FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			1
STATE	STATE DIST.	COUNTY	
TEXAS	ATL	TITUS	
CONT.	SECT.	JOB	HIGHWAY NO.

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
PROJECT NO.
CSJ: 0610-03-095

TITUS COUNTY
IH 30

LIMITS FROM: 1.7 MI W OF US 67 , WB
TO: 1.0 MI W OF US 67 , WB

NET LENGTH OF ROADWAY = 6554.77 FT = 1.241 MI
NET LENGTH OF BRIDGE = 0.00 FT = 0.000 MI
NET LENGTH OF PROJECT = 6554.77 FT = 1.241 MI

Add comma's

AGREE

FOR WORK CONSISTING OF CONSTRUCTING WEIGH STATION AND RAMPS

50 MPH

Ramp design speed meets 50mph allowed per Table 3-20, Mid range design speed.

Why would the exit side of ramp not meet a 75 mph design speed?

Decel la
decel pri

Should th
Ramps

RAMP DESIGN SPEED = 70 MPH
BYPASS DESIGN SPEED = 30 MPH
AREA OF DISTURBED SOIL = 12.92 AC
ADT(2018) = 47,086
ADT(2038) = 65,920
ACCESSIBILITY STANDARDS = PROWAG

ADT (2021) = 29,507
ADT (2041) = 41,310

AGREED

ADT UPDATED TO
RECENT YEAR AV

ADT (2022) = 29,89
ADT (2042) = 53,20

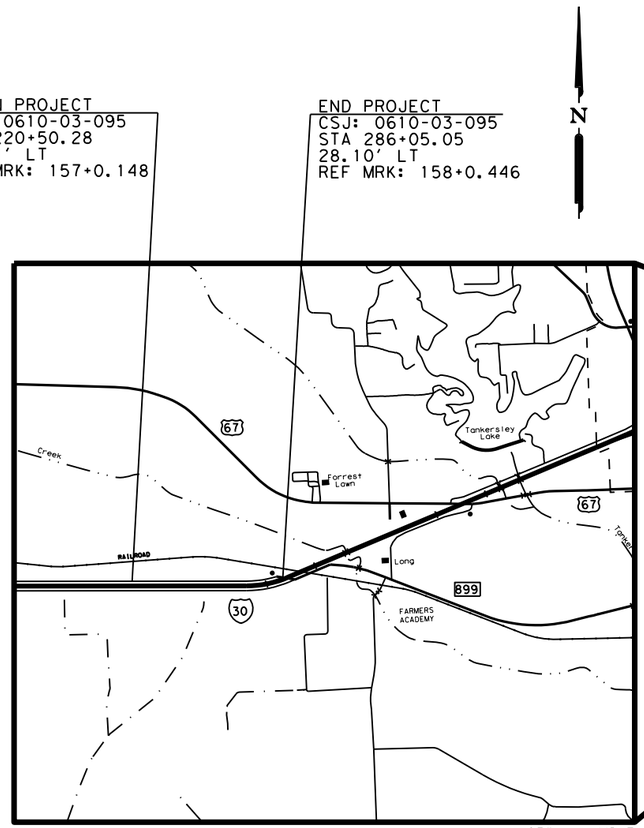
REGISTERED ACCESSIBILITY SPECIALIST INSPECTION REQ
TDLR NO.

INDEX OF SHEETS

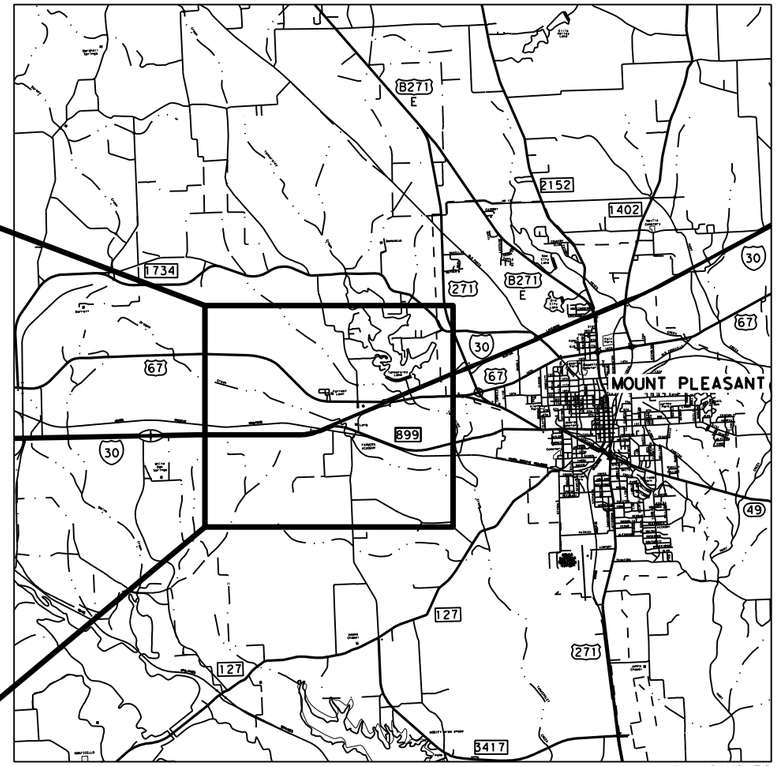
SEE SHEET 2 FOR INDEX OF SHEETS

BEGIN PROJECT
CSJ: 0610-03-095
STA 220+50.28
48.01' LT
REF MRK: 157+0.148

END PROJECT
CSJ: 0610-03-095
STA 286+05.05
28.10' LT
REF MRK: 158+0.446



1.25" = 1 MILE



1" = 2 MILES

THE CONTRACTOR SHALL MAKE HIS OWN INVESTIGATIONS AND ARRANGEMENTS FOR DELIVERY OF MATERIALS.

CONSTRUCTION SIGN AND BARRICADE PLACEMENT SHALL BE IN ACCORDANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AS SHOWN ON THE BC STANDARDS, AND AS SPECIFIED HEREIN OR AS DIRECTED.

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

EXCEPTIONS: NONE
EQUATIONS: NONE
R.R. CROSSINGS: NONE

60% PLANS

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

_____ P.E. _____
AREA ENGINEER DATE

SUBMITTED FOR LETTING

PROJECT MANAGER

RECOMMENDED FOR LETTING

DIRECTOR OF TRANSPORTATION
PLANNING & DEVELOPMENT

APPROVED FOR LETTING

DISTRICT ENGINEER

FILE LOCATION
http://www.txdot.gov/inside-txdot/district/san-antonio/specinfo.html

AGREE

01/01/2028

AGREE

Titus

IH 30

LEVELS DISP

COUNTY _____ PROJ. NO. _____
HWY. NO. _____ LETTING DATE _____
DATE ACCEPTED _____

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\General\1163504index01.dgn

SHEET NO.	DESCRIPTION
	GENERAL
1	TITLE SHEET
2	INDEX OF SHEETS
3	EXISTING TYPICAL SECTIONS
4-6	PROPOSED TYPICAL SECTIONS
7	GENERAL NOTES
8	ESTIMATE AND QUANTITY
9-14	SUMMARY OF QUANTITIES
15	SUMMARY OF SMALL SIGNS
16	SUMMARY OF LARGE SIGNS
	TRAFFIC CONTROL PLAN
17	TRAFFIC CONTROL PLAN NARRATIVE
18-20	TRAFFIC CONTROL PLAN OVERALL PHASING LAYOUT
21-22	TCP TYPICAL SECTIONS
23-27	TRAFFIC CONTROL PLAN PHASE 1
28-32	TRAFFIC CONTROL PLAN PHASE 2
	TRAFFIC CONTROL STANDARDS
33	* CRASH CUSHION SUMMARY SHEET
34-45	* BC(1 THRU 12)-21
46	* WZ(RS)-22
47	* WZ-ITS(3)
48	* ~~TCP(2-6)-18~~
49	* TCP(3-2)-13
50	* TCP(3-3)-14
51	* TCP(5-1)-18
52-53	* SSCB(2)-10
54	* ABSORB(M)-19
55	* SLED-19
	ROADWAY DETAILS
56	PUBLIC SAFETY COMMERCIAL VEHICLE INSPECTION FACILITY SURVEY CONTROL INDEX
57	PUBLIC SAFETY COMMERCIAL VEHICLE INSPECTION FACILITY SURVEY CONTROL DATA
58-59	HORIZONTAL ALIGNMENT DATA
60-66	PLAN AND PROFILE
67	EDGE DRAIN LAYOUT
68	PARKING LOT DETAILS
69-70	CONCRETE JOINT DETAILS
71	EDGE DRAIN DETAILS
72	CHAIN LINK FENCE PLAN
73	HMAC TRANSITION DETAILS
74-75	MISCELLANEOUS DETAILS
	ROADWAY STANDARDS
76-77	* CPCD-14
78	* JS-14
79	* CCCG-22
80-83	* PED-18
84-86	* PRD-13
87	* CLF-10
88-90	* RLSTD016-19
91	* QGELITEM10N20
92	* QGUARDM10N20
	STRUCTURAL DETAILS
93	PRE-ENGINEERED METAL INSPECTION CANOPY PLAN AND ELEVATION
94	PRE-ENGINEERED METAL INSPECTION CANOPY DETAILS
95-96	PRE-ENGINEERED METAL INSPECTION CANOPY INSPECTION PIT DETAILS
97	PRE-ENGINEERED METAL STATIC SCALE CANOPY PLAN AND ELEVATION
98	PRE-ENGINEERED METAL STATIC SCALE CANOPY DETAILS
	DRAINAGE DETAILS
99	EXIST DRAINAGE AREA MAP
100	EXIST DRAINAGE CALCULATIONS
101	PROPOSED DRAINAGE AREA MAP
102	PROPOSED DRAINAGE CALCULATIONS
103	GRADED DRAINAGE DITCH CALCULATIONS
104	INTERNAL DRAINAGE AREA MAP & DETAILS
105	CURB INLET HYDRAULIC DATA
106	HYDRULIC DATA SHEET CULVERT A-1
107	HYDRULIC DATA SHEET CULVERT A-6
108	HYDRULIC DATA SHEET CULVERT B-4
109	HYDRULIC DATA SHEET CULVERT B-1
110	CULVERT A-1 LAYOUT
111	CULVERT A-4 LAYOUT
112	CULVERT A-6 LAYOUT
113	CULVERT B-4 LAYOUT
114	CULVERT B-1 LAYOUT
115-116	ARMOR CURB DETAIL
117	SIDEWALK (TY A) DETAIL

AGREE, STANDARD REMOVED

Delete - not a divided highway

ADD FOLLOWING STANDARDS:
1.) TCP(1-2)-18 and or TCP(2-2)-18 - for IH 30 frontage rd., during drainage pipe and riprap install?
2.) TCP(5-1)-18
3.) TCP(6-1)-12 - for freeway lane closer.

TCP(2-2)-18 ADDED

AGREE

Vertical Alignment Data?

Vertical alignment data provided in the roadway Plan & profile sheets.

AGREE

HMAC TRANSITION DETAIL

Worksheet for edge condition treatment types? must be signed and sealed by engineer

AGREE added to TCP

Standard TYPE T80SS? Reviewer is not seeing where this will be used in plans.

AGREE, STANDARD REMOVED

Proposed Drainage Ditch Calculations

AGREE

Change sheet order?

AGREE

SHEET NO.	DESCRIPTION
118	RIP RAP DETAILS
119	COLLAR DETAILS
	DRAINAGE STANDARDS
120	* SCP-5
121	* PBGC
122	* PAZD-CZ
123	* PSET-SC
124-125	* SETB-CD
126-127	* SETP-CD
128	* PSET-RP
129	* PB
130-131	* PCU
	UTILITIES
132-135	UTILITY LAYOUT
	TRAFFIC ITEMS
136-139	ILLUMINATION AND CONDUIT LAYOUT
140	ILLUMINATION ASSEMBLY LOCATIONS, CONDUIT, AND CONDUCTOR SUMMARY
141-144	SIGNING & PAVEMENT MARKINGS PLAN
	TRAFFIC STANDARDS
145-153	* HMID(1 THRU 9)-03
154	* HMIP(1)-16
155	* HMIP(2)-16
156	* HMIF(1)-98
157	* HMIF(2)-98
158-162	* TSR(1 THRU 5)-13
163	* CMV-19
164	* CMV(SD)-19
165-167	* PM(1 THRU 3)-20
168	* PM(AP)-21
169	* CPM(1)-14
170	* FPM(5)-19
171	* SMD(GEN)-08
172	* SMD(SLIP-1)-08
173	* SMD(SLIP-2)-08
174	* SMD(SLIP-3)-08
	ELECTRICAL DETAILS
175	ELECTRICAL NOTES, LEGEND, AND ABBREVIATION
176	ELECTRICAL SERVICE LOCATIONS
177	ELECTRICAL LAYOUT
178	INSPECTION AND STATIC CANOPY ELECTRICAL & LIGHTING PLAN
179	INSPECTION PIT ELECTRICAL AND LIGHTING PLAN
180	RISER DIAGRAM
181	INSPECTION AND STATIC SCALE CANOPY LIGHTING SECTIONS
182-183	ELECTRICAL SCHEDULES
	ELECTRICAL STANDARDS
184-190	* ED(1 THRU 7)-14
191	* RID(1)-20
192	* RID(2)-20
193-196	* RIP(1 THRU 4)-19
	ENVIRONMENTAL ISSUES
197-198	* SW3P
199-202	SW3P PLAN
203	* EPIC
204	* EC(1)-16
205	* EC(2)-16
206	* EC(3)-16
207-209	* EC(9)-16

AGREE

RIPRAP DETAILS

CONCRETE PIPE COLLAR AND CONNECTION DETAIL

AGREE

AGREE

HMIP (1 THRU 2) -16 - to stay consistent?

HMIF (1 THRU 2) -98 - to stay consistent?

AGREE

Update to new standards
Use these for anything inside the weight station area
PM(1)-22
PM(2)-22
PM(3)-22

Use these txdot standards for ramps and IH 30 lanes
FPM(1)-22
FPM(2)-22
FPM(5)-22

AGREE

CPM(1)-23

FPM(5)-22

AGREE

AGREE

Add comma

AGREE

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

SWP3 PLAN

AGREE

Delete *

AGREE

THE STANDARD SHEETS SPECIFICALLY SHOWN WITH PRECEDING (*), HAVE BEEN SELECTED BY MY OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

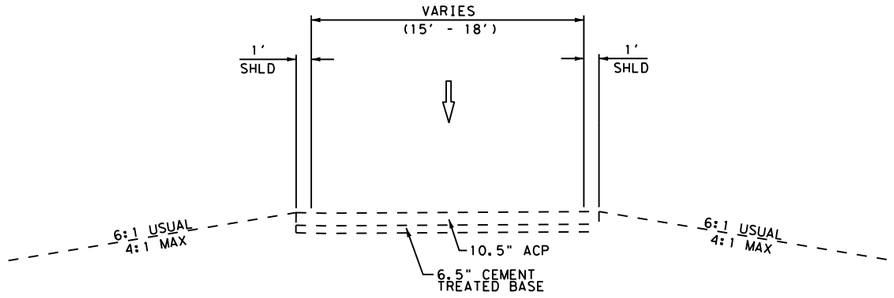
WB IH 30 CMV STATION

INDEX OF SHEETS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DW:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DW:	ATL	TITUS	0610	03	095	2

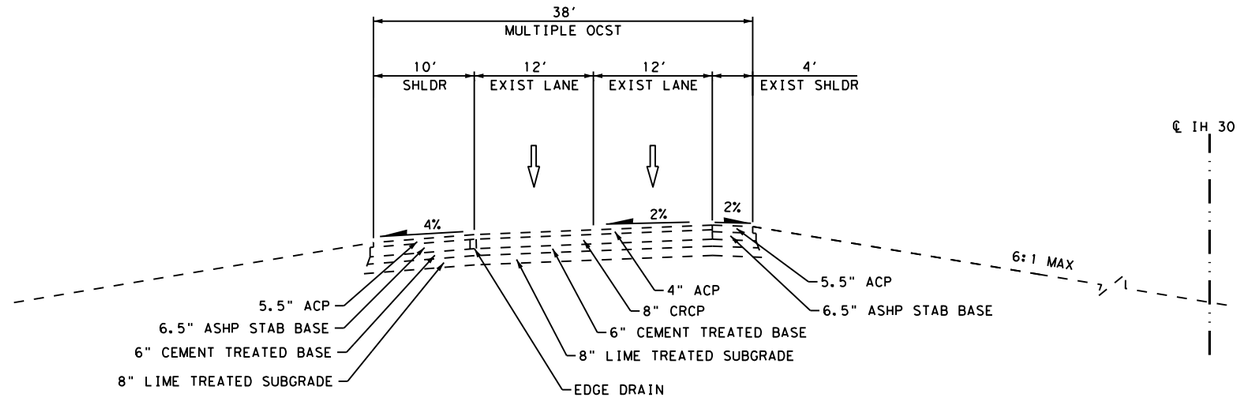
Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\General\1163504TYPS01.dgn



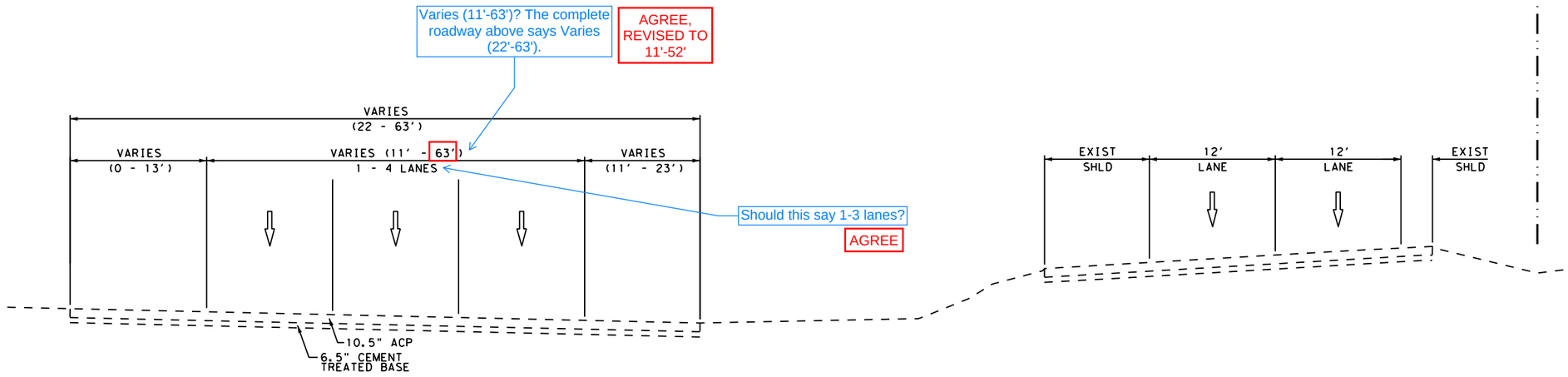
EXISTING TYPICAL SECTION
RAMP SECTION
NTS

STA 26+80 TO STA 32+00
STA 37+36 TO STA 43+00
STA 54+78 TO STA 56+73



EXISTING TYPICAL SECTION
WB IH 30
NTS

STA 220+50.28 TO STA 286+05.05



EXISTING TYPICAL SECTION
CMV STATION
NTS

STA 32+00 TO STA 37+36
STA 43+00 TO STA 54+78

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
EXISTING TYPICAL SECTIONS

SHEET 1 OF 1

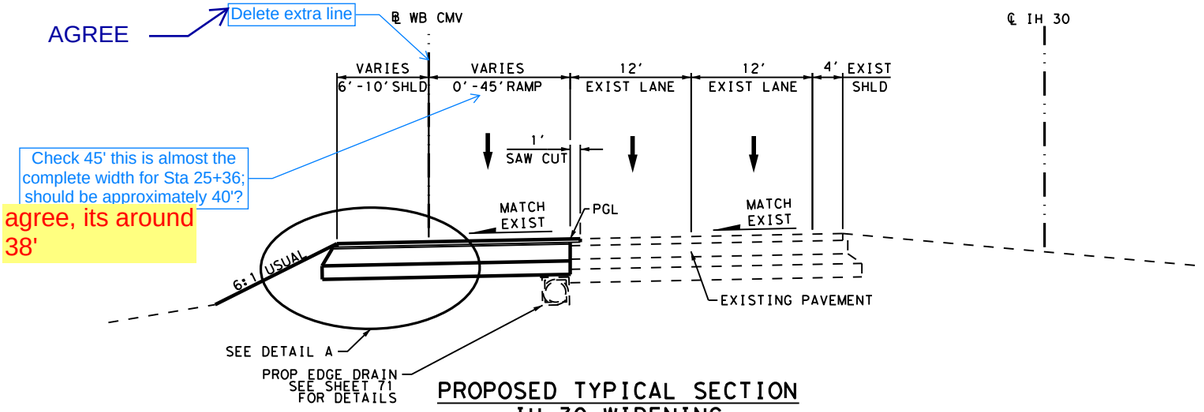
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	3

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\General\1163504TYPS02.dgn

AGREE

Delete extra line



Check 45' this is almost the complete width for Sta 25+36; should be approximately 40'?

agree, its around 38'

PROPOSED TYPICAL SECTION
IH 30 WIDENING

NTS

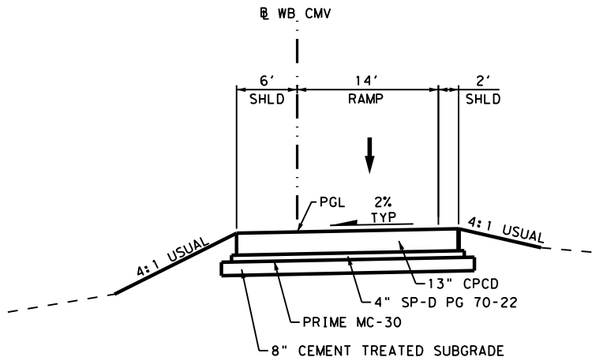
STA 11+18 TO STA 25+36
STA 64+88 TO STA 74+81

station revised to 6+45 for new limits

Sta 9+40?

Shows Sta 74+82 on sheet 66?

agree



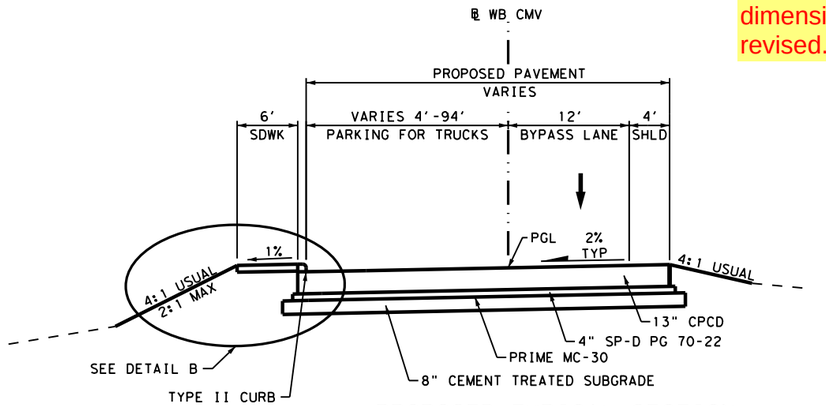
PROPOSED TYPICAL SECTION
RAMP SECTION

NTS

STA 25+36 TO STA 32+70
STA 59+29 TO STA 64+88

At Sta 32+56 shoulder increases from 6' to 14'; so what sta should this be? see sheet 62

Stationing and dimensions have been revised.



stations revised using new design.

Check Sta 32+56?

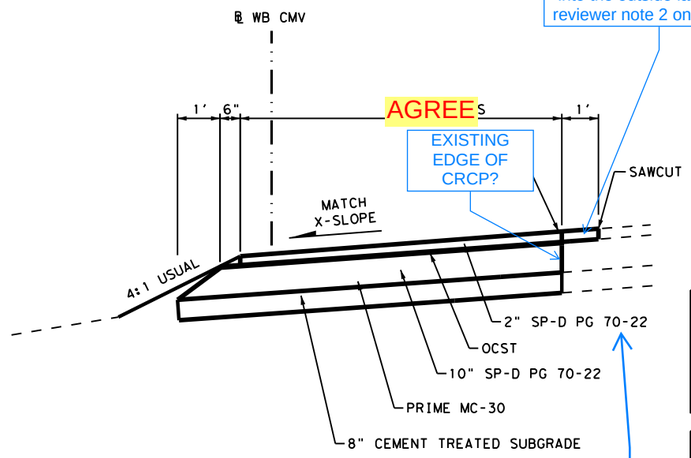
PROPOSED TYPICAL SECTION
TRUCK PARKING SECTION

NTS

STA 32+70 TO STA 39+30

Agree, item 0354-6045 to remove 2" existing acp. notes added to RDWY Summaries.

How is the contractor going to remove 2" existing acp - 1' into the outside lane? - see reviewer note 2 on sheet 10.

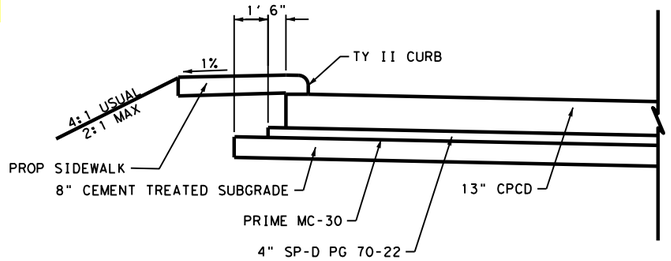


DETAIL A

NTS

Shows SP-D PG76-22 on Sheet 10?

AGREE, CALLOUT CORRECTED IN DETAIL A TO "2" SP-D PG 76-22"



DETAIL B

NTS

NOTE PROPOSED SIDEWALK AND CURB FROM APPROXIMENT STA 35+14 TO STA 52+19?

agree, stationing revised to use new design.

AGREE

Misspelling

NOTES

1. SP-D SHALL BE APPLIED IN 2" LIFTS.
2. TACK COAT SHALL BE APPLIED INBETWEEN LIFTS OF HMA.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

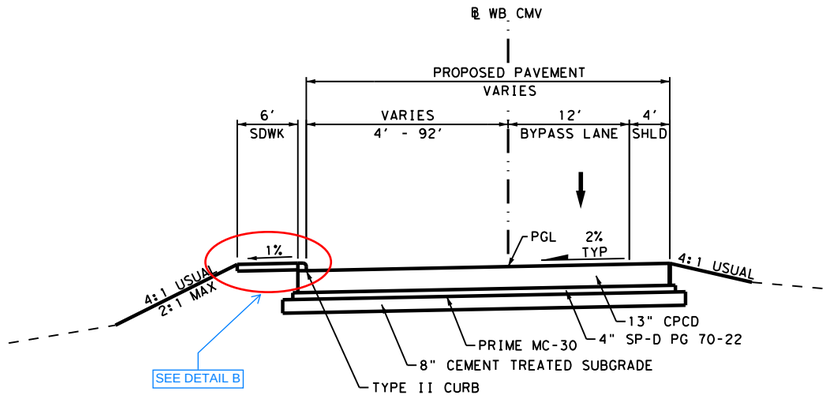
REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
PROPOSED TYPICAL SECTIONS

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	4

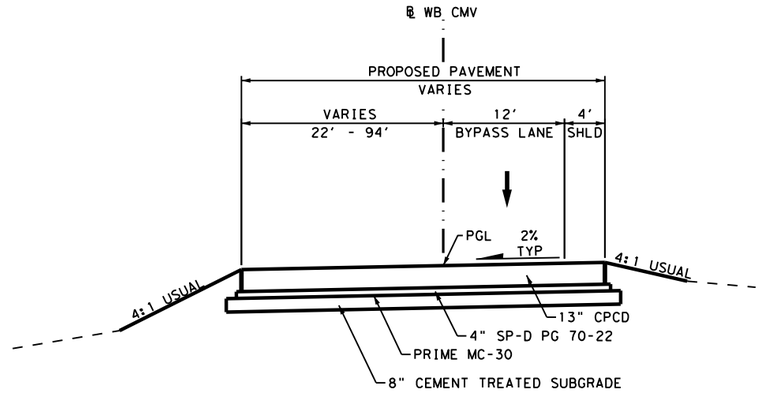


AGREE, CALLOUT ADDED

PROPOSED TYPICAL SECTION

NTS

STA 39+30 TO STA 45+72
STA 47+74 TO STA 50+00



PROPOSED TYPICAL SECTION

NTS

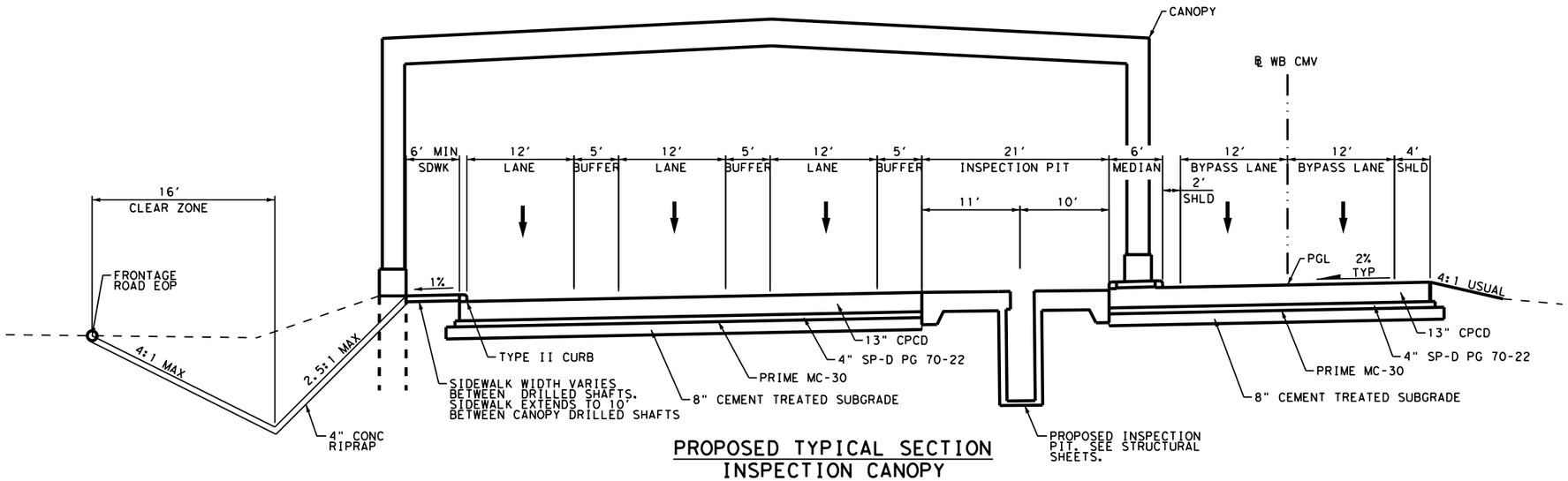
STA 55+79 TO STA 59+29

AGREE

Misspelling

NOTES

1. SP-D SHALL BE APPLIED IN 2" LIFTS.
2. TACK COAT SHALL BE APPLIED INBETWEEN LIFTS OF HMA.



PROPOSED TYPICAL SECTION
INSPECTION CANOPY

NTS

STA 45+72 TO STA 47+74

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

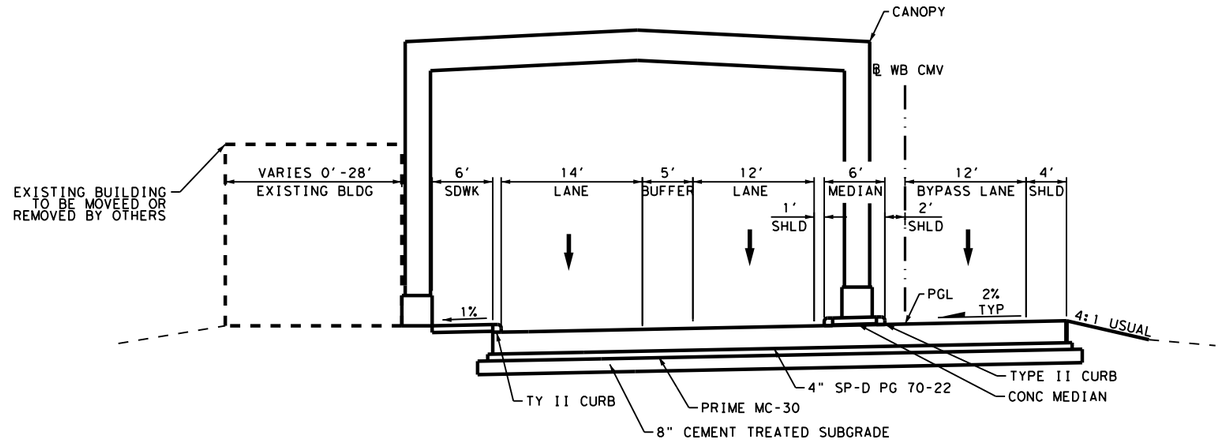
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PROPOSED TYPICAL SECTIONS

SHEET 2 OF 3

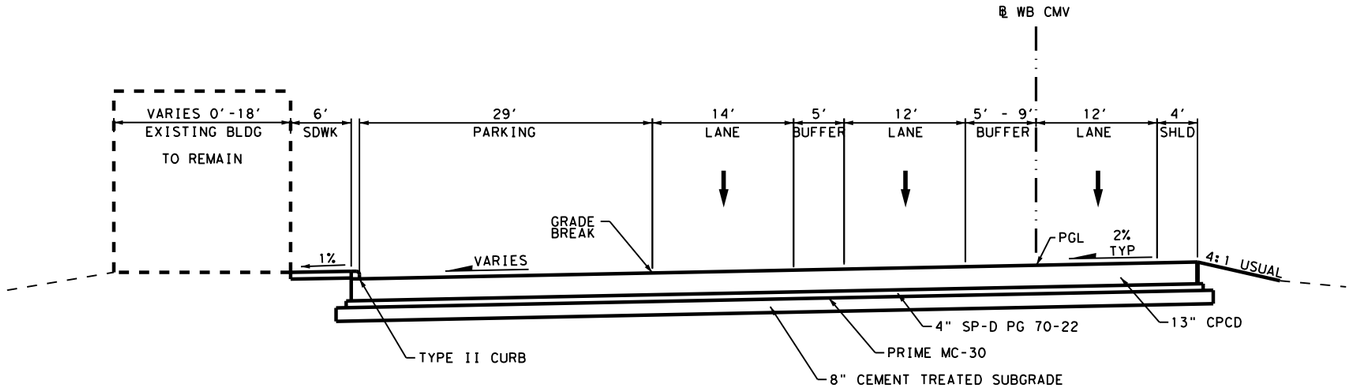
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	5



PROPOSED TYPICAL SECTION
STATIC SCALE CANOPY

NTS

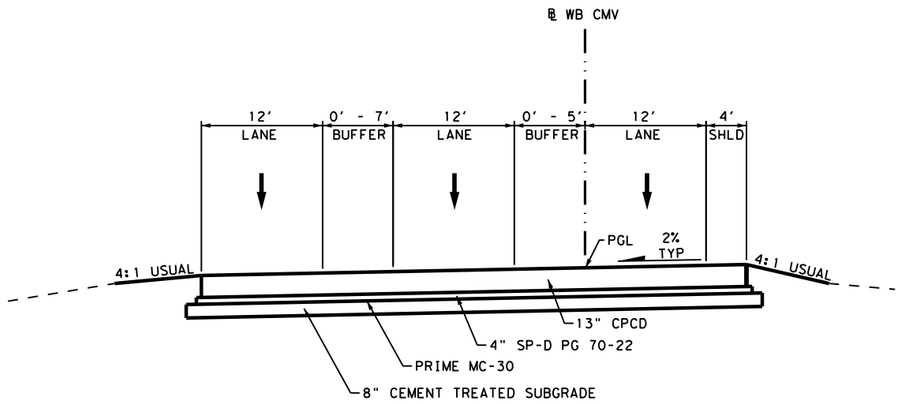
STA 50+00 TO STA 50+86



PROPOSED TYPICAL SECTION
DPS VEHICLE PARKING SECTION

NTS

STA 50+86 TO STA 52+21



PROPOSED TYPICAL SECTION

NTS

STA 52+21 TO STA 55+79

AGREE

Misspelling

NOTES

1. SP-D SHALL BE APPLIED IN 2" LIFTS.
2. TACK COAT SHALL BE APPLIED INBETWEEN LIFTS OF HMA.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PROPOSED TYPICAL SECTIONS

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	6

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\General\11635O4TYPS04.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\General\11635040enNotes.dgn

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

GENERAL NOTES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	7

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\General\11635504EST&QTY.dgn

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ESTIMATE & QUANTITY

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	8

SUMMARY OF TCP QUANTITIES

AGREE

Text wrap

ITEM		0512	0512	0512	0545	0545	0545	0662	0662	0662
DESC		6001	6025	6049	6003	6005	6019	6048	6056	6109
SHT NO	TCP	PORT CTB (FUR & INST) (SGL SLOPE) (TY 1)	PORT CTB (MOVE) (SGL SLP) (TY 1)	PORT CTB (REMOVE) (SGL SLP) (TY 1)	CRASH CUSH ATTEN (MOVE & RESET)	CRASH CUSH ATTEN (REMOVE)	CRASH CUSH ATTEN (INSTL) (S) (N) (TL3)	WK ZN PAV MRK REMOV (REFL) TY I-C	WK ZN PAV MRK REMOV (TRAF BTN) TY W	WK ZN PAV MRK SHT TERM (TAB) TY W
		LF	LF	LF	EA	EA	EA	EA	EA	EA
21	TRAFFIC CONTROL PLAN PHASE 1	1620						88	263	
22	TRAFFIC CONTROL PLAN PHASE 1	420					1	100	300	
23	TRAFFIC CONTROL PLAN PHASE 1	90						100	300	
24	TRAFFIC CONTROL PLAN PHASE 1	1230				1	1	101	303	
25	TRAFFIC CONTROL PLAN PHASE 1							25	73	
26	TRAFFIC CONTROL PLAN PHASE 2		30	30				29	87	132
27	TRAFFIC CONTROL PLAN PHASE 2		1050	1050	1	1				150
28	TRAFFIC CONTROL PLAN PHASE 2		1260	1260						150
29	TRAFFIC CONTROL PLAN PHASE 2		1020	1020						152
30	TRAFFIC CONTROL PLAN PHASE 2									37
GEN	GENERAL									
	TOTALS	3360	3360	3360	1	2	2	443	1326	621

Correct all sheet numbers

AGREE

Example sheet no 23

Plotted on: /14/20

NOTES
1.) ADD COMMA'S TO ALL QUANTITIES - EX. 1,000 SY
2.) BID ITEM FOR REMOVING EXISTING 6" W BRK STRIPING ON ASPHALT IN PHASE 1? WORKZONE SHORT TERM TAPE?
3.) USE NEW PM(1)-22 - UPDATED 12-22
4.) SHEET NO. 28 SHOWS WK ZN PVMT MRK AND NON-REMOV (W) 4" (SLD) - NOT SEEING A BID ITEM FOR THIS. IS THIS NEEDED?

AGREE

commas comment discussed and not possible due to excel formula issues.

bid item added.

NOT NEEDED. TCP PHASE REVISED.

items not used anymore

AGREE

0677-6002? This would be for phase 1 right?

item not used on TCP anymore.

0666-6171?

Text wrap

0666-6306?

0678-6002?

ITEM		0666	0666	0677	0678	6001	6079	6185
DESC		6167	6300	6001	6001	6002	6003	6001
SHT NO	TCP	REFL PAV MRK TY II (W) 4" (BRK)	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	ELIM EXT PAV MRK & MRKS (4")	PAV SURF PREP FOR MRK (4")	PORTABLE CHANGEABLE MESSAGE SIGN	AUTO PORT SMRT TRF MONITOR SYS (PLAN 2)	TMA (STATIONARY)
		LF	LF	LF	LF	EA	DAY	EA
21	TRAFFIC CONTROL PLAN PHASE 1							
22	TRAFFIC CONTROL PLAN PHASE 1							
23	TRAFFIC CONTROL PLAN PHASE 1							
24	TRAFFIC CONTROL PLAN PHASE 1							
25	TRAFFIC CONTROL PLAN PHASE 1							
26	TRAFFIC CONTROL PLAN PHASE 2	438	438	2187	2187			
27	TRAFFIC CONTROL PLAN PHASE 2	500	500	2500	2500			
28	TRAFFIC CONTROL PLAN PHASE 2	500	500	2500	2500			
29	TRAFFIC CONTROL PLAN PHASE 2	504	504	2519	2519			
30	TRAFFIC CONTROL PLAN PHASE 2	122	122	608	608			
GEN	GENERAL					1	45	2
	TOTALS	2064	2064	10314	10314	1	45	2

May want to include some mobile TMA for striping where the ramp ties into IH 30

agree

Correct all sheet numbers

AGREE

Round to nearest 10 LF

Check values

agree, quantities will be verified.

Change all pavement markings to 6"

agree, we've moved the items to signing & pave marking summary.

Design Filename: P:\116\35\04\Design\Civil\Summaries\1163504TCPSummary.dgn

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

WB IH 30 CMV STATION

SUMMARY OF QUANTITIES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	9

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Summaries\163504RDWYSummary.dgn

SUMMARY OF ROADWAY QUANTITIES

SHT NO	ROADWAY	0100 6002 PREPARING ROW STA	0104 6023 REMOVING CONC (CTB) LF	0105 6037 REMOVING STAB BASE AND ASPH PAV(0"-16") SY	0110 6001 EXCAVATION (ROADWAY) CY	0132 6001 EMBANKMENT (FINAL) (ORD COMP) (TY A) CY	0275 6001 CEMENT TON 34 LB/SY	0275 6011 CEMENT TREAT(EXIST MATL)(8") SY	0310 6009 PRIME COAT (MC-30) GAL 0.25 GAL/SY
60	PLAN AND PROFILE	5.6			248	179	20.0	1148	288
61	PLAN AND PROFILE	10.0			756	1189	48.0	2815	704
62	PLAN AND PROFILE	10.0	46		6150	1864	71.0	4071	1018
63	PLAN AND PROFILE	10.0	34		9135	2991	124.0	7256	1814
64	PLAN AND PROFILE	10.0	80	177	1790	6190	153.0	8953	2239
65	PLAN AND PROFILE	10.0			2476	347	56.0	3279	821
66	PLAN AND PROFILE	9.8			564	4269	40.0	2341	586
67	EDGE DRAIN LAYOUT								
	TOTALS	65.4	160	177	21119	17028	512.0	29864	7470

NOTES
1.) ADD COMMA'S TO ALL QUANTITIES - EX. 1,000 SY
2.) ADD BID ITEM 0354-6045 FOR ALL OF THE EXISTING SHOULDER AND RAMP; BECAUSE NOT SURE HOW THEY WILL BE ABLE TO REMOVE 2" ACP - 1' INTO THE LANE WITHOUT PLANING - SEE DETAIL A ON SHEET 4 (FROM SAWCUT TO EXISTING EOT); PLAN FROM SAWCUT TO EXISTING EOP.
3.) ADD BID ITEM 0104-6054 FOR REMOVING 485 LF OF EXISTING MOWSTRIP
4.) PROPOSED MBGF AND MOWSTRIP (ON EXIT RAMP SIDE)? SEE CROSS-SECTION 74+50.

excel doesnt cooperate when it's the result of a formula

agree, 354-6045 added

AGREE

SHT NO	ROADWAY	0316 6017 ASPH (AC-20-5TR) GAL 0.4 GAL/SY	0316 6222 AGGR(TY-PB GR-3 SAC-B) CY 90 SY/CY	0360 6023 CONC PVMT (JOINTED - CPCD) (13") SY	0432 6001 RIPRAP (CONC)(4 IN) CY	0450 6048 RAIL (HANDRAIL)(TY B) LF	0465 6005 JCTBOX(COMPL)(PJB)(3FTX3FT) EA	0465 6030 INLET (COMPL)(PCU)(3FT)(LEFT) EA	0467 6390 SET (TY II)(24 IN)(RCP)(4:1)(C) EA
60	PLAN AND PROFILE	460	13						
61	PLAN AND PROFILE	1127	32						
62	PLAN AND PROFILE	72	2	3586	1				
63	PLAN AND PROFILE			6916	72	34			
64	PLAN AND PROFILE			8608	247	272	1	1	1
65	PLAN AND PROFILE	22	1	2916	1				
66	PLAN AND PROFILE	938	27						
67	EDGE DRAIN LAYOUT				12				
	TOTALS	2619	75	22026	333	306	1	1	1

we removed the trees that would be an obstruction in the bottom of the ditch. Slope within the CZ is between 4:1 and 3:1 (traversable but not recoverable), obstructions have been removed

SHT NO	ROADWAY	0471 6003 GRATE & FRAME EA	0481 6023 PIPE (PVC)(SCH 80)(6 IN) LF	0529 6002 CONC CURB (TY II) LF	0529 6020 CONC CURB & GUTTER (ARMOR CURB) LF	0531 6001 CONC SIDEWALKS (4") SY	0531 6005 CURB RAMPS (TY 2) EA	0531 6032 CONC SIDEWALKS (SPECIAL) SY	0536 6002 CONC MEDIAN SY
60	PLAN AND PROFILE								
61	PLAN AND PROFILE								
62	PLAN AND PROFILE								
63	PLAN AND PROFILE	72		922	104	590	2	23	
64	PLAN AND PROFILE	36		700	52	582	1	12	193
65	PLAN AND PROFILE								
66	PLAN AND PROFILE								
67	EDGE DRAIN LAYOUT		600						
	TOTALS	108	600	1622	156	1172	3	35	

Show all text for bid item

0531 6032 CONC SIDEWALKS (SPECIAL) (TYPE A) SY

AGREE

agree, Special Spec 3021 will be submitted for approval for 0610-03-095

3021-6002? for OTU

SHT NO	ROADWAY	0542 6001 REMOVE METAL BEAM GUARD FENCE LF	0542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL EA	0542 6004 RM MTL BM GD FENCE TRANS (THRIE-BEAM) EA	0550 6001 CHAIN LINK FENCE (INSTALL)(6') LF	0556 6008 PIPE UNDERDRAINS (TY 8)(6") LF	0752 6015 TREE AND BRUSH REMOVAL AC	3021 6001 WIDE FLANGE PAVEMENT TERMINALS LF	3076 6066 TACK COAT GAL
60	PLAN AND PROFILE								447
61	PLAN AND PROFILE								1104
62	PLAN AND PROFILE							22	439
63	PLAN AND PROFILE								703
64	PLAN AND PROFILE				440				873
65	PLAN AND PROFILE						0.30		323
66	PLAN AND PROFILE	437	1	1			1.00	22	915
67	EDGE DRAIN LAYOUT					2598			
	TOTALS	437	1	1	440	2598	1.30	44	4804

Shows 400' on sheet 64 and 72. See note on pg 64

fence quantity revised

384 LF of fence
4-ped gates 4ft wide= 16ft
4-vehicle gates 10ft wide= 40ft
total is 440 lf

SHT NO	ROADWAY	3077 6051 SP MIXES SP-D PG70-22 TON 110 LB/SY/IN	3077 6064 SP MIXES SP-D PG76-22 TON 110 LB/SY/IN	4020 6001 PERMEABLE CONCRETE EDGE DRAIN LF	5084 6001 FIXED BOLLARD EA
60	PLAN AND PROFILE	614.6	123.0	660	
61	PLAN AND PROFILE	1517.8	303.6	1003	
62	PLAN AND PROFILE	907.0	19.5	35	
63	PLAN AND PROFILE	1546.5			
64	PLAN AND PROFILE	1919.1			6
65	PLAN AND PROFILE	691.4	5.8	11	
66	PLAN AND PROFILE	1258.0	251.8	374	
67	EDGE DRAIN LAYOUT				
	TOTALS	8454.4	703.7	2083	6

Why have a edge drain layout detail if the total is not located

AGREE

Reviewer only sees 6 bollards labeled on sheet 64. Might think about adding bollards on the down stream sides, so if

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

WB IH 30 CMV STATION

SUMMARY OF QUANTITIES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	10

AGREE

0416 6004?

ITEM	ITEM	ITEM	ITEM	ITEM	ITEM
STRUCTURAL SUMMARY	DRILL SHAFT (36 IN)	CL C CONC (COLUMN)	CL K CONC (MISC)	STR STEEL (MISC NON-BRIDGE)	PRE-ENGINEERED METAL BUILDING/ CANOPY
	LF	CY	CY	LB	LS
PRE-ENGINEERED METAL CANOPY, 200 FT x 85 FT	720	30	147.6	5510	1.0
PRE-ENGINEERED METAL CANOPY, 80 FT x 45 FT	360	10.4			1.0
TOTAL	1080	40.4	147.6	5510	2.0

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SUMMARY OF QUANTITIES

DIST	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CONT. DIST.	6	TEXAS				IH 30
DIST	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CONT. DIST.	ATL	TITUS	0610	03	095	11

Plotted on: 7/15/2022

Design Filename: S:\Transportation\19-204C TxDOT-PD IH30 CMV Inspection Facility\CAD\01-Sheets\Quantity Summary.dgn

SUMMARY OF DRAINAGE QUANTITIES

AGREE

Text wrap

AGREE

Correct Sheet Numbers

ITEM	0110	0402	0420	0432	0432	0462	0464	0464	0464	0464	0465
DESC	6002	6001	6071	6031	6039	6006	6003	6005	6008	6009	6558
DRAINAGE	EXCAVATION (CHANNEL)	TRENCH EXCAVATION PROTECTION	CL C CONC (COLLAR)	RIPRAP (STONE PROTECTION) (12 IN)	BEDDING MATERIAL (6 IN)	CONC BOX CULV (5 FT X 2 FT)	RC PIPE (CL III) (18 IN)	RC PIPE (CL III) (24 IN)	RC PIPE (CL III) (36 IN)	RC PIPE (CL III) (42 IN)	INL (CMP) (PAZD -CZ) (FG) (3FTX 3FT-3FTX3FT)
SHT NO	CY	LF	EA	CY	CY	LF	LF	LF	LF	LF	EA
102 PARALLEL DRAINAGE			2				94				
108 CULVERT A-1 LAYOUT		24		6.2	3.5	45					
109 CULVERT A-4 LAYOUT		30						85			
110 CULVERT A-6 LAYOUT			1							68	
111 CULVERT B-4 LAYOUT	34.0							77			1
112 CULVERT B-1 LAYOUT				4.1	2.2				25		
TOTALS	34.0	54	3	10.3	5.7	45	94	162	25	68	1

AGREE

med this? Internal Drainage Area Map & Details

ITEM	0467	0467	0467	0467	0467	0467	0496
DESC	6001	6172	6173	6363	6394	6450	6006
DRAINAGE	SET (PIPE RUNNER ASSEMBLY)	SET (TY I) (S= 5 FT) (HW= 3 FT) (4:1) (C)	SET (TY I) (S= 5 FT) (HW= 3 FT) (6:1) (C)	SET (TY II) (18 IN) (RCP) (6:1) (P)	SET (TY II) (24 IN) (RCP) (6:1) (C)	SET (TY II) (36 IN) (RCP) (4:1) (C)	REMOV STR (HEADWALL)
SHT NO	EA	EA	EA	EA	EA	EA	EA
102 PARALLEL DRAINAGE				2			2
108 CULVERT A-1 LAYOUT		1	1				2
109 CULVERT A-4 LAYOUT							
110 CULVERT A-6 LAYOUT	1						1
111 CULVERT B-4 LAYOUT					1		
112 CULVERT B-1 LAYOUT						1	1
TOTALS	1	1	1	2	1	1	6

storm drain p&p sheets added

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Summaries\1163504DRNSummary.dgn

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SUMMARY OF QUANTITIES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	12

SUMMARY OF ILLUMINATION AND CONDUIT QUANTITIES

AGREE

Correct all sheet numbers

SHT NO	ITEM	0416	0416	0432	0610	0610	0613	0618	0618	0618
	DESC	6026	6029	6001	6009	6288	6005	6046	6047	6070
	ILLUMINATION	DRILL SHAFT (HIGH MAST POLE) (60 IN)	DRILL SHAFT (RDWY ILL POLE) (30 IN)	RIPRAP (CONC)(4 IN)	REMOVE RD IL ASM (TRANS-BASE)	IN RD IL (TY SA) 50T-10 (400W EQ) LED	HI MST IL POLE (150 FT)(80 MPH)	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (2") (BORE)	CONDT (RM) (2")
		LF	LF	CY	EA	EA	EA	LF	LF	LF
132	ILLUMINATION AND CONDUIT LAYOUT	64		5.1	2		2	1012		
133	ILLUMINATION AND CONDUIT LAYOUT		80		11	8		2229	193	
134	ILLUMINATION AND CONDUIT LAYOUT		90		9	9		7901	100	
135	ILLUMINATION AND CONDUIT LAYOUT	32		2.6			1	2339		1200
	TOTALS	96	170	7.7	22	17	3	13481	293	1200

SHT NO	ITEM	0620	0620	0624	0628	0628	6156
	DESC	6007	6008	6002	6011	6040	6002
	ILLUMINATION	ELEC CONDR (NO.8) BARE	ELEC CONDR (NO.8) INSULATED	GROUND BOX TY A (122311)W/AP	ELC SRV TY A 120/240 060(NS)SS(E)	ELC SRV TY A 240/480 060(NS)SS(E)	LED HI MST IL ASM (6 FIXT)(ASYM)(
		LF	LF	EA	EA	EA	EA
132	ILLUMINATION AND CONDUIT LAYOUT	1312	2624	1		1	2
133	ILLUMINATION AND CONDUIT LAYOUT	2822	5644	4			
134	ILLUMINATION AND CONDUIT LAYOUT	3381	6762	14	1		
135	ILLUMINATION AND CONDUIT LAYOUT	183	366	10		1	1
	TOTALS	7698	15396	29	1	2	3

Show all text for bid item

0628 6011 ELC SRV TY A 120/240 060(NS)SS(E)TP(O) EA

Show all text for bid item

0628 6040 ELC SRV TY A 240/480 060(NS)SS(E)EX(O) EA

Show all text for bid item

6156 6002 LED HI MST IL ASM (6 FIXT)(ASYM)(TY A) EA

AGREE

Show all text for bid item

0624 6002 GROUND BOX TY A (122311)W/APRON EA

AGREE

NOTES
1.) ADD COMMA'S TO ALL QUANTITIES - EX. 1,000 SY
2.) ADD BID ITEMS 0678-6002, 0678-6004, AND 0678-6008.

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

AGREE

AGREE

Values should be calculated in 3 ft increments; see FPM(2)-22

0666-6018? FPM(2)-22 Standard

Text wrap

AGREE

SHT NO	ITEM	0636	0644	0644	0644	0647	0647	0666	0666
	DESC	6002	6001	6004	6037	6001	6003	6009	6036
	SIGNING	ALUMINUM SIGNS (TY G)	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	IN SM RD SN SUP&AM TYS80(1)SA(U-WC)	INSTALL LRSS (STRUCT STEEL)	REMOVE LRSA	REFL PAV MRK TY I (W)4"(LNDP)(100MIL)	REFL PAV MRK TY I (W)8"(SLD)(100MIL)
		SF	EA	EA	EA	LB	EA	LF	LF
141	SIGNING & PAVEMENT MARKINGS PLAN							113	1008
142	SIGNING & PAVEMENT MARKINGS PLAN		2	1				194	71
143	SIGNING & PAVEMENT MARKINGS PLAN	28	5			192		42	1822
144	SIGNING & PAVEMENT MARKINGS PLAN	105			1	678	3		780
	TOTALS	133	7	1	1	870	3	349	3681

AGREE

Text wrap

Text wrap

Text wrap

Not sure why this is needed here? Delete?

0666-6225?

AGREE

agree

0666-6306?

agree

0666-6309?

SHT NO	ITEM	0666	0666	0666	0666	0666	0666	0666	0666
	DESC	6042	6048	6159	6224	6226	6230	6300	6303
	SIGNING	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	RE PV MRK TY I(BLACK)4"(SHADOW)(100MIL)	PAVEMENT SEALER 4"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)
		LF	LF	LF	LF	LF	LF	LF	LF
141	SIGNING & PAVEMENT MARKINGS PLAN	300							1560
142	SIGNING & PAVEMENT MARKINGS PLAN		464	355	5112	71	464	95	2505
143	SIGNING & PAVEMENT MARKINGS PLAN		213	230	5692	1822	213	172	3260
144	SIGNING & PAVEMENT MARKINGS PLAN								982
	TOTALS	300	677	585	10804	1893	677	267	8307

0666-6321?

AGREE

SHT NO	ITEM	0666	0672	0685
	DESC	6315	6010	6004
	SIGNING	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	REFL PAV MRKR TY II-C-R	INSTL RDSD FLSH BCN ASSM (SOLAR PWRD)
		LF	EA	EA
141	SIGNING & PAVEMENT MARKINGS PLAN		68	
142	SIGNING & PAVEMENT MARKINGS PLAN	1963	154	
143	SIGNING & PAVEMENT MARKINGS PLAN	1988	325	1
144	SIGNING & PAVEMENT MARKINGS PLAN		65	1
	TOTALS	3951	613	2

shadow marking to contrast white markings on concrete.

check quantity; seem high

quantities updated

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SUMMARY OF QUANTITIES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	13

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Summaries\11635045GNSummary.dgn

AGREE

Correct all sheet numbers

mple sheet no 199

Plotted on: 10/14/2022

SUMMARY OF SW3P QUANTITIES

SHT NO	ROADWAY	ITEM 0164 6001 BROADCAST SEED (PERM) (RURAL) SY	ITEM 0164 6009 BROADCAST SEED (TEMP) (WARM) SY	ITEM 0164 6011 BROADCAST SEED (TEMP) (COOL) SY	ITEM 0168 6001 VEGETATIVE WATERING 15.6 GAL/SY MG	ITEM 0506 6001 ROCK FILTER DAMS (INSTALL) (TY 1) LF	ITEM 0506 6011 ROCK FILTER DAMS (REMOVE) LF	ITEM 0506 6020 CONSTRUCTION EXITS (INSTALL) (TY SY	ITEM 0506 6024 CONSTRUCTION EXITS (REMOVE) SY
195	SW3P PLAN	4020	1005	1005	94.1			112	
196	SW3P PLAN	14670	3668	3668	343.3	90	90		
197	SW3P PLAN	12391	3098	3098	290.0	150	150		
198	SW3P PLAN	7204	1801	1801	168.6				112
	TOTALS	38285	9572	9572	896.0	240	240	112	112

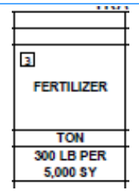
Show all text for bid item

0164 6001 BROADCAST SEED (PERM) (RURAL) (SANDY) SY

AGREE

Use rate of 80 MG PER 5,000 SY

Add Fertilizer with a note saying it for contractor information only. See example below.



3. FOR CONTRACTOR INFORMATION ONLY.

AGREE

Show all text for bid item

0506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1) SY

AGREE

NOTES
1.) ADD COMMA'S TO ALL QUANTITIES - EX. 1,000 SY
2.)STANDARD EC(1)-16 IS USED BUT NO BID ITEMS 0506-6038 AND 0506 6039? IF USED PLACE TEMP SEDMT CONT FENCE ON SW3P PLAN. SEE SHEET 199 FOR REVIEWER COMMENT.

silt fence added

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SUMMARY OF QUANTITIES

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	14

Design Filename: P:\116\35\04\Design\Civil\Summaries\11635045W3PSummary.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) 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
142	2-1	W4-1R	MERGING TRAFFIC	36" X 36"		X	10BWG	1	SA	T		
	2-2	R2-1	SPEED LIMIT 15	30x36	X	X	TWT	1	WS	P		
	2-3	R2-1	SPEED LIMIT 15	30x36	X	X	TWT	1	WS	P		
143	3-1	R2-1	SPEED LIMIT 15	30x36	X	X	TWT	1	WS	P		
	3-2	R8-X	NO PARKING OFFICIAL USE ONLY	30" X 24"		X	10BWG	1	SA	P		
	3-3	R8-X	NO PARKING OFFICIAL USE ONLY	30" X 24"		X	10BWG	1	SA	P		
	3-4	R2-1X	MAINTAIN 15 M.P.H.	24" X 30"		X	10BWG	1	SA	P		
144	4-1	R5-X	MAINTAIN 200 FT BETWEEN TRUCKS	30" X 24"		X	10BWG	1	SA	P		
	4-2	W13-2	EXIT 50 MPH	48" X 60"		X	S80	1	SA	U	WC	

AGREE

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.

3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

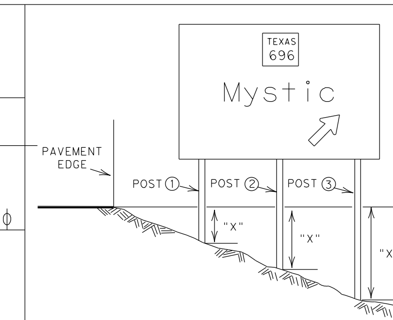
FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0610	03	095	IH 30
4-16		DIST	COUNTY		SHEET NO.
8-16		ATL	TITUS		15

18

DATE: 10/14/2022 2:45:40 PM
FILE: P:\116\35\04\Design\Civil\Summaries\116350450N_small.dgn

SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN BACK-GROUND COLOR	SIGN TEXT	SIGN DIMENSIONS	PLAQUES, & OTHER ATTACHMENTS		BACKGROUND SUBSTRATE (SQ FT)		TYPE OF MOUNT	"X" DIMENSION ◒			GALVANIZED STRUCTURAL STEEL					DRILLED SHAFT			
					DIRECT APPLY	* ALUMINUM (TYPE A)	GROUND MOUNT (TYPE G)	OVERHEAD (TYPE O)		post 1	post 2	post 3	SIZE	LINEAR FEET post 1	post 2	post 3	TOTAL WEIGHT LBS.	LINEAR FEET NON-REINF 12"ϕ	REINFORCED 24"ϕ	30"ϕ	36"ϕ
144	LGS1	GREEN	CMV INSPECTION STATION 1 MILE	78" X 60"			32.5		321	0.77	1.10		S3X5.7	12.48	12.81		201.95	7			
144	LGS2	GREEN	CMV INSPECTION STATION ½ MILE	78" X 60"			32.5		321	0.88	1.26		S3X5.7	12.39	12.97		203.49	7			
143	LGS3	GREEN	CMV STATION ↗	66" X 60"			27.5		321				S3X5.7	11.81	16.71		191.86	7			
144	LGS4	GREEN	ALL COMMERCIAL VEHICLES & BUSES NEXT RIGHT WHEN FLASHING	96" X 60"			40		321	1.35	1.49		S4X7.7	13.06	13.20		272.6	7			
			PAGE TOTALS				92.5							PAGE TOTALS			597.3	21			



◒ The "X" dimension is the elevation difference at the post between the ground and the edge of pavement or top of curb.

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.

The post lengths listed here are approximations, The corrected post lengths will be furnished by the Contractor after the stud posts are placed.

Tower heights shall be verified with the Engineer before fabrication.

* This column is for aluminum Type A and not direct apply. Direct apply is subsidiary to the sign.

SIGN TYPE

SIGN TYPE 1 3 0
- 1 — Wind Design Zone
- 3 — No. of Posts
- 0 — Series No.: 0 Aluminum/Fiberglass, 1 Aluminum, 2 Fiberglass

See sheet SMD(8W1)

SUMMARY OF LARGE SIGNS

SOLS

DN.:-TxDOT CK.:-TxDOT DW.:-TxDOT CK.:-TxDOT

REVISIONS: 11-93, 8-95, 5-01, 1-04, 9-08

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30
DIST	COUNTY		SHEET NO.
ATL	TITUS		16

19

DATE: 10/14/2022 2:45:42 PM
FILE: P:\116\35\04\Design\Civil\Summaries\1163504SGN_large.dgn

Plotted on: 10/14/2022

DETOURS, BARRICADES, WARNING SIGNS, SEQUENCE OF WORK, ETC.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIREMENTS OF ITEM 7, "LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC", OF THE STANDARD SPECIFICATIONS. CONTRACTOR TO FOLLOW SEQUENCE OF WORK, UNLESS OTHERWISE APPROVED. IN ADDITION TO THESE REQUIREMENTS, THE FOLLOWING PROVISIONS SHALL ALSO GOVERN ON THIS CONTRACT:

1. SEQUENCE OF WORK

SEQUENCE NOTES:

1. PLACE TEMPORARY QUEUE DETECION SYSTEM IN ACCORDANCE WITH TXDOT WZ STANDARD ITS(3)-19 OR AS DIRECTED BY THE ENGINEER. THE TEMPORARY QUEUE DETECTION SYSTEM SHALL BE UTILIZED FOR PHASE 1 ONLY.

WZ-ITS(3)-19 AGREE

2. PLACE ADVANCE WARNING AND WORK ZONE SIGNS IN ACCORDANCE WITH BC STANDARD SHEETS AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE (TMUTCD), TCP SHEETS, AND AS DIRECTED BY THE ENGINEER.

3. COVER ALL EXISTING CMV STATION SIGNAGE PRIOR TO PHASE. THIS WORK IS SUBSIDIARY TO ITEM 502.

4. PLACE SW3P DEVICES AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

SWP3 AGREE

5. IF UNPROTECTED BY BARRIER, DROP OFF CONDITIONS GREATER THAN 2" MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY.

minimum 3:1 AGREE

PHASE I:

a. PHASE I UTILIZES MILESTONE COMPLETION. SEE ITEM 8 FOR ADDITIONAL INFORMATION.

b. CLOSE OUTSIDE WB LANE USING TXDOT STANDARD TCP (6-1a).

TCP(6-1)-12 was not show on Index of sheets AGREE, STANDARD CORRECTED AND ADDED TO INDEX OF SHEETS

c. INSTALL WZPM, PCTB, AND CRASH CUSHIONS AS SHOWN ON PHASE I TCP SHEETS.

d. REMOVE EXISTING MBGF, CONSTRUCT PAVEMENT WIDENING THROUGH RAMP GORES AS SHOWN IN THE PLANS. ALL TREE REMOVAL, EMBANKMENT/GRADING TO BE COMPLETE IN PHASE II.

e. ONCE ALL OF PHASE I WORK IS COMPLETE, MOVE PCTB INTO PHASE II CONFIGURATION AND OPEN OUTSIDE WB LANE.

PHASE II:

a. ADJUST WORK ZONE SIGNS BASED ON TCP STANDARD (5-1)-18.

b. REMOVE WZPM. INSTALL 4"(W)(BRK) PERMANENT PM FOR WB MAIN LANES.

c. INSTALL/ADJUST WORK ZONE SIGNS USING TXDOT STANDARD TCP(2-1).

d. INSTALL ADDITIONAL PCTB AS NEEDED FOR PHASE II CONFIGURATION.

e. REMOVE TREES, CONSTRUCT CULVERTS, PAVEMENT, CANOPIES, INSPECTION PIT, ILLUMINATION, ELECTRICAL ITEMS, DITCHES, AND GRADING.

f. ONCE ALL OF PHASE II ITEMS ARE COMPLETE, REMOVE PCTB AND REOPEN OUTSIDE WB SHOULDER.

PHASE III:

a. PLACE PERMANENT SIGNING AS SHOWN IN THE PLANS.

b. PLACE PERMANENT PAVEMENT MARKINGS AS SHOWN IN PLANS.

c. PERFORM FINAL CLEAN UP OPERATIONS.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

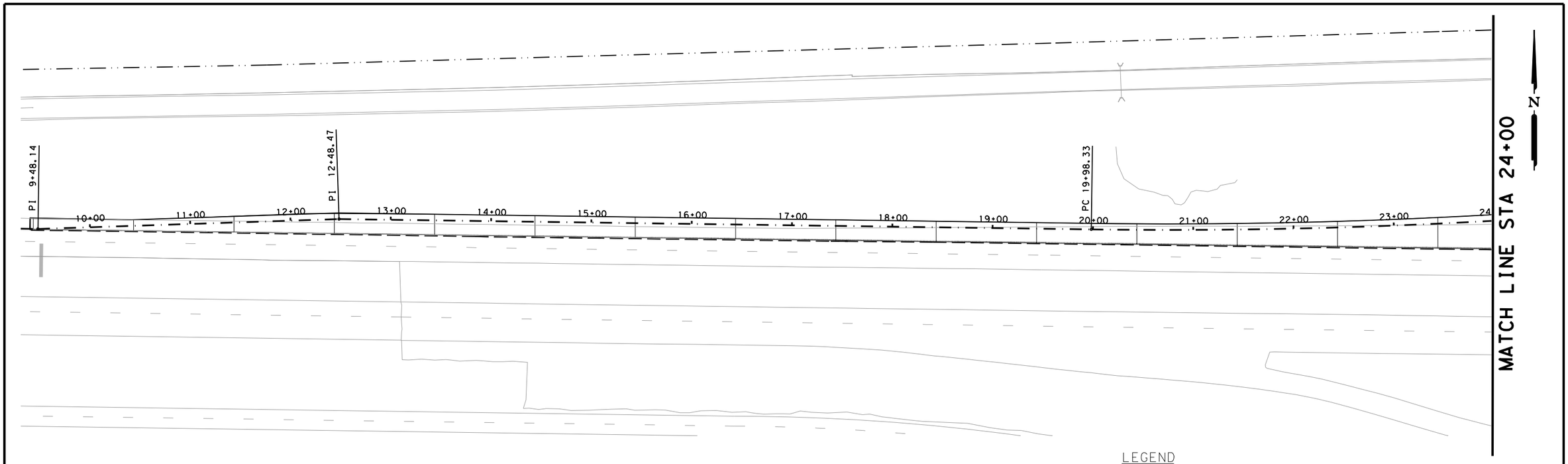
TRAFFIC CONTROL PLAN NARRATIVE

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	17

Design Filename: P:\116\35\04\Design\Civil\TCP\116504_tcpNARR.dgn

Plotted on: 10/14/2022

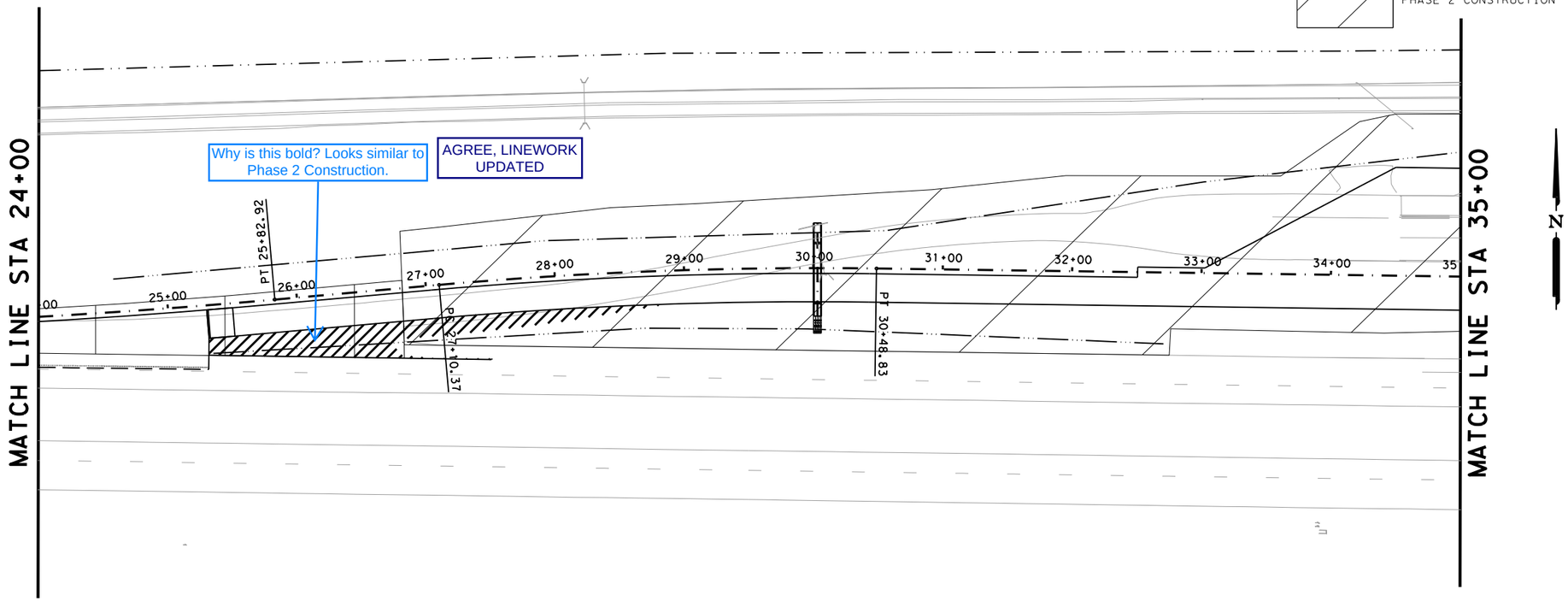
Design Filename: P:\116\35\04\Design\Civil\TCP\1163504_tcpPHASE.dgn



LEGEND

PHASE I CONSTRUCTION

PHASE 2 CONSTRUCTION



DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

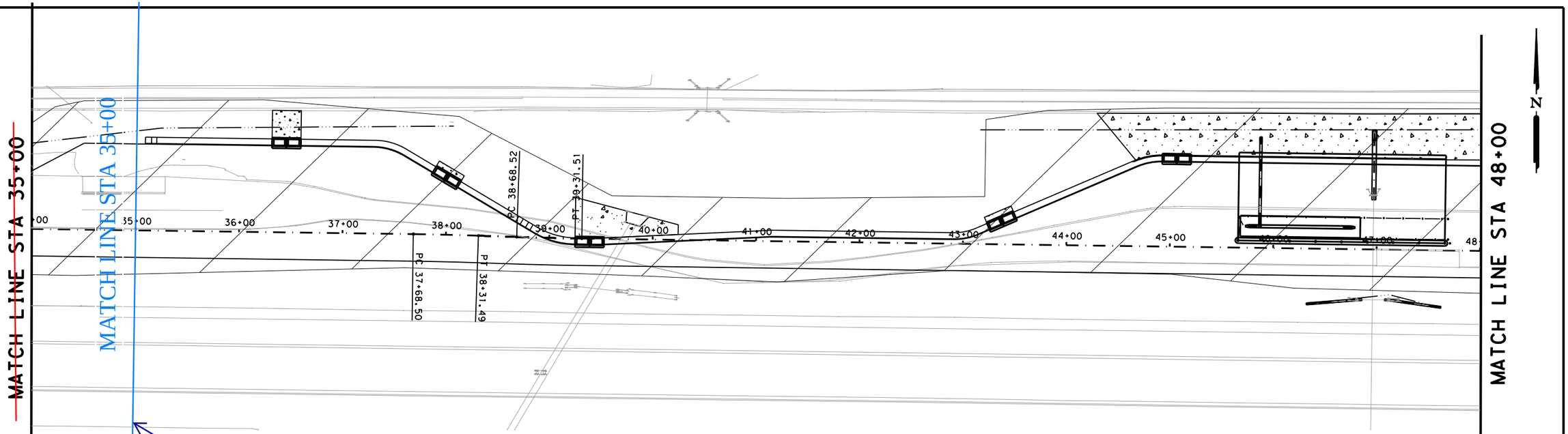
WB IH 30 CMV STATION

TRAFFIC CONTROL PLAN OVERALL PHASING LAYOUT

SHEET 1 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	18

Plotted on: 10/14/2022

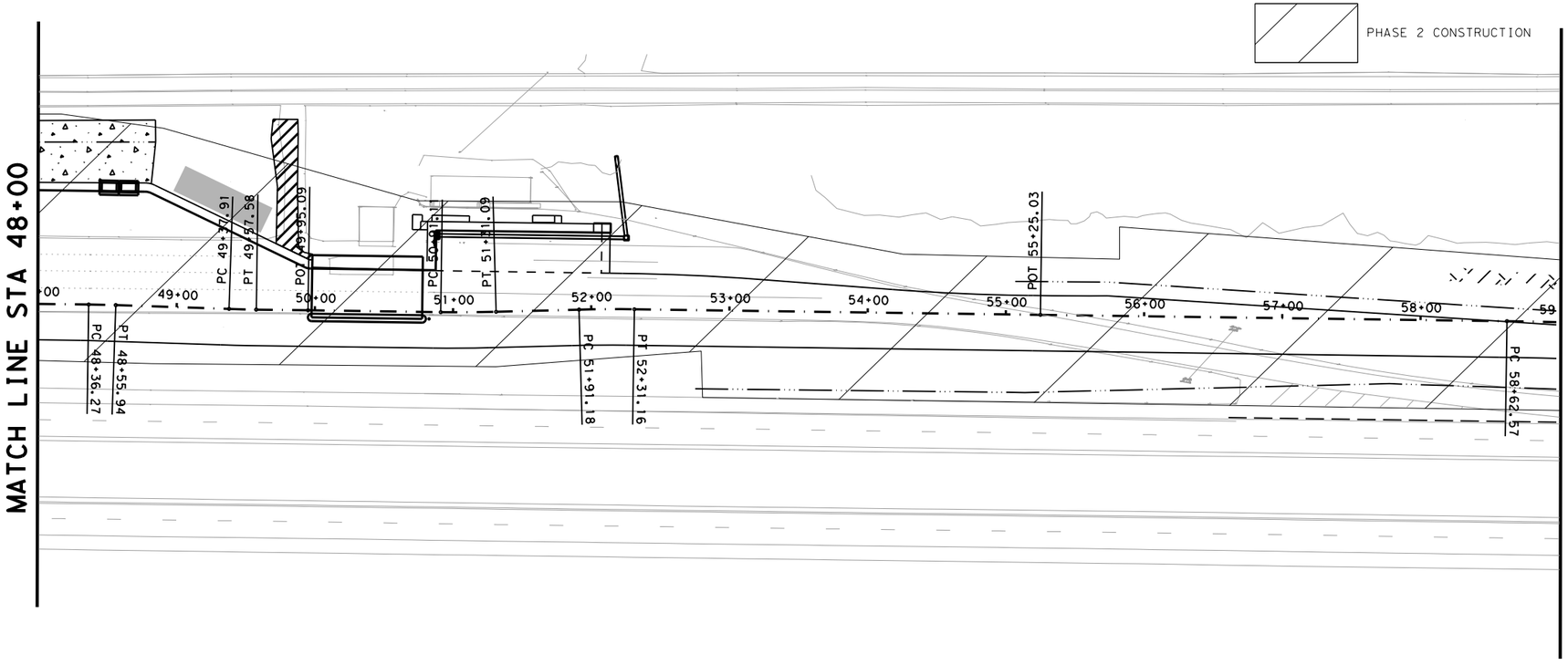


agree, sheets have been recut

LEGEND

PHASE I CONSTRUCTION

PHASE 2 CONSTRUCTION



DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

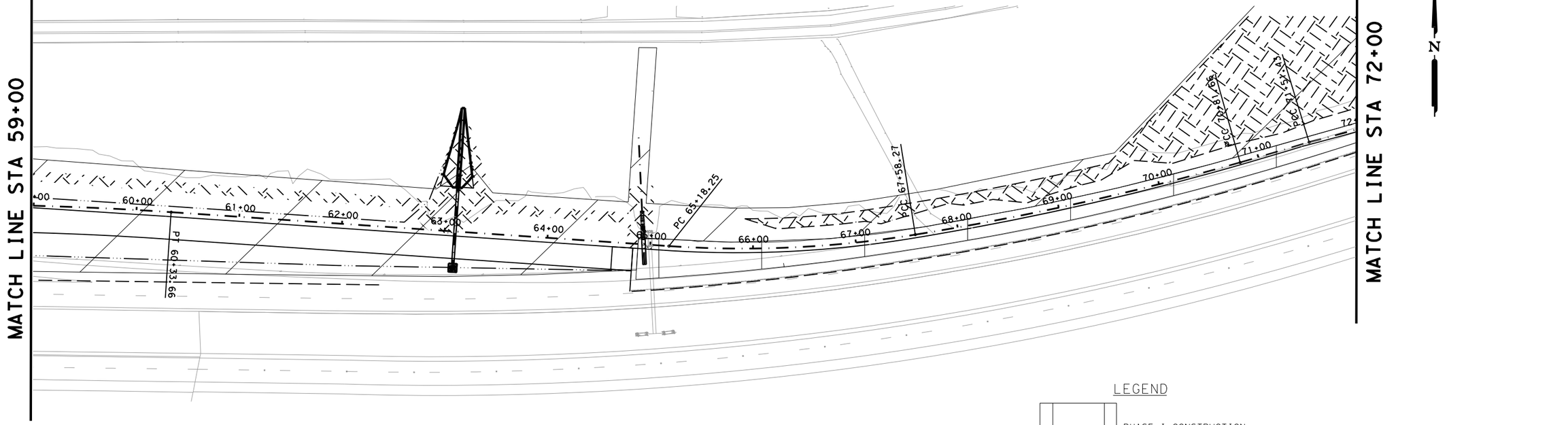
TRAFFIC CONTROL PLAN OVERALL PHASING LAYOUT

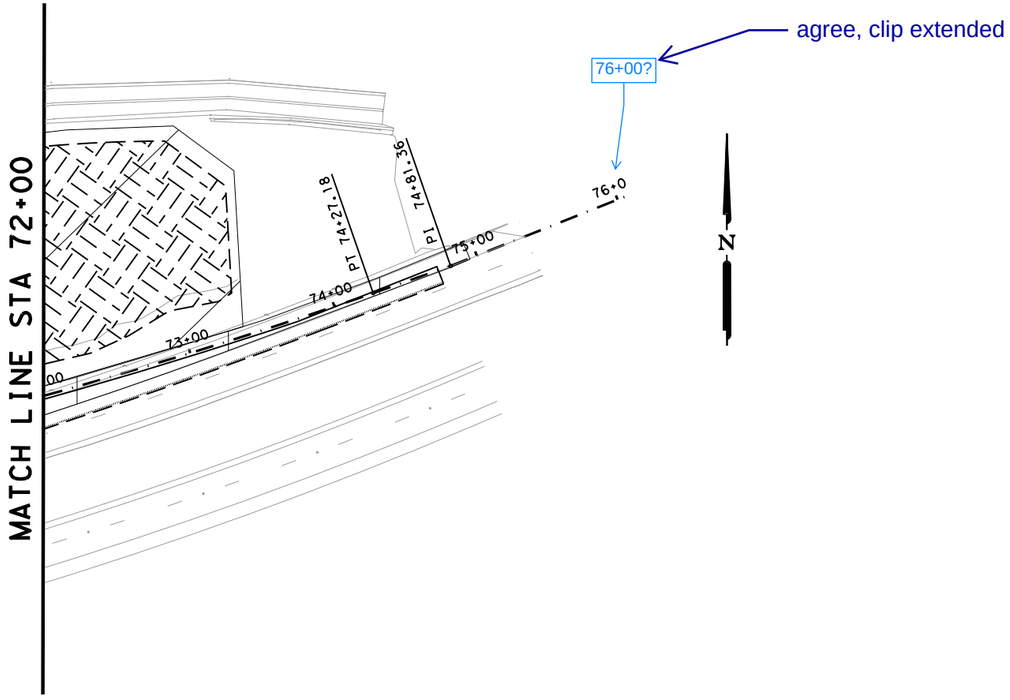
SHEET 2 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	19

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504_tcpPHASE.dgn

Plotted on: 10/14/2022





LEGEND

PHASE I CONSTRUCTION

PHASE 2 CONSTRUCTION

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

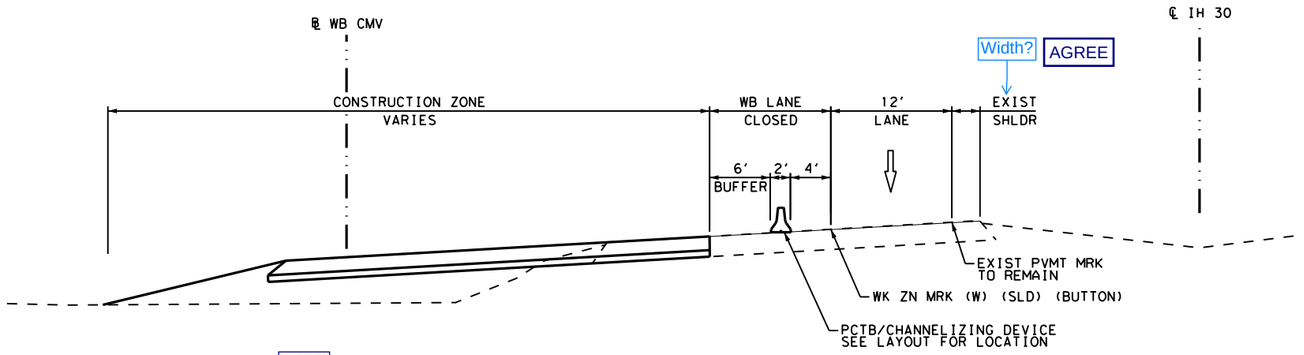
TRAFFIC CONTROL PLAN OVERALL PHASING LAYOUT

SHEET 3 OF 3

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	20

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504_tcpPHASE.dgn

Plotted on: 10/14/2022

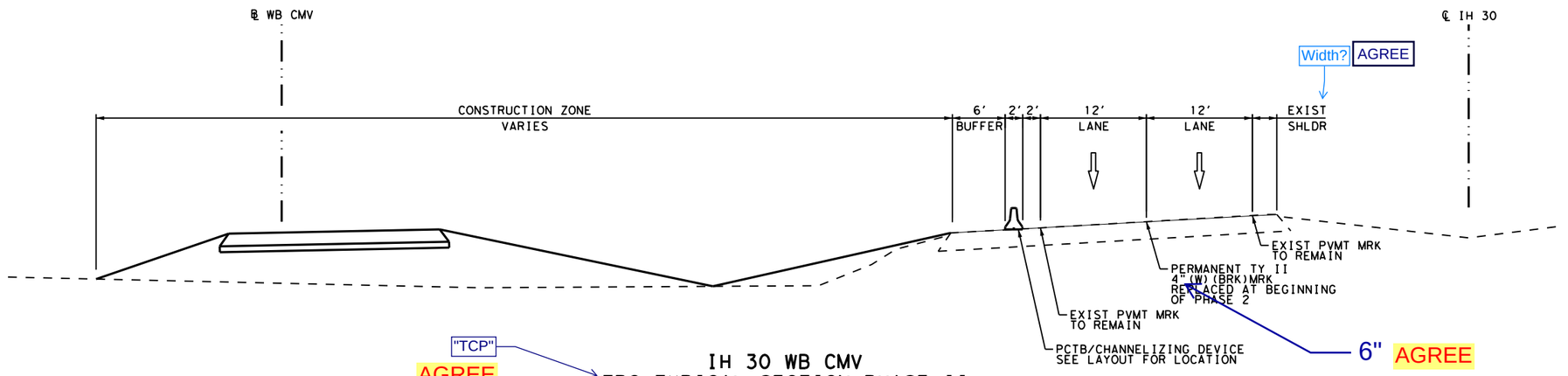


"TCP"
AGREE

IH 30 WB CMV
IPC TYPICAL SECTION PHASE I

N.T.S.

