Solicitation 1803-219

Southwest Bypass Segment 2

Bid Designation: Public

Williamson County, Texas

Bid 1803-219
Southwest Bypass Segment 2

Bid Number	1803-219
Bid Title	Southwest Bypass Segment 2
Bid Start Date	In Held
Bid End Date	May 9, 2018 10:30:00 AM CDT
Question & Answer End Date	May 4, 2018 3:00:00 PM CDT
Bid Contact	Johnny Grimaldo Purchasing Specialist II 512-**943**-1553 johnny.grimaldo@wilco.org
Contract Duration	**One Time Purchase**
Contract Renewal	Not Applicable
Prices Good for	**365 days**
Pre-Bid Conference	**May 2, 2018 10:30:00 AM CDT** **Attendance is optional** **Location: 901 S. Austin Avenue, Georgetown, TX 78626**
Bid Comments	**Williamson County is seeking qualified contractors to widen the existing roadway, which includes grading, drainage improvements, flexible base, HMAC, striping and signing.** **Estimated time of completion is 420 calendar days to substantial completion, and 30 calendar days to final completion, with an estimated cost of $10,840,000.00.**

Item Response Form

Item	**1803-219--01-01 -** Total Bid Price
Quantity	**1 each**
Unit Price	
Delivery Location	**Williamson County, Texas** No Location Specified

Qty 1

Description
TOTAL BID PRICE

Item	**1803-219--01-02 -** Please attach all documents to this line
Quantity	**1 each**

Prices are not requested for this item.

Delivery Location	**Williamson County, Texas** No Location Specified

Qty 1

Description
Please Attach all Documents to this line

PUBLIC ANNOUNCEMENT AND GENERAL INFORMATION

WILLIAMSON COUNTY PURCHASING DEPARTMENT
SOLICITATION 1803-219
Southwest Bypass Segment 2

BIDS MUST BE RECEIVED ON OR BEFORE:
May 9, 2018 10:30:00 AM CDT

BIDS WILL BE PUBLICLY OPENED:
May 9, 2018 10:30:00 AM CDT

Notice is hereby given that sealed Bids for the above-mentioned goods and/or services will be accepted by the Williamson County Purchasing Department. Williamson County uses BidSync to distribute and receive bids. Specifications for this IFB may be obtained by registering at www.bidsync.com.

Williamson County prefers and requests electronic submittal of this Bid.

All electronic bids must be submitted via: www.bidsync.com

Electronic bids are requested, however paper bids will currently still be received, until further notice and may be mailed or delivered to the address listed below.

Bidders are strongly encouraged to carefully read this entire IFB.

All interested Bidders are invited to submit a Bid in accordance with the Instructions and General Requirements, Bid Format, Bid Specifications, and Definitions, Terms and Conditions stated in this IFB.

Please note that a complete package must be submitted choosing one of the above two methods. Split packages submitted will be considered "unresponsive" and will not be accepted or evaluated.

Williamson County will not accept any Bids received after the submittal deadline, and shall return such Bids unopened to the Bidder.

General Information:

- If mailed or delivered in person, Bids and Bid addenda are to be delivered in sealed envelope on or before the submittal deadline, as noted in the Public Announcement and General Information listed above for this IFB, to:

  Williamson County Purchasing Department
  Attn: **BID NAME AND NUMBER**
  901 South Austin Avenue
  Georgetown, Texas 78626

  - Bidders should list the Bid Number, Bid Name, Name and Address of Bidder, and the Date of the Bid opening on the outside of the box or envelope and note "Sealed Bid Enclosed."
  - Bidder should submit one (1) original.
  - Williamson County will NOT be responsible for unmarked or improperly marked envelopes.
  - Williamson County will not accept any responsibility for Bids being delivered by third party carriers.
  - Facsimile transmittals will NOT be accepted.

- Bids will be opened publicly in a manner; however, to avoid public disclosure of contents only the names and of Bidders and prices will be read aloud.

- All submitted questions with their answers will be posted and updated on www.bidsync.com.

- It is the Bidder's responsibility to review all documents in BidSync, including any Addenda that may have been added after the document packet was originally released and posted.

  - Any Addenda and/or other information relevant to the IFB will be posted on www.bidsync.com.

  - The Williamson County Purchasing Department takes no responsibility to ensure any interested Bidder has obtained any outstanding addenda or additional information.

Bidder References

List the last (3) companies or governmental agencies, where the same or similar goods and/or services as contained in this IFB package, were recently provided by Bidder.

Reference 1

Client Name: Location:

Contact Name: Title:

Phone: E-mail

Contract Date To: Contract Date From: Contract Value: $

Scope of Work:

Reference 2

Client Name: Location:

Contact Name: Title:

Phone: E-mail

Contract Date To: Contract Date From: Contract Value: $

Scope of Work:

Reference 3

Client Name: Location:

Contact Name: Title:

Phone: E-mail

Contract Date To: Contract Date From: Contract Value: $

Scope of Work:

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor or other person doing business with local governmental entity

Form CIQ

This questionnaire is being filed in accordance with chapter 176 of the Local Government Code by a person doing business with the governmental entity.

By law this questionnaire must be filed with the records administrator of the local government not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.

A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of person doing business with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.**

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than September 1 of the year for which an activity described in Section 176.006(a), Local Government Code, is pending and not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

3 **Describe each affiliation or business relationship with an employee or contractor of the local governmental entity who makes recommendations to a local government officer of the local governmental entity with respect to expenditure of money.**

4 **Describe each affiliation or business relationship with a person who is a local government officer and who appoints or employs a local government officer of the local governmental entity that is the subject of this questionnaire.**

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor or other person doing business with local governmental entity

Form CIQ
Page 2

5 **Name of local government officer with whom filer has affiliation or business relationship.**
(Complete this section only if the answer to A, B, or C is YES.)

This section, item 5 including subparts A, B, C & D, must be completed for each officer with whom the filer has affiliation or other relationship. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income from the filer of the questionnaire?

☐ Yes ☐ No

B. Is the filer of the questionnaire receiving or likely to receive taxable income from or at the direction of the local government officer named in this section AND the taxable income is not from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire affiliated with a corporation or other business entity that the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

☐ Yes ☐ No

D. Describe each affiliation or business relationship.

6. Describe any other affiliation or business relationship that might cause conflict of interest:

7

Signature of person doing business with the governmental entity	Date

Signature not required if completing in BIDSYNC electronically.

BID AFFIDAVIT

This form must be completed, signed, notarized and returned with Bid package

The undersigned attests that the company named below, under the provisions of Subtitle F, Title 10, Texas Government Code Chapter 2270:

1. Does not boycott Israel currently; and
2. Will not boycott Israel during the term of the contract.

Pursuant to Section 2270.001, Texas Government Code:

1. "Boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and
2. "Company" means a for-profit sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, or any limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of those entities or business associations that exist to make a profit.

The undersigned certifies that the IFB and the Bidder's Bid have been carefully reviewed and are submitted as correct and final. Bidder further certifies and agrees to furnish any and/or all goods and/or services upon which prices are extended at the price Bid, and upon the conditions contained in the IFB.

I hereby certify that the foregoing Bid has not been prepared in collusion with any other Bidder or other person or persons engaged in the same line of business prior to the official opening of this Bid. Further, I certify that the Bidder is not now, nor has been for the past six (6) months, directly or indirectly concerned in any pool or agreement or combination, to control the price of services/commodities Bid on, or to influence any person or persons to submit a Bid or not to submit a Bid thereon."

Name of Bidder:	
Address of Bidder:	
Email:	
Telephone:	
Printed Name of Person Submitting Affidavit:	
Signature of Person Submitting Affidavit:	

Cooperative Purchasing Program

Check one of the following options below. A non-affirmative Bid will in no way have a negative impact on the County's evaluation of the Bid.

☐	I will offer the quoted prices to all authorized entities during the term of the County's Contract.
☐	I will not offer the quoted prices to all authorized entities.

If no box is checked, the Bidder agrees to make best efforts in good faith to offer the quoted prices to all authorized entities.

BEFORE ME, the undersigned authority, a Notary Public, personally appeared _____ (*Name of Signer*), who after being by me duly sworn, did depose and say: "I, _____, (*Name of Signer*) am a duly authorized officer of/agent for _____ (*Name of Bidder*) and have been duly authorized to execute the foregoing on behalf of the said _____ (*Name of Bidder*).

SUBSCRIBED AND SWORN to before me by the above-named _____

on this the _____ day of _____, 20_____.

_____

Notary Public in and for

The State of _____

The County of _____

SIGNATURE AND NOTARY NOT REQUIRED IF COMPLETING IN BIDSYNC ELECTRONICALLY.

BID FORM
WILLIAMSON COUNTY, TEXAS

PROJECT: 1803-219 Southwest Bypass: Segment 2 **BIDDER:** _____

Full compensation for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract will be considered as included in the unit prices for the work set forth below, and no separate payment will be made for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract, unless separate payment is expressly provided for therein.

BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
1	100-6002	PREPARING ROW	94	STA		$ -
2	104-6001	REMOVING CONC (PAV)	5	SY		$ -
3	104-6013	REMOVING CONC (FOUNDATIONS)	582	SY		$ -
4	105-6011	REMOVING STAB BASE AND ASPH PAV (2"-6")	715	SY		$ -
5	110-6001	EXCAVATION (ROADWAY)	171,443	CY		$ -
6	132-6005	EMBANKMENT (FINAL)(ORD COMP)(TY C)	123,229	CY		$ -
7	132-6006	EMBANKMENT (FINAL)(DENS CONT)(TY C)	37,034	CY		$ -
8	160-6005	FURNISHING AND PLACING TOPSOIL	4,393	CY		$ -
9	161-6017	COMPOST MANUF TOPSOIL (4")	42,306	SY		$ -
10	164-6009	BROADCAST SEED (TEMP) (WARM)	21,154	SY		$ -
11	164-6011	BROADCAST SEED (TEMP) (COOL)	21,154	SY		$ -
12	164-6023	CELL FBR MLCH SEED(PERM) (RURAL)(CLAY)	42,306	SY		$ -
13	168-6001	VEGETATIVE WATERING	6,982	MG		$ -
14	169-6001	SOIL RETENTION BLANKETS (CL 1) (TY A)	17,219	SY		$ -
15	247-6041	FL BS (CMP IN PLC) (TYA GR1&2) (FNAL POS)	9,838	CY		$ -
16	310-6027	PRIME COAT(MC-30 OR AE-P)	5,455	GAL		$ -

[1]Refer to the Technical Specifications section for a description of the specific reference number.

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
17	340-6242	D-GR HMA(SQ)TY-B OR D PG64-22(LVL-UP)	829	TON		$ -
18	341-6008	D-GR HMA TY-B PG64-22	4,672	TON		$ -
19	341-6042	D-GR HMA TY-D SAC-B PG70-22	5,941	TON		$ -
20	354-6021	PLANE ASPH CONC PAV(0" TO 2")	4,175	SY		$ -
21	400-6005	CEM STABIL BKFL	224	CY		$ -
22	401-6001	FLOWABLE BACKFILL	167	CY		$ -
23	416-6001	DRILL SHAFT (18 IN)	119	LF		$ -
24	416-6005	DRILL SHAFT (42 IN)	672	LF		$ -
25	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	32	LF		$ -
26	416-6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	52	LF		$ -
27	420-6007	CL A CONC (FLUME)	1	CY		$ -
28	420-6013	CL C CONC (ABUT)	74.1	CY		$ -
29	420-6029	CL C CONC (CAP)	135	CY		$ -
30	420-6037	CL C CONC (COLUMN)	148.4	CY		$ -
31	420-6074	CL C CONC (MISC)	86.4	CY		$ -
32	422-6001	REINF CONC SLAB	35,280	SF		$ -

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
33	422-6015	APPROACH SLAB	75.4	CY		$ -
34	423-RW05	RETAINING WALL 5 (MSE) (ASHLAR STONE FIN)	2,690	SF		$ -
35	423-RW06	RETAINING WALL 6 (MSE) (ASHLAR STONE FIN)	2,416	SF		$ -
36	425-6040	PRESTR CONC GIRDER (TX62)	3,587.05	LF		$ -
37	431-8001	PNEUMATICALLY PLACED CONC (ROCK FACIA)	625	SY		$ -
38	432-6001	RIPRAP (CONC)(4 IN)	82	CY		$ -
39	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	184	CY		$ -
40	432-6045	RIPRAP (MOW STRIP)(4 IN)	33	CY		$ -
41	432-8001	RIPRAP (STONE PROTECTION)(8 IN) (TY I)	877	CY		$ -
42	432-8002	RIPRAP (STONE PROTECTION)(8 IN) (TY II)	9,178	CY		$ -
43	450-6023	RAIL (TY SSTR)	1,782	LF		$ -
44	454-6001	SEALED EXPANSION JOINT (4 IN) (SEJ - A)	144	LF		$ -
45	464-6005	RC PIPE (CL III)(24 IN)	84	LF		$ -
46	464-6007	RC PIPE (CL III)(30 IN)	168	LF		$ -
47	464-6008	RC PIPE (CL III)(36 IN)	360	LF		$ -
48	464-6018	RC PIPE (CL IV)(24 IN)	310	LF		$ -

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
49	464-6026	RC PIPE (CL V)(24 IN)	264	LF		$ -
50	466-6005	HEADWALL (CH - FW - 0) (DIA= 24 IN)	1	EA		$ -
51	466-6130	HEADWALL (CH - PW - S) (DIA= 24 IN)	1	EA		$ -
52	467-6001	SET (PIPE RUNNER ASSEMBLY)	1	EA		$ -
53	467-6388	SET (TY II) (24 IN) (RCP) (3: 1) (C)	1	EA		$ -
54	467-6390	SET (TY II) (24 IN) (RCP) (4: 1) (C)	1	EA		$ -
55	467-6394	SET (TY II) (24 IN) (RCP) (6: 1) (C)	2	EA		$ -
56	467-6419	SET (TY II) (30 IN) (RCP) (4: 1) (C)	2	EA		$ -
57	467-6422	SET (TY II) (30 IN) (RCP) (6: 1) (C)	2	EA		$ -
58	467-6448	SET (TY II) (36 IN) (RCP) (3: 1) (C)	3	EA		$ -
59	467-6453	SET (TY II) (36 IN) (RCP) (6: 1) (C)	3	EA		$ -
60	496-6039	REMOV STR (BUILDING)	2	EA		$ -
61	496-6043	REMOV STR (SMALL FENCE)	1,566	LF		$ -
62	500-6001	MOBILIZATION	1	LS		$ -
63	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	14	MO		$ -
64	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	200	LF		$ -

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
65	506-6011	ROCK FILTER DAMS (REMOVE)	387	LF		$ -
66	506-6020	CONSTRUCTION EXITS (INSTALL) (TY 1)	160	SY		$ -
67	506-6024	CONSTRUCTION EXITS (REMOVE)	160	SY		$ -
68	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	5,297	LF		$ -
69	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	8,539	LF		$ -
70	506-8002	REMOVE ROCK	7,383	SY		$ -
71	512-6005	PORT CTB (FUR & INST)(F-SHAPE)(TY 1)	1,440	LF		$ -
72	529-6007	CONC CURB & GUTTER (TY I)	4,940	LF		$ -
73	529-6008	CONC CURB & GUTTER (TY II)	429	LF		$ -
74	531-6017	CURB RAMPS (TY 22)	4	EA		$ -
75	540-6001	MTL W-BEAM GD FEN (TIM POST)	237.5	LF		$ -
76	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	4	EA		$ -
77	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	1	EA		$ -
78	544-6001	GUARDRAIL END TREATMENT (INSTALL)	3	EA		$ -
79	550-6001	CHAIN LINK FENCE (INSTALL) (6')	116	LF		$ -
80	550-6006	GATE (REMOVE)	2	EA		$ -

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
81	552-8001	WIRE FENCE	15,416	LF		$ -
82	552-8002	GALVANIZED TUBE GATE	5	EA		$ -
83	556-6006	PIPE UNDERDRAINS (TY 6) (6")	215	LF		$ -
84	610-6105	IN RD IL (U/P) (TY 1) (250W EQ) LED	8	EA		$ -
85	610-6290	IN RD IL (TY SA) 50T-12 (400W EQ) LED	2	EA		$ -
86	610-6291	IN RD IL (TY SA) 50T-12-12(400W EQ)LED	2	EA		$ -
87	618-6023	CONDT (PVC) (SCH 40) (2")	9,808	LF		$ -
88	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)	778	LF		$ -
89	618-6025	CONDT (PVC) (SCH 40) (2") (CONC ENCSE)	398	LF		$ -
90	618-6046	CONDT (PVC) (SCH 80) (2")	400	LF		$ -
91	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)	335	LF		$ -
92	618-6053	CONDT (PVC) (SCH 80) (3")	130	LF		$ -
93	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)	740	LF		$ -
94	618-6066	CONDT (RM) (1 1/4")	161	LF		$ -
95	620-6007	ELEC CONDR (NO.8) BARE	2,964	LF		$ -
96	620-6008	ELEC CONDR (NO.8) INSULATED	5,048	LF		$ -

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
97	621-6002	TRAY CABLE (3 CONDR) (12 AWG)	860	LF		$ -
98	624-6002	GROUND BOX TY A (122311) W/APRON	12	EA		$ -
99	624-6010	GROUND BOX TY D (162922)W/APRON	5	EA		$ -
100	628-6044	ELC SRV TY A 240/480 060(NS)SS(E)PS(U)	2	EA		$ -
101	628-6164	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	1	EA		$ -
102	644-6001	IN SM RD SN SUP&AM TY10BWG(1) SA(P)	16	EA		$ -
103	644-6004	IN SM RD SN SUP&AM TY10BWG(1) SA(T)	20	EA		$ -
104	644-6012	IN SM RD SN SUP&AM TY10BWG(1)SB(T)	1	EA		$ -
105	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)	10	EA		$ -
106	644-6066	IN SM RD SN SUP&AM (RAIL MOUNT)	5	EA		$ -
107	644-6076	REMOVE SM RD SN SUP&AM	10	EA		$ -
108	658-6004	INSTL DEL ASSM (D-SW)SZ 1(FLX)SRF	37	EA		$ -
109	658-6005	INSTL DEL ASSM (D-SW)SZ 1(FLX)SRF(BI)	31	EA		$ -
110	658-6014	INSTL DEL ASSM (D-SW)SZ (BR)CTB (BI)	112	EA		$ -
111	658-6047	INSTL OM ASSM (OM-2Y)(WC)GND	7	EA		$ -
112	658-6061	INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2	29	EA		$ -

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BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
113	666-6006	REFL PAV MRK TY I (W)4"(DOT) (100MIL)	56	LF		$ -
114	666-6036	REFL PAV MRK TY I (W)8"(SLD) (100MIL)	3,806	LF		$ -
115	666-6048	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	202	LF		$ -
116	666-6054	REFL PAV MRK TY I (W)(ARROW) (100MIL)	28	EA		$ -
117	666-6078	REFL PAV MRK TY I (W)(WORD) (100MIL)	28	EA		$ -
118	666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	20	EA		$ -
119	666-6147	REFL PAV MRK TY I (Y) 24"(SLD) (100MIL)	164	LF		$ -
120	666-6168	REFL PAV MRK TY II (W) 4" (DOT)	56	LF		$ -
121	666-6170	REFL PAV MRK TY II (W) 4" (SLD)	4,130	LF		$ -
122	666-6178	REFL PAV MRK TY II (W) 8" (SLD)	422	LF		$ -
123	666-6184	REFL PAV MRK TY II (W) (ARROW)	7	EA		$ -
124	666-6192	REFL PAV MRK TY II (W) (WORD)	7	EA		$ -
125	666-6207	REFL PAV MRK TY II (Y) 4" (SLD)	3,466	LF		$ -
126	666-6214	REFL PAV MRK TY II (Y) 24" (SLD)	89	LF		$ -
127	666-6282	REF PROF PAV MRK TY I(W)4"(SLD)(060MIL)	15,518	LF		$ -
128	666-6287	REF PROF PAV MRK TY I(Y)4"(SLD)(090MIL)	16,301	LF		$ -

[1]Refer to the Technical Specifications section for a description of the specific reference number.

BID FORM
WILLIAMSON COUNTY, TEXAS

PROJECT: **1803-219 Southwest Bypass: Segment 2** **BIDDER:** _____

Full compensation for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract will be considered as included in the unit prices for the work set forth below, and no separate payment will be made for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract, unless separate payment is expressly provided for therein.

BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
129	666-6303	RE PM W/RET REQ TY I (W)4"(SLD) (100MIL)	3,103	LF		$ -
130	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL)	5,434	LF		$ -
131	672-6007	REFL PAV MRKR TY I-C	95	EA		$ -
132	672-6009	REFL PAV MRKR TY II-A-A	582	EA		$ -
133	672-6010	REFL PAV MRKR TY II-C-R	547	EA		$ -
134	677-6001	ELIM EXT PAV MRK & MRKS (4")	4,381	LF		$ -
135	677-6007	ELIM EXT PAV MRK & MRKS (24")	199	LF		$ -
136	680-6002	INSTALL HWY TRF SIG (ISOLATED)	1	EA		$ -
137	685-6004	INSTL RDSD FLSH BCN ASSM (SOLAR PWRD)	4	EA		$ -
138	686-6040	INS TRF SIG PL AM(S)1 ARM(36')LUM&ILSN	1	EA		$ -
139	686-6044	INS TRF SIG PL AM(S)1 ARM(40')LUM&ILSN	1	EA		$ -
140	686-6048	INS TRF SIG PL AM(S)1 ARM(44')LUM&ILSN	2	EA		$ -
141	740-6005	ANTI - GRAFFITI COATNG (PERMNENT-TY III)	2,690	SF		$ -
142	6090-6002	ILSN (LED) (8 D)	4	EA		$ -
143	S2-BD	BOULDER DELINEATION	8,051	LF		$ -
144	S2-GA	GATE ATTENDANT	5,600	HR		$ -

[1]Refer to the Technical Specifications section for a description of the specific reference number.

BID FORM
WILLIAMSON COUNTY, TEXAS

PROJECT: **1803-219 Southwest Bypass: Segment 2** **BIDDER:** _____

Full compensation for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract will be considered as included in the unit prices for the work set forth below, and no separate payment will be made for compliance with each and every provision of the Request for Bids, the Bid, the Specifications, and the Contract, unless separate payment is expressly provided for therein.

BID ITEM	TECH SPEC[1]	DESCRIPTION	BID QUANTITY	UNIT MEASURE	UNIT COST	AMOUNT BID
145	S2-RC	ROCK CUT	56,312	SF		$ -

NON-BID ITEMS TO BE INCLUDED IN BID AND CONTRACT AMOUNT. DO NOT MAKE CHANGES TO THIS SECTION.

146	999-WC01	FORCE ACCOUNT	100,000	DOL	$ 1.00	$ 100,000.00
147	341-WC01	FORCE ACCOUNT - ESTIMATED PLACEMENT AND PRODUCTION BONUS/PENALTY (TY B)	30,000	DOL	$ 1.00	$ 30,000.00
148	341-WC02	FORCE ACCOUNT - ESTIMATED PLACEMENT AND PRODUCTION BONUS/PENALTY (TY D SURFACE)	40,000	DOL	$ 1.00	$ 40,000.00
149	585-WC01	FORCE ACCOUNT - ESTIMATED RIDE QUALITY BONUS/PENALTY	10,000	DOL	$ 1.00	$ 10,000.00

TOTAL AMOUNT OF BID

_____ **Dollars and** _____ **Cents** $ 180,000.00

NOTE: THE COURT MAY EITHER REJECT ALL BIDS OR AWARD A CONTRACT TO THE LOWEST AND BEST BID.

[1]Refer to the Technical Specifications section for a description of the specific reference number.

WILLIAMSON COUNTY
1848

WILLIAMSON COUNTY

PROJECT CONSTRUCTION MANUAL

FOR

SOUTHWEST BYPASS: SEGMENT 2

SOLICITATION 1803-219

WILLIAMSON COUNTY, TEXAS
PURCHASING DEPARTMENT
901 SOUTH AUSTIN AVENUE
GEORGETOWN, TEXAS 78626

April 2018



The enclosed Specifications, Special Specifications, Special Provisions, General Notes, and Specification Data in this document have been selected by me, or under my responsible supervision as being applicable to this project. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

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SECTION 1
ADDENDA

ADDENDUM NO. __

Date:

Owner: **Williamson County, Texas**

Project Name:

Project No:

This Addendum forms a part of the Contract and clarifies, corrects or modifies the original Construction Documents, dated _____. Acknowledge receipt of this addendum in space provided on Bid Form. Failure to do so may subject bidder to disqualification.

DESCRIPTION OF ADDITION OR CHANGE:

This addendum consists of __ page(s).

_____
Approved by ENGINEER

END

EXAMPLE

SECTION 2
INVITATION FOR BIDS

PUBLIC NOTICE WILLIAMSON COUNTY
INVITATION FOR BIDS

Williamson County Commissioner's Court invites the submission of sealed bids for:

1803-219 SOUTHWEST BYPASS SEGMENT 2

Williamson County is seeking qualified contractors to widen the existing roadway, which includes grading, drainage improvements, flexible base, HMAC, striping and signing. Estimated time of completion is 420 calendar days to substantial completion, and 30 calendar days to final completion, with an estimated cost of $10,840,000.00.

Sealed bids will be publicly opened and read aloud in the Williamson County Purchasing Department, 901 South Austin Avenue, Georgetown, Texas on WEDNESDAY, MAY 9, 2018 AT 10:30 AM.

Bids must be received on or before WEDNESDAY, MAY 9, 2018 AT 10:30 AM. Bid documents and plans may be viewed and responded to by registering with BIDSYNC at www.bidsync.com.

No fee is required to register with Bidsync as a Williamson County Supplier, or to participate in the County's solicitation process. The receipt of electronic bids will be registered in Bidsync.

The Time-Date Stamp Clock located at the Williamson County Purchasing Department will serve as the official clock for the purpose of verifying the date and time of receipt of Paper Bids.

There will be a Non-Mandatory Pre-Bid Conference on WEDNESDAY, MAY 2, 2018 AT 10:30 AM at Williamson County Purchasing Department, 901 South Austin Avenue, Georgetown, Texas.

BID BOND REQUIRED
A Cashier's Check, Certified Check, or acceptable Bidder's Bond in the amount of five percent (5%) of the Bid must accompany each Bid. Performance, Payment and Warranty Bonds will be required as designated in the bidding documents.

The Williamson County Commissioners' Court reserves the right to accept the lowest and best Bid as deemed by the Court, or reject any and/or all bids.

Bidder shall use per unit pricing. Payments will be made by check.

The designated Purchasing Agent for this Bid is Johnny Grimaldo, Senior Purchasing Specialist, under the direction of Randy Barker, Purchasing Agent for Williamson County, 512-943-1553.

This notice is issued by order of the Williamson County Commissioners' Court on APRIL 17, 2018; Dan A. Gattis, County Judge.

SECTION 3
BID INSTRUCTIONS/REQUIREMENTS

BID INSTRUCTIONS/REQUIREMENTS

All Bids must be received in the Williamson County Purchasing Department either hardcopy or electronically through BidSync.

Williamson County prefers and requests electronic submittal of this bid.

All electronic bids must be submitted via: www.bidsync.com

All interested Respondents are invited to submit a Bid in accordance with the Instructions and General Requirements, Bid Format, Bid Specifications, and Definitions, Terms and Conditions stated in this BID.

Electronic bids are requested, however paper bids will currently still be received, until further notice and may be mailed or delivered to the address listed below.

Please note that a complete package must be submitted choosing one of the above two methods.

Split packages submitted will be considered "unresponsive" and will not be accepted or evaluated.

If mailed or delivered in person, Bids are to be delivered in sealed envelope on or before the submittal deadline to:

Williamson County Purchasing Department
Attn: **1803-219 Southwest Bypass Segment 2**
901 South Austin Avenue
Georgetown, Texas 78626

Respondents should list the Bid Number, Bid Name, Name and Address of Respondent, and the Date of the Bid opening on the outside of the box or envelope.

Respondent should submit one (1) original; **AND** (2) two copies and (1) CD **OR** (1) USB copy of the Bid.

Williamson County will not accept any Bids received after the submittal deadline.
Williamson County will not accept any responsibility for Bids being delivered by third party carriers. Facsimile transmittals will NOT be accepted.

All questions should be submitted on the Bidsync site. Questions with their answers will be posted and updated on www.bidsync.com.

Any addenda and/or other information relevant to the Bid will be posted on: www.bidsync.com.

ALL BIDS MUST BE SUBMITTED ON THE FORMS PROVIDED IN THIS BID DOCUMENT. (May be replaced with a computer generated printout, if submitted in an identical format to the proposal).

FACSIMILE AND ELECTRONIC MAIL TRANSMITTALS SHALL NOT BE ACCEPTED.

1. All of the items listed are to be on a "per unit" basis, stating a firm price per unit or unit quantity of each item. **This price must be good from the date of Bid opening through the completion of the project. Bids which do not state a fixed price will not be considered.** The Court may award a contract for the period implied or expressly stated in the lowest and best Bid.

2. All of the items listed are to be Free On Board to final destination **(FOB DESTINATION)** with all transportation charges if applicable to be included in the price, unless otherwise specified in the Invitation for Bids. The title and risk of loss of the goods shall not pass to the County until receipt and acceptance takes place at the FOB point.

3. It is understood that the Commissioners Court of Williamson County, Texas, reserves the right to accept or reject any and/or all Bids for any or all materials and/or services covered in this Bid request, and to waive informalities or defects in the Bid or to accept such Bid it shall deem to be in the best interest of Williamson County.

4. Funding: Funds for payment have been provided through the Williamson County budget approved by Commissioners Court for the 2013 Road Bond Program.

5. Late Bid: Bids received after submission deadline will be considered VOID AND UNACCEPTABLE and will be returned to the bidder unopened. Williamson County is not responsible for lateness or non-delivery of mail, carrier, etc. The date and time stamp of the Williamson County Purchasing Department shall be the official date and time of receipt.

6. Altering Bid: Bidders **cannot alter or amend bid** after submission deadline.

7. Sales Tax: Williamson County is by statute, exempt from the State Sales Tax and Federal Excise Tax.

8. Contract: This Bid, when properly accepted by Williamson County, shall constitute a contract equally binding between the successful bidder and Williamson County. No different or additional terms will become part of this contract.

9. Changes: No oral statement of any person shall modify or otherwise change, or affect the terms, conditions, plans and/or specifications stated in the Bid Package and or Bid Instructions/Requirements.

10. Delivery Times and Locations: The commodity and/or service covered by this Bid shall be as stated in the Bid Package.

11. Payments: The Construction Inspector will manage the Contractor payments. Invoices for the work specified in the Contract Documents will be submitted to the Construction Inspector. Upon satisfactory completion and acceptance of these invoices, the Construction Inspector will forward the invoices to the County via the GEC. County's payment for goods and services shall be governed by Chapter 2251 of the Texas Government Code. An invoice shall be deemed overdue the 31st day after the later of (1) the date County receives the goods under the Contract; (2) the date the performance of the service under the Contract is completed; or (3) the date the Williamson County Auditor receives an invoice for the goods or services. Interest charges for any overdue payments shall be paid by County in accordance with Texas Government Code Section 2251.025. More specifically, the rate of interest that shall accrue on a late payment is the rate in effect on September 1 of County's fiscal year in which the payment becomes due. The said rate in effect on September 1 shall be equal to the sum of one percent (1%); and (2) the prime rate published in the Wall Street Journal on the first day of July of the preceding fiscal year that does not fall on a Saturday or Sunday.

    In the event that an error appears in an invoice submitted by Successful Bidder, County shall notify Successful Bidder of the error not later than the twenty first (21st) day after the date County receives the invoice. If the error is resolved in favor of Successful Bidder, Successful Bidder shall be entitled to receive interest on the unpaid balance of the invoice submitted by Successful Bidder beginning on the date that the payment for the invoice became overdue. If the error is resolved in favor of the County, Successful Bidder shall submit a corrected invoice that must be paid in accordance within the time set forth above. The unpaid balance accrues interest as provided by Chapter 2251 of the Texas Government Code if the corrected invoice is not paid by the appropriate date. As a minimum, invoices shall include:

    (1) Name, address, and telephone number of Contractor and similar information in the event the payment is to be made to a different address

    (2) County contract, Purchase Order, and/or delivery order number

    (3) Identification of items or service as outlined in the contract

    (4) Quantity or quantities, applicable unit prices, total prices, and total amount

    (5) Any additional payment information which may be called for by the Contract

    Payment inquiries should be directed to the Williamson County Auditor's Office, Accounts Payable Department:
    512-943-1573
    accountspayable@wilco.org

12. Conflict of Interest: No public official shall have interest in a contract, in accordance

with Vernon's Texas Codes Annotated, Local Government Code Title 5, Subtitle C, Chapter 171. As of January 1, 2006 Vendors are responsible for complying with Local Government Code Title 5, Subtitle C, Chapter 176. Additional information may be obtained from the County website at the following link: http://www.wilco.org/CountyDepartments/Purchasing/ConflictofInterestDisclosure/tabid/689/language/en-US/Default.aspx. The Williamson County Conflict of Interest Questionnaire is attached as a fillable form. This form must be completed, signed, and submitted with your bid (attached to the first Line Item of this bid) or completed electronically and signed electronically when entering your password in Bidsync.

13. Ethics: The bidder shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official or agent of Williamson County.

14. Minimum Standards for Responsible Bidders: A prospective bidder must affirmatively demonstrate bidder's responsibility. A prospective bidder must meet the following requirements:

    a. have adequate financial resources, or the ability to obtain such resources as required;

    b. be able to comply with the required or proposed delivery schedule;

    c. have a satisfactory record of performance;

    d. be otherwise qualified and eligible to receive an award.

    Williamson County may request representation and other information sufficient to determine bidder's ability to meet these minimum standards listed above.

15. References: Williamson County **REQUIRES** bidder to supply with this Bid, a list of at least **three (3) references** where like services have been supplied by their firm. The Bidder References Form is attached as a fillable form in this bid document. This form must be completed and attached to the first line item on your bid or included with an all paper bid.

16. Bidder shall provide with this Bid response, all documentation required by this Bid. Failure to provide this information may result in rejection of the Bid.

17. Termination for Default: Williamson County reserves the right to enforce the performance of this contract in any manner prescribed by law or deemed to be in the best interest of the County in the event of breach or default of this contract. Non-Performance of the bidder in terms of specifications shall be a basis for the termination of the contract by the County. The County shall not pay for commodities/services which are unsatisfactory. Contractors will be given a reasonable opportunity before termination to correct the deficiencies. This, however, shall in no way be construed as negating the basis for termination for non-performance.

18. Contract Administration: Under this contract, Robert Daigh, Williamson County Sr. Director of Infrastructure or designee, shall be the contract administrator with designated responsibility to ensure compliance with contract requirements, such as but not limited to, acceptance, inspection and delivery. The contract administrator will serve as liaison between Williamson County Commissioners Court and the successful bidder or the Construction Inspector.

19. Purchase Order: Williamson County may generate a purchase order(s) to the successful bidder as products and/or services are required. The purchase order number must appear on all itemized invoices and/or request for payment.

20. Silence of Specifications: The apparent silence of these specifications as to any detail or to the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.

21. Contract Times and Liquidated Damages - Bidders must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the County, and to fully complete the project within the specified time stated in the proposal. Bidders must agree to pay liquidated damages in accordance with Special Provision 000-001 per day to County for every day past the specified completion date stated in the proposal.

22. BIDS MUST BE: legible and of a quality that can be reproduced.

23. Bid forms that are included in the Bid package shall be used. **CHANGES to Bid forms made by bidders shall DISQUALIFY THE BID.** Exceptions to the Bid forms and or specifications shall be made on an **attachment** to the Bid package.

24. Workers Compensation Coverage Requirements: The Texas Labor Code, §406.096, requires workers' compensation insurance coverage for all persons providing services on a building or construction project for a governmental entity. The rule requires a governmental entity to timely obtain certificates of coverage and retain them for the duration of the project. The rule also sets out the language to be included in bid specifications and in contracts awarded by a governmental entity and the information required to be in the posted notice to employees. The rule is adopted under the Texas Labor Code, §402.061. The information provided below is a result of this rule. By submitting your bid to the county, you are acknowledging that this rule is a part of these bid specifications, and that you will observe and abide by all of the requirements outlined in the rule. You are further agreeing that should your bid or proposal be accepted by the Williamson County Commissioners' Court, the necessary certificates of coverage showing workers' compensation coverage, will be provided to the following name and address, prior to beginning work:

    Williamson County Purchasing Department
    901 South Austin Avenue
    Georgetown, Texas 78626

If you have any questions related to this ruling and/or requirement, you are encouraged to contact either the Williamson County Purchasing Department at (512) 943-1553, or you may call the Texas Workers' Compensation Commission at (512) 804-4000.

A. Definitions: The following words and terms, when used in this provision, shall have the following meanings. Terms not defined in this rule shall have the meaning defined in the Texas Labor Code, if so defined.

(1) Certificate of coverage ("certificate")-A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees (including those subject to a coverage agreement) providing services on a project, for the duration of the project.

(2) Building or construction – Has the meaning defined in the Texas Labor Code, §406.096(e)(1).

(3) Contractor--A person bidding for or awarded a building or construction project by Williamson County.

(4) Coverage--Workers' compensation insurance meeting the statutory requirements of the Texas Labor Code, §401.011(44).

(5) Coverage agreement--A written agreement on form TWCC-81, form TWCC-82, form TWCC-83, or form TWCC-84, filed with the Texas Workers' Compensation Commission which establishes a relationship between the parties for purposes of the Texas Workers' Compensation Act, pursuant to the Texas Labor Code, Chapter 406, Subchapters F and G, as one of employer/employee and establishes who will be responsible for providing workers' compensation coverage for persons providing services on the project.

(5) Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

(6) Persons providing services on the project ("subcontractor" in §406.096) - includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

(8) Project--Includes the provision of all services related to a building or construction contract for Williamson County.

B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

(1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project;

(2) no later than seven (7) days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The contractor shall notify Williamson County in writing by certified mail or personal delivery, within ten (10) days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

(1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services

on the project, for the duration of the project;

(2) provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

(3) provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(4) obtain from each other person with whom it contracts, and provide to the contractor:

(a) a certificate of coverage, prior to the other person beginning work on the project; &

(b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(5) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) notify the governmental entity in writing by certified mail or personal delivery, within ten(10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(7) contractually require each person with whom it contracts, to perform as required by paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten (10) days after receipt of notice of breach from Williamson County.

25. **PERFORMANCE AND PAYMENT BONDS:** Chapter 262.032 and Chapter 2253.021 of the Texas Government Code governs the requirements for performance bonds and payment bonds for government entities making public work contracts. A performance bond is required if the contract is in excess of $50,000 and is to be made for the full amount of the contract. A payment bond is required if the contract is in excess of $25,000 and is to be made for the full amount of the contract. The bonds are to be executed within ten (10) days after receipt of written notification of award of contract prior to beginning work on the project and must be executed by a corporate surety or sureties in accordance with the Texas Insurance Code. In the event the bond exceeds $100,000.00, the surety must also (1) hold a certificate of authority from the United States secretary of the treasury to qualify as a surety on obligations permitted or required under federal law; or (2) have obtained reinsurance for any liability in excess of $100,000.00 from a reinsurer that is

authorized and admitted as are insurer in this state and is the holder of a certificate of authority from the United States secretary of the treasury to qualify as a surety or reinsurer on obligations permitted or required under federal law.

In determining whether the surety or reinsurer holds a valid certificate of authority the County may rely on the list of companies holding certificates of authority as published in the Federal Register covering the date on which the bond is to be executed. If the public works contract is less than $50,000 the performance bond will not be required as long as the contract provides that payment is not due until the work is completed and accepted by the county. The purpose of a performance bond is for the protection of the government entity and is conditioned on the faithful performance of the work being done in accordance with the plans, specifications and contract documents. The payment bond is for the protection of persons supplying labor and materials to the contractor to ensure payment.

26. **BIDDERS BOND:** All bids shall be accompanied by a certified cashier's check upon a National or State bank in an amount not less than five percent (5%) of the total maximum bid price, payable without recourse to Williamson County, or a bid bond in the same amount from a reliable surety company, as a guarantee that the bidder will enter into a contract and execute performance and payment bonds, as stipulated by item 25 above, within ten (10) days after notice of award of contract to him. Bid guarantees must be submitted in the same sealed envelope with the bid. Bids submitted without check or bid bonds will not be considered.
    Bidders are not required to use Surety 2000 for your Bid Bond supplier, however; when bidding electronically in Bidsync and using Surety 2000, you may import your bid bond directly from the Surety 2000 web site.
    To use a different bond provider you MUST:

    1. Scan the completed bond
    2. Download the completed bond to the line item of this bid with your other required documents.

    Bid bonds must be attached to the line item of the electronic bid OR submitted in the same sealed envelope with a paper Bid.

27. All bid securities will be returned to the respective bidders within twenty-five (25) days after bids are opened, except those which the County elects to hold until the successful bidder has executed the contract. Thereafter, all remaining securities, including security of the successful bidder, will be returned within sixty (60) days.

28. Prior to submitting any bid, bidders are required to read the plans, specifications, bid, contract and bond forms carefully; to inform themselves by their independent research, test and investigation of the difficulties to be encountered and judge for themselves of the accessibility of the work and all attending circumstances affecting the cost of doing the work and the time required for its completion and obtain all information required to make an intelligent bid.

29. Should the bidder find discrepancies in, or omissions from the plans, specifications, or other documents, or should he/she be in doubt as to their meaning, he/she should notify at once the Project Engineer and may obtain clarification or addendum prior to submitting any bid.

30. In case of ambiguity or lack of clarity in the statement of prices in the bids, the county reserves the right to consider the most favorable analysis thereof, or to reject the bid. Unreasonable (or unbalanced) prices submitted in a bid may result in rejection of such bid or other bids.

31. Award of the contract, if awarded, will be made within sixty (60) days after opening of the bids and no bidder may withdraw his bid within said sixty (60) day period of time unless a prior award is made.

32. Within ten (10) days of written notification of award of the contract, the bidder shall execute and furnish to the County the performance bond, or letter of credit if applicable, and payment bond as required by item 25 above; and the Certificate of Insurance showing coverages in

accordance with contract documents. Failure to execute contract, Bonds and Certificate of Insurance shall be just cause for the annulment of the award. In case of the annulment of the award, the bid guarantee shall become the property of Williamson County, not as a penalty, but as a liquidated damage.

33. Any quantities given in any portion of the contract documents, including the plans, are estimates only, and the actual amount of work required may differ somewhat from the estimates. The basis for the payment shall be the actual amount of work done and/or material furnished.

34. **THE TEXAS HAZARD COMMUNICATION ACT**, Chapter 502 of the Health and Safety Code, Sec. 502.006, states that a chemical manufacturer or distributor shall provide appropriate Material Safety Data Sheets (MSDS) to employers who acquire hazardous chemicals in this state with each initial shipment and with the first shipment after a MSDS is updated. The MSDS must conform to the most current requirements of the OSHA standard in 29 CFR 1910.1200. By submitting your bid to the County you are acknowledging that this regulation is a part of this bid and that you will provide appropriate MSDS with each initial shipment and with the first shipment after a MSDS is updated.

35. **THE WILLIAMSON COUNTY HAZARD COMMUNICATION PROGRAM POLICY** Under Revised Texas Hazard Communication Act (THCA) of 1993 states that it is the responsibility of all contractor/sub-contractors who bring hazardous chemicals onto county property to provide appropriate MSDS to the county at the work site. When exposure to a hazardous chemical is expected each contractor/sub-contractor shall be responsible for the appropriate training of their employees. For a copy of the Williamson County Hazard Communication Program Policy contact the Williamson County Unified Road & Bridge System Safety/Training Coordinator at 512/930-3330. By submitting your bid to the County you are acknowledging that this policy is a part of this bid and that you will provide appropriate MSDS to the county work site and provide for appropriate training as applicable.

36. **CERTIFICATE OF INTERESTED PARTIES TEXAS ETHICS COMMISSION (FORM 1295)** As of January 1, 2016, Bidders are responsible for complying with the Texas Government Code Section 2252.908. The law states that the County may not enter into certain contracts with a Bidder unless the Bidder submits a disclosure of interested parties to the County at the time the Bidder submits the signed contract to Williamson County.
On January 1, 2016, the Texas Ethics Commission made available on its website a new filing application that must be used to file Form 1295. Information regarding how to use the filing application is available on the Texas Ethics Commission website at the following link:
https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm
The Low Bidder must:
    1. Use the online application to process the required information on Form 1295
    2. Print a copy of the form which will contain a unique certification number
    3. An authorized agent of the Bidder must sign the printed copy of the form
    4. and have the form notarized
    5. the completed Form 1295 and certification of filing must be filed (scanning and emailing form is sufficient) with Williamson County prior to award of the contract by Commissioners Court.

37. Ambiguity, Conflict, or other Errors in the IFB If Bidder discovers any ambiguity, conflict, discrepancy, omission or other error in this IFB, Bidder shall immediately notify Williamson County Purchasing Department of such error in writing and request modification or clarification of the document. Modifications will be made by issuing Addenda. If the Bidder fails to notify Williamson County prior to the date and time fixed for submission of Bids of an error or ambiguity in the IFB known to Bidder, or an error or ambiguity that reasonably should have been known to

Bidder, then Bidder shall be deemed to have waived the error or ambiguity or its later resolution. Williamson County may also modify the IFB, no later than 48 hours prior to the date and time fixed for submission of Bids, by issuance of an Addendum. All addenda will be numbered consecutively, beginning with 1.

SECTION 4
BID FORM, BID AFFIDAVIT, BIDDER REFERENCES, & CONFLICT OF INTEREST QUESTIONNAIRE

ALL REQUIRED DOCUMENTS MUST BE FILLED OUT AND SUBMITTED WITH BID

www.bidsync.com

FOLLOWING CONTRACT AWARD REQUIRED DOCUMENTS WILL BE INSERTED IN THIS SECTION

SECTION 5
STANDARD FORM OF AGREEMENT

STANDARD FORM OF AGREEMENT

STATE OF TEXAS

WILLIAMSON COUNTY

THIS STANDARD FORM OF AGREEMENT (the "Agreement") is by and between WILLIAMSON COUNTY, TEXAS, a political subdivision of the State of Texas (hereinafter called "County") and _____ (hereinafter called "Contractor").

The County and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. Work

Contractor shall complete all Work as specified or indicated in the Contract Documents. The "Project" is generally described as follows:

Project No. 1803-219 – Southwest Bypass Segment 2

Article 2. Engineer of Record

The Project has been designed by HDR Engineering, Inc. who is hereinafter called the "Engineer of Record" and who is to act as the County's design professional.

Article 3. Contract Time

The Work shall be Substantially Completed in 420 calendar days (the "Contract Time"). Following Substantial Completion, the Contractor shall proceed expeditiously with adequate forces and shall achieve Final Completion within the time specified in the Special Conditions.

Article 4. Contract Price

County shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraph 4.1 below (the "Contract Price"):

4.1 For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in the Bid Form, and as totaled below:

TOTAL OF ALL UNIT PRICES_____ $_____(dollars)
(insert words)

As provided in the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by the Engineer of Record.

Article 5. Contractor's Representations

In order to induce County to enter into this Agreement, Contractor makes the following representations:

5.1 Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents including the "technical data".

5.2 Contractor has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.

5.3 Contractor is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.

5.4 Contractor has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site which have been identified. Contractor acknowledges that such reports and drawings are not Contract Documents and may not be complete for Contractor's purposes. Contractor acknowledges that the County and Engineer of Record do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site.

5.5 Contractor has correlated the information known to Contractor, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

5.6 Contractor has given Engineer of Record written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Contract Documents and the written resolution thereof by Engineer of Record is acceptable to Contractor, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5.7 Contractor represents and agrees that there are no obligations, commitments, or impediments of any kind that will limit or prevent performance of its obligations under the Contract Documents.

5.8 Contractor warrants, represents, and agrees that if (i) it is a corporation or limited liability company, then it is a corporation duly organized, validly existing and in good standing under the laws of the State of Texas, or a foreign corporation or limited liability company duly authorized and in good standing to conduct business in the State of Texas, that it has all necessary corporate power and has received all necessary corporate approvals to execute and deliver this Agreement, and the individual executing the Agreement on behalf of Contractor has been duly authorized to act for and bind Contractor; or (ii) if it is a partnership, limited partnership, or limited liability partnership, then it has all necessary partnership power and has secured all necessary approvals to execute and deliver this Agreement and perform all its obligations under the Contract Documents; and the individual executing this Agreement on behalf of Contractor has been duly authorized to act for and bind Contractor.

5.9 Neither the execution and delivery of this Agreement by Contractor nor the performance of its obligations under the Contract Documents will result in the violation of any provision, if a corporation, of its articles of incorporation or by-laws, if a limited liability company, of its articles of organization or regulations, or if a partnership, by any partnership agreement by which Contractor is bound, or any agreement by which Contractor is bound or to the best of the Contractor's knowledge and belief, will conflict with any order or decree of any court or governmental instrumentality relating to Contractor.

5.10 Except for the obligation of the County to pay Contractor the Contract Price pursuant to the terms of the Contract Documents, and to perform certain other obligations pursuant to the terms and conditions explicitly set forth in the Contract Documents, County shall have no liability to Contractor or to anyone claiming through or under Contractor by reason of the execution or performance of this Agreement. Notwithstanding any obligation or liability of County to Contractor, no present or future partner or affiliate of County or any agent, officer, director, or employee of County, or of the various departments comprising Williamson County, or anyone claiming under County has or shall have any personal liability to Contractor or to anyone claiming through or under Contractor by reason of the execution or performance of this Agreement.

Article 6. Contract Documents

The "Contract Documents," which comprise the entire agreement between the County and Contractor concerning the Work, consist of the following:

6.1 This Standard Form of Agreement

6.2 Performance Bond

6.3 Payment Bond

6.4 Maintenance Bond

6.5 Certificate of Insurance

6.6 Wage Rates

6.7 General Conditions

6.8 Special Conditions

6.9 Technical Specifications

6.10 Plan Drawings

6.11 Addenda numbers _____ to _____, inclusive

6.12 Contractor's Bid Affidavit and Bid Form

6.13 Documentation submitted by Contractor prior to Notice of Award.

6.14 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying or supplementing the Contract Documents pursuant to applicable sections in the General Conditions.

The documents listed in paragraphs 6.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 6. The Contract Documents may only be amended, modified or supplemented as provided in the General Conditions.

Article 7. Miscellaneous

7.1 Terms used in this Agreement, which are defined in the General Conditions, will have the meanings indicated in the General Conditions.

7.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that

may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

7.3 The County and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

7.4 Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the County and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken position.

7.5 Each party to this Agreement hereby agrees and acknowledges that venue and jurisdiction of any suit, right, or cause of action arising out of or in connection with this Agreement shall lie exclusively in Williamson County, Texas. Furthermore, this Agreement shall be governed by and construed in accordance with the laws of the State of Texas, excluding, however, its choice of law rules.

7.6 The parties to this Agreement agree that during the performance of the services under this Agreement they will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The parties to this Agreement will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship.

7.7 This Agreement is for the sole and exclusive benefit of the parties hereto, and nothing in this Agreement, express or implied, is intended to confer or shall be construed as conferring upon any other person any rights, remedies or any other type or types of benefits.

7.8 Each party to this Agreement acknowledges that it and its counsel have reviewed this Agreement and that the normal rules of construction are not applicable and there will be no presumption that any ambiguities will be resolved against the drafting party in the interpretation of this Agreement.

7.9 Each party to this Agreement, in the performance of this Agreement, shall act in an individual capacity and not as agents, employees, partners, joint ventures or

associates of one another. The employees or agents of one party shall not be deemed or construed to be the employees or agents of the other party for any purposes whatsoever.

7.10 Nothing in this Agreement shall be deemed to waive, modify or amend any legal defense available at law or in equity to County, its past or present officers, employees, or agents or employees, nor to create any legal rights or claim on behalf of any third party. County does not waive, modify, or alter to any extent whatsoever the availability of the defense of governmental immunity under the laws of the State of Texas and of the United States.

7.11 To the extent, if any, that any provision in this Agreement is in conflict with Tex. Gov't Code 552.001 et seq., as amended (the "Public Information Act"), the same shall be of no force or effect. Furthermore, it is expressly understood and agreed that County, its officers and employees may request advice, decisions and opinions of the Attorney General of the State of Texas in regard to the application of the Public Information Act to any items or data furnished to County as to whether or not the same are available to the public. It is further understood that County's officers and employees shall have the right to rely on the advice, decisions and opinions of the Attorney General, and that County, its officers and employees shall have no liability or obligation to any party hereto for the disclosure to the public, or to any person or persons, of any items or data furnished to County by a party hereto, in reliance of any advice, decision or opinion of the Attorney General of the State of Texas.

7.12 County and Contractor have signed this Agreement in triplicate. One counterpart each has been delivered to the County, Contractor and Engineer of Record. All portions of the Contract Documents have been signed, initialed or identified by County and Contractor or identified by Engineer of Record on their behalf.

7.13 This Agreement and the Contract Documents represent the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either oral or written. This Agreement may be amended only by written instrument signed by each party to this Agreement. NO OFFICIAL, EMPLOYEE, AGENT, OR REPRESENTATIVE OF THE COUNTY HAS ANY AUTHORITY, EITHER EXPRESS OR IMPLIED, TO AMEND THIS CONTRACT, EXCEPT PURSUANT TO SUCH EXPRESS AUTHORITY AS MAY BE GRANTED BY THE WILLIAMSON COUNTY COMMISSIONERS COURT.

This Agreement will be effective on _____, 20_____ (which is the "Effective Date" of the Agreement).

COUNTY_____	CONTRACTOR_____
By:_____	By: _____
Dan A. Gattis, Williamson County Judge	Title: _____
	[CORPORATE SEAL]
Attest_____	Attest_____

SECTION 6
WAGE RATES

WAGE RATES

Contractor must pay all workers not less than the prevailing wage rate for Williamson County, Texas.

General Decision Number: TX180016 01/05/2018 TX16

Superseded General Decision Number: TX20170016

State: Texas

Construction Types: Heavy and Highway

Counties: Atascosa, Bandera, Bastrop, Bell, Bexar, Brazos, Burleson, Caldwell, Comal, Coryell, Guadalupe, Hays, Kendall, Lampasas, McLennan, Medina, Robertson, Travis, Williamson and Wilson Counties in Texas.

HEAVY (excluding tunnels and dams, not to be used for work on Sewage or Water Treatment Plants or Lift / Pump Stations in Bell, Coryell, McClennon and Williamson Counties) and HIGHWAY Construction Projects

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher)for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018

* SUTX2011-006 08/03/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures)	$ 12.56	
ELECTRICIAN	$ 26.35	
FORM BUILDER/FORM SETTER		

Paving & Curb.....$ 12.94
Structures.....$ 12.87

LABORER
Asphalt Raker.....$ 12.12
Flagger.....$ 9.45
Laborer, Common.....$ 10.50
Laborer, Utility.....$ 12.27
Pipelayer.....$ 12.79
Work Zone Barricade
Servicer.....$ 11.85

PAINTER (Structures).....$ 18.34

POWER EQUIPMENT OPERATOR:
Agricultural Tractor.....$ 12.69
Asphalt Distributor.....$ 15.55
Asphalt Paving Machine.....$ 14.36
Boom Truck.....$ 18.36
Broom or Sweeper.....$ 11.04
Concrete Pavement
Finishing Machine.....$ 15.48
Crane, Hydraulic 80 tons
or less.....$ 18.36
Crane, Lattice Boom 80
tons or less.....$ 15.87
Crane, Lattice Boom over
80 tons.....$ 19.38
Crawler Tractor.....$ 15.67
Directional Drilling
Locator.....$ 11.67
Directional Drilling
Operator.....$ 17.24
Excavator 50,000 lbs or
Less.....$ 12.88
Excavator over 50,000 lbs...$ 17.71
Foundation Drill, Truck
Mounted.....$ 16.93
Front End Loader, 3 CY or
Less.....$ 13.04
Front End Loader, Over 3 CY.$ 13.21
Loader/Backhoe.....$ 14.12
Mechanic.....$ 17.10
Milling Machine.....$ 14.18
Motor Grader, Fine Grade....$ 18.51
Motor Grader, Rough.....$ 14.63
Pavement Marking Machine....$ 19.17
Reclaimer/Pulverizer.....$ 12.88
Roller, Asphalt.....$ 12.78
Roller, Other.....$ 10.50
Scraper.....$ 12.27
Spreader Box.....$ 14.04
Trenching Machine, Heavy....$ 18.48

Servicer.....$ 14.51

Steel Worker
Reinforcing.....$ 14.00
Structural.....$ 19.29

TRAFFIC SIGNAL INSTALLER
Traffic Signal/Light Pole
Worker.....$ 16.00

TRUCK DRIVER
Lowboy-Float.....$ 15.66
Off Road Hauler.....$ 11.88
Single Axle.....$ 11.79
Single or Tandem Axle Dump
Truck.....$ 11.68
Tandem Axle Tractor w/Semi
Trailer.....$ 12.81

WELDER.....$ 15.97

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year.

Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that

indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number,005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

SECTION 7
PERFORMANCE BOND

PERFORMANCE BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of _____

County of _____, and State of _____, as principal, and

_____

authorized under the laws of the State of Texas to act as surety on bonds for principals, are held and firmly bound unto Williamson County (County), in the penal sum of

_____Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written Agreement with the County, dated the _____day of _____, 20_____(the "Agreement"), to which the said Agreement, along with the Contract Documents referenced therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform said Agreement and shall in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by the Agreement agreed and covenanted by the Principal to be observed and performed, and according to the true intent and meaning of said Agreement and the Contract Documents hereto annexed, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the work performed thereunder, or to the Contract Documents referenced therein, shall in anyway affect the obligations on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms on the Agreement, or to the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20___.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____) _____	(_____) _____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____) _____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Art. 21.09 of the Insurance Code)

****

I,_____, having executed Bonds
SIGNATURE

for _____ do hereby affirm I have
NAME OF SURETY

verified that said Surety is now certified with Authority from either: (a) the Secretary of the Treasury of the United States if the project funding includes Federal monies; or (b) the State of Texas if none of the project funding is from Federal sources; and further, said Surety is in no way limited or restricted from furnishing Bond in the State of Texas for the amount and under conditions stated herein.

SECTION 8
PAYMENT BOND

PAYMENT BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of _____

County of _____, and State of _____, as Principal (hereinafter referred to as the "Principal"), and

_____
authorized under the laws of the State of Texas to act as Surety on bonds for principals (hereinafter referred to as the "Surety"), are held and firmly bound unto Williamson County, (hereinafter referred to as the "County"), in the penal sum of

_____Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written agreement with the County, dated the _____ day of _____, 20_____, to _____

_____ (hereinafter referred to as the "Agreement"), which said Agreement and the Contract Documents incorporated therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the Work provided for in said Agreement, then, this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the Work performed thereunder, or to the other Contract Documents accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the Agreement, or to the work to be performed thereunder or to the other Contract Documents accompanying the same.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20___.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____) _____	(_____) _____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____) _____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Art. 21.09 of the Insurance Code)

SECTION 9
MAINTENANCE BOND

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That _____
(NAME OF CONTRACTOR)

_____

as principal, hereinafter called "CONTRACTOR" and _____

_____
(NAME OF SURETY)

a corporation organized under the laws of _____
as Surety, hereinafter called "SURETY", do hereby expressly acknowledge themselves to be held and bound to pay unto WILLIAMSON COUNTY as Obligee, a political subdivision of the State of Texas, hereinafter called "COUNTY", the sum of (20% of total construction contract amount)

_____
(INSERT WORDS)
_____ Dollars ($_____) for the payment of which sum well and truly to be made unto said COUNTY and its successors, said principal and sureties do hereby bind themselves, their assigns, and successors jointly and severally.

This obligation is conditioned, however, that whereas said CONTRACTOR has by written Agreement dated _____ , 20 _____ , entered into an agreement with said COUNTY to build and construct _____

_____
which said Agreement and the Contract Documents therein mentioned and adopted by the COUNTY are hereby expressly made a part thereof as though the same were written and embodied herein.

WHEREAS, under the terms and conditions of the Agreement, specifications and other Contract Documents, it is provided that the CONTRACTOR shall maintain and keep in good repair the Work constructed and/or equipment furnished by it as contemplated by the plan drawings, specifications, and other Contract Documents, and perform for a period of 2 years from the date of acceptance as shown on the "Certificate of Completion" issued by the ENGINEER, or the date of Final Payment by the COUNTY if a separate Certificate of Completion is not issued, all necessary repairs, reconstruction and renewal of any part of said construction, and to furnish the labor and materials to make good and to repair any defective condition growing out of or on account of the breakage or failure of any substance or the improper function of any part of the construction work. The CONTRACTOR shall reimburse the COUNTY for the costs of all engineering and special services required to be furnished by the COUNTY which are directly attributable to the restoration of the constructed work. Said maintenance contemplates the complete restoration of the constructed work to a functional use during the said period as set forth above. It is the intended purpose of this section to require the correction of all defective conditions resulting from materials furnished or work and labor performed by the CONTRACTOR under the conditions prescribed by the Agreement, plans and specifications and other Contract Documents; and in case the CONTRACTOR shall fail or refuse to commence and actively pursue such corrections within ten (10) days after proper written notifications have been furnished to it by the COUNTY, it is agreed that the COUNTY may do said work and supply such materials and the said CONTRACTOR and SURETY herein shall be liable for the payment of all costs thereby incurred.

NOW THEREFORE, if the said CONTRACTOR shall keep and perform its said agreement to maintain said work and keep the same in good repair for the said maintenance period as provided above, then these presents shall be null and void and have no further effect, but if default shall be made by the

CONTRACTOR in the performance of its Agreement to maintain and repair said work, then these presents shall have full force and effect and the COUNTY shall have and recover from the said CONTRACTOR and its sureties damages in the premises, as provided, and it is further understood and agreed that this obligation shall be a continuing one against the principal and sureties hereon, and that successive recoveries may be had hereon for successive breaches until the full amount shall have been exhausted; and it is further understood that the obligation herein to maintain said work shall continue throughout said maintenance period, and the same shall not be changed, diminished, or in any manner affected from any cause during said time.

IN WITNESS WHEREOF, this instrument is executed this _____ day of _____, 20 ____

_____ _____

PRINCIPAL PHONE NO.

_____

SIGNATURE (SEAL)

_____ _____

NAME & TITLE WITNESS OR ATTEST TO SEAL

_____ _____

SURETY PHONE NO.

_____

SIGNATURE (SEAL)

_____ _____

NAME & TITLE WITNESS OR ATTEST TO SEAL

_____

SIGNATURE OF LICENSED LOCAL RECORDING AGENT
appointed to countersign on behalf of Surety

SECTION 10
CERTIFICATE OF INSURANCE

CERTIFICATE OF INSURANCE

TO: DATE:_____

_____ Project No.:_____
(COUNTY)

_____ Type of _____

_____ Project:_____
(ADDRESS)

THIS IS TO CERTIFY THAT _____
(Name and address of insured)

is, at the date of this certificate, insured by this Company with respect to the business operations hereinafter described for the types of Insurance and in accordance with the provisions of the standard policies used by this Company, and further hereinafter described. Exceptions to the standard policy noted on reverse side hereof.

TYPE OF INSURANCE	POLICY NO.	EFFECTIVE	EXPIRES	LIMITS OF LIABILITY	
Workmen's Compensation					
				1 Person	$
Public Liability				1 Accident	$
Contingent				1 Person	$
Liability				1 Accident	$
Property Damage					
Builder's Risk					
Automobile					
Other					

The foregoing Policies (do) (do not) cover all sub-contractors.

Locations Covered:_____

Descriptions of Operations Covered:_____

The above policies either in the body thereof or by appropriate endorsement provide that they may not be changed or canceled by the insurer in less than five days after the insured has received written notice of such change or cancellation.

Where applicable local laws or regulations require more than five days actual notice of change or cancellation to the assured, the above policies contain such special requirements, either in the body thereof or by appropriate endorsement thereto attached.

_____
(Name of Insurer)

By:_____

Phone No. (___) _____ Title:_____

SECTION 11
GENERAL CONDITIONS OF AGREEMENT

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General Conditions of Agreement

1. Definition of Terms

For purposes of the Contract Documents, the following terms shall have the meanings set forth herein:

1.01 The Agreement

The term the "Agreement" shall mean Standard Form of Agreement by and between County and Contractor relating to the Work and the construction of the Project.

1.02 County

Williamson County, Texas, being a political subdivision of the State of Texas, is the entity identified in the Agreement and hereinafter referred to as the "County." Nothing contained in the Contract Documents shall create any contractual or agency relationship between any parties other than the County and the Contractor.

1.03 Department

The "Department" shall mean the Texas Department of Transportation (TxDOT).

1.04 Contractor

The term the "Contractor" shall mean the successful bidder that enters into the Agreement with the County for the construction of the Work and the Project defined by the Contract Documents.

1.05 Engineer

The term the "Engineer" shall mean the County Engineer or the authorized representative of the County Engineer.

1.06 General Engineering Consultant (GEC)

The term the "General Engineering Consultant" or "GEC" shall mean the consulting engineering firm representing and assisting the County in the design, review, and coordination of the design and construction phases of the Project. The GEC shall be responsible for the construction oversight of the Project.

1.07 Construction Observer

The "Construction Observer" or the "Observer" shall mean the County's employee or a contracted consultant who performs construction engineering and inspection services for the Project.

1.08 Construction Representative

The "Construction Representative" shall mean the GEC's designated field representative

during construction of the Project which shall provide for coordination and assistance of the construction observation effort.

1.09 Engineer of Record

The term "Engineer of Record" shall mean the County's design professional, who shall provide professional engineering design services for the Project.

1.10 Contract Documents

The "Contract Documents" shall consist of the Special Conditions, Notice for Bidders, Proposal, the fully executed Agreement, Performance and Payment Bonds, Maintenance Bond, Special Bonds (when required), General Conditions, Technical Specifications or Specifications, Plans and all modifications thereof incorporated in any such documents before the execution of the Agreement and all modifications that are made, in accordance with the Contract Documents, following the execution of the Agreement.

The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In case of conflict between any of the Contract Documents, priority of interpretation shall be in the following order: Fully Executed Agreement, Performance and Payment Bonds, Maintenance Bond, Special Bonds (if any), Proposal, General Conditions, Special Conditions, Technical Specifications or Specifications, and Plans.

1.11 Subcontractor

The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor. It includes one who furnishes material worked to special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.

1.12 Sub-Subcontractor

The term "Sub-Subcontractor" means one who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. It includes one who furnishes material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.

1.13 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual or to an officer of the entity for whom it is intended, or if delivered to or sent by registered mail to the last business address known to it who gives the notice.

1.14 Work

The Contractor shall provide and pay for all materials, machinery, equipment, tools, superintendence, labor, services, insurance, and all water, light, power, fuel, transportation and other facilities necessary for the execution and completion of the work covered by the Contract Documents (collectively known as the "Work"). Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of a good quality. The

Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials. Materials or work described in words which, when so applied, have a well-known technical or trade meaning shall be held to refer to such recognized standards.

1.15 Extra Work

The term "Extra Work" as used in the Contract Documents shall be understood to mean and include all work that may be required by the County to be done by the Contractor to accomplish any change, alteration or addition to the Work shown upon the plans, or reasonably implied by the specifications, and not covered by the Contractor's Proposal, except as provided under Section 2.13 "Changes and Alterations" herein.

1.16 Working Day

The term "Working Day" is defined as any day not including Saturdays, Sundays or any legal holidays, in which weather or other conditions, not under the control of the Contractor, will permit construction of the principal units of the Work for a period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m.

1.17 Calendar Day

The term "Calendar Day" is defined as any day of the week or month, no days being excepted.

1.18 Substantially Completed

The term "Substantially Completed" or "Substantial Completion" shall be understood to mean that all Project Work (or the work for a specified phase of the Project) requiring lane or shoulder closures or obstructions is completed, and traffic is following the lane arrangement as shown on the plans for the finished roadway (or the specified phase of work). Additionally, all pavement construction, resurfacing, traffic control devices, and pavement markings shall be in their final position (or as called for on the plans for the specified phase of work) at such time; provided, however, the Engineer may make an exception as to the permanent pavement markings being in their final position provided that, in the Engineer's sole discretion, the lack of markings does not cause a disruption to traffic flow or an unsafe condition for the traveling public, and work zone pavement markings are in place.

1.19 Notice of Substantial Completion

Notice issued to the Contractor by the Observer or County's Representative acknowledging Substantial Completion of the Project, signifying the end of time charges.

1.20 Certificate of Completion

Certificate issued to the Contractor by the Observer acknowledging "Final Completion" of the Project, as determined by completion of the Punch List, from which time the warranty period for the Project shall begin. The issuance of the Certificate of Completion shall serve as evidence of "Final Completion" and such certificate shall relieve the Contractor of ownership responsibilities for the Project, except for repair of damage caused by the Contractor or by the Contractor's operations to existing facilities or completed and substantially accepted work.

1.21 Certificate of Acceptance

Certificate issued to the Contractor by the County acknowledging final acceptance and purchase of the Project.

1.22 Project

The "Project" shall mean and include the Project defined, described and set forth in the Agreement.

1.23 Contract Time

The "Contract Time" shall mean the amount of time in which the Work shall be Substantially Completed. The number of days allotted for the Contract Time shall be specifically set forth in the Agreement.

1.24 Contract Price

The "Contract Price" shall mean the amount that the County shall pay the Contractor for completion of the Work in accordance with the Contract Documents. The specific amount of the Contract Price shall be determined pursuant to the terms of the Contract Documents.

2. Responsibilities of the Engineer and the Contractor

2.01 County-Observer Relationship

The Observer will be the County's contracted consultant during construction. The duties, responsibilities and limitations of authority of the Observer as the County's representative during construction are as set forth in the Contract Documents and/or the Agreement for Construction Engineering and Inspection Services and shall not be extended or limited without written consent of the County or the Observer. The Observer will advise and consult with the County and the GEC, and all of the County's instructions to the Contractor shall be issued through the Observer.

2.02 Professional Observation by the Construction Observer

The Observer shall be on the jobsite when work is being performed to provide construction engineering inspections of the Work performed by the Contractor. In addition to performing material testing on behalf of the County, the Observer shall review the progress of the executed Work and to determine if such Work meets the essential performance and design features and the technical and functional engineering requirements of the Contract Documents; provided and except, however, that the Observer shall not be responsible, directly or indirectly, for the Contractor's construction means, methods, techniques, sequences, quality, procedures, programs, safety precautions or lack of same incident thereto or in connection therewith. Notwithstanding any other provision of the Contract Documents, the Engineer and the Observer shall not be responsible or liable for any acts, errors, omissions or negligence of the Contractor, any Subcontractor or any of the Contractor's or Subcontractor's agents, servants or employees or any other person, firm or corporation performing or attempting to perform any of the Work.

2.03 Payments for Work

The Observer shall review the Contractor's applications for payment and supporting data, determine the amount owed to the Contractor and recommend, in writing to the GEC for review, payment to the Contractor in such amounts; such recommendation of payment to the Contractor constitutes a representation to the County of the Observer's professional judgment that the Work has progressed to the point indicated to the best of its knowledge, information and belief, but such recommendation of an application for payment to the Contractor shall not be deemed as a representation by the Observer that the Observer has made any examination to determine how or for what purpose the Contractor has used the monies paid on account of the Contract Price.

2.04 Initial Determinations

The Observer initially shall determine all claims, disputes and other matters in question between the Contractor and the County relating to execution or progress of the Work or interpretation of the Contract Documents. The Observer's decision shall be rendered in writing to the GEC for review within a reasonable time, which shall not be construed to be less than ten (10) days.

2.05 Objections

In the event the Observer renders any decision which, in the opinion of either party hereto, is not in accordance with the meaning and intent of the Contract Documents, either party may file with the Observer its written objection to the decision within thirty (30) days of such decision by the Observer, and by such action may reserve the right to submit the question so raised to litigation as hereinafter provided.

2.06 Lines and Grades

Unless otherwise specified, all lines and grades shall be furnished by the Contractor at its own expense. Whenever necessary, construction work shall be suspended to permit performance of this work, but such suspension will be as brief as practicable and the Contractor shall be allowed no extra compensation therefore.

2.07 Contractor's Duty and Superintendence

The Contractor shall give adequate attention to the faithful prosecution and completion of the Work subject of the Contract Documents and shall keep on the Project site, at all times during its progress, a competent Superintendent and any necessary assistants to supervise and direct the Work. The Superintendent shall represent the Contractor in its absence and all directions given to the Superintendent shall be as binding as if given to the Contractor.

The Contractor is and at all times shall remain an independent contractor, solely responsible for the manner and method of completing its work under the Contract Documents, with full power and authority to select the means, method and manner of performing such work, so long as such methods do not adversely affect the completed improvements, the County and the Observer being interested only in the result obtained and conformity of such completed improvements with the Contract Documents.

Likewise, the Contractor shall be solely responsible for the safety of itself, its employees and other persons, as well as for the protection and safety of the improvements being erected and its property or any other person's property, as a result of its operations under the Contract Documents. Engineering construction drawings and specifications, as well as any additional information concerning the Work to be performed passing from or through the Observer, shall not be interpreted as requiring or allowing the Contractor to deviate from the Contract documents, the plans and specifications; the intent of such drawings, specifications and any other such information being to define with specificity the agreement of the parties as to the Work the Contractor is to perform.

Any review of work in process, or any visit or observation and inspection during construction, or any clarification of plans and specifications, by the Observer or the County, or any agent, employee, or representative of either of them, whether through personal observation or inspection on the Project site or by means of approval of shop drawings for temporary construction or construction processes, or by other means or methods, is agreed by the Contractor to be for the purpose of observing the extent and nature of work completed or being performed, as measured against the drawings and specifications constituting the Contract Documents, or for the purpose of enabling the Contractor to more fully understand the plans and specifications so that the completed construction work will conform thereto, and shall in no way relieve the Contractor from full and complete responsibility for the proper performance of its work on the Project, including but not limited to the propriety of means and methods of the Contractor in performing in accordance with the Contract Documents, and the adequacy of any designs, plans or other facilities for accomplishing such performance. Deviation by the Contractor from plans and specifications that may have been in evidence during any such visitation or observation by the Observer, the Engineer, or any of their representatives, whether called to the Contractor's attention or not, shall in no way relieve the Contractor from its responsibility to complete all work in accordance with the Contract Documents.

2.08 Contractor's Understanding

It is understood and agreed that the Contractor has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under the Contract Documents.

2.09 Character of Workers

The Contractor agrees to employ only orderly and competent workers, skillful in the performance of the type of work required under the Contract Documents, to do the Work; and agrees that whenever the Observer shall inform it in writing that any workers on the Work are, in its opinion, incompetent, unfaithful or disorderly, or refuse instructions from the Observer in the absence of the Superintendent, such worker shall be discharged from the Work and shall not again be employed on the Work without the Observer's written consent. No illegal alien may be employed by any Contractor for work on this Project, and a penalty

of $500.00 per day will be assessed for each day and for each illegal alien who works for the Contractor at this Project.

2.10 Shop Drawings

The Contractor shall submit to the Observer, with such promptness as to cause no delay in its own work or in that of any other contractor, a minimum of four (4) stamped/reviewed copies, unless otherwise specified, of all shop and/or setting drawings and schedules required for the work of the various trades, and the Engineer of Record shall pass upon them with reasonable promptness, making desired corrections. Note: A single copy of the reviewed drawings shall be retained by the reviewer, the County, and the County's Representative for their records. The Contractor may not submit more than four different shop drawing plans for review in any one week. The Engineer of Record shall return the shop drawings to the Contractor, via the GEC, within three (3) weeks of its having received them, with appropriate comments. The Contractor shall make any corrections required by the Engineer of Record, file with it two (2) corrected copies and furnish such other copies as may be needed. The Engineer of Record's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless the Contractor has in writing called the Engineer of Record's attention to such deviations at the time of submission, nor shall it relieve Contractor from responsibility for errors of any sort in shop drawings or schedules. It shall be the Contractor's responsibility to fully and completely review all shop drawings to ascertain their effect on its ability to perform the required work in accordance with the Contract Documents and within the time for completion thereof. Any shop drawings which are required for temporary supports must be signed and sealed by an Engineer registered in the State of Texas.

Such review by the Engineer of Record shall be for the sole purpose of determining the sufficiency of said shop drawings or schedules to result in finished improvements in conformity with the plans and specifications, and shall not relieve the Contractor of its duties and obligations, as an independent contractor, set forth in the Contract Documents. It is hereby expressly understood and agreed that the Engineer of Record does not assume any duty to pass upon the propriety or adequacy of such drawings or schedules, or any means or methods reflected thereby, in relation to the safety of either person or property during the Contractor's performance hereunder.

2.11 Preliminary Approval

The Observer shall not have the power to waive the obligations of the Contract Documents for the furnishing by the Contractor of good material, and of its performing good work as herein described, and in full accordance with the Contract Documents. No failure or omission of the Observer to discover, object to or condemn any defective work or material shall release the Contractor from the obligations to fully and properly perform in full accordance with the Contract Documents, including without limitation, the obligation to at once tear out, remove and properly replace any defective work or material at any time prior to final acceptance upon the discovery of said defective work or material; provided, however, that the Observer shall, upon request of the Contractor, inspect and accept or reject any material furnished, and in the event the material has been once accepted by the Observer,

such acceptance shall be binding on the County unless it can be clearly shown that such material furnished does not meet the specifications for this work.

Any questioned work may be ordered to be taken up or removed for re-examination by the Observer, prior to final acceptance, and if found not in accordance with the plans and/or specifications for said work, all expenses relating to the removing, re-examination and replacement shall be solely borne by the Contractor. Otherwise, if the questioned work is found to be in accordance with the plans and/or specifications for said work, the expense thus incurred shall be allowed as Extra Work and shall be paid for by the County; provided, however, where inspection or approval is specifically required by the specifications prior to performance of certain work, should the Contractor proceed with such work without requesting prior inspection or approval, the Contractor shall bear all expense of taking up, removing, and replacing this work if so directed by the Observer.

2.12 Defects and Their Remedies

It is further agreed that if the Work or any part thereof, or any material brought on the site of the Work for use in the Work or selected for the same, shall be deemed by the Observer as unsuitable or not in conformity with the Contract Documents, or the intent thereof, the Contractor shall, after receipt of notice thereof from the Observer, forthwith remove such material and rebuild or otherwise remedy such work so that it shall be in full accordance with the Contract Documents.

2.13 Changes and Alterations

The Contractor further agrees that the County may make such changes and alterations as the County may see fit in the line, grade, form, dimensions, plans or materials for the Work herein contemplated, or any part thereof, either before or after the beginning of the construction, without affecting the validity of the Contract Documents.

If such changes or alterations diminish the quantity of the Work to be done, they shall not constitute the basis for a claim for damages or anticipated profits on the Work that may be dispensed with, except as provided for unit price items under Section 5 “Measurement and Payment”. If the amount of work is increased, and the Work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price, if any, established for such work under the Contract Documents, except as provided for unit price items under Section 5 “Measurement and Payment”. Otherwise, such additional work shall be paid for as provided under Extra Work. In the event the County makes such changes or alterations as shall make useless any work already done or material already furnished or used in said work, then the County shall compensate the Contractor for any material or labor so used, and for any actual loss occasioned by such change, due to actual expense incurred in preparation for the Work as originally planned.

3. General Obligations and Responsibilities

3.01 Keeping of Plans and Specifications Accessible and Keeping a Superintendent on the Project Site

The Contractor shall keep one (1) copy of the plans and specifications constantly accessible on the Work, with the latest revisions noted thereon. The Contractor shall give the Work its constant attention to facilitate the progress thereof and shall cooperate with the Construction Observer in every way possible. The Contractor shall designate, to the Construction Observer in writing, the name of a Superintendent, employed by the firm, regardless of how much of the Work may be sublet. The Superintendent will be available at all time. In the event a competent superintendent is not available, the Construction Observer may suspend work until one is available.

3.02 Ownership of Documents

All drawings, specifications and copies thereof furnished by the Engineer of Record shall not be reused on other work, and, with the exception of the signed contract sets, are to be returned to the Engineer of Record on request, at the completion of the work. All models, drawings, specifications and copies thereof are the property of the County.

3.03 Adequacy of Design

It is understood that the County believes it has employed competent engineers and designers. It is therefore agreed that the County and Engineer shall be responsible for the adequacy of the design, sufficiency of the Contract Documents, the safety of the structure and the practicability of the operations of the completed project provided that the Contractor has complied with the requirements of the said Contract Documents, all approved modifications thereof, and additions and alterations thereto approved in writing by the County. The burden of proof of such compliance shall be upon the Contractor to show that it has complied with the said requirements of the Contract Documents, approved modifications thereof, and all approved additions and alterations thereto.

The paper copies of the Contract Documents are considered to be the official contract documents. Any request by the Contractor and use thereof of electronic or digital information, including engineering design and survey files, shall be at the sole risk and legal responsibility of the Contractor. Neither the County nor the Engineer of Record makes any warranty or representation as to the compatibility of the files provided with other software programs, nor shall they be held responsible for subsequent uses of the data by the Contractor or anyone who may obtain the data from the Contractor. **THE CONTRACTOR SHALL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD THE COUNTY ITS AGENTS, EMPLOYEES, OR REPRESENTATIVES AND THE ENGINEER OF RECORD HARMLESS FROM ANY AND ALL CLAIMS, SUITS, LIABILITY, DEMANDS OR COSTS ARISING OUT OF OR RESULTING FROM SUCH USE.** Because data stored on electronic media can deteriorate undetected or be modified undetected, neither the County nor the Engineer of Record can be held liable for the completeness or correctness of the electronic data once in possession of the Contractor.

3.04 Contractor's Responsibility for Work

Until the issuance of the Certificate of Completion for the Project, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non execution of the Work.

In case of suspension of work for any cause, the Contractor shall be responsible for the preservation of all materials. The Contractor shall provide suitable drainage of the roadway in good and passable condition until Final Completion, except as outlined below for opening the roadway to traffic.

Whenever, in the opinion of the Observer, any roadway or portion thereof is in suitable condition for travel, it shall be opened to traffic; provided, however, such opening shall not be held to be, in any way, the final acceptance of the roadway or any part thereof or be held as a waiver of any of the provisions of the Contract Documents. Where it is considered by the Observer to be in the public interest and so ordered in writing by the Observer, any Substantially Completed roadway or portion thereof may be opened to traffic as follows:

(1) When both required by plans, job sequence or the approved traffic control plan, and when the County accepts responsibility for maintaining such portion of the roadway opened to traffic.
(2) When work is suspended for a period of time at the convenience of the County, the County will assume the responsibility for maintaining the entire roadway during the period of suspension; or
(3) When the roadway or portion thereof is opened to traffic during construction operations at the convenience of the County, the County will assume responsibility for the maintenance of the traveled way and shoulders during the period in which it is opened to traffic.

The County, in assuming responsibility for maintenance under this provision, may require the Work to be done in accordance with Section 6, "Extra Work and Claims".

Except for damage by the Contractor or damage caused by the Contractor's operations, the Contractor will not be responsible for repair of damage to existing facilities or damage to completed and accepted work such as guard fence, bridge wings, railing, illumination assemblies, underpass structure, traffic barriers, delineator assemblies, signs, sign bridges, changeable message signs, vehicle impact attenuators (crash cushions and guardrail end treatments) and traffic signals, where such damage is caused by (a) motor-vehicle, seacraft or aircraft that are not being operated by Contractor; (b) railroad-train collision (c) vandalism: (d) Acts of God, such as earthquake, tidal wave, tornado, hurricane, or other cataclysmic phenomena of natures: or (e) Acts of Governmental Authorities.

Upon completion of all work provided for in the Contract Documents for any individual limits, control or project, the Observer may make an inspection, and if the Work is found to be satisfactory, the Contractor will be released from further maintenance on that portion of

the Work, except for damage caused by the Contractor or its operations. Such partial acceptance must be made in writing and shall in no way void or alter any terms of the Contract Documents. Other specific units of the Project will be accepted on an individual basis when shown on the plans or as approved, in writing, by the Observer.

3.05 Protection Against Accident to Employees and the Public

The Contractor shall at all times exercise reasonable precautions for the safety of employees and others on or near the Work and shall comply with all applicable provisions of federal, state, and municipal safety laws and building and construction codes. All machinery and equipment and other physical hazards shall, except where incompatible with federal, state, or municipal laws or regulations, be guarded in accordance with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America. The Contractor shall provide such machinery guards, safe walkways, ladders, bridges, gangplanks, and other safety devices. The safety precautions actually taken and their adequacy shall be the sole responsibility of the Contractor, acting at its discretion as an independent contractor.

Within 24 hours after Contractor becomes aware of the occurrence of any accident or other event which results in, or might result in, injury to the person or property of anyone, whether or not it results from or involves any action or failure to act by the Contractor or any employee or agent of the Contractor and which arises in any manner from the performance of the Work, the Contractor shall send a written report of such accident or other event to the County and the Observer, setting forth a full and concise statement of the facts pertaining thereto. Such statement shall include a written recordation of the location of the event and the circumstances surrounding the event through photographs, interviewing witnesses, obtaining of medical reports and other documentation that defines the event. The Contractor shall also provide to the County a copy of any and all accident reports received from safety officials or agencies. Copies of such documentation shall be provided to the County and the Observer for their records. The Contractor shall also immediately send the County and the Observer a copy of any summons, subpoena, notice, or other documents served upon the Contractor, its agents, employees, or representatives, or received by it or them, in connection with any matter before any court arising in any manner from the Contractor's performance of the Work.

3.06 Performance and Payment Bonds

Unless otherwise specified, it is further agreed by the parties to the Contract Documents that the Contractor will execute separate performance and payment bonds, each in the sum of one hundred (100%) percent of the total Contract Price, on forms acceptable to County, guaranteeing faithful performance of the Work and the fulfillment of any guarantee required, and further guaranteeing payment to all persons supplying labor and materials or furnishing Contractor with any equipment in the execution of the Work subject of the Contract Documents. It is agreed that the Contractor shall have no rights under the Contract Documents until such performance and payment bonds are furnished to and approved by the County.

Unless otherwise specified, the cost of the premium for the performance and payment bonds shall be included in the price bid by the Contractor for the Work subject of the Contract Documents, and no extra payment for such bonds will be made by the County.

Each bond shall be executed by a corporate surety or corporate sureties, with an A.M. Best rating of "B" or better, duly authorized to do business and to issue surety bonds in the State of Texas. If any surety upon any bond furnished in connection herewith becomes insolvent, or otherwise not authorized to do business in this state, the Contractor shall promptly furnish equivalent security to protect the interests of the County and of persons supplying labor, materials and equipment in the prosecution of the Work subject of the Contract Documents. Furthermore, the surety company underwriting the bonds must be acceptable to the County.

Each bond shall be accompanied by a valid Power of Attorney (issued by the surety company and attached, signed and sealed, with the corporate embossed seal, to the bond) authorizing the agent who signs the bond to commit the company to the terms of the bond, and stating on the face of the Power of Attorney the limit, if any, in the total amount for which such agent is empowered to issue a single bond.

3.07 Protection of Adjoining Property

The Contractor shall take proper means to protect the adjacent or adjoining property or properties, in any way encountered, which might be injured or seriously affected by any process of construction to be undertaken pursuant to the Contract Documents, from any damage or injury by reason of said process of construction; and the Contractor shall be liable for any and all claims for such damage on account of its failure to fully protect all adjoining property. **THE CONTRACTOR AGREES TO INDEMNIFY, SAVE AND HOLD HARMLESS THE COUNTY, THE OBSERVER THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES AGAINST ANY CLAIM OR CLAIMS FOR DAMAGES DUE TO ANY INJURY TO ANY ADJACENT OR ADJOINING PROPERTY, ARISING OR GROWING OUT OF THE PERFORMANCE OF THE WORK, BUT ANY SUCH INDEMNITY SHALL NOT APPLY TO ANY CLAIM OF ANY KIND ARISING SOLELY OUT OF THE EXISTENCE OR CHARACTER OF THE WORK.**

3.08 Protection Against Claims of Subcontractors, Laborers, Materialmen and Furnishers of Machinery, Equipment and Supplies

THE CONTRACTOR AGREES THAT IT WILL INDEMNIFY, DEFEND AND SAVE HARMLESS THE COUNTY, THE OBSERVER, THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES FROM ALL CLAIMS GROWING OUT THE LAWFUL DEMANDS OF SUBCONTRACTORS, LABORERS, WORKERS, MECHANICS, MATERIALMEN AND FURNISHERS OF MACHINERY, MACHINERY PARTS, EQUIPMENT, POWER TOOLS, AND ALL SUPPLIES, INCLUDING COMMISSARY, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THE WORK SUBJECT OF THE CONTRACT DOCUMENTS. When so desired by the County, the Contractor shall furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged or waived. If the Contractor fails to furnish such evidence to County's complete satisfaction, then the County may either pay directly any unpaid bills of which the County has written notice of, or may withhold from

the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to liquidate any and all such lawful claims. When satisfactory evidence is furnished that all liabilities have been fully discharged, payments to the Contractor shall be resumed in full in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligation upon the County by either the Contractor or its surety.

3.09 Protection Against Royalties or Patented Invention

The Contractor shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letter patent or copyright by suitable legal agreement with the patentee or owner. **THE CONTRACTOR SHALL DEFEND ALL SUITS OR CLAIMS FOR INFRINGEMENT OF ANY PATENT OR COPYRIGHT RIGHTS AND SHALL INDEMNIFY AND SAVE HARMLESS THE COUNTY, THE OBSERVER THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES FROM ANY LOSS ON ACCOUNT THEREOF, EXCEPT THAT THE COUNTY SHALL DEFEND ALL SUCH SUITS AND CLAIMS AND SHALL BE RESPONSIBLE FOR ALL SUCH LOSS WHEN A PARTICULAR DESIGN, DEVICE, MATERIAL OR PROCESS OR THE PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS SPECIFIED OR REQUIRED BY THE COUNTY; PROVIDED, HOWEVER, IF CHOICE OF ALTERNATE DESIGN, DEVICE, MATERIAL OR PROCESS IS ALLOWED TO THE CONTRACTOR, THEN THE CONTRACTOR SHALL INDEMNIFY AND SAVE THE COUNTY HARMLESS FORM ANY LOSS ON ACCOUNT THEREOF.** If the material or process specified or required by the County is known by the Contractor to be an infringement, the Contractor shall be responsible for such loss unless it promptly gives such information to the County.

3.10 Laws and Ordinances

The Contractor shall at all times observe and comply with all federal, state and local laws, ordinance and regulations, which in any manner affect the Contract Documents or the Work, and **SHALL INDEMNIFY AND SAVE HARMLESS THE COUNTY, THE OBSERVER THE GEC AND THE ENGINEER OF RECORD, AS WELL AS ANY OF THEIR AGENTS, REPRESENTATIVES, OFFICERS OR EMPLOYEES AGAINST ANY CLAIM ARISING FROM THE VIOLATION OF ANY SUCH LAWS, ORDINANCES, AND REGULATIONS WHETHER BY THE CONTRACTOR OR ITS EMPLOYEES, EXCEPT WHERE SUCH VIOLATIONS ARE CALLED FOR BY THE PROVISIONS OF THE CONTRACT DOCUMENTS.** If the Contractor observes that the plans and specifications are at variance therewith, it shall promptly notify the Observer, in writing, and any necessary changes shall be prepared as provided in the Contract Documents for changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Observer, the Contractor shall bear all costs arising therefrom.

In case the County is a body politic and corporate, the law from which it derives its powers, insofar as the same regulates the objects for which, or the manner in which, or the conditions under which the County may enter into contract, shall be controlling and shall be considered as part of the Contract Documents to the same effect as though embodied herein.

3.11 Assignment and Subletting

The Contractor further agrees that it will retain personal control and will give its personal attention to the fulfillment of the Work strictly in accordance with the Contract Documents and that Contractor will not assign, by Power of Attorney or otherwise, or sublet any right or interest it may have under the Contract Documents without the written consent of the Observer, and that no part or feature of the Work will be sublet to anyone objectionable to the Observer or the County. The Contractor further agrees that the subletting of any portion or feature of the Work, or materials required in the performance of the Work, shall not relieve the Contractor from its full obligations to the County as provided in the Contract Documents.

3.12 Indemnification

THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS THE COUNTY, THE OBSERVER, THE GEC AND THE ENGINEER OF RECORD AND THEIR RESPECTIVE OFFICERS, AGENTS AND EMPLOYEES, FROM AND AGAINST ALL DAMAGES, CLAIMS, LOSSES, DEMANDS, SUITS, JUDGMENTS AND COSTS, INCLUDING REASONABLE ATTORNEYS' FEES AND EXPENSES, ARISING OUT OF OR RESULTING FROM THE PERFORMANCE OF THE WORK, PROVIDED THAT ANY SUCH DAMAGE, CLAIM, LOSS, DEMAND, SUIT, JUDGMENT, COST OR EXPENSE:

(1) IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH OF ANY PERSON INCLUDING CONTRACTOR'S EMPLOYEES AND ANY SUBCONTRACTOR'S EMPLOYEES AND ANY SUB-SUBCONTRACTOR'S EMPLOYEES, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY INCLUDING CONTRACTOR'S PROPERTY (OTHER THAN THE WORK ITSELF) AND THE PROPERTY OF ANY SUBCONTRACTOR OF SUB-SUBCONTRACTOR INCLUDING THE LOSS OF USE RESULTING THEREFROM; AND,

(2) IS CAUSED IN WHOLE OR IN PART BY ANY INTENTIONAL OR NEGLIGENT ACT OR OMISSION OF THE CONTRACTOR, ANY SUBCONTRACTOR, ANY SUB-SUBCONTRACTOR OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY ONE OF THEM OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE.

THE OBLIGATION OF THE CONTRACTOR UNDER THIS PARAGRAPH SHALL NOT EXTEND TO THE LIABILITY OF THE OBSERVER, THE ENGINEER, THE GEC, THE ENGINEER OF RECORD THEIR AGENTS OR EMPLOYEES ARISING OUT OF THE PREPARATION OF MAPS, PLANS, REPORTS, SURVEYS, CHANGE ORDERS, DESIGNS OR SPECIFICATIONS, OR THE APPROVAL OF MAPS, PLANS, REPORTS, SURVEYS, CHANGE ORDERS, DESIGNS OR SPECIFICATIONS OR THE ISSUANCE OF OR THE FAILURE TO GIVE DIRECTIONS OR INSTRUCTIONS BY THE OBSERVER, ITS AGENTS OR EMPLOYEES, PROVIDED SUCH IS THE SOLE CAUSE OF THE INJURY OR DAMAGE.

IN ANY AND ALL CLAIMS AGAINST THE COUNTY, THE OBSERVER THE GEC OR THE ENGINEER OF RECORD OR ANY OF THEIR AGENTS OR EMPLOYEES BY ANY EMPLOYEE OF THE CONTRACTOR, ANY SUBCONTRACTOR, ANY SUB-SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER SECTION 3.12 SHALL NOT BE

LIMITED IN ANY WAY BY ANY LIMITATION ON THE AMOUNT OR TYPE OF DAMAGES, COMPENSATION OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR ANY SUBCONTRACTOR OR SUB-SUBCONTRACTOR UNDER WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS OR OTHER EMPLOYEE BENEFIT ACTS.

3.13 Insurance

The Contractor at its own expense shall purchase, maintain and keep in force such insurance as will protect Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract Documents, whether such operations be by itself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

(1) Workman's compensation claims, disability benefits and other similar employee benefit acts;

(2) Claims for damages because of body injury, occupational sickness or disease, or death of its employees, and claims insured by usual bodily injury liability coverages;

(3) Claims for damages because of bodily injury, sickness or disease, or death of any person other than its employees, and claims insured by usual bodily injury liability coverages; and

(4) Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

CERTIFICATE OF INSURANCE. Before commencing any of the Work, Contractor shall file with the County valid Certificates of Insurance acceptable to the County and the Observer. Such Certificates shall contain a provision that coverages afforded under the policies will not be canceled until at least thirty (30) days prior written notice has been given to the County.

The Contractor shall also file with the County valid Certificates of Insurance covering all Sub-contractors of the Contractor.

3.14 Final Clean-up

Upon the completion of the Work and before acceptance and Final Payment will be made, the Contractor shall clean and remove from the site of the Work all surplus and discarded materials, temporary structures and debris of every kind. The Contractor shall leave the site of the Work in a neat and orderly condition at least equal to that which originally existed. Surplus and waste materials removed from the site of the Work shall be disposed of at locations that are both satisfactory to the Observer and in accordance with the laws pertaining to the disposal of such surplus, debris and waste materials.

In the event the Contractor fails or refuses to clean and remove surplus materials and debris as provided above, the County or the Observer may do so, or cause same to be done, at the

Contractor's expense, and the reasonable cost thereof shall be deducted from any amounts that are owing to the Contractor.

4. Prosecution and Progress

4.01 Time and Order of Completion

It is the meaning and intent of the Contractor Documents, unless otherwise specifically provided, that the Contractor shall be allowed to prosecute its work at such times and seasons, in such order of precedence, and in such manner as shall be most conducive to the economy of construction; provided, however, that the order and the time of prosecution shall be such that the Work shall be substantially completed, as a whole and in part, in accordance with the Contract Documents and within the time of completion designated in the Contractor's bid or proposal; provided, however, when the County is having other work done on the same Project or an adjoining project, either by contract or by its own force, the Observer may direct the time and manner of constructing the Work done under the Contract Documents, so that conflict will be avoided and the construction of the various works and projects being performed for the County shall be harmonized.

Unless otherwise specified, the Contractor shall plan to begin work 10 calendar days from the authorization date to begin work as designated by the Notice to Proceed.

The Contractor shall submit, at such times as may reasonably be requested by the Observer, schedules which shall show the order in which the Contractor proposes to carry on the Work, the dates at which the Contractor will start the several parts of the Work, and estimated dates of completion of the several parts.

Nighttime work is allowed only when shown on the plans or directed or allowed by the Engineer. Nighttime work is defined as work performed from 30 min. after sunset to 30 min. before sunrise.

4.02 Extension of Time

Should the Contractor be delayed in the completion of the Work by any act or neglect of the County, the Observer or the Engineer of Record, or of any employee of either, or by other contractors employed by the County, or by changes ordered in the Work, or by strikes, lockouts, fires, and unusual delays by common carriers, or unavoidable cause or causes beyond the Contractor's control, or by any cause which the Observer shall decide justifies the delay, then an extension of time shall be allowed for completing the Work, sufficient to compensate for the delay, the amount of the extension to be determined by the Observer; provided, however, before the Observer may decide whether or not to allow such an extension of time, the Contractor must tender a prompt written request for an extension of time wherein the Contractor shall give the Observer a written description of the cause of such delay. Adverse weather conditions will not be justification for extension of time on "Calendar Days" contracts.

4.03 Hindrances and Delays

No claims shall be made by the Contractor for damages resulting from hindrances or delays from any cause (except where the Work is stopped by order of and for the convenience of the County) during the progress of any portion of the Work embraced in the Contract Documents. In case said work shall be stopped by the act of the County, then such expense, as in the sole judgment of the Observer is caused by such stoppage of said work, shall be paid by the County to the Contractor.

5. Measurement and Payment

5.01 Quantities and Measurements

No extra or customary measurements of any kind will be allowed. Rather the actual measured and/or computed length, area, solid contents, number and weight only shall be considered, unless otherwise specifically provided otherwise in the Contract Documents.

5.02 Estimated Quantities

The Contract Documents are intended to show clearly all work to be done and material to be furnished hereunder. Where the estimated quantities are shown for the various classes of work to be done and material to be furnished under the Contract Documents, they are approximate and are to be used only as a basis for estimating the probable cost of the Work and for comparing the proposals offered for the Work. It is understood and agreed that the actual amount of work to be done and material to be furnished under the Contract Documents may differ somewhat from these estimates.

Plans quantities may or may not represent the exact quantity of work performed or material moved, handled, or placed during the execution of the Work. For plans quantity measurement items, the estimated bid quantities are designated as final payment quantities, unless revised by the governing specifications. If the actual quantity measured as outlined under “Measurement” varies by more than 5% (or as stipulated under “Measurement” for specific Items) from the total estimated quantity for an individual Item originally shown in the Contract Documents, an adjustment may be made to the quantity of authorized work done for payment purposes. The party requesting the adjustment will provide field measurements and calculations showing the revised quantity. When approved, this revised quantity will constitute the final quantity for which payment will be made. Payment for revised quantity will be made at the unit price bid for that Item, except as provided for in the Contract Documents. When quantities are revised by a change in design approved by the County, by change order, or to correct an error on the plans, the plans quantity will be increased or decreased by the amount involved in the change, and the 5% variance will apply to the new plans quantity.

Where payment is based on the unit price method, the Contractor agrees that it will make no claim for damages, anticipated profits or otherwise on account of any differences which may be found between the quantities of work actually done, the material actually furnished under the Contract Documents and the estimated quantities contemplated and contained in the proposal; provided, however, that in case the actual quantity of any major item should

become as much as twenty-five percent (25%) more than or twenty-five percent (25%) less than the estimated or contemplated quantity for such items, then either party to the Agreement, upon demand, shall be entitled to revised consideration upon the portion of the Work above or below twenty-five percent (25%) of the estimated quantity.

A "Major Item" shall be construed to be any individual bid item incurred in the proposal that has a total cost equal to or greater that five percent (5%) of the total contract cost, computed on the basis of the proposal quantities and the contract unit prices.

Any revised consideration is to be determined by agreement between the parties, otherwise by the terms of the Contract Documents, as provided under Section 6.03 "Extra Work".

5.03 Price of Work

In consideration of the furnishing of all the necessary labor, equipment and material, and the completion of all of the Work by the Contractor, and on the completion of all of the Work and on the delivery of all material in full conformity with the specifications and stipulations contained in the Contract Documents, the County agrees to pay the Contractor the Contract Price that is set forth in the Agreement. The Contractor hereby agrees to receive such Contract Price in full for furnishing all material and all labor required for the Work, also for all expense incurred by Contractor, and for well and truly performing the same and the whole thereof in the manner with and in accordance to the Contract Documents.

5.04 Partial Payments

On or before the first Wednesday of each month, the Contractor shall submit to the Observer a statement showing the total value of the Work performed up to and including the last day of the preceding month. The statement shall also include the value of all sound materials delivered on the job site and to be included in the Work and all partially completed work whether bid as a lump sum or a unit item which, in the opinion of the Observer, is acceptable. The Observer shall either examine and approve by signature or modify and approve such modified statement.

The County shall then pay the Contractor, within 30 days of the statement submittal, the total amount of the approved statement, less ten percent (10%) of the amount thereof, which ten percent (10%) shall be retained until Final Payment, and further less all previous payments and all further sums that may by retained by the County under the terms of the Contract Documents and/or under state or federal law. It is understood, however, that in case the whole work be near to completion and some unexpected and unusual delay occurs due to no fault or neglect on the part of the Contractor, then the County may, upon written recommendation of the Observer, pay a reasonable and equitable portion of the retained percentage to the Contractor; or the Contractor, at the County's option, may be relieved of the obligation to fully complete the Work and, thereupon, the Contractor shall receive payment of the balance due Contractor under the contract subject to the terms and conditions stated in the Contract Documents.

(1) When work progress is fifty percent (50%) complete, as determined by the value of the work completed to date against the original or revised contract amount, whichever is greater, the County may reduce the amount retained to five percent (5%) of the value of all work satisfactorily complete to date, including the value paid for materials on hand, provided, in the sole opinion of the Observer, the Contractor is making satisfactory progress toward completion of the project in a timely manner and there is no other cause to retain a greater percentage.
(2) Upon issuance of the NOTICE OF SUBSTANTIAL COMPLETION and agreement to final project quantities, the percent retained may be further reduced, at the discretion of the Engineer and the Observer, to two percent (2%) of the total value of all work completed to date. This amount shall be retained until Final Payment and close out of the project.

5.05 Punch List

The Contractor shall notify the Observer in writing when, in the Contractor's opinion, the Work has been "Substantially Completed" and when so notifying the Observer, the Contractor shall furnish to the Observer, in writing, a detailed list of unfinished work, also known as the Punch List. The Observer will review the Punch List and will add any items that the Contractor failed to include on said list. The fact that a structure or facility has been "Substantially Completed" shall not excuse the Contractor from performing all of the Work undertaken, whether such work is of a minor or major nature. Furthermore, the Contractor shall remain obligated to fully complete the Work and perform its obligations under the Contract Documents after the Work has been Substantially Completed.

5.06 Final Completion and Acceptance

The Contractor shall have a specified time period for completion of the Punch List items, as set forth in Section XI of the Special Conditions, "Completion of Work on Time." Within ten (10) days after the Contractor has given the Observer written notice that the Punch List has been completed, the Observer shall inspect the Work and within said time, if the Work is found to be completed in accordance with the Contact Documents, the Observer shall issue to the Contractor its Certificate of Completion. In the event the Punch List has not been completed, the Observer shall advise the Contractor, in writing, of the Observer's basis for deeming the Punch List incomplete. Following the Contractor's receipt of the Observer's notice that the Punch List is incomplete, the Contractor shall complete the remaining items prior to the expiration of the above referenced specified time period for completion of the Punch List items. Upon satisfactory completion of the Punch List and the issuance of the Certificate of Completion, it shall be the Contractor's responsibility to submit the contract close-out documents, which shall include the record drawings, maintenance bond and Affidavit of All Bills Paid, and thereupon it shall be the duty of the County to issue a Certificate of Acceptance (Final Acceptance) to the Contractor.

5.07 Final Payment

Upon the issuance of the Notice of Substantial Completion, the Observer shall proceed to make final measurements and prepare final statement for the value of all work performed and materials furnished under the terms of the Contract Documents and shall certify same to the

County, and, then, Final Payment shall be made to the Contractor. At the County's sole discretion, this payment may include payment for work remaining to be performed in association with the removal of temporary erosion controls or the establishment of permanent stabilization measures. On or after the 30th day, and before the 35th day after the date of the Certificate of Acceptance, the balance due the Contractor under the terms of the Contract Documents shall be paid. Neither the Certificate of Acceptance nor the Final Payment, nor any provision in the Contract Documents, shall relieve the Contractor of the obligation for fulfillment of any warranty which may be required.

5.08 Payments Withheld

The County may, on account of subsequently discovered evidence, withhold or nullify the whole or part of any certificate to such extent as may be necessary to protect itself from loss on account of:

(a) Defective work not remedied or other obligations hereunder not completed.
(b) Claims filed or reasonable evidence indicating the probable or potential filing of claims.
(c) Failure of the Contractor to make payments properly to Subcontractors or for material or labor.
(d) Damage to the County or another contractor's work, material or equipment.
(e) Reasonable doubt that the Work can be completed for the unpaid balance of the contract amount or Contract Price.
(f) Reasonable indication that the Work will not be completed within the contract time.
(g) Other causes affecting the performance of the Work subject of the Contract Documents.

When the above grounds are removed or the Contractor provides a surety bond satisfactory to the County, which will protect the County in the amount withheld, payment shall be made for amounts withheld because of them.

5.09 Delayed Payments

Should the County fail to make payment to the Contractor of the sum named in any partial or final statement, when such payment is due, then the County shall pay to the Contractor, in addition to the sum shown as due by such statement, interest thereon in accordance with Texas Government Code Section 2251.025. More specifically, the rate of interest that shall accrue on a late payment is the rate in effect on September 1 of County's fiscal year in which the payment becomes due. The said rate in effect on September 1 shall be equal to the sum of one percent (1%); and (2) the prime rate published in the Wall Street Journal on the first day of July of the preceding fiscal year that does not fall on a Saturday or Sunday. County's payment of the amount due plus said interest shall fully liquidate any injury to the Contractor growing out of such delay in payment. It is expressly agreed that delay by the County in making payment to the Contractor of the sum named in any partial or final statement shall not constitute, on the part of the County, a breach under the Contract Documents, nor shall it serve as an abandonment by the County. Furthermore, any delay by the County in making payment to the Contractor of the sum named in any partial or final statement shall not, to any

extent or for any time, relieve the Contractor of its obligations to fully and completely perform pursuant to the terms of the Contract Documents.

6. Extra Work and Claims

6.01 Change Orders

Without invalidating the Agreement or any terms of the Contract Documents, the County may, at any time or from time to time, order additions, deletions or revisions to the Work. Any such additions, deletions or revisions to the Work may only be effectuated and authorized by written Change Order. The said written Change Order shall be prepared by the GEC for execution by the County and the Contractor. The Change Order shall set forth the basis for any change in Contract Price, as hereinafter set forth in Section 6.03, Extra Work, and for any change in contract time which may result from the change.

In the event the Contractor shall refuse to execute a Change Order which has been prepared by the GEC and executed by the County, the GEC may, in writing, instruct the Contractor to proceed with the Work as set forth in the Change Order and the Contractor shall thereafter proceed with such work. The Contractor may make claim against the County for Extra Work involved under the Change Order, as hereinafter provided.

6.02 Minor Changes

The Observer may authorize minor changes in the Work which are not inconsistent with the overall intent of the Contract Documents and which do not involve an increase in Contract Price. If the Contractor believes that any minor change or alteration authorized by the Observer involves Extra Work which entitles it to an increase in the Contract Price, the Contractor shall make written request to the Observer for a written Field Order. For purposes of this section, a "Field Order" shall mean the Contractor's cost proposal for the Extra Work that the Contractor believes would increase the Contract Price.

In such case, the Contractor, by copy of its communication to the Observer or by separate writing, shall advise the County of its request to the Observer for a written Field Order. The Contractor's notice to the County shall inform the County that the work subject of the written Field Order may result in an increase in the Contract Price.

Any request by the Contractor for a change in Contract Price shall be made prior to commencing the work covered by the proposed change.

6.03 Extra Work

It is agreed that the basis of compensation to the Contractor for work either added or deleted by a change order or for which a claim for Extra Work is made shall be determined by the unit prices upon which the Work and Project was bid to the extent such work can be fairly classified within the various work item descriptions. For work that cannot be fairly classified within the said various work item descriptions, the basis of compensation to the Contractor

for work either added or deleted by a change order or for which a claim for Extra Work is made shall be determined by one or more of the following methods:

Method (A)
By agreed unit prices; or

Method (B)
By agreed lump sum; or

Method (C)
If neither Method (A) nor Method (B) is agreed upon before the Extra Work is commenced, then the Contractor shall be paid the "actual field cost" of the Work, plus fifteen percent (15%).

In the event said Extra Work is performed and paid for under Method (C), then the provisions of this paragraph shall apply and the "actual field cost" is hereby defined to include the cost to the Contractor of all workmen, such as foremen, timekeepers, mechanics and laborers, and materials, supplies, trucks, rentals on machinery and equipment, for the time actually employed or used on such Extra Work, plus actual equipment, for the time actually employed or used on such Extra Work, plus actual transportation charges necessarily incurred, together with all power, fuel, lubricants, water and similar operating expenses, also all necessary incidental expenses incurred directly on account of such Extra Work, including Social Security, Old Age Benefits and other payroll taxes, and a rateable proportion of premiums on performance and payment bonds and maintenance bonds, public liability and property damage and workers' compensation, and all other insurance as may be required by any law or ordinance, or directed or agreed to by the County. The Observer may direct the form in which accounts of the "actual field cost" shall be kept and the records of these accounts shall be made available to the Observer. The Observer or the County may also specify, in writing before the Extra Work commences, the method of doing the Extra Work and the type and kind of machinery and equipment to be used; otherwise these matters shall be determined by the Contractor. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using one hundred percent (100%), unless otherwise specified, of the latest schedule of Equipment ownership Expense adopted by the Associated General Contractors of America. Where practicable the terms and prices for the use of machinery and equipment shall be incorporated in the written Extra Work order. The fifteen percent (15%) of the "actual field cost" to be paid the Contractor shall cover and compensate Contractor for its profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the "actual field cost" as herein defined, save that where the Contractor's camp or field office must be maintained primarily on account of such Extra Work; then the cost to maintain and operate the same shall be included in the "actual field cost."

No claim for Extra Work of any kind will be allowed unless ordered, in writing, by the Observer. In case any orders or instructions, either oral or written, appear to the Contractor to involve Extra Work for which Contractor should receive compensation or an adjustment in

the construction time, Contractor shall make written request to the Observer for written order authorizing such Extra Work. Should a difference of opinion arise as to what does or does not constitute Extra Work, or as to the payment therefor, and the Observer insists upon its performance, the Contractor shall proceed with the Work after making written request for written order and shall keep an accurate account of the "actual field cost" thereof, as provided under Method (C).

6.04 Time of Filing Claims

The County and Contractor hereby agree and acknowledge that all questions of dispute or adjustment presented by the Contractor shall be in writing and filed with the Observer within thirty (30) days after the Observer has given any directions, order or instruction to which the Contractor desires to take exception. The Observer shall reply within thirty (30) days to such written exceptions by the Contractor and render the Observer's final decision in writing. In case the Contractor should appeal from the Observer's decision, the Contractor may file with the County its objection. It is further agreed that the acceptance by the Contractor of the Final Payment shall serve as a bar to any claims that the Contractor may have for matters arising prior to or after the Contractor's acceptance of the Final Payment.

6.05 Continuing Performance

The Contractor shall continue performance of the Work during all disputes or disagreements with the County. The production or delivery of goods, the furnishing of services and the construction of projects or facilities shall not be delayed, prejudiced or postponed pending resolution of any disputes or disagreements, except as the County may otherwise agree in writing.

7. Abandonment of Contract

7.01 Abandonment by Contractor

In case the Contractor should abandon and fail or refuse to resume work within ten (10) days after written notification from either the County or the Observer, or if the Contractor fails to comply with the orders of the Observer when such orders are consistent with the Contract Documents, then and in such case where performance bonds exist, the appropriate sureties on these bonds shall be provided with a notice of abandonment and notice for completion whereby (i) the sureties are notified of the Contractor's abandonment or Contractor's failure or refusal to resume work; and (ii) the sureties are directed to complete the Work. A copy of the notice of abandonment and notice for completion shall be delivered to the Contractor.

After receiving a copy of the above described notice of abandonment and notice for completion, the Contractor shall not remove from the Project any machinery, equipment, tools, materials or supplies that then currently exist on the Project site, but the same, together with any materials and equipment under contract for the Work, may be held for use on the Project by the County or the surety on the performance bond, or another contractor in completion of the Work; and the Contractor shall not receive any rental or credit therefor (except when used in connection with Extra Work, where credit shall be allowed as provided for under Section 6, Extra Work and Claims, herein), it being understood that the use of such

equipment and materials will ultimately reduce the cost to complete the Work and be reflected in the final settlement.

Where there is no performance bond provided or in case the surety should fail to commence compliance within ten (10) days after service of the herein above provided notice of abandonment and notice for completion, then the County may provide for completion of the Work in either of the following elective manners:

(1) The County may thereupon employ such force of men and use such machinery, equipment, tools, materials and supplies as the County may deem necessary to complete the Work and charge the expense of such labor, machinery, equipment, tools, materials and supplies to the Contractor, and expense so charged shall be deducted and paid by the County out of such monies as may be due, or that may thereafter at any time become due to the Contractor under and by virtue of the Contract Documents. In case such expense is less than the sum which would have been payable under the Contract Documents if the same had been completed by the Contractor, then the Contractor shall receive the difference. In case such expense is greater than the sum which would have been payable under the Contract Documents if the same had been completed by the Contractor, then the Contractor and/or its surety shall pay the amount of such excess to the County, or

(2) The County, under sealed bids, after five (5) days notice published one or more times in a newspaper having general circulation in the area of the location of the Project, may let a contract for the completion of the Work under substantially the same terms and conditions which are provided in the Contract Documents. In case there is any increase in cost to the County under the new contract as compared to what would have been the cost under the Contract Documents, such increase shall be charged to the Contractor and the surety shall be and remain bound therefor. However, should the cost to complete any such contract prove to be less than what would have been the cost to complete under the Contract Documents, the Contractor and/or its surety shall be credited therewith.

When the Work shall have reached Final Completion, the Contractor and its surety shall be so notified and Certificates of Completion and Acceptance, as provided in Section 5.06 herein above, shall be issued. A complete itemized statement of the contract accounts, certified by the Observer as being correct, shall then be prepared and delivered to the Contractor and its surety, whereupon the Contractor and/or its surety, or the County as the case may be, shall pay the balance due as reflected by said statement within fifteen (15) days after the date of such Certificate of Completion.

In the event the statement of accounts shows that the cost to complete the Work is less than that which would have been the cost to the County had the Work been completed by the Contractor under the terms of the Contract Documents, or when the Contractor and/or its surety shall pay the balance shown to be due by them to the County, then all machinery, equipment, tools, materials or supplies left on the site of the Project shall be turned over to the Contractor and/or its surety.

Should the cost to complete the Work exceed the exceed the amount the County would have been obligated to pay the Contractor had the Work been completed by the Contractor under the terms of the Contract Documents, and should the Contractor and/or its surety fail to pay the amount due the County within the time designated hereinabove, and should there remain any machinery, equipment, tools, materials or supplies on the site of the Project, notice thereof, together with an itemized list of such equipment and materials, shall be mailed to the Contractor and its surety at the respective addresses designated in the Contract Documents. After properly tendering such notice, such property shall be held at the risk of the Contractor and its surety subject only to the duty of the County to exercise ordinary care to protect such property. After fifteen (15) days from the date of said notice, the County may sell such machinery, equipment, tools, materials or supplies and apply the net sum derived from such sale to the credit of the Contractor and its surety. Such sale may be made at either public or private sale, with or without notice, as the County may elect. The County shall release, to their proper owners, any machinery, equipment, tools, materials, or supplies, which remain on the Project and which belong to persons other than the Contractor or its surety. The books on all operations provided herein shall be opened to the Contractor and its surety.

7.02 Abandonment by the County

In the event that the County should fail, within ten (10) days after receiving written notification from the Contractor, to comply with the terms of the Contract Documents, then the Contractor may suspend or wholly abandon the Work, and may remove therefrom all machinery, tools and equipment, and all materials on the Project site that have not been included in payments to the Contractor and have not been wrought into the Work. Thereupon, the Observer shall make an estimate of the total amount earned by the Contractor, which estimate shall include the value of all work actually completed by said Contractor (at the prices stated in the Contract Documents), the value of all partially completed work at a fair and equitable price, and the amount of all Extra Work performed at the prices agreed upon, or provided for by the terms of the Contract Documents. The Observer shall then make a final statement of the balance due the Contractor by deducting from the above estimate all previous payments by the County and all other sums that may be retained by the County under the terms of the Agreement and the Contract Documents and the Observer shall certify same to the County who shall pay to the Contractor on or before thirty (30) days after the date of the Observer's certification.

8. Subcontractors

8.01 Award of Subcontracts for Portions of the Work

Unless otherwise specified in the Contract Documents or in the Instructions to Bidders, the Contractor, as soon as practicable after the award of the contract, shall furnish to the Observer, in writing for acceptance by the County, a list of the names of the Subcontractors proposed for the principal portions of the Work. The Observer shall promptly notify the Contractor, in writing, if the County, after due investigation, has objection to any Subcontractor on such list and does not accept such Subcontractor.

The Contractor shall not contract with any Subcontractor or any person or organization (including those who are to furnish materials or equipment fabricated to a special design) proposed for portions of the Work designated in the Contract Documents or in the Instructions to Bidders or, if none is so designated, with any Subcontractor proposed for the principal portions of the Work who has been rejected by the County. The Contractor will not be required to contract with any Subcontractor or person or organization against whom the Contractor has a reasonable objection.

If the County refuses to accept any Subcontractor or person or organization on a list submitted by the Contractor in response to the requirements of the Contract Documents or the Instructions to Bidders, the Contractor shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate change order shall be issued; however, no increase in the Contract Price shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting for acceptance any list or lists of names as required by the Contract Documents or the Instructions to Bidders.

If the County requires a change of any proposed Subcontractor or person or organization previously accepted by them, the Contract Price shall be increased or decreased by the difference in cost occasioned by such change and an appropriate change order shall be issued.

The Contractor shall not make any substitution for any Subcontractor or person or organization that has been accepted by the County, unless the substitution is acceptable to the County.

8.02 Subcontractual Relations

All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate written agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

(1) preserve and protect the rights of the County, the Observer, the GEC and the Engineer of Record under the contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;
(2) require that such work be performed in accordance with the requirements of the Contract Documents;
(3) require submission to the Contractor of the applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with the Contract Documents;
(4) require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner provided in the Contract Documents for like claims by the Contractor upon the County;
(5) obligate each subcontractor specifically to consent to the provisions of this section.

A copy of all such signed subcontract agreements shall be filed by the Contractor with the Observer before the Subcontractor shall be allowed to commence work.

8.03 Payments to Subcontractors

The Contractor shall pay each Subcontractor, upon receipt of payment from the County, an amount directly based upon the value of the Work performed and allowed to the Contractor on account of such Subcontractor's work, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to its subcontractors.

If the Observer fails to approve a payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the Contractor shall pay the Subcontractor, on demand made at any time after the Certificate for Payment should otherwise have been issued, for its work to the extent completed, less the retained percentage, if any.

The Observer may, on request and at its discretion, furnish to any Subcontractor, if practicable, information regarding percentages of completion certified to the Contractor on account of work done by such Subcontractors.

Neither the County, the Observer nor the Engineer shall have any obligation to pay or to see to the payment of any monies to such Subcontractor except as may otherwise be required.

9. Protection of Persons and Property

9.01 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

9.02 Safety of Persons and Property

The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

(1) all employees on the Work and all other persons who may be affected thereby:
(2) all the Work and all materials and equipment to be incorporated therein, whether in storage or off the site, under the care, custody or control of the Contractor or any of its Subcontractors or Sub-subcontractors; and
(3) other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, fences, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety

and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

All blasting, including methods of storing and handling explosives and highly inflammable materials, shall conform to federal, state, local laws and ordinances.

The following is a list of requirements in addition to federal, state, and local laws and ordinances:

(1) The Contractor shall furnish the County with a Certificate of Blasting Insurance in the amount of $300,000.00 for each contract, at least twenty-four (24) hours prior to using explosives. A blasting permit must be obtained from the appropriate jurisdictions at least five (5) days prior to use of explosives. If blasting is covered under the Contractor's General Insurance Certificate for each contract, a separate blasting certificate will not be required.
(2) The following public utility companies and departments will be notified by the Contractor, on every occasion, at least twenty-four (24) hours prior to the use of explosives: Water and Wastewater, Electric, Gas, Telephone and the County Engineering Department.
(3) Explosive materials to be used shall be limited to blasting agents and dynamite, unless prior approval of other materials is obtained in writing from the Engineering Department.
(4) During blasting, all reasonable precautions shall be taken to protect pedestrians, passing vehicles, and public or private property. Blasting mats or protective cover shall be used when required by the Observer, the permit, or by safe blasting practices.
(5) All explosives shall be stored in accordance with all applicable laws and codes.
(6) The Engineer or its representative shall have the right to limit the use of explosives and/or blasting methods which in its opinion are dangerous to the public or nearby property of any kind.
(7) The Contractor, at its expense, shall promptly repair or replace all items known to be damaged as a result of blasting. All claims of damage shall be investigated by the County or by consulting firms approved by the County.
(8) The Contractor shall maintain accurate records throughout the blasting operations showing the type explosive used, number of holes, pounds per hole, depth of hole, total pounds per shot, delays used, date and time of blast and initials of the Observer. The Contractor is fully responsible for all claims resulting from its blasting operation.

All damage or loss to any property referred to in this article caused, in whole or in part, by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be

remedied by the Contractor, except damage or loss attributable solely to faulty drawings or specifications or solely to the acts or omissions of the County its agents, employees, or representatives or anyone employed by either of them, and not attributable in any degree to the fault or negligence of the Contractor.

The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the County.

9.03 Location and Protection of Utilities

Notwithstanding any other provision of the Contract Documents, the Contractor shall be solely responsible for the location and protection of any and all public utility lines and utility customer service lines in the Project area. The Contractor shall exercise due care to locate and to mark, uncover or otherwise protect all such lines in the construction zone and any of the Contractor's work or storage areas. Upon request, the County shall provide such information as it has about the location and grade of water, sewer, gas, and telephone and electric lines and other utilities in the Work area but such information shall not relieve or be deemed to be in satisfaction of the Contractor's obligation hereunder, which shall be primary and nondelegable. Any such lines damaged by the Contractor's operations shall be immediately repaired by the Contractor or it shall cause such damage to be repaired at its expense.

10. Termination

10.01 Termination by the County for Cause

Conditions for termination are as follows:

(A) Without prejudice to any other legal or equitable right or remedy which it would otherwise possess hereunder or as a matter of law, the County shall be entitled, by giving Contractor five (5) days prior written notice, to terminate the Agreement in its entirety at any time:

(1) If the Contractor becomes insolvent, voluntarily files for bankruptcy, is the subject of an involuntary petition for bankruptcy commenced by its creditors, makes a general assignment for the benefit of creditors or becomes the subject of any other proceeding commenced under any statute or law for the relief of debtors; or

(2) If a receiver trustee or liquidator of any of the property or income of Contractor shall be appointed; or

(3) If Contractor:

(a) Shall fail to prosecute the Work or any part thereof with diligence necessary to insure its progress and completion as prescribed by the time schedules; and shall fail to take such steps to remedy such default within ten (10) days after written notice thereof from the County; or

(4) If Contractor:

(a) Shall commit a default under any of the terms, provisions, conditions, or covenants contained in the Contract Documents; and

(b) Shall fail to take such steps to remedy such default within ten (10) days after written notice thereof from the County.

(B) In the event of County's termination for cause, Contractor shall only be paid its reimbursable costs incurred prior to the effective date of the termination notice and shall not be entitled to receive any further fixed fee payments hereunder and shall be further subject to any claim the County may have against Contractor under other provisions of the Contract Documents or as a matter of law, including the refund of any overpayment of reimbursable costs and/or fixed fee.

(C) If the Agreement is terminated for cause, the County shall have the right, but shall not be obligated, to complete the Work itself or by others; and to this end, the County shall be entitled to take possession of and use such equipment and materials as may be on the Project site, and to exercise all rights, options, and privileges of Contractor under its subcontracts, purchase orders, or otherwise; and Contractor shall promptly assign such rights, options and privileges to the County. If the County elects to complete the Work itself or by others, pursuant to the foregoing, the Contractor will reimburse the County for all costs incurred by the County (including, without limitation, applicable, general, and administrative expenses, and field overhead, and the cost of necessary equipment, materials, and field labor) in correcting work by Contractor which fails to meet contract requirements.

Nothing contained in the preceding sections shall require the County to pay for any of the Work which is unsatisfactory, as determined by the Observer or which is not submitted in compliance with the terms of the Contract Documents. The County shall not be required to make any payments to Contractor when Contractor is in default under the Contract Documents.

This Article shall not constitute a waiver of any right, at law or at equity, which the County may have if Contractor is in default, including the right to bring legal action for damages or to force specific performance of the terms and conditions of the Contract Documents.

10.02 Termination for Convenience

In connection with the Work outlined in the Contract Documents, it is agreed and fully understood by Contractor, that the County may cancel or indefinitely suspend further work hereunder or terminate the Agreement for the convenience of the County, upon fifteen (15) days written notice to Contractor. In the event the County terminates the Agreement for convenience, it is hereby understood and acknowledged by the Contractor that immediately upon receipt of the County's notice of termination, all work and labor being performed under the Contract Documents shall cease. Contractor shall invoice the County for all work satisfactorily completed and shall be compensated in accordance with the terms of the Contractor Documents for work accomplished prior to the receipt of said notice. No amount shall be due for lost or anticipated profits. However, no cost incurred after the effective date of the notice of termination shall be treated as reimbursable costs unless it relates to carrying out the un-terminated portion or taking closeout measures.

10.03 Obligations of Contractor Following Termination

After receipt of a notice of termination, whether such termination be for cause or convenience, Contractor shall, in good faith and to the best of its ability, do all things necessary to assure the efficient proper closeout of the terminated work (including the protection of County property). Among other things, the Contractor shall, except as otherwise directed or approved by the County:

(1) Stop the Work on the date and to the extent specified in the notice of termination.
(2) Place no further orders for subcontracts for services, equipment or materials, except as may be necessary for completion of such portion of the Work as is not terminated.
(3) Terminate all orders and subcontracts to the extent that they relate to the performance of the Work terminated by the notice of termination.
(4) Assign to the County, in the manner and to the extent directed by it, all right title, and interest of Contractor under the orders or subcontracts so terminated; in which case, the County shall have the right to settle or pay any or all claims arising out of such termination of such orders and/or subcontracts.
(5) With the approval of the County, settle all outstanding liabilities and all claims arising out of such termination or orders and subcontracts.
(6) Deliver to the County, all documents, property, plans, field surveys, maps, cross sections and other data, designs and work related to the Project, which shall become the property of the County upon termination. The delivery of such items shall be made in a reasonably organized form, without restriction on future use. Should the County subsequently contract with a new contractor for continuation of services on the Project subject of the Contract Documents, Contractor shall cooperate in providing information to the County and the new contractor.

11. Inspection and Audit

Contractor's records shall be subject to audit and such records shall include, but not be limited to accounting records, written policies and procedures; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets; correspondence; change order files (including documentation covering negotiated settlements); back charge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other Contractor records which may have a bearing on matters of interest to the County in connection with the contractor's work for the County. All of the foregoing, hereinafter referred to as "records," shall be open to inspection and subject to audit and/or reproduction by County or its authorized representative to the extent necessary to adequately permit evaluation and verification of:

(a) Contractor compliance with the Contract Documents,
(b) compliance with County's business ethics policies,
(c) compliance by other contractors or subcontractors with contracts with County or Contractor, and
(d) compliance with provisions for pricing change orders, invoices or claims submitted by the Contractor or any of its payees.

Other specific records subject to audit include all information, materials and data of every kind and character such as documents, subscriptions, recordings, computerized information, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information that may, in County's judgment, have any bearing on or pertain to any matters, rights, duties or obligations under or covered by the Contract Documents. Such records subject to audit shall also include those records necessary to evaluate and verify direct and indirect costs, (including overhead allocations) as they may apply to costs associated with this Project. In those situations where Contractor's records have been generated from computerized data (whether mainframe, mini-computer, or PC based computer systems), Contractor agrees to provide County's representatives with extracts of data files in computer readable format on data disks or suitable alternative computer data exchange formats.

The County or its designee shall be entitled to audit all of the Contractor's records for a period of three (3) years after final payment or a longer period if required by law.

Contractor shall require all payees (including those entering into lump sum subcontracts and lump sum major material purchase orders), to comply with the provisions of this article by insertion of the requirements hereof in a written contract agreement between Contractor and payee. Requirements to include flow-down audit provisions in contracts with payees will apply to Subcontractors, Sub-Subcontractors, material suppliers, etc. when working under any type of contract including lump sum agreement, unit price agreements, time and material agreements, cost plus agreements, or other agreements. Contractor will cooperate fully and will cause all payees to cooperate fully in furnishing or in making available to County from time to time whenever requested in an expeditious manner any and all such information, materials and data required by this section.

County's agent or its authorized representative shall have access to the Contractor's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of the Work, shall have access to all necessary records, and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this section.

SECTION 12
SPECIAL CONDITIONS OF AGREEMENT

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SPECIAL CONDITIONS

I. County

Williamson County, a political subdivision of the State of Texas, acting through its County Judge, or his designee, agents or employees, whom Contractor has entered into the Agreement and for whom the Work is to be performed, is referred to as "County". The County shall be contacted through its Purchasing Department for contract related subjects and through the County Engineer's office for design and construction related subjects:

Purchasing Department	County Engineer
Williamson County	Williamson County
901 South Austin Avenue	3151 SE Inner Loop
Georgetown, TX 78626	Georgetown, TX 78626

II. Program Manager

Prime Strategies, Inc. is the County's Program Manager for the Project. The Program Manager represents the County and oversees the planning, design, review, and coordination of the design and construction phases of the Project.

III. General Engineering Consultant (GEC)

HNTB Corporation is the consulting engineering firm representing and assisting the County in the design, review, and coordination of the design and construction phases of the project, including oversight of the construction engineering and inspection services performed on the Project.

IV. The Construction Observer

Williamson County or Representative is the "Construction Observer" referred to herein and in the Contract Documents. The Construction Observer will be responsible for performing construction observation services on the Project.

V. Engineer of Record

HDR Engineering, Inc. is the County's design professional, who shall provide professional engineering services as defined in the Texas Government Code Chapter 2254, Subchapter A, and referred to as the " Engineer of Record" in the "General Conditions of Agreement" contained in the Contract Documents. Nothing contained in the Contract Documents shall create any contractual or agency relationship between the Engineer of Record and the Contractor.

VI. Insurance

The Contractor will carry Workmen's Compensation Insurance, Public Liability and Property Damage Insurance, and Automobile Insurance sufficient to provide adequate protection against damage claims which may arise from operations under the Contract Documents, in compliance with the following:

Contractors Insurance: Without limiting any of the other obligations or liabilities of the Contractor, during the term of the Agreement and prior to Final Completion, the Contractor and each subcontractor, at their own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly approved to do business in the State of Texas and satisfactory to the County. Certificates of each policy shall be delivered to the County before any work is started, along with a written statement from the issuing company stating that said policy shall not be canceled, non-renewed or materially changed without 30 days advance written notice being given to the County. Prior to the effective date of cancellation, Contractor must deliver to the County a replacement certificate of insurance or proof of reinstatement. A model Certificate of Insurance is illustrated herein. Coverage shall be of the following types and not less than the specified amounts:

(a) workers' compensation as required by Texas law, with the policy endorsed to provide a waiver of subrogation as to the County; employer's liability insurance of not less than $500,000 for each accident, $500,000 disease--each employee, $500,000 disease-policy limit.

(b) commercial general liability insurance, including independent contractor's liability, completed operations and contractual liability covering, but not limited to, the liability assumed under the indemnification provisions of the Contract Documents, fully insuring Contractor's (or subcontractor's) liability for injury to or death of County's employees and third parties, extended to include personal injury liability coverage with damage to property of third parties, with minimum limits as set forth below:

General Aggregate	$1,000,000
Operations Aggregate	$1,000,000
Personal and Advertising Injury	$600,000
Each Occurrence	$600,000
Fire Damage (any one fire)	$50,000
Medical Expense (any one person)	$5,000

The policy shall include coverage extended to apply to completed operations, asbestos hazards (if this project involves work with asbestos) and XCU (explosion, collapse and underground) hazards. The completed operations coverage must be maintained for a minimum of one year after Final Completion and acceptance of the Work, with evidence of same filed with County.

(c) comprehensive automobile and truck liability insurance, covering owned, hired and non-owned vehicles, with a combined bodily injury and property damage minimum limit of $600,000 per occurrence; or separate limits of $250,000 for bodily injury (per person), $500,000 bodily injury (per accident) and $100,000 for property damage. Such insurance shall include coverage for loading and unloading hazards.

"Umbrella" Liability Insurance: The Contractor shall obtain, pay for and maintain umbrella liability insurance during the contract term, insuring Contractor for an amount of not less than $1,000,000 per occurrence combined limit for bodily injury and property damage that follows form and applies in excess of the primary liability coverages required herein above. The policy shall provide "drop down" coverage where underlying primary insurance coverage limits are insufficient or exhausted. County and Project Engineer shall be named as additional insured.

Policy Endorsements and Special Conditions

(a) Each insurance policy to be furnished by Contractor shall include the following conditions by endorsement to the policy:

(1) name the County, the Program Manager, the County's Representatives, the GEC, the Construction Observer and the Engineer of Record as an additional insured as to all applicable coverage;
(2) each policy shall require that 30 days prior to the cancellation, non-renewal or any material change in coverage, a notice thereof shall be given to County by certified mail.
(3) the term "County" shall include all authorities, boards, bureaus, commissions, divisions, departments and offices of the County and individual members, employees and agents thereof in their official capacities, and/or while acting on behalf of the County;
(4) the "Program Manager" represents and assists the County in the planning, design, review, and coordination of the design and construction phases of the project.
(5) the policy phrase "other insurance" shall not apply to the County where the County is an additional insured on the policy; and
(6) all provisions of the Contract Documents concerning liability, duty and standard of care together with the indemnification provision, shall be underwritten by contractual liability coverage sufficient to include such obligations within applicable policies.

(b) Insurance furnished by the Contractor shall also be in accordance with the following requirements:
(1) any policy submitted shall not be subject to limitations, conditions or restrictions deemed inconsistent with the intent of the insurance requirements to be fulfilled by Contractor. The County's decision thereon shall be final;
(2) all policies are to be written through companies duly licensed to transact that class of insurance in the State of Texas; and
(3) all liability policies required herein shall be written with an "occurrence" basis coverage trigger.

(c) Contractor agrees to the following:
(1) Contractor hereby waives subrogation rights for loss or damage to the extent same are covered by insurance. Insurers shall have no right of recovery or subrogation against the County, it being the intention that the insurance policies shall protect all

parties to the Agreement and be primary coverage for all losses covered by the policies;

(2) companies issuing the insurance policies and Contractor shall have no recourse against the County for payment of any premiums or assessments for any deductibles, as all such premiums and deductibles are the sole responsibility and risk of the Contractor;

(3) approval, disapproval or failure to act by the County regarding any insurance supplied by the Contractor (or any subcontractors) shall not relieve the Contractor of full responsibility or liability for damages and accidents as set forth in the contract documents. Neither shall the bankruptcy, insolvency or denial of liability by the insurance company exonerate the Contractor from liability; and

(4) no special payments shall be made for any insurance that the Contractor and subcontractors are required to carry; all are included in the contract price and the contract unit prices.

Any of such insurance policies required under the Contract Documents may be written in combination with any of the others, where legally permitted, but none of the specified limits may be lowered thereby.

The Contractor shall furnish the County with satisfactory proof that it has provided adequate insurance coverage in amounts and by approved carriers as required by the Contract Documents.

VII. Record ("As-Built") Drawings

The Contractor shall mark all changes and revisions on all of its copies of the working drawings during the course of the Project as they occur. Upon completion of the Project and prior to Final Acceptance and Payment, the Contractor shall submit to the Construction Observer one set of its working drawings, dated and signed by the Contractor and its project superintendent and labeled as "As-Built", that shows all changes and revisions outlined above and that shows field locations of all above ground appurtenances including, but not limited to valves, fire hydrants and manholes. These as-built drawings shall be forwarded to the GEC and then to the County and become the property of the County. Each appurtenance shall be located by at least two (2) horizontal distances measured from existing, easily identifiable, immovable appurtenances such as fire hydrants or valves. Property pins can be used for as-builts tie-ins provided no existing utilities as previously described are available. Costs for delivering as-built drawings shall be subsidiary to other bid items.

VIII. Limit of Financial Resources

The County has a limited amount of financial resources committed to this Project; therefore, it shall be understood by Contractor that the County may be required to change and/or delete any items which it may feel is necessary to accomplish all or part of the scope of work within its limit of financial resources. Contractor shall be entitled to no claim for damages or anticipated profits on any portion of work that may be omitted. At any time during the duration of the Project, the County reserves the right to omit any

work from the Contract Documents. Unit prices for all items previously approved in the Contract Documents shall be used to delete or add work per change order.

IX. Limits of Work and Payment

It shall be the obligation of the Contractor to complete all work included in the Contract Documents, so authorized by the County, as described in the Contract Documents and Technical Specifications. Any question arising as to the limits of work shall be left up to the interpretation of the Engineer and/or Observer.

X. State Sales Tax

On a contract awarded by a governmental entity for the construction of a publicly-owned improvement in a street right-of-way or other easement which has been dedicated to the public and to the an Organization which qualifies for exemption pursuant to the provisions of Article 20.04 (F) of the Texas Limited Sales, Excise and Use Tax Act, the Contractor can probably be exempted in the following manner:

> The Contractor may buy tax-free any materials incorporated into the project by issuing a resale certificate in lieu of paying the sales tax at the time of purchase. The Contractor may then accept an exemption certificate from the City for the materials.

Even with a separated contract, the rental of equipment and the purchase of items which do not ultimately become part of the physical structure will still be subject to state and local sales taxes.

XI. Completion of Work on Time

The Contractor agrees that time is of the essence and that the definite value of damages which would result from delay would be incapable of ascertainment and uncertain, so that for each day of delay beyond the number of days herein agreed upon for the Substantial Completion of the Work specified in the Contract Documents and contracted for, after due allowance for such extension of time as is provided for under the provisions of Section 4.02 of the General Conditions, the County may withhold permanently from the Contractor's total compensation, not as penalty but as liquidated damages, the sum as specified in Special Specification 000-001 per calendar day.

Furthermore, it is agreed by the Contractor that the time period between Substantial Completion and Final Completion shall be no longer than **30** calendar days. This separate time period shall be for completion of the Punch List, as set forth in Section 5.06 of the General Conditions, Final Completion and Acceptance. In the event that Contractor fails to attain Final Completion on or before the expiration of the above said time period, the Contractor shall be subject to the remedies set forth in the Contract Documents. More specifically, the Contractor shall be subject to the terms set forth under Section 7.01 of the General Conditions, Abandonment by the Contractor. In addition to exercising its rights and remedies under the Contract Documents, the County may also exercise any remedy that may be available to it under the law or in equity.

XII. Layout and Construction Stakes

All construction staking shall be performed by the Contractor at the Contractor's expense.

XIII. Safety

The Contractor must use methods of construction that meet or exceed Occupational Safety and Health Administration Standards and any other local, state or federal regulations for safety that are in effect. The Contractor will have a trench safety plan prepared and sealed by Contractor's registered professional engineer.

XIV. Maintenance Bond Term & Amount

The required Maintenance Bond amount for this Project shall be twenty percent (20%) of the total amount bid and the bond period shall be two years from date of acceptance of completion, as noted on the Certificate of Completion.

XV. Safety Restrictions - Work Near High Voltage Lines

The following procedures shall be followed for work near high voltage lines on the Project.

(a) A warning sign not less than five (5) inches by seven (7) inches, painted yellow with black letters that are legible at twelve (12) feet shall be placed inside and outside vehicles such as cranes, derricks, power shovels, drilling rigs, pile drivers, hoisting equipment or similar apparatus. The warning sign shall read as follows: "Warning-Unlawful to Operate This Equipment Within Six Feet of High Voltage Lines".

(b) Equipment that may be operated with ten (10) feet of high voltage lines shall have an insulating cage guard around the boom or arm (except backhoes or dippers), and insulator links on the lift hook connections.

(c) When necessary to work within six (6) feet of high voltage electrical lines, notify the power company. The electric company will erect temporary mechanical barriers, de-energize the line, or raise or lower the line. All such work done by the power company shall be at the expense of the contractor. The contractor shall maintain an accurate log of all such calls to the electric company.

(d) No person shall work within six (6) feet of high voltage lines without protection measures having been taken as outlined in Paragraph C.

XVI. Erosion Control

Contractor shall comply with all laws prohibiting the pollution of any lake, stream, river, or wetland by the dumping of any refuse, rubbish, dredge material, or debris therein.

The Contractor will file the Notice of Intent (NOI) and the Notice of Termination (NOT) as the Project's operator. All required Permits and Notices shall be posted by the Contractor at the Project site.

Contractor shall apply temporary and/or permanent erosion and sedimentation controls, as specified in the plans or directed to disturbed roadside areas, fifteen feet and beyond from road pavement, prior to initiating road base operations. Following asphalt paving of road pavement, apply temporary and/or permanent erosion and sedimentation controls to remaining disturbed areas, as specified in the plans or as directed.

Contractor shall be responsible for the maintenance of all temporary and permanent water quality and erosion control measures proposed under the Storm Water Pollution Prevention Plan (SWPPP) or the Water Pollution Abatement Plan (WPAP) for the duration of the Project construction. Upon completion of construction and before the Construction Observer issues the Certificate of Completion, Contractor shall be responsible for the removal of all temporary measures and the cleaning and resetting of all permanent measures. All costs associated with this work shall be considered subsidiary to other bid items and no additional compensation shall be allowed.

Contractor shall take special precautions during all periods of heavy rainfall and at all locations where storm water, groundwater and/or mud and debris may enter the sewer systems. All mud, stones, and debris that enter the sewer systems due to Contractor's operations, or Contractor's neglect, shall be cleaned from the system by Contractor. It shall be Contractor's responsibility to see that such storm water, groundwater and debris do not enter the sewer system. All costs for such work shall be merged in the unit prices bid and no additional compensation shall be allowed.

If it is necessary in the prosecution of the Work to interrupt existing surface drainage, sewers, or under drainage, temporary drainage shall be provided until permanent drainage work is completed. The construction of all temporary drainage installations shall be considered as incidental to the construction of the Work. Drainage ways shall be kept clear or other satisfactory provisions made for drainage.

Contractor shall be responsible for and shall take all reasonable and necessary precautions to preserve and protect all existing tile drains, sewers, and other subsurface drains, or parts thereof, which may be continued in service without

change. Contractor shall repair, at its own expense, any and all damage to such facilities resulting from negligence or carelessness on the part of its operations.

The Construction Observer shall be responsible for the monitoring and inspection of the erosion control measures by completion of the Construction Pollution Prevention Plan Inspection and Maintenance Report, as required for coverage under the Texas Pollutant Discharge Elimination System (TPDES) General Construction Permit (TXR150000).

XVII. Discovery of Hazardous Materials

If, during the course of the Work, the existence of hazardous material, including asbestos containing material, is observed in the work area, the Contractor shall immediately notify the County in writing. The Contractor shall not perform any work pertinent to the hazardous material prior to receipt of special instructions from the County. Asbestos containing material includes transit pipe.

XVIII. Submittals – Certificate of Compliance

The Contractor shall submit to the Construction Observer a Certificate of Compliance from the manufacturer and/or supplier of each and every specified material or manufactured equipment item. The said certificate shall state that the material or the item of equipment to be furnished has been manufactured with materials in accordance with the applicable sections of all required codes, specifications, and standards as required by the specifications.

XIX. Unavailability of Materials

If the Contractor is unable to furnish or use any of the materials or equipment specified because of any order by a governmental agency limiting the manufacture or use, or because of the supply situation in the general market for such material or equipment, the Contractor shall offer substitutes therefor. The substitutes shall be suitable for the purpose, considering the factors of quality, serviceability, appearance, and maintenance. No substitute shall be used until the Engineer has approved it.

No consideration will be given to the use of substitutes on account of market conditions unless the Contractor demonstrates that, for the item in question, the Contractor placed its order without delay, that it has shown due diligence in attempting to locate the item as specified, and that the unavailability is due to market conditions in general throughout the particular industry.

If substitutes are used in the Work, the compensation to be paid to the Contractor shall be subject to review and adjustment. As a general principle, if the Engineer shall determine that the substitute will be less satisfactory, the Contractor shall allow a credit to the County; only under unusual circumstances shall there be an increase in compensation to the Contractor on account of substitution. The basis upon which the amount of price and adjustments will be founded shall be the cost of the appropriate items at the time the bids for the Project were opened.

XX. Traffic Control

Access shall be provided for residents and emergency vehicles at all times. When it becomes necessary to restrict access, the Contractor shall notify all applicable agencies (i.e. Fire Department, E.M.S., Public Works, etc.) a minimum of five (5) working days in advance of the proposed restrictions. At the end of each day, two lanes of traffic shall be opened to the public, unless otherwise stated in the Contract Documents.

XXI. Temporary Traffic Handling Devices

The Contractor shall furnish, erect and maintain all necessary barricades, lights, warning signs and temporary pavement markings as shown on the Plans and/or in accordance with the Texas Manual on Uniform Traffic Control Devices and with the Specifications in the Contract Documents. In addition, the Contractor shall provide flag-persons and take necessary precautionary measures for the protection of persons, property and the Work, when deemed necessary by the County or the Construction Observer.

The Construction Observer shall be responsible for the monitoring and inspection of the traffic control measures by completion of the Traffic Control Devices Inspection Report (TCDIR), and the Contractor shall be responsible for compliance with the terms of the TCDIR procedures.

XXII. Roadway Signs

All permanent and temporary roadway signage designated in the Contract Documents shall be in accordance with the Texas Manual on Uniform Traffic Control Devices.

XXIII. Project Signs

The Contractor shall erect at the site of construction, and maintain during construction, signs satisfactory to the County identifying the Project and indicating that the government is participating in the development of the Project. The project signs must be temporary signs, mounted in such a way that they can be moved and do not pose a safety issue. Two project signs will be required for the Project. The two said signs shall be 8' X 4' and made out of white 10 mm corrugated plastic with pressure sensitive vinyl lettering or approved equivalent to include: Road Bond Program, Your County Tax Dollars at Work!, with the Williamson County Seal, the Project's name, and a brief description relating to the estimated date of completion, website address and the appropriate Williamson County Commissioner's name and precinct number. Furnishing, installing and maintaining these signs shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling". The Contractor may use any manufacturer; however, the manufacturer must meet Williamson County standards.

XXIV. Permits

The Contractor shall be responsible for obtaining any and all required construction permits. Contractor agrees to comply with all conditions of the

permits and to maintain copies of the permits at the site at all times while the Work is in progress. The County shall be responsible for obtaining Section 404 permits from the U.S. Army Corps of Engineers as part of the Project design. When Contractor-initiated changes in the construction method changes the impacts to waters of the U.S., Contractor shall be responsible for obtaining new or revised Section 404 permits.

XXV. Landscape Restoration

If not designated as a specific pay item in bid package, the Contractor shall take the means necessary to protect all trees, shrubbery and sod. Protection, removal and replacement of existing landscaping will be in accordance with the Contract Documents.

XXVI. Existing Fencing

All fences encountered during construction within the right-of-way (ROW) shall be removed by the Contractor under "Preparing Right-of-Way." Permanent fencing, designating the ROW, will be provided by others, unless otherwise shown in the Contract Documents. The Contractor will be required to coordinate preparing ROW operations and fence removal and installations with the landowners as needed.

XXVII. Easements

Any easements, both temporary and permanent, required for the Project will be provided by the County as shown in the Contract Documents. Other easements required or desirable by the Contractor shall be arranged by the Contractor at its sole expense. The easements shall be cleaned after use and restored to their original conditions, or better by the Contractor. In the event additional work is required by the Contractor, it shall be the Contractor's responsibility to obtain written permission from the property owners involved for the use of additional property required. No additional payment will be allowed for this item.

XXVIII. Limits of Contractor's Operation

The Contractor shall limit construction operations to within the ROW or the easement unless otherwise directed by the County or its authorized representative.

XXIX. Maintenance of Pedestrian Walkways

The Contractor will be required to maintain clear walkways for pedestrians during construction in a manner to provide access in the most convenient and safest manner consistent with essential construction operations. Specifically, the following will be enforced.

Pedestrian traffic may be blocked at a location where work is actually in progress. Signs, barricades, and warning devices must be placed at nearest crosswalks approaching the construction site from every direction advising pedestrians of the blockage and advising them to use alternate routes.

Access to doorways and pedestrian entrances must be maintained at all times during hours that access is needed by business. Paving by sections or providing temporary access may be required.

No more than one corner of any intersection may be under construction at any one time. Work must be completed and opened for use by pedestrians before starting work on any other corner of an intersection.

The Contractor will be expected to diligently pursue construction from start to completion at every location to avoid prolonged and unnecessary disruptions to pedestrian traffic.

This work shall be considered incidental and not a separate pay item, unless provided otherwise in the Contract Documents.

XXX. Spoil

All excavated material unfit for backfill, waste material accumulated on the job, and any material surplus to that needed in the prosecution of the Work shall be removed from the site by the Contractor and properly and legally disposed of at its expense, unless otherwise directed by the Observer. **THE CONTRACTOR SHALL INDEMNIFY AND SAVE HARMLESS THE COUNTY, ALL OF ITS OFFICERS, AGENTS, AND EMPLOYEES FROM ALL SUITS, ACTIONS, OR CLAIMS OF ANY CHARACTER RESULTING FROM ITS ARRANGEMENTS FOR THE DISPOSAL OF SPOIL.** This shall be incidental and not a separate pay item.

XXXI. Materials Testing

Quality Control testing of all materials, construction items or products incorporated in the work shall be performed by the Contractor at the Contractor's expense, and shall be performed in accordance with the Quality Control (QC) / Quality Assurance (QA) program outlined in Appendix A.

Quality Assurance sampling and testing for acceptance may be required for quality assurance of used materials as directed by the Construction Observer or the County. The cost of such tests will be incurred by the County and coordinated by the Construction Observer through funds made available to the Construction Observer under his/her agreement with the County for the professional services related to construction engineering and inspection on the Project.

The Contractor shall furnish for review by the Construction Observer, not later than 10 days after receipt of notice to proceed, a Quality Control Plan consisting of plans, procedures, and organization necessary to produce an end product which complies with the contract documents. The Contractor will be allowed the latitude to develop standards of control subject to approval by the County. As a minimum, the plan shall include description of the type and frequency of

inspection staffing, materials handling and control, and testing deemed necessary to measure and control quality as specified by the contract documents.

XXXII. Pre-Construction Conference

Before the Project work order is issued, a pre-construction conference shall be held with representatives of the County and the Contractor. The Contractor shall plan to submit a schedule of operations at the pre-construction conference, unless otherwise notified. See Section XXXVI-Prosecution and Progress for additional construction schedule requirements.

XXXIII. Weight Tickets

The Contractor will be responsible for providing asphalt and aggregate tickets for quantity verifications on all asphaltic concrete used for the Project.

XXXIV. Confined Space Entry Program

It shall be the responsibility of the Contractor to implement and maintain a variable "Confined Space Entry Program" which must meet OSHA requirements for all its employees and subcontractors at all times during construction. OSHA defines all active sewer manholes, regardless of depth, as "permit required confined spaces". Contractors shall submit an acceptable "Confined Space Entry Program" for all applicable manholes and maintain an active file for these manholes. The cost of complying with this program shall be subsidiary to the pay items involving work in confined spaces.

XXXV. Tree and Plant Protection

Scope: Provide complete protection and maintenance of existing trees, shrubs, and grass areas designated to remain within construction limits and/or right-of-way.

Coordination: Coordinate protection of existing trees, shrubs and grass areas with other trades so as to prevent damage to these items.

Payment for Damages: If existing trees, shrubs or grass areas are destroyed, killed or badly damaged as a result of construction observations, Contract sum will be reduced by the amount of assessed damages. Damages will be evaluated by the Construction Observer, using the following:

Trees: International Shade Tree Conference Standards and following formula – measurement of a cross section of tree trunk will be made at a point 2 feet above existing grade level to determine cross section area in square inches. Assessment for damage will be $27.00 per square inch.

Shrubs and Grass Areas: An initial fine of $1,000 shall be imposed for any unauthorized disturbance within the boundaries of the shrub and grass areas to remain within the right-of-way and outside the limits of disturbance. This

disturbance includes but is not limited to: parking or intrusion of equipment or vehicles; storage of any materials, and any unauthorized damage and/or removal of vegetation. In addition to the initial fine, a base fine of $8.00 for every square foot of area of damaged vegetation within any areas designated to remain on the plans shall be imposed. The areas covered under this section include but are not limited to: areas designated to remain or no-work areas. In determining the amount of fine, the Construction Observer shall consider the degree and extent of harm caused by the violation, the cost of rectifying the damage, and whether the violation was committed willfully.

Materials: Tree Protection lumber dimensions shall be 4X4 and 2X4 sizes.

Protection: The Contractor shall protect existing trees, shrubs, and grass areas within construction limits from the following damage:

(1) Compaction of root area by equipment, vehicles or material storage;
(2) Trunk damage by moving equipment material storage, nailing or bolting;
(3) Strangling by tying ropes or guy wires to trunks or large branches;
(4) Poisoning by pouring solvents, gas, paint or other chemicals on or around trees and roots;
(5) Cutting of roots by excavating or ditching;
(6) Damage of branches by improper pruning;
(7) Drought from failure to water or by cutting or changing normal drainage pattern past roots;
(8) Changes of soil pH factor by disposal of lime base materials such as concrete or plaster;
(9) Do not cut roots 1-1/2” in diameter or over. Excavation and earthwork within drip line of trees shall be done by hand.

Install barricade protection around trees and shrubs, constructed of 4X4 posts and 2X4 stringers top and bottom. Install protection prior to demolition or excavation operations. Leave protection until construction operations are essentially complete.

Maintenance:

(1) Water trees and shrubs within construction limits as required to maintain their health during course of construction operations.
(2) Pruning will be performed by County.

XXXVI. Prosecution and Progress

At the pre-construction meeting, the Contractor shall submit for acceptance a schedule of all planned work activities and sequences that is intended to be followed in order to both substantially and fully complete the Work within the

allotted time periods (the "Project Schedule"). The purpose of the County requiring the Project Schedule shall be to:

(1) Ensure adequate planning during the prosecution and progress of the work in accordance with the allowable number of working/ calendar days and all milestones;
(2) Assure coordination of the efforts of the Contractor, County, Program Manager, Construction Observer, utilities and others that may be involved in the Project;
(3) Assist the Contractor, County, Program Manager and Construction Observer in monitoring the progress of the Work and evaluating proposed changes to the Contract Documents; and
(4) Assist the County, Program Manager and Construction Observer in administering the time requirements set forth in the Contract Documents.

A Type B Schedule will be required on all projects. Following is the schedule requirements:

Type B Schedule:

The Contractor shall create and maintain a Critical Path Method (CPM) Project Schedule showing the manner of prosecution of work that it intends to follow in order to both substantially and fully complete the Work within the allotted time periods. The Project Schedule shall employ computerized CPM for the planning, scheduling and reporting of the work as described in this specification. The CPM Project Schedule shall be prepared using the Precedence Diagram Method (PDM). No direct compensation will be allowed for fulfilling these requirements, as such work is considered subsidiary to the various bid items of the Project.

(1) Personnel. The Contractor shall provide an individual, referred to hereinafter as the Scheduler, to create and maintain the CPM schedule. He or she shall be proficient in CPM analysis and shall be able to perform required tasks on the software. The Scheduler shall be made available for discussion or meetings when requested by the County, Construction Observer or Program Manager.

(2) Schedule. The Project Schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the Work.

Each activity on the schedule shall be described by: An activity number utilizing an alphanumeric designation system tied to the traffic control

plans, and that is agreeable to the County, Program Manager, or Construction Observer; concise description of the Work represented by the activity; and activity durations in whole working days with a maximum of twenty (20) working days. Durations greater than twenty (20) working days may be used for non-construction activities (mobilization, submittal preparation, curing, etc.), and other activities mutually agreeable between the Contractor and County, Program Manager or Construction Observer. The Contractor shall provide a legend for all abbreviations. The activities shall be coded so that organized plots of the schedule may be produced. Typical activity coding includes: Traffic control phase, location and work type.

The activity durations shall be based on the quantity for the individual work activity divided by a production rate. An estimated production rate for each activity shall also be shown.

The Contractor shall plan and incorporate major resources into the schedule. Major resources are defined as crews and equipment that constrain the Contractor from pursuing available work. The resources shall accurately represent the Contractor's planned equipment and manpower to achieve the productivity rates specified above.

Seasonal weather conditions shall be considered and included in the CPM schedule for all work influenced by temperature and/or precipitation. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions. Average historical weather data is available through the National Oceanic and Atmospheric Administration (NOAA). These effects will be simulated through the use of work calendars for each major work type (i.e., earthwork, concrete paving, structures, asphalt, drainage, etc.) Project and work calendars should be updated each month to show days actually able to work on the various work activities.

“Total float” is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float time in the schedule is a shared commodity between the County and the Contractor.

Only responsible delays in activities that affect milestone dates or the Project’s completion date, as determined by CPM analysis, will be considered for a time extension.

The schedule shall show the sequence and interdependence of activities required for complete performance of the work. The schedule shall be prepared and maintained in accordance with the scheduling requirements stated in this Section and shall include two (2) organized plots with the

activities logically grouped using the activity coding. The Contractor shall also provide an electronic copy of the schedule via e-mail.

The schedule shall encompass the time from the start of the Contract Time to the Project's Final Completion. The longest path through the schedule shall be readily discernable on the plot of the schedule.

(3) Joint Review, Revision and Acceptance. Within twenty (20) calendar days of receipt of the Contractor's proposed schedule, the County or its authorized agents shall evaluate the schedule for compliance with this specification, and notify the Contractor of the findings. If the County or its authorized personnel request a revision or justification, the Contractor shall provide a satisfactory revision or adequate justification to the satisfaction of the Construction Observer or County authorized personnel within seven (7) calendar days.

If the Contractor submits a CPM schedule for acceptance which is based on a sequence of work not in the Contract Documents, then the Contractor shall notify the County or its authorized entities in writing, separate from the schedule submittal.

The County's review and acceptance of the Contractor's Project Schedule is for conformance to the requirements of the Contract Documents only. Review and acceptance by the County or other authorized personnel of the Contractor's Project Schedule does not relieve the Contractor of any of its responsibility for the Project Schedule, or of the Contractor's ability to meet interim milestone dates (if specified) and the Final Completion date, nor does such review and acceptance expressly or by implication warrant, acknowledge or admit the reasonableness of the logic, durations, manpower or equipment loading of the Contractor's Project Schedule. In the event the Contractor fails to define any element of work, activity or logic and the County's review does not detect this omission or error, such omission or error, when discovered by the Contractor or County and its authorized personnel, shall be corrected by the Contractor at the next monthly schedule update and shall not affect the project completion date.

(4) Updates. The Project Schedule shall be updated on a monthly basis and shall be required as a basis for the pay application approval. The Project Schedule update shall be submitted with the pay application. The Contractor shall meet with the Construction Observer or County authorized personnel each month at a scheduled update meeting to review actual progress made through the data date of the schedule update. The review of progress will include dates activities actually started and/or completed, and the percentage of work completed or remaining duration on each activity started and/or completed. The percentage of work complete shall be calculated by utilizing the quantity and productivity rate

information. The Project Schedule update shall include one (1) copy of the following information:

a) Electronic copy of the updated schedule including revisions and changes via e-mail.
b) One (1) logically organized plot of the schedule update if requested by the County or its authorized personnel.

(5) Project Schedule Revisions. If the Contractor desires to make major changes in the Project Schedule, the Contractor shall notify the County or Construction Observer in writing. The written notification shall include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule. In addition to the written notification of the revision, the Contractor shall provide an electronic copy and one logically organized plot of the schedule including the revision if requested by the County or Construction Observer.

Major changes are hereby defined as those that may affect compliance with the requirements of the Contract Documents or those that change the critical path. All other changes may be accomplished through the monthly updating process.

(6) Time Impact Analysis. The Contractor shall notify the County or Construction Observer when an impact may justify an extension of Contract Time or adjustment of milestone dates. This notice shall be made in writing as soon as possible, but no later than the end of the next estimate period after the commencement of an impact or the notice for a change is given to the Contractor. Not providing notice to the County or Construction Observer by the end of the next estimate period will indicate the Contractor's approval of the time charges as shown on that time statement. Future consideration of that statement will not be permitted and the Contractor forfeits its right to subsequently request a time extension or time suspension unless the circumstances are such that the Contractor could not reasonably have knowledge of the impact by the end of the next estimate period.

When changes are initiated or impacts are experienced, the Contractor shall submit to the County or Construction Observer a written time impact analysis describing the influence of each change or impact.

A time impact analysis is an evaluation of the effects of changes in the construction sequence, contract, plans, or site conditions on the Contractor's plan for constructing the Project, as represented by the Project Schedule. The purpose of the time impact analysis is to determine if the overall Project has been delayed, and if necessary, to provide the Contractor and the County a

basis for making adjustments to the time allotted for Substantial Completion and Final Completion.

A time impact analysis shall consist of one or all of the steps listed below.

Step 1. Establish the status of the Project before the impact using the most recent Project Schedule update prior to the impact occurrence.

Step 2. Predict the effect of the impact on the most recent Project Schedule update prior to the impact occurrence. This requires estimating the duration of the impact and inserting the impact into the schedule update. The Contractor shall demonstrate how the impact was inserted into the schedule showing the added or modified activities and the added or modified relationships. Any other changes made to the schedule including modifications to the calendars or constraints shall be noted.

Step 3. Track the effects of the impact on the schedule during its occurrence. Note any changes in sequencing, and mitigation efforts.

Step 4. Compare the status of the Work prior to the impact (Step 1) to the prediction of the effect of the impact (Step 2), and to the status of the work during and after the effects of the impact are over (Step 3). Note that if an impact causes a lack of access to a portion of the Project, the effects of the impact may extend to include a reasonable period for remobilization.

The time impact analysis shall include an electronic copy of the complete schedule prepared in Step 2. If the Project Schedule is revised after the submittal of a time impact analysis but prior to its approval, the Contractor shall promptly indicate in writing to the County or Construction Observer the need for any modification to its time impact analysis.

Only one (1) copy of each time impact analysis shall be submitted within fourteen (14) calendar days after the completion of an impact. The County or Construction Observer may require Step 1 and Step 2 of the time impact analysis be submitted at the commencement of the impact, if needed to make a decision regarding the suspension of Contract Time.

Approval or rejection of each time impact analysis by the County, Construction Observer or Program Manager shall be made within fourteen (14) calendar days after receipt unless subsequent meetings and negotiations are necessary.

The time impact analysis shall be incorporated into and attached to any relevant change order(s) and/or supplemental agreement(s).

XXXVII. Sanitary Provisions

Provide and maintain adequate, neat, and sanitary toilet accommodations for employees, including County employees and representatives, in compliance with the requirements and regulations of the Texas Department of Health or other authorities having jurisdiction.

XXXVIII. Work Near Railroads

(A) General.

If the work crosses or is in close proximity to a railroad, do not interfere with the use or operation of the railroad company's trains or other property. Assign responsible supervisory personnel to ensure that tracks and adjacent areas are clear of debris, road materials, and equipment. It is the Contractor's responsibility to contact the railroad to determine the railroad's requirements for work within the railroad right of way and to comply with the requirements. The County will not reimburse the Contractor for any cost associated with these requirements. If the work requires construction within 25 ft. horizontally of the near rail or if the tracks may be subject to obstruction due to construction operations, notify the Engineer and the Railroad Company at least 3 days before performing work. The railroad company will provide flaggers during this work. If railroad flaggers will be needed longer than 2 consecutive days, request them at least 30 days before performing work within the railroad right of way. Flaggers provided by the railroad company will be paid for by the County. Do not store material or equipment in the Railroad's right of way within 15 ft. of the centerline of any track. Do not place any forms or temporary falsework within 8.5 ft. horizontally from the centerline or 22 ft. vertically above the top of rails of any track, unless otherwise shown in the Contract Documents.

(B) Temporary Crossings.

If a temporary crossing is needed, obtain permission from the railroad company before crossing the tracks. Execute the "Agreement for Contractor's Temporary Crossing" if required by the Railroad Company. The Contractor shall ensure that the tracks are left clear of equipment and debris that would endanger the safe operation of railroad traffic. Provide a crossing guard on each side of the crossing to direct equipment when hauling across the tracks. The Contractor shall stop construction traffic a safe distance away from the crossing upon the approach of railroad traffic. Work for temporary crossings will not be paid for directly, but shall be subsidiary to items of the Work subject of the Contract Documents. Work performed by the Railroad Company for the temporary crossing, except flaggers, will be at the Contractor's expense.

SECTION 13
TECHNICAL SPECIFICATIONS

Williamson County

Project: 1803-219 Southwest Bypass Segment 2

Basis of Estimate

Item	Description	**Rate	Basis	Quantity
160	**Topsoil**	27 CF/CY	118,611 CF	4,393 CY
161	**Compost Manufactured Topsoil**	9 SF/SY	380,754 SF	42,306 SY
164	**Seeding**			
	Temp (Warm)	9 SF/SY	190,386 SY	21,154 SY
	Temp (Cool)	9 SF/SY	190,386 SY	21,154 SY
	Perm	9 SF/SY	380,754 SF	42,306 SY
166	**Fertilizer (13-13-13)****	375 LB/AC	42,306 SY	1.65 TON
168	**Vegetative Watering**			
	(Item 164)(Temp)	55 GAL/SY	42,306 SY	2,327 MG
	(Item 164)(Perm)	110 GAL/SY	42,306 SY	4,655 MG
247	**FL BS (CMP IN PLC)**			
	(TY A GR 1&2)	27 CF/CY	265,626 CF	9,838 CY
		134 LB/CF		17,797 TON
310	**Prime Coat (MC-30 or AE-P)**	0.20 GAL/SY	27,276 SY	5,455 GAL
340	**Dense-Graded Hot-Mix Asphalt (SQ)**			
	TY-B or D PG64-22 Level Up	153.33 LB/CF	10,815 CF	829 TON
341	**Dense-Graded Hot-Mix Asphalt**			
	TY-B PG64-22	115 LB/SY/IN	27,085 SY	4,672 TON
	TY-D SAC-B PG70-22	115 LB/SY/IN	67,502 SY	5,941 TON

** For Informational Purposes Only.

MODIFIED STANDARDS

The following standard detail sheet or sheets have been modified:

RW(TRF) (MOD)
IGND (MOD)
BL (MOD)
IGTS (MOD)

CONTACT INFORMATION

City of Georgetown Electric Utility adjustments to be coordinated with:
City of Georgetown – Georgetown Utility Systems
300 Industrial Avenue, Georgetown, TX 78626
Jimmy Sikes; jimmy.sikes@georgetown.org; 512-930-6117

Work in the vicinity of the Enterprise Pipeline Facility to be coordinated with:
Enterprise Products
9420 W. Sam Houston Pkwy N., Room N1.217
Houston, Texas 77064-6317
P.O. Box 4324
Houston, TX 77210
Land_Encroachments@eprod.com; 866-901-8170
Rebecca Curry; ReCurry@eprod.com; 281-887-3312

Pedernales Electric Cooperative
10625 W Highway 29
Liberty Hill, TX 78642
P.O. Box 2048
Liberty Hill, TX 78642-2048
Dirk Field; dirk.field@peci.com; 512-778-5470 ext. 7037

City of Georgetown
300-1 Industrial Ave

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Georgetown, TX 78626
Michael Hallmark; Michael.hallmark@georgetown.org; 512-930-3569

Frontier/Verizon
2525 Ridgepoint Suite 400
Austin, TX 78754
Kevin Moseley; William.Moseley@ftr.com; 512-869-2257

LCRA
3700 Lake Austin Blvd.
Austin, TX 78703
Mary Beth Nickel; mnickel@lcra.org; 512-578-1806

P.O. Box 220
Austin, TX 78767

Oncor
3620 Franklin Avenue
Waco, TX 76710-7328
Leslie Davis; Leslie.Davis@oncor.com; 254-750-5244

GENERAL

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

If work is performed at CONTRACTOR's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the work, if required.

Right of way meets and bounds are on file with the County.

The roadbed shall be free of organic material prior to placing any section of the pavement structure.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Provide a smooth, clean saw-cut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The CONTRACTOR will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the CONSTRUCTION OBSERVER. Consider subsidiary to pertinent Items.

Damage to existing pipes and SETs due to CONTRACTOR operations shall be repaired at CONTRACTOR's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The CONTRACTOR will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

The Project Superintendent will be capable of speaking English and will be available to contact at all times when work is being performed, including subcontractor work. The Superintendent will be available and on-call 24 hours a day.

Coordinate and obtain approval from the CONSTRUCTION OBSERVER for all bridgework over existing roadways (including Texas Crushed Stone ROW crossing, if applicable).

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CONTRACTOR shall coordinate with Georgetown Utility Systems to allow them to install conduit underneath the proposed roadway after clearing activities, but prior to placement of the road base. Approximate location is at WBFR Station 400+20.00. Considered subsidiary to pertinent items.

Measure all minimum vertical clearances for all structures (including, but not limited to, signal mast arms, span wires, and overhead sign bridge structures) within the limits of the project for all roadway alignments in all directions of travel. Coordinate with the CONSTRUCTION OBSERVER to take these measurements and obtain prior to opening roadways to traffic unless otherwise approved. The CONSTRUCTION OBSERVER will report all minimum vertical clearance information on State maintained roadways to the Austin District Permit Office.

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Refer to TxDOT's website for list of pre-qualified manufacturers. No substitutions will be allowed for materials found on the list. Submit list of approved suppliers/materials from TxDOT website to show items are TxDOT approved. Submit this list with request for material approval.

ENVIRONMENTAL (SW3P, WPAP, ETC.)

See SW3P, TCEQ Requirements for Recharge Zone of the Edwards Aquifer, and Temporary Erosion Notes for additional general notes and requirements not listed in this section.

CONTRACTOR shall designate an employee to coordinate the maintenance of the erosion control devices on this project. Maintain erosion control features according the Temporary and Permanent Erosion Control Sheets.

Install silt fence, erosion control logs, and rock filter dams at the earliest time possible, as directed. Periodically inspect and maintain all sediment traps and silt fence to ensure proper function. The sediment traps and silt fence shall remain in place until vegetation is established as determined solely by the CONSTRUCTION OBSERVER.

All slopes shall be seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied.

Silt fences, rock berms, erosion control logs, sedimentation basins, and similarly recognized techniques and materials shall be employed during construction to prevent point source sedimentation loading of downstream facilities. Such installation shall be regularly inspected by the City of Georgetown for effectiveness. Additional measures may be required if, in the opinion of the CONSTRUCTION OBSERVER, they are warranted.

All temporary erosion control measures shall not be removed until final inspection and approval of the project by the CONSTRUCTION OBSERVER. It shall be the responsibility of the CONTRACTOR to maintain all temporary erosion control structures and to remove each structure as approved by the CONSTRUCTION OBSERVER.

All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, drives and areas used by the public shall be cleaned up immediately.

After temporary erosion control devices are no longer required, cleanup and reshaping of those areas will be required. Consider incidental to pertinent items.

The project limits are within the Edwards Aquifer Recharge Zone. Transport any soils contaminated during construction of the proposed project from the site and properly dispose of off-site, off the recharge zone, and off any area draining to the recharge zone of the Edwards Aquifer.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Protect all areas of the right of way, which are not included in the actual limits of the proposed construction areas, from disturbance. Restore any area disturbed because of the CONTRACTOR's operations to a condition as good as, or better than, before the beginning of work at no cost to the state. This does not include the area between the existing quarry walls.

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Remove sediment accumulated during project construction from detention ponds prior to project close out, as directed the by CONSTRUCTION OBSERVER. Subsidiary to pertinent items.

When any abandoned well is encountered, cease construction operations in this area and notify the CONSTRUCTION OBSERVER who will coordinate the proper plugging procedures with Texas Commission on Environmental Quality (TCEQ).

Erosion control and stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Track all exposed soil, stockpiles, and slopes. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Re-track slopes and stockpiles after each rain event or every 14 days, whichever occurs first. This work is subsidiary.

CONTRACTOR is responsible to submit and receive approval from the TCEQ for any above ground storage tanks to be kept on site as well as any fees associated with this request. At a minimum, locate aboveground storage tanks kept on-site for construction purposes over bermed impervious liners as to not allow any leakage into underlying soils. Additionally, the containment will be sized to capture 150% of the total volume of fluids stored on-site within the storage area.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Collect wastewater generated on-site by chemical toilets and transport off-site and dispose of properly.

Clean asphalt equipment in such a manner that will not leave any petroleum contaminants in the right of way. No construction waste materials will be buried within the right of way.

Project Specific Location (PSL) in USACE Jurisdictional Area.

Do not initiate activities in a PSL associated with a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The jurisdictional area includes all waters of the U.S. including wetlands or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Consult with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of all USACE coordination and approvals before initiating activities.

Proceed with activities in PSLs that do not affect a USACE jurisdictional area if self-determination has been made that the PSL is non-jurisdictional or proper clearances have been obtained in USACE jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. Document any determinations that PSL activities do not affect a USACE jurisdictional area. Maintain copies of PSL determinations for review by the Department or any regulatory agency. The CONTRACTOR must document and coordinate with the USACE, if required, before any excavation material hauled from or embankment material hauled into a USACE jurisdictional area by either (1) or (2) below.

1. Restricted Use of Materials for the Previously Evaluated Permit Areas. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
    a. suitable excavation of required material in the areas shown on the plans and cross sections as specified in Standard Specification Item 110, Excavation is used for permanent or temporary fill within a USACE jurisdictional area;
    b. suitable embankment from within the USACE jurisdictional area is used as fill within a USACE evaluated area;
    c. Unsuitable excavation or excess excavation that is disposed of at an approved location within a USACE evaluated area.
2. Contractor Materials from Areas Other than Previously Evaluated Areas. Provide the Department with a copy of all USACE coordination and approvals before initiating any activities in a jurisdictional area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
    a. Standard Specification Item 132, Embankment is used for temporary or permanent fill within a USACE jurisdictional area;

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b. Unsuitable excavation or excess excavation that is disposed of outside a USACE evaluated area.

Work over or near Bodies of Water (Lakes, Rivers, Ponds, Creeks, etc.).
Keep on site a universal spill kit adequate for the body of water and the work being performed. No debris is allowed to fall into a body of water. Debris that falls into the water must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. This work is subsidiary.

DSHS Asbestos and Demolition Notification.
Complete and provide the Texas Department of State Health Services (DSHS) notification form to the CONSTRUCTION OBSERVER at least 30 calendar days prior to bridge or bridge class culvert removal or renovation. Notify the CONSTRUCTION OBSERVER via email of any changes to the work start date.

Migratory Birds and Bats.
Migratory birds may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 1st and January 31st. Prevent migratory birds from re-nesting between February 1st and August 31st.

All methods used for the removal of unoccupied bird nests and the prevention of re-nesting must be approved by the CONSTRUCTION OBSERVER well in advance of the planned use.

In the event that any active nests are encountered on-site during construction, all construction activity within the immediate vicinity of the nest must cease immediately. Contact the CONSTRUCTION OBSERVER to determine how to proceed.

Bats may roost within the project limits under bridges, in culverts, in large hollow trees, in dead standing trees, and in trees with shaggy bark. Maternity colonies may occur from April 1st through August 31st. If bats are present, ensure bats are not harmed. Exclusion protocols for known colonies should be followed well in advance of commencement of construction activities. Exclusion measures by qualified individuals are used to relocate existing colonies, except from April 1st through August 31st when such measures may separate mothers and pups. Exclusion measures are also the means of preventing establishment of new colonies and re-establishment of relocated colonies.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by migratory birds or bats. This work is subsidiary.

TRENCH SAFETY NOTES
In accordance with the laws of the State of Texas and the US Occupational Safety and Health Administration regulations, all the trenches over 5 feet in depth in either hard and compact or soft and unstable soil shall be sloped, sored, sheeted, braced, or otherwise supported. Furthermore, all trenches less than 5 feet in depth shall also be effectively protected when hazardous ground movement may be expected. Trench safety systems to be utilized for this project will be provided by the CONTRACTOR.

In accordance with the US Occupational Safety and Health Administration regulations, when persons are in trenches 4 feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.

If trench safety system details were not provided in the plans because trenches were anticipated to be less than 5 feet in depth, and if during construction it is found that trenches are in fact 5 feet or more in depth or trenches less than 5 feet in depth are in an area where hazardous ground movement is expected, all construction shall cease, the trenched area shall be barricaded and the CONSTRUCTION OBSERVER notified immediately. Construction shall not resume until appropriate trench safety systems details, as designed by a professional engineer, are retained and copies submitted to the CONSTRUCTION OBSSERVER for approval.

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QUARRY REQUIREMENTS AND COORDINATION

The project passes through the Texas Crushed Stone (TCS) active quarry. It is the CONTRACTOR's responsibility to coordinate with TCS for their blasting schedule and achieve set-back requirements during blast events. The CONTRACTOR shall keep the ROW secure at all times and is responsible for all personnel, equipment, and production during TCS blasting activity. Subsidiary to pertinent items. There will not be additional payment for any losses or delays during blast protocols.

Texas Crushed Stone requires one Right of Way access route (crossing) per an industrial agreement with the City of Georgetown. The crossing must be 80' wide and 25' tall at a minimum and TCS traffic must have access through it at all times. The current location of the crossing will need to be re-located to its permanent location as shown in the plans. CONTRACTOR is responsible for coordinating construction traffic as well as the change in the crossing location with Texas Crushed Stone. The PCTB, as called out on the Fencing and Grading Plans, must be installed and the crash walls, as called out on the Bridge Plans (Bents 3 and 4), must be complete before the TCS crossing is relocated. Subsidiary to pertinent items.

CONTRACTOR's Project Superintendent as well as any personnel working near the vertical walls of the quarry shall have proof of completion for MSHA New Miner Training with emphasis on High Wall Safety (8 hour course). Subsidiary to Item 500 "Mobilization".

BLASTING

Blasting is allowed on this project. All blasting shall meet the specifications and requirements of Item S2 RC.

Coordinate with the CONSTRUCTION OBSERVER and Texas Crushed Stone to determine blasting times.

Blasting is not allowed within 200 feet of TxDOT right-of-way. The roadway RM 2243 shall not be compromised and road closures are not permitted for blasting activities.

It is the CONTRACTORS responsibility to secure the site at all times.

A blasting plan is required to be submitted to the CONSTRUCTION OBSERVER for approval at least 1 week before each blast.

HAUL ROAD

Utilize the existing haul road (by others) where possible. The maximum grade on the existing access route is 15%.

Physical alterations of the existing haul road, including additional clearing, blading, grade alterations, and gate modifications at RM 2243 shall be considered subsidiary to pertinent items. Maintain sheet flow conditions at the edge of the haul road outside the limits of the existing quarry disturbance.

Remove all traffic control devices, remove rock, and re-vegetate the areas shown in the plans upon completion of work or as directed. This includes sections of the haul road no longer used due to any re-alignment of the haul road. Provide sufficient watering to establish vegetation, as approved by the CONSTRUCTION OBSERVER. Re-vegetation is not required within the existing limits of quarry disturbance, which is approximately from WBFR Station 401+00 to Station 439+00. Additional topsoil, seeding, and watering required to establish vegetation, but not directly called out in the plans, shall be considered subsidiary to pertinent items.

ITEM 100 - PREPARING RIGHT OF WAY

Do not burn brush unless otherwise approved.

Trim vegetation around signs and other obstructions. Consider subsidiary to pertinent Items.

Use hand methods or other means to remove objectionable material and obstructions if doing work by mechanical methods is impractical. Consider subsidiary to the pertinent Items.

All trees and brush are to be removed within the limits of the Right of Way between the I-35 SBFR and RM 2243 with the following two exceptions:

- All trees that have a diameter at breast height (DBH) of 12 inches or larger (excluding Hackberry, Chinaberry, Ashe Juniper (cedar), Chinese Tallow, and Mesquite) are to remain.
- All trees and brush within the limits of the permanent protection fence (two areas) installed near karst features in Segment 2 are to remain. Do not enter either area during construction.

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Removal of all trees and brush subsidiary to this item.

Re-vegetate all areas disturbed by tree clearing activity outside of the construction limits. Disturbed areas must be seeded or sodded within 14 days of last clearing activity. Subsidiary to this item.

Removal of existing building and parking lot along the I-35 southbound frontage road is required prior to project completion, but does not need to run concurrent with other site prep activities. See Item 496 and Item 504 of the general notes for additional information. Cap existing well in accordance with State law. Considered subsidiary to this item.

All items requiring removal that are not specifically called out for removal in the plans are considered subsidiary to this item. Prep ROW quantities for the WBFR cover all City ROW between the I-35 SBFR and RM 2243, as well as any TxDOT ROW on the I-35 SBFR and any City ROW on the Bypass north of RM 2243. Quantities for RM 2243 cover all TxDOT ROW on RM 2243.

ITEM 110 & 132 – EXCAVATION & EMBANKMENT

At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

Unsuitable material encountered in a cut or fill section will be considered waste. The CONSTRUCTION OBSERVER will define unsuitable material. Material, which the CONTRACTOR might deem to be unsatisfactory or unsuitable, due to moisture content, will not be considered unsuitable material, unless otherwise approved.

Obtain approval of all compaction equipment prior to all backfilling and embankment operations.

ITEM 132 – EMBANKMENT

The CONSTRUCTION OBSERVER must approve all embankment material before use on this project.

Existing material located within the project limits may be used as embankment if it meets specifications shown on the plans and if approved by the Construction Observer.

If delivery from offsite source is necessary, furnish embankment with a PI of less than 25 that does not contain sulfate contents greater than 3000 ppm.

Stockpile imported TY C embankment at an approved location until it meets all testing requirements. The stockpile must be between 500 CY and 5000 CY and must not exceed a height of 15 ft. It is the Contractor's responsibility to identify and notify the Construction Observer of the location of the borrow source to allow time for testing and approval to avoid delay to the project. Allow a minimum of five (5) working days for testing.

At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

Embankment placed over the area of MSE backfill must meet the same backfill requirements for the type specified under Item 423 in the plans.

The underlying layer or existing subgrade must be prepared and inspected prior to placement of the embankment. Use approved compaction equipment for all backfilling and embankment operations. Detachable sheepsfoot-type wheels mounted on backhoes, trackhoes and other similar equipment will not be allowed for compaction operations, including pipe installation. Payment for compaction will be subsidiary to the various bid items of the contract.

Track ALL embankment slopes left idle for more than 14 days, within or at the end of the 14-day idle period, to prevent erosion. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Re-track slopes after rain events, as directed. Consider tracking of slopes to prevent erosion as subsidiary to the pertinent Items.

Due to the depth (30+ft) of some of the fills and the desire to limit settlement while using ordinary compaction methods, it is recommended that rock embankment construction be inspected/observed on a full-time basis.

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EMBANKMENT MATERIAL

There are two types of embankment on this project. Zone 1 embankment consists of all embankment material located lower than 8 ft beneath the proposed pavement surface. Zone 2 embankment consist of all embankment material within 8 ft of the proposed pavement surface. Material recommendations for the two zones are provided below. All embankment material should be free of vegetation or other objectionable material.

- Zone 1 embankment material should consist of material meeting TxDOT Standard Specifications Item 132, 3.2 Rock Embankment with the following exception: the maximum lift thickness should not exceed 2 ft, therefore the maximum rock size in its greatest dimension must be less than 2 feet.
- Zone 2 embankment material should consist of material meeting TxDOT Standard Specifications Item 132, Type C with the following gradation and plasticity requirements.

Item	Description	(Percent Retained-Sieve)					LL Max.	PI Max.	PI Min.
		2½"	1¾"	7/8"	#4	#40			
132	Embankment (Density Control) (Zone 2)	0	0-10	10-40	45-75	60-85	45	20	6

EMBANKMENT PLACEMENT – COMPACTION

- Compact the Zone 1 Rock Embankment using ordinary compaction methods in accordance with TxDOT Standard Specifications Item 132.
- Compact Zone 2 embankment material using density control in accordance with TxDOT Standard Specifications Item 132 with a maximum compacted lift thickness of 12 inches, provided the compaction operation and equipment has the ability to meet the compaction throughout each lift. Quality Assurance Embankment Testing (plasticity index, gradation, moisture/density relationship and in-place density) shall be in accordance with the TxDOT Guide Schedule of Sampling and Testing, March 2015. Quality Control testing shall be at the frequency selected by the CONTRACTOR.

ITEM 160 - TOPSOIL

No sandy loam allowed. Obtain approval of the actual depth of the topsoil sources for both on-site and off-site sources

All topsoil sources shall be approved by the CONSTRUCTION OBSERVER.

Existing topsoil salvaged from the project, meeting specification requirements, may be used where topsoil is called out in the plans.

The maximum height of topsoil stockpiles shall be five (5) feet.

Seed or track slopes within 14 days of placement.

ITEM 161 – COMPOST

Place a minimum of four (4) inches of compost manufactured topsoil at the locations identified on the plans. Any excess shall be at the CONTRACTOR's expense.

ITEM 164 – SEEDING FOR EROSION CONTROL

"No mowing" signs are not required on this project.

ITEM 166 – FERTILIZER

Fertilize all areas to be seeded. Apply fertilizer at a rate that provides 375 lbs of nitrogen per acre of seeded area. Fertilizer shall be subsidiary to other items.

ITEM 169 – SOIL RETENTION BLANKETS

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Divisions (CST) materials producers list. Refer to TxDOT's website for list of pre-qualified manufacturers. Direct all questions to the Maintenance Division, Vegetation Management Section, 125 E. 11th Street, Austin, TX 78701-2483.

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ITEM 204 – SPRINKLING
Sprinkling for the control of dust, as directed, will be required on this project. If dust control is not being maintained, cease operations until maintenance resumes. This work shall be considered subsidiary to pertinent items.

ITEM 247 - FLEXIBLE BASE
Furnish TY A material meeting Grade 1 & 2 requirements for the roadway and intersecting streets.

Flexible base material shall come from a source approved by the CONSTRUCTION OBSERVER. If the flexible base comes from a stockpile, the stockpile shall be tested before delivery to the project. The stockpile shall be built in lifts not to exceed two (2) feet and in a manner as to obtain a minimum working face of not less than ten (10) feet and maximum working face of not more than twenty (20) feet. Final acceptance of flexible base material will be from tests made from windrow samples or the stockpile.

The following table will govern the acceptance of compaction on base courses, when compacted in multiple courses. Compaction requirements are in percent of maximum dry density as determined by (Tex-113-E). When compacting in a single course, compact to at least 100% of maximum dry density as determined by Tex-113-E.

Item	Material	All Roadways	
		Lift	Min Density
247	FL BS (CMP IN PLC)	1st (first lift) 2nd (final lift)	98% 100%

Correct subgrade (e.g. unstable areas, soft spots, etc.) prior to placing Flex Base. This includes cut areas where the flex base is to be placed on existing rock. Consider subsidiary to the pertinent Items.

ITEM 300 – ASPHALTS, OILS, AND EMULSIONS
Asphalt season starts May 1st and ends September 15th.

PPA and REOBs are not allowed.

ITEMS 310, 340, & 341
Perform work during good weather, unless otherwise directed. If work is performed at CONTRACTOR's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the work, if required.

ITEM 310 – PRIME COAT
Provide medium cure cutback asphalt (MC-30) or asphalt emulsion prime (AE-P).

Provide CONSTRUCTION OBSERVER with current Distributer Certification confirming calibration of asphalt measurement equipment.

Apply Prime to finished flex base surface at the rate shown in the plans. Hot mix can be applied to the primed surface of flex base after the prime has penetrated and cured for a minimum of 36 hours depending on weather conditions or as approved by the CONSTRUCTION OBSERVER. Provide the CONSTRUCTION OBSERVER with a copy of the asphalt deliver ticket prior to application. Do not apply if rain is forecast prior to paving.

Apply blotter material to all driveways and intersections. This work is subsidiary. When Multi Option is allowed, provide MC 30, EC 30, or AE-P.

ITEM 340 & 341 - DENSE-GRADED HOT-MIX ASPHALT
Contractor to submit for approval a current mix design (less than 6 months old) to the Construction Observer that meets the following requirements prior to use on the project.

Provide mixture Type B using PG binder 64-22 & Type D using PG binder 70-22.

Use aggregate meeting a Surface Aggregate Classification (SAC) requirement of B for all surface and non-surface mixtures (including shoulders).

Provide performance grade (PG) binders that do not contain Recycled Engine Oil Bottoms (REOB's) or Poly Phosphoric Acid (PPA).

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Do not perform this work when the weather, as indicated by NOAA states a chance of rain of 40% or greater.

Mill a transverse butt joint to transition from the new ACP to the existing surface tie-in. Make the transition a minimum of 50 feet H: 1 inch V slope ratio of newly placed ACP. Make the temporary joint, at the tie-in, a minimum of a 10 feet longitudinally and covering the entire width. Saw-cut existing pavement as directed. Prior to milling, core the existing pavement to determine its thickness. Do not proceed with milling until directed. Consider this work subsidiary to the pertinent Items.

Complete all roadways before final surface course placement, unless directed otherwise.

Ensure placement sequence to avoid excess distance of longitudinal joint lapback not to exceed one day's production rates.

The Contractor shall utilize a material transfer device per item 320 and a grade reference (such as a ski) for overlay operations. Consider subsidiary to the pertinent items.

Use a device to create a maximum 3H: 1V notched wedge joint on all longitudinal hot mix joints of two (2) inches or greater. Consider subsidiary to the pertinent Items.

Taper transverse faces at ends of passes as directed.

Make transverse tapers on each end of pass using a minimum slope rate of 60H:1V. Tapers shall be removed directly before placement of succeeding lift. Consider subsidiary to the pertinent Items.

Provide a minimum transition for all side streets of at least 12 ft. and driveways of at least six (6) feet, unless otherwise shown on the plans or otherwise approved/directed.

Tack every intermediate layer, unless otherwise directed. Do not dilute tack coat. Apply it through a distributor spray bar in accordance with Article 316.3.1 Distributor.

TESTING

Testing to be under separate COUNTY contract. CONTRACTOR shall coordinate with involved parties for asphalt testing.

The CONTRACTOR must sample asphalt binder, in accordance to the applicable item. Label the sample can with the corresponding project, lot, and sub-lot numbers.

Samples must be stored in a common area where they are readily available to the COUNTY representative at the plant. The CONTRACTOR will be responsible for supplying storage for all samples. Retain all asphalt samples until hot mix production is complete or directed otherwise.

Target laboratory molded density is 97% for all mixtures for Texas Gyratory Compactor (TGC) mixture designs.

When directed, the CONTRACTOR is responsible for disposal of all asphalt binder samples, in accordance to Local, State, and Federal regulations.

Refill and compact all HMAC core holes to the same elevation as the adjacent roadway. Use hot mix of the type being used in the project to fill core holes. As an alternative a high performance cold patching mix such as Rapid Cure Patching Mix meeting the requirements of DMS-9203 or Medium Cure Patching mix made with SCM meeting requirements of DMS-9202. Consider this work subsidiary to the pertinent Items.

When using Superpave Gyratory Compactor (SGC) to design mixtures, submit the SGC mix design to the CONSTRUCTION OBSERVER for approval.

When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

All mixtures must meet the Hamburg requirement as stated in the table below.

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High-Temperature Binder Grade	Test Method	Hamburg Wheel Test Requirements [1]		
		Minimum # of Passes	Maximum Rut Depth (mm)[2]	Minimum Rut Depth (mm)[2,3]
PG 64 or lower	Tex-242-F	7,000	12.5	3
PG 70	Tex-242-F	15,000	12.5	3
PG 76 or higher	Tex-242-F	20,000	12.5	3

1. The CONSTRUCTION OBSERVER may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.
2. Rut depth tested @ 122°F
3. Unless approved otherwise.

Use of RAS is not allowed. When using RAP, include the management methods of processing, stockpiling, and testing of RAP in the QCP submitted for the project. Blending of RAP in one feeder bin or in a stockpile is not permitted.

RAP is not allowed for any surface mix applications.

No more than 20% RAP by weight of aggregate is allowed in any mix application.

Submit any proposed adjustments or changes to a job mix formula to the CONSTRUCTION OBSERVER before production of the new job mix formula.

For Mixture Design Verification, provide the CONSTRUCTION OBSERVER with two 5-gallon buckets of each aggregate stockpile to be used on the project with three gallons of each PG binder from the plant to be used on the project. Sufficient quantities of any other additives that will be used in the HMA mixture shall also be provided.

Prior to allowing production of the trial batch, the Construction Observer will use the materials provided by the Contractor to perform the following tests to verify the HMA mixture .

1. Indirect Tensile Test in accordance with Tex-266-F
2. HAMBURG Wheel Test in accordance with Tex-242-F
3. Overlay Test in accordance with Tex-248-F
4. Cantabro Test in accordance with Tex-245-F

For mixtures designed with a Texas Gyratory Compactor (TGC), the CONSTRUCTION OBSERVER may require that the target laboratory molded density be raised to no more than 97.5% or may lower the design number of gyrations to no less than 35 for mixtures designed with an SGC if any of the following conditions exist:

1. The Indirect Tensile Test results in a value greater than 200 PSI
2. The Hamburg Wheel Test results in a value less than 3.0 mm
3. The Overlay Test results in a value less than 100 cycles
4. The Cantabro Test results in a value of more than 20% loss

In lieu of or in addition to evaluating the mixture design prior to allowing a trial batch to be produced, the CONSTRUCTION OBSERVER may also evaluate the mixture produced during the trial batch for compliance with the four tests listed above.

Submit thermal and segregation profiles as well as longitudinal joint densities on electronic forms provided by County to the CONSTRUCTION OBSERVER.

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When surface irregularities, as defined in Article 341.4.9.3.3.5, "Irregularities," are detected or measured, the Contractor must take immediate corrective action defined as the removal and replacement of a full lane width of the defective area using a paver to place new mix, unless otherwise directed. If there are multiple defective areas within a sub-lot, making up to 30% of the sub-lot by area, the CONSTRUCTION OBSERVER will require the entire sub-lot be removed, unless directed otherwise.

ITEM 354 – PLANING AND TEXTURING PAVEMENT

Milling machines must be able to meet the longitudinal grade and cross slope required.

Remove the loose material from the roadway before opening to traffic.

Plane a full lane width before opening to traffic at the end of a work period.

Accomplish a 2-inch depth of planing and texturing in two passes. A single cut will be permitted if at most a 1¼-inch vertical offset is created against adjacent lanes when opened to traffic at the end of a work period.

Accomplish the 2-inch Planed Butt Joint only when there is at least 4 inches of existing thickness of ACP. Consider the determination of existing thickness of ACP as subsidiary to the various Items.

Taper transverse faces at ends of passes as directed.

Make Transverse Tapers on each end of each pass using a minimum slope rate of 50 feet H to 1-inch V.

Retain ownership of planed materials.

Plane the designated areas and depths specified in the plans, as required. Mill the pavement producing a final pavement surface with transverse pattern of 0.2 inches center to center of each strike area with difference no greater than 1/16 inch between the ridge and valley (RVD) measurement of the final milled surface. Construct a uniform finish free from gouges and ridges that does not vary more than 1/8 inch in width of the cut.

Use planning machine that is power-driven, self-propelled micro-milling equipment possessing the size and shape to allow traffic safe passage through areas adjacent to the work.

Also, ensure the micro milling equipment will be:

- Equipped with a cutting mandrel with carbide or equivalent tipped cutting teeth designed for micro-milling bituminous pavement full lane width to close tolerances
- Capable of removing pavement to an accuracy of 1/16 inch (1.6 mm) with a maximum tool spacing of 5/8 inches
- Equipped with grade and slope controls operating from a string line or ski and based on mechanical or sonic operation
- Furnished with a lighting system for night work, as necessary
- Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck

Ensure micro-milling methods produce a uniform finished surface and maintain a constant cross slope between pavement edges in each lane. Provide positive drainage to prevent water accumulation on the micro-milled pavement, as shown on the Plans or directed by the CONSTRUCTION OBSERVER. The cross slope must be uniform with no depressions or slope misalignments greater than ¼ per 12 ft. exit when the slope is tested with a straightedge placed perpendicular to the center line.

Bevel back the longitudinal vertical edges greater than two (2) inches (50 mm) produced by the removal process and left exposed to traffic. Bevel the vertical edges back at least three (3) inches for each two (2) inches (75 mm for each 50 mm) of material removed. Use an attached mold board or other approved method.

Taper the transverse edges 10 ft. (3 m) to avoid creating a traffic hazard and to produce a smooth surface when removing material at ramp areas and ends of milled sections.

Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as bridge approach slabs, drainage structures, and utility appurtenances greater than ½ in areas left open to transversing vehicles. Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance. Do not micro-mill bridge joints. Damage due to micro-milling will be repaired at the CONTRACTOR's expense and to the satisfaction of the CONSTRUCTION OBSERVER.

Remove dust, residue, and loose milled material from the micro-milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.

Measure the milled surface with a 10-foot straightedge at locations determined by the CONSTRUCTION OBSERVER for quality acceptance and acceptance of test section of milling operation. Remove and replace any areas exceeding 1/8 inch RVD, as directed by the CONSTRUCTION OBSERVER at no cost to the Department.

ITEM 400 - EXCAVATION AND BACKFILL FOR STRUCTURES

Cut pavements with the use of a saw as directed. Consider subsidiary to pertinent Items.

Obtain approval of all compaction equipment prior to all backfilling and embankment operations.

Use two (2) inch washed, crushed stone with 0% passing a No. 4 sieve to backfill for bridge ends. Consider subsidiary to the pertinent Items. Provide weep holes out the face of the backwall, as directed.

ITEM 416 – DRILLED SHAFT FOUNDATIONS

Stake all Foundations, for approval, before beginning drilling operations, as directed. Examples of types of foundations are Bridge Supports, Traffic Signal Pole Foundation, Roadway Illumination Assembly Foundations, Sign Support Locations, etc.

Calculate the vertical signal head clearance before placing any Traffic Signal Pole Foundation.

Fabricate roadway illumination assembly foundations in accordance with the City of Georgetown standards GUSL-CF-B or GUSL-CF-BR (for specific installation in rock). Alternate designs to GUSL-CF-BR or GUSL-CF-BR are prohibited.

Obtain approval before placing additional exposed Traffic Pole Foundation.

Set anchor bolts for Mast-Arm Signal Poles and Strain Poles. Set two in tension and two in compression. Obtain approval of anchor bolt placement as directed before placing concrete.

Field cut holes for anchor bolts only as directed.

Remove spoils, daily, out of flood plain, or as directed.

Take cores at the bottom of all drilled shafts supporting a bridge abutment or interior bent in accordance with Item 416.3.2. Drilled shafts under wingwalls are excluded from this requirement.

ITEM 420 – CONCRETE SUBSTRUCTURES

Use Permanent Metal Deck Forms (PMDF) or prestressed concrete panels.

Do not use PMDF in areas where a "Free Joint" is indicated in the plans.

Check the sign plans for locations of clearance signs and brackets on structures, which will require inserts in the pre-stressed beams. Forward such locations to the beam fabricator.

Where Retaining Walls are integral parts of the abutment header, do not place the abutment cap prior to backfilling the wall and the abutment area up to the elevation of the bottom of the abutment cap, unless otherwise directed.

The "H" values shown on bridge layout sheets are estimated column heights. Calculate the actual column heights based on field conditions.

Perform work during good weather unless otherwise directed. If work is performed at CONTRACTOR's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the work, if required.

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Prior to the completion of work, stencil the National Bridge Inventory (NBI) number (structure number) on each structure built/shown on this project, as directed. Verify with the CONSTRUCTION OBSERVER that the NBI number, which is shown on each Bridge Layout, is the number to use. Stencil the NBI number in an approved location on each bridge. Consider subsidiary to the pertinent Items.

At backwall to cap construction joints, use bonding mortar, grout, or epoxy as a bonding agent.

ITEM 421 – HYDRAULIC CEMENT CONCRETE

Sulfate resistant concrete is not required for any class of concrete.

Over-design requirements for compressive strength are waived for non-structural concrete, as defined in Table 8, Item 421.4.1.

Minimum air-entrainment requirements are waived for all classes of concrete, except for Class S, DC, or CO concrete. For all classes of concrete, except for Class S, P, or CO concrete or non-structural concrete, as defined in Table 8, the entrained air content must not exceed 8% air.

For all non-pavement applications using Class S, or CO concrete, target 5.5% entrained air. If the air content exceeds the target air content by more than 3 percentage points, the load of concrete will be rejected.

ITEM 423 - RETAINING WALLS

Provide Ashlar Stone Finish for all MSE retaining walls. Match aesthetic details of Southwest Bypass: Segment 1 as well as Southwest Bypass and Wolf Ranch Parkway. Do not include Map of Texas emblem unless otherwise directed. Finish subsidiary to retaining wall. Finish subsidiary to this item.

Drill, epoxy, and place #4 bars @ 18 inch centers, as directed, to tie riprap to the coping or anchor slab.

Exposed face of wall, face of coping, and exposed underside of coping shall receive a permanent TY III Anti-Graffiti Coating per Item 740.

Surface area is measured from finished grade at top of wall, including coping, down to the estimated top of footing/bottom of wall.

Immediately backfill the face of the retaining wall after the wall height gets above the final grade in front of the wall.

Do not measure any footing adjustments made to accommodate the available optional designs. Supply the retaining wall fabricators with the drainage plans. Ensure the wall design accommodates the construction of inlets, conduit, and any other large drainage structure as shown on the plans.

Consider any Retaining Wall Light Brackets RW (BL) required for this project subsidiary to pertinent Items.

Use the approved Mechanically Stabilized Earth (MSE) Wall Systems listed on TxDOT's website.

Two (2) feet either side of the width of the leveling pad must be compacted to meet ordinary compaction standards prior to placement of the leveling pad.

Verify each row of panel placement for specification tolerances after backfilling is accomplished and prior to placement of the next row of panels. Correct to within tolerance prior to placing subsequent rows of panels. Notify when a tolerance check is needed.

At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

Build the wall backfill material a minimum of 24 inches horizontally beyond the end of the wall reinforcement. Compact it in accordance with 423.3.

For retaining walls RW-05 and RW-06 in the plans, use TxDOT 2014 Standard Specifications Item 423 type "DS" backfill. For RW-06, any embankment below select fill shall be type "DS" backfill, in lieu of embankment type specified under Item 132. No additional payment will be made, subsidiary to pertinent items.

Particles larger than ¼ inch will be angular or crushed. Rounded rock or gravel will not be allowed.

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Retaining wall coping placement will be such that the outside face of the wall panels are not offset from the inside face of coping by more than 1½ inches.

Seal all form liner joints, in a manner acceptable to prevent leakage at the surface.

Follow form liner manufacturer's recommended procedures for form liner construction.

The form liner will release clean and free of the concrete, without pulling or breaking concrete from the textured surface.

Provide underdrains as called out in the plans.

ITEM 425 - PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

Hold a Prephase meeting for the erection of concrete members such as, Precast-Prestressed Concrete Beams and Precast-Prestressed Concrete Panels prior to the work, as directed. Notify the CONSTRUCTION OBSERVER of the meeting at least 24 hours prior.

ITEM 427 - SURFACE FINISHES FOR CONCRETE

All concrete structures, except those with form liner surfaces and those areas designated to receive special surface finishes, shall receive a Surface Area I, rub finish in accordance with this item. Perform an Ordinary Surface Finish to the faces of concrete units, such as Retaining Walls, Inlets, etc., that will have backfill material against them.

Perform the rub finish as soon as possible after form removal. Complete the finish application within 5 calendar days from the pour date. Should the completion of the finish work fall behind, or exceed the 5 day time frame, pours of any additional structures will cease until such time as the surface finish of existing structures is completed.

Consider Surface Finishes for concrete as subsidiary to the pertinent Items.

Follow form liner manufacturer's recommended procedures for form liner construction.

The form liner shall release clean and free of the concrete, without pulling or breaking concrete from the textured surface.

Seal all form liner joints, in a manner acceptable to prevent leakage at the surface.

Perform an Ordinary Surface Finish to the faces of concrete units, such as Retaining Walls, Inlets, etc., that will have backfill material against them.

Perform Low-Pressure water blasting to the concrete surfaces, if forms are not removed in time.

ITEM 431 – PNEUMATICALLY PLACED CONCRETE

This item shall be paid for by the square yard. Basis of estimate is 10% of the rock cut. Final quantities will vary based on field conditions encountered during construction.

Place PPC on unstable rock cuts or existing rock walls as determined and directed by the CONSTRUCTION OBSERVER. Paid for under this item. Incidental surface preparation required prior to placing PPC, including removal of loose rock, considered subsidiary to pertinent items.

Provide 2" thickness and use welded wire fabric unless otherwise directed. Mix design shall conform to Class II. Place anchors as directed. Subsidiary to this item.

Sculpt PPC finish to reproduce the texture and shape of the rock surrounding the PPC. Stain all PPC to match existing rock color patterns. Use white cement to provide better color match if needed, or as directed. Provide 4'x4' test panel for approval by the CONSTRUCTION OBSERVER prior to placing PPC. Subsidiary to this item. Provide additional thickness as needed for sculpting (max 2"). Paid for under this item.

ITEM 432, 462, 465, 466, & 467

Remove all loose Formwork and other Materials from the Floodplain or drainage areas, daily, which could float off in a Storm water Event, as directed.

ITEM 432 - RIPRAP

Fibers for Concrete as defined in DMS-4550 will not be allowed.

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Make concrete riprap five (4) inches thick unless otherwise noted or directed.

Make all mow strip riprap concrete four (4) inches thick, unless otherwise directed.

Where any proposed riprap joins existing riprap, saw cut the existing riprap and dowel/epoxy #4 bars @ 12 inch centers. Consider subsidiary to the pertinent Items. Consider saw cutting of riprap as subsidiary.

Additional riprap may be required, as determined by the CONSTRUCTION OBSERVER, near the end of project completion due to unanticipated erosion locations. Any additional, approved riprap will be paid for under this item.

All 8" Stone Riprap Protection shall have a thickness of 8" unless otherwise called out in the plans. 8" Stone Riprap Protection shall meet the gradation requirements in the table below unless otherwise approved by the CONSTRUCTION OBSERVER.

Sieve Size	Ty I Percent Retained	Ty II Percent Retained
5"		0
4"		10 - 40
3"		30 – 70
2"	0	60 – 90
1.5"	10 – 40	
1"	30 – 70	100
3/4"	60 - 90	
1/2"	100	

Use mechanically crushed on-site material from excavation activity for 8" Stone Protection Riprap. Stone should vary in size within the limits of the table above (Do not use a single size stone). Adjust stone gradation as directed by the CONSTRUCTION OBSERVER and obtain approval prior to placement. Crushed off-site material may be used if approved. Maintain a uniform aesthetic/color when placing stone riprap as directed. Subsidiary to this item.

Place 8" Stone Riprap Protection as shown on Figure 5 of the SRR standard. Place two layers of woven filter fabric beneath 8" Stone Riprap Protection. Do not place bedding material. Subsidiary to this item.

Ensure stone is free of excess sediment prior to placement. Wash stone prior to placement if directed by the CONSTRUCTION OBSERVER. Subsidiary to this item.

When placing stone, ensure tight interlocking of different stone sizes. Fill voids with smaller stone as directed by the CONSTRUCTION OBSERVER. Subsidiary to this item.

Compact stone riprap within clearzone (TY I) with vibratory drum roller. Other compaction methods must be approved by the CONSTRUCTION OBSERVER. When placing 8" Stone Riprap Protection TY I adjacent to TY D asphalt as shown on the typical sections, ensure any gaps are filled with smaller stone. Sweep stone off pavement surface prior to compacting stone riprap. Provide 50' long by 8.5' wide test strip of compacted TY I riprap for CONSTRUCTION OBSERVER's approval prior to placement on remainder of project and adjust gradation as directed. Subsidiary to this item.

ITEM 454 – BRIDGE EXPANSION JOINTS

Apply protection System II to structural steel armor joint.

For Asphalt-Plug Expansion Joints, refer to TxDOT's website for approved systems.

ITEMS 464, 466, & 467

When RCP or structure is to be placed below finished roadway subgrade and there is less than three (3) feet of fill from top of RCP to finished subgrade elevation, then flowable fill is required, as directed. Payment made under Item 401.

ITEM 466 – HEADWALLS AND WINGWALLS

Use Class C concrete for headwalls or wingwalls.

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ITEM 467 – SAFETY END TREATMENT

Cut pipe ends, in the field, to match roadway side slopes, or as directed. Apply asphalt base aluminum paint to the cut ends.

All Type II SETs shall have mitered pipe ends and cast-in-place riprap aprons.

ITEM 496 – REMOVING STRUCTURES

Notify CONSTRUCTION OBSERVER at least **30** days prior to Building Demolition that will require a 10-Calendar-Day, Prior-To-Work Notification to Texas Department of State Health Services (DSHS). If the work does not happen on the notified date then another 10-Calendar-Day, Prior-To-Work Notification will be required.

Conduct walk-through of Building with CONSTRUCTION OBSERVER to determine materials/items to be salvaged. Any material/items deemed salvageable shall be removed and stored at a location(s) approved by the CONSTRUCTION OBSERVER. Salvaging material/items shall be subsidiary to pertinent items.

Provide a detailed plan for the removal of the existing structure(s) to include the schedule of removal and list of all equipment to be used.

Removal of Building to include the structure itself, all miscellaneous items within that are not marked salvagable, all items adjacent to the exterior of the building not marked salvageable, any septic system on site, and all incidentals associated with the building. All removals associated with building shall be subsidiary to pertinent items.

The structure or structures to be removed may have surface coatings, which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations as well as those set by Texas Department of State Health Services (DSHS).

The structural steel to be removed may contain lead paint. Submit a proposed demolition plan for approval by the CONSTRUCTION OBSERVER at least 60 days prior to the desired demolition date. Demolition plan should limit disturbing where lead paint is located when possible. If flame cutting methods will be used and lead paint cannot be avoided, the County will arrange to have the paint removed at the indicated flame-cutting locations. The paint will be removed by a separate contractor for a width of four (4) inches. No paint removal will be required if other demolition methods are employed.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

In addition to the traffic control plans and the latest BC standard plan sheets, provide within the limits of the project, standard barricades, warning signs, delineators, lights, 28" cones, and flaggers in sufficient numbers and any combination as considered necessary by the CONSTRUCTION OBSERVER.

Utilize daily lane shifts as needed for the construction of the project. Normal traffic patterns shall be reinstated at the end of each workday. Perform mill and overlay operations during off-peak hours. Peak hours are defined as Monday through Friday: 7am-9am and 4pm-6pm. Ensure safety wedge is in place prior to normal traffic reinstatement.

Place one TY III barricade (8 feet) at each stockpile of material that is placed on the right-of-way and is located within 30 feet of the traveled way.

Furnish advisory speed signs in sufficient number as determined by the CONSTRUCTION OBSERVER.

Furnish sufficient personnel available to revise traffic control as directed by the CONSTRUCTION OBSERVER.

For any roadway drop-off greater than 2 inches adjacent to a roadway which is under traffic, the CONTRACTOR will be required to incorporate and maintain a 3:1 safety wedge into the proposed construction. All work involved shall be considered subsidiary to Item 502.

Provide the CONSTRUCTION OBSERVER a letter certifying that all truck-mounted attenuators (TMA) used on this project that were purchased on or after October 1, 1998, have been found to be crash worthy using the criteria outlined in NCHRP reports 230 or 350.

After completion of the project the CONTRACTOR shall fill any holes left by the barricades or sign supports and restore the area in which the signs were removed to its original condition.

Cover or remove any existing signs which conflict with temporary traffic control operations. Payment shall be considered subsidiary to this item.

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Ensure all permanent signs and pavement markings are installed before opening that section of roadway to traffic. Consider subsidiary to the pertinent items. Repair or replace any signs which are damaged during construction, or which are deemed insufficient by the CONSTRUCTION OBSERVER.

Repair barricades within 48 hours after barricade report has been delivered.

Refer to the Project Layout and Temporary Erosion Control Plan for Texas Crushed Stone ROW crossing notes.

Coordinate with the CONSTRUCTION OBSERVER for opening of the finished roadway to public traffic.

ITEM 504 - FIELD OFFICE AND LABORATORY
CONTRACTOR may use the I-35 southbound frontage building on the southeastern corner of the project, owned by the City of Georgetown, as the project field office. The City will pay for utilities. Any improvements (HVAC, Roofing, etc.) required in order to utilize the building as a field office are the sole responsibility of the CONTRACTOR.

All requirements under this item are considered subsidiary to pertinent items. Note that this building is to be removed in this project under separate item.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS
Obtain the CONSTRUCTION OBSERVER's approval for proposed methods used for erosion control before starting each phase of construction.

ITEM 512 – PORTABLE CONCRETE TRAFFIC BARRIER
Furnished PCTB may be salvaged in good condition as approved by the CONSTRUCTION OBSERVER.

ITEM 529 – CONCRETE CURB, GUTTER AND COMBINED CURB AND GUTTER
Fibers for concrete as defined in DMS-4550 will not be allowed.

ITEM 540 - METAL BEAM GUARD FENCE
Before beginning the installation of the proposed Metal Beam Guard Fence (MBGF), stake the locations for approval. Adjust the limits of the MBGF to meet field conditions, as directed, before erection.

Furnish new timber posts matching the post type on Southwest Bypass Segment 1 and RM 2243. Refer to Long Span standard for spanning culvert crossings.

Use applicable standard to match the existing RM 2243 metal beam guard fence height. Obtain approval prior to placement. Do not use the older, lower height standards for new metal beam guard fence called out elsewhere in the plans.

Install all permanent MBGF and delineators, when the roadway is constructed in one-half widths, on that section, before opening the road to traffic.

Provide Rail Elements that meet AASHTO M 180 TY I Galvanization (1.80 Oz per SY).

ITEM 550 – CHAIN LINK FENCE
Provide thermally fused PVC coating according to the specifications. Coating shall be black unless otherwise directed by the CONSTRUCTION OBSERVER.

ITEM 552 – WIRE FENCE
Begin installation of barbed wire fence within 30 calendar days of the NTP and complete installation within 60 calendar days of the NTP.

ITEM 556 – PIPE UNDERDRAINS
Filter material will meet the gradation requirements for concrete coarse aggregate (Grade 2, 3, or 4), per Table 4 of TxDOT Item 421.

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ITEM 585 - RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type B Pay Schedule 3 to evaluate ride quality of travel lanes and shoulders greater than or equal to 10 ft wide.

The Contractor is responsible for the Surface Testing and the results shall be provided in a simple format by project stationing.

ITEMS 610, 618, 620, 624, 628, 684, & 686

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Refer to TxDOT's website for list of pre-qualified manufacturers. No substitutions will be allowed for materials found on the list.

ITEM 610 – ROADWAY ILLUMINATION ASSEMBLIES

Fabricate steel roadway illumination poles in accordance with TxDOT standards RIP-(1) – RIP-(4) (Roadway Illumination Poles - 2017). Poles fabricated according to RIP-17.

Limitations on Use of the RIP-17 Standard

The Roadway Illumination Pole (RIP-17) standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, the contractor shall provide poles meeting the following requirements:

A. Submittals. Following the electronic shop drawing submittal process (see ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf), the contractor shall submit to the Engineer, for approval, fabrication drawings and calculations for the poles. The drawings and calculations shall be sealed by a Texas registered or licensed professional engineer (P.E.).

B. Luminaire Structural Support Requirements. Lighting poles, arms, and anchor bolt assemblies shall have a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the current edition of the AASHTO Design Specifications. For transformer base poles, the fabricator shall include transformer base and connecting hardware in calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.

Alternate designs to RIP-17 or the use of aluminum to fabricate poles will require the submission of shop drawings. Copies of the standard shop drawings are on file with Traffic Operations Division, Bridge Division, and the Materials Section of Construction Division. Additional shop drawings for roadway illumination assemblies built in conformance with these drawings are not required. Pre-approved shop drawing manufacturers and assembly model numbers can be found on TxDOT's website. Category is "Roadway Illumination and Electrical Supplies."

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Category is "Roadway Illumination and Electrical Supplies." Fuse holder is shown on list under Items 610 & 620.

Provide 10-amp time delay fuses.

The local public utility will provide a 240/480-Volt Power Service Drop that will be utilized by the Illumination System installed within the project.

Provide luminaire drivers with a 480-volt operating range.

Maintain all new illumination for the duration of the contract.

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Place the illumination system in operation after satisfactory completion of the circuit tests. Final acceptance will not be made until the system has operated satisfactorily for a period of at least 14 consecutive days. Consider all repairs and adjustments subsidiary to pertinent Items. Pay for electrical energy during the trial period.

Inspection of all completed work provided in the Contract will be performed. The CONTRACTOR will be released from further maintenance on that project if the work is found to be satisfactory. Partial acceptance will be made and will be in no way void or alter any Items of the contract.

ITEM 618 - CONDUIT

Do not use cast iron junction boxes in concrete bridge rails. Use polymer concrete junction boxes only. Mount the junction boxes flush (+ 0", - ½") with concrete surface of concrete bridge rail.

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Category is "Roadway Illumination and Electrical Supplies."

Consider the polymer concrete barrier boxes subsidiary to ITEM 618, "CONDUIT."

Refer to plans and specifications for type of conduit. Waterproof and tighten all couplings and connections. Bring all proposed and existing conduit into a ground box and 'elbow' it unless otherwise shown on the plans. Provide a bushing to protect the wire from abrasion when a conduit run terminates.

Replace sections of conduit with the size and type shown on the plans in the event the existing conduit proves unusable due to location or damage.

Fit PVC and HDPE conduit terminations with bell ends.

Secure permission from the proper authority, as directed, before cutting into or removing any sidewalks or curbs for installation of this Item.

Saw cut and replace any riprap, which must be removed to install the conduit. Replace riprap with material and texture as directed.

The locations of conduit and ground boxes are diagrammatic and so shift, as directed, to accommodate field conditions.

Install conduit in an area not exceeding two (2) feet in any direction from a straight line with the depth of the conduit at least two (2) feet, unless otherwise shown on the plans. Installation of the conduit by jacking or boring method will be at a depth of at least one (1) foot below the bottom of the base material of the roadway. Evidence of damage to the roadway during the jacking or boring operation will be enough grounds to stop the method being used.

Install conduit on a 2-inch sand cushion and backfill with at least six (6) inches of sand. Backfill the remainder of the trench with flexible base, soil or two-sack concrete as required by the location of the conduit or as directed.

Install underground conduits within a concrete encasement for all illumination conduits routed directly under a proposed roadway. Bore all illumination conduits routed directly under an existing roadway.

Consider all conduit elbows and rigid metal extensions required to be installed on PVC conduit systems subsidiary.

Install a high tension, non-metallic pull rope in all conduit runs. The pull ropes are for future use. Cap all empty conduit runs using standard weather tight conduit caps as directed. Consider this work subsidiary to the pertinent Item.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system including installed loop detectors and traffic signal cables which are in conformance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

Placement of conduit under the existing pavement using the open trench method will not be allowed without prior approval.

Seal all conduit ends with a permanently soft, non-toxic duct seal. The duct seal must not adversely affect plastic materials or corrode metals.

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Use a coring device when drilling holes through concrete structures. Do not use masonry or concrete drills, unless otherwise approved.

Use conduit hangers for three (3) inch and larger conduit when hanging conduit from structures. Conduit hangers shall be used for all conduits prohibited from being embedded within bridge structure and routing across the bridge structure.

Existing conduit may be proposed for reuse in this project. If the existing conduit cannot be used to place or add new electrical conductors, repair or replace this conduit, as directed. Repair of the conduit will be paid as "Extra Work" on a "Force Account" basis. Probe the existing conduit when locating drill shafts so that the existing conduit's location will be known before it is needed.

When using existing conduit, ensure that all conduits have bushings and are cleaned of dirt, mud, grease, and other debris. Restrap conduit that is being relocated to new timber poles as if it were a new installation. Consider this work subsidiary to this Item.

Consider all fittings, brackets, and junction boxes necessary to complete the installations subsidiary to the pertinent Items.

ITEM 620 – ELECTRICAL CONDUCTORS

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder from manufacturers pre-qualified by the Traffic Operations Division. Fuse holder is shown on the producer list under Items 610 & 620.

Provide and install approved 10-amp time delay fuses.

Provide breakaway disconnects in all breakaway poles. Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

Install a minimum size 8 AWG equipment grounding conductor (EGC) in all conduits including loop detectors and traffic signal cables. Payment and the size of the EGC will be in accordance with standard ED (3)-14, note 12.

Clearly and permanently, mark "Illumination" on the Illumination Conductors installed in a Signal Mast-Arm Pole or Strain Pole. Make the marks easily visible from the hand hole.

Identify the conductors as shown on the Electrical Details Standard Sheets when two or more conductors are present in one conduit or enclosure. Use identification tag with two plastic straps. Each tag will indicate circuit number, letter, or other identification as shown on the plans.

Bond grounding conductors, which share the same conduit, junction box or structures, together at every accessible point, in accordance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

All wiring will be in accordance with the National Electrical Code (NEC) and the appropriate Department standard sheets.

ITEM 628 – ELECTRICAL SERVICES

The service enclosure provided in this contract will have provisions for pad locking the enclosure shut.

The traffic signal system will require 120/240-Volt Power Service provided by the Local Electric Utility Company. CONTRACTOR shall make all arrangements for power.

The illumination system will require 240/480-Volt Power Service provided by the Local Electric Utility Company. CONTRACTOR shall make all arrangements for power.

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ITEM 644 – SMALL ROADSIDE SIGN ASSEMBLIES
Fabricate all small signs not detailed on the plans in conformance with the latest edition of the "Standard Highway Sign Designs for Texas," refer to TxDOT's website.

ITEM 662 – WORK ZONE PAVEMENT MARKINGS
Notify the CONSTRUCTION OBSERVER at least 24 hours in advance of removing existing striping and placing pavement markings & markers.

Apply markings during good weather unless otherwise directed. If markings are placed at CONTRACTOR's option, when inclement weather is impending, and the markings are damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the markings if required.

Remove work zone pavement markings within 48 hours after permanent striping has been completed.

Foil backed pavement markings will not be allowed.

ITEM 666 – RETROREFLECTORIZED PAVEMENT MARKINGS
Reference existing channel islands, gores, and lane striping before commencing work. Provide referencing that will include a sketch of the layout to the CONSTRUCTION OBSERVER. Obtain approval for placement of guidemarks from the CONSTRUCTION OBSERVER before installing any permanent pavement markings. Consider subsidiary to the pertinent Items.

ITEM 672 – RAISED PAVEMENT MARKERS
Place the bituminous adhesive at a temperature range of 380°F to 390°F. Place the pavement marker on the bituminous adhesive within approximately 20 seconds after the adhesive is placed on the pavement. Ensure the pavement marker rests solely on the adhesive and not the pavement surface. Ensure that a minimum of ⅛ inch layer of bituminous adhesive remains between the pavement marker and the pavement surface.

ITEM 677 – ELIMINATE EXISTING PAVEMENT MARKINGS AND MARKERS
Use flail milling methods only unless otherwise approved by the CONSTRUCTION OBSERVER. Mill minimum width necessary for complete removal of the existing markings. Place 30 Mil (min) black thermoplastic over all areas that are flail milled. The black thermoplastic must meet the specifications of Item 666. Thermoplastic considered subsidiary to this item.

ITEM 680 – HIGHWAY TRAFFIC SIGNALS
Install all of the materials necessary for a complete signal system as follows:

Provide a 7 day advance notice to the Austin District Signal Shop at (512) 832-7012, and the Georgetown/Williamson County Area Office (512) 930-5402 before beginning any work involving traffic signals.

Provide a 14 day advance notice to the City of Georgetown (512) 930-8151 before beginning any work involving traffic signals.

Furnish all materials, tools, and labor required to provide a completed installation in accordance with the plans and specifications. Furnished materials provided by the CONTRACTOR will be new undepreciated stock.

Place the traffic signal into operation after the entire traffic signal has been completed, all required striping is complete, and all conflicting signing is removed. The responsible Signal Shop will be present to program the controller and assist with detection setup.

Install 250W EQ LED illumination fixtures as shown in the plans. Test in accordance with Item 616. This work is subsidiary.

Furnish and install permanent signs mounted on the traffic signal poles. Furnish all hardware for installation. Consider all costs associated with the furnishing and installation of the permanent signs and the necessary hardware subsidiary to the pertinent Items.

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After the completion of the entire signal installation (including striping), a 30-day test period begins. After it has been determined, by the County, that the field wiring and controller operation are satisfactory after this test period, and all other requirements of the project have been met, the County will relieve the CONTRACTOR of any other responsibilities for the operation of the signal.

Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the CONSTRUCTION OBSERVER a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the CONSTRUCTION OBSERVER of each trouble call. Do not clear the error log in the conflict monitor during the thirty-day test period without the approval of the CONSTRUCTION OBSERVER.

Remove the existing stop sign panels (or assemblies) after the traffic signals are in operation.

Notify the CONSTRUCTION OBSERVER one (1) week before beginning any work involving traffic signals.

ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS

Install signal head attachments so the wiring to each passes from the signal pole through the attachment hardware to the signal head. Refer to District Standard for more conductor attachment information. Attachment methods not shown on the district standard are to be approved by the Construction Observer before work begins. Use UV rated tie wraps.

Ensure the signal heads are made of aluminum and are hooded and covered until the signal system is put into operation.

Each signal head will be one-way with the proper number of sections shown on the plans. Each head color will be bright yellow (Federal Yellow #13538 of Federal Standard 595). The inside of the visors will have a flat black finish.

Installed traffic signal heads within the project will have backplates unless otherwise shown on the plans. Backplates will be black aluminum.

Provide pedestrian signal head assemblies, which have a flush “egg-crated” or “Z” pattern visor for all lamps, and a one-piece reflector assembly for incandescent lamps only.

Provide louvers, which have five (5) vanes with a black finish on inside surfaces when required within the project. Fasten a hardware cloth screen, securely, with ⅝" or smaller mesh size to the front face of each louver to prevent entry by birds.

Mount signal heads level and plumb as directed.

Replace, at Contractor’s expense, all burned out or defective lamps for a period of four (4) weeks from the date of the initial turn on. At the end of this 4-week period, the Construction Observer will relieve the Contractor of any maintenance of this portion of the signal system.

Use the four point mounting system (TY A) for signal heads, except in cases of skewed or vertical heads when (TY B) will be used.

Place LED’s at the proper angle with the ground. The wording “top” or the “up arrow” indicates the proper fixed alignment within the signal head. Hang the head parallel to the ground once attached and not angled down as with incandescent heads. Ensure the signal head to be level and within tolerances. LED’s are designed to direct the indication towards the roadway surface. Variance in head leveling will cause the LED indication to appear dim during slight movement. Ensure each LED head to be properly leveled and sight tested before final acceptance.

ITEM 684 – TRAFFIC SIGNAL CABLES

Leave at least two (2) feet for each cable run in each pull box and leave at least two (2) feet in each steel pole in addition to the required length for each separate cable. Provide an extra five (5) feet of each conductor terminating in the controller cabinet. Ensure conductors are continuous without splice from terminal point to terminal point or as directed. Do not use wire nuts.

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ITEM 685 - ROADSIDE FLASHING BEACON ASSEMBLIES
Sign considered subsidiary to flashing beacon assembly.

ITEM 686 – TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)
Provide and install damping plates on all mast arms of 40 ft. and over. For mast arms less than 40 ft., refer to SMA and DMA Vibration Notes for guidance. Consider the cost for the provision and installation of damping plates as subsidiary to the various bid Items found within this project.

Provide double nuts on top and bottom of the base plate as shown on the standards.

Provide signal pole assemblies as shown on plans. Luminaire lamps and the installation of the arms and lamps are considered subsidiary to the pertinent Items.

When luminaires are to be installed on mast arm poles, provide a separate terminal strip in the signal pole access compartment. The terminal strip shall be a 4-circuit Buchanan-Type 104SN, Kulka-Type 985-GP-4 CU, or equivalent.

Provide a 10-amp time-delay fuse for traffic signal poles onto which luminaires are to be installed. Place the fuse in the fuse block indicated within note #4 found on State standard MA-D-12.

Furnish mast arms to the City of Georgetown for future installation, as noted in the plans.

ITEM 730 – ROADSIDE MOWING
Perform roadside mowing along the Roadway for the length of the project, as directed.

Complete spot mowing, as directed.

ITEM 734 – LITTER REMOVAL
Litter Removal, as defined below, is subsidiary to Roadside Mowing.

Complete Litter Removal Cycles along the Roadway for the length of the project, as directed.

Complete Litter Removal cycles prior to any mowing cycles.

Remove all litter on the right of way, within project limits.

ITEM 738 – CLEANING AND SWEEPING HIGHWAYS
Complete cleaning and sweeping cycles at regular intervals, as directed. Complete one cycle at the end of construction and prior to final acceptance. Subsidiary to pertinent items.

ITEM 6090 – LED INTERNALLY ILLUMINATED STREET NAME SIGNS
Coordinate with City of Georgetown for fabrication of Internally Illuminated Street Name Signs.

S2 RC – ROCK CUT
Place PPC on unstable areas as determined and directed by the CONSTRUCTION OBSERVER. Paid for under Item 431, “Pneumatically Placed Concrete”.

Refer to the “BLASTING” section of the general notes for notes pertaining to blasting activities.

Alternate methods to achieve a smooth rock face must be approved by the CONSTRUCTION OBSERVER and will be subject to site testing sufficient to substantiate the method to the satisfaction of the CONSTRUCTION OBSERVER prior to implementation. No additional payment will be made for alternate methods.

S2 GA - GATE ATTENDANT
Provide 2 (two) full time gate attendants, one located at the project entrance at RM 2243 and the other at the Segment 1 I-35 SBFR entrance, during working hours for the duration of the project, or as directed by the CONSTRUCTION OBSERVER. Gate attendants shall keep a log of all personnel and vehicles entering and exiting the site. Gate attendants shall be paid for by the hour. Contract assumes 10 hours per workday (5,600 total hours).

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ALT BID 1 – RETAINING WALL RW-06

If the CONSTRUCTION OBSERVER directs the CONTRACTOR not to build Alt Bid 1, omit Sheets 22, 78, 113, and 114 from the plan set. Deduct the quantities listed on Sheet 22 from the contract.

The list of material below is for the CONTRACTOR's information only.

It is the responsibility of the CONTRACTOR to verify all items and quantities listed below.

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680

DESCRIPTION	UNIT	QUANTITY
TRAFFIC SIGNAL CONTROLLER FOUNDATION	EA	1
LED LUMINAIRE	EA	4
R9-3 (18" x 18")	EA	4

[SOUTHWEST BYPASS: SEGMENT 2]
WILLIAMSON COUNTY
GOVERNING SPECIFICATIONS
(STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND SPECIAL SPECIFICATIONS)

WHERE DISCREPENCIES OCCUR BETWEEN THE VARIOUS GOVERNING SPECIFICATIONS, THE SPECIAL PROVISIONS SHALL GOVERN OVER BOTH STANDARD SPECIFICATIONS AND SPECIAL SPECIFICATIONS.

ALL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE TO THIS PROJECT ARE IDENTIFIED AS FOLLOWS:

STANDARD SPECIFICATIONS: ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION NOVEMBER 1, 2014. STANDARD SPECIFICATIONS ARE INCORPORATED INTO THE CONTRACT BY REFERENCE.

< > REFERNCE ITEMS NOT USED ON THIS CONTRACT
( ) REFERENCE ITEMS USED ON THIS CONTRACT

ITEMS 1 - 9 ARE SUPERSEDED BY THE CONTRACT GENERAL AND SPECIAL CONDITIONS, WHERE APPLICABLE. WHEREVER, IN THE TXDOT STANDARD SPECIFICATIONS, REFERENCE IS MADE TO THE STATE OF TEXAS, THE DEPARTMENT AND ITS REPRESENTATIVES, SUCH REFERENCE SHALL BE TAKEN TO MEAN WILLIAMSON COUNTY AND ITS REPRESENTATIVES.

ITEM 100	PREPARING RIGHT OF WAY
ITEM 104	REMOVING CONCRETE
ITEM 105	REMOVING TREATED AND UNTREATED BASE AND ASPHALT PAVEMENT
ITEM 110	EXCAVATION (132)
ITEM 132	EMBANKMENT (100) (132) <204> <210> <216> (400)
ITEM 160	TOPSOIL
ITEM 161	COMPOST
ITEM 164	SEEDING FOR EROSION CONTROL
ITEM 168	VEGETATIVE WATERING
ITEM 169	SOIL RETENTION BLANKETS
ITEM 247	FLEXIBLE BASE (105) <204> <210> <216>
ITEM 310	PRIME COAT <300> <316>
ITEM 340	DENSE-GRADED HOT-MIX ASPHALT (SMALL QUANTITY) <300> <320> <520> (585)
ITEM 341	DENSE-GRADED HOT-MIX ASPHALT <300> <320> <520> (585)
ITEM 354	PLANING AND TEXTURING PAVEMENT
ITEM 400	EXCAVATION AND BACKFILL FOR STRUCTURES (110) (132) <421> (423)
ITEM 416	DRILLED SHAFT FOUNDATIONS <405> (420) <421> <440> <448>
ITEM 420	CONCRETE STRUCTURES (400) <421> <427> <440> <441> <448>
ITEM 422	CONCRETE SUPERSTRUCTURES (420) <421> <422> <424> <438> <440> <780>
ITEM 423	RETAINING WALLS (110) (132) <216> (400) (420) <421> <424> <440> <445> <458> (556)
ITEM 425	PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS (420) <421> <424> <426> <427> <434> <440> <442> <445> <448>
ITEM 431	PNEUMATICALLY PLACED CONCRETE (420) <421> <440>
ITEM 432	RIPRAP (420) <421> <440>
ITEM 450	RAILING (420) <421> (422) <424> <427> <440> <442> <445> <540>
ITEM 454	BRIDGE EXPANSION JOINTS <442>
ITEM 464	REINFORCED CONCRETE PIPE (400) (467)
ITEM 466	HEADWALLS AND WINGWALLS (400) (420) <421> (432) <440> (464)
ITEM 467	SAFETY END TREATMENT (400) (420) <421> (432) <442> <440> <445> <462> <464>
ITEM 496	REMOVING STRUCTURES

ITEM 500	MOBILIZATION
ITEM 502	BARRICADES, SIGNS AND TRAFFIC HANDLING
ITEM 506	TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS
ITEM 512	PORTABLE CONCRETE TRAFFIC BARRIER (420) <421> <424> <440> <442>
ITEM 529	CONCRETE CURB, GUTTER AND COMBINED CURB AND GUTTER (420) <421> <440>
ITEM 540	METAL BEAM GUARD FENCE <421> <441> <445> (529)
ITEM 544	GUARDRAIL END TREATMENTS
ITEM 550	CHAIN LINK FENCE <421> <445>
ITEM 552	WIRE FENCE <445>
ITEM 556	PIPE UNDERDRAINS
ITEM 610	ROADWAY ILLUMINATION ASSEMBLIES (416) <421> (432) <441> <442> <445> <449> <616> (618) (620) (624) (628)
ITEM 618	CONDUIT (400) <476>
ITEM 620	ELECTRICAL CONDUCTORS
ITEM 624	GROUND BOXES (420) <421> (432) <440> (618) (620)
ITEM 628	ELECTRICAL SERVICES <441> <445> <449> (618) (620) <627> <656>
ITEM 644	SMALL ROADSIDE SIGN ASSEMBLIES <421> <440> <441> <442> <445> <636> <643> <656>
ITEM 658	DELINEATOR AND OBJECT MARKER ASSEMBLIES <445>
ITEM 666	REFLECTORIZED PAVEMENT MARKINGS (677) <678>
ITEM 672	RAISED PAVEMENT MARKERS (677) <678>
ITEM 677	ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS <300> <302> <316>
ITEM 680	HIGHWAY TRAFFIC SIGNALS (416) (610) (618) (620) (624) <625> (628) <636> <656> (682) (684) (686)
ITEM 682	VEHICLE AND PEDESTRIAN SIGNAL HEADS
ITEM 684	TRAFFIC SIGNAL CABLES
ITEM 685	ROADSIDE FLASHING BEACON ASSEMBLIES <441> <442> <445> <449> <656> <687>
ITEM 686	TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL) (416) <421> <441> <442> <445> <449>
ITEM 690	MAINTENANCE OF TRAFFIC SIGNALS (416) <421> <476> (610) (618) (620) (624) <625> (628) <636> <656> (680) (682) (684) (685) (686)
ITEM 740	GRAFFITI REMOVAL AND ANTI-GRAFFITI COATING <427>

SPECIAL PROVISIONS: THE CONTENT OF THE SPECIAL PROVISIONS ARE INCLUDED ON THE FOLLOWING PAGES.

SP 000-001	SCHEDULE OF LIQUIDATED DAMAGES
SP 002-WC1	RIGHT OF WAY IMPORTANT NOTICE TO CONTRACTORS
SP 500-WC01	MOBILIZATION
SP 502-WC01	BARRICATEDS, SIGNS, AND TRAFFIC HANDLING
SP 506-WC001	TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

SPECIAL SPECIFICATIONS: THE CONTENT OF THE SPECIAL SPECIFICATIONS ARE INCLUDED ON THE FOLLOWING PAGES.

SS 6090	LED INTERNALLY ILLUMINATED STREET NAME SIGNS <445> <446> (618) (620)
SS S2 BD	<621> BOULDER DELINEATION
SS S2 GA	GATE ATTENDANT
SS S2 RC	ROCK CUT (110) (431)
SS WC101	SOIL RIPPING (160-WC001) (161-WC001) (164-WC001) (506-WC001) <WC102>
SS WC102	MULCH (161-WC001) (506-WC001)

GENERAL: THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH PAYMENT IS TO BE MADE. THESE, TOGETHER WITH SUCH OTHER PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN THE ABOVE-LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS LISTED ABOVE, CONSTITUTE THE COMPLETE SPECIFICATIONS FOR THIS PROJECT.

Special Provision to Item 000
Schedule of Liquidated Damages

Table1
Schedule of Liquidated Damages

For Dollar Amount of Original Contract		Dollar Amount of Daily Contract Administration Liquidated Damages per Working Day
From More Than	To and Including	
0	100,000	**570**
100,000	500,000	**590**
500,000	1,000,000	**610**
1,000,000	1,500,000	**685**
1,500,000	3,000,000	**785**
3,000,000	5,000,000	**970**
5,000,000	10,000,000	**1125**
10,000,000	20,000,000	**1285**
20,000,000	Over 20,000,000	**2590**

Special Provision 002—WC1
Right Of Way Important Notice to Contractors

The Contractor's attention is directed to the fact that there may be some outstanding right of way approvals as of April 2018 required for the construction of this project. The County anticipates that these approvals will be completed as shown.

For the Contractor's information, the following is a list of all tracts of right of way required for the construction of the project. The Contractor is invited to review the outstanding approval with the Engineer assigned to this project and listed in the "Notice to Contractors." An extension of work time may be granted, as necessary, for delays caused by interference with approvals beyond the estimated dates of clearance.

The following right of way tracts are to be approved as shown. The approximate location is based on the project centerline/baseline stationing.

PARCEL	OWNER	RT/LT OF CL	APPROX. LOCATION	ESTIMATED DATE OF APPROVAL
RM 2243	TxDOT		Approval required for all work inside TxDOT ROW along RM2243	Approval 10/01/2018

Special Provision to Item 500
Mobilization

Item 500, "Mobilization," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 500.3., "Payment." The 6th and 7th bullet is deleted and replaced by the following:

- Upon Final Completion, 97% of the mobilization lump sum bid will be paid. Previous payments under this Item will be deducted from this amount, and

- Payment for the remainder of the lump sum bid for "Mobilization" will be made with the Final Payment after all submittals are received, final quantities have been determined, and when any separate vegetative establishment and maintenance, test, and performance periods provided for in the Contract have been successfully completed and the County has issued the Certificate of Acceptance.

Special Provision to Item 502
Barricades, Signs, and Traffic Handling

For this project, Item 502, "Barricades, Signs, and Traffic Handling," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 502.4.1.3., "Maximum Total Payment Prior to Acceptance" is voided and replaced by the following:

> **Maximum Total Payment Prior to Completion.** The total payment for this Item will not exceed 10% of the total Contract amount before final completion in accordance with General Conditions of Agreement, Section 5.06, "Final Completion and Acceptance." The remaining balance will be paid in accordance with Section 502.4.1.5, "Balance Due."

Article 502.4.1.5., "Balance Due" is voided and replaced by the following:

> **Balance Due.** If all work is complete in accordance with General Conditions of Agreement, Section 5.06, "Final Completion and Acceptance," before payment of the amount allowed by this Article, the balance due will be paid with the Final Payment.

Special Provision 506-WC001

Temporary Erosion, Sedimentation, and Environmental Controls

For this project, Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls," of the Standard Specifications, is hereby voided and replaced with the following.

PART 1 – GENERAL

1.1 DESCRIPTION

Install, maintain, and remove erosion, sedimentation, and environmental control measures to prevent or reduce the discharge of pollutants in accordance with the Storm Water Pollution Prevention Plan (SW3P) in the plans and the Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR150000.

1.2 MEASUREMENT

A. Rock Filter Dams

Installation or removal of rock filter dams will be measured by the foot or by the cubic yard. The measured volume will include sandbags when used.

1. Linear Measurement

When rock filter dams are measured by the foot, measurement will be along the centerline of the top of the dam.

2. Volume Measurement

When rock filter dams are measured by the cubic yard, measurement will be based on the volume of rock computed by the method of average end areas.

a. Installation: Measurement will be made in final position.

b. Removal: Measurement will be made at the point of removal.

B. Temporary Pipe Slope Drains

Temporary pipe slope drains will be measured by the foot.

C. Temporary Paved Flumes

Temporary paved flumes will be measured by the square yard of surface area. The measured area will include the energy dissipater at the flume outlet.

D. Construction Exits

Construction exits will be measured by the square yard of surface area.

E. Earthwork for Erosion and Sediment Control

1. Equipment and Labor Measurement

   Equipment and labor used will be measured by the actual number of hours the equipment is operated and the labor is engaged in the work.

2. Volume Measurement

   a. In Place

      i. Excavation

         Excavation will be measured by the cubic yard in its original position and the volume computed by the method of average end areas.

      ii. Embankment

         Embankment will be measured by the cubic yard in its final position by the method of average end areas. The volume of embankment will be determined between:

         - the original ground surfaces or the surface upon that the embankment is to be constructed for the feature and
         - the lines, grades, and slopes of the accepted embankment for the feature.

   b. In Vehicles

      Excavation and embankment quantities will be combined and paid for under "Earthwork (Erosion and Sediment Control, In Vehicle)." Excavation will be measured by the cubic yard in vehicles at the point of removal. Embankment will be measured by the cubic yard in vehicles measured at the point of delivery. Shrinkage or swelling factors will not be considered in determining the calculated quantities.

F. Construction Perimeter Fence

   Construction perimeter fence will be measured by the foot.

G. Sandbags for Erosion Control

   Sandbags will be measured as each sandbag or by the foot along the top of sandbag berms or dams.

H. Temporary Sediment-Control Fence

   Installation or removal of temporary sediment-control fence will be measured by the foot.

I. Biodegradable Erosion Control Logs

   Installation or removal of biodegradable erosion control logs will be measured by the foot along the centerline of the top of the control logs.

J. Vertical Tracking

   Vertical tracking will not be measured or paid for directly, but is considered subsidiary to this Item.

1.3 PAYMENT

The following will not be paid for directly, but are subsidiary to pertinent Items:

- erosion-control measures for Contractor project-specific locations (PSLs) inside and outside the right-of-way (such as construction and haul roads, field offices, equipment and supply areas, plants, and material sources);

- removal of litter, unless a separate pay item is shown on the plans;
- repair to devices and features damaged by Contractor operations;
- added measures and maintenance needed due to negligence, carelessness, lack of maintenance, and failure to install permanent controls;
- removal and reinstallation of devices and features needed for the convenience of the Contractor;
- finish grading and dressing upon removal of the device; and
- minor adjustments including, but not limited to plumbing posts, reattaching fabric, minor grading to maintain slopes on an erosion embankment feature, or moving small numbers of sandbags.

Stabilization of disturbed areas will be paid for under pertinent Items.

Furnishing and installing pipe for outfalls associated with sediment traps and ponds will not be paid for directly, but is subsidiary to the excavation and embankment under this Item.

A. Rock Filter Dams

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid as follows:

1. Installation

Installation will be paid for as "Rock Filter Dams (Install)" of the type specified. This price is full compensation for furnishing and operating equipment, finish backfill and grading, lacing, proper disposal, labor, materials, tools, and incidentals.

2. Removal

Removal will be paid for as "Rock Filter Dams (Remove)." This price is full compensation for furnishing and operating equipment, proper disposal, labor, materials, tools, and incidentals.

When the Owner directs that the rock filter dam installation or portions thereof be replaced, payment will be made at the unit price bid for "Rock Filter Dams (Remove)" and for "Rock Filter Dams (Install)" of the type specified. This price is full compensation for furnishing and operating equipment, finish backfill and grading, lacing, proper disposal, labor, materials, tools, and incidentals.

B. Temporary Pipe Slope Drains

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Temporary Pipe Slope Drains" of the size specified. This price is full compensation for furnishing materials, removal and disposal, furnishing and operating equipment, labor, tools, and incidentals.

Removal of temporary pipe slope drains will not be paid for directly, but is subsidiary to the installation Item. When the Owner directs that the pipe slope drain installation or portions thereof be replaced, payment will be made at the unit price bid for "Temporary Pipe Slope Drains" of the size specified, which is full compensation for the removal and reinstallation of the pipe drain.

Earthwork required for the pipe slope drain installation, including construction of the sediment trap, will be measured and paid for under "Earthwork for Erosion and Sediment Control."

Riprap concrete or stone, when used as an energy dissipater or as a stabilized sediment trap, will be measured and paid for in accordance with Item 432, "Riprap."

C. Temporary Paved Flumes

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Temporary Paved Flume (Install)" or "Temporary Paved Flume (Remove)." This price is full compensation for furnishing and placing materials, removal and disposal, equipment, labor, tools, and incidentals.

When the Owner directs that the paved flume installation or portions thereof be replaced, payment will be made at the unit prices bid for "Temporary Paved Flume (Remove)" and "Temporary Paved Flume (Install)." These prices are full compensation for the removal and replacement of the paved flume and for equipment, labor, tools, and incidentals.

Earthwork required for the paved flume installation, including construction of a sediment trap, will be measured and paid for under "Earthwork for Erosion and Sediment Control."

D. Construction Exits

Contractor-required construction exits from off right-of-way locations or on right-of-way PSLs will not be paid for directly, but are subsidiary to pertinent Items.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" for construction exits needed on right-of-way access to work areas required by the Owner will be paid for at the unit price bid for "Construction Exits (Install)" of the type specified or "Construction Exits (Remove)." This price is full compensation for furnishing and placing materials, excavating, removal and disposal, cleaning vehicles, labor, tools, and incidentals.

When the Owner directs that a construction exit or portion thereof be removed and replaced, payment will be made at the unit prices bid for "Construction Exit (Remove)" and "Construction Exit (Install)" of the type specified. These prices are full compensation for the removal and replacement of the construction exit and for equipment, labor, tools, and incidentals.

Construction of sediment traps used in conjunction with the construction exit will be measured and paid for under "Earthwork for Erosion and Sediment Control."

E. Earthwork for Erosion and Sediment Control

1. Initial Earthwork for Erosion and Sediment Control

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Excavation (Erosion and Sediment Control, In Place)," "Embankment (Erosion and Sediment Control, In Place)," "Excavation (Erosion and Sediment Control, In Vehicle)," "Embankment (Erosion and Sediment Control, (In Vehicle)," or "Earthwork (Erosion and Sediment Control, In Vehicle)."

This price is full compensation for excavation and embankment, including hauling, disposal of material not used elsewhere on the project; embankments, including furnishing material from approved sources and construction of erosion-control features; and equipment, labor, tools, and incidentals.

Sprinkling and rolling required by this Item will not be paid for directly, but will be subsidiary to this Item.

2. Maintenance Earthwork for Erosion and Sediment Control for Cleaning and Restoring Control Measures

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid under a Contractor Force Account Item from invoice provided to the Owner.

This price is full compensation for excavation, embankment, and re-grading, including removal of accumulated sediment in various erosion control installations as directed, hauling, and disposal of material not used elsewhere on the project, excavation for construction of erosion-control features, embankments, including furnishing material from approved sources and construction of erosion-control features, and equipment, labor, tools, and incidentals.

Earthwork needed to remove and obliterate erosion-control features will not be paid for directly, but is subsidiary to pertinent Items unless otherwise shown on the plans.

Sprinkling and rolling required by this Item will not be paid for directly, but will be subsidiary to this Item.

F. Construction Perimeter Fence

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Construction Perimeter Fence." This price is full compensation for furnishing and placing the fence, digging, fence posts, wire, and flagging, removal and disposal, and materials, equipment, labor, tools, and incidentals.

Removal of construction perimeter fence will be not paid for directly, but is subsidiary to the installation Item. When the Owner directs that the perimeter fence installation or portions thereof be removed and replaced, payment will be made at the unit price bid for "Construction Perimeter Fence," which is full compensation for the removal and reinstallation of the construction perimeter fence.

G. Sandbags for Erosion Control

Sandbags will be paid for at the unit price bid for "Sandbags for Erosion Control" (of the height specified when measurement is by the foot). This price is full compensation for materials, placing sandbags, removal and disposal, equipment, labor, tools, and incidentals.

Removal of sandbags will not be paid for directly but is subsidiary to the installation Item. When the Owner directs that the sandbag installation or portions thereof be replaced, payment will be made at the unit price bid for "Sandbags for Erosion Control," which is full compensation for the reinstallation of the sandbags.

H. Temporary Sediment-Control Fence

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid as follows:

1. Installation

Installation will be paid for as "Temporary Sediment-Control Fence (Install)." This price is full compensation for furnishing and operating equipment, finish backfill and grading, lacing, proper disposal, labor, materials, tools, and incidentals.

2. Removal

Removal will be paid for as "Temporary Sediment-Control Fence (Remove)." This price is full compensation for furnishing and operating equipment, proper disposal, labor, materials, tools, and incidentals.

I. Biodegradable Erosion Control Logs

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid as follows:

1. Installation

   Installation will be paid for as "Biodegradable Erosion Control Logs (Install)" of the size specified. This price is full compensation for furnishing and operating equipment, finish backfill and grading, staking, proper disposal, labor, materials, tools, and incidentals.

2. Removal

   Removal will be paid for as "Biodegradable Erosion Control Logs (Remove)." This price is full compensation for furnishing and operating equipment, proper disposal, labor, materials, tools, and incidentals.

J. Vertical Tracking

Vertical tracking will not be measured or paid for directly, but is considered subsidiary to this Item.

PART 2 – PRODUCTS

2.1 MATERIALS

Furnish materials in accordance with the following:

- Item 161, "Compost"
- Item 432, "Riprap"
- Item 556, "Pipe Underdrains"

A. Rock Filter Dams

1. Aggregate

   Furnish aggregate with hardness, durability, cleanliness, and resistance to crumbling, flaking, and eroding acceptable to the Owner. Provide the following:

   a. Type 1, Type 2, and Type 4 rock filter dams: Use three (3) inches to six (6) inches aggregate.

   b. Type 3 rock filter dams: Use four (4) inches to eight (8) inches aggregate.

2. Wire

   Provide minimum twenty (20) gauge galvanized wire for the steel wire mesh and tie wires for Types 2 and Type 3 rock filter dams. Type 4 dams require:

   a. a double-twisted, hexagonal weave with a nominal mesh opening of 2½ inches by 3¼ inches;

   b. minimum 0.0866 inches steel wire for netting;

   c. minimum 0.1063 inches steel wire for selvages and corners; and

   d. minimum 0.0866 inches for binding or tie wire.

3. Sandbag Material

   Furnish sandbags meeting Section 506.2.8., "Sandbags," except that any gradation of aggregate may be used to fill the sandbags.

B. Temporary Pipe Slope Drains

Provide corrugated metal pipe, polyvinyl chloride (PVC) pipe, flexible tubing, watertight connection bands, grommet materials, prefabricated fittings, and flared entrance sections that conform to the plans. Recycled and other materials meeting these requirements are allowed if approved.

Furnish concrete in accordance with Item 432, "Riprap."

C. Temporary Paved Flumes

Furnish asphalt concrete, hydraulic cement concrete, or other comparable non-erodible material that conforms to the plans. Provide rock or rubble with a minimum diameter of six (6) inches and a maximum volume of one-half (½) $ft.^3$ for the construction of energy dissipaters.

D. Construction Exits

Provide materials that meet the details shown on the plans and this Section.

1. Rock Construction Exit

Provide crushed aggregate for long-term and short-term construction exits. Furnish aggregates that are clean, hard, durable, and free from adherent coatings such as salt, alkali, dirt, clay, loam, shale, soft or flaky materials, and organic and injurious matter. Use four (4) inch to eight (8) inch aggregate for Type 1. Use two (2) inch to four (4) inch aggregate for Type 3.

2. Timber Construction Exit

Furnish No. 2 quality or better railroad ties and timbers for long-term construction exits, free of large and loose knots, and treated to control rot. Fasten timbers with nuts and bolts or lag bolts, of at least one-half (½) inch diameter, unless otherwise shown on the plans or allowed. Provide plywood or pressed wafer board at least one-half (½) inch thick for short-term exits.

3. Foundation Course

Provide a foundation course consisting of flexible base, bituminous concrete, hydraulic cement concrete, or other materials as shown on the plans or directed.

E. Embankment for Erosion Control

Provide rock, loam, clay, topsoil, or other earth materials that will form a stable embankment to meet the intended use.

F. Pipe

Provide pipe outlet material in accordance with Item 556, "Pipe Underdrains," and details shown on the plans.

G. Construction Perimeter Fence

1. Posts

Provide essentially straight wood or steel posts that are at least sixty (60) inches long. Furnish soft wood posts with a minimum diameter of three (3) inches or use nominal two (2) inch by four (4) inch boards. Furnish hardwood posts with a minimum cross-section of 1½ inches by $1^1/_5$ inches. Furnish T-shaped or L-shaped steel posts with a minimum weight of 0.5 lbs. per foot.

2. Fence

   Provide orange construction fencing as approved.

3. Fence Wire

   Provide eleven (11) gauge or larger galvanized smooth or twisted wire. Provide sixteen (16) gauge or larger tie wire.

4. Flagging

   Provide brightly-colored flagging that is fade-resistant and at least ¾ inches wide to provide maximum visibility both day and night.

5. Staples

   Provide staples with a crown at least one-half (½) inch wide and legs at least one-half (½) inch long.

6. Used Materials

   Previously used materials meeting the applicable requirements may be used if approved.

H. Sandbags

Provide sandbag material of polypropylene, polyethylene, or polyamide woven fabric with a minimum unit weight of four (4) oz. per square yard, a Mullen burst-strength exceeding 300 psi, and an ultraviolet stability exceeding 70%.

Use natural coarse sand or manufactured sand meeting the gradation given in Table 1 to fill sandbags. Filled sandbags must be twenty-four (24) inches to thirty (30) inches long, sixteen (16) inches to eighteen (18) inches wide, and six (6) inches to eight (8) inches thick.

Table 1: Sand Gradation

Sieve #	Retained (% by Weight)
4	Maximum 3%
100	Minimum 80%
200	Minimum 95%

Aggregate may be used instead of sand for situations where sandbags are not adjacent to traffic. The aggregate size shall not exceed $^{3}/_{8}$ inch.

I. Temporary Sediment Control Fence

Provide a net-reinforced fence using woven geo-textile fabric. Logos visible to the traveling public will not be allowed.

1. Fabric

   Provide fabric materials in accordance with DMS-6230, “Temporary Sediment Control Fence Fabric.”

2. Posts

   Provide essentially straight wood or steel posts with a minimum length of 48 inches, unless otherwise shown on the plans. Furnish soft wood posts at least three (3) inches in diameter or use nominal two (2) inch by four (4) inch boards. Furnish hardwood posts with a minimum cross-section of 1½ inches by 1½ inches. Furnish T-shaped or L-shaped steel posts with a minimum weight of 1.3 lbs. per foot.

3. Net Reinforcement

   Provide net reinforcement of at least 12½ gauge galvanized welded wire mesh, with a maximum opening size of two (2) inches by four (4) inches, at least twenty-four (24) inches wide, unless otherwise shown on the plans.

4. Staples

   Provide staples with a crown at least ¾ inch wide and legs one-half (½) inch long.

5. Used Materials

   Use recycled material meeting the applicable requirements if approved.

J. Biodegradable Erosion Control Logs

1. Core Material

   Furnish core material that is biodegradable or recyclable. Use compost, mulch, aspen excelsior wood fibers, chipped site vegetation, agricultural rice or wheat straw, coconut fiber, 100% recyclable fibers, or any other acceptable material unless specifically called out on the plans. Permit no more than 5% of the material to escape from the containment mesh. Furnish compost meeting the requirements of Item 161, "Compost."

2. Containment Mesh

   Furnish containment mesh that is 100% biodegradable, photodegradable, or recyclable such as burlap, twine, UV photodegradable plastic, polyester, or any other acceptable material.

   Furnish biodegradable or photodegradable containment mesh when log will remain in place as part of a vegetative system.

   Furnish recyclable containment mesh for temporary installations.

3. Size

   Furnish biodegradable erosion control logs with diameters shown on the plans or as directed. Stuff containment mesh densely so logs do not deform.

PART 3 – EXECUTION

3.1 Construction

A. Contractor Responsibilities

Implement the Owner's SW3P for the project in accordance with the plans and specifications, TPDES General Permit TXR150000, and as directed by the Owner. Develop and implement an SW3P for project-specific material supply plants within and outside of the Owner's right-of-way in accordance with the specific or general storm water permit requirements. Prevent water pollution from storm water associated with construction activity from entering any surface water or private property on or adjacent to the project site.

B. General

1. Phasing

Implement control measures in the area to be disturbed before beginning construction or as directed. Limit the disturbance to the area shown on the plans or as directed. If, in the opinion of the Owner, the Contractor cannot control soil erosion and sedimentation resulting from construction operations, the Owner will limit the disturbed area to that which the Contractor is able to control. Minimize disturbance to vegetation.

2. Maintenance

Immediately correct ineffective control measures. Implement additional controls as directed. Remove excavated material within the time requirements specified in the applicable storm water permit.

3. Stabilization

Stabilize disturbed areas where construction activities will be temporarily stopped in accordance with the applicable storm water permit. Establish a uniform vegetative cover. The project will not be accepted until a 70% density of existing adjacent undisturbed areas is obtained, unless otherwise shown on the plans. When shown on the plans, the Owner may accept the project when adequate controls are in place that will control erosion, sedimentation, and water pollution until sufficient vegetative cover can be established.

4. Finished Work

Upon acceptance of vegetative cover, remove and dispose of all temporary control measures, temporary embankments, bridges, matting, falsework, piling, debris, or other obstructions placed during construction that are not a part of the finished work or as directed.

5. Restricted Activities and Required Precautions

Do not discharge onto the ground or surface waters any pollutants such as chemicals, raw sewage, fuels, lubricants, coolants, hydraulic fluids, bitumens, or any other petroleum product. Operate and maintain equipment on-site to prevent actual or potential water pollution. Manage, control, and dispose of litter on-site such that no adverse impacts to water quality occur. Prevent dust from creating a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property. Wash out concrete trucks only as described in the TPDES General Permit TXR150000. Utilize appropriate controls to minimize the off-site transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water (i.e. dewatering). Prevent discharges that would contribute to a violation of Edwards Aquifer Rules, water quality standards, the impairment of a listed water body, or other state or federal law.

C. Installation, Maintenance, and Removal Work

Perform work in accordance with the SW3P, according to manufacturers' guidelines, and in accordance with the TPDES General Permit TXR150000. Install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until soil disturbing activities are completed and permanent erosion control features are in place or the disturbed area has been adequately stabilized as determined by the Owner. If a device ceases to function as intended, repair or replace the device or portions thereof as necessary. Remove sediment, debris, and litter. When approved, sediments may be disposed of within embankments, or in the right-of-way in areas where the material will not contribute to further siltation. Dispose of removed material in accordance with federal, state, and local regulations.

Remove devices upon approval or as directed. Finish-grade and dress the area upon removal. Stabilize disturbed areas in accordance with the permit and as shown on the plans or as directed. Materials removed are considered consumed by the project. Retain ownership of stockpiled material and remove it from the project when new installations or replacements are no longer required.

1. Rock Filter Dams for Erosion Control

   Remove trees, brush, stumps, and other objectionable material that may interfere with the construction of rock filter dams. Place sandbags as a foundation when required or at the Contractor's option.

   Place the aggregate to the lines, height, and slopes specified, without undue voids for Types 1, 2, 3, and 5. Place the aggregate on the mesh and then fold the mesh at the upstream side over the aggregate and secure it to itself on the downstream side with wire ties or hog rings for Types 2 and Type 3, or as directed. Place rock filter dams perpendicular to the flow of the stream or channel unless otherwise directed. Construct filter dams according to the following criteria unless otherwise shown on the plans:

   a. Type 1: Non-reinforced

      i. Height: At least eighteen (18) inches measured vertically from existing ground to top of filter dam

      ii. Top Width: At least two (2) ft.

      iii. Slopes: No steeper than 2:1

   b. Type 2: Reinforced

      i. Height: At least eighteen (18) inches measured vertically from existing ground to top of filter dam

      ii. Top Width: At least two (2) ft.

      iii. Slopes: No steeper than 2:1

   c. Type 3: Reinforced

      i. Height: At least thirty-six (36) inches measured vertically from existing ground to top of filter dam

      ii. Top Width: At least two (2) ft.

      iii. Slopes: No steeper than 2:1

   d. Type 4: Sack Gabions

      Unfold sack gabions and smooth out kinks and bends. Connect the sides by lacing in a single loop–double loop pattern on four (4) inch to 5 inch spacing for vertical filling. Pull the end lacing rod at one end until tight, wrap around the end, and twist four (4) times. Fill with stone at the filling end, pull the rod tight, cut the wire with approximately six (6) inches remaining, and twist wires four (4) times.

      Place the sack flat in a filling trough, fill with stone, connect sides, and secure ends as described above for horizontal filling.

      Lift and place without damaging the gabion. Shape sack gabions to existing contours.

   e. Type 5: Provide rock filter dams as shown on the plans.

2. Temporary Pipe Slope Drains

   Install pipe with a slope as shown on the plans or as directed. Construct embankment for the drainage system in eight (8) inch lifts to the required elevations. Hand-tamp the soil around and under the entrance section to the top of the embankment as shown on the plans or as directed. Form the top of the embankment or earth dike over the pipe slope drain at least one (1) ft. higher than the top of the inlet pipe at all points. Secure the pipe with hold-downs or hold-down grommets spaced a maximum of ten (10) ft. on

center. Construct the energy dissipaters or sediment traps as shown on the plans or as directed. Construct the sediment trap using concrete or rubble riprap in accordance with Item 432, "Riprap," when designated on the plans.

3. Temporary Paved Flumes

Construct paved flumes as shown on the plans or as directed. Provide excavation and embankment (including compaction of the subgrade) of material to the dimensions shown on the plans unless otherwise indicated. Install a rock or rubble riprap energy dissipater, constructed from the materials specified above, to a minimum depth of nine (9) inches at the flume outlet to the limits shown on the plans or as directed.

4. Construction Exits

Prevent traffic from crossing or exiting the construction site or moving directly onto a public roadway, alley, sidewalk, parking area, or other right-of-way areas other than at the location of construction exits when tracking conditions exist. Construct exits for either long-term or short-term use.

a. Long-Term

Place the exit over a foundation course as required. Grade the foundation course or compacted subgrade to direct runoff from the construction exits to a sediment trap as shown on the plans or as directed. Construct exits with a width of at least fourteen (14) ft. for one-way and twenty (20) ft. for two-way traffic for the full width of the exit or as directed.

i. Type 1: Construct to a depth of at least eight (8) inches using crushed aggregate as shown on the plans or as directed.

ii. Type 2: Construct using railroad ties and timbers as shown on the plans or as directed.

b. Short-Term

i. Type 3: Construct using crushed aggregate, plywood, or wafer board. This type of exit may be used for daily operations where long-term exits are not practical.

ii. Type 4: Construct as shown on the plans or as directed.

5. Earthwork for Erosion Control

Perform excavation and embankment operations to minimize erosion and to remove collected sediments from other erosion control devices.

a. Excavation and Embankment for Erosion Control Features

Place earth dikes, swales, or combinations of both along the low crown of daily lift placement, or as directed, to prevent runoff spillover. Place swales and dikes at other locations as shown on the plans or as directed to prevent runoff spillover or to divert runoff. Construct cuts with the low end blocked with undisturbed earth to prevent erosion of hillsides. Construct sediment traps at drainage structures in conjunction with other erosion control measures as shown on the plans or as directed.

Create a sediment basin, where required, providing 3,600 cu. ft. of storage per acre drained, or equivalent control measures for drainage locations that serve an area with ten (10) or more disturbed acres at one time, not including off-site areas.

b. Excavation of Sediment and Debris

Remove sediment and debris when accumulation affects the performance of the devices, after a rain, and when directed.

6. Construction Perimeter Fence

Construct, align, and locate fencing as shown on the plans or as directed.

a. Installation of Posts

Embed posts eighteen (18) inches deep or adequately anchor in rock, with a spacing of eight (8) ft. to ten (10) ft.

b. Wire Attachment

Attach the top wire to the posts at least three (3) ft. from the ground. Attach the lower wire midway between the ground and the top wire.

c. Flag Attachment

Attach flagging to both wire strands midway between each post. Use flagging at least eighteen (18) inches long. Tie flagging to the wire using a square knot.

7. Sandbags for Erosion Control

Construct a berm or dam of sandbags that will intercept sediment-laden storm water runoff from disturbed areas, create a retention pond, detain sediment, and release water in sheet flow. Fill each bag with sand so that at least the top six (6) inches of the bag is unfilled to allow for proper tying of the open end. Place the sandbags with their tied ends in the same direction. Offset subsequent rows of sandbags one-half (½) the length of the preceding row. Place a single layer of sandbags downstream as a secondary debris trap. Place additional sandbags as necessary or as directed for supplementary support to berms or dams of sandbags or earth.

8. Temporary Sediment-Control Fence

Provide temporary sediment-control fence near the downstream perimeter of a disturbed area to intercept sediment from sheet flow. Incorporate the fence into erosion-control measures used to control sediment in areas of higher flow. Install the fence as shown on the plans, as specified in this Section, or as directed.

a. Installation of Posts

Embed posts at least eighteen (18) inches deep, or adequately anchor if in rock, with a spacing of six (6) ft. to eight (8) ft. and install on a slight angle toward the runoff source.

b. Fabric Anchoring

Dig trenches along the uphill side of the fence to anchor six (6) inches to eight (8) inches of fabric. Provide a minimum trench cross-section of six (6) inches by six (6) inches. Place the fabric against the side of the trench and align approximately two (2) inches of fabric along the bottom in the upstream direction. Backfill the trench, then hand-tamp.

c. Fabric and Net Reinforcement Attachment

Attach the reinforcement to wooden posts with staples, or to steel posts with T-clips, in at least four (4) places equally spaced unless otherwise shown on the plans. Sewn vertical pockets may be used to attach reinforcement to end posts. Fasten the fabric to the top strand of reinforcement by hog rings or cord every fifteen (15) inches or less.

d. Fabric and Net Splices

Locate splices at a fence post with a minimum lap of six (6) inches attached in at least six (6) places equally spaced unless otherwise shown on the plans. Do not locate splices in concentrated flow areas.

Requirements for installation of used temporary sediment-control fence include the following:

i. fabric with minimal or no visible signs of biodegradation (weak fibers);

ii. fabric without excessive patching (more than one (1) patch every fifteen (15) ft. to twenty (20) ft.);

iii. posts without bends; and

iv. backing without holes.

9. Biodegradable Erosion Control Logs

Install biodegradable erosion control logs near the downstream perimeter of a disturbed area to intercept sediment from sheet flow. Incorporate the biodegradable erosion control logs into the erosion measures used to control sediment in areas of higher flow. Install, align, and locate the biodegradable erosion control logs as specified below, as shown in plans or as directed.

Secure biodegradable erosion control logs in a method adequate to prevent displacement as a result of normal rain events, prevent damage to the logs, and to the satisfaction of the Owner such that flow is not allowed under the logs. Temporarily removing and replacing biodegradable erosion logs as to facilitate daily work is allowed at the Contractor's expense.

10. Vertical Tracking

Perform vertical tracking on slopes to temporarily stabilize soil. Provide equipment with a track undercarriage capable of producing a linear soil impression measuring a minimum of twelve (12) inches long by two (2) inches to four (4) inches wide by one-half (½) inch to two (2) inches deep. Do not exceed twelve (12) inches between track impressions. Install continuous linear track impressions where the twelve (12) inches length impressions are perpendicular to the slope. Vertical tracking is required on projects where soil disturbing activities have occurred unless otherwise approved.

END OF SECTION

Special Specification 6090
LED Internally Illuminated Street Name Signs

1. DESCRIPTION

Furnish, fabricate, and install light emitting diode (LED) internally illuminated street name (IISN) signs attached to traffic signal poles as shown on the plans.

2. MATERIALS

Provide new materials that comply with the details shown on the plans, the requirements of this Item, and the pertinent requirements of the following Items:

- Item 445, "Galvanizing"
- Item 446, "Field Cleaning and Painting Steel"
- Item 620, "Electrical Conductors"
- Item 621, "Tray Cable"

Furnish and fabricate LED IISN sign assemblies and associated mounting hardware from new materials that comply with this specification. Provide single side message or double side message signs as shown on the plans.

Furnish 6 sets of submittals, of the LED IISN and mounting hardware, to the Engineer at the project address. Do not begin work or purchase materials before the submittals are approved by the Engineer.

2.1. **General Requirements.** Ensure sign assembly standard lengths are between 4 ft. and 10 ft. Ensure standard viewable heights are between 15 in. and 30 in. Use single or double faced signs as required by plans. Ensure maximum weight of the sign does not exceed maximum capacity of IISN support arms.

Construct sign fixture housing from 5000 or 6000 series aluminum. Powder-coat paint all exterior fixture housing glossy black or as shown on the plans. Ensure paint exceeds 1000-hr. salt-spray test in accordance with ASTM B117. IISN housing must be rated as NEMA type 3R. Use stainless steel screws and hardware.

Ensure sign panels, light sources, light engines, and power supplies can be replaced without sign removal. The sign shall be capable of continuous operation over a range in temperatures from -10°F to +140°F.

2.2. **LED Requirements.** Provide high flux LED's that are rated to maintain a minimum 70% of their initial lumens after 60,000 hr. according to IESNA LM-80-08. Ensure the LED arrays or modules will continue to operate if one LED goes out. Provide light engine and LED arrays or modules that are replaceable without removing the sign.

2.3. **Sign Panel Requirements.** Ensure the front panel of the sign is ultraviolet, weather, abrasion and impact resistant high impact strength polycarbonate, acrylic or a glass-fiber reinforced polyester fluoride. The front panel will be replaceable for future maintenance purposes. Provide translucent reflective type D sheeting and colored transparent acrylic film as per TxDOT DMS - 8300, "Sign Face Material."

As per Texas Manual on Uniform Traffic Control Devices Section 2D.38, street name signs will have a white legend on a green background. A border, if used, will be the same color as the legend. The lettering should be at least 8 inch capital letters, or upper/lower case letters. Supplementary lettering to indicate the type of street (such as Street, Avenue, or Road) or the section of the City (such as SE) may be in smaller lettering, at least 3 in. high. Ensure letter font type is Clearview - 2W as shown on *Standard Highway Sign Designs for Texas*, D3-1 Overhead Mount.

2.4. **Electrical and Illumination Requirements.** Provide IISN that will operate at 120 VAC. Ensure product meets standard for electric signs UL 48. The on-board circuitry of an IISN shall include voltage surge protection, to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.8, NEMA Standard TS 2-2003. The power supply shall be housed inside the sign enclosure. Power supply shall be UL Class 2 limited output voltage and current plus isolation for safe operation, and UL rated for outdoor damp locations. Power supply shall be IP 64 Outdoor Rated. The light source shall evenly illuminate the sign panel. The average luminance over the entire panel surface will be uniform.

2.5. **Support Requirements.** The sign shall be designed and constructed to withstand 110 mph wind loads in conformance with the requirements of the AASHTO publication *Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals* (5th Edition 2009).

The sign must be supplied with mounting brackets from the manufacturer (swinging or rigid mounting) as shown on the plans.

2.6. **Color.** The color of the legend, symbols, and background must fall within the CIE (The International Commission on Illumination) color coordinates and reflectance values listed in Table 1.

Table 1
CIE Chromaticity Coordinates and Reflectance Values

	White			Green	
x	y	Reflectance	x	y	Reflectance
0.300	0.290	40 Min	0.255	0.330	3.5-10
280	0.310		0.255	0.520	
0.360	0.360		0.020	0.540	

2.7. **Workmanship.** The panels must exhibit good workmanship and must be free from objectionable marks or defects that would adversely affect appearance or serviceability.

2.8. **Warranty.** The manufacturer will replace failed IISNs, when non-operable due to defect in material or workmanship, within five years of installation with a new IISN that passes all testing, delivered and installed at the project location.

3. CONSTRUCTION

Fabricate and install internally illuminated street name signs in accordance with the details and dimensions shown on the plans, specified, or as approved by the Engineer. Install in accordance with the latest Electrical Detail Standards. Install signs level and plumb brackets or clamps. Attach IISN to traffic signal poles as per manufacturer's instructions or as shown on the plans.

Use established industry and utility safety practices when installing IISNs located near overhead or underground utilities. Consult with the appropriate utility company before beginning work.

Prevent scarring or marring of the poles, mast arms, and IISNs. Replace damaged components. Repair damaged galvanizing in accordance with Section 445.3.5, "Repairs." Repair damaged painted areas of a roadway illumination assembly in accordance with Item 446, "Field Cleaning and Painting Steel."

4. MEASUREMENT

This Item will be measured as each LED IISN sign installed.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement," will be paid for at the unit bid price for "LED Internally Illuminated Street Name Signs" of the

sizes and types specified. This price is full compensation for furnishing, fabricating and installing the signs; support arm clamp assembly; liquidtight flexible metal conduit; and equipment, labor, tools, and incidentals.

New conduit will be paid for under Item 618, “Conduit.” New conductors, except the conductors internal to the pole, will be paid for under Item 620, “Electrical Conductors.” New tray cable, except the tray cable internal to the pole, will be paid for under Item 621, “Tray Cable.”

Special Specification S2 BD
Boulder Delineation

1. DESCRIPTION

Furnish and install boulder delineation.

2. MATERIALS

Furnish boulders to the size and shape specified on the plans.

Furnish boulders matching the stone type and aesthetic requirements as shown on the plans.

3. CONSTRUCTION

Place boulders so that each boulder is firmly seated on the proposed grade and cannot be dislodged, tilted, or otherwise moved by human means. Human means is defined as using body weight and/or strength to push, pull, stand on, or otherwise apply force without the use of tools.

4. MEASUREMENT

This item will be measured by the linear foot of boulders placed along a line. Measurement is taken along one edge of the boulders and does is not adjust for the size or shape of the boulders placed. Measurement includes any gaps between boulders specified in the plans.

5. PAYMENT

The work performed in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Boulder Delineation”. This price is full compensation for furnishing and installing boulders as well as all tools, labor, and incidentals.

Special Specification S2 GA
Gate Attendant

1. DESCRIPTION

Provide full time gate attendant(s).

2. MATERIALS

Furnish clipboards, paper, or other materials as needed.

3. WORK METHODS

Record the name, organization, date, and time for all personnel entering and leaving the job site. Each week, deliver all records for the preceding week to the County. Retain copies until Final Completion.

4. MEASUREMENT

This item will be measured by the hour per gate attendant.

5. PAYMENT

The work performed in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Gate Attendant”. This price is full compensation for all labor, materials, and incidentals.

Special Specification S2 RC
Rock Cut (Blasting & Scaling)

1. DESCRIPTION

Use controlled blasting methods, production blasting, and scaling to achieve smooth, uniform, and unfractured backslopes (Rock Cuts).

2. MATERIALS

Furnish all explosives and blasting caps that are no more than 1 year old. Each blasting cap period shall come from one lot number. Explosive storage shall be in accordance with all Federal, State, and local laws and regulations, and as approved by the County.

3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work in a safe and controlled manner.

4. CONSTRUCTION

4.1. **Blasting Methods and Requirements.** Use methods in making excavations that do not shatter or loosen the backslopes and that produce smooth and uniform excavation slopes at the specified Slope angle.

4.1.1. **Perimeter Controlled Blasting**. The use of explosives and blasting accessories in carefully spaced and aligned drill holes. Perimeter controlled blasting techniques include presplitting and trim (cushion) blasting. Use on the entire length of cut section in Rock or cemented materials that have backslopes of 1V:0.75H or steeper, even if the main excavation can be ripped.

4.1.1.1. **Presplitting.** A perimeter control blasting method in which the perimeter row of blast holes are drilled along the plane of the specified final excavation backslope and that utilizes reduced drill hole spacing and reduced diameter explosives decoupled from the drill hole wall, and whose initiation precedes the initiation of the adjacent production holes by a minimum of 25 milliseconds.

Attach mechanical devices to all drilling Equipment used to drill the presplit holes to determine, within an accuracy of 1 degree, the angle at which the drill steel enters the Rock.Drill presplit holes with a minimum diameter of 2 1/2 inches and a maximum diameter of 3 inches. Drill the presplit holes with a minimum spacing of 10 times the presplit hole diameter, and a maximum spacing of 14 times the presplit hole diameter.

Start presplit drill holes along the presplit line within 3 inches of the dimensions shown on the blasting plan. Holes located beyond this tolerance will be rejected. Completely fill the rejected holes with stemming material at no additional cost to the County. Drill new presplit holes with the proper spacing.

Control the drilling operations to ensure that presplit hole alignment does not vary from the plane of the planned slope by more than 6 inches either parallel or normal to the slope.

The length of presplit holes for any individual lift shall not exceed 30 feet unless the Contractor can demonstrate to the County's satisfaction that hole alignment can be maintained within the above tolerances. If more than 5 percent of the presplit holes are misaligned in any one lift, reduce the height of the lifts until the 6-inch alignment tolerance is met.

Drill presplit holes a minimum of 30 feet longitudinally beyond the limits of the production holes to be detonated or to the end of the cut. Unless otherwise allowed by the County in writing, remove all overburden, including any loose or decomposed Rock, before drilling the presplitting holes. Cut the ground surface above the cut to the elevation specified in the plans prior to drilling the presplitting holes.

Use only explosives manufactured specifically made for presplitting in the presplit holes. The maximum diameter of explosives used in presplit holes shall not be greater than half the diameter of the presplit hole. Bulk ammonium nitrate and fuel oil (ANFO) will not be allowed in the presplit holes.

Determine that the presplit hole is free of obstructions for its entire depth before placing charges. Exercise all necessary precautions so the placing of the charges will not cause caving of material from the walls of the holes.

Detonation of explosives in each hole in a presplit shot may be delayed, providing the hole-to-hole delay is no more than 25 milliseconds.

4.1.1.2. **Trim (Cushion) Blasting.** A perimeter control blasting method in which the initiation of the perimeter row of blast holes drilled along the plane of the specified final excavation backslope follows the initiation of the adjacent production holes within 25 to 75 milliseconds, if production holes are being employed in the blast. When the horizontal distance from the new proposed slope face to the existing Rock face is less than 15 feet, the Contractor may trim blast instead of presplitting. The requirements in 4.1.1.1 for presplitting also apply to trim blasting, by changing the words "presplit" and "presplitting" to "trim blasting". If trim blasting burdens are less than 6 feet or zones of weakness in the Rock are observed, submit a hole loading diagram that reflects the site conditions.

4.1.2. **Production Blasting**. Fragmentation blasting in the main excavation area, usually using more widely spaced drill holes than controlled blast holes. Blasting in the mass of Rock to be excavated shall be designed to control flyrock, minimize ground vibration and air blast, and result in loosened and fragmented in-place Rock of a size that can be removed, transported, or crushed to produce specified products. Lay out production blast holes in a consistent pattern that does not affect the perimeter control blast holes.

Do not drill any row of production blast holes closer than 6 feet to the perimeter controlled blast line. Where necessary to minimize damage to the Rock backslope, a row of buffer holes may be drilled between the perimeter controlled blast line and the production blast holes. Except for the bottom lift, do not extend production holes below the bottom of the controlled blast holes. Do not exceed 6-inch diameter for production holes. Detonate production holes on a delay sequence documented in the blasting plan.

4.1.2.1. **Buffer Row.** The buffer row is located between the production holes and the perimeter controlled blast line. Locate the buffer hole line a minimum of 3 feet away from the perimeter control blast line, or 1 foot for every inch of buffer hole diameter, whichever is greater. Space buffer row holes 3 to 5 feet center-to-center. The explosive load in buffer holes shall not exceed 50 percent of the full explosive load that could be placed in a 3-inch production hole. Initiation of the buffer holes shall be on a delayed sequence toward a free face.

4.1.3. **Safety and Flyrock Control.** Use techniques that effectively limit and control flyrock. Clear the site of all boulders or other material as directed prior to beginning blasting Work. Following every blast, observe the entire blast area for a minimum of 5 minutes before reentering or commencing Work in the area.

Be responsible for the storage, transportation, and handling of explosives, their use, and the results of all blasting operations.

Cover all blast areas that are within 200 feet of residences, facilities or aboveground utilities using appropriate blast containment mats or an approved equivalent method.

Discontinue blasting operations, as directed, if it is apparent that the methods employed are either not producing acceptable results or the safety of the public, the Contractor's employees, or adjacent property is being jeopardized.

4.1.4. **Blast Monitoring.** If there is a structure within 1,000 feet of the blast, monitoring equipment shall be placed at the structure or located in a line between the blast and the structure, unless approved otherwise by the County. Blast monitoring data shall be submitted to the County with the blast report. The Contractor shall install blast monitoring equipment as specified by the manufacturer and Vibration Specialist and assure good coupling between the seismographs and ground.

Unless otherwise specified, ground vibrations shall not exceed a maximum peak particle velocity (largest single component) of 2 inches per second at any structure or water well. A seismograph shall be set for each blast at a distance determined by the Vibration Specialist to get a record of the vibration levels. Blasts shall not damage any existing structures. Furthermore, at the existing structures in the vicinity of the site, the maximum vibration and airblast limits shall not exceed the values indicated in Table 1, Table 2, and Figure B-1, Appendix B, of the United States Bureau of Mines Report of Investigations, RI 8507, 1980.

Table 1
Ground Vibration Limits

Type of Structure[1]	Peak Particle Velocity (inches per second)	
	At Low Frequency[2] (<40 Hertz)	At High Frequency (>40 Hertz)
Modern structures, drywall interiors	0.75	2.0
Older structures, plaster on wood lath construction for interior walls	0.50	2.0

1. For precarious structures not listed in the table, use the limits for older structures; for all other structures not listed in the table, use the limits listed for modern structures.
2. All spectral peaks within 50 percent amplitude of the predominant frequency must be analyzed.

Table 2
Air Overpressure Limits (decibels)

Instrumentation	Residential Structures	All Other Structures
0.1 hertz high-pass system	115	134
2 hertz high-pass system	113	133
5 or 6 hertz high-pass system	110	129
C-slow (for events not exceeding 2 seconds' duration)	85	105

Blasting in the vicinity of concrete and shotcrete shall be limited to prevent damage to cast-in-place concrete and shotcrete. The Contractor shall take special care when blasting in the vicinity of structural concrete and shotcrete that has not achieved full strength. Unless approved by the County, conform with the limitations in Table 3.

Table 3
Ground Vibration Limits for Green Concrete

Time After Pour	Peak Particle Velocity (inches per second)
0 – 3 days	0.25
3 – 28 days	1.0
>28 days	2.0

4.1.5. **Scaling.** Remove all loose, hanging, or potentially dangerous Rock on the excavated surface by scaling during the completion of the excavation of each lift or test section. Do not begin drilling the next lift until this Work has been completed, as directed. Scale the slopes throughout the Contract at the frequency required to remove loose or overhanging material. Use a suitable standard steel mine scaling rod to hand-scale the slopes. Other methods such as machine scaling, hydraulic splitters or light blasting may be used instead of, or to supplement, hand scaling.

The rock slope locations delineated on the Plans shall be thoroughly scaled and trimmed to the satisfaction of the County to assure that the desired rock face is obtained. No loose or potentially unstable rock shall be left on the rock face or the soil slope above the rock face. No vegetation shall be left on the rock face. No overhangs or launching pads shall be left on the rock face.

4.1.6. **Tolerance.** Rock slopes shall not deviate from a plane surface by more than 1 foot and shall not deviate from their theoretical location by more than 1 foot measured along any line perpendicular to the theoretical slope line.

4.2. **Blasting Procedures.**

4.2.1. **Preblast Survey.** The contractor shall conduct a preblast survey of all properties within 500 feet of the blast area and shall afford any property owners within at least 1,000 feet of the blast area an opportunity to have a preblast survey conducted on their property and structures. This survey shall be conducted by the contractor or his representative to determining existing conditions of the facilities and to document any preblast damage. The survey shall also determine the conditions of any water wells on the property including their quality and quantity of flow. Provide copies of all correspondence to the County. The limits of this survey may be expanded at the contractor's option.

4.2.2. **Blasting Plan.** Provide a blasting plan for the proposed cut, prepared by a person qualified and experienced in blasting Work. Submit the blasting plan for the County's review at least 14 Calendar Days before beginning drilling and blasting Work.

The blasting plan will be reviewed for conformance with the Specifications and any concerns will be discussed with the Contractor. Submit any proposed changes to the blasting plan in writing to the County for review before implementation. Submittal of blasting plan is for quality control and record-keeping purposes.

Review of blast design and techniques shall not relieve the Contractor of responsibility for adequacy, accuracy, safety, proper supervision, and compliance with these Specifications and/or the OSHA Regulations (29 CFR 1926.900-.914) and all federal, state, and local regulations that govern the use of explosives.

The blasting plan shall contain the full details of the drilling and blasting patterns, vibration, flyrock, and noise reduction methods, blast area security measures and traffic control that the Contractor proposes to use, and the following information:

- Station limits of proposed shot.
- Removal of overburden.

- Plan and Cross Section diagrams of proposed drill pattern for controlled and production blast holes including buffer rows, free face, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height and sub drill depth. Accurately draw to scale and show each cut area to be blasted.
- Loading diagram showing the type, amount and specific gravity of explosives, primers, and initiators, and location depth, and type of stemming.
- Initiation sequence of production and controlled blast holes including delay times and delay system.
- Manufacturer's product data sheets for all explosives, primers and initiators to be used in the Work.

4.2.3. **Blasting Safety Plan**. In addition to the required Construction Plan a detailed Blasting Safety Plan shall be prepared stating “all regulations will be followed” and include the following:

- Description of clearing and guarding procedures to ensure the safety of personnel, staff, visitors, and the general public during blasting operations.
- Description of how inspections for and handling of misfires in loaded and/or excavated material.
- Description of how the explosive materials will be safely transported and stored.
- Safety Data Sheets (SDS).
- Proposed powder magazine locations.
- Emergency response plan to be approved by the County and further submitted to the local response agency before explosives are allowed on site.

4.2.4. **Blasting Notification.** Notify all owners and occupants of buildings, Structures, and utilities that are within the following distances of the blasting areas:

- 300 feet for shots using less than 50 pounds of explosives per time delay of 15 milliseconds.
- 600 feet for shots using between 50 and 250 pounds of explosives per time delay of 15 milliseconds.
- 1,250 feet for shots using more than 250 pounds of explosives per time delay of 15 milliseconds.

Provide notification, in writing, once, at least 48 hours before blasting begins, and again on the Day the blasting operations occur. Do not begin detonation of the blast until the County representative is ready to witness and videotape the blast.

Do not begin detonation of the blast until the County representative is ready to witness and videotape the blast. The Contractor shall establish a system of warning signals prior to blasting. As a minimum, warning signals shall be given at five minutes and one minute prior to each blast. Additionally, an all- clear signal shall be given after the shot has been examined for misfires or other problems. Warning signals shall be audible throughout the work area and for a distance of at least 1,000 feet from the blast.

4.2.5. **Blasting Test Sections.** Demonstrate the adequacy of proposed blasting plan by means of test shots in each cut or excavation before beginning full-scale blasting. Do not proceed with remaining drilling and blasting until acceptable test blast results have been demonstrated to the satisfaction of the County.

In areas where perimeter controlled blasting techniques are being employed, drill and blast short representative test sections not exceeding 100 feet in length. Excavate a section not less than 20 feet wide exposing the full height of the lift for examination. In areas where no perimeter controlled blasting techniques are being employed, determine effectiveness of the test section based on the material placement, cut slope stability, fragmentation and control of ground vibration, air blast and flyrock.

Do not drill ahead of the test blast area, except as provided in 4.1.1.1, until the test section has been evaluated. The Contractor may be directed to use test section lengths less than 100 feet.

If the results of the test shots are unacceptable, revise the methods, techniques, and procedures, at no additional cost to the County, so that the results achieved will be acceptable. No further drilling and blasting will be allowed until the revised methods are reviewed according to 4.2.2 and verified by additional test shots.

If, during the progress of the Work, the methods of drilling and blasting do not produce acceptable results within the tolerances specified, drill, blast and excavate additional test sections until a technique is determined that will produce acceptable results.

4.2.6. **Blasting According to Plan.** After the County has reviewed the blasting plan and determined that test sections have demonstrated acceptable results, perform all perimeter controlled and production blasting according to the plan that produced acceptable results. Notify the County when any changes in conditions or results are observed. On the Day of each blasting occurrence and before detonation of the blast, the supervisor or blasting specialist in charge shall certify, in writing, that the shots being carried out are consistent with the reviewed blasting plan.

4.2.7. **Blasting Report.** Submit a blasting report detailing the blast outcome within 48 hours of making each blast. Include in the report the following:

- Drill logs and notes regarding conditions encountered in the drill holes, including a description of encountered subsurface conditions such as open joints, soft or fractured Rock zones, groundwater conditions, hole alignment, and drilling problems.
- Any variations from the submitted Blasting Plan, including any changes to explosives type or amount, loading dimensions, hole spacing, and initiation sequence and delay times.
- All blast monitoring documentation.
- A copy of color video recording of blast area(s) before, during, and after each blast, with sound, a minimum format of 720p resolution, and in a format commonly used for viewing with a computer or DVD player.
- A comment section that includes the Contractor's evaluation of the blast performance, any unusual conditions or situations during the blast, and any misfires.
- Details of all damage incurred and details of all neighbors' complaints or comments.

4.2.8. **Rock Reinforcement.** Excavation shall be staged to allow rock reinforcement, where required, to be installed as the cut is brought down.

4.2.9. **Suspension of Blasting.** If damage to existing facilities or adjacent property occurs due to blasting, immediately suspend blasting and report damage to the County. Discontinue blasting operations if the methods of drilling and blasting do not produce acceptable results within the tolerances specified.

Before resuming blasting operations, revise the Blasting Plan and take other appropriate measures as necessary to correct the unacceptable blasting results. Submit the revised Blasting Plan to the County. Do not resume blasting until authorized by the County.

5. MEASUREMENT

This item will be measured by the square foot of Rock Cut surface area, from the bottom of grading to existing ground or as shown in the plans. Trapezoidal areas are calculated based on existing ground distance between perimeter controlled blast holes and their respective lengths.

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Rock Cut". This price is full compensation for all perimeter controlled blasting, production blasting, scaling, blasting procedures, blasting coordination, and blast vibration monitoring as well as all equipment, labor, tools, and incidentals.

Excavation of existing material will be paid in accordance with Item 110, "Excavation."

Concrete placed for Rock Cut stability will be paid for in accordance with Item 431, "Pneumatically Placed Concrete."

Special Specification WC101
Soil Ripping

PART 1 – GENERAL

1.1 DESCRIPTION

Soil ripping is a treatment measure that loosens overly compacted soil. Soil ripping is the plowing of the ground to alleviate compaction to allow for vegetated growth and to prevent erosion in sheet flow conditions. Perform soil ripping on designated areas according to the plans or as directed.

1.2 RELATED ITEMS

A. Item 160-WC001, “Topsoil”

B. Item 161-WC001, “Compost”

C. Item WC102, “Mulch”

D. Item 164-WC001, “Seeding for Erosion Control”

E. Item 506-WC001, “Temporary Erosion, Sedimentation and Environmental Controls”

1.3 MEASUREMENT & PAYMENT

Not measured or paid directly. This item is subsidiary to other items in the contract. The contractor should apply the quantity of project seeding area with 2.2 and 2.3 of this specification for estimation purposes.

1.4 QUALITY CONTROL SUBMITTALS

A. Submit soil ripping equipment data for approval, prior to installation.

PART 2 – EXECUTION

2.1 SEQUENCING

A. Complete final grading in accordance with the plans or as directed.

B. Soil ripping should be performed prior to the installation of compost and/or topsoil, mulch, and/or native grass seeding and wildflower seeding.

2.2 CONSTRUCTION

A. Installation:

1. All soil surfaces with a slope of 3:1 or less that are compacted due to equipment traffic should be ripped.

2. Perform soil ripping parallel and perpendicular (in both directions) to the slope at location, groove spacing, and depth shown on the plans as well as any additional areas that have been compacted during construction

activities to achieve a standard proctor density of 80% – 85% in channels and 70% – 75% in non-channel areas.

3. If construction activities are on-going, repeat procedure as necessary.

4. Soil ripping should not be implemented within a drainage channel or in channel flow conditions.

2.3 MAINTENANCE

A. Routinely inspect the soil ripping weekly during construction and within 24 hours after every one-half (½) inch or greater rainfall event. Inspections should ensure that:

1. No slumping of the rips has occurred.

2. The ripping was installed at the appropriate depth and spacing.

3. The contour rips are parallel and perpendicular to the slope.

B. If major slumping or slope failure occurs, the area should be regraded and reseeded. If minor slumping or rills occur, the specified topsoil and/or compost and seeding for the area in the plans may be applied, at the discretion of the Owner's Representative.

C. Continue to inspect the area on a weekly basis until vegetation has been established.

END OF SECTION

Special Specification WC102
Mulch

PART 1 – GENERAL

1.1 DESCRIPTION

Furnish and apply mulch as shown in the plans or as directed.

1.2 RELATED ITEMS

A. Item 161-WC001, “Compost”

B. Item WC103, “Mulch Topdressing”

C. Item 506-WC001, “Temporary Erosion, Sedimentation, and Environmental Controls”

1.3 MEASUREMENT & PAYMENT

Not measured or paid directly. This item is subsidiary to other items of the contract.

1.4 QUALITY CONTROL SUBMITTALS

A. Submit one (1) pound sample of on-site shredded mulch for approval.

B. Submit imported organic mulch product data and supplier information, including product composition, as well as a one (1) pound sample for approval.

C. A statement that the shredded mulch has met the decomposition process.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Mulch can be on-site shredded organic mulch or an imported organic mulch product.

1. Mulch can be comprised of wood chips, shredded bark, shredded landscape trimmings, or coarse compost material originating from the 3-county Central Texas region (Williamson, Travis, and Hays).

2. Mulch to be shredded with no pieces greater than three (3) inches in length and with all pieces passing through a two (2) to three (3) inch screen.

3. Invasive species should be excluded from mulch.

4. Color: natural wood.

5. Contamination: less than 0.5% weight by volume.

6. Mulch to have undergone a decomposition process either on-site or at a supplier’s location.

PART 3 – EXECUTION

3.1 SEQUENCING

A. For mulch material that has not gone through the stockpiling and decomposition process: Following removal of the existing vegetation from the site, shred the material to the specified size and place in a stockpile on-site. Complete the decomposition process in stockpile prior to installation or use of mulch at depths specified on plans. If using the mulch for dust control, compaction control, or on existing vegetation to remain, place immediately after the completion of the decomposition process.

3.2 CONSTRUCTION

A. Installation

1. Shred trees and vegetation to the specified size requirements.

2. Apply Nitrogen at the rate of one (1) part Nitrogen to ten (10) parts mulch.

3. Stockpile the mulch and allow to sit or cook for a period of no less than three (3) weeks if the temperature is above 70°F. If the temperature is below 70°F, extend the sitting or cooking time to five (5) to six (6) weeks.

4. Turn the stockpile at least twice per week during the sitting or cooking period.

5. Stockpiles should be surrounded by biodegradable erosion control logs within 24 hours of placement to prevent run-off of the material.

END OF SECTION

APPENDIX A

QUALITY CONTROL / QUALITY ASSURANCE PROGRAM

Approved December 2007

Appendix A

Quality Control / Quality Assurance Program

Section 1. Overview

Introduction

Williamson County has established the following Quality Control (QC) / Quality Assurance (QA) Program to assure that the materials and workmanship incorporated into any roadway or highway construction project are in reasonable conformity with the requirements of the approved plans and specifications, including any approved changes. It consists of an "Acceptance Program" and a “QA Program" based on test results obtained by qualified persons and equipment.

This QC/QA Program allows for the use of validated contractor-performed QC test results as part of an acceptance decision. It also allows for the use of test results obtained by commercial laboratories in the QA Program in acceptance decisions, as well. The effectiveness of the “Acceptance Program” shall be the responsibility of the Construction Observer.

Definitions

Acceptance Program - All factors that comprise the Williamson County's determination of the quality of the product as specified in the contract requirements. These factors include QC and QA verification sampling and testing, and inspection.

Quality Control Program - The contractor’s systematic program detailing the control measures and reporting requirements necessary to achieve reasonable conformance with the requirements of the approved plans and specifications.

Quality Assurance Program - Activities that are an unbiased and independent evaluation of all the inspection, sampling and testing procedures used in the acceptance program.

Proficiency Samples - Homogenous samples that are distributed and tested by two or more laboratories and/or personnel. The test results are compared to assure that the laboratories and/or personnel are obtaining the same results.

Qualified Laboratories - Laboratories that are capable as defined by appropriate programs established by Williamson County and as indicated in the "Laboratory Qualification Program". As a minimum, the qualification program shall include provisions for checking testing equipment and the laboratory shall keep records of calibration checks.

Qualified Sampling and Testing Personnel - Personnel who are capable as defined by appropriate programs established as stated in Section 6 of this Appendix.

Quality Assurance – All those planned and systematic actions necessary to provide confidence that a product or service will satisfy given requirements for quality.

Quality Control - All contractor/vendor operational techniques and activities that are performed or conducted to fulfill the contract requirements.

Vendor – A supplier of project-produced material that is not the contractor.

Verification Sampling and Testing - Sampling and testing performed to validate the quality of the product, which consists of the QC and QA sampling and testing.

Approved December 2007

Section 2. Acceptance Program

Materials incorporated into any roadway or highway construction project shall be subject to verification sampling and testing, and inspection as part of the QC program outlined below:

- Quality Control Inspection

  - Contractor-performed QC Inspection will be required as part of the acceptance decision. Inspection check lists for the following structural items shall be completed and submitted as part of the acceptance program:

    Item 400 – Excavation & Backfill
    Item 416 – Drilled Shaft Foundations
    Item 420 – Concrete Structures
    Item 421 – Hydraulic Cement Concrete
    Item 422 – Bridge Deck
    Item 423 – Retaining Wall
    Item 425 – Precast Pre-stressed Concrete Structural Members
    Item 440 – Reinforcing Steel
    Item 442 – Metal for Structures
    Item 462 – Concrete Box Culverts
    Item 464 – Reinforced Concrete Pipe

    Sample Inspection check lists are included at the end of this Appendix.

  - The contractor shall designate individual(s) responsible for the QC Inspection for the project or each work element thereof. The designated QC individual(s) will maintain responsibility for providing reports detailing the compliance of each work element to the requirements of the approved project plans and specifications.

  - The QC report will detail requirements of the approved project plans and specifications and measures initiated to ensure reasonable conformity.

  - The contactor shall submit the QC Plan for acceptance detailing the individuals & methods(s) intended to be used to obtain reasonable conformance to the approved project plans and specifications.

- Quality Control Sampling, Testing and frequency

  - Contractor-performed QC sampling and testing will be used as part of an acceptance decision.

  - The frequency and location will be according to the “Project Test” frequency as shown in Appendix B. This project has been designed utilizing TxDOT Specifications; therefore, the 2005 TxDOT Guide Schedule for Sampling and Testing has been adopted for the testing program. As a County-developed project, all references to TxDOT in the testing program shall be understood to mean Williamson County, and all references to the Engineer shall be understood to mean the County Engineer or his designated representative(s).

  - These QC sampling and testing personnel, laboratories, and equipment shall be qualified according to the "Sampling and Testing Personnel Qualification Program" and the "Laboratory Qualification Program" and shall be evaluated under the "Quality Assurance Program" contained herein.

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- Any equipment used to perform QC sampling and testing shall be subject to an evaluation by QA sampling and testing personnel. This evaluation shall include calibration checks and split or proficiency sample tests. The requirements for, and frequency of, equipment calibration are shown in Appendix B. Acceptable tolerance limits for the comparison of test results from split or proficiency samples are shown in “Acceptable Tolerance Limits for Independent Assurance.”

- Any individual who performs verification or QC sampling and testing shall be evaluated by QA sampling and testing personnel. This evaluation shall include observations and split or proficiency sample testing. Acceptable tolerance limits for the comparison of test results for split or proficiency samples are shown in "Acceptable Tolerance Limits for Quality Assurance."

- Furthermore, these QC test results may be validated by verification test results obtained from independently taken samples at the direction of the Construction Observer or the County.

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Section 3. Quality Assurance Program

This Quality Assurance Program; as deemed necessary by the County or the Construction Observer; shall evaluate all QC inspection, sampling and testing procedures, personnel, and equipment used as part of the acceptance program.