STA 9+40.00 TO STA 25+36.75
STA 68+88.00 TO STA 74+81.55



"TCP"
AGREE

IH 30 WB CMV
IPC TYPICAL SECTION PHASE II

N.T.S.

STA 25+36.75 TO STA 32+00.00
STA 55+00.00 TO STA 68+88.00

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

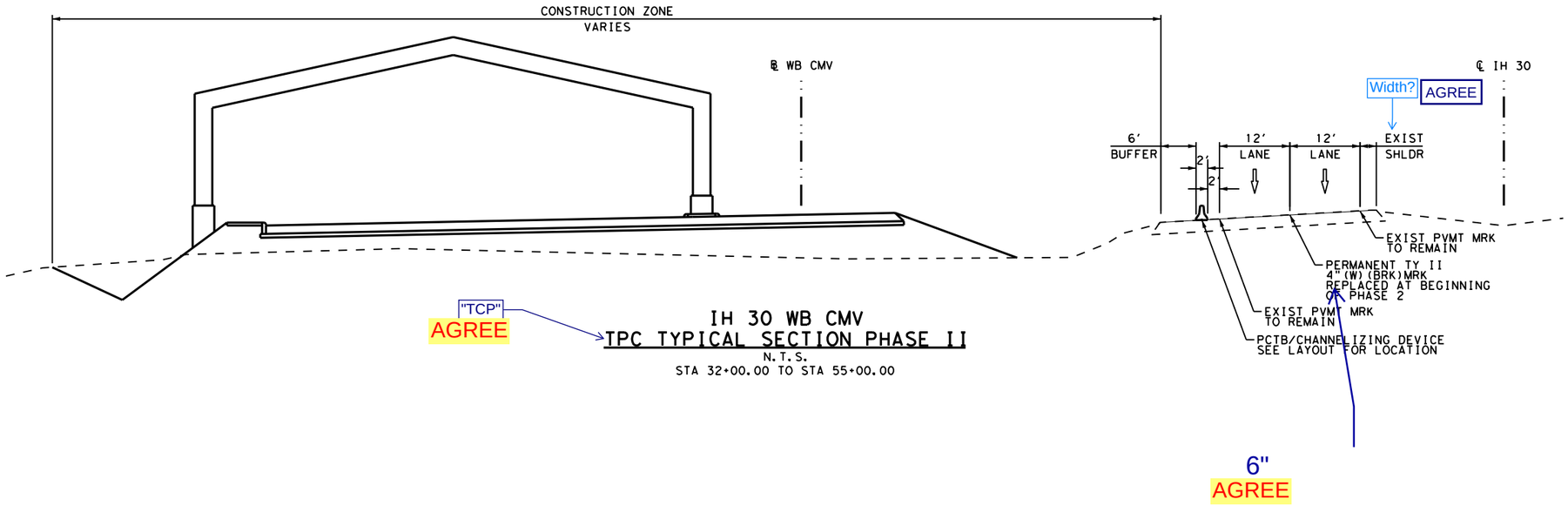
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

TCP TYPICAL SECTIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DW G:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DW G:	ATL	TITUS	0610	03	095	21

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504_tcptyp_01.dgn



IH 30 WB CMV
TPC TYPICAL SECTION PHASE II

N.T.S.
STA 32+00.00 TO STA 55+00.00

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

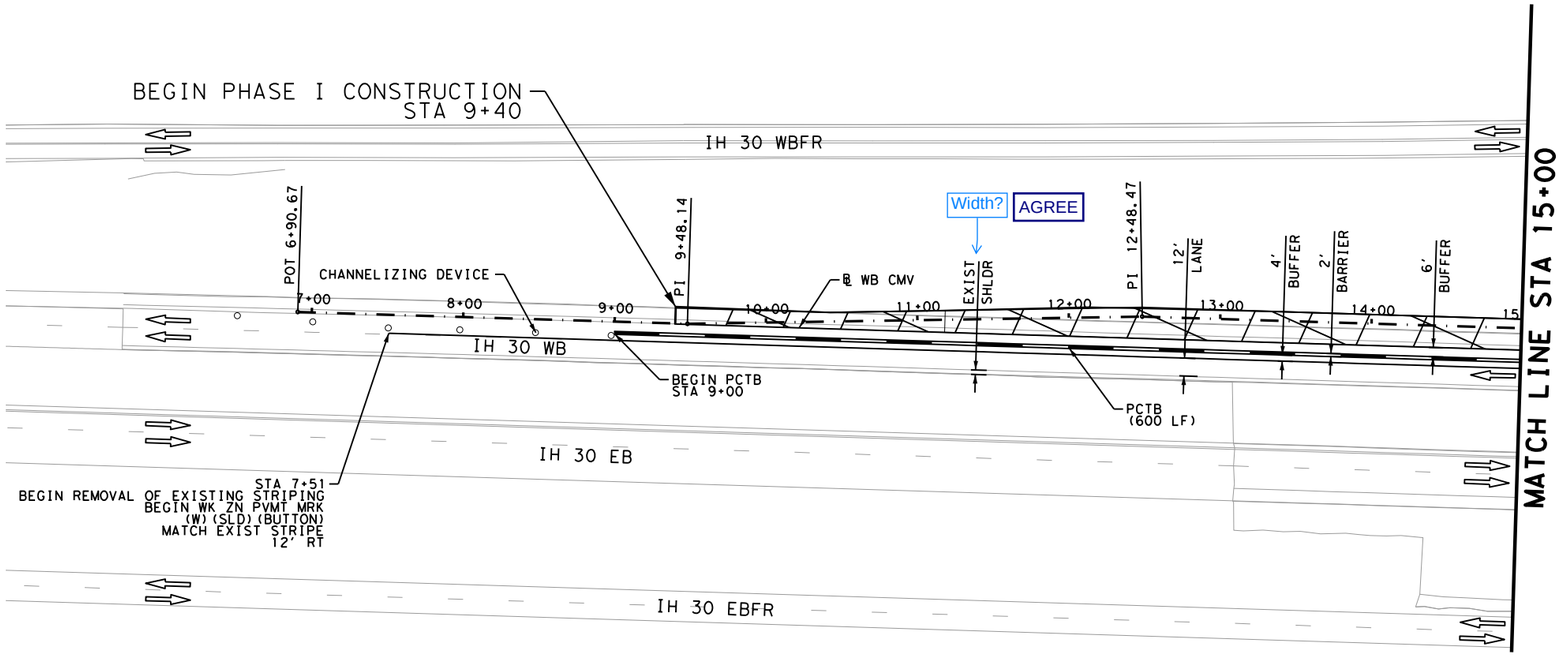
WB IH 30 CMV STATION

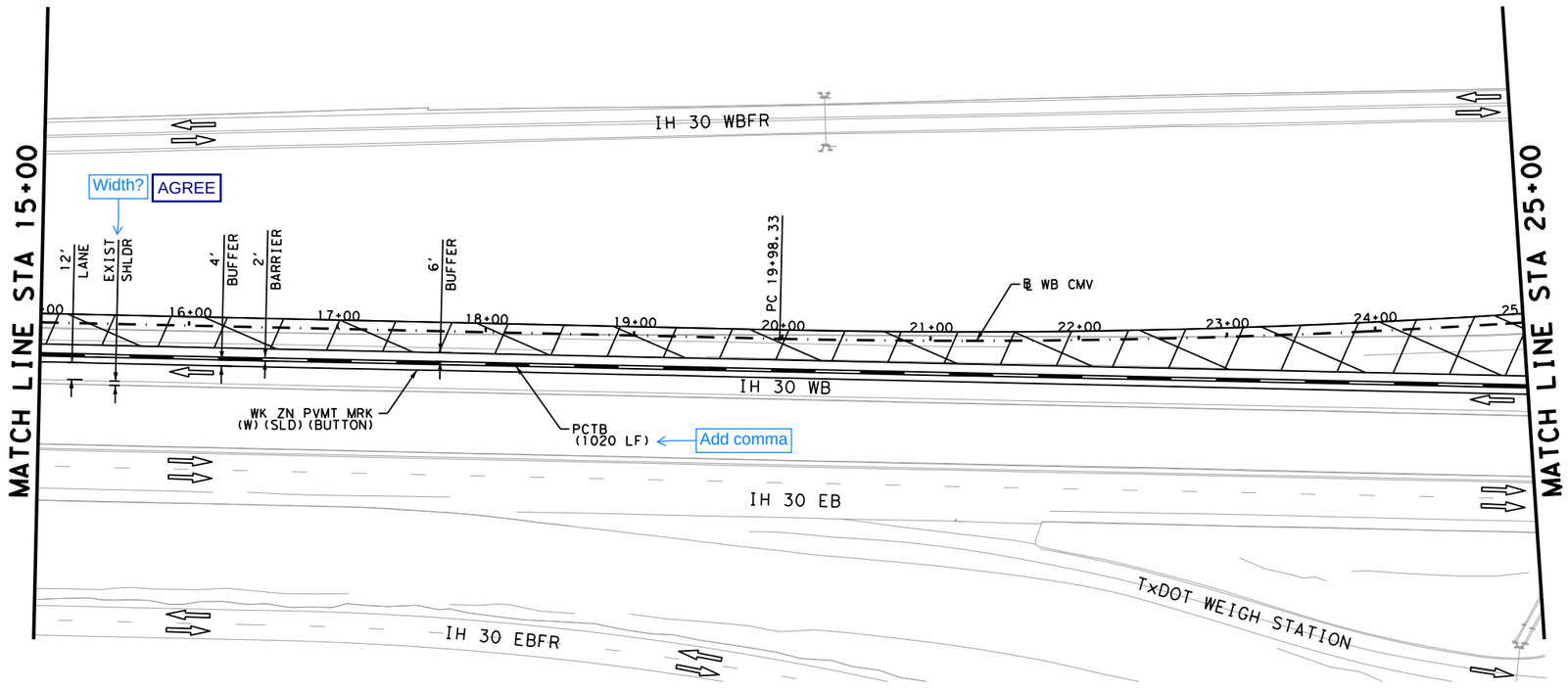
TCP TYPICAL SECTIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	22

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504_tcptyp_02.dgn





LEGEND

- PHASE I CONSTRUCTION
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
TRAFFIC CONTROL PLAN PHASE I

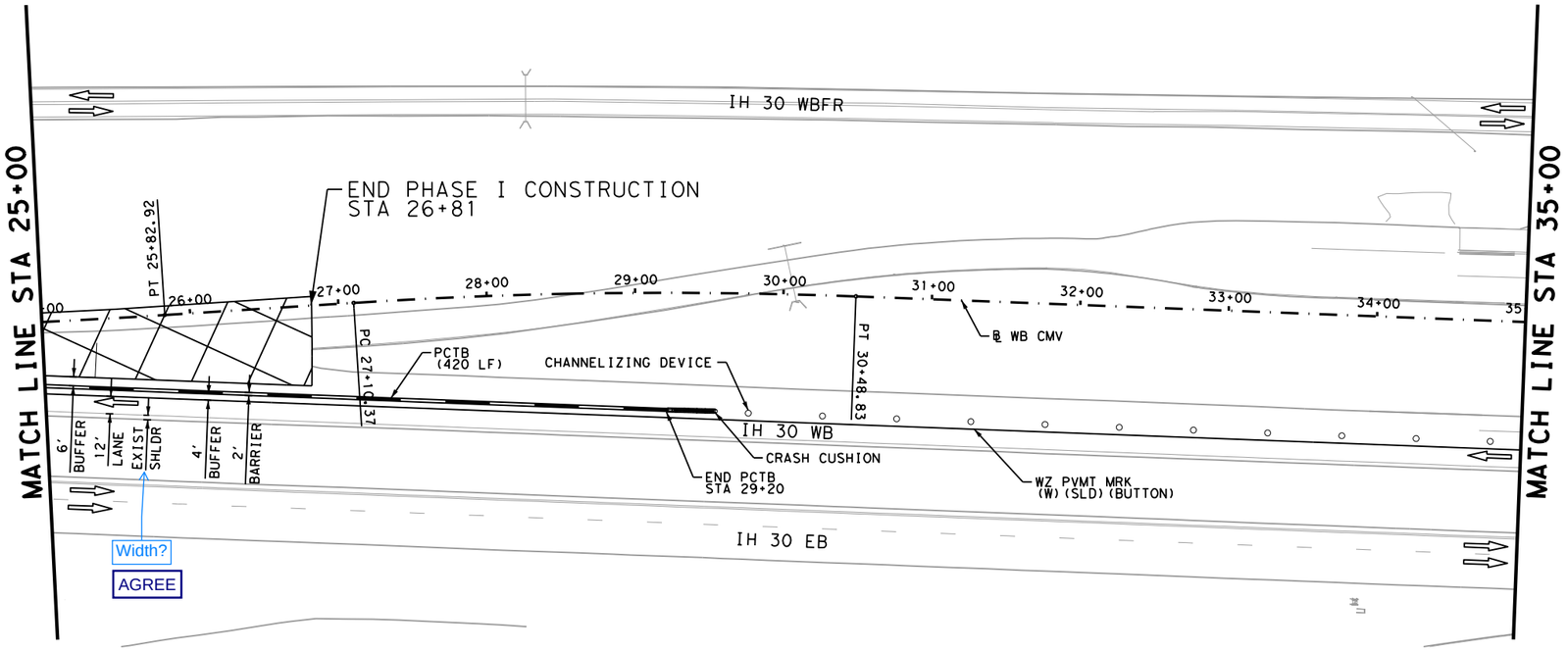
BEGIN PROJECT TO STA 25+00

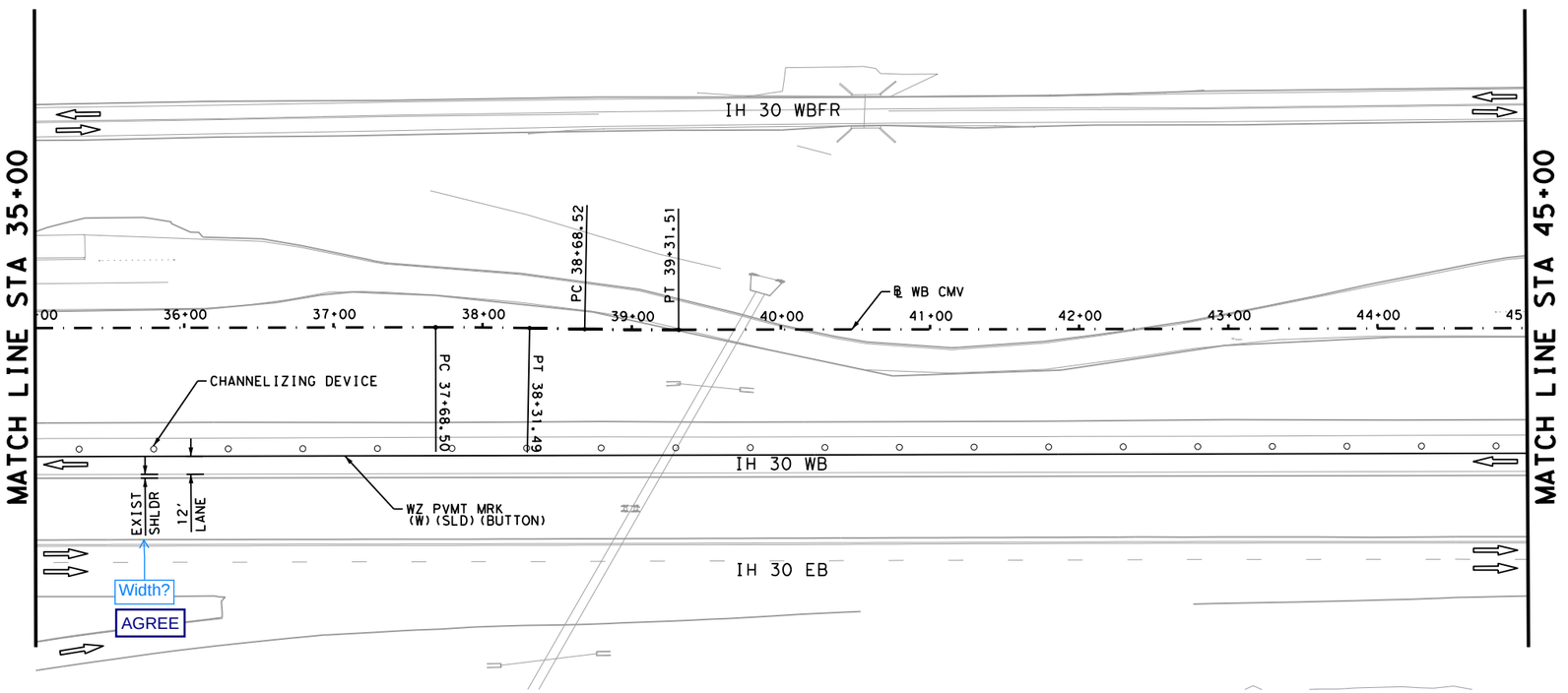
SHEET 1 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	23

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504tcpPH102.dgn





N

N

LEGEND

- PHASE I CONSTRUCTION
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

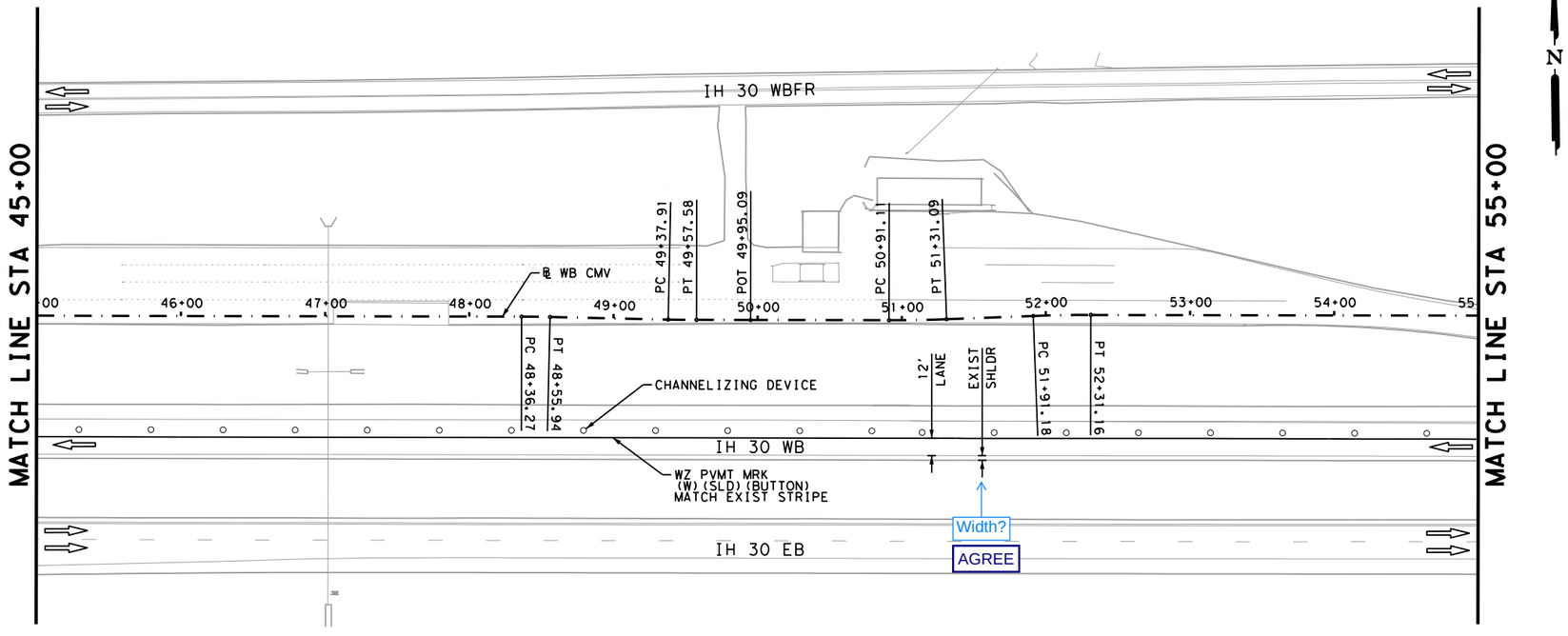
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

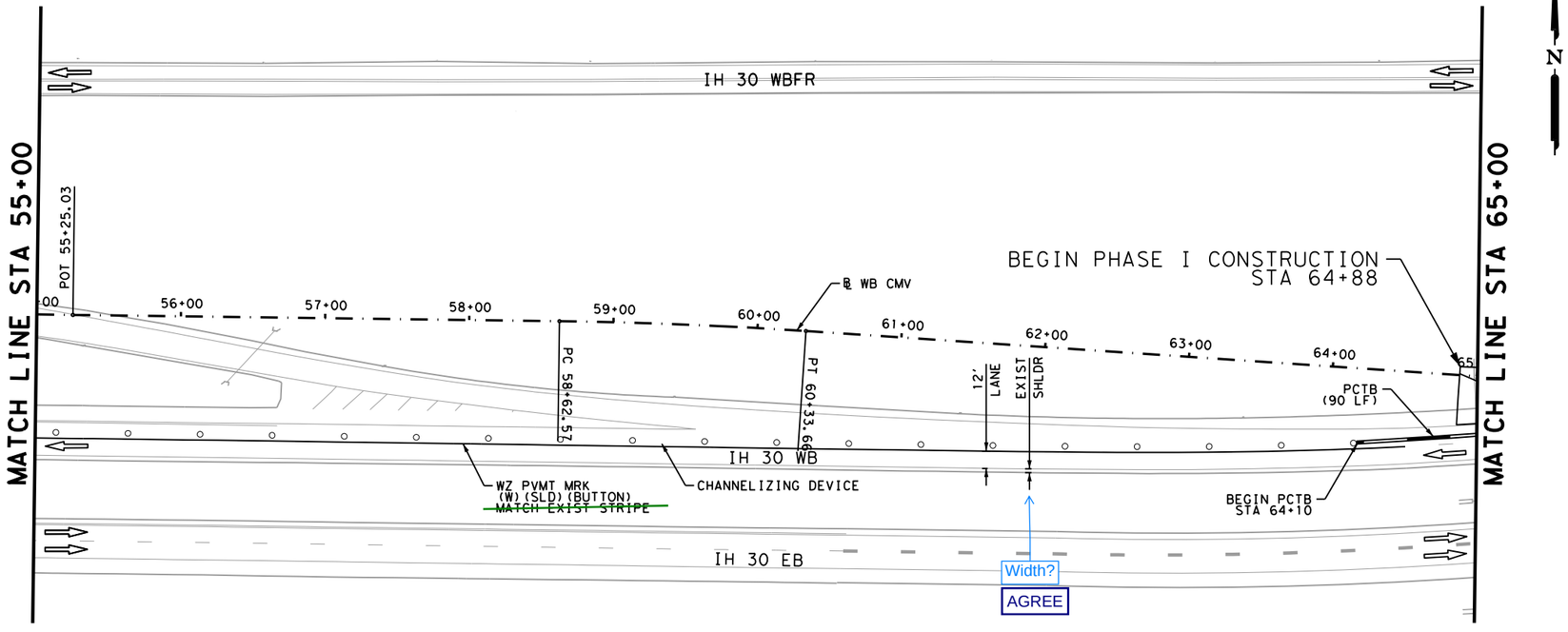
WB IH 30 CMV STATION
TRAFFIC CONTROL PLAN PHASE I

STA 25+00 TO STA 45+00

SHEET 2 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	24





LEGEND

- PHASE I CONSTRUCTION
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

agree

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

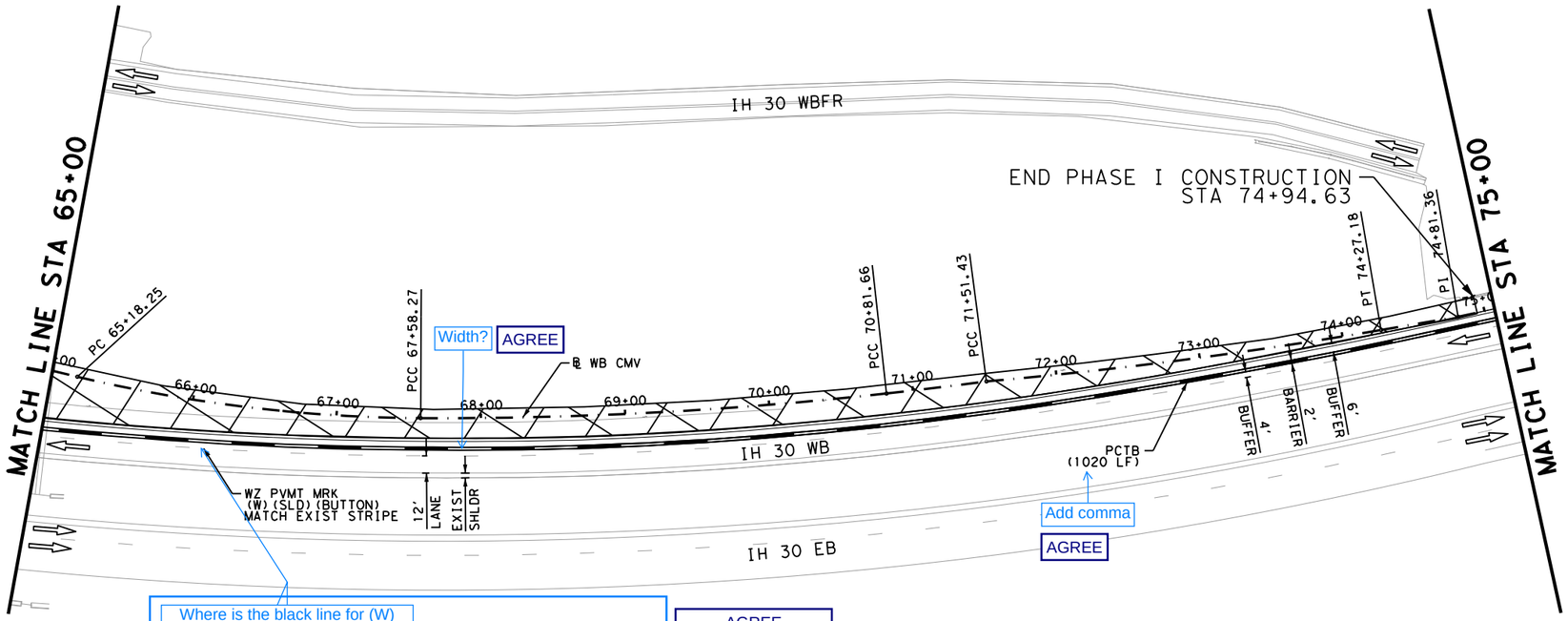
WB IH 30 CMV STATION

TRAFFIC CONTROL PLAN PHASE I

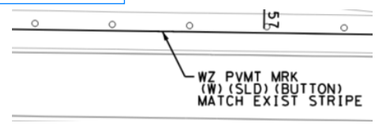
STA 45+00 TO STA 65+00

SHEET 3 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	25



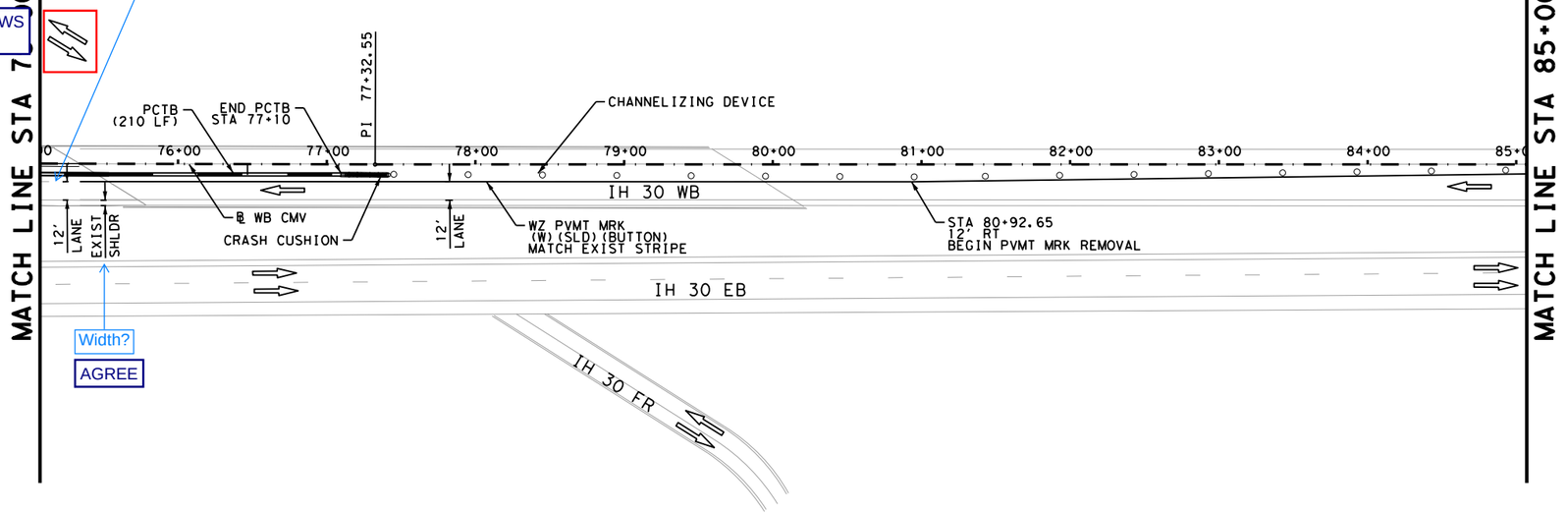
Where is the black line for (W) (SLD) (BUTTON) like other sheets? See example below comment.



AGREE

WORK ZONE PAVEMENT MARKINGS ADDED

AGREE, ARROWS REMOVED



Width?

AGREE

LEGEND

- PHASE I CONSTRUCTION
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

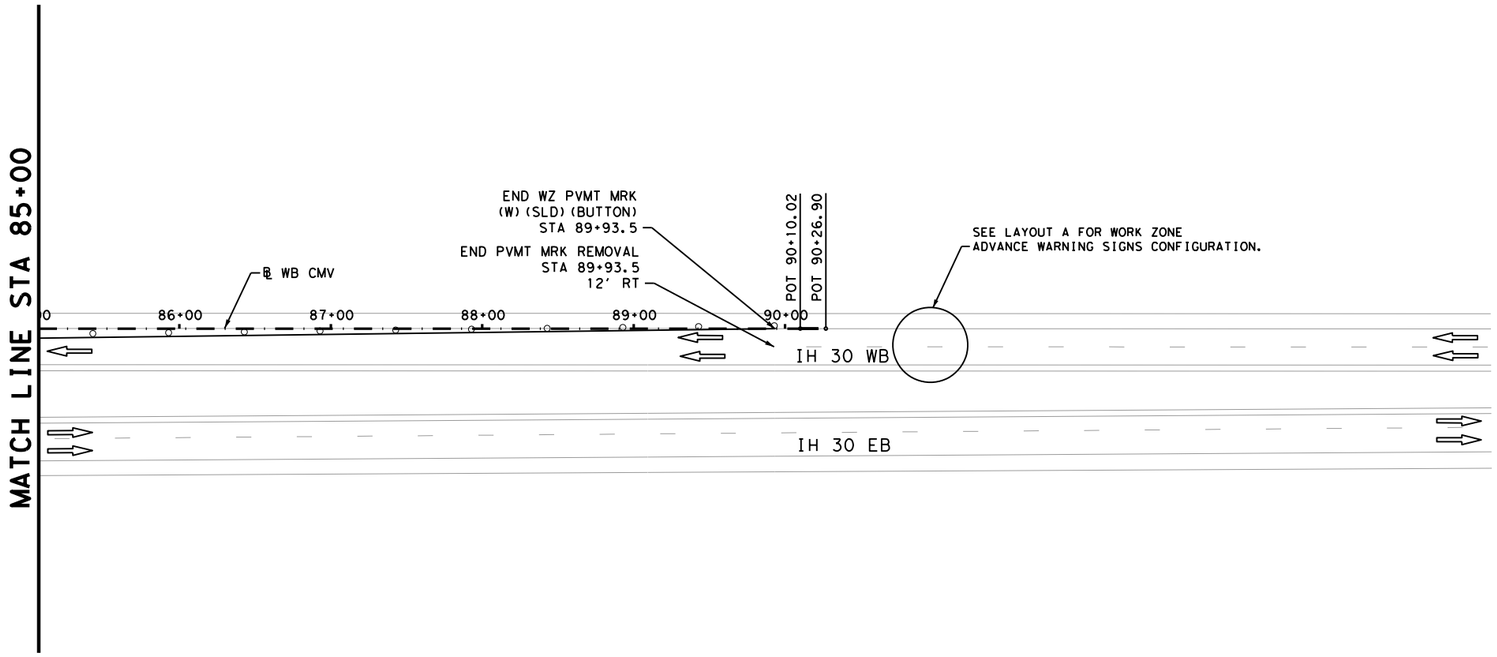
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

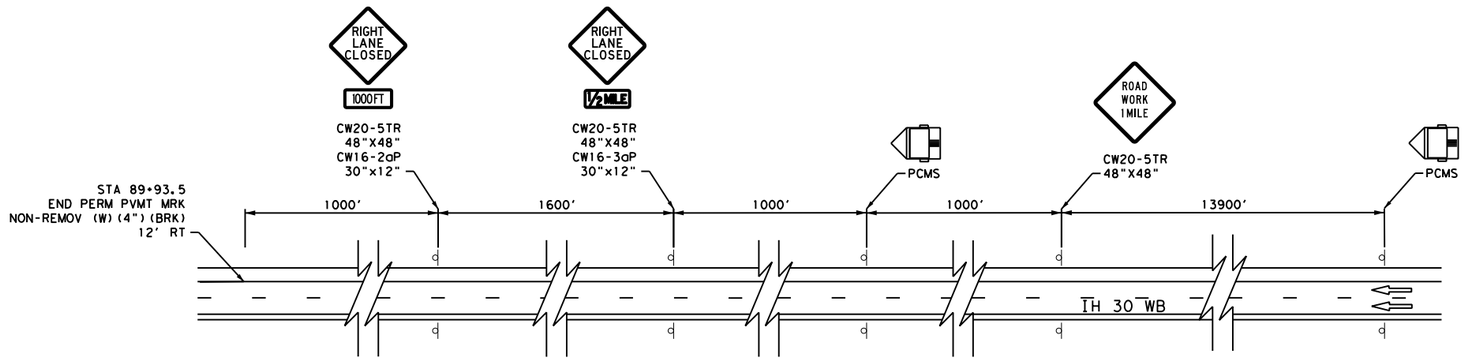
WB IH 30 CMV STATION
TRAFFIC CONTROL PLAN PHASE I

STA 65+00 TO STA 85+00

SHEET 4 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DW:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DW:	ATL	TITUS	0610	03	095	26





LAYOUT A
NTS

LEGEND

- PHASE I CONSTRUCTION
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

TRAFFIC CONTROL PLAN PHASE I

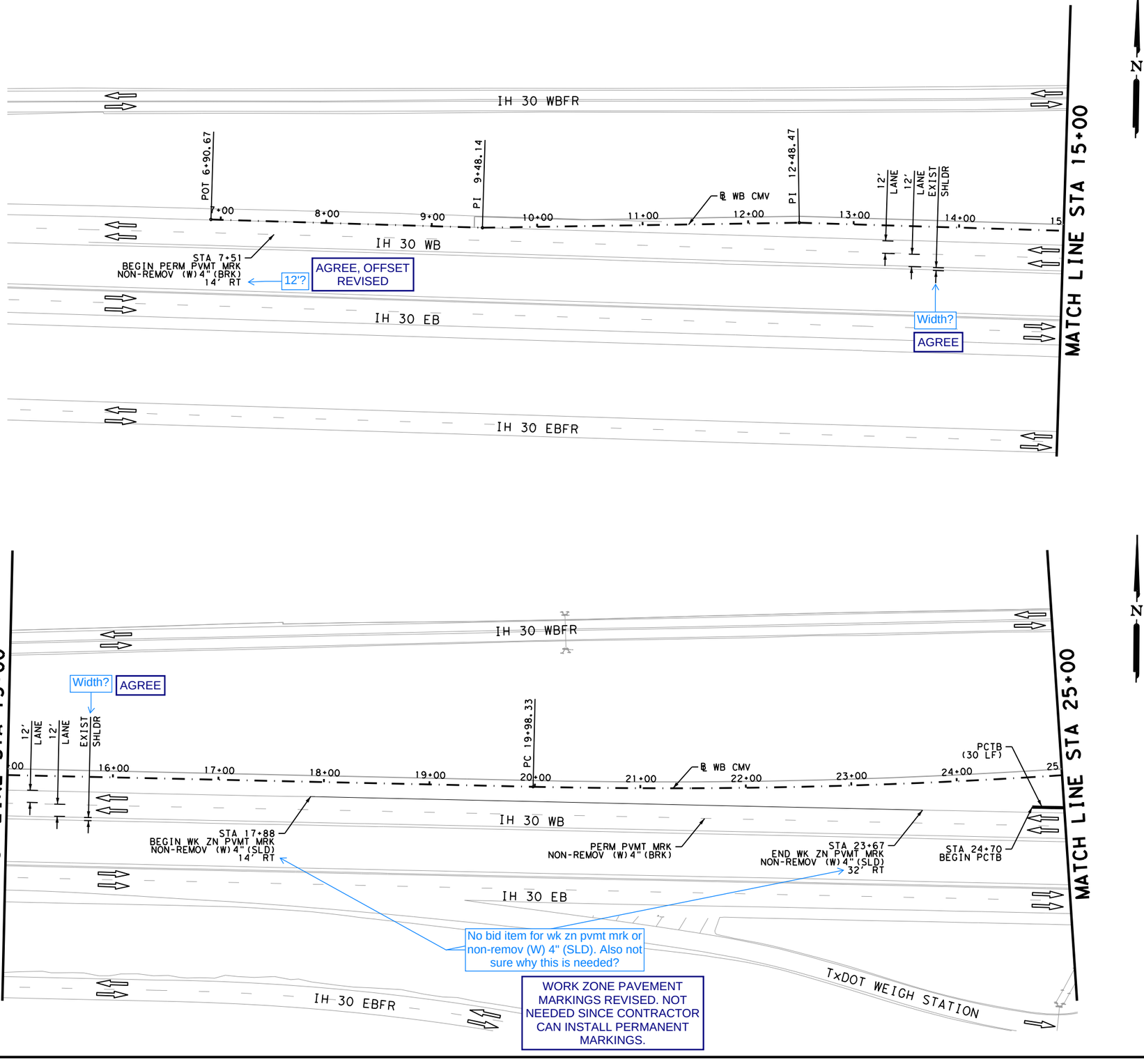
STA 85+00 TO END PROJECT

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DW:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DW:	ATL	TITUS	0610	03	095	27

Plotted on: 10/14/2022
Design Filename: P:\116\35\04\Design\Civil\TCP\116350 4tcpPH105.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\TCP\116504tcpPH201.dgn



DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

TRAFFIC CONTROL PLAN PHASE II

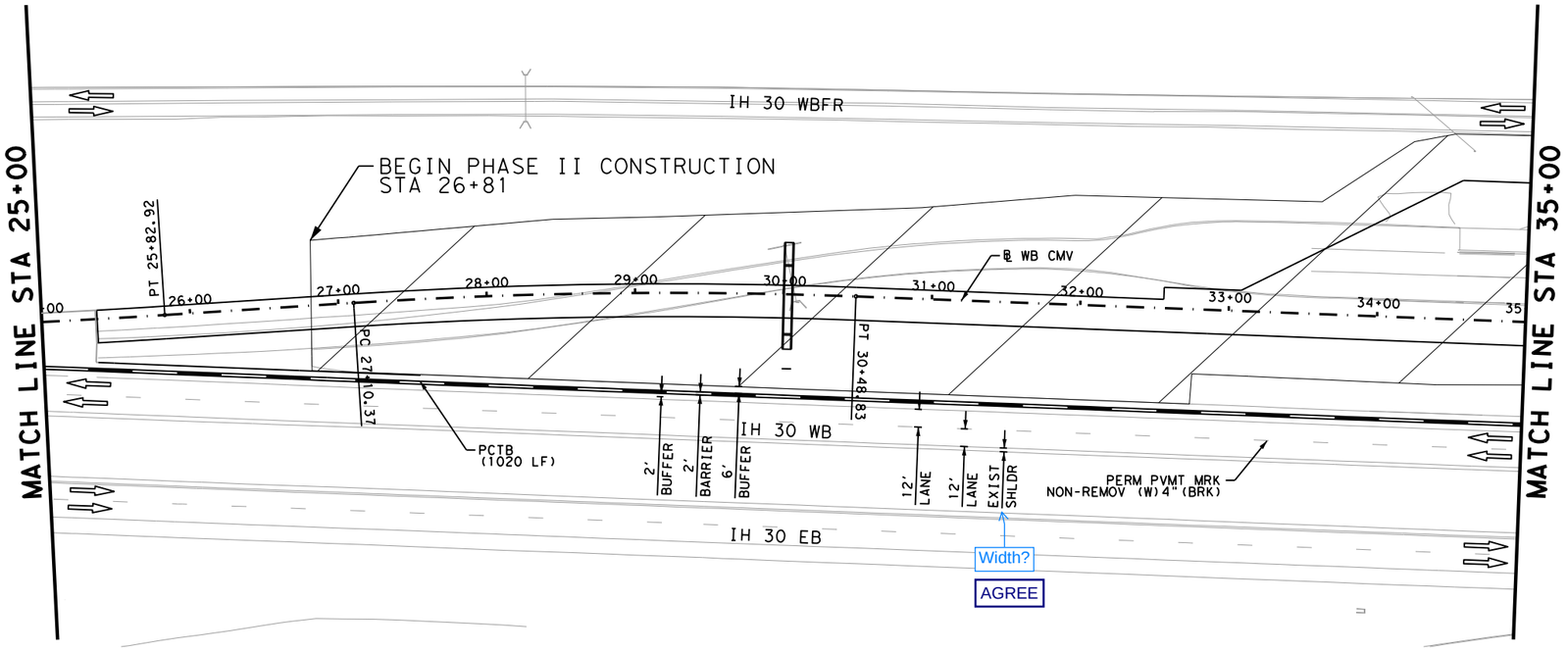
BEGIN PROJECT TO STA 25+00

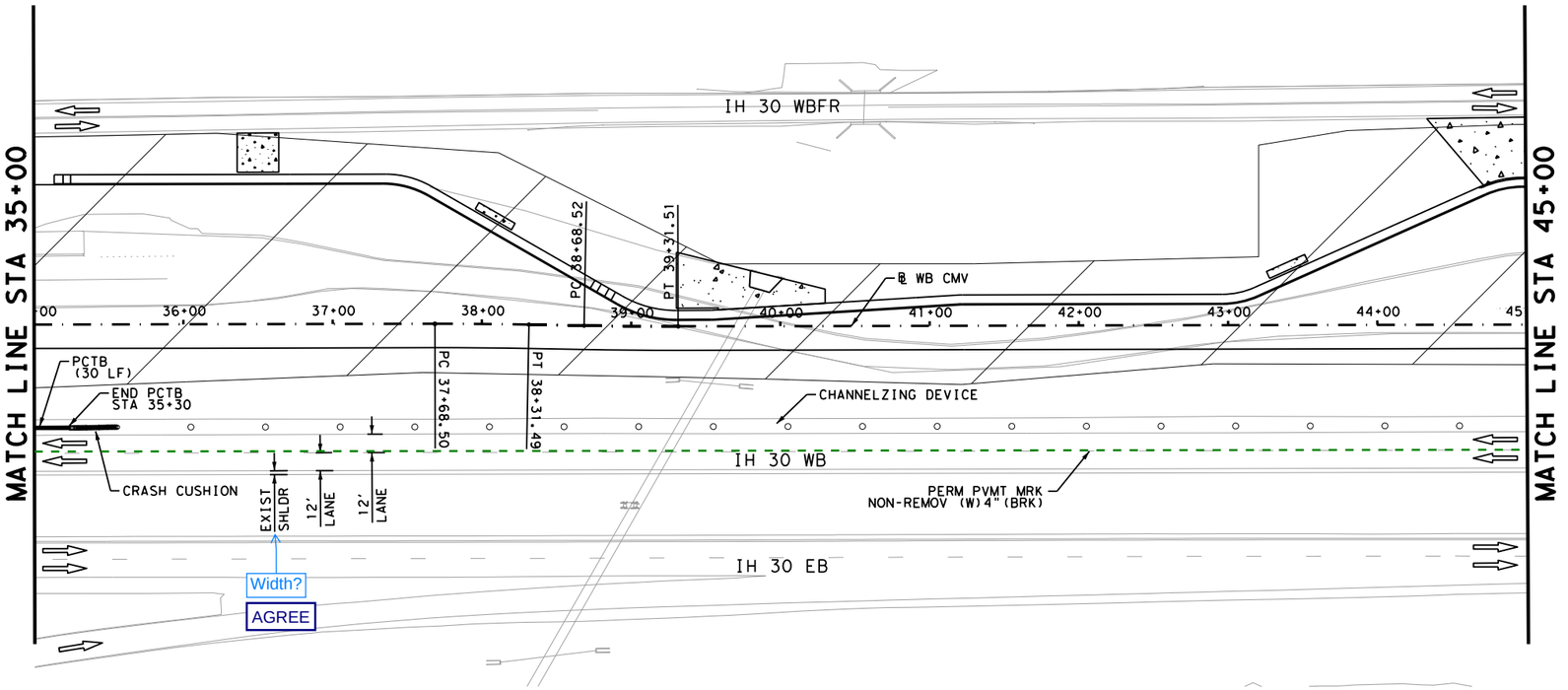
SHEET 1 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	28

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504tcpPH202.dgn





LEGEND

- PHASE II CONSTRUCTION
- TREE REMOVAL
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

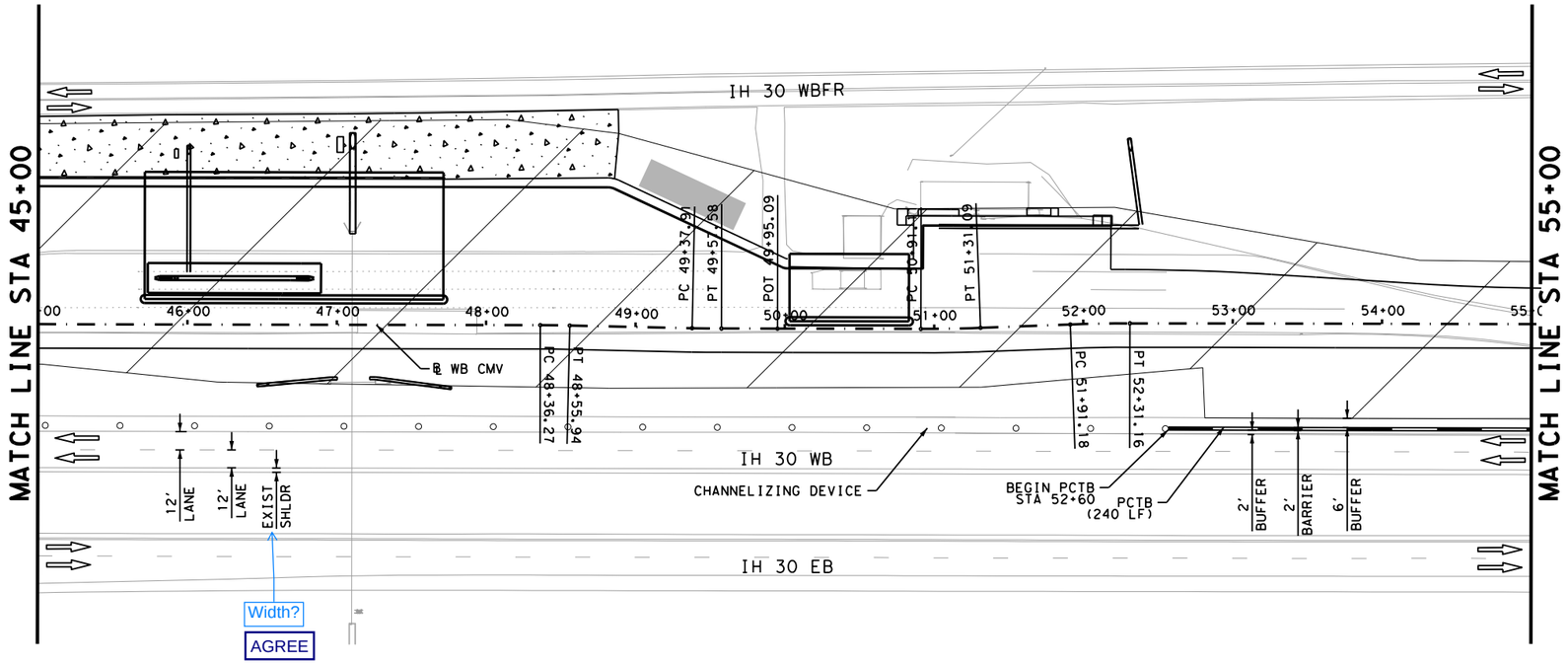
TRAFFIC CONTROL PLAN PHASE II

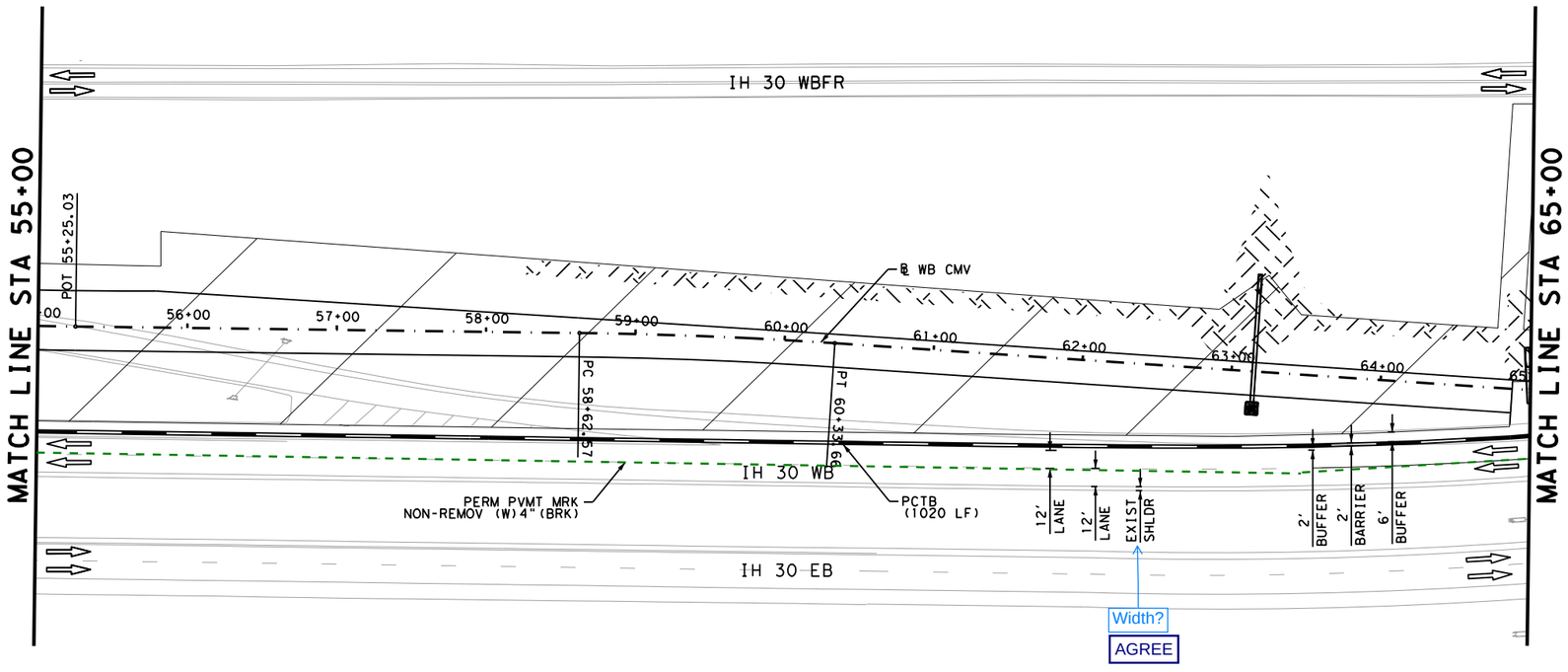
STA 25+00 TO STA 45+00

SHEET 2 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	29

Plotted on: 10/14/2022





LEGEND

- PHASE II CONSTRUCTION
- TREE REMOVAL
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

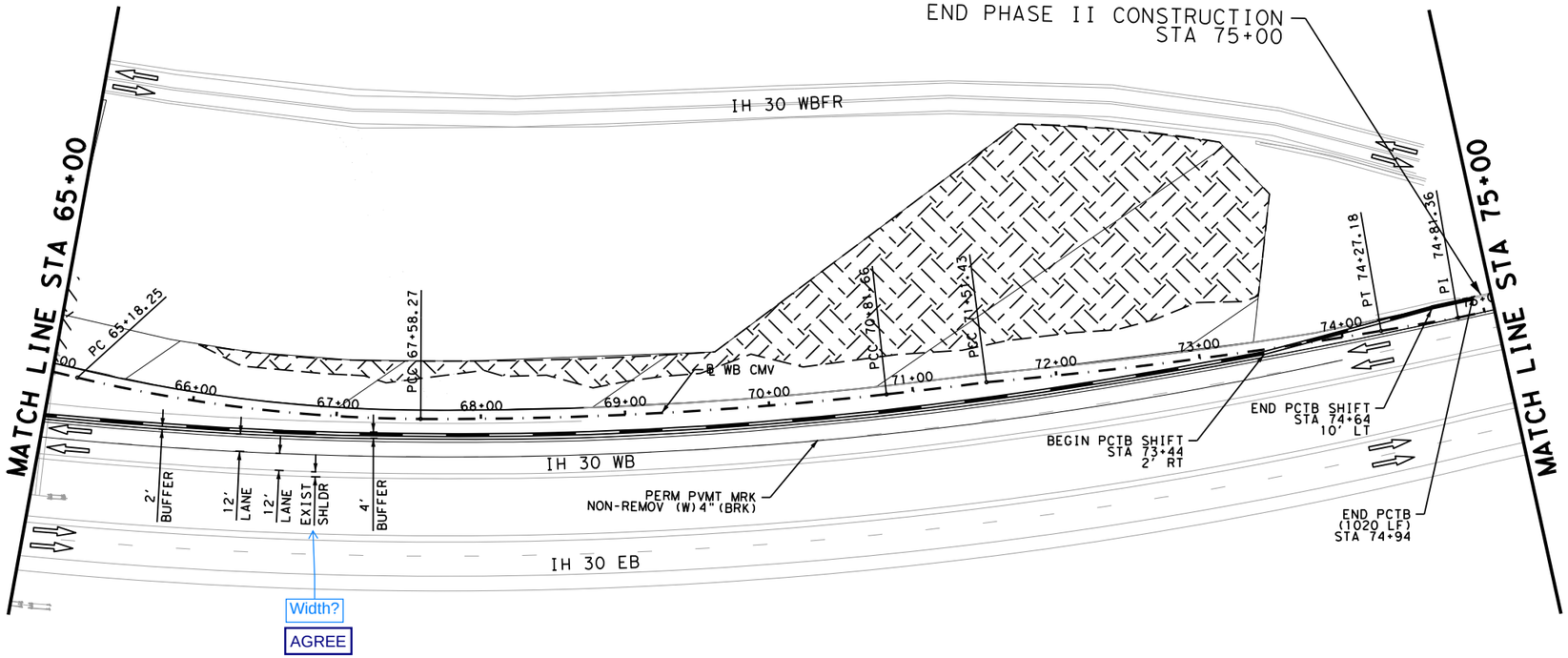
TRAFFIC CONTROL PLAN PHASE II

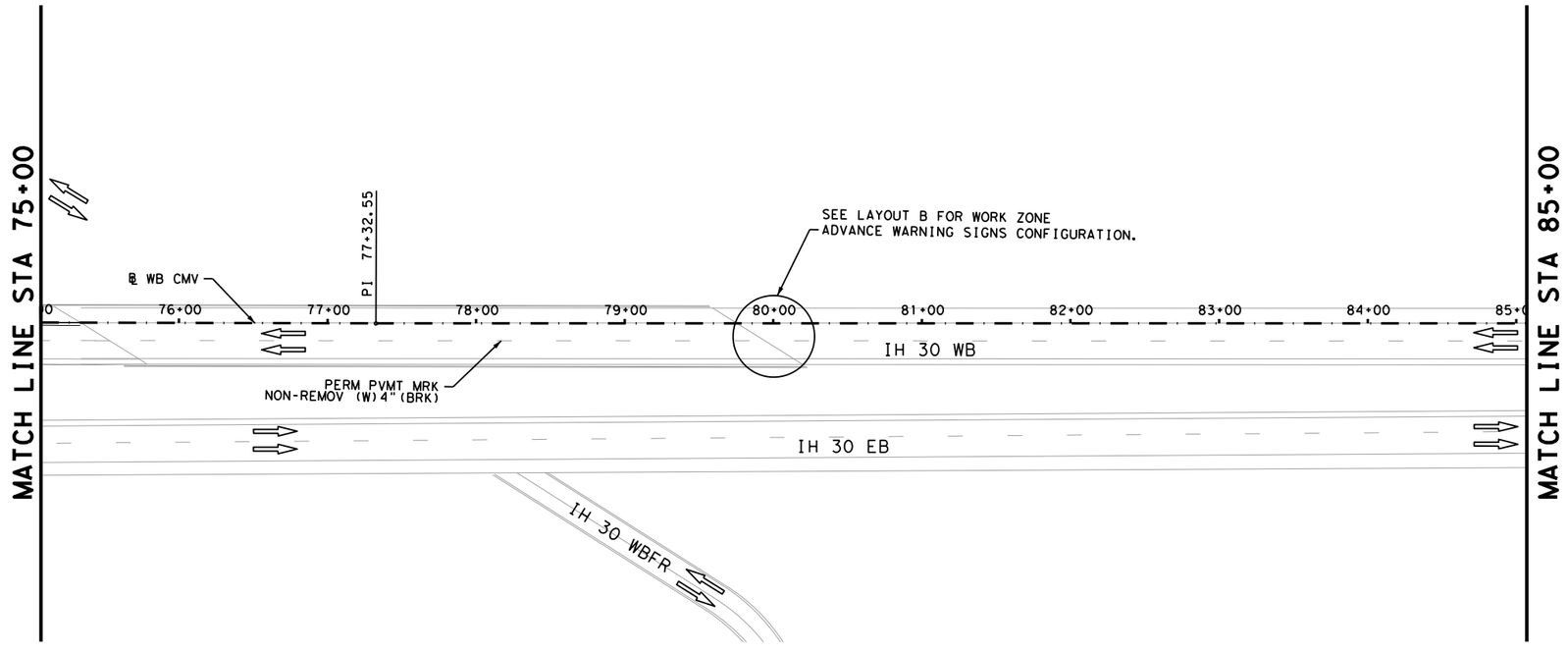
STA 45+00 TO STA 65+00

SHEET 3 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	30

Design Filename: P:\116\35\04\Design\Civil\TCP\116350 4tcpPH203.dgn





N

LEGEND

- PHASE II CONSTRUCTION
- TREE REMOVAL
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

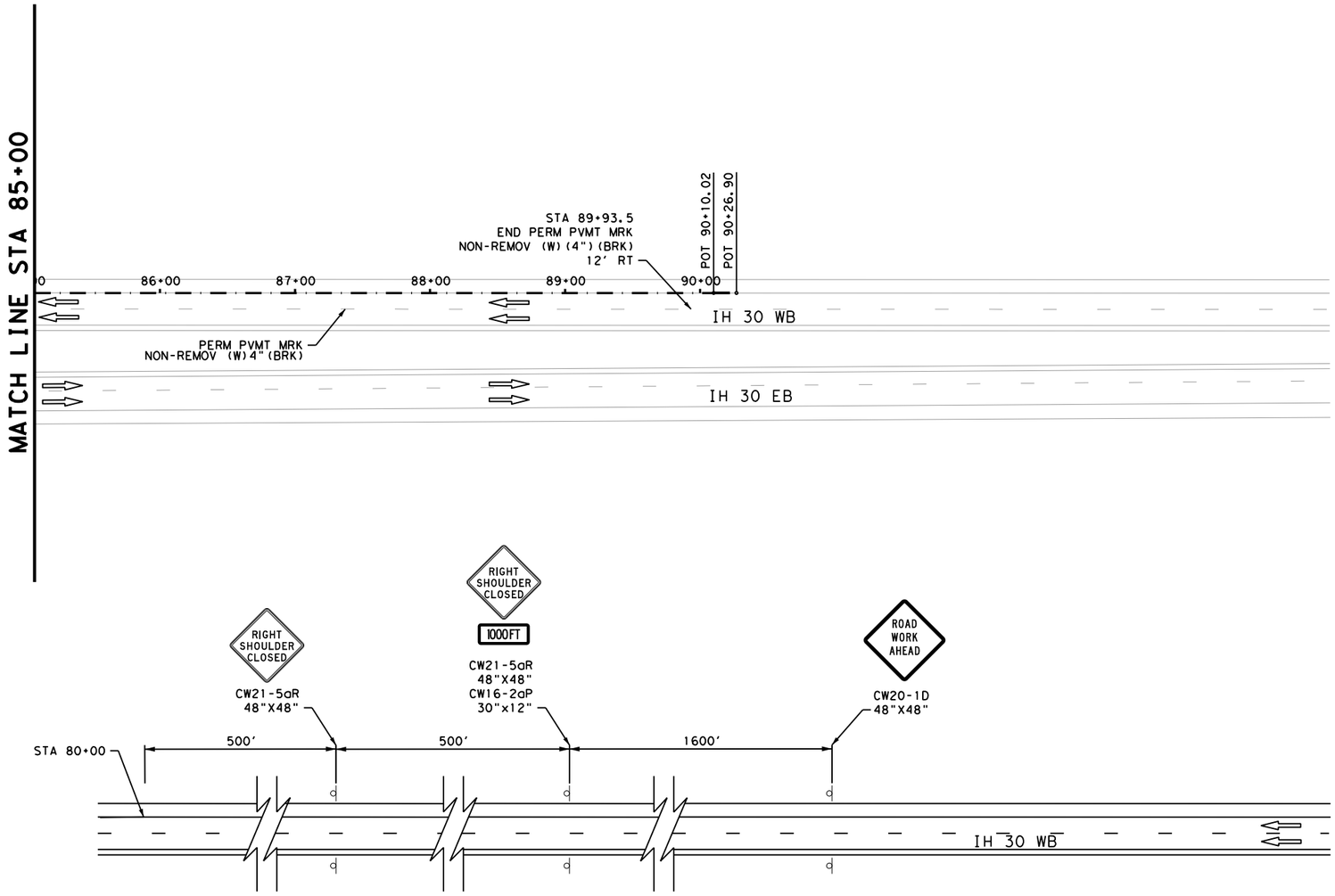
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
TRAFFIC CONTROL PLAN PHASE II

STA 65+00 TO STA 85+00

SHEET 4 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	31



LAYOUT B
NTS

N

LEGEND

- PHASE II CONSTRUCTION
- TREE REMOVAL
- BARRIER
- TYPE III BARRICADE
- BARRELS
- SIGN
- TRAFFIC FLOW ARROWS

NOTES:

1. FOR ADDITIONAL DETAILS SEE TxDOT TCP STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

TRAFFIC CONTROL PLAN PHASE II

STA 85+00 TO END PROJECT

SHEET 5 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	32

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\TCP\1163504tcpPH205.dgn

agree. CCSS updated

PLAN SHEET NUMBER 24. Check all remaining sheet numbers.

should not be listed ewer is not seeing be used.

S MOVED

LOC NO.	TCP PHASE	PLAN SHEET NUMBER	LOCATION	STA	TEST LEVEL	DIRECTION OF TRAFFIC (UNI/BI)	FOUNDATION PAD		BACKUP SUPPORT			AVAILABLE SITE LENGTH	CRASH CUSHION									
							PROPOSED MATERIAL	PROPOSED THICKNESS	DESCRIPTION	WIDTH	HEIGHT		INSTALL	REMOVE	MOVE / RESET		L	L	R	R	S	S
															MOVE/ RESET	FROM LOC.#	N	W	N	W	N	W
1	1	2 OF 5	WB IH 30 CMV STATION	STA 28+07	TL-3	WB	EXIST PAV	-	PCTB	24"	42"		1								1	
2	1	4 OF 5	WB IH 30 CMV STATION	STA 77+36	TL-3	WB	EXIST PAV	-	PCTB	24"	42"		1	1							1	
3	2	2 OF 5	WB IH 30 CMV STATION	STA 35+57	TL-3	WB	EXIST PAV	-	PCTB	24"	42"			1	1	1					1	
4	PERMANENT	5 OF 7	WB IH 30 CMV STATION	STA 49+72	TL-3	WB	CONC	6"	T80SS	17"	42"		1				1					
												TOTALS	2	2	1							

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

FOR DEFINITIONS SEE THE "CRASH CUSHION CATEGORIZATION CHART.PDF" AT THE DESIGN DIVISION (ROADWAY STANDARDS) WEBSITE. USE QUICK LINKS TO ACCESS ATTENUATORS / CRASH CUSHIONS SECTION.
http://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/rdwyIse.htm

CRASH CUSHION SUMMARY SHEET

FILE: ccss.dgn	DN: TxDOT	CK:		CK:
© TxDOT	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		
	ATL	TITUS		
	FEDERAL AID PROJECT			SHEET NO.
				33

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Standards\TCP\1163504_CCSS1.dgn

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

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

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

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

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

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

Texas Department of Transportation

Traffic Safety Division Standard

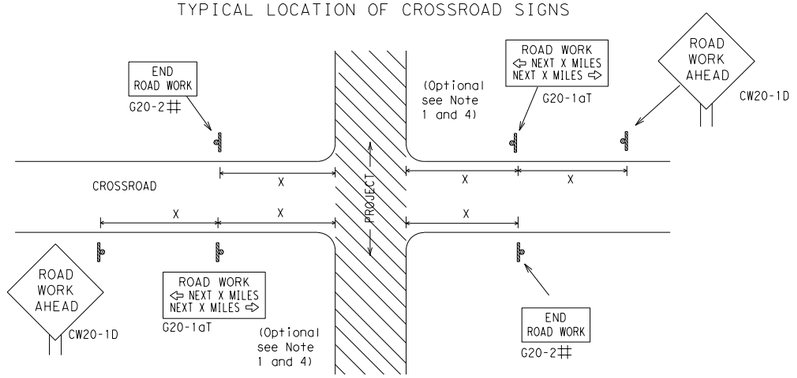
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
5-10 5-21	ATL	TITUS		34

DATE: 10/14/2022 2:46:23 PM
FILE: P:\116335\04\Design\Civil\Standards\TCP\bc-21.dgn

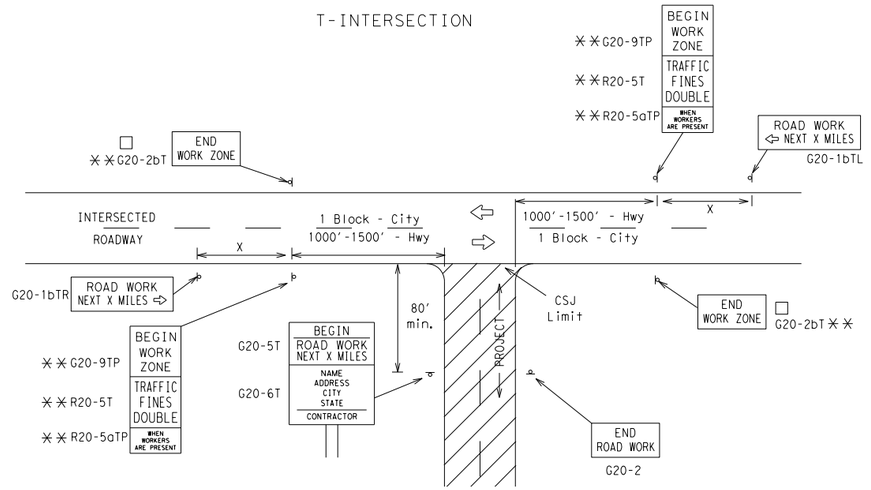
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

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

SPACING

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

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

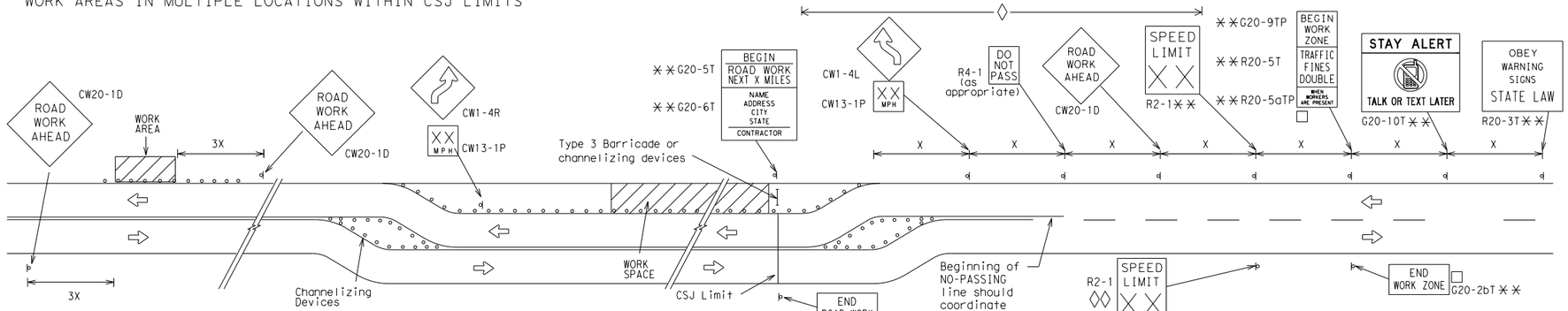
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

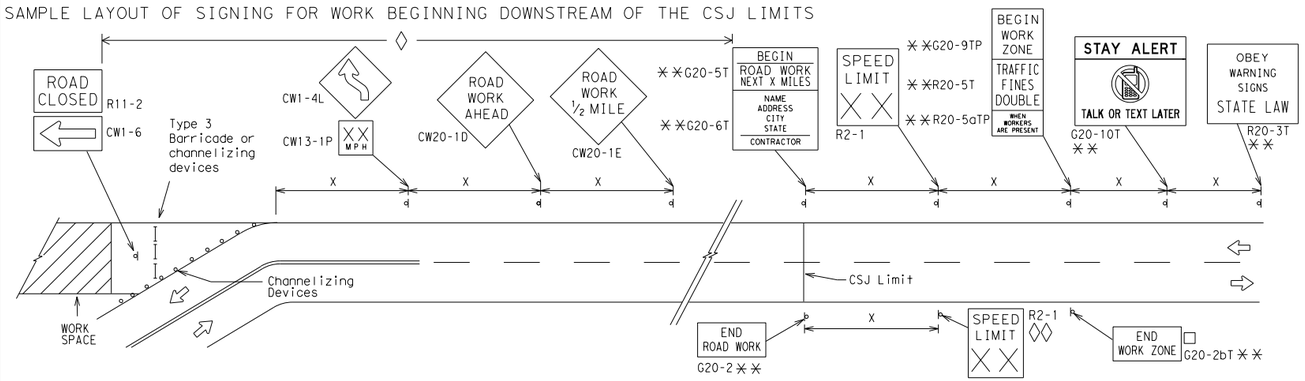
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		35

DATE: 10/14/2022 2:46:23 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\bc-21.dgn

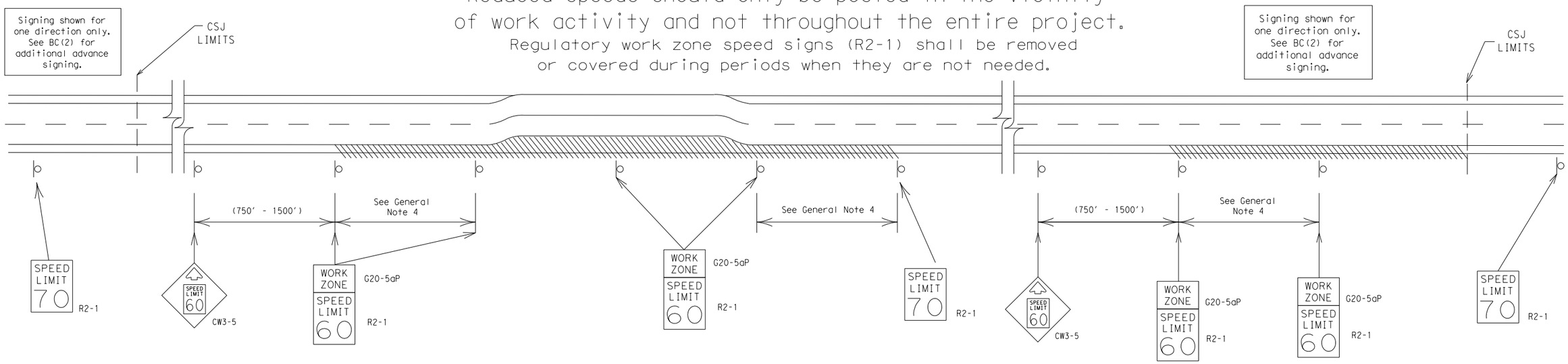
DATE: 10/14/2022 2:46:24 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\bc-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

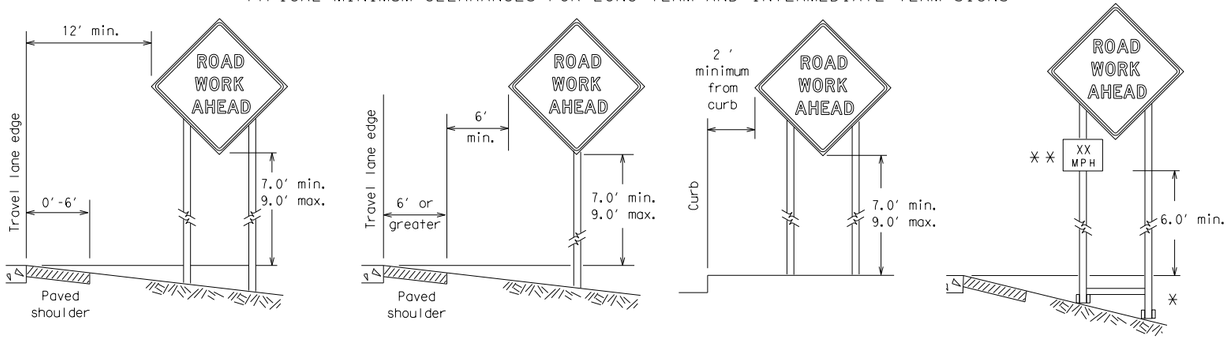
Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		36

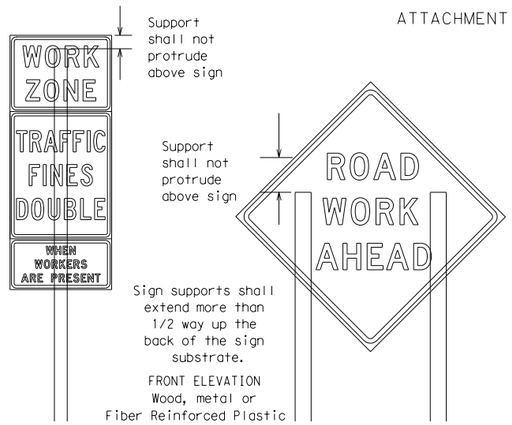
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



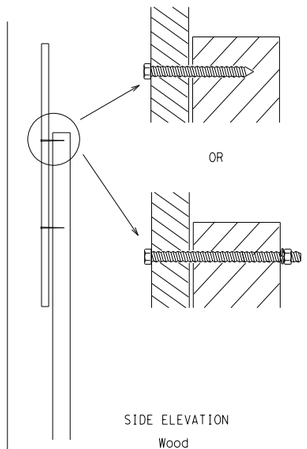
⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⁎⁎ 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



FRONT ELEVATION
Wood, metal or
Fiber Reinforced Plastic



SIDE ELEVATION
Wood

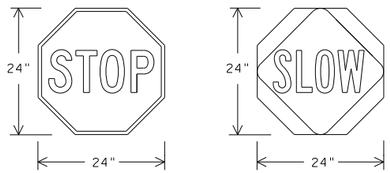
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

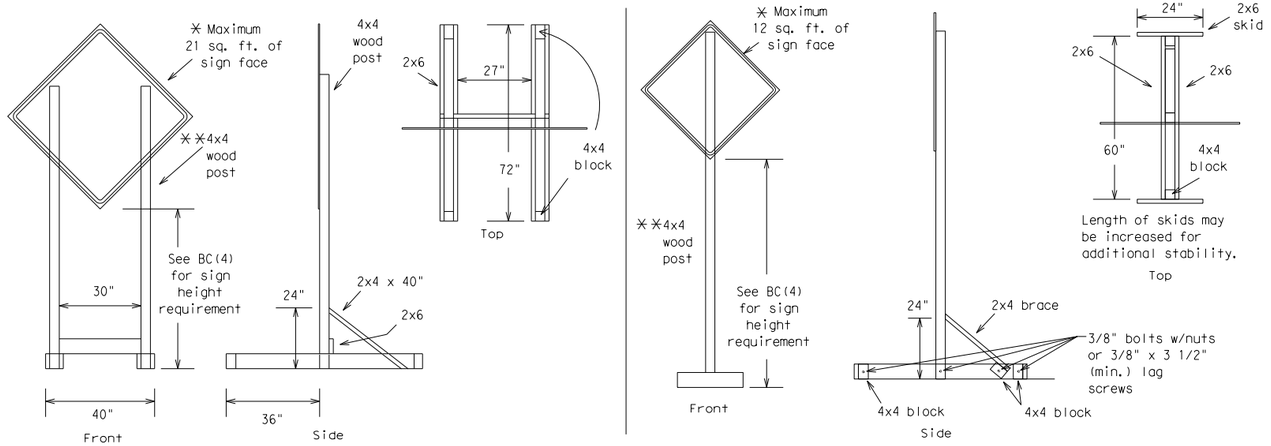
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

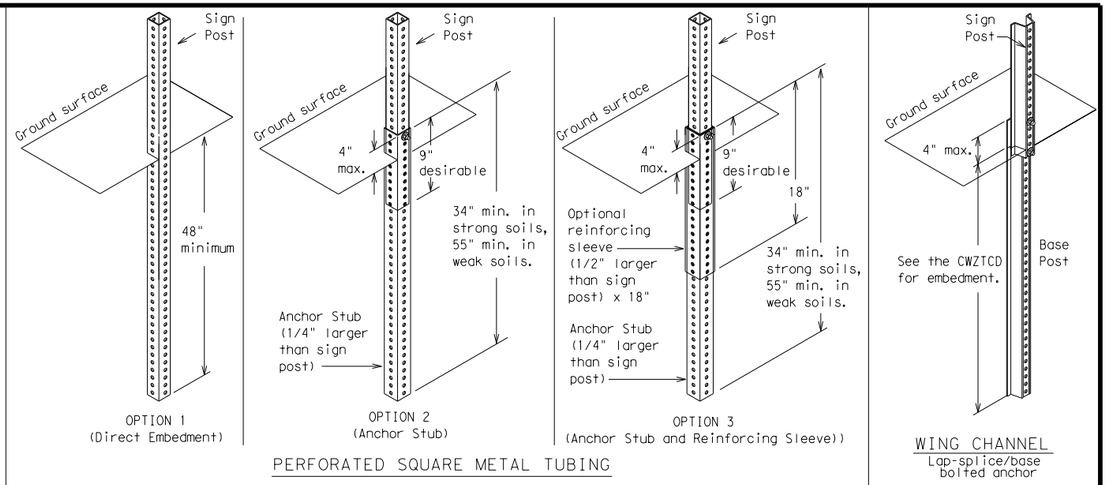
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		37

DATE: 10/14/2022 2:46:24 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\bc-21.dgn



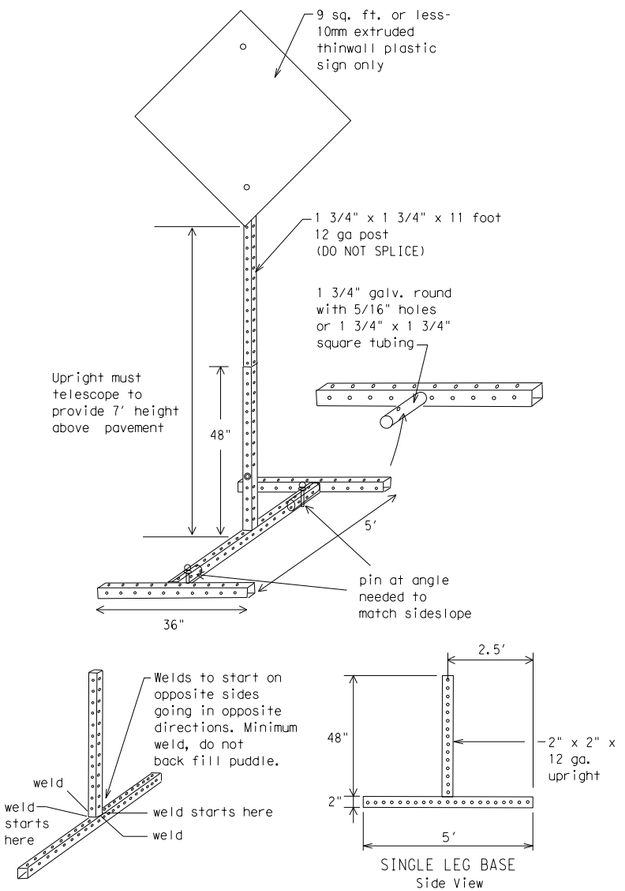
SKID MOUNTED WOOD SIGN SUPPORTS

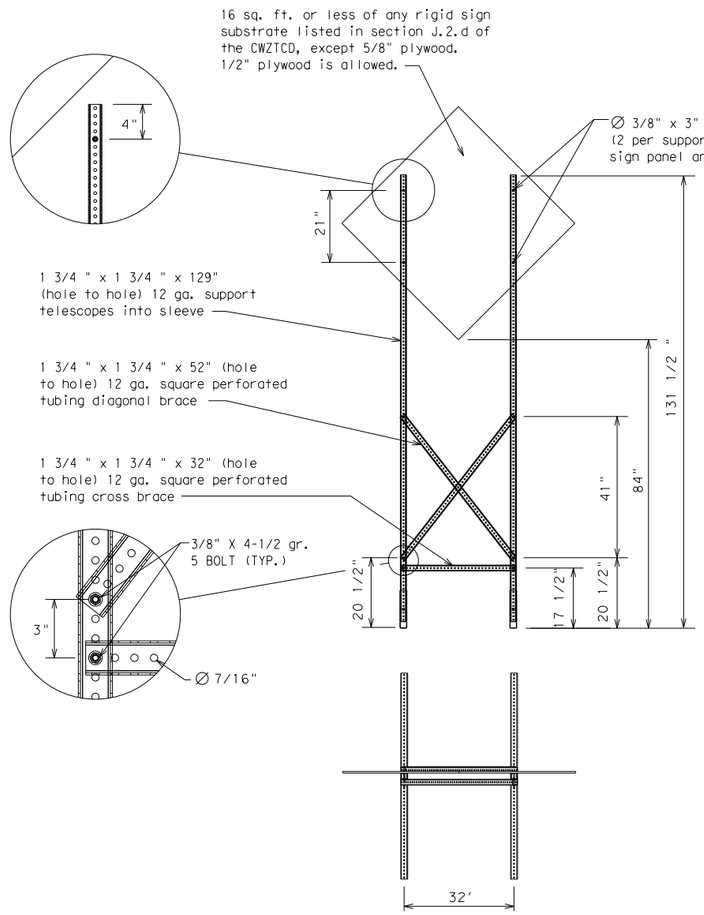
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

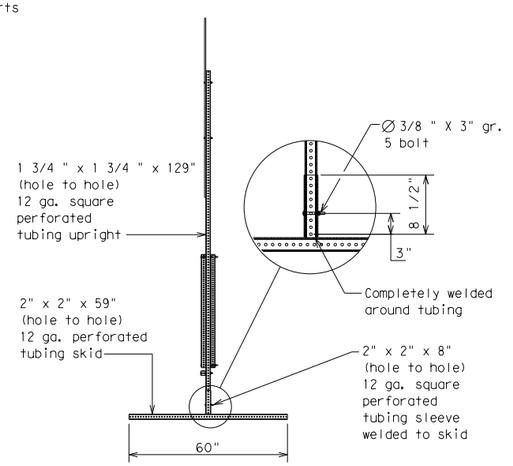


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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 Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		38

DATE: 10/14/2022 2:46:25 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\bc-21.dgn

DATE: 10/14/2022 2:46:26 PM
FILE: P:\116335\04\Design\Civil\Standards\TCP\bc-21.dgn

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

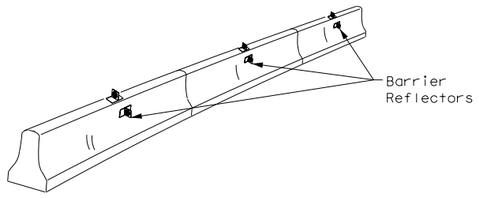
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		39

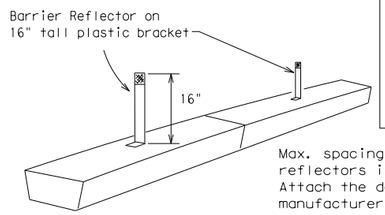
100

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



CONCRETE TRAFFIC BARRIER (CTB)

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

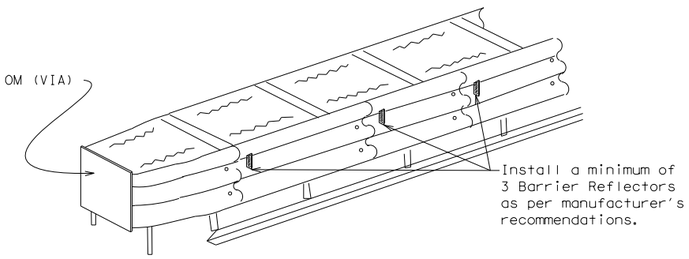


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

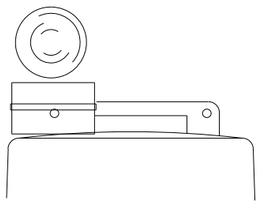


DELINEATION OF END TREATMENTS

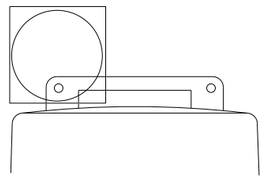
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

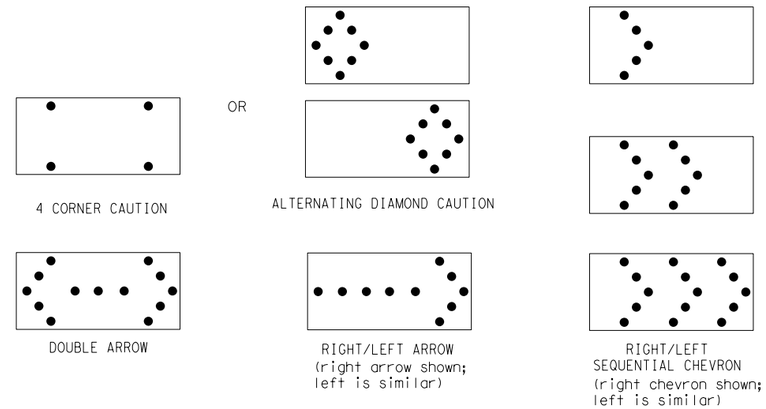
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



4 CORNER CAUTION

ALTERNATING DIAMOND CAUTION

DOUBLE ARROW

RIGHT/LEFT ARROW
(right arrow shown;
left is similar)

RIGHT/LEFT
SEQUENTIAL CHEVRON
(right chevron shown;
left is similar)

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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		40

DATE: 10/14/2022 2:46:27 PM
FILE: P:\1163504\Design\Civil\Standards\TCP\bc-21.dgn

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

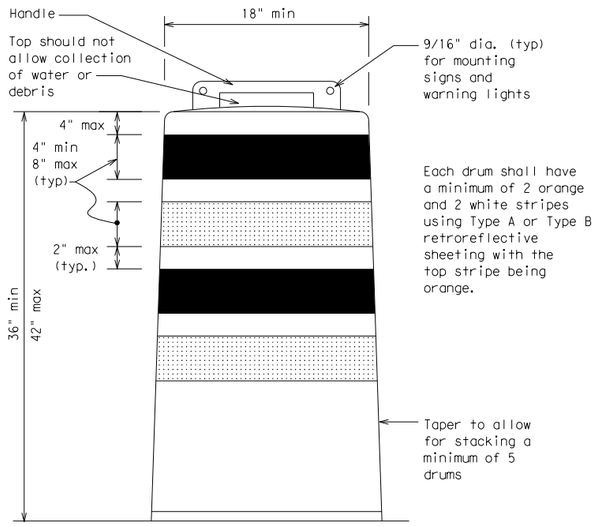
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

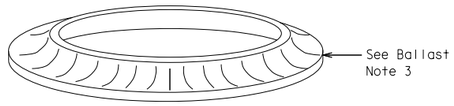
RETROREFLECTIVE SHEETING

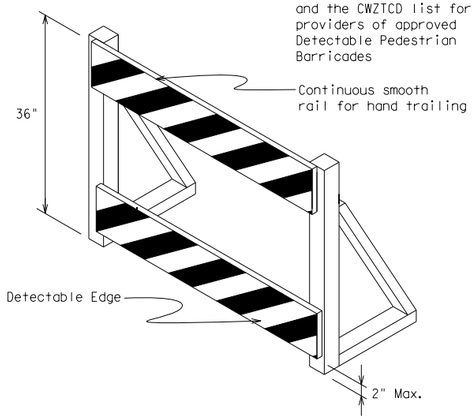
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

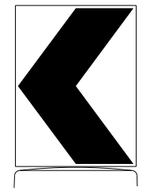




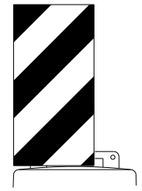


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

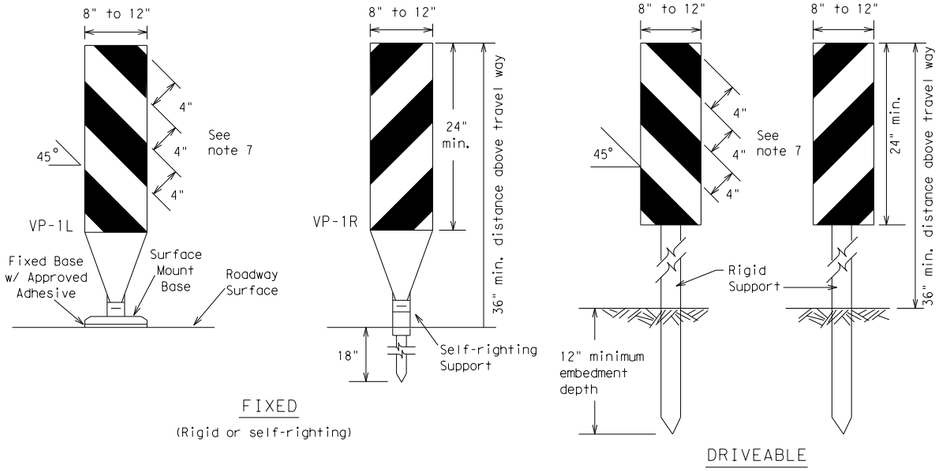
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	ATL	TITUS		41
7-13				

102

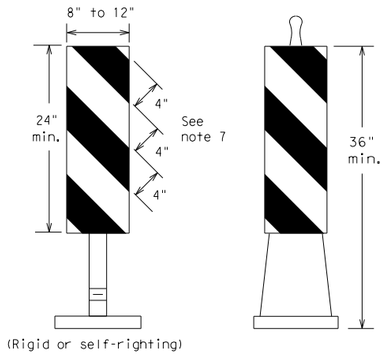
DATE: 10/14/2022 2:46:27 PM
FILE: P:\116135\04\Design\Civil\Standards\TCP\bc-21.dgn



FIXED

(Rigid or self-righting)

DRIVEABLE

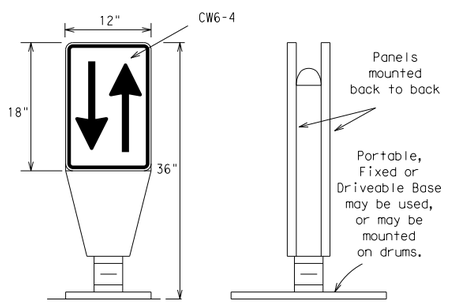


(Rigid or self-righting)

PORTABLE

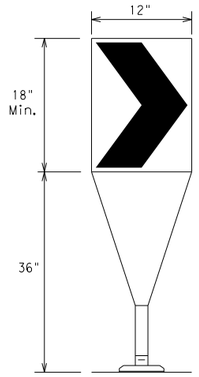
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



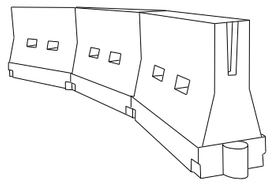
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

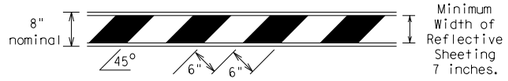
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		42

DATE: 10/14/2022 2:46:28 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\bc-21.dgn

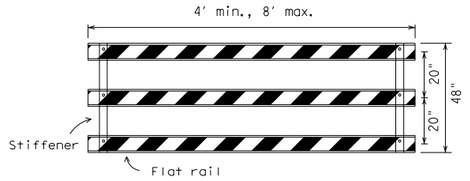
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



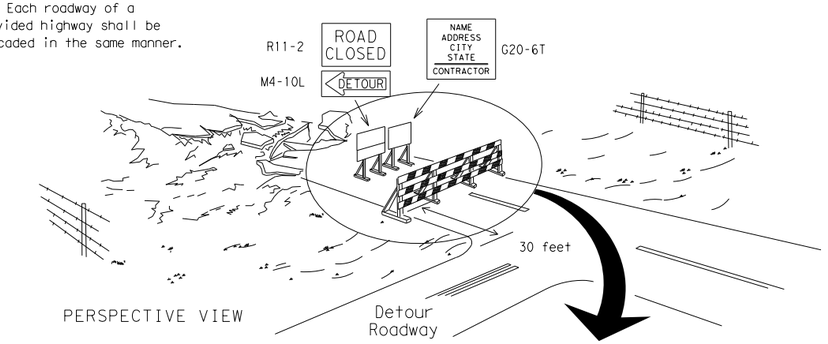
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

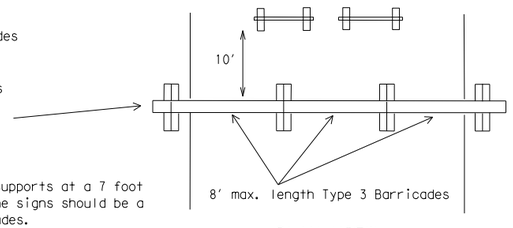
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

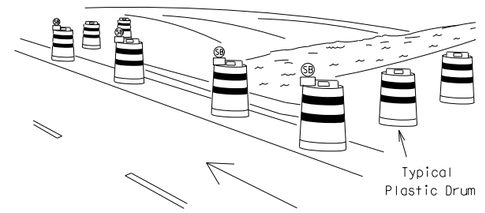
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

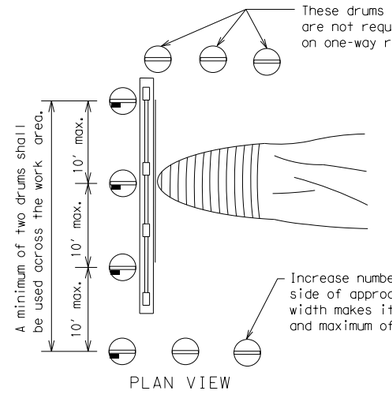
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

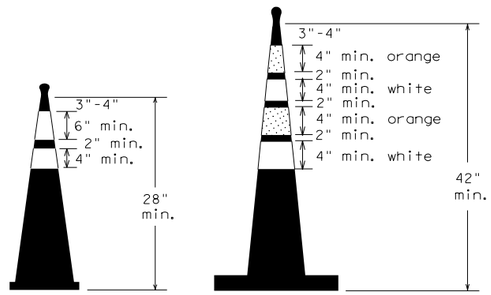
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



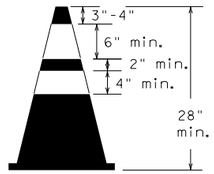
PLAN VIEW

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

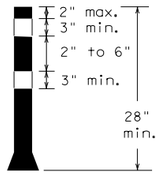
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

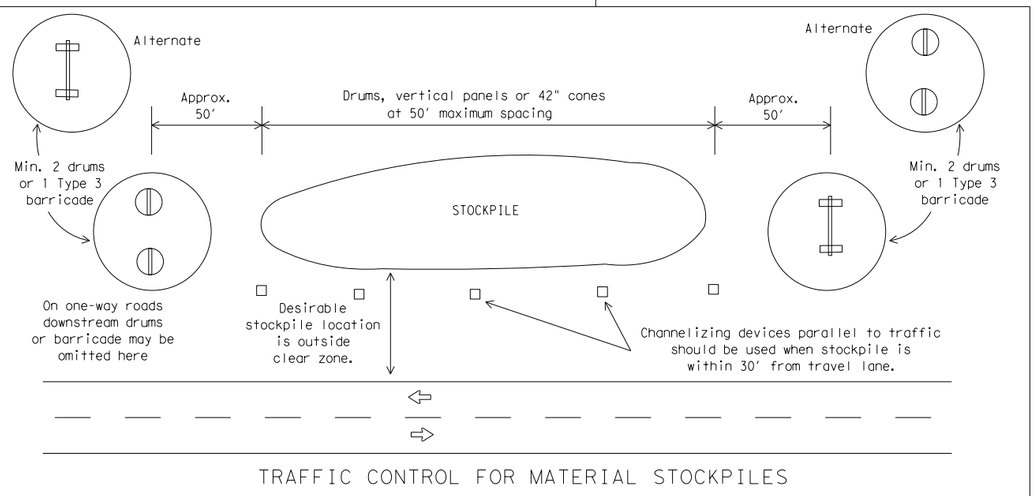


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ATL	TITUS		43

104

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

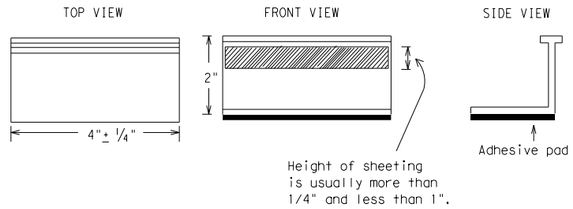
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

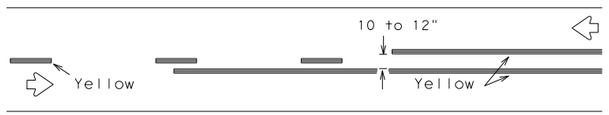
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		44

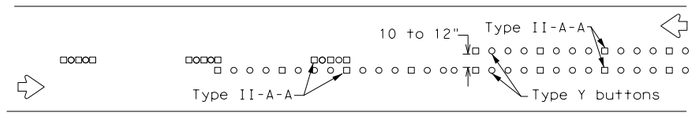
DATE: 10/14/2022 2:46:29 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\bc-21.dgn

DATE: 10/14/2022 2:46:30 PM
FILE: P:\116135\04\Design\Civil\Standards\TCP\bc-21.dgn

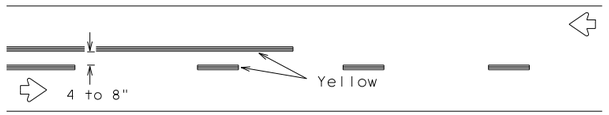
PAVEMENT MARKING PATTERNS



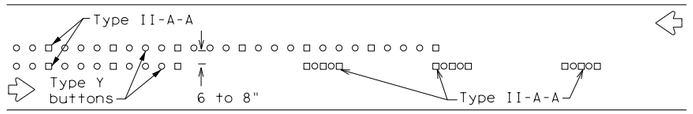
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



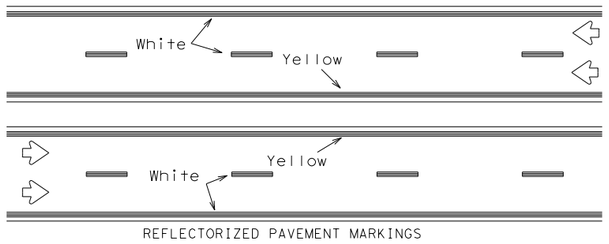
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



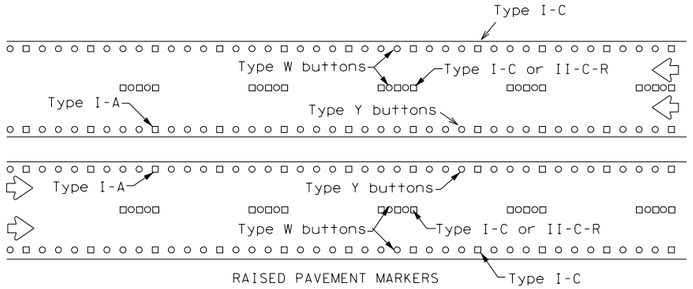
RAISED PAVEMENT MARKERS - PATTERN B

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



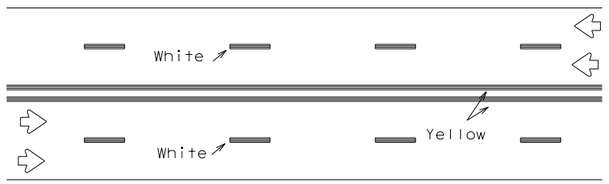
REFLECTORIZED PAVEMENT MARKINGS



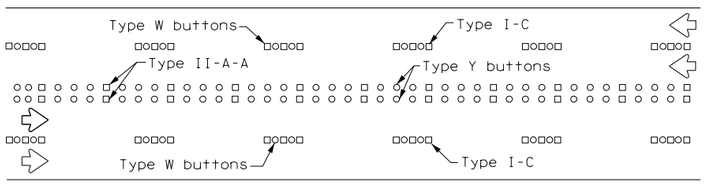
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



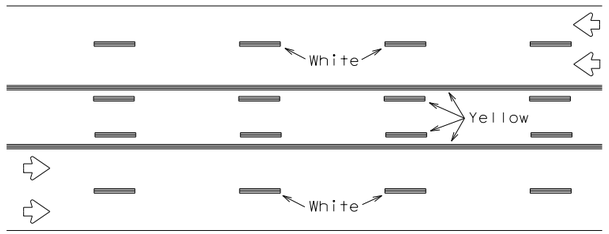
REFLECTORIZED PAVEMENT MARKINGS



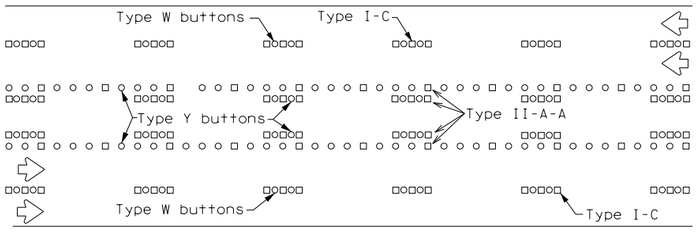
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

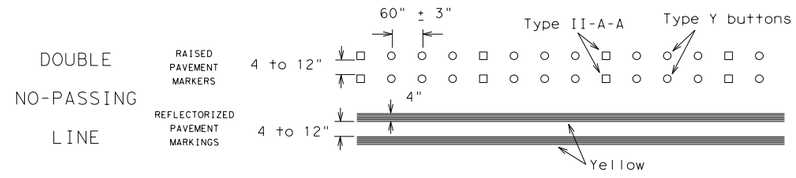
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

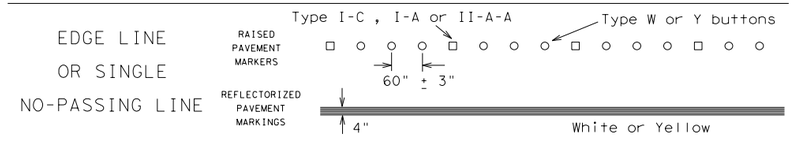
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

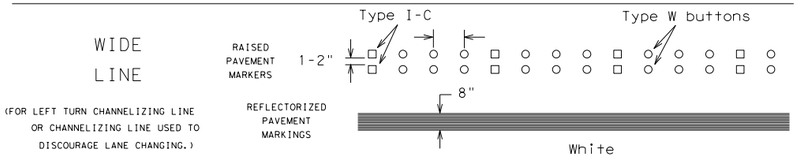


EDGE LINE OR SINGLE NO-PASSING LINE



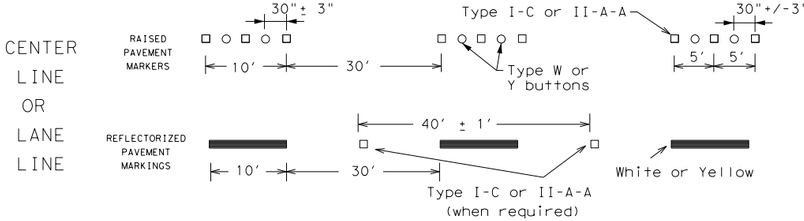
WIDE LINE

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

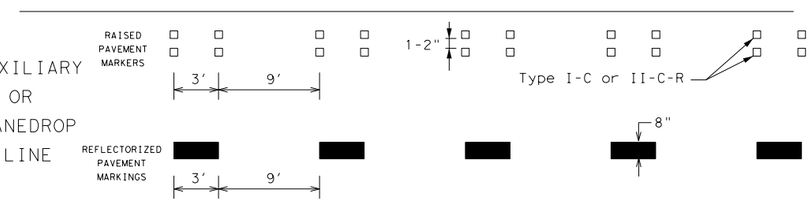


BROKEN LINES

CENTER LINE OR LANE LINE

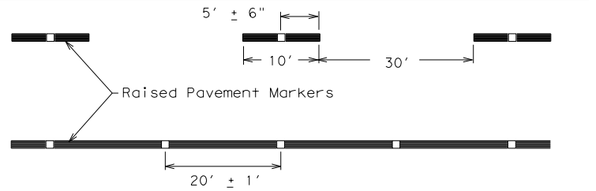


AUXILIARY OR LANEDROP LINE



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."

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

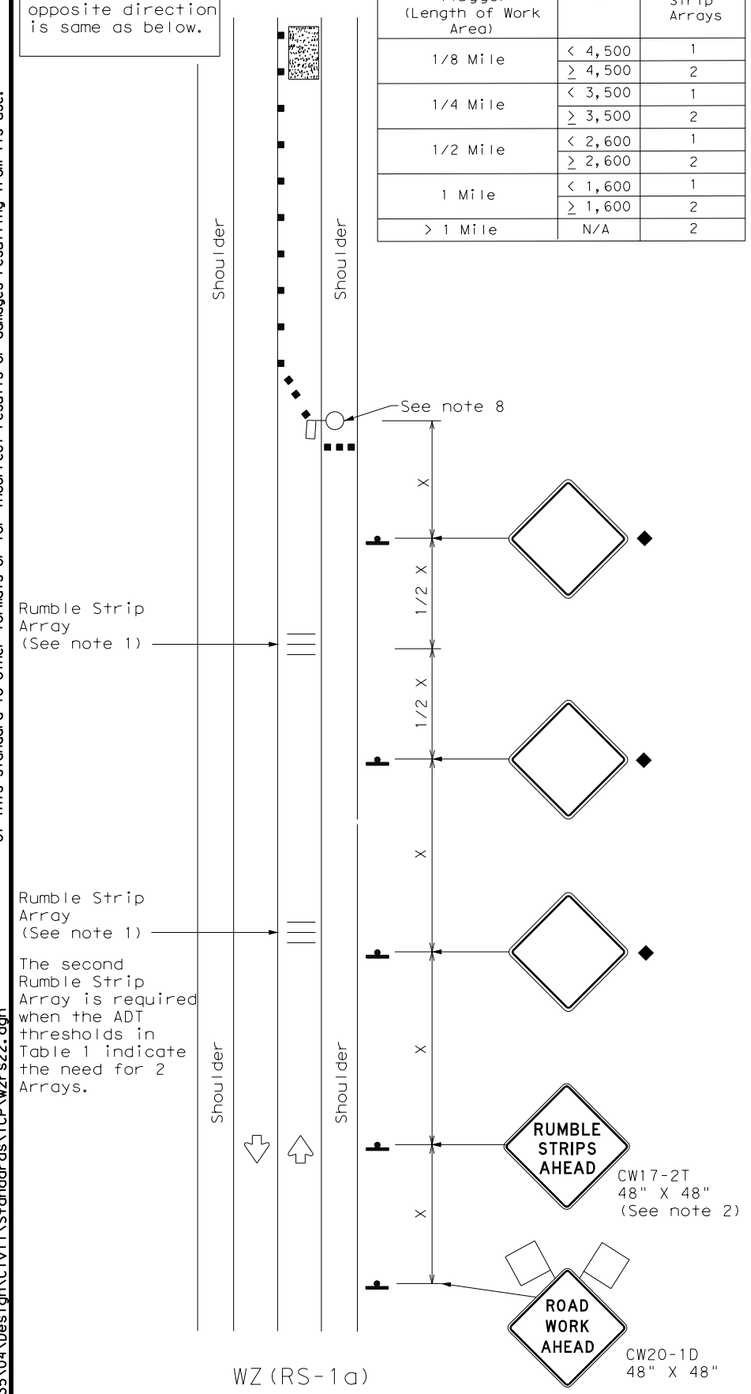
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		45

DATE: 10/14/2022 2:46:31 PM
FILE: P:\116335\04\Design\Civil\Standards\TCP\wzrs22.dgn

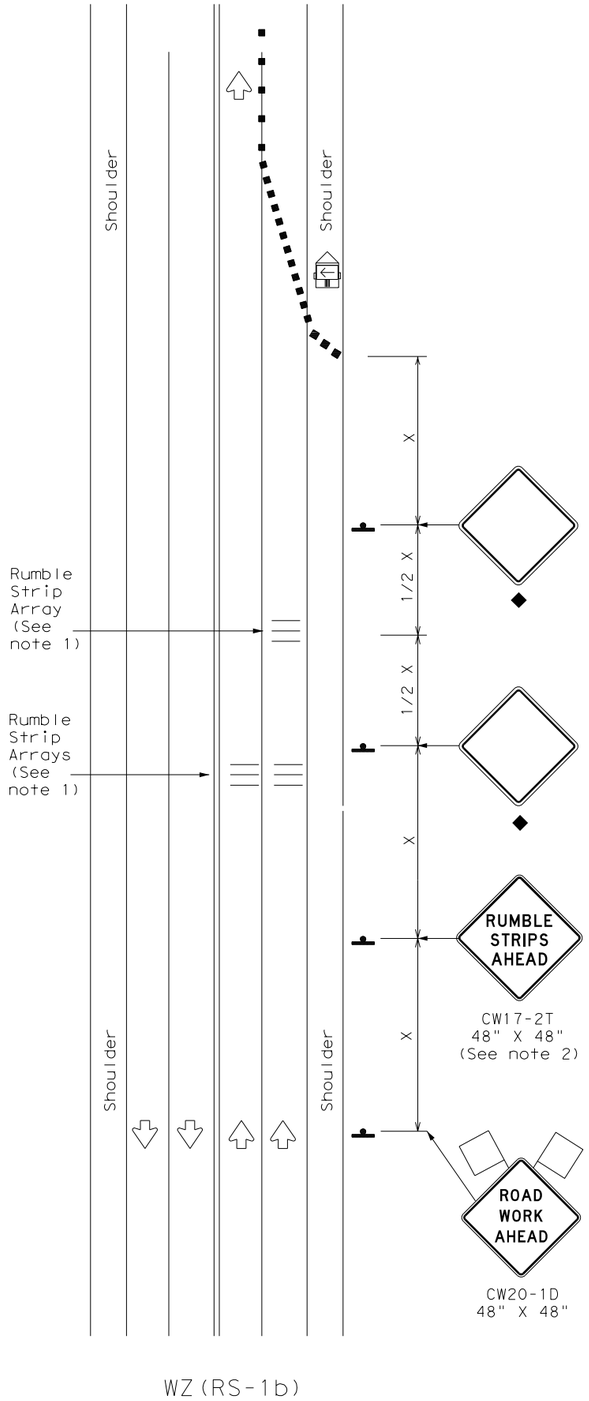
Warning sign and rumble strip sequence in opposite direction is same as below.



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	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
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

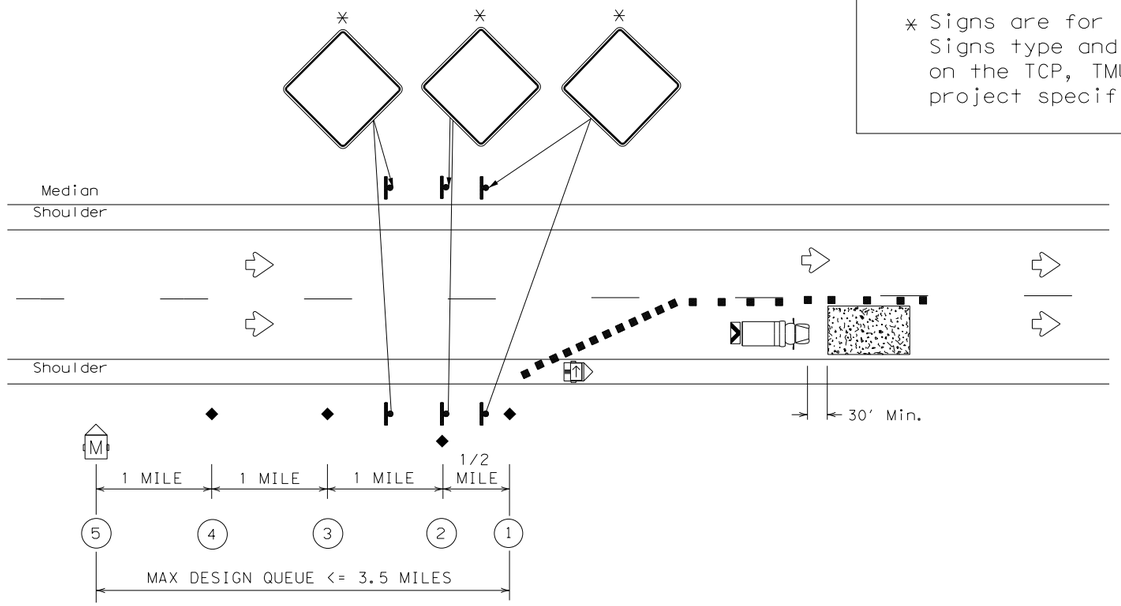
Texas Department of Transportation — Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		46

DATE: 10/14/2022 2:46:32 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\wz-its(3)-19.dgn



* Signs are for illustrative purposes only. Signs type and placement will vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

Type 2 - QUEUE DETECTION SYSTEM

(Max Design Queue <=3.5 Miles)

LEGEND			
	Work Area		Traffic Flow
	Sign		Portable Traffic Sensor
	Channelizing Devices		Truck Mounted Attenuator (TMA)
(1)	Location		Flag
	Heavy Work Vehicle		Trailer Mounted Flashing Arrow Board
M	Portable Changeable Message Sign (PCMS)		

GENERAL NOTES

1. Unless project conditions and manufacturer's specifications dictate otherwise, the number of PCMS, static signs and spacing of sensors will be as shown in the plans.
2. Temporary Queue Detection System devices shall be operational only while work is actually in progress or a definite need exists.
3. Refer to TCP and BC Traffic Engineering Standard sheets for additional information regarding the type and placement of temporary traffic control devices.
4. The viewing angle of the sensors should not be blocked.
5. Sensor at location (1) may be mounted on the Flashing Arrow Board Trailer in the taper if spacing is adequate.
6. Pay item should be paid under Special Specification "Temporary Queue Detection System".

OPERATIONAL GUIDELINE FOR PCMS MESSAGES

Message at (5)	Last 5 MIN Speed Averages V(MPH)			
	Sensor at (4)	Sensor at (3)	Sensor at (2)	Sensor at (1)
ROAD WORK AHEAD	> 45	> 45	> 45	> 45
SLOW TRAFFIC 3 MILES	> 45	> 45	> 45	25 < V < 45
SLOW TRAFFIC 2 MILES	> 45	> 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC 1 MILE	> 45	25 < V < 45	25 < V < 45	25 < V < 45
SLOW TRAFFIC AHEAD	25 < V < 45	25 < V < 45	25 < V < 45	25 < V < 45
STOPPED TRAFFIC 3 MILES	> 25	> 25	> 25	<= 25
STOPPED TRAFFIC 2 MILES	> 25	> 25	<= 25	<= 25
STOPPED TRAFFIC 1 MILE	> 25	<= 25	<= 25	<= 25
STOPPED TRAFFIC AHEAD	<= 25	<= 25	<= 25	<= 25

Texas Department of Transportation

Traffic Safety Division Standard

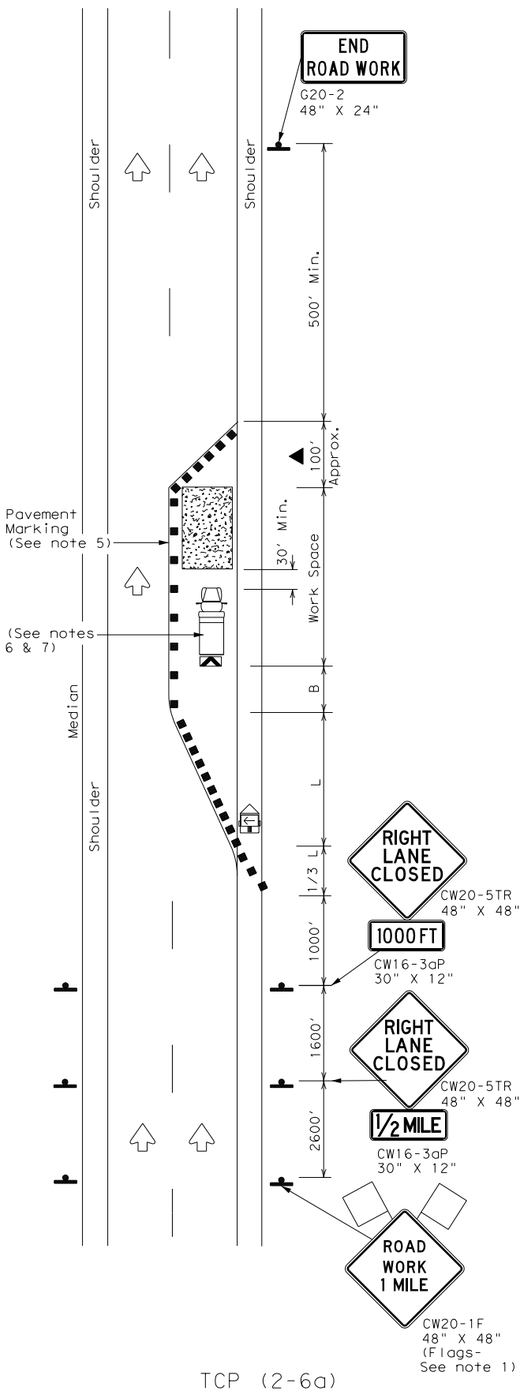
TEMPORARY QUEUE DETECTION SYSTEM TYPE 2

(Queue <= 3.5 Miles)

WZ-ITS(3)-19

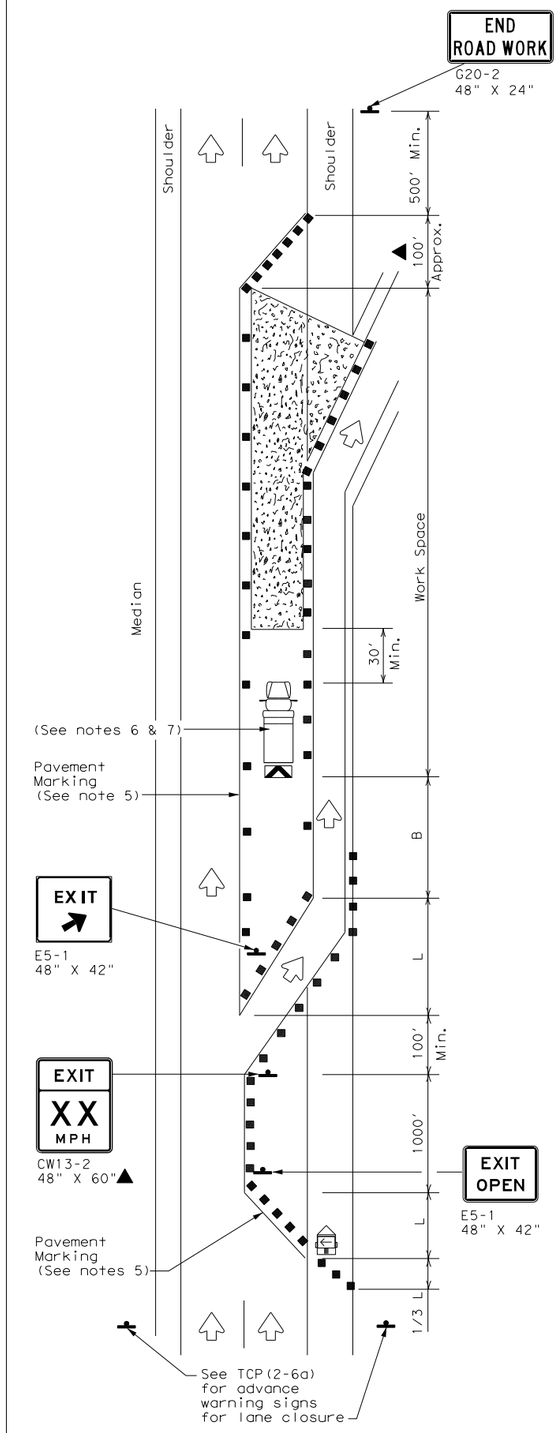
FILE: wz-its(3)-19.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		47

DATE: 10/14/2022 2:46:33 PM
FILE: P:\116335\04\Design\Civil\Standards\TCP\tcp2-6-18.dgn



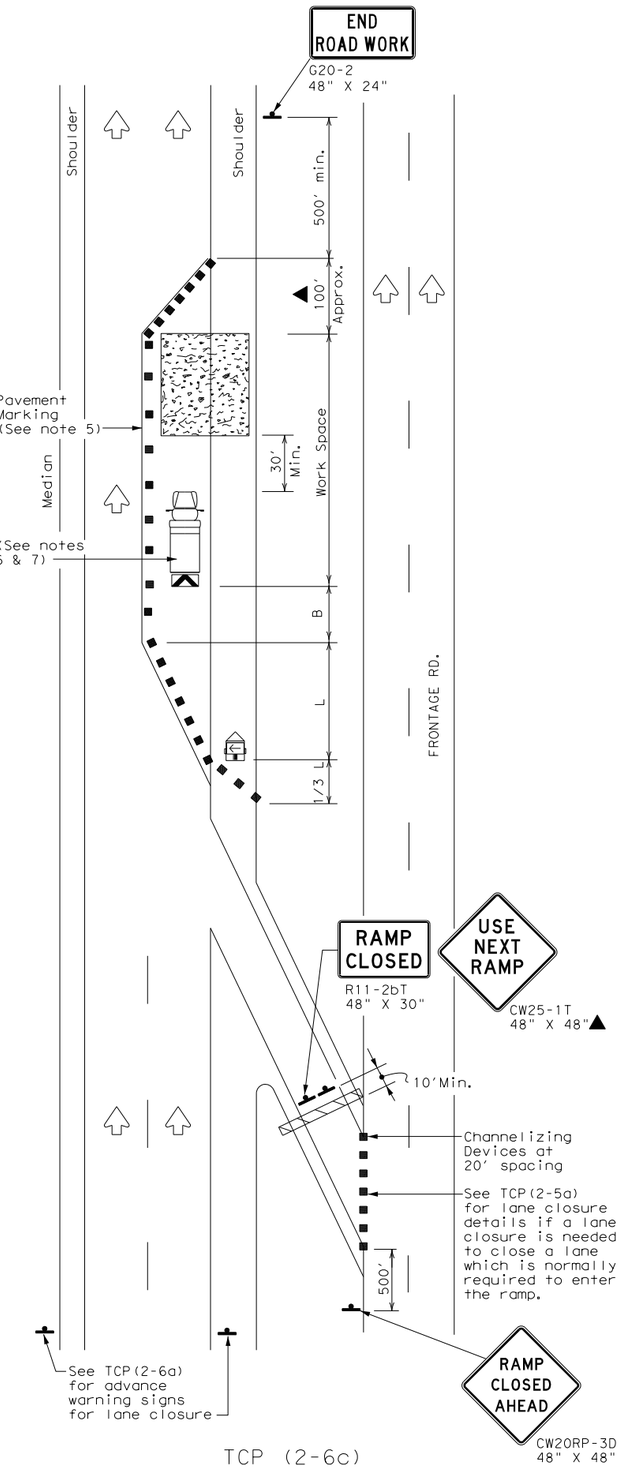
TCP (2-6a)

ONE LANE CLOSURE



TCP (2-6b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (2-6c)

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. Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on everyother channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
5. The placement of pavement markings may be omitted on Intermediate-term stationary work zones with the approval of the Engineer.
6. Shadow Vehicle with TMA and high intensity rotating, flashing,oscillating or strobe lights. 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.
7. 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.

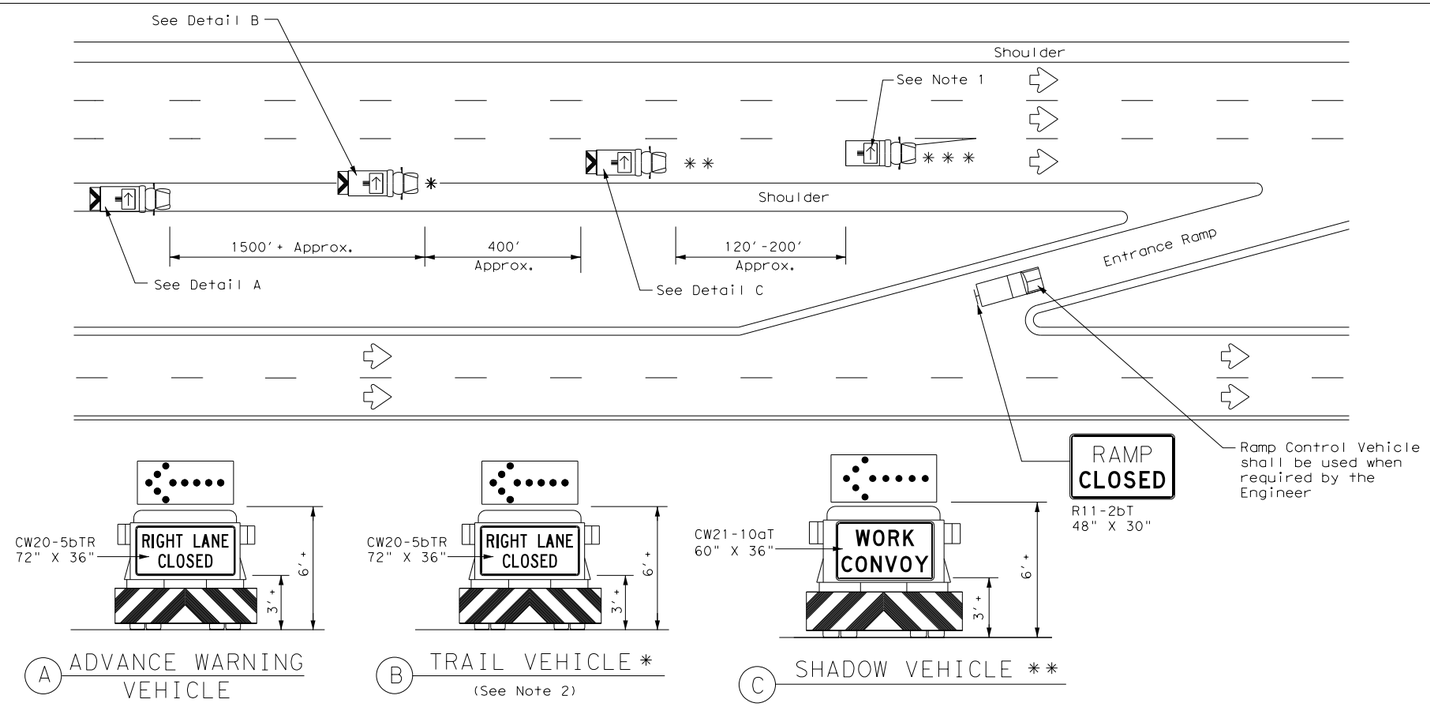
Texas Department of Transportation

Traffic Operations Division Standard

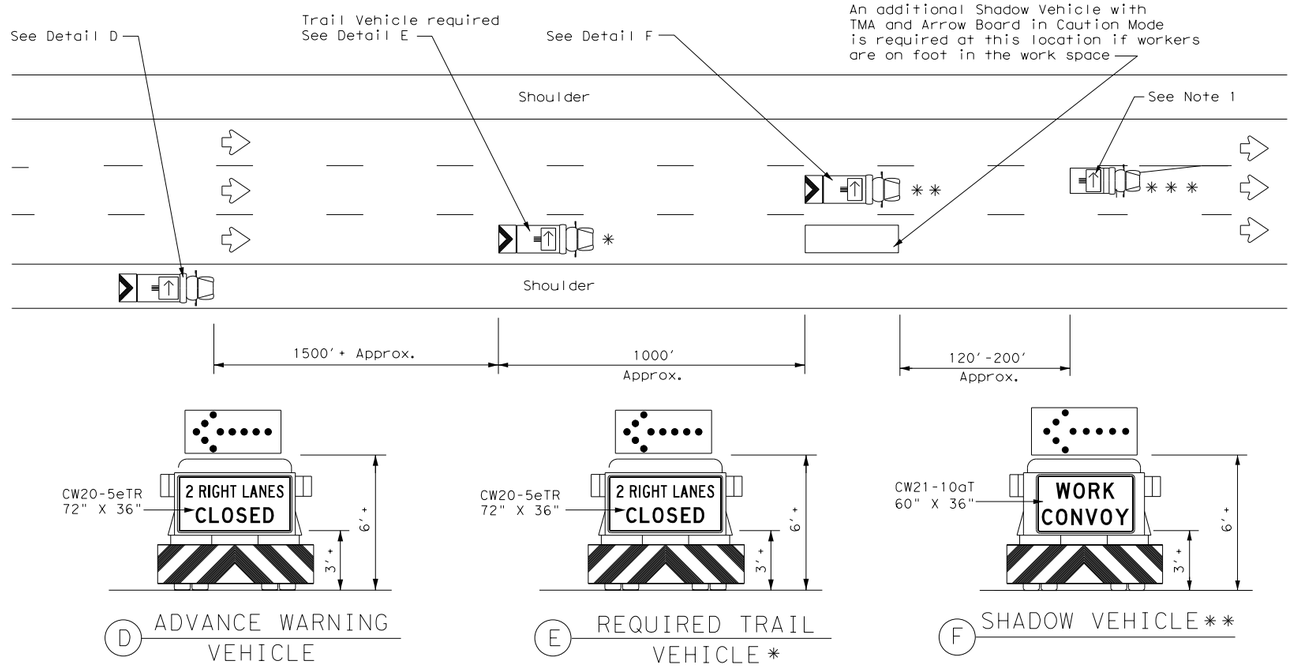
TRAFFIC CONTROL PLAN LANE CLOSURES ON DIVIDED HIGHWAYS

TCP(2-6)-18

FILE: tcp2-6-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		48



RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



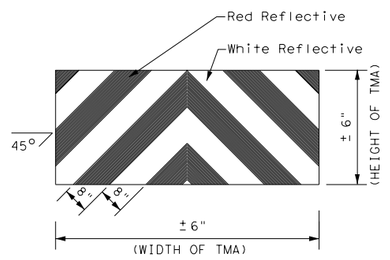
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

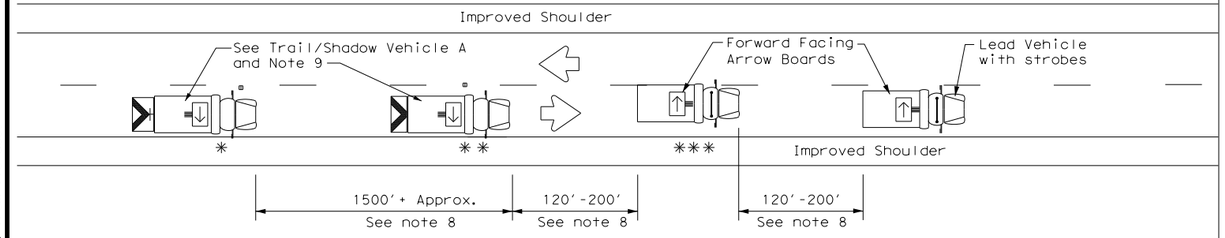
TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	ATL	TITUS		49
1-97				

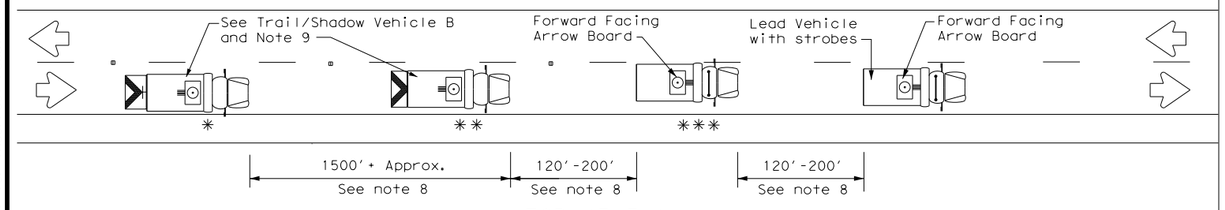
176

DATE: 10/14/2022 2:46:34 PM
FILE: P:\116335\04\Design\Civil\Standards\TCP\tcp3-2.dgn



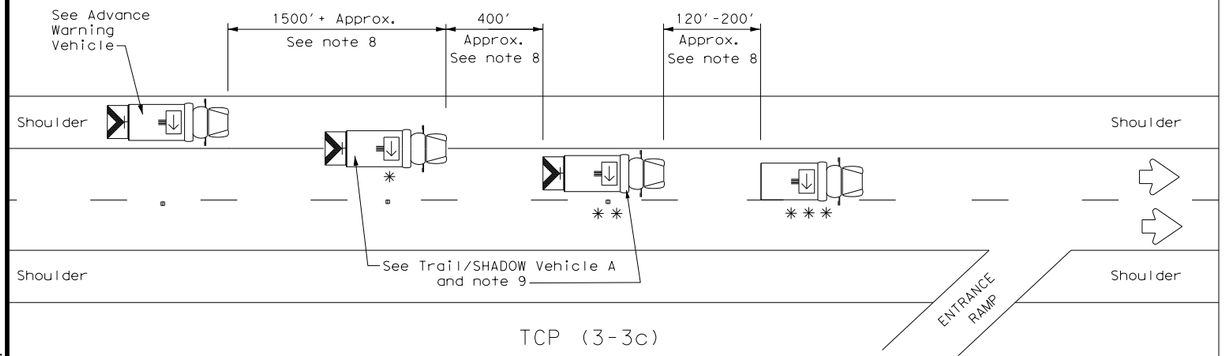
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS (WORK ON TRAVEL LANE)



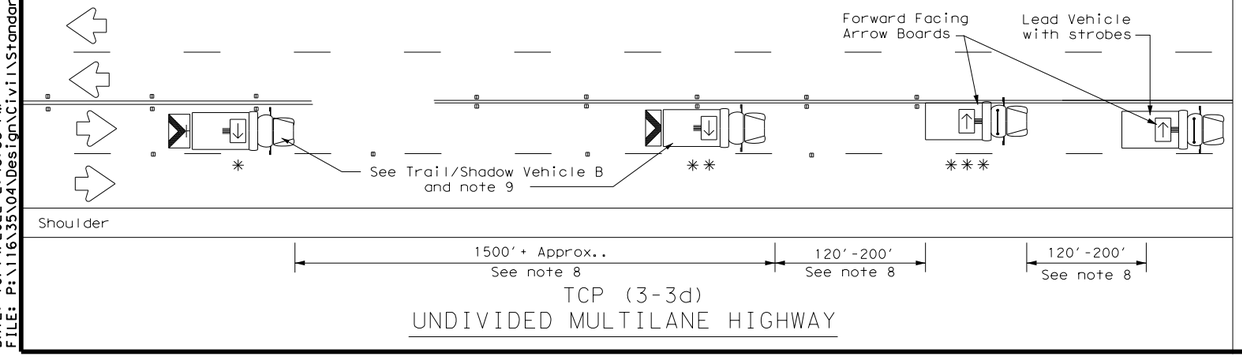
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



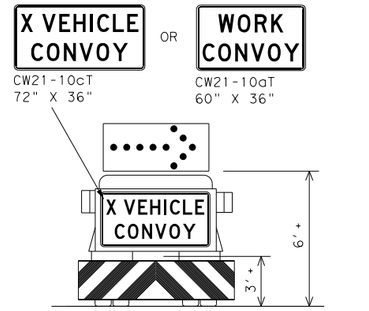
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



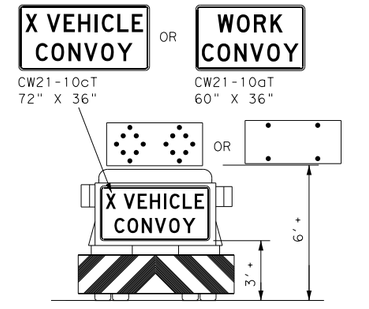
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



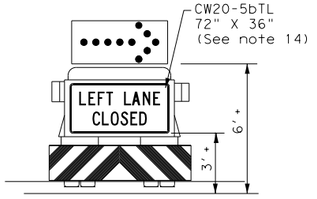
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

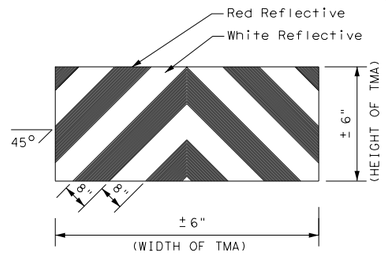


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

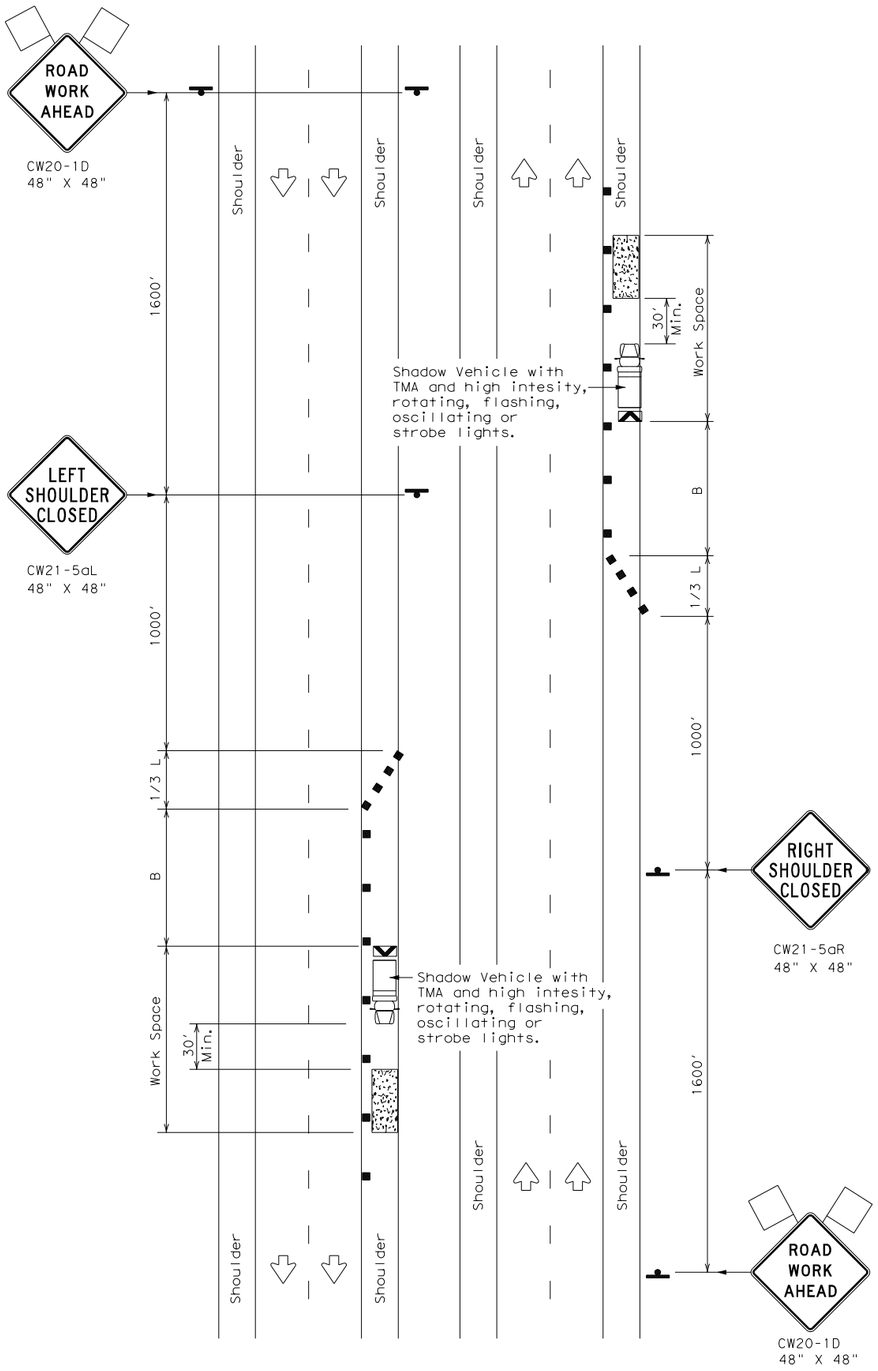
TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	ATL	TITUS		50
1-97 7-14				

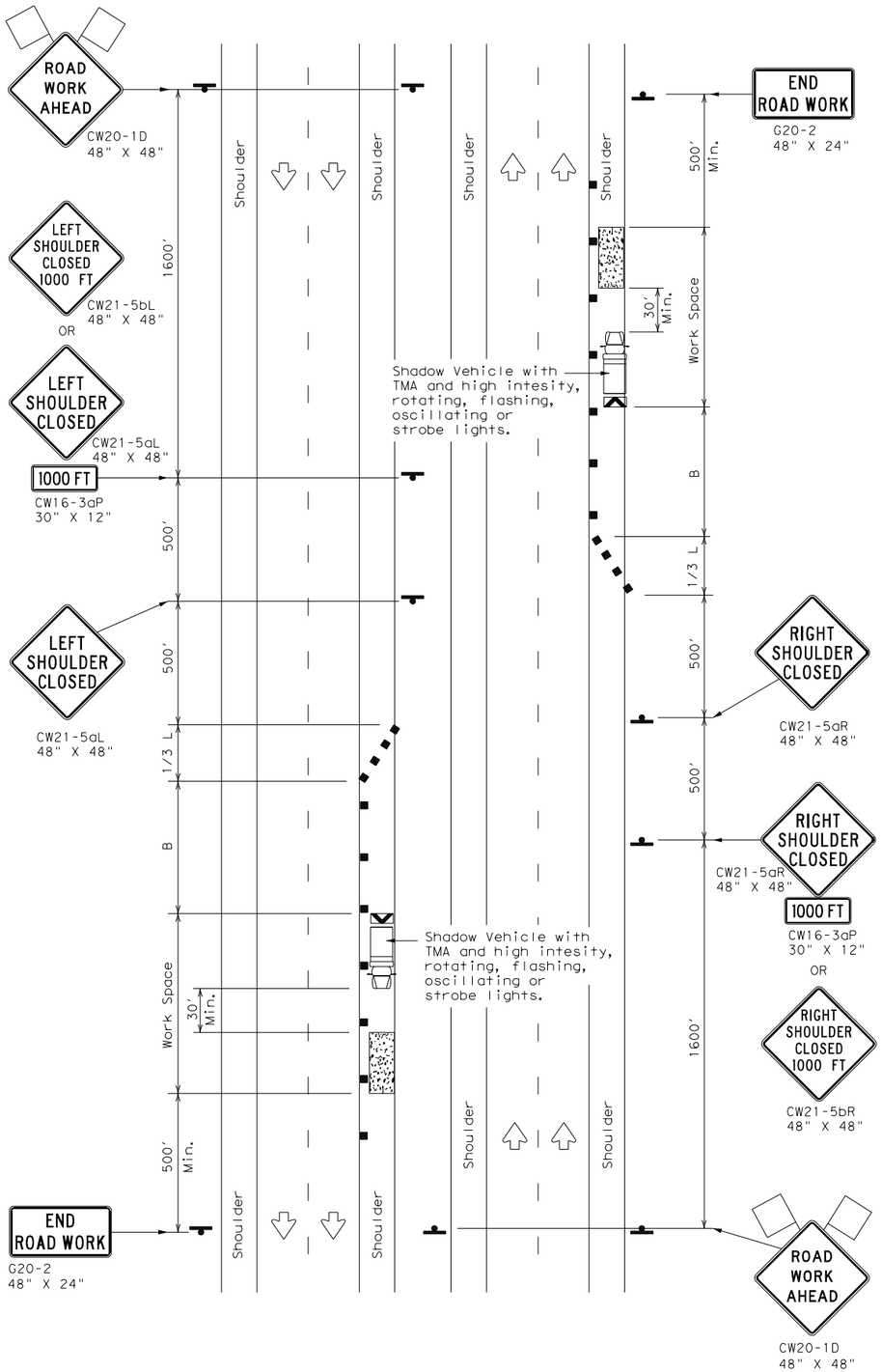
DATE: 10/14/2022 2:46:35 PM
FILE: P:\116\35\04\Design\Civil\Standards\TCP\tcp3-3.dgn

DATE: 10/14/2022 2:46:37 PM
FILE: P:\116135\04\Design\Civil\Standards\TCP\tcp5-1-18.dgn



TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

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

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

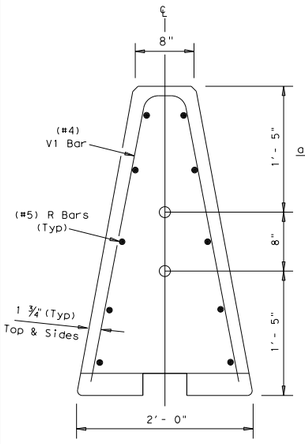
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

TCP(5-1)-18

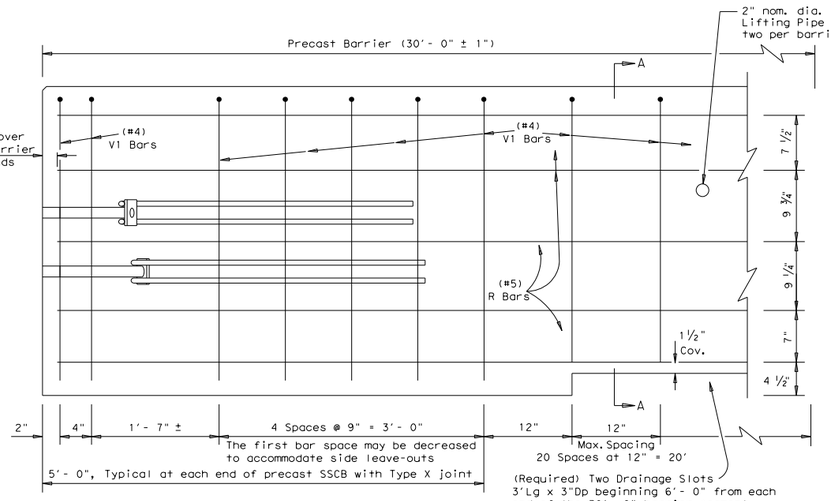
FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
2-18	DIST	COUNTY		SHEET NO.
	ATL	TITUS		51

DATE: 10/14/2022
FILE: P:\116135\04\Design\Civil\Standards\TCP\sscb210.dgn



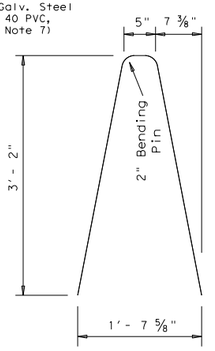
End View
Precast Barrier

Pipe locations for Joint
Type X connection



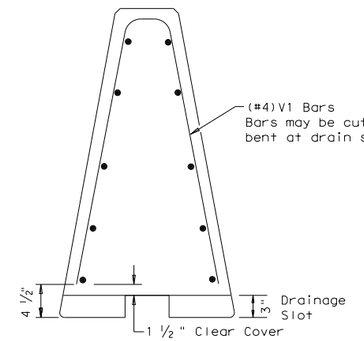
Reinforcement for Precast (SSCB)
Single Slope Concrete Barrier (Type 1)

Showing reinforcement for Joint Connection (Type X)

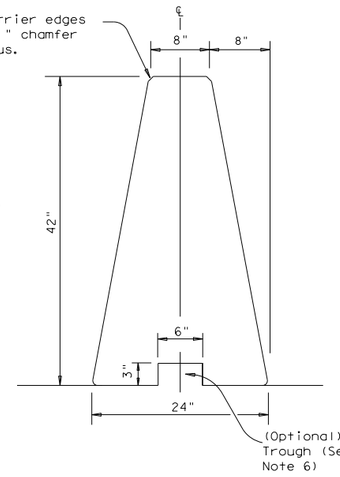


V1 Bar
#4 Rebar

Note:
V1 Bars above the drainage slots may bent to accomadate 1 ½" clear cover as directed by the Engineer.