- QA Inspection
    - The Construction Observer will be responsible for QA inspection. The inspection will be performed at periodic intervals to assure compliance with the accepted QC program, as well as to assure reasonable close conformity to the approved project plans and specifications.
- Sampling and Testing Frequency and Location
    - Quality Assurance sampling and testing shall be performed at the same location and frequency established for the Project Tests in the "Guide Schedule of Sampling and Testing" found in Appendix B.
    - The frequency for the “Independent Assurance Tests” shall be as directed by the Construction Observer.
- Testing Equipment
    - Laboratory testing equipment used for QA sampling and testing shall be qualified according to the "Laboratory Qualification Program."
    - All laboratories used for QA sampling and testing must be AASHTO accredited and listed as an accepted Lab by the County.
    - The frequency for qualifying QA sampling and testing equipment shall not exceed one (1) year or as directed by the Construction Observer.
    - Calibration/verification is required whenever the laboratory or equipment is moved.
    - The QA equipment shall be other than that used for performing verification or QC testing.
- Testing Personnel
    - Laboratory personnel who perform QA sampling and testing shall be in accordance with the "Sampling and Testing Personnel Qualification Program" Included herein.
    - The individuals performing QA sampling and testing shall be other than those who perform other verification or QC testing.
- Comparison of QC and QA Test Results
    - Acceptable tolerance limits for the comparison of test results from split and proficiency samples are shown in "Acceptable Tolerance Limits for Independence Assurance."
    - If the comparison of the test results do not comply with the tolerances, an engineering review of the test procedures and equipment shall be performed immediately to determine the source of the discrepancy.
    - Corrective actions must be identified and incorporated as appropriate.

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Test results from all samples involved in the Quality Assurance Program shall be documented and reported in the project files.

- Dispute Resolution System
    - Testing disputes arising between the Construction Observer, or his/her designated agents, and the Contractor shall be resolved in a reliable, unbiased manner. The decision of the County, the Construction Observer, or their authorized representatives will be final.

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Section 4. Materials Certification

The Independent Assurance agency shall submit a "Certificate of Materials" to the Construction Observer indicating the conformity of tested materials to the approved plans and specifications including any exceptions, if applicable.

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Section 5. Conflict of Interest

To avoid an appearance of a conflict of interest, sampling and testing of materials under the QA program shall be performed at a qualified laboratory other than the laboratory used for project testing by the Contractor.

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Section 6. Sampling and Testing Personnel Qualification Program

Purpose

This program provides uniform Countywide procedures for sampling and testing personnel qualification to ensure that tests required by the specifications are performed according to the prescribed sampling and testing methods.

Sampling and Testing Personnel Qualification

Sampling and testing personnel will be qualified to perform tests for the acceptance of materials in the areas of Portland cement concrete, soils and aggregates and bituminous materials. The test methods for which individuals can be qualified include, but are not limited to, the following.
(* Denotes tests on which split or proficiency sample evaluations are required.)

Soils & Aggregates (100-E Series & 400-A Series)
Tex-101-E, Preparing Soil and Flexible Base Materials for Testing

Tex-102-E, Determining Slaking Time

Tex-103-E, Determining Moisture Content in Soil Materials

Tex-104-E, Determining Liquid Limit of Soils*

Tex-105-E, Determining Plastic Limit of Soils*

Tex-106-E, Calculating the Plasticity Index of Soils*

Tex-107-E, Determining the Bar Linear Shrinkage of Soils*

Tex-108-E, Determining the Specific Gravity of Soils

Tex-110-E, Particle Size Analysis of Soils*

Tex-111-E, Determining the Amount of Material in Soils Finer than 75 □m (No.200) Sieve

Tex-113-E, Laboratory Compaction Characteristics and Moisture-Density Relationship of Base Materials

Tex-114-E, Laboratory Compaction Characteristics and Moisture-Density Relationship of Subgrade and Embankment Soils

Tex-115-E, Field Method for Determining In-Place Density of Soils and Base Materials

Tex-116-E, Ball Mill Method for Determining the Disintegration of Flexible Base Material

Tex-117-E, Triaxial Compression Tests for Disturbed Soils and Base Materials

Tex-120-E, Soil-Cement Testing

Tex-121-E, Soil-Lime Testing

Tex-126-E, Molding, Testing, and Evaluating Bituminous Black Base Materials*

Tex-127-E, Lime Fly-Ash Compressive Strength Test Methods
Tex-128-E, Determining Soil pH

Tex-129-E, Measuring the Resistivity of Soil Materials

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Tex-140-E, Measuring Thickness of Pavement Layer

Tex-400-A, Sampling Stone, Gravel, Sand, and Mineral Aggregates

Tex-401-A, Sieve Analysis of Fine and Coarse Aggregate*

Tex-402-A, Fineness Modulus of Fine Aggregate

Tex-403-A, Saturated Surface Dry Specific Gravity and Absorption of Aggregates

Tex-404-A, Determining Unit Mass (Weight) of Aggregates

Tex-405-A, Determining Percent Solids and Voids in Concrete Aggregates

Tex-406-A, Material Finer Than 75 □m (No. 200) Sieve in Mineral Aggregates (Decantation Test for Concrete Aggregates)

Tex-408-A, Organic Impurities in Fine Aggregate for Concrete

Tex-409-A, Free Moisture and Water Absorption in Aggregate for Concrete

Tex-409-A, Free Moisture and Water Absorption in Aggregate for Concrete

Tex-411-A, Soundness of Aggregate by Using Sodium Sulfate or Magnesium Sulfate

Tex-413-A, Determining Deleterious Materials in Mineral Aggregates

Tex-425-A, Determining Moisture Content in Fine Aggregate by the "Speedy" Moisture Method

Tex-460-A, Determining Crushed Face Particle Count

Bituminous (200-F Series)

Tex-200-F, Sieve Analysis of Fine and Coarse Aggregate*

Tex-201-F, Bulk Specific Gravity and Water Absorption of Aggregate

Tex-202-F, Apparent Specific Gravity of Material Finer than 180 □m (No. 80) Sieve

Tex-203-F, Sand Equivalent Test*

Tex-204-F, Design of Bituminous Mixtures

Tex-205-F, Laboratory Method of Mixing Bituminous Mixtures

Tex-206-F, Compacting Test Specimens of Bituminous Mixtures*

Tex-207-F, Determining Density of Compacted Bituminous Mixtures*

Tex-208-F, Test for Stabilometer Value of Bituminous Mixtures*

Tex-210-F, Determining Asphalt Content of Bituminous Mixtures by Extraction*

Tex-211-F, Recovery of Asphalt from Bituminous Mixtures by the Abson Process

Tex-212-F, Determining Moisture Content of Bituminous Mixtures

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Tex-213-F, Determining Hydrocarbon-Volatile Content of Bituminous Mixtures

Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates

Tex-221-F, Sampling Aggregate for Bituminous Mixtures, Surface Treatments and Limestone Rock Asphalt

Tex-222-F, Sampling Bituminous Mixtures

Tex-224-F, Determining Flakiness Index

Tex-226-F, Indirect Tensile Strength Test

Tex-227-F, Theoretical Maximum Specific Gravity of Bituminous Mixtures*

Tex-228-F, Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method*

Tex-229-F, Combined HMAC Cold-Belt Sampling and Testing Procedure

Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method*

Concrete (400-A Series)

Tex-407-A, Sampling Freshly-Mixed Concrete

Tex-414-A, Air Content of Freshly Mixed Concrete by the Volumetric Method*

Tex-415-A, Slump of Portland Cement Concrete*

Tex-416-A, Air Content of Freshly Mixed Concrete by the Pressure Method*

Tex-417-A, Unit Weight, Yield, and Air Content (Gravimetric) of Concrete

Tex-418-A, Compressive Strength of Cylindrical Concrete Specimens*

Tex-419-A, Compressive Strength of Concrete Using Portions of Beams Broken in Flexure

Tex-424-A, Obtaining and Testing Drilled Cores of Concrete

Tex-436-A, Measuring Texture Depth by the Sand Patch Method

Tex-437-A, Test for Flow of Grout Mixtures (Flow Cone Method)

Tex-447-A, Making and Curing Concrete Test Specimens

Tex-448-A, Flexural Strength of Concrete Using Simple Beam Third-Point Loading*

Tex-450-A, Capping Cylindrical Concrete Specimens

Tex-460-A, Determining Crushed Face Particle Count

Asphalt (500-C Series)

Tex-502-C, Penetration of Bituminous Materials (refer to AASHTO T 49)

Tex-530-C, Effect of Water on Bituminous Paving Mixtures

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Tex-531-C, Prediction of Moisture-Induced Damage to Bituminous Paving Materials Using Molded Specimens

Tex-1000-S, Operating Pavement Profilograph and Evaluating Profiles

Who Must Be Qualified?

Any individual who performs tests on materials for acceptance must be qualified.

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Qualification of Sampling and Testing Personnel

All sampling and testing personnel for approved laboratories shall be qualified to do the work in accordance with "Laboratory Qualification Program".

Each laboratory shall maintain a minimum of one (1) qualified individual for each test procedure performed.

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Section 7. Laboratory Qualification Program

Purpose

This program provides uniform countywide procedures to ensure that laboratory facilities and equipment are adequate for the performance of required sampling and testing methods.

Laboratories

All laboratories that perform testing for Williamson County must be accredited under the AASHTO Laboratory Accreditation Program. These include, but are not limited to the following:

- Area/project laboratories (includes field laboratories)
- Commercial laboratories
- Contractor laboratories
- Vendor laboratories (material suppliers).

The most current AASHTO accredited laboratories in the State of Texas can be obtained at http://patapsco.nist.gov/aashto/amrl/services/aap_intro.htm. In addition, Appendix C includes a list of AASHTO accredited laboratories obtained at the time this document was prepared.

Laboratory Qualification Responsibility

The Construction Observer or his/her authorized representatives will be responsible to ensure all QA laboratories used for project and QA testing and sampling are qualified.

Qualification Process

The laboratory qualifying authority will:

- identify the scope of testing to be performed
- verify that manuals and/or test methods used to perform tests are available and up-to-date
- document that the laboratory has the required equipment to perform the tests
- check the calibration/verification records for each piece of equipment, to include:
    - description of equipment
    - identification of any traceable standard used
    - frequency of calibration
    - date of last calibration
    - date of next calibration
    - procedure used to calibrate equipment
    - procedure used to identify equipment not in compliance.

In addition, all equipment may be subjected to calibration verification or other inspection by the qualifying authority.

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Calibration Standards and Frequencies for Laboratory Equipment

The standards for calibration and the frequencies for laboratory equipment calibrations shall be in accordance with appropriate testing equipment measures as indicated in the Texas Department of Transportation Manual of Testing Procedures. 100-E (Soils), 200-F (Bituminous), and 400-A (Concrete) series of TxDOT's *Manual of Testing Procedures*.

Frequency for Laboratory Qualification

Laboratories shall be qualified at an interval not to exceed six (6) months, or as directed by the Construction Observer. Calibration/verification is required whenever the laboratory or equipment is moved.

Non-Compliance

A laboratory that does not meet the above requirements is subject to disqualification. Any equipment in a qualified laboratory failing to meet specified equipment requirements for a specific test method shall not be used for that test method.

Documentation

The Construction Observer will be responsible for verifying that laboratories are qualified to perform material testing. Documentation will be required to be kept by the qualified laboratory. Calibration records will be maintained for three (3) years, unless directed otherwise by the Construction Observer.

Dispute Resolution

The County will have the final decision regarding all disputes of the laboratory qualification and calibration of testing equipment.

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Section 8. Acceptable Tolerance Limits for Quality Assurance

The following tables indicate the acceptable tolerance limits for the specified material.

Embankment

Embankment		
Procedure	**Texas Test Method**	**Tolerance**
In-place Density	"Tex-115-E, Field Method for Determining In-Place Density of Soils and Base Materials"	± 2.5% Field Density

Untreated & Treated Sub-base and Base Courses

Untreated & Treated Sub-base and Base Courses		
Procedure	**Texas Test Method**	**Tolerance**
In-place Density	"Tex-115-E, Field Method for Determining In-Place Density of Soils and Base Materials"	± 2.5% Field Density
Gradation:	"Tex-110-E, Particle Size Analysis of Soils"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%
Liquid Limit	"Tex-104-E, Determining Liquid Limit of Soils"	15% of the mean*
Plasticity Index	"Tex-106-E, Calculating the Plasticity Index of Soils"	20% of the mean*

Asphalt Stabilized Base

Asphalt Stabilized Base		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%
Liquid Limit	"Tex-104-E, Determining Liquid Limit of Soils"	15% of the mean*
Plasticity Index	"Tex-106-E, Calculating the Plasticity Index of Soils"	20% of the mean*
Percent Asphalt	"Tex-210-F, Determining Asphalt Content of Bituminous Mixtures by Extraction"	± 0.3%
-	"Tex-228-F, Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method"	± 0.3%

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-	"Tex-126-E, Molding, Testing, and Evaluating Bituminous Black Base Materials"	± 0.3%
-	"Tex-229-F, Combined HMAC Cold-belt Sampling and Testing Procedure"	± 0.3%
-	"Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method"	± 0.3%
In-place Density (Cores)	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 1% Field Density

Surface Treatment Aggregates

Surface Treatment Aggregates		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%

Portland Cement Concrete Coarse Aggregate

Portland Cement Concrete Coarse Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-401-A, Sieve Analysis of Fine and Coarse Aggregate"	-
> No. 4 ≤ No. 4	-	± 5% ± 3%

Portland Cement Concrete Fine Aggregate

Portland Cement Concrete Fine Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation (3/8" through No. 200)	"Tex-401-A, Sieve Analysis of Fine and Coarse Aggregate"	± 3%
Sand Equivalent	"Tex-203-F, Sand Equivalent Test"	± 10

Portland Cement Concrete Complete Mixture

Portland Cement Concrete Complete Mixture		
Procedure	**Texas Test Method**	**Tolerance**
Flexural Strength Compressive	1. "Tex-448-A, Flexural Strength of Concrete Using Simple Beam Third-Point Loading" 2. "Tex-418-A, Compressive Strength of Cylindrical Concrete Specimens"	20% of the mean*

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Slump	"Tex-415-A, Slump of Portland Cement Concrete"	± 1.0"
Entrained Air	3. "Tex-414-A, Air Content of Freshly Mixed Concrete by the Volumetric Method" 4. "Tex-416-A, Air Content of Freshly Mixed Concrete by the Pressure Method"	± 1%

Asphaltic Concrete Coarse Aggregate

Asphaltic Concrete Coarse Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	-
> No. 10 ≤ No. 10	-	± 5% ± 3%
Deleterious Material	"Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates"	± 0.3 %
Decantation	"Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates"	20% of the mean*

Asphaltic Concrete Fine Aggregate

Asphaltic Concrete Fine Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation (No. 10 through No. 200)	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	± 3%
Bar Linear Shrinkage	"Tex-107-E, Determining the Bar Linear Shrinkage of Materials"	± 2

Asphaltic Concrete Combined Aggregate

Asphaltic Concrete Combined Aggregate		
Procedure	**Texas Test Method**	**Tolerance**
Gradation:	"Tex-200-F, Sieve Analysis of Fine and Coarse Aggregates"	-
> 5/8" 5/8" through No. 200 Passing No. 200	-	± 5% ± 3% ± 1.5%
Sand Equivalent	"Tex-203-F, Sand Equivalent Test"	± 10

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Asphaltic Concrete Complete Mixture

Asphaltic Concrete Complete Mixture		
Procedure	**Texas Test Method**	**Tolerance**
Asphalt Content	"Tex-210-F, Determining Asphalt Content of Bituminous Mixtures by Extraction"	± 0.3%
-	"Tex-228-F, Determining Asphalt Content of Bituminous Mixtures by the Nuclear Method"	± 0.3%
-	"Tex-229-F, Combined HMAC Cold-belt Sampling and Testing Procedure"	± 0.3%
-	"Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method"	± 0.3%
Maximum Theoretical Specific Gravity	"Tex-227-F, Theoretical Maximum Specific Gravity of Bituminous Mixtures"	± 0.020
Laboratory Molded Density	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 1.0%
Laboratory Molded Bulk Specific Gravity	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 0.020
Stability	"Tex-208-F, Test for Stabilometer Value of Bituminous Mixtures"	5 points
Moisture	"Tex-212-F, Determining Moisture Content of Bituminous Mixtures"	± 0.2 mL
In-place Air Voids (Core)	"Tex-207-F, Determining Density of Compacted Bituminous Mixtures"	± 1.0%

NOTE: The above tolerances are to be used when comparison of test results is by split samples. A tolerance of plus or minus two (2) standard deviations shall be used when comparison of test results is by proficiency samples.

*The difference between compared test results shall not exceed the indicated percentage of the mean of the compared test results - the mean being the average of the two test results.

EXAMPLE: Plasticity Index	
Job Control test value	18
IA Test value	22
Mean	20
20% difference	4

Both values are within 20% of the mean.

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Williamson County Road Bond Program
Construction Quality Control & Quality Assurance Program

Inspection Check Lists

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 400 – Excavation & Backfill for Structures
Report No.: _____
Description: _____
Date: _____
Location: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Excavation and Backfill for Structures	**Yes**	**No**	**NA**
I. Excavation (400.3)			
1. Whenever excavating for installing structures across private property beyond the limits of the embankment, is the top soil removed prior excavation and kept separate and later replaced, as nearly as feasible, in its original position?	☐	☐	☐
2. If trench excavation deeper than five (5) feet, is trench protection required?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

		Yes	No	NA
3.	When old or abandoned structures or foundations are encountered in the excavation, are they removed for the full width of the excavation and to a depth of one (1) foot below the bottom of the excavation?	☐	☐	☐
4.	During construction, did the contractor receive approval from the Engineer of Record before laying any structures in the presence of water?	☐	☐	☐
5.	If the excavation cannot be dewatered to the point where the subgrade is free of mud, was a concrete mixture with not less than three (3) sacks of cement per cubic yard (or other material approved by the Engineer of Record) placed a minimum of three (3) inches in depth in the bottom of the excavation?	☐	☐	☐
6.	For all culverts where the soil encountered at established footing grade is an unstable or incompressible material is the procedure shown in Item 400.3.A.4 followed unless other methods are called for in the plans?	☐	☐	☐
7.	Unless otherwise shown on the plans, are all sewer pipe structures constructed in an open cut with vertical sides to a point one (1) foot above the pipe?	☐	☐	☐
8.	Are all vertical sides sheeted and braced when necessary to maintain the required vertical excavation throughout the construction?	☐	☐	☐
9.	For pipe to be installed in a fill section was the embankment constructed to one (1) foot above the top of the pipe and then excavated for the pipe?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

	Yes	No	NA
10. Is the trench excavated to the width and elevations as shown in the plans?	☐	☐	☐
11. Is the pipe, culvert, etc., properly centered in the trench?	☐	☐	☐

II. Shaping and Bedding (400.3.B)

1. For precast box sections and pipe, is the bedding in accordance with Item 400.3.B unless otherwise shown on the plans?	☐	☐	☐
2. For precast pipe and box sections where cement stabilized backfill is indicated on the plans, is the excavation undercut a minimum 4 inches and backfilled with stabilized material to support the pipe at the required grade?	☐	☐	☐

III. Backfill – General (400.3.C)

1. Is backfill material free from stones of such size as to interfere with compaction, large or frozen lumps which will not break down readily under compaction; and wood or other extraneous material?	☐	☐	☐
2. a. Is backfill in areas not supporting any portion of the completed roadbed, retaining wall or embankment, placed in layers not more than ten (10) inches in depth (loose measurement)?	☐	☐	☐
b. Is backfill which will support any portion of the roadbed, retaining wall or embankment, placed in uniform layers not to exceed eight (8) inches in depth (loose measurement)?	☐	☐	☐

Williamson County
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Inspection Check Lists

	Yes	No	NA
3. Is each layer of backfill material to the moisture content needed to obtain the required density?	☐	☐	☐
4. If a cohesionless material, such as sand, is used, is it compacted with vibratory equipment, water ponding or a combination of both?	☐	☐	☐

IV. Backfill – Bridge Foundations, Retaining Walls and Culverts (400.3.C.2)

1. Is the material used for backfilling free of any appreciable amount of gravel or stone particles more than four (4) inches in greatest dimension and of a gradation that permits thorough compaction?	☐	☐	☐
2. Are mechanical tamps or rammers required when the structure being backfilled could sustain damage from other compacting operations?	☐	☐	☐
3. Are any special density requirements for backfill under or adjacent to structures met?	☐	☐	☐

V. Backfill – Pipe (400.3.C.3)

1. After the bedding and pipes have been installed as required, is the selected backfill materials brought to proper moisture condition, placed along both sides of the pipe equally, in uniform layers not exceeding eight (8) inches in depth (loose measurement), and thoroughly compacted mechanically?	☐	☐	☐



Williamson County
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	Yes	No	NA
2. Is the method of backfill in question 1 above continued in this manner to the top of pipe elevation and compacted in accordance with Item 400.3.C.1?	☐	☐	☐

_____

_____

VI. Cement Stabilized Backfill (400.3.C.4)

	Yes	No	NA
1. When required by plans, is cement stabilized backfill or flowable backfill placed equally along all sides of the structure, so as to prevent strain on or displacement of the structure; and are all voids filled?	☐	☐	☐

_____

_____

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 416 – Drilled Shaft Foundations
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

416 – Drilled Shaft Foundations	**Yes**	**No**	**NA**
I. Materials (416.2)			
1. Did the Contractor incorporate materials into this project that meet the requirements of referenced items in Section 416.2?	☐	☐	☐
2. Does concrete for Drilled Shafts meet the requirements of Table 1 and Table 2 for concrete class and slump?	☐	☐	☐
3. If drilling slurry is used, does it meet the requirements of Table 3, as determined by Tex-130 E?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

	Yes	No	NA
4. Do Chemical Admixtures meet the requirements of DMS-4620?	☐	☐	☐

II. Construction (416.3)

A. Excavation

1. When excavating, was satisfactory founding material encountered at plan elevation?	☐	☐	☐
If not, was the bottom of the shaft adjusted, or the foundation altered, as determined by the Engineer of Record, to satisfactorily comply with the design requirements?			
2. Is the shaft vertical alignment measured and found to be within a tolerance of 1 inch per 10 feet of depth? **(Hold Point)**	☐	☐	☐
3. Is the center of shaft location measured and found to be not more than 1 inch from the horizontal position shown on the plans? **(Hold Point)**	☐	☐	☐
If not, was a structural review performed?			
4. Did the Contractor provide suitable access and lighting for proper inspection of the completed excavation?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

	Yes	No	NA
5. For abutment drill shafts, is the embankment at the bridge ends completed to grade and thoroughly compacted prior to drilling?	☐	☐	☐

B. Requirements for Slurry Displacement Method

1. If the slurry method is used to construct drilled shaft, is slurry mixed at the project site or is it premixed in a reservoir adjacent to the excavation (not in the shaft excavation or other hole)?	☐	☐	☐
2. During and after drilling was a head of slurry maintained in the shaft excavation at or near ground level or higher as necessary to counteract ground water pressure?	☐	☐	☐
3. Just prior to placement of reinforcing steel, was an airlift or proper size cleanout bucket used to remove accumulated material on the bottom after the completion of drilling? **(Hold Point)**	☐	☐	☐
4. Was concrete placement started within 4 hours of shaft excavation? If not, was shaft reprocessed?	☐	☐	☐
5. Is the slurry agitated if the placement of concrete is delayed to keep it liquefied?			

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

C. Reinforcing Steel	Yes	No	NA
1. Is the cage of reinforcing steel completely assembled according to plans and placed in the drill shaft as a unit immediately prior to concrete placement? **(Hold Point)**	☐	☐	☐
2. Where spiral reinforcement is used, is it tied to longitudinal bars (not welded) at a spacing not to exceed 24 inches?	☐	☐	☐
3. In uncased shafts, are concrete spacer blocks or steel chairs placed at sufficient intervals to insure concentric spacing for the entire length of the cage?	☐	☐	☐
4. In cased shafts, are steel chair spacers or bent pieces of steel bars placed at sufficient intervals to insure concentric spacing inside the casing?	☐	☐	☐
5. Is the cage adequately supported to control vertical displacement and racking and distortion of the steel during concrete placement and/or extraction of the casing?	☐	☐	☐
6. a. Is the elevation of the steel cage checked before and after concrete placement or after casing extraction when casing is used?	☐	☐	☐
b. Did the downward movement of the steel not exceed 6 inches per 20 feet of shaft length?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

	Yes	No	NA
c. Did the upward movement of the steel not exceed 6 inches?	☐	☐	☐
d. Were the dowel bars checked for proper lap length between the shaft and column?	☐	☐	☐

D. Concrete (Perform all work in accordance with the requirements of Item 420, "Concrete Structures".)

1. For dry shafts 24" in diameter or smaller, is concrete placed continuously through the entire length of the shaft through a suitable tube or tremie (limit freefall to 25 feet) to prevent segregation of materials?	☐	☐	☐
2. Does the elapsed time from the beginning of concrete placement into the cased portion of the shaft until the completion of extraction of the casing exceed one hour?	☐	☐	☐
3. At the time the concrete is placed, is the excavated drill shaft free from accumulated seep water?	☐	☐	☐
4. Has all loose material been removed from the bottom of the excavation prior to placing concrete?	☐	☐	☐

(Note: For dry shafts over 24" diameter concrete freefall is unlimited; use 3 foot drop tube.)

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

	Yes	No	NA
E. Additional Requirements for Slurry Displacement or Underwater Concrete Placement Methods			
1. Is the concrete placed through a closed tremie or pumped to the bottom of the excavation?	☐	☐	☐
2. If a tremie is used, is it kept full of concrete and well submerged in the previously placed concrete at all times?	☐	☐	☐

How is this determined?

3. During the placement of concrete was the tremie raised, as necessary, to maintain the free flow of concrete and the stability of any casing used?

4. Was additional concrete placed to ensure the removal of any contaminated concrete at the top of the shaft?

5. For pours over water, was a collar used to capture the slurry and the top portion of concrete flushed from the shaft?

6. If the tremie seal (separating layer between the concrete and contaminated bottom hole material) is lost, was the tremie removed, the bottom resealed and the tremie re-inserted at least 5 feet below the new seal before continuing concrete placement?

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

	Yes	No	NA
F. Load Testing			
1. If required, were the poured drill shafts load tested after curing in accordance with Item 405, "Foundation Test Load"?	☐	☐	☐

_____

_____

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

Drilled Shaft Record
Form No. 416

DRILLED SHAFT				BELL FTG.		Date Drilled	Casing Used	Drilling Mud	Slurry Plmt.	Remarks
No.	Dia. (in)	Top of Shaft Elev.	Length (ft)	Dia. (CY)	Vol. (CY)					
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							
Bent No.	Design Load		Tons per shaft							

Summary for Payment				Comments
Total this sheet		Total this structure		
size of shaft	Length (ft.)	size of shaft	Length (ft.)	
Total Vol of Bells		Total Vol of Bells		

Williamson County
Road Bond Program
Inspection Check Lists

Drilled Shaft Foundations – Item 416

Signature/Date:_____

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 420 – Concrete Structures
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Concrete Structures	**Yes**	**No**	**NA**
I. Materials (420.2)	☐	☐	☐
1. Were concrete structures constructed from materials conforming to TxDOT's Department Material Specifications in accordance with Section 420.2?			

II. Construction (420.4)

A. Schedule Restrictions

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
1. Did the Contractor comply with the schedule restrictions of Section 420.4.A, prior to erecting forms, removing forms, placement of materials, equipment and bridge rail, opening to construction or full traffic, post-tensioning or backfilling, ensure the previously placed concrete attained the minimum compressive strength or curing time?	☐	☐	☐

B. Falsework and Forms

1. Are the working drawings for forms and falsework signed and sealed by a Registered Professional Engineer, licensed in the state of Texas?	☐	☐	☐
2. Were the falsework and forms placed braced and alignments checked to ensure placement in accordance with the plans signed/sealed working drawings?	☐	☐	☐

C. Reinforcement (provided under Item 440)

1. Was reinforcing steel supports welded to I-beams or girders or to reinforcing steel as shown in the plans?	☐	☐	☐
2. Is the installation of dowels and anchor bolts in accordance with Section 420.4.G.10?	☐	☐	☐

D. Placing Concrete - General

1. Is the temperature of structural concrete at the time of placement between 50°and 95° F?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
2. Is the temperature of each truck load of concrete for bridge slabs and top slabs of direct traffic culverts being checked and is it between 50° and 85°F?	☐	☐	☐
3. Does the transporting time from the Batching Plant to the placing of concrete in the forms conform to the specification or requirements?	☐	☐	☐
4. If a pump is used to deliver concrete from the truck to the structure, is sampling for testing done at the discharge or was correlation testing performed and documented to ensure that specifications are met at the discharge end?	☐	☐	☐
5. Are all forms, pre-stressed concrete panels, T-beams and concrete box beams wetted thoroughly and remaining puddles of excess water removed prior to concrete placement?	☐	☐	☐
6. Does the method of handling, placing and consolidation of concrete minimize segregation of the concrete and displacement of the reinforcement?	☐	☐	☐
7. Does the concrete have a free fall of five (5) feet or less except in the case of thin walls or as specified otherwise?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
8. Is the concrete deposited in the forms in uniform layers not more than thirty-six (36) inches in thickness unless otherwise directed by the Engineer?	☐	☐	☐
9. Is the sequence of successive layers or adjacent portions of concrete such that they can be vibrated into a homogenous mass with the previously placed concrete before it sets?	☐	☐	☐
10. Is the construction sequence arranged so that cold joints in a monolithic placement is avoided?	☐	☐	☐
11. Is the concrete vibrated immediately after placement to consolidate the concrete and have the mortar flushed to the form surfaces?	☐	☐	☐
12. Is at least one stand-by vibrator provided for emergency use in addition to those required for placement?	☐	☐	☐
13. Is the rate of placement and finish satisfactory?	☐	☐	☐
14. Unless otherwise shown on the plans, for monolithic mass placements having a least dimension greater than five (5) feet, did the contractor submit a detailed plan to minimize temperature differential and meet the requirements of the Specification?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
E. Construction Joints			
1. Are all construction joints in bridge slabs of the type and at the locations shown on the plans?	☐	☐	☐
2. Are there additional bridge slab construction joints placed that are not shown on the plans?	☐	☐	☐
3. Was written authorization from the Engineer given for additional joints in these members?	☐	☐	☐
F. Placing Concrete in Cold Weather			
1. Is concrete placed only when the ambient temperature in the shade is 35°F and rising or above 40°F?	☐	☐	☐
2. Is the temperature maintained after placement in accordance with Section 420.4.G.11?	☐	☐	☐
G. Placing Concrete in Hot Weather			
1. Unless otherwise directed by the Engineer, is an approved retarding agent used in all concrete pours for superstructures and top slabs of direct traffic culverts when the air temperature is above 85°F?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
H. Placing Concrete in Water			
1. Are all classes of concrete placed under water, except Class E and Class SS, redesigned to contain an additional sack of cement per cubic yard?	☐	☐	☐
2. Is the concrete placed with a tremie meeting the requirements of Section 420.4.G.13, and is it not permitted to fall freely through the water nor disturbed after being placed?	☐	☐	☐
I. Placing Concrete in Superstructure			
1. For simple span bridge slabs, what type of finishing machine was used?	☐	☐	☐
2. If other than a mechanical longitudinal screed or a self-propelled transverse finishing machine was used, was approval given by the Engineer for small placements or unusual conditions?	☐	☐	☐
J. Finish of Bridge Slabs			
1. Did QC Reviewer witness the dry-run with the Contractor to ensure dead load deflection, screed profile, steel elevation, tying of rebar, armor joint elevation, depth of cover, etc. was checked?	☐	☐	☐
2. Was the concrete worked with a float to ensure a smooth finish?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
3. Did QC Reviewer perform sufficient checks with a 16-ft. straight edge on the plastic concrete to ensure final surface is within specified tolerances?	☐	☐	☐
4. Did QC Reviewer continue checking and floating until the deck surface was true to grade, free of depressions, high spots, voids and rough spots?	☐	☐	☐
5. Was the surface finish achieved by using a carpet drag, burlap drag or broom?	☐	☐	☐
6. Was the finished concrete surface coated within 10 minutes with a single application of evaporation retardant at the rate recommended by the manufacturer?	☐	☐	☐
7. Is the final bridge deck surface given a grooved steel tine finish approximately 1/8 to 3/16 inches deep approximately 1/8 inches wide, randomly spaced approximately ¾ to 1 inch apart?	☐	☐	☐
8. Did the bridge deck finish meet the ride quality tolerance of 1/8 inch in ten (10) feet (10 feet straight edge test)?	☐	☐	☐
9. Was the bridge deck grooved by saw-cutting in accordance with Section 420.4.I?	☐	☐	☐

Williamson County Road Bond Program Inspection Check Lists

Concrete Structures – Item 420

	Yes	No	NA
K. Curing Concrete			
1. Were the curing requirements of Item 420.4.J met? (Note: See Table 1 – Please note "Exceptions to 4-Day Curing?")	☐	☐	☐
L. Removal of Forms and Falsework			
1. Did the Contractor remove the forms and falsework in accordance with Section 420.4.K?	☐	☐	☐
M. Ordinary Surface Finish			
1. Unless noted otherwise in the plans, did the exposed surfaces for the following items receive an ordinary finish in accordance with Section 420.4.M?			
a. Inside and top of inlets?	☐	☐	☐
b. Inside and top of manholes?	☐	☐	☐
c. Inside of sewer appurtenances?	☐	☐	☐
d. Inside of culvert barrels?	☐	☐	☐
e. Bottom of bridge slab between girders or beams?	☐	☐	☐
f. Vertical and bottom surfaces of interior concrete beams or girders?	☐	☐	☐

Note: Form marks and chamfer edges do not need to be smoothed for inside of culvert barrels and bottom of bridge slabs between girders or beams.

N. Surface Finishes for Concrete (Item 427)			
1. Was the surface cleaned and patched in preparation to receive the finish coating as shown in the plans: was this work performed in accordance with the requirements of Item 427?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Structures – Item 420

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 421 – Hydraulic Cement Concrete
Description:
Location:
Report No.:
Date:
Time:

QC Reviewer:

Results: ☐ Accepted ☐ Not Accepted

Remarks:

QC Reviewer Signature:

Portland Cement Concrete	**Yes**	**No**	**NA**
I. Materials (421.2)			
1. Do the materials used in all mixed concrete placed on the job conform to TxDOT's Department Material Specifications and other requirements of Section 421.2?	☐	☐	☐
2. Is the concrete mix visually checked for uniformity from the beginning to the end of each load?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Hydraulic Cement Concrete – Item 421

	Yes	No	NA
II. Construction (421.4)			
A. Classification and Mix Design			
1. Are the requirements for entrained air met as outlined in Section 421.4.A.4 (Table 7)?	☐	☐	☐
2. Are the requirements of Table 8 – "Slump Requirements" being met?	☐	☐	☐
3. Is the maximum water-cement ratio exceeded?	☐	☐	☐
4. If question 3 is "yes", is the ratio regularly exceeded; was a new design performed?	☐	☐	☐
5. Is no water added to the concrete once discharge has begun to ensure that the maximum water-cement ratio is not exceeded?	☐	☐	☐
B. Job Testing and Documentation			
1. Was the concrete checked at the beginning of the load for slump or entrained air to prohibit placement of non-conforming material?	☐	☐	☐
2. Is the required job site testing (strength, clump, entrained air, concrete temperature, etc.) being performed at the required frequency using proper TxDOT testing methods?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Hydraulic Cement Concrete – Item 421

	Yes	No	NA
3. Are the concrete tickets properly completed?	☐	☐	☐
4. Is the amount of water withheld (based on the design water-cement ratio) at the plant shown on the concrete ticket?	☐	☐	☐
5. If concrete is pumped, where is sampling and testing being performed?	☐	☐	☐
6. Were comparison tests recorded between the haul unit and the point of unit discharge after pump?	☐	☐	☐

C. Truck Mounted Paving Mixers and Transit Mix Trucks

1. Is each truck delivered concrete batch mixed not less than 70 nor more than 100 revolutions of the drum at the mixing speed designated by the manufacturer to produce a uniform concrete mix?	☐	☐	☐
2. When water is added at the job site, is the batch mixed a minimum of 25 revolutions at mixing speed?	☐	☐	☐

Concrete Batch Ticket

Ticket No: _____

Date: _____

Material Information

MAT'L	Identification*	Am't Batched
AEA		oz.
RA		oz.
WRA		oz.
		oz.
CA_1		lbs.
CA_2		lbs.
FA_1		lbs.
Cement		lbs.
Fly Ash		lbs.
		lbs.
		lbs.
		lbs.

AT PLANT

Plant | Des. No. | Truck No.

CY | County | Project | CCSJ

Class | Air Temp ℉ | Mixer Chg'd. ☐ AM ☐ PM | MAX TIME

*%Moist | CA_1 | CA_2 | CA_3 | CA_4 | FA_1 | FA_2

Water: Added (gal). | Ice. (lbs) | Max. (gal)

Rev. Const.: Beg. | End | Mix Rev.

Remarks

Plant Inspector Signature

AT JOBSITE

Structure | Location in Str.

Water Added (gal). | Ice (lbs).

Rev. Constr. Beg. | End. | Mix Rev.

*Slump | *%Air | *Conc. Temp ℉ | *Unit Weight Lbs/ft^3

*Bm. Or Cyl. Nos | Target Value psi | Mixer Unloaded ☐ AM ☐ PM

Remarks

Plant Inspector Signature

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 422 – Reinforced Concrete Slab
Description: _____
Location: _____
Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Reinforced Concrete Slab	**Yes**	**No**	**NA**
I. Materials (422.2)			
1. Are the materials furnished by the Contractor in accordance with the referenced Items of work and meet the requirements of Section 422.2?	☐	☐	☐
II. Construction (422.3)			
A. Pre-placement			
1. Is all placing, finishing and curing equipment in place and operational?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforced Concrete Slab – Item 422

	Yes	No	NA
2. Has a dry runoff the equipment been done?	☐	☐	☐
3. Has the proper clear cover for the rebar been checked?	☐	☐	☐
4. Does screed clear at the armor joints?	☐	☐	☐
5. Are drains and grates at plan location and elevation?	☐	☐	☐
6. Is sufficient plastic and curing blankets available in case of inclement weather after the pour begins?	☐	☐	☐
7. Are forms, deck panels, beams and every element that the fresh concrete will come in contact with properly wetted?	☐	☐	☐

B. During Placement

1. Has placement begun at the low end on spans with a profile grade of 1.5% or more?	☐	☐	☐
2. Are proper clear cover depths being checked at the frequency shown in the Test Guide Schedule?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforced Concrete Slab – Item 422

	Yes	No	NA
3. Is concrete being placed between exterior and adjacent beams prior to placing concrete on overhangs?	☐	☐	☐
4. Is the application of evaporation retardant and curing compound being applies at the times required by specification and at the rates identified by the manufacturer?	☐	☐	☐

C. Post Placement

1. Is the final surface within specification tolerances when checked with a 16-ft straightedge?	☐	☐	☐
2. Has concrete attained a compressive strength in accordance with Section 420.4.A and Table 5 of Section 421.4 prior to removing forms or introducing loads?	☐	☐	☐
3. If deck grooves are saw cut, were they installed in accordance with Section 420.4.I?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 423 – Retaining Wall
Description:
Location:
Report No.:
Date:
Time:

QC Reviewer:

Results: ☐ Accepted ☐ Not Accepted

Remarks:

QC Reviewer Signature:

Retaining Wall	**Yes**	**No**	**NA**
I. Materials (432.2)			
1. Do the materials furnished by the Contractor meet the requirements of the referenced Items of work and other requirements of Section 432.2?			
2. For non-reinforced cast-in-place, was “Class A” concrete used?	☐	☐	☐
3. For reinforced cast-in-place, was “Class C” concrete used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

	Yes	No	NA
4. Are precast panels fabricated with "Class H" concrete with compressive strength breaks of 4,000 psi or greater?	☐	☐	☐
5. If machine-made concrete block units are used, were they cast in accordance with ASTM C-90, Class 1, Type II and meet the 28-day compressive strength of 4,000 psi with maximum moisture absorption of 7%?	☐	☐	☐
6. If machine-made concrete block units are used, were they sampled and tested in accordance with ASTM C-140 and are the molded dimensions within 1/8" tolerance, except where height must be within 1/16"?	☐	☐	☐
7. For filter fabric used in the Retaining Wall System, is it UV-resistant and does the material meet the requirements of DMS-6200?	☐	☐	☐
8. Are approved joint fillers, pads, waterstops, etc. used as shown in the plans?	☐	☐	☐
9. Does the retaining wall design service life meet the requirements of Section 423.3B?	☐	☐	☐
10. Does the backfill material conform to the gradation and other requirements stated in the plans and/or Item 423.C.2: Table 2 and Item 423.3.C.3: Table 3?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

II. Construction (423.2)	Yes	No	NA
1. Is the foundation for the structure graded level and compacted with a roller approved prior to wall construction? (Hold Point)	☐	☐	☐
2. Are any foundation soils found to be unsuitable removed and replaced?	☐	☐	☐
3. Is filter fabric placed behind all wall joints, and at the intersection of retaining walls with other structures, including riprap?	☐	☐	☐
4. Does the filter fabric cover joints a minimum of 6 inches on each side and is it positively held in place?	☐	☐	☐
5. As select fill material is placed behind the wall panels, are the panel alignments maintained by acceptable bracing methods?	☐	☐	☐
6. Do vertical tolerances and horizontal alignment tolerance not exceed ¾" when measured along the wall with a 10-foot straight edge?	☐	☐	☐
7. Is the overall vertical tolerance of the wall (plumbness from top to bottom) within ½" per 10-feet of wall height?	☐	☐	☐
8. Does the backfill placement closely follow the erection of each lift of panels, and is it placed in 8" lifts and compacted to 95% of density?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Retaining Wall – Item 423

	Yes	No	NA
9. At each reinforcement level, is the backfill leveled and compacted before placing the reinforcement?	☐	☐	☐
10. Is adjacent embankment placed to approximately the same level as the backfill material? Note: Do not create a continuous, distinct, vertical joint between the select and embankment backfill.	☐	☐	☐
11. Is compaction in the 3-foot strip adjacent to the backside of the wall accomplished with hand operated or walk-behind compacter?	☐	☐	☐
12. If rock backfill is used as select material, was a filter fabric layer placed before placing the last 2 feet of backfill immediately below the pavement structure or top of wall? Note: Overlap splices by at least 18".	☐	☐	☐
13. Does the upper 2 feet of rock backfill contain no stones larger than 3" in their greatest dimension and is it composed of material with sufficient fines to fill the voids in a compacted state?	☐	☐	☐
14. Is the wall being constructed in accordance with the details shown on the plan sheets and/or construction drawings?	☐	☐	☐
15. If construction drawings are used to show the construction details, does the Reviewer have (or have access to) a copy of these drawings?	☐	☐	☐

Williamson County Road Bond Program Inspection Check Lists

Retaining Wall – Item 423

	Yes	No	NA
16. Are proper spacers provided between panels?	☐	☐	☐
17. Is grading and drainage maintained adjacent to the wall during construction?	☐	☐	☐
18. If temporary MSE walls are used, were the walls constructed in accordance with Section 423.3.F requirements?	☐	☐	☐
19. If Concrete Block Retaining Walls are used, were the walls constructed in accordance with Section 423.3.G?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item:	425 – Precast Pre-stressed Concrete Structural Members	Report No.:	
Description:		Date:	
Location:		Time:	

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Precast/Pre-stressed Concrete Structural Members	**Yes**	**No**	**NA**
I. Materials (425.2)			
1. Do the materials incorporated in the Precast Pre-stressed Concrete Structural Members conform to the reference items of work, TxDOT's Department Material Specifications and other requirements of Section 425.2?	☐	☐	☐
2. Did the Contractor provide manufacturer's certifications for bedding strips and use adhesives or bonding agents as recommended by the polystyrene manufacturer?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Precast Pre-stressed Concrete Structural Members – Item 425

	Yes	No	NA
II. Construction (425.3)			
1. Are beams, bridge deck panels and bearing pads approved by TxDOT and is the TxDOT stamp on them?	☐	☐	☐
2. Do beams have any signs of damage such as cracks, spalling and/or "honeycombs"?	☐	☐	☐
3. Are dimensions correct?	☐	☐	☐
4. During erection of beams, did the Contractor securely tie or brace all beams in accordance with minimum erection and bracing standards?	☐	☐	☐
5. Are any safety hazards apparent (power lines, traffic hazards or other construction activities)?	☐	☐	☐
6. Have beams been erected to proper alignment as shown on the plans?	☐	☐	☐
7. Are beams positioned with the proper clearance from the abutment back-wall and adjacent beam?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 440 – Reinforcing Steel
Description:
Location:
Report No.:
Date:
Time:

QC Reviewer:

Results: ☐ Accepted ☐ Not Accepted

Remarks:

QC Reviewer Signature:

Reinforcing Steel	**Yes**	**No**	**NA**
I. Materials (440.2)			
1. Does the reinforcing steel to be welded comply with ASTM A706 or have a carbon equivalency of not more than 0.55%?	☐	☐	☐
2. Do the electrodes used for welding conform to the requirements of Item 448.2 for the type of reinforcing steel used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

		Yes	No	NA
3.	Does the person performing the welding operation have welder certification paper issued by TxDOT that covers the type of work he/she is performing? (448.4)	☐	☐	☐
4.	Is an oven used to dry and store electrodes with low hydrogen coverings for the times and at the temperatures required? (448.4.C)	☐	☐	☐
5.	Is the rebar used on the job from an approved Mill as required by Section 440.2.A?	☐	☐	☐
6.	Unless otherwise shown on the plans, is the deformed rebar Grade 60 as required by Section 440.2.B?	☐	☐	☐
7.	For Epoxy Coated Rebar, is the coated reinforcing steel in accordance with Table 3 (440.2.F)?	☐	☐	☐
8.	Are mechanical couplers used when reinforcing steel is spliced?	☐	☐	☐
9.	Are all couplers furnished by the Contractor produced by a pre-qualified manufacturer? (DMS-4510)	☐	☐	☐
10.	Before being used, are the couplers sampled and tested as required in Item 440.2.G and do they meet all requirements? (DMS-4510)	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

	Yes	No	NA
II. Construction (440.3.C)			
1. Is steel reinforcement adequately stored above the surface of the ground upon platforms, skids or other supports and protected from damage and deterioration?	☐	☐	☐
2. In final placement, is the reinforcement free from dirt, paint, grease, oil or other foreign materials and from defects such as cracks and delaminations?	☐	☐	☐
3. Are lap-splice, wield-splice, or mechanically spliced bars placed as shown on the plans and meet the requirements of Section 440.3.D and Table 5 "Minimum Lap Requirements by Bar Size"?	☐	☐	☐
If not, was written approval given by the Engineer for additional splices?			
4. In the plane of the steel parallel to the nearest surface of concrete, do the bars vary from plan placement by not more than 1/12 of the spacing between bars?	☐	☐	☐
5. In the plane of the steel perpendicular to the nearest surface of concrete, do the bars vary from plan placement by not more than 1/4"?	☐	☐	☐
6. Is the depth of cover (concrete) to the nearest surface of steel at least 1" unless otherwise shown on the plans?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

		Yes	No	NA
7.	For bridge slabs, is the clear cover tolerance for the top mat of reinforcement 0" to ½"?	☐	☐	☐
8.	Are bars of the proper size, location and quantity as shown on the plans?	☐	☐	☐
9.	a. What type of bar supports are used?	☐	☐	☐
	b. Are the bar supports adequate in strength and number to hold the reinforcement in place, before and during concrete placement?	☐	☐	☐
	If not, is concrete placement halted until corrective measures are taken?			
	c. If individual bar supports are used, are they placed in rows at 4 ft. maximum spacing?	☐	☐	☐
	d. If continuous type bar supports are used, are they placed in rows at 4 ft. maximum spacing?	☐	☐	☐
	e. Are continuous type bar supports used when permanent metal deck forms are used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Reinforcing Steel – Item 440

	Yes	No	NA
10. Are all accessories used with epoxy coated reinforcement such as tie wires, bar chairs, supports or clips made of steel, fully coated with epoxy or plastic?	☐	☐	☐
11. Has all visible damage to the coating been repaired in accordance with Section 440.3.F.3 before the reinforcement is used?	☐	☐	☐
12. Is any cutting of coated reinforcement done only by sawing or shear cutting with permission of the Engineer?	☐	☐	☐
13. Have all cut ends been coated before the reinforcement is used?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 442 – Metal for Structures
Description: _____
Location: _____

Report No.: _____
Date: _____
Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____

Metal for Structures	**Yes**	**No**	**NA**
I. Materials (442.2)			
A. Non-Bridge Structures:			
1. Was the structural steel delivered and used within the project tested in accordance with ASTM A370?	☐	☐	☐
2. Does the type and grades of steel used by the Contractor in accordance with the listing in Section 442.2.2.A or as shown on the plans?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Metal for Structures – Item 442

	Yes	No	NA
3. Have tension members and other components listed in Section 442.2.2.B been impact tested and do the test results conform with the Charpy V-notch (CVN) requirements of Table 1 within the above stated section?	☐	☐	☐

B. Other Components such as Shear Connectors, Anchors, Fasteners, Slip-resistant Deck Plates and Rail Posts:

1. Do the materials supplied to the project under this section have a certification of material properties from the manufacturer?	☐	☐	☐
2. Do the materials meet the ASTM requirements as shown in Section 442.2.3 per category description and tested in accordance with section requirements?	☐	☐	☐

C. Forgings, Castings and Extrusions (442.2.B, C, D, E, F, G):

1. Do the components under this category meet the ASTM, class, grade and/or alloy-temper as required in accordance by Section 442.2.B, C, D, E, F, G?	☐	☐	☐

II. Construction Methods (442.3)

1. Was the structural metal fabricated, welded and erected in accordance with Item 441, “Steel Structures”; Item 447, “Structural Bolting; Item 448, “Structural Field Welding”; and applicable AWS welding codes?	☐	☐	☐
2. Were the fabricated and erected structural metal members painted in accordance with Item 446, “Cleaning and Painting Steel”?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Metal for Structures – Item 442

		Yes	No	NA
3.	When specified in the plans, was the fabricated steel items galvanized in accordance with Item 445, "Galvanizing"?	☐	☐	☐
4.	Were field repairs to the painting or galvanizing of fabricated and erected steel items performed in accordance with Item 446, "Cleaning and Painting" or Item 445, "Galvanizing"?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Spec Item: 462 – Concrete Box Culverts & Storm Drains
464 – Reinforced Concrete Pipe

Report No.: _____

Description: _____

Date: _____

Location: _____

Time: _____

QC Reviewer: _____

Results: ☐ Accepted ☐ Not Accepted

Remarks: _____

QC Reviewer Signature: _____ :

Concrete Box Culverts & Storm Drains/Reinforced Concrete Pipe	**Yes**	**No**	**NA**
I. Materials (462.2 and 464.2)			
A. Reinforced Concrete Pipe, Concrete Box Culverts and Strom Drains	☐	☐	☐
1. Were the individual sections of pipe or pre-cast boxes inspected and rejected if they do not have the Division of Materials and Tests monogram on them?	☐	☐	☐
2. For cast-in-place or pre-cast box culverts and storm drains, do the materials and method of fabrication comply with the requirements of Section 462.2.A, B?			

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
3. For cast-in-place box culverts and storm drains, during fabrication, did test specimens meet the requirements of Item 421, "Hydraulic Cement Concrete"; Item 440, "Reinforcing Steel" and conform to the requirements of Item 420, "Concrete Structures"?	☐	☐	☐
4. Were the individual sections of pipe or pre-cast boxes inspected at the project site and repaired or rejected if any of the defects are found?	☐	☐	☐
5. Were pre-cast sections inspected to ensure they meet the tolerance in accordance with Section 462.2.F?	☐	☐	☐
6. Are cracks which extend into the plane of the reinforcing steel repaired in an approved manner?	☐	☐	☐
7. Are small damaged or honeycombed areas which are purely surface in nature repaired to the satisfaction of the Engineer?	☐	☐	☐
8. Are precast sections stored on level blocking in a manner acceptable to the Engineer?	☐	☐	☐
9. Are lifting holes larger than 3" diameter?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
B. Jointing Materials			
1. For all jointing materials except mortar, has the Contractor furnished the Engineer the Manufacturer's Certificate of Compliance that complies with the requirements in Section 464.2.I?	☐	☐	☐

II. Construction (462.3 and 464.3)

A. Laying Pipe and Pre-cast Boxes

1. Unless otherwise authorized by the Engineer, did the Contractor start the laying of pipe or present boxes on the bedding at the outlet end with the spigot or tongue pointing downstream and proceed toward the inlet end with the abutting sections properly matched, true to the established lines and grade?	☐	☐	☐
2. Is proper equipment provided for hoisting and lowering the sections of pipe or pre-cast boxes into the trench without disturbing the bedding and the sides of the trench?	☐	☐	☐
3. Are the ends of the pipe or precast boxes carefully cleaned, if necessary?	☐	☐	☐
4. Is the pipe or pre-cast boxes fitted and matched so that when laid in the bed, it forms a smooth uniform conduit?	☐	☐	☐
5. Are multiple installations of reinforced concrete pipe (RCP) laid with the center lines of individual barrels parallel?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
6. Unless otherwise shown on the plans for multiple installations for RCP, are the clear distances between outer surfaces of adjacent pipes as shown in Item 464.3.B (Table 5)?	☐	☐	☐
7. Is the area for placement of structures excavated, shaped and the structures bedded and backfilled in accordance with Item 400, "Excavation and Backfill Structures"?	☐	☐	☐
8. Unless otherwise shown on the plans or permitted in writing by the Engineer, did heavy earth moving equipment haul over the structure before a minimum of 4-feet of compacted fill was placed over the top of the structure?	☐	☐	☐
9. Is pipe or pre-cast boxes damaged by the Contractor's equipment removed and replaced or repaired by an approved method by the Engineer?	☐	☐	☐

B. Jointing for Pipes, Concrete Box Culverts and Storm Drains

1. Does the mortar consist of one part cement, two parts sand, and sufficient water to make a plastic mix?	☐	☐	☐
2. Are the structure ends cleaned and wetted before making the joint?	☐	☐	☐
3. After the structures are tightly jointed, is the mortar packed into the joint from both inside and outside the structure, and then the inside finished smooth and flush with adjacent joints of structure?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
4. Are mortar joints cured by keeping the joints wet for at least 48 hours or until the backfill operation begins after the mortar joint has cured for at least 6 hours?	☐	☐	☐
5. Is no mortar jointing done when the atmospheric temperature is at or below 40°F?	☐	☐	☐
6. Are mortared joints protected against freezing by backfilling or other approved methods for at least 24 hours?	☐	☐	☐

C. Joints using Cold-Applied, Plastic Asphalt Sewer Joint Compound

1. Are both ends of the structure clean and dry at the time the joint is made?	☐	☐	☐
2. Was a ½" thick layer of the compound troweled or otherwise placed in the groove end of the structure covering not less than two-thirds of the joint face around the entire circumference before the tongue end of the next structure is shoved home with sufficient pressure to make a tight joint?	☐	☐	☐
3. After the joint is made, is any excess mastic projecting into the structure removed?	☐	☐	☐

D. Joints Using Rubber Gasket

1. Where rubber gasket joints are required by the plans, is the joint assembly made according to the recommendations of the gasket manufacturer?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
2. When using rubber gaskets, are the joints water tight?	☐	☐	☐

E. Joints Using Pre-formed Flexible Joint Sealants

1. Are the joints placed according to the procedure shown in Article 464.3.C.4 and the manufacturer's recommendations?	☐	☐	☐
2. Is the joint sealer placed in such manner that no dirt or other deleterious materials will come in contact with the joint sealing material?	☐	☐	☐
3. When the atmospheric temperature is below 60°F, are plastic joint seal gaskets either stored in an area warmed to above 70°F or artificially warmed to this temperature in a manner satisfactory to the Engineer?	☐	☐	☐

F. Connections and Stub Ends for Pipes, Concrete Box Culverts and Storm Drains

1. Is the bottom of existing structures mortared or concreted if necessary to eliminate any drainage pockets created by the connections?	☐	☐	☐
2. Is any damage to the existing structure resulting form making the connection satisfactorily repaired by the Contractor?	☐	☐	☐
3. Unless otherwise shown on the plans, are the connections between concrete pipe and corrugated metal pipe made with a suitable concrete collar having a minimum thickness of 4"?	☐	☐	☐

Williamson County
Road Bond Program
Inspection Check Lists

Concrete Box Culverts & Storm Drains – Item 462
Reinforced Concrete Pipe – Item 464

	Yes	No	NA
4. Are stub ends, for connections to future work not shown on the plans, finished by installing watertight plugs into the free end of the pipe?	☐	☐	☐
5. For precast boxes, fill lifting holes with mortar or concrete and cure or precast concrete mortar plugs may be used. Have the holes been filled accordingly prior to backfill?	☐	☐	☐

APPENDIX B

GUIDE SCHEDULE OF SAMPLING AND TESTING

GUIDE SCHEDULE OF SAMPLING & TESTING

MAY 2016



Using the Guide Schedule

Research of sampling and testing rates listed for project tests in the following Guide Schedule show that the Department's and the Contractor's risk of either rejecting "good" material or accepting "bad" material range from 20% to 40%.

To reduce this risk, we recommend that the sampling rate be increased during initial production. A four-fold increase in testing frequency will generally reduce risk to approximately 5%. The intent of increasing testing at the start of production is to insure that the Contractor's processes are in control and to establish acceptability requirements early.

There is a need to increase the frequency of testing for high-variability materials and when testing results do not meet specifications. The Engineer may require the Contractor to reimburse the Department for costs resulting from failing test results, in accordance with the specifications.

Materials incorporated in TxDOT projects are subjected to various quality assurance procedures such as testing (as outlined in this document), certification, quality monitoring, approved lists, etc. The Engineer and testing staff should familiarize themselves with materials to be used before work begins by reviewing the specifications and this document. Discuss material testing requirements with the Contractor.

Other testing required by the specifications, but not shown in the Guide Schedule, should be performed at a frequency necessary to provide adequate confidence that materials meet specifications.

NOTE: For projects subject to FHWA construction oversight activities, use the "Letter of Certification of Materials Used" to document reasons for material acceptance when a test fails. For all other projects, document the justification and explanation for acceptance of materials that fail project tests in the project file.

Assuring the quality of the product and proper incorporation of materials into the project begins with proper sampling practices. Sampling, testing, and construction inspection must be performed collaboratively to assure the specific attributes of the finished product reflect quality workmanship. Sampling guidance for hot-mixed asphalt is contained in Tex-225-F, "Random Selection of Bituminous Mixture Samples," and the respective specification for that material. All remaining materials are covered by method and materials specifications, to which the following applies.

For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows:

- Soils/flexible base: Vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed.
- Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
- Concrete (structural and miscellaneous: Always sample as near as practicable to the point of placement. For strength testing, vary the time of day or the number of truck from which the concrete is sampled. Tests for slump, air, and temperature should be done often to ensure the consistent control of the concrete production (not applicable to miscellaneous concrete).

This Guide Schedule is applicable to all contracts associated with the 2014 Standard Specifications.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
EMBANKMENT (CUTS & FILLS)	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Materials with PI ≤ 15: 10,000 CY	For Type A embankment or when required by the plans. This test may be waived for embankment cuts as directed by the Engineer. Determine a new liquid limit and plasticity index for each different material or notable change in material. Sample in accordance with Tex-100-E.
	Plasticity Index **(A)**	Tex-106-E		Materials with PI > 15: 5,000 CY	
	Gradation	Tex-110-E		Each 10,000 CY	When shown on plans. This test may be waived for embankment cuts, as directed by the Engineer. Sample in accordance with Tex-100-E.
	Moisture/Density	Tex-114-E		As directed by the Engineer	Not required for ordinary compaction. Determine a new optimum moisture and maximum density for each different material or notable change in material. Sample in accordance with Tex-100-E.
	In-place Density **(A)**	Tex-115-E	As designated by the Engineer	Fill: each 5,000 CY min. 1 per lift.	Not required for ordinary compaction. Determine a new optimum moisture and maximum density according to Tex-114-E for each different material or notable change in material. Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E, as necessary for control, for each different material or notable change in material and adjust the density accordingly. Materials such as RAP, gypsum, lime, cement, and iron ore tend to bias the counts for nuclear density gauges.
				Cut: each 6,000 LF	
RETAINING WALL (NON-SELECT BACKFILL)	As shown above for Embankment (Cuts and Fills)		As shown above for Embankment (Cuts and Fills)	As shown above for Embankment (Cuts and Fills)	Sample in accordance with Tex-100-E.
RETAINING WALL (SELECT BACKFILL)	Gradation	Tex-110-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Resistivity **(A)**	Tex-129-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Each 5,000 CY	For material with resistivity between 1,500 and 3,000 ohm-cm, determine chloride and sulfate content, as specified in Item 423. Sample in accordance with Tex-400-A.
	pH **(A)**	Tex-128-E	During stockpiling operations, from completed stockpile, or project site **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
RETAINING WALL (SELECT BACKFILL) (continued)	Soundness	Tex-411-A	During stockpiling operations, or from completed stockpile	1 per source, per project	Test when backfill sources appear to contain particles such as shale, caliche, or other soft, poor-durability particles. Sample in accordance with Tex-400-A.
	In-place Density **(A)**	Tex-115-E	As designated by the Engineer.	1 per backfill lift, per wall	Not required for rock backfill. For walls greater than 500 ft. in length, perform one test per lift for every 500 ft. in length. **(F)** Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E for each different material or notable change in material and adjust the density accordingly.
UNTREATED BASE COURSES	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Plasticity Index **(A)**	Tex-106-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	
	Gradation **(A)**	Tex-110-E	During stockpiling operations, from completed stockpile, or windrow **(B)**	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Moisture/Density	Tex-113-E	From completed stockpile at the source **(E)**	Each 20,000 CY	Not required for ordinary compaction. Sample in accordance with Tex-400-A.
	Wet Ball Mill **(A)**	Tex-116-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. Sample in accordance with Tex-400-A.
	Strength **(A)**	Tex-117-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. When base material is from a source where the District has a record of satisfactory triaxial results, the frequency of testing may be reduced to one per 30,000 CY. If any one test falls below the minimum value required, the frequency of testing will return to the original frequency of 20,000 CY. Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

				PROJECT TESTS		
MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
UNTREATED BASE COURSES		In-place Density (A)	Tex-115-E	As designated by the Engineer	Each 3,000 CY, min. 1 per lift	Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E, as necessary for control, for each different material or notable change in material and adjust the density accordingly. Materials such as RAP, gypsum, lime, cement, and iron ore tend to bias the counts for nuclear density gauges.
		Thickness (A)	Tex-140-E	As designated by the Engineer	Each 3,000 CY	Not required where survey grade control documents compliance.
TREATED SUBGRADE AND BASE COURSES	SUBGRADE BEFORE TREATMENT	Organic Content	Tex-148-E	As designated by the Engineer	1 per 500 linear feet or 5,000 CY	Required for existing subgrade material and material imported from a borrow source. Soil survey and geologic maps may be used to determine sampling locations. Sample in accordance with Tex-100-E.
		Sulfate Content	Tex-145-E	As designated by the Engineer	1 per 500 linear feet or 5,000 CY	Required for existing subgrade material and material imported from a borrow source. Soil survey and geologic maps may be used to determine sampling locations. Sample in accordance with Tex-100-E.
	NEW BASE MATERIAL	Liquid Limit (A)	Tex-104-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY	When central mix site or plant is used, windrow sampling may be waived. Sample in accordance with Tex-400-A.
		Plasticity Index (A)	Tex-106-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY	
		Gradation (A)	Tex-110-E	During stockpiling operations, from completed stockpile, or windrow (B)	Each 5,000 CY	Sample in accordance with Tex-400-A.
		Wet Ball Mill (A)	Tex-116-E	From completed stockpile at the source (E)	Each 20,000 CY	As required by the plans. Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

				PROJECT TESTS		
MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (F)	REMARKS
TREATED SUBGRADE AND BASE COURSES	NEW BASE MATERIAL	Strength **(A)**	Tex-117-E	From completed stockpile at the source **(E)**	Each 20,000 CY	As required by the plans. When base material is from a source where the District has a record of satisfactory triaxial results, the frequency of testing may be reduced to one per 30,000 CY. If any one test falls below the minimum value required, the frequency of testing will return to the original frequency of 20,000 CY.
	LIME	Compliance with DMS-6350	Tex-600-J	During delivery to project	Commercial Lime Slurry: each 200 tons of lime Carbide Lime Slurry: each 100 tons of lime	Sample in accordance with Tex-400-A.Verify the source is listed on the current Material Producer List for Lime. Only materials appearing on the Material Producer List will be accepted. Sample frequency for Carbide Lime Slurry may be increased as directed by the Engineer. For Hydrated Lime and Quick Lime project testing is not required but it is encouraged to sample and test the material at a rate of 1 per project as a best practice.
	CEMENT	Compliance with DMS-4600		Railroad car, truck, or cement bins		Verify the source is listed on the current Material Producer List for Cement. If not, sample and test in accordance with DMS-4600. **(C)**
	FLY ASH MATERIAL	Compliance with DMS-4615		Project samples at location designated by the Engineer		Verify the source is listed on the current Material Producer List for Fly Ash. Only materials from CST/M&P approved sources appearing on the Material Producer List for Fly Ash will be accepted. Project testing is not required but it is encouraged to sample and test the material at a rate of 1 per project as a best practice. **(C)**
	COMPLETE MIXTURE	Pulverization Gradation	Tex-101-E Part III	Roadway, after pulverization and mixing	As necessary for control	At the beginning of the project, one test must be made for each 4,500 CY or 6,000 tons until the Engineer is satisfied that acceptable pulverization results are being obtained. Sample in accordance with Tex-100-E.
		Soil-Cement Testing Soil-Lime Testing	Tex-120-E, Part II, or Tex-121-E, Part II	From roadway windrow after treatment **(E)**	Each 20,000 CY	Not required for ordinary compaction. Determine a new moisture/density curve for each different or notable change in material. Perform Tex-120-E, Part II, for Cement Treated Material, and Tex-121-E, Part II, for Lime, Lime-Fly Ash, or Fly Ash Treated Material. If Tex-120-E, Part I, Tex-121-E, Part I, or Tex-127-E is performed prior to the project, this test may be waived. Sample in accordance with Tex-100-E.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE I – EMBANKMENTS, SUBGRADES, BACKFILL, AND BASE COURSES

MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	PROJECT TESTS: LOCATION OR TIME OF SAMPLING (D)	PROJECT TESTS: FREQUENCY OF SAMPLING (F)	REMARKS
TREATED SUBGRADE AND BASE COURSES	COMPLETE MIXTURE	Soil-Cement Testing Soil-Lime Testing	Tex-120-E, Part I, Tex-121-E, Part I, or Tex-127-E	From roadway windrow after treatment	As necessary for control	Perform Tex-120-E, Part I, on cement treated material, and Tex-121-E, Part I, for lime-fly ash or fly ash treated material. Verifies the field strength by comparing results from the mix design. Performed at the discretion of Engineer. Sample in accordance with Tex-100-E.
		In-place Density **(A)**	Tex-115-E	As designated by the Engineer	Each 3,000 CY, min 1 per lift	Determine the appropriate moisture/density curve for each different material or notable change in material. Correct the moisture contents measured by nuclear density gauge in Tex-115-E with the moisture contents determined in accordance with Tex-103-E, as necessary for control, for each different material or notable change in material and adjust the density accordingly. Stabilizers and materials such as RAP, gypsum, and iron ore tend to bias the counts for nuclear density gauges.
		Thickness **(A)**	Tex-140-E	As designated by the Engineer	Each 3,000 CY	Not required where survey grade control documents are used for compliance
RECLAIMED ASPHALT PAVEMENT (RAP), CRUSHED CONCRETE, and RECYCLED MATERIALS		Sulfate Content	Tex-145-E	During stockpiling operations, from completed stockpile, or windrow	Each 5,000 CY	Required only for contractor furnished recycled material, including crushed concrete. Not required for RAP. Sample in accordance with Tex-400-A.
		Deleterious Material	Tex-413-A		Each 5,000 CY	Required only for contractor furnished recycled material, including crushed concrete. Sample in accordance with Tex-400-A.
		Decantation	Tex-406-A	During stockpiling operations, from completed stockpile, or windrow	Each 5,000 CY	Required only for contractor furnished RAP. Sample in accordance with Tex-400-A.

TABLE I – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Engineer will select any of these locations or any combinations thereof with the provision that the initial sample will be obtained from the completed stockpile at the source and at least one out of ten consecutive samples will be taken at the project site (from the windrow for treated and untreated bases and embankments when possible).
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.

This is a guide for minimum sampling and testing.

Testing frequency may need to be increased for high material variability or when test results approach specification limits.

D	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Soils/Flexible Base: For gradation, liquid limit, and plastic limit, vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed. • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
E	The Engineer will sample from the completed stockpile at the source and test prior to placement.
F	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IA – ASPHALT STABILIZED BASE (Plant Mix)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
AGGREGATE	Gradation **(A)**	Tex-200-F, Part I	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Liquid Limit **(A)**	Tex-104-E	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY	Sample in accordance with Tex-400-A.
	Plasticity Index **(A)**	Tex-106-E	During stockpiling operations, from completed stockpile, or prior to mixing	Each 5,000 CY	
	Wet Ball Mill or L. A. Abrasion **(A)**	Tex-116-E or Tex-410-A	During stockpiling operations, from completed stockpile, or prior to mixing	Each 20,000 CY	When L. A. Abrasion is specified, tests are not required when the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. Sample in accordance with Tex-400-A. **(B)**
	Coarse Aggregate Angularity **(A)**	Tex-460-A, Part I	During stockpiling operations, from completed stockpile, or prior to mixing	1 per project, per source	Not required for crushed stone sources. Sample in accordance with Tex-400-A.
	Sand Equivalent	Tex-203-F	Hot aggregate bins, feeder belt, or stockpile	1 per project, per source	When designated by the Engineer, test may be run on combined aggregates when multiple sources are used. Sample in accordance with Tex-400-A.
LIME	Compliance with DMS-6350		During delivery to the project	Hydrated Lime: 1 per project Commercial Lime Slurry: each 200 tons of lime **(D)** Carbide Lime Slurry: each 100 tons of lime **(D)** Quick Lime: 1 per project	On projects requiring less than 50 tons, material from CST/M&P approved sources may be accepted on the basis of Producer's Certification without sampling.
RECLAIMED ASPHALT PAVEMENT (RAP), and RECYCLED AGGREGATE	Decantation	Tex-217-F, Part II	During stockpiling operations, from completed stockpile, or prior to mixing	Each 10,000 CY	Sample in accordance with Tex-400-A.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IA – ASPHALT STABILIZED BASE (Plant Mix)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
RECYCLED ASPHALT SHINGLES (RAS)	Decantation	Tex-217-F, Part III	During stockpiling operations, from completed stockpile, or prior to mixing	Each 10,000 CY	Sample in accordance with Tex-400-A.
ASPHALT BINDER	Compliance with Item 300 – Binder and Tack Coat		Sampled, tested and preapproved by CST/M&P. Take project samples when designated by the Engineer.	1 each for binder and tack coat per project, per grade, per source	Test at least one sample taken from the project. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
COMPLETE MIXTURE	Laboratory Density **(A)**	Tex-126-E	Plant Mix **(C)**	20,000 CY (25,000 tons)	Sample in accordance with Tex-222-F.
	Percent Asphalt **(A)**	Tex-236-F	Plant Mix **(C)**	Each 1,500 CY (2,000 tons) or days production	Determine asphalt content correlation factors for ignition oven at a minimum of one per project. Sample in accordance with Tex-222-F.
	Indirect Tensile Strength – Dry	Tex-226-F	Plant Mix	1 per project, per design	Sample in accordance with Tex-222-F.
	Moisture Susceptibility	Tex-530-C	As designated by the Engineer	1 per project, per design	This test may be waived, when shown on the plans. Sample in accordance with Tex-222-F.
ROADWAY	In-Place Air Voids **(A)**	Tex-207-F	Roadway cores, as designated by the Engineer **(C, D)**	Each 2,500 CY (3,000 tons) or days production	Not required for ordinary compaction or when air void requirements are waived. Sample in accordance with Tex-222-F.

TABLE IA – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Engineer will select any of these locations or any combinations thereof with the provision that at least one out of ten consecutive samples will be taken at the project site (from the windrow for treated and untreated bases and embankments when possible).
C	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Soils/flexible base: Vary sampling between stockpiling operations, completed stockpile, windrow, and project site. Vary the time of day sampling is performed. • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE II – SEAL COAT

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
AGGREGATE	Gradation (A)	Tex-200-F, Part I	Stockpile (At source or at point of delivery)	One each 1,000 CY	Rate may be reduced to one each 2,000 CY if the Engineer approves a contractor quality control plan. Sample in accordance with Tex-221-F.
	L. A. Abrasion (A)	Tex-410-A	Stockpile	1 per 20,000 CY	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample and test at 1 per 20,000 CY prior to use. Sample in accordance with Tex-221-F. (B)
	Magnesium Soundness (A)	Tex-411-A	Stockpile	1 per 20,000 CY	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample and test at 1 per 20,000 CY prior to use. Sample in accordance with Tex-221-F. (B)
	Surface Aggregate Classification (A)	Tex-612-J, Tex-411-A	Stockpile	1 per 20,000 CY	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample and test at 1 per 20,000 CY prior to use. Sample in accordance with Tex-221-F. (B)
	Pressure Slake (A)	Tex-431-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	Freeze Thaw (A)	Tex-432-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	Unit Weight	Tex-404-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	24 hr Water Absorption (A)	Tex-433-A	Stockpile	1 per 20,000 CY	Same as above. Required only for lightweight aggregate. Sample in accordance with Tex-221-F.
	Coarse Aggregate Angularity	Tex-460-A	Stockpile	1 per 20,000 CY	Only required for crushed gravel. Sample in accordance with Tex-221-F.
	Deleterious Material (A)	Tex-217-F, Part I	Stockpile	1 per 10,000 CY	Not required for lightweight aggregate. Sample in accordance with Tex-221-F.
	Decantation (A)	Tex-406-A	Stockpile	1 per 10,000 CY	Sample in accordance with Tex-221-F.
	Flakiness Index	Tex-224-F	Stockpile	Frequency as directed by the Engineer	Sample in accordance with Tex-221-F.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IA – ASPHALT STABILIZED BASE (Plant Mix)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (C)	FREQUENCY OF SAMPLING (D)	REMARKS
	Micro Deval	Tex-461-A	Stockpile	1 per project or as necessary for control	Compare result to published value listed on the current Material Producer List for BRSQC. Submit sample to CST/M&P for Soundness and L.A. Abrasion testing when results differ by more than 3% points, unless otherwise directed by the Engineer. Sample in accordance with Tex-221-F.
	White Rock Count	Tex-220-F	Stockpile		Required only for Limestone Rock Asphalt. Not required when CST/M&P provides inspection at the plant. Sample in accordance with Tex-221-F.
	Naturally Impregnated Bitumen Content	Tex-236-F	Stockpile		Required only for Limestone Rock Asphalt. Not required when CST/M&P provides inspection at the plant. Sample in accordance with Tex-221-F.
PRECOATED AGGREGATE	Asphalt Content	Tex-236-F	Stockpile	Frequency as directed by the Engineer when a target value is specified	Sample in accordance with Tex-221-F.
ASPHALT	Compliance with Item 300		Sampled, tested, and preapproved by CST/M&P. Take project samples when designated by the Engineer from the distributor or transport.	1 per project, per grade, per source	Sample in accordance with Tex-500-C. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.

TABLE II – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
C	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, belt sampling, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE III – HYDRAULIC CEMENT CONCRETE – STRUCTURAL (Classes: C, F, H, S, CO, K, LMC, or SS)

				PROJECT TESTS		
MATERIAL OR PRODUCT		**TEST FOR**	**TEST NUMBER**	**LOCATION OR TIME OF SAMPLING (D)**	**FREQUENCY OF SAMPLING (E)**	**REMARKS**
MINERAL AGGREGATE	COARSE AGGREGATE	Decantation **(B)**	Tex-406-A	From stockpile at concrete plant	Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Sieve Analysis **(A) (B)**	Tex-401-A		Each 1,000 CY of concrete (each source)	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Deleterious Materials **(B)**	Tex-413-A		1 per project or as necessary for control	Sample in accordance with Tex-400-A.
		Los Angeles Abrasion **(A) (B)**	Tex-410-A		Two, each source	Verify the value of the source, as listed on the current Material Producer list for CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. **(C)**
		5-cycle Magnesium Sulfate Soundness **(A) (B)**	Tex-411-A		Two, each source	Verify the value of the source, as listed on the current CRSQC, meets the project specifications. **(C)**
	FINE AGGREGATE	Sand Equivalent **(B)**	Tex-203-F	From stockpile at concrete plant	1 per project or as necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Organic Impurities **(B)**	Tex-408-A		1 per project, per source	Sample in accordance with Tex-400-A.
		Sieve Analysis **(A) (B)**	Tex-401-A		Each 1,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Fineness Modulus **(B)**	Tex-402-A		1 per project or as necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used. Test to confirm material variability when strength values are in question.
		Deleterious Material **(B)**	Tex-413-A		1 per project or as necessary for control	Sample in accordance with Tex-400-A. Test to confirm material variability when strength values are in question.
		Acid Insoluble Residue **(A) (B)**	Tex-612-J		Two, each source	Only for concrete subject to direct traffic. Verify the value of the source, as listed on the current CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. **(C)**
SILICA FUME		Compliance with DMS-4630 **(A)**		Railroad car, truck, bags or silos	1 per project, per class of concrete (For each type and brand)	Sample in accordance with Tex-320-D.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE III – HYDRAULIC CEMENT CONCRETE – STRUCTURAL (Classes: C, F, H, S, CO, K, LMC, or SS)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	REMARKS
METAKAOLIN	Compliance with DMS-4635 **(A)**		Railroad car, truck or silos	1 per project, per class of concrete (For each type and brand)	
MIX DESIGN	Compliance with Standard Specification Item 421.4.A		At source (if not approved)	Min. 1 design per class, per source	Verify if cement, fly ash, slag cement, and chemical admixture sources are listed on the Material Producer Lists. If not, sample and submit to CST/M&P for testing. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT). Sample in accordance with Tex-300-D for cement and in accordance with Tex-733-I for fly ash.
JOINT MATERIAL	Compliance with DMS-6300				Sample in accordance with Tex-500-C. Verify the source is listed on the Material Producer List for Joint Sealers. If not, sample and test prior to use in accordance with DMS-6310. **(C)**
CURING COMPOUND	Compliance with DMS-4650		Sampled at jobsite; tested by CST/M&P. See remarks.	When requested by CST	Only products listed on the Material Producer List for Concrete Curing Compounds will be allowed. When sample is requested by CST, sample in accordance with Tex-718-I. Ensure container has been agitated and mixed prior to sampling. **(C)**
EVAPORATION RETARDANTS	Compliance with DMS-4650				Only products listed on the Material Producer list for Evaporation Retardants will be allowed. **(C)**
REINFORCING STEEL	Compliance with the Std. Specifications & Spec. Provisions	As Specified			Only materials from CST/M&P approved sources listed on the Material Producer Lists for Reinforcing Steel Mills and Seven Wire Steel Strand will be allowed. **(C)**
MECHANICAL COUPLERS	Compliance with DMS-4510	Tex-743-I	Sampled at jobsite; Tested by CST/M&P	3 couplers per lot (500 couplers) for each type, model, bar size and grade	Only materials from CST/M&P approved sources listed on the Material Producer List for Mechanical Couplers will be allowed. **(C)**
LATEX	Compliance with DMS-4640 for concrete chemical admixtures		Sampled at jobsite.	Min. of 1 test per project	Sample in accordance with Tex-321-E.
EPOXY	Compliance with DMS-6100, unless otherwise specified		Sampled at jobsite if not pre-approved by CST/M&P.	1 per batch or shipment	Verify the source is listed on the Material Producer List for Epoxies and Adhesives. If not, sample and test prior to use in accordance with DMS-6100. Sample in accordance with Tex-734-I. **(C)**

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Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE III – HYDRAULIC CEMENT CONCRETE – STRUCTURAL (Classes: C, F, H, S, CO, K, LMC, or SS)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (D)	FREQUENCY OF SAMPLING (E)	REMARKS
CONCRETE	Compressive Strength (A)	Tex-418-A	At point of concrete placement	4 cylinders for each 60 CY per class, per day (For bridge railing and traffic railing, testing may be reduced to 4 cylinders per 180 CY per class regardless of days)	Sampling must be in accordance with Tex-407-A. Test two cylinders at 7 days, and if the average value is below the design strength as defined in Item 421 Table 8, test the remaining 2 cylinders at 28 days. If the average value of the 2 cylinders tested at 7 days meets the minimum design strength listed in Item 421 Table 8, the 2 remaining cylinders are not required to be tested.
CONCRETE	Slump	Tex-415-A		1 test per 4 strength specimens	Sample in accordance with Tex-407-A. Perform slump and temperature tests on the same load from which strength test specimens are made. Perform entrained air test only when entrained air concrete is specified in the plans. Check temperature of every load for bridge slabs and mass concrete placements. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Entrained Air (A)	Tex-416-A or Tex-414-A			
	Temperature of Concrete (A)	Tex-422-A			
	Slab Thickness and Depth of Reinforcement	Tex-423-A, Part II	During dry run and during concrete placement (Bridge decks and direct traffic culverts)	1 per span	Min 6–Max 18 locations per span

TABLE III – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	These Project Tests may be used for one or more projects being furnished concrete from the same plant during the same period.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Aggregates: Sample aggregates nearest the point of incorporation into the work. Vary sampling between stockpiling operations, completed stockpile, and if deemed necessary, railroad cars/trucks. Vary the time of day sampling is performed. • Concrete (structural): Always sample as near as practicable to the point of placement. For strength testing, vary the time of day or the number of truck from which the concrete is sampled. Test often for slump, air, and temperature to ensure the consistent control of the concrete production.
E	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IV – HYDRAULIC CEMENT CONCRETE – NON-STRUCTURAL CONCRETE (Classes: A, B, or E)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING (B)	FREQUENCY OF SAMPLING (C)	REMARKS
CONCRETE	Compressive Strength (A)	Tex-418-A	At point of concrete placement	2 cylinders per 180 CY, per class	Sampling must be in accordance with Tex-407-A. Strength will be determined by 7-day specimens.
MIX DESIGN	Compliance with the Standard Specification		At source if not approved.	Min. 1 design per class, per source	Verify if cement, fly ash, slag cement, and chemical admixture sources are listed on the Material Producer Lists. If not, sample and submit to CST/M&P for testing. Sample in accordance with Tex-300-D for cement and in accordance with Tex-733-I for fly ash. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT).
SILICA FUME	Compliance with DMS-4630		Railroad car, truck, bags or silos	1 test per project, per class (for each type and brand)	Sample in accordance with Tex-320-D.
METAKAOLIN	Compliance with DMS-4635		Railroad car, truck or silos	1 test per project, per class (for each type and brand)	

TABLE IV – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	For acceptance testing, especially that which directly determines payment for the Contractor, sampling personnel should provide randomness in sampling by avoiding patterned sampling routines. Examples of such sampling practices are as follows: • Concrete (miscellaneous): Always sample as near as practicable to the point of placement. For strength testing, vary the time of day or the number of truck from which the concrete is sampled.
C	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P or HES)

				PROJECT TESTS		
MATERIAL OR PRODUCT		TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	REMARKS
MINERAL AGGREGATE	COARSE AGGREGATE	Decantation	Tex-406-A	From stockpile at concrete plant	Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Sieve Analysis (A)	Tex-401-A		As necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Deleterious Materials	Tex-413-A		Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		L.A. Abrasion (A)	Tex-410-A		Two, each source	Verify the value of the source, as listed on the current CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. (C)
		5-Cycle Magnesium Sulfate Soundness (A)	Tex-411-A			
	FINE AGGREGATE	Sand Equivalent	Tex-203-F	From stockpile at concrete plant	Each 3,000 CY of concrete (Each source or combination of sources)	Sample in accordance with Tex-400-A. Test combined aggregate when used. No less than one per week's production.
		Organic Impurities	Tex-408-A		1 per project, per source	Sample in accordance with Tex-400-A.
		Sieve Analysis (A)	Tex-401-A		As necessary for control	Sample in accordance with Tex-400-A. Test combined aggregate when used.
		Fineness Modulus (B)	Tex-402-A			
		Deleterious Material (B)	Tex-413-A		Each 20,000 CY of concrete (each source)	Sample in accordance with Tex-400-A.
		Acid Insoluble (A)	Tex-612-J		1 per project, per source	Verify the value of the source, as listed on the current CRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-400-A. (C)
MIX DESIGN		Compliance with the Standard Specifications Item 421.4.A		At source, if not approved	Min. 1 design, per class, per source	Verify if cement, fly ash, ground granulated blast furnace slag, and admixture sources are listed on the Material Producer List. If not, sample and submit to CST/M&P for testing. Sample in accordance with Tex-300-D for cement and in accordance with Tex-733-I for fly ash. Water testing is contracted by the concrete supplier (commercial lab report to be reviewed by TxDOT).

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P or HES)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	REMARKS
SILICA FUME	Compliance with DMS-4630		Railroad car, truck, bags or silos	1 per project per class of concrete (For each type and brand)	Sample in accordance with Tex-320-D.
METAKAOLIN	Compliance with DMS-4635		Railroad car, truck or silos	1 per project per class of concrete (For each type and brand)	Sample in accordance with Tex-320-D.
JOINT MATERIAL	Compliance with DMS-6310		Sampled at jobsite if not sampled at source by CST/M&P; tested by CST/M&P. See remarks.	1 per batch or shipment	Sample in accordance with Tex-500-C. Sampling may be waived when the source is listed on the Material Producer List for Joint Sealers. **(C)**
CURING COMPOUND	Compliance with DMS-4650		Sampled at jobsite; tested by CST/M&P. See remarks.	When requested by CST	Only products listed on the Material Producer List for Concrete Curing Compounds will be allowed. When sample is requested by CST, sample in accordance with Tex-718-I. Ensure container has been agitated and mixed prior to sampling. **(C)**
EVAPORATION RETARDANTS	Compliance with DMS-4650				Only products listed on the Material Producer List for Evaporation Retardants will be allowed. **(C)**
REINFORCING STEEL	Compliance with the Std. Specifications & Spec. Provisions	As Specified			Only materials from CST/M&P approved sources listed on the Material Producer List for Reinforcing Steel Mills and Seven Wire Steel Strand will be accepted. **(C)**
MULTIPLE PIECE TIE BARS	Compliance with DMS-4515	Tex-712-I	Sampled at jobsite if not sampled at source by CST/M&P; tested by CST/M&P. See remarks.	Refer to Tex-711-I for sampling rates	Only materials from CST/M&P approved sources listed on the Material Producer List for Multiple Piece Tie-bars for Concrete Pavements will be allowed. Sample in accordance with Tex-734-I.
EPOXY	Compliance with DMS-6100		Sampled at jobsite if not pre-approved by CST/M&P. See remarks.	1 batch per shipment	Verify the source is listed on the Material Producer List for Epoxies and Adhesives. If not, sample and test prior to use in accordance with DMS-6100. Sample in accordance with Tex-734-I. **(C)**

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – HYDRAULIC CEMENT CONCRETE PAVEMENT (Classes: P or HES)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION OR TIME OF SAMPLING	FREQUENCY OF SAMPLING (D)	REMARKS
CONCRETE	Strength (A) (B)	Tex-448-A or Tex-418-A	At point of concrete placement	2 cylinders for every 10 contractor job control tests	Sample in accordance with Tex-407-A. When the contract requires the project testing to be by the Engineer, the frequency and job control testing will be in accordance with the item of work. Split sample verification testing used when contractor performs job control testing. When job control testing by the contractor is waived by the plans, the frequency of sampling will be one test (2 specimens) for each 3,000 SY of concrete or fraction thereof or per day and split sample verification testing will be waived. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Slump	Tex-415-A	At time and location strength specimens are made	1 test for every 10 contractor job control tests.	Sample in accordance with Tex-407-A. Slump is not required for slip-formed pavement. Perform slump and temperature tests on the same load from which the strength specimens are made. Perform entrained air test only when entrained air concrete is specified in the plans. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Entrained Air (A)	Tex-416-A or Tex-414-A			
	Temperature	Tex-422-A			
	Thickness	Tex-423-A	Center of paving machine	Every 500 feet	Methods other than Tex-423-A may be shown on the plans.
	Ride Quality Surface Test Type B (A)	Tex-1001-S	Final riding surface of travel lanes		Engineer may verify contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results from surface test Type A are not required to be reported.

This is a guide for minimum sampling and testing.

Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE V – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	When a project test does not meet the specified strength requirements and a reduced pay factor is assigned, document the analysis on the Letter of Certification of Materials Used.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, 346, 347 and 348)

(All testing as noted in Table VI may be waived for exempt production as defined by specification.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION (Per Design)**	**FREQUENCY OF SAMPLING (E)**	**REMARKS**
COARSE AGGREGATE	L. A. Abrasion **(A)**	Tex-410-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. **(C)**
	Magnesium Sulfate Soundness **(A)**	Tex-411-A			
	Surface Aggregate Classification **(A)**	Tex-499-A		1 per project, per source	
	Micro Deval	Tex-461-A		1 per project, per aggregate source	Not required when the Rated Source Soundness Magnesium loss is 15 or less as listed on the current published BRSQC. If testing is required, sample in accordance with Tex-221-F.
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per source, per design	Does not apply to Item 342. Sample in accordance with Tex-221-F. The timing of when the test is performed is at the discretion of the Engineer.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A)**		Sampled, tested and pre-approved by CST/M&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of one sample taken from the project. Sample tack coat at the distributor on the roadway in accordance with Tex-500C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
MIX DESIGN	Compliance with applicable specification	Tex-204-F	At source (if not approved)	Min 1 design per Mix Type and Asphalt Grade	Verify that aggregates, recycled asphalt pavement, recycled asphalt shingles, mineral filler, asphalt binder, anti-stripping additives, and warm mix systems are on the Material Producer List where applicable and that they meet project specification requirements. Project sampling and testing may be conducted on individual materials as necessary for control.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, 346, 347 and 348)

(All testing as noted in Table VI may be waived for exempt production as defined by specification.)

			PROJECT TESTS		PROJECT INDEPENDENT ASSURANCE TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION	FREQUENCY (Per Design)	LOCATION	FREQUENCY	REMARKS
COMPLETE MIXTURE	Asphalt Content (%) (A)	Tex-236-F	Engineer Truck Sample (D)	Minimum 1 per Lot			Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced (D)	1 per Sublot	Truck	1 per 10 Lots only if compactor is shared by Contractor and State	Sample in accordance with Tex-222-F. Does not apply to Item 342, "Permeable Friction Course." Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Gradation (A)	Tex-236-F	Engineer Truck Sample (D)	Minimum 1 per 12 Sublots (E)			Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Boil Test	Tex-530-C	Truck Sample	1 per project			Sample in accordance with Tex-222-F. Unless waived by the Engineer.
	Indirect Tensile Strength – Dry	Tex-226-F					Sample in accordance with Tex-222-F. Unless waived by the Engineer. Does not apply to Items 342, 346, and 348.
	Moisture Content	Tex-212-F, Part II	Engineer Truck Sample				Sample in accordance with Tex-222-F.
	Lab Molded Density (A)	Tex-207-F	Truck Sample (D)	1 per Sublot 1 per Lot for Item 347	Truck	1 per 10 Lots only if compactor is shared by Contractor and State	Sample in accordance with Tex-222-F. Contractor's required testing will be in accordance with specification requirements for the appropriate specification Item #.
	Drain Down Test (A)	Tex-235-F	Engineer Truck Sample	1 per project 1 per Lot for Item 342			Sample in accordance with Tex-222-F. Not required for Item 341 and Item 344.
	Hamburg Wheel Test (A)	Tex-242-F	Engineer Truck Sample	1 per project			Sample in accordance with Tex-222-F. Sample during production. Does not apply to Item 348.
	Overlay Test	Tex-248-F	Engineer Truck Sample	1 per project			Sample in accordance with Tex-222-F. Does not apply to Items 341, 344, and 348.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VI – ASPHALT CONCRETE PAVEMENT (Items 341, 342, 344, 346, 347, and 348)

(All testing as noted in Table VI may be waived for exempt production as defined by specification.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY (Per Design)**	**REMARKS**
ROADWAY	In-Place Air Voids **(A)**	Tex-207-F	Roadway **(D)**	2 cores per Sublot	Two cores taken per Sublot and averaged. Sample in accordance with Tex-222-F. Does not apply to Items 342, 347, and 348.
ROADWAY	Segregation Profile **(A)**	Tex-207-F, Part V	Roadway	1 per project	Not required when Contractor uses thermal imaging system. Does not apply to Items 342, 347, and 348.
	Joint Density **(A)**	Tex-207-F, Part VII	Roadway	1 per project	
	Thermal Profile	Tex-244-F	Immediately behind paver	1 per project	Not required when Contractor uses thermal imaging system.
	Ride Quality Test Type B **(A)**	Tex-1001-S	Final riding surface of travel lanes	1 per project	Engineer may verify Contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results for surface test Type A are not required to be reported.
	Permeability	Tex-246-F	Roadway	1 per project	Only applies to Items 342, 347, and 348.
FABRIC UNDERSEAL	Compliance with DMS-6220		Sampled, tested, and approved by CST/M&P		Sampling must be in accordance with Tex-735-I. Verify the source is listed on the current Material Producer List for Silt Fence, Filter Fabric, and Fabric Underseals. If not, sample and test prior to use in accordance with DMS-6220.

TABLE VI – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field. This letter is required only for Asphalt Content and/or Gradation when production of complete mixture is suspended as required by QC/QA specifications.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project. These project tests may be used for one or more projects furnishing hot mix with the same aggregate source.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Perform random sampling as specified in Tex-225-F, "Random Selection of Bituminous Mixture Samples."
E	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VII – ASPHALT CONCRETE PAVEMENT (Items 334)
(Refer to DMS-9210, "Limestone Rock Asphalt (LRA)," for testing requirements for Item 330.)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION**	**FREQUENCY (Per Design) (F)**	**REMARKS**
COARSE AGGREGATE	L. A. Abrasion **(A)**	Tex-410-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. **(D)**
	Magnesium Sulfate Soundness **(A)**	Tex-411-A			
	Micro Deval	Tex-461-A			Sample in accordance with Tex-221-F. Testing frequency may be reduced or eliminated based on a satisfactory test history.
	Surface Aggregate Classification **(A)**	Tex-499-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. SiteManager Quality Monitoring test documentation is accomplished by attaching an approved mix design.
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per source	Sample in accordance with Tex-221-F. The timing of when the test is performed is at the discretion of the Engineer.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A) (C)**		Sampled, tested and pre-approved by CST/M&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of one sample from production. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
MIX DESIGN	Compliance with applicable specification	Tex-204-F	At source (if not approved)	Min 1 design per Mix Type and Asphalt Grade	Verify that aggregates, recycled asphalt pavement, recycled asphalt shingles, mineral filler, asphalt binder, anti-stripping additives, and warm mix systems are on the Material Producer List where applicable and that they meet project specification requirements. Project sampling and testing may be conducted in individual materials as necessary for control.
COMPLETE MIXTURE	Asphalt Content (%) **(A)**	Tex-236-F	Engineer Truck Sample **(E)**	Minimum of 1 per 5,000 tons	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced **(E)**	1 per 5,000 tons	Sample in accordance with Tex-222-F.
	Gradation **(A)**	Tex-236-F	Truck Sample	Minimum 1 per 5,000 tons	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Boil Test	Tex-530-C		1 per project	Sample in accordance with Tex-222-F. The timing of when the test is performed is at the discretion of the Engineer.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VII – ASPHALT CONCRETE PAVEMENT (Items 334) (Refer to DMS-9210, "Limestone Rock Asphalt (LRA)," for testing requirements for Item 330.)					
			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION	FREQUENCY (Per Design) (F)	REMARKS
COMPLETE MIXTURE	Moisture Content	Tex-212-F, Part II	Truck Sample	1 per 5,000 tons	Sample in accordance with Tex-222-F. Performed by CST/M&P at the point of production for payment calculations.
	Hydrocarbon-Volatile Content	Tex-213-F		1 per 5,000 tons	Sample in accordance with Tex-222-F. The timing of when the test is performed is at the discretion of the Engineer.
	Lab Molded Density (A)	Tex-207-F		1 per 5,000 tons	Sample in accordance with Tex-222-F.
	Hveem Stability (A)	Tex-208-F		1 per 5,000 tons	Sample in accordance with Tex-222-F. The timing of when the test is performed is at the discretion of the Engineer.
ROADWAY	Ride Quality Test Type B (A)	Tex-1001-S	Final riding surface of travel lanes		Engineer may verify Contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results from surface test Type A are not required to be reported.

TABLE VII – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project.
C	Or as called for in the Specifications.
D	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
E	Perform random sampling as specified in Tex-225-F, "Random Selection of Bituminous Mixture Samples."
F	Each test performed that is based on a quantity of material is considered "or fraction thereof" for calculating number of tests.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VIII – ASPHALT CONCRETE PAVEMENT (Item 340)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION	FREQUENCY	REMARKS
COARSE AGGREGATE	L. A. Abrasion (A)	Tex-410-A	Stockpile (B)	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer List for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. (C)
	Magnesium Sulfate Soundness (A)	Tex-411-A			
	Micro Deval	Tex-461-A	Stockpile (B)	1 per project, per source	Sample in accordance with Tex-221-F. Testing frequency may be reduced or eliminated based on a satisfactory test history.
	Surface Aggregate Classification (A)	Tex-499-A	Stockpile (B)	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC, meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. (C)
COMBINED AGGREGATE	Sand Equivalent	Tex-203-F	Stockpiles, hot bins or feeder belts	1 per project, per design	Sample in accordance with Tex-221-F.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat (A)		Sampled, tested and pre-approved by CST/M&P. Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of 1 sample taken from the project. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at hot mix plant in accordance with Tex-500-C, Part II. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
MIX DESIGN	Compliance with applicable specification	Tex-204-F	At source (if not approved)	Min. 1 design per Mix Type and Asphalt Grade	Verify that aggregates, recycled asphalt pavement, recycled asphalt shingles, mineral filler, asphalt binder, anti-stripping additives, and warm mix systems are on the Material Producer List where applicable and that they meet project specification requirements. Project sampling and testing may be conducted in individual materials as necessary for control.
COMPLETE MIXTURE	Asphalt Content (%)	Tex-236-F	Truck Sample (D)	Minimum of 1 per day	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Voids in Mineral Aggregates (VMA)	Tex-207-F	Truck Sample Plant Produced (D)	1 per day	Sample in accordance with Tex-222-F.
	Gradation (A)	Tex-236-F	Truck Sample	Minimum 1 per day	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Boil Test	Tex-530-C		1 per project	Sample in accordance with Tex-222-F. Unless waived by the Engineer.
	Indirect Tensile Strength – Dry	Tex-226-F		1 per project, per design	Sample in accordance with Tex-222-F. Unless waived by the Engineer.

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE VIII – ASPHALT CONCRETE PAVEMENT (Item 340)

			PROJECT TESTS		
MATERIAL OR PRODUCT	TEST FOR	TEST NUMBER	LOCATION	FREQUENCY	REMARKS
COMPLETE MIXTURE	Lab Molded Density (A)	Tex-207-F	Truck Sample	1 per day	Sample in accordance with Tex-222-F.
	Hamburg Wheel Tracker (A)	Tex-242-F		1 per project	Sample in accordance with Tex-222-F. Sample during production.
ROADWAY	Air Voids (A)	Tex-207-F	Selected by the Engineer (D)	1 per day (2 Cores)	Sample in accordance with Tex-222-F.
	Ride Quality Test Type B (A)	Tex-1001-S	Final riding surface of travel lanes		Engineer may verify Contractor's results for surface test Type B. For traditional design-bid-build TxDOT projects, CST has contracted with TTI to perform random ride verification at 10% frequency. Results from surface test Type A are not required to be reported.
FABRIC UNDERSEAL	Compliance with DMS-6220		Sampled, tested, and approved by CST/M&P		Sample in accordance with Tex-735-I. Verify the source is listed on the current Material Producer List for Silt Fence, Filter Fabric, and Fabric Underseals. If not sample and submit to CST/M&P for testing prior to use in accordance with DMS-6220.

TABLE VIII – FOOTNOTES

A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field. This letter is required only for Asphalt Content and/or Gradation when production of complete mixture is suspended as required by QC/QA specifications.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project. These project tests may be used for one or more projects furnishing hot mix with the same aggregate source.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Perform random sampling as specified in Tex-225-F, "Random Selection of Bituminous Mixture Samples."

This is a guide for minimum sampling and testing.
Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IX – MICROSURFACING (Item 350)

			PROJECT TESTS		
MATERIAL OR PRODUCT	**TEST FOR**	**TEST NUMBER**	**LOCATION OF SAMPLING**	**FREQUENCY (Per Design)**	**REMARKS**
AGGREGATE	5-Cycle Magnesium Sulfate Soundness **(A)**	Tex-411-A	Stockpile **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing at 1 per project, per source. **(C)**
	Gradation	Tex-200-F, Part II		1 per project, per source	Sample in accordance with Tex-221-F.
	Crushed Face Count	Tex-460-A		1 per project, per source	Sample in accordance with Tex-221-F.
	Acid Insoluble **(A)**	Tex-612-J		1 per project, per source	Verify the value of the source, as listed on the current BRSQC, meets the project specifications. If not, sample and submit to CST/M&P for testing prior to use in accordance with Tex-499-A. Sample in accordance with Tex-221-F. **(C)**
	Surface Aggregate Classification	Tex-499-A	Stockpile, or BRSQC **(B)**	1 per project, per source	Verify the published value of the source, as listed on the current Material Producer list for BRSQC meets the project specifications. If not, sample in accordance with Tex-221-F and submit to CST/M&P for testing at 1 per project, per source. **(C)**
COMBINED BLEND	Sand Equivalent	Tex-203-F	Stockpile **(B)**	1 per project, per source	Sample in accordance with Tex-221-F.
ASPHALT BINDER	Compliance with Item 300 Binder & Tack Coat **(A)**		Sampled, tested, and pre-approved by CST/M&P. Project test sampled at the Plant for Binder & Road for Tack Coat	1 each for binder and tack coat per project, per grade, per source	Test a minimum of one sample during production. Sample tack coat at the distributor on the roadway in accordance with Tex-500-C, Part III. Sample binder at microsurfacing machine in accordance with Tex-500-C, Part III. Binder should arrive on the project pre-approved. If not pre-approved, sample binder before use.
CEMENT	Compliance with DMS-4600				Verify the source is listed on the current Material Producer List for Cement. If not, sample and submit to CST/M&P for testing prior to use in accordance with DMS-4600.
COMPLETE MIX	Asphalt Content	Tex-236-F	During production	1 per day	Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven using Tex-236-F at a minimum of one per project.
	Gradation	Tex-200-F, Part II Tex-236-F			Sample in accordance with Tex-222-F. Determine correlation factors for ignition oven use at a minimum of one per project.

This is a guide for minimum sampling and testing.

Testing frequency may need to be increased for high material variability or when test results approach specification limits.

TABLE IX – FOOTNOTES	
A	When this project acceptance test fails but the product is accepted, document the reasons for acceptance on the Letter of Certification of Materials Used or in the SiteManager Remarks field. This letter is required only for Asphalt Content and/or Gradation when production of complete mixture is suspended as required by QC/QA specifications.
B	Sampling may be performed at the plant, quarry, or both. Aggregate properties may be re-tested at any time during the project. These project tests may be used for one or more projects furnishing hot mix with the same aggregate source.
C	Attach the corresponding QM test report for SiteManager projects to satisfy project sampling and testing requirements.
D	Each test performed that is based on a quantity of material is considered “or fraction thereof” for calculating number of tests.

APPENDIX C

AASHTO ACCREDITED LABORATORIES

AASHTO Accredited CMT Laboratories in Texas

* Directory of accredited laboratories and scope of testing is maintained on the AASHTO Materials Reference Laboratory website at: http://www.amrl.net. Laboratory must be accredited for each specific test performed.

WILLIAMSON COUNTY

PRECINCT NUMBER 3

SOUTHWEST BYPASS: SEGMENT 2

NET LENGTH OF ROAD OVERLAY = 1,852.93 FT (0.351 MILES)
NET LENGTH OF NEW ROADWAY = 4,897.55 FT (0.928 MILES)
NET LENGTH OF NEW BRIDGE = 720.00 FT (0.136 MILES)
NET LENGTH OF EXISTING BRIDGE = 914.02 FT (0.173 MILES)
NET LENGTH OF PROJECT = 8,384.50 FT (1.588 MILES)

LIMITS: FROM IH 35 SBFR TO RM 2243 (LEANDER ROAD)

RM 2243 (LEANDER ROAD)

CSJ: 2103-01-034

NET LENGTH OF ROAD OVERLAY = 450.00 FT (0.085 MILES)

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		NO.
6			
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	AUS	WILLIAMSON	1
CONTROL	SECTION	JOB	
2103	01	034	

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION NOT REQUIRED

ROADWAY	CLASSIFICATION	DESIGN SPEED
SW BYPASS WBFR	MAJOR URBAN COLLECTOR	50 MPH
RM 2243	MINOR ARTERIAL	55 MPH

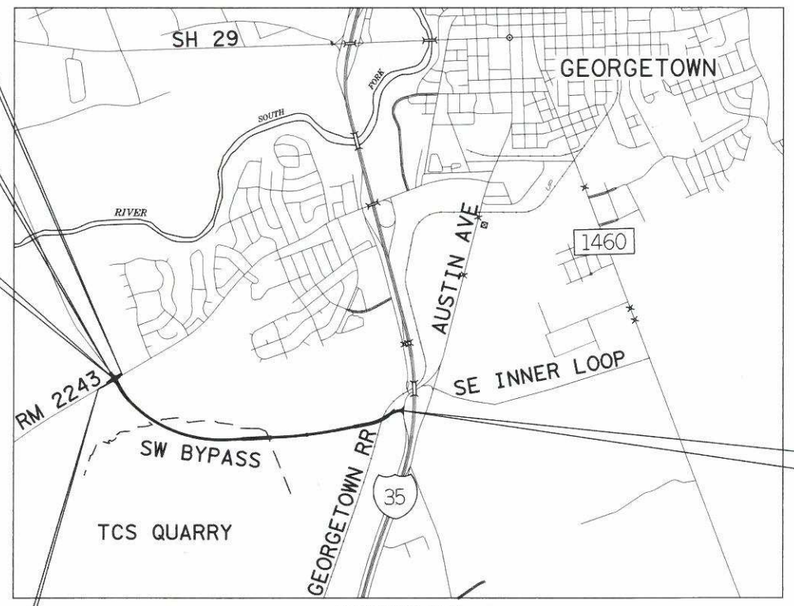
ROADWAY	ADT (2019)	ADT (2035)
SW BYPASS WBFR	20,300	68,500
ROADWAY	ADT (2015)	ADT (2035)
RM 2243	10,549	21,100

END PROJECT
STA 483+00.00
CSJ: 2103-01-034

END PROJECT
STA. 12+24.00

℄ WBFR_S2_CL STA 451+47.30=
℄ RM 2243 STA 480+72.74=
℄ RAMPNB2 STA 10+32.63, 5' RT

FOR THE CONSTRUCTION OF INTERIM TWO-WAY ROADWAY (FUTURE WESTBOUND FRONTAGE RD) CONSISTING OF GRADING, FLEX BASE, ASPHALT PAVEMENT, RETAINING WALLS, STORM SEWER, CULVERTS, EROSION CONTROL, WATER QUALITY FEATURES, AND BRIDGE STRUCTURE.



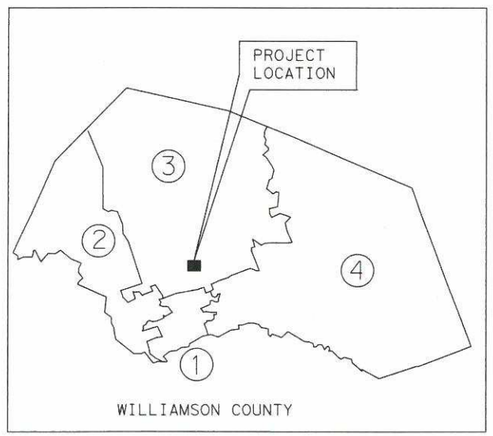
VICINITY MAP
N.T.S.

BEGIN PROJECT
STA. 68+36.97

BEGIN PROJECT
STA 475+06.85
CSJ: 2103-01-034

EXCEPTIONS: NONE
EQUATIONS: ℄ WBFR_I_CL STA 394+90.00 7.50 LT = ℄ WBFR_S2_CL STA 394+90.00
STA 72+93.69 BK= STA 372+93.02 AH
BRIDGE: STA 404+50.00 TO 411+70.00
WATERSHED: BRAZOS RIVER BASIN
AREA OF CONSTRUCTION DISTURBANCE: 56.07 ACRES

REQUIRED SIGNS SHALL BE PLACED IN ACCORDANCE WITH STANDARD SHEETS BC(1)-14 THRU BC(12)-14 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".



TxDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES ADOPTED ON NOVEMBER 1, 2014 AND ALL APPLICABLE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS AS INDICATED IN THE BID DOCUMENTS SHALL GOVERN ON THIS PROJECT.

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

PREPARED BY:
HDR ENGINEERING, INC.
TBPE FIRM NO. F-754

JEFFREY L. CURREN
PROJECT MANAGER
3/23/18
DATE

STATE OF TEXAS
JEFFREY L. CURREN
84227
LICENSED
PROFESSIONAL ENGINEER

WILLIAMSON COUNTY
1848

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APPROVED BY:
WILLIAMSON COUNTY

DAN A GATTIS — DATE 3/27/18
WILLIAMSON COUNTY JUDGE

VALERIE COVEY — DATE 3/27/18
WILLIAMSON COUNTY COMMISSIONER
PRECINCT 3

APPROVED BY:
HNTB CORPORATION

RICHARD L RIDINGS, PE — DATE 3/27/18
ROAD BOND MANAGEMENT TEAM

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/22/2018
TIME: 11:05:23 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:4000

SHEET NO.	GENERAL
1	TITLE SHEET
2 - 3	INDEX OF SHEETS
4 - 5	PROJECT LAYOUT
6 - 12	TYPICAL SECTIONS
13 - 13K	GENERAL NOTES
14 - 22	SUMMARY OF QUANTITIES
23 - 24	SUMMARY OF SMALL SIGN
25 - 26	BORE HOLE LAYOUT
27 - 29	BORING LOGS

SHEET NO.	TRAFFIC CONTROL PLANS
30	TRAFFIC CONTROL PLAN - SBFR I-35
31 - 32	TRAFFIC CONTROL PLAN - RM 2243
* 33 - 44	BC(1)-14 THRU BC(12)-14
* 45	TCP(1-3)-18
* 46	TCP(1-5)-18

SHEET NO.	ROADWAY PLANS
47 - 47A	SURVEY CONTROL
48	SW BYPASS PANEL LAYOUT
49 - 50	ALIGNMENT DATA
51	REMOVAL PLAN
52 - 59	PLAN AND PROFILE - WBFR
60	PLAN AND PROFILE - RM 2243
61	INTERSECTION DETAIL - RM 2243
62	INTERSECTION DETAIL POINT TABLE
63	ISLAND DETAIL - RM 2243
# 64	BED-14
# 65	CCCG-12
# 66	CONCRETE DRIVEWAYS, SIDEWALKS AND RIPRAP MEDIANS (AUSTIN DISTRICT)
# 67	CONCRETE RIPRAP AND VEGETATIVE CONTROL (AUSTIN DISTRICT)
# 68	GF(31)-14
# 69	GF(31) LS-17
# 70	GF(31) TR-14
# 71	SGT (8) 31-17
# 72	SGT (8S) 31-17
# 73 - 76	PED-18

SHEET NO.	RETAINING WALLS
77	RETAINING WALL RW-05 PLAN AND PROFILE
78	RETAINING WALL RW-06 PLAN AND PROFILE
# 79	RW(MSE)DD
# 80	RM(EM)
# 81 - 82	RW(MSE)
83 - 84	RW(TRF)(MOD)
# 85	CRR

SHEET NO.	FENCING AND GRADING
86 - 87	GRADING ALIGNMENT DATA
88 - 93	FENCING AND GRADING PLAN
94	GRADING POINTS TABLE
95 - 99	ROCK CUT CONTROL POINTS
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102	GRADING DETAILS

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105	HYDRAULIC COMPUTATION
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109	DRAINAGE CULVERT NO.6 LAYOUT
110	DRAINAGE CULVERT NO.7 LAYOUT
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113 - 114	DRAINAGE CULVERT NO.8B LAYOUT
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** 118 - 119	SRR
** 120	CH-FW-0
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129 - 130	ABUTMENT NO. 7
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132	INTERIOR BENT NOS. 3-4
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136	360.00' PRESTRESSED CONCRETE GIRDER UNIT 2
137	IGND(MOD)
% 138	BAS-A
% 139 - 140	BL(MOD)
% 141	CSAB
% 142 - 143	FD
% 144 - 145	IGD
% 146 - 148	IGEB
% 149 - 150	IGMS
151	IGTS(MOD)
% 152 - 153	MEBR(C)
% 154 - 157	PCP
% 158	PCP-FAB
% 159 - 160	PMDF
% 161 - 162	SEJ-A
% 163 - 164	SSTR

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

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
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

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STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
LICENSED
PROFESSIONAL ENGINEER

Phaisarn Cwatanaphol, P.E.

03/26/2018

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STATE OF TEXAS
TYLER W. BRENDLINGER
122092
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

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

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

INDEX OF SHEETS

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	2
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	
CHECK				
JC				

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	SHEET NO.	TRAFFIC SIGNAL
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	166	SW BYPASS AND RM 2243 PROPOSED (INTERIM) SIGNAL LAYOUT
	167	SW BYPASS AND RM 2243 CONDUIT AND CONDUCTOR SCHEDULES (INTERIM)
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	172	SW BYPASS AND RM 2243 ELEVATIONS (ULTIMATE)
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$	175	SMA-80(1)-12
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$	177	ED(1)-14
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$	179	ED(3)-14
$	180	ED(4)-14
$	181	ED(5)-14
$	182	ED(6)-14
$	183	ED(8)-14
$	184	ED(9)-14
$	185	ED(12)-14
$	186	SNS-95
$	187	SMA-80(2)-12
$	188	MA-C-12
$	189	MA-C(ILSN)-12
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$	191	LUM-A-12
$	192	CFA-12
$	193	TS-CF-04
$	194	MA-DPD-12
$	195	MAD-14(AUS)
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	202	ILLUMINATION UNDERPASS LAYOUTS
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	205	ILLUMINATION SCHEMATICS
##	206	RID(1)-17
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##	209	RIP(1)-17
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	214 - 216	STRIPING REMOVAL PLAN - RM 2243
	217	STRIPING REMOVAL PLAN - RAMPNB2
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	219 - 226	SIGNING AND STRIPING - WBFR
	227 - 229	SIGNING AND STRIPING - RM 2243
	230	SIGNING DETAIL WBFR
*	231	D&OM(3)-15B
*	232	D&OM(5)-15
*	233	D&OM (VIA)-15
*	234	PM(1)-12
*	235	PM(2)-12
*	236	PM(3)-12
*	237	SMD (GEN)-08
*	238	SMD(SLIP-1)-08
*	239	SMD(SLIP-2)-08
*	240	TSR(4)-13
*	241	SMD(BR-1)-14
*	242	SMD(BR-2)-14
*	243	SMD(BR-3)-14
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	246	EPIC
	247	TCEQ REQUIREMENTS FOR RECHARGE ZONE OF THE EDWARDS AQUIFER
	248	TEMPORARY EROSION GENERAL NOTES
	249 - 256	TEMPORARY EROSION CONTROL PLAN
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*	268	TREE PROTECTION STANDARD

SHEET NO.	UTILITIES
269 - 276	UTILITY LAYOUT

XS01 - XS127 CROSS SECTIONS

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

$ 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
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER

22 MAR 2018

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
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

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NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

INDEX OF SHEETS

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	3
JW	2103	01	034	
CHECK				
JC				

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FILE: \

I-35 SBFR CENTERLINE "℄ SBFR"
POINT NO: 11
NORTHING: 10196145.3564
EASTING: 3129925.6570
IH 35 SBFR
EXISTING BUILDING TO BE REMOVED UPON PROJECT COMPLETION
POINT NO: 70049
NORTHING: 10195085.900
EASTING: 3129365.240
℄ SBFR
STA 911+95.41
20.25' LT
POINT NO: 804
NORTHING: 10195354.5847
EASTING: 3129320.6403
℄ SBFR
STA 909+25.04
22.44' LT
END 1.5" OVERLAY AT APPROACH SLAB STA 372+95.48
PC 910+00.56
PT 909+21.32
S11°59'43.87"W
910+00
℄ WBFR_I_CL STA 68+29.29 = ℄ SBFR STA 907+41.47
S84°33'23"W
PC 372+93.02
POB 68+00.00
LIMITS OF INNER SPACE CAVERN
BEGIN PROJECT STA 68+36.97
BEGIN 1.5" OVERLAY
70+00
PC 69+17.80
S44°38'15.07"W
370+00
PI 724+41.77
PC 731+04.92
905+00
ROW
GRR ROW
POB 734+25.00
SPUR CENTERLINE "WBFR_I_SPUR"
POINT NO: 803
NORTHING: 10195507.4031
EASTING: 3129135.8664
℄ WBFR_I_CL
STA 69+80.58
7.52' LT
LAUBACH TRUSTEES
POINT NO: 1575
NORTHING: 10195785.8711
EASTING: 3129405.9802
℄ SBFR
STA 904+51.69
48.46' LT

J-D-P PROPERTIES
ROW
GEORGETOWN RAILROAD
POINT NO: 5845
NORTHING: 10194843.3400
EASTING: 3128518.8500
℄ WBFR_I_CL
STA 377+60.35
348.95' LT
ENTERPRISED ESMT (TYP)
POINT NO: 300
NORTHING: 10195032.0400
EASTING: 3128439.0750
℄ WBFR_I_CL
STA 377+88.99
147.01' LT
POINT NO: 5843
NORTHING: 10195161.4000
EASTING: 3128609.9300
℄ WBFR_I_CL
STA 376+04.64
72.80' LT
SEGMENT 1 WBFR CENTERLINE "WBFR_I_CL"
EQUATION:
STA 72+93.69 BK =
STA 372+93.02 AH
375+00
380+00
ENTERPRISE ESMT
ENTERPRISE ESMT
PT 378+20.38
BEGIN 1.5" OVERLAY AT APPROACH SLAB STA 382+09.50
POINT NO: 302
NORTHING: 10194970.1064
EASTING: 3128134.6716
℄ WBFR_I_CL
STA 380+95.75
149.25' LT
POINT NO: 303
NORTHING: 10194990.8796
EASTING: 3127876.3254
STA 383+45.39
79.56' LT
POINT NO: 304
NORTHING: 10194963.4544
EASTING: 3127775.5816
℄ WBFR_I_CL
STA 384+49.51
87.25' LT
POINT NO: 70050
NORTHING: 10193849.920
EASTING: 3129071.799
EXISTING FEATURE PROTECTION FENCE
POINT NO: 306
NORTHING: 10194840.7437
EASTING: 3127451.0929
℄ WBFR_I_CL
STA 387+90.26
146.15' LT
SEGMENT 1 FEATURE F1
EXISTING FEATURE PROTECTION FENCE
POINT NO: 305
NORTHING: 10194878.8912
EASTING: 3127660.7608
℄ WBFR_I_CL
STA 385+78.36
148.35'
SEGMENT 1 FEATURE F3
SEGMENT 1 FEATURE F2
N78°59'55.05"E
SW BYPASS WBFR
385+00
390+00
395+00
DRAINAGE ESMT
PC 387+03.24
POINT NO: 307
NORTHING: 10194824.9095
EASTING: 3127282.4697
℄ WBFR_I_CL
STA 389+56.86
132.22' LT
THE TEXAS CRUSHED STONE CO.
POINT NO: 310
NORTHING: 10194748.8900
EASTING: 3126706.0275
℄ WBFR_I_CL
STA 395+31.33
126.47' LT
400' ROW
SEGMENT 2 WBFR CENTERLINE "WBFR_S2_CL"
END 1.5" OVERLAY
BEGIN FULL DEPTH CONSTRUCTION
℄ WBFR_I_CL STA 394+90.00
7.50 LT =
℄ WBFR_S2_CL STA 394+90.00
SEGMENT 1 CONSTRUCTION BY OTHERS
POINT NO: 309
NORTHING: 10194769.6577
EASTING: 3126868.2736
℄ WBFR_I_CL
STA 393+69.68
125.53
MATCH LINE STA 395+50

NOTES:
HORIZONTAL DATUM IS BASED ON THE NAD-83 (1993) TEXAS CENTRAL (4203) STATE PLANE SYSTEM. COORDINATES ARE SURFACE VALUES BASED ON A COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00014.

VERTICAL DATUM IS NAVD-88.

SEE SHEET 47 AND 48 FOR CONTROL POINTS

0 100 200 300 400
SCALE IN FEET

N

MATCH LINE STA 395+00
STA 407+10.00
339.50 LT
NORTHING: 10194447.76
EASTING: 3125533.65
STA 407+90.00
339.50 LT
NORTHING: 10194443.80
EASTING: 3125453.75
EXISTING LIMITS OF QUARRY
ROW
CITY OF GEORGETOWN OVERHEAD TRANSMISSION LINES
POINT NO: 531
NORTHING: 10194700.5101
EASTING: 3126309.4578
℄ WBFR_I_CL
STA 399+25.83
136.90' LT
TEMPORARY HAUL ROAD BY OTHERS
SEGMENT 2 WBFR CENTERLINE "WBFR_S2_CL"
PROPOSED CULVERT NO.6
STA 396+00.00
BEGIN BRIDGE
STA 404+50.00
80'
PROPOSED TEXAS CRUSHED STONE ACCESS ROUTE (ROW CROSSING)
POB 211+00.00
END BRIDGE
STA 411+70.00
400' ROW
400+00
SW BYPASS WBFR
405+00
S87°09'58.90"W
410+00
415
211+00
212+00
213+00
214+00
215
PROPOSED BRIDGE
RETAINING WALL RW-05
STA 407+90.00
60.50 RT
NORTHING: 10194843.31
EASTING: 3125433.98
STA 407+10.00
60.50 RT
NORTHING: 10194847.27
EASTING: 3125513.88
PT 402+15.25
UTILITY ESMT
UTILITY ESMT
POINT NO: 530
NORTHING: 10194891.1399
EASTING: 3126325.4820
℄ WBFR_I_CL
STA 398+94.61
57.88' RT
100' CITY OF GEORGETOWN ESMT
THE TEXAS CRUSHED STONE CO.
EXISTING LIMITS OF QUARRY
MATCH LINE STA 415+00

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

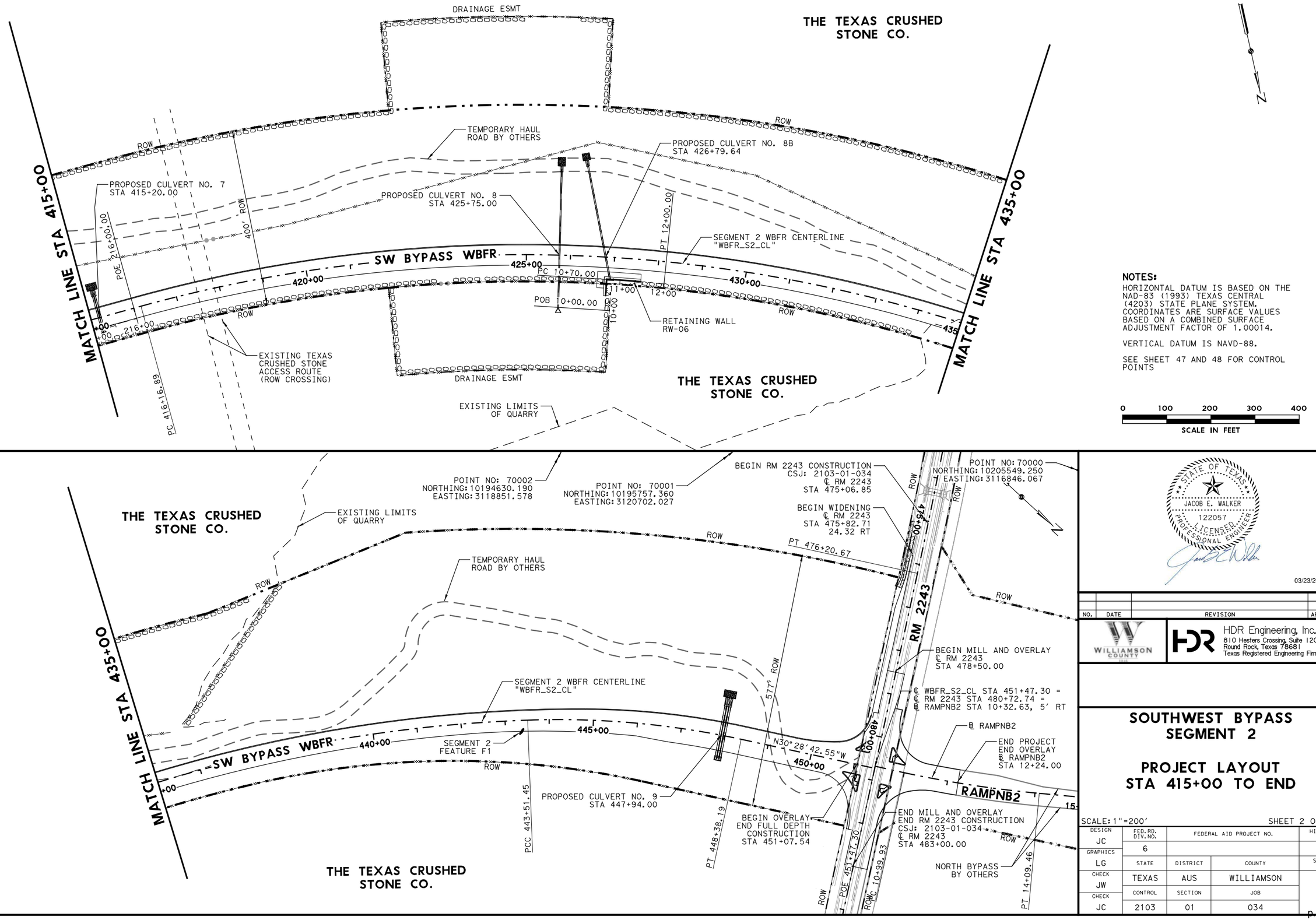
SOUTHWEST BYPASS SEGMENT 2

PROJECT LAYOUT BEGIN TO STA 415+00

SCALE: 1"=200'
SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	4
CHECK				
JC				

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NOTES:

HORIZONTAL DATUM IS BASED ON THE NAD-83 (1993) TEXAS CENTRAL (4203) STATE PLANE SYSTEM. COORDINATES ARE SURFACE VALUES BASED ON A COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00014.

VERTICAL DATUM IS NAVD-88.

SEE SHEET 47 AND 48 FOR CONTROL POINTS

0 100 200 300 400
SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

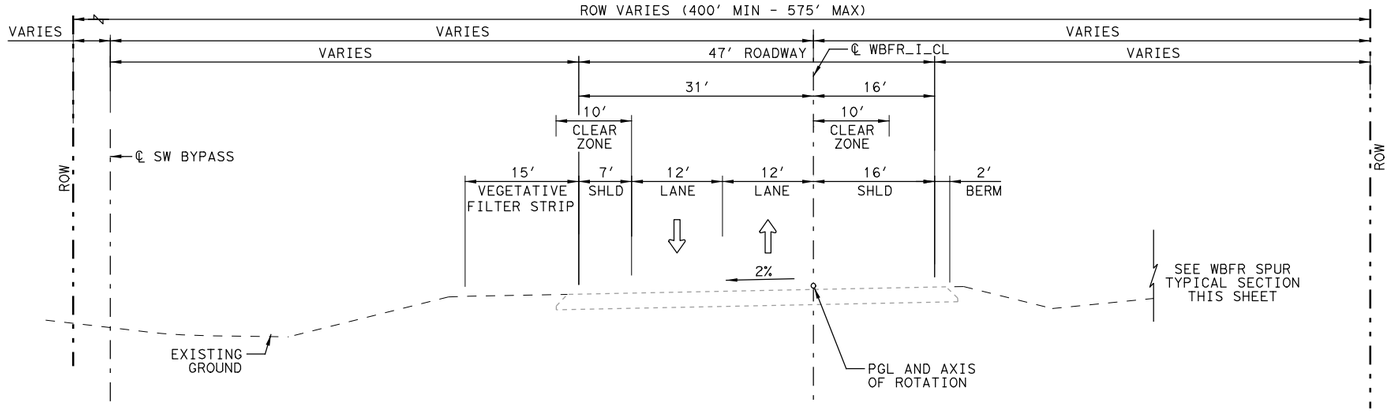
SOUTHWEST BYPASS SEGMENT 2

PROJECT LAYOUT STA 415+00 TO END

SCALE: 1"=200' SHEET 2 OF 2

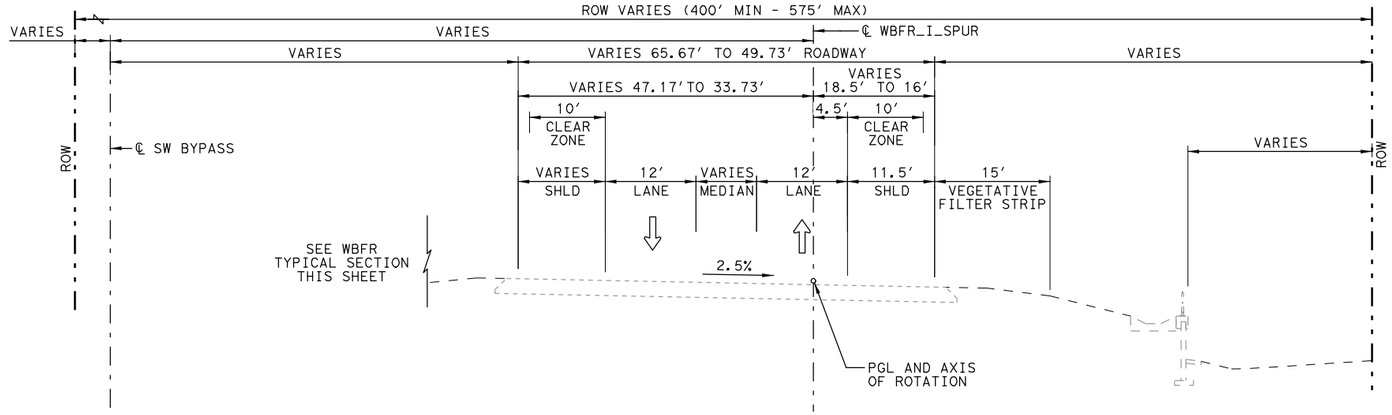
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JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	5
JW	2103	01	034	
CHECK				
JC				

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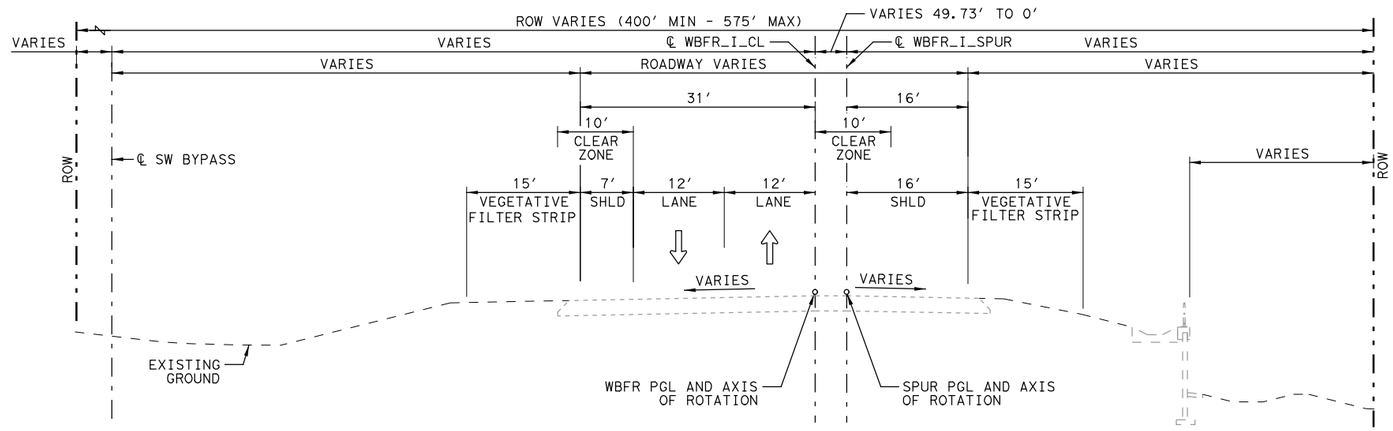
EXISTING SW BYPASS WBFR: SEGMENT 1

STA 68+36.97 TO STA 70+60.74



EXISTING SW BYPASS WBFR SPUR: SEGMENT 1

STA 368+20.00 TO STA 370+62.03



EXISTING SW BYPASS WBFR: SEGMENT 1

STA 70+60.74 TO STA 372+95.48
STATION EQUATION: STA 72+93.69 BK = STA 372+93.02 AHD
SPUR STA 370+62.03 TO STA 372+95.48
STA 372+95.48 TO STA 382+09.50 (BRIDGE LIMITS)

GENERAL NOTES:

1. THE HMAC TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE.
2. ALL LOCATIONS OF VEGETATION FILTER STRIPS ARE TO HAVE SIDE SLOPES NO STEEPER THAN 5:1.
3. 15' VEGETATIVE FILTER STRIP MEASURED FROM OUTER MOST EDGE OF PAVED SURFACE INCLUDING MOW STRIP.
4. SEE EROSION CONTROL SHEETS FOR TOPSOIL AND SEEDING LIMITS.
5. SEE RETAINING WALL LAYOUT SHEETS FOR WALL LIMITS.
6. 2' BERM AND MOW STRIP CROSS-SLOPES TO MATCH ROADWAY CROSS-SLOPES UNLESS OTHERWISE NOTED.
7. SEE GRADING PLAN FOR SITE GRADING AND DITCH FLOW LINES.
8. BACKFILL NEW PAVEMENT EDGE WITH TOPSOIL AND SEEDING. COST TO BE SUBSIDIARY TO OVERLAY BID ITEMS.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

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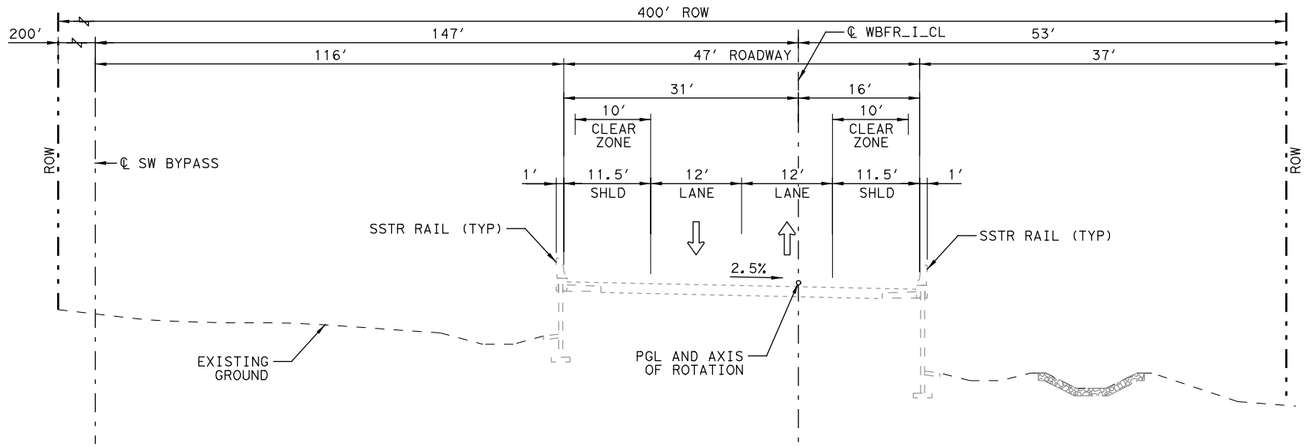
SOUTHWEST BYPASS SEGMENT 2

TYPICAL SECTIONS

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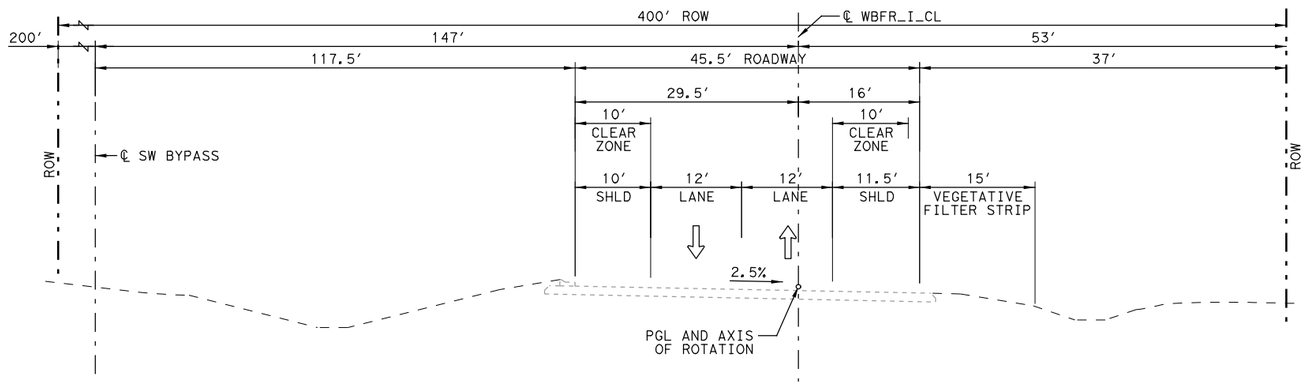
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	6
JW	2103	01	034	
CHECK				
JC				

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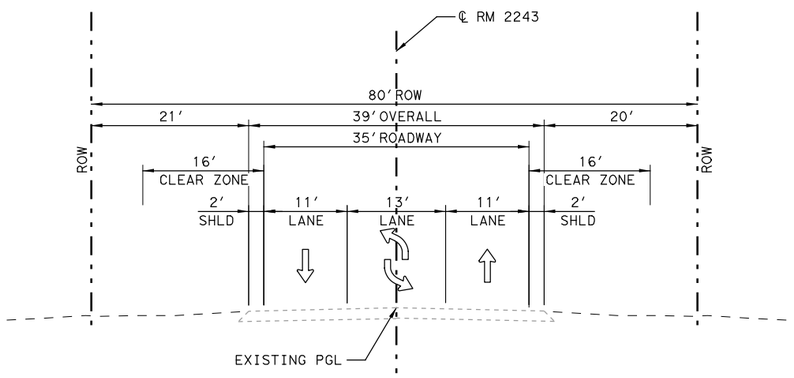
EXISTING SW BYPASS WBFR: SEGMENT 1

STA 382+09.50 TO STA 387+90.00



EXISTING SW BYPASS WBFR: SEGMENT 1

STA 387+90.00 TO STA 394+90.00



RM 2243 EXISTING TYPICAL SECTION

STA 475+82.71 TO STA 483+00.00

GENERAL NOTES:

1. THE HMAC TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE.
2. ALL LOCATIONS OF VEGETATION FILTER STRIPS ARE TO HAVE SIDE SLOPES NO STEEPER THAN 5:1.
3. 15' VEGETATIVE FILTER STRIP MEASURED FROM OUTER MOST EDGE OF PAVED SURFACE INCLUDING MOW STRIP.
4. SEE EROSION CONTROL SHEETS FOR TOPSOIL AND SEEDING LIMITS.
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JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

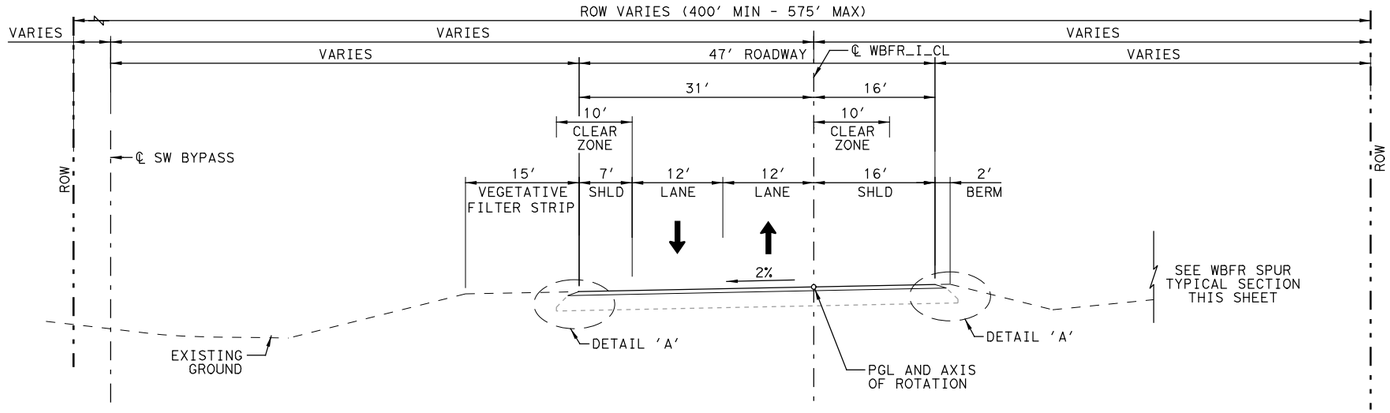
SOUTHWEST BYPASS SEGMENT 2

TYPICAL SECTIONS

SCALE: N.T.S. SHEET 2 OF 7

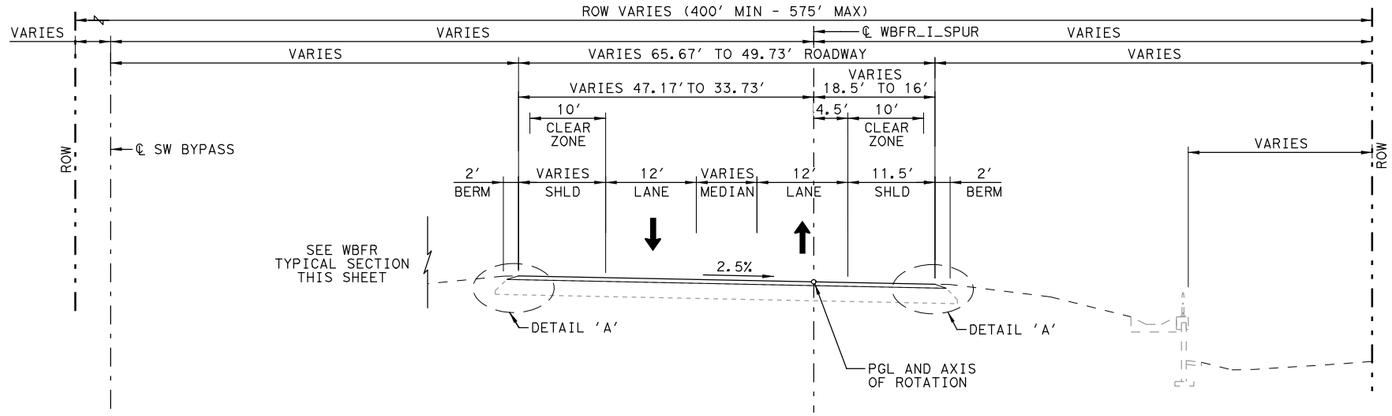
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JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	
CHECK JC	CONTROL	SECTION	JOB	7
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:41:00 PM SCALE: 1:240
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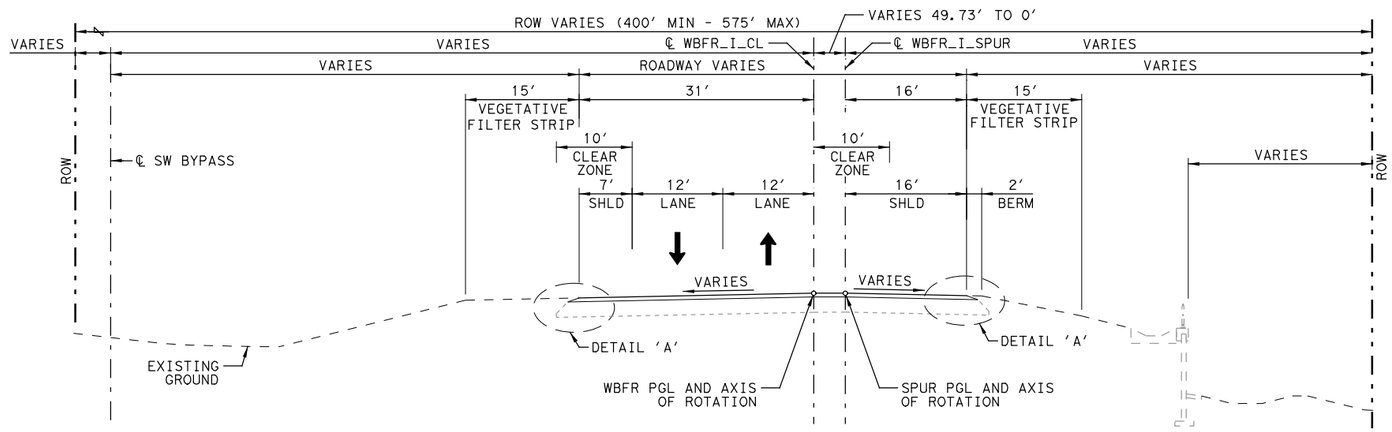
SW BYPASS WBFR

STA 68+36.97 TO STA 70+60.74



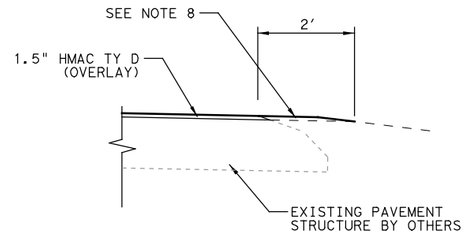
SW BYPASS WBFR SPUR

STA 368+20.00 TO STA 370+62.03



SW BYPASS WBFR

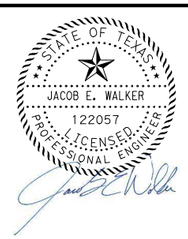
STA 70+60.74 TO STA 372+95.48
STATION EQUATION: STA 72+93.69 BK = STA 372+93.02 AHD
SPUR STA 370+62.03 TO STA 372+95.48
STA 372+95.48 TO STA 382+09.50 (BRIDGE LIMITS)



DETAIL "A"

GENERAL NOTES:

1. THE HMAC TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE.
2. ALL LOCATIONS OF VEGETATION FILTER STRIPS ARE TO HAVE SIDE SLOPES NO STEEPER THAN 5:1.
3. 15' VEGETATIVE FILTER STRIP MEASURED FROM OUTER MOST EDGE OF PAVED SURFACE INCLUDING MOW STRIP.
4. SEE EROSION CONTROL SHEETS FOR TOPSOIL AND SEEDING LIMITS.
5. SEE RETAINING WALL LAYOUT SHEETS FOR WALL LIMITS.
6. 2' BERM AND MOW STRIP CROSS-SLOPES TO MATCH ROADWAY CROSS-SLOPES UNLESS OTHERWISE NOTED.
7. SEE GRADING PLAN FOR SITE GRADING AND DITCH FLOW LINES.
8. BACKFILL NEW PAVEMENT EDGE WITH TOPSOIL AND SEEDING. COST TO BE SUBSIDIARY TO OVERLAY BID ITEMS.



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

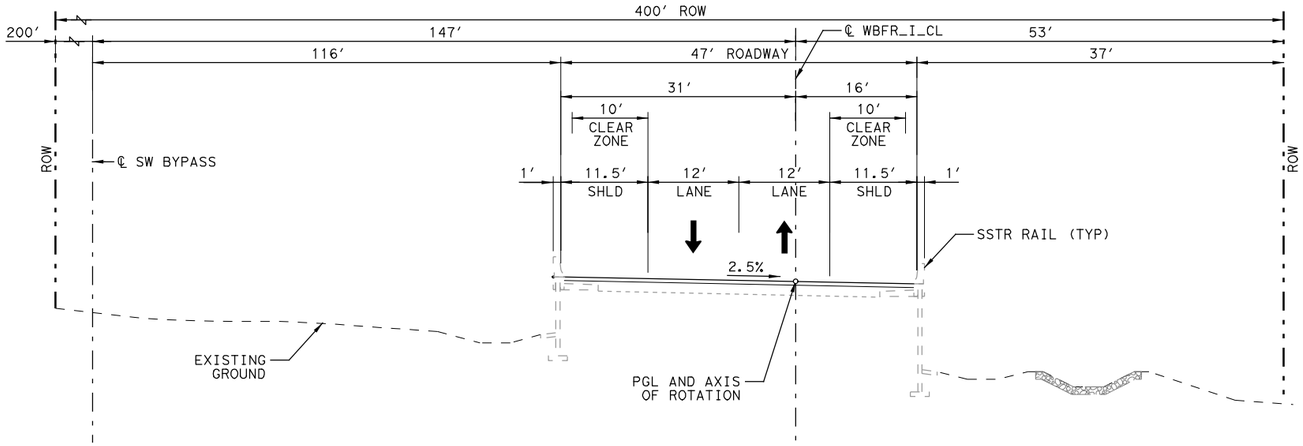
SOUTHWEST BYPASS SEGMENT 2

TYPICAL SECTIONS

SCALE: N. T. S. SHEET 3 OF 7

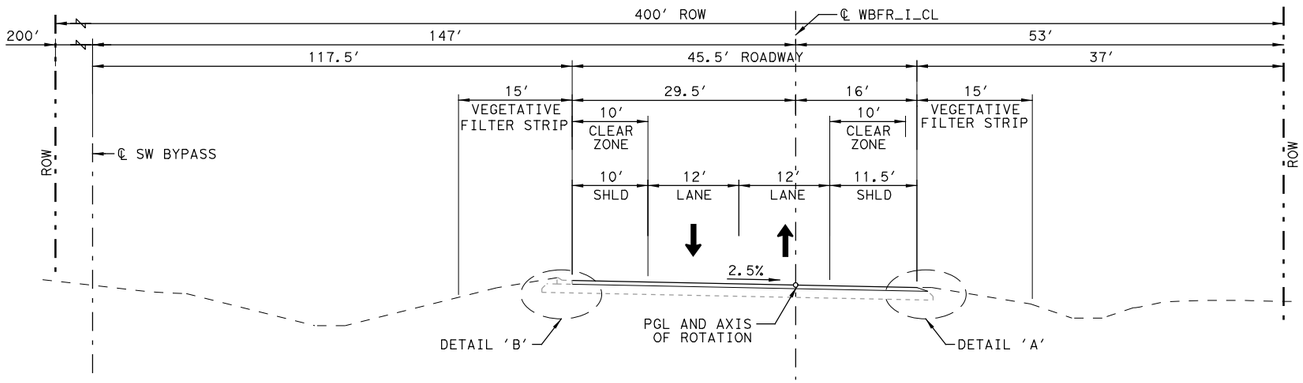
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	8
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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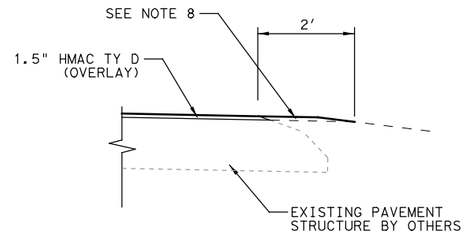
SW BYPASS WBFR: SEGMENT 1

STA 382+09.50 TO STA 387+90.00

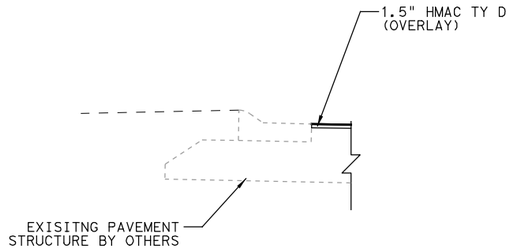


SW BYPASS WBFR: SEGMENT 1

STA 387+90.00 TO STA 394+90.00



DETAIL "A"



DETAIL "B"

GENERAL NOTES:

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7. SEE GRADING PLAN FOR SITE GRADING AND DITCH FLOW LINES.
8. BACKFILL NEW PAVEMENT EDGE WITH TOPSOIL AND SEEDING. COST TO BE SUBSIDIARY TO OVERLAY BID ITEMS.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

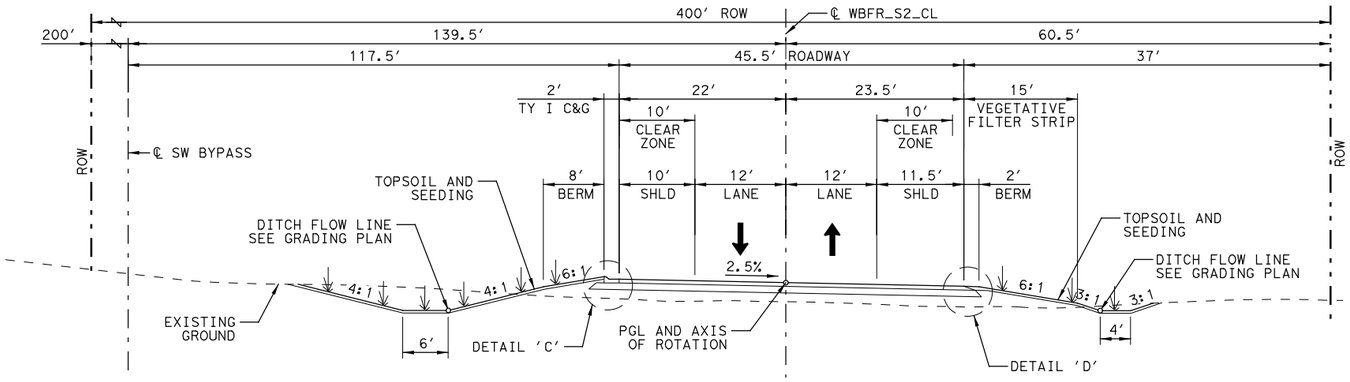
SOUTHWEST BYPASS SEGMENT 2

TYPICAL SECTIONS

SCALE: N. T. S. SHEET 4 OF 7

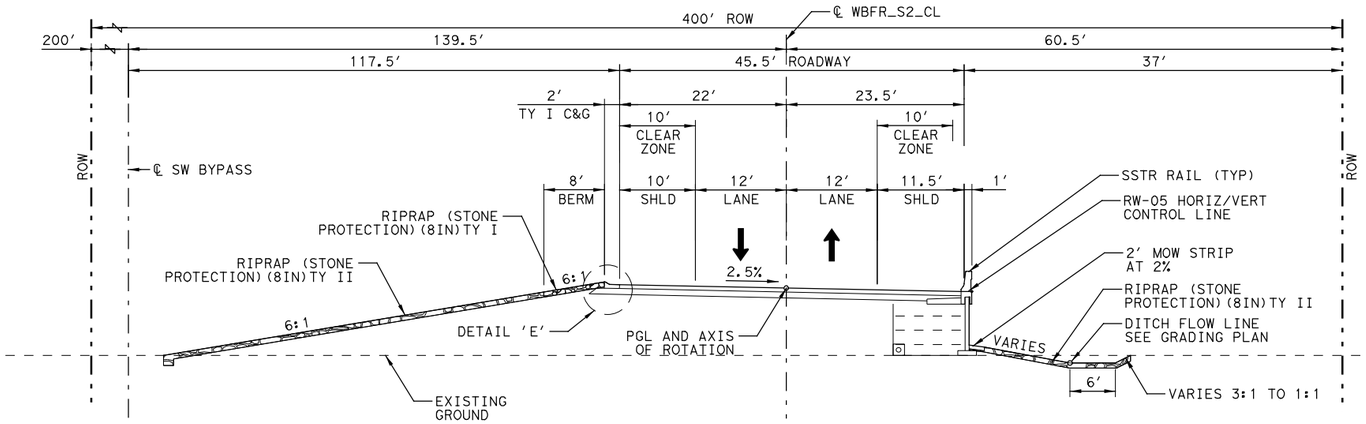
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	9
JW / JC	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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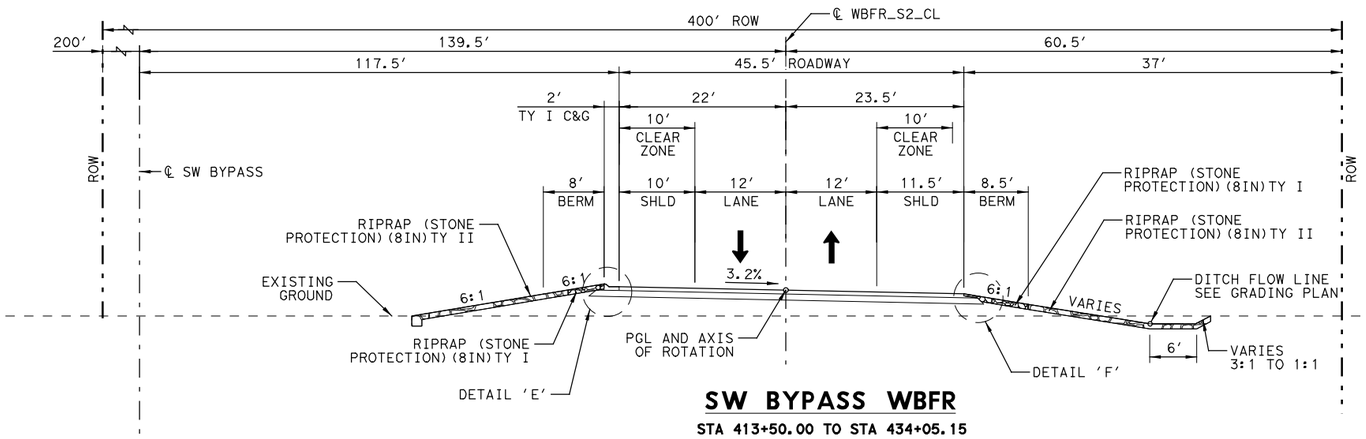
SW BYPASS WBFR

STA 394+90 TO STA 404+50.00
STA 404+50.00 TO STA 411+70.00 (BRIDGE LIMITS)



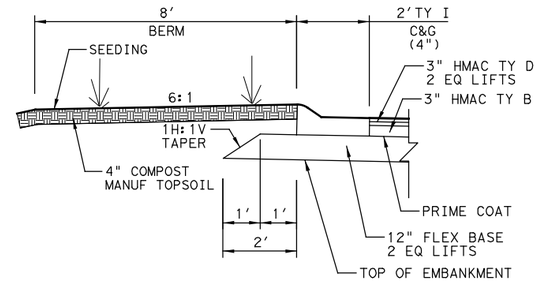
SW BYPASS WBFR

STA 411+70.00 TO STA 413+50.00

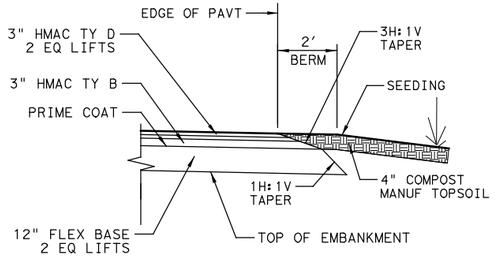


SW BYPASS WBFR

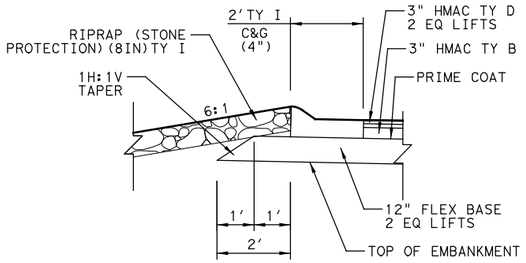
STA 413+50.00 TO STA 434+05.15



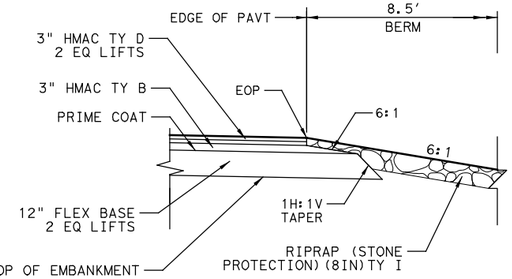
DETAIL "C"



DETAIL "D"



DETAIL "E"



DETAIL "F"

GENERAL NOTES:

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STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

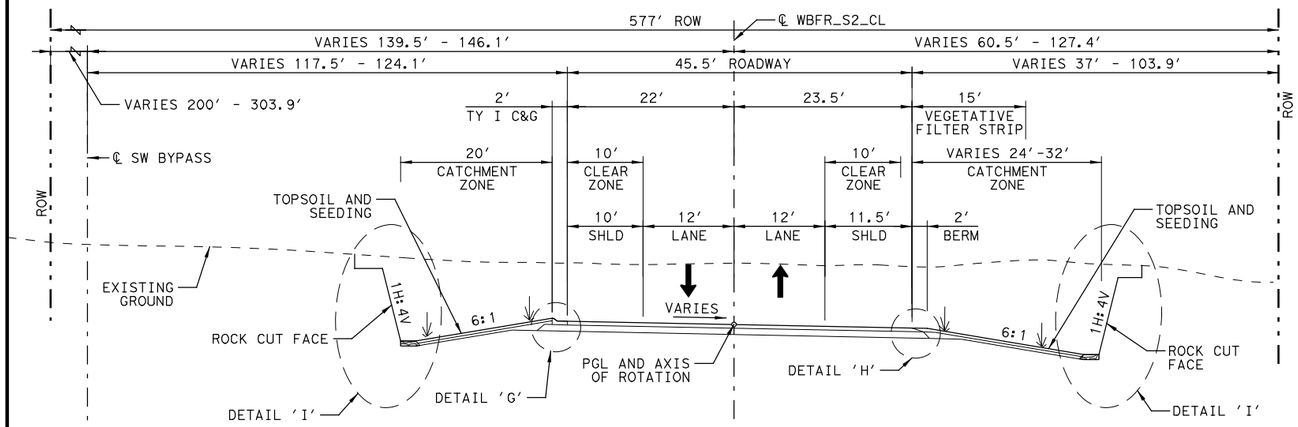
TYPICAL SECTIONS

SCALE: N. T. S.

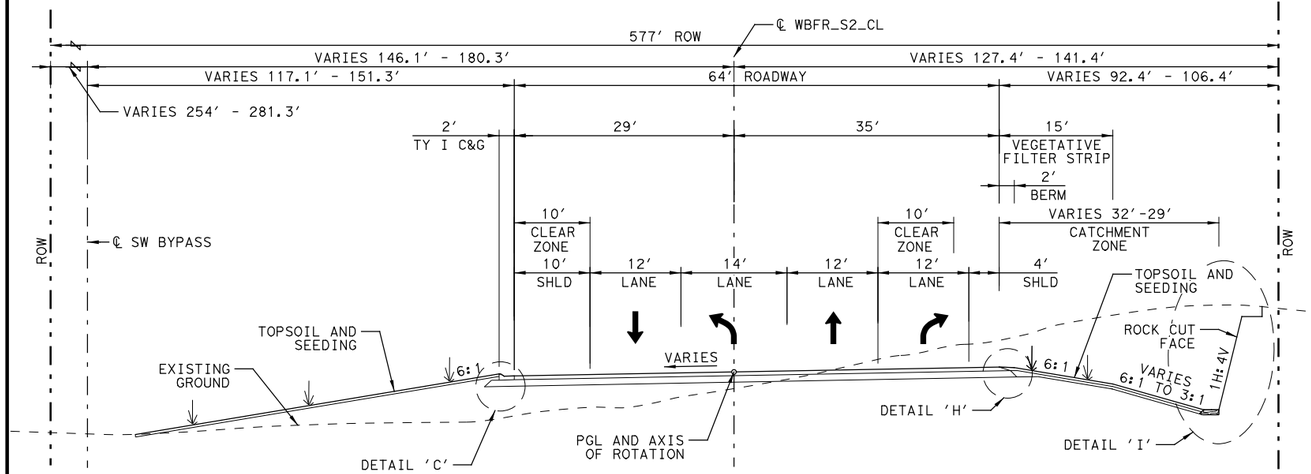
SHEET 5 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	10
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

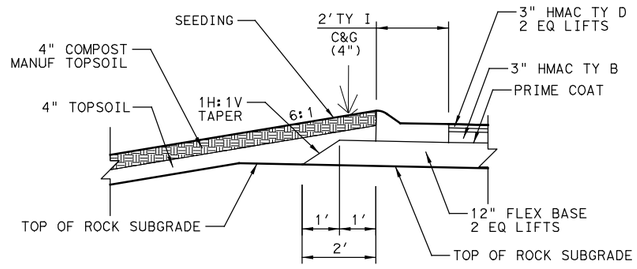
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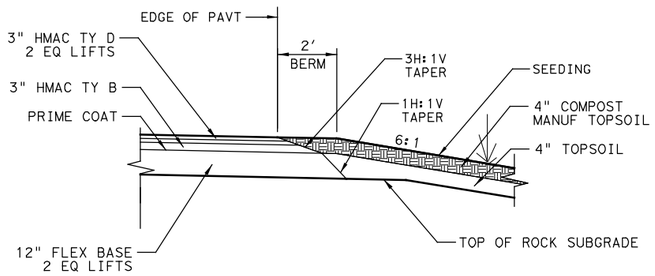
SW BYPASS WBFR
STA 434+05.15 TO STA 446+00.00



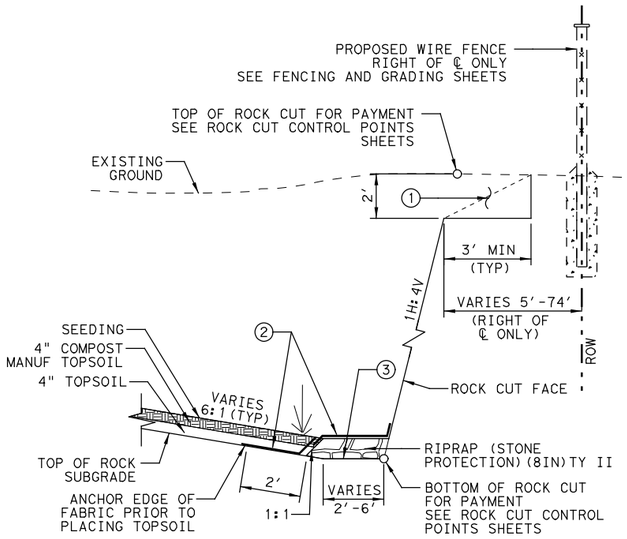
SW BYPASS WBFR
STA 446+00.00 TO STA 451+07.54



DETAIL "G"



DETAIL "H"



DETAIL "I"

GENERAL NOTES:

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8. BACKFILL NEW PAVEMENT EDGE WITH TOPSOIL AND SEEDING. COST TO BE SUBSIDIARY TO OVERLAY BID ITEMS.

(1) REMOVE LOOSE TOPSOIL, CLAY, AND WEATHERED LIMESTONE IN TOP 2' OF ROCK CUT AS DIRECTED BY THE ENGINEER. PRIOR TO STA 442+00, USE MILLING METHODS TO PROVIDE A FLAT 3' BENCH. EXCAVATION OF BENCH IS RECOMENDED BEFORE BEGGINING BLASTING ACTIVITY. BEYOND STA 442+00, THE REMOVAL SHALL FOLLOW A 2:1 SLOPE INSTED OF THE 3' FLAT BENCH. SOLID ROCK/BOULDERS MAY BE LEFT IN PLACE AND FINAL SLOPE MAY VARY. FOR BOTH SECTIONS, ENSURE ALL LOOSE MATERIAL IS REMOVED FROM THE TOP OF THE ROCK CUT. LOOSE MATERIAL TYPICALLY INCLUDES ANYTHING THAT CAN BE DISLODGED BY CAT 420 SERIES BACKHOE OR EQUIVALENT, BUT IS SUBJECT TO THE ENGINEER'S APPROVAL. ALL WORK SHALL BE AS DIRECTED BY THE ENGINEER. ALL WORK SHALL BE CONSIDERED SUBSIDIARY TO EXCAVATION, PAID FOR IN CY.

(2) PLACE TWO LAYERS OF NON-WOVEN FILTER FABRIC AND OVERLAP AS SHOWN PRIOR TO PLACEMENT OF TOPSOIL. REMOVE TOP PORTION OF FILTER FABRIC, ALONG WITH SEDIMENT AND DEBRIS, ONCE VEGETATION IS SUFFICIENTLY ESTABLISHED AS DETERMINED BY THE ENGINEER. SUBSIDIARY TO 8" STONE PROTECTION RIPRAP.

(3) ROCK SUBGRADE IS NOT REQUIRED TO BE FLAT IN THIS AREA, BUT MUST NOT BE HIGHER THAN SHOWN. INTENT OF TYPICAL IS FOR THE STONE RIPRAP TO COVER ROUGH GRADING BETWEEN THE 6:1 SUBGRADE AND BOTTOM OF THE ROCK CUT. NO ADJUSTMENT TO PROPOSED GRADES WILL BE MADE. NO ADDITIONAL PAYMENT WILL BE MADE FOR CUTS DEEPER THAN SHOWN.



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY, TX

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

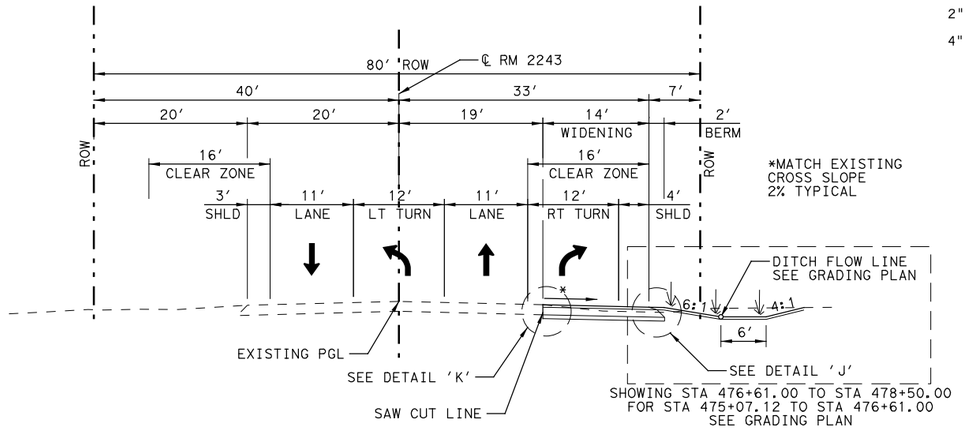
SOUTHWEST BYPASS SEGMENT 2

TYPICAL SECTIONS

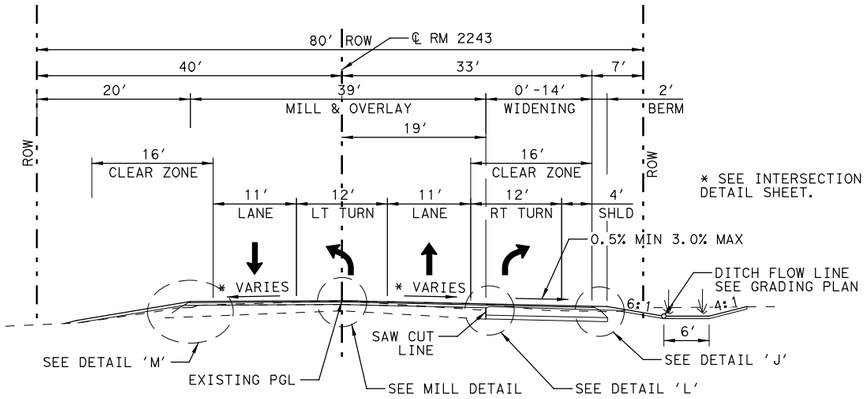
SCALE: N.T.S. SHEET 6 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	11
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

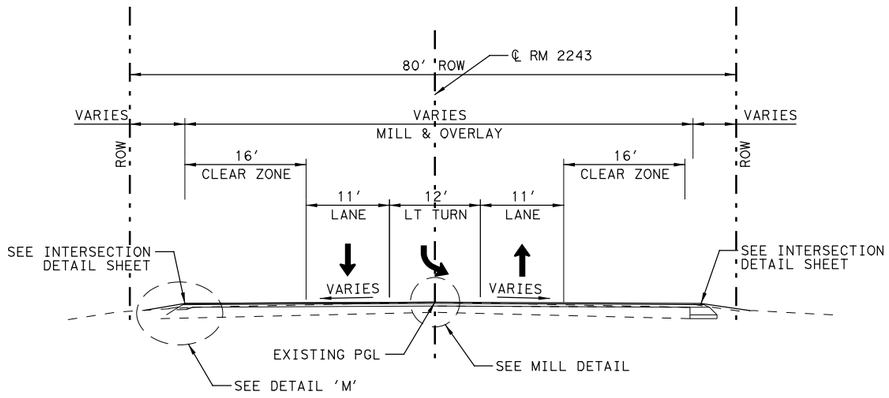
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4/12/2018 7:20 AM



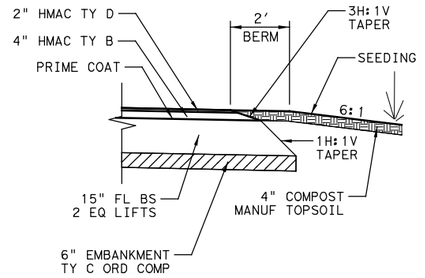
RM 2243 TYPICAL SECTION
STA 475+82.71 TO STA 478+50.00



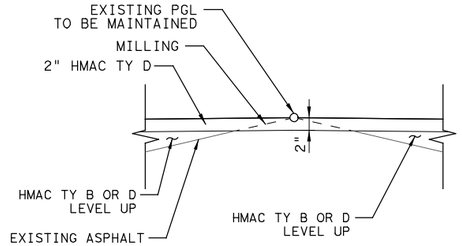
RM 2243 TYPICAL SECTION
STA 478+50.00 TO STA 479+51.15



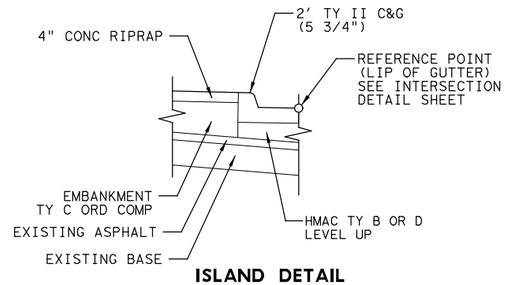
RM 2243 TYPICAL SECTION
STA 479+51.15 TO STA 483+00.00



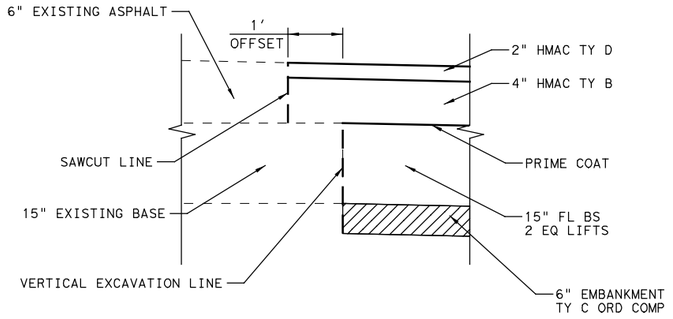
DETAIL "J"



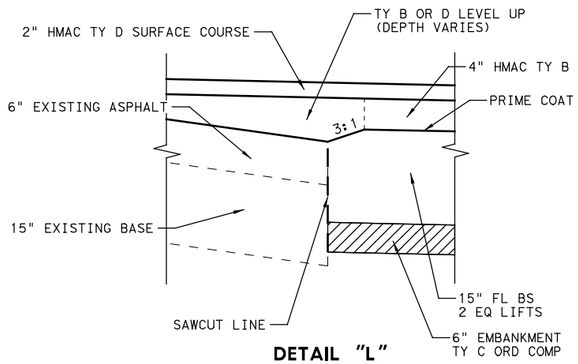
MILL DETAIL



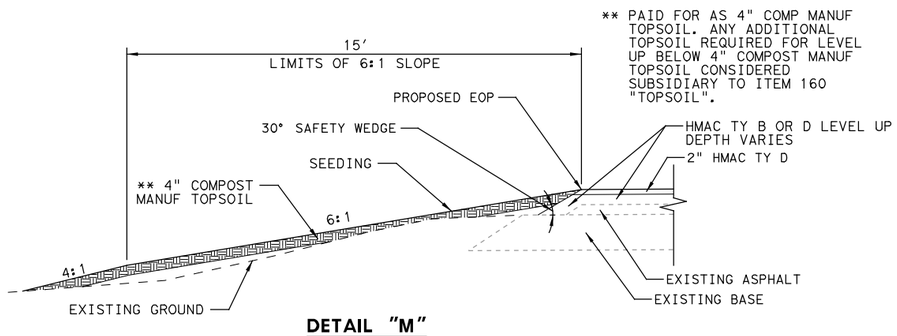
ISLAND DETAIL



DETAIL "K"



DETAIL "L"



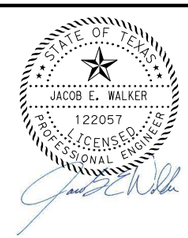
** PAID FOR AS 4" COMP MANUF TOPSOIL. ANY ADDITIONAL TOPSOIL REQUIRED FOR LEVEL UP BELOW 4" COMPOST MANUF TOPSOIL CONSIDERED SUBSIDIARY TO ITEM 160 "TOPSOIL".

DETAIL "M"

THIS DETAIL ALSO APPLIES TO BOTH SIDES OF THE LEVEL UP ON RAMP NB2

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8. BACKFILL NEW PAVEMENT EDGE WITH TOPSOIL AND SEEDING. COST TO BE SUBSIDIARY TO OVERLAY BID ITEMS.



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

TYPICAL SECTIONS

SCALE: N.T.S. SHEET 7 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	12
JW	2103	01	034	
CHECK				
JC				

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Basis of Estimate

Item	Description	**Rate	Basis	Quantity
160	**Topsoil**	27 CF/CY	118,611 CF	4,393 CY
161	**Compost Manufactured Topsoil**	9 SF/SY	380,754 SF	42,306 SY
164	**Seeding**			
	Temp (Warm)	9 SF/SY	190,386 SY	21,154 SY
	Temp (Cool)	9 SF/SY	190,386 SY	21,154 SY
	Perm	9 SF/SY	380,754 SF	42,306 SY
166	**Fertilizer (13-13-13)****	375 LB/AC	42,306 SY	1.65 TON
168	**Vegetative Watering**			
	(Item 164)(Temp)	55 GAL/SY	42,306 SY	2,327 MG
	(Item 164)(Perm)	110 GAL/SY	42,306 SY	4,655 MG
247	**FL BS (CMP IN PLC)**			
	(TY A GR 1&2)	27 CF/CY	265,626 CF	9,838 CY
		134 LB/CF		17,797 TON
310	**Prime Coat (MC-30 or AE-P)**	0.20 GAL/SY	27,276 SY	5,455 GAL
340	**Dense-Graded Hot-Mix Asphalt (SQ)**			
	TY-B or D PG64-22 Level Up	153.33 LB/CF	10,815 CF	829 TON
341	**Dense-Graded Hot-Mix Asphalt**			
	TY-B PG64-22	115 LB/SY/IN	27,085 SY	4,672 TON
	TY-D SAC-B PG70-22	115 LB/SY/IN	67,502 SY	5,941 TON

** For Informational Purposes Only.

MODIFIED STANDARDS
The following standard detail sheet or sheets have been modified:

RW(TRF) (MOD)
IGND (MOD)
BL (MOD)
IGTS (MOD)

CONTACT INFORMATION
City of Georgetown Electric Utility adjustments to be coordinated with:
City of Georgetown – Georgetown Utility Systems
300 Industrial Avenue, Georgetown, TX 78626
Jimmy Sikes; jimmy.sikes@georgetown.org; 512-930-6117

Work in the vicinity of the Enterprise Pipeline Facility to be coordinated with:
Enterprise Products
9420 W. Sam Houston Pkwy N., Room N1.217 — P.O. Box 4324
Houston, Texas 77064-6317 — Houston, TX 77210
Land_Encroachments@eprod.com; 866-901-8170
Rebecca Curry; ReCurry@eprod.com; 281-887-3312

Pedernales Electric Cooperative
10625 W Highway 29 — P.O. Box 2048
Liberty Hill, TX 78642 — Liberty Hill, TX 78642-2048
Dirk Field; dirk.field@peci.com; 512-778-5470 ext. 7037

City of Georgetown
300-1 Industrial Ave
Georgetown, TX 78626
Michael Hallmark; Michael.hallmark@georgetown.org; 512-930-3569

Frontier/Verizon
2525 Ridgepoint Suite 400
Austin, TX 78754
Kevin Moseley; William.Moseley@ftr.com; 512-869-2257

LCRA
3700 Lake Austin Blvd. — P.O. Box 220
Austin, TX 78703 — Austin, TX 78767
Mary Beth Nickel; mnickel@lcra.org; 512-578-1806

Oncor
3620 Franklin Avenue
Waco, TX 76710-7328
Leslie Davis; Leslie.Davis@oncor.com; 254-750-5244

GENERAL
References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved.

Cross sections are supplemental data to the Plan and Profile sheets. In the case of a discrepancy, the Plan and Profile sheets shall govern.

If work is performed at CONTRACTOR's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the work, if required.

Right of way meets and bounds are on file with the County.

The roadbed shall be free of organic material prior to placing any section of the pavement structure.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Provide a smooth, clean saw-cut along the existing asphalt or concrete pavement structure, as directed. Consider subsidiary to the pertinent Items.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The CONTRACTOR will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the CONSTRUCTION OBSERVER. Consider subsidiary to pertinent Items.

Damage to existing pipes and SETs due to CONTRACTOR operations shall be repaired at CONTRACTOR's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The CONTRACTOR will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

The Project Superintendent will be capable of speaking English and will be available to contact at all times when work is being performed, including subcontractor work. The Superintendent will be available and on-call 24 hours a day.

Coordinate and obtain approval from the CONSTRUCTION OBSERVER for all bridgework over existing roadways (including Texas Crushed Stone ROW crossing, if applicable).

CONTRACTOR shall coordinate with Georgetown Utility Systems to allow them to install conduit underneath the proposed roadway after clearing activities, but prior to placement of the road base. Approximate location is at WBFR Station 400+20.00. Considered subsidiary to pertinent items.

Measure all minimum vertical clearances for all structures (including, but not limited to, signal mast arms, span wires, and overhead sign bridge structures) within the limits of the project for all roadway alignments in all directions of travel. Coordinate with the CONSTRUCTION OBSERVER to take these measurements and obtain prior to opening roadways to traffic unless otherwise approved. The CONSTRUCTION OBSERVER will report all minimum vertical clearance information on State maintained roadways to the Austin District Permit Office.

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Refer to TxDOT's website for list of pre-qualified manufacturers. No substitutions will be allowed for materials found on the list. Submit list of approved suppliers/materials from TxDOT website to show items are TxDOT approved. Submit this list with request for material approval.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/26/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 1 OF 12

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	13
JW	2103	01	034	
CHECK				
JC				

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ENVIRONMENTAL (SW3P, WPAP, ETC.)
See SW3P, TCEQ Requirements for Recharge Zone of the Edwards Aquifer, and Temporary Erosion Notes for additional general notes and requirements not listed in this section.

CONTRACTOR shall designate an employee to coordinate the maintenance of the erosion control devices on this project. Maintain erosion control features according the Temporary and Permanent Erosion Control Sheets.

Install silt fence, erosion control logs, and rock filter dams at the earliest time possible, as directed. Periodically inspect and maintain all sediment traps and silt fence to ensure proper function. The sediment traps and silt fence shall remain in place until vegetation is established as determined solely by the CONSTRUCTION OBSERVER.

All slopes shall be seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied.

Silt fences, rock berms, erosion control logs, sedimentation basins, and similarly recognized techniques and materials shall be employed during construction to prevent point source sedimentation loading of downstream facilities. Such installation shall be regularly inspected by the City of Georgetown for effectiveness. Additional measures may be required if, in the opinion of the CONSTRUCTION OBSERVER, they are warranted.

All temporary erosion control measures shall not be removed until final inspection and approval of the project by the CONSTRUCTION OBSERVER. It shall be the responsibility of the CONTRACTOR to maintain all temporary erosion control structures and to remove each structure as approved by the CONSTRUCTION OBSERVER.

All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, drives and areas used by the public shall be cleaned up immediately.

After temporary erosion control devices are no longer required, cleanup and reshaping of those areas will be required. Consider incidental to pertinent items.

The project limits are within the Edwards Aquifer Recharge Zone. Transport any soils contaminated during construction of the proposed project from the site and properly dispose of off-site, off the recharge zone, and off any area draining to the recharge zone of the Edwards Aquifer.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Protect all areas of the right of way, which are not included in the actual limits of the proposed construction areas, from disturbance. Restore any area disturbed because of the CONTRACTOR's operations to a condition as good as, or better than, before the beginning of work at no cost to the state. This does not include the area between the existing quarry walls.

Remove sediment accumulated during project construction from detention ponds prior to project close out, as directed the by CONSTRUCTION OBSERVER. Subsidiary to pertinent items.

When any abandoned well is encountered, cease construction operations in this area and notify the CONSTRUCTION OBSERVER who will coordinate the proper plugging procedures with Texas Commission on Environmental Quality (TCEQ).

Erosion control and stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Track all exposed soil, stockpiles, and slopes. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Re-track slopes and stockpiles after each rain event or every 14 days, whichever occurs first. This work is subsidiary.

CONTRACTOR is responsible to submit and receive approval from the TCEQ for any above ground storage tanks to be kept on site as well as any fees associated with this request. At a minimum, locate aboveground storage tanks kept on-site for construction purposes over bermed impervious liners as to not allow any leakage into underlying soils. Additionally, the containment will be sized to capture 150% of the total volume of fluids stored on-site within the storage area.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Collect wastewater generated on-site by chemical toilets and transport off-site and dispose of properly.

Clean asphalt equipment in such a manner that will not leave any petroleum contaminants in the right of way. No construction waste materials will be buried within the right of way.

Project Specific Location (PSL) in USACE Jurisdictional Area.
Do not initiate activities in a PSL associated with a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The jurisdictional area includes all waters of the U.S. including wetlands or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Consult with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of all USACE coordination and approvals before initiating activities.

Proceed with activities in PSLs that do not affect a USACE jurisdictional area if self-determination has been made that the PSL is non-jurisdictional or proper clearances have been obtained in USACE jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. Document any determinations that PSL activities do not affect a USACE jurisdictional area. Maintain copies of PSL determinations for review by the Department or any regulatory agency. The CONTRACTOR must document and coordinate with the USACE, if required, before any excavation material hauled from or embankment material hauled into a USACE jurisdictional area by either (1) or (2) below.

1. Restricted Use of Materials for the Previously Evaluated Permit Areas. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
   a. suitable excavation of required material in the areas shown on the plans and cross sections as specified in Standard Specification Item 110, Excavation is used for permanent or temporary fill within a USACE jurisdictional area;
   b. suitable embankment from within the USACE jurisdictional area is used as fill within a USACE evaluated area;
   c. Unsuitable excavation or excess excavation that is disposed of at an approved location within a USACE evaluated area.
2. Contractor Materials from Areas Other than Previously Evaluated Areas. Provide the Department with a copy of all USACE coordination and approvals before initiating any activities in a jurisdictional area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
   a. Standard Specification Item 132, Embankment is used for temporary or permanent fill within a USACE jurisdictional area;
   b. Unsuitable excavation or excess excavation that is disposed of outside a USACE evaluated area.

Work over or near Bodies of Water (Lakes, Rivers, Ponds, Creeks, etc.).
Keep on site a universal spill kit adequate for the body of water and the work being performed. No debris is allowed to fall into a body of water. Debris that falls into the water must be removed at the end of each work day. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. This work is subsidiary.

DSHS Asbestos and Demolition Notification.
Complete and provide the Texas Department of State Health Services (DSHS) notification form to the CONSTRUCTION OBSERVER at least 30 calendar days prior to bridge or bridge class culvert removal or renovation. Notify the CONSTRUCTION OBSERVER via email of any changes to the work start date.

Migratory Birds and Bats.
Migratory birds may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 1st and January 31st. Prevent migratory birds from re-nesting between February 1st and August 31st.

All methods used for the removal of unoccupied bird nests and the prevention of re-nesting must be approved by the CONSTRUCTION OBSERVER well in advance of the planned use.

In the event that any active nests are encountered on-site during construction, all construction activity within the immediate vicinity of the nest must cease immediately. Contact the CONSTRUCTION OBSERVER to determine how to proceed.

Bats may roost within the project limits under bridges, in culverts, in large hollow trees, in dead standing trees, and in trees with shaggy bark. Maternity colonies may occur from April 1st through August 31st. If bats are present, ensure bats are not harmed. Exclusion protocols for known colonies should be followed well in advance of commencement of construction activities. Exclusion measures by qualified individuals are used to relocate existing colonies, except from April 1st through August 31st when such measures may separate mothers and pups. Exclusion measures are also the means of preventing establishment of new colonies and re-establishment of relocated colonies.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by migratory birds or bats. This work is subsidiary.

STATE OF TEXAS
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SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 2 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	13A
JW	2103	01	034	
CHECK				
JC				

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TRENCH SAFETY NOTES

In accordance with the laws of the State of Texas and the US Occupational Safety and Health Administration regulations, all the trenches over 5 feet in depth in either hard and compact or soft and unstable soil shall be sloped, sored, sheeted, braced, or otherwise supported. Furthermore, all trenches less than 5 feet in depth shall also be effectively protected when hazardous ground movement may be expected. Trench safety systems to be utilized for this project will be provided by the CONTRACTOR.

In accordance with the US Occupational Safety and Health Administration regulations, when persons are in trenches 4 feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.

If trench safety system details were not provided in the plans because trenches were anticipated to be less than 5 feet in depth, and if during construction it is found that trenches are in fact 5 feet or more in depth or trenches less than 5 feet in depth are in an area where hazardous ground movement is expected, all construction shall cease, the trenched area shall be barricaded and the CONSTRUCTION OBSERVER notified immediately. Construction shall not resume until appropriate trench safety systems details, as designed by a professional engineer, are retained and copies submitted to the CONSTRUCTION OBSSERVER for approval.

QUARRY REQUIREMENTS AND COORDINATION

The project passes through the Texas Crushed Stone (TCS) active quarry. It is the CONTRACTOR's responsibility to coordinate with TCS for their blasting schedule and achieve set-back requirements during blast events. The CONTRACTOR shall keep the ROW secure at all times and is responsible for all personnel, equipment, and production during TCS blasting activity. Subsidiary to pertinent items. There will not be additional payment for any losses or delays during blast protocols.

Texas Crushed Stone requires one Right of Way access route (crossing) per an industrial agreement with the City of Georgetown. The crossing must be 80' wide and 25' tall at a minimum and TCS traffic must have access through it at all times. The current location of the crossing will need to be re-located to its permanent location as shown in the plans. CONTRACTOR is responsible for coordinating construction traffic as well as the change in the crossing location with Texas Crushed Stone. The PCTB, as called out on the Fencing and Grading Plans, must be installed and the crash walls, as called out on the Bridge Plans (Bents 3 and 4), must be complete before the TCS crossing is relocated. Subsidiary to pertinent items.

CONTRACTOR's Project Superintendent as well as any personnel working near the vertical walls of the quarry shall have proof of completion for MSHA New Miner Training with emphasis on High Wall Safety (8 hour course). Subsidiary to Item 500 "Mobilization".

BLASTING

Blasting is allowed on this project. All blasting shall meet the specifications and requirements of Item S2 RC.

Coordinate with the CONSTRUCTION OBSERVER and Texas Crushed Stone to determine blasting times.

Blasting is not allowed within 200 feet of TxDOT right-of-way. The roadway RM 2243 shall not be compromised and road closures are not permitted for blasting activities.

It is the CONTRACTORS responsibility to secure the site at all times.

A blasting plan is required to be submitted to the CONSTRUCTION OBSERVER for approval at least 1 week before each blast.

HAUL ROAD

Utilize the existing haul road (by others) where possible. The maximum grade on the existing access route is 15%.

Physical alterations of the existing haul road, including additional clearing, blading, grade alterations, and gate modifications at RM 2243 shall be considered subsidiary to pertinent items. Maintain sheet flow conditions at the edge of the haul road outside the limits of the existing quarry disturbance.

Remove all traffic control devices, remove rock, and re-vegetate the areas shown in the plans upon completion of work or as directed. This includes sections of the haul road no longer used due to any re-alignment of the haul road. Provide sufficient watering to establish vegetation, as approved by the CONSTRUCTION OBSERVER. Re-vegetation is not required within the existing limits of quarry disturbance, which is approximately from WBFR Station 401+00 to Station 439+00. Additional topsoil, seeding, and watering required to establish vegetation, but not directly called out in the plans, shall be considered subsidiary to pertinent items.

ITEM 100 - PREPARING RIGHT OF WAY

Do not burn brush unless otherwise approved.

Trim vegetation around signs and other obstructions. Consider subsidiary to pertinent Items.

Use hand methods or other means to remove objectionable material and obstructions if doing work by mechanical methods is impractical. Consider subsidiary to the pertinent Items.

All trees and brush are to be removed within the limits of the Right of Way between the I-35 SBFR and RM 2243 with the following two exceptions:

- All trees that have a diameter at breast height (DBH) of 12 inches or larger (excluding Hackberry, Chinaberry, Ashe Juniper (cedar), Chinese Tallow, and Mesquite) are to remain.
- All trees and brush within the limits of the permanent protection fence (two areas) installed near karst features in Segment 2 are to remain. Do not enter either area during construction.

Removal of all trees and brush subsidiary to this item.

Re-vegetate all areas disturbed by tree clearing activity outside of the construction limits. Disturbed areas must be seeded or sodded within 14 days of last clearing activity. Subsidiary to this item.

Removal of existing building and parking lot along the I-35 southbound frontage road is required prior to project completion, but does not need to run concurrent with other site prep activities. See Item 496 and Item 504 of the general notes for additional information. Cap existing well in accordance with State law. Considered subsidiary to this item.

All items requiring removal that are not specifically called out for removal in the plans are considered subsidiary to this item. Prep ROW quantities for the WBFR cover all City ROW between the I-35 SBFR and RM 2243, as well as any TxDOT ROW on the I-35 SBFR and any City ROW on the Bypass north of RM 2243. Quantities for RM 2243 cover all TxDOT ROW on RM 2243.

ITEM 110 & 132 – EXCAVATION & EMBANKMENT

At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

Unsuitable material encountered in a cut or fill section will be considered waste. The CONSTRUCTION OBSERVER will define unsuitable material. Material, which the CONTRACTOR might deem to be unsatisfactory or unsuitable, due to moisture content, will not be considered unsuitable material, unless otherwise approved.

Obtain approval of all compaction equipment prior to all backfilling and embankment operations.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

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SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 3 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	
CHECK JC	CONTROL	SECTION	JOB	13B
	2103	01	034	

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ITEM 132 – EMBANKMENT
The CONSTRUCTION OBSERVER must approve all embankment material before use on this project.

Existing material located within the project limits may be used as embankment if it meets specifications shown on the plans and if approved by the Construction Observer.

If delivery from offsite source is necessary, furnish embankment with a PI of less than 25 that does not contain sulfate contents greater than 3000 ppm.

Stockpile imported TY C embankment at an approved location until it meets all testing requirements. The stockpile must be between 500 CY and 5000 CY and must not exceed a height of 15 ft. It is the Contractor's responsibility to identify and notify the Construction Observer of the location of the borrow source to allow time for testing and approval to avoid delay to the project. Allow a minimum of five (5) working days for testing.

At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

Embankment placed over the area of MSE backfill must meet the same backfill requirements for the type specified under Item 423 in the plans.

The underlying layer or existing subgrade must be prepared and inspected prior to placement of the embankment. Use approved compaction equipment for all backfilling and embankment operations. Detachable sheepsfoot-type wheels mounted on backhoes, trackhoes and other similar equipment will not be allowed for compaction operations, including pipe installation. Payment for compaction will be subsidiary to the various bid items of the contract.

Track ALL embankment slopes left idle for more than 14 days, within or at the end of the 14-day idle period, to prevent erosion. Tracking consists of operating a tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Re-track slopes after rain events, as directed. Consider tracking of slopes to prevent erosion as subsidiary to the pertinent Items.

Due to the depth (30+ft) of some of the fills and the desire to limit settlement while using ordinary compaction methods, it is recommended that rock embankment construction be inspected/observed on a full-time basis.

EMBANKMENT MATERIAL
There are two types of embankment on this project. Zone 1 embankment consists of all embankment material located lower than 8 ft beneath the proposed pavement surface. Zone 2 embankment consist of all embankment material within 8 ft of the proposed pavement surface. Material recommendations for the two zones are provided below. All embankment material should be free of vegetation or other objectionable material.

- Zone 1 embankment material should consist of material meeting TxDOT Standard Specifications Item 132, 3.2 Rock Embankment with the following exception: the maximum lift thickness should not exceed 2 ft, therefore the maximum rock size in its greatest dimension must be less than 2 feet.
- Zone 2 embankment material should consist of material meeting TxDOT Standard Specifications Item 132, Type C with the following gradation and plasticity requirements.

Item	Description	(Percent Retained-Sieve)					LL Max.	PI Max.	PI Min.
		2½"	1¾"	7/8"	#4	#40			
132	Embankment (Density Control) (Zone 2)	0	0-10	10-40	45-75	60-85	45	20	6

EMBANKMENT PLACEMENT – COMPACTION
- Compact the Zone 1 Rock Embankment using ordinary compaction methods in accordance with TxDOT Standard Specifications Item 132.

ITEM 160 - TOPSOIL
No sandy loam allowed. Obtain approval of the actual depth of the topsoil sources for both on-site and off-site sources

All topsoil sources shall be approved by the CONSTRUCTION OBSERVER.

Existing topsoil salvaged from the project, meeting specification requirements, may be used where topsoil is called out in the plans.

The maximum height of topsoil stockpiles shall be five (5) feet.

Seed or track slopes within 14 days of placement.

ITEM 161 – COMPOST
Place a minimum of four (4) inches of compost manufactured topsoil at the locations identified on the plans. Any excess shall be at the CONTRACTOR's expense.

ITEM 164 – SEEDING FOR EROSION CONTROL
"No mowing" signs are not required on this project.

ITEM 166 – FERTILIZER
Fertilize all areas to be seeded. Apply fertilizer at a rate that provides 375 lbs of nitrogen per acre of seeded area. Fertilizer shall be subsidiary to other items.

ITEM 169 – SOIL RETENTION BLANKETS
Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Divisions (CST) materials producers list. Refer to TxDOT's website for list of pre-qualified manufacturers. Direct all questions to the Maintenance Division, Vegetation Management Section, 125 E. 11th Street, Austin, TX 78701-2483.

ITEM 204 – SPRINKLING
Sprinkling for the control of dust, as directed, will be required on this project. If dust control is not being maintained, cease operations until maintenance resumes. This work shall be considered subsidiary to pertinent items.

ITEM 247 - FLEXIBLE BASE
Furnish TY A material meeting Grade 1 & 2 requirements for the roadway and intersecting streets.

Flexible base material shall come from a source approved by the CONSTRUCTION OBSERVER. If the flexible base comes from a stockpile, the stockpile shall be tested before delivery to the project. The stockpile shall be built in lifts not to exceed two (2) feet and in a manner as to obtain a minimum working face of not less than ten (10) feet and maximum working face of not more than twenty (20) feet. Final acceptance of flexible base material will be from tests made from windrow samples or the stockpile.

The following table will govern the acceptance of compaction on base courses, when compacted in multiple courses. Compaction requirements are in percent of maximum dry density as determined by (Tex-113-E). When compacting in a single course, compact to at least 100% of maximum dry density as determined by Tex-113-E.

Item	Material	All Roadways	
		Lift	Min Density
247	FL BS (CMP IN PLC)	1st (first lift) 2nd (final lift)	98% 100%

Correct subgrade (e.g. unstable areas, soft spots, etc.) prior to placing Flex Base. This includes cut areas where the flex base is to be placed on existing rock. Consider subsidiary to the pertinent Items.

ITEM 300 – ASPHALTS, OILS, AND EMULSIONS
Asphalt season starts May 1st and ends September 15th.

PPA and REOBs are not allowed.

ITEMS 310, 340, & 341
Perform work during good weather, unless otherwise directed. If work is performed at CONTRACTOR's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the work, if required.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 4 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	13C
JW	2103	01	034	
CHECK				
JC				

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ITEM 310 – PRIME COAT
Provide medium cure cutback asphalt (MC-30) or asphalt emulsion prime (AE-P).

Provide CONSTRUCTION OBSERVER with current Distributer Certification confirming calibration of asphalt measurement equipment.

Apply Prime to finished flex base surface at the rate shown in the plans. Hot mix can be applied to the primed surface of flex base after the prime has penetrated and cured for a minimum of 36 hours depending on weather conditions or as approved by the CONSTRUCTION OBSERVER. Provide the CONSTRUCTION OBSERVER with a copy of the asphalt deliver ticket prior to application. Do not apply if rain is forecast prior to paving.

Apply blotter material to all driveways and intersections. This work is subsidiary. When Multi Option is allowed, provide MC 30, EC 30, or AE-P.

ITEM 340 & 341 - DENSE-GRADED HOT-MIX ASPHALT
Contractor to submit for approval a current mix design (less than 6 months old) to the Construction Observer that meets the following requirements prior to use on the project.

Provide mixture Type B using PG binder 64-22 & Type D using PG binder 70-22.

Use aggregate meeting a Surface Aggregate Classification (SAC) requirement of B for all surface and non-surface mixtures (including shoulders).

Provide performance grade (PG) binders that do not contain Recycled Engine Oil Bottoms (REOB's) or Poly Phosphoric Acid (PPA).

Do not perform this work when the weather, as indicated by NOAA states a chance of rain of 40% or greater.

Mill a transverse butt joint to transition from the new ACP to the existing surface tie-in. Make the transition a minimum of 50 feet H: 1 inch V slope ratio of newly placed ACP. Make the temporary joint, at the tie-in, a minimum of a 10 feet longitudinally and covering the entire width. Saw-cut existing pavement as directed. Prior to milling, core the existing pavement to determine its thickness. Do not proceed with milling until directed. Consider this work subsidiary to the pertinent Items.

Complete all roadways before final surface course placement, unless directed otherwise.

Ensure placement sequence to avoid excess distance of longitudinal joint lapback not to exceed one day's production rates.

The Contractor shall utilize a material transfer device per item 320 and a grade reference (such as a ski) for overlay operations. Consider subsidiary to the pertinent items.

Use a device to create a maximum 3H: 1V notched wedge joint on all longitudinal hot mix joints of two (2) inches or greater. Consider subsidiary to the pertinent Items.

Taper transverse faces at ends of passes as directed.

Make transverse tapers on each end of pass using a minimum slope rate of 60H:1V. Tapers shall be removed directly before placement of succeeding lift. Consider subsidiary to the pertinent Items.

Provide a minimum transition for all side streets of at least 12 ft. and driveways of at least six (6) feet, unless otherwise shown on the plans or otherwise approved/directed.

Tack every intermediate layer, unless otherwise directed. Do not dilute tack coat. Apply it through a distributor spray bar in accordance with Article 316.3.1 Distributor.

TESTING
Testing to be under separate COUNTY contract. CONTRACTOR shall coordinate with involved parties for asphalt testing.

The CONTRACTOR must sample asphalt binder, in accordance to the applicable item. Label the sample can with the corresponding project, lot, and sub-lot numbers.

Samples must be stored in a common area where they are readily available to the COUNTY representative at the plant. The CONTRACTOR will be responsible for supplying storage for all samples. Retain all asphalt samples until hot mix production is complete or directed otherwise.

Target laboratory molded density is 97% for all mixtures for Texas Gyratory Compactor (TGC) mixture designs.

When directed, the CONTRACTOR is responsible for disposal of all asphalt binder samples, in accordance to Local, State, and Federal regulations.

Refill and compact all HMAC core holes to the same elevation as the adjacent roadway. Use hot mix of the type being used in the project to fill core holes. As an alternative a high performance cold patching mix such as Rapid Cure Patching Mix meeting the requirements of DMS-9203 or Medium Cure Patching mix made with SCM meeting requirements of DMS-9202. Consider this work subsidiary to the pertinent Items.

When using Superpave Gyratory Compactor (SGC) to design mixtures, submit the SGC mix design to the CONSTRUCTION OBSERVER for approval.

When using substitute binders, mold specimens for mix design and production at the temperature required for the substitute binder used to produce the HMA.

All mixtures must meet the Hamburg requirement as stated in the table below.

High-Temperature Binder Grade	Test Method	Hamburg Wheel Test Requirements [1]		
		Minimum # of Passes	Maximum Rut Depth (mm)[2]	Minimum Rut Depth (mm)[2,3]
PG 64 or lower	Tex-242-F	7,000	12.5	3
PG 70	Tex-242-F	15,000	12.5	3
PG 76 or higher	Tex-242-F	20,000	12.5	3

1. The CONSTRUCTION OBSERVER may accept Hamburg Wheel test results for production and placement if no more than 1 of the 5 most recent tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.
2. Rut depth tested @ 122°F
3. Unless approved otherwise.

Use of RAS is not allowed. When using RAP, include the management methods of processing, stockpiling, and testing of RAP in the QCP submitted for the project. Blending of RAP in one feeder bin or in a stockpile is not permitted.

RAP is not allowed for any surface mix applications.

No more than 20% RAP by weight of aggregate is allowed in any mix application.

Submit any proposed adjustments or changes to a job mix formula to the CONSTRUCTION OBSERVER before production of the new job mix formula.

For Mixture Design Verification, provide the CONSTRUCTION OBSERVER with two 5-gallon buckets of each aggregate stockpile to be used on the project with three gallons of each PG binder from the plant to be used on the project. Sufficient quantities of any other additives that will be used in the HMA mixture shall also be provided.

Prior to allowing production of the trial batch, the Construction Observer will use the materials provided by the Contractor to perform the following tests to verify the HMA mixture .

1. Indirect Tensile Test in accordance with Tex-266-F
2. HAMBURG Wheel Test in accordance with Tex-242-F
3. Overlay Test in accordance with Tex-248-F
4. Cantabro Test in accordance with Tex-245-F

For mixtures designed with a Texas Gyratory Compactor (TGC), the CONSTRUCTION OBSERVER may require that the target laboratory molded density be raised to no more than 97.5% or may lower the design number of gyrations to no less than 35 for mixtures designed with an SGC if any of the following conditions exist:

1. The Indirect Tensile Test results in a value greater than 200 PSI
2. The Hamburg Wheel Test results in a value less than 3.0 mm
3. The Overlay Test results in a value less than 100 cycles
4. The Cantabro Test results in a value of more than 20% loss

In lieu of or in addition to evaluating the mixture design prior to allowing a trial batch to be produced, the CONSTRUCTION OBSERVER may also evaluate the mixture produced during the trial batch for compliance with the four tests listed above.

Submit thermal and segregation profiles as well as longitudinal joint densities on electronic forms provided by County to the CONSTRUCTION OBSERVER.

When surface irregularities, as defined in Article 341.4.9.3.3.5, "Irregularities," are detected or measured, the Contractor must take immediate corrective action defined as the removal and replacement of a full lane width of the defective area using a paver to place new mix, unless otherwise directed. If there are multiple defective areas within a sub-lot, making up to 30% of the sub-lot by area, the CONSTRUCTION OBSERVER will require the entire sub-lot be removed, unless directed otherwise.



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810 Hesters Crossing, Suite 120
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SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 5 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	13D
JW	2103	01	034	
CHECK				
JC				

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ITEM 354 – PLANING AND TEXTURING PAVEMENT
Milling machines must be able to meet the longitudinal grade and cross slope required.

Remove the loose material from the roadway before opening to traffic.

Plane a full lane width before opening to traffic at the end of a work period.

Accomplish a 2-inch depth of planing and texturing in two passes. A single cut will be permitted if at most a 1¼-inch vertical offset is created against adjacent lanes when opened to traffic at the end of a work period.

Accomplish the 2-inch Planed Butt Joint only when there is at least 4 inches of existing thickness of ACP. Consider the determination of existing thickness of ACP as subsidiary to the various Items.

Taper transverse faces at ends of passes as directed.

Make Transverse Tapers on each end of each pass using a minimum slope rate of 50 feet H to 1-inch V.

Retain ownership of planed materials.

Plane the designated areas and depths specified in the plans, as required. Mill the pavement producing a final pavement surface with transverse pattern of 0.2 inches center to center of each strike area with difference no greater than 1/16 inch between the ridge and valley (RVD) measurement of the final milled surface. Construct a uniform finish free from gouges and ridges that does not vary more than 1/8 inch in width of the cut.

Use planning machine that is power-driven, self-propelled micro-milling equipment possessing the size and shape to allow traffic safe passage through areas adjacent to the work.

Also, ensure the micro milling equipment will be:

- Equipped with a cutting mandrel with carbide or equivalent tipped cutting teeth designed for micro-milling bituminous pavement full lane width to close tolerances
- Capable of removing pavement to an accuracy of 1/16 inch (1.6 mm) with a maximum tool spacing of 5/8 inches
- Equipped with grade and slope controls operating from a string line or ski and based on mechanical or sonic operation
- Furnished with a lighting system for night work, as necessary
- Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck

Ensure micro-milling methods produce a uniform finished surface and maintain a constant cross slope between pavement edges in each lane. Provide positive drainage to prevent water accumulation on the micro-milled pavement, as shown on the Plans or directed by the CONSTRUCTION OBSERVER. The cross slope must be uniform with no depressions or slope misalignments greater than ¼ per 12 ft. exit when the slope is tested with a straightedge placed perpendicular to the center line.

Bevel back the longitudinal vertical edges greater than two (2) inches (50 mm) produced by the removal process and left exposed to traffic. Bevel the vertical edges back at least three (3) inches for each two (2) inches (75 mm for each 50 mm) of material removed. Use an attached mold board or other approved method.

Taper the transverse edges 10 ft. (3 m) to avoid creating a traffic hazard and to produce a smooth surface when removing material at ramp areas and ends of milled sections.

Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as bridge approach slabs, drainage structures, and utility appurtenances greater than ½ in areas left open to transversing vehicles. Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance. Do not micro-mill bridge joints. Damage due to micro-milling will be repaired at the CONTRACTOR's expense and to the satisfaction of the CONSTRUCTION OBSERVER.

Remove dust, residue, and loose milled material from the micro-milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.

Measure the milled surface with a 10-foot straightedge at locations determined by the CONSTRUCTION OBSERVER for quality acceptance and acceptance of test section of milling operation. Remove and replace any areas exceeding 1/8 inch RVD, as directed by the CONSTRUCTION OBSERVER at no cost to the Department.

ITEM 400 - EXCAVATION AND BACKFILL FOR STRUCTURES
Cut pavements with the use of a saw as directed. Consider subsidiary to pertinent Items.

Obtain approval of all compaction equipment prior to all backfilling and embankment operations.

Use two (2) inch washed, crushed stone with 0% passing a No. 4 sieve to backfill for bridge ends. Consider subsidiary to the pertinent Items. Provide weep holes out the face of the backwall, as directed.

ITEM 416 – DRILLED SHAFT FOUNDATIONS
Stake all Foundations, for approval, before beginning drilling operations, as directed. Examples of types of foundations are Bridge Supports, Traffic Signal Pole Foundation, Roadway Illumination Assembly Foundations, Sign Support Locations, etc.

Calculate the vertical signal head clearance before placing any Traffic Signal Pole Foundation.

Fabricate roadway illumination assembly foundations in accordance with the City of Georgetown standards GUSL-CF-B or GUSL-CF-BR (for specific installation in rock). Alternate designs to GUSL-CF-BR or GUSL-CF-BR are prohibited.

Obtain approval before placing additional exposed Traffic Pole Foundation.

Set anchor bolts for Mast-Arm Signal Poles and Strain Poles. Set two in tension and two in compression. Obtain approval of anchor bolt placement as directed before placing concrete.

Field cut holes for anchor bolts only as directed.

Remove spoils, daily, out of flood plain, or as directed.

Take cores at the bottom of all drilled shafts supporting a bridge abutment or interior bent in accordance with Item 416.3.2. Drilled shafts under wingwalls are excluded from this requirement.

ITEM 420 – CONCRETE SUBSTRUCTURES
Use Permanent Metal Deck Forms (PMDF) or prestressed concrete panels.

Do not use PMDF in areas where a "Free Joint" is indicated in the plans.

Check the sign plans for locations of clearance signs and brackets on structures, which will require inserts in the pre-stressed beams. Forward such locations to the beam fabricator.

Where Retaining Walls are integral parts of the abutment header, do not place the abutment cap prior to backfilling the wall and the abutment area up to the elevation of the bottom of the abutment cap, unless otherwise directed.

The "H" values shown on bridge layout sheets are estimated column heights. Calculate the actual column heights based on field conditions.

Perform work during good weather unless otherwise directed. If work is performed at CONTRACTOR's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the work, if required.

Prior to the completion of work, stencil the National Bridge Inventory (NBI) number (structure number) on each structure built/shown on this project, as directed. Verify with the CONSTRUCTION OBSERVER that the NBI number, which is shown on each Bridge Layout, is the number to use. Stencil the NBI number in an approved location on each bridge. Consider subsidiary to the pertinent Items.

At backwall to cap construction joints, use bonding mortar, grout, or epoxy as a bonding agent.

STATE OF TEXAS
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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 6 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	13E
CHECK				
JC				

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ITEM 421 – HYDRAULIC CEMENT CONCRETE
Sulfate resistant concrete is not required for any class of concrete.

Over-design requirements for compressive strength are waived for non-structural concrete, as defined in Table 8, Item 421.4.1.

Minimum air-entrainment requirements are waived for all classes of concrete, except for Class S, DC, or CO concrete. For all classes of concrete, except for Class S, P, or CO concrete or non-structural concrete, as defined in Table 8, the entrained air content must not exceed 8% air.

For all non-pavement applications using Class S, or CO concrete, target 5.5% entrained air. If the air content exceeds the target air content by more than 3 percentage points, the load of concrete will be rejected.

ITEM 423 - RETAINING WALLS
Provide Ashlar Stone Finish for all MSE retaining walls. Match aesthetic details of Southwest Bypass: Segment 1 as well as Southwest Bypass and Wolf Ranch Parkway. Do not include Map of Texas emblem unless otherwise directed. Finish subsidiary to retaining wall. Finish subsidiary to this item.

Drill, epoxy, and place #4 bars @ 18 inch centers, as directed, to tie riprap to the coping or anchor slab.

Exposed face of wall, face of coping, and exposed underside of coping shall receive a permanent TY III Anti-Graffiti Coating per Item 740.

Surface area is measured from finished grade at top of wall, including coping, down to the estimated top of footing/bottom of wall.

Immediately backfill the face of the retaining wall after the wall height gets above the final grade in front of the wall.

Do not measure any footing adjustments made to accommodate the available optional designs. Supply the retaining wall fabricators with the drainage plans. Ensure the wall design accommodates the construction of inlets, conduit, and any other large drainage structure as shown on the plans.

Consider any Retaining Wall Light Brackets RW (BL) required for this project subsidiary to pertinent Items.

Use the approved Mechanically Stabilized Earth (MSE) Wall Systems listed on TxDOT's website.

Two (2) feet either side of the width of the leveling pad must be compacted to meet ordinary compaction standards prior to placement of the leveling pad.

Verify each row of panel placement for specification tolerances after backfilling is accomplished and prior to placement of the next row of panels. Correct to within tolerance prior to placing subsequent rows of panels. Notify when a tolerance check is needed.

At no time will the retaining wall backfill material exceed the adjacent embankment operation by more than one embankment lift. At no time will the embankment adjacent to the retaining wall backfill exceed the wall backfill by any elevation.

Build the wall backfill material a minimum of 24 inches horizontally beyond the end of the wall reinforcement. Compact it in accordance with 423.3.

For retaining walls RW-05 and RW-06 in the plans, use TxDOT 2014 Standard Specifications Item 423 type "DS" backfill. For RW-06, any embankment below select fill shall be type "DS" backfill, in lieu of embankment type specified under Item 132. No additional payment will be made, subsidiary to pertinent items.

Particles larger than ¼ inch will be angular or crushed. Rounded rock or gravel will not be allowed.

Retaining wall coping placement will be such that the outside face of the wall panels are not offset from the inside face of coping by more than 1½ inches.

Seal all form liner joints, in a manner acceptable to prevent leakage at the surface.

Follow form liner manufacturer's recommended procedures for form liner construction.

The form liner will release clean and free of the concrete, without pulling or breaking concrete from the textured surface.

Provide underdrains as called out in the plans.

ITEM 425 - PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS
Hold a Prephase meeting for the erection of concrete members such as, Precast-Prestressed Concrete Beams and Precast-Prestressed Concrete Panels prior to the work, as directed. Notify the CONSTRUCTION OBSERVER of the meeting at least 24 hours prior.

ITEM 427 - SURFACE FINISHES FOR CONCRETE
All concrete structures, except those with form liner surfaces and those areas designated to receive special surface finishes, shall receive a Surface Area I, rub finish in accordance with this item. Perform an Ordinary Surface Finish to the faces of concrete units, such as Retaining Walls, Inlets, etc., that will have backfill material against them.

Perform the rub finish as soon as possible after form removal. Complete the finish application within 5 calendar days from the pour date. Should the completion of the finish work fall behind, or exceed the 5 day time frame, pours of any additional structures will cease until such time as the surface finish of existing structures is completed.

Consider Surface Finishes for concrete as subsidiary to the pertinent Items.

Follow form liner manufacturer's recommended procedures for form liner construction.

The form liner shall release clean and free of the concrete, without pulling or breaking concrete from the textured surface.

Seal all form liner joints, in a manner acceptable to prevent leakage at the surface.

Perform an Ordinary Surface Finish to the faces of concrete units, such as Retaining Walls, Inlets, etc., that will have backfill material against them.

Perform Low-Pressure water blasting to the concrete surfaces, if forms are not removed in time.

ITEM 431 – PNEUMATICALLY PLACED CONCRETE
This item shall be paid for by the square yard. Basis of estimate is 10% of the rock cut. Final quantities will vary based on field conditions encountered during construction.

Place PPC on unstable rock cuts or existing rock walls as determined and directed by the CONSTRUCTION OBSERVER. Paid for under this item. Incidental surface preparation required prior to placing PPC, including removal of loose rock, considered subsidiary to pertinent items.

Provide 2" thickness and use welded wire fabric unless otherwise directed. Mix design shall conform to Class II. Place anchors as directed. Subsidiary to this item.

Sculpt PPC finish to reproduce the texture and shape of the rock surrounding the PPC. Stain all PPC to match existing rock color patterns. Use white cement to provide better color match if needed, or as directed. Provide 4'x4' test panel for approval by the CONSTRUCTION OBSERVER prior to placing PPC. Subsidiary to this item. Provide additional thickness as needed for sculpting (max 2"). Paid for under this item.

ITEM 432, 462, 465, 466, & 467
Remove all loose Formwork and other Materials from the Floodplain or drainage areas, daily, which could float off in a Storm water Event, as directed.

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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
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SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 7 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	13F
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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ITEM 432 - RIPRAP
Fibers for Concrete as defined in DMS-4550 will not be allowed.

Make concrete riprap five (4) inches thick unless otherwise noted or directed.

Make all mow strip riprap concrete four (4) inches thick, unless otherwise directed.

Where any proposed riprap joins existing riprap, saw cut the existing riprap and dowel/epoxy #4 bars @ 12 inch centers. Consider subsidiary to the pertinent Items. Consider saw cutting of riprap as subsidiary.

Additional riprap may be required, as determined by the CONSTRUCTION OBSERVER, near the end of project completion due to unanticipated erosion locations. Any additional, approved riprap will be paid for under this item.

All 8" Stone Riprap Protection shall have a thickness of 8" unless otherwise called out in the plans. 8" Stone Riprap Protection shall meet the gradation requirements in the table below unless otherwise approved by the CONSTRUCTION OBSERVER.

Sieve Size	Ty I Percent Retained	Ty II Percent Retained
5"		0
4"		10 - 40
3"		30 – 70
2"	0	60 – 90
1.5"	10 – 40	
1"	30 – 70	100
3/4"	60 - 90	
1/2"	100	

Use mechanically crushed on-site material from excavation activity for 8" Stone Protection Riprap. Stone should vary in size within the limits of the table above (Do not use a single size stone). Adjust stone gradation as directed by the CONSTRUCTION OBSERVER and obtain approval prior to placement. Crushed off-site material may be used if approved. Maintain a uniform aesthetic/color when placing stone riprap as directed. Subsidiary to this item.

Place 8" Stone Riprap Protection as shown on Figure 5 of the SRR standard. Place two layers of woven filter fabric beneath 8" Stone Riprap Protection. Do not place bedding material. Subsidiary to this item.

Ensure stone is free of excess sediment prior to placement. Wash stone prior to placement if directed by the CONSTRUCTION OBSERVER. Subsidiary to this item.

When placing stone, ensure tight interlocking of different stone sizes. Fill voids with smaller stone as directed by the CONSTRUCTION OBSERVER. Subsidiary to this item.

Compact stone riprap within clearzone (TY I) with vibratory drum roller. Other compaction methods must be approved by the CONSTRUCTION OBSERVER. When placing 8" Stone Riprap Protection TY I adjacent to TY D asphalt as shown on the typical sections, ensure any gaps are filled with smaller stone. Sweep stone off pavement surface prior to compacting stone riprap. Provide 50' long by 8.5' wide test strip of compacted TY I riprap for CONSTRUCTION OBSERVER's approval prior to placement on remainder of project and adjust gradation as directed. Subsidiary to this item.

ITEM 454 – BRIDGE EXPANSION JOINTS
Apply protection System II to structural steel armor joint.

For Asphalt-Plug Expansion Joints, refer to TxDOT's website for approved systems.

ITEMS 464, 466, & 467
When RCP or structure is to be placed below finished roadway subgrade and there is less than three (3) feet of fill from top of RCP to finished subgrade elevation, then flowable fill is required, as directed. Payment made under Item 401.

ITEM 466 – HEADWALLS AND WINGWALLS
Use Class C concrete for headwalls or wingwalls.

ITEM 467 – SAFETY END TREATMENT
Cut pipe ends, in the field, to match roadway side slopes, or as directed. Apply asphalt base aluminum paint to the cut ends.

All Type II SETs shall have mitered pipe ends and cast-in-place riprap aprons.

ITEM 496 – REMOVING STRUCTURES
Notify CONSTRUCTION OBSERVER at least **30** days prior to Building Demolition that will require a 10-Calendar-Day, Prior-To-Work Notification to Texas Department of State Health Services (DSHS). If the work does not happen on the notified date then another 10-Calendar-Day, Prior-To-Work Notification will be required.

Conduct walk-through of Building with CONSTRUCTION OBSERVER to determine materials/items to be salvaged. Any material/items deemed salvageable shall be removed and stored at a location(s) approved by the CONSTRUCTION OBSERVER. Salvaging material/items shall be subsidiary to pertinent items.

Provide a detailed plan for the removal of the existing structure(s) to include the schedule of removal and list of all equipment to be used.

Removal of Building to include the structure itself, all miscellaneous items within that are not marked salvagable, all items adjacent to the exterior of the building not marked salvageable, any septic system on site, and all incidentals associated with the building. All removals associated with building shall be subsidiary to pertinent items.

The structure or structures to be removed may have surface coatings, which may contain hazardous materials. Provide for the safety and health of employees and abide by all OSHA Standards and Regulations as well as those set by Texas Department of State Health Services (DSHS).

The structural steel to be removed may contain lead paint. Submit a proposed demolition plan for approval by the CONSTRUCTION OBSERVER at least 60 days prior to the desired demolition date. Demolition plan should limit disturbing where lead paint is located when possible. If flame cutting methods will be used and lead paint cannot be avoided, the County will arrange to have the paint removed at the indicated flame-cutting locations. The paint will be removed by a separate contractor for a width of four (4) inches. No paint removal will be required if other demolition methods are employed.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING
In addition to the traffic control plans and the latest BC standard plan sheets, provide within the limits of the project, standard barricades, warning signs, delineators, lights, 28" cones, and flaggers in sufficient numbers and any combination as considered necessary by the CONSTRUCTION OBSERVER.

Utilize daily lane shifts as needed for the construction of the project. Normal traffic patterns shall be reinstated at the end of each workday. Perform mill and overlay operations during off-peak hours. Peak hours are defined as Monday through Friday: 7am-9am and 4pm-6pm. Ensure safety wedge is in place prior to normal traffic reinstatement.

Place one TY III barricade (8 feet) at each stockpile of material that is placed on the right-of-way and is located within 30 feet of the traveled way.

Furnish advisory speed signs in sufficient number as determined by the CONSTRUCTION OBSERVER.

Furnish sufficient personnel available to revise traffic control as directed by the CONSTRUCTION OBSERVER.

For any roadway drop-off greater than 2 inches adjacent to a roadway which is under traffic, the CONTRACTOR will be required to incorporate and maintain a 3:1 safety wedge into the proposed construction. All work involved shall be considered subsidiary to Item 502.

Provide the CONSTRUCTION OBSERVER a letter certifying that all truck-mounted attenuators (TMA) used on this project that were purchased on or after October 1, 1998, have been found to be crash worthy using the criteria outlined in NCHRP reports 230 or 350.

After completion of the project the CONTRACTOR shall fill any holes left by the barricades or sign supports and restore the area in which the signs were removed to its original condition.

Cover or remove any existing signs which conflict with temporary traffic control operations. Payment shall be considered subsidiary to this item.

Ensure all permanent signs and pavement markings are installed before opening that section of roadway to traffic. Consider subsidiary to the pertinent items. Repair or replace any signs which are damaged during construction, or which are deemed insufficient by the CONSTRUCTION OBSERVER.

Repair barricades within 48 hours after barricade report has been delivered.

Refer to the Project Layout and Temporary Erosion Control Plan for Texas Crushed Stone ROW crossing notes.

Coordinate with the CONSTRUCTION OBSERVER for opening of the finished roadway to public traffic.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 8 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK JW	CONTROL	SECTION	JOB	13G
CHECK JC	2103	01	034	

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ITEM 504 - FIELD OFFICE AND LABORATORY
CONTRACTOR may use the I-35 southbound frontage building on the southeastern corner of the project, owned by the City of Georgetown, as the project field office. The City will pay for utilities. Any improvements (HVAC, Roofing, etc.) required in order to utilize the building as a field office are the sole responsibility of the CONTRACTOR.

All requirements under this item are considered subsidiary to pertinent items. Note that this building is to be removed in this project under separate item.

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS
Obtain the CONSTRUCTION OBSERVER's approval for proposed methods used for erosion control before starting each phase of construction.

ITEM 512 – PORTABLE CONCRETE TRAFFIC BARRIER
Furnished PCTB may be salvaged in good condition as approved by the CONSTRUCTION OBSERVER.

ITEM 529 – CONCRETE CURB, GUTTER AND COMBINED CURB AND GUTTER
Fibers for concrete as defined in DMS-4550 will not be allowed.

ITEM 540 - METAL BEAM GUARD FENCE
Before beginning the installation of the proposed Metal Beam Guard Fence (MBGF), stake the locations for approval. Adjust the limits of the MBGF to meet field conditions, as directed, before erection.

Furnish new timber posts matching the post type on Southwest Bypass Segment 1 and RM 2243. Refer to Long Span standard for spanning culvert crossings.

Use applicable standard to match the existing RM 2243 metal beam guard fence height. Obtain approval prior to placement. Do not use the older, lower height standards for new metal beam guard fence called out elsewhere in the plans.

Install all permanent MBGF and delineators, when the roadway is constructed in one-half widths, on that section, before opening the road to traffic.

Provide Rail Elements that meet AASHTO M 180 TY I Galvanization (1.80 Oz per SY).

ITEM 550 – CHAIN LINK FENCE
Provide thermally fused PVC coating according to the specifications. Coating shall be black unless otherwise directed by the CONSTRUCTION OBSERVER.

ITEM 552 – WIRE FENCE
Begin installation of barbed wire fence within 30 calendar days of the NTP and complete installation within 60 calendar days of the NTP.

ITEM 556 – PIPE UNDERDRAINS
Filter material will meet the gradation requirements for concrete coarse aggregate (Grade 2, 3, or 4), per Table 4 of TxDOT Item 421.

ITEM 585 - RIDE QUALITY FOR PAVEMENT SURFACES
Use Surface Test Type B Pay Schedule 3 to evaluate ride quality of travel lanes and shoulders greater than or equal to 10 ft wide.

The Contractor is responsible for the Surface Testing and the results shall be provided in a simple format by project stationing.

ITEMS 610, 618, 620, 624, 628, 684, & 686
Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Refer to TxDOT's website for list of pre-qualified manufacturers. No substitutions will be allowed for materials found on the list.

ITEM 610 – ROADWAY ILLUMINATION ASSEMBLIES
Fabricate steel roadway illumination poles in accordance with TxDOT standards RIP-(1) – RIP-(4) (Roadway Illumination Poles - 2017). Poles fabricated according to RIP-17.

Limitations on Use of the RIP-17 Standard

The Roadway Illumination Pole (RIP-17) standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, the contractor shall provide poles meeting the following requirements:

A. Submittals. Following the electronic shop drawing submittal process (see ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf), the contractor shall submit to the Engineer, for approval, fabrication drawings and calculations for the poles. The drawings and calculations shall be sealed by a Texas registered or licensed professional engineer (P.E.).

B. Luminaire Structural Support Requirements. Lighting poles, arms, and anchor bolt assemblies shall have a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the current edition of the AASHTO Design Specifications. For transformer base poles, the fabricator shall include transformer base and connecting hardware in calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.

Alternate designs to RIP-17 or the use of aluminum to fabricate poles will require the submission of shop drawings. Copies of the standard shop drawings are on file with Traffic Operations Division, Bridge Division, and the Materials Section of Construction Division. Additional shop drawings for roadway illumination assemblies built in conformance with these drawings are not required. Pre-approved shop drawing manufacturers and assembly model numbers can be found on TxDOT's website. Category is "Roadway Illumination and Electrical Supplies."

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Category is "Roadway Illumination and Electrical Supplies." Fuse holder is shown on list under Items 610 & 620.

Provide 10-amp time delay fuses.

The local public utility will provide a 240/480-Volt Power Service Drop that will be utilized by the Illumination System installed within the project.

Provide luminaire drivers with a 480-volt operating range.

Maintain all new illumination for the duration of the contract.

Place the illumination system in operation after satisfactory completion of the circuit tests. Final acceptance will not be made until the system has operated satisfactorily for a period of at least 14 consecutive days. Consider all repairs and adjustments subsidiary to pertinent Items. Pay for electrical energy during the trial period.

Inspection of all completed work provided in the Contract will be performed. The CONTRACTOR will be released from further maintenance on that project if the work is found to be satisfactory. Partial acceptance will be made and will be in no way void or alter any Items of the contract.

STATE OF TEXAS
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03/23/2018

NO.	DATE	REVISION	APPROVED

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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

GENERAL NOTES

SHEET 9 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	13H
JW	2103	01	034	
CHECK				
JC				

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ITEM 618 - CONDUIT

Do not use cast iron junction boxes in concrete bridge rails. Use polymer concrete junction boxes only. Mount the junction boxes flush (+ 0", - ½") with concrete surface of concrete bridge rail.

Use materials from prequalified material producers list as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) materials producers list. Category is "Roadway Illumination and Electrical Supplies."

Consider the polymer concrete barrier boxes subsidiary to ITEM 618, "CONDUIT."

Refer to plans and specifications for type of conduit. Waterproof and tighten all couplings and connections. Bring all proposed and existing conduit into a ground box and 'elbow' it unless otherwise shown on the plans. Provide a bushing to protect the wire from abrasion when a conduit run terminates.

Replace sections of conduit with the size and type shown on the plans in the event the existing conduit proves unusable due to location or damage.

Fit PVC and HDPE conduit terminations with bell ends.

Secure permission from the proper authority, as directed, before cutting into or removing any sidewalks or curbs for installation of this Item.

Saw cut and replace any riprap, which must be removed to install the conduit. Replace riprap with material and texture as directed.

The locations of conduit and ground boxes are diagrammatic and so shift, as directed, to accommodate field conditions.

Install conduit in an area not exceeding two (2) feet in any direction from a straight line with the depth of the conduit at least two (2) feet, unless otherwise shown on the plans. Installation of the conduit by jacking or boring method will be at a depth of at least one (1) foot below the bottom of the base material of the roadway. Evidence of damage to the roadway during the jacking or boring operation will be enough grounds to stop the method being used.

Install conduit on a 2-inch sand cushion and backfill with at least six (6) inches of sand. Backfill the remainder of the trench with flexible base, soil or two-sack concrete as required by the location of the conduit or as directed.

Install underground conduits within a concrete encasement for all illumination conduits routed directly under a proposed roadway. Bore all illumination conduits routed directly under an existing roadway.

Consider all conduit elbows and rigid metal extensions required to be installed on PVC conduit systems subsidiary.

Install a high tension, non-metallic pull rope in all conduit runs. The pull ropes are for future use. Cap all empty conduit runs using standard weather tight conduit caps as directed. Consider this work subsidiary to the pertinent Item.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system including installed loop detectors and traffic signal cables which are in conformance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

Placement of conduit under the existing pavement using the open trench method will not be allowed without prior approval.

Seal all conduit ends with a permanently soft, non-toxic duct seal. The duct seal must not adversely affect plastic materials or corrode metals.

Use a coring device when drilling holes through concrete structures. Do not use masonry or concrete drills, unless otherwise approved.

Use conduit hangers for three (3) inch and larger conduit when hanging conduit from structures. Conduit hangers shall be used for all conduits prohibited from being embedded within bridge structure and routing across the bridge structure.

Existing conduit may be proposed for reuse in this project. If the existing conduit cannot be used to place or add new electrical conductors, repair or replace this conduit, as directed. Repair of the conduit will be paid as "Extra Work" on a "Force Account" basis. Probe the existing conduit when locating drill shafts so that the existing conduit's location will be known before it is needed.

When using existing conduit, ensure that all conduits have bushings and are cleaned of dirt, mud, grease, and other debris. Restrap conduit that is being relocated to new timber poles as if it were a new installation. Consider this work subsidiary to this Item.

Consider all fittings, brackets, and junction boxes necessary to complete the installations subsidiary to the pertinent Items.

ITEM 620 – ELECTRICAL CONDUCTORS

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holder from manufacturers pre-qualified by the Traffic Operations Division. Fuse holder is shown on the producer list under Items 610 & 620.

Provide and install approved 10-amp time delay fuses.

Provide breakaway disconnects in all breakaway poles. Use Bussman HEBW, Littelfuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littelfuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

Install a minimum size 8 AWG equipment grounding conductor (EGC) in all conduits including loop detectors and traffic signal cables. Payment and the size of the EGC will be in accordance with standard ED (3)-14, note 12.

Clearly and permanently, mark "Illumination" on the Illumination Conductors installed in a Signal Mast-Arm Pole or Strain Pole. Make the marks easily visible from the hand hole.

Identify the conductors as shown on the Electrical Details Standard Sheets when two or more conductors are present in one conduit or enclosure. Use identification tag with two plastic straps. Each tag will indicate circuit number, letter, or other identification as shown on the plans.

Bond grounding conductors, which share the same conduit, junction box or structures, together at every accessible point, in accordance with the Electrical Detail Standard Sheets and the latest edition of the National Electrical Code (NEC).

All wiring will be in accordance with the National Electrical Code (NEC) and the appropriate Department standard sheets.

ITEM 628 – ELECTRICAL SERVICES

The service enclosure provided in this contract will have provisions for pad locking the enclosure shut.

The traffic signal system will require 120/240-Volt Power Service provided by the Local Electric Utility Company. CONTRACTOR shall make all arrangements for power.

The illumination system will require 240/480-Volt Power Service provided by the Local Electric Utility Company. CONTRACTOR shall make all arrangements for power.

ITEM 644 – SMALL ROADSIDE SIGN ASSEMBLIES

Fabricate all small signs not detailed on the plans in conformance with the latest edition of the "Standard Highway Sign Designs for Texas," refer to TxDOT's website.

STATE OF TEXAS
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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GENERAL NOTES

SHEET 10 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	131
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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ITEM 662 – WORK ZONE PAVEMENT MARKINGS
Notify the CONSTRUCTION OBSERVER at least 24 hours in advance of removing existing striping and placing pavement markings & markers.

Apply markings during good weather unless otherwise directed. If markings are placed at CONTRACTOR's option, when inclement weather is impending, and the markings are damaged by subsequent precipitation, the CONTRACTOR is responsible for all costs associated with replacing the markings if required.

Remove work zone pavement markings within 48 hours after permanent striping has been completed.

Foil backed pavement markings will not be allowed.

ITEM 666 – RETROREFLECTORIZED PAVEMENT MARKINGS
Reference existing channel islands, gores, and lane striping before commencing work. Provide referencing that will include a sketch of the layout to the CONSTRUCTION OBSERVER. Obtain approval for placement of guidemarks from the CONSTRUCTION OBSERVER before installing any permanent pavement markings. Consider subsidiary to the pertinent Items.

ITEM 672 – RAISED PAVEMENT MARKERS
Place the bituminous adhesive at a temperature range of 380°F to 390°F. Place the pavement marker on the bituminous adhesive within approximately 20 seconds after the adhesive is placed on the pavement. Ensure the pavement marker rests solely on the adhesive and not the pavement surface. Ensure that a minimum of ⅛ inch layer of bituminous adhesive remains between the pavement marker and the pavement surface.

ITEM 677 – ELIMINATE EXISTING PAVEMENT MARKINGS AND MARKERS
Use flail milling methods only unless otherwise approved by the CONSTRUCTION OBSERVER. Mill minimum width necessary for complete removal of the existing markings. Place 30 Mil (min) black thermoplastic over all areas that are flail milled. The black thermoplastic must meet the specifications of Item 666. Thermoplastic considered subsidiary to this item.

ITEM 680 – HIGHWAY TRAFFIC SIGNALS
Install all of the materials necessary for a complete signal system as follows:

Provide a 7 day advance notice to the Austin District Signal Shop at (512) 832-7012, and the Georgetown/Williamson County Area Office (512) 930-5402 before beginning any work involving traffic signals.

Provide a 14 day advance notice to the City of Georgetown (512) 930-8151 before beginning any work involving traffic signals.

Furnish all materials, tools, and labor required to provide a completed installation in accordance with the plans and specifications. Furnished materials provided by the CONTRACTOR will be new undepreciated stock.

Place the traffic signal into operation after the entire traffic signal has been completed, all required striping is complete, and all conflicting signing is removed. The responsible Signal Shop will be present to program the controller and assist with detection setup.

Install 250W EQ LED illumination fixtures as shown in the plans. Test in accordance with Item 616. This work is subsidiary.

Furnish and install permanent signs mounted on the traffic signal poles. Furnish all hardware for installation. Consider all costs associated with the furnishing and installation of the permanent signs and the necessary hardware subsidiary to the pertinent Items.

After the completion of the entire signal installation (including striping), a 30-day test period begins. After it has been determined, by the County, that the field wiring and controller operation are satisfactory after this test period, and all other requirements of the project have been met, the County will relieve the CONTRACTOR of any other responsibilities for the operation of the signal.

Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the CONSTRUCTION OBSERVER a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the CONSTRUCTION OBSERVER of each trouble call. Do not clear the error log in the conflict monitor during the thirty-day test period without the approval of the CONSTRUCTION OBSERVER.

Remove the existing stop sign panels (or assemblies) after the traffic signals are in operation.

Notify the CONSTRUCTION OBSERVER one (1) week before beginning any work involving traffic signals.

ITEM 682 – VEHICLE AND PEDESTRIAN SIGNAL HEADS
Install signal head attachments so the wiring to each passes from the signal pole through the attachment hardware to the signal head. Refer to District Standard for more conductor attachment information. Attachment methods not shown on the district standard are to be approved by the Construction Observer before work begins. Use UV rated tie wraps.

Ensure the signal heads are made of aluminum and are hooded and covered until the signal system is put into operation.

Each signal head will be one-way with the proper number of sections shown on the plans. Each head color will be bright yellow (Federal Yellow #13538 of Federal Standard 595). The inside of the visors will have a flat black finish.

Installed traffic signal heads within the project will have backplates unless otherwise shown on the plans. Backplates will be black aluminum.

Provide pedestrian signal head assemblies, which have a flush "egg-crated" or "Z" pattern visor for all lamps, and a one-piece reflector assembly for incandescent lamps only.

Provide louvers, which have five (5) vanes with a black finish on inside surfaces when required within the project. Fasten a hardware cloth screen, securely, with ⅝" or smaller mesh size to the front face of each louver to prevent entry by birds.

Mount signal heads level and plumb as directed.

Replace, at Contractor's expense, all burned out or defective lamps for a period of four (4) weeks from the date of the initial turn on. At the end of this 4-week period, the Construction Observer will relieve the Contractor of any maintenance of this portion of the signal system.

Use the four point mounting system (TY A) for signal heads, except in cases of skewed or vertical heads when (TY B) will be used.

Place LED's at the proper angle with the ground. The wording "top" or the "up arrow" indicates the proper fixed alignment within the signal head. Hang the head parallel to the ground once attached and not angled down as with incandescent heads. Ensure the signal head to be level and within tolerances. LED's are designed to direct the indication towards the roadway surface. Variance in head leveling will cause the LED indication to appear dim during slight movement. Ensure each LED head to be properly leveled and sight tested before final acceptance.

ITEM 684 – TRAFFIC SIGNAL CABLES
Leave at least two (2) feet for each cable run in each pull box and leave at least two (2) feet in each steel pole in addition to the required length for each separate cable. Provide an extra five (5) feet of each conductor terminating in the controller cabinet. Ensure conductors are continuous without splice from terminal point to terminal point or as directed. Do not use wire nuts.

STATE OF TEXAS
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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

GENERAL NOTES

SHEET 11 OF 12

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	13J
JW	2103	01	034	
CHECK				
JC				

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ITEM 685 - ROADSIDE FLASHING BEACON ASSEMBLIES
Sign considered subsidiary to flashing beacon assembly.

ITEM 686 – TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)
Provide and install damping plates on all mast arms of 40 ft. and over. For mast arms less than 40 ft., refer to SMA and DMA Vibration Notes for guidance. Consider the cost for the provision and installation of damping plates as subsidiary to the various bid Items found within this project.

Provide double nuts on top and bottom of the base plate as shown on the standards.

Provide signal pole assemblies as shown on plans. Luminaire lamps and the installation of the arms and lamps are considered subsidiary to the pertinent Items.

When luminaires are to be installed on mast arm poles, provide a separate terminal strip in the signal pole access compartment. The terminal strip shall be a 4-circuit Buchanan-Type 104SN, Kulka-Type 985-GP-4 CU, or equivalent.

Provide a 10-amp time-delay fuse for traffic signal poles onto which luminaires are to be installed. Place the fuse in the fuse block indicated within note #4 found on State standard MA-D-12.

Furnish mast arms to the City of Georgetown for future installation, as noted in the plans.

ITEM 730 – ROADSIDE MOWING
Perform roadside mowing along the Roadway for the length of the project, as directed.

Complete spot mowing, as directed.

ITEM 734 – LITTER REMOVAL
Litter Removal, as defined below, is subsidiary to Roadside Mowing.

Complete Litter Removal Cycles along the Roadway for the length of the project, as directed.

Complete Litter Removal cycles prior to any mowing cycles.

Remove all litter on the right of way, within project limits.

ITEM 738 – CLEANING AND SWEEPING HIGHWAYS
Complete cleaning and sweeping cycles at regular intervals, as directed. Complete one cycle at the end of construction and prior to final acceptance. Subsidiary to pertinent items.

ITEM 6090 – LED INTERNALLY ILLUMINATED STREET NAME SIGNS
Coordinate with City of Georgetown for fabrication of Internally Illuminated Street Name Signs.

S2 RC – ROCK CUT
Place PPC on unstable areas as determined and directed by the CONSTRUCTION OBSERVER. Paid for under Item 431, "Pneumatically Placed Concrete".

Refer to the "BLASTING" section of the general notes for notes pertaining to blasting activities.

Alternate methods to achieve a smooth rock face must be approved by the CONSTRUCTION OBSERVER and will be subject to site testing sufficient to substantiate the method to the satisfaction of the CONSTRUCTION OBSERVER prior to implementation. No additional payment will be made for alternate methods.

S2 GA - GATE ATTENDANT
Provide 2 (two) full time gate attendants, one located at the project entrance at RM 2243 and the other at the Segment 1 I-35 SBFR entrance, during working hours for the duration of the project, or as directed by the CONSTRUCTION OBSERVER. Gate attendants shall keep a log of all personnel and vehicles entering and exiting the site. Gate attendants shall be paid for by the hour. Contract assumes 10 hours per workday (5,600 total hours).

RETAINING WALL RW-06
If the CONSTRUCTION OBSERVER directs the CONTRACTOR not to build Retaining Wall RW-06, omit Sheets 22, 78, 113, and 114 from the plan set. Adjust contract quantities as shown on sheet 22.

The list of material below is for the CONTRACTOR's information only.

It is the responsibility of the CONTRACTOR to verify all items and quantities listed below.

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680

DESCRIPTION	UNIT	QUANTITY
TRAFFIC SIGNAL CONTROLLER FOUNDATION	EA	1
LED LUMINAIRE	EA	4
R9-3 (18" x 18")	EA	4

STATE OF TEXAS
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122057
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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

GENERAL NOTES

SHEET 12 OF 12

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	13K
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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SUMMARY OF TRAFFIC CONTROL QUANTITIES

LOCATION	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING (MO)	S2 GA GATE ATTENDANT (HR)
SOUTHWEST BYPASS: SEGMENT 2		
TRAFFIC CONTROL PLAN SBFR I-35 - SHEET 1 of 1		2,800
CSJ: 2103-01-034	14	
TRAFFIC CONTROL PLAN RM 2243- SHEET 1 of 2		2,800
TRAFFIC CONTROL PLAN RM 2243- SHEET 2 of 2		
Total	14	5,600

SUMMARY OF ROADWAY QUANTITIES

LOCATION	100 6002 PREPARING ROW (STA)	104 6001 REMOVING CONC (PAV) (SY)	104 6013 REMOVING CONC (FOUNDATIONS) (SY)	105 6011 REMOVING STAB BASE AND ASPH PAV (2"-6") (SY)	110 6001 EXCAVATION (ROADWAY) (CY)	132 6005# EMBANKMENT (FINAL) (ORD COMP) (TY C) (CY)	132 6006## EMBANKMENT (FINAL) (DENS CONT) (TY C) (CY)	247 6041 FL BS (CMP IN PLC) (TYA GR1&2) (FNAL POS) (CY)	310 6027 PRIME COAT (MC-30 OR AE-P) (GAL)	340 6242 D-GR HMA (SQ) TY-B OR D PG64-22 (LVL-UP) (TON)	341 6008 D-GR HMA TY-B PG64-22 (TON)	341 6042 D-GR HMA TY-D SAC-B PG70-22 (TON)	354 6021 PLANE ASPH CONC PAV (0" TO 2") (SY)	432 6001 RIPRAP (CONC) (4 IN) (CY)	432 6045 RIPRAP (MOW STRIP) (4 IN) (CY)	496 6039 REMOV STR (BUILDING) (EA)	496 6043 REMOV STR (SMALL FENCE) (LF)	529 6007 CONC CURB & GUTTER (TY I) (LF)
SOUTHWEST BYPASS: SEGMENT 2																		
PLAN AND PROFILE WBFR - SHEET 1 OF 8	12	5	582	715	-	-	-	-	-	-	-	290	-	-	-	2	617	-
PLAN AND PROFILE WBFR - SHEET 2 OF 8	11	-	-	-	-	-	-	-	-	-	-	373	-	-	-	-	-	-
PLAN AND PROFILE WBFR - SHEET 3 OF 8	11	-	-	-	2,166	212	1,021	1,247	689	-	590	773	-	-	-	-	-	661
PLAN AND PROFILE WBFR - SHEET 4 OF 8	11	-	-	-	4,400	4,798	1,325	630	347	-	298	297	-	-	15	-	-	347
PLAN AND PROFILE WBFR - SHEET 5 OF 8	11	-	-	-	1,056	6,776	9,472	2,058	1,136.0	-	975	965	-	-	13	-	-	1,105
PLAN AND PROFILE WBFR - SHEET 6 OF 8	11	-	-	-	6,195	102,560	23,914	2,078	1,148	-	983	966	-	-	-	-	-	1,108
PLAN AND PROFILE WBFR - SHEET 7 OF 8	11	-	-	-	85,864	100	515	2,114	1,170	-	1,001	986	-	-	-	-	-	1,109
PLAN AND PROFILE WBFR - SHEET 8 OF 8	8	-	-	-	7,658	79	787	1,497	846	239	725	857	1,217	9	-	-	-	583
CSJ: 2103-01-034																		
PLAN AND PROFILE RM 2243 - SHEET 1 OF 1	8	-	-	-	951	224	-	214	119	590	100	434	2,958	43	-	-	-	27
Total	94	5	582	715	108,290	114,749	37,034	9,838	5,455	829	4,672	5,941	4,175	52	28	2	617	4,940

\# ZONE 1 EMBANKMENT SEE GENERAL NOTES
\## ZONE 2 EMBANKMENT SEE GENERAL NOTES

SUMMARY OF ROADWAY QUANTITIES CONT

LOCATION	529 6008 CONC CURB & GUTTER (TY II) (LF)	531 6017 CURB RAMPS (TY 22) (EA)	540 6001 MTL W-BEAM GD FEN (TIM POST) (LF)	540 6006 MTL BEAM GD FEN TRANS (THRIE-BEAM) (EA)	540 6016 DOWNSTREAM ANCHOR TERMINAL SECTION (EA)	544 6001 GUARDRAIL END TREATMENT (INSTALL) (EA)
SOUTHWEST BYPASS: SEGMENT 2						
PLAN AND PROFILE WBFR - SHEET 1 OF 8	-	-	-	-	-	-
PLAN AND PROFILE WBFR - SHEET 2 OF 8	-	-	-	-	-	-
PLAN AND PROFILE WBFR - SHEET 3 OF 8	-	-	-	-	-	-
PLAN AND PROFILE WBFR - SHEET 4 OF 8	-	-	75	3	-	2
PLAN AND PROFILE WBFR - SHEET 5 OF 8	-	-	163	1	1	1
PLAN AND PROFILE WBFR - SHEET 6 OF 8	-	-	-	-	-	-
PLAN AND PROFILE WBFR - SHEET 7 OF 8	-	-	-	-	-	-
PLAN AND PROFILE WBFR - SHEET 8 OF 8	155	-	-	-	-	-
CSJ: 2103-01-034						
PLAN AND PROFILE RM 2243 - SHEET 1 OF 1	274	4	-	-	-	-
Total	429	4	238	4	1	3

SUMMARY OF RETAINING WALL QUANTITIES

LOCATION	420 6007 CL A CONC (FLUME) (CY)	423 RW05 RETAINING WALL (MSE) (ASHLAR STONE FIN) (SF)	423 RW06 RETAINING WALL (MSE) (ASHLAR STONE FIN) (SF)	432 6001 RIPRAP (CONC) (4 IN) (CY)	432 6045 RIPRAP (MOW STRIP) (4 IN) (CY)	450 6023 RAIL (TY SSTR) (LF)	556 6006 PIPE UNDERDRAINS (TY 6) (6") (LF)	740 6005 ANTI - GRAFFITI COATNG (PERMNENT-TY III) (SF)
SOUTHWEST BYPASS: SEGMENT 2								
RW-05 - SHEET 1 OF 1	1	2,690	-	-	5	180	215	2,690
RW-06 - SHEET 1 OF 1	-	-	2,416	28	-	114	-	-
Total	1	2,690	2,416	28	5	294	215	2,690

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 1 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	14
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00002017018.tbl
USER: lgomezgonz DATE: 4/10/2018 TIME: 9:52:53 AM SCALE: 1:1
FILE: \

WBFR EARTHWORK QUANTITIES

STATION	ITEM 110 6001 EXCAVATION (ROADWAY) (CY)	ITEM 132 6005 EMBANKMENT (FINAL) (ORD COMP) (TY C) (CY)	ITEM 132 6006 * EMBANKMENT (FINAL) (DENS CONT) (TY C) (CY)
394+90.00	0	0	0
395+00.00	34	4	0
395+50.00	85	16	258
396+00.00	77	16	375
396+50.00	153	16	185
397+00.00	187	16	83
397+50.00	187	16	47
398+00.00	156	16	47
398+50.00	127	16	21
399+00.00	131	16	4
399+50.00	174	16	0
400+00.00	189	16	1
400+50.00	185	16	0
401+00.00	223	16	0
401+50.00	258	16	0
402+00.00	275	16	0
402+50.00	322	16	0
403+00.00	747	22	0
403+50.00	776	40	0
404+00.00	427	38	0
404+50.00	568	20	0
405+00.00	997	0	0
405+50.00	257	0	0
406+00.00	0	0	0
406+50.00	0	0	0
407+00.00	0	0	0
407+50.00	0	0	0
408+00.00	0	0	0
408+50.00	0	0	0
409+00.00	0	0	0
409+50.00	0	0	0
410+00.00	0	0	0
410+50.00	0	0	0
411+00.00	0	0	0
411+50.00	0	0	0
412+00.00	10	2,634	431
412+50.00	21	2,012	894
413+00.00	23	1,522	914
413+50.00	29	935	875
414+00.00	36	141	858
414+50.00	29	24	797
415+00.00	17	12	785
415+50.00	13	12	661
416+00.00	14	9	529
416+50.00	22	8	394
417+00.00	34	9	209
417+50.00	71	9	75
418+00.00	90	9	36
418+50.00	51	8	139
419+00.00	19	8	307
419+50.00	23	8	364
420+00.00	47	88	348
420+50.00	82	281	291
421+00.00	73	367	260
421+50.00	81	364	280
422+00.00	82	436	181
422+50.00	163	632	109
423+00.00	49	837	280
423+50.00	8	1,057	780
424+00.00	5	1,555	1,178
424+50.00	5	2,871	1,211
425+00.00	5	5,085	1,211
425+50.00	5	6,705	1,211
426+00.00	4	8,090	1,211
426+50.00	5	8,990	1,209
427+00.00	5	9,870	1,176
427+50.00	3	10,366	1,102

WBFR EARTHWORK QUANTITIES CONT.

STATION	ITEM 110 6001 EXCAVATION (ROADWAY) (CY)	ITEM 132 6005 EMBANKMENT (FINAL) (ORD COMP) (TY C) (CY)	ITEM 132 6006* EMBANKMENT (FINAL) (DENS CONT) (TY C) (CY)
428+00.00	64	10,460	1,012
428+50.00	285	10,152	980
429+00.00	593	9,070	1,453
429+50.00	828	7,901	984
430+00.00	948	4,945	990
430+50.00	881	1,898	997
431+00.00	585	518	1,004
431+50.00	266	186	1,013
432+00.00	109	271	1,022
432+50.00	67	468	1,025
433+00.00	37	617	1,022
433+50.00	18	826	1,020
434+00.00	16	1,033	1,015
434+50.00	1,461	683	868
435+00.00	3,557	96	498
435+50.00	4,155	4	17
436+00.00	4,150	0	0
436+50.00	4,342	0	0
437+00.00	4,670	0	0
437+50.00	4,898	0	0
438+00.00	4,921	0	0
438+50.00	4,873	0	0
439+00.00	4,799	0	0
439+50.00	4,703	0	0
440+00.00	4,530	0	0
440+50.00	4,310	0	0
441+00.00	4,156	0	0
441+50.00	3,984	0	0
442+00.00	3,804	0	0
442+50.00	3,641	0	0
443+00.00	3,478	0	0
443+50.00	3,292	0	0
444+00.00	2,966	0	0
444+50.00	2,609	0	0
445+00.00	2,250	0	0
445+50.00	1,776	0	0
446+00.00	1,250	0	0
446+50.00	824	0	0
447+00.00	628	0	14
447+50.00	667	0	156
448+00.00	758	3	219
448+50.00	684	8	201
449+00.00	543	8	125
449+50.00	512	9	55
450+00.00	550	21	16
450+50.00	603	9	1
451+07.54	639	21	0
TOTAL	107,339	114,525	37,034

* DENSITY CONTROLLED EMBANKMENT IS REQUIRED UP TO 8' BENEATH THE PAVEMENT SURFACE. SEE GENERAL NOTES FOR MORE INFORMATION.

TABLES INCLUDE WBFR EARTHWORK ONLY. SEE FENCING AND GRADING PLAN FOR ADDITIONAL EARTHWORK FOR SITE GRADING REQUIRED.

RM 2243 EARTHWORK QUANTITIES

STATION	ITEM 110 6001 EXCAVATION (ROADWAY) (CY)	ITEM 132 6005 EMBANKMENT (FINAL) (ORD COMP) (TY C) (CY)
475+07.12	0	0
475+50.00	11	0
476+00.00	37	5
476+50.00	65	12
477+00.00	108	20
477+50.00	171	30
478+00.00	193	30
478+50.00	166	30
479+00.00	97	31
479+50.00	76	30
480+00.00	0	0
480+50.00	0	21
481+00.00	0	0
481+50.00	0	15
482+00.00	0	0
482+50.00	11	0
483+00.00	16	0
TOTAL	951	224

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 2 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	15

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 TIME: 2:03:17 PM SCALE: 1:1
FILE: \ PENTABLE: S2-00000201707018.tbl

SUMMARY OF FENCING AND GRADING

LOCATION	110 6001	132 6005	431 8001	496 6043	512 6005	550 6001	550 6006	552 8001	552 8002	S2 BD	S2 RC
	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY C)	PNEUMATICALLY PLACED CONC (ROCK FACIA)	REMOV STR (SMALL FENCE)	PORT CTB (FUR & INST) (F-SHAPE) (TY 1)	CHAIN LINK FENCE (INSTALL) (6')	GATE (REMOVE)	WIRE FENCE	GALVANIZED TUBE GATE	BOULDER DELINEATION	ROCK CUT
	CY	CY	SY	LF	LF	LF	EA	LF	EA	LF	SF
SOUTHWEST BYPASS: SEGMENT 2											
FENCING AND GRADING PLAN - SHEET 1 OF 6	-	-	-	391	-	-	1	164	-	-	-
FENCING AND GRADING PLAN - SHEET 2 OF 6	26,443	461	-	-	1,440	-	-	3,507	3	1,852	-
FENCING AND GRADING PLAN - SHEET 3 OF 6	12,664	227	-	-	-	-	-	3,966	2	2,860	-
FENCING AND GRADING PLAN - SHEET 4 OF 6	23,845	7,792	31	-	-	116	-	4,012	-	2,640	2,834
FENCING AND GRADING PLAN - SHEET 5 OF 6	-	-	540	-	-	-	-	2,716	-	699	48,578
FENCING AND GRADING PLAN - SHEET 6 OF 6	201	-	54	558	-	-	1	1,051	-	-	4,900
Total	63,153	8,480	625	949	1,440	116	2	15,416	5	8,051	56,312

SUMMARY OF DRAINAGE QUANTITIES

LOCATION	401 6001	432 6033	464 6005	464 6007	464 6008	464 6018	464 6026	466 6005	466 6130	467 6001	467 6388	467 6390	467 6394	467 6419	467 6422	467 6448	467 6453
	FLOWABLE BACKFILL	RIPRAP (STONE PROTECTION) (18 IN)	RC PIPE (CL III) (24 IN)	RC PIPE (CL III) (30 IN)	RC PIPE (CL III) (36 IN)	RC PIPE (CL IV) (24 IN)	RC PIPE (CL V) (24 IN)	HEADWALL (CH - FW - O) (DIA= 24 IN)	HEADWALL (CH - PW - S) (DIA= 24 IN)	SET (PIPE RUNNER ASSEMBLY)	SET (TY II) (24 IN) (RCP) (3:1) (C)	SET (TY II) (24 IN) (RCP) (4:1) (C)	SET (TY II) (24 IN) (RCP) (6:1) (C)	SET (TY II) (30 IN) (RCP) (4:1) (C)	SET (TY II) (30 IN) (RCP) (6:1) (C)	SET (TY II) (36 IN) (RCP) (3:1) (C)	SET (TY II) (36 IN) (RCP) (6:1) (C)
	CY	CY	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
SOUTHWEST BYPASS: SEGMENT 2																	
CULVERT NO. 6 LAYOUT - SHEET 1 OF 1	21	53	84	-	-	-	-	-	-	-	1	1	-	-	-	-	-
CULVERT NO. 7 LAYOUT - SHEET 1 OF 1	30	35	-	168	-	-	-	-	-	-	-	-	-	2	2	-	-
CULVERT NO. 8 LAYOUT - SHEET 1 OF 2	-	30	-	-	-	200	-	-	-	-	-	-	1	-	-	-	-
CULVERT NO. 8 LAYOUT - SHEET 2 OF 2	-	-	-	-	-	110	-	1	-	-	-	-	-	-	-	-	-
CULVERT NO. 8B LAYOUT - SHEET 1 OF 2	-	25	-	-	-	-	94	-	-	-	-	-	1	-	-	-	-
CULVERT NO. 8B LAYOUT - SHEET 2 OF 2	-	-	-	-	-	-	170	-	1	-	-	-	-	-	-	-	-
CULVERT NO. 9 LAYOUT - SHEET 1 OF 1	116	41	-	-	360	-	-	-	-	1	-	-	-	-	-	3	3
Total	167	184	84	168	360	310	264	1	1	1	1	1	2	2	2	3	3

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 3 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	16
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/7018.tbl
USER: lgomezgonz DATE: 4/11/2018 TIME: 7:01:36 AM SCALE: 1:1
FILE: \

TRAFFIC SIGNAL QUANTITY SUMMARY (INTERIM)

CONTRACTOR PROVIDED AND INSTALLED ITEMS				
TXDOT SPECS				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	LEANDER RD AND SW BYPASS
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	52
618	6046	CONDT (PVC) (SCH 80) (2")	LF	400
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	335
618	6053	CONDT (PVC) (SCH 80) (3")	LF	130
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	740
620	6007	ELEC CONDR (NO.8) BARE	LF	1340
620	6008	ELEC CONDR (NO.8) INSULATED	LF	1800
621	6002	TRAY CABLE (3 CONDR) (12 AWG)	LF	860
624	6010	GROUND BOX TY D (162922)W/APRON	EA	5
628	6164	ELC SRV TY D 120/240 070(NS)AL(E)PS(U)	EA	1
680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
*	*	TRAFFIC CONTROLLER FOUNDATION	EA	1
*	*	LED LUMINAIRE	EA	4
*	*	R9-3 (18"X18")	EA	4
686	6040	INS TRF SIG PL AM(S)1 ARM(36')LUM&ILSN**	EA	1
686	6044	INS TRF SIG PL AM(S)1 ARM(40')LUM&ILSN**	EA	1
686	6048	INS TRF SIG PL AM(S)1 ARM(44')LUM&ILSN**	EA	2
6090	6002	ILSN(LED)(8 D)(CITY OF GEORGETOWN)	EA	4

NOTES
* SUBSIDIARY TO ITEM 680.
** MAST ARMS TO BE FURNISHED AND DELIVERED TO THE CITY OF GEORGETOWN TO BE INSTALLED AT A LATER TIME.

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 4 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS AF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK BP	TEXAS	AUS	WILLIAMSON	17
CHECK TG	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/7018.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 2:03:21 PM SCALE: 1:1
FILE: \

TRAFFIC SIGNAL QUANTITY SUMMARY(ULTIMATE)(FOR INFORMATION ONLY)

ITEMS TO BE INSTALLED BY CITY OF GEORGETOWN				
TXDOT SPECS				
ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	LEANDER RD AND SW BYPASS
620	6009	ELEC CONDR (NO.6) BARE	LF	70
620	6010	ELEC CONDR (NO.6) INSULATED	LF	140
680	6011	INSTALL HWY TRF SIG (UPGRADE)	EA	1
*	*	TRAFFIC CONTROLLER	EA	1
*	*	TRAFFIC CONTROLLER CABINET	EA	1
*	*	BATTERY BACK-UP UNIT	EA	1
*	*	R10-17T (36"X42")	EA	4
*	*	WIND DAMPNER	EA	3
*	*	CONFIRMATION LIGHTS	EA	8
*	*	REMOVE SIGNS ON POLES	EA	2
682	6001	VEH SIG SEC (12")LED(GRN)	EA	8
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	4
682	6003	VEH SIG SEC (12")LED(YEL)	EA	8
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	8
682	6005	VEH SIG SEC (12")LED(RED)	EA	8
682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	4
682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	6
682	6023	BACK PLATE (12")(3 SEC)	EA	8
682	6024	BACK PLATE (12")(4 SEC)	EA	4
684	6028	TRF SIG CBL (TY A)(14 AWG)(2 CONDR)	LF	1045
684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	2039
684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	964
684	6049	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	LF	180
686	6292	INS TRF SIG PL AM (MAST)(INSTALL ONLY)	EA	4
688	6001	PED DETECT PUSH BUTTON (APS)	EA	6
688	6003	PED DETECTOR CONTROLLER UNIT	EA	1
6025	6001	RADAR PRESENCE DETECTOR	EA	4
6025	6002	RADAR DETECTION CABLE(6 CONDR)	LF	1928
6027	6003	CONDUIT (PREPARE)	LF	1605
6057	6001	RADAR ADVANCED DETECTION DEVICE	EA	4
**	**	RADAR PROCESSOR SYSTEM(4 CHANNEL)	EA	2

NOTES
* SUBSIDIARY TO ITEM 680.
** SUBSIDIARY TO ITEM 6025 AND 6057.

NOTE
QUANTITIES INCLUDED IN ULTIMATE SIGNAL PLANS ARE PROVIDED FOR INFORMATION ONLY AND ARE NOT INCLUDED IN THE BID FOR INTERIM SIGNAL INSTALLATION. CITY OF GEORGETOWN WILL BID AND CONSTRUCT ULTIMATE SIGNAL ONCE TRAFFIC SIGNAL WARRANTS ARE MET FOR THIS INTERSECTION.

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 5 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	18
BP	2103	01	034	
CHECK				
TG				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 2:03:23 PM SCALE:1:1
DATE: 3/23/2018
FILE: \

SUMMARY OF ILLUMINATION QUANTITIES

LOCATION	416 6029	432 6001	610 6105	610 6290	610 6291	618 0002***	618 6023	618 6024	618 6025	618 6066	620 6007	620 6008	624 6002	628 6044
	DRILL SHAFT (RDWY ILL POLE) (30 IN)	RIPRAP (CONC) (4 IN)	IN RD IL (U/P) (TY 1) (250W EQ) LED	IN RD IL (TY SA) 50T-12 (400W EQ) LED	IN RD IL (TY SA) 50T-12-12 (40 0W EQ) LED	CONT (LFMC) (1-1/4)	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	CONDT (PVC) (SCH 40) (2") (CONC ENCSE)	CONDT (RM) (1 1/4")	ELEC CONDR (NO. 8) BARE	ELEC CONDR (NO. 8) INSULATED	GROUND BOX TY A (122311) W/APRON	ELC SRV TY A 240/480 060 (NS) SS (E) PS (U)
	LF	CY	EA	EA	EA	LF	LF	LF	LF	LF	LF	LF	EA	EA
ILLUMINATION LAYOUT														
BEGIN TO STA 379+00	32	2	-	2	2	-	755	-	-	-	951	1,902	-	-
STA 396+00 TO STA 407+50	-	-	-	-	-	-	2,985	-	-	-	361	722	4	1
STA 407+50 TO STA 417+00	-	-	-	-	-	-	2,977	-	-	-	72	144	4	-
STA 445+68 TO END	-	-	-	-	-	-	115	778	398	-	-	-	4	1
ILLUMINATION UNDERPASS LAYOUT														
TCS QUARRY BRIDGE	-	-	8	-	-	24	-	-	-	161	240	480	-	-
Total	32	2	8	2	2	24	6,832	778	398	161	1,624	3,248	12	2

*** FOR CONTRACTOR'S INFORMATION ONLY.

SUMMARY OF REMOVAL PAVEMENT MARKINGS QUANTITIES

LOCATION	677 6001	677 6007
	ELIM EXT PAV MRK & MRKS (4")	ELIM EXT PAV MRK & MRKS (24")
	LF	LF
SOUTHWEST BYPASS: SEGMENT 2		
SBFR I-35 Sheet 1 of 1	1,153	-
RM 2243 Sheet 2 of 3	-	-
RAMPNB2 Sheet 1 of 1	592	199
CSJ: 2103-01-034		
RM 2243 Sheet 1 of 3	1,452	-
RM 2243 Sheet 2 of 3	70	-
RM 2243 Sheet 3 of 3	1,114	-
Total	4,381	199

NOTES:
1. QUANTITIES WITHIN TXDOT ROW (CSJ: 2103-01-034) ARE SEPARATED FOR ADMINISTRATIVE PURPOSES, EVEN THOUGH THEY MAY BE CALLED OUT ON THE SAME SHEET.

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 6 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LG	6			
GRAPHICS: LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: JC	TEXAS	AUS	WILLIAMSON	19
CHECK: JW	CONTROL	SECTION	JOB	
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 FILE: \
PENTABLE: S2-0000020/7018.tbl TIME: 2:03:25 PM SCALE: 1:20

SUMMARY OF SIGN AND PAVEMENT MARKINGS QUANTITIES

LOCATION	644 6001 IN SM RD SN SUP&AM TY10BWG(1) SA(P) EA	644 6004 IN SM RD SN SUP&AM TY10BWG(1) SA(T) EA	644 6012 IN SM RD SN SUP&AM TY10BWG(1)SB(T) EA	644 6030 IN SM RD SN SUP&AM TYS80(1)SA(T) EA	644 6066 IN SM RD SN SUP&AM (RAIL MOUNT) EA	644 6076 REMOVE SM RD SN SUP&AM EA	658 6004 INSTL DEL ASSM (D-SW)SZ 1(FLX)SRF EA	658 6005 INSTL DEL ASSM (D-SW)SZ 1(FLX)SRF(BI) EA	658 6014 INSTL DEL ASSM (D-SW)SZ (BR)CTB (BI) EA	658 6047 INSTL OM ASSM (OM-2Y)(WC)GND EA	658 6061 INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2 EA	666 6006 REFL PAV MRK TY I (W)4"(DOT) (100MIL) LF	666 6036 REFL PAV MRK TY I (W)8"(SLD) (100MIL) LF	666 6048 REFL PAV MRK TY I (W)24"(SLD) (100MIL) LF	666 6054 REFL PAV MRK TY I (W)(ARROW) (100MIL) EA
SOUTHWEST BYPASS: SEGMENT 2															
SIGNING AND STRIPING SBFR I-35 - SHEET 1 OF 1	1	7	1	2	-	-	25	-	-	-	-	56	230	16	2
SIGNING AND STRIPING WBFR - SHEET 1 OF 8	3	1	-	-	2	-	-	31	29	-	6	-	-	-	1
SIGNING AND STRIPING WBFR - SHEET 2 OF 8	-	-	-	-	2	-	-	-	37	2	6	-	-	-	-
SIGNING AND STRIPING WBFR - SHEET 3 OF 8	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
SIGNING AND STRIPING WBFR - SHEET 4 OF 8	-	1	-	1	1	-	-	-	41	-	9	-	-	-	-
SIGNING AND STRIPING WBFR - SHEET 5 OF 8	-	1	-	-	-	-	-	-	1	1	8	-	-	-	-
SIGNING AND STRIPING WBFR - SHEET 6 OF 8	-	1	-	-	-	-	-	-	4	-	-	-	-	-	-
SIGNING AND STRIPING WBFR - SHEET 7 OF 8	1	2	-	2	-	-	-	-	-	-	-	-	-	-	-
SIGNING AND STRIPING WBFR - SHEET 8 OF 8	4	1	-	1	-	-	-	-	-	2	-	-	736	-	8
SIGNING AND STRIPING RM 2243 - SHEET 2 OF 3	2	4	-	2	-	1	4	-	-	-	-	-	846	90	6
CSJ: 2103-01-034															
SIGNING AND STRIPING RM 2243 - SHEET 1 OF 3	2	1	-	1	-	2	-	-	-	-	-	-	473	-	3
SIGNING AND STRIPING RM 2243 - SHEET 2 OF 3	3	-	-	-	-	5	8	-	-	-	-	-	1,222	96	6
SIGNING AND STRIPING RM 2243 - SHEET 3 OF 3	-	1	-	1	-	2	-	-	-	-	-	-	299	-	2
Total	16	20	1	10	5	10	37	31	112	7	29	56	3,806	202	28

SUMMARY OF SIGN AND PAVEMENT MARKINGS QUANTITIES CONT.

LOCATION	666 6078 REFL PAV MRK TY I (W)(WORD) (100MIL) EA	666 6102 REF PAV MRK TY I(W)36"(YLD TRI)(100MIL) EA	666 6147 REFL PAV MRK TY I (Y) 24"(SLD) (100MIL) LF	666 6168 REFL PAV MRK TY II (W) 4" (DOT) LF	666 6170 REFL PAV MRK TY II (W) 4" (SLD) LF	666 6178 REFL PAV MRK TY II (W) 8" (SLD) LF	666 6184 REFL PAV MRK TY II (W) (ARROW) EA	666 6192 REFL PAV MRK TY II (W) (WORD) EA	666 6207 REFL PAV MRK TY II (Y) 4" (SLD) LF	666 6214 REFL PAV MRK TY II (Y) 24" (SLD) LF	666 6282 REF PROF PAV MRK TY I(W)4"(SLD)(060MIL) LF	666 6287 REF PROF PAV MRK TY I(Y)4"(SLD)(090MIL) LF	666 6303 RE PM W/RET REQ TY I (W)4"(SLD) (100MIL) LF	666 6315 RE PM W/RET REQ TY I (Y)4"(SLD) (100MIL) LF
SOUTHWEST BYPASS: SEGMENT 2														
SIGNING AND STRIPING SBFR I-35 - SHEET 1 OF 1	2	-	89	56	772	230	1	1	936	89	-	-	1,057	1,182
SIGNING AND STRIPING WBFR - SHEET 1 OF 8	1	-	-	-	1,218	-	-	-	-	-	1,899	1,900	-	-
SIGNING AND STRIPING WBFR - SHEET 2 OF 8	-	-	-	-	620	-	-	-	-	-	2,401	2,402	-	-
SIGNING AND STRIPING WBFR - SHEET 3 OF 8	-	-	-	-	-	-	-	-	-	-	2,201	2,200	-	-
SIGNING AND STRIPING WBFR - SHEET 4 OF 8	-	-	-	-	1,520	-	-	-	-	-	2,200	2,200	-	-
SIGNING AND STRIPING WBFR - SHEET 5 OF 8	-	-	-	-	-	-	-	-	-	-	2,200	2,200	-	-
SIGNING AND STRIPING WBFR - SHEET 6 OF 8	-	-	-	-	-	-	-	-	-	-	2,200	2,200	-	-
SIGNING AND STRIPING WBFR - SHEET 7 OF 8	-	-	68	-	-	-	-	-	-	-	2,104	2,199	96	539
SIGNING AND STRIPING WBFR - SHEET 8 OF 8	8	-	7	-	-	192	2	2	-	-	313	700	435	172
SIGNING AND STRIPING RM 2243 - SHEET 2 OF 3	6	10	-	-	-	-	-	-	-	-	-	300	642	244
CSJ: 2103-01-034														
SIGNING AND STRIPING RM 2243 - SHEET 1 OF 3	3	-	-	-	-	-	2	2	1,264	-	-	-	268	1,264
SIGNING AND STRIPING RM 2243 - SHEET 2 OF 3	6	10	-	-	-	-	-	-	50	-	-	-	605	817
SIGNING AND STRIPING RM 2243 - SHEET 3 OF 3	2	-	-	-	-	-	2	2	1,216	-	-	-	-	1,216
Total	28	20	164	56	4,130	422	7	7	3,466	89	15,518	16,301	3,103	5,434

SUMMARY OF SIGN AND PAVEMENT MARKINGS QUANTITIES CONT.

LOCATION	672 6007 REFL PAV MRKR TY I-C EA	672 6009 REFL PAV MRKR TY II-A-A EA	672 6010 REFL PAV MRKR TY II-C-R EA	685 6004 INSTL RDSD FLSH BCN ASSM (SOLAR PWRD) EA
SOUTHWEST BYPASS: SEGMENT 2				
SIGNING AND STRIPING SBFR I-35 - SHEET 1 OF 1	7	48	-	-
SIGNING AND STRIPING WBFR - SHEET 1 OF 8	-	94	-	-
SIGNING AND STRIPING WBFR - SHEET 2 OF 8	-	30	-	-
SIGNING AND STRIPING WBFR - SHEET 3 OF 8	-	28	-	-
SIGNING AND STRIPING WBFR - SHEET 4 OF 8	-	28	-	-
SIGNING AND STRIPING WBFR - SHEET 5 OF 8	-	28	-	-
SIGNING AND STRIPING WBFR - SHEET 6 OF 8	-	28	-	-
SIGNING AND STRIPING WBFR - SHEET 7 OF 8	-	48	-	-
SIGNING AND STRIPING WBFR - SHEET 8 OF 8	24	60	14	-
SIGNING AND STRIPING RM 2243 - SHEET 2 OF 3	13	28	205	2
CSJ: 2103-01-034				
SIGNING AND STRIPING RM 2243 - SHEET 1 OF 3	16	62	7	1
SIGNING AND STRIPING RM 2243 - SHEET 2 OF 3	20	40	321	-
SIGNING AND STRIPING RM 2243 - SHEET 3 OF 3	15	60	-	1
Total	95	582	547	4

NOTES:

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NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 7 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LG	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JC	TEXAS	AUS	WILLIAMSON	20
CHECK JW	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 2:03:26 PM SCALE: 1:20
DATE: 3/23/2018
FILE: \

SUMMARY OF EROSION CONTROL QUANTITIES

LOCATION	160 6005 FURNISHING AND PLACING TOPSOIL	161 6017 COMPOST MANUF TOPSOIL (4")	164 6009 BROADCAST SEED (TEMP) (WARM)	164 6011 BROADCAST SEED (TEMP) (COOL)	164 6023 CELL FBR MLCH SEED(PERM) (RURAL)(CLAY)	166 6002 * FERTILIZER	168 6001 VEGETATIVE WATERING	169 6001 SOIL RETENTION BLANKETS (CL 1) (TY A)	432 8001 RIPRAP (STONE PROTECTION) (8 IN) (TY I)	432 8002 RIPRAP (STONE PROTECTION) (8 IN) (TY II)	506 6002 ROCK FILTER DAMS (INSTALL) (TY 2)	506 6011 ROCK FILTER DAMS (REMOVE)	506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	506 6024 CONSTRUCTION EXITS (REMOVE)	506 6038 TEMP SEDMT CONT FENCE (INSTALL)	506 6039 TEMP SEDMT CONT FENCE (REMOVE)	506 8002 REMOVE ROCK
	CY	SY	SY	SY	SY	TON	MG	SY	CY	CY	LF	LF	SY	SY	LF	LF	SY
SOUTHWEST BYPASS: SEGMENT 2																	
TEMPORARY EROSION CONTROL PLAN - SHEET 1 OF 8	-	-	-	-	-	-	-	-	-	-	-	26	-	-	963	2,335	-
TEMPORARY EROSION CONTROL PLAN - SHEET 2 OF 8	-	-	-	-	-	-	-	-	-	-	-	161	-	-	381	1,803	-
TEMPORARY EROSION CONTROL PLAN - SHEET 3 OF 8	-	-	-	-	-	-	-	-	-	-	30	30	80	80	1,781	2,229	1,814
TEMPORARY EROSION CONTROL PLAN - SHEET 4 OF 8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	454	454	-
TEMPORARY EROSION CONTROL PLAN - SHEET 5 OF 8	-	-	-	-	-	-	-	-	-	-	15	15	-	-	-	-	-
TEMPORARY EROSION CONTROL PLAN - SHEET 6 OF 8	-	-	-	-	-	-	-	-	-	-	60	60	-	-	-	-	-
TEMPORARY EROSION CONTROL PLAN - SHEET 7 OF 8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	875	875	3,299
TEMPORARY EROSION CONTROL PLAN - SHEET 8 OF 8	-	-	-	-	-	-	-	-	-	-	65	65	80	80	699	699	2,270
CSJ: 2103-01-034																	
TEMPORARY EROSION CONTROL PLAN - SHEET 8 OF 8	-	-	-	-	-	-	-	-	-	-	30	30	-	-	144	144	-
SOUTHWEST BYPASS: SEGMENT 2																	
PERMANENT EROSION CONTROL PLAN - SHEET 1 OF 8	-	3,466	1,733	1,733	3,466	0.13	572	-	-	-	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 2 OF 8	-	60	30	30	60	-	10	-	-	-	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 3 OF 8	482	8,960	4,480	4,480	8,960	0.35	1,479	5,564	-	-	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 4 OF 8	1,510	8,698	4,349	4,349	8,698	0.34	1,435	1,782	12	689	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 5 OF 8	-	-	-	-	-	-	-	-	394	2,620	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 6 OF 8	31	218	109	109	218	0.01	36	218	467	5,644	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 7 OF 8	2,043	14,029	7,015	7,015	14,029	0.54	2,315	4,949	4	146	-	-	-	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 8 OF 8	327	6,250	3,125	3,125	6,250	0.24	1,032	4,277	-	79	-	-	-	-	-	-	-
CSJ: 2103-01-034																	
PERMANENT EROSION CONTROL PLAN - SHEET 8 OF 8	-	625	313	313	625	0	103	429	-	-	-	-	-	-	-	-	-
Total	4,393	42,306	21,154	21,154	42,306	2	6,982	17,219	877	9,178	200	387	160	160	5,297	8,539	7,383

* FOR CONTRACTOR'S INFORMATION ONLY

NOTES:
1. QUANTITIES WITHIN TXDOT ROW (CSJ: 2103-01-034) ARE SEPARATED FOR ADMINISTRATIVE PURPOSES, EVEN THOUGH THEY MAY BE CALLED OUT ON THE SAME SHEET.

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 8 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
LG	6			
GRAPHICS: LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK: JC	TEXAS	AUS	WILLIAMSON	21
CHECK: JW	CONTROL	SECTION	JOB	
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 FILE: \
PENTABLE: S2-0000020/T0718.tbl TIME: 2:03:28 PM SCALE: 1:20

CONTRACT QUANTITY ADJUSTMENTS IF RETAINING WALL RW-06 IS NOT CONSTRUCTED

LOCATION	132 6005	423 RW06	432 6001	432 6033	432 8002	450 6023	464 6026	466 6130	467 6394	550 6001	552 8001	S2 BD
	EMBANKMENT (FINAL) (ORD COMP) (TY C)	RETAINING WALL (MSE) (ASHLAR STONE FIN)	RIPRAP (CONC) (4 IN)	RIPRAP (STONE PROTECTION) (18 IN)	RIPRAP (STONE PROTECTION) (8 IN) (TY II)	RAIL (TY SSTR)	RC PIPE (CL V) (24 IN)	HEADWALL (CH - PW - S) (DIA= 24 IN)	SET (TY II) (24 IN) (RCP) (6: 1) (C)	CHAIN LINK FENCE (INSTALL) (6')	WIRE FENCE	BOULDER DELINEATION
	CY	SF	CY	CY	CY	LF	LF	EA	EA	LF	LF	LF
SOUTHWEST BYPASS: SEGMENT 2												
RW-06 - SHEET 1 OF 1	-	(2,416)	(28)	-	-	(114)	-	-	-	-	-	-
FENCING AND GRADING PLAN - SHEET 4 OF 6	1,080	-	-	-	-	-	-	-	-	(116)	107	107
CULVERT NO. 8B LAYOUT - SHEET 1 OF 2	-	-	-	(25)	-	-	(94)	-	(1)	-	-	-
CULVERT NO. 8B LAYOUT - SHEET 2 OF 2	-	-	-	-	-	-	(170)	(1)	-	-	-	-
PERMANENT EROSION CONTROL PLAN - SHEET 6 OF 8	-	-	-	-	38	-	-	-	-	-	-	-
Total	1,080	(2,416)	(28)	(25)	38	(114)	(264)	(1)	(1)	(116)	107	107

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SUMMARY OF QUANTITIES

SHEET 9 OF 9

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	22
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 4/10/2018
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 9:53:06 AM SCALE: 1:1

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	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
218	1	D3-2	SW BYPASS NEXT RIGHT	78 x 36	X		S80	1	SA	T		
	2	R3-7R	RIGHT LANE MUST TURN RIGHT	36 x 36	X		10BWG	1	SA	P		
	3	W4-1R	MERGEING TRAFFIC	48 x 48	X		10BWG	1	SA	T		
	4	5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	5	R5-1	DO NOT ENTER	36 x 36	X		10BWG	1	SA	T		
	6	W1-6R	RIGHT ARROW	48 x 24	X		10BWG	1	SA	T		
	7	R6-1R	ONE WAY	54 x 18	X		10BWG	1	SA	T		
	8	5-1a	WRONG WAY	42 x 30	X		10BWG	1	SA	T		
	9	W1-2R	CURVE ADVISORY SPEED 35	48 x48	X		10BWG	1	SA	T		
	10	R3-5R	RIGHT TURN ONLY	30 x 36	X		S80	1	SA	T		
		R5-1	DO NOT ENTER	36 x 36								
	11	R1-1	STOP	48 x 48	X		10BWG	1	SB	T		
219	1	M3-3B	SOUTH	24 x 12	X		10BWG	1	SA	P		
		M1-1B	INTERSTATE 35	24 x 24								
		M6-1B	RIGHT ARROW	21 x 15								
	2	R3-5R	RIGHT TURN ONLY	30 x 36	X		10BWG	1	SA	P		
	3	W3-1	STOP AHEAD	48 x 48	X			1	RM	TYPE 3		
	4	M2-1B	JCT	21 x 15	X			1	RM	TYPE 1		
		M3-3B	SOUTH	12 x 24								
		M1-1B	INTERSTATE 35	24 x 24								
	5	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48 x 48	X		10BWG	1	SA	T		
	6	R2-1	SPEET LIMIT 50	30 x 36	X		10BWG	1	SA	P		
220	1	W1-2L	CURVE ADVISORY SPEED 40	48 x 48	X			1	RM	TYPE 1		
	2	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48 x 48	X			1	RM	TYPE 1		
222	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48 x 48	X		10BWG	1	SA	T		
	2	R16-4 (MOD)	ACTIVE QUARRY ZONE / CELL PHONE USE PROHIBITED	72 x 42	X		S80	1	SA	T		
	3	R8-3a	NO PARKING	48 x 48	X			1	RM	TYPE 3		
223	1	W8-13aT	BRIDGE MAY ICE IN COLD WEATHER	48 x 48	X		10BWG	1	SA	T		
224	1	R8-3a	NO PARKING	48 x 48	X		10BWG	1	SA	T		
225	1	R16-4 (MOD)	ACTIVE QUARRY ZONE / CELL PHONE USE PROHIBITED	72 x 42	X		S80	1	SA	T		
	2	M2-1	JCT	21 x 15	X		10BWG	1	SA	P		
		M1-6R	TEXAS RANCH ROAD	24 x 24								
	3	W3-1	STOP AHEAD	48 x 48	X		10BWG	1	SA	T		
	4	D3-2	LEANDER RD NEXT INTERSECTION	102 x 36	X		S80	1	SA	T		
	5	R3-8b	ADVANCE INTERSECTION LANE CONTROL	48 x 30	X		10BWG	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).

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS SHEET 1 OF 2

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
4-16	DIST	COUNTY		SHEET NO.
8-16	AUS	WILLIAMSON		33

18

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: 3/23/2018 12:34:23 PM
FILE: c:\pwworking\dal\d0910664\sums01.dgn

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	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
226	1	R2-1	SPEET LIMIT 50	30 x 36	X		10BWG	1	SA	P		
	2	R3-7R	RIGHT LANE MUST TURN RIGHT	36 x 36	X		10BWG	1	SA	P		
	3	D3-2	LEANDER RD NEXT INTERSECTION	102 x 36	X		S80	1	SA	T		
	4	R3-8b	ADVANCE INTERSECTION LANE CONTROL	48 x 30	X		10BWG	1	SA	T		
	5	R3-7R	RIGHT LANE MUST TURN RIGHT	36 x 36	X		10BWG	1	SA	P		
	6	R2-1	SPEET LIMIT 50	30 x 36	X		10BWG	1	SA	P		
227	1	W2-1	INTERSECTION WARNING	48 x 48	X		10BWG	1	SA	T	SPRFBA(1)-13	
	2	D3-2	SW BYPASS NEXT INTERSECTION	102 x 36	X		S80	1	SA	T		
	3	R2-1	SPEET LIMIT 55	24 x 30	X		10BWG	1	SA	P		
	4	R3-7R	RIGHT LANE MUST TURN RIGHT	36 x 36	X		10BWG	1	SA	P		
228	1	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	T		
	2	R1-1	STOP	48 x 48	X		S80	1	SA	T	SPRFBA(1)-13	
		W4-4	CROSS TRAFFIC DOES NOT STOP	36 x 18								
	3	R3-5R	RIGHT TURN ONLY	30 x 36	X		10BWG	1	SA	P		
	4	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	T		
	5	M1-6R	TEXAS RANCH ROAD	24 x 24	X		10BWG	1	SA	P		
		M6-4	DIRECTIONAL ARROW	21 x 15								
	6	R3-5R	RIGHT TURN ONLY	30 x 36	X		10BWG	1	SA	P		
	7	R3-5R	RIGHT TURN ONLY	30 x 36	X		10BWG	1	SA	P		
	8	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	T		
	9	R1-2	YIELD	48 x 48 x 48	X		10BWG	1	SA	T		
	10	R1-1	STOP	48 x 48	X		S80	1	SA	T	SPRFBA(1)-13	
		W4-4	CROSSING TRAFFIC DOES NOT STOP	36 x 18								
	11	R3-5R	RIGHT TURN ONLY	30 x 36	X		10BWG	1	SA	P		
229	1	D3-2	SW BYPASS NEXT INTERSECTION	102 x 36	X		S80	1	SA	T		
	2	W2-1	INTERSECTION WARNING	48 x 48	X		10BWG	1	SA	T	SPRFBA(1)-13	

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).

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

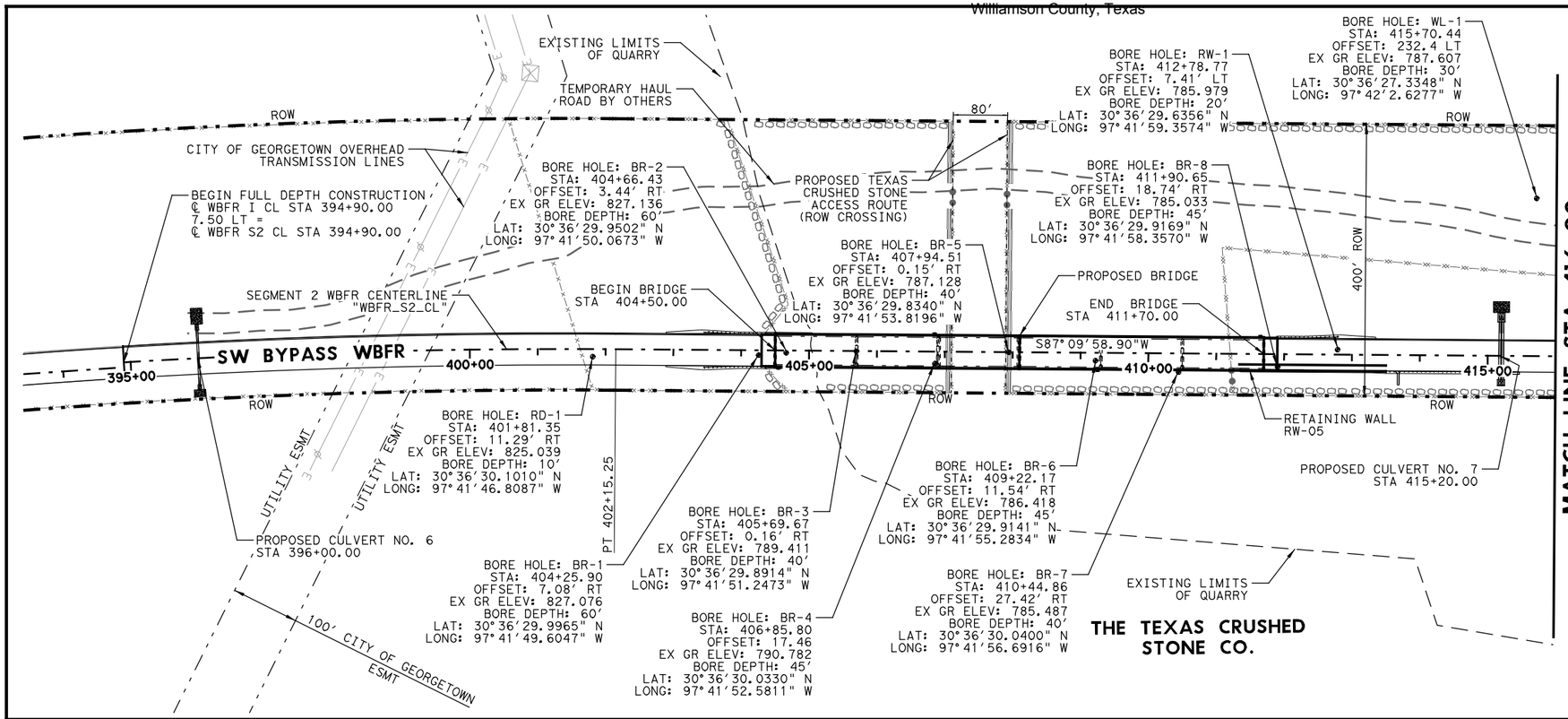
SOSS SHEET 2 OF 2

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© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
4-16 8-16	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		24

18

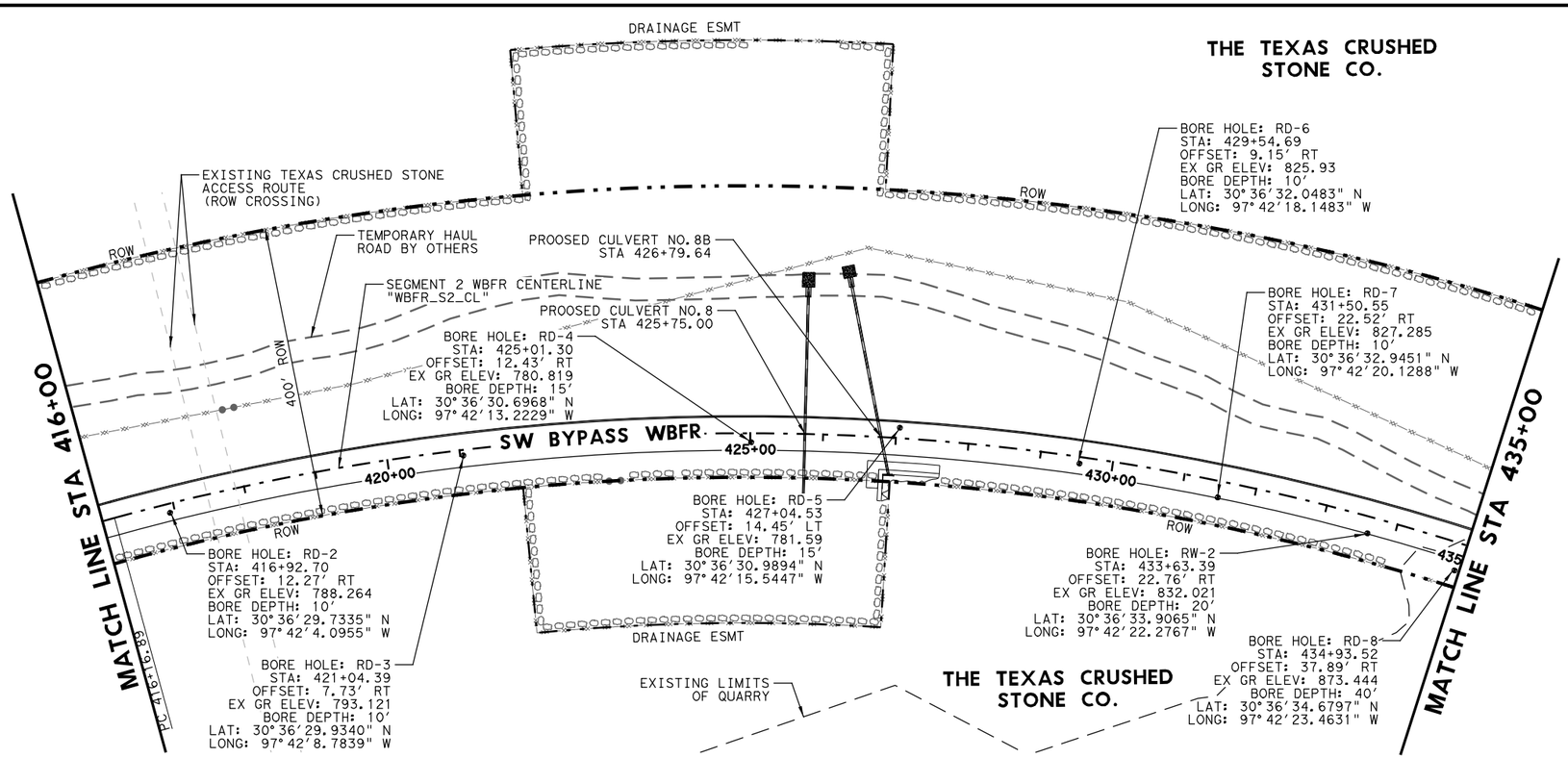
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DATE: 3/23/2018 12:35:27 PM
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NOTES:
SEE "SW BYPASS WBFR BORING LOGS" SHEETS FOR BORING LOG DATA.

0 100 200 300 400
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

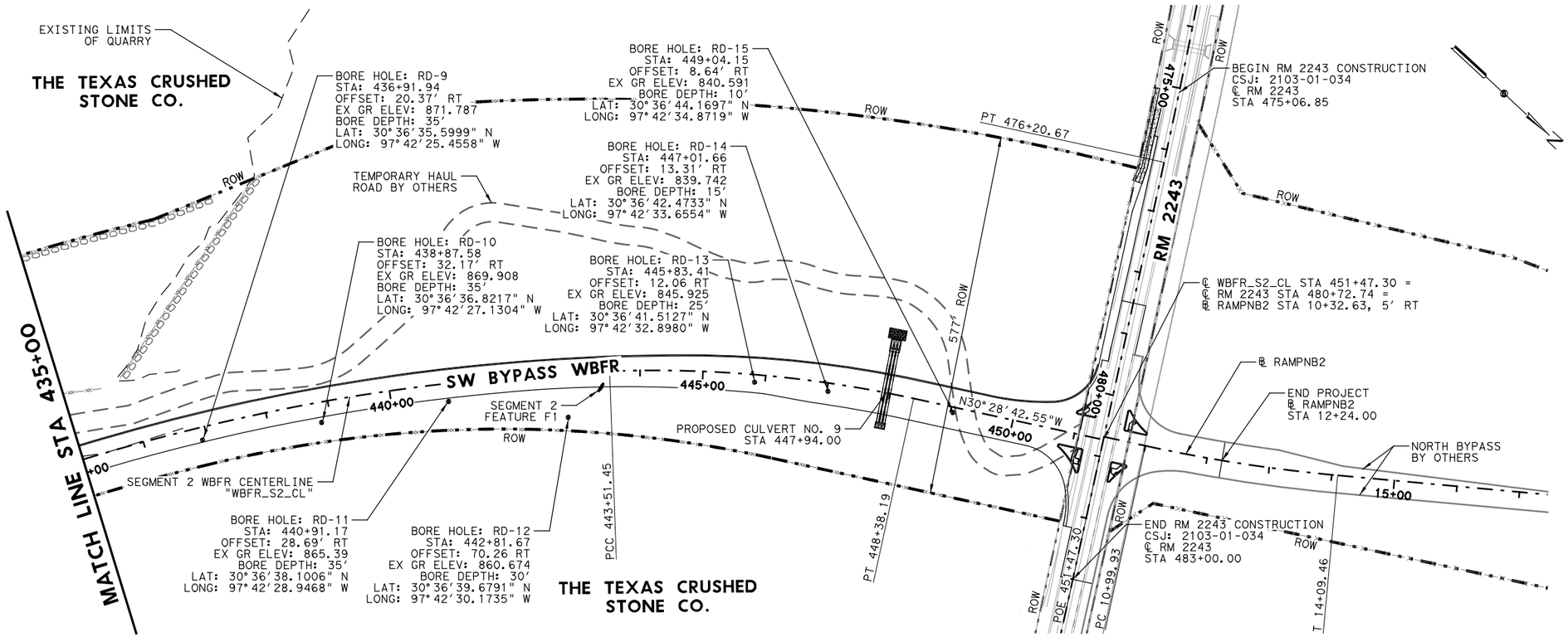
BORE HOLE LAYOUT WBFR

SCALE: 1"=200' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	25
JW	2103	01	034	
CHECK				
JC				

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FILE: \

4/12/2018 7:20 AM



NOTES:
SEE "SW BYPASS WBFR BORING LOGS" SHEETS FOR BORING LOG DATA.