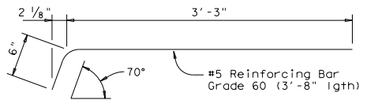


Section A-A
Steel Placement at
(Required) Drainage Slots



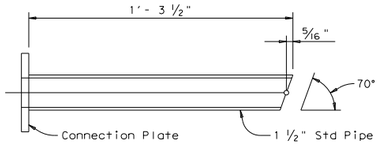
Single Slope Concrete Traffic Barrier

Precast SSCB barrier may be connected to cast-in-place SSBC. The joint connection "Types" may be used in the cast-in-place barrier, to match the precast barrier connection.



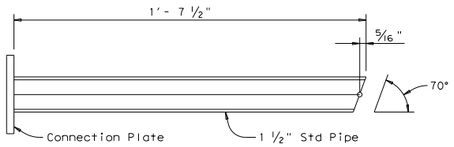
DEFORMED BAR ANCHOR DETAILS

Two (2) Bars required per assembly.
Eight (8) required per Joint.



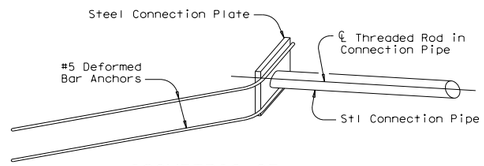
UPPER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Upper Assembly.
Two (2) required per Joint.



LOWER CONNECTION PIPE DETAILS

One (1) Steel Pipe required per Lower Assembly.
Two (2) required per Joint.

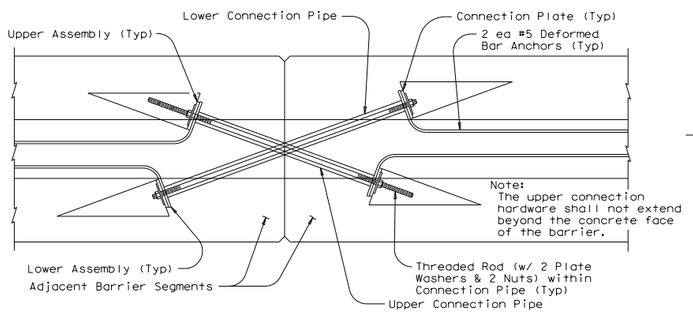


ISOMETRIC OF
TYPICAL WELDED ASSEMBLY

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

General Notes

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a ¾" chamfer or a tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items.
9. All steel assemblies shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."



TYPE X JOINT INSTALLATION DETAIL

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

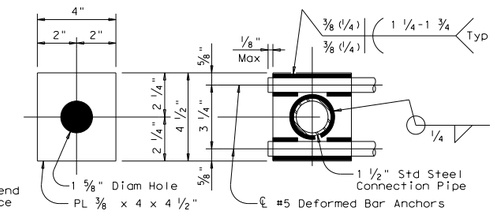
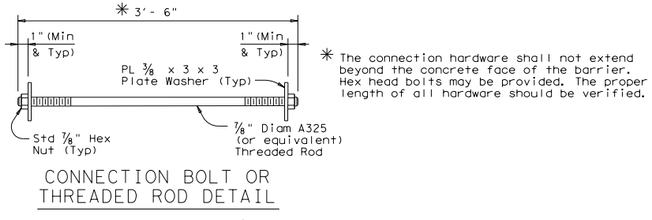


PLATE DIMENSIONS WELDING DETAILS

CONNECTION PLATE DETAILS

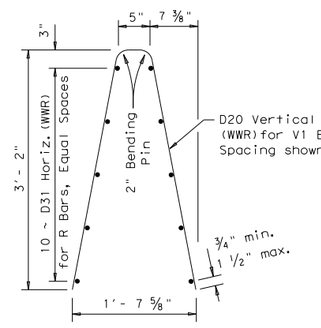
One (1) Plate required per assembly.
Four (4) required per Joint. All steel fittings for joint Type X shall be galvanized after fabrication in accordance with Item 445.



CONNECTION BOLT OR
THREADED ROD DETAIL

Two (2) Threaded Rods (Or Equivalent Hex Hd. Bolts)
(w/ Two (2) PL ⅜ x 3 x 3
Plate Washers & Two (2) Std Hex Nuts)
required per Joint.

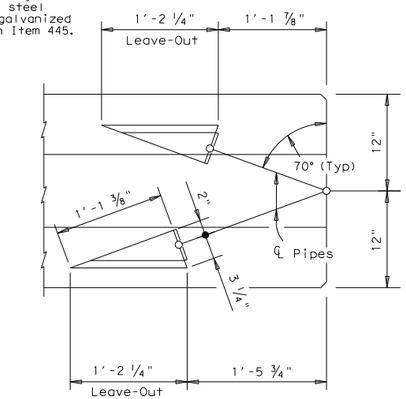
Weight of one precast 30 ft.
(SSCB) segment = Approx. 10.5 Tons
or 717 lbs per ft.



Welded Wire Reinforcement
(WWR) Option for Bars R and V1

(WWR) General Notes

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



BARRIER PLAN AT JOINT

SHEET 1 OF 2

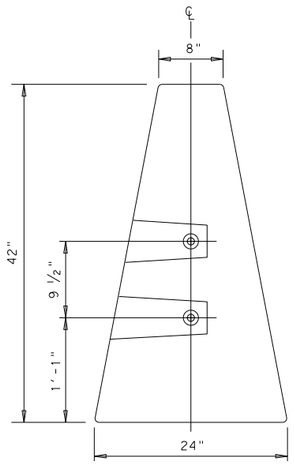
Texas Department of Transportation — Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

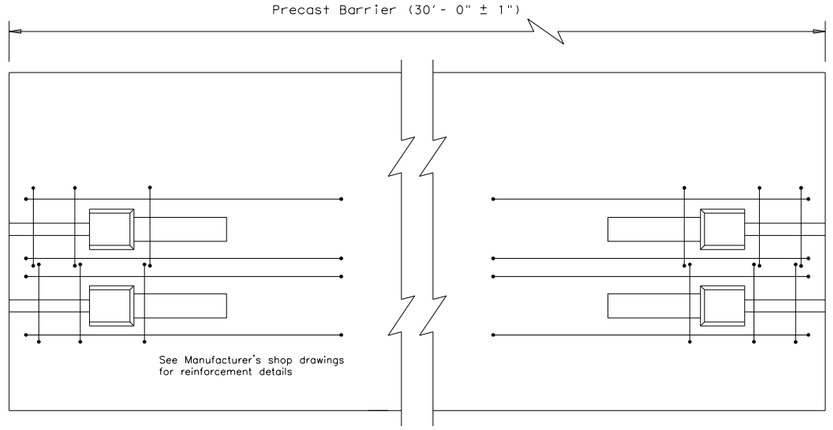
PRECAST BARRIER (TYPE 1)

SSCB(2)-10

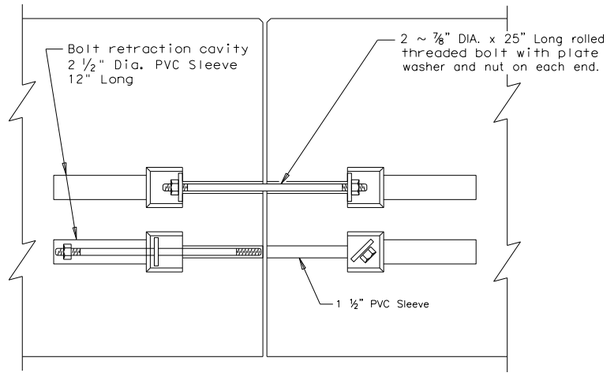
FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: BD	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		52



END VIEW
"QUICK-BOLT" POCKET LOCATIONS

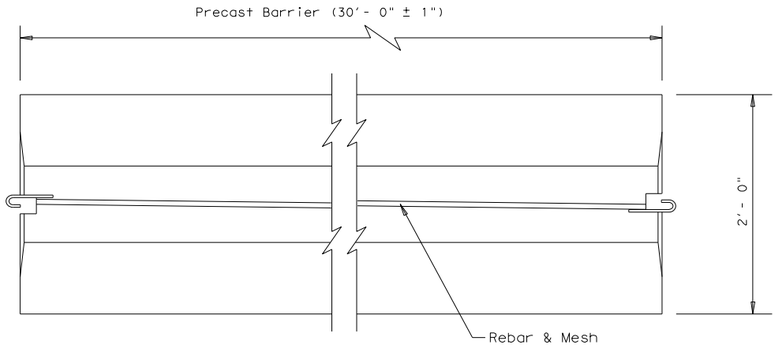


ELEVATION VIEW
"QUICK-BOLT" (SSCB)
See Manufacturer's shop drawing for additional details

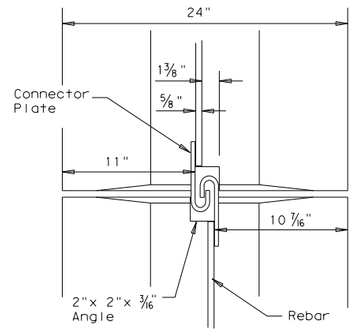


ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

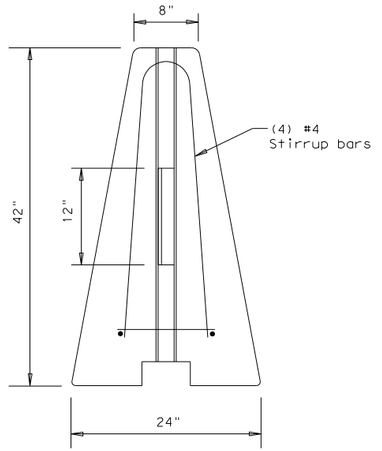
Joint Connection (Type Q)



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



VIEW FROM ABOVE
J-J HOOK CONNECTION



END VIEW

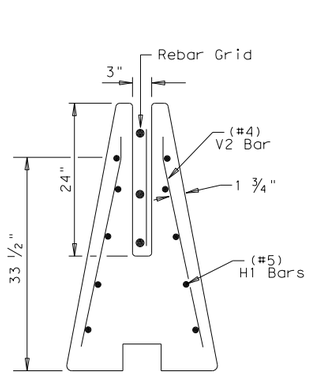
Proprietary Joint Connections (SSCB)

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

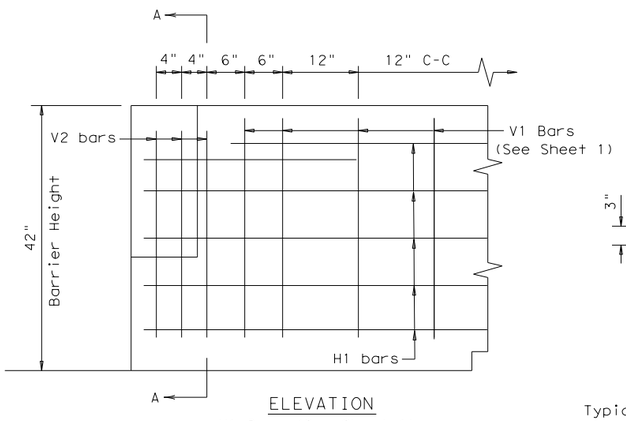
J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

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

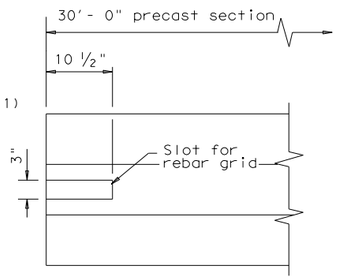
Joint Connection (Type R)



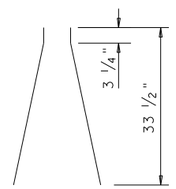
SECTION A-A
Showing (Type R) Rebar Grid



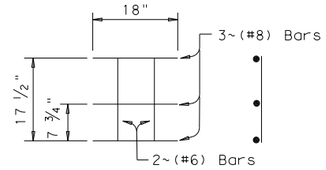
ELEVATION
V1 Bars (See Sheet 1)



TOP VIEW
JOINT CONNECTION
Typical at both ends of barrier segment



(#4) V2 BARS
6 ~ two piece bars per barrier segment



WELDED REBAR GRID

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

SINGLE SLOPE CONCRETE BARRIER

PRECAST BARRIER (TYPE 1)

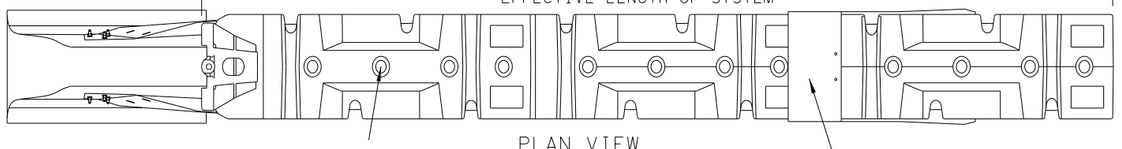
SSCB(2)-10

FILE: sscb210.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		53

DATE: 10/14/2022
FILE: P:\116735\04\Design\Civil\Standards\TCP\sscb210.dgn

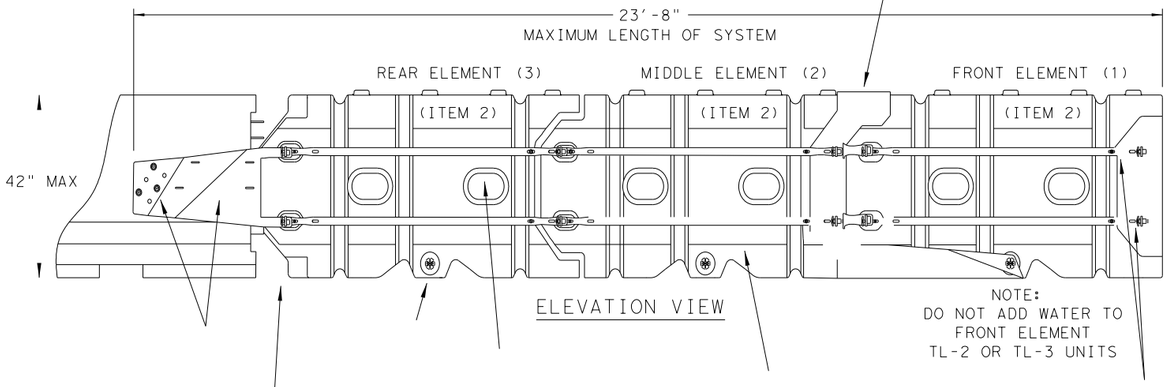
DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\TCP\absorbm19.dgn

SYSTEM SHOWN - ABSORB-M TL-3



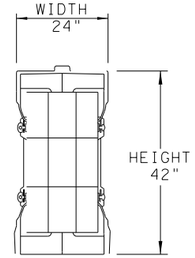
PLAN VIEW

TRAFFIC FLOW

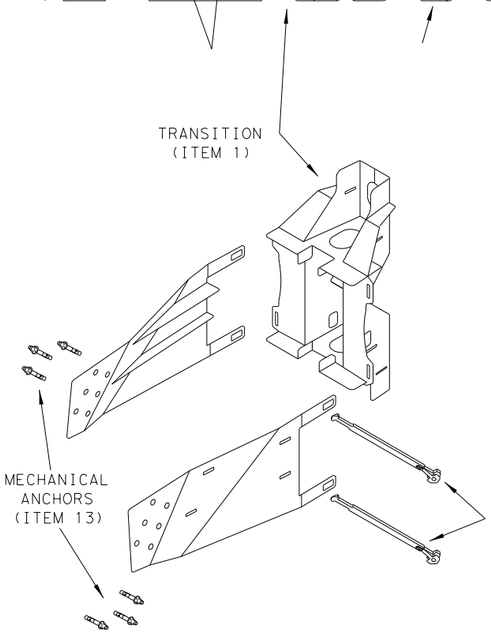


ELEVATION VIEW

TRAFFIC FLOW



SECTION A-A



TEST LEVEL	NUMBER OF ELEMENTS	EFFECTIVE LENGTH	MAXIMUM LENGTH
TL-2	2	14'- 7 3/4"	17'- 4"
TL-3	3	20'- 11 3/4"	23'- 8"

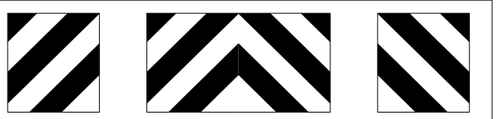
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING THE INSTALLATION AND TECHNICAL GUIDANCE, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800. 180 RIVER ROAD, RIO VISTA, CA 94571
2. THE ABSORB-M SYSTEM IS ONLY APPROVED FOR USE IN (TEMPORARY WORK ZONE) LOCATIONS.
3. THE ABSORB-M IS A WATER FILLED NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO A FOUNDATION AND CAN BE INSTALLED ON TOP OF CONCRETE, ASPHALT, OR ANY SURFACE CAPABLE OF BEARING THE WEIGHT OF THE SYSTEM.
4. MAXIMUM PERMISSIBLE CROSS-SLOPE IS 8%.
5. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
6. THE ABSORB-M SHOULD BE LOCATED APPROXIMATELY PARALLEL WITH THE BARRIER.
7. THE USE OF THE ABSORB-M IS RESTRICTED TO A BARRIER HEIGHT OF UP TO 42 INCHES.
8. DO NOT ADD WATER TO FRONT ELEMENT (TL-2 OR TL-3 UNIT).

BILL OF MATERIALS (BOM) ABSORB-M TL-3 & TL-2 SYSTEMS			QTY	QTY
ITEM #	PART NUMBER	PART DESCRIPTION	TL-2 SYSTEM	TL-3 SYSTEM
1	BSI-1809036-00	TRANSITION-(GALV)	1	1
* 2	BSI-1808002-00	PRE-ASSEMBLED ABSORBING (ELEMENTS)	2	3
* 3	BSI-4004598	FILL CAPS	8	12
* 4	BSI-4004599	DRAIN PLUGS	2	3
* 5	BSI-1809053-00	TENSION STRAP-(GALV)	8	12
* 6	BSI-2001998	C-SCR FH 3/8-16 X 1 1/2 GR5 PLT	8	12
* 7	BSI-2001999	C-SCR FH 3/8-16 X 1 GR5 PLT	8	12
8	BSI-1809035-00	MIDNOSE-(GALV)	1	1
9	BSI-1808014-00	NOSE PLATE	1	1
10	BSI-1809037-00	TRANSITION STRAP (LEFT-HAND)-(GALV)	1	1
11	BSI-1809038-00	TRANSITION STRAP (RIGHT-HAND)-(GALV)	1	1
12	BSI-1808005-00	PIN ASSEMBLY	8	10
13	BSI-2002001	ANC MECH 5/8-11X5 (GALV)	6	6
14	ABSORB-M	INSTALLATION AND INSTRUCTIONS MANUAL	1	1

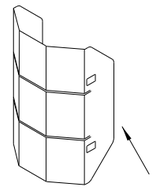
* COMPONENTS PRE-ASSEMBLED WITH ELEMENT ASSEMBLY

DELINEATION DECAL PLACEMENT GUIDE



TRAFFIC FLOW LEFT-SIDE BARRIER | TRAFFIC FLOW BOTH-SIDE BARRIER | TRAFFIC FLOW RIGHT-SIDE BARRIER

** APPLY DECAL



NOSE PLATE

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

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

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE ABSORB-M, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

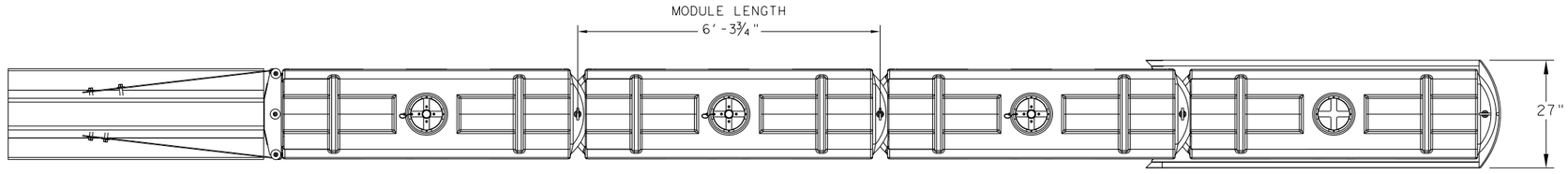
SACRIFICIAL

Texas Department of Transportation — Design Division Standard

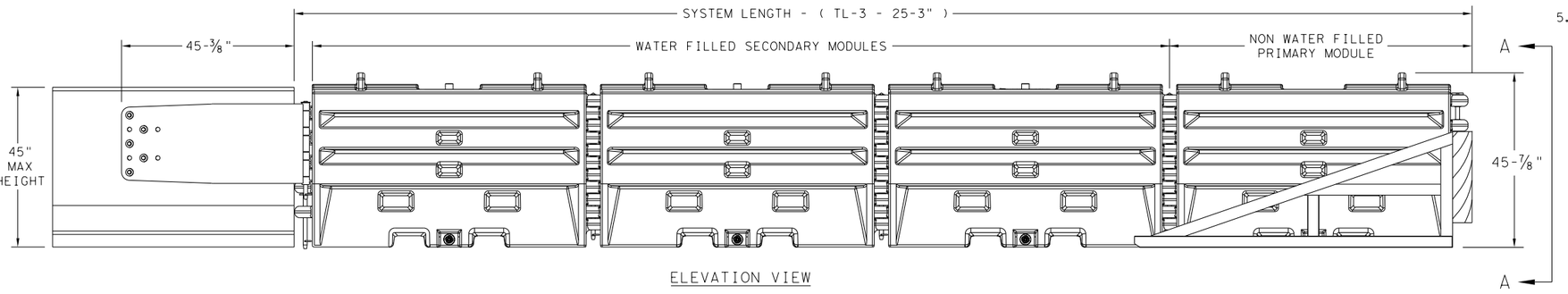
LINDSAY TRANSPORTATION SOLUTIONS
CRASH CUSHION
(MASH TL-3 & TL-2)
TEMPORARY - WORK ZONE
ABSORB(M)-19

FILE: absorbm19	DN: TxDOT	CK: KM	DW: VP	CK:
© TxDOT: JULY 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		54

DATE: 10/14/2022
FILE: P:\116135\04\Design\Civil\Standards\TCP\sled19.dgn



PLAN VIEW



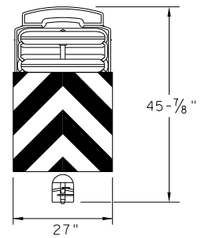
ELEVATION VIEW

GENERAL NOTES

1. REFER TO THE INSTALLATION MANUAL FOR SPECIFIC SYSTEM ASSEMBLY AND MODULE ORIENTATION. FOR ADDITIONAL INFORMATION, CONTACT TRAFFIX, INC. AT (949) 361-5663.
2. THE SLED SYSTEM IS A MASH APPROVED TEST LEVEL 3 (TL-3) CRASH CUSHION APPROVED FOR USE IN TEMPORARY WORK ZONES. THE SLED SYSTEM IS A NON-REDIRECTIVE, GATING CRASH CUSHION THAT DOES NOT NEED TO BE ATTACHED TO THE GROUND AND CAN BE INSTALLED ON CONCRETE, ASPHALT, GRAVEL OR COMPACTED SOIL.
3. MAXIMUM PERMISSIBLE CROSS SLOPE IS 8° (DEGREES) (14%).
4. THE INSTALLATION AREA SHOULD BE FREE FROM CURBS, ELEVATED OBJECTS, OR DEPRESSIONS.
5. THE SLED SYSTEM CAN BE ATTACHED TO:

- CONCRETE BARRIER, TEMPORARY OR PERMANENT, 45" MAXIMUM HEIGHT
- STEEL BARRIER
- PLASTIC BARRIER
- CONCRETE BRIDGE ABUTMENTS
- W-BEAM GUARD RAIL
- THRIE BEAM GUARD RAIL

TEST LEVEL	NUMBER OF SECONDARY MODULES	SYSTEM LENGTH
TL-3	3	25′ 3"

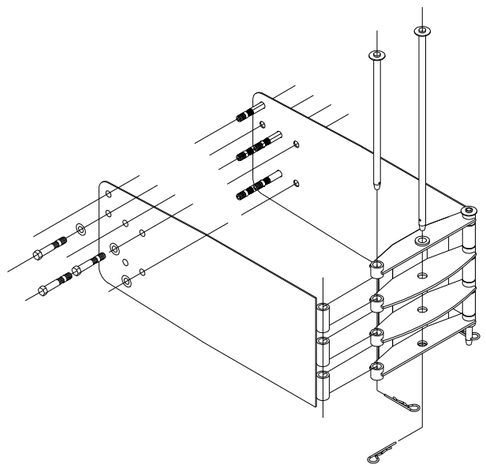


SECTION A-A

NOSE SHEETING PANEL DELINEATION

NOTE:
SEE INSTALLATION MANUAL FOR CUSTOMIZED DELINEATION NOSE SHEETING FOR DECAL PLACEMENT.

BILL OF MATERIAL		
PART NUMBER	DESCRIPTION	QTY: TL-3
45131	TRANSITION FRAME, GALVANIZED	1
45150	TRANSITION PANEL, GALVANIZED	2
45147-CP	TRANSITION SHORT DROP PIN W/ KEEPER PIN, GALVANIZED	2
45148-CP	TRANSITION LONG DROP PIN W/ KEEPER PIN, GALVANIZED	1
45050	ANCHOR BOLTS	9
12060	WASHER, 3/4" ID X 2" OD	9
45044-Y	SLED YELLOW WATER FILLED MODULE	3
45044-YH	SLED YELLOW "NO FILL" MODULE	1
45044-S	CIS (CONTAINMENT IMPACT SLED), GALVANIZED	1
45043-CP	T-PIN W/ KEEPER PIN	4
18009-B-I	FILL CAP W/ "DRIVE BY" FLOAT INDICATOR	3
45033-RC-B	DRAIN PLUG	3
45032-DPT	DRAIN PLUG REMOVAL TOOL	1



SLED TRANSITION COMPONENTS FOR ATTACHMENT TO CMB

NOTE:
SEE MANUFACTURER'S INSTALLATION MANUAL FOR FURTHER DETAILS.

TRANSITION OPTIONS
SLED TRANSITION TO CONCRETE TRAFFIC BARRIER (TEMPORARY OR PERMANENT)
SLED TRANSITION TO STEEL TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO PLASTIC TRAFFIC BARRIER (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO W-BEAM OR THRIE BEAM GUARD RAIL (CONTACT MFGR FOR PROPER TRANSITION)
SLED TRANSITION TO CONCRETE BRIDGE ABUTMENT

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SLED, IT IS NOT INTENDED TO REPLACE THE INSTALLATION INSTRUCTIONS MANUAL.

SACRIFICIAL

Texas Department of Transportation

Design Division Standard

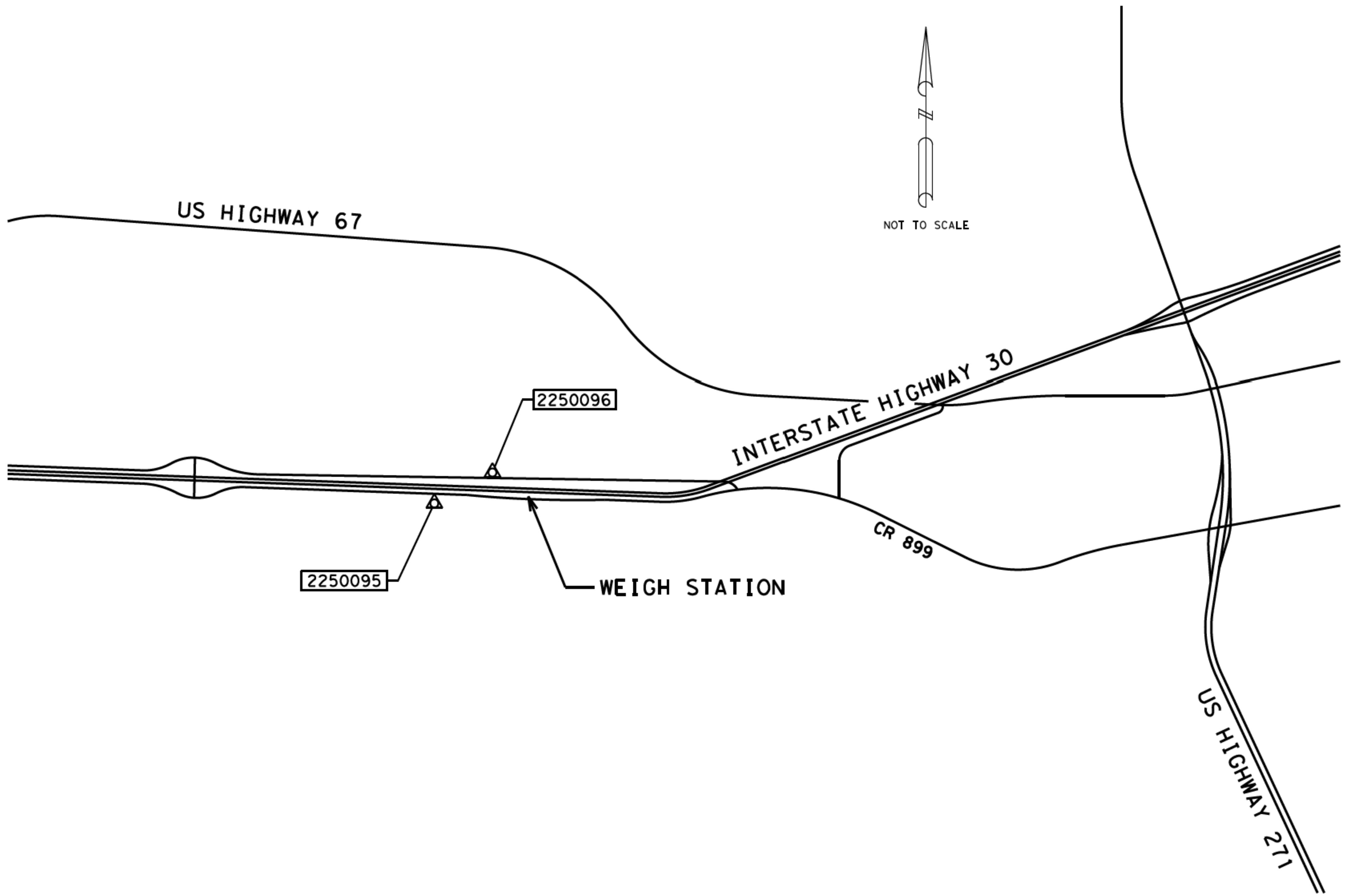
SLED
CRASH CUSHION
TL-3 MASH COMPLIANT
(TEMPORARY, WORK ZONE)
SLED-19

FILE: sled19.dgn	DN: TxDOT	CK: KM	DW: VP	CK:
©TxDOT: DECEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		55

SURVEY CONTROL POINTS								
CONTROL POINT	SURFACE COORDINATES		GRID COORDINATES		LATITUDE	LONGITUDE	ELEVATION	DESCRIPTION
	NORTHING	EASTING	NORTHING	EASTING				
2250095	7,122,502.1695	3,022,801.2115	7,121,647.5718	3,022,438.5189	33°09'30.14953"	95°03'19.19072"	437.347	FOUND 3-1/4" TxDOT ALUMINUM DISK ON A 5/8" IRON ROD IN CONC FLUSH W/ GROUND
2250096	7,122,861.7611	3,024,112.7280	7,122,007.1202	3,023,749.8780	33°09'33.27966"	95°03'03.63329"	408.637	FOUND 3-1/4" TxDOT ALUMINUM DISK ON A 5/8" IRON ROD IN CONC FLUSH W/ GROUND

NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83) 2011 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00012
2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (MOUNT PLEASANT), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS
3. UNIT OF MEASURE IS U.S. SURVEY FOOT
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (MOUNT PLEASANT)
5. FIELD SURVEYS WERE PERFORMED DURING JUNE 2017



I HERBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY MULTIPLE GPS OBSERVATIONS ACCESSING THE STATE VIRTUAL REFERENCE SYSTEM IN JULY 2017, AND IS CORRECTLY SHOWN HEREON.

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding, or permit purposes.
Engineer CHRISTOPHER R. FREEMAN
r.p.l.s. No. 5701 Date 7/20/2022

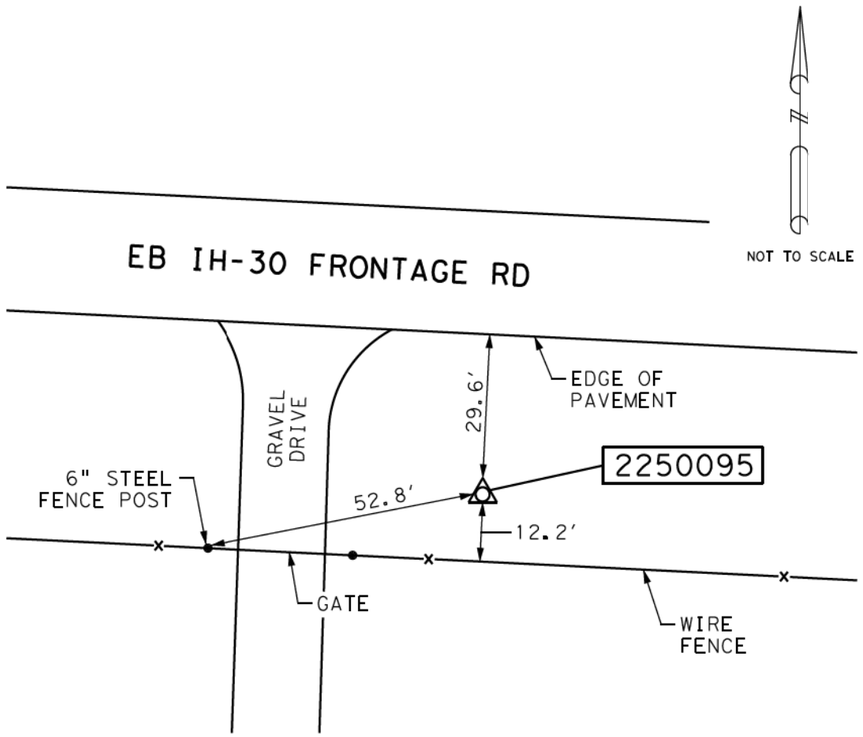
3320 BELT LINE ROAD
FARMERS BRANCH, TX 75234
TBPELS FIRM NO. F-782, 10140700

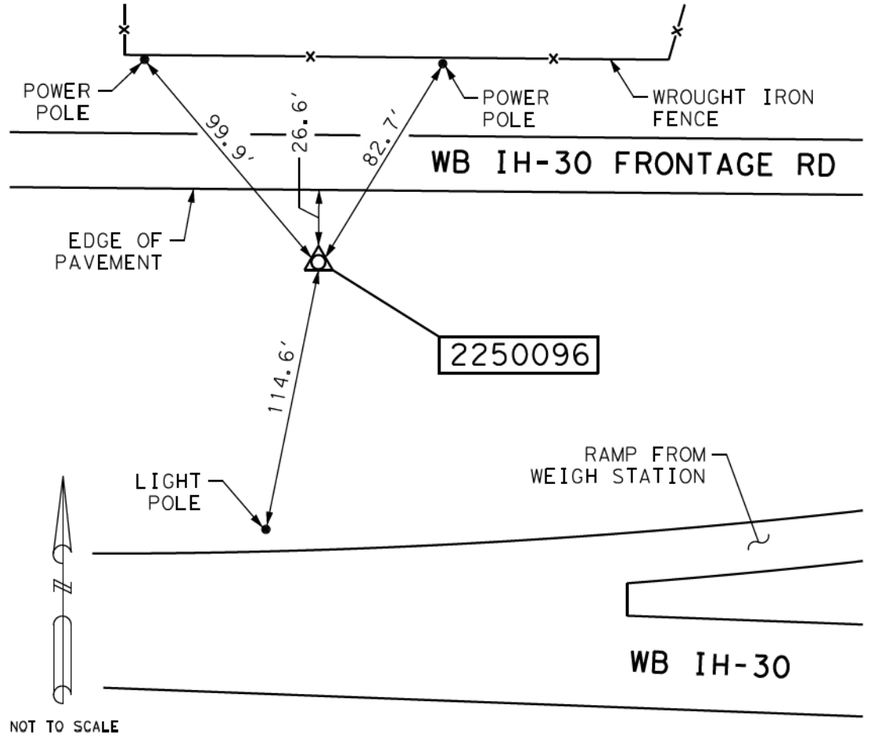
Texas Department of Transportation

PUBLIC SAFETY COMMERICAL VEHICLE INSPECTION FACILITY SURVEY CONTROL INDEX

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6			IH 30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	ATLANTA	TITUS	56
CONTROL	SECTION	JOB	
0610	03	095	

Plotted on: 10/14/2022
Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504surveycontrol.dgn
$TIME$ 7/20/2022 O:_(113) Pape Dawson Eng\19.113.09 Dept. of Public Safety Commercial Vehicle Inspection Facility in Titus Co\Control\PSC VEHICLE INSPECTION FACILITY INDEX SHEET.dgn





NOTES:

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS COORDINATE SYSTEM OF 1983 TEXAS NORTH CENTRAL ZONE (4202), NORTH AMERICAN DATUM OF 1983 (NAD83) 2011 ADJUSTMENT, EPOCH 2010 (GEOID 12A). ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY A COMBINED ADJUSTMENT FACTOR OF 1.00012
2. ALL HORIZONTAL CONTROL OF THIS PROJECT WAS ESTABLISHED BY TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (MOUNT PLEASANT), BASED ON THREE AVERAGED 180 EPOCH OBSERVATIONS
3. UNIT OF MEASURE IS U.S. SURVEY FOOT
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM NETWORK (MOUNT PLEASANT)
5. FIELD SURVEYS WERE PERFORMED DURING JUNE 2017

I HERBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY MULTIPLE GPS OBSERVATIONS ACCESSING THE STATE VIRTUAL REFERENCE SYSTEM IN JULY 2017, AND IS CORRECTLY SHOWN HEREON.

PRELIMINARY
FOR REVIEW ONLY
Not for construction, bidding, or permit purposes.

LTRA
Engineer CHRISTOPHER R. FREEMAN
P.E. No. 5701 Date 7/20/2022

CONTROL POINT: 2250095

APPROXIMATE LOCATION:

FROM THE WEIGH STATION LOCATED ON THE EASTBOUND SIDE OF IH-30 NEAR MILE MARKER 157, GO 3 TENTHS OF A MILE WEST ALONG THE FRONTAGE ROAD LOCATED ON THE SOUTH SIDE OF IH-30 TO A MONUMENT

MONUMENT:

SET A TxDOT 3-1/4" ALUMINUM DISK ON A 5/8" IRON ROD SET IN CONCRETE FLUSH WITH THE GROUND

SURFACE COORDINATES, US SURVEY FEET TEXAS STATE PLANE COORDINATE SYSTEM NAD 83 (2011), NORTH CENTRAL ZONE 4202 DERIVED FROM THE TXDOT VRS NETWORK (MOUNT PLEASANT)

COMBINED SURFACE ADJUSTMENT FACTOR: 1.00012

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,122,502.1695	NORTHING:	7,121,647.5718
EASTING:	3,022,801.2115	EASTING:	3,022,438.5189
ELEVATION=	437.347	ELEVATION=	437.347

LATITUDE: 33°09'30.14953"
LONGITUDE: 95°03'19.19072"

ELEVATION IS NAVD 88, BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK (MOUNT PLEASANT)

CONTROL POINT: 2250096

APPROXIMATE LOCATION:

FROM THE WEIGH STATION LOCATED ON THE WESTBOUND SIDE OF IH-30 NEAR MILE MARKER 157, GO 5 TENTHS OF A MILE WEST ALONG THE FRONTAGE ROAD LOCATED ON THE NORTH SIDE OF IH-30 TO A MONUMENT

MONUMENT:

SET A TxDOT 3-1/4" ALUMINUM DISK ON A 5/8" IRON ROD SET IN CONCRETE FLUSH WITH THE GROUND

SURFACE COORDINATES, US SURVEY FEET TEXAS STATE PLANE COORDINATE SYSTEM NAD 83 (2011), NORTH CENTRAL ZONE 4202 DERIVED FROM THE TXDOT VRS NETWORK (MOUNT PLEASANT)

COMBINED SURFACE ADJUSTMENT FACTOR: 1.00012

SURFACE COORDINATES:		GRID COORDINATES:	
NORTHING:	7,122,861.7611	NORTHING:	7,122,007.1202
EASTING:	3,024,112.7280	EASTING:	3,023,749.8780
ELEVATION=	408.637	ELEVATION=	408.637

LATITUDE: 33°09'33.27966"
LONGITUDE: 95°03'03.63329"

ELEVATION IS NAVD 88, BASED ON THREE 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK (MOUNT PLEASANT)

LTRA
3320 BELT LINE ROAD
FARMERS BRANCH, TX 75234
TBPELS FIRM NO. F-782, 10140700

PUBLIC SAFTEY COMMERICAL VEHICLE INSPECTION FACILITY SURVEY CONTROL DATA

FED RD DIV NO.	FEDERAL AID PROJECT		HIGHWAY
6			IH 30
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS	ATLANTA	TITUS	57
CONTROL	SECTION	JOB	
0610	03	095	

$TIME$
7/20/2022
08_(113) Pope Dawson Eng\19.113.09 Dept. of Public Safety Commercial Vehicle Inspection Facility In Titus Co\Control\PSC VEHICLE INSPECTION FACILITY DATA SHEET.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504HAD01.dgn

℄ WB CMV ALIGNME

agree, degree symbol shows up now.

Beginning chain WB_CMV description
Feature: Geom_Centerline

Point 57 N 7,122,738.93 E 3,022,256.10 Sta 6+90.67

Course from 57 to 58 S 89° 12′ 45.21" E Dist 257.47

Point 58 N 7,122,735.39 E 3,022,513.55 Sta 9+48.14

Course from 58 to 59 N 88° 06′ 56.08" E Dist 300.33

Point 59 N 7,122,745.26 E 3,022,813.71 Sta 12+48.47

Course from 59 to PC WB_CMV_7 S 89° 12′ 45.21" E Dist 749.86

Curve Data

Curve WB_CMV_7					
P.I. Station	22+90.88	N	7,122,730.94	E	3,023,856.03
Delta =	5° 52′ 34.68" (LT)				
Degree =	1° 00′ 18.68"				
Tangent =	292.55				
Length =	584.60				
Radius =	5,700.00				
External =	7.50				
Long Chord =	584.34				
Mid. Ord. =	7.49				
P.C. Station	19+98.33	N	7,122,734.96	E	3,023,563.50
P.T. Station	25+82.92	N	7,122,756.89	E	3,024,147.43
C.C.		N	7,128,434.42	E	3,023,641.84
Back = S	89° 12′ 45.21" E				
Ahead = N	84° 54′ 40.11" E				
Chord Bear = N	87° 50′ 57.45" E				

Course from PT WB_CMV_7 to PC WB_CMV_10 N 84° 54′ 40.11" E Dist 127.45

Curve Data

Curve WB_CMV_10					
P.I. Station	28+79.75	N	7,122,783.22	E	3,024,443.09
Delta =	5° 52′ 34.89" (RT)				
Degree =	1° 44′ 10.45"				
Tangent =	169.38				
Length =	338.45				
Radius =	3,300.00				
External =	4.34				
Long Chord =	338.31				
Mid. Ord. =	4.34				
P.C. Station	27+10.37	N	7,122,768.19	E	3,024,274.38
P.T. Station	30+48.83	N	7,122,780.89	E	3,024,612.45
C.C.		N	7,119,481.20	E	3,024,567.09
Back = N	84° 54′ 40.11" E				
Ahead = S	89° 12′ 45.00" E				
Chord Bear = N	87° 50′ 57.56" E				

Course from PT WB_CMV_10 to PC WB_CMV_13 S 89° 12′ 45.00" E Dist 719.68

Curve Data

Curve WB_CMV_13					
P.I. Station	38+00.00	N	7,122,770.56	E	3,025,363.55
Delta =	1° 08′ 44.75" (RT)				
Degree =	1° 49′ 08.09"				
Tangent =	31.50				
Length =	62.99				
Radius =	3,150.00				
External =	0.16				
Long Chord =	62.99				
Mid. Ord. =	0.16				
P.C. Station	37+68.50	N	7,122,771.00	E	3,025,332.05
P.T. Station	38+31.49	N	7,122,769.50	E	3,025,395.03
C.C.		N	7,119,621.29	E	3,025,288.76
Back = S	89° 12′ 45.00" E				
Ahead = S	88° 04′ 00.25" E				
Chord Bear = S	88° 38′ 22.63" E				

Course from PT WB_CMV_13 to PC WB_CMV_16 S 88° 04′ 00.25" E Dist 37.03

Curve Data

Curve WB_CMV_16					
P.I. Station	39+00.02	N	7,122,767.19	E	3,025,463.51
Delta =	1? 08′ 44.75" (LT)				
Degree =	1? 49′ 08.09"				
Tangent =	31.50				
Length =	62.99				
Radius =	3,150.00				
External =	0.16				
Long Chord =	62.99				
Mid. Ord. =	0.16				
P.C. Station	38+68.52	N	7,122,768.25	E	3,025,432.03
P.T. Station	39+31.51	N	7,122,766.76	E	3,025,495.01
C.C.		N	7,125,916.46	E	3,025,538.30
Back = S	88° 04′ 00.25" E				
Ahead = S	89° 12′ 45.00" E				
Chord Bear = S	88° 38′ 22.63" E				

Course from PT WB_CMV_16 to PC WB_CMV_19 S 89° 12′ 45.00" E Dist 904.75

Curve Data

Curve WB_CMV_19					
P.I. Station	48+46.11	N	7,122,754.19	E	3,026,409.51
Delta =	1° 07′ 38.98" (RT)				
Degree =	5° 43′ 46.48"				
Tangent =	9.84				
Length =	19.68				
Radius =	1,000.00				
External =	0.05				
Long Chord =	19.68				
Mid. Ord. =	0.05				
P.C. Station	48+36.27	N	7,122,754.32	E	3,026,399.67
P.T. Station	48+55.94	N	7,122,753.86	E	3,026,419.35
C.C.		N	7,121,754.42	E	3,026,385.93
Back = S	89° 12′ 45.00" E				
Ahead = S	88° 05′ 06.02" E				
Chord Bear = S	88° 38′ 55.51" E				

Course from PT WB_CMV_19 to PC WB_CMV_22 S 88° 05′ 06.02" E Dist 81.96

Curve Data

Curve WB_CMV_22					
P.I. Station	49+47.75	N	7,122,750.79	E	3,026,511.10
Delta =	1° 07′ 38.98" (LT)				
Degree =	5° 43′ 46.48"				
Tangent =	9.84				
Length =	19.68				
Radius =	1,000.00				
External =	0.05				
Long Chord =	19.68				
Mid. Ord. =	0.05				
P.C. Station	49+37.91	N	7,122,751.12	E	3,026,501.26
P.T. Station	49+57.58	N	7,122,750.65	E	3,026,520.93
C.C.		N	7,123,750.56	E	3,026,534.68
Back = S	88° 05′ 06.02" E				
Ahead = S	89° 12′ 45.00" E				
Chord Bear = S	88° 38′ 55.51" E				

Course from PT WB_CMV_22 to 60 S 89° 12′ 45.00" E Dist 37.51

Point 60 N 7,122,750.14 E 3,026,558.44 Sta 49+95.09

Course from 60 to PC WB_CMV_27 S 89° 12′ 45.00" E Dist 96.02

Curve Data

Curve WB_CMV_27					
P.I. Station	51+11.10	N	7,122,748.55	E	3,026,674.43
Delta =	2° 17′ 26.20" (LT)				
Degree =	5° 43′ 46.48"				
Tangent =	19.99				
Length =	39.98				
Radius =	1,000.00				
External =	0.20				
Long Chord =	39.98				
Mid. Ord. =	0.20				
P.C. Station	50+91.11	N	7,122,748.82	E	3,026,654.44
P.T. Station	51+31.09	N	7,122,749.07	E	3,026,694.42
C.C.		N	7,123,748.73	E	3,026,668.19
Back = S	89° 12′ 45.00" E				
Ahead = N	88° 29′ 48.80" E				
Chord Bear = N	89° 38′ 31.90" E				

Course from PT WB_CMV_27 to PC WB_CMV_30 N 88° 29′ 48.80" E Dist 60.10

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	58

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504HAD02.dgn

℄ WB CMV ALIGNMENT (CONT.)

Curve Data

Curve WB_CMV_30

P.I. Station	52+11.17	N	7,122,751.17	E	3,026,774.48
Delta =	2° 17′ 26.20" (RT)				
Degree =	5° 43′ 46.48"				
Tangent =	19.99				
Length =	39.98				
Radius =	1,000.00				
External =	0.20				
Long Chord =	39.98				
Mid. Ord. =	0.20				
P.C. Station	51+91.18	N	7,122,750.65	E	3,026,754.50
P.T. Station	52+31.16	N	7,122,750.90	E	3,026,794.47
C.C.		N	7,121,750.99	E	3,026,780.73
Back = N	88° 29′ 48.80" E				
Ahead = S	89° 12′ 45.00" E				
Chord Bear = N	89° 38′ 31.90" E				

Course from PT WB_CMV_30 to 61 S 89° 12′ 45.00" E Dist 293.86

Point 61 N 7,122,746.86 E 3,027,088.31 Sta 55+25.03

Course from 61 to PC WB_CMV_35 S 89° 12′ 45.00" E Dist 337.54

Curve Data

Curve WB_CMV_35

P.I. Station	59+48.13	N	7,122,741.04	E	3,027,511.38
Delta =	3° 06′ 43.23" (RT)				
Degree =	1° 49′ 08.09"				
Tangent =	85.57				
Length =	171.09				
Radius =	3,150.00				
External =	1.16				
Long Chord =	171.07				
Mid. Ord. =	1.16				
P.C. Station	58+62.57	N	7,122,742.22	E	3,027,425.82
P.T. Station	60+33.66	N	7,122,735.22	E	3,027,596.74
C.C.		N	7,119,592.51	E	3,027,382.52
Back = S	89° 12′ 45.00" E				
Ahead = S	86° 06′ 01.76" E				
Chord Bear = S	87° 39′ 23.38" E				

Course from PT WB_CMV_35 to PC WB_CMV_38 S 86° 06′ 01.76" E Dist 484.59

Curve Data

Curve WB_CMV_38

P.I. Station	66+38.78	N	7,122,694.07	E	3,028,200.47
Delta =	13° 05′ 49.23" (LT)				
Degree =	5° 27′ 24.27"				
Tangent =	120.53				
Length =	240.02				
Radius =	1,050.00				
External =	6.90				
Long Chord =	239.49				
Mid. Ord. =	6.85				
P.C. Station	65+18.25	N	7,122,702.27	E	3,028,080.22
P.T. Station	67+58.27	N	7,122,713.34	E	3,028,319.45
C.C.		N	7,123,749.84	E	3,028,151.62
Back = S	86° 06′ 01.76" E				
Ahead = N	80° 48′ 09.00" E				
Chord Bear = N	87° 21′ 03.62" E				

Curve Data

Curve WB_CMV_39

P.I. Station	69+20.14	N	7,122,739.21	E	3,028,479.25
Delta =	6° 39′ 02.56" (LT)				
Degree =	2° 03′ 23.62"				
Tangent =	161.88				
Length =	323.39				
Radius =	2,786.00				
External =	4.70				
Long Chord =	323.21				
Mid. Ord. =	4.69				
P.C. Station	67+58.27	N	7,122,713.34	E	3,028,319.45
P.T. Station	70+81.66	N	7,122,783.42	E	3,028,634.97
C.C.		N	7,125,463.52	E	3,027,874.14
Back = N	80° 48′ 09.00" E				
Ahead = N	74° 09′ 06.45" E				
Chord Bear = N	77° 28′ 37.72" E				

Curve Data

Curve WB_CMV_40

P.I. Station	71+16.54	N	7,122,792.94	E	3,028,668.53
Delta =	1° 10′ 50.40" (LT)				
Degree =	1° 41′ 31.70"				
Tangent =	34.89				
Length =	69.77				
Radius =	3,386.00				
External =	0.18				
Long Chord =	69.77				
Mid. Ord. =	0.18				
P.C. Station	70+81.66	N	7,122,783.42	E	3,028,634.97
P.T. Station	71+51.43	N	7,122,803.16	E	3,028,701.89
C.C.		N	7,126,040.71	E	3,027,710.29
Back = N	74° 09′ 06.45" E				
Ahead = N	72° 58′ 16.05" E				
Chord Bear = N	73° 33′ 41.25" E				

Curve Data

Curve WB_CMV_41

P.I. Station	72+89.38	N	7,122,837.94	E	3,028,835.39
Delta =	4° 38′ 48.64" (LT)				
Degree =	1° 41′ 06.61"				
Tangent =	137.95				
Length =	275.75				
Radius =	3,400.00				
External =	2.80				
Long Chord =	275.67				
Mid. Ord. =	2.80				
P.C. Station	71+51.43	N	7,122,803.16	E	3,028,701.89
P.T. Station	74+27.18	N	7,122,883.42	E	3,028,965.63
C.C.		N	7,126,093.34	E	3,027,844.74
Back = N	75° 23′ 52.95" E				
Ahead = N	70° 45′ 04.31" E				
Chord Bear = N	73° 04′ 28.63" E				

Course from PT WB_CMV_41 to 62 N 70° 45′ 04.31" E Dist 54.18

Point 62 N 7,122,901.28 E 3,029,016.78 Sta 74+81.36

Course from 62 to 63 N 68° 19′ 05.25" E Dist 251.19

Point 63 N 7,122,994.08 E 3,029,250.20 Sta 77+32.55

==========

Ending chain WB_CMV description

℄ IH 30 ALIGNMENT

Beginning chain IH30 description
Feature: Road_Centerline

==========

Point IH301 N 7,122,688.92 E 3,021,060.07 Sta 205+96.00

Course from IH301 to PC IH30_3 N 89° 45′ 01" E Dist 603.83

Curve Data

Curve IH30_3

P.I. Station	216+14.77	N	7,122,693.36	E	3,022,078.83
Delta =	1° 02′ 14" (RT)				
Degree =	0° 07′ 30"				
Tangent =	414.93				
Length =	829.84				
Radius =	45,836.62				
External =	1.88				
Long Chord =	829.83				
Mid. Ord. =	1.88				
P.C. Station	211+99.83	N	7,122,691.55	E	3,021,663.90
P.T. Station	220+29.68	N	7,122,687.66	E	3,022,493.72
C.C.		N	7,076,855.36	E	3,021,863.79
Back = N	89° 45′ 01" E				
Ahead = S	89° 12′ 45" E				
Chord Bear = S	89° 43′ 52" E				

Course from PT IH30_3 to PC IH30_6 S 89° 12′ 45" E Dist 5,327.46

℄ IH 30 ALIGNMENT (CONT.)

Curve Data

Curve IH30_6

P.I. Station	279+47.99	N	7,122,606.32	E	3,028,411.47
Delta =	22° 37′ 19" (LT)				
Degree =	1° 56′ 23"				
Tangent =	590.86				
Length =	1,166.32				
Radius =	2,954.00				
External =	58.51				
Long Chord =	1,158.76				
Mid. Ord. =	57.38				
P.C. Station	273+57.13	N	7,122,614.44	E	3,027,820.67
P.T. Station	285+23.45	N	7,122,826.08	E	3,028,959.94
C.C.		N	7,125,568.16	E	3,027,861.27
Back = S	89° 12′ 45" E				
Ahead = N	68° 09′ 56" E				
Chord Bear = N	79° 28′ 35" E				

Course from PT IH30_6 to IH308 N 68° 09′ 56" E Dist 1,690.26

Point IH308 N 7,123,454.73 E 3,030,528.95 Sta 302+13.72

==========

Ending chain IH30 description

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	59

Agree, widening and edge drain now start at the same station

STA 9+40? to match sheet 67 start of edge drain.

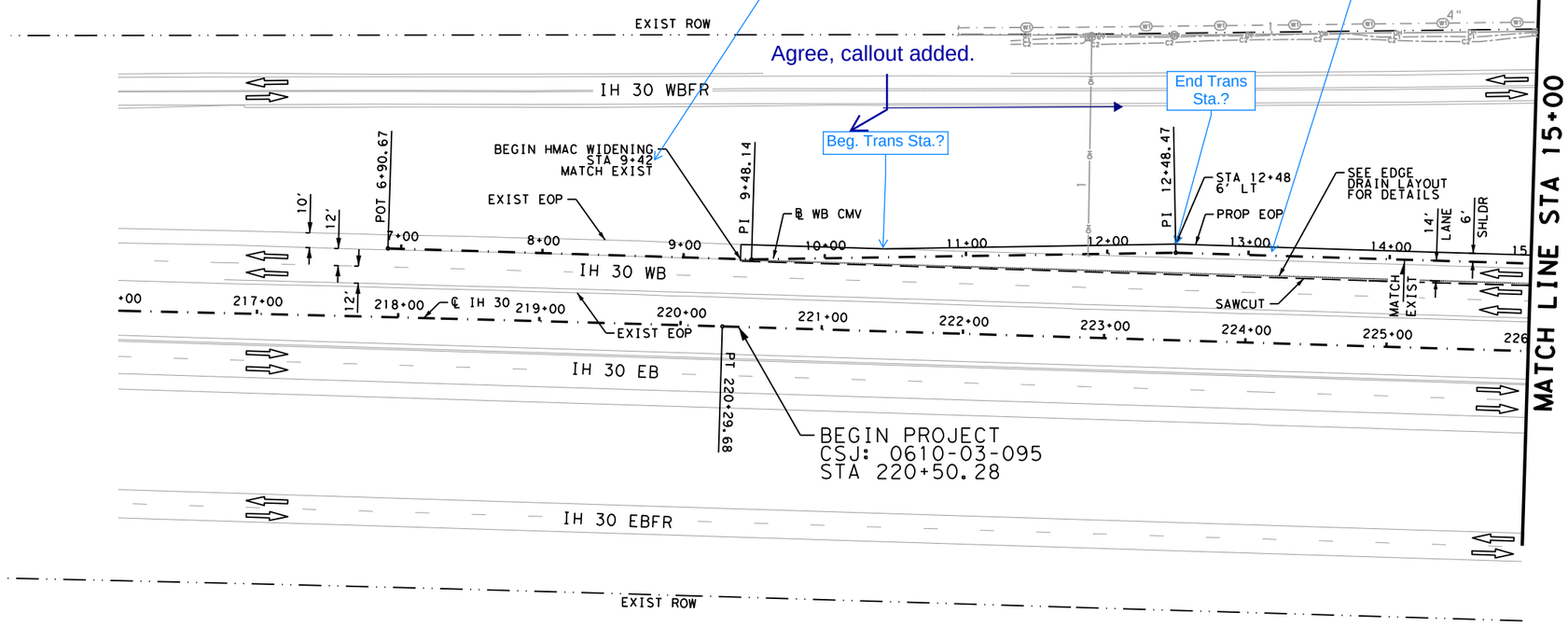
Check Acceleration Length again. Table 3-13 of the roadway design manual shows 75 mph to 40 mph needs to be 1,160'. Not sure we are meeting this Sta. 19+98.33 (40mph) - Sta. 10+56.33 (75mph)=942'

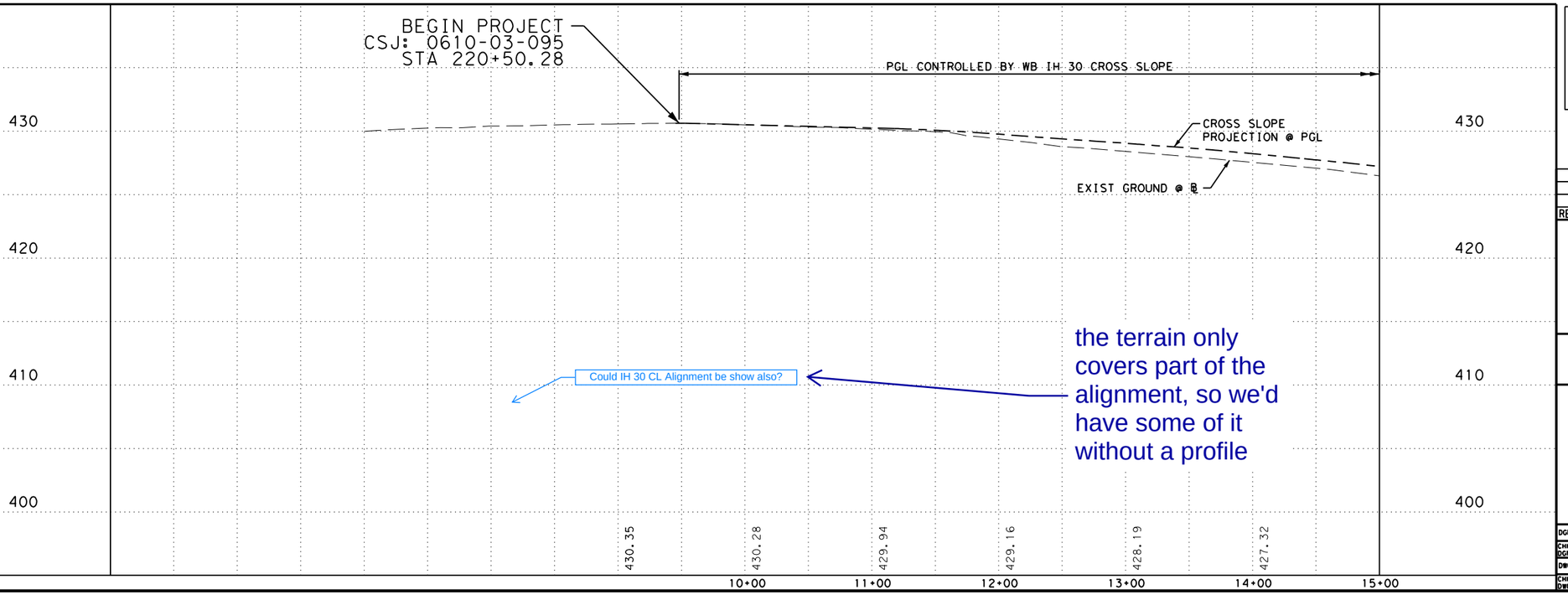
To 1mph, so would need 780'.
The nose of the gore is equat 2-ft around STA 18+60.
STA 18+60 (50 mph) - STA 9+45 (75 mph) = 915'

Agree, callout added.

Beg. Trans Sta.?

End Trans Sta.?





the terrain only covers part of the alignment, so we'd have some of it without a profile

ND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A, ~~AND~~ RIPRAP AND CONTROL DETAILS

AGR

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100
SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PLAN AND PROFILE

BEGIN PROJECT TO STA 15+00

SHEET 1 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	60

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504pp01.dgn

Plotted on: 10/14/2022

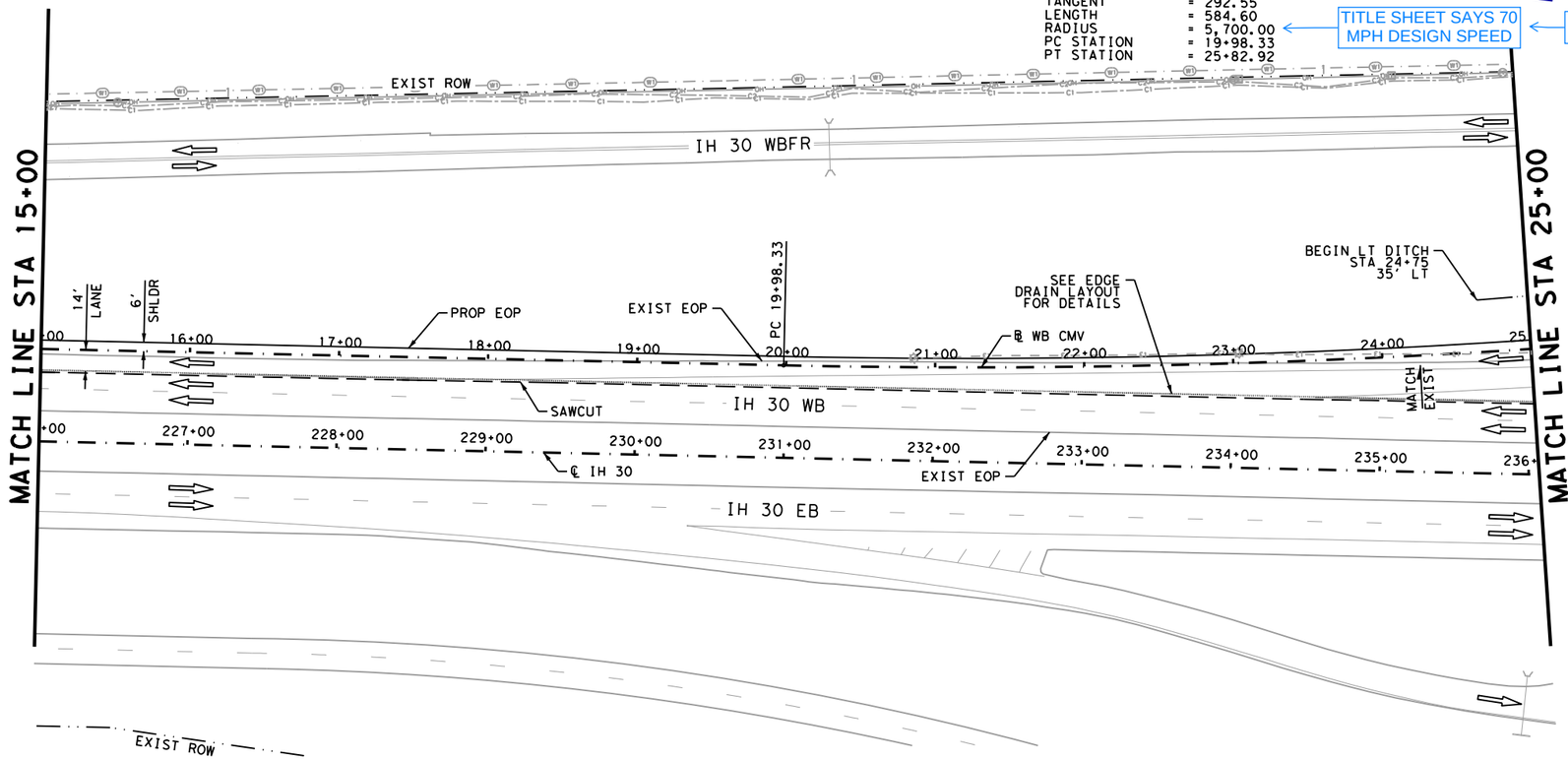
Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504pp02.dgn

PI STATION	= 22+90.88
DELTA	= 5° 52' 34.68" (LT)
DEGREE OF CURVE	= 1° 00' 18.68"
TANGENT	= 292.55
LENGTH	= 584.60
RADIUS	= 5,700.00
PC STATION	= 19+98.33
PT STATION	= 25+82.92

title sheet updated

TITLE SHEET SAYS 70 MPH DESIGN SPEED

The ramp design speed should be 50 mph. 5,700 ft radius with 2% cross-slope = 50 mph



LEGEND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

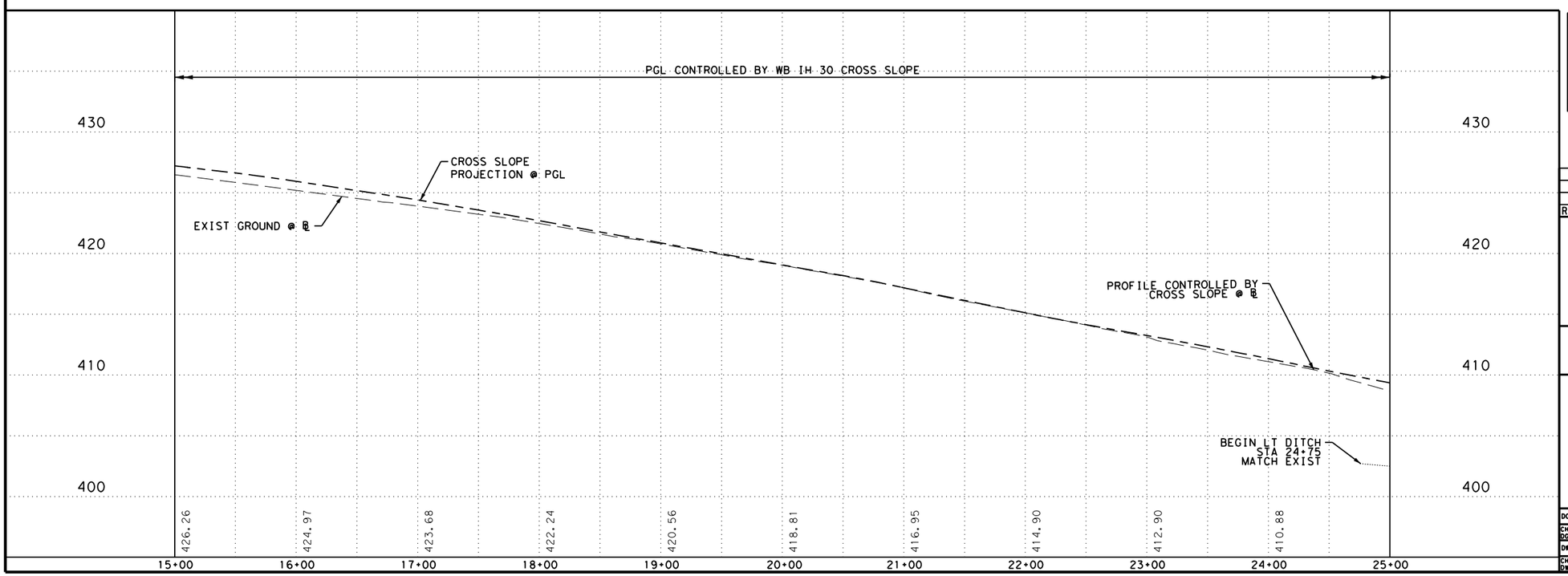
1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A AND RIPRAP AND CONTROL DETAILS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022



0 50 100

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

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PLAN AND PROFILE

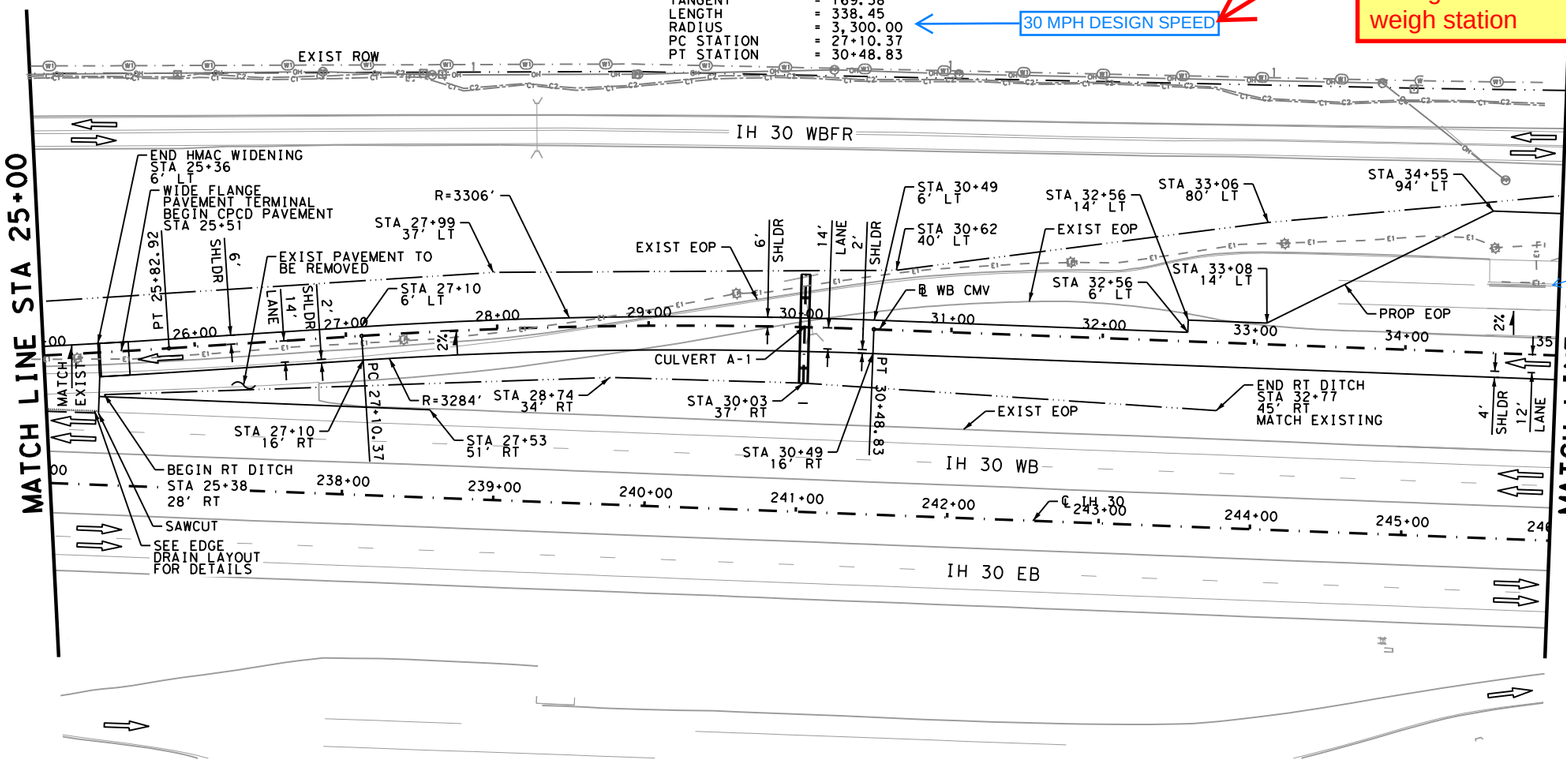
STA 15+00 TO STA 25+00

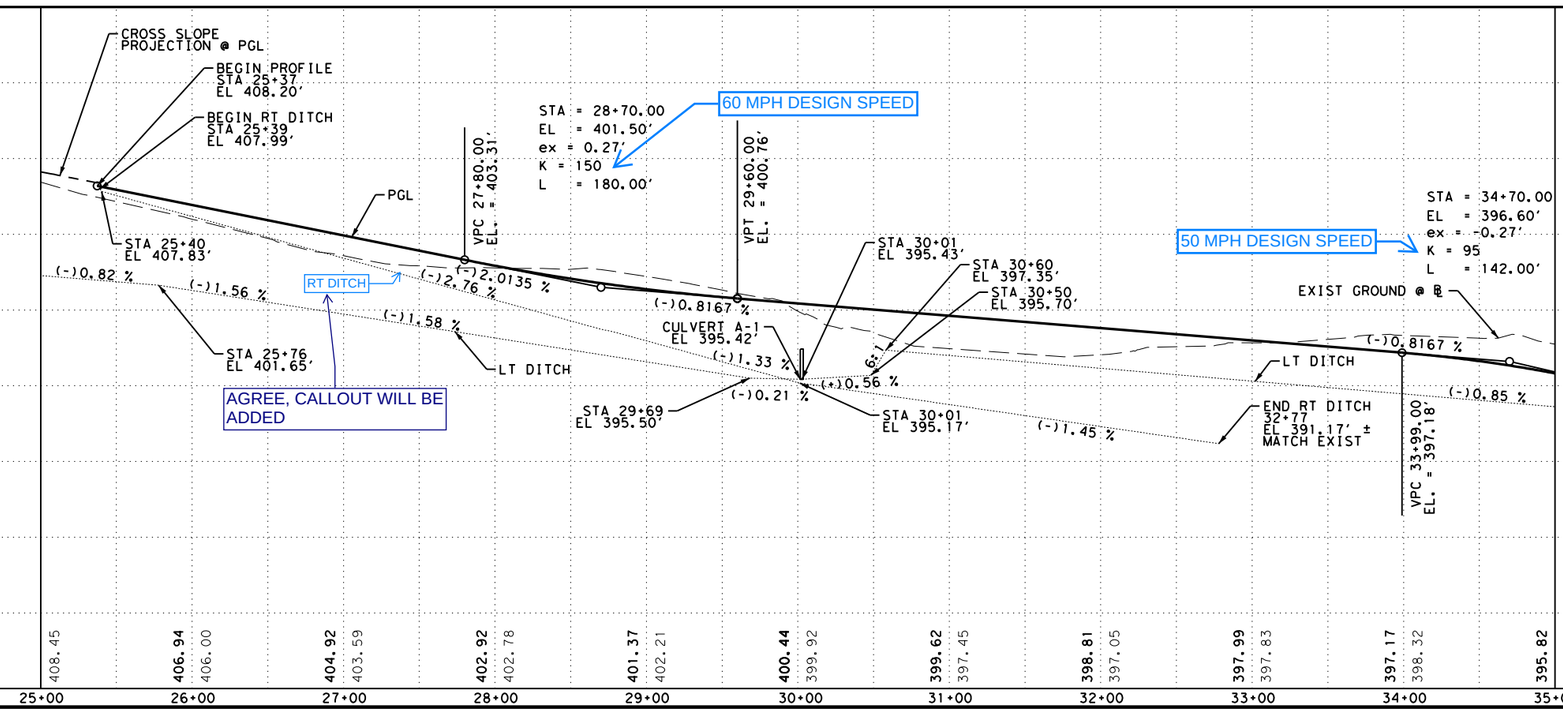
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	61

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504pp03.dgn

we intend to have a 15 mph design throughout the weigh station





LEGEND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A AND RIPRAP AND CONTROL DETAILS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100

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

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PLAN AND PROFILE

STA 25+00 TO STA 35+00

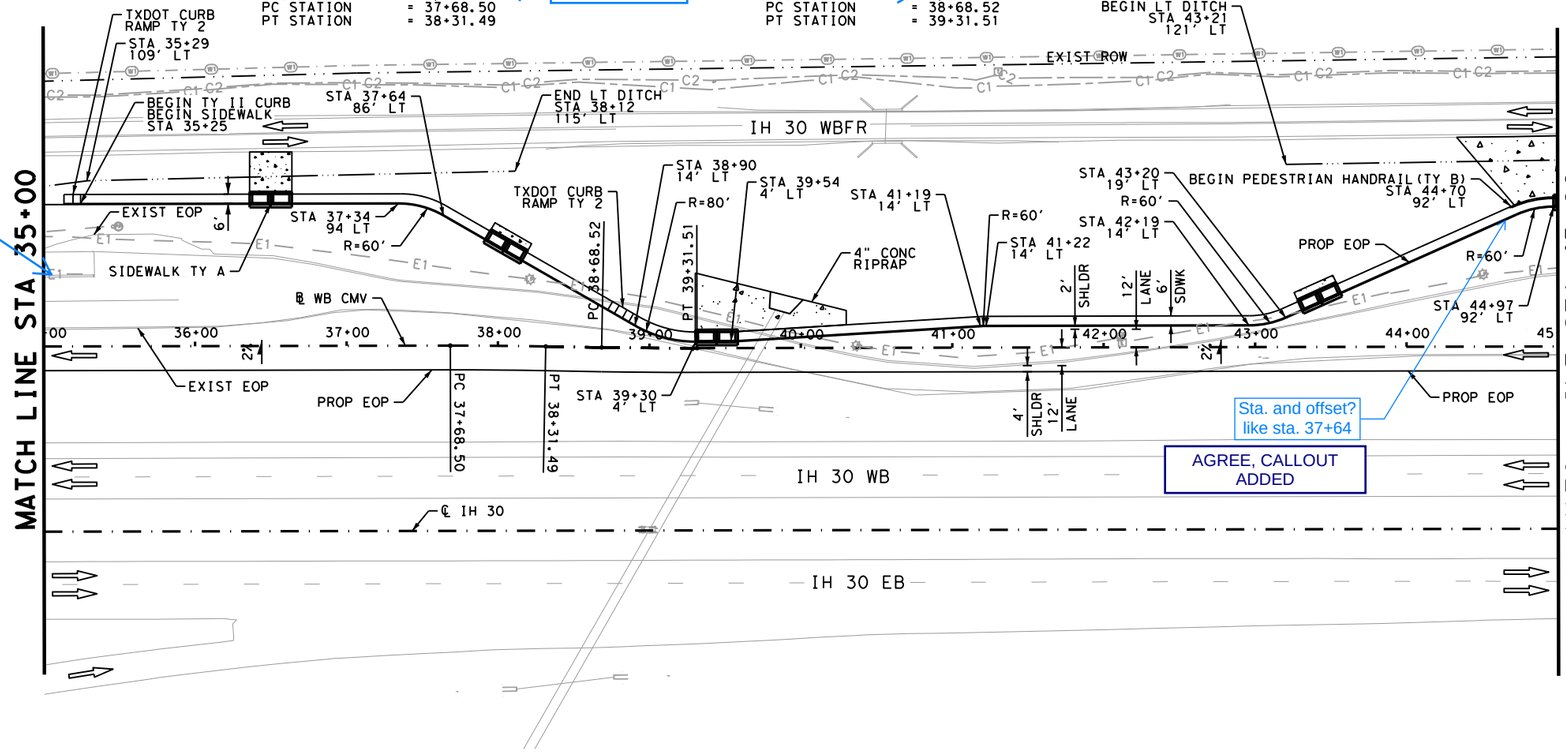
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	62

we intend to have a 15 mph design throughout the weigh station

PI STATION = 38+00.00
DELTA = 1° 08' 44.75" (RT)
DEGREE OF CURVE = 1° 49' 08.09"
TANGENT = 31.50
LENGTH = 62.99
RADIUS = 3,150.00
PC STATION = 37+68.50
PT STATION = 38+31.49

30 MPH DESIGN

PI STATION = 39+00.02
DELTA = 1° 08' 44.75" (LT)
DEGREE OF CURVE = 1° 49' 08.09"
TANGENT = 31.50
LENGTH = 62.99
RADIUS = 3,150.00
PC STATION = 38+68.52
PT STATION = 39+31.51



Remove Conc (CTB) 34'

AGREE, CALLOUT ADDED

Sta. and offset? like sta. 37+64

AGREE, CALLOUT ADDED

N

LEGEND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

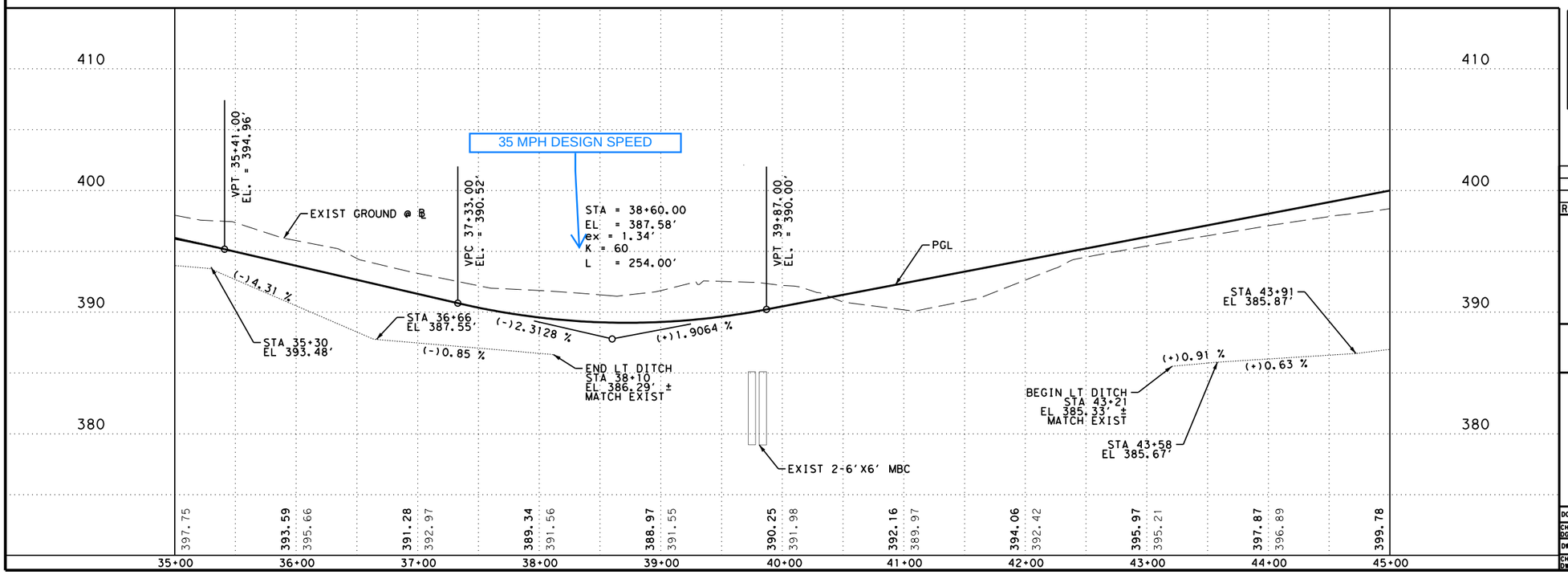
1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDIARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A AND RIPRAP AND CONTROL DETAILS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022



0 50 100

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

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation

WB IH 30 CMV STATION

PLAN AND PROFILE

STA 35+00 TO STA 45+00

SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	63

Design Filename: P:\116\35\04\Design\Civil\Roadway\116350 4pp04.dgn
Plotted on: 10/14/2022

THERE'S A VEHICULAR OPENING GATE ON EACH SIDE OF THE CANOPY, QUANTITIES REVISED.

Sheet 10 shows 446

BYPASS DESIGN SPEED

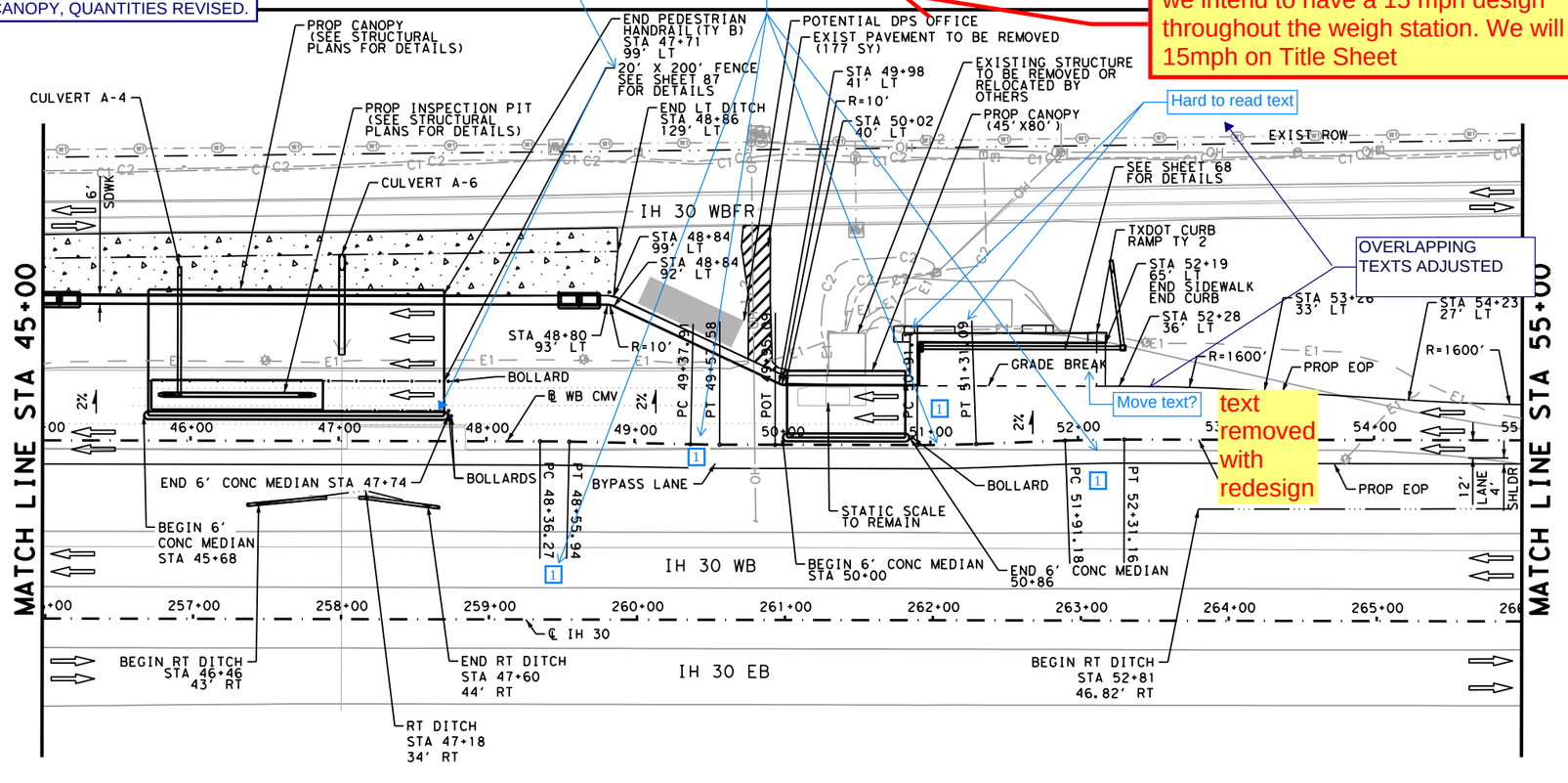
we intend to have a 15 mph design throughout the weigh station. We will show 15mph on Title Sheet

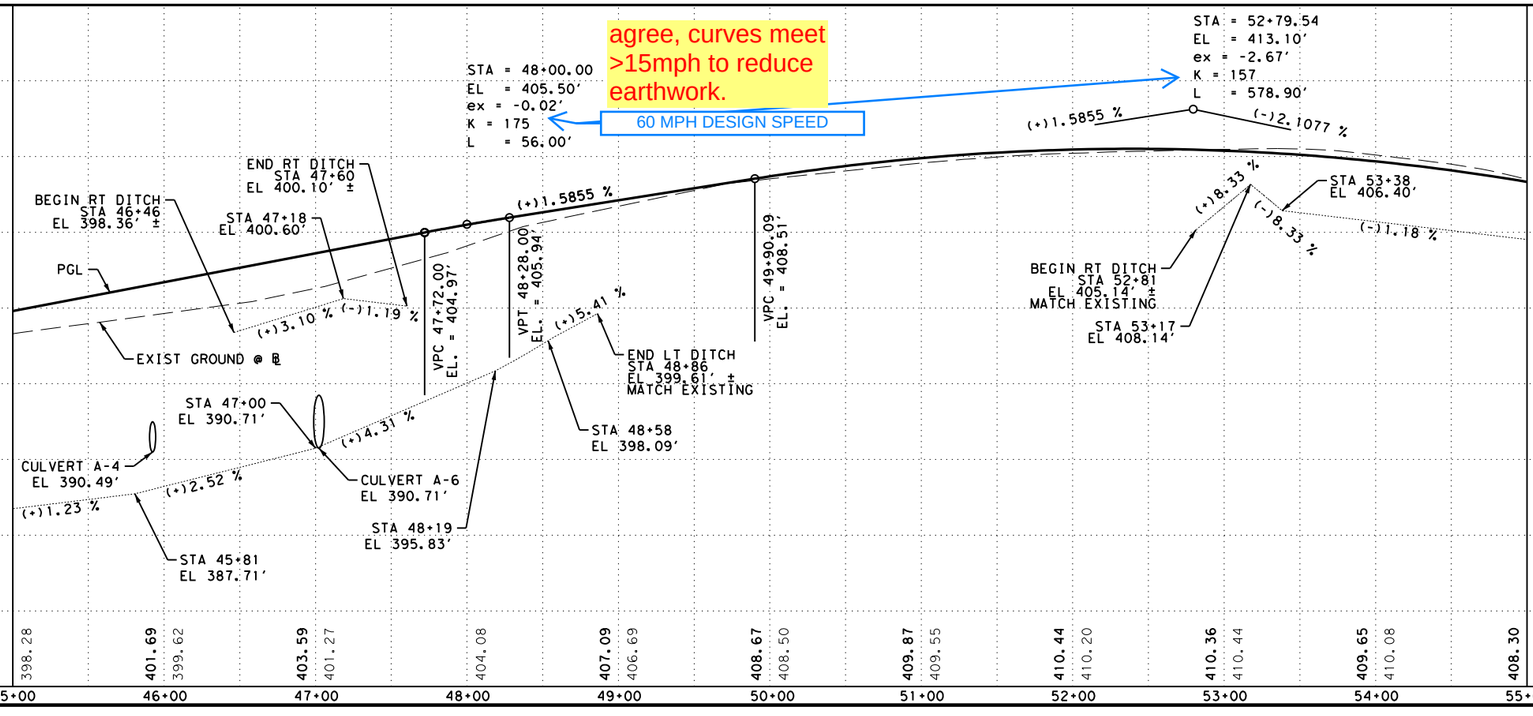
Hard to read text

OVERLAPPING TEXTS ADJUSTED

Move text?

text removed with redesign





LEGEND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A, ~~AND~~ RIPRAP, AND CONTROL DETAILS

AGR

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100
SCALE: PLAN 1" = 100' PROFILE: 1" = 10'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PLAN AND PROFILE

STA 45+00 TO STA 55+00

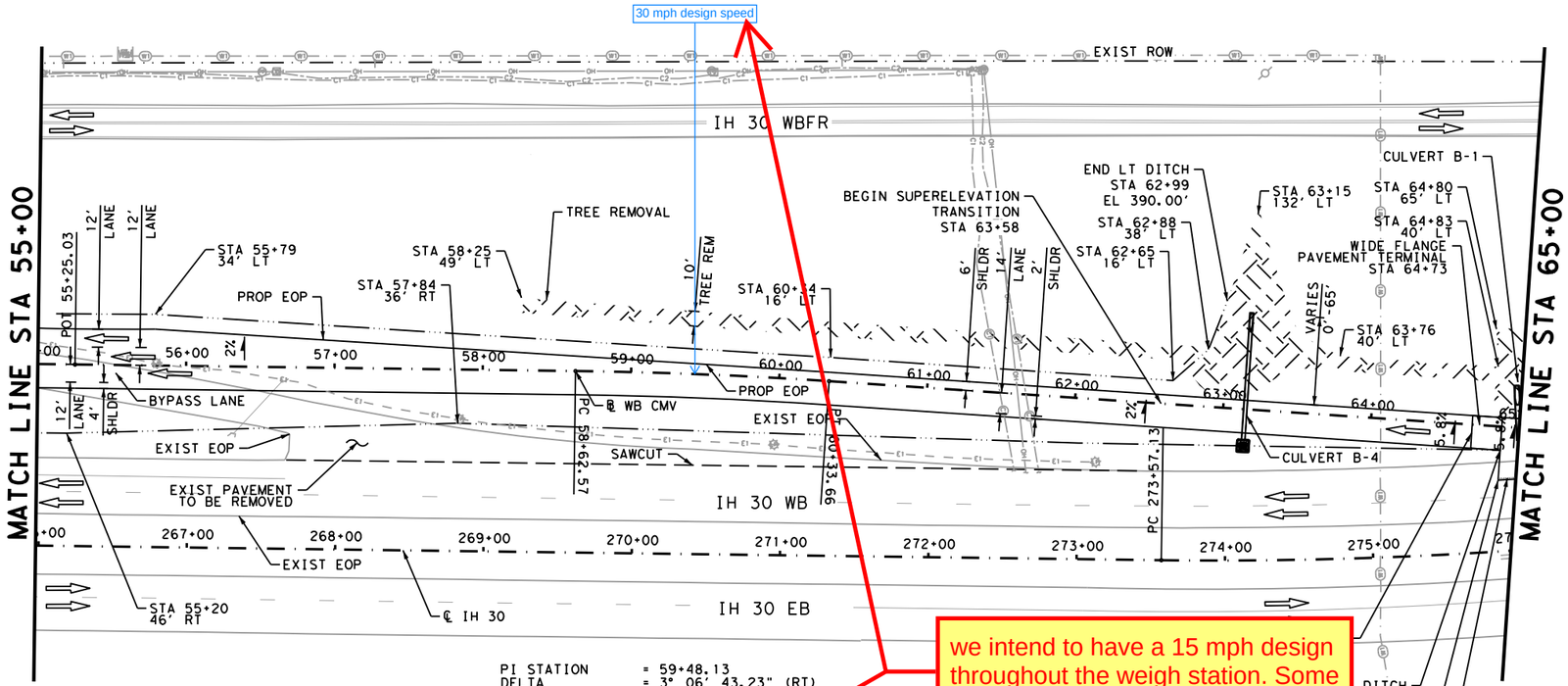
SHEET 5 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	64

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504pp05.dgn

Plotted on: 10/14/2022



PI STATION = 59+48.13
DELTA = 3° 06' 43.23" (RT)
DEGREE OF CURVE = 1° 49' 08.09"
TANGENT = 85.57
LENGTH = 171.09
RADIUS = 3,150.00
PC STATION = 58+62.57
PT STATION = 60+33.66

30 MPH DESIGN SPEED

we intend to have a 15 mph design throughout the weigh station. Some curves meet higher speeds.

LEGEND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

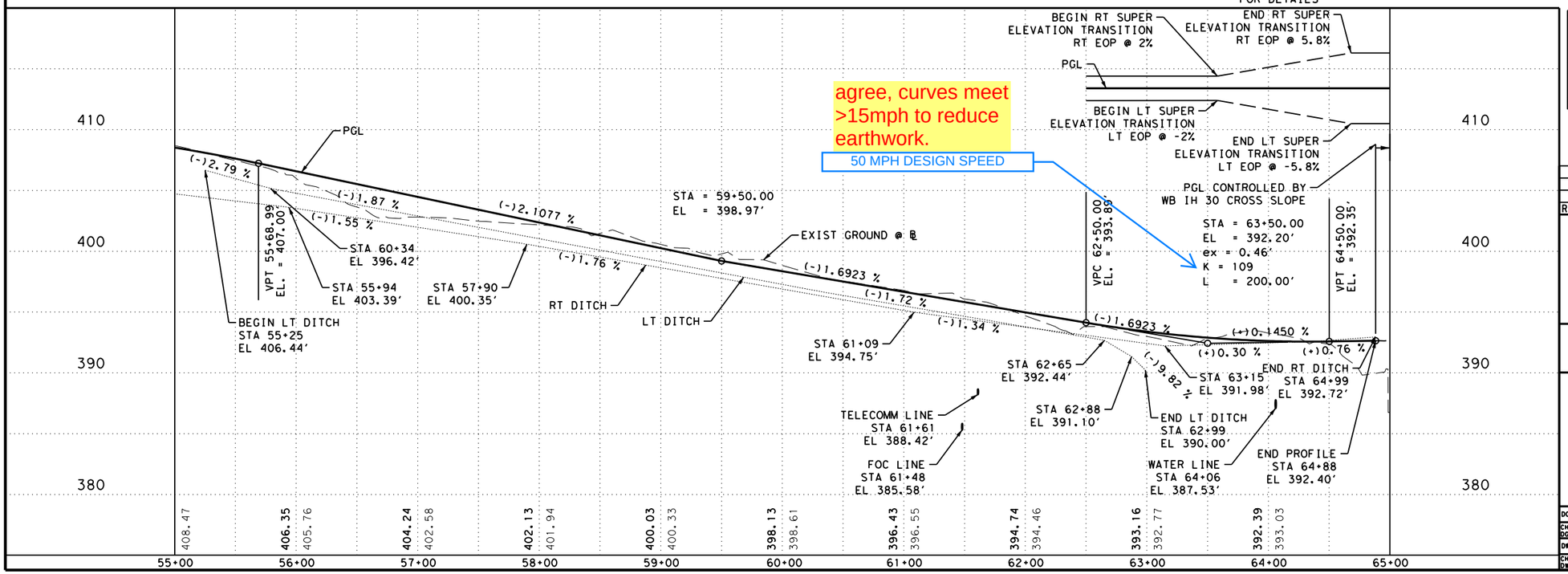
1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDIARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A AND RIPRAP AND CONTROL DETAILS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022



0 50 100

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

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation ©2022

WB IH 30 CMV STATION

PLAN AND PROFILE

STA 55+00 TO STA 65+00

SHEET 6 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	65

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504pp06.dgn

Plotted on: 10/14/2022

ramp will meet 50mph minimum

50 mph design speed with super? Assume 5.8% super elev.

70 mph design speed with super? Assume 5.6% super elev.

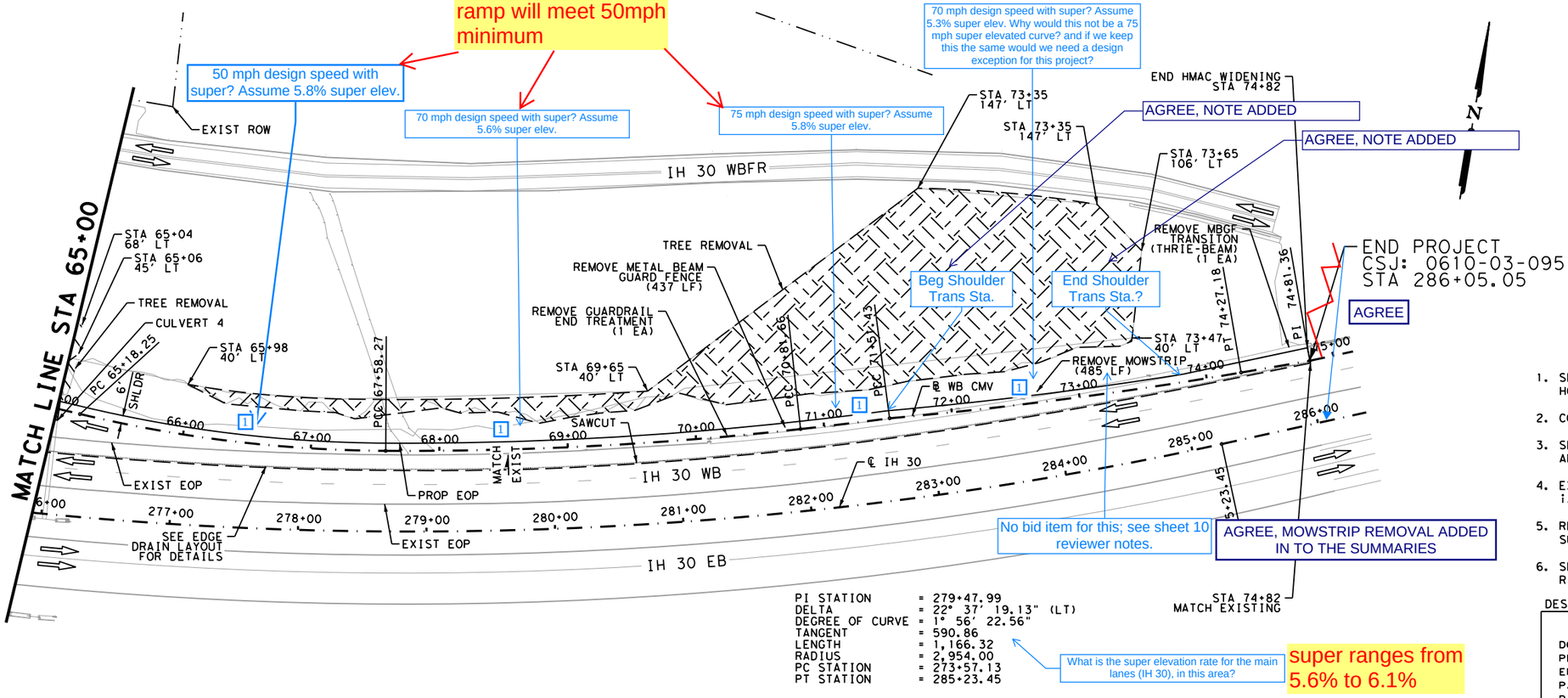
75 mph design speed with super? Assume 5.8% super elev.

70 mph design speed with super? Assume 5.3% super elev. Why would this not be a 75 mph super elevated curve? and if we keep this the same would we need a design exception for this project?

AGREE, NOTE ADDED

AGREE, NOTE ADDED

AGREE



PI STATION	=	279+47.99
DELTA	=	22° 37' 19.13" (LT)
DEGREE OF CURVE	=	1° 56' 22.56"
TANGENT	=	590.86
LENGTH	=	1,166.32
RADIUS	=	2,954.00
PC STATION	=	273+57.13
PT STATION	=	285+23.45

No bid item for this; see sheet 10 reviewer notes.

AGREE, MOWSTRIP REMOVAL ADDED IN TO THE SUMMARIES

What is the super elevation rate for the main lanes (IH 30), in this area?

super ranges from 5.6% to 6.1%

LEGEND

- TRAFFIC FLOW ARROW
- DITCH FLOW LINE
- SAWCUT
- EDGE DRAIN
- EXIST ROW
- 4" CONC RIPRAP
- TREE REMOVAL

NOTES

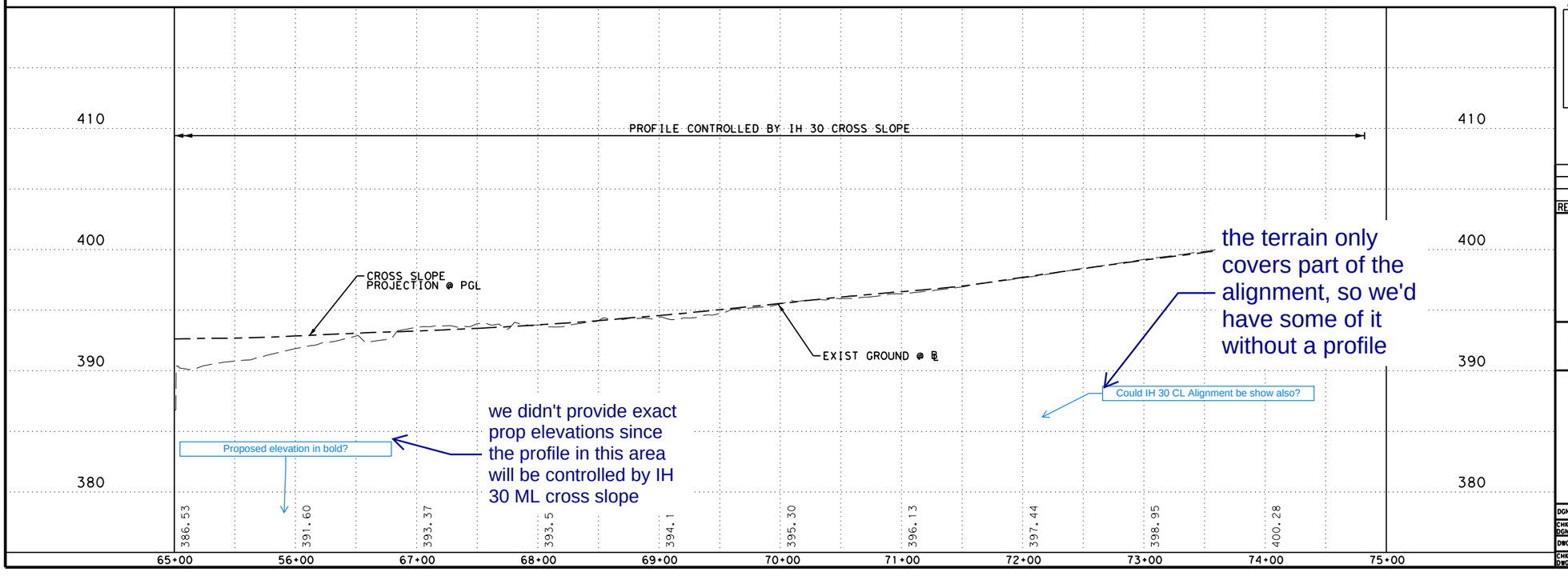
1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
4. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
5. REMOVAL OF EXISTING PAVEMENT AND BASE IS SUBSIDARY TO ITEM 110 "EXCAVATION"
6. SEE DRAINAGE DETAILS FOR SIDEWALK TY-A AND RIPRAP AND CONTROL DETAILS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022



the terrain only covers part of the alignment, so we'd have some of it without a profile

Could IH 30 CL Alignment be show also?

we didn't provide exact prop elevations since the profile in this area will be controlled by IH 30 ML cross slope

Proposed elevation in bold?

0 50 100

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

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Texas Department of Transportation ©2022

WB IH 30 CMV STATION

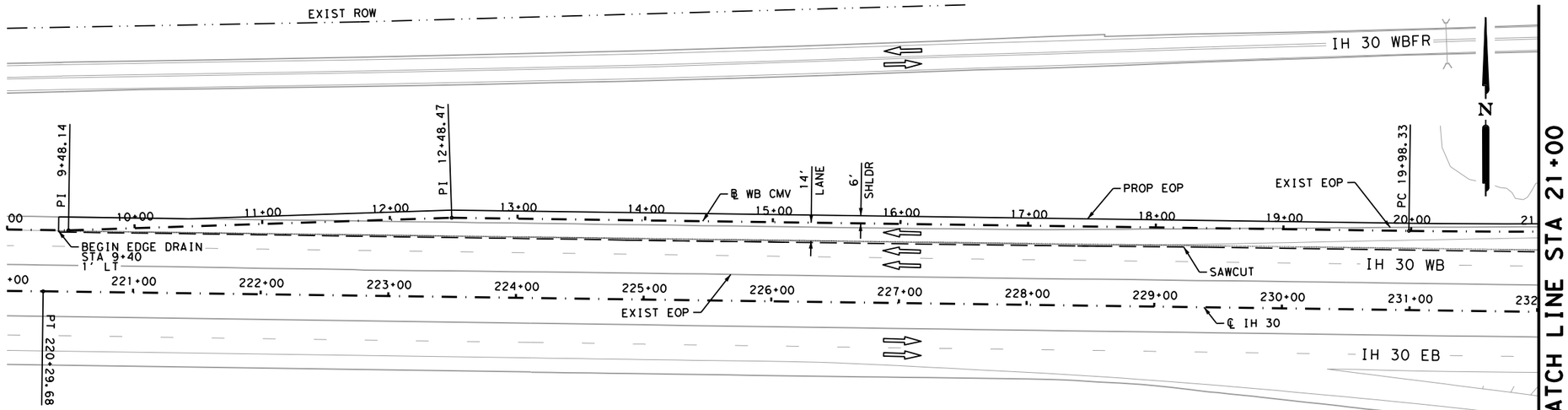
PLAN AND PROFILE

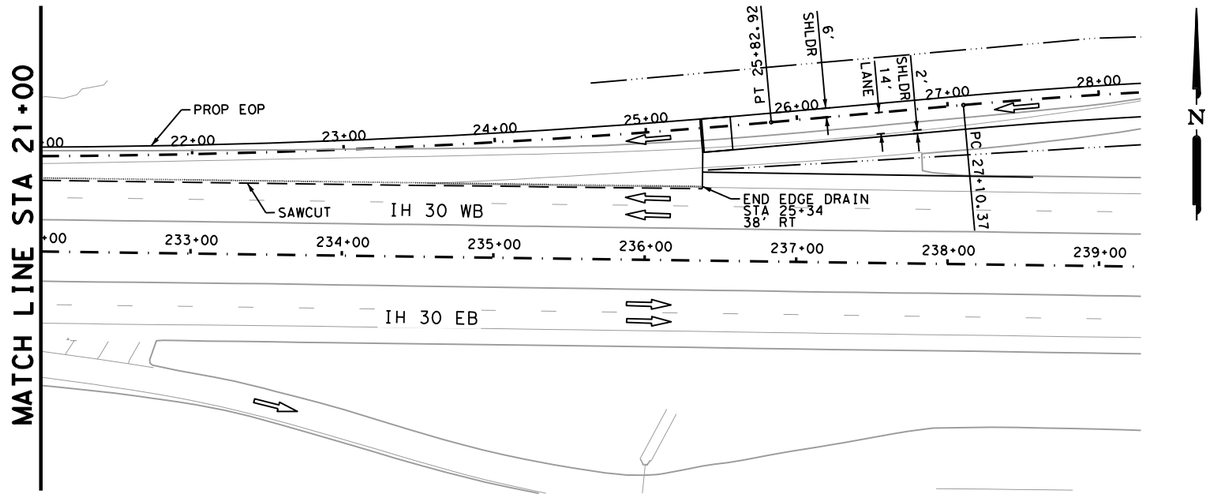
STA 65+00 TO END PROJECT

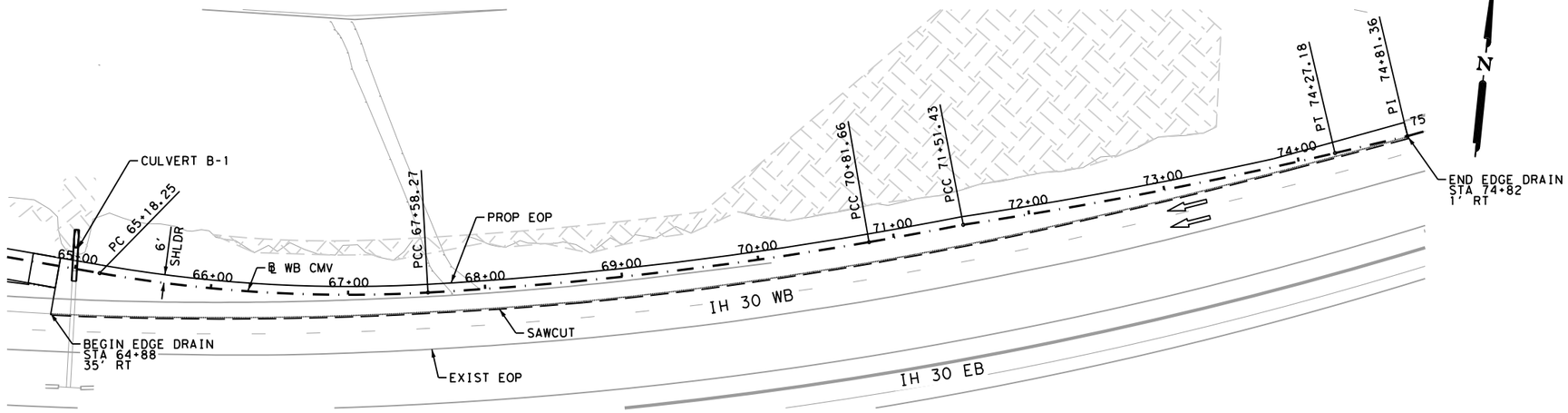
SHEET 7 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	66

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504pp07.dgn







LEGEND

- TRAFFIC FLOW ARROW
- EDGE DRAIN
- DITCH FLOW LINE
- EXIST ROW

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. CONTRACTOR TO FIELD VERIFY ALL UTILITIES.
3. UNDERDRAIN OUTFALL LOCATIONS TO BE FIELD VERIFIED.
4. SEE EDGE DRAIN DETAILS.
5. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

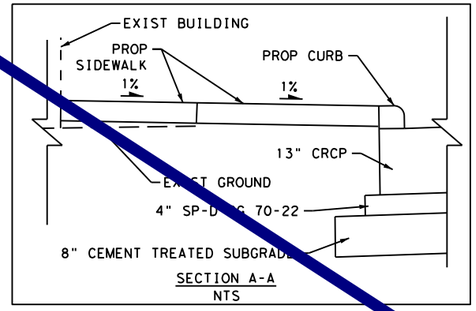
WB IH 30 CMV STATION
EDGE DRAIN LAYOUT

SHEET 1 OF 1

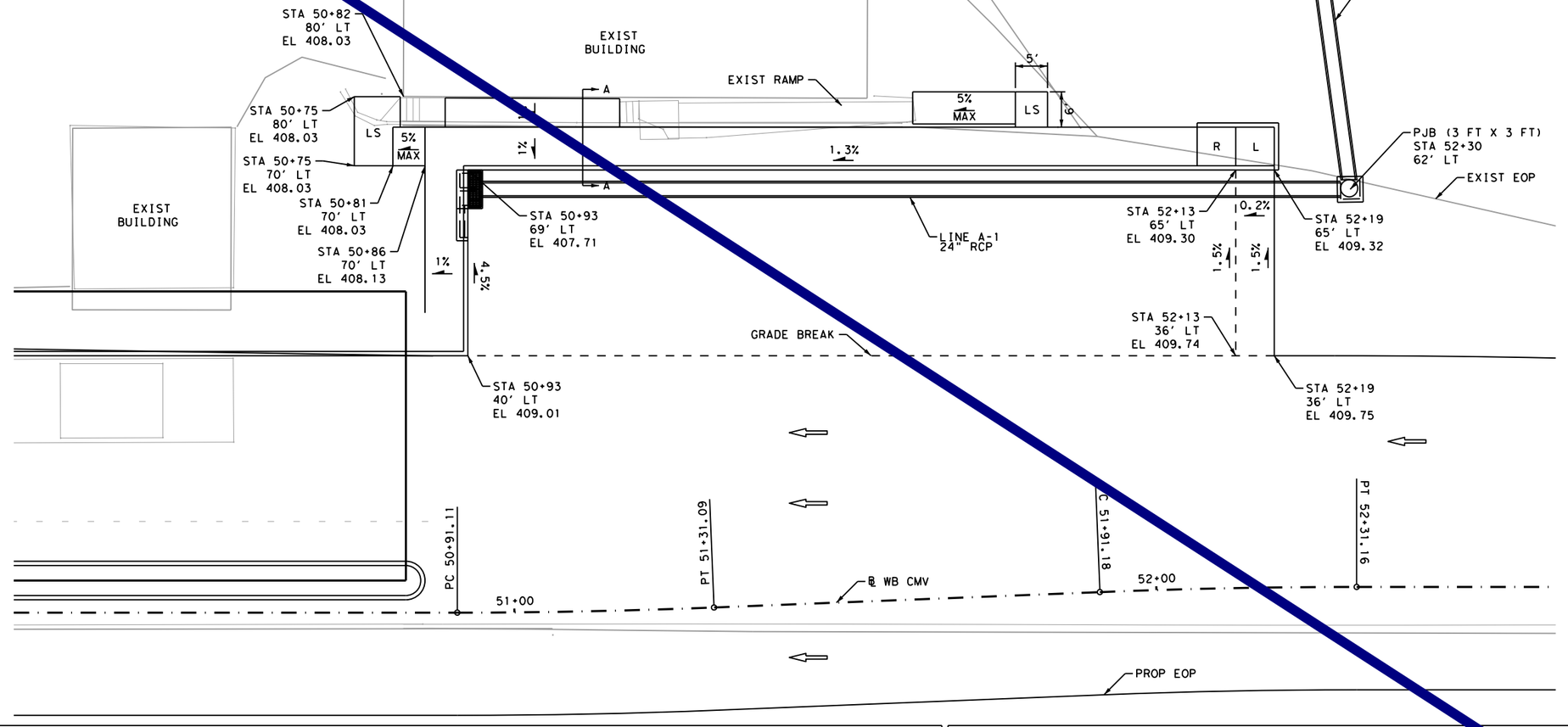
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	67

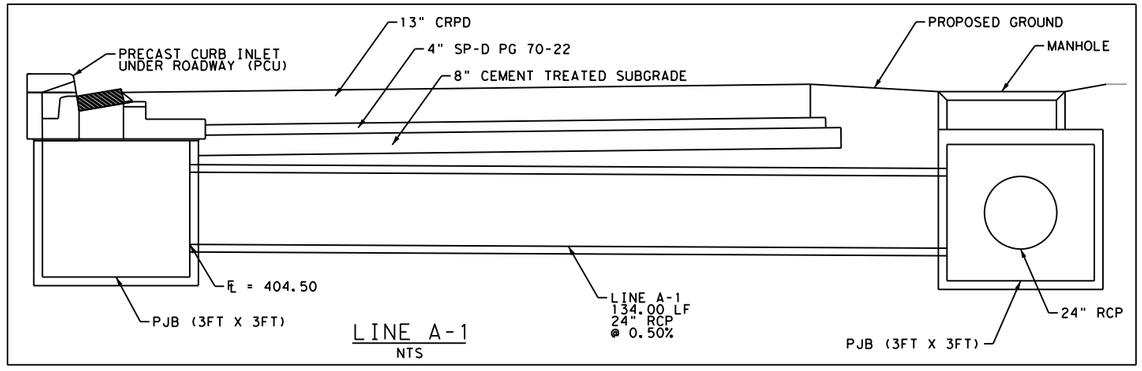
Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\116504_EdgeDrainLayout.dgn

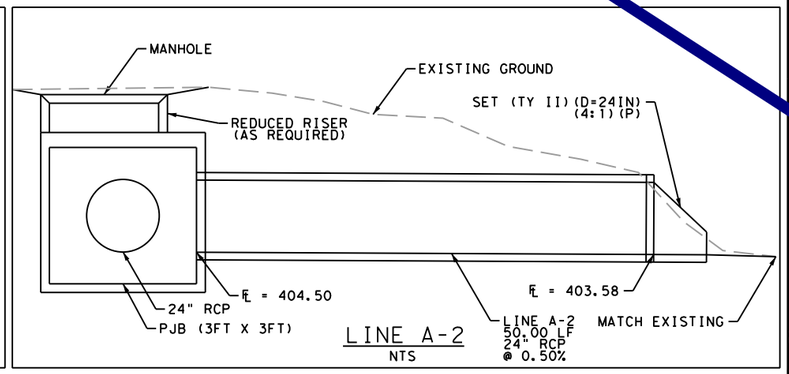


SECTION A-A
NTS





LINE A-1
NTS



LINE A-2
NTS

N

LEGEND

⇦	TRAFFIC FLOW ARROW
— — —	GRADE BREAK
L	LANDING (SHALL NOT EXCEED 2 PERCENT IN ANY DIRECTION)
LS	LEVEL SIDEWALK (SHALL NOT EXCEED 2 PERCENT SLOPE IN ANY DIRECTION)
R	RAMP (CROSS SLOPE NOT TO EXCEED 2 PERCENT; LONGITUDINAL NOT TO EXCEED 8.3 PERCENT)

NOTES

1. SEE HORIZONTAL ALIGNMENT DATA SHEETS FOR HORIZONTAL ALIGNMENT DATA.
2. SEE PAVEMENT MARKING SHEETS FOR STRIPING AND TRAFFIC FLOW DETAILS.
3. EXISTING FEATURES ARE SHOWN SCREENED BACK; i.e. FADED
4. SEE DRAINAGE SHEETS FOR ADDITIONAL INFORMATION.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

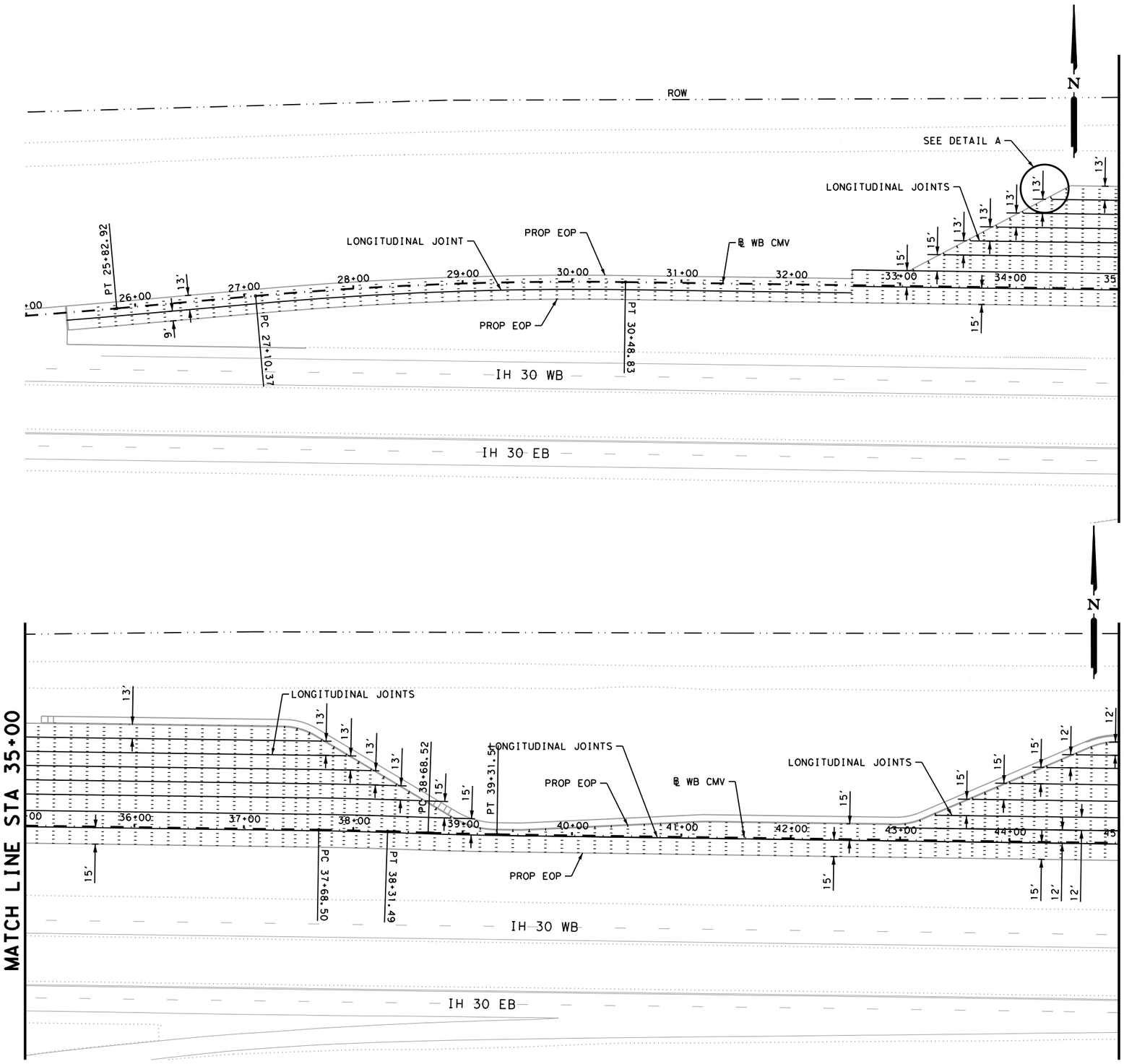
0 50 100 150
SCALE: 1"= 100'

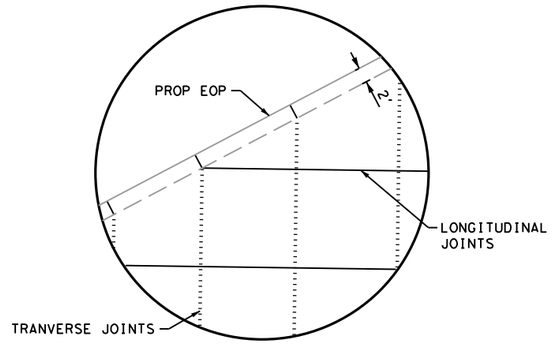
REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
PARKING LOT DETAILS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	68





DETAIL A
NTS

LEGEND

TRANSVERSE JOINTS

LONGITUDINAL JOINTS

NOTES

1. SEE SHEET CPCD-14 FOR ADDITIONAL DETAILS.
2. SEE SHEET JS-14 FOR JOINT DETAILS.
3. PROPOSED CHANGES IN THE JOINT LAYOUT MUST BE SUBMITTED FOR APPROVAL.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

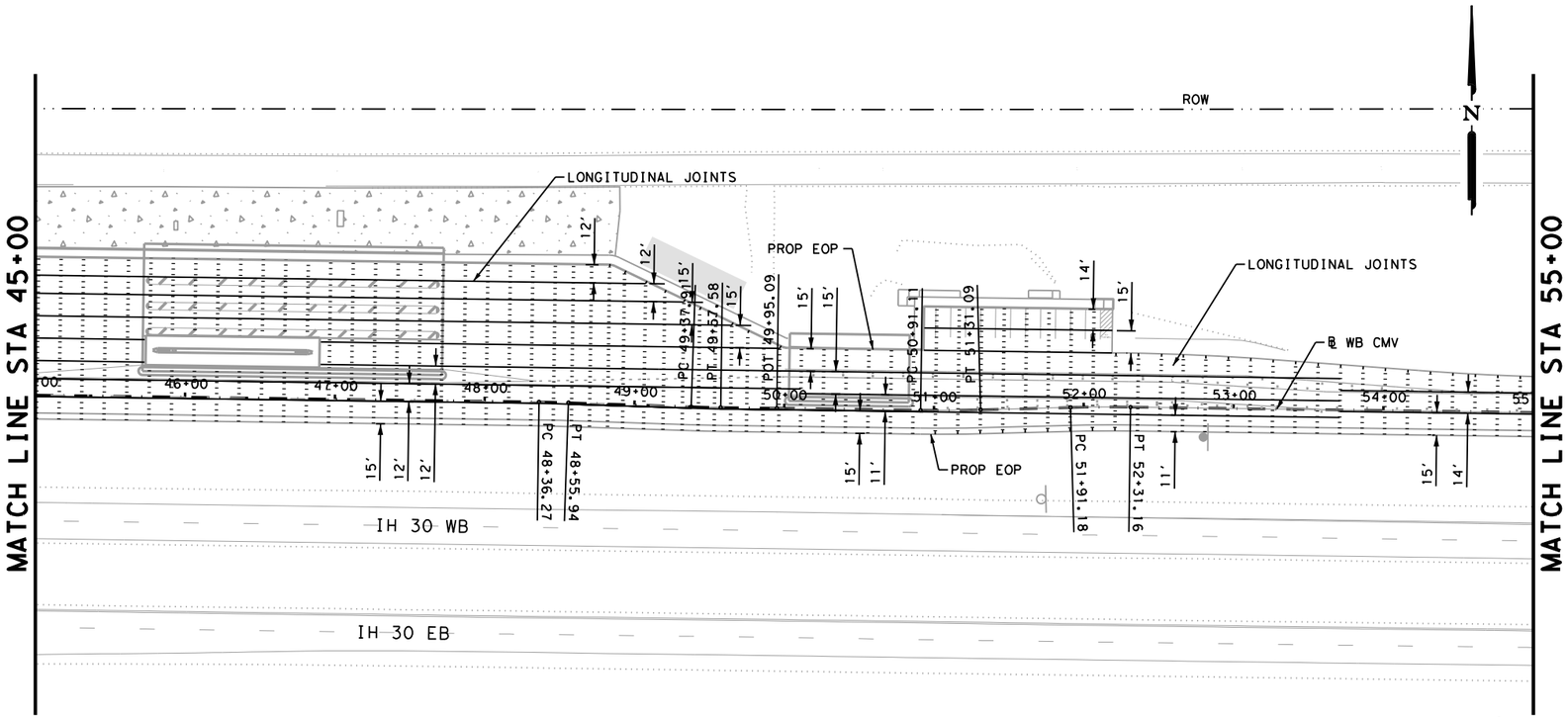
CONCRETE JOINT DETAILS

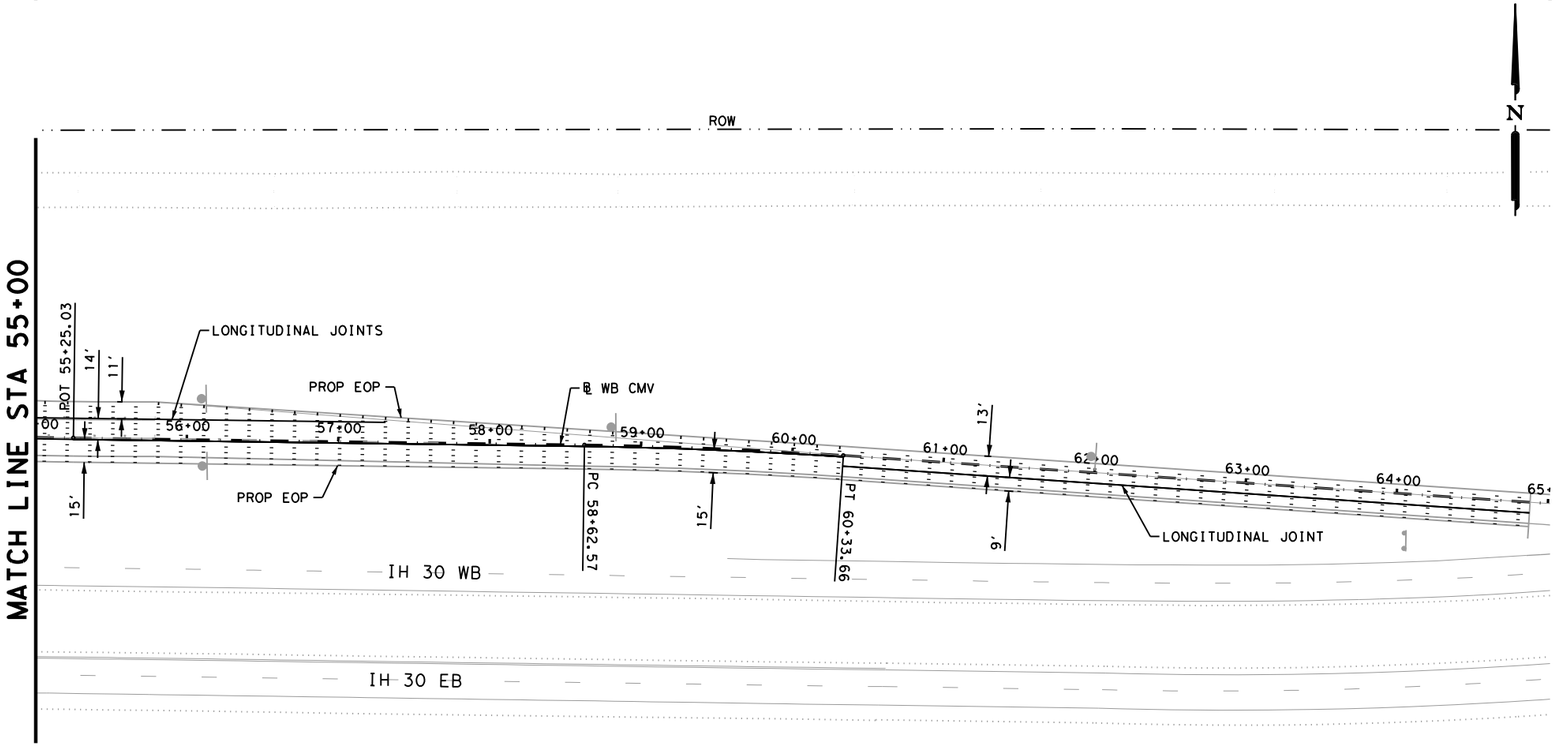
SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	69

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504_JointDet01.dgn





LEGEND

TRANSVERSE JOINTS

LONGITUDINAL JOINTS

NOTES

1. SEE SHEET CPCD-14 FOR ADDITIONAL DETAILS.
2. SEE SHEET JS-14 FOR JOINT DETAILS.
3. PROPOSED CHANGES IN THE JOINT LAYOUT MUST BE SUBMITTED FOR APPROVAL.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

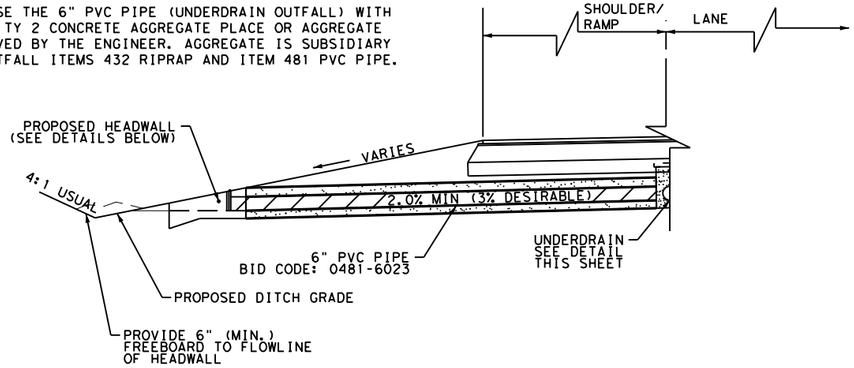
CONCRETE JOINT DETAILS

SHEET 2 OF 2

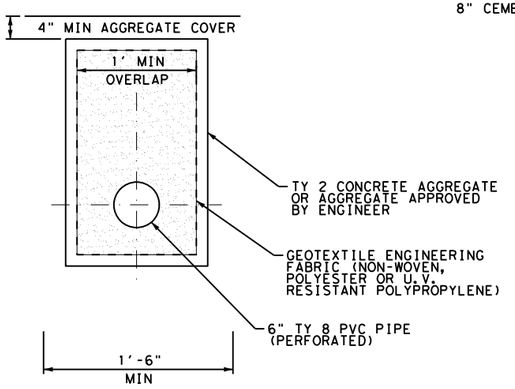
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	70

NOTE:

ENCLOSE THE 6" PVC PIPE (UNDERDRAIN OUTFALL) WITH 6" OF TY 2 CONCRETE AGGREGATE PLACE OR AGGREGATE APPROVED BY THE ENGINEER. AGGREGATE IS SUBSIDIARY TO OUTFALL ITEMS 432 RIPRAP AND ITEM 481 PVC PIPE.

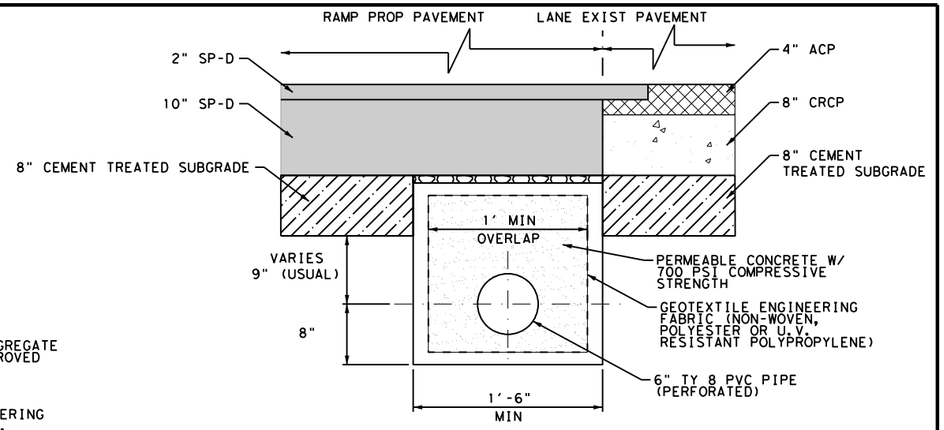


UNDERDRAIN OUTFALL DETAIL



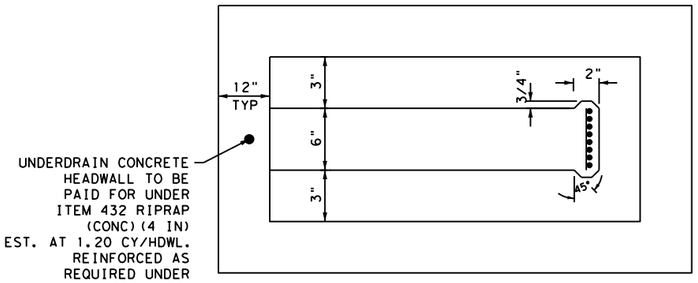
UNDERDRAIN DETAIL

NOTE:
THIS UNDERDRAIN DETAIL IS INTENDED FOR BID CODE: 0556-6008.
THIS UNDERDRAIN IS INTENDED TO BE LOCATED AT POOR OR WET SUBGRADE AREAS AS APPROVED BY THE ENGINEER.

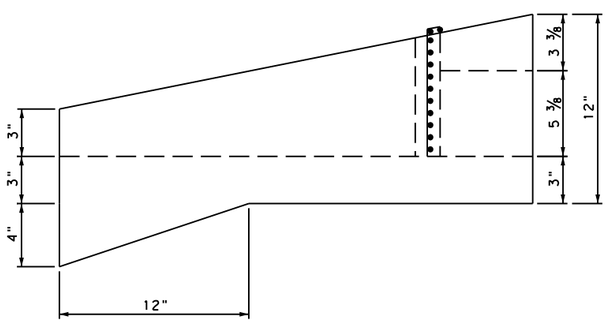


UNDERDRAIN DETAIL
PERMEABLE CONCRETE EDGE DRAIN

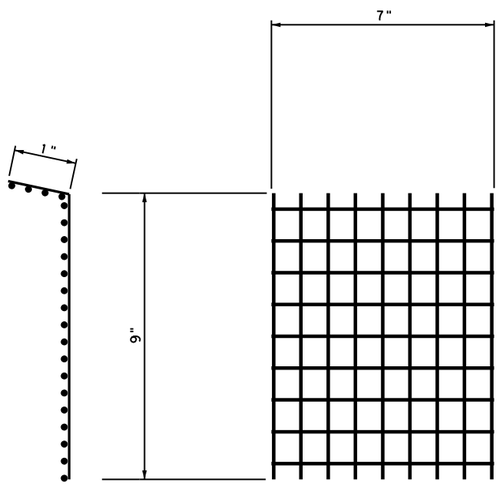
NOTE:
THIS UNDERDRAIN DETAIL (PERMEABLE CONCRETE EDGE DRAIN) IS INTENDED FOR BID CODE: 4020-6001.
THE LOCATIONS OF THE PERMEABLE CONCRETE EDGE DRAIN ARE CALLED OUT ON EDGE DRAIN LAYOUT.



TOP VIEW



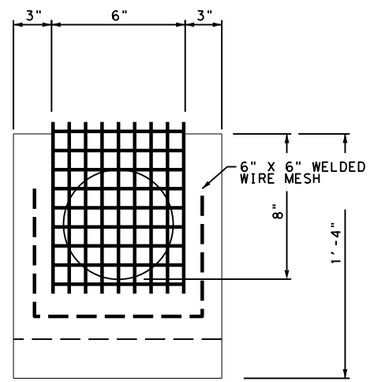
SIDE VIEW



SIDE VIEW FRONT VIEW

RODENT SHIELD

NOTE: ALL RODENT SHIELDS TO BE GALVANIZED



UNDERDRAIN CONCRETE HEADWALL DETAILS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

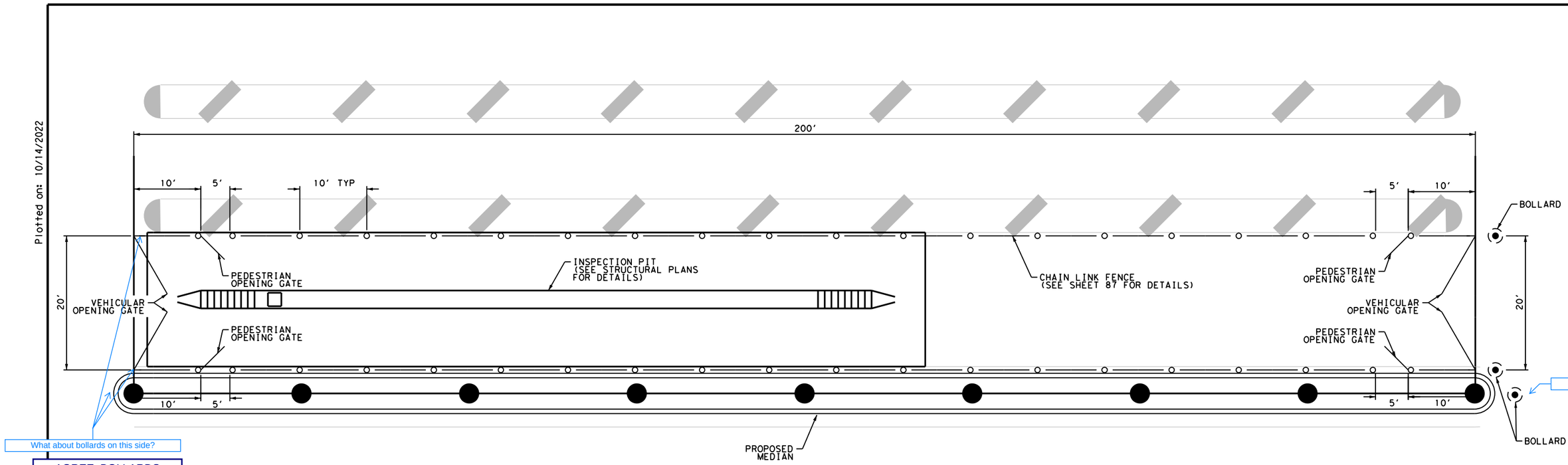
REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

EDGE DRAIN DETAILS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	71



two bollards like

AGREE, BOL
REV

What about bollards on this side?

AGREE, BOLLARDS ADDED AND DETAIL REVISED

CHAIN LINK FENCE PLAN

NOT TO SCALE

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

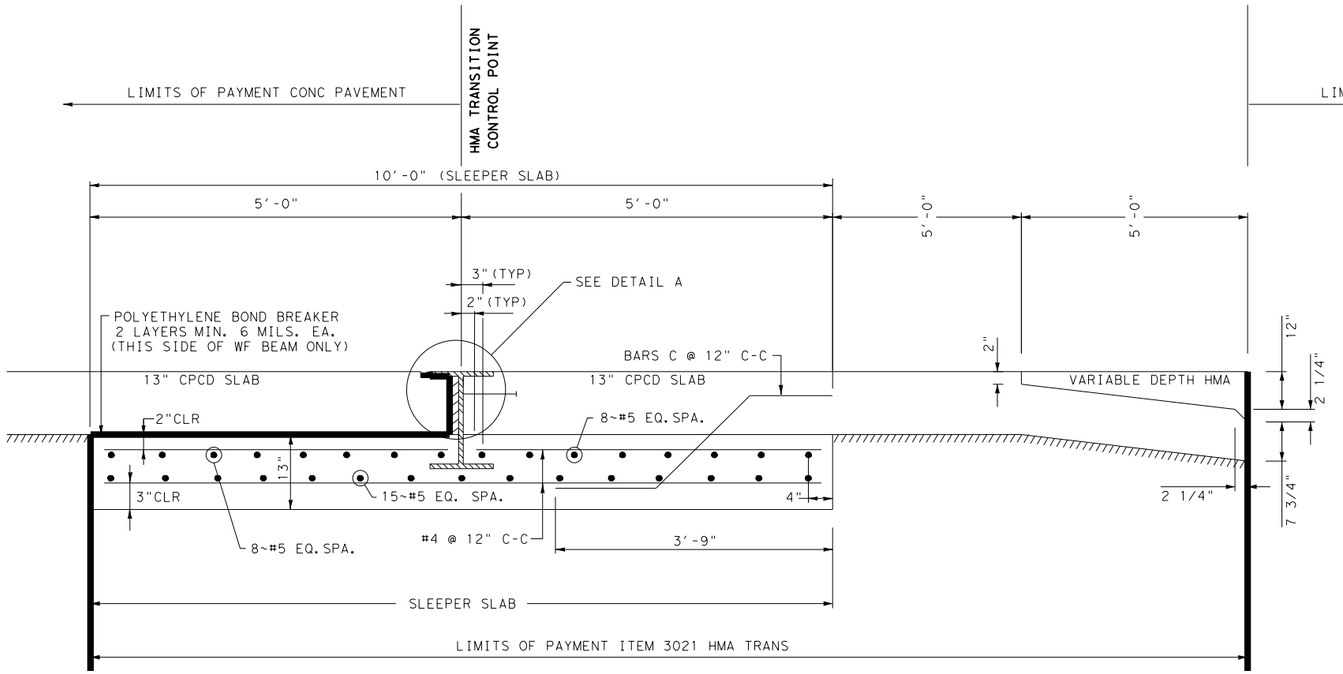
WB IH 30 CMV STATION

CHAIN LINK FENCE PLAN

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	72

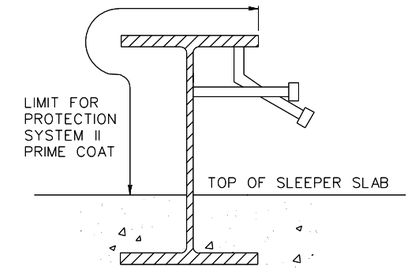
Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504_ChainLinkFence.dgn



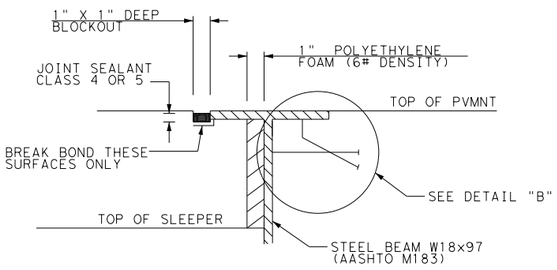
TYPICAL APPROACH SLAB SECTION FOR CONCRETE TO HMA TRANSITION

N. T. S.



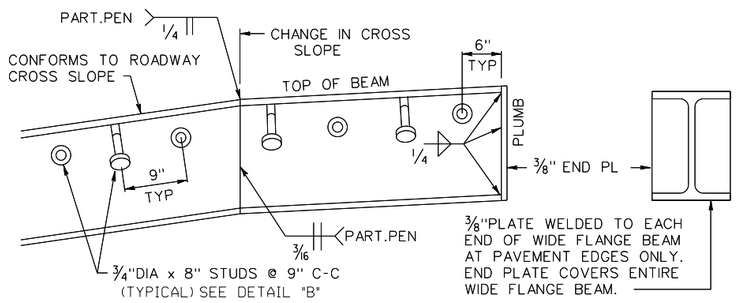
WIDE FLANGE PAINTING DETAIL

N. T. S.

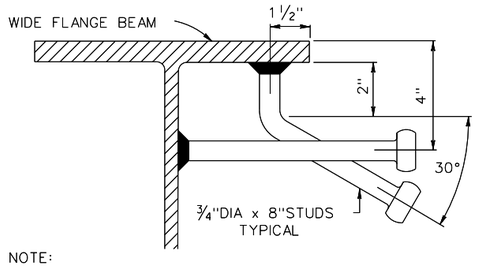


DETAIL "A"

N. T. S.



WIDE FLANGE DETAIL



NOTE:
STUDS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION. ANY STUD WHICH IS DISLODGED IN SHIPPING OR CAN BE DISLODGED BY HAMMER SHALL BE REPLACED.

DETAIL "B"

N. T. S.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

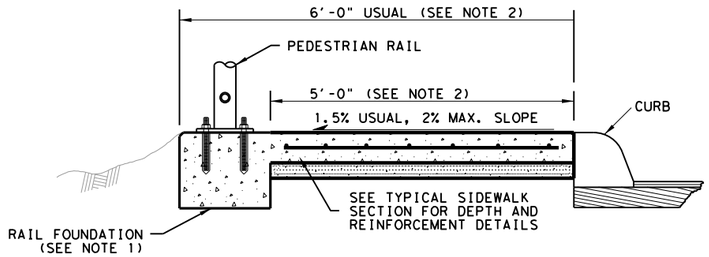
REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

HMAC TRANSITION DETAIL

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	73



TYPICAL SIDEWALK SECTION WITH PEDESTRIAN RAIL

NOT TO SCALE

NOTES:

1. SEE PEDESTRIAN HANDRAIL DETAILS STANDARD "PRD" FOR MORE INFORMATION. CONCRETE RAIL FOUNDATION TO BE POURED WITH THE SIDEWALK BUT PAYMENT IS SUBSIDIARY TO ITEM 450 "RAILING".

2. CLEAR SIDEWALK WIDTH EXCLUDING THE PEDESTRIAN RAIL FOUNDATION SHALL BE 5' UNLESS OTHERWISE SPECIFIED IN THE PLANS.

PRD-13

AGREE

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

MISCELLANEOUS DETAILS

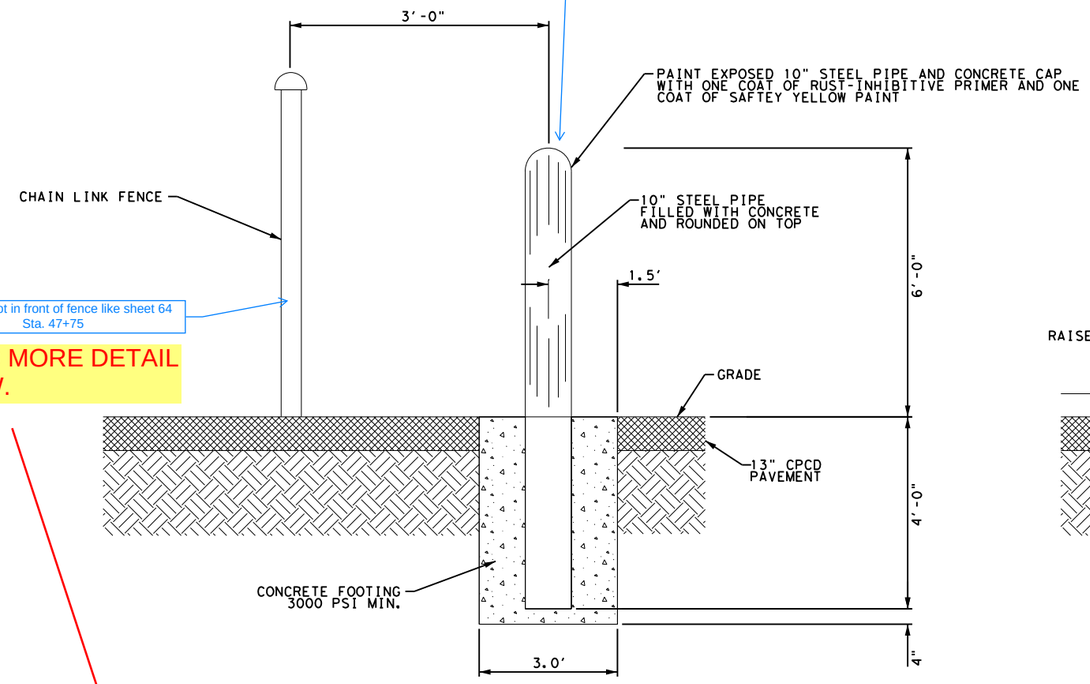
SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	74

Plotted on: 10/14/2022

Bollard in front of fence like sheet 64 approx STA. 47+75? also see sheet 72

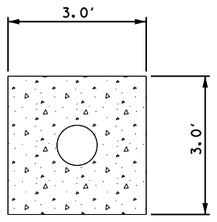
AGREE, BOLLARD DETAIL REVISED BELOW



Bollard is not in front of fence like sheet 64 Sta. 47+75

ADDED MORE DETAIL BELOW.

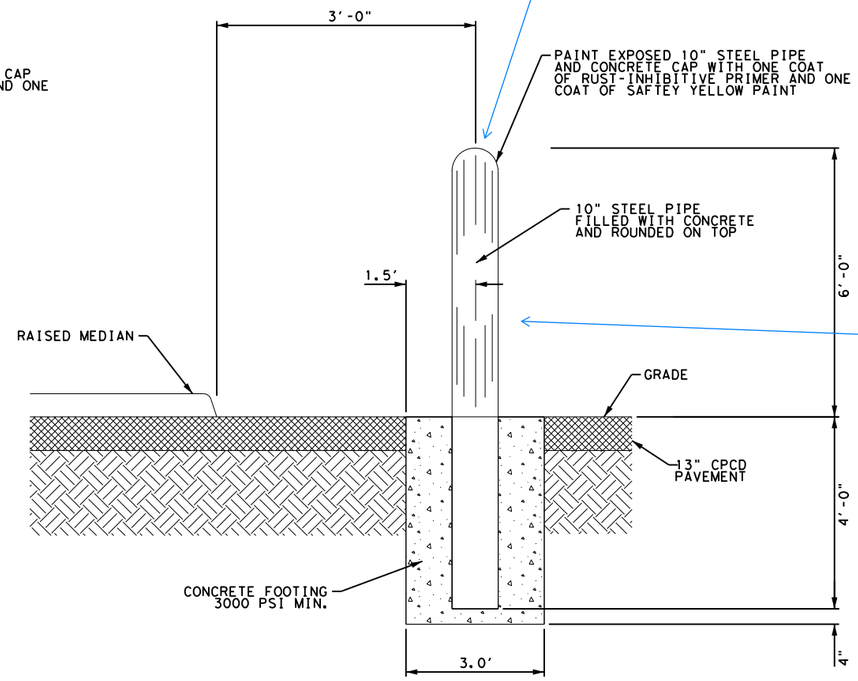
BOLLARD AT FENCE POST DETAIL
NOT TO SCALE



BOLLARD AT FENCE POST PLAN DETAIL
NOT TO SCALE

Also not seeing a detail showing a bollard in front of 6" raised median? also see sheet 72

AGREE, BOLLARD DETAIL REVISED BELOW



BOLLARD AT MEDIAN DETAIL
NOT TO SCALE

AGREE, BOLLARDS ADDED PER REVIEWER NOTE

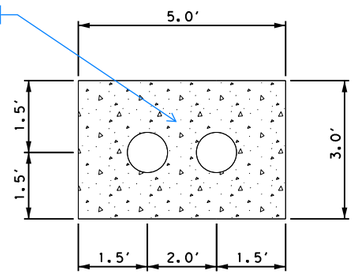
See reviewer note on Summary of Quantities sheet 10 bid item 5084-6001

Not seeing two post like image below.

SECOND POST IS BEHIND THE FIRST POST SEE DETAIL BELOW.