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122057
LICENSED
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03/23/2018

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Texas Registered Engineering Firm F-754

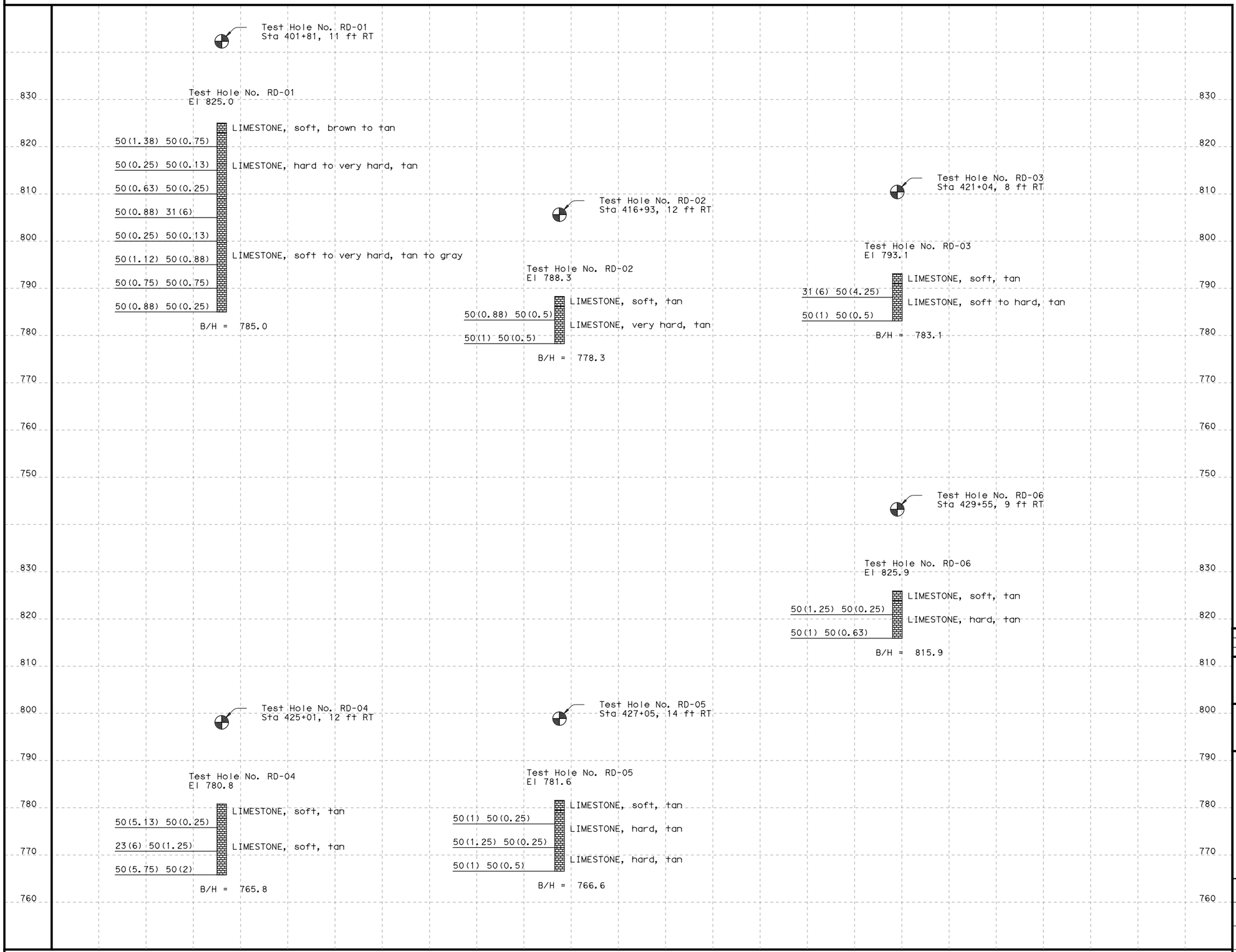
SOUTHWEST BYPASS SEGMENT 2

BORE HOLE LAYOUT WBFR

SCALE: 1"=200' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	26
JW	2103	01	034	
CHECK				
JC				

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FILE: \



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Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

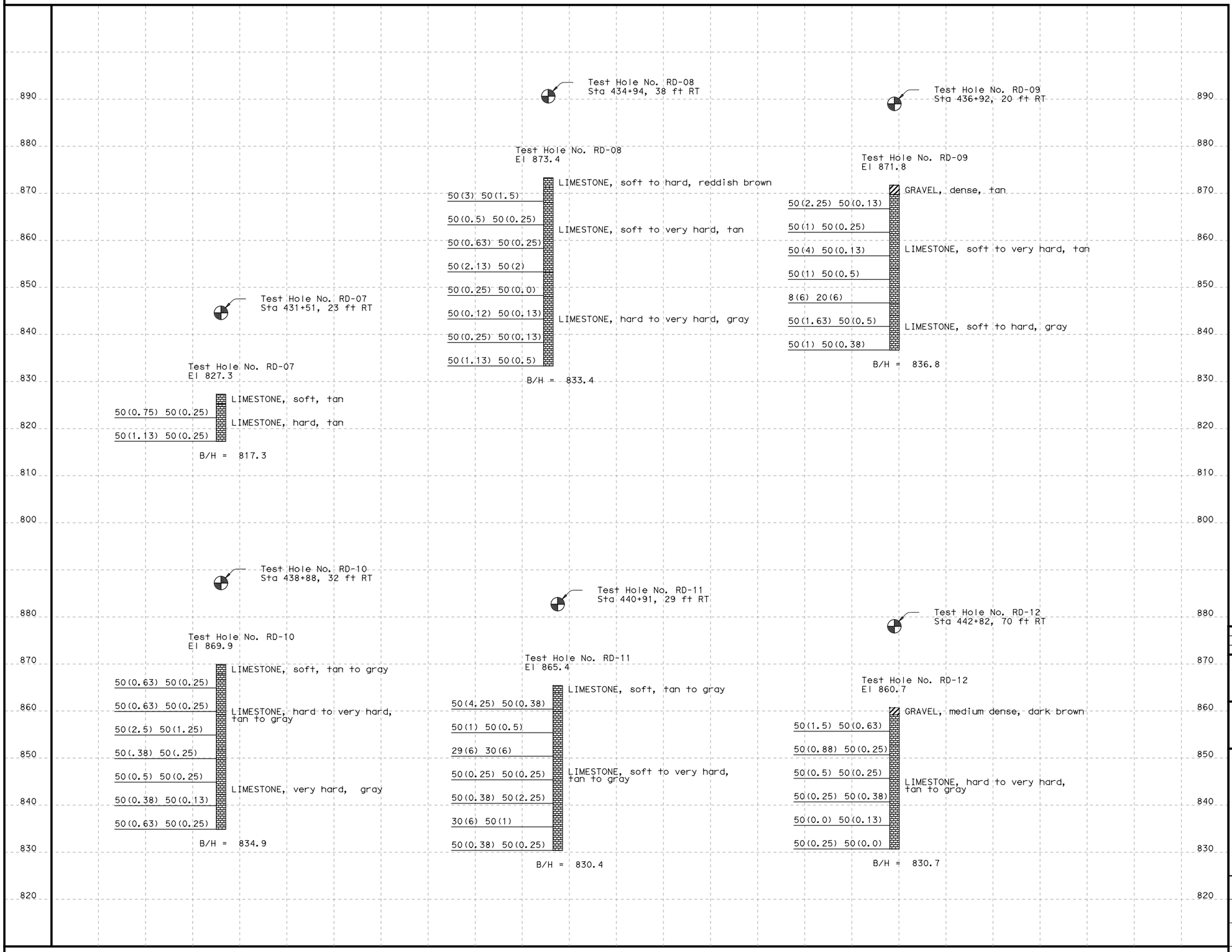
BORING LOGS WBFR

SCALE: 1"=20'

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TW	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	27
CHECK				
JC				

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FILE: \



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SOUTHWEST BYPASS
SEGMENT 2

BORING LOGS
WBFR

SCALE: 1"=20'

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TW	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	28
JW	2103	01	034	
CHECK				
JC				

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Test Hole No. RD-13
Sta 445+83, 12 ft RT

Test Hole No. RD-13
El 845.9

50(0.82) 50(0.43) GRAVEL, dense, dark brown to tan
50(0.37) 50(0.13)
50(4.5) 50(0.38) LIMESTONE, hard to very hard, tan to gray
40(6) 50(1.25)
50(1) 50(0.25)

B/H = 820.9

Test Hole No. RD-14
Sta 447+02, 13 ft RT

Test Hole No. RD-14
El 839.7

50(2.75) 50(1.5) GRAVEL, dense, dark brown to tan
50(1.13) 50(1) LIMESTONE, soft to very hard, tan to gray
50(.25) 50(0.0)

B/H = 824.7

Test Hole No. RD-15
Sta 449+04, 9 ft RT

Test Hole No. RD-15
El 840.6

20(6) 50(0.13) GRAVEL, very dense, dark brown
50(0.37) 50(0.38) LIMESTONE, soft to very hard, tan to gray

B/H = 830.6

Test Hole No. RW-02
Sta 433+63, 23 ft RT

Test Hole No. RW-02
El 832.0

50(1) 50(0.5) LIMESTONE, completely weathered, tan
50(1.25) 50(1)
50(0.5) 50(0.25) LIMESTONE, hard to very hard, tan
50(1) 50(0.38)

B/H = 812

Test Hole No. RW-01
Sta 412+79, 7 ft RT

Test Hole No. RW-01
El 786.0

50(0.5) 50(0.25) LIMESTONE, soft, tan
50(0.5) 50(0.38)
50(0.5) 50(0.13) LIMESTONE, hard to very hard, tan
50(4.5) 50(1.5)

B/H = 766.0

Test Hole No. WL-01
Sta 415+70, 232 ft LT

Test Hole No. WL-01
El 787.6

50(0.75) 50(0.25) LIMESTONE, soft, reddish brown
50(1.38) 20(6) LIMESTONE, soft to very hard, tan
50(0.5) 50(0.25)
50(0.5) 50(0.25)
50(0.37) 50(0.13) LIMESTONE, very hard, tan
50(0.38) 50(0.25)

B/H = 757.6

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SOUTHWEST BYPASS
SEGMENT 2

BORING LOGS
WBFR

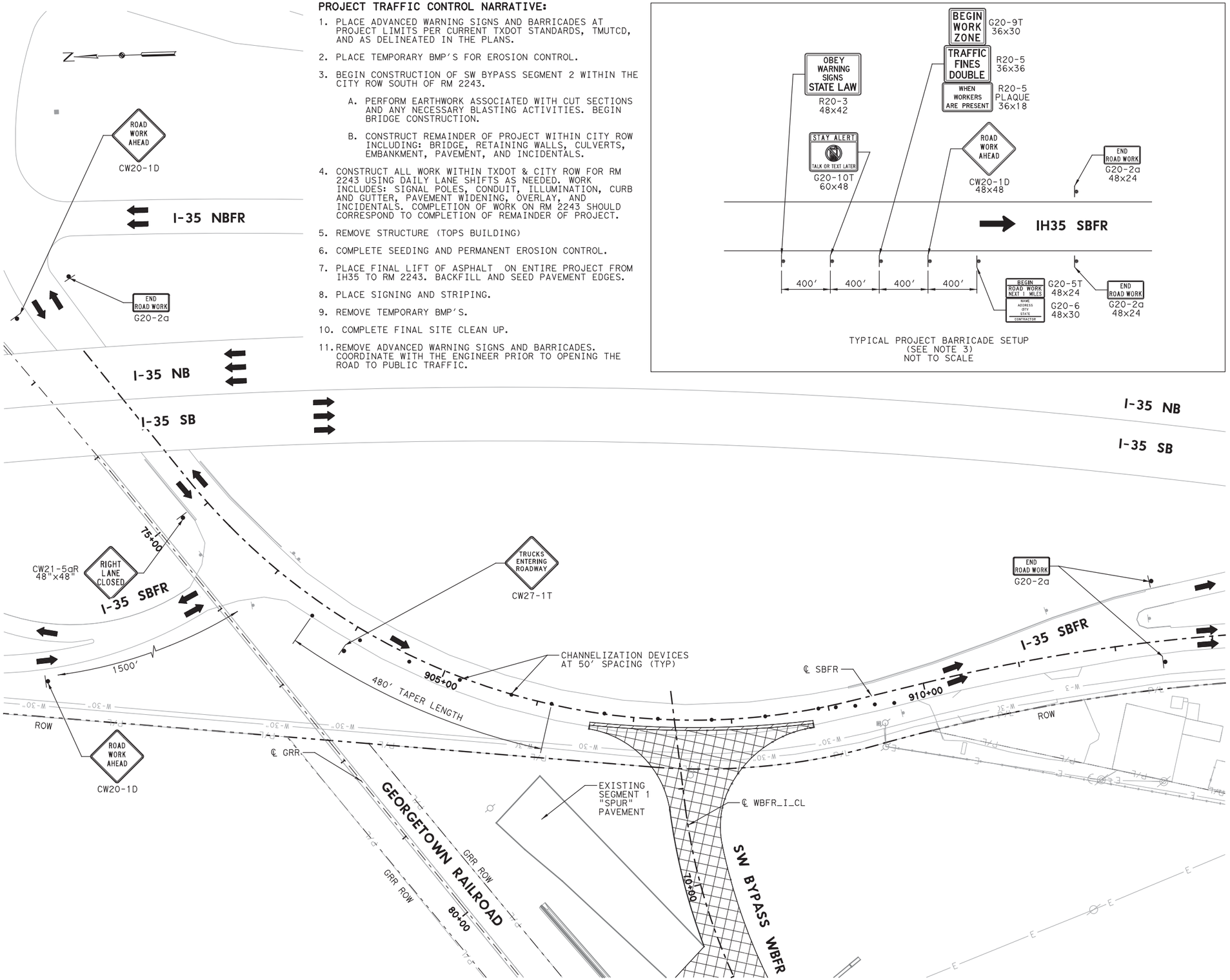
SCALE: 1"=20' SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TW	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	29
JW	2103	01	034	
CHECK				
JC				

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USER: lgomezgonz DATE: 3/23/2018 TIME: 10:27:39 AM SCALE: 1:20
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PROJECT TRAFFIC CONTROL NARRATIVE:

1. PLACE ADVANCED WARNING SIGNS AND BARRICADES AT PROJECT LIMITS PER CURRENT TXDOT STANDARDS, TMUTCD, AND AS DELINEATED IN THE PLANS.
2. PLACE TEMPORARY BMP'S FOR EROSION CONTROL.
3. BEGIN CONSTRUCTION OF SW BYPASS SEGMENT 2 WITHIN THE CITY ROW SOUTH OF RM 2243.
   A. PERFORM EARTHWORK ASSOCIATED WITH CUT SECTIONS AND ANY NECESSARY BLASTING ACTIVITIES. BEGIN BRIDGE CONSTRUCTION.
   B. CONSTRUCT REMAINDER OF PROJECT WITHIN CITY ROW INCLUDING: BRIDGE, RETAINING WALLS, CULVERTS, EMBANKMENT, PAVEMENT, AND INCIDENTALS.
4. CONSTRUCT ALL WORK WITHIN TXDOT & CITY ROW FOR RM 2243 USING DAILY LANE SHIFTS AS NEEDED. WORK INCLUDES: SIGNAL POLES, CONDUIT, ILLUMINATION, CURB AND GUTTER, PAVEMENT WIDENING, OVERLAY, AND INCIDENTALS. COMPLETION OF WORK ON RM 2243 SHOULD CORRESPOND TO COMPLETION OF REMAINDER OF PROJECT.
5. REMOVE STRUCTURE (TOPS BUILDING)
6. COMPLETE SEEDING AND PERMANENT EROSION CONTROL.
7. PLACE FINAL LIFT OF ASPHALT ON ENTIRE PROJECT FROM IH35 TO RM 2243. BACKFILL AND SEED PAVEMENT EDGES.
8. PLACE SIGNING AND STRIPING.
9. REMOVE TEMPORARY BMP'S.
10. COMPLETE FINAL SITE CLEAN UP.
11. REMOVE ADVANCED WARNING SIGNS AND BARRICADES. COORDINATE WITH THE ENGINEER PRIOR TO OPENING THE ROAD TO PUBLIC TRAFFIC.



TYPICAL PROJECT BARRICADE SETUP
(SEE NOTE 3)
NOT TO SCALE

LEGEND

- PLASTIC DRUMS
- TRAFFIC FLOW
- SIGN POST
- TY III BARRICADE
- WORK ZONE
- MILL AND OVERLAY

NOTES:

1. SEE TCP(1-5a)-18 FOR ANY ADDITIONAL INFORMATION NOT SHOWN, INCLUDING SIGN PLACEMENT.
2. TRAFFIC CONTROL PLANS SHALL CONFORM TO THE CURRENT TxDOT STANDARDS AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ADVANCED WARNING SIGNS SHALL REMAIN UNTIL COMPLETION OF THE WORK.
4. SEE BC(2)-14 FOR SIGN SPACING AND LOCATIONS OF TYPICAL CROSSROAD SIGNS.
5. LANE SHALL ONLY BE CLOSED WHEN CONTRACTOR IS READY TO WORK ON I-35 SBFR, NOT FOR THE ENTIRE DURATION OF PROJECT.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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Texas Registered Engineering Firm F-754

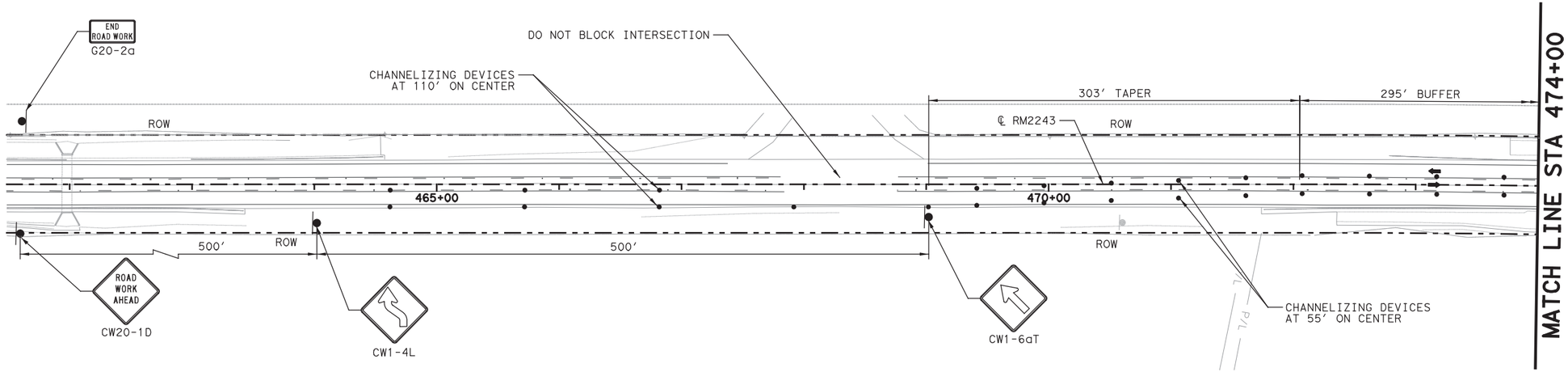
SOUTHWEST BYPASS SEGMENT 2

TRAFFIC CONTROL PLAN SBFR I-35

SCALE: 1"=100' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	30
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	
CHECK				
JC				

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LEGEND

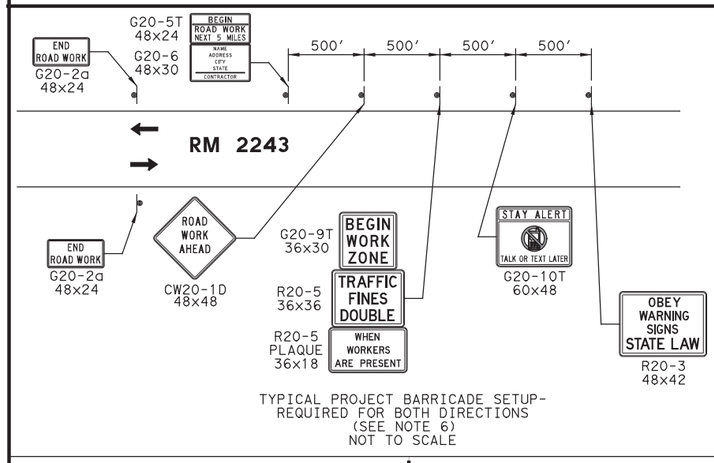
- PLASTIC DRUMS
- TRAFFIC FLOW
- SIGN POST
- TY III BARRICADE
- WORK ZONE
- MILL AND OVERLAY

NOTES:

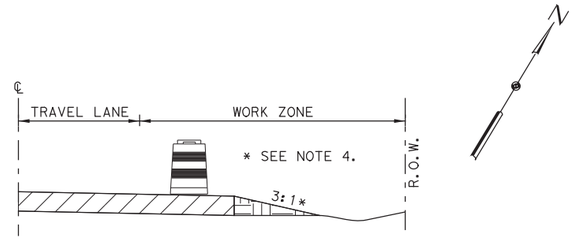
1. SEE TCP(1-3a)-18 FOR ANY ADDITIONAL INFORMATION NOT SHOWN, INCLUDING SIGN PLACEMENT.
2. CONTRACTOR TO UTILIZE DAILY LANE SHIFTS TO PERFORM SHOULDER WIDENING, MILL, AND OVERLAY. ENSURE ALL LANES RETURN TO FULL OPERATION AT THE END OF EACH DAY. LANE SHIFTS ARE TO BE IMPLEMENTED DURING WORKING HOURS ONLY.
3. MAINTAIN 11' TRAVEL LANES THROUGH TRAFFIC CONTROL ZONE.
4. EDGE DROP OFFS IN EXCESS OF 2" SHALL BE BACK FILED WITH 3:1 MAX SAFETY WEDGE USING FLEX BASE OR OTHER APPROVED MATERIAL AND WILL BE SUBSIDIARY TO PERTINENT BID ITEMS.
5. TRAFFIC CONTROL PLANS SHALL CONFORM TO THE CURRENT TxDOT STANDARDS AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
6. ADVANCED WARNING SIGNS SHALL REMAIN UNTIL COMPLETION OF THE WORK.
7. SEE BC(2)-14 FOR SIGN SPACING AND LOCATIONS OF TYPICAL CROSSROAD SIGNS.

0 50 100 150 200

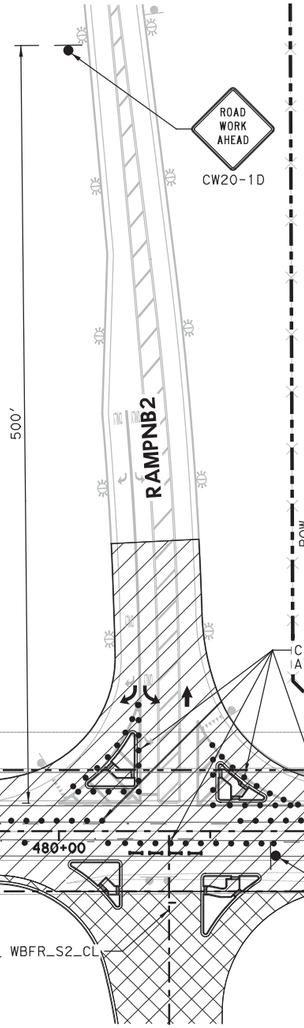
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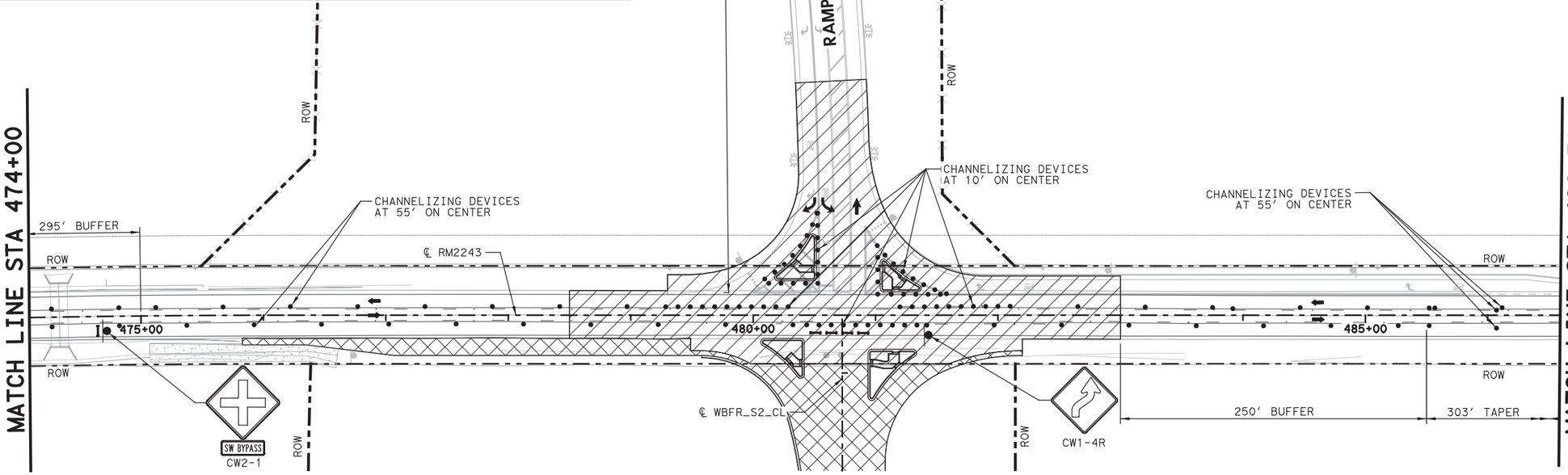


TYPICAL PROJECT BARRICADE SETUP-
REQUIRED FOR BOTH DIRECTIONS
(SEE NOTE 6)
NOT TO SCALE



SAFETY WEDGE DETAIL





STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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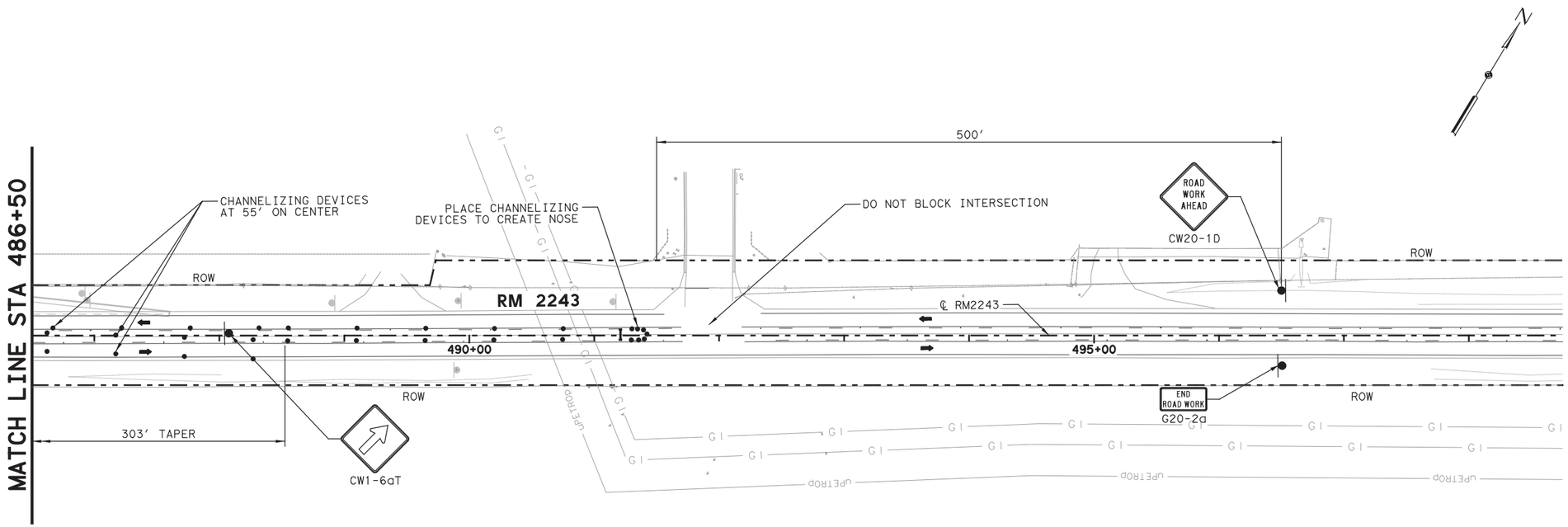
SOUTHWEST BYPASS SEGMENT 2

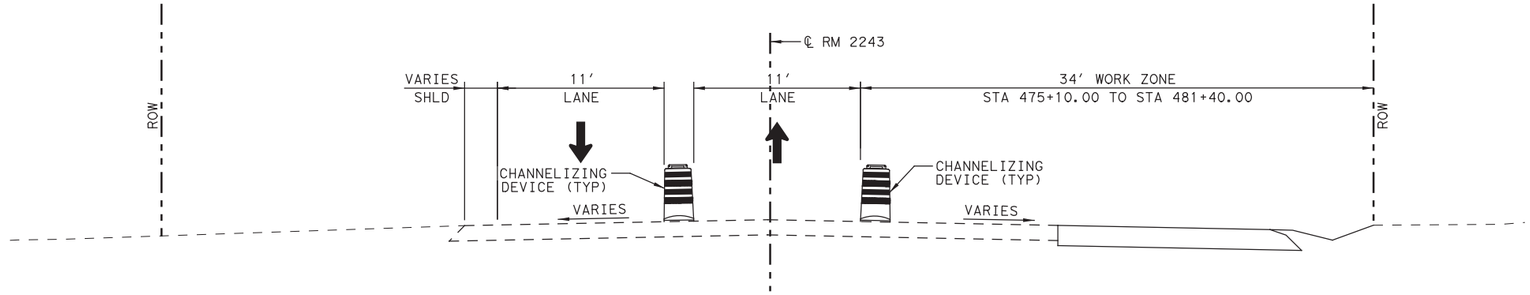
TRAFFIC CONTROL PLAN RM 2243

SCALE: 1"=100' SHEET 1 OF 2

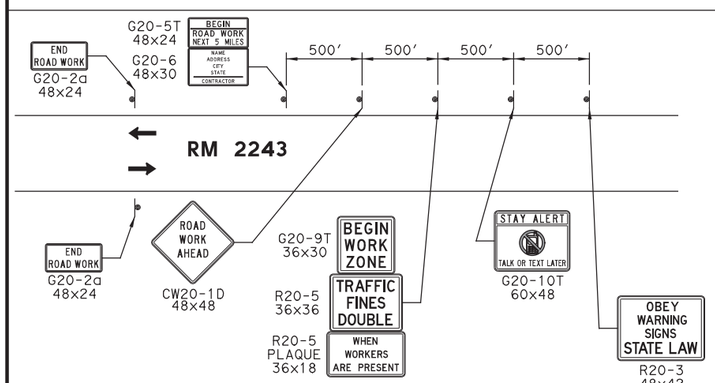
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JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	31
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020070718.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 10:21:23 AM SCALE: 1:100
FILE: \





TYPICAL SECTION



TYPICAL PROJECT BARRICADE SETUP-
REQUIRED FOR BOTH DIRECTIONS
(SEE NOTE 6)
NOT TO SCALE

LEGEND

- PLASTIC DRUMS
- TRAFFIC FLOW
- SIGN POST
- TY III BARRICADE
- WORK ZONE
- MILL AND OVERLAY

NOTES:

1. SEE TCP(1-3a)-18 FOR ANY ADDITIONAL INFORMATION NOT SHOWN, INCLUDING SIGN PLACEMENT.
2. CONTRACTOR TO UTILIZE DAILY LANE SHIFTS TO PERFORM SHOULDER WIDENING, MILL, AND OVERLAY. ENSURE ALL LANES RETURN TO FULL OPERATION AT THE END OF EACH DAY. LANE SHIFTS ARE TO BE IMPLEMENTED DURING WORKING HOURS ONLY.
3. MAINTAIN 11' TRAVEL LANES THROUGH TRAFFIC CONTROL ZONE.
4. EDGE DROP OFFS IN EXCESS OF 2" SHALL BE BACK FILED WITH 3:1 MAX SAFETY WEDGE USING FLEX BASE OR OTHER APPROVED MATERIAL AND WILL BE SUBSIDIARY TO PERTINENT BID ITEMS.
5. TRAFFIC CONTROL PLANS SHALL CONFORM TO THE CURRENT TxDOT STANDARDS AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
6. ADVANCED WARNING SIGNS SHALL REMAIN UNTIL COMPLETION OF THE WORK.
7. SEE BC(2)-14 FOR SIGN SPACING AND LOCATIONS OF TYPICAL CROSSROAD SIGNS.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

TRAFFIC CONTROL PLAN RM 2243

SCALE: 1"=100' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	32
JW	2103	01	034	
CHECK				
JC				

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USER: lgomezgonz DATE: 3/23/2018 TIME: 10:21:30 AM SCALE: 1:100
FILE: \

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

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

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. 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.

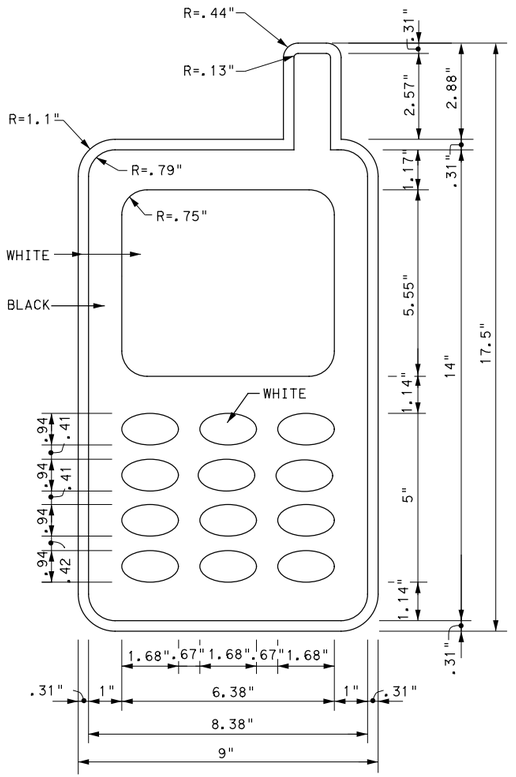
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

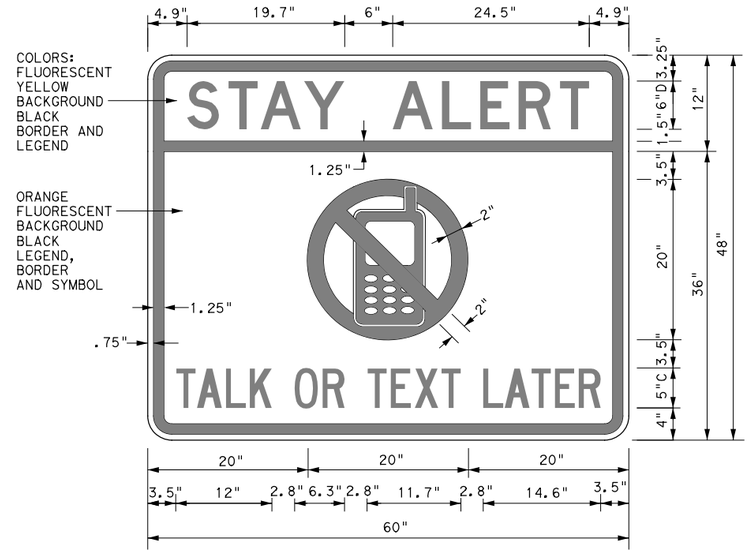
12. The Engineer has the final decision on the location of all traffic control devices.

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

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

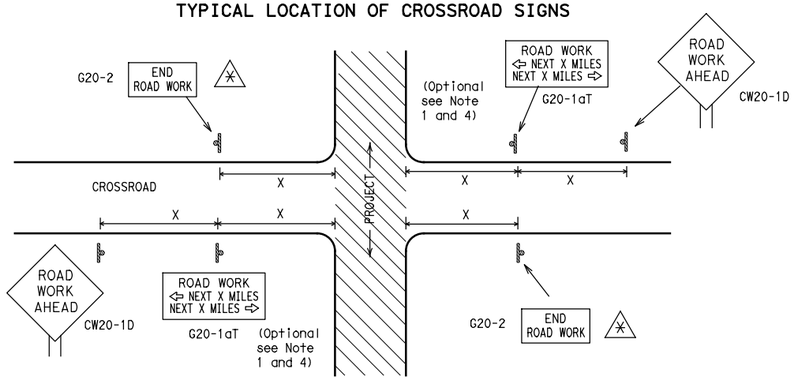
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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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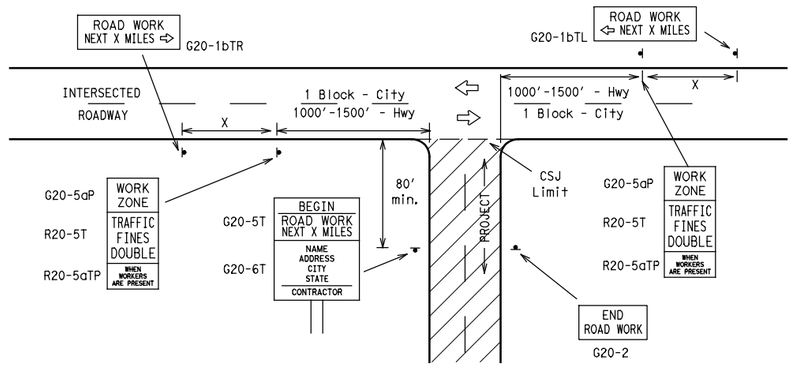
TYPICAL LOCATION OF CROSSROAD SIGNS



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

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. 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]

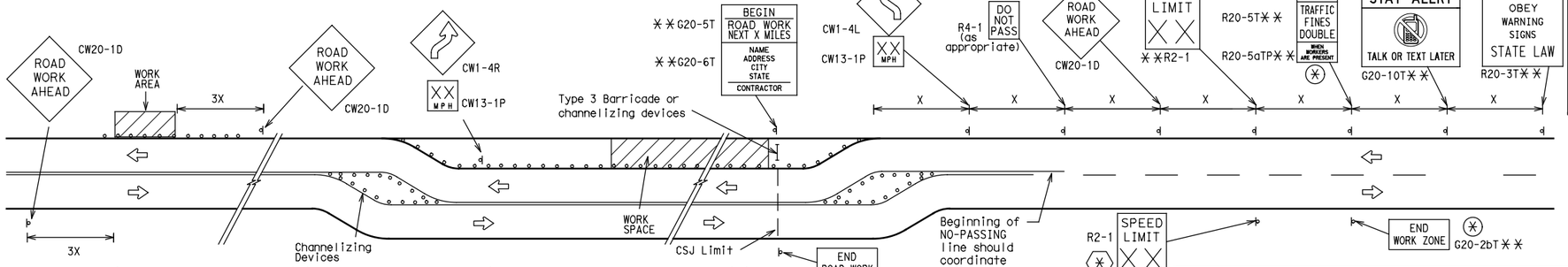
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ 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.

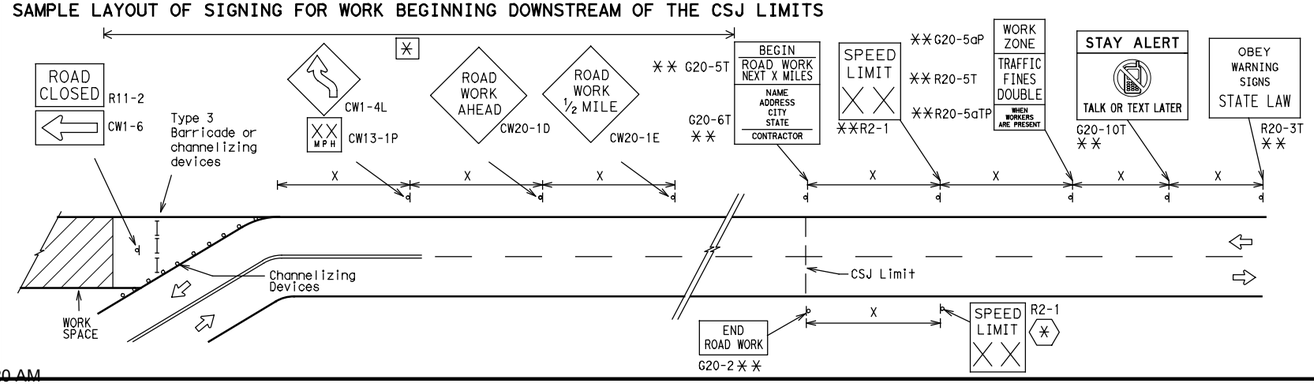
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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 AT THE CSJ LIMITS

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

(✳) The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

✳✳ 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.

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Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

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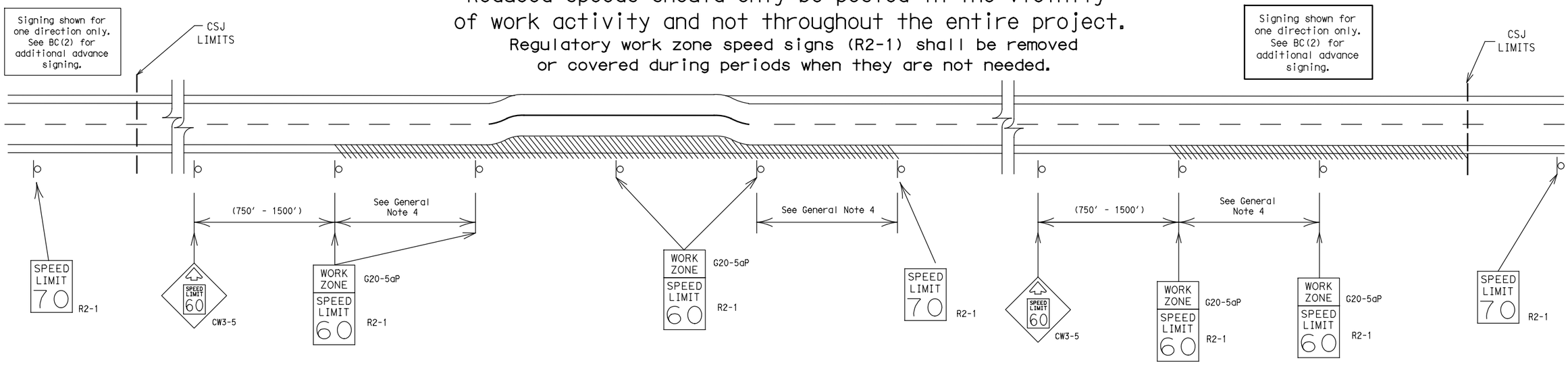
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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.

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SHEET 3 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

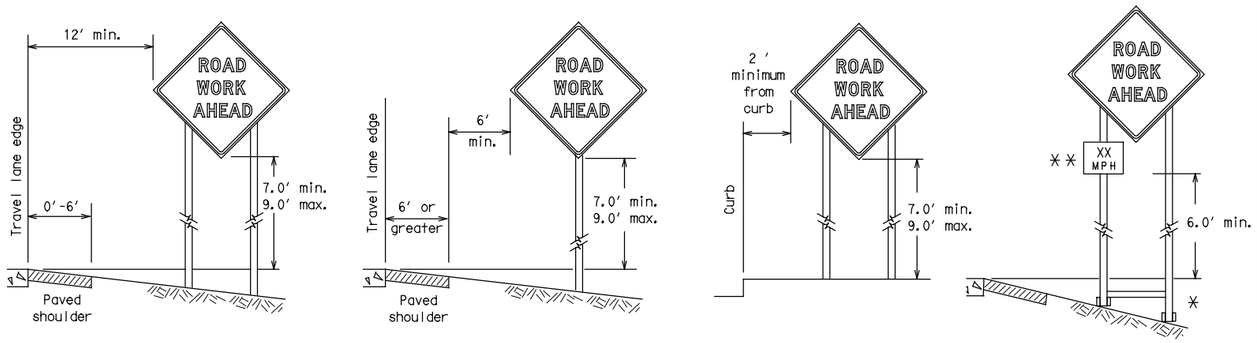
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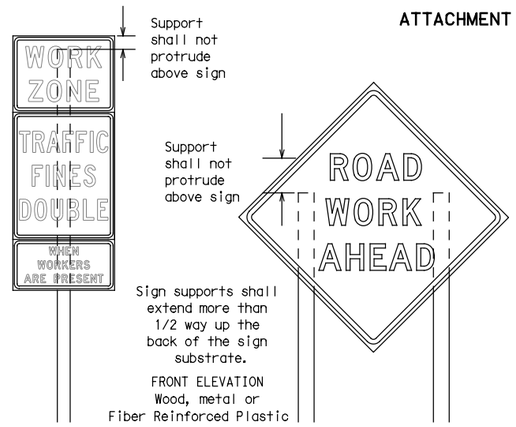
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



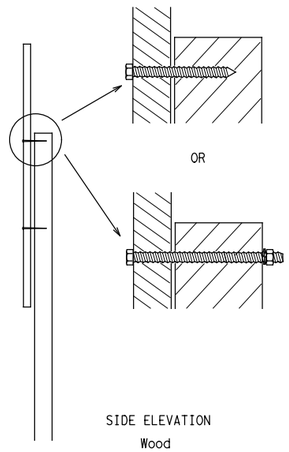
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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.

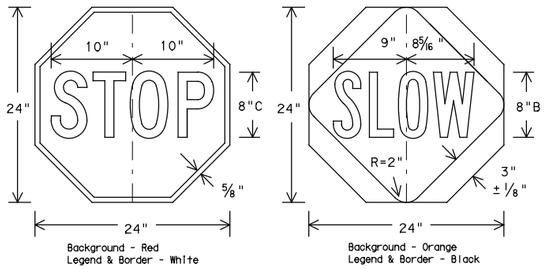


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.

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

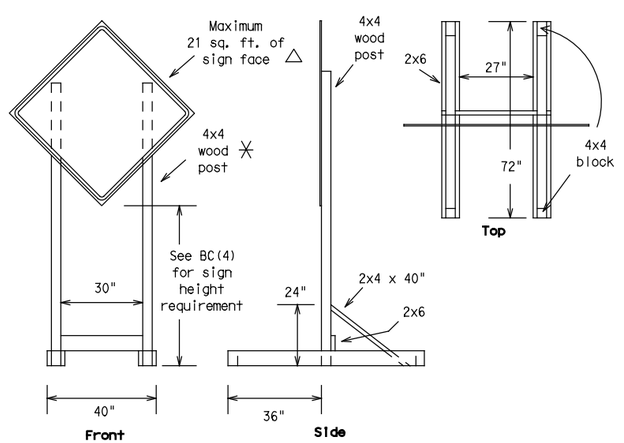
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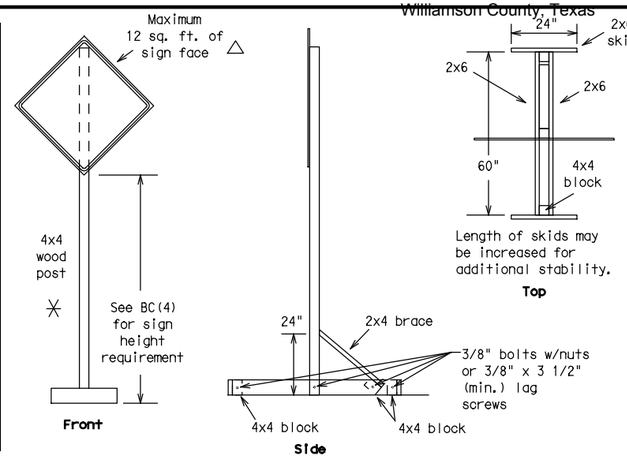
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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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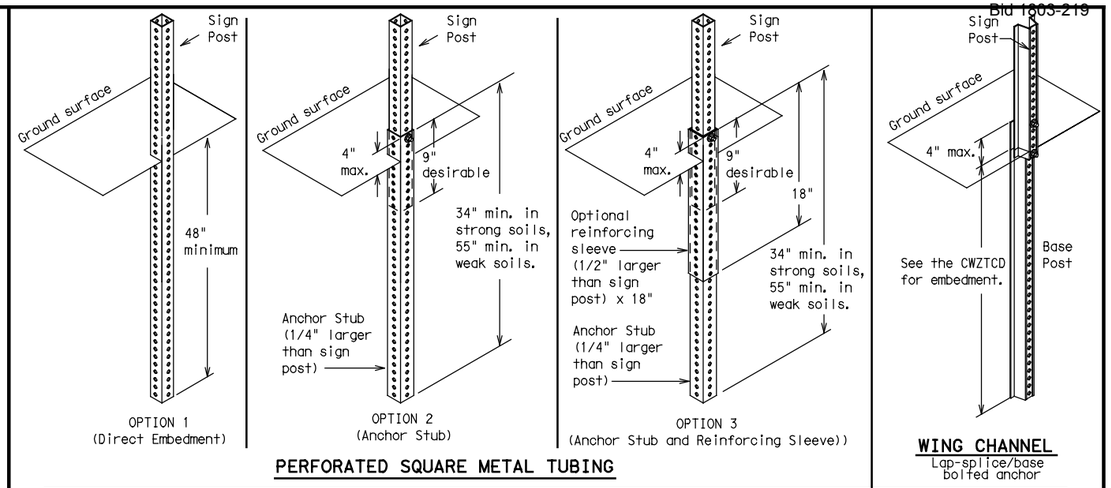
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SKID MOUNTED WOOD SIGN SUPPORTS

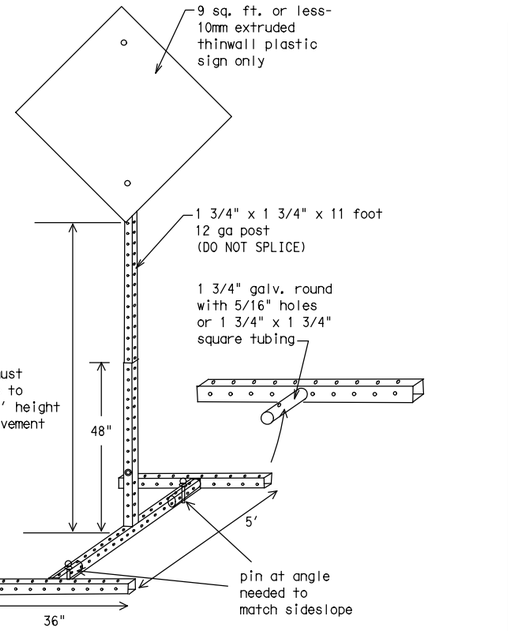
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

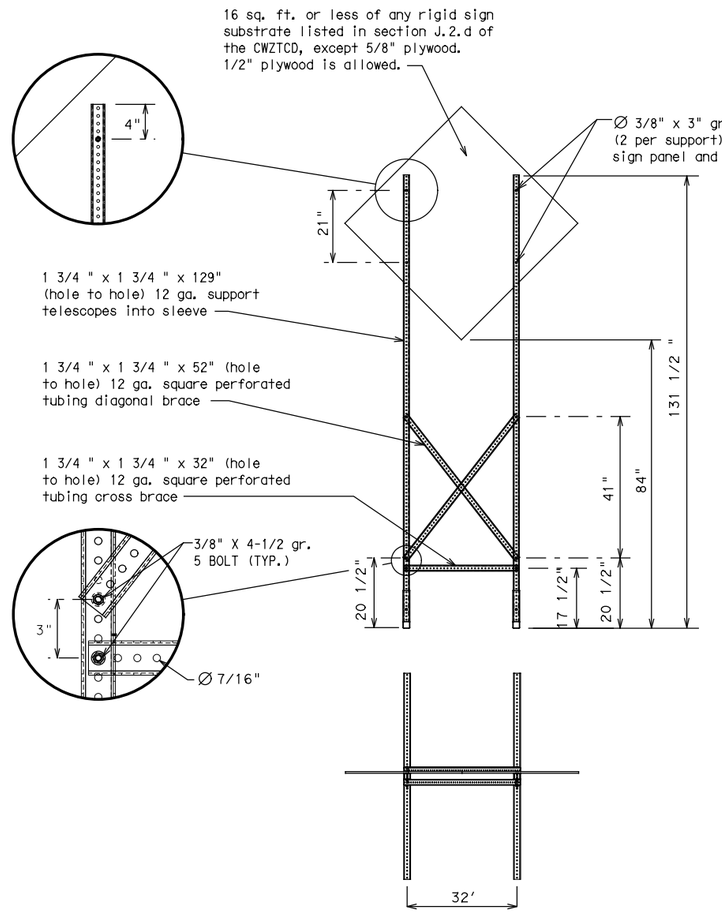


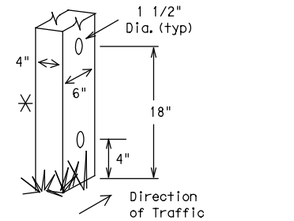
PERFORATED SQUARE METAL TUBING

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.

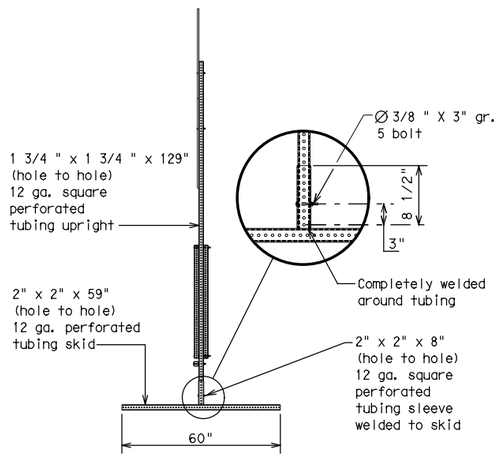






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation — Traffic Operations Division Standard

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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	AUS	WILLIAMSON		37

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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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** 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

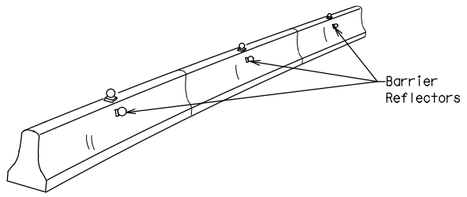
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7-13	AUS	WILLIAMSON		38

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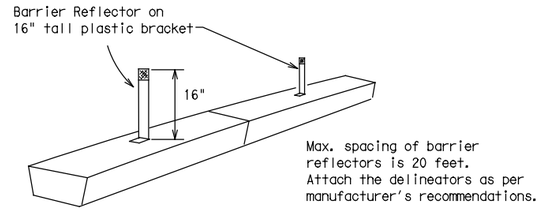
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1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors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

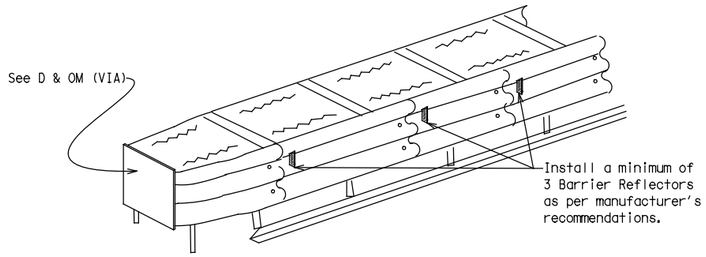


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

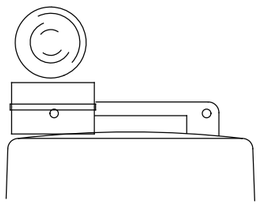


DELINEATION OF END TREATMENTS

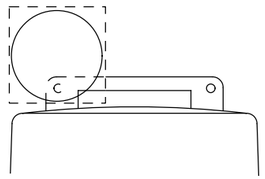
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

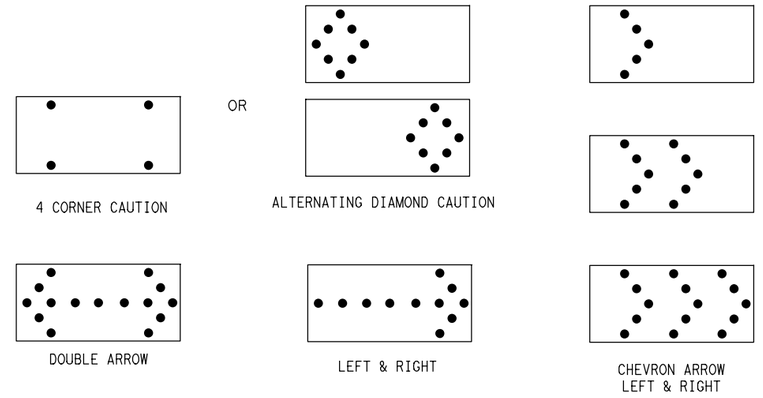
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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

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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:

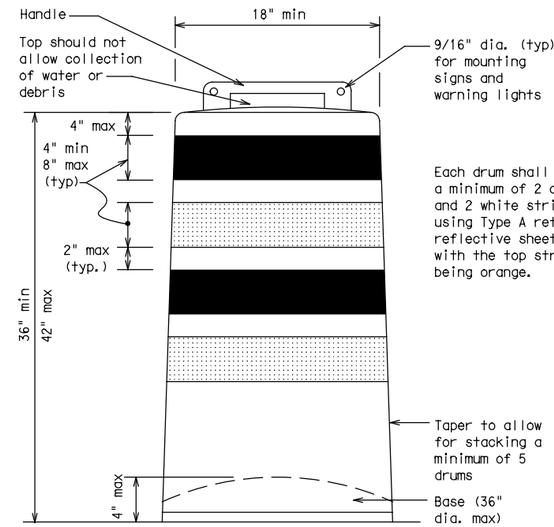
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

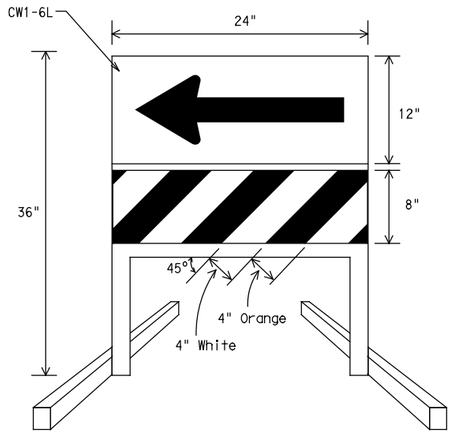
RETROREFLECTIVE SHEETING

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.

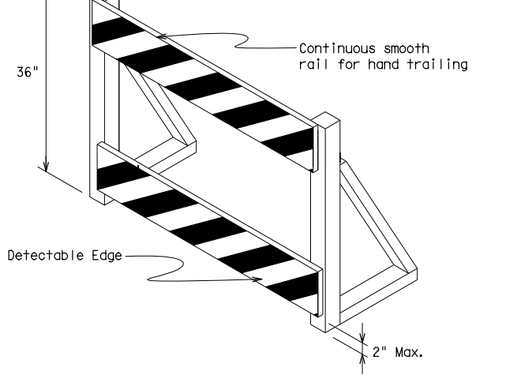




DIRECTION INDICATOR BARRICADE

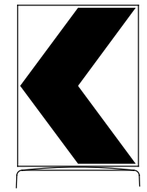
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. 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

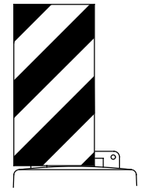


DETECTABLE PEDESTRIAN BARRICADES

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

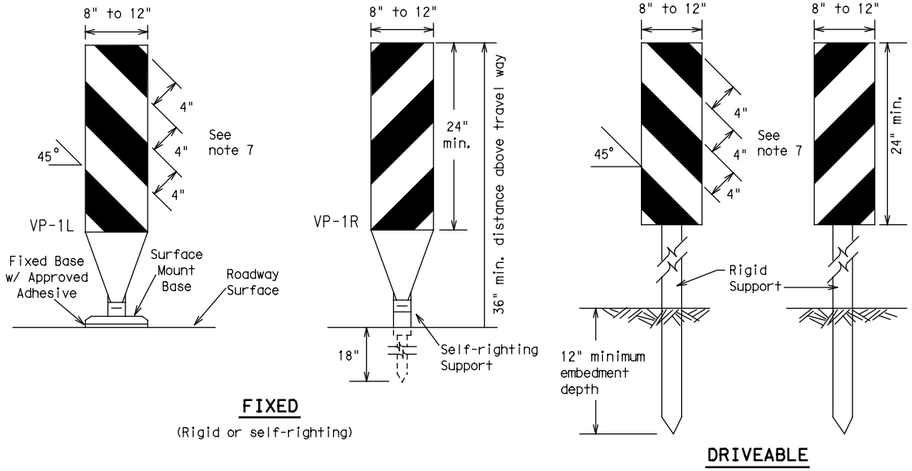
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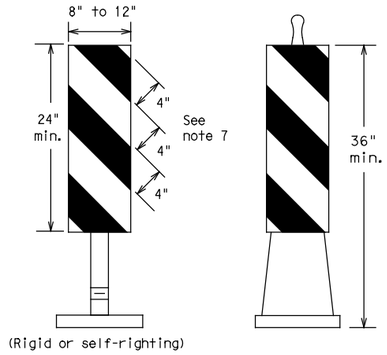
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FIXED
(Rigid or self-righting)

DRIVEABLE

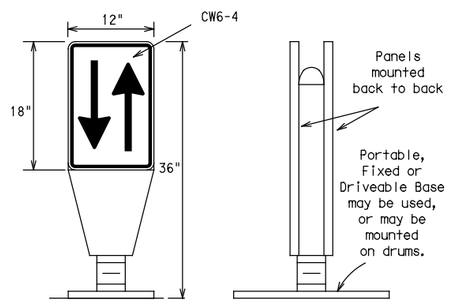


(Rigid or self-righting)

PORTABLE

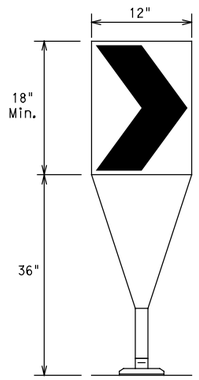
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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)



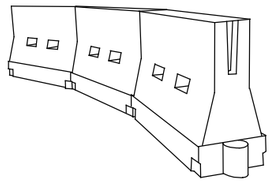
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

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

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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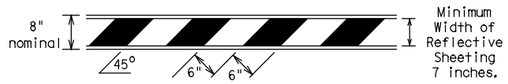
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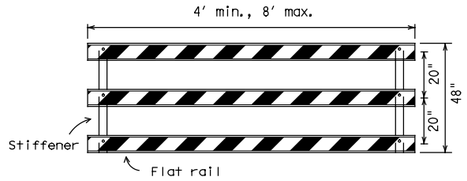
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



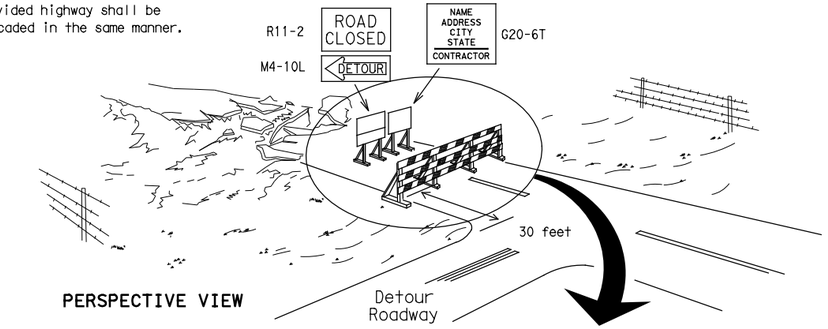
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

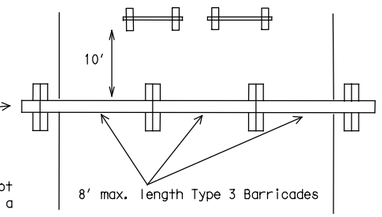
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

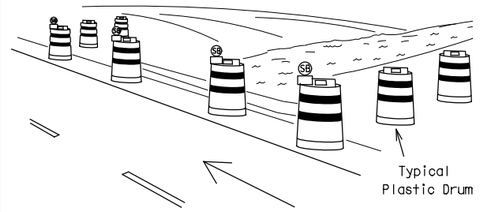
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

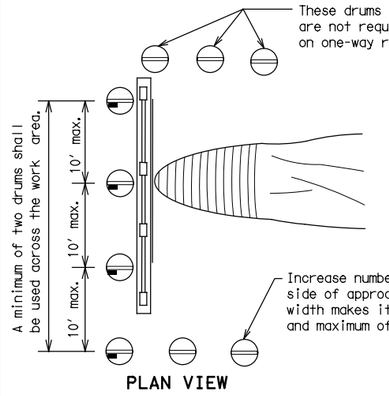
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

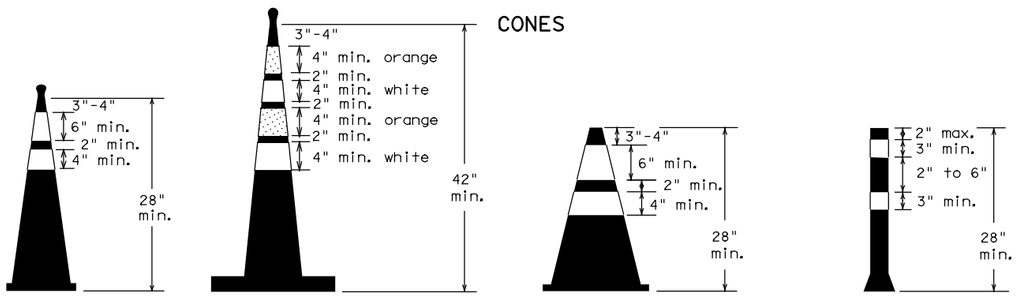
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

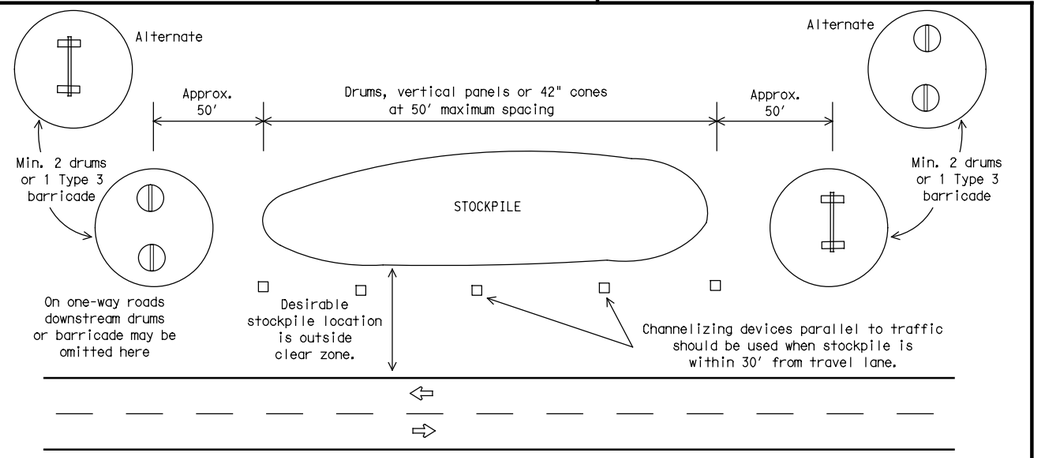
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

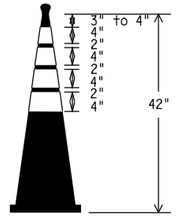
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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
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REVISIONS	2103	01	034	
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	AUS	WILLIAMSON		42

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

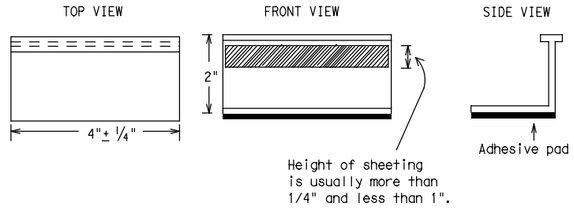
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

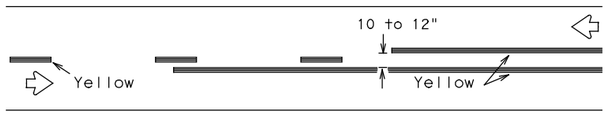
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1-02 7-13	AUS	WILLIAMSON		43
11-02 8-14				

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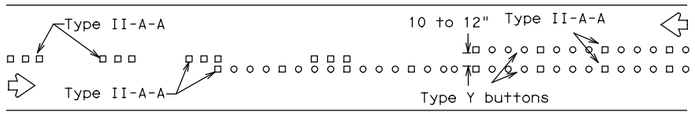
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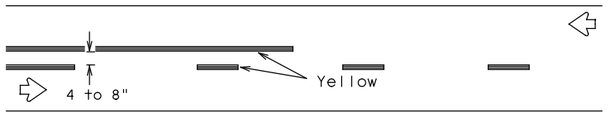
PAVEMENT MARKING PATTERNS



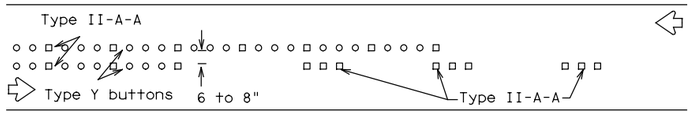
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



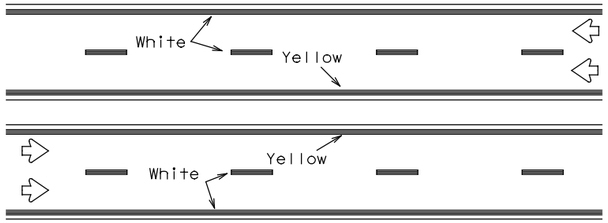
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



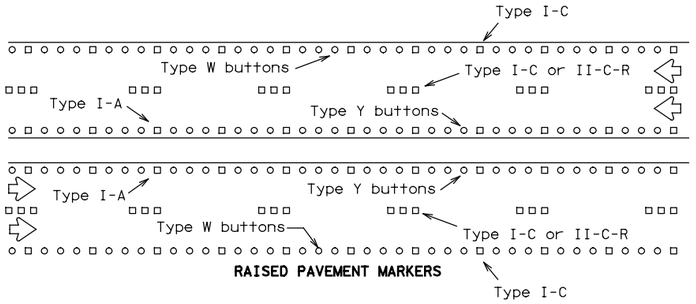
RAISED PAVEMENT MARKERS - PATTERN B

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

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



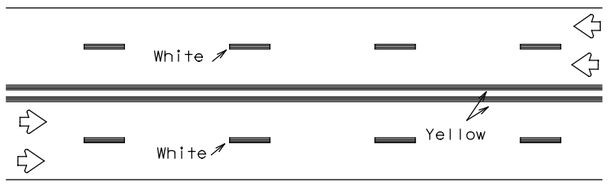
REFLECTORIZED PAVEMENT MARKINGS



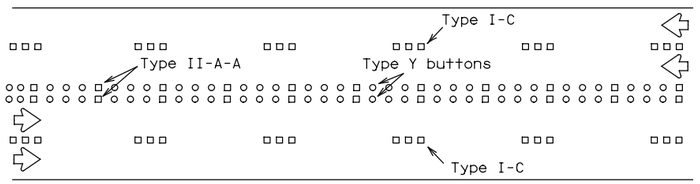
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



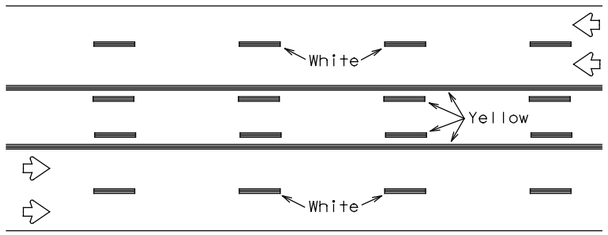
REFLECTORIZED PAVEMENT MARKINGS



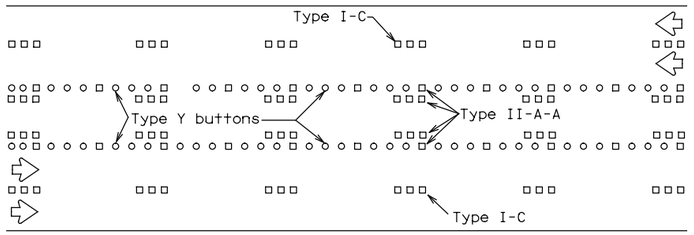
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

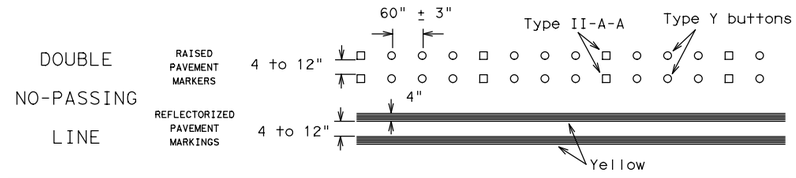
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

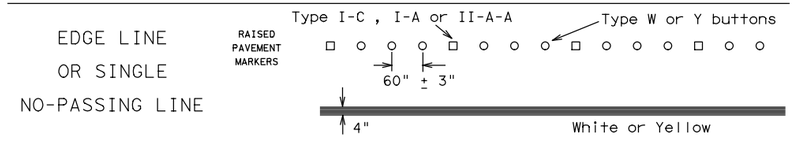
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

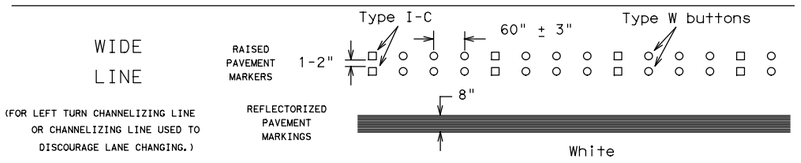


EDGE LINE OR SINGLE NO-PASSING LINE



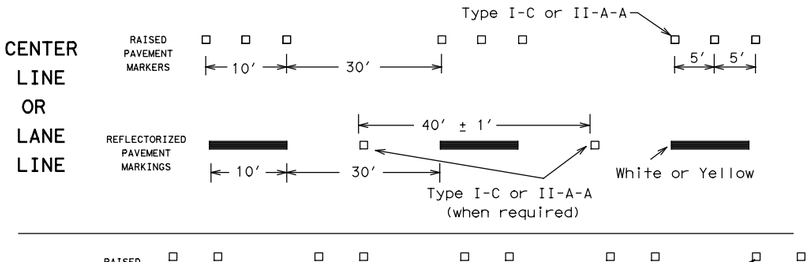
WIDE LINE

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

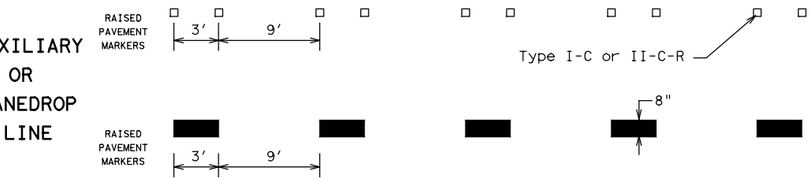


BROKEN LINES

CENTER LINE OR LANE LINE

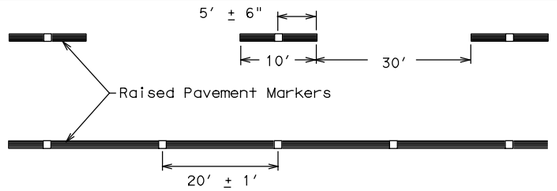


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

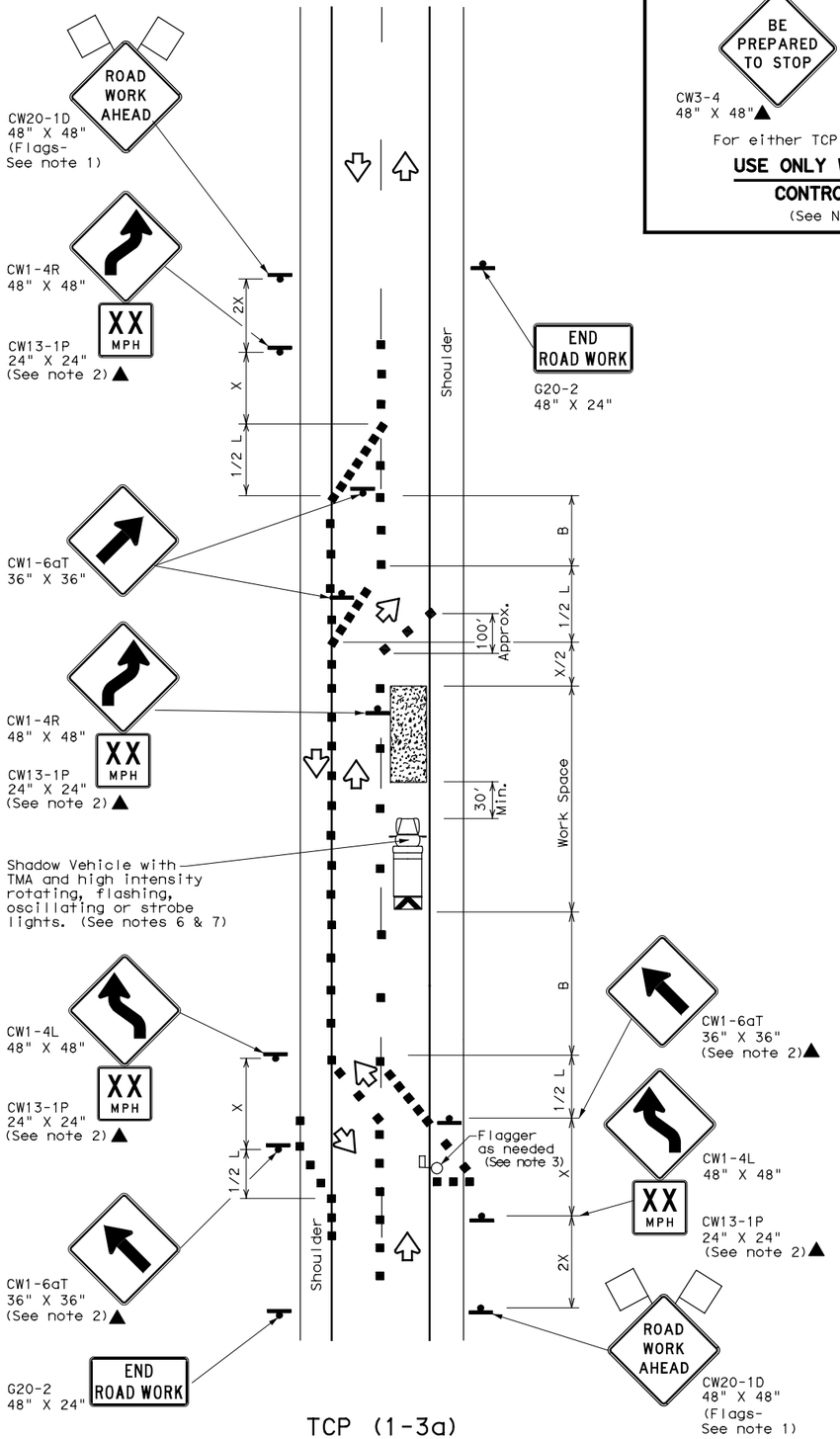
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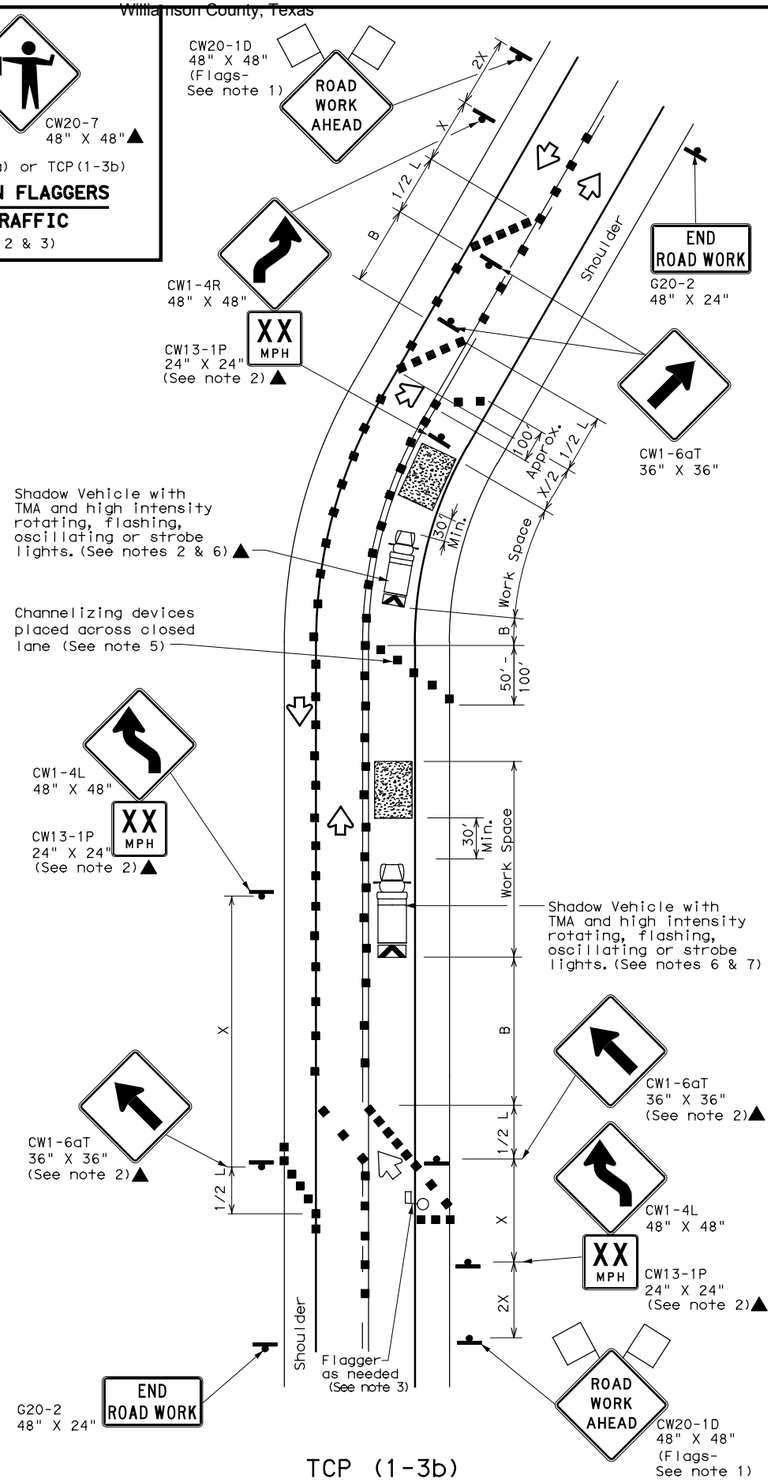


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
CW3-4 48" X 48"
CW20-7 48" X 48"
For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
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 wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

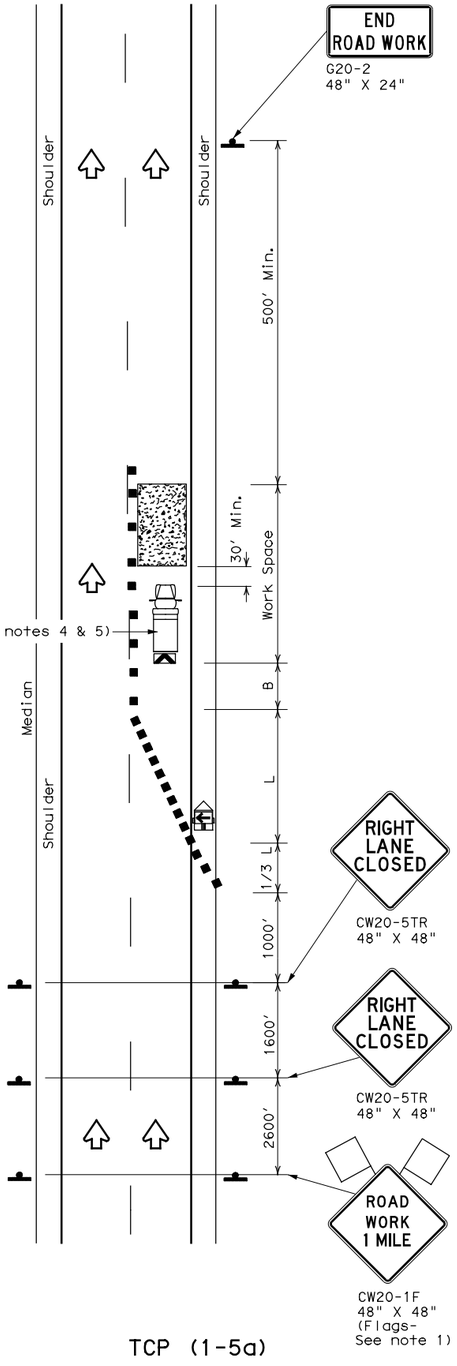
TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AUS	WILLIAMSON		45
1-97 2-18				

153

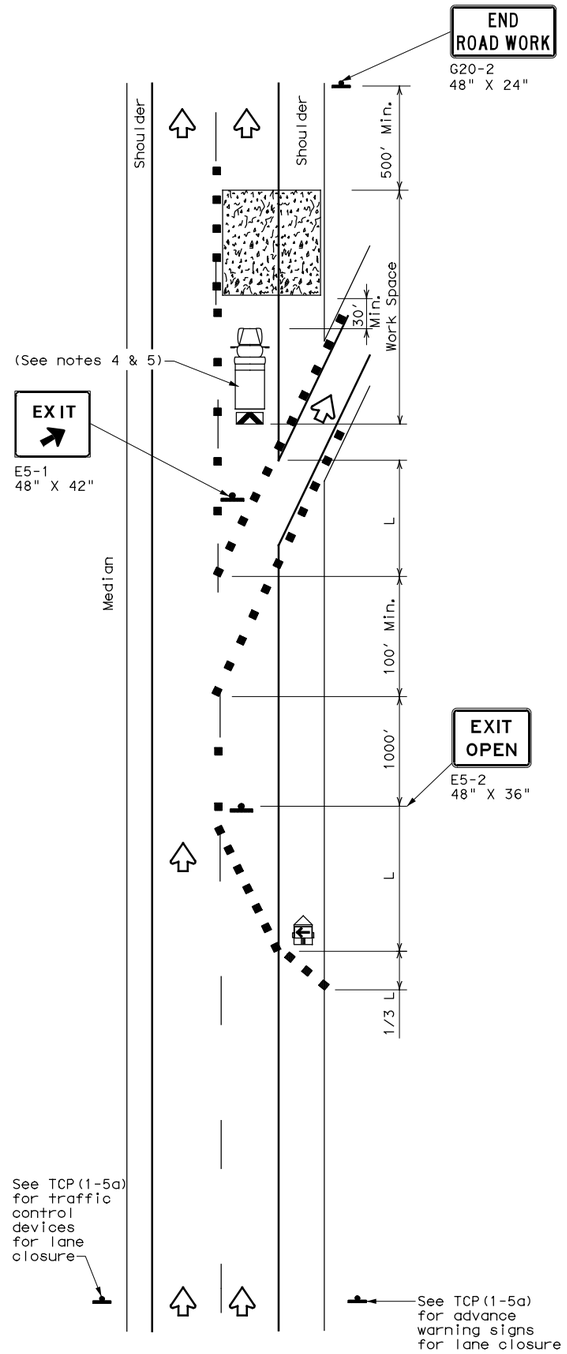
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 3/23/2018 10:28:43 AM
FILE: c:\pwworking\dal\d0911859\tcp1-5-18.dgn



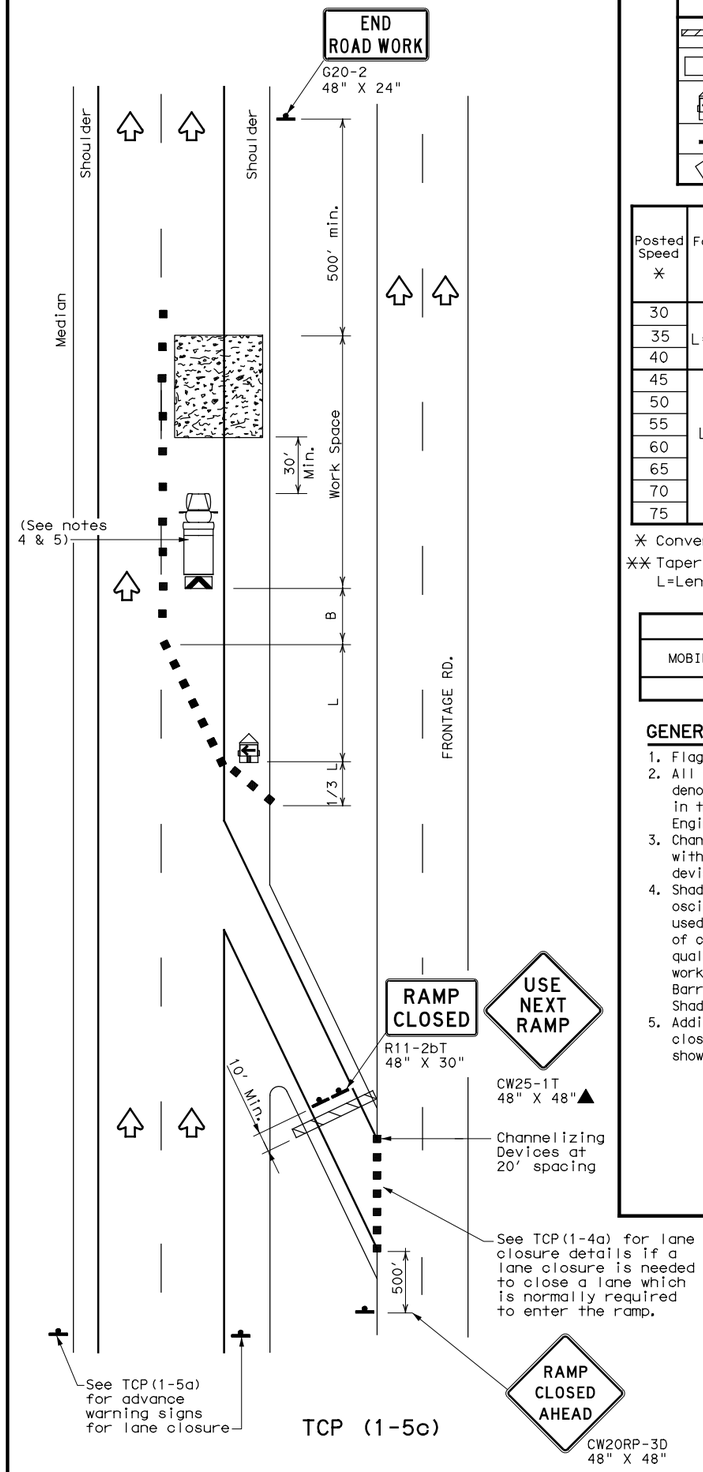
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		46

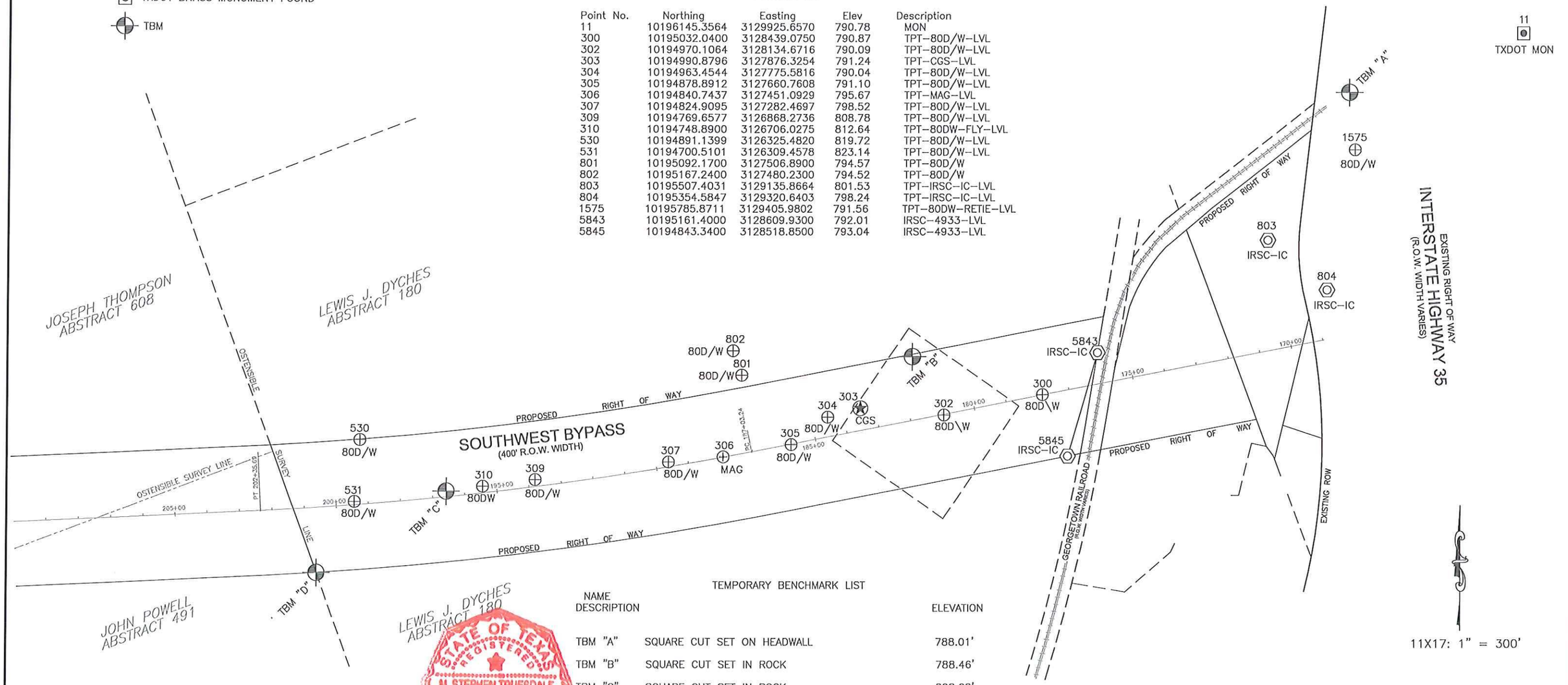
CONTROL MAP OF SW BYPASS WILLIAMSON COUNTY, TEXAS

LEGEND

- MAG NAIL SET
- IRON ROD SET W/ CAP
- COTTON GIN SPINDLE (CGS)
- 80D/W NAIL SET
- TXDOT BRASS MONUMENT FOUND
- TBM

CONTROL MAP

Point No.	Northing	Easting	Elev	Description
11	10196145.3564	3129925.6570	790.78	MON
300	10195032.0400	3128439.0750	790.87	TPT-80D/W-LVL
302	10194970.1064	3128134.6716	790.09	TPT-80D/W-LVL
303	10194990.8796	3127876.3254	791.24	TPT-CGS-LVL
304	10194963.4544	3127775.5816	790.04	TPT-80D/W-LVL
305	10194878.8912	3127660.7608	791.10	TPT-80D/W-LVL
306	10194840.7437	3127451.0929	795.67	TPT-MAG-LVL
307	10194824.9095	3127282.4697	798.52	TPT-80D/W-LVL
309	10194769.6577	3126868.2736	808.78	TPT-80D/W-LVL
310	10194748.8900	3126706.0275	812.64	TPT-80DW-FLY-LVL
530	10194891.1399	3126325.4820	819.72	TPT-80D/W-LVL
531	10194700.5101	3126309.4578	823.14	TPT-80D/W-LVL
801	10195092.1700	3127506.8900	794.57	TPT-80D/W
802	10195167.2400	3127480.2300	794.52	TPT-80D/W
803	10195507.4031	3129135.8664	801.53	TPT-IRSC-IC-LVL
804	10195354.5847	3129320.6403	798.24	TPT-IRSC-IC-LVL
1575	10195785.8711	3129405.9802	791.56	TPT-80DW-RETIE-LVL
5843	10195161.4000	3128609.9300	792.01	IRSC-4933-LVL
5845	10194843.3400	3128518.8500	793.04	IRSC-4933-LVL



11X17: 1" = 300'

TEMPORARY BENCHMARK LIST

NAME	DESCRIPTION	ELEVATION
TBM "A"	SQUARE CUT SET ON HEADWALL	788.01'
TBM "B"	SQUARE CUT SET IN ROCK	788.46'
TBM "C"	SQUARE CUT SET IN ROCK	808.08'
TBM "D"	IRON ROD WITH CAP STAMPED "INLAND"	827.10'

STATE OF TEXAS REGISTERED M. STEPHEN TRUESDALE 4933 PROFESSIONAL LAND SURVEYOR

AS PREPARED BY:

M. Stephen Truesdale 28 MAR 2017

M. STEPHEN TRUESDALE
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 4933
LICENSED STATE LAND SURVEYOR
FIRM REGISTRATION NO. 100591-00
INLAND GEODETICS, LLC
1504 CHISHOLM TRAIL ROAD, STE. 103
ROUND ROCK, TX 78681

DATE

NOTES:
COORDINATES ARE SURFACE VALUES BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83, CENTRAL ZONE 4203.
TO CONVERT COORDINATES AND DISTANCES TO GRID VALUES MULTIPLY BY A COMBINED SURFACE ADJUSTMENT FACTOR OF 0.99986002.
ELEVATIONS REPORTED ARE GPS ORTHOMETRIC HEIGHTS.

INLAND GEODETICS
PROFESSIONAL LAND SURVEYORS
1504 CHISHOLM TRAIL RD. STE. 103
ROUND ROCK, TX. 78681
PH. (512) 238-1200, FAX (512) 238-1251
FIRM REGISTRATION NO. 100591-00

CONTROL MAP OF SW BYPASS WILLIAMSON COUNTY, TEXAS

LEGEND

- COTTON GIN SPINDLE (CGS)
- 80D/W NAIL SET (UNLESS NOTED OTHERWISE)
- IRON ROD FOUND

CONTROL MAP

PointNo.	Northing	Easting	Elev	Description
100	10196081.8600	3121271.7200	824.93	TPT–IRON ROD FOUND
101	10195752.2700	3120634.3050	845.26	TPT–CGS
500	10196584.8600	3122031.4710	858.34	TPT–80DW
501	10196354.7100	3121644.1930	838.02	TPT–100DW



11X17: 1" = 100'

AS PREPARED BY:

M. Stephen Truesdale 23 MAR 2018

M. STEPHEN TRUESDALE — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR NO. 4933
LICENSED STATE LAND SURVEYOR
FIRM REGISTRATION NO. 100591-00
INLAND GEODETICS, LLC
1504 CHISHOLM TRAIL ROAD, STE. 103
ROUND ROCK, TX 78681

STATE OF TEXAS REGISTERED M. STEPHEN TRUESDALE 4933 PROFESSIONAL LAND SURVEYOR

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COORDINATES ARE SURFACE VALUES BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83, CENTRAL ZONE 4203.
TO CONVERT COORDINATES AND DISTANCES TO GRID VALUES MULTIPLY BY A COMBINED SURFACE ADJUSTMENT FACTOR OF 0.99986002.
ELEVATIONS REPORTED ARE GPS ORTHOMETRIC HEIGHTS.

INLAND GEODETICS
PROFESSIONAL LAND SURVEYORS
1504 CHISHOLM TRAIL RD. STE. 103
ROUND ROCK, TX. 78681
PH. (512) 238-1200, FAX (512) 238-1251
FIRM REGISTRATION NO. 100591-00

4/12/2018 7:20 AM
S:_HDR-PROJECTS\SWBYPASS\ROW-SCHEV\HDR SW-BYPASS-SH1-PHASE 2-CONTROL.dwg

Williamson County, Texas



N

NOT TO SCALE

LEGEND

✕ – AERIAL TARGET

CONTROL NOTES:

POINT NUMBERS 1575 AND 803, PROVIDED BY HDR ON 10.19.2015, WERE USED FOR THIS CONTROL SURVEY.
FILE NAME: HDR-SW-BYPASS-TOPO-2016-FINAL.CSV.

#803	#1575
N: 10195507.40	N: 10195785.87
E: 3129135.87	E: 3129405.98
EL: 801.53	EL: 791.56

DATUM
TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, (4203) FIPS NAD 83 NAVD 88 GRID

NOTES:
COORDINATES ARE GRID VALUES BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, AS STATED ABOVE. TO CONVERT THE COORDINATES TO SURFACE MULTIPLY BY THE COMBINED SURFACE ADJUSTMENT FACTOR WHICH HAS BEEN CALCULATED BY ANOTHER SURVEYING FIRM AND RELATED HEREON AS 1.00014.

Point Table

Point #	Northing	Easting	Elevation	Raw Description
70000	10204120.67	3116409.77	891.50	AT-3
70001	10194330.15	3120265.19	845.45	AT-4
70002	10193203.14	3118415.00	890.29	AT-5
70049	10193658.79	3128927.19	803.78	AT-1
70050	10192422.98	3128633.79	814.62	AT-2

STATE OF TEXAS
REGISTERED
WILLIAM R. HERRING
6355
PROFESSIONAL
LAND SURVEYOR

WILLIAM R. HERRING
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 6355 – STATE OF TEXAS

9/18/2017
DATE

NO.	REVISIONS	BY	DATE

JOB NUMBER: 38165
DATE: 08.21.2017
SCALE: NTS
SURVEYOR: WHerring
TECHNICIAN: MPowell/TNelson
DRAWING: 38165-WilCoByPass
TRACT ID: N/A
PARTYCHIEF: KMiller
FIELDBOOKS: 27834

SAM
SURVEYING•AERIAL MAPPING•ENGINEERING
4801 Southwest Parkway
Building Two, Suite 100
Austin Texas, 78735
Ofc: 512.447.0575
Fax: 512.326.3029
email: info@sam.biz
Texas Firm Registration No. 10064300

SW BYPASS - PANEL LAYOUT
HDR
WILLIAMSON COUNTY, TEXAS

PROJECT: HDR SW BYPASS

SHEET 1
OF 1

PATH:\\SAMINC\AUS\PROJECTS\1017038165\100\SURVEY\02BASE\1017038165-GS - HDR WILLIAMSON COUNTY BY-PASS-GS - 1017038165-GS.DWG

4/12/2018 7:20 AM

ULTIMATE ML CL "SWB_ML_CL"

FUTURE MAINLANE CENTERLINE NOT SHOWN ON SHEETS

	STATION	NORTHING	EASTING
(1) Element: Circular			
PC ( )	171+15.89	10195330.833	3129030.148
PI ( )	174+76.48	10195093.676	3128758.520
CC ( )		10196340.238	3128148.840
PT ( )	178+20.38	10195024.863	3128404.556
Radius:	1340.00		
Delta:	30°07'21.85" Right		
Degree of Curvature(Arc):	4°16'32.90"		
Length:	704.49		
Tangent:	360.59		
Chord:	696.41		
Middle Ordinate:	46.03		
External:	47.67		
Tangent Direction:	S 48°52'33.20" W		
Radial Direction:	N 41°07'26.80" W		
Chord Direction:	S 63°56'14.12" W		
Radial Direction:	N 11°00'04.95" W		
Tangent Direction:	S 78°59'55.05" W		
Element: Linear			
PT ( )	178+20.38	10195024.863	3128404.556
PC ( )	187+03.24	10194856.385	3127537.921
Tangent Direction:	S 78°59'55.05" W		
Tangent Length:	882.86		
(2) Element: Circular			
PC ( )	187+03.24	10194856.385	3127537.921
PI ( )	194+70.77	10194709.916	3126784.499
CC ( )		10205408.828	3125486.471
PT ( )	202+35.69	10194671.972	3126017.910
Radius:	10750.00		
Delta:	8°10'03.85" Right		
Degree of Curvature(Arc):	0°31'58.74"		
Length:	1532.45		
Tangent:	767.53		
Chord:	1531.16		
Middle Ordinate:	27.30		
External:	27.37		
Tangent Direction:	S 78°59'55.05" W		
Radial Direction:	N 11°00'04.95" W		
Chord Direction:	S 83°04'56.98" W		
Radial Direction:	N 2°50'01.10" W		
Tangent Direction:	S 87°09'58.90" W		
Element: Linear			
PT ( )	202+35.69	10194671.972	3126017.910
PC ( )	216+37.33	10194602.680	3124617.983
Tangent Direction:	S 87°09'58.90" W		
Tangent Length:	1401.64		
(3) Element: Circular			
PC ( )	216+37.33	10194602.680	3124617.983
PI ( )	236+97.65	10194500.826	3122560.181
CC ( )		10198003.517	3124449.652
PT ( )	253+43.01	10196276.451	3121515.156
Radius:	3405.00		
Delta:	62°21'18.54" Right		
Degree of Curvature(Arc):	1°40'57.70"		
Length:	3705.67		
Tangent:	2060.32		
Chord:	3525.48		
Middle Ordinate:	491.79		
External:	574.82		
Tangent Direction:	S 87°09'58.90" W		
Radial Direction:	N 2°50'01.10" W		
Chord Direction:	N 61°39'21.83" W		
Radial Direction:	N 59°31'17.45" E		
Tangent Direction:	N 30°28'42.55" W		

SOUTHWEST BYPASS WBFR "WBFR_I_CL"

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	68+00.00	10195535.155	3129313.720
PC ( )	69+17.80	10195523.980	3129196.447
Tangent Direction:	N 84°33'23" E		
Tangent Length:	117.80		
(4) Element: Circular			
PC ( )	69+17.80	10195523.980	3129196.447
PI ( )	70+83.83	10195508.230	3129031.173
CC ( )		10194925.690	3129253.461
PT ( )	72+41.77	10195409.875	3128897.419
Radius:	601.00		
Design Speed(mph):	40.00		
Superelevation:	-5.800%		
Delta:	30°53'07" Left		
Degree of Curvature(Arc):	9°32'00"		
Length:	323.97		
Tangent:	166.02		
Chord:	320.06		
Middle Ordinate:	21.70		
External:	22.51		
Tangent Direction:	N 84°33'23" E		
Radial Direction:	N 5°26'37" W		
Chord Direction:	N 69°06'50" E		
Radial Direction:	N 36°19'43" W		
Tangent Direction:	N 53°40'17" E		

SOUTHWEST BYPASS WBFR "WBFR_I_CL" CONT

	STATION	NORTHING	EASTING
Element: Linear			
PT ( )	72+41.77	10195409.875	3128897.419
PC ( )	72+93.69	10195379.118	3128855.593
Tangent Direction:	N 53°40'17" E		
Tangent Length:	51.92		
(5) Element: Circular			
PC ( )	72+93.69	10195379.118	3128855.593
PI ( )	A 375+61.08	10195220.316	3128639.636
CC ( )		10196340.238	3128148.840
Eqn ( )	72+93.69	10195379.118	3128855.593
Eqn ( )	A 372+93.02	10195379.118	3128855.593
PT ( )	A 378+20.38	10195169.162	3128376.503
Radius:	1193.00		
Design Speed(mph):	50.00		
Superelevation:	5.600%		
Delta:	25°19'38" Right		
Degree of Curvature(Arc):	4°48'10"		
Length:	527.36		
Tangent:	268.06		
Chord:	523.08		
Middle Ordinate:	29.02		
External:	29.74		
Tangent Direction:	N 53°40'17" E		
Radial Direction:	N 36°19'43" W		
Chord Direction:	N 66°20'06" E		
Radial Direction:	N 11°00'05" W		
Tangent Direction:	N 78°59'55" E		
Element: Linear			
PT ( )	A 378+20.38	10195169.162	3128376.503
PC ( )	A 387+03.24	10195000.684	3127509.869
Tangent Direction:	N 78°59'55" E		
Tangent Length:	882.86		
(6) Element: Circular			
PC ( )	A 387+03.24	10195000.68	3127509.87
PI ( )	A 390+96.80	10194925.58	3127123.54
CC ( )		10205408.83	3125486.47
POE( )	A 394+90.00	10194879.32	3126732.71
Radius:	10603.00		
Design Speed(mph):	50.00		
Superelevation:	1.400%		
Delta:	4°15'05" Right		
Degree of Curvature(Arc):	0°32'25"		
Length:	786.76		
Tangent:	393.56		
Chord:	786.58		
Middle Ordinate:	7.30		
External:	7.30		
Tangent Direction:	N 78°59'55" E		
Radial Direction:	N 11°00'05" W		
Chord Direction:	N 81°07'28" E		
Radial Direction:	N 6°45'00" W		
Tangent Direction:	N 83°15'00" E		

(WBFR_I_CL ENDS AT STA 394+90)

SOUTHWEST BYPASS WBFR "WBFR_S2_CL"

	STATION	NORTHING	EASTING
(6) Element: Circular			
POB( )	394+90.00	10194871.87	3126733.59
PI ( )	398+52.77	10194829.24	3126373.34
CC ( )		10205408.83	3125486.47
PT ( )	402+15.25	10194811.30	3126011.01
Radius:	10610.50		
Delta:	3°54'59" Right		
Degree of Curvature(Arc):	0°32'24"		
Length:	725.25		
Tangent:	362.77		
Chord:	725.11		
Middle Ordinate:	6.20		
External:	6.20		
Tangent Direction:	S 83°15'00" W		
Radial Direction:	N 6°45'00" W		
Chord Direction:	S 85°12'30" W		
Radial Direction:	N 2°50'01" W		
Tangent Direction:	S 87°09'59" W		
Element: Linear			
PT ( )	402+15.25	10194811.30	3126011.01
PC ( )	416+16.89	10194742.01	3124611.09
Tangent Direction:	S 87°09'59" W		
Tangent Length:	1401.64		

SOUTHWEST BYPASS WBFR "WBFR_S2_CL" CONT

	STATION	NORTHING	EASTING
(7) Element: Circular			
PC ( )	416+16.89	10194742.01	3124611.09
PI ( )	430+70.10	10194670.17	3123159.65
CC ( )		10198003.52	3124449.65
PCC ( )	443+51.45	10195700.37	3122134.70
Radius:	3265.50		
Delta:	47°58'48" Right		
Degree of Curvature(Arc):	1°45'16"		
Length:	2734.56		
Tangent:	1453.21		
Chord:	2655.36		
Middle Ordinate:	282.09		
External:	308.76		
Tangent Direction:	S 87°09'59" W		
Radial Direction:	N 2°50'01" W		
Chord Direction:	N 68°50'37" W		
Radial Direction:	N 45°08'47" E		
Tangent Direction:	N 44°51'13" W		
(8) Element: Circular			
PCC ( )	443+51.45	10195700.37	3122134.70
PI ( )	445+96.10	10195873.80	3121962.15
CC ( )		10197068.65	3123509.99
PT ( )	448+38.19	10196084.65	3121838.06
Radius:	1940.00		
Delta:	14°22'30" Right		
Degree of Curvature(Arc):	2°57'12"		
Length:	486.73		
Tangent:	244.65		
Chord:	485.46		
Middle Ordinate:	15.24		
External:	15.37		
Tangent Direction:	N 44°51'13" W		
Radial Direction:	N 45°08'47" E		
Chord Direction:	N 37°39'58" W		
Radial Direction:	N 59°31'17" E		
Tangent Direction:	N 30°28'43" W		
Element: Linear			
PT ( )	448+38.19	10196084.65	3121838.06
POE ( )	453+00.00	10196482.65	3121603.82
Tangent Direction:	N 30°28'43" W		
Tangent Length:	461.81		

(WBFR_S2_CL BEGINS AT STA 394+90

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ALIGNMENT DATA

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	49
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020I0718.tbl
USER: lgomezgonz TIME: 1:44:34 PM SCALE: 1:1
DATE: 3/23/2018
FILE: \

RM 2243 "℄ RM 2243"

		STATION	NORTHING	EASTING
(9)	Element: Circular			
	POB ( )	472+30.64	10195918.838	3120958.604
	PI ( )	474+25.67	10196023.288	3121123.312
	CC ( )		10186240.810	3127095.979
	PT ( )	476+20.67	10196122.074	3121291.479
	Radius:	11460.00		
	Design Speed(mph):	55.00		
	Superelevation:	6.000%		
	Delta:	1°57′00" Right		
	Degree of Curvature(Arc):	0°30′00"		
	Length:	390.03		
	Tangent:	195.04		
	Chord:	390.01		
	Middle Ordinate:	1.66		
	External:	1.66		
	Tangent Direction:	N 57°37′08" E		
	Radial Direction:	N 32°22′52" W		
	Chord Direction:	N 58°35′38" E		
	Radial Direction:	N 30°25′52" W		
	Tangent Direction:	N 59°34′08" E		
	Element: Linear			
	PT ( )	476+20.67	10196122.074	3121291.479
	POE ( )	503+38.95	10197498.885	3123635.288
	Tangent Direction:	N 59°34′08" E		
	Tangent Length:	2718.28		

RAMP "℄ RAMPNB2"

		STATION	NORTHING	EASTING
	Element: Linear			
	POB ( )	10+00.00	10196320.392	3121693.514
	PC ( )	10+99.93	10196406.516	3121642.827
	Tangent Direction:	N 30°28′43" W		
	Tangent Length:	99.93		
(10)	Element: Circular			
	PC ( )	10+99.93	10196406.516	3121642.827
	PI ( )	12+54.89	10196540.063	3121564.229
	CC ( )		10195138.479	3119488.278
	PT ( )	14+09.46	10196662.882	3121469.740
	Radius:	2500.00		
	Design Speed(mph):	50.00		
	Superelevation:	3.800%		
	Delta:	7°05′38" Left		
	Degree of Curvature(Arc):	2°17′31"		
	Length:	309.52		
	Tangent:	154.96		
	Chord:	309.33		
	Middle Ordinate:	4.79		
	External:	4.80		
	Tangent Direction:	N 30°28′43" W		
	Radial Direction:	N 59°31′17" E		
	Chord Direction:	N 34°01′31" W		
	Radial Direction:	N 52°25′40" E		
	Tangent Direction:	N 37°34′20" W		
	Element: Linear			
	PT ( )	14+09.46	10196662.882	3121469.740
	PC ( )	20+49.75	10197170.370	3121079.314
	Tangent Direction:	N 37°34′20" W		
	Tangent Length:	640.29		

SBFR I-35 "℄ SBFR"

		STATION	NORTHING	EASTING
	Element: Linear			
	POB ( )	900+00.00	10196124.67	3129679.95
	PC ( )	901+68.10	10196022.82	3129546.22
	Tangent Direction:	S 52°42′24" W		
	Tangent Length:	168.10		
(11)	Element: Circular			
	PC ( )	901+68.10	10196022.82	3129546.22
	PI ( )	905+90.59	10195766.83	3129210.11
	CC ( )		10195492.19	3129950.35
	PT ( )	909+21.32	10195353.56	3129297.92
	Radius:	667.00		
	Delta:	64°42′08" Left		
	Degree of Curvature(Arc):	8°35′24"		
	Length:	753.22		
	Tangent:	422.49		
	Chord:	713.83		
	Middle Ordinate:	103.53		
	External:	122.55		
	Tangent Direction:	S 52°42′24" W		
	Radial Direction:	N 37°17′36" W		
	Chord Direction:	S 20°21′20" W		
	Radial Direction:	S 78°00′16" W		
	Tangent Direction:	S 11°59′44" E		
	Element: Linear			
	PT ( )	909+21.32	10195353.56	3129297.92
	PC ( )	910+00.56	10195276.06	3129314.39
	Tangent Direction:	S 11°59′44" E		
	Tangent Length:	79.24		
(12)	Element: Circular			
	PC ( )	910+00.56	10195276.06	3129314.39
	PI ( )	913+66.08	10194918.52	3129390.35
	CC ( )		10194878.67	3127444.11
	PT ( )	917+22.88	10194558.17	3129329.08
	Radius:	1912.02		
	Delta:	21°38′42" Right		
	Degree of Curvature(Arc):	2°59′48"		
	Length:	722.32		
	Tangent:	365.52		
	Chord:	718.03		
	Middle Ordinate:	34.01		
	External:	34.62		
	Tangent Direction:	S 11°59′44" E		
	Radial Direction:	S 78°00′16" W		
	Chord Direction:	S 1°10′23" E		
	Radial Direction:	N 80°21′01" W		
	Tangent Direction:	S 9°38′59" W		

SOUTHWEST BYPASS WBFR "WBFR_I_SPUR"

		STATION	NORTHING	EASTING
(5)	Element: Linear			
	POB ( )	367+25.00	10195772.351	3129264.678
	PC ( )	371+04.92	10195502.013	3128997.739
	Tangent Direction:	N 44°38′15" E		
	Tangent Length:	379.92		
	Element: Circular			
	PC ( )	371+04.92	10195502.013	3128997.739
	PI ( )	374+73.77	10195239.551	3128738.576
	CC ( )		10196340.238	3128148.840
	PT ( )	378+20.38	10195169.162	3128376.503
	Radius:	1193.00		
	Design Speed(mph):	50.00		
	Superelevation:	5.600%		
	Delta:	34°21′40" Right		
	Degree of Curvature(Arc):	4°48′10"		
	Length:	715.46		
	Tangent:	368.85		
	Chord:	704.79		
	Middle Ordinate:	53.23		
	External:	55.72		
	Tangent Direction:	N 44°38′15" E		
	Radial Direction:	N 45°21′45" W		
	Chord Direction:	N 61°49′05" E		
	Radial Direction:	N 11°00′05" W		
	Tangent Direction:	N 78°59′55" E		
	Element: Linear			
	PT ( )	378+20.38	10195169.162	3128376.503
	POE ( )	387+03.24	10195000.684	3127509.869
	Tangent Direction:	N 78°59′55" E		
	Tangent Length:	882.86		

STATE OF TEXAS
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WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

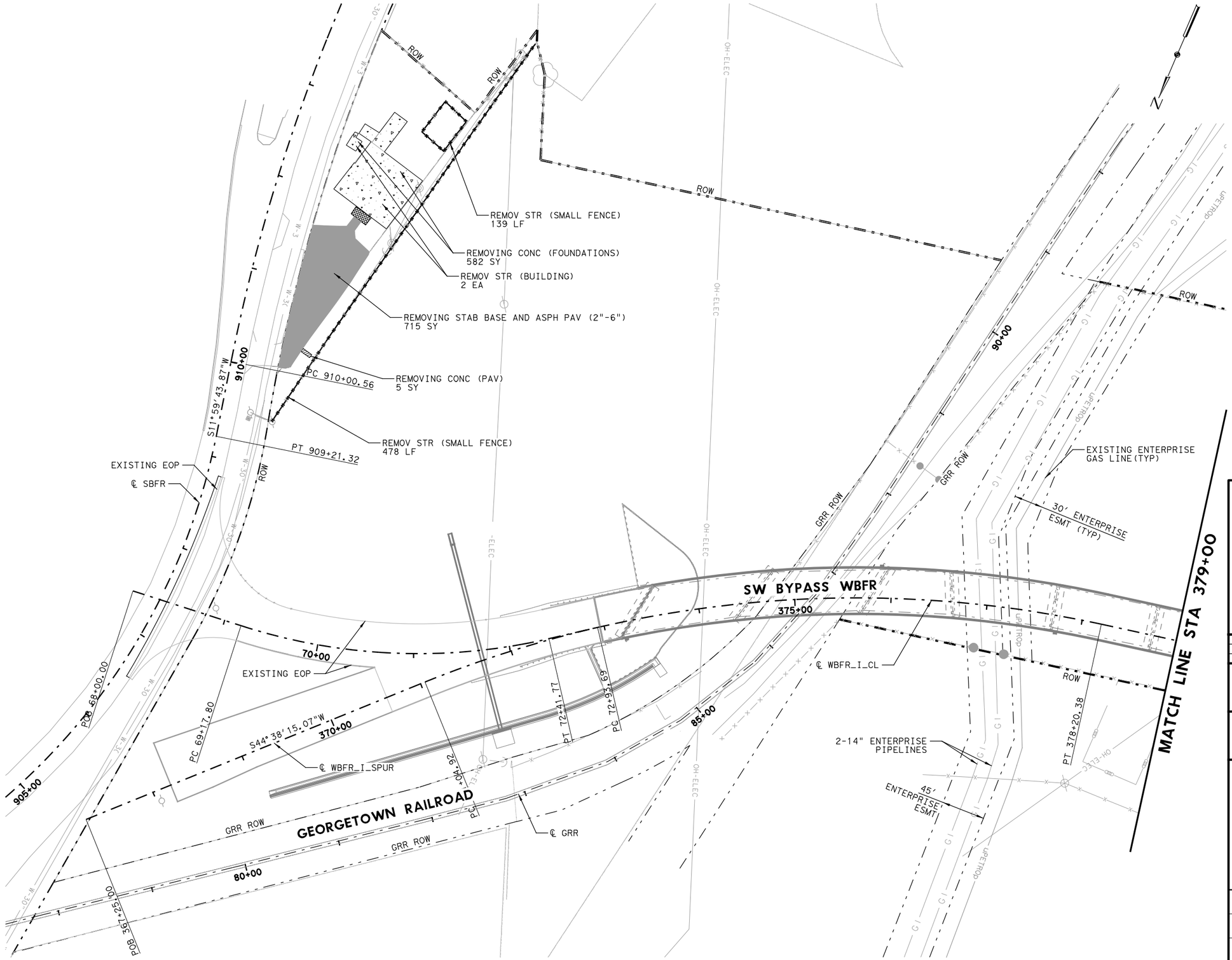
SOUTHWEST BYPASS SEGMENT 2

ALIGNMENT DATA

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	50
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:44:36 PM SCALE:1:1
FILE: \



LEGEND

- REMOVE STAB BASE AND ASPHALT
- REMOVE WOOD DECK
- REMOVE FOUNDATION
- REMOVE CONCRETE PAV
- REMOVE FENCE

NOTES:

1. ALL ITEMS REQUIRING REMOVAL THAT ARE NOT SPECIFICALLY CALLED OUT IN PLANS SHALL BE CONSIDERED SUBSIDIARY TO PREP ROW.

STATE OF TEXAS
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NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

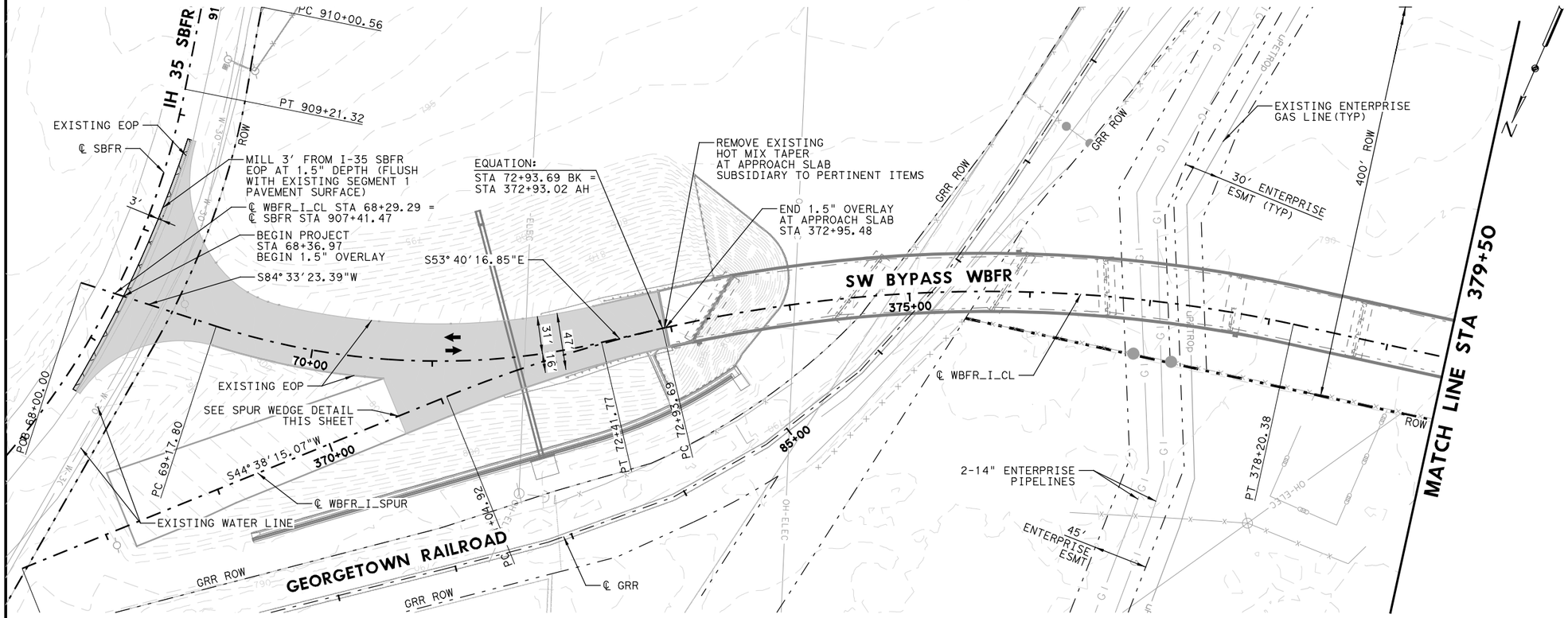
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

REMOVAL PLAN

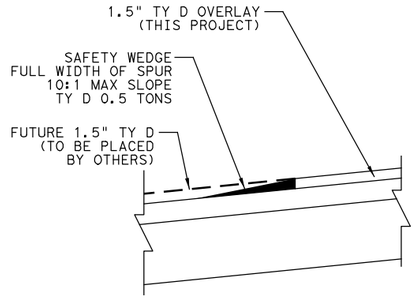
SCALE: 1"=100'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	51
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	



LEGEND

- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

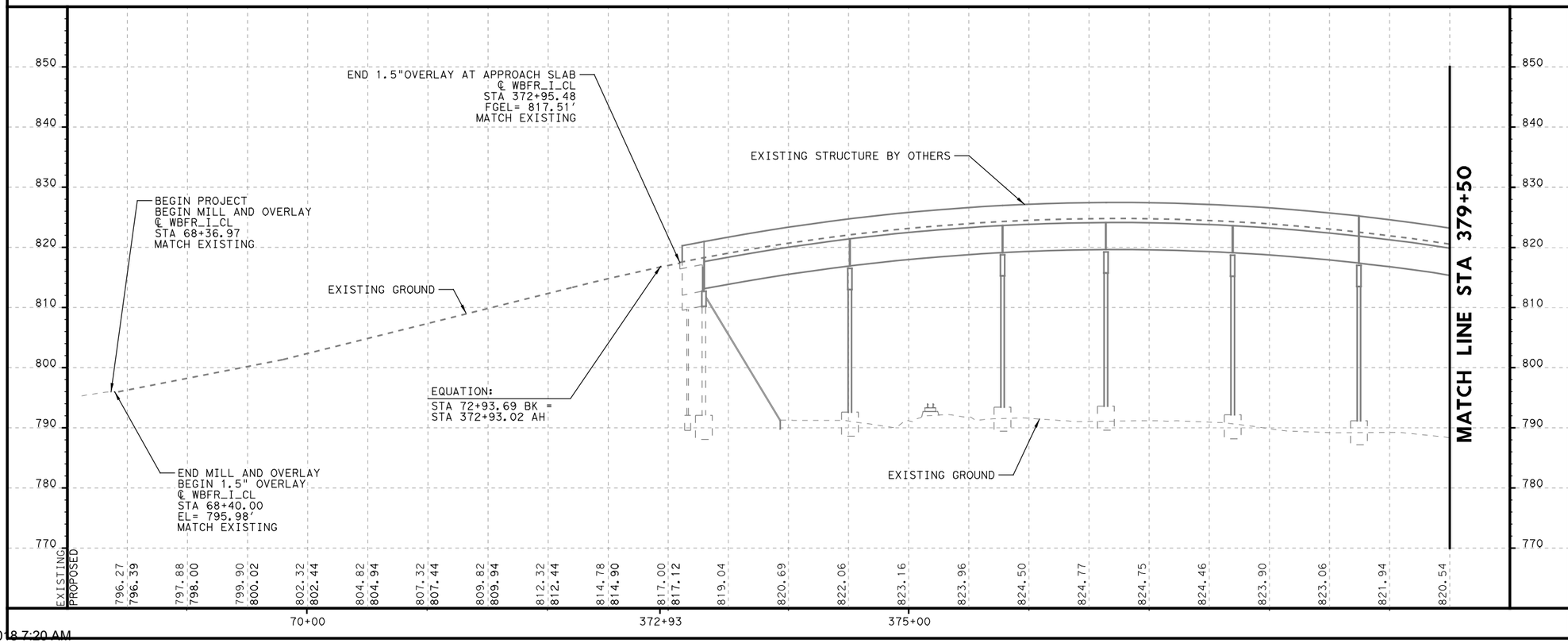


SPUR WEDGE DETAIL

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET





03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

PLAN AND PROFILE WBFR BEGIN TO STA 379+50

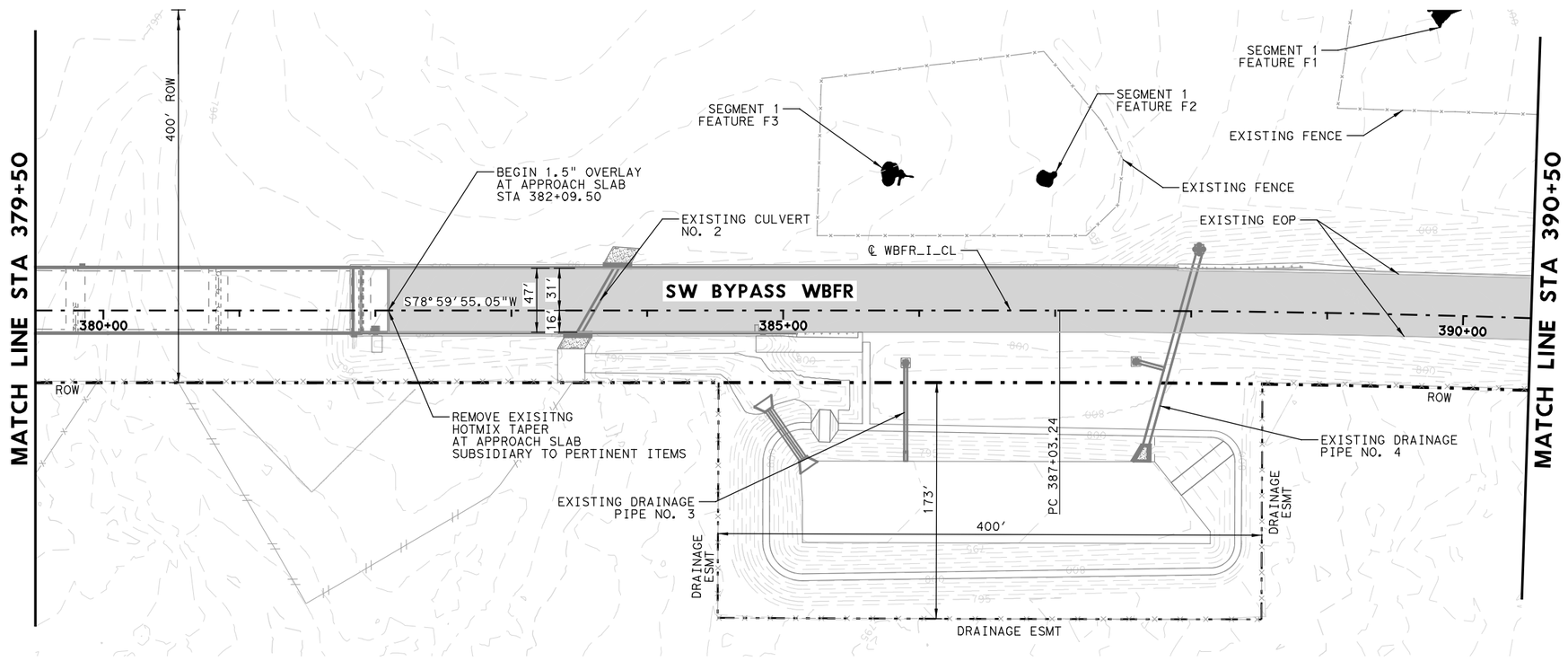
SCALE: 1"=100'-H
1"=20'-V

SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	52
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:44:46 PM SCALE: 1:100
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4/12/2018 7:20 AM



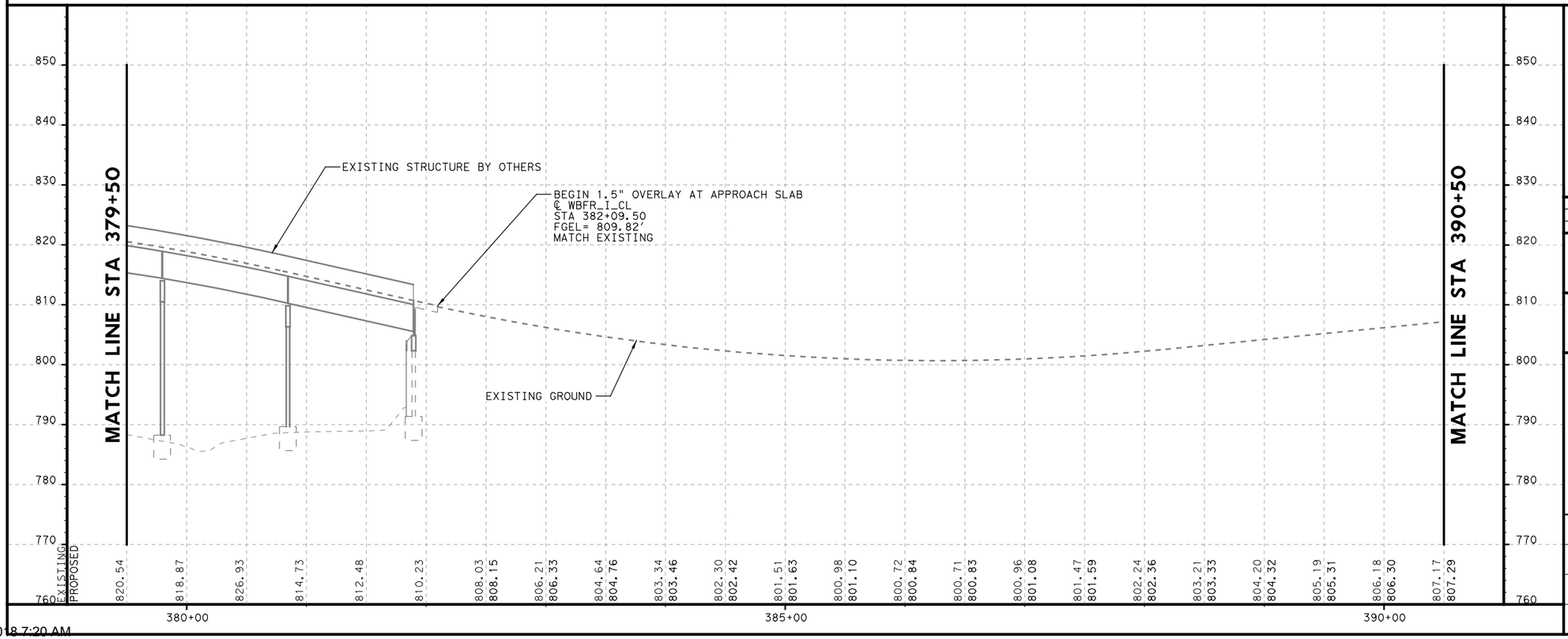
LEGEND

- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

NOTES:

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2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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SOUTHWEST BYPASS SEGMENT 2

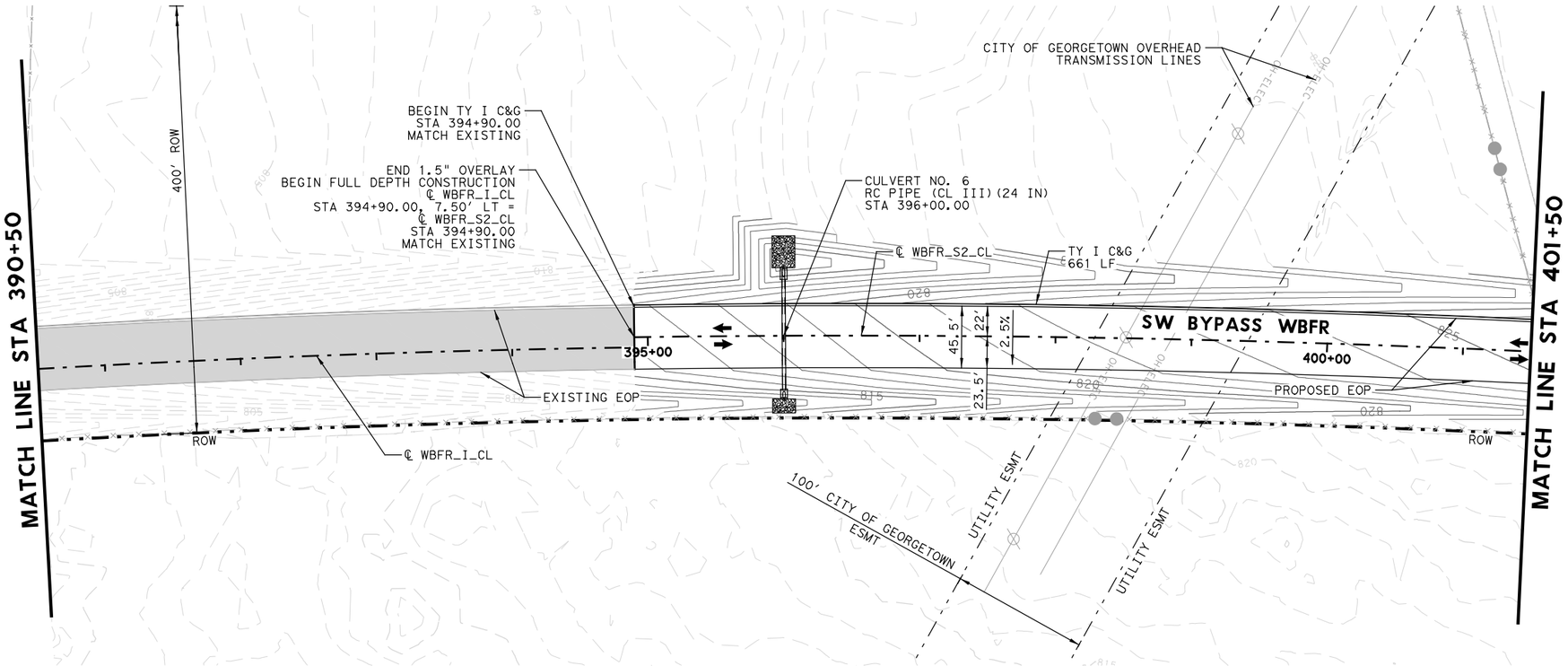
PLAN AND PROFILE WBFR STA 379+50 TO STA 390+50

SCALE: 1"=100'-H
1"=20'-V

SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	53
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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4/12/2018 7:20 AM



LEGEND

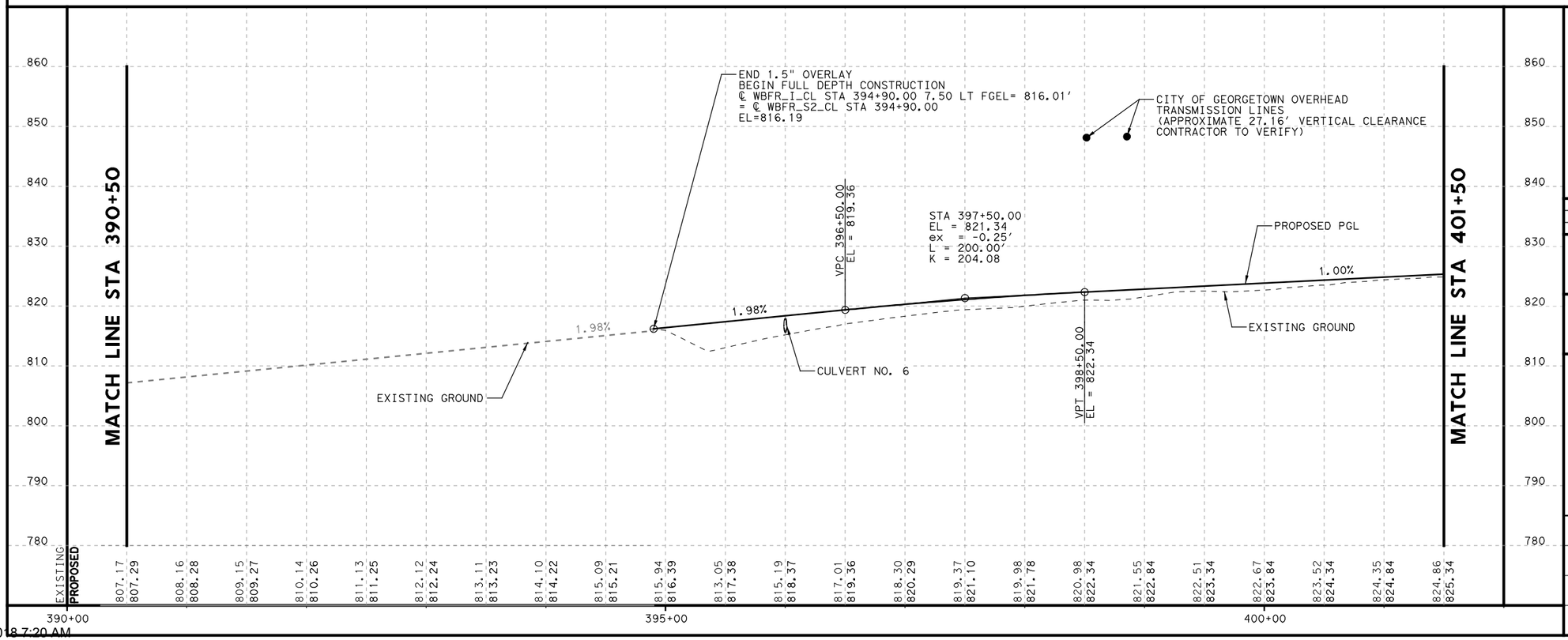
- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

N

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET



STATE OF TEXAS
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SOUTHWEST BYPASS SEGMENT 2

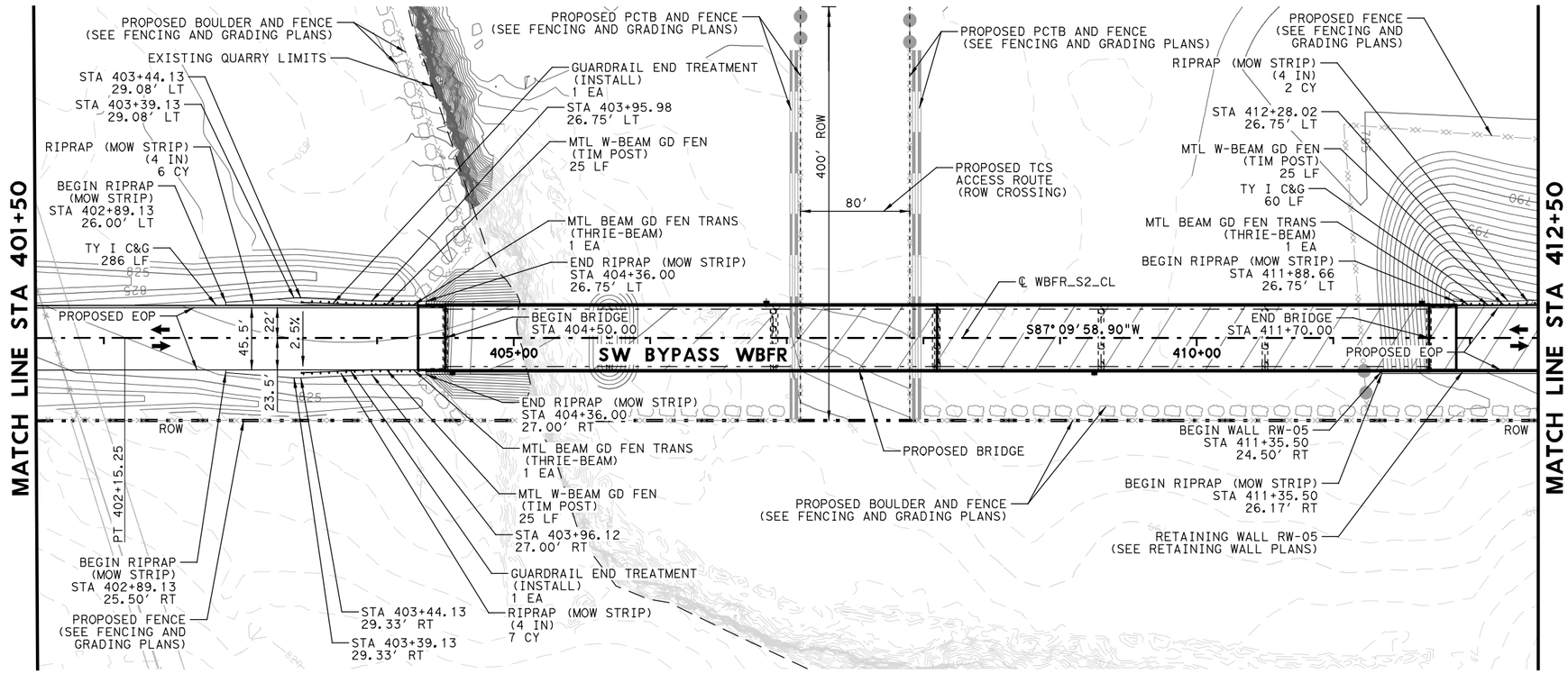
PLAN AND PROFILE WBFR 390+50 TO STA 401+50

SCALE: 1"=100'-H
1"=20'-V

SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	54
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
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4/12/2018 7:20 AM



LEGEND

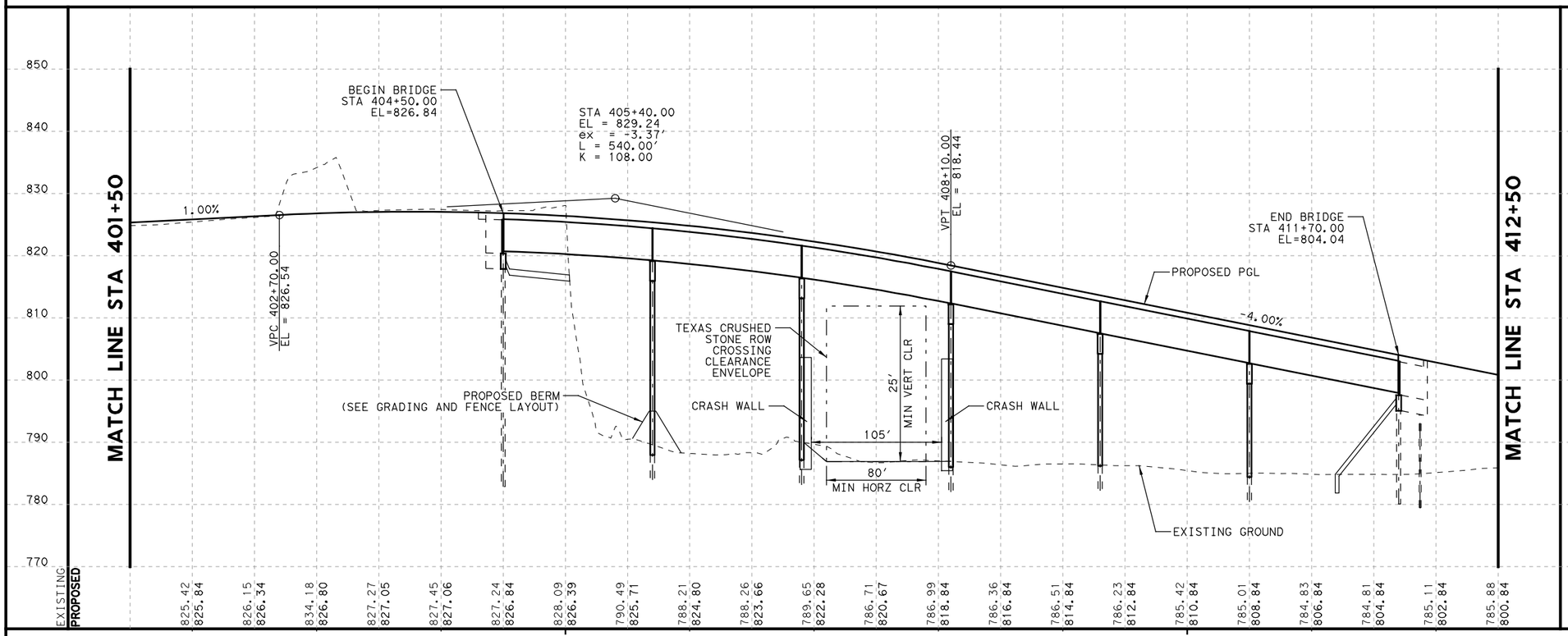
- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

N

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

PLAN AND PROFILE WBFR STA 401+50 TO STA 412+50

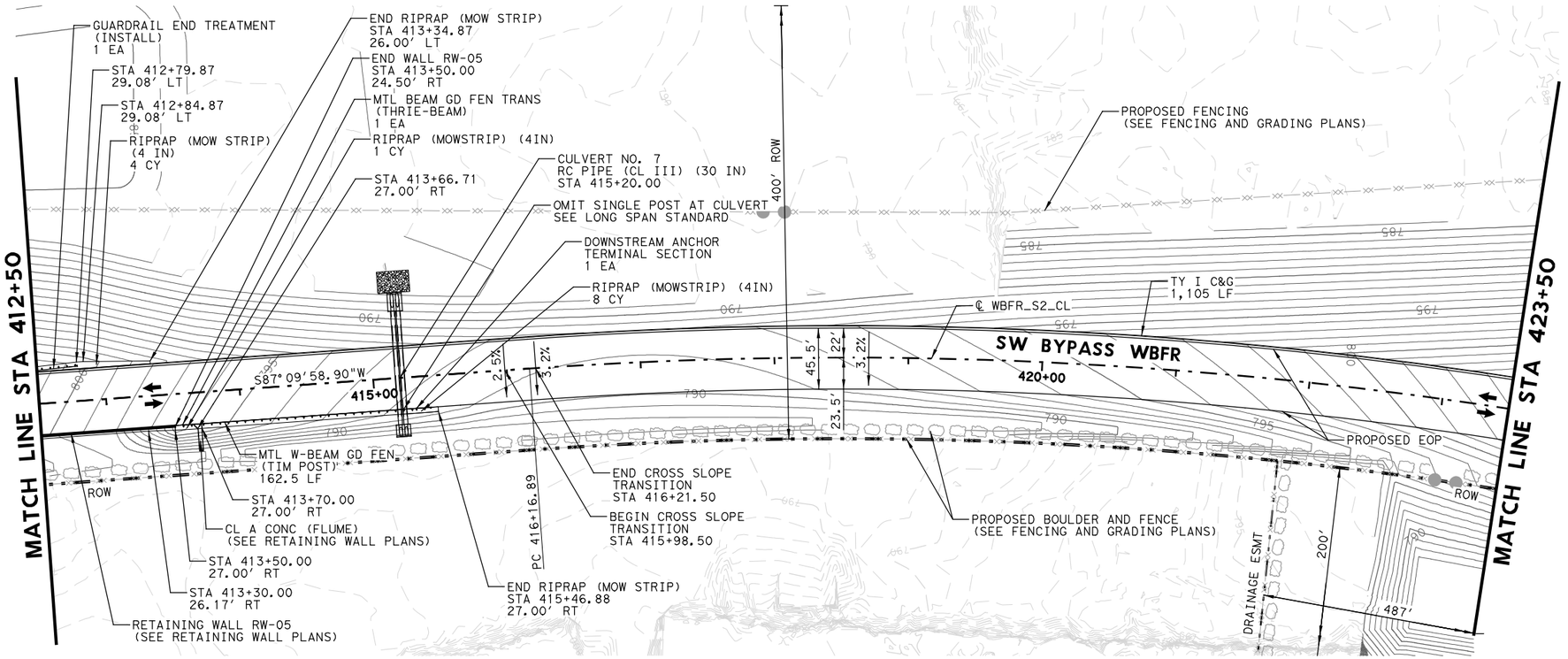
SCALE: 1"=100'-H
1"=20'-V

SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	55
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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4/12/2018 7:20 AM



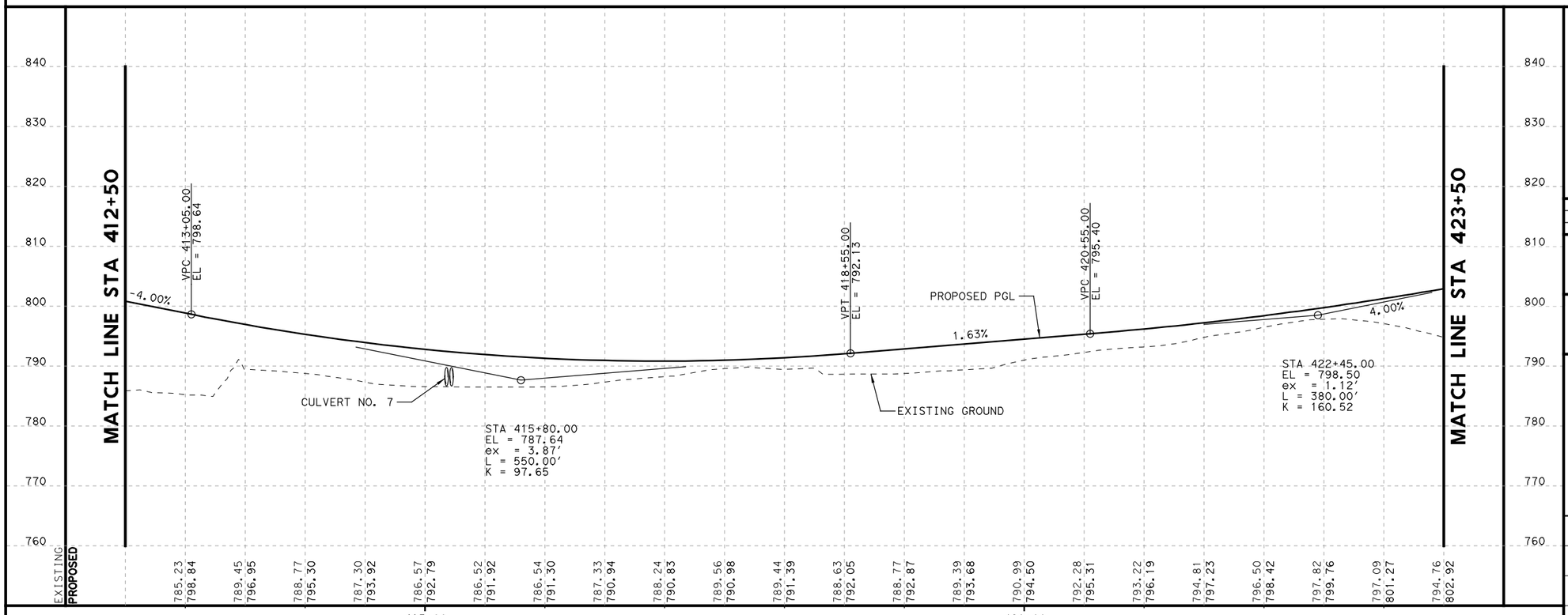
LEGEND

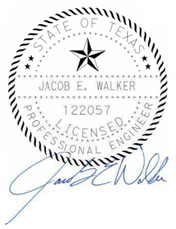
- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET





03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

PLAN AND PROFILE WBFR STA 412+50 TO STA 423+50

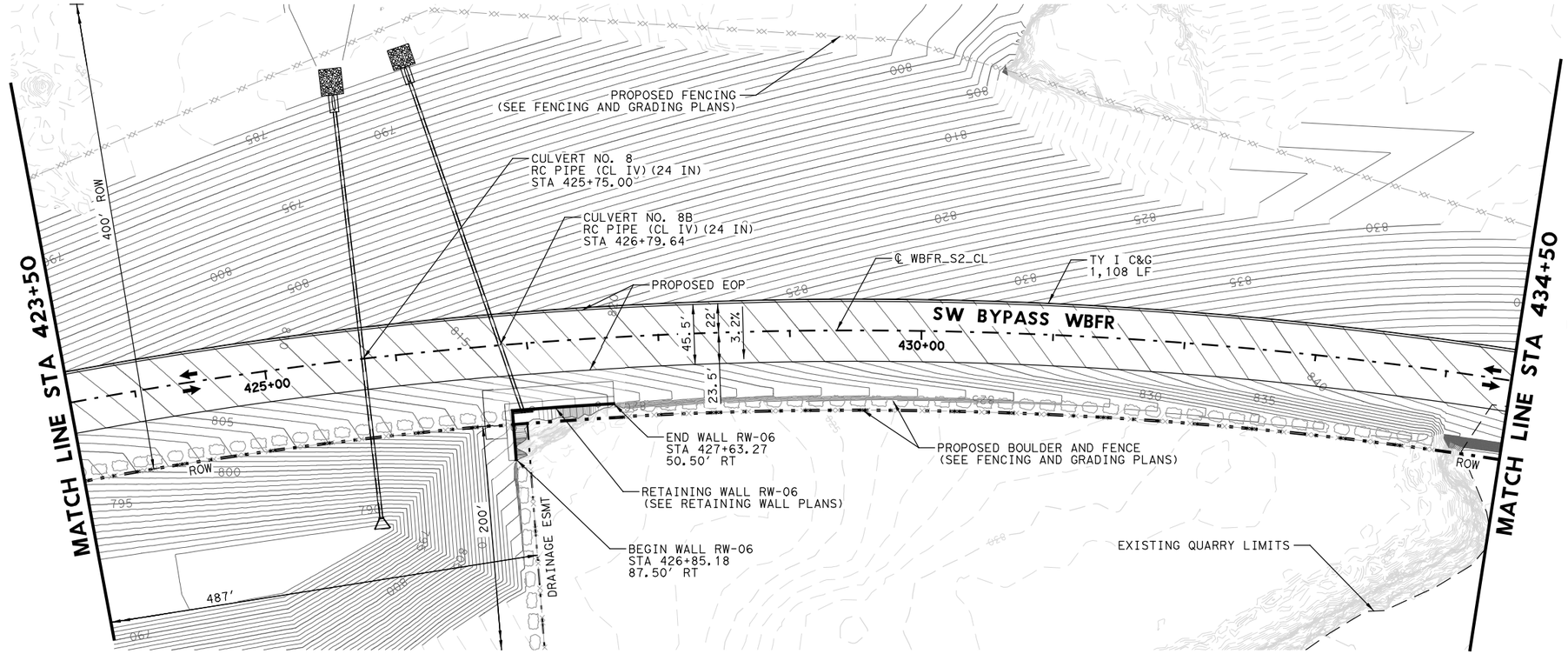
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1"=20'-V

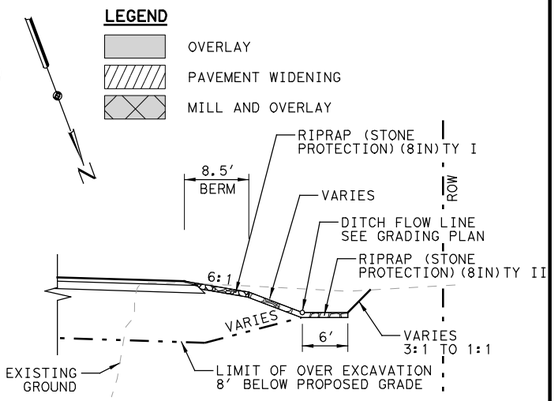
SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS KB	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	56
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:45:26 PM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM





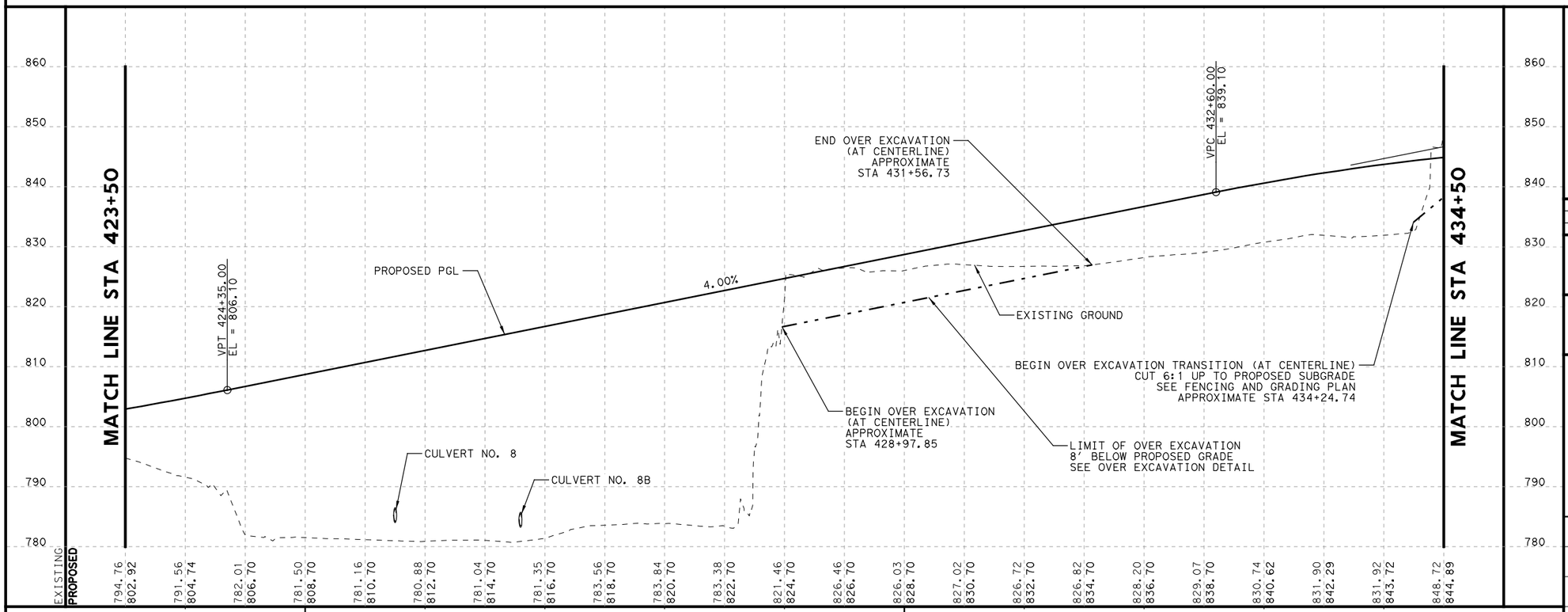
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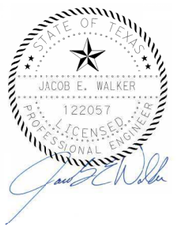
APPROXIMATE STA 427+90.00 TO STA 432+85.00

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET





NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

PLAN AND PROFILE WBFR STA 423+50 TO STA 434+50

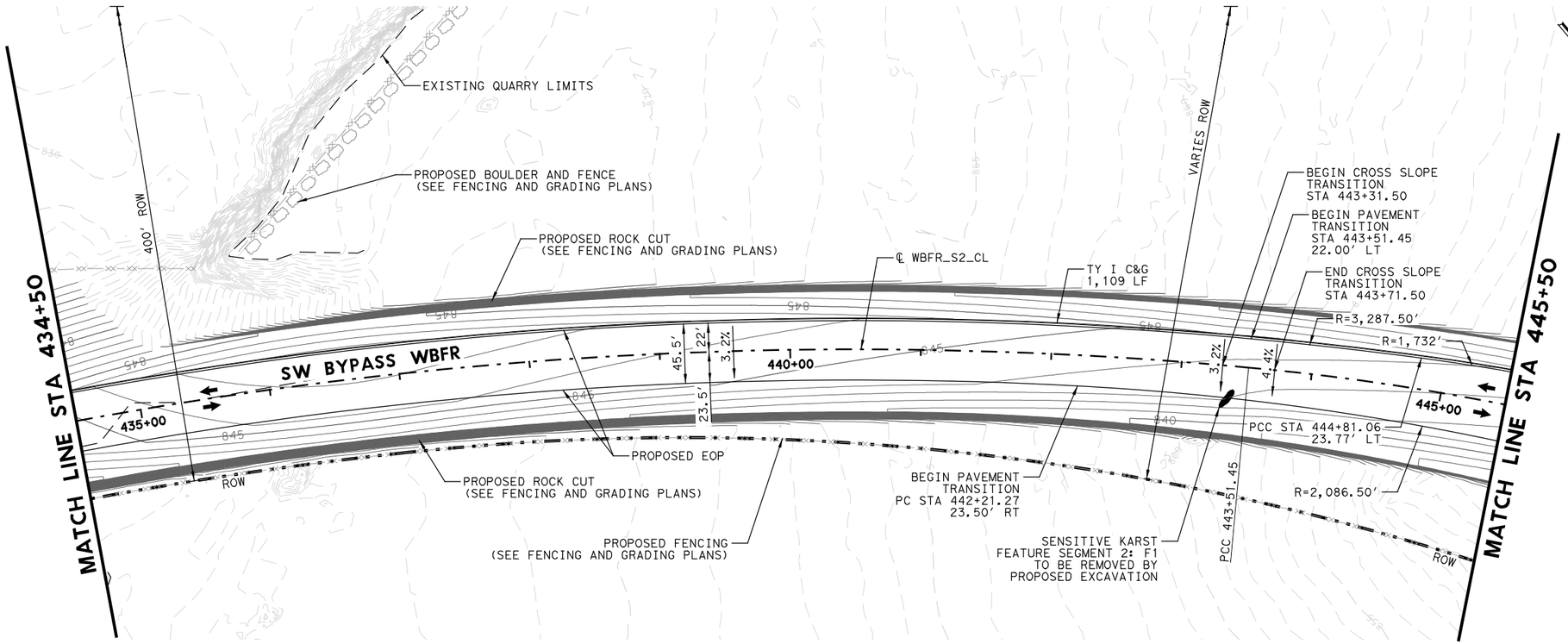
SCALE: 1"=100'-H
1"=20'-V

SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	57
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:45:37 PM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



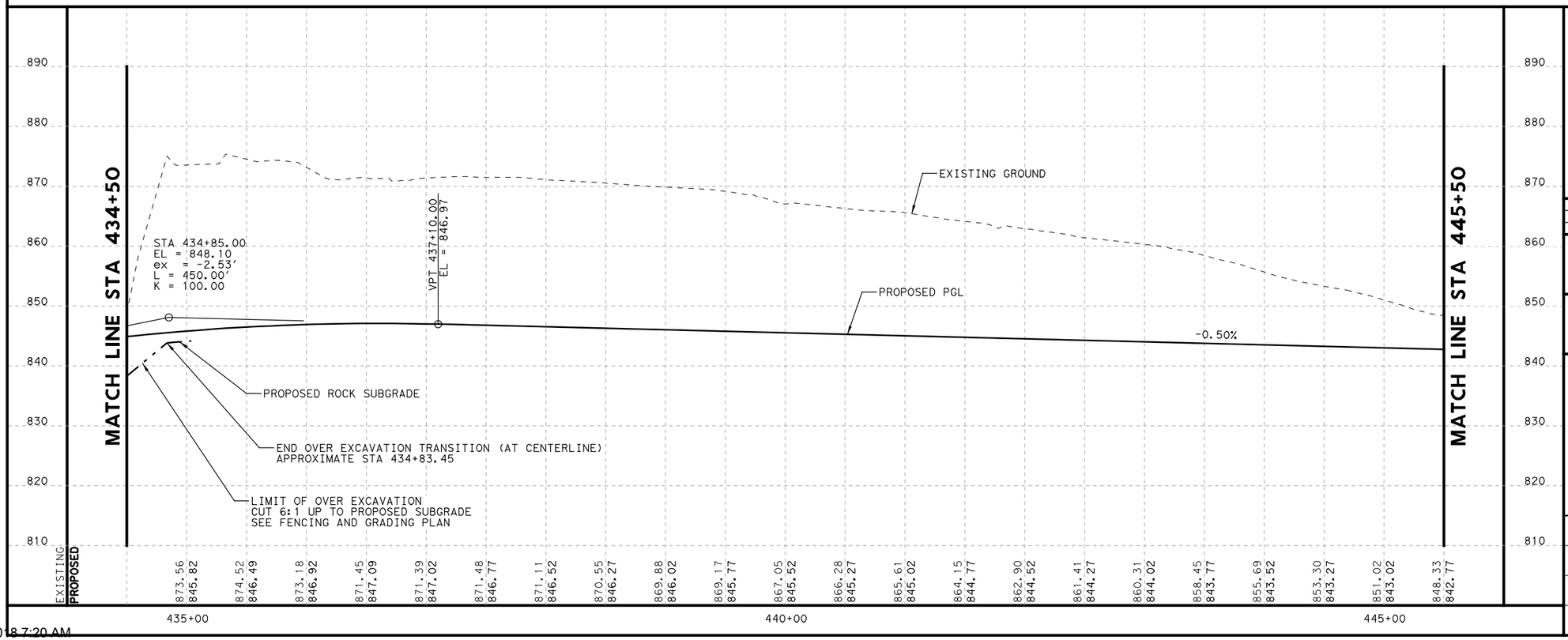
LEGEND

- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET





03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

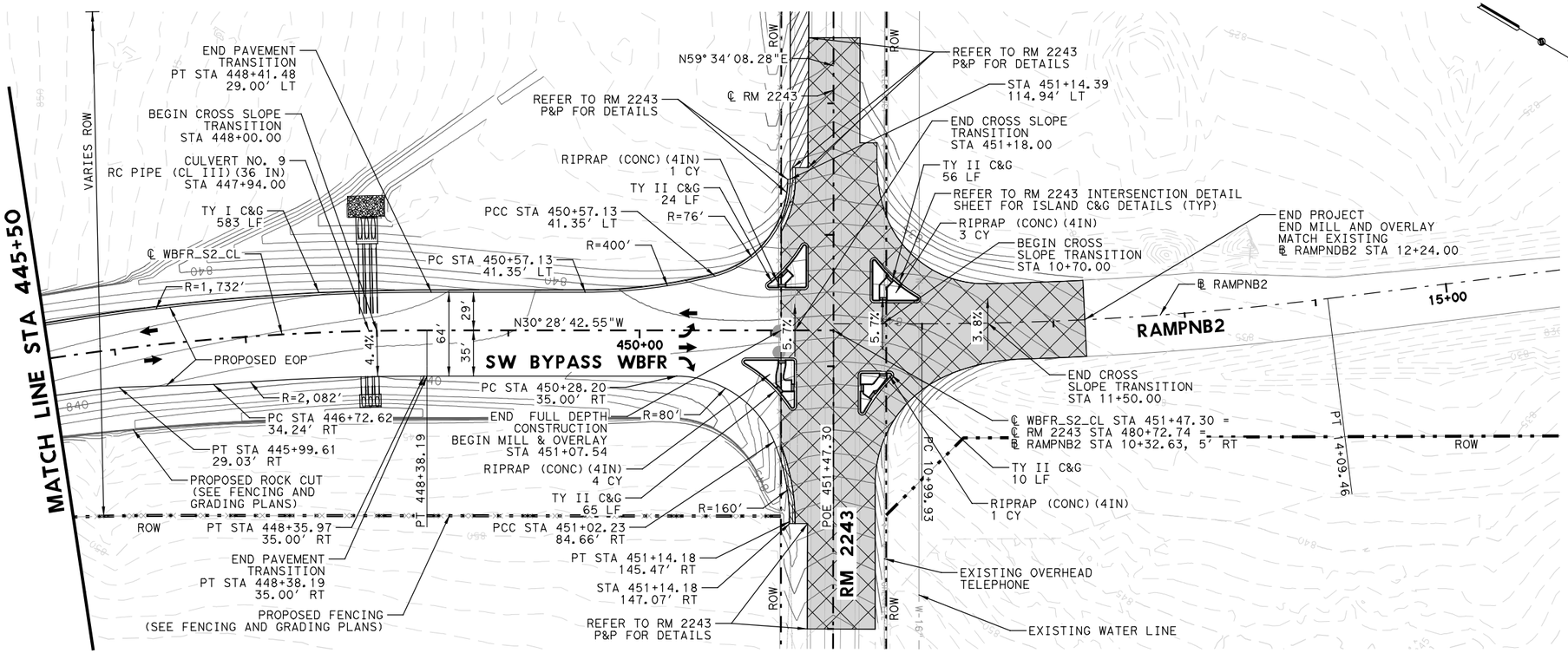
PLAN AND PROFILE WBFR STA 434+50 TO STA 445+50

SCALE: 1"=100'-H
1"=20'-V

SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	58
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:45:47 PM SCALE: 1:100
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4/12/2018 7:20 AM



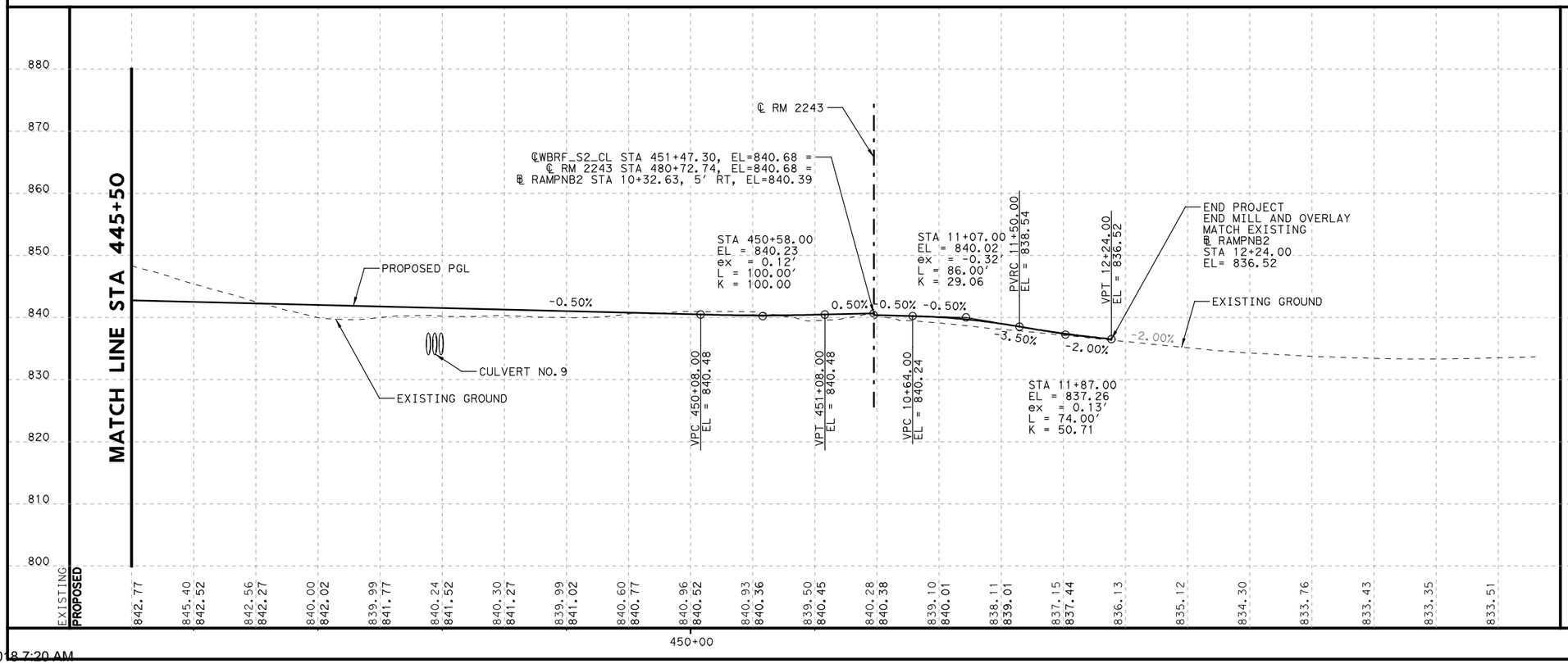
LEGEND

- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

PLAN AND PROFILE WBFR STA 445+50 TO END

SCALE: 1"=100'-H
1"=20'-V

SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
KB	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	59
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:45:57 PM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM

SAW CUT EXISTING PAVEMENT. SUBSIDIARY TO VARIOUS ITEMS.
℄ RM 2243 STA 476+61.00 27.48′ RT
℄ RM 2243 STA 476+35.16 24.38′ RT
EXISTING OVERHEAD TELEPHONE
BEGIN WIDENING MATCH EXISTING ℄ RM 2243 STA 475+82.71 18.63′ RT
℄ RM 2243 STA 475+82.71 24.32′ RT
BEGIN CONSTRUCTION CSJ: 2103-01-034 ℄ RM 2243 STA 475+06.85
℄ RM 2243 STA 475+07.12 22.75′ RT
BEGIN RIPRAP ℄ RM 2243 STA 475+06.85 37.74′ RT
RIPRAP (4IN) 27 CY
℄ RM 2243 STA 476+39.46 37.88′ RT
END RIPRAP ℄ RM 2243 STA 476+59.11 43.19′ RT
℄ RM 2243 STA 477+07.00 33.00′ RT
℄ RM 2243 PC STA 479+45.07 33.00′ LT
℄ RM 2243 STA 479+30.00 33.00′ LT
℄ RM 2243 STA 479+30.01 19.98′ LT
PT 476+20.67
℄ RM 2243 STA 478+50.00 20.16′ LT
EXISTING ~3.8%
BEGIN MILL AND OVERLAY BEGIN TRANSITION MATCH EXISTING ℄ RM 2243 STA 478+50.00
EXISTING ~3.2%
N59°34′08.28"E
℄ RM 2243 STA 478+50.00 18.94′ RT
℄ RM 2243 STA 479+48.87 19.12′ RT
℄ RM 2243 STA 479+48.85 29.00′ RT
END TY I C&G ℄ WBFR_S2_CL STA 451+12.39 114.94′ LT
BEGIN CURB HEIGHT TRANSITION 4" TO 0" OVER 10 FT ℄ WBFR_S2_CL PC STA 541+12.32 108.89′ LT
TY I C&G 27 LF
SAWCUT 4′ FROM PROPOSED EDGE OF PAVEMENT REMOVAL OF EXISTING PAVEMENT PAID FOR AS EXCAVATION
CURB RAMP (TY 22) 1 EA
TY II C&G 55 LF
℄ RM 2243 PCC STA 479+81.36 38.62′ LT
END CROSS SLOPE TRANSITION ℄ RM 2243 STA 480+00.00
END PROJECT END MILL AND OVERLAY MATCH EXISTING ℄ RAMPNB2 STA 12+24.00
℄ RAMPNB2 STA 12+24.00 30.00′ LT
℄ RAMPNB2 PT STA 11+49.79 30.00′ LT
RIPRAP (CONC)(4IN) 3 CY
℄ RAMPNB2 PC STA 11+75.26 28.00′ RT
℄ RAMPNB2 PT STA 11+22.55 37.77′ RT
℄ RAMPNB2 PC STA 11+21.56 38.16′ RT
℄ WBFR_S2_CL STA 451+47.30 = ℄ RM 2243 STA 480+72.74 = ℄ RAMPNB2 STA 10+32.63, 5′ RT
REFER TO RM 2243 INTERSECTION DETAIL SHEET FOR ISLAND C&G DETAILS (TYP)
PC 10+99.93
℄ RAMPNB2 STA 12+24.00 28.00′ RT
CURB RAMP (TY 22) 1 EA
TY II C&G 80 LF
RIPRAP (CONC)(4IN) 4 CY
℄ RM 2243 PT STA 481+89.57 32.00′ LT
BEGIN CROSS SLOPE TRANSITION STA 481+50.00
℄ RM 2243 STA 483+00.00 32.00′ LT
EXISTING ~2.3%
END PROJECT END MILL AND OVERLAY END TRANSITION MATCH EXISTING ℄ RM 2243 STA 483.00+00
EXISTING ~3.2%
EXISTING WATER LINE
℄ RM 2243 STA 483+00.00 19.70′ RT
℄ RM 2243 STA 482+19.85 19.48′ RT
℄ RM 2243 STA 482+19.84 29.00′ RT
℄ RM 2243 PT STA 482+18.24 29.00′ RT
SAWCUT 4′ FROM PROPOSED EDGE OF PAVEMENT REMOVAL OF EXISTING PAVEMENT PAID FOR AS EXCAVATION
℄ RM 2243 PC STA 481+59.83 39.75′ RT
CURB RAMP (TY 22) 1 EA
RIPRAP (CONC)(4IN) 4 CY
TY II C&G LF 60
END FULL DEPTH CONSTRUCTION BEGIN MILL AND OVERLAY ℄ WBFR_S2_CL STA 451+07.54
℄ RM 2243 PC STA 479+57.83 29.00′ RT
END WIDENING ℄ RM 2243 PT STA 479+97.89 39.75′ RT
RIPRAP (CONC)(4IN) 5 CY
CURB RAMP (TY 22) 1 EA
R=76′
TY II C&G 79 LF
℄ WBFR_S2_CL
R=400′
N30°28′42.55"W
RAMPNB2
SW BYPASS
WBFR
RM 2243
POE 451+47.30
0.5%
ROW
W-16"
475+00
485+00
450+00
29′
35′
64′
19′
14′
33′
52′

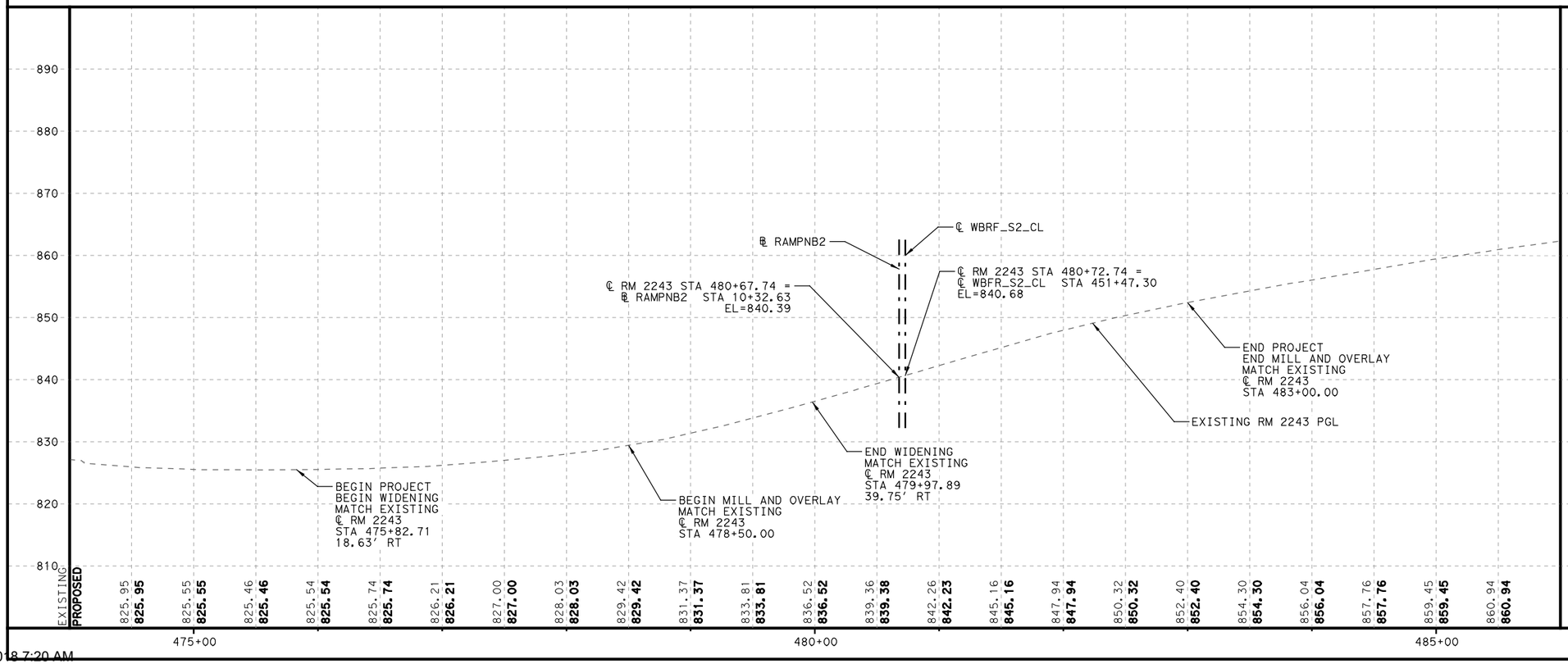
LEGEND

- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
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3. SEE "INTERSECTION DETAILS" SHEETS FOR INTERSECTION AND MEDIAN INFORMATION NOT SHOWN.

H: 0 50 100 150 200
V: 0 10 20 30 40
SCALE IN FEET



STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

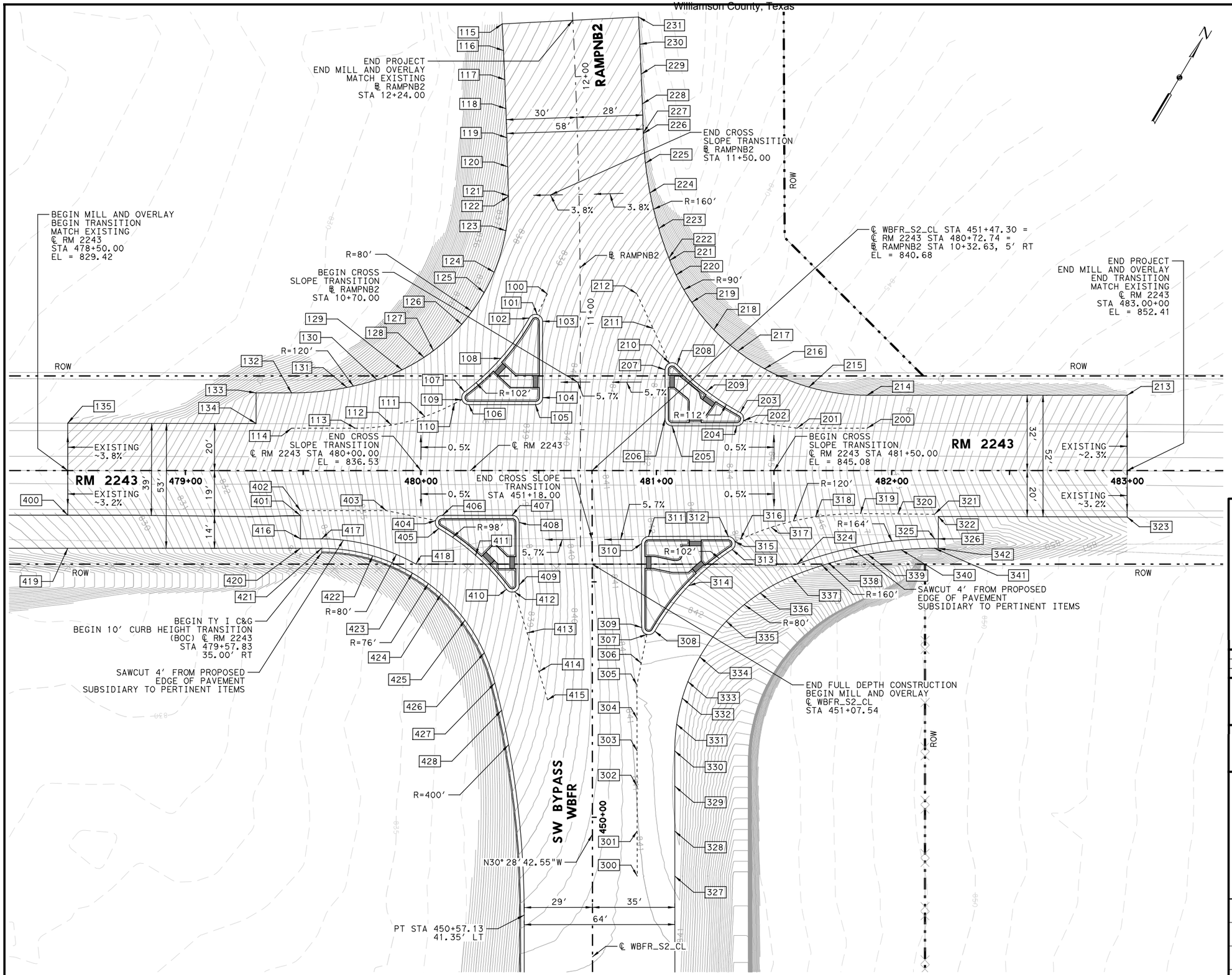
PLAN AND PROFILE RM 2243 STA 474+00 TO 486+00

SCALE: 1"=100′-H
1"=20′-V

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	60
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:46:12 PM SCALE: 1:100
FILE: \
4/12/2018 7:20 AM



LEGEND

- OVERLAY
- PAVEMENT WIDENING
- MILL AND OVERLAY
- GRADE BREAK

NOTES:

1. ALL STATION AND OFFSET ARE FROM "WBFR_S2_CL" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM LIP OF GUTTER OR EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
3. MILL AREA TO A DEPTH 2" BELOW PROPOSED GRADE. MILLING WILL NOT BE UNIFORM ACROSS THE PROPOSED OVERLAY AREA. ANY ADJUSTMENT REQUIRED TO ATTAIN CORRECT MILLING DEPTH CONSIDERED SUBSIDIARY TO PERTINENT ITEMS.

0 20 40 60 80

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

INTERSECTION DETAIL RM 2243

SCALE: 1"=40' SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	61
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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DATE: 3/23/2018
FILE: \

4/12/2018 7:20 AM

TABLE OF NW POINTS					
POINT	BASELINE	STATION	OFFSET	ELEVATION	DESCRIPTION
100	℄ RAMPNB2	11+07.71	14.00′ LT	839.02	BREAKLINE
101	℄ RAMPNB2	10+98.95	18.24′ LT	838.94	BREAKLINE
102	℄ RAMPNB2	10+97.52	21.61′ LT	838.78	LOC PRC (102′-3′)
103	℄ RAMPNB2	10+96.05	16.00′ LT	839.09	LOC PT (3′)
104	℄ RAMPNB2	10+63.65	16.00′ LT	839.33	LOC PC (3′)
105	℄ RM 2243	480+48.72	28.00′ LT	839.17	LOC PT (3′)
106	℄ RM 2243	480+20.34	28.00′ LT	837.55	LOC PC (3′)
107	℄ RM 2243	480+18.54	33.40′ LT	837.44	LOC PRC (3′-102′)
108	℄ RM 2243	480+33.94	47.71′ LT	838.24	LOC
109	℄ RM 2243	480+17.45	30.20′ LT	837.38	BREAKLINE
110	℄ RM 2243	480+14.28	28.51′ LT	837.21	BREAKLINE PC (90′)
111	℄ RM 2243	480+01.66	23.00′ LT	836.51	BREAKLINE (90′)
112	℄ RM 2243	479+87.48	19.33′ LT	835.67	BREAKLINE (90′)
113	℄ RM 2243	479+72.07	18.00′ LT	834.79	BREAKLINE PT (90′)
114	℄ RM 2243	479+45.07	18.00′ LT	833.25	BREAKLINE
115	℄ RAMPNB2	12+24.00	30.00′ LT	835.38	EOP
116	℄ RAMPNB2	12+12.50	30.00′ LT	835.62	EOP
117	℄ RAMPNB2	12+00.00	30.00′ LT	835.91	EOP
118	℄ RAMPNB2	11+87.50	30.00′ LT	836.24	EOP
119	℄ RAMPNB2	11+75.00	30.00′ LT	836.59	EOP
120	℄ RAMPNB2	11+62.50	30.00′ LT	836.98	EOP
121	℄ RAMPNB2	11+50.00	30.00′ LT	837.40	EOP
122	℄ RAMPNB2	11+49.79	30.00′ LT	837.40	EOP PC (80′)
123	℄ RAMPNB2	11+35.00	31.30′ LT	837.72	EOP (80′)
124	℄ RAMPNB2	11+17.25	36.50′ LT	837.81	EOP (80′)
125	℄ RAMPNB2	11+08.46	40.77′ LT	837.72	EOP (80′)
126	℄ RM 2243	480+17.38	62.19′ LT	837.36	EOP (80′)
127	℄ RM 2243	480+05.30	50.97′ LT	836.74	EOP (80′)
128	℄ RM 2243	480+01.30	48.14′ LT	836.50	EOP (80′)
129	℄ RM 2243	479+92.04	42.87′ LT	835.90	EOP (80′)
130	℄ RM 2243	479+81.36	38.62′ LT	835.21	EOP PCC (80′-120′)
131	℄ RM 2243	479+68.60	35.33′ LT	834.42	EOP (120′)
132	℄ RM 2243	479+45.07	33.00′ LT	833.00	EOP PT (120′)
133	℄ RM 2243	479+30.00	33.00′ LT	832.01	EOP
134	℄ RM 2243	479+30.00	20.00′ LT	832.35	EOP
135	℄ RM 2244	478+50.00	20.16′ LT	828.66	EOP

TABLE OF NE POINTS					
POINT	BASELINE	STATION	OFFSET	ELEVATION	DESCRIPTION
200	℄ RM 2243	481+89.57	18.00′ LT	847.16	BREAKLINE
201	℄ RM 2243	481+59.79	18.00′ LT	845.53	BREAKLINE
202	℄ RM 2243	481+37.10	21.26′ LT	844.24	BREAKLINE
203	℄ RM 2243	481+35.63	24.63′ LT	844.06	LOC PRC (112′-3′)
204	℄ RM 2243	481+34.19	19.00′ LT	844.09	LOC PT (3′)
205	℄ RM 2243	481+06.72	19.00′ LT	842.52	LOC PC (3′)
206	℄ RAMPNB2	10+54.60	36.00′ RT	842.34	LOC PT (3′)
207	℄ RAMPNB2	10+75.46	36.00′ RT	842.16	LOC PC (3′)
208	℄ RAMPNB2	10+77.55	41.15′ RT	842.38	LOC PRC (3′-112′)
209	℄ RAMPNB2	10+66.37	53.76′ RT	843.20	LOC (112′)
210	℄ RAMPNB2	10+78.25	37.89′ RT	842.22	BREAKLINE
211	℄ RAMPNB2	10+93.02	30.95′ RT	841.54	BREAKLINE
212	℄ RAMPNB2	11+07.71	24.01′ RT	840.84	BREAKLINE
213	℄ RM 2243	483+00.00	32.00′ LT	851.68	EOP
214	℄ RM 2243	481+89.57	32.00′ LT	847.03	EOP PC (90′)
215	℄ RM 2243	481+64.80	35.48′ LT	845.26	EOP (90′)
216	℄ RM 2243	481+45.96	43.28′ LT	843.93	EOP (90′)
217	℄ RAMPNB2	10+83.34	66.88′ RT	843.31	EOP (90′)
218	℄ RAMPNB2	10+92.44	56.78′ RT	842.73	EOP (90′)
219	℄ RAMPNB2	11+04.05	47.38′ RT	842.07	EOP (90′)
220	℄ RAMPNB2	11+15.51	40.76′ RT	841.41	EOP (90′)
221	℄ RAMPNB2	11+21.56	38.16′ RT	841.09	EOP PT (90′)
222	℄ RAMPNB2	11+22.55	37.77′ RT	841.04	EOP PC (160′)
223	℄ RAMPNB2	11+35.00	33.62′ RT	840.41	EOP (160′)
224	℄ RAMPNB2	11+50.00	30.19′ RT	839.68	EOP (160′)
225	℄ RAMPNB2	11+62.50	28.55′ RT	839.20	EOP (160′)
226	℄ RAMPNB2	11+75.00	28.00′ RT	838.80	EOP (160′)
227	℄ RAMPNB2	11+75.26	28.00′ RT	838.79	EOP PT (160′)
228	℄ RAMPNB2	11+87.50	28.00′ RT	838.44	EOP
229	℄ RAMPNB2	12+00.00	28.00′ RT	838.12	EOP
230	℄ RAMPNB2	12+12.50	28.00′ RT	837.82	EOP
231	℄ RAMPNB2	12+24.00	28.00′ RT	837.58	EOP

TABLE OF SE POINTS					
POINT	BASELINE	STATION	OFFSET	ELEVATION	DESCRIPTION
300	℄ WBFR_S2_CL	449+75.00	19.00′ RT	840.95	BREAKLINE
301	℄ WBFR_S2_CL	449+94.10	19.00′ RT	840.98	BREAKLINE
302	℄ WBFR_S2_CL	450+13.21	19.00′ RT	841.02	BREAKLINE
303	℄ WBFR_S2_CL	450+28.20	19.00′ RT	841.06	BREAKLINE
304	℄ WBFR_S2_CL	450+41.92	19.00′ RT	841.11	BREAKLINE
305	℄ WBFR_S2_CL	450+56.20	19.00′ RT	841.20	BREAKLINE
306	℄ WBFR_S2_CL	450+65.44	20.80′ RT	841.34	BREAKLINE
307	℄ WBFR_S2_CL	450+77.70	23.18′ RT	841.57	BREAKLINE
308	℄ WBFR_S2_CL	450+79.09	26.60′ RT	841.59	LOC PRC (102′-3′)
309	℄ WBFR_S2_CL	450+80.59	21.00′ RT	841.48	LOC PT (3′)
310	℄ WBFR_S2_CL	451+16.28	21.00′ RT	841.72	LOC PC (3′)
311	℄ RM 2243	480+96.77	28.00′ RT	841.91	LOC PT (3′)
312	℄ RM 2243	481+30.56	28.00′ RT	843.84	LOC PC (3′)
313	℄ RM 2243	481+32.20	33.51′ RT	843.80	LOC PRC (3′-102′)
314	℄ RM 2243	481+13.74	48.91′ RT	842.42	LOC (102′)
315	℄ RM 2243	481+33.45	30.19′ RT	843.99	BREAKLINE
316	℄ RM 2243	481+35.69	29.17′ RT	844.12	BREAKLINE PC (120′)
317	℄ RM 2243	481+48.83	24.04′ RT	844.90	BREAKLINE (120′)
318	℄ RM 2243	481+67.62	19.60′ RT	845.93	BREAKLINE (120′)
319	℄ RM 2243	481+86.76	18.22′ RT	846.97	BREAKLINE PT (120′)
320	℄ RM 2243	482+02.63	18.35′ RT	847.80	BREAKLINE
321	℄ RM 2243	482+18.24	18.48′ RT	848.51	BREAKLINE
322	℄ RM 2243	482+19.85	19.48′ RT	848.57	EOP
323	℄ RM 2243	483+00.00	19.70′ RT	851.78	EOP
324	℄ RM 2243	481+59.83	39.75′ RT	N/A	SAW CUT PC (164′)
325	℄ RM 2243	482+18.24	29.00′ RT	N/A	SAW CUT PT (164′)
326	℄ RM 2243	482+19.84	29.00′ RT	N/A	SAW CUT
327	℄ WBFR_S2_CL	449+75.00	35.00′ RT	841.21	EOP
328	℄ WBFR_S2_CL	449+94.10	35.00′ RT	841.32	EOP
329	℄ WBFR_S2_CL	450+13.21	35.00′ RT	841.35	EOP
330	℄ WBFR_S2_CL	450+28.20	35.00′ RT	841.33	EOP PC (80′)
331	℄ WBFR_S2_CL	450+39.52	35.80′ RT	841.29	EOP (80′)
332	℄ WBFR_S2_CL	450+50.60	38.20′ RT	841.22	EOP (80′)
333	℄ WBFR_S2_CL	450+57.61	40.60′ RT	841.18	EOP (80′)
334	℄ WBFR_S2_CL	450+68.11	45.67′ RT	841.31	EOP (80′)
335	℄ RM 2243	481+29.72	64.02′ RT	842.14	EOP (80′)
336	℄ RM 2243	481+44.20	51.95′ RT	843.52	EOP (80′)
337	℄ RM 2243	481+57.44	45.00′ RT	844.64	EOP PCC (80′-164′)
338	℄ RM 2243	481+73.41	39.41′ RT	845.83	EOP (164′)
339	℄ RM 2243	481+89.87	35.53′ RT	846.86	EOP (164′)
340	℄ RM 2243	482+04.00	33.63′ RT	847.62	EOP (164′)
341	℄ RM 2243	482+18.24	33.00′ RT	848.26	EOP PT (164′)
342	℄ RM 2244	482+19.84	33.00′ RT	848.33	EOP

TABLE OF SW POINTS					
POINT	BASELINE	STATION	OFFSET	ELEVATION	DESCRIPTION
400	℄ RM 2243	478+50.00	18.94′ RT	828.81	WIDENING
401	℄ RM 2243	479+48.87	19.12′ RT	833.49	WIDENING
402	℄ RM 2243	479+48.88	17.00′ RT	833.52	BREAKLINE
403	℄ RM 2243	479+85.25	17.00′ RT	835.56	BREAKLINE
404	℄ RM 2243	480+06.25	21.18′ RT	836.78	BREAKLINE
405	℄ RM 2243	480+07.61	24.58′ RT	836.85	LOC PRC (98′-3′)
406	℄ RM 2243	480+09.13	19.00′ RT	836.96	LOC PT (3′)
407	℄ RM 2243	480+38.76	19.00′ RT	838.65	LOC PC (3′)
408	℄ WBFR_S2_CL	454+25.33	31.00′ LT	838.80	LOC PT (3′)
409	℄ WBFR_S2_CL	450+98.73	31.00′ LT	838.68	LOC PC (3′)
410	℄ WBFR_S2_CL	450+96.93	36.41′ LT	838.38	LOC PRC (3′-98′)
411	℄ WBFR_S2_CL	451+11.28	49.49′ LT	837.67	LOC (98′)
412	℄ WBFR_S2_CL	450+95.90	33.00′ LT	838.55	BREAKLINE
413	℄ WBFR_S2_CL	450+78.34	27.65′ LT	838.95	BREAKLINE
414	℄ WBFR_S2_CL	450+61.89	22.65′ LT	839.32	BREAKLINE
415	℄ WBFR_S2_CL	450+49.88	19.00′ LT	839.57	BREAKLINE
416	℄ RM 2243	479+48.85	29.00′ RT	N/A	SAW CUT
417	℄ RM 2243	479+57.83	29.00′ RT	N/A	SAW CUT PC (80′)
418	℄ RM 2243	479+97.89	37.75′ RT	N/A	SAW CUT PT (80′)
419	℄ RM 2243	478+50.00	33.00′ RT	828.35	EOP
420	℄ RM 2243	479+48.84	33.00′ RT	833.28	EOP
421	℄ RM 2243	479+57.83	33.00′ RT	833.81	LOC PC (76′)
422	℄ RM 2243	479+79.54	36.17′ RT	835.11	LOC (76′)
423	℄ RM 2243	479+96.44	43.53′ RT	836.19	LOC (76′)
424	℄ WBFR_S2_CL	450+94.92	64.20′ LT	836.96	LOC (76′)
425	℄ WBFR_S2_CL	450+83.79	54.05′ LT	837.61	LOC (76′)
426	℄ WBFR_S2_CL	450+70.00	45.88′ LT	838.17	LOC (76′)
427	℄ WBFR_S2_CL	450+57.13	41.35′ LT	838.54	LOC PCC (76′-400′)
428	℄ WBFR_S2_CL	450+45.52	38.58′ LT	838.81	LOC (400′)

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

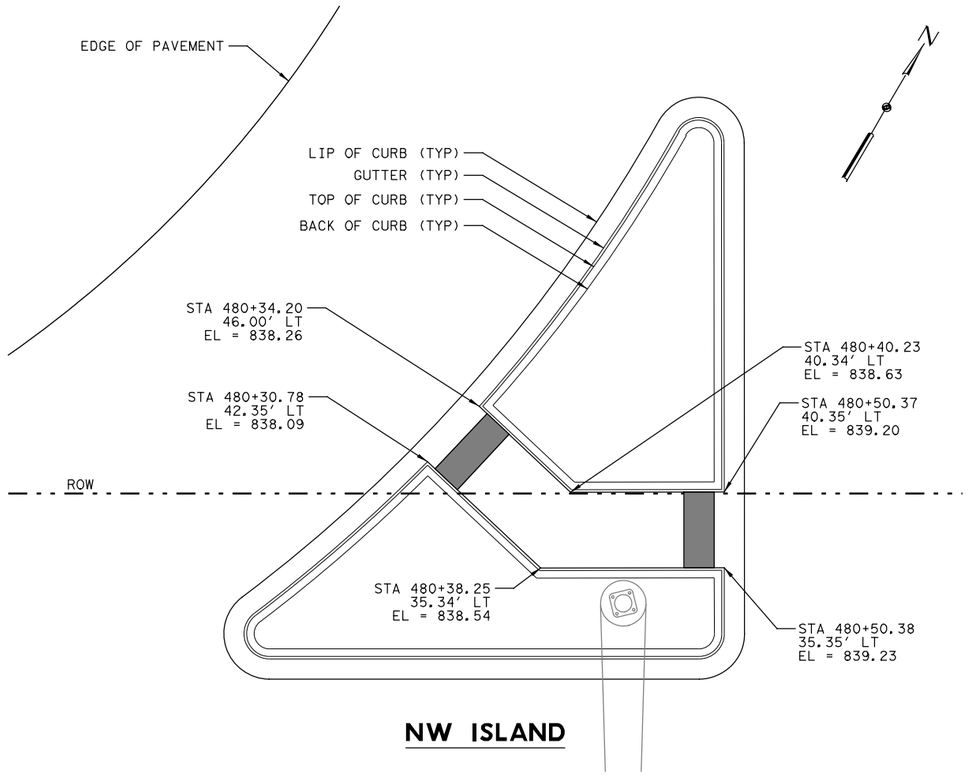
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

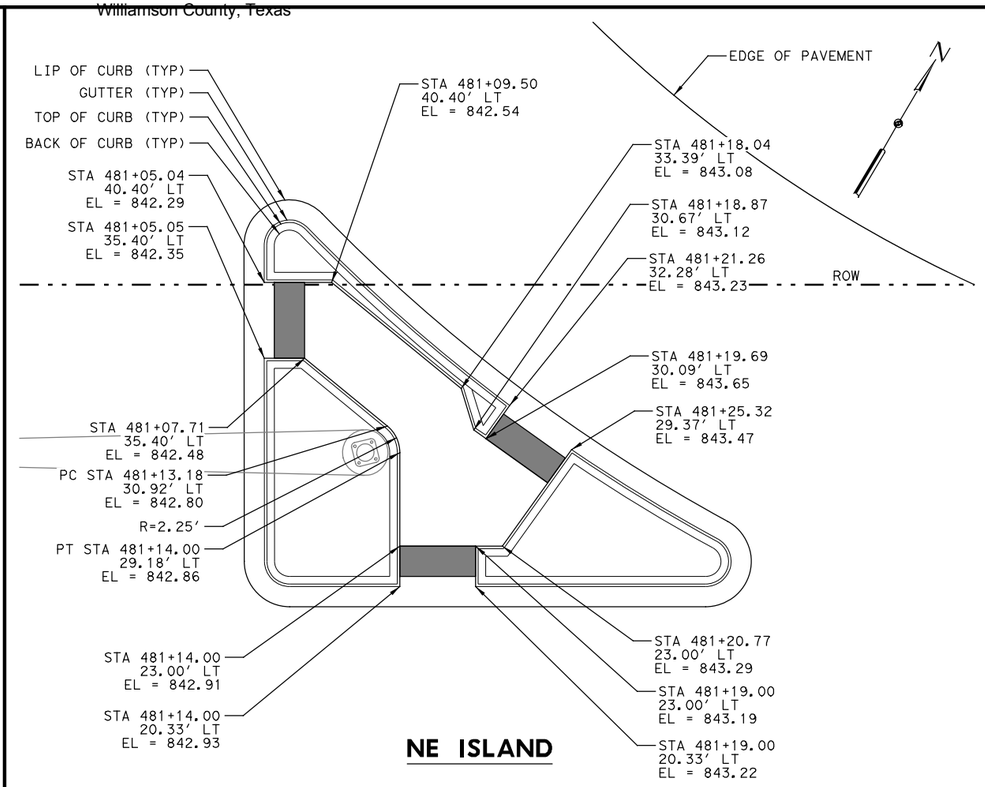
INTERSECTION DETAIL POINT TABLES

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK	CONTROL	SECTION	JOB	62
JW				
CHECK	2103	01	034	
JC				

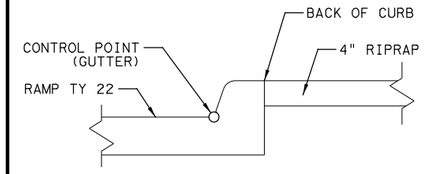
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NW ISLAND



NE ISLAND



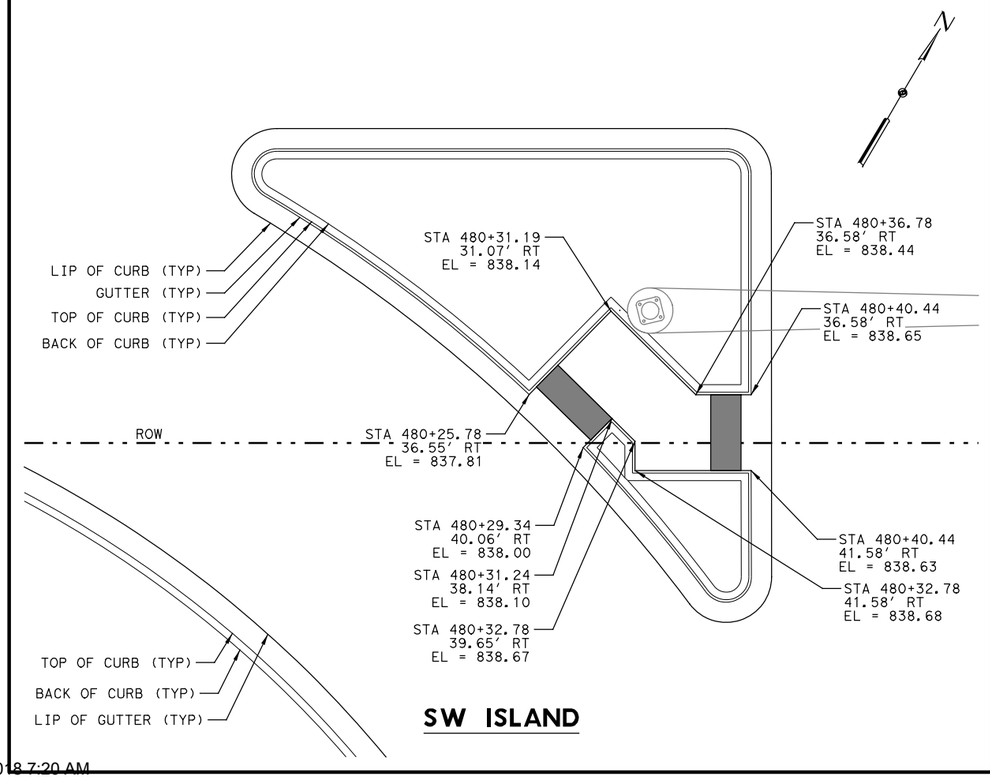
DETAIL B

NOTES:

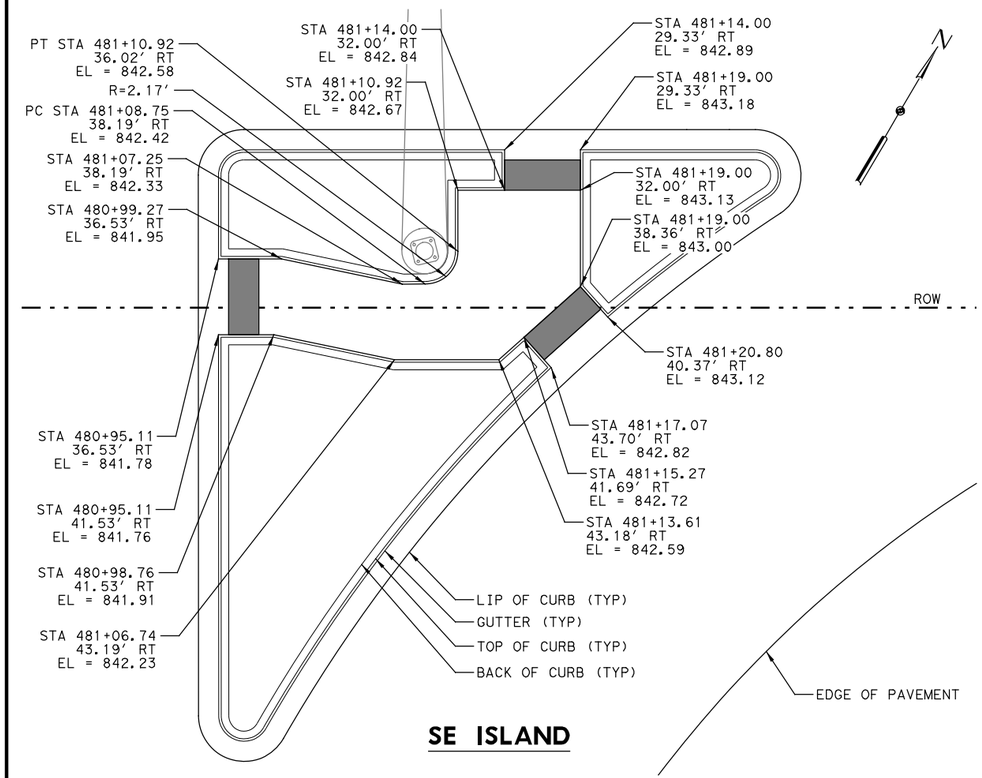
1. ALL STATION AND OFFSET ARE FROM "RM 2243" UNLESS OTHERWISE INDICATED.
2. ALL DIMENSIONS ARE FROM GUTTER UNLESS OTHERWISE INDICATED. SEE DETAIL B.

0 5 10 15 20

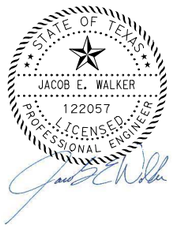
SCALE IN FEET



SW ISLAND



SE ISLAND



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ISLAND DETAIL RM 2243

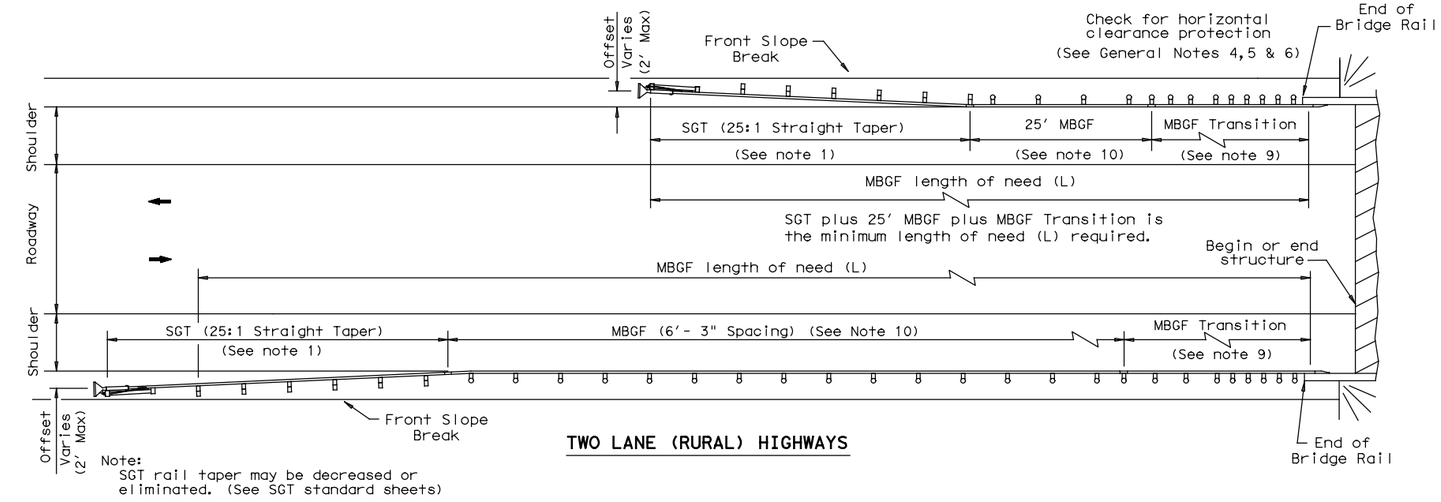
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SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
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CHECK	CONTROL	SECTION	JOB	63
JW	2103	01	034	
CHECK				
JC				

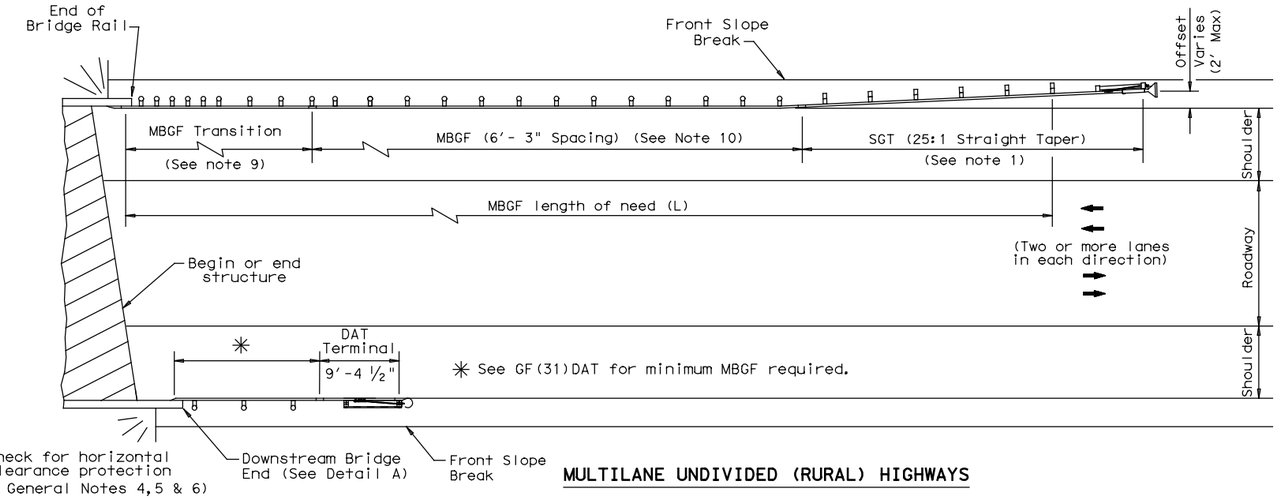
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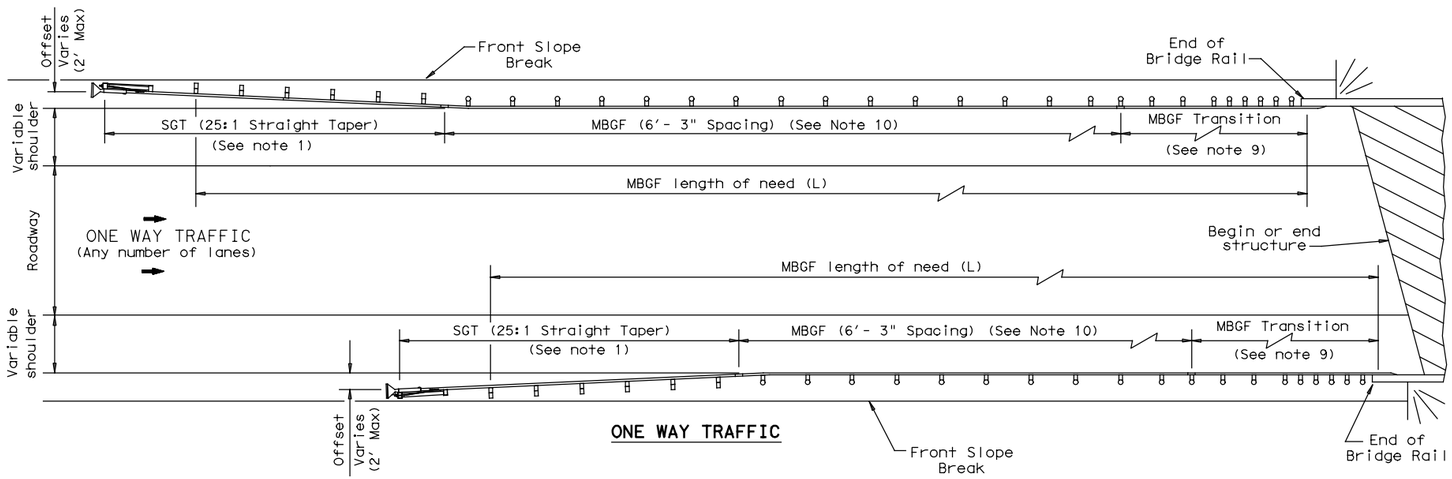


Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)

TWO LANE (RURAL) HIGHWAYS



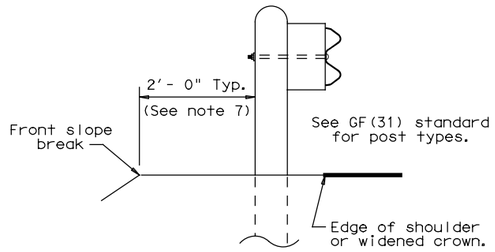
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



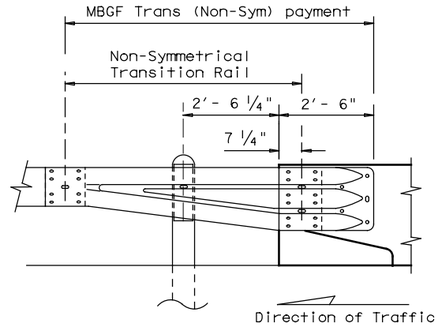
ONE WAY TRAFFIC

GENERAL NOTES

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



TYPICAL CROSS SECTION AT MBGF



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

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation

Design Division Standard

BRIDGE END DETAILS

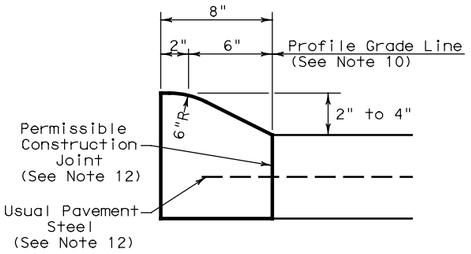
(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

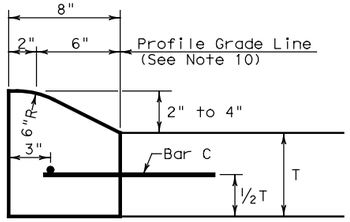
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© TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
04-2014 Added 25' MBGF to Two Lane (Rural) Highway section. Eng.CGL, Cad.VP	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		64

DATE: 3/23/2018 10:36:57 AM
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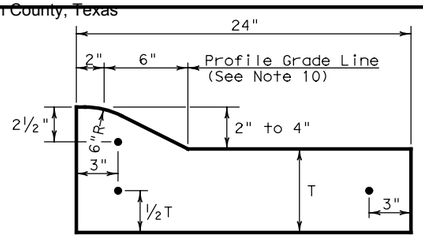
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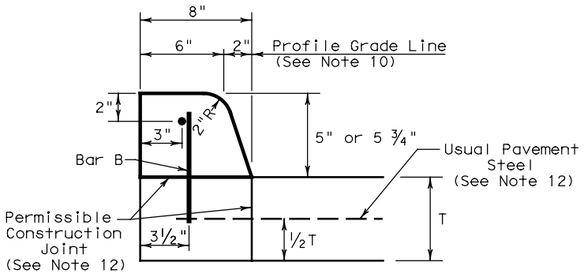
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



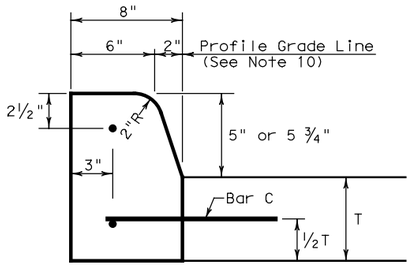
TYPE I CURB
2" - 4" HEIGHT



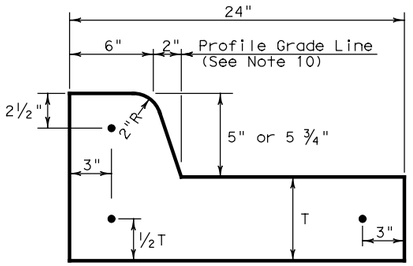
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



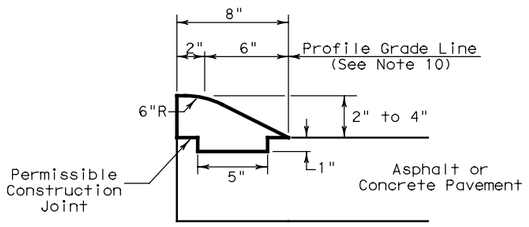
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



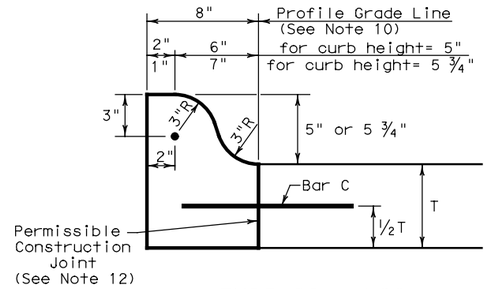
TYPE II CURB
5" - 5 ¾" HEIGHT



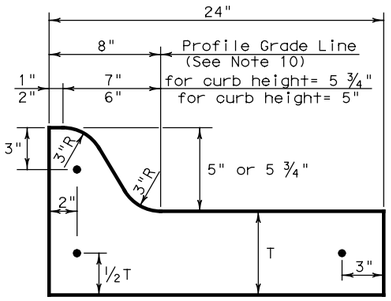
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



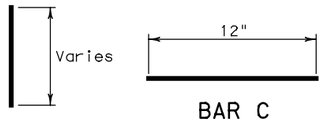
TYPE III CURB (KEYED)
2" - 4" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

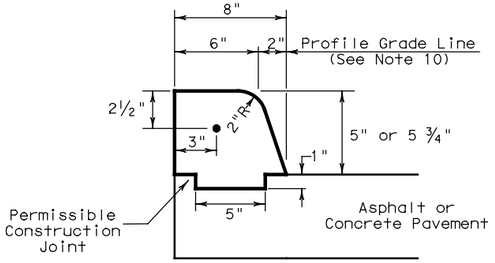


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

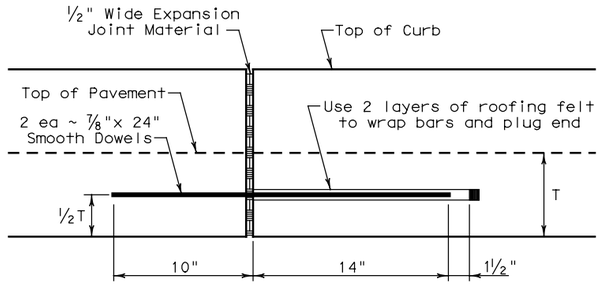


BAR B

BAR C

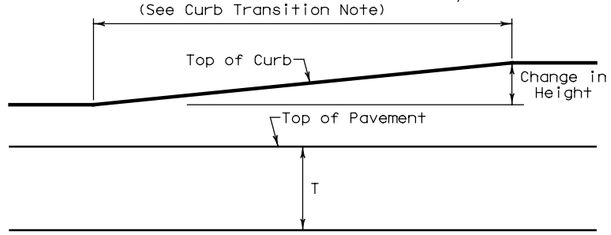


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



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.

Texas Department of Transportation

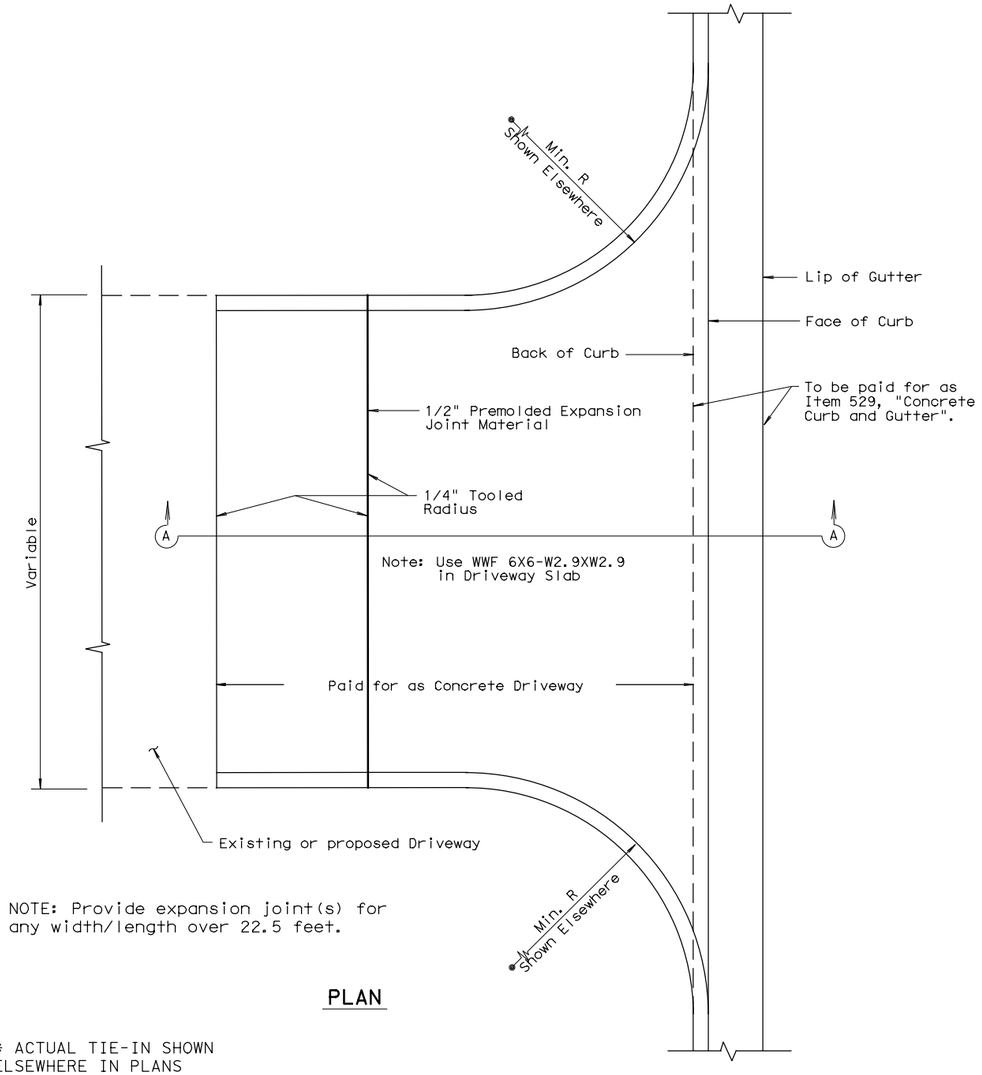
Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

CCCG-12

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© TxDOT: 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS UPDATED 2012 - VP	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		65

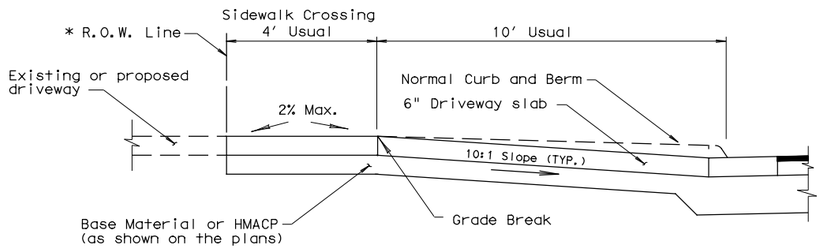
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NOTE: Provide expansion joint(s) for any width/length over 22.5 feet.

PLAN

* ACTUAL TIE-IN SHOWN ELSEWHERE IN PLANS OR AS DIRECTED.



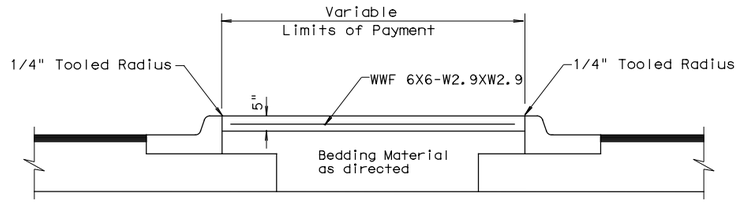
SECTION A-A

CONCRETE DRIVEWAY DETAILS

Payment for Driveways will be in accordance with Item 530, "Driveways".

Ensure grade break does not exceed 8% unless otherwise directed.

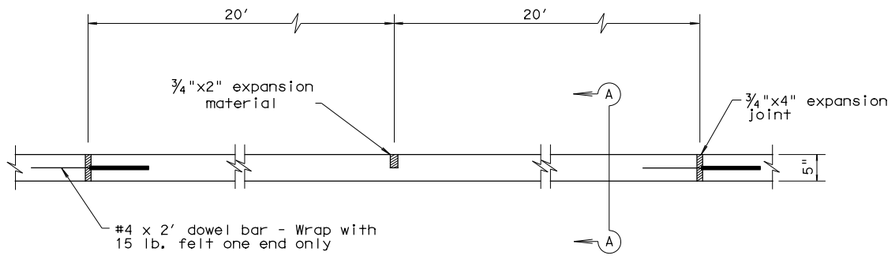
Provide absolute minimum sidewalk crossing width of 3′ for driveway width of 20′ or less.



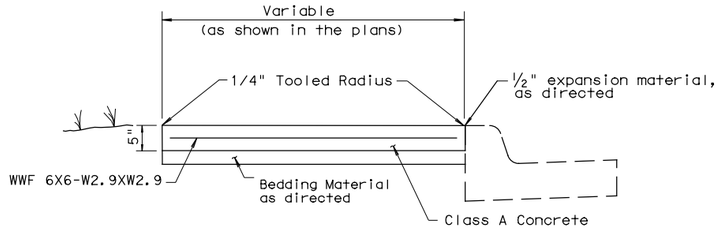
RIPRAP MEDIAN DETAIL

Use Class B Concrete for Riprap.

Payment of Riprap Median will be in accordance with Item 432, "Riprap".



ELEVATION



SECTION A-A

SIDEWALK DETAILS

Place a ¾" expansion joint at 40′ (max.) intervals and at sidewalk ends.

Expansion joints will be continuous with adjacent curb and gutter joints.

Place a ¼" tooled radius at all joints.

Ensure the cross slope of the sidewalk does not exceed 2%.

Payment for sidewalk will be in accordance with Item 531, "Sidewalks".

See Statewide PED standard for additional pedestrian element criteria.

Texas Department of Transportation
Austin District Design

CONCRETE DRIVEWAYS, SIDEWALKS AND RIPRAP MEDIANS

AUSTIN DISTRICT STANDARD

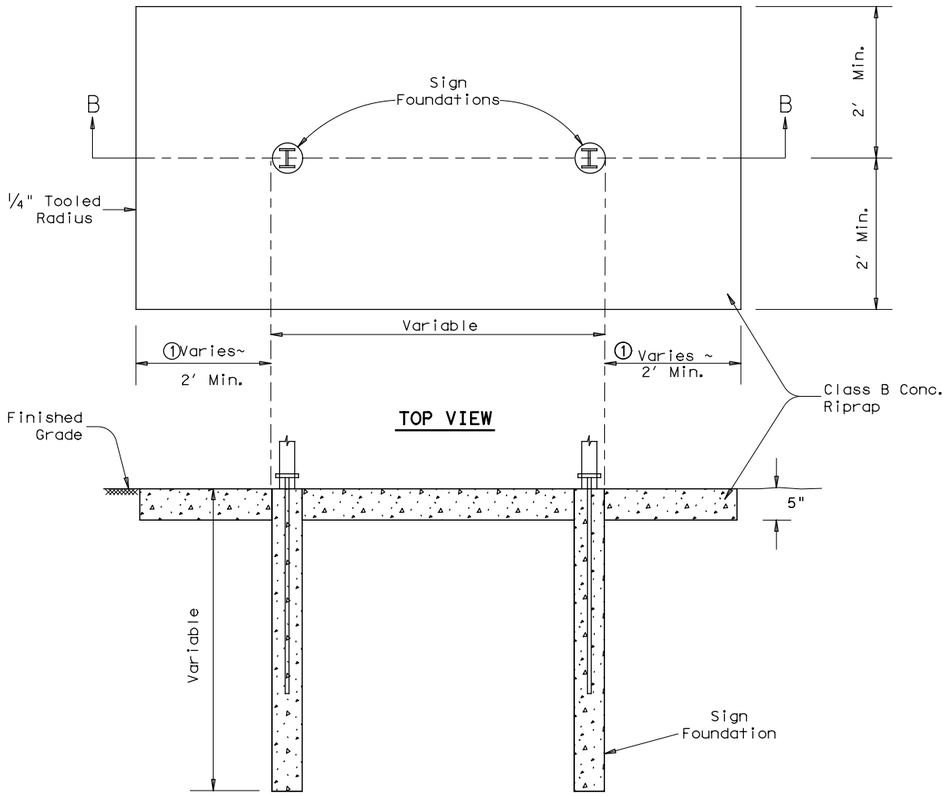
© TxDOT 2002

DIST	FED REG	FEDERAL AID PROJECT •	SHEET
AUS	6		66

REVISIONS
4/03 District Update
9/04 2004 Update

COUNTY	CONTROL	SECT	JOB	HIGHWAY
WILLIAMSON	2103	01	034	

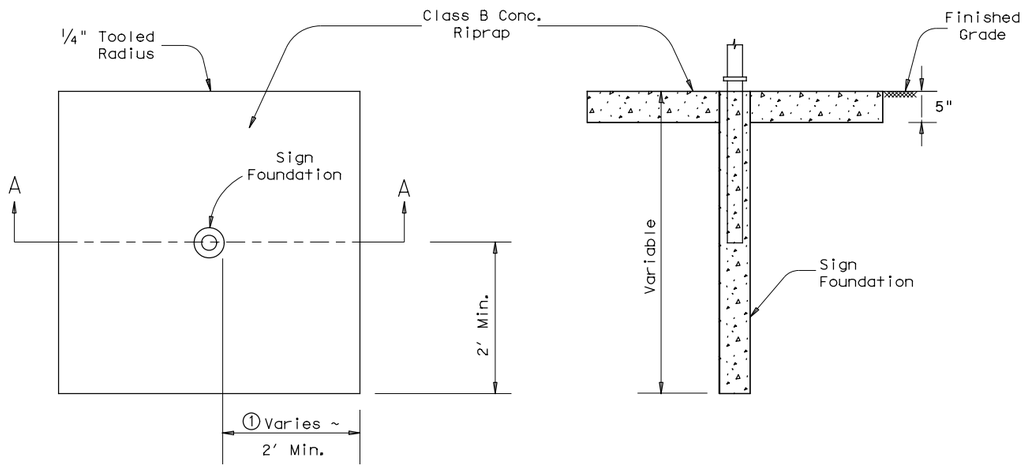
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TOP VIEW

SECTION B-B

LARGE GROUND MOUNTED GUIDE SIGNS OR OVERHEAD SIGN BRIDGES

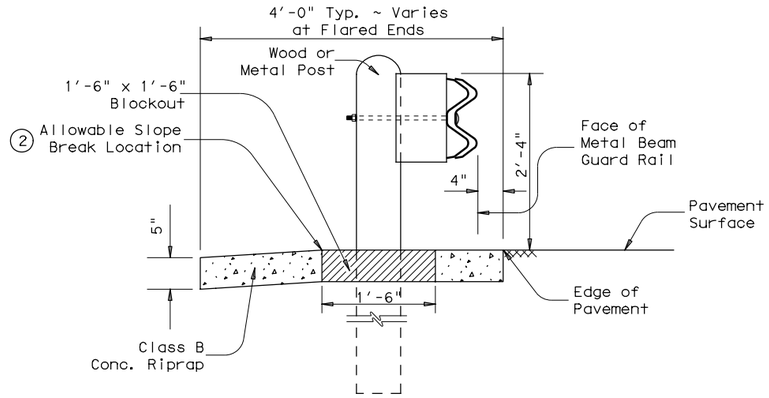


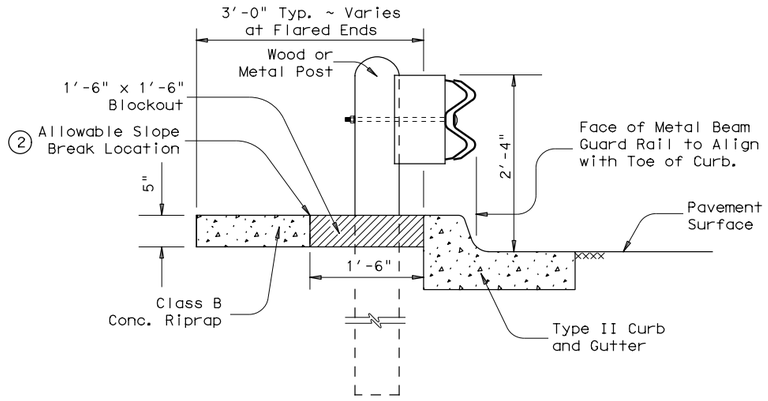
TOP VIEW

SECTION A-A

CANTILEVER SIGNS

Use detail on small roadside signs only when shown elsewhere on the plans or as directed.





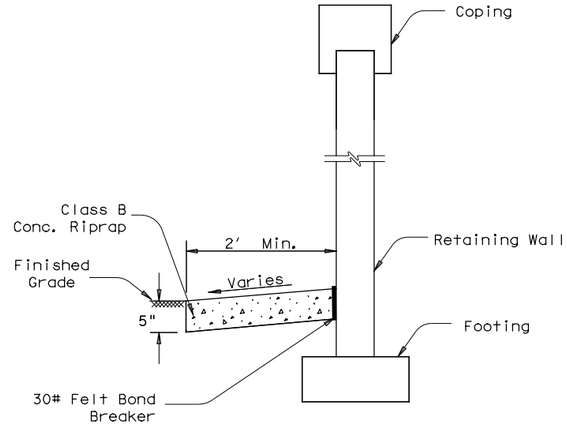
METAL BEAM GUARD FENCE

Fill 1'-6" x 1'-6" Blockout with 2 sack Grout after Riprap has been placed. Consider subsidiary to pertinet Items.

① For large Ground Mounted Guide Signs, extend the Riprap to the outside lateral edges of the signs. However, in those instances where the edge of the sign does not extend 2'-0" from the post, utilize a 2'-0" minimum dimension.

① For Overhead Sign Bridges and Cantilever Sign Mounts the dimensions will be measured from outside edge of Drill Shafts.

② For rehabilitation type projects that do not involve reworking the front slope behind the Metal Beam Guard Fence, a break in the slope is allowed as shown or as directed but shall be 4:1 or flatter. For all other projects, the Riprap Mow Strip shall be placed at 10:1 or flatter or as directed. Unless paid for under separate bid items, earthwork required to adjust the slope as shown or directed will be subsidiary to pertinent Items.



RETAINING WALL

GENERAL NOTES:

Provide vegetation control for Signs, Metal Beam Guard Fence and Retaining Walls as shown on the plans or as directed.

Payment for Riprap shall be in accordance with Item 432, "Riprap". Reinforce Riprap with WWF 6X6-W2.9XW2.9.

Ensure care is taken such that the finished grade of Riprap matches finished grade of adjacent topsoil.

Make Riprap depth 5" unless otherwise shown on the plans.

Ensure that the thickness of the Concrete Riprap is not applied to the sign Drilled Shaft foundation resulting in the shortening of the required Drilled Shaft length.

Unless otherwise shown, center the Metal Beam Guard Fence posts in the 1'-6"X1'-6" Blockout for Grout.

Texas Department of Transportation
Austin District Design

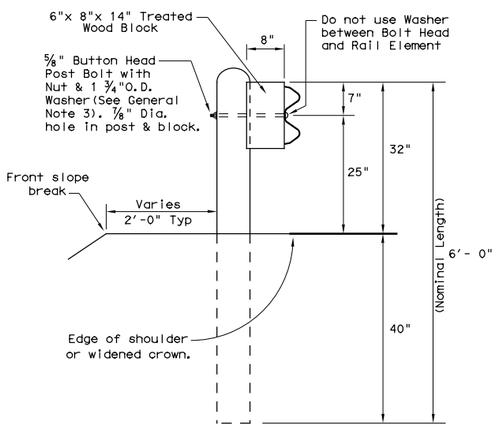
CONCRETE RIPRAP FOR VEGETATION CONTROL

Austin District Standard

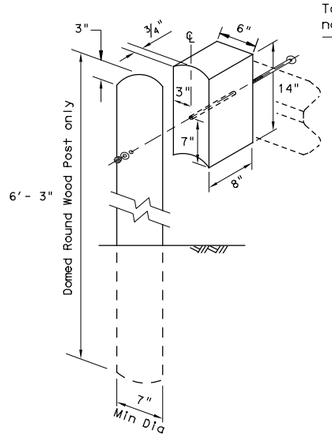
© TxDOT 2003	DIST	FED REG	FEDERAL AID PROJECT •			SHEET
REVISIONS 3/03 District Update 9/04 2004 Update	AUS	6				67
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	WILLIAMSON		2103	01	034	

VC-04.dgn

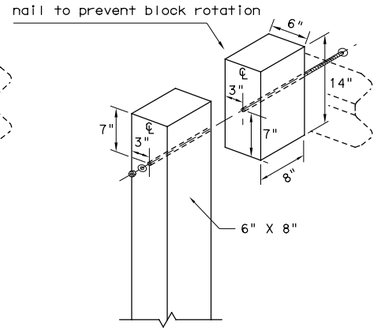
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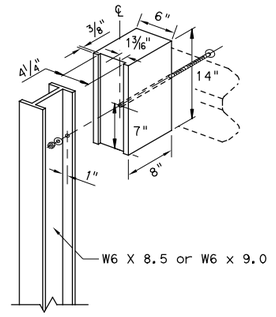
TYPICAL POST



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.

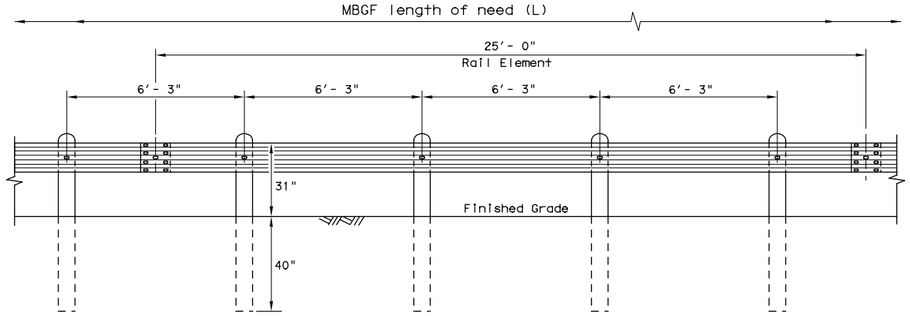
9. If solid rock is encountered within 0 to 18" of the finished grade, drill a 22" dia. hole, or drill two 12" dia. front to back overlapping holes, 24" into the rock. If solid rock is encountered below 18",drill a 12" dia. hole, 12" into the rock or to the standard embedment depth, whichever maybe less. 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.

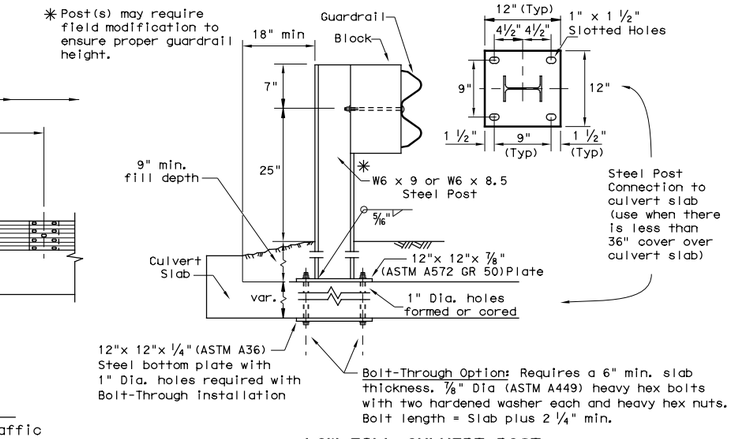
12. Unless otherwise shown in the plans, a composite material post and/or block that meets the requirements of DMS-7210,"Composite Material Posts and Blocks for Metal Beam Guard Fence" may be substituted for posts and/or blocks of similar dimensions. The Construction Division, TxDOT maintains a Material 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

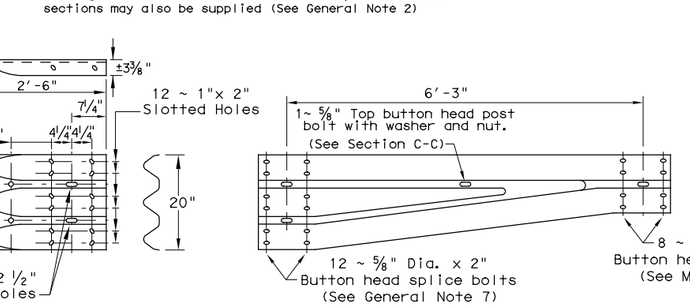
Showing a 25'- 0" section of W-Beam rail, 12'- 6" rail sections may also be supplied (See General Note 2)



LOW FILL CULVERT POST

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

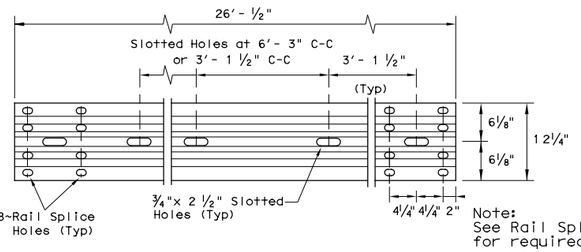
Epoxy Note:
Epoxy Anchor Option: This option may only be used if the culvert slab is 8" min. thick. Threaded anchor rods must be ⅞" Dia. ASTM A449 or A193 Grade B7 with heavy hex nut, and one hardened washer each. Embed anchor rods 6" with Hilti HIT RE 500 epoxy adhesive. Other Type III Class C epoxy 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)

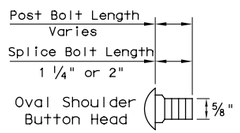
NON-SYMMETRICAL TRANSITION TO W-BEAM (10 Gauge)



Note: See Rail Splice Detail for required hardware.

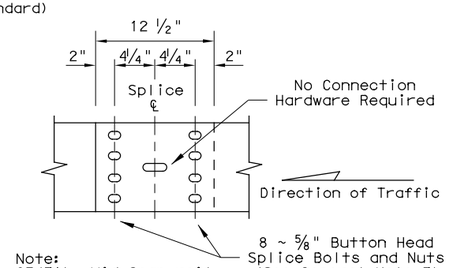
ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

12'- 6" RAIL SECTIONS MAY ALSO BE SUPPLIED (SEE GENERAL NOTE 2)



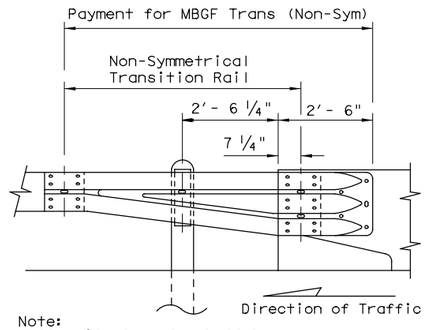
BUTTON HEAD BOLT

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

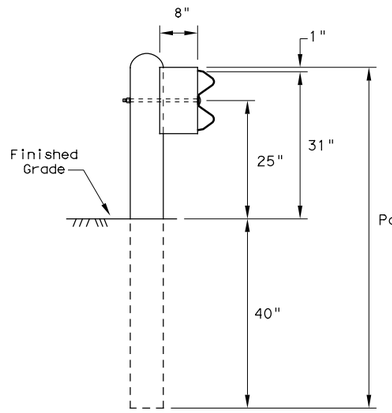
METAL BEAM GUARD FENCE

GF(31)-14

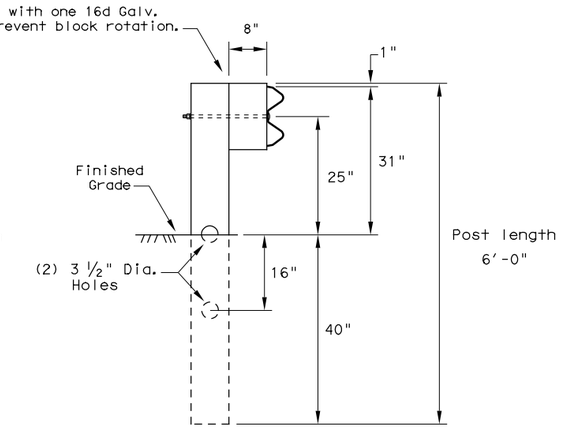
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©TxDOT: December 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		68

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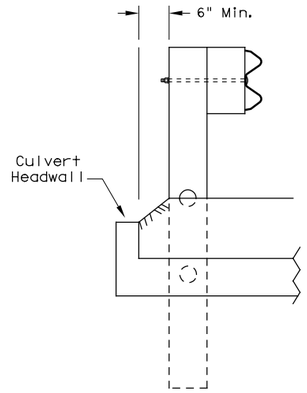


Standard Line Post Installation



Rectangular CRT Post (6"x 8" x 6' Long)

(6) CRT required.
See Elevation Detail for locations.

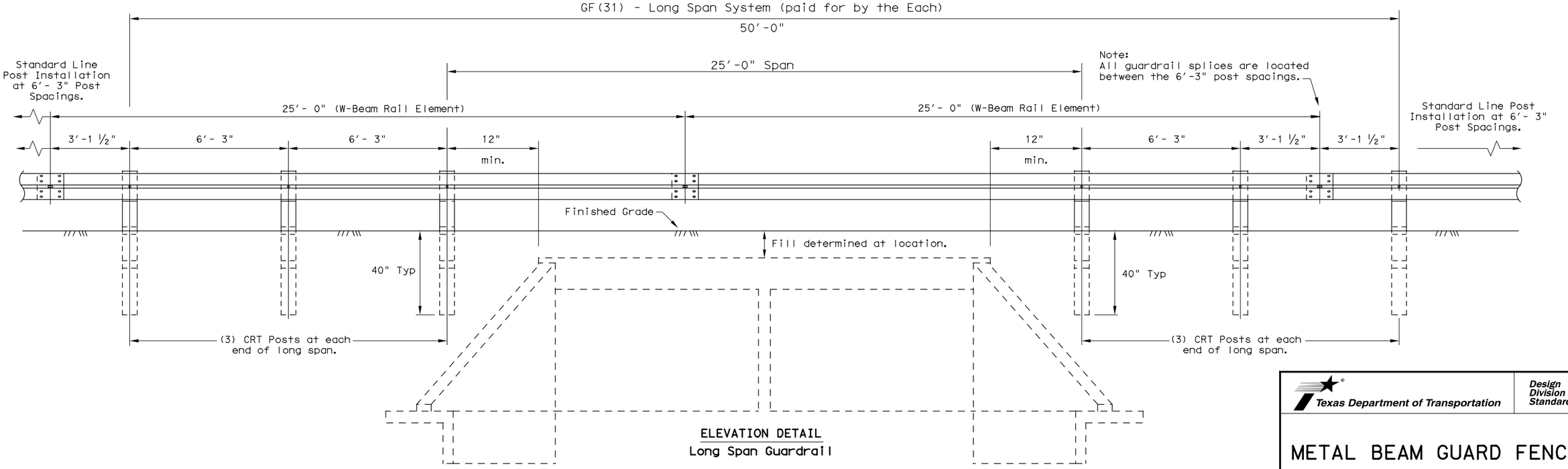


Lateral Offset Between the Guardrail and the Culvert Headwall

GENERAL NOTES

1. The type of line post (round wood post, rectangular wood post, or steel post) will be as shown in the plans. The exact position of the transitions shall be as shown in the plans or as directed by the Engineer. Steel posts to be galvanized in accordance with Item 445, "Galvanizing."
2. Rail element shall meet all requirements of Item 540, "Metal Beam Guard Fence" except as modified on the plans. The Contractor may furnish rail elements of 12 ½ or 25 foot nominal lengths.
3. Rail post holes are offset 3'- 1 ½" from standard guardrail to accommodate the midspan splicing.
4. Button head post bolts (ASTM A307) shall be of sufficient length to extend through the full thickness of the nut (ASTM A563) and no more than ¾" beyond it. Button head splice bolts (ASTM A307) are ⅝" x 1 ¼" with a ⅝" double recessed nut (ASTM A563). Galvanized fittings (bolts, nuts, and washers) shall be in accordance with Item, "Metal For Structures". Fittings shall be subsidiary to the bid item requiring construction of transition.
5. Where solid rock is encountered or where shown on the plans, the diameter of the holes shall be approximately 12 inches, the backfilling shall be with a cohesionless material, and embedment depth shall be 1' - 6" or more as directed by the Engineer.
6. Posts shall not be set in concrete, of any depth.
7. Refer to GF(31) Standard Sheet for additional details.

NOTE: Field drilled holes shall be repaired in accordance with Item 445, "Galvanizing". Flame cutting of holes in guardrail shall not be permitted.



ELEVATION DETAIL
Long Span Guardrail

Texas Department of Transportation

Design Division Standard

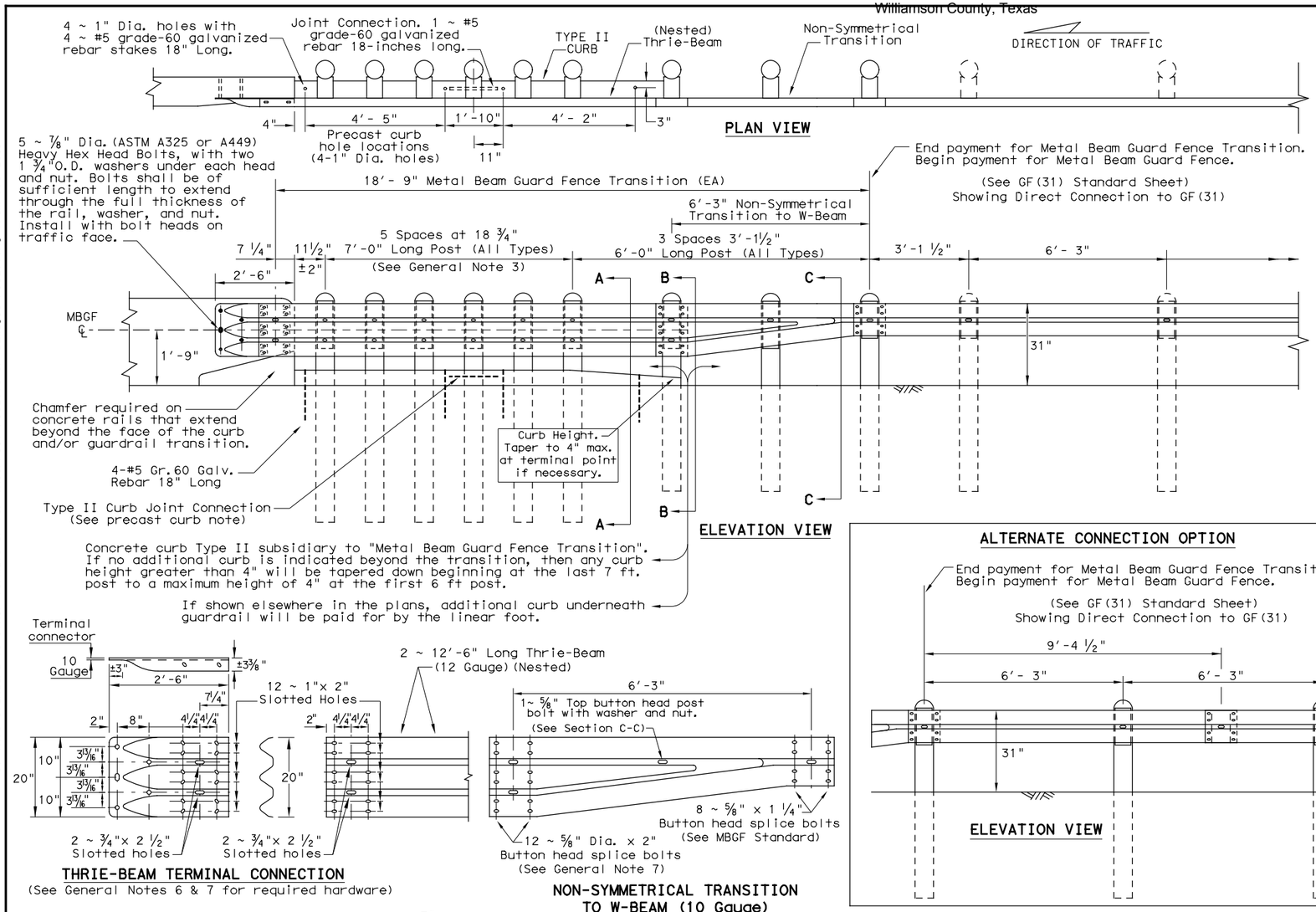
METAL BEAM GUARD FENCE
(LONG SPAN)

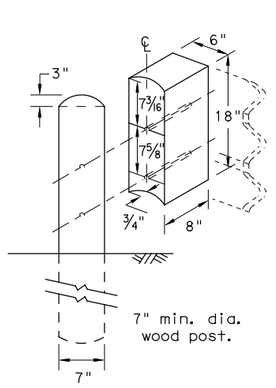
GF(31)LS-17

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REVISIONS Revised 12, 2017 CL	2103	01	034			
	DIST	COUNTY		SHEET NO.		
	AUS	WILLIAMSON		69		

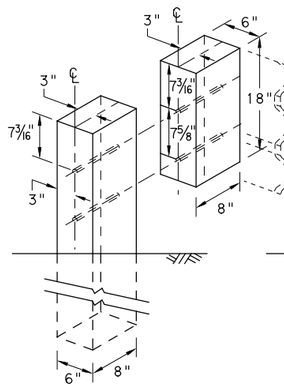
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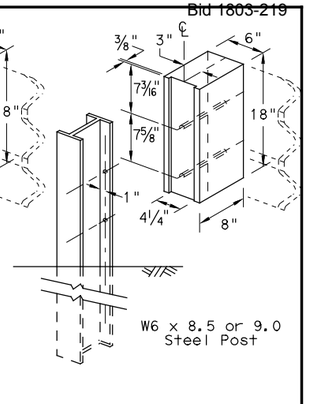




WOOD BLOCK TO ROUND WOOD POST



WOOD BLOCK TO RECTANGULAR WOOD POST



WOOD BLOCK TO STEEL POST

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.

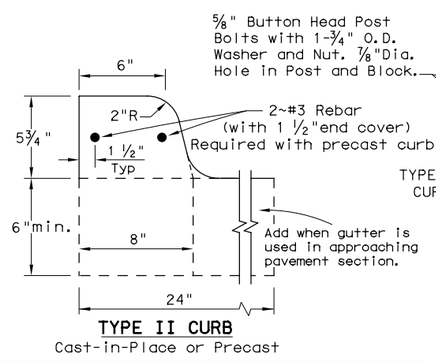
10. If solid rock is encountered. See the MBGF standard sheet for the proper installation guidance.

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.

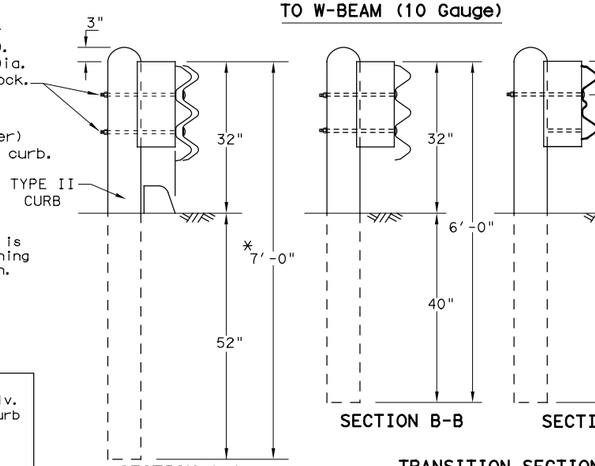
THRIE-BEAM TERMINAL CONNECTION
(See General Notes 6 & 7 for required hardware)

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



TYPE II CURB
Cast-in-Place or Precast

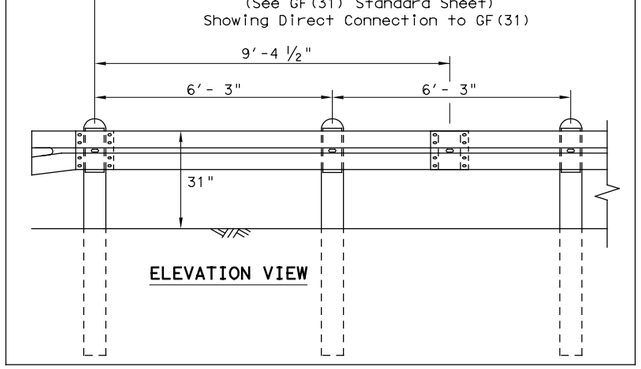
PRECAST CURB:
Type II Precast Curb secured with 4~#5 Gr.60 Galv. Rebar stakes 18" long. The 12'- 2" section of curb may be cast in two sections.
Section ① 5'- 8" long
Section ② 6'- 6" long with the last 3'- 6" of curb tapered to a 4" height.
The Joint Connection is two 9" long 1" Dia. female ends connected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



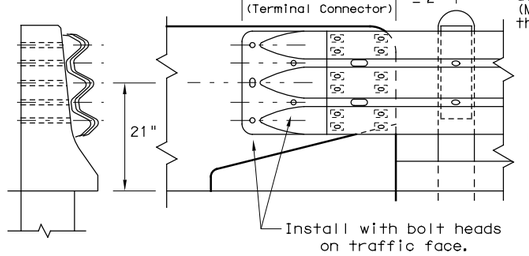
SECTION A-A
SECTION B-B
SECTION C-C
TRANSITION SECTIONS

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

ALTERNATE CONNECTION OPTION



ELEVATION VIEW



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

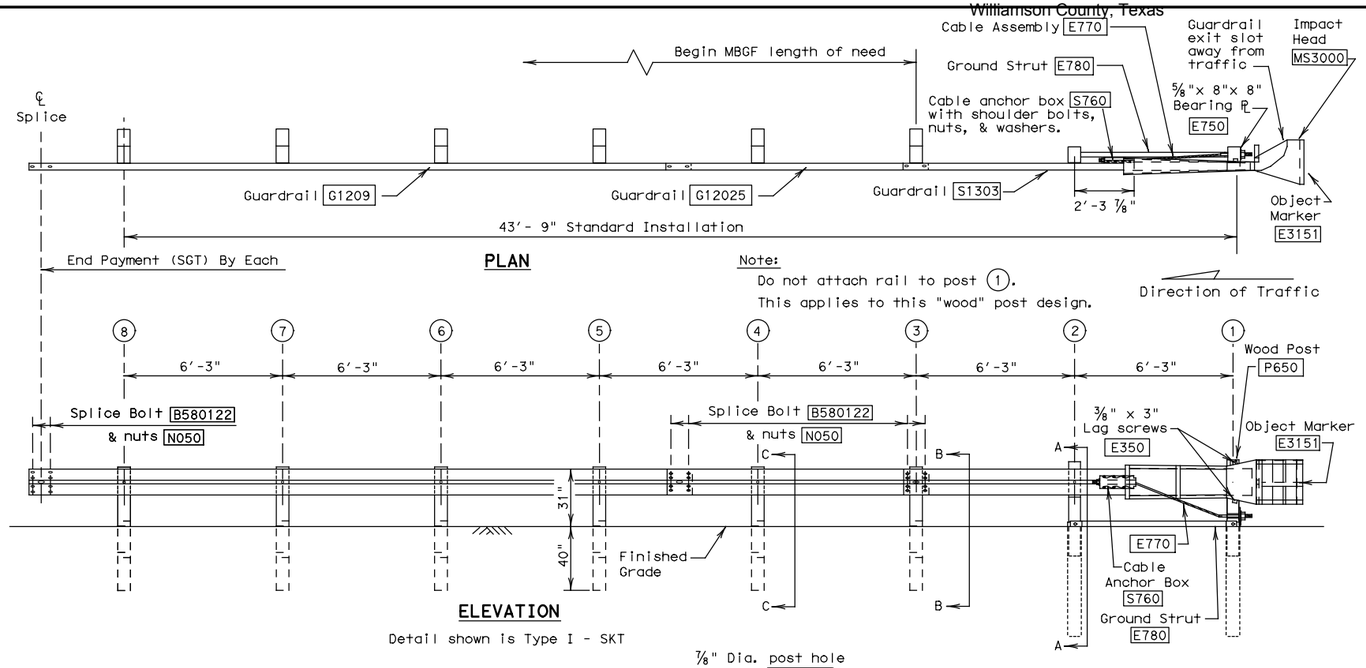
Texas Department of Transportation — Design Division Standard

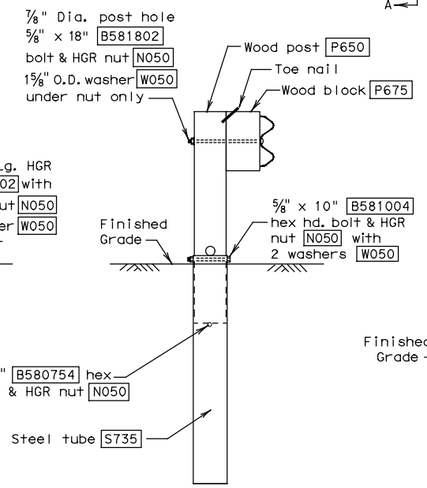
METAL BEAM GUARD FENCE TRANSITION
(Thrie-Beam Transition)
GF(31)TR-14

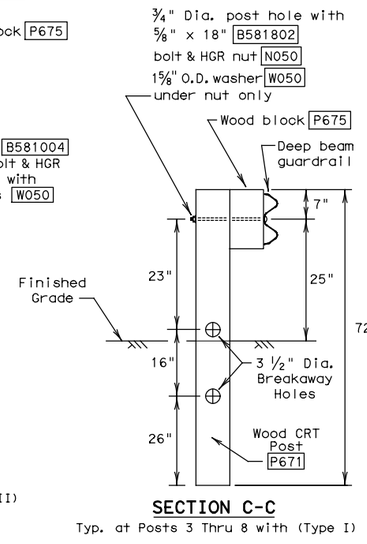
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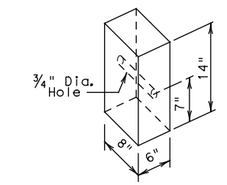
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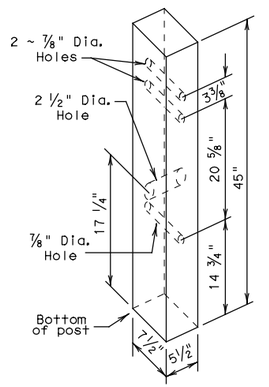
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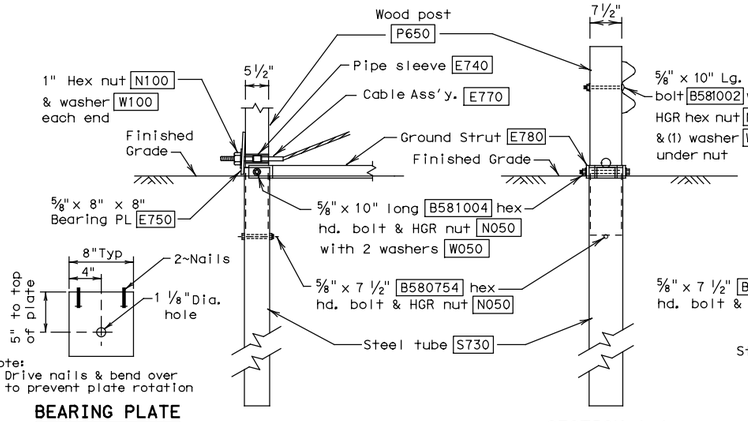


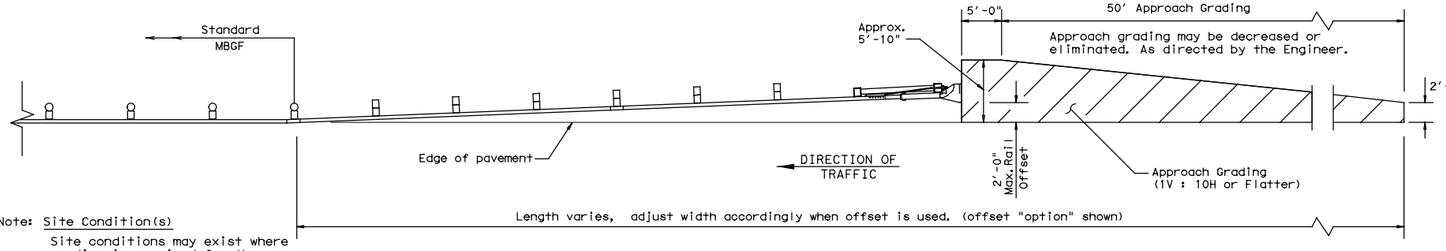












GENERAL NOTES

1. For additional information contact: Interstate Steel Inc. (432) 263-3725
2. The Type of SGT unit will be specified elsewhere in the plans. The numbers in the circles indicate post position. The Type of SGT unit chosen is a maintenance consideration and does not affect the systems performance.

	Post & Tube Options	Post Only
Type I	Posts (1) thru (2)	Posts (3) thru (8)
Type II	Posts (1) thru (4)	Posts (5) thru (8)
Type III	Posts (1) thru (8)	None

3. SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius, without special fabrication.
4. All bolts, nuts cable assemblies, cable anchors, steel tubes & bearing plates shall be galvanized.
5. A flare rate of 25:1 may be used over the first 50 ft. of the system to prevent the terminal head from encroaching the shoulder. The flare may be decreased or eliminated for specific installations, if directed by the Engineer.
6. The steel tubes shall not protrude more than 4 inches above ground. Site grading may be necessary to meet this requirement.
7. The steel tubes may be driven with an approved driving head. They shall not be driven with the wood post in the tube. If the steel tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent tube settlement.
8. If solid rock is encountered. See the Manufacturer's installation manual for the proper installation guidance.
9. The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
10. The wood blocks shall be "toe nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks. The bearing plate on the front post shall also be "toe nailed" to prevent rotation.
11. For curb installations, the soil tubes and posts shall be installed at the proper ground elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed if directed by the Engineer.
12. An object marker shall be installed on the front of the impact head as detailed on D&OM(VIA).

BILL OF MATERIAL

Item #	POST & TUBE OPTIONS Type I	Type II	Type III	DESCRIPTION
S1303	1	1	1	Guardrail (12 Ga.) 12'- 6" SKT
G12025	1	1	1	Guardrail (12 Ga.) 9'- 4 1/2"
G1209	1	1	1	Guardrail (12 Ga.) 25'- 0"
S730	2	2	2	Steel Tube - 6" x 8" x 72" x 1/8" min. or 3/16"
S735	0	2	6	Steel Tube - 6" x 8" x 54" x 1/8" min. or 3/16"
P650	2	4	8	Wood Posts - 5 1/2" x 7 1/2" x 45"
P671	6	4	0	Wood CRT Posts - 6" x 8" x 72"
P675	6	6	6	Wood Block - 6" x 8" x 14"
E740	1	1	1	Pipe Sleeve - 2" Std. Pipe x 5 1/2"
E750	1	1	1	Bearing Plate - 5/8" x 8" x 8"
S760	1	1	1	Cable Anchor Box
E770	1	1	1	Cable Assembly
E780	1	1	1	Ground Strut
MS3000	1	1	1	Impact Head
				HARDWARE
B580754	2	4	8	5/8" x 7 1/2" Hex Hd. Bolt
B581004	2	4	8	5/8" x 10" Hex Hd. Bolt (Top of Tubes)
W050	11	15	23	5/8" Washers
B581002	1	1	1	5/8" x 10" HGR Post Bolt (Post 2)
B580122	16	16	16	5/8" x 1 1/4" HGR Splice Bolt
B581802	6	6	6	5/8" x 18" HGR Post Bolt (Posts (3) thru (8))
N050	35	39	47	5/8" HGR Nut (24-Spi, Varies-Posts, 2-Strut)
E350	2	2	2	3/8" x 3" Lag Screw
N100	2	2	2	1" Hex Nut (Anchor Cable)
W100	2	2	2	1" Washer (Anchor Cable)
SB12A	8	8	8	Cable Anchor Box Shoulder Bolts
N012A	8	8	8	1/2" Structural Nut
W012A	8	8	8	1/2" Structural Washer
E3151	1	1	1	Object Marker - (18" x 18")

POST & TUBE OPTIONS

Type I	post (1) thru (2)
Type II	post (1) thru (4)
Type III	post (1) thru (8)

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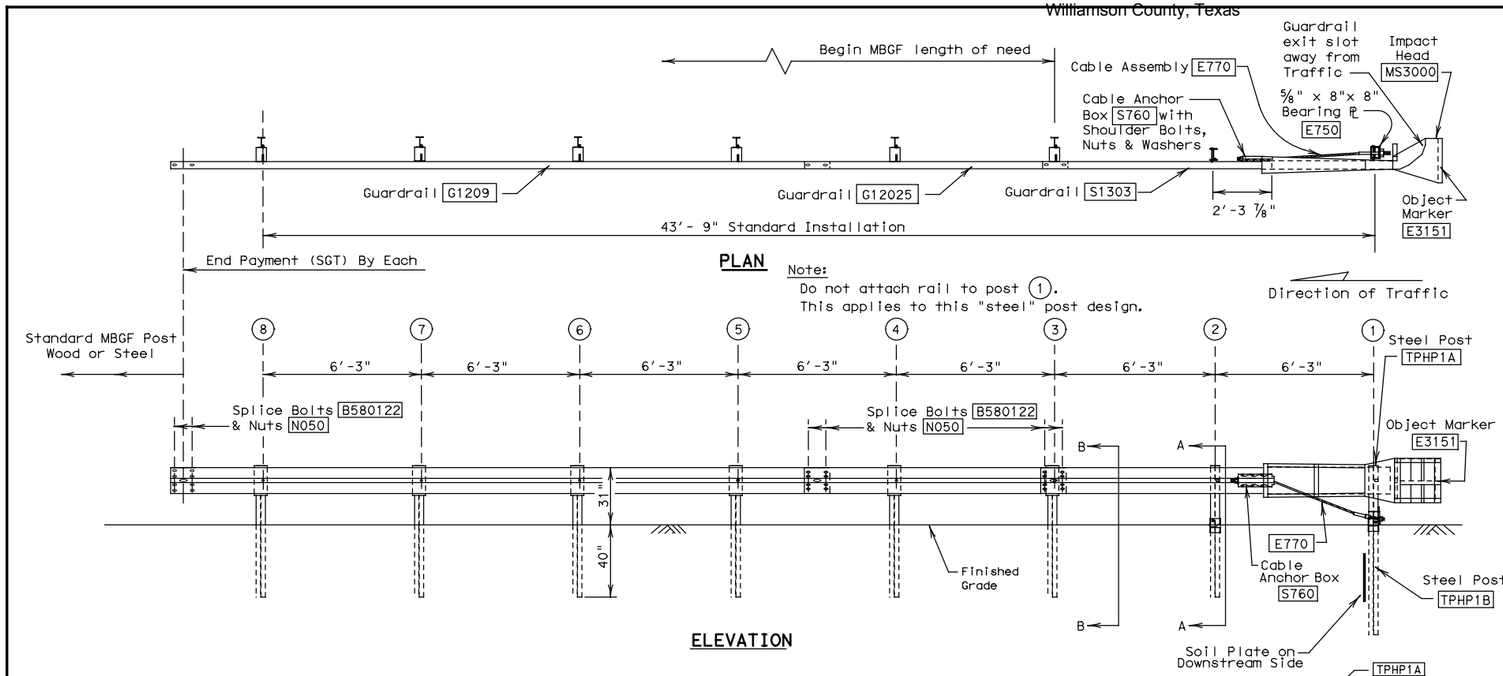
SINGLE GUARDRAIL TERMINAL (SKT-31) (WOOD POST)

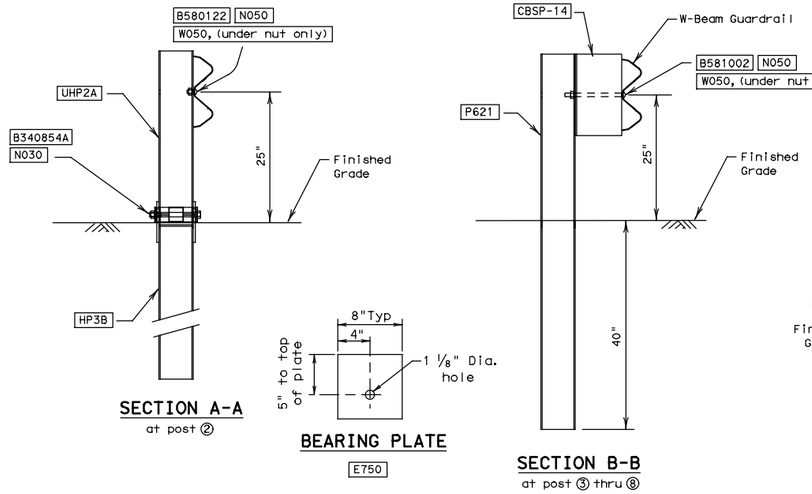
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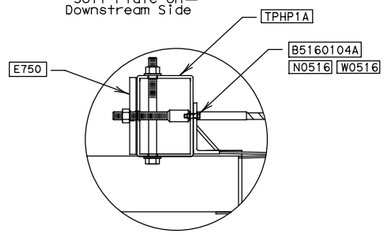
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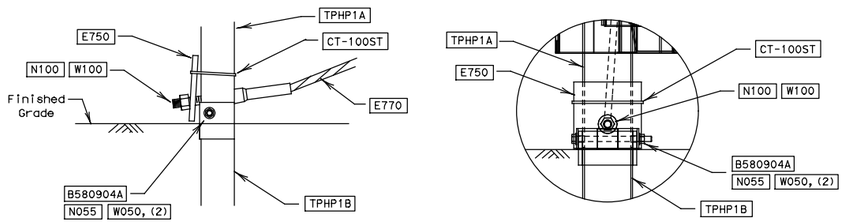
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IMPACT HEAD CONNECTION DETAIL

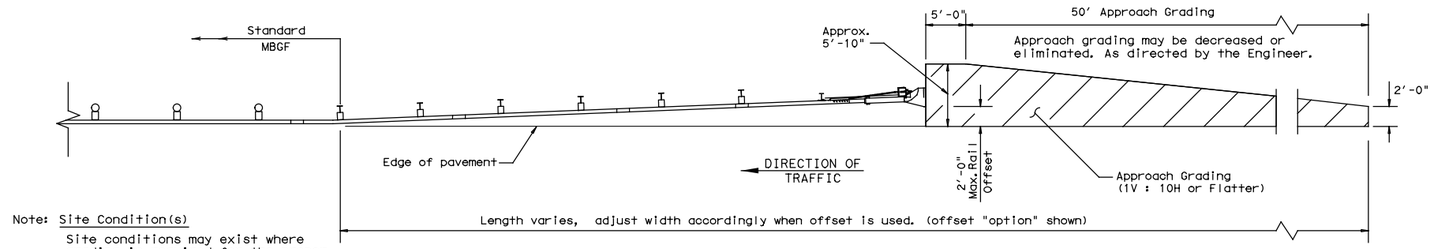


POST #1 CONNECTION DETAILS

GENERAL NOTES

1. For additional information contact: Interstate Steel Inc., (432) 263-3725.
2. All bolts, nuts cable assemblies, cable anchors, steel posts & bearing plates shall be galvanized.
3. SGT's placed within the "minimum" 150 ft. radius, shall be installed straight. Standard rail elements may be installed within the radius without special fabrication.
4. A flare rate of 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.
5. The lower sections of the post shall not protrude more than 4 inches above finished ground. Site grading may be necessary to meet this requirement.
6. The lower section of the steel posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
7. If solid rock is encountered. See manufacturer's installation manual for the proper installation guidance.
8. The breakaway cable assembly must be taut. A locking device, (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening the nuts.
9. Hinge bolts shall not be set below finished grade. At curb locations the posts shall be installed at the proper grade elevation behind the curb. The posts will then require field drilling new holes to accommodate the rail to post connection bolt to maintain the proper height of the rail above the gutter pan. The excess post length above the rail will be removed as directed by the Engineer.
10. An object marker shall be installed on the front of the impact head as detailed on D&OM(VIA).

ITEM NO.	QTY	BILL OF MATERIALS
S1303	1	GUARDRAIL (12 GA) 12'- 6" SKT Panel
G12025	1	GUARDRAIL (12 GA) 9' - 4 ½"
G1209	1	GUARDRAIL (12 GA) 25'- 0"
TPHP1A	1	FIRST POST ASSEMBLY TOP, TUBE
TPHP1B	1	FIRST POST ASSEMBLY BOTTOM, 6'- 0"
UHP2A	1	SECOND POST ASSEMBLY TOP
HP3B	1	SECOND POST ASSEMBLY BOTTOM, 3'- 5⅞"
P621	6	STANDARD STEEL LINE POST 6'- 0" (POST 3 THRU 8)
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
CT-100ST	1	CABLE TIE - STEEL
CBSP-14	6	ROUTED BLOCK
MS3000	1	IMPACT HEAD
HARDWARE		
B580122	25	⅝" Dia. x 1 ¼" SPLICE BOLT
B580904A	1	⅝" Dia. x 9" HEX BOLT GR. 5
B340854A	1	¾" Dia. x 8 ½" HEX BOLT GR. 5
B581002	6	⅝" Dia. x 10" H.G.R. BOLT (Post 3 thru 8)
N055	1	⅝" Dia. HEX NUT (Post 1 only)
N050	31	⅝" Dia. H.G.R. NUT (at splices & at Post 2 thru 8)
W050	9	H.G.R. WASHER (At Post 1(2) & 2 thru 8)
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B5160104A	2	⅝" x 1" HEX BOLT, GR. 5
N0516	2	⅝" HEX NUT
W0516	4	⅝" WASHER
SB12A	8	CABLE ANCHOR BOX SHOULDER BOLT
N030	1	¾" HEX NUT
N012A	8	½" STR. NUT
W012A	8	½" STR. WASHER
E3151	1	OBJECT MARKER (18" x 18")



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 AT GUARDRAIL END TREATMENTS

Texas Department of Transportation — Design Division Standard

SINGLE GUARDRAIL TERMINAL (SKT-31) (STEEL POST) SGT(8S)31-17

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	AUS	WILLIAMSON		73

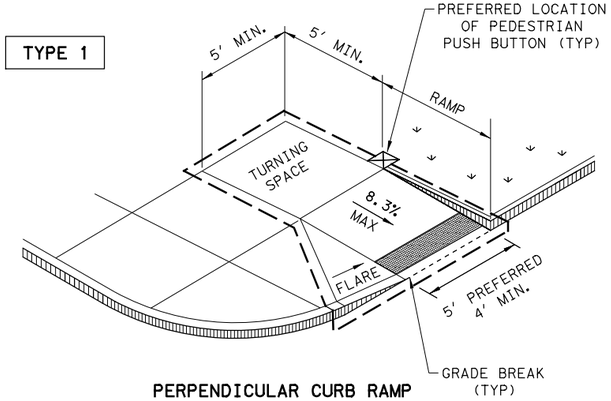
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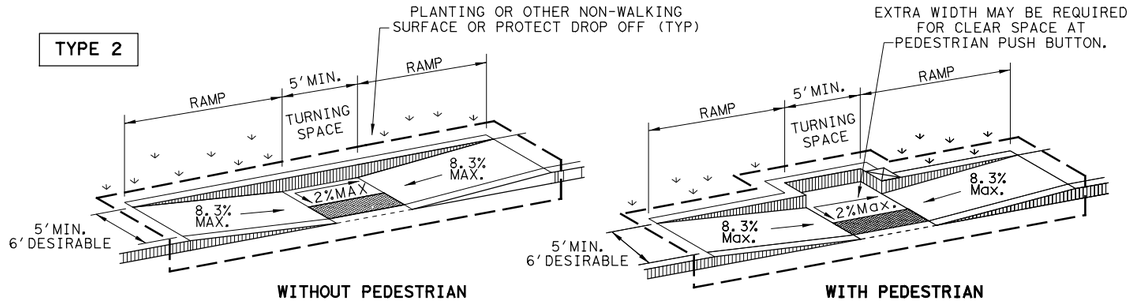
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TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

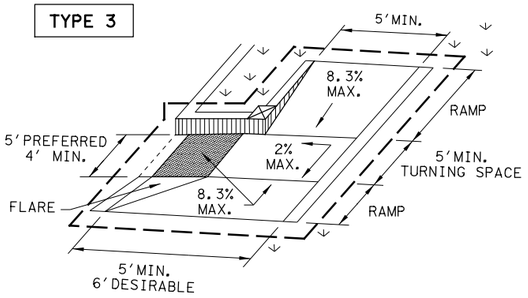


WITHOUT PEDESTRIAN PUSH BUTTON

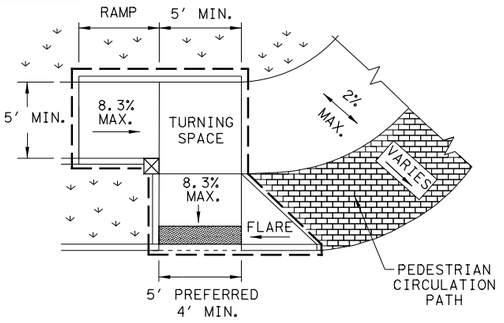
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

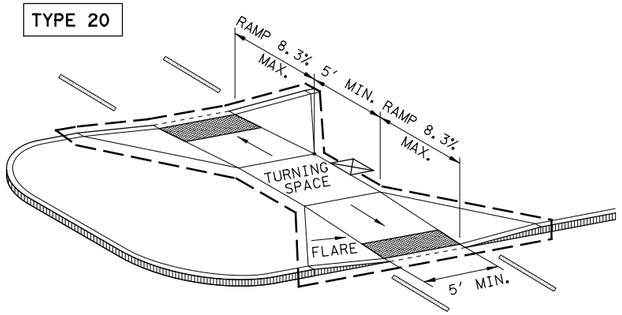


TYPE 6



COMBINATION CURB RAMPS

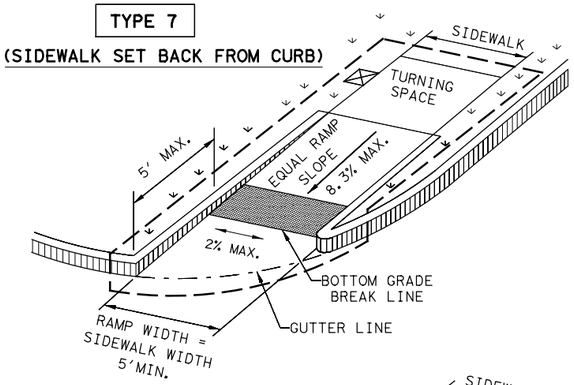
TYPE 20



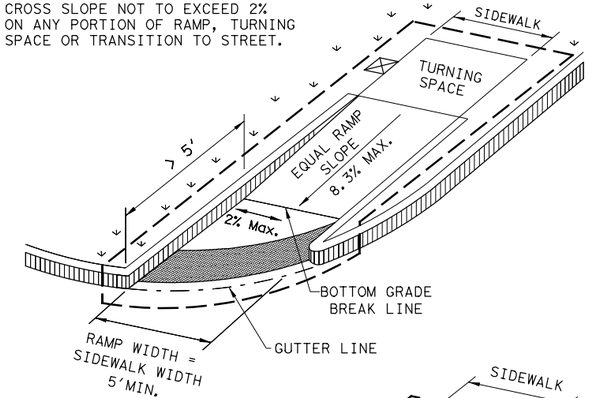
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

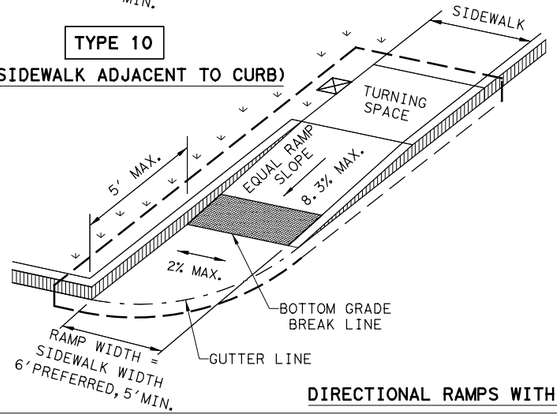


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

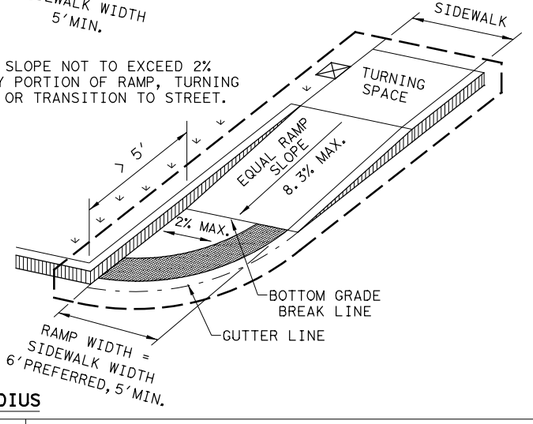


TYPE 10

(SIDEWALK ADJACENT TO CURB)

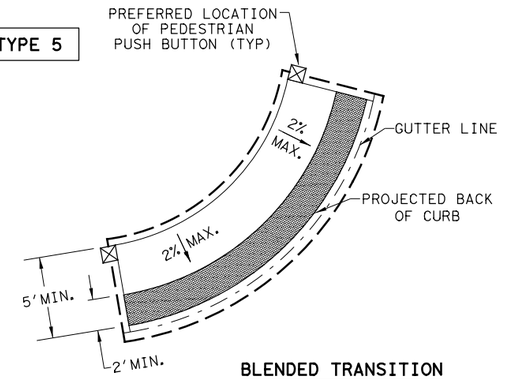


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

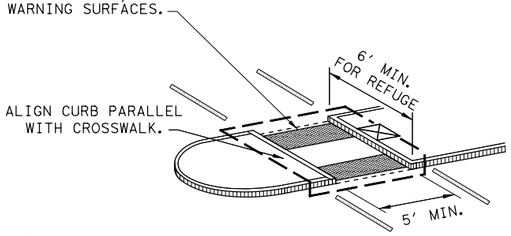
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

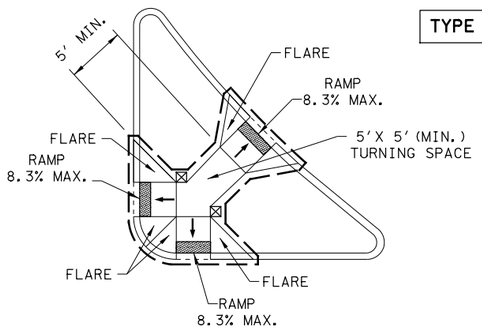
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



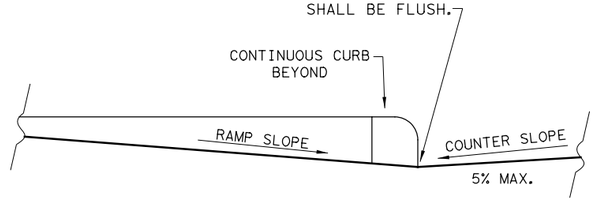
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		73

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GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5′. Where the sidewalk is adjacent to the back of curb, a 6′ sidewalk width is desirable. Where a 5′ sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4′ for short distances. 5′x 5′ passing areas at intervals not to exceed 200′ are required.
5. Turning Spaces shall be 5′x 5′ minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4′x 4′ wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6′ wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5′x 5′ landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicaible standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

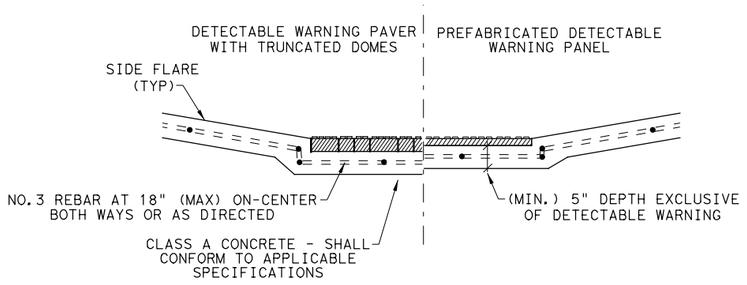
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

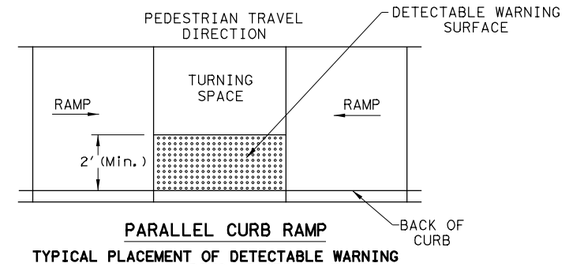
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

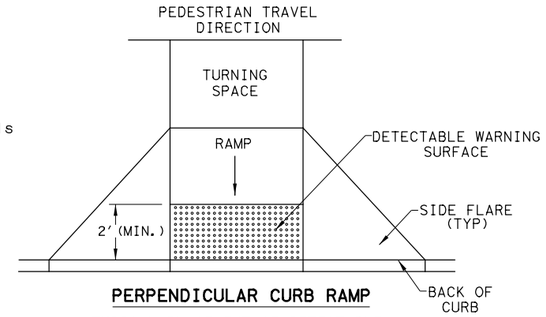


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

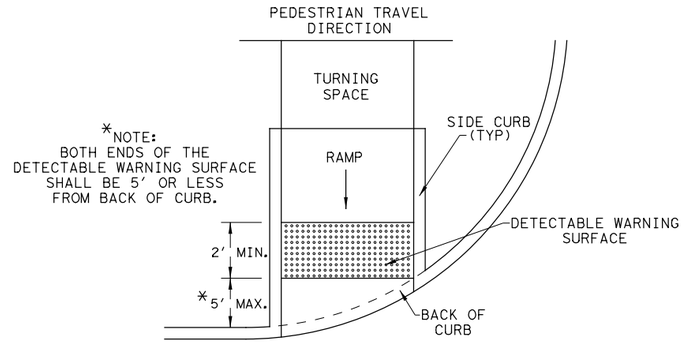
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

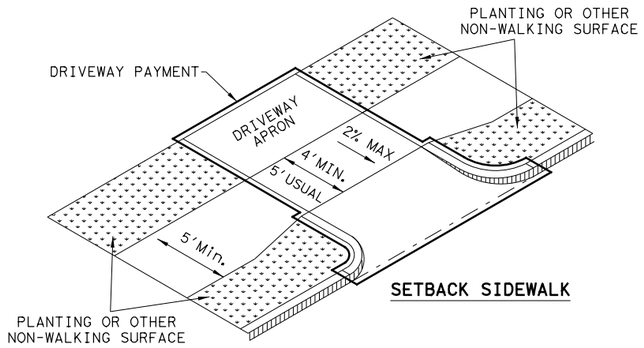
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© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	2103	01	034		
	DIST	COUNTY		SHEET NO.	
	AUS	WILLIAMSON		74	

DATE: 3/23/2018
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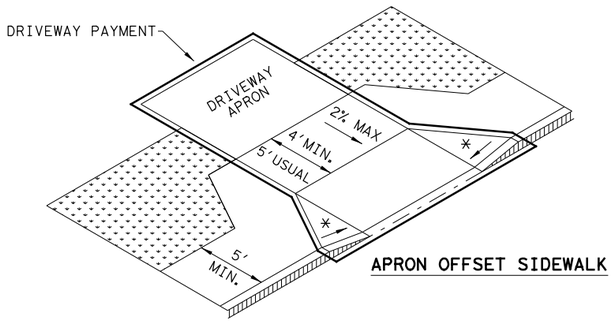
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DATE: 3/23/2018
FILE: c:\pwworking\dal\d0911856\ped18.dgn

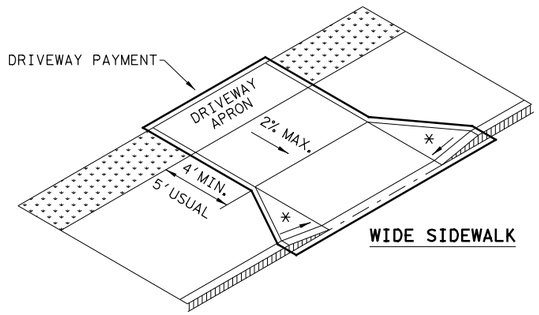
SIDEWALK TREATMENT AT DRIVEWAYS



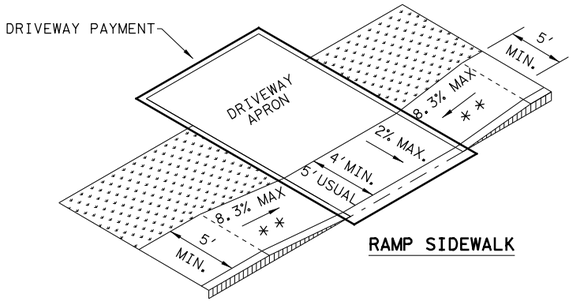
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

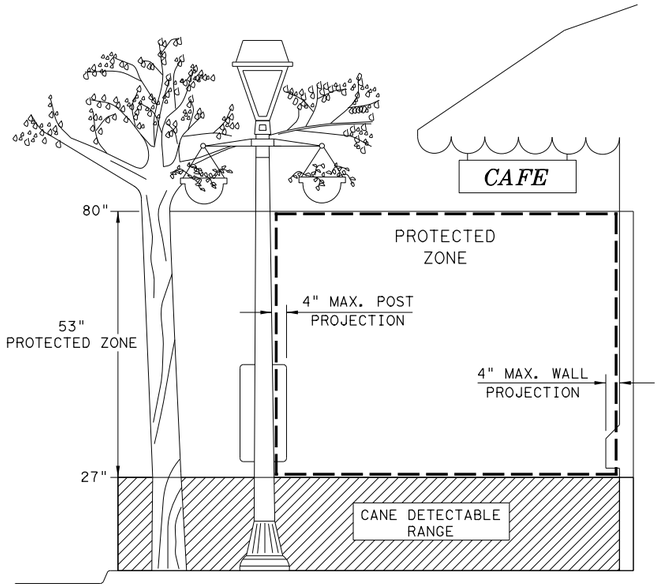


RAMP SIDEWALK

NOTES:

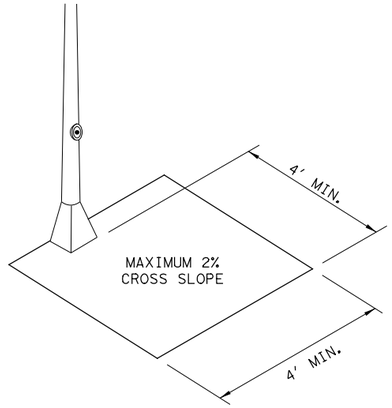
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

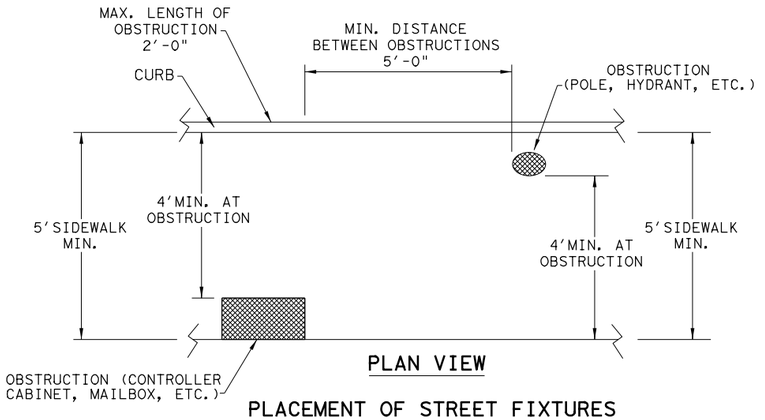


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



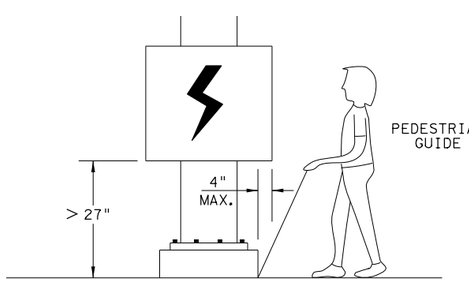
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



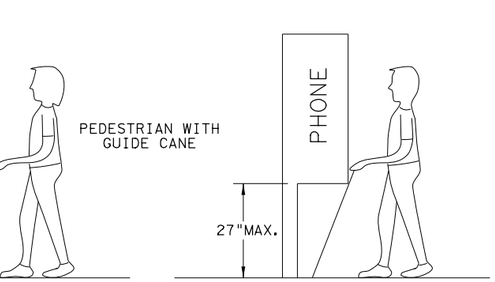
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

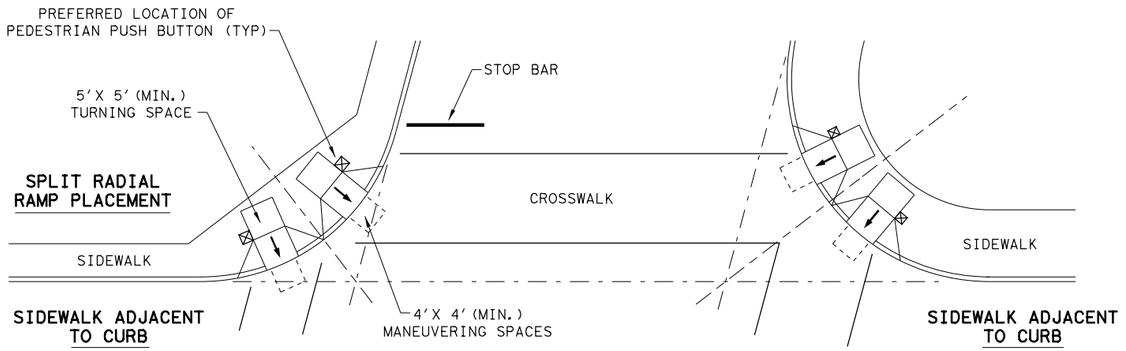
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		75

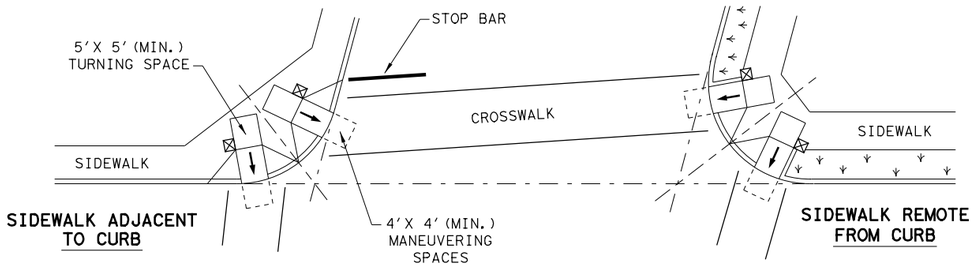
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TYPICAL CROSSING LAYOUTS

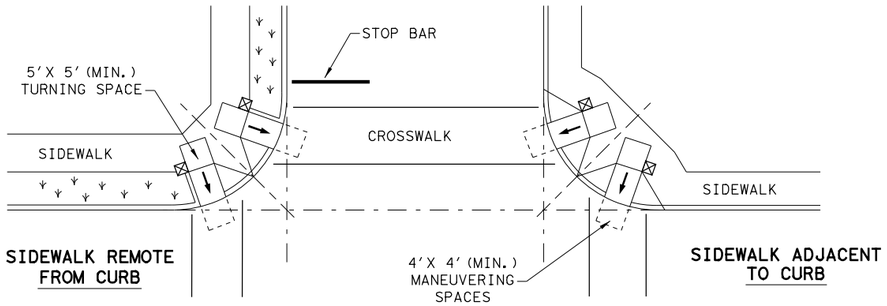
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



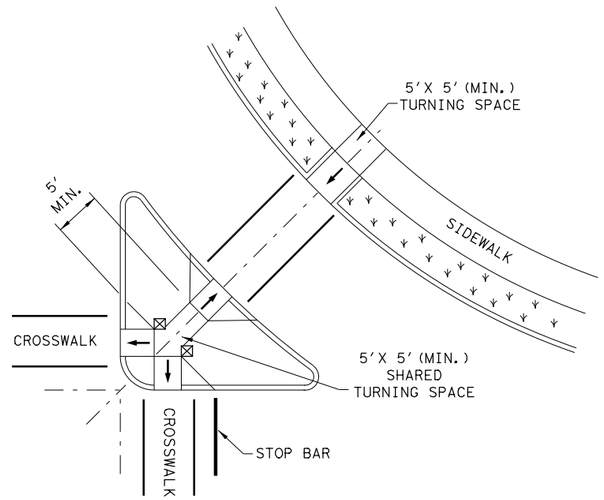
SKEWED INTERSECTION WITH "LARGE" RADIUS



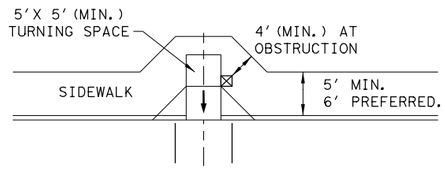
SKEWED INTERSECTION WITH "SMALL" RADIUS

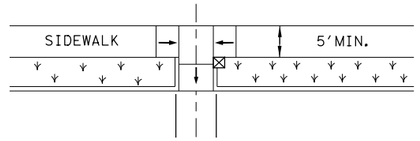


NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND





MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

SHEET 4 OF 4

Texas Department of Transportation — Design Division Standard

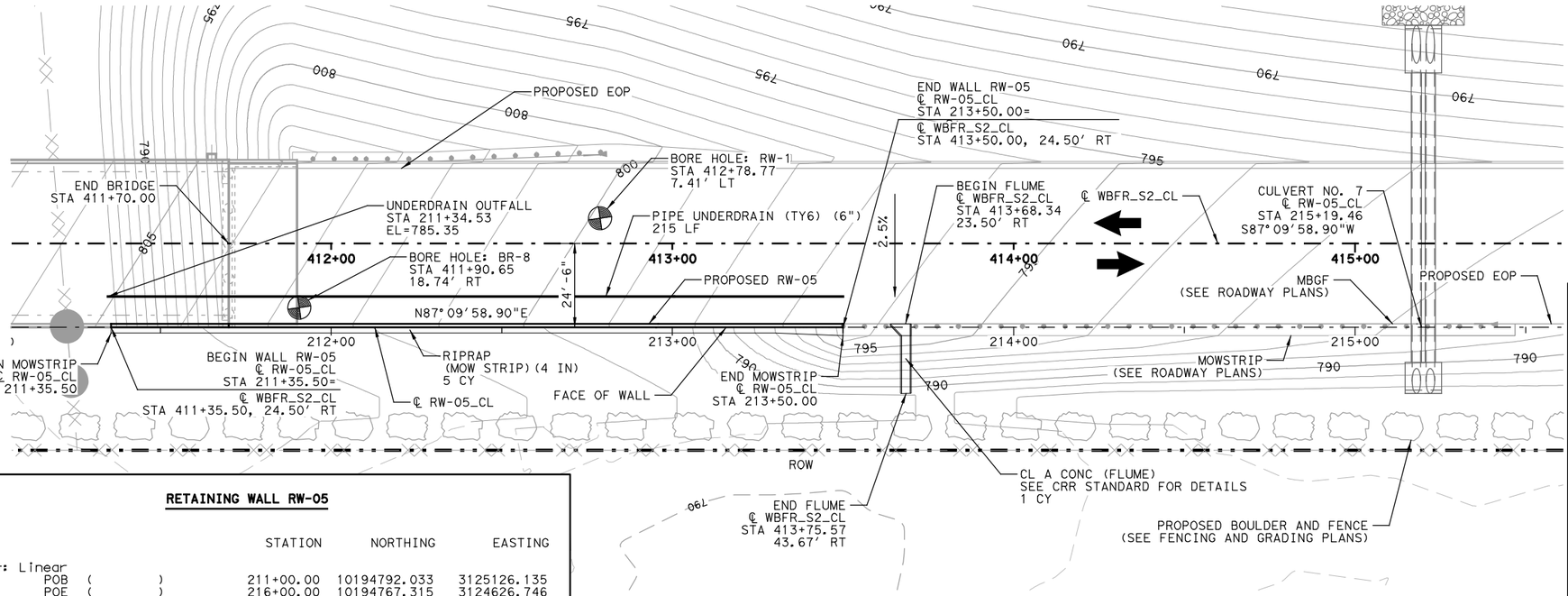
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

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© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
REVISED 08, 2005	DIST	COUNTY		SHEET NO.
REVISED 06, 2012	AUS	WILLIAMSON		76
REVISED 01, 2018				

DATE: 3/23/2018
FILE: c:\pwworking\dal\d0911856\ped18.dgn

4/12/2018 7:20 AM



PLAN

RETAINING WALL RW-05

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	211+00.00	10194792.033	3125126.135
POE ( )	216+00.00	10194767.315	3124626.746
Tangent Direction:	N 87°09'59" E		
Tangent Length:	500.00		

H: 0 20 40 60 80
V: 0 5 10 15 20
SCALE IN FEET

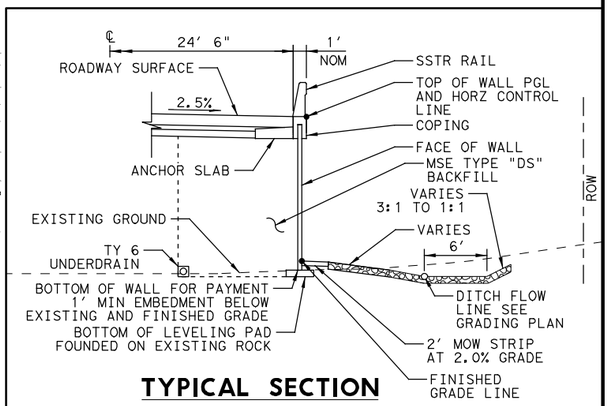
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LEGEND

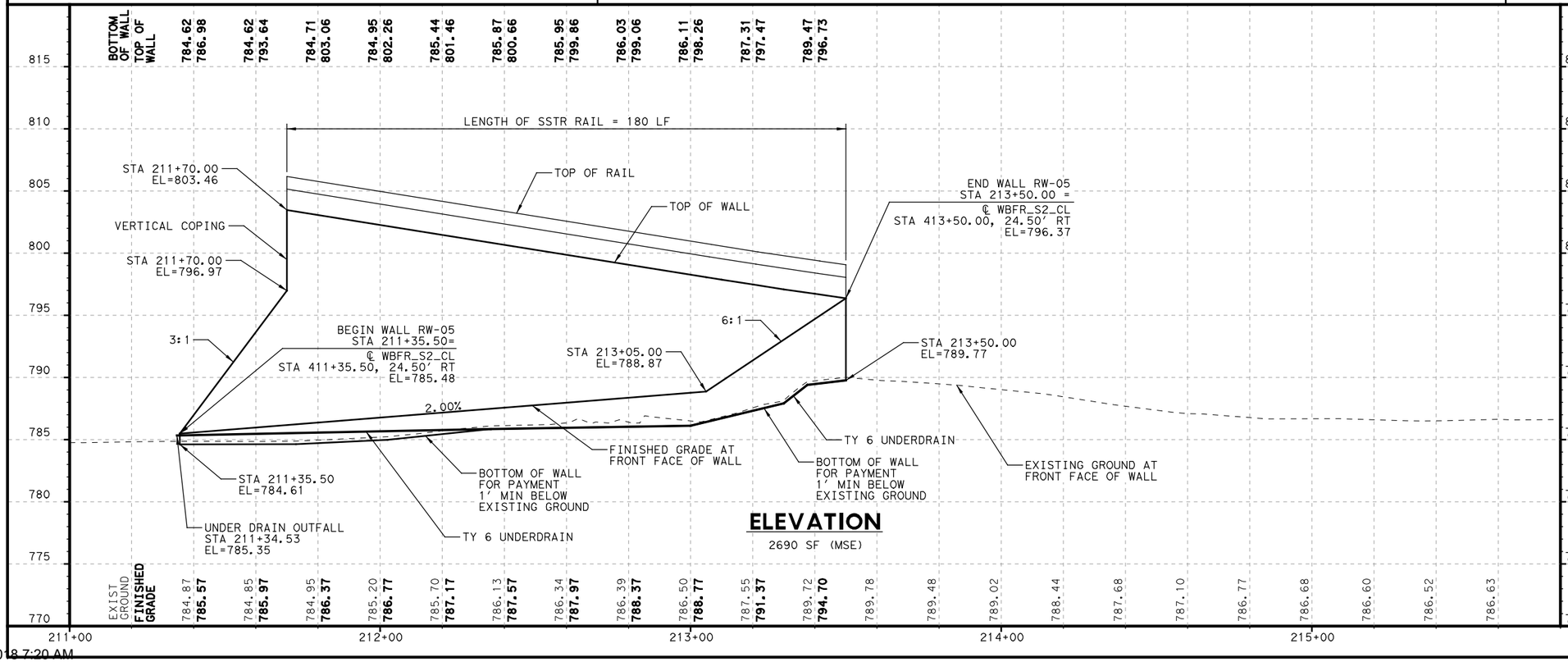
- PROPOSED RETAINING WALL
- TRAFFIC ARROW
- BORING
- PROPOSED ROW
- PROPOSED RIPRAP

NOTES:

1. EXISTING GROUND AS SHOWN IS EXISTING LIMESTONE. SEE "BORING LOGS WBFR" SHEETS FOR BORING LOG DATA.

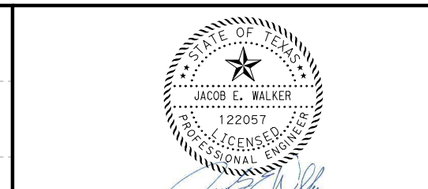


TYPICAL SECTION



ELEVATION

2690 SF (MSE)



JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

RETAINING WALL RW-05 PLAN AND PROFILE

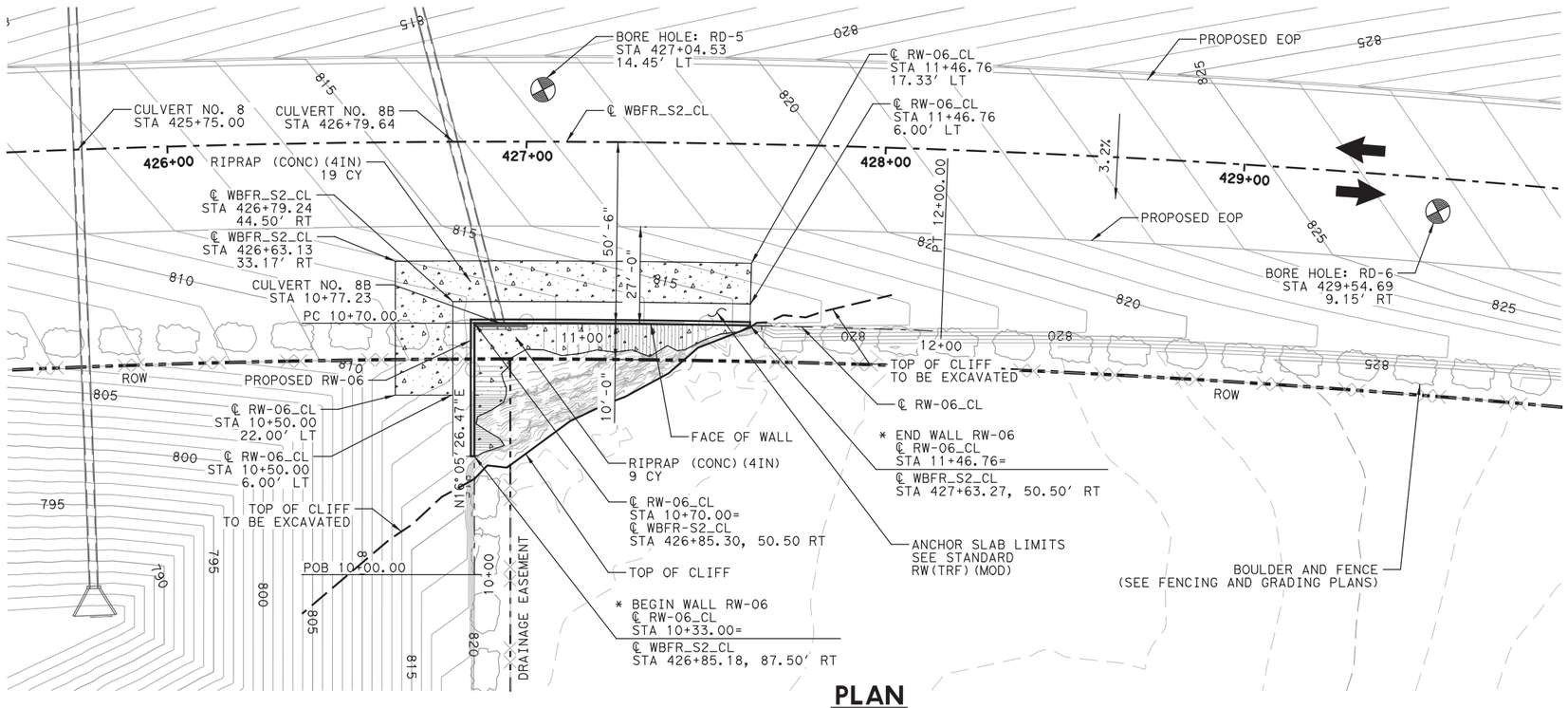
SCALE: 1"=40'-H
1"=10'-V

SHEET 1 OF 1

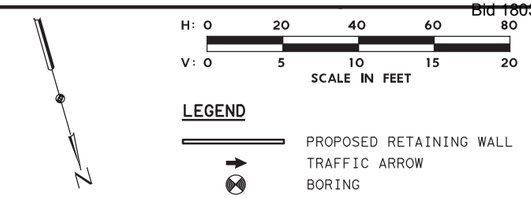
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	77
JW				
CHECK	2103	01	034	
JC				

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4/12/2018 7:20 AM



PLAN

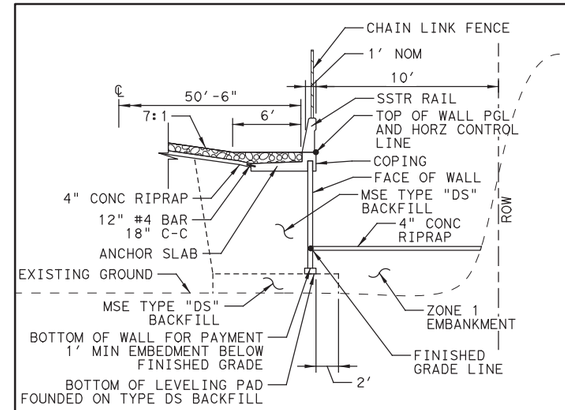


LEGEND

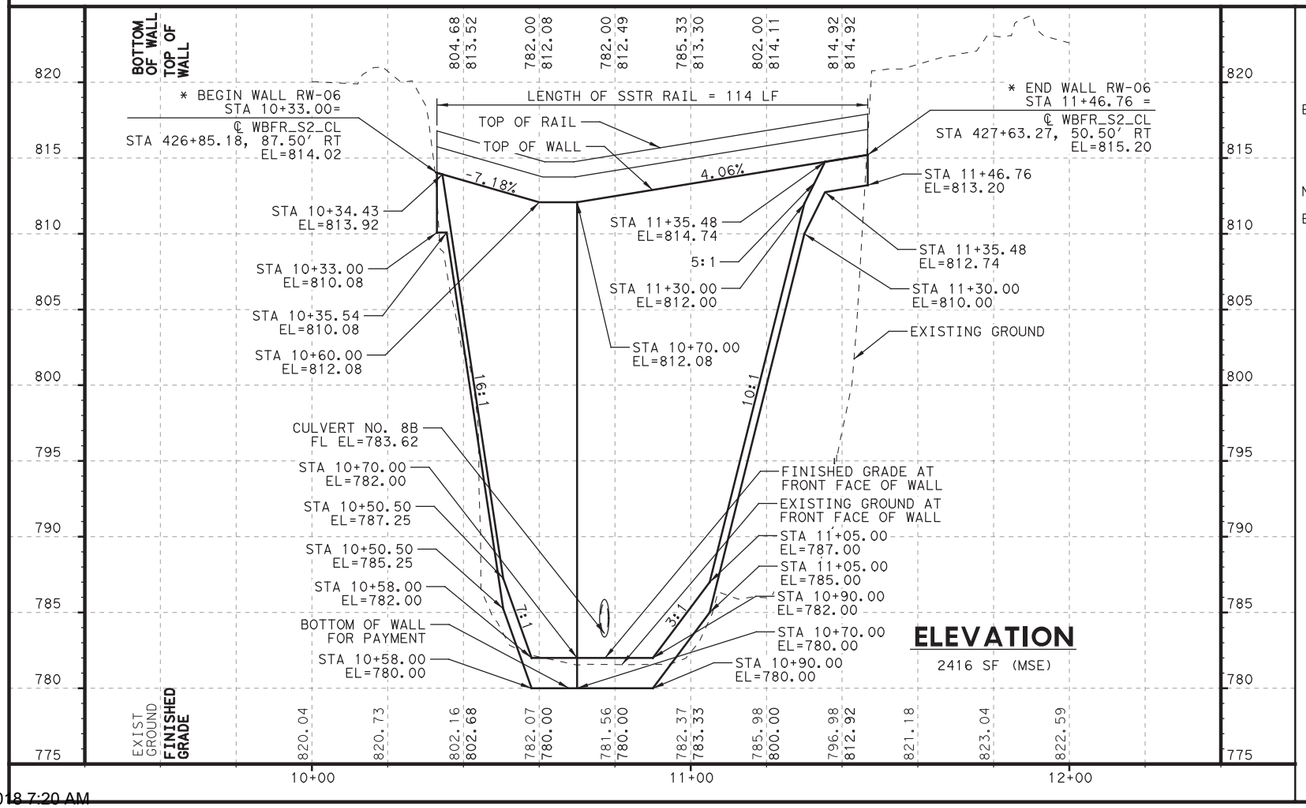
- PROPOSED RETAINING WALL
- TRAFFIC ARROW
- BORING
- PROPOSED ROW
- PROPOSED RIPRAP

NOTES:

1. EXISTING GROUND AS SHOWN IS EXISTING LIMESTONE. SEE "BORING LOGS WBFR" SHEETS FOR BORING LOG DATA.



TYPICAL SECTION



ELEVATION

2416 SF (MSE)

RETAINING WALL RW-06

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	10+00.00	10194978.968	3123587.602
PC	( )	10+70.00	10194911.711	3123568.200
Tangent Direction:		N 16°05'26" E		
Tangent Length:		70.00		
Non-collinear				
Element: Circular				
PC	( )	10+70.00	10194911.711	3123568.200
PI	( )	11+35.01	10194929.534	3123505.683
CC	( )		10198003.517	3124449.652
PT	( )	12+00.00	10194949.870	3123443.936
Radius:		3215.00		
Delta:		2°19'00" Right		
Degree of Curvature(Arc):		1°46'56"		
Length:		130.00		
Tangent:		65.01		
Chord:		129.99		
Middle Ordinate:		0.66		
External:		0.66		
Tangent Direction:		N 74°05'15" W		
Radial Direction:		N 15°54'45" E		
Chord Direction:		N 72°55'45" W		
Radial Direction:		N 18°13'45" E		
Tangent Direction:		N 71°46'15" W		

* IF RETAINING WALL RW-6 IS NOT CONSTRUCTED, REMOVE RETAINING WALL RW-6 PLAN AND PROFILE SHEET FROM PLAN SET.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

RETAINING WALL RW-06 PLAN AND PROFILE

SCALE: 1"=40'-H
1"=10'-V

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK				
JW	CONTROL	SECTION	JOB	78
CHECK				
JC	2103	01	034	

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FILE: \
4/12/2018 7:20 AM

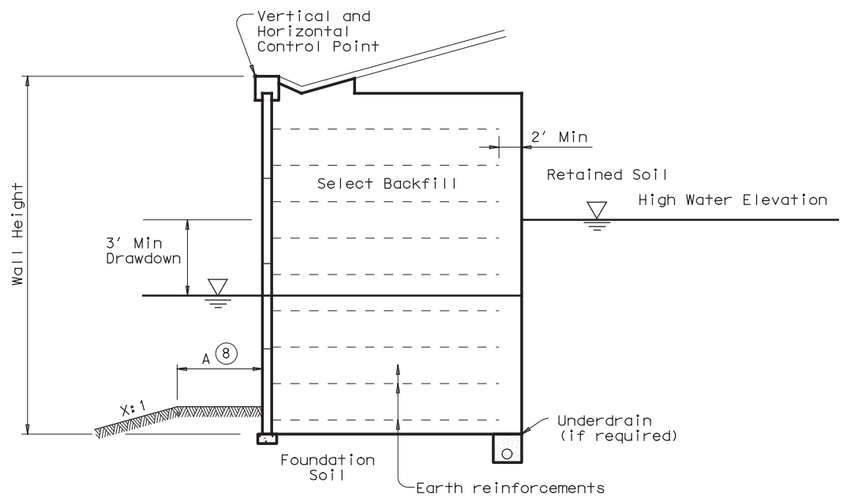
WALL SUMMARY

MSE Retaining Wall	Begin Station (1)	End Station (1)	Retained Soil Frictin Angle (2)	Foundation Soil Friction Angle (2)	Ground Improvement (3)	Min Earth Reinforcement Length (4)	Min Wall Embedment (7)	Underdrain Required (5)	Drawdown Analysis (6)	Bench Width (8)
RW-05	STA 211+35.50	STA 213+50.00	32° Ⓐ	34° Ⓑ	None	8′ or 0.7 H′	1′ Ⓑ	Yes	No	2′
RW-06	STA 10+33.00	STA 11+46.76	32° Ⓐ	34° Ⓒ	None	8′ or 0.7 H′	1′ Ⓒ	No	Yes	2′

Ⓐ Retained embankment shall consist of Rock Embankment or Type C material as defined in the general notes.

Ⓑ RW-05, Leveling pad and reinforced zone shall be founded on limestone.

Ⓒ RW-06, Leveling pad and reinforced zone shall be founded on TxDot Standard specifications Item 423 Type DS backfill.



TYPICAL SECTION
(RAPID DRAWDOWN CONDITION)

(1) Indicate limits for which the stated soil design requirements/assumptions are applicable.

(2) Retained and Foundation friction angle listed should be based on local experience or measured/correlated long term strength values.

(3) Indicate if ground improvement is required or not required. If shown as required, refer to Ground Improvement Detail(s) for additional information.

(4) Indicate on table minimum length and length ratio required. The minimum default length of earth reinforcements shall be either 8′-0" or 70% of the wall height, whichever is greater. Wall height and design wall height may differ depending on project geometry and loading conditions. Note: Wall height at bridge abutments is equal to the distance between the top of leveling pad and finished grade at the bridge abutment backwall.

(5) Indicate if underdrain is required or not required.

(6) Indicate if rapid drawdown analysis is required.

(7) Guidance to wall designer of record for determination of minimum wall embedment: Unless noted elsewhere in the plans, the minimum embedment provided from the top of leveling pad to finish grade shall be 1′ for level ground where there is no potential for erosion or future excavation or 2′ for sloping ground (4.0H:1.0V or steeper) or where there is potential for removal of soil in front of the wall.

(8) Horizontal Bench width at base of wall varies. Use the following criteria to establish base width.
A = 2.0′ Min for X ≥ 4. or
A = 4.0′ Min for X ≦ 4.
Applicable to both drawdown and dry condition.

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HDR ENGINEERING, INC.
TBPE FIRM F-754

STATE OF TEXAS
THOMAS C. WESLING
81589
LICENSED
PROFESSIONAL ENGINEER
03/22/2018

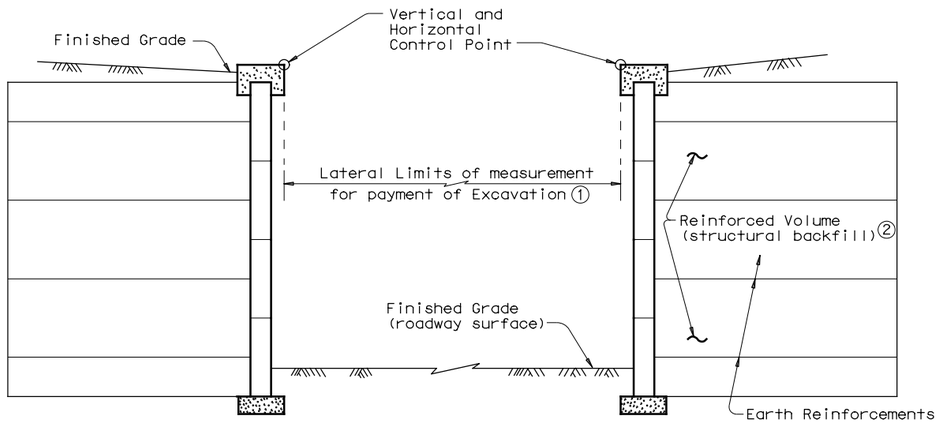
Texas Department of Transportation — Bridge Division Standard

MECHANICALLY STABILIZED EARTH RETAINING WALL DESIGN DATA

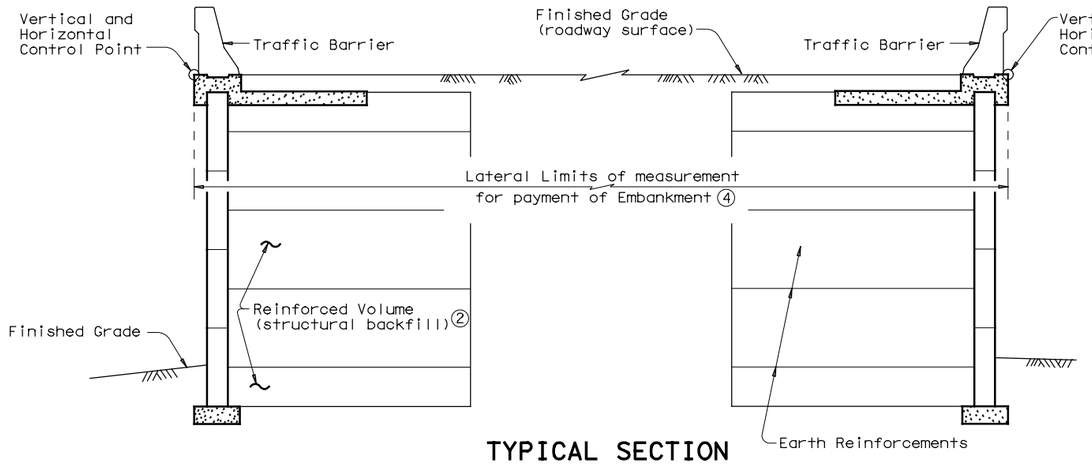
RW(MSE)DD

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©TxDOT January 2013	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		79

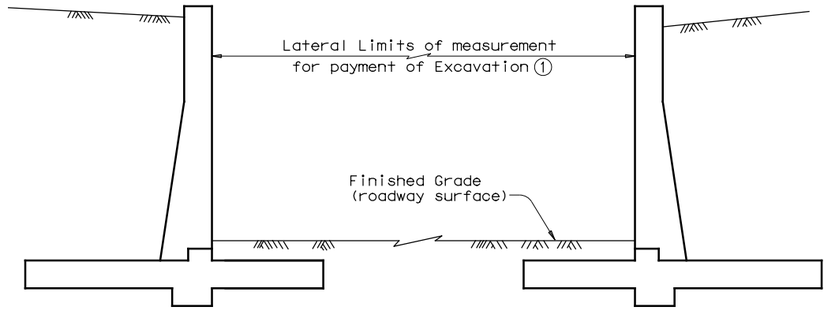
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TYPICAL SECTION
Excavation Between MSE Retaining Walls ③



TYPICAL SECTION
Embankment Between MSE Retaining Walls ③



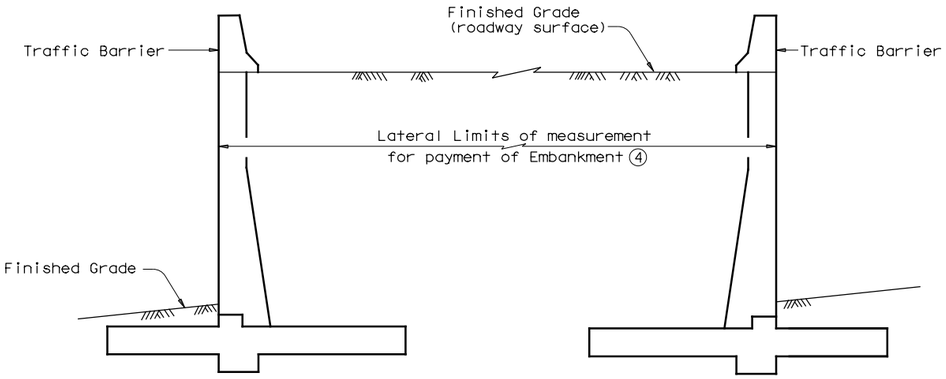
TYPICAL SECTION
Excavation Between Conventional Retaining Walls

① Only the Excavation above the proposed subgrade elevation will be measured for payment.

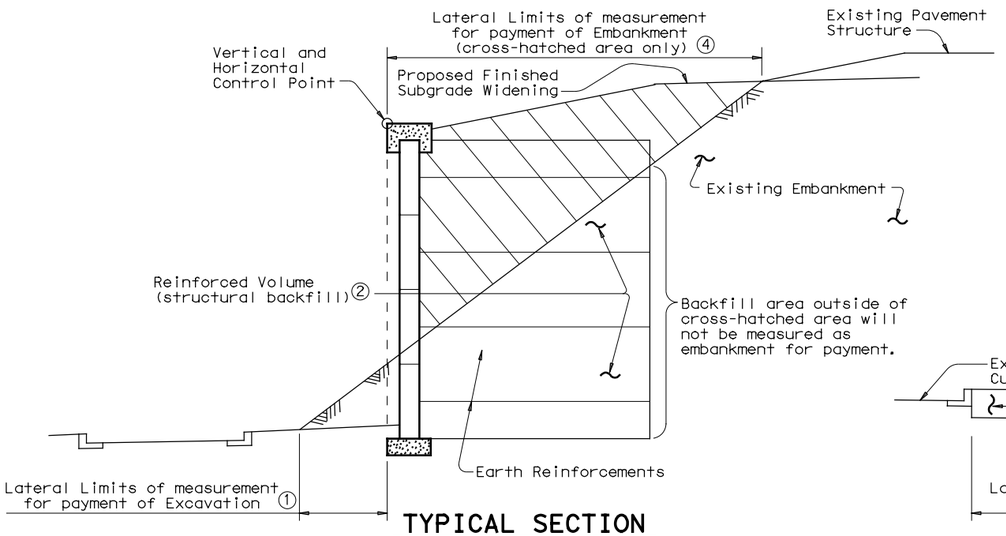
② Meeting requirements of Retaining-Wall Item.

③ Earthwork measurement with other designs of retaining walls will be made to the outside finished face in the same manner.

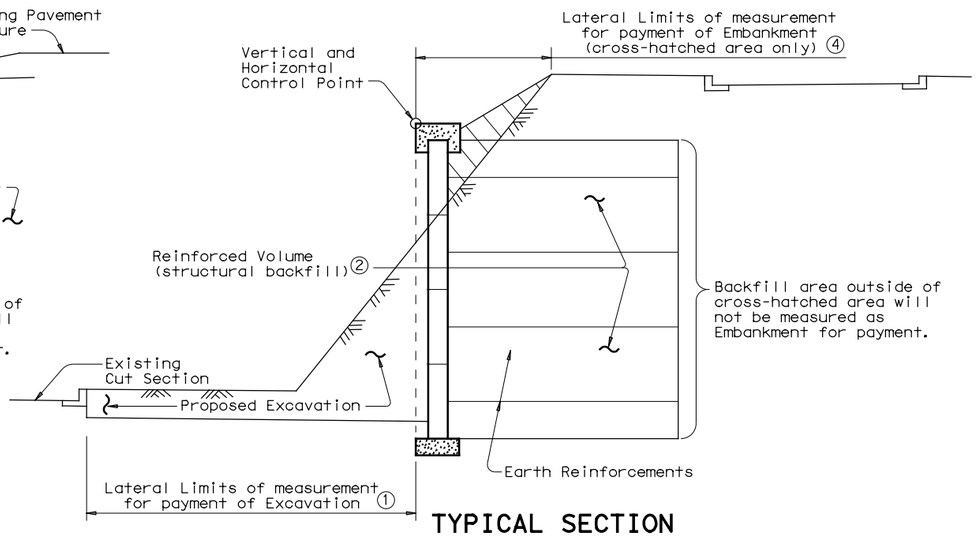
④ Only the Embankment above the existing ground line will be measured for payment.



TYPICAL SECTION
Embankment Between Conventional Retaining Walls



TYPICAL SECTION
Widening Embankment with MSE Retaining Walls ③



TYPICAL SECTION
Widening Cut Section with MSE Retaining Walls ③

Texas Department of Transportation

Bridge Division Standard

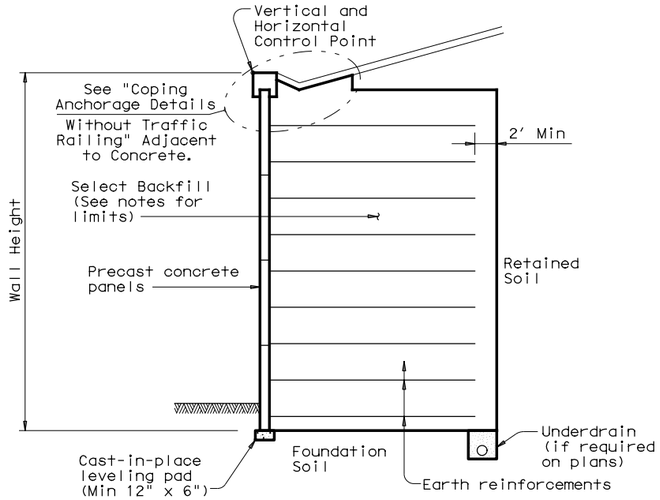
EARTHWORK MEASUREMENT AT RETAINING WALLS

RW(EM)

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©TxDOT	March 2010	CONT	SECT	JOB	HIGHWAY
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		AUS	WILLIAMSON		80

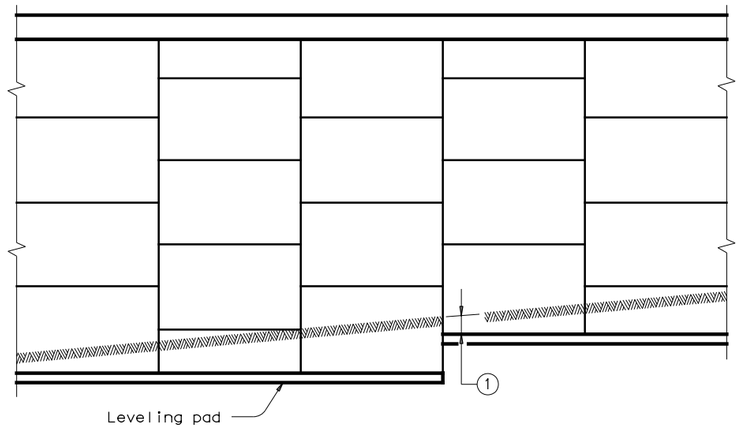
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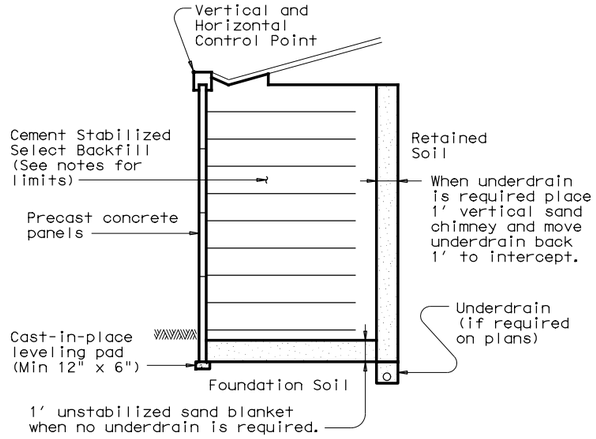


TYPICAL SECTION

(Wall at bottom of slope)

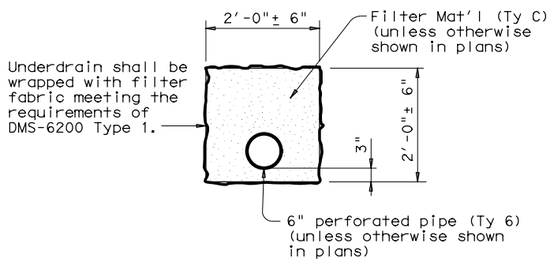


ELEVATION

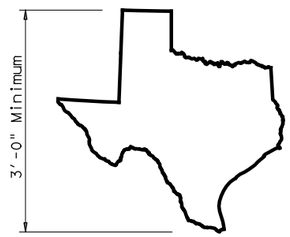


SPECIAL DRAINAGE PROVISIONS

(When cement stabilized backfill is used)



UNDERDRAIN DETAIL



MAP OF TEXAS EMBLEM ②

① Minimum embedment conforming to values given on the RW(MSE)DD standard.

② Map of Texas emblem shall be formed into a wall panel next to each bridge abutment. The exact location of each emblem shall be approved by the Engineer. The cost of forming the emblems will not be paid for directly, but shall be incidental to the Item "Retaining Wall". The map of Texas shall be inset a minimum of ¾" into the face of the panel, and shall receive a smooth finish. The inset area shall be finished in a contrasting color as approved by the Engineer.

Texas Department of Transportation

Bridge Division Standard

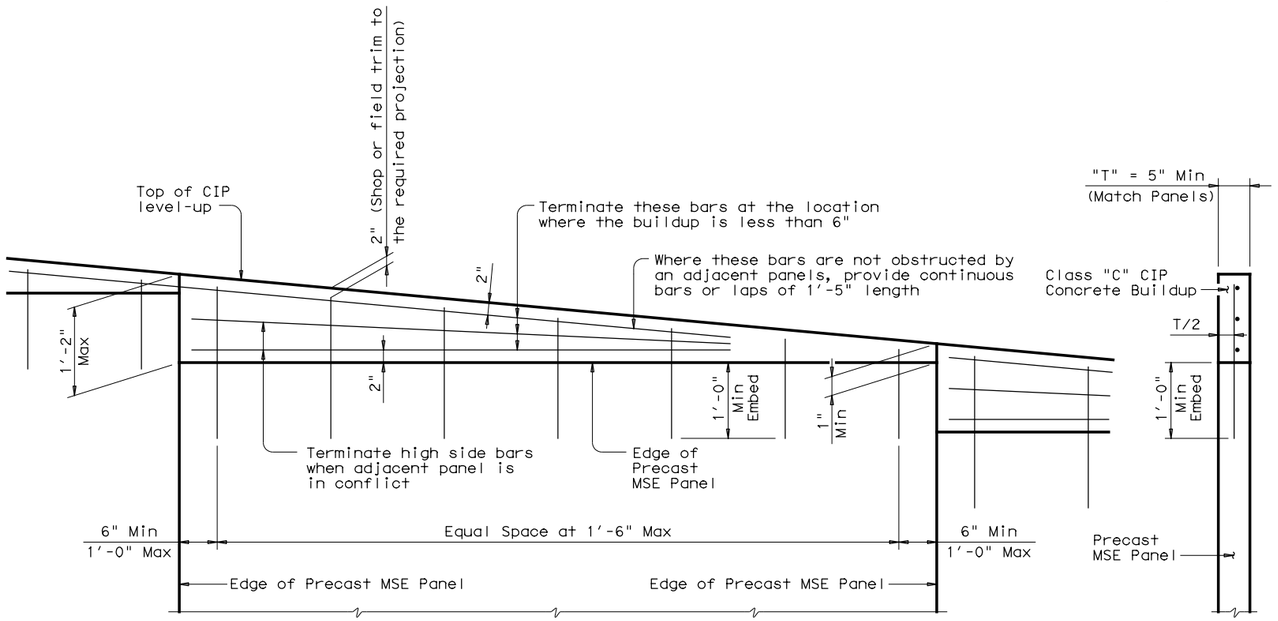
MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

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©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 04-11: Added Table & Corrosion Criteria. 01-13: Wall embed, (WS) table, retained fill, soil strength.	2103	01	034	
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LEVEL UP DETAIL (5)

Provide Grade 60 (#4) Reinforcement

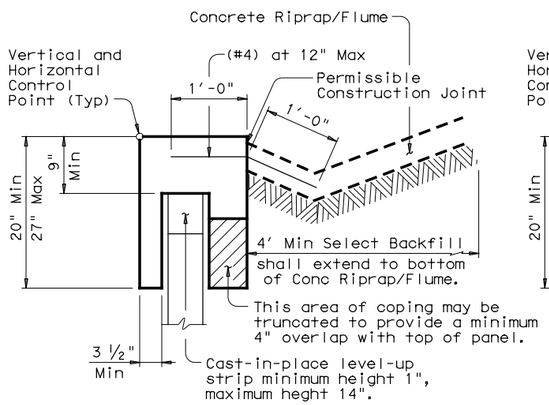
(3) Precast coping shall be anchored to prevent rotation or displacement. Use these details to develop custom anchorage for precast copings. Details shall include coping reinforcement. Concrete flume (if required) shall be paid for separately from Item 423.

(4) Soil design parameter must be based on long term soil strength. Design parameters must be listed on the RW(MSE)DD standard.

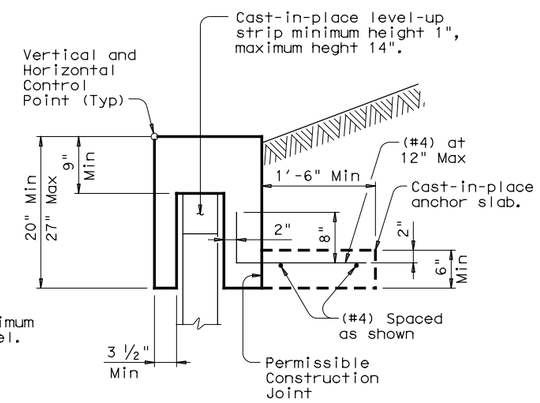
(5) Cast vertical bars into the top of panels. At contractor's option vertical bars may be embedded 4" with a Type III Clac C epoxy anchorage system. Follow manufacturer's directions for installing the epoxied vertical bars.

(6)

SELECT BACKFILL UNIT WEIGHT			
Type A, B & D	Unit Weight	Inernal Stability	External Stability
	105 PCF	Pullout	Sliding, Overturning, Eccentricity
	125 PCF	Rupture	Bearing



ADJACENT TO CONCRETE
(Excluding Concrete Pavement)



ADJACENT TO SOIL

COPING ANCHORAGE DETAILS WITHOUT TRAFFIC RAILING (3)

DESIGN PARAMETERS:

Design of retaining walls shall be based on the following design parameters unless stated elsewhere in the plans:

Retained Soil	Unit Weight = 125 pcf Ø = (4) C = 0 psf
Foundation Soil	Ø = (4) C = 0 psf
Select Backfill	Unit Weight = See Table (6) Ø = 34 C = 0 psf
Cement Stabilized Select Backfill	Unit Weight = 125 pcf Ø = 45 C = 0 psf

Stress in steel and concrete shall be in accordance with current AASHTO Standard and Interim Specifications. The minimum length of earth reinforcements are as shown on the RW(MSE)DD standard.

STABILITY CRITERIA:

Stability criteria applies to both dry and drawdown analysis.
Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5.
Factor of safety in overturning shall be greater than or equal to 2.0.
The base pressure resultant shall fall within the middle third of the retaining wall.
The factor of safety against pullout of the earth reinforcements shall be greater than or equal to 1.5 at each level. Pullout resistance shall be determined from test data evaluated at ¾ inch strain.

CORROSION CRITERIA:

The earth reinforcement elements shall be designed to have a minimum design life of 75 years, using current AASHTO corrosion rates.
Stress calculations (rupture) shall be done on the calculated earth reinforcement section remaining after 75 years. Pullout calculations may be based on non-corroded section.

PRECAST COPINGS:

Wall supplier is to maximize lengths of precast coping. Precast coping is to be provided in 10′ minimum lengths (typical). To optimize coping lengths at radiuses, end of runs or other wall geometric conditions favorable to shorter coping sections, shorter lengths may be used pending approval by the Engineer. This applies only to coping without railing.

JOINT SEALER:

The joints between coping segments must be sealed in accordance with the DMS-6310 "Joint Sealant's and Fillers", joint sealing material, Class 4. The joint must be sealed 3" below and 6" above the adjoining pavement surface, or as directed by the Engineer. The purpose of the joint sealing is to contain surface drainage and prevent infiltration into the retaining wall backfill.

GENERAL NOTES:

Section and elevation shown is for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information.
The select backfill specified for use within the mechanically stabilized earth volume shall extend horizontally from the back of the panels to a minimum 2′ beyond the end of the earth reinforcements. The select backfill shall extend vertically from the top of the leveling pad or 4" below the lowest earth reinforcement, whichever is lower, to the top of panels.
The uppermost earth reinforcements shall be no more than 3.0′ below the top of wall.
The lowest level of earth reinforcements shall be no more than 2.0′ above the top of the leveling pad.
Minimum wire size for earth reinforcements shall be W7.0. If different longitudinal and cross wires are used in an earth reinforcement mesh, the smaller wire shall have at least 50% of the cross sectional area of the larger wire.
A maximum of four wire mesh configurations (wire sizes) will be allowed on a project. Each mesh configuration shall have a unique transverse bar spacing, differing from other configurations by a minimum of 3". Earth reinforcement lengths shall be stepped in increments no finer than 12".
Standard precast concrete panels shall have a maximum height of 6′, and a maximum surface area of 50 sq ft. Top and bottom panels may exceed these limitations as necessary to achieve required wall grades. Maximum height of any panel shall be 7′-6". Minimum panel thickness shall be 5". Panels shall be arranged to provide offset horizontal joints.
An open joint shall be provided around the perimeter of the concrete panels. The joint configuration shall be such that 1) the filter fabric and/or pad materials are not exposed at the wall face and 2) the design opening is between ⅜" and ¾".
A one-piece corner panel shall be provided for wall angle changes of greater than 30 degrees. Butting of chamfered panels will be allowed for angle changes of 30 degrees or less.
Concrete coping shall be provided along the top of wall, at the vertical steps at bridge backwalls, and at other vertical steps along the top of wall. The joints between all coping segments shall be sealed to prevent infiltration of water into the retaining wall backfill. Sealing shall be in accordance with the DMS-6310 "Joint Sealants and Fillers", using Class 4 joint sealant.
When obstructions (inlets, drilled shafts, piling, etc.) prevent placement of soil reinforcements in their normal locations, provide details and calculations that establish support for the affected panels. Furnish the same earth reinforcement coverage as that required in the absence of the obstruction. For skewed (rotated) earth reinforcements no adjustment in length is needed for skew angles between 1 and 10 degrees. For skew angles greater than 10 degrees adjust the length of earth reinforcement to provide a cosine length of the reinforcement equivalent to the stated design length for the section of wall. Provide calculations that justify any alterations made to the soil reinforcements or modifications to their normal placement. Do not use panels without any soil reinforcements connected to them unless they are connected with galvanized hardware to adjacent panels which do have supporting Soil reinforcements attached to them and as approved by the Engineer.
Reinforced concrete must be Class "C", Precast concrete Class "H", Unreinforced concrete Class "A".
All reinforcing steel must be Grade 60.
Coping and anchor slabs are considered subsidiary to the Item "Retaining Wall".
These details are to be used in conjunction with the retaining wall layout, standard RW(MSE)DD and other applicable standards.

Texas Department of Transportation

Bridge Division Standard

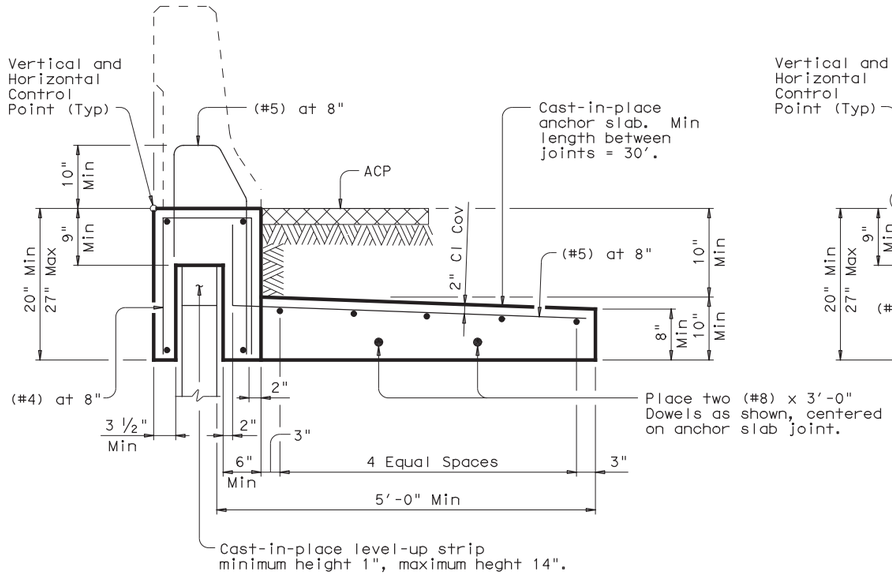
MECHANICALLY STABILIZED EARTH RETAINING WALL

RW(MSE)

FILE: rwstde01.dgn	DN: TxDOT	CK: TxDOT	DW: JGD	CK: MJG
©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS 04-11: Added Table & Corrosion Criteria. 01-13: Wall embed, (WS) table, retained fill, soil strength.	2103	01	034	
	DIST	COUNTY		SHEET NO.
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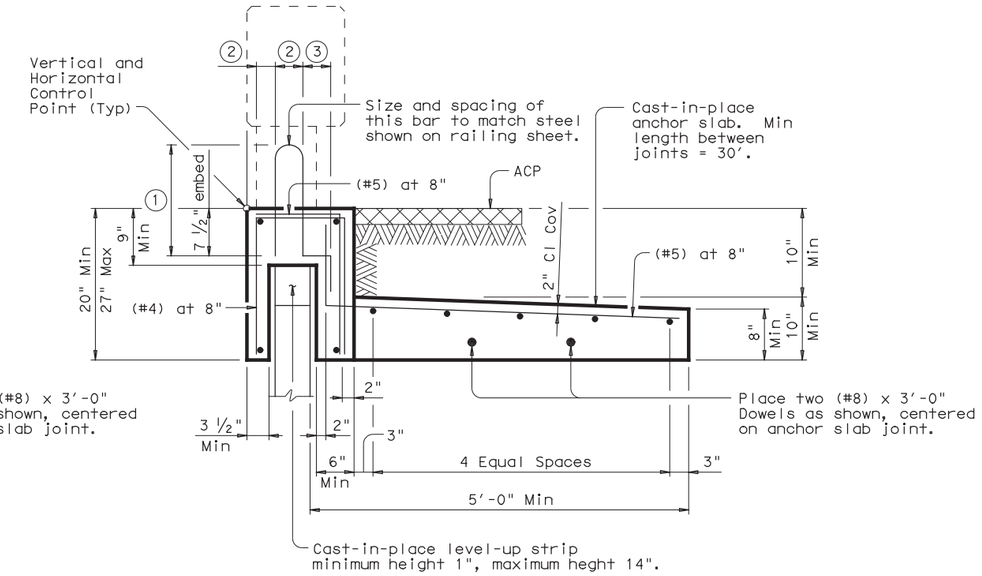
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"WIDE BASED" ADJACENT TO ACP

(Showing T551 Rail, other rails listed similar)

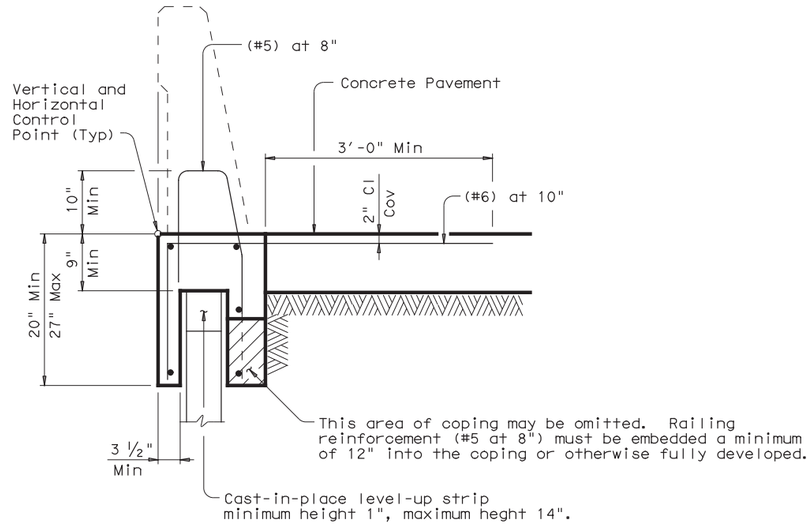


"NARROW BASED" ADJACENT TO ACP

(Showing T223 Rail, other rails listed similar)

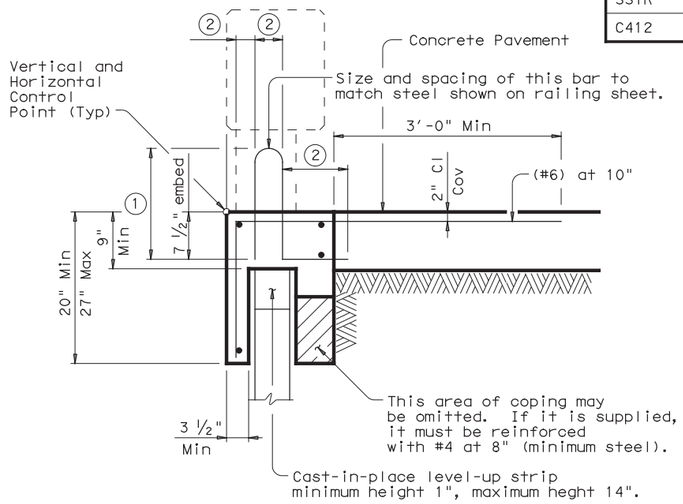
Rail Type	Detail	Precasting Rail with Coping Allowed
T1F/T1W/C1W	NARROW	NO
T221/C221	NARROW	YES
T223/C223	NARROW	NO
T401/T402/C402	NARROW	NO
T411/C411	NARROW	NO
T551/T552	WIDE	YES
T66	NARROW	NO
T77	NARROW	NO
SSTR	WIDE	YES
C412	NARROW	NO

1. Reinforcement length equal to length shown on the appropriate Rail standard plus 1".
2. Match dimension on the appropriate Rail standard.
3. Match dimension on the appropriate Rail standard. Bend end of rail anchorage reinforcing as shown as required to maintain Clear Cover.



"WIDE BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing SSTR Rail, other rails listed similar)



"NARROW BASED" ADJACENT TO CONCRETE PAVEMENT

(Showing T223 Rail, other rails listed similar)

CAST-IN-PLACE COPINGS:

Casting of the coping directly against the precast panel sides will not be permitted, as this may result in panel cracking. The contractor must use a ¼"(Min) compressible material on both sides of the panel to isolate the coping from the precast panel.

When cast-in-place coping is anchored to reinforced concrete pavement, a smooth level-up strip must be provided on the top of the precast panels. The purpose of the level-up is to allow the pavement and coping to move longitudinally relative to the wall without causing damage.

Railing and coping joints must be provided at 33' maximum spacing. Railing and coping joints must be placed to coincide with precast panel joints.

PRECAST COPINGS:

A smooth level-up strip must be provided on top of the precast panels prior to installation of the coping. Shims may be used on top of the level-up strip to facilitate alignment. Total shim thickness not to exceed 1".

Precast coping must be provided in 10' minimum lengths.

JOINTED CONCRETE PAVEMENT:

When coping is adjacent to and anchored into jointed concrete pavement, the coping joints must coincide with the pavement joints.

JOINT SEALER:

The joints between coping segments must be sealed in accordance with the DMS-6310 "Joint Sealant's and Fillers", joint sealing material, Class 4. The joint must be sealed 3" below and 6" above the adjoining pavement surface, or as directed by the Engineer. The purpose of the joint sealing is to contain surface drainage and prevent infiltration into the retaining wall backfill.

GENERAL NOTES:

Details on this sheet are to be used in development of specific details for mounting traffic railing on mechanically stabilized earth (MSE) walls.

The specific details proposed must have strengths equivalent to those shown on this sheet. Areas of particular importance are the connection of the coping to the railing, the strength of the vertical coping leg connecting the railing to the anchor slab, and the connection of the coping to the anchor slab or concrete pavement.

Shop drawings for the traffic railing foundations must be submitted to the Engineer in accordance with the Item "Retaining Wall". The shop drawings must include bar bending details.

Precasting of the coping or coping and railing will be allowed. The anchor slab, when required, must be cast-in-place.

The Contractor's attention is directed to the fact that various configurations of precast coping/railing combinations are covered by patent. The contractor must provide for use of these systems in accordance with Article 7.3.

Concrete must be Class "C".

All reinforcing steel must be Grade 60.

Longitudinal bars must be (#4), unless otherwise shown.

Coping and anchor slabs must be considered subsidiary to the Item "Retaining Wall". The traffic railing will be paid for by the linear foot for the appropriate railing type.

STATE OF TEXAS
JOHN M. HOLT
68237
REGISTERED PROFESSIONAL ENGINEER

03/22/2018

Texas Department of Transportation — Bridge Division Standard

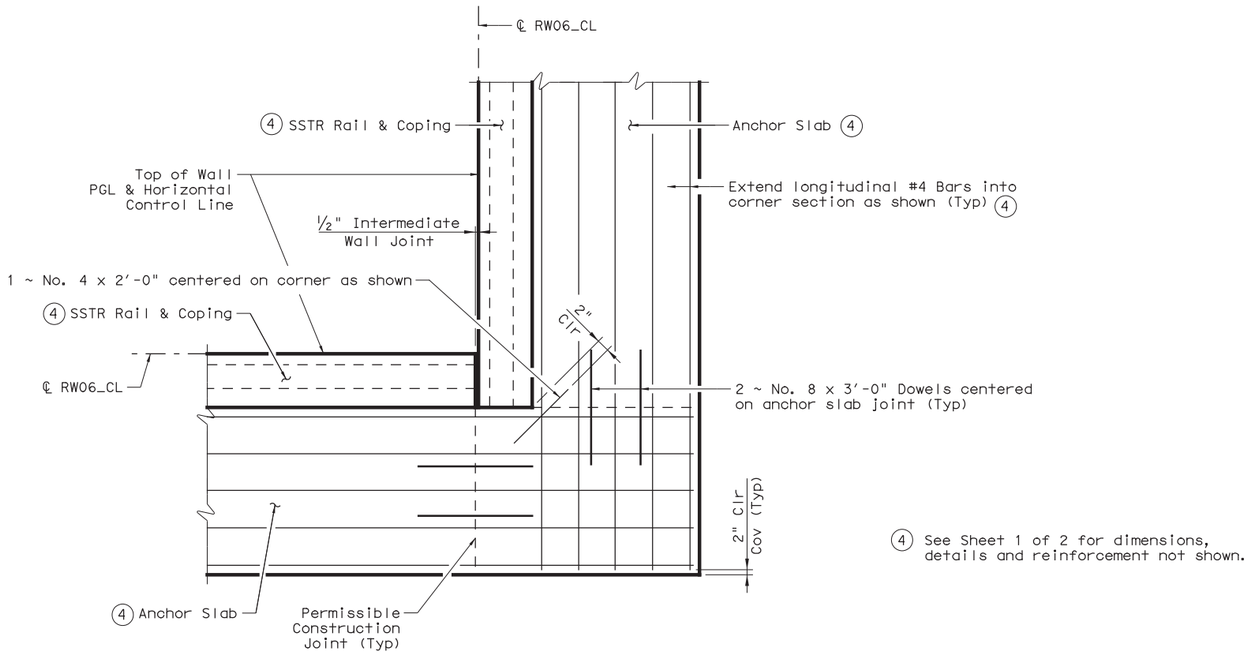
RETAINING WALL TRAFFIC RAILING FOUNDATIONS

SH 1 OF 2 — RW(TRF)(MOD)

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©TxDOT March 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
01-13: Precast option with Rails.	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		83

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4 See Sheet 1 of 2 for dimensions, details and reinforcement not shown.

ANCHOR SLAB AT WALL CORNER

NOTES:

See Sheet 1 of 2 for General Notes.

See "Retaining Wall RW-06 Plan & Profile" sheet for additional information.

STATE OF TEXAS
JOHN M. HOLT
68237
REGISTERED PROFESSIONAL ENGINEER

03/22/2018

Texas Department of Transportation — Bridge Division Standard

RETAINING WALL TRAFFIC RAILING FOUNDATIONS

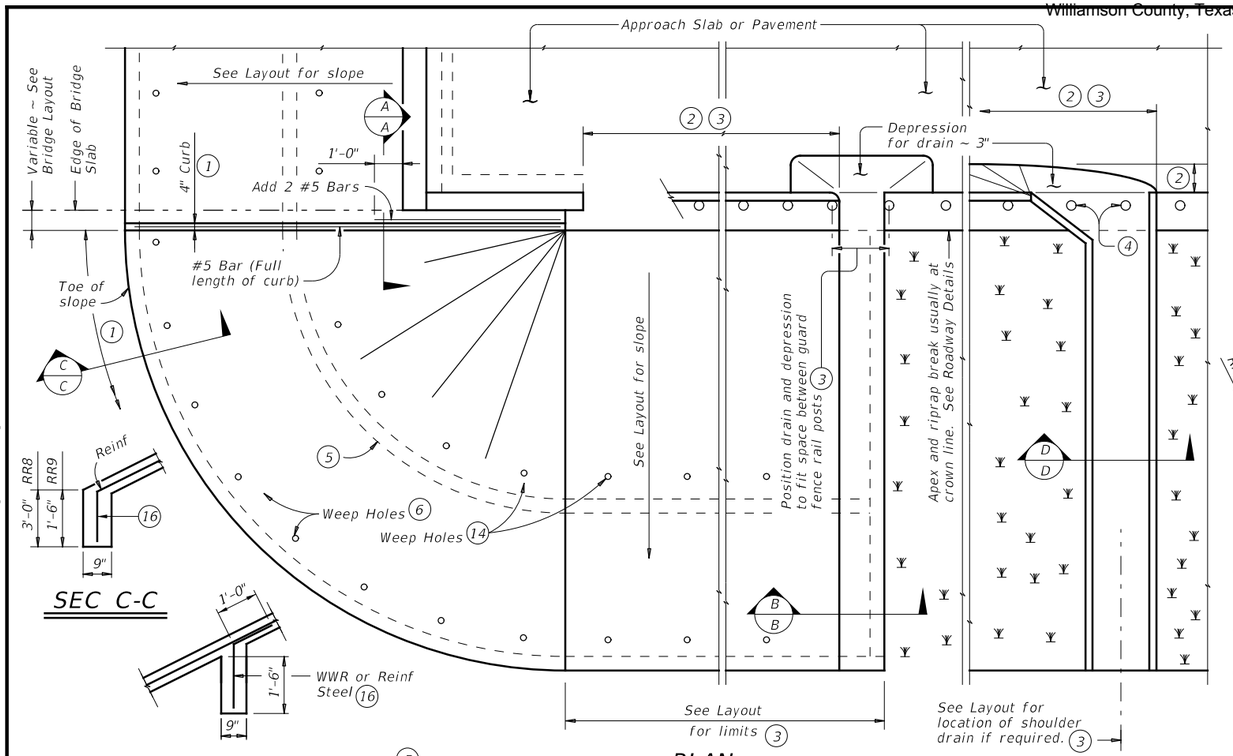
SH 2 OF 2 — RW(TRF)(MOD)

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REVISIONS 01-13: Precast option with Rails. MOD 01/18: Anchor Slab Corner Detail	2103	01	034	
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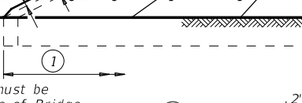
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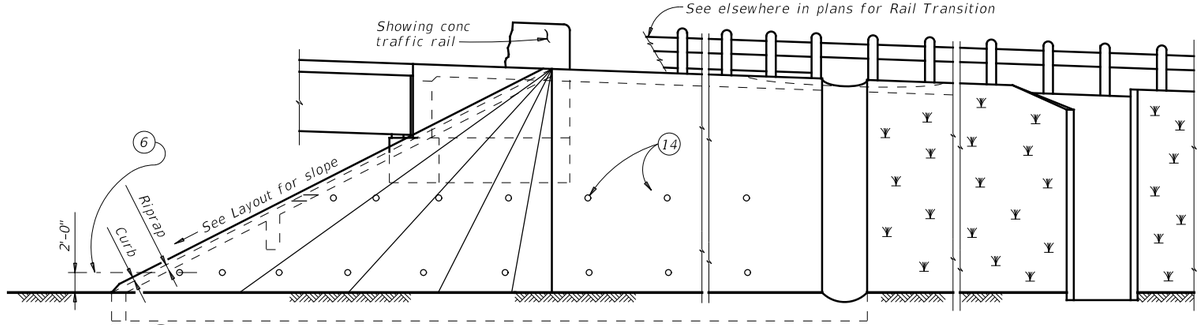


PLAN

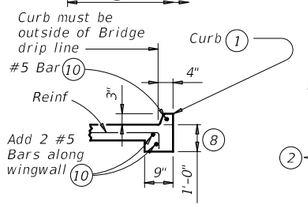
SEC C-C



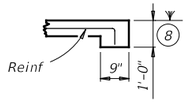
INTERMEDIATE TOEWALL (5)



ELEVATION

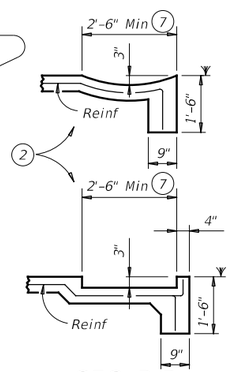


SEC A-A



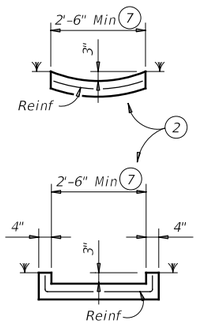
SEC B-B

(No Drain)



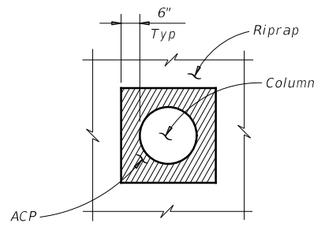
SEC B-B

(Shoulder Drain integral with riprap)



SEC D-D

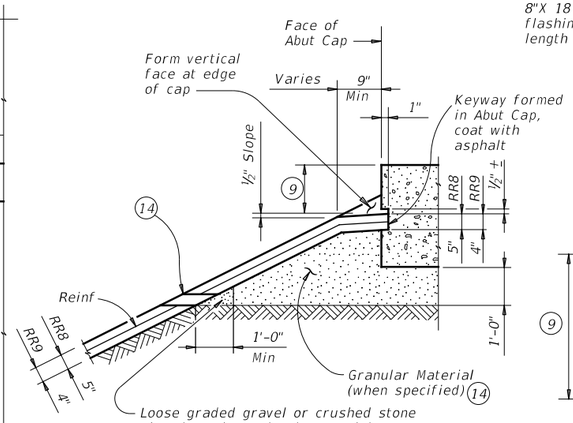
(Shoulder Drain)



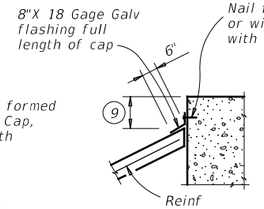
Riprap Blockout to be filled with ACP. (Subsidiary to Riprap)

RIPRAP DETAIL AT COLUMNS

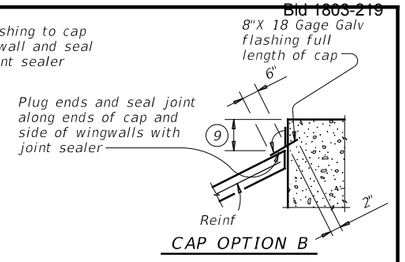
(As directed by the Engineer)



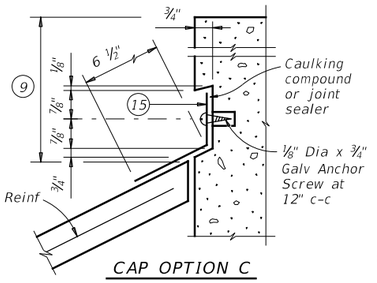
SHOWING KEYWAY OPTION



CAP OPTION A

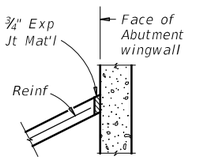


CAP OPTION B

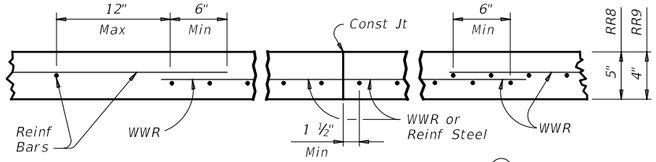


CAP OPTION C

SECTIONS THRU RIPRAP AT CAP (11)



SECT THRU RIPRAP AT WINGWALL (12)



REINFORCEMENT DETAILS (13)

See General Notes for optional sythetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete with a minimum compressive strength of 2,000 psi unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

Use reinforcing bars, deformed Welded Wire Reinforcing (WWR), or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015 REVISIONS	CONT	SECT	JOB	HIGHWAY
	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		85

RT QUARRY DITCH FL "℄ DITCH RT2"

		STATION	NORTHING	EASTING
Element: Linear				
POB	( )	11+00.00	10194812.508	3125125.121
PI	( )	15+00.00	10194792.734	3124725.610
Tangent Direction:		N 87°09'59" E		
Tangent Length:		400.00		
Element: Linear				
PI	( )	15+00.00	10194792.734	3124725.610
PC	( )	16+16.89	10194786.955	3124608.862
Tangent Direction:		N 87°09'59" E		
Tangent Length:		116.89		
Element: Circular				
PC	( )	16+16.89	10194786.955	3124608.862
PI	( )	20+92.16	10194763.459	3124134.174
CC	( )		10198003.517	3124449.652
PT	( )	25+60.62	10194878.084	3123672.935
Radius:		3220.50		
Delta:		16°47'23" Right		
Degree of Curvature(Arc):		1°46'45"		
Length:		943.73		
Tangent:		475.27		
Chord:		940.35		
Middle Ordinate:		34.51		
External:		34.88		
Tangent Direction:		N 87°09'59" E		
Radial Direction:		N 2°50'01" W		
Chord Direction:		N 84°26'19" W		
Radial Direction:		N 13°57'22" E		
Tangent Direction:		N 76°02'38" W		
Element: Linear				
PT	( )	25+60.62	10194878.084	3123672.935
PI	( )	26+69.31	10194904.299	3123567.450
Tangent Direction:		N 76°02'38" W		
Tangent Length:		108.69		
Element: Linear				
PI	( )	26+69.31	10194904.299	3123567.450
PC	( )	26+70.62	10194904.658	3123566.190
Tangent Direction:		N 74°05'15" W		
Tangent Length:		1.31		
Element: Circular				
PC	( )	26+70.62	10194904.658	3123566.190
PI	( )	27+35.78	10194922.522	3123503.529
CC	( )		10198003.517	3124449.652
PT	( )	28+00.92	10194942.905	3123441.642
Radius:		3222.33		
Delta:		2°19'00" Right		
Degree of Curvature(Arc):		1°46'41"		
Length:		130.30		
Tangent:		65.16		
Chord:		130.29		
Middle Ordinate:		0.66		
External:		0.66		
Tangent Direction:		N 74°05'15" W		
Radial Direction:		N 15°54'45" E		
Chord Direction:		N 72°55'45" W		
Radial Direction:		N 18°13'45" E		
Tangent Direction:		N 71°46'15" W		
Element: Linear				
PT	( )	28+00.92	10194942.905	3123441.642
PC	( )	28+06.70	10194944.713	3123436.153
Tangent Direction:		N 71°46'15" W		
Tangent Length:		5.78		
Element: Circular				
PC	( )	28+06.70	10194944.713	3123436.153
PI	( )	30+47.18	10195019.940	3123207.740
CC	( )		10197414.225	3124249.485
PT	( )	32+86.30	10195135.786	3122997.000
Radius:		2600.00		
Delta:		10°34'08" Right		
Degree of Curvature(Arc):		2°12'13"		
Length:		479.60		
Tangent:		240.48		
Chord:		478.92		
Middle Ordinate:		11.05		
External:		11.10		
Tangent Direction:		N 71°46'15" W		
Radial Direction:		N 18°13'45" E		
Chord Direction:		N 66°29'11" W		
Radial Direction:		N 28°47'53" E		
Tangent Direction:		N 61°12'07" W		

RT QUARRY DITCH FL "℄ DITCH RT2" CONT

		STATION	NORTHING	EASTING
Element: Linear				
PT	( )	32+86.30	10195135.786	3122997.000
PC	( )	33+55.56	10195169.151	3122936.306
Tangent Direction:		N 61°12'07" W		
Tangent Length:		69.26		
Element: Circular				
PC	( )	33+55.56	10195169.151	3122936.306
PI	( )	33+62.26	10195172.380	3122930.431
CC	( )		10195142.861	3122921.854
PT	( )	33+68.75	10195172.802	3122923.741
Radius:		30.00		
Delta:		25°11'27" Left		
Degree of Curvature(Arc):		190°59'09"		
Length:		13.19		
Tangent:		6.70		
Chord:		13.08		
Middle Ordinate:		0.72		
External:		0.74		
Tangent Direction:		N 61°12'07" W		
Radial Direction:		N 28°47'53" E		
Chord Direction:		N 73°47'50" W		
Radial Direction:		N 3°36'26" E		
Tangent Direction:		N 86°23'34" W		
Element: Linear				
PT	( )	33+68.75	10195172.802	3122923.741
PC	( )	33+76.56	10195173.293	3122915.947
Tangent Direction:		N 86°23'34" W		
Tangent Length:		7.81		
Element: Circular				
PC	( )	33+76.56	10195173.293	3122915.947
PI	( )	33+78.77	10195173.432	3122913.743
CC	( )		10195183.273	3122916.576
PT	( )	33+80.90	10195174.486	3122911.802
Radius:		10.00		
Delta:		24°54'27" Right		
Degree of Curvature(Arc):		572°57'28"		
Length:		4.35		
Tangent:		2.21		
Chord:		4.31		
Middle Ordinate:		0.24		
External:		0.24		
Tangent Direction:		N 86°23'34" W		
Radial Direction:		N 3°36'26" E		
Chord Direction:		N 73°56'21" W		
Radial Direction:		N 28°30'53" E		
Tangent Direction:		N 61°29'07" W		
Element: Linear				
PT	( )	33+80.90	10195174.486	3122911.802
POE	( )	33+82.90	10195175.441	3122910.045
Tangent Direction:		N 61°29'07" W		
Tangent Length:		2.00		

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

GRADING ALIGNMENT DATA

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	86
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 FILE: \
PENTABLE: S2-0000020170718.tbl TIME: 1:47:03 PM SCALE: 1:1

RT CUT DITCH FL "℄ DITCH RT3"

		STATION	NORTHING	EASTING
Element: Circular				
PC	( )	0+00.00	10195172.451	3122915.552
PI	( )	3+94.01	10195360.168	3122569.134
CC	( )		10198003.517	3124449.652
PCC	( )	7+84.12	10195625.875	3122278.197
Radius:		3220.00		
Delta:		13°57'08.80" Right		
Degree of Curvature(Arc):		1°46'45.74"		
Length:		784.12		
Tangent:		394.01		
Chord:		782.19		
Middle Ordinate:		23.84		
External:		24.02		
Tangent Direction:		N 61°32'51.33" W		
Radial Direction:		N 28°27'08.67" E		
Chord Direction:		N 54°34'16.93" W		
Radial Direction:		N 42°24'17.48" E		
Tangent Direction:		N 47°35'42.52" W		
Element: Circular				
PCC	( )	7+84.12	10195625.875	3122278.197
PI	( )	9+83.22	10195760.140	3122131.183
CC	( )		10197057.629	3123585.791
PCC	( )	11+80.93	10195921.481	3122014.521
Radius:		1939.00		
Delta:		11°43'31.18" Right		
Degree of Curvature(Arc):		2°57'17.69"		
Length:		396.81		
Tangent:		199.10		
Chord:		396.12		
Middle Ordinate:		10.14		
External:		10.20		
Tangent Direction:		N 47°35'42.52" W		
Radial Direction:		N 42°24'17.48" E		
Chord Direction:		N 41°43'56.93" W		
Radial Direction:		N 54°07'48.66" E		
Tangent Direction:		N 35°52'11.34" W		
Element: Circular				
PCC	( )	11+80.93	10195921.481	3122014.521
PI	( )	12+80.09	10196001.832	3121956.421
CC	( )		10197155.482	3123721.119
PT	( )	13+79.10	10196087.288	3121906.127
Radius:		2106.00		
Delta:		5°23'28.79" Right		
Degree of Curvature(Arc):		2°43'14.15"		
Length:		198.17		
Tangent:		99.16		
Chord:		198.09		
Middle Ordinate:		2.33		
External:		2.33		
Tangent Direction:		N 35°52'11.34" W		
Radial Direction:		N 54°07'48.66" E		
Chord Direction:		N 33°10'26.95" W		
Radial Direction:		N 59°31'17.45" E		
Tangent Direction:		N 30°28'42.55" W		
Element: Linear				
PT	( )	13+79.10	10196087.288	3121906.127
PC	( )	15+95.99	10196274.210	3121796.116
Tangent Direction:		N 30°28'42.55" W		
Tangent Length:		216.89		
Element: Circular				
PC	( )	15+95.99	10196274.210	3121796.116
PI	( )	16+46.43	10196317.684	3121770.530
CC	( )		10196314.787	3121865.062
PT	( )	16+86.00	10196359.510	3121798.730
Radius:		80.00		
Delta:		64°28'01.68" Right		
Degree of Curvature(Arc):		71°37'11.01"		
Length:		90.01		
Tangent:		50.44		
Chord:		85.34		
Middle Ordinate:		12.33		
External:		14.58		
Tangent Direction:		N 30°28'42.55" W		
Radial Direction:		N 59°31'17.45" E		
Chord Direction:		N 1°45'18.28" E		
Radial Direction:		S 56°00'40.88" E		
Tangent Direction:		N 33°59'19.12" E		
Element: Linear				
PT	( )	16+86.00	10196359.510	3121798.730
PI	( )	17+25.29	10196392.088	3121820.695
Tangent Direction:		N 33°59'19.12" E		
Tangent Length:		39.29		
Element: Linear				
PI	( )	17+25.29	10196392.088	3121820.695
POE	( )	17+29.80	10196394.617	3121824.425
Tangent Direction:		N 55°51'51.87" E		
Tangent Length:		4.51		

BOTTOM OF RT WALL CUT "℄ RT WALL CUT"

		STATION	NORTHING	EASTING
Element: Circular				
PC	( )	0+00.00	10195174.209	3122916.505
PI	( )	3+44.27	10195338.230	3122613.817
CC	( )		10198003.517	3124449.652
PCC	( )	6+85.93	10195562.571	3122352.676
Radius:		3218.00		
Delta:		12°12'46.51" Right		
Degree of Curvature(Arc):		1°46'49.72"		
Length:		685.93		
Tangent:		344.27		
Chord:		684.64		
Middle Ordinate:		18.26		
External:		18.36		
Tangent Direction:		N 61°32'51.33" W		
Radial Direction:		N 28°27'08.67" E		
Chord Direction:		N 55°26'28.07" W		
Radial Direction:		N 40°39'55.18" E		
Tangent Direction:		N 49°20'04.82" W		
Element: Circular				
PCC	( )	6+85.93	10195562.571	3122352.676
PI	( )	10+34.65	10195789.805	3122088.169
CC	( )		10197155.482	3123721.119
PT	( )	13+77.05	10196090.331	3121911.298
Radius:		2100.00		
Delta:		18°51'22.26" Right		
Degree of Curvature(Arc):		2°43'42.13"		
Length:		691.12		
Tangent:		348.71		
Chord:		688.00		
Middle Ordinate:		28.37		
External:		28.76		
Tangent Direction:		N 49°20'04.82" W		
Radial Direction:		N 40°39'55.18" E		
Chord Direction:		N 39°54'23.69" W		
Radial Direction:		N 59°31'17.45" E		
Tangent Direction:		N 30°28'42.55" W		
Element: Linear				
PT	( )	13+77.05	10196090.331	3121911.298
PC	( )	15+93.94	10196277.253	3121801.287
Tangent Direction:		N 30°28'42.55" W		
Tangent Length:		216.89		
Element: Circular				
PC	( )	15+93.94	10196277.253	3121801.287
PI	( )	16+40.60	10196317.467	3121777.620
CC	( )		10196314.787	3121865.062
PT	( )	16+77.21	10196356.155	3121803.705
Radius:		74.00		
Delta:		64°28'01.68" Right		
Degree of Curvature(Arc):		77°25'36.22"		
Length:		83.26		
Tangent:		46.66		
Chord:		78.94		
Middle Ordinate:		11.40		
External:		13.48		
Tangent Direction:		N 30°28'42.55" W		
Radial Direction:		N 59°31'17.45" E		
Chord Direction:		N 1°45'18.28" E		
Radial Direction:		S 56°00'40.88" E		
Tangent Direction:		N 33°59'19.12" E		
Element: Linear				
PT	( )	16+77.21	10196356.155	3121803.705
PI	( )	17+04.76	10196379.004	3121819.109
Tangent Direction:		N 33°59'19.12" E		
Tangent Length:		27.56		
Element: Linear				
PI	( )	17+04.76	10196379.004	3121819.109
PI	( )	17+17.94	10196392.088	3121820.695
Tangent Direction:		N 6°54'32.08" E		
Tangent Length:		13.18		
Element: Linear				
PI	( )	17+17.94	10196392.088	3121820.695
POE	( )	17+22.45	10196394.617	3121824.425
Tangent Direction:		N 55°51'51.87" E		
Tangent Length:		4.51		

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

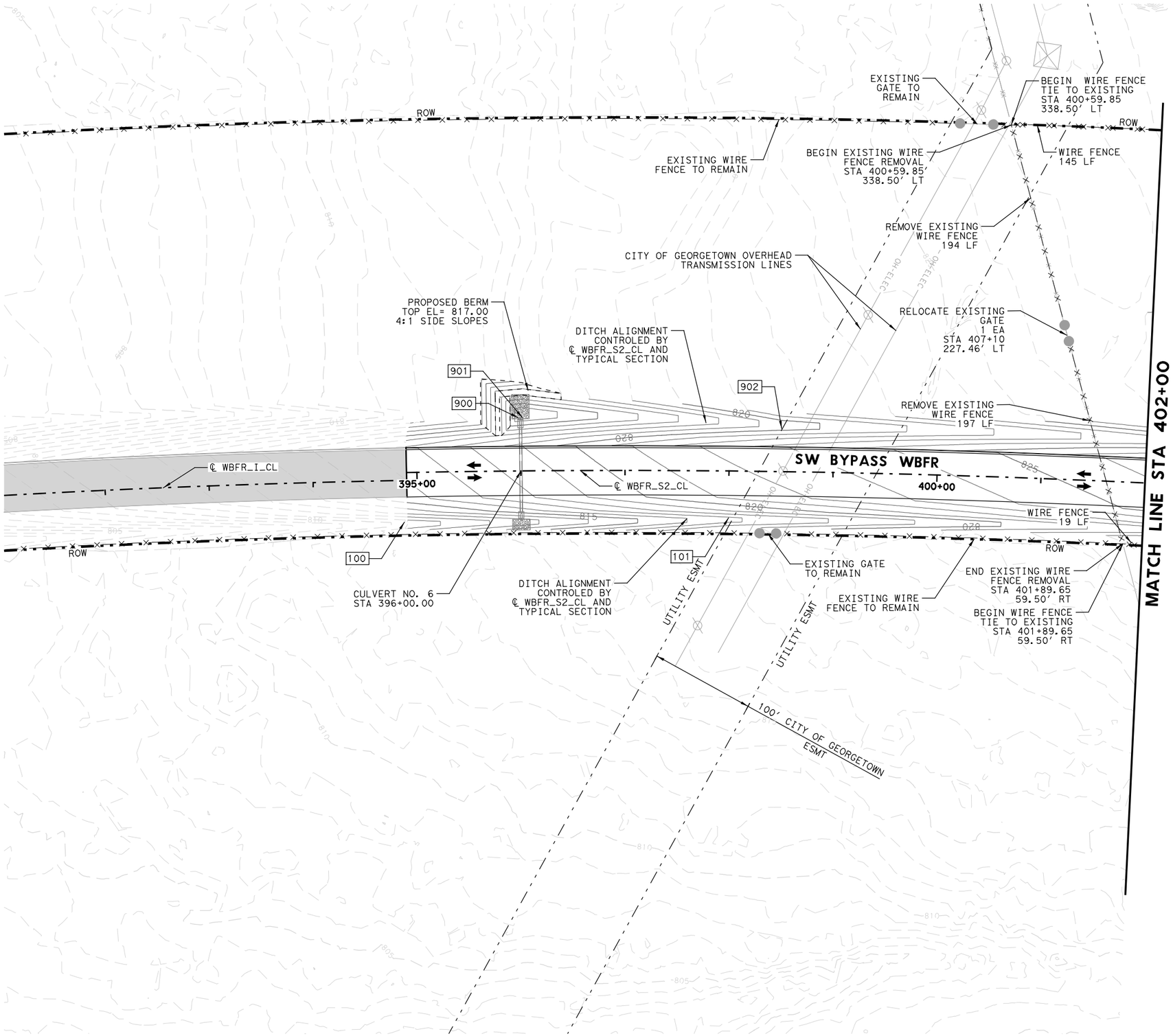
SOUTHWEST BYPASS SEGMENT 2

GRADING ALIGNMENT DATA

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	87
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:47:07 PM SCALE:1:1
FILE: \



N

LEGEND

- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE
- CHAIN LINK FENCE
- BOULDER DELINEATION
- ROW
- PCTB
- GRADE BREAK
- GATE
- ### GRADING AND ROCK CUT POINT

NOTES:

1. POTENTIAL FENCING GAPS: IF SLOPES ARE GREATER THAN 2:1 OR ELEVATION CHANGE GREATER THAN 4 FT, COORDINATE FENCE AND BOULDER PLACEMENT WITH ENGINEER.
2. SEE DRAINAGE SHEETS FOR CULVERT INFORMATION.
3. SEE ROADWAY SHEETS FOR GEOMETRIC INFORMATION INFORMATION.
4. SEE GRADING POINT TABLE SHEET FOR GRADING POINT INFORMATION.
4. SEE ROCK CUT CONTROL POINTS SHEETS FOR ROCK CUT POINT INFORMATION.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TX

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

FENCING AND GRADING PLAN

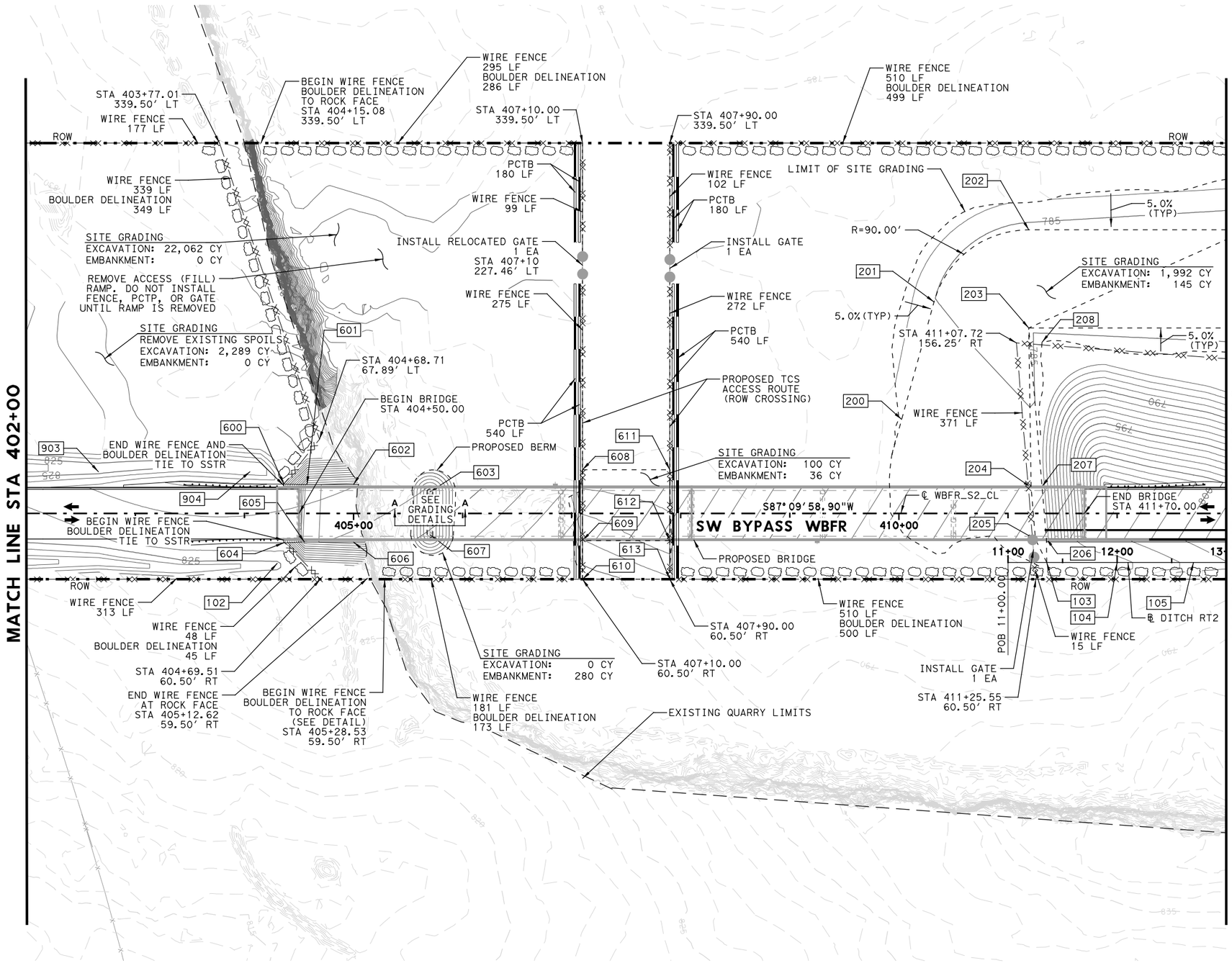
STA 391+00 TO STA 402+00

SCALE: 1"=100' SHEET 1 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	88
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000220170718.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 1:47:22 PM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



LEGEND

- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE
- CHAIN LINK FENCE
- BOULDER DELINEATION
- ROW
- PCTB
- GRADE BREAK
- GATE
- ### GRADING AND ROCK CUT POINT

NOTES:

1. POTENTIAL FENCING GAPS: IF SLOPES ARE GREATER THAN 2:1 OR ELEVATION CHANGE GREATER THAN 4 FT, COORDINATE FENCE AND BOULDER PLACEMENT WITH ENGINEER.
2. SEE DRAINAGE SHEETS FOR CULVERT INFORMATION.
3. SEE ROADWAY SHEETS FOR GEOMETRIC INFORMATION INFORMATION.
4. SEE GRADING POINT TABLE SHEET FOR GRADING POINT INFORMATION.
4. SEE ROCK CUT CONTROL POINTS SHEETS FOR ROCK CUT POINT INFORMATION.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

FENCING AND GRADING PLAN

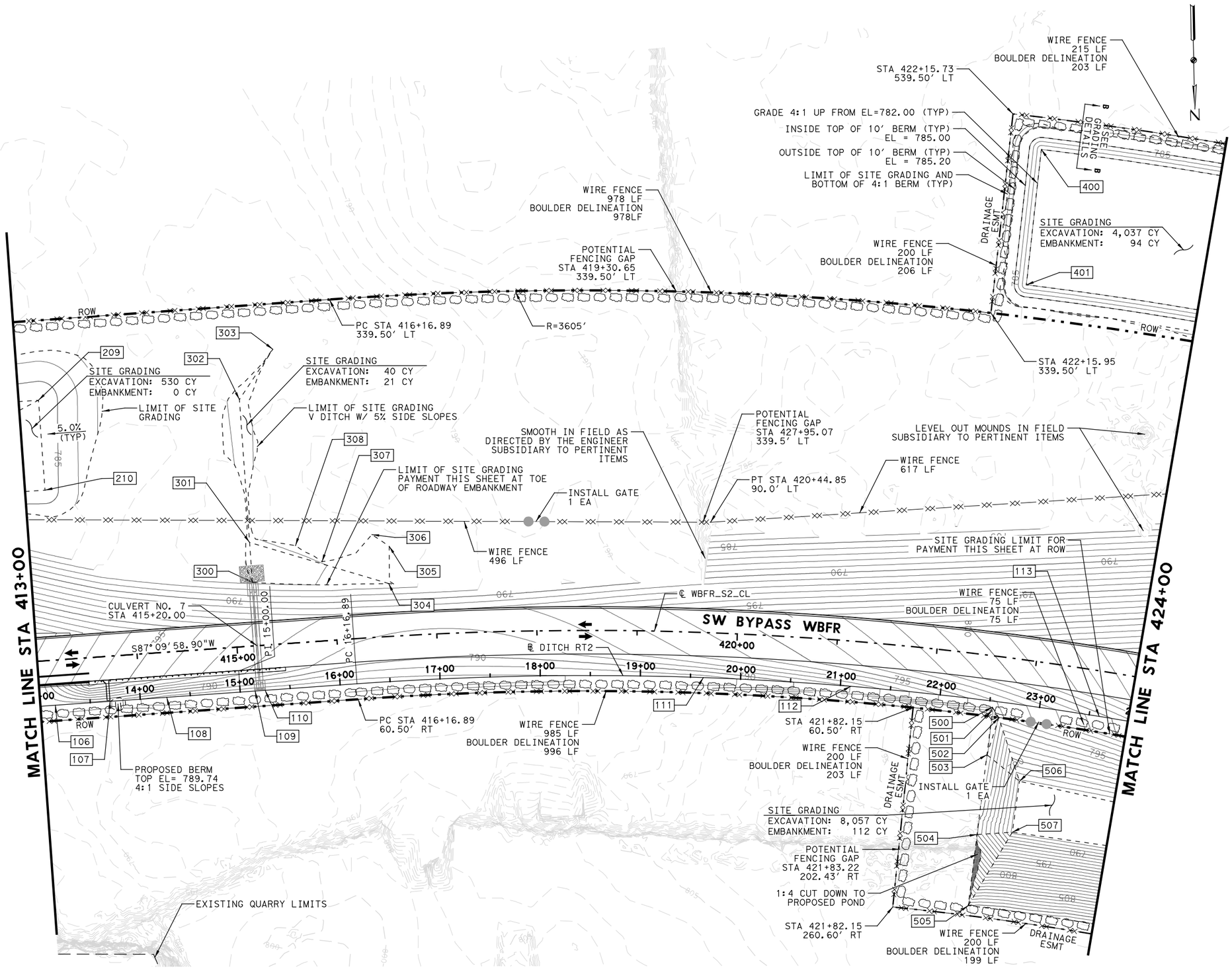
STA 402+00 TO STA 413+00

SCALE: 1"=100' SHEET 2 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
RR	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	89
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-0000020170718.tbl TIME: 1:47:30 PM DATE: 3/23/2018 SCALE: 1:100

4/12/2018 7:20 AM



LEGEND

- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE
- CHAIN LINK FENCE
- BOULDER DELINEATION
- ROW
- PCTB
- GRADE BREAK
- GATE
- ### GRADING AND ROCK CUT POINT

NOTES:

1. POTENTIAL FENCING GAPS: IF SLOPES ARE GREATER THAN 2:1 OR ELEVATION CHANGE GREATER THAN 4 FT, COORDINATE FENCE AND BOULDER PLACEMENT WITH ENGINEER.
2. SEE DRAINAGE SHEETS FOR CULVERT INFORMATION.
3. SEE ROADWAY SHEETS FOR GEOMETRIC INFORMATION INFORMATION.
4. SEE GRADING POINT TABLE SHEET FOR GRADING POINT INFORMATION.
4. SEE ROCK CUT CONTROL POINTS SHEETS FOR ROCK CUT POINT INFORMATION.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

FENCING AND GRADING PLAN

STA 413+00 TO STA 424+00

SCALE: 1"=100' SHEET 3 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
RR	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	90
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:47:40 PM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM

LIMIT OF SITE GRADING AND BOTTOM OF 4:1 BERM (TYP)
OUTSIDE TOP OF 10' BERM (TYP) EL = 785.20
INSIDE TOP OF 10' BERM (TYP) EL = 785.00
GRADE 4:1 UP FROM EL=782.00 (TYP)
135'
402
WEIR EL=784.00 SEE GRADING DETAILS
403
404
BOULDER DELINEATION 115 LF
BOULDER DELINEATION 69 LF
WIRE FENCE 312 LF
STA 426+67.61 539.50' LT
TOP OF 14' BERM EL = 784.50
WIRE FENCE 200 LF
BOULDER DELINEATION 206 LF
405
GRADE 4:1 UP FROM EL=782.00 TO EXISTING GROUND
DRAINAGE ESMT
SITE GRADING
EXCAVATION: 5,538 CY
EMBANKMENT: 41 CY
406
407
408
409
410
ROW
2%
25'
GRADE 4:1 UP TO EXISTING GROUND
411
412
413
414
415
416
GRADE OUT EXISTING HIGH POINT
STA 426+67.61 339.50' LT
STA 426+49.19 258.39' LT
CULVERT NO. 8 STA 425+75.00
SITE GRADING LIMIT FOR PAYMENT THIS SHEET AT ROW
CULVERT NO. 8B STA 426+79.64
WIRE FENCE 279 LF
BOULDER DELINEATION 280 LF
POTENTIAL FENCING GAP STA 427+95.08 339.50' LT
POTENTIAL FENCING GAP STA 430+66.45 339.50' LT
POTENTIAL FENCING GAP STA 431+42.84 339.50' LT
POTENTIAL FENCING GAP STA 432+86.58 339.50' LT
POTENTIAL FENCING GAP STA 434+27.38 339.50' LT
WIRE FENCE 919 LF
BOULDER DELINEATION 919 LF
R=3605'
701
700
WIRE FENCE 1190 LF
STA 429+86.99 219.96' LT
SITE GRADING
REMOVE MOUND AND GRADE TO DRAIN TOWARDS EASEMENT
EXCAVATION: 618 CY
EMBANKMENT: 236 CY
703
702
SITE GRADING
EXCAVATION: 263 CY
EMBANKMENT: 0 CY
STA 434+75.03 114.05' LT
STA 434+85.00 26.00' LT
CHAIN LINK FENCE (INSTALL)(6') 116 LF
OMIT IF RW-06 IS NOT CONSTRUCTED
END CHAIN LINK FENCE CONNECT TO CLIFF FACE MAX GAP 4" STA 427+63.28 50.00' RT
OMIT IF RW-06 IS NOT CONSTRUCTED
BOTTOM OF OVER EXCAVATION WEDGE BEGIN 6:1 CUT UP TO PROPOSED SUBGRADE
℄ DITCH RT3
℄ RT WALL CUT
MATCH LINE STA 424+00
MATCH LINE STA 435+00
℄ WBFR_S2_CL
SW BYPASS WBFR
PT 25+60.62
PC 25+69.31
PT 26+70.62
PC 28+00.92
PT 28+06.70
425+00
26+00
27+00
28+00
29+00
30+00
430+00
31+00
32+00
PT 32+86.30
33+00
33+83
PC 33+55.56
PT 33+67.75
PC 33+76.56
PT 33+80.90
POE 33+82.90
436
114
115
116
117
118
119
120
121
513
512
510
508
511
515
514
509
INCLUDE FENCE AND BOUNDER DELINEATION IF RW-06 IS NOT CONSTRUCTED
WIRE FENCE 77 LF
BOULDER DELINEATION 77 LF
SITE GRADING
INCLUDE IF RW-06 IS NOT CONSTRUCTED
EXCAVATION: 0 CY
EMBANKMENT: 1,080 CY
CONNECT WIRE FENCE TO CHAIN LINK FENCE OMIT IF RW-06 IS NOT CONSTRUCTED
SITE GRADING
EXCAVATION: 17,426 CY
EMBANKMENT: 7,515 CY
BEGIN CHAIN LINK FENCE STA 426+84.67 87.50' RT OMIT IF RW-06 IS NOT CONSTRUCTED
INCLUDE FENCE AND BOUNDER DELINEATION IF RW-06 IS NOT CONSTRUCTED
WIRE FENCE 30 LF
BOULDER DELINEATION 30 LF
1:4 CUT DOWN TO PROPOSED POND BETWEEN POINTS 514 & 515
DRAINAGE ESMT
WIRE FENCE 169 LF
BOULDER DELINEATION 157 LF
STA 426+95.46 260.60' RT
WIRE FENCE 272 LF
BOULDER DELINEATION 270 LF
WIRE FENCE 625 LF
BOULDER DELINEATION 624 LF
END WIRE FENCE BOULDER DELINEATION AT ROCK FACE STA 433+99.91 59.52' RT
EXISTING QUARRY LIMITS
STA 434+05.00 26.00' RT
DITCH FLOW LINE AND ROCK WALL CUT CONTROLLED BY ℄ RT WALL CUT SEE ROCK CUT CONTROL POINTS TABLE FOR ROCK WALL CUT POINTS
BEGIN WIRE FENCE STA 434+53.15 60.52' RT
WIRE FENCE 46 LF

LEGEND

- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE
- CHAIN LINK FENCE
- BOULDER DELINEATION
- ROW
- PCTB
- GRADE BREAK
- GATE
- ### GRADING AND ROCK CUT POINT

NOTES:

1. POTENTIAL FENCING GAPS: IF SLOPES ARE GREATER THAN 2:1 OR ELEVATION CHANGE GREATER THAN 4 FT, COORDINATE FENCE AND BOULDER PLACEMENT WITH ENGINEER.
2. SEE DRAINAGE SHEETS FOR CULVERT INFORMATION.
3. SEE ROADWAY SHEETS FOR GEOMETRIC INFORMATION INFORMATION.
4. SEE GRADING POINT TABLE SHEET FOR GRADING POINT INFORMATION.
4. SEE ROCK CUT CONTROL POINTS SHEETS FOR ROCK CUT POINT INFORMATION.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

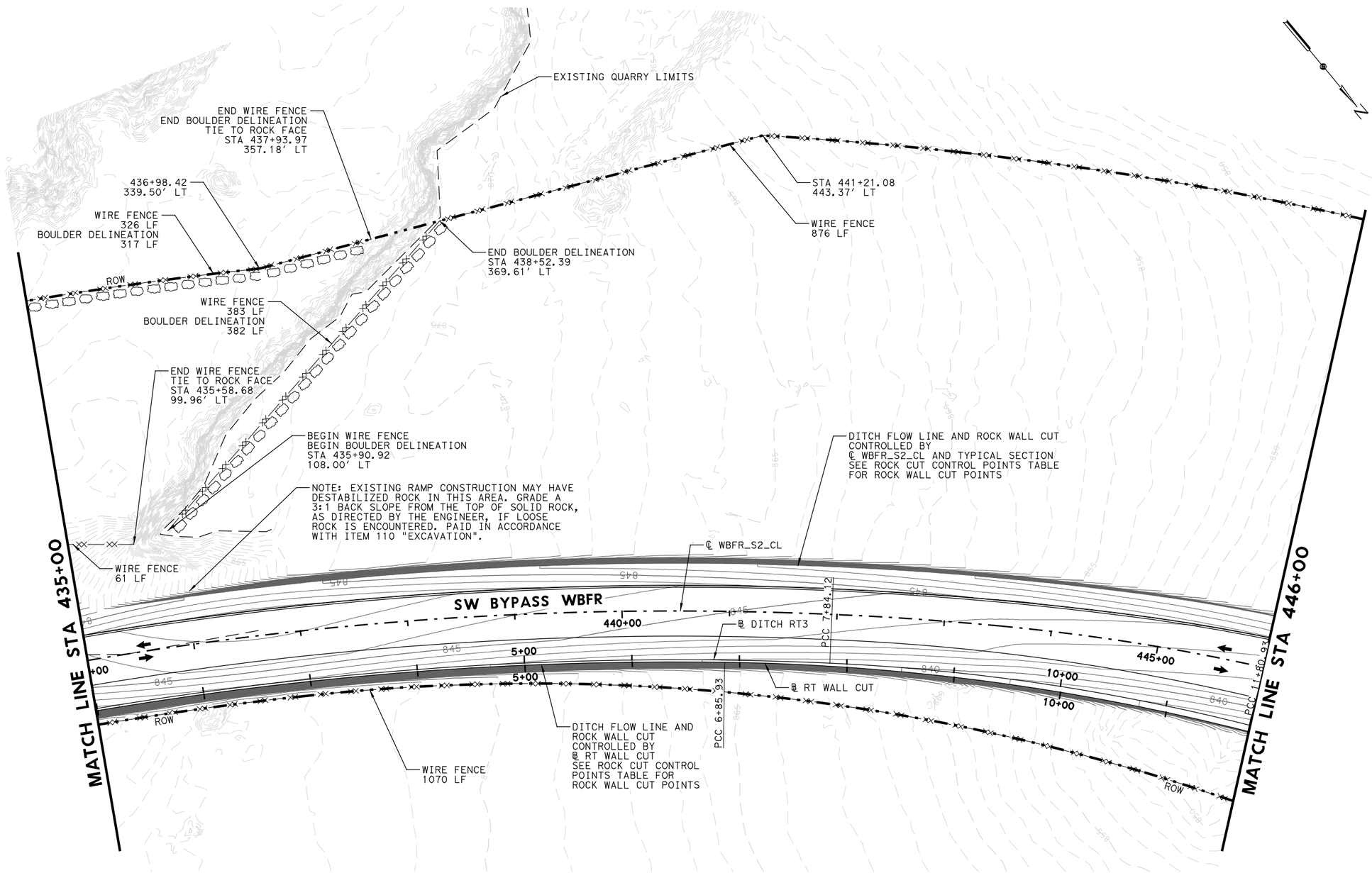
FENCING AND GRADING PLAN

STA 424+00 TO STA 435+00

SCALE: 1"=100' SHEET 4 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS RR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	
CHECK JC	CONTROL	SECTION	JOB	91
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 4/10/2018 TIME: 2:46:58 PM SCALE: 1:100
FILE: \



LEGEND

- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE
- CHAIN LINK FENCE
- BOULDER DELINEATION
- ROW
- PCTB
- GRADE BREAK
- GATE
- ### GRADING AND ROCK CUT POINT

NOTES:

1. POTENTIAL FENCING GAPS: IF SLOPES ARE GREATER THAN 2:1 OR ELEVATION CHANGE GREATER THAN 4 FT, COORDINATE FENCE AND BOULDER PLACEMENT WITH ENGINEER.
2. SEE DRAINAGE SHEETS FOR CULVERT INFORMATION.
3. SEE ROADWAY SHEETS FOR GEOMETRIC INFORMATION INFORMATION.
4. SEE GRADING POINT TABLE SHEET FOR GRADING POINT INFORMATION.
4. SEE ROCK CUT CONTROL POINTS SHEETS FOR ROCK CUT POINT INFORMATION.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

FENCING AND GRADING PLAN

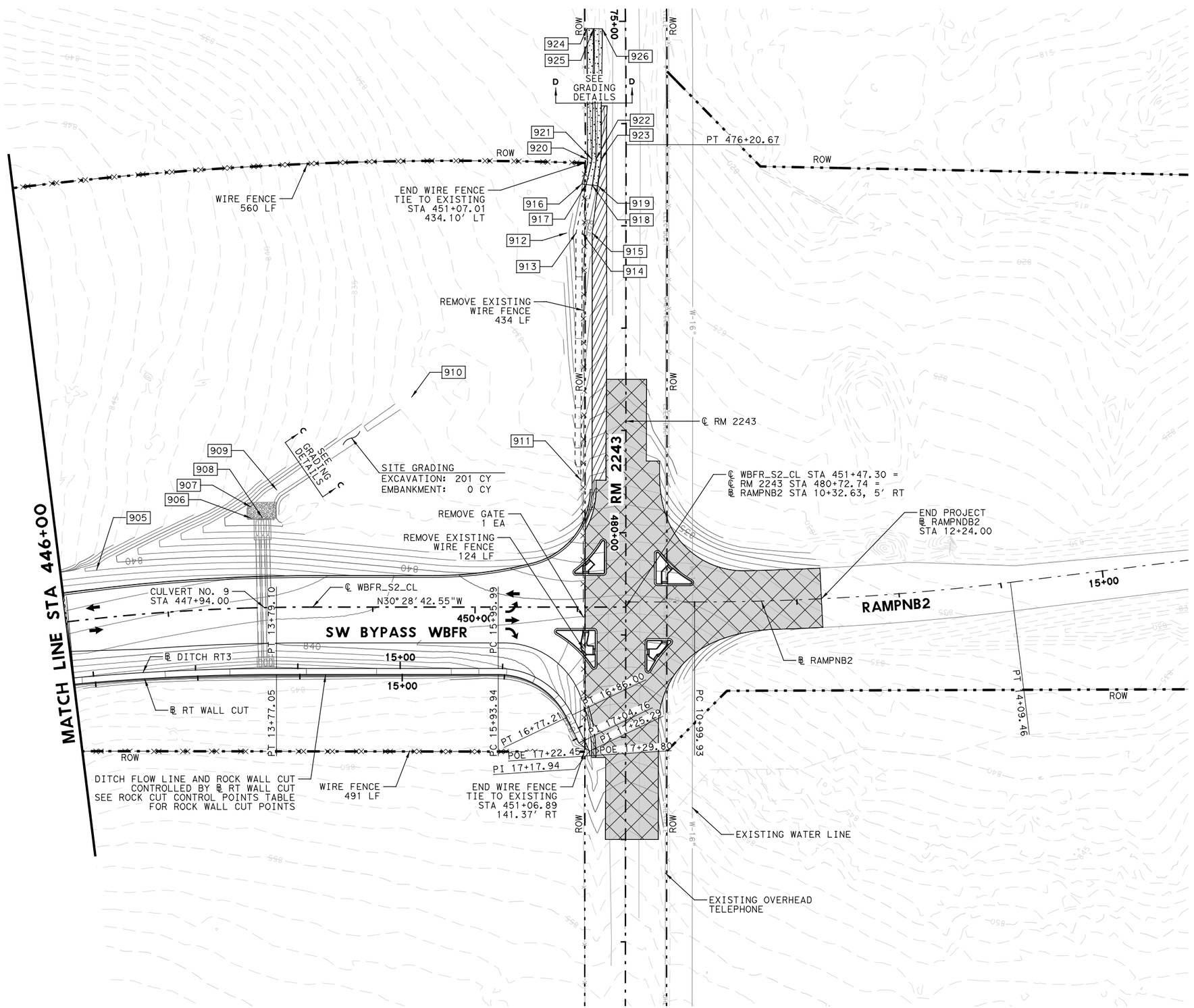
STA 435+00 TO STA 446+00

SCALE: 1"=100' SHEET 5 OF 6

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
RR	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	92
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201107181.tbl
USER: lgomezgon2 TIME: 1:48:00 PM SCALE: 1:100
DATE: 3/23/2018
FILE: \

4/12/2018 7:20 AM



LEGEND

- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE
- CHAIN LINK FENCE
- BOULDER DELINEATION
- ROW
- PCTB
- GRADE BREAK
- GATE
- ### GRADING AND ROCK CUT POINT

NOTES:

1. POTENTIAL FENCING GAPS: IF SLOPES ARE GREATER THAN 2:1 OR ELEVATION CHANGE GREATER THAN 4 FT, COORDINATE FENCE AND BOULDER PLACEMENT WITH ENGINEER.
2. SEE DRAINAGE SHEETS FOR CULVERT INFORMATION.
3. SEE ROADWAY SHEETS FOR GEOMETRIC INFORMATION INFORMATION.
4. SEE GRADING POINT TABLE SHEET FOR GRADING POINT INFORMATION.
4. SEE ROCK CUT CONTROL POINTS SHEETS FOR ROCK CUT POINT INFORMATION.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

FENCING AND GRADING PLAN

STA 446+00 TO END

SCALE: 1"=100' SHEET 6 OF 6

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS RR	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	93
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201707018.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:48:0 PM SCALE:1:100
FILE: \

4/12/2018 7:20 AM

TABLE OF GRADING POINTS (100'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 3 OF 8					
100	℄ WBFR_S2_CL	394+87.00	47.68' RT	810.27	DITCH FL
101	℄ WBFR_S2_CL	398+00.00	44.90' RT	816.84	DITCH FL
SHEET 4 OF 8					
102	℄ WBFR_S2_CL	404+30.00	45.90' RT	824.40	END DITCH FL
103	℄ DITCH RT2	11+35.49	0.00'	785.48	DITCH FL
104	℄ DITCH RT2	12+00.00	0.00'	785.67	DITCH FL
105	℄ DITCH RT2	12+70.00	0.00'	787.29	DITCH FL
SHEET 5 OF 8					
106	℄ DITCH RT2	13+15.00	0.00'	788.31	DITCH FL
107	℄ DITCH RT2	13+70.00	0.00'	788.76	DITCH FL
108	℄ DITCH RT2	14+26.54	0.00'	787.37	DITCH FL
109	℄ DITCH RT2	15+15.00	0.00'	787.10	DITCH FL
110	℄ DITCH RT2	15+25.00	0.00'	787.10	DITCH FL
111	℄ DITCH RT2	19+62.88	0.00'	788.41	DITCH FL
112	℄ DITCH RT2	21+10.29	0.00'	791.00	DITCH FL
113	℄ DITCH RT2	23+60.17	0.00'	799.50	DITCH FL
SHEET 6 OF 8					
114	℄ DITCH RT2	28+59.43	0.00'	819.73	DITCH FL
115	℄ DITCH RT2	32+65.13	0.00'	830.83	DITCH FL
116	℄ DITCH RT2	33+50.86	0.00'	831.91	DITCH FL
117	℄ DITCH RT2	33+60.93	0.00'	832.09	DITCH FL
118	℄ DITCH RT2	33+65.11	0.00'	832.33	DITCH FL
119	℄ DITCH RT2	33+69.28	0.00'	832.73	DITCH FL
120	℄ DITCH RT2	33+73.68	0.00'	834.75	DITCH FL
121	℄ DITCH RT2	33+81.56	0.00'	839.70	DITCH FL

TABLE OF GRADING POINTS (200'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 4 OF 8					
200	℄ WBFR_S2_CL	410+02.46	86.05' LT	785.38	BREAKLINE
201	℄ WBFR_S2_CL	410+32.18	193.91' LT	785.01	BREAKLINE
202	℄ WBFR_S2_CL	411+18.95	260.00' LT	784.66	BREAKLINE
203	℄ WBFR_S2_CL	411+18.95	170.00' LT	784.79	FLOWLINE
204	℄ WBFR_S2_CL	411+21.20	23.66' LT	785.21	FLOWLINE
205	℄ WBFR_S2_CL	411+25.21	24.00' RT	785.35	FLOWLINE
206	℄ WBFR_S2_CL	411+35.17	23.16' RT	785.38	BREAKLINE
207	℄ WBFR_S2_CL	411+31.17	24.50' LT	785.23	BREAKLINE
208	℄ WBFR_S2_CL	411+31.16	156.82' LT	785.39	EXISTING
SHEET 5 OF 8					
209	℄ WBFR_S2_CL	413+20.00	260.00' LT	784.06	FLOWLINE
210	℄ WBFR_S2_CL	413+20.00	170.00' LT	784.33	BREAKLINE

TABLE OF GRADING POINTS (300'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 5 OF 8					
300	℄ WBFR_S2_CL	415+20.00	63.25' LT	786.80	FLOW LINE
301	℄ WBFR_S2_CL	415+20.00	103.25' LT	786.71	FLOW LINE
302	℄ WBFR_S2_CL	415+20.00	246.50' LT	786.38	FLOW LINE
303	℄ WBFR_S2_CL	415+56.85	294.16' LT	786.32	FLOW LINE
304	℄ WBFR_S2_CL	416+55.00	52.70' LT	787.23	ROADWAY TOE
305	℄ WBFR_S2_CL	416+57.70	89.91' LT	787.55	TIE
306	℄ WBFR_S2_CL	416+41.53	102.58' LT	787.54	TIE
307	℄ WBFR_S2_CL	415+90.80	79.00' LT	787.04	TIE
308	℄ WBFR_S2_CL	415+65.47	96.90' LT	787.25	TIE

TABLE OF GRADING POINTS (400'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 5 OF 8					
400	℄ WBFR_S2_CL	422+43.46	507.53' LT	782.00	POND BOTTOM
401	℄ WBFR_S2_CL	422+44.64	371.50' LT	782.00	POND BOTTOM
SHEET 6 OF 8					
402	℄ WBFR_S2_CL	424+89.53	519.50' LT	785.00	10' BERM TOP
403	℄ WBFR_S2_CL	426+11.36	517.50' LT	784.50	14' BERM TOP
404	℄ WBFR_S2_CL	426+39.91	507.50' LT	782.00	POND BOTTOM
405	℄ WBFR_S2_CL	426+48.52	497.04' LT	784.50	END OF BERM
406	℄ WBFR_S2_CL	426+38.88	371.50' LT	782.00	POND BOTTOM
407	℄ WBFR_S2_CL	425+97.45	371.50' LT	782.00	POND BOTTOM
408	℄ WBFR_S2_CL	425+75.00	346.50' LT	782.00	FLOW LINE
409	℄ WBFR_S2_CL	425+52.55	371.50' LT	782.00	POND BOTTOM
410	℄ WBFR_S2_CL	425+42.53	359.51' LT	785.00	10' BERM TOP
411	℄ WBFR_S2_CL	425+51.73	243.22' LT	783.18	TIE
412	℄ WBFR_S2_CL	425+75.00	204.35' LT	782.94	FLOW LINE
413	℄ WBFR_S2_CL	425+95.55	243.20' LT	783.12	TIE
414	℄ WBFR_S2_CL	426+16.14	263.00' LT	784.04	TIE
415	℄ WBFR_S2_CL	426+05.40	302.87' LT	783.20	TIE
416	℄ WBFR_S2_CL	426+45.07	371.44' LT	783.73	TIE

TABLE OF GRADING POINTS (500'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 5 OF 8					
500	℄ WBFR_S2_CL	422+62.01	50.97' RT	795.86	FLOW LINE
501	℄ WBFR_S2_CL	422+62.00	54.95' RT	797.23	TIE
502	℄ WBFR_S2_CL	422+77.00	60.50' RT	795.70	BREAKLINE
503	℄ WBFR_S2_CL	422+62.72	98.81' RT	797.13	TIE
504	℄ WBFR_S2_CL	422+62.99	179.04' RT	795.08	TIE
505	℄ WBFR_S2_CL	422+63.24	250.50' RT	809.93	TIE
506	℄ WBFR_S2_CL	422+99.63	120.93' RT	786.69	POND BOTTOM
507	℄ WBFR_S2_CL	422+99.57	172.24' RT	786.68	POND BOTTOM
SHEET 6 OF 8					
508	℄ WBFR_S2_CL	424+89.32	167.47' RT	785.55	POND BOTTOM
509	℄ WBFR_S2_CL	425+09.06	250.50' RT	812.81	TIE
510	℄ WBFR_S2_CL	425+69.27	130.12' RT	785.00	POND BOTTOM
511	℄ WBFR_S2_CL	425+80.73	130.12' RT	785.00	POND BOTTOM
512	℄ WBFR_S2_CL	426+55.00	60.50' RT	810.54	Tie
513	℄ WBFR_S2_CL	426+80.00	60.50' RT	811.69	TIE
514	℄ WBFR_S2_CL	426+85.27	88.18' RT	814.63	TIE
515	℄ WBFR_S2_CL	426+84.85	188.55' RT	821.34	TIE

TABLE OF GRADING POINTS (600'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 4 OF 8					
600	℄ WBFR_S2_CL	404+36.00	26.75' LT	828.07	TOP OF MOW STRIP
601	℄ WBFR_S2_CL	404+57.38	26.51' LT	817.26	BREAKLINE
602	℄ WBFR_S2_CL	405+00.00	26.51' LT	816.41	BREAKLINE
603	℄ WBFR_S2_CL	405+70.00	19.50' LT	795.00	TOP OF BERM
604	℄ WBFR_S2_CL	404+36.00	27.00' RT	826.19	TOP OF MOW STRIP
605	℄ WBFR_S2_CL	404+55.00	26.51' RT	817.26	BREAKLINE
606	℄ WBFR_S2_CL	405+00.00	26.51' RT	816.36	BREAKLINE
607	℄ WBFR_S2_CL	405+70.00	19.50' RT	795.00	TOP OF BERM
608	℄ WBFR_S2_CL	407+10.00	40.00' LT	786.24	EXIST GROUND
609	℄ WBFR_S2_CL	407+10.00	25.00' RT	789.04	BREAKLINE
610	℄ WBFR_S2_CL	407+10.00	60.50' RT	790.56	EXIST GROUND
611	℄ WBFR_S2_CL	407+90.00	40.00' LT	786.38	EXIST GROUND
612	℄ WBFR_S2_CL	407+90.00	25.00' RT	787.41	BREAKLINE
613	℄ WBFR_S2_CL	407+90.00	60.50' RT	789.11	EXIST GROUND

TABLE OF GRADING POINTS (700'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 6 OF 8					
700	℄ WBFR_S2_CL	430+48.86	214.14' LT	800.00	FLOWLINE
701	℄ WBFR_S2_CL	429+76.60	242.05' LT	797.21	FLOWLINE
702	℄ WBFR_S2_CL	434+14.30	190.16' LT	829.31	FLOWLINE
703	℄ WBFR_S2_CL	432+21.27	115.10' LT	826.00	FLOWLINE

TABLE OF GRADING POINTS (900'S)					
POINT NO.	ALIGNMENT	STATION	OFFSET	ELEVATION	DESCRIPTION
SHEET 3 OF 8					
900	℄ WBFR_S2_CL	395+98.00	51.16' LT	813.14	DITCH FL
901	℄ WBFR_S2_CL	396+02.00	51.07' LT	813.24	DITCH FL
902	℄ WBFR_S2_CL	398+50.00	41.52' LT	819.56	DITCH FL
SHEET 4 OF 8					
903	℄ WBFR_S2_CL	402+66.00	38.20' LT	824.55	DITCH FL
904	℄ WBFR_S2_CL	404+05.00	38.21' LT	825.25	END DITCH FL
SHEET 8 OF 8					
905	℄ WBFR_S2_CL	446+34.69	47.13' LT	840.96	DITCH FL
906	℄ WBFR_S2_CL	447+83.66	87.62' LT	833.82	DITCH FL
907	℄ WBFR_S2_CL	447+83.60	98.62' LT	833.82	DITCH FL
908	℄ WBFR_S2_CL	447+94.01	88.53' LT	833.81	DITCH FL
909	℄ WBFR_S2_CL	448+07.98	114.75' LT	833.63	DITCH FL
910	℄ WBFR_S2_CL	449+37.99	205.21' LT	832.68	TIE TO EXIST
911	℄ RM 2243	479+48.83	43.87' RT	831.78	DITCH FL
912	℄ RM 2243	477+07.00	58.05' RT	826.62	DITCH TIE
913	℄ RM 2243	477+07.00	48.79' RT	824.30	DITCH FL
914	℄ RM 2243	477+07.00	42.79' RT	824.30	DITCH FL
915	℄ RM 2243	477+07.00	33.00' RT	825.64	EOP
916	℄ RM 2243	476+59.12	43.19' RT	825.26	DITCH TIE
917	℄ RM 2243	476+59.63	38.93' RT	823.93	DITCH FL
918	℄ RM 2243	476+60.34	32.98' RT	823.93	DITCH FL
919	℄ RM 2243	476+61.00	27.48' RT	825.19	EOP
920	℄ RM 2243	476+35.00	37.75' RT	825.09	DITCH TIE
921	℄ RM 2243	476+35.00	33.32' RT	823.78	DITCH FL
922	℄ RM 2243	476+35.00	29.50' RT	823.78	DITCH FL
923	℄ RM 2243	476+35.00	24.38' RT	825.06	EOP
924	℄ RM 2243	475+07.12	37.74' RT	823.95	DITCH TIE
925	℄ RM 2243	475+07.12	31.13' RT	822.82	DITCH FL
926	℄ RM 2243	475+07.12	22.75' RT	824.73	MOW STRIP

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TX

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GRADING POINTS TABLE

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	94
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 1:48:13 PM SCALE: 1:1
FILE: \

SOUTHWEST (LEFT) ROCK CUT - POINT TABLE								
TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,153.439	3,122,766.946	844.55	10,195,153.654	3,122,767.073	843.55	1.03	N 30:34:12.89 E	0
10,195,155.865	3,122,762.493	845.34	10,195,156.234	3,122,762.712	843.62	1.77	N 30:41:20.25 E	7
10,195,158.297	3,122,758.043	846.12	10,195,158.820	3,122,758.354	843.69	2.51	N 30:44:15.63 E	11
10,195,160.736	3,122,753.596	846.91	10,195,161.413	3,122,754.000	843.75	3.26	N 30:49:35.96 E	15
10,195,163.180	3,122,749.152	847.70	10,195,164.013	3,122,749.651	843.81	4.01	N 30:55:23.80 E	18
10,195,165.631	3,122,744.711	848.48	10,195,166.619	3,122,745.305	843.87	4.75	N 31:00:53.63 E	22
10,195,168.099	3,122,740.280	849.22	10,195,169.232	3,122,740.963	843.93	5.45	N 31:04:57.35 E	26
10,195,170.579	3,122,735.855	849.93	10,195,171.852	3,122,736.625	843.98	6.13	N 31:10:06.60 E	29
10,195,173.066	3,122,731.434	850.64	10,195,174.478	3,122,732.292	844.03	6.81	N 31:17:05.66 E	33
10,195,175.559	3,122,727.016	851.35	10,195,177.111	3,122,727.962	844.08	7.49	N 31:21:49.73 E	36
10,195,178.058	3,122,722.602	852.06	10,195,179.750	3,122,723.636	844.13	8.17	N 31:25:46.44 E	40
10,195,180.563	3,122,718.190	852.77	10,195,182.397	3,122,719.315	844.17	8.87	N 31:31:31.82 E	43
10,195,183.075	3,122,713.782	853.49	10,195,185.049	3,122,714.997	844.21	9.57	N 31:36:44.50 E	47
10,195,185.590	3,122,709.375	854.21	10,195,187.709	3,122,710.684	844.25	10.27	N 31:42:19.65 E	50
10,195,188.112	3,122,704.972	854.94	10,195,190.375	3,122,706.374	844.29	10.98	N 31:46:46.28 E	54
10,195,190.639	3,122,700.572	855.66	10,195,193.047	3,122,702.069	844.32	11.69	N 31:52:05.87 E	57
10,195,193.166	3,122,696.170	856.43	10,195,195.726	3,122,697.768	844.35	12.45	N 31:58:23.46 E	61
10,195,195.691	3,122,691.767	857.22	10,195,198.412	3,122,693.470	844.38	13.24	N 32:02:28.79 E	65
10,195,198.223	3,122,687.368	858.02	10,195,201.104	3,122,689.177	844.41	14.03	N 32:07:29.99 E	69
10,195,200.761	3,122,682.971	858.81	10,195,203.803	3,122,684.889	844.43	14.82	N 32:13:54.07 E	73
10,195,203.306	3,122,678.578	859.61	10,195,206.508	3,122,680.604	844.45	15.63	N 32:19:21.89 E	77
10,195,205.856	3,122,674.188	860.41	10,195,209.220	3,122,676.323	844.47	16.43	N 32:24:06.15 E	81
10,195,208.413	3,122,669.802	861.21	10,195,211.939	3,122,672.047	844.49	17.23	N 32:29:05.49 E	85
10,195,210.977	3,122,665.419	862.01	10,195,214.664	3,122,667.775	844.50	18.05	N 32:34:43.16 E	90
10,195,213.546	3,122,661.039	862.80	10,195,217.396	3,122,663.507	844.51	18.85	N 32:39:41.23 E	94
10,195,216.122	3,122,656.662	863.60	10,195,220.134	3,122,659.243	844.52	19.67	N 32:45:14.36 E	98
10,195,218.703	3,122,652.288	864.41	10,195,222.878	3,122,654.983	844.53	20.49	N 32:50:33.38 E	102
10,195,221.304	3,122,647.926	865.15	10,195,225.630	3,122,650.727	844.53	21.25	N 32:55:20.15 E	106
10,195,223.925	3,122,643.577	865.82	10,195,228.387	3,122,646.476	844.53	21.94	N 33:00:43.67 E	110
10,195,226.552	3,122,639.231	866.49	10,195,231.151	3,122,642.229	844.53	22.64	N 33:05:58.41 E	113
10,195,229.186	3,122,634.888	867.17	10,195,233.922	3,122,637.986	844.53	23.34	N 33:11:24.88 E	117
10,195,231.826	3,122,630.549	867.84	10,195,236.699	3,122,633.748	844.52	24.04	N 33:17:01.95 E	120
10,195,234.472	3,122,626.214	868.51	10,195,239.483	3,122,629.513	844.51	24.74	N 33:21:32.30 E	124
10,195,237.125	3,122,621.882	869.19	10,195,242.273	3,122,625.283	844.50	25.45	N 33:27:01.95 E	127
10,195,239.822	3,122,617.579	869.67	10,195,245.070	3,122,621.058	844.49	25.96	N 33:32:28.18 E	131
10,195,242.521	3,122,613.277	870.18	10,195,247.873	3,122,616.836	844.47	26.50	N 33:37:23.92 E	133
10,195,245.289	3,122,609.020	870.39	10,195,250.683	3,122,612.619	844.45	26.74	N 33:42:43.64 E	135
10,195,248.063	3,122,604.767	870.60	10,195,253.499	3,122,608.406	844.43	26.98	N 33:47:57.78 E	136
10,195,250.865	3,122,600.533	870.70	10,195,256.321	3,122,604.198	844.41	27.10	N 33:53:26.66 E	137
10,195,253.676	3,122,596.304	870.79	10,195,259.150	3,122,599.993	844.38	27.22	N 33:58:35.56 E	138
10,195,256.494	3,122,592.080	870.88	10,195,261.985	3,122,595.793	844.36	27.34	N 34:03:59.24 E	139
10,195,259.322	3,122,587.863	870.95	10,195,264.827	3,122,591.598	844.33	27.44	N 34:09:21.16 E	139
10,195,262.158	3,122,583.651	871.00	10,195,267.675	3,122,587.407	844.31	27.51	N 34:14:50.00 E	140
10,195,265.002	3,122,579.444	871.06	10,195,270.530	3,122,583.220	844.28	27.60	N 34:20:08.64 E	140
10,195,267.843	3,122,575.236	871.16	10,195,273.391	3,122,579.037	844.26	27.73	N 34:24:55.80 E	141
10,195,270.687	3,122,571.030	871.27	10,195,276.258	3,122,574.859	844.23	27.87	N 34:30:03.97 E	141
10,195,273.535	3,122,566.825	871.40	10,195,279.132	3,122,570.686	844.21	28.03	N 34:35:57.21 E	142
10,195,276.389	3,122,562.626	871.53	10,195,282.012	3,122,566.516	844.18	28.19	N 34:40:31.96 E	143
10,195,279.250	3,122,558.430	871.66	10,195,284.899	3,122,562.352	844.16	28.35	N 34:46:17.61 E	144
10,195,282.117	3,122,554.239	871.79	10,195,287.792	3,122,558.191	844.13	28.51	N 34:51:10.36 E	144
10,195,285.031	3,122,550.080	871.73	10,195,290.691	3,122,554.035	844.11	28.47	N 34:56:39.97 E	145
10,195,287.965	3,122,545.936	871.59	10,195,293.597	3,122,549.884	844.08	28.36	N 35:01:48.85 E	144
10,195,290.900	3,122,541.792	871.49	10,195,296.509	3,122,545.736	844.06	28.27	N 35:06:47.47 E	144
10,195,293.808	3,122,537.629	871.54	10,195,299.427	3,122,541.594	844.03	28.36	N 35:12:30.18 E	144
10,195,296.729	3,122,533.475	871.56	10,195,302.352	3,122,537.456	844.01	28.40	N 35:17:52.53 E	144
10,195,299.706	3,122,529.361	871.35	10,195,305.283	3,122,533.322	843.98	28.21	N 35:23:01.81 E	144
10,195,302.659	3,122,525.231	871.27	10,195,308.220	3,122,529.193	843.96	28.15	N 35:28:06.31 E	143
10,195,305.619	3,122,521.105	871.19	10,195,311.164	3,122,525.068	843.93	28.10	N 35:33:11.93 E	143
10,195,308.586	3,122,516.984	871.12	10,195,314.114	3,122,520.948	843.91	28.05	N 35:38:36.33 E	143
10,195,311.558	3,122,512.866	871.05	10,195,317.070	3,122,516.832	843.88	28.01	N 35:44:08.92 E	142
10,195,314.532	3,122,508.751	871.00	10,195,320.033	3,122,512.721	843.86	27.98	N 35:49:02.97 E	142
10,195,317.512	3,122,504.639	870.95	10,195,323.002	3,122,508.615	843.83	27.95	N 35:54:46.90 E	142
10,195,320.498	3,122,500.533	870.89	10,195,325.977	3,122,504.513	843.81	27.91	N 35:59:42.10 E	142
10,195,323.487	3,122,496.428	870.86	10,195,328.958	3,122,500.415	843.78	27.91	N 36:04:57.92 E	142
10,195,326.493	3,122,492.336	870.78	10,195,331.946	3,122,496.322	843.76	27.85	N 36:09:56.97 E	142
10,195,329.503	3,122,488.246	870.70	10,195,334.940	3,122,492.234	843.73	27.80	N 36:15:35.20 E	141
10,195,332.519	3,122,484.161	870.63	10,195,337.940	3,122,488.150	843.71	27.75	N 36:20:49.92 E	141
10,195,335.542	3,122,480.081	870.56	10,195,340.947	3,122,484.071	843.68	27.71	N 36:26:05.79 E	141
10,195,338.569	3,122,476.005	870.49	10,195,343.960	3,122,479.997	843.66	27.66	N 36:31:10.94 E	141
10,195,341.602	3,122,471.932	870.42	10,195,346.979	3,122,475.927	843.63	27.61	N 36:36:41.71 E	140
10,195,344.642	3,122,467.865	870.36	10,195,350.004	3,122,471.862	843.61	27.57	N 36:42:07.13 E	140
10,195,347.687	3,122,463.802	870.29	10,195,353.035	3,122,467.801	843.58	27.53	N 36:47:15.11 E	140
10,195,350.738	3,122,459.743	870.23	10,195,356.073	3,122,463.745	843.56	27.49	N 36:52:30.19 E	140
10,195,353.795	3,122,455.689	870.17	10,195,359.117	3,122,459.694	843.53	27.46	N 36:57:46.08 E	140

SOUTHWEST (LEFT) ROCK CUT - POINT TABLE								
TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,356.858	3,122,451.639	870.11	10,195,362.167	3,122,455.647	843.51	27.42	N 37:03:02.80 E	139
10,195,359.927	3,122,447.595	870.05	10,195,365.223	3,122,451.605	843.48	27.39	N 37:07:55.57 E	139
10,195,363.003	3,122,443.554	869.99	10,195,368.285	3,122,447.568	843.46	27.35	N 37:13:57.48 E	139
10,195,366.086	3,122,439.520	869.93	10,195,371.354	3,122,443.535	843.43	27.32	N 37:18:46.06 E	139
10,195,369.178	3,122,435.493	869.84	10,195,374.429	3,122,439.507	843.41	27.24	N 37:23:42.83 E	139
10,195,372.276	3,122,431.469	869.77	10,195,377.510	3,122,435.484	843.38	27.20	N 37:29:30.49 E	138
10,195,375.378	3,122,427.450	869.70	10,195,380.597	3,122,431.465	843.36	27.15	N 37:34:16.48 E	138
10,195,378.486	3,122,423.435	869.63	10,195,383.690	3,122,427.452	843.33	27.11	N 37:39:53.19 E	138
10,195,381.606	3,122,419.429	869.53	10,195,386.789	3,122,423.443	843.31	27.03	N 37:45:22.21 E	138
10,195,384.741	3,122,415.435	869.39	10,195,389.895	3,122,419.438	843.28	26.91	N 37:50:08.56 E	137
10,195,387.890	3,122,411.452	869.21	10,195,393.006	3,122,415.439	843.26	26.75	N 37:55:47.97 E	136
10,195,391.048	3,122,407.476	869.01	10,195,396.124	3,122,411.444	843.23	26.57	N 38:00:55.35 E	135
10,195,394.212	3,122,403.505	868.81	10,195,399.248	3,122,407.454	843.21	26.39	N 38:06:06.89 E	135
10,195,397.381	3,122,399.538	868.62	10,195,402.378	3,122,403.469	843.18	26.22	N 38:11:28.10 E	134
10,195,400.552	3,122,395.573	868.44	10,195,405.514	3,122,399.489	843.16	26.06	N 38:16:49.54 E	133
10,195,403.729	3,122,391.613	868.27	10,195,408.656	3,122,395.513	843.13	25.91	N 38:21:49.01 E	132
10,195,406.907	3,122,387.653	868.12	10,195,411.805	3,122,391.542	843.11	25.78	N 38:26:58.16 E	131
10,195,410.090	3,122,383.698	867.98	10,195,414.959	3,122,387.577	843.08	25.67	N 38:32:36.17 E	131
10,195,413.280	3,122,379.748	867.84	10,195,418.119	3,122,383.615	843.06	25.54	N 38:37:46.10 E	130
10,195,416.475	3,122,375.803	867.70	10,195,421.286	3,122,379.659	843.03	25.43	N 38:42:43.40 E	129
10,195,419.676	3,122,371.862	867.55	10,195,424.458	3,122,375.708	843.01	25.30	N 38:48:30.73 E	129
10,195,422.885	3,122,367.928	867.40	10,195,427.637	3,122,371.761	842.98	25.17	N 38:53:23.70 E	128
10,195,426.096	3,122,363.996	867.27	10,195,430.821	3,122,367.820	842.96	25.06	N 38:59:01.20 E	128
10,195,429.310	3,122,360.066	867.16	10,195,434.012	3,122,363.883	842.93	24.98	N 39:04:08.68 E	127
10,195,432.531	3,122,356.142	867.04	10,195,437.209	3,122,359.951	842.91	24.87	N 39:09:13.50 E	127
10,195,435.757	3,122,352.223	866.92	10,195,440.411	3,122,356.024	842.88	24.78	N 39:14:20.73 E	126
10,195,438.989	3,122,348.308	866.80	10,195,443.620	3,122,352.102	842.86	24.68	N 39:19:35.19 E	126
10,195,442.227	3,122,344.397	866.69	10,195,446.835	3,122,348.185	842.83	24.59	N 39:25:18.72 E	125
10,195,445.469	3,122,340.491	866.59	10,195,450.055	3,122,344.273	842.81	24.51	N 39:30:42.66 E	125
10,195,448.707	3,122,336.581	866.53	10,195,453.282	3,122,340.365	842.78	24.48	N 39:35:39.41 E	124
10,195,451.951	3,122,332.676	866.48	10,195,456.515	3,122,336.463	842.76	24.45	N 39:41:03.65 E	124
10,195,455.201	3,122,328.777	866.42	10,195,459.753	3,122,332.566	842.73	24.42	N 39:46:24.12 E	124
10,195,458.457	3,122,324.882	866.37	10,195,462.998	3,122,328.673	842.71	24.39	N 39:51:23.10 E	124
10,195,461.719	3,122,320.993	866.31	10,195,466.249	3,122,324.786	842.68	24.36	N 39:56:22.81 E	124
10,195,464.988	3,122,317.108	866.26	10,195,469.505	3,122,320.903	842.66	24.33	N 40:02:08.21 E	124
10,195,468.278	3,122,313.243	866.11	10,195,472.767	3,122,317.026	842.63	24.20	N 40:07:18.24 E	123
10,195,471.537	3,122,309.351	866.17	10,195,476.036	3,122,313.153	842.61	24.29	N 40:12:01.34 E	123
10,195,474.820	3,122,305.479	866.13	10,195,479.310	3,122,309.286	842.58	24.27	N 40:17:38.70 E	123
10,195,478.123	3,122,301.624	866.02	10,195,482.590	3,122,305.423	842.56	24.18	N 40:22:47.27 E	123
10,195,481.431	3,122,297.774	865.90	10,195,485.876	3,122,301.566	842.53	24.09	N 40:28:02.19 E	123
10,195,484.746	3,122,293.929	865.79	10,195,489.168	3,122,297.714	842.51	24.00	N 40:33:42.45 E	122
10,195,488.067	3,122,290.089	865.68	10,195,492.466	3,122,293.866	842.48	23.91	N 40:38:58.30 E	122
10,195,491.424	3,122,286.281	865.40	10,195,495.770	3,122,290.024	842.46	23.65	N 40:44:12.24 E	121
10,195,494.760	3,122,282.455	865.27	10,195,499.080	3,122,286.187	842.43	23.54	N 40:49:24.13 E	120
10,195,498.101	3,122,278.634	865.14	10,195,502.395	3,122,282.355	842.41	23.43	N 40:54:38.98 E	119
10,195,501.448	3,122,274.817	865.01	10,195,505.717	3,122,278.528	842.38	23.33	N 41:00:00.41 E	119
10,195,504.800	3,122,271.005	864.88	10,195,509.044	3,122,274.706	842.36	23.21	N 41:05:24.75 E	118
10,195,508.161	3,122,267.202	864.74	10,195,512.377	3,122,270.889	842.33	23.10	N 41:10:13.90 E	118
10,195,511.529	3,122,263.404	864.59	10,195,515.716	3,122,267.077	842.31	22.97	N 41:15:30.61 E	117
10,195,514.903	3,122,259.611	864.44	10,195,519.061	3,122,263.270	842.28	22.84	N 41:20:50.88 E	116
10,195,518.282	3,122,255.824	864.29	10,195,522.411	3,122,259.469	842.26	22.71	N 41:26:14.75 E	116
10,195,521.680	3,122,252.053	864.07	10,195,525.768	3,122,255.672	842.23	22.51	N 41:31:03.47 E	115
10,195,525.059	3,122,248.265	863.99	10,195,529.130	3,122,251.881	842.21	22.45	N 41:36:45.24 E	114
10,195,528.435	3,122,244.474	863.95	10,195,532.498	3,122,248.095	842.18	22.44	N 41:42:28.27 E	114
10,195,531.807	3,122,240.682	863.96	10,195,535.872	3,122,244.314	842.16	22.47	N 41:46:48.65 E	114
10,195,535.205	3,122,236.911	863.87	10,195,539.252	3,122,240.538	842.13	22.41	N 41:52:02.33 E	114
10,195,538.611	3,122,233.147	863.77	10,195,542.637	3,122,236.768	842.11	22.33	N 41:58:06.01 E	114
10,195,542.028	3,122,229.394	863.63	10,195,546.028	3,122,233.002	842.08	22.21	N 42:03:01.66 E	113
10,195,545.455	3,122,225.650	863.47	10,195,549.425	3,122,229.242	842.06	22.07	N 42:08:18.06 E	112
10,195,548.890	3,122,221.913	863.30	10,195,552.828	3,122,225.487	842.03	21.92	N 42:13:33.08 E	112
10,195,552.328	3,122,218.180	863.15	10,195,556.236	3,122,221.737	842.01	21.79	N 42:18:28.69 E	111
10,195,555.773	3,122,214.452	862.99	10,195,559.650	3,122,217.993	841.98	21.66	N 42:24:23.57 E	110
10,195,559.227	3,122,210.733	862.80	10,195,563.070	3,122,214.253	841.96	21.48	N 42:29:17.38 E	110
10,195,562.689	3,122,207.021	862.61	10,195,566.496	3,122,210.519	841.93	21.32	N 42:34:40.24 E	109
10,195,566.155	3,122,203.314	862.43	10,195,569.927	3,122,206.790	841.91	21.15	N 42:39:41.06 E	108
10,195,569.627	3,122,199.612	862.24	10,195,573.364	3,122,203.067	841.88	20.99	N 42:45:16.45 E	107
10,195,573.103	3,122,195.914	862.07	10,195,576.807	3,122,199.349	841.86	20.83	N 42:50:31.55 E	106
10,195,576.582	3,122,192.219	861.90	10,195,580.255	3,122,195.635	841.83	20.69	N 42:55:25.48 E	105
10,195,580.067	3,122,188.529	861.74	10,195,583.709	3,122,191.928	841.81	20.54	N 43:01:24.18 E	105
10,195,583.552	3,122,184.840	861.60	10,195,587.169	3,122,188.225	841.78	20.43	N 43:06:08.25 E	104
10,195,587.046	3,122,181.159	861.45	10,195,590.635	3,122,184.528	841.76	20.30	N 43:11:20.43 E	103
10,195,590.545	3,122,177.483	861.30	10,195,594.106	3,122,180.836	841.73	20.17	N 43:16:36.62 E	103
10,195,594.050	3,122,173.813	861.15	10,195,597.582	3,122,177.150	841.71	20.04	N 43:22:26.04 E	102
10,195,597.558	3,122,170.146	861.00	10,195,601.065	3,122,173.469	841.68	19.91	N 43:27:24.58 E	101

NOTES:

1. SEE TYPICAL SECTIONS FOR ROCK CUT SLOPES AS WELL AS TOP AND BOTTOM OF ROCK CUT FOR PAY.
2. SEE FENCING AND GRADING PLANS FOR GRADING INFORMATION.
3. ROCK CUT PAID FOR UNDER ITEM S2 RC AS "ROCK CUT" BY THE SF.
4. POINTS ARE LOCATED ALONG ℄ WBFR_S2_CL ON APPROXIMATELY 5' STATION INCREMENTS. NOTE THAT THE ROCK CUT FACES ARE NOT PERPENDICULAR TO THE ROADWAY CENTERLINE. USE TABLE VALUES FOR ROCK CUT CONSTRUCTION. LEFT CUT POINTS ARE FROM STA 435+20 TO STA 446+35 (APPROXIMATE LENGTH OF CUT = 4,354 LF). RIGHT CUT POINTS ARE FROM STA 434+05 TO STA 450+30, FOLLOWED BY POINTS APPROXIMATELY EVERY 3'-5' AROUND THE RIGHT TURN (APPROXIMATE LENGTH OF CUT = 6,998 LF).
5. USE LINEAR INTERPOLATION FOR VALUES BETWEEN ROWS.
6. COORDINATES ARE SURFACE VALUES. TO OBTAIN GRID VALUES, DIVIDE BY A COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00014.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ROCK CUT CONTROL POINTS

SHEET 1 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	95
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000220170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:48:5 PM SCALE: 1:1
FILE: \
4/12/2018 7:20 AM

SOUTHWEST (LEFT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,601.077	3,122,166.490	860.84	10,195,604.553	3,122,169.793	841.66	19.77	N 43:32:17.27 E	101
10,195,604.605	3,122,162.842	860.65	10,195,608.046	3,122,166.122	841.63	19.61	N 43:37:39.92 E	100
10,195,608.138	3,122,159.198	860.47	10,195,611.546	3,122,162.457	841.61	19.44	N 43:43:10.98 E	99
10,195,611.675	3,122,155.560	860.29	10,195,615.051	3,122,158.797	841.58	19.29	N 43:47:45.12 E	98
10,195,615.216	3,122,151.925	860.12	10,195,618.561	3,122,155.143	841.56	19.13	N 43:53:29.09 E	97
10,195,618.763	3,122,148.295	859.96	10,195,622.077	3,122,151.494	841.53	19.00	N 43:59:18.36 E	97
10,195,622.310	3,122,144.667	859.81	10,195,625.599	3,122,147.850	841.51	18.86	N 44:03:42.05 E	96
10,195,625.862	3,122,141.043	859.68	10,195,629.126	3,122,144.212	841.48	18.76	N 44:09:14.18 E	95
10,195,629.425	3,122,137.429	859.52	10,195,632.659	3,122,140.579	841.46	18.62	N 44:14:46.15 E	95
10,195,632.988	3,122,133.817	859.38	10,195,636.197	3,122,136.951	841.43	18.50	N 44:19:21.23 E	94
10,195,636.558	3,122,130.210	859.24	10,195,639.741	3,122,133.329	841.41	18.38	N 44:25:05.35 E	93
10,195,640.141	3,122,126.617	859.05	10,195,643.290	3,122,129.713	841.38	18.21	N 44:30:49.52 E	93
10,195,643.730	3,122,123.030	858.86	10,195,646.845	3,122,126.102	841.36	18.04	N 44:36:06.47 E	92
10,195,647.327	3,122,119.451	858.66	10,195,650.406	3,122,122.496	841.33	17.86	N 44:40:54.84 E	91
10,195,650.936	3,122,115.884	858.41	10,195,653.972	3,122,118.896	841.31	17.63	N 44:46:21.49 E	90
10,195,654.529	3,122,112.301	858.30	10,195,657.543	3,122,115.301	841.29	17.53	N 44:51:59.84 E	89
10,195,658.123	3,122,108.720	858.21	10,195,661.120	3,122,111.712	841.27	17.46	N 44:57:07.80 E	89
10,195,661.722	3,122,105.143	858.12	10,195,664.703	3,122,108.128	841.25	17.39	N 45:02:18.29 E	88
10,195,665.322	3,122,101.568	858.06	10,195,668.291	3,122,104.549	841.23	17.35	N 45:06:56.00 E	88
10,195,668.952	3,122,097.999	857.93	10,195,671.896	3,122,100.965	841.21	17.23	N 45:12:47.82 E	88
10,195,672.630	3,122,094.469	857.58	10,195,675.511	3,122,097.381	841.19	16.89	N 45:18:23.77 E	87
10,195,676.282	3,122,090.914	857.41	10,195,679.132	3,122,093.803	841.17	16.74	N 45:23:21.67 E	86
10,195,679.948	3,122,087.373	857.19	10,195,682.759	3,122,090.231	841.16	16.52	N 45:28:30.04 E	85
10,195,683.622	3,122,083.840	856.96	10,195,686.391	3,122,086.664	841.14	16.31	N 45:33:48.29 E	84
10,195,687.298	3,122,080.309	856.74	10,195,690.028	3,122,083.102	841.12	16.10	N 45:39:12.73 E	83
10,195,690.971	3,122,076.775	856.57	10,195,693.672	3,122,079.546	841.10	15.95	N 45:43:58.48 E	82
10,195,694.650	3,122,073.247	856.41	10,195,697.320	3,122,075.996	841.08	15.80	N 45:50:06.78 E	81
10,195,698.335	3,122,069.726	856.24	10,195,700.975	3,122,072.451	841.06	15.65	N 45:54:27.67 E	80
10,195,702.026	3,122,066.210	856.06	10,195,704.634	3,122,068.911	841.04	15.48	N 46:00:12.86 E	79
10,195,705.726	3,122,062.704	855.87	10,195,708.300	3,122,065.377	841.03	15.30	N 46:04:51.33 E	78
10,195,709.432	3,122,059.204	855.67	10,195,711.971	3,122,061.849	841.01	15.11	N 46:10:17.02 E	78
10,195,713.151	3,122,055.717	855.43	10,195,715.647	3,122,058.326	840.99	14.88	N 46:16:04.96 E	76
10,195,716.884	3,122,052.244	855.15	10,195,719.329	3,122,054.809	840.97	14.62	N 46:22:19.53 E	75
10,195,720.620	3,122,048.775	854.87	10,195,723.017	3,122,051.297	840.95	14.35	N 46:27:20.41 E	74
10,195,724.357	3,122,045.307	854.62	10,195,726.711	3,122,047.790	840.94	14.10	N 46:31:39.66 E	73
10,195,728.082	3,122,041.827	854.47	10,195,730.410	3,122,044.289	840.92	13.97	N 46:36:08.74 E	72
10,195,731.815	3,122,038.353	854.32	10,195,734.114	3,122,040.794	840.90	13.83	N 46:42:57.39 E	71
10,195,735.554	3,122,034.886	854.15	10,195,737.824	3,122,037.304	840.89	13.67	N 46:48:29.61 E	70
10,195,739.299	3,122,031.425	853.99	10,195,741.540	3,122,033.819	840.87	13.52	N 46:53:26.27 E	69
10,195,743.059	3,122,027.980	853.77	10,195,745.262	3,122,030.340	840.86	13.31	N 46:58:14.19 E	68
10,195,746.824	3,122,024.540	853.55	10,195,748.989	3,122,026.866	840.84	13.10	N 47:03:11.32 E	67
10,195,750.593	3,122,021.104	853.34	10,195,752.722	3,122,023.398	840.83	12.90	N 47:08:11.14 E	66
10,195,754.367	3,122,017.672	853.14	10,195,756.460	3,122,019.936	840.81	12.71	N 47:14:51.16 E	65
10,195,758.147	3,122,014.248	852.93	10,195,760.204	3,122,016.478	840.80	12.50	N 47:18:39.21 E	64
10,195,761.936	3,122,010.831	852.71	10,195,763.954	3,122,013.026	840.78	12.30	N 47:24:20.67 E	63
10,195,765.751	3,122,007.403	852.49	10,195,767.728	3,122,009.566	840.77	12.08	N 47:34:20.74 E	63
10,195,769.582	3,122,003.982	852.26	10,195,771.518	3,122,006.111	840.75	11.86	N 47:43:05.79 E	62
10,195,773.428	3,122,000.576	852.01	10,195,775.318	3,122,002.667	840.74	11.62	N 47:53:25.44 E	60
10,195,777.287	3,121,997.186	851.74	10,195,779.128	3,121,999.235	840.72	11.36	N 48:03:38.58 E	59
10,195,781.151	3,121,993.801	851.50	10,195,782.948	3,121,995.813	840.71	11.12	N 48:13:50.33 E	58
10,195,785.024	3,121,990.426	851.26	10,195,786.779	3,121,992.402	840.69	10.90	N 48:23:23.52 E	57
10,195,788.909	3,121,987.065	851.02	10,195,790.619	3,121,989.002	840.68	10.66	N 48:33:41.99 E	55
10,195,792.803	3,121,983.713	850.78	10,195,794.470	3,121,985.614	840.66	10.43	N 48:45:08.11 E	54
10,195,796.705	3,121,980.372	850.54	10,195,798.331	3,121,982.236	840.65	10.19	N 48:54:04.45 E	53
10,195,800.618	3,121,977.043	850.30	10,195,802.202	3,121,978.870	840.63	9.97	N 49:04:29.54 E	52
10,195,804.541	3,121,973.726	850.06	10,195,806.083	3,121,975.514	840.62	9.73	N 49:13:29.95 E	51
10,195,808.476	3,121,970.421	849.81	10,195,809.974	3,121,972.170	840.60	9.49	N 49:25:13.06 E	49
10,195,812.420	3,121,967.129	849.56	10,195,813.875	3,121,968.837	840.59	9.25	N 49:34:23.52 E	48
10,195,816.374	3,121,963.849	849.31	10,195,817.786	3,121,965.516	840.57	9.01	N 49:44:03.77 E	47
10,195,820.338	3,121,960.579	849.06	10,195,821.707	3,121,962.205	840.56	8.76	N 49:54:16.27 E	46
10,195,824.308	3,121,957.317	848.83	10,195,825.638	3,121,958.906	840.54	8.55	N 50:04:13.87 E	44
10,195,828.287	3,121,954.067	848.60	10,195,829.578	3,121,955.619	840.52	8.33	N 50:14:43.09 E	43
10,195,832.276	3,121,950.828	848.37	10,195,833.529	3,121,952.343	840.51	8.10	N 50:24:25.63 E	42
10,195,836.274	3,121,947.601	848.14	10,195,837.489	3,121,949.078	840.49	7.89	N 50:33:31.78 E	41
10,195,840.282	3,121,944.385	847.91	10,195,841.458	3,121,945.824	840.48	7.66	N 50:44:35.27 E	40
10,195,844.300	3,121,941.181	847.68	10,195,845.438	3,121,942.583	840.46	7.44	N 50:56:01.84 E	39
10,195,848.328	3,121,937.990	847.45	10,195,849.427	3,121,939.352	840.45	7.22	N 51:05:59.58 E	38
10,195,852.375	3,121,934.825	847.14	10,195,853.426	3,121,936.133	840.43	6.92	N 51:13:03.13 E	36
10,195,856.432	3,121,931.671	846.84	10,195,857.434	3,121,932.926	840.41	6.63	N 51:23:45.28 E	35
10,195,860.499	3,121,928.529	846.53	10,195,861.452	3,121,929.730	840.40	6.32	N 51:34:04.11 E	33
10,195,864.223	3,121,924.953	846.24	10,195,865.479	3,121,926.546	840.38	6.20	N 51:44:45.62 E	32
10,195,867.574	3,121,920.895	845.96	10,195,869.516	3,121,923.374	840.36	6.42	N 51:55:31.97 E	33
10,195,868.581	3,121,913.817	845.75	10,195,873.562	3,121,920.214	840.35	9.74	N 52:05:38.49 E	58
10,195,871.933	3,121,909.722	845.49	10,195,877.618	3,121,917.065	840.33	10.62	N 52:15:09.80 E	54

SOUTHWEST (LEFT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,874.960	3,121,905.190	845.21	10,195,881.683	3,121,913.928	840.31	12.06	N 52:25:31.40 E	62
10,195,877.243	3,121,899.670	844.97	10,195,885.757	3,121,910.802	840.30	14.77	N 52:35:25.59 E	80

NOTES:

1. SEE TYPICAL SECTIONS FOR ROCK CUT SLOPES AS WELL AS TOP AND BOTTOM OF ROCK CUT FOR PAY.
2. SEE FENCING AND GRADING PLANS FOR GRADING INFORMATION.
3. ROCK CUT PAID FOR UNDER ITEM S2 RC AS "ROCK CUT" BY THE SF.
4. POINTS ARE LOCATED ALONG ℄ WBFR_S2_CL ON APPROXIMATELY 5' STATION INCREMENTS. NOTE THAT THE ROCK CUT FACES ARE NOT PERPENDICULAR TO THE ROADWAY CENTERLINE. USE TABLE VALUES FOR ROCK CUT CONSTRUCTION. LEFT CUT POINTS ARE FROM STA 435+20 TO STA 446+35 (APPROXIMATE LENGTH OF CUT = 4,354 LF). RIGHT CUT POINTS ARE FROM STA 434+05 TO STA 450+30, FOLLOWED BY POINTS APPROXIMATELY EVERY 3'-5' AROUND THE RIGHT TURN (APPROXIMATE LENGTH OF CUT = 6,998 LF).
5. USE LINEAR INTERPOLATION FOR VALUES BETWEEN ROWS.
6. COORDINATES ARE SURFACE VALUES. TO OBTAIN GRID VALUES, DIVIDE BY A COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00014.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ROCK CUT CONTROL POINTS

SHEET 2 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	96
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:48:8 PM SCALE: 1:1
FILE: \

NORTHEAST (RIGHT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,176.731	3,122,912.268	839.82	10,195,176.560	3,122,912.175	839.03	0.81	S 28:32:23.95 W	0
10,195,183.693	3,122,910.455	860.92	10,195,178.917	3,122,907.848	839.16	22.43	S 28:37:41.19 W	57
10,195,187.553	3,122,906.961	867.89	10,195,181.282	3,122,903.525	839.28	29.49	S 28:43:09.02 W	128
10,195,190.827	3,122,903.151	872.16	10,195,183.652	3,122,899.205	839.41	33.76	S 28:48:33.34 W	156
10,195,193.321	3,122,898.913	872.84	10,195,186.029	3,122,894.890	839.52	34.35	S 28:53:07.96 W	168
10,195,195.666	3,122,894.594	872.81	10,195,188.413	3,122,890.577	839.64	34.19	S 28:58:45.94 W	169
10,195,198.016	3,122,890.289	872.78	10,195,190.799	3,122,886.277	839.75	34.05	S 29:04:12.38 W	168
10,195,200.400	3,122,885.980	872.84	10,195,193.201	3,122,881.964	839.87	33.98	S 29:09:18.69 W	168
10,195,202.787	3,122,881.684	872.90	10,195,195.605	3,122,877.663	839.97	33.94	S 29:14:35.66 W	167
10,195,205.180	3,122,877.391	872.96	10,195,198.015	3,122,873.365	840.08	33.89	S 29:19:53.58 W	167
10,195,207.568	3,122,873.107	872.98	10,195,200.427	3,122,869.080	840.18	33.81	S 29:25:11.31 W	167
10,195,209.966	3,122,868.805	872.97	10,195,202.855	3,122,864.781	840.29	33.69	S 29:30:17.35 W	167
10,195,212.368	3,122,864.518	872.97	10,195,205.285	3,122,860.495	840.38	33.59	S 29:35:44.50 W	166
10,195,214.788	3,122,860.239	873.01	10,195,207.722	3,122,856.212	840.48	33.53	S 29:40:45.64 W	165
10,195,217.209	3,122,855.962	873.03	10,195,210.165	3,122,851.933	840.57	33.46	S 29:46:06.70 W	165
10,195,219.628	3,122,851.684	873.01	10,195,212.614	3,122,847.658	840.67	33.34	S 29:51:20.17 W	165
10,195,222.054	3,122,847.410	872.99	10,195,215.071	3,122,843.387	840.75	33.23	S 29:56:48.56 W	164
10,195,224.484	3,122,843.137	872.96	10,195,217.533	3,122,839.119	840.84	33.11	S 30:01:47.65 W	164
10,195,226.930	3,122,838.874	872.96	10,195,220.002	3,122,834.855	840.92	33.03	S 30:07:06.37 W	163
10,195,229.391	3,122,834.619	873.00	10,195,222.478	3,122,830.595	841.01	32.97	S 30:12:11.99 W	163
10,195,231.851	3,122,830.364	873.00	10,195,224.961	3,122,826.339	841.08	32.90	S 30:17:33.42 W	162
10,195,234.317	3,122,826.113	873.01	10,195,227.449	3,122,822.086	841.16	32.83	S 30:23:05.66 W	162
10,195,236.762	3,122,821.849	872.87	10,195,229.945	3,122,817.838	841.23	32.61	S 30:28:18.44 W	161
10,195,239.132	3,122,817.540	872.36	10,195,232.446	3,122,813.593	841.31	32.01	S 30:33:17.89 W	159
10,195,241.589	3,122,813.282	872.22	10,195,234.955	3,122,809.352	841.37	31.80	S 30:38:33.43 W	157
10,195,244.071	3,122,809.039	872.16	10,195,237.470	3,122,805.114	841.44	31.67	S 30:44:09.63 W	156
10,195,246.472	3,122,804.748	871.69	10,195,239.991	3,122,800.881	841.50	31.12	S 30:49:23.31 W	155
10,195,248.866	3,122,800.452	871.16	10,195,242.519	3,122,796.652	841.57	30.50	S 30:54:33.47 W	152
10,195,251.396	3,122,796.237	871.22	10,195,245.053	3,122,792.426	841.62	30.51	S 30:59:53.81 W	150
10,195,253.951	3,122,792.037	871.37	10,195,247.594	3,122,788.204	841.68	30.60	S 31:05:17.47 W	151
10,195,256.464	3,122,787.812	871.29	10,195,250.141	3,122,783.987	841.73	30.47	S 31:10:16.27 W	151
10,195,258.984	3,122,783.591	871.22	10,195,252.694	3,122,779.773	841.79	30.34	S 31:15:27.18 W	150
10,195,261.511	3,122,779.374	871.14	10,195,255.255	3,122,775.563	841.83	30.21	S 31:20:55.45 W	149
10,195,264.075	3,122,775.179	871.20	10,195,257.821	3,122,771.357	841.88	30.22	S 31:25:49.10 W	149
10,195,266.661	3,122,770.998	871.33	10,195,260.394	3,122,767.154	841.92	30.32	S 31:31:25.58 W	149
10,195,269.254	3,122,766.822	871.47	10,195,262.973	3,122,762.956	841.97	30.41	S 31:36:45.33 W	150
10,195,271.851	3,122,762.648	871.58	10,195,265.559	3,122,758.762	842.00	30.49	S 31:41:59.56 W	150
10,195,274.437	3,122,758.467	871.62	10,195,268.151	3,122,754.572	842.04	30.49	S 31:47:01.09 W	150
10,195,277.034	3,122,754.293	871.67	10,195,270.750	3,122,750.385	842.07	30.51	S 31:52:38.47 W	150
10,195,279.639	3,122,750.124	871.73	10,195,273.355	3,122,746.203	842.11	30.53	S 31:57:45.88 W	150
10,195,282.251	3,122,745.959	871.79	10,195,275.967	3,122,742.025	842.13	30.57	S 32:02:52.73 W	151
10,195,284.870	3,122,741.799	871.85	10,195,278.584	3,122,737.851	842.16	30.60	S 32:07:52.98 W	151
10,195,287.496	3,122,737.644	871.91	10,195,281.209	3,122,733.680	842.18	30.64	S 32:13:54.24 W	151
10,195,290.129	3,122,733.492	871.97	10,195,283.839	3,122,729.514	842.21	30.68	S 32:18:38.12 W	151
10,195,292.776	3,122,729.350	872.07	10,195,286.476	3,122,725.352	842.22	30.77	S 32:23:57.63 W	151
10,195,295.447	3,122,725.223	872.25	10,195,289.120	3,122,721.194	842.24	30.93	S 32:29:19.56 W	152
10,195,298.125	3,122,721.100	872.42	10,195,291.769	3,122,717.039	842.25	31.10	S 32:34:31.73 W	153
10,195,300.774	3,122,716.959	872.43	10,195,294.425	3,122,712.889	842.27	31.09	S 32:39:42.24 W	153
10,195,303.411	3,122,712.811	872.35	10,195,297.088	3,122,708.743	842.27	31.01	S 32:45:20.99 W	153
10,195,306.055	3,122,708.666	872.26	10,195,299.757	3,122,704.601	842.28	30.90	S 32:50:23.77 W	153
10,195,308.705	3,122,704.526	872.18	10,195,302.432	3,122,700.464	842.28	30.82	S 32:55:28.39 W	152
10,195,311.363	3,122,700.391	872.10	10,195,305.113	3,122,696.330	842.29	30.73	S 33:00:51.12 W	152
10,195,314.028	3,122,696.259	872.02	10,195,307.801	3,122,692.200	842.28	30.65	S 33:05:52.32 W	151
10,195,316.726	3,122,692.150	872.06	10,195,310.495	3,122,688.075	842.28	30.70	S 33:11:03.15 W	151
10,195,319.443	3,122,688.053	872.16	10,195,313.195	3,122,683.953	842.27	30.81	S 33:16:23.83 W	152
10,195,322.166	3,122,683.961	872.27	10,195,315.902	3,122,679.836	842.27	30.92	S 33:21:57.24 W	152
10,195,324.881	3,122,679.862	872.29	10,195,318.615	3,122,675.723	842.25	30.96	S 33:26:48.18 W	153
10,195,327.601	3,122,675.768	872.31	10,195,321.335	3,122,671.614	842.24	31.00	S 33:32:31.57 W	153
10,195,330.328	3,122,671.678	872.33	10,195,324.060	3,122,667.509	842.22	31.04	S 33:37:43.86 W	153
10,195,333.030	3,122,667.572	872.20	10,195,326.792	3,122,663.409	842.21	30.91	S 33:43:03.41 W	153
10,195,335.745	3,122,663.473	872.10	10,195,329.530	3,122,659.312	842.18	30.84	S 33:48:09.63 W	152
10,195,338.477	3,122,659.386	872.05	10,195,332.275	3,122,655.220	842.16	30.81	S 33:53:24.00 W	152
10,195,341.215	3,122,655.304	871.99	10,195,335.025	3,122,651.132	842.14	30.77	S 33:58:46.52 W	152
10,195,343.960	3,122,651.226	871.94	10,195,337.782	3,122,647.048	842.11	30.75	S 34:04:09.61 W	152
10,195,346.717	3,122,647.156	871.92	10,195,340.545	3,122,642.969	842.09	30.75	S 34:09:08.75 W	152
10,195,349.480	3,122,643.090	871.89	10,195,343.315	3,122,638.893	842.06	30.75	S 34:14:46.30 W	152
10,195,352.239	3,122,639.021	871.82	10,195,346.091	3,122,634.822	842.04	30.70	S 34:19:57.15 W	151
10,195,355.001	3,122,634.955	871.73	10,195,348.872	3,122,630.756	842.01	30.63	S 34:24:54.66 W	151
10,195,357.770	3,122,630.892	871.64	10,195,351.661	3,122,626.693	841.99	30.56	S 34:30:09.19 W	151
10,195,360.552	3,122,626.840	871.59	10,195,354.455	3,122,622.635	841.96	30.54	S 34:35:36.19 W	151
10,195,363.344	3,122,622.793	871.55	10,195,357.256	3,122,618.581	841.94	30.52	S 34:40:39.11 W	151
10,195,366.141	3,122,618.751	871.51	10,195,360.062	3,122,614.531	841.91	30.51	S 34:46:05.22 W	150
10,195,368.945	3,122,614.713	871.47	10,195,362.875	3,122,610.486	841.89	30.49	S 34:51:08.68 W	150
10,195,371.757	3,122,610.681	871.44	10,195,365.694	3,122,606.445	841.86	30.49	S 34:56:26.21 W	150

NORTHEAST (RIGHT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,374.573	3,122,606.651	871.41	10,195,368.520	3,122,602.408	841.84	30.48	S 35:01:46.14 W	150
10,195,377.396	3,122,602.627	871.37	10,195,371.351	3,122,598.375	841.81	30.47	S 35:07:19.98 W	150
10,195,380.224	3,122,598.606	871.33	10,195,374.189	3,122,594.347	841.79	30.45	S 35:12:40.52 W	150
10,195,383.059	3,122,594.590	871.30	10,195,377.033	3,122,590.324	841.76	30.45	S 35:17:45.27 W	150
10,195,385.900	3,122,590.578	871.26	10,195,379.883	3,122,586.304	841.74	30.43	S 35:23:13.09 W	150
10,195,388.732	3,122,586.559	871.15	10,195,382.739	3,122,582.289	841.71	30.35	S 35:28:11.25 W	150
10,195,391.577	3,122,582.550	871.07	10,195,385.601	3,122,578.278	841.69	30.28	S 35:33:33.98 W	149
10,195,394.429	3,122,578.546	870.99	10,195,388.470	3,122,574.272	841.66	30.23	S 35:38:57.82 W	149
10,195,397.283	3,122,574.543	870.90	10,195,391.344	3,122,570.270	841.64	30.16	S 35:44:03.53 W	149
10,195,400.143	3,122,570.545	870.81	10,195,394.225	3,122,566.273	841.61	30.10	S 35:49:27.19 W	149
10,195,403.021	3,122,566.559	870.77	10,195,397.112	3,122,562.280	841.59	30.08	S 35:54:36.58 W	148
10,195,405.909	3,122,562.581	870.75	10,195,400.005	3,122,558.291	841.56	30.09	S 36:00:11.27 W	148
10,195,408.804	3,122,558.607	870.74	10,195,402.904	3,122,554.307	841.54	30.10	S 36:05:06.26 W	148
10,195,411.705	3,122,554.638	870.73	10,195,405.809	3,122,550.327	841.51	30.12	S 36:10:23.84 W	148
10,195,414.598	3,122,550.663	870.64	10,195,408.720	3,122,546.352	841.49	30.05	S 36:15:24.46 W	148
10,195,417.496	3,122,546.692	870.56	10,195,411.637	3,122,542.381	841.46	30.00	S 36:20:43.09 W	148
10,195,420.400	3,122,542.726	870.47	10,195,414.561	3,122,538.415	841.44	29.92	S 36:26:19.94 W	148
10,195,423.309	3,122,538.763	870.37	10,195,417.490	3,122,534.453	841.41	29.85	S 36:31:35.40 W	147
10,195,426.226	3,122,534.805	870.29	10,195,420.426	3,122,530.496	841.39	29.79	S 36:36:35.29 W	147
10,195,429.148	3,122,530.852	870.20	10,195,423.367	3,122,526.543	841.36	29.73	S 36:41:59.44 W	147
10,195,432.077	3,122,526.903	870.11	10,195,426.315	3,122,522.594	841.34	29.66	S 36:47:24.95 W	146
10,195,435.012	3,122,522.959	870.03	10,195,429.268	3,122,518.651	841.31	29.60	S 36:52:11.63 W	146
10,195,437.952	3,122,519.019	869.94	10,195,432.228	3,122,514.711	841.29	29.53	S 36:57:57.13 W	146
10,195,440.900	3,122,515.084	869.86	10,195,435.194	3,122,510.777	841.26	29.48	S 37:02:46.38 W	145
10,195,443.856	3,122,511.155	869.79	10,195,438.166	3,122,506.846	841.24	29.43	S 37:08:11.08 W	145
10,195,446.822	3,122,507.235	869.74	10,195,441.143	3,122,502.921	841.21	29.41	S 37:13:18.43 W	145
10,195,449.794	3,122,503.319	869.69	10,195,444.127	3,122,498.999	841.19	29.38	S 37:19:06.84 W	145
10,195,452.772	3,122,499.407	869.64	10,195,447.117	3,122,495.083	841.16	29.36	S 37:24:09.81 W	145
10,195,455.752	3,122,495.497	869.57	10,195,450.113	3,122,491.171	841.14	29.30	S 37:29:37.97 W	145
10,195,458.733	3,122,491.587	869.47	10,195,453.114	3,122,487.264	841.11	29.23	S 37:34:22.90 W	144
10,195,461.728	3,122,487.688	869.41	10,195,456.122	3,122,483.361	841.09	29.19	S 37:39:46.12 W	144
10,195,464.728	3,122,483.793	869.35	10,195,459.136	3,122,479.463	841.06	29.16	S 37:45:04.87 W	144
10,195,467.734	3,122,479.903	869.29	10,195,462.155	3,122,475.569	841.04	29.12	S 37:50:29.59 W	144
10,195,470.747	3,122,476.017	869.23	10,195,465.181	3,122,471.680	841.01	29.09	S 37:55:31.97 W	143
10,195,473.766	3,122,472.137	869.18	10,195,468.213	3,122,467.796	840.99	29.06	S 38:00:58.13 W	143
10,195,476.792	3,122,468.262	869.13	10,195,471.250	3,122,463.916	840.96	29.04	S 38:06:11.91 W	143
10,195,479.819	3,122,464.388	869.05	10,195,474.294	3,122,460.041	840.94	28.98	S 38:11:42.79 W	143
10,195,482.846	3,122,460.514	868.95	10,195,477.343	3,122,456.171	840.91	28.90	S 38:16:50.55 W	143
10,195,485.880	3,122,456.645	868.85	10,195,480.398	3,122,452.305	840.89	28.82	S 38:22:04.87 W	142
10,195,488.919	3,122,452.780	868.75	10,195,483.459	3,122,448.444	840.86	28.75	S 38:27:16.08 W	142
10,195,491.964	3,122,448.920	868.65	10,195,486.527	3,122,444.588	840.84	28.67	S 38:32:47.53 W	142
10,195,495.016	3,122,445.065	868.54	10,195,489.600	3,122,440.737	840.81	28.58	S 38:37:43.80 W	141
10,195,498.084	3,122,441.223	868.50	10,195,492.679	3,122,436.890	840.79	28.56	S 38:43:04.56 W	141
10,195,501.158	3,122,437.385	868.45	10,195,495.763	3,122,433.048	840.76	28.54	S 38:47:43.94 W	141
10,195,504.220	3,122,433.539	868.31	10,195,498.854	3,122,429.210	840.74	28.42	S 38:53:41.00 W	140
10,195,507.232	3,122,429.651	867.88	10,195,501.951	3,122,425.378	840.71	28.01	S 38:58:38.13 W	139
10,195,510.253	3,122,425.771	867.48	10,195,505.053	3,122,421.550	840.69	27.61	S 39:04:02.28 W	137
10,195,513.344	3,122,421.947	867.39	10,195,508.161	3,122,417.726	840.66	27.55	S 39:09:32.89 W	136
10,195,516.421	3,122,418.111	867.21	10,195,511.275	3,122,413.908	840.64	27.39	S 39:14:24.94 W	135
10,195,519.497	3,122,414.275	866.99	10,195,514.395	3,122,410.094	840.61	27.19	S 39:20:02.47 W	135
10,195,522.585	3,122,410.448	866.81	10,195,517.521	3,122,406.286	840.59	27.03	S 39:24:57.96 W	134
10,195,525.707	3,122,406.649	866.77	10,195,520.653	3,122,402.482	840.56	27.02	S 39:30:19.53 W	133
10,195,528.836	3,122,402.856	866.73	10,195,523.790	3,122,398.682	840.54	27.00	S 39:35:49.95 W	133
10,195,531.971	3,122,399.067	866.69	10,195,526.933	3,122,394.888	840.51	26.99	S 39:40:32.03 W	133
10,195,535.111	3,122,395.283	866.66	10,195,530.083	3,122,391.098	840.49	26.98	S 39:46:18.94 W	133
10,195,538.258	3,122,391.504	866.62	10,195,533.237	3,122,387.313	840.46	26.97	S 39:51:05.61 W	133
10,195,541.407	3,122,387.728	866.57	10,195,536.398	3,122,383.533	840.44	26.93	S 39:56:45.32 W	133
10,195,544.550	3,122,383.946	866.45	10,195,539.565	3,122,379.758	840.41	26.84	S 40:02:03.49 W	133
10,195,547.698	3,122,380.169	866.34	10,195,542.737	3,122,375.988	840.39	26.75	S 40:07:23.90 W	132
10,195,550.843	3,122,376.388	866.17	10,195,545.915	3,122,372.223	840.36	26.60	S 40:12:12.63 W	132
10,195,553.993	3,122,372.613	866.01	10,195,549.099	3,122,368.462	840.34	26.46	S 40:18:14.37 W	131
10,195,557.150	3,122,368.842	865.84	10,195,552.288	3,122,364.706	840.31	26.32	S 40:23:13.58 W	130
10,195,560.313	3,122,365.076	865.68	10,195,555.483	3,122,360.956	840.29	26.17	S 40:27:51.29 W	129
10,195,563.491	3,122,361.324	865.57	10,195,558.684	3,122,357.210	840.26	26.09	S 40:33:29.08 W	129
10,195,566.675	3,122,357.576	865.46	10,195,561.891	3,122,353.469	840.24	26.00	S 40:38:44.34 W	128
10,195,569.863	3,122,353.836	865.34	10,195,565.104	3,122,349.734	840.21	25.90	S 40:45:34.40 W	128
10,195,573.055	3,122,350.103	865.21	10,195,568.326	3,122,346.006	840.19	25.79	S 40:54:15.24 W	127
10,195,576.254	3,122,346.374	865.07	10,195,571.557	3,122,342.286	840.16	25.68	S 41:02:04.00 W	127
10,195,579.461	3,122,342.653	864.92	10,195,574.797	3,122,338.573	840.14	25.54	S 41:10:44.28 W	126
10,195,582.678	3,122,338.939	864.78	10,195,578.045	3,122,334.868	840.11	25.43	S 41:18:20.35 W	126
10,195,585.904	3,122,335.234	864.64	10,195,581.302	3,122,331.171	840.09	25.31	S 41:26:25.96 W	125
10,195,589.138	3,122,331.536	864.50	10,195,584.568	3,122,327.481	840.06	25.19	S 41:34:58.50 W	124
10,195,592.387	3,122,327.850	864.39	10,195,587.842	3,122,323.799	840.04	25.10	S 41:42:39.28 W	124
10,195,595.644	3,122,324.172	864.28	10,195,591.125	3,122,320.125	840.01	25.02	S 41:50:45.97 W	124

NOTES:

1. SEE TYPICAL SECTIONS FOR ROCK CUT SLOPES AS WELL AS TOP AND BOTTOM OF ROCK CUT FOR PAY.
2. SEE FENCING AND GRADING PLANS FOR GRADING INFORMATION.
3. ROCK CUT PAID FOR UNDER ITEM S2 RC AS "ROCK CUT" BY THE SF.
4. POINTS ARE LOCATED ALONG ℄ WBFR_S2_CL ON APPROXIMATELY 5' STATION INCREMENTS. NOTE THAT THE ROCK CUT FACES ARE NOT PERPENDICULAR TO THE ROADWAY CENTERLINE. USE TABLE VALUES FOR ROCK CUT CONSTRUCTION. LEFT CUT POINTS ARE FROM STA 435+20 TO STA 446+35 (APPROXIMATE LENGTH OF CUT = 4,354 LF). RIGHT CUT POINTS ARE FROM STA 434+05 TO STA 450+30, FOLLOWED BY POINTS APPROXIMATELY EVERY 3'-5' AROUND THE RIGHT TURN (APPROXIMATE LENGTH OF CUT = 6,998 LF).
5. USE LINEAR INTERPOLATION FOR VALUES BETWEEN ROWS.
6. COORDINATES ARE SURFACE VALUES. TO OBTAIN GRID VALUES, DIVIDE BY A COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00014.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ROCK CUT CONTROL POINTS

SHEET 3 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	97
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00002201T0718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:48:21 PM SCALE: 1:1
FILE: \
4/12/2018 7:20 AM

NORTHEAST (RIGHT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,598.911	3,122,320.503	864.17	10,195,594.416	3,122,316.458	839.99	24.92	S 41:59:01.29 W	123
10,195,602.187	3,122,316.842	864.07	10,195,597.716	3,122,312.800	839.96	24.85	S 42:06:54.38 W	123
10,195,605.454	3,122,313.172	863.87	10,195,601.024	3,122,309.149	839.94	24.67	S 42:14:36.31 W	122
10,195,608.727	3,122,309.508	863.66	10,195,604.341	3,122,305.505	839.91	24.48	S 42:23:09.51 W	121
10,195,612.018	3,122,305.860	863.50	10,195,607.667	3,122,301.870	839.89	24.34	S 42:31:18.39 W	120
10,195,615.333	3,122,302.233	863.42	10,195,611.001	3,122,298.242	839.86	24.29	S 42:39:13.89 W	120
10,195,618.656	3,122,298.614	863.34	10,195,614.344	3,122,294.623	839.84	24.22	S 42:47:09.62 W	120
10,195,621.986	3,122,295.002	863.25	10,195,617.695	3,122,291.011	839.81	24.16	S 42:55:31.71 W	119
10,195,625.316	3,122,291.389	863.12	10,195,621.054	3,122,287.407	839.79	24.05	S 43:03:17.09 W	119
10,195,628.669	3,122,287.798	863.06	10,195,624.422	3,122,283.811	839.76	24.02	S 43:11:29.07 W	118
10,195,632.027	3,122,284.211	862.99	10,195,627.798	3,122,280.223	839.74	23.97	S 43:19:12.10 W	118
10,195,635.390	3,122,280.630	862.90	10,195,631.183	3,122,276.643	839.71	23.90	S 43:27:43.34 W	118
10,195,638.762	3,122,277.057	862.81	10,195,634.576	3,122,273.071	839.68	23.84	S 43:35:52.92 W	118
10,195,642.143	3,122,273.492	862.72	10,195,637.977	3,122,269.507	839.66	23.77	S 43:43:40.46 W	117
10,195,645.532	3,122,269.935	862.63	10,195,641.387	3,122,265.951	839.63	23.71	S 43:51:55.33 W	117
10,195,648.927	3,122,266.384	862.52	10,195,644.804	3,122,262.403	839.60	23.63	S 43:59:46.15 W	117
10,195,652.316	3,122,262.849	862.40	10,195,648.219	3,122,258.875	839.57	23.53	S 44:07:36.82 W	116
10,195,655.709	3,122,259.325	862.28	10,195,651.639	3,122,255.358	839.54	23.44	S 44:15:56.71 W	115
10,195,659.110	3,122,255.810	862.15	10,195,655.066	3,122,251.850	839.51	23.34	S 44:23:55.38 W	115
10,195,662.519	3,122,252.304	862.03	10,195,658.501	3,122,248.350	839.48	23.24	S 44:32:24.12 W	114
10,195,665.937	3,122,248.805	861.91	10,195,661.944	3,122,244.859	839.45	23.15	S 44:39:38.90 W	114
10,195,669.363	3,122,245.314	861.78	10,195,665.396	3,122,241.375	839.42	23.05	S 44:47:49.49 W	113
10,195,672.789	3,122,241.825	861.62	10,195,668.855	3,122,237.900	839.39	22.91	S 44:56:03.79 W	113
10,195,676.215	3,122,238.336	861.41	10,195,672.322	3,122,234.433	839.36	22.73	S 45:04:24.58 W	112
10,195,679.650	3,122,234.854	861.20	10,195,675.797	3,122,230.974	839.33	22.54	S 45:12:00.18 W	111
10,195,683.092	3,122,231.381	860.99	10,195,679.280	3,122,227.524	839.30	22.36	S 45:20:10.30 W	110
10,195,686.549	3,122,227.923	860.82	10,195,682.771	3,122,224.082	839.26	22.22	S 45:28:25.52 W	109
10,195,690.024	3,122,224.483	860.70	10,195,686.269	3,122,220.648	839.23	22.13	S 45:36:13.99 W	109
10,195,693.508	3,122,221.052	860.59	10,195,689.776	3,122,217.223	839.20	22.05	S 45:44:06.02 W	108
10,195,696.998	3,122,217.629	860.47	10,195,693.290	3,122,213.806	839.17	21.96	S 45:52:29.46 W	108
10,195,700.490	3,122,214.207	860.31	10,195,696.812	3,122,210.397	839.13	21.83	S 46:00:35.70 W	107
10,195,703.981	3,122,210.784	860.11	10,195,700.341	3,122,206.997	839.10	21.66	S 46:08:01.99 W	107
10,195,707.493	3,122,207.384	859.98	10,195,703.879	3,122,203.606	839.07	21.55	S 46:16:15.47 W	106
10,195,711.294	3,122,204.287	861.48	10,195,707.424	3,122,200.222	839.03	23.14	S 46:24:27.87 W	109
10,195,714.983	3,122,201.075	862.29	10,195,710.977	3,122,196.848	839.00	24.01	S 46:32:15.48 W	116
10,195,718.571	3,122,197.758	862.48	10,195,714.537	3,122,193.481	838.96	24.24	S 46:40:29.13 W	118
10,195,721.903	3,122,194.169	861.12	10,195,718.105	3,122,190.124	838.93	22.87	S 46:48:13.76 W	115
10,195,725.309	3,122,190.657	860.15	10,195,721.681	3,122,186.774	838.89	21.91	S 46:56:40.04 W	110
10,195,728.682	3,122,187.109	858.91	10,195,725.264	3,122,183.434	838.83	20.70	S 47:04:30.31 W	104
10,195,732.238	3,122,183.756	858.68	10,195,728.855	3,122,180.102	838.76	20.53	S 47:12:19.48 W	101
10,195,735.802	3,122,180.412	858.45	10,195,732.454	3,122,176.778	838.68	20.38	S 47:20:44.40 W	100
10,195,739.367	3,122,177.069	858.17	10,195,736.059	3,122,173.463	838.60	20.17	S 47:28:04.71 W	99
10,195,742.916	3,122,173.736	857.85	10,195,739.659	3,122,170.169	838.53	19.91	S 47:36:03.74 W	98
10,195,746.469	3,122,170.419	857.53	10,195,743.261	3,122,166.889	838.45	19.67	S 47:44:09.63 W	96
10,195,750.046	3,122,167.130	857.31	10,195,746.870	3,122,163.618	838.37	19.52	S 47:52:33.88 W	95
10,195,753.633	3,122,163.851	857.11	10,195,750.486	3,122,160.355	838.29	19.40	S 48:00:26.48 W	95
10,195,757.223	3,122,160.576	856.91	10,195,754.109	3,122,157.101	838.24	19.24	S 48:08:09.61 W	94
10,195,760.818	3,122,157.307	856.70	10,195,757.739	3,122,153.856	838.20	19.07	S 48:15:37.77 W	93
10,195,764.415	3,122,154.041	856.47	10,195,761.377	3,122,150.619	838.17	18.86	S 48:24:06.53 W	92
10,195,768.009	3,122,150.773	856.18	10,195,765.021	3,122,147.391	838.13	18.61	S 48:32:21.75 W	91
10,195,771.611	3,122,147.513	855.88	10,195,768.673	3,122,144.173	838.09	18.34	S 48:39:49.77 W	90
10,195,775.227	3,122,144.270	855.64	10,195,772.332	3,122,140.962	838.05	18.13	S 48:48:33.01 W	89
10,195,778.853	3,122,141.038	855.40	10,195,775.998	3,122,137.761	838.01	17.92	S 48:56:12.66 W	88
10,195,782.489	3,122,137.819	855.18	10,195,779.671	3,122,134.569	837.98	17.73	S 49:04:19.91 W	87
10,195,786.135	3,122,134.610	854.98	10,195,783.351	3,122,131.385	837.94	17.56	S 49:11:50.67 W	86
10,195,789.787	3,122,131.411	854.78	10,195,787.038	3,122,128.210	837.90	17.40	S 49:20:39.15 W	85
10,195,793.447	3,122,128.220	854.57	10,195,790.731	3,122,125.044	837.86	17.22	S 49:27:50.90 W	84
10,195,797.113	3,122,125.037	854.37	10,195,794.432	3,122,121.887	837.82	17.06	S 49:35:54.69 W	83
10,195,800.788	3,122,121.864	854.17	10,195,798.140	3,122,118.739	837.78	16.89	S 49:43:24.21 W	82
10,195,804.470	3,122,118.701	853.97	10,195,801.855	3,122,115.600	837.75	16.72	S 49:51:35.48 W	82
10,195,808.155	3,122,115.542	853.75	10,195,805.576	3,122,112.469	837.71	16.53	S 49:59:42.40 W	81
10,195,811.761	3,122,112.289	852.99	10,195,809.305	3,122,109.348	837.67	15.79	S 50:08:06.28 W	79
10,195,815.419	3,122,109.097	852.51	10,195,813.040	3,122,106.235	837.63	15.34	S 50:15:55.41 W	76
10,195,819.100	3,122,105.933	852.13	10,195,816.783	3,122,103.132	837.59	14.99	S 50:24:08.25 W	74
10,195,822.781	3,122,102.768	851.70	10,195,820.532	3,122,100.037	837.55	14.59	S 50:31:41.79 W	72
10,195,826.468	3,122,099.611	851.27	10,195,824.287	3,122,096.952	837.51	14.18	S 50:38:24.94 W	70
10,195,830.119	3,122,096.411	850.57	10,195,828.050	3,122,093.875	837.47	13.50	S 50:47:26.36 W	67
10,195,833.844	3,122,093.301	850.28	10,195,831.820	3,122,090.807	837.43	13.25	S 50:56:20.48 W	65
10,195,837.580	3,122,090.204	850.02	10,195,835.596	3,122,087.749	837.39	13.02	S 51:03:24.14 W	64
10,195,841.304	3,122,087.093	849.64	10,195,839.379	3,122,084.699	837.35	12.67	S 51:11:50.86 W	62
10,195,845.046	3,122,084.005	849.34	10,195,843.168	3,122,081.658	837.32	12.39	S 51:20:03.26 W	61
10,195,848.795	3,122,080.924	849.02	10,195,846.965	3,122,078.627	837.28	12.10	S 51:27:21.50 W	60
10,195,852.490	3,122,077.777	848.33	10,195,850.768	3,122,075.604	837.24	11.43	S 51:36:17.41 W	57
10,195,856.224	3,122,074.678	847.83	10,195,854.577	3,122,072.591	837.20	10.96	S 51:43:13.87 W	54

NORTHEAST (RIGHT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,195,859.965	3,122,071.588	847.34	10,195,858.393	3,122,069.586	837.16	10.49	S 51:51:37.70 W	52
10,195,863.716	3,122,068.510	846.86	10,195,862.216	3,122,066.591	837.12	10.04	S 51:59:12.43 W	50
10,195,867.530	3,122,065.513	846.75	10,195,866.046	3,122,063.605	837.08	9.97	S 52:07:30.06 W	49
10,195,871.350	3,122,062.524	846.63	10,195,869.882	3,122,060.628	837.04	9.89	S 52:15:02.72 W	48
10,195,875.142	3,122,059.499	846.28	10,195,873.724	3,122,057.660	837.00	9.57	S 52:21:54.78 W	47
10,195,878.969	3,122,056.521	846.13	10,195,877.574	3,122,054.701	836.96	9.45	S 52:31:49.55 W	46
10,195,882.809	3,122,053.560	846.02	10,195,881.429	3,122,051.751	836.92	9.38	S 52:39:42.17 W	46
10,195,886.656	3,122,050.608	845.90	10,195,885.291	3,122,048.811	836.88	9.30	S 52:46:46.99 W	45
10,195,890.511	3,122,047.667	845.80	10,195,889.160	3,122,045.880	836.84	9.24	S 52:54:36.53 W	45
10,195,894.328	3,122,044.676	845.40	10,195,893.035	3,122,042.957	836.80	8.86	S 53:03:00.69 W	44
10,195,898.147	3,122,041.688	844.97	10,195,896.917	3,122,040.044	836.75	8.47	S 53:11:49.47 W	42
10,195,901.951	3,122,038.679	844.39	10,195,900.805	3,122,037.141	836.71	7.92	S 53:18:33.62 W	40
10,195,905.774	3,122,035.696	843.89	10,195,904.699	3,122,034.246	836.67	7.44	S 53:26:51.10 W	37
10,195,909.639	3,122,032.769	843.63	10,195,908.600	3,122,031.361	836.63	7.22	S 53:34:31.49 W	36
10,195,913.590	3,122,029.960	843.92	10,195,912.507	3,122,028.485	836.59	7.55	S 53:42:44.99 W	36
10,195,917.376	3,122,026.926	843.03	10,195,916.420	3,122,025.618	836.55	6.68	S 53:50:14.72 W	35
10,195,921.255	3,122,024.019	842.74	10,195,920.340	3,122,022.760	836.51	6.42	S 53:59:29.66 W	32
10,195,923.144	3,122,022.723	842.94	10,195,922.194	3,122,021.413	836.47	6.67	S 54:03:02.60 W	15
10,195,927.218	3,122,019.908	843.31	10,195,926.207	3,122,018.508	836.41	7.11	S 54:09:55.21 W	34
10,195,931.277	3,122,017.079	843.56	10,195,930.225	3,122,015.615	836.35	7.43	S 54:17:59.14 W	36
10,195,935.341	3,122,014.262	843.81	10,195,934.247	3,122,012.732	836.29	7.75	S 54:26:02.37 W	38
10,195,939.398	3,122,011.441	843.99	10,195,938.274	3,122,009.861	836.23	8.00	S 54:34:20.07 W	39
10,195,943.392	3,122,008.537	843.70	10,195,942.305	3,122,007.001	836.17	7.76	S 54:42:49.08 W	39
10,195,947.458	3,122,005.738	843.88	10,195,946.341	3,122,004.152	836.12	8.00	S 54:50:36.39 W	39
10,195,951.511	3,122,002.926	843.94	10,195,950.381	3,122,001.314	836.06	8.12	S 54:58:11.39 W	40
10,195,955.569	3,122,000.125	844.00	10,195,954.426	3,121,998.486	836.01	8.24	S 55:06:32.36 W	40
10,195,959.631	3,121,997.335	844.06	10,195,958.476	3,121,995.670	835.95	8.36	S 55:15:04.32 W	41
10,195,963.699	3,121,994.556	844.12	10,195,962.531	3,121,992.864	835.90	8.47	S 55:22:56.63 W	41
10,195,967.771	3,121,991.788	844.18	10,195,966.590	3,121,990.069	835.84	8.60	S 55:30:35.53 W	42
10,195,971.847	3,121,989.029	844.24	10,195,970.655	3,121,987.284	835.79	8.71	S 55:39:47.63 W	43
10,195,975.923	3,121,986.274	844.26	10,195,974.724	3,121,984.511	835.73	8.79	S 55:46:50.67 W	43
10,195,980.004	3,121,983.530	844.29	10,195,978.798	3,121,981.747	835.68	8.87	S 55:55:33.77 W	43
10,195,985.146	3,121,980.096	844.32	10,195,983.930	3,121,978.287	835.60	8.99	S 56:05:28.39 W	55
10,195,989.180	3,121,977.423	844.35	10,195,987.953	3,121,975.589	835.53	9.09	S 56:12:58.72 W	44
10,195,993.220	3,121,974.759	844.38	10,195,991.983	3,121,972.900	835.45	9.20	S 56:21:35.10 W	44
10,195,997.256	3,121,972.091	844.35	10,195,996.018	3,121,970.221	835.38	9.25	S 56:29:38.99 W	45
10,196,001.287	3,121,969.415	844.23	10,196,000.059	3,121,967.552	835.30	9.20	S 56:36:32.58 W	45
10,196,005.341	3,121,966.774	844.23	10,196,004.107	3,121,964.892	835.23	9.28	S 56:44:51.82 W	45
10,196,009.401	3,121,964.144	844.24	10,196,008.160	3,121,962.241	835.15	9.37	S 56:53:25.78 W	45
10,196,013.464	3,121,961.518	844.22	10,196,012.219	3,121,959.600	835.07	9.43	S 57:00:42.65 W	45
10,196,017.533	3,121,958.904	844.21	10,196,016.284	3,121,956.969	835.00	9.49	S 57:09:31.12 W	46
10,196,021.612	3,121,956.304	844.22	10,196,020.354	3,121,954.347	834.92	9.59	S 57:15:58.51 W	46
10,196,025.691	3,121,953.705	844.20	10,196,024.431	3,121,951.734	834.84	9.65	S 57:24:37.67 W	47
10,196,029.775	3,121,951.116	844.18	10,196,028.513	3,121,949.131	834.77	9.70	S 57:33:11.14 W	47
10,196,033.866	3,121,948.537	844.15	10,196,032.601	3,121,946.538	834.69	9.75	S 57:40:25.32 W	47
10,196,037.962	3,121,945.967	844.13	10,196,036.695	3,121,943.954	834.61	9.81	S 57:48:47.97 W	47
10,196,042.064	3,121,943.408	844.11	10,196,040.794	3,121,941.380	834.54	9.86	S 57:56:37.88 W	48
10,196,046.173	3,121,940.858	844.09	10,196,044.900	3,121,938.816	834.46	9.93	S 58:03:36.86 W	48
10,196,050.288	3,121,938.321	844.08	10,196,049.011	3,121,936.261	834.38	10.00	S 58:12:18.38 W	48
10,196,054.406	3,121,935.789	844.05	10,196,053.127	3,121,933.715	834.31	10.04	S 58:20:18.89 W	48
10,196,058.531	3,121,933.268	844.03	10,196,057.249	3,121,931.179	834.23	10.10	S 58:27:46.60 W	49
10,196,062.661	3,121,930.756	844.00	10,196,061.377	3,121,928.653	834.15	10.15	S 58:35:36.90 W	49
10,196,066.796	3,121,928.254	843.98	10,196,065.511	3,121,926.137	834.07	10.21	S 58:44:33.45 W	49
10,196,070.938	3,121,925.762	843.96	10,196,069.650	3,121,923.630	833.99	10.28	S 58:51:45.61 W	50
10,196,075.090	3,121,923.288	843.97	10,196,073.795	3,121,921.133	833.92	10.36	S 58:59:49.78 W	50
10,196,079.241	3,121,920.812	844.02	10,196,077.945	3,121,918.645	833.92	10.41	S 59:07:04.68 W	50
10,196,083.397	3,121,918.347	844.06	10,196,082.101	3,121,916.167	833.92	10.45	S 59:16:07.36 W	50
10,196,087.559	3,121,915.891	844.11	10,196,086.262	3,121,913.699	833.92	10.50	S 59:23:14.36 W	51
10,196,091.724	3,121,913.441	844.15	10,196,090.429	3,121,911.241	833.94	10.52	S 59:31:02.59 W	51
10,196,095.893	3,121,910.987	844.22	10,196,094.598	3,121,908.787	834.00	10.53	S 59:31:02.59 W	51
10,196,100.054	3,121,908.521	844.22	10,196,098.767	3,121,906.333	834.07	10.46	S 59:32:08.16 W	51
10,196,104.215	3,121,906.053	844.22	10,196,102.936	3,121,903.880	834.13	10.40	S 59:31:10.12 W	50
10,196,108.374	3,121,903.584	844.22	10,196,107.104	3,121,901.426	834.20	10.33	S 59:31:22.27 W	50
10,196,112.535	3,121,901.117	844.22	10,196,111.273	3,121,898.973	834.27	10.26	S 59:31:05.19 W	50
10,196,116.695	3,121,898.650	844.23	10,196,115.441	3,121,896.520	834.34	10.19	S 59:30:47.88 W	49
10,196,120.934	3,121,896.137	844.23	10,196,119.688	3,121,894.020	834.41	10.12	S 59:31:12.95 W	50
10,196,125.235	3,121,893.587	844.24	10,196,123.998	3,121,891.484	834.48	10.06	S 59:32:08.32 W	50
10,196,129.536	3,121,891.037	844.25	10,196,128.307	3,121,888.948	834.55	10.00	S 59:31:51.09 W	50
10,196,133.838	3,121,888.489	844.27	10,196,132.616	3,121,886.412	834.63	9.94	S 59:31:46.68 W	50
10,196,138.141	3,121,885.941	844.29	10,196,136.925	3,121,883.876	834.70	9.88	S 59:30:28.03 W	50
10,196,142.443	3,121,883.394	844.31	10,196,141.234	3,121,881.340	834.77	9.83	S 59:31:07.00 W	49
10,196,146.745	3,121,880.846	844.33	10,196,145.543	3,121,878.804	834.84	9.78	S 59:31:02.25 W	49
10,196,151.050	3,121,878.302	844.36	10,196,149.852	3,121,876.268	834.92	9.73	S 59:30:08.85 W	49
10,196,155.354	3,121,875.758	844.40	10,196,154.161	3,121,873.731	834.99	9.70	S 59:31:15.13 W	49

NOTES:

1. SEE TYPICAL SECTIONS FOR ROCK CUT SLOPES AS WELL AS TOP AND BOTTOM OF ROCK CUT FOR PAY.
2. SEE FENCING AND GRADING PLANS FOR GRADING INFORMATION.
3. ROCK CUT PAID FOR UNDER ITEM S2 RC AS "ROCK CUT" BY THE SF.
4. POINTS ARE LOCATED ALONG ℄ WBFR_S2_CL ON APPROXIMATELY 5' STATION INCREMENTS. NOTE THAT THE ROCK CUT FACES ARE NOT PERPENDICULAR TO THE ROADWAY CENTERLINE. USE TABLE VALUES FOR ROCK CUT CONSTRUCTION. LEFT CUT POINTS ARE FROM STA 435+20 TO STA 446+35 (APPROXIMATE LENGTH OF CUT = 4,354 LF). RIGHT CUT POINTS ARE FROM STA 434+05 TO STA 450+30, FOLLOWED BY POINTS APPROXIMATELY EVERY 3'-5' AROUND THE RIGHT TURN (APPROXIMATE LENGTH OF CUT = 6,998 LF).
5. USE LINEAR INTERPOLATION FOR VALUES BETWEEN ROWS.
6. COORDINATES ARE SURFACE VALUES. TO OBTAIN GRID VALUES, DIVIDE BY A COMBINED SURFACE ADJUSTMENT FACTOR OF 1.00014.

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ROCK CUT CONTROL POINTS

SHEET 4 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	98
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:48:24 PM SCALE: 1:1
FILE: \

NORTHEAST (RIGHT) ROCK CUT - POINT TABLE

TOP OF ROCK CUT			BOTTOM OF ROCK CUT			ROCK CUT LENGTH	BEARING	AREA (SF)
NORTHING	EASTING	EL	NORTHING	EASTING	EL			
10,196,159.658	3,121,873.214	844.43	10,196,158.470	3,121,871.195	835.06	9.66	S 59:31:37.25 W	48
10,196,163.962	3,121,870.669	844.46	10,196,162.779	3,121,868.659	835.14	9.61	S 59:31:14.71 W	48
10,196,168.267	3,121,868.125	844.50	10,196,167.089	3,121,866.123	835.21	9.58	S 59:31:37.02 W	48
10,196,172.571	3,121,865.581	844.54	10,196,171.398	3,121,863.587	835.28	9.54	S 59:31:59.52 W	48
10,196,176.877	3,121,863.040	844.58	10,196,175.707	3,121,861.051	835.35	9.51	S 59:32:04.04 W	48
10,196,181.183	3,121,860.499	844.63	10,196,180.016	3,121,858.515	835.43	9.48	S 59:32:08.58 W	47
10,196,185.489	3,121,857.958	844.68	10,196,184.325	3,121,855.979	835.50	9.46	S 59:32:13.15 W	47
10,196,189.789	3,121,855.405	844.68	10,196,188.634	3,121,853.443	835.57	9.39	S 59:30:55.14 W	47
10,196,194.083	3,121,852.844	844.63	10,196,192.943	3,121,850.907	835.64	9.27	S 59:31:17.51 W	47
10,196,198.374	3,121,850.277	844.56	10,196,197.252	3,121,848.371	835.72	9.11	S 59:30:57.84 W	46
10,196,202.661	3,121,847.704	844.46	10,196,201.561	3,121,845.835	835.79	8.94	S 59:31:15.82 W	45
10,196,206.963	3,121,845.155	844.48	10,196,205.870	3,121,843.299	835.86	8.89	S 59:30:22.08 W	45
10,196,211.268	3,121,842.612	844.52	10,196,210.179	3,121,840.762	835.93	8.85	S 59:31:00.71 W	44
10,196,215.573	3,121,840.069	844.56	10,196,214.489	3,121,838.226	836.01	8.81	S 59:32:13.82 W	44
10,196,219.875	3,121,837.521	844.58	10,196,218.798	3,121,835.690	836.08	8.76	S 59:32:08.96 W	44
10,196,224.178	3,121,834.974	844.60	10,196,223.107	3,121,833.154	836.15	8.71	S 59:31:29.37 W	44
10,196,228.495	3,121,832.451	844.70	10,196,227.416	3,121,830.618	836.19	8.77	S 59:31:00.12 W	44
10,196,232.809	3,121,829.924	844.78	10,196,231.725	3,121,828.082	836.23	8.81	S 59:31:24.89 W	44
10,196,237.120	3,121,827.392	844.83	10,196,236.034	3,121,825.546	836.27	8.82	S 59:31:54.27 W	44
10,196,241.098	3,121,825.022	844.90	10,196,240.024	3,121,823.198	836.44	8.72	S 59:30:35.11 W	41
10,196,245.396	3,121,822.467	845.00	10,196,244.333	3,121,820.662	836.62	8.64	S 59:30:19.20 W	43
10,196,249.693	3,121,819.910	845.09	10,196,248.642	3,121,818.125	836.81	8.54	S 59:30:38.21 W	43
10,196,253.986	3,121,817.347	845.15	10,196,252.952	3,121,815.589	837.00	8.40	S 59:32:14.29 W	42
10,196,258.288	3,121,814.799	845.29	10,196,257.261	3,121,813.053	837.18	8.36	S 59:32:09.20 W	42
10,196,262.596	3,121,812.261	845.46	10,196,261.570	3,121,810.517	837.37	8.34	S 59:31:53.70 W	42
10,196,266.902	3,121,809.719	845.62	10,196,265.879	3,121,807.981	837.55	8.32	S 59:31:07.00 W	42
10,196,271.173	3,121,807.119	845.51	10,196,270.188	3,121,805.445	837.74	8.01	S 59:31:37.12 W	41
10,196,275.441	3,121,804.513	845.37	10,196,274.497	3,121,802.909	837.93	7.67	S 59:31:19.09 W	39
10,196,279.568	3,121,802.013	845.23	10,196,278.699	3,121,800.458	838.11	7.34	S 60:48:06.08 W	36
10,196,283.188	3,121,800.056	845.15	10,196,282.435	3,121,798.508	838.26	7.10	S 64:03:36.47 W	30
10,196,285.983	3,121,798.736	845.14	10,196,285.310	3,121,797.186	838.38	6.97	S 66:31:47.37 W	22
10,196,288.824	3,121,797.541	845.14	10,196,288.228	3,121,795.992	838.50	6.84	S 68:57:18.19 W	22
10,196,291.711	3,121,796.473	845.15	10,196,291.190	3,121,794.925	838.61	6.74	S 71:23:55.16 W	21
10,196,294.641	3,121,795.531	845.17	10,196,294.193	3,121,793.985	838.73	6.64	S 73:50:22.07 W	21
10,196,297.615	3,121,794.715	845.20	10,196,297.238	3,121,793.172	838.85	6.55	S 76:16:11.86 W	21
10,196,300.632	3,121,794.029	845.25	10,196,300.325	3,121,792.489	838.97	6.47	S 78:43:33.05 W	21
10,196,303.691	3,121,793.474	845.32	10,196,303.453	3,121,791.935	839.08	6.43	S 81:12:32.70 W	21
10,196,306.793	3,121,793.055	845.41	10,196,306.622	3,121,791.513	839.20	6.40	S 83:40:19.36 W	21
10,196,309.934	3,121,792.770	845.51	10,196,309.831	3,121,791.228	839.32	6.38	S 86:10:42.70 W	21
10,196,313.116	3,121,792.623	845.61	10,196,313.080	3,121,791.081	839.44	6.36	S 88:39:45.35 W	21
10,196,316.336	3,121,792.611	845.70	10,196,316.368	3,121,791.078	839.57	6.32	N 88:48:15.03 W	21
10,196,319.331	3,121,792.725	845.76	10,196,319.426	3,121,791.207	839.68	6.27	N 86:25:08.28 W	19
10,196,322.886	3,121,793.026	845.86	10,196,323.055	3,121,791.525	839.82	6.23	N 83:34:33.71 W	23
10,196,326.092	3,121,793.452	845.96	10,196,326.326	3,121,791.967	839.94	6.20	N 81:02:42.74 W	21
10,196,329.567	3,121,794.083	846.07	10,196,329.872	3,121,792.615	840.07	6.18	N 78:15:46.39 W	22
10,196,332.946	3,121,794.869	846.19	10,196,333.321	3,121,793.420	840.20	6.17	N 75:29:24.89 W	22
10,196,336.344	3,121,795.836	846.32	10,196,336.789	3,121,794.408	840.34	6.16	N 72:41:30.04 W	22
10,196,339.766	3,121,796.938	846.46	10,196,340.263	3,121,795.585	840.69	5.95	N 69:49:48.39 W	22
10,196,343.387	3,121,798.309	846.61	10,196,343.930	3,121,797.042	841.10	5.68	N 66:48:05.07 W	23
10,196,347.228	3,121,800.015	846.79	10,196,347.814	3,121,798.840	841.54	5.41	N 63:29:36.58 W	24
10,196,350.972	3,121,801.943	846.96	10,196,351.592	3,121,800.863	841.98	5.13	N 60:08:27.54 W	23
10,196,354.610	3,121,804.084	847.11	10,196,355.250	3,121,803.103	842.42	4.83	N 56:52:47.10 W	21
10,196,358.429	3,121,806.557	847.27	10,196,359.041	3,121,805.650	842.89	4.51	N 55:59:25.50 W	21
10,196,362.373	3,121,809.135	847.49	10,196,362.947	3,121,808.283	843.38	4.24	N 56:01:53.40 W	21
10,196,365.023	3,121,813.752	847.75	10,196,367.189	3,121,810.540	843.87	5.48	N 56:00:23.01 W	23
10,196,368.729	3,121,816.945	847.97	10,196,371.325	3,121,813.094	844.37	5.88	N 56:00:56.42 W	28
10,196,372.275	3,121,820.537	848.21	10,196,375.675	3,121,815.495	844.88	6.93	N 56:00:24.52 W	32
10,196,374.905	3,121,825.197	848.49	10,196,380.127	3,121,817.452	845.37	9.85	N 56:00:37.87 W	41

NOTES:

1. SEE TYPICAL SECTIONS FOR ROCK CUT SLOPES AS WELL AS TOP AND BOTTOM OF ROCK CUT FOR PAY.
2. SEE FENCING AND GRADING PLANS FOR GRADING INFORMATION.
3. ROCK CUT PAID FOR UNDER ITEM S2 RC AS "ROCK CUT" BY THE SF.
4. POINTS ARE LOCATED ALONG ℄ WBFR_S2_CL ON APPROXIMATELY 5' STATION INCREMENTS. NOTE THAT THE ROCK CUT FACES ARE NOT PERPENDICULAR TO THE ROADWAY CENTERLINE. USE TABLE VALUES FOR ROCK CUT CONSTRUCTION. LEFT CUT POINTS ARE FROM STA 435+20 TO STA 446+35 (APPROXIMATE LENGTH OF CUT = 4,354 LF). RIGHT CUT POINTS ARE FROM STA 434+05 TO STA 450+30, FOLLOWED BY POINTS APPROXIMATELY EVERY 3'-5' AROUND THE RIGHT TURN (APPROXIMATE LENGTH OF CUT = 6,998 LF).
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STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

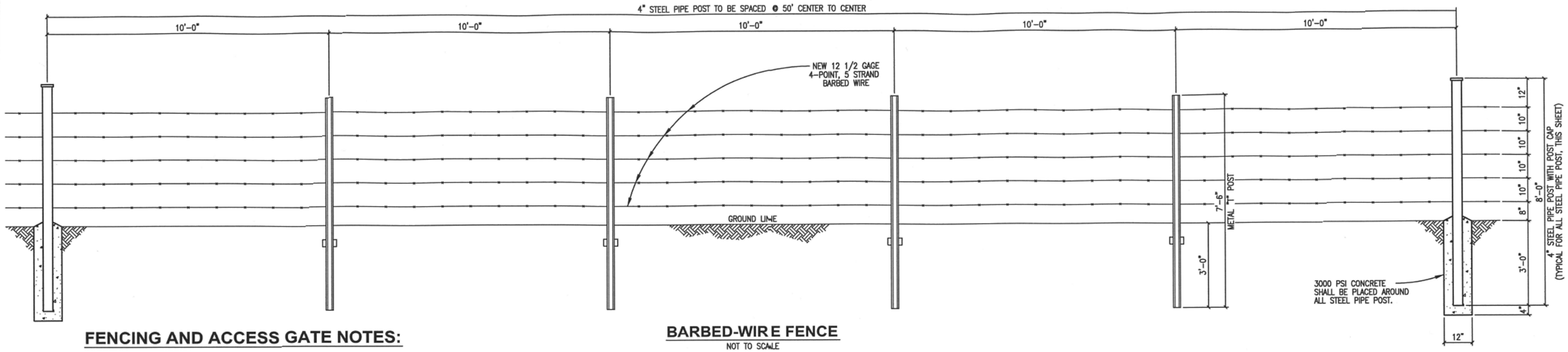
SOUTHWEST BYPASS SEGMENT 2

ROCK CUT CONTROL POINTS

SHEET 5 OF 5

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	99
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

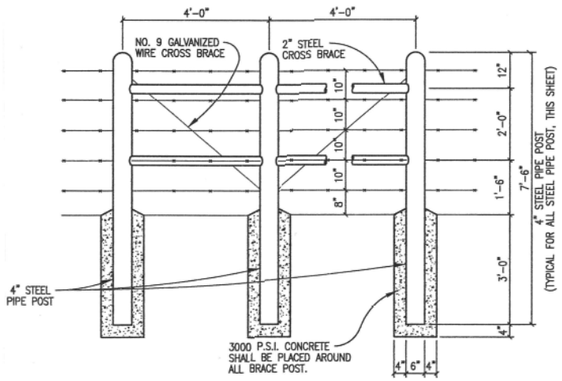
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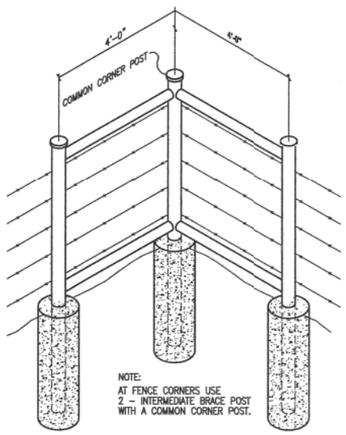
BARBED-WIRE FENCE
NOT TO SCALE

FENCING AND ACCESS GATE NOTES:

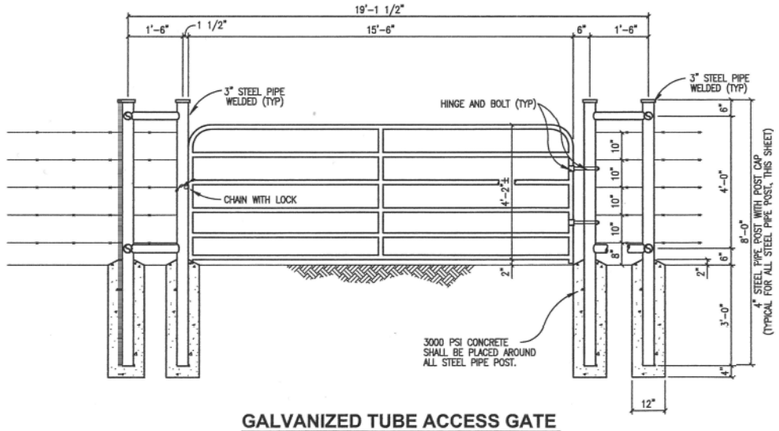
1. GATE MANUFACTURER SHALL FURNISH HINGES AND HINGE BOLTS.
2. GATE MANUFACTURER SHALL FURNISH SLIDING LATCHES FOR GATE.
3. CONTRACTOR SHALL FURNISH GALVANIZED CHAIN AND MASTER LOCK WITH KEY FOR GATES REQUIRED. LOCKS SHALL BE IDENTICAL FOR ALL GATES. MASTER KEYS SHALL BE GIVEN TO THE CITY OF GEORGETOWN CONSTRUCTION PROJECT MANAGER.
4. WHERE EXISTING ADJACENT POST IS MORE THAN 6 FEET FROM NEW GATE POST, CONTRACTOR SHALL INSTALL NEW LIKE POST 6 FEET MAXIMUM FROM GATE POST.
5. GATE SHALL BE 11'-6" RAIL MADE OF 1 5/8" GALVINIZED TUBING
6. IF FIRM SOIL FOOTING NOT OBTAINED FOR METAL "T" POST, 3000 P.S.I. CONCRETE SHALL BE PLACED AROUND BASE, AS DIRECTED BY THE ENGINEER.
7. ALL BARBED WIRE SHALL BE NEW 12 1/2 GAGE, 4-POINT, 5 STRAND BARBED WIRE.
8. INTERMEDIATE BRACE POST SHALL BE SPACED AT A MAXIMUM OF 500' ALONG NEW BARBED WIRE FENCE.
9. ALL P.I. POINTS ON NEW FENCE SHALL BE 6" STEEL POSTS AS DETAILED ON THIS SHEET.



INTERMEDIATE BRACE POST
NOT TO SCALE



FENCE CORNER BRACE POSTS
NOT TO SCALE



GALVANIZED TUBE ACCESS GATE
NOT TO SCALE

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

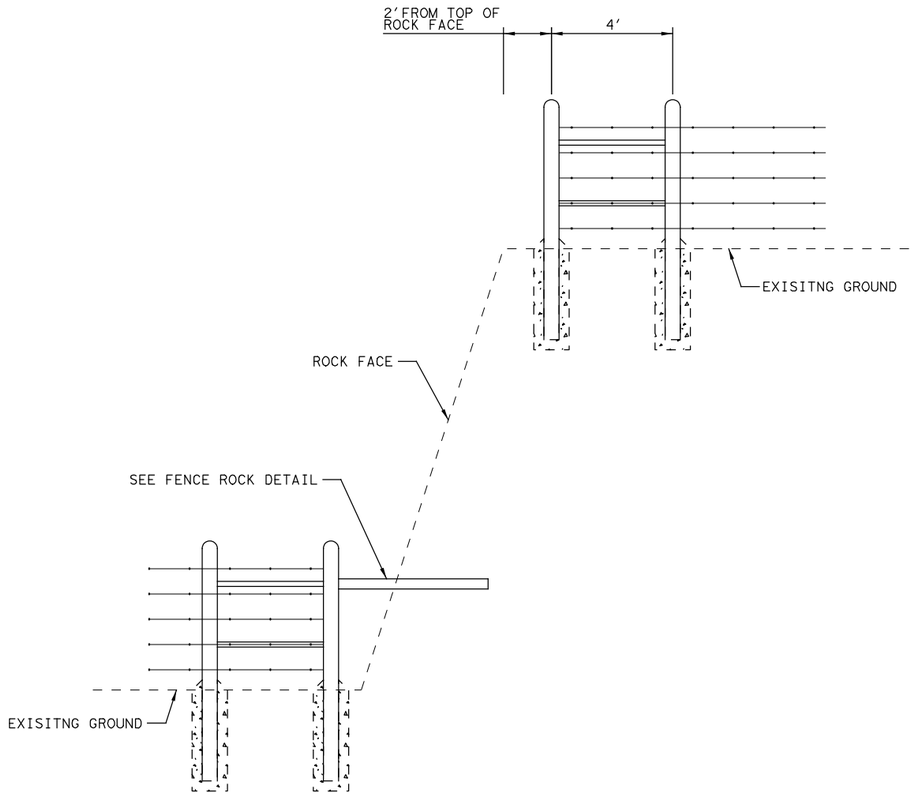
FENCING DETAILS

NTS

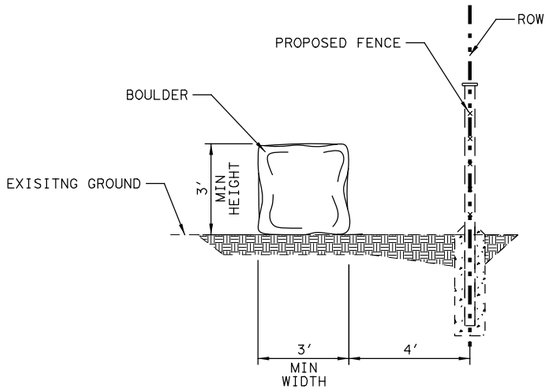
SHEET 1 OF 2

DESIGN	FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	100
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 1:48:30 PM SCALE: 1:2
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4/12/2018 7:20 AM



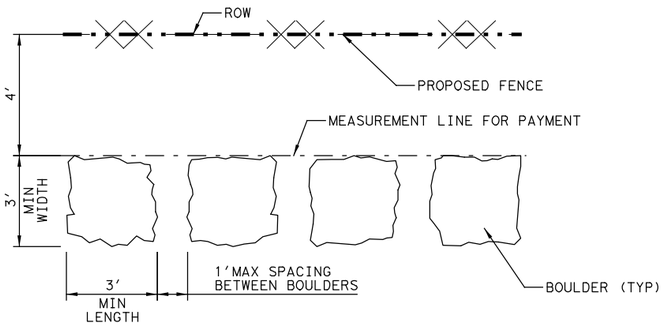
FENCE AT TOP OF ROCK FACE



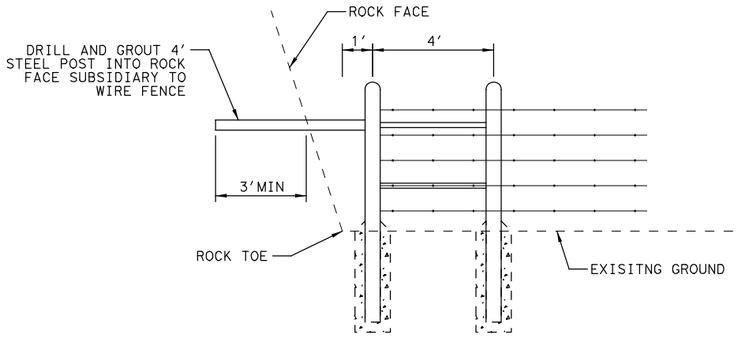
FENCE AND BOULDER DELINEATION ELEVATION

BOULDER DELINEATION GENERAL NOTES:

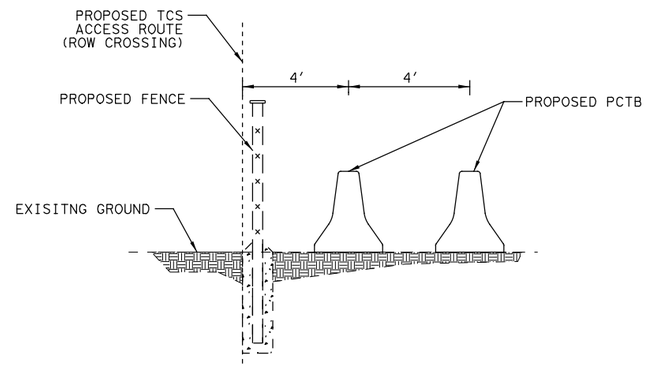
1. MIN BOULDER SIZE IS 3'x3'x3', OR 3' IN THE SMALLEST DIMENSION. BOULDERS SHOULD NOT VARY BY MORE THAN 25% IN WIDTH OR HEIGHT FROM ONE BOULDER TO THE NEXT. PLACE BOULDERS TO MAINTAIN UNIFORM WIDTH AND HEIGHT ALONG MEASUREMENT LINE IF POSSIBLE. OTHERWISE, PLACE LONGEST DIMENSION PARALLEL TO THE MEASUREMENT LINE.
2. FINAL PLACEMENT IS SUBJECT TO THE ENGINEER'S APPROVAL. COORDINATE WITH ENGINEER PRIOR TO PLACEMENT AND ADJUST AS DIRECTED. ENGINEER MAY APPROVE ALTERNATE BOULDER SIZES AND PLACEMENT, PROVIDED THEY MEET THE INTENT OF UNIFORM DELINEATION. SUBSIDIARY TO ITEM S2 BD.
3. NO IMPORT OF NEW ROCK IS ANTICIPATED. UTILIZE EXISTING ROCK FROM PROJECT EXCAVATIONS. BOULDERS ARE NOT REQUIRED TO BE CUT TO SIZE.



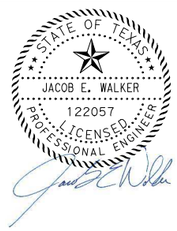
FENCE AND BOULDER DELINEATION PLAN



FENCE ROCK TIE



TCS FENCE CROSSING DETAIL



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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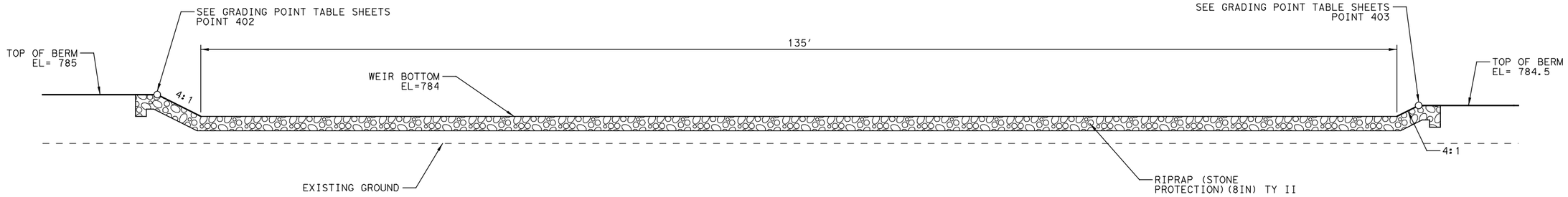
SOUTHWEST BYPASS SEGMENT 2

FENCING DETAILS

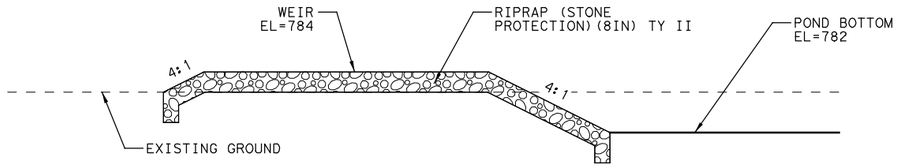
NTS SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	101
JW	2103	01	034	
CHECK				
JC				

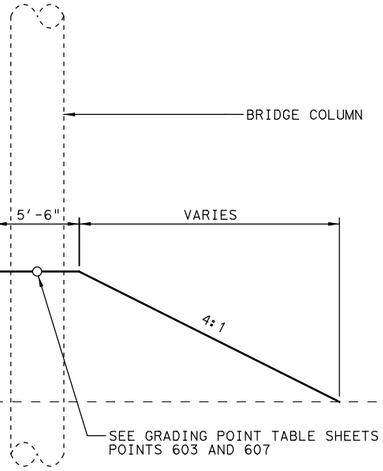
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FILE: \
4/12/2018 7:20 AM



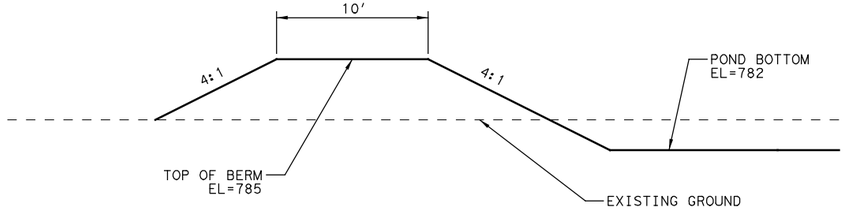
DETAIL SECTION ALONG WEIR



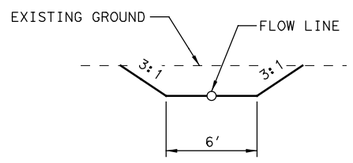
DETAIL SECTION THROUGH WEIR



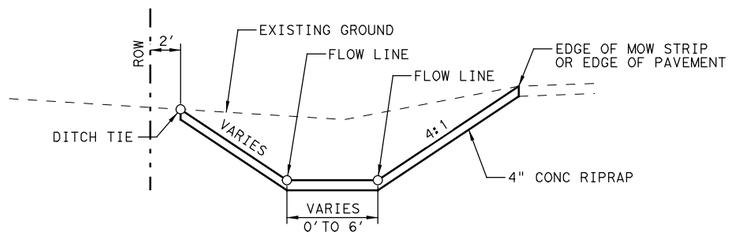
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

GRADING DETAILS

NTS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	102
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:48:51 PM SCALE: 1:1
FILE: \
4/12/2018 7:20 AM

CULVERT NO. 6

Project Name: SWBypass_2243
Description:
Horizontal Alignment Name: S2_Culvert 6
Description: Segment 2-Culvert 6
Style: D_ALIGN_ML

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	10+20.00	10194779.972	3126632.865
POE ( )	11+60.00	10194919.165	3126617.852
Tangent Direction:	N 6°09'21" W		
Tangent Length:	140.00		

CULVERT NO. 7

Project Name: SWBypass_2243
Description:
Horizontal Alignment Name: S2_Culvert 7
Description: Segment 2-Culvert 7
Style: D_ALIGN_ML

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	10+00.00	10194646.922	3124712.800
POE ( )	12+00.00	10194846.677	3124702.912
Tangent Direction:	N 2°50'01" W		
Tangent Length:	200.00		

CULVERT NO. 8

Project Name: SWBypass_2243
Description:
Horizontal Alignment Name: S2_Culvert 8
Description:
Style: Default

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	8+00.00	10194543.608	3123588.467
POE ( )	13+50.00	10195077.323	3123721.311
Tangent Direction:	N 13°58'38" E		
Tangent Length:	550.00		

CULVERT NO. 8B *

Project Name: SWBypass_2243
Description:
Horizontal Alignment Name: S2_Culvert 8B
Description: S2_Culvert 8B
Style: Default

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	10+00.00	10194525.78	3123550.44
POE ( )	14+25.00	10194950.62	3123562.28
Tangent Direction:	N 1°35'47" E		
Tangent Length:	425.00		

* IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, OMIT CULVERT NO. 8B FROM CULVERT ALIGNMENT DATA.

CULVERT NO. 9

Project Name: SWBypass_2243
Description:
Horizontal Alignment Name: S2_Culvert 9
Description: Segment 2-Culvert 9
Style: D_ALIGN_ML

	STATION	NORTHING	EASTING
Element: Linear			
POB ( )	9+46.51	10196094.739	3121440.889
PI ( )	9+71.19	10196096.600	3121465.503
Tangent Direction:	N 85°40'34" E		
Tangent Length:	24.68		
Element: Linear			
PI ( )	9+71.19	10196096.600	3121465.503
PI ( )	10+98.91	10196075.487	3121591.470
Tangent Direction:	N 80°29'07" W		
Tangent Length:	127.72		
Element: Linear			
PI ( )	10+98.91	10196075.487	3121591.470
PC ( )	12+81.49	10195998.370	3121756.955
Tangent Direction:	N 65°00'51" W		
Tangent Length:	182.57		
Element: Circular			
PC ( )	12+81.49	10195998.370	3121756.955
PI ( )	12+97.70	10195991.522	3121771.649
CC ( )		10196025.562	3121769.627
PT ( )	13+11.21	10196000.061	3121785.429
Radius:	30.00		
Delta:	56°46'09" Left		
Degree of Curvature(Arc):	190°59'09"		
Length:	29.72		
Tangent:	16.21		
Chord:	28.52		
Middle Ordinate:	3.61		
External:	4.10		
Tangent Direction:	N 65°00'51" W		
Radial Direction:	N 24°59'09" E		
Chord Direction:	N 86°36'04" E		
Radial Direction:	N 31°47'00" W		
Tangent Direction:	N 58°13'00" E		
Element: Linear			
PT ( )	13+11.21	10196000.061	3121785.429
POE ( )	15+00.00	10196099.498	3121945.908
Tangent Direction:	N 58°13'00" E		
Tangent Length:	188.79		

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
LICENSED
PROFESSIONAL ENGINEER

Phaisarn Cwatanaphol, P.E.

04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

CULVERT ALIGMENT DATA

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
BD	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	103
PC	2103	01	034	
CHECK				
QL				

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USER: lgomezgonz DATE: 4/10/2018 TIME: 9:42:44 AM SCALE:1:1
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TABLE B5 RATIONAL METHOD PEAK FLOW CALCULATIONS TABLE													
DRAINAGE ID	DRAINAGE AREA (AC)	COMPOSITE C	*TC (MIN)	I5 (IN/HR)	Q5 (CFS)	I10 (IN/HR)	Q10 (CFS)	I25 (IN/HR)	Q25 (CFS)	I50 (IN/HR)	Q50 (CFS)	I100 (IN/HR)	Q100 (CFS)
SEGMENT 2 PROPOSED CONDITIONS													
I-2b3	3.53	0.39	11.7	5.48	8	6.37	9	7.47	11	8.66	14	9.70	17
I-5a	12.46	0.40	30.0	3.46	17	4.07	20	4.88	27	5.72	35	6.49	41
I-5b	16.59	0.43	25.5	3.79	27	4.45	32	5.32	42	6.23	54	7.05	64
Q-4b	3.75	0.47	10.0	5.81	10	6.75	12	7.88	16	9.11	20	10.20	23
Q-4c	2.78	0.59	10.8	5.65	9	6.56	11	7.68	14	8.88	18	9.95	21
Q-4d1	5.75	0.57	10.0	5.81	19	6.75	22	7.88	29	9.11	36	10.20	42
Q-4d2	1.06	0.45	10.0	5.81	3	6.75	3	7.88	4	9.11	5	10.20	6
Q-5	0.83	0.45	10.0	5.81	2	6.75	3	7.88	3	9.11	4	10.20	5
I-2b1	1.90	0.63	10.0	5.81	7	6.75	8	7.88	11	9.11	13	10.20	15
I-5c	1.10	0.43	16.3	4.75	2	5.55	3	6.56	3	7.63	4	8.59	5

DESIGN YEAR = 25-YR
* PER WILLIAMSON COUNTY DESIGN CRITERIA MANUAL AND TXDOT HYDRAULIC DESIGN MANUAL, A 10 MINUTE MINIMUM TIME OF CONCENTRATION WAS USED FOR RATIONAL METHOD CALCULATIONS.

CULVERT NO. 6

DRAINAGE ID: I-2b3
Q25 = 11 CFS
Q100 = 17 CFS

CULVERT NO. 7

DRAINAGE ID: Q-4b, Q-4c, & Q-5
Q25 = 33 CFS
Q100 = 49 CFS

CULVERT NO. 8

DRAINAGE ID: Q-4d1
Q25 = 29 CFS
Q100 = 42 CFS

CULVERT NO. 8B

DRAINAGE ID: Q-4d2
Q25 = 4 CFS
Q100 = 6 CFS

CULVERT NO. 9

DRAINAGE ID: I-5a & I-5b
Q25 = 69 CFS
Q100 = 105 CFS

STATE OF TEXAS
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89252
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Phaisarn Cwatanaphol, P.E.
03/22/2018

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Round Rock, Texas 78681
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SOUTHWEST BYPASS
SEGMENT 2

HYDROLOGY COMPUTATIONS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS QL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PC	TEXAS	AUS	WILLIAMSON	
	CONTROL	SECTION	JOB	104
CHECK PC	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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4/12/2018 7:20 AM

HY-8 INPUT DATA

CULVERT DATA										TAILWATER DATA					
NAME	SHAPE	RISE (IN)	n	INLET CONFIGURATION	OVERALL LENGTH (FT)	INLET ELEVATION (FT)	OUTLET ELEVATION (FT)	SLOPE (FT/FT)	NUMBER OF BARRELS	CHANNEL TYPE	BOTTOM WIDTH (FT)	SIDE SLOPE	CHANNEL SLOPE (FT/FT)	n	25-YR TAILWATER ELEVATION (FT)
CULVERT NO. 6	CIRCULAR	24	0.013	SET (TY II)(24 IN)(RCP)(4:1)(C)-UPSTREAM SET (TY II)(24 IN)(RCP) (3:1)(C)-DOWNSTREAM	96.29	813.13	812.64	0.0051	1	N/A	N/A	N/A	N/A	N/A	813.54
CULVERT NO. 7	CIRCULAR	30	0.013	SET (TY II)(30 IN)(RCP)(4:1)(C)-UPSTREAM SET (TY II)(30 IN)(RCP) (6:1)(C)-DOWNSTREAM	107.81	787.10	786.80	0.0028	2	IRREGULAR CHANNEL	40	55	0.005	0.059	N/A
CULVERT NO. 8	CIRCULAR	24	0.013	SET (TY II)(24 IN)(RCP)(6:1)(C)-DOWNSTREAM HEADWALL (CH-FW-O)(DIA = 24 IN)-UPSTREAM	323.79	785.00	782.95	0.0063	1	IRREGULAR CHANNEL	0	35	0.0018	0.059	N/A
#CULVERT NO. 8B	CIRCULAR	24	0.013	HEADWALL (CH-PW-S)(DIA = 24 IN)-UPSTREAM SET (TY II)(24 IN)(RCP) (6:1)(C)-DOWNSTREAM	264.00	783.62	782.83	0.0030	1	IRREGULAR CHANNEL	45	30	0.0023	0.25	783.05
CULVERT NO. 9	CIRCULAR	36	0.013	SET (TY II)(36 IN)(RCP)(3:1)(C)-UPSTREAM SET (TY II)(36 IN)(RCP) (6:1)(C)-DOWNSTREAM	145.03	834.58	833.81	0.0053	3	IRREGULAR CHANNEL	0	6	0.013	0.059	N/A

CULVERT HYDRAULIC COMPUTATIONS

NAME	*Q25 (CFS)	Q100 (CFS)	OUTLET V25 (FT/S)	OUTLET V100 (FT/S)	TW V25 (FT/S)	TW V100 (FT/S)	HW25	HW100	TW25	TW100	USGS FLOW TYPE 25	USGS FLOW TYPE 100
CULVERT NO. 6	11.00	17.00	5.67	6.80	0.00	0.00	815.14	815.83	813.54	813.71	7-M2c	7-M2c
CULVERT NO. 7	33.00	49.00	6.00	6.98	0.77	0.89	789.36	789.99	787.06	787.14	2-M2c	7-M2c
CULVERT NO. 8	29.00	42.00	9.57	13.37	0.73	0.81	790.98	797.74	783.71	783.87	7-M2c	6-FFc
#CULVERT NO. 8B	4.00	6.00	0.00 **	0.00 **	0.44	0.51	783.65	783.80	783.05	783.11	6-FF†	6-FF†
CULVERT NO. 9	69.00	105.00	6.80	7.50	2.65	2.97	836.88	837.65	835.38	835.68	1-S2n	5-S2n

* DESIGN YEAR
** SYSTEM IN FREE FLOW

SW BYPASS DITCH FLOW CALCULATIONS

DRAINAGE ID	STATION RANGE	SIDE	DESCRIPTION	SLOPE %	n	BOTTOM WIDTH (FT)	SLOPE LT (FT)	SLOPE RT (FT)	*Q25 (CFS)	Q100 (CFS)	h25 (FT)	h100 (FT)	V25 (FT/S)	V100 (FT/S)	MAX HEIGHT CAPACITY (CFS)
I-2b1	394+87 - 396+00	RT	DITCH (STONE)	0.0211	0.045	4	3	3	22	32	0.92	1.16	3.55	4.13	108.41
	396+00 - 404+33			0.0149	0.045	4	3	3	11	15	0.71	0.85	2.59	2.91	71.81
I-2b3	396+01 - 404+18	LT	DITCH (STONE)	0.0181	0.045	6	4	6	11	17	0.54	0.71	2.50	3.00	35.09
Q-4b	413+65 - 415+20	RT	DITCH (STONE)	0.0114	0.045	6	3	3	16	23	0.78	0.97	2.50	2.88	406.18
Q-4c	415+20 - 420+86	RT	DITCH (STONE)	0.0065	0.045	6	3	3	17	26	0.93	1.21	2.08	2.47	58.98
Q-5	420+86 - 423+32			0.0311	0.045	6	3	3	3	5	0.23	0.31	2.04	2.48	129.02
Q-4d	427+61 - 433+83	RT	DITCH (STONE)	0.0252	0.045	6	3	2	29	42	0.88	1.10	4.03	4.66	60.66
	433+83 - 434+06			0.3207	0.045	3	3	2	29	42	0.61	0.75	10.82	12.39	522.41
	434+06 - 436+55			0.0129	0.045	2	3	2	29	42	1.50	1.87	3.39	3.91	185.20
I-5b	436+55 - 447+90	RT	DITCH (GRASS)	0.0076	0.030	4	6	3	42	64	1.23	1.58	3.62	4.26	406.56
I-5a	447+90 - 451+05	RT	DITCH (GRASS)	0.0115	0.030	6	5	3	27	41	0.80	1.03	3.72	4.39	731.24
I-5c	436+58 - 446+15	LT	DITCH (GRASS)	0.0040	0.030	2	3	6	3	5	0.49	0.67	1.46	1.79	196.26
	446+15 - 447+80	LT	DITCH (GRASS)	0.0426	0.030	6	3	6	3	5	0.16	0.22	2.81	3.47	863.26

* DESIGN YEAR

IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, OMIT CULVERT NO. 8B FROM TABLE.

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
LICENSED
PROFESSIONAL ENGINEER

Phaisarn Cwatanaphol, P.E.

04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

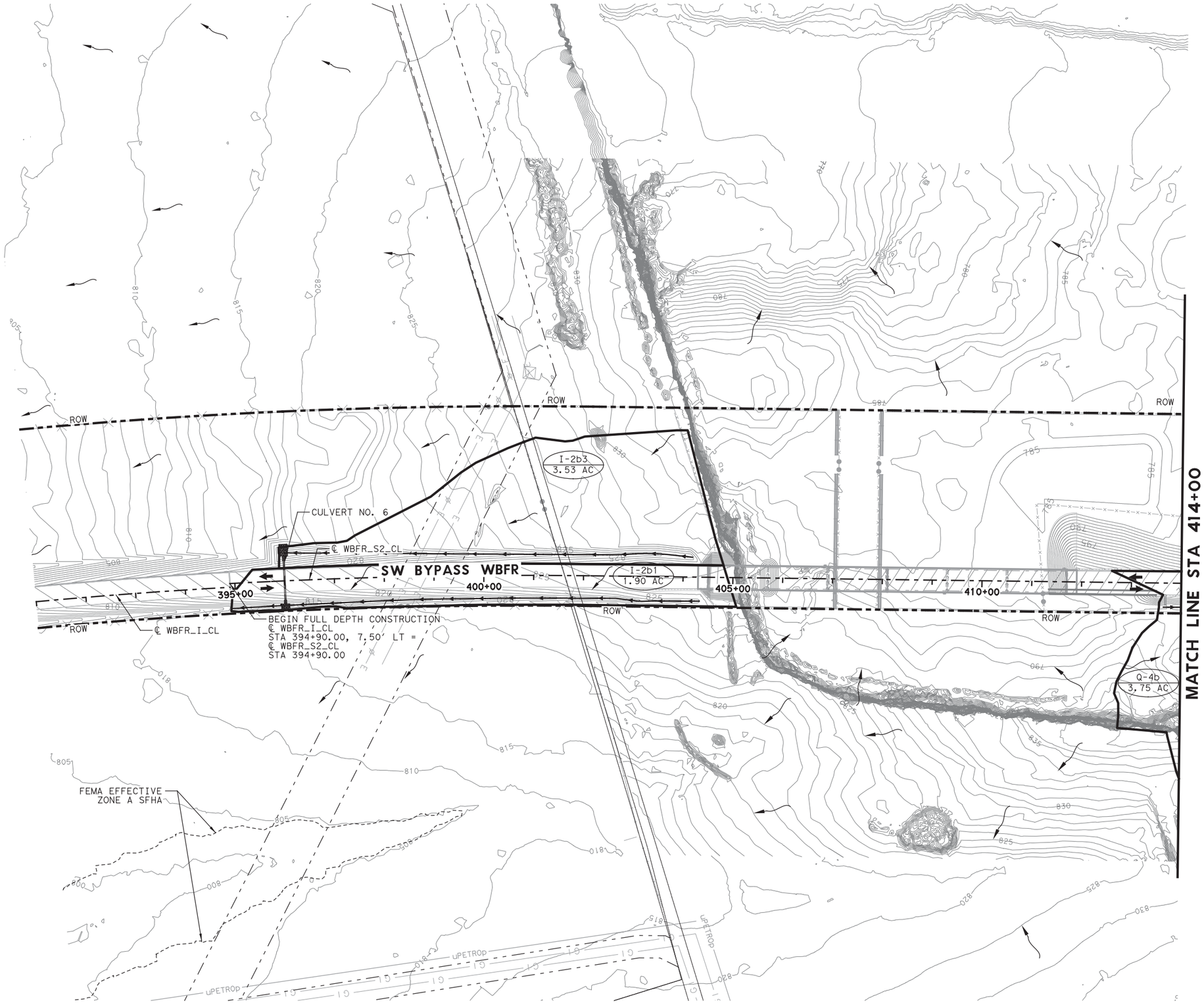
SOUTHWEST BYPASS SEGMENT 2

HYDRAULIC COMPUTATIONS

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS QL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PC	TEXAS	AUS	WILLIAMSON	105
CHECK PC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-0000020T0718.tbl TIME: 9:42:47 AM DATE: 4/10/2018 SCALE: 1:1



N

LEGEND

- PROPOSED DRAINAGE AREA BOUNDARY
- 820 — MAJOR CONTOURS
- MINOR CONTOURS
- PROPOSED DITCH
- FLOW ARROW
- DA-XX / X.XX AC — DRAINAGE AREA ID / DRAINAGE AREA

NOTES:

1. DRAINAGE ANALYSIS PER WILLIAMSON COUNTY DRAINAGE CRITERIA MANUAL.
2. SEE DRAINAGE REPORT FOR EXISTING AND OVERALL PROPOSED DRAINAGE AREA.

* IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, OMIT CULVERT NO. 8B FROM PLAN SHEET.

0 100 200 300 400

SCALE IN FEET

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
LICENSED
PROFESSIONAL ENGINEER

Phaisarn Cwatanaphol, P.E.

04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

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Texas Registered Engineering Firm F-754

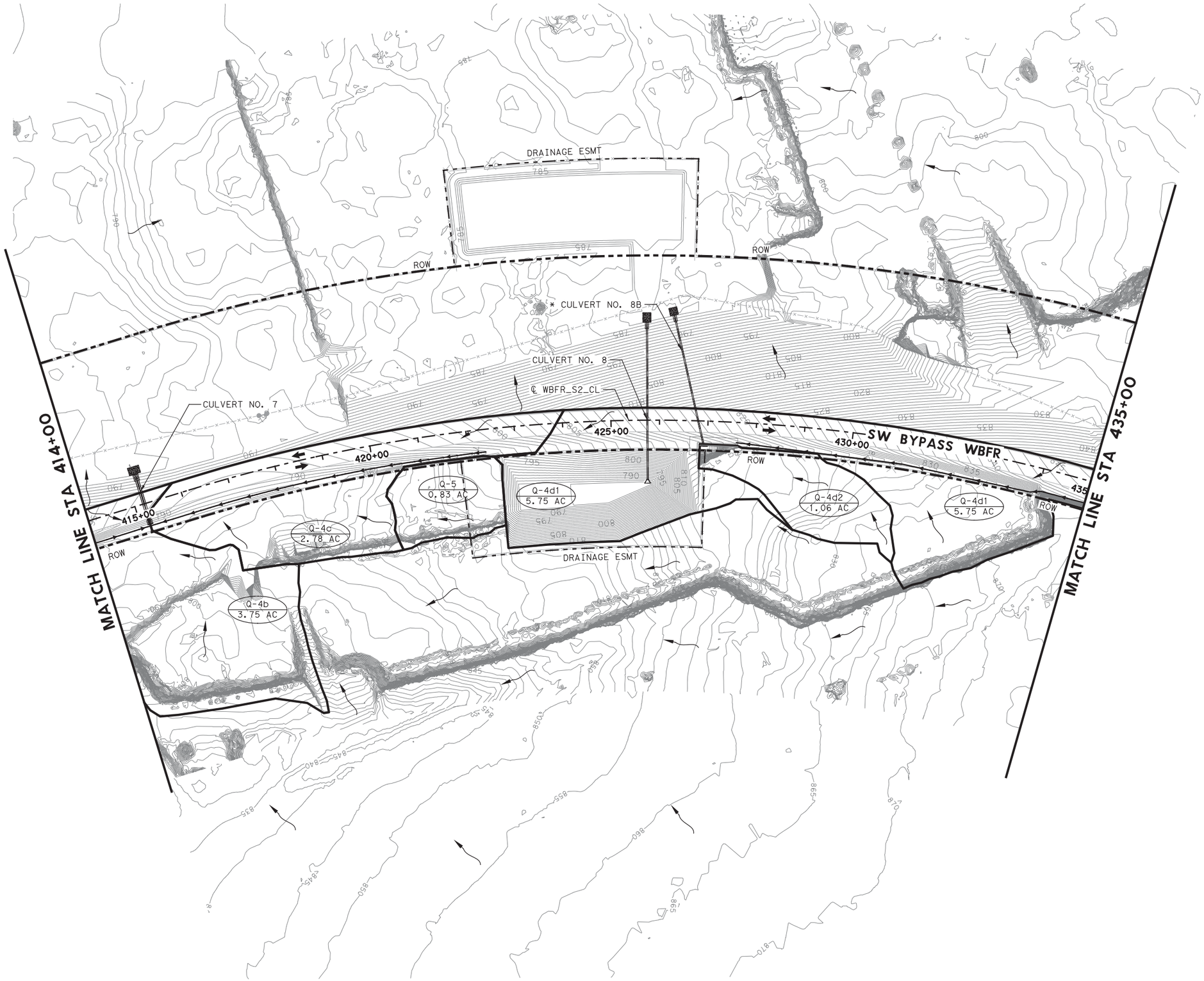
SOUTHWEST BYPASS SEGMENT 2

PROPOSED DRAINAGE AREA MAP BEGIN TO STA 414+00

SCALE: 1"=200' SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PC	TEXAS	AUS	WILLIAMSON	
CHECK QL	CONTROL 2103	SECTION 01	JOB 034	106

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 4/10/2018 TIME: 9:42:59 AM SCALE: 1:200
FILE: \



LEGEND

- PROPOSED DRAINAGE AREA BOUNDARY
- 820 MAJOR CONTOURS
- MINOR CONTOURS
- PROPOSED DITCH
- FLOW ARROW
- DA-XX / X.XX AC — DRAINAGE AREA ID / DRAINAGE AREA

NOTES:

1. DRAINAGE ANALYSIS PER WILLIAMSON COUNTY DRAINAGE CRITERIA MANUAL.
2. SEE DRAINAGE REPORT FOR EXISTING AND OVERALL PROPOSED DRAINAGE AREA.

* IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, OMIT CULVERT NO. 8B FROM PLAN SHEET.

0 100 200 300 400

SCALE IN FEET

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
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04/10/2018

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Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

PROPOSED DRAINAGE AREA MAP STA 414+00 TO STA 435+00

SCALE: 1"=200' SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PC	TEXAS	AUS	WILLIAMSON	
CHECK QL	CONTROL 2103	SECTION 01	JOB 034	107

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgonz DATE: 4/10/2018 TIME: 9:43:06 AM SCALE: 1:200
FILE: \

4/12/2018 7:20 AM



LEGEND

- PROPOSED DRAINAGE AREA BOUNDARY
- 820 MAJOR CONTOURS
- MINOR CONTOURS
- PROPOSED DITCH
- FLOW ARROW
- DA-XX / X.XX AC — DRAINAGE AREA ID / DRAINAGE AREA

NOTES:

1. DRAINAGE ANALYSIS PER WILLIAMSON COUNTY DRAINAGE CRITERIA MANUAL.
2. SEE DRAINAGE REPORT FOR EXISTING AND OVERALL PROPOSED DRAINAGE AREA.

* IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, OMIT CULVERT NO. 8B FROM PLAN SHEET.

0 100 200 300 400

SCALE IN FEET

STATE OF TEXAS
PHAISARN CWATANAPHOL
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LICENSED
PROFESSIONAL ENGINEER

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04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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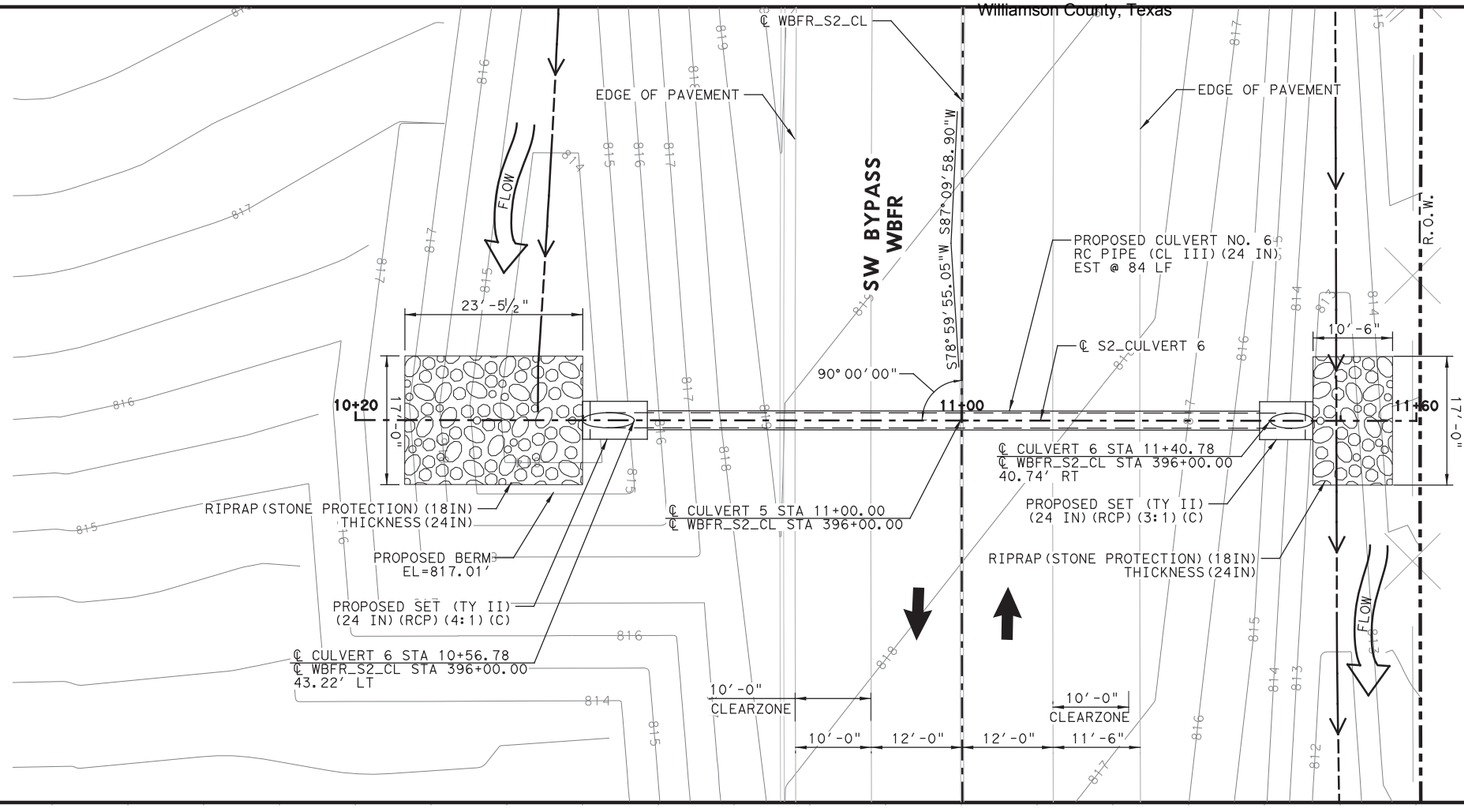
SOUTHWEST BYPASS SEGMENT 2

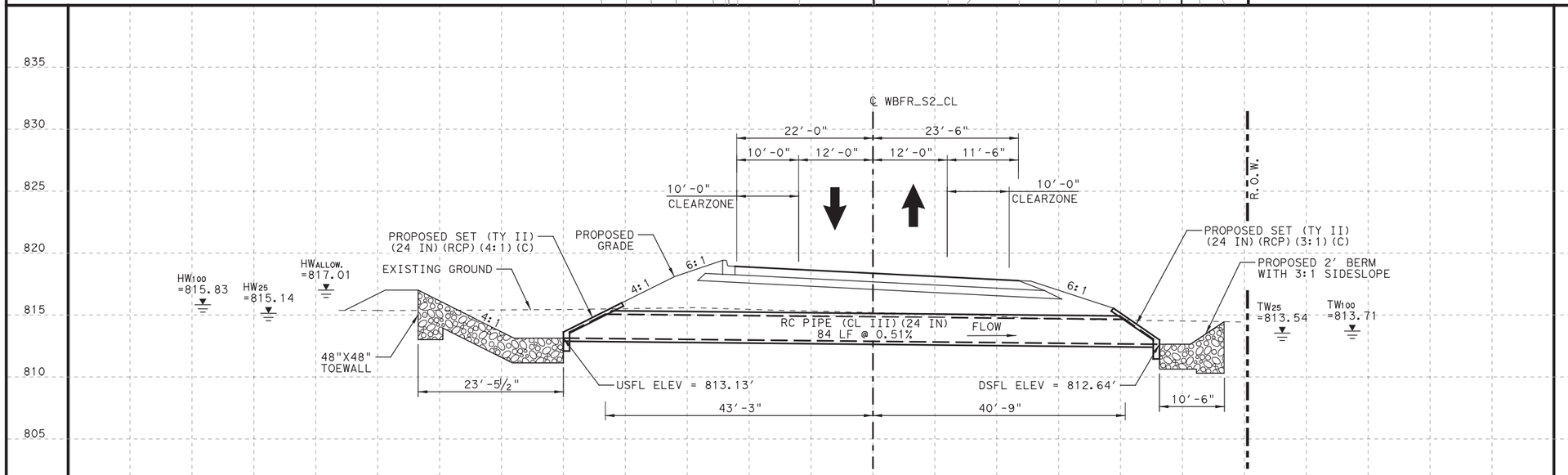
PROPOSED DRAINAGE AREA MAP STA 435+00 TO END

SCALE: 1"=200' SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PC	TEXAS	AUS	WILLIAMSON	108
CHECK QL	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020ITOTI8.tbl
USER: lgomezgonz DATE: 4/10/2018 TIME: 9:43:3 AM SCALE: 1:200
FILE: \





CULVERT NO. 6

RC PIPE (CL III)(24 IN)
SET (TY II)(24 IN)(RCP)(3:1)(C) DOWNSTREAM
SET (TY II)(24 IN)(RCP)(4:1)(C) UPSTREAM

HYDRAULIC DATA

DESIGN FREQ.	= 25-YR
TW_{25}	= 813.54
$HW_{ALLOW.}$	= 817.01
Q_{25}	= 11 CFS
HW_{25}	= 815.14
Q_{100}	= 17 CFS
TW_{100}	= 813.71
HW_{100}	= 815.83
V_{25}	= 5.67 FT/S
V_{100}	= 6.80 FT/S

LEGEND

796.00 — PROPOSED CONTOURS
PROPOSED ROW
RIPRAP (STONE PROTECTION)

NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
2. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING RIPRAP ON SOLID ROCK OR UNDISTURBED AREAS.

STATE OF TEXAS
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PROFESSIONAL ENGINEER
Phaisarn Cwatanaphol, P.E.
03/22/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

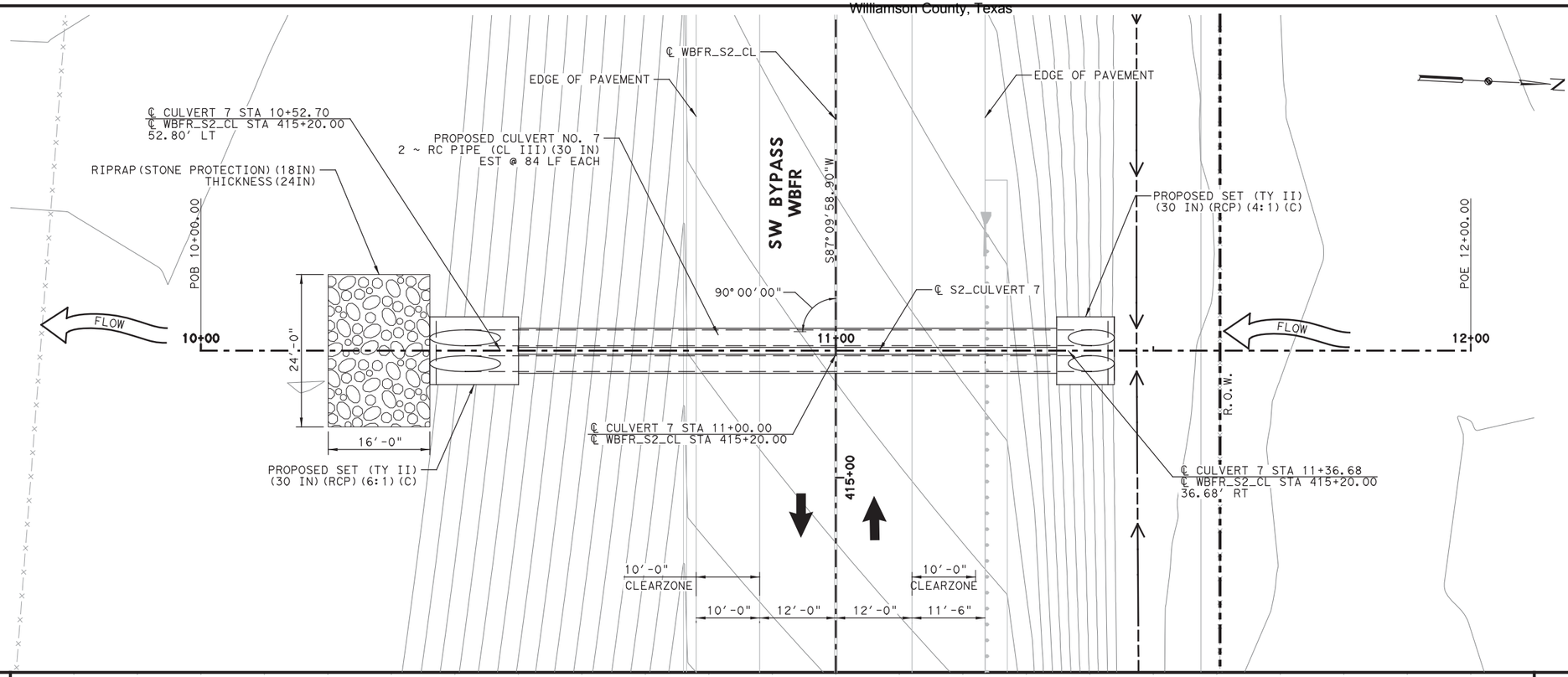
DRAINAGE CULVERT NO. 6 LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 1 OF 1

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
BD	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	109
PC				
CHECK	2103	01	034	
QL				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: qluu TIME: 3:19:03 PM SCALE: 1:20
DATE: 3/22/2018
FILE: \



HYDRAULIC DATA

DESIGN FREQ.	= 25-YR
TW_{25}	= 787.06
$HW_{ALLOW.}$	= 789.73
Q_{25}	= 33 CFS
HW_{25}	= 789.36
Q_{100}	= 49 CFS
TW_{100}	= 787.14
HW_{100}	= 789.99
V_{25}	= 6.00 FT/S
V_{100}	= 6.98 FT/S

LEGEND

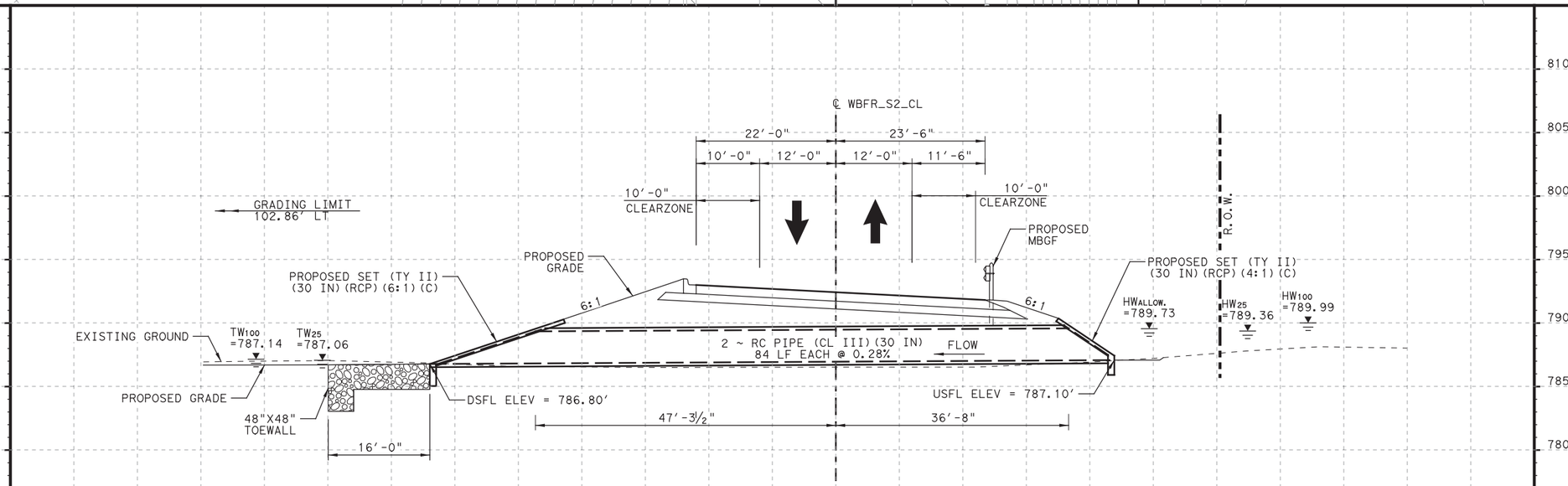
796.00 PROPOSED CONTOURS

PROPOSED ROW

RIPRAP (STONE PROTECTION)

NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
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CULVERT NO. 7

2 ~ RC PIPE (CL III)(30 IN)
SET (TY II)(30 IN)(RCP)(4:1)(C) UPSTREAM
SET (TY II)(30 IN)(RCP)(6:1)(C) DOWNSTREAM

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
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Phaisarn Cwatanapho, P.E. 03/22/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

DRAINAGE CULVERT NO. 7 LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
BD	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	110
PC	2103	01	034	
CHECK				
QL				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: qluu TIME: 3:9:0 PM SCALE: 1:20
DATE: 3/22/2018
FILE: \

4/12/2018 7:20 AM

EDGE OF PAVEMENT

℄ WBFR_S2_CL

S87°09'58.90"W N30°28'42.55"W

SW BYPASS WBFR

MATCH LINE STA 11+12

20'-0"

17'-0"

RIPRAP (STONE PROTECTION) (18IN) THICKNESS (24IN)

RC PIPE (CL IV) (24 IN) EST @ 310 LF

℄ CULVERT 8 STA 11+00.00
℄ WBFR_S2_CL STA 425+75.00

9+00 10+00 11+00

℄ S2_CULVERT 8

90°00'00"

FLOW

℄ CULVERT 8 STA 9+12.02
℄ WBFR_S2_CL STA 425+75.00
187.96' LT

PROPOSED SET (TY II) (24 IN) (RCP) (6:1) (C)

10'-0" CLEARZONE

10'-0" 12'-0" 12'-0"

HYDRAULIC DATA

DESIGN FREQ.	= 25-YR
TW_{25}	= 783.71
$HW_{ALLOW.}$	= 807.60
Q_{25}	= 29 CFS
HW_{25}	= 790.98
Q_{100}	= 42 CFS
TW_{100}	= 783.87
HW_{100}	= 797.74
V_{25}	= 9.57 FT/S
V_{100}	= 13.37 FT/S

LEGEND

796.00 PROPOSED CONTOURS

PROPOSED ROW

RIPRAP (STONE PROTECTION)

NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
2. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING RIPRAP ON SOLID ROCK OR UNDISTURBED AREAS.

℄ WBFR_S2_CL
22'-0" 12'-0"
10'-0" 12'-0" 12'-0"

10'-0" CLEARZONE

815 810 805 800 795 790 785 780 775 770

PROPOSED GRADE

6:1

PROPOSED SET (TY II) (24 IN) (RCP) (6:1) (C)

EXISTING GROUND
48"X48" TOEWALL

TW_{100} =783.87 TW_{25} =783.71

FLOW

RC PIPE (CL IV) (24 IN) 310 LF @ 0.63%

187'-9⅝"

12'-0"

20'-0"

DSFL ELEV = 782.95'

MATCH LINE STA 11+12

9+00 10+00 11+00

CULVERT NO. 8

RC PIPE (CL IV) (24 IN)
SET (TY II) (24 IN) (RCP) (6:1) (C) DOWNSTREAM
HEADWALL (CH-FW-0) (DIA = 24 IN) UPSTREAM

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
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PROFESSIONAL ENGINEER

Phaisarn Cwatanapho l, P.E. 03/22/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

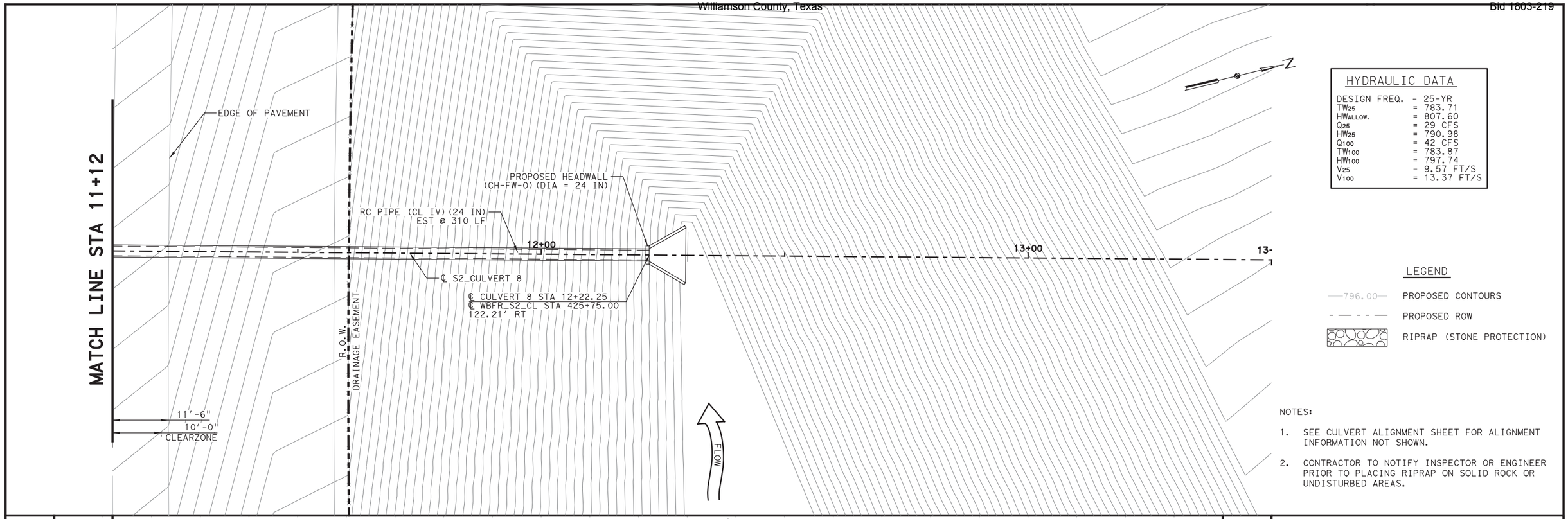
DRAINAGE CULVERT NO. 8 LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 1 OF 2

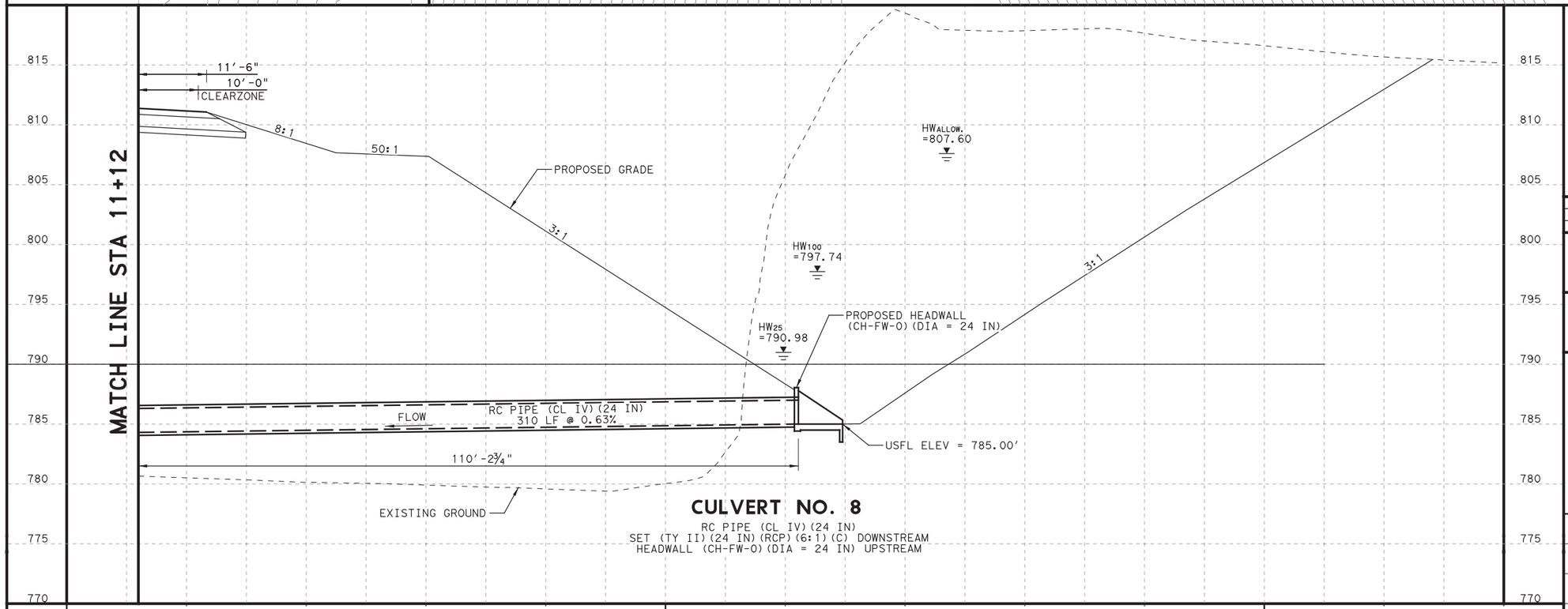
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL				
GRAPHICS				
BD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	WILLIAMSON	
PC	CONTROL	SECTION	JOB	111
CHECK	2103	01	034	
QL				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020I7071B.tbl
USER: qluu TIME: 3:9:46 PM SCALE: 1:20
DATE: 3/22/2018
FILE: \



NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
2. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING RIPRAP ON SOLID ROCK OR UNDISTURBED AREAS.



CULVERT NO. 8

RC PIPE (CL IV)(24 IN)
SET (TY II)(24 IN)(RCP)(6:1)(C) DOWNSTREAM
HEADWALL (CH-FW-0)(DIA = 24 IN) UPSTREAM

STATE OF TEXAS
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03/22/2018

NO.	DATE	REVISION	APPROVED

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SOUTHWEST BYPASS SEGMENT 2

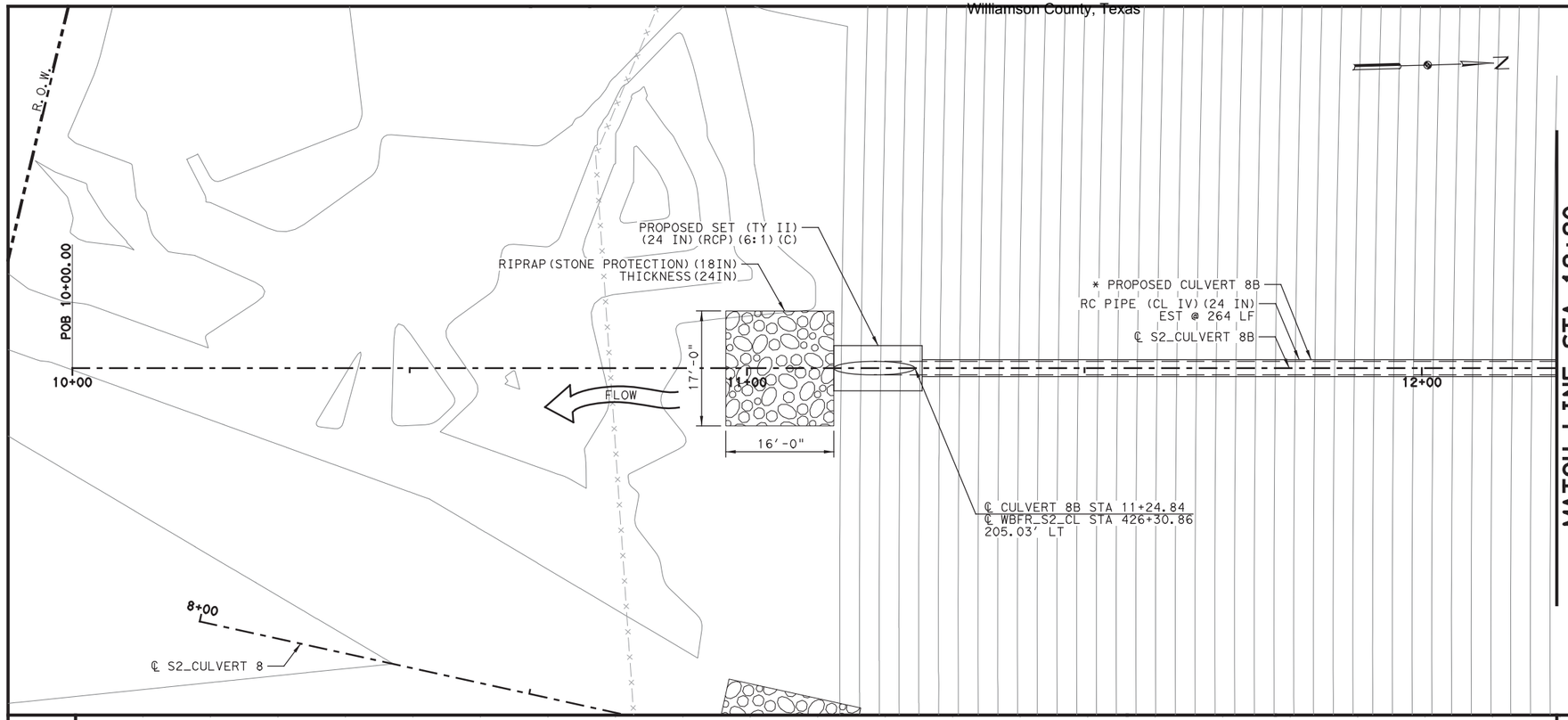
DRAINAGE CULVERT NO. 8 LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL				
GRAPHICS				
BD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	WILLIAMSON	
PC	CONTROL	SECTION	JOB	112
CHECK	2103	01	034	
QL				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201707IB.tbl
USER: qluu TIME: 3/9/23 PM SCALE: 1:20
DATE: 3/22/2018
FILE: \



HYDRAULIC DATA

DESIGN FREQ.	= 25-YR
TW_{25}	= 783.05
$HW_{ALLOW.}$	= 809.72
Q_{25}	= 4 CFS
HW_{25}	= 783.65
Q_{100}	= 6 CFS
TW_{100}	= 783.11
HW_{100}	= 783.80
V_{25}	= 0.00 FT/S
V_{100}	= 0.00 FT/S

LEGEND

796.00 — PROPOSED CONTOURS

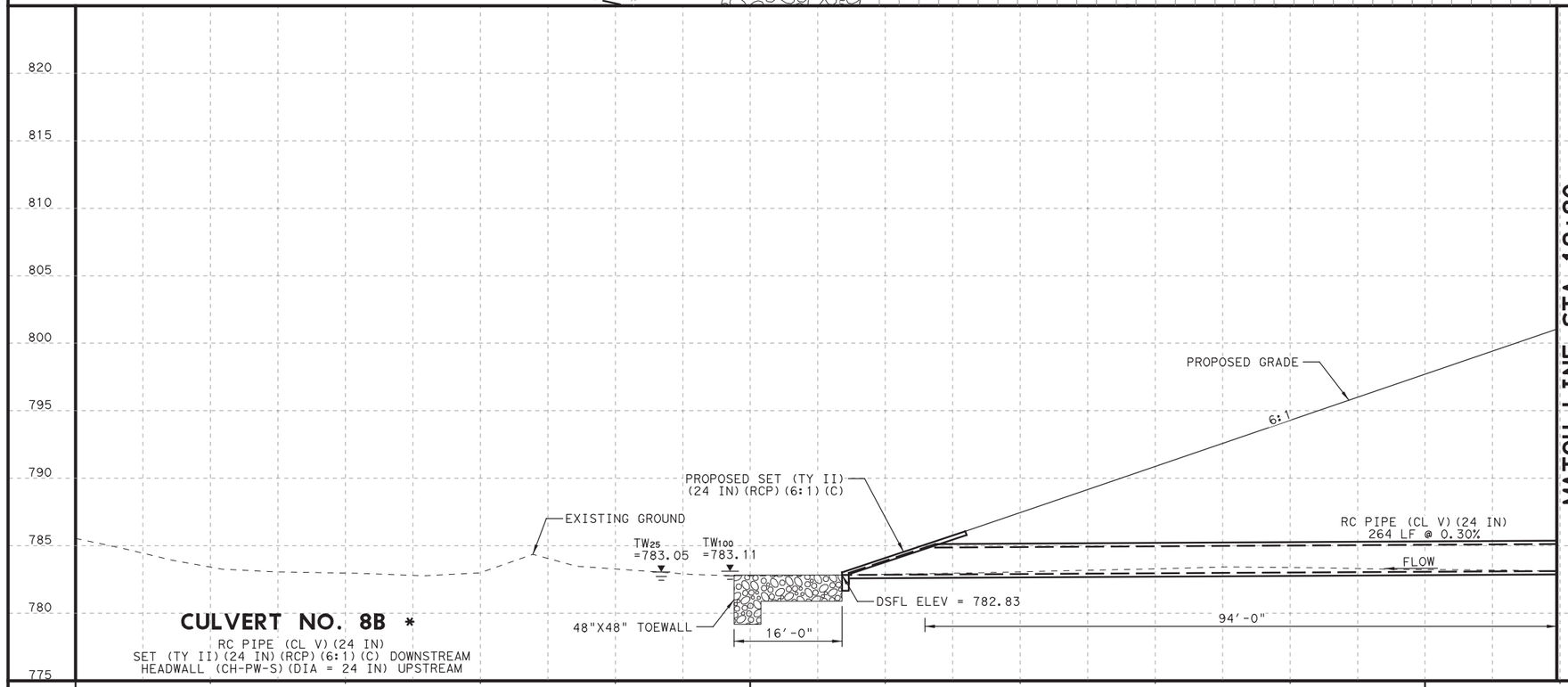
PROPOSED ROW

RIPRAP (STONE PROTECTION)

NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
2. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING RIPRAP ON SOLID ROCK OR UNDISTURBED AREAS.

* IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, REMOVE DRAINAGE CULVERT NO. 8B LAYOUT SHEETS FROM PLAN SET.



CULVERT NO. 8B *

RC PIPE (CL V) (24 IN)
SET (TY II) (24 IN) (RCP) (6:1) (C) DOWNSTREAM
HEADWALL (CH-PW-S) (DIA = 24 IN) UPSTREAM

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
LICENSED
PROFESSIONAL ENGINEER

Phaisarn Cwatanapho l, P.E. 04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

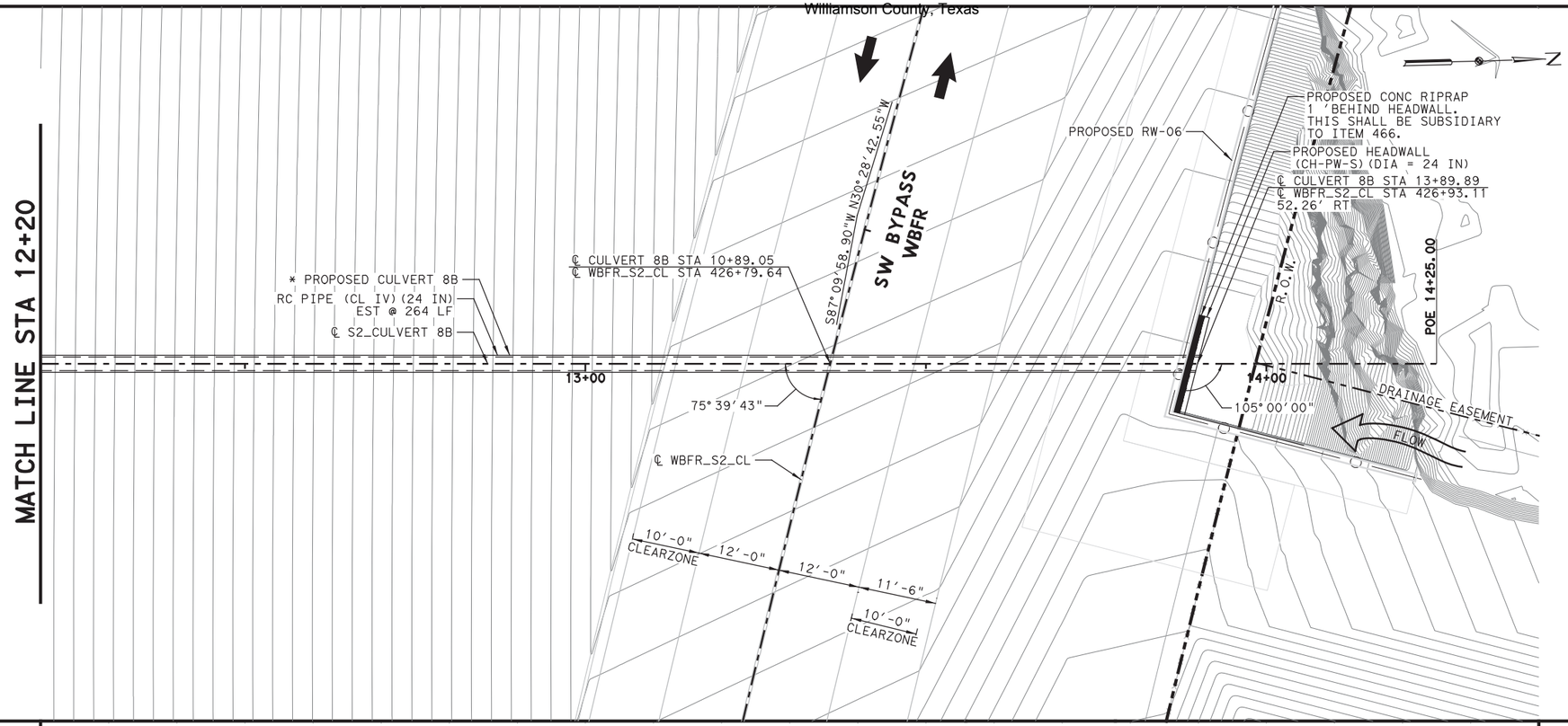
DRAINAGE CULVERT NO. 8B LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 1 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL				
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
QL	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	113
PC	2103	01	034	
CHECK				
QL				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020I7018.tbl
USER: lgomezgon2 DATE: 4/10/2018 TIME: 9:43:34 AM SCALE: 1:20
FILE: \



HYDRAULIC DATA

DESIGN FREQ.	= 25-YR
TW_{25}	= 783.05
$HW_{ALLOW.}$	= 809.72
Q_{25}	= 4 CFS
HW_{25}	= 783.65
Q_{100}	= 6 CFS
TW_{100}	= 783.11
HW_{100}	= 783.80
V_{25}	= 0.00 FT/S
V_{100}	= 0.00 FT/S

LEGEND

796.00 — PROPOSED CONTOURS

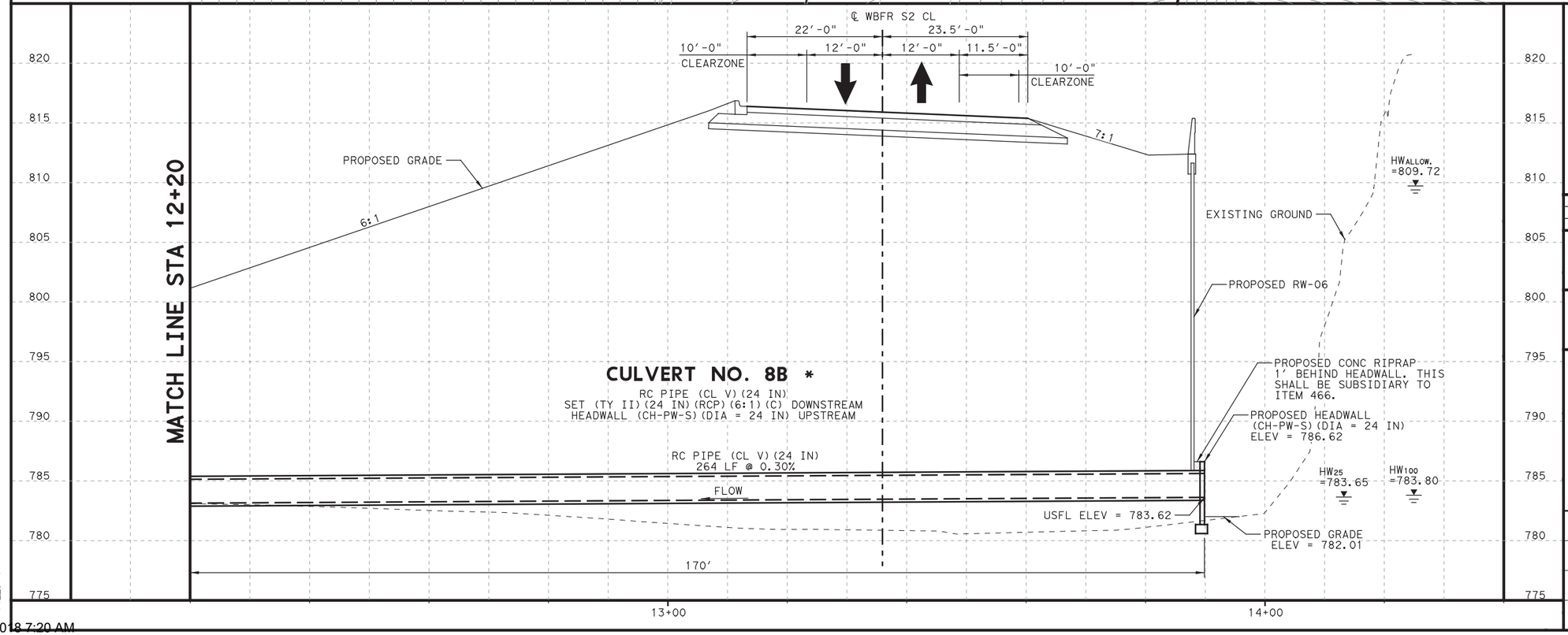
PROPOSED ROW

RIPRAP (STONE PROTECTION)

NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
2. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING RIPRAP ON SOLID ROCK OR UNDISTURBED AREAS.

* IF RETAINING WALL RW-06 IS NOT CONSTRUCTED, REMOVE DRAINAGE CULVERT NO. 8B LAYOUT SHEETS FROM PLAN SET.



CULVERT NO. 8B *

RC PIPE (CL V) (24 IN)
SET (TY II) (24 IN) (RCP) (6:1) (C) DOWNSTREAM
HEADWALL (CH-PW-S) (DIA = 24 IN) UPSTREAM

STATE OF TEXAS
PHAISARN CWATANAPHOL
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SOUTHWEST BYPASS SEGMENT 2

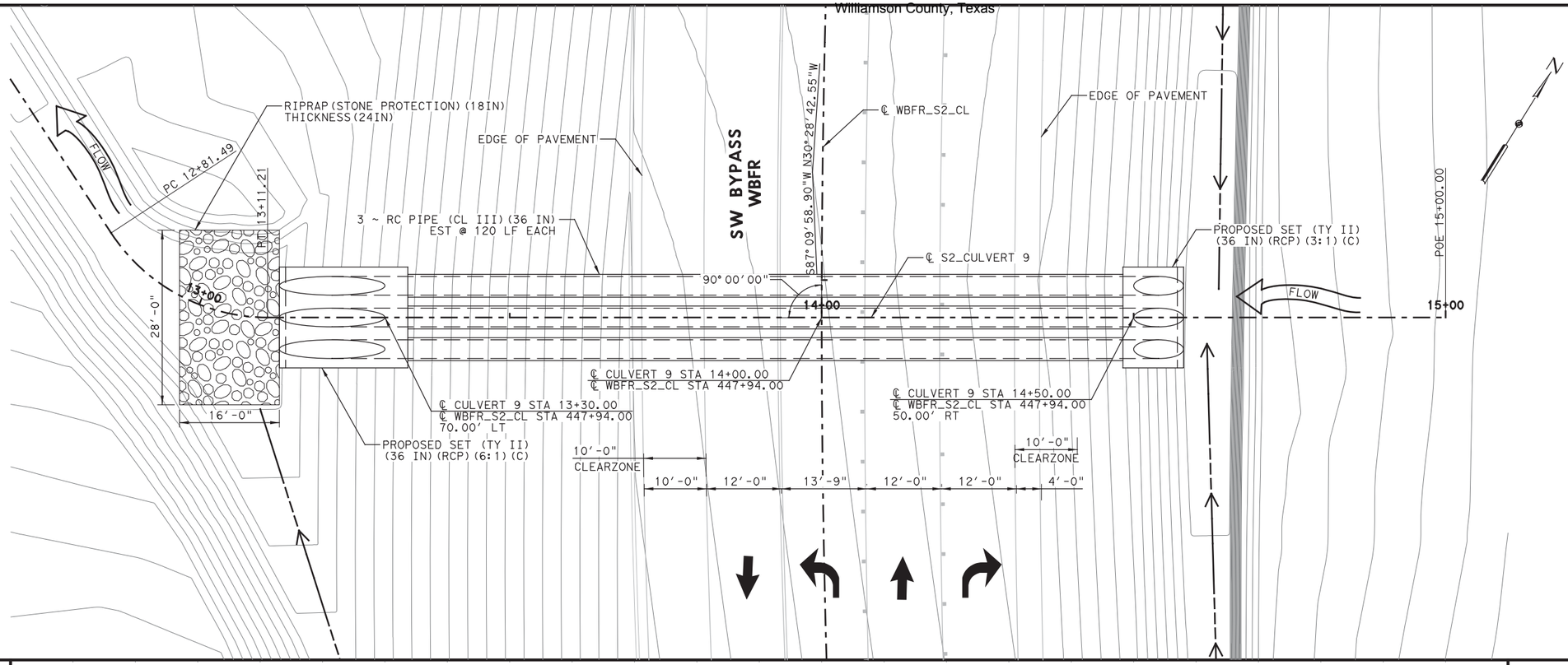
DRAINAGE CULVERT NO. 8B LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
QL				
GRAPHICS				
QL	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	WILLIAMSON	
PC	CONTROL	SECTION	JOB	114
CHECK	2103	01	034	
QL				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201707I8.tbl
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FILE: \
4/12/2018 7:20 AM



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$HW_{ALLOW.}$	= 837.21
Q_{25}	= 69 CFS
HW_{25}	= 836.88
Q_{100}	= 105 CFS
TW_{100}	= 835.68
HW_{100}	= 837.65
V_{25}	= 6.80 FT/S
V_{100}	= 7.50 FT/S

LEGEND

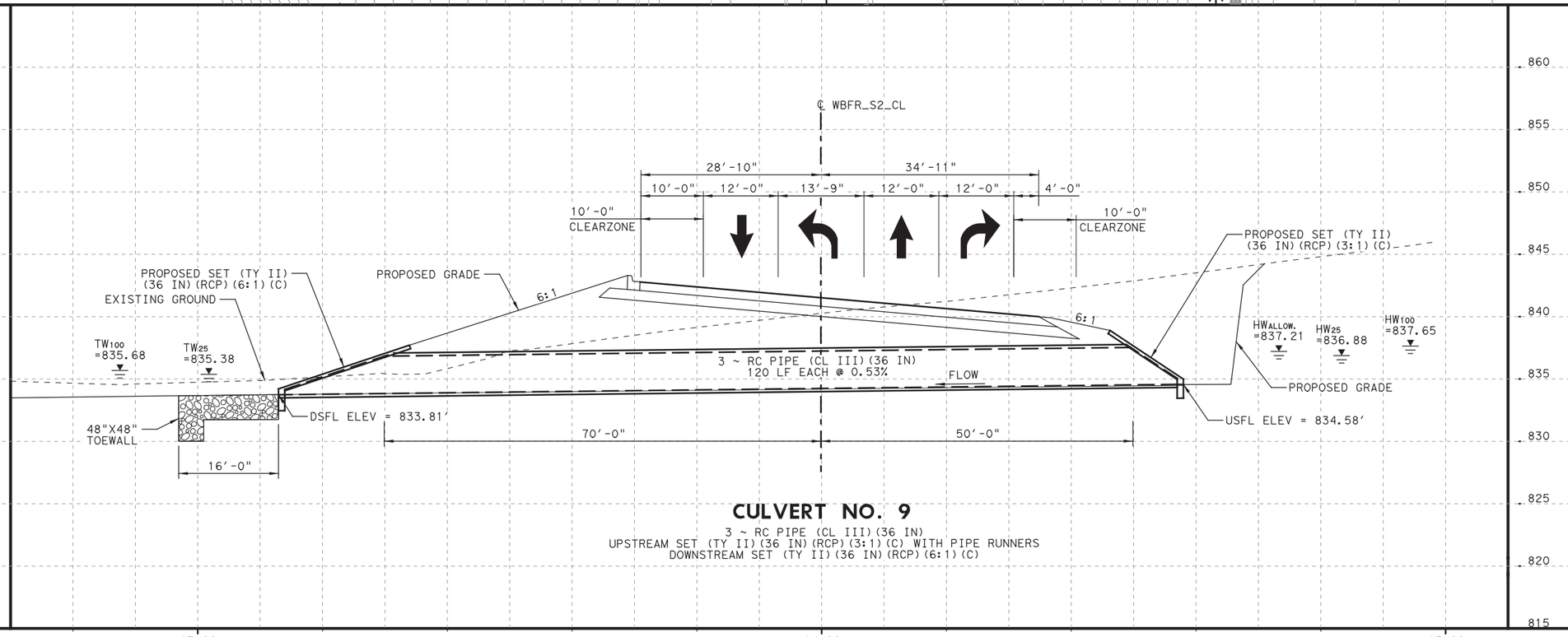
796.00 — PROPOSED CONTOURS

PROPOSED ROW

RIPRAP (STONE PROTECTION)

NOTES:

1. SEE CULVERT ALIGNMENT SHEET FOR ALIGNMENT INFORMATION NOT SHOWN.
2. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING RIPRAP ON SOLID ROCK OR UNDISTURBED AREAS.



CULVERT NO. 9

3 ~ RC PIPE (CL III) (36 IN)
UPSTREAM SET (TY II) (36 IN) (RCP) (3:1) (C) WITH PIPE RUNNERS
DOWNSTREAM SET (TY II) (36 IN) (RCP) (6:1) (C)

STATE OF TEXAS
PHAISARN CWATANAPHOL
89252
LICENSED
PROFESSIONAL ENGINEER
Phaisarn Cwatanapho, P.E.
03/22/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

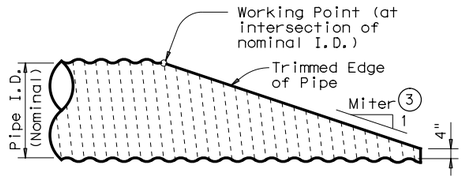
SOUTHWEST BYPASS SEGMENT 2

DRAINAGE CULVERT NO. 9 LAYOUT

SCALE: 1"=20'-H
1"=10'-V

SHEET 1 OF 1

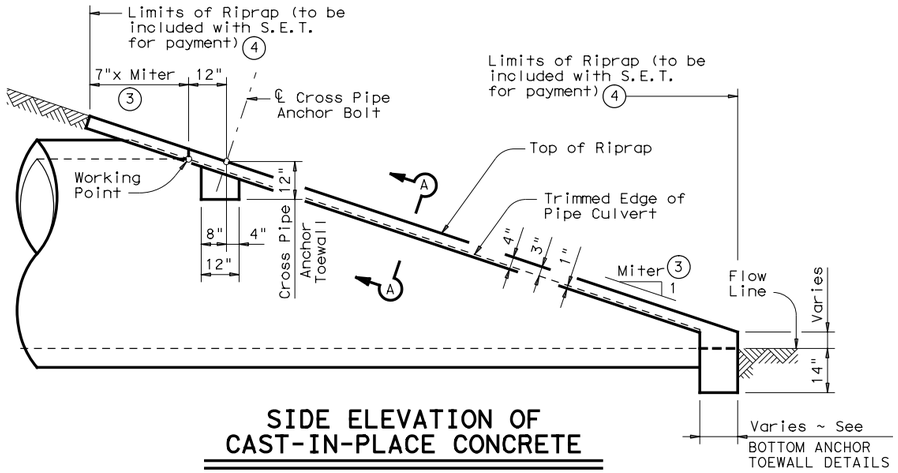
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QL				
GRAPHICS				
BD	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	WILLIAMSON	
PC	CONTROL	SECTION	JOB	115
CHECK	2103	01	034	
QL				



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.

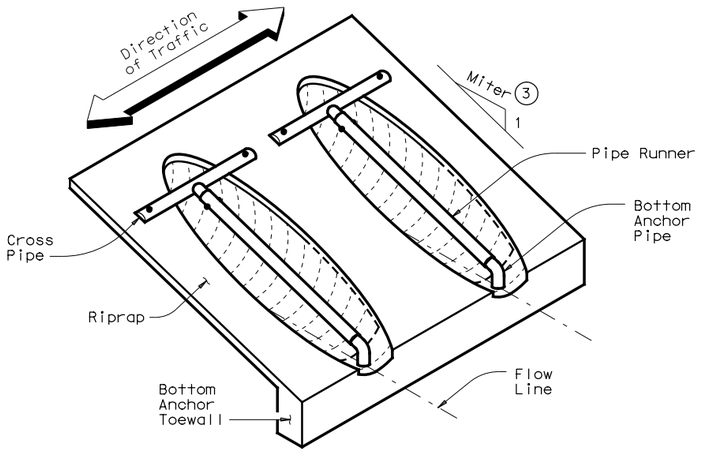
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(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.