Sheet 64 shows the bollards staggered

AGREE, BOLLARD DETAIL REVISED



BOLLARD AT MEDIAN PLAN DETAIL
NOT TO SCALE

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

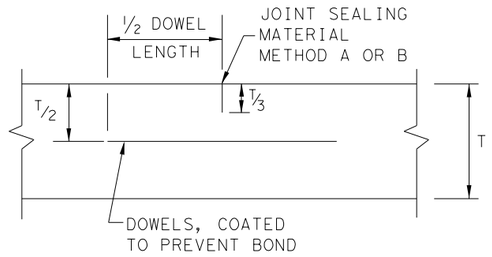
MISCELLANEOUS DETAILS

SHEET 2 OF 2

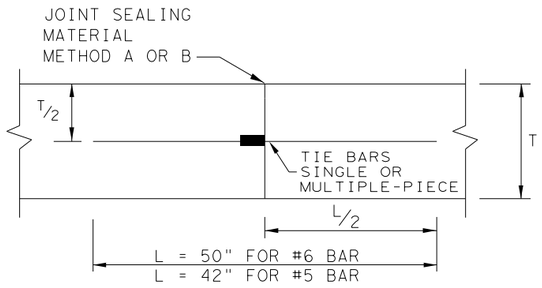
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	75

Design Filename: P:\116\35\04\Design\Civil\Roadway\1163504_MiscellaneousDet.dgn

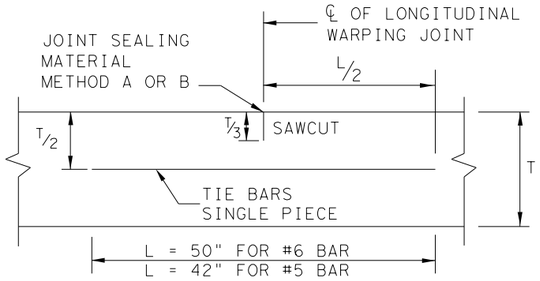
DATE: 10/14/2022 2:47:14 PM
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\cpcd14.dgn



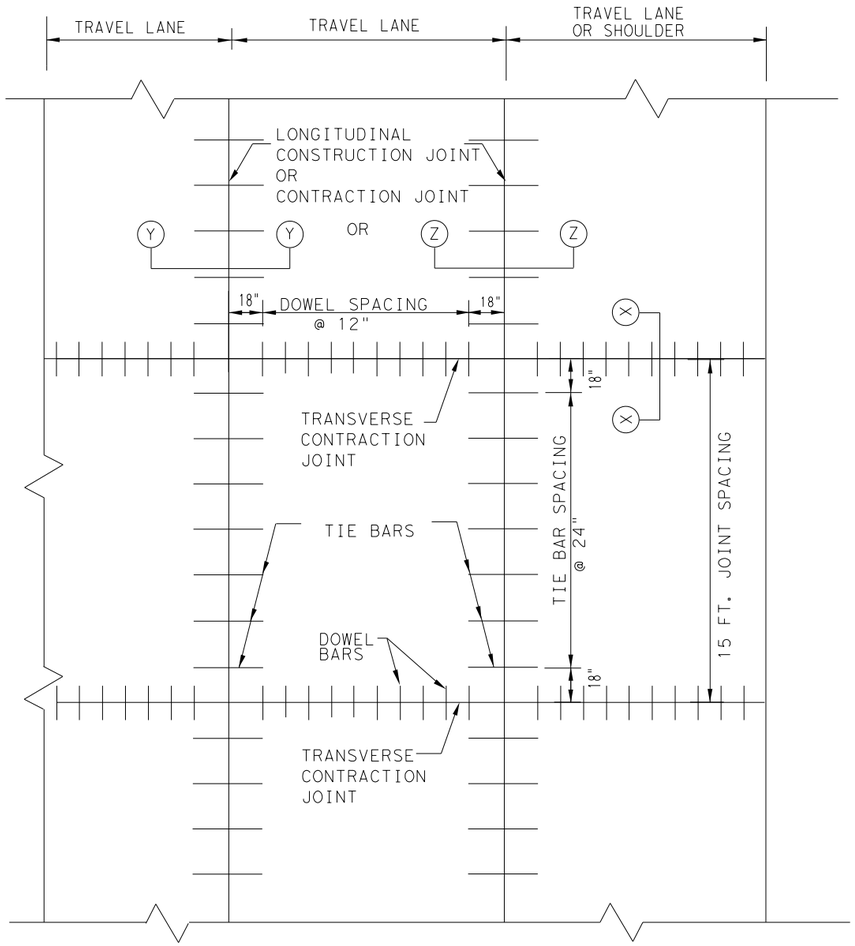
TRANSVERSE CONTRACTION JOINT
SECTION X-X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y-Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z-Z



TYPICAL PAVEMENT LAYOUT
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT ARE NOT COVERED BY THIS STANDARD.
2. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATION FOR "CONCRETE PAVEMENT".
3. THE SPACING BETWEEN TRANSVERSE CONTRACTION JOINTS SHALL BE 15 FT. UNLESS OTHERWISE SHOWN IN THE PLANS.
4. TRANSVERSE CONSTRUCTION JOINTS MAY BE FORMED BY USE OF METAL OR WOOD FORMS EQUAL IN DEPTH TO THE DEPTH OF PAVEMENT, OR BY METHODS APPROVED BY THE ENGINEER.
5. USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL THE FORMED JOINTS.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE JOINT BETWEEN OUTSIDE LANE AND SHOULDER SHALL BE A LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) UNLESS OTHERWISE SHOWN IN THE PLANS. THE SAW CUT DEPTH FOR THE LONGITUDIANL CONTRACTION JOINT (SECTION Z-Z) SHALL BE ONE THIRD OF THE SLABTHICKNESS (T/3).
8. WHEN TYING CONCRETE GUTTER AT A LONGITUDINAL JOINT, THE TIE BAR LENGTH OR POSITION MAY BE ADJUSTED. PROVIDE 3 IN. OF CONCRETE COVER FROM THE BACK OF GUTTER TO THE END OF TIE BAR.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN. 10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. WHEN AN MONOLITHIIC CURB IS SPECIFIED, THE JOINT IN THE CURB SHALL COINCIDE WITH PAVEMENT JOINTS AND MAY BE FORMED BY ANY MEANS APPROVED BY THE ENGINEER.
11. DOWEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1/4 IN. HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED. WHERE DOWEL BAR BASKETS ARE USED, REMOVE THE SHIPPING WIRES.
12. THE DETAIL FOR JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

TABLE NO. 1 DOWELS (SMOOTH BARS)

SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	AVERAGE SPACING (IN.)
6 to 7.5	1" X 18"	12
8 to 10	1 1/4" X 18"	12
>= 10.5	1 1/2" X 18"	12

TABLE NO. 2 TIE BARS (DEFORMED BARS)

SLAB THICKNESS T (IN.)	BAR SIZE	AVERAGE SPACING (IN.)
6 to 7.5	#5	24
>= 8	#6	24

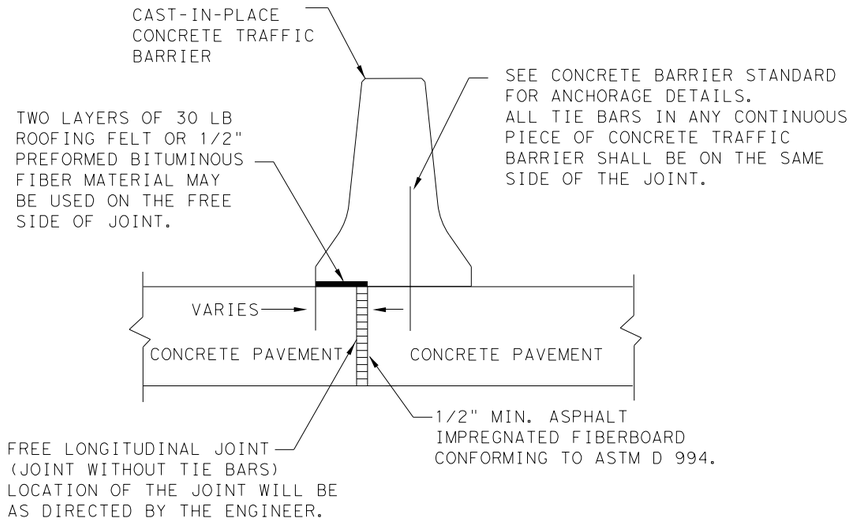
Texas Department of Transportation | Design Division Standard

CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-6 to 12 INCHES

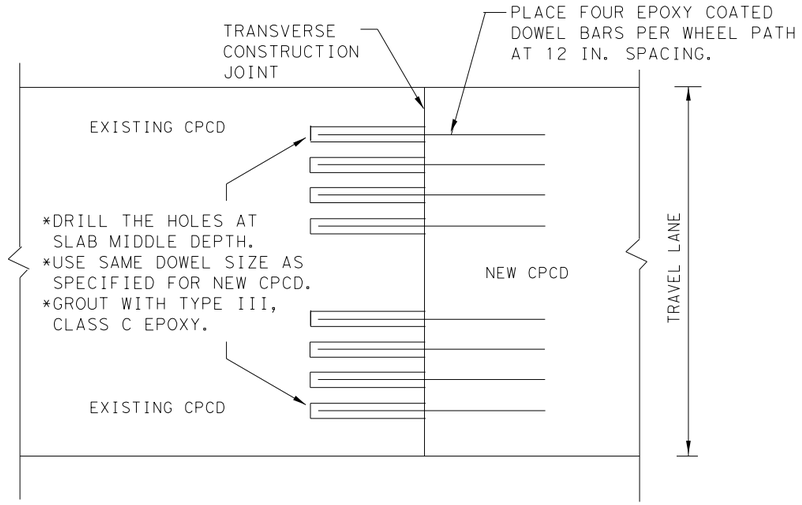
CPCD-14

FILE: cpcd14.dgn	DN: TxDOT	CK: HC	DW: HC	CK: AN
© TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		76

DATE: 10/14/2022 2:47:15 PM
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\cpcd14.dgn



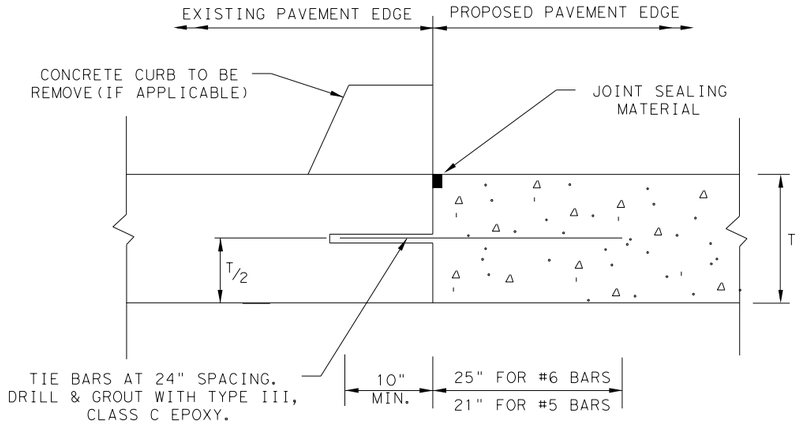
FREE LONGITUDINAL JOINT DETAIL



TRANSVERSE JOINT DETAIL

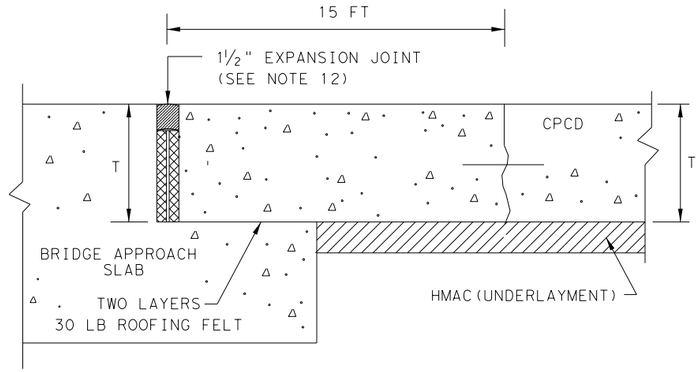
EXISTING CPCD TO NEW CPCD

PLAN VIEW (NOT TO SCALE)



1. BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
2. SPACE TIE BARS AT 24" SPACING. USE #6 BARS FOR 8" AND THICKER SLABS, USE #5 BARS FOR LESS THAN 8" THICK SLABS.
3. THE TRANSVERSE JOINTS OF PROPOSED PAVEMENT SHALL COINCIDE WITH EXISTING PAVEMENT JOINTS UNLESS OTHERWISE SHOWN ON THE PLANS.

LONGITUDINAL WIDENING JOINT DETAIL



TRANSVERSE EXPANSION JOINT DETAIL

AT BRIDGE APPROACH

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

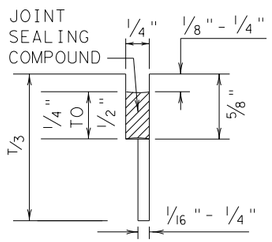
CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-6 to 12 INCHES

CPCD-14

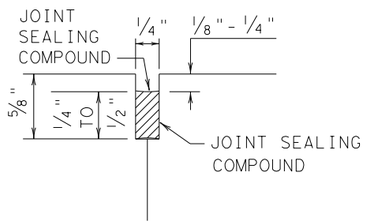
FILE: cpcd14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
© TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		77

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\js14.dgn

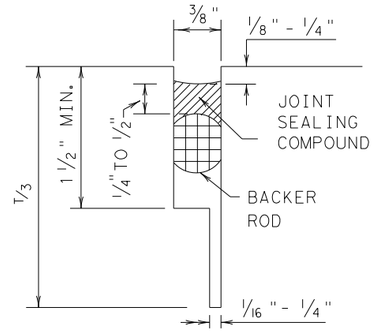
METHOD B: JOINT SEALING COMPOUND



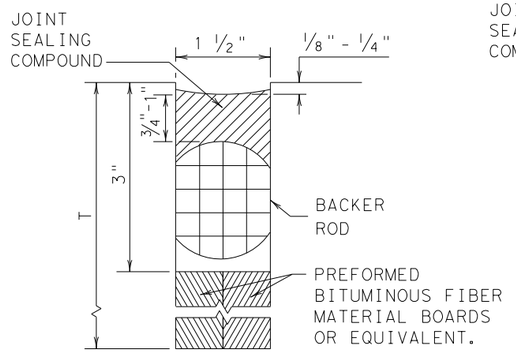
LONGITUDINAL SAWED CONTRACTION JOINT



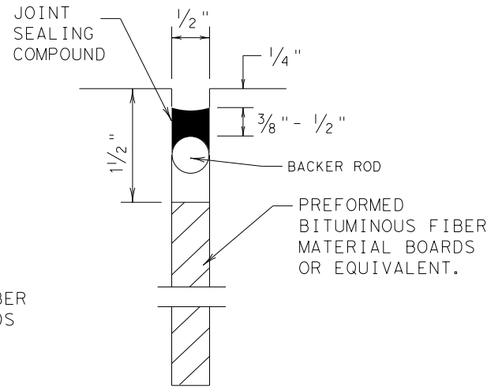
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

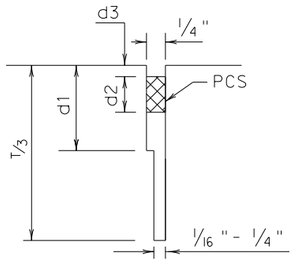


TRANSVERSE FORMED EXPANSION JOINT

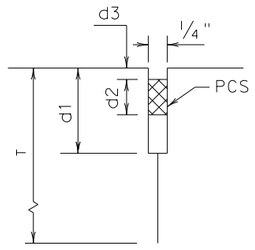


FORMED ISOLATION JOINT

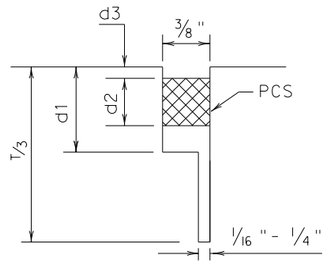
METHOD A: PREFORMED COMPRESSION SEALS (PCS)(DMS-6310 CLASS 6)



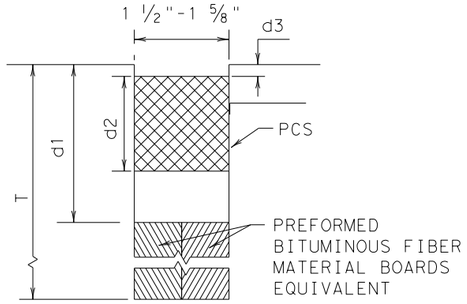
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

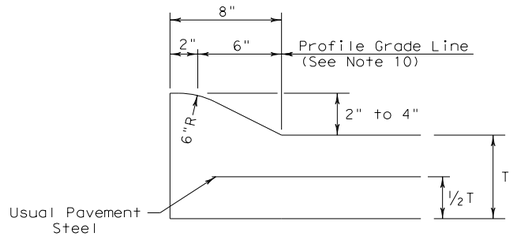
CONCRETE PAVING DETAILS

JOINT SEALS

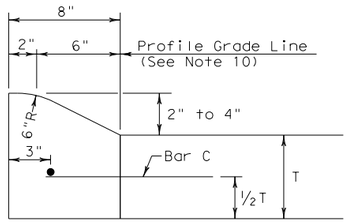
JS-14

FILE: js14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		78

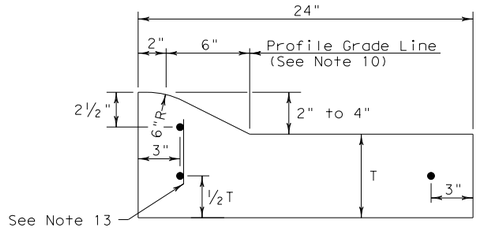
DATE: 10/14/2022
FILE: P:\1161351\04\Design\Civil\Standards\Roadway\cccg22.dgn



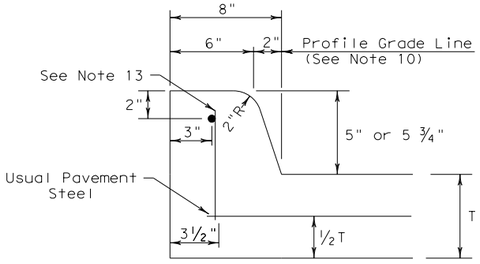
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



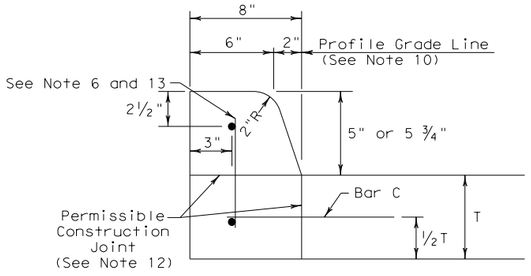
TYPE I CURB
2" - 4" HEIGHT



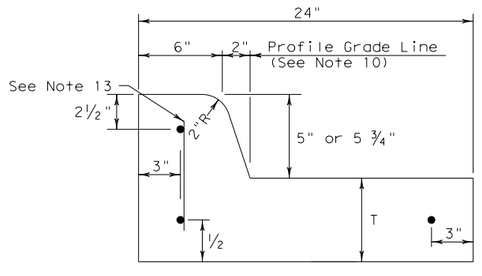
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



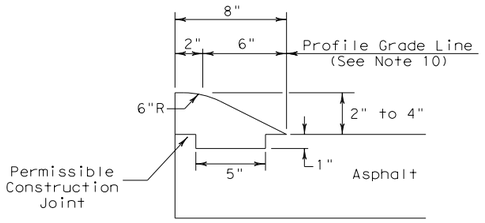
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



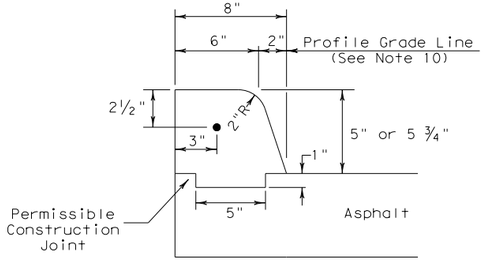
TYPE II CURB
5" - 5 ¾" HEIGHT



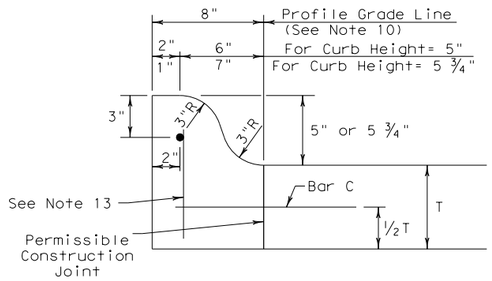
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



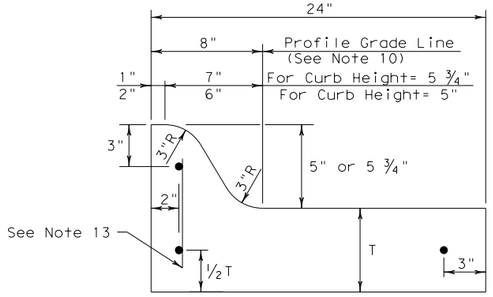
TYPE III CURB (KEYED)
2" - 4" HEIGHT



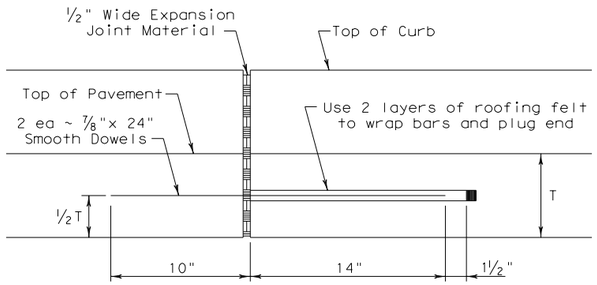
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

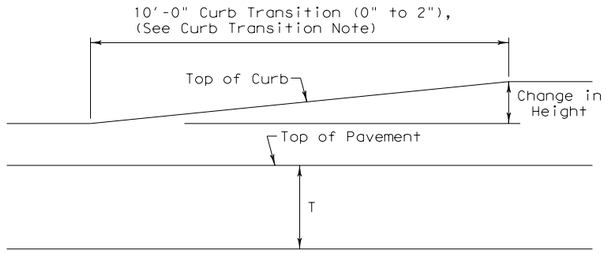


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

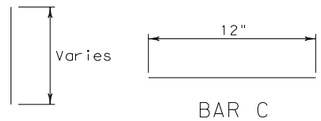
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



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 fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
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 to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
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 horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

Texas Department of Transportation

Design Division Standard

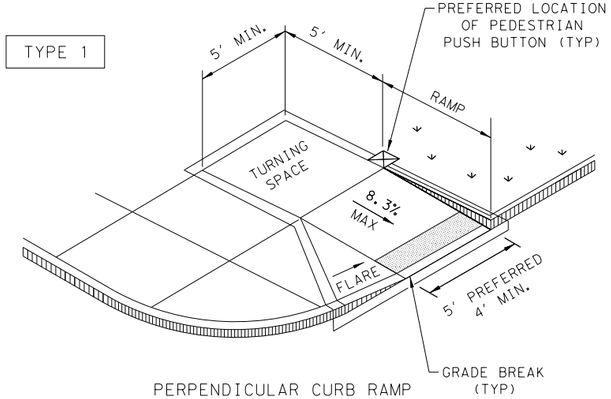
CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM
©TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		79

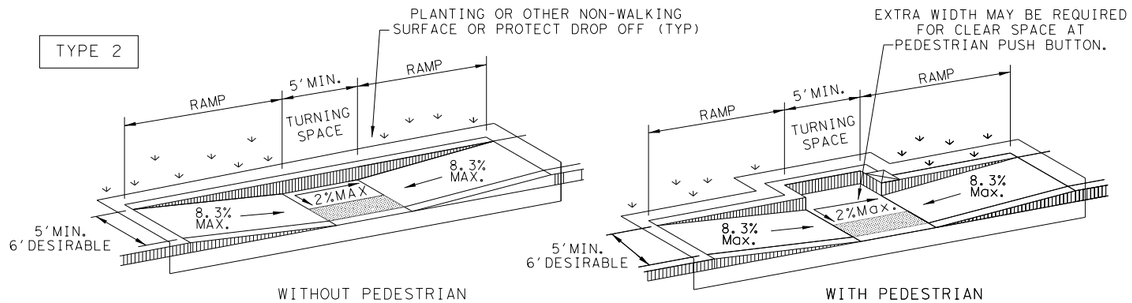
DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\ped18.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

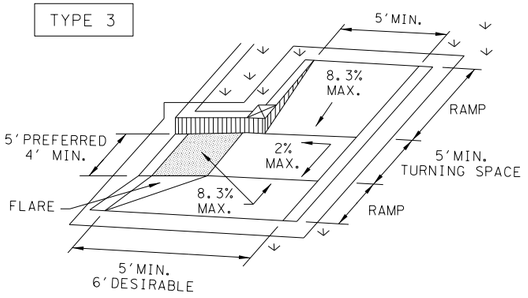


WITHOUT PEDESTRIAN PUSH BUTTON

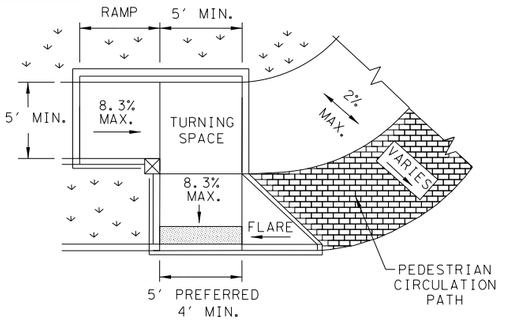
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

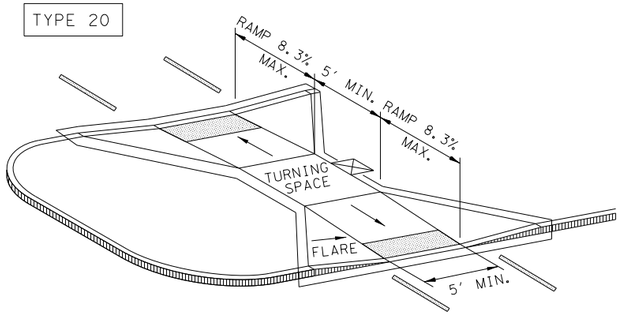


TYPE 6



COMBINATION CURB RAMPS

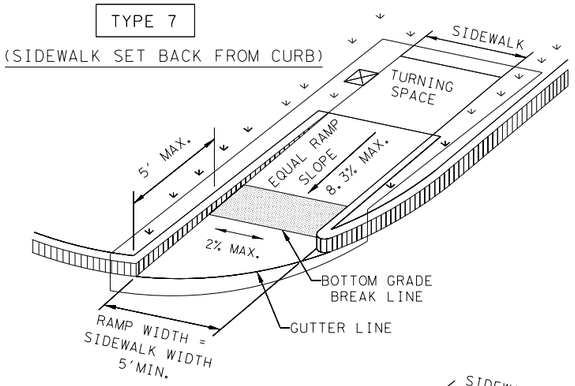
TYPE 20



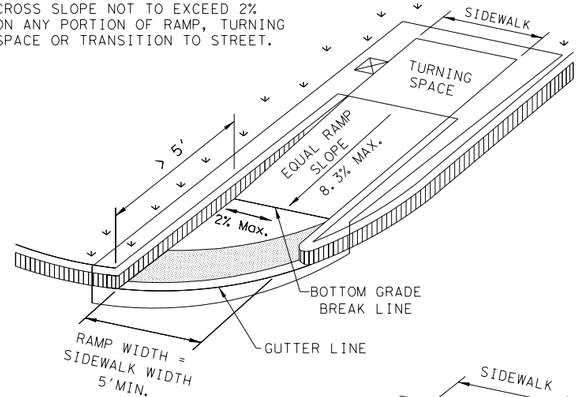
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

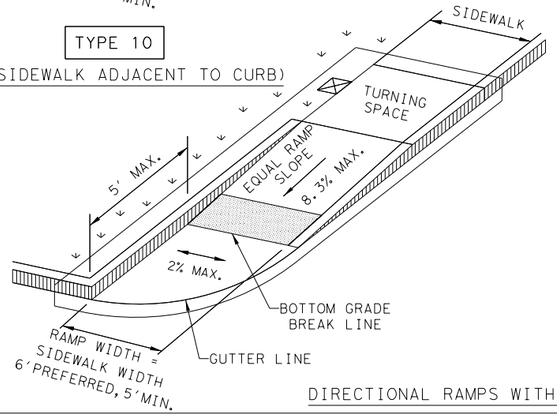


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

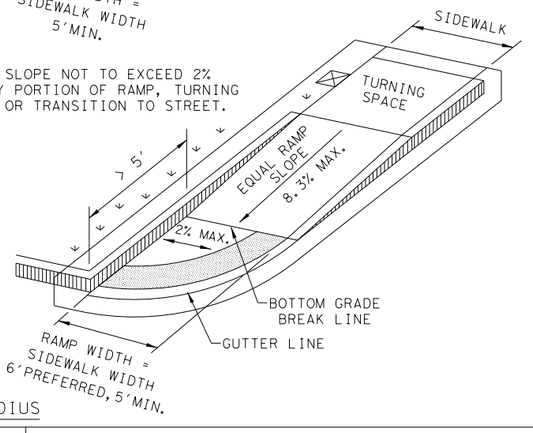


TYPE 10

(SIDEWALK ADJACENT TO CURB)

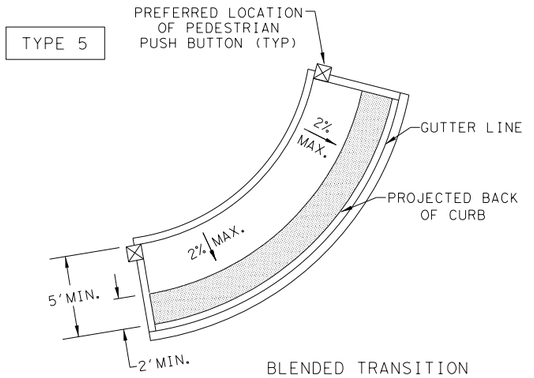


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

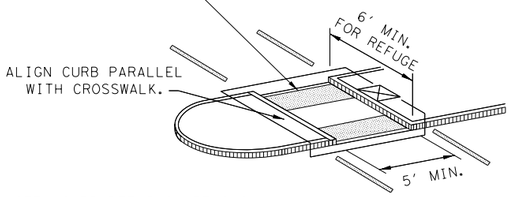
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

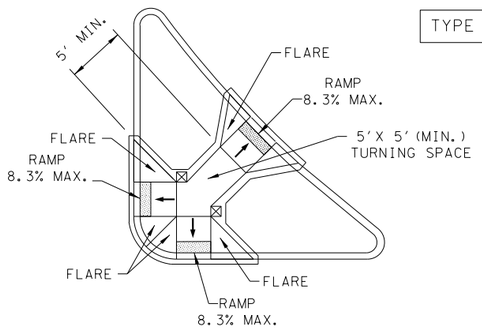
INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

TYPE 21



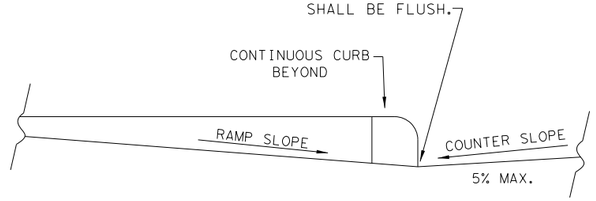
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

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	0610	03	095	IH 30
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	ATL	TITUS		80

DATE: 10/14/2022
FILE: P:\1161535\04\Design\Civil\Standards\Roadway\ped18.dgn

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 applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

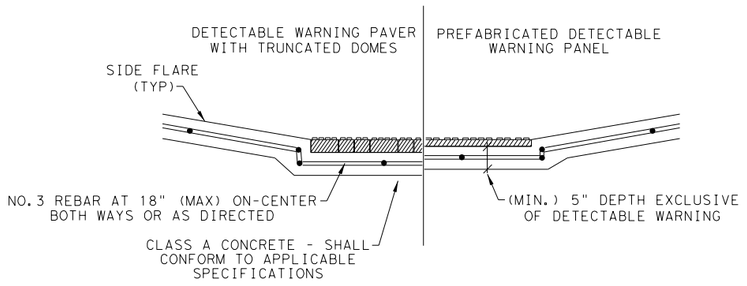
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material 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.

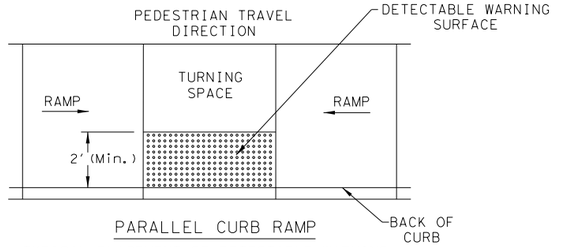
SIDEWALKS

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.



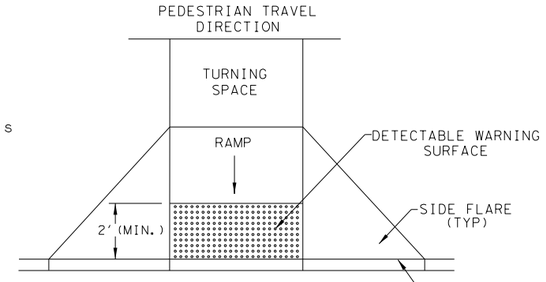
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



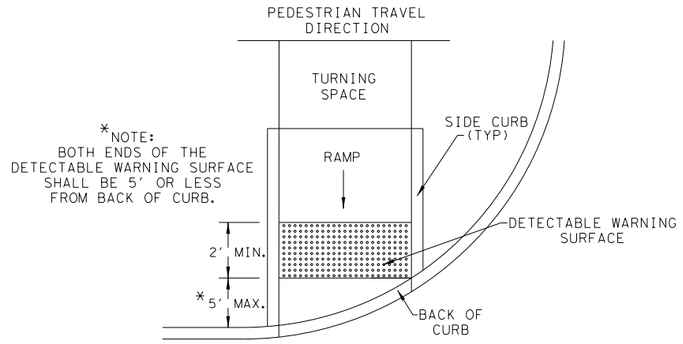
PARALLEL CURB RAMP

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

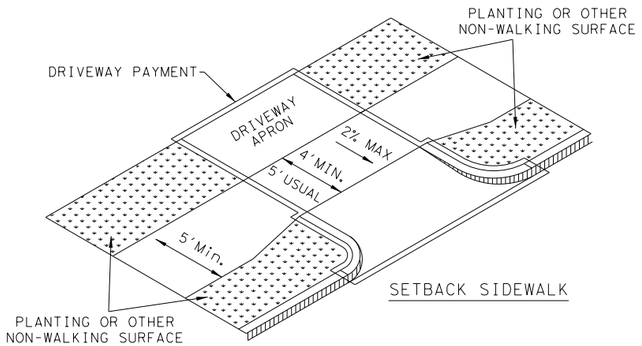
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

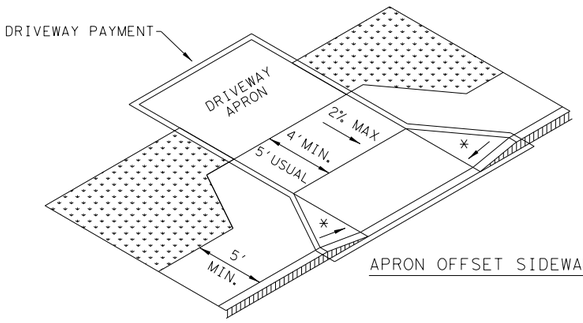
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	ATL	TITUS		81

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\ped18.dgn

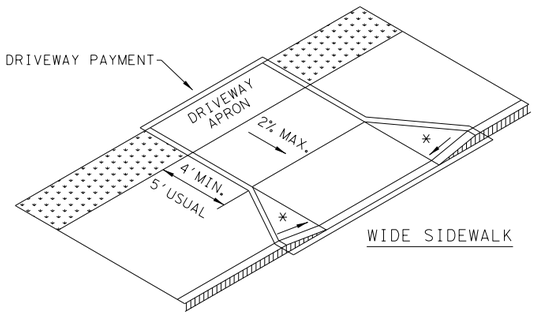
SIDEWALK TREATMENT AT DRIVEWAYS



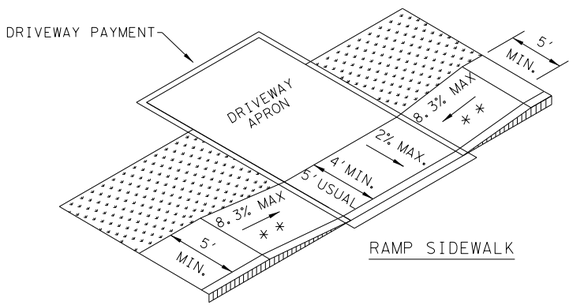
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

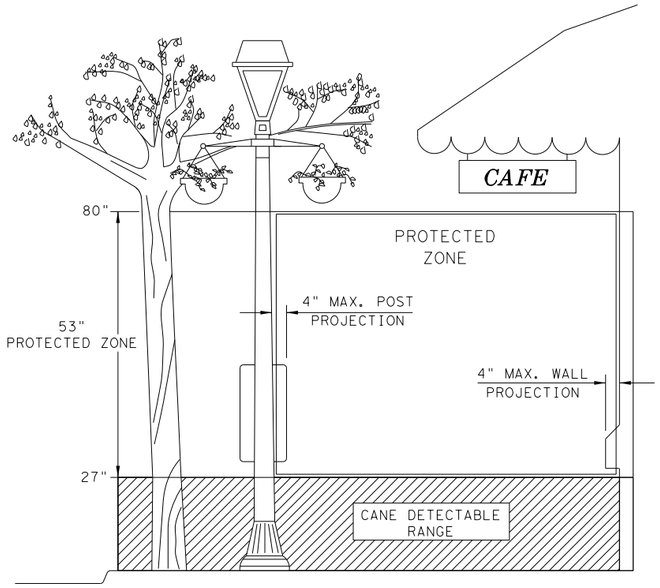


RAMP SIDEWALK

NOTES:

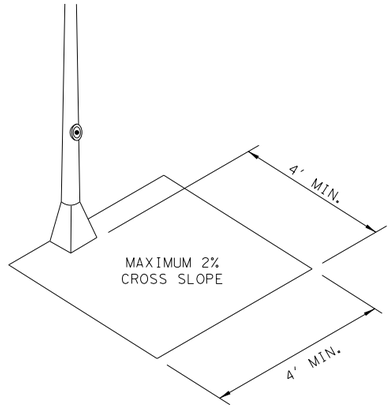
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

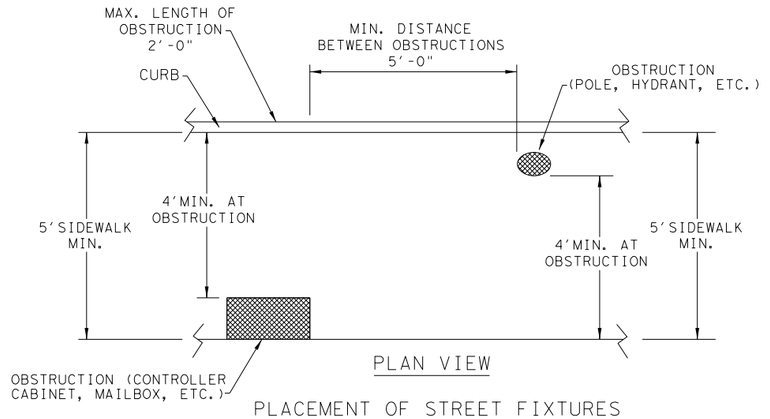


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



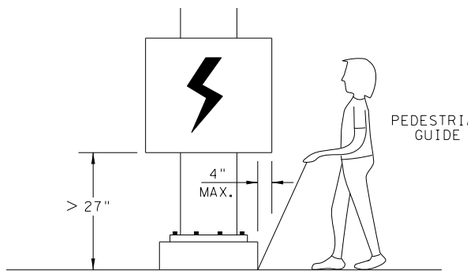
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



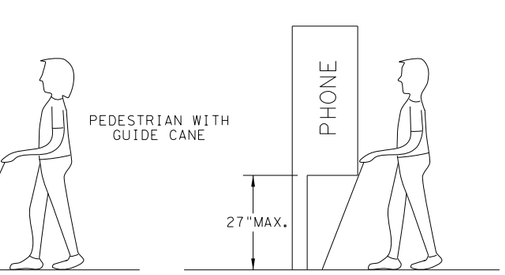
PLAN VIEW

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"

Texas Department of Transportation | Design Division Standard

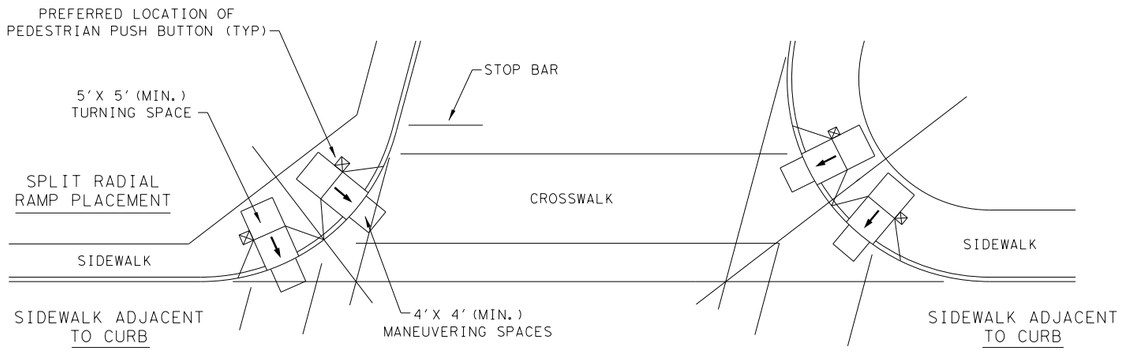
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

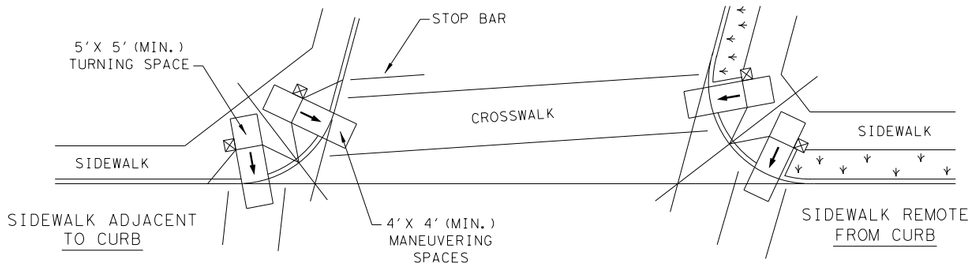
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0610	03	095	IH 30	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	ATL	TITUS		82	

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\ped18.dgn

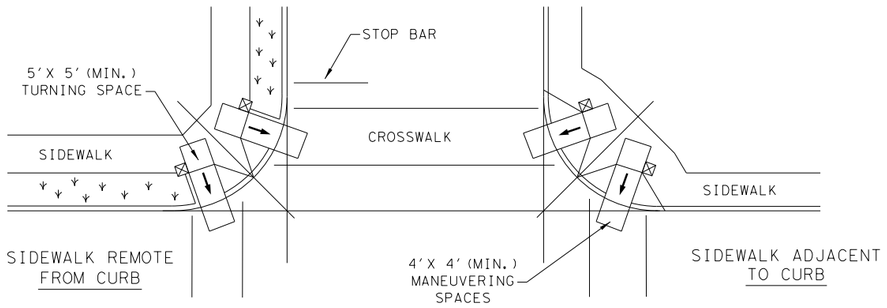
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



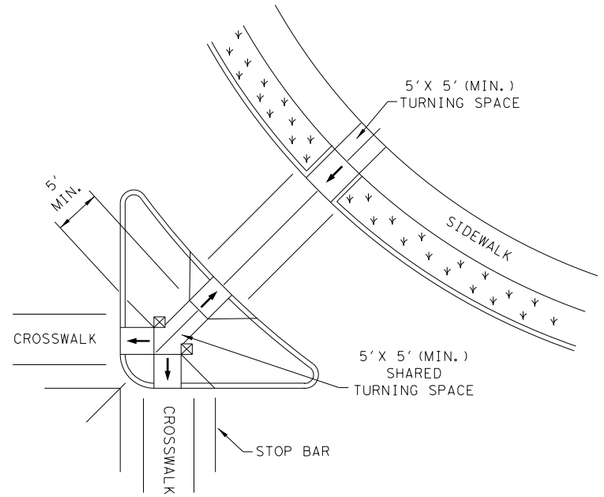
SKEWED INTERSECTION WITH "LARGE" RADIUS



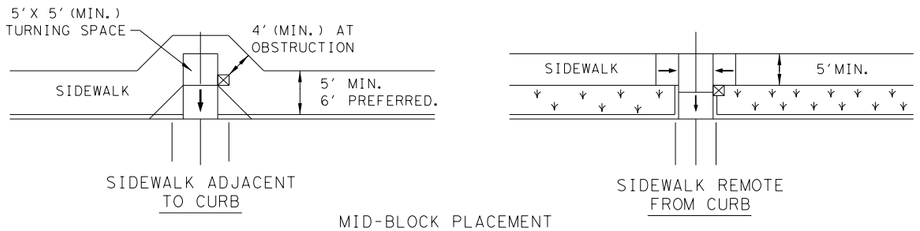
SKEWED INTERSECTION WITH "SMALL" RADIUS



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

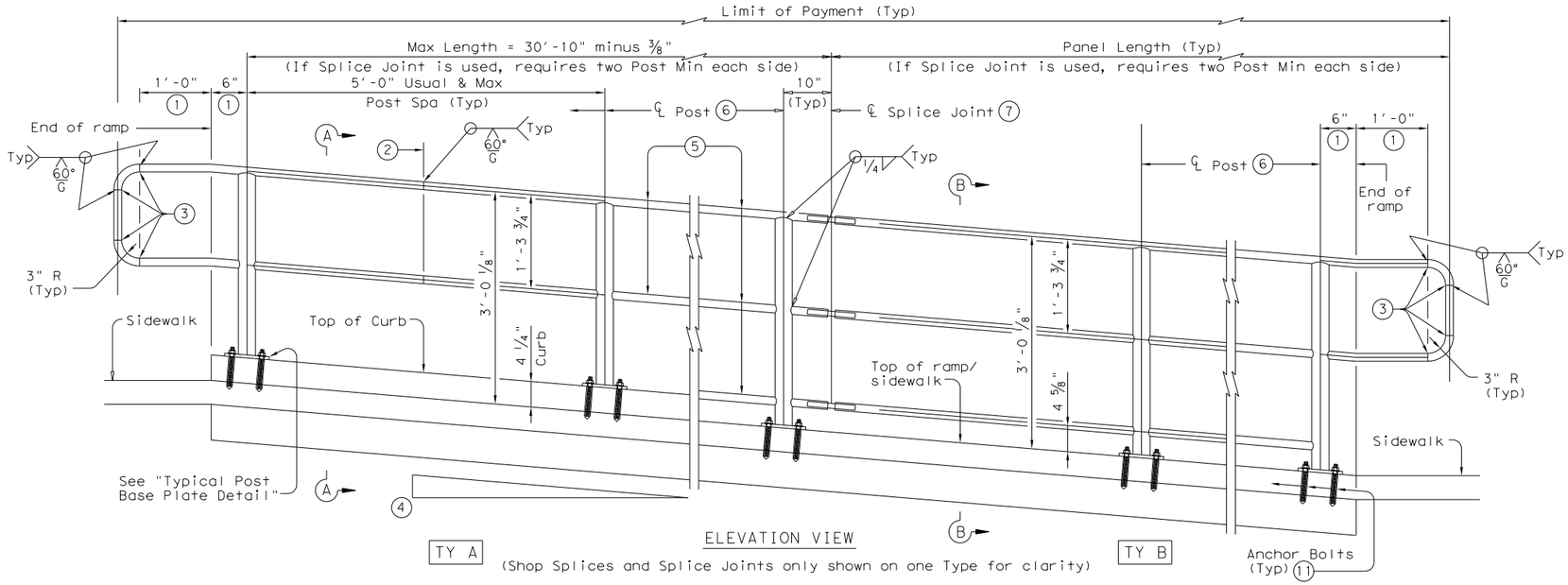
Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

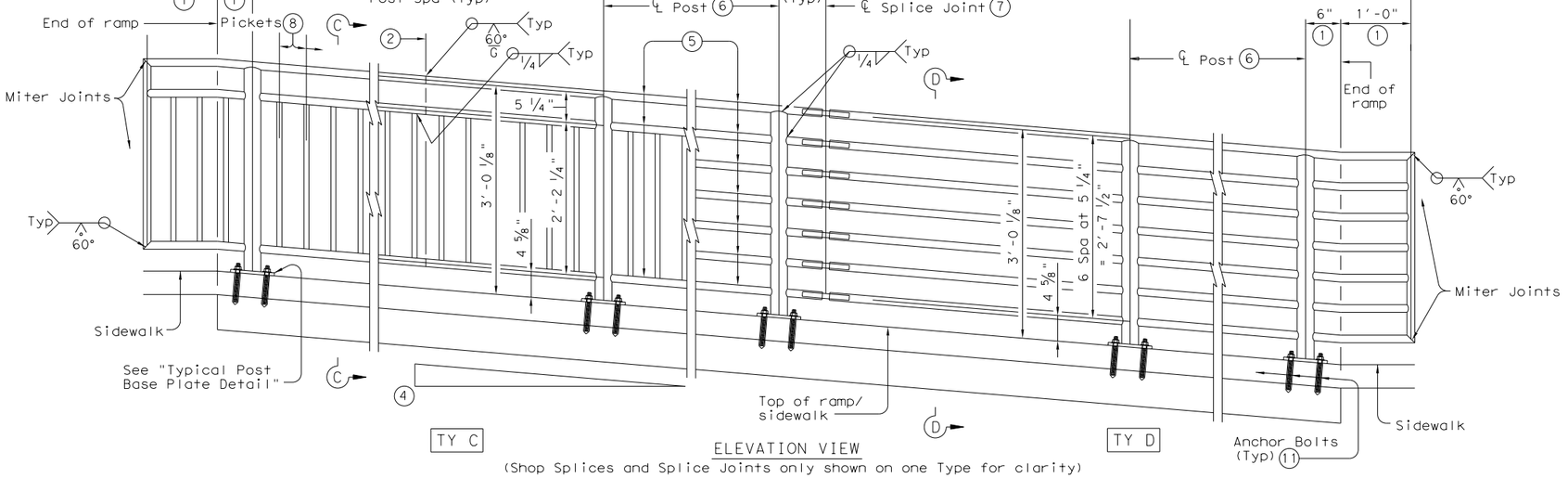
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0610	03	095		IH 30
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	ATL	TITUS			83

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\prd13.dgn



ELEVATION VIEW

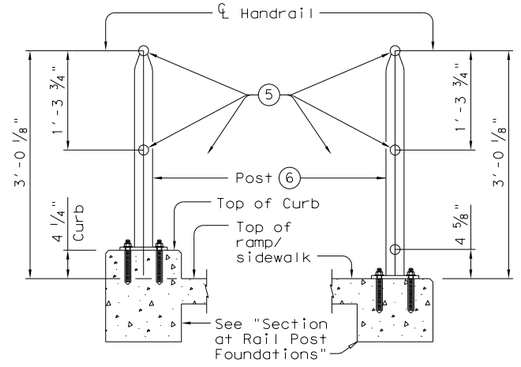
(Shop Splices and Splice Joints only shown on one Type for clarity)



ELEVATION VIEW

(Shop Splices and Splice Joints only shown on one Type for clarity)

RECOMMENDED USAGE ⑨ ⑩	
Dropoff Height/ Condition	Recommended Rail Options
< 30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F

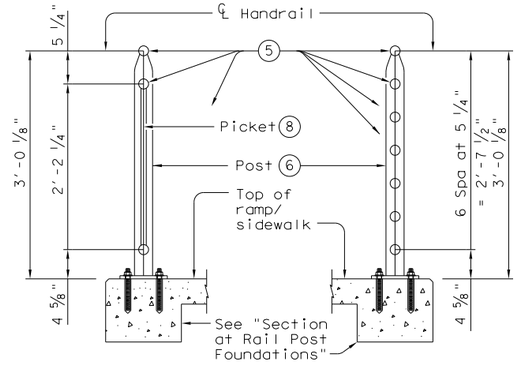


SECTION A-A

(Showing Handrail TY A)

SECTION B-B

(Showing Handrail TY B)



SECTION C-C

(Showing Handrail TY C)

SECTION D-D

(Showing Handrail TY D)

1. Parallel to ground.
2. One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
3. Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
4. See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
5. 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.
6. 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
7. See "Handrail Fabrication Details" for Splice Joints.
8. ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.
9. When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
10. Not to be used on bridges.
11. See "General Notes" for anchor bolt information.

SHEET 1 OF 3

Texas Department of Transportation

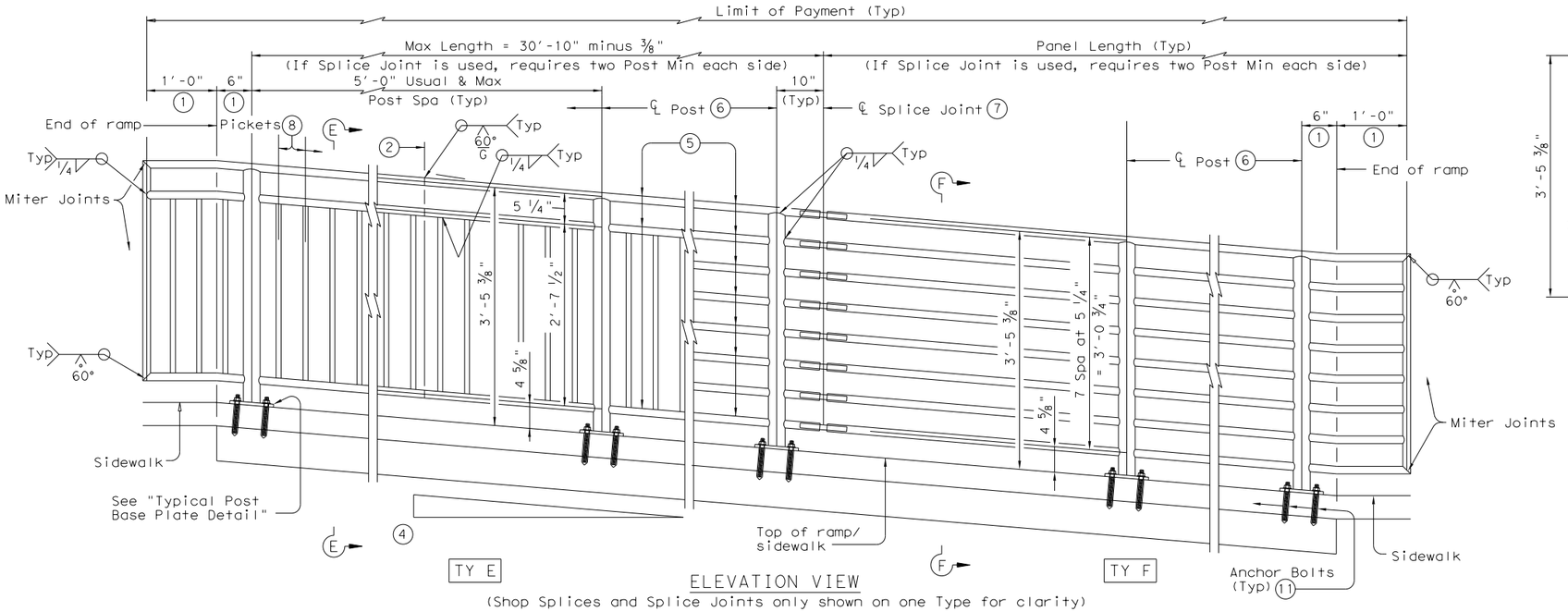
Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

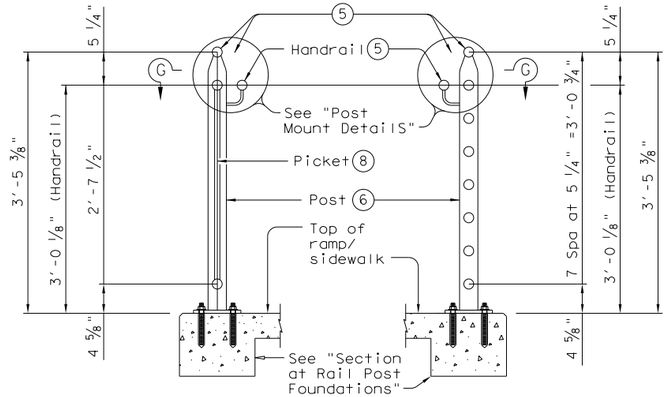
FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT Decmeber 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		84

DATE: 10/14/2022
FILE: P:\116335\04\Design\Civil\Standards\Roadway\prd13.dgn



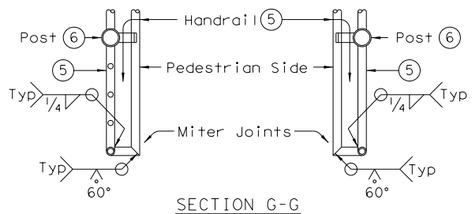
ELEVATION VIEW

(Shop Splices and Splice Joints only shown on one Type for clarity)

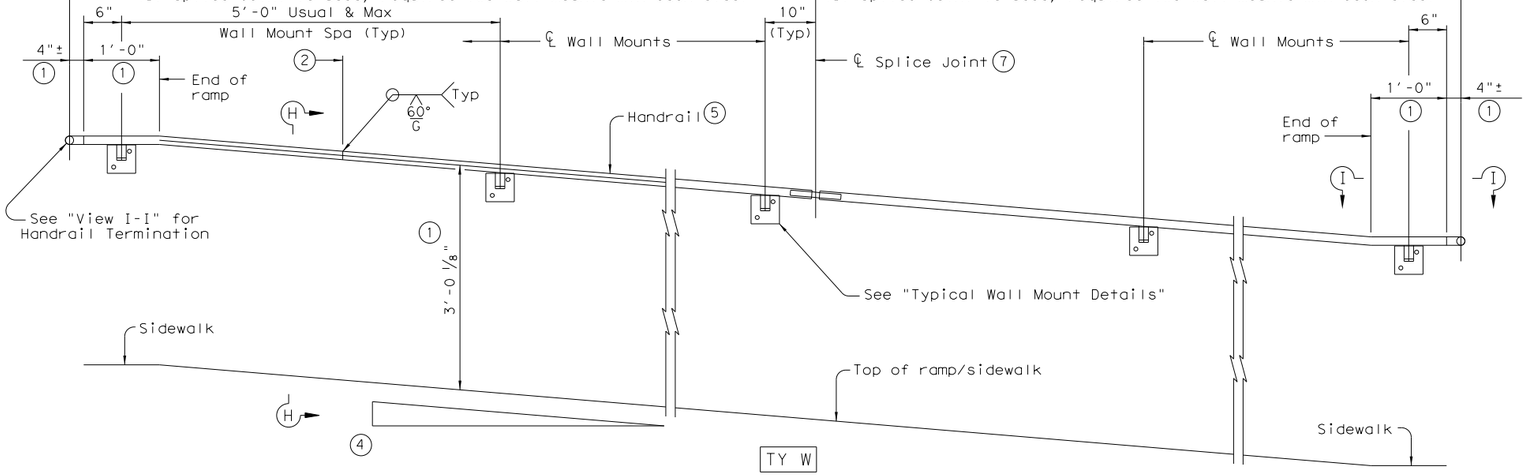


SECTION E-E
(Showing Handrail TY E)

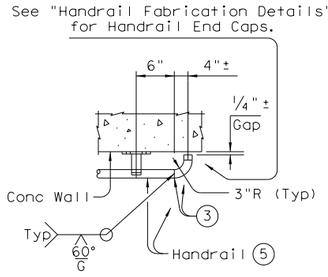
SECTION F-F
(Showing Handrail TY F)



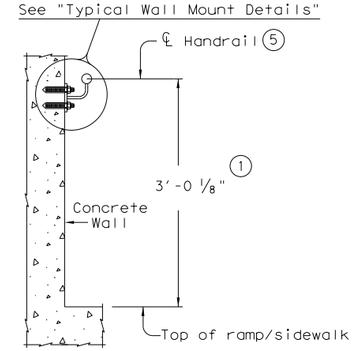
SECTION G-G
(Showing Handrail Termination)



ELEVATION VIEW



VIEW I-I
(Showing Handrail Termination)



SECTION H-H
(Showing Handrail TY W)

(1) Parallel to ground.

(2) One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(3) Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

(4) See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.

(7) See "Handrail Fabrication Details" for Splice Joints.

(8) ℄ ⅝" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

(11) See "General Notes" for anchor bolt information.

Texas Department of Transportation

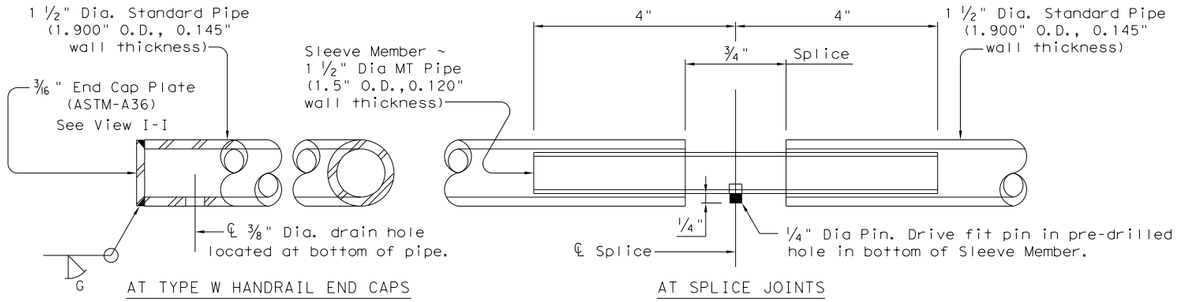
Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED MAY, 2013 (VP)	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		85

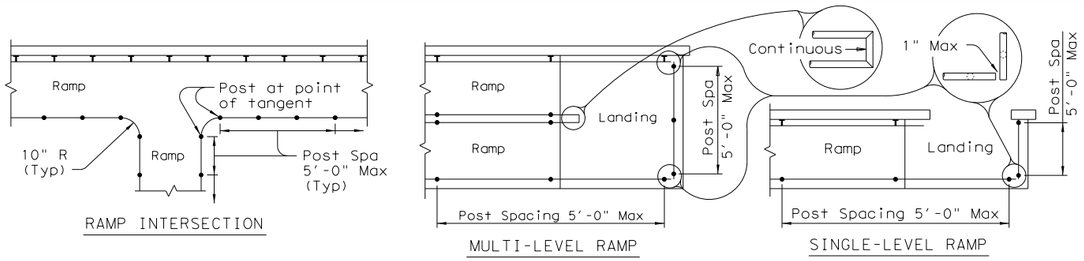
DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\prd13.dgn



AT TYPE W HANDRAIL END CAPS

AT SPLICE JOINTS

HANDRAIL FABRICATION DETAILS

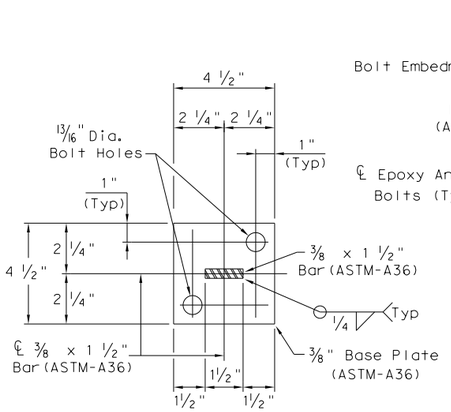


RAMP INTERSECTION

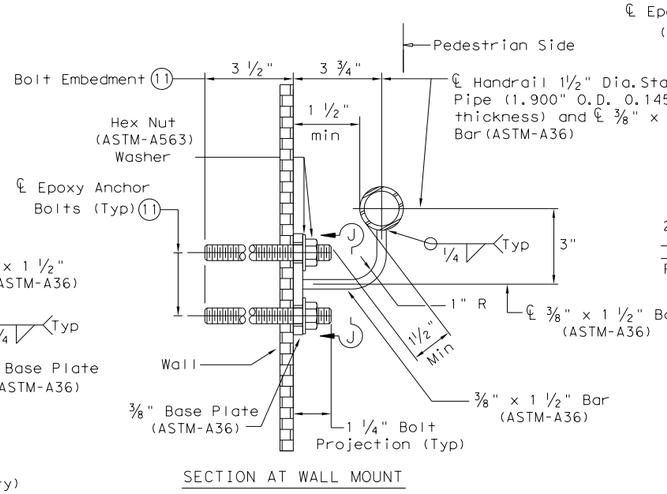
MULTI-LEVEL RAMP

SINGLE-LEVEL RAMP

PLAN SHOWING RAIL AT RAMP CONDITIONS

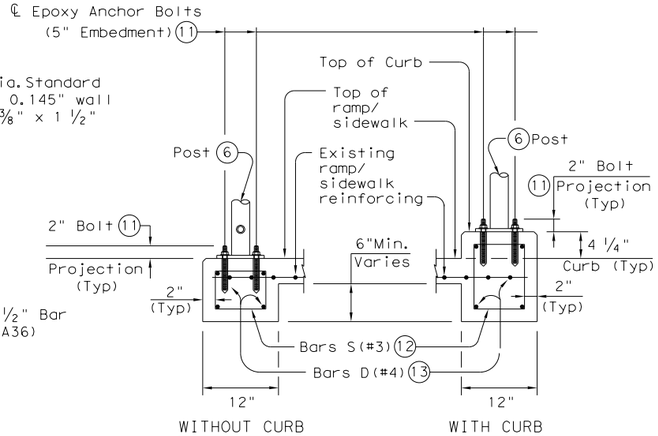


SECTION J-J
(Anchor Bolts not shown for clarity)



SECTION AT WALL MOUNT

TYPICAL WALL MOUNT DETAILS



SECTION AT RAIL POST FOUNDATIONS

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

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

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. threaded rod embedment depth for wall mounts is 3 ½" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ⅛" by grinding.

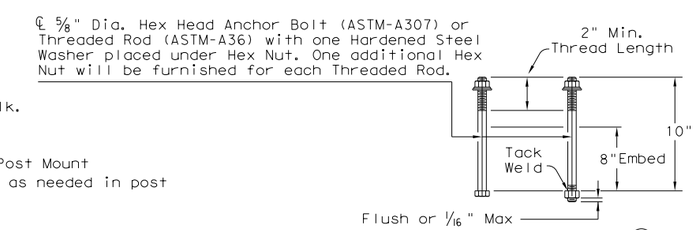
(5) 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

(6) 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diamenter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

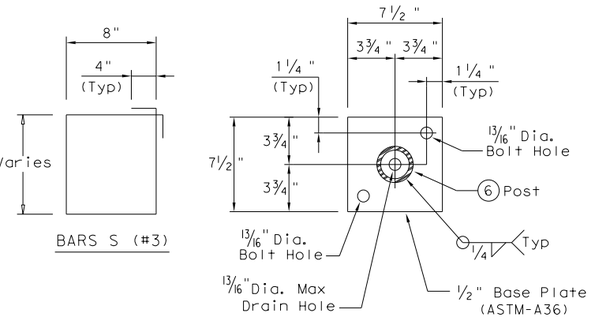
(11) See "General Notes" for anchor bolt information.

(12) Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

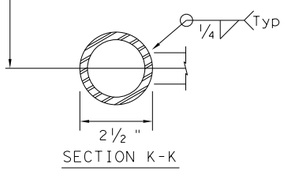
(13) Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.



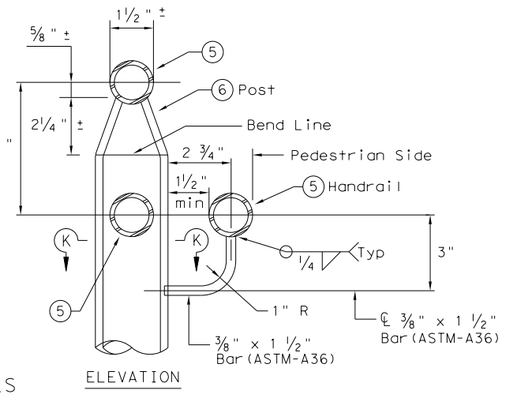
CAST-IN-PLACE ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)



TYPICAL POST BASE PLATE DETAIL



SECTION K-K



ELEVATION

POST MOUNT DETAILS

SHEET 3 OF 3

Texas Department of Transportation

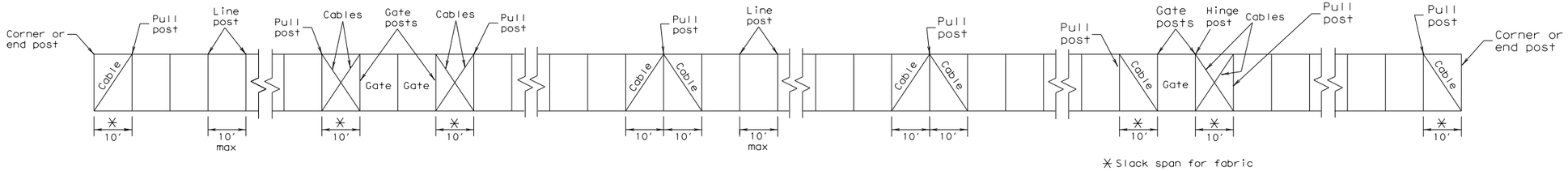
Design Division Standard

PEDESTRIAN HANDRAIL DETAILS

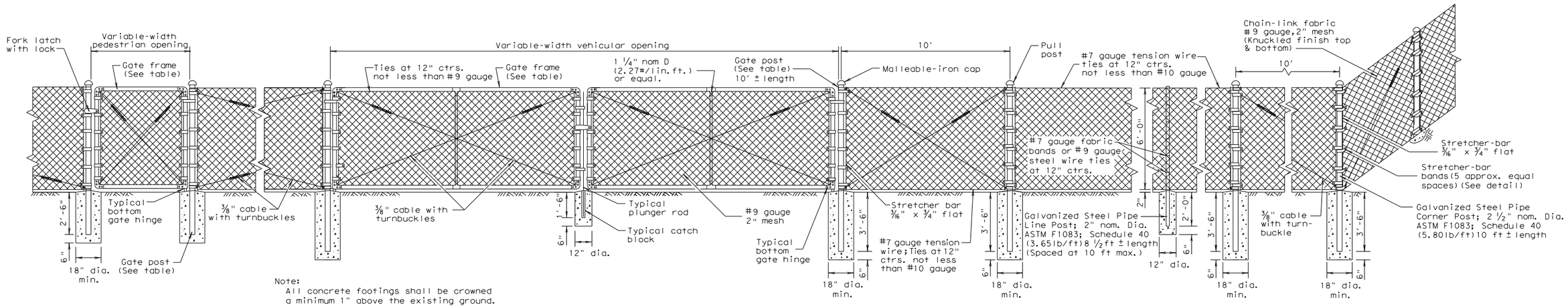
PRD-13

FILE: prd13.dgn	DN: TxDOT	CK: AM	DW: JTR	CK: CGL
©TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET NO.
	ATL	TITUS		86

DATE: 10/14/2022 2:47:23 PM
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\clf10.dgn



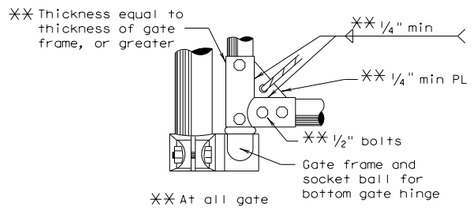
TYPICAL CABLE AND POST ARRANGEMENT



Note:
All concrete footings shall be crowned a minimum 1" above the existing ground.

CHAIN-LINK BARRIER FENCE (6 FT.)

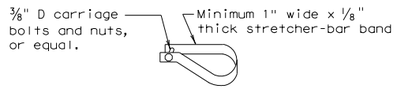
Foundation designs shown are "minimums" for a 6 ft. fence.
Taller fences may require larger foundation designs.



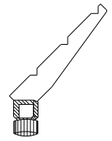
TYPICAL BOTTOM GATE HINGE

GATE (TYPES AND SIZES)	
Single Inclusive	Double Inclusive
Up to 6' Over 6' to 12' Over 12' to 18' Over 18'	Up to 12' Over 12' to 26' Over 26' to 36' Over 36'

GATE FRAME (WEIGHT)		GATE POST (WEIGHT)	
SIZE	WT./LIN. FT.	SIZE	WT./LIN. FT.
1 1/2" nom dia. or equal	2.72 Lbs.	2 1/2" nom dia. or equal	5.79 Lbs.
		3 1/2" nom dia. or equal	9.11 Lbs.
		6" nom dia.	18.97 Lbs.
		8" nom dia.	24.70 Lbs.

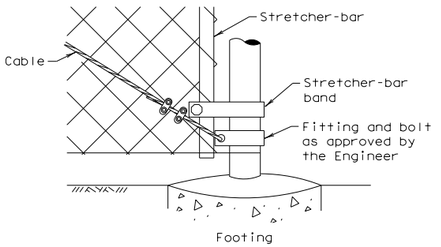


TYPICAL STRETCHER-BAR BAND

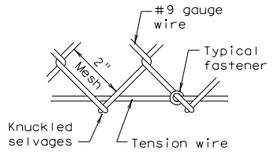


"OPTIONAL" 3 WIRE 45° BARBED WIRE ARM

Barbed wire arm related items shall conform to Item 550, "Chain Link Fence."



TERMINAL POST DETAIL



FABRIC & TENSION WIRE DETAIL, TOP & BOTTOM

GENERAL NOTES

1. Items hereon shall conform to Item 550, "Chain Link Fence."
2. Typical installation plan may vary as shown elsewhere on the plans or as directed by the Engineer. Location of gates shown elsewhere on plans.
3. Gate-frame members shall be bolted, at frame corners, to joint fittings with four 1/2" bolts per joint.
4. All cable connections are to be made with two 3/8" cable clamps.
5. All pull posts and end posts and their foundations shall have the same respective dimensions as those shown for corner post.
6. All pull post shall be furnished with two stretcher bars.
7. One end of each turnbuckle may be attached directly to fittings with a clevis.
8. Concrete footings are to be crowned at the top to shed water.

Texas Department of Transportation

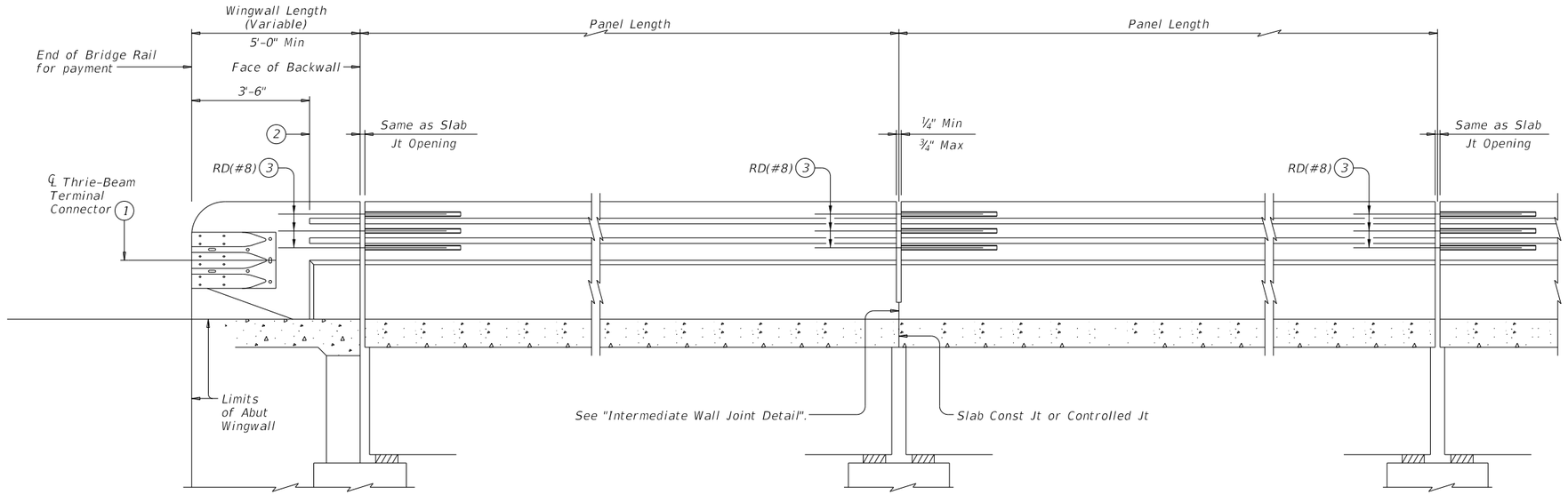
Design Division Standard

CHAIN LINK FENCE

CLF-10

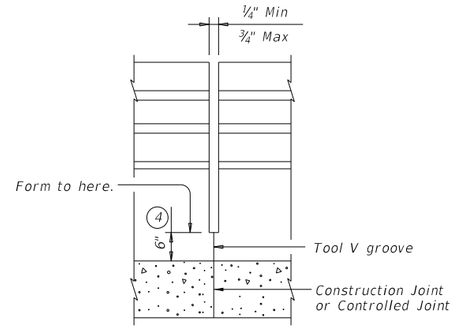
FILE: clf10.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP
© TxDOT 1996 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		87

DATE: 10/14/2022 2:47:24 PM
FILE: P:\116135\04\Design\Civil\Standards\Roadway\rlstd016-19.dgn



AT ABUTMENTS | AT BENTS WITHOUT SLAB EXP JOINTS | AT BENTS WITH SLAB EXP JOINTS

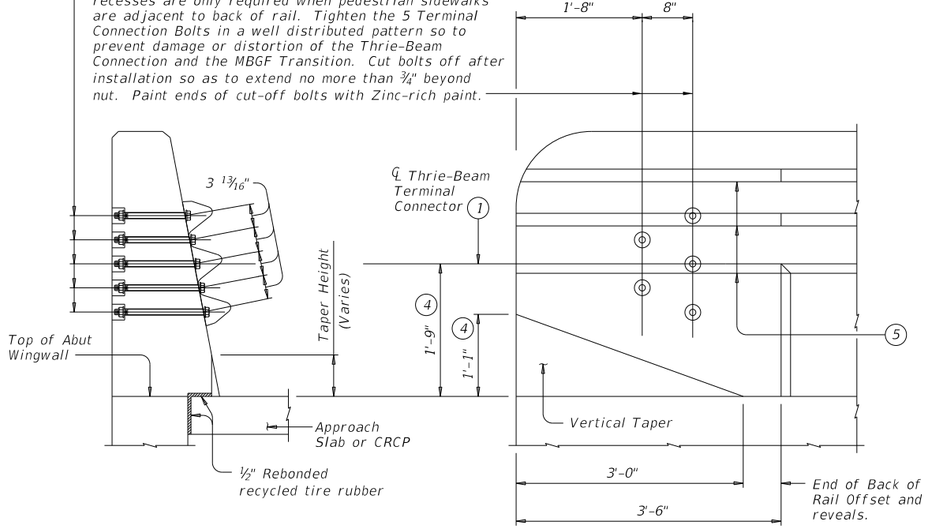
ROADWAY ELEVATION OF RAIL



INTERMEDIATE WALL JOINT DETAIL (8)

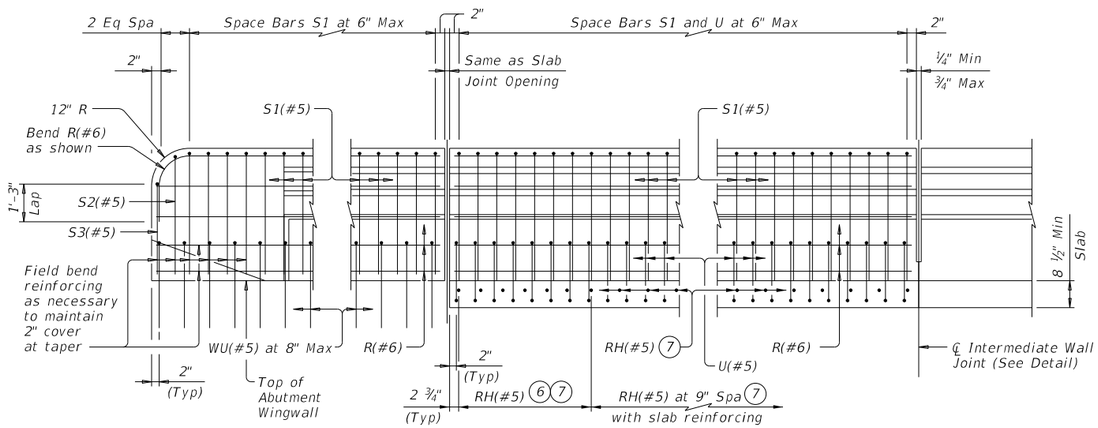
Provide at all Interior Bents without slab expansion joints.