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SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

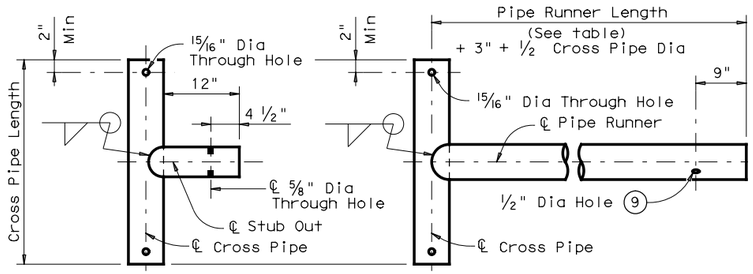
SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

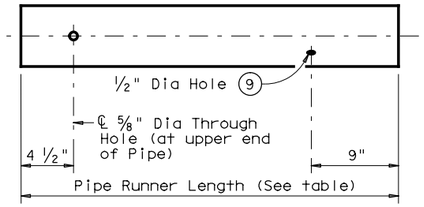
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©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
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11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		116

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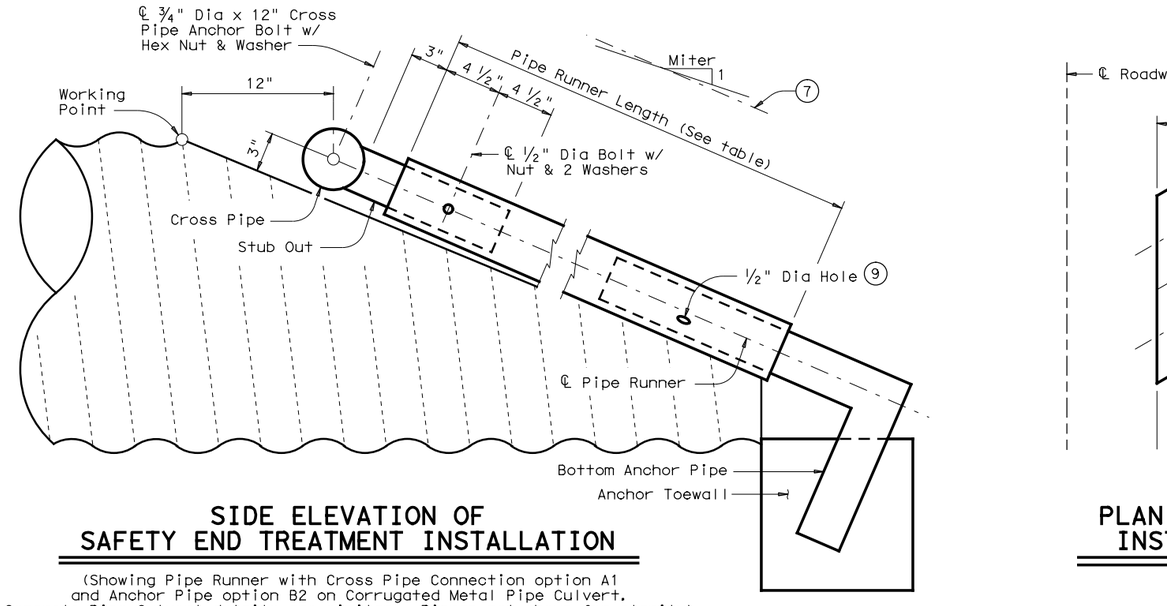
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



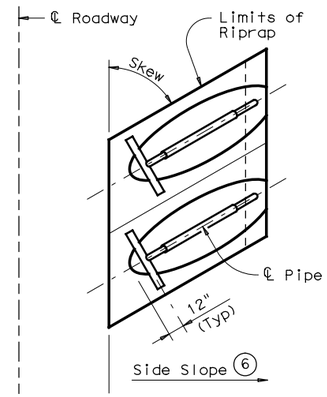
NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

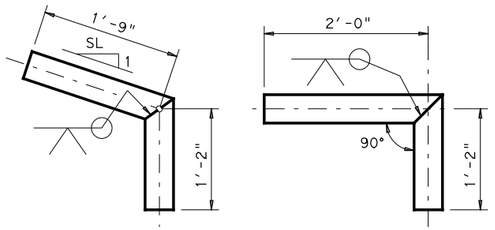


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(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)

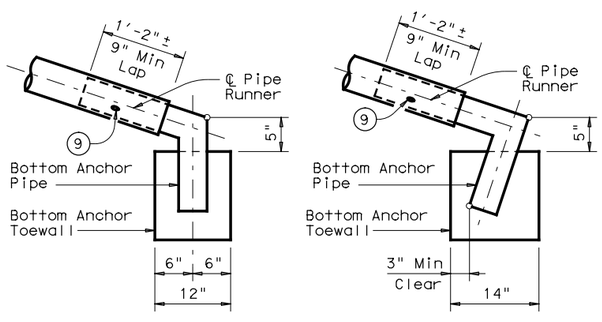


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

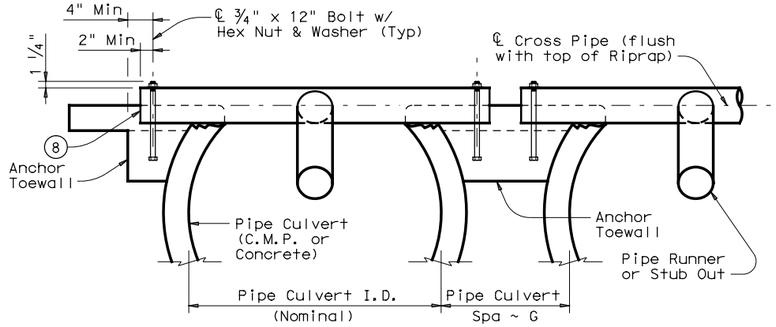
BOTTOM ANCHOR PIPE DETAILS (10)



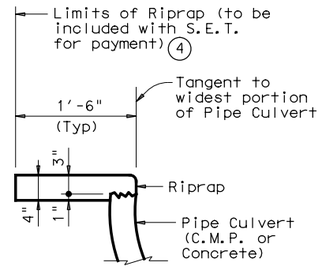
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert & Riprap not shown for clarity)



SHOWING CROSS PIPE & ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT & RIPRAP

SECTION A-A

(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

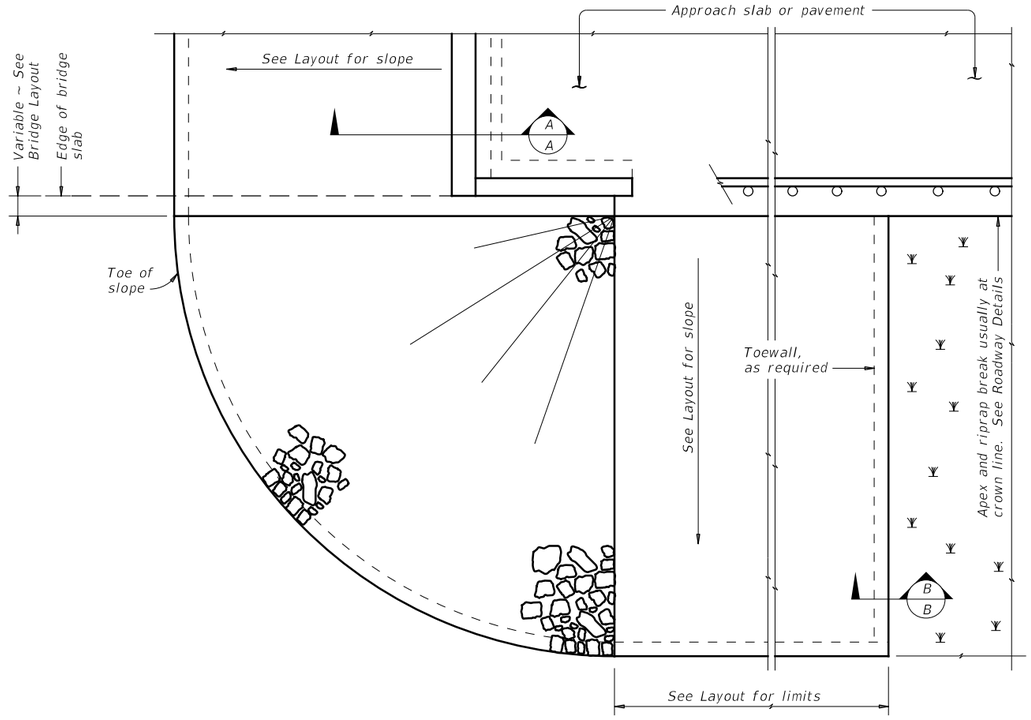
FOR 12" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

SETP-CD

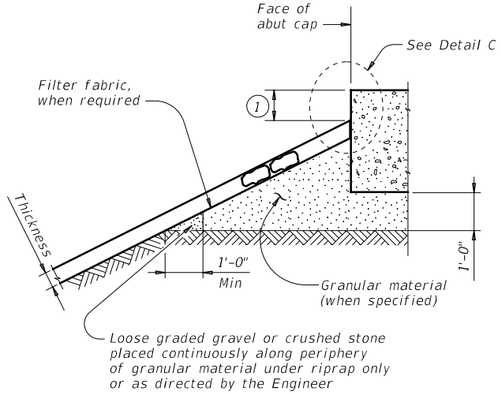
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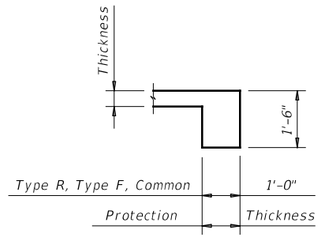
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PLAN

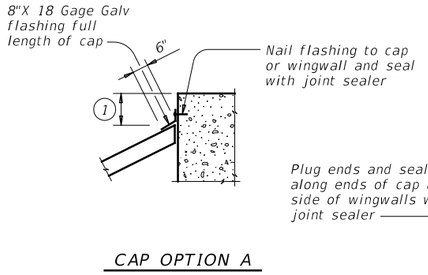


SECTION A-A AT CAP

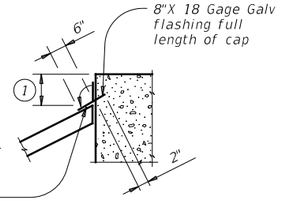


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

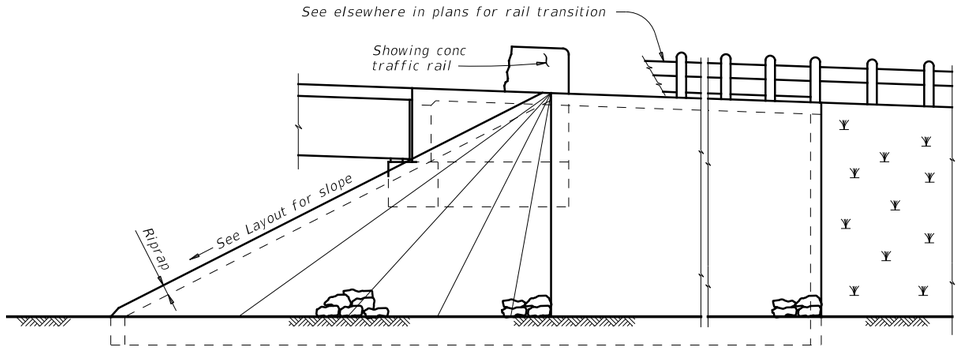


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

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.

(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.

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	2103	01	034	
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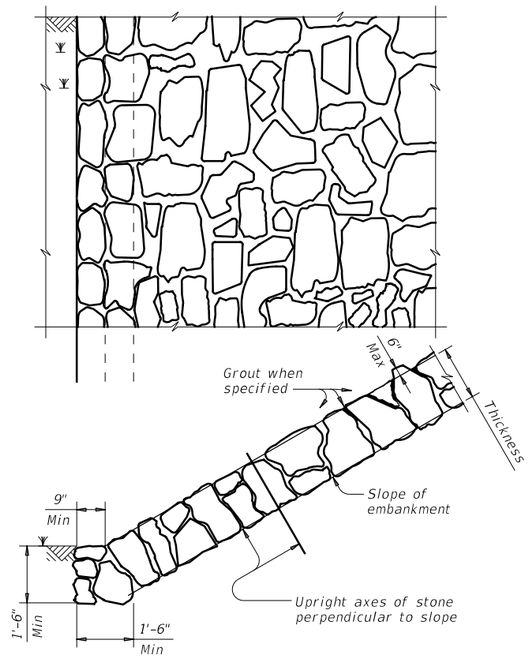


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

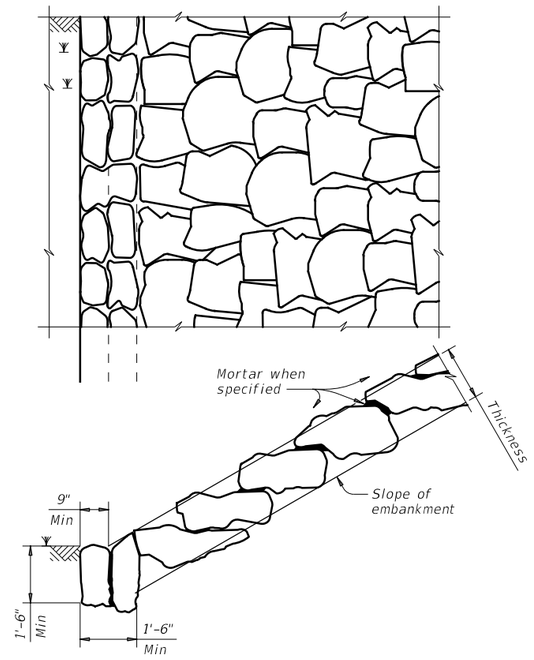


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

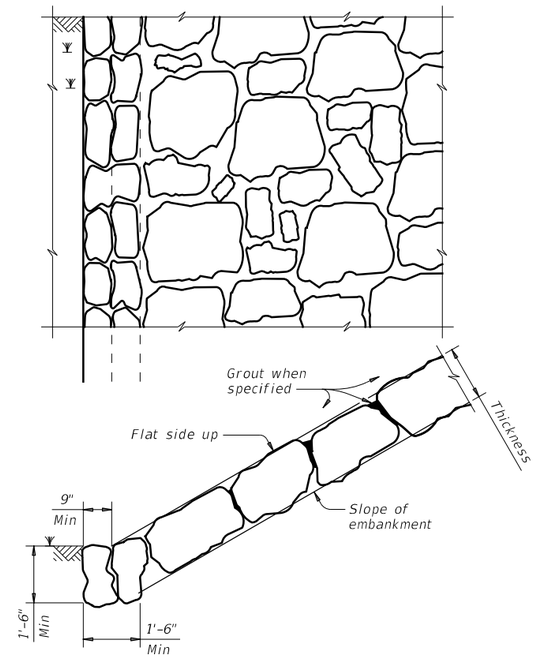


FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

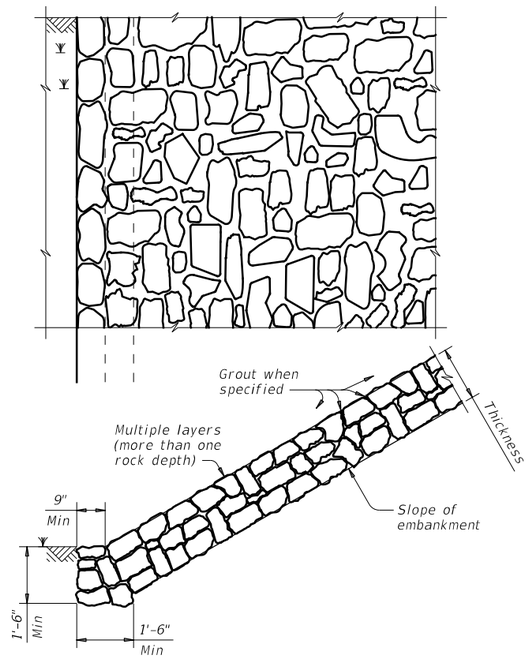


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

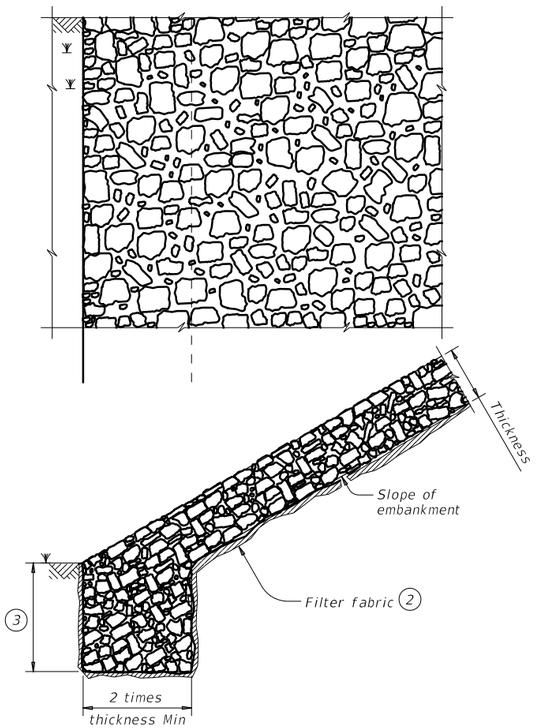


FIGURE 5 ~ PROTECTION STONE RIPRAP

(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.

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SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

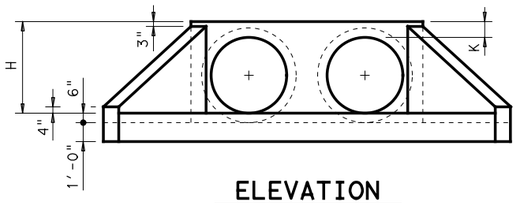
STONE RIPRAP

SRR

FILE: srrstde1.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		119

TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

SLOPE	DIA OF PIPE, D	Values for one Pipe						Values to be added for each addt'l Pipe		
		W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4'- 7 ½"	2'- 6"	2'-10"	3'- 3 ¼"	84	0.6	1'- 9"	20	0.2
	15"	5'- 5 ¾"	2'- 9 ½"	3'- 4"	3'-10 ¼"	99	0.7	2'- 2"	24	0.3
	18"	6'- 4 ¼"	3'- 1"	3'-10"	4'- 5"	120	0.9	2'- 8"	32	0.3
	21"	7'- 2 ¾"	3'- 4 ½"	4'- 4"	5'- 0"	137	1.1	3'- 1"	43	0.4
	24"	8'- 2 ½"	3'- 9 ½"	4'-10"	5'- 7"	158	1.3	3'- 7"	50	0.5
	27"	9'- 1"	4'- 1"	5'- 4"	6'- 2"	173	1.5	3'-11"	56	0.6
	30"	9'-11 ½"	4'- 4 ½"	5'-10"	6'- 8 ¾"	197	1.7	4'- 4"	65	0.8
	33"	10'-10"	4'- 8"	6'- 4"	7'- 3 ¾"	216	2.0	4'- 8"	71	0.9
	36"	11'- 8 ¼"	4'-11 ½"	6'-10"	7'-10 ¾"	241	2.2	5'- 1"	81	1.0
	42"	13'- 5 ¼"	5'- 6 ½"	7'-10"	9'- 0 ½"	290	2.8	5'-10"	97	1.3
	48"	15'- 9"	6'- 1 ½"	9'- 4"	10'- 9 ¼"	350	3.8	6'- 7"	117	1.7
	54"	17'- 5 ¾"	6'- 8 ½"	10'- 4"	11'-11 ¼"	415	4.5	7'- 6"	151	2.1
	60"	19'- 2 ¾"	7'- 3 ½"	11'- 4"	13'- 1"	469	5.3	8'- 3"	174	2.5
	66"	20'-11 ½"	7'-10 ½"	12'- 4"	14'- 3"	530	6.2	8'- 9"	194	2.9
	72"	22'- 8 ½"	8'- 5 ½"	13'- 4"	15'- 4 ¾"	587	7.1	9'- 4"	213	3.3
3:1	12"	6'- 3"	2'- 6"	4'- 3"	4'-11"	114	0.8	1'- 9"	22	0.2
	15"	7'- 5"	2'- 9 ½"	5'- 0"	5'- 9 ¼"	133	1.1	2'- 2"	28	0.3
	18"	8'- 6 ¾"	3'- 1"	5'- 9"	6'- 7 ¾"	166	1.3	2'- 8"	37	0.5
	21"	9'- 8 ¾"	3'- 4 ½"	6'- 6"	7'- 6"	189	1.6	3'- 1"	48	0.6
	24"	11'- 0"	3'- 9 ½"	7'- 3"	8'- 4 ½"	221	2.0	3'- 7"	58	0.7
	27"	12'- 2"	4'- 1"	8'- 0"	9'- 2 ¾"	245	2.3	3'-11"	67	0.8
	30"	13'- 4"	4'- 4 ½"	8'- 9"	10'- 1 ¼"	287	2.7	4'- 4"	77	1.0
	33"	14'- 5 ¾"	4'- 8"	9'- 6"	10'-11 ¾"	310	3.1	4'- 8"	84	1.2
	36"	15'- 7 ¾"	4'-11 ½"	10'- 3"	11'-10"	343	3.5	5'- 1"	96	1.4
	42"	17'-11 ½"	5'- 6 ½"	11'- 9"	13'- 6 ¾"	424	4.5	5'-10"	119	1.7
	48"	21'- 1 ¾"	6'- 1 ½"	14'- 0"	16'- 2"	527	6.1	6'- 7"	146	2.3
	54"	23'- 5 ½"	6'- 8 ½"	15'- 6"	17'-10 ¾"	618	7.3	7'- 6"	186	2.9
	60"	25'- 9 ¼"	7'- 3 ½"	17'- 0"	19'- 7 ½"	707	8.7	8'- 3"	219	3.4
	66"	28'- 1"	7'-10 ½"	18'- 6"	21'- 4 ¼"	797	10.1	8'- 9"	242	3.9
	72"	30'- 4 ¾"	8'- 5 ½"	20'- 0"	23'- 1 ¼"	910	11.7	9'- 4"	272	4.4
4:1	12"	7'-10 ¾"	2'- 6"	5'- 8"	6'- 6 ½"	144	1.1	1'- 9"	24	0.3
	15"	9'- 4"	2'- 9 ½"	6'- 8"	7'- 8 ½"	177	1.5	2'- 2"	32	0.4
	18"	10'- 9 ½"	3'- 1"	7'- 8"	8'-10 ¼"	217	1.9	2'- 8"	42	0.5
	21"	12'- 2 ¾"	3'- 4 ½"	8'- 8"	10'- 0"	254	2.3	3'- 1"	57	0.7
	24"	13'- 9 ½"	3'- 9 ½"	9'- 8"	11'- 2"	295	2.8	3'- 7"	67	0.9
	27"	15'- 3"	4'- 1"	10'- 8"	12'- 3 ¾"	328	3.3	3'-11"	77	1.0
	30"	16'- 8 ¼"	4'- 4 ½"	11'- 8"	13'- 5 ¾"	379	3.8	4'- 4"	89	1.3
	33"	18'- 1 ¾"	4'- 8"	12'- 8"	14'- 7 ½"	417	4.5	4'- 8"	101	1.4
	36"	19'- 7"	4'-11 ½"	13'- 8"	15'- 9 ¼"	464	5.1	5'-1"	115	1.7
	42"	22'- 5 ¾"	5'- 6 ½"	15'- 8"	18'- 1"	575	6.5	5'-10"	141	2.1
	48"	26'- 6 ¼"	6'- 1 ½"	18'- 8"	21'- 6 ¾"	720	8.9	6'- 7"	175	2.8
	54"	29'- 5"	6'- 8 ½"	20'- 8"	23'-10 ¼"	863	10.7	7'- 6"	226	3.6
	60"	32'- 3 ¾"	7'- 3 ½"	22'- 8"	26'- 2"	984	12.7	8'- 3"	264	4.3
	66"	35'- 2 ½"	7'-10 ½"	24'- 8"	28'- 5 ¾"	1126	14.9	8'- 9"	300	4.9
	72"	38'- 1 ¼"	8'- 5 ½"	26'- 8"	30'- 9 ½"	1283	17.3	9'- 4"	334	5.6
6:1	12"	11'- 2"	2'- 6"	8'- 6"	9'- 9 ¾"	220	1.9	1'- 9"	28	0.4
	15"	13'- 2 ¼"	2'- 9 ½"	10'- 0"	11'- 6 ½"	264	2.5	2'- 2"	37	0.5
	18"	15'- 2 ½"	3'- 1"	11'- 6"	13'- 3 ¼"	326	3.2	2'- 8"	50	0.7
	21"	17'- 2 ¾"	3'- 4 ½"	13'- 0"	15'- 0 ¼"	381	3.9	3'- 1"	69	0.9
	24"	19'- 4 ½"	3'- 9 ½"	14'- 6"	16'- 9"	447	4.8	3'- 7"	80	1.2
	27"	21'- 4 ¾"	4'- 1"	16'- 0"	18'- 5 ¾"	506	5.7	3'-11"	96	1.4
	30"	23'- 5 ¼"	4'- 4 ½"	17'- 6"	20'- 2 ½"	587	6.7	4'- 4"	110	1.7
	33"	25'- 5 ½"	4'- 8"	19'- 0"	21'-11 ¼"	667	7.8	4'- 8"	127	2.0
	36"	27'- 5 ¾"	4'-11 ½"	20'- 6"	23'- 8"	727	9.0	5'- 1"	144	2.3
	42"	31'- 6 ¼"	5'- 6 ½"	23'- 6"	27'- 1 ½"	914	11.5	5'-10"	179	3.0
	48"	37'- 3 ½"	6'- 1 ½"	28'- 0"	32'- 4"	1181	15.9	6'- 7"	231	4.0
	54"	41'- 4 ¼"	6'- 8 ½"	31'- 0"	35'- 9 ½"	1412	19.2	7'- 6"	300	5.0
	60"	45'- 4 ¾"	7'- 3 ½"	34'- 0"	39'- 3"	1619	22.9	8'- 3"	353	6.0



ELEVATION
Showing dimensions

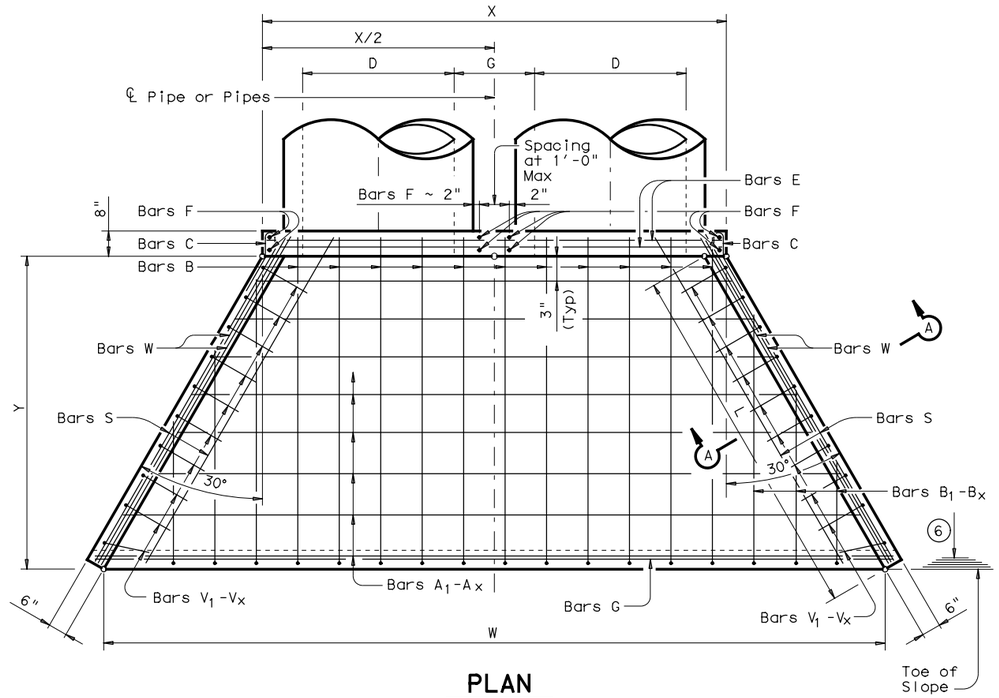
1. Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.
2. For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
3. Provide a 1'-0" footing as shown where required to maintain 4" Min cover for pipes.
4. Quantities shown are for one structure end only (one headwall).
5. Min Length = 6" + 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$
   Max Length = 12 x H - 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$ - 1"
6. Lengths of wings based on SL:1 Slope along this line.

TABLE OF REINFORCING STEEL (4)

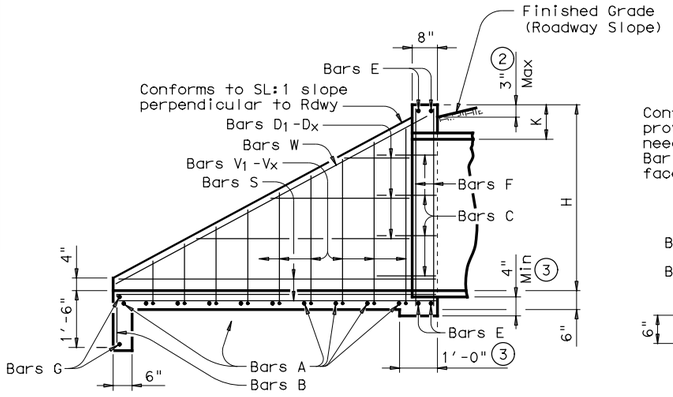
Bar	Size	Spa	No.
A	# 4	1'-0"	~
B	# 3	1'-6"	~
C	# 4	1'-0"	~
D	# 3	1'-0"	~
E	# 5	~	4
F	# 5	~	~
G	# 3	~	2
S	# 4	~	6
V	# 4	1'-0"	~
W	# 5	~	4

TABLE OF CONSTANT DIMENSIONS

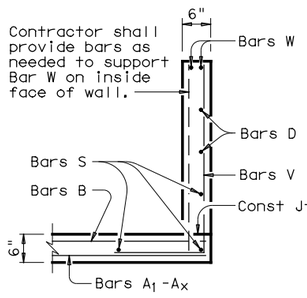
DIA OF PIPE, D	G	K	H
12"	9"	1'- 0"	2'- 0"
15"	11"	1'- 0"	2'- 3"
18"	1'- 2"	1'- 0"	2'- 6"
21"	1'- 4"	1'- 0"	2'- 9"
24"	1'- 7"	1'- 0"	3'- 0"
27"	1'- 8"	1'- 0"	3'- 3"
30"	1'-10"	1'- 0"	3'- 6"
33"	1'-11"	1'- 0"	3'- 9"
36"	2'- 1"	1'- 0"	4'- 0"
42"	2'- 4"	1'- 0"	4'- 6"
48"	2'- 7"	1'- 3"	5'- 3"
54"	3'- 0"	1'- 3"	5'- 9"
60"	3'- 3"	1'- 3"	6'- 3"
66"	3'- 3"	1'- 3"	6'- 9"
72"	3'- 4"	1'- 3"	7'- 3"



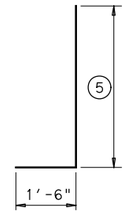
PLAN



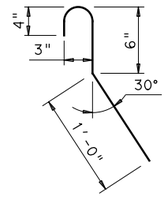
TYPICAL WING ELEVATION



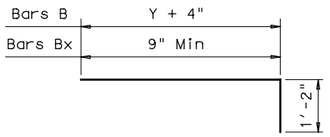
SECTION A-A



BARS V



BARS C
(2'-0" long)



BARS B & B_1-B_X

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.
Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.
All reinforcing steel shall be Grade 60.
All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.
No bridge rails of any type may be mounted directly to these culvert headwalls.

Texas Department of Transportation | Bridge Division Standard

CONCRETE HEADWALLS
WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: chfw00se.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		120

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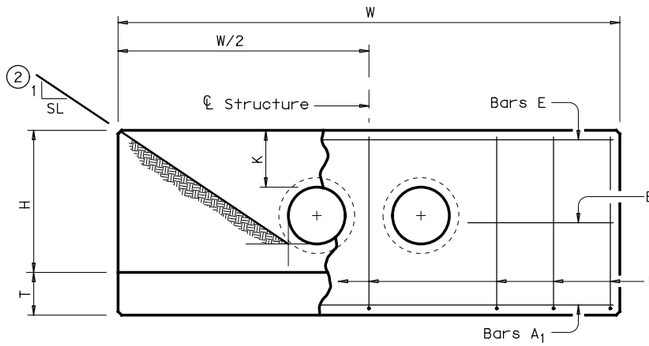
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TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (4)

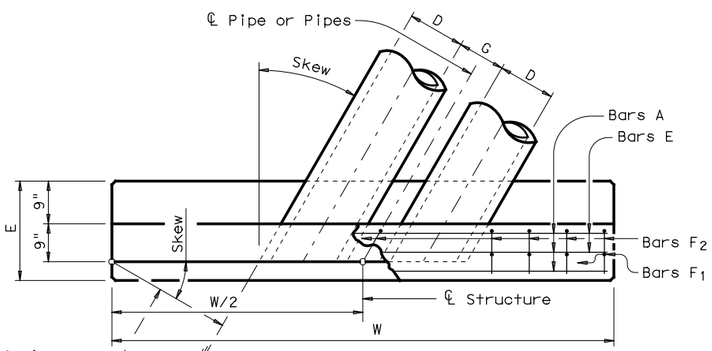
SLOPE	DIA OF PIPE, D	15 Degrees						30 Degrees						45 Degrees					
		Values for one Pipe			Values to be added for each addt'l Pipe			Values for one Pipe			Values to be added for each addt'l Pipe			Values for one Pipe			Values to be added for each addt'l Pipe		
		W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)	W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	9′- 4"	124	1.1	1′- 9 3/4"	15	0.2	10′- 5"	130	1.2	2′- 0"	16	0.2	12′- 9"	159	1.5	2′- 5 3/4"	17	0.3
	15"	10′- 7"	136	1.3	2′- 3"	17	0.2	11′-10"	159	1.5	2′- 6"	18	0.2	14′- 6"	191	1.8	3′- 0 3/4"	20	0.3
	18"	11′-11"	165	1.5	2′- 9"	19	0.3	13′- 3"	174	1.7	3′- 1"	29	0.3	16′- 3"	207	2.1	3′- 9 1/4"	33	0.4
	21"	13′- 2"	203	1.9	3′- 2 1/4"	31	0.4	14′- 9"	233	2.1	3′- 6 3/4"	33	0.4	18′- 0"	276	2.6	4′- 4 1/4"	36	0.5
	24"	14′- 6"	240	2.1	3′- 8 1/4"	34	0.4	16′- 2"	251	2.4	4′- 1 3/4"	36	0.5	19′-10"	318	2.9	5′- 0 3/4"	39	0.6
	27"	15′- 9"	258	2.5	4′- 0 3/4"	38	0.5	17′- 7"	292	2.8	4′- 6 1/4"	39	0.6	21′- 7"	342	3.4	5′- 6 1/4"	44	0.7
	30"	17′- 1"	297	2.8	4′- 5 3/4"	40	0.6	19′- 1"	311	3.1	5′- 0"	42	0.6	23′- 4"	388	3.8	6′- 1 3/4"	47	0.8
	33"	18′- 5"	320	3.3	4′- 9 3/4"	43	0.6	20′- 6"	358	3.6	5′- 4 3/4"	46	0.7	25′- 1"	439	4.4	6′- 7 1/4"	51	0.9
	36"	19′- 8"	401	4.0	5′- 3"	47	0.9	21′-11"	422	4.5	5′-10 3/4"	50	0.9	26′-10"	517	5.5	7′- 2 1/4"	55	1.2
	42"	22′- 3"	476	5.0	6′- 0 3/4"	53	1.1	24′-10"	528	5.6	6′- 8 3/4"	56	1.2	30′- 5"	634	6.9	8′- 3"	76	1.4
	48"	25′-11"	577	6.6	6′- 9 3/4"	60	1.3	28′-10"	637	7.3	7′- 7 1/4"	79	1.5	35′- 4"	791	9.0	9′- 3 3/4"	88	1.8
	54"	28′- 6"	711	7.8	7′- 9"	83	1.6	31′- 9"	781	8.7	8′- 8"	87	1.8	38′-11"	958	10.7	10′- 7 1/4"	97	2.2
	60"	31′- 1"	805	9.2	8′- 6 1/4"	91	1.9	34′- 8"	881	10.2	9′- 6 1/4"	97	2.1	42′- 5"	1113	12.5	11′- 8"	124	2.6
	66"	33′- 8"	907	10.6	9′- 0 3/4"	98	2.1	37′- 6"	1028	11.8	10′- 1 1/4"	102	2.4	46′- 0"	1235	14.5	12′- 4 1/4"	132	2.9
	72"	36′- 3"	1071	12.1	9′- 8"	105	2.4	40′- 5"	1207	13.5	10′- 9 1/4"	110	2.6	49′- 6"	1446	16.6	13′- 2 1/4"	141	3.2
3:1	12"	13′- 6"	178	1.6	1′- 9 3/4"	15	0.2	15′- 0"	189	1.8	2′- 0"	15	0.2	18′- 5"	237	2.2	2′- 5 3/4"	17	0.2
	15"	15′- 3"	212	1.9	2′- 3"	17	0.2	17′- 0"	223	2.1	2′- 6"	17	0.3	20′-10"	276	2.6	3′- 0 3/4"	20	0.3
	18"	17′- 1"	231	2.3	2′- 9"	19	0.3	19′- 1"	259	2.5	3′- 1"	29	0.3	23′- 4"	318	3.1	3′- 9 1/4"	32	0.4
	21"	18′-11"	306	2.7	3′- 2 1/4"	31	0.4	21′- 1"	339	3.0	3′- 6 3/4"	33	0.4	25′-10"	413	3.7	4′- 4 1/4"	36	0.5
	24"	20′- 8"	345	3.1	3′- 8 3/4"	35	0.4	23′- 1"	384	3.5	4′- 1 3/4"	36	0.5	28′- 3"	462	4.2	5′- 0 3/4"	40	0.6
	27"	22′- 6"	376	3.7	4′- 0 3/4"	38	0.5	25′- 1"	438	4.1	4′- 6 1/4"	39	0.6	30′- 9"	522	5.0	5′- 6 1/4"	44	0.7
	30"	24′- 4"	422	4.1	4′- 5 3/4"	40	0.6	27′- 2"	466	4.6	5′- 0"	42	0.6	33′- 3"	578	5.6	6′- 1 3/4"	47	0.8
	33"	26′- 2"	476	4.8	4′-10"	43	0.6	29′- 2"	522	5.3	5′- 4 3/4"	46	0.7	35′- 9"	644	6.5	6′- 7 1/4"	51	0.9
	36"	27′-11"	590	5.9	5′- 3 1/4"	47	0.8	31′- 2"	645	6.6	5′-10 3/4"	50	0.9	38′- 2"	787	8.0	7′- 2 1/4"	56	1.2
	42"	31′- 7"	684	7.3	6′- 0 1/4"	53	1.1	35′- 3"	776	8.2	6′- 8 3/4"	56	1.2	43′- 2"	933	10.0	8′- 3"	79	1.4
	48"	36′- 9"	880	9.6	6′- 9 3/4"	61	1.3	41′- 0"	953	10.7	7′- 7 1/4"	81	1.5	50′- 2"	1166	13.1	9′- 3 3/4"	88	1.8
	54"	40′- 5"	1065	11.4	7′- 9"	85	1.6	45′- 0"	1185	12.7	8′- 8"	89	1.8	55′- 2"	1435	15.5	10′- 7 1/4"	97	2.2
	60"	44′- 0"	1224	13.3	8′- 6 1/4"	93	1.9	49′- 1"	1356	14.8	9′- 6 1/4"	96	2.1	60′- 1"	1627	18.2	11′- 8"	124	2.6
	66"	47′- 7"	1357	15.4	9′- 1"	98	2.1	53′- 1"	1497	17.2	10′- 1 1/4"	103	2.3	65′- 1"	1834	21.1	12′- 4 1/4"	130	2.9
	72"	51′- 3"	1624	17.7	9′- 8"	105	2.3	57′- 2"	1787	19.7	10′- 9 1/4"	109	2.6	70′- 0"	2210	24.1	13′- 2 1/4"	139	3.2
4:1	12"	17′- 7"	232	2.1	1′- 9 3/4"	15	0.2	19′- 8"	259	2.4	2′- 0"	16	0.2	24′- 0"	314	2.9	2′- 5 3/4"	18	0.2
	15"	19′-11"	272	2.5	2′- 3"	17	0.2	22′- 3"	301	2.8	2′- 6"	18	0.3	27′- 3"	361	3.5	3′- 0 3/4"	21	0.3
	18"	22′- 3"	313	3.0	2′- 9"	19	0.3	24′-10"	344	3.3	3′- 1"	29	0.3	30′- 5"	427	4.0	3′- 9 1/4"	32	0.4
	21"	24′- 7"	407	3.6	3′- 2 1/4"	31	0.4	27′- 5"	446	4.0	3′- 6 3/4"	33	0.4	33′- 7"	549	4.9	4′- 4 1/4"	36	0.5
	24"	26′-11"	455	4.1	3′- 8 3/4"	35	0.4	30′- 0"	499	4.5	4′- 1 3/4"	36	0.5	36′- 9"	609	5.6	5′- 0 3/4"	40	0.6
	27"	29′- 3"	514	4.8	4′- 0 3/4"	38	0.5	32′- 7"	562	5.4	4′- 6 1/4"	40	0.6	39′-11"	703	6.6	5′- 6 1/4"	43	0.7
	30"	31′- 7"	568	5.4	4′- 5 3/4"	40	0.6	35′- 3"	620	6.0	5′- 0"	42	0.6	43′- 2"	768	7.4	6′- 1 3/4"	49	0.8
	33"	33′-11"	634	6.2	4′-10"	43	0.7	37′-10"	710	7.0	5′- 4 3/4"	46	0.7	46′- 4"	848	8.5	6′- 7 1/4"	52	0.9
	36"	36′- 3"	776	7.7	5′- 3"	48	0.9	40′- 5"	868	8.6	5′-10 3/4"	49	0.9	49′- 6"	1058	10.6	7′- 2 1/4"	56	1.1
	42"	40′-11"	921	9.6	6′- 0 1/4"	53	1.0	45′- 7"	1022	10.7	6′- 8 3/4"	57	1.2	55′-10"	1262	13.1	8′- 3"	78	1.4
	48"	47′- 7"	1152	12.6	6′-10"	61	1.3	53′- 1"	1268	14.0	7′- 7 1/4"	80	1.5	65′- 1"	1579	17.2	9′- 3 3/4"	86	1.8
	54"	52′- 3"	1416	14.9	7′- 9 1/4"	86	1.6	58′- 4"	1589	16.6	8′- 8"	89	1.8	71′- 5"	1916	20.4	10′- 7 1/4"	95	2.2
	60"	56′-11"	1606	17.5	8′- 6 3/4"	92	1.9	63′- 6"	1798	19.5	9′- 6 1/4"	95	2.1	77′- 9"	2184	23.9	11′- 8"	122	2.6
	66"	61′- 7"	1811	20.2	9′- 0 3/4"	97	2.1	68′- 8"	2011	22.5	10′- 1 1/4"	101	2.4	84′- 2"	2464	27.6	12′- 4 1/4"	131	2.9
	72"	66′- 3"	2142	23.2	9′- 8"	104	2.4	73′-11"	2371	25.9	10′- 9 1/4"	108	2.6	90′- 6"	2929	31.7	13′- 2 1/4"	138	3.2
6:1	12"	25′-11"	342	3.1	1′- 9 3/4"	15	0.2	28′-10"	374	3.5	2′- 0"	16	0.2	35′- 4"	456	4.3	2′- 5 3/4"	17	0.2
	15"	29′- 3"	390	3.7	2′- 3"	17	0.2	32′- 7"	442	4.2	2′- 6"	18	0.2	39′-11"	549	5.1	3′- 0 3/4"	20	0.3
	18"	32′- 7"	459	4.4	2′- 9"	20	0.3	36′- 4"	515	4.9	3′- 1"	29	0.3	44′- 7"	629	6.0	3′- 9 1/4"	33	0.4
	21"	36′- 0"	608	5.3	3′- 2 1/4"	31	0.4	40′- 2"	660	5.9	3′- 6 3/4"	33	0.4	49′- 2"	823	7.2	4′- 4 1/4"	38	0.5
	24"	39′- 4"	672	6.0	3′- 8 3/4"	35	0.4	43′-11"	748	6.7	4′- 1 3/4"	36	0.5	53′- 9"	920	8.2	5′- 0 3/4"	42	0.6
	27"	42′- 8"	770	7.1	4′- 0 3/4"	38	0.5	47′- 8"	852	8.0	4′- 6 1/4"	41	0.5	58′- 4"	1039	9.7	5′- 6 1/4"	45	0.7
	30"	46′- 1"	839	8.0	4′- 5 3/4"	40	0.6	51′- 5"	949	8.9	5′- 0"	44	0.6	62′-11"	1154	10.9	6′- 1 3/4"	48	0.8
	33"	49′- 5"	947	9.2	4′-10"	45	0.7	55′- 2"	1040	10.3	5′- 4 3/4"	48	0.7	67′- 6"	1284	12.6	6′- 7 1/4"	50	0.9
	36"	52′-10"	1151	11.4	5′- 3"	49	0.8	58′-11"	1287	12.7	5′-10 3/4"	51	1.0	72′- 1"	1575	15.6	7′- 2 1/4"	55	1.1
	42"	59′- 6"	1365	14.2	6′- 0 1/4"	55	1.0	66′- 5"	1522	15.8	6′- 8 3/4"	57	1.2	81′- 4"	1867	19.4	8′- 3"	76	1.4
	48"	69′- 4"	1729	18.5	6′-10"	59	1.3	77′- 4"	1934	20.7	7′- 7 1/4"	79	1.5	94′- 9"	2360	25.3	9′- 3 3/4"	86	1.8
	54"	76′- 1"	2130	22.0	7′- 9 1/4"	83	1.6	84′-10"	2370	24.6	8′- 8"	87	1.8	103′-11"	2904	30.1	10′- 7 1/4"	95	2.2
	60"	82′-10"	2414	25.8	8′- 6 3/4"	90	1.9	92′- 5"	2673	28.8	9′- 6 1/4"	94	2.1	113′-2"	3286	35.3	11′- 8"	122	2.6
	66"	89′- 7"	2712	29.9	9′- 0 3/4"	96	2.1	99′-11"	3030	33.3	10′- 1 1/4"	101	2.4	122′-4"	3689	40.8	12′- 4 1/4"	130	2.9
	72"	96′- 3"	3210	34.2	9′- 8"	102	2.4	107′-5"	3572	38.2	10′- 9 1/4"	108	2.6	131′-6"	4364	46.8	13′- 2 1/4"	139	3.2

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: 3/22/2018 3:19:57 PM
FILE: c:\pwworking\ddl\d0911850\chpwsste.dgn



ELEVATION

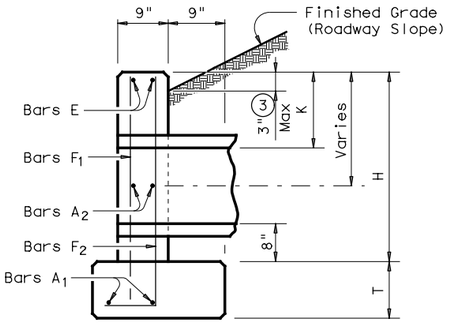


PLAN OF SKEWED PIPES

Showing 30° Skew

Lengths of wings based on SL:1 Slope along this line.

(2) Toe of Slope



℄ SECTION

BARS F2

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) Indicated slope is perpendicular to centerline Pipe or Pipes.

(3) For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(4) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

DIA OF PIPE, D	G	K	H	T	E
12"	9"	1′- 0"	2′- 8"	9"	1′- 9"
15"	11"	1′- 0"	2′-11"	9"	1′- 9"
18"	1′- 2"	1′- 0"	3′- 2"	9"	1′- 9"
21"	1′- 4"	1′- 0"	3′- 5"	9"	2′- 0"
24"	1′- 7"	1′- 0"	3′- 8"	9"	2′- 0"
27"	1′- 8"	1′- 0"	3′-11"	9"	2′- 3"
30"	1′-10"	1′- 0"	4′- 2"	9"	2′- 3"
33"	1′-11"	1′- 0"	4′- 5"	9"	2′- 6"
36"	2′- 1"	1′- 0"	4′- 8"	1′- 0"	2′- 6"
42"	2′- 4"	1′- 0"	5′- 2"	1′- 0"	2′- 9"
48"	2′- 7"	1′- 3"	5′-11"	1′- 0"	3′- 0"
54"	3′- 0"	1′- 3"	6′- 5"	1′- 0"	3′- 3"
60"	3′- 3"	1′- 3"	6′-11"	1′- 0"	3′- 6"
66"	3′- 3"	1′- 3"	7′- 5"	1′- 0"	3′- 9"
72"	3′- 4"	1′- 3"	7′-11"	1′- 0"	4′- 0"

TABLE OF REINFORCING STEEL (4)

Bar	Size	Spa	No.
A1	# 5	~	2
A2	# 5	1′-6"	~
E	# 5	~	2
F	# 5	1′-0"	~

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete.

All reinforcing steel shall be Grade 60.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

No bridge rails of any type may be mounted directly to these culvert headwalls.

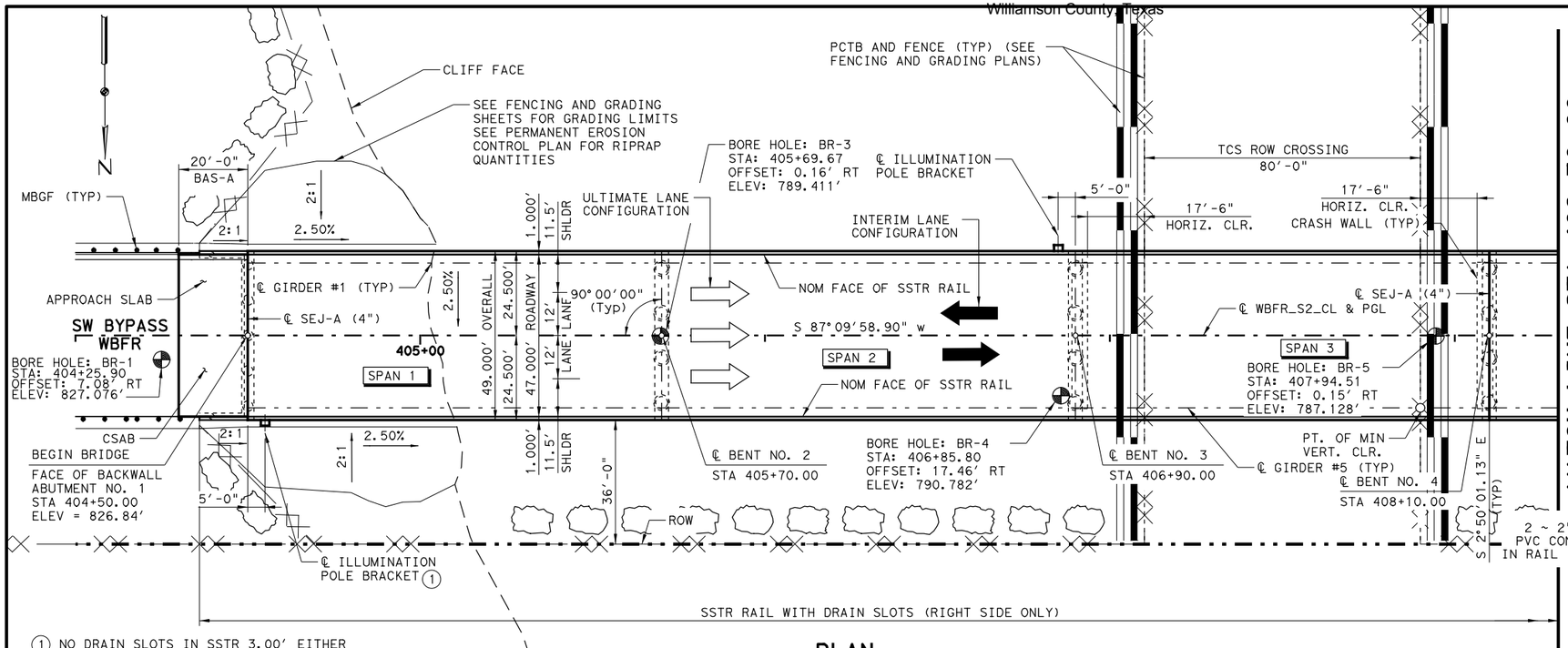
Texas Department of Transportation

Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR SKEWED PIPE CULVERTS

CH-PW-S

FILE: chpwsste.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		124



PLAN

(1) NO DRAIN SLOTS IN SSTR 3.00' EITHER SIDE OF ILLUMINATION POLE BRACKET.

(2) SEE FENCING AND GRADING SHEETS FOR GRADING LIMITS. SEE PERMANENT EROSION CONTROL PLAN FOR RIPRAP QUANTITIES.

GENERAL NOTES:

1. DESIGNED IN ACCORDANCE WITH AASHTO LRFD SPECIFICATION, 7TH EDITION WITH ALL CURRENT INTERIM SPECIFICATIONS.

2. FOR ADDITIONAL GEOMETRIC INFORMATION SEE ROADWAY SHEETS.

3. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND MUST BE CORRECTED FOR GRADE AND SUPERELEVATION.

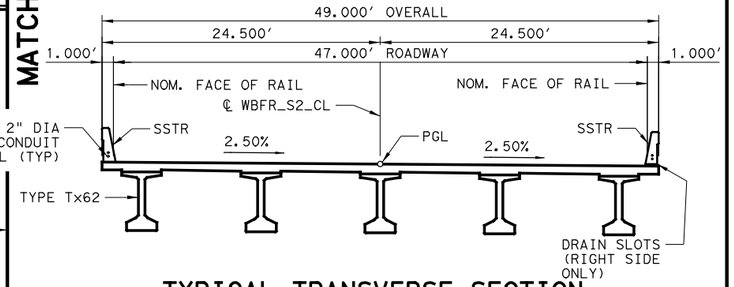
4. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF UTILITIES PRIOR TO ORDERING MATERIALS OR DRILLING FOUNDATIONS.

5. THE "H" VALUES SHOWN ARE ESTIMATED COLUMN HEIGHTS. CONTRACTOR SHALL VERIFY ACTUAL COLUMN HEIGHTS BASED ON FIELD CONDITIONS.

6. FOR BORE HOLE DATA, SEE BORING LOG SHEETS.

7. DRILLED SHAFTS ARE DESIGNED WITH SKIN FRICTION ONLY DUE TO THE POSSIBILITY OF ENCOUNTERING VOIDS. FOUND DRILLED SHAFTS AT THE ELEVATIONS SHOWN OR DEEPER.

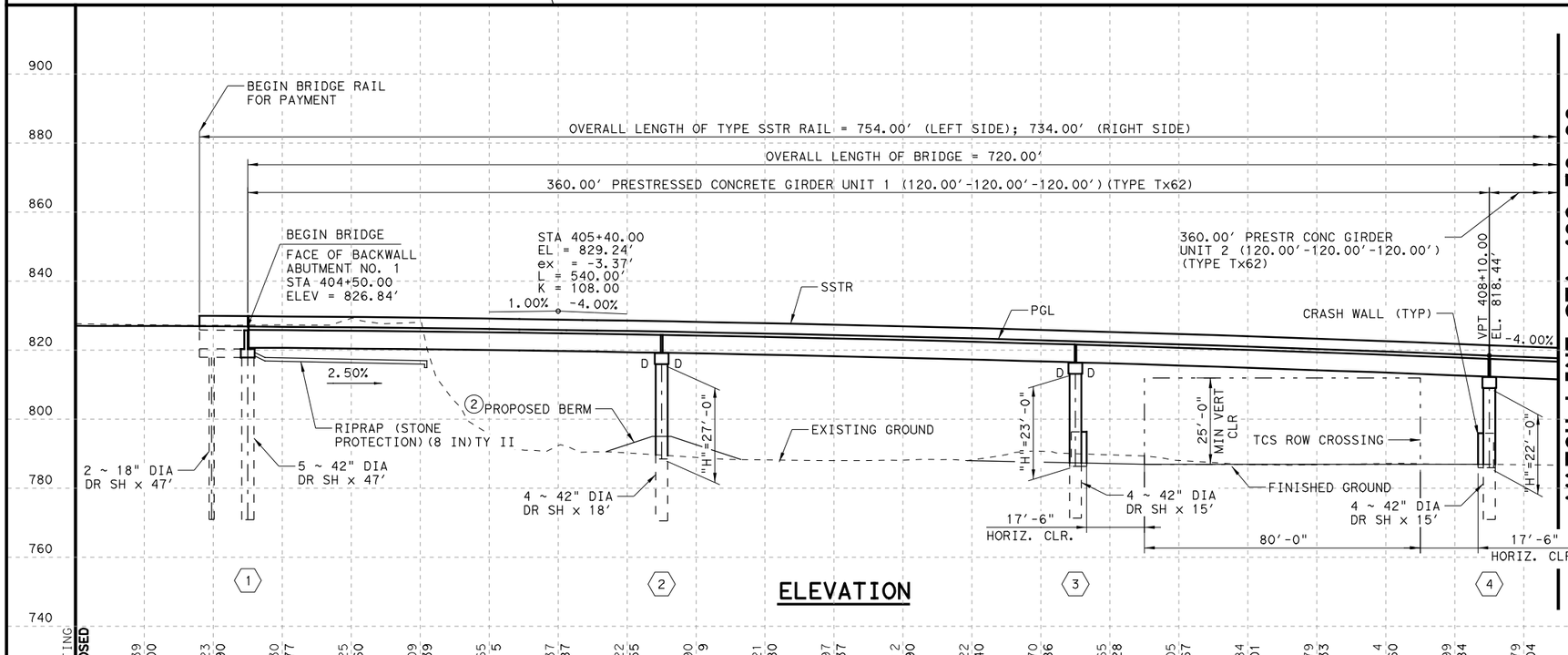
NBI NO: 14-246-D017-01-004
DESIGN SPEED: 50 MPH
ADT (2018): 20,300
ADT (2038): 68,500
FUNC. CLASS: MAJOR URBAN COLLECTOR
DESIGN INCLUDES 2" FUTURE OVERLAY



TYPICAL TRANSVERSE SECTION

NTS

HL93 LOADING



ELEVATION



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

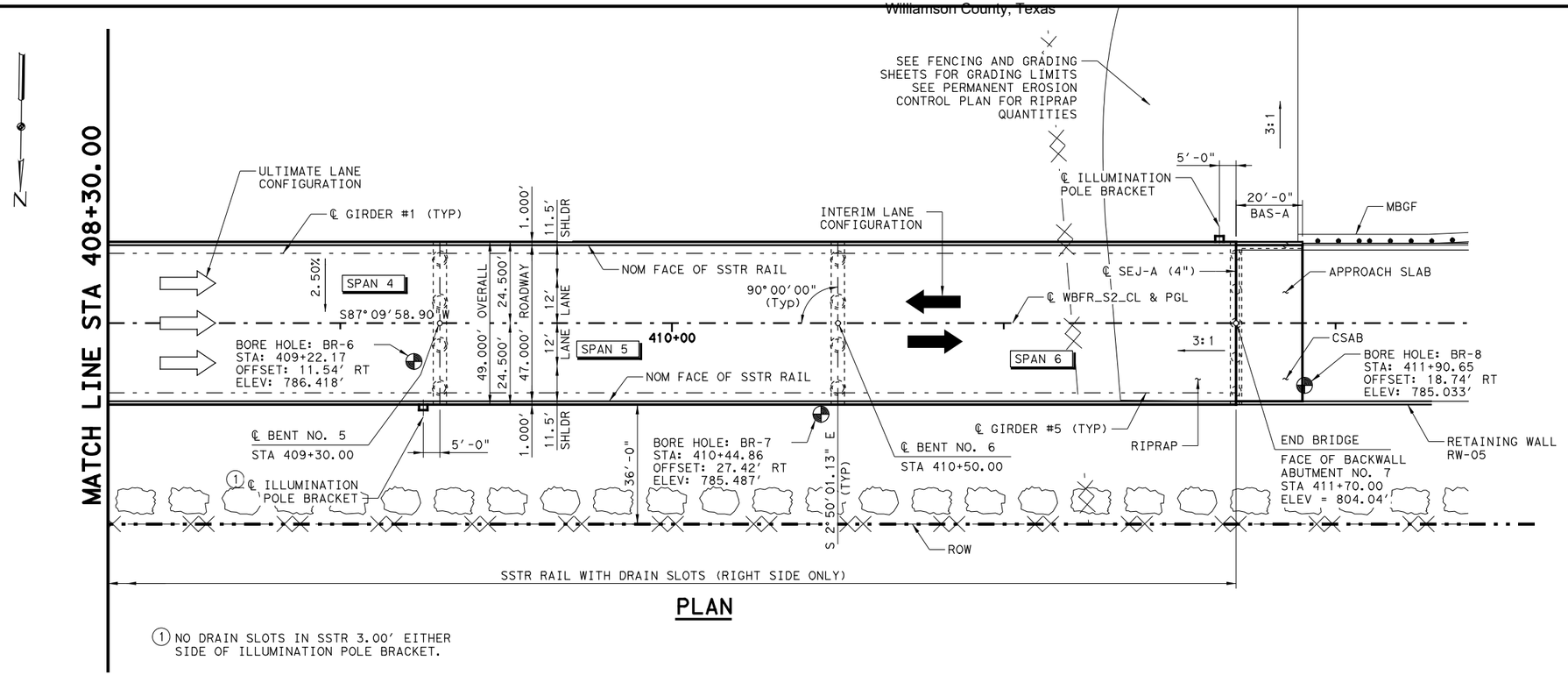
SOUTHWEST BYPASS SEGMENT 2 BRIDGE LAYOUT

TCS QUARRY BRIDGE

SCALE: 1"=40' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	122
JMH	2103	01	034	
CHECK				
JMH				

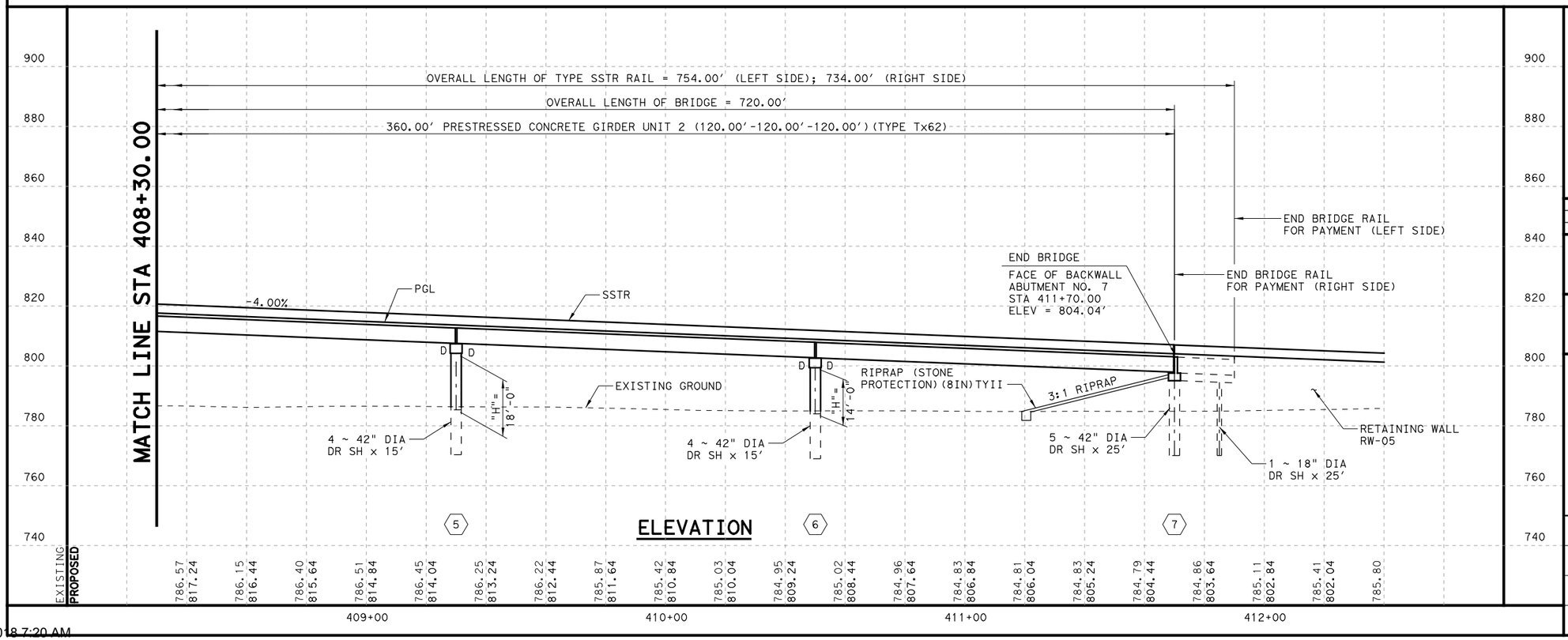
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USER: lgomezgonz DATE: 3/23/2018 TIME: 1:36:22 PM SCALE: 1:40
FILE: \
4/12/2018 7:20 AM



PLAN

① NO DRAIN SLOTS IN SSTR 3.00' EITHER SIDE OF ILLUMINATION POLE BRACKET.

HL93 LOADING



ELEVATION

STATE OF TEXAS
TYLER W. BRENDLINGER
122092
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 BRIDGE LAYOUT

TCS QUARRY BRIDGE

SCALE: 1"=40' SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	123
JMH	2103	01	034	
CHECK				
JMH				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/22/2018 TIME: 10:3:57 AM SCALE: 1:40
FILE: \
4/12/2018 7:20 AM

Test Hole No. BR-01
Sta 404+26, 7 ft RT

Test Hole No. BR-01
El 827.1

CLAY, stiff, brown

50(.87) 50(.38) LIMESTONE, very hard, tan

50(.62) 50(.13)

50(.62) 50(.13) LIMESTONE, very hard, tan to gray

50(.62) 50(.13)

6(6) 15(6)

50(.5) 50(.25)

50(1) 50(.5)

26(6) 50(4.5) LIMESTONE, soft to hard, tan to gray

50(.88) 50(.25)

50(.75) 50(.75)

50(.75) 50(.75)

50(.25) 50(.5)

B/H = 767.1

Test Hole No. BR-02
Sta 404+66, 3 ft RT

Test Hole No. BR-02
El 827.1

50(.63) 50(.25) LIMESTONE, soft, tan

50(.25) 50(0) LIMESTONE, very hard, tan

50(.5) 50(0)

50(.12) 50(.13)

50(.62) 50(.38)

50(.38) 50(.25)

50(3.25) 50(2.13) LIMESTONE, soft to very hard, tan to gray

50(.37) 50(.13)

50(1) 50(1.5)

50(.75) 50(.13)

50(.25) 50(.13)

50(.25) 50(.13)

B/H = 767.1

Test Hole No. BR-03
Sta 405+70, 0

Test Hole No. BR-03
El 789.4

LIMESTONE, soft, tan

LIMESTONE, hard, tan

50(.62) 50(.88)

50(.63) 50(0) LIMESTONE, hard to very hard, tan

50(.88) 50(.25)

50(.37) 50(.38)

50(.75) 50(.5)

50(.63) 50(.25) LIMESTONE, hard to very hard, tan to gray

50(.5) 50(.25)

B/H = 749.4

Test Hole No. BR-04
Sta 406+86, 17 ft RT

Test Hole No. BR-04
El 790.8

50(2.5) 50(.5) LIMESTONE, soft, reddish brown to tan

50(.62) 50(.38) LIMESTONE, soft to very hard, tan

50(.38) 50(0)

50(.75) 50(.25)

50(.75) 50(.25)

50(.63) 50(.25) LIMESTONE, hard to very hard, tan to gray

50(3.38) 50(1.5)

50(.75) 50(.13)

B/H = 745.8

Test Hole No. BR-05
Sta 407.95, 0

Test Hole No. BR-05
El 787.1

50(1) 50(.5) LIMESTONE, soft, tan

50(.38) 50(.5) LIMESTONE, hard to very hard, tan

50(.5) 50(.25)

50(.38) 50(.13)

50(.88) 50(.5) LIMESTONE, very hard, tan

50(.88) 50(.25)

50(.38) 50(1) LIMESTONE, very hard, tan

50(1) 50(1)

B/H = 747.1

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2
BORING LOGS

TSC QUARRY BRIDGE

SCALE: 1"=20' SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	124
JMH	2103	01	034	
CHECK				
JMH				

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PENTABLE: S2-0000020170718.tbl TIME: 10:13:59 AM DATE: 3/22/2018 SCALE: 1:20

4/12/2018 7:20 AM



Test Hole No. BR-06
Sta 409+22, 12 ft RT

Test Hole No. BR-06
El 786.4

50(1.63) 50(2)
50(.5) 50(.25)
50(.75) 50(.38)
50(1.75) 50(.13)
50(.75) 50(.63)
50(.5) 50(.25)
50(.88) 50(.5)
50(.63) 50(.25)
50(.38) 50(.38)

LIMESTONE, soft, tan
LIMESTONE, hard to very hard, tan
LIMESTONE, very hard, tan to gray

B/H = 741.4



Test Hole No. BR-07
Sta 410+45, 27 ft RT

Test Hole No. BR-07
El 785.5

50(.37) 50(.13)
50(.88) 50(.75)
50(.5) 50(.13)
50(.5) 50(.25)
50(.38) 50(.25)
50(3) 10(6)
50(1) 50(.88)
50(.63) 50(.25)

LIMESTONE, soft, reddish brown to tan
LIMESTONE, very hard, tan
LIMESTONE, very hard, tan to gray

B/H = 745.5



Test Hole No. BR-08
Sta 411+91, 19 ft RT

Test Hole No. BR-08
El 785

50(.5) 50(.75)
50(.37) 50(.13)
50(.25) 50(.25)
50(.5) 50(.38)
50(6) 50(1)
50(6) 10(2)
50(.5) 50(.5)
50(.38) 50(.25)

LIMESTONE, hard to very hard, tan to gray
LIMESTONE, very hard, gray

B/H = 740

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2
BORING LOGS

TSC QUARRY BRIDGE

SCALE: 1"=20'

SHEET 2 OF 2

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	125
JMH	2103	01	034	
CHECK				
JMH				

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USER: lgomezgon2 DATE: 3/22/2018 TIME: 10:40:1 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

SUMMARY OF ESTIMATED QUANTITIES

BRIDGE ELEMENT \ BID ITEM DESCRIPTION	400 6005 CEM STABIL BKFL	416 6001 DRILL SHAFT (18")	416 6005 DRILL SHAFT (42")	420 6013 CL C CONC (ABUT)	420 6029 CL C CONC (CAP)	420 6037 CL C CONC (COLUMN)	420 6074 CL C CONC (MISC)	422 6001 REINF CONC SLAB	422 6015 APPROACH SLAB	425 6040 PRESTR CONC GIRDER (TX62)	450 6023 RAIL (TY SSTR)	454 6001 SEALED EXPANSION JOINT (4 IN) (SEJ - A)	618 6023 CONDT (PVC) (SCH 40) (2")
	CY	LF	LF	CY	CY	CY	CY	SF	CY	LF	LF	LF	LF
2 ~ ABUTMENTS	224	119	360	74.1							48.0	96	96
5 ~ INTERIOR BENTS			312		135.0	148.4	86.4					48	
1 ~ 360.00' PRESTR CONC GIRDER UNIT 1								17640	37.7	1793.05	720.0		1440
1 ~ 360.00' PRESTR CONC GIRDER UNIT 2								17640	37.7	1794.00	720.0		1440
TOTAL	224	119	672	74.1	135.0	148.4	86.4	35280	75.4	3587.05	1488.0	144	2976

BEARING SEAT ELEVATIONS

		GIRD. 1	GIRD. 2	GIRD. 3	GIRD. 4	GIRD. 5
ABUT 1	(FWD)	821.087	820.825	820.562	820.300	820.037
BENT 2	(BK)	819.645	819.383	819.120	818.858	818.595
	(FWD)	819.609	819.347	819.085	818.822	818.560
BENT 3	(BK)	816.856	816.594	816.331	816.069	815.806
	(FWD)	816.798	816.536	816.273	816.011	815.748
BENT 4	(BK)	812.734	812.471	812.209	811.947	811.684
	(FWD)	812.550	812.287	812.025	811.763	811.500
BENT 5	(BK)	807.830	807.568	807.305	807.042	806.780
	(FWD)	807.750	807.487	807.225	806.963	806.700
BENT 6	(BK)	803.030	802.768	802.505	802.242	801.980
	(FWD)	802.950	802.688	802.425	802.163	801.900
ABUT 7	(BK)	798.230	797.968	797.705	797.443	797.180

NOTES:

1. FOR RIPRAP (STONE PROTECTION)(8 IN)TY II QUANTITIES, SEE PERMANENT EROSION CONTROL PLAN SHEETS.

HL93 LOADING



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

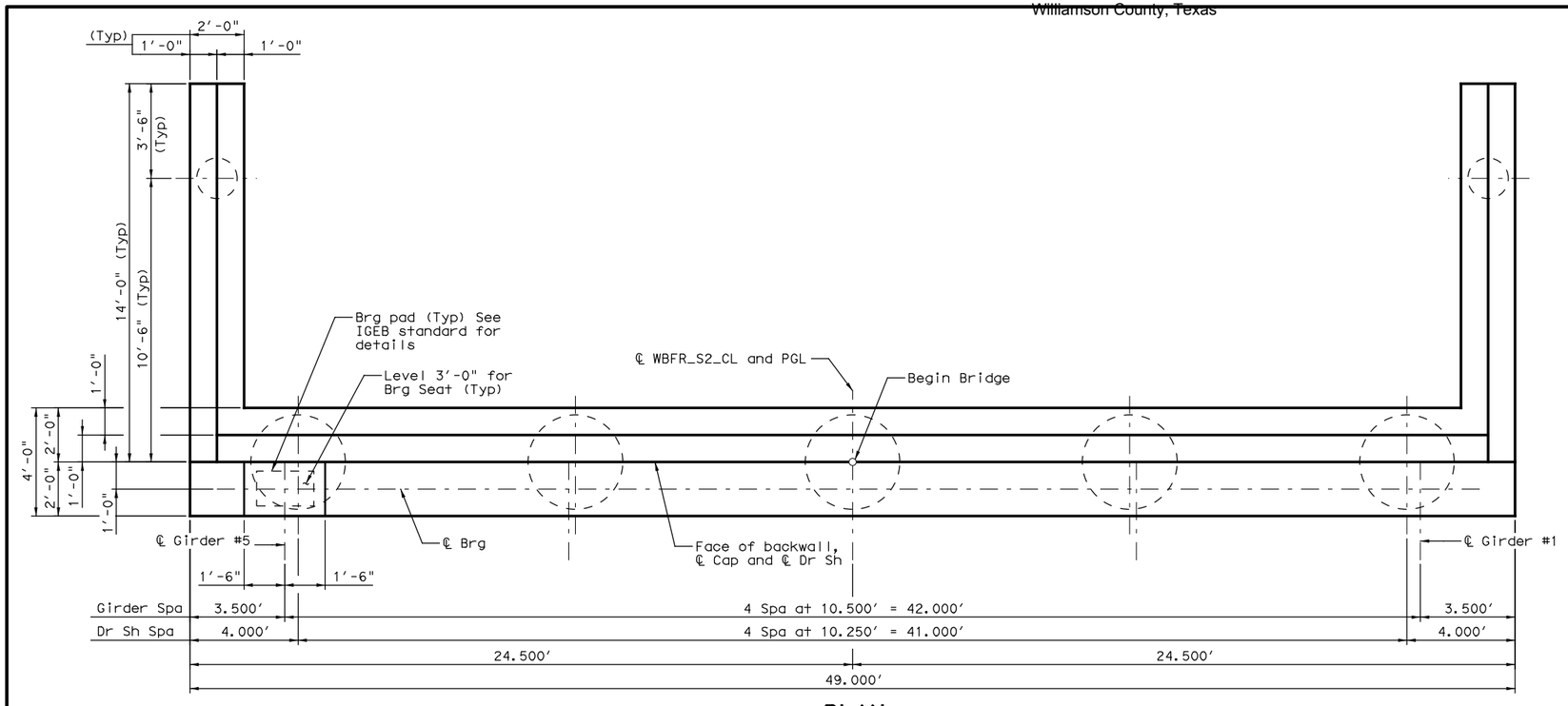
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2
ESTIMATED QUANTITIES AND BEARING SEAT ELEVATIONS TCS QUARRY BRIDGE

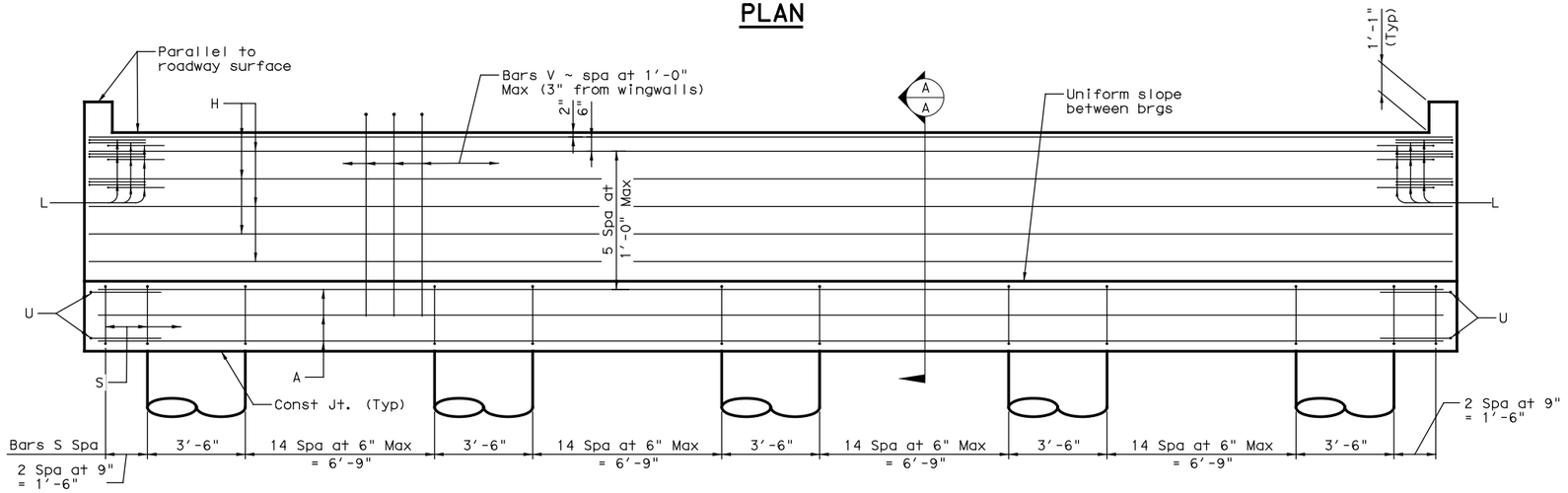
SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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JMH				

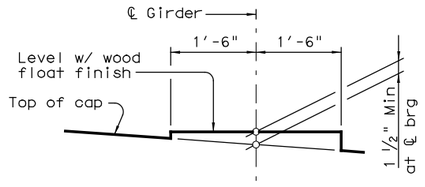
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PLAN

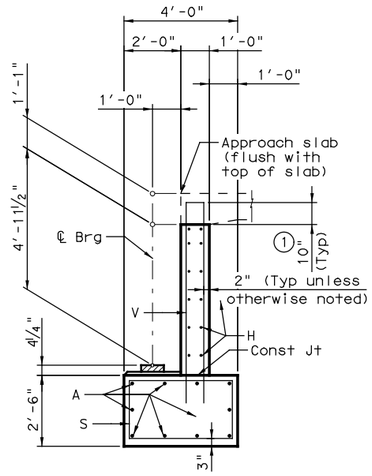


ELEVATION



BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)



SECTION A-A

1 Increase as required to maintain 3" from finished grade.

HL93 LOADING

STATE OF TEXAS
TYLER W. BRENDLINGER
122092
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

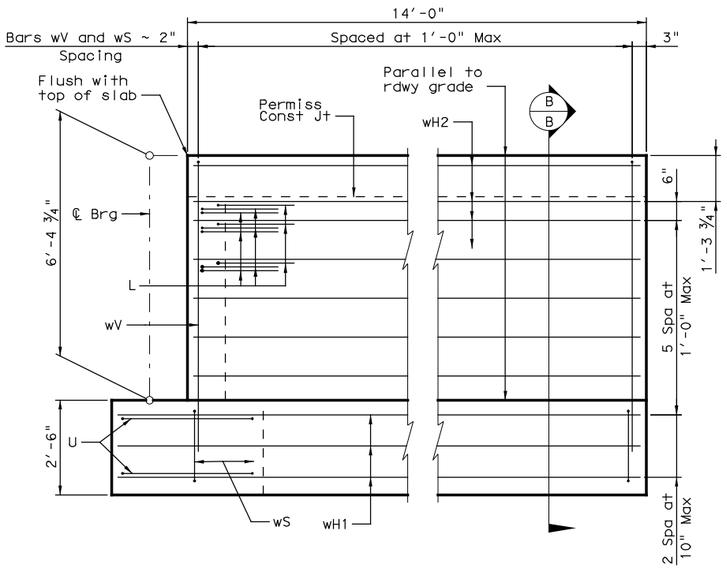
SOUTHWEST BYPASS SEGMENT 2 ABUTMENT NO. 1

TCS QUARRY BRIDGE

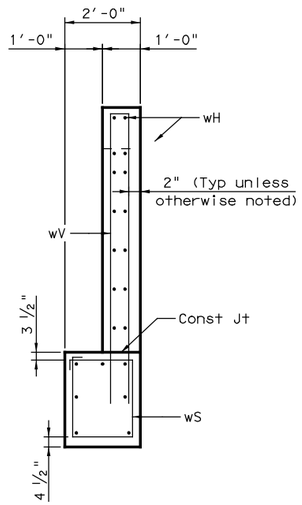
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DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS TGG	STATE	DISTRICT	COUNTY	SHEET NO.
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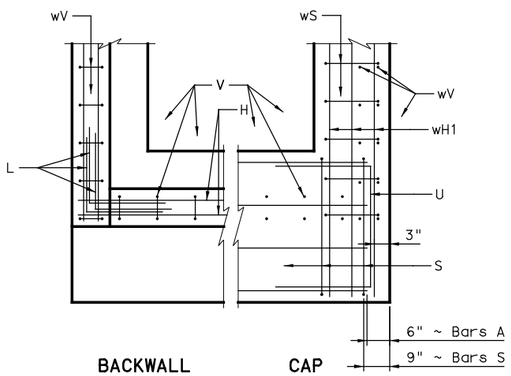
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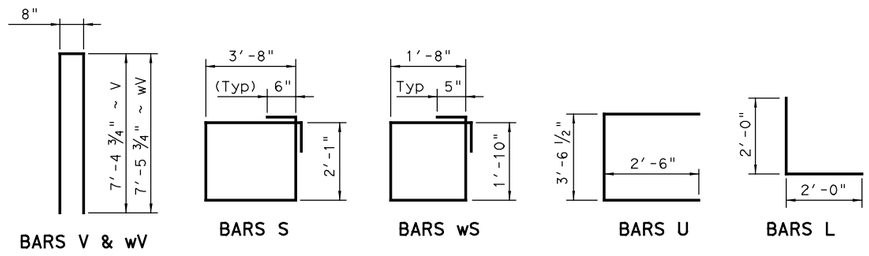
WINGWALL ELEVATION



SECTION B-B



CORNER DETAILS



① For Contractor's information only.

TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	10	#11	48′-0"	2550
H	12	#6	48′-8"	877
L	18	#6	4′-0"	108
S	66	#5	12′-6"	860
U	4	#6	8′-7"	52
V	48	#5	15′-6"	776
wH1	14	#6	15′-8"	329
wH2	28	#6	13′-8"	575
wS	30	#4	7′-10"	157
wV	30	#5	15′-8"	490
① Reinforcing Steel			Lb	6774
Class C Concrete			CY	38.7

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014)

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

See Foundation Detail Standard Sheet, FD, for all foundation details and notes not shown
See Stone Riprap Standard Sheet, SRR, for riprap attachment details
See railing standards for rail anchorage in wingwalls
Calculated Foundation Loads = 111 tons/ Dr Sh
See Bridge Layout for header slope and foundation type, size and length

MATERIAL NOTES:

Provide Class C Concrete strength f′c = 3600 psi
Provide Grade 60 reinforcing steel

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WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
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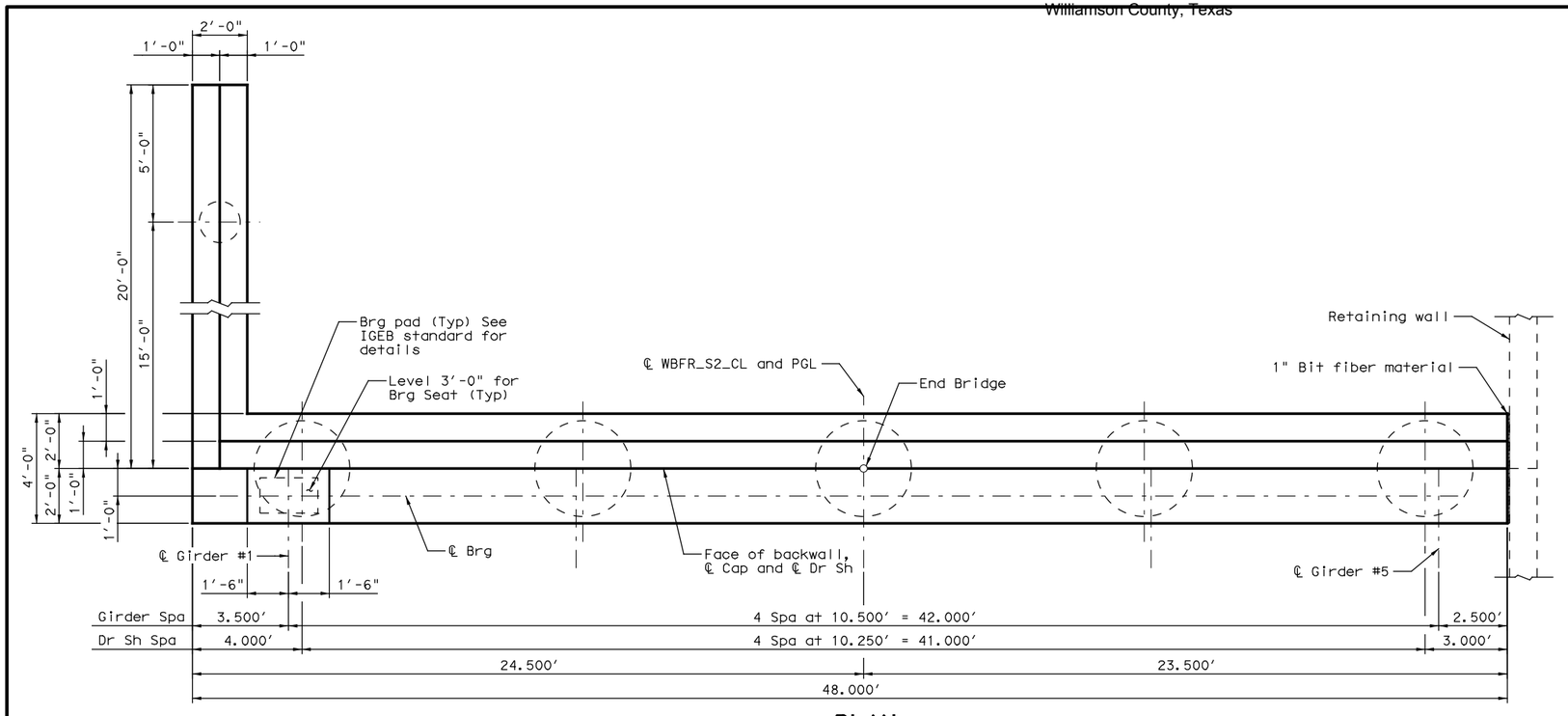
SOUTHWEST BYPASS SEGMENT 2 ABUTMENT NO. 1

TCS QUARRY BRIDGE

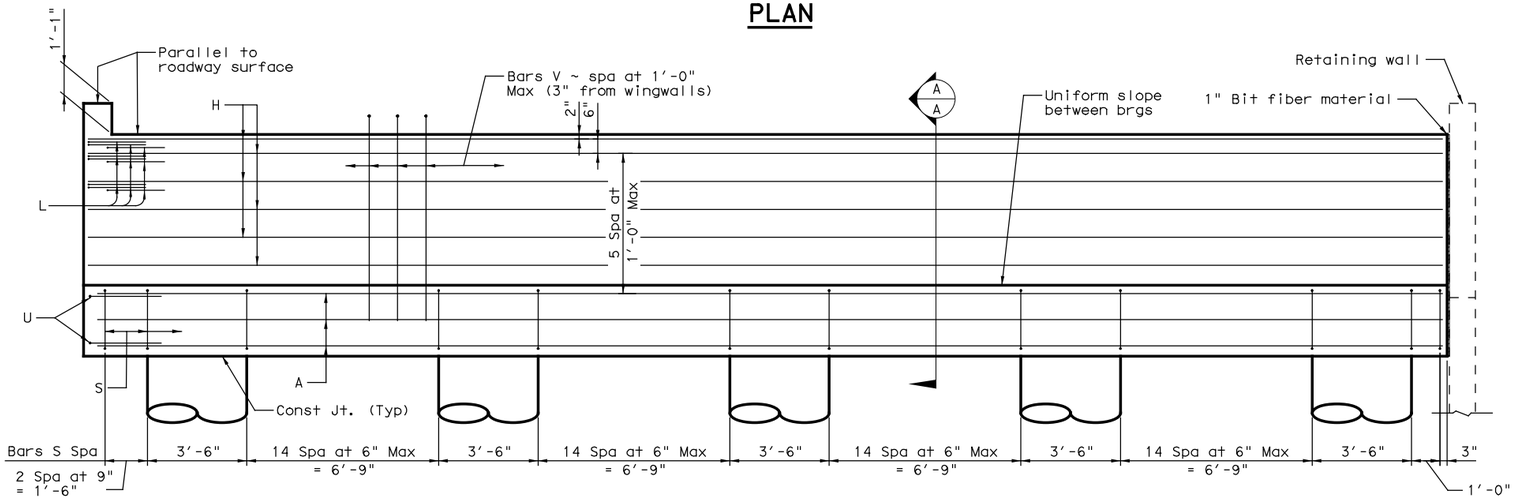
SCALE: 1/2"=1′-0" SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK	CONTROL	SECTION	JOB	128
JMH	2103	01	034	
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JMH				

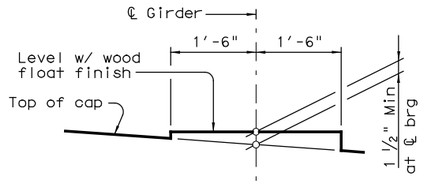
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PLAN

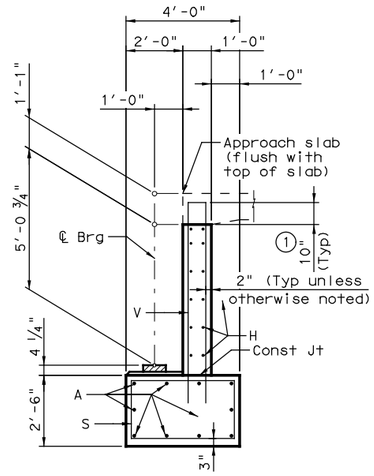


ELEVATION



BEARING SEAT DETAIL

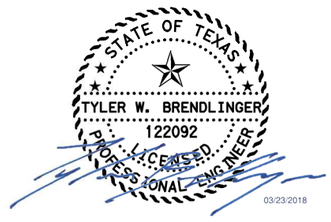
(Bearing surface must be clean and free of all loose material before placing bearing pad.)



SECTION A-A

1 Increase as required to maintain 3" from finished grade.

HL93 LOADING



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 ABUTMENT NO. 7

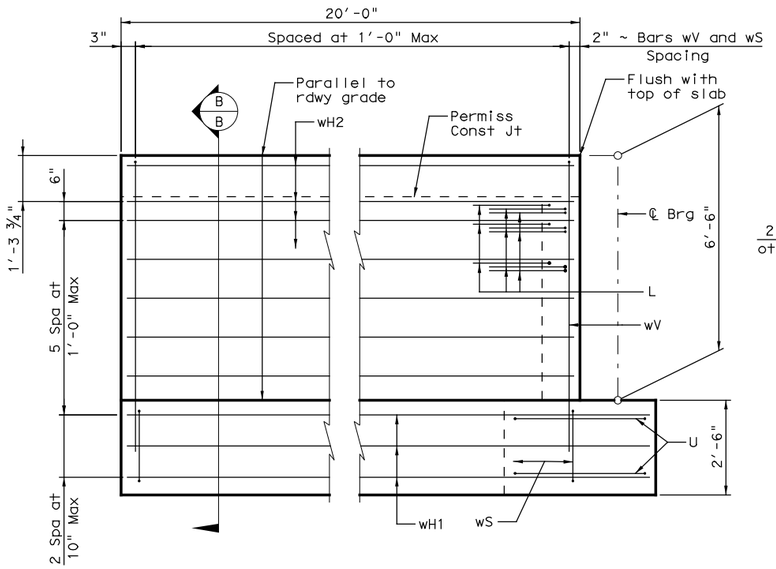
TCS QUARRY BRIDGE

SCALE: 3/8"=1'-0" SHEET 1 OF 2

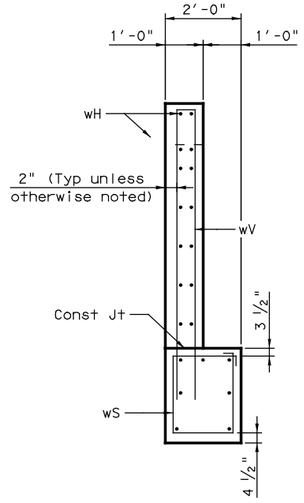
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TWB	6			
GRAPHICS TGG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMH	TEXAS	AUS	WILLIAMSON	129
CHECK JMH	CONTROL	SECTION	JOB	
	2103	01	034	

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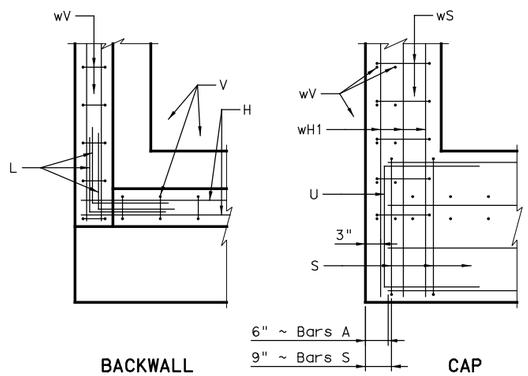
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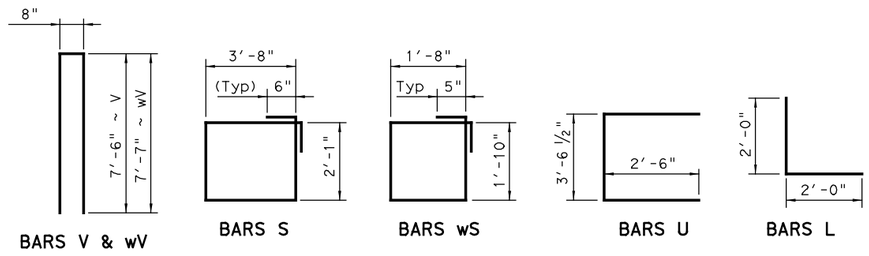
WINGWALL ELEVATION



SECTION B-B



CORNER DETAILS



(1) For Contractor's information only.

TABLE OF ESTIMATED QUANTITIES

Bar	No.	Size	Length	Weight
A	10	#11	47'-4"	2513
H	12	#6	47'-8"	859
L	9	#6	4'-0"	54
S	65	#5	12'-6"	847
U	4	#6	8'-7"	52
V	48	#5	15'-8"	784
wH1	7	#6	21'-8"	228
wH2	14	#6	19'-8"	414
wS	21	#4	7'-10"	110
wV	21	#5	15'-10"	347
(1) Reinforcing Steel			Lb	6208
Class C Concrete			CY	35.4

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014)

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

See Foundation Detail Standard Sheet, FD, for all foundation details and notes not shown
See Stone Riprap Standard Sheet, SRR, for riprap attachment details
See railing standards for rail anchorage in wingwalls
Calculated Foundation Loads = 111 tons/ Dr Sh
See Bridge Layout for header slope and foundation type, size and length

MATERIAL NOTES:

Provide Class C Concrete strength f'c = 3600 psi
Provide Grade 60 reinforcing steel

HL93 LOADING



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

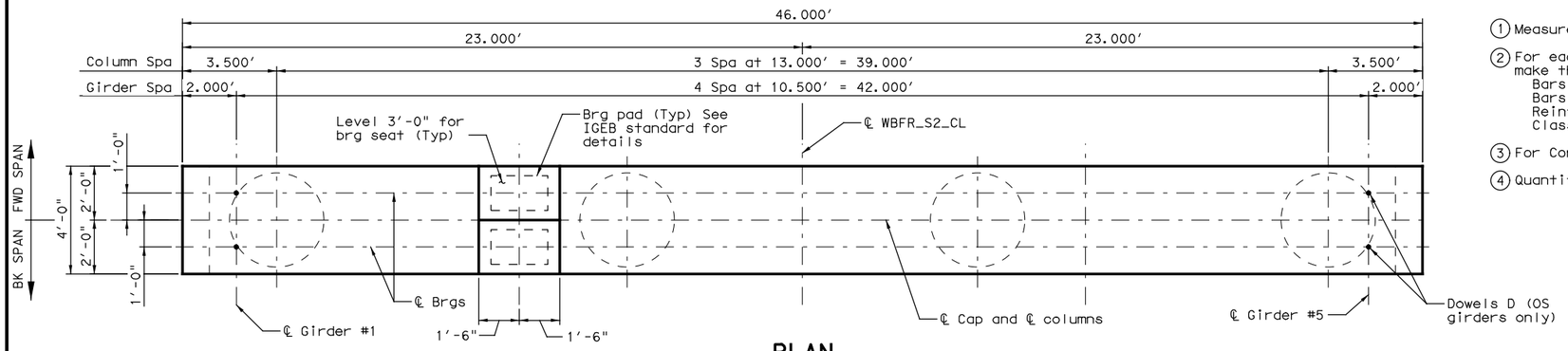
SOUTHWEST BYPASS SEGMENT 2 ABUTMENT NO. 7

TCS QUARRY BRIDGE

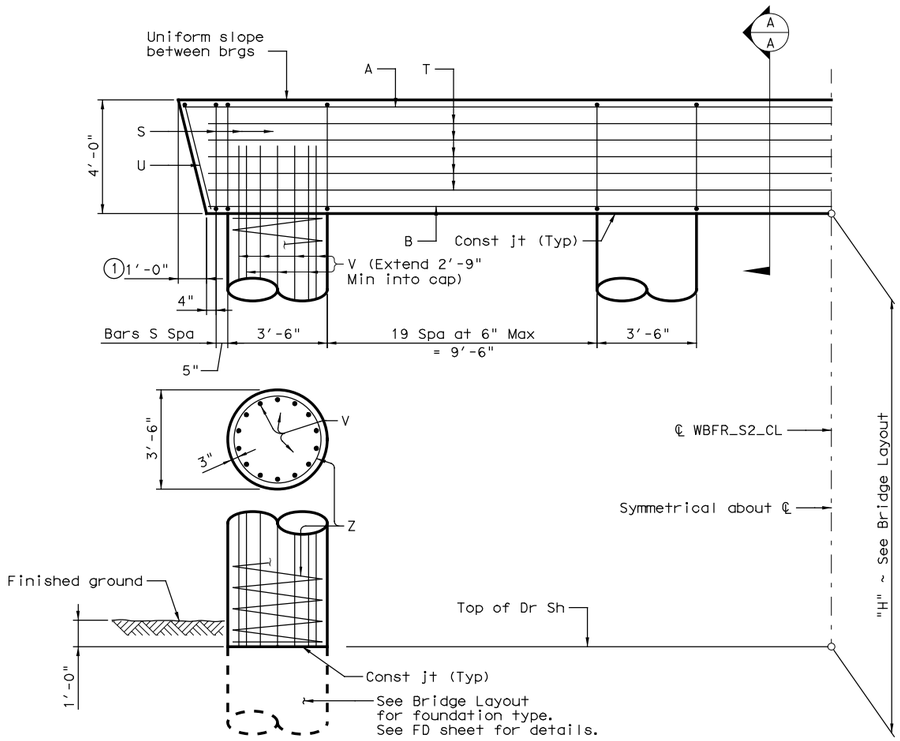
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GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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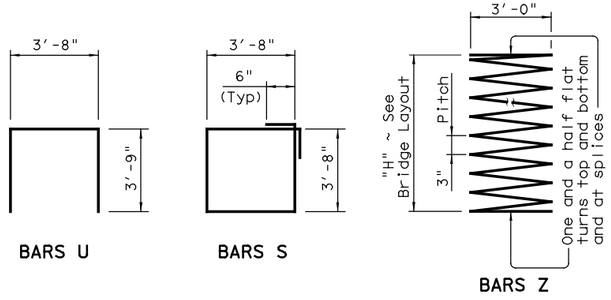
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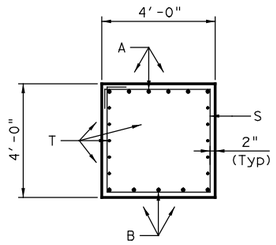


PLAN

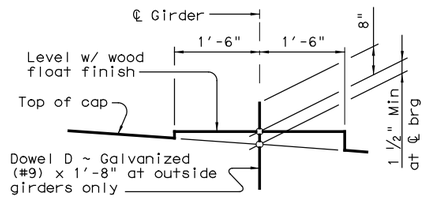


HALF ELEVATION





SECTION A-A



BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)

(1) Measured parallel to top of cap cross-slope.

(2) For each linear foot variation in "H" value, make the following adjustments:
Bars V length, 1'-0"
Bars Z length, 37'-9"
Reinforcing steel, 291 Lb
Class "C" conc (col), 1.43 CY

(3) For Contractor's information only.

(4) Quantities shown are for one Interior Bent only.

TABLE OF CAP QUANTITIES (4)

Bar	No.	Size	Length	Weight
A	6	#11	45'-6"	1450
B	5	#11	43'-9"	1162
D	4	#9	1'-8"	23
S	64	#5	15'-8"	1046
T	10	#5	43'-9"	456
U	2	#5	11'-2"	23
(3) Reinforcing Steel			Lb	4160
Class C Concrete (Cap)			CY	27.0

TABLE OF COLUMN QUANTITIES (2)

Bent	"H"	Bars V 56 ~ #9		Bars Z 4 ~ #4		Reinf Steel	Class C Conc (Col)
No.	Ft	Length	Weight	Length	Weight	Lb	CY
2	27'	29'-9"	5664	1047'-6"	2799	8463	38.5
5	18'	20'-9"	3951	707'-9"	1891	5842	25.7
6	14'	16'-9"	3189	556'-9"	1488	4677	20.0

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014)

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

See Foundation Detail Standard Sheet, FD, for all foundation details and notes not shown
Calculated Foundation Loads = 276 tons/ Dr Sh
See Bridge Layout for foundation type, size and length

MATERIAL NOTES:

Provide Class C Concrete strength f'c = 3600 psi
Provide Grade 60 reinforcing steel
Galvanize dowel bars D

HL93 LOADING



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

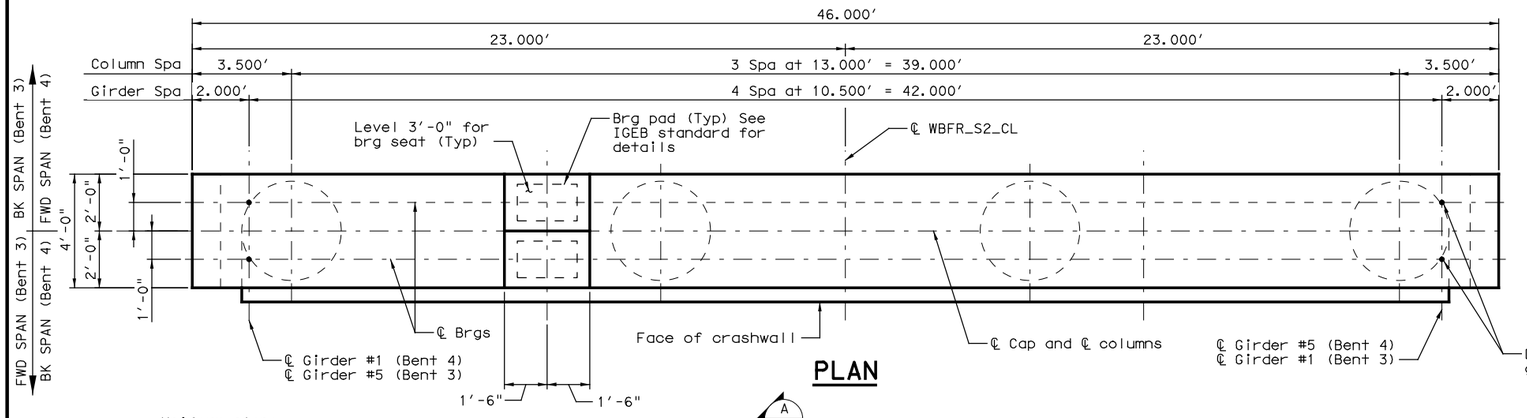
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 INTERIOR BENT NOS. 2, 5-6 TCS QUARRY BRIDGE

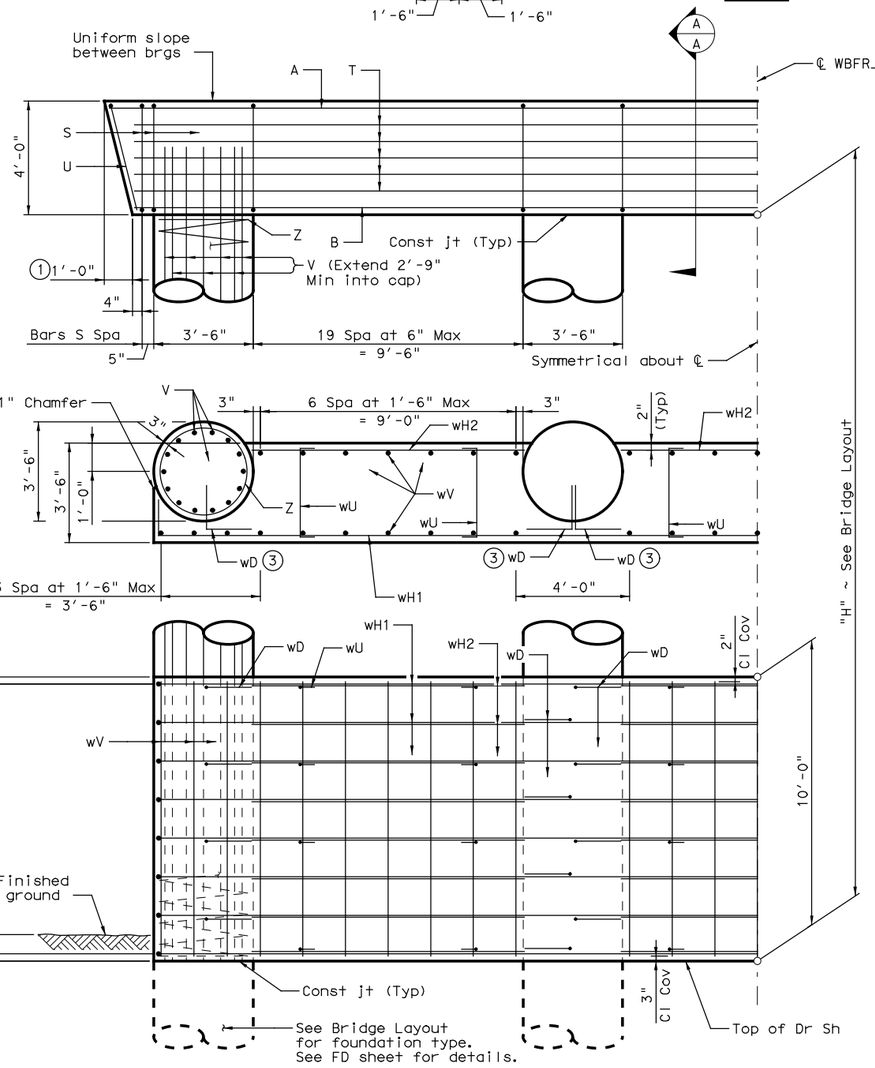
SCALE: 3/8"=1'-0" SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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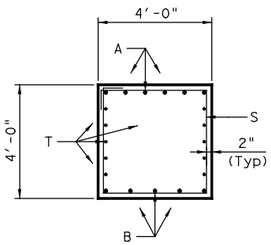
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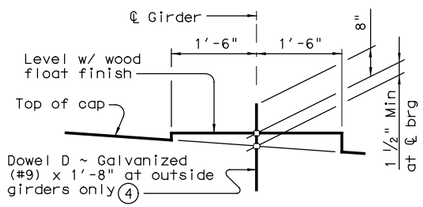
PLAN



HALF ELEVATION



SECTION A-A



BEARING SEAT DETAIL

(Bearing surface must be clean and free of all loose material before placing bearing pad.)

(1) Measured parallel to top of cap cross-slope

(2) For each linear foot variation in "H" value, make the following adjustments:
Bars V length, 1'-0"
Bars Z length, 37'-9"
Reinforcing steel, 291 Lb
Class "C" conc (col), 1.43 CY

(3) Bars wD Embed 1'-3" Min into Column. At Contractor's option, bars wD may be placed with the column or may be drilled and grouted with the anchorage end sloped 1:6 in column.

(4) Deduct 23 lbs for Dowels D at Interior Bent No. 4.

(5) For Contractor's information only.

(6) Quantities shown are for one Interior Bent only.

TABLE OF CAP QUANTITIES (6)

	Bar	No.	Size	Length	Weight
	A	6	#11	45'-6"	1450
	B	5	#11	43'-9"	1162
(4)	D	4	#9	1'-8"	23
	S	64	#5	15'-8"	1046
	T	10	#5	43'-9"	456
	U	2	#5	11'-2"	23
	wD	24	#6	3'-2"	114
	wH1	8	#6	44'-8"	537
	wH2	24	#6	9'-6"	342
	wU	24	#4	4'-2"	67
	wV	48	#4	9'-8"	697
(5)	Reinforcing Steel			Lb	5917
	Class C Concrete (Cap)			CY	27.0
	Class C Conc (Misc)			CY	43.2

TABLE OF COLUMN QUANTITIES (2)

Bent	"H"	Bars V 56 ~ #9		Bars Z 4 ~ #4		Reinf Steel	Class C Conc (Col)
No.	Ft	Length	Weight	Length	Weight	Lb	CY
3	23'	25'-9"	4903	896'-6"	2395	7298	32.8
4	22'	24'-9"	4712	858'-9"	2295	7007	31.4

GENERAL NOTES:

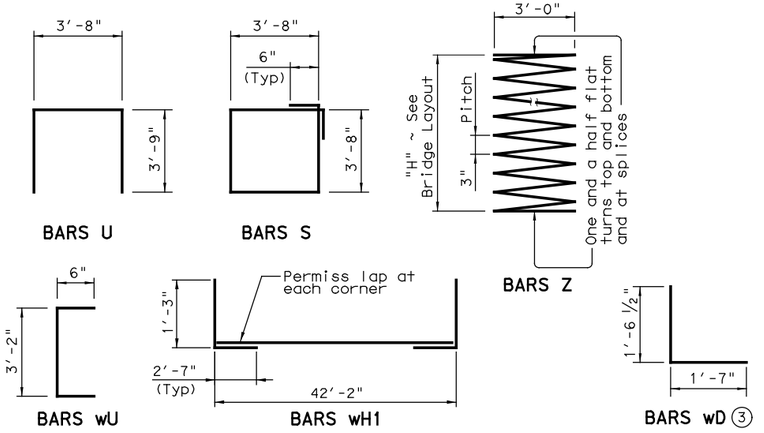
Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014)

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

See Foundation Detail Standard Sheet, FD, for all foundation details and notes not shown
Calculated Foundation Loads = 303 tons/ Dr Sh
See Bridge Layout for foundation type, size and length

MATERIAL NOTES:

Provide Class C Concrete strength f'c = 3600 psi
Provide Grade 60 reinforcing steel
Galvanize dowel bars D



HL93 LOADING



NO.	DATE	REVISION	APPROVED

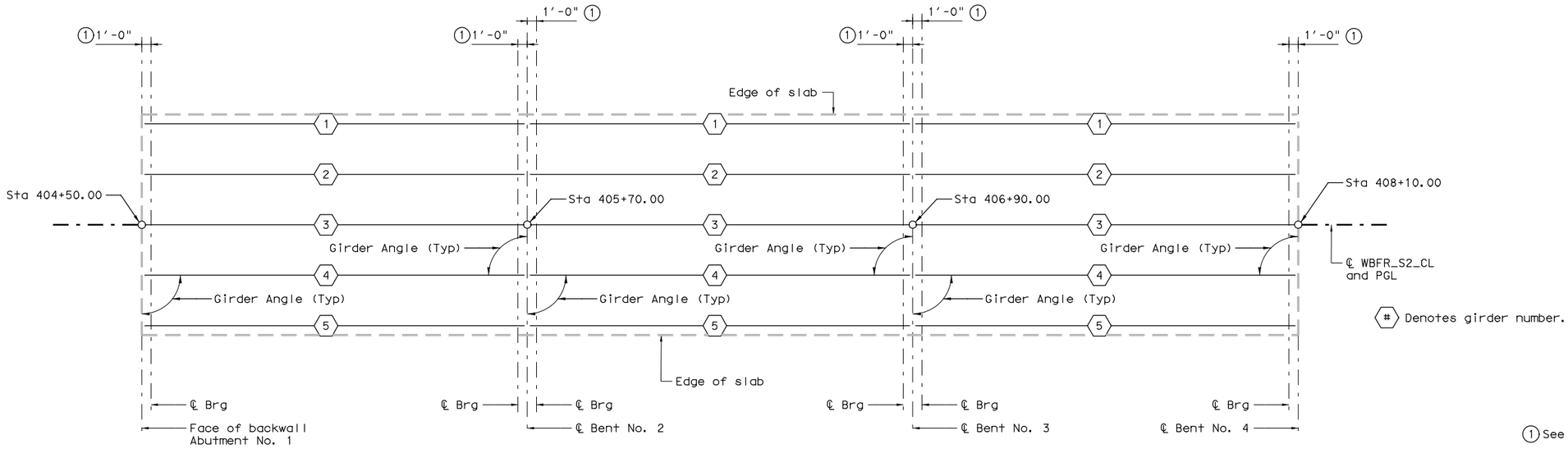
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 INTERIOR BENT NOS. 3-4 TCS QUARRY BRIDGE

SCALE: 3/8"=1'-0" SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS TGG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMH	TEXAS	AUS	WILLIAMSON	
CHECK JMH	CONTROL	SECTION	JOB	132
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgonz DATE: 3/22/2018 TIME: 10:45:21 AM SCALE:1:1
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(1) See IGEB Standard for orientation of dimension.

(2) Girder lengths shown are bottom girder flange lengths with adjustments made for girder slope.

FRAMING PLAN

BENT REPORT

ABUT NO. 1 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.500	90	0	0
	GIRDER 3	10.500	90	0	0
	GIRDER 4	10.500	90	0	0
	GIRDER 5	10.500	90	0	0
	TOTAL	42.000			

BENT NO. 2 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 1	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.500	90	0	0
	GIRDER 3	10.500	90	0	0
	GIRDER 4	10.500	90	0	0
	GIRDER 5	10.500	90	0	0
	TOTAL	42.000			

BENT NO. 2 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.500	90	0	0
	GIRDER 3	10.500	90	0	0
	GIRDER 4	10.500	90	0	0
	GIRDER 5	10.500	90	0	0
	TOTAL	42.000			

BENT NO. 3 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 2	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.500	90	0	0
	GIRDER 3	10.500	90	0	0
	GIRDER 4	10.500	90	0	0
	GIRDER 5	10.500	90	0	0
	TOTAL	42.000			

BENT NO. 3 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.500	90	0	0
	GIRDER 3	10.500	90	0	0
	GIRDER 4	10.500	90	0	0
	GIRDER 5	10.500	90	0	0
	TOTAL	42.000			

BENT NO. 4 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN 3	GIRDER 1	0.000	90	0	0
	GIRDER 2	10.500	90	0	0
	GIRDER 3	10.500	90	0	0
	GIRDER 4	10.500	90	0	0
	GIRDER 5	10.500	90	0	0
	TOTAL	42.000			

GIRDER REPORT

BEAM REPORT, SPAN 1

	C-C BENT	HORIZONTAL DISTANCE C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	120.000	118.000	119.51	-0.0122
GIRDER 2	120.000	118.000	119.51	-0.0122
GIRDER 3	120.000	118.000	119.51	-0.0122
GIRDER 4	120.000	118.000	119.51	-0.0122
GIRDER 5	120.000	118.000	119.51	-0.0122

BEAM REPORT, SPAN 2

	C-C BENT	HORIZONTAL DISTANCE C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	120.000	118.000	119.53	-0.0233
GIRDER 2	120.000	118.000	119.53	-0.0233
GIRDER 3	120.000	118.000	119.53	-0.0233
GIRDER 4	120.000	118.000	119.53	-0.0233
GIRDER 5	120.000	118.000	119.53	-0.0233

BEAM REPORT, SPAN 3

	C-C BENT	HORIZONTAL DISTANCE C-C BRG.	TRUE DISTANCE BOT. GDR. FLG. (2)	GIRDER SLOPE
GIRDER 1	120.000	118.000	119.57	-0.0344
GIRDER 2	120.000	118.000	119.57	-0.0344
GIRDER 3	120.000	118.000	119.57	-0.0344
GIRDER 4	120.000	118.000	119.57	-0.0344
GIRDER 5	120.000	118.000	119.57	-0.0344

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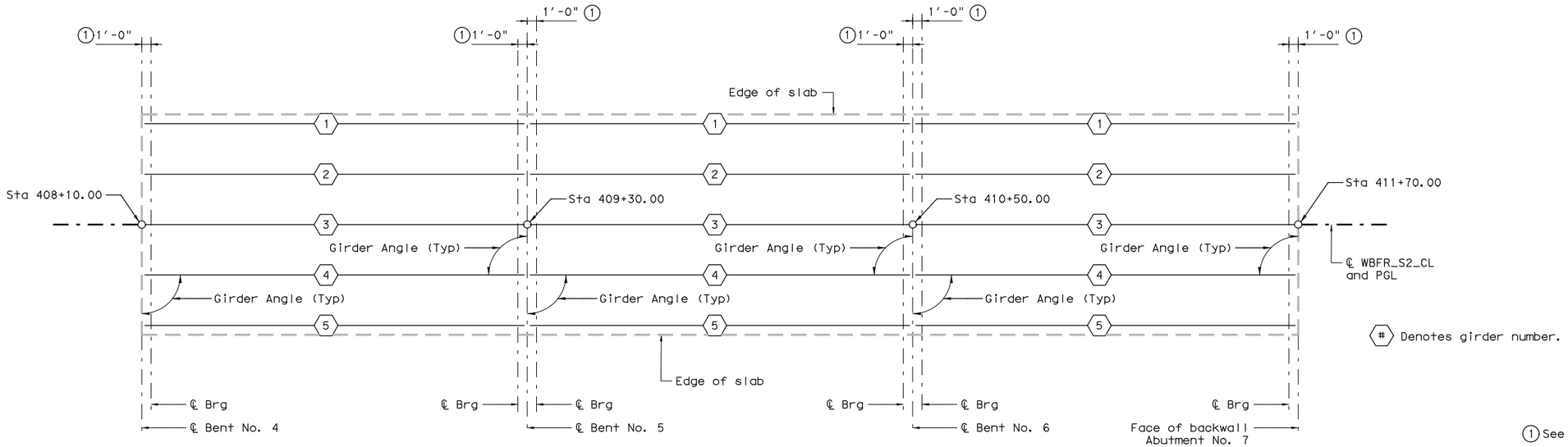
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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2
FRAMING PLAN
UNIT 1
TCS QUARRY BRIDGE

SCALE: 3/8"=1'-0" SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	133
JMH	2103	01	034	
CHECK				
JMH				

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SPAN 4 (TY Tx62 Girder)

SPAN 5 (TY Tx62 Girder)

SPAN 6 (TY Tx62 Girder)

(1) See IGEB Standard for orientation of dimension.

(2) Girder lengths shown are bottom girder flange lengths with adjustments made for girder slope.

FRAMING PLAN

BENT REPORT

BENT NO. 4 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN	4	GIRDER 1	0.000	90	0	0
		GIRDER 2	10.500	90	0	0
		GIRDER 3	10.500	90	0	0
		GIRDER 4	10.500	90	0	0
		GIRDER 5	10.500	90	0	0
		TOTAL	42.000			

BENT NO. 5 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN	4	GIRDER 1	0.000	90	0	0
		GIRDER 2	10.500	90	0	0
		GIRDER 3	10.500	90	0	0
		GIRDER 4	10.500	90	0	0
		GIRDER 5	10.500	90	0	0
		TOTAL	42.000			
SPAN	5	GIRDER 1	0.000	90	0	0
		GIRDER 2	10.500	90	0	0
		GIRDER 3	10.500	90	0	0
		GIRDER 4	10.500	90	0	0
		GIRDER 5	10.500	90	0	0
		TOTAL	42.000			

BENT NO. 6 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN	5	GIRDER 1	0.000	90	0	0
		GIRDER 2	10.500	90	0	0
		GIRDER 3	10.500	90	0	0
		GIRDER 4	10.500	90	0	0
		GIRDER 5	10.500	90	0	0
		TOTAL	42.000			
SPAN	6	GIRDER 1	0.000	90	0	0
		GIRDER 2	10.500	90	0	0
		GIRDER 3	10.500	90	0	0
		GIRDER 4	10.500	90	0	0
		GIRDER 5	10.500	90	0	0
		TOTAL	42.000			

ABUT NO. 7 (S 2 50 1.13 E)
DISTANCE BETWEEN STATION LINE AND GIRDER 1, 21.000 L

		GIRDER	GIRDER SPAC. (C.L. BENT)	GIRDER ANGLE D	M	S
SPAN	6	GIRDER 1	0.000	90	0	0
		GIRDER 2	10.500	90	0	0
		GIRDER 3	10.500	90	0	0
		GIRDER 4	10.500	90	0	0
		GIRDER 5	10.500	90	0	0
		TOTAL	42.000			

GIRDER REPORT

BEAM REPORT, SPAN 4

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG.(2)	GIRDER SLOPE
GIRDER 1	120.000	118.000	119.60	-0.0400
GIRDER 2	120.000	118.000	119.60	-0.0400
GIRDER 3	120.000	118.000	119.60	-0.0400
GIRDER 4	120.000	118.000	119.60	-0.0400
GIRDER 5	120.000	118.000	119.60	-0.0400

BEAM REPORT, SPAN 5

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG.(2)	GIRDER SLOPE
GIRDER 1	120.000	118.000	119.60	-0.0400
GIRDER 2	120.000	118.000	119.60	-0.0400
GIRDER 3	120.000	118.000	119.60	-0.0400
GIRDER 4	120.000	118.000	119.60	-0.0400
GIRDER 5	120.000	118.000	119.60	-0.0400

BEAM REPORT, SPAN 6

	HORIZONTAL DISTANCE C-C BENT	C-C BRG.	TRUE DISTANCE BOT. GDR. FLG.(2)	GIRDER SLOPE
GIRDER 1	120.000	118.000	119.60	-0.0400
GIRDER 2	120.000	118.000	119.60	-0.0400
GIRDER 3	120.000	118.000	119.60	-0.0400
GIRDER 4	120.000	118.000	119.60	-0.0400
GIRDER 5	120.000	118.000	119.60	-0.0400

HL93 LOADING

STATE OF TEXAS
TYLER W. BRENDLINGER
122092
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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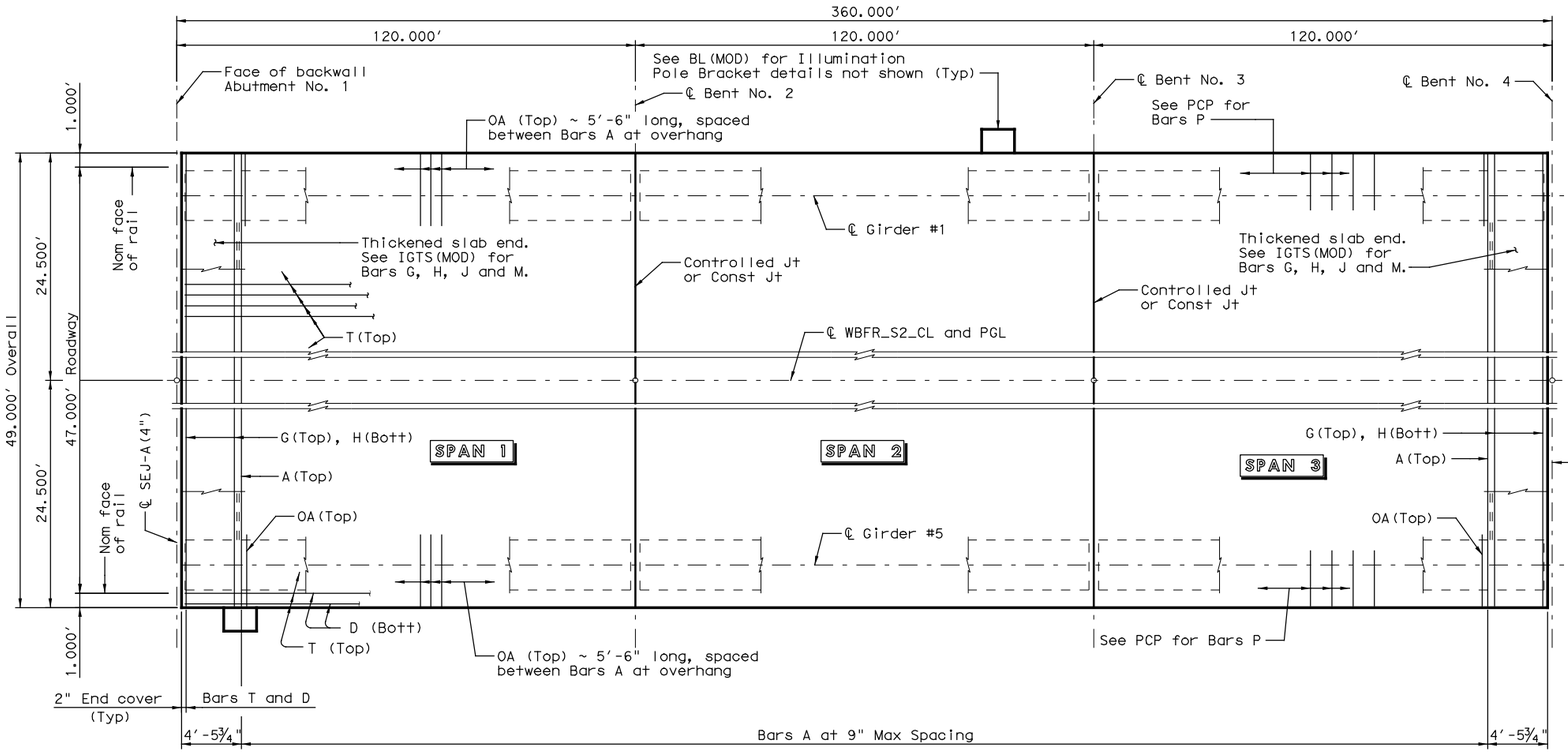
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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2
FRAMING PLAN
UNIT 2
TCS QUARRY BRIDGE

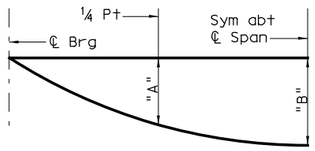
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DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	134
JMH	2103	01	034	
CHECK				
JMH				

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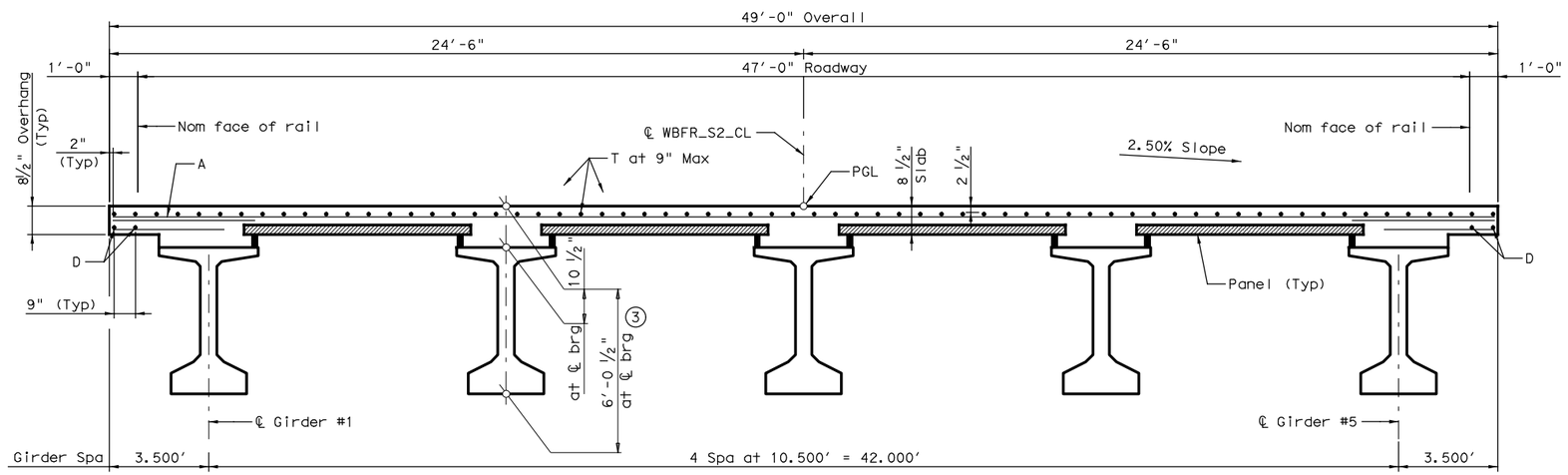
PLAN



Span No.	Girder No.	"A" Ft	"B" Ft
1-3	1,5	0.104	0.146
	2-4	0.125	0.175

DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only. (E_c = 5000 ksi)
Calculated deflections shown are theoretical and actual deflections may be less. Deflections shall be adjusted based on field observations



TYPICAL TRANSVERSE SECTION

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

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONC SLAB	PRESTRESSED CONC BEAMS (TY Tx62) ②	REINFORCING STEEL
	SF	LF	Lb
1	5880	597.55	13524
2	5880	597.65	13524
3	5880	597.85	13524
Total	17640	1793.05	① 40572

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014)
See PCP and PCP-FAB for panel details not shown
See IGTS(MOD) Standard for Thickened Slab End Details and quantity adjustments
See IGMS Standard for miscellaneous details
See Railing Standard for rail anchorage in slab
See BL(MOD) Standard for Illumination Pole Bracket details and conduit in SSTR railing
See PMDF Standard for details and quantity 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

① Reinforcing steel weight is calculated using an approximate factor of 2.3 lbs per sq ft

② Quantity shown are bottom beam flange lengths with adjustments made for beam slope.

③ Theoretical dimension only.

HL93 LOADING



NO.	DATE	REVISION	APPROVED

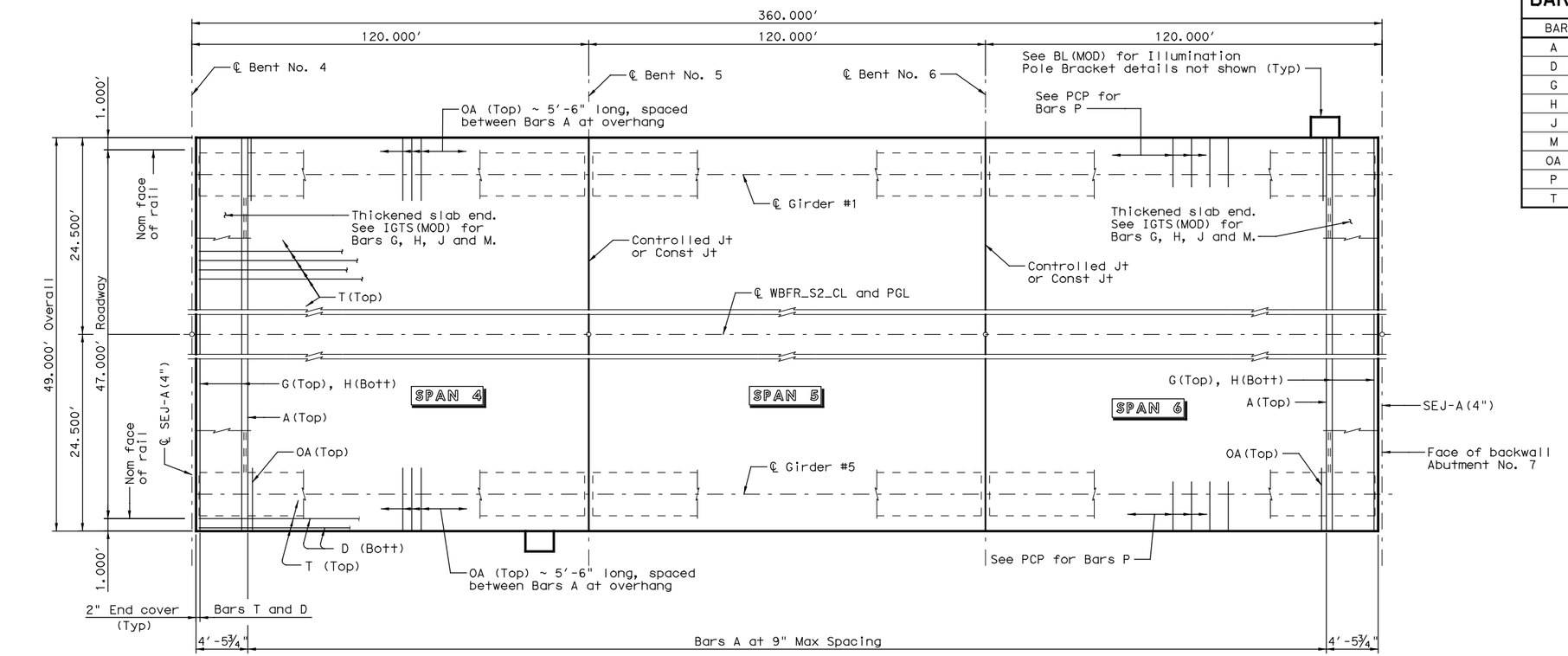
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 360.00' PRESTRESSED CONCRETE GIRDER UNIT 1 TCS QUARRY BRIDGE

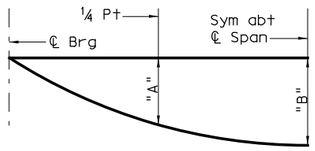
SCALE: 3/8"=1'-0" SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	135
JMH	2103	01	034	
CHECK				
JMH				

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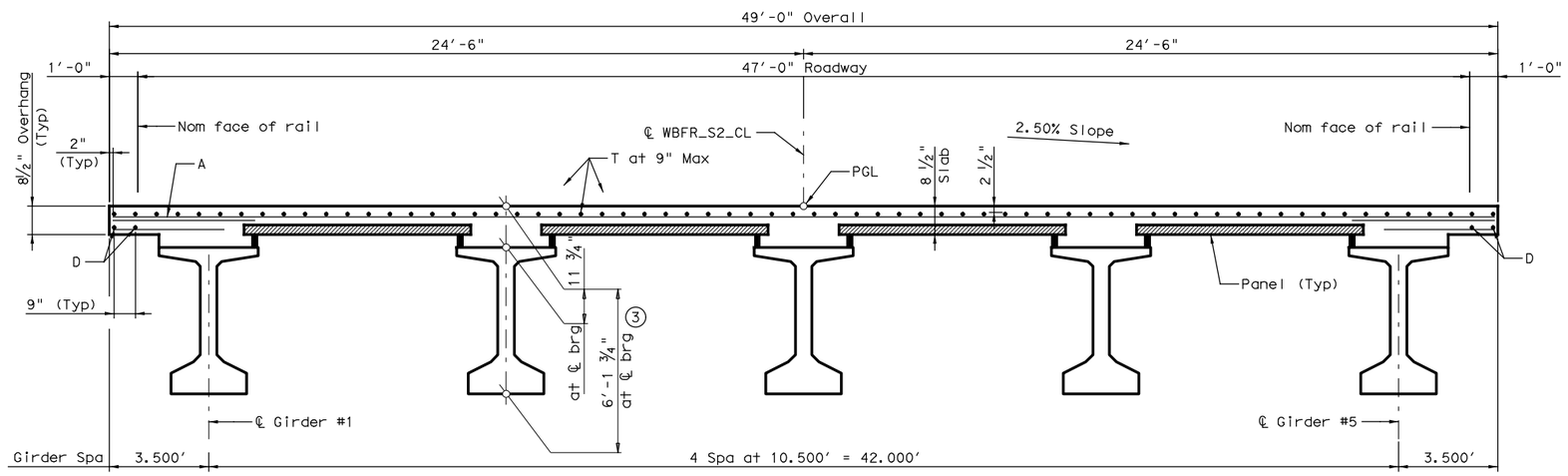
PLAN



Span No.	Girder No.	"A" Ft	"B" Ft
4-6	1,5	0.104	0.146
	2-4	0.125	0.175

DEAD LOAD DEFLECTION DIAGRAM

NOTE: Deflections shown are due to concrete slab only. (E_c = 5000 ksi)
Calculated deflections shown are theoretical and actual deflections may be less. Deflections shall be adjusted based on field observations



TYPICAL TRANSVERSE SECTION

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

TABLE OF ESTIMATED QUANTITIES

SPAN	REINF CONC SLAB	PRESTRESSED CONC BEAMS (TY Tx62) ②	REINFORCING STEEL
	SF	LF	Lb
4	5880	598.00	13524
5	5880	598.00	13524
6	5880	598.00	13524
Total	17640	1794.00	① 40572

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications, 7th Edition (2014)
See PCP and PCP-FAB for panel details not shown
See IGTS(MOD) Standard for Thickened Slab End Details and quantity adjustments
See IGMS Standard for miscellaneous details
See Railing Standard for rail anchorage in slab
See BL(MOD) Standard for Illumination Pole Bracket details and conduit in SSTR railing
See PMDF Standard for details and quantity 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

① Reinforcing steel weight is calculated using an approximate factor of 2.3 lbs per sq ft
② Quantity shown are bottom beam flange lengths with adjustments made for beam slope.
③ Theoretical dimension only.

HL93 LOADING



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 360.00′ PRESTRESSED CONCRETE GIRDER UNIT 2 TCS QUARRY BRIDGE

SCALE: 3/8"=1′-0" SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TWB	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
TGG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	136
JMH	2103	01	034	
CHECK				
JMH				

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DATE:
FILE:

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															
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (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	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) Moment	Shear
SOUTHWEST BYPASS TCS QUARRY BRIDGE	All	All	Tx62		52	0.6	270	21.47										12	54.5	12.5	6.000	7.500	3.954	-4.440	11093	0.778	0.985

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

(1) When T0 END (in) equals T0 ℄ (in), place these straight strands at the defined T0 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 = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(3) Portion of full HL93.

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 60 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:

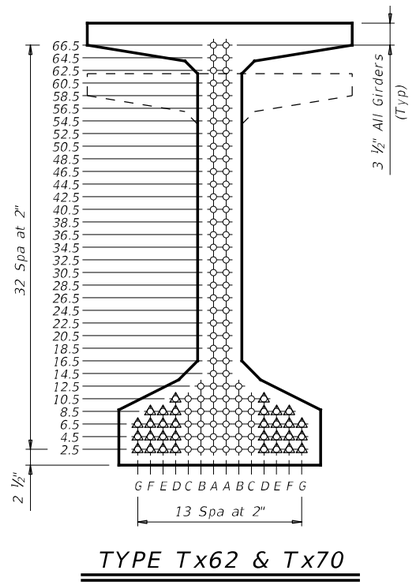
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc. Place strands within a row as follows:

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.



TYPE Tx62 & Tx70

HL93 LOADING

STATE OF TEXAS
TYLER W. BRENDLINGER
122092
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PROFESSIONAL ENGINEER
03/23/2018

Texas Department of Transportation

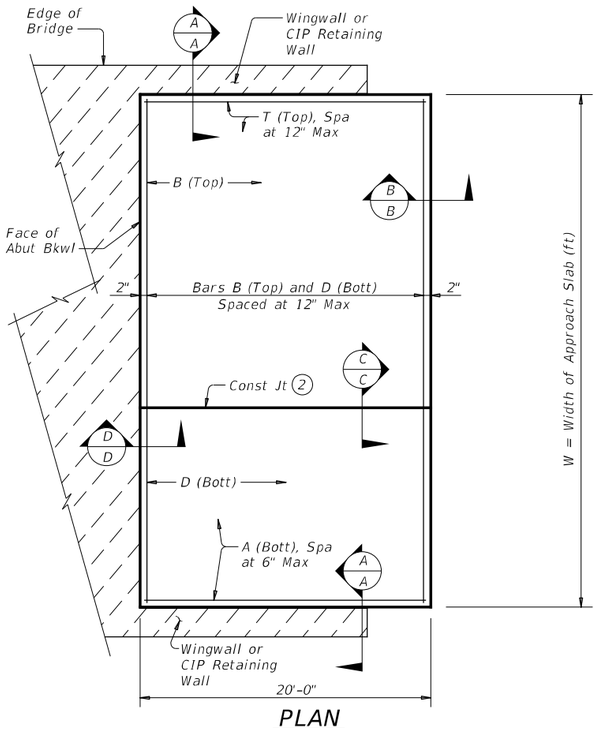
Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DESIGNS (NON-STANDARD SPANS)

IGND(MOD)

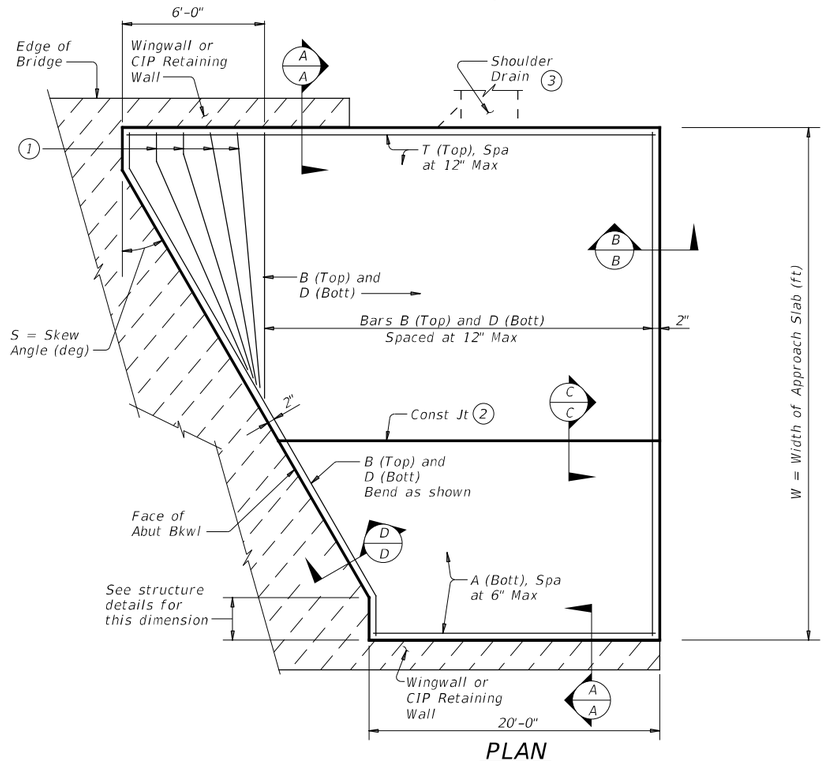
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©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
MOD: Removed girder sections not required	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		137

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PLAN

(Showing Non-Skewed Approach Slab)



PLAN

(Showing Skewed Approach Slab)

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

APPROXIMATE QUANTITIES (4)

Reinf steel weight = 8.5 Lbs/SF of Approach Slab

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

W = Width of Approach Slab (ft)

S = Skew Angle (deg)

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

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

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

(4) For Contractor's information only.

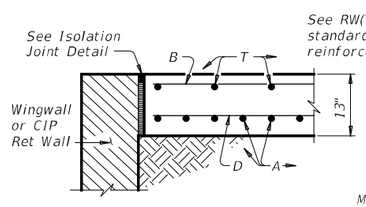
(5) Multiple piece tie bars are acceptable at longitudinal construction joints provided minimum laps shown are achieved.

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

(7) Place in accordance with Item 438.

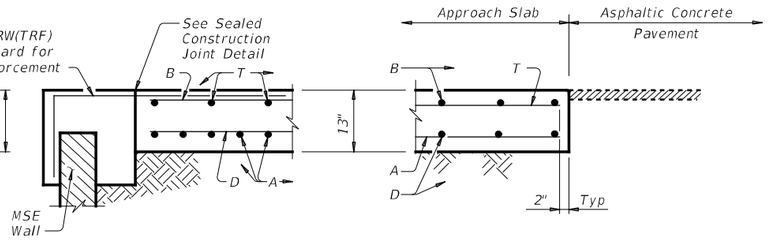
(8) Backer rod shall be 25% larger than joint opening and shall be compatible with the sealant.

(9) Place ½" Preformed Bituminous Fiber Material between concrete railing and top of approach slab as shown when concrete railing projects over the approach slab.



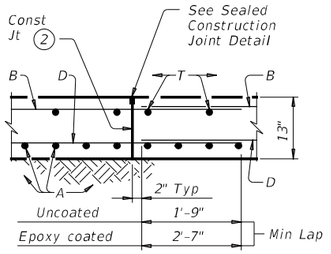
SHOWING WINGWALL OR CIP RETAINING WALL

SECTION A-A

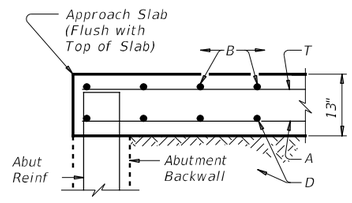


SHOWING MSE WALL

SECTION B-B



SECTION C-C (5)



SECTION D-D

GENERAL NOTES:

Construct approach slab in accordance with Item 422.

Provide Class "S" concrete with a minimum compressive strength of 4,000 psi.

Provide Grade 60 reinforcing steel.

Construct the subgrade or subbase from the bridge for a minimum distance of 100 feet prior to the approach slab, unless otherwise indicated on the plans.

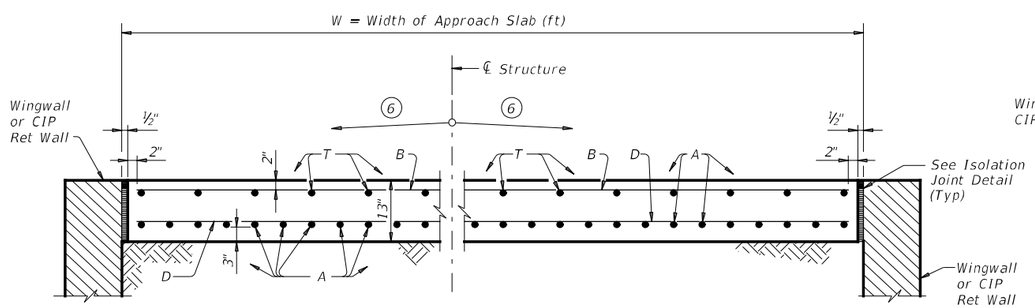
Compact and finish the subgrade or foundation for the approach slab to the typical cross-section and to the lines and grades shown on the plans.

Cure for 4 days using water or membrane curing per Item 422.

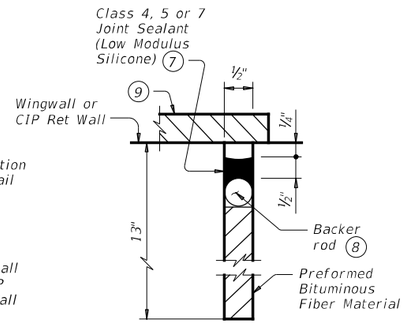
Sealant, backer rod and preformed bituminous fiber material are subsidiary to approach slab concrete.

Provide a 1" bondbreaker (asphaltic concrete pavement or asphalt stabilized base) between the approach slab and cement stabilized backfill or cement treated base. Other bondbreakers may be used if approved by the Engineer.

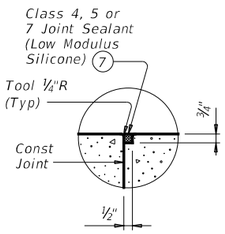
Cover dimensions are clear dimensions, unless noted otherwise.



TYPICAL TRANSVERSE SECTION



ISOLATION JOINT DETAIL



SEALED CONSTRUCTION JOINT DETAIL

Texas Department of Transportation

Bridge Division Standard

BRIDGE APPROACH SLAB

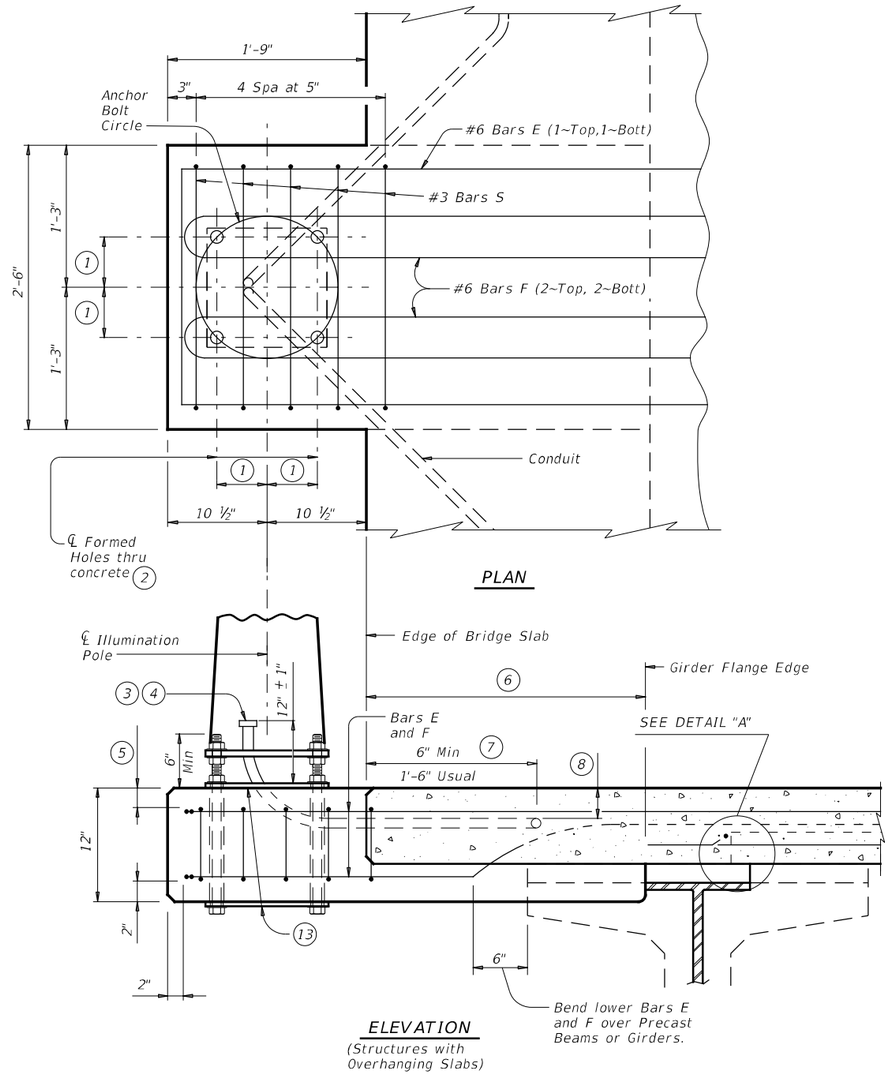
ASPHALTIC CONCRETE PAVEMENT

BAS-A

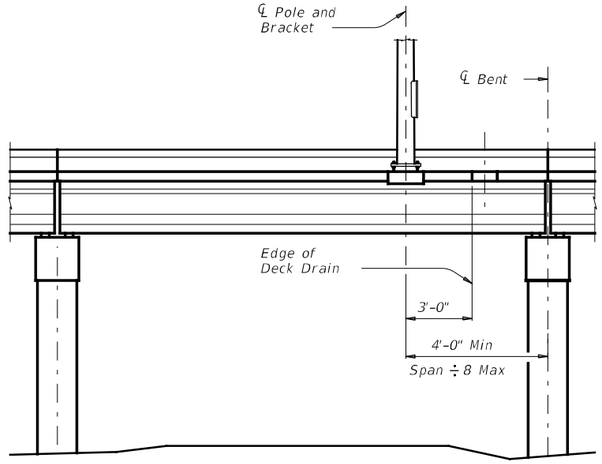
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©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
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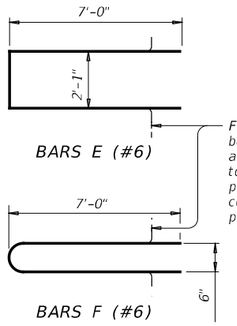
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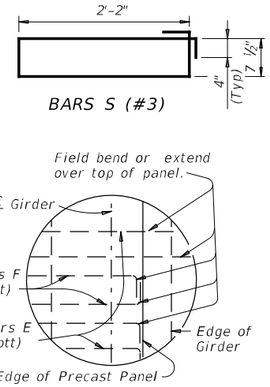


ILLUMINATION POLE BRACKET LOCATION AND REINFORCING



TYPICAL BRIDGE ELEVATION





PRIOR TO ORDERING MATERIALS THE POLE MANUFACTURE MUST PROVIDE A POLE DESIGN THAT MEETS CURRENT AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORT FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS AND INTERIM SPECIFICATIONS FOR APPROVAL OF THE ENGINEER.

TABLE OF ANCHOR BOLT AND STEEL PLATE INFORMATION

	ANCHOR BOLT CIRCLE DIAMETER	ANCHOR BOLT OFFSET	ANCHOR BOLT DIAMETER	ANCHOR BOLT HOLE SIZE		TOP AND BOTTOM STEEL PLATE SIZE	CENTER HOLE DIAMETER IN TOP STEEL PLATE
				CONCRETE	STEEL		
	IN	IN	IN	IN	IN	IN	IN
	13	4 3/8	1	1 ¼	1 ¼	PL ½ X 13 X 1'-1"	9 ½
	15	5 5/16	1 ¼	1 ½	1 ½	PL ½ X 15 ½ X 1'-3 ½	10 ½
1	(14) SWBY	11	3 7/8	1	1 ¼	1 ¼	PL ½ X 12 X 1'-0"	7 ½

ESTIMATED QUANTITIES~ONE BRACKET

ITEM		UNIT	QUANT
CONCRETE	(9) (10)	CY	0.2
REINFORCING STEEL	(10)	LB	146
STRUCTURAL STEEL	(10) (11)	LB	104
CONDUIT	(12)	LF	4

(1) See table for dimension.
(2) See table for hole size.
(3) If lighting is to be placed on future contract, extend conduit only 6" and provide water tight cap.
(4) Ream burrs and install bell ends or bushings on all conduit ends.
(5) Provide same clear cover required for bridge slab. Place beneath top slab reinforcing only if necessary to provide this cover.
(6) If slab edge to girder flange edge exceeds 3'-11", lengthen Bars E and F proportionally to ensure Bars E and F extend 1'-6" Min beyond girder flange edge.
(7) Clear rail anchors, drains, etc 1 ½" Min.
(8) 1 ½" Min cover but always beneath top layer slab reinforcing.
(9) Variation due to slab thickness is insignificant.
(10) For Contractor's information only.
(11) Anchor Bolts, Nuts, Washers, and 2 plates.
(12) Additional to main run (Size and type as shown elsewhere on the plans).
(13) See table for anchor bolt and steel plate information.
1 (14) Bolt circle and bolt diameter based on Valmont Model No. R800 A320.

GENERAL NOTES:

Designed for up to 50 Ft light pole with one 12 Ft arm, 60 Lb luminaire with 1.6 sq ft EPA at maximum design wind speed of 110 mph (3 second gusts). A special design is required if luminaire mounting height exceeds 100 ft above average surrounding terrain.

Concrete for Illumination Pole Brackets must be of the same type and placed monolithically with the bridge slab. The bracket quantity is considered subsidiary to the Item "Reinforced Concrete Slab".

The anchor bolts, nuts, washers, and plates are subsidiary to the Item "Roadway Illumination Assemblies".

1 The number and location of brackets is shown elsewhere on the plans. Brackets found to conflict with other components of the bridge may be relocated as necessary.

Provide Grade 60 reinforcing steel.

Cover dimensions are clear dimensions, unless noted otherwise.

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

Texas Department of Transportation — Bridge Division Standard

BRIDGE LIGHTING DETAILS

BL(MOD)

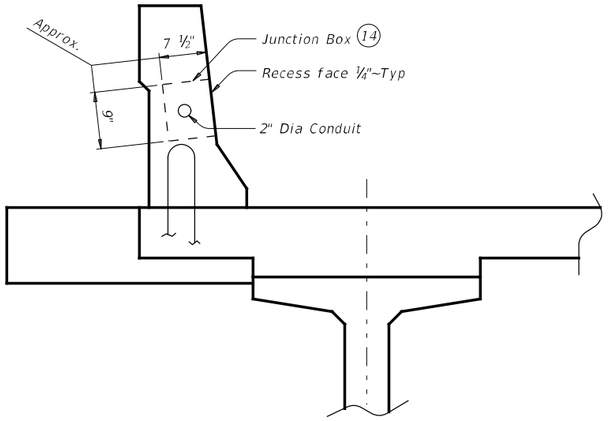
STATE OF TEXAS
TYLER W. BRENDLINGER
122092
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
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	AUS	WILLIAMSON		139

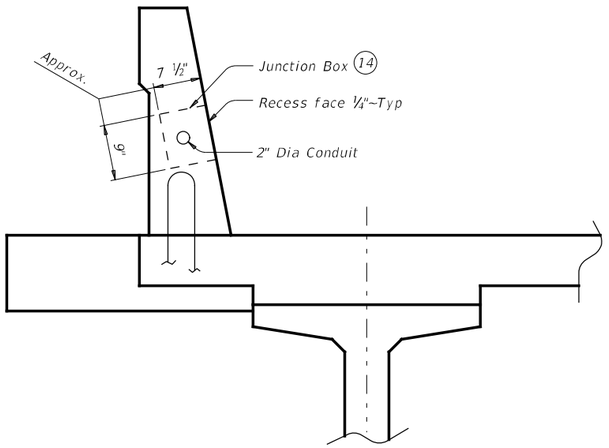
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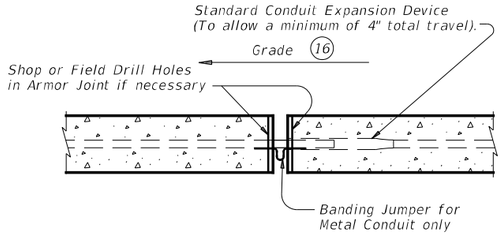
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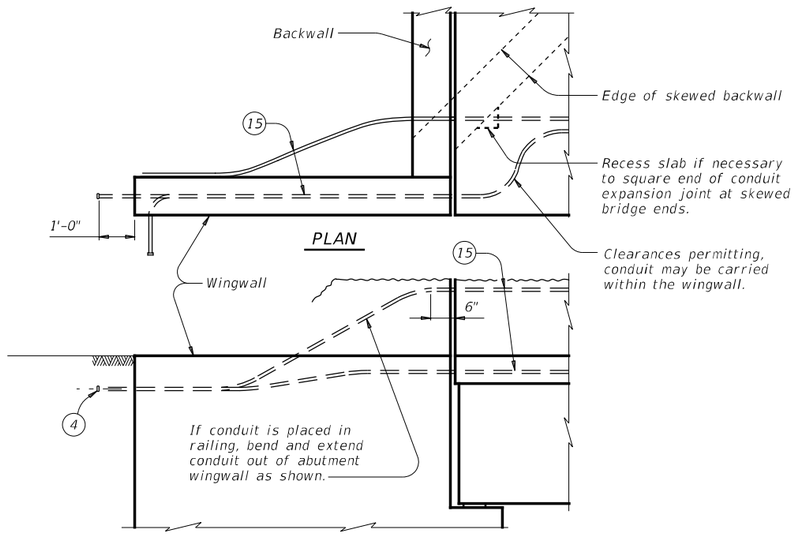
SHOWING T551, T552, AND T80HT



SHOWING SSTR AND T80SS

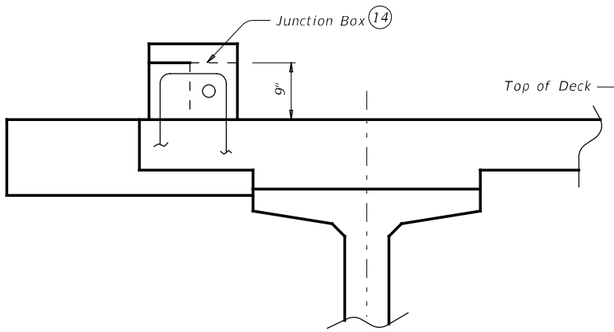


CONDUIT EXPANSION JOINT



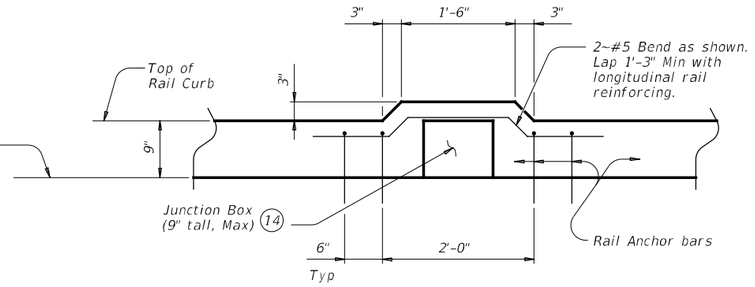
ELEVATION

TREATMENT AT END OF BRIDGE



SHOWING T1F, T1W, T66, AND C1W

See Elevation View for curb modifications



ELEVATION VIEW

For Rail Types T1F, T1W,T66, and C1W, center Junction Box between posts. Additional reinforcing and concrete required for this rail modification is considered subsidiary to the rail. Do not locate Junction Box in the same bay as a drain slot in rail curb.

JUNCTION BOX LOCATION

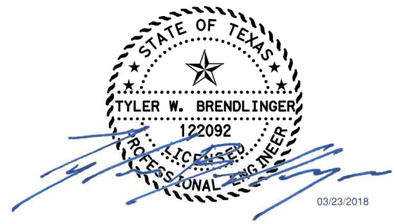
Use these details as a guide in locating junction boxes in rail types not shown.

(4) Ream burrs and install bell ends or bushings on all conduit ends.

(14) Provide polymer concrete junction boxes meeting the requirements of DMS 11030.

(15) Position of conduit shown elsewhere on the plans or as directed by the Engineer.

(16) Place Conduit Expansion Device on high side of expansion joint.



SHEET 2 OF 2

Texas Department of Transportation

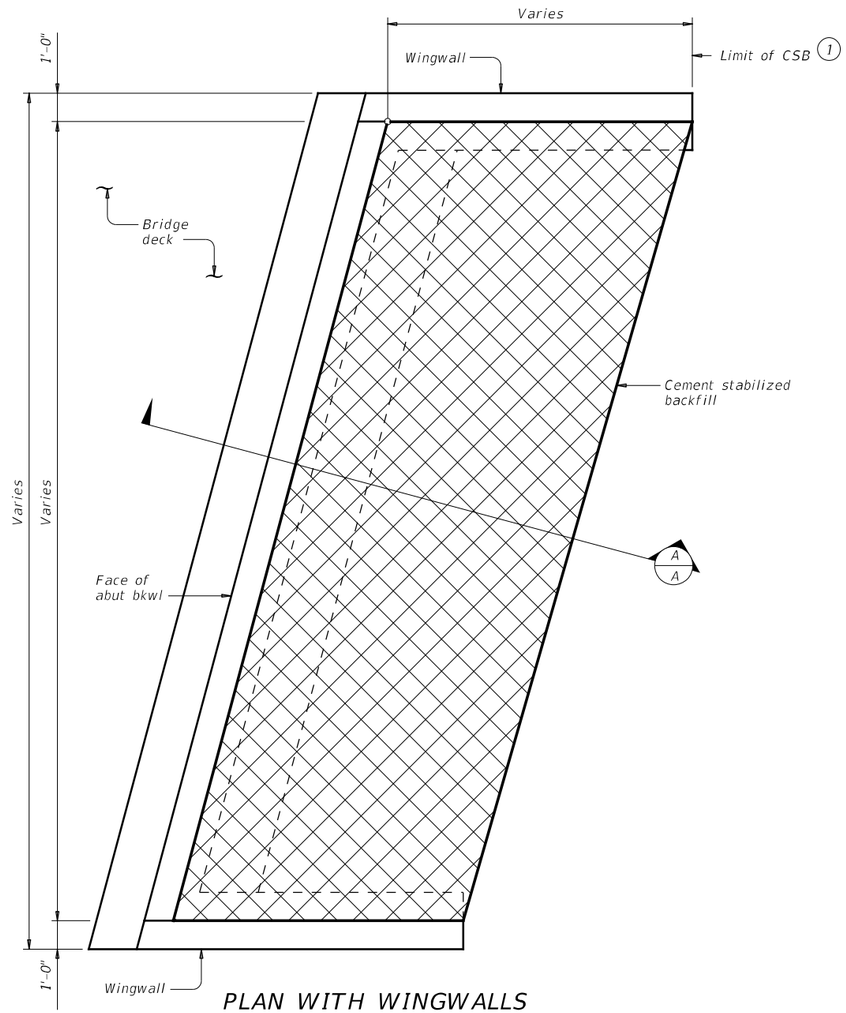
Bridge Division Standard

BRIDGE LIGHTING DETAILS

BL(MOD)

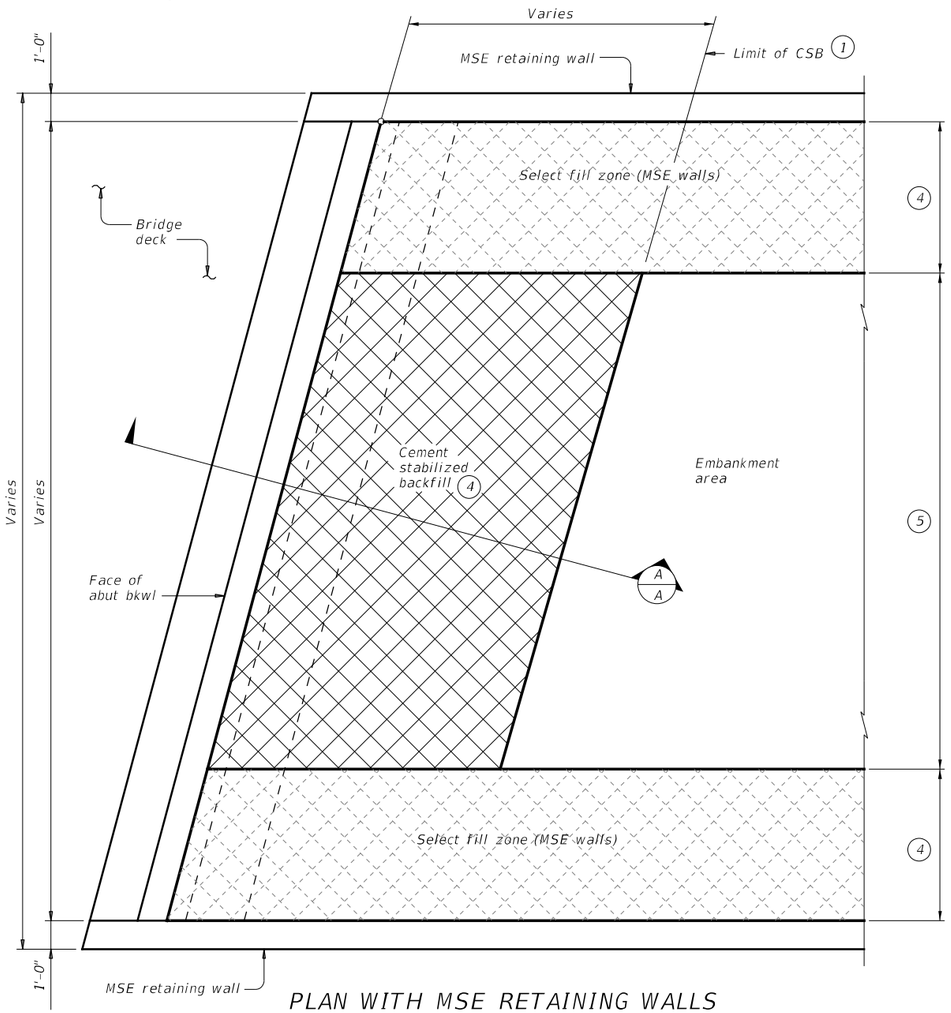
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©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
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	AUS	WILLIAMSON		140

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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.

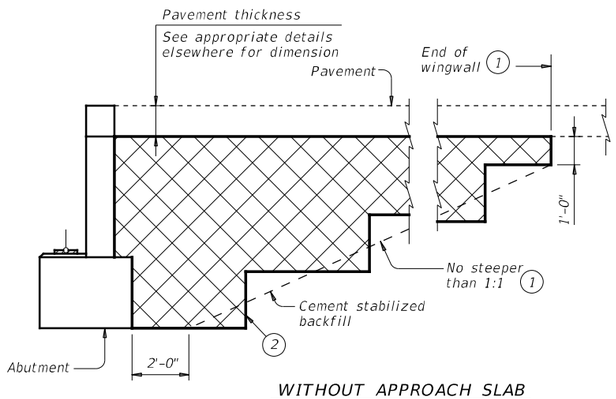
(5) When distance between select fill zones is less than 5'-0", MSE select fill may be substituted for cement stabilized backfill with approval from the Engineer.

GENERAL NOTES:

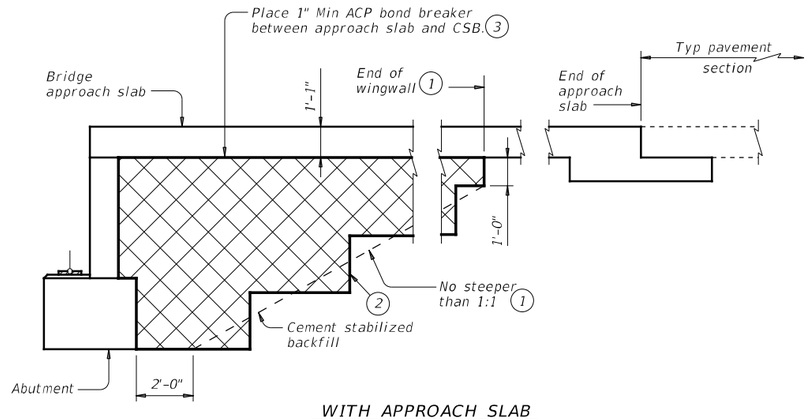
Provide Cement Stabilized Backfill (CSB) meeting the requirements of Item 400, "Excavation and Backfill for Structures", to the limits shown at bridge abutments.

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

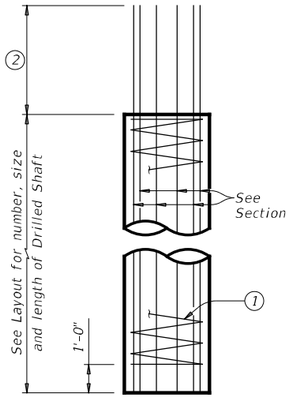
CSAB

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©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 01-16: Add MSE wall details.	2103	01	034	
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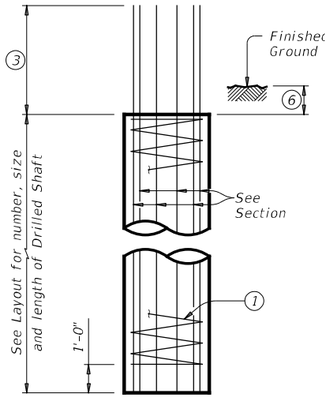
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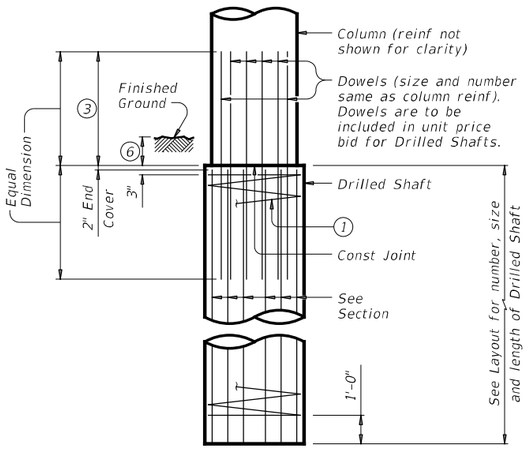
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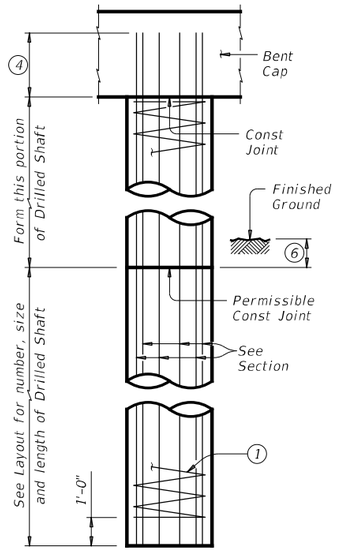
ABUTMENTS, WINGWALLS AND MULTI-DRILLED SHAFT FOOTINGS



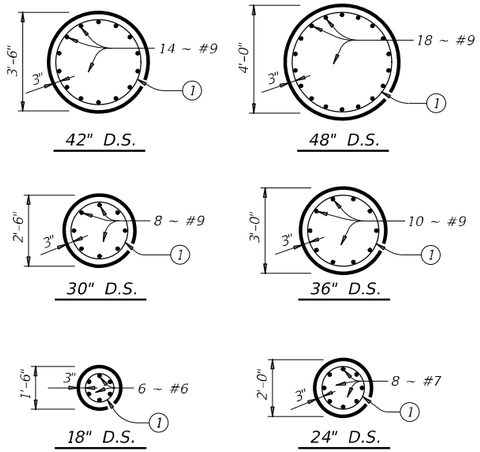
INTERIOR BENTS DRILLED SHAFT DIA EQUAL TO COLUMN DIA



INTERIOR BENTS DRILLED SHAFT DIA GREATER THAN COLUMN DIA



OPTIONAL INTERIOR BENT DRILLED SHAFT DETAIL (5)

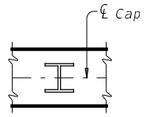


DRILLED SHAFT SECTIONS

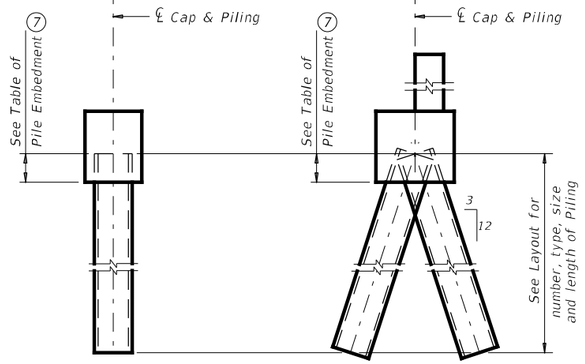
DRILLED SHAFT DETAILS

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

See standard CP for additional details on concrete pile embedment.

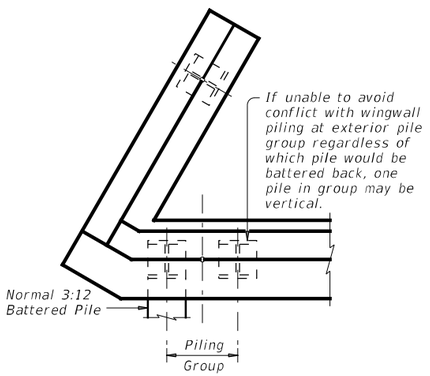


ORIENTATION OF STEEL H-PILING

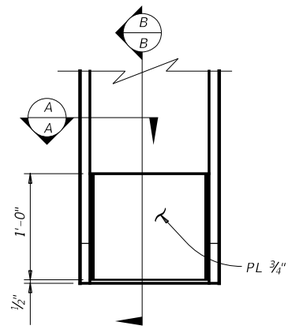


VERTICAL PILE BATTERED PILE

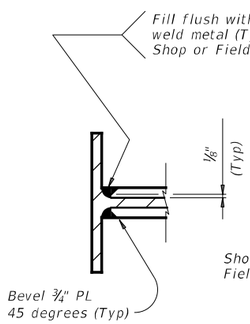
PILING DETAILS
(Concrete or Steel H)



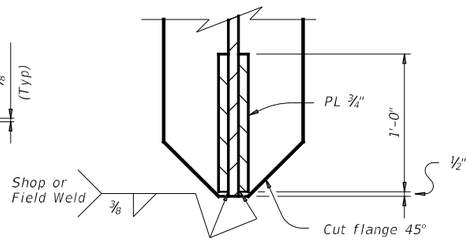
DETAIL "A"
(Showing Plan View of a 30° Skewed Abutment)



ELEVATION



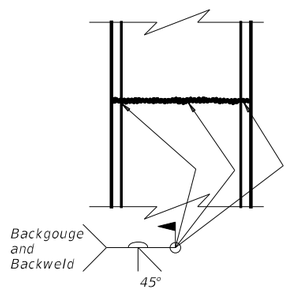
SECTION A-A

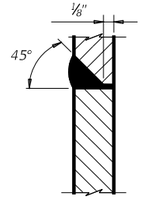


SECTION B-B

STEEL H-PILE TIP REINFORCEMENT

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





SECTION THRU FLANGE OR WEB

STEEL H-PILE SPLICE DETAIL

Use when required.

(1) #3 Spiral at 6" pitch (One and a half flat turns top & 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.

SHEET 1 OF 2

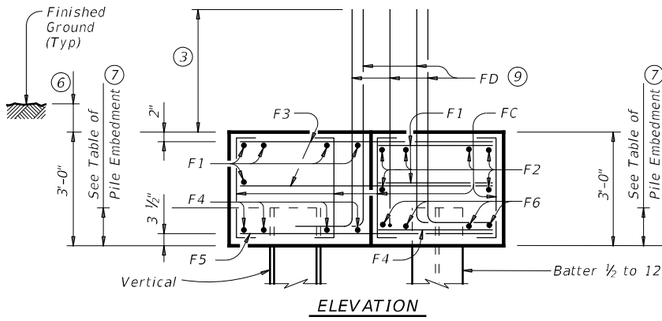
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COMMON FOUNDATION DETAILS

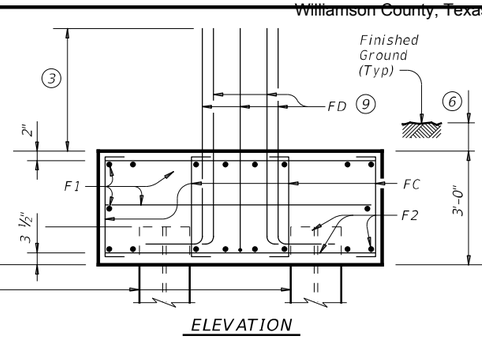
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	AUS	WILLIAMSON		142

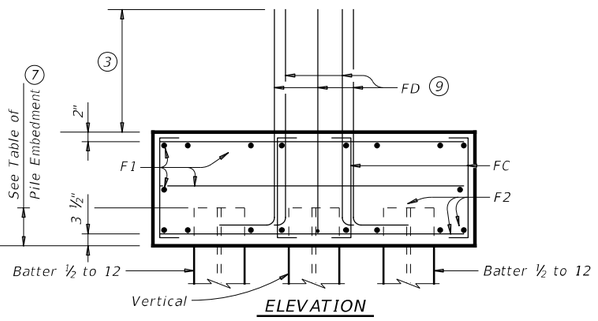
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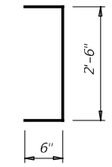
ELEVATION



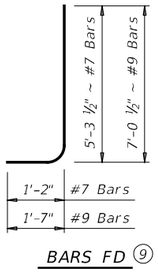
ELEVATION



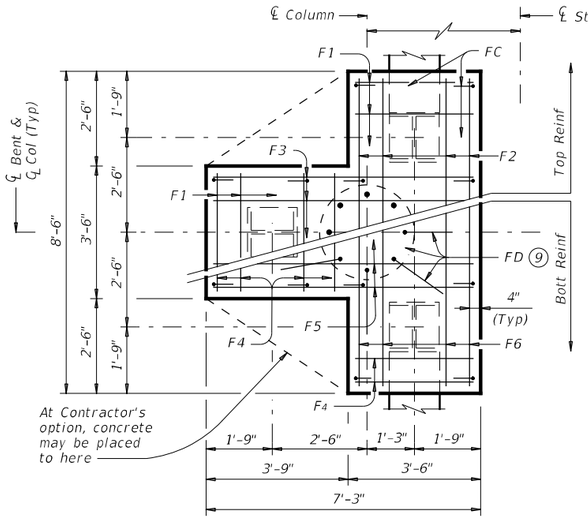
ELEVATION



BARS FC



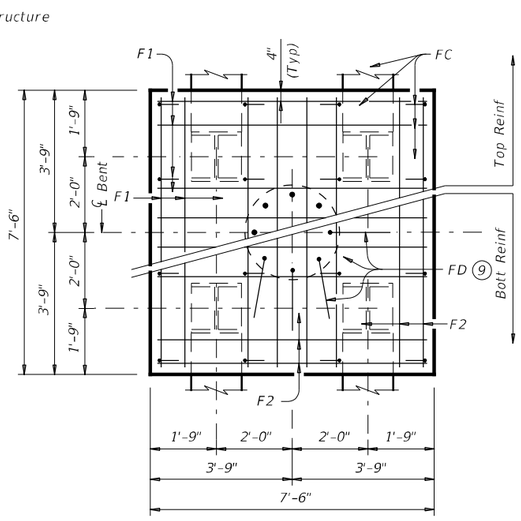
BARS FD (9)



PLAN

THREE PILE FOOTING (8)

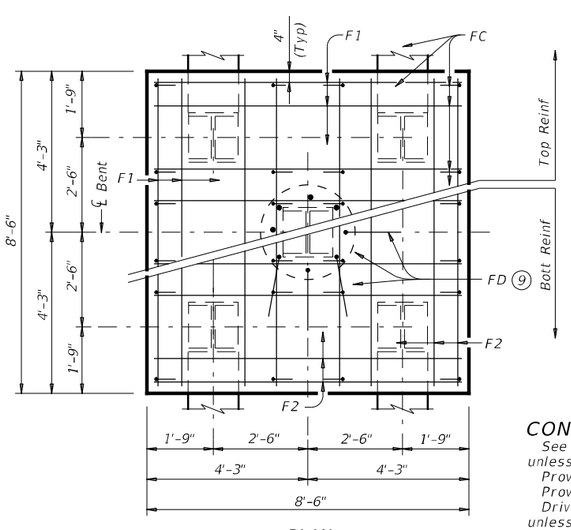
For 36" Dia and smaller columns.



PLAN

FOUR PILE FOOTING (8)

For 42" Dia and smaller columns.



PLAN

FIVE PILE FOOTING (8)

For 42" Dia and smaller columns.

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

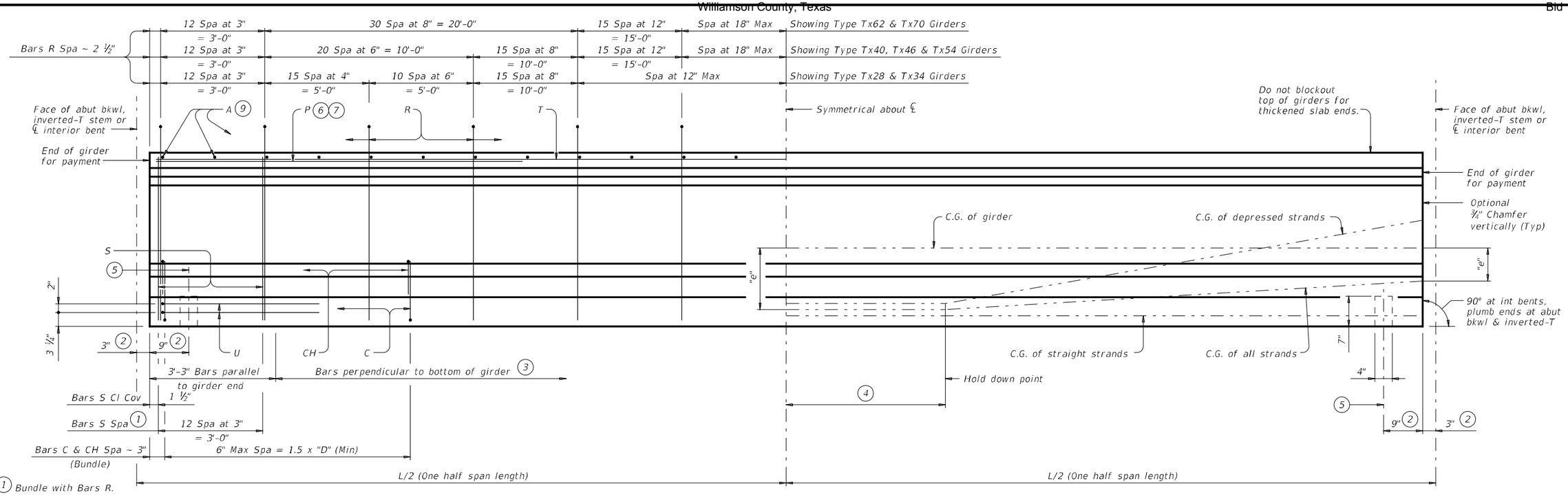
FD

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(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.

GIRDER ELEVATION

(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.

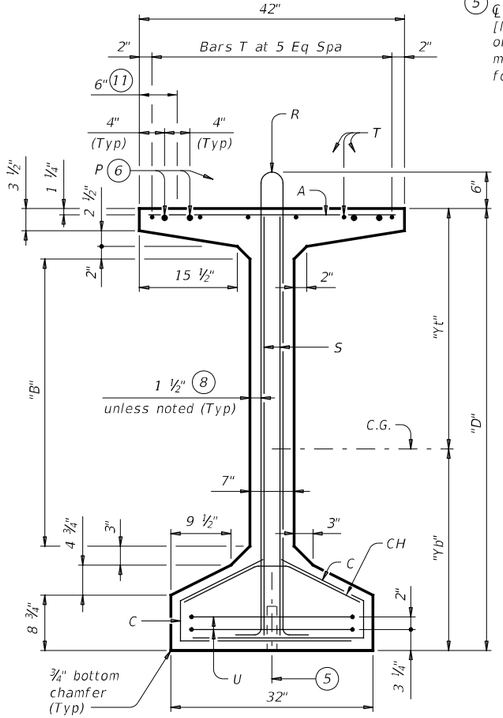
(7) Bars P (#6 x 15'-0") are only required in Tx28, Tx34, Tx40, Tx46, and Tx54 girders when "e" at girder ends exceeds 0.25 x "D". At the fabricator's option bars larger than #6 may be used. When L is less than 50 ft, Bars P are to be the same length as Bars T.

(8) 1 ⅜" Clear Cover to Bars S.

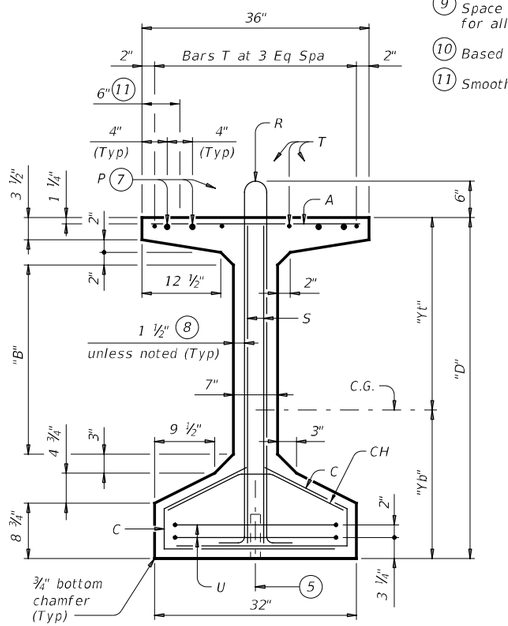
(9) Space Bars A at 6" Max for girders requiring overhang bracket hangers. Space at 12" Max for all other girders. Tie to Bars R as necessary. See standard IGMS for "Deck Forming Notes".

(10) Based on 155 pcf total weight of concrete and reinforcing steel.

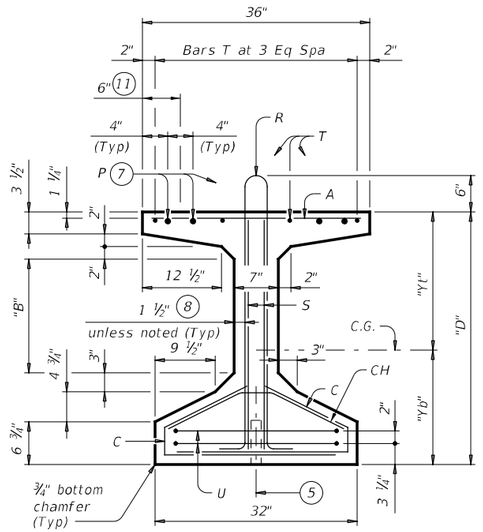
(11) Smooth trowel finish on the slab overhang side of exterior girder.



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

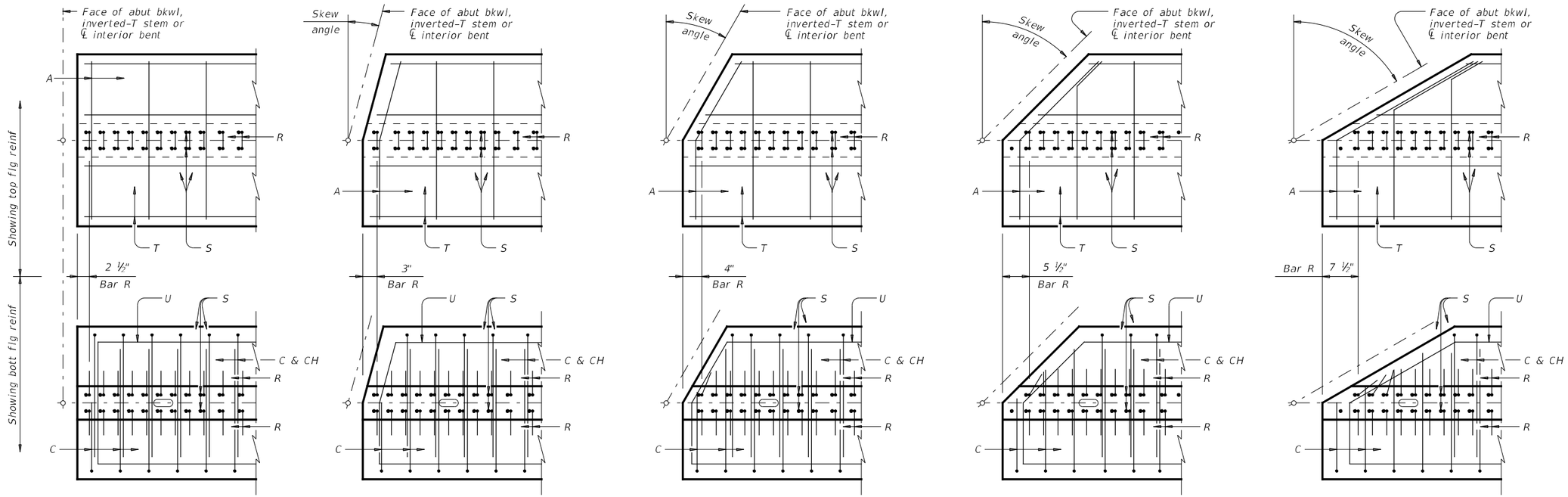
Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

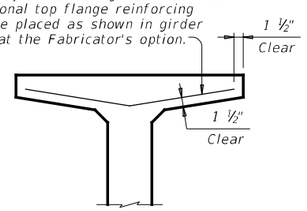
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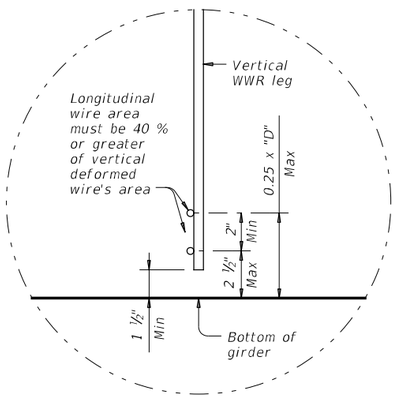


PLAN OF GIRDER ENDS (12)

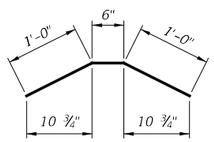
To control top flange cracking that may occur during form removal, additional top flange reinforcing may be placed as shown in girder ends at the Fabricator's option.



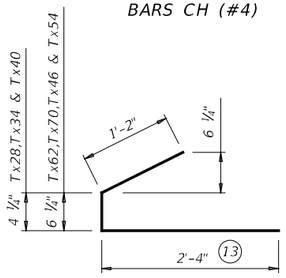
OPTIONAL TOP FLANGE REINFORCING DETAIL



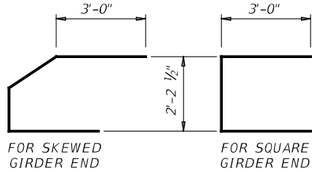
OPTIONAL WELDED WIRE REINFORCEMENT (WWR) DETAIL



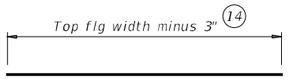
BARS CH (#4)



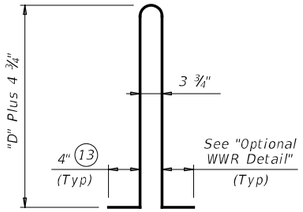
BARS C (#4)



BARS U (#5)



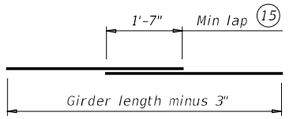
BARS A (#3)



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

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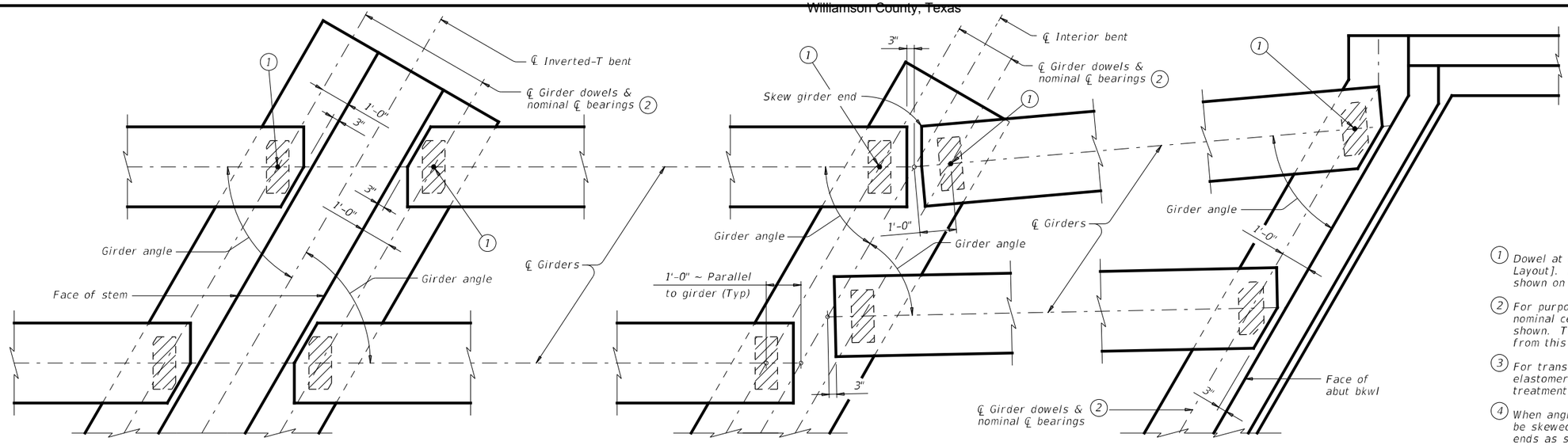
PRESTRESSED CONCRETE I-GIRDER DETAILS

IGD

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AT INVERTED-T BENT W/SKEW

AT CONVENTIONAL INTERIOR BENT W/SKEW

AT ABUTMENT W/SKEW (3)

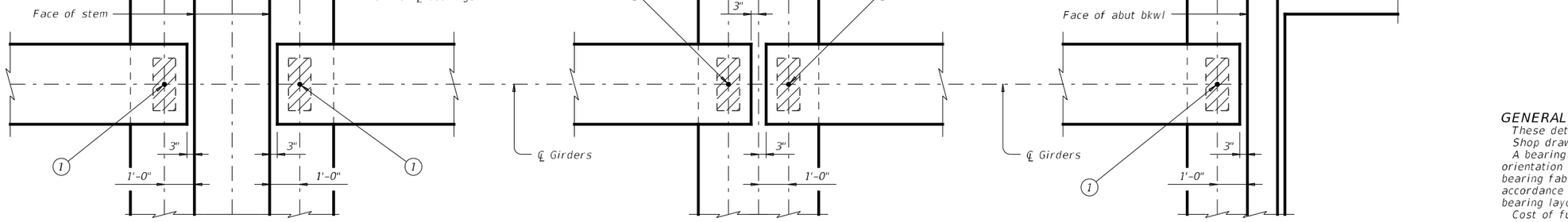
(1) Dowel at doweled girder end [labeled (D) on Bridge Layout]. Required for outside girder only or as shown on substructure details.

(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.



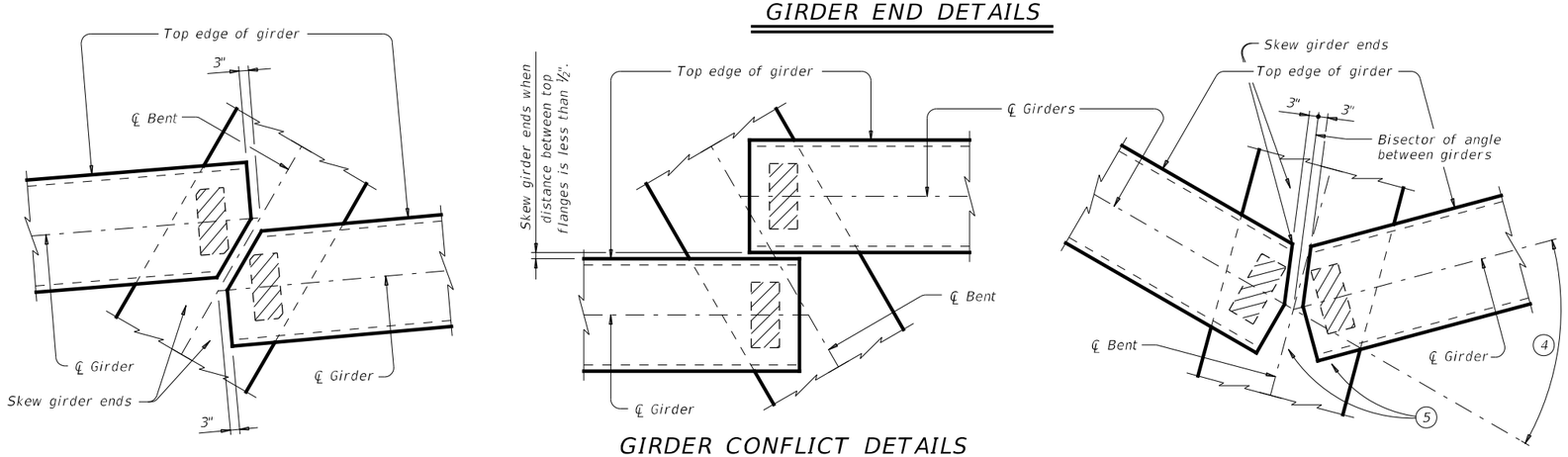
AT INVERTED-T BENT

AT CONVENTIONAL INTERIOR BENT

AT ABUTMENT (3)

GIRDER END DETAILS

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".



GIRDER CONFLICT DETAILS

HL93 LOADING SHEET 1 OF 3

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ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

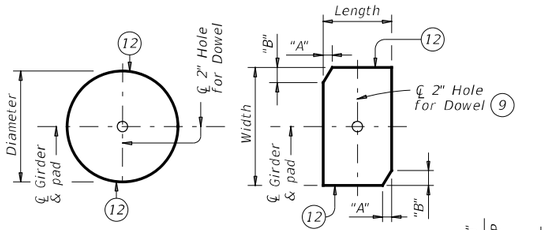
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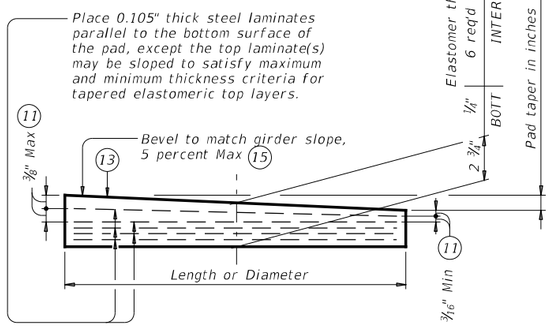
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PLANS (10)



ELEVATION

LAMINATED ELASTOMERIC BEARING PAD

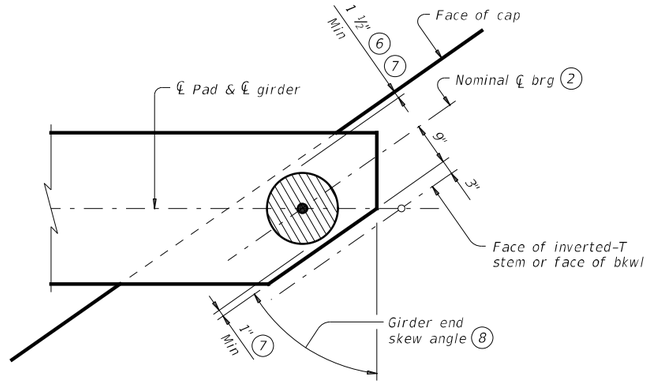
(50 DUROMETER)

TABLE OF MINIMUM SUBSTRUCTURE DIMENSIONS (14)

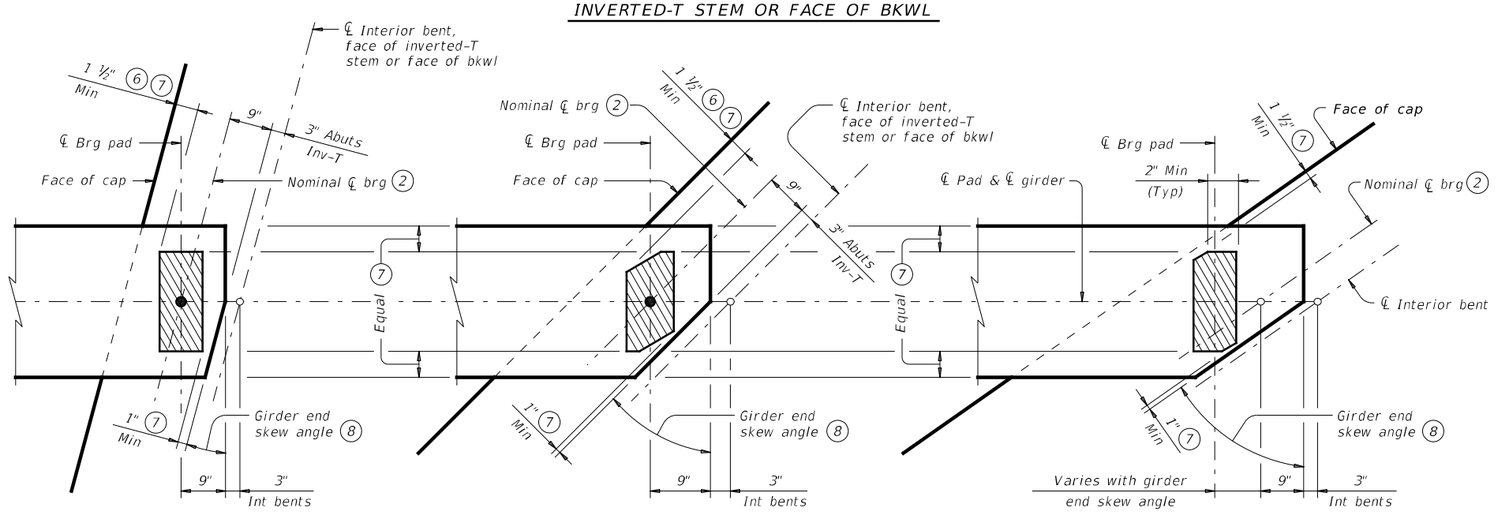
Girder Type	Abutments	Int Bents	Inv-T Bents
	Face of Bkwl to Face of Cap	Overall Cap Width	Corbel Width
Tx28 thru Tx54	1'-9"	3'-6"	1'-10 ½"
Tx62 & Tx70	2'-0"	4'-0"	2'-1 ½"

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"



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

(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 $\left(\frac{0.0625"}{\text{Length or Dia}}\right)$ IN/IN.

(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

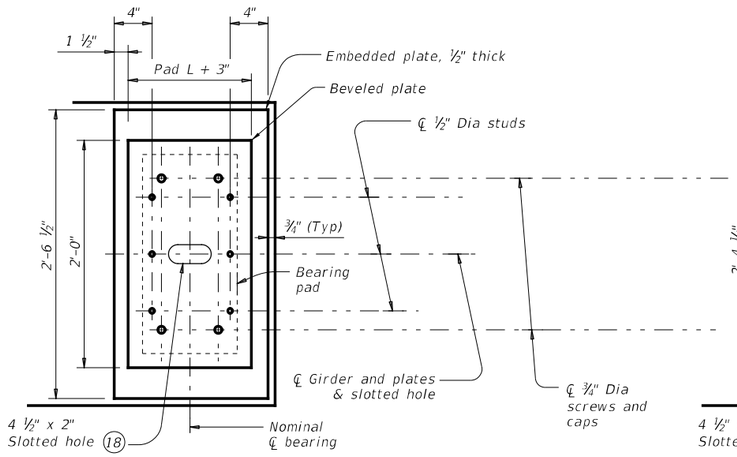
PRESTR CONCRETE I-GIRDERS

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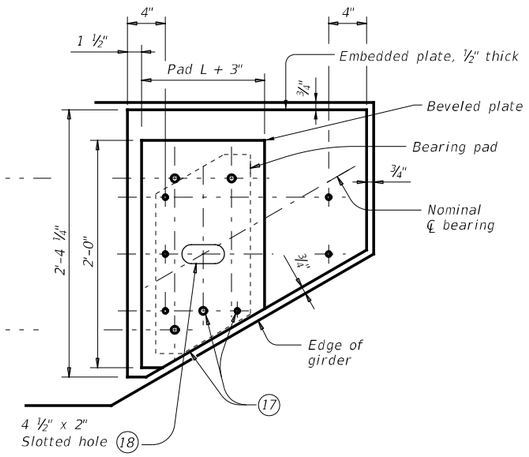
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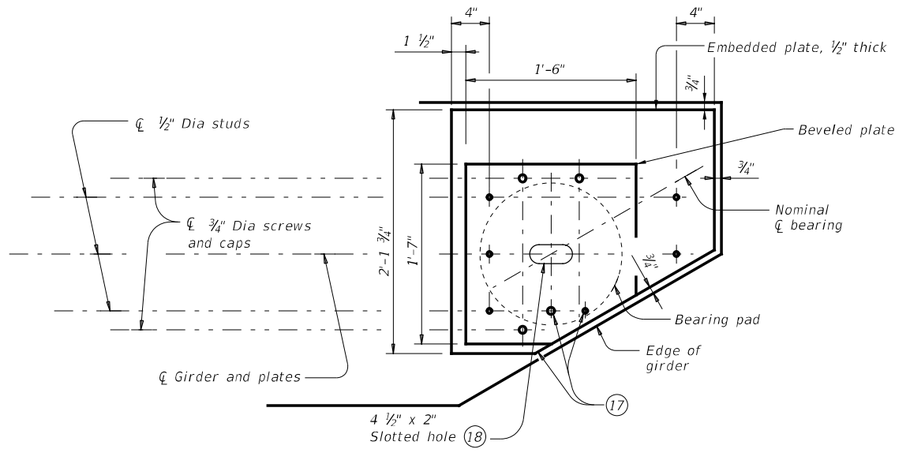
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NORMAL GIRDER END
RECTANGULAR BEARING PAD

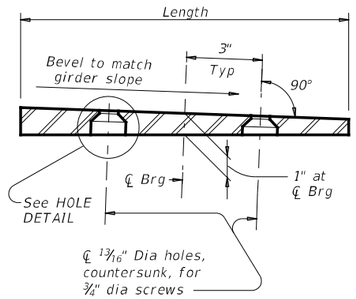


SKEWED GIRDER END
CLIPPED RECTANGULAR BEARING PAD

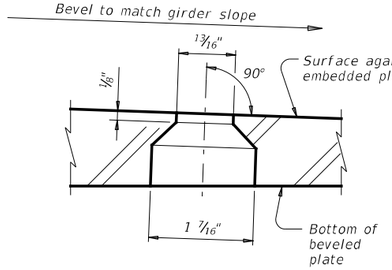


SKEWED GIRDER END
15" DIA BEARING PAD

PLAN VIEW OF SOLE PLATE DETAILS

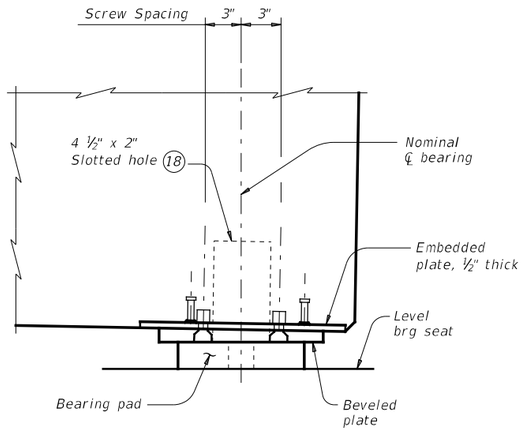


SECTION

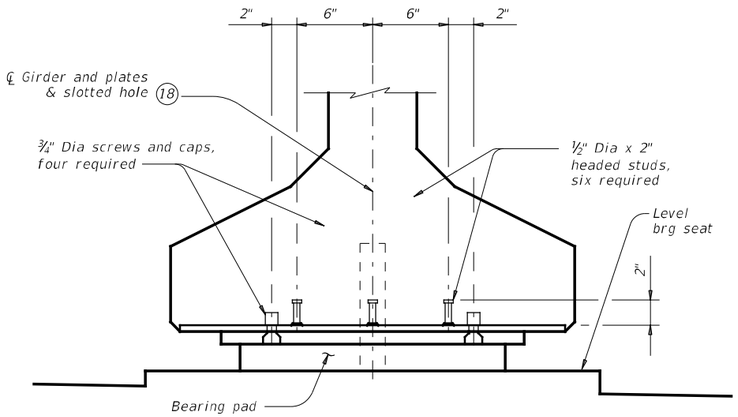


HOLE DETAIL

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 ¾" 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

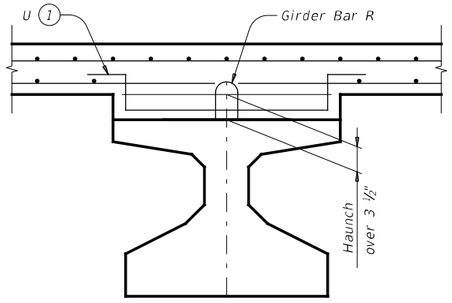
Texas Department of Transportation | Bridge Division Standard

ELASTOMERIC BEARING AND GIRDER END DETAILS
PRESTR CONCRETE I-GIRDERS

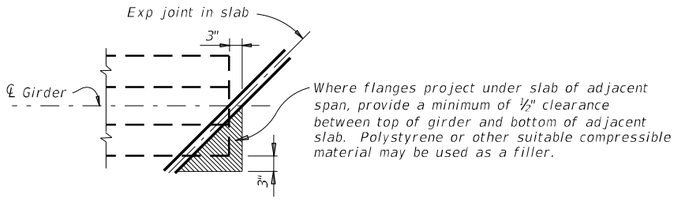
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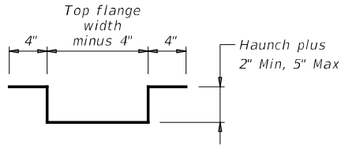
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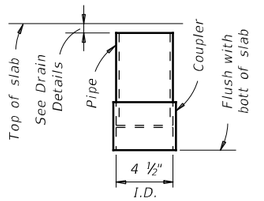
HAUNCH REINFORCING DETAIL



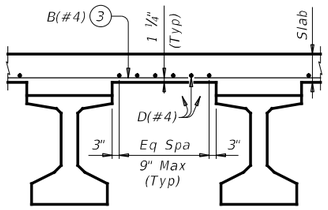
TREATMENT AT GIRDER END FOR SKEWED SPANS



BARS U (#4)

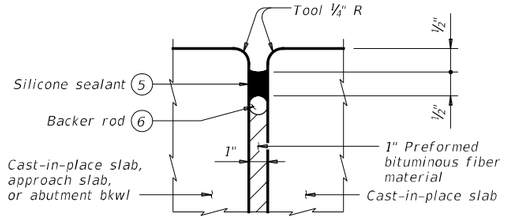


C-I-P DRAIN DETAIL (2)

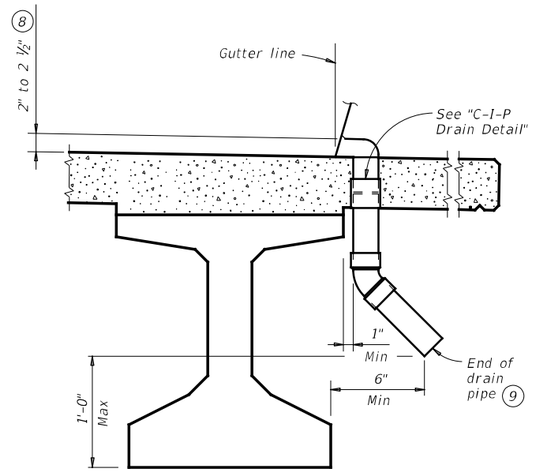


TYPICAL PART TRANSVERSE SLAB SECTION WITHOUT PCP (4)

Top reinforcing steel not shown for clarity.



TYPE A JOINT DETAIL (7)



DRAIN DETAIL (10)

(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.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

MISCELLANEOUS SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

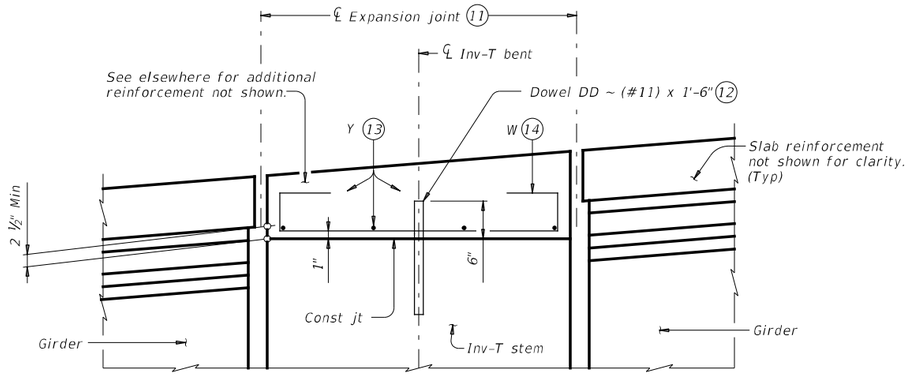
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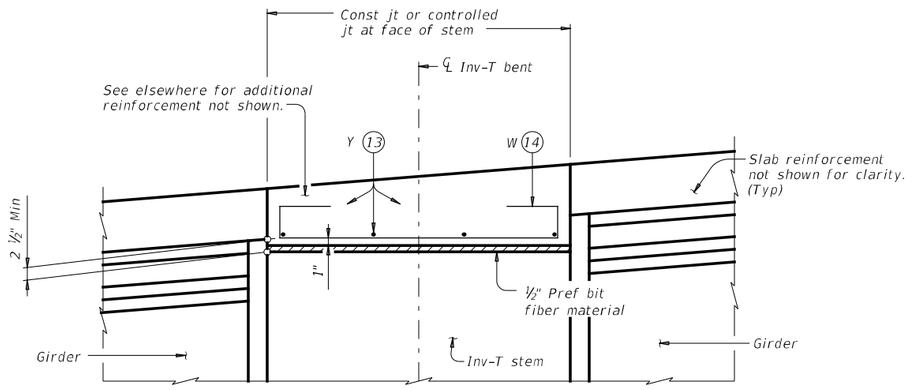
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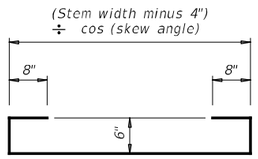


SHOWING EXPANSION JOINTS

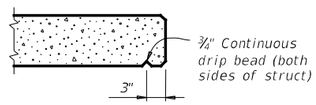


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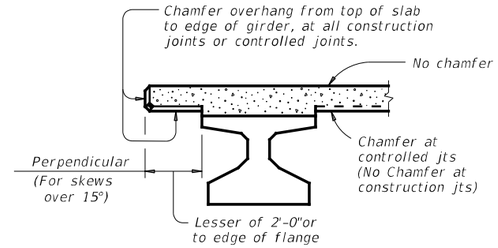
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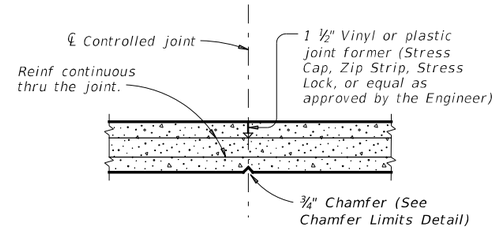
BARS W (#4)



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.

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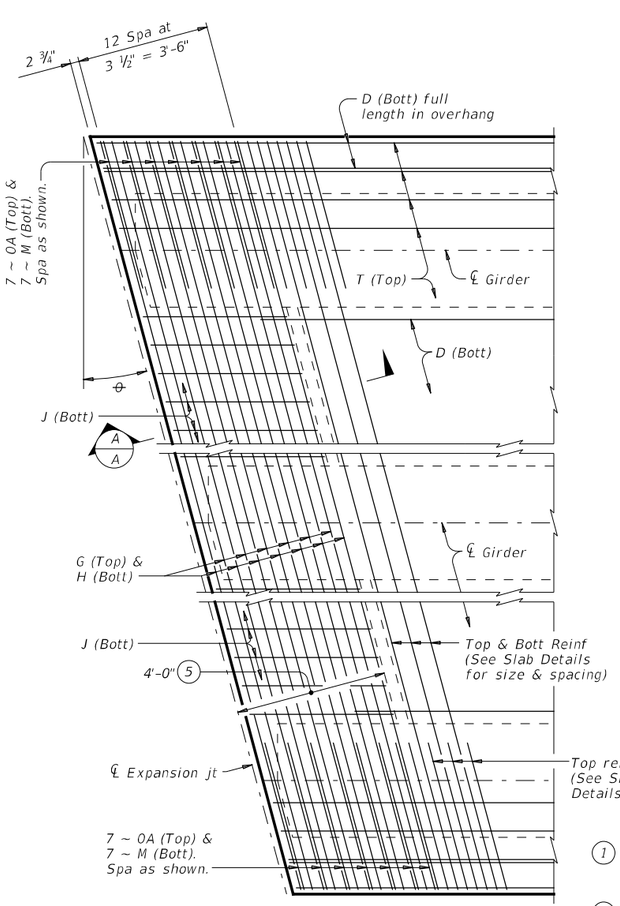
MISCELLANEOUS SLAB DETAILS
PRESTR CONCRETE I-GIRDERS

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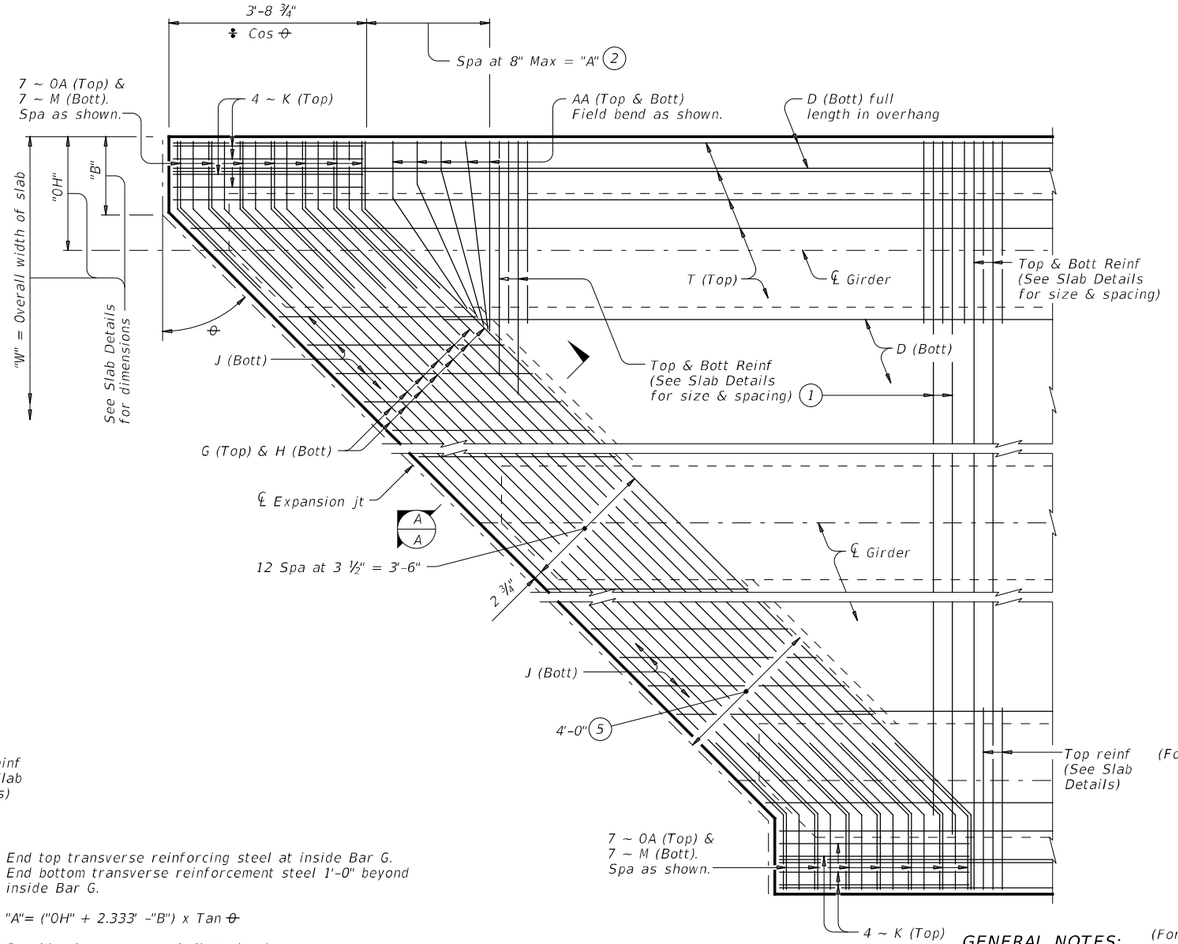
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PARTIAL PLAN FOR SLABS WITHOUT BREAKBACK



PARTIAL PLAN FOR SLABS WITH BREAKBACK

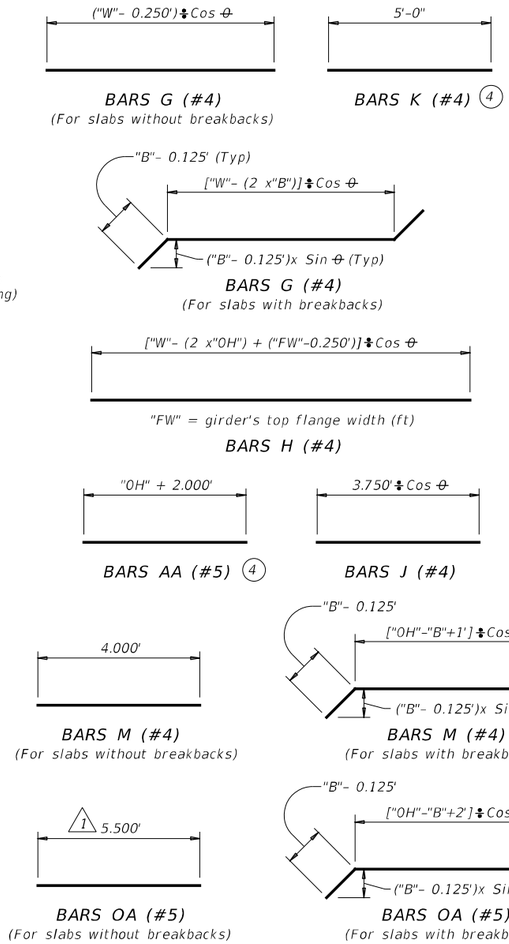
(1) End top transverse reinforcing steel at inside Bar G. End bottom transverse reinforcement steel 1'-0" beyond inside Bar G.

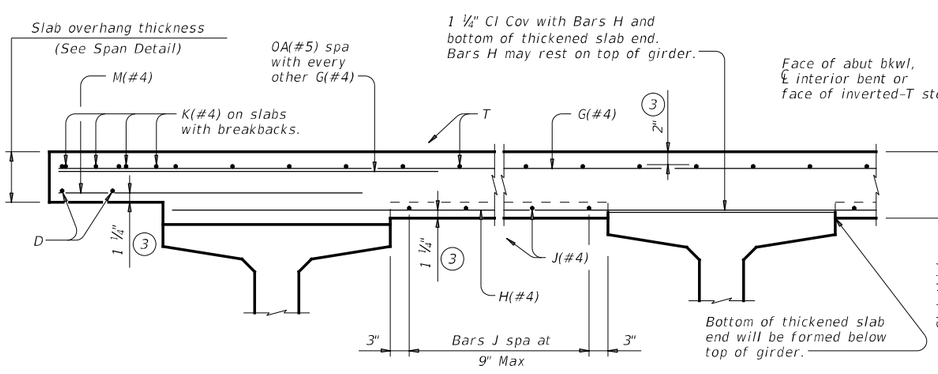
(2) "A"= ("0H" + 2.333" -"B") x Tan θ

(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(4) Only required on slabs with breakbacks.

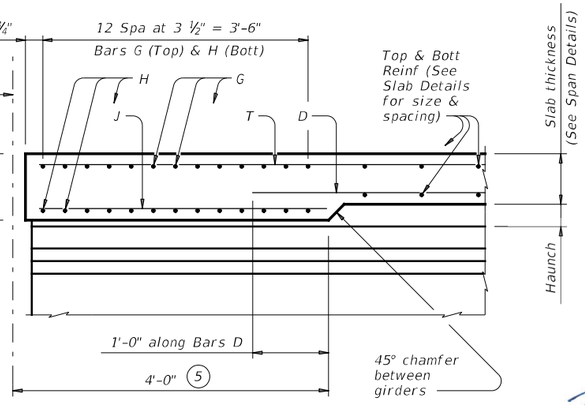
(5) Thickened slab end dimensioned perpendicular to face of bkwl, centerline interior bent or face of inverted-T stem.





TYPICAL TRANSVERSE SECTION

(Showing Prestressed Conc I-Girders at ℄ Brg)



SECTION A-A

(Showing with 2" and more of haunch)

GENERAL NOTES:

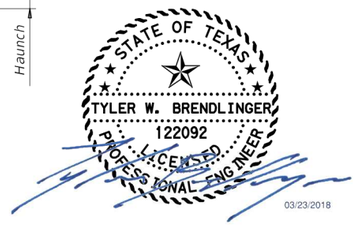
Designed according to AASHTO LRFD Bridge Design Specifications.
These details are restricted to Prestressed Concrete I-Girder Spans.
These details are to be used in conjunction with the Span Details and PCP standard (if prestressed concrete panels are used).
When Option 2 from PCP standard is used, provide Bars AA, G, K and 0A 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 0A 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.

HL93 LOADING



Texas Department of Transportation

Bridge Division Standard

THICKENED SLAB END DETAILS

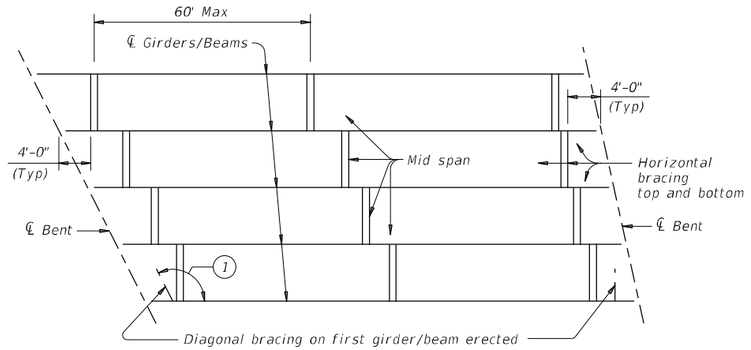
PRESTRESSED CONCRETE I-GIRDER SPANS

IGTS(MOD)

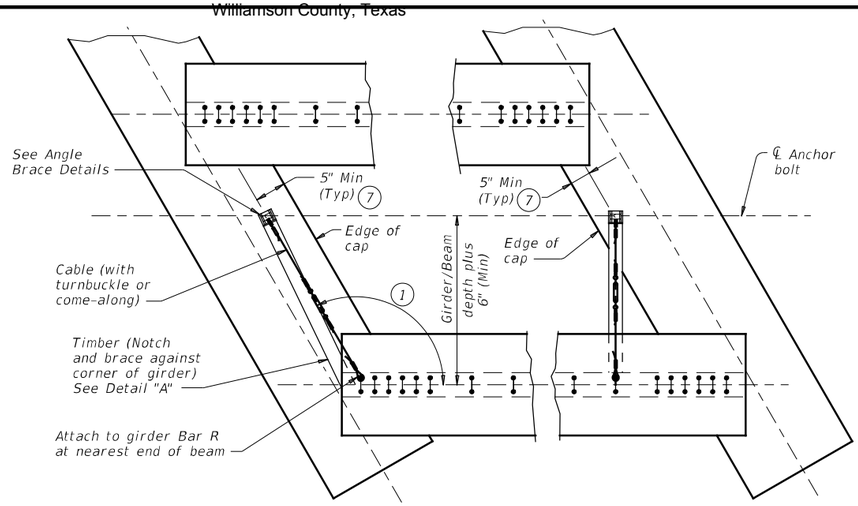
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REVISIONS	2103	01	034	
1 MOD: Bar 0A	DIST	COUNTY		SHEET NO.
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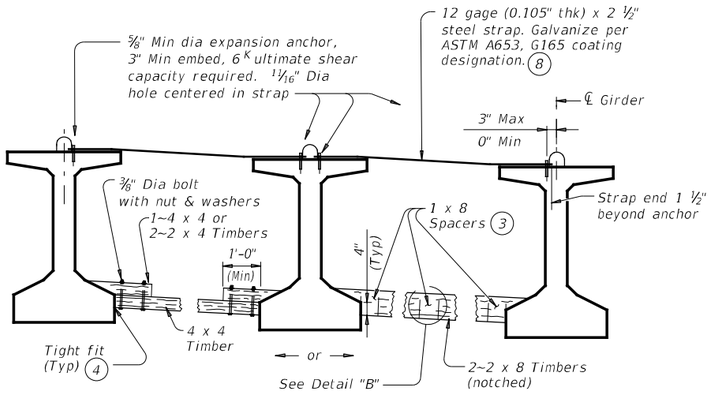
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ERECTION BRACING

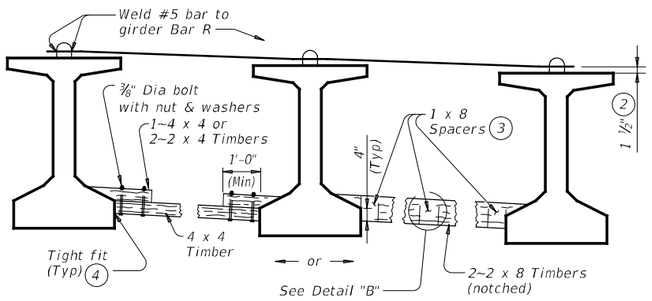


PLAN



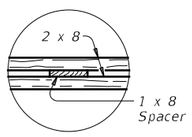
FOR ERECTION BRACING, OPTION 1

(This option is not allowed when slab is formed with PMDF or plywood.)



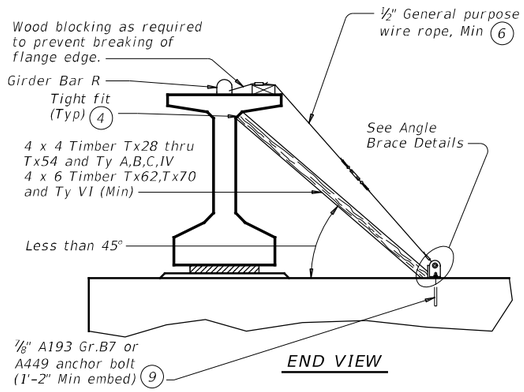
FOR ERECTION BRACING, OPTION 2

HORIZONTAL BRACING DETAILS 5



PLAN

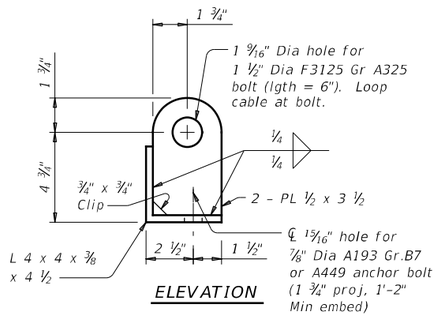
DETAIL "B"



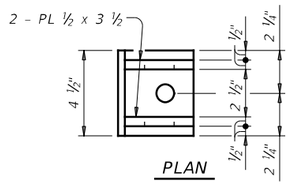
END VIEW

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.

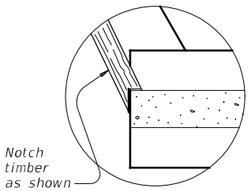
ERECTION BRACING:

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.

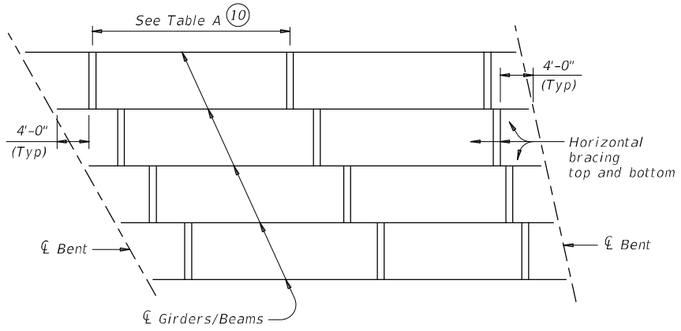
Texas Department of Transportation

Bridge Division Standard

MINIMUM ERECTION AND BRACING REQUIREMENTS
PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

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SLAB PLACEMENT BRACING

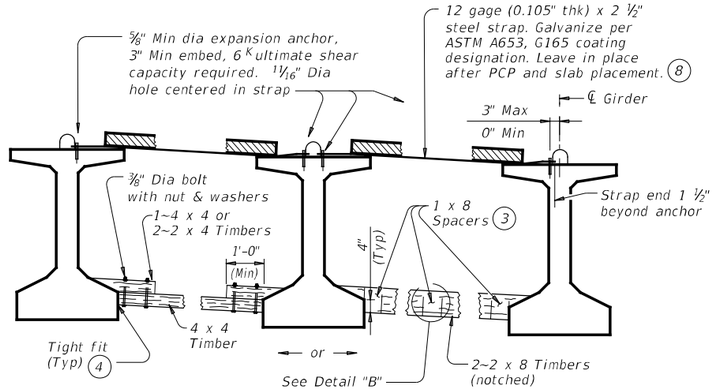
TABLE A

OPTION 1-RIGID BRACING (STEEL STRAP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	¼ points
Tx34	¼ points	¼ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	⅛ points	⅛ points
B	⅛ points	⅛ points
C	⅛ points	⅛ points
IV	¼ points	⅛ points
VI	¼ points	⅛ points

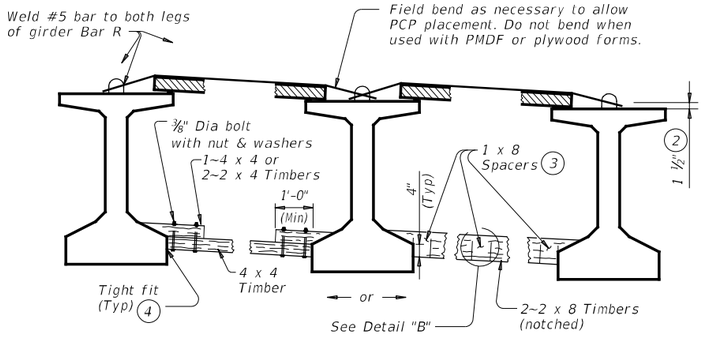
OPTION 2-FLEXIBLE BRACING (NO. 5 OVER PCP)

Girder or Beam Type	Maximum Bracing Spacing	
	Slab Overhang less than 4'-0" (11)	Slab Overhang 4'-0" and greater (11)
Tx28	¼ points	⅛ points
Tx34	¼ points	⅛ points
Tx40	¼ points	⅛ points
Tx46	¼ points	⅛ points
Tx54	¼ points	⅛ points
Tx62	¼ points	⅛ points
Tx70	¼ points	⅛ points
A	2.0 ft	1.5 ft
B	3.0 ft	2.0 ft
C	4.5 ft	2.0 ft
IV	¼ points	4.0 ft
VI	¼ points	4.0 ft



FOR SLAB PLACEMENT BRACING, OPTION 1 - RIGID

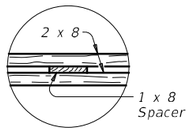
(Showing slab formed with PCP. This option is not allowed when slab is formed with PMDF or plywood.)



FOR SLAB PLACEMENT BRACING, OPTION 2 - FLEXIBLE

(Showing slab formed with PCP.)

HORIZONTAL BRACING DETAILS (5)



PLAN

DETAIL "B"

(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".

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SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

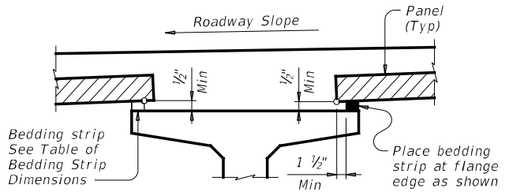
MINIMUM ERECTION AND BRACING REQUIREMENTS

PRESTRESSED CONCRETE I-GIRDERS AND I-BEAMS

MEBR(C)

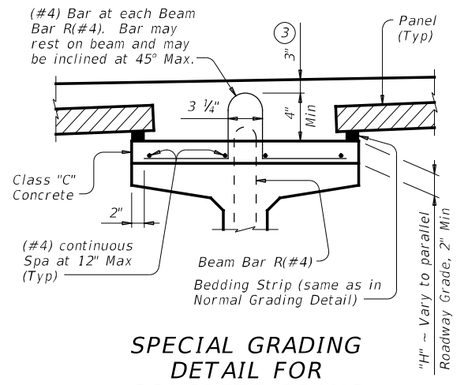
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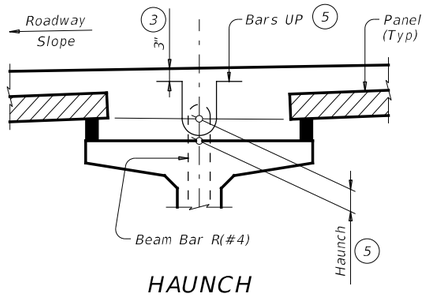
NORMAL GRADING DETAIL (1)

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)



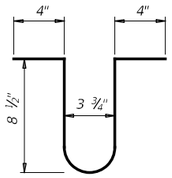
SPECIAL GRADING DETAIL FOR CONCRETE BEAMS

Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)

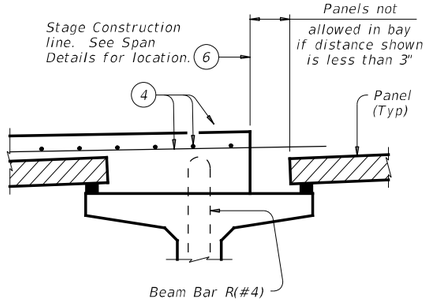


HAUNCH REINFORCING DETAIL

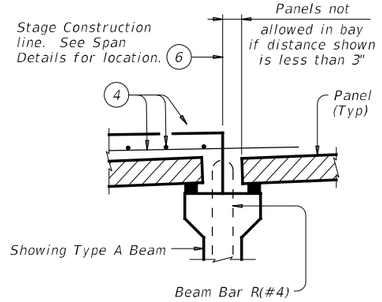
Showing Prestressed Concrete I-Girders.
(Other Beam Types Similar)



BARS UP (#4) (5)



PRESTR CONC I-GIRDERS



PRESTR CONC I-BEAMS

STAGE CONSTRUCTION LIMITATIONS

(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.

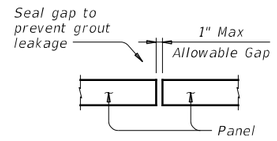
(3) Provide clear cover as indicated unless otherwise shown on Span Details.

(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.

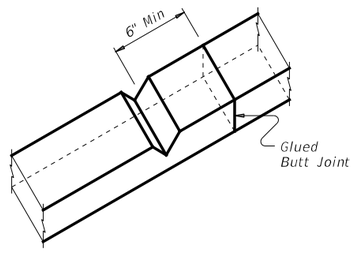
(6) Do not locate construction Joints on top of a panel.

(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..



TYPICAL SECTION AT PANEL JOINT

(Panel reinforcing not shown for clarity.)
The gap cannot be considered as a panel fabrication tolerance.



BEDDING STRIP DETAIL (7)

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.

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

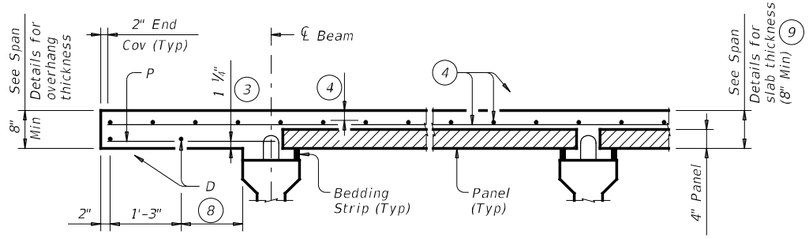
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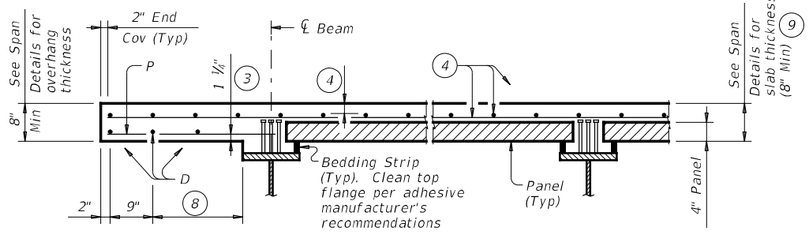
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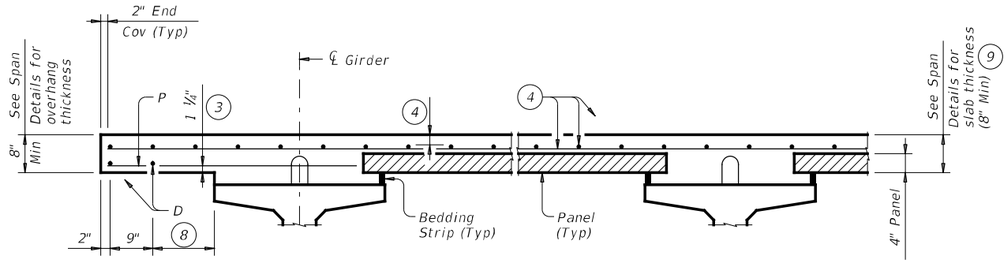
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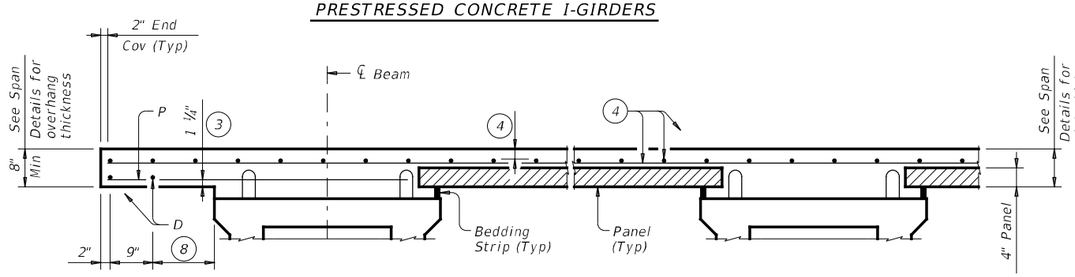
PRESTRESSED CONCRETE I-BEAMS



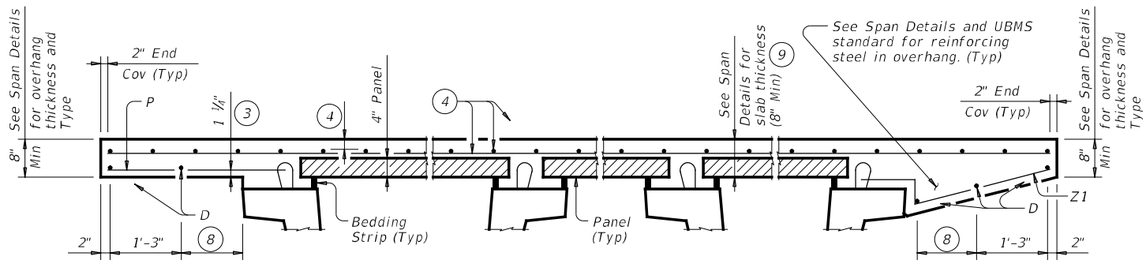
STEEL BEAMS



PRESTRESSED CONCRETE I-GIRDERS



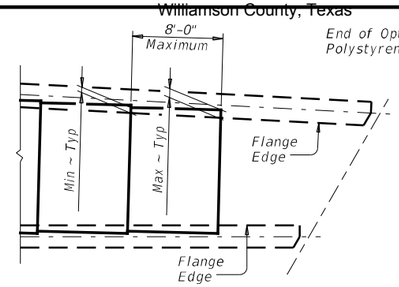
PRESTRESSED CONCRETE X-BEAMS



NORMAL OVERHANG WITH PRESTR CONC U-BEAMS

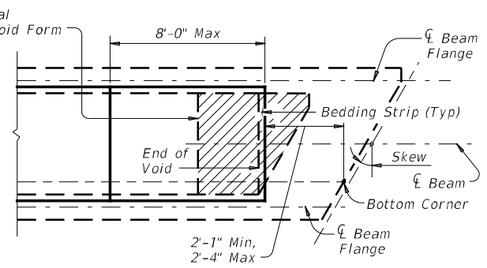
SLOPED OVERHANG WITH PRESTR CONC U-BEAMS

TYPICAL PART TRANSVERSE SECTIONS

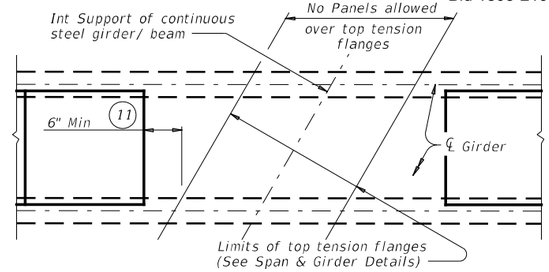


AT FLARED BEAMS OR GIRDERS

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.

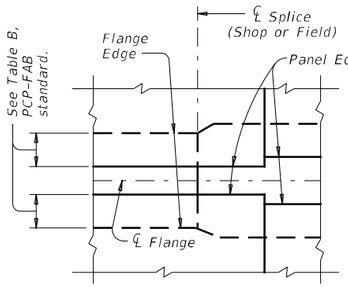
(7) Butt adjacent bedding strips together with adhesive. Cut v-notches, approx ¼" deep, in the top of the bedding strips at 8' o.c..

(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.

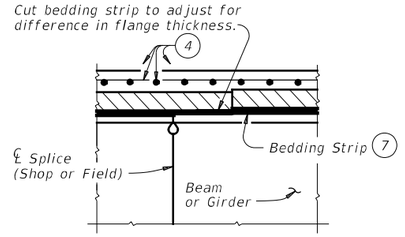
(10) Field adjust Bars Z1(#4) to match actual slope of slab overhangs. Width of slab overhang will vary along span with curved slab edges. Adjust Bar Z1(#4) dimensions to maintain proper cover. Bars Z2(#4) are located at Inv-T stems only.

(11) Location of concrete placement sequence boundaries and bolted field splices should be considered by the contractor in determining panel limits.



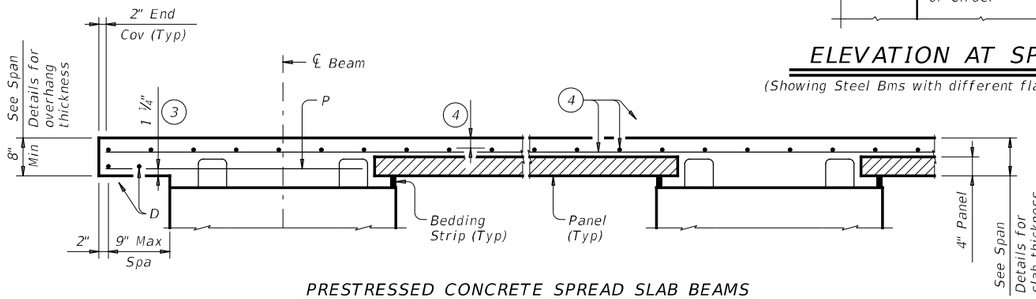
PLAN AT SPLICE

(Showing Steel Bms with flange width transition)



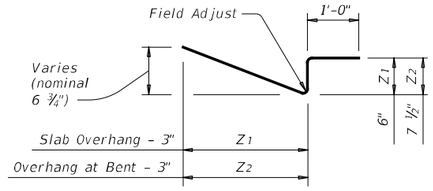
ELEVATION AT SPLICE

(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.



BARS Z (#4) (10)

HL93 LOADING SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

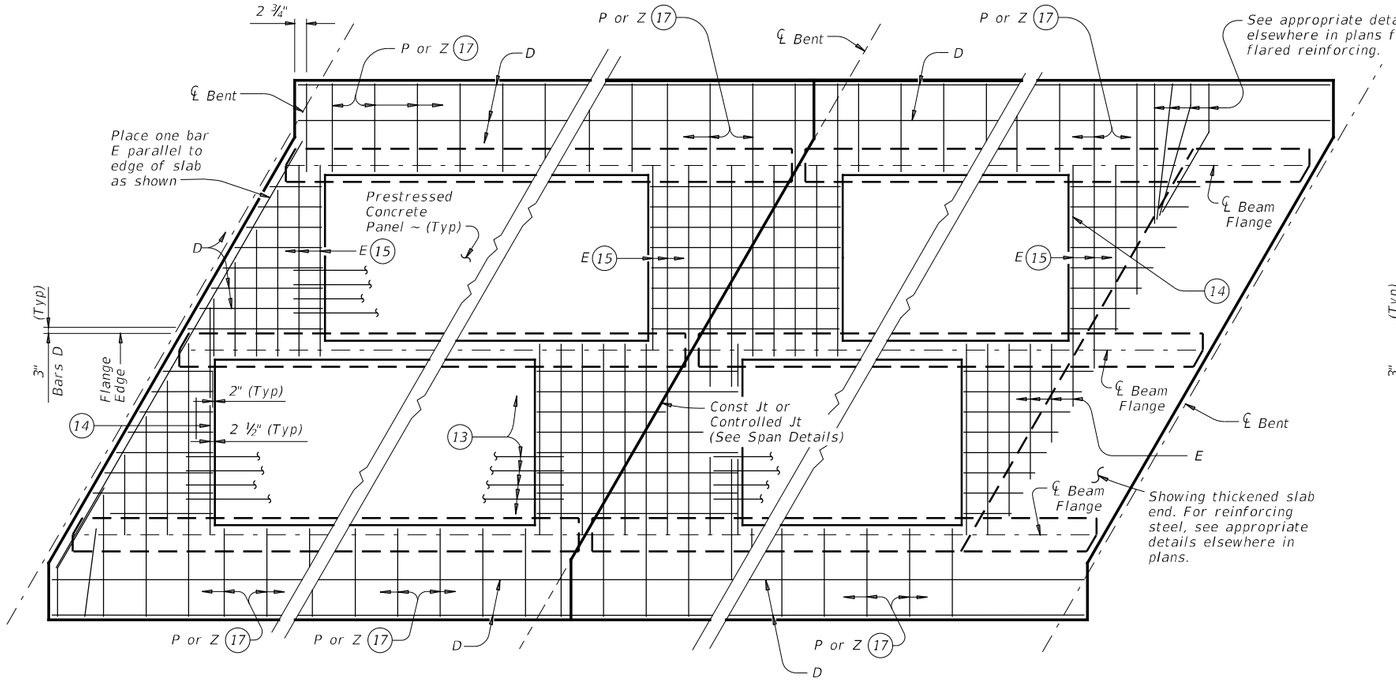
PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

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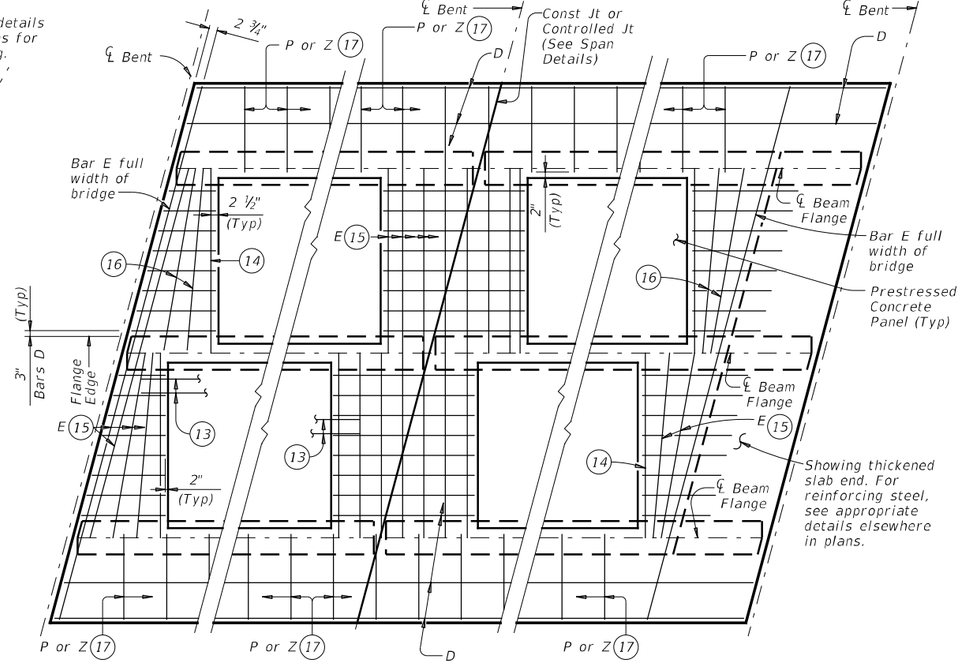
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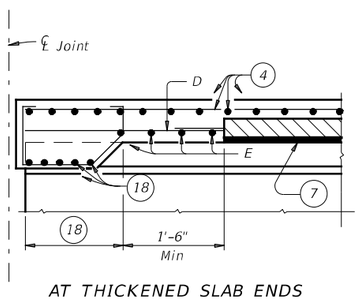
AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

OPTION 1 ~ PLAN OF SLABS WITH NORMAL REINFORCEMENT

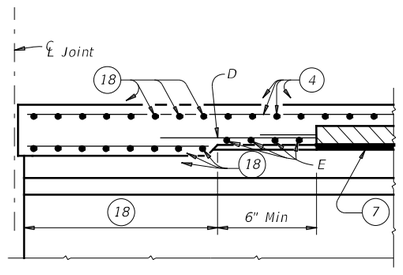


AT ALL SPAN ENDS UNLESS NOTED OTHERWISE | AT INTERIOR BENTS | AT THICKENED END SLABS

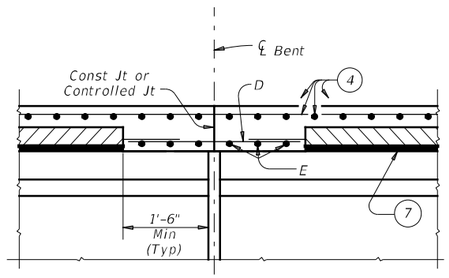
OPTION 1 ~ PLAN OF SLABS WITH SKEWED REINFORCEMENT



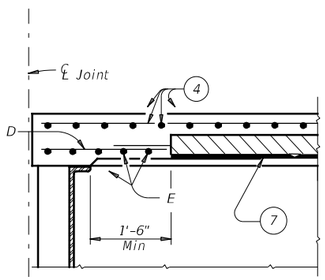
AT THICKENED SLAB ENDS FOR PRESTR CONC U-BMS



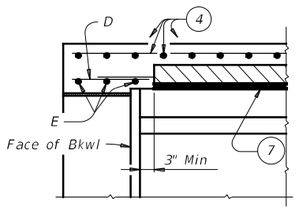
AT THICKENED SLAB ENDS FOR PRESTR CONC I-BMS AND STEEL BMS



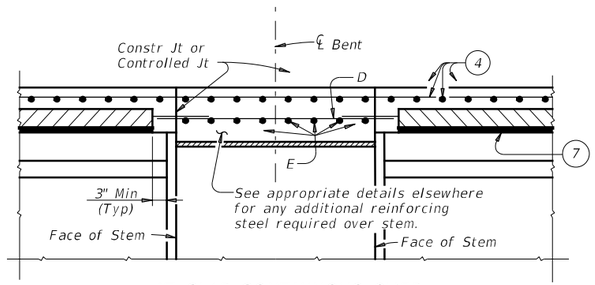
AT SLAB CONTINUOUS OVER CONVENTIONAL INTERIOR BENTS FOR ALL SIMPLE SPAN BMS



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

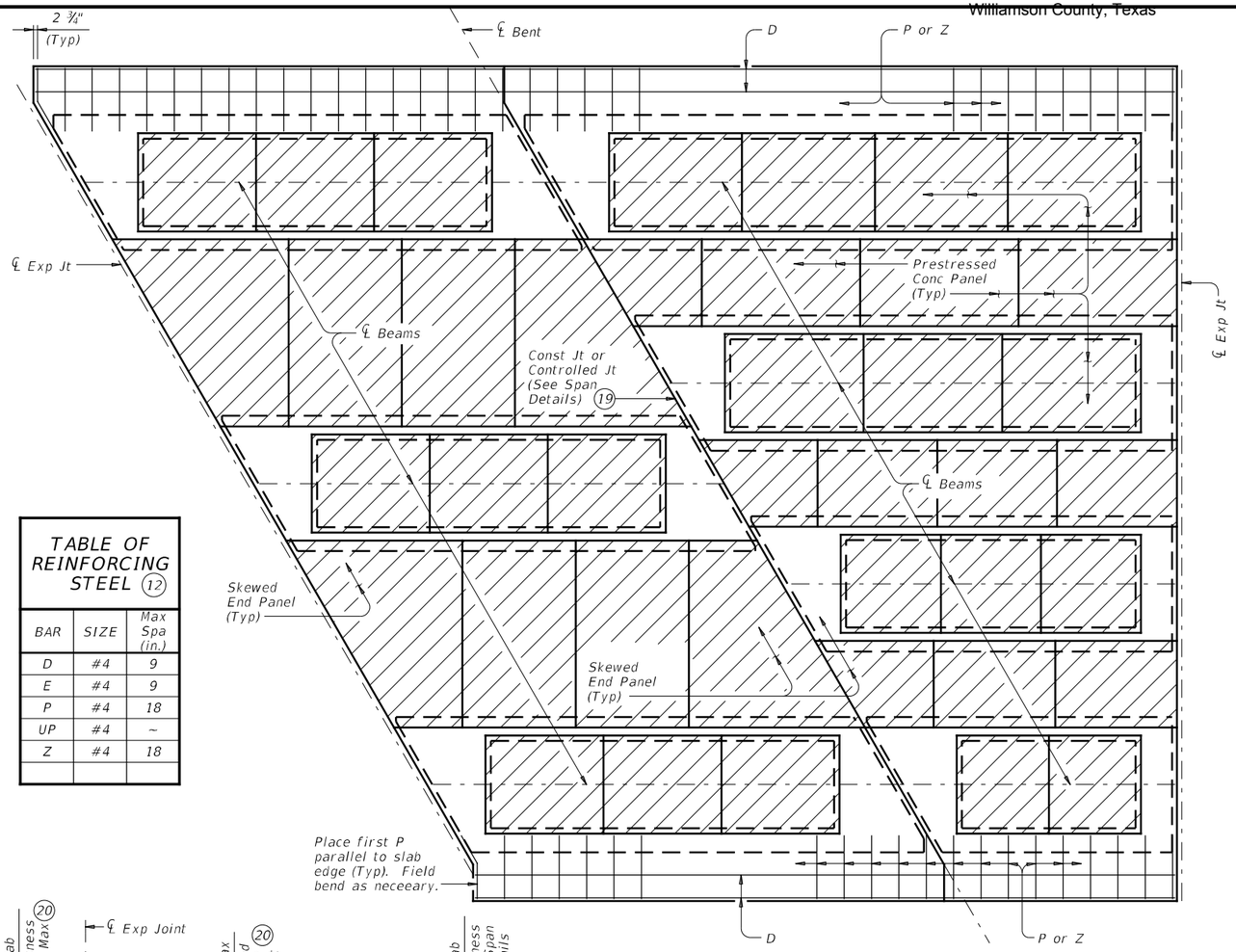
Texas Department of Transportation | Bridge Division Standard

PRESTRESSED CONCRETE PANELS
DECK DETAILS

PCP

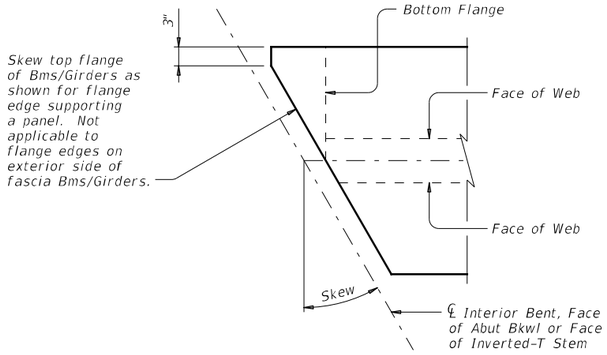
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OPTION 2 ~ PLAN OF SLAB

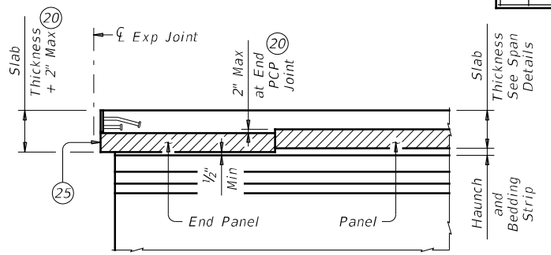
(Showing U-Beams; other beams similar)



OPTION 2 ~ SHOWING MODIFICATION TO BEAM/GIRDER TOP FLANGE FOR SKEWS OVER 5°

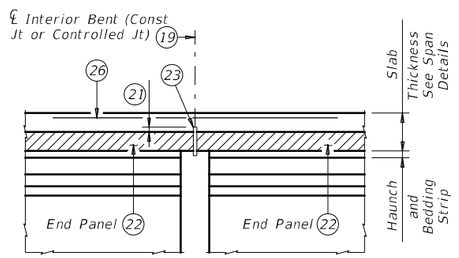
Showing I-Bm/I-Girder, U-Bms and Steel Bms similar.

TABLE OF REINFORCING STEEL (12)		
BAR	SIZE	Max Spa (in.)
D	#4	9
E	#4	9
P	#4	18
UP	#4	~
Z	#4	18



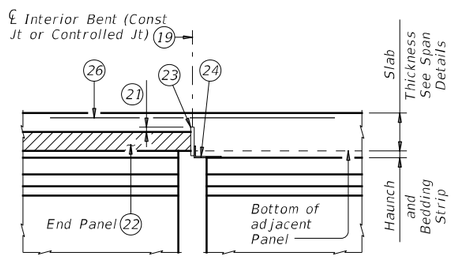
JOINTS (BETWEEN BEAMS/GIRDERS OR AT INV-T STEM)

For SEJ-A, SEJ-S(0), AJ and Type A Expansion Joints only.



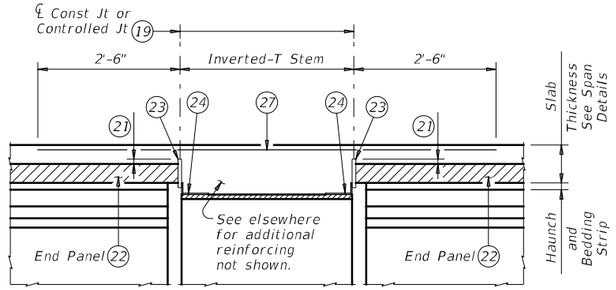
CONVENTIONAL INTERIOR BENT

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)

(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(0) 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

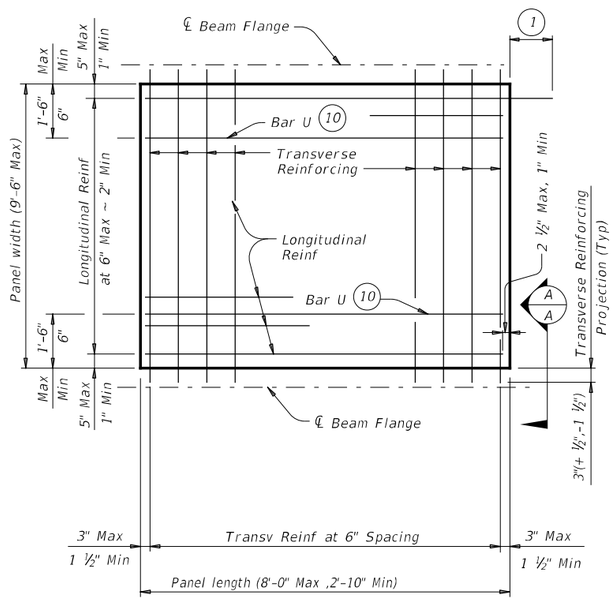
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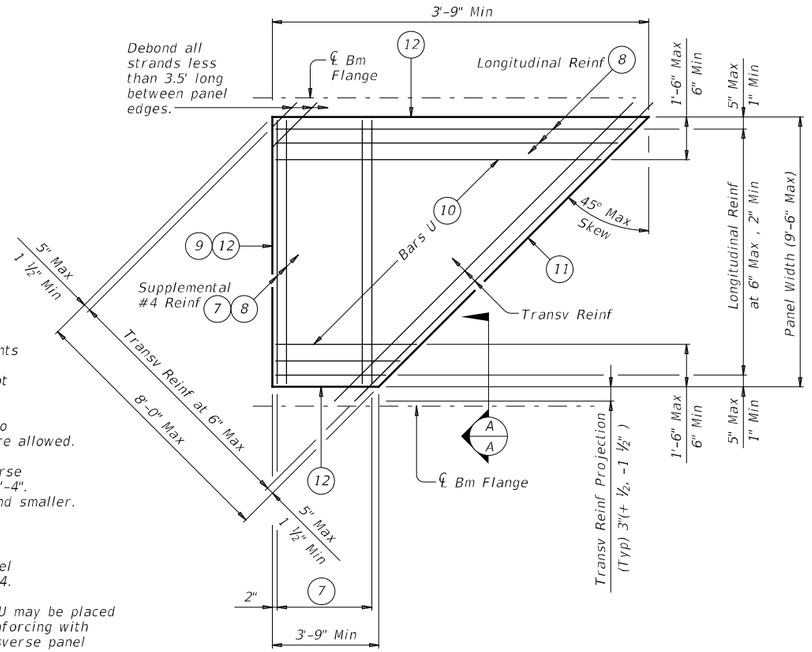
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TYPICAL NON-SKEWED PANEL PLAN



TYPICAL SKEWED END PANEL PLAN

(Only to be used with details shown elsewhere in the plans.)

1. At connection with cast-in-place slab, extend longitudinal panel reinforcement 1'-0" (+2",-0") past panel end. Alternatively, provide (#3) x 2'-0" dowels at 6" Max Spacing and extend dowels 1'-0" past panel end.
2. Four loops required per panel.
3. Four loops required per panel. ⅜" or ½" strands may be used.
4. Normal dimensions must be used on spans with parallel beams. Maximum and Minimum dimensions apply only to spans with flared beams.
5. See Normal Grading Detail on PCP standard for lap requirements and bedding strip dimensions. Some laps shown in tables cannot utilize all bedding strip widths.
6. One Splice allowed per panel. No more than two sheets of WWR are allowed.
7. Provide (#4) bars under transverse reinforcing, 10 Spaces at 4" = 3'-4". Omit for 5 degree (1:12) skew and smaller.
8. End Cover 2 ½" Max, 1" Min.
9. Recess strands on indicated panel edge in accordance with Item 424.
10. At the fabricator's option, Bars U may be placed parallel to transverse panel reinforcing with horizontal legs in plane of transverse panel reinforcing.
11. Use length of indicated panel edge as panel width for purpose of determining type of transverse reinforcing.
12. Timber form work permissible this edge.

TABLE A (4) (5)			
Beam Type	Normal (In.)	Min (In.)	Max (In.)
A	3	2 ½	3 ½
B	3	2 ½	3 ½
C	4	3	4 ½
IV	6	4	7 ½
VI	6 ½	4 ½	8 ½
U40 – 54	5 ½	5 ½	7
Tx28–70	6	4	7 ½
XB20 – 40	4	3	4 ½
XSB12 – 15	4	3	4 ½

TABLE B (4) (5)			
Top Flange Width	Normal (In.)	Min (In.)	Max (In.)
11" to 12"	2 ¾	2 ½	2 ¾
Over 12" to 15"	3 ¼	3	3 ¼
Over 15" to 18"	4	3	4 ¾
Over 18"	5	3 ½	6 ¼

GENERAL NOTES:

Provide Class H concrete for panels. Release strength f'ci=3500 psi. Minimum 28 day strength f'c=5000 psi.

Do not use epoxy-coated reinforcing steel bar or strand in panels.

Remove laitance from top panel surface.

Finish top of panel to a roughness between a No.6 and No.9 concrete surface profile, inclusive, as specified by the International Concrete Repair Institute (ICRI).

Shop drawings for the fabrication of panels will not require the Engineer's approval if fabrication is in accordance with the details shown on this standard.

A panel layout which identifies location of each panel must be developed by the Fabricator. Permanently mark each panel in accordance with the panel layout. A copy of the layout is to be provided to the Engineer.

TRANSVERSE PANEL REINFORCEMENT:

For panel widths over 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kips per strand.

For panel widths over 3'-6" up to and including 5', use ⅜" or ½" Dia (270k) prestressing strands with a tension of 14.4 kip per strand. Optionally, #4 Grade 60 reinforcing bars may be used in lieu of prestressed strands.

For panel widths up to 3'-6", use #4 Grade 60 reinforcing bars (prestressed strands alone are not allowed).

Place transverse panel reinforcement at panel centroid and space at 6" Max.

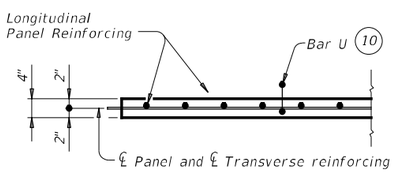
LONGITUDINAL PANEL REINFORCEMENT:

Any of the following options may be used for longitudinal panel reinforcement:

1. (#3) Grade 60 reinforcing steel at 6" Max Spacing. No splices allowed.
2. ⅜" Dia prestressing strands at 4 ½" Max Spacing (unstressed). No splices allowed.
3. ½" Dia prestressing strands at 6" Max Spacing (unstressed). No splices allowed.
4. Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) providing 0.22 sq in per foot of panel width. Wires larger than D11 not permitted. Provide transverse wires to ensure proper handling of reinforcing. One splice per panel is allowed. See WWR Splice Detail.

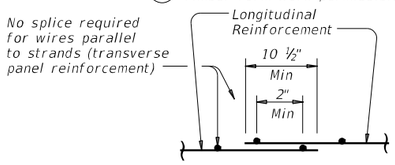
No combination of longitudinal reinforcement options in a panel is allowed.

Place longitudinal panel reinforcement above or below transverse panel reinforcement. Must be placed above transverse panel reinforcement for skewed end panels with supplemental #4 reinforcement.

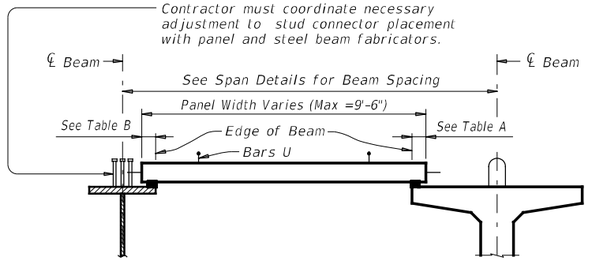


SECTION A-A

(Not Showing supplemental #4 bars for Skewed End Panels.)



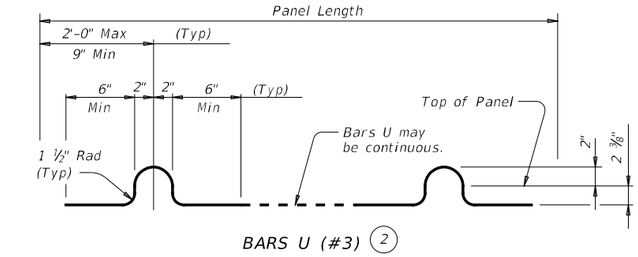
WELDED WIRE REINFORCEMENT (WWR) SPLICE DETAIL (6)



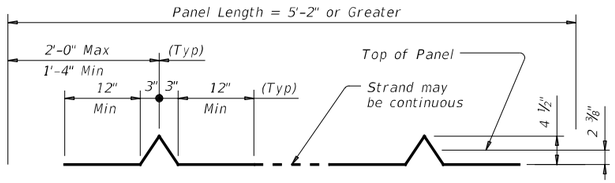
STEEL BEAMS

PRESTRESSED CONCRETE BEAMS OR GIRDERS

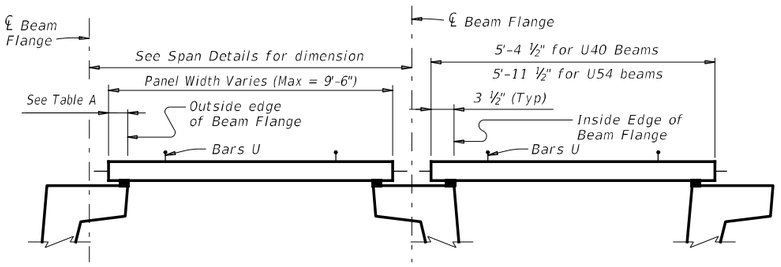
Typ unless noted otherwise



BARS U (#3) (2)



OPTIONAL STRAND FOR BARS U (3)



PRESTRESSED CONCRETE U-BEAMS

TYPICAL SECTIONS FOR DETERMINING PANEL WIDTH

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

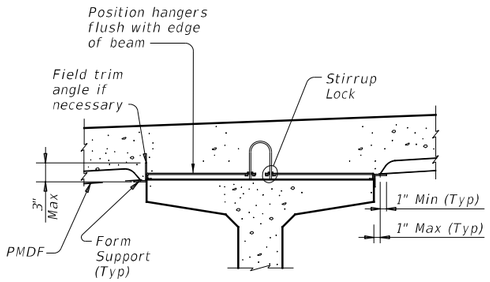
PRESTRESSED CONCRETE PANEL FABRICATION DETAILS

PCP-FAB

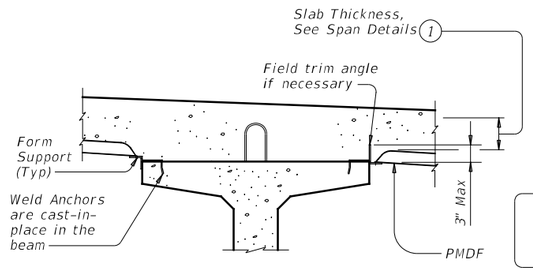
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©TxDOT January 2015 REVISIONS	CONT	SECT	JOB	HIGHWAY
	2103	01	034	
	DIST	COUNTY		SHEET NO.
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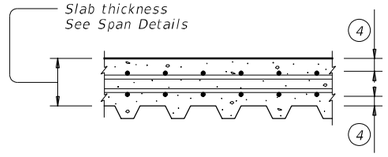
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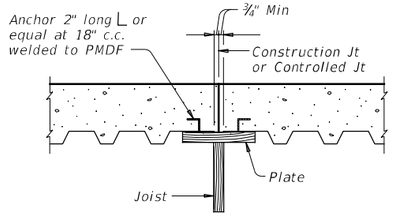
PRESTR CONC I-BEAMS AND I-GIRDERS WITH STIRRUP LOCKS



PRESTR CONC I-BEAMS AND I-GIRDERS WITH WELD ANCHORS

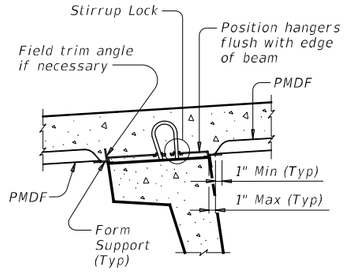


TYP LONGITUDINAL SLAB SECTION

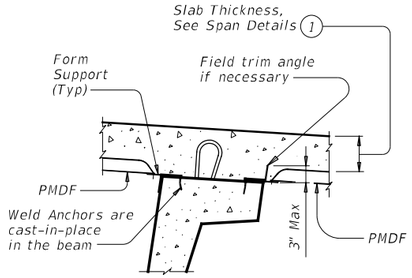


Note: In spans where PMD forms are used, timber forms must be used at construction joints. Adequate provision must be made to support edge of metal form and to provide anchorage of metal form to slab concrete where joined to wood forms.

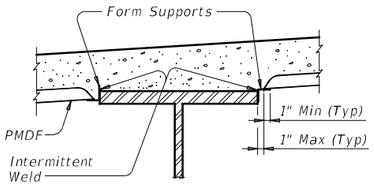
SECTION THRU CONSTRUCTION JOINT



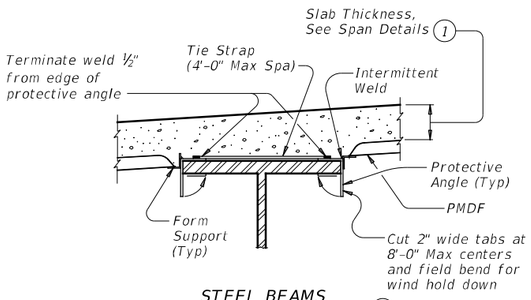
U-BEAMS WITH STIRRUP LOCKS



U-BEAMS WITH WELD ANCHORS

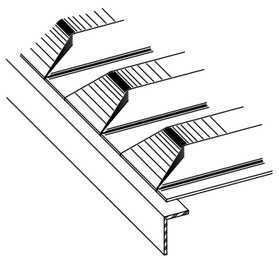


STEEL BEAMS AT COMPRESSION FLANGES

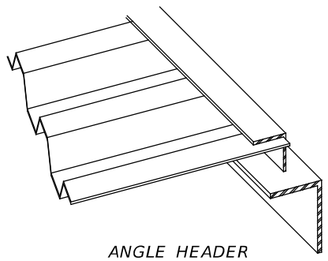


STEEL BEAMS AT TENSION FLANGES (2)

TYPICAL TRANSVERSE SECTIONS



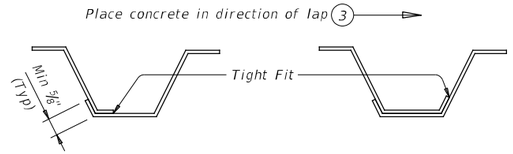
PRECLOSED



ANGLE HEADER

NOTE: This type is to be used for skewed ends only.

TYPES OF END CLOSURES



SIDE LAP DETAILS

(1) Slab thickness minus 5/8" if corrugations match reinforcing bars.

(2) Welding of form supports to tension flanges will not be permitted. Other methods of providing wind hold down resistance for PMDF in tension flange zones will be considered. At least one layer of sheet metal must be provided between the flange and the weld joint.

(3) The direction of concrete placement will be such that the upper layer of the form overlap is loaded first.

(4) See Span details for cover requirements.

GENERAL NOTES:

Steel for Permanent Metal Deck Forms (PMDF) and support angles shall conform to ASTM A653, Structural Steel (SS), with coating designation G165. Steel must have a minimum yield strength of 33 ksi. Minimum thickness of PMDF is 20 gage and that of support angles and protective angles is 12 gage.

Submit two copies of forming plans for PMDF to the Engineer. These plans must show all essential details of proposed form sheets, closures, fasteners, supports, connectors, special conditions and size and location of welds. These plans must clearly show areas of tension flanges for steel beams and provisions for protecting the tension flanges from welding notch effects by inclusion of separating sheet metal or other positive method. These plans must be designed, signed, and sealed by a licensed professional engineer. Department approval of these plans is not required, but the Department reserves the right to require modifications to the plans. The Contractor is responsible for the adequacy of these plans.

The details and notes shown on this standard are to be used as a guide in preparation of the forming plans.

All material, labor, tools and incidentals necessary to form a bridge deck with Permanent Metal Deck Forms is considered subsidiary to Item 422, "Concrete Superstructures".

DESIGN NOTES:

As a minimum, PMDF and support angles must be designed for the dead load of the form, reinforcement and concrete plus 50 psf for construction loads. Flexural stresses due to these design loads must not exceed 75 percent of the yield strength of the steel. Allowable stress for weld metal must be 12,400 psi.

Maximum deflection under the weight of forms, reinforcement and concrete or 120 psf, whichever is greater, shall not exceed the following:

1/180 of the form design span, but not more than 0.50", for design spans of 10' or less.

1/240 of the form design span, but not more than 0.75", for design spans greater than 10'.

The form design span must not be less than the clear distance between beam flanges, measured parallel to the form flutes, minus 2".

CONSTRUCTION NOTES:

Form sheets must not be permitted to rest directly on the top of beam flanges. Form sheets must be securely fastened to form supports and must have a minimum bearing length of one inch at each end. Form supports must be placed in direct contact with beam flanges.

All attachments must be made by permissible welds, screws, bolts, clips or other means shown on the the forming plans. All sheet metal assembly screws must be installed with torque-limiting devices to prevent stripping. Only welds or bolts must be used to support vertical loads.

Welding and welds must be in accordance with the provisions of Item 448, "Structural Field Welding", pertaining to fillet welds. All welds must be made by a qualified welder in accordance with Item 448.

All permanently exposed form metal, where the galvanized coating has been damaged, must be thoroughly cleaned and repaired in accordance with Item 445, "Galvanizing". Minor heat discoloration in areas of welds need not be touched up.

Flutes must line up uniformly across the entire width of the structure where main reinforcing steel is located in the flute.

Construction joints will not be permitted unless shown on the plans. The location of and forming details for any construction joint used must be shown on the forming plans. Forms below a construction joint must be removed after curing of the slab.

A sequence for uniform vibration of concrete must be approved by the Engineer prior to concrete placement. Attention must be given to prevent damage to the forms, yet provide proper vibration to prevent voids or honeycomb in the flutes and at headers and/or construction joints.

FOR PRESTR CONC U-BEAM BRIDGES:

Size, spacing, and orientation of bottom mat of slab reinforcement must match the top mat of reinforcing shown on the span details except all bottom mat bars are to be #5.

SHEET 1 OF 2

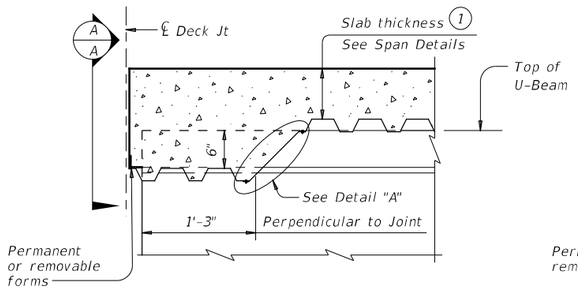
Texas Department of Transportation | Bridge Division Standard

PERMANENT METAL DECK FORMS

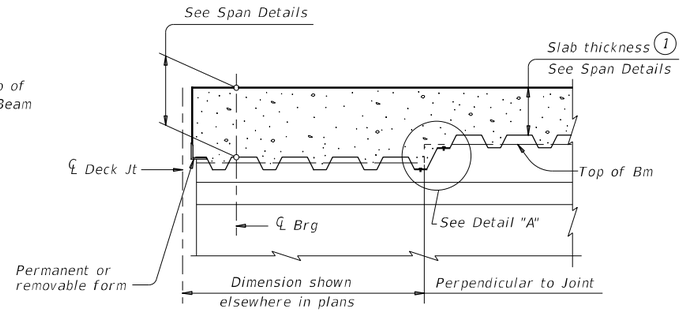
PMDF

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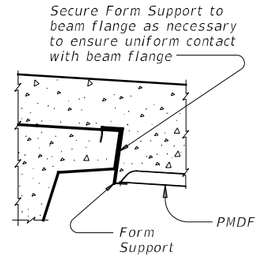


AT THICKENED SLAB END FOR U-BEAMS

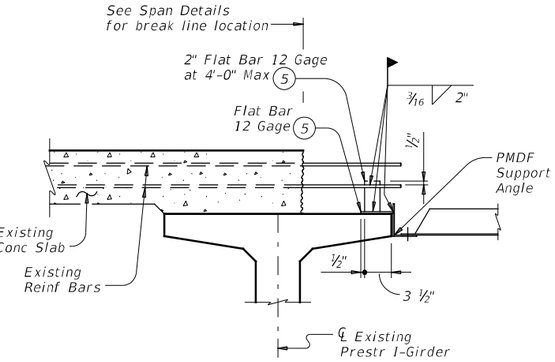


AT THICKENED SLAB END FOR PRESTRESSED I-BEAMS, I-GIRDERS AND STEEL BEAMS

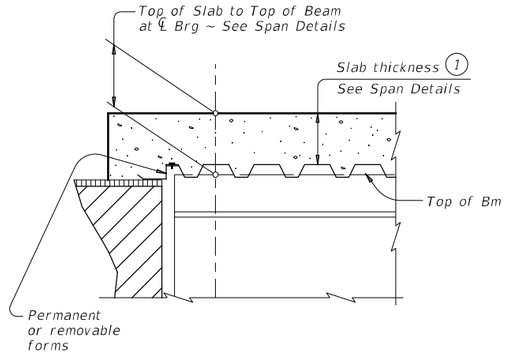
Showing I-Beam block-out. No block-out for I-Girders or Steel Beams.



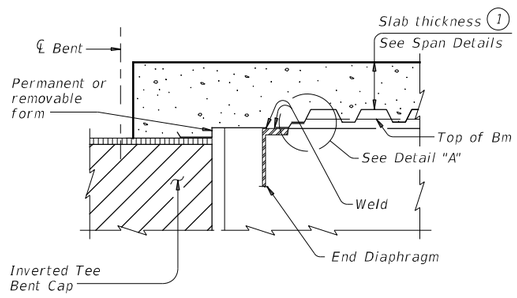
SECTION A-A



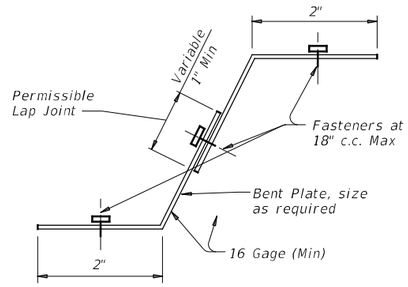
SHOWING PRESTRESSED CONCRETE I-BEAMS, I-GIRDERS AND U-BEAMS



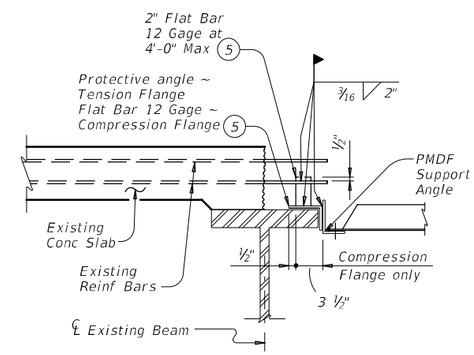
AT SLAB OVER ABUT BKWL OR INV TEE STEM FOR CONC BEAMS WITHOUT THICKENED SLAB END



AT SLAB OVER INV TEE STEM FOR STEEL BEAMS WITHOUT THICKENED SLAB END

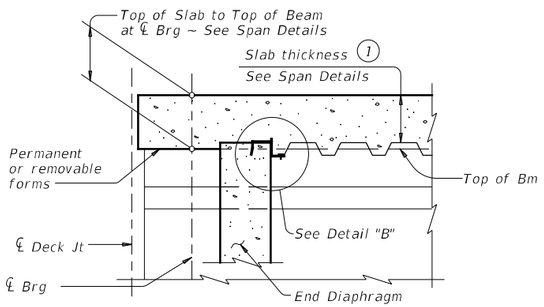


DETAIL "A"

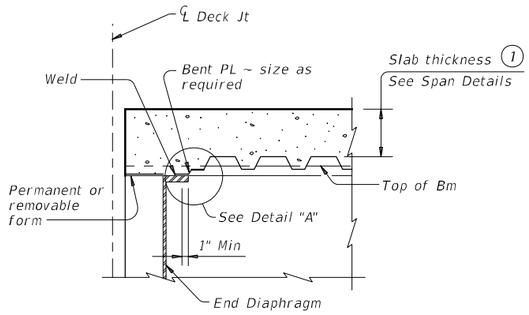


SHOWING STEEL BEAMS

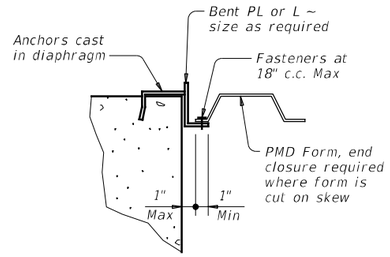
WIDENING DETAILS



AT CONC END DIAPHRAGM FOR PRESTRESSED I-BEAMS AND STEEL BEAMS



AT END DIAPHRAGM FOR STEEL BEAMS WITHOUT THICKENED SLAB END



DETAIL "B"

(1) Slab thickness minus 5/8" if corrugations match reinforcing bars

(5) Minimum yield stress of 12 Gage bars shall be 40 ksi

DETAILS AT ENDS OF BEAMS

SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

PERMANENT METAL DECK FORMS

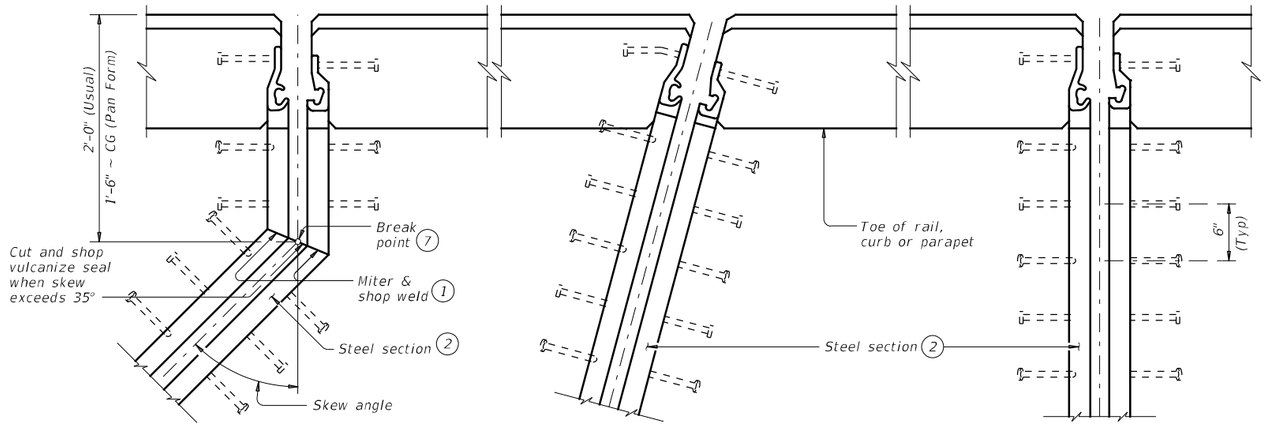
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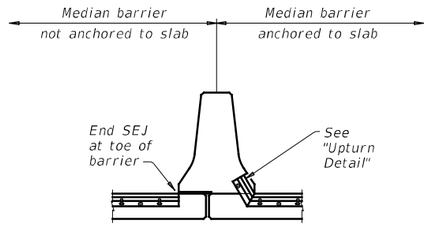
SHOWING SKEWS WITH SLAB BREAKBACKS

SHOWING SKEWS WITHOUT SLAB BREAKBACKS

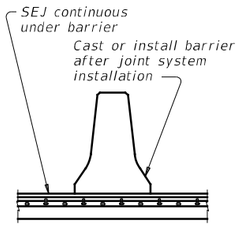
SHOWING WITHOUT SKEWS AND SLAB BREAKBACKS

PLANS OF END CONDITIONS

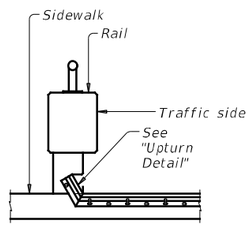
Used for Watson Bowman Acme (SE-400 or SE-500) and D.S. Brown (A2R-400 or A2R-XTRA) joint systems.
Shown with upturns



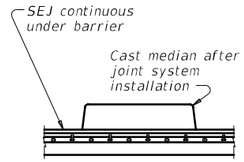
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



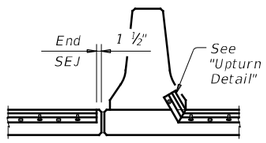
AT MEDIAN BARRIER



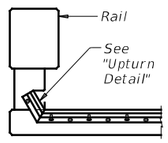
AT SIDEWALK BEHIND BRIDGE RAIL



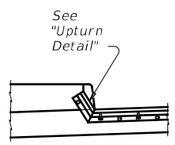
AT RAISED MEDIAN



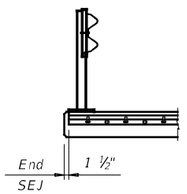
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



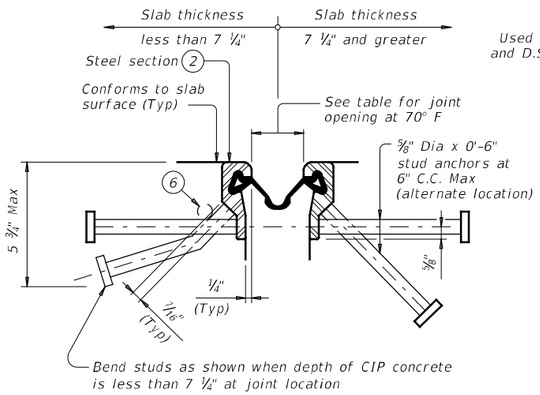
AT SIDEWALK



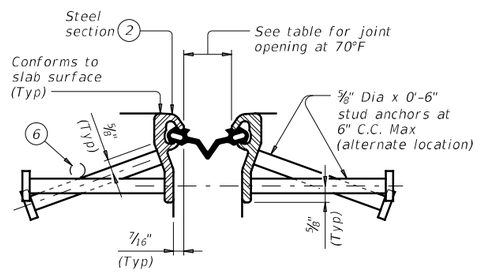
AT STEEL POST BRIDGE RAIL

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

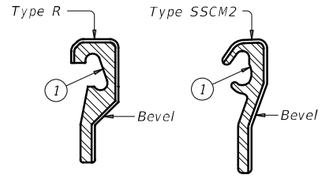
REDUCED LONGITUDINAL MOVEMENT RANGE

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:

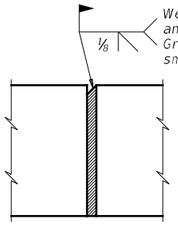
Joints installed on a skew have reduced ability to accommodate longitudinal movement. Use table values to determine the correct joint size for skewed installations.

For other skews over 25 degrees, calculate reduced movement range by multiplying joint size by cosine (skew).



WELD LIMITS

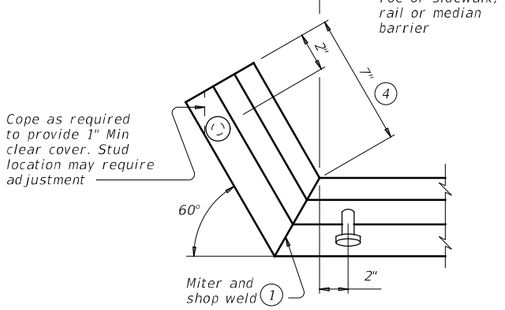
WELD LIMITS



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

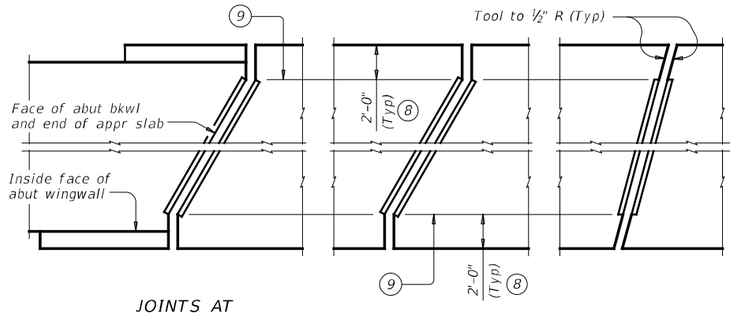
Bridge Division Standard

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	2103	01	034	
01-16: Addition of strip seal type, dimension armor plate Joint Seal splice note.	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		161

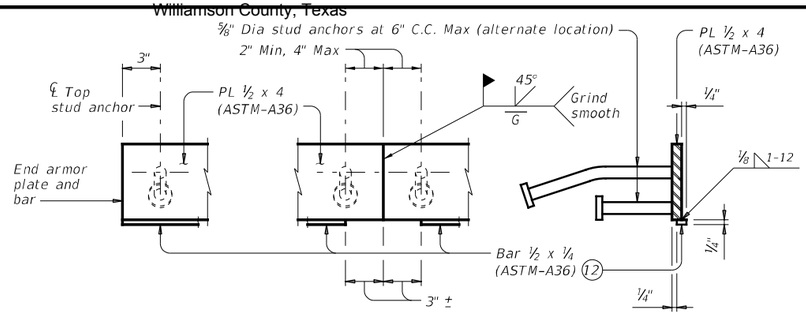
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JOINTS AT ABUTMENTS — SKEWS OVER 15° — SKEWS THRU 15°

PLANS OF ARMOR PLATES

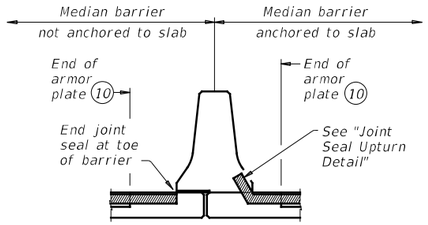
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



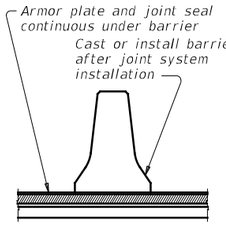
END VIEW — FIELD SPLICE (Studs not shown for clarity) — SECTION

ELEVATION OF ARMOR PLATE

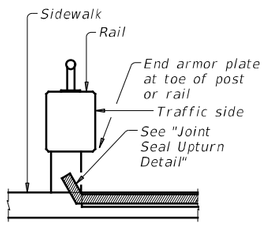
Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems



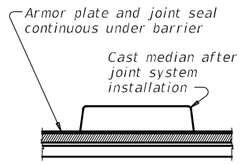
WITH OPEN DECK JOINT BELOW MEDIAN BARRIER



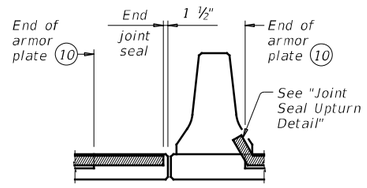
AT MEDIAN BARRIER



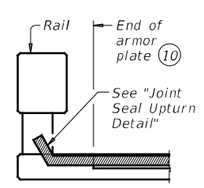
AT SIDEWALK BEHIND BRIDGE RAIL



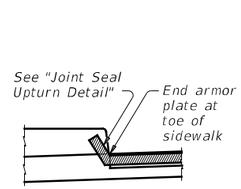
AT RAISED MEDIAN



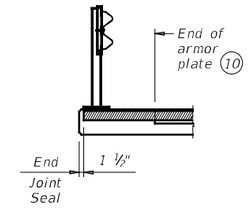
WITH OPEN DECK JOINT ADJACENT TO MEDIAN BARRIER



AT CONCRETE BRIDGE RAIL



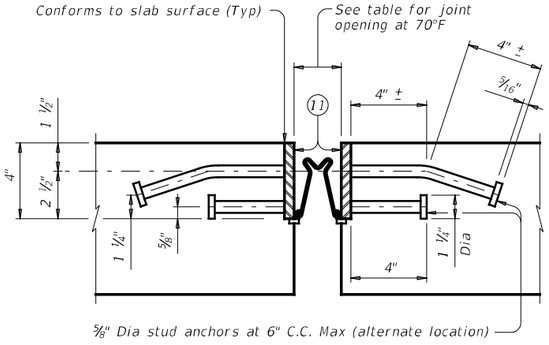
AT SIDEWALK



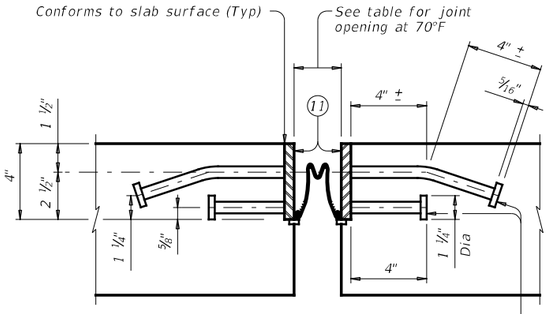
AT STEEL POST BRIDGE RAIL

TYPICAL SECTIONS OF ARMOR PLATES & SEALS (5)

Used for R.J. Watson (SF-400) and Watson Bowman Acme (SPS-400) joint systems

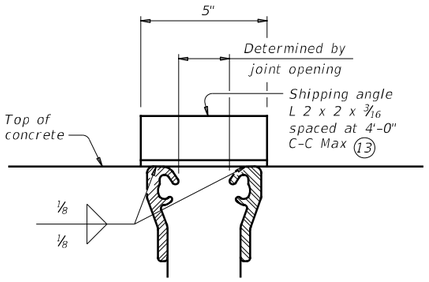


SECTION THRU R J WATSON (SF-400) JOINT



SECTION THRU WATSON BOWMAN ACME (SPS-400) JOINT

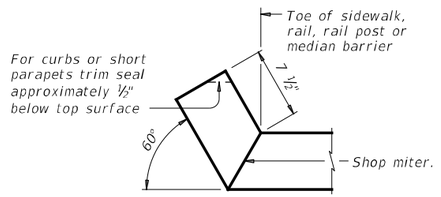
CONSTRUCTION NOTE FOR R.J. WATSON (SF-400) AND WATSON BOWMAN ACME (SPS-400) JOINTS:
Splice and install seal in accordance with the Manufacturer's directions and with the adhesive provided by the Manufacturer. Splice in joint seal may be performed in the field.



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.

Texas Department of Transportation — Bridge Division Standard

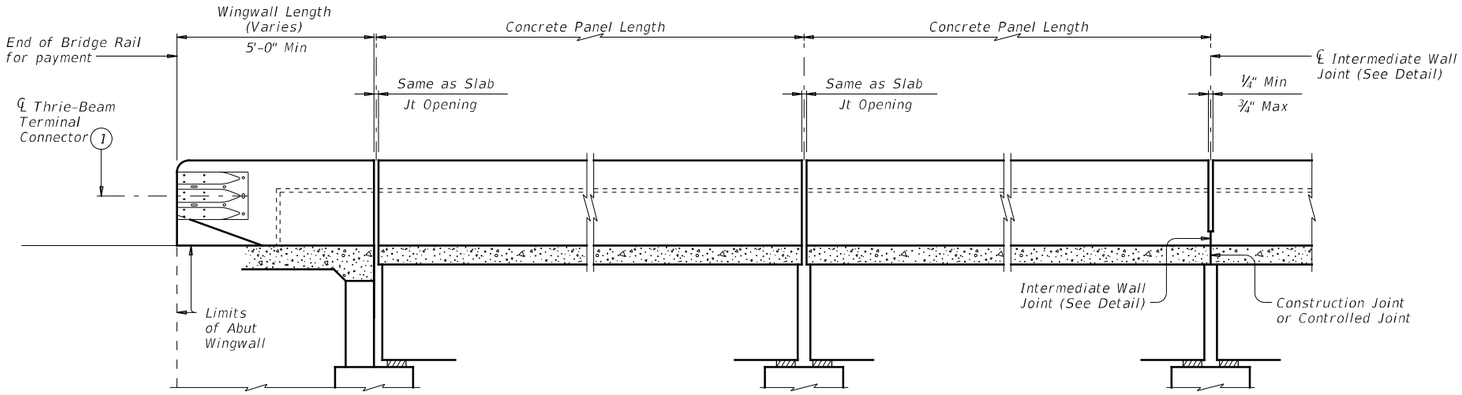
SEALED EXPANSION JOINT TYPE A WITHOUT OVERLAY

SEJ-A

FILE: sejaste1.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
01-16: Addition of strip seal type, dimension armor plate Joint Seal splice note.	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		162

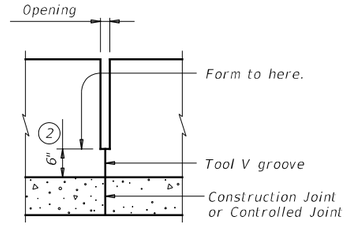
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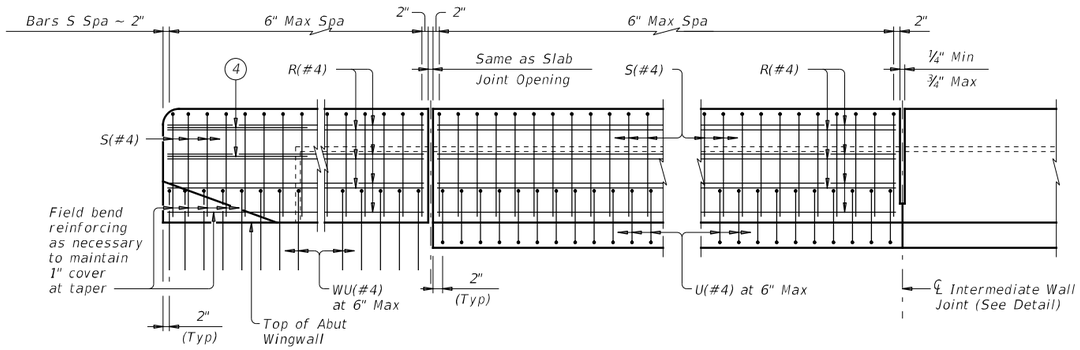
AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL

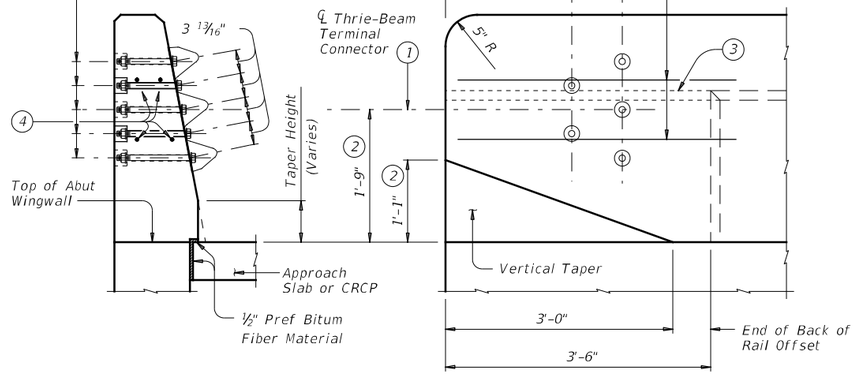
Provide at all interior bents without slab expansion joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

℄ 5 ~ ⅞" Dia A325 Bolts with two 1 ¾" O.D. washers. Place washer under each head and nut. Tighten the 5 Terminal Connection Bolts in a well distributed pattern so to prevent damage or distortion of the Thrie-Beam Connection and the MBGF Transition. Cut bolts off after installation so as to extend no more than ¾" beyond nut. Paint ends of cut-off bolts with Zinc-rich paint. (1)

℄ 5 ~ 1" Dia holes and 2 ½" Dia x 2" deep recesses. Form or core holes and recesses. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes and recesses. (5)



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS

(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) Increase 2" for structures with Overlay.

(3) Back of rail offset may, with Engineer's approval, be continued to the end of the railing.

(4) Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when Terminal Connections are required.

(5) Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail.

SHEET 1 OF 2

Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

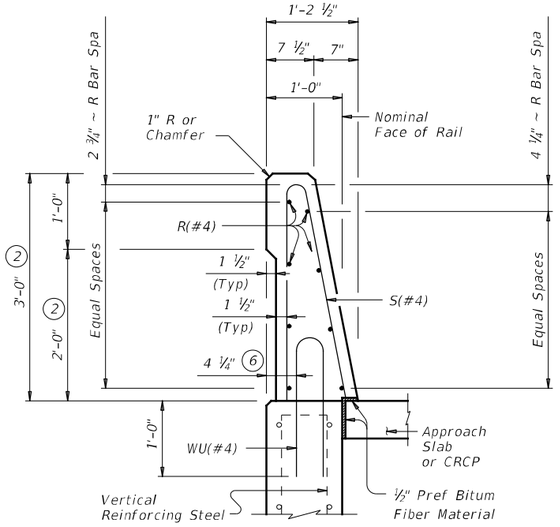
TYPE SSTR

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©TxDOT July 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		163

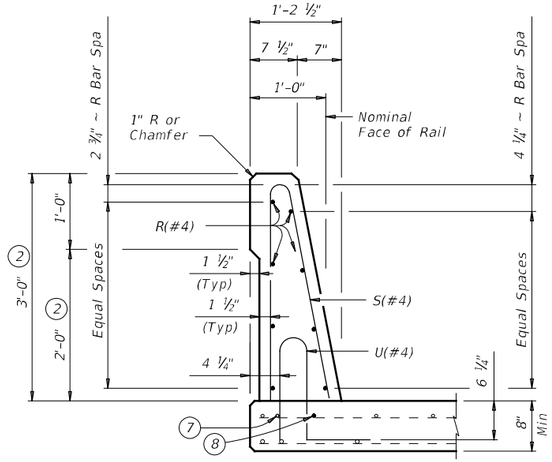
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ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON BRIDGE SLAB

SECTIONS THRU RAIL

(2) Increase 2" for structures with Overlay.

(6) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

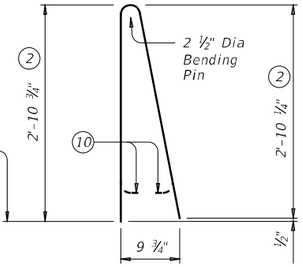
(7) As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.

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

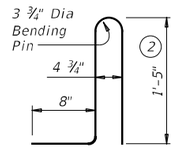
(9) No longitudinal wires may be within upper bend.

(10) Bend or cut as required to clear drain slots.

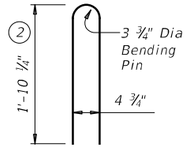
(11) Space U(#4) bars at 4" Max when end region of panel length is less than 6'-0" to side slot drain. Space U(#4) bars at 6" Max when end region of panel length is 6'-0" and greator to side slot drain.



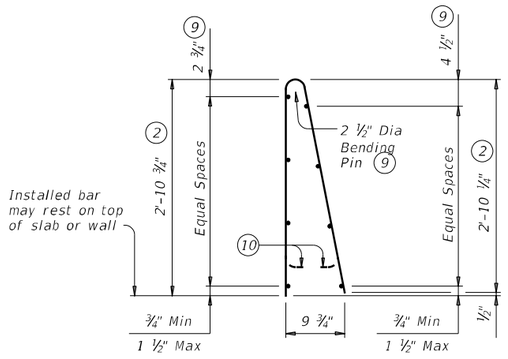
BARS S (#4)



BARS U (#4)

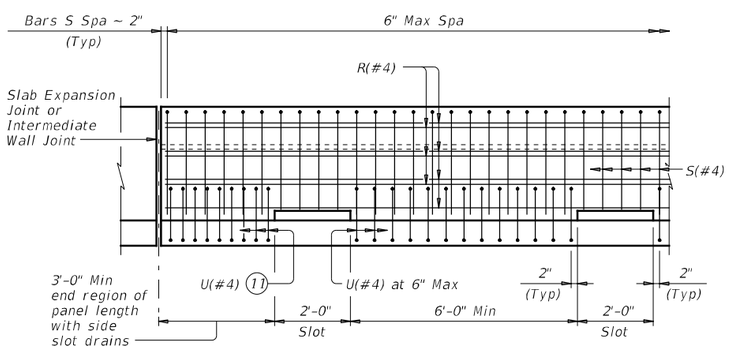


BARS WU (#4)



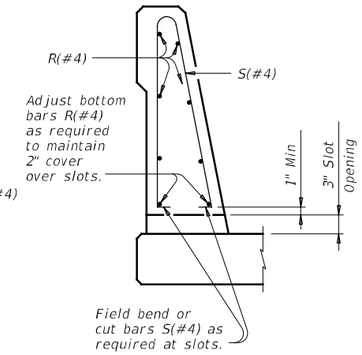
OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	1.067 Sq In.	0.267 Sq In. per Ft
	No. of Wires	Spacing
Minimum	8	4"
Maximum	10	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	



OPTIONAL SIDE SLOT DRAIN DETAIL

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Drains should not be placed over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.



SECTION THRU OPTIONAL SIDE SLOT DRAIN

CONSTRUCTION NOTES:

This railing may be constructed with slip-forms when approved by the Engineer, with equipment approved by the Engineer. Provide sensor control for both line and grade. Tack welding to provide bracing for slip-form operations is acceptable. Welding can be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to U, WU and S bars at any location on the cage. If increased bracing is needed, provide additional anchorage devices and weld in the upper two thirds of the cage.

The back of railing must be vertical unless otherwise shown in the plans or approved by the Engineer.

MATERIAL NOTES:

Galvanize all steel components except reinforcing unless otherwise shown in plans.

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat all rail reinforcement if slab bars are epoxy coated.

Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars U and WU unless noted otherwise. Deformed WWR (ASTM A1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars.

Provide bar laps, where required, as follows:

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

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 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 will not be required for this rail.

Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise.

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

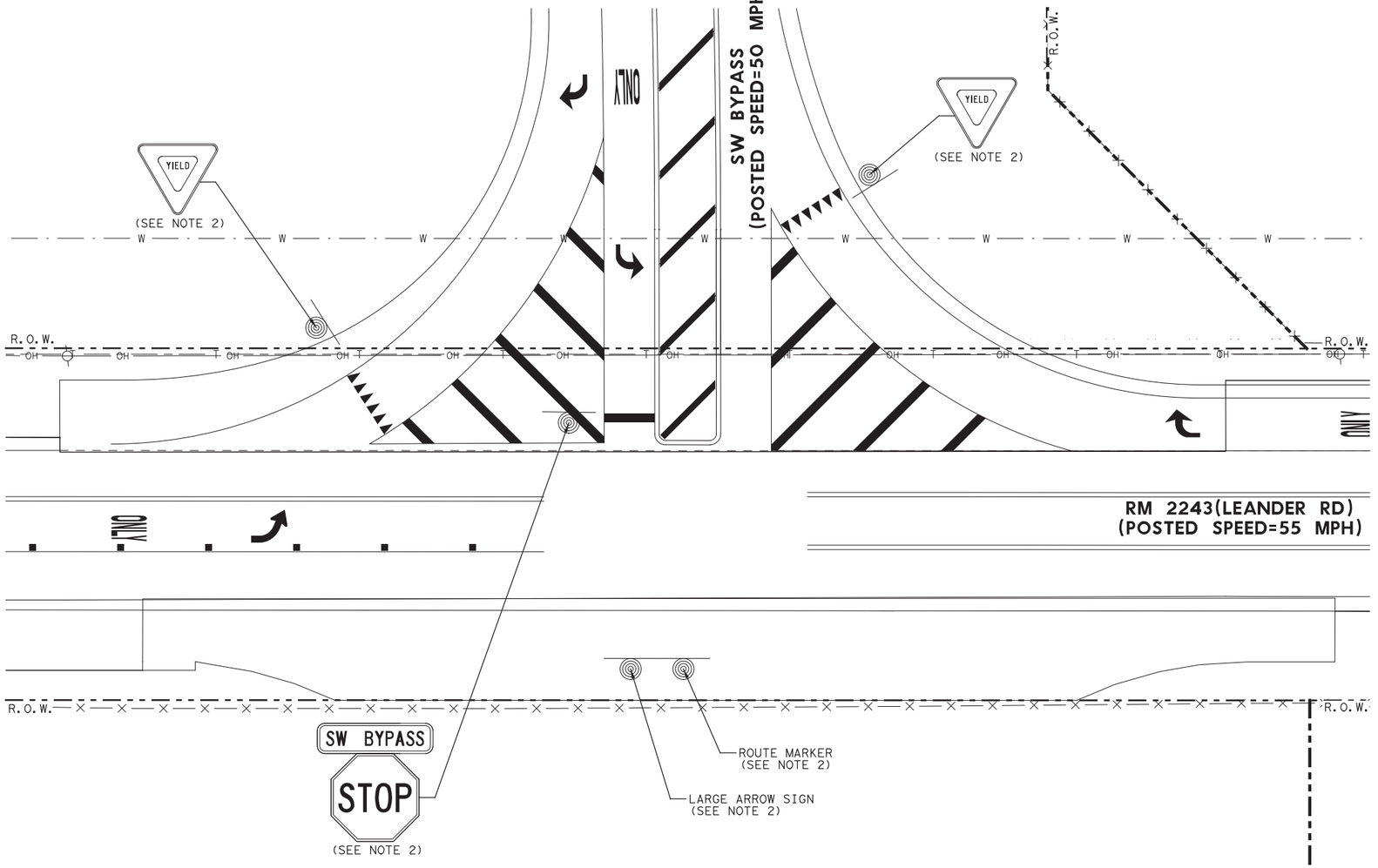
Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL SINGLE SLOPE

TYPE SSTR

FILE: rlstd014.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: TxDOT
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REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		164



LEGEND

- EXIST. GROUND MOUNTED SIGN
- EXIST. UTILITY POLE
- EXIST. OVERHEAD TELEPHONE LINE
- EXIST. TELEPHONE LINE
- EXIST. WATER LINE
- EXIST. FENCE
- EXIST. RIGHT OF WAY
- PROP. RIGHT OF WAY

0 15 30 45 60
SCALE IN FEET

NOTES

1. THE EXISTENCE AND LOCATION OF UTILITIES, EITHER UNDERGROUND OR OVERHEAD, INDICATED ON THE PLANS ARE TAKEN FROM THE BEST RECORDS AVAILABLE AND ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES (PRIVATE/PUBLIC AND SHOWN/NOT SHOWN) PRIOR TO COMMENCING WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO LOCATE, PRESERVE, AND PROTECT THESE UTILITIES.
2. REFER TO SIGNING AND STRIPING PLANS FOR REMOVAL AND RELOCATION OF EXISTING SIGNS.
3. NORTH LEG OF SW BYPASS IS CURRENTLY UNDER CONSTRUCTION. EXISTING FEATURES SHOWN HERE REPRESENT EXPECTED CONDITIONS AT COMPLETION OF SW BYPASS NORTH SEGMENT CONSTRUCTION.

TIMOTHY GRIMES
100107
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
3.23.2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

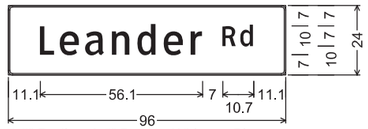
SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 EXISTING INTERSECTION LAYOUT

SCALE: 1"=30'

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	165
KK	2103	01	034	
CHECK				
TG				

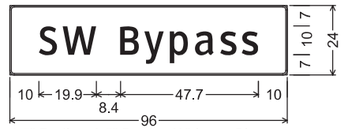
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USER: AFAZ DATE: 3/22/2018 TIME: 3:32:34 PM SCALE: i:30
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SIGN LEGEND



1.5" Radius, 0.5" Border, White on Blue;
[Leander] ClearviewHwy-3-W;
[Rd] ClearviewHwy-3-W;

S1
ILSN SIGN(DOUBLE SIDED)
(CITY OF GEORGETOWN)
(2 EA)



1.5" Radius, 0.5" Border, White on Blue;
[SW Bypass] ClearviewHwy-3-W;

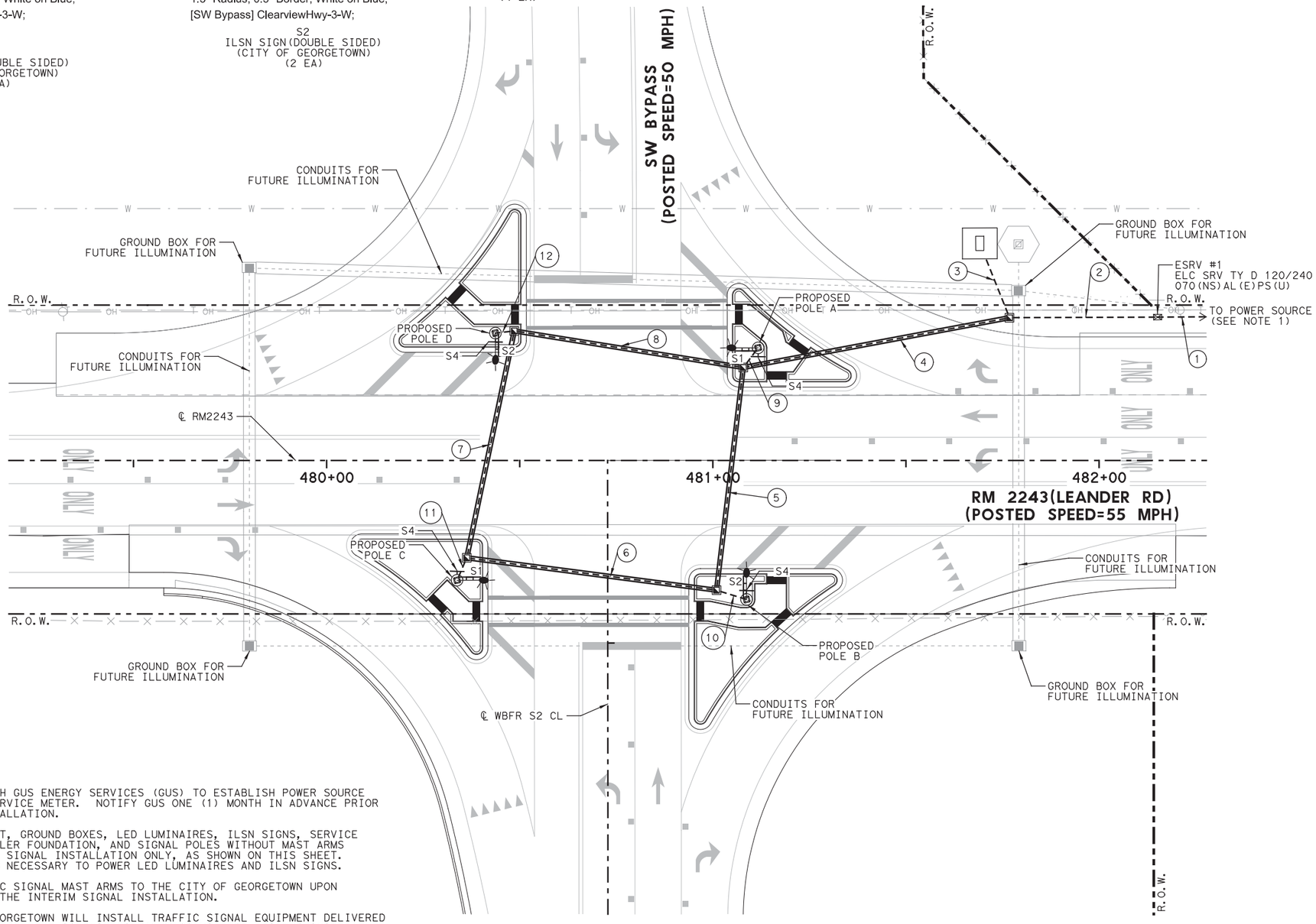
S2
ILSN SIGN(DOUBLE SIDED)
(CITY OF GEORGETOWN)
(2 EA)



S4
R9-3
(18"X18")
(4 EA)

CAUTION

UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR MUST LOCATE ALL UTILITIES PRIOR TO DRILLING AND BORING. CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGED UTILITIES.



LEGEND

- PROP. SIGNAL POLE
- PROP. LUMINAIRE
- PROP. GROUND BOX W/ APRON
- PROP. CONDUIT(BORED)
- PROP. CONDUIT(TRENCHED)
- PROP. SIGN
- PROP. ILSN SIGN
- PROP. SERVICE METER
- PROP. CONTROLLER FOUNDATION
- EXIST. UTILITY POLE
- EXIST. OVERHEAD TELEPHONE LINE
- EXIST. TELEPHONE LINE
- EXIST. WATER LINE
- EXIST. FENCE
- EXIST. RIGHT OF WAY
- PROP. RIGHT OF WAY
- (X) CONDUIT RUN NO.

0 15 30 45 60
SCALE IN FEET

NOTES

1. COORDINATE WITH GUS ENERGY SERVICES (GUS) TO ESTABLISH POWER SOURCE AND INSTALL SERVICE METER. NOTIFY GUS ONE (1) MONTH IN ADVANCE PRIOR TO SIGNAL INSTALLATION.
2. INSTALL CONDUIT, GROUND BOXES, LED LUMINAIRES, ILSN SIGNS, SERVICE METER, CONTROLLER FOUNDATION, AND SIGNAL POLES WITHOUT MAST ARMS DURING INTERIM SIGNAL INSTALLATION ONLY, AS SHOWN ON THIS SHEET. PROVIDE WIRING NECESSARY TO POWER LED LUMINAIRES AND ILSN SIGNS.
3. DELIVER TRAFFIC SIGNAL MAST ARMS TO THE CITY OF GEORGETOWN UPON COMPLETION OF THE INTERIM SIGNAL INSTALLATION.
4. THE CITY OF GEORGETOWN WILL INSTALL TRAFFIC SIGNAL EQUIPMENT DELIVERED BY THE CONTRACTOR ONCE TRAFFIC SIGNAL WARRANTS ARE MET FOR THIS INTERSECTION, AS SHOWN IN THE PROPOSED (ULTIMATE) SIGNAL LAYOUT. INSTALLATION OF THIS EQUIPMENT WILL BE BID AND PAID FOR SEPARATELY.
5. EXACT LOCATION OF POLES, ELECTRICAL SERVICES, AND GROUND BOXES SHALL BE DETERMINED IN THE FIELD AND SUBJECT TO FINAL APPROVAL BY ENGINEER IN THE FIELD. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT LOCATIONS FROM THE ENGINEER, PRIOR TO CONSTRUCTION.

PROPOSED POLE OFFSETS			
POLE	ALIGNMENT	STATION	OFFSET
A	℄ RM2243	STA 481+11.7	29.2 LT
B	℄ RM2243	STA 481+8.7	36.0 RT
C	℄ RM2243	STA 480+33.8	31.0 RT
D	℄ RM2243	STA 480+43.7	33.0 LT

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED
PROFESSIONAL ENGINEER
3.23.2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 PROPOSED (INTERIM) SIGNAL LAYOUT

SCALE: 1"=30'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	166
KK	2103	01	034	
CHECK				
TG				

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4/12/2018 7:20 AM

CONDUIT AND CONDUCTOR SCHEDULE

RUN NO.	LENGTH LF	PROPOSED CONDUITS 2" PVC EA	2" PVC (LUM'S) EA	3" PVC (TRAFFIC) EA	3" PVC (RADAR) EA	2" PVC (LUM'S) (BORED) EA	3" PVC (TRAFFIC) (BORED) EA	3" PVC (RADAR) (BORED) EA	NO. 8 BARE EA	NO. 8 XHHW (LUM'S) EA	TRAY CABLE 3/C 12 AWG (ILSN) EA
1*	265	1									
2**	40	1	1						2	8	4
3**	20	1		2	1				4		
4	70					1	2	1	4	8	4
5	65					1	1	1	3	4	2
6	70					1	1	1	3	2	1
7	65					1	1	1	3		
8	65					1	1	1	3	2	1
9	10		1	1	1				3	2	1
10	10		1	1	1				3	2	1
11	10		1	1	1				3	2	1
12	5		1	1	1				3	2	1
TOTAL (LF)		325	75	75	55	335	405	335	1340	1480	740

NOTES
1. * PROVIDE CONDUIT FOR USE BY UTILITY COMPANY. COORDINATE WITH GUS ENERGY SERVICES TO ESTABLISH POWER SOURCE AND INSTALL SERVICE METER.
2. ** INSTALL 1-2" FOR #6 INSULATED AND #6 BARE. KEEP THESE CABLES SEPARATE FROM OTHER CABLES.

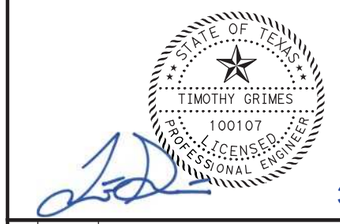
POLE DETAILS AND WIRING INSIDE POLES

POLE	TYPE	CONDUCTORS/CABLE IN POLES (LF) NO. 8 XHHW (LUM'S)	TRAY CABLE 3/C 12 AWG (ILSN)
A	STEEL POLE (30' TALL) WITH LUM + ILSN**	80	30
B	STEEL POLE (30' TALL) WITH LUM + ILSN**	80	30
C	STEEL POLE (30' TALL) WITH LUM + ILSN**	80	30
D	STEEL POLE (30' TALL) WITH LUM + ILSN**	80	30
TOTALS (LF)		320	120

** SEE ULTIMATE CONDITIONS POLE SCHEDULE FOR MAST ARM LENGTHS. MAST ARMS TO BE FURNISHED BY CONTRACTOR AND DELIVERED TO CITY OF GEORGETOWN FOR FUTURE INSTALLATION.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DATA											
SERVICE POLE NO.	SERVICE POLE DESCRIPTION	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO/SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBOARD/ LOAD CENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	CIRCUIT AMP LOAD	SERVICE KVA LOAD
1	ELC SRV TY D 120/240 070 (NS)AL(E)PS(U)	2"	3/#4	N/A	2P/70	30	100	SIGNAL	1P/50	40	6.8
								LUMINAIRE	2P/15	6	
								ILSN	1P/15	5	



3.23.2018

NO.	DATE	REVISION	APPROVED

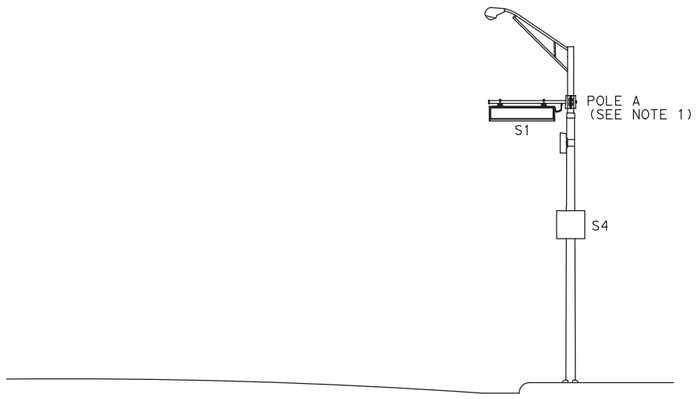
WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

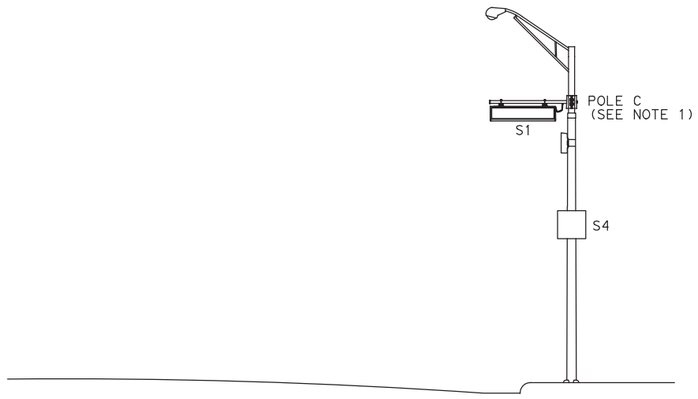
SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 CONDUIT AND CONDUCTOR SCHEDULES (INTERIM)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS AF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KK	TEXAS	AUS	WILLIAMSON	
CHECK TG	CONTROL	SECTION	JOB	167
	2103	01	034	

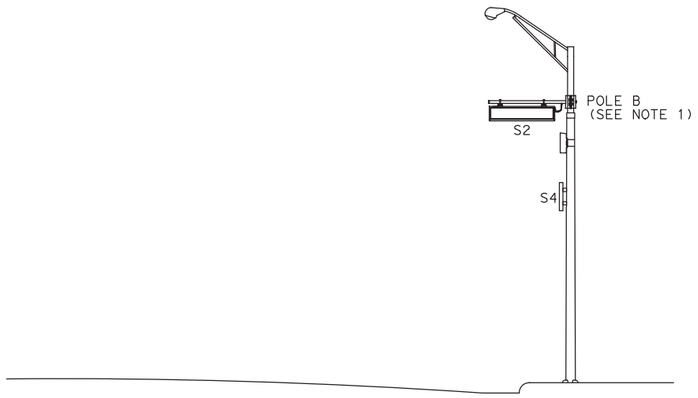
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4/12/2018 7:20 AM



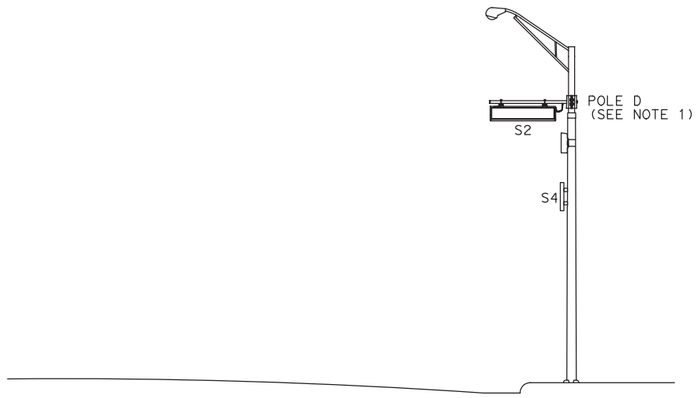
LOOKING NORTH ON SW BYPASS AT RM 2243(LEANDER RD)



LOOKING SOUTH ON SW BYPASS AT RM 2243(LEANDER RD)



LOOKING EAST ON RM 2243(LEANDER RD) AT SW BYPASS



LOOKING WEST ON RM 2243(LEANDER RD) AT SW BYPASS

NOTES

1. SIGNAL POLES, LUMINAIRES, AND ILSNS INSTALLED DURING INTERIM CONDITION. MAST ARMS, SIGNAL HEADS, SIGNAL RELATED SIGNS, RADAR UNITS, AND CONFIRMATION LIGHTS TO BE INSTALLED DURING ULTIMATE CONDITION BY CITY OF GEORGETOWN.

NOT TO SCALE

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED
PROFESSIONAL ENGINEER

3.23.2018

NO.	DATE	REVISION	APPROVED

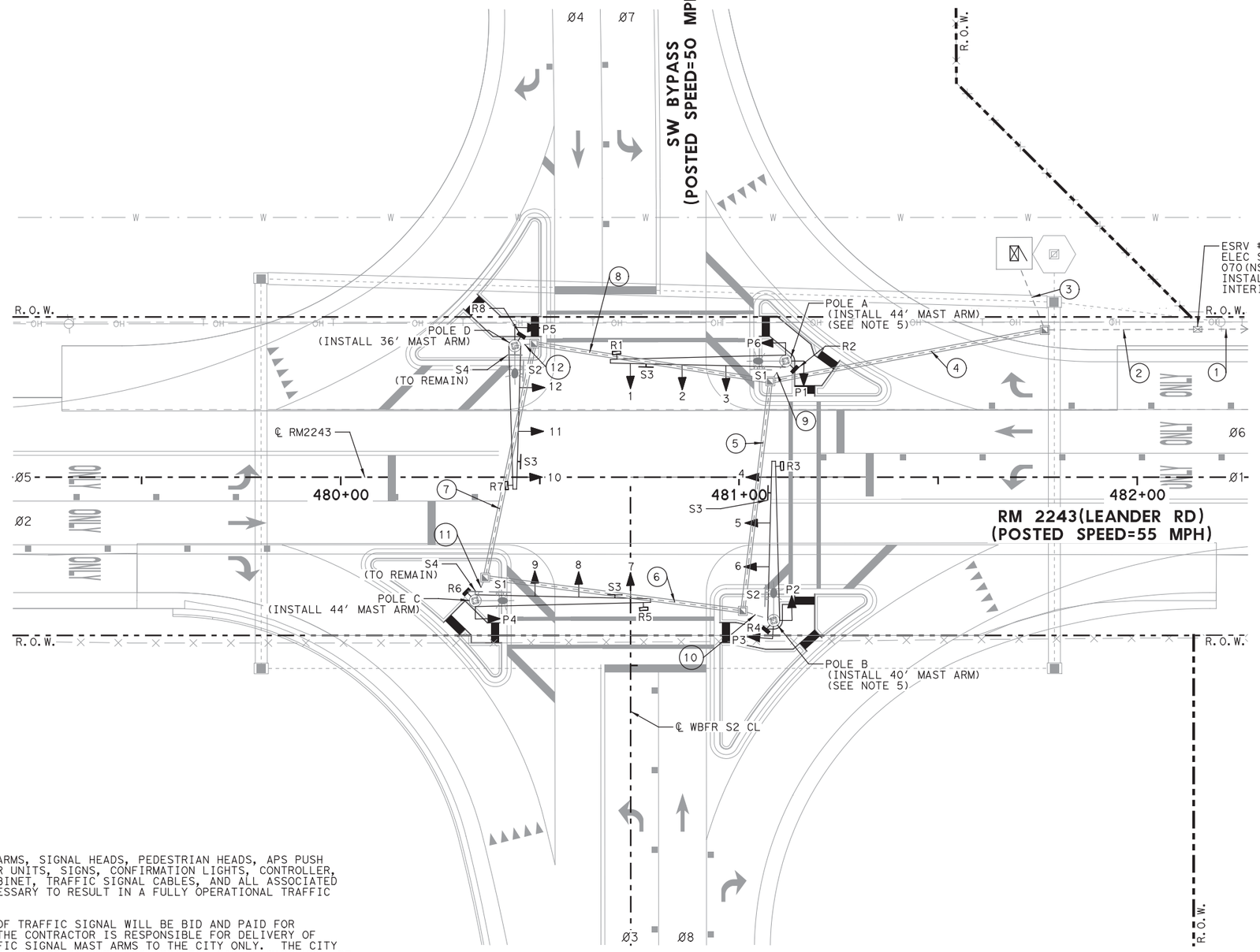
WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 ELEVATIONS (INTERIM)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	168
KK	2103	01	034	
CHECK				
TG				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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LEGEND

- PROP. MAST ARM
- PROP. SIGNAL HEAD
- PROP. PEDESTRIAN SIGNAL HEAD
- PROP. SIGN ON MAST ARM
- PROP. RADAR (PRESENCE DETECTION)
- PROP. RADAR (ADVANCE DETECTION)
- PROP. CONTROLLER W/ BBU
- EXIST. SIGNAL POLE
- EXIST. LUMINAIRE
- EXIST. GROUND BOX W/ APRON
- EXIST. CONDUIT (BORED)
- EXIST. CONDUIT (TRENCHED)
- EXIST. SIGN
- EXIST. ILSN SIGN
- EXIST. SERVICE METER
- EXIST. UTILITY POLE
- EXIST. OVERHEAD TELEPHONE LINE
- EXIST. TELEPHONE LINE
- EXIST. WATER LINE
- EXIST. FENCE
- EXIST. RIGHT OF WAY
- PROP. RIGHT OF WAY
- (X) CONDUIT RUN NO.

0 15 30 45 60
SCALE IN FEET

NOTES

1. INSTALL MAST ARMS, SIGNAL HEADS, PEDESTRIAN HEADS, APS PUSH BUTTONS, RADAR UNITS, SIGNS, CONFIRMATION LIGHTS, CONTROLLER, CONTROLLER CABINET, TRAFFIC SIGNAL CABLES, AND ALL ASSOCIATED EQUIPMENT NECESSARY TO RESULT IN A FULLY OPERATIONAL TRAFFIC SIGNAL.
2. INSTALLATION OF TRAFFIC SIGNAL WILL BE BID AND PAID FOR SEPARATELY. THE CONTRACTOR IS RESPONSIBLE FOR DELIVERY OF ULTIMATE TRAFFIC SIGNAL MAST ARMS TO THE CITY ONLY. THE CITY WILL STOCKPILE THIS EQUIPMENT UNTIL TRAFFIC SIGNAL WARRANTS ARE MET FOR THIS INTERSECTION.
3. EXACT LOCATION OF SIGNAL HEADS, PEDESTRIAN HEADS, AND RADAR EQUIPMENT SHALL BE DETERMINED IN THE FIELD AND SUBJECT TO FINAL APPROVAL BY ENGINEER IN THE FIELD.
4. SIGNAL HEADS SHALL NOT BE PLACED OVER THE ROADWAY UNTIL ALL NECESSARY MATERIALS ARE AT HAND AS APPROVED BY THE ENGINEER IN THE FIELD.
5. REMOVE R9-3 SIGNS INSTALLED DURING INTERIM CONDITIONS, EXCEPT AS NOTED.

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED
PROFESSIONAL ENGINEER
3.23.2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 PROPOSED (ULTIMATE) SIGNAL LAYOUT

SCALE: 1"=30'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	169
KK	2103	01	034	
CHECK				
TG				

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4/12/2018 7:20 AM

SIGN LEGEND



S1
ILSN SIGN
(INSTALLED WITH INTERIM SIGNAL)



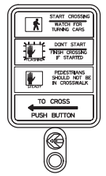
S2
ILSN SIGN
(INSTALLED WITH INTERIM SIGNAL)



S3
R10-17T
(36"X42")
(4 EA)



S4
(INSTALLED WITH
INTERIM SIGNAL)



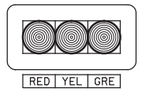
S5*
(APS PUSH
BUTTONS)
(3 EA)



S6*
(APS PUSH
BUTTONS)
(3 EA)

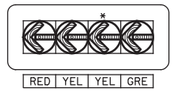
(* SHOWN ON ELEVATION SHEET ONLY)

SIGNAL HEAD LEGEND



HEADS: 2,3,5,6,8
9,11,12

3 SECTION SIGNAL
HEAD AND BACKPLATE



HEADS: 1,4,7,10

4 SECTION SIGNAL
HEAD AND BACKPLATE

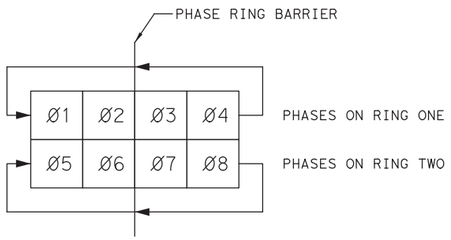
*FLASHING YELLOW ARROW



HEADS: P1-P6

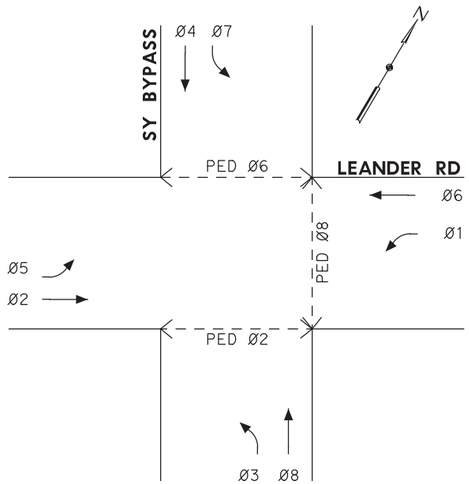
COUNTDOWN
PEDESTRIAN HEAD

PHASE RING DIAGRAM



NOTE: COORDINATE WITH CITY OF
GEORGETOWN FOR PROGRAMMING
SIGNAL TIMING AND PHASING.

PHASING DIAGRAM



OL M = Ø2
OL N = Ø4
OL O = Ø6
OL P = Ø8



3.23.2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2
SW BYPASS AND RM 2243
SIGNING AND PHASING
(ULTIMATE)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	170
KK	2103	01	034	
CHECK				
TG				

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CONDUIT AND CONDUCTOR SCHEDULE

RUN	LENGTH	EXISTING CONDUITS							EXISTING WIRING			NO. 6 BARE	NO. 6 XHHW	TY A 14 AWG			
		2" PVC	2" PVC (LUM'S)	3" PVC (TRAFFIC)	3" PVC (RADAR)	2" PVC (LUM'S) (BORED)	3" PVC (TRAFFIC) (BORED)	3" PVC (RADAR) (BORED)	NO. 8 BARE	NO. 8 XHHW (LUM'S)	TRAY CABLE 3/C 12 AWG (ILSN)			5/C SIGNAL CABLE	7/C SIGNAL CABLE	2/C PUSH BUTTON	6/C (RADAR)
NO.	LF	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1	265	1															
2**	40	1	1						2	8	4	1	2				
3**	20	1		2	1				4			1	2	10	4	6	8
4	70					1	2	1	4	8	4			10	4	6	8
5	65					1	1	1	3	4	2			5	2	3	4
6	70					1	1	1	3	2	1			2	1	1	2
7	65					1	1	1	3								
8	65					1	1	1	3	2	1			2	1	1	2
9	10		1	1	1				3	2	1			3	1	2	2
10	10		1	1	1				3	2	1			3	1	2	2
11	10		1	1	1				3	2	1			2	1	1	2
12	5		1	1	1				3	2	1			2	1	1	2
A	5											1	2	10	4	6	8
TOTAL (LF)												65	130	1635	680	955	1360

NOTES
1. RUN A IS SLACK (5') FOR EACH CABLE.
2. ** MAINTAIN 1-2" CONDUIT FOR #6 INSULATED AND #6 BARE. KEEP THESE CABLES SEPARATE FROM OTHER CABLES.

POLE DETAILS & WIRING INSIDE POLES AND ARMS

POLE	TYPE	CONDUCTORS/CABLE IN POLES (LF)				
		5/C (SIGNAL)	7/C (SIGNAL)	2/C (PUSH BUTTON)	6/C (RADAR)	TY A 16 AWG 3/C (CONF. LIGHT)
A	STEEL POLE WITH 44' MA ILSN & LUM (30' TALL)	99	69	20	138	45
B	STEEL POLE WITH 40' MA ILSN & LUM (30' TALL)	95	65	20	130	45
C	STEEL POLE WITH 44' MA ILSN & LUM (30' TALL)	84	69	10	138	45
D	STEEL POLE WITH 36' MA ILSN & LUM (30' TALL)	76	61	10	122	45
TOTALS (LF)		354	264	60	528	180

NOTES:
1. TOTAL LENGTH INCLUDES ADDITIONAL SLACK (5') FOR EACH CABLE. RADAR CABLE ASSUMES FULL LENGTH OF MAST ARM FOR MOUNTING UNITS.
2. ILLUMINATION AND ILSN TRAY CABLE INSTALLED DURING INTERIM CONDITIONS TO REMAIN.

INSIDE CABINET CHART

CONDUCTORS/CABLE IN CABINET (LF)					
NO. 6 BARE	NO. 6 XHHW	5/C (SIGNAL)	7/C (SIGNAL)	2/C (PUSH BUTTON)	6/C (RADAR)
LF	LF	LF	LF	LF	LF
5	10	50	20	30	40

CABLE TERMINATION CHART

CONDUCTOR CABLE	CABLE 1 POLE A 7/C 14 AWG	CABLE 2 POLE A 5/C 14 AWG	CABLE 3 POLE A 5/C 14 AWG	CABLE 4 POLE A 5/C 14 AWG	CABLE 5 POLE B 7/C 14 AWG	CABLE 6 POLE B 5/C 14 AWG	CABLE 7 POLE B 5/C 14 AWG	CABLE 8 POLE B 5/C 14 AWG	CABLE 9 POLE C 7/C 14 AWG	CABLE 10 POLE C 5/C 14 AWG	CABLE 11 POLE C 5/C 14 AWG	CABLE 12 POLE D 7/C 14 AWG	CABLE 13 POLE D 5/C 14 AWG	CABLE 14 POLE D 5/C 14 AWG
BLACK	SH 1 Y ARW PH 3	SH 2,3 Y PH 8	PED P6 DNW PED PH 6	SPARE	SH 4 Y ARW PH 5	SH 5,6 Y PH 2	SPARE	PED P3 DNW PED PH 2	SH 7 Y ARW PH 7	SH 8,9 Y PH 4	PED P4 DNW PED PH 2	SH 10 Y ARW PH 1	SH 11,12 Y PH 6	PED P5 DNW PED PH 6
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 1 R ARW PH 3	SH 2,3 R PH 8	SPARE	PED P1 DNW PED PH 8	SH 4 R ARW PH 5	SH 5,6 R PH 2	PED P2 DNW PED PH 8	SPARE	SH 7 R ARW PH 7	SH 8,9 R PH 4	SPARE	SH 10 R ARW PH 1	SH 11,12 R PH 6	SPARE
GREEN	SH 1 G ARW PH 3	SH 2,3 G PH 8	SPARE	PED P1 W PED PH 8	SH 4 G ARW PH 5	SH 5,6 G PH 2	PED P2 W PED PH 8	SPARE	SH 7 G ARW PH 7	SH 8,9 G PH 4	SPARE	SH 10 G ARW PH 1	SH 11,12 G PH 6	SPARE
ORANGE	SH 1 FYA OL N	SPARE	PED P6 W PED PH 6	SPARE	SH 4 FYA OL O	SPARE	SPARE	PED P3 W PED PH 2	SH 7 FYA OL P	SPARE	PED P4 W PED PH 2	SH 10 FYA OL M	SPARE	PED P5 W PED PH 6
BLUE	SPARE	N/A			SPARE	N/A			SPARE	N/A		SPARE	N/A	
WHITE/BLACK	SPARE	N/A			SPARE	N/A			SPARE	N/A		SPARE	N/A	

APS MESSAGE INFORMATION

APS UNIT #	ACKNOWLEDGEMENT DEFAULT "WAIT"	EXTENDED PRESS MESSAGE	WALK PHASE MESSAGE
		WAIT TO CROSS (STREET NAME) AT (CROSS STREET NAME)"	(STREET NAME) WALK SIGN IS ON TO CROSS, (STREET NAME)" OR TONE
P1	YES	LEANDER ROAD AT SOUTHWEST BYPASS	LEANDER ROAD
P2	YES	LEANDER ROAD AT SOUTHWEST BYPASS	LEANDER ROAD
P3	YES	SOUTHWEST BYPASS AT LEANDER ROAD	SOUTHWEST BYPASS
P4	YES	SOUTHWEST BYPASS AT LEANDER ROAD	SOUTHWEST BYPASS
P5	YES	SOUTHWEST BYPASS AT LEANDER ROAD	SOUTHWEST BYPASS
P6	YES	SOUTHWEST BYPASS AT LEANDER ROAD	SOUTHWEST BYPASS

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED PROFESSIONAL ENGINEER
3.23.2018

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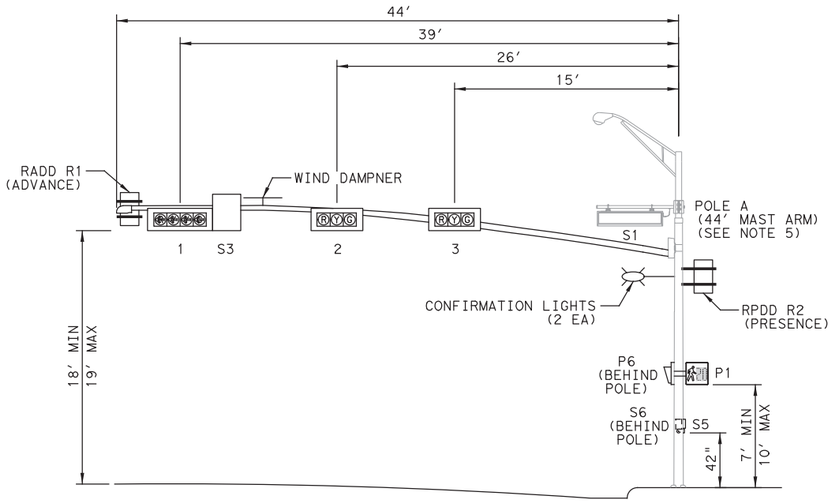
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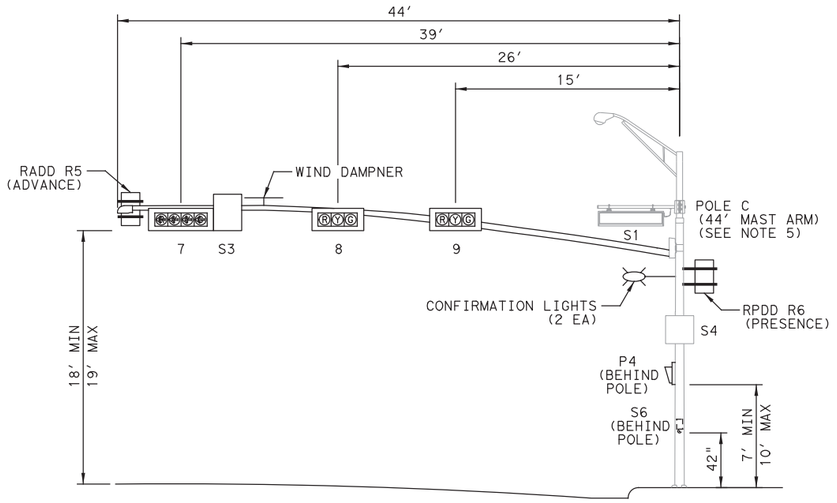
SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 CONDUIT AND CONDUCTOR SCHEDULES (ULTIMATE)

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TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	171
KK	2103	01	034	
CHECK				
TG				

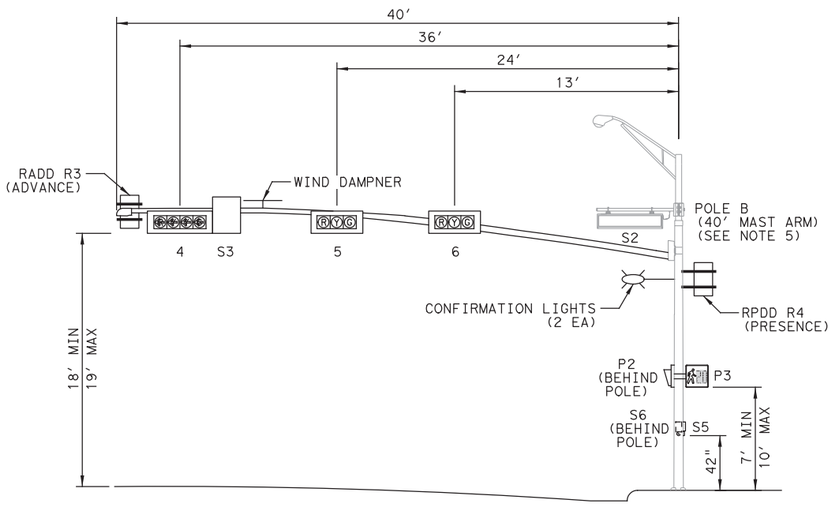
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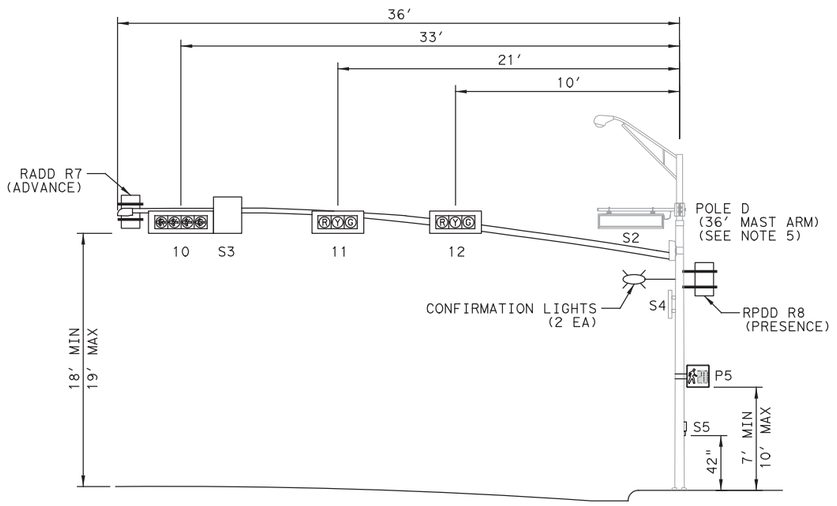
LOOKING NORTH ON SW BYPASS AT RM 2243(LEANDER RD)



LOOKING SOUTH ON SW BYPASS AT RM 2243(LEANDER RD)



LOOKING EAST ON RM 2243(LEANDER RD) AT SW BYPASS



LOOKING WEST ON RM 2243(LEANDER RD) AT SW BYPASS

NOTES

1. CENTER HEADS OVER THE LANES OR AS DIRECTED BY THE ENGINEER. DISTANCES SHOWN ALONG MAST ARMS ARE APPROXIMATE AND MUST BE ADJUSTED IN FIELD AS NEEDED.
2. CALCULATE MAST ARM ATTACHMENT HEIGHT IN THE FIELD FOR APPROVAL BY THE ENGINEER.
3. INSTALL WIND DAMPNERS ON MAST ARMS 40′ OR LONGER.
4. INSTALL RADAR LOCATIONS AS DIRECTED BY THE ENGINEER.
5. SIGNAL POLES, LUMINAIRES, AND ILSNS INSTALLED DURING INTERIM CONDITION. MAST ARMS, SIGNAL HEADS, PEDESTRIAN HEADS, APS PUSH BUTTONS, SIGNAL RELATED SIGNS, RADAR UNITS, AND CONFIRMATION LIGHTS TO BE INSTALLED DURING ULTIMATE CONDITION.
6. MOUNT PUSH BUTTONS ADJACENT TO PEDESTRIAN LANDING AREA ACCESSIBLE TO MEET ADA AND TMUTCD REQUIREMENTS. SEE TXDOT STANDARD PED-18.

NOT TO SCALE

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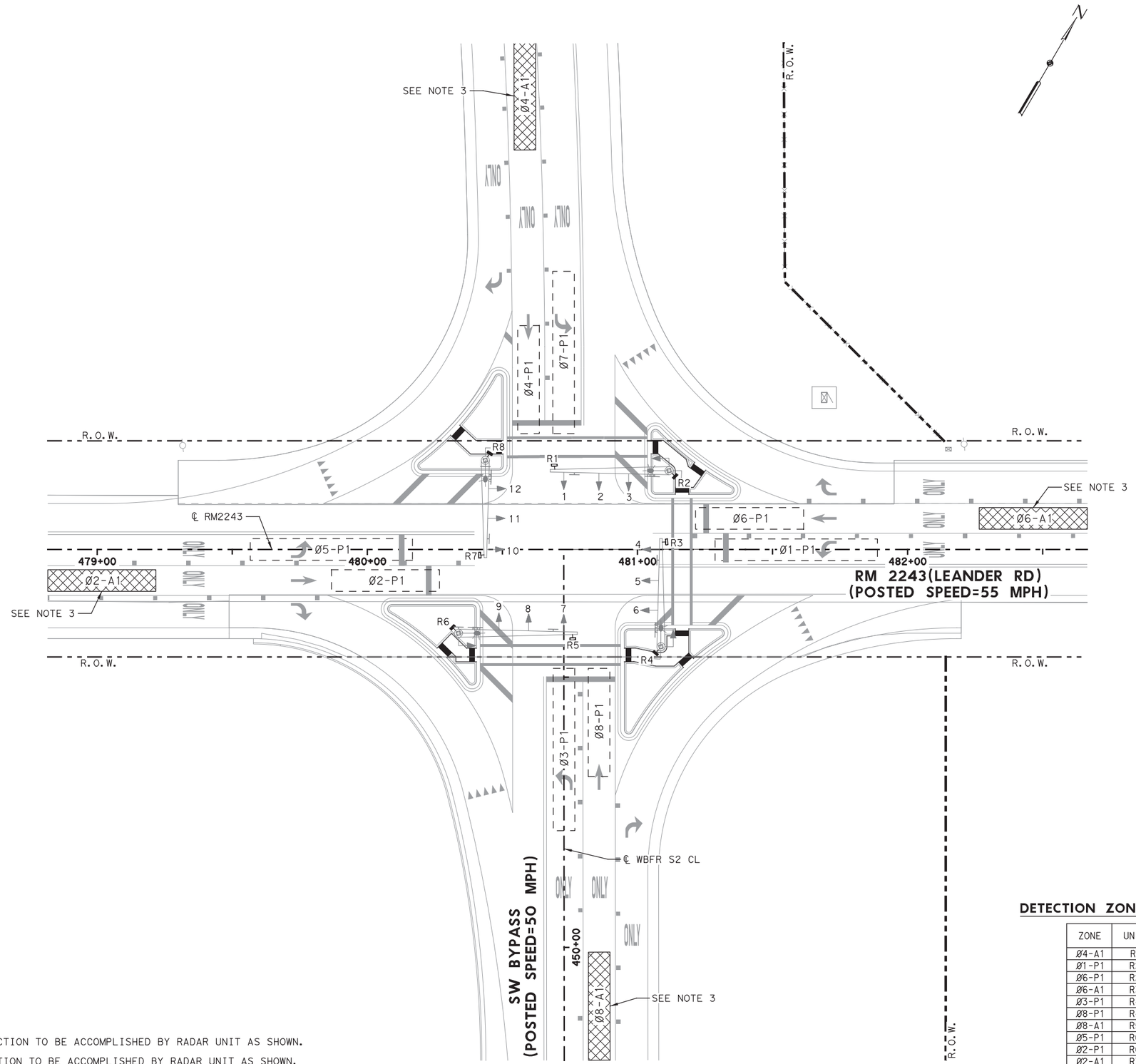
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SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 ELEVATIONS (ULTIMATE)

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AF	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	172
KK				
CHECK	2103	01	034	
TG				

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LEGEND

- MAST ARM
- SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- SIGN ON MAST ARM
- ILSN SIGN
- RADAR (PRESENCE DETECTION)
- RADAR (ADVANCE DETECTION)
- SIGNAL POLE
- LUMINAIRE
- CONTROLLER
- SERVICE METER
- RIGHT OF WAY
- PROP. RIGHT OF WAY

0 20 40 60 80
SCALE IN FEET

NOTES

1. PRESENCE DETECTION TO BE ACCOMPLISHED BY RADAR UNIT AS SHOWN.
2. ADVANCE DETECTION TO BE ACCOMPLISHED BY RADAR UNIT AS SHOWN.
3. ADVANCE DETECTION ZONE BEGINS 100 FEET FROM STOP BAR AND EXTENDS TO 400 FEET.

DETECTION ZONE INFORMATION

ZONE	UNIT	SIZE (L'XW')
Ø4-A1	R1	300'X8'
Ø1-P1	R2	60'X8'
Ø6-P1	R2	40'X8'
Ø6-A1	R3	300'X8'
Ø3-P1	R4	60'X8'
Ø8-P1	R4	40'X8'
Ø8-A1	R5	300'X8'
Ø5-P1	R6	60'X8'
Ø2-P1	R6	40'X8'
Ø2-A1	R7	300'X8'
Ø7-P1	R8	60'X8'
Ø4-P1	R8	40'X8'

STATE OF TEXAS
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SOUTHWEST BYPASS SEGMENT 2
SW BYPASS AND RM 2243 VEHICLE DETECTION DETAILS (ULTIMATE)

SCALE: 1"=40'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS AF	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK KK	TEXAS	AUS	WILLIAMSON	173
CHECK TG	CONTROL 2103	SECTION 01	JOB 034	

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FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

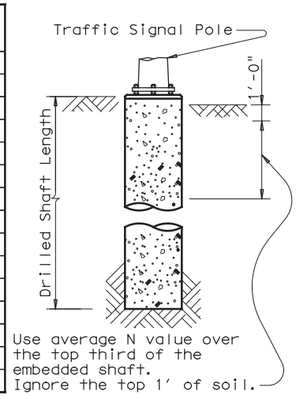
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET)				
				24-A	30-A	36-A	36-B	42-A
POLE A	10	36-A	1			13		
POLE B	10	36-A	1			13		
POLE C	10	36-A	1			13		
POLE D	10	36-A	1			13		
TOTAL DRILLED SHAFT LENGTHS						52		

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

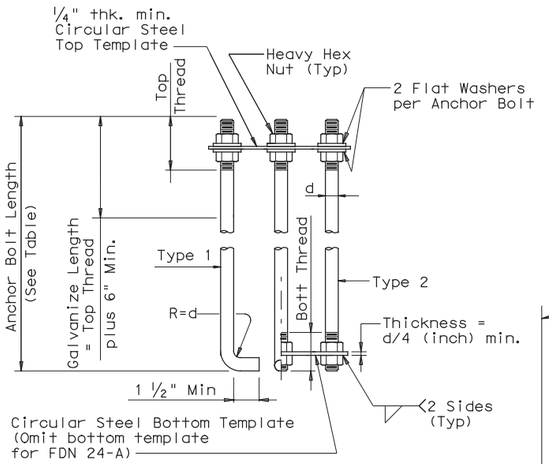


ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.

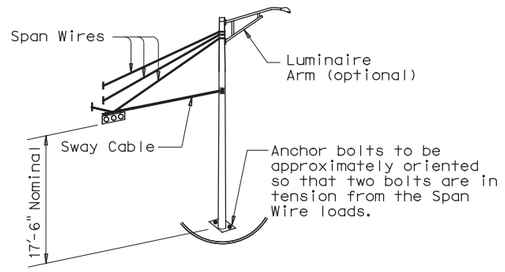
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



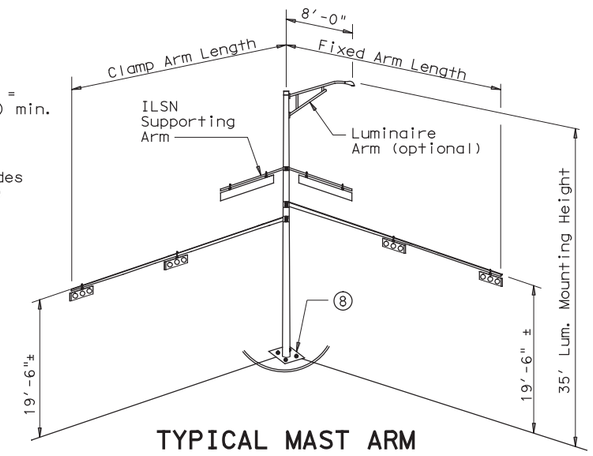
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

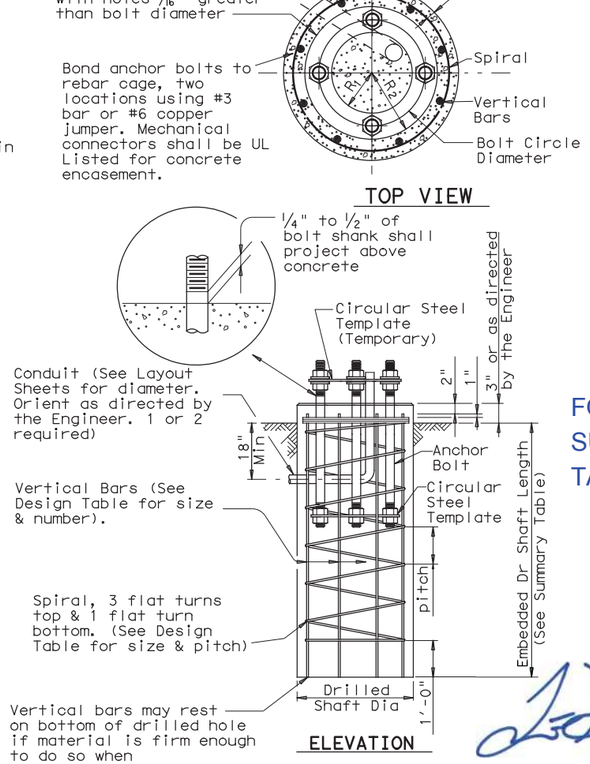
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

FOUNDATION SUMMARY TABLE

STATE OF TEXAS
TIMOTHY GRIMES
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3.23.2018

Texas Department of Transportation
Traffic Operations Division

SW BYPASS AND RM 2243 TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

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REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		174

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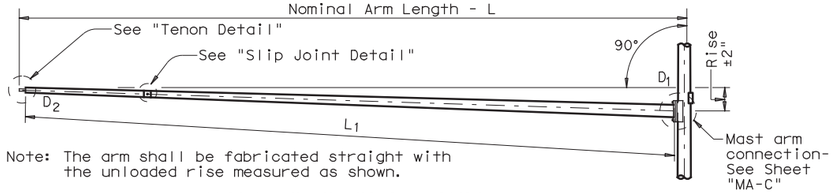
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

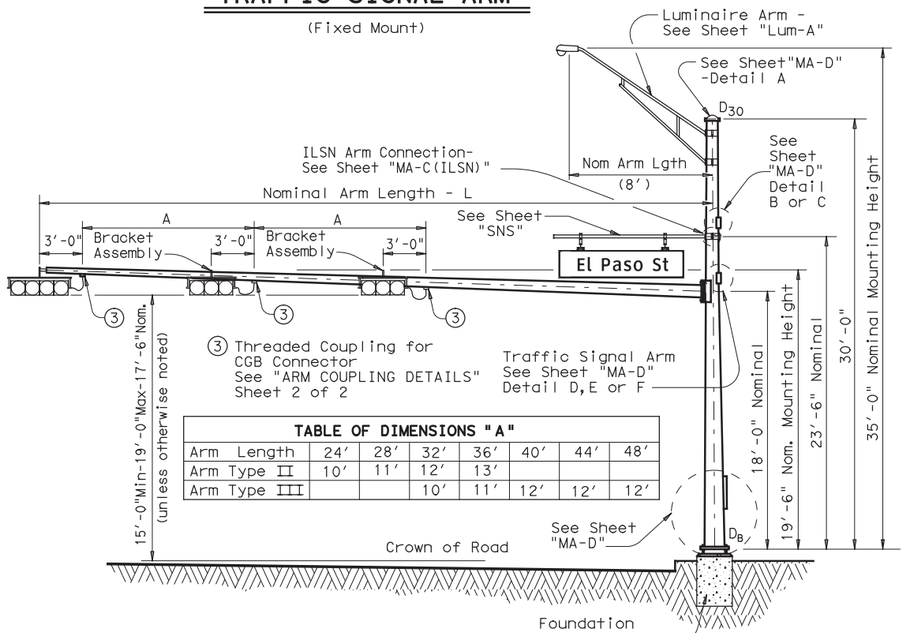


TABLE OF DIMENSIONS "A"

Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80	1	36S-80		36-80	
40	40L-80	1	40S-80		40-80	
44	44L-80	2	44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	1
40					40III-80	1
44					44III-80	2
48					48III-80	

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	4

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	4

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3′-4"	
1 ¾"	3′-10"	4

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

SHIPPING PARTS LIST

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED PROFESSIONAL ENGINEER

3.23.2018

Texas Department of Transportation
Traffic Operations Division

SW BYPASS AND RM 2243
TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)
SMA-80(1)-12

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DN: MS	CK: JSY	DW: MMF	CK: JSY

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CONT	SECT	JOB	HIGHWAY
2103	01	034	

DIST	COUNTY	SHEET NO.
AUS	WILLIAMSON	175

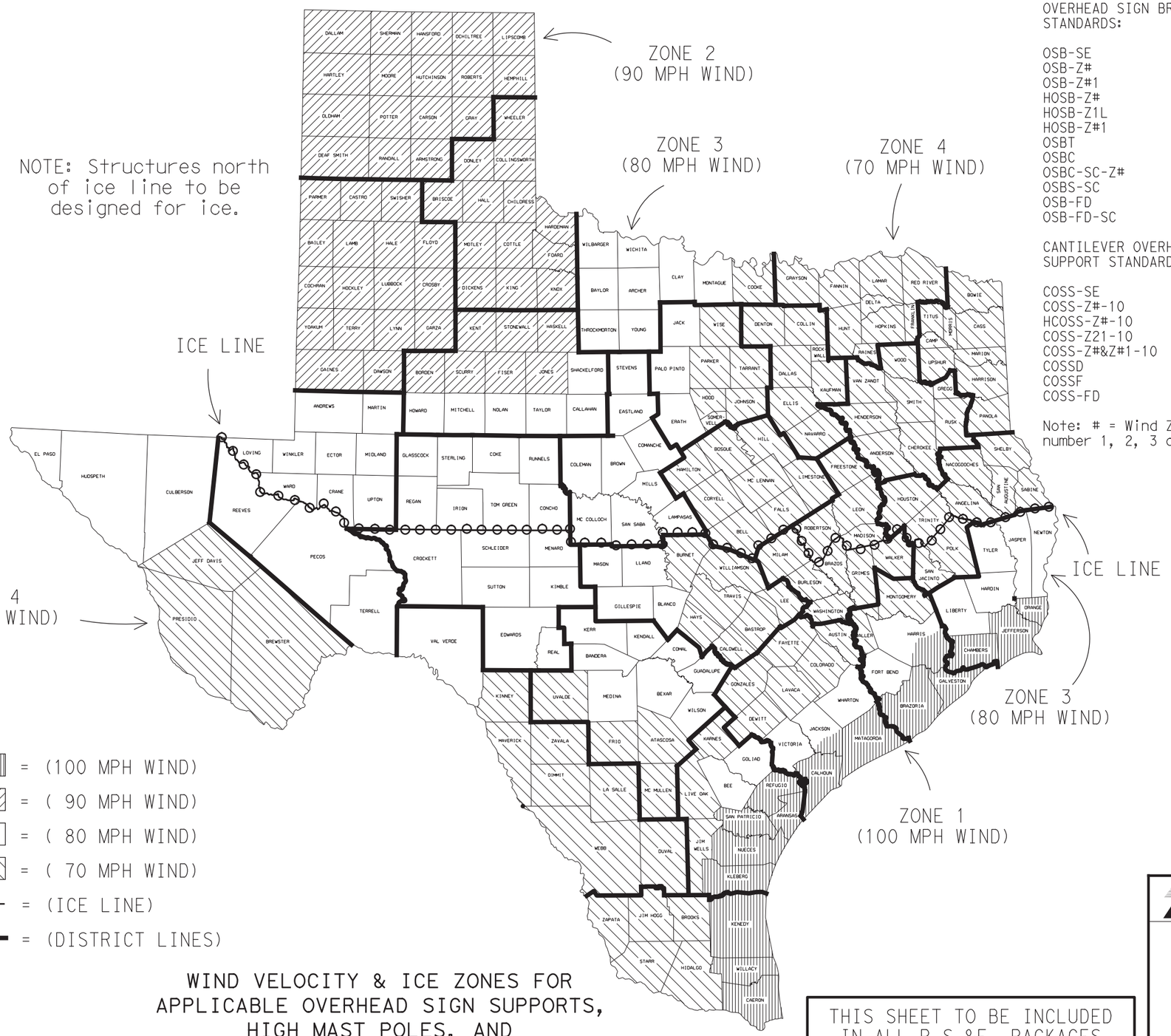
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LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation | Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

WV & IZ-14

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© TxDOT April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		176

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

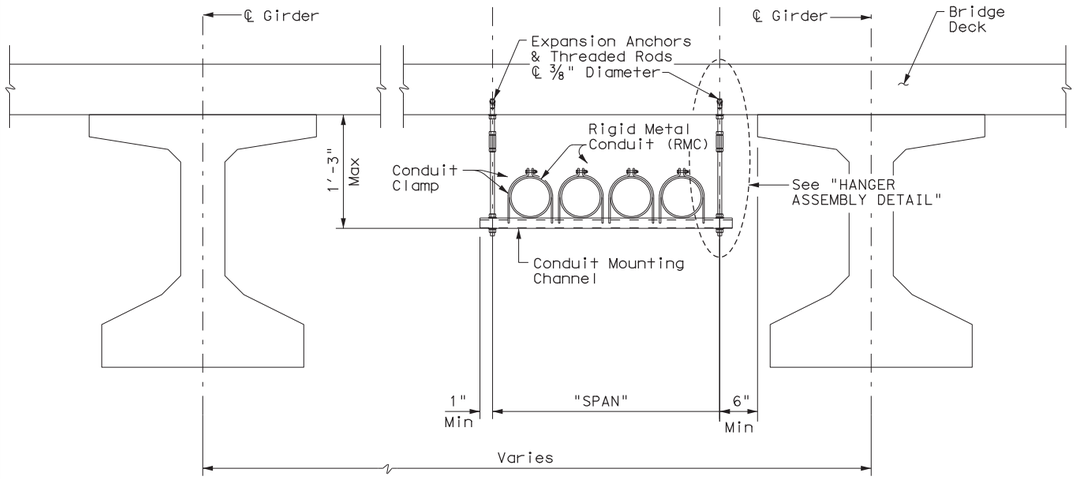
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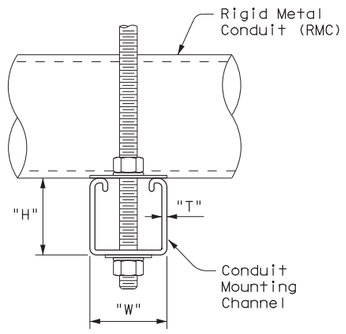
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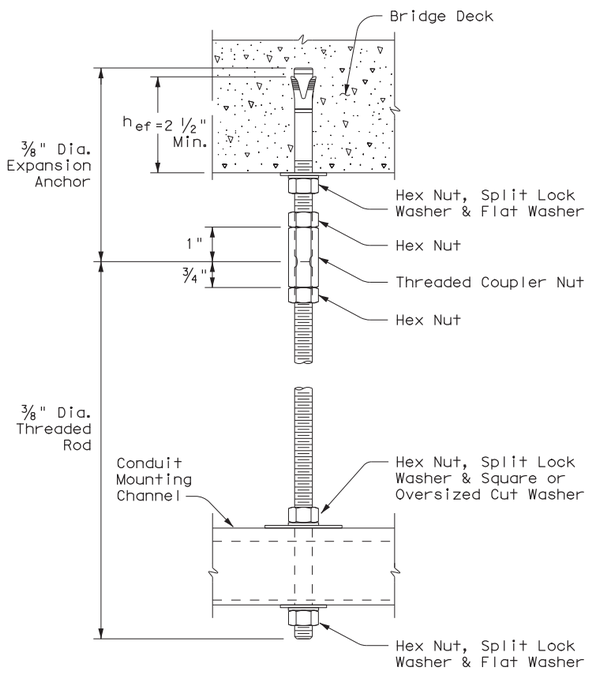


CONDUIT HANGING DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less than 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

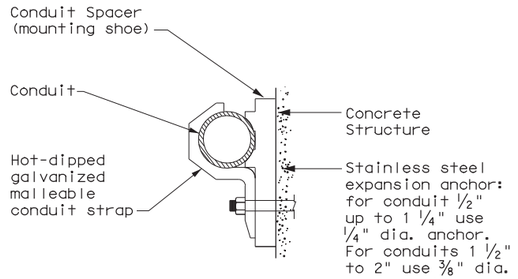
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

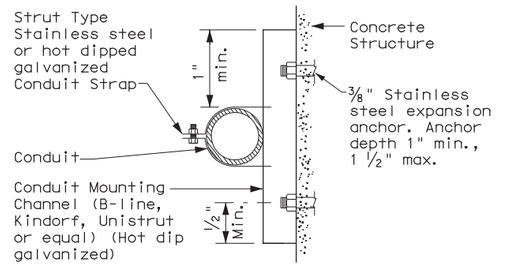




HANGER ASSEMBLY DETAIL

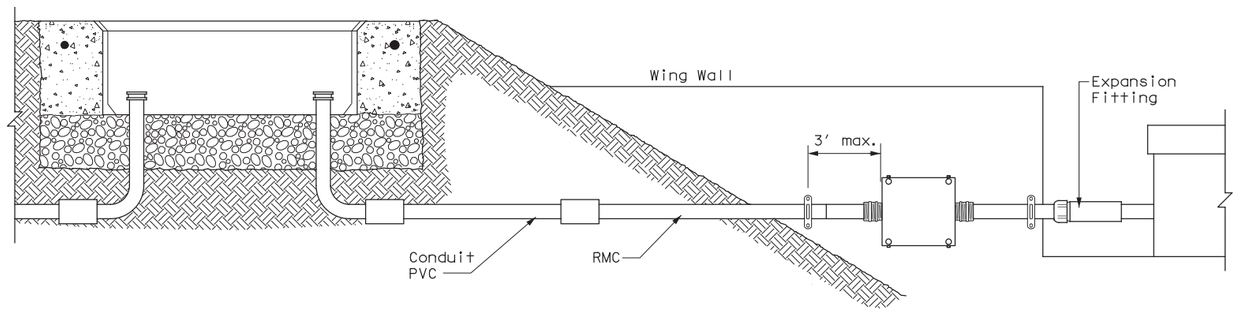
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)B.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.

4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.

5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (h_{ef}), as shown. Increase (h_{ef})as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.

6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (h_{ef}). No lateral loads shall be introduced after conduit installation.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUIT SUPPORTS

ED(2)-14

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

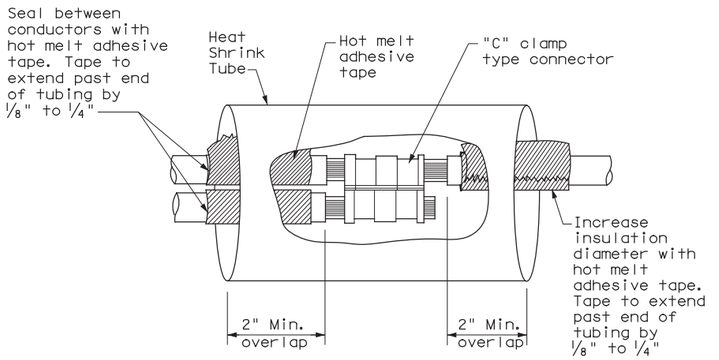
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

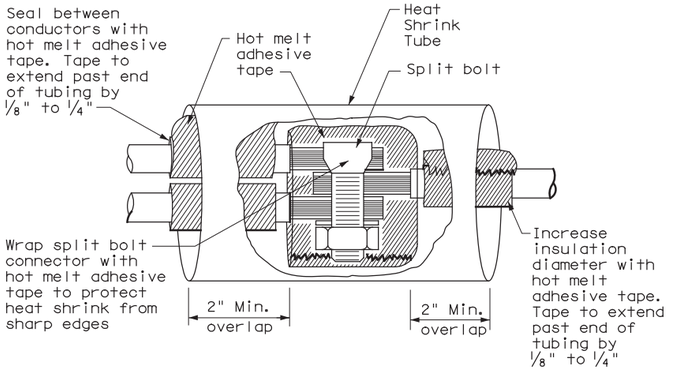
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

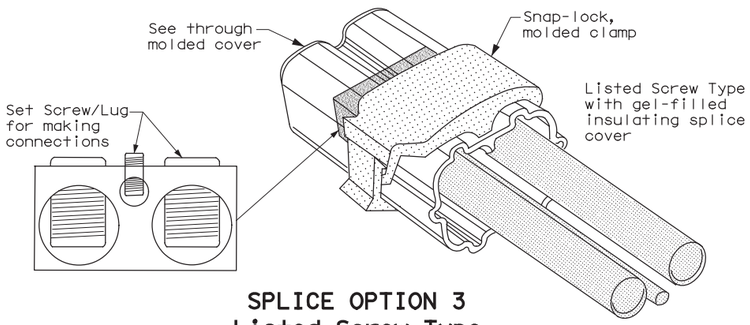
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

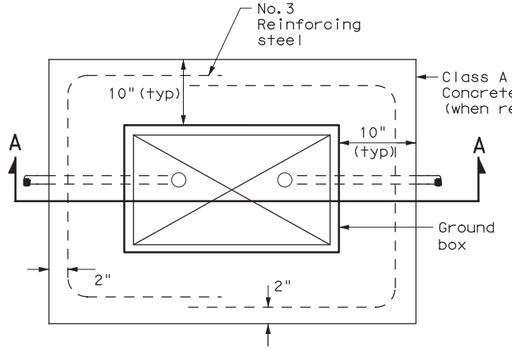
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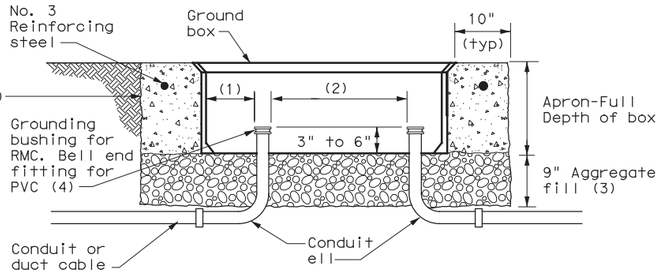
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PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

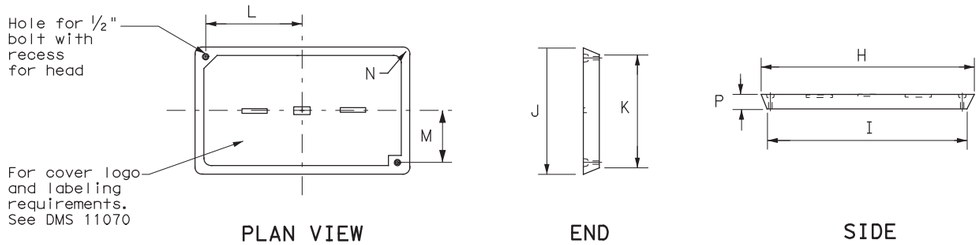
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.



PLAN VIEW END SIDE

GROUND BOX COVER

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

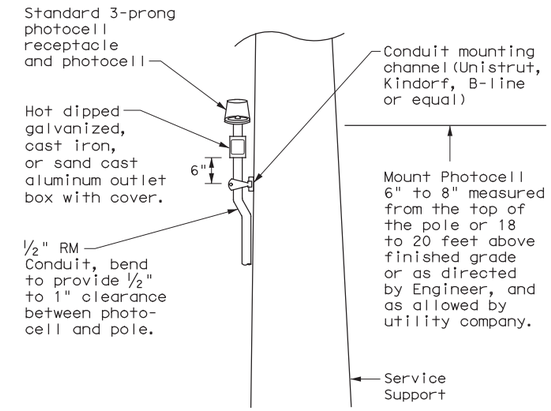
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

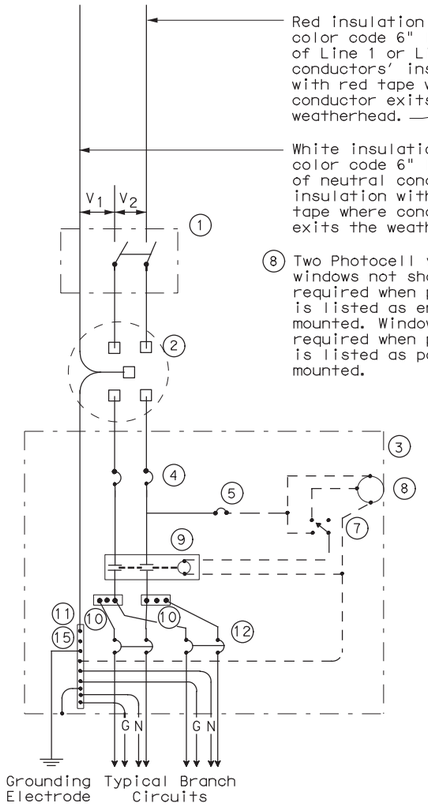
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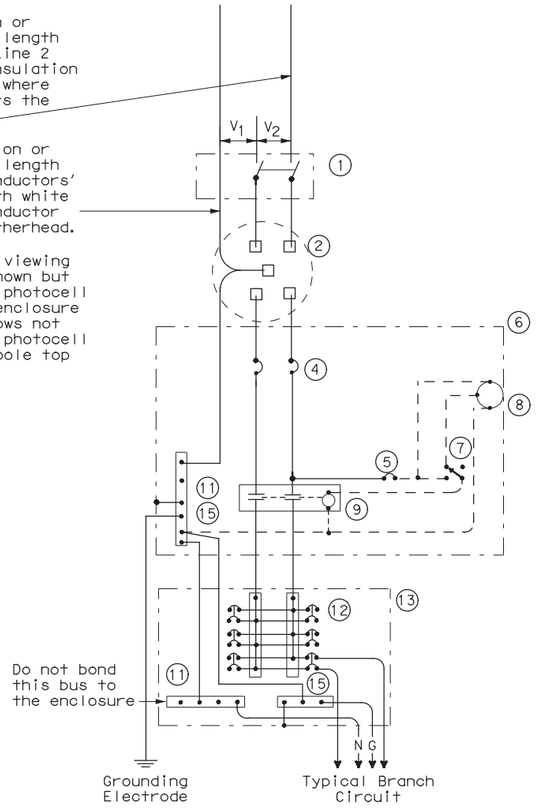
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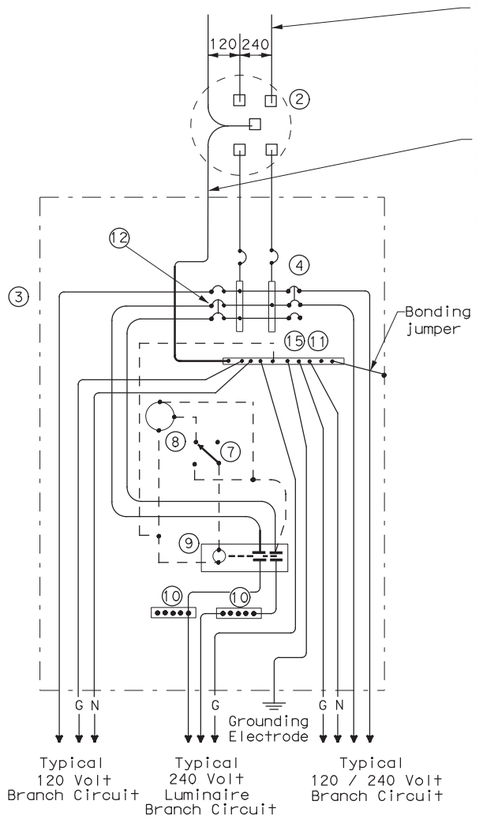
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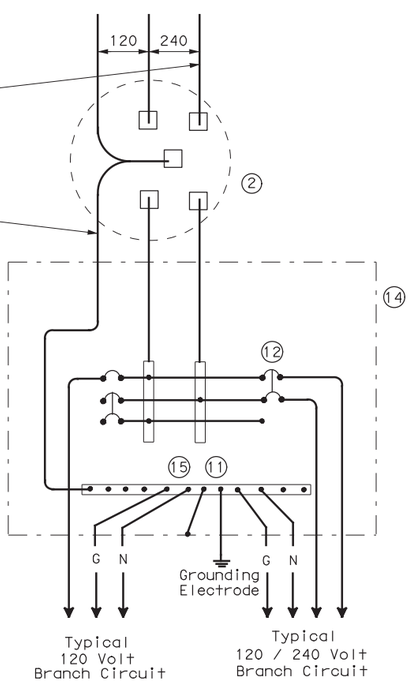
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
——N——	Neutral Conductor
——G——	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

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Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

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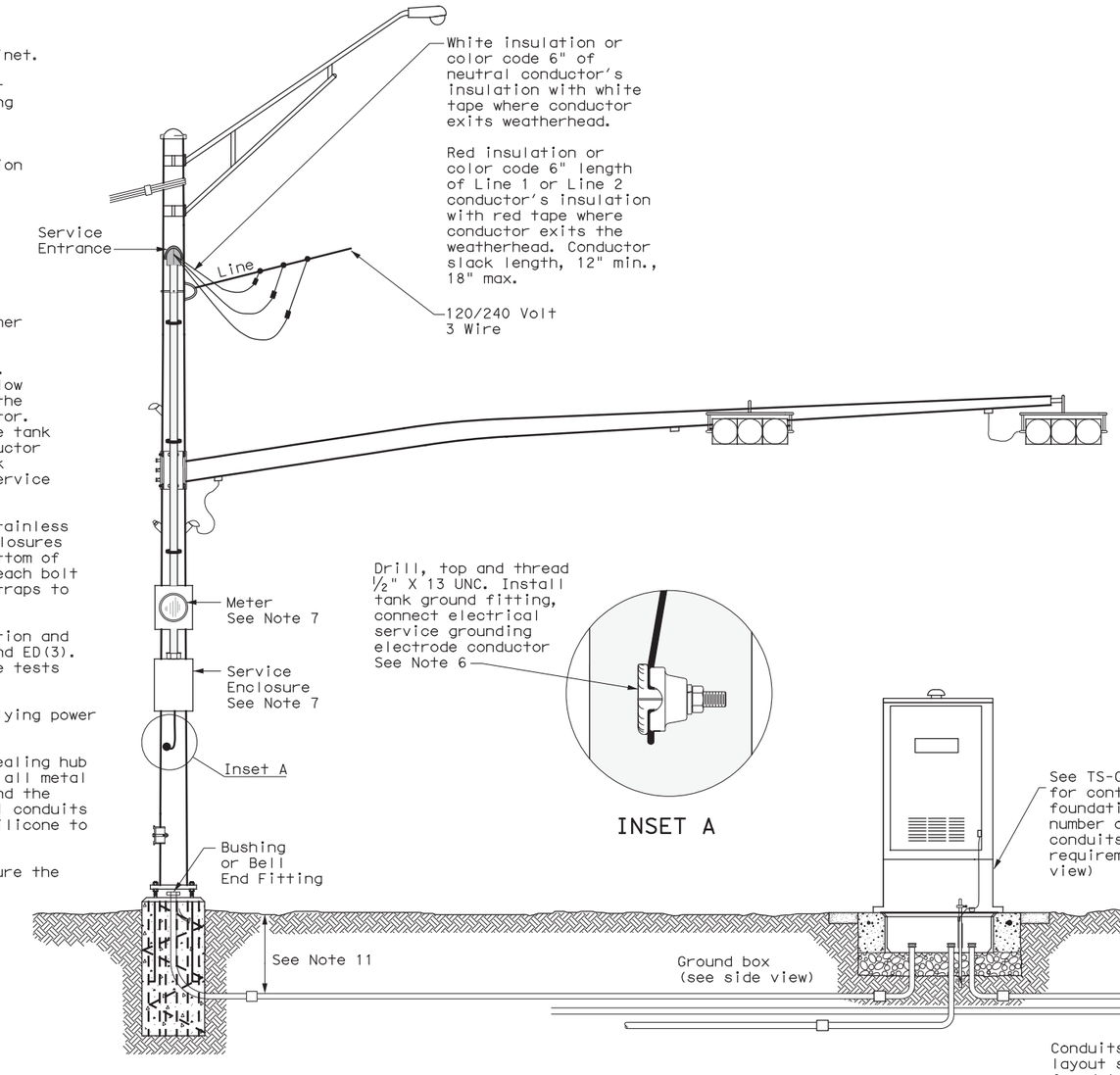
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TRAFFIC SIGNAL NOTES

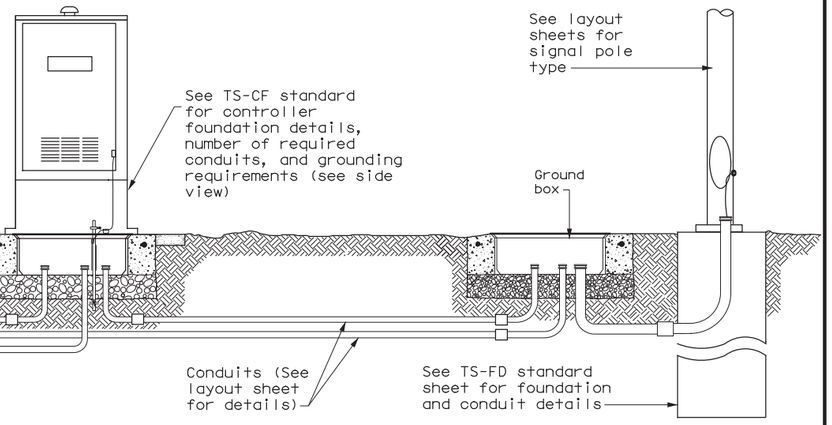
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

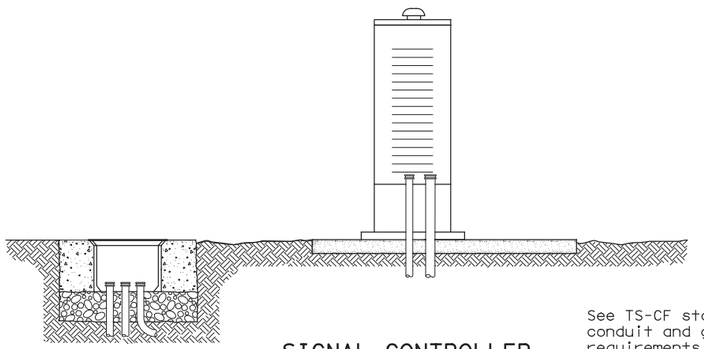
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

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71H

PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

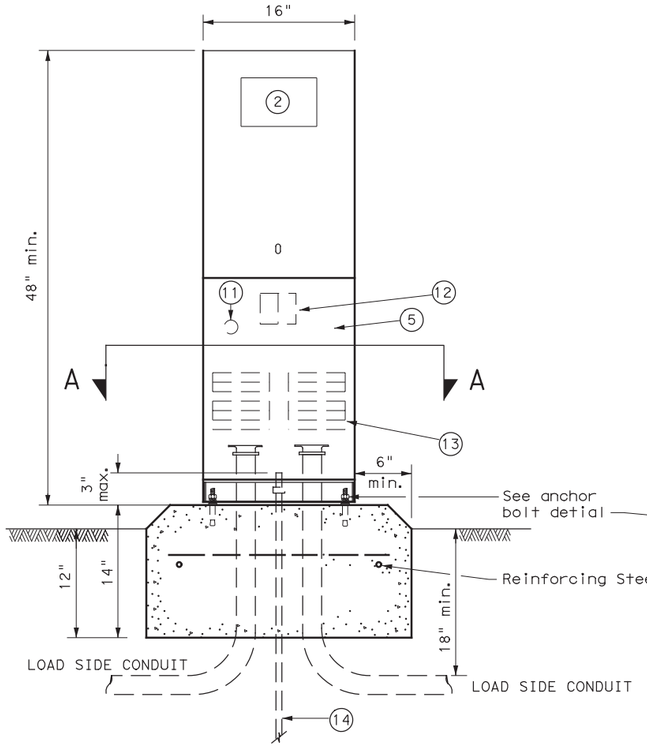
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

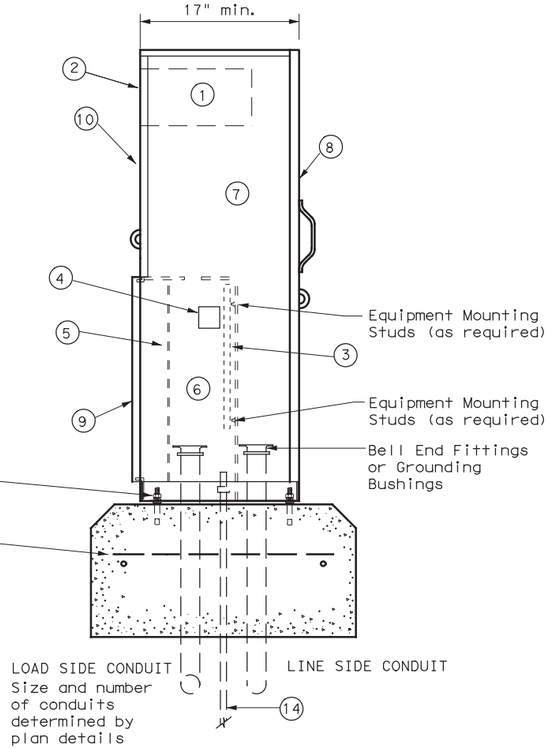
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

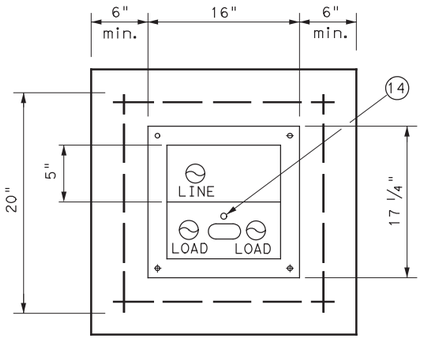


FRONT VIEW

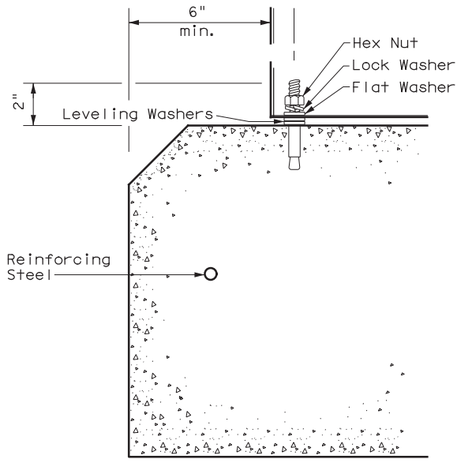


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS
ED(9)-14

FILE: ed9-14.dgn			DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT October 2014	CONT	SECT	JOB		HIGHWAY		
REVISIONS	2103	01	034				
	DIST	COUNTY				SHEET NO.	
	AUS	WILLIAMSON				184	

71J

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

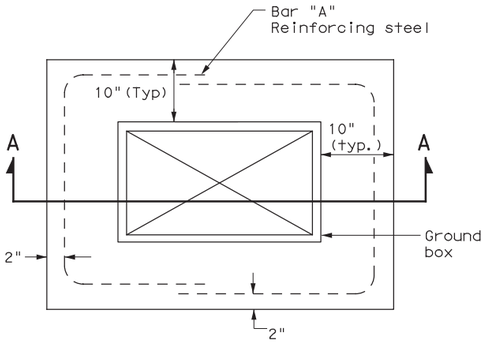
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

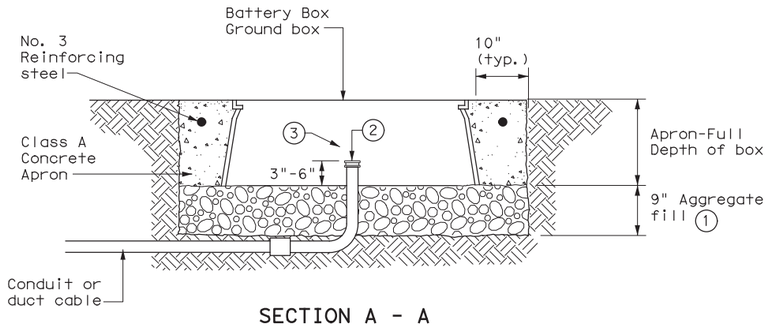
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



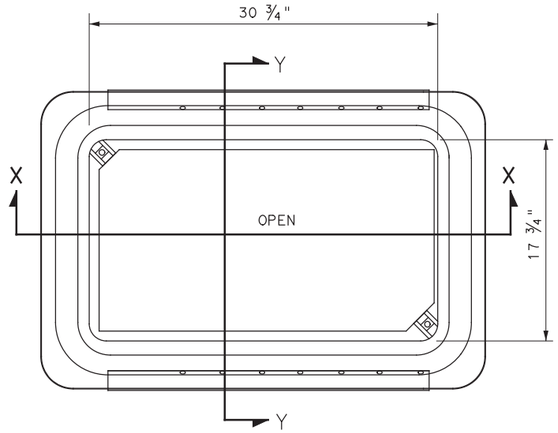
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

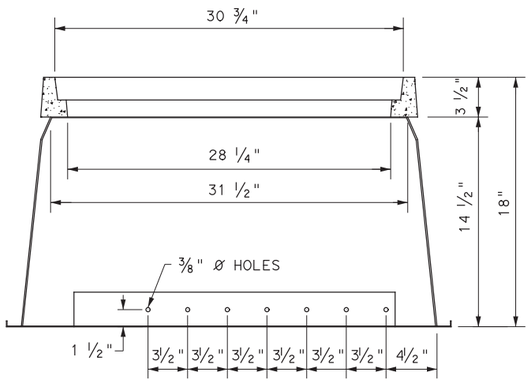
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

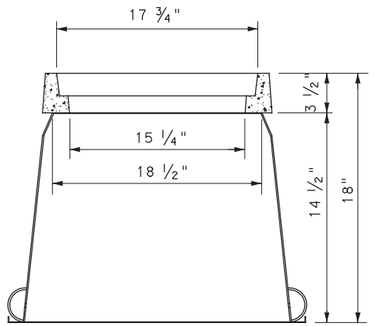
(3) Install all conduits in a neat and workmanlike manner.



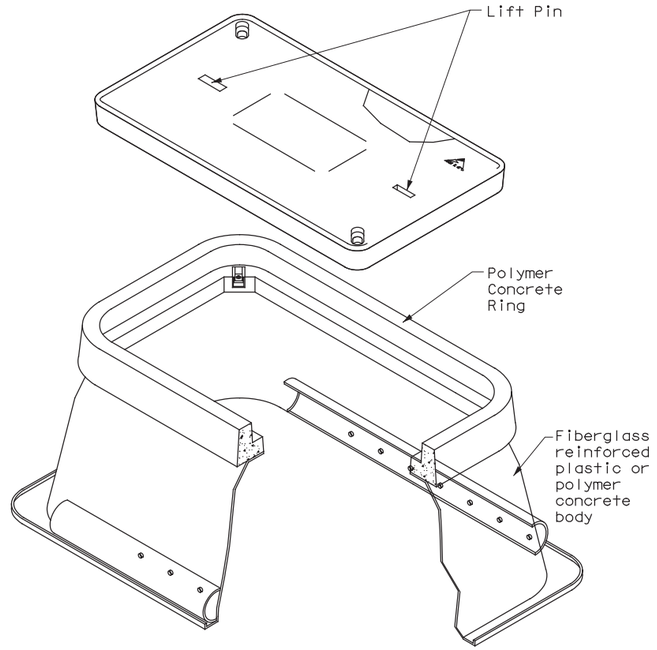
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



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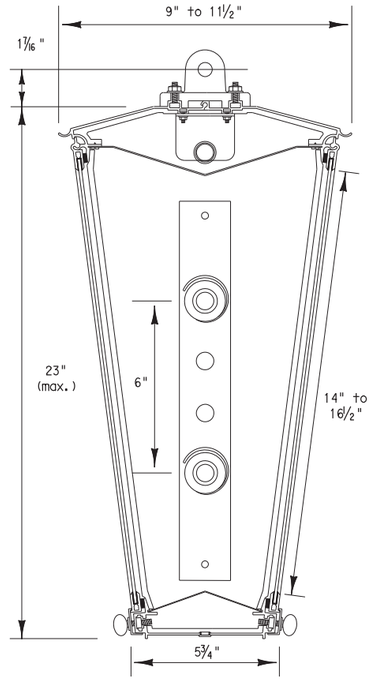
ELECTRICAL DETAILS BATTERY BOX GROUND BOXES

ED(12)-14

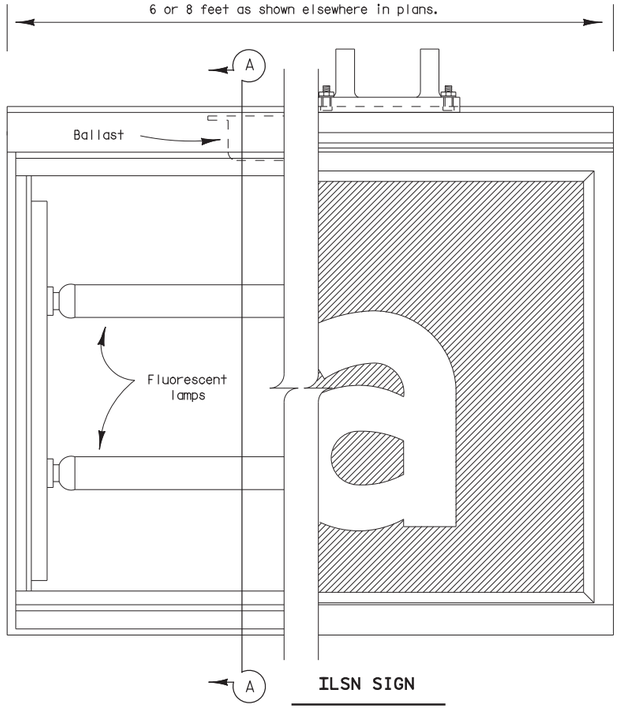
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	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		185

71M

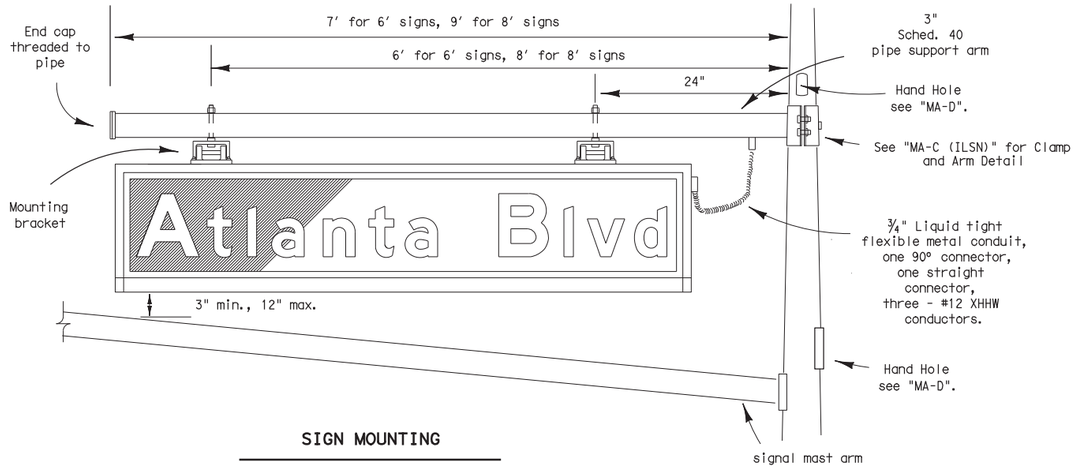
INTERNALLY LIGHTED STREET NAME SIGN DETAILS



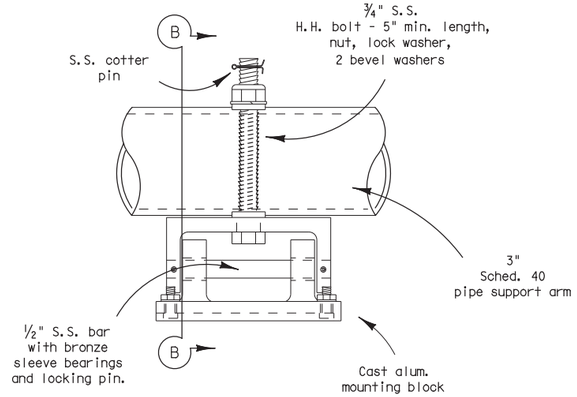
Section A-A



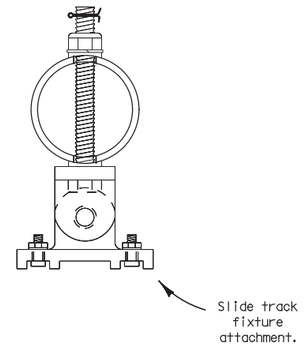
ILSN SIGN



SIGN MOUNTING



MOUNTING BRACKET



Section B-B

ILSN SIGN NOTES:

1. Eight foot ILSN sign shall not exceed 11.5 sq.ft. effective projected area (EPA) and shall not exceed a weight of 85 lbs.
   Six foot ILSN sign shall not exceed 8.7 sq.ft. EPA and shall not exceed a weight of 70 lbs.
2. Sign message shall be as shown elsewhere in the plans.
3. See Special Specification, "internally Lighted Street Name Signs" for additional details.

EXPLANATION OF DESCRIPTION

ILSN Sign 6 S

- ILSN Sign: Internally lighted street name sign
- 6: Sign length; 6 or 8 ft.
- S: Single or double face

Texas Department of Transportation
Traffic Operations Division

STREET NAME SIGN DETAILS (ILLUMINATED)

SNS-95

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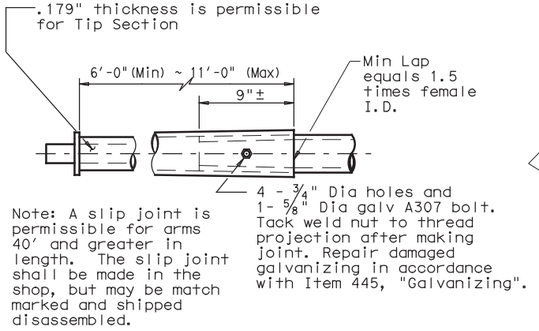
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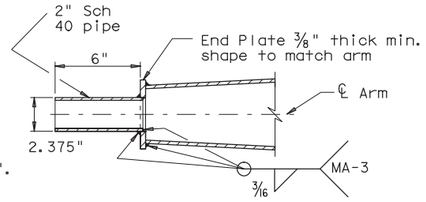
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AUS	WILLIAMSON	186

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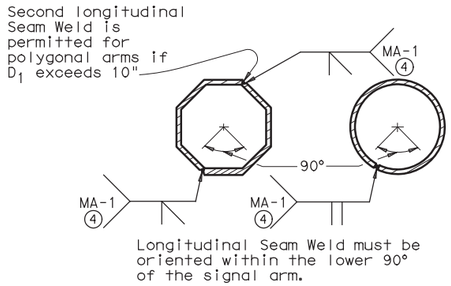
SLIP JOINT DETAIL



TENON DETAIL

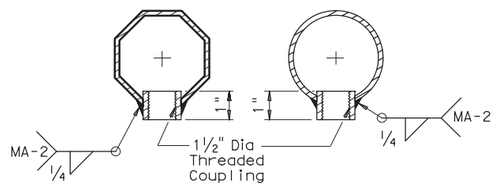
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

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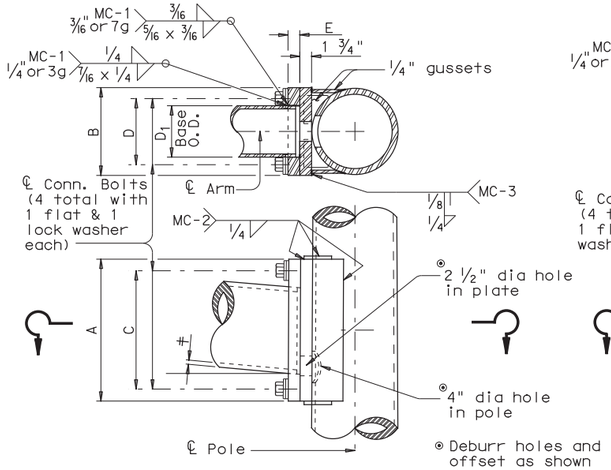
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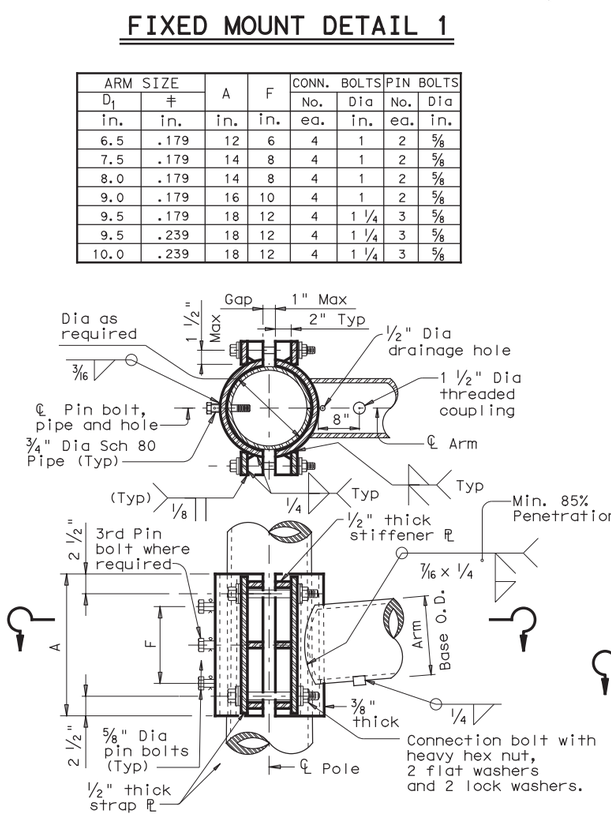
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ARM SIZE D_1 in.	ARM SIZE ℄ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



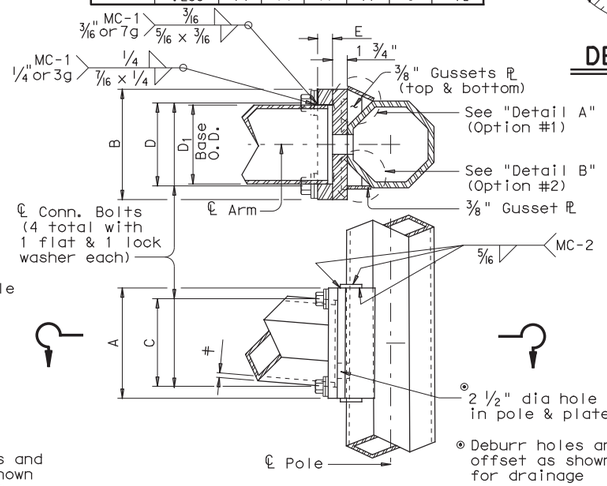
FIXED MOUNT DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ℄ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 ¼	3	5/8
9.5	.239	18	12	4	1 ¼	3	5/8
10.0	.239	18	12	4	1 ¼	3	5/8

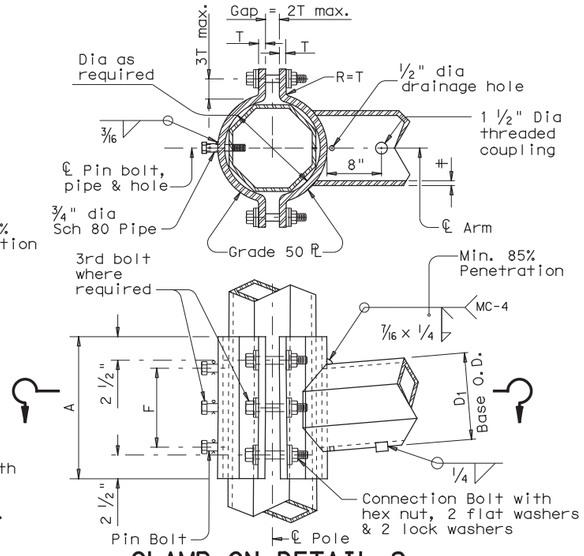


CLAMP-ON DETAIL 1

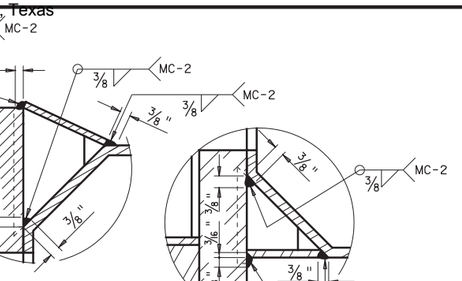
ARM SIZE D_1 in.	ARM SIZE ℄ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	6	¾	4	¾	2	5/8
7.5	.179	14	8	¾	4	¾	2	5/8
8.0	.179	14	8	¾	4	¾	2	5/8
9.0	.179	16	10	⅞	4	1	2	5/8
10.0	.179	18	10	⅞	4	1	2	5/8
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FIXED MOUNT DETAIL 2

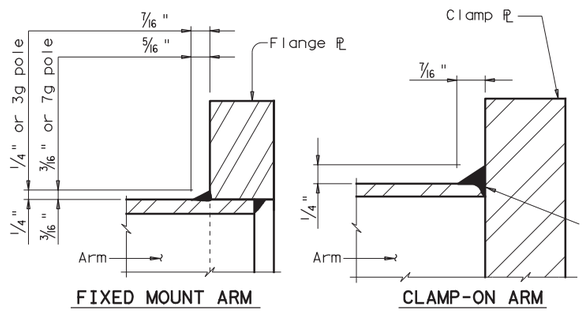


CLAMP-ON DETAIL 2



DETAIL A

DETAIL B

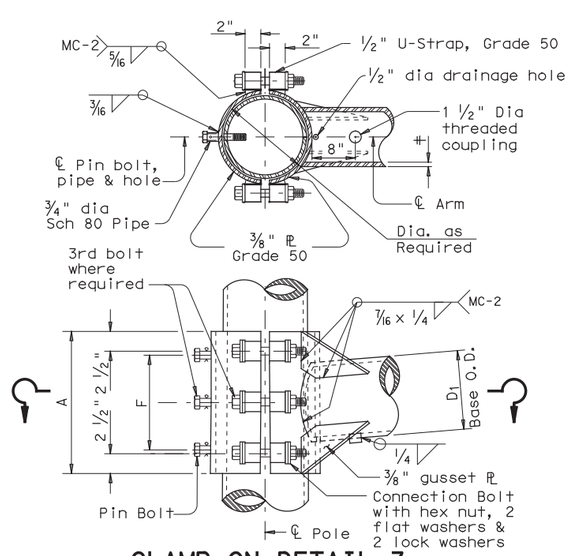


FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

ARM SIZE D_1 in.	ARM SIZE ℄ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
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7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 9/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

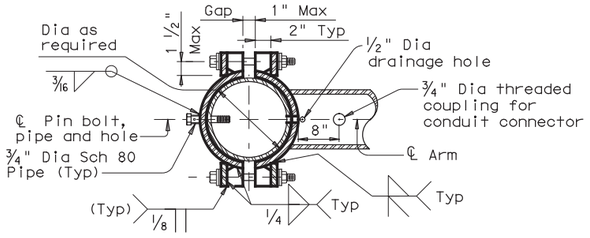
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1-12	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		126A

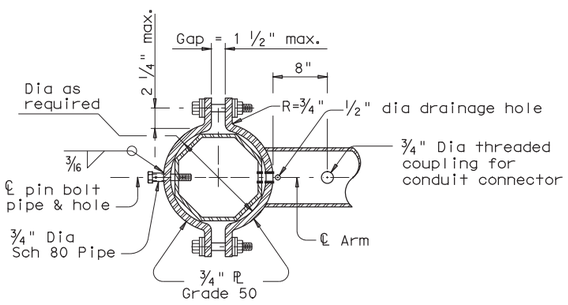
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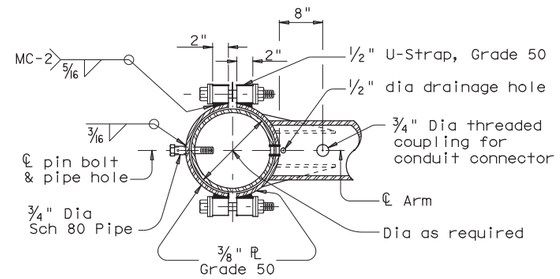
TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1, 2 and 3						
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
	in.	in.	ea.	in.	ea.	in.
3 in. dia Schedule 40 Pipe	10	4	4	¾	2	⅝



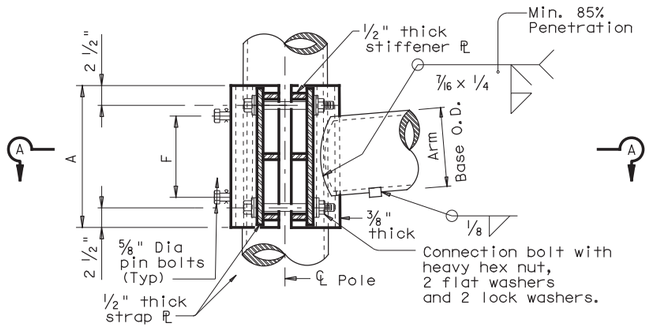
SECTION A-A



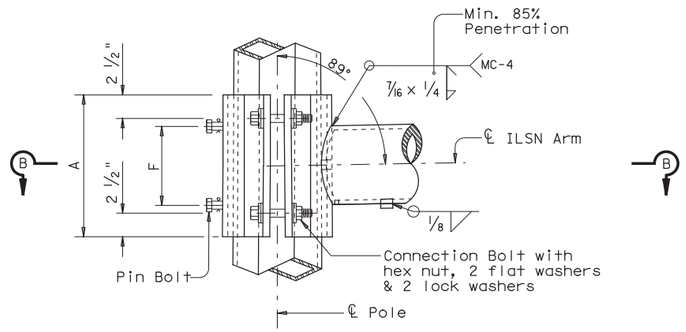
SECTION B-B



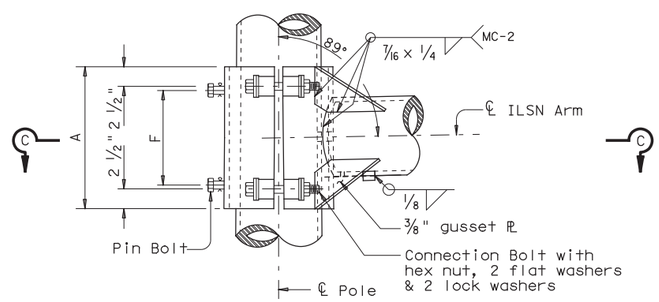
SECTION C-C



ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:

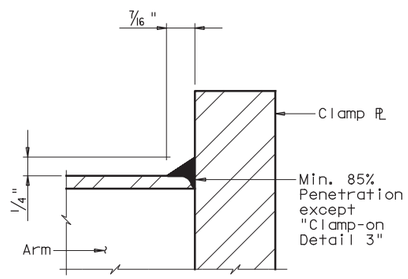
Clamp-on details shall be used for ILSN support arm assemblies. A 1 ½" inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the details.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

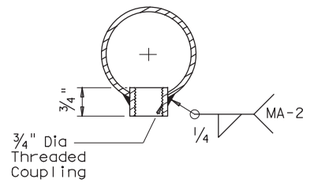
NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 9/16" dia holes for a ⅛" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON ARM

ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST-ARM CONNECTIONS

MA-C(ILSN)-12

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CONT	SECT	JOB	HIGHWAY
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DIST	COUNTY	SHEET NO.
AUS	WILLIAMSON	189

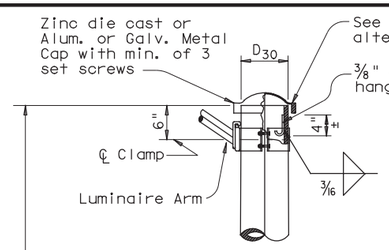
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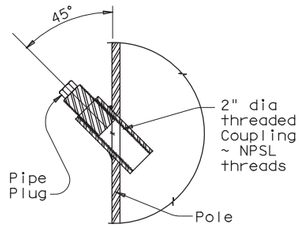
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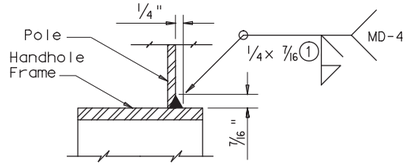


DETAIL A

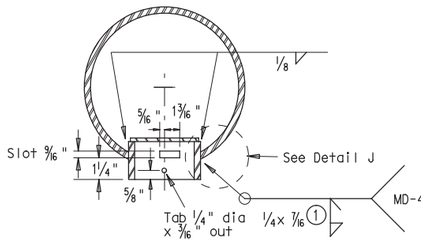
(for pole with luminaire)



POLE COUPLING DETAIL

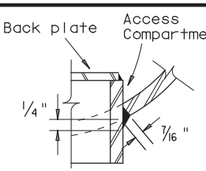


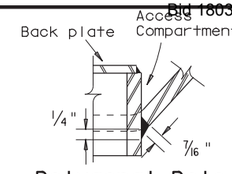
DETAIL G



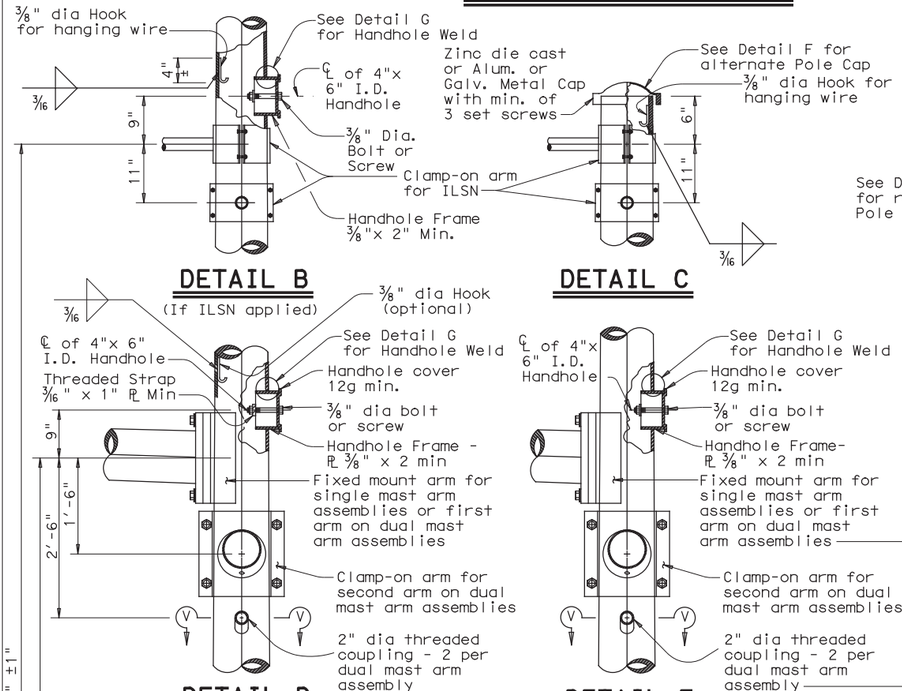
SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.





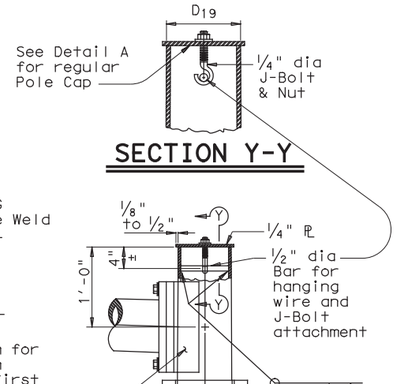
DETAIL J



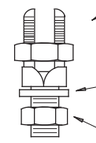
DETAIL B

(If ILSN applied)

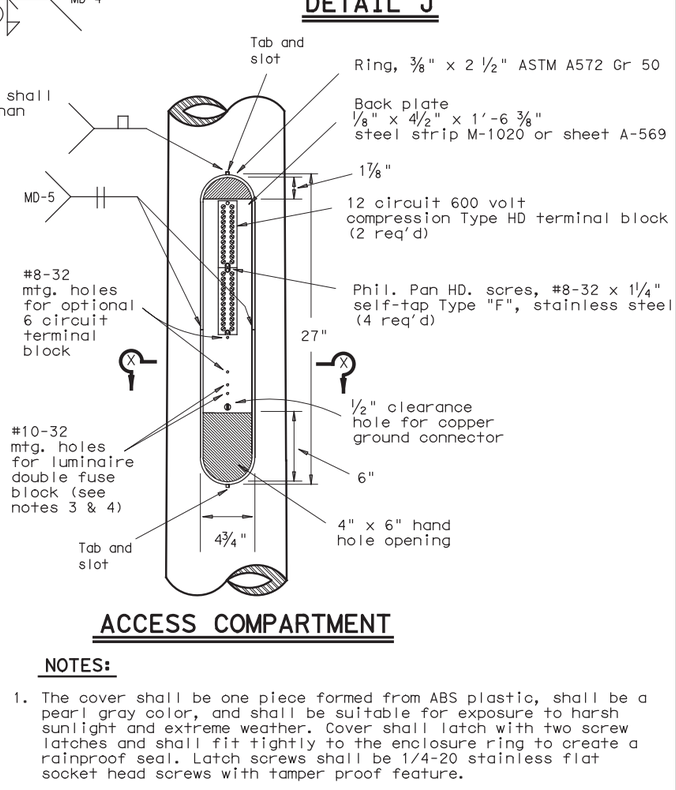
DETAIL C



SECTION Y-Y



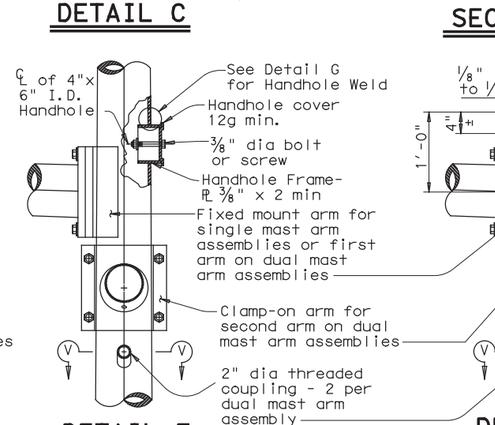
COPPER GROUND CONNECTOR



ACCESS COMPARTMENT

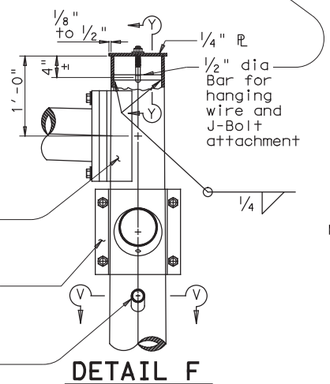
DETAIL D

(for 30' pole with luminaire and ILSN sign)



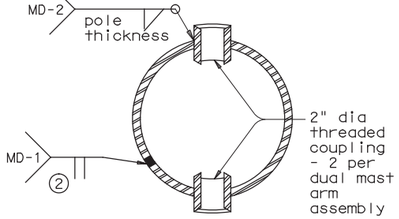
DETAIL E

(for 24' pole with ILSN sign and no luminaire)



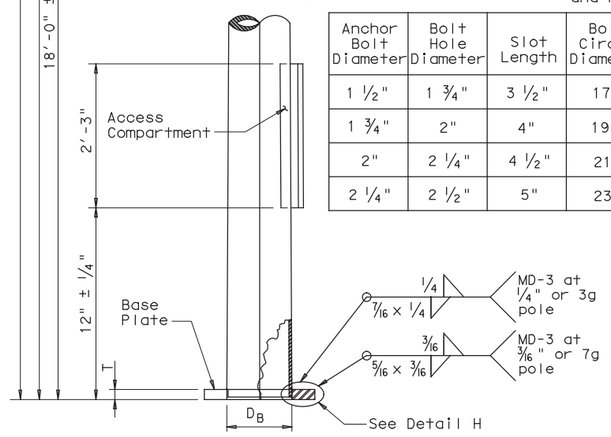
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

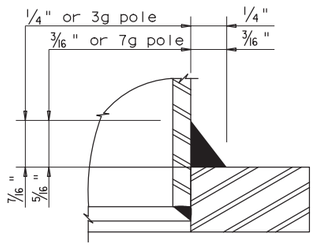


SECTION V-V

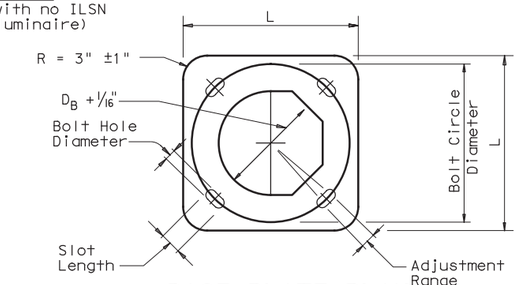
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



POLE ELEVATION



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

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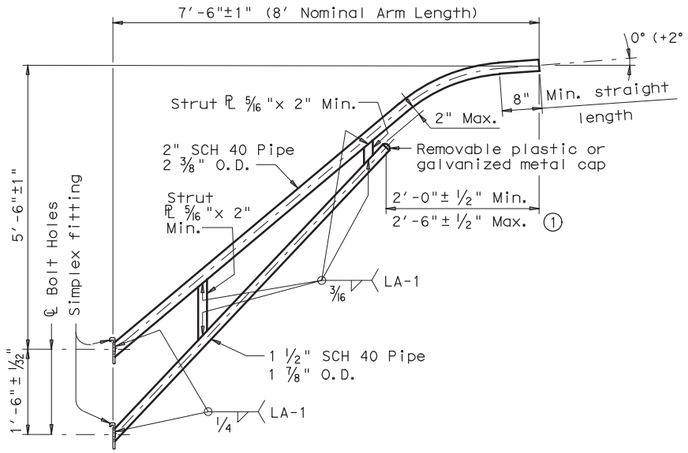
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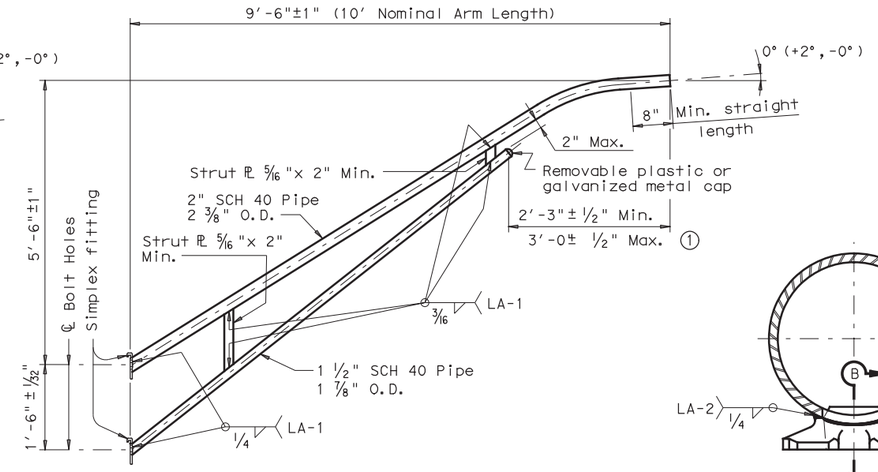
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DIST	COUNTY	SHEET NO.
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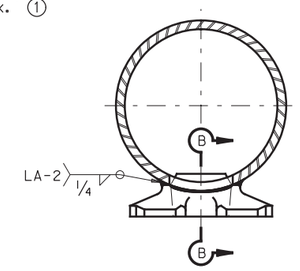
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8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

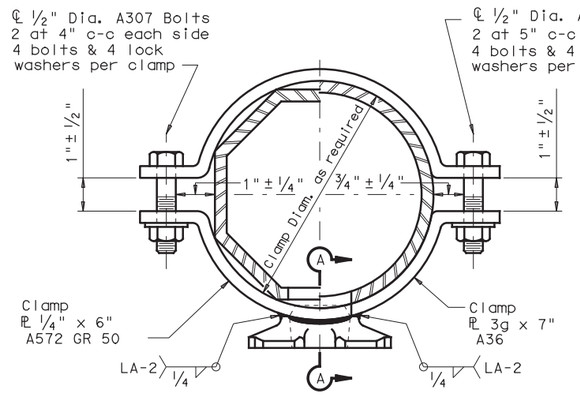
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

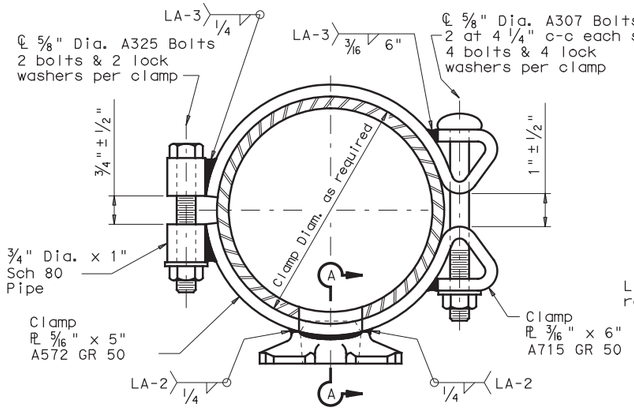
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



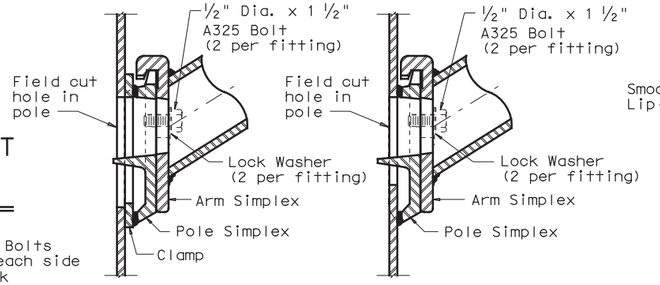
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



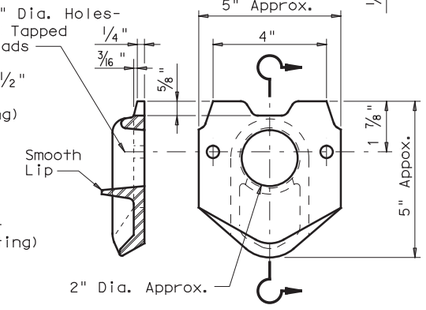
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CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

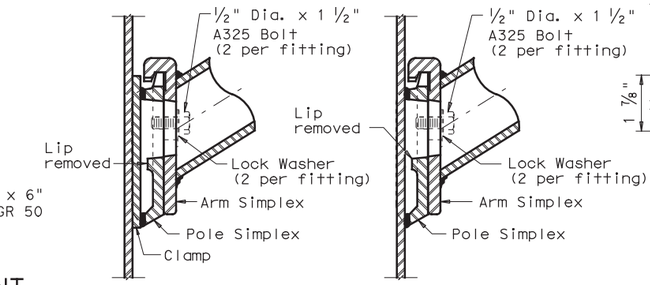


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

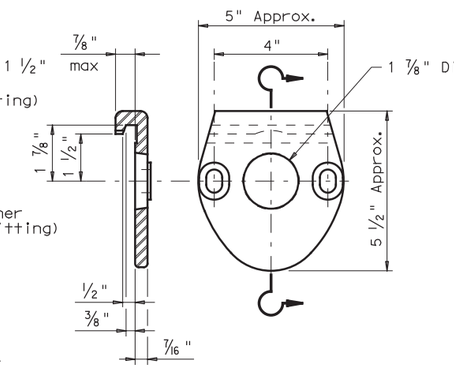


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

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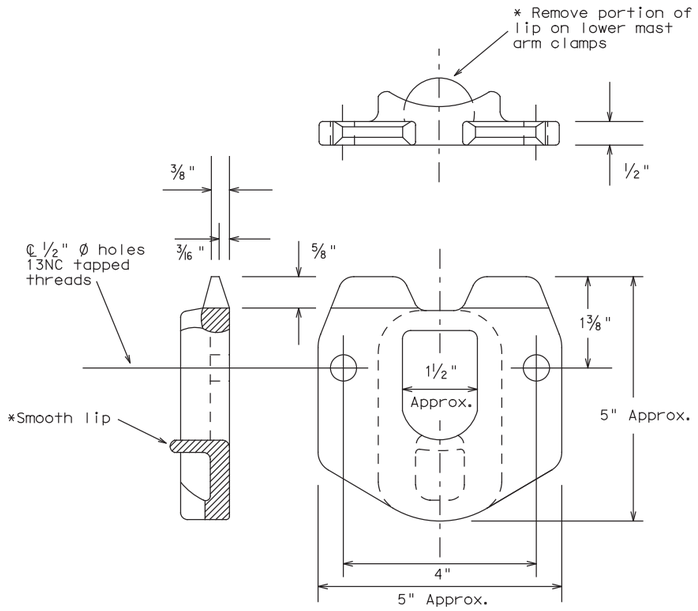
REVISIONS: 5-96, 1-99, 1-12

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DIST	COUNTY	SHEET NO.
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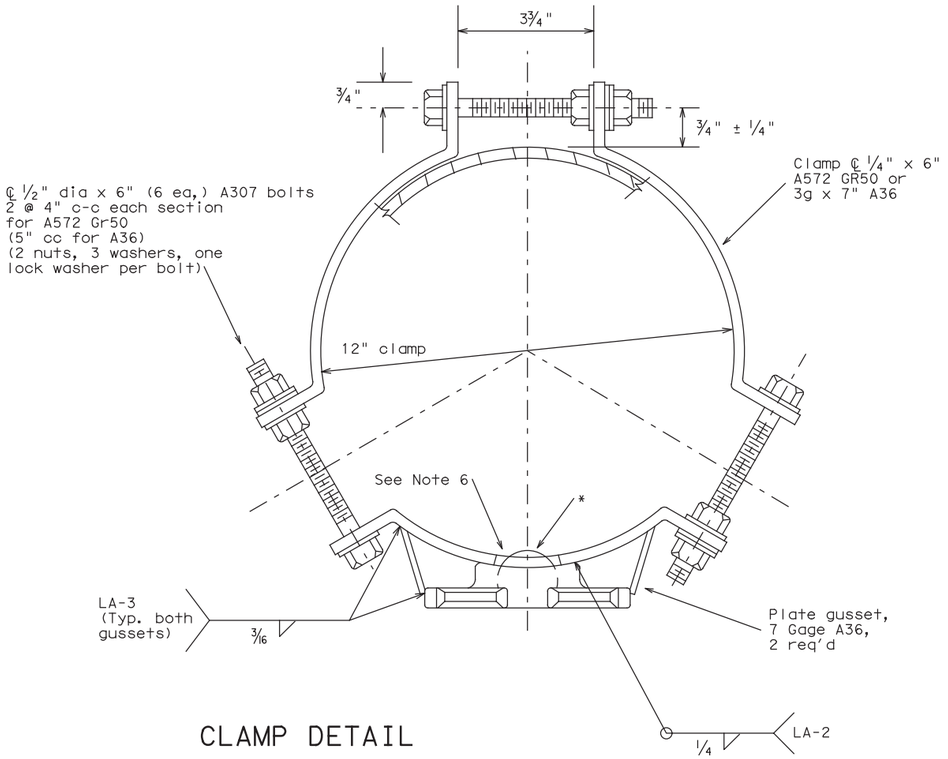
POLE SIMPLEX DETAILS

OTHER MATERIALS:

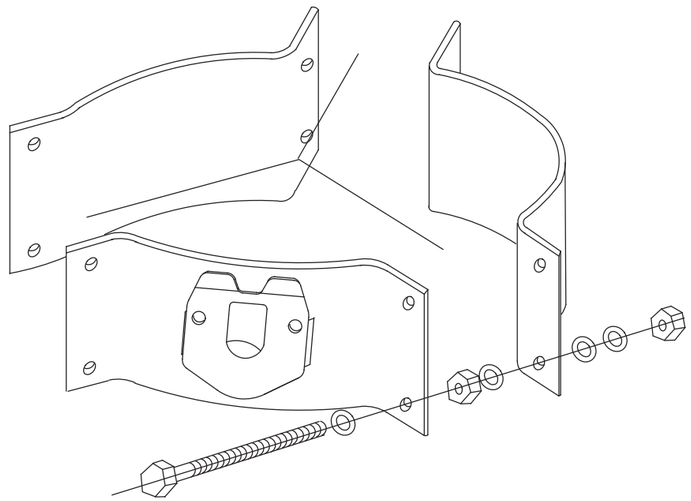
1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, ½in. X 1½in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.



CLAMP DETAIL



PROJECTION

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

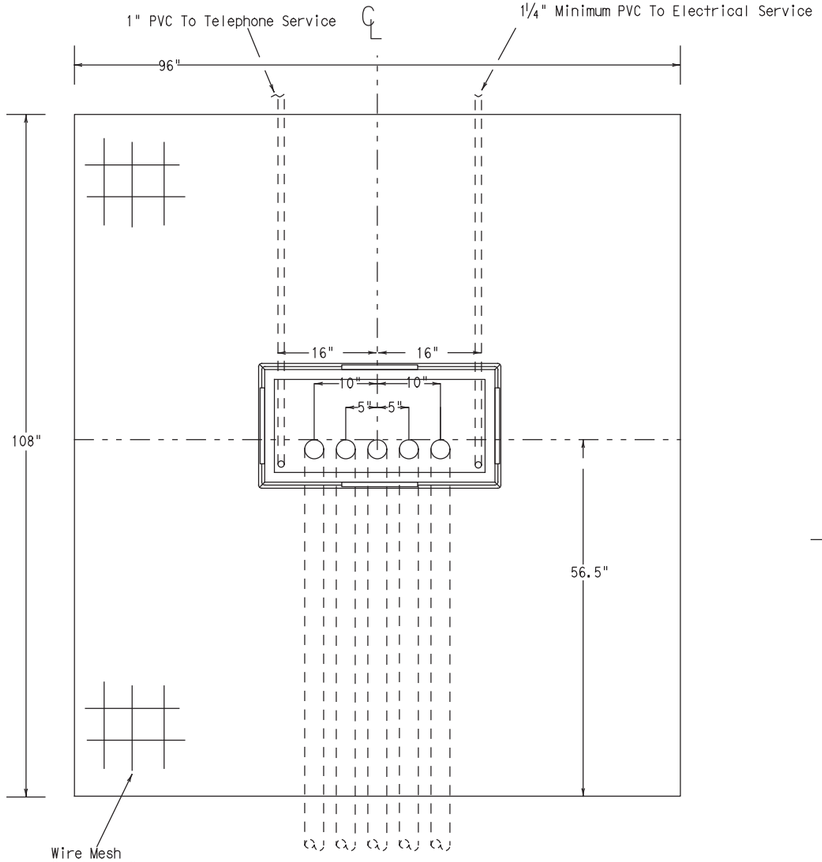
CFA-12

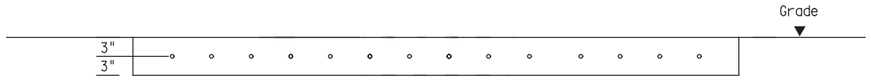
©TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS	CONT	SECT	JOB	HIGHWAY
11-99	2103	01	034	
1-12	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		130

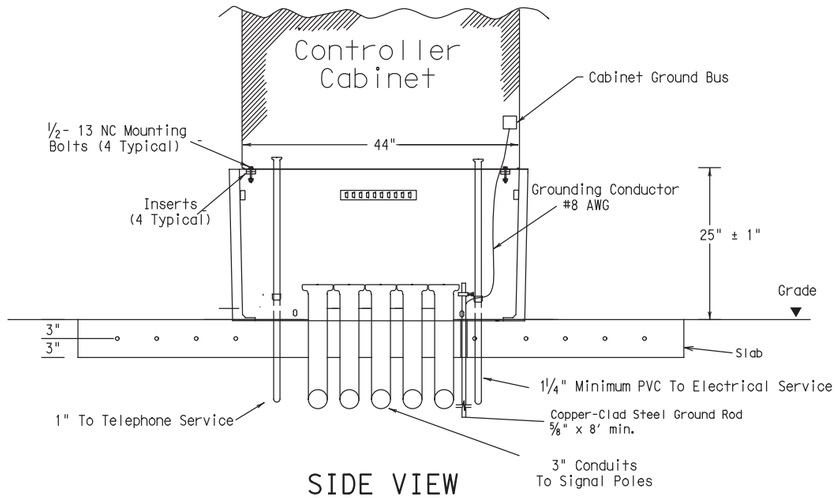
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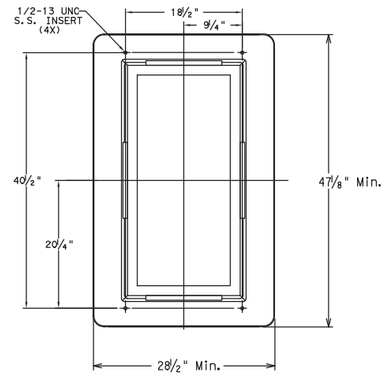
TOP VIEW
(Slab & Base)







SIDE VIEW
(Slab & Base)



CABINET BASE

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Operation Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four ½"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x ⅜ x ⅜ inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using ½"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
11. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
12. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
13. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

14. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
15. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
16. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
17. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

18. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
19. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

20. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation
Traffic Operations Division

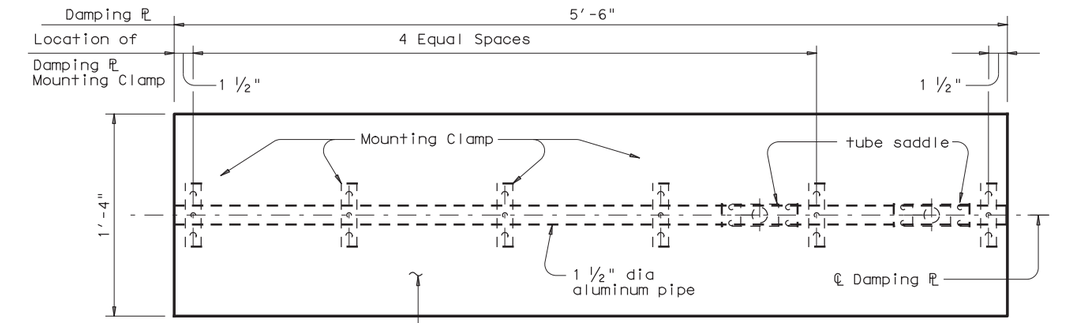
TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-04

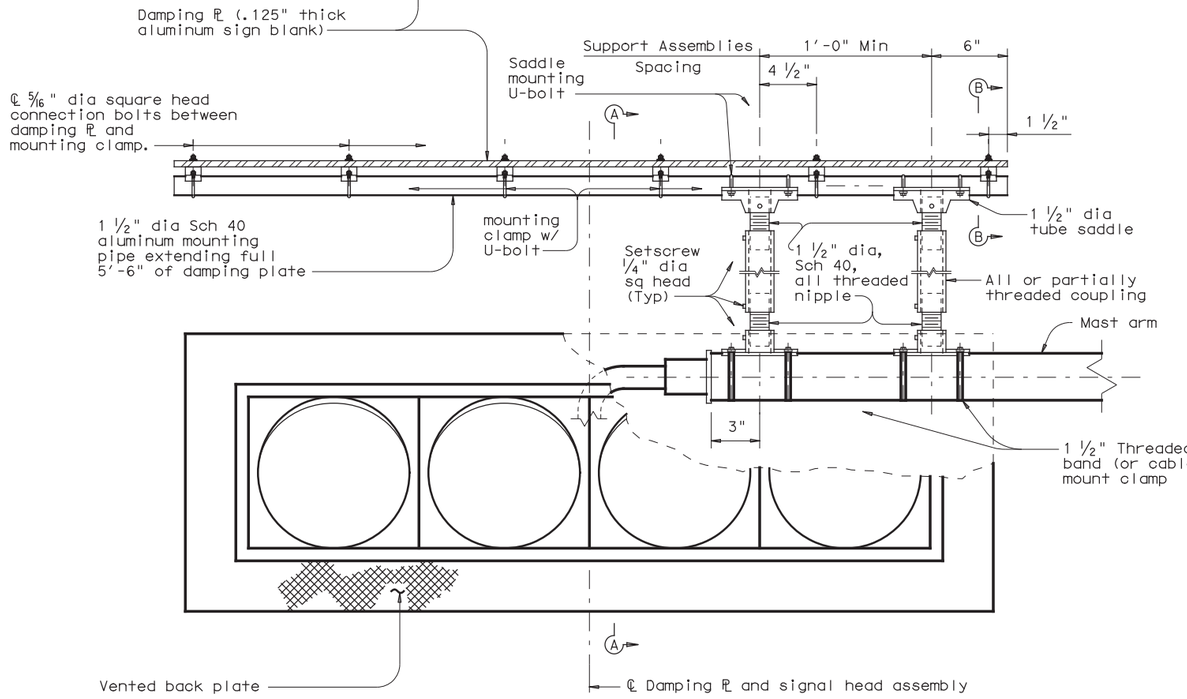
©TxDOT October 2000	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT	
12-04 REVISIONS	CONT	SECT	JOB	HIGHWAY	
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	DIST	COUNTY		SHEET NO.	
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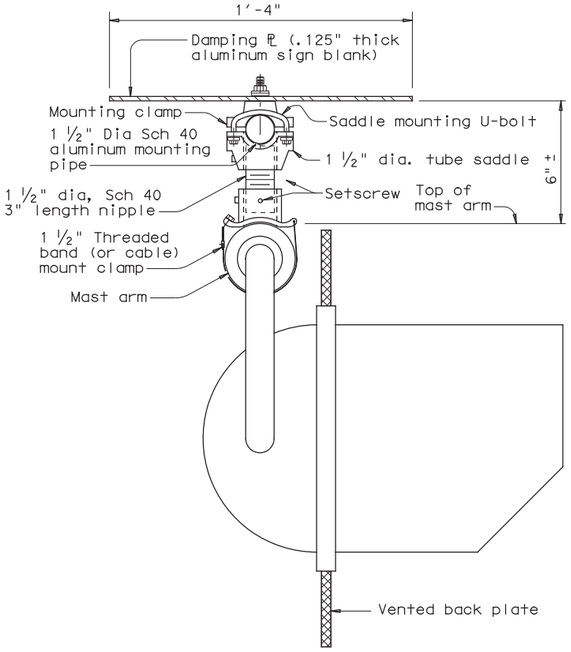
PLAN



ELEVATION

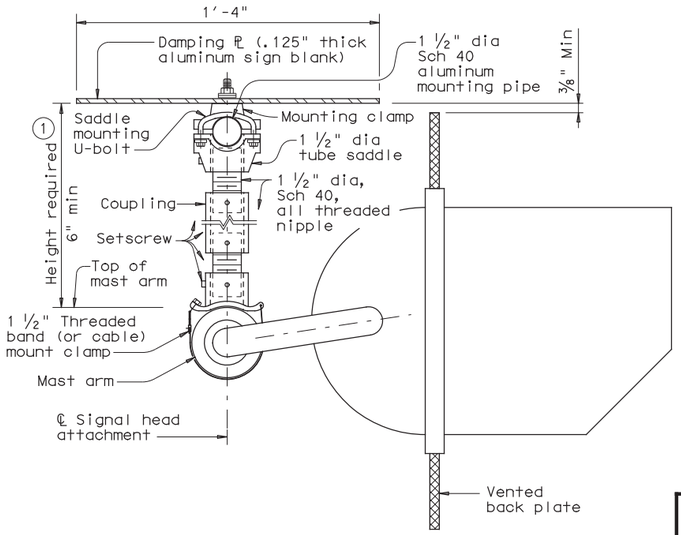
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

1 Recommended supporting assemblies to achieve required height			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"

GENERAL NOTES:

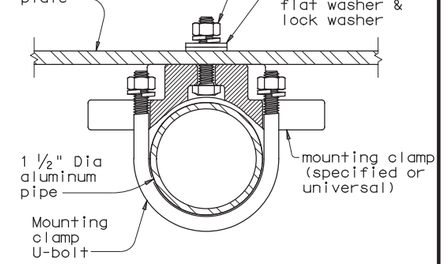
In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

Aluminum sign blank for damping plate shall conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle shall be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling shall be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies shall conform to Standard sheet SMD(GEN)-08. U-bolts for saddle mounting shall have a minimum yield strength of 36 ksi.

Damping plate shall be mounted horizontally. Position centerline of damping plate to align with centerline of signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate shall be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

Unless stipulated by the manufacturers, all steel parts shall be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

Contractor shall verify applicable field dimensions before the installation.



SECTION B-B

(Showing damping plate attachment)

Texas Department of Transportation
Traffic Operations Division

MAST ARM DAMPING PLATE DETAILS

MA-DPD-12

©TxDOT January 2012

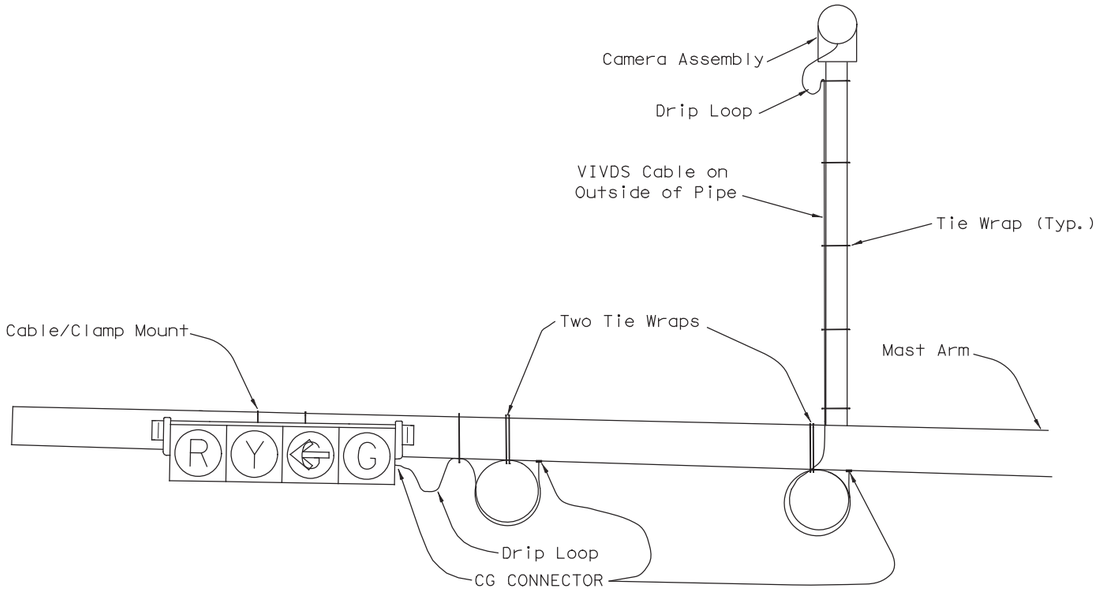
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CONT	SECT	JOB	HIGHWAY
2103	01	034	

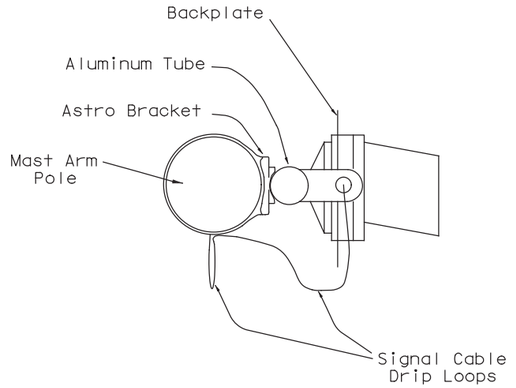
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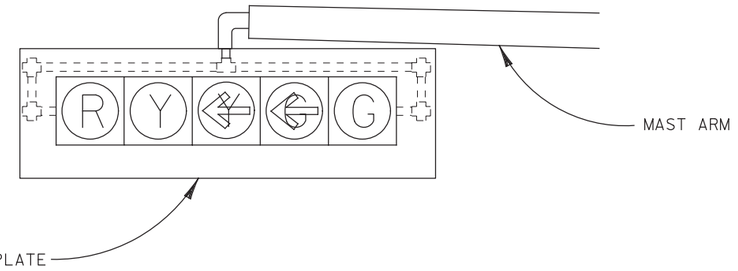


MAST ARM
ELEVATION VIEW

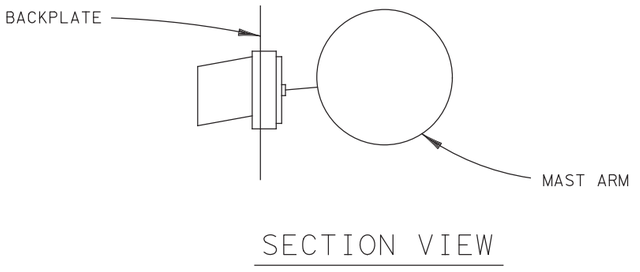
Backplate Not Shown



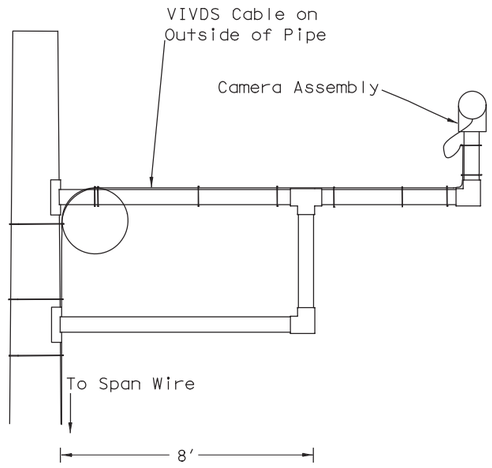
MAST ARM
SECTION VIEW(SIDE)



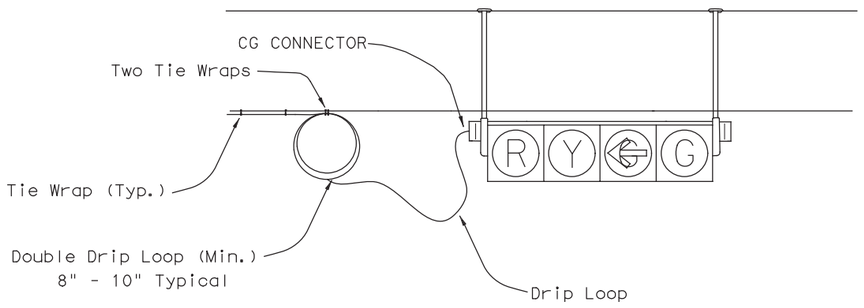
ELEVATION VIEW



SECTION VIEW



ELEVATION VIEW - CAMERA BRACKET



ELEVATION VIEW - SPAN WIRE

Backplate Not Shown

NO SCALE

Texas Department of Transportation | Austin District Standard

Austin District Traffic

MISC. ATTACHMENT DETAILS

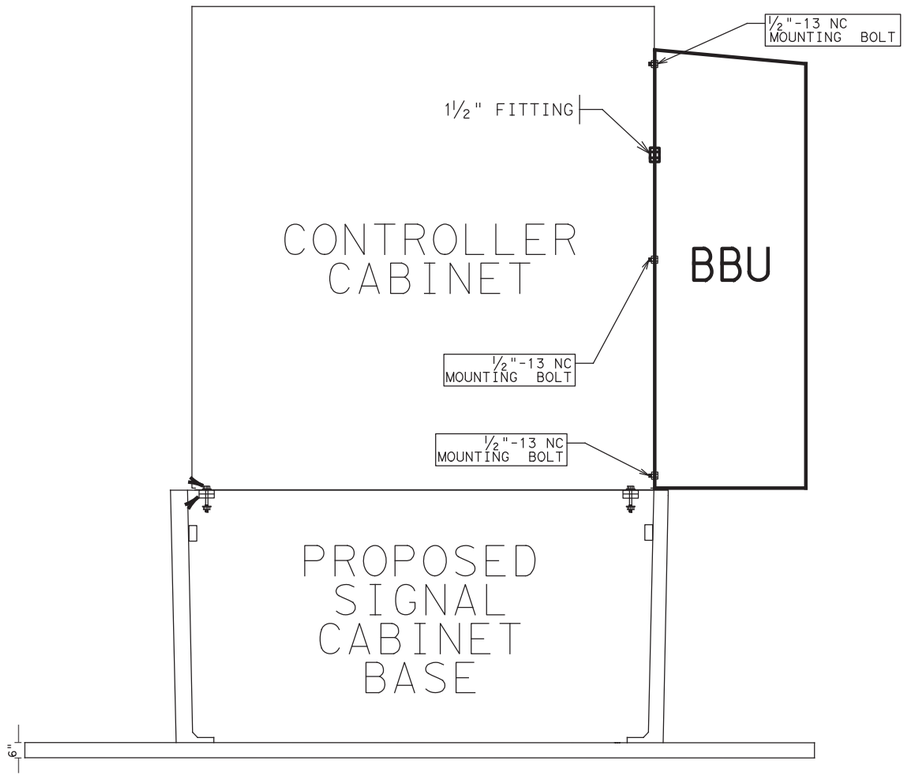
MAD-14(AUS)

©BYEAR® REVISIONS	CONT	SECT	JOB	HIGHWAY
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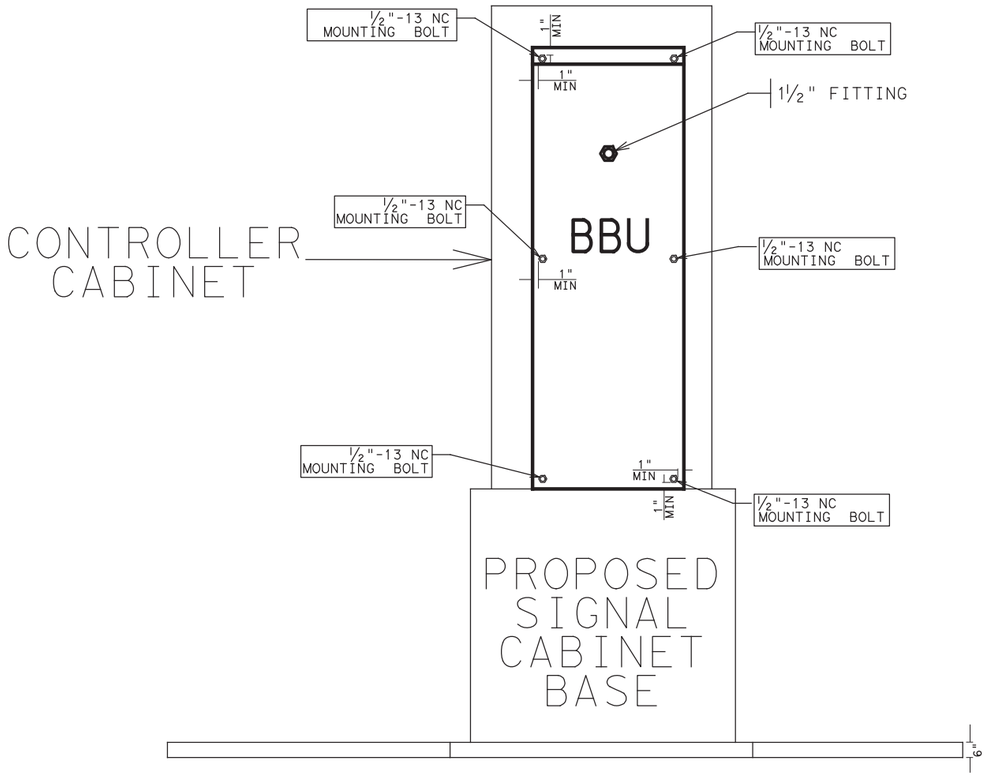
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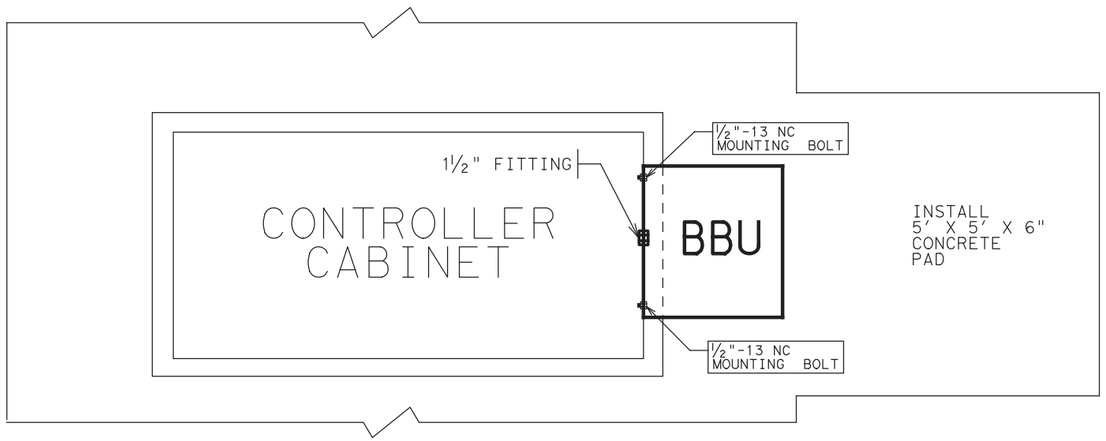
NOTES:
1. INSTALL 1½" FITTING WITH SIX # 6 AWG CONDUCTORS AND 6 EA OF ½"-1½" BOLTS BETWEEN THE TWO CABINETS.
2. CAULK BETWEEN THE CABINETS OF THE EXISTING CONTROLLER AND BBU UNIT.
3. ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT SUBSIDIARY TO THE ITEM OF BBU.
4. INSTALL A 5' X 5' CONCRETE PAD (REFER TO CURRENT TS-CF STANDARD, 6" SLAB) UNDER THE BBU AND NEXT TO THE 6" SLAB OF SIGNAL CABINET BASE AS DIRECTED.
5. THE INSTALLATION OF BBU IS FOR REFERENCE ONLY. BBU SYSTEM WILL BE APPROVED ACCORDING TO THE SPECIAL SPECIFICATIONS.



ELEVATION VIEW



SIDE VIEW



PLAN VIEW

NO SCALE

Texas Department of Transportation | Austin District Standard

Austin District Traffic

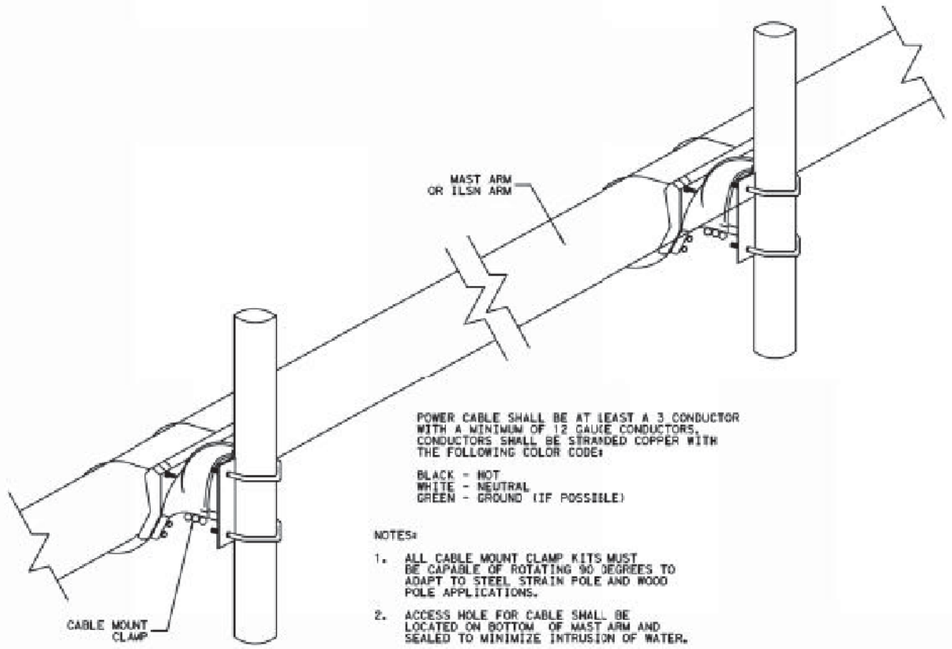
BATTERY BACK-UP EXTERNAL BATTERY CABINET (SIDE MOUNT)

BBU-14 (AUS)

©YEAR®	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		196

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4/12/2018 7:20 AM



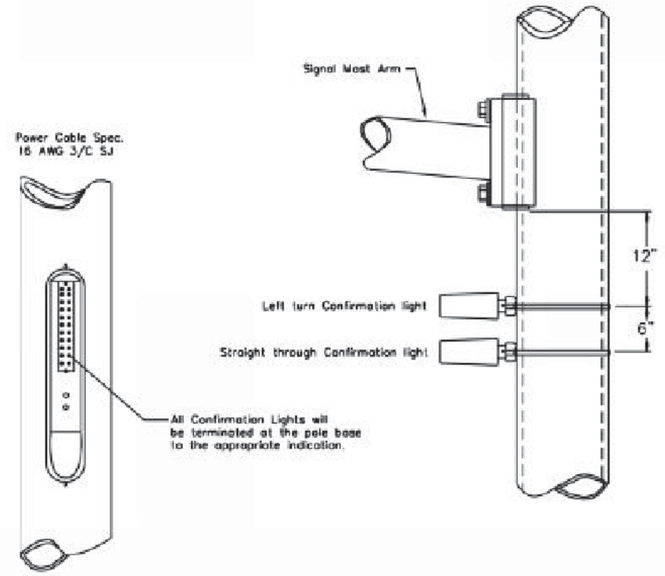
POWER CABLE SHALL BE AT LEAST A 3 CONDUCTOR WITH A MINIMUM OF 12 GAUGE CONDUCTORS. CONDUCTORS SHALL BE STRANDED COPPER WITH THE FOLLOWING COLOR CODE:

BLACK - HOT
WHITE - NEUTRAL
GREEN - GROUND (IF POSSIBLE)

NOTES:

1. ALL CABLE MOUNT CLAMP KITS MUST BE CAPABLE OF ROTATING 90 DEGREES TO ADAPT TO STEEL STRAIN POLE AND WOOD POLE APPLICATIONS.
2. ACCESS HOLE FOR CABLE SHALL BE LOCATED ON BOTTOM OF MAST ARM AND SEALED TO MINIMIZE INTRUSION OF WATER.

RIGID MAST ARM FOR ILSN SIGNS



CONFIRMATION LIGHT INSTALLATION

STATE OF TEXAS
TIMOTHY GRIMES
100107
LICENSED
PROFESSIONAL ENGINEER

3.23.2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

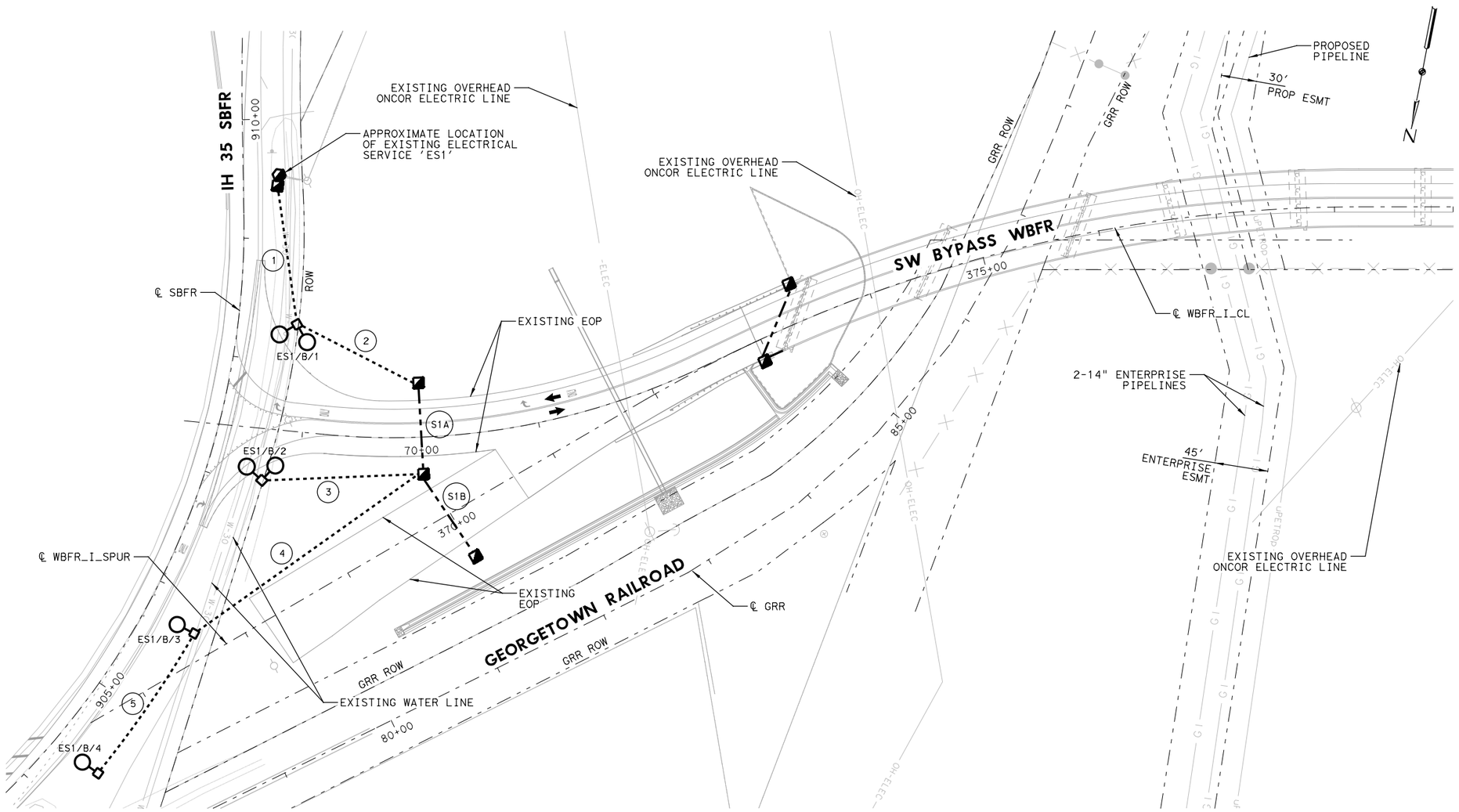
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

CITY OF GEORGETOWN SIGNAL DETAILS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
TG	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	197
KK	2103	01	034	
CHECK				
TG				

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LEGEND

- EXISTING ELECTRIAL SERVICE ASSEMBLY TYPE A, 120/240 VOLT, 1 PHASE STEEL POLE TYPE SERVICE
- ELECTRIAL SERVICE ASSEMBLY TYPE A, 240/480 VOLT, 1 PHASE PEDESTAL TYPE SERVICE
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (1) LED LUMINAIRE HEAD
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (2) LED LUMINAIRE HEADS
- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE, 3000K LUMINAIRE TEMPERATURE
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- EXISTING BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (TRENCHED)
- CONDUCTORS IN CONDUIT SEGMENT (BORED)
- CONDUCTORS IN CONDUIT SEGMENT (INSTALLED IN SEGMENT #1 CONSTRUCTION)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION; CIRCUIT DESIGNATION; ELECTRICAL SERVICE DESIGNATION

0 50 100 150 200
SCALE IN FEET

ROADWAY ILLUMINATION ASSEMBLY SUMMARY

SERVICE	CIRCUIT	POLE NO.	STATION	OFFSET	ASSEMBLY TYPE	NOTES
ES1	B	1	369+68.50	202.65 LT (WBFR_I_SPUR)	IN RD IL (TYPE SA) 50T-12-12 (400W EQ) LED	1,2
ES1	B	2	368+83.25	98.75 LT (WBFR_I_SPUR)	IN RD IL (TYPE SA) 50T-12-12 (400W EQ) LED	1,2
ES1	B	3	367+62.50	21.00 LT (WBFR_I_SPUR)	IN RD IL (TYPE SA) 50T-12 (400W EQ) LED	2
ES1	B	4	366+33.25	40.00 RT (WBFR_I_SPUR)	IN RD IL (TYPE SA) 50T-12 (400W EQ) LED	2

NOTE:
1) POLE MOUNT ILLUMINATION ASSEMBLY MAST ARMS AT 90 DEGREES. REFER TO ILLUMINATION ASSEMBLY DETAILS FOR ADDITIONAL INFORMATION.
2) PROVIDE ROADWAY ILLUMINATION ASSEMBLY WITH TYPE IV OPTIC DISTRIBUTION, 3000K TEMPERATURE LEDs, AND 17,600 LUMEN OUTPUT (PER LUMINAIRE HEAD).

CONDUCTORS AND CONDUIT SUMMARY

SERVICE	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (LF)	CONDUIT (LF) 0618-6023 CONDT (PVC) (SCH 40) (2")	CONDUCTORS (LF) 0620-6007 ELEC CONDR (NO. 8) BARE	CONDUCTORS (LF) 0620-6008 ELEC CONDR (NO. 8) INSULATED	NOTES
ES1	B	1	128	1 X 128 = 128	1 X 133 = 133	2 X 133 = 266	
ES1	B	2	114	1 X 114 = 114	1 X 119 = 119	2 X 119 = 238	
ES1	B	3	137	1 X 137 = 137	1 X 142 = 142	2 X 142 = 284	
ES1	B	4	236	1 X 236 = 236	1 X 241 = 241	2 X 241 = 482	
ES1	B	5	140	1 X 140 = 140	1 X 145 = 145	2 X 145 = 290	
ES1	B	S1A	78		1 X 83 = 83	2 X 83 = 166	1
	SPARE						1
ES1	B	S1B	83		1 X 88 = 88	2 X 88 = 176	1
	SPARE						1
SHEET TOTAL				755	951	1902	

NOTE:
1) SEGMENT RUN UNDERGROUND CONDUIT INFRASTRUCTURE WAS INSTALLED DURING SEGMENT 1 CONSTRUCTION.

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM#	DESCRIPTION	UNIT	QTY
0416	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	32
0432	RIPRAP (CONC)(4 IN)	CY	2.0
0610	IN RD IL (TY SA) 50T-12 (400W EQ) LED	EA	2
0610	IN RD IL (TY SA) 50T-12-12(400W EQ)LED	EA	2
0618	CONDT (PVC) (SCH 40) (2")	LF	755
0620	ELEC CONDR (NO.8) BARE	LF	951
0620	ELEC CONDR (NO.8) INSULATED	LF	1902

GENERAL NOTES:
1. LOCATION OF ILLUMINATION EQUIPMENT MAY BE FIELD ADJUSTED AS DIRECTED BY THE INSPECTING ENGINEER TO ACCOMODATE ROADWAY FEATURES AND AVOID UTILITY CONFLICTS.
2. CONTACT POWER CO. WITH 2-WEEKS NOTICE FOR ELECTRICAL SERVICE CONNECTIONS.
3. THE CONSTRUCTION OF ILLUMINATION SHALL MEET ALL TxDOT STANDARDS/ SPECS, POWER COMPANY STANDARDS, N.E.C., CITY OF GEORGETOWN STANDARDS, UNLESS OTHERWISE NOTED.
4. VERIFY WITH THE UTILITY COMPANY(S) THE EXACT LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THE UTILITIES.
5. ABOVE GRADE NEMA 3R JUNCTION BOXES SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 618, "CONDUIT" BID ITEM.
6. PROVIDE CONDUIT EXPANSION AND DEFLECTION COUPLING WHERE UNDERGROUND CONDUIT SEGMENT ENTERS THE BRIDGE STRUCTURE AND TRANSITIONS TO A BRIDGE EMBEDDED CONDUIT SEGMENTS. COUPLING SHALL ALLOW FOR A MAXIMUM OF 4" HORIZONTAL AND VERTICAL MOVEMENT.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
22 MAR 2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

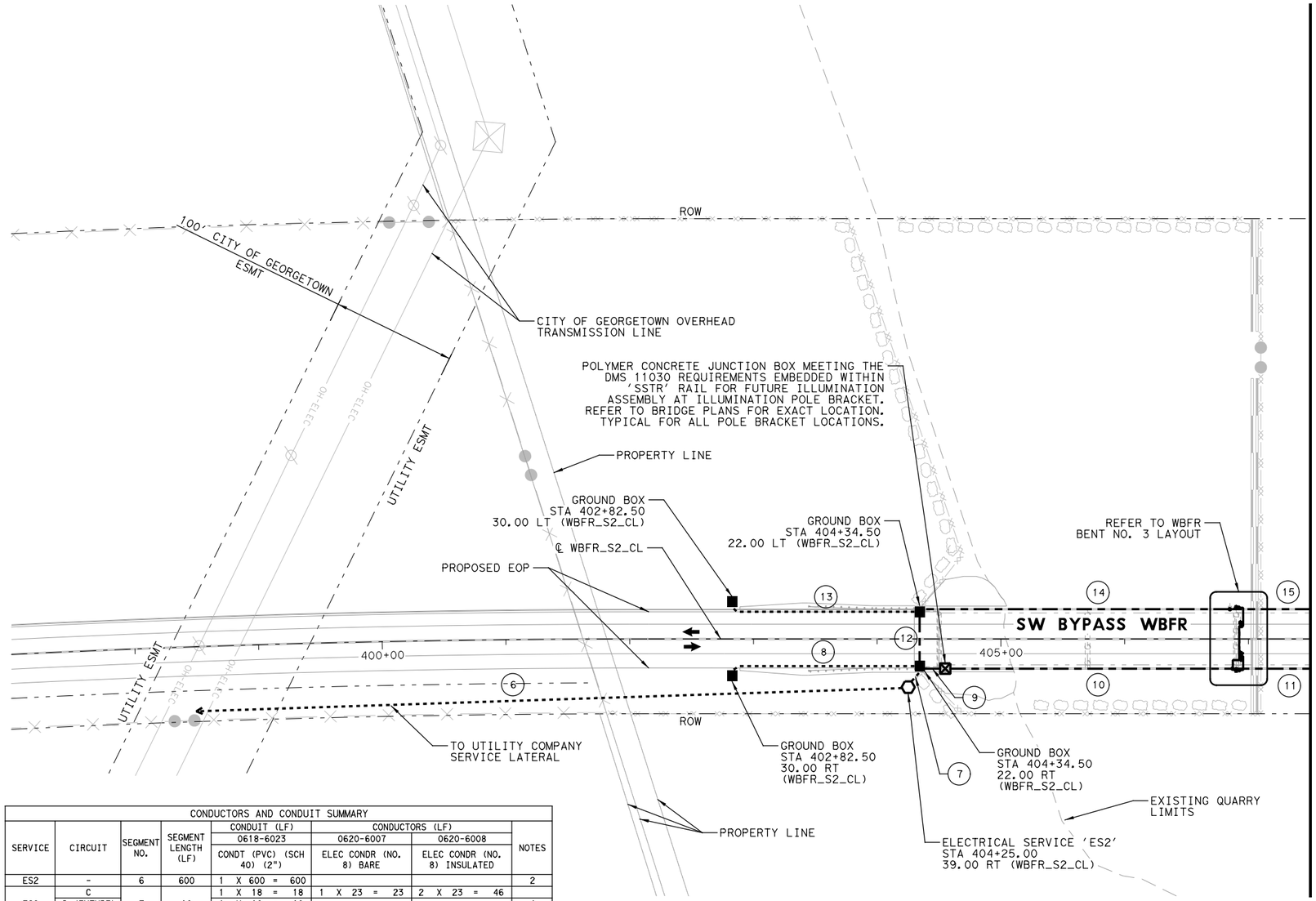
SOUTHWEST BYPASS SEGMENT 2

ILLUMINATION LAYOUT BEGIN TO STA 379+00

SCALE: 1"=100' SHEET 1 OF 4

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS				
GM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TEXAS	AUS	WILLIAMSON	
PD	CONTROL	SECTION	JOB	198
CHECK	2103	01	034	
PD				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201T0718.tbl
USER: GUMARTIN DATE: 3/22/2018 TIME: 3:26:23 PM SCALE: 1:100
FILE: \



LEGEND

- EXISTING ELECTRIAL SERVICE ASSEMBLY TYPE A, 120/240 VOLT, 1 PHASE STEEL POLE TYPE SERVICE
- ELECTRIAL SERVICE ASSEMBLY TYPE A, 240/480 VOLT, 1 PHASE PEDESTAL TYPE SERVICE
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (1) LED LUMINAIRE HEAD
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (2) LED LUMINAIRE HEADS
- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE, 3000K LUMINAIRE TEMPERATURE
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- EXISTING BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (TRENCHED)
- CONDUCTORS IN CONDUIT SEGMENT (BORED)
- CONDUCTORS IN CONDUIT SEGMENT (INSTALLED IN SEGMENT #1 CONSTRUCTION)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION; CIRCUIT DESIGNATION; ELECTRICAL SERVICE DESIGNATION

0 50 100 150 200
SCALE IN FEET

CONDUCTORS AND CONDUIT SUMMARY							
SERVICE	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (LF)	CONDUIT (LF) 0618-6023 CONDT (PVC) (SCH 40) (2")	CONDUCTORS (LF) 0620-6007 ELEC CONDR (NO. 8) BARE	CONDUCTORS (LF) 0620-6008 ELEC CONDR (NO. 8) INSULATED	NOTES
ES2	-	6	600	1 X 600 = 600			2
ES2	C	7	18	1 X 18 = 18	1 X 23 = 23	2 X 23 = 46	
	D (FUTURE)			1 X 18 = 18			1
	SPARE			1 X 18 = 18			1
ES2	D (FUTURE)	8	157	1 X 157 = 157			1
	SPARE			1 X 157 = 157			1
ES2	C	9	21	1 X 21 = 21	1 X 26 = 26	2 X 26 = 52	3
	D (FUTURE)			1 X 21 = 21			1,3
	SPARE			1 X 21 = 21			1,3
ES2	C	10	236	1 X 236 = 236	1 X 241 = 241	2 X 241 = 482	3
	D (FUTURE)			1 X 236 = 236			1,3
	SPARE			1 X 236 = 236			1,3
ES2	C	11	66	1 X 66 = 66	1 X 71 = 71	2 X 71 = 142	3
	D (FUTURE)			1 X 66 = 66			1,3
	SPARE			1 X 66 = 66			1,3
ES2	D (FUTURE)	12	44	1 X 44 = 44			1,3
	SPARE			1 X 44 = 44			1,3
ES2	D (FUTURE)	13	157	1 X 157 = 157			1
	SPARE			1 X 157 = 157			1
ES2	D (FUTURE)	14	254	1 X 254 = 254			1,3
	SPARE			1 X 254 = 254			1,3
ES2	D (FUTURE)	15	69	1 X 69 = 69			1,3
	SPARE			1 X 69 = 69			1,3
SHEET TOTAL				2985	361	722	

NOTES:
1) PROVIDE EMPTY CONDUIT SEGMENT WITH PULLSTRING.
2) SERVICE CONDUCTORS PROVIDED BY UTILITY COMPANY. COORDINATE WITH UTILITY COMPANY.
3) SEGMENT RUN TO BE INSTALLED EMBEDDED WITHIN BRIDGE STRUCTURE. REFER TO BRIDGE DRAWINGS FOR ADDITIONAL INFORMATION. COORDINATE INSTALLATION WITH BRIDGE CONTRACTOR.

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM#	DESCRIPTION	UNIT	QTY
0618	CONDT (PVC) (SCH 40) (2")	LF	2985
0620	ELEC CONDR (NO.8) BARE	LF	361
0620	ELEC CONDR (NO.8) INSULATED	LF	722
0624	GROUND BOX TY A (122311)W/APRON	EA	4
0628	ELC SRV TY A 240/480 060(NS)SS(E)PS(U)	EA	1

GENERAL NOTES:
1. LOCATION OF ILLUMINATION EQUIPMENT MAY BE FIELD ADJUSTED AS DIRECTED BY THE INSPECTING ENGINEER TO ACCOMODATE ROADWAY FEATURES AND AVOID UTILITY CONFLICTS.
2. CONTACT POWER CO. WITH 2-WEEKS NOTICE FOR ELECTRICAL SERVICE CONNECTIONS.
3. THE CONSTRUCTION OF ILLUMINATION SHALL MEET ALL TxDOT STANDARDS/ SPECS, POWER COMPANY STANDARDS, N.E.C., CITY OF GEORGETOWN STANDARDS, UNLESS OTHERWISE NOTED.
4. VERIFY WITH THE UTILITY COMPANY(S) THE EXACT LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THE UTILITIES.
5. ABOVE GRADE NEMA 3R JUNCTION BOXES SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 618, "CONDUIT" BID ITEM.
6. PROVIDE CONDUIT EXPANSION AND DEFLECTION COUPLING WHERE UNDERGROUND CONDUIT SEGMENT ENTERS THE BRIDGE STRUCTURE AND TRANSITIONS TO A BRIDGE EMBEDDED CONDUIT SEGMENTS. COUPLING SHALL ALLOW FOR A MAXIMUM OF 4" HORIZONTAL AND VERTICAL MOVEMENT.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
22 MAR 2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

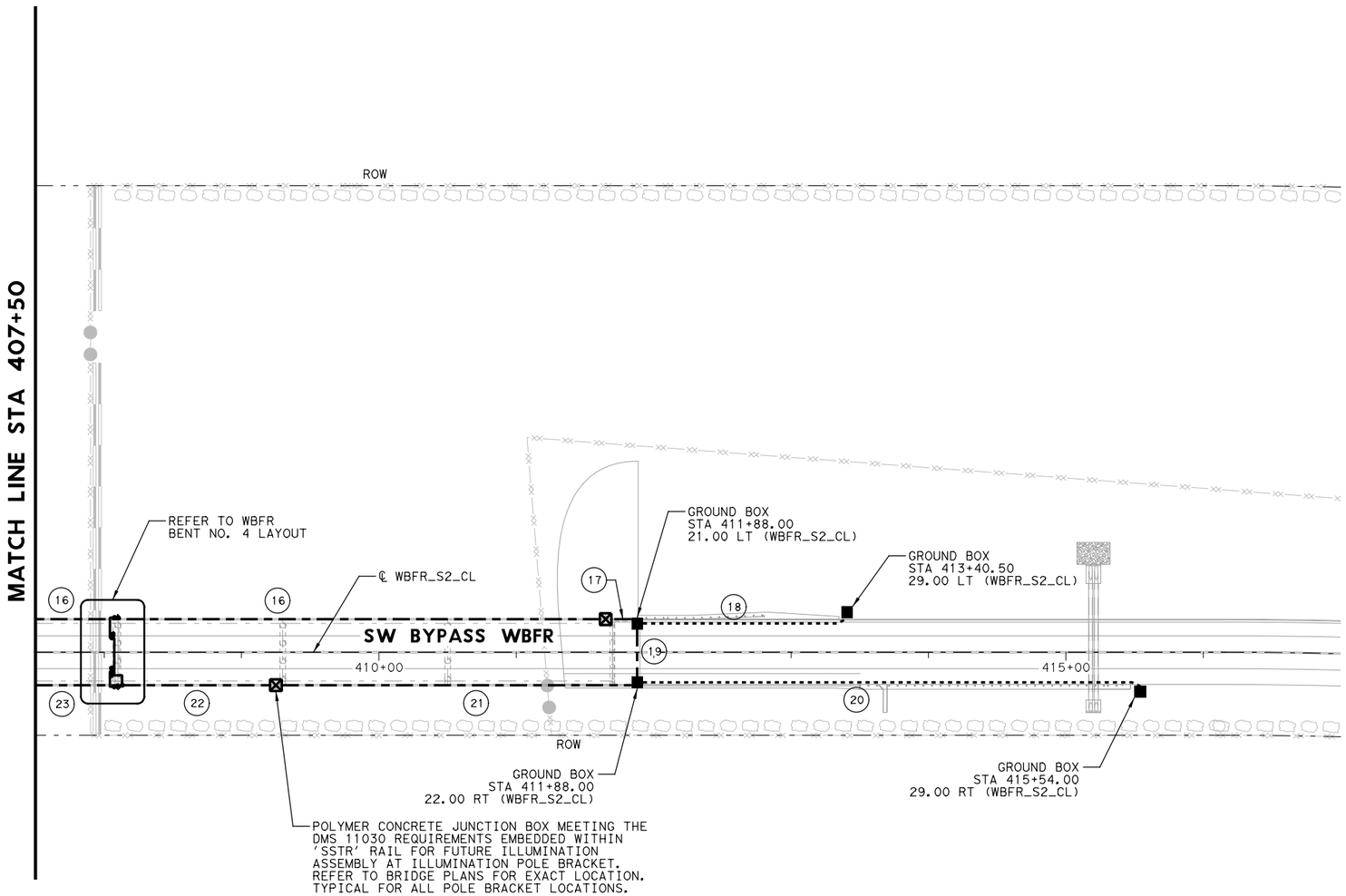
ILLUMINATION LAYOUT STA 396+00 TO 407+50

SCALE: 1"=100' SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS GM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PD	TEXAS	AUS	WILLIAMSON	199
CHECK PD	CONTROL 2103	SECTION 01	JOB 034	

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USER: GUMARTIN TIME: 3:26:30 PM SCALE: 1:100
DATE: 3/22/2018
FILE: \

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LEGEND

- EXISTING ELECTRIAL SERVICE ASSEMBLY TYPE A, 120/240 VOLT, 1 PHASE STEEL POLE TYPE SERVICE
- ELECTRIAL SERVICE ASSEMBLY TYPE A, 240/480 VOLT, 1 PHASE PEDESTAL TYPE SERVICE
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (1) LED LUMINAIRE HEAD
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (2) LED LUMINAIRE HEADS
- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE, 3000K LUMINAIRE TEMPERATURE
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- EXISTING BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (TRENCHED)
- CONDUCTORS IN CONDUIT SEGMENT (BORED)
- CONDUCTORS IN CONDUIT SEGMENT (INSTALLED IN SEGMENT #1 CONSTRUCTION)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION / CIRCUIT DESIGNATION / ELECTRICAL SERVICE DESIGNATION

0 50 100 150 200
SCALE IN FEET

CONDUCTORS AND CONDUIT SUMMARY

SERVICE	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (LF)	CONDUIT (LF) 0618-6023 CONDT (PVC) (SCH 40) (2")	CONDUCTORS (LF) 0620-6007 ELEC CONDR (NO. 8) BARE	CONDUCTORS (LF) 0620-6008 ELEC CONDR (NO. 8) INSULATED	NOTES
ES1	D (FUTURE)	16	415	1 X 415 = 415			1,2
	SPARE			1 X 415 = 415			1,2
ES1	D (FUTURE)	17	23	1 X 23 = 23			1,2
	SPARE			1 X 23 = 23			1,2
ES1	D (FUTURE)	18	158	1 X 158 = 158			1
	SPARE			1 X 158 = 158			1
ES1	D (FUTURE)	19	43	1 X 43 = 43			1,2
	SPARE			1 X 43 = 43			1,2
ES1	D (FUTURE)	20	371	1 X 371 = 371			1
	SPARE			1 X 371 = 371			1
ES1	D (FUTURE)	21	263	1 X 263 = 263			1,2
	SPARE			1 X 263 = 263			1,2
ES1	D (FUTURE)	22	115	1 X 115 = 115			1,2
	SPARE			1 X 115 = 115			1,2
ES1	C	23	67	1 X 67 = 67	1 X 72 = 72	2 X 72 = 144	2
	D (FUTURE)			1 X 67 = 67			1,2
	SPARE			1 X 67 = 67			1,2
SHEET TOTAL				2977	72	144	

NOTES:
1) PROVIDE EMPTY CONDUIT SEGMENT WITH PULLSTRING.
2) SEGMENT RUN TO BE INSTALLED EMBEDDED WITHIN BRIDGE STRUCTURE. REFER TO BRIDGE DRAWINGS FOR ADDITIONAL INFORMATION. COORDINATE INSTALLATION WITH BRIDGE CONTRACTOR.

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM#	DESCRIPTION	UNIT	QTY
0618	CONDT (PVC) (SCH 40) (2")	LF	2977
0620	ELEC CONDR (NO.8) BARE	LF	72
0620	ELEC CONDR (NO.8) INSULATED	LF	144
0624	GROUND BOX TY A (122311)W/APRON	EA	4

GENERAL NOTES:
1. LOCATION OF ILLUMINATION EQUIPMENT MAY BE FIELD ADJUSTED AS DIRECTED BY THE INSPECTING ENGINEER TO ACCOMODATE ROADWAY FEATURES AND AVOID UTILITY CONFLICTS.
2. CONTACT POWER CO. WITH 2-WEEKS NOTICE FOR ELECTRICAL SERVICE CONNECTIONS.
3. THE CONSTRUCTION OF ILLUMINATION SHALL MEET ALL TxDOT STANDARDS/ SPECS, POWER COMPANY STANDARDS, N.E.C., CITY OF GEORGETOWN STANDARDS, UNLESS OTHERWISE NOTED.
4. VERIFY WITH THE UTILITY COMPANY(S) THE EXACT LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THE UTILITIES.
5. ABOVE GRADE NEMA 3R JUNCTION BOXES SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 618, "CONDUIT" BID ITEM.
6. PROVIDE CONDUIT EXPANSION AND DEFLECTION COUPLING WHERE UNDERGROUND CONDUIT SEGMENT ENTERS THE BRIDGE STRUCTURE AND TRANSITIONS TO A BRIDGE EMBEDDED CONDUIT SEGMENTS. COUPLING SHALL ALLOW FOR A MAXIMUM OF 4" HORIZONTAL AND VERTICAL MOVEMENT.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
22 MAR 2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

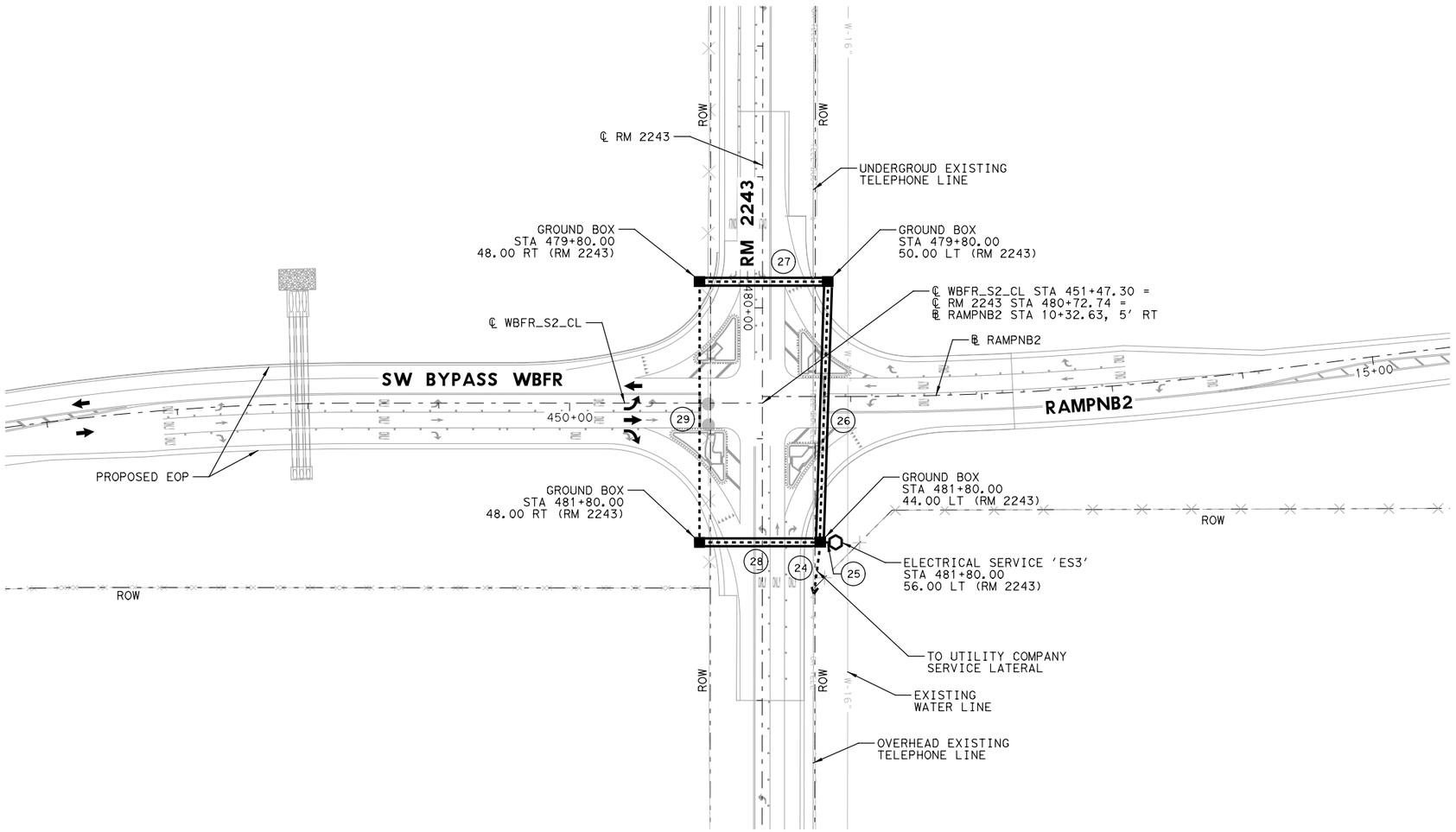
SOUTHWEST BYPASS SEGMENT 2

ILLUMINATION LAYOUT STA 407+50 TO 417+00

SCALE: 1"=100' SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
GM	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	200
PD	2103	01	034	
CHECK				
PD				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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LEGEND

- EXISTING ELECTRIAL SERVICE ASSEMBLY TYPE A, 120/240 VOLT, 1 PHASE STEEL POLE TYPE SERVICE
- ELECTRIAL SERVICE ASSEMBLY TYPE A, 240/480 VOLT, 1 PHASE PEDESTAL TYPE SERVICE
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (1) LED LUMINAIRE HEAD
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (2) LED LUMINAIRE HEADS
- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE, 3000K LUMINAIRE TEMPERATURE
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- EXISTING BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (TRENCHED)
- CONDUCTORS IN CONDUIT SEGMENT (BORED)
- CONDUCTORS IN CONDUIT SEGMENT (INSTALLED IN SEGMENT #1 CONSTRUCTION)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION; CIRCUIT DESIGNATION; ELECTRICAL SERVICE DESIGNATION

0 50 100 150 200
SCALE IN FEET

CONDUCTORS AND CONDUIT SUMMARY							
SERVICE	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (LF)	CONDUIT (LF) 0618-6023 CONDT (PVC) (SCH 40) (2")	0618-6024 CONDT (PVC) (SCH 40) (2") (BORE)	0618-6025 CONDT (PVC) (SCH 40) (2") (CONC ENCSE)	NOTES
ES3	-	24	100	1 X 100 = 100			2
ES3	-	25	15	1 X 15 = 15			2
	E (FUTURE)			1 X 0 = 0			1
	F (FUTURE)			1 X 0 = 0			1
ES3	E (FUTURE)	26	199		1 X 199 = 199		1
ES3	F (FUTURE)				1 X 199 = 199		1
ES3	E (FUTURE)	27	98		1 X 98 = 98		1
ES3	F (FUTURE)				1 X 98 = 98		1
ES3	E (FUTURE)	28	92		1 X 92 = 92		1
ES3	F (FUTURE)				1 X 92 = 92		1
ES3	E (FUTURE)	29	199			1 X 199 = 199	1
ES3	F (FUTURE)					1 X 199 = 199	1
SHEET TOTAL				115	778	398	

NOTES:
1) PROVIDE EMPTY CONDUIT SEGMENT WITH PULLSTRING.
2) SERVICE CONDUCTORS PROVIDED BY UTILITY COMPANY. COORDINATE WITH UTILITY COMPANY.

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM#	DESCRIPTION	UNIT	QTY
0618	CONDT (PVC) (SCH 40) (2")	LF	115
0618	CONDT (PVC) (SCH 40) (2") (BORE)	LF	778
0618	CONDT (PVC) (SCH 40) (2") (CONC ENCSE)	LF	398
0624	GROUND BOX TY A (122311)W/APRON	EA	4
0628	ELC SRV TY A 240/480 060(NS)SS(E)PS(U)	EA	1

GENERAL NOTES:
1. LOCATION OF ILLUMINATION EQUIPMENT MAY BE FIELD ADJUSTED AS DIRECTED BY THE INSPECTING ENGINEER TO ACCOMODATE ROADWAY FEATURES AND AVOID UTILITY CONFLICTS.
2. CONTACT POWER CO. WITH 2-WEEKS NOTICE FOR ELECTRICAL SERVICE CONNECTIONS.
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5. ABOVE GRADE NEMA 3R JUNCTION BOXES SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 618, "CONDUIT" BID ITEM.
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STATE OF TEXAS
PAUL K. DAVILA
101043
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22 MAR 2018

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WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
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Texas Registered Engineering Firm F-754

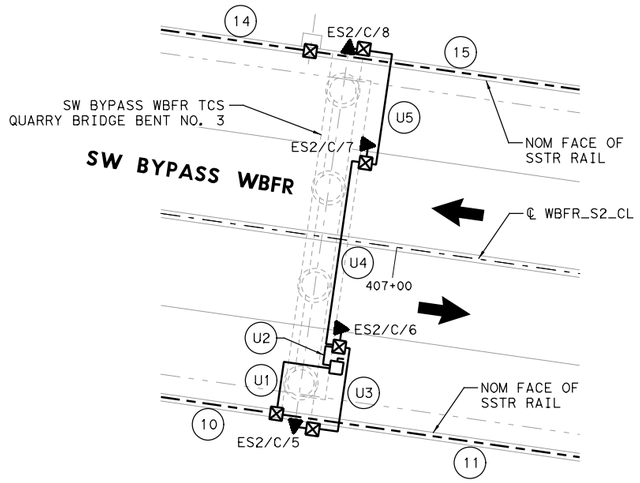
SOUTHWEST BYPASS SEGMENT 2

ILLUMINATION LAYOUT STA 445+68 TO END

SCALE: 1"=100' SHEET 4 OF 4

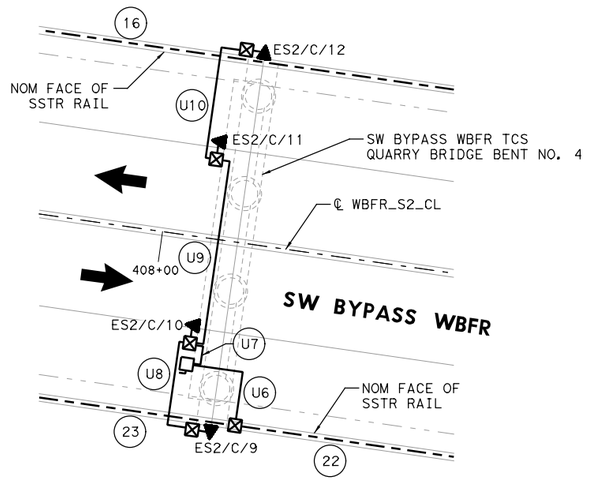
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
GM	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	201
PD	2103	01	034	
CHECK				
PD				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: GMARTIN DATE: 3/22/2018 TIME: 3:26:43 PM SCALE: 1:00
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REFER TO WBFR BENT NO. 3 DETAIL FOR ADDITIONAL INFORMATION

WBFR BENT NO. 3 LAYOUT



REFER TO WBFR BENT NO. 4 DETAIL FOR ADDITIONAL INFORMATION

WBFR BENT NO. 4 LAYOUT

LEGEND

- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE HEAD
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION; CIRCUIT DESIGNATION; ELECTRICAL SERVICE DESIGNATION

N

GENERAL NOTES:

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6. PROVIDE CONDUIT EXPANSION AND DEFLECTION COUPLING WHERE UNDERGROUND CONDUIT SEGMENT ENTERS THE BRIDGE STRUCTURE AND TRANSITIONS TO A BRIDGE EMBEDDED CONDUIT SEGMENTS. COUPLING SHALL ALLOW FOR A MAXIMUM OF 4" HORIZONTAL AND VERTICAL MOVEMENT.

0 20 40 60 80
SCALE IN FEET

ROADWAY ILLUMINATION ASSEMBLY SUMMARY

SERVICE	CIRCUIT	POLE NO.	STATION	OFFSET	ASSEMBLY TYPE	NOTES
ES2	C	5	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	1,3
ES2	C	6	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	1,3
ES2	C	7	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	1,3
ES2	C	8	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	1,3
ES2	C	9	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	2,3
ES2	C	10	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	2,3
ES2	C	11	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	2,3
ES2	C	12	-	-	IN RD IL (U/P) (TY 1) (250W EQ) LED	2,3

NOTE:
1) REFER TO WBFR BENT NO. 3 ILLUMINATION DETAIL FOR ADDITIONAL INFORMATION.
2) REFER TO WBFR BENT NO. 4 ILLUMINATION DETAIL FOR ADDITIONAL INFORMATION.
3) PROVIDE UNDERPASS ILLUMINATION ASSEMBLY WITH TYPE III OPTIC DISTRIBUTION AND 3000K TEMPERATURE LEDs.

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM#	DESCRIPTION	UNIT	QTY
0610	IN RD IL (U/P) (TY 1) (250W EQ) LED	EA	8
0618	CONDT (RM) (1 1/4")	LF	161
0620	ELEC CONDR (NO.8) BARE	LF	240
0620	ELEC CONDR (NO.8) INSULATED	LF	480
**	CONDT (LFMC) (1-1/4")	LF	24

CONDUCTORS AND CONDUIT SUMMARY

SERVICE	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (LF)	CONDUIT (LF)		CONDUCTORS (LF)		NOTES
				**	0618-6066	0620-6007	0620-6008	
				CONDT (LFMC) (1-1/4")	CONDT (RM) (1-1/4")	ELEC CONDR (NO. 8) BARE	ELEC CONDR (NO. 8) INSULATED	
ES2	C	U1	12		1 X 12 = 12	1 X 17 = 17	2 X 17 = 34	1
ES2	C	U2	5		1 X 5 = 5	1 X 10 = 10	2 X 10 = 20	1
ES2	C	U3	15		1 X 15 = 15	1 X 20 = 20	2 X 20 = 40	1
ES2	C	U4	27		1 X 27 = 27	1 X 32 = 32	2 X 32 = 64	1
ES2	C	U5	19		1 X 19 = 19	1 X 24 = 24	2 X 24 = 48	1
ES2	C	U6	12		1 X 12 = 12	1 X 17 = 17	2 X 17 = 34	1
ES2	C	U7	5		1 X 5 = 5	1 X 10 = 10	2 X 10 = 20	1
ES2	C	U8	15		1 X 20 = 20	1 X 20 = 20	2 X 20 = 40	1
ES2	C	U9	27		1 X 27 = 27	1 X 32 = 32	2 X 32 = 64	1
ES2	C	U10	19		1 X 19 = 19	1 X 24 = 24	2 X 24 = 48	1
ES2	C	U11	12	1 X 12 = 12		1 X 17 = 17	2 X 17 = 34	2
ES2	C	U12	12	1 X 12 = 12		1 X 17 = 17	2 X 17 = 34	2
SHEET TOTAL				24	161	240	480	

NOTES:
1) SEGMENT RUN SHALL BE INSTALLED SURFACE MOUNTED TO BRIDGE STRUCTURE. COORDINATE INSTALLATION WITH BRIDGE CONTRACTOR.
2) LIQUID-TIGHT FLEXIBLE STEEL CONDUIT (TYPE LFMC) SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 618, "CONDUIT" BID ITEM.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED PROFESSIONAL ENGINEER
22 MAR 2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

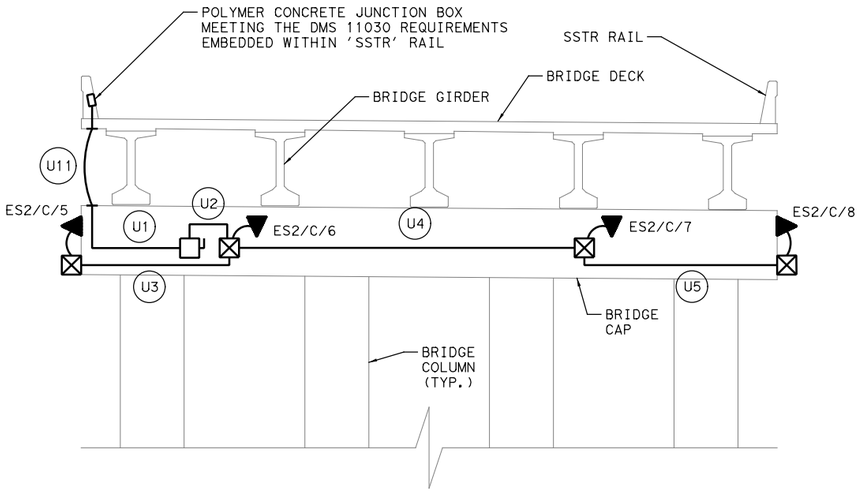
ILLUMINATION UNDERPASS LAYOUT TCS QUARRY BRIDGE

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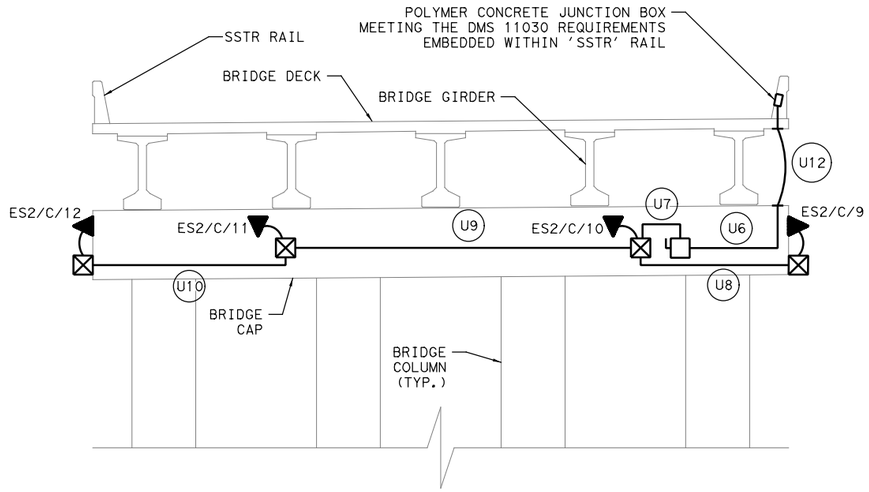
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GM	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
GM	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	202
PD	2103	01	034	
CHECK				
PD				

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WBFR BENT NO. 3 DETAIL



WBFR BENT NO. 4 DETAIL

LEGEND

- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE HEAD
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION
  - CIRCUIT DESIGNATION
  - ELECTRICAL SERVICE DESIGNATION

GENERAL NOTES:

1. LOCATION OF ILLUMINATION EQUIPMENT MAY BE FIELD ADJUSTED AS DIRECTED BY THE INSPECTING ENGINEER TO ACCOMODATE ROADWAY FEATURES AND AVOID UTILITY CONFLICTS.
2. CONTACT POWER CO. WITH 2-WEEKS NOTICE FOR ELECTRICAL SERVICE CONNECTIONS.
3. THE CONSTRUCTION OF ILLUMINATION SHALL MEET ALL TxDOT STANDARDS/ SPECS, POWER COMPANY STANDARDS, N.E.C., CITY OF GEORGETOWN STANDARDS, UNLESS OTHERWISE NOTED.
4. VERIFY WITH THE UTILITY COMPANY(S) THE EXACT LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THE UTILITIES.
5. ABOVE GRADE NEMA 3R JUNCTION BOXES SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 618, "CONDUIT" BID ITEM.
6. PROVIDE CONDUIT EXPANSION AND DEFLECTION COUPLING WHERE UNDERGROUND CONDUIT SEGMENT ENTERS THE BRIDGE STRUCTURE AND TRANSITIONS TO A BRIDGE EMBEDDED CONDUIT SEGMENTS. COUPLING SHALL ALLOW FOR A MAXIMUM OF 4" HORIZONTAL AND VERTICAL MOVEMENT.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
22 MAR 2018

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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

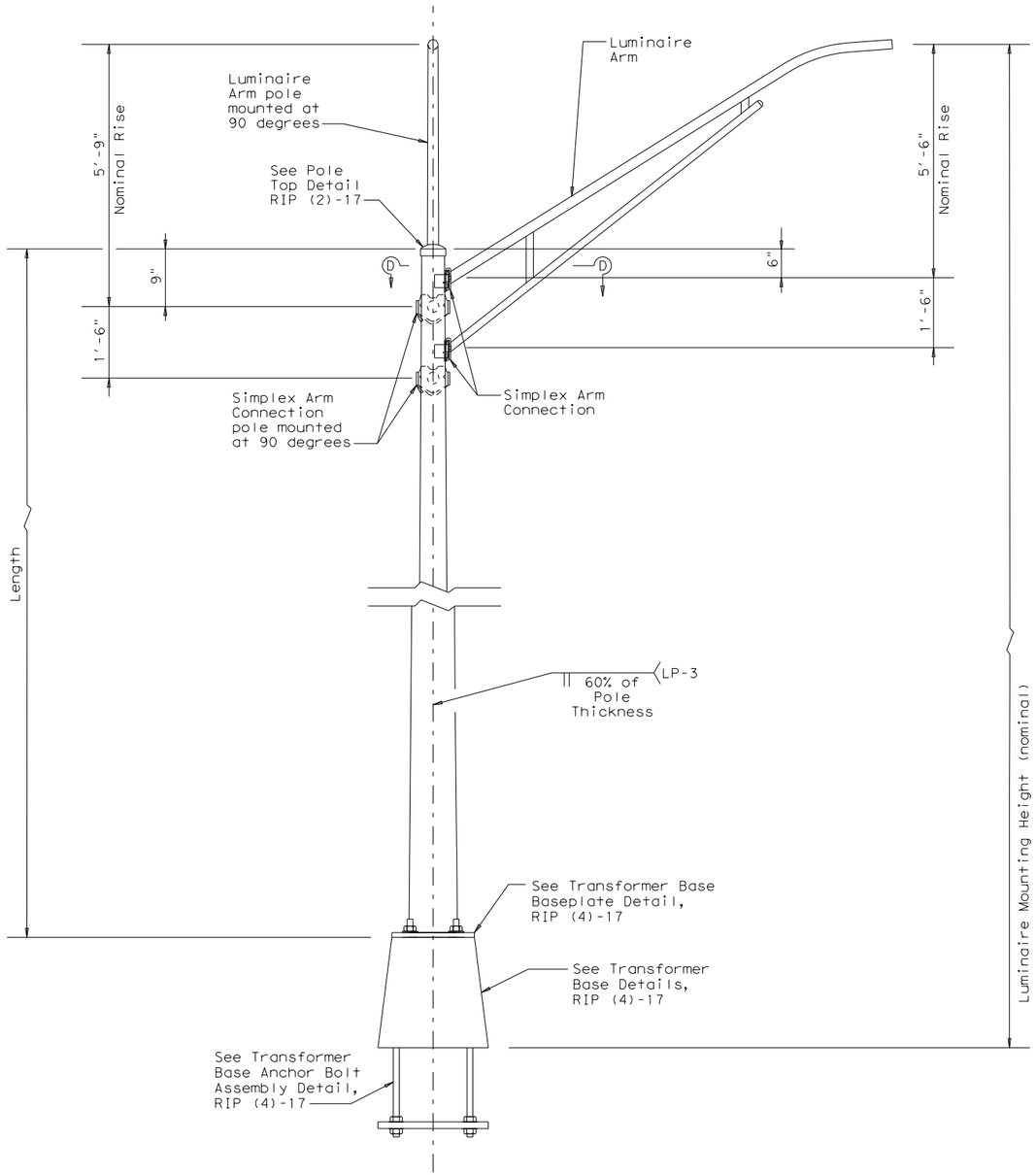
ILLUMINATION DETAILS

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
GM	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	203
PD	2103	01	034	
CHECK				
PD				

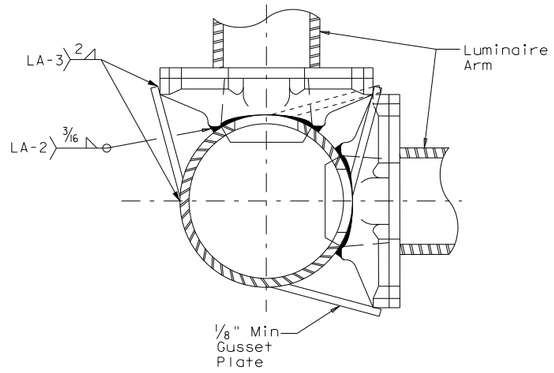
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TRANSFORMER BASE POLE WITH TWO LUMINAIRE HEADS MOUNTED AT 90 DEGREES

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
50.00	10.00	3.41	43.50	0.1196	30.3



SECTION D-D

GENERAL NOTES:

1. Refer to TxDOT Roadway Illumination Poles Standards RIP (1)-17, RIP (2)-17, RIP (3)-17, and RIP (4)-17 for additional design conformance requirements.

STATE OF TEXAS
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22 MAR 2018

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ILLUMINATION DETAILS

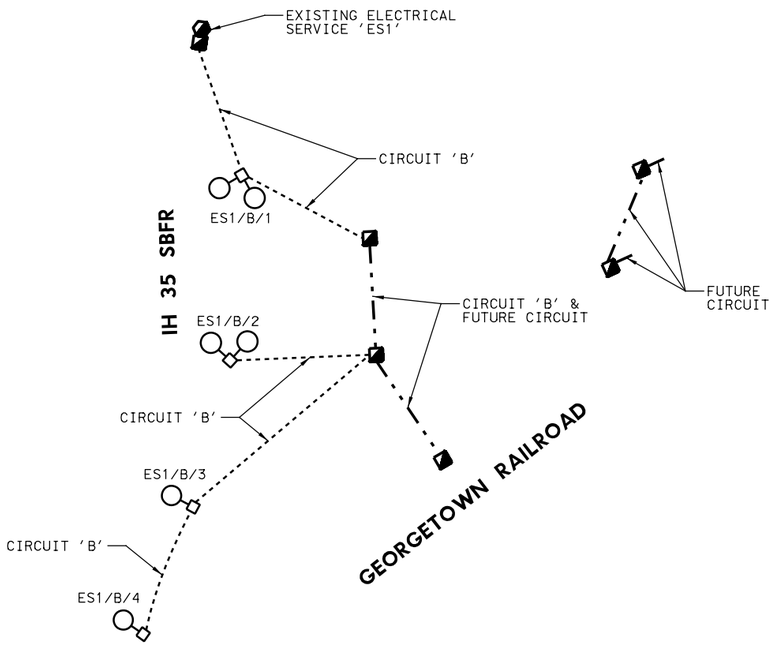
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK				
PD				

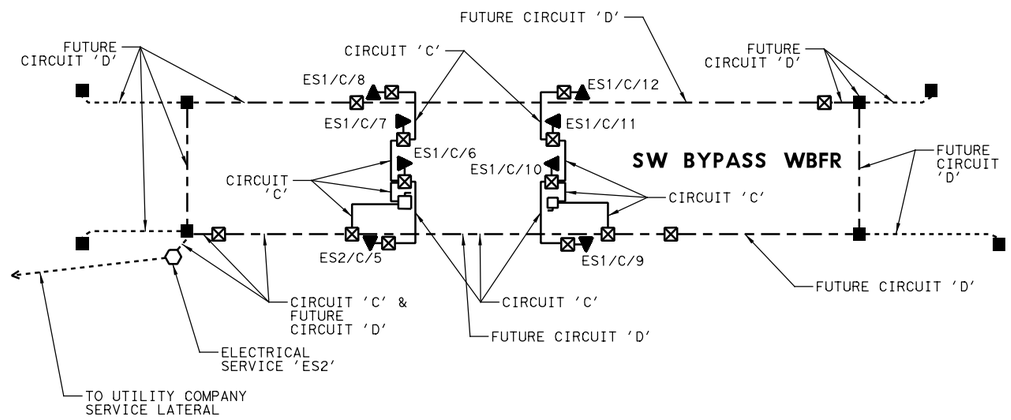
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ELECTRICAL SERVICES DATA SHEET											
ELEC. SERVICE NO.	ELECTRICAL SERVICE DESCRIPTION (SEE ED (5),(6), & (9) - 14)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD/ LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
'ES1' (EXISTING)	ELC SRV TY A (120/240) 060 (NS) GS (E) SP (O)	EXISTING	EXISTING	N/A	2P/60 (EXISTING)	60 (EXISTING)	N/A	A (EXISTING) B	2P/20 (*) 2P/20 (**)	5.84 3.13	2.15
'ES2'	ELC SRV TY A (240/480) 060 (NS) SS (E) PS (U)	2"	3/#6	N/A	2P/60	60	N/A	C D (FUTURE) SPARE	2P/20 2P/20 2P/20	1.57 5.84	3.56
'ES3'	ELC SRV TY A (240/480) 060 (NS) SS (E) PS (U)	2"	3/#6	N/A	2P/60	60	N/A	E (FUTURE) F (FUTURE) SPARE	2P/20 2P/20 2P/20	5.84 5.84	5.61

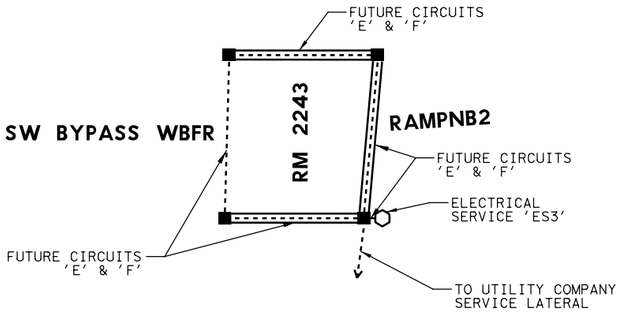
(*) DENOTES EXISTING CIRCUIT BREAKER WITH EXISTING CONNECTED LOAD TO REMAIN.
(**) DENOTES NEW CIRCUIT BREAKER WITH NEW CONNECTED LOAD.



SCHEMATICS - EXISTING ELECTRICAL SERVICE 'ES1'



SCHEMATICS - ELECTRICAL SERVICE 'ES2'



SCHEMATICS - ELECTRICAL SERVICE 'ES3'

LEGEND

- EXISTING ELECTRIAL SERVICE ASSEMBLY TYPE A, 120/240 VOLT, 1 PHASE STEEL POLE TYPE SERVICE
- ELECTRIAL SERVICE ASSEMBLY TYPE A, 240/480 VOLT, 1 PHASE PEDESTAL TYPE SERVICE
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (1) LED LUMINAIRE HEAD
- TxDOT STANDARD ILLUMINATION ASSEMBLY, 50' MOUNTING HEIGHT, TRANSFORMER BASE, TYPE IV DISTRIBUTION, (2) LED LUMINAIRE HEADS
- TxDOT STANDARD UNDERPASS ILLUMINATION ASSEMBLY, TYPE III DISTRIBUTION, (1) LED LUMINAIRE, 3000K LUMINAIRE TEMPERATURE
- 30A/2P DISCONNECT SWITCH (NEMA 3R)
- EXISTING BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- BELOW GRADE GROUND BOX (TY A) (NEMA 3R)
- ABOVE GRADE JUNCTION BOX (NEMA 3R)
- CONDUCTORS IN CONDUIT SEGMENT (SURFACE)
- CONDUCTORS IN CONDUIT SEGMENT (TRENCHED)
- CONDUCTORS IN CONDUIT SEGMENT (BORED)
- CONDUCTORS IN CONDUIT SEGMENT (INSTALLED IN SEGMENT #1 CONSTRUCTION)
- CONDUCTORS IN CONDUIT SEGMENT (EMBEDDED IN STRUCTURE)
- (XX) CONDUCTOR/ CONDUIT SEGMENT NO.
- X/X/X — ILLUMINATION ASSEMBLY DESIGNATION / CIRCUIT DESIGNATION / ELECTRICAL SERVICE DESIGNATION

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
22 MAR 2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

ILLUMINATION SCHEMATICS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
GM	6			
GRAPHICS GM	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK PD	TEXAS	AUS	WILLIAMSON	
CHECK PD	CONTROL	SECTION	JOB	205
	2103	01	034	

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ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

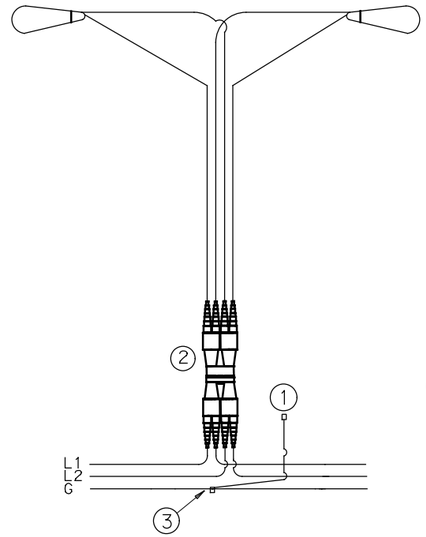
      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

NOTES:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.

Texas Department of Transportation — Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-17

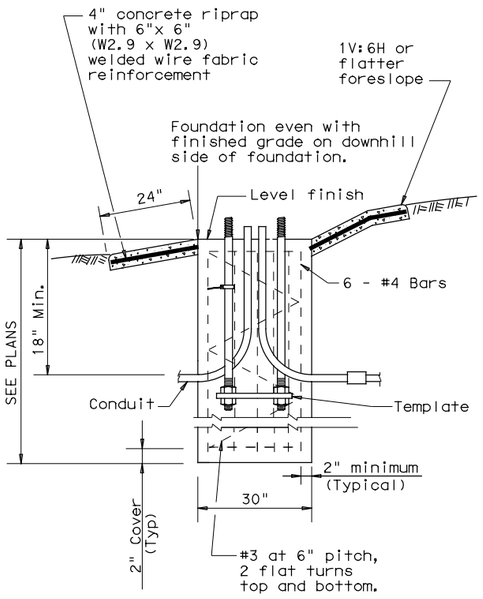
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	AUS	WILLIAMSON		266

72A

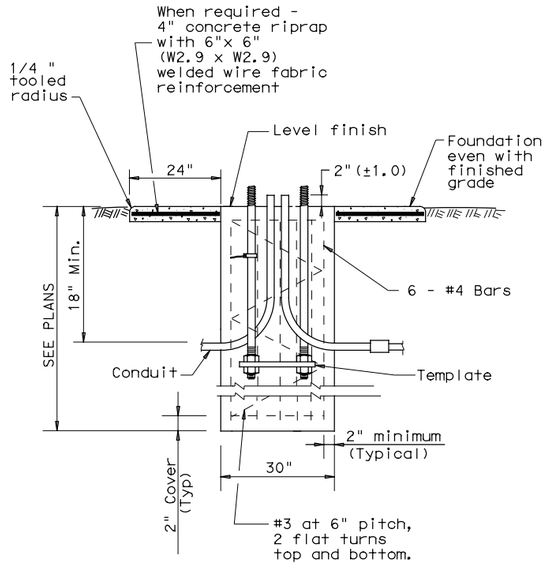
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SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1
ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1 in. x 30 in.
40-50 ft.	15 in.	17 ¼ in.	1 ¼ in. x 30 in.

TABLE 2
RECOMMENDED FOUNDATION LENGTHS (See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3
PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

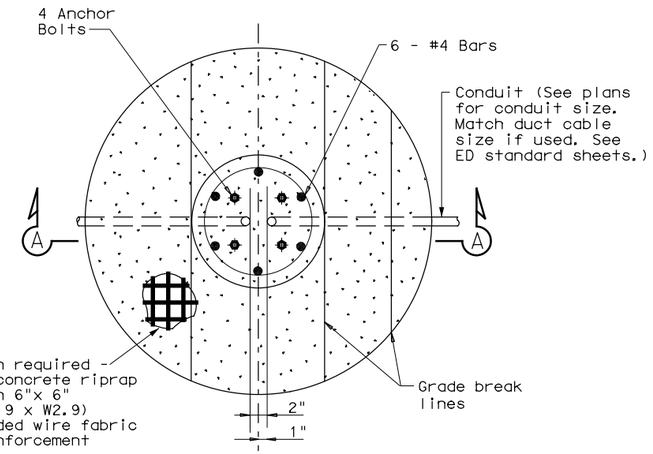
1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Use riprap on T-base foundations that are located on sloped grades.

TABLE 4
BREAKAWAY POLE PLACEMENT (See note 6)

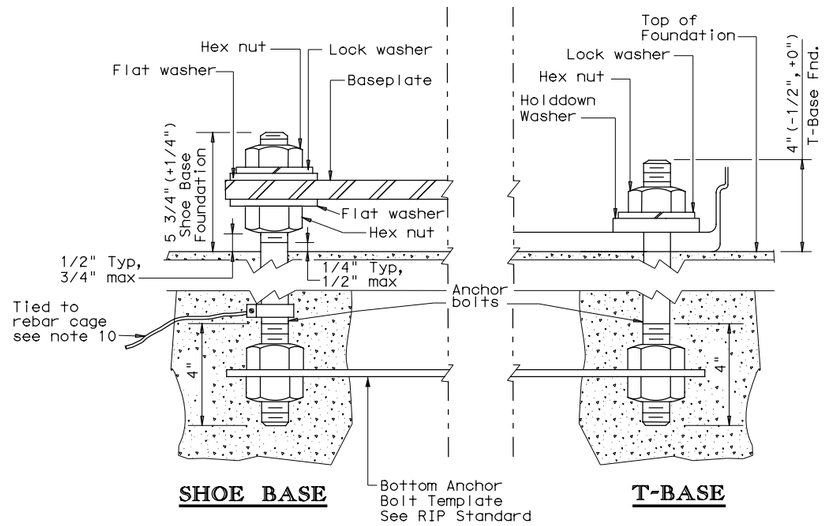
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)
RID(2)-17

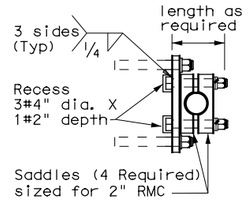
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© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-11 7-17	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		207

72B

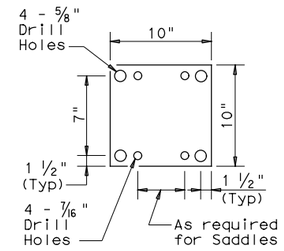
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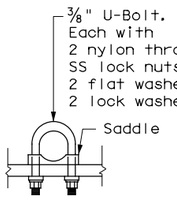
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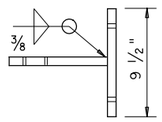
SECTION A-A



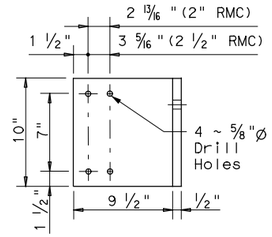
MOUNTING PLATE
(ASTM A-36 or better)



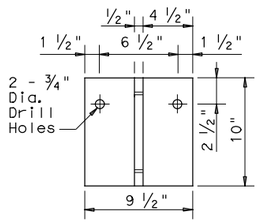
CLAMP DETAIL
(2 Req'd)



PLAN VIEW

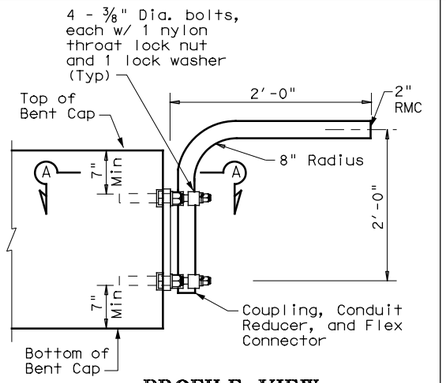


FRONT

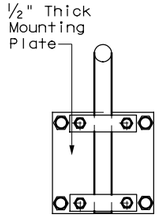


SIDE

BRACKET DETAIL
Make from 1/2" plate (ASTM A-36 or better)

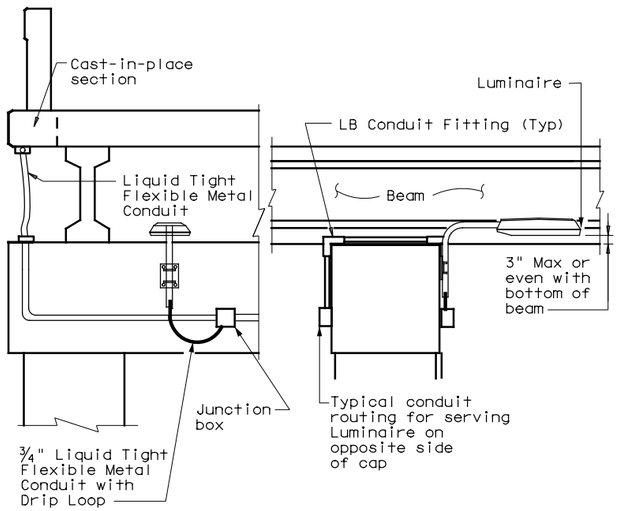


PROFILE VIEW
Or as Required
(See Note A.3)



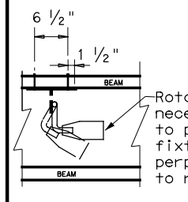
END VIEW

UNDERPASS LIGHTING ARM



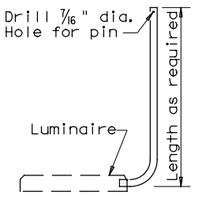
IN RD IL AM (U/P)(TY 1)
If bridge has pre-cast panels under deck, run circuit under deck edge.

UNDERPASS LIGHTING TYPE 1

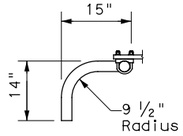


PLAN VIEW

FIXTURE ORIENTATION

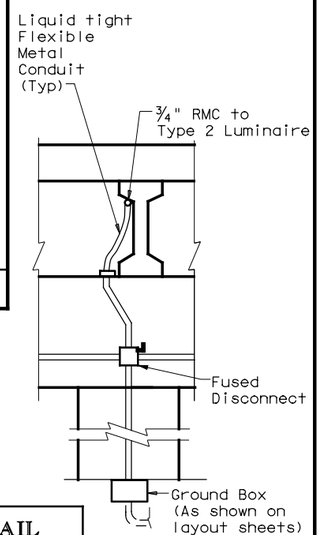


SIDE



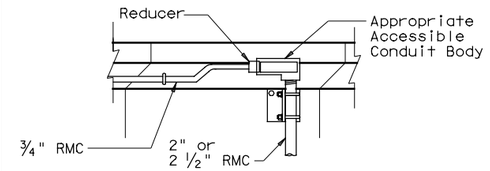
PLAN VIEW

ARM DETAIL

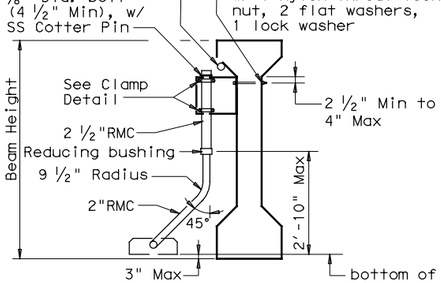


3 - No. 12 XHHW in 3/4" RMC for Branch Circuit runs from fused disconnect to underpass Luminaires

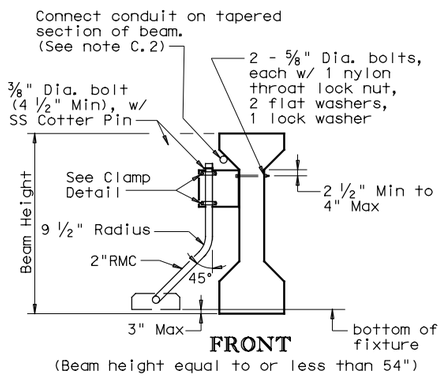
CONDUIT DETAIL



CONDUIT CONNECTION PROFILE

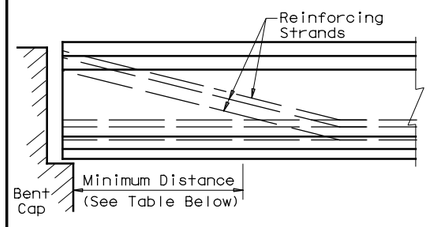


FRONT
(Beam height greater than 54")



FRONT
(Beam height equal to or less than 54")

IN RD IL AM (U/P)(TY 2)



LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET

TABLE 5
LOCATION OF UNDERPASS LIGHT MOUNTING BRACKET TABLE

SPAN LENGTH	MINIMUM DISTANCE
≤ 50'	10'-0"
50'- 70'	15'-0"
70'- 90'	20'-0"
> 90'	25'-0"

UNDERPASS LIGHTING TYPE 2

GENERAL NOTES:

A. ALL 150 watt HPS and 150 watt equivalent LED Luminaires

1. Luminaire locations, conduit and conductor sizes and routing are typical and diagrammatic only. See project layout sheets for specific details.
2. Conduit will be paid for under Item 618, "Conduit" and conductors will be paid for under Item 620, "Electrical Conductors," unless otherwise shown on the plans.
3. Adjust conduit in saddles to place fixture height and orientation as required. See fixture orientation detail and plans. Where practicable, place luminaires so the bottom of luminaire is above the bottom of the beam, maximum of 3 in. (See detail UNDERPASS LIGHTING ARM TYPE 2)
4. Except as noted, galvanize all structural steel and exposed bolts, nuts, and washers in accordance with Item 445 "Galvanizing".
5. Fabrication of brackets and support arms will not be paid for directly but is subsidiary to Item 610, "Roadway Illumination Assemblies."
6. Install a heavy duty NEMA 3R fused disconnect or breaker enclosure rated at 30 amps and 480 volts to switch underpass luminaires as shown on plans, with at least one per bridge circuit. Install 20 amp time-delay fuses or inverse-time circuit breakers. Mount disconnect or breaker enclosure 10 ft.(min) above grade on columns or bent caps as approved by the Department. Modify disconnect to allow padlocking in the "ON" and "OFF" positions. Padlocks and disconnect switches or circuit breakers for underpass fixtures will not be paid for directly but are subsidiary to the various bid items of the contract.
7. Conduit on columns, caps, and slab is shown surface mounted. For new columns and caps, embed PVC conduit in concrete. Bond and ground metal junction boxes and conduit.

B. TYPE 1

1. Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) for Type 1 arm shaft.
2. Use 3/8 in. stainless steel bolt or stud non-epoxy type expansion anchors for concrete for Type 1 mounting. Except as noted, provide an allowable 2650 lbs minimum pull-out force (after consideration of adjustment factors for edge distance and bolt spacing) for each anchor. Install each anchor to the embedment depth recommended by the manufacturer.
3. Attach conduit to plate with 4 saddles, four - 3/8 in. diameter bolts, nylon throat lock nuts, and lock washers.

C. TYPE 2

1. Provide 2 in. rigid metal conduit (2.375" O.D., 0.146" wall) or provide a combination of 2 1/2 in. (2.875" O.D., 0.193" wall) and 2 in. (2.375" O.D., 0.146" wall) rigid metal conduits with a reducing bushing as beam height stipulated for Type 2 arm shaft. Field cutting and threading will be permitted. Paint cut and threaded areas with zinc rich paint after conduit is connected to adjacent fitting.
2. Connecting conduit may be strapped to tapered section only of precast beams as shown. Anchor as approved by the Engineer. Maximum anchor depth is 1 in.
3. Indiscriminate drilling into precast concrete beams may result in reduced beam strength. Use drilling location and method as directed by the Engineer. See Location of Underpass Lighting Mounting Bracket detail. The locations shown in the table are such that reinforcing strands will not be damaged.

Texas Department of Transportation — Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS
(UNDERPASS LIGHT FIXTURES)

RID(3)-17

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©TxDOT	May 2013	CONT	SECT	JOB	HIGHWAY
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2-14		DIST	COUNTY		SHEET NO.
7-17		AUS	WILLIAMSON		288

72C

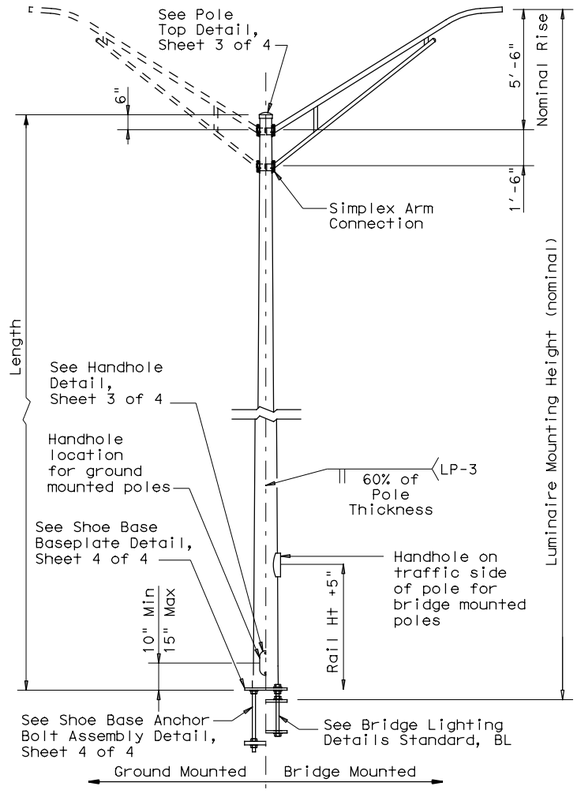
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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation Pole	A1	A2	Luminaire	Quantity	T-Base Designation Pole	A1	A2	Luminaire	Quantity	CSB/SSCB Mounted Designation Pole	A1	A2	Luminaire	Quantity
20	(Type SA 20 S - 4)			(150W EQ) LED		(Type SA 20 T - 4)			(150W EQ) LED						
	(Type SA 20 S - 4 - 4)			(150W EQ) LED		(Type SA 20 T - 4 - 4)			(150W EQ) LED						
30	(Type SA 30 S - 4)			(250W EQ) LED		(Type SA 30 T - 4)			(250W EQ) LED		(Type SP 28 S - 4)			(250W EQ) LED	
	(Type SA 30 S - 4 - 4)			(250W EQ) LED		(Type SA 30 T - 4 - 4)			(250W EQ) LED		(Type SP 28 S - 4 - 4)			(250W EQ) LED	
	(Type SA 30 S - 8)			(250W EQ) LED		(Type SA 30 T - 8)			(250W EQ) LED		(Type SP 28 S - 8)			(250W EQ) LED	
	(Type SA 30 S - 8 - 8)			(250W EQ) LED		(Type SA 30 T - 8 - 8)			(250W EQ) LED		(Type SP 28 S - 8 - 8)			(250W EQ) LED	
40	(Type SA 40 S - 4)			(250W EQ) LED		(Type SA 40 T - 4)			(250W EQ) LED		(Type SP 38 S - 4)			(250W EQ) LED	
	(Type SA 40 S - 4 - 4)			(250W EQ) LED		(Type SA 40 T - 4 - 4)			(250W EQ) LED		(Type SP 38 S - 4 - 4)			(250W EQ) LED	
	(Type SA 40 S - 8)			(250W EQ) LED		(Type SA 40 T - 8)			(250W EQ) LED		(Type SP 38 S - 8)			(250W EQ) LED	
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED		(Type SP 38 S - 8 - 8)			(250W EQ) LED	
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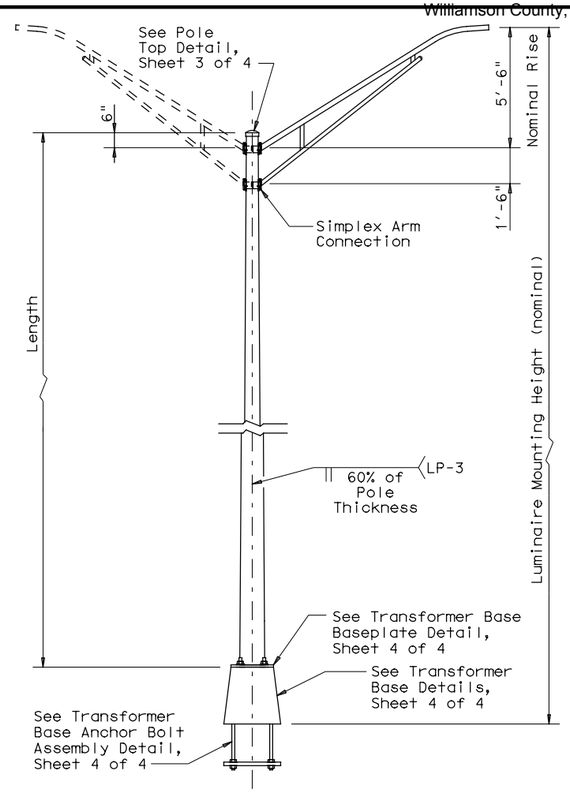
OTHER Designation Pole	A1	A2	Luminaire	Quantity

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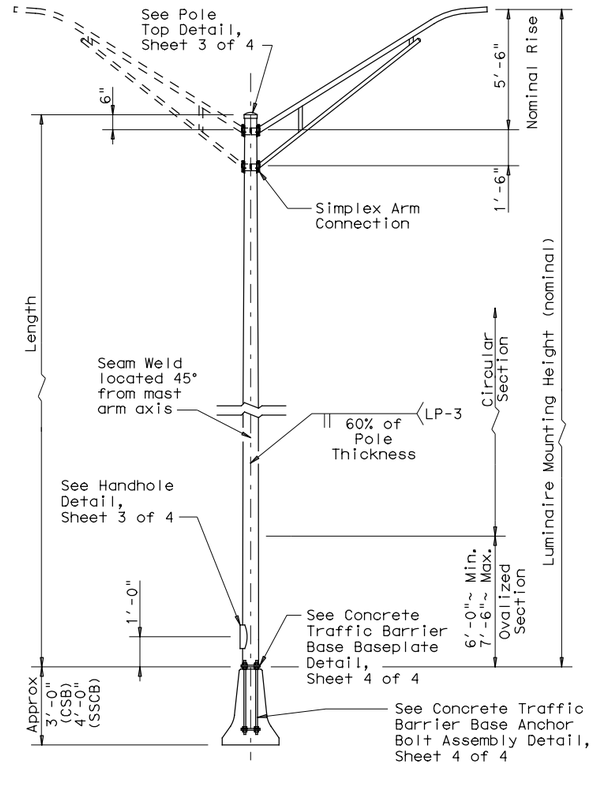
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.41	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About ℄ of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	A325 ①	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

① Lubricate in the field if necessary instead of the requirements in ASTM A325.

② Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.

③ A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

GENERAL NOTES:

1. Designs conform to 2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications. Design 3-Second Gust Wind Speed equal 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is less than 25' above natural ground level.
2. Design structures to support two 12' luminaire mast arms and luminaires. Design mast arms for a 60-pound luminaire having an effective projected area of 1.6 square feet.
3. Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
4. For mounting heights between values shown in the tables, use base diameter and thickness values for the larger pole.
5. Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
6. Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with the ANSI/AWS Structural Welding Code D1.1.
7. Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
8. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
9. Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
10. All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. Except for poles mounted on a concrete traffic barrier or bridge bracket, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
11. The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
12. Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.

Texas Department of Transportation

Traffic Operations Division Standard

ROADWAY ILLUMINATION POLES

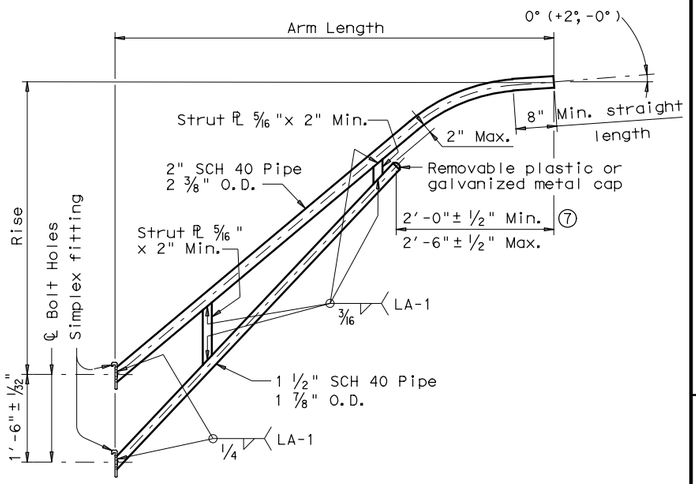
RIP(2)-17

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©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
7-17	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		210

73B

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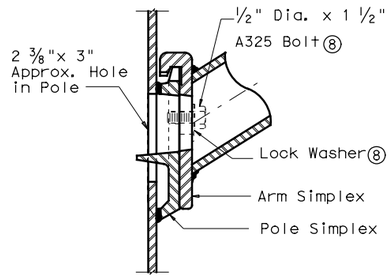
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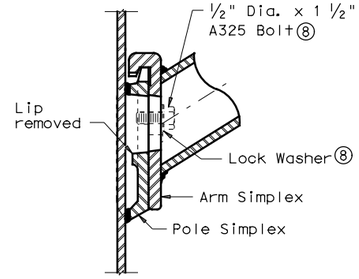
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6" ⑩
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±3"
Arm Rise	+1 3/4" in 10 ft
Arm Diameter	+3/16"
Overall length or width	+1/4"
Thickness	+1/4", -1/16"
Deviation from flat	1/8" in 12"
Spacing between holes	+3/32"
Bolt hole size	±1/16"
Strut location in truss arms	±1 1/2"

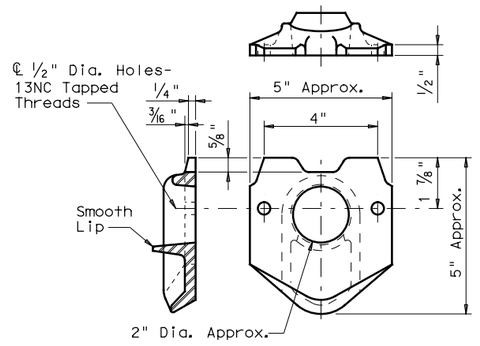


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

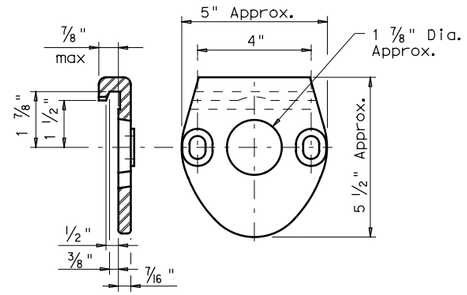


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

SECTION B-B



POLE SIMPLEX DETAIL ⑨



ARM SIMPLEX DETAIL ⑨

NOTES:

④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

⑤ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.

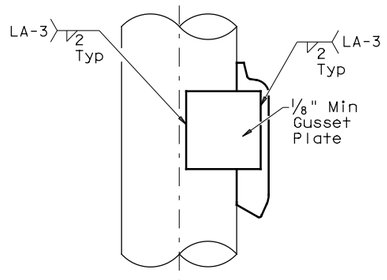
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

⑧ Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.

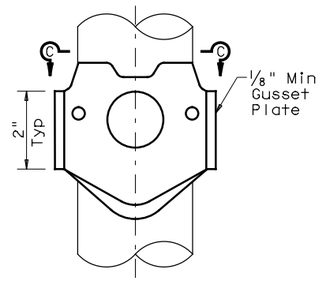
⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ Luminaire mounting heights are based on assumed 5'-6" luminaire arm rise.

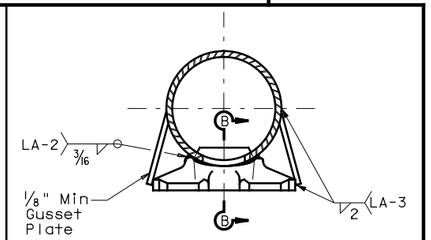
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted



SIDE

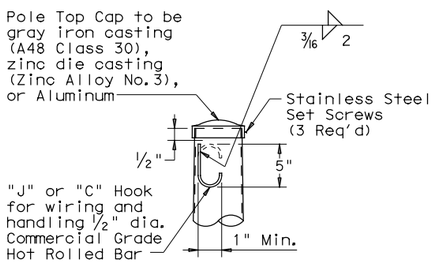


ELEVATION

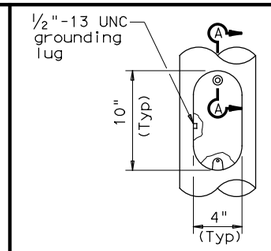


SECTION C-C

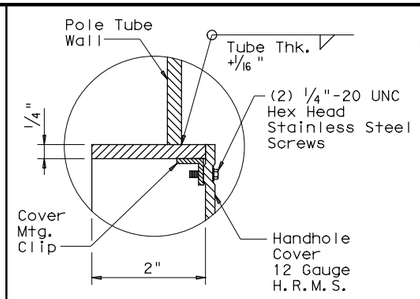
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

Texas Department of Transportation — Traffic Operations Division Standard

ROADWAY ILLUMINATION POLES

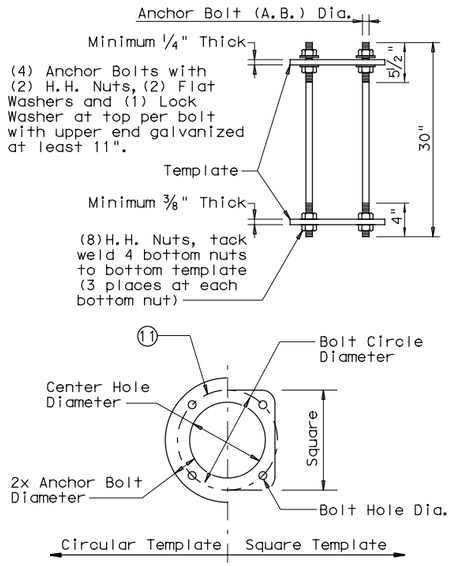
RIP(3)-17

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©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
7-17	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		211

73C

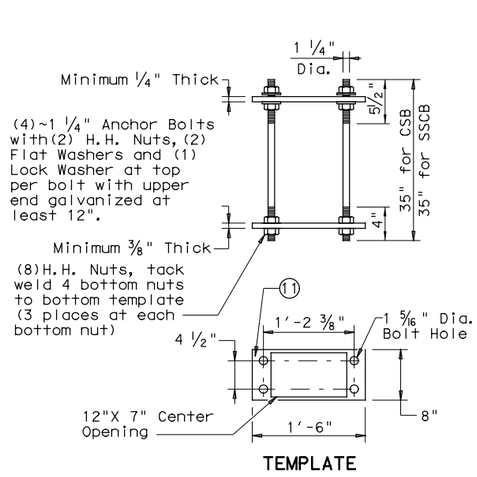
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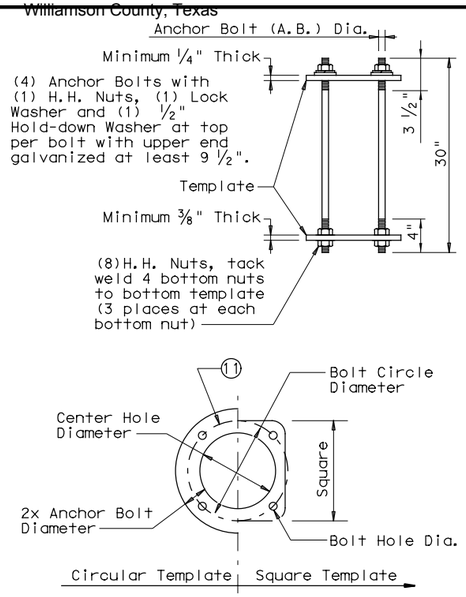


SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE					
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	SQUARE	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′-39′	1"	13"	13"	11"	1 1/16"
40′-50′	1 1/4"	15"	14 1/2"	12 1/2"	1 5/16"



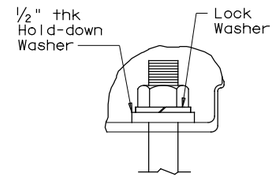
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY



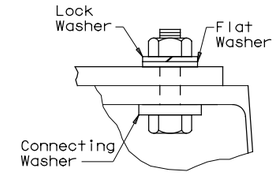
TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE					
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	SQUARE	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′- 39′	1"	14"	14"	12"	1 1/16"
40′- 50′	1 1/4"	17 1/4"	16 3/4"	14 3/4"	1 5/16"

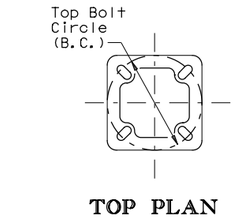
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



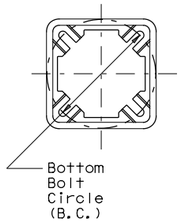
DETAIL A



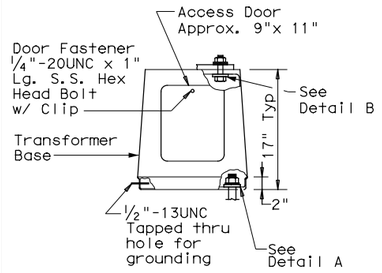
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

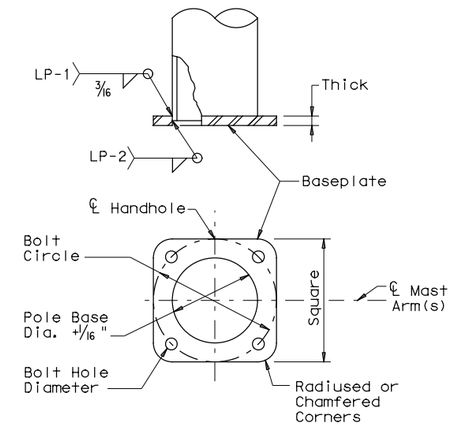
1. For mounting heights between those shown in the table, use the values in he table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the 2001 Edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
3. Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
4. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
5. Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

(11) Anchor Bolt Templates do not need to be galvanized.

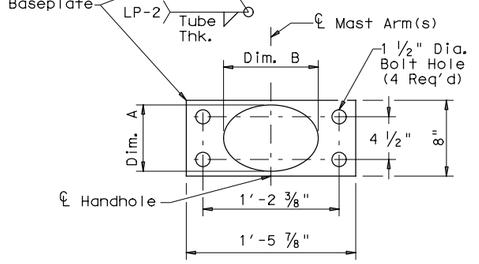
(12) Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"



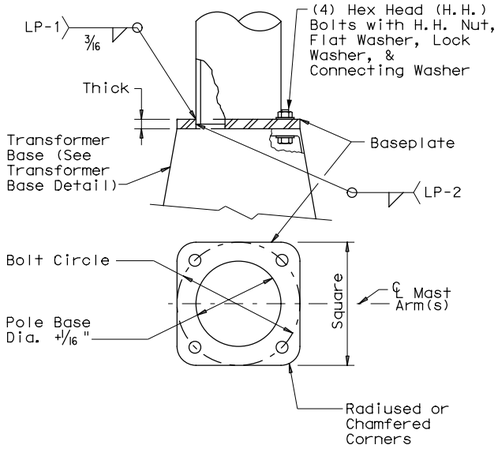
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20′- 39′	13"	13"	1 1/4"	1 1/4"
40′	15"	15"	1 1/4"	1 1/2"
50′	15"	15"	1 1/2"	1 1/2"



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28′- 38′	9"	7"± 1/4"	10"± 1/4"
48′	10 1/2"	7"± 1/4"	13"± 1/4"



TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20′- 39′	13"	13"	1 1/4"	1"	1 1/4"	A
40′	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50′	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

SHEET 4 OF 4

Texas Department of Transportation

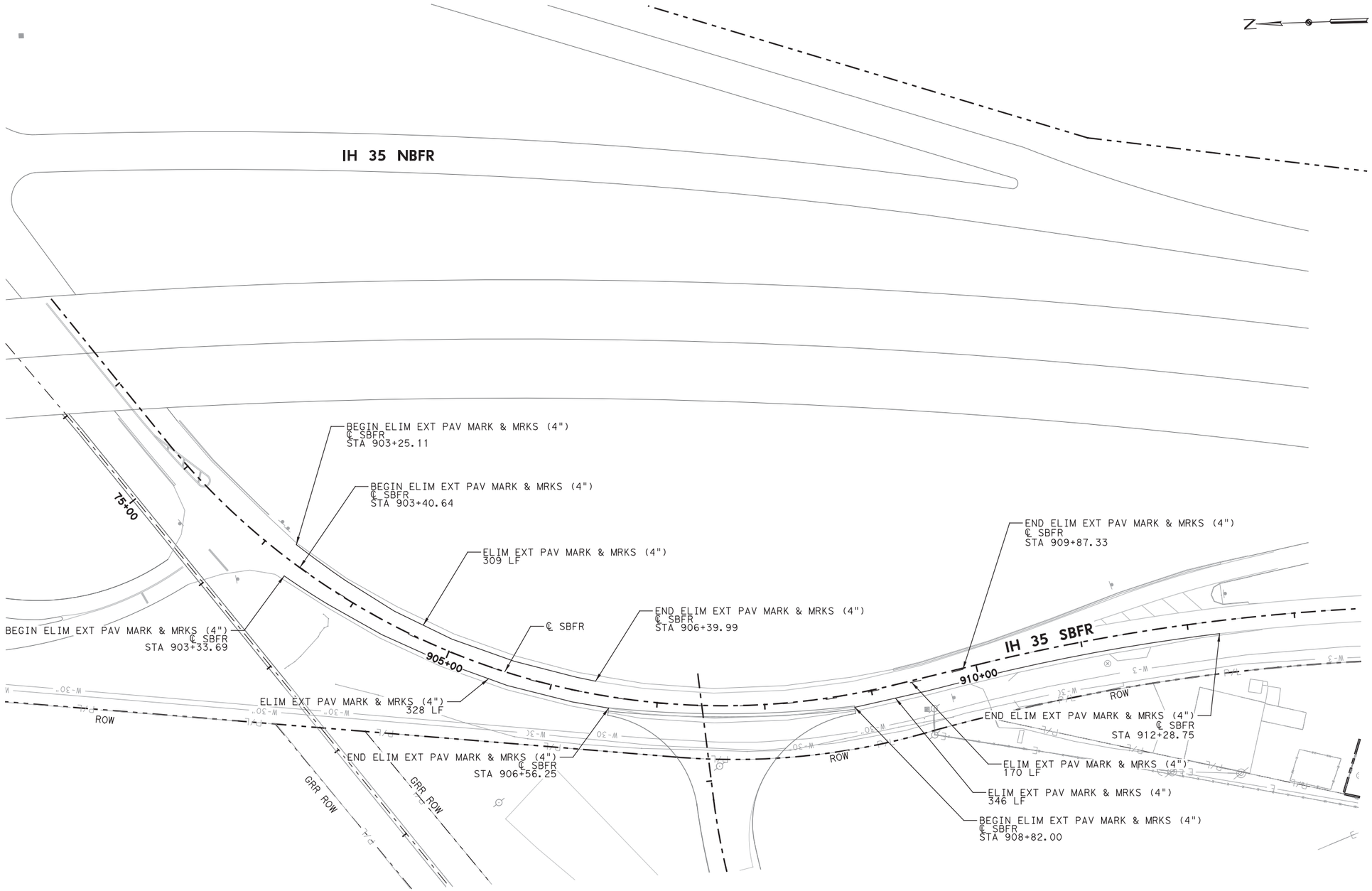
Traffic Operations Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-17

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REVISIONS 7-17	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		243

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NOTES:

1. REMOVAL OF RPMS SHALL BE CONSIDERED SUBSIDIARY TO ELIM PAV MARK & MARKS (4").
2. EXISTING STRIPING WITHIN THE LIMITS OF MILL AND OVERLAY IS NOT DIRECTLY CALLED OUT FOR REMOVAL. ANY NECESSARY REMOVAL OF THESE STRIPES IS CONSIDERED SUBSIDIARY TO PERTINENT ITEMS. FLAIL MILLING IS NOT REQUIRED IN THIS CASE.

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

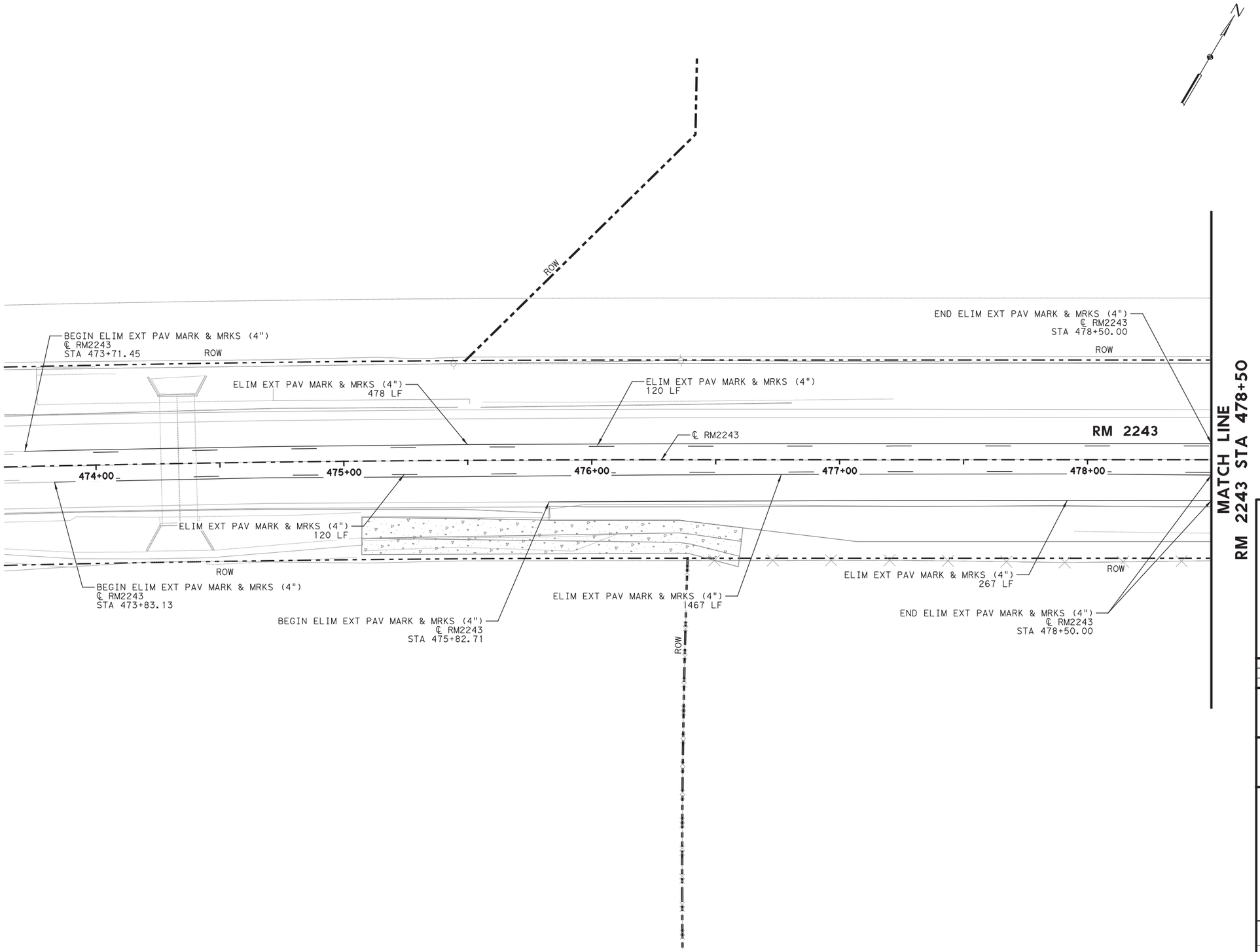
SOUTHWEST BYPASS SEGMENT 2

STRIPING REMOVAL PLAN SBFR I-35

SCALE: 1"=100' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	213
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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USER: lgomezgonz DATE: 3/23/2018
FILE: \
PENTABLE: S2-000002017018.tbl
TIME: 10:57:48 AM SCALE: 1:100



NOTES:

1. REMOVAL OF RPMS SHALL BE CONSIDERED SUBSIDIARY TO ELIM PAV MARK & MARKS (4").
2. EXISTING STRIPING WITHIN THE LIMITS OF MILL AND OVERLAY IS NOT DIRECTLY CALLED OUT FOR REMOVAL. ANY NECESSARY REMOVAL OF THESE STRIPES IS CONSIDERED SUBSIDIARY TO PERTINENT ITEMS. FLAIL MILLING IS NOT REQUIRED IN THIS CASE.

0 20 40 60 80

SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

STRIPING REMOVAL PLAN RM 2243 BEGIN TO STA 478+50

SCALE: 1"=40' SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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FILE: \

MATCH LINE
RAMPNB2 STA 12+00

SEE NOTE 2

ONLY

RAMPNB2

℄ RAMPNB2

SEE NOTE 2

ONLY

SEE NOTE 2

ROW

11+00

SEE NOTE 2

SEE NOTE 2

ELIM EXT PAV MARK & MRKS (4")
10 LF

ELIM EXT PAV MARK & MRKS (4")
25 LF

BEGIN ELIM EXT PAV MARK & MRKS (4")
℄ RM2243
STA 483+00.00

ROW

ROW

ONLY

SEE NOTE 2

SEE NOTE 2

SEE NOTE 2

SEE NOTE 2

RM 2243

MATCH LINE
RM 2243 STA 478+50

MATCH LINE
RM 2243 STA 483+25

479+00 480+00 481+00 482+00 483+00

SEE NOTE 2

℄ RM2243

SEE NOTE 2

ROW

ROW

BEGIN ELIM EXT PAV MARK & MRKS (4")
℄ RM2243
STA 483+00.00

ELIM EXT PAV MARK & MRKS (4")
25 LF

ELIM EXT PAV MARK & MRKS (4")
10 LF

SW BYPASS WBFR

℄ WBFR_S2_CL

450+00

ROW

NOTES:

1. REMOVAL OF RPMS SHALL BE CONSIDERED SUBSIDIARY TO ELIM PAV MARK & MARKS (4").
2. EXISTING STRIPING WITHIN THE LIMITS OF MILL AND OVERLAY IS NOT DIRECTLY CALLED OUT FOR REMOVAL. ANY NECESSARY REMOVAL OF THESE STRIPES IS CONSIDERED SUBSIDIARY TO PERTINENT ITEMS. FLAIL MILLING IS NOT REQUIRED IN THIS CASE.

0 20 40 60 80
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS
SEGMENT 2

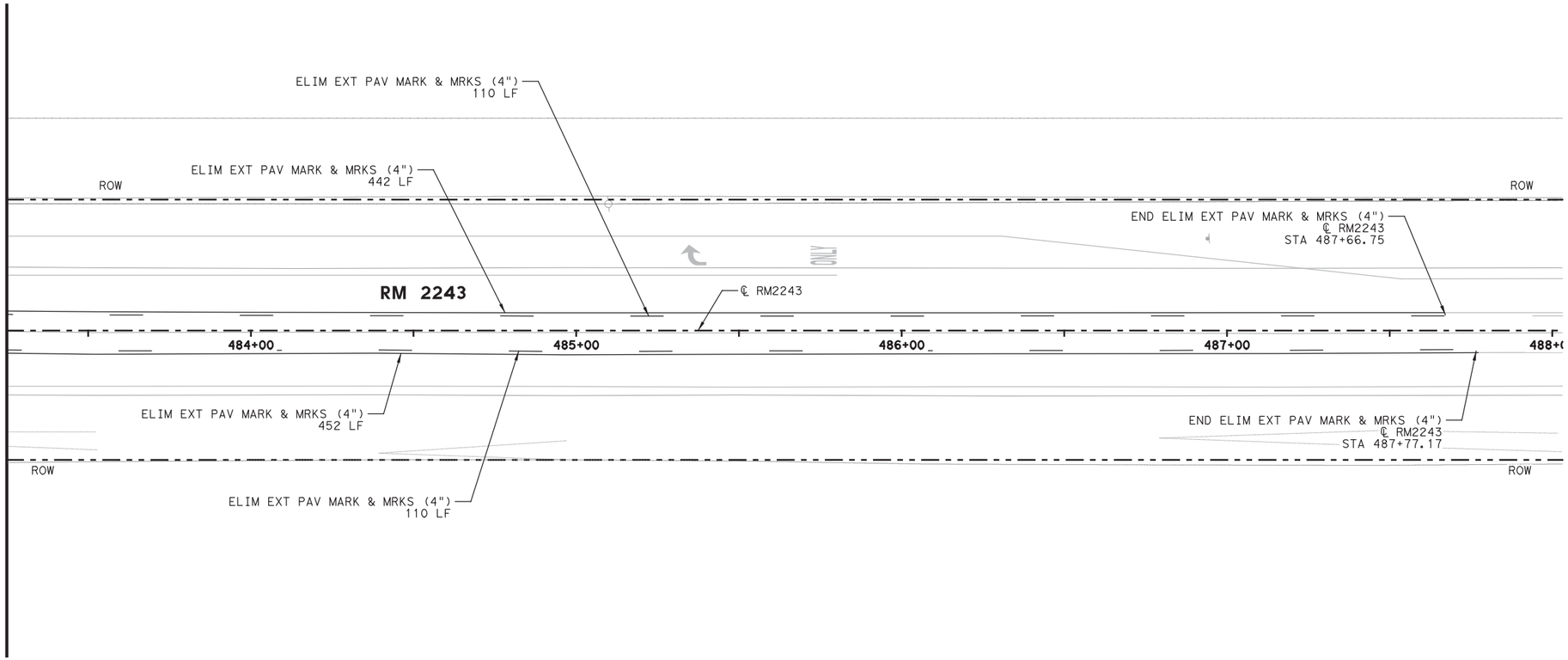
STRIPING REMOVAL PLAN
RM 2243
STA 478+50 TO STA 483+25

SCALE: 1"=40' SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	215
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 10:57:54 AM SCALE: 1:40
FILE: \

4/12/2018 7:20 AM



NOTES:

1. REMOVAL OF RPMS SHALL BE CONSIDERED SUBSIDIARY TO ELIM PAV MARK & MARKS (4").
2. EXISTING STRIPING WITHIN THE LIMITS OF MILL AND OVERLAY IS NOT DIRECTLY CALLED OUT FOR REMOVAL. ANY NECESSARY REMOVAL OF THESE STRIPES IS CONSIDERED SUBSIDIARY TO PERTINENT ITEMS. FLAIL MILLING IS NOT REQUIRED IN THIS CASE.

0 20 40 60 80
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

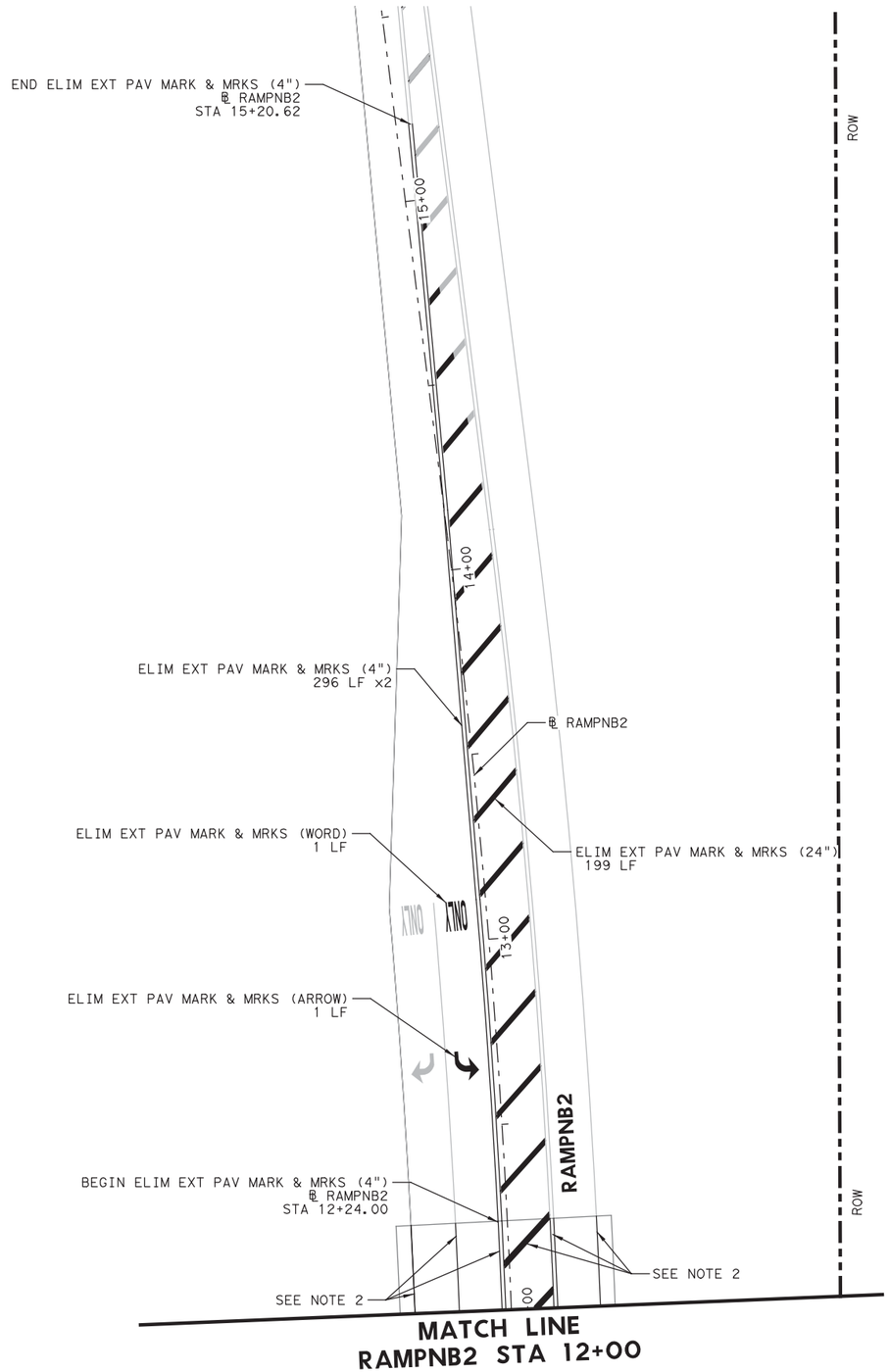
SOUTHWEST BYPASS SEGMENT 2

STRIPING REMOVAL PLAN RM 2243 STA 483+25 TO END

SCALE: 1"=40' SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	216
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 10:57:58 AM SCALE: 1:40
FILE: \





NOTES:

1. REMOVAL OF RPMS SHALL BE CONSIDERED SUBSIDIARY TO ELIM PAV MARK & MARKS (4").
2. EXISTING STRIPING WITHIN THE LIMITS OF MILL AND OVERLAY IS NOT DIRECTLY CALLED OUT FOR REMOVAL. ANY NECESSARY REMOVAL OF THESE STRIPES IS CONSIDERED SUBSIDIARY TO PERTINENT ITEMS. FLAIL MILLING IS NOT REQUIRED IN THIS CASE.