℄ 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. Bolt recesses are only required when pedestrian sidewalks are adjacent to back of rail. 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.



SECTION | ELEVATION

TERMINAL CONNECTION DETAILS



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT (8)

(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) End back of rail offset and reveals. See "Terminal Connection Details".

(3) Located at rail joints. For placement and assembly of RD(#8) bar, see "Sections Thru Rail On Abutment Wingwall", "Sections Thru Rail On Bridge Slab" and "Bar RD(#8) Assembly Detail".

(4) Increase 2" for structures with overlay.

(5) Back of rail offset and reveals may, with Engineer's approval, be continued to end of the railing.

(6) RH(#5) at 7" Spacing = 3'-6" with thickened slab end reinforcing.

(7) Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past ℄ of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)

(8) RD(#6) bars located at rail joints are not shown for clarity.

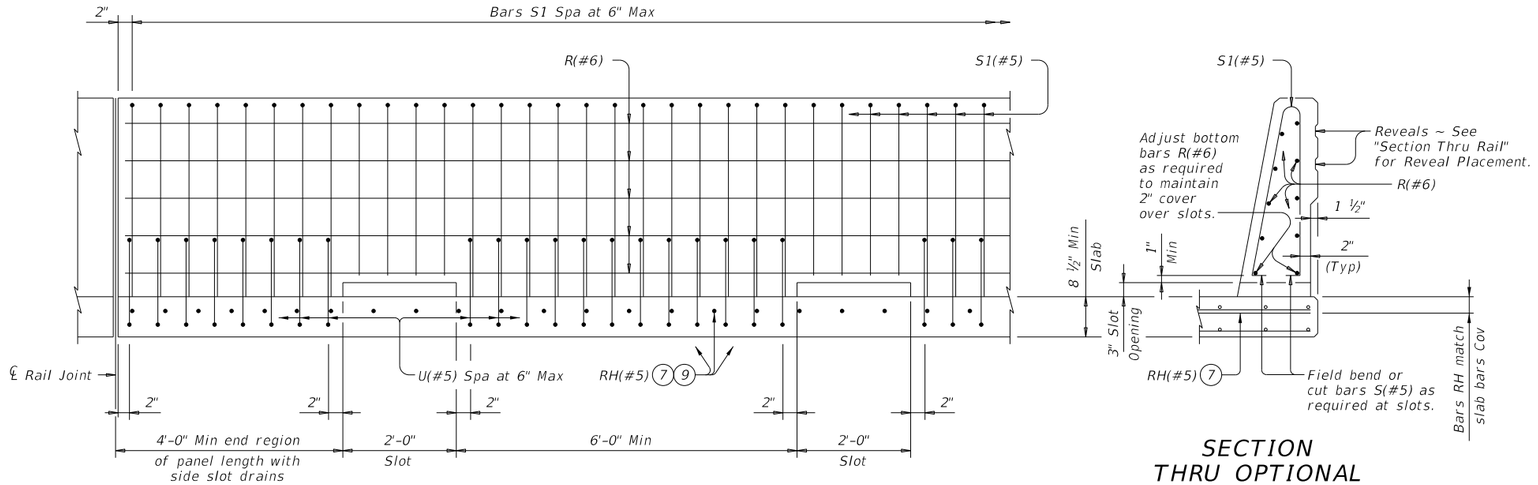
Texas Department of Transportation | Bridge Division Standard

TRAFFIC RAIL

TYPE T80SS

FILE: rlstd016-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		88

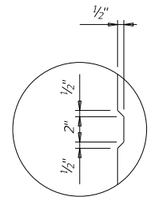
DATE: 10/14/2022 2:47:25 PM
FILE: P:\116335\04\Design\Civil\Standards\Roadway\rlstd016-19.dgn



OPTIONAL SIDE SLOT DRAIN DETAIL (8)

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots will not be permitted.

SECTION THRU OPTIONAL SIDE SLOT DRAIN



TYPICAL REVEAL DETAIL

(4) Increase 2" for structures with overlay.

(7) Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past ℄ of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)

(8) RD(#6) bars located at rail joints are not shown for clarity.

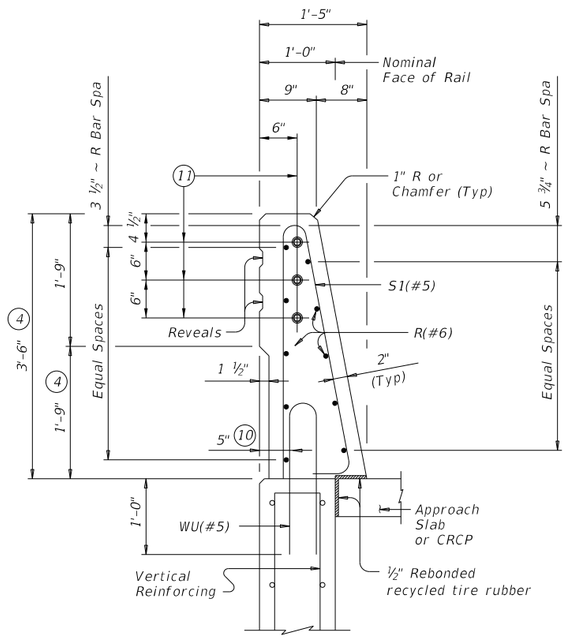
(9) See "Elevation Showing Typical Reinforcing Placement" for spacing RH(#5) bars.

(10) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls on traffic side of wall.

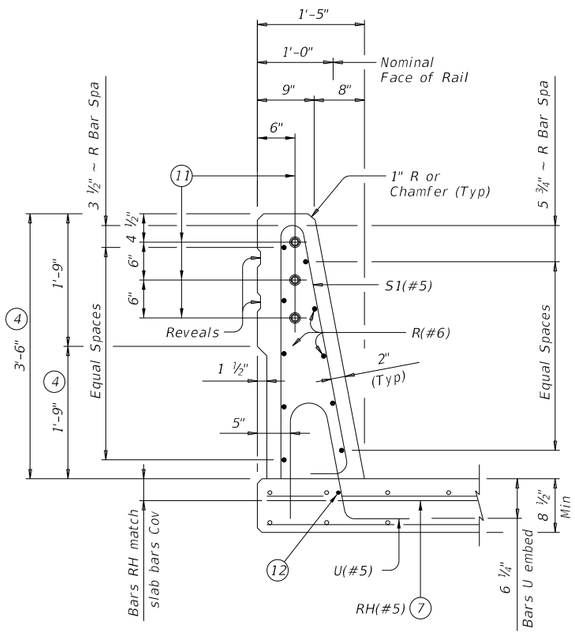
(11) ℄ 3 Bars RD(#8) placed as shown at each joint. Center RD(#8) bar at joint locations with 1 ¼" PVC pipe Sch 80 sleeve on one side of joint. See "Bar RD(#8) Assembly Detail".

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

(13) Mounting this rail to retaining walls requires additional details not covered by this standard.

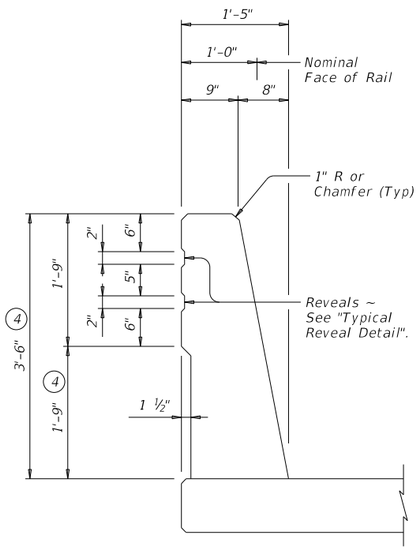


ON ABUTMENT WINGWALLS (13)



ON BRIDGE SLAB

SECTIONS THRU RAIL (13)



REVEAL PLACEMENT

(Showing location of Reveals)

Texas Department of Transportation

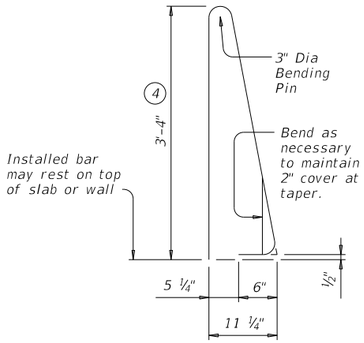
Bridge Division Standard

TRAFFIC RAIL

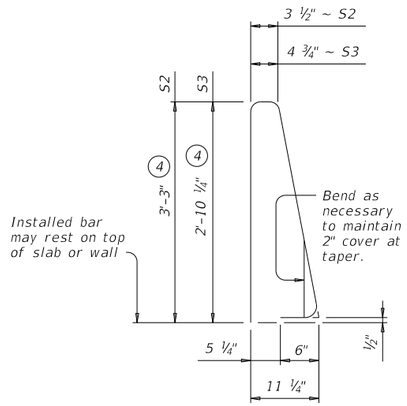
TYPE T80SS

FILE: rlstd016-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		89

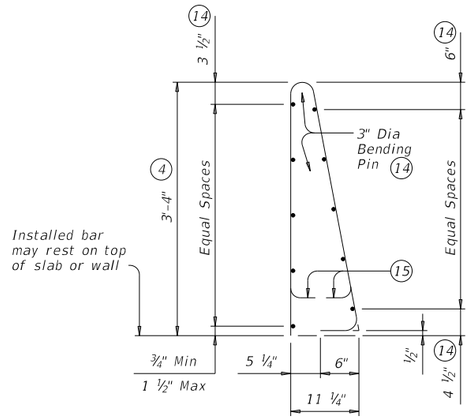
DATE: 10/14/2022 2:47:26 PM
FILE: P:\116135\04\Design\Civil\Standards\Roadway\rlstd016-19.dgn



BARS S1 (#5)

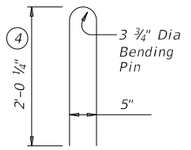


BARS S2-3 (#5)

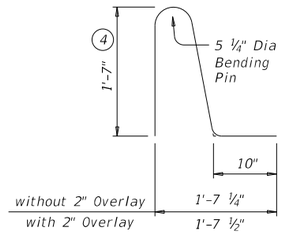


OPTIONAL WELDED WIRE REINFORCEMENT (WWR)

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (Cumulative Total) Wire Area	3.770 Sq In.	0.530 Sq In. per Ft
	No. of Wires	Spacing
Minimum	10	4"
Maximum	14	8"
Maximum Wire Size Differential	The smaller wire must have an area of 40% or more of the larger wire.	

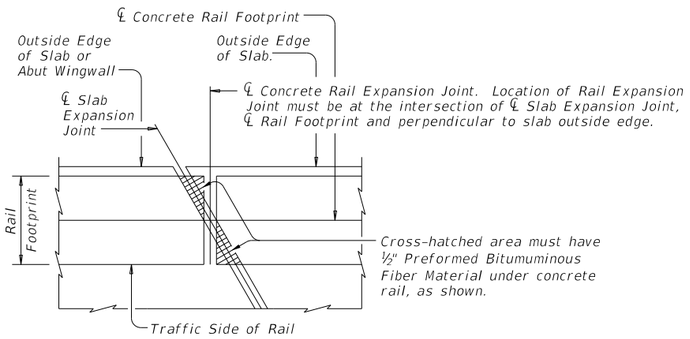


BARS WU (#5)



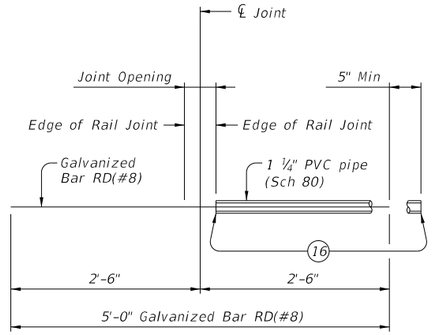
BARS U (#5)

(4) Increase 2" for structures with overlay.
(14) No longitudinal wires may be within bend area.
(15) Bend or cut as required to clear drain slots.
(16) Tape ends of 1 ¼" PVC Sch 80 to prevent concrete or mortar from seeping in.



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.



BAR RD(#8) ASSEMBLY DETAIL

CONSTRUCTION NOTES:

This railing may be constructed by the slipform process 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 slipform operations is acceptable. Welding may be performed at a minimum spacing of 3 ft between the cage and the anchorage. It is permissible to weld to bars U, WU and S 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. Paint welded areas on epoxy coated and/or galvanized reinforcing with an organic zinc rich paint in accordance with Item 445 "Galvanizing".

If rail is slipformed, apply an heavy epoxy bead 1" behind toe of traffic side of rail to concrete deck just prior to slip forming. Provide a ⅜" width x ¼" tall heavy epoxy bead with Type III, Class C or a Type V epoxy.

The back of railing must be vertical unless otherwise shown on the plans or approved by the Engineer.

MATERIAL NOTES:

Galvanize RD(#8) bar as shown.

Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere.

Provide Grade 60 reinforcing steel.

Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized. Do not epoxy coat RD(#8) bars.

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 or galvanized ~ #6 = 2'–5"
Epoxy coated ~ #6 = 3'–7"

GENERAL NOTES:

This rail has been evaluated and accepted to be of equal strength to railings with like geometry, which have been crash tested to meet MASH TL-5 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

Rail anchorage details shown on this standard may require modification for select structure types.

See appropriate details elsewhere in plans for these modifications.

Shop drawings are not required for this rail.

Average weight of railing is 533 plf.

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

Texas Department of Transportation

Bridge Division Standard

TRAFFIC RAIL

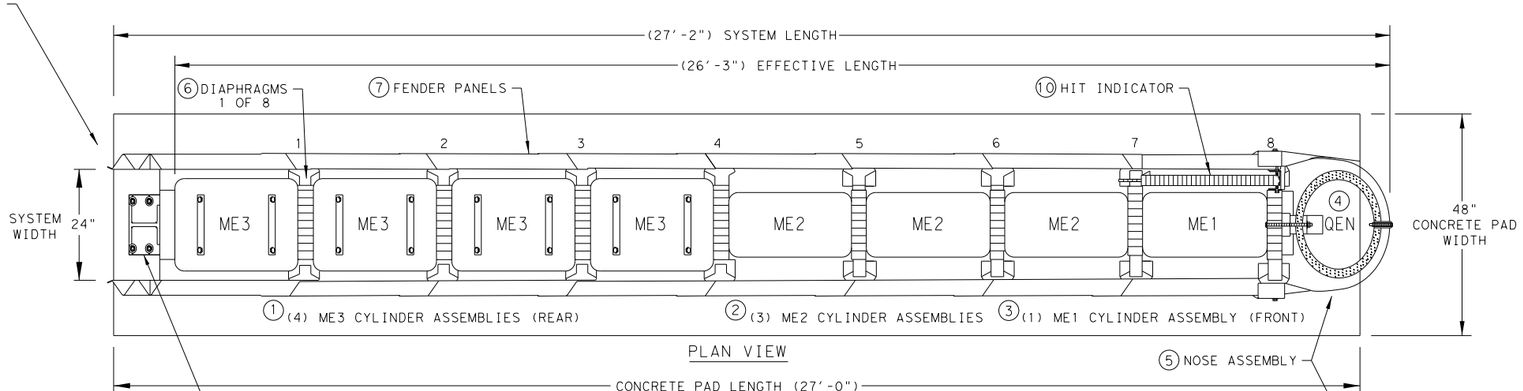
TYPE T80SS

FILE: rlstd016-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		90

DATE: 10/14/2022
FILE: P:\1161350\04\Design\Civil\Standards\Roadway\qgelitem10n20.dgn

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

QUADGUARD EITE M10 24" WIDE (8 BAY) SYSTEM



PLAN VIEW

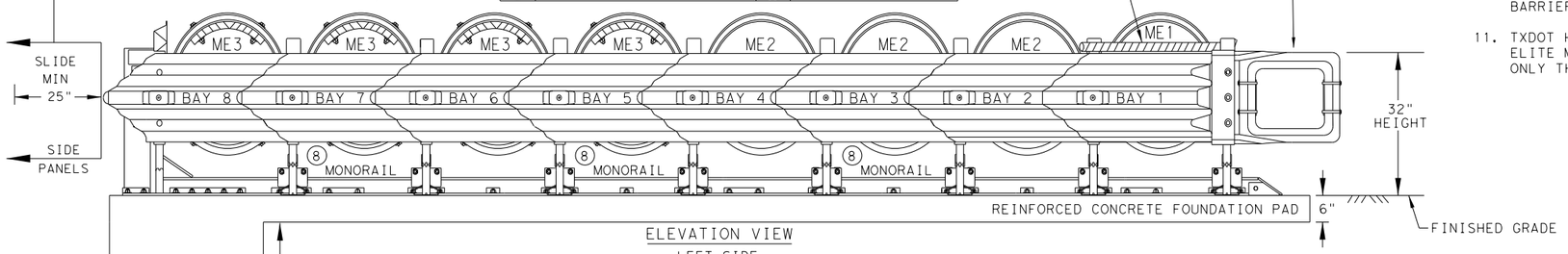
⑨ SHOWN WITH TENSION STRUT BACKUP ASSEMBLY

KEY		KEY	
①	ME3 CYLINDER ASSEMBLIES	⑥	DIAPHRAGMS
②	ME2 CYLINDER ASSEMBLIES	⑦	FENDER PANELS
③	ME1 CYLINDER ASSEMBLY	⑧	MONORAILS
④	QEN CYLINDER	⑨	TYPE OF BACKUP
⑤	NOSE BELT ASSEMBLY	⑩	HIT INDICATOR

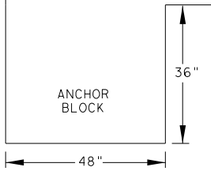
④ QEN CYLINDER INSTALLED INSIDE OF NOSE BELT ASSEMBLY ⑤

NOTE:
PROVISION SHALL BE MADE FOR REAR FENDER SIDE PANELS TO SLIDE REARWARD UPON IMPACT, 25" MIN.

NOTE:
HIT INDICATOR WILL RAISE UPON IMPACT.



ELEVATION VIEW
LEFT SIDE



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

A MANUFACTURER'S DRAWING PACKAGE UNIQUE AND SPECIFIC FOR THE QUADGUARD ELITE M10 FIELD INSTALATION AND INFORMATION REGARDING THE TYPE OF BACKUP ASSEMBLY REQUIRED FOR THE TRANSITION WILL BE PROVIDED BY THE MANUFACTURER TO THE ENGINEER AND INSTALLER.

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

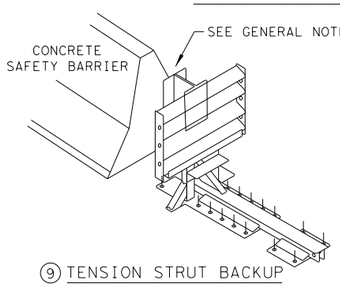
8" NON-REINFORCED CONCRETE PAD MAY NOT REQUIRE AN ANCHOR BLOCK, IF THE PAD IS INSTALLED AGAINST AN IMMOVABLE CONCRETE BACKUP.

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

NOTE:
THE QUADGUARD ELITE M10 8-BAY, 24" WIDE - NARROW SYSTEM TESTED TO MASH TEST LEVEL 3.

TL-3 MODEL #	QM10024E	CYLINDER TYPES IN BAYS			
BAYS	8	TYPE-ME3	TYPE-ME2	TYPE-ME1	TYPE-QEN
DIAPHRAGMS	8	4	3	1	1
WIDTH	24"	REAR	FRONT		NOSE

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS

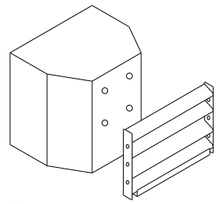


⑨ TENSION STRUT BACKUP

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

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD ELITE M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).



⑨ CONCRETE BACKUP

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

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

GENERAL NOTES

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

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

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

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

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

LOW MAINTENANCE

Texas Department of Transportation — Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD ELITE M10 (MASH TL-3)

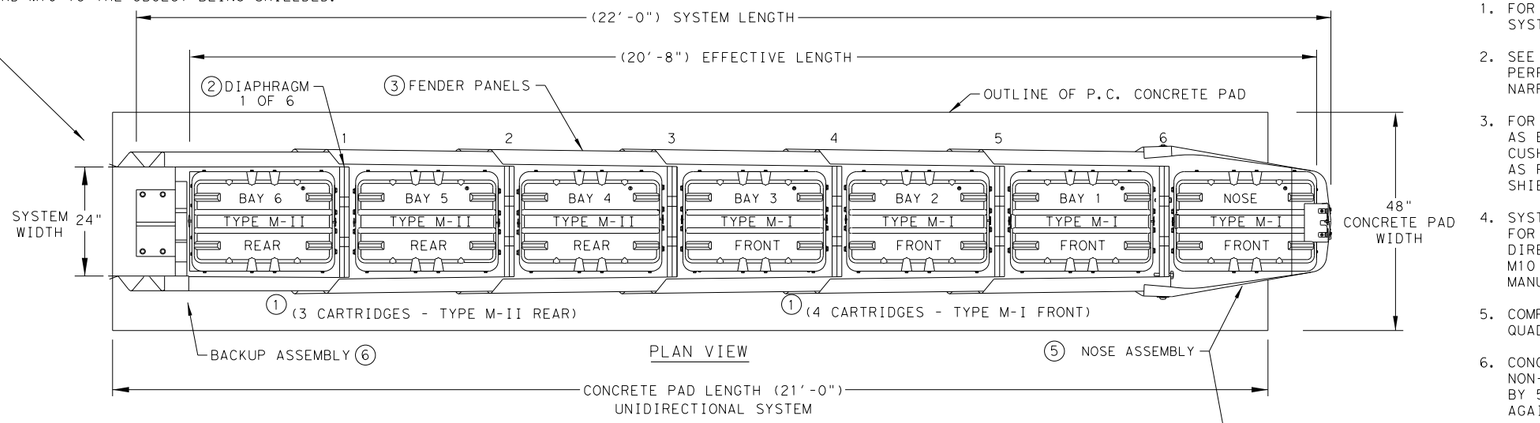
QGELITE(M10)(N)-20

FILE: qgelitem10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		91

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\Roadway\qguardm10n20.dgn

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

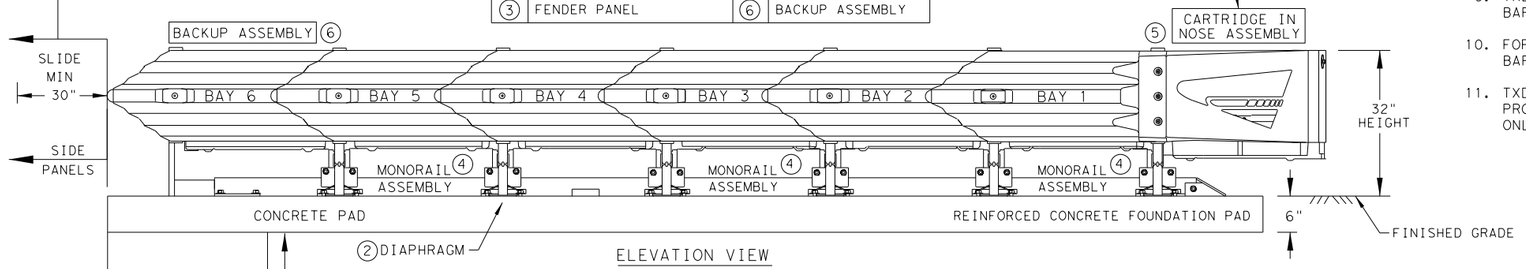
QUADGUARD M10 24" WIDE 6-BAY SYSTEM



PLAN VIEW

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

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



ELEVATION VIEW
LEFT SIDE

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

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

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

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

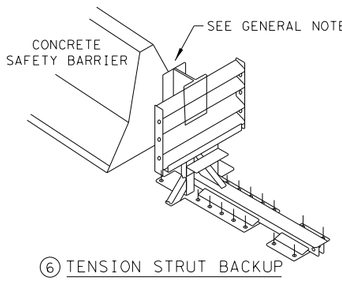
CONCRETE PAD AND ANCHOR BLOCK COMBINATIONS SHALL BE CONFIRMED WITH THE MANUFACTURER BASED UPON SITE SPECIFIC DATA (SSD).

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

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

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

BACKUP ASSEMBLY TYPES FOR SYSTEM TRANSITIONS



(6) TENSION STRUT BACKUP

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

NOTE:
TRANSITION ASSEMBLIES FOR THE QUADGUARD M10 TO THRIE-BEAM OR W-BEAM FENCE REQUIRES I-BEAM POSTS:

ALL POSTS W6X8.5/9 I-BEAMS (78" LONG).

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

GENERAL NOTES

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

FOUNDATION & ANCHORING REQUIREMENTS FOUNDATION TYPES: A, B, C, & D	
FOUNDATION TYPE: A	REINFORCED CONCRETE PAD OR ROADWAY
FOUNDATION:	6" MINIMUM DEPTH (P.C.C.)
ANCHORAGE:	7" STUDS EMBEDDED 5 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: B	ASPHALT OVER P.C.C.
FOUNDATION:	3" MIN. (A.C.) OVER 3" MIN. (P.C.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: C	ASPHALT OVER SUBBASE
FOUNDATION:	6" MIN. (A.C.) OVER 6" MIN. (C.S.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE
FOUNDATION TYPE: D	ASPHALT ONLY
FOUNDATION:	8" MIN. (A.C.)
ANCHORAGE:	18" THREADED ROD EMBEDDED 16 ½" - APPROVED ADHESIVE

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

NOTE: SEE TRINITY'S PRODUCT DESCRIPTION ASSEMBLY MANUAL FOR THE APPROVED ADHESIVE.

IF THE UNIT IS ANCHORED TO ASPHALTIC CONCRETE, IT SHOULD BE RELOCATED TO FRESH, UNDISTURBED ASPHALT AND RE-ANCHORED AFTER EACH IMPACT TO ENSURE ADEQUATE FUTURE PERFORMANCE.

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

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

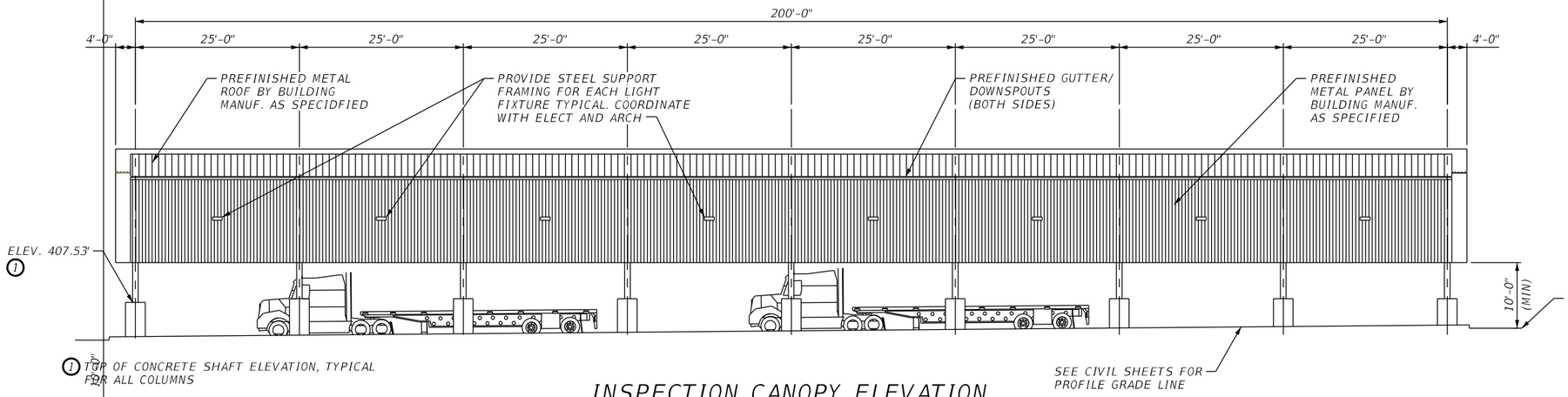
REUSABLE

Texas Department of Transportation — Design Division Standard

TRINITY HIGHWAY ENERGY ABSORPTION QUADGUARD M10 (MASH TL-3 & TL-2 NARROW-24"ONLY)

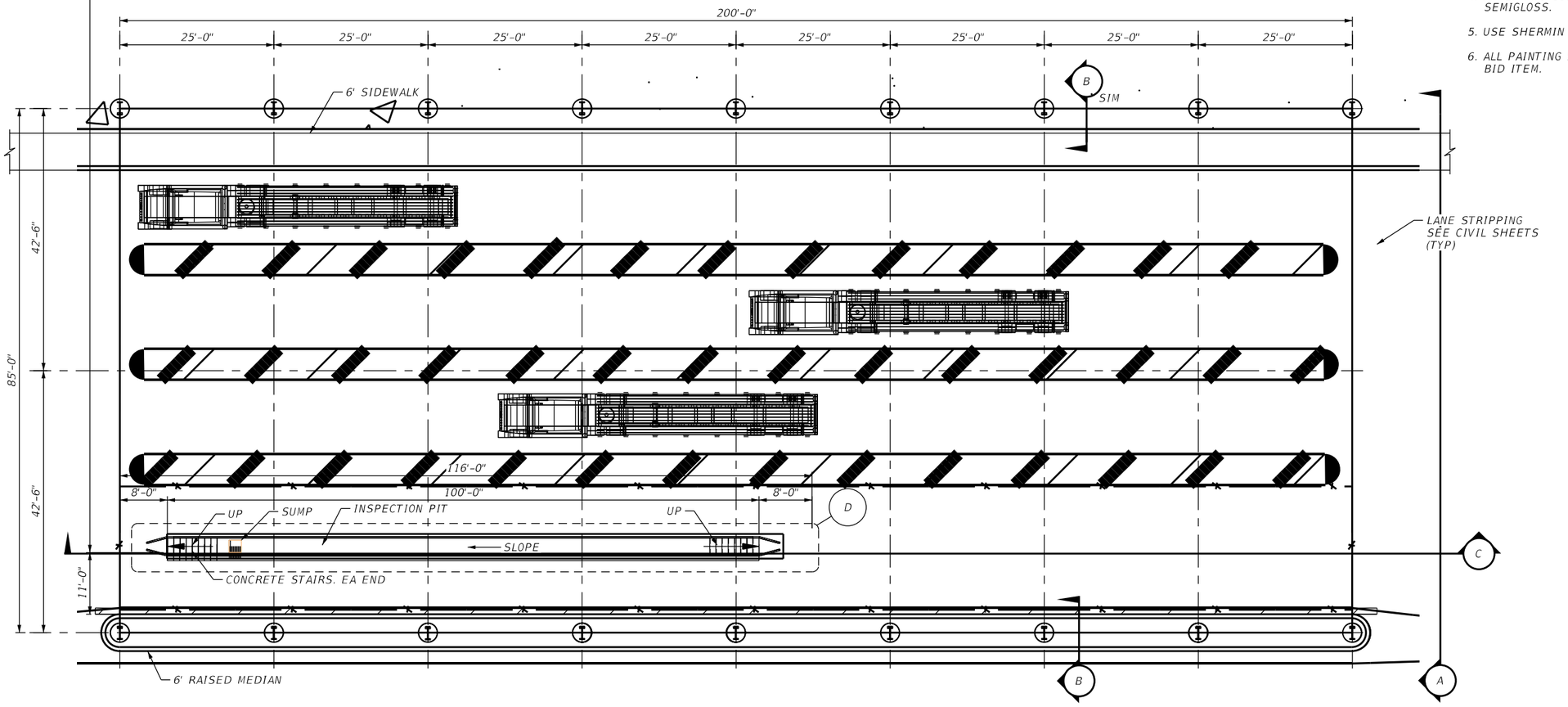
QGUARD(M10)(N)-20

FILE: qguardm10n20.dgn	DN: TxDOT	CK: KM	DW: VP	CK: AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		92



INSPECTION CANOPY ELEVATION

SCALE: 3/64" = 1'-0"



INSPECTION CANOPY FOUNDATION PLAN

SCALE: 3/64" = 1'-0"

GENERAL NOTES:

- DRILLED SHAFT PER ITEM 416, INCULDING PAYMENT
- CONCRETE FOR COLUMNS SHALL BE CASS "C" PER ITEM 421, PAYMENT PER ITEM 420.
- CONCRETE FOR PIT SHALL BE CLASS "K" PER ITEM 421, (CONCRETE STRENGTH fc'=4000 PSI, COARSE AGGREGATE GRADE 2-5) PER ITEM 420.
- CONCRETE CONSTRUCTION PER ITEM 420
- REINFORCING SHALL BE GR. 60, PER ITEM 440
- STRUCTURAL STEEL AND OTHER METALS USED FOR THE CONSTRUCTION PER ITEM 441 AND ITEM 442, PAYMENT PER ITEM 442
- PRE-ENGINEERED METAL CANOPY PER SPECIAL SPECIFICATION 5086-6001, INCLUDING PAYMENT. DESIGN ROOF LIVE LOAD: 20 psf
- CALCLATED FOUNDATION LOADS: 32 TONS/DRILLED SHAFT VERTICAL
  14 TONS/DRILLED SHAFT LATERAL
- DESIGN SOIL BEARING CAPACITY XX TONS/SF

PAINTING NOTES:

1. PAINT ALL EXPOSED SHOP STEEL STRUCTURES.
2. PAINT COLUMNS AND PURLINS BEFORE INSTALLING ROOF PANELS AND SIDING.
3. TOUCH UP STEEL STRUCTURE AS NEEDED WITH PRIMER
4. APPLY TWO COLOR COATS OF LOW VOC ALKYD ENAMEL, SEMIGLOSS.
5. USE SHERMIN WILLIAMS (INDUSTRIAL GRADE) OR EQUIVALENT.
6. ALL PAINTING IS SUBSIDIARY TO METAL BUILDING/CANOPY BID ITEM.

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

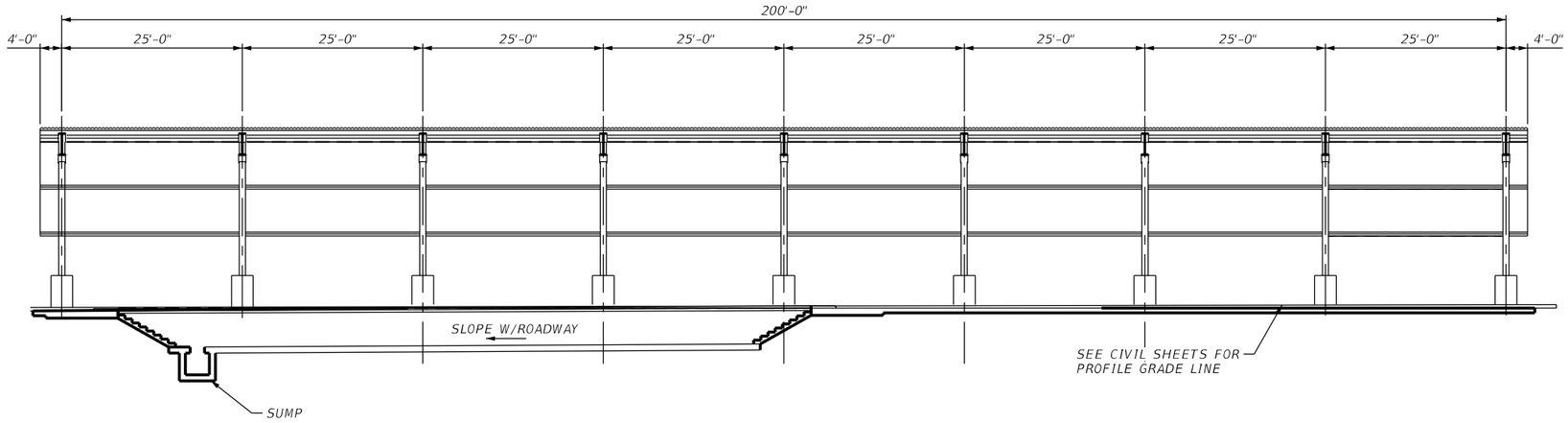
WB IH 30 CMV STATION

PRE-ENGINEERED METAL INSPECTION CANOPY PLAN AND ELEVATION

SHEET 1 OF 7

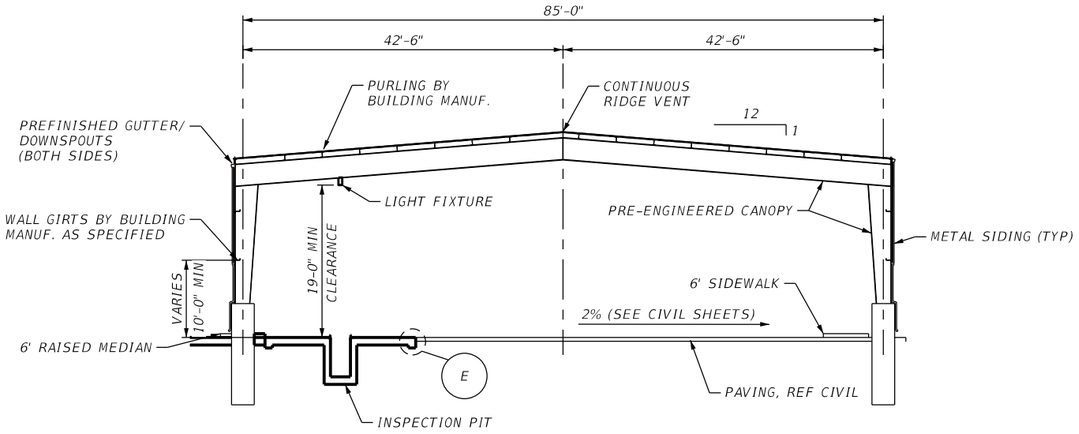
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DSG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DSG:	ATL	TITUS	0610	03	095	93

Design Filename: S:\Transportation\19-204C TxDOT-PD IH30 CMV Inspection Facility\CAD\01-Sheets\Inspection Canopy - 1.dgn
Plotted on: 7/15/2022



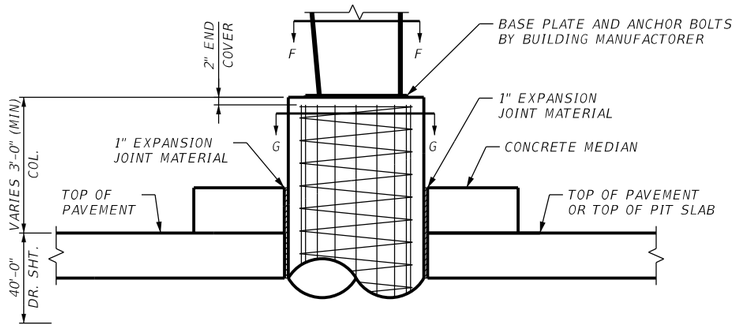
SECTION C - LONG SECTION

SCALE: 3/64" = 1'-0"



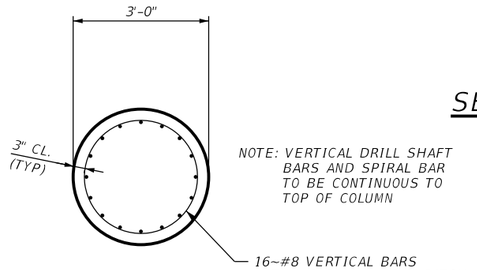
SECTION 1 - INSPECTION CANOPY SECTION

SCALE: 3/64" = 1'-0"



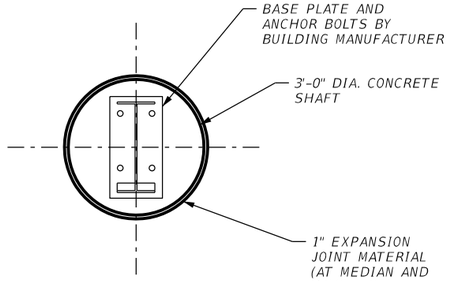
SECTION B - COLUMN TO PIER DETAIL

SCALE: 3/8 = 1'-0"



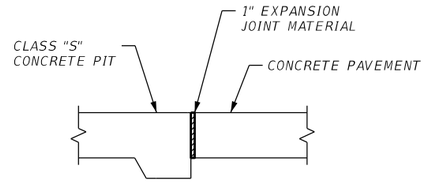
SECTION G-G

SCALE: 3/8 = 1'-0"



SECTION F-F

SCALE: 3/8 = 1'-0"



SECTION E - PIT TO PAVEMENT JOINT

SCALE: 3/8 = 1'-0"

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

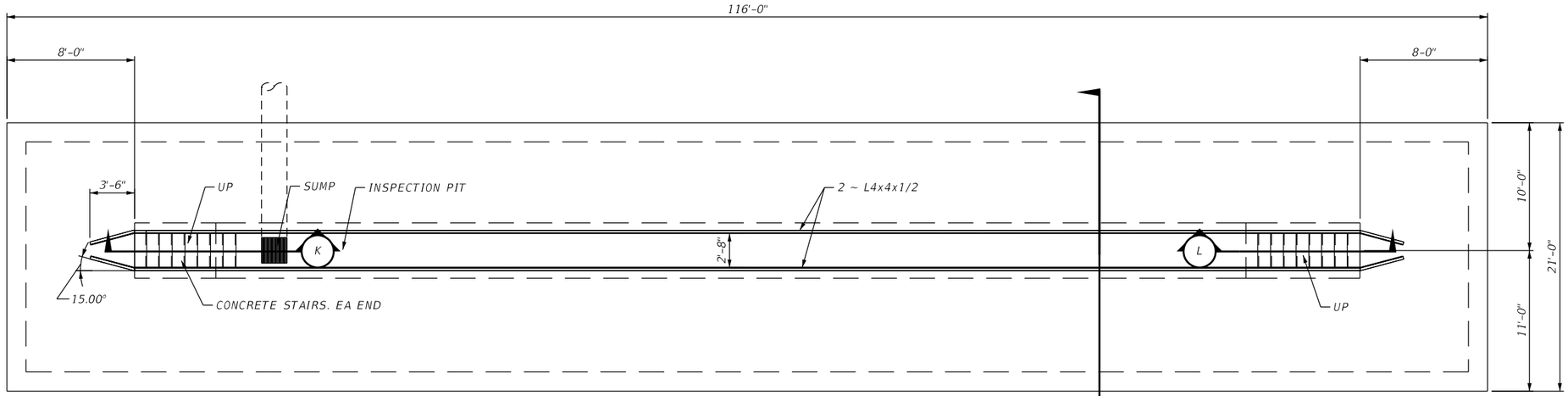
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PRE-ENGINEERED METAL INSPECTION CANOPY DETAILS

SHEET 2 OF 7

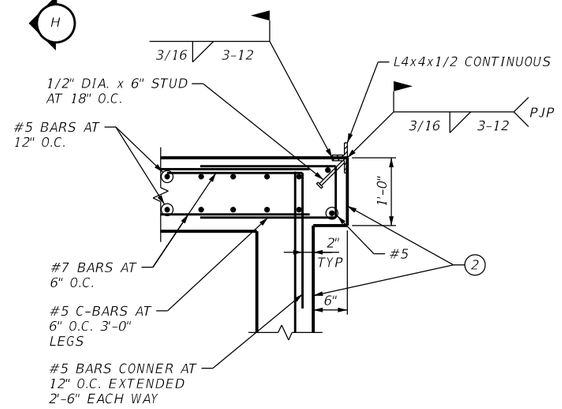
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CNT. DGN:	6	TEXAS				IH 30
DGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CNT. DGN:	ATL	TITUS	0610	03	095	94



DETAIL D - INSPECTION PIT PLAN

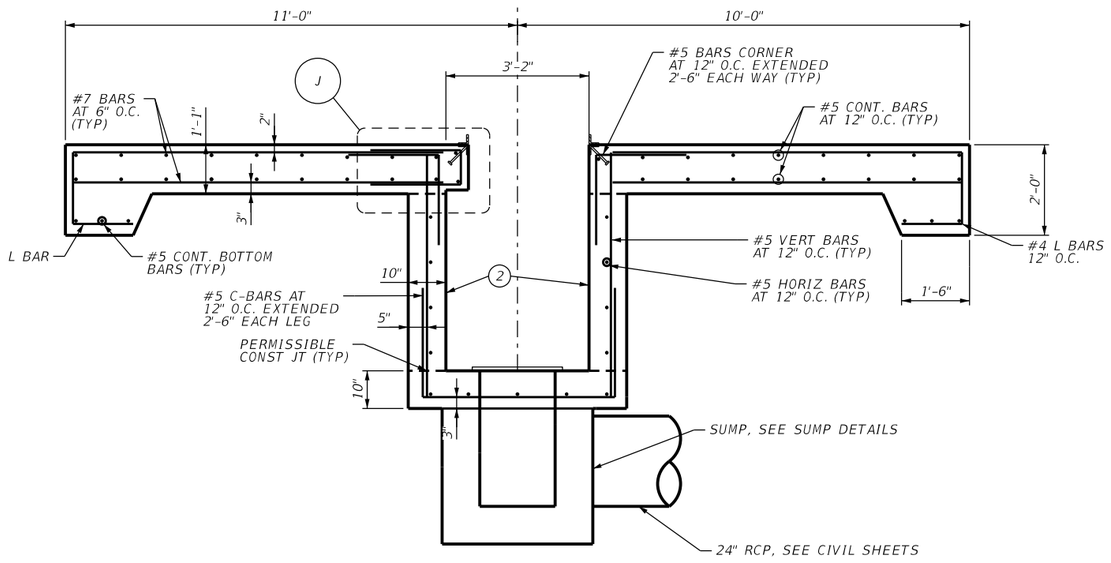
SCALE: 3/64" = 1'-0"

1. PAINT EXPOSED STR. STEEL SURFACES PER ITEM 446, SYSTEM II. PROVIDE APPEARANCE COAT FEDERAL STANDARD 595C COLOR 13591 (YELLOW). COST TO BE SUBSIDIARY TO ITEM 442.
2. PAINT EXPOSED VERTICAL SURFACES OF INSPECTION PIT PER ITEM 427. CONCRETE PAINT PROVIDE APPEARANCE COAT FEDERAL STANDARD 595C COLOR 27925 (WHITE). COST TO BE SUBSIDIARY TO ITEM 420.



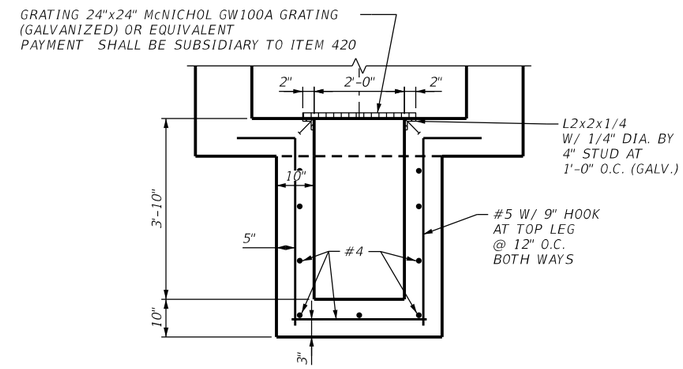
DETAIL J

SCALE: 3/8 = 1'-0"



SECTION H

SCALE: 3/8 = 1'-0"



SUMP DETAILS

SCALE: 3/8 = 1'-0"

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

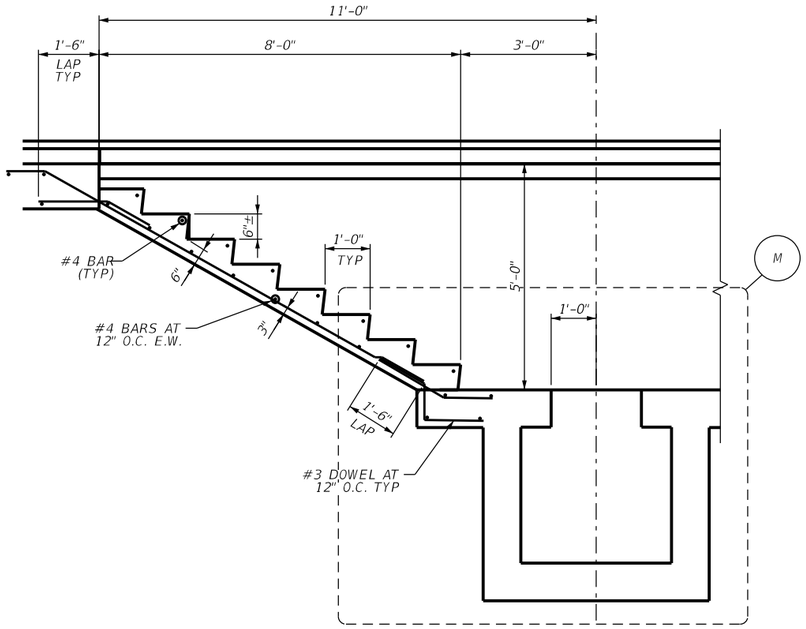
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PRE-ENGINEERED METAL INSPECTION CANOPY INSPECTION PIT DETAILS

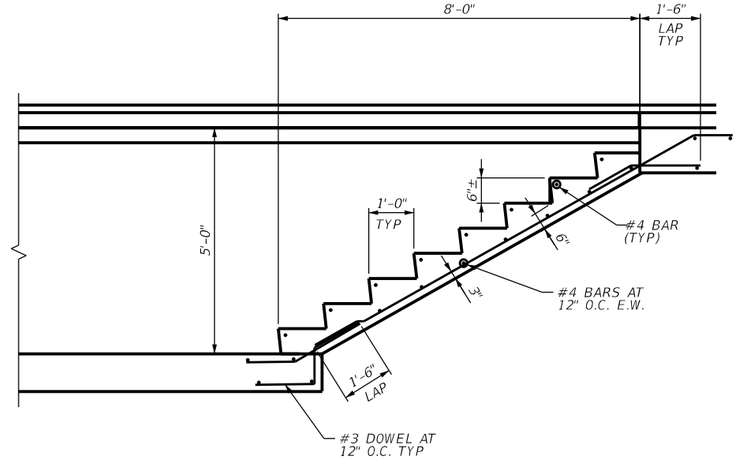
SHEET 3 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK. DGN:	6	TEXAS				IH 30
DSG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK. DSG:	ATL	TITUS	0610	03	095	95



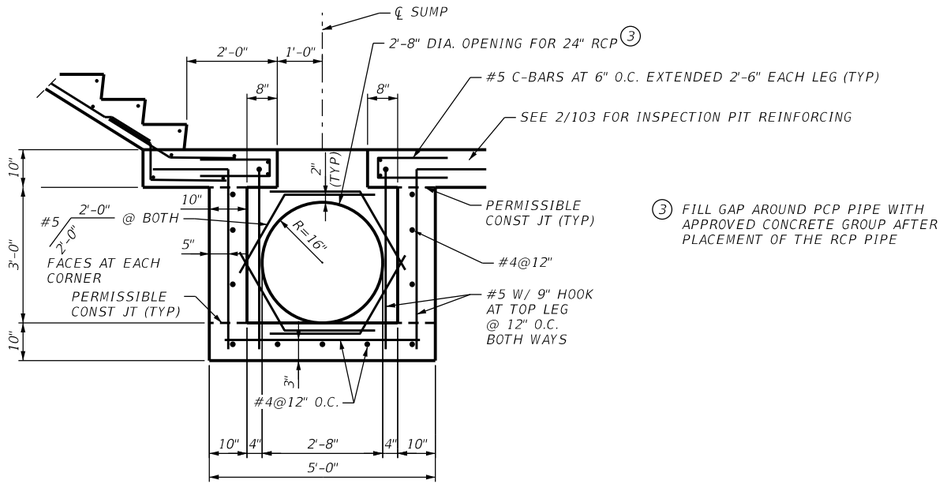
SECTION K - PIT SECTION

SCALE: 3/8 = 1'-0"



SECTION L - PIT SECTION

SCALE: 3/8 = 1'-0"



(3) FILL GAP AROUND PCP PIPE WITH APPROVED CONCRETE GROUP AFTER PLACEMENT OF THE RCP PIPE

DEATIL M - SUMP DETAILS

SCALE: 3/8 = 1'-0"

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

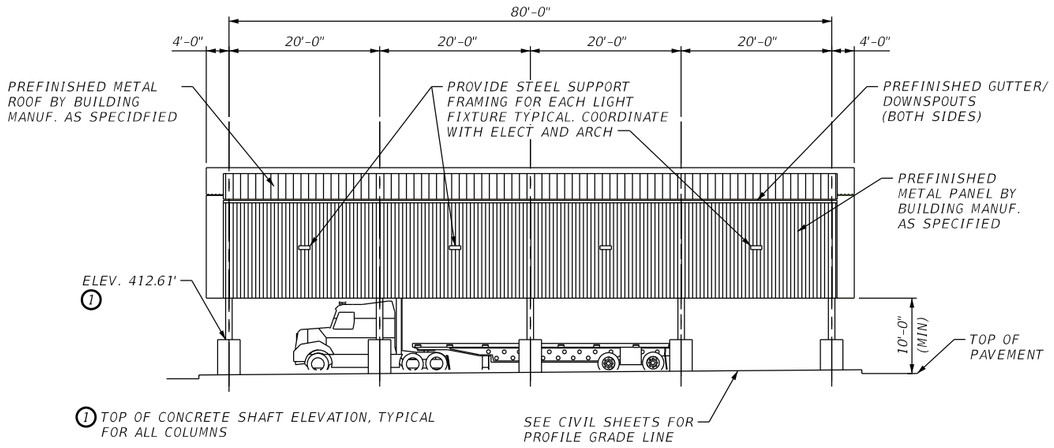
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PRE-ENGINEERED METAL INSPECTION CANOPY INSPECTION PIT DETAILS

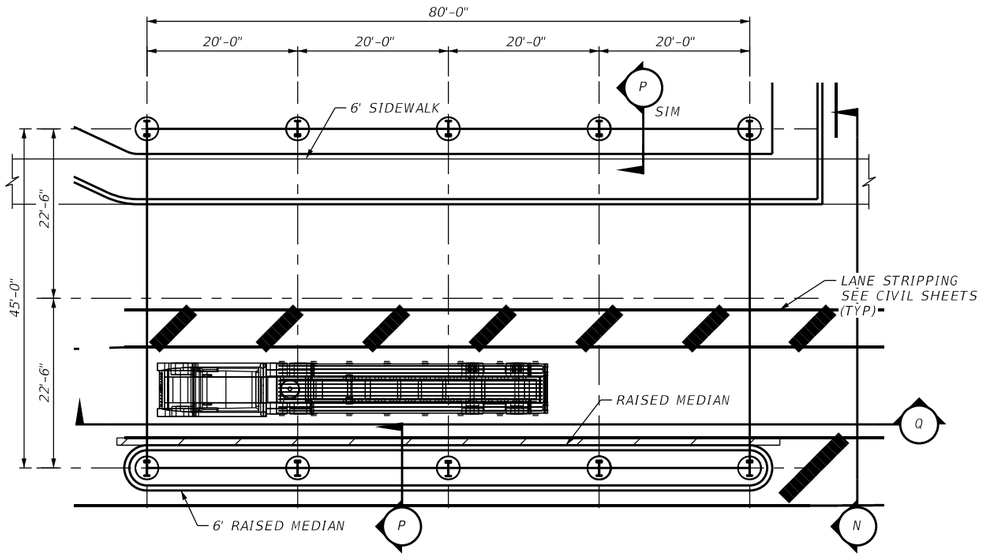
SHEET 4 OF 7

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DSGN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	96



STATIC SCALE CANOPY ELEVATION

SCALE: 3/64" = 1'-0"



STATIC SCALE CANOPY FOUNDATION PLAN

SCALE: 3/64" = 1'-0"

GENERAL NOTES:

- DRILLED SHAFT PER ITEM 416, INCULDING PAYMENT
- CONCRETE FOR COLUMNS SHALL BE CASS "C" PER ITEM 421, PAYMENT PER ITEM 420.
- CONCRETE CONSTRUCTION PER ITEM 420
- REINFORCING SHALL BE GR. 60, PER ITEM 440
- STRUCTURAL STEEL AND OTHER METALS USED FOR THE CONSTRUCTION PER ITEM 441 AND ITEM 442, PAYMENT PER ITEM 442
- PRE-ENGINEERED METAL CANOPY PER SPECIAL SPECIFICATION 5086-6001, INCLUDING PAYMENT. ROOF LIVE LOAD: 20 psf
- CALCLATED FOUNDATION LOADS: 14.0 TONS/DRILLED SHAFT VERTICAL
  4.0 TONS/DRILLED SHAFT LATERAL
- DESIGN SOIL BEARING CAPACITY XX TONS/SF

PAINTING NOTES:

1. PAINT ALL EXPOSED SHOP STEEL STRUCTURES.
2. PAINT COLUMNS AND PURLINS BEFORE INSTALLING ROOF PANELS AND SIDING.
3. TOUCH UP STEEL STRUCTURE AS NEEDED WITH PRIMER
4. APPLY TWO COLOR COATS OF LOW VOC ALKYD ENAMEL, SEMIGLOSS.
5. USE SHERMIN WILLIAMS (INDUSTRIAL GRADE) OR EQUIVALENT.
6. ALL PAINTING IS SUBSIDIARY TO METAL BUILDING/CANOPY BID ITEM.

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

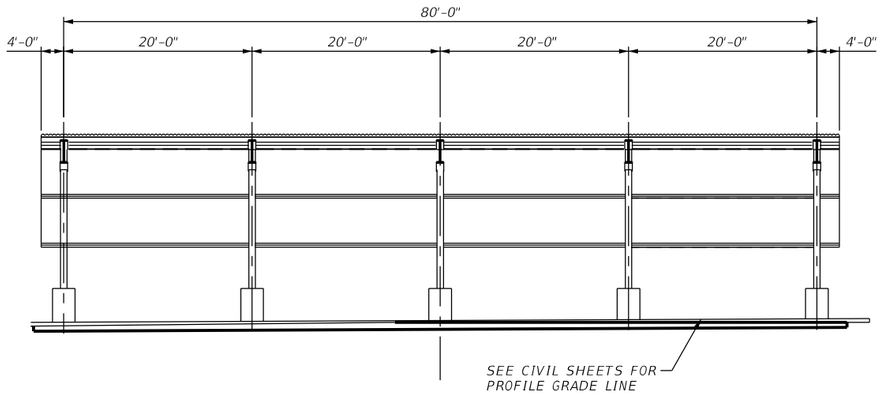
WB IH 30 CMV STATION

PRE-ENGINEERED METAL STATIC SCALE CANOPY PLAN AND ELEVATION

SHEET 5 OF 7

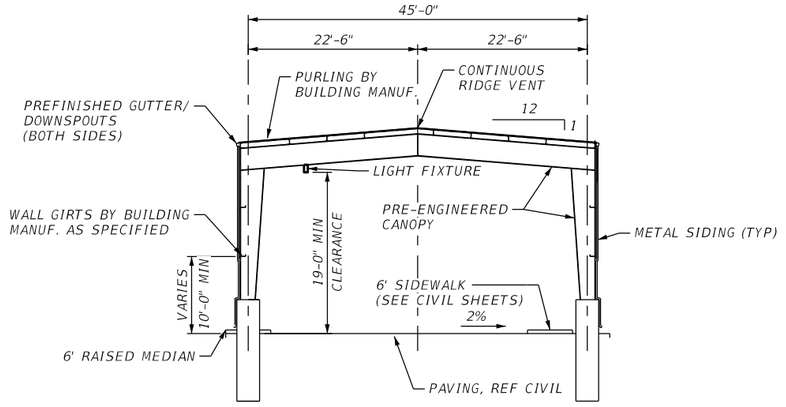
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DSN:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DSN:	ATL	TITUS	0610	03	095	97

Design Filename: S:\Transportation\19-204C TxDOT-PD IH30 CMV Inspection Facility\CAD\01-Sheets\Static Scale Canopy - 1.dgn
Plotted on: 7/15/2022



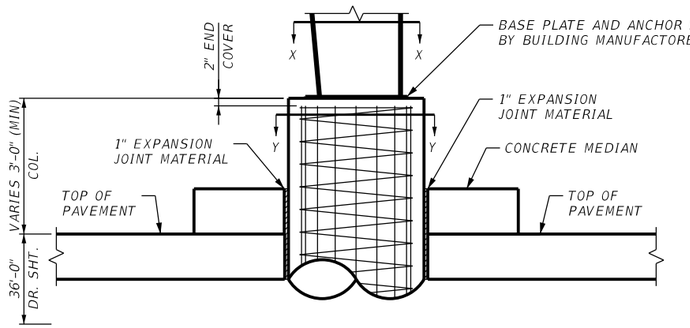
DETAIL Q - LONG SECTION

SCALE: 3/64" = 1'-0"



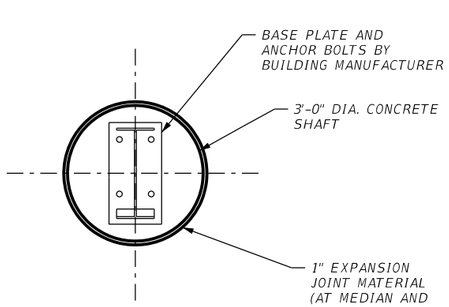
DETAIL N - STATIC SCALE CANOPY TYPICAL SECTION

SCALE: 3/64" = 1'-0"



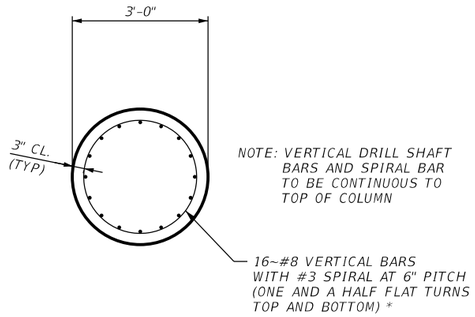
SECTION P - COLUMN TO PIER DETAIL

SCALE: 3/8 = 1'-0"



SECTION X-X

SCALE: 3/8 = 1'-0"



SECTION Y-Y

SCALE: 3/8 = 1'-0"

60% SUBMITTAL
DOCUMENT INCOMPLETE: NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: SIDNEY A. MIELKE, P.E.
P.E. SERIAL No.: 60799
DATE: 7-15-2022

REV. NO.	DATE	DESCRIPTION	BY

STRUCTURAL ENGINEERING ASSOCIATES
TEXAS REGISTERED ENGINEERING FIRM F-199

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

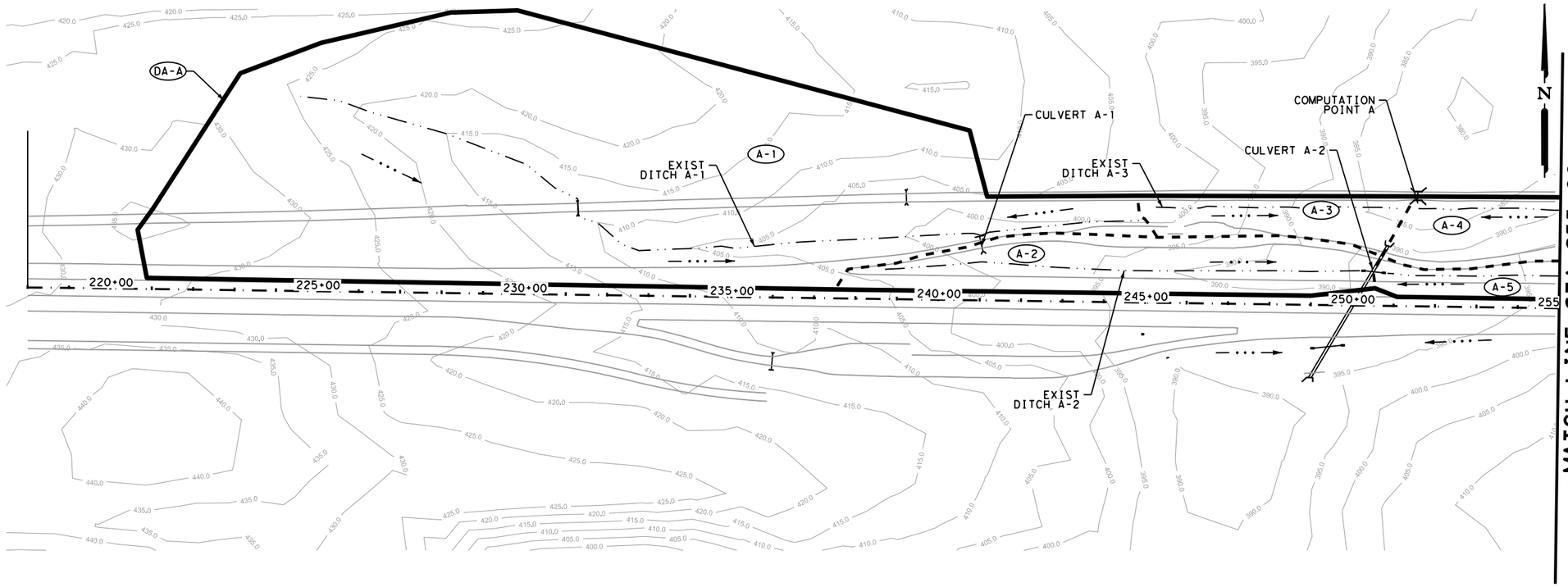
WB IH 30 CMV STATION

PRE-ENGINEERED METAL STATIC SCALE CANOPY DETAILS

SHEET 6 OF 7

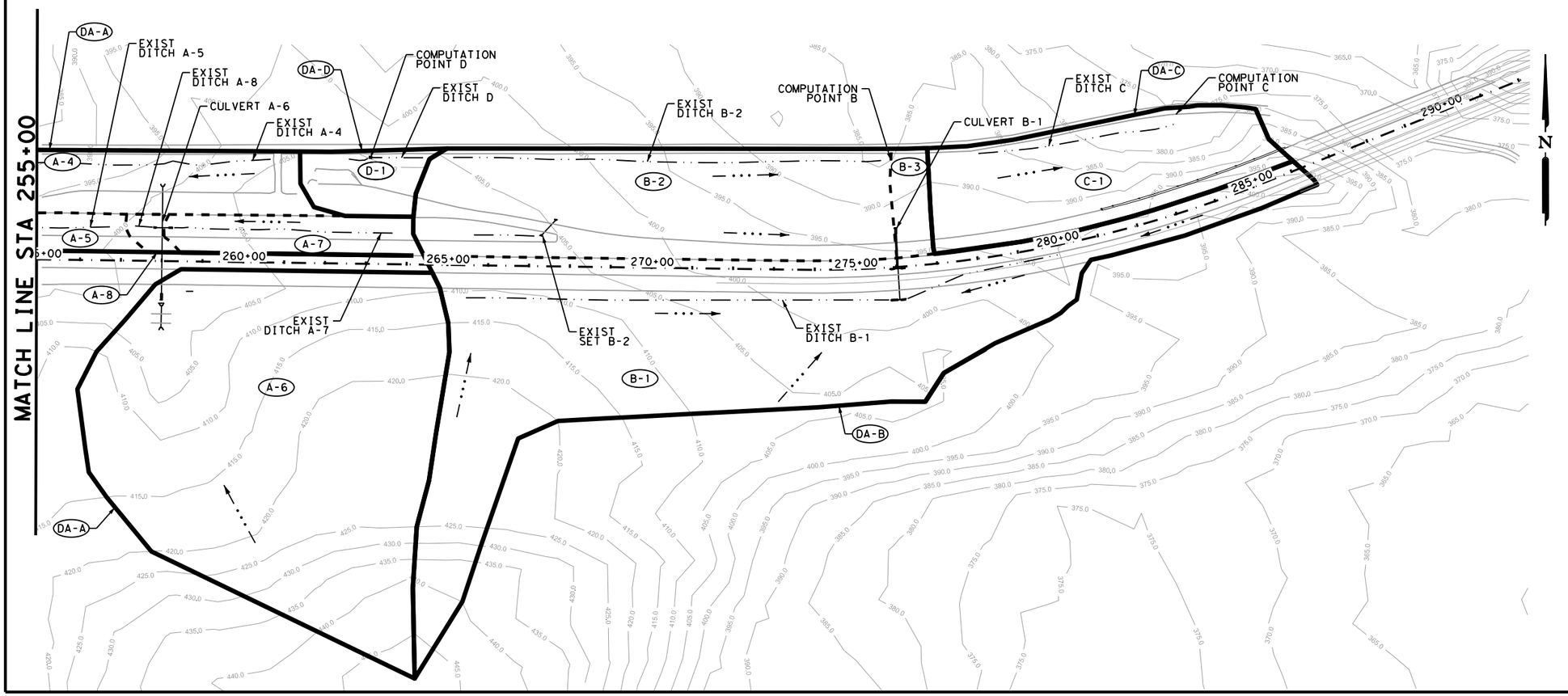
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DSG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DSG:	ATL	TITUS	0610	03	095	98

Plotted on: 10/14/2022



LEGEND

FLOW ARROW



DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 100 200 300
SCALE: 1"= 300'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

EXIST DRAINAGE AREA MAP

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	99

Design Filename: P:\116\35\04\Design\Civil\Drainage\116350 4DRN_AREA_EMAP01.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504DRN_AREA_EMAP02.dgn

EXIST DRAINAGE RUNOFF COEFFICIENTS							RATIONAL METHOD				
DRAINAGE AREA	DISCHARGE TO	IMPERVIOUS (ACRES)	COMMERICAL (ACRES)	UNDEVELOPED (ACRES)	TOTAL AREA	COMPOSITE RUNOFF COEFFICIENT (C)	Tc	I 10	I 100	Q 10	Q 100
		0.95	0.80	0.35	ACRES		MIN	IN/HR		CFS	
DA-A	COMP A	8.47	1.09	41.75	51.31	0.46	20.25	4.80	6.89	113.3	162.7
A-1	CULVERT A-1	3.29	1.09	20.26	24.64	0.46	18.87	4.97	7.14	56.4	81.0
A-1+A-2	DITCH A-2	4.88	1.09	22.24	28.21	0.48	19.61	4.87	7.00	66.0	94.8
A-1+A-2+A-5	CULVERT A-2	5.49	1.09	22.92	29.50	0.48	19.94	4.83	6.95	68.4	98.5
A-3	DITCH A-3	0.31	0.00	1.20	1.51	0.48	10.00	6.56	9.38	4.8	6.8
A-4	DITCH A-4	1.23	0.00	2.62	3.85	0.55	11.93	6.12	8.76	13.0	18.6
A-6+A-7+A-8	CULVERT A-6	1.44	0.00	15.01	16.45	0.41	12.79	5.94	8.51	40.1	57.4
D-1	COMP D	0.49	0.00	0.53	1.02	0.64	10.38	6.46	9.25	4.3	6.1
DA-B	COMP B	4.56	0.00	18.66	23.22	0.47	17.06	5.22	7.49	57.0	81.8
B-1	CULVERT B-1	2.72	0.00	12.80	15.52	0.46	16.31	5.33	7.65	38.1	54.7
C-1	COMP C	1.01	0.00	3.51	4.52	0.49	10.00	6.56	9.38	14.6	20.8

We should be checking freeway and frontage road hydraulics for proper Q's

design is following freeway design AEP

Table 4-2: Recommended Design Standards for Various Drainage Facilities

Functional classification and structure type	Design AEP (Design ARI) 50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)
Freeways (main lanes):					
Culverts					X
Bridges+					X
Principal arterials:					
Culverts			X	[X]	X
Small bridges+			X	[X]	X
Major river crossings+					[X]
Minor arterials and collectors (including frontage roads):					
Culverts		X	[X]	X	
Small bridges+			X	[X]	X
Major river crossings+				X	[X]
Local roads and streets:					
Culverts	X	X	X		
Small bridges+	X	X	X		
Off-system projects:					
Culverts	FHWA policy is "same or slightly better" than existing.				
Small bridges+					
Storm drain systems on interstates and controlled access highways (main lanes):					
Inlets, drain pipe, and roadside ditches			X		
Inlets for depressed roadways*					X

NOTES

1. C-VALUES CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL TABLE 4-10 & 4-11.
2. TIME OF CONCENTRATION CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL EQUATION 4-16.
3. 10 MINUTE MINIMUM USED FOR TIME OF CONCENTRATION.
4. INTENSITIES FOUND USING TXDOT EDB-2019 SPREADSHEET INCLUDING ATLAS-14 DATA.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

EXIST DRAINAGE CALCULATIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	100

Plotted on: 10/14/2022

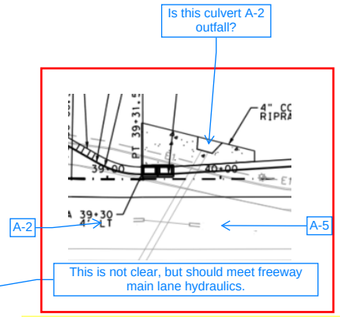
LINE A-2 IS INTENDED TO CONVEY WATER FROM THE CURB INLET NEAR THE DPS PARKING TO BEHIND THE BUILDING

AGREE

Existing bridge?

Where is culvert A-2? Not sure why Sheet 68 says A-2

Is this culvert A-2 outfall?



This is not clear, but should meet freeway main lane hydraulics.

AGREE, THEY MEET 10YR DESIGN PER FREEWAY REQUIREMENTS

will add callouts to all computation points describing existing structure.

What is this structure? like ditch or pipe?

MATCH LINE STA 255+00

MATCH LINE STA 255+00

DA-A
A-1
CULVERT A-1
PROP DITCH A-1
PROP DITCH A-3
DITCH A-3 COMPUTATION POINT
CULVERT A-2
COMPUTATION POINT A
A-3
A-4
DITCH A-2 COMPUTATION POINT
A-2
A-5
MATCH EXISTING DITCH
DITCH A-5 COMPUTATION POINT
220+00
225+00
230+00
235+00
240+00
245+00
250+00
255

DITCH A-4 COMPUTATION POINT
CULVERT A-4
CULVERT A-6
PROP DITCH A-4
DA-D
COMPUTATION POINT D
D-1
A-4
A-5
A-7
A-8
260+00
265+00
270+00
275+00
280+00
285+00
290+00
B-2
B-4
B-3
C-1
DITCH B-2 COMPUTATION POINT
CULVERT B-4
COMPUTATION POINT B
CULVERT B-1
DA-C
COMPUTATION POINT C
PROP DITCH B-4
DITCH B-4 COMPUTATION POINT
PAZD B-4
A-6
B-1
DA-B
DA-A

LEGEND

FLOW ARROW

N

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 100 200 300
SCALE: 1" = 300'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PROPOSED DRAINAGE AREA MAP

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	101

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504DRN_AREA_MAP01.dgn

agree, 10yr meets freeway criteria

We should be checking freeway and frontage road hydraulics for proper Q's

PROPOSED DRAINAGE RUNOFF COEFFICIENTS							RATIONAL METHOD					DIFFERENCE BETWEEN PROPOSED AND EXISTING FLOW	
DRAINAGE AREA	DISCHARGE TO	IMPERVIOUS (ACRES)	COMMERICAL (ACRES)	UNDEVELOPED (ACRES)	TOTAL AREA	COMPOSITE RUNOFF COEFFICIENT (C)	Tc	I 10	I 100	Q 10	Q 100	Q 10	Q 100
		0.95	0.80	0.35	ACRES		MIN	IN/HR		CFS		CFS	
DA-A	COMP A	10.35	1.09	40.00	51.44	0.49	20.25	4.80	6.89	121.0	173.7	7.7	11.0
A-1	CULVERT A-1	3.09	1.09	19.48	23.66	0.45	18.87	4.97	7.14	53.0	76.1	-3.4	-4.9
A-1+A-2	DITCH A-2	4.31	1.09	20.83	26.23	0.47	19.61	4.87	7.00	60.1	86.3	-5.9	-8.5
A-3	DITCH A-3	1.74	0.00	1.74	3.48	0.65	11.42	6.23	8.91	14.1	20.2	9.3	13.4
A-4	DITCH A-4	2.25	0.00	1.76	4.01	0.69	11.93	6.12	8.76	17.0	24.3	4.0	5.7
A-1+A-2+A-5	CULVERT A-2	4.92	1.09	21.49	27.50	0.48	19.94	4.83	6.95	63.8	91.8	-4.6	-6.7
A-6+A-7+A-8	CULVERT A-6	1.44	0.00	15.01	16.45	0.41	12.79	5.94	8.51	40.1	57.4	0.0	0.0
D-1	COMP D	0.51	0.00	0.58	1.09	0.64	10.00	6.56	9.38	4.6	6.6	0.3	0.5
DA-B	COMP B	4.93	0.00	18.29	23.22	0.48	17.06	5.22	7.49	58.2	83.5	1.2	1.7
B-1	CULVERT B-1	2.72	0.00	12.80	15.52	0.46	16.31	5.33	7.65	38.1	54.7	0.0	0.0
B-2+B-4	DITCH B-2	1.89	0.00	5.25	7.14	0.51	19.61	4.87	7.00	17.8	25.5	N/A	N/A
B-4	CULVERT B-4	1.08	0.00	0.98	2.06	0.67	10.00	6.56	9.38	9.1	13.0	N/A	N/A
C-1	COMP C	1.04	0.00	3.48	4.52	0.49	10.00	6.56	9.38	14.6	20.8	0.0	0.0

C-1 is shown here

DA-C?

NOTES

1. C-VALUES CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL TABLE 4-10 & 4-11.
2. TIME OF CONCENTRATION CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL EQUATION 4-16.
3. 10 MINUTE MINIMUM USED FOR TIME OF CONCENTRATION.
4. INTENSITIES FOUND USING TXDOT EDB-2019 SPREADSHEET INCLUDING ATLAS-14 DATA.