0 20 40 60 80

SCALE IN FEET



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

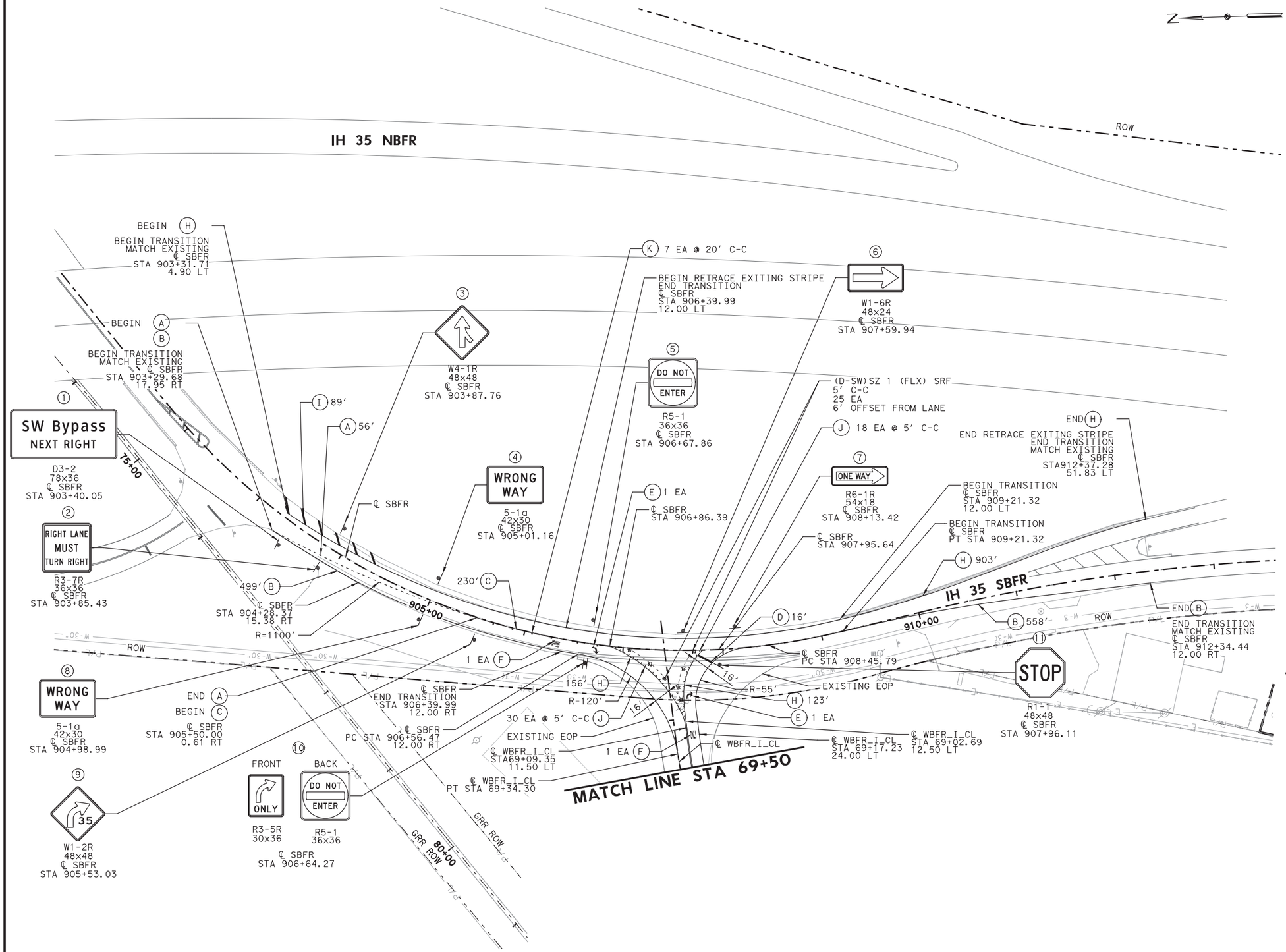
SOUTHWEST BYPASS SEGMENT 2

STRIPING REMOVAL PLAN RAMPNB2 STA 12+00 TO END

SCALE: 1"=40' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	217
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 10:58:02 AM SCALE: 1:40
FILE: \



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND
EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.
4. RESPECTIVE "REFL PAV MRK TY II" ITEM INCLUDED IN QUANTITIES AS SEALER FOR TY I MARKINGS APPLIED TO ALL CONCRETE SURFACES AS WELL AS ASPHALT SURFACES OLDER THEN 3 YEARS.
5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

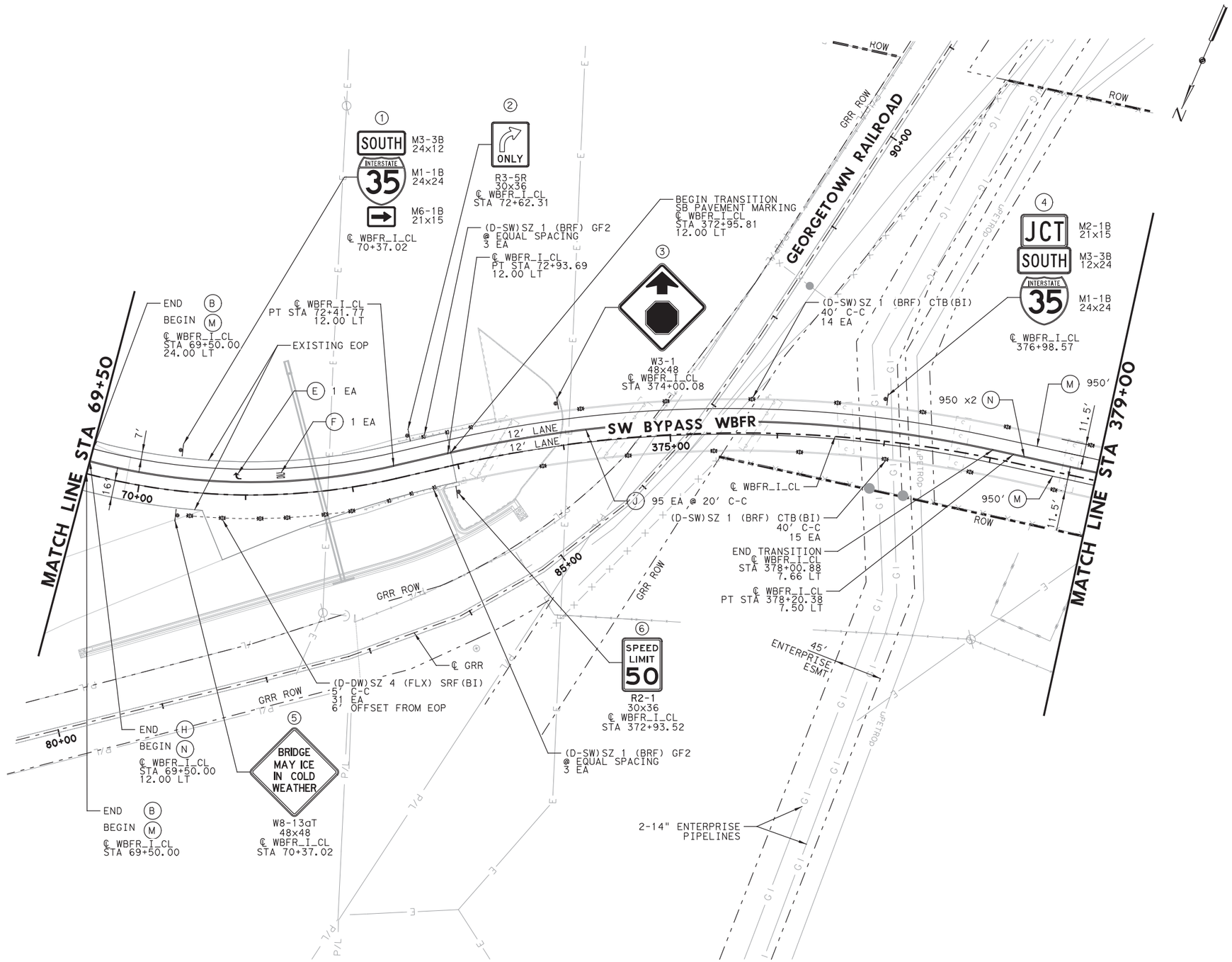
SIGNING AND STRIPING SBFR I-35 STA 901+00 TO STA 913+00

SCALE: 1"=100' SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	218
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 TIME: 10:58:07 AM SCALE: 1:100 PENTABLE: S2-0000020I7018.tbl FILE: \

4/12/2018 7:20 AM



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE) — EXISTING SIGN TO BE REMOVED
SIGN (2 SIDE)
DELINEATOR — EXISTING SIGN TO REMAIN
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND — PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.
4. RESPECTIVE "REFL PAV MRK TY II" ITEM INCLUDED IN QUANTITIES AS SEALER FOR TY I MARKINGS APPLIED TO ALL CONCRETE SURFACES AS WELL AS ASPHALT SURFACES OLDER THEN 3 YEARS.
5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

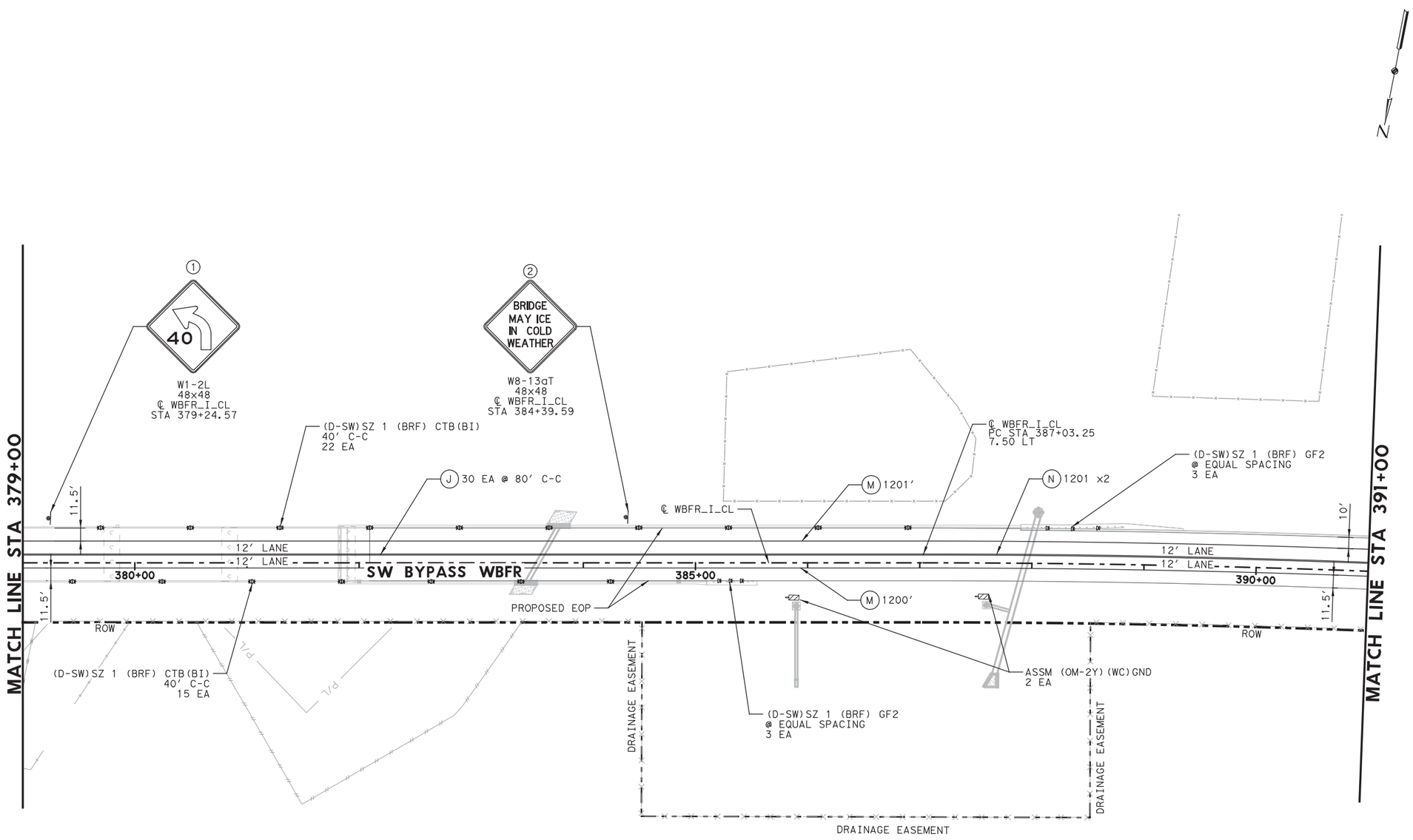
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 69+50 TO STA 379+00

SCALE: 1"=100' SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	219
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-00000201071B.tbl
DATE: 3/23/2018
TIME: 10:58:11 AM
SCALE: 1:100



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND
EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

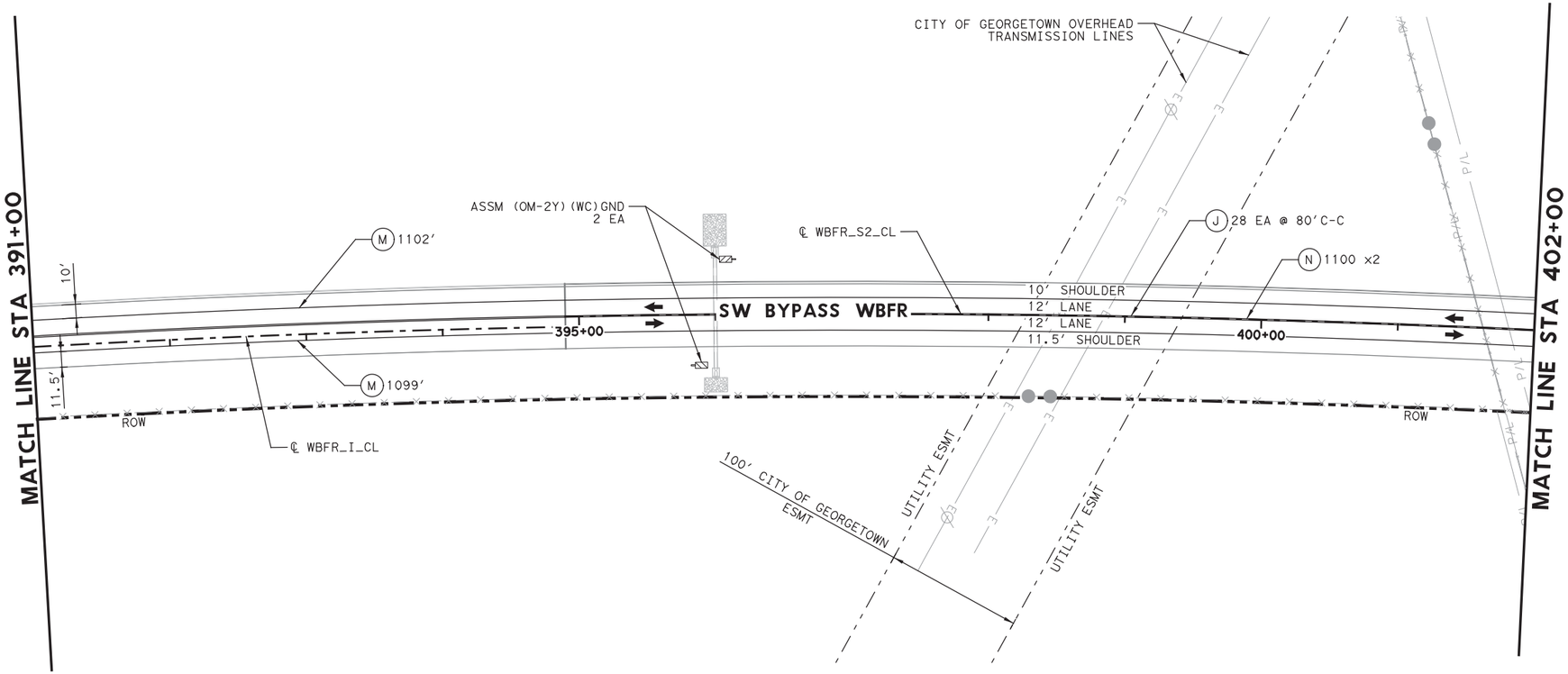
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 379+00 TO STA 391+00

SCALE: 1"=100′ SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	220
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgon2 FILE: \
PENTABLE: S2-0000020707IB.tbl TIME: 10:58:15 AM DATE: 3/23/2018 SCALE: 1:00



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND

EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.
4. RESPECTIVE "REFL PAV MRK TY II" ITEM INCLUDED IN QUANTITIES AS SEALER FOR TY I MARKINGS APPLIED TO ALL CONCRETE SURFACES AS WELL AS ASPHALT SURFACES OLDER THEN 3 YEARS.
5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

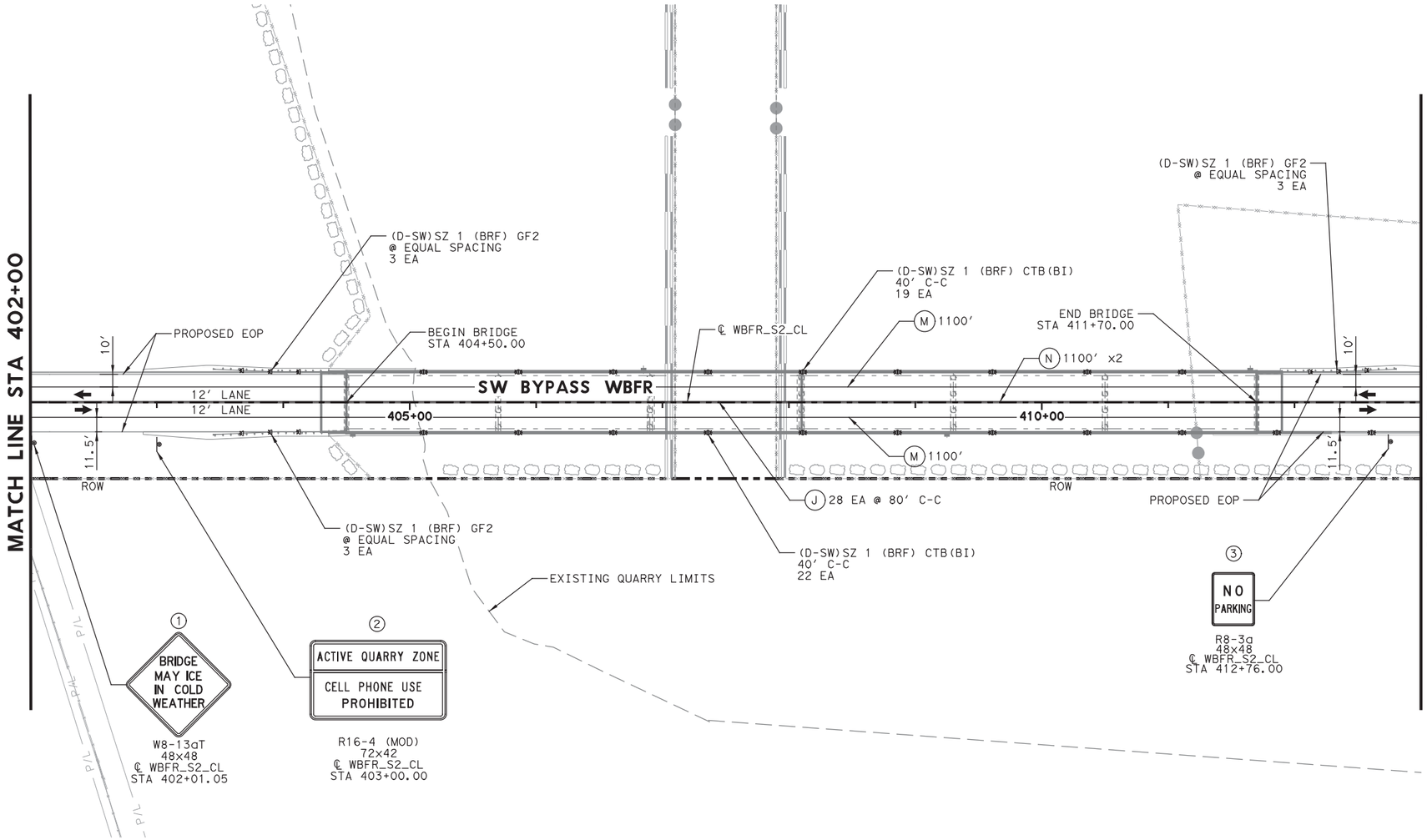
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 391+00 TO 402+00

SCALE: 1"=100′ SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	221
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/7018.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 10:58:20 AM SCALE: 1:100
FILE: \



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND
EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.
4. RESPECTIVE "REFL PAV MRK TY II" ITEM INCLUDED IN QUANTITIES AS SEALER FOR TY I MARKINGS APPLIED TO ALL CONCRETE SURFACES AS WELL AS ASPHALT SURFACES OLDER THEN 3 YEARS.
5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

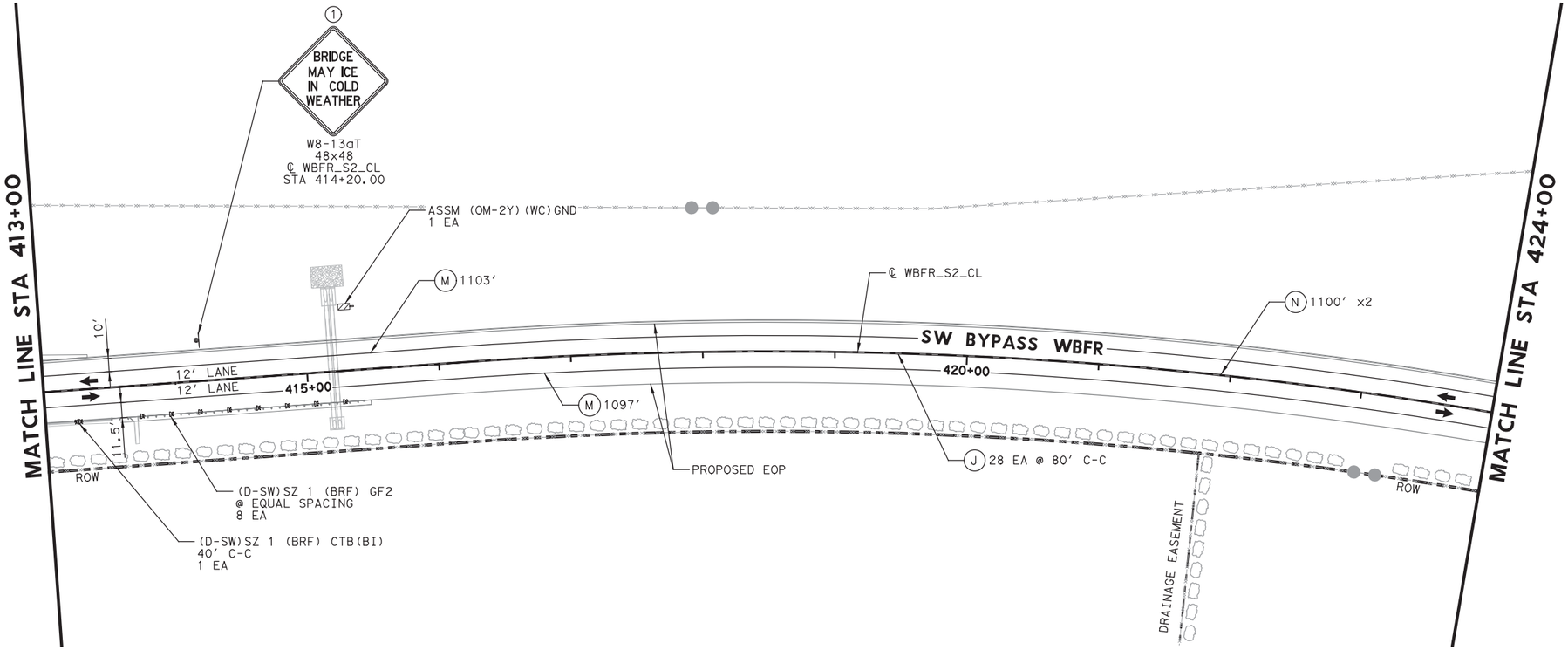
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 402+00TO STA 413+00

SCALE: 1"=100' SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	222
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/23/2018
FILE: \
PENTABLE: S2-0000020170718.tbl
TIME: 10:58:24 AM SCALE: 1:100



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND
EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

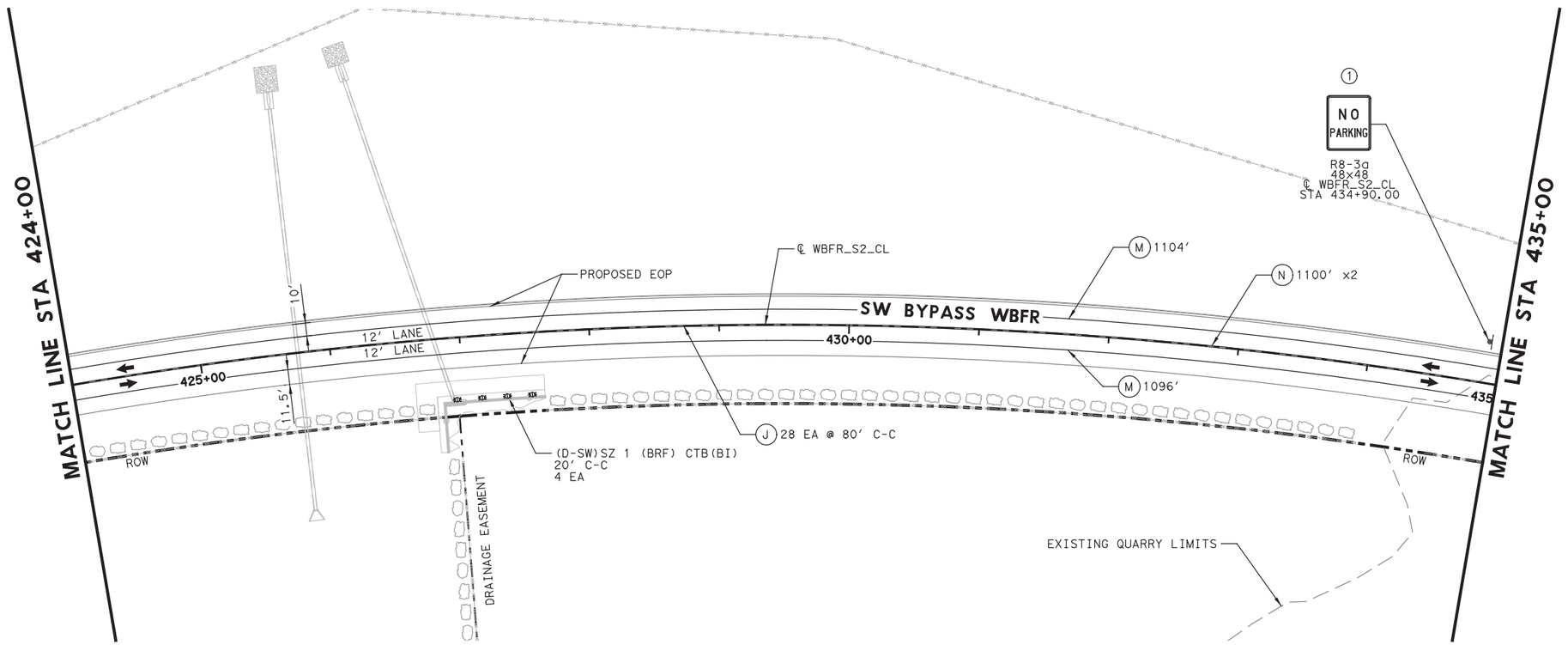
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 413+00 TO STA 424+00

SCALE: 1"=100′ SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	223
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 FILE: \
PENTABLE: S2-0000220/T0718.tbl TIME: 10:58:28 AM SCALE: 1=100



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND
EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. ALL PAVEMENT MARKINGS ARE TY I (100MIL) UNLESS OTHERWISE SPECIFIED.
4. RESPECTIVE "REFL PAV MRK TY II" ITEM INCLUDED IN QUANTITIES AS SEALER FOR TY I MARKINGS APPLIED TO ALL CONCRETE SURFACES AS WELL AS ASPHALT SURFACES OLDER THEN 3 YEARS.
5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

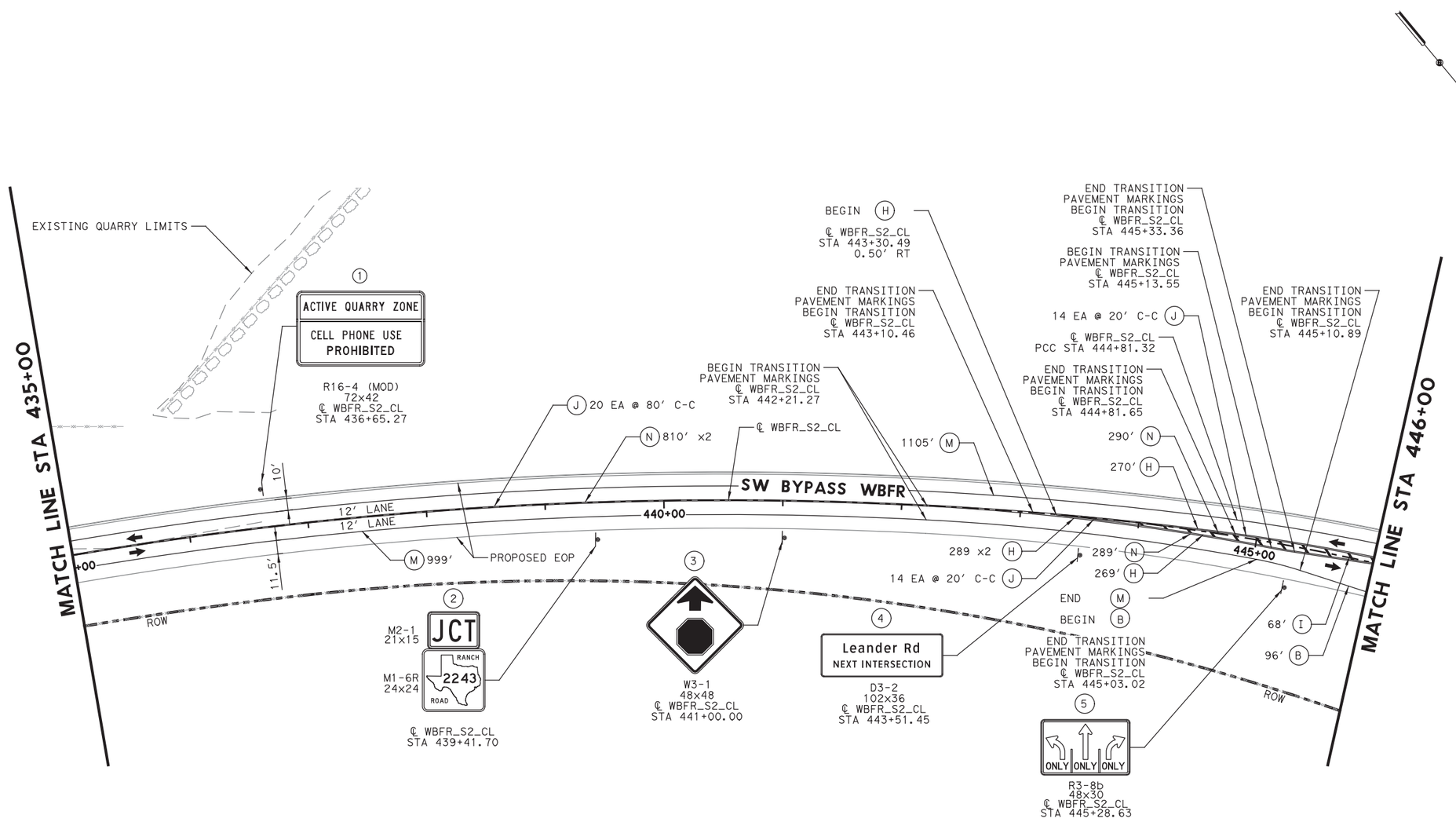
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 424+00 TO STA 435+00

SCALE: 1"=100' SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	224
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000207078.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 10:58:33 AM SCALE: 1:00
FILE: \



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE) — EXISTING SIGN TO BE REMOVED
SIGN (2 SIDE) — EXISTING SIGN TO REMAIN
DELINEATOR — PROPOSED SIGN
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
2. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

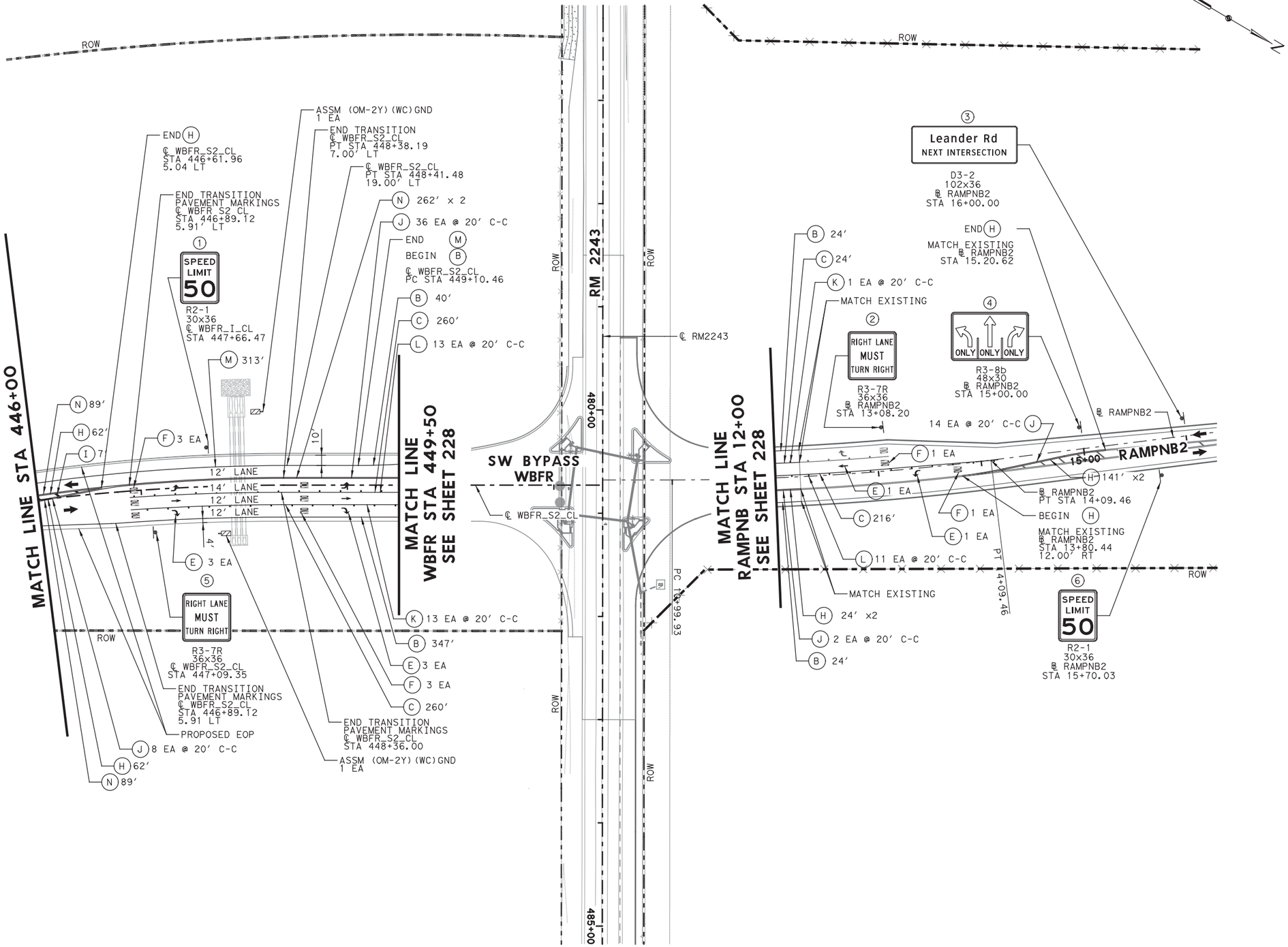
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 435+00 TO STA 446+00

SCALE: 1"=100' SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	
CHECK JC	CONTROL	SECTION	JOB	225
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002070718.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 10:58:38 AM SCALE: 1:00
FILE: \
4/12/2018 7:20 AM



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE)
SIGN (2 SIDE)
DELINEATOR
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND
EXISTING SIGN TO BE REMOVED
EXISTING SIGN TO REMAIN
PROPOSED SIGN

NOTES:

1. REFER TO SUMMARY OF SMALL SIGNS FOR SIGN QUANTITIES.
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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

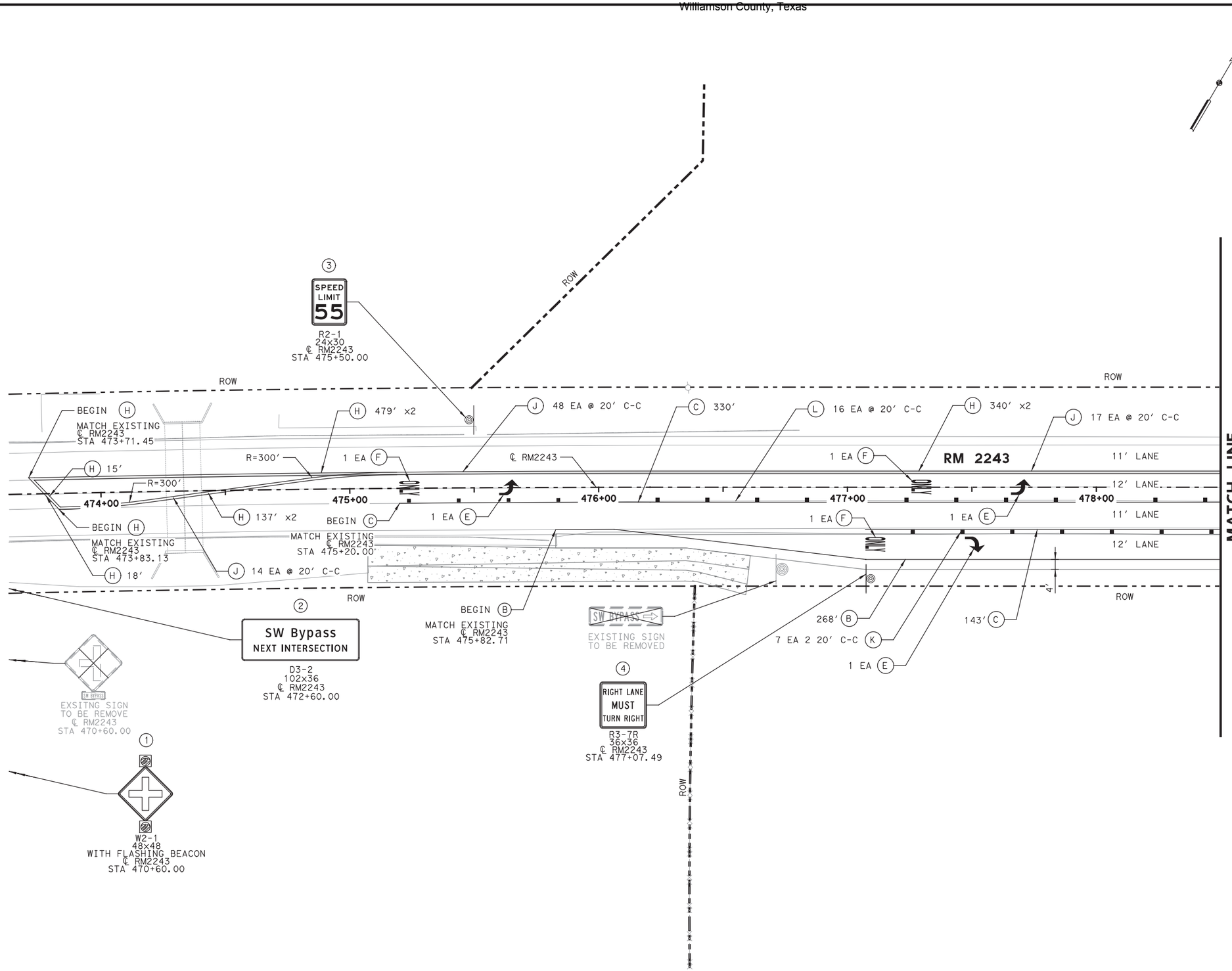
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING WBFR STA 446+00 TO END

SCALE: 1"=100' SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	226
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/23/2018
FILE: \
PENTABLE: S2-000002070718.tbl
TIME: 10:58:43 AM SCALE: 1:00



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE) — EXISTING SIGN TO BE REMOVED
SIGN (2 SIDE)
DELINEATOR — EXISTING SIGN TO REMAIN
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND — PROPOSED SIGN

NOTES:

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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 20 40 60 80
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

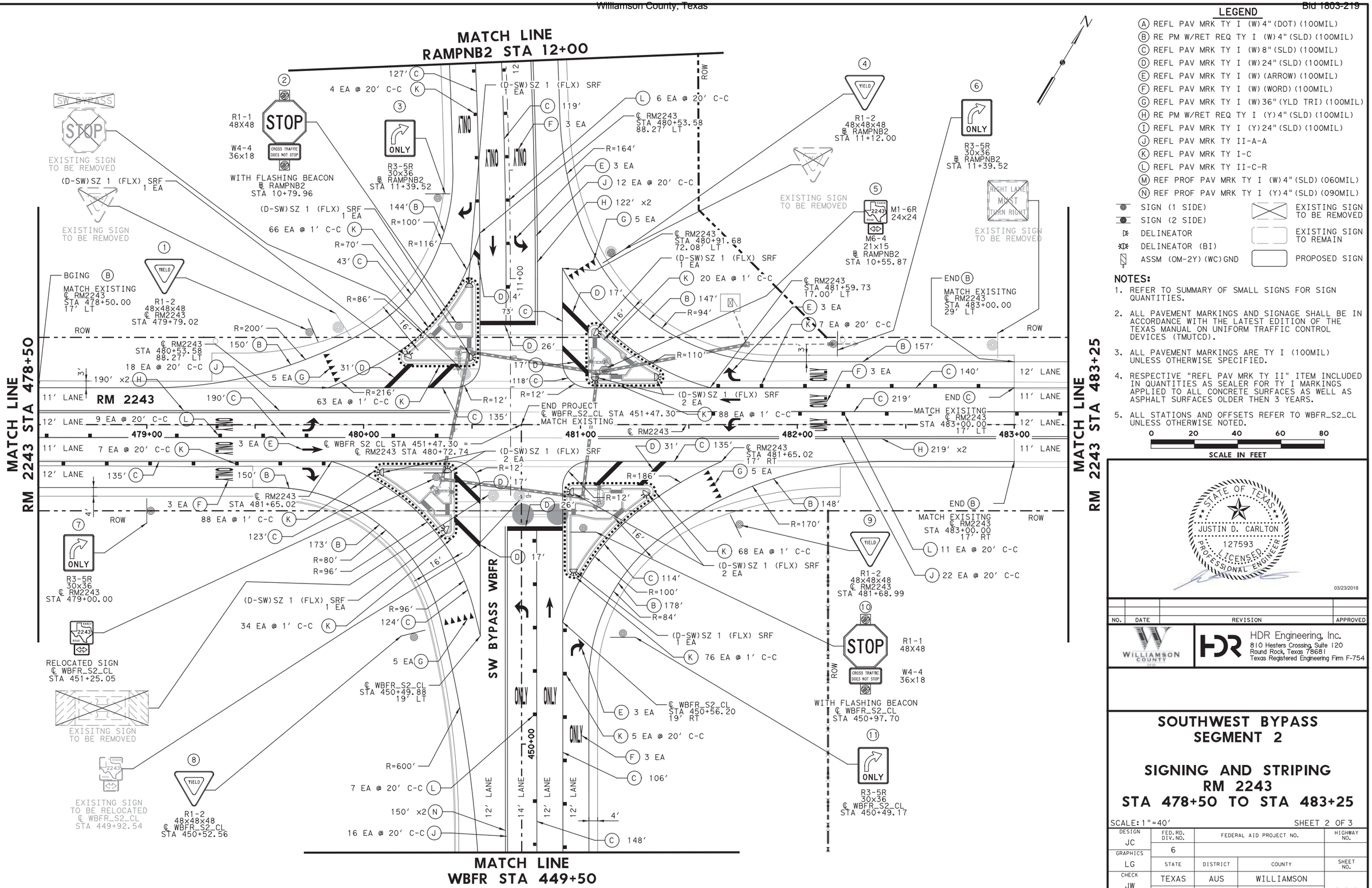
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING RM 2243 BEGIN TO STA 478+50

SCALE: 1"=40′ SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	227
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201707018.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 10:58:47 AM SCALE: 1:40
FILE: \



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE) — EXISTING SIGN TO BE REMOVED
SIGN (2 SIDE) — EXISTING SIGN TO REMAIN
DELINEATOR — PROPOSED SIGN
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND

NOTES:

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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 20 40 60 80
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

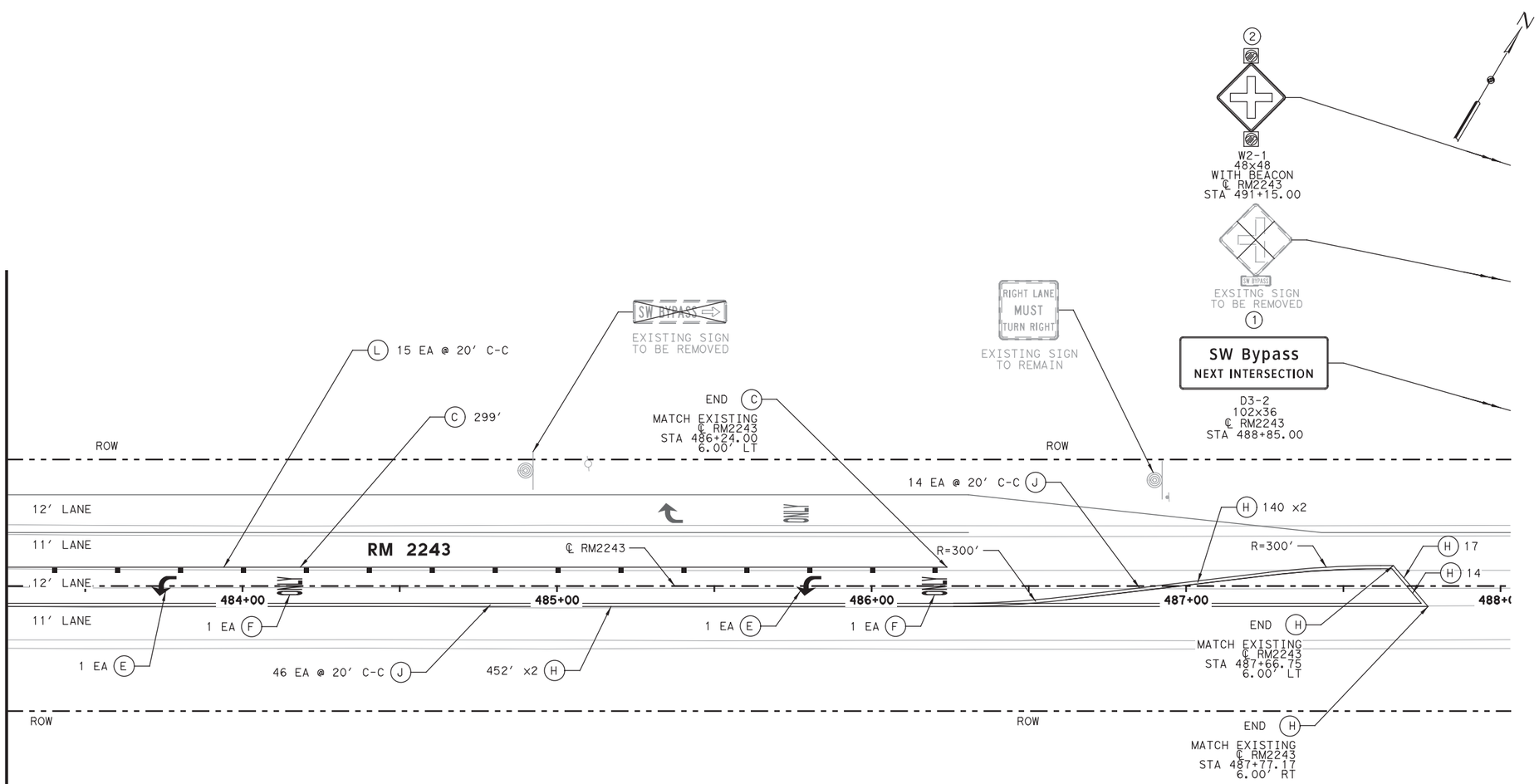
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING RM 2243 STA 478+50 TO STA 483+25

SCALE: 1"=40′ SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	228
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/T0718.tbl
USER: lgomezgonz TIME: 10:58:51 AM SCALE: 1:40
FILE: \ DATE: 3/23/2018



LEGEND

- (A) REFL PAV MRK TY I (W)4"(DOT)(100MIL)
- (B) RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
- (C) REFL PAV MRK TY I (W)8"(SLD)(100MIL)
- (D) REFL PAV MRK TY I (W)24"(SLD)(100MIL)
- (E) REFL PAV MRK TY I (W)(ARROW)(100MIL)
- (F) REFL PAV MRK TY I (W)(WORD)(100MIL)
- (G) REFL PAV MRK TY I (W)36"(YLD TRI)(100MIL)
- (H) RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)
- (I) REFL PAV MRK TY I (Y)24"(SLD)(100MIL)
- (J) REFL PAV MRK TY II-A-A
- (K) REFL PAV MRK TY I-C
- (L) REFL PAV MRK TY II-C-R
- (M) REF PROF PAV MRK TY I (W)4"(SLD)(060MIL)
- (N) REF PROF PAV MRK TY I (Y)4"(SLD)(090MIL)

SIGN (1 SIDE) — EXISTING SIGN TO BE REMOVED
SIGN (2 SIDE) — EXISTING SIGN TO REMAIN
DELINEATOR — PROPOSED SIGN
DELINEATOR (BI)
ASSM (OM-2Y)(WC)GND

NOTES:

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5. ALL STATIONS AND OFFSETS REFER TO WBFR_S2_CL UNLESS OTHERWISE NOTED.

0 20 40 60 80
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

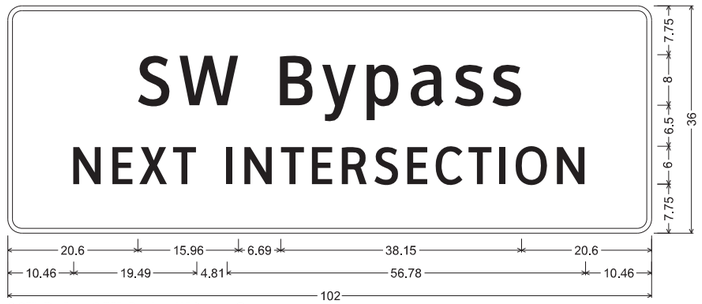
SOUTHWEST BYPASS SEGMENT 2

SIGNING AND STRIPING RM 2243 STA 483+25 TO END

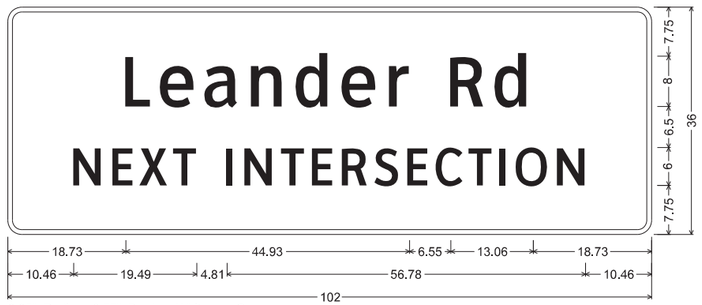
SCALE: 1"=40' SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	229
JW	2103	01	034	
CHECK				
JC				

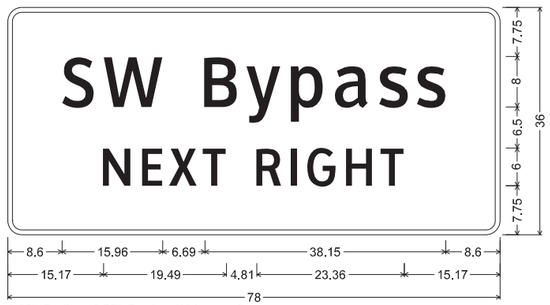
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USER: lgomezgonz DATE: 3/23/2018
FILE: \
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TIME: 10:58:56 AM SCALE: 1:40



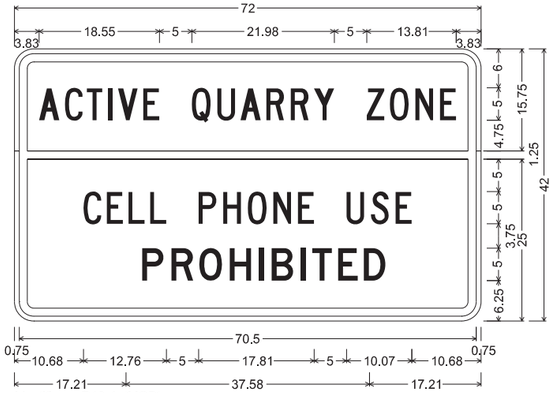
2.25" Radius, 0.75" Border, White on Green;
[SW Bypass] ClearviewHwy-3-W; [NEXT INTERSECTION] ClearviewHwy-3-W;



2.25" Radius, 0.75" Border, White on Green;
[Leander RD] ClearviewHwy-3-W; [NEXT INTERSECTION] ClearviewHwy-3-W;



2.25" Radius, 0.75" Border, White on Green;
[SW Bypass] ClearviewHwy-3-W; [NEXT RIGHT] ClearviewHwy-3-W;



Identifier : R16-4 (MOD);
3.00" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[ACTIVE QUARRY ZONE] C;
3.00" Radius, 1.25" Border, 0.75" Indent, Black on White;
[CELL PHONE USE] C; [PROHIBITED] D;



03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

SIGNING DETAILS WBFR

NTS

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	230
JW	2103	01	034	
CHECK				
JC				

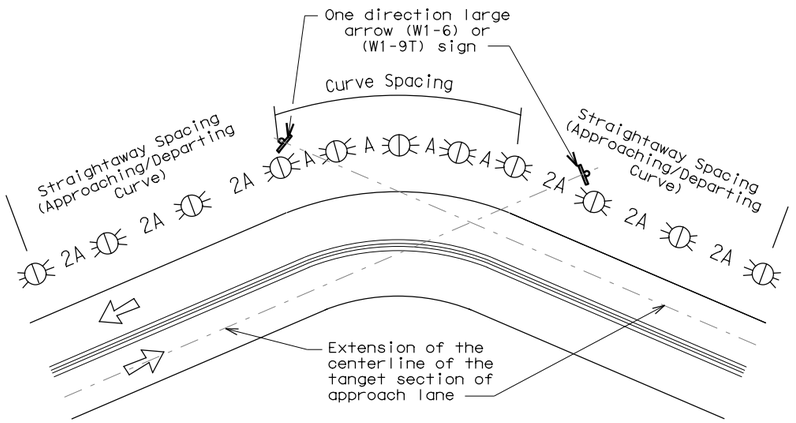
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USER: lgomezgonz DATE: 3/23/2018 TIME: 10:58:58 AM SCALE: 1:100
FILE: \

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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

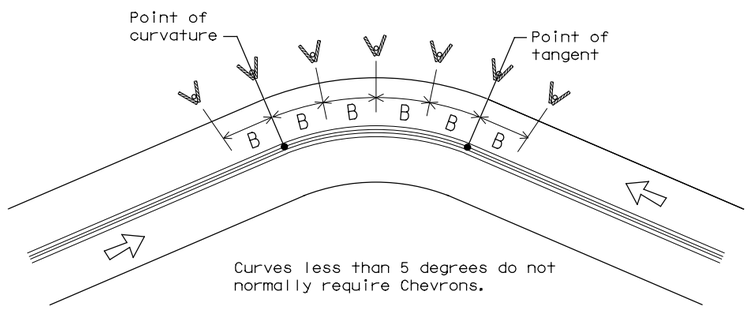


Curves less than 1 degree do not normally require delineators.

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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©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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3-15	DIST	COUNTY		SHEET NO.
8-15	AUS	WILLIAMSON		231

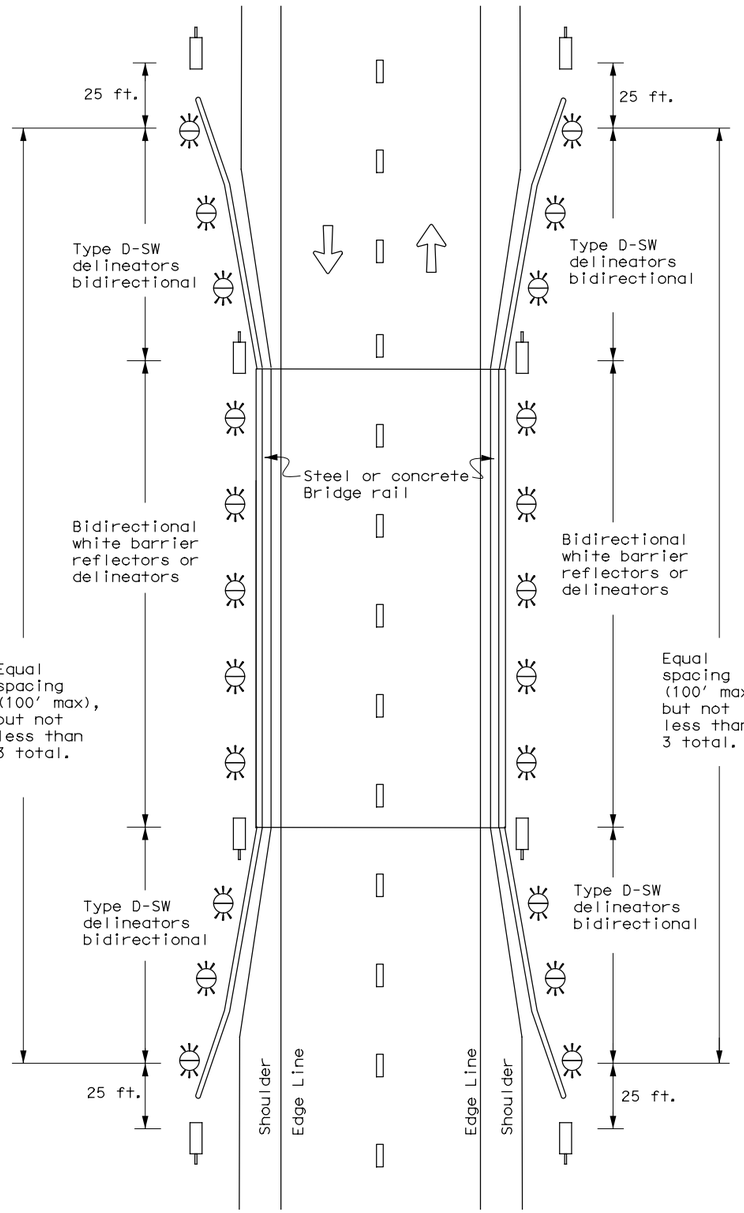
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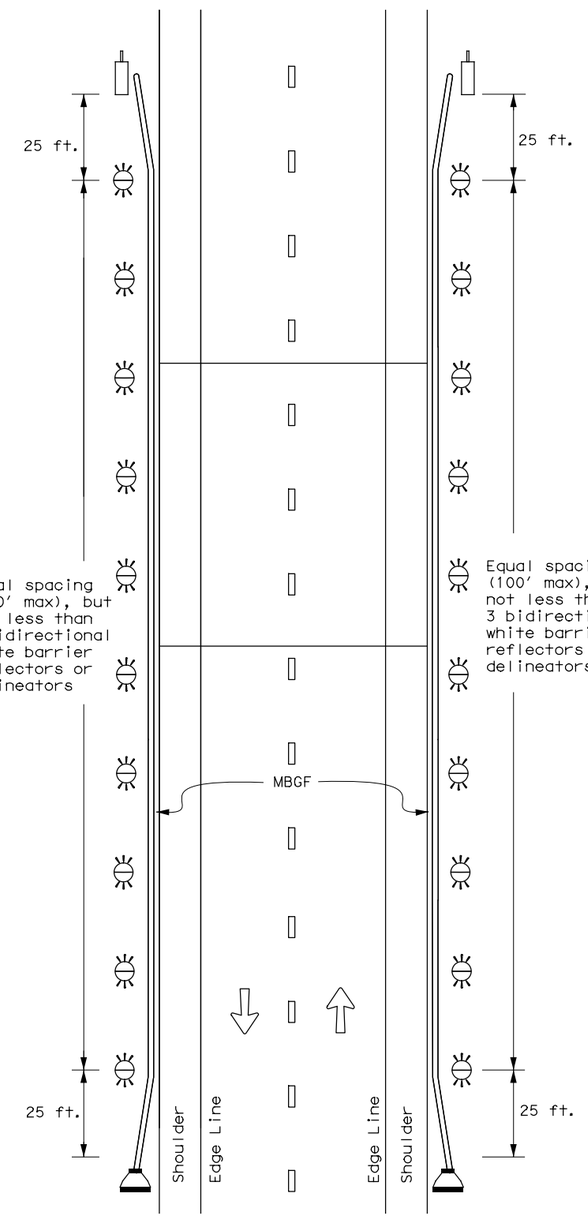
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TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



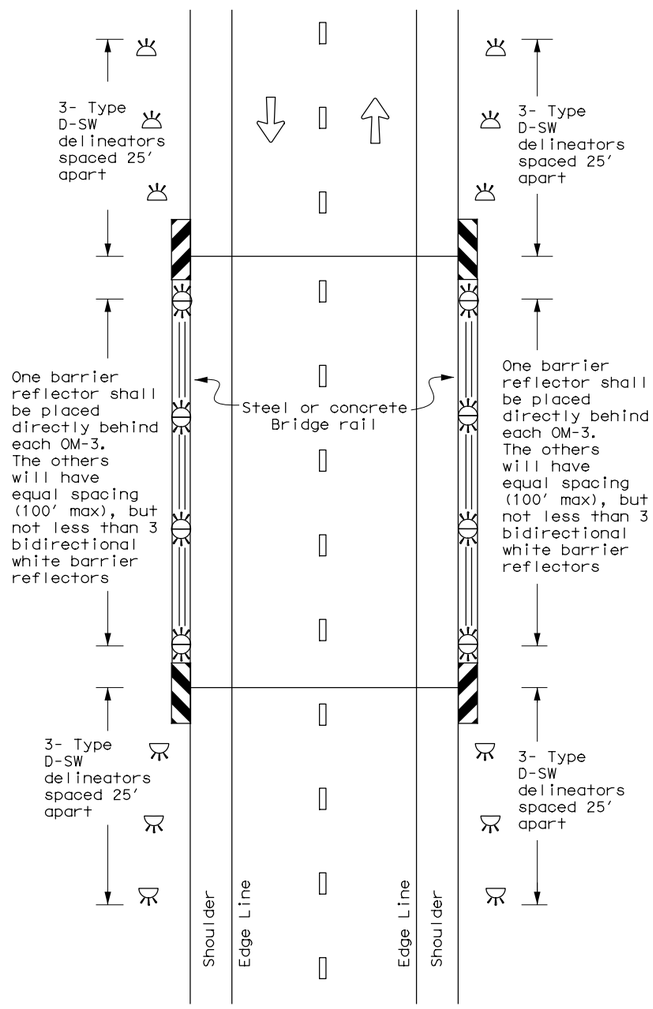
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



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

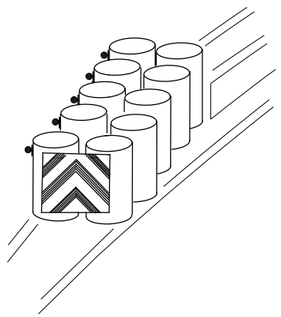
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

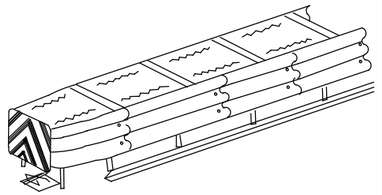
D & OM(5)-15

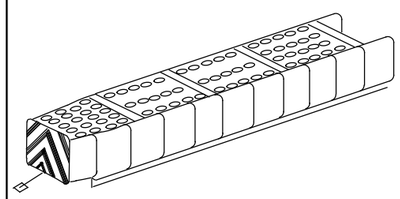
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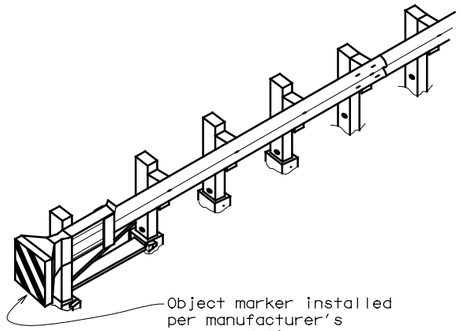
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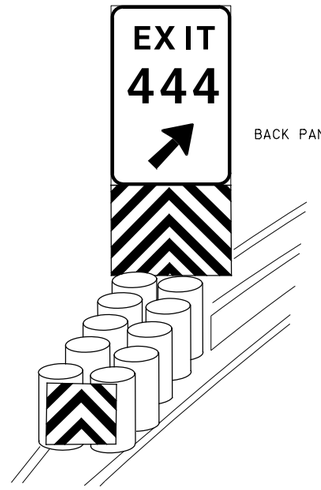
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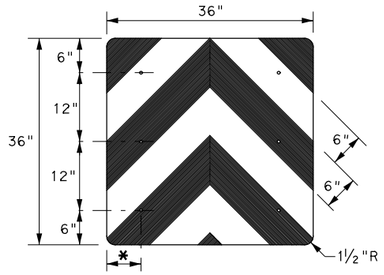


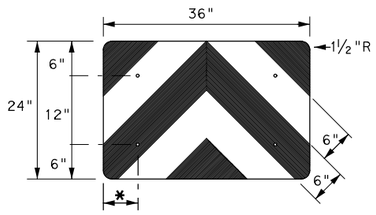




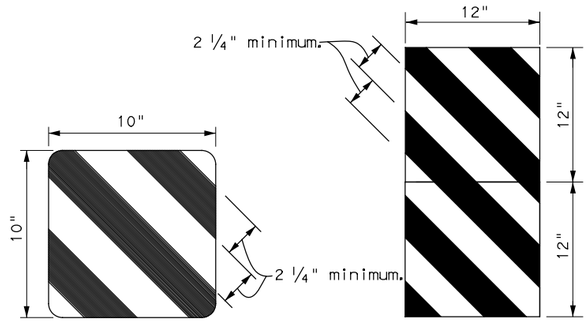




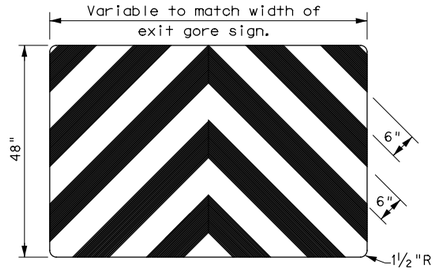


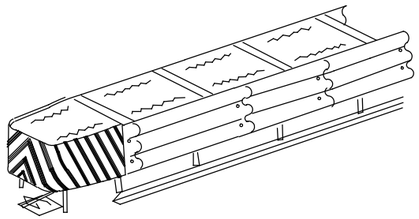


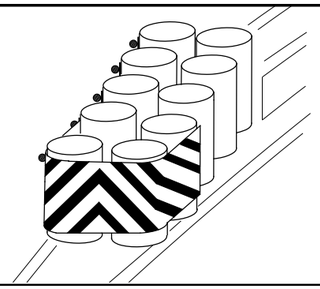
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

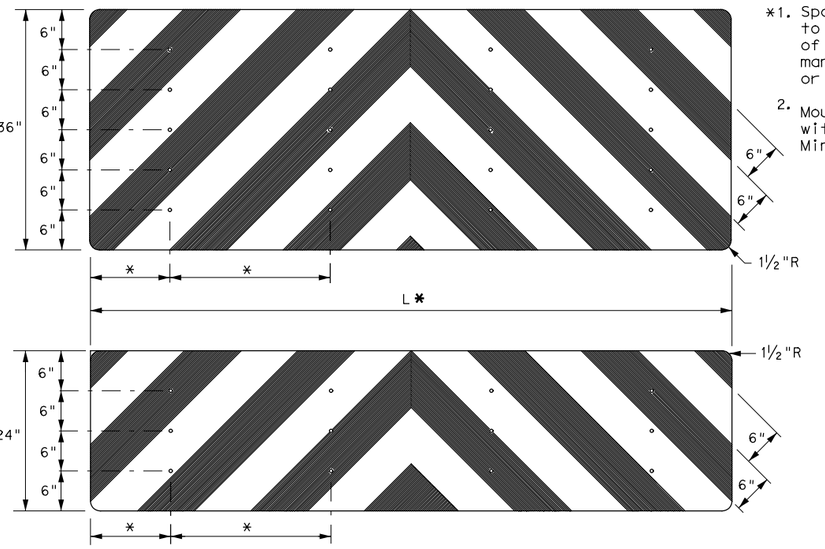


OBJECT MARKERS SMALLER THAN 3 FT^2









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

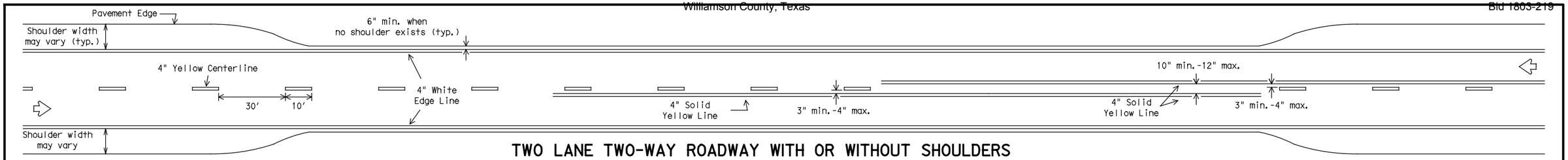
DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-15

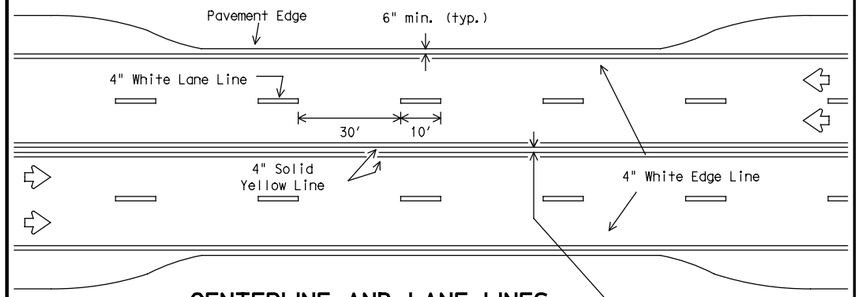
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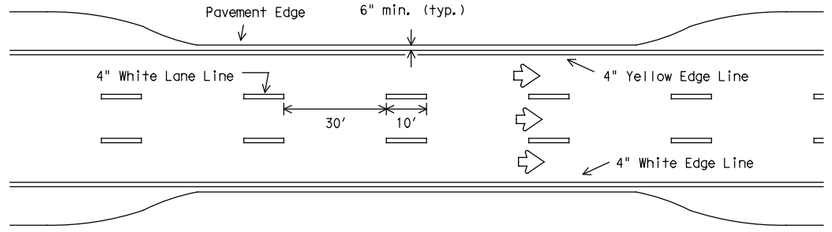
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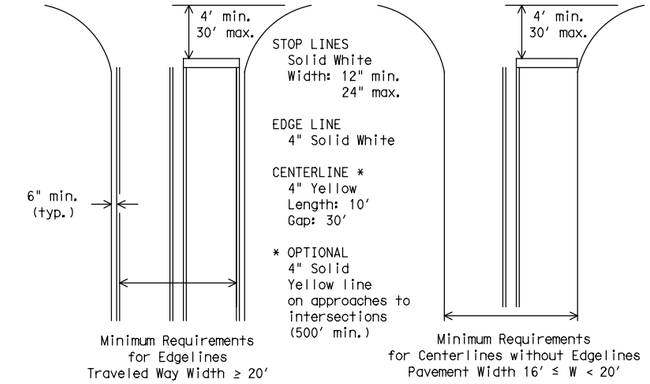
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

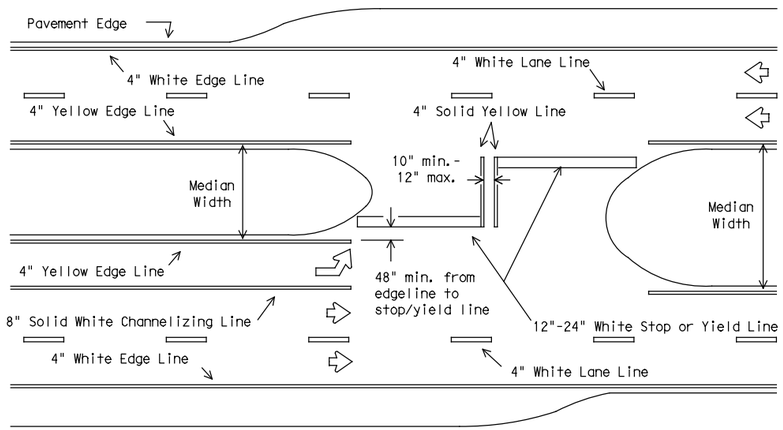


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



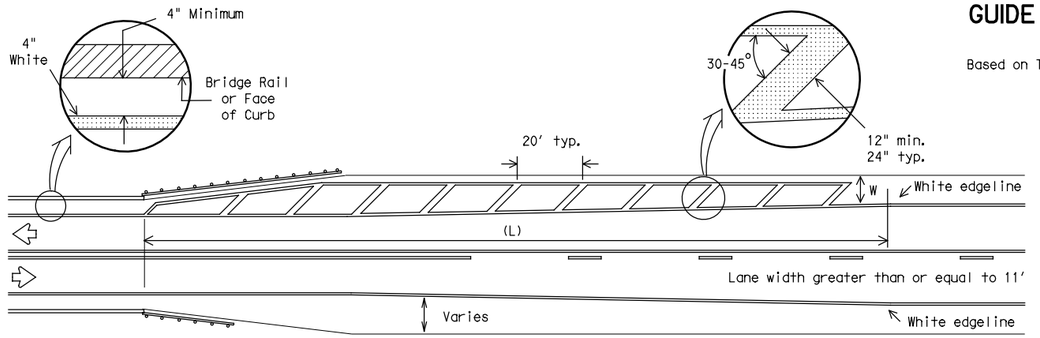
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

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 crosshatching 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 crosshatching should be:

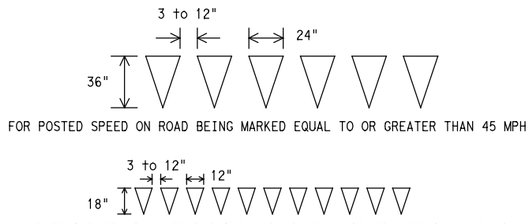
$L = 4(40)^2 / 60 = 106.67$ ft. rounded to 110 ft.

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

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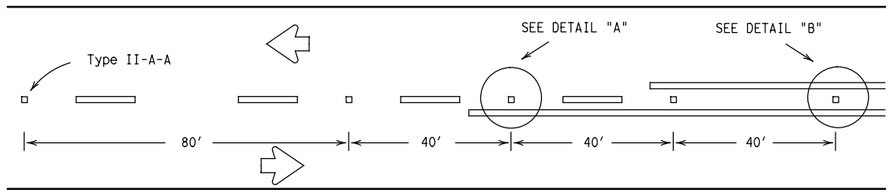
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22A

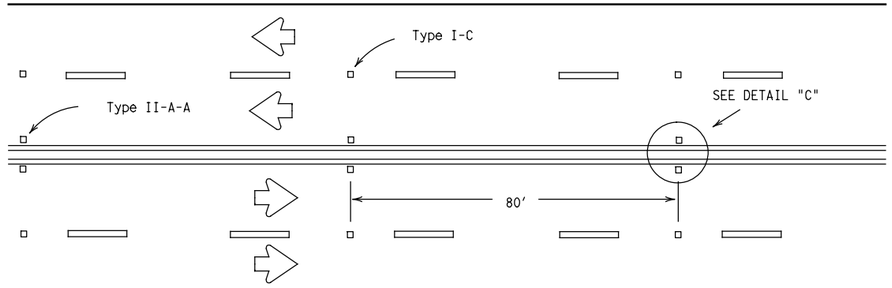
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REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

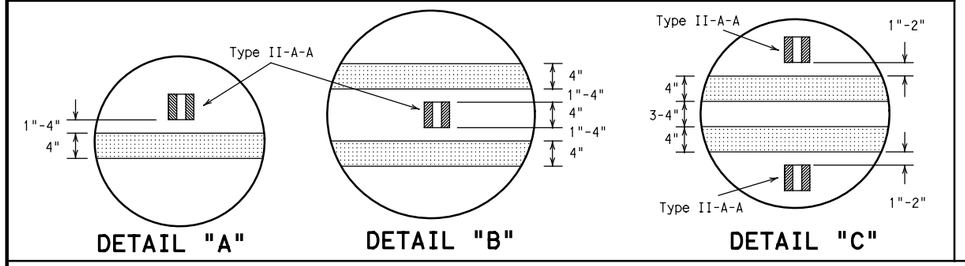


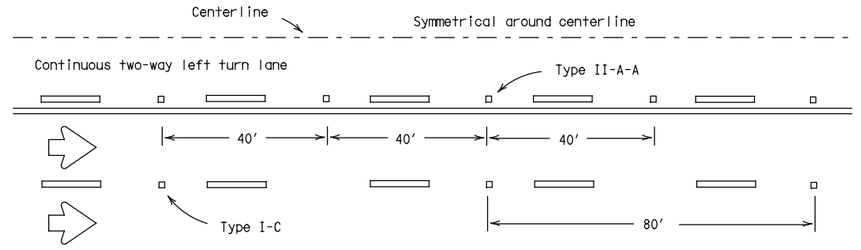
CENTERLINE FOR ALL TWO LANE ROADWAYS



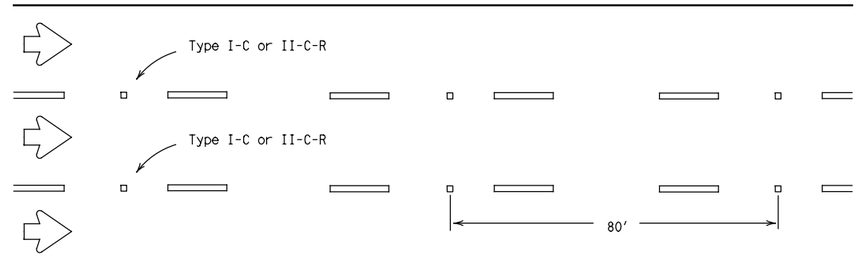
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.



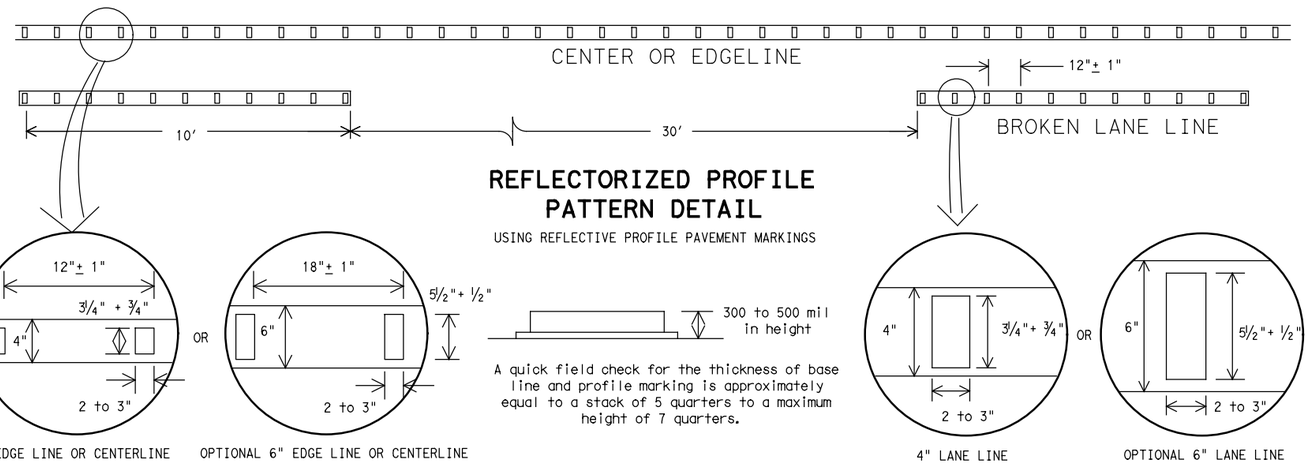


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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.



4" EDGE LINE OR CENTERLINE — OPTIONAL 6" EDGE LINE OR CENTERLINE — 4" LANE LINE — OPTIONAL 6" LANE LINE

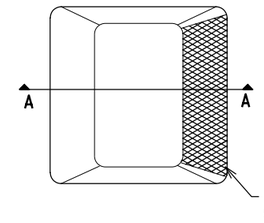
NOTE:
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

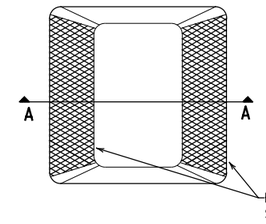
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

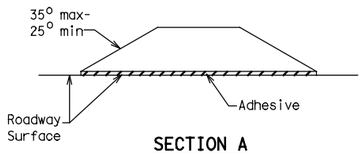
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS
REFLECTORIZED PROFILE MARKINGS
PM(2)-12

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REVISIONS
4-92 2-10
5-00 2-12
8-00
2-08
22B

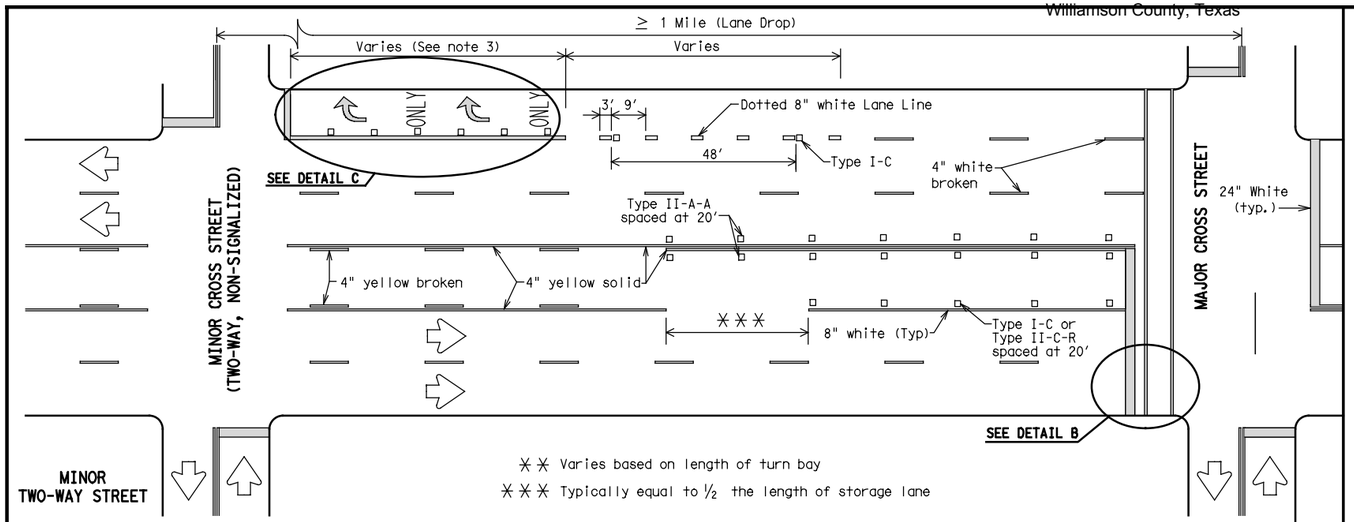
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2103	01	034	

DIST	COUNTY	SHEET NO.
AUS	WILLIAMSON	235

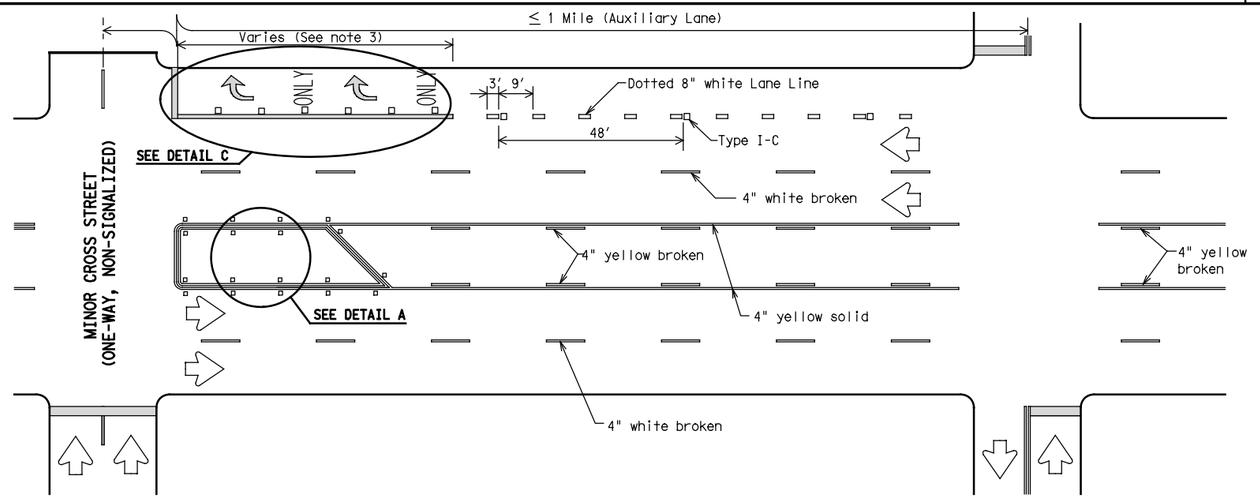
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4/12/2018 7:20 AM

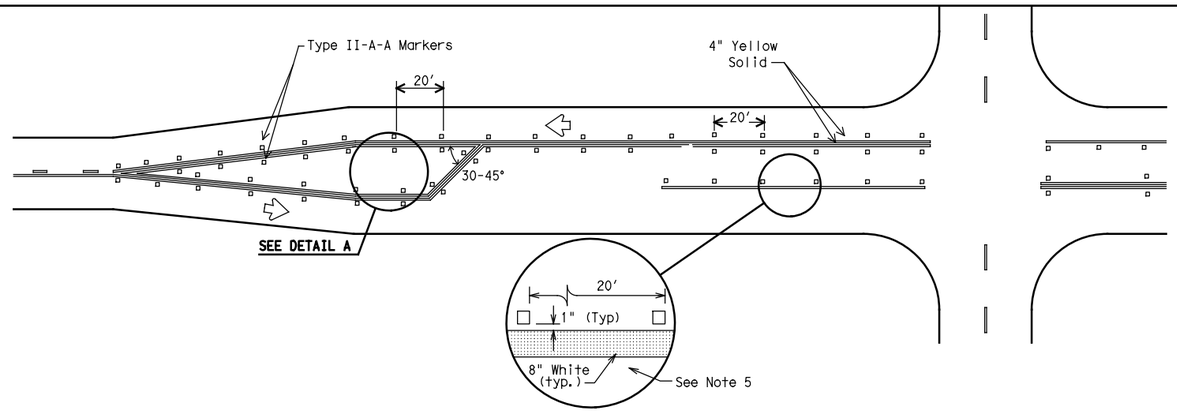
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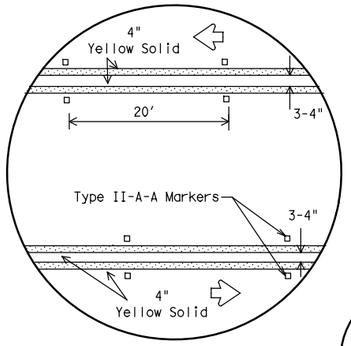
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



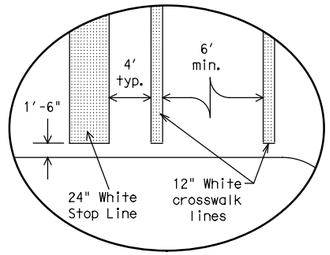
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS

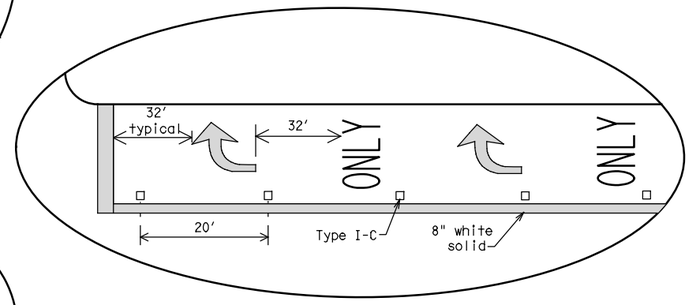


DETAIL A



Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

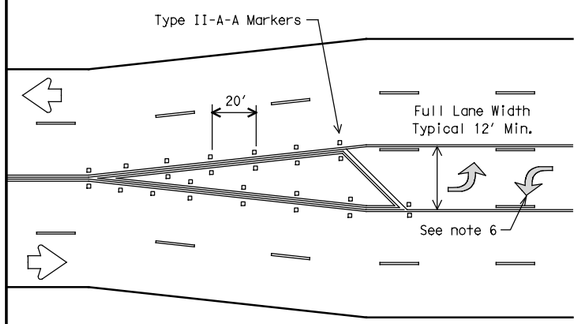
DETAIL B



DETAIL C

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL 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 paterns 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

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REVISIONS
5-00 2-12
8-00
3-03
2-10

CONT	SECT	JOB	HIGHWAY
2103	01	034	

DIST	COUNTY	SHEET NO.
AUS	WILLIAMSON	236

22C

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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)

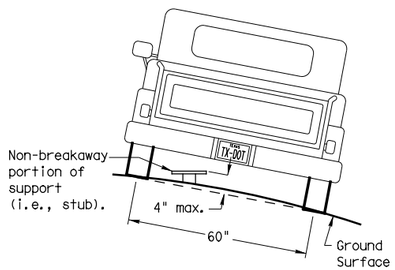
Anchor Type

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))

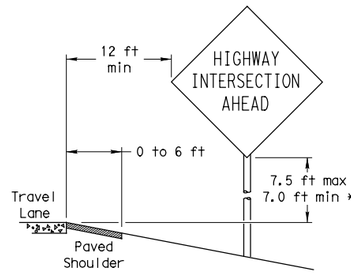
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

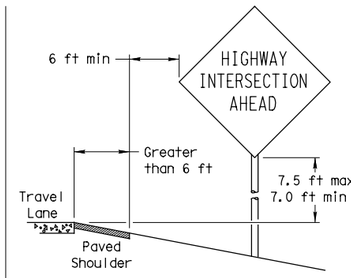
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

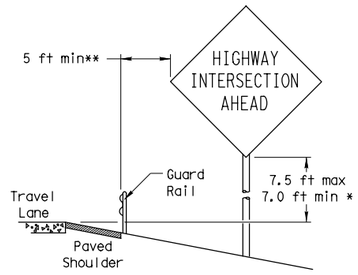
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



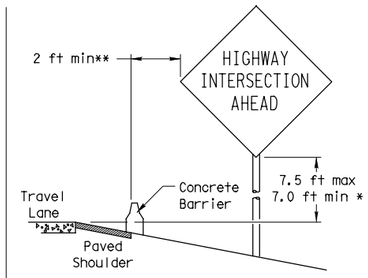
GREATER THAN 6 FT. WIDE

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.

BEHIND BARRIER



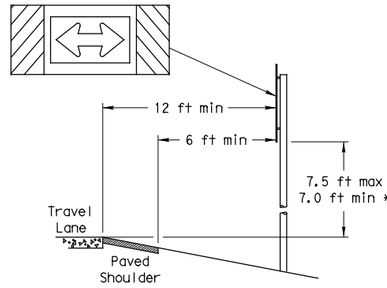
BEHIND GUARDRAIL



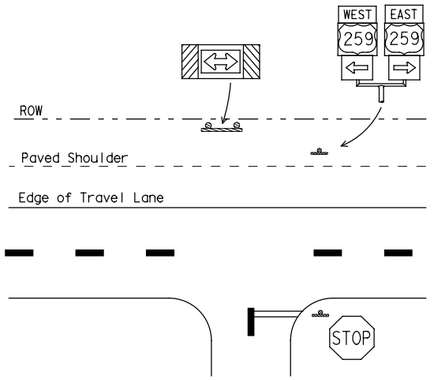
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

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.



* 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

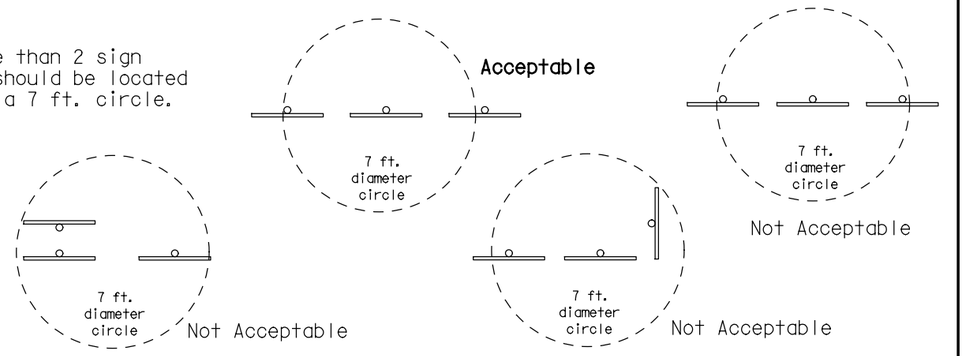
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

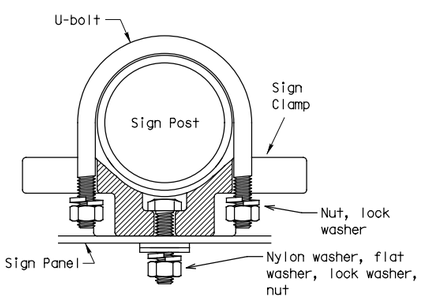
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.

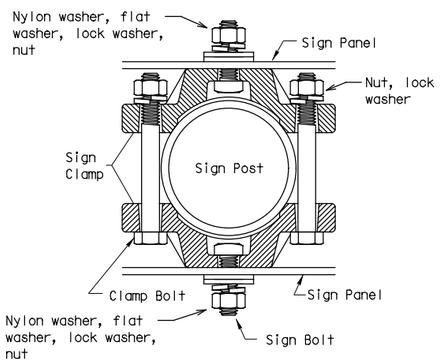


TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



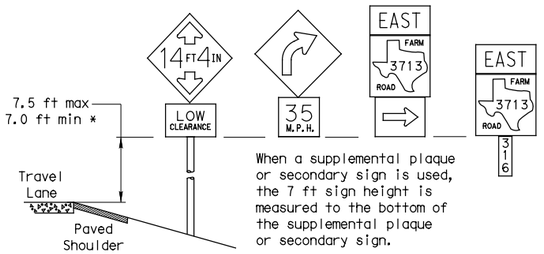
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

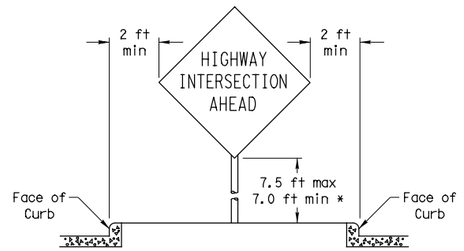
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



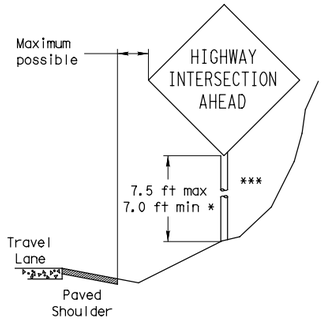
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

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9-08 REVISIONS

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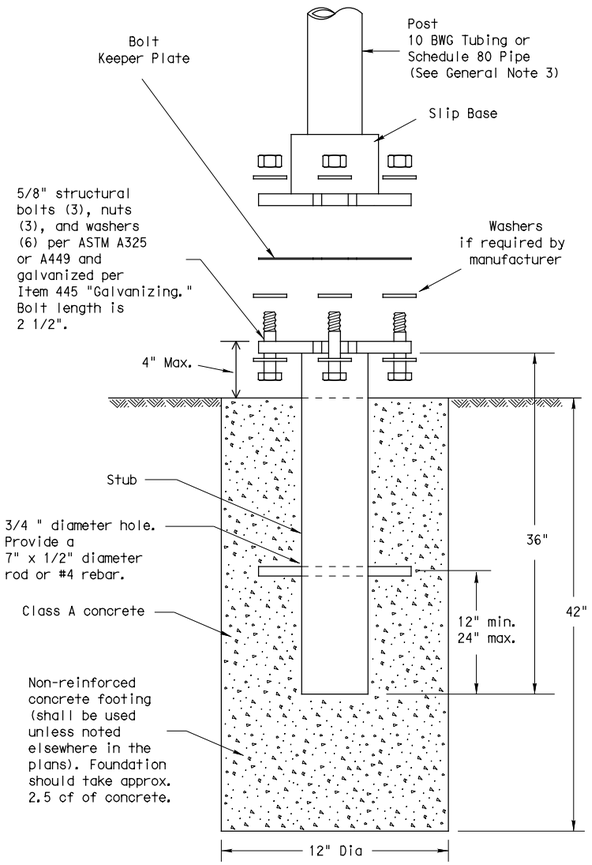
CONT	SECT	JOB	HIGHWAY
2103	01	034	

DIST	COUNTY	SHEET NO.
AUS	WILLIAMSON	237

26A

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

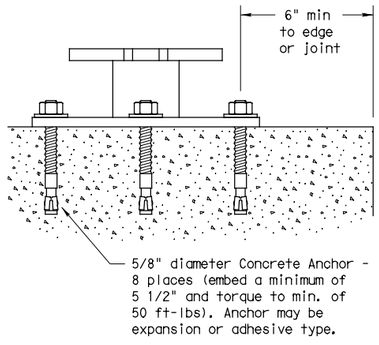
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   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

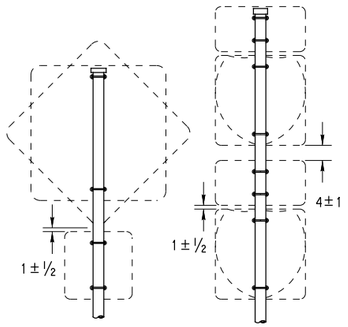
SMD(SLIP-1)-08

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9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		228

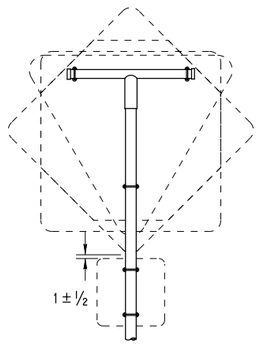
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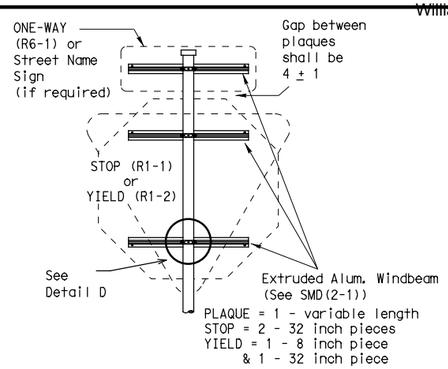
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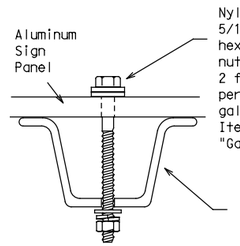
SM RD SGN ASSM TY XXXXX(1)XX(P)



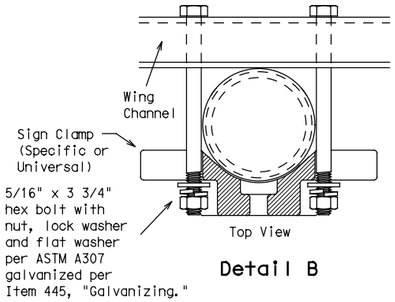
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



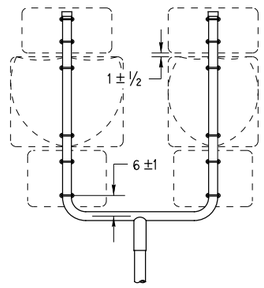
Detail B

GENERAL NOTES:

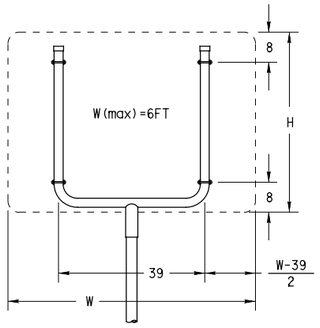
1.

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

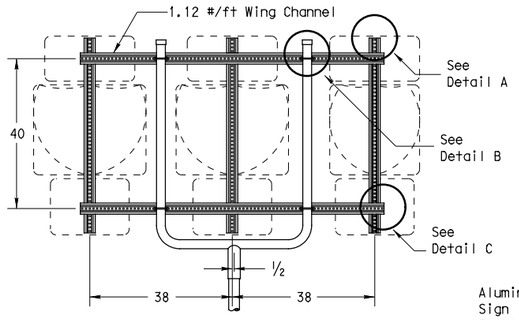
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material 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.



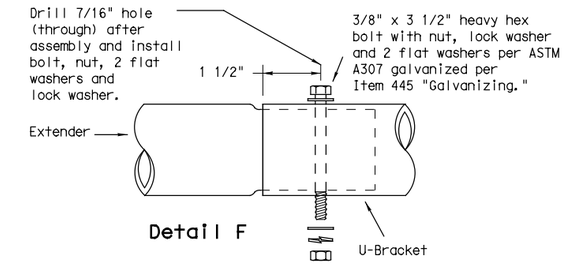
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

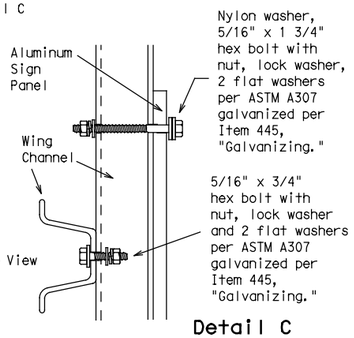


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

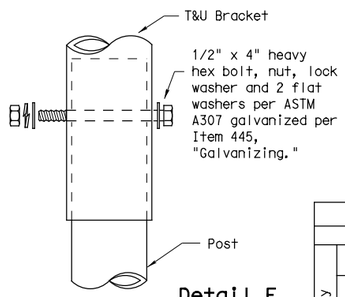


Detail F

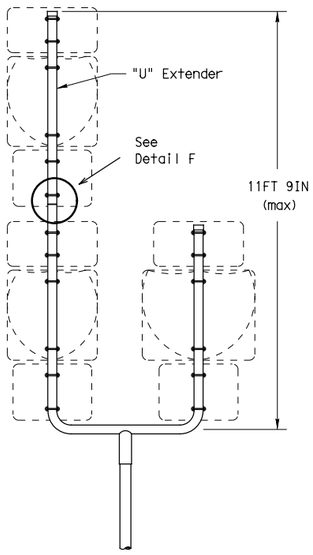
Splices shall only be allowed behind the sign substrate.



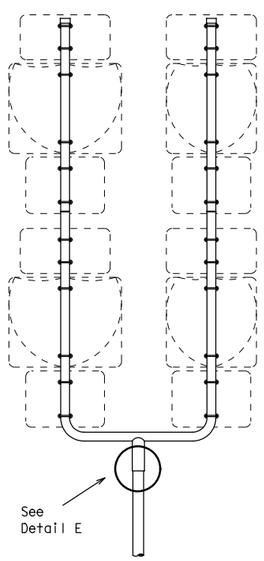
Detail C



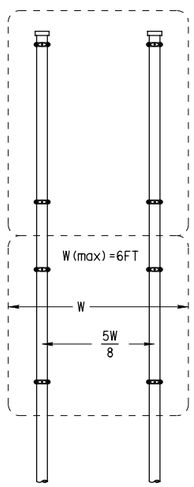
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

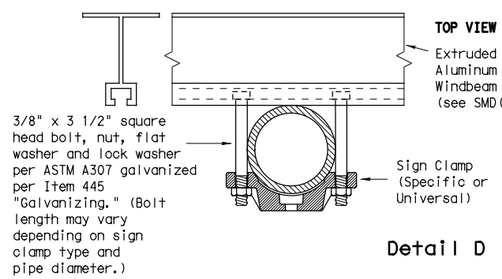


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

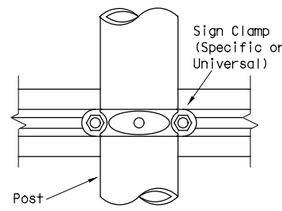


SM RD SGN ASSYM TY XXXXX(2)XX(P)

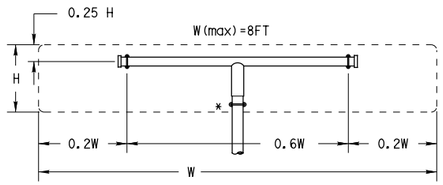
SIDE VIEW



Detail D



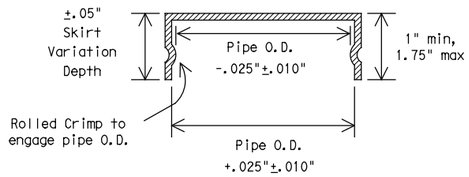
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	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

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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2103	01	034	
DIST	COUNTY		SHEET NO.
AUS	WILLIAMSON		238

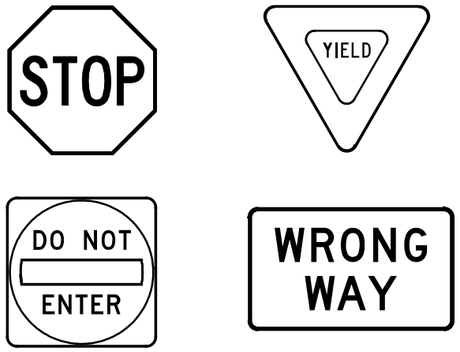
9-08 REVISIONS

26C

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REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

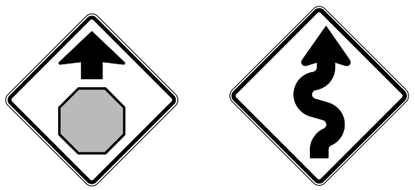
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

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

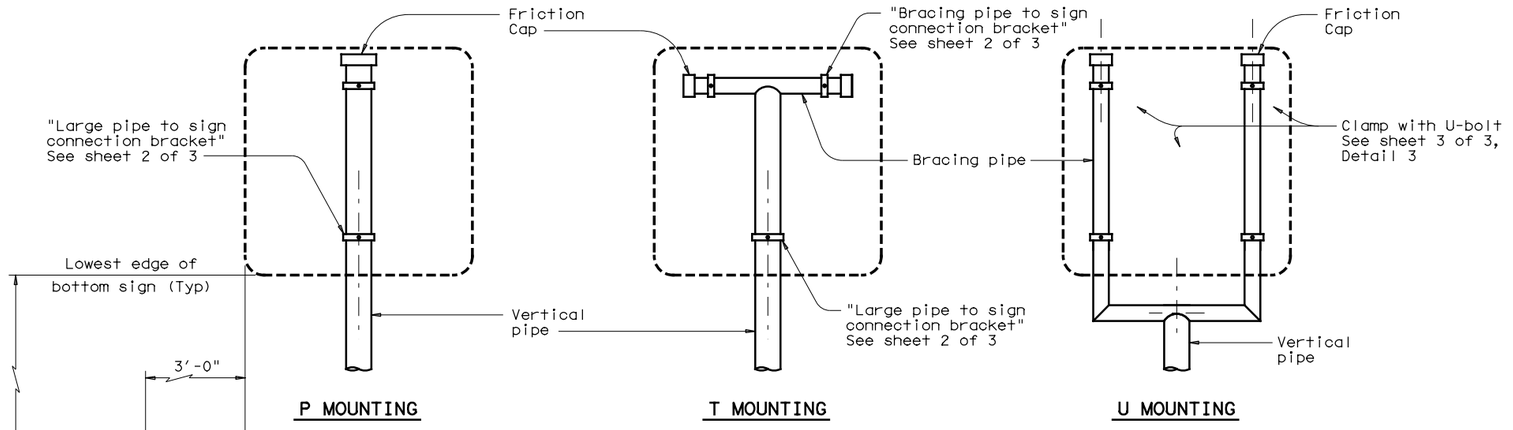
TSR(4)-13

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©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
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12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AUS	WILLIAMSON		240

4

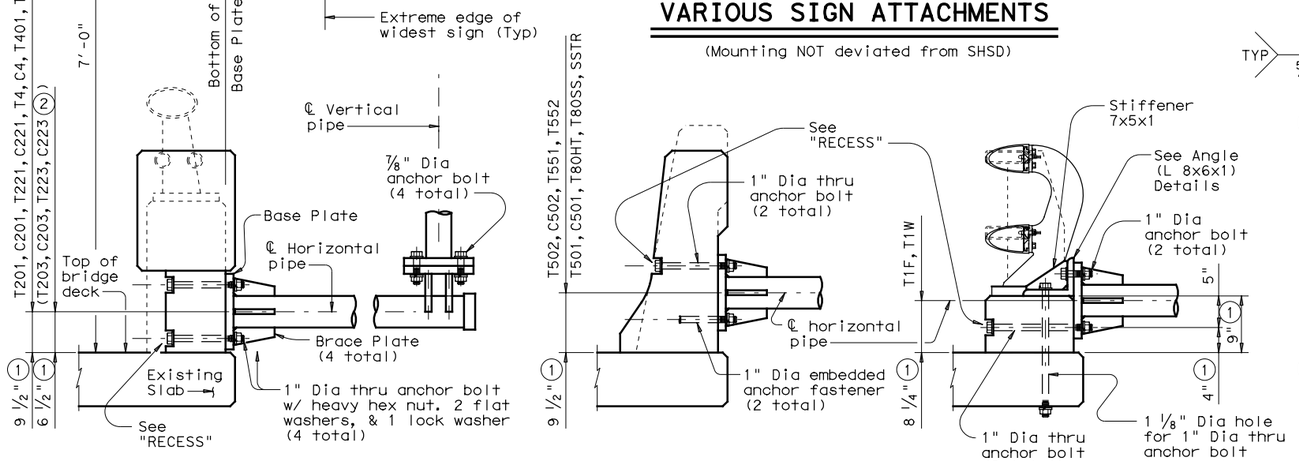
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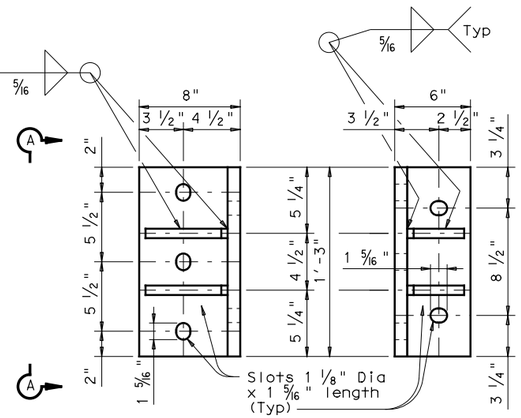


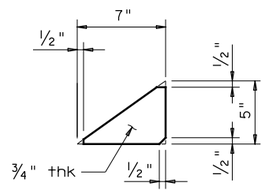
VARIOUS SIGN ATTACHMENTS

(Mounting NOT deviated from SHSD)



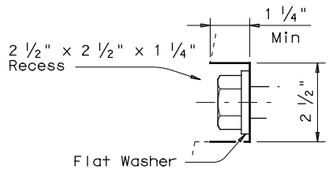
LONGITUDINAL SECTION THROUGH RAILING & SIGN MOUNT





STIFFENER

ANGLE (L 8x6x1) DETAILS



RECESS

(1) Increase 2" for structure with overlay.

(2) Attached at ℄ post.

PIPE SIZE AND THICKNESS			
Pipe Placement / Design Wind Speed	Horizontal	Vertical	Bracing
90 mph	5" X-Strong (.375")	4" X-Strong (.337")	2 ½" Standard (.203")
130 mph	6" X-Strong (.432")	5" X-Strong (.375")	3" X-Strong (.300")

GENERAL NOTES:

Design conforms to 2013 AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design 3-second gust wind speeds of 90 mph and 130 mph with a 1.14 gust factor, and a wind importance factor of 1.0 (50-year mean recurrence interval) for the supporting structures. For mounting connection between sign panel and pipe, wind importance factors of 0.71 and 0.54, for 90 mph and 130 mph winds, respectively, are applied to adjust the wind speeds to a 10-year mean recurrence interval.

See standard sheet WV & IZ(LTS2013) for the boundaries of each design wind zone. All mounting shall be based on 130 mph wind speed design except when located in 90 mph wind zone. Maximum panel area is 30 sq. ft. Maximum design height is 50 ft, with design height defined as the distance between natural ground (average elevation of surrounding terrain) and the center of sign(s) at the mounting location.

Material for pipe shall be ASTM A53 Grade B, or A501. Structural steel plates shall be ASTM A36, A572 Grade 50, or A588. Bolts used to connect pipe and mounting bracket, and wind beam to sign panel shall be ASTM A307. Anchor bolts shall be ASTM A325 or A193 B7. Each anchor bolt shall be provided with 2 flat washers, 1 lock washer, and 1 heavy hex nut. All parts shall be galvanized in accordance with Standard Specifications Item 445, "Galvanizing".

Attach horizontal pipe at least 2'-0" from the edge of any nearby drain slot.

Contractor shall verify applicable field dimensions before fabrication. Holes drilled through the railing parapet wall shall be drilled with rotary (coring or masonry drill) type equipment. Percussion (star) drilling shall not be allowed. Anchorage for pipe attached to rail shall be placed using an anchoring system approved by the engineer. Installation of anchor fasteners including hole depth, diameter and material shall be in accordance with the manufacturers' recommendation.

Each embedded anchor fastener shall resist an allowable design loading (after applying the reduction factors of bolt spacing and bolt edge distance) of:

	130 mph	90 mph
Tension	12.5 kips	7.5 kips
Shear	9.0 kips	5.0 kips

Each anchoring system shall provide a capacity to resist the required tension and shear acting simultaneously.

For sign connection to mounting, shop drill holes on sign blank in accordance with the current Standard Highway Sign Designs for Texas (SHSD). Additional hole(s) needed to meet a stipulated-type mounting may be field drilled. For multi-sign or back-to-back signs mounting, the engineer shall determine the proper type which ensures each individual mounting meets requirements.

Refer to Standard sheets SMD(GEN), SMD(SLIP-2 and SMD(2-1) for details not covered here.

SHEET 1 OF 3

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

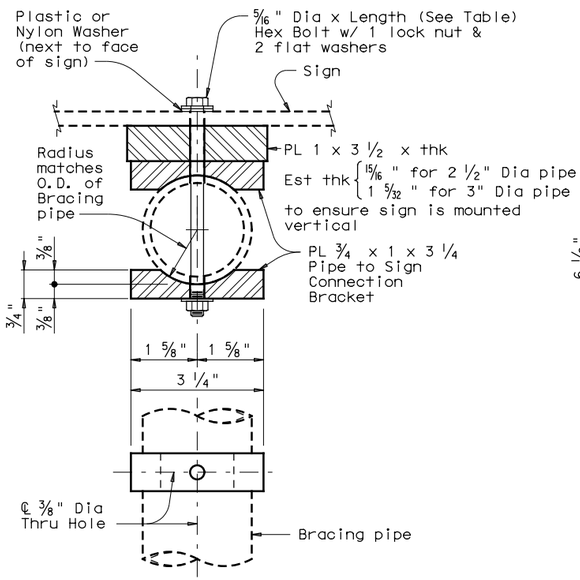
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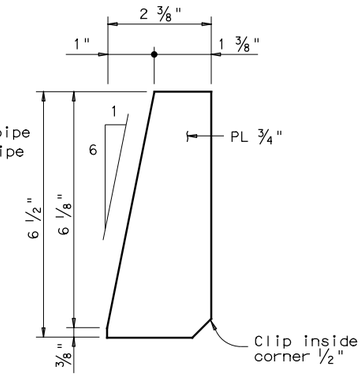
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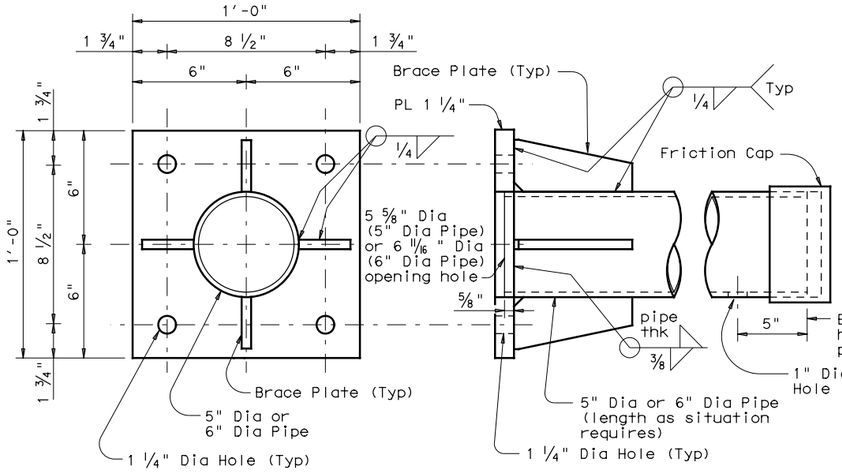


BRACING PIPE TO SIGN CONNECTION BRACKET DETAILS

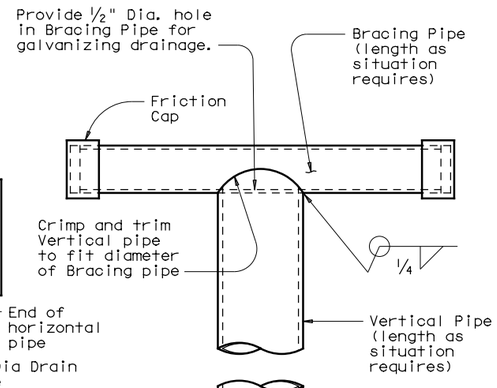
(Showing T Mounting)

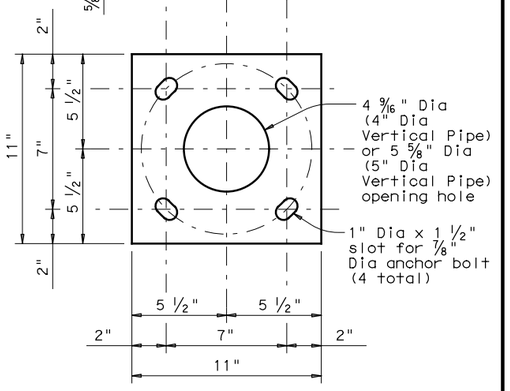


BRACE PLATE DETAILS



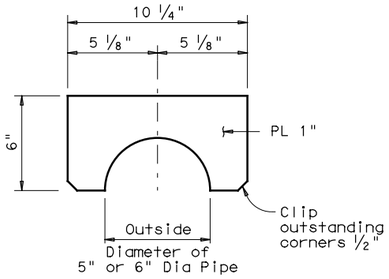
BASE PLATE DETAILS



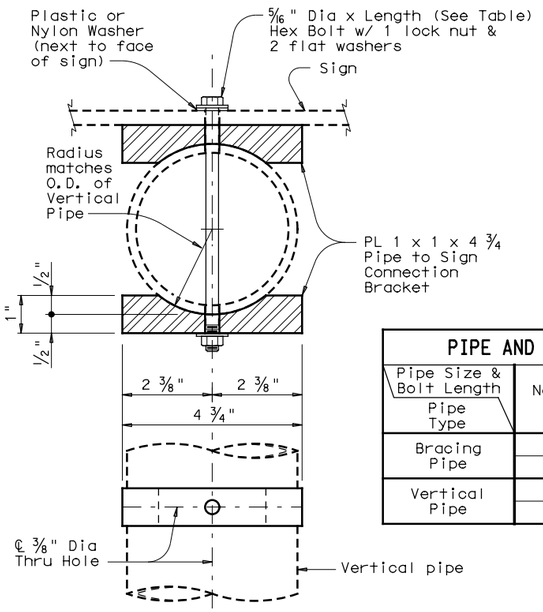


SIGN POLE & POLE BASE PLATE DETAILS

(Showing only T Mounting)



SIGN POLE SUPPORT PLATE BRACKET DETAILS



LARGE PIPE TO SIGN CONNECTION BRACKET DETAILS

(Showing P or T Mounting)

PIPE AND BOLT SPECIFICATIONS		
Pipe Size & Bolt Length / Pipe Type	Nominal Pipe Dia (in.)	Bolt Length (in.)
Bracing Pipe	2 1/2	6
	3	7
Vertical Pipe	4	7
	5	8

SIGN POLE SUPPORT PLATE DETAILS

SHEET 2 OF 3

Texas Department of Transportation | Traffic Operations Division Standard

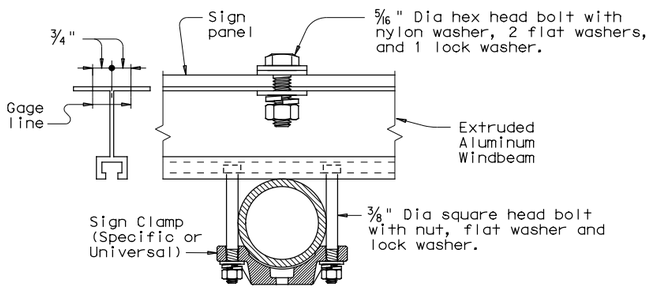
BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-2)-14

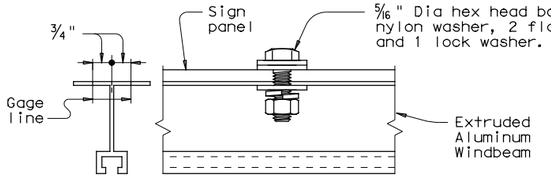
FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		242

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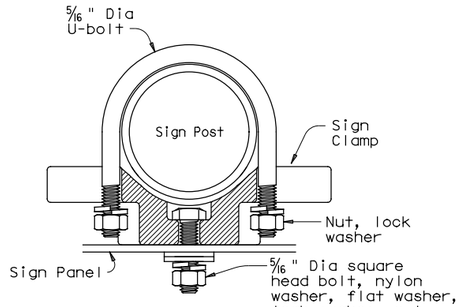
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DETAIL 1



DETAIL 2

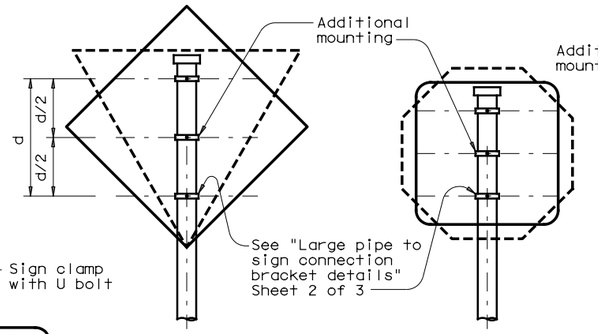


DETAIL 3

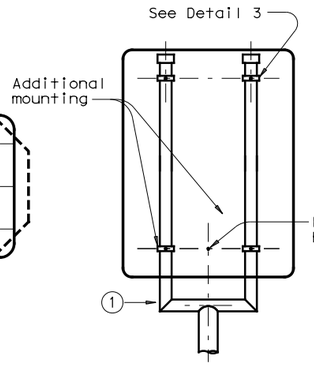
SIGN SHAPE	SQUARE			HORIZONTAL RECTANGLE			VERTICAL RECTANGLE			DIAMOND			OCTAGON			EQUILATERAL TRIANGLE			INTERSTATE SHIELD	PENTAGON (SCHOOL)	
Type of Sign Mounting on SHSD / Design Wind Speed	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	T	U	P	P	T
90 mph					(Type 23) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"		(Type 2) 36"x48" (Type 32) 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" 48"x72" (Type 3) 48"x84"			(Type 3) 60"x60"									(Type Special) 45"x36"		
130 mph	(Type 1) 30"x30" 36"x36"	(Type 3) 48"x48"		(Type 1) 36"x24" 36"x30"	(Type 23) 48"x42" 54"x42" 60"x30" 66"x36" 84"x24" (Type 3) 60"x48"	(Type 3) 72"x36" 78"x36" (Type 23) 72"x30" 84"x24"	(Type 1) 30"x36" 30"x42"	(Type 3) 36"x48" 36"x60" 36"x72" 42"x60" 48"x54" 48"x60" (Type 4) 48"x72" 48"x84"	(Type 3) 48"x60"	(Type 1) 36"x36"	(Type 3) 48"x48" 60"x60"					(Type 1) 48"x48"			(Type Special) 36"x36" 45"x36"		

Notes:
1. Drill holes in addition to the hole pattern of the Standard Highway Sign Designs for Texas (SHSD) at specified locations to meet a stipulated-type mounting indicated in the parenthesis ( ).
2. "Blank" in the above table indicates all other signs excluded from stipulated mounting shall be mounted in accordance with SHSD.

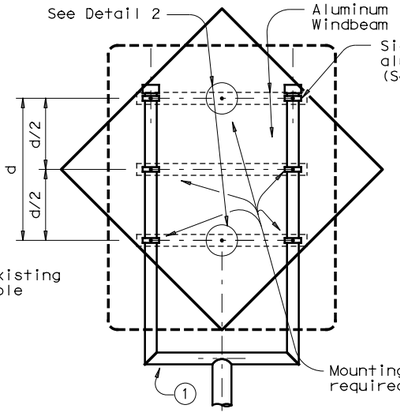
(1) In lieu of welding, the Fabricator may bend bracing pipe elbows if the following conditions are met:
a. Spacing between vertical bracing pipes is equal to or greater than 2'-6".
b. Bending radius is 12".
c. The distance between the lowest clamp and centerline of horizontal bent pipe is 13" max.

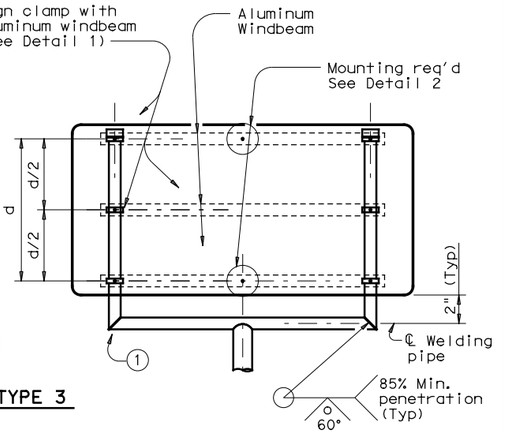


TYPE 1

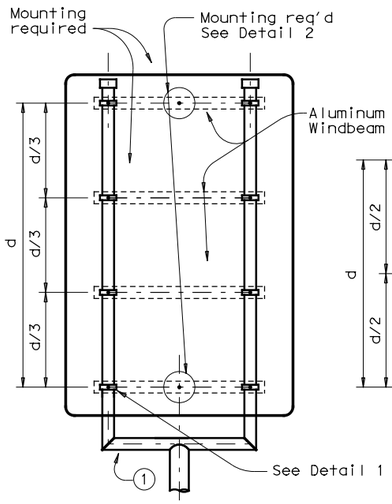


TYPE 2

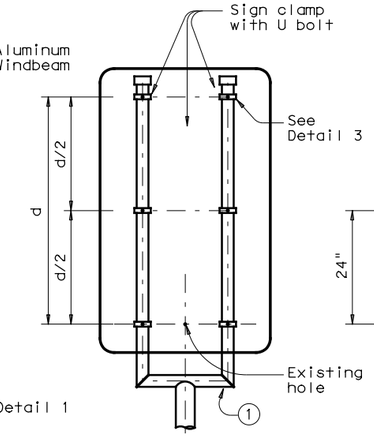




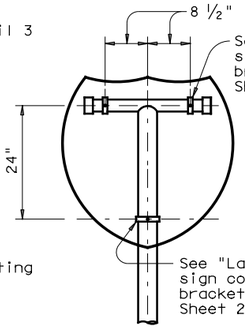
TYPE 3



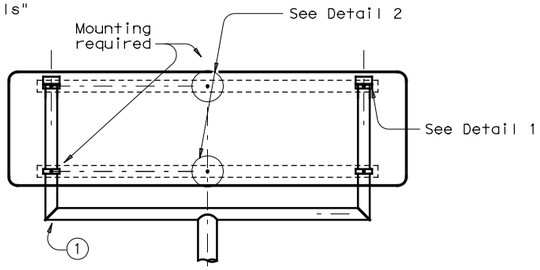
TYPE 4



TYPE 32



TYPE SPECIAL



TYPE 23

Texas Department of Transportation

Traffic Operations Division Standard

BRIDGE RAILING SIGN MOUNT DETAILS

SMD(BR-3)-14

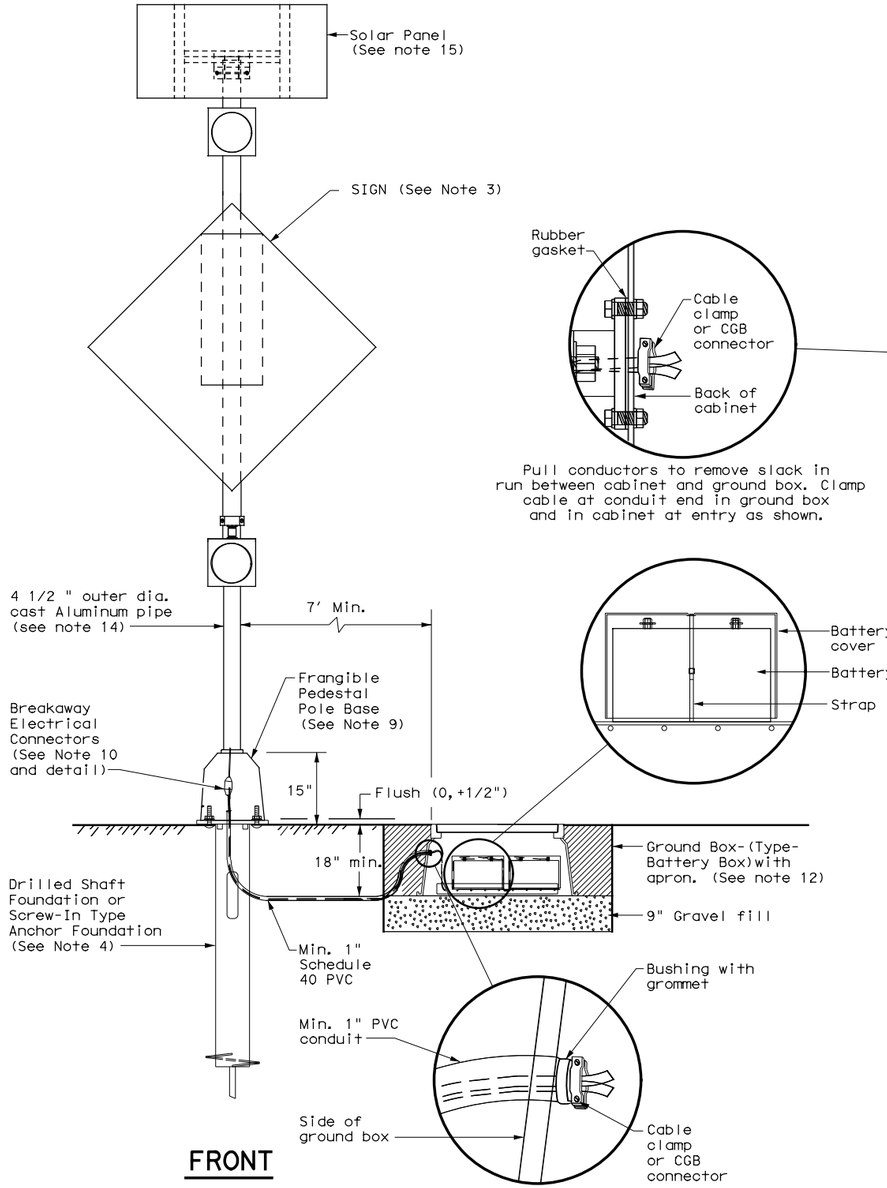
FILE: smdbr-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		243

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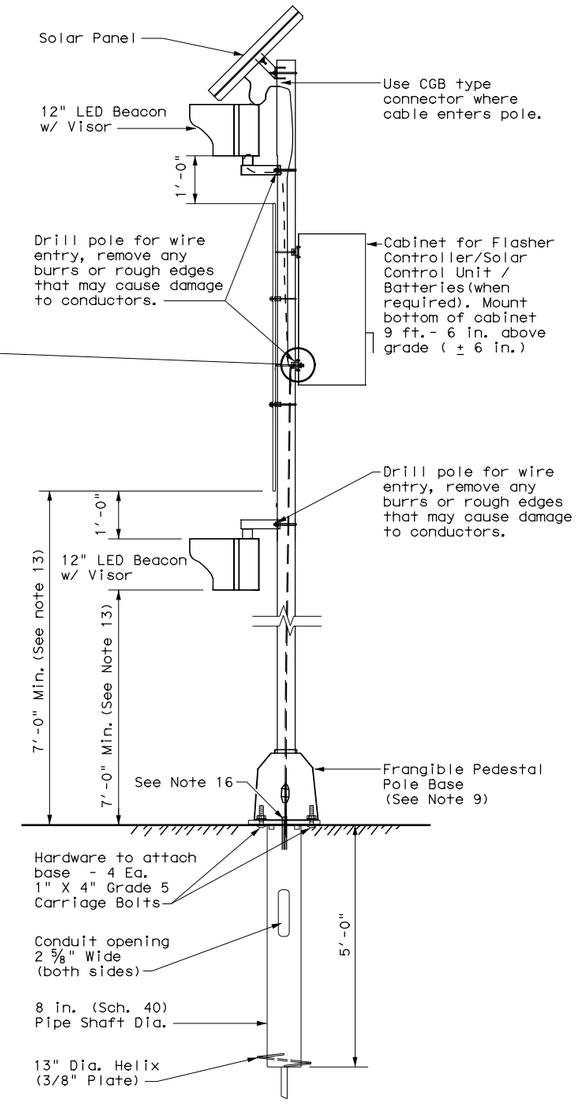
GENERAL NOTES:

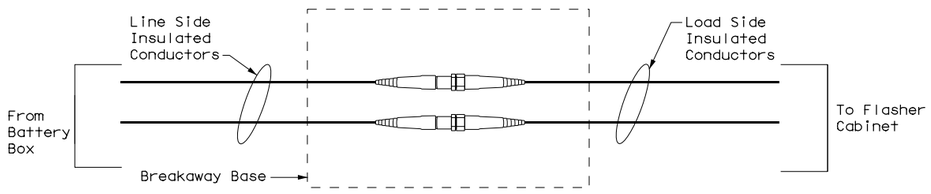
1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
7. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
8. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
11. Install the batteries in a battery box. Place the batteries on a 3/16" thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16" plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
12. See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
13. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
14. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
15. Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
16. Ensure height of conduit is below top of anchor bolts.

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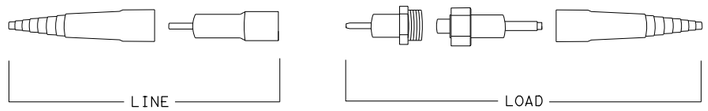


Pull conductors to remove slack in run between cabinet and ground box. Clamp cable at conduit end in ground box and in cabinet at entry as shown.





NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

SOLAR POWERED ROADSIDE FLASHING BEACON ASSEMBLY DETAILS

SPRFBA(1)-13

FILE: spb1-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
12-04 3-13	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		244

75A

A. GENERAL SITE DATA

1. PROJECT LIMITS: *SOUTHWEST BYPASS FROM IH 35 SBFR TO RM 2243 (LEANDER ROAD)*

Begin Project Coordinates : Latitude (N): A. 30° 36' 29"N Longitude (W): -A. 97° 42' 13"W

2. PROJECT SITE MAPS:

- *Project Location Map: The Title Sheet*
- *Drainage Patterns: Shown on Proposed Drainage Area Maps*
- *Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Shown on Fencing and Grading Layout*
- *Location of Erosion and Sediment Controls: Shown on Erosion Control Sheets*
- *Surface Waters and Discharge Locations: Shown on Proposed Area Maps*
- *Project Specific Location(s) (PSL): To be determined by the project Construction Personnel. Location(s) shown on SW3P Site Map (If PSL location(s) is within one mile of project) and information located in project SW3P Binder (Reference item #10 below).*

3. PROJECT DESCRIPTION:

For the construction of a new facility (principal collector) consisting of grading, flex base, asphalt pavment, culverts, bridge, and erosion control.

4. MAJOR SOIL DISTURBING ACTIVITIES:

1. Install control down-slope of work area and initiate inspection and maintenance activities.
2. Begin phased construciton with interim stabilizzation practices. Adjust erosion and sedimentation controls during construction to meet requirements and changeing conditions and as directed/approved by the Engineer.
3. Major soil disturbing activites may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):

- *X Placement of road base*
- *X Extensive ditch grading*
- *____ Upgrading or replacing culverts or bridges*
- *____ Temporary detour road(s)*
- *X Other: Site grading and rock cut excavations*

5. EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

Description of existing vegetation cover: (Primarily Grass, with exposed rock within quarry limits)
Percentage of existing vegetative cover: (51%)
Existing vegetative cover:

- *____ Thick or uniformly established*
- *X Thin and Patchy*
- *____ None or minimal cover*

6. TOTAL PROJECT AREA: *98.53* Acres

7. TOTAL AREA TO BE DISTURBED: *56.07* Acres (57 %)

8. WEIGHTED RUNOFF COEFFICIENT

BEFORE CONSTRUCTION: *0.435*
AFTER CONSTRUCTION: *0.444*

9. NAME OF RECEIVING WATERS:

- *X A classified stream does not pass through project.*
- *____ A classified stream passes through project. Name _____ Segment Number _____*

Name of receiving waters that will receive discharges from disturbed areas of the project: _____

Site is in a Municipal Seperate Storm Sewer System (MS4).
MS4 Operator (name): CITY OF GEORGETOWN

- *X USACE Wetlands are not located on project. (One isolated wetland exists)*
- *____ USACE Wetlands are present. Contractor shall not disturb without specific authorization.*

Location/Plan Sheet Info.: _____

- *____ No Water Pollution Abatement Plan or Contributing Zone Plan required.*
- *X A Water Pollution Abatement Plan or Contributing Zone Plan applies to project.*

10. PROJECT SW3P Binder:

A. For projects disturbing one to five acres, The Contractor will maintain a SW3P Binder at the project field office (if there is not a project field office, should be kept on the Job Site at all times) which contains the following: Index Sheet, TCEQ Signature Authority, TCEQ Small Construction Site Notice, Contractor Certification of Compliance, SW3P Inspector Qualification Statements, Inspection and Maintenance Reports (Form 2118), SW3P Sheet, Site Location Maps, Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.

B. For projects disturbing 5 acres or more, the Contractor will follow the actions listed in (10.A.) above with the addition of the following: Notice Of Intent (N.O.I.) and Fee Payment Form, TCEQ Large Construction Site Notice (to be used instead of Small Site Notice), and TPDES Permit Coverage Notice.

C. For projects disturbing less than one acre, actions described in (10.A.) and (10.B.) above are not required. Acreage is calculated by adding Total Area To Be Disturbed Acres on project (See #7 above) and the PSL(s) acreage located within one mile of project.

B. EROSION AND SEDIMENT CONTROLS

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

- *T* TEMPORARY SEEDING
- ____ MULCHING (Hay or Straw)
- ____ BUFFER ZONES
- ____ PLANTING
- *P* SEEDING
- ____ SODDING
- *P* PRESERVATION OF NATURAL RESOURCES
- ____ FLEXIBLE CHANNEL LINER
- ____ RIGID CHANNEL LINER
- *P* SOIL RETENTION BLANKET
- *P* COMPOST MANUFACTURED TOPSOIL
- ____ VERTICAL TRACKING
- ____ OTHER: *Disturbed areas on which construction activity has ceased, either temporarily or permanently, shall be stabilized within 14 days unless activities are scheduled to resume and do so within 21 days.*

2. STRUCTURAL PRACTICES: (T = Temporary or P = Permanent)

- *T* SILT FENCES
- ____ EROSION CONTROL LOGS
- ____ EROSION CONTROL COMPOST BERMS (Low Velocity)
- *T* ROCK FILTER DAMS
- ____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ____ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ____ DIVERSION DIKE AND SWALE COMBINATIONS
- ____ PIPE SLOPE DRAINS
- *P* PAVED FLUMES
- *T* ROCK BEDDING AT CONSTRUCTION EXIT
- ____ TIMBER MATTING AT CONSTRUCTION EXIT
- ____ CHANNEL LINERS
- *T, P* SEDIMENT TRAPS (Existing low points inside ROW will function as sediment traps in smaller stroms)
- ____ SEDIMENT BASINS
- ____ STORM INLET SEDIMENT TRAP
- *P* STONE OUTLET STRUCTURES
- *P* CURBS AND GUTTERS
- ____ STORM SEWERS
- ____ VELOCITY CONTROL DEVICES
- *P* OTHER: *(WPAP Facilities - Vegetative Filter Strips) (Stone riprap on side slopes within quarry)*

NOTE: TOP OF BMP'S SHOULD NOT BE HIGHER THAN ROADWAY ELEVATION AS NOT TO FLOOD ROADWAY UNLESS PRIOR APPROVAL FROM ENGINEER IS OBTAINED.

3. STORM WATER MANAGEMENT:

The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

- *X Existing or new vegetation provides natural filtration.*
- *X The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.*
- *____ Project includes permanent sedimentation controls (other than grass).*
- *X Velocities do not require dissipation devices.*
- *____ Velocity-dissipation devices included in the design.*
- *____ Other : _____*

4. NON-STORM WATER DISCHARGES:

Filter non-storm water discharges, or hold in retention basins, before being allowed to mix with storm water. These discharges consist of, but not limited to, non-polluted ground water, spring water, foundation or footing drain water, water used for dust control or pavement washing and vehicle washwater containing no detergents.

Off-site discharges are prohibited except as follows:

1. *Discharges from fire fighting activities and/or fire hydrant flushings.*
2. *Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).*
3. *Plain water used to control dust.*
4. *Plain water originating from potable water sources.*
5. *Uncontaminated groundwater, spring water or accumulated stormwater.*
6. *Foundation or footing drains where flows are not contaminated with process materials such as solvents.*
7. *Other: _____*

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations shall be as directed by the Engineer and will be included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

Maintain all erosion and sediment controls in good working order. Perform any necessary cleaning/repairs/replacements at the earliest possible date prior to next rain event, but no later than 7 calendar days, Ensure the surrounding ground has dried sufficiently to prevent damage from equipment. "Too Wet" is the only reason for not adhering to time frames described. When construction activities permanently or temporarily cease and are not expected to resume for 14 or more days on a disturbed portion of the site, stabilization measures must be initiated immediately.

2. INSPECTION:

A Construction Observer will perform a regularly scheduled SW3P inspection every 7 calendar days. An Inspection and Maintenance Report, signed by the Construction Observer and the Contractor, will be filed for each Inspection. Revise/clean/repair/replace each BMP control device in accordance with the current Field Inspection and Maintenance Report (Form 2118) and item 1 (Maintenance) above.

3. WASTE MATERIALS:

On a daily basis, or as may be directed, collect all waste materials, trash and debris from the construction site and deposit into a metal dumpster having a secure cover and which meets all state and local city solid waste management requirements. Empty the dumpster as required by regulation, or as may be directed, at a local approved landfill site. Do not bury construction waste on the construction project site.

4. HAZARDOUS WASTE & SPILL REPORTING:

As a minimum, any products in the following categories are considered to be hazardous: Paints, Acids, Solvents, Fuels, Asphalt Products, Chemical Additives for Soil Stabilization, and Concrete Curing Compounds or Additives. When storing hazardous material on the project site, or at a Project Specific Location, take all practicable precaution to prevent and/or contain any spillage of these materials. In the event of a spill, contact the spill coordinator immediately.

5. SANITARY WASTE:

Use a licensed sanitary waste management contractor to collect all sanitary waste from portable units as may be required by local regulation, or as directed.

6. CONSTRUCTION VEHICLE TRACKING:

On a regular basis, or as may be directed, dampen haul roads for dust control and stabilize construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be available on a daily basis, or as may be directed, to remove sediment from paved roadways abutting or traversing the project site.

7. MANAGEMENT PRACTICES:

A. Construct disposal areas, stockpiles, haul roads and PSL's in a manner that will minimize and control the amount of sediment that may enter receiving waters. Do not locate disposal areas in any wetland, waterbody or streambed.
B. Locate construction staging areas, vehicle maintenance and PSL's areas in a manner to minimize the runoff of pollutants.
C. When working in or near a wetland, install and maintain operating soil erosion and sediment controls at all times during construction and isolate the work from the wetland.
D. Clear all waterways as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.
E. Procedures and/or practices should be taken to control dust.
F. Sediment to be removed from roadways daily or when work begins after weather events if construction activities have ceased due to weather event.
G. The Contractor will be required to contain wash water from concrete trucks in a manner that will prevent same from entering any waterway.
H. The Contractor is responsible for insuring that all Subcontractors are aware and comply with all components of the Temporary Erosion Control Plans.

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

WILLIAMSON COUNTY

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

TEMPLATE REVISION DATE: 06/12/2015

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	245
JW	2103	01	034	
CHECK				
JC				

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DATE: 3/23/2018
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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. City of Georgetown

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. ITEM 164 AUSTIN DISTRICT PERMANENT RURAL SEEDMIX CLAY IS SPECIFIED FOR USE ON THE PROJECT.
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. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT THERE IS THE POSSIBILITY THAT MIGRATORY BIRDS MAY BE NESTING IN ANY WOODY VEGETATION OR EXISTING STRUCTURES WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHALL REMOVAL ALL WOODY VEGETATION, AND OLD MIGRATORY BIRD NESTS FROM ANY STRUCTURES, BETWEEN SEPTEMBER 1 AND JANUARY 31 WHILE ANY NESTS ARE NOT OCCUPIED BY A BIRD. IN ADDITION, THE CONTRACTOR MUST BE PREPARED TO PREVENT MIGRATORY BIRDS FROM RE-NESTING ON ANY STRUCTURES BETWEEN FEBRUARY 1 AND AUGUST 31. ALL METHODS MUST BE APPROVED BY A QUALIFIED PROFESSIONAL WELL IN ADVANCE OF THE PLANNED USE.
2.

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. WATER POLLUTION ABATEMENT PLAN (WPAP) RN109538439
2.
3.

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

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	2103	01	034	
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	AUS	WILLIAMSON		246
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

The following TCEQ requirements (Form TCEQ-0592, Rev. 3/15/07) are applicable to all work in the recharge zone of the Edwards Aquifer in Hays, Travis and/or Williamson Counties and must be adhered to by the Contractor and all Subcontractors:

1. Written construction notification must be given to the appropriate TCEQ regional office no later than 48 hours prior to commencement of the regulated activity. Information must include the date on which the regulated activity will commence, the name of the approved plan for the regulated activity, and the name of the prime contractor and the name and telephone number of the contact person.

2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.

3. If any sensitive feature is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. The regulated activities near the sensitive feature may not proceed until the TCEQ has reviewed and approved the methods proposed to protect the sensitive feature and the Edwards Aquifer from any potentially adverse impacts to water quality.

4. No temporary aboveground hydrocarbon and hazardous substance storage tank system is installed within 150 feet of a domestic, industrial, irrigation, or public water supply well, or other sensitive feature.

5. Prior to commencement of construction, all temporary erosion and sedimentation (E&S) control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. Controls specified in the temporary storm water section of the approved Edwards Aquifer Protection Plan are required during construction. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.

6. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).

7. Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake must be provided that can indicate when the sediment occupies 50% of the basin volume.

8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.

10. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.

11. The following records shall be maintained and made available to the TCEQ upon request: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

12. The holder of any approved Edward Aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

    A. any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;

    B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;

    C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

TCEQ Regional Offices

Austin Regional Office
12100 Park 35 Circle
Bldg A, Room 179
Austin, Texas 78753
Phone (512)339-2929
Fax (512)339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480
Phone (210)490-3096
Fax (210)545-4329

Texas Department of Transportation®
Austin District Design

TCEQ Requirements for Recharge Zone of the Edwards Aquifer

Austin District Standard

© TxDOT 2003	DIST	FED REG	FEDERAL AID PROJECT #			SHEET
REVISIONS 01/10/14 REQUIREMENTS AND ADDRESS UPDATED	AUS	6				247
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	WILLIAMSON		2103	01	034	

FILE: TCEQ-03.dgn

SW BYPASS TEMPORARY EROSION CONTROL NOTES:

1. CONTRACTOR MUST APPLY FOR A TPDES CONSTRUCTION GENERAL PERMIT NO LESS THAN TWO DAYS PRIOR TO THE START OF CONSTRUCTION. A CONSTRUCTION STORM WATER POLLUTION PREVENTION PLAN (SWPPP) HAS BEEN PREPARED FOR THIS PROJECT PURSUANT TO THE GENERAL PERMIT REGULATIONS. THE SWPPP MUST BE COMPLIED WITH, RETAINED ON SITE, AND KEPT CURRENT IN ACCORDANCE WITH THE REGULATIONS.

2. GRUB ONLY THOSE AREAS ESSENTIAL FOR COMPLETING SITE CONSTRUCTION. CONSTRUCTION TRAFFIC SHOULD TRAVEL OVER THE AREAS THAT MUST BE DISTURBED FOR OTHER CONSTRUCTION ACTIVITY. RESTRICT CONSTRUCTION VEHICLES FROM TRAVERSING UNPROTECTED CONSTRUCTION AREAS WITH VEGETATIVE COVER.

3. CLEAR ALL TREES AND BRUSH (INCLUDING STUMPS) WITHIN THE ROW BETWEEN I-35 AND RM 2243 (ESTIMATED AT 27.2 AC) WITH THE FOLLOWING TWO EXCEPTIONS:

   A. ALL TREES THAT HAVE A DIAMETER AT BREAST HEIGHT (DBH) OF 12 INCHES OR LARGER (EXCLUDING HACKBERRY, CHINABERRY, ASHE JUNIPER (CEDAR), CHINESE TALLOW, AND MESQUITE) ARE TO REMAIN.

   B. ALL CLEARING OF TREES AND BRUSH WITHIN THE LIMITS OF THE PERMANENT PROTECTION FENCE (TWO AREAS) INSTALLED NEAR KARST FEATURES IN SEGMENT 1 MUST BE ACCOMPLISHED WITH HAND METHODS ONLY. GRIND STUMPS 2" BELOW GRADE WITH HAND OPERATED GRINDER. DO NOT PULL STUMPS.

   DO NOT GRUB (REMOVE OR SCRAPE THE EXISING GROUND COVER/GRASSES) WITH THE EXCEPTION OF STUMPS. RE-VEGETATE ALL AREAS DISTURBED BY CLEARING ACTIVITY OUTSIDE OF THE CONSTRUCTION LIMITS. DISTURBED AREAS MUST BE SEEDED OR SODDED WITHIN 14 DAYS OF LAST CLEARING ACTIVITY. SEED AREAS WITHIN THE PERMANENT PROTECTIOIN FENCE DEVOID OF VEGETATION EVEN IF THEY WERE NOT IMPACTED BY CLEARING ACTIVITIES. SUBSIDIARY TO ITEM 100 "PREPARING RIGHT OF WAY".

4. CONSTRUCTION EXITS/ENTRANCES TO BE PLACED IN THE FIELD WITH APPROVAL FROM THE ENGINEER STABILIZED CONSTRUCTION EXITS SHALL BE CONSTRUCTED AT ALL ACCESS POINTS AND MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT OFF SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH CRUSHED STONE OR CLEAN OUT OF THE EXISTING STONE.

5. ON-SITE STAGING AREAS TO BE PLACED IN THE FIELD WITH APPROVAL FROM THE ENGINEER. STAGING AREAS MUST NOT BE LOCATED INSIDE THE 100 YEAR FLOODPLAIN, UP SLOPE OF GEOLOGICALLY SENSITIVE FEATURES, ON STEEP SLOPES, OR ERODIBLE SOILS. SEDIMENT CONTROL FENCE SHALL BE PLACED AROUND THE PERIMETER. TYPE II ROCK FILTER DAMS SHALL BE PLACED AT ANY LOCATION OF CONCENTRATED FLOW DOWN SLOPE OF THE STAGING AREA.

6. SHOULD THE CONTRACTOR DESIRE A STAGING AREA OFF-SITE, INFORMATION INDICATING THE PROPOSED LOCATION AND PLACEMENT OF APPROPRIATE TEMPORARY EROSION AND SEDIMENTATION CONTROLS MUST BE SUBMITTED TO THE TCEQ FOR REVIEW AND APPROVAL PRIOR TO ITS INSTALLATION. CONTRACTOR SHALL BEAR COST OF ANY FEES REQUIRED FOR THE REVIEW PROCESS.

7. DETAILED INFORMATION FOR SENSITIVE FEATURES IS PROVIDED IN THE GEOLOGIC ASSESSMENT SECTION OF THE WPAP, RN109538439.

8. RETAIN SEDIMENT ON-SITE. WHEN REMOVING TEMPORARY CONTROLS, REMOVE ACCUMULATED SEDIMENT.

9. SEDIMENT CONTROL FENCE (SCF) MUST BE REPAIRED IF BLOWOUTS HAVE OCCURRED OR A WEAK SPOT HAS DEVELOPED.

10. SEDIMENT SHALL BE REMOVED FROM BEHIND SEDIMENT CONTROL WHEN IT REACHES 1/3 THE HEIGHT OF THE STRUCTURE, OR SIX INCHES (SCF) / ONE FOOT (RFD), WHICHEVER IS LESS.

11. INSPECTIONS

   A. VISUAL INSPECTIONS OF DISTURBED AREAS THAT HAVE NOT BEEN STABILIZED, AREAS USED FOR STORAGE OF EXPOSED MATERIALS, CONSTRUCTION EXITS, AND STORM WATER CONTROL SYSTEMS AND BMPS SHALL BE PERFORMED AT LEAST ONCE EVERY 14 DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.

   B. AREAS THAT HAVE BEEN FINALLY OR TEMPORARILY STABILIZED MUST BE INSPECTED AT LEAST ONCE PER MONTH.

   C. ALL AREAS EXPOSED TO PRECIPITATION MUST BE VISUALLY INSPECTED FOR EVIDENCE OF OR POTENTIAL FOR POLLUTANTS ENTERING THE DRAINAGE SYSTEM.

   D. SEDIMENT AND EROSION CONTROLS MUST BE EVALUATED TO DETERMINE WHETHER THEY ARE ADEQUATE AND OPERATING PROPERLY OR WHETHER ADDITIONAL CONTROL MEASURES ARE NEEDED.

   E. CONSTRUCTION EXITS MUST BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING.

   F. IF AN INSPECTION SHOWS THAT ADDITIONAL CONTROLS OR MODIFIED BMPS ARE NEEDED TO CORRECT PROBLEMS IDENTIFIED, THE SW3P MUST BE MODIFIED WITHIN SEVEN CALENDAR DAYS FOLLOWING THE INSPECTION. THE ADDITIONAL OR MODIFIED BMPS MUST BE IMPLEMENTED PRIOR TO THE NEXT ANTICIPATED STORM EVENT.

12. PLUG ALL EXISTING BORE HOLES IN ACCORDANCE WITH 30 TAC 213.7 "PLUGGING OF ABANDONED WELLS AND BORINGS":

   "(C) ALL BORINGS WITH DEPTHS GREATER THAN OR EQUAL TO 20 FEET MUST BE PLUGGED WITH A NON-SHRINK GROUT FROM THE BOTTOM OF THE HOLE TO WITHIN THREE FEET OF THE SURFACE. THE REMAINDER OF THE HOLE MUST BE BACKFILLED WITH CUTTINGS FROM THE BORING OR GRAVEL. ALL BORINGS LESS THAN 20 FEET MUST BE BACKFILLED WITH CUTTINGS FROM THE BORING OR GRAVEL. ALL BORINGS MUST BE BACKFILLED OR PLUGGED WITHIN FOUR DAYS OF COMPLETION OF THE DRILLING OPERATION. VOIDS MAY BE FILLED WITH GRAVEL."

   CONSIDERED SUBSIDIARY TO ITEM 100 "PREPARING RIGHT OF WAY".

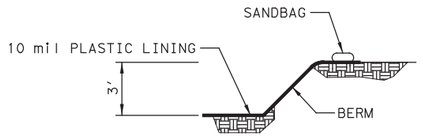
13. SPRINKLING FOR THE CONTROL OF DUST, AS DIRECTED, WILL BE REQUIRED ON THIS PROJECT. SPRINKLE FOR DUST CONTROL ON PRIMARY ENTRY AND EXIT TO THE QUARRY LIMITS AS WELL AS ANY OTHER AREA SUBJECT TO CONSTRUCTION TRAFFIC. SPRINKLING IS NOT REQIURED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER, FOR ANY PARTS OF THE EXISING QUARRY FLOOR LEFT UNDISTRURBED BY CONSTRUCTION ACTIVITY. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO PERTINENT ITEMS.

14. EXISTING HAUL ROAD, INSTALLED BY OTHERS, TO BE REMOVED PRIOR TO PROJECT COMPLETION. EXISTING 3IN-5IN ROCK MAY BE REUSED FOR EMBANKMENT OR RIPRAP, PROVIDED IT MEETS PROJECT SPECIFICATIONS (OR AS APPROVED BY THE ENGINEER). SUBSIDIARY TO ITEM 506 "TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS".

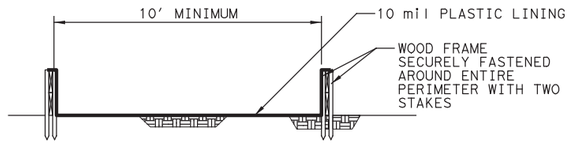
15. PROVIDE TREE PROTECTION FOR ALL TREES LOCATED ADJACENT TO THE CONSTRUCTION AREA NOT DESIGNATED FOR REMOVAL BY NOTE 3, OR AS DIRECTED BY THE ENGINEER. ESTIMATED AT 20 TREES.

16. ANY DISCHARGE FROM DEWATERING OPERATIONS MUST BE CONTAINED ON-SITE. OTHERWISE, SPREAD UPSTREAM OF SILT CONTROL FENCE OR ROCK FILTER DAMS.

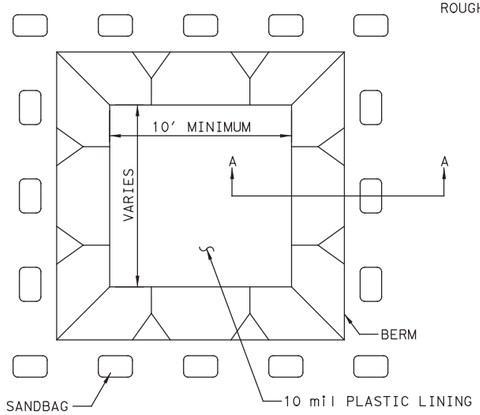
17. CONCRETE WASHOUT LOCATION TO BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER. WASHOUTS MUST NOT BE LOCATED INSIDE THE 100 YEAR FLOODPLAIN, UP SLOPE OF GEOLOGICALLY SENSITIVE FEATURES, OR ON STEEP SLOPES.



SECTION A-A
NOT TO SCALE

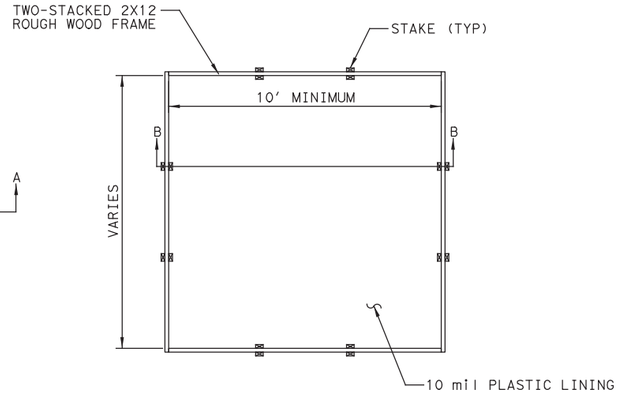


SECTION B-B
NOT TO SCALE



PLAN
NOT TO SCALE

TYPE "BELOW GRADE"



PLAN
NOT TO SCALE

TYPE "ABOVE GRADE" WITH WOOD PLANKS

CONCRETE WASHOUT DETAIL

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

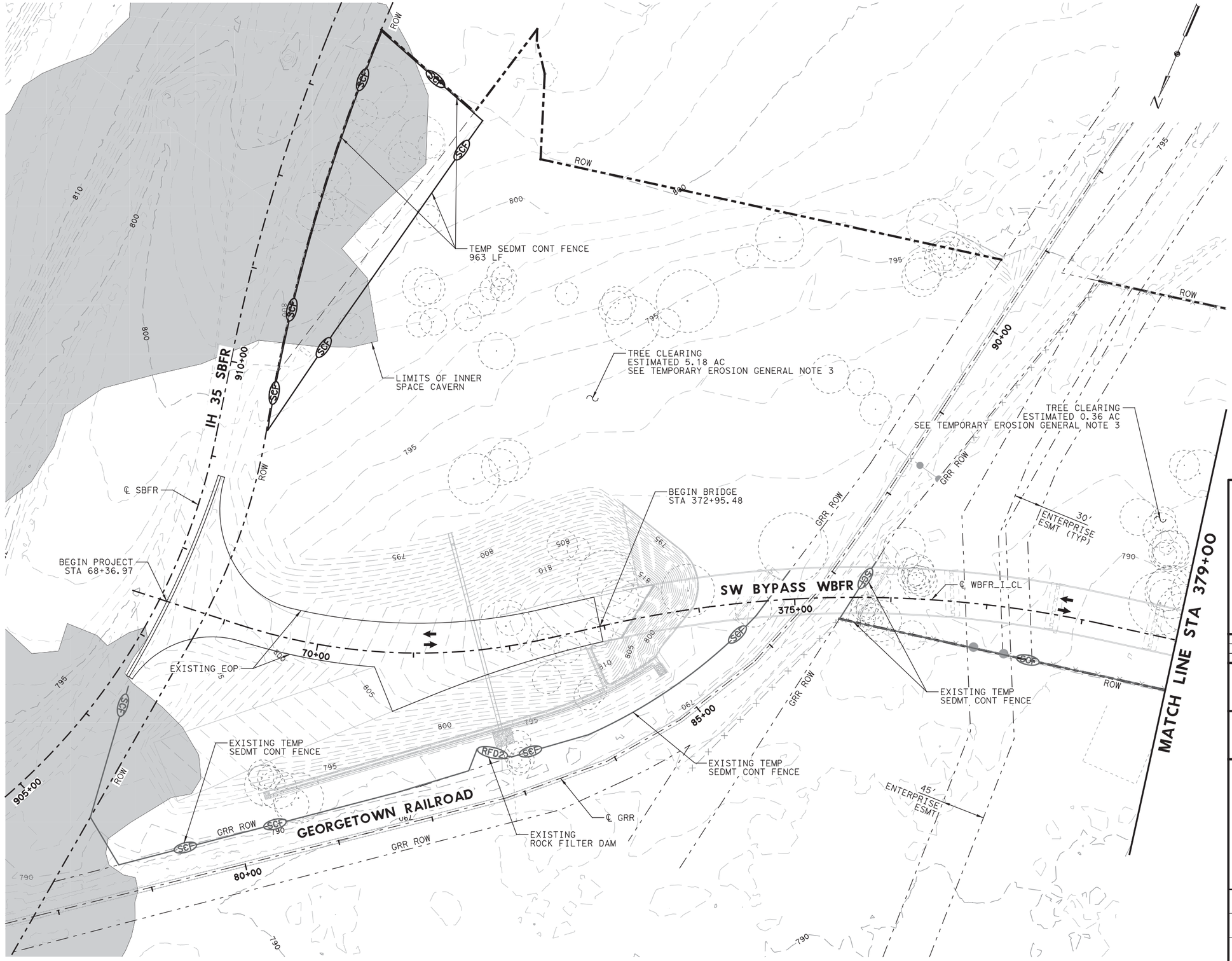
SOUTHWEST BYPASS SEGMENT 2

TEMPORARY EROSION
GENERAL NOTES

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	
JW	2103	01	034	248
CHECK				
JC				

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LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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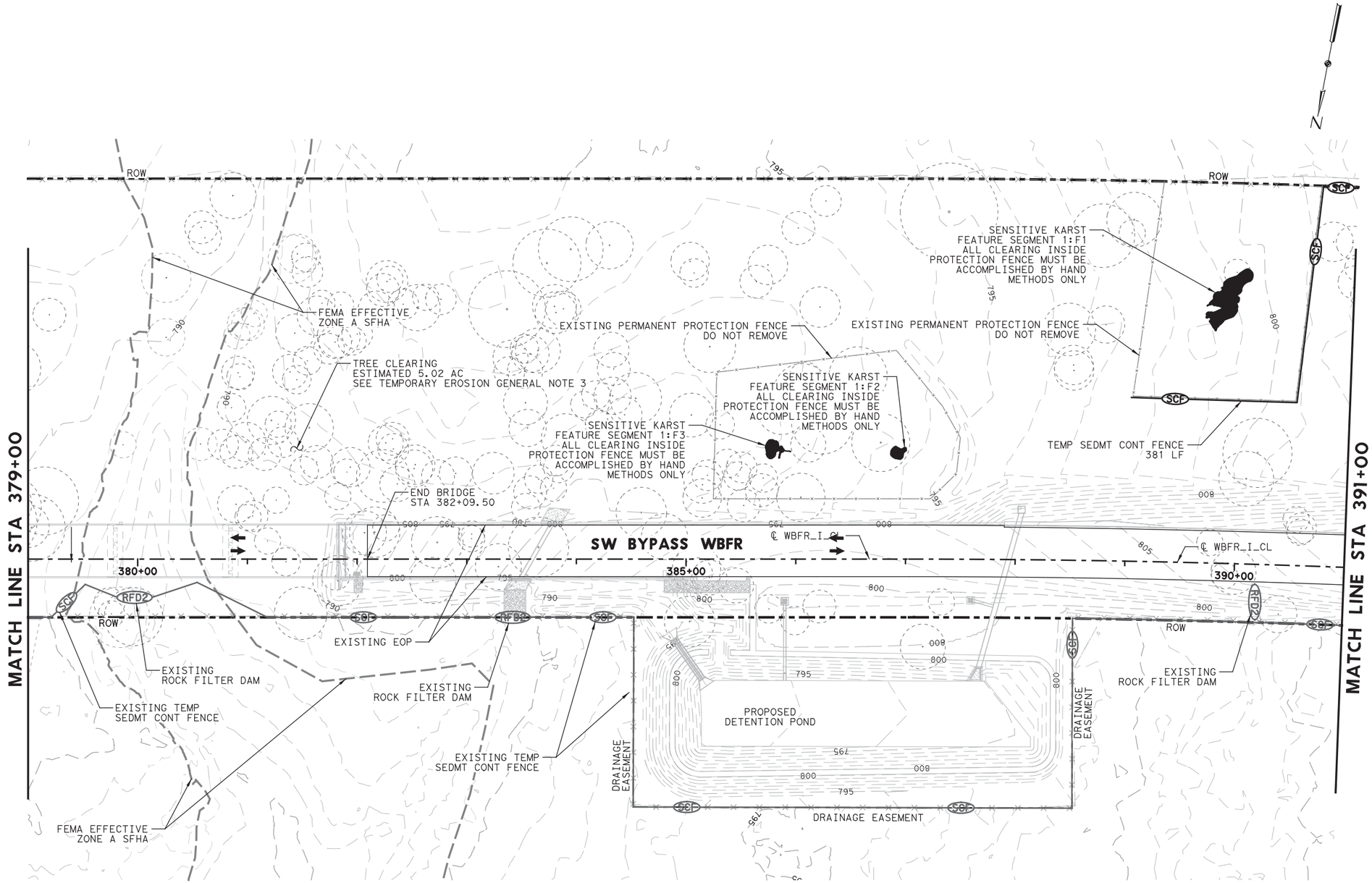
SOUTHWEST BYPASS SEGMENT 2

TEMPORARY EROSION CONTROL PLAN BEGIN PROJECT TO STA 379+00

SCALE: 1"=100' SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	249
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

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LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

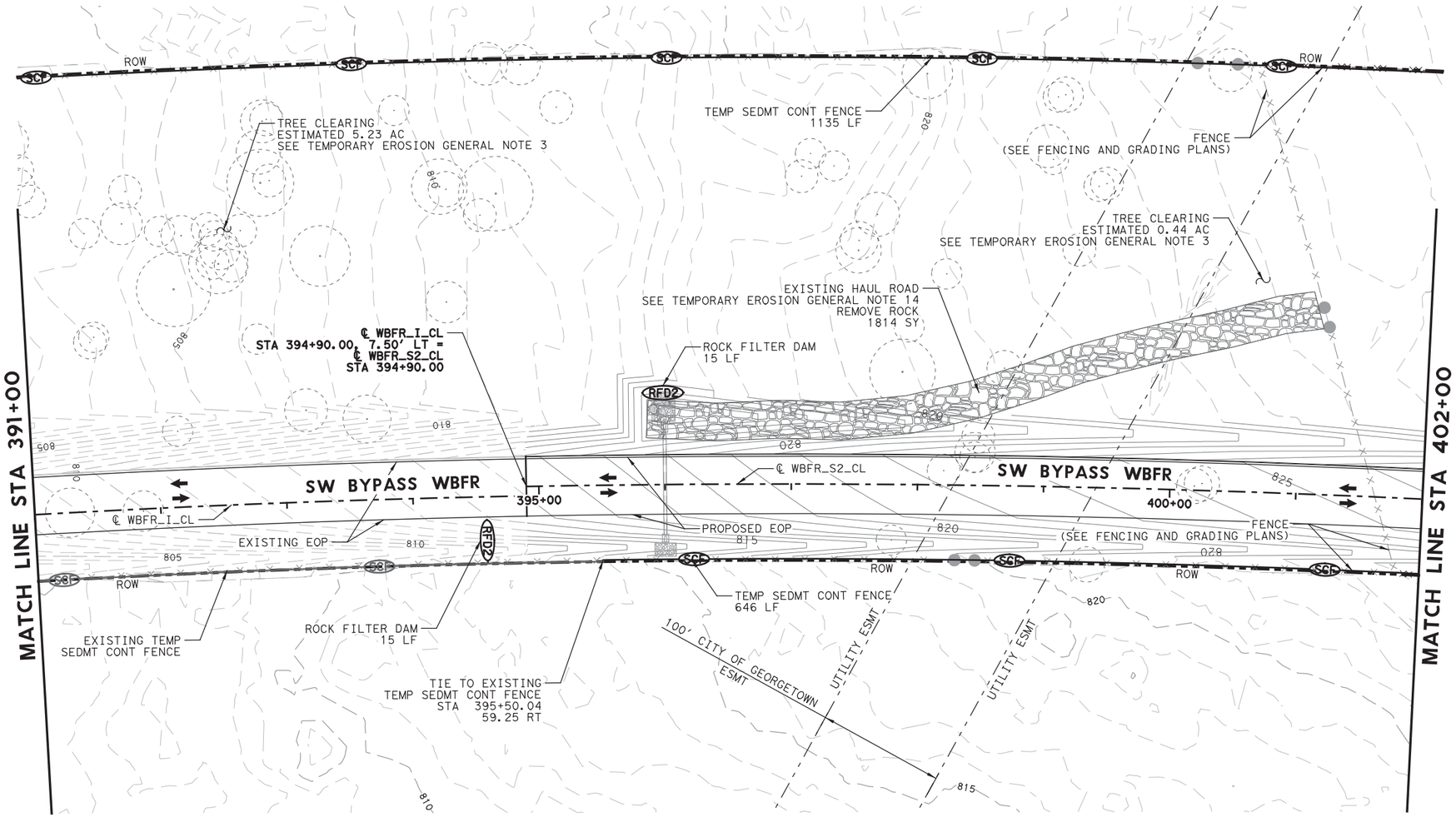
STA 379+00 TO STA 391+00

SCALE: 1"=100' SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

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4/12/2018 7:20 AM





LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

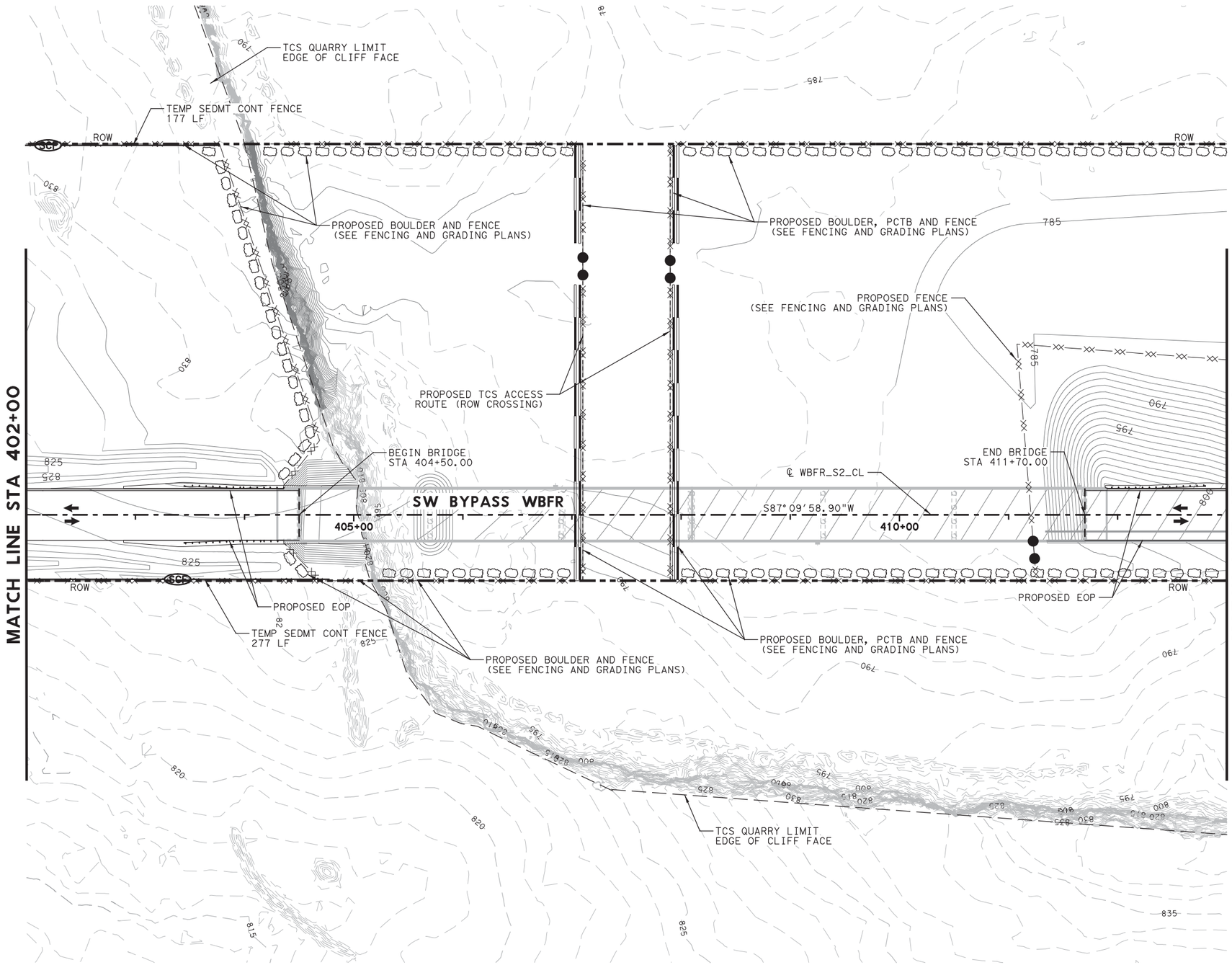
SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

STA 391+00 TO STA 402+00

SCALE: 1"=100' SHEET 3 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	251
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/23/2018
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 11:03:37 AM SCALE: 1:100



N

LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

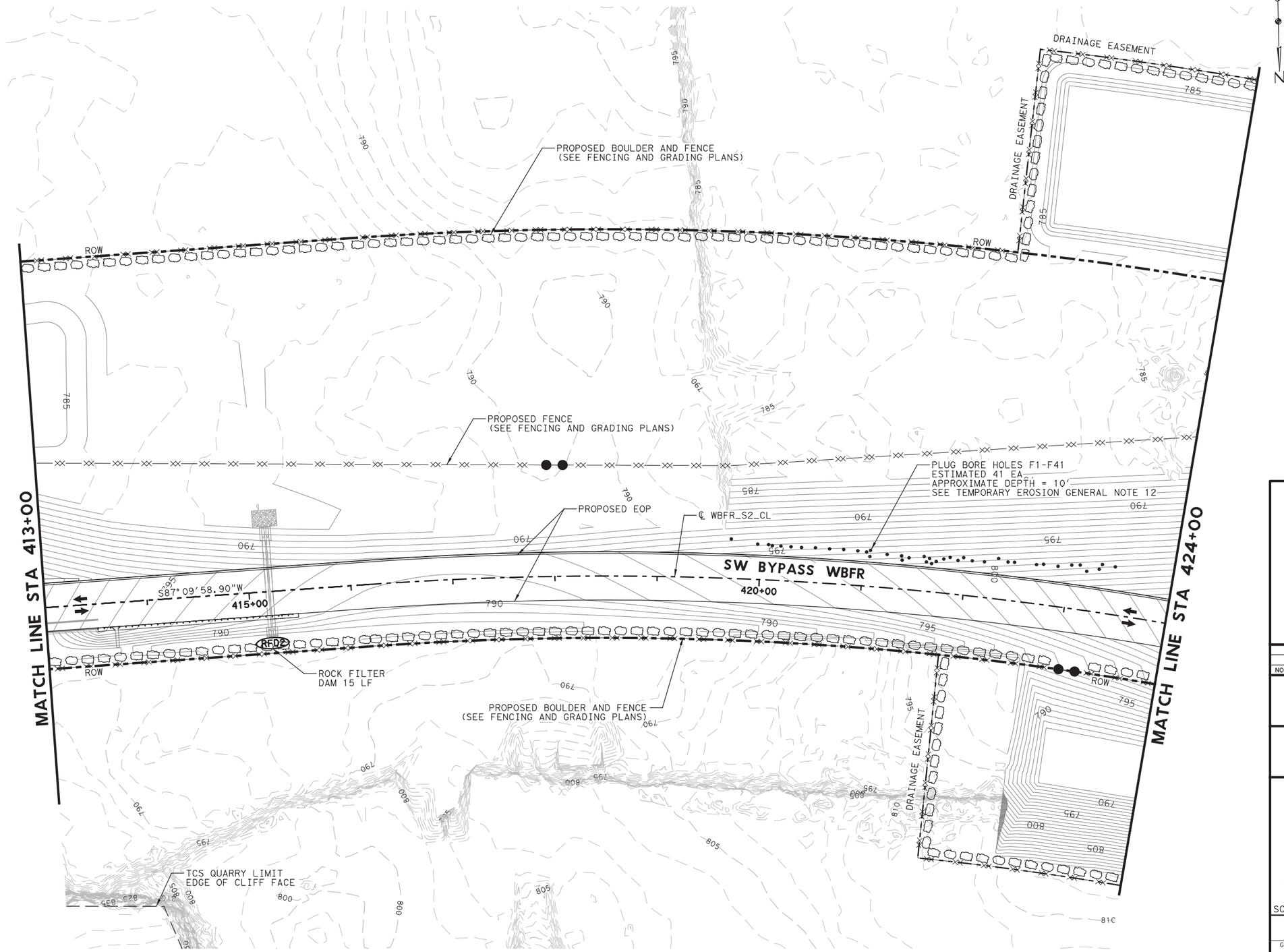
STA 402+00 TO STA 413+00

SCALE: 1"=100' SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	
CHECK JC	CONTROL	SECTION	JOB	252
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201707l8.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 11:03:43 AM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
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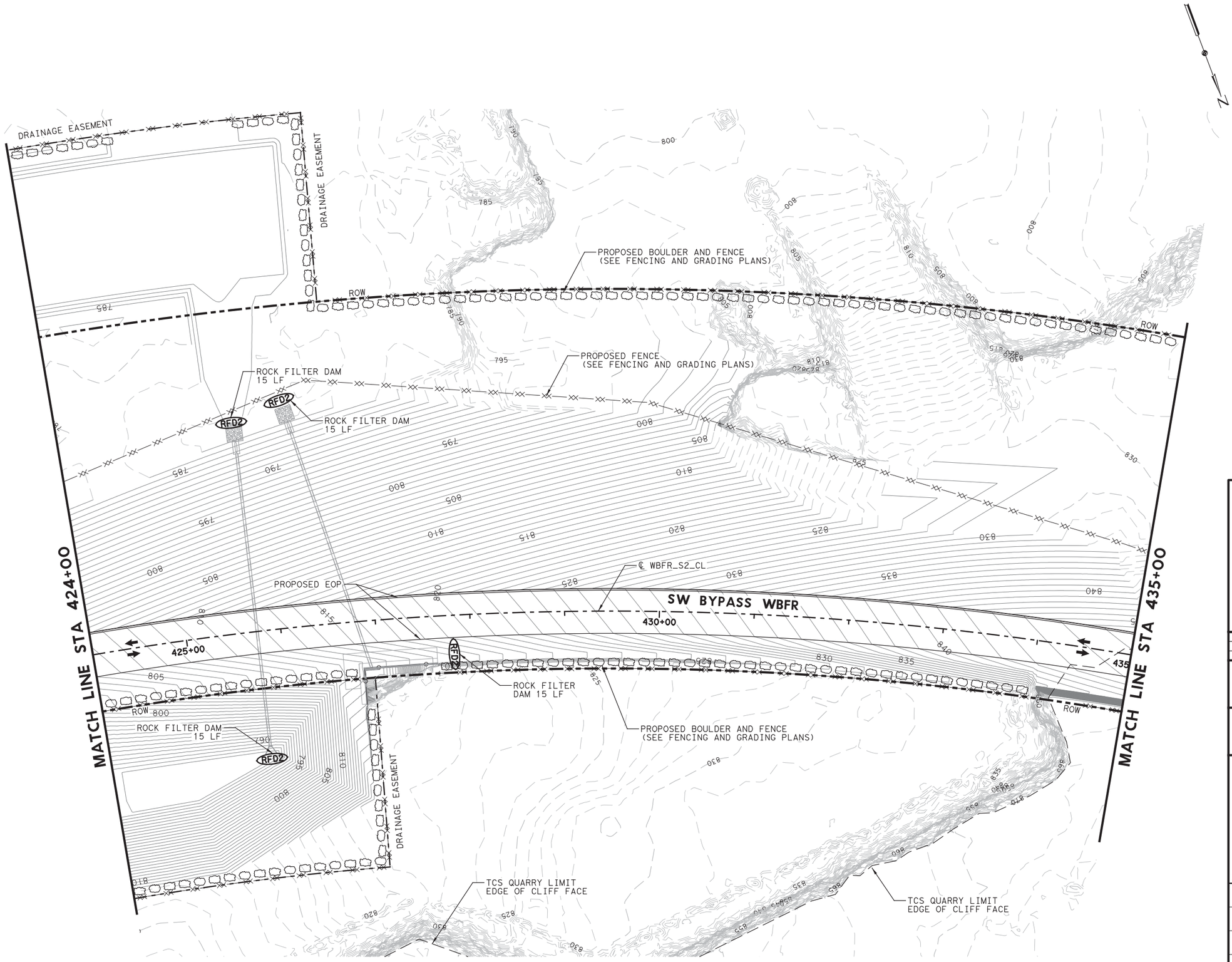
SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

STA 413+00 TO STA 424+00

SCALE: 1"=100' SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	253
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 11:03:49 AM SCALE: 1:100
FILE: \



LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

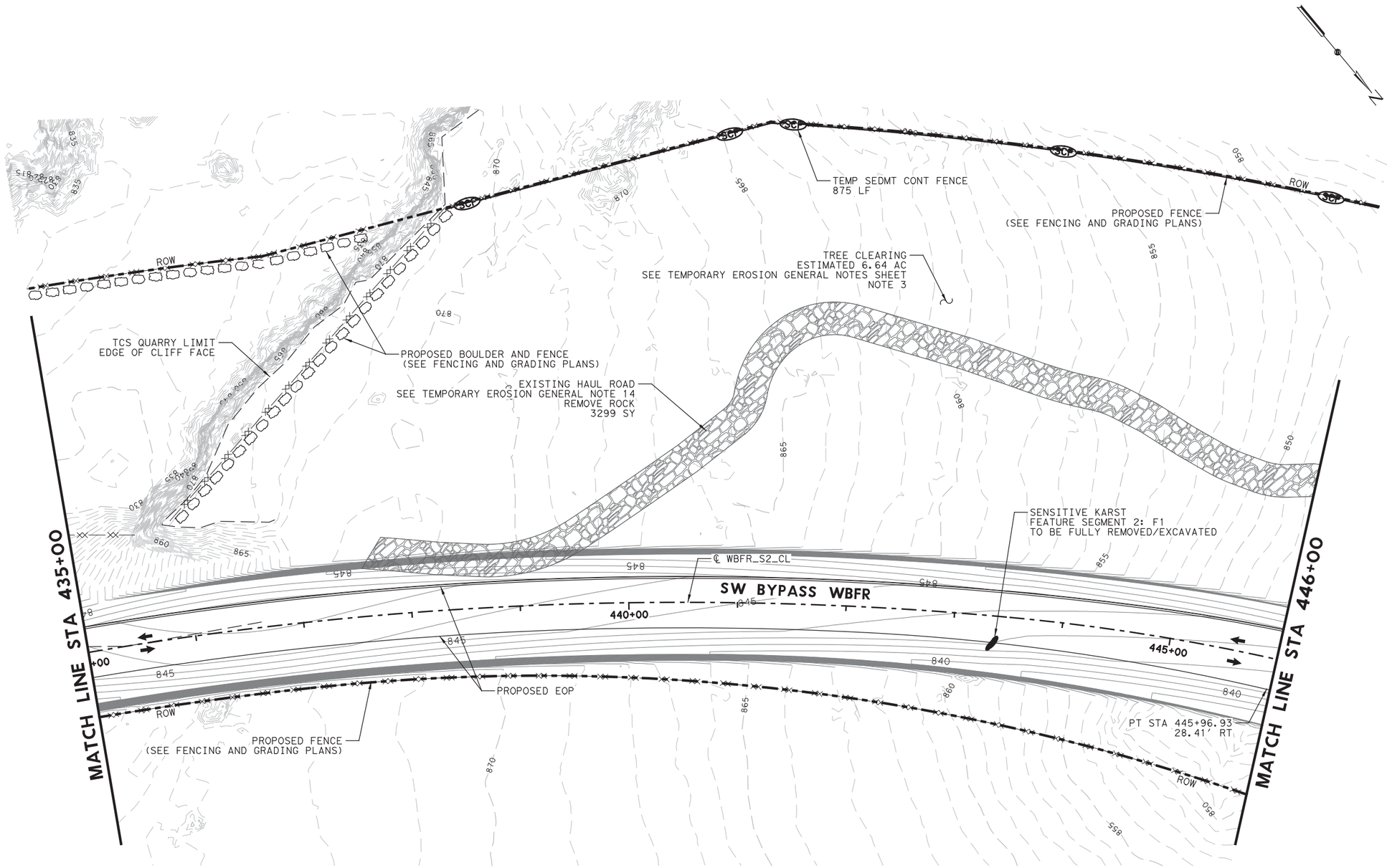
STA 424+00 TO STA 435+00

SCALE: 1"=100' SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	254
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 11:03:56 AM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

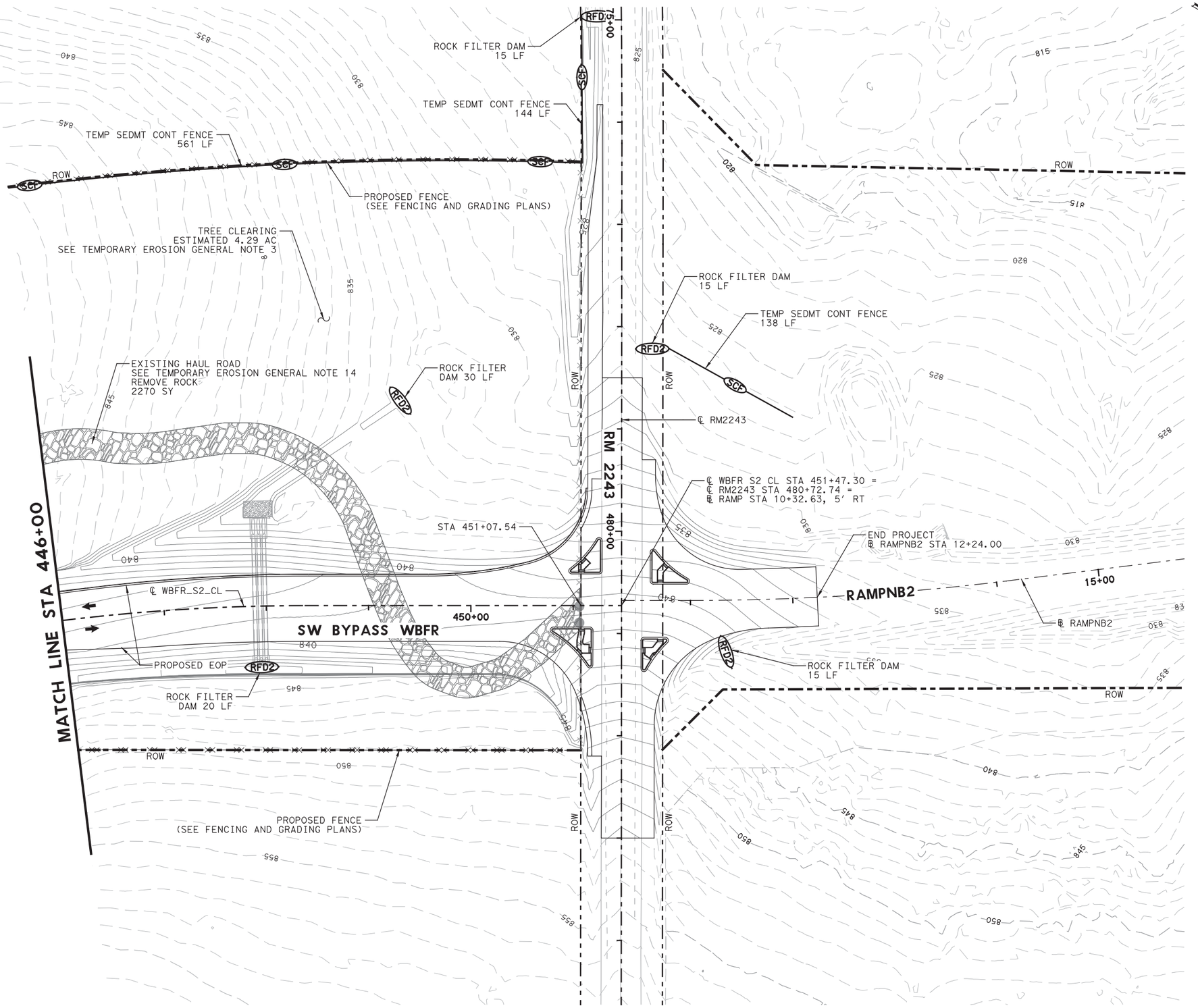
SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

STA 435+00 TO STA 446+00

SCALE: 1"=100' SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	255
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 FILE: \
PENTABLE: S2-00000207070718.tbl TIME: 11:04:02 AM SCALE: 1:100



LEGEND

- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM (TY II)
- PERMANENT PROTECTION FENCE
- ROCK (3"-5")

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
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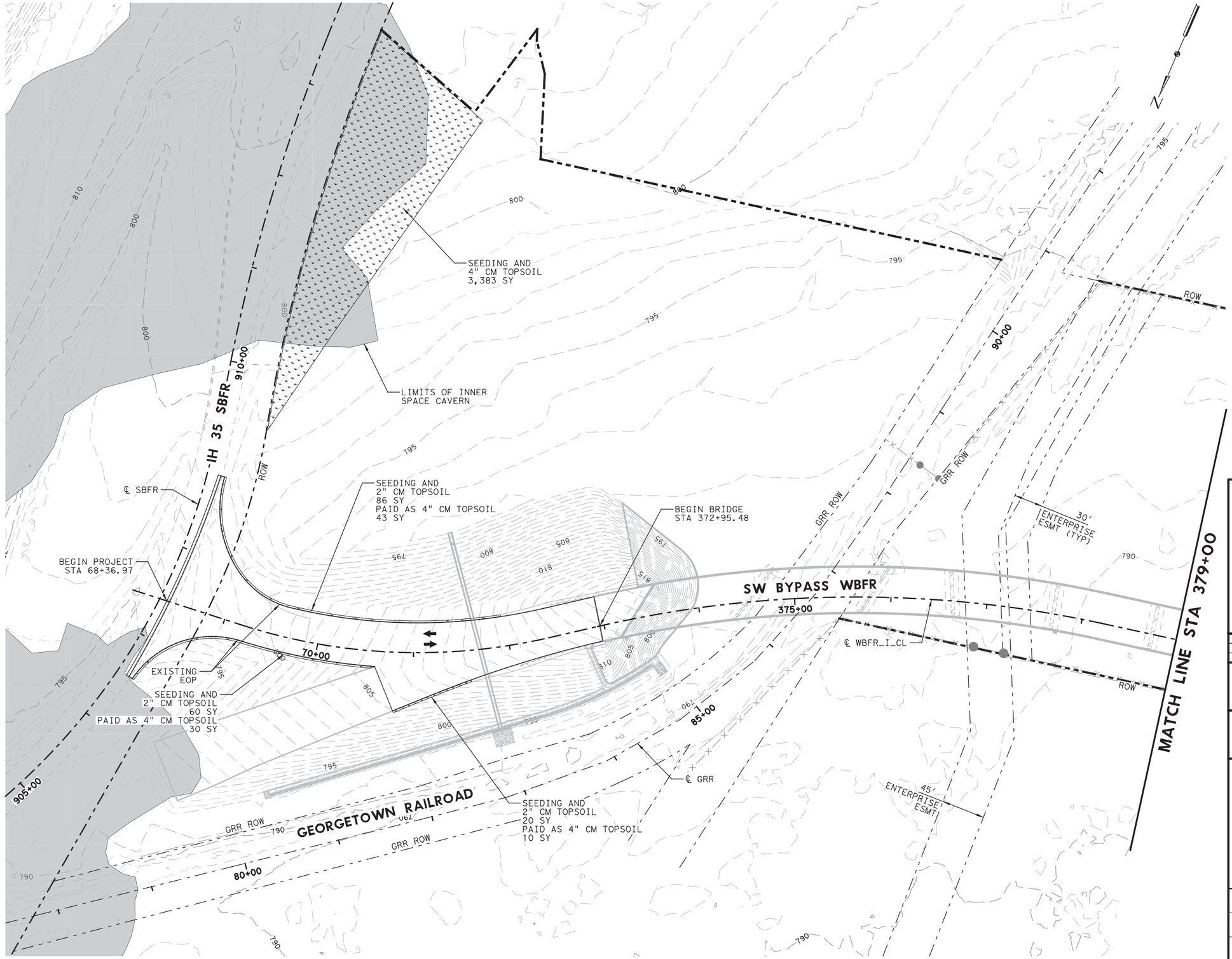
SOUTHWEST BYPASS SEGMENT 2 TEMPORARY EROSION CONTROL PLAN

STA 446+00 TO END

SCALE: 1"=100' SHEET 8 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	256
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020IT07B.tbl
USER: lgomezgon2 DATE: 3/23/2018 TIME: 11:04:07 AM SCALE: 1:100
FILE: \



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
- RIPRAP (STONE PROTECTION)(8IN)TY II

NOTES:

1. DETAILED INFORMATION FOR SENSITIVE FEATURES IS PROVIDED IN THE GEOLOGIC ASSESSMENT SECTION OF THE WPAP.
2. THE MINIMUM VEGETATIVE COVER FOR ALL VEGETATIVE FILTER STRIPS IS 95% PRIOR TO PROJECT ACCEPTANCE.
3. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING BLANKETS, SEEDING, OR TOPSOIL ON SOLID ROCK OR UNDISTURBED AREAS.
4. QUANTITY FOR VEGETATIVE FILTER STRIPS ARE INCLUDED IN SOIL RETENTION BLANKET, SEEDING, AND TOPSOIL QUANTITIES.
5. CONTRACTOR RESPONSIBLE TO VEGETATE ANY ADDITIONAL DISTURBED AREAS NOT CALLED OUT IN PLANS. PROVIDE SEEDING AND TOPSOIL FOR THESE AREAS. SUBSIDIARY TO PERTINENT ITEMS.
6. ALL 8" RIPRAP SHALL HAVE A THICKNESS OF 8" UNLESS OTHERWISE SPECIFIED. SEE GENERAL NOTES FOR GRADATION REQUIREMENTS.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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Round Rock, Texas 78681
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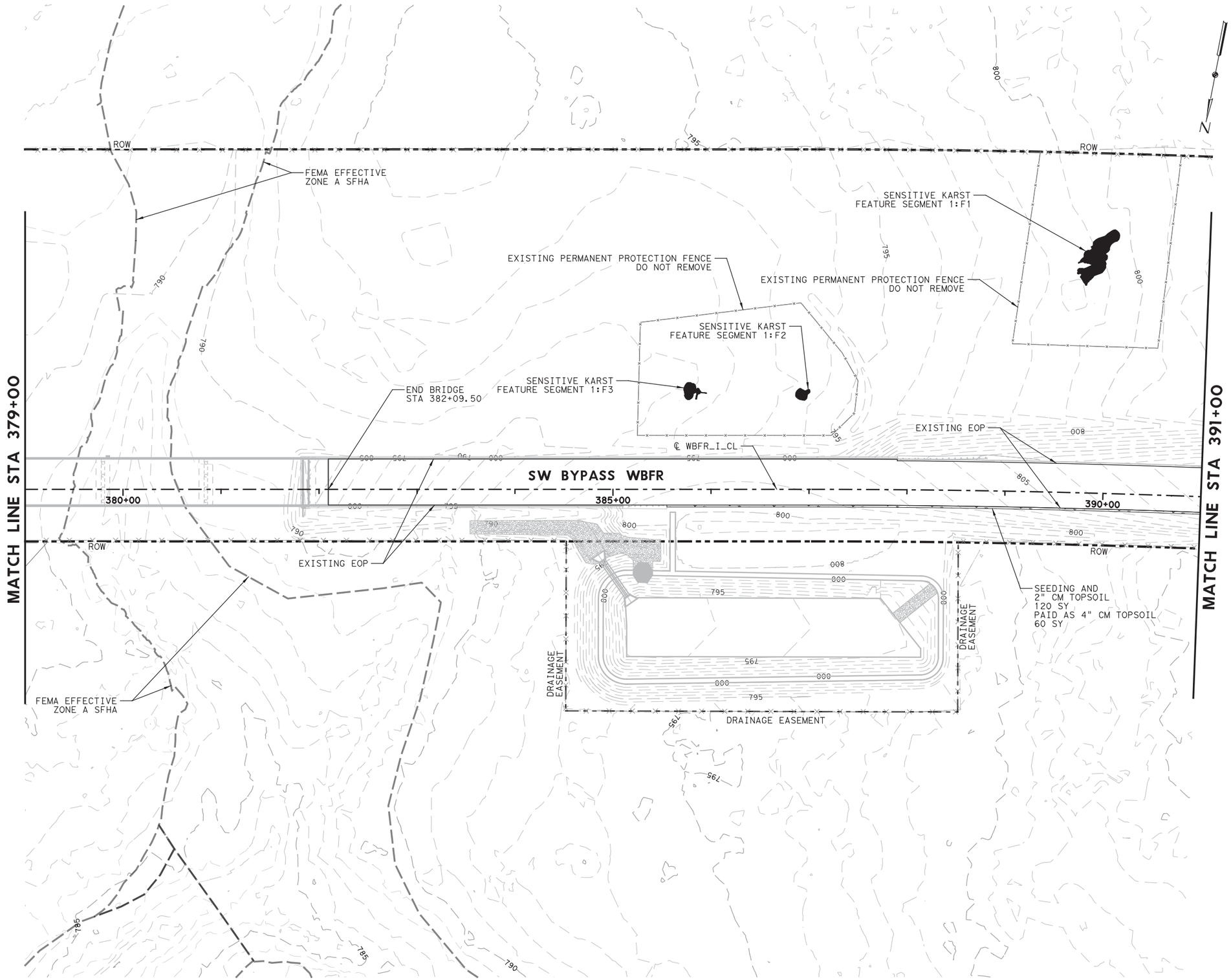
SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

BEGIN PROJECT TO STA 379+00

SCALE: 1"=100' SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	257
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-0000020\T0718.tbl TIME: 11:04:13 AM DATE: 3/23/2018 SCALE: 1:100



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
- RIPRAP (STONE PROTECTION)(8IN)TY II

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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

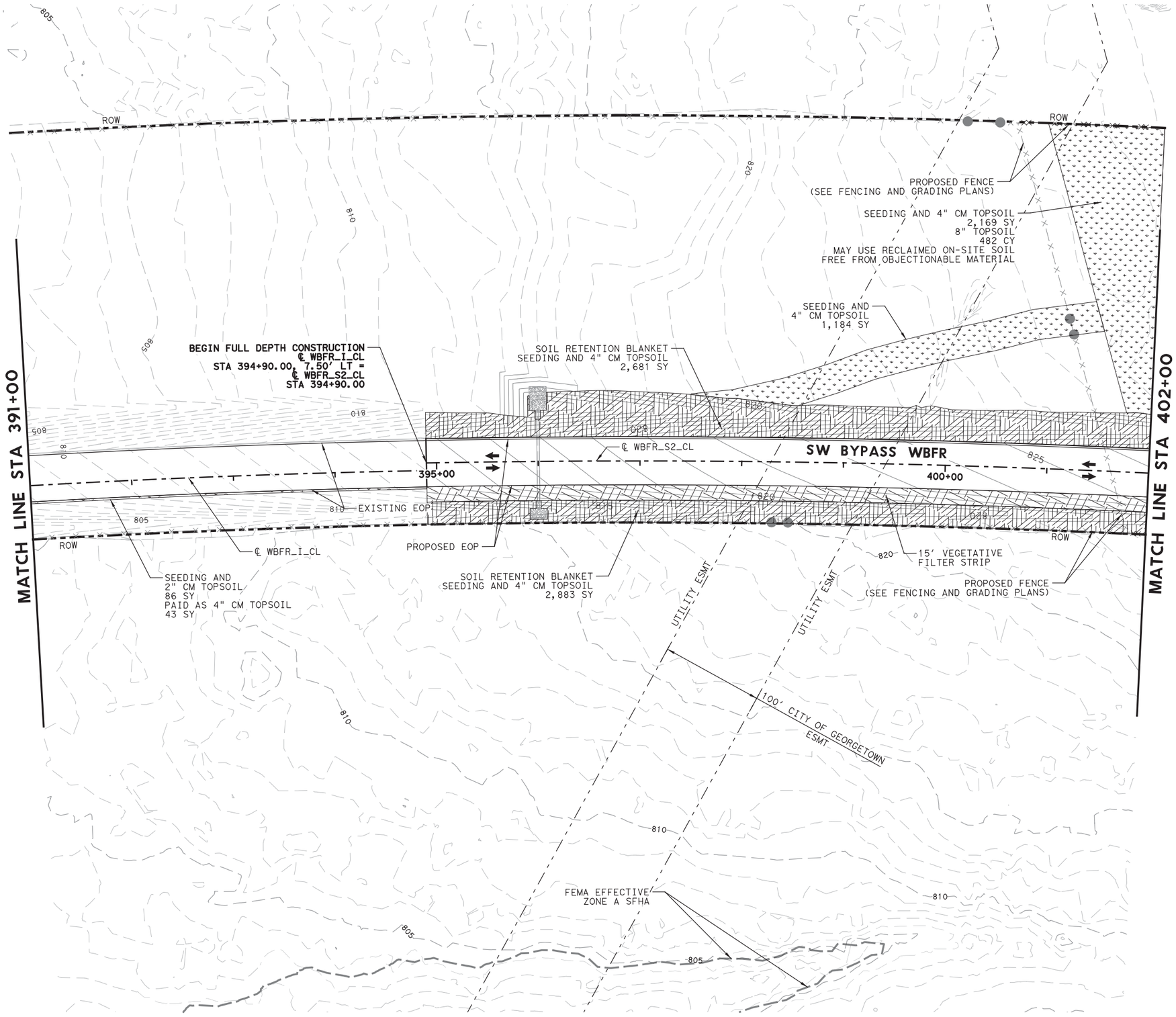
SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

STA 379+00 TO STA 391+00

SCALE: 1"=100' SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	258
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/23/2018 FILE: \
PENTABLE: S2-000002017018.tbl TIME: 11:04:19 AM SCALE: 1:00



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
- RIPRAP (STONE PROTECTION)(8IN)TY II

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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

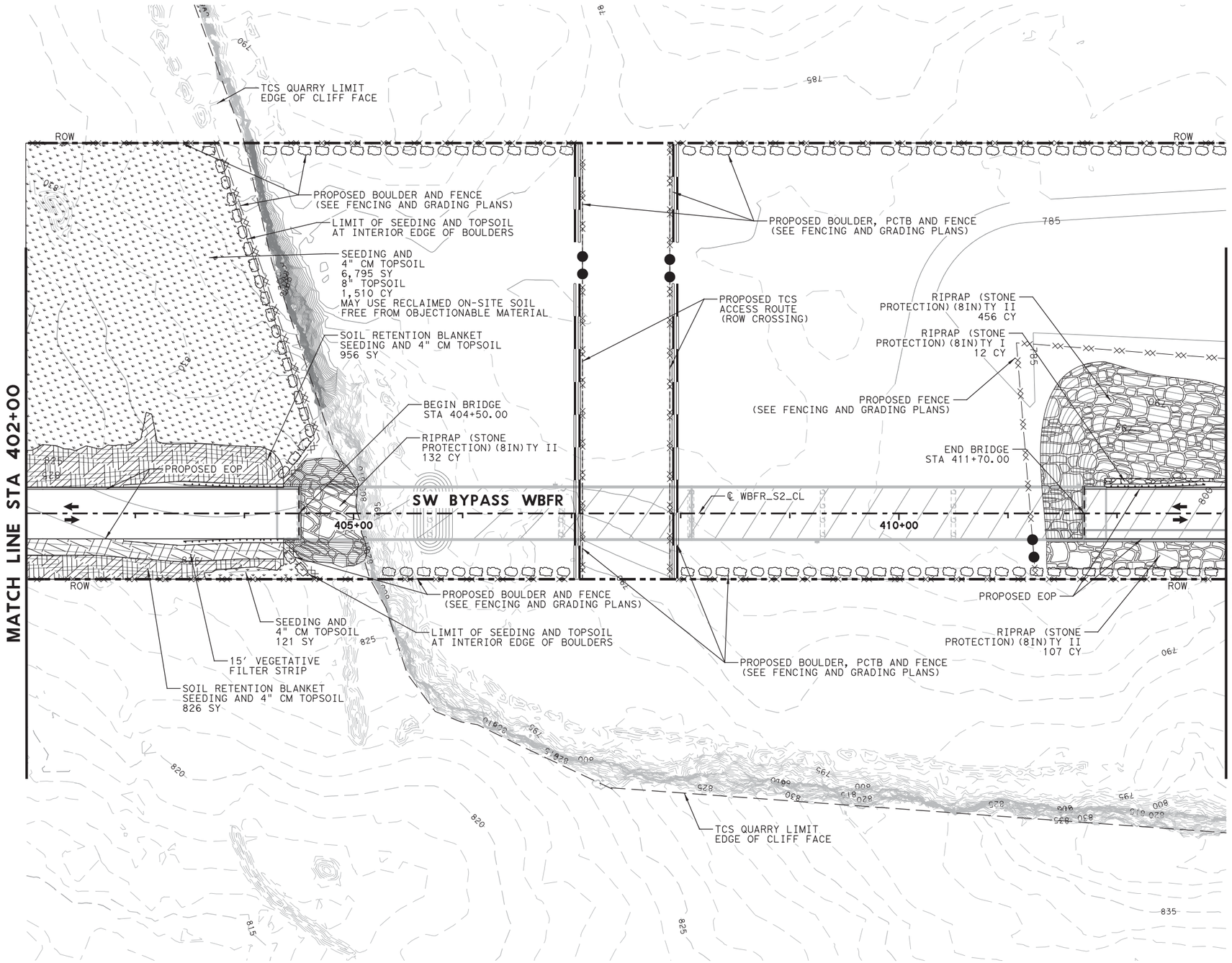
STA 391+00 TO STA 402+00

SCALE: 1"=100' SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	259
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 11:04:25 AM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
- RIPRAP (STONE PROTECTION)(8IN)TY II

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6. ALL 8" RIPRAP SHALL HAVE A THICKNESS OF 8" UNLESS OTHERWISE SPECIFIED. SEE GENERAL NOTES FOR GRADATION REQUIREMENTS.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

STA 402+00 TO STA 413+00

SCALE: 1"=100' SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	260
JW				
CHECK	2103	01	034	
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 11:04:31 AM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

STA 413+00 TO STA 424+00

SCALE: 1"=100' SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	261
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 11:04:38 AM SCALE: 1:00
FILE: \

4/12/2018 7:20 AM



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
- RIPRAP (STONE PROTECTION)(8IN)TY II

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0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
04/10/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

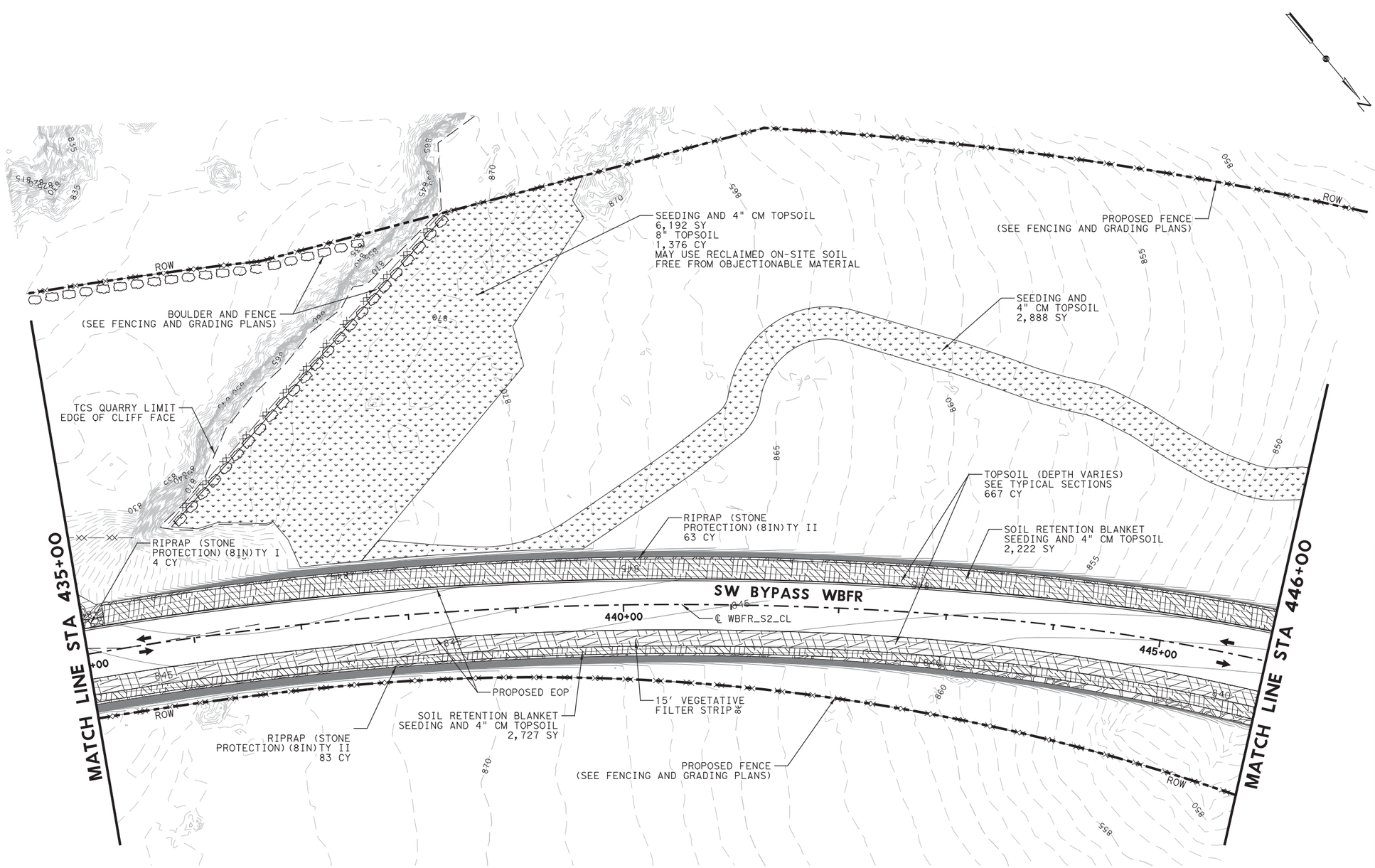
SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

STA 424+00 TO STA 435+00

SCALE: 1"=100' SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	262
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201710718.tbl
USER: lgomezgonz DATE: 4/10/2018 TIME: 9:48:04 AM SCALE: 1:100
FILE: \



LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
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2. THE MINIMUM VEGETATIVE COVER FOR ALL VEGETATIVE FILTER STRIPS IS 95% PRIOR TO PROJECT ACCEPTANCE.
3. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING BLANKETS, SEEDING, OR TOPSOIL ON SOLID ROCK OR UNDISTURBED AREAS.
4. QUANTITY FOR VEGETATIVE FILTER STRIPS ARE INCLUDED IN SOIL RETENTION BLANKET, SEEDING, AND TOPSOIL QUANTITIES.
5. CONTRACTOR RESPONSIBLE TO VEGETATE ANY ADDITIONAL DISTURBED AREAS NOT CALLED OUT IN PLANS. PROVIDE SEEDING AND TOPSOIL FOR THESE AREAS. SUBSIDIARY TO PERTINENT ITEMS.
6. ALL 8" RIPRAP SHALL HAVE A THICKNESS OF 8" UNLESS OTHERWISE SPECIFIED. SEE GENERAL NOTES FOR GRADATION REQUIREMENTS.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

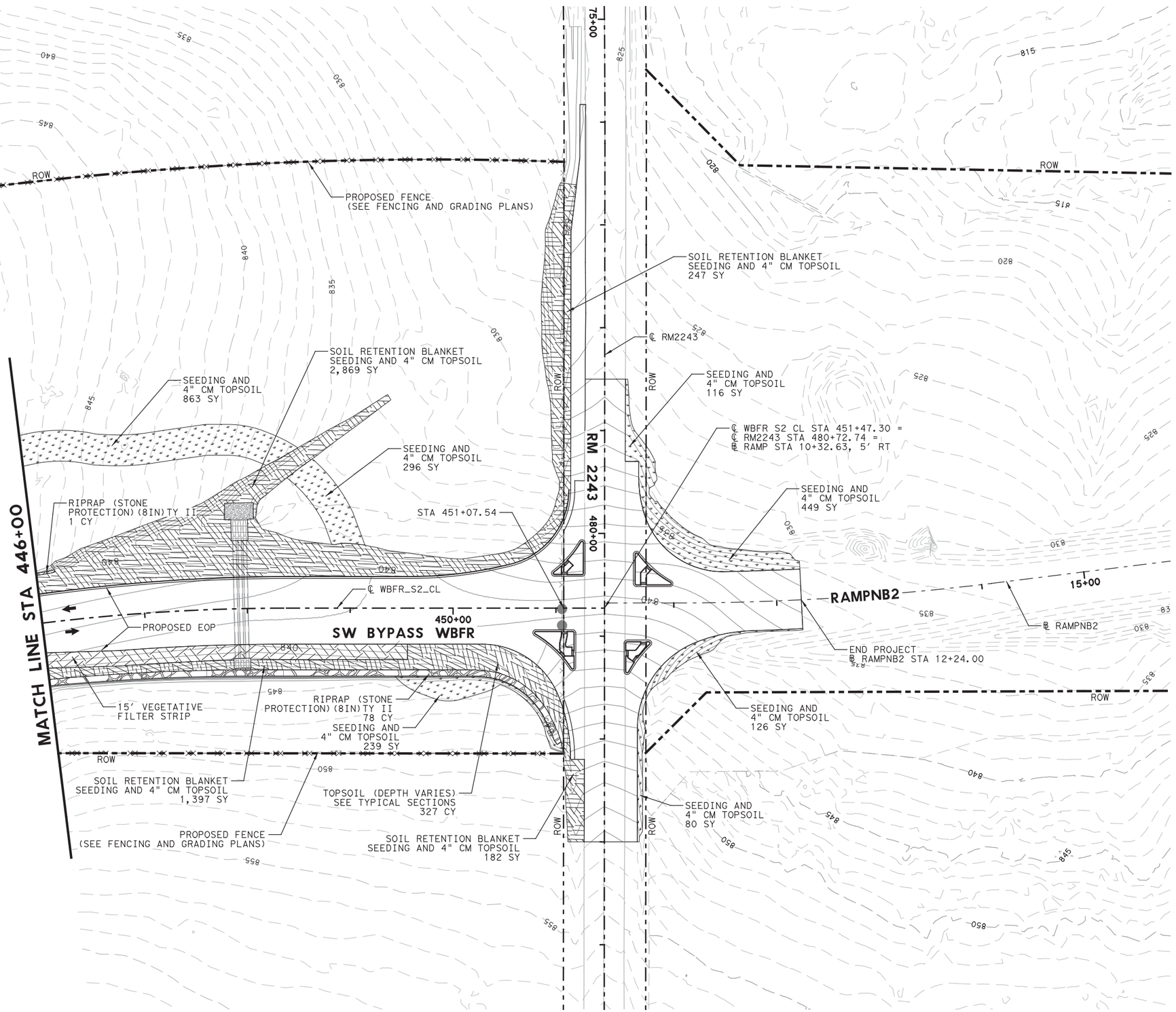
SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

STA 435+00 TO STA 446+00

SCALE: 1"=100' SHEET 7 OF 8

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JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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JW	2103	01	034	
CHECK				
JC				

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LEGEND

- PROPOSED CONSTRUCTION
- VEGETATIVE FILTER STRIP
- SOIL RETENTION BLANKET (CL 1)(TY A) SEEDING AND 4" COMPOST MANUF TOPSOIL
- SEEDING AND 4" COMPOST MANUF TOPSOIL
- RIPRAP (STONE PROTECTION)(8IN)TY I
- RIPRAP (STONE PROTECTION)(8IN)TY II

NOTES:

1. DETAILED INFORMATION FOR SENSITIVE FEATURES IS PROVIDED IN THE GEOLOGIC ASSESSMENT SECTION OF THE WPAP.
2. THE MINIMUM VEGETATIVE COVER FOR ALL VEGETATIVE FILTER STRIPS IS 95% PRIOR TO PROJECT ACCEPTANCE.
3. CONTRACTOR TO NOTIFY INSPECTOR OR ENGINEER PRIOR TO PLACING BLANKETS, SEEDING, OR TOPSOIL ON SOLID ROCK OR UNDISTURBED AREAS.
4. QUANTITY FOR VEGETATIVE FILTER STRIPS ARE INCLUDED IN SOIL RETENTION BLANKET, SEEDING, AND TOPSOIL QUANTITIES.
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6. ALL 8" RIPRAP SHALL HAVE A THICKNESS OF 8" UNLESS OTHERWISE SPECIFIED. SEE GENERAL NOTES FOR GRADATION REQUIREMENTS.

0 50 100 150 200
SCALE IN FEET

STATE OF TEXAS
JUSTIN D. CARLTON
127593
LICENSED
PROFESSIONAL ENGINEER
03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2 PERMANENT EROSION CONTROL PLAN

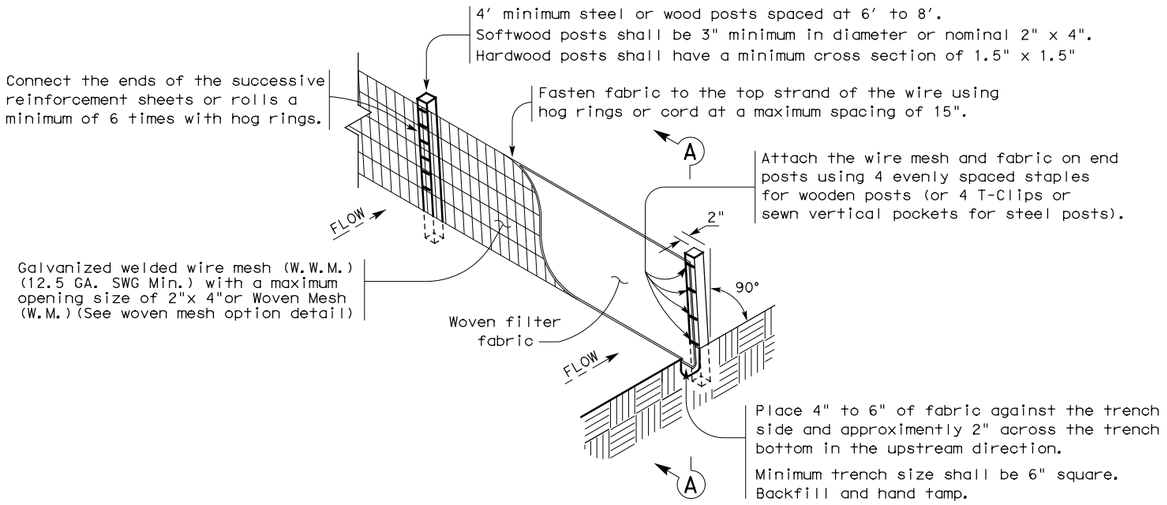
STA 446+00 TO END

SCALE: 1"=100' SHEET 8 OF 8

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CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

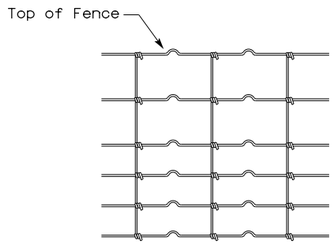
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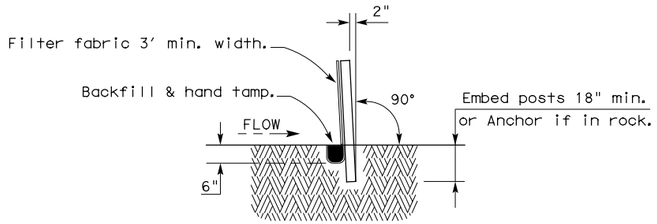
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TEMPORARY SEDIMENT CONTROL FENCE

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.

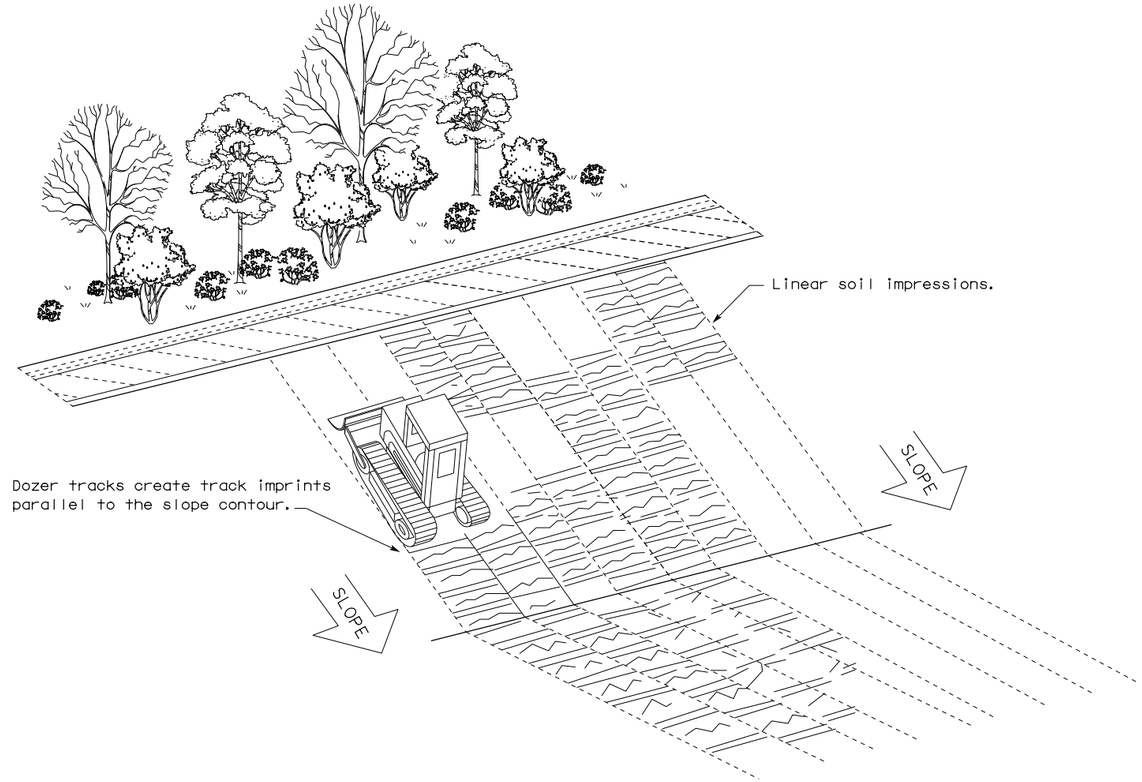
LEGEND

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

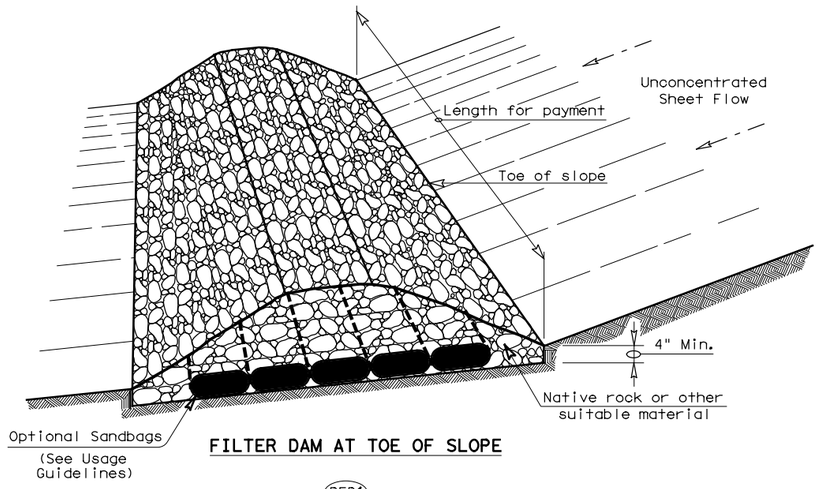
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

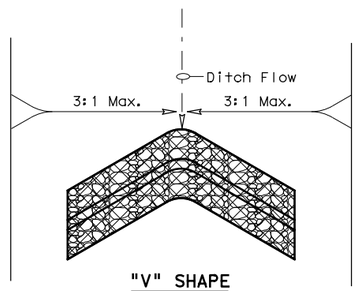
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© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	2103	01	034	
	DIST	COUNTY		SHEET NO.
	AUS	WILLIAMSON		265

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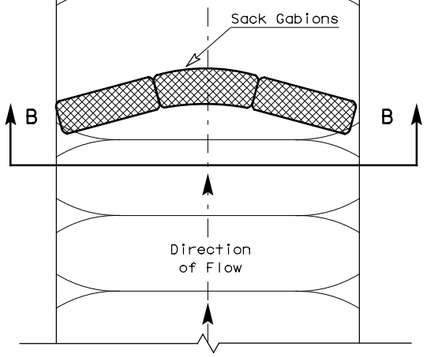


FILTER DAM AT TOE OF SLOPE

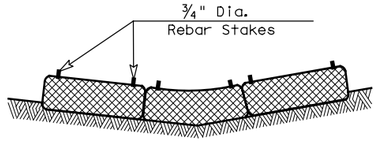
RFD1



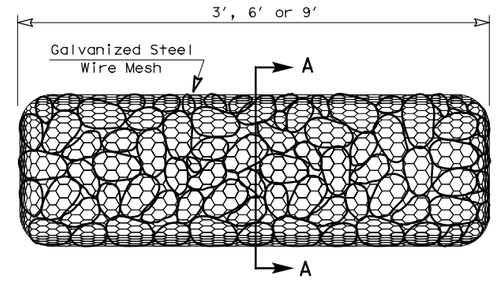
"V" SHAPE
PLAN VIEW



PLAN VIEW

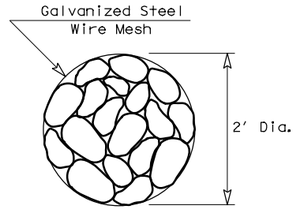


SECTION B-B

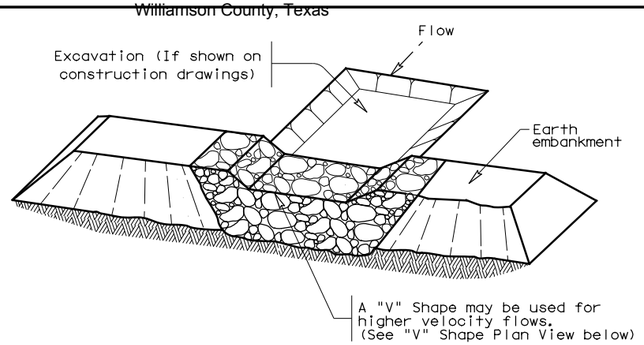


TYPE 4 (SACK GABIONS)

RFD4

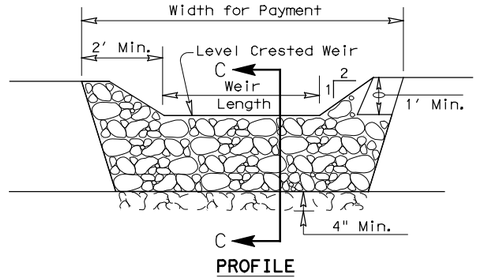


SECTION A-A

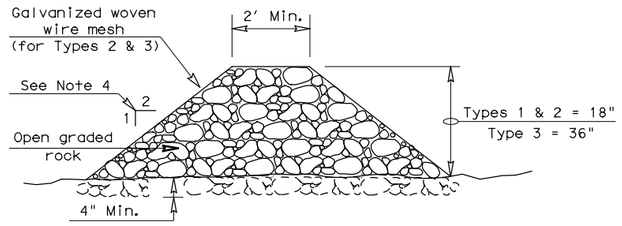


FILTER DAM AT SEDIMENT TRAP

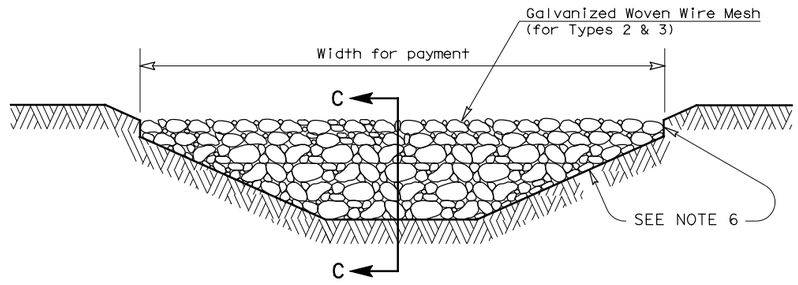
RFD1 — OR — RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 — OR — RFD2 — OR — RFD3

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

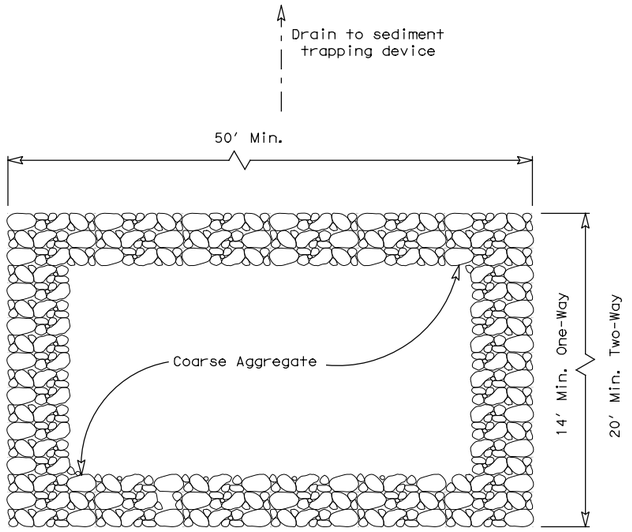
ROCK FILTER DAMS

EC(2)-16

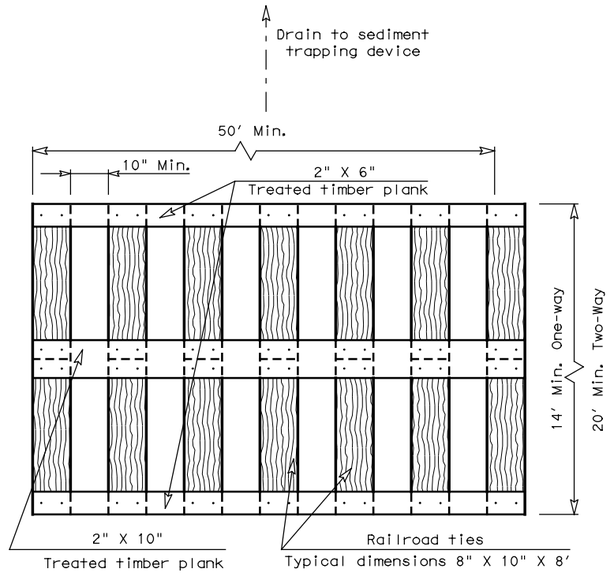
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REVISIONS	2103	01	034	
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	AUS	WILLIAMSON		266

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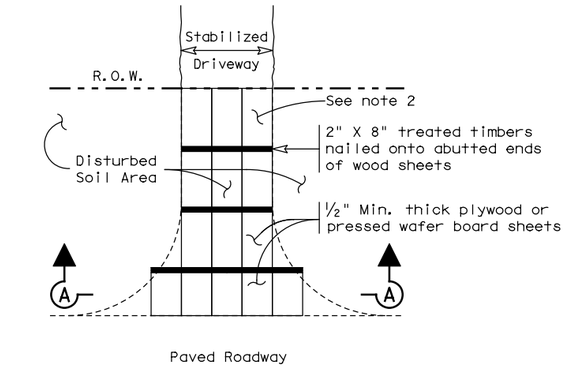
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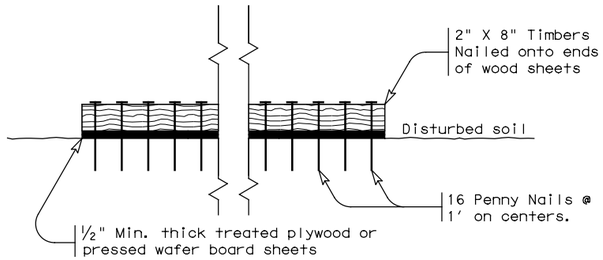
PLAN VIEW



PLAN VIEW



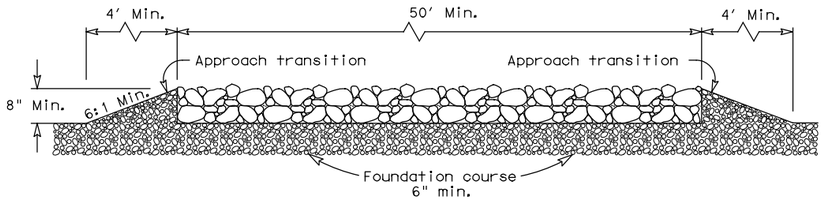
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



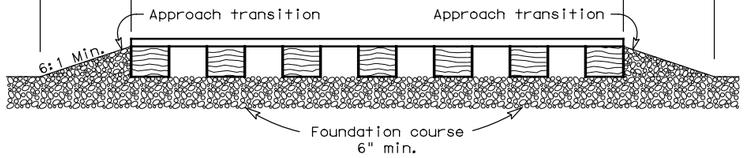
ELEVATION VIEW

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.

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

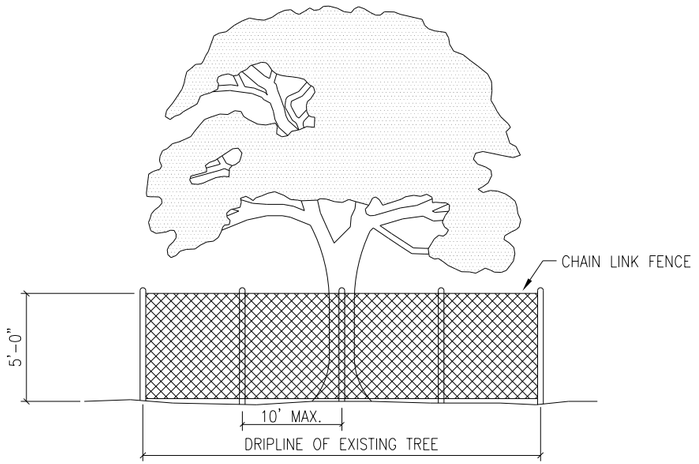
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

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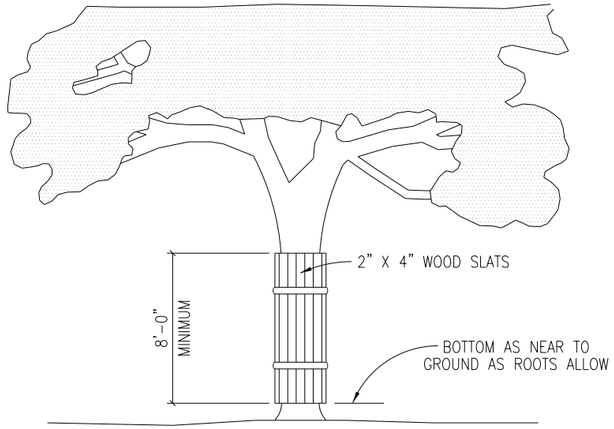


NOTES:

1. TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR GRADING).
2. FENCES SHALL COMPLETELY SURROUND THE TREE, OR CLUSTERS OF TREES; WILL BE LOCATED AT THE OUTERMOST LIMIT OF THE TREE BRANCHES (DRIPLINE), AND WILL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT IN ORDER TO PREVENT THE FOLLOWING:
   A. SOIL COMPACTION IN THE ROOT ZONE AREA RESULTING FROM VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MATERIALS.
   B. ROOT ZONE DISTURBANCES DUE TO GRADE CHANGES (GREATER THAN SIX INCHES (6") CUT OR FILL, OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE CITY.
   C. WOUNDS TO EXPOSED ROOTS, TRUNKS OR LIMBS BY MECHANICAL EQUIPMENT.
   D. OTHER ACTIVITIES DETRIMENTAL TO TREES, SUCH AS CHEMICAL STORAGE, CEMENT TRUCK CLEANING AND FIRE.
3. EXCEPTIONS TO INSTALLING FENCES AT TREE DRIPLINES MAY BE PERMITTED IN THE FOLLOWING CASES:
   A. WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA.
   B. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN SIX FEET (6'-0") TO BUILDING.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006	
Georgetown Utility Systems	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS TREE PROTECTION – CHAIN LINK FENCE
	DRAWING NAME: EC09
	SCALE: NTS; DATE: 1/2003; DRAWN BY: MRS; APPROVED BY: TRB



NOTES:

1. WHERE ANY EXCEPTIONS RESULT IN A FENCE BEING CLOSER THAN FOUR FEET (4'-0") TO A TREE TRUNK; PROTECT THE TRUNK WITH STRAPPED-ON-PLANKING TO A HEIGHT OF EIGHT FEET (8'-0"), OR TO THE LIMITS OF LOWER BRANCHING IN ADDITION TO THE REDUCED FENCING PROVIDED.
2. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN TWO (2) DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE, AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
3. PRIOR EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINE. MAKE A CLEAN CUT BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH A ROCK SAW OR SIMILAR EQUIPMENT, TO MINIMIZE DAMAGE TO REMAINING ROOTS.
4. TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES SHOULD BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS SHOULD BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.
5. ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE.
6. NO LANDSCAPE TOPSOIL DRESSING GREATER THE FOUR INCHES (4") SHALL BE PERMITTED WITHIN THE DRIPLINE OF A TREE. NO SOIL IS PERMITTED ON THE ROOT FLARE OF ANY TREE.
7. PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC AND EQUIPMENT SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS.

The Architect/Engineer assumes responsibility for appropriate use of this standard.

REVISION NOTE: ADOPTED 6/21/2006	
Georgetown Utility Systems	CITY OF GEORGETOWN CONSTRUCTION STANDARDS AND DETAILS TREE PROTECTION – WOOD SLATS
	DRAWING NAME: EC10
	SCALE: NTS; DATE: 1/2003; DRAWN BY: MRS; APPROVED BY: TRB

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

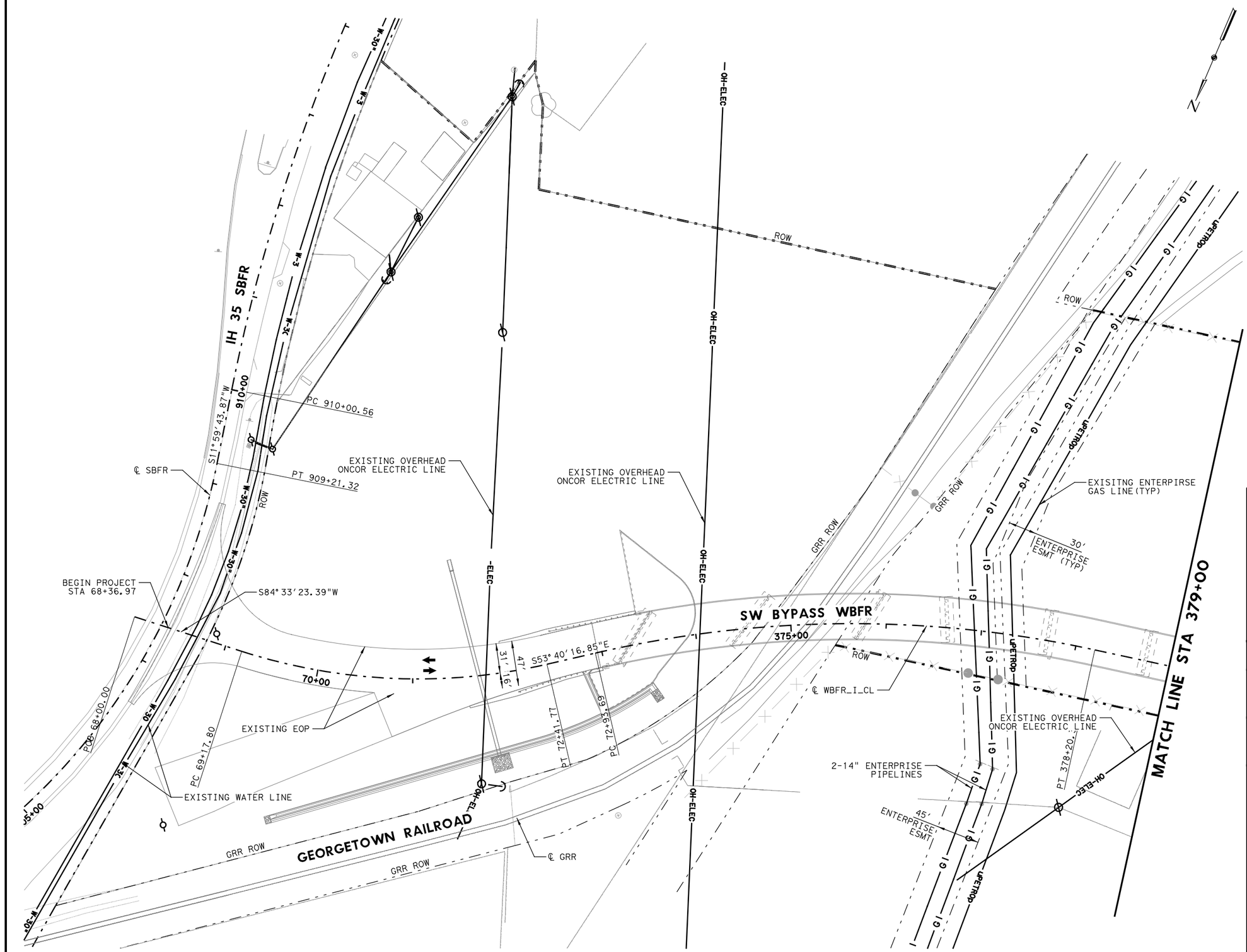
SOUTHWEST BYPASS SEGMENT 2

TREE PROTECTION STANDARD

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	268
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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DATE: 3/23/2018
FILE: \



LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- I G — ENTERPRISED PIPELINE
- UPETROp — PROPOSED PIPELINE

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY, TEXAS

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

UTILITY LAYOUT BEGIN TO 379+00

SCALE: 1"=100' SHEET 1 OF 8

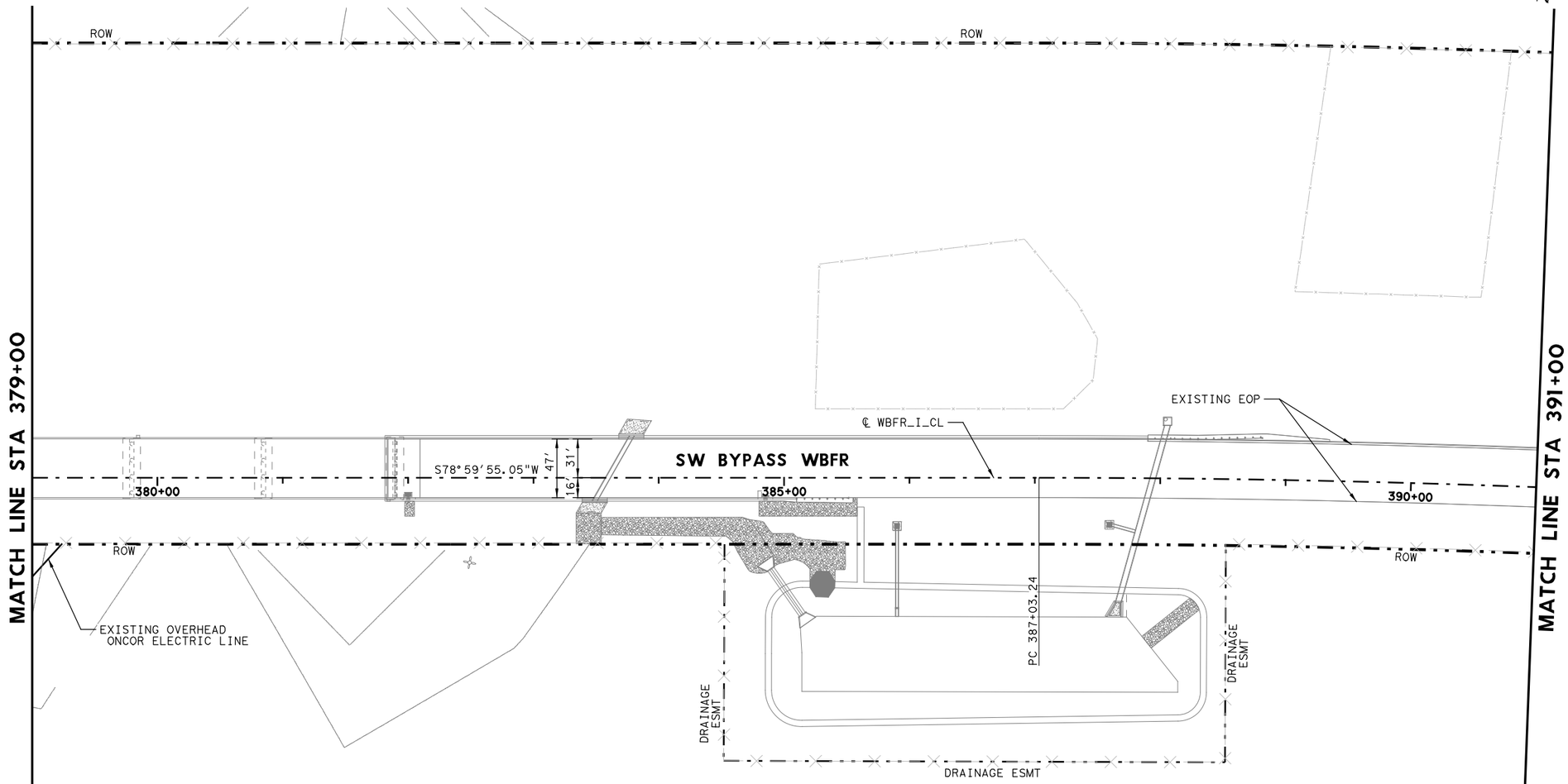
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JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	269
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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FILE: \

4/12/2018 7:20 AM

LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- IG — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE



0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
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Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

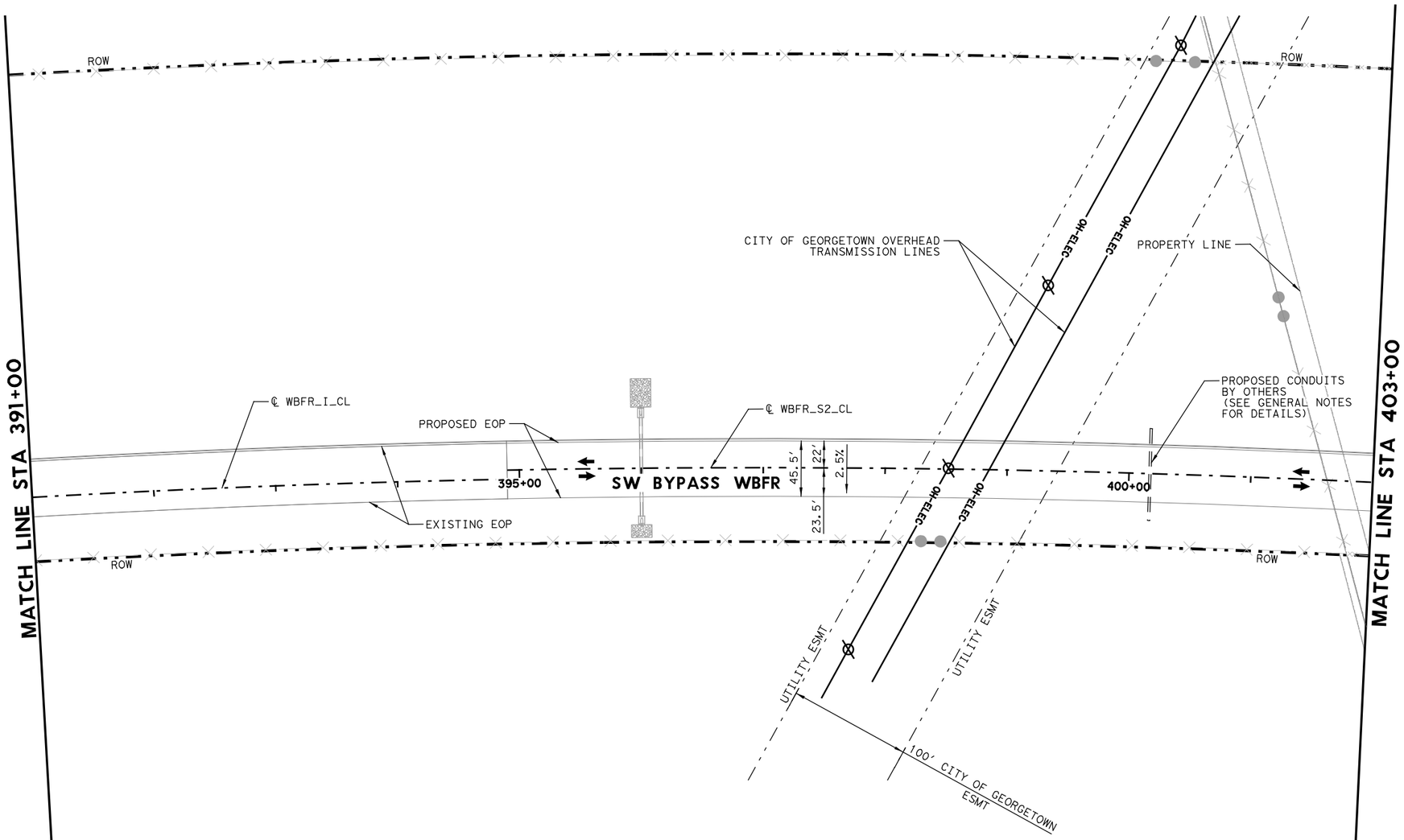
UTILITY LAYOUT STA 379+00 TO STA 391+00

SCALE: 1"=100' SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	270
CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

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4/12/2018 7:20 AM



LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- I G — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE

N

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

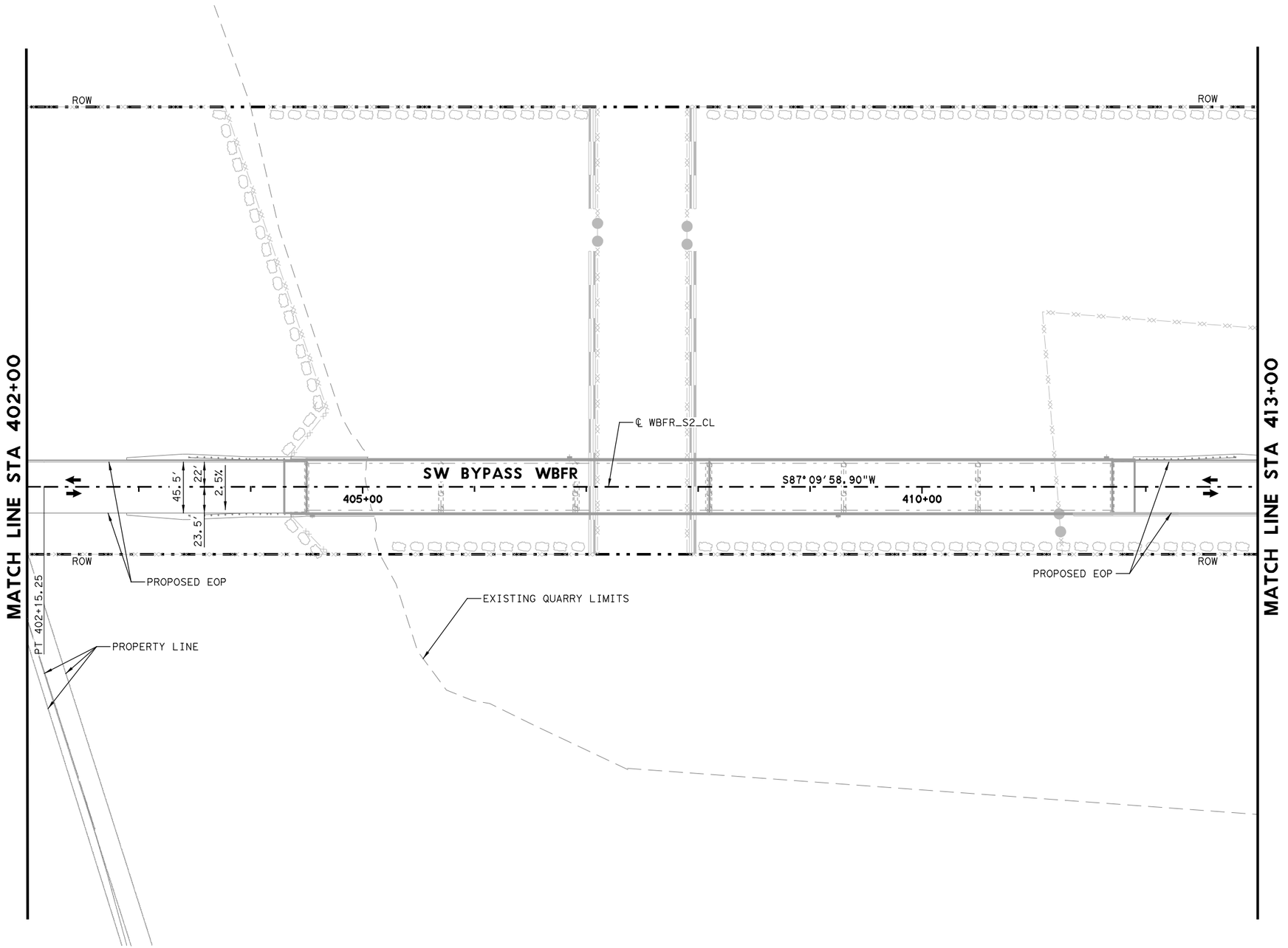
UTILITY LAYOUT STA 391+00 TO STA 403+00

SCALE: 1"=100' SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	271
JW	2103	01	034	
CHECK				
JC				

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
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4/12/2018 7:20 AM



LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- IG — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE

N

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

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WILLIAMSON COUNTY

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

UTILITY LAYOUT STA 402+00 TO STA 413+00

SCALE: 1"=100' SHEET 4 OF 8

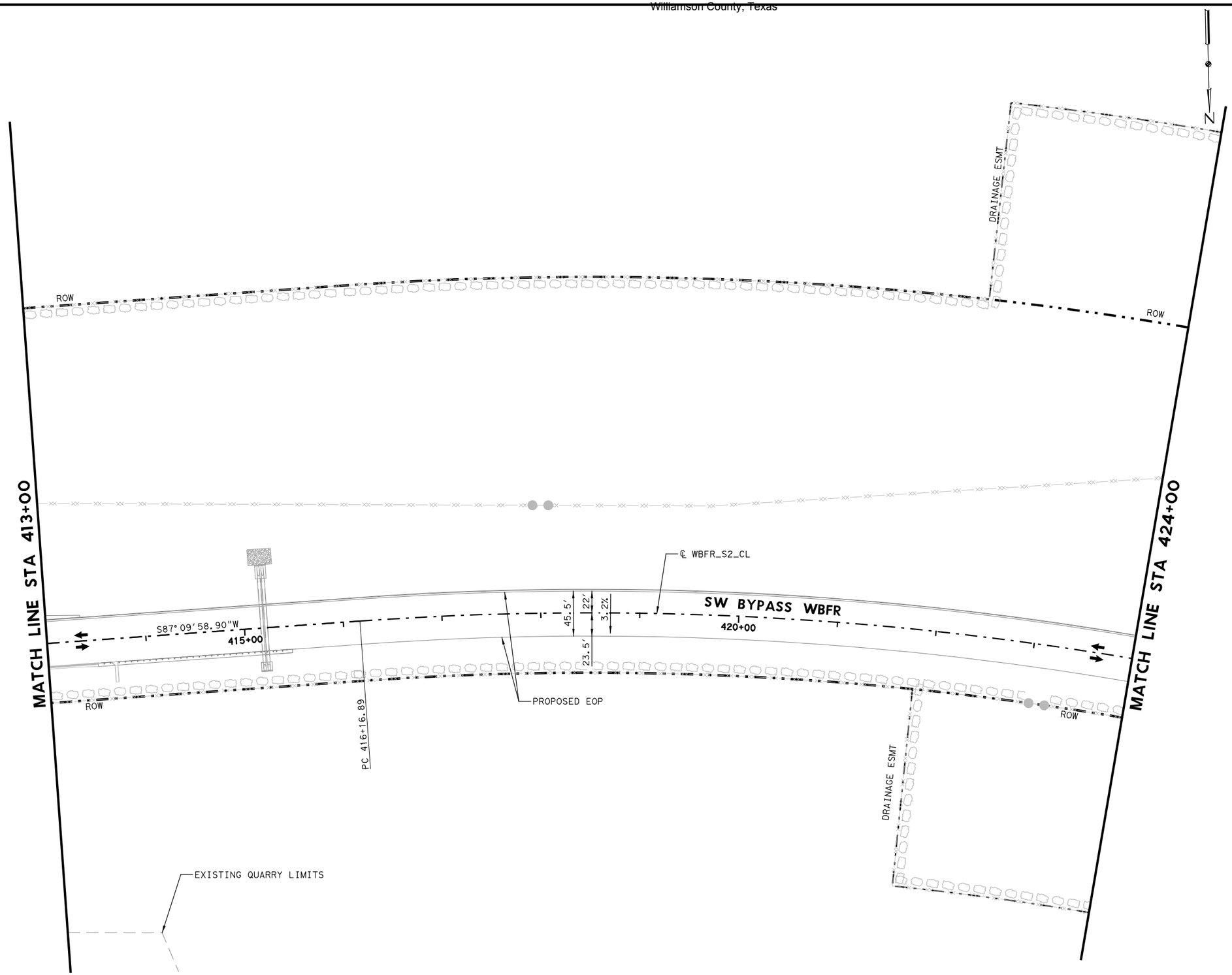
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	272
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

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FILE: \

4/12/2018 7:20 AM

LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- IG — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE



0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
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03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
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Texas Registered Engineering Firm F-754

SOUTHWEST BYPASS SEGMENT 2

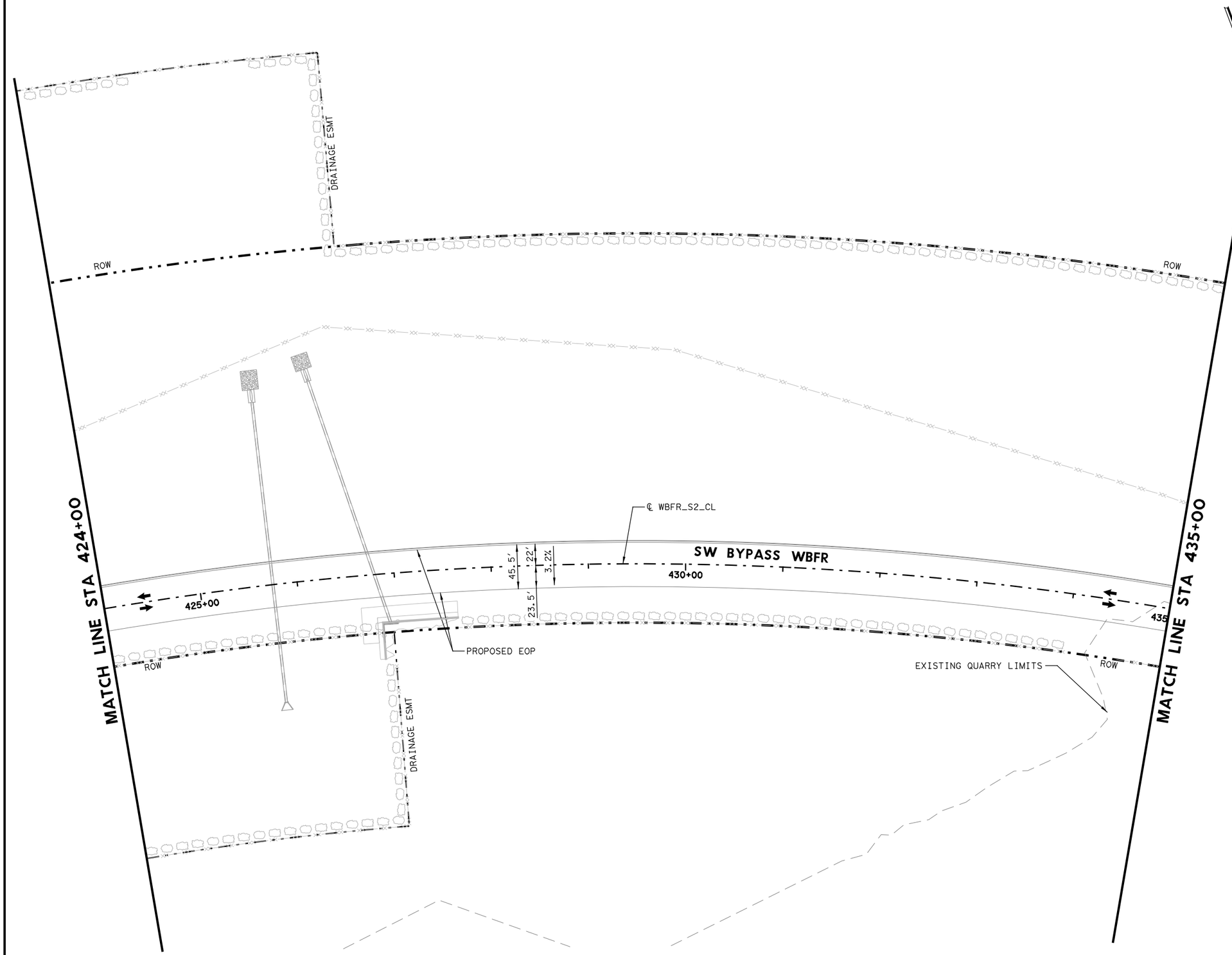
UTILITY LAYOUT STA 413+00 TO STA 424+00

SCALE: 1"=100' SHEET 5 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	273
JW	2103	01	034	
CHECK				
JC				

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FILE: \ DATE: 3/23/2018

4/12/2018 7:20 AM



LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- I G — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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SOUTHWEST BYPASS SEGMENT 2

UTILITY LAYOUT STA 424+00 TO STA 435+00

SCALE: 1"=100' SHEET 6 OF 8

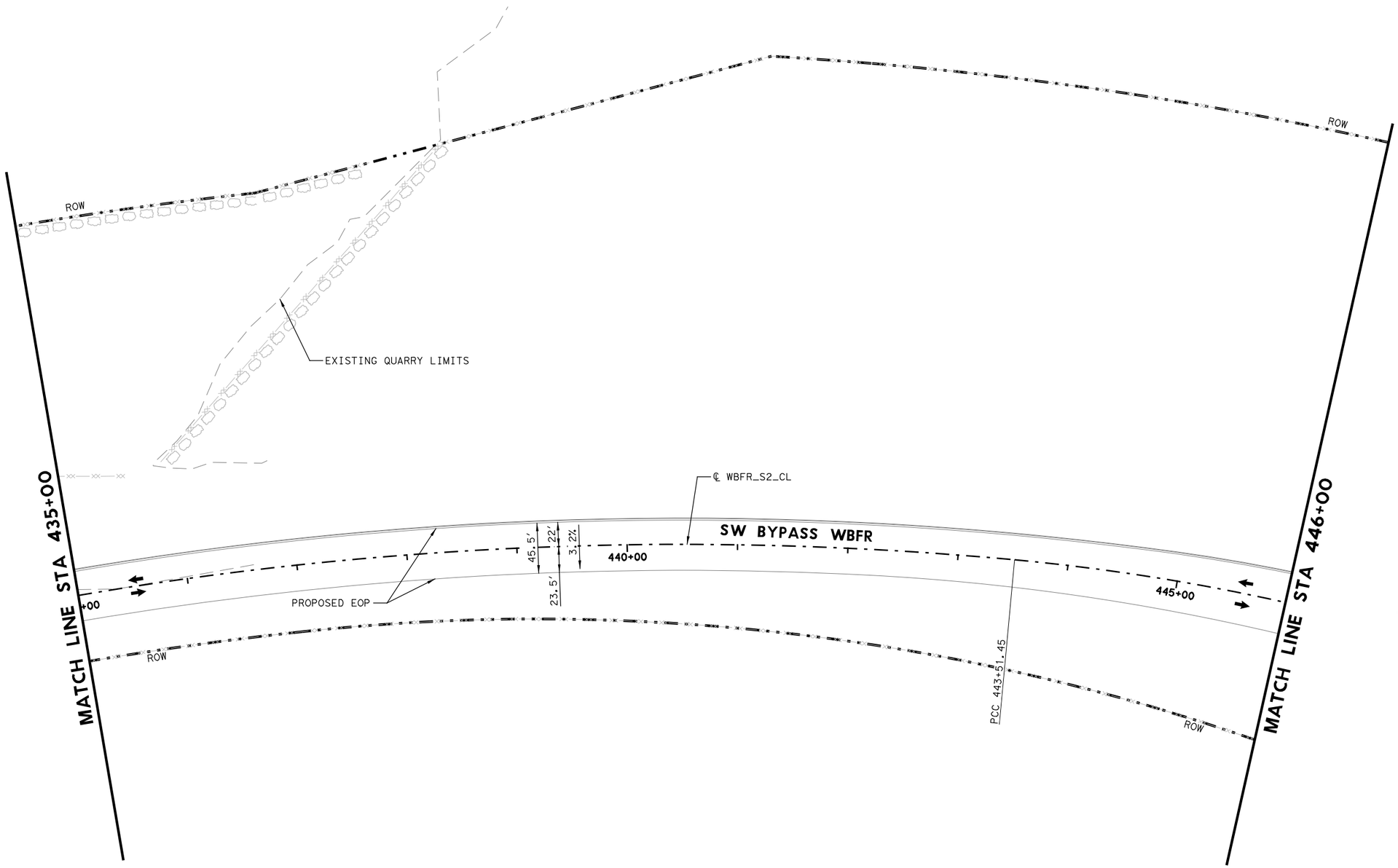
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
LG	TEXAS	AUS	WILLIAMSON	
CHECK	CONTROL	SECTION	JOB	274
JW	2103	01	034	
CHECK				
JC				

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4/12/2018 7:20 AM

LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- I G — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE



0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

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WILLIAMSON COUNTY

HDR Engineering, Inc.
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SOUTHWEST BYPASS SEGMENT 2

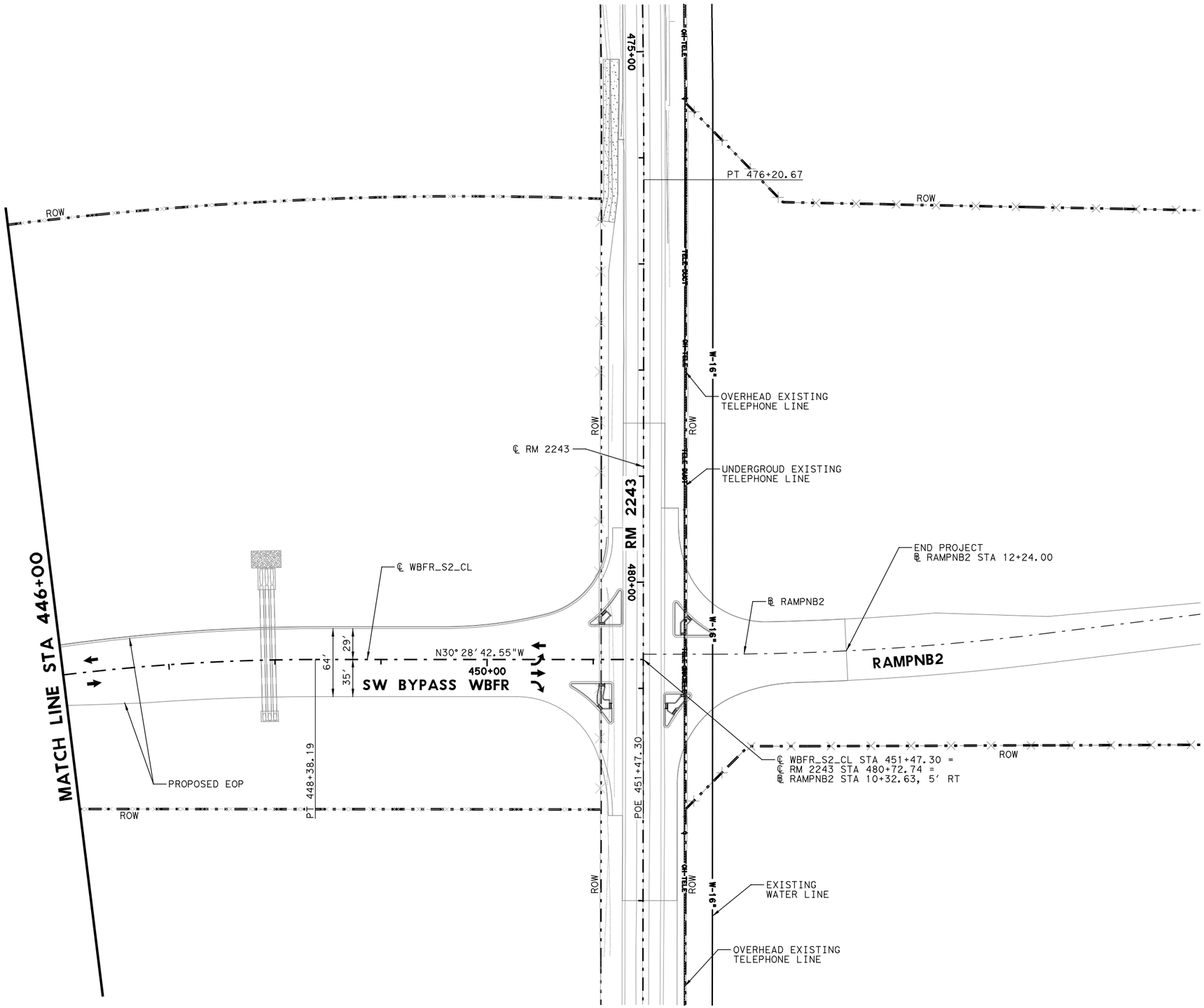
UTILITY LAYOUT STA 435+00 TO STA 446+00

SCALE: 1"=100' SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JW	TEXAS	AUS	WILLIAMSON	275
CHECK JC	CONTROL 2103	SECTION 01	JOB 034	

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/23/2018 TIME: 1:54:19 PM SCALE: 1:100
FILE: \

4/12/2018 7:20 AM



LEGEND

- W-30" — EXISTING 30" WATER LINE
- W-16" — EXISTING 16" WATER LINE
- E — EXISTING OVERHEAD ELECTRIC LINE
- UG-TELE — EXISTING UNDERGROUND TELEPHONE LINE
- OH-TELE — EXISTING OVERHEAD TELEPHONE LINE
- IG — ENTERPRISED PIPELINE
- uPETROp — PROPOSED PIPELINE

0 50 100 150 200

SCALE IN FEET

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/23/2018

NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

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SOUTHWEST BYPASS SEGMENT 2

UTILITY LAYOUT STA 446+00 TO END

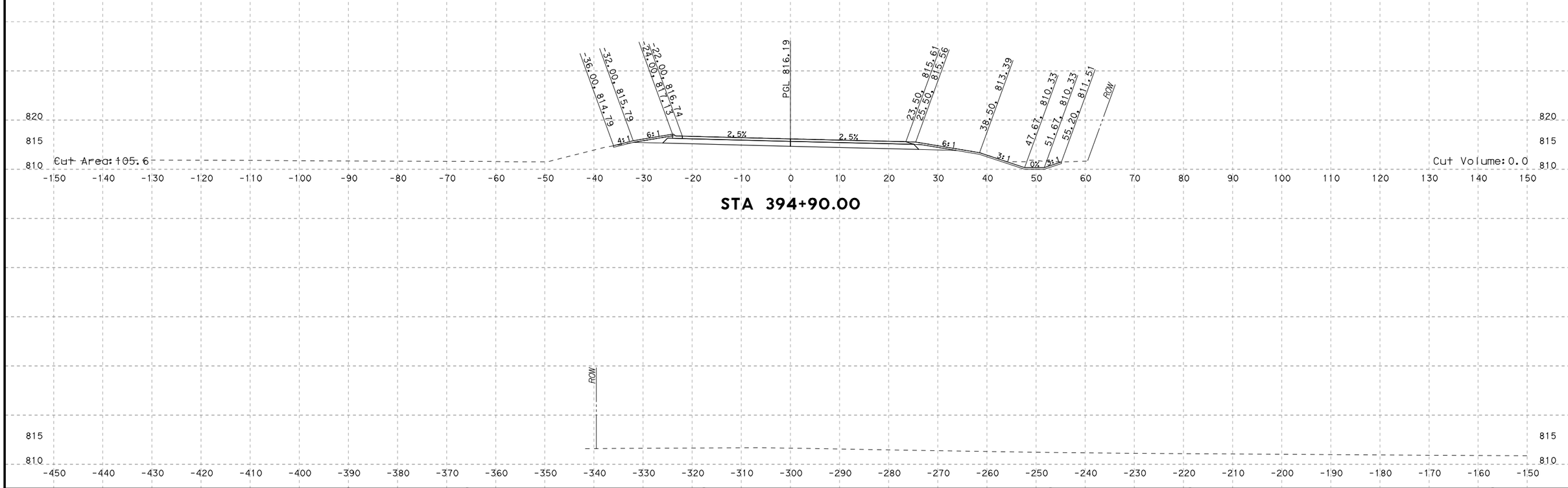
SCALE: 1"=100' SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JC	6			
GRAPHICS LG	STATE	DISTRICT	COUNTY	SHEET NO.
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CHECK JC	CONTROL	SECTION	JOB	
	2103	01	034	

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FILE: \

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 394+90.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020/T0718.tbl
DATE: 3/26/2018
TIME: 11:19:4 AM
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NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

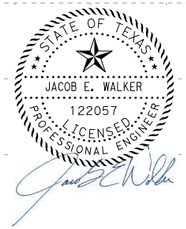
HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 394+90.00

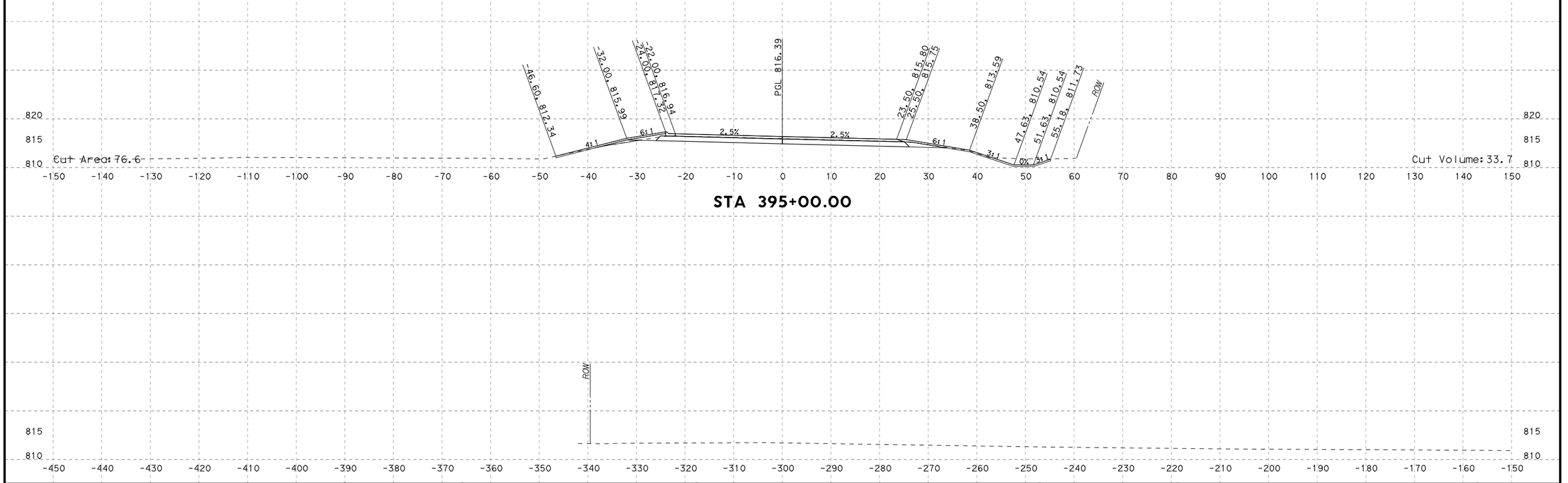
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-01



03/26/2018



STA 395+00.00

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DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

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Texas Registered Engineering Firm F-754

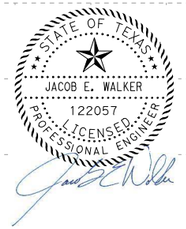
STA 395+00.00

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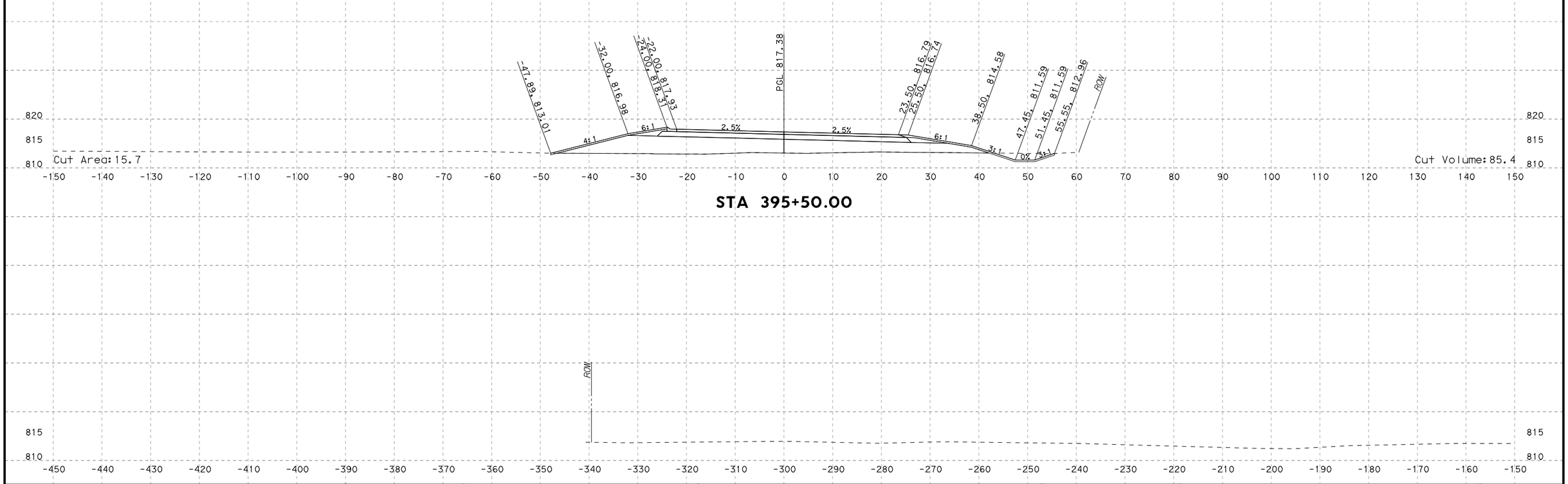
SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-02

4/12/2018 7:20 AM



03/26/2018



STA 395+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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FILE: \
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TIME: 11:19:21 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

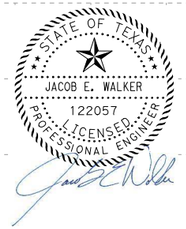
HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 395+50.00

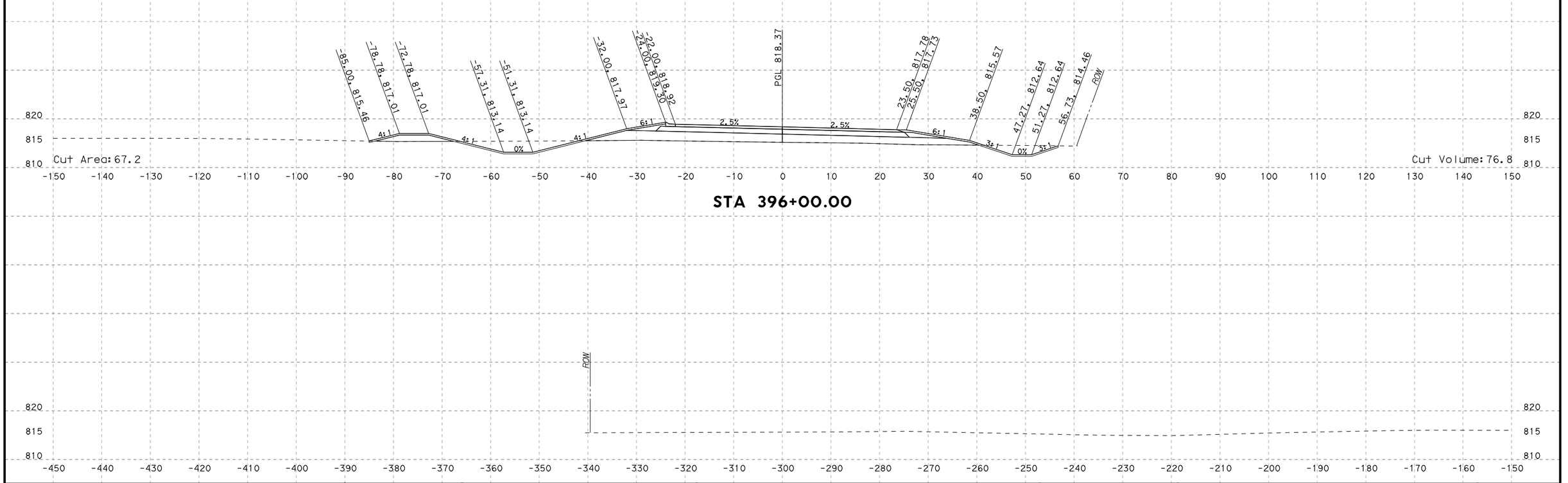
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-03



03/26/2018



NO.	DATE	REVISION	APPROVED

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Texas Registered Engineering Firm F-754

STA 396+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

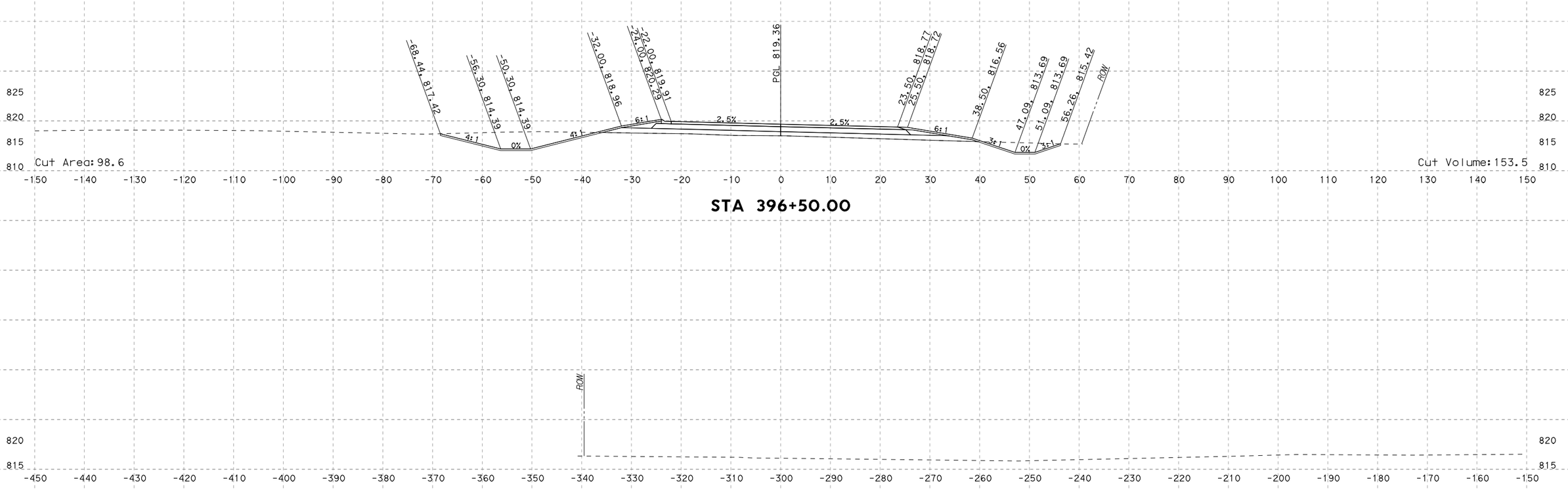
SHEET NO.
XS-04

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DATE: 3/26/2018
TIME: 11:9:24 AM
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 396+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/26/2018
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 11:19:27 AM
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 396+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

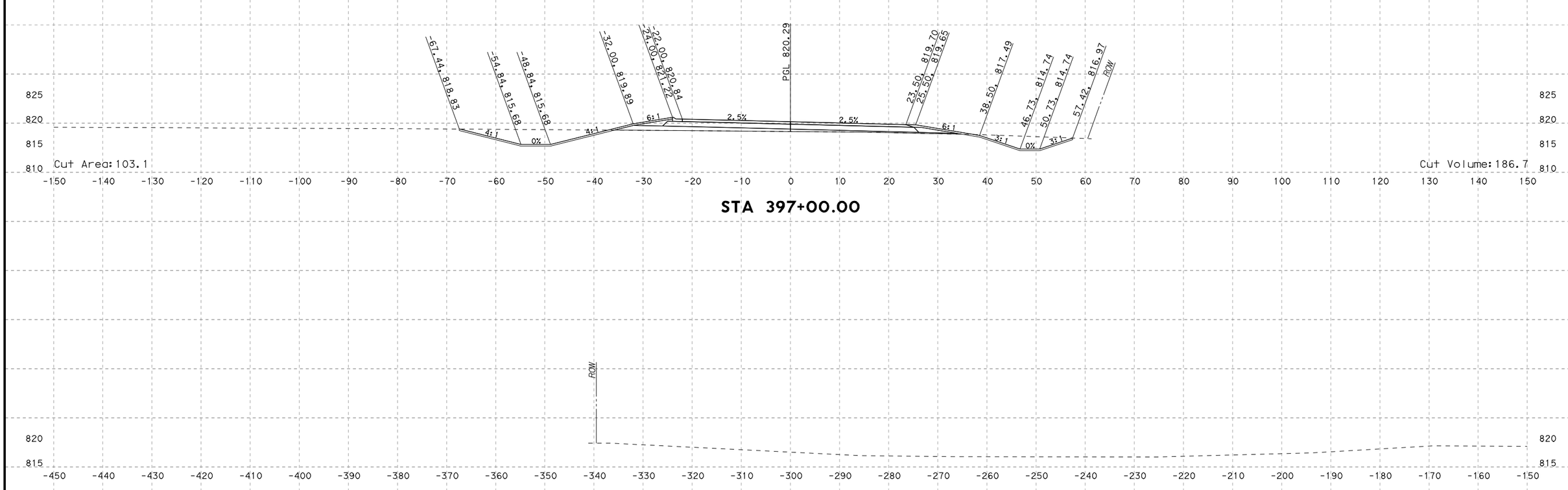
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-05

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 397+00.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 397+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

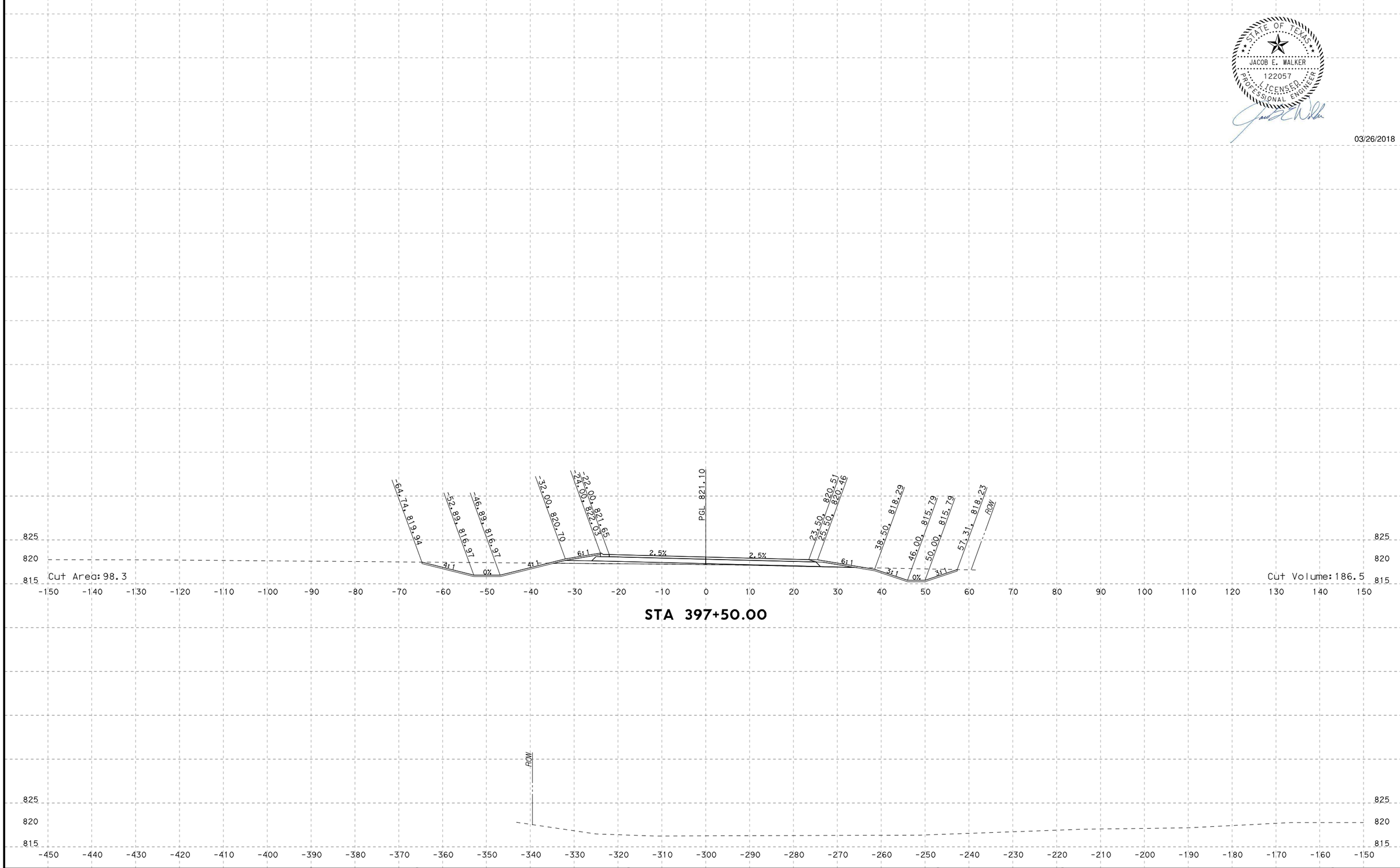
SHEET NO.
XS-06

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:09:30 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 397+50.00

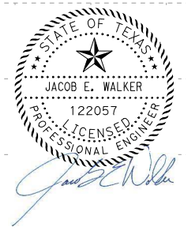
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

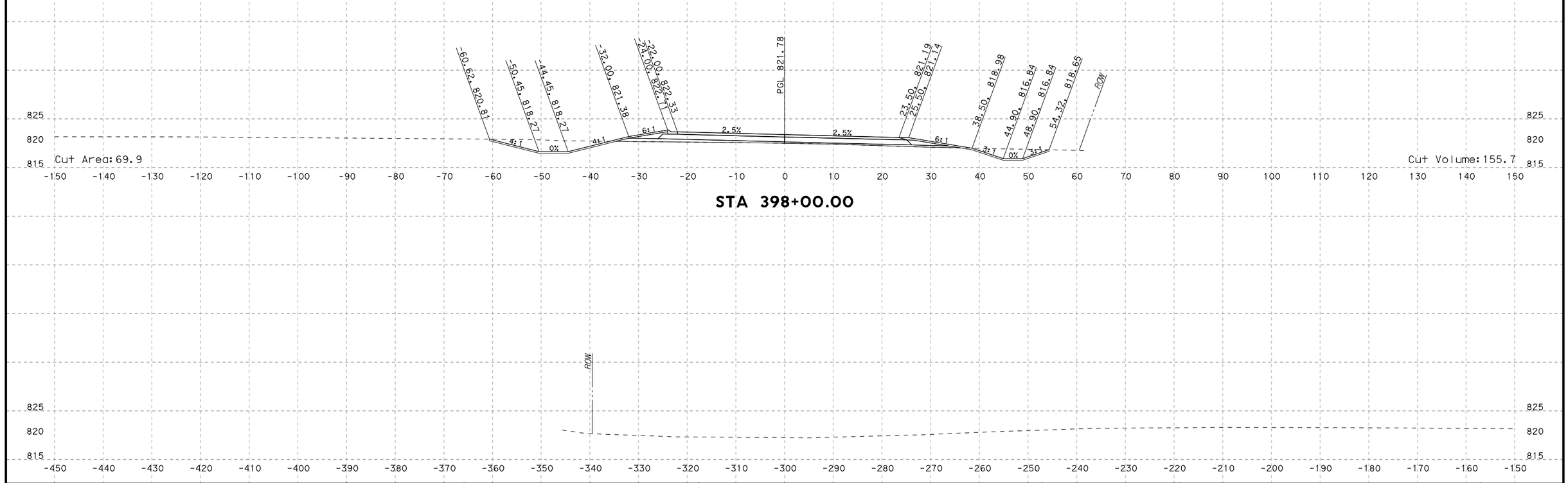
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XS-07

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SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 398+00.00

SCALE: HORIZ: 1"=20'
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

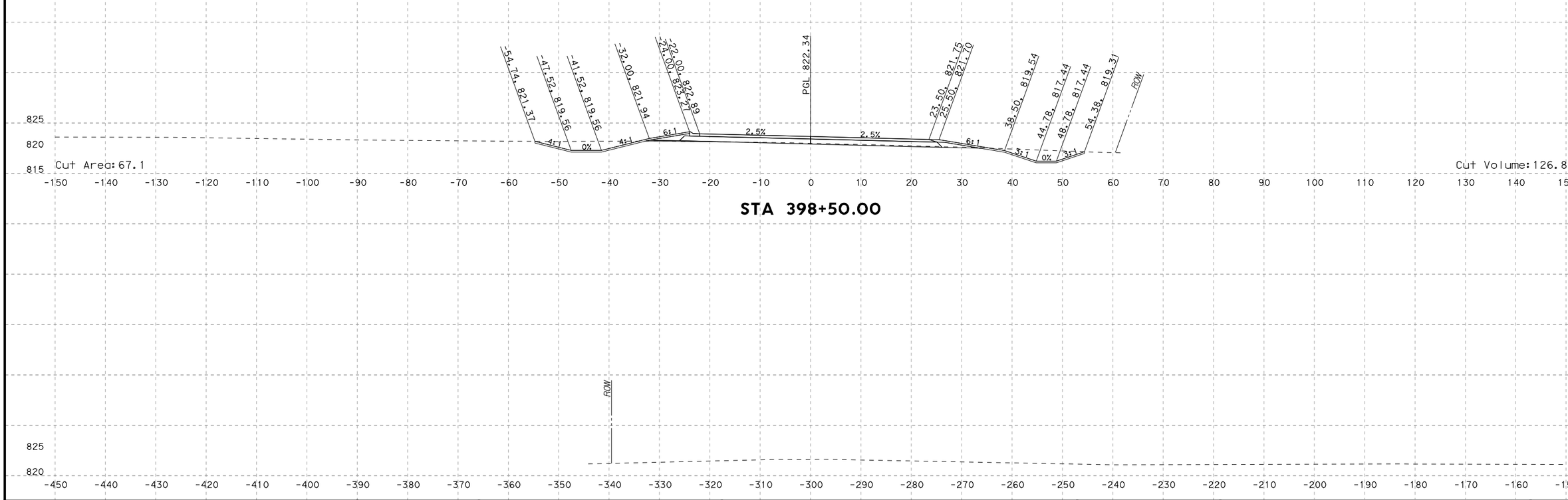
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XS-08

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4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 398+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
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SCALE: HORIZ: 1"=20'
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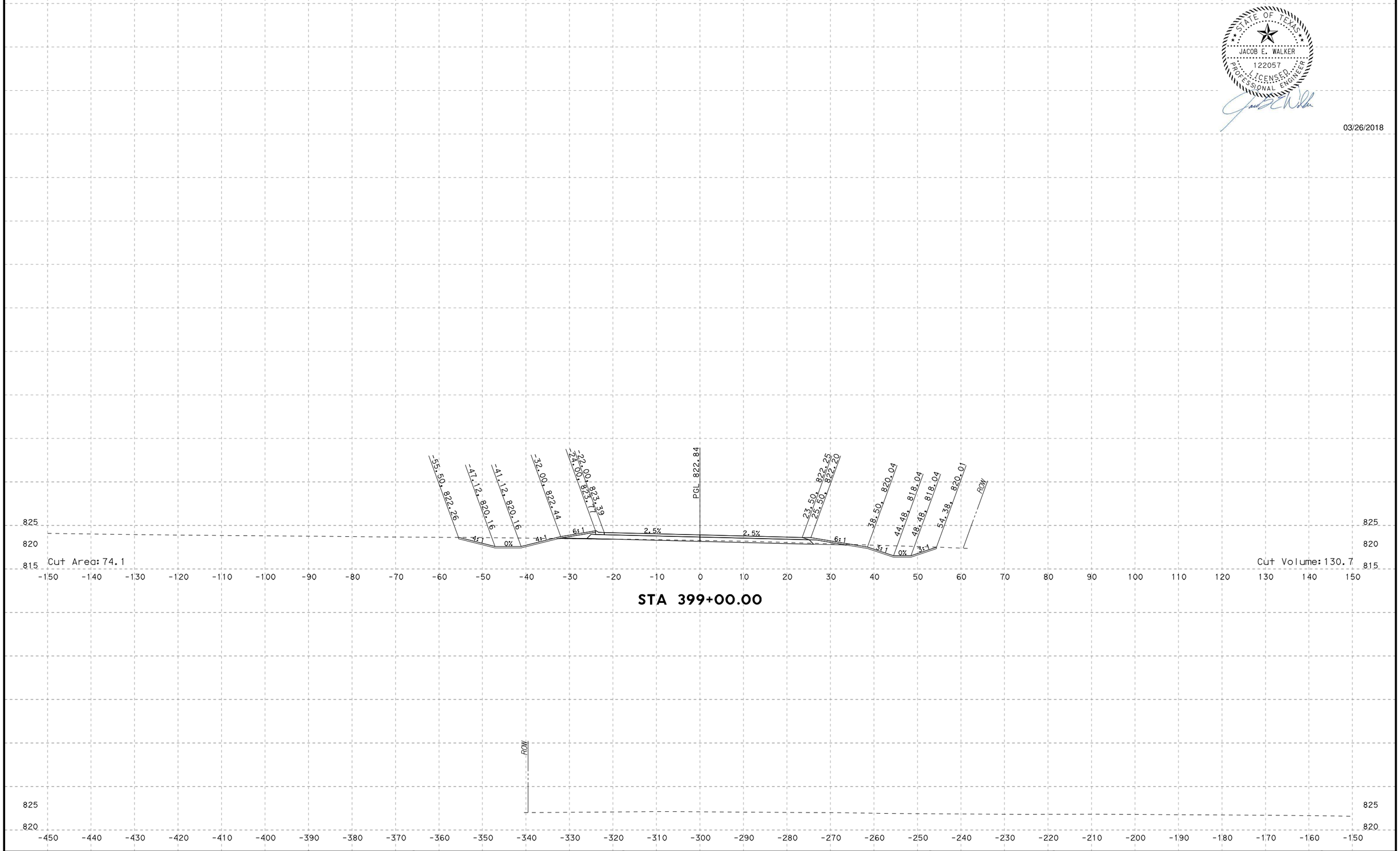
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-09

4/12/2018 7:20 AM

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JACOB E. WALKER
122057
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PROFESSIONAL ENGINEER

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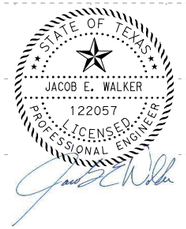
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

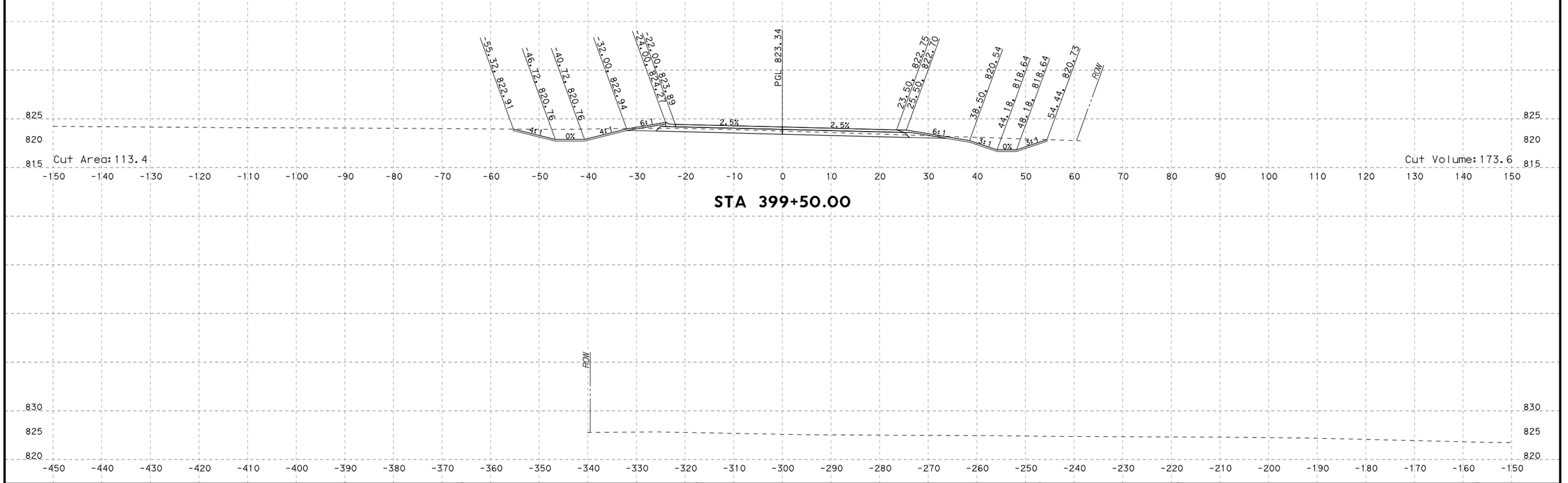
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4/12/2018 7:20 AM



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NO.	DATE	REVISION	APPROVED

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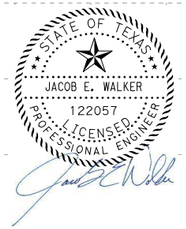
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

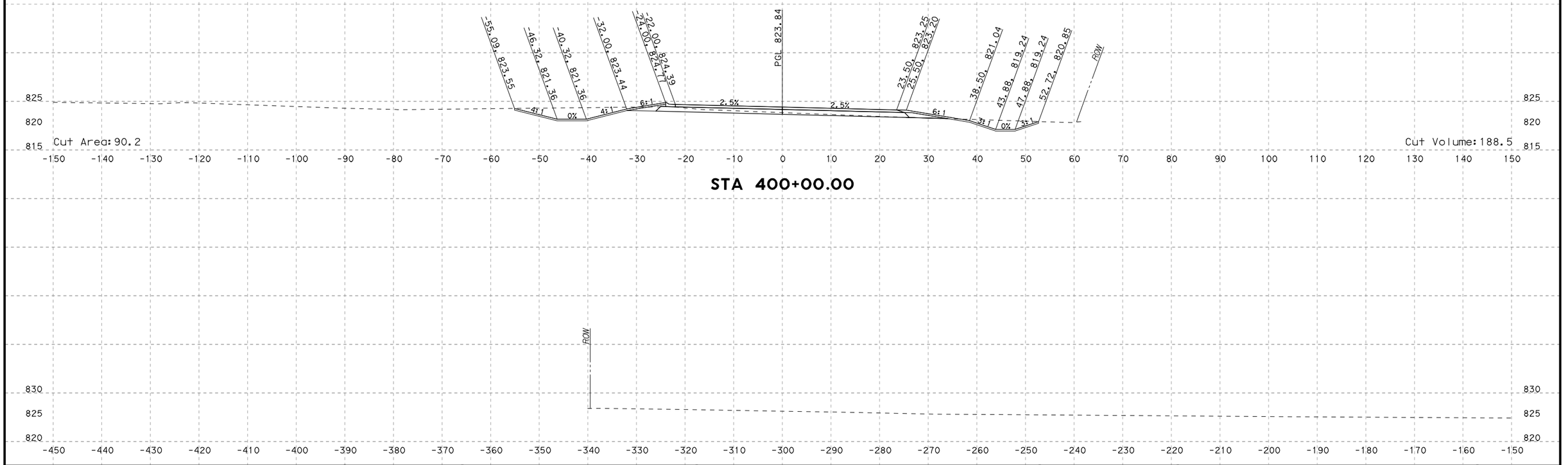
SHEET NO.
XS-11

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SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 400+00.00

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TIME: 11:9:50 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

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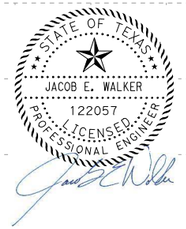
STA 400+00.00

SCALE: HORIZ: 1"=20'
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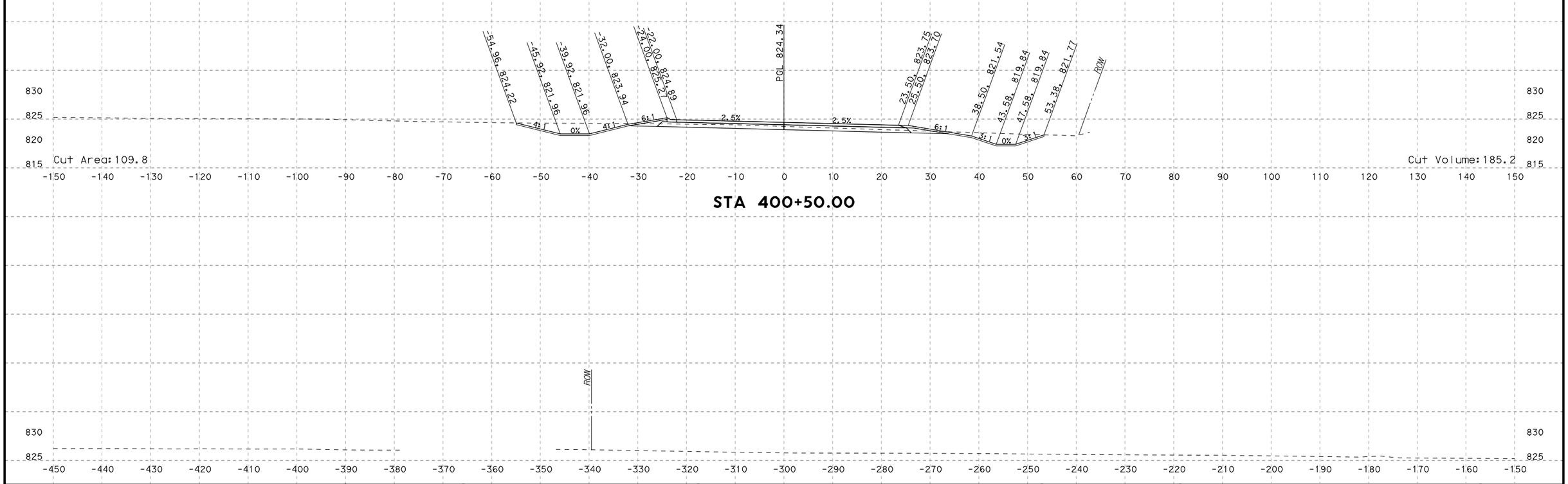
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-12

4/12/2018 7:20 AM



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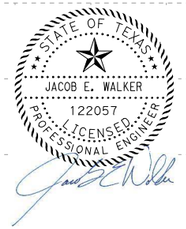
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

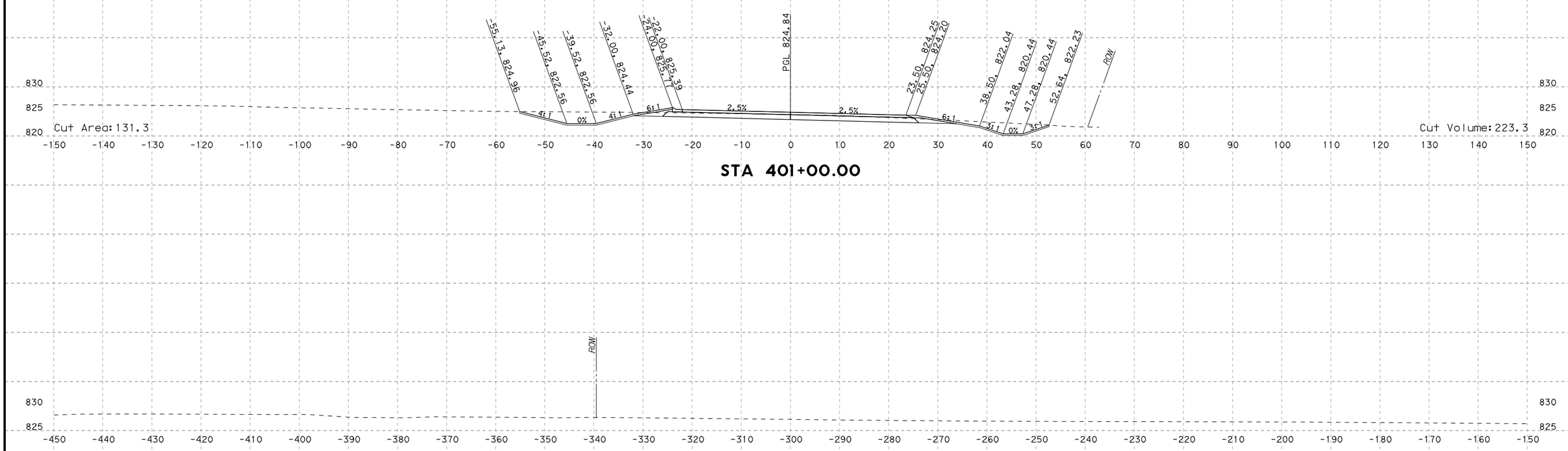
SHEET NO.
XS-13

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4/12/2018 7:20 AM



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NO.	DATE	REVISION	APPROVED

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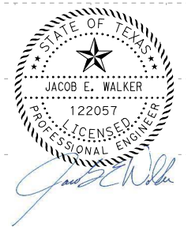
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

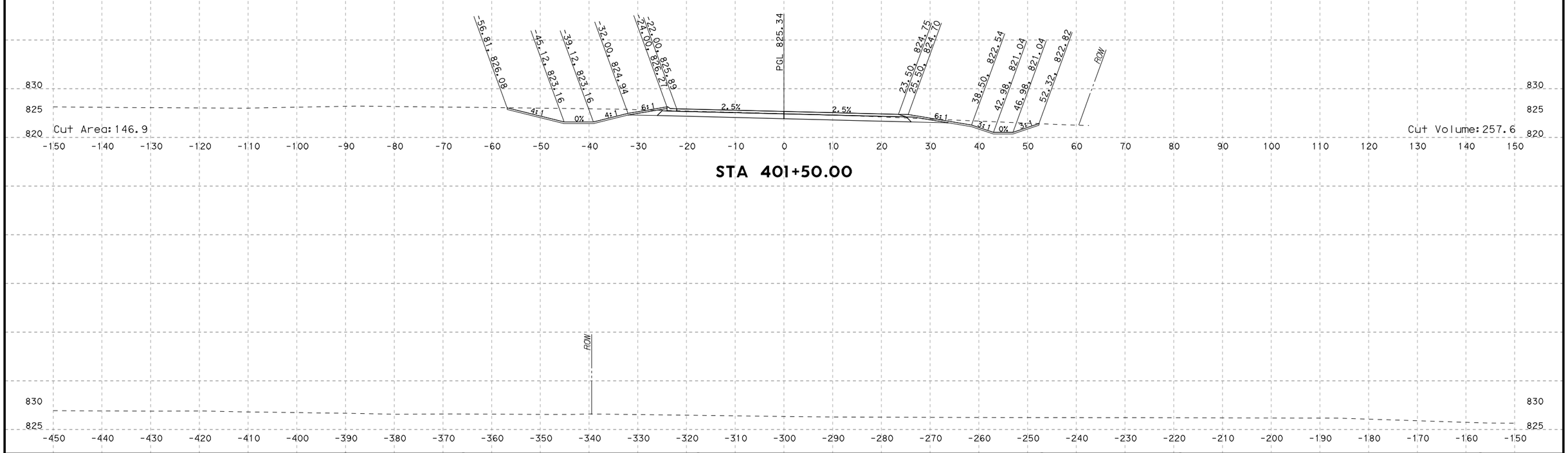
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XS-14

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4/12/2018 7:20 AM



03/26/2018



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STA 401+50.00

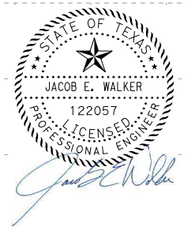
SCALE: HORIZ: 1"=20'
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

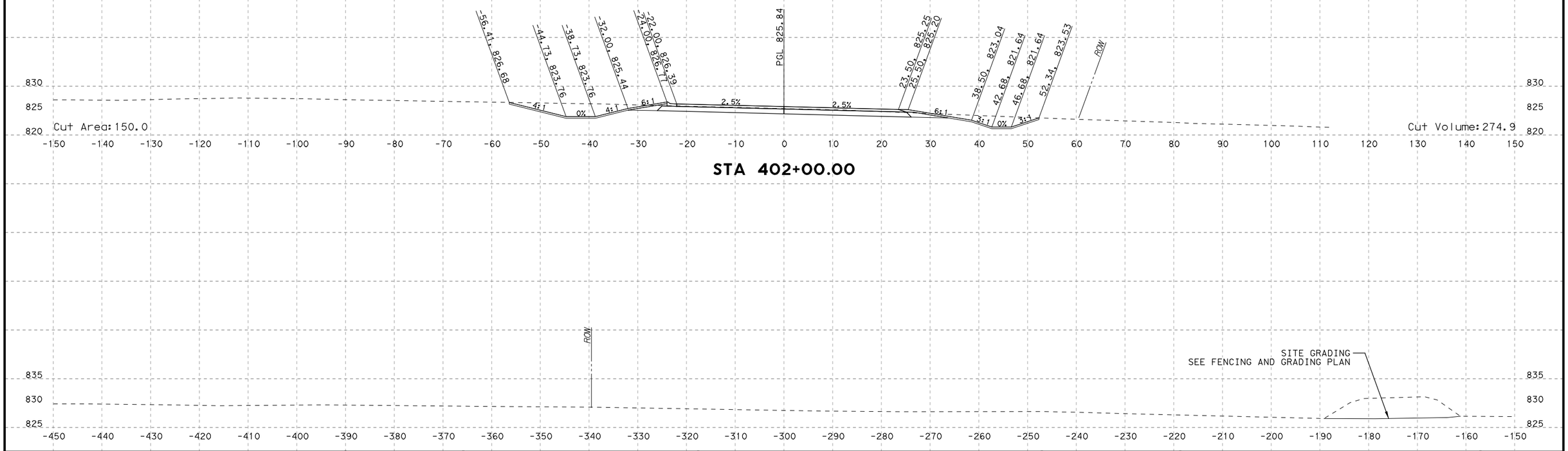
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XS-15

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4/12/2018 7:20 AM



03/26/2018



STA 402+00.00

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STA 402+00.00

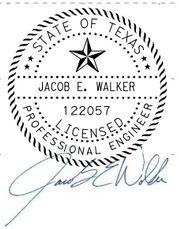
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

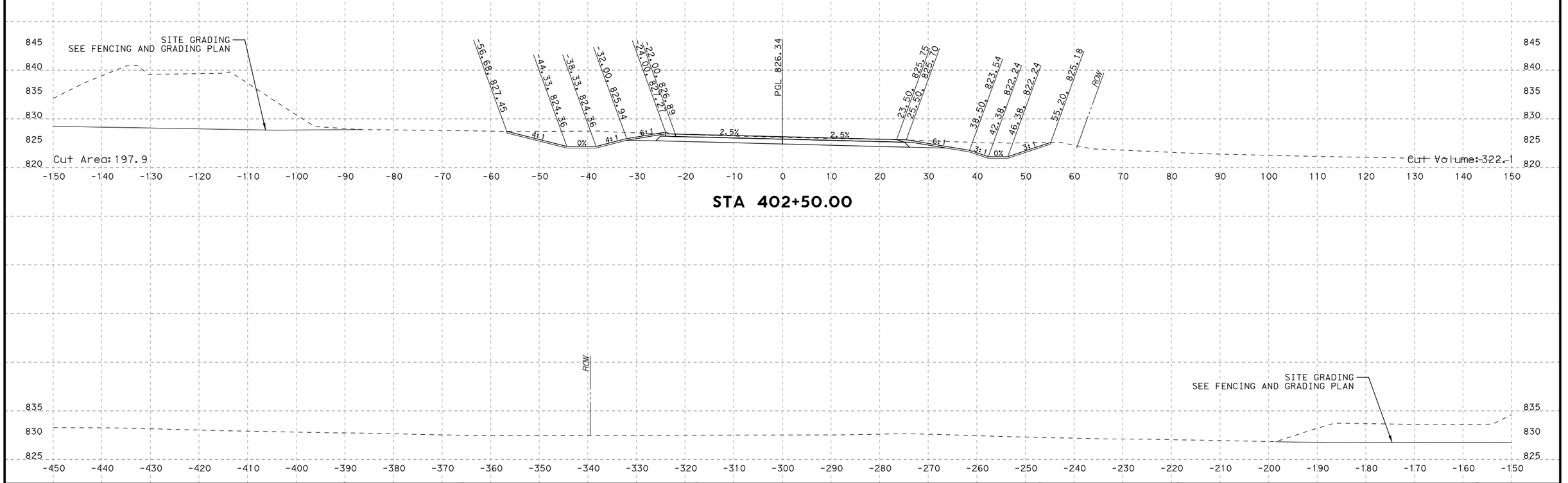
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XS-16

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4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/26/2018 TIME: 11:20:07 AM PENTABLE: S2-0000020/0718.tbl SCALE: 1:20
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NO.	DATE	REVISION	APPROVED

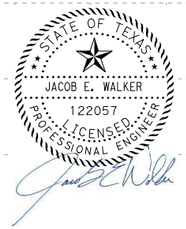
HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 402+50.00

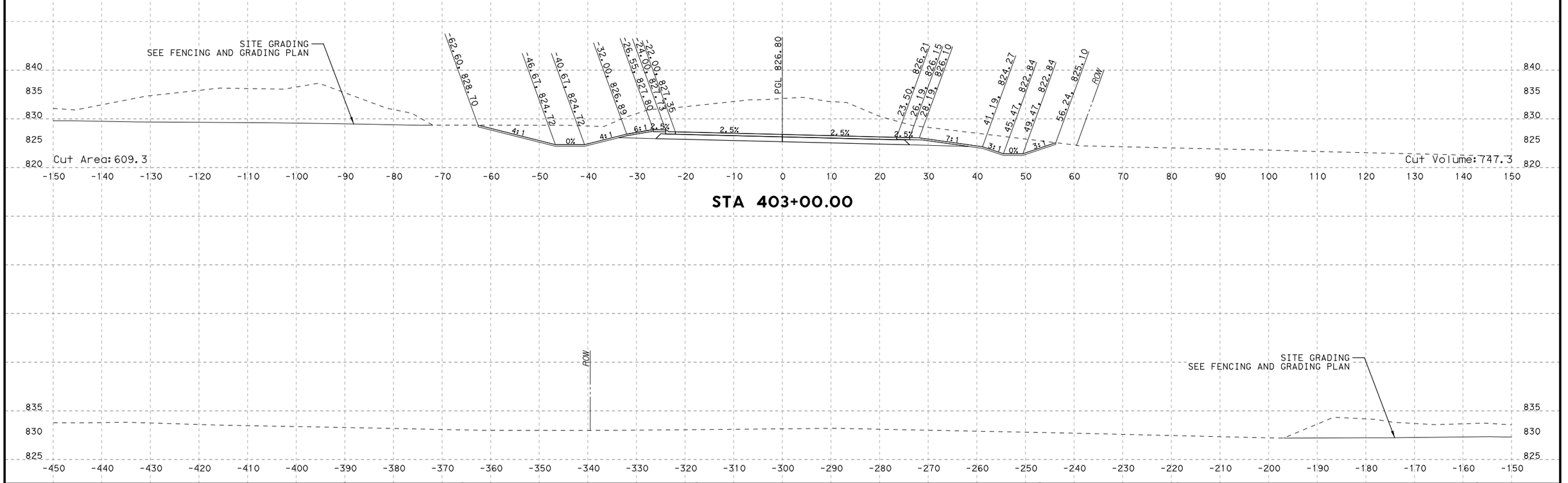
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-17



03/26/2018



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STA 403+00.00

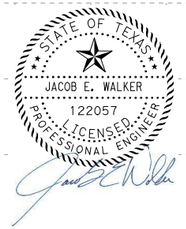
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

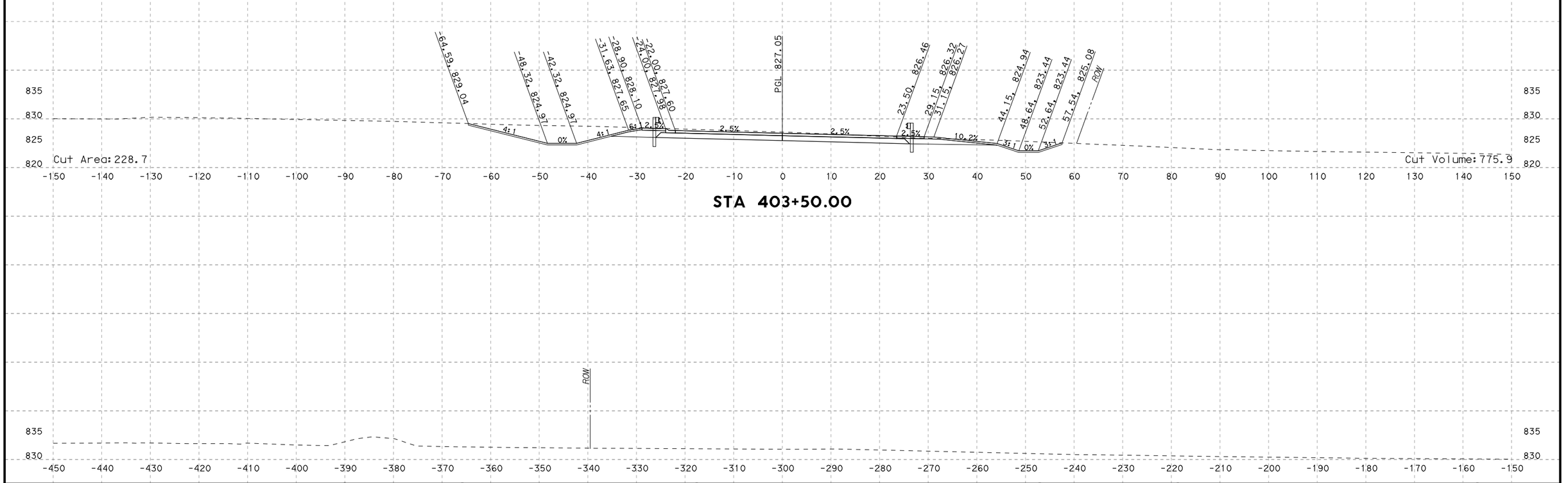
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4/12/2018 7:20 AM



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STA 403+50.00

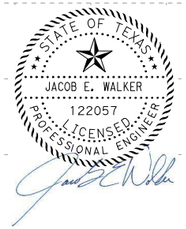
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

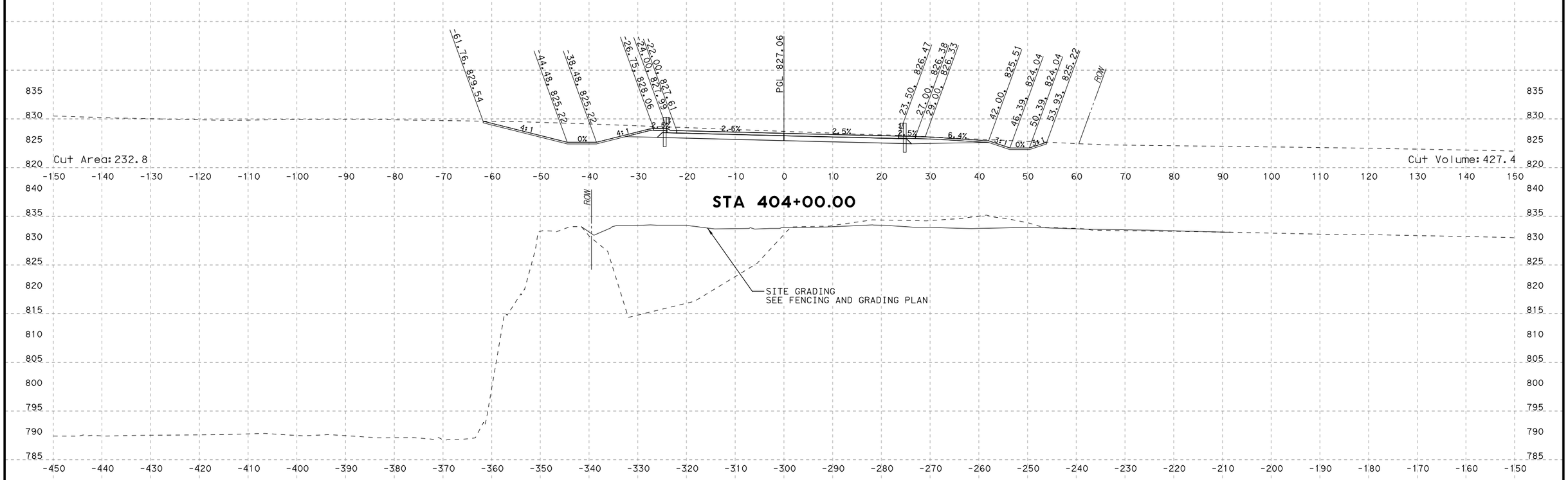
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SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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NO.	DATE	REVISION	APPROVED

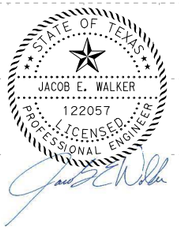
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 404+00.00

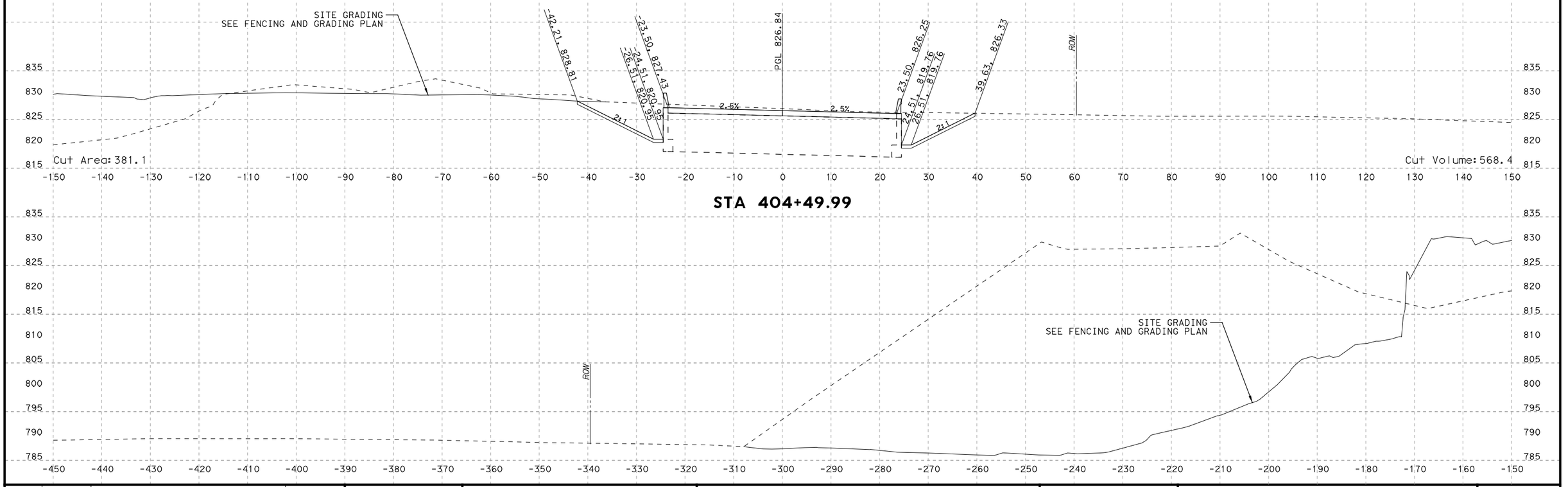
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-20



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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
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STA 404+49.99

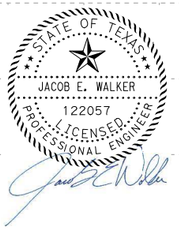
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

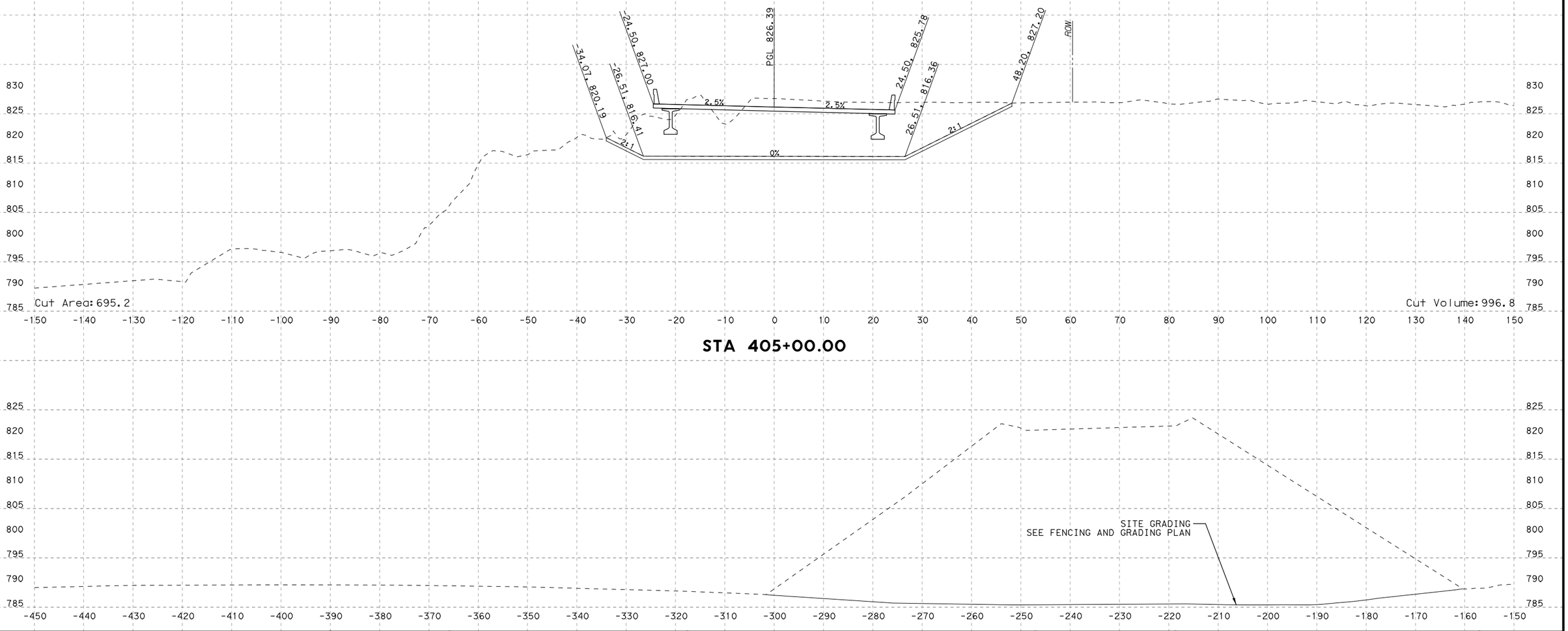
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XS-21

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4/12/2018 7:20 AM



03/26/2018



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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 405+00.00

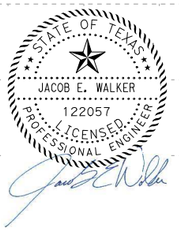
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

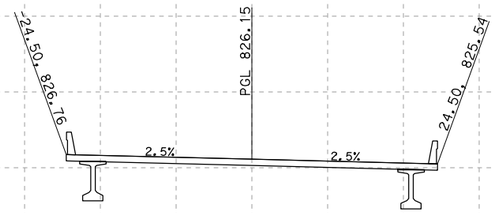
SHEET NO.
XS-22

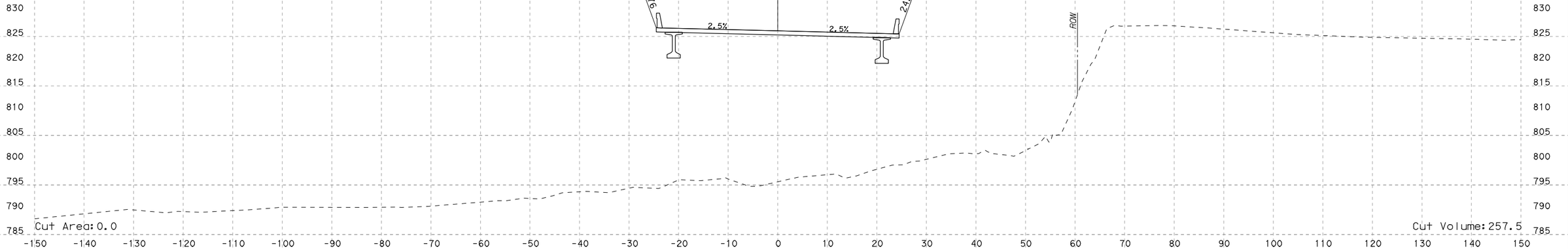
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4/12/2018 7:20 AM

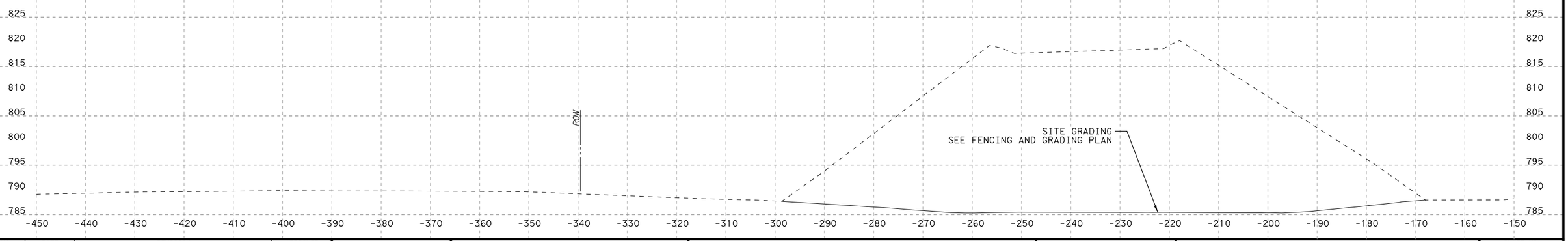


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STA 405+20.00



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Texas Registered Engineering Firm F-754

STA 405+20.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

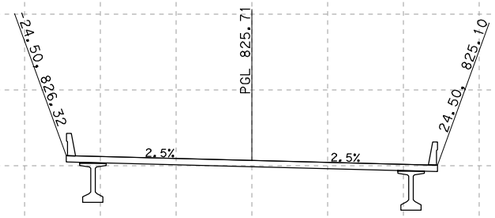
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XS-23

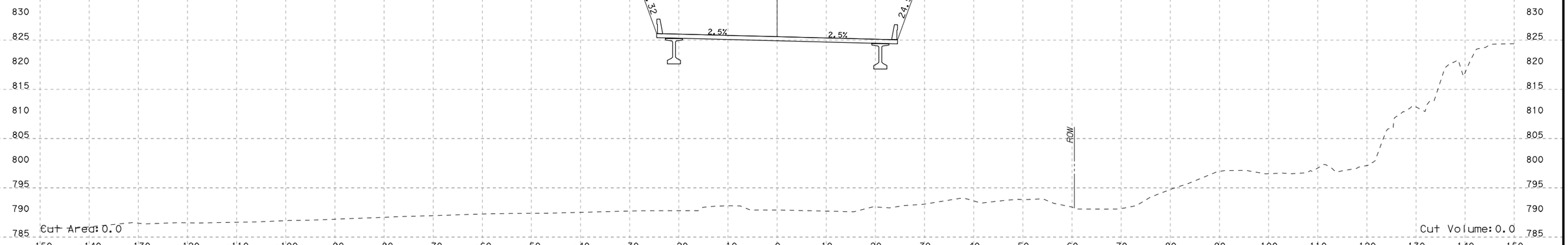
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4/12/2018 7:20 AM

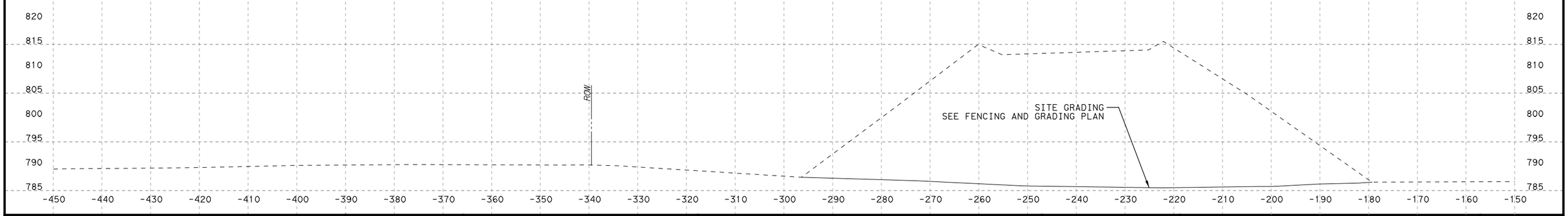
STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018





STA 405+50.00



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

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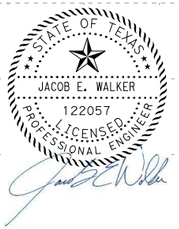
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VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

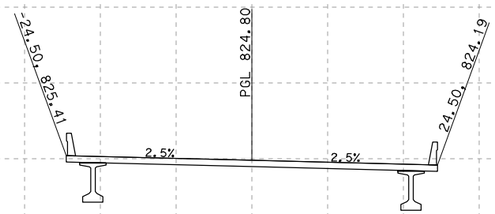
SHEET NO.
XS-24

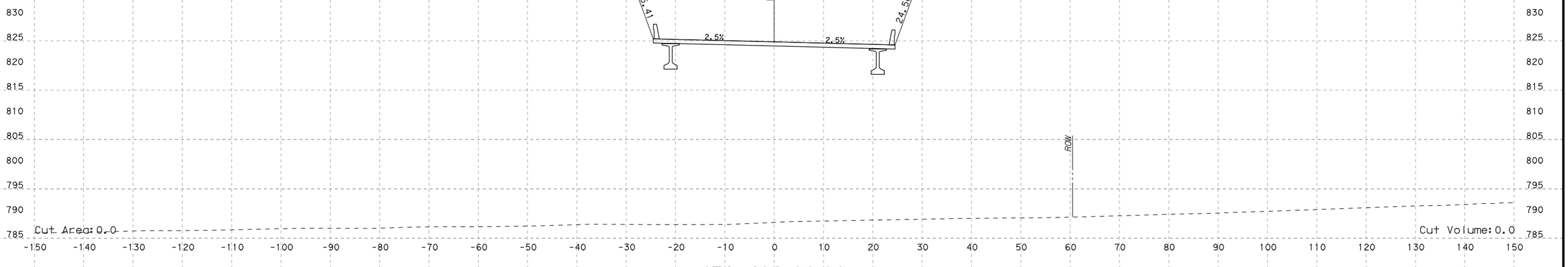
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4/12/2018 7:20 AM

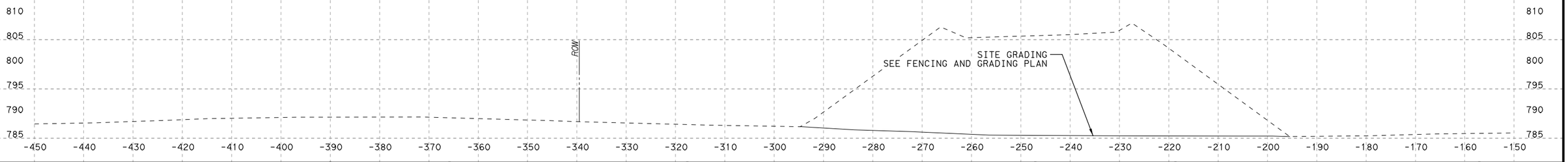


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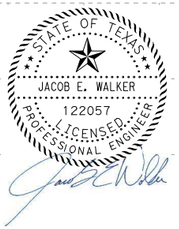
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

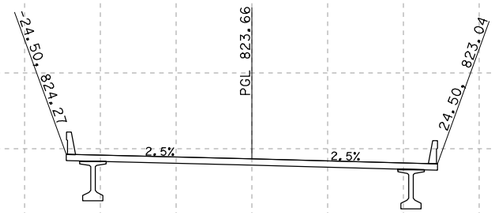
SHEET NO.
XS-25

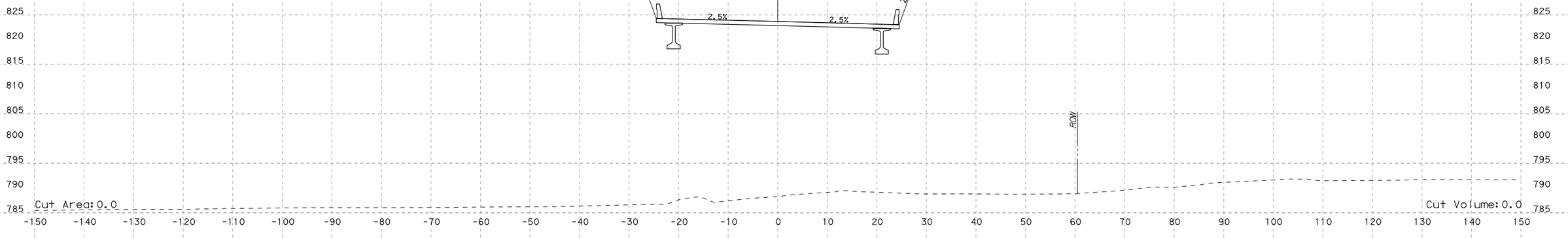
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DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM

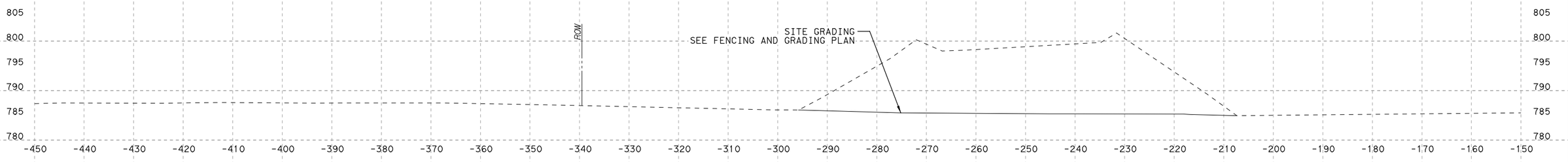


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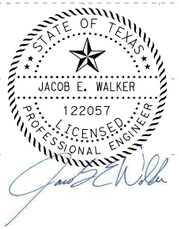
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

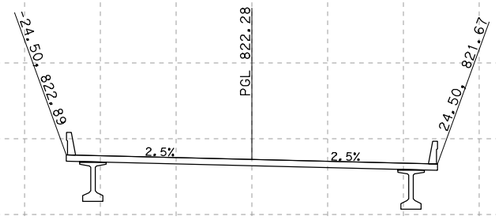
SHEET NO.
XS-26

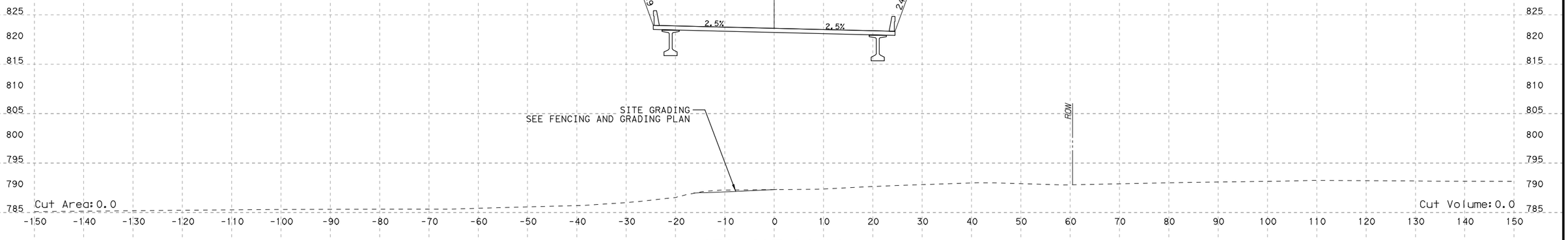
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DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM

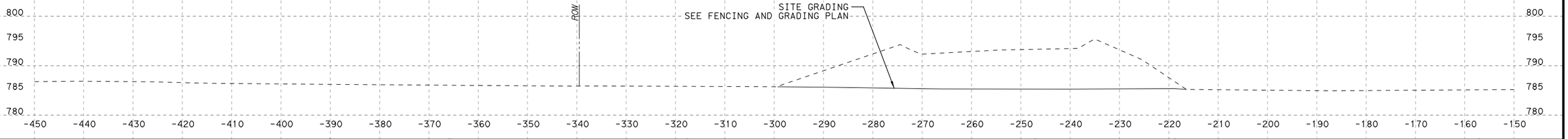


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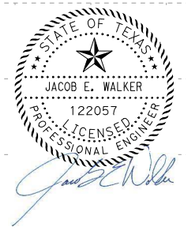
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

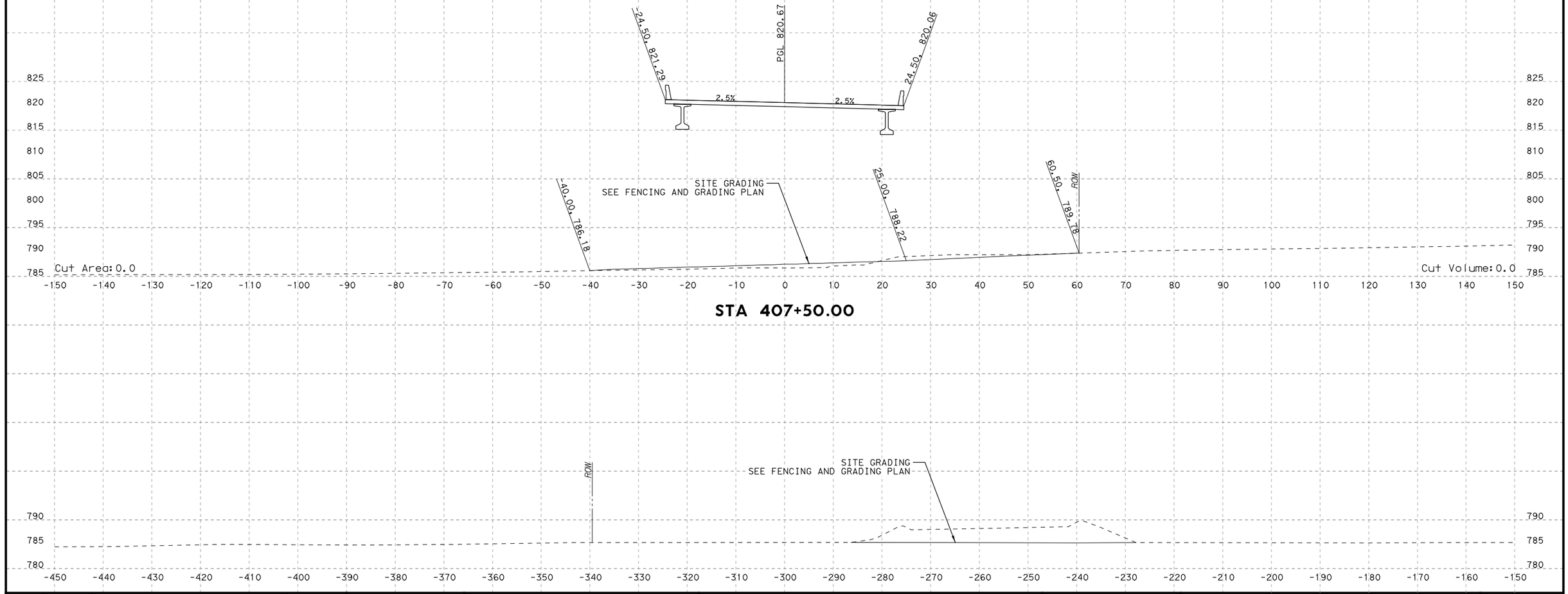
SHEET NO.
XS-27

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SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:20:44 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

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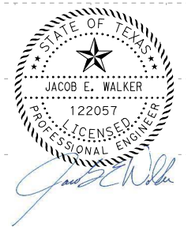
STA 407+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

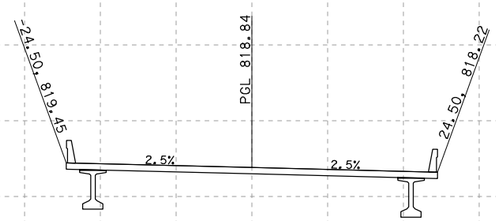
SOUTHWEST BYPASS SEGMENT 2 - WBFR

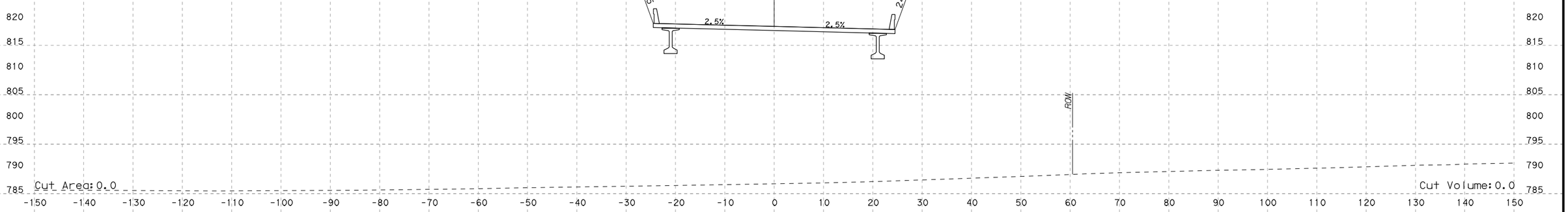
SHEET NO.
XS-28

4/12/2018 7:20 AM

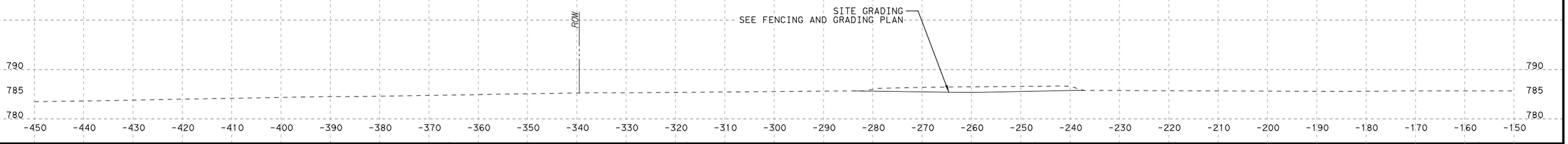


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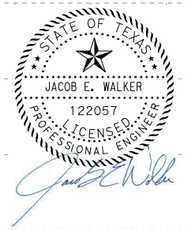
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

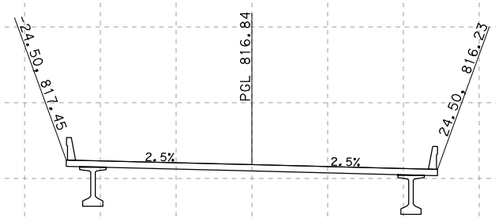
SHEET NO.
XS-29

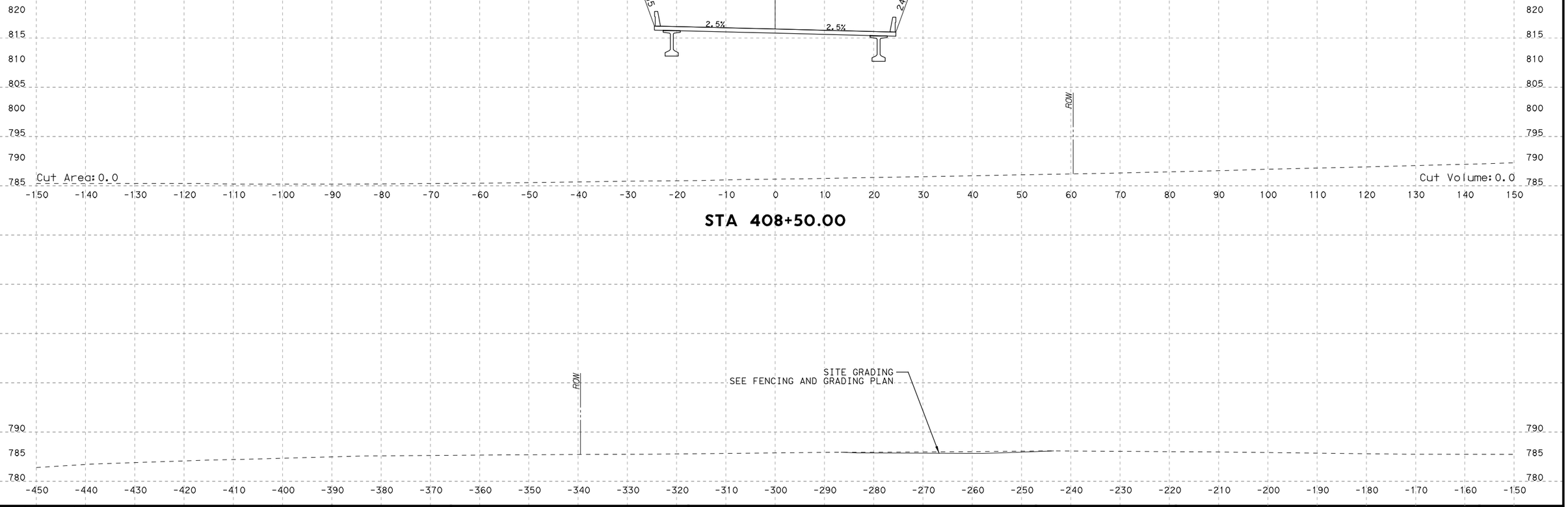
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4/12/2018 7:20 AM



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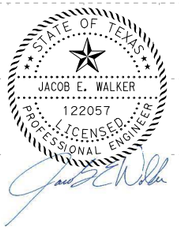
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

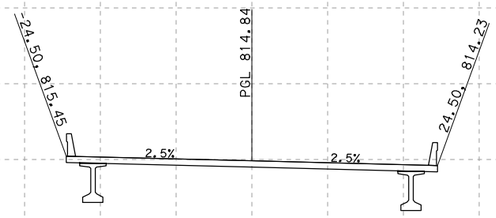
SHEET NO.
XS-30

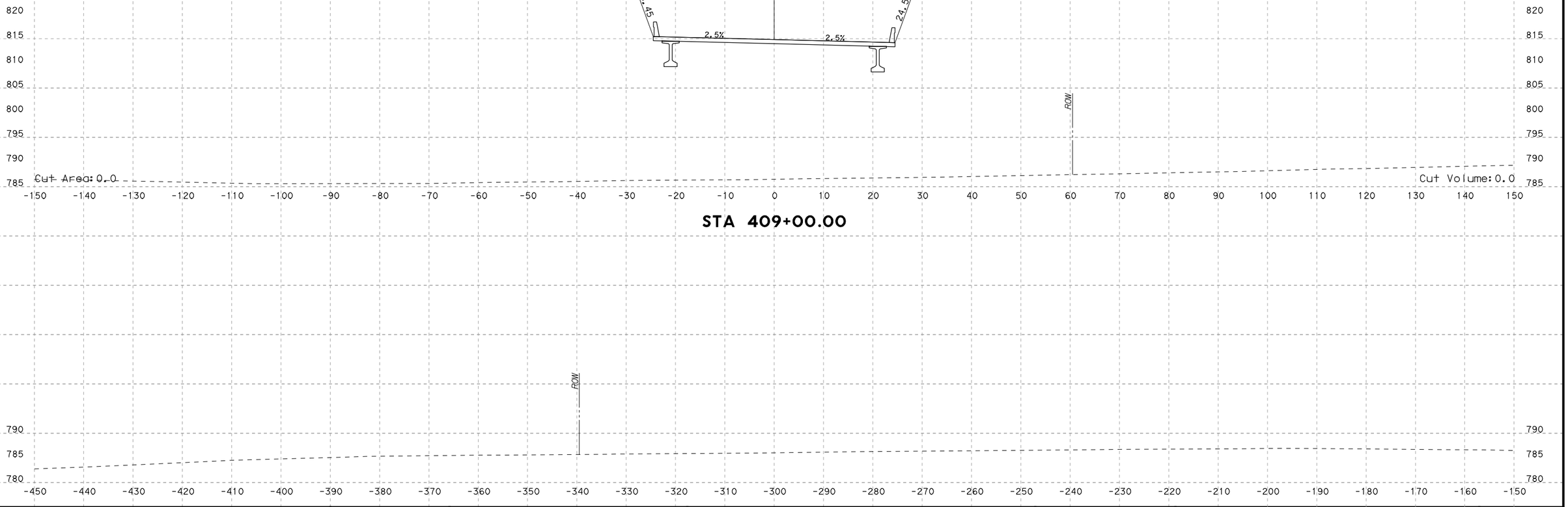
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DATE: 3/26/2018
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PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018





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STA 409+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

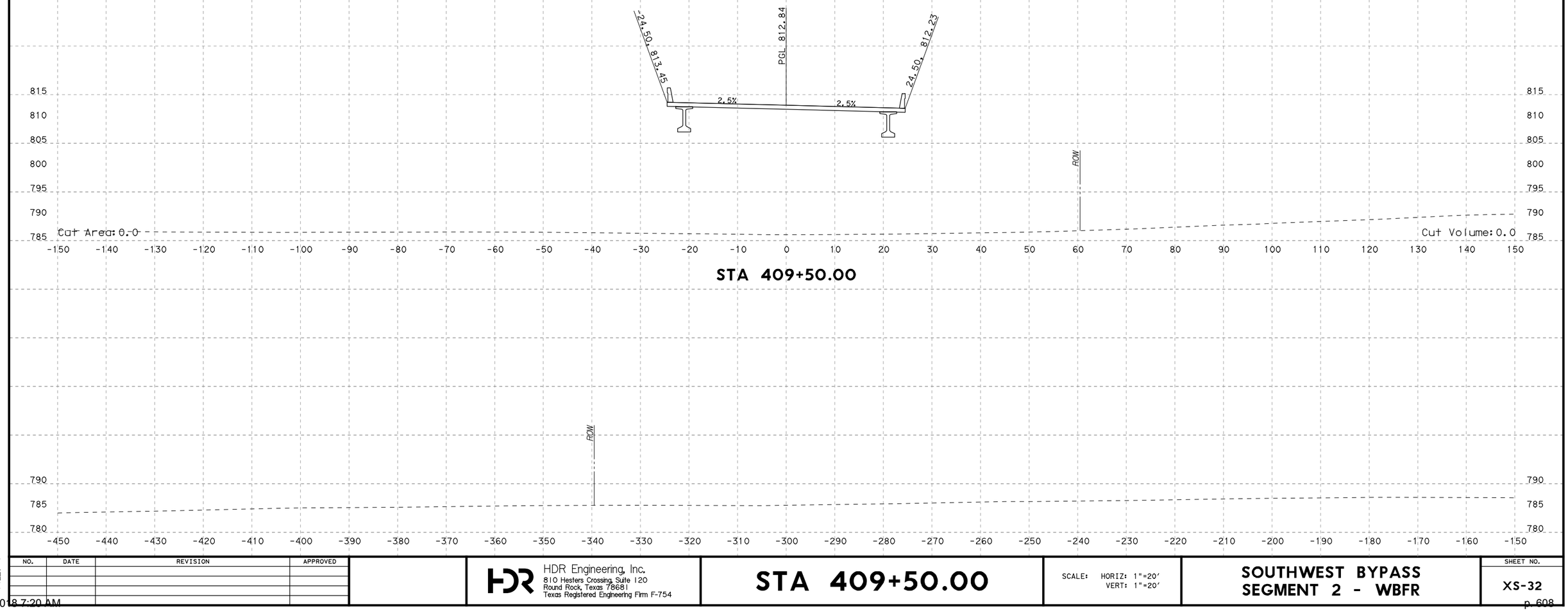
SHEET NO.
XS-31

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TIME: 11:20:54 AM SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



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SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

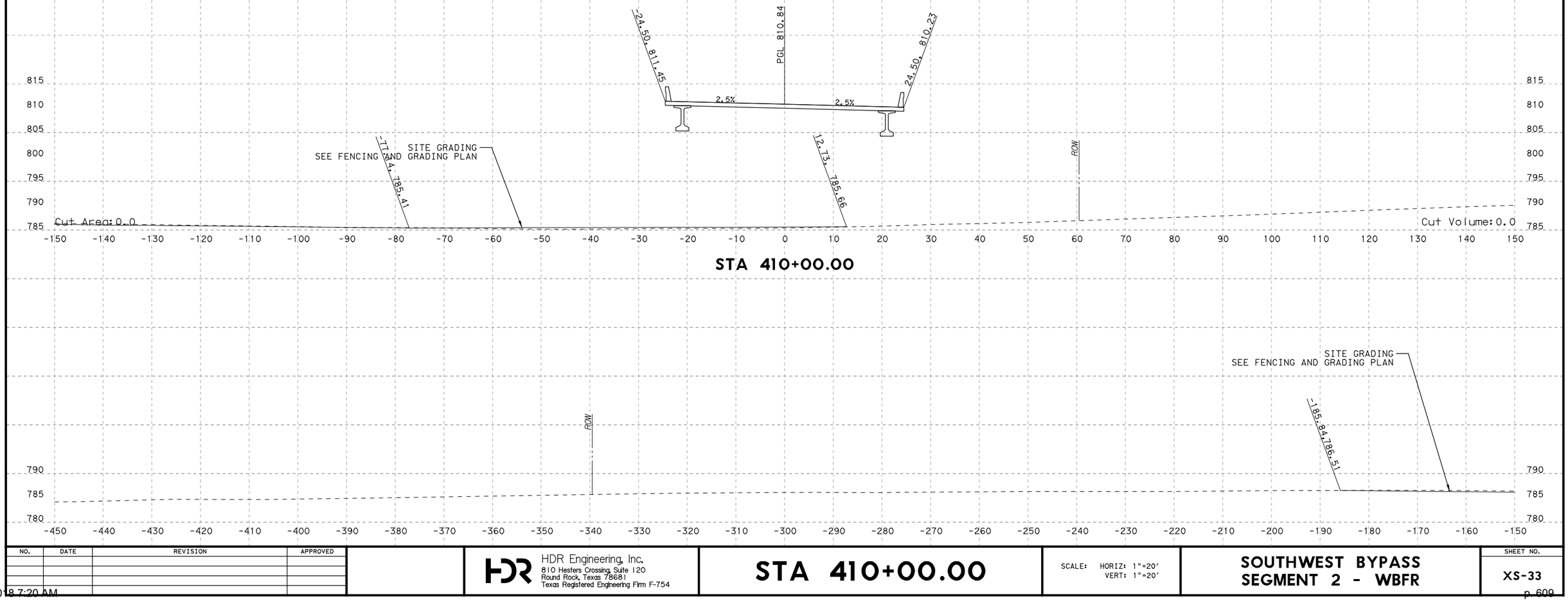
SHEET NO.
XS-32

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TIME: 11:20:58 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:21:01 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 410+00.00

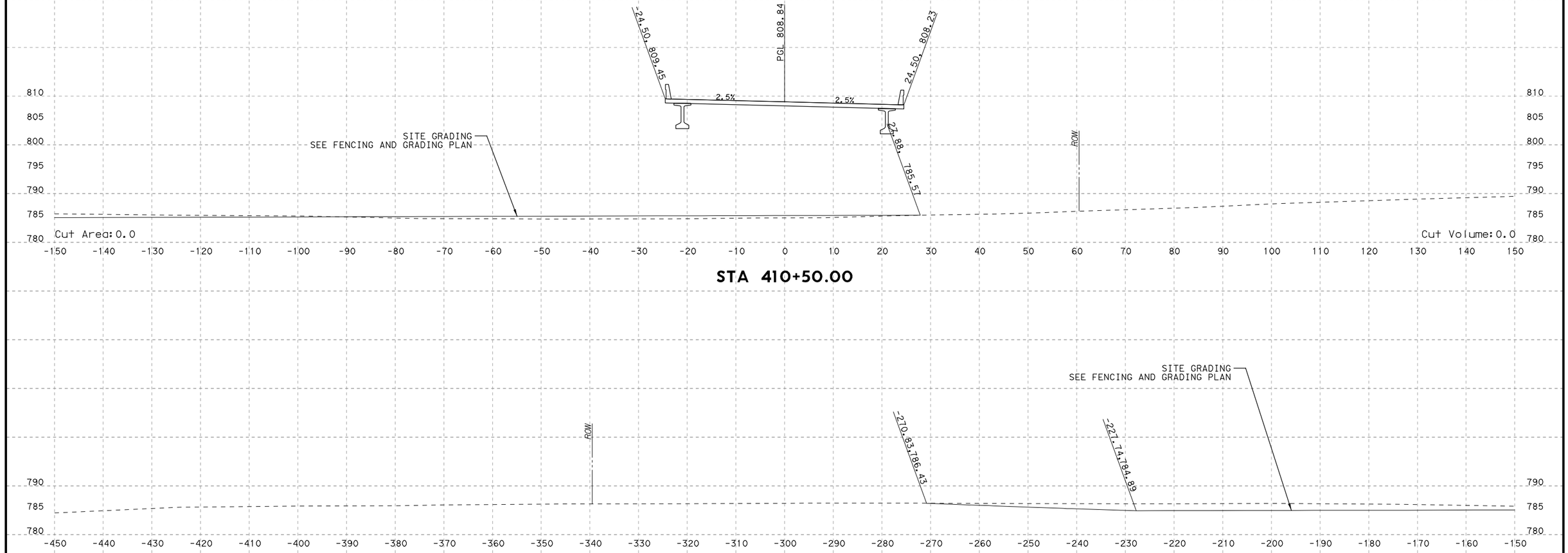
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-33

STATE OF TEXAS
JACOB E. WALKER
122057
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PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:21:05 AM SCALE: 1:20
FILE: \

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 410+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

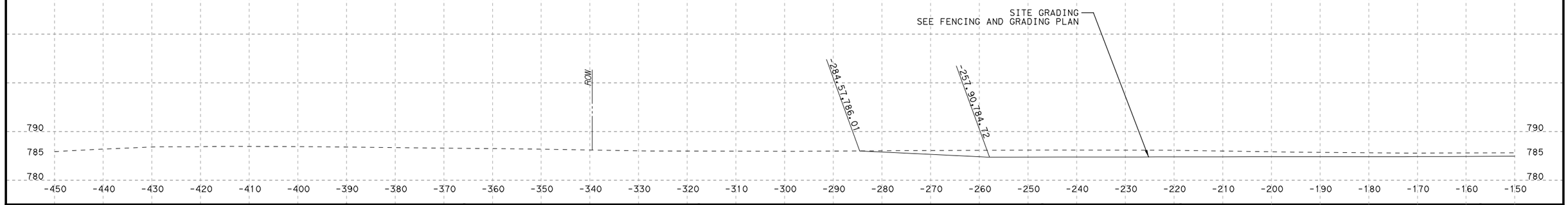
SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-34

STATE OF TEXAS
JACOB E. WALKER
122057
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Texas Registered Engineering Firm F-754

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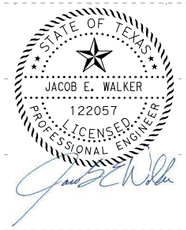
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

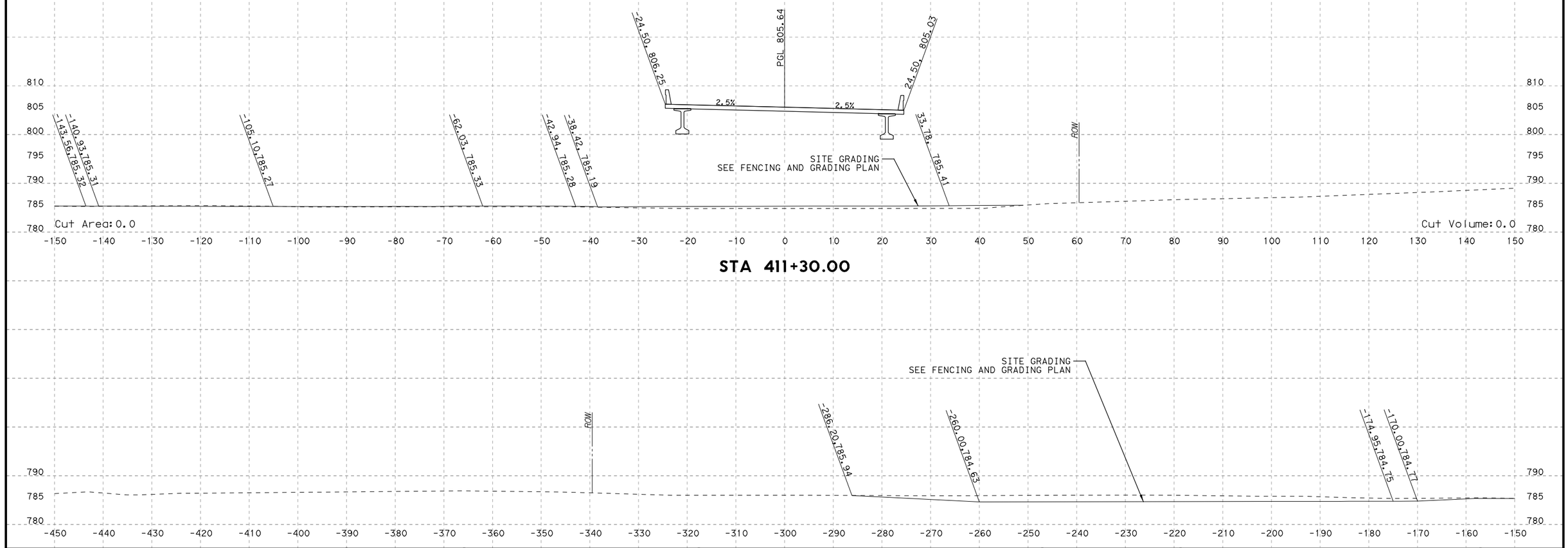
SHEET NO.
XS-35

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
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TIME: 11:21:08 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 411+30.00

NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 411+30.00

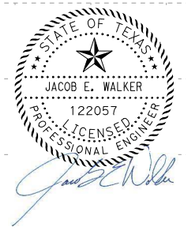
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SOUTHWEST BYPASS SEGMENT 2 - WBFR

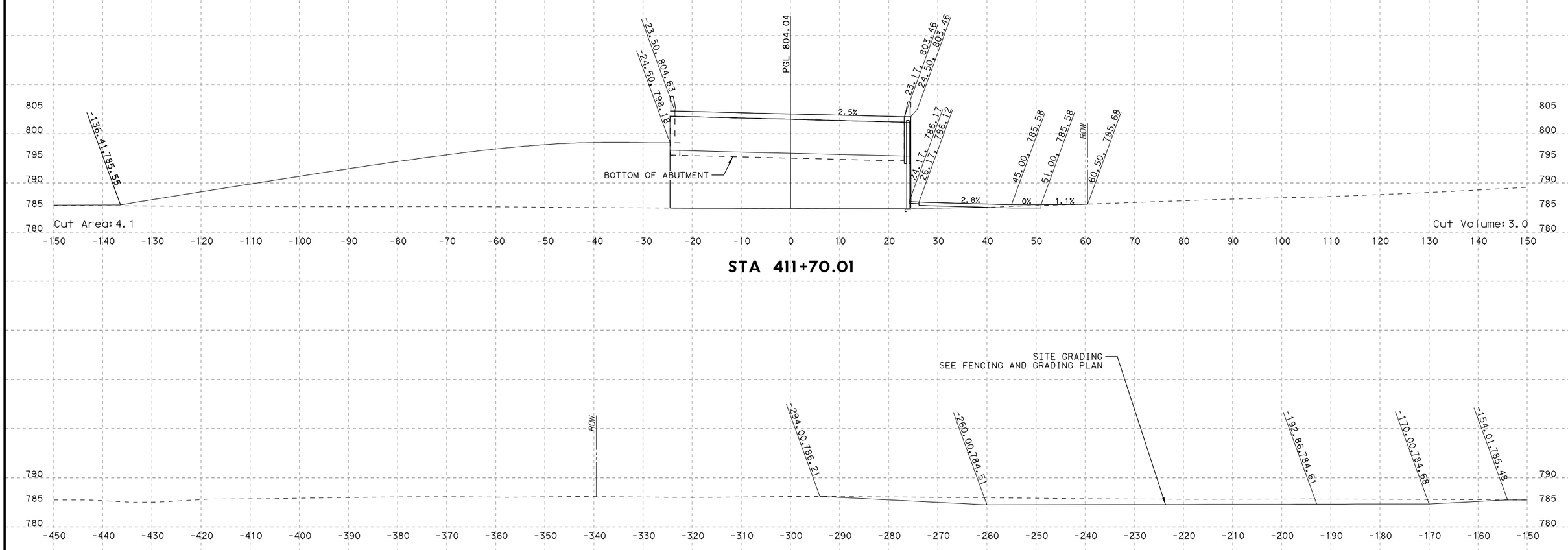
SHEET NO.
XS-36

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FILE: \

4/12/2018 7:20 AM



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STA 411+70.01

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STA 411+70.01

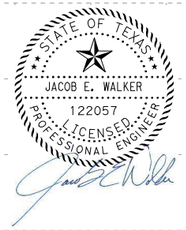
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SOUTHWEST BYPASS
SEGMENT 2 - WBFR

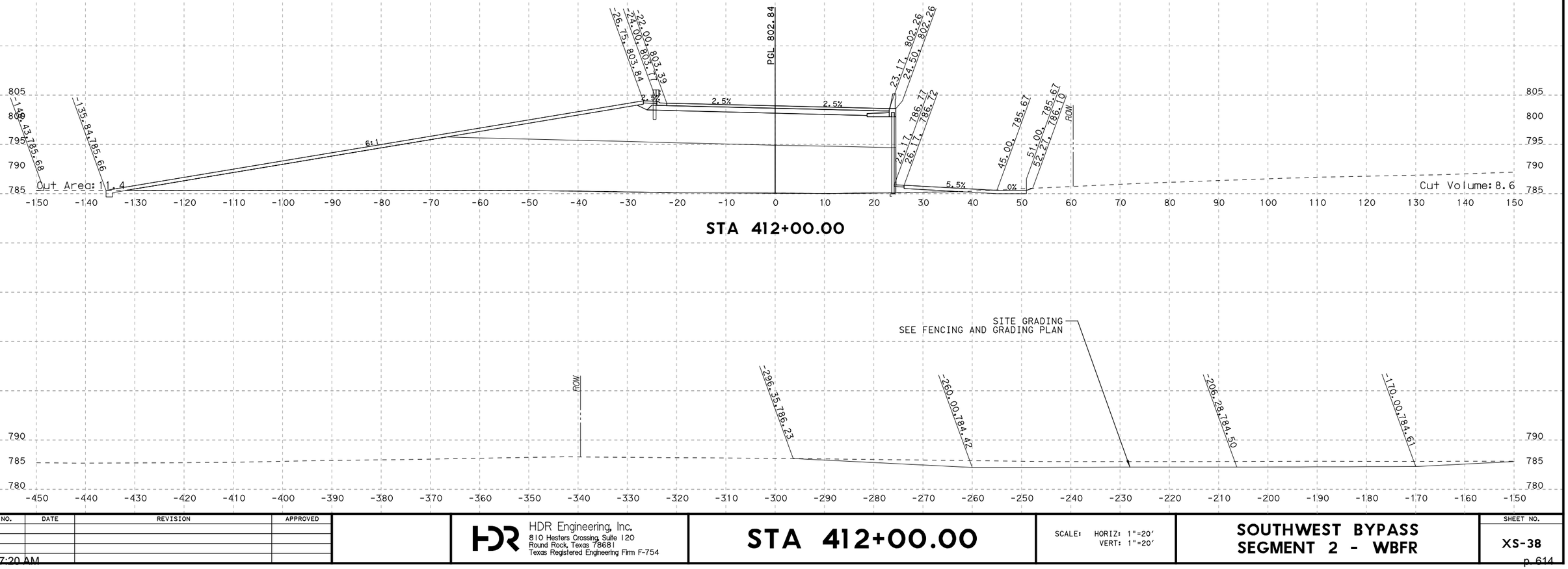
SHEET NO.
XS-37

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DATE: 3/26/2018
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PENTABLE: S2-0000020/f07l8.tbl
SCALE: 1:20

4/12/2018 7:20 AM



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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 412+00.00

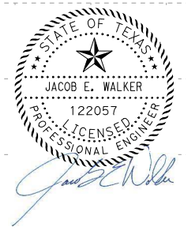
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

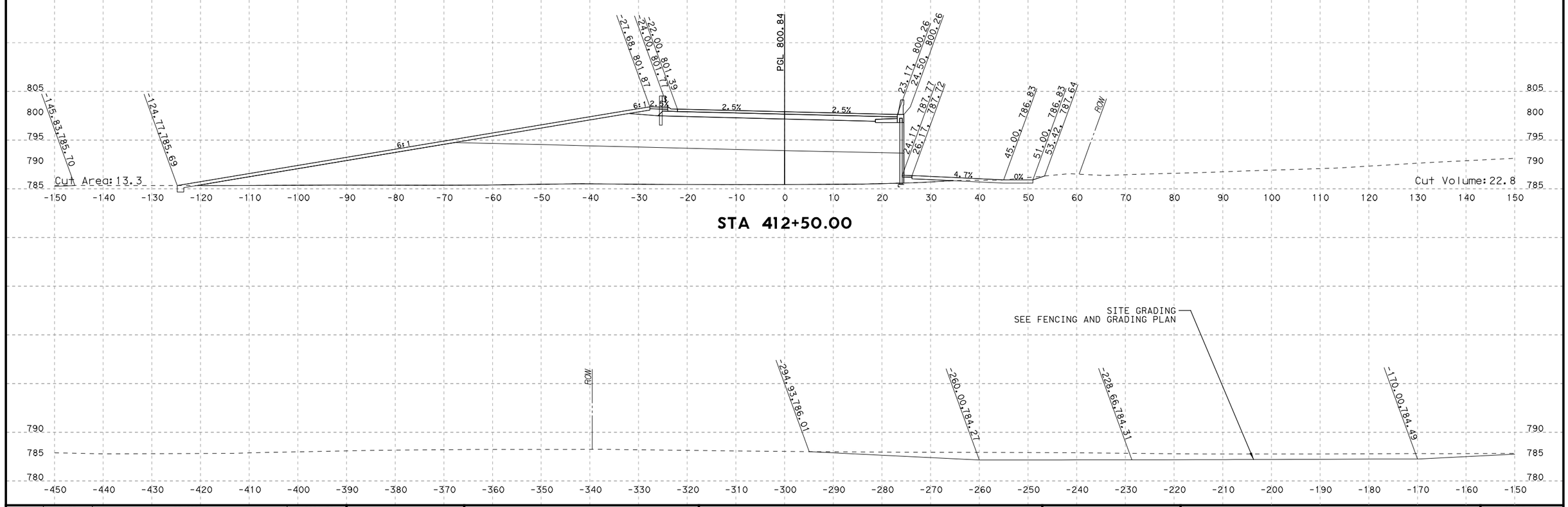
SHEET NO.
XS-38

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:21:8 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



03/26/2018



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HDR Engineering, Inc.
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STA 412+50.00

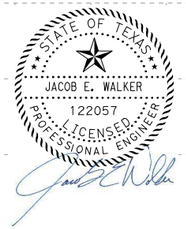
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

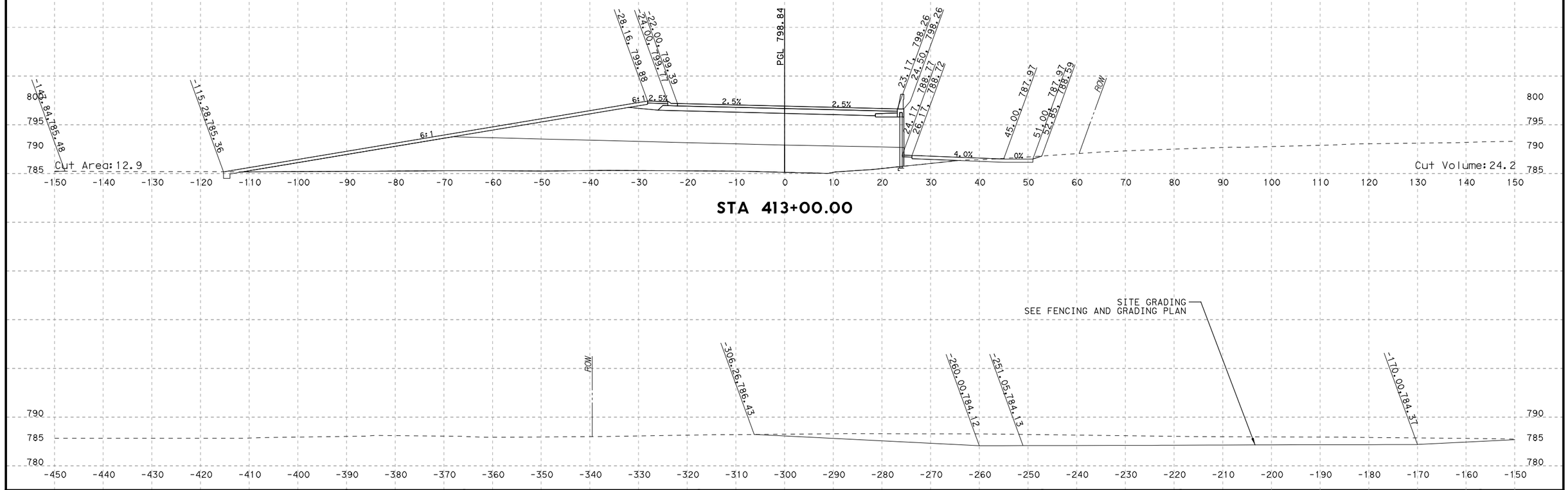
SHEET NO.
XS-39

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:21:21 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM



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STA 413+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-40

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:21:25 AM SCALE: 1:20
FILE: \
4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

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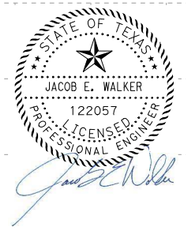
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

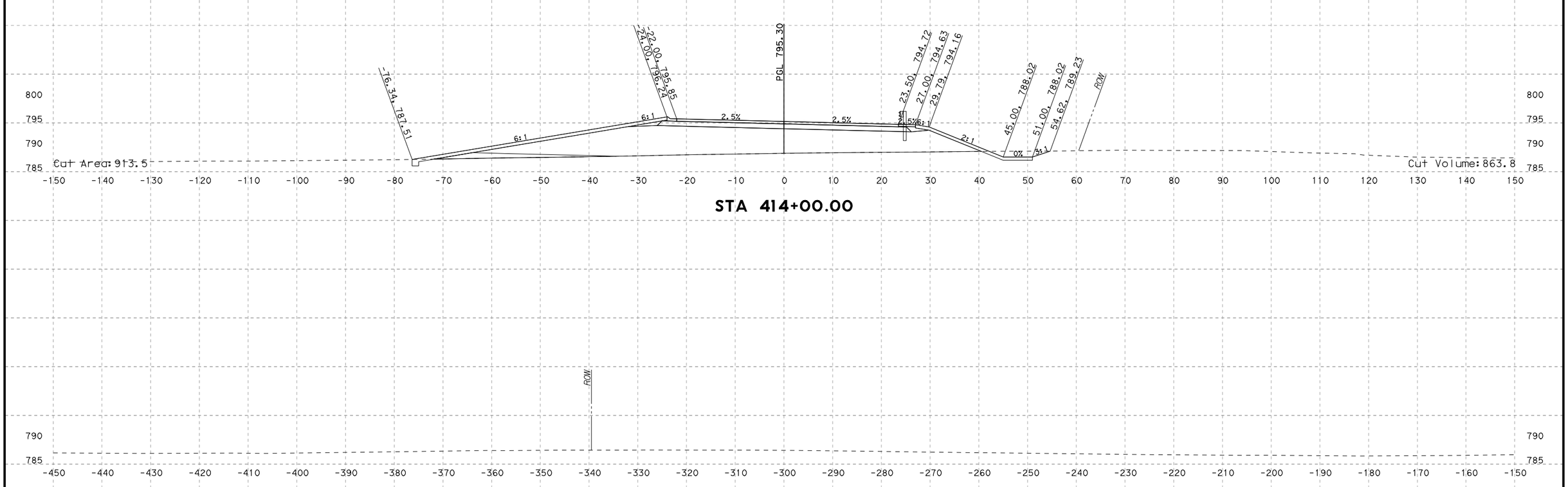
SHEET NO.
XS-41

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-00000207/0718.tbl
DATE: 3/26/2018
TIME: 11:21:28 AM
SCALE: 1:20

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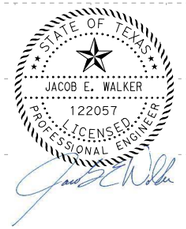
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

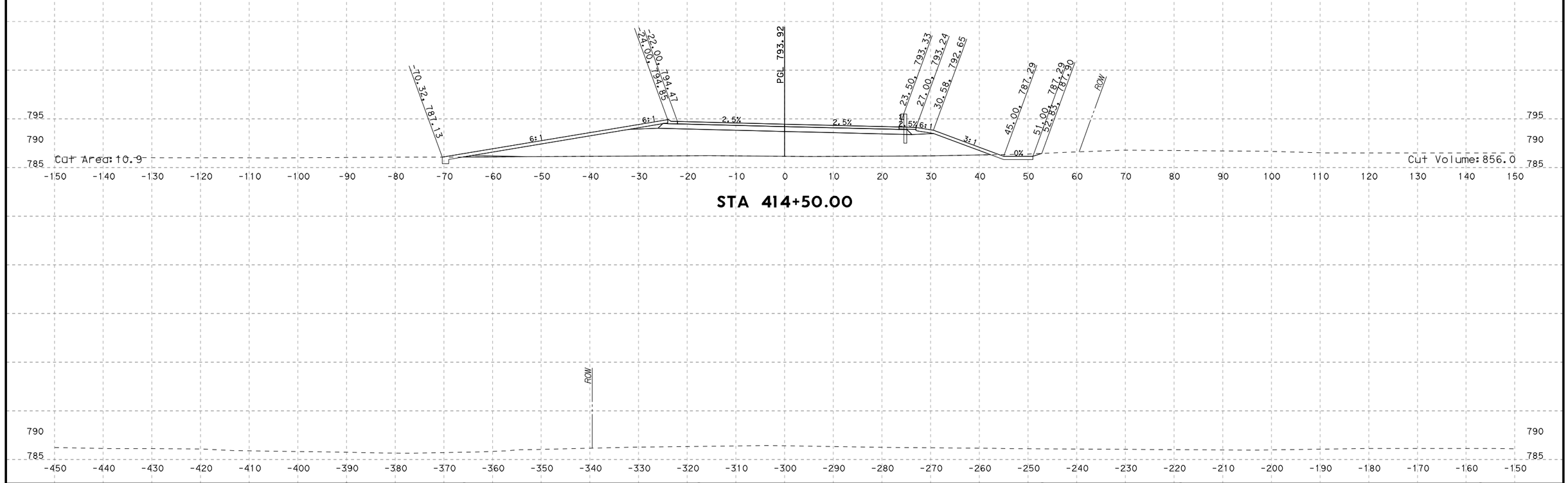
SHEET NO.
XS-42

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/26/2018
FILE: \
PENTABLE: S2-00000201707018.tbl
TIME: 11:29:31 AM SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 414+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 11:21:34 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

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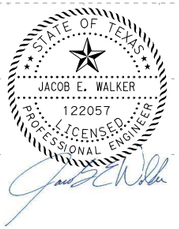
STA 414+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

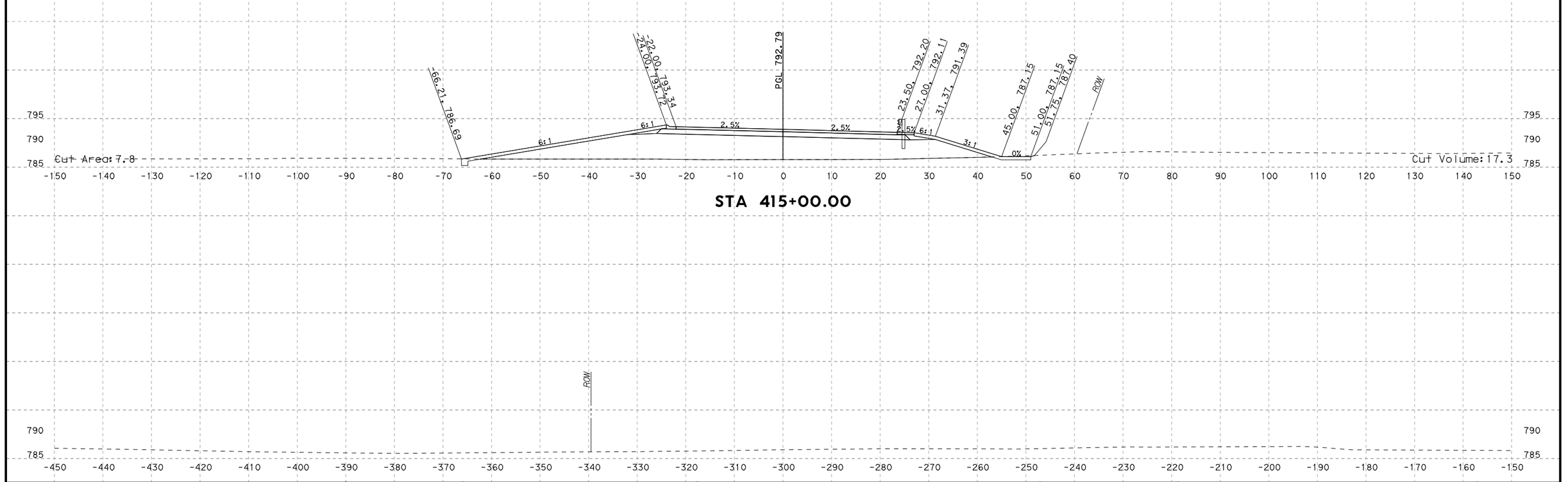
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-43

4/12/2018 7:20 AM



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STA 415+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

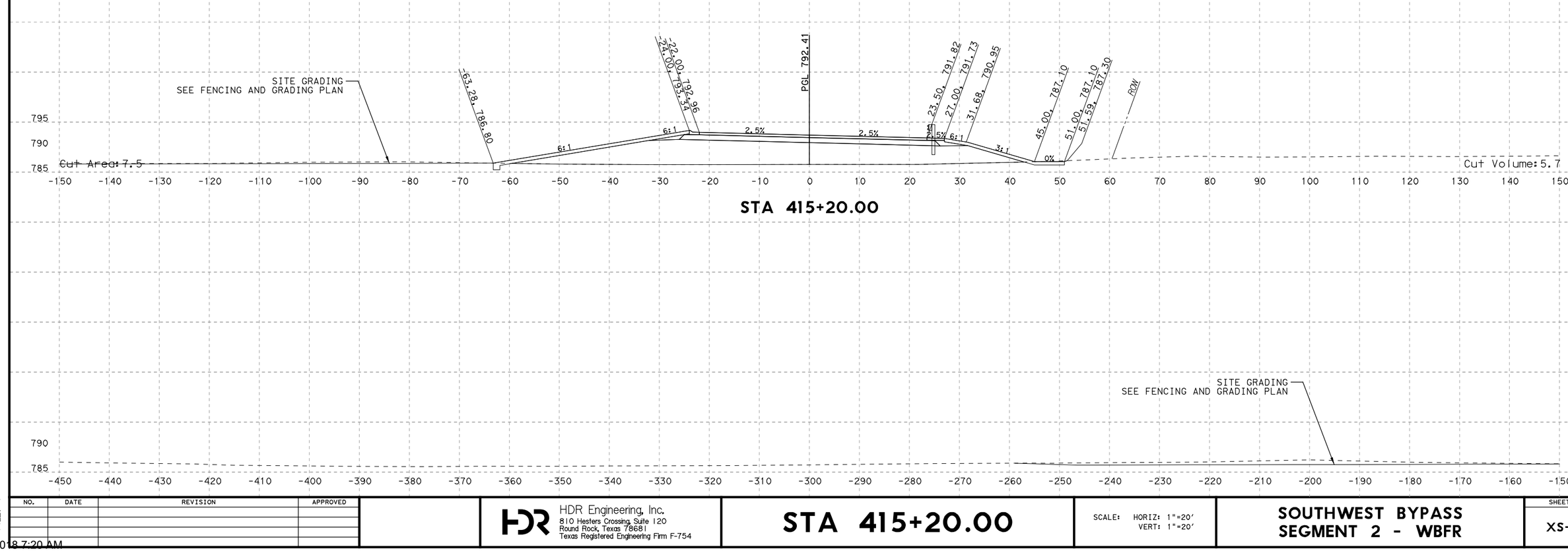
SHEET NO.
XS-44

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:21:38 AM
PENTABLE: S2-0000020/T0718.tbl
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
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STA 415+20.00

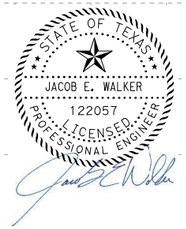
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

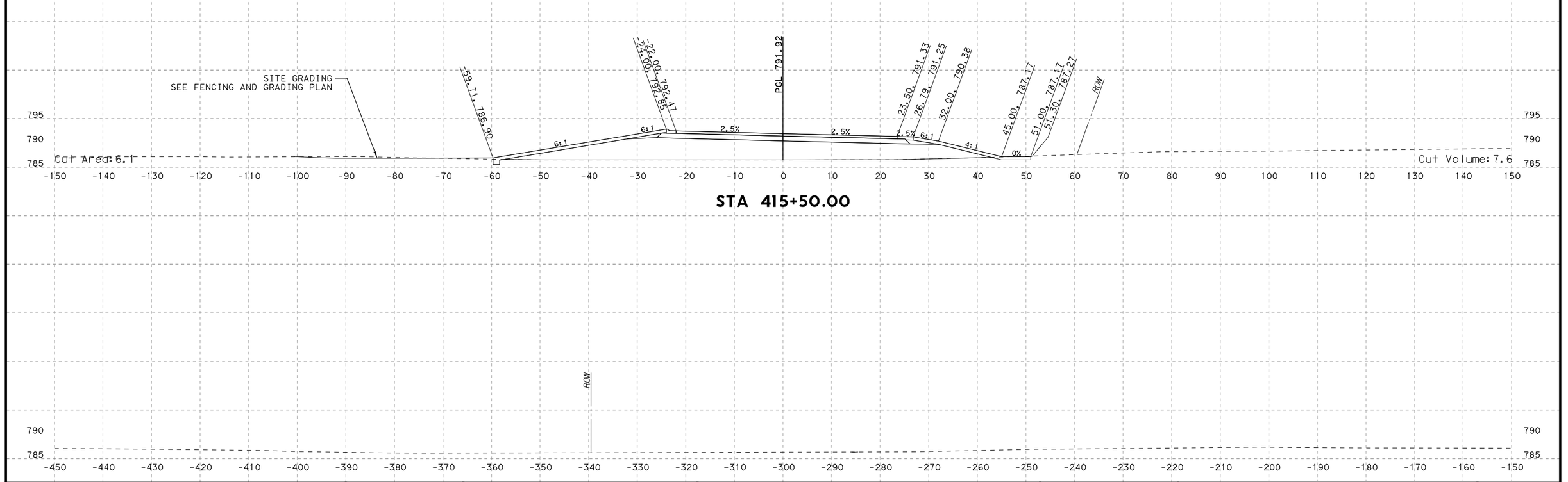
SHEET NO.
XS-45

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:21:41 AM
PENTABLE: S2-0000020I0718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



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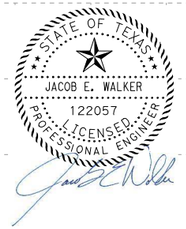
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

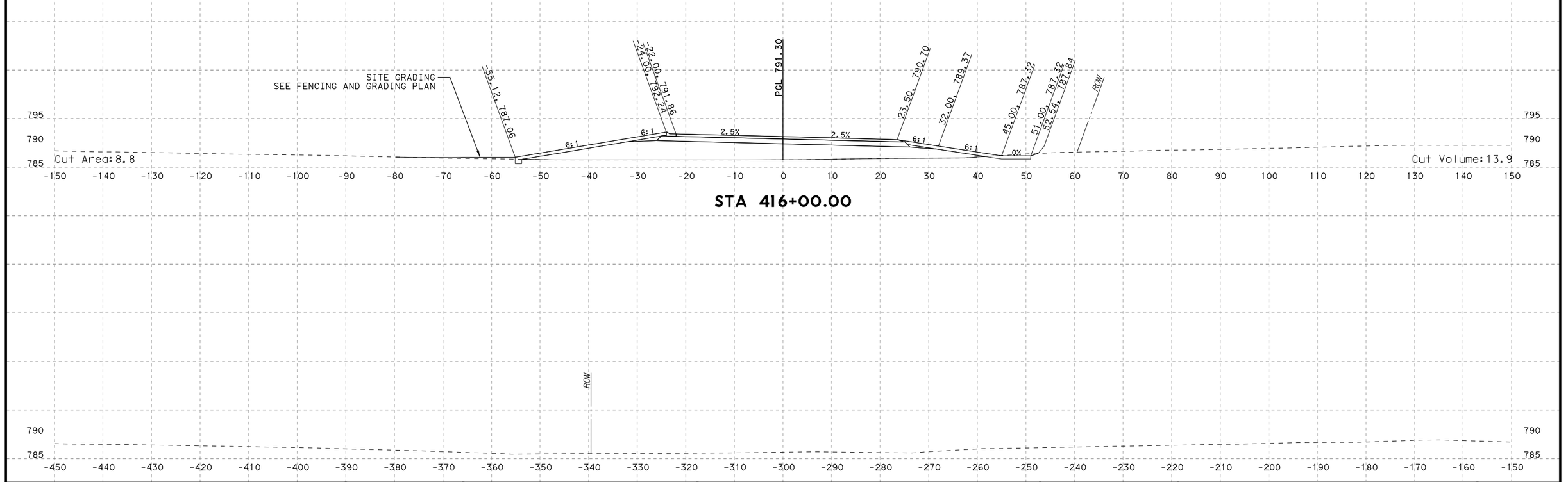
SHEET NO.
XS-46

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:21:44 AM
PENTABLE: S2-0000020/T0718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



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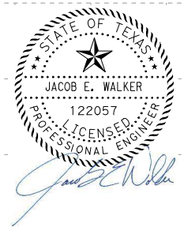
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

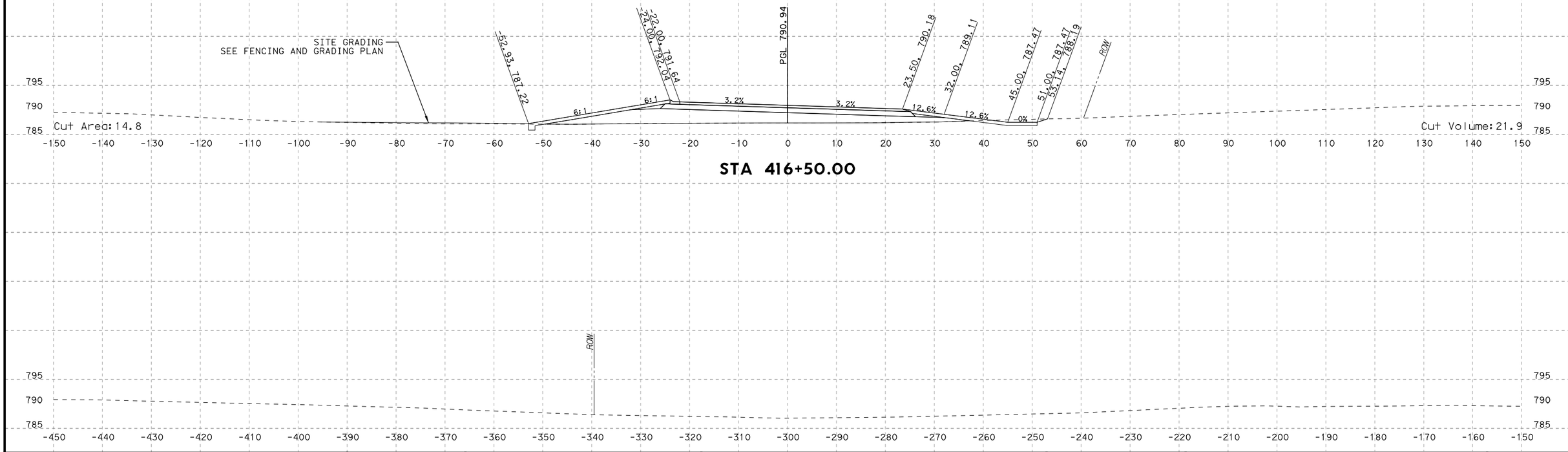
SHEET NO.
XS-47

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:21:48 AM
PENTABLE: S2-0000020/10718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 416+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/0718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:21:51 AM SCALE: 1:20
FILE: \

NO.	DATE	REVISION	APPROVED

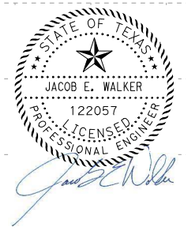
HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 416+50.00

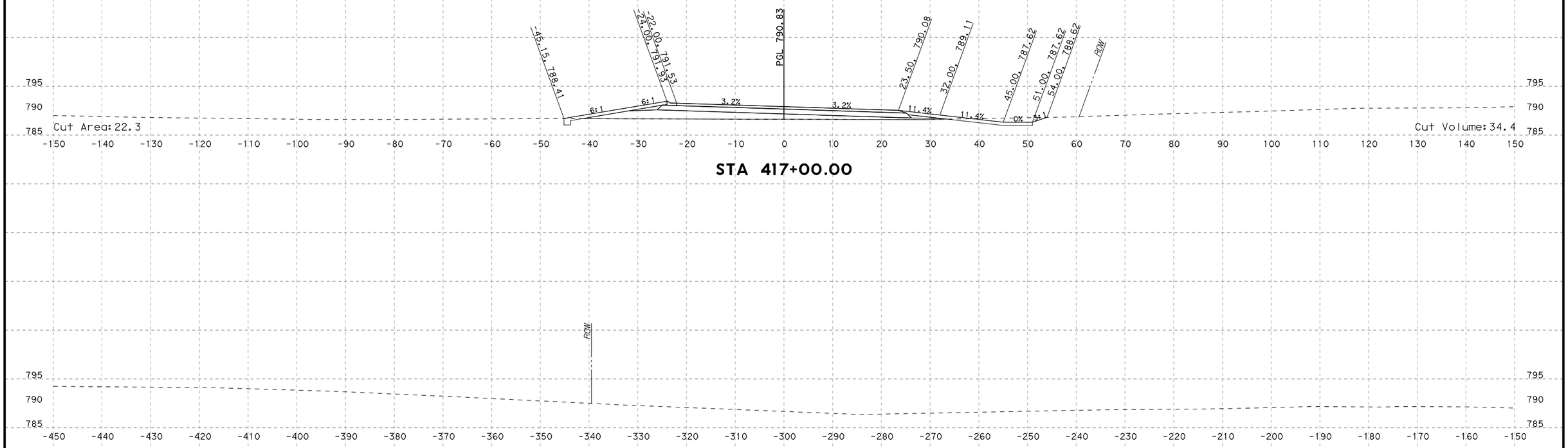
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-48



03/26/2018



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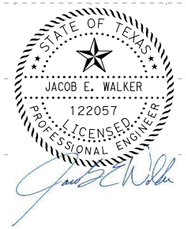
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

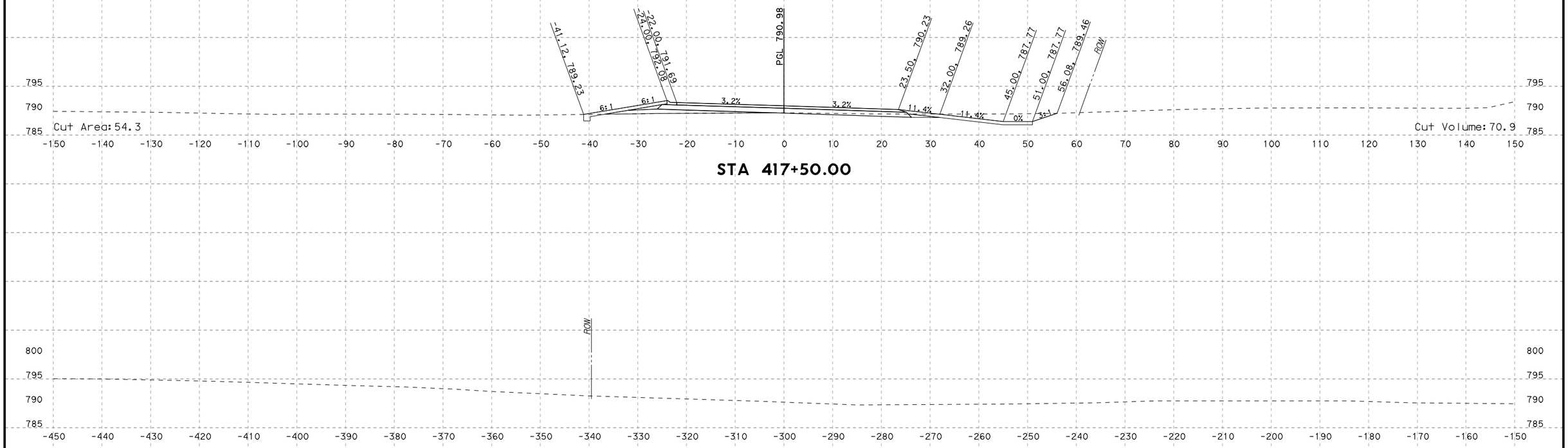
SHEET NO.
XS-49

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 11:21:54 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 417+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/T0718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:21:57 AM SCALE: 1:20
FILE: \

NO.	DATE	REVISION	APPROVED

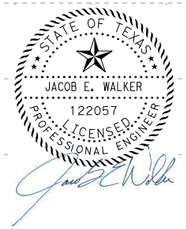
HDR Engineering, Inc.
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STA 417+50.00

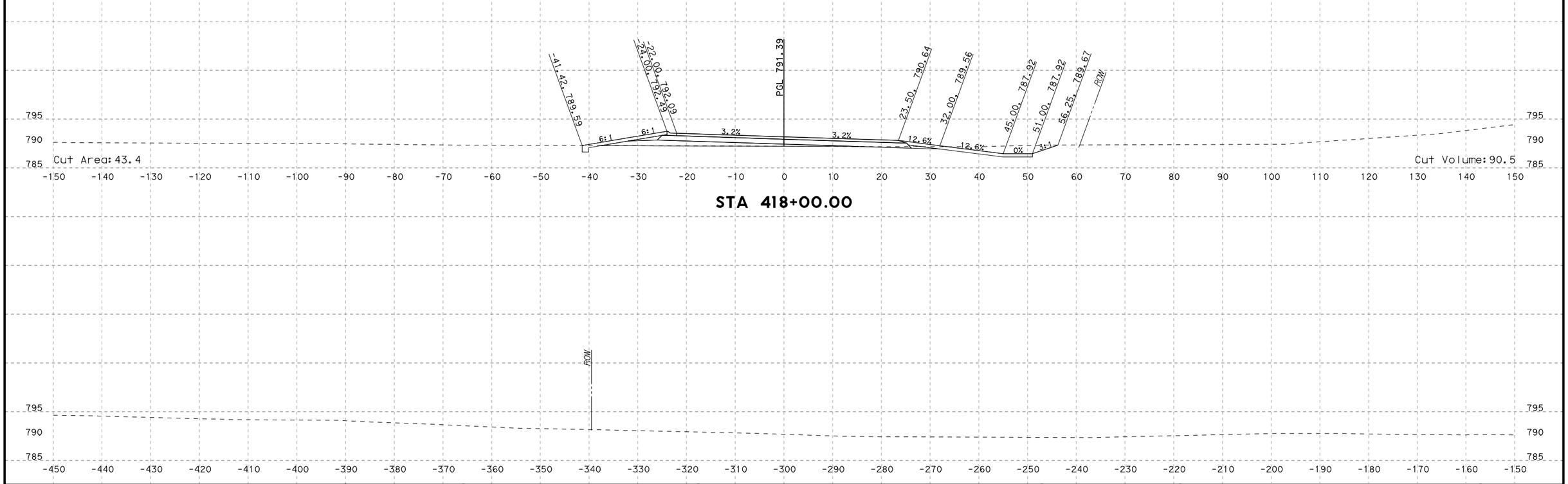
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-50



03/26/2018



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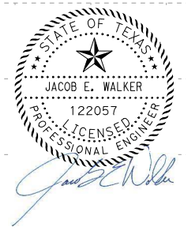
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

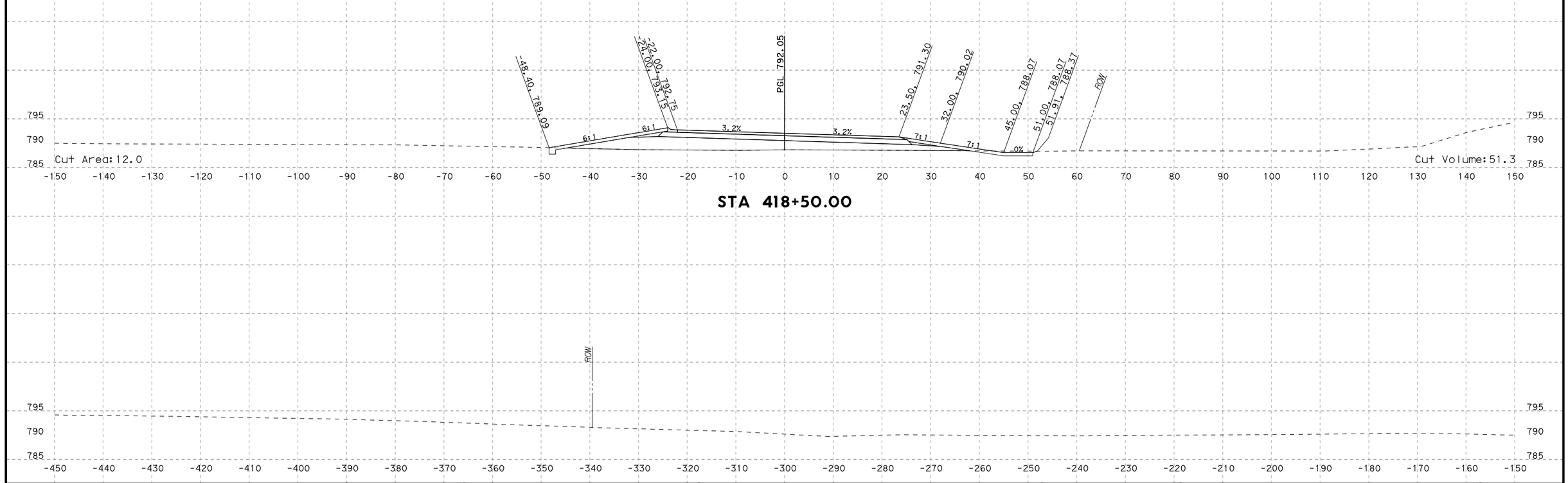
SHEET NO.
XS-51

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:22:01 AM
PENTABLE: S2-0000020/T0718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 11:22:04 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
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STA 418+50.00

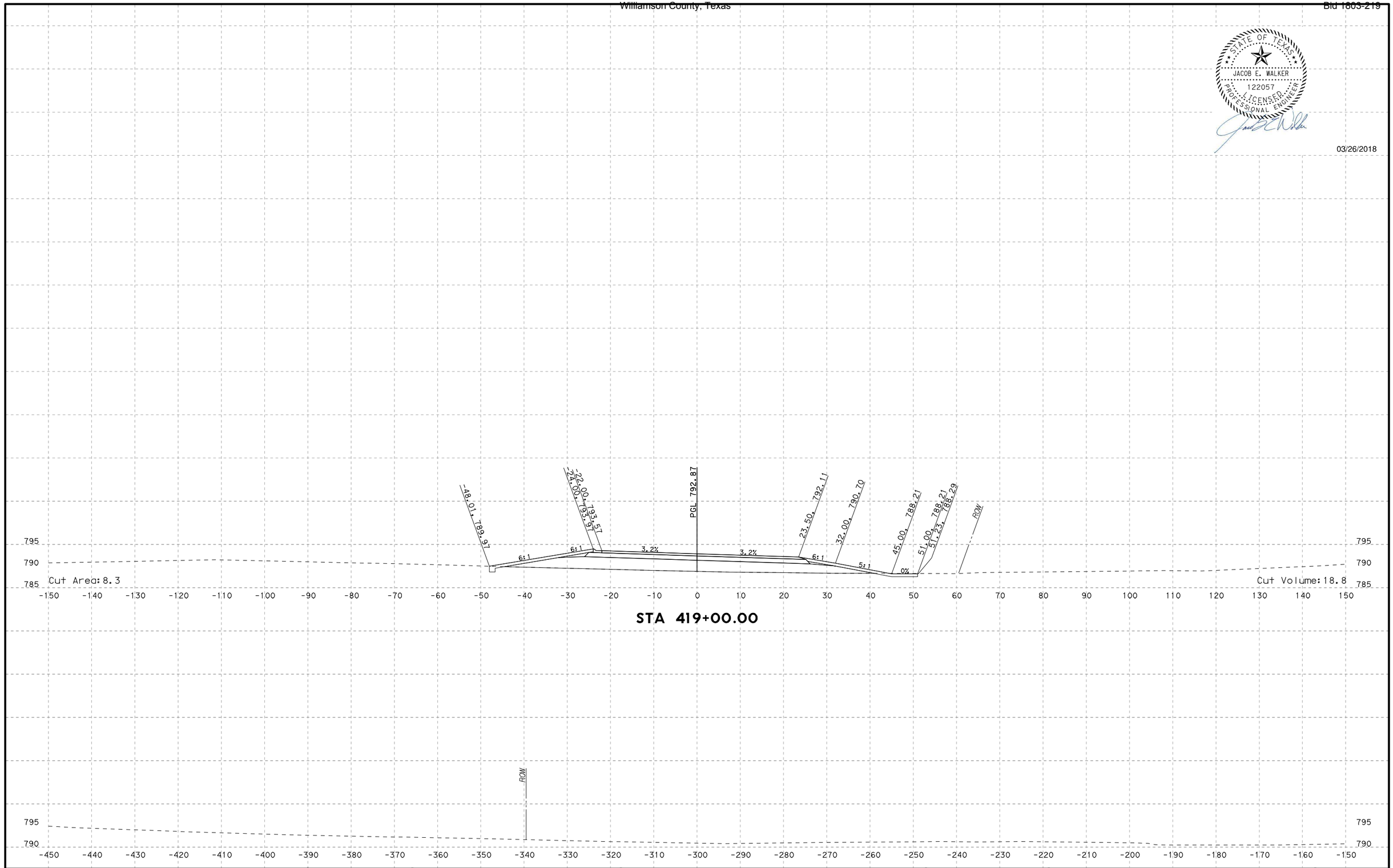
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-52

4/12/2018 7:20 AM

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Texas Registered Engineering Firm F-754

STA 419+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

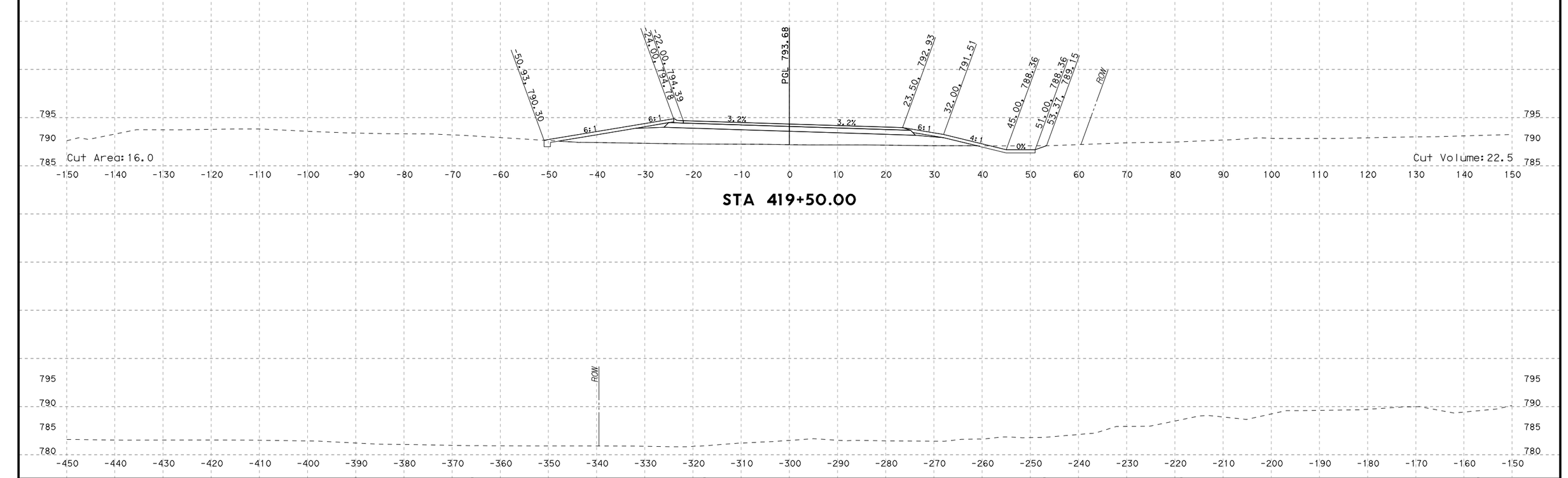
SHEET NO.
XS-53

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:22:07 AM
PENTABLE: S2-0000020I0718.tbl
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 419+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020/T0718.tbl
TIME: 11:22:10 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
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STA 419+50.00

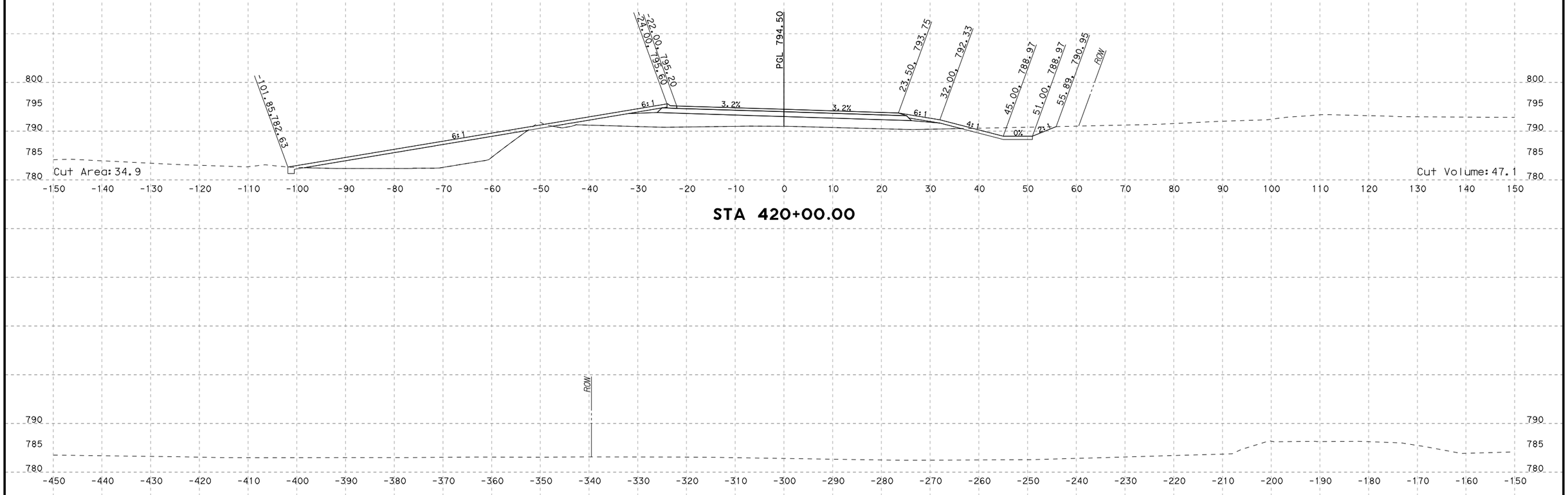
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-54

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 420+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

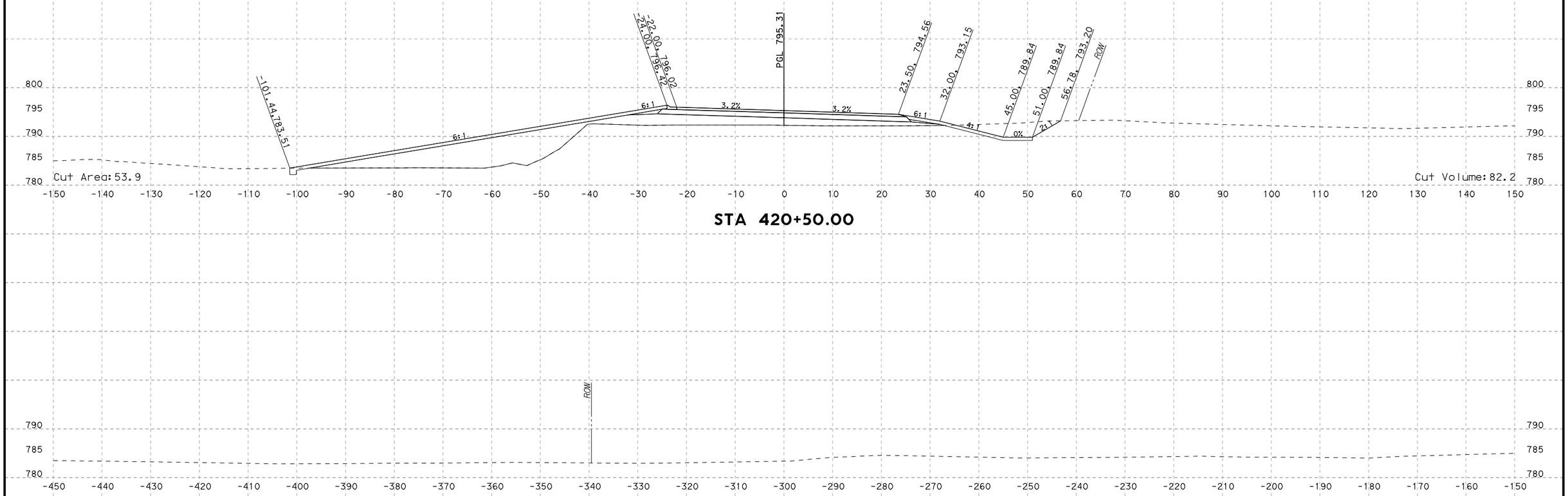
SHEET NO.
XS-55

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: \gomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:22:4 AM
PENTABLE: S2-0000020I7018.tbl
SCALE: 1:20

4/12/2018 7:20 AM

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122057
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PROFESSIONAL ENGINEER

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STA 420+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020\T0718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:22:17 AM SCALE: 1:20
FILE: \

NO.	DATE	REVISION	APPROVED

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STA 420+50.00

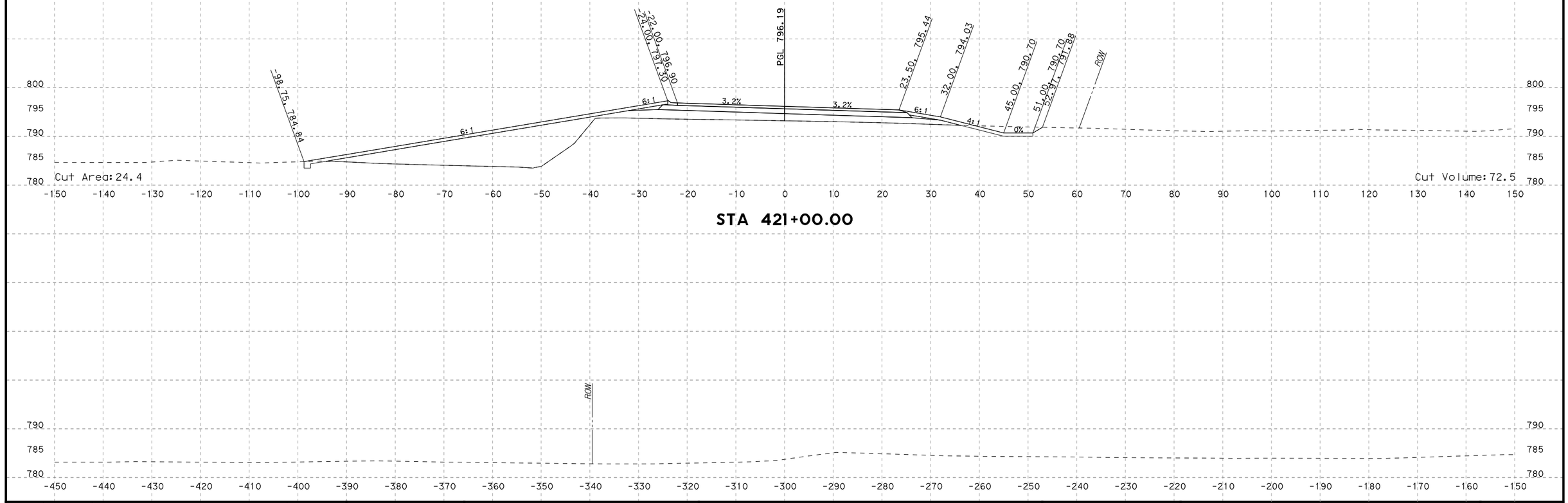
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-56

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PROFESSIONAL ENGINEER

03/26/2018



STA 421+00.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:22:20 AM SCALE: 1:20
DATE: 3/26/2018 FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 421+00.00

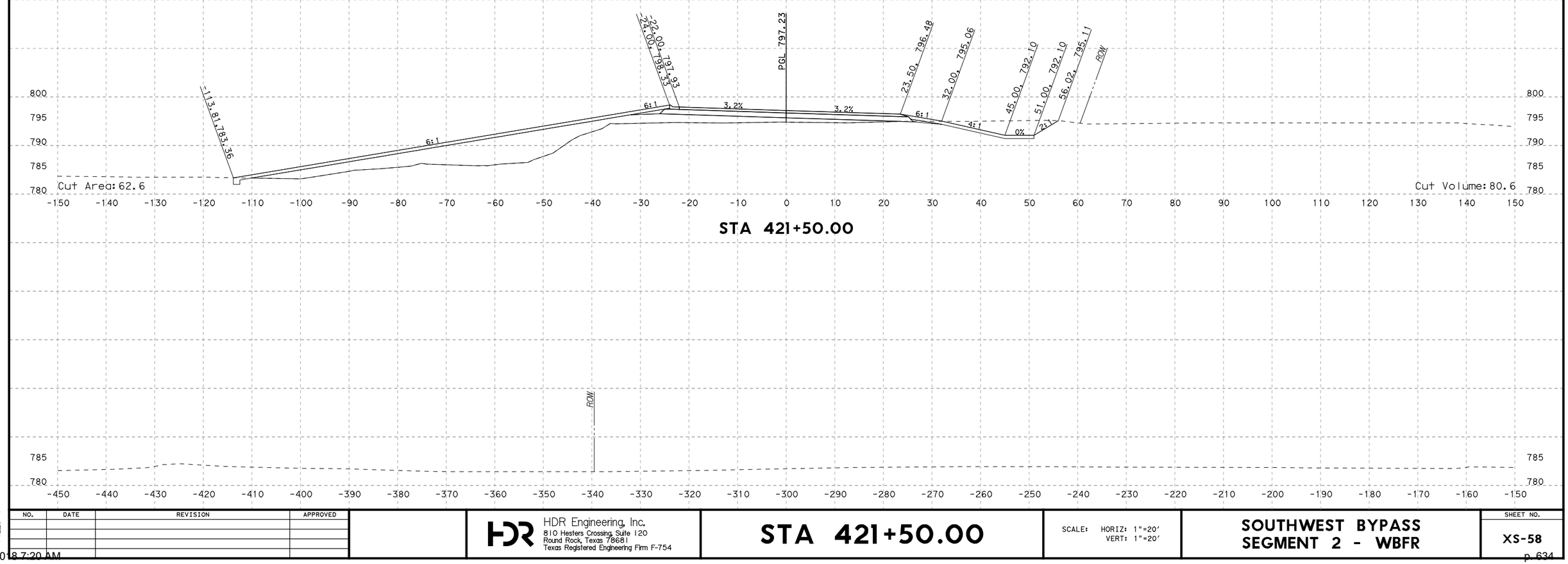
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VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-57

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 421+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020170718.tbl
TIME: 11:22:24 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

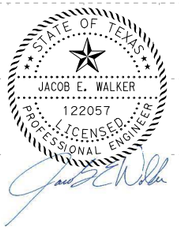
STA 421+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

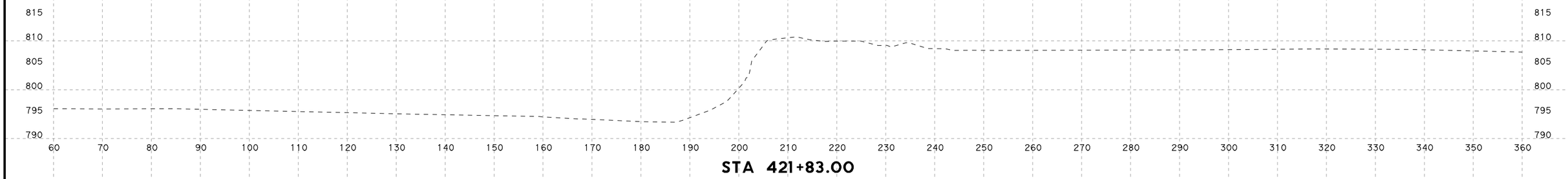
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-58

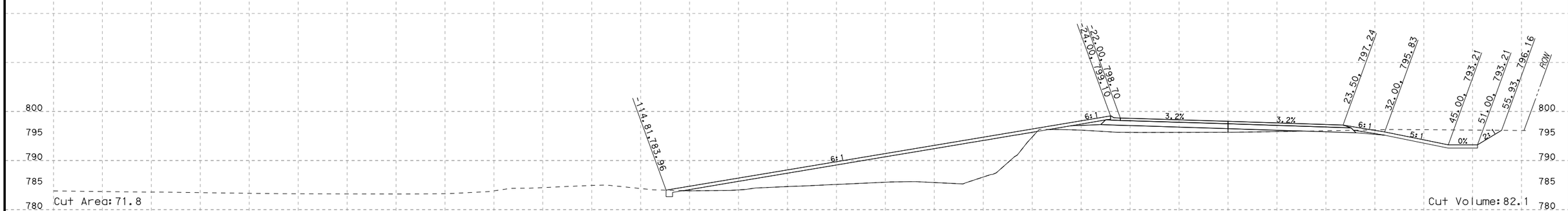
4/12/2018 7:20 AM



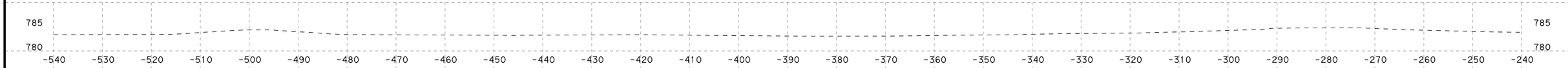
03/26/2018



STA 421+83.00



STA 421+83.00



NO.	DATE	REVISION	APPROVED

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STA 421+83.00

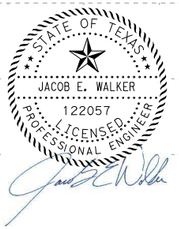
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

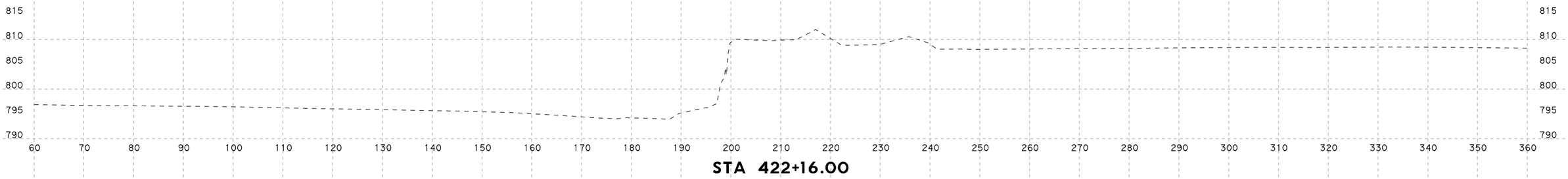
SHEET NO.
XS-59

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
DATE: 3/26/2018 TIME: 11:22:27 AM PENTABLE: S2-0000020170718.tbl SCALE: 1:20

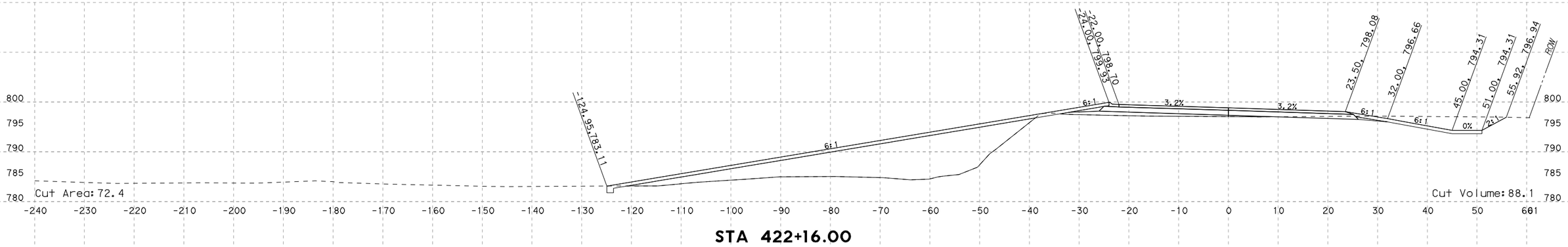
4/12/2018 7:20 AM



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STA 422+16.00



STA 422+16.00

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STA 422+16.00

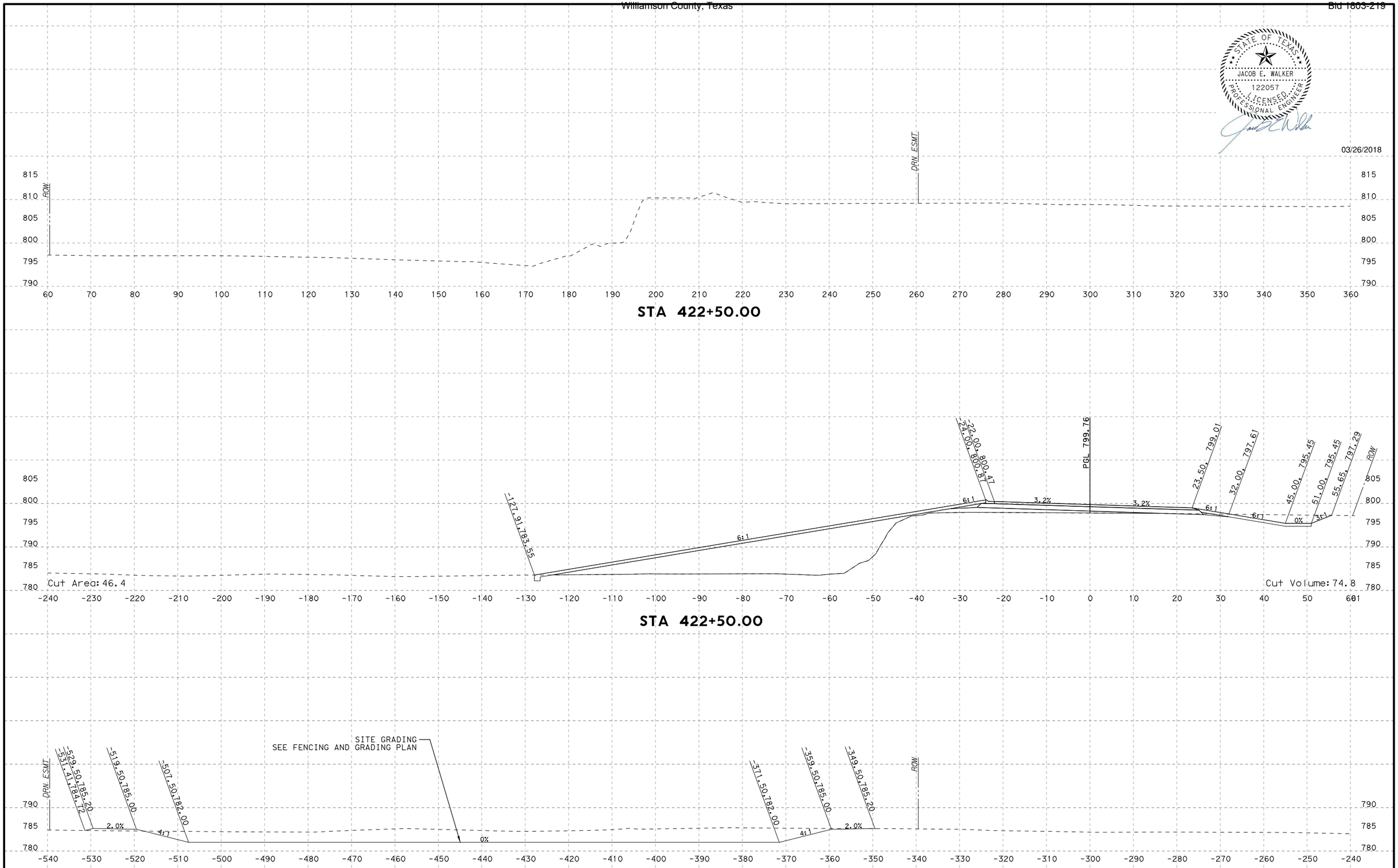
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VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-60

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:22:30 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



NO.	DATE	REVISION	APPROVED

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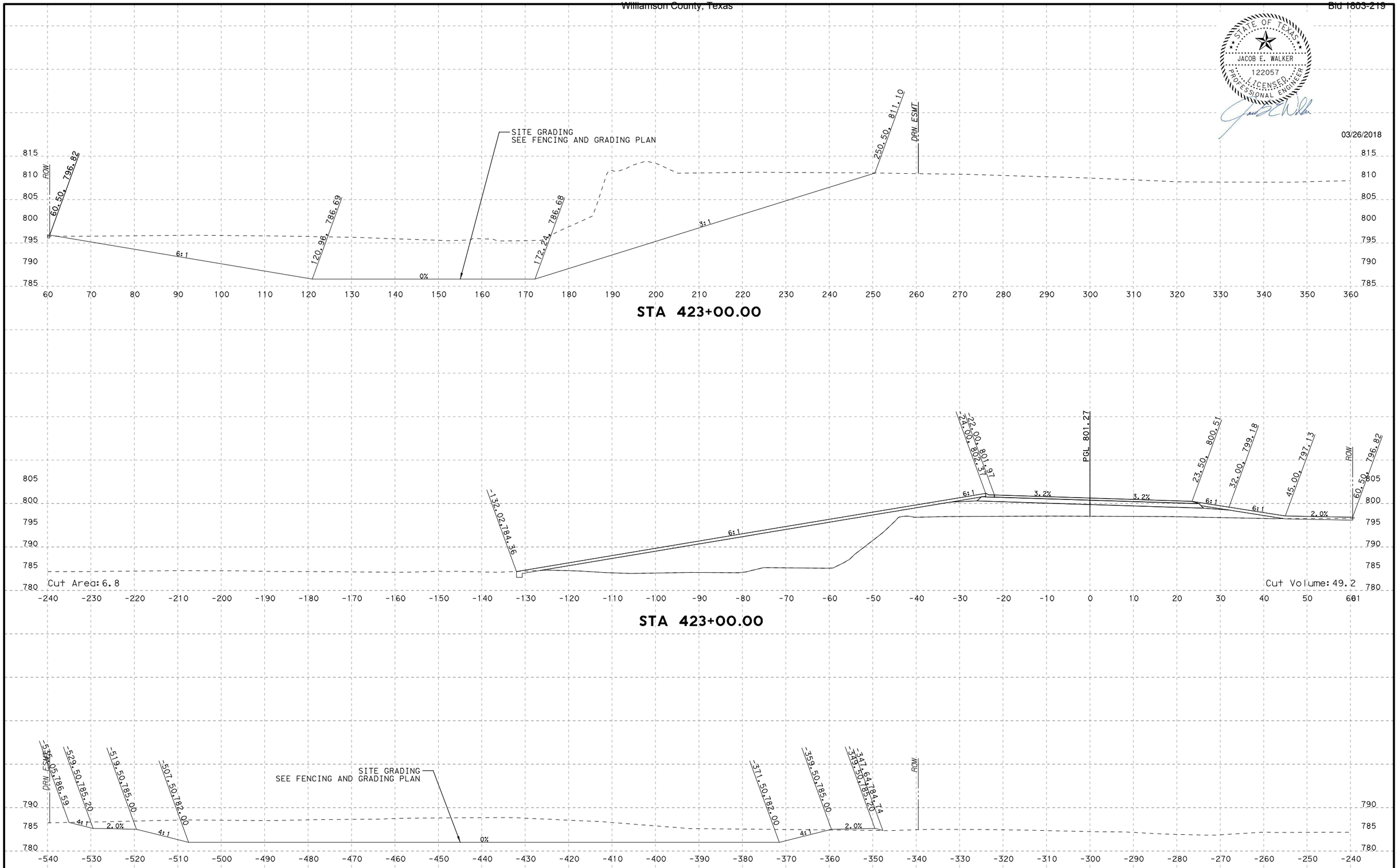
STA 422+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-61

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:22:34 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \
4/12/2018 7:20 AM



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:22:37 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

NO.	DATE	REVISION	APPROVED

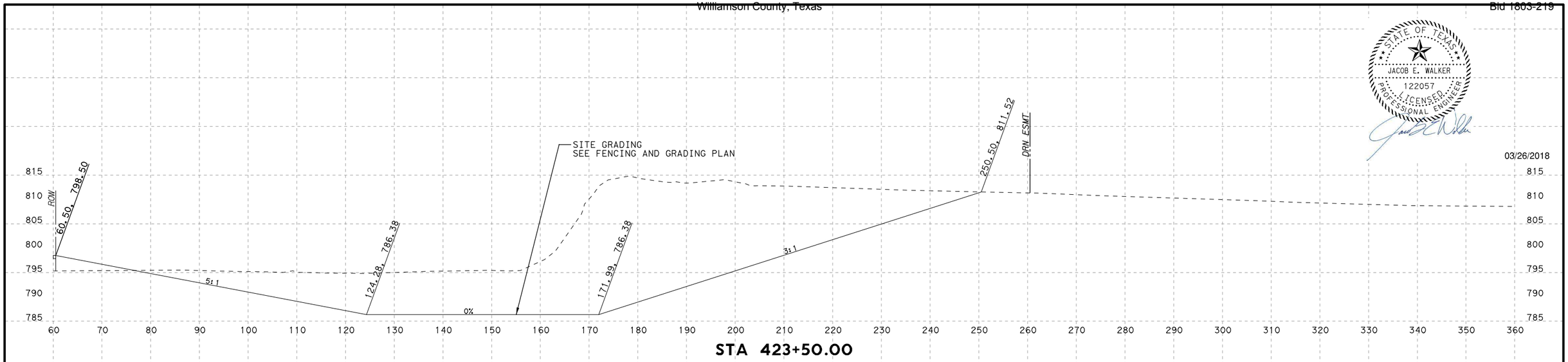
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 423+00.00

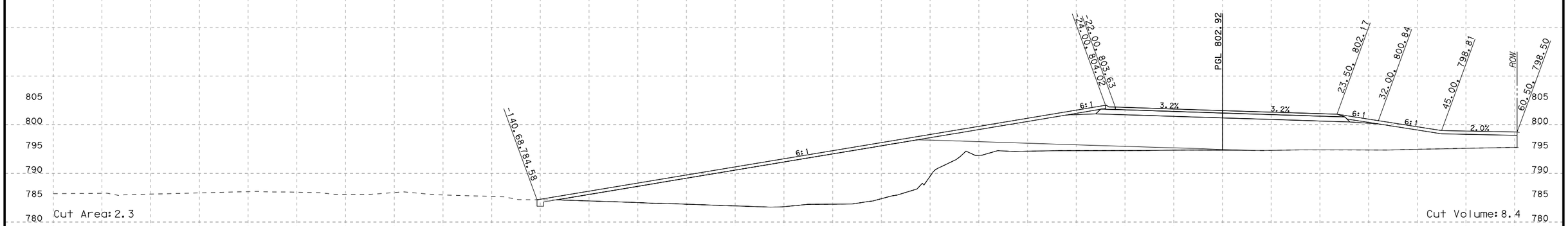
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

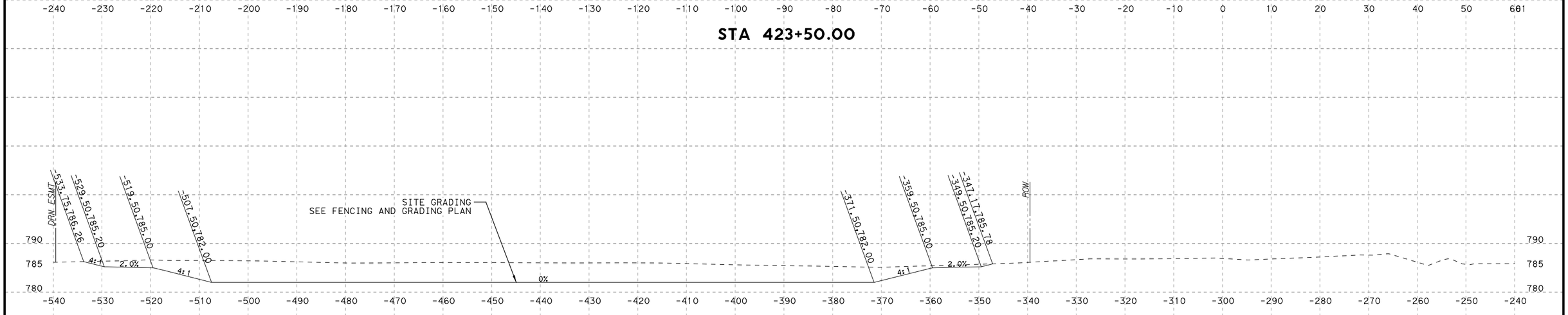
SHEET NO.
XS-62



STA 423+50.00



STA 423+50.00



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Round Rock, Texas 78681
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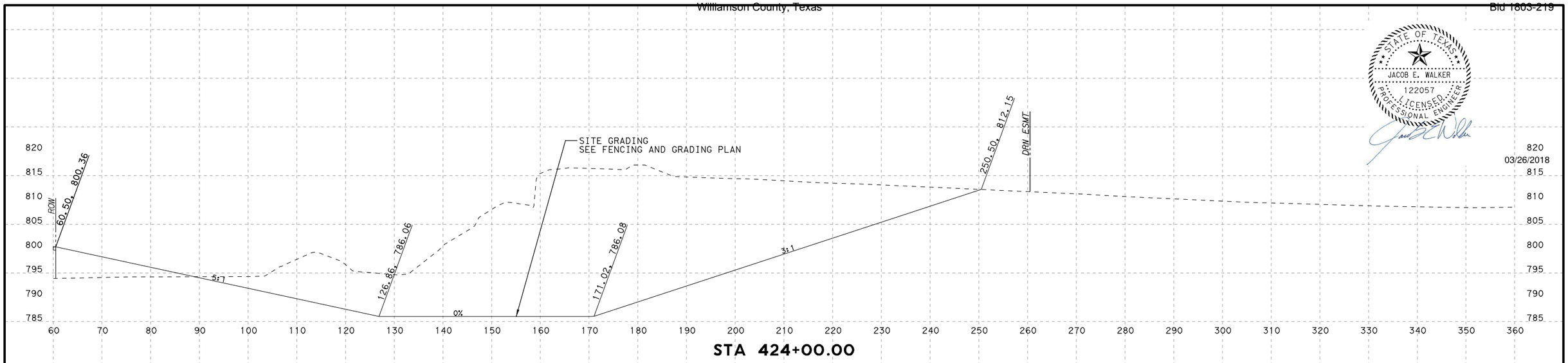
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VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

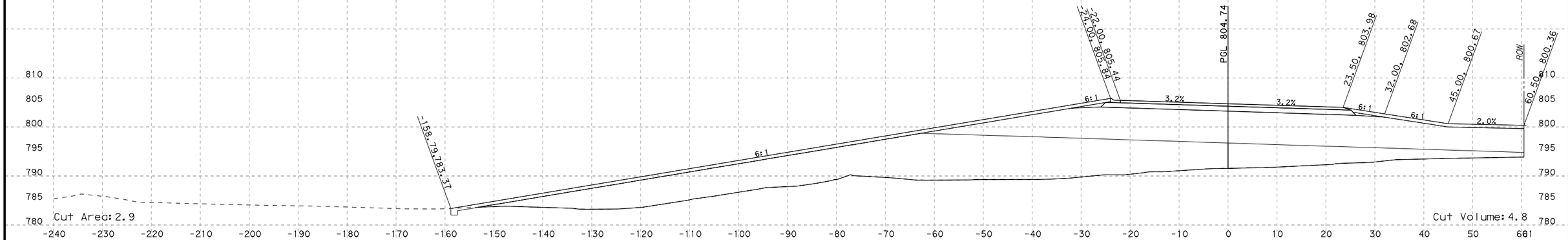
SHEET NO.
XS-63

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:22:40 AM SCALE: 1:20
FILE: \
4/12/2018 7:20 AM

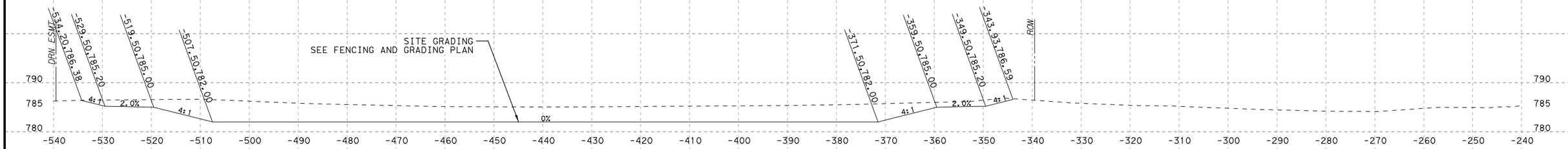
JACOB E. WALKER
122057
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PROFESSIONAL ENGINEER
STATE OF TEXAS
03/26/2018



STA 424+00.00



STA 424+00.00



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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 424+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

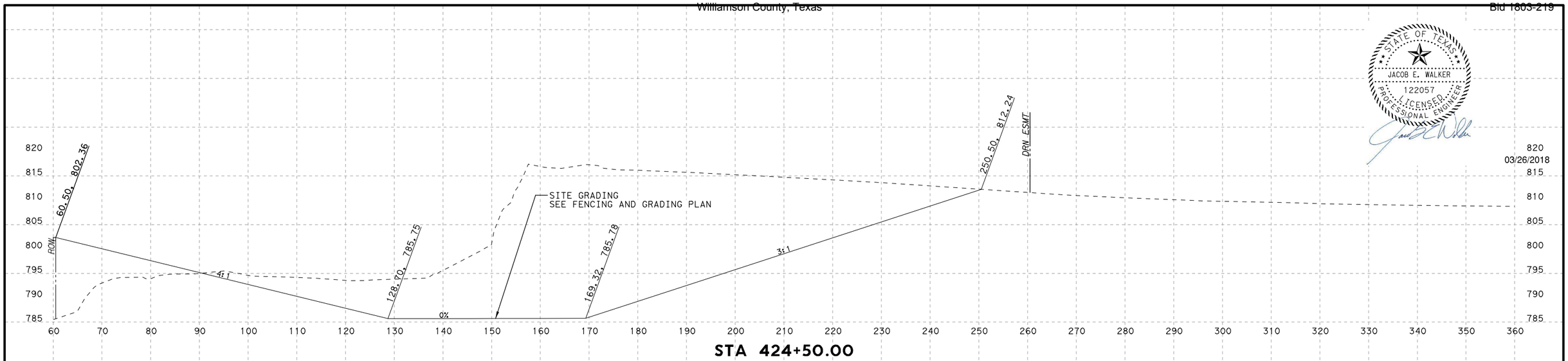
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-64

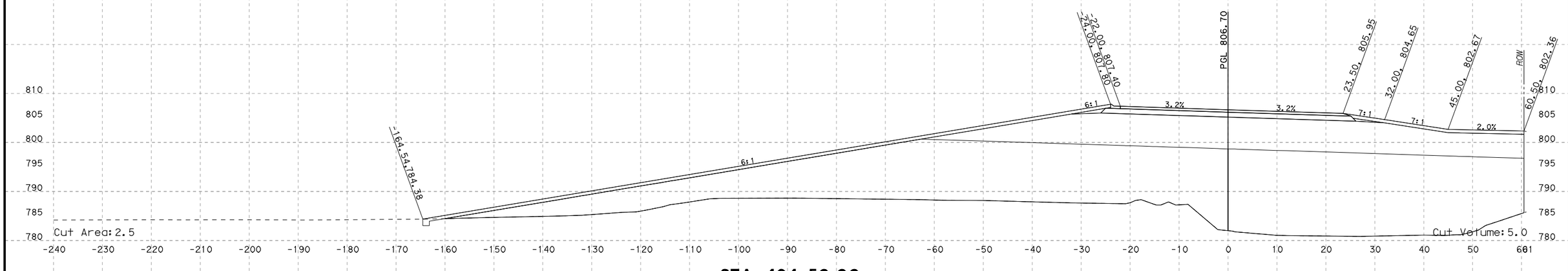
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USER: lgomezgonz DATE: 3/26/2018 TIME: 11:22:44 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

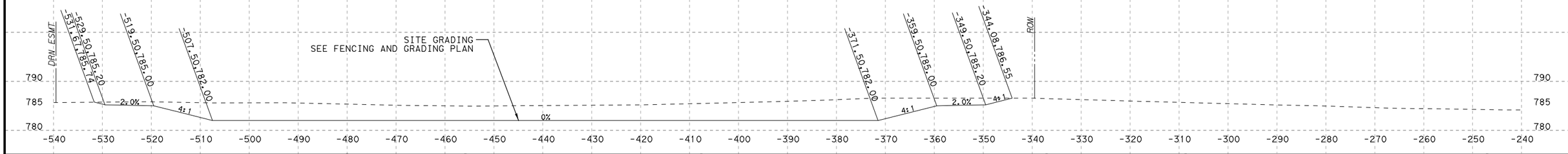
JACOB E. WALKER
122057
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PROFESSIONAL ENGINEER
STATE OF TEXAS
03/26/2018



STA 424+50.00



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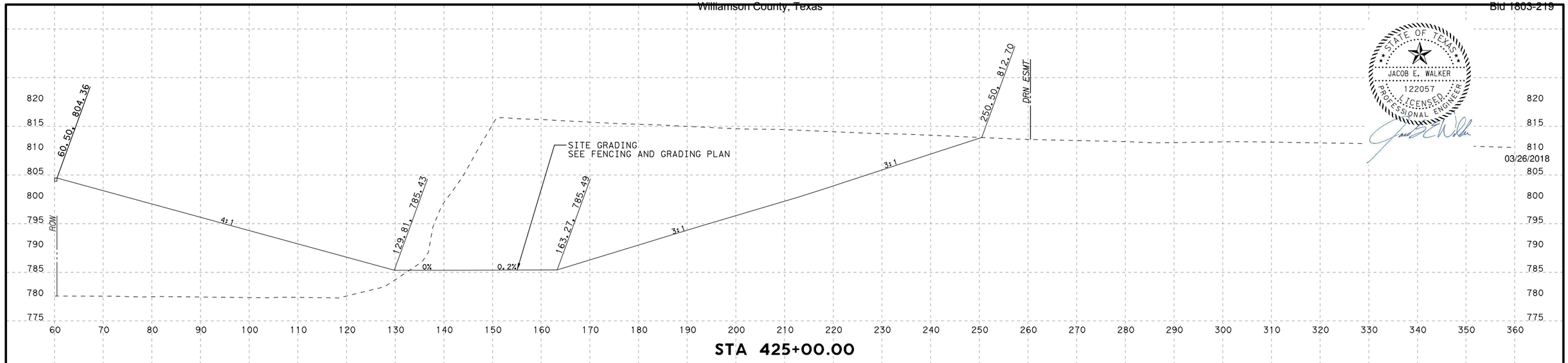
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-65

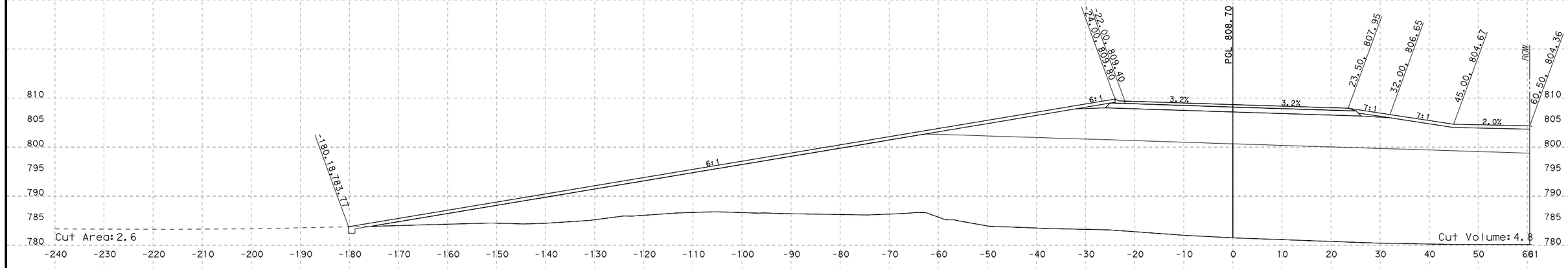
PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgon2 DATE: 3/26/2018 TIME: 11:22:47 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

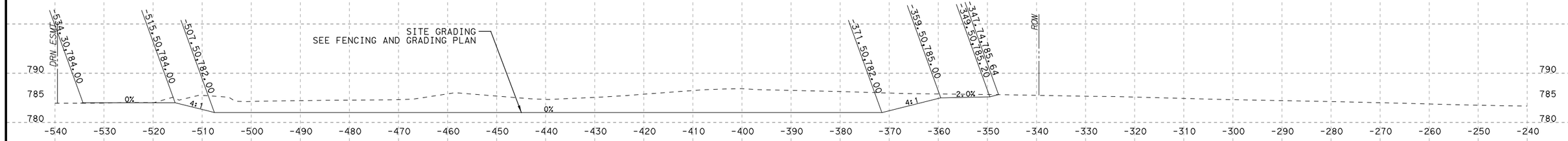


STA 425+00.00

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/26/2018



STA 425+00.00



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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 425+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

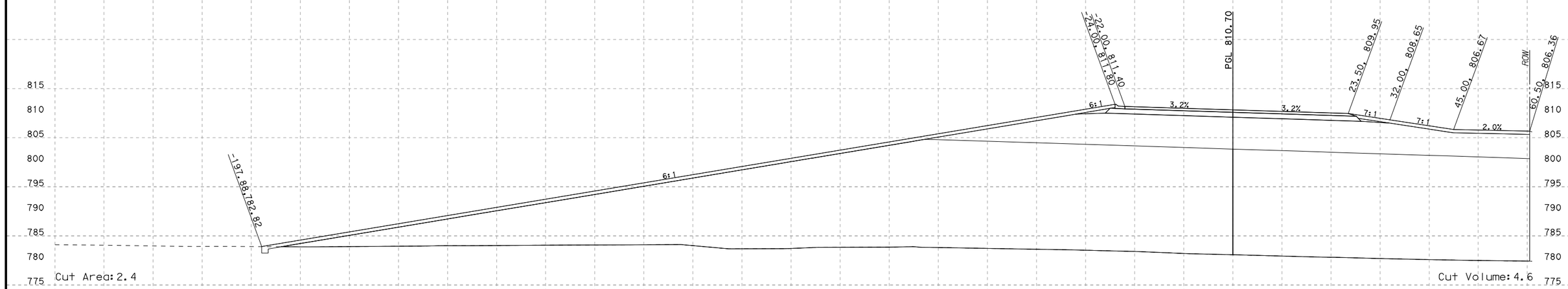
SHEET NO.
XS-66

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DATE: 3/26/2018
FILE: \

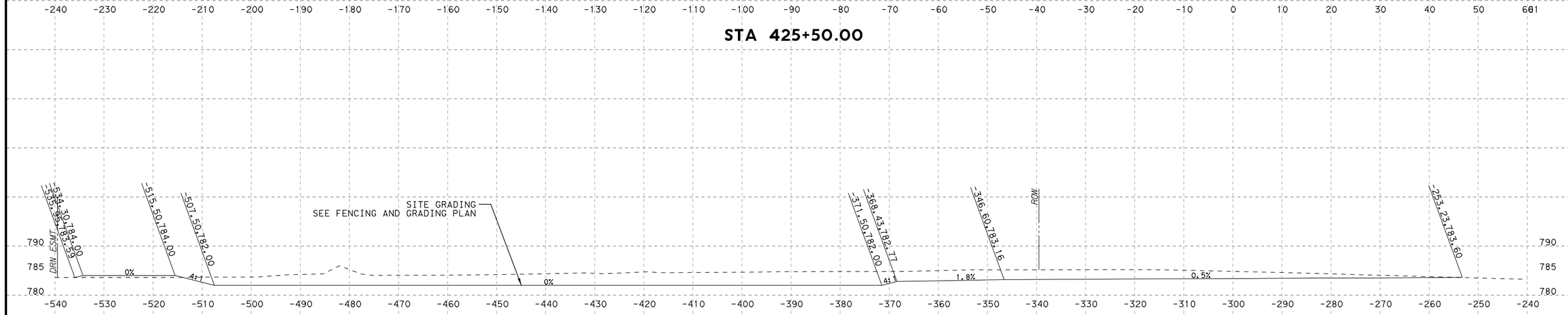
4/12/2018 7:20 AM



STA 425+50.00



STA 425+50.00



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HDR Engineering, Inc.
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Round Rock, Texas 78681
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STA 425+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-67

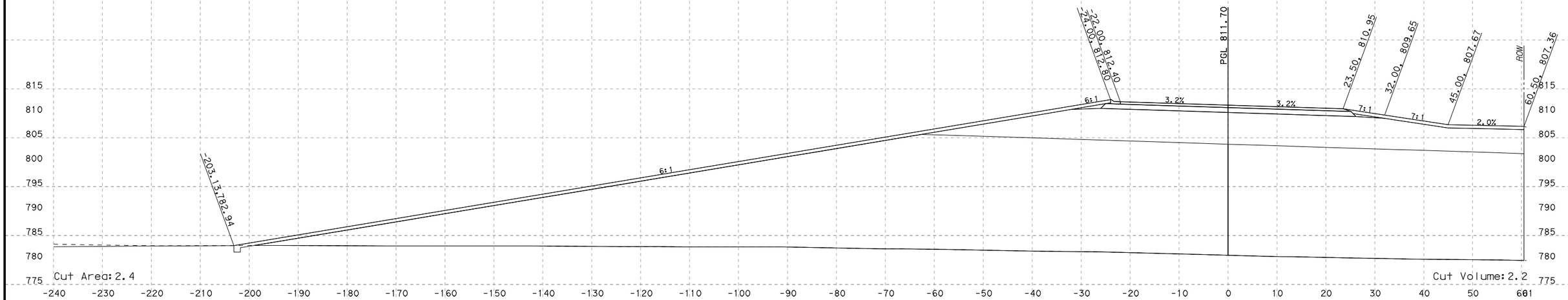
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DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM

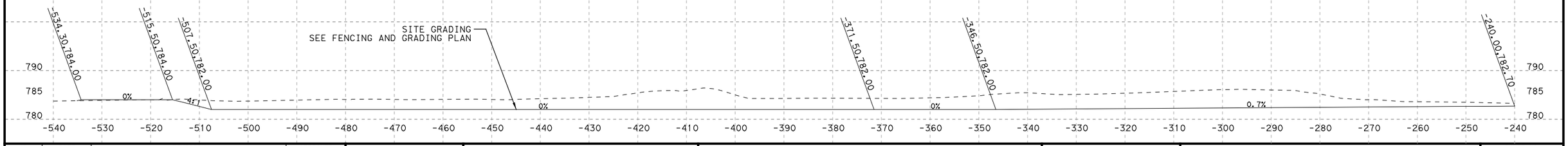


STATE OF TEXAS
JACOB E. WALKER
122057
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PROFESSIONAL ENGINEER
03/26/2018

STA 425+75.00



STA 425+75.00



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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 425+75.00

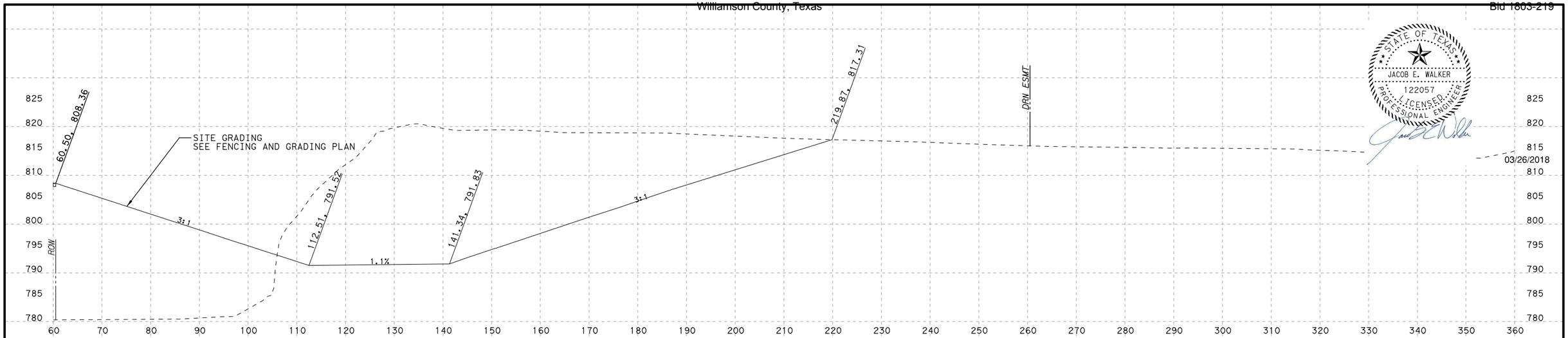
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VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-68

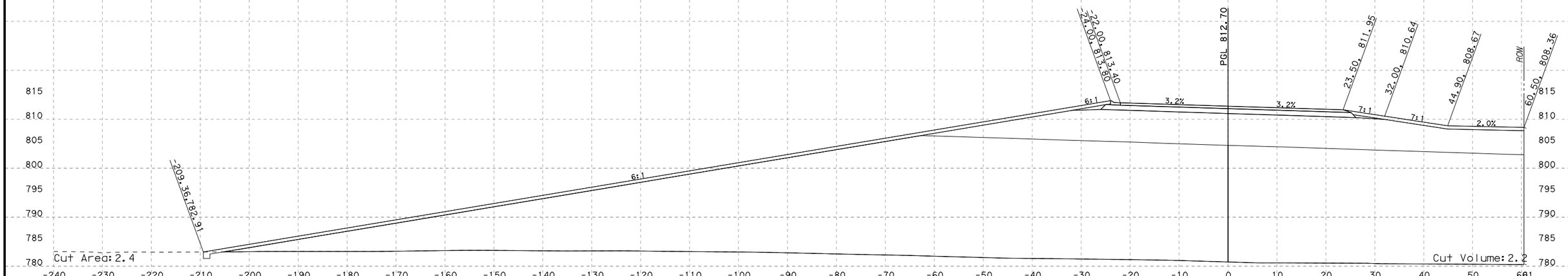
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USER: lgomezgonz DATE: 3/26/2018 TIME: 11:22:57 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

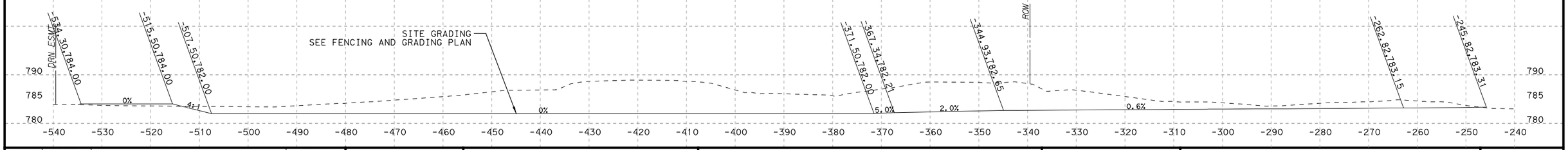


STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER
03/26/2018

STA 426+00.00



STA 426+00.00



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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

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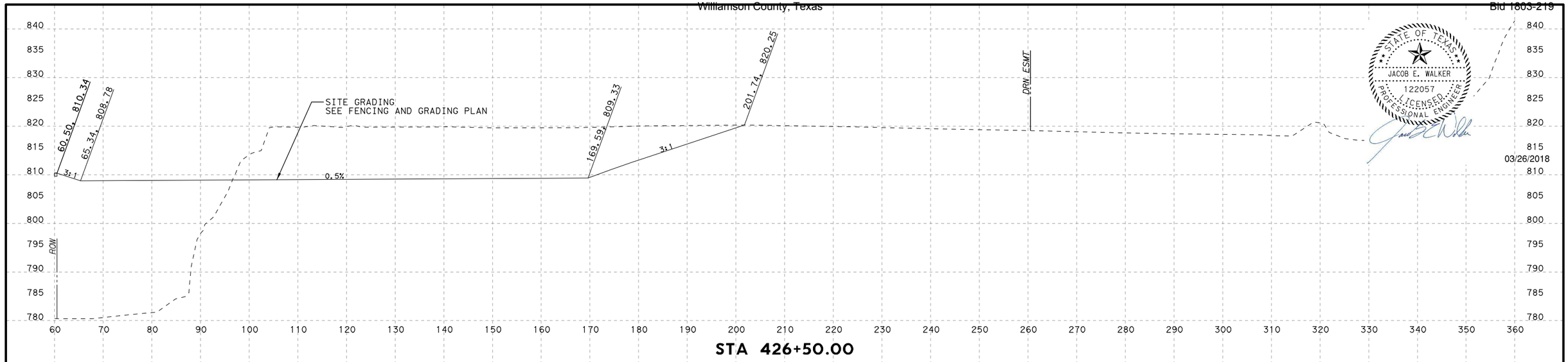
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

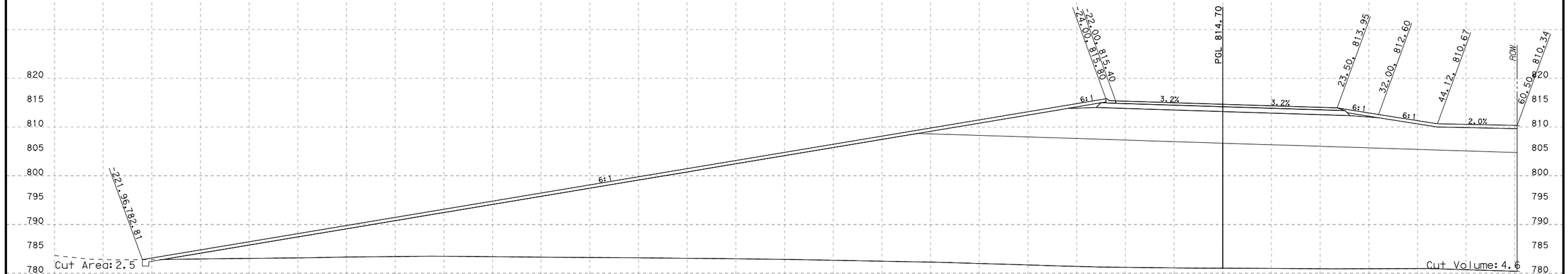
SHEET NO.
XS-69

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020I0718.tbl
USER: lgomezgonz TIME: 11:23:00 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

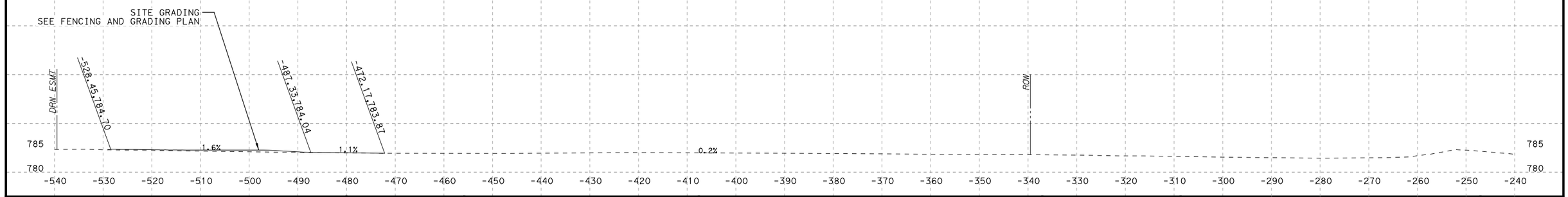
4/12/2018 7:20 AM



STA 426+50.00



STA 426+50.00



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Round Rock, Texas 78681
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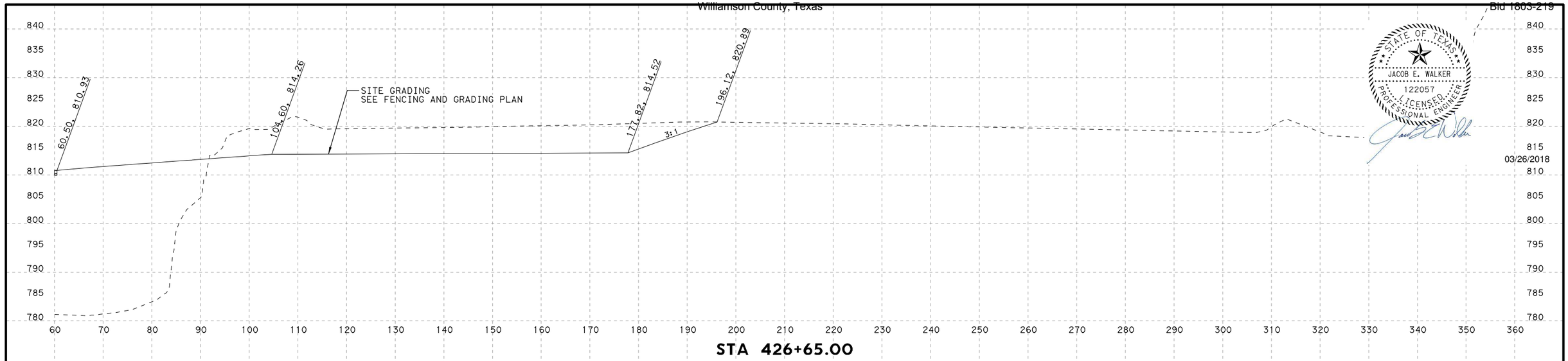
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-70

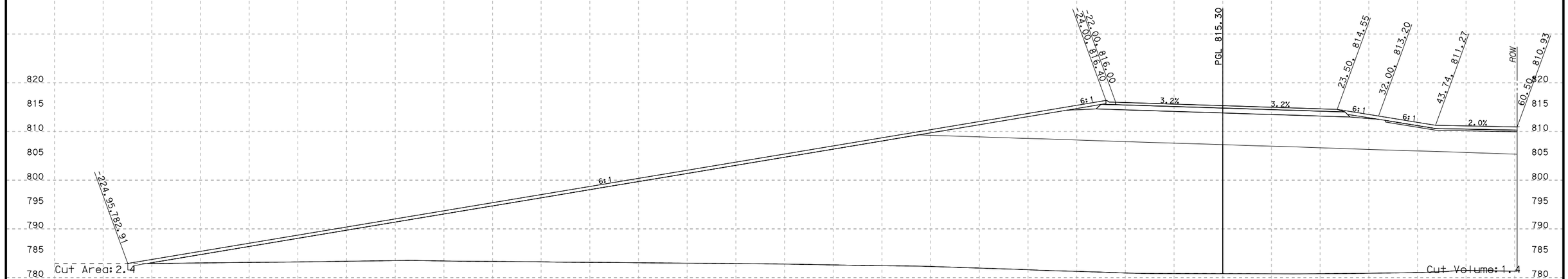
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USER: lgomezgonz DATE: 3/26/2018 TIME: 11:23:04 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



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03/26/2018

STA 426+65.00



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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

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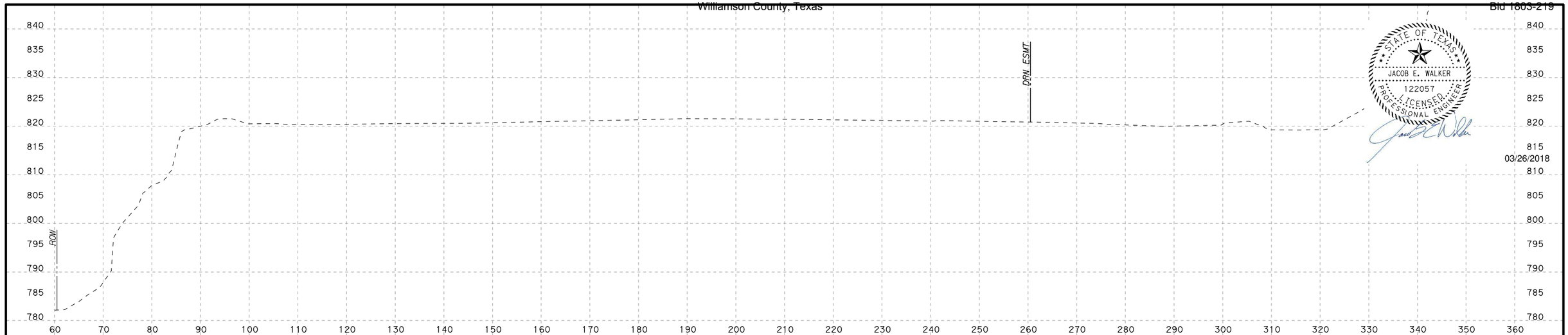
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

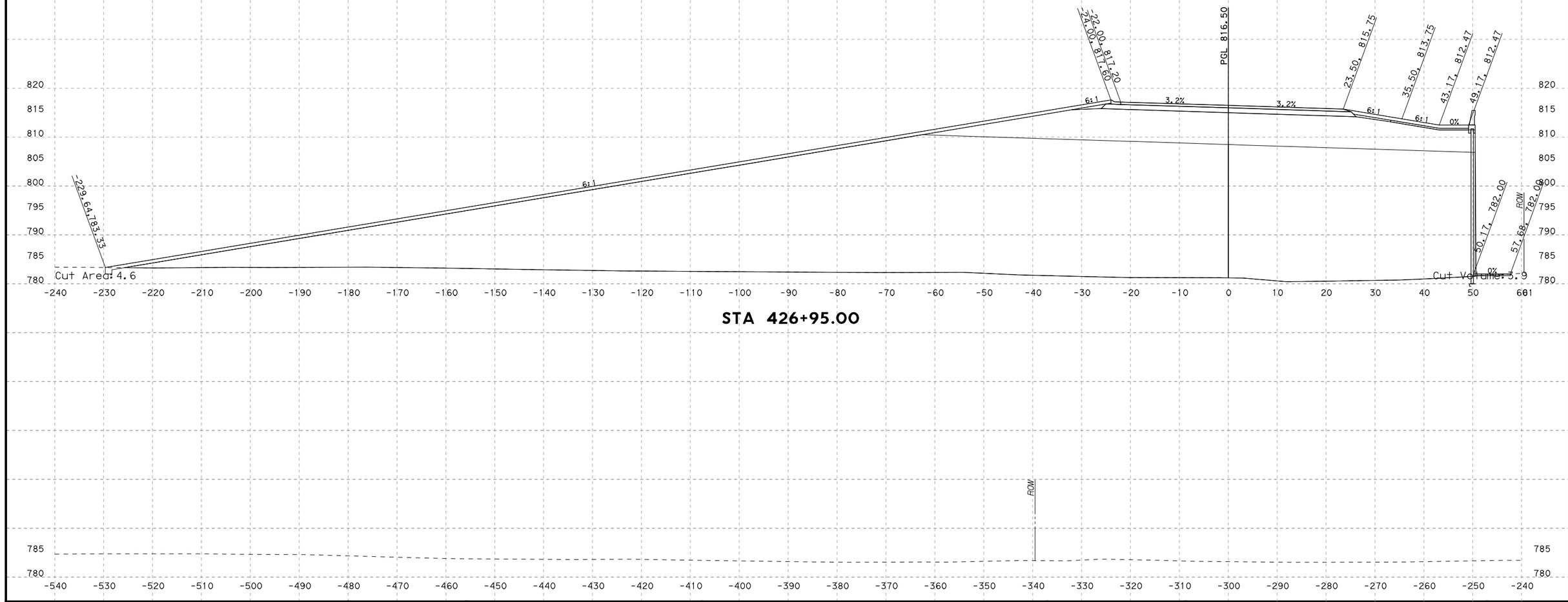
SHEET NO.
XS-71

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:23:07 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



STA 426+95.00



STA 426+95.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 426+95.00

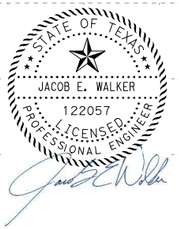
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

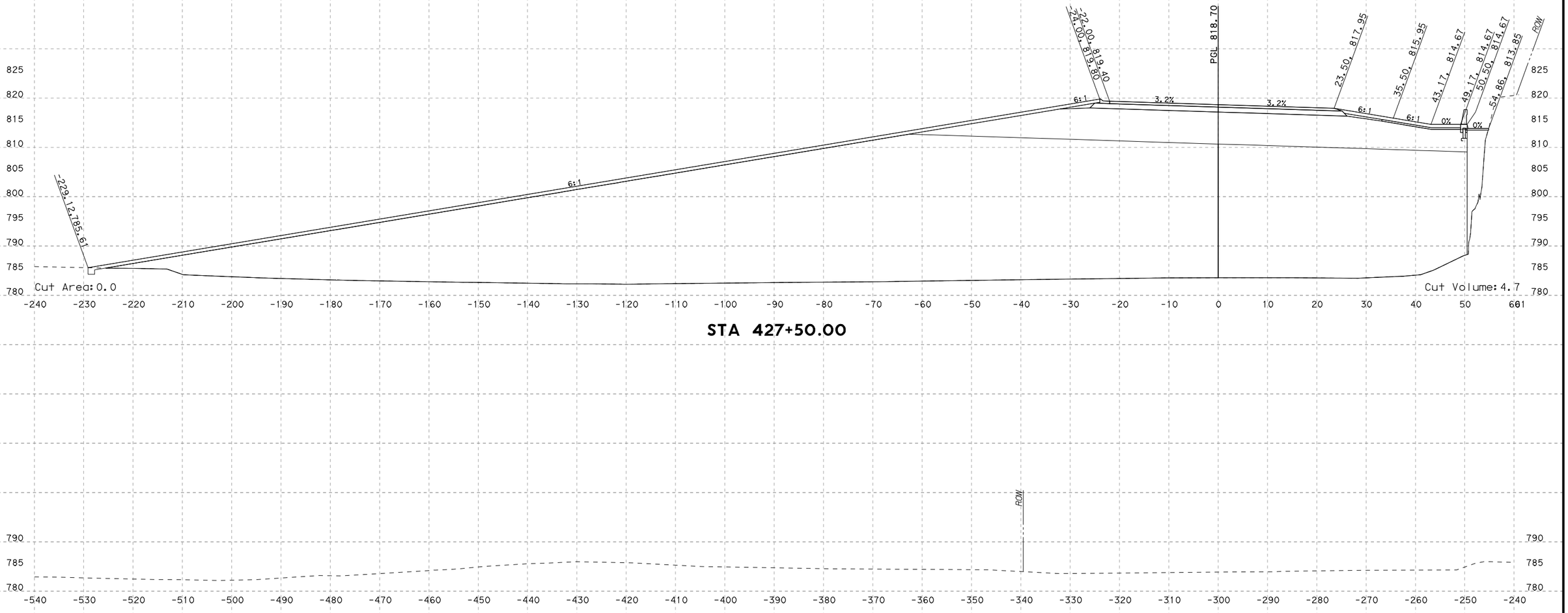
SHEET NO.
XS-72

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-00000201710718.tbl
TIME: 11:23:10 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 427+50.00

NO.	DATE	REVISION	APPROVED

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STA 427+50.00

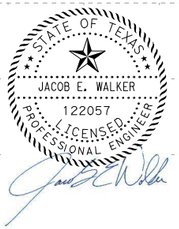
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

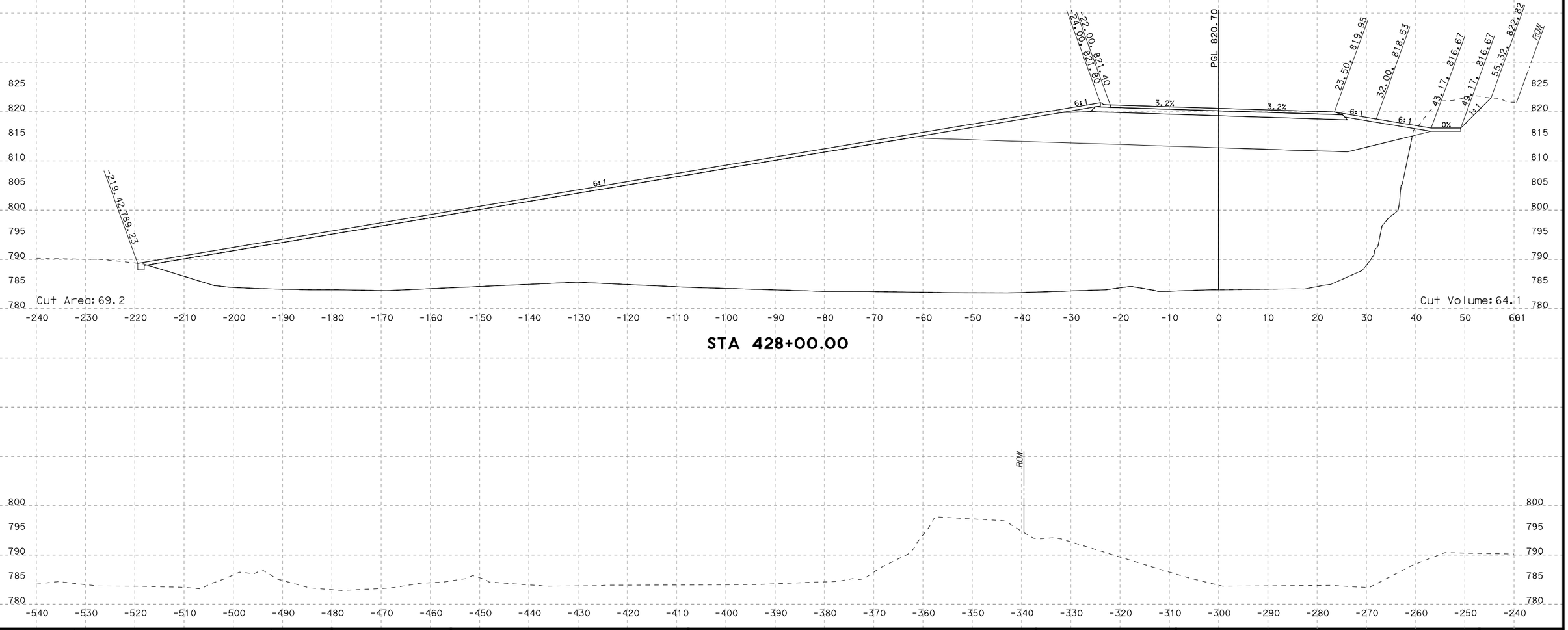
SHEET NO.
XS-73

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020\T0718.tbl
TIME: 11:23:4 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 428+00.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020070718.tbl
USER: lgomezgon2 DATE: 3/26/2018 TIME: 11:23:17 AM SCALE: 1:20
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 428+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO. XS-74

STATE OF TEXAS
JACOB E. WALKER
122057
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03/26/2018

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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 428+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

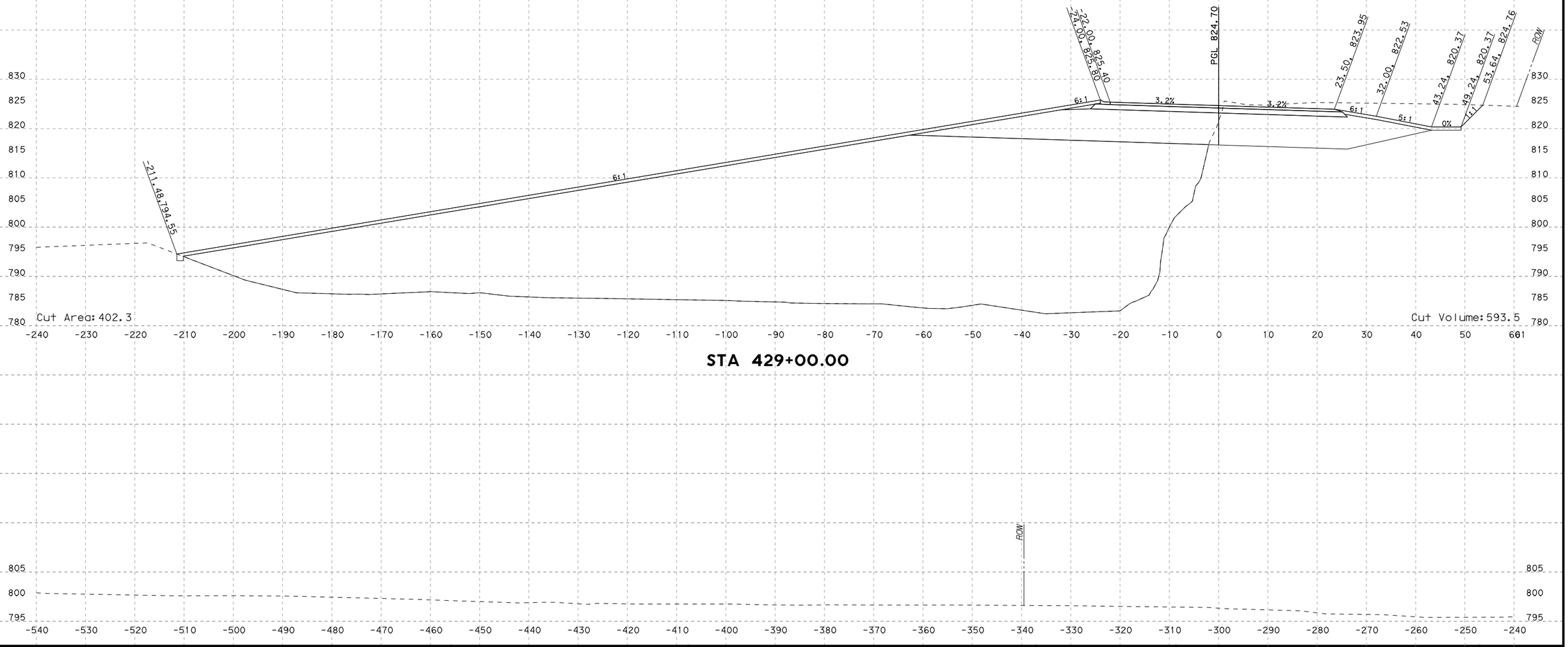
SHEET NO.
XS-75

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:23:20 AM
PENTABLE: S2-0000020I7018.tbl
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/26/2018 FILE: \
PENTABLE: S2-0000020170718.tbl TIME: 11:23:24 AM SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 429+00.00

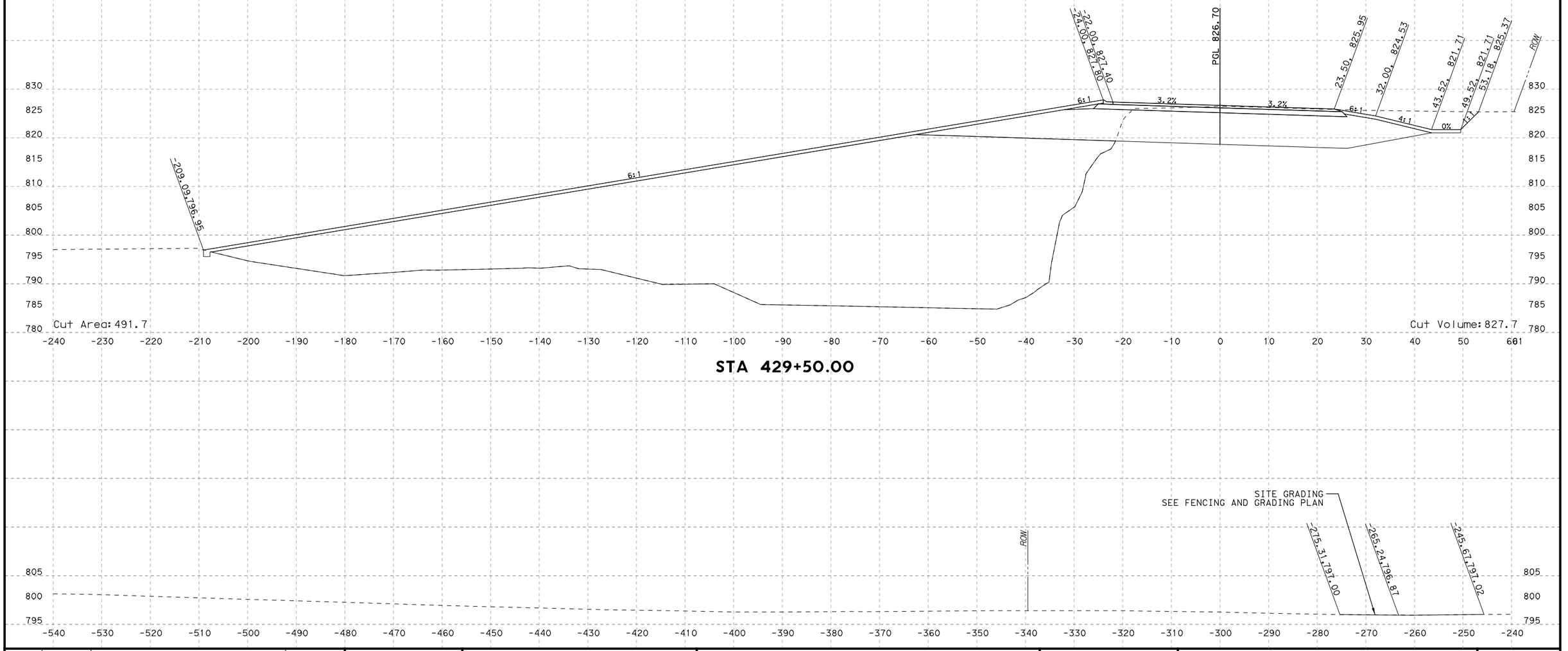
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-76

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 429+50.00

NO.	DATE	REVISION	APPROVED

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Texas Registered Engineering Firm F-754

STA 429+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

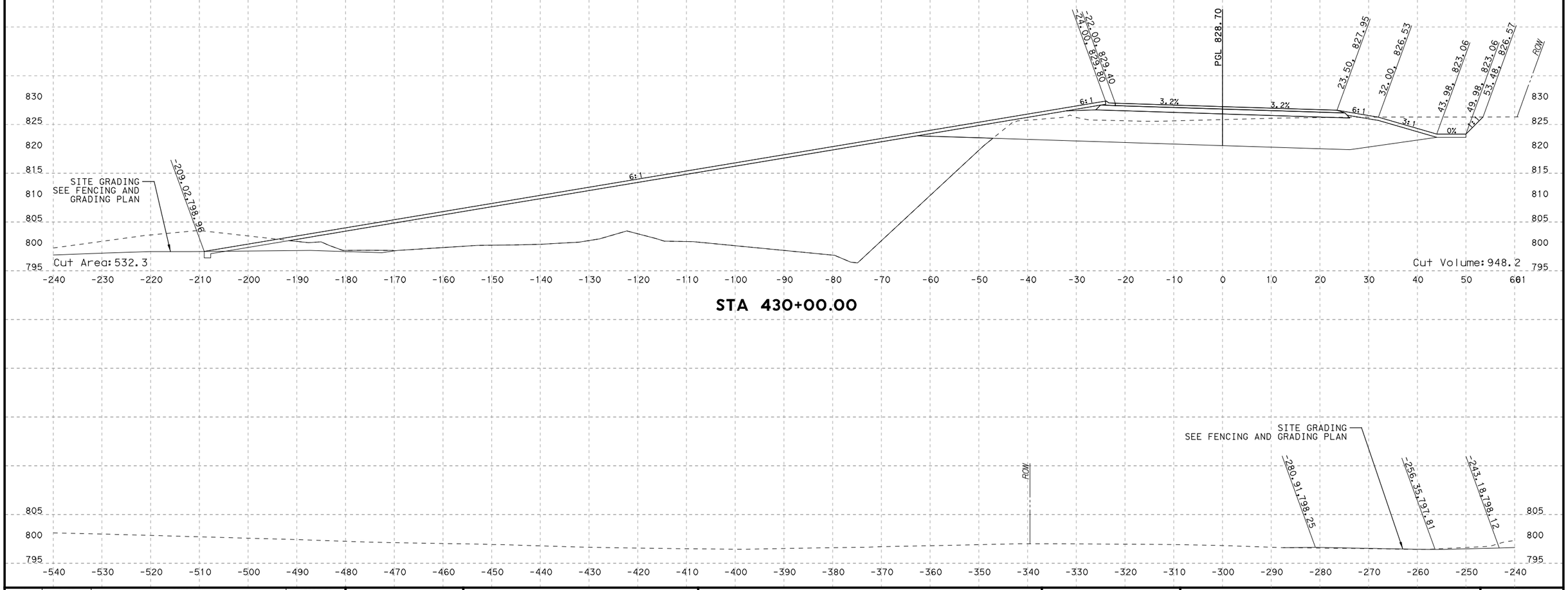
SHEET NO.
XS-77

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:23:27 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

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NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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STA 430+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

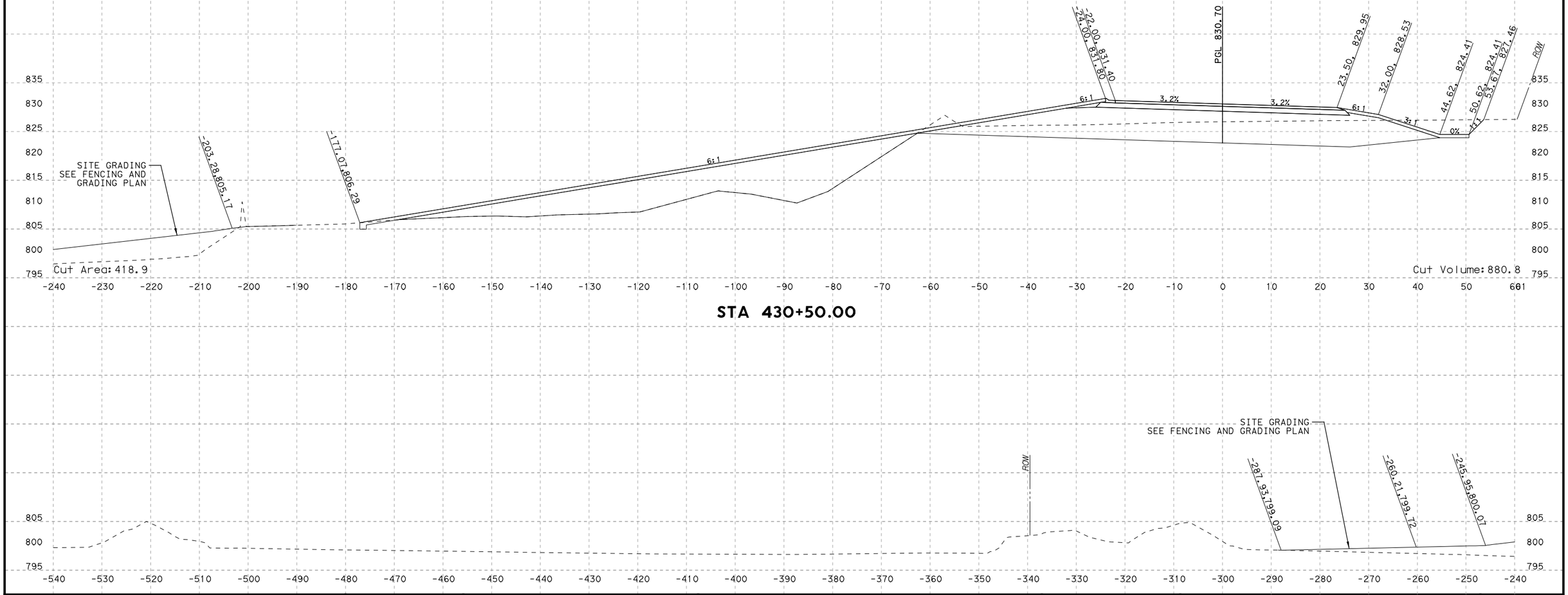
SHEET NO.
XS-78

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/26/2018
FILE: \
PENTABLE: S2-00000201707 18.tbl
TIME: 11:23:30 AM SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



STA 430+50.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Texas Registered Engineering Firm F-754

STA 430+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

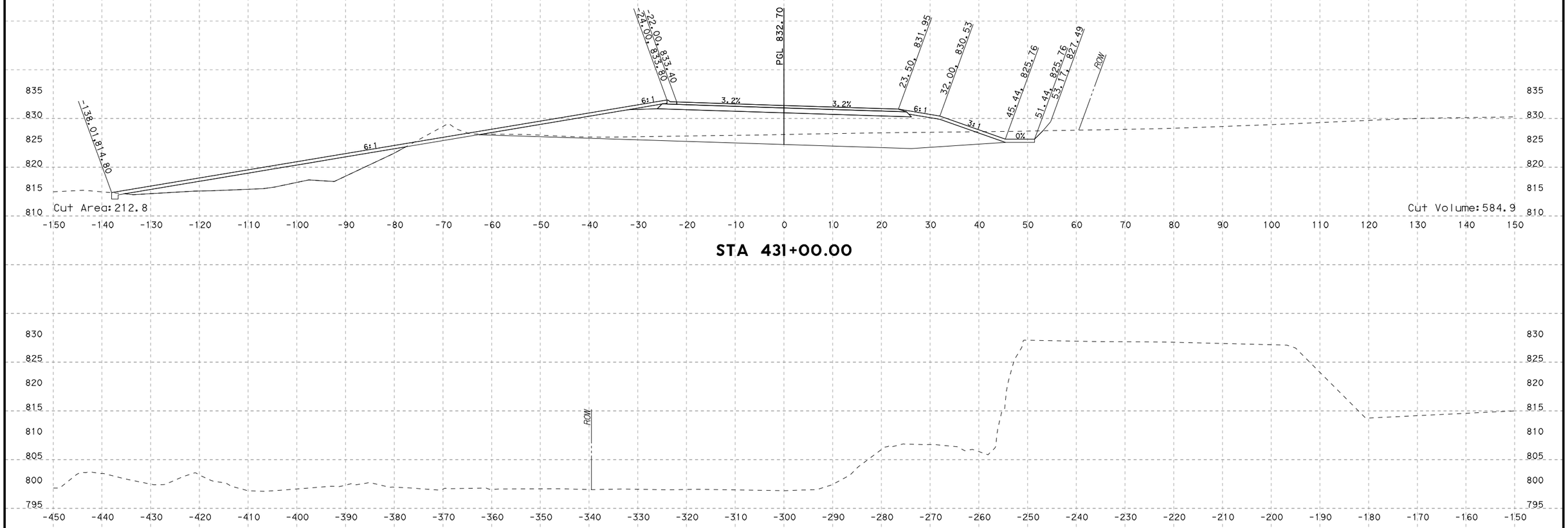
SHEET NO.
XS-79

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
DATE: 3/26/2018 TIME: 11:23:34 AM PENTABLE: S2-0000020170718.tbl SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
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03/26/2018



STA 431+00.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgon2 TIME: 11:23:37 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
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STA 431+00.00

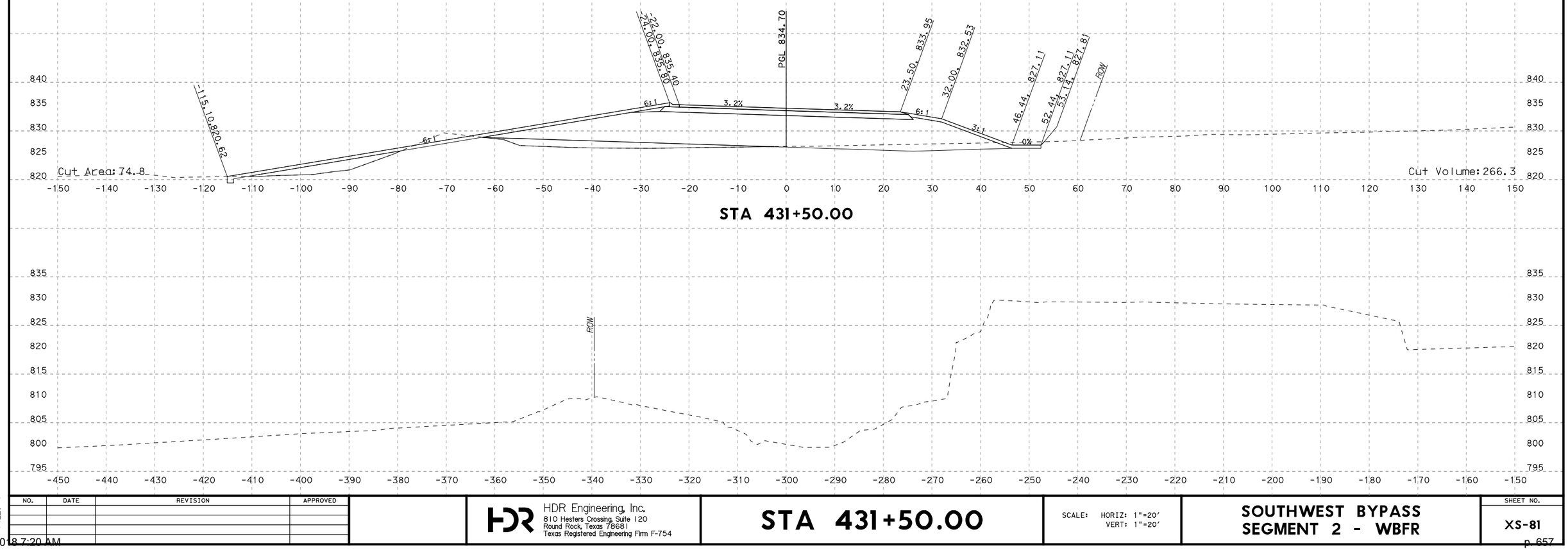
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-80

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
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03/26/2018



STA 431+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020I7018.tbl
USER: lgomezgonz TIME: 11:23:40 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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STA 431+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

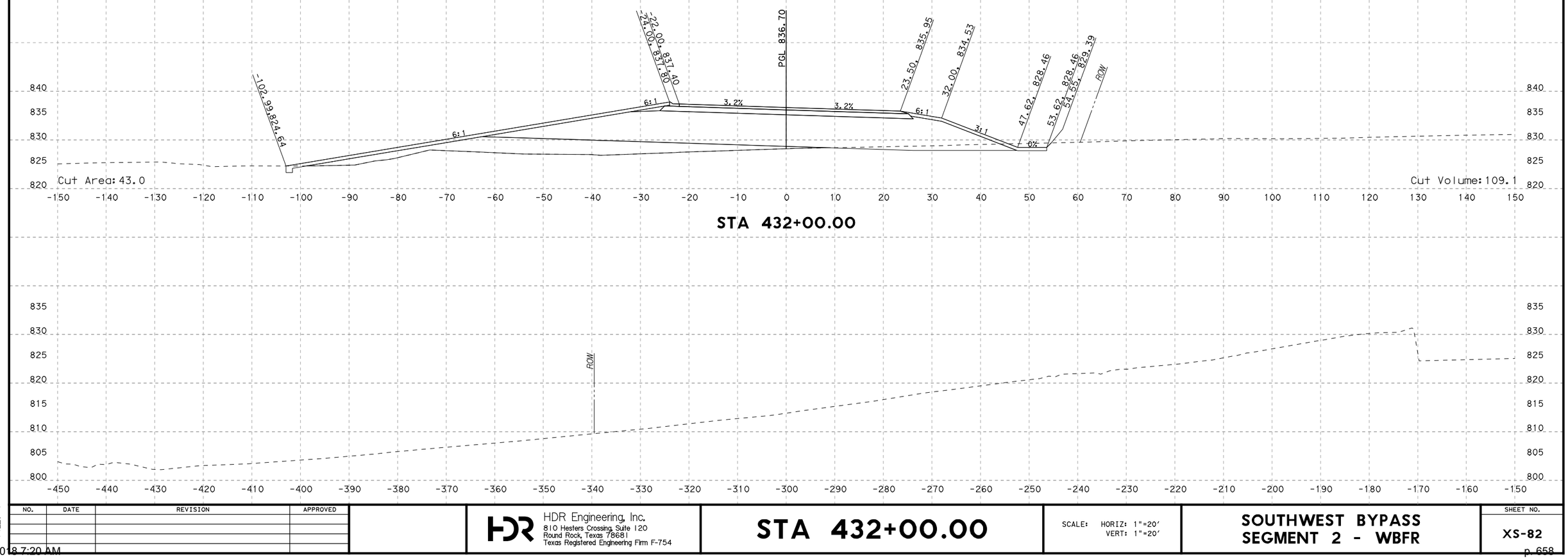
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-81

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgon2 TIME: 11:23:44 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Texas Registered Engineering Firm F-754

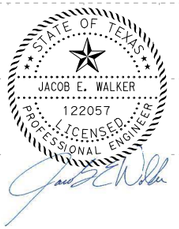
STA 432+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

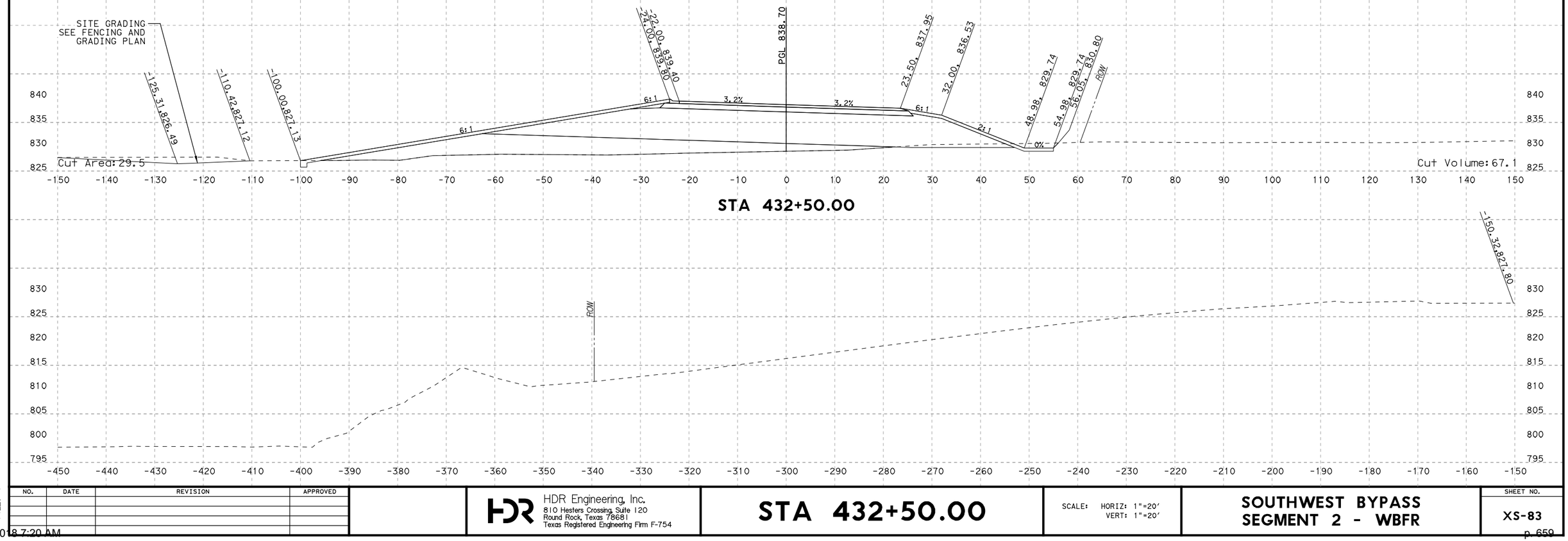
SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-82

4/12/2018 7:20 AM



03/26/2018



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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STA 432+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

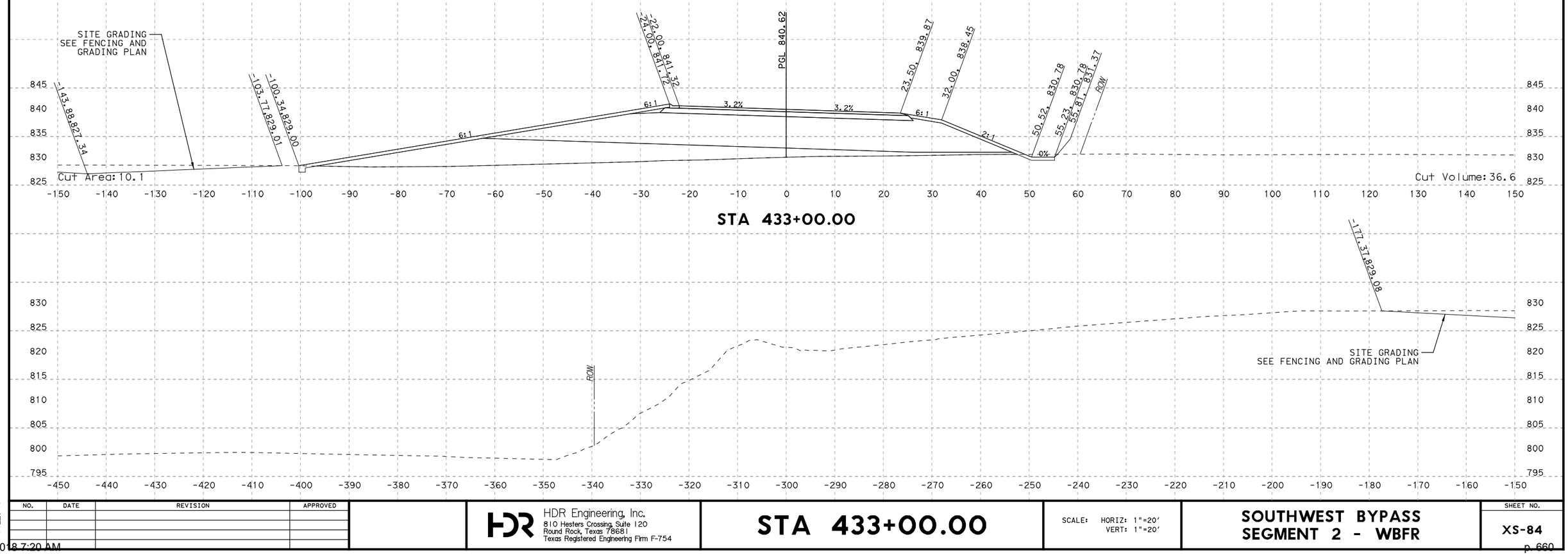
SHEET NO.
XS-83

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:23:47 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 433+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

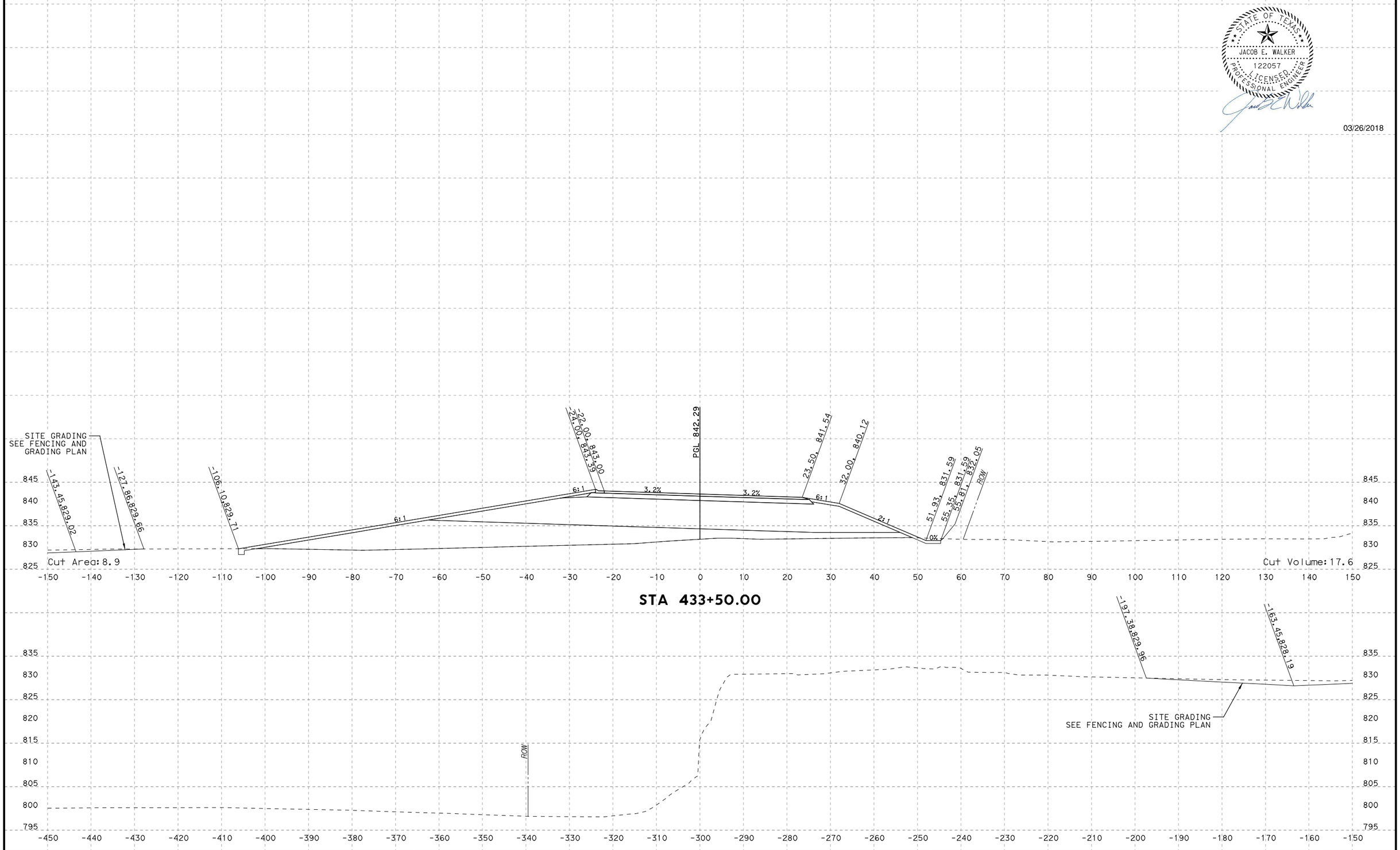
SHEET NO.
XS-84

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020170718.tbl
TIME: 11:23:50 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

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STA 433+50.00

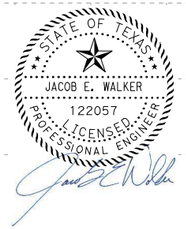
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

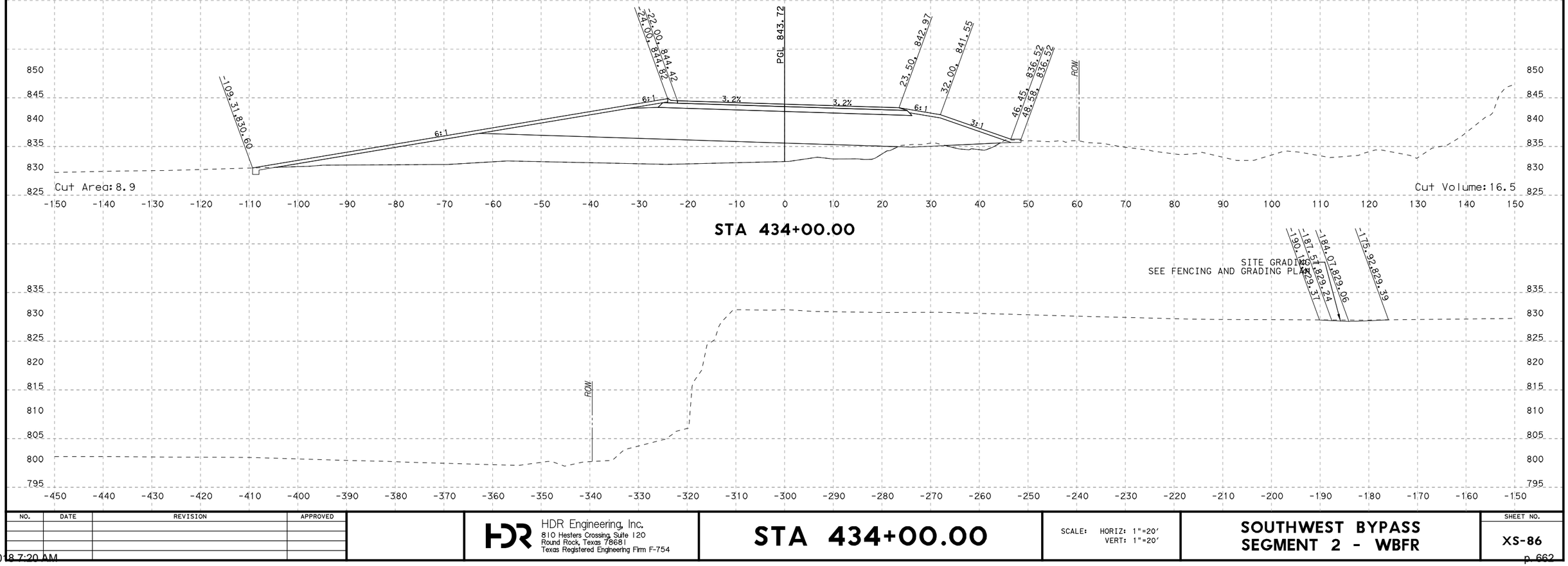
SHEET NO.
XS-85

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-00000201707I8.tbl TIME: 11:23:53 AM DATE: 3/26/2018 SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:23:57 AM SCALE: 1:20
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 434+00.00

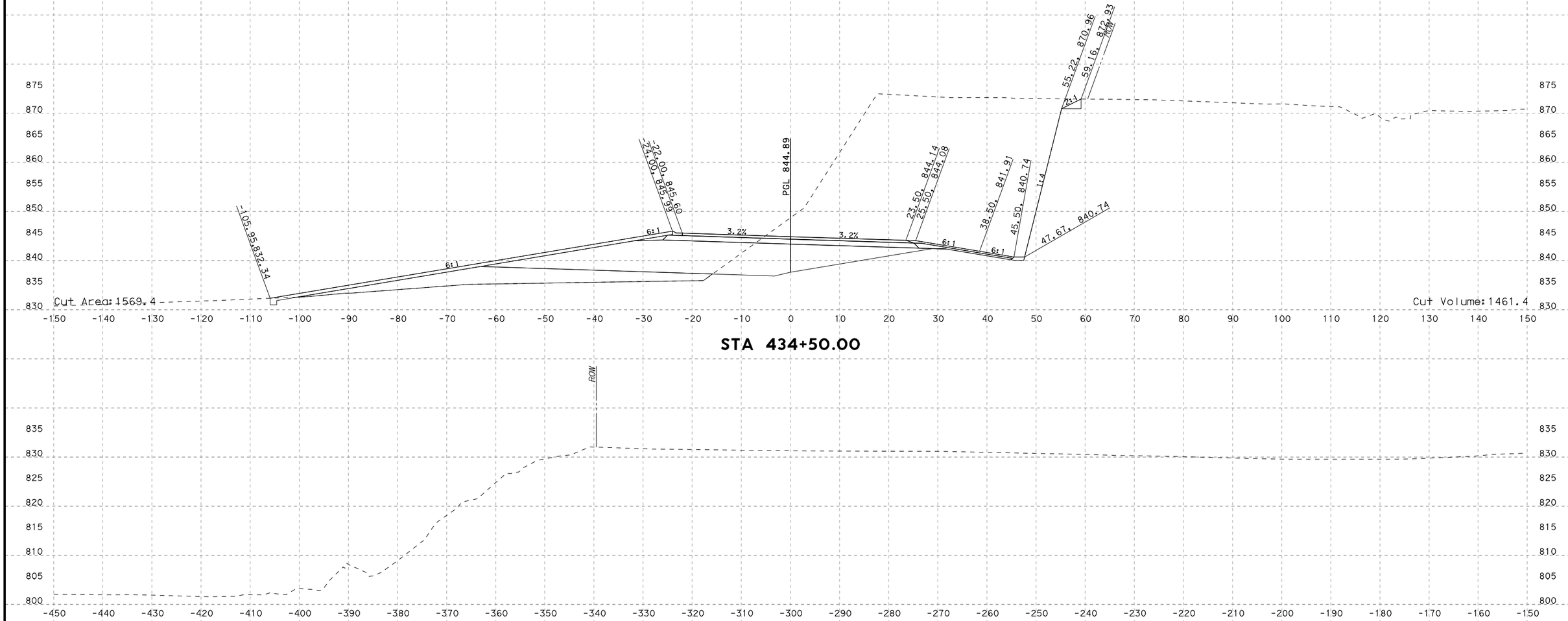
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-86

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 434+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-0000020170718.tbl TIME: 11:24:00 AM DATE: 3/26/2018 SCALE: 1:20

4/12/2018 7:20 AM

NO.	DATE	REVISION	APPROVED

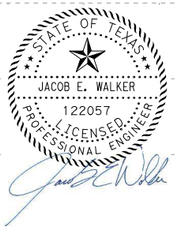
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 434+50.00

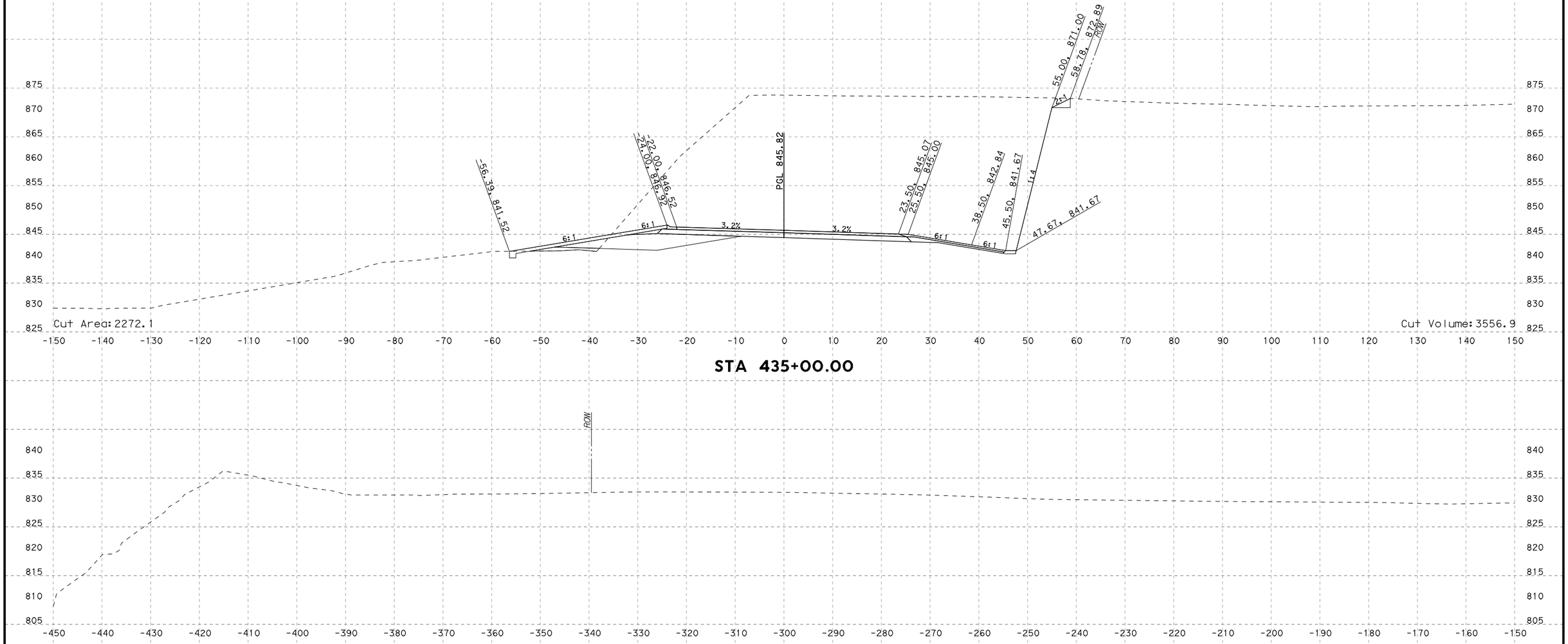
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-87



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgon2
FILE: \
DATE: 3/26/2018
TIME: 11:24:03 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 435+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-88

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgon2 FILE: \
PENTABLE: S2-00000201707IB.tbl TIME: 11:24:07 AM DATE: 3/26/2018 SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 435+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

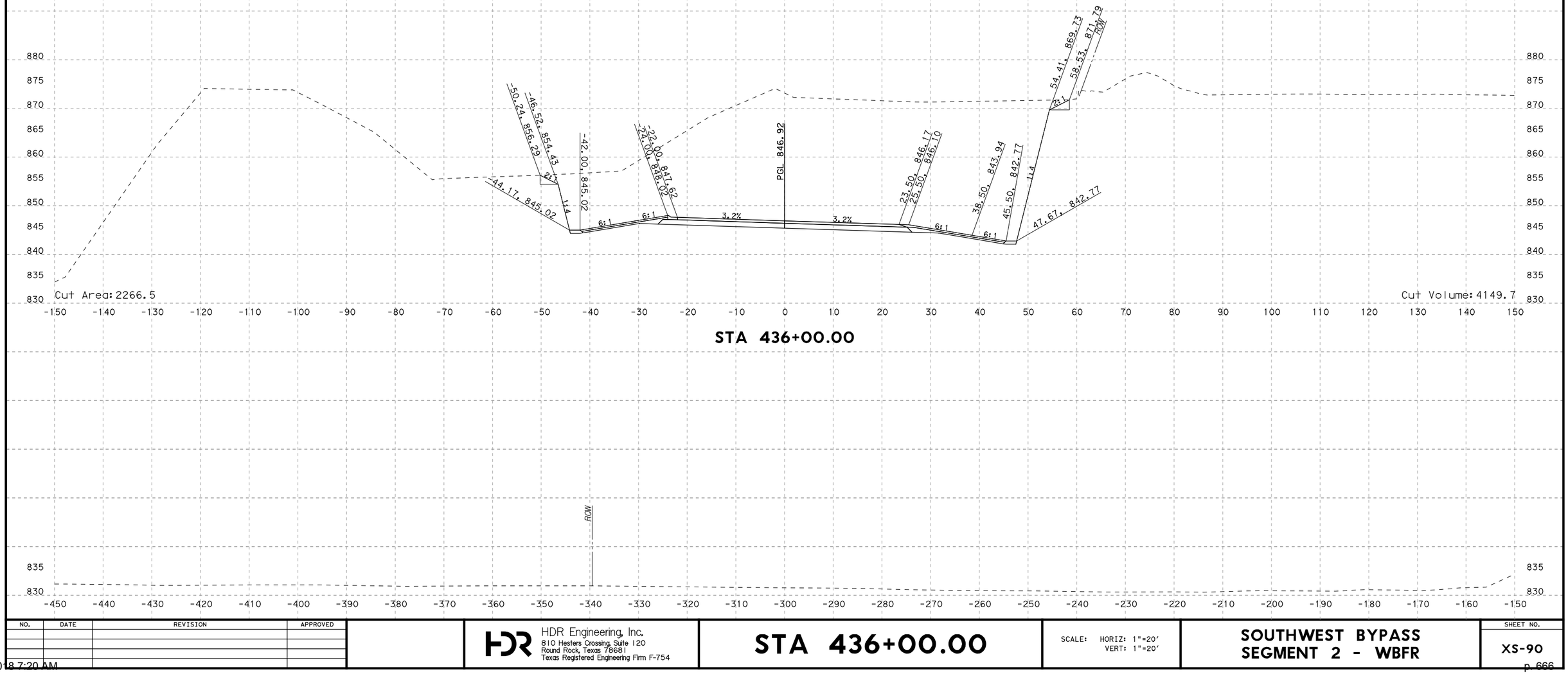
SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-89

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 436+00.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 436+00.00

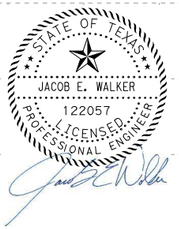
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

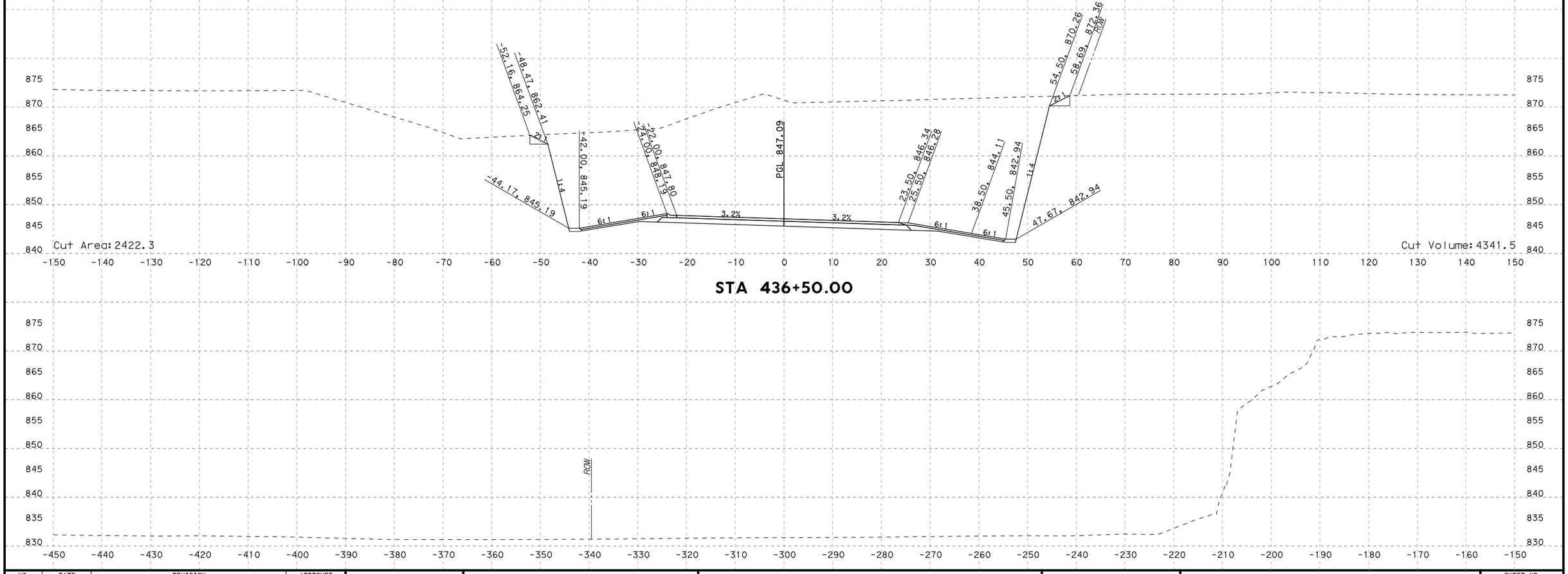
SHEET NO.
XS-90

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:24:10 AM
PENTABLE: S2-00000201707018.tbl
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 436+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

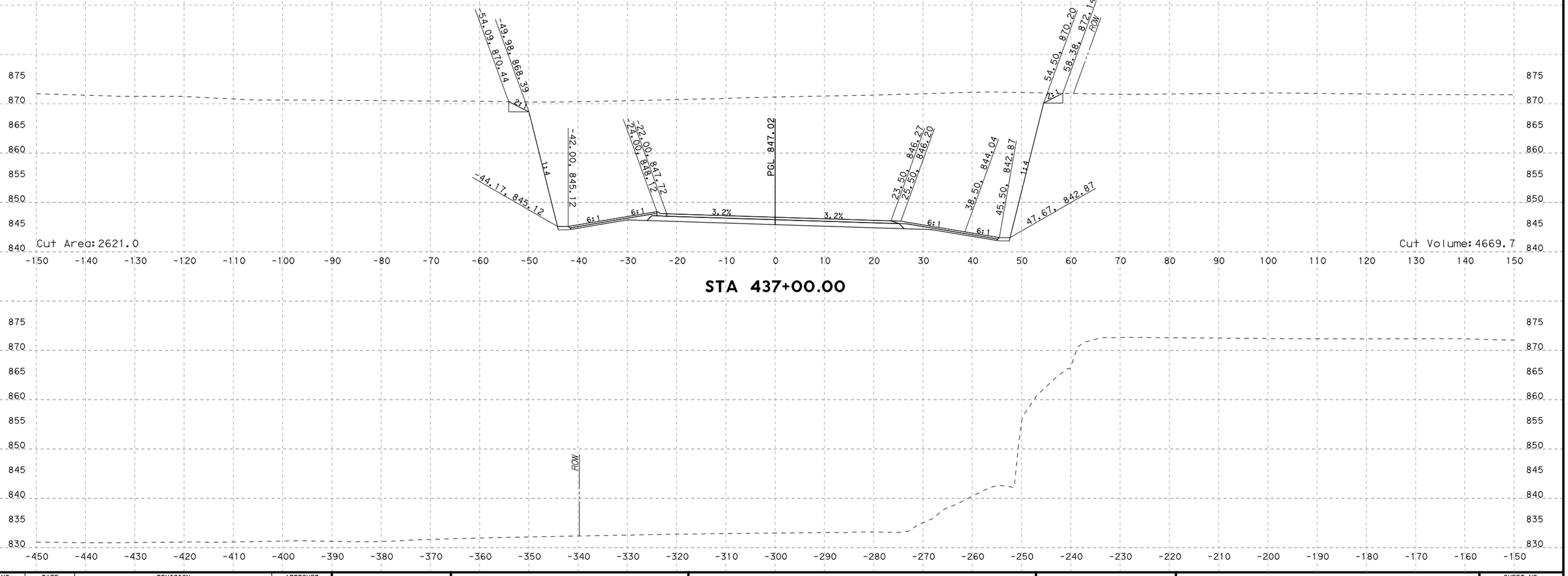
SHEET NO.
XS-91

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:24:13 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

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810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 437+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-92

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgon2 FILE: \
PENTABLE: S2-0000020170718.tbl TIME: 11:24:16 AM DATE: 3/26/2018 SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020170718.tbl
TIME: 11:24:20 AM
DATE: 3/26/2018
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 437+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-93

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz DATE: 3/26/2018 FILE: \
PENTABLE: S2-0000020\T0718.tbl TIME: 11:24:23 AM SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 438+00.00

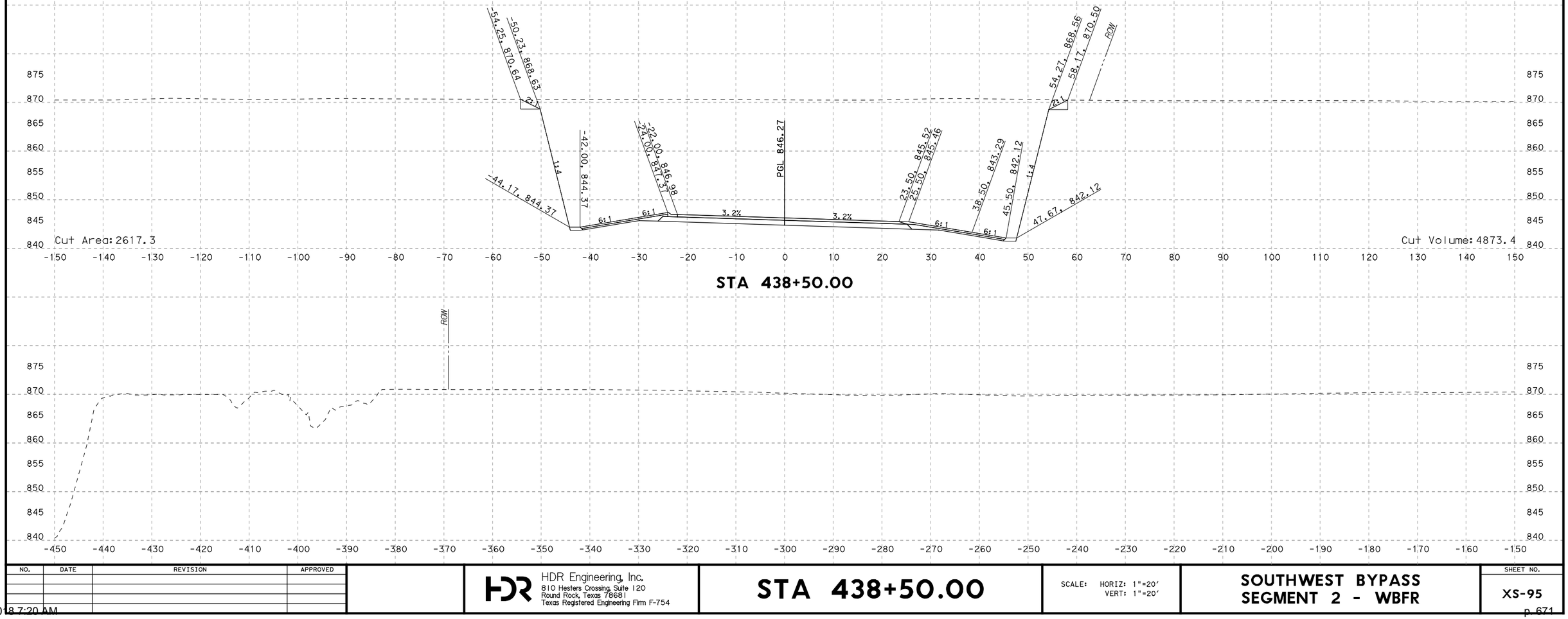
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-94

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 438+50.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 438+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

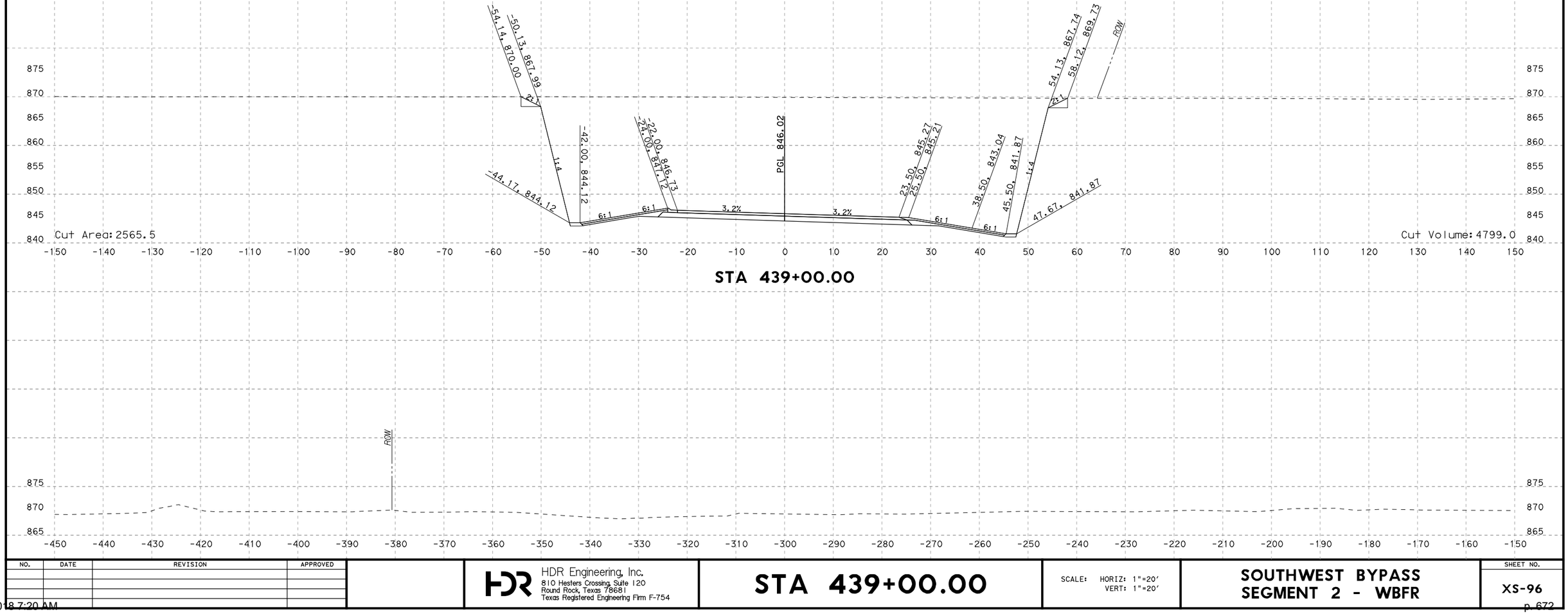
SHEET NO.
XS-95

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020\T0718.tbl
DATE: 3/26/2018
TIME: 11:24:26 AM
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 439+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

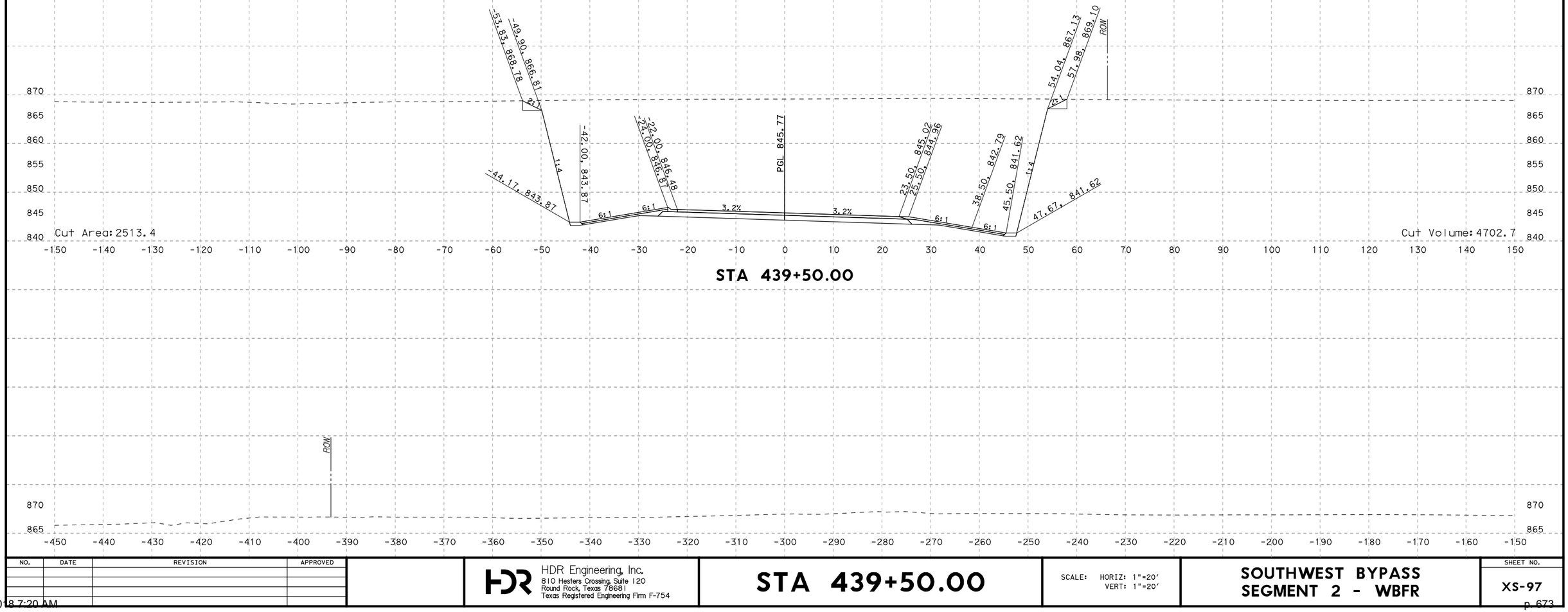
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-96

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:24:30 AM SCALE: 1:20
FILE: \
4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 439+50.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 439+50.00

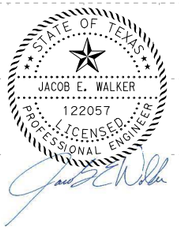
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

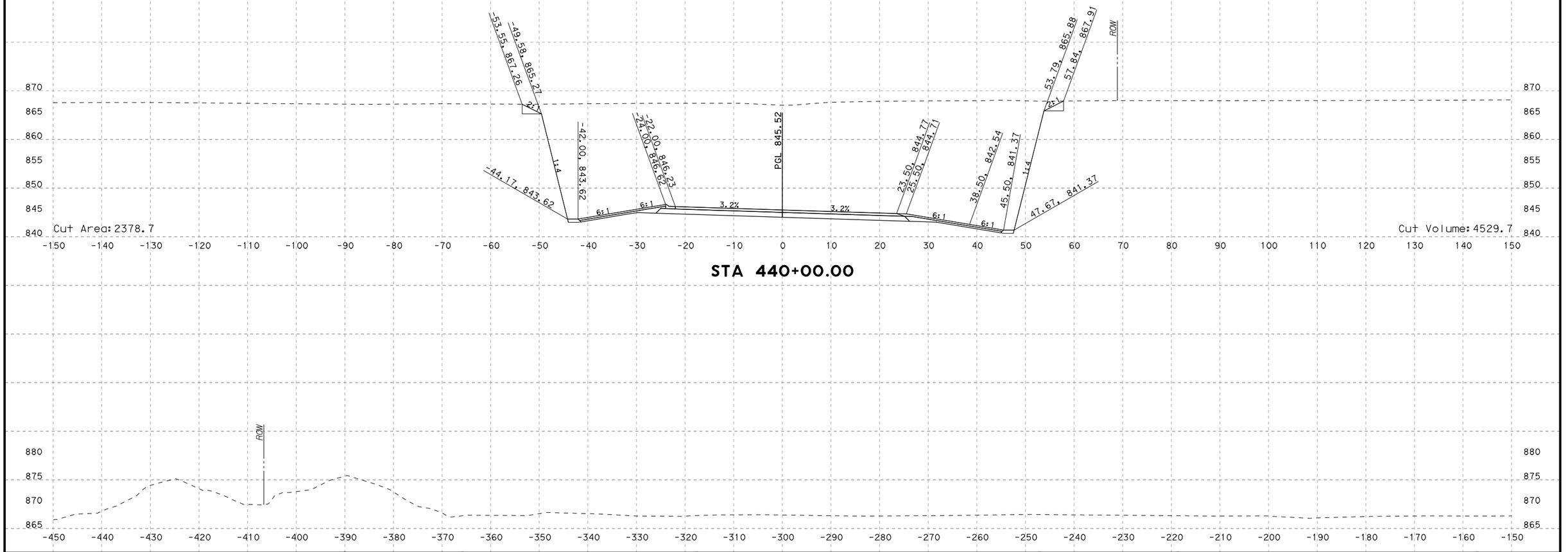
SHEET NO.
XS-97

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:24:33 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgon2 DATE: 3/26/2018 TIME: 11:24:36 AM SCALE: 1:20
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 440+00.00

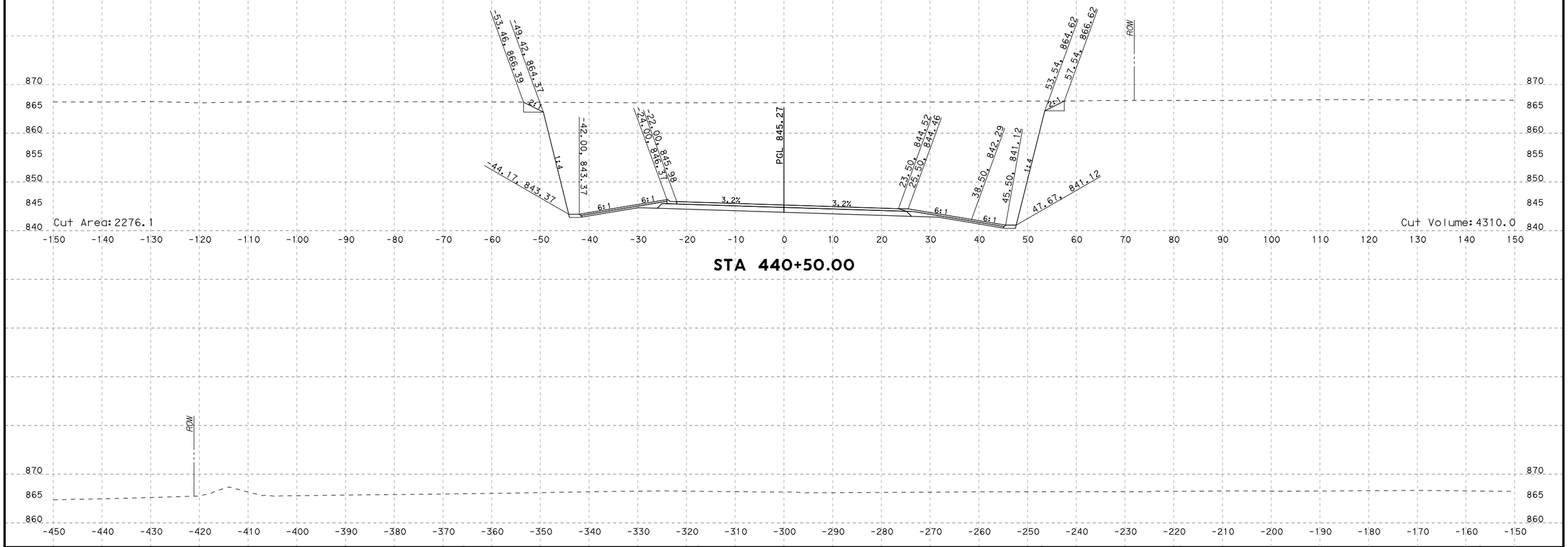
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-98



03/26/2018



NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Texas Registered Engineering Firm F-754

STA 440+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-99

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-00000207/0718.tbl
TIME: 11:24:40 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-00000201/0718.tbl TIME: 11:24:43 AM DATE: 3/26/2018 SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 441+00.00

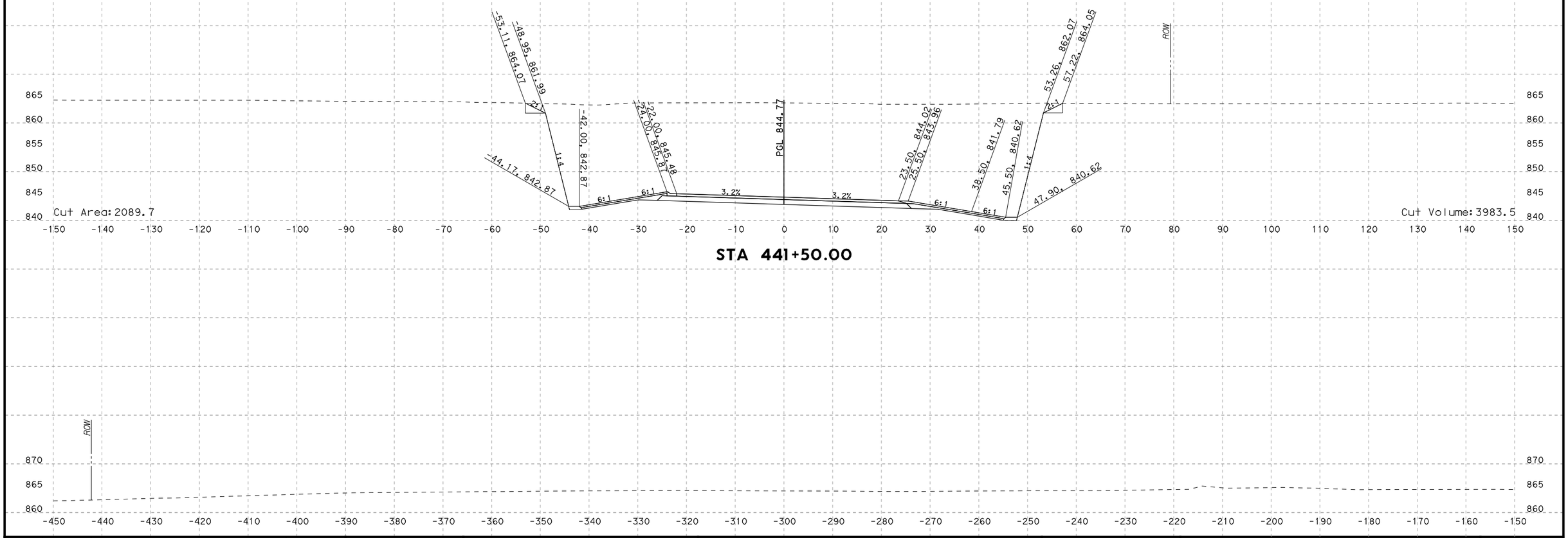
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-100

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 441+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020170718.tbl
TIME: 11:24:54 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 441+50.00

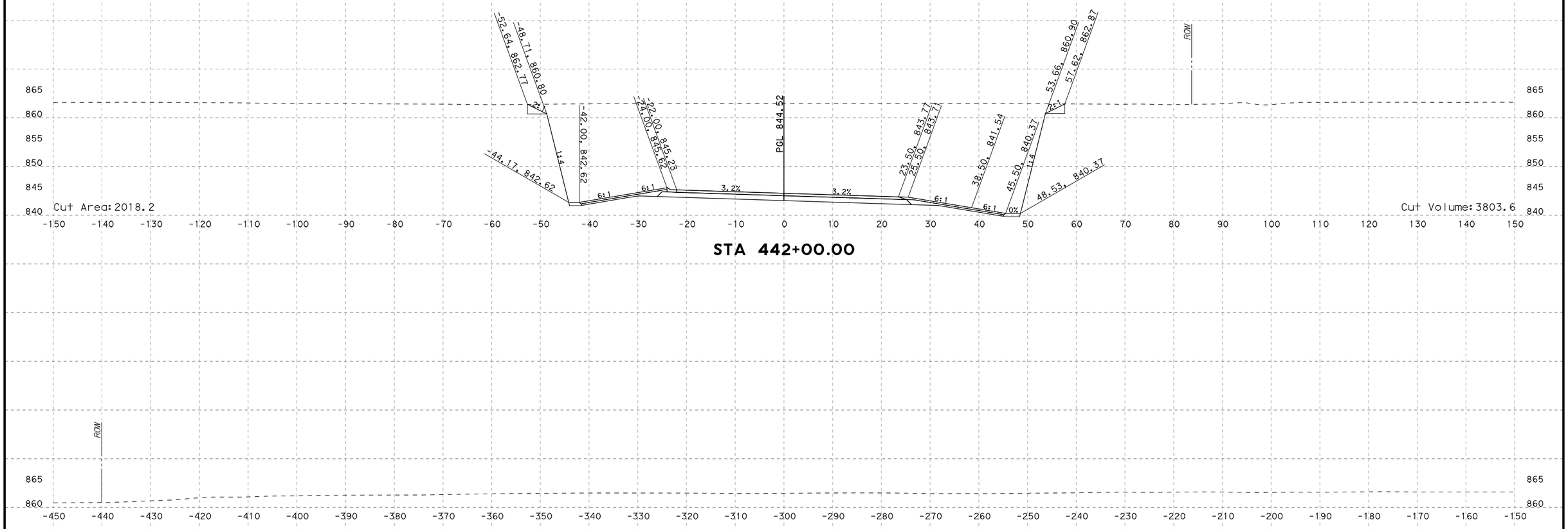
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-101

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 442+00.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 442+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

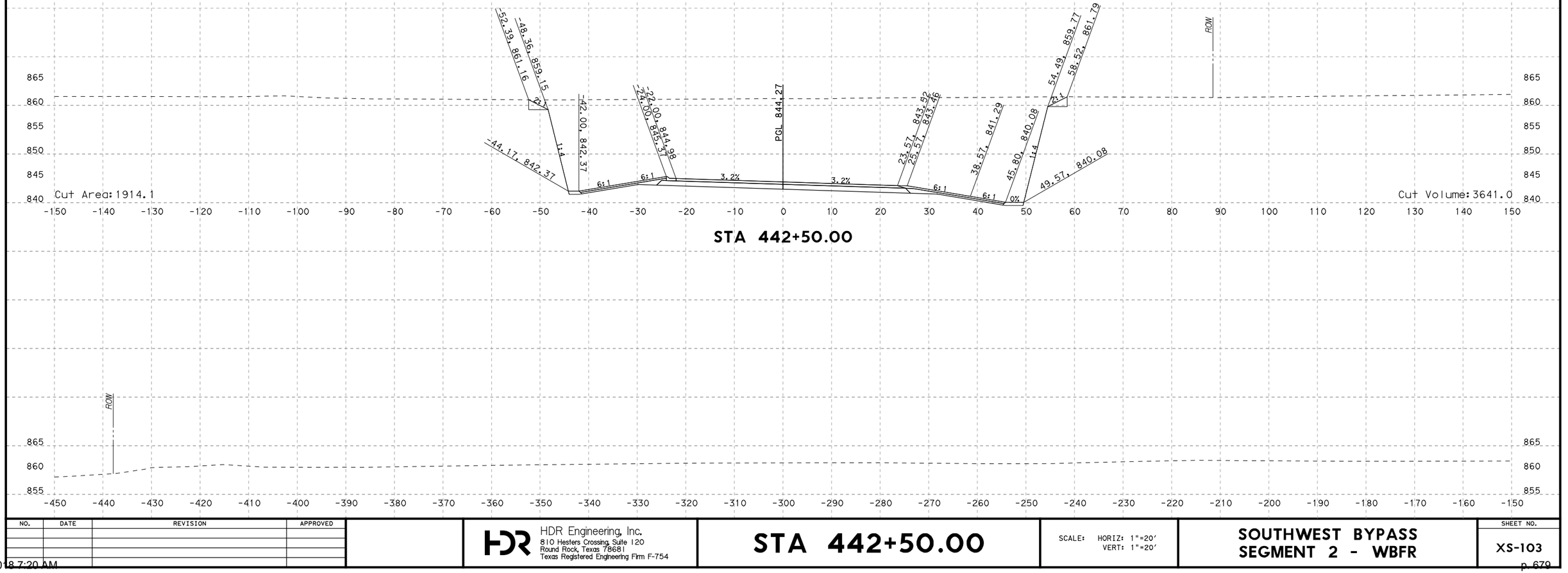
SHEET NO.
XS-102

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020I0718.tbl
TIME: 11:24:58 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

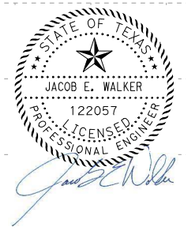
STA 442+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

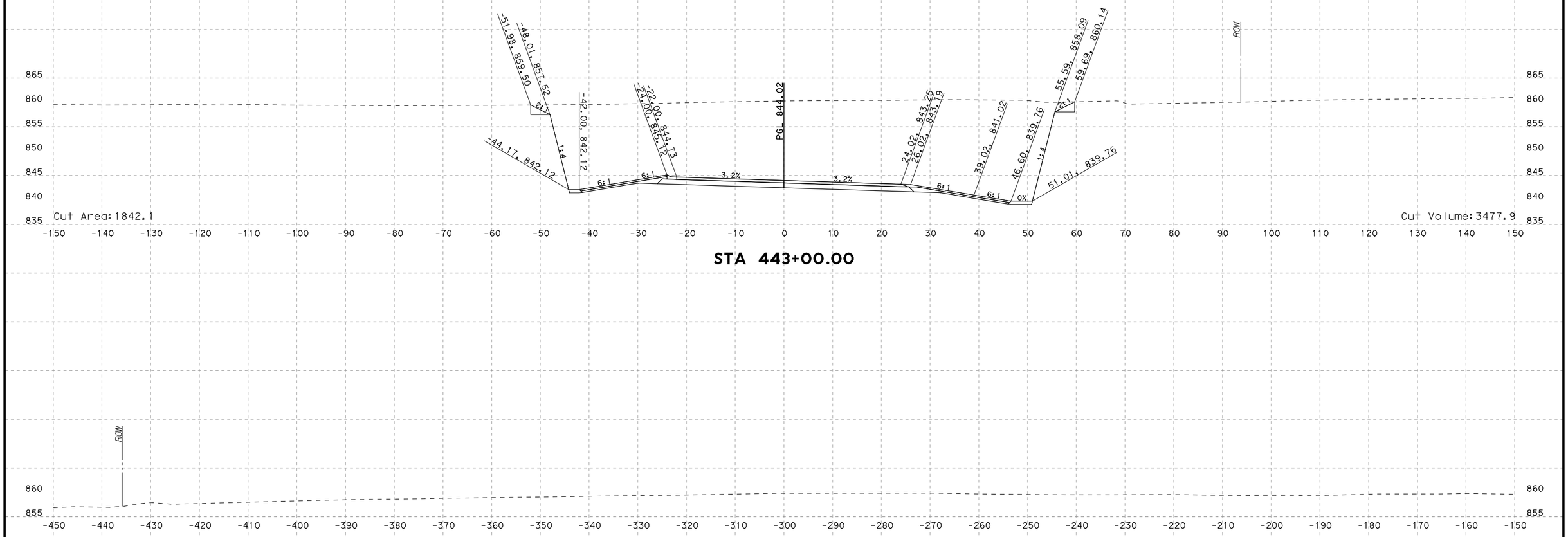
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-103

PLOT DRIVER: TXDOT_PDF_BW.pltcfg USER: lgomezgonz FILE: \
PENTABLE: S2-00000201107018.tbl DATE: 3/26/2018 TIME: 11:25:01 AM SCALE: 1:20
4/12/2018 7:20 AM



03/26/2018



STA 443+00.00

NO.	DATE	REVISION	APPROVED

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Texas Registered Engineering Firm F-754

STA 443+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

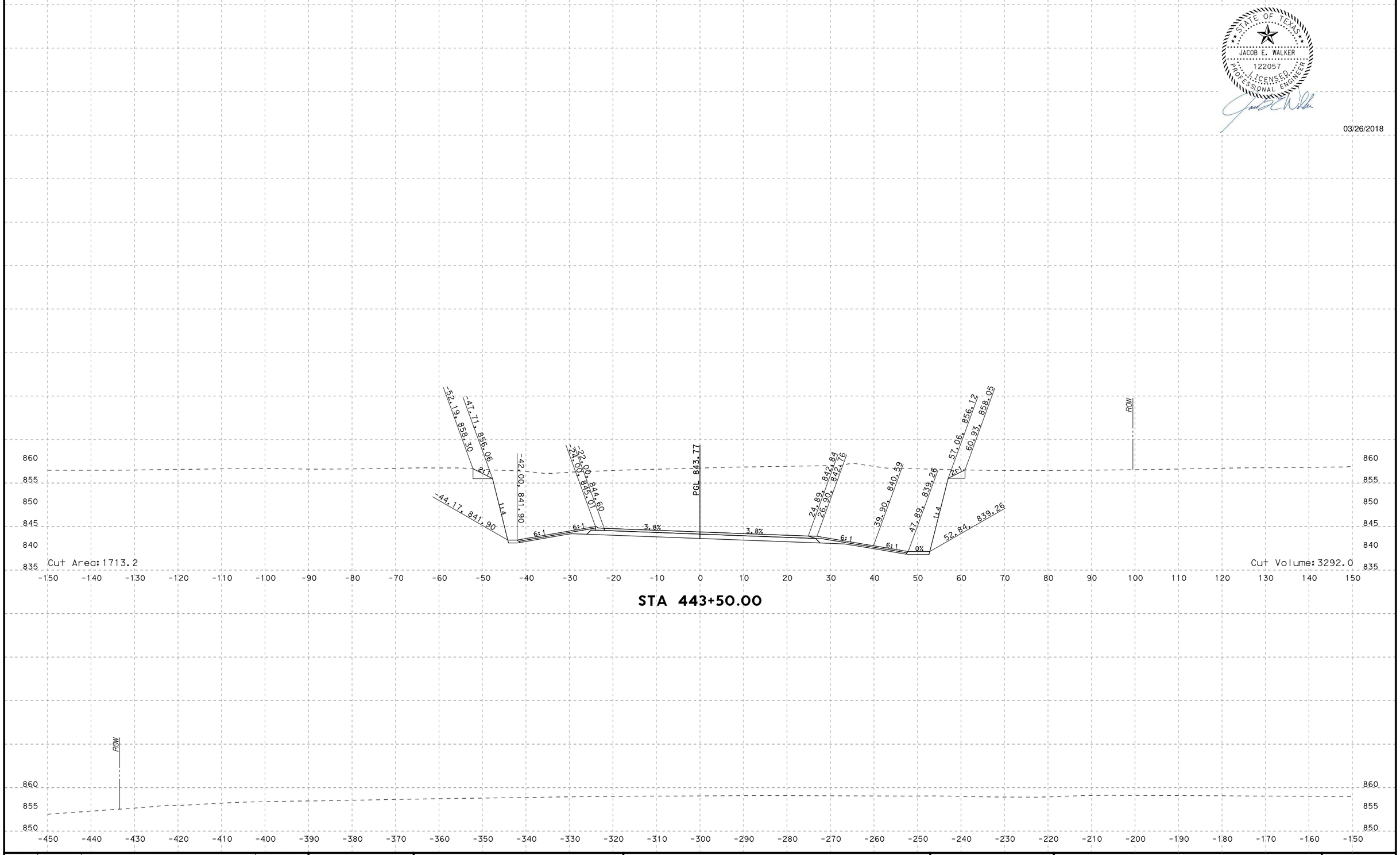
SHEET NO.
XS-104

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/26/2018
FILE: \
PENTABLE: S2-0000020\T0718.tbl
TIME: 11:25:04 AM SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 443+50.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

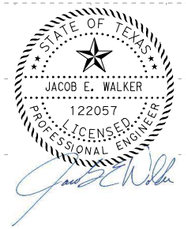
STA 443+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

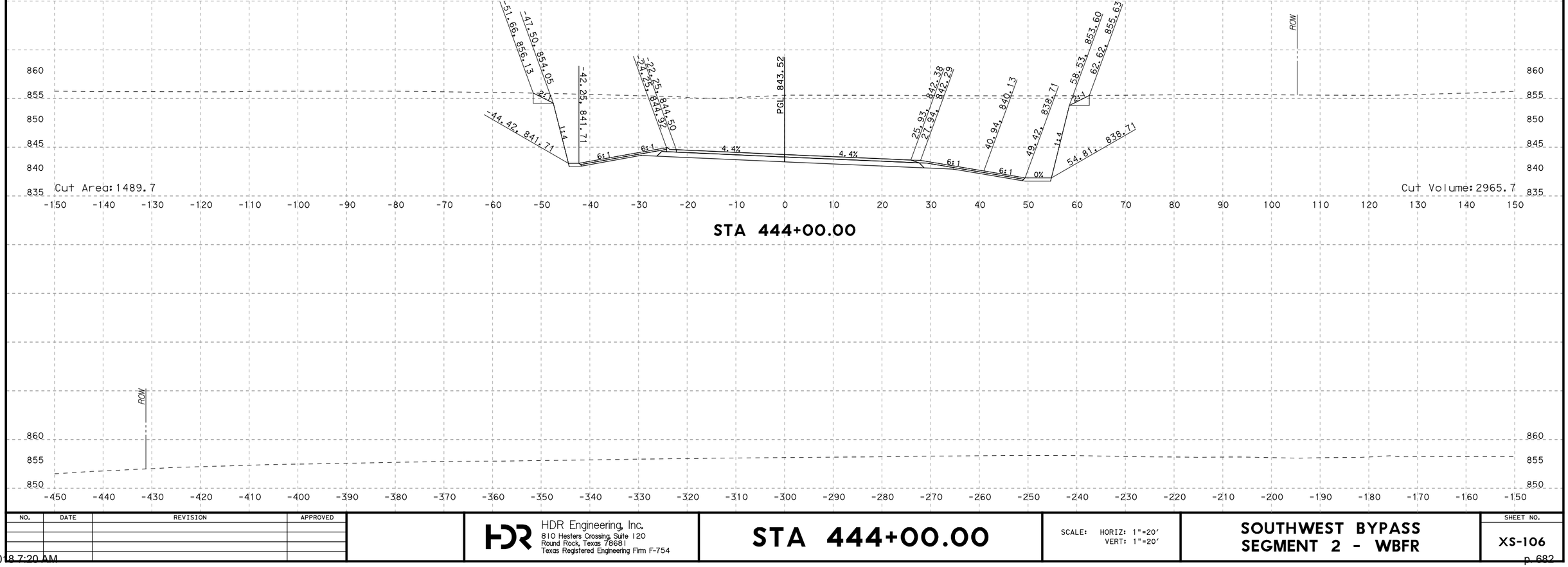
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-105

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:25:07 AM SCALE: 1:20
FILE: \
4/12/2018 7:20 AM



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:25:11 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

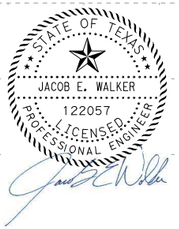
STA 444+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

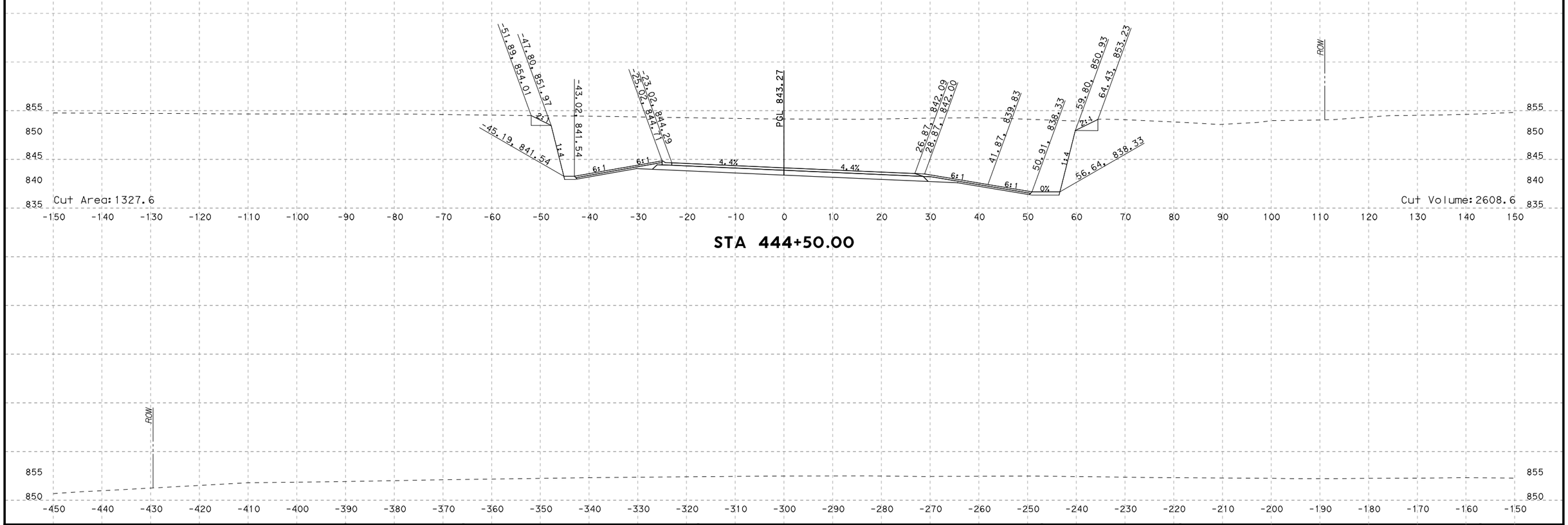
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-106

4/12/2018 7:20 AM



03/26/2018



STA 444+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:25:14 AM
PENTABLE: S2-0000020170718.tbl
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

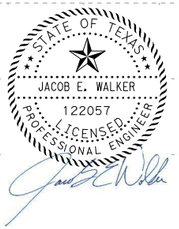
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 444+50.00

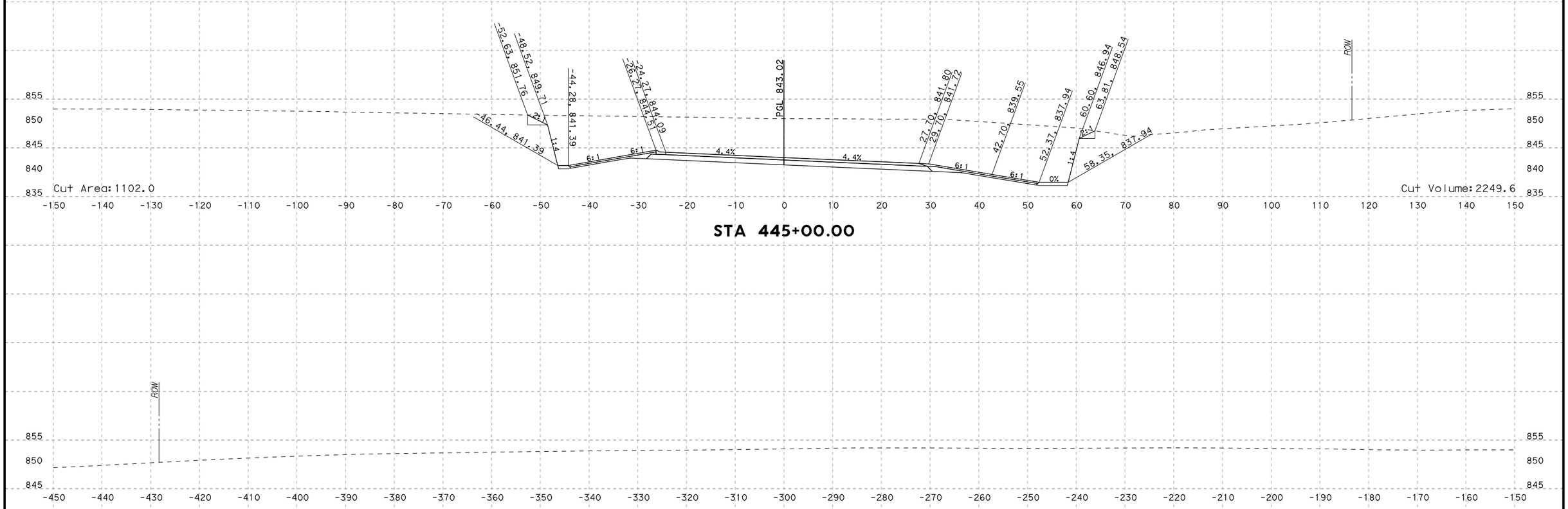
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-107



03/26/2018



PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020\T0718.tbl
USER: lgomezgonz TIME: 11:25:17 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

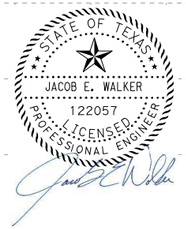
STA 445+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

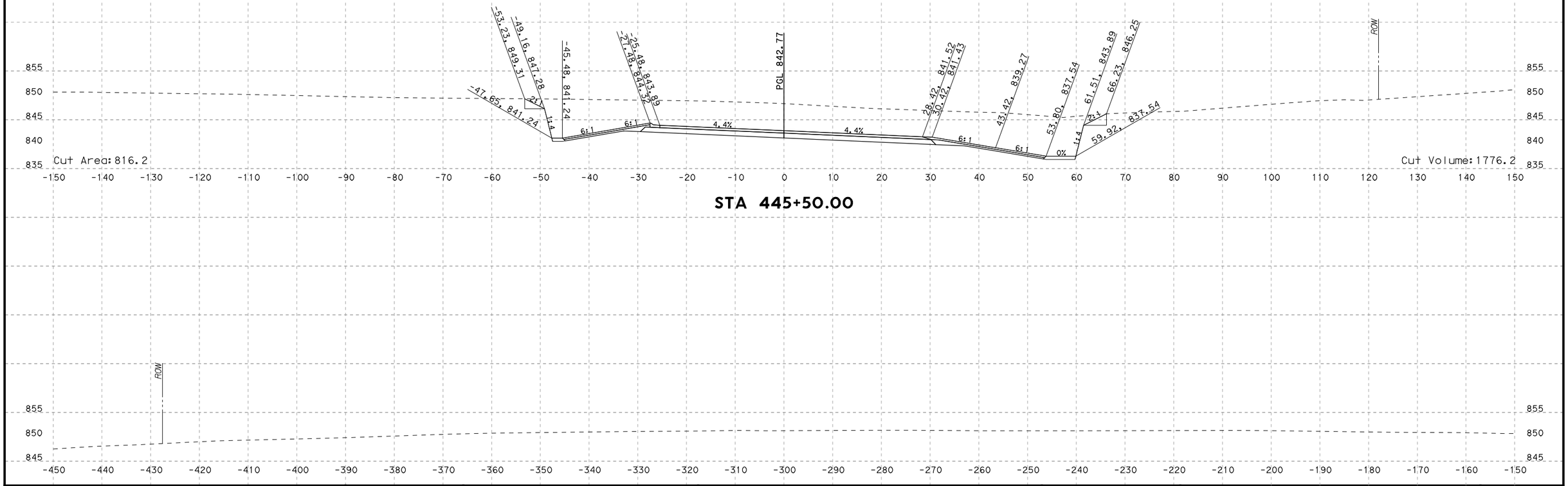
SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-108

4/12/2018 7:20 AM



03/26/2018



STA 445+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:25:21 AM
PENTABLE: S2-0000020I7018.tbl
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 445+50.00

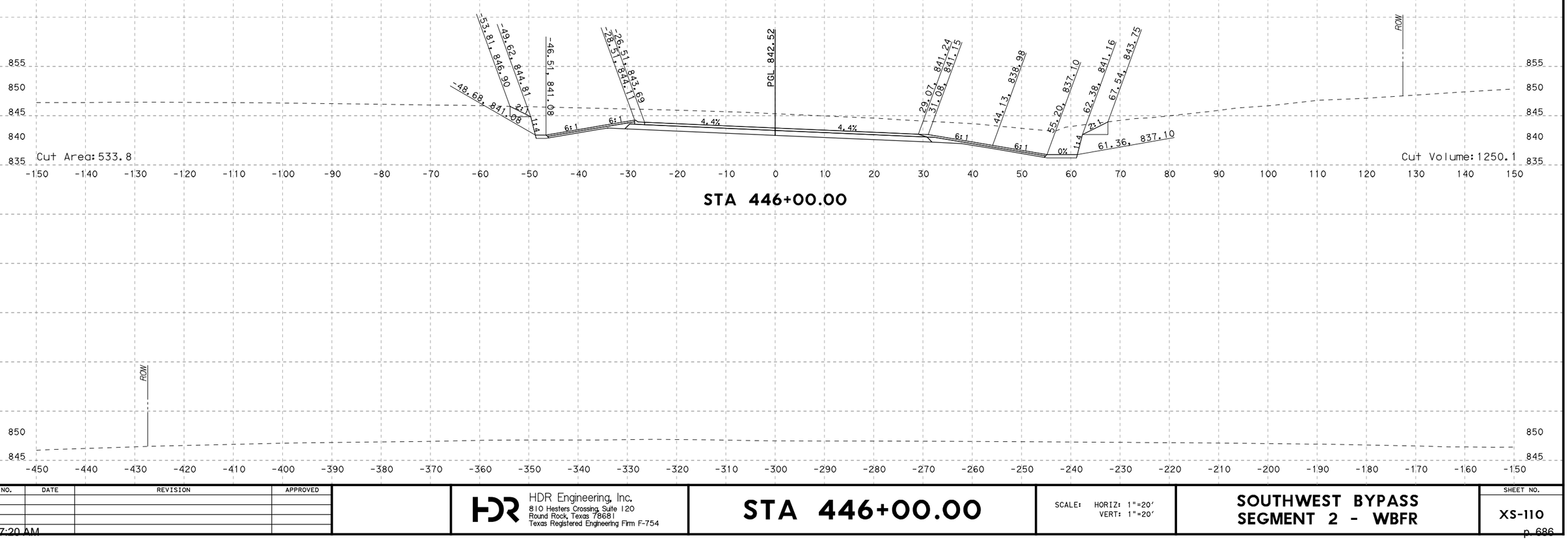
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-109

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



STA 446+00.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 446+00.00

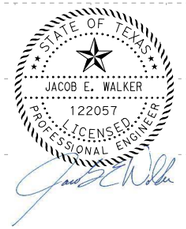
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

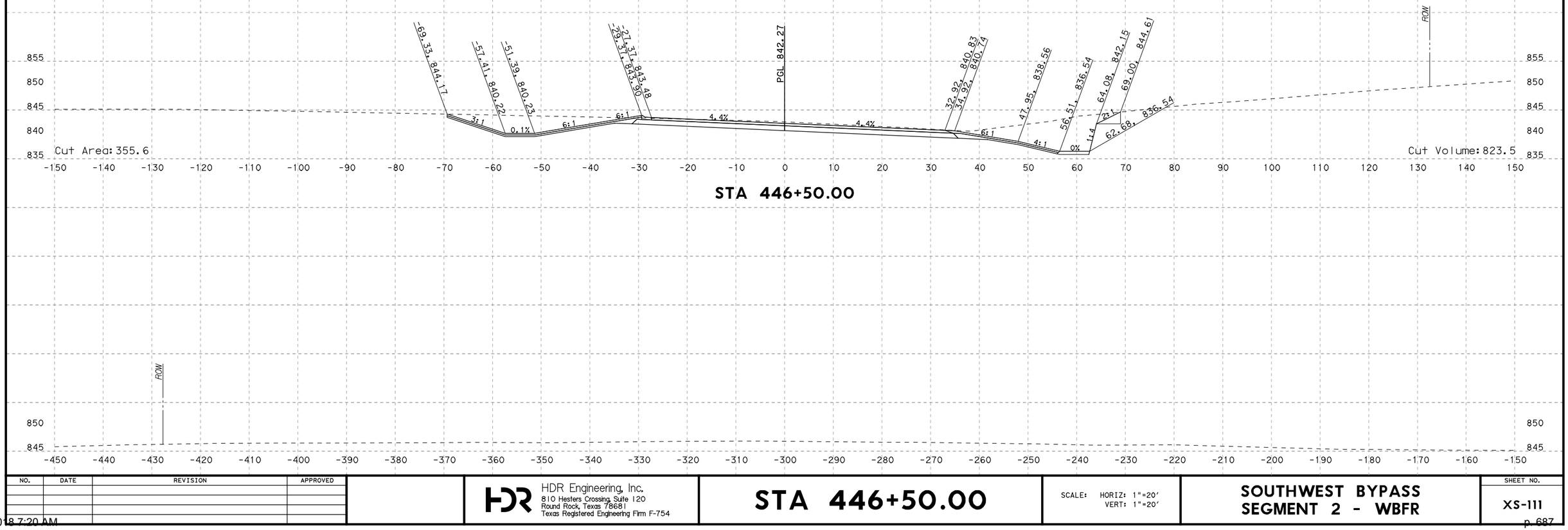
SHEET NO.
XS-110

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:25:24 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



03/26/2018



STA 446+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/26/2018
FILE: \
PENTABLE: S2-0000020I7018.tbl
TIME: 11:25:27 AM
SCALE: 1:20

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 446+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

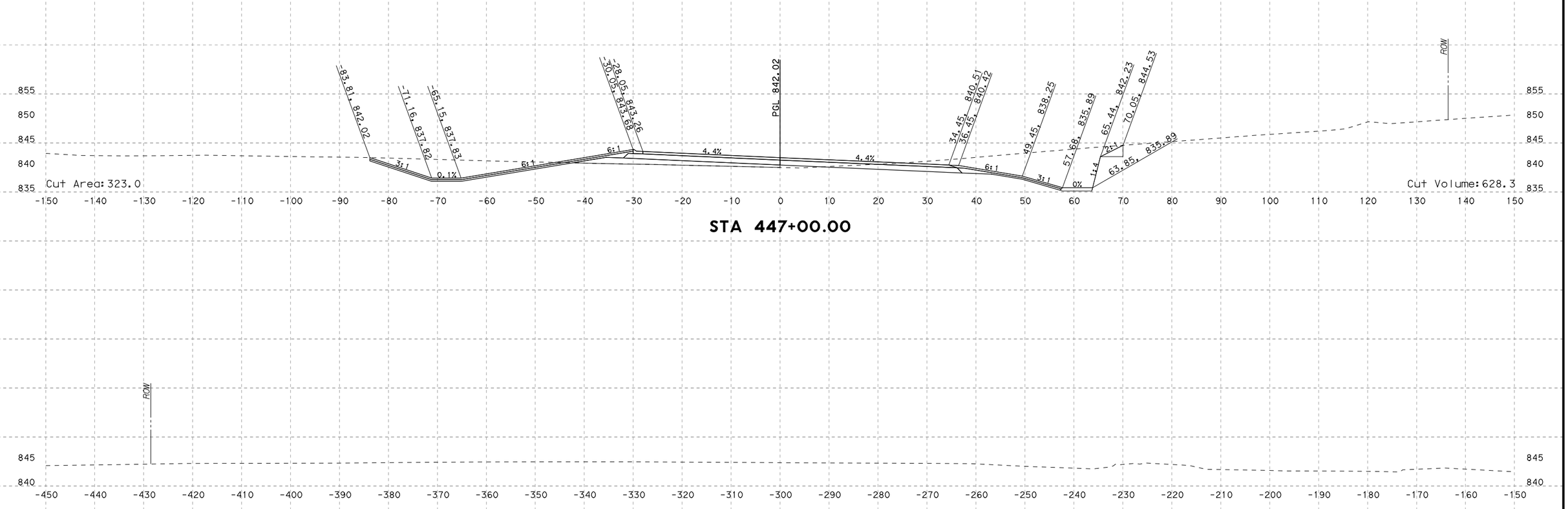
SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-111

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 447+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

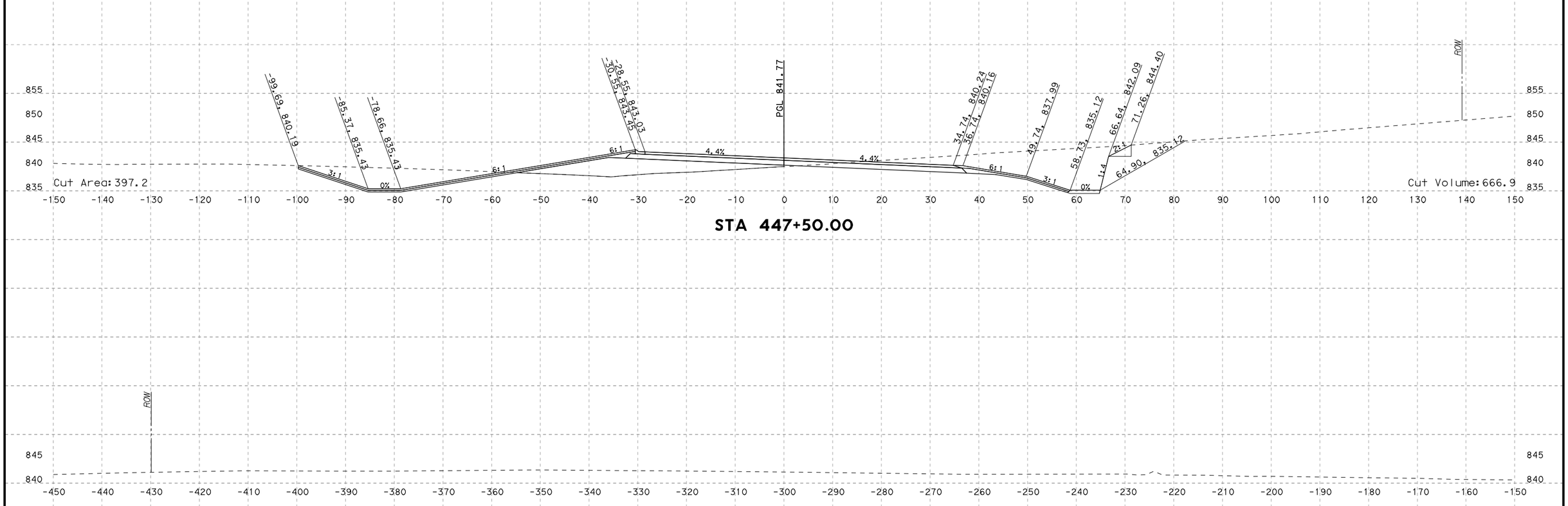
SHEET NO.
XS-112

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: \gomezgonz
FILE: \
DATE: 3/26/2018
TIME: 11:25:31 AM
PENTABLE: S2-0000020I0718.tbl
SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018



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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 447+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-113

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz DATE: 3/26/2018
FILE: \
PENTABLE: S2-0000020I0718.tbl
TIME: 11:25:34 AM SCALE: 1:20

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
LICENSED
PROFESSIONAL ENGINEER

03/26/2018

STA 448+00.00

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 448+00.00

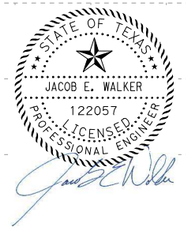
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

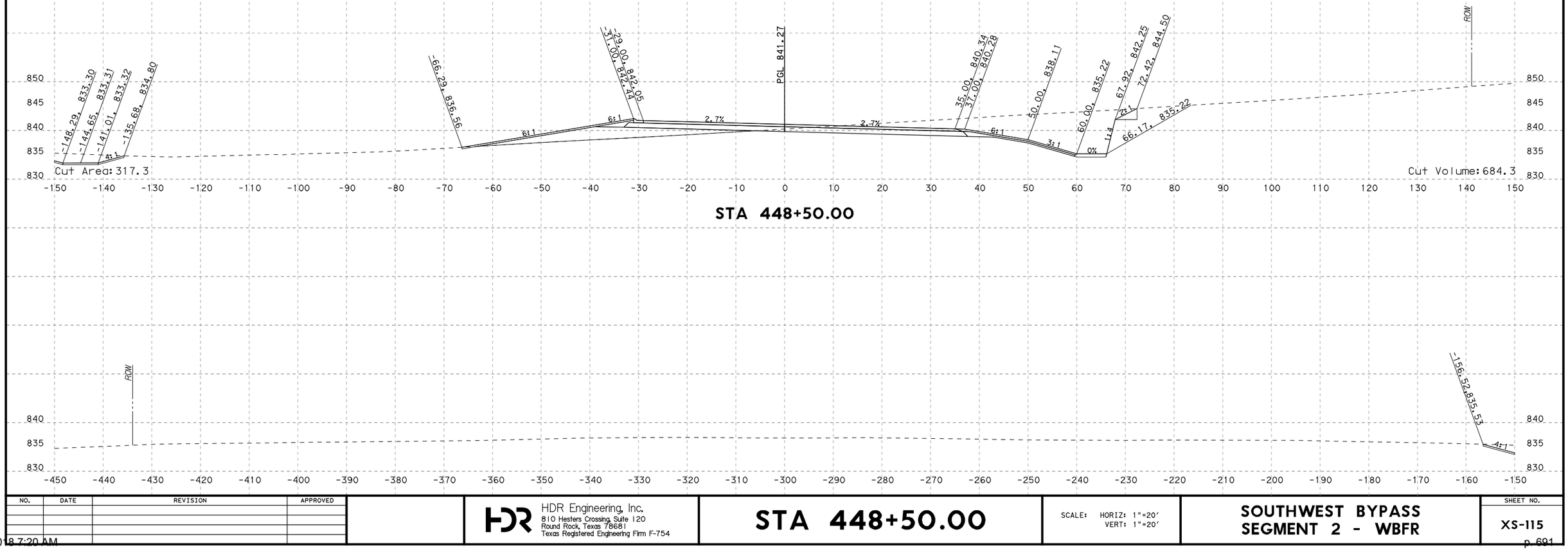
SHEET NO.
XS-114
p. 690

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-00000207070718.tbl
DATE: 3/26/2018
TIME: 11:25:37 AM
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



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Texas Registered Engineering Firm F-754

STA 448+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

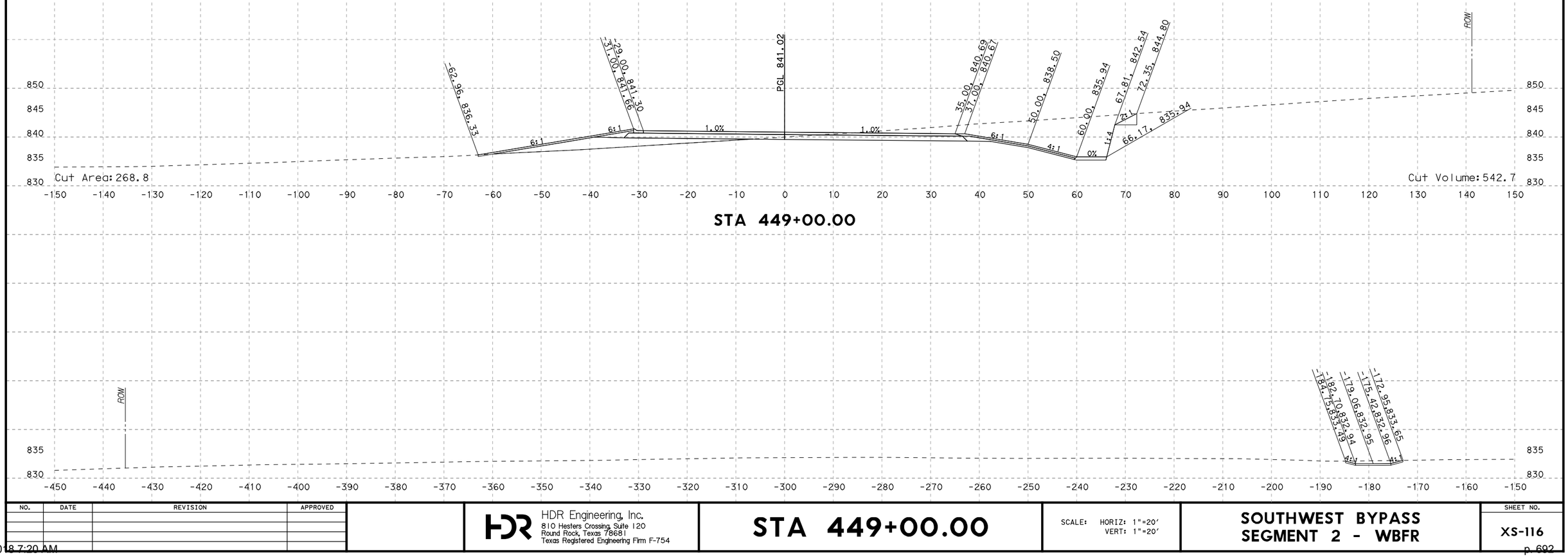
SHEET NO.
XS-115

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020\T0718.tbl
USER: lgomezgonz TIME: 11:25:40 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM

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JACOB E. WALKER
122057
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Round Rock, Texas 78681
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STA 449+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-116

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-00000201707018.tbl
USER: lgomezgonz TIME: 11:25:44 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM

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STA 449+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

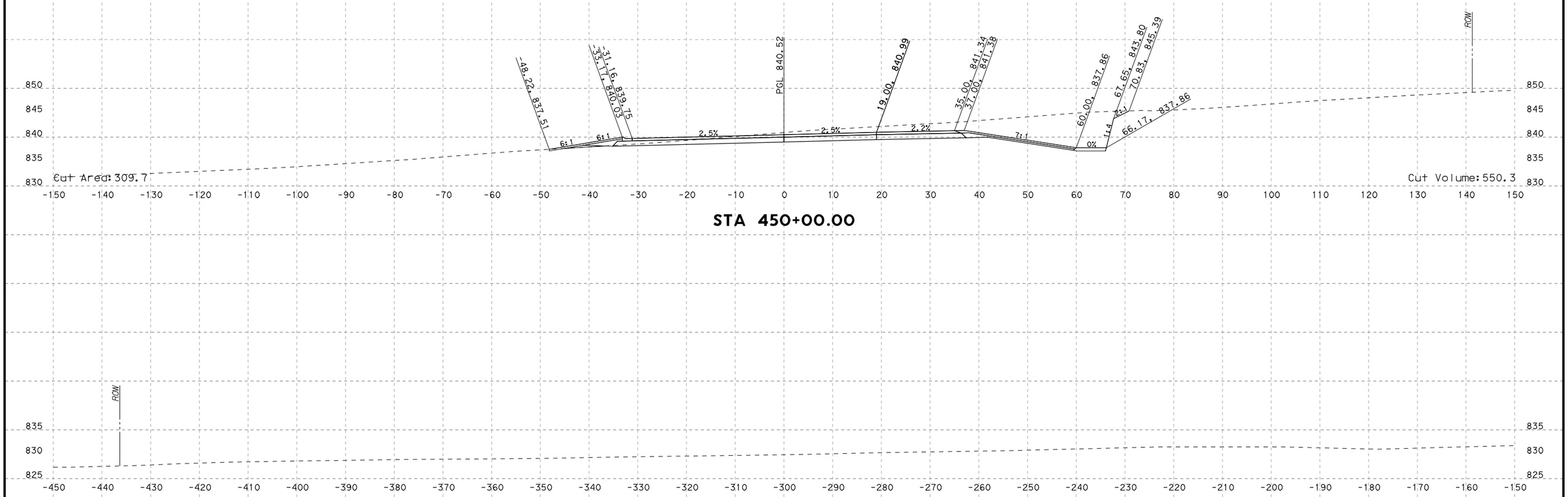
SHEET NO.
XS-117

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020\T0718.tbl
DATE: 3/26/2018
TIME: 11:25:47 AM
SCALE: 1:20

4/12/2018 7:20 AM

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STA 450+00.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:25:50 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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STA 450+00.00

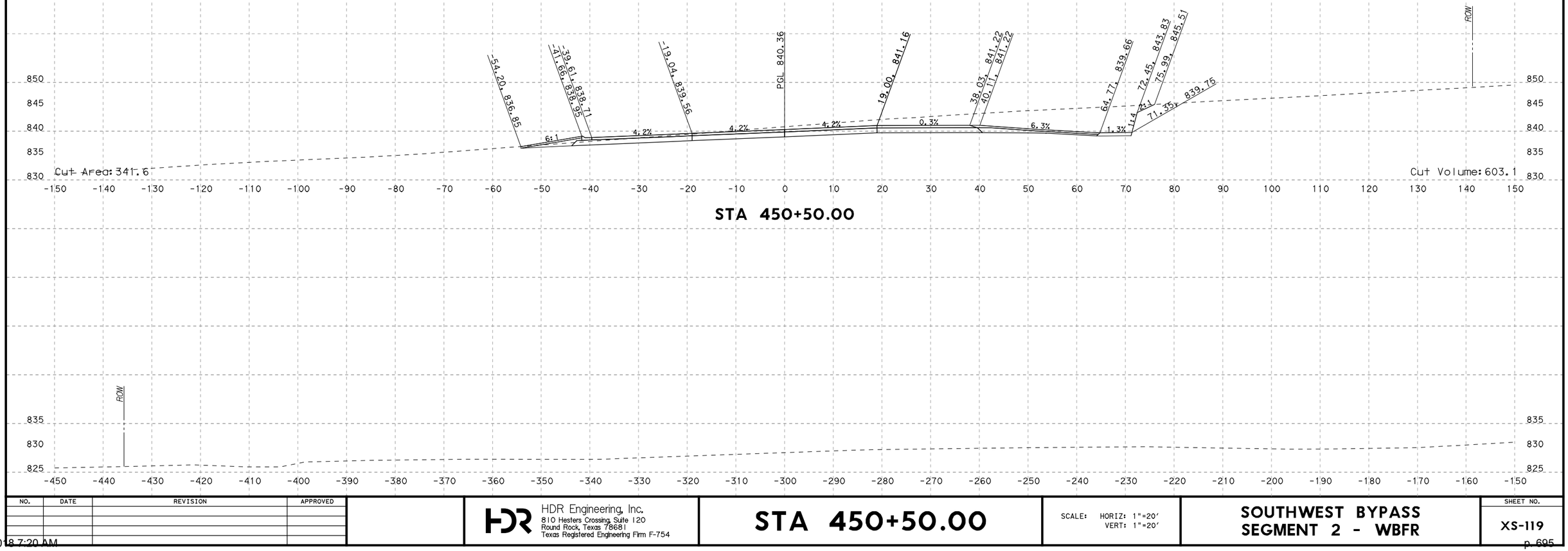
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-118



03/26/2018



STA 450+50.00

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz TIME: 11:25:54 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

NO.	DATE	REVISION	APPROVED

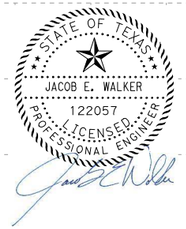
HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 450+50.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

SHEET NO.
XS-119



03/26/2018

STA 451+00.00

NO.	DATE	REVISION	APPROVED

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STA 451+00.00

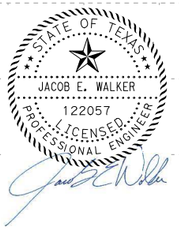
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - WBFR

SHEET NO.
XS-120

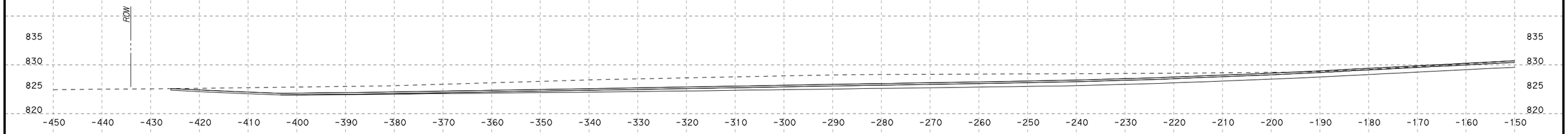
PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:25:57 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



03/26/2018

STA 451+07.00



NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
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STA 451+07.00

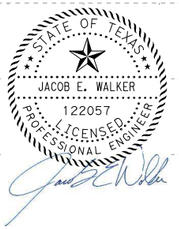
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - WBFR

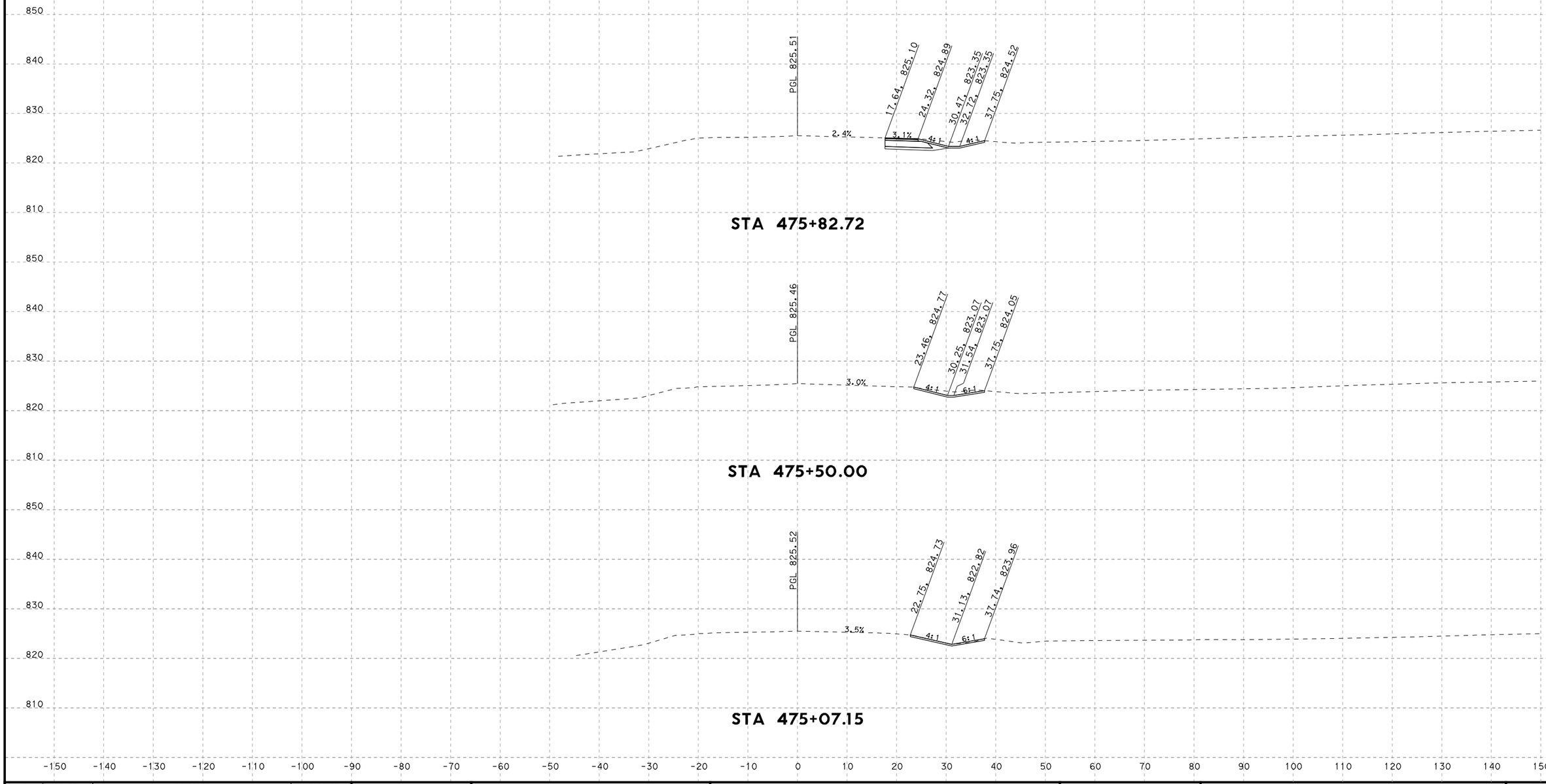
SHEET NO.
XS-121

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020\T0718.tbl
USER: lgomezgonz TIME: 11:26:00 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM



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NO.	DATE	REVISION	APPROVED

HDR Engineering, Inc.
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Round Rock, Texas 78681
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STA 475+07.15 TO STA 475+82.72

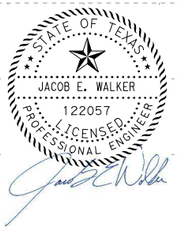
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - RM 2243

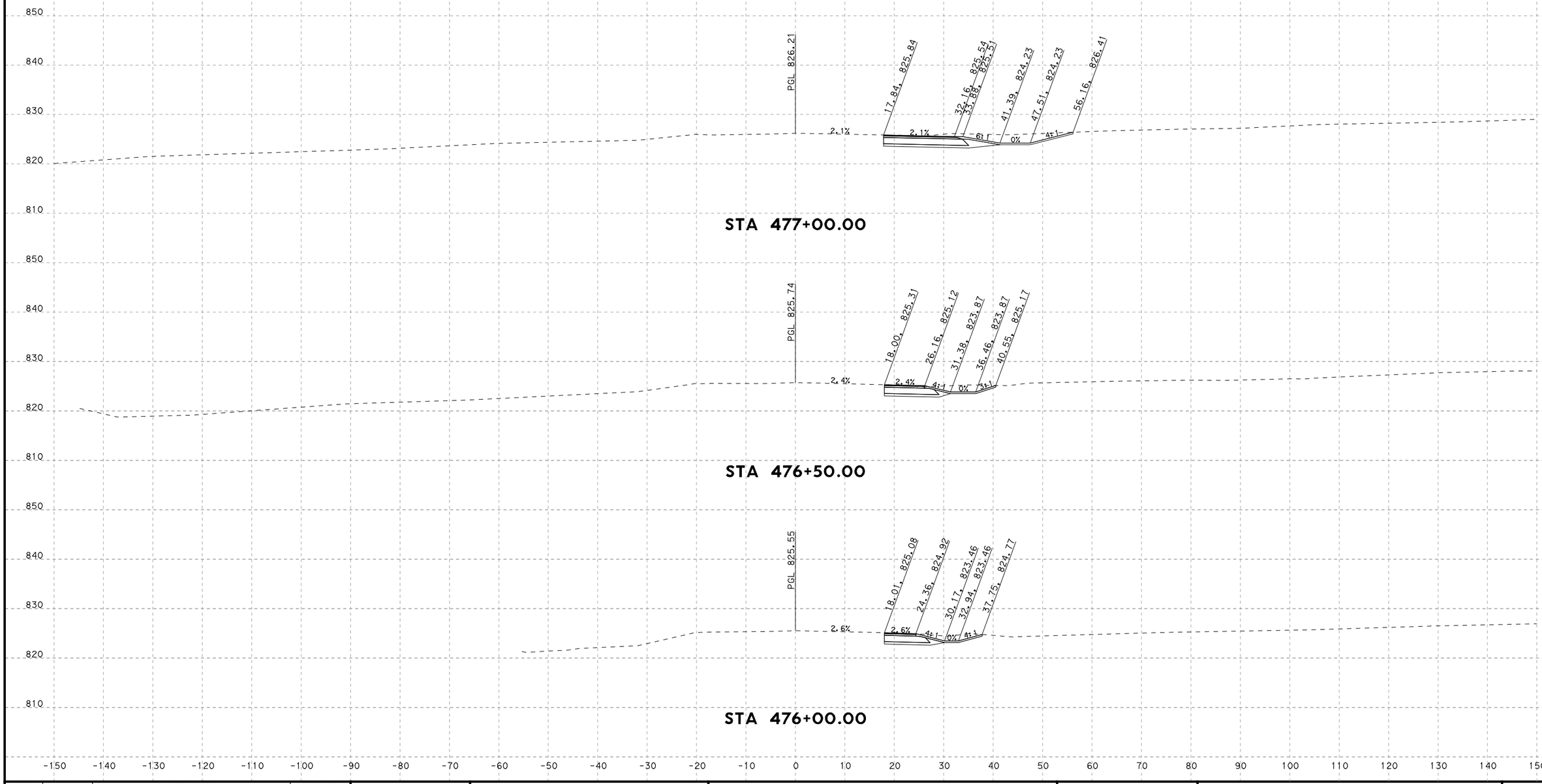
SHEET NO.
XS-122

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020\T0718.tbl
USER: lgomezgonz TIME: 11:26:03 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM



03/26/2018



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HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 476+00.00 TO STA 477+00.00

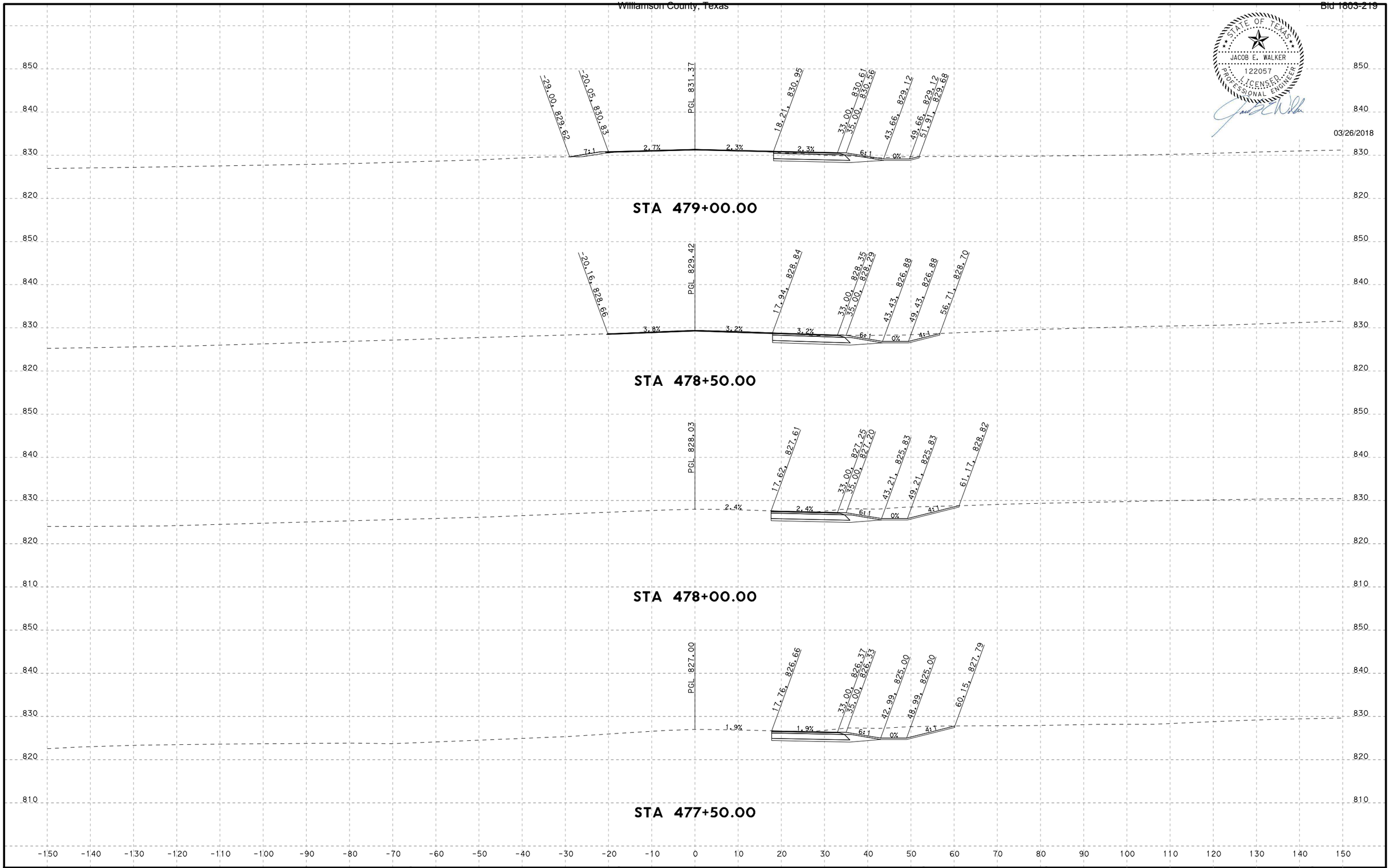
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - RM 2243

SHEET NO.
XS-123

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-000002017018.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:26:07 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



STATE OF TEXAS
JACOB E. WALKER
122057
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NO.	DATE	REVISION	APPROVED

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Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 477+50.00 TO STA 479+00.00

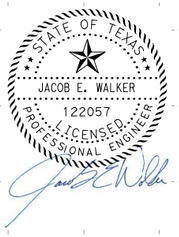
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - RM 2243

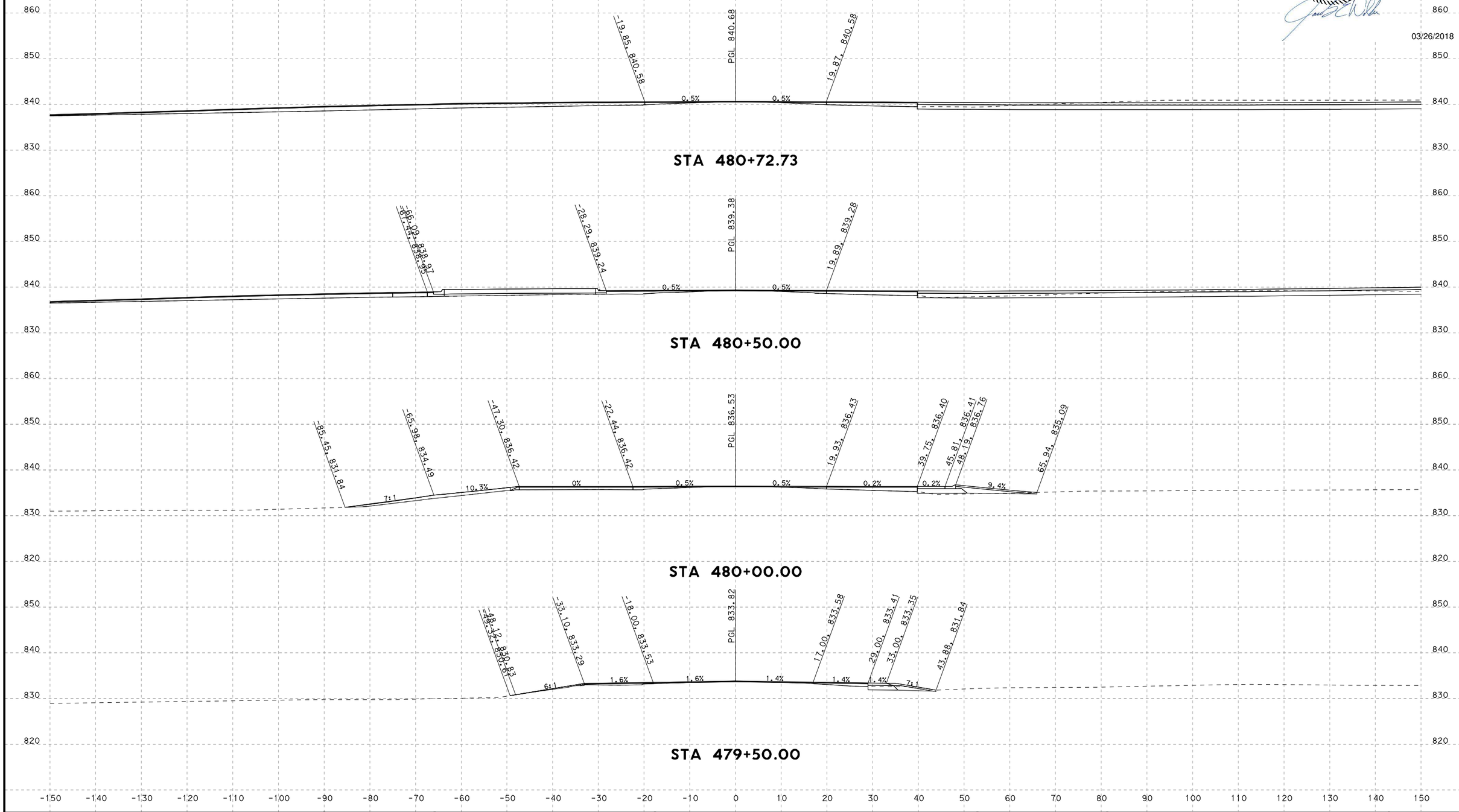
SHEET NO.
XS-124

PLOT DRIVER: TXDOT_PDF_BW.pltcfg
USER: lgomezgonz
FILE: \
PENTABLE: S2-0000020170718.tbl
TIME: 11:26:10 AM
DATE: 3/26/2018
SCALE: 1:20

4/12/2018 7:20 AM



03/26/2018



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 479+50.00 TO STA 480+72.73

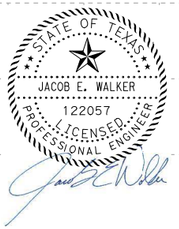
SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - RM 2243

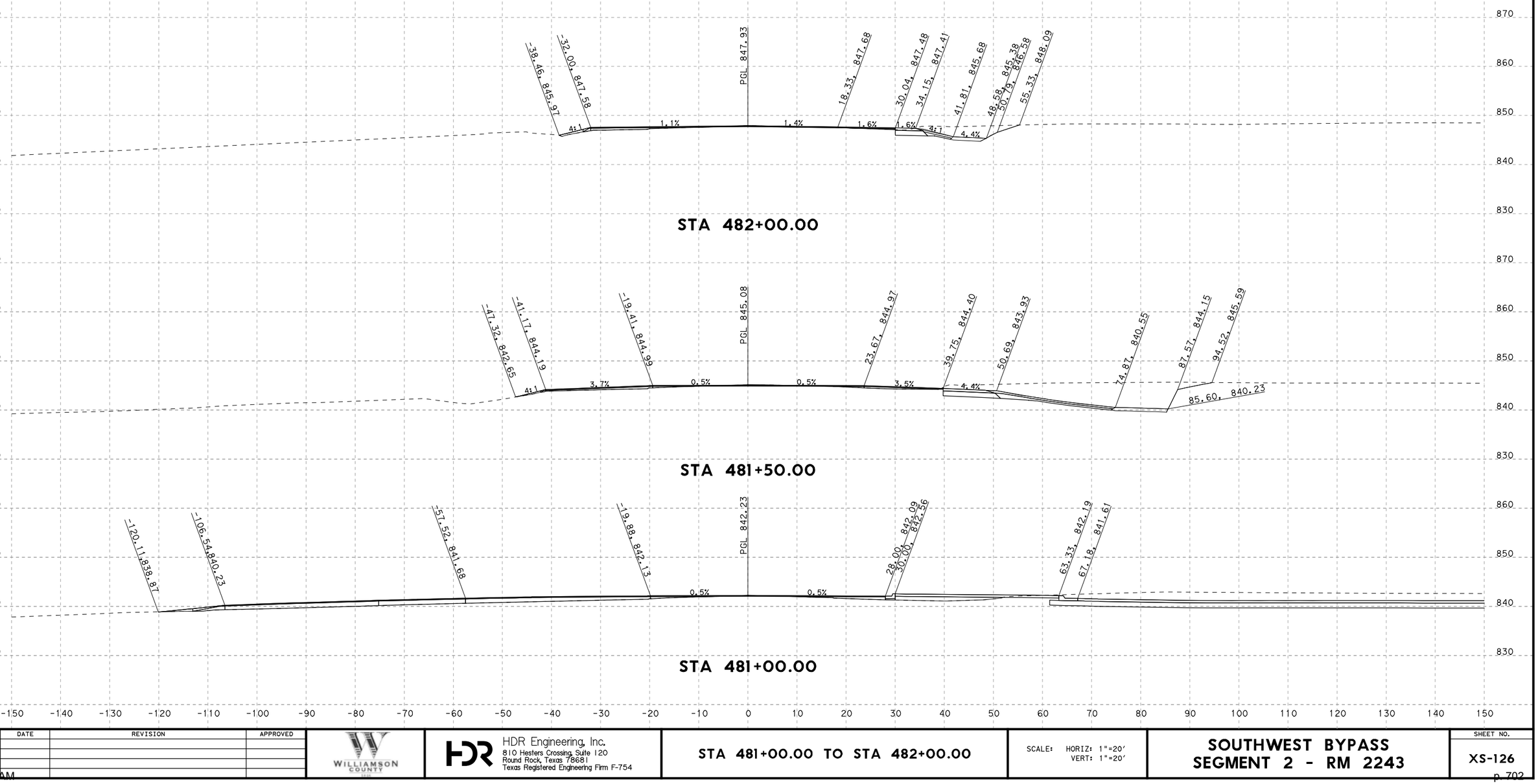
SHEET NO.
XS-125

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020I0718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:26:13 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM



03/26/2018



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WILLIAMSON COUNTY

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
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STA 481+00.00 TO STA 482+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS SEGMENT 2 - RM 2243

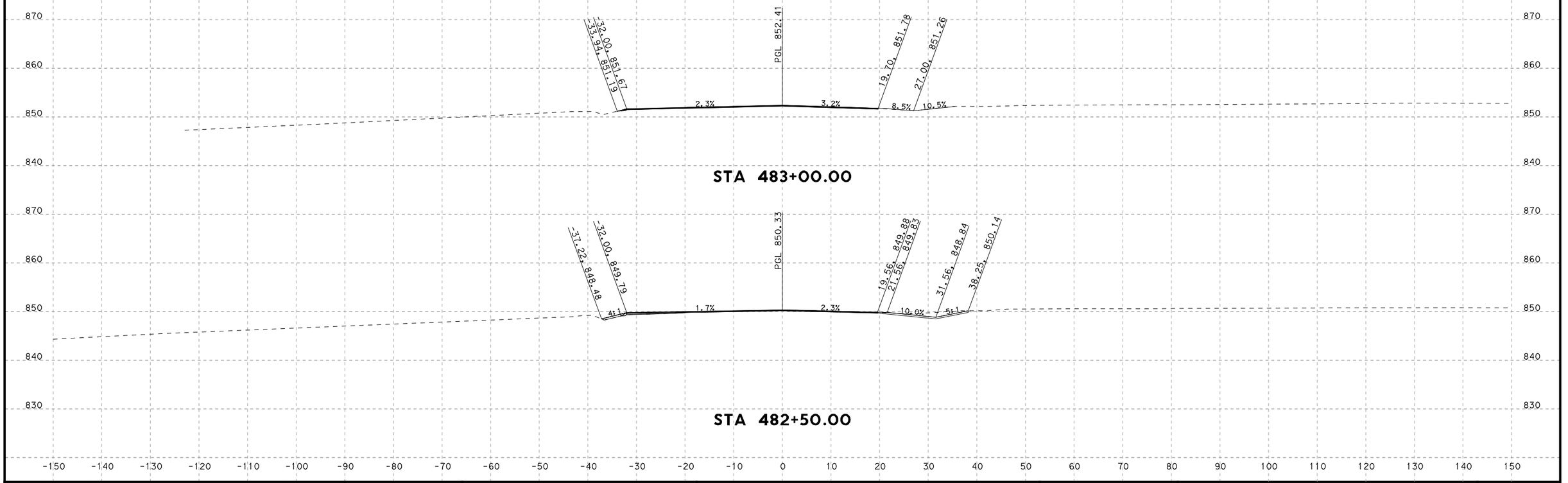
SHEET NO.
XS-126

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020/0718.tbl
USER: lgomezgonz TIME: 11:26:17 AM SCALE: 1:20
DATE: 3/26/2018
FILE: \

4/12/2018 7:20 AM

STATE OF TEXAS
JACOB E. WALKER
122057
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PROFESSIONAL ENGINEER

03/26/2018



NO.	DATE	REVISION	APPROVED

WILLIAMSON COUNTY TEXAS

HDR Engineering, Inc.
810 Hesters Crossing, Suite 120
Round Rock, Texas 78681
Texas Registered Engineering Firm F-754

STA 482+50.00 TO STA 483+00.00

SCALE: HORIZ: 1"=20'
VERT: 1"=20'

SOUTHWEST BYPASS
SEGMENT 2 - RM 2243

SHEET NO.
XS-127

PLOT DRIVER: TXDOT_PDF_BW.pltcfg PENTABLE: S2-0000020170718.tbl
USER: lgomezgonz DATE: 3/26/2018 TIME: 11:26:20 AM SCALE: 1:20
FILE: \

4/12/2018 7:20 AM

Question and Answers for Bid #1803-219 - Southwest Bypass Segment 2

Overall Bid Questions
There are no questions associated with this bid.