PAZD-CZ INLET COMPUTATIONS							
INLET	EQUATION COEFFICIENT	INLET HEAD FT	Q1 CFS	Q2 CFS	Q3 CFS	Q10 CFS	Q3>Q10?
B-4	0.67	1.0	3.36	26.88	13.44	9.1	YES

Q1: INLET CAPACITY FOR SINGLE OPENING
Q2: INLET CAPACITY FOR ALL 8 OPENINGS
Q3: INLET CAPACITY AT 50% CLOGGING

✳ NOTE: GRATE ON TOP OF INLET WAS IGNORED IN CAPACITY ANALYSIS

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

PROPOSED DRAINAGE CALCULATIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	102

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504DRN_AREA_MAP02.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\116350 4DRN_DC01.dgn

DITCH COMPUTATIONS - RATIONAL METHOD												
Ditch Sub Area	Drainage Areas	Ditch	Computation Location		Longitud. Slope (%)	Ditch Depth (ft)	N-Value	Front Slope (H:1)	Back Slope (H:1)	Ditch Flow Velocity (ft/s)		Ditch Flow Depth (ft)	
			STA.	O.S.						$V_{.}$	$V_{..}$	$D_{.}$	$D_{..}$
A2	A1+A2	DITCH A3	32+76	100' LT	0.85	2.25	0.035	4	4	2.67	2.91	1.16	1.32
A3	A3	DITCH A4	44+83	115' LT	1.91	3	0.015	2	5	5.38	5.86	0.95	1.09
A4	A4+A6+A7+A8	DITCH D1	52+30	140' LT	0.32	1.00	0.035	8	8	2.10	3.85	0.29	0.56
A5	A5	B2	62+15	160' LT	1.84	1.6	0.035	6	5	4.89	5.41	0.81	0.93
B2	B2+B4	B4	60+90	39' LT	1.76	1.8	0.035	5	6	4.14	4.55	0.63	0.72

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

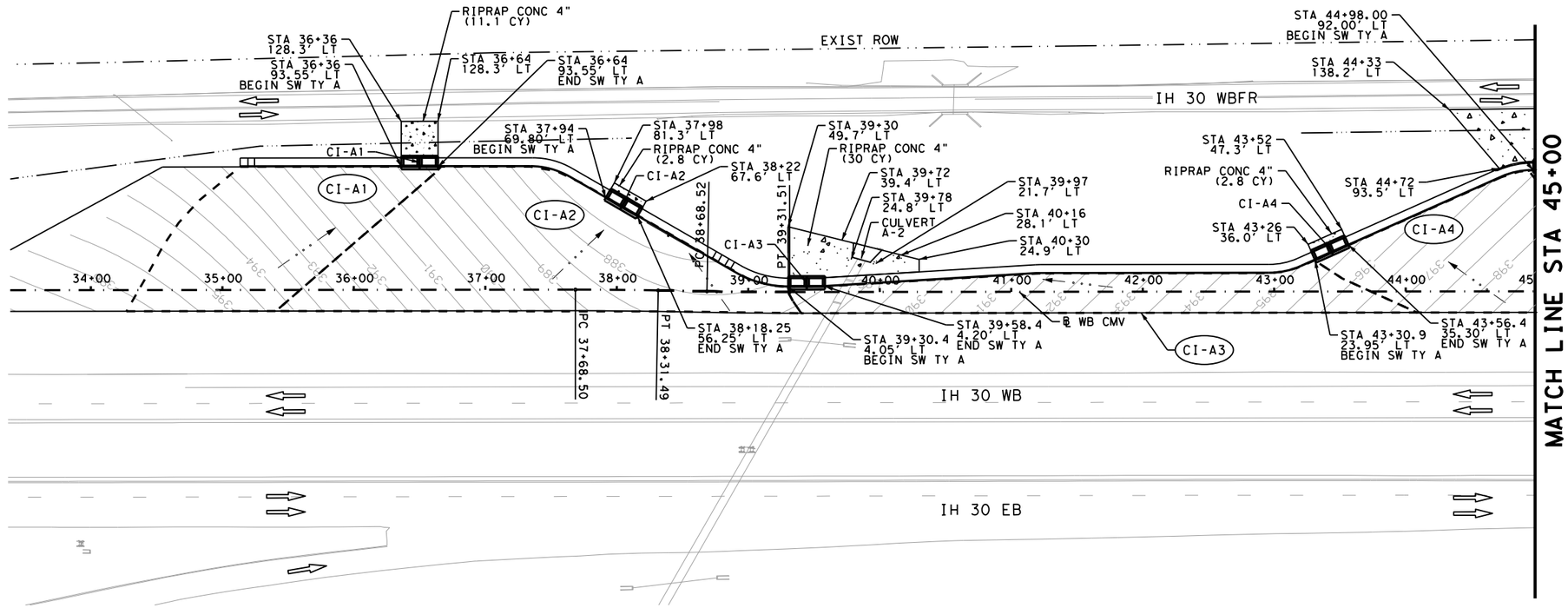
WB IH 30 CMV STATION

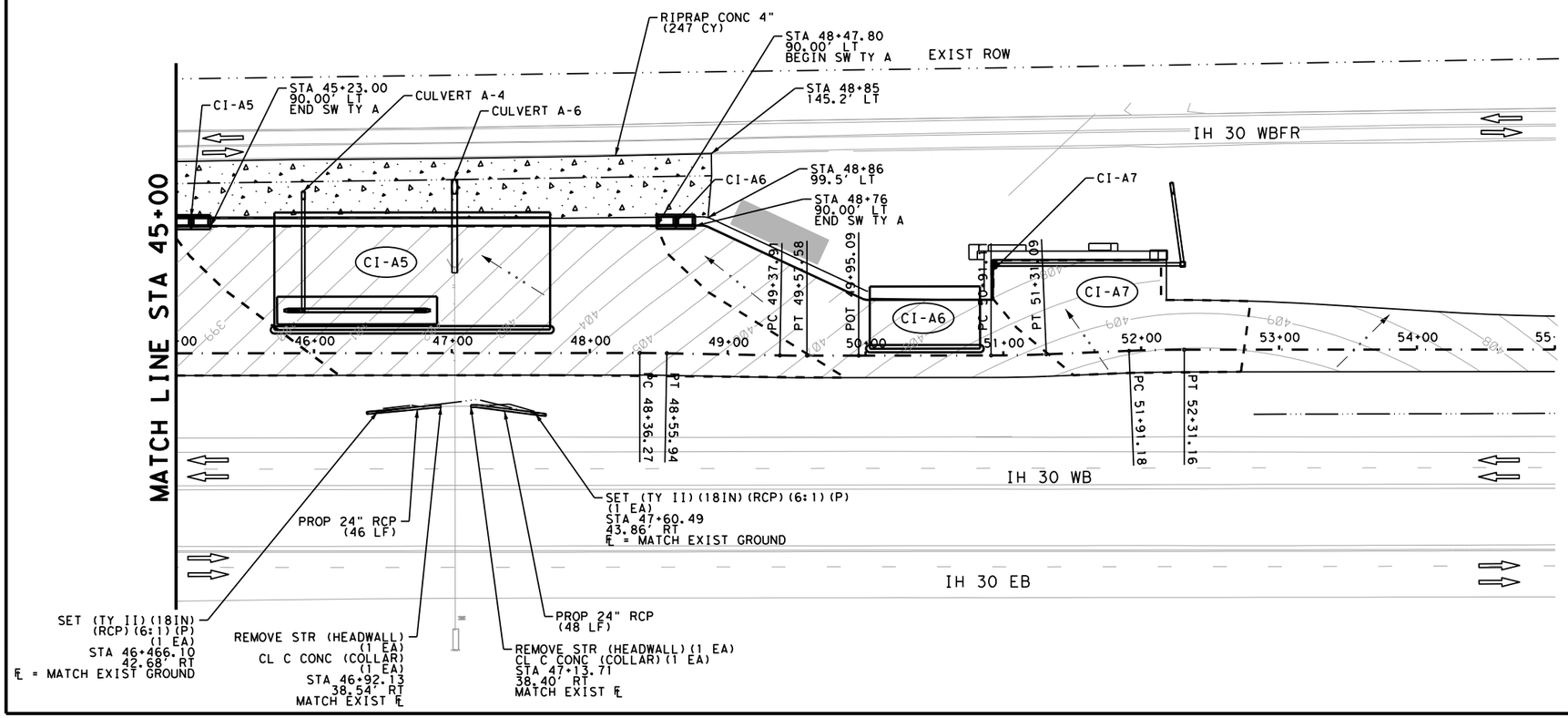
PROPOSED DRAINAGE DITCH CALCULATIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	103

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504INT_DRN_AREA.dgn





LEGEND

- ROW
- INTERNAL DRAINAGE AREA
- PROPOSED CONTOURS
- FLOW ARROW
- CI-XX — CURB INLET DRAINAGE AREA
- PROPOSED DITCH FLOW LINE

NOTES

1. ALL RIPRAP SHALL HAVE 8" X 12" TOE WALL.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

INTERNAL DRAINAGE AREA MAP & DETAILS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	104

INLET COMPUTATIONS - 10 YEAR STORM													
DRAINAGE AREA	DISCHARGE TO	AREA	Q_{10}	Q_{BYPASS}	Q_{TOTAL}	ROAD CROSS SLOPE	LONGITUDINAL ROAD SLOPE	INLET LENGTH	ALLOWABLE PONDED WIDTH	CALCULATED PONDED WIDTH	CALCULATED PONDED DEPTH	BYPASS FLOW	BYPASS TO INLET
		AC	CFS	CFS	CFS	%	%	FT	FT	FT	FT	CFS	
CI A-1	CURB INLET #1	0.36	2.2	0.0	2.2	2.0	2.2	20	100	7.93	0.16	0.0	C2
CI A-2	CURB INLET #2	0.62	3.7	0.0	3.7	2.4	1.1	20	65	9.88	0.24	0.0	-
CI A-3	CURB INLET #3	0.29	1.8	0.0	1.8	2.0	1.2	20	10	8.24	0.16	0.0	C2
CI A-4	CURB INLET #4	0.20	1.2	0.3	1.5	2.7	1.0	20	30	6.56	0.18	0.0	C3
CI A-5	CURB INLET #5	0.88	5.2	0.0	5.2	2.0	1.9	20	90	11.31	0.23	0.3	C4
CI A-6	CURB INLET #6	0.32	1.9	0.0	1.9	2.0	1.5	20	90	8.06	0.16	0.0	C5
CI A-7	CURB INLET #7	0.27	1.6	0.0	1.6	1.3	4.5	9.5	15	8.06	0.10	0.0	-

NOTES

1. C-VALUES CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL TABLE 4-11.

2. TIME OF CONCENTRATION CALCULATED USING TXDOT HYDRAULIC DESIGN MANUAL EQUATION 4-16.

3. INTENSITIES FOUND USING TXDOT EDB-2019 SPREADSHEET INCLUDING ATLAS-14 DATA.

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO I AUSTIN I HOUSTON I FORT WORTH I DALLAS
2000 NW LOOP 410 I SAN ANTONIO, TX 78213 I 210.375.9000
TEXAS ENGINEERING FIRM #470 I TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

CURB INLET HYDRAULIC DATA

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	105

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\116350 4CURB_HYD_DATA.dgn

show 5, 10, and 100yr

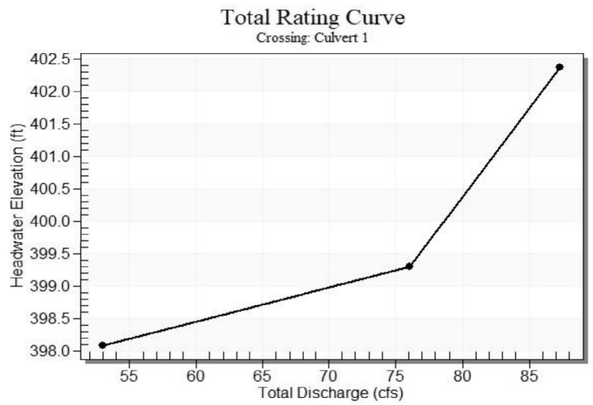
m the Txdot Hydrology shows showing the [10 yr], and 25 yr for would also show 50 yr, ng because of Freeway n lanes.

(25-yr)	(50-yr)
	x
	x
[x]	x
[x]	x
	[x]
x	
[x]	x
x	[x]
	x

Table 1 - Summary of Culvert Flows at Crossing: Culvert 1

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
398.10	10 year	53.00	53.00	0.00	1
399.31	100 year	76.10	76.10	0.00	1
400.05	Overtopping	87.30	87.30	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert 1



Culvert Performance Curve Plot: Culvert 1

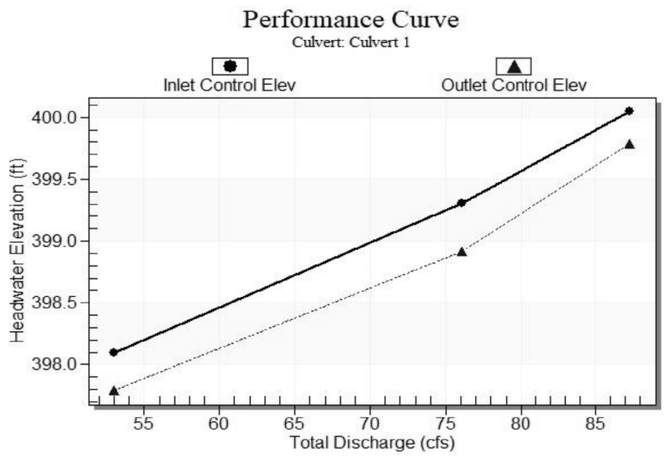


Table 3 - Downstream Channel Rating Curve (Crossing: Culvert 1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
53.00	396.99	1.84	3.93	1.15	0.72
76.10	397.25	2.10	4.30	1.31	0.74

Tailwater Channel Data - Culvert 1

Tailwater Channel Option: Triangular Channel
Side Slope (H:V): 4.00 (_:1)
Channel Slope: 0.0100
Channel Manning's n: 0.0350
Channel Invert Elevation: 395.15 ft

Roadway Data for Crossing: Culvert 1

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 22.00 ft
Crest Elevation: 400.05 ft
Roadway Surface: Paved
Roadway Top Width: 22.00 ft

Table 2 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	53.00	53.00	398.10	2.676	2.371	5-JS1t	1.284	1.517	1.836	1.836	5.773	3.930
100 year	76.10	76.10	399.31	3.885	3.492	5-JS1f	1.658	1.930	2.000	2.103	7.610	4.302

****

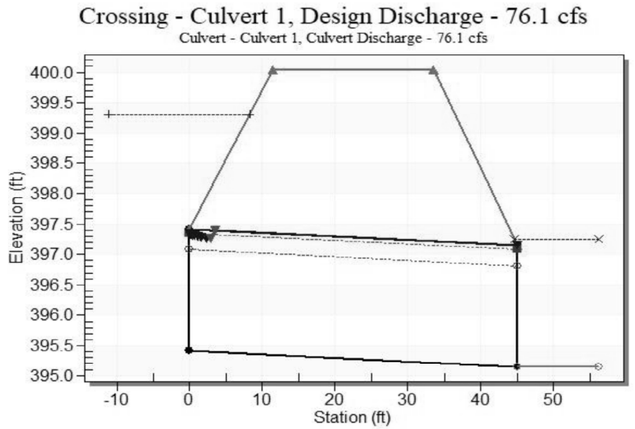
Straight Culvert

Inlet Elevation (invert): 395.42 ft, Outlet Elevation (invert): 395.15 ft

Culvert Length: 45.00 ft, Culvert Slope: 0.0060

****

Water Surface Profile Plot for Culvert: Culvert 1



INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

Crossing Discharge Data

Discharge Selection Method: Recurrence

Site Data - Culvert 1

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 395.42 ft
Outlet Station: 45.00 ft
Outlet Elevation: 395.15 ft
Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box
Barrel Span: 5.00 ft
Barrel Rise: 2.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: Square Edge (90 & 15° flare) Wingwall
Inlet Depression: None

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
HYDRAULIC DATA
SHEET CULVERT A-1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	106

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504HYD_DATA_CLV01.dgn

6 from the Txdot Hydrology
e 4-2 shows showing the
5 yr, [10 yr], and 25 yr for
but I would also show 50 yr,
r-toping because of Freeway
main lanes.

we will show 5, 10,
25, 50, and 100yr

Plotted on: 10/14/2

Table 1 - Summary of Culvert Flows at Crossing: Culvert A-6

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert A-6 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
394.96	10 year	38.10	38.10	0.00	1
395.73	100 year	54.70	54.70	0.00	1
402.00	Overtopping	132.81	132.81	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert A-6

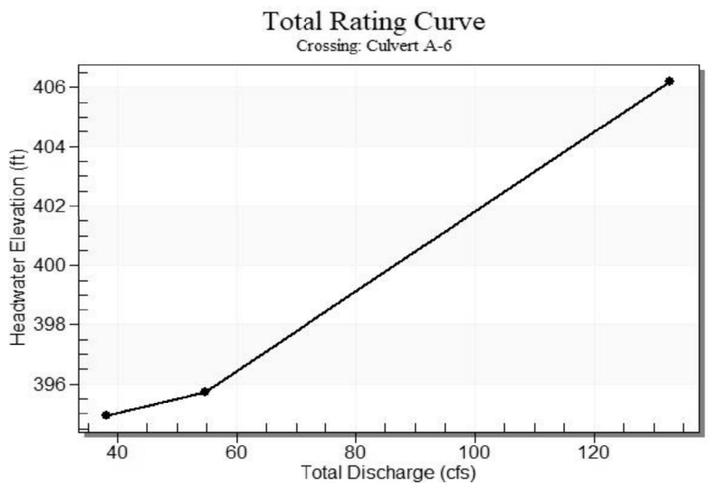


Table 2 - Culvert Summary Table: Culvert A-6

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	38.10	38.10	394.96	2.840	1.034	1-S2n	1.208	1.912	1.349	1.868	10.762	5.458
100 year	54.70	54.70	395.73	3.615	1.922	5-S2n	1.471	2.309	1.668	2.140	11.695	5.974

****

Straight Culvert

Inlet Elevation (invert): 392.12 ft, Outlet Elevation (invert): 390.78 ft

Culvert Length: 68.01 ft, Culvert Slope: 0.0197

****

Crossing Discharge Data

Discharge Selection Method: Recurrence

Culvert Performance Curve Plot: Culvert A-6

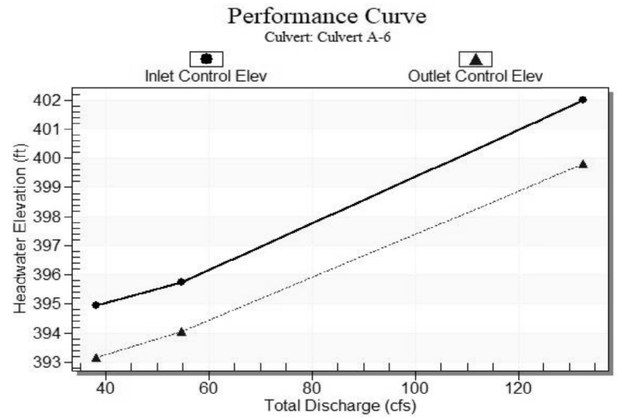


Table 3 - Downstream Channel Rating Curve (Crossing: Culvert A-6)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
38.10	392.65	1.87	5.46	2.45	1.00
54.70	392.92	2.14	5.97	2.80	1.02

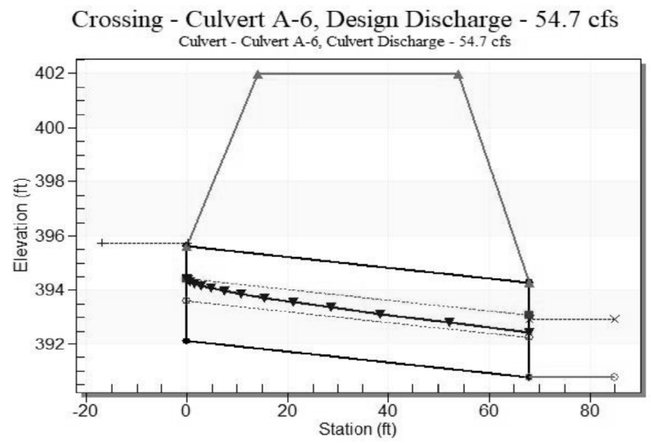
Tailwater Channel Data - Culvert A-6

Tailwater Channel Option: Triangular Channel
Side Slope (H:V): 2.00 (_:1)
Channel Slope: 0.0210
Channel Manning's n: 0.0350
Channel Invert Elevation: 390.78 ft

Roadway Data for Crossing: Culvert A-6

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 21.00 ft
Crest Elevation: 402.00 ft
Roadway Surface: Paved
Roadway Top Width: 40.00 ft

Water Surface Profile Plot for Culvert: Culvert A-6



Site Data - Culvert A-6

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 392.12 ft
Outlet Station: 68.00 ft
Outlet Elevation: 390.78 ft
Number of Barrels: 1

Culvert Data Summary - Culvert A-6

Barrel Shape: Circular
Barrel Diameter: 3.50 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
HYDRAULIC DATA SHEET CULVERT A-6

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	107

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504HYD_DATA_CLV03.dgn

from the Txdot Hydrology 4-2 shows showing the yr, [10 yr], and 25 yr for ut I would also show 50 yr, toping because of Freeway ain lanes.

we will show 5, 10, 25, 50, and 100yr

Plotted on: 10/14/2

Table 1 - Summary of Culvert Flows at Crossing: Culvert 5

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert B-4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
390.09	10 year	9.10	9.10	0.00	1
390.54	100 year	13.00	13.00	0.00	1
392.99	Overtopping	25.90	25.90	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert 5

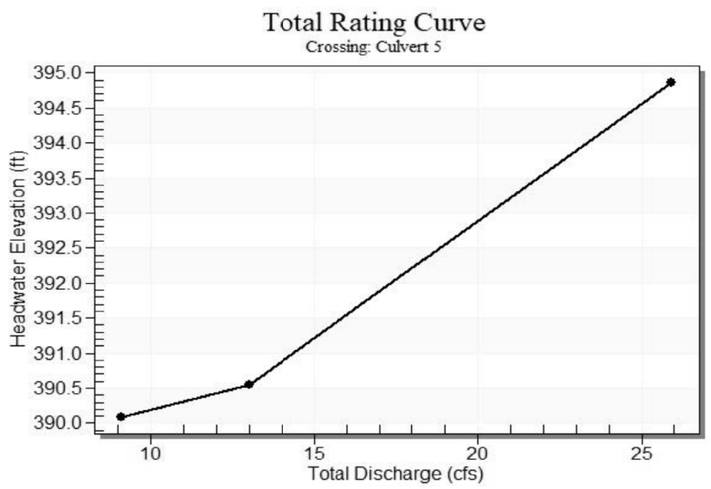


Table 2 - Culvert Summary Table: Culvert B-4

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	9.10	9.10	390.09	1.614	1.763	2-M2c	1.261	1.075	1.075	0.907	5.291	1.464
100 year	13.00	13.00	390.54	2.081	2.210	7-M2c	2.000	1.294	1.294	1.051	6.043	1.602

****

Straight Culvert

Inlet Elevation (invert): 388.33 ft, Outlet Elevation (invert): 388.11 ft

Culvert Length: 77.00 ft, Culvert Slope: 0.0029

****

Crossing Discharge Data

Discharge Selection Method: Recurrence

Culvert Performance Curve Plot: Culvert B-4

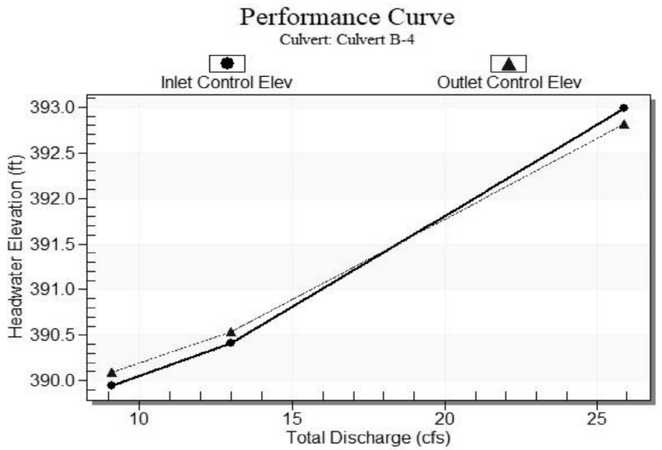


Table 3 - Downstream Channel Rating Curve (Crossing: Culvert 5)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
9.10	389.02	0.91	1.46	0.17	0.36
13.00	389.16	1.05	1.60	0.20	0.37

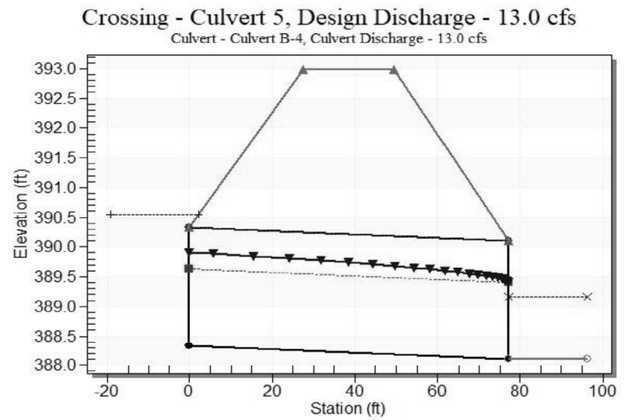
Tailwater Channel Data - Culvert 5

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 1.42 ft
Side Slope (H:V): 6.00 (_:1)
Channel Slope: 0.0030
Channel Manning's n: 0.0350
Channel Invert Elevation: 388.11 ft

Roadway Data for Crossing: Culvert 5

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 47.00 ft
Crest Elevation: 392.99 ft
Roadway Surface: Paved
Roadway Top Width: 22.00 ft

Water Surface Profile Plot for Culvert: Culvert B-4



Site Data - Culvert B-4

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 388.33 ft
Outlet Station: 77.00 ft
Outlet Elevation: 388.11 ft
Number of Barrels: 1

Culvert Data Summary - Culvert B-4

Barrel Shape: Circular
Barrel Diameter: 2.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: Mitered to Conform to Slope
Inlet Depression: None

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
HYDRAULIC DATA
SHEET CULVERT B-4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	108

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504HYD_DATA_CLV04.dgn

n the Txdot Hydrology shows showing the [10 yr], and 25 yr for would also show 50 yr, ng because of Freeway lanes.

we will show 5, 10, 25, 50, and 100yr

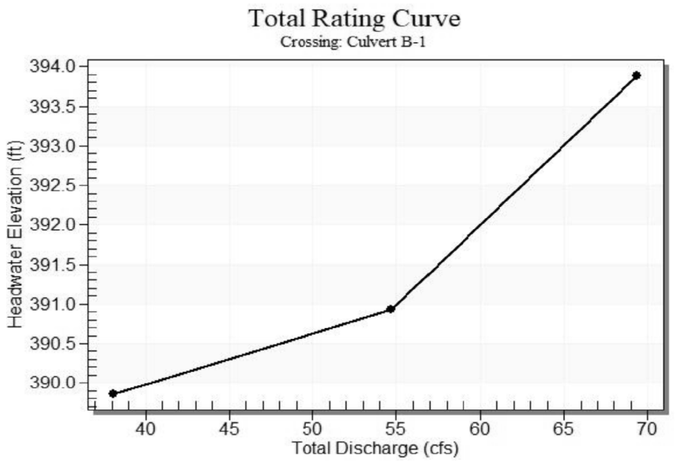
Plotted on: 10/

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504HYD_DATA_CLV05.dgn

Table 1 - Summary of Culvert Flows at Crossing: Culvert B-1

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert B-1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
389.86	10 year	38.10	38.10	0.00	1
390.92	100 year	54.70	54.70	0.00	1
392.35	Overtopping	69.35	69.35	0.00	Overtopping

Rating Curve Plot for Crossing: Culvert B-1



Culvert Performance Curve Plot: Culvert B-1

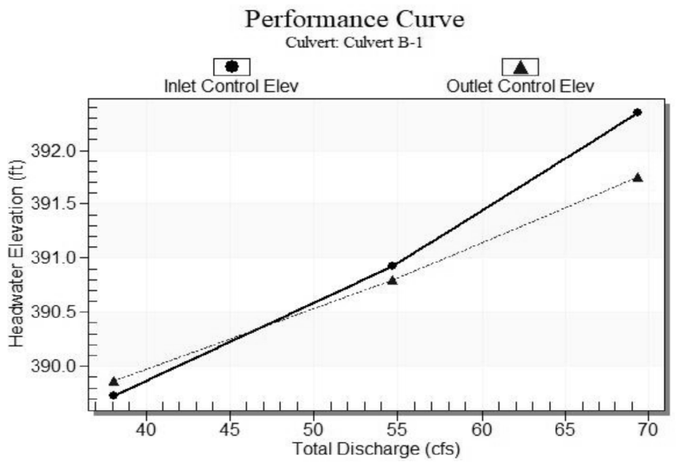


Table 3 - Downstream Channel Rating Curve (Crossing: Culvert B-1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
38.10	388.06	1.58	2.54	0.49	0.50
54.70	388.29	1.81	2.78	0.56	0.52

Tailwater Channel Data - Culvert B-1

Tailwater Channel Option: Triangular Channel
Side Slope (H:V): 6.00 (_:1)
Channel Slope: 0.0050
Channel Manning's n: 0.0350
Channel Invert Elevation: 386.48 ft

Roadway Data for Crossing: Culvert B-1

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 21.00 ft
Crest Elevation: 392.35 ft
Roadway Surface: Paved
Roadway Top Width: 7.00 ft

Table 2 - Culvert Summary Table: Culvert B-1

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
10 year	38.10	38.10	389.86	3.176	3.312	7-M2c	2.093	2.004	2.004	1.580	7.596	2.543
100 year	54.70	54.70	390.92	4.374	4.247	7-M2c	3.000	2.398	2.398	1.810	9.030	2.783

****

Straight Culvert

Inlet Elevation (invert): 386.55 ft, Outlet Elevation (invert): 386.48 ft

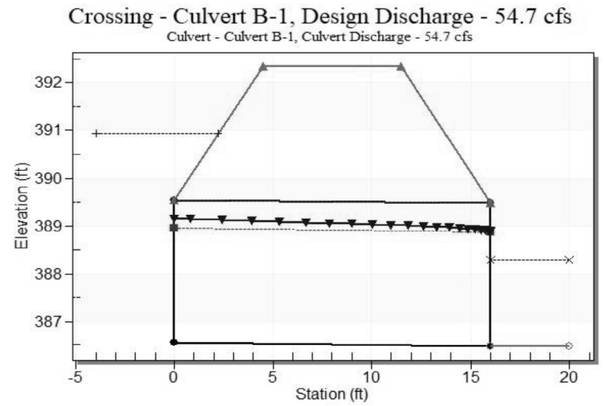
Culvert Length: 16.00 ft, Culvert Slope: 0.0044

****

Crossing Discharge Data

Discharge Selection Method: Recurrence

Water Surface Profile Plot for Culvert: Culvert B-1



Site Data - Culvert B-1

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 386.55 ft
Outlet Station: 16.00 ft
Outlet Elevation: 386.48 ft
Number of Barrels: 1

Culvert Data Summary - Culvert B-1

Barrel Shape: Circular
Barrel Diameter: 3.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

REV. NO.	DATE	DESCRIPTION	BY

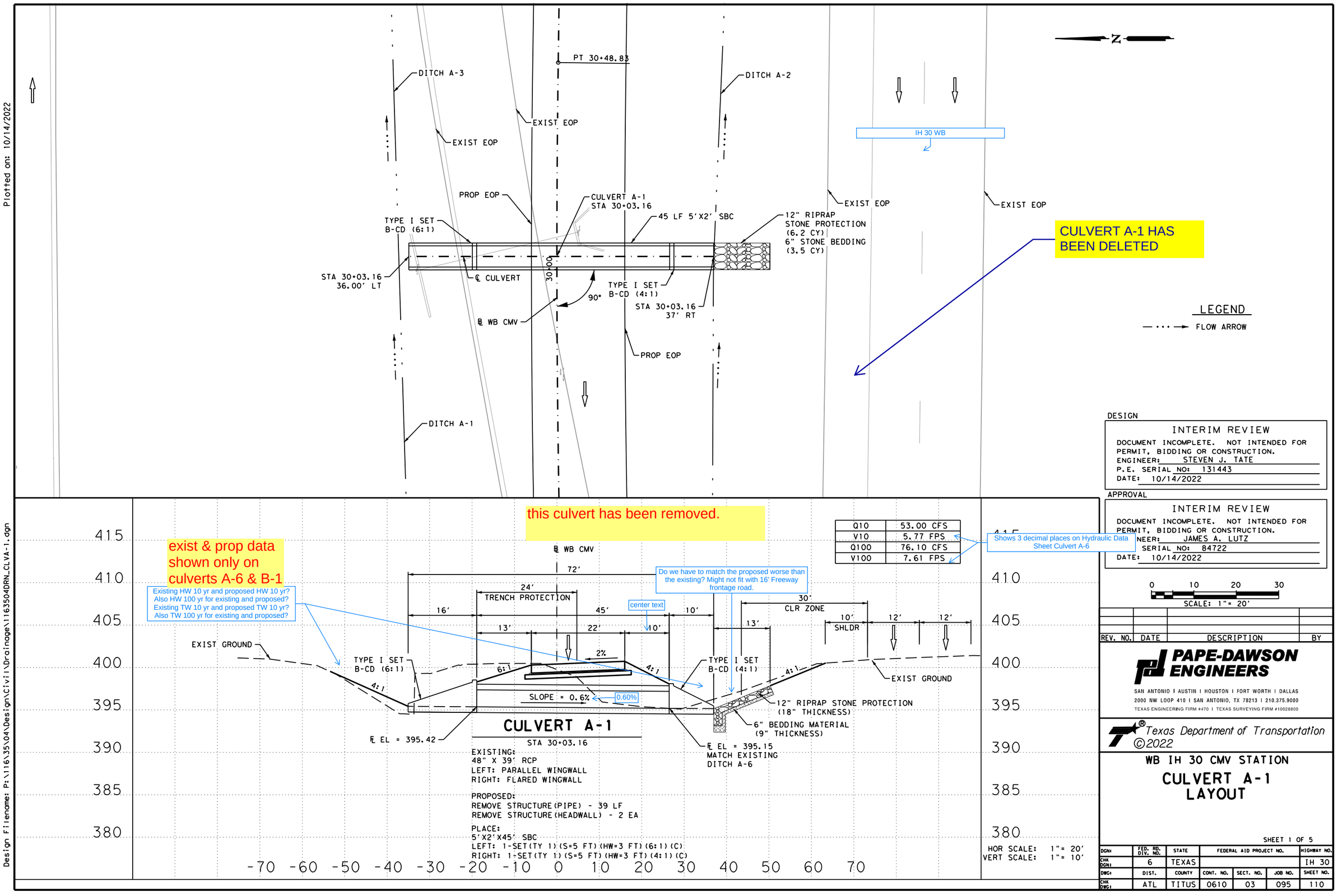
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION
HYDRAULIC DATA SHEET CULVERT B-1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	109

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504DRN_CLVA-1.dgn



DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
SERIAL NO: 84722
DATE: 10/14/2022

0 10 20 30
SCALE: 1"= 20'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

CULVERT A-1 LAYOUT

SHEET 1 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	110

Plotted on: 10/14/2022

AGREE, CALLOUTS MOVED TO AVOID OVERLAP WITH PROPOSED DESIGN

Hard to read

MITER PIPE TO MATCH AND FORM TO RIPRAP SLOPE. SUBSIDIARY TO ITEM 0464. NO SEPARATE PAY.

STA 45+92.33
117.5' LT

℄ CULVERT

85 LF 24" RCP

CULVERT A-4
STA 45+92.33
32.5' LT

PROP INSPECTION PIT

℄ WB CMV

46+00

EXIST EOP

PROP EOP

EXIST EOP

PROP EOP

EXIST EOP

N

NOTES

1. CULVERT NOT ANALYZED. NO DRAINAGE AREA. USED AS CLEAN OUT.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 10 20 30
SCALE: 1" = 20'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

CULVERT A-4 LAYOUT

SHEET 2 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	111

4 added callout, meets 16' CZ

Looks like this location might not be meeting the 16' clear zone for a Freeway frontage road.

85'
30' TRENCH PROTECTION
6'
60'

PROP RAIL HANDRAIL TY(B)

℄ WB CMV

2%

4:1

2:1

10' LANE

℄ EL = 391.66

15'-3"

5:1

EXISTING GROUND

SLOPE = 0.5%

℄ EL = 392.48

MITER PIPE TO MATCH AND FORM TO RIPRAP SLOPE. SUBSIDIARY TO ITEM 0464. NO SEPARATE PAY.

TIE INTO EXIST EOP

CULVERT A-4

STA 45+92.33

EXISTING:
NONE

PROPOSED: 85 LF X 24" RCP
W/ PIPE END FORMED INTO 2:1 CONCRETE RIPRAP SLOPE

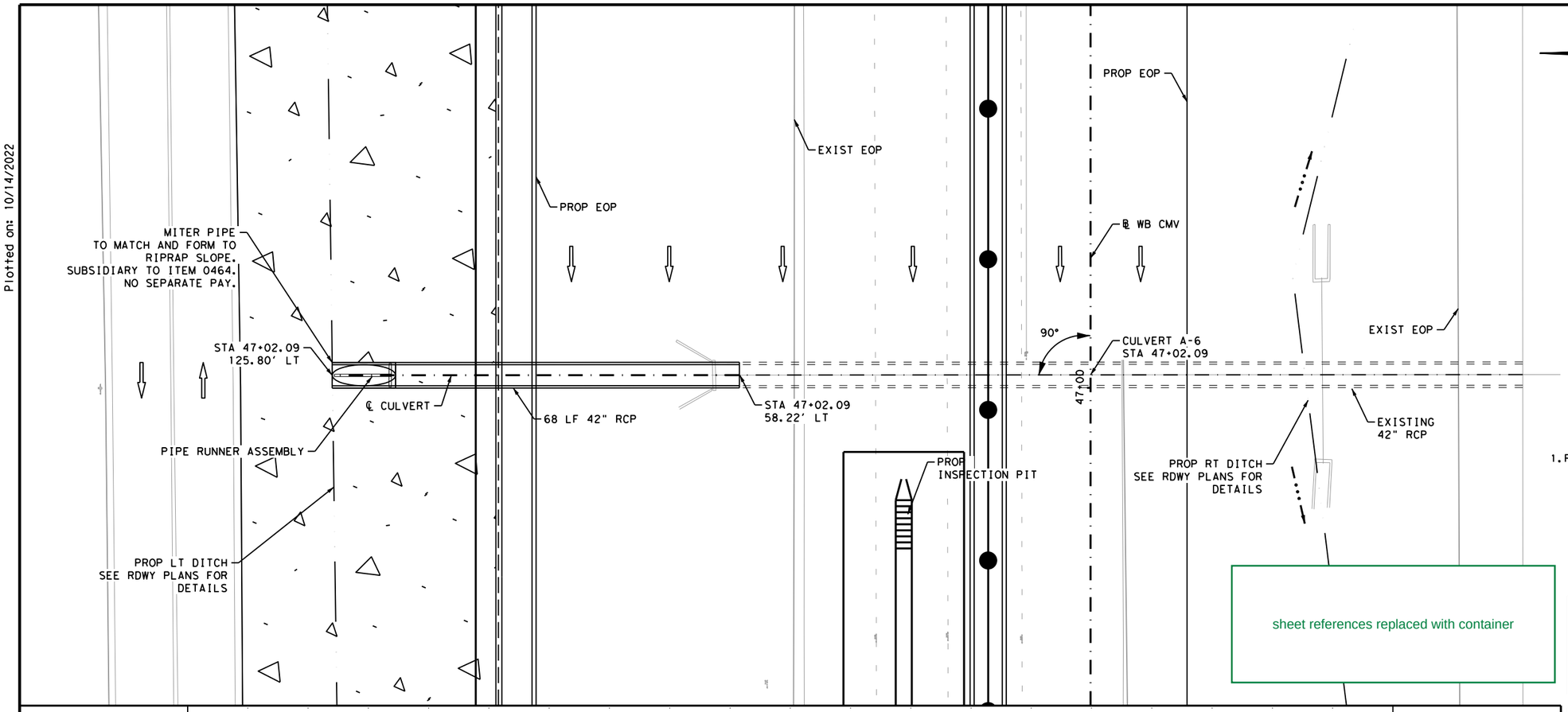
410 405 400 395 390 385 380 375

-140 -130 -120 -110 -100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40

HOR SCALE: 1" = 20'
VERT SCALE: 1" = 10'

Design Filename: P:\116350\04\Design\Civil\Drainage\1163504DRN_CLVA-4.dgn

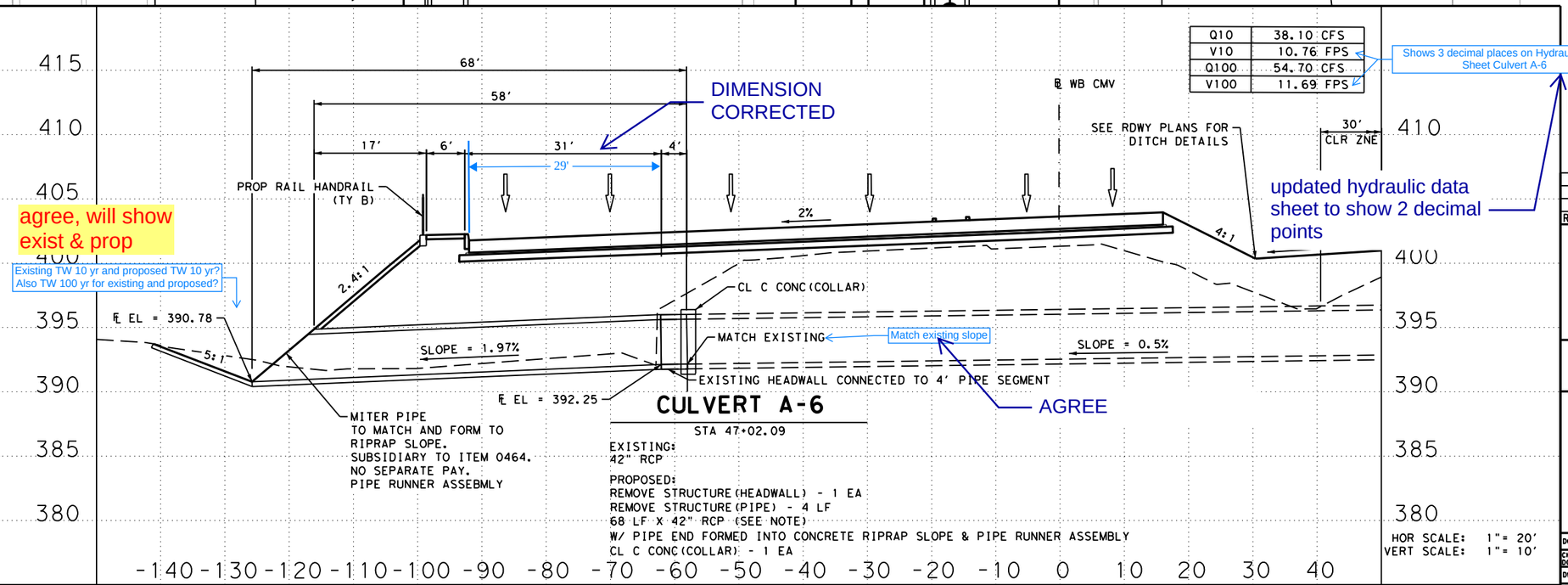
Plotted on: 10/14/2022



NOTES

1. REMOVE EXISTING CULVERTS TO NEAREST JOINTS.

sheet references replaced with container



agree, will show exist & prop

Existing TW 10 yr and proposed TW 10 yr?
Also TW 100 yr for existing and proposed?

Q10	38.10 CFS
V10	10.76 FPS
Q100	54.70 CFS
V100	11.69 FPS

Shows 3 decimal places on Hydraulic Data Sheet Culvert A-6

updated hydraulic data sheet to show 2 decimal points

CULVERT A-6

STA 47+02.09

EXISTING:
42" RCP

PROPOSED:
REMOVE STRUCTURE(HEADWALL) - 1 EA
REMOVE STRUCTURE(PIPE) - 4 LF
68 LF X 42" RCP (SEE NOTE)
W/ PIPE END FORMED INTO CONCRETE RIPRAP SLOPE & PIPE RUNNER ASSEMBLY
CL C CONC(COLLAR) - 1 EA

HOR SCALE: 1"= 20'
VERT SCALE: 1"= 10'

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 10 20 30
SCALE: 1"= 20'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

CULVERT A-6 LAYOUT

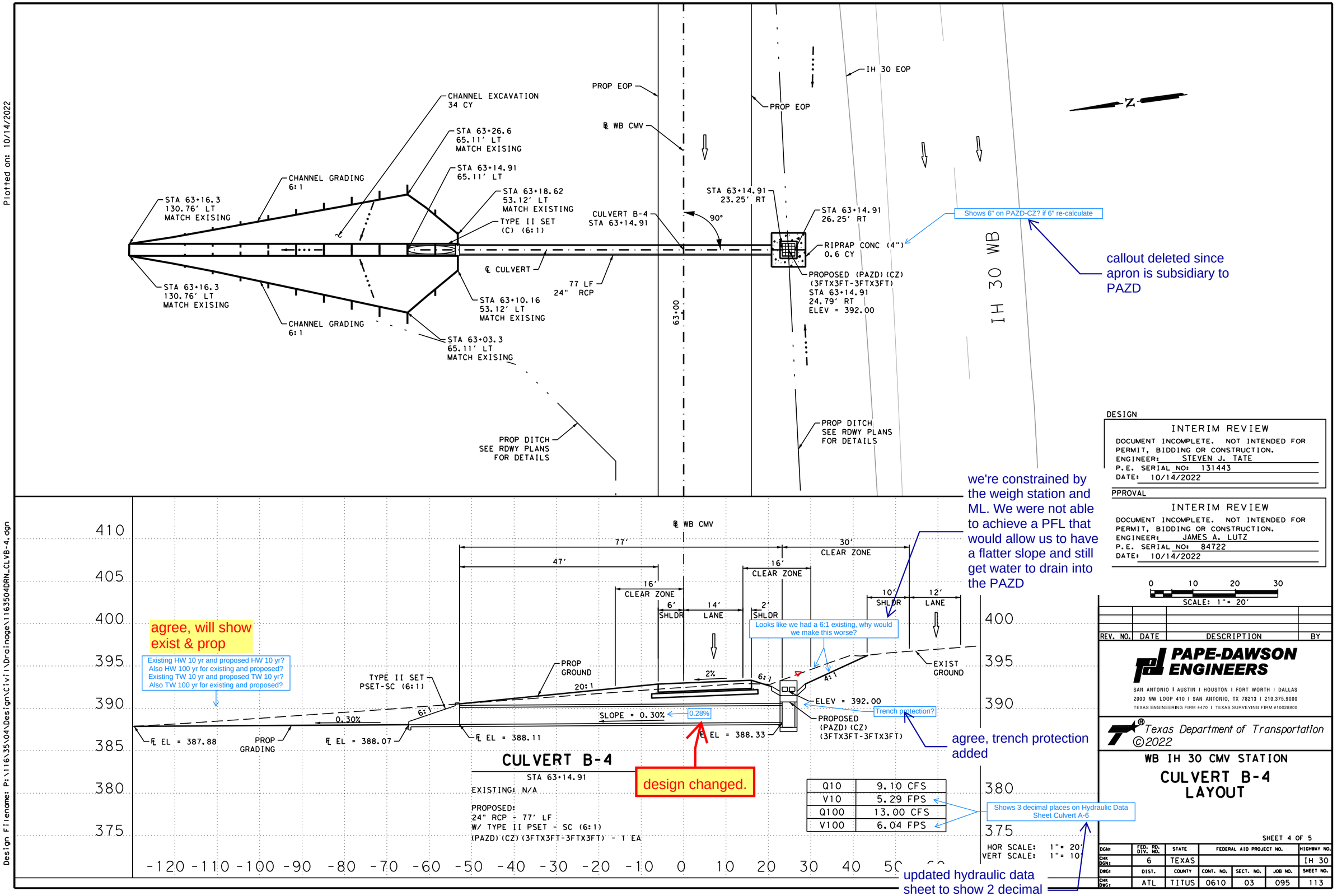
SHEET 3 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	112

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504DRN_CLVA-6.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\116504DRN_CLVB-4.dgn



we're constrained by the weigh station and ML. We were not able to achieve a PFL that would allow us to have a flatter slope and still get water to drain into the PAZD

agree, trench protection added

updated hydraulic data sheet to show 2 decimal points

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

PPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 10 20 30
SCALE: 1"= 20'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

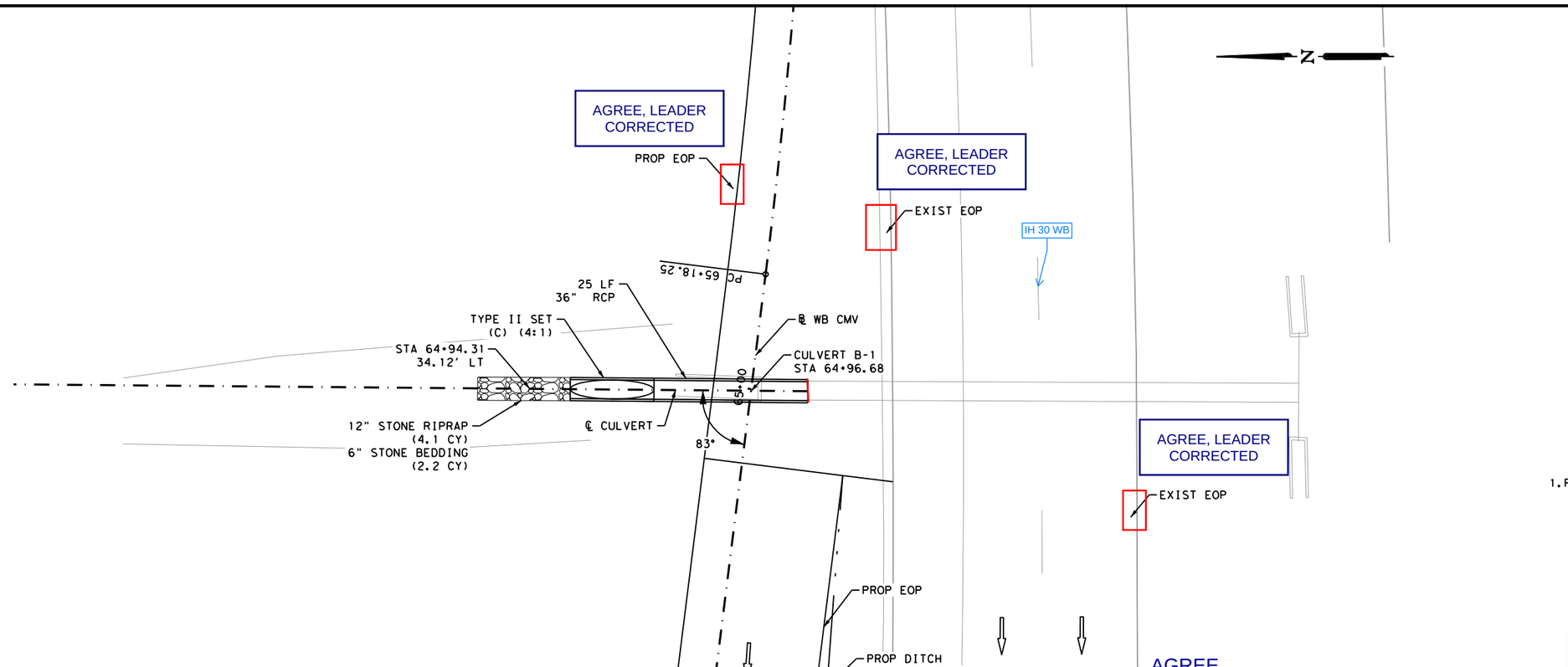
CULVERT B-4 LAYOUT

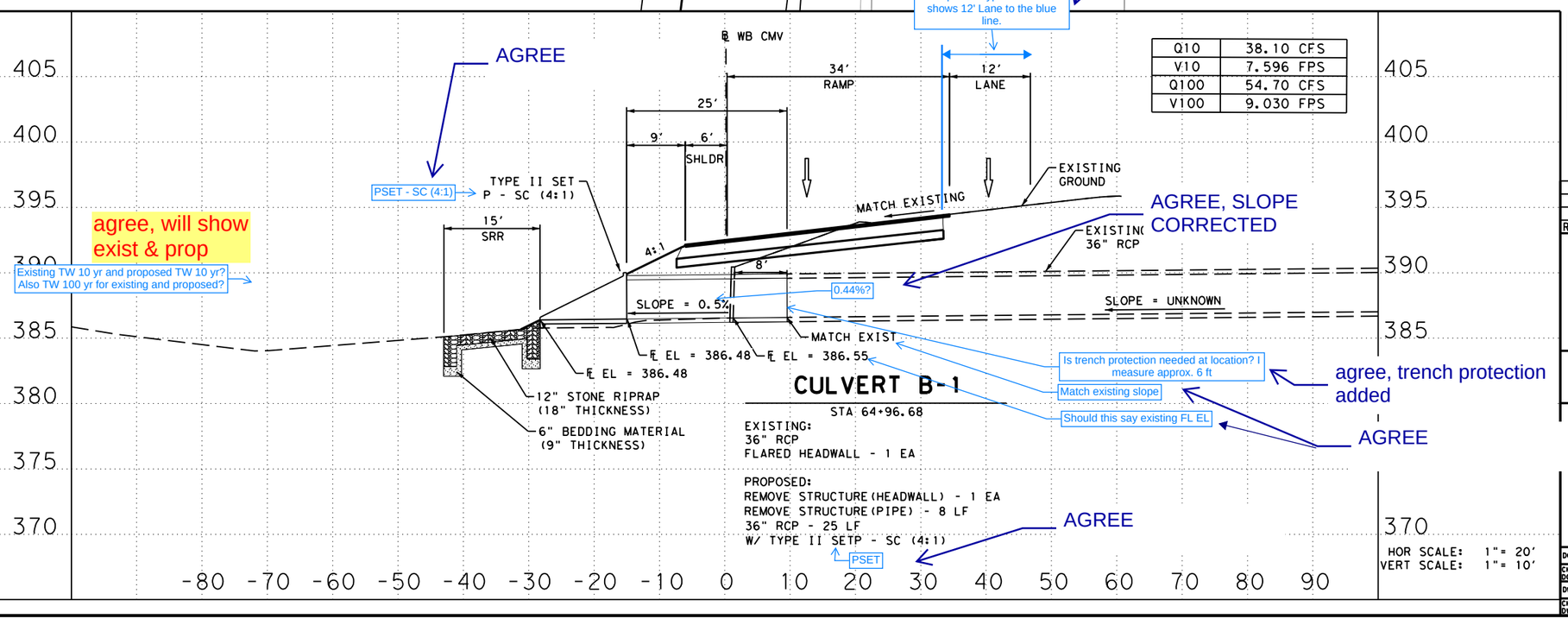
SHEET 4 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DW:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DW:	ATL	TITUS	0610	03	095	113

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Drainage\1163504DRN_CLVB-1.dgn





Q10	38.10 CFS
V10	7.596 FPS
Q100	54.70 CFS
V100	9.030 FPS

CULVERT B-1

STA 64+96.68

EXISTING:
36" RCP
FLARED HEADWALL - 1 EA

PROPOSED:
REMOVE STRUCTURE(HEADWALL) - 1 EA
REMOVE STRUCTURE(PIPE) - 8 LF
36" RCP - 25 LF
W/ TYPE II SETP - SC (4:1)
PSET

AGREE

HOR SCALE: 1"= 20'
VERT SCALE: 1"= 10'

NOTES

1. REMOVE EXISTING CULVERTS TO NEAREST JOINTS.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 10 20 30
SCALE: 1"= 20'

REV. NO.	DATE	DESCRIPTION	BY

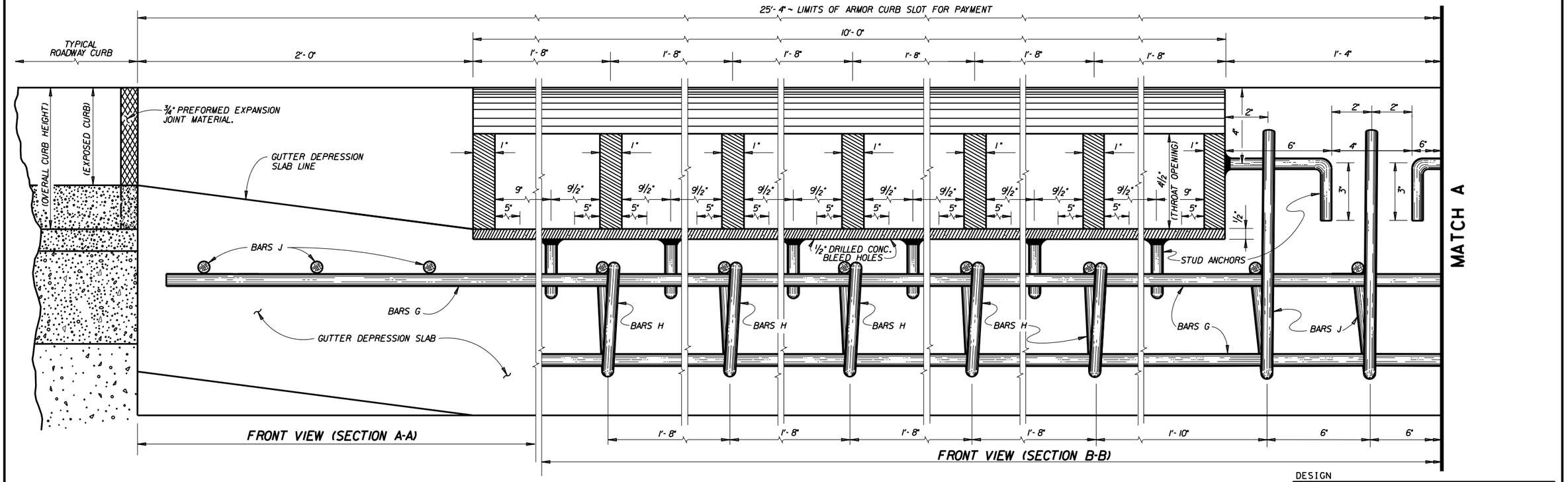
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

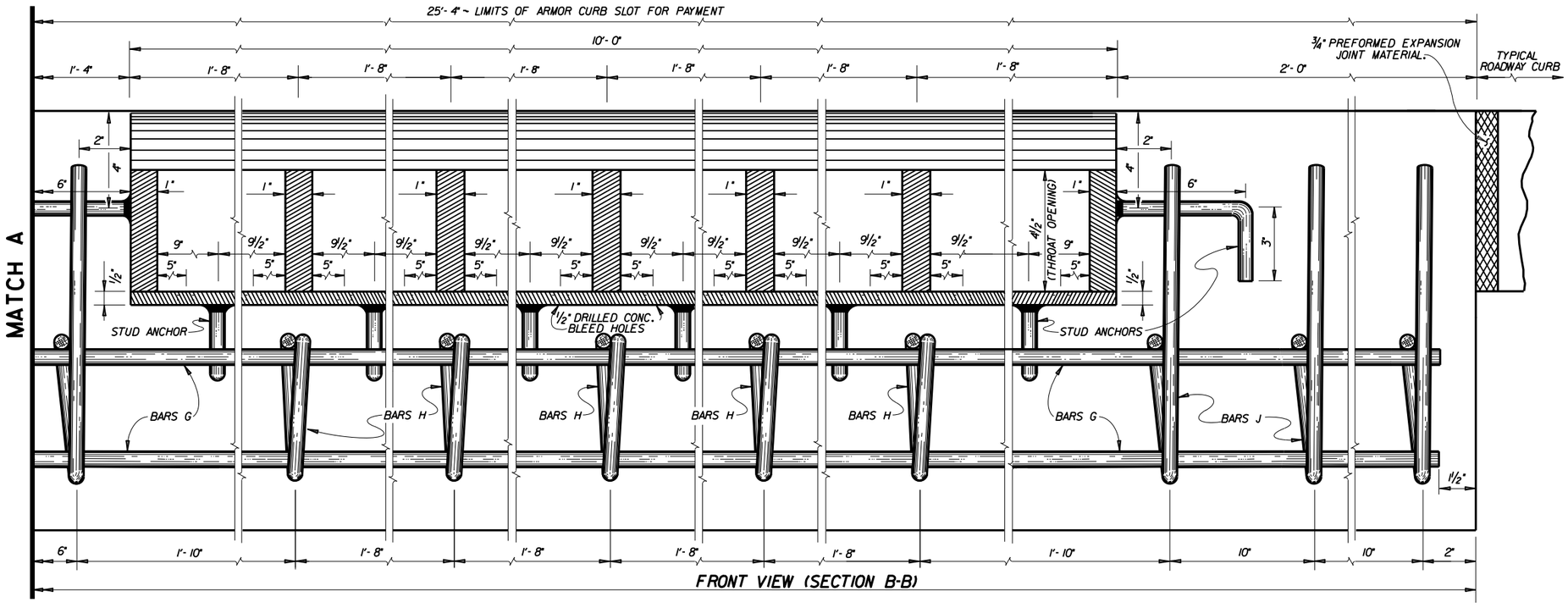
WB IH 30 CMV STATION

CULVERT B-1 LAYOUT

SHEET 5 OF 5

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	114





DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

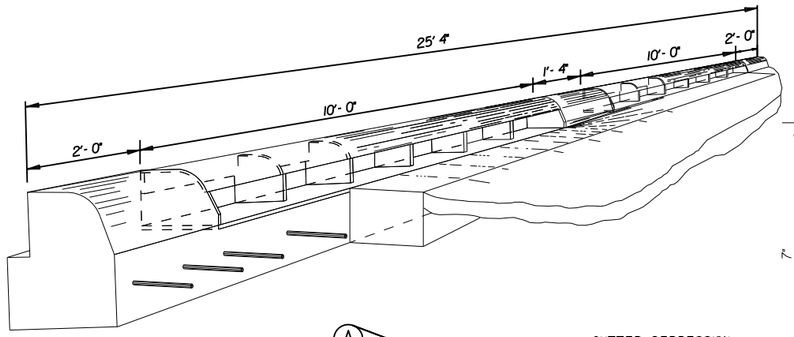
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

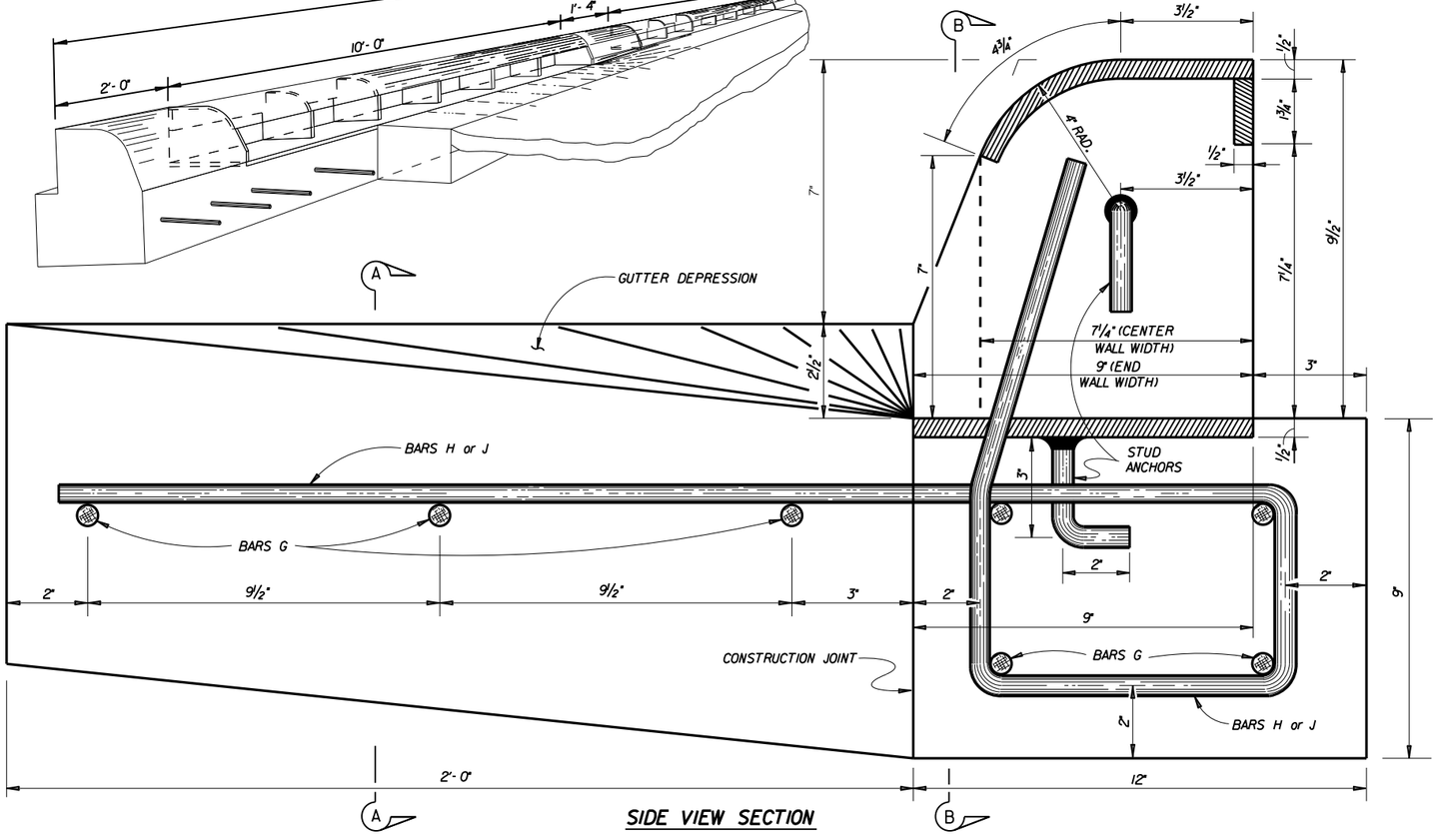
WB IH 30 CMV STATION

ARMOR CURB DETAIL

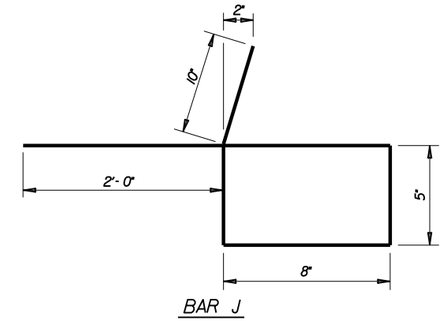
SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	115

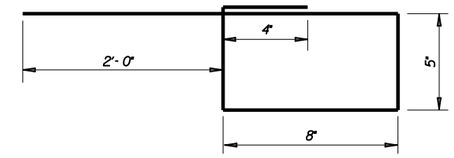




SIDE VIEW SECTION



BAR J



BAR H

ESTIMATED QUANTITIES
FOR REINFORCING STEEL

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
G	7	#4	SHOWN	13'-9"	64
H	10	#4	1'-8"	4'-6"	30
J	9	#4	8"	5'-0"	30
TOTAL WEIGHT *				LBS.	124
EST. CONCRETE FOR FOUNDATION *				C.Y.	0.80
EST. CONCRETE FOR GUTTER DEPRESSION *				C.Y.	1.41

STRUCTURAL STEEL FOR ARMOR CURB SLOT

STUD ANCHORS (½"DIA.)	LBS.	7.0
STEEL PLATE	LBS.	902
TOTAL WEIGHT *	LBS.	977.0

* FOR CONTRACTORS INFO ONLY.

GENERAL NOTES:

ALL CONCRETE SHALL BE CL."A".

ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.

ALL SIDES OF ARMOR CURB SLOT AND STUD ANCHORS SHALL BE ¼" FILLET WELDS.

ALL EXPOSED STRUCTURAL STEEL (ARMOR) SHALL BE GALVANIZED.

ALL EXPOSED EDGES ON ARMOR CURB SHALL RECEIVE A ⅛" BEVEL.

THE SHAPE OF THE TYPICAL ROADWAY CURB SHALL TRANSITION TO THE ARMOR CURB AS APPROVED BY THE ENGINEER.

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

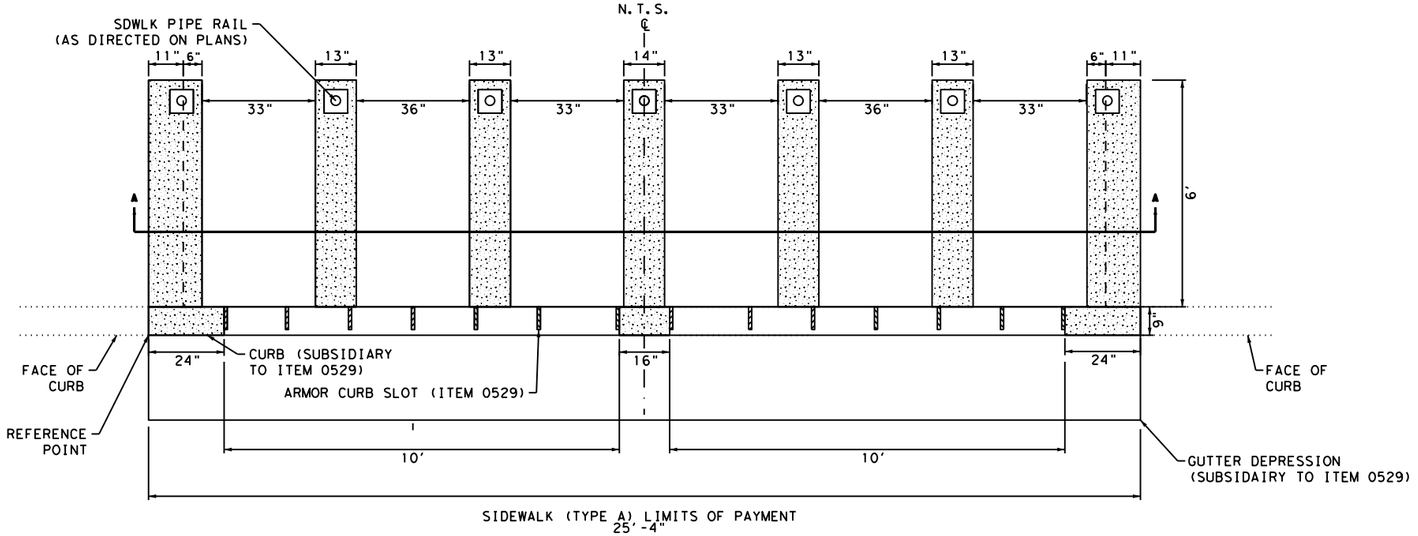
ARMOR CURB DETAIL

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	116

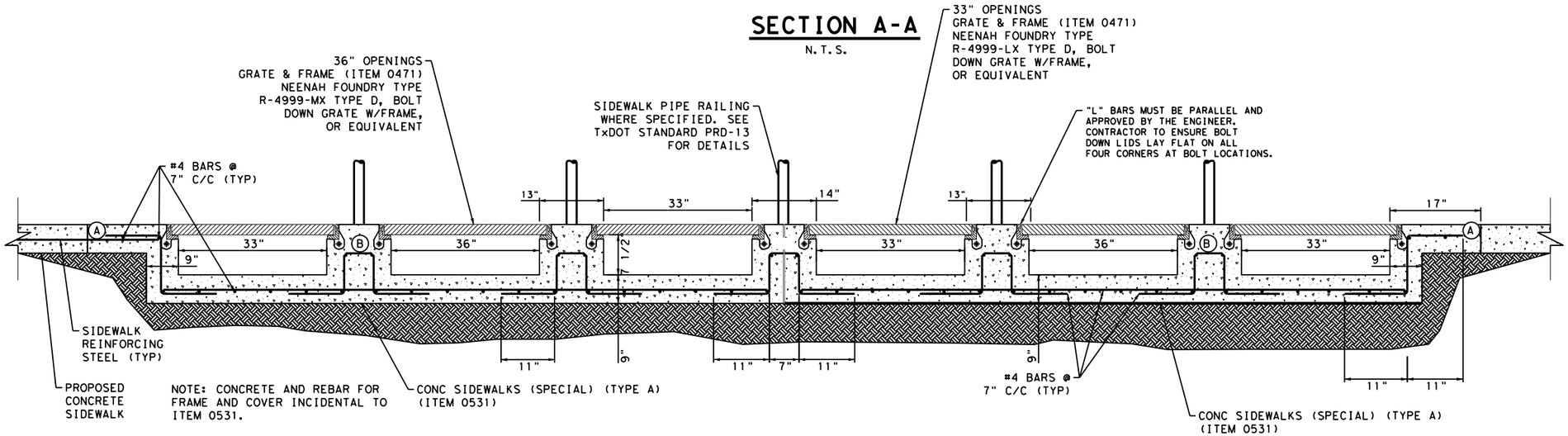
SIDEWALK (TYPE A) DETAIL

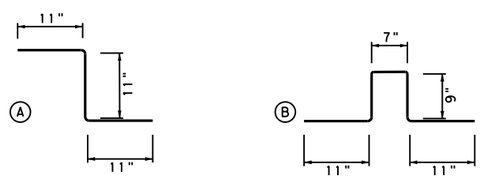
PLAN
(SEE NOTE 1)
N. T. S.



NOTE: GRATE AND FRAMES NOT SHOWN IN PLAN VIEW FOR CLARITY

SECTION A-A
N. T. S.

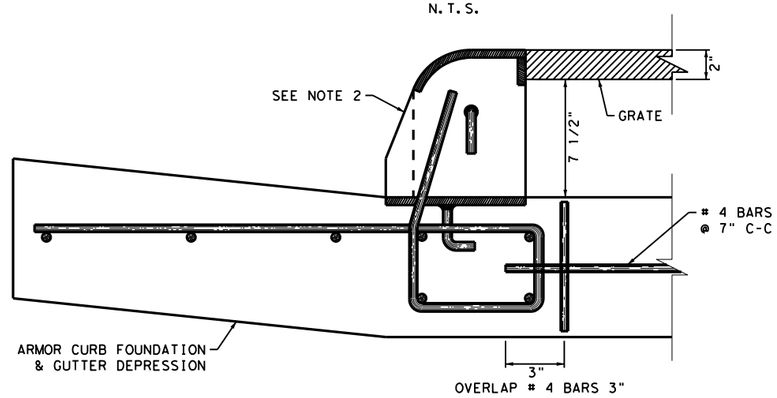




REINFORCING STEEL DETAIL

TABLE OF REINFORCING STEEL			
BAR	SIZE	SPAN	NO.
A	#4	2'-9"	20
B	#4	3'-11"	20

ARMOR CURB SLOT DETAIL
N. T. S.



NOTES:

1) SIDEWALK (TY A) IS PAID SEPARATELY UNDER THE FOLLOWING PAY ITEMS UNLESS OTHERWISE SHOW:

   ITEM 0471-6003 GRATE & FRAME
   ITEM 0529-6020 CONC CURB & GUTTER (ARMOR CURB)
   ITEM 0531-6032 CONC SIDEWALKS (SPECIAL) (TYPE A)

2) SEE ARMOR CURB DETAIL FOR ADDITIONAL INFORMATION

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

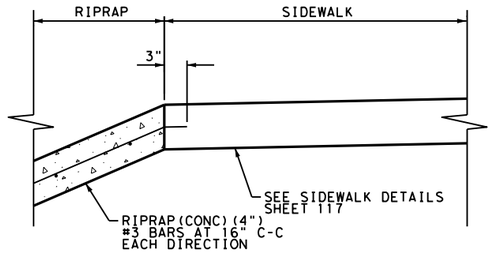
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SIDEWALK (TYPE A) DETAIL

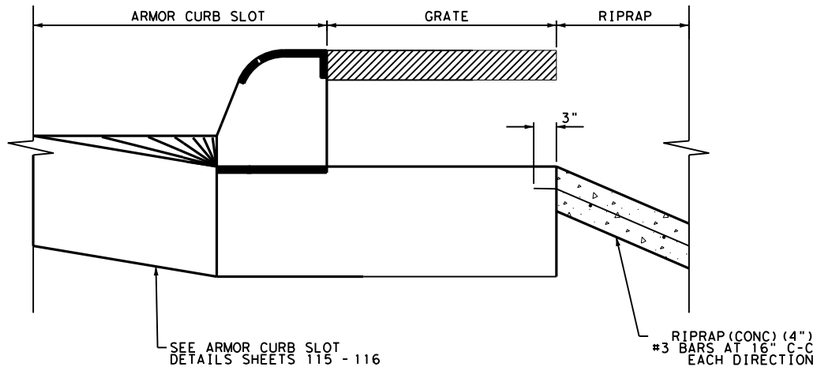
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	117

Plotted on: 10/14/2022
Design Filename: P:\116\35\04\Design\Civil\Drainage\116350 4SIDEWALK_DETAIL.dgn



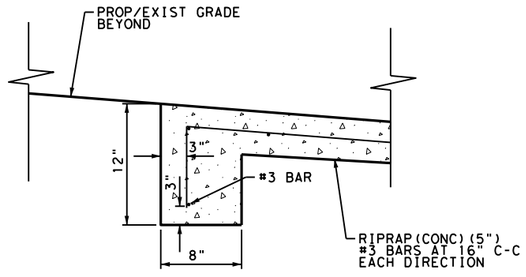
RIPRAP AT SIDEWALK

REINFORCEMENT CONNECTION DETAILS



RIPRAP AT ARMOR CURB SLOT

REINFORCEMENT CONNECTION DETAILS



RIPRAP TOEDOWN

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

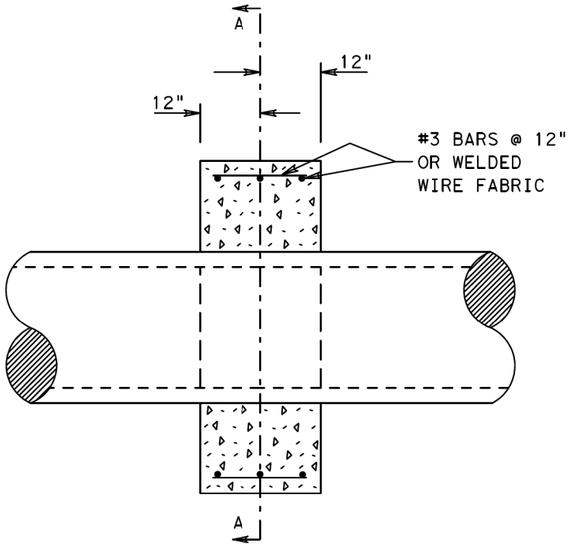
RIP RAP DETAILS

RIPRAP DETAILS

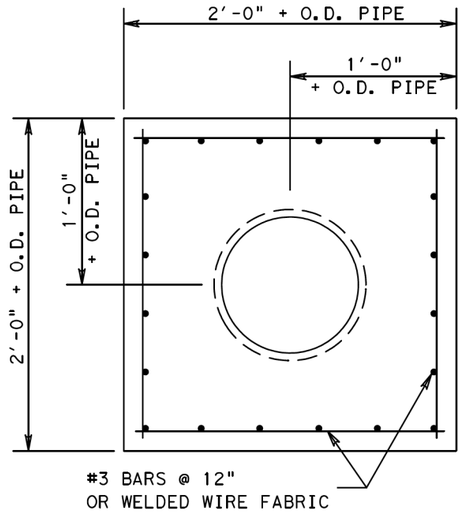
AGREE

SHEET 1 OF 1

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	118



STRAIGHT DRAINAGE PIPE



SECTION A-A

NOTES :

1. ALL CONCRETE SHALL BE CLASS "A".
2. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 3 INCHES.
3. COLLAR MAY BE USED FOR CORRIGATED METAL OR REINFORCED CONCRETE PIPES.
4. PIPES MAY BE PLACED ON ANY SIDE AS INDICATED IN THE PLANS.

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

DETAIL FOR CONCRETE COLLARS FOR DRAINAGE PIPE CONNECTIONS AND DRAINAGE PIPE JUNCTIONS

CONCRETE PIPE COLLAR AND CONNECTION DETAIL

FED RD. DIV. NO.	FEDERAL AID PROJECT NO.		FILE NO.			SHEET NO.
6						119
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS		TITUS				IH 30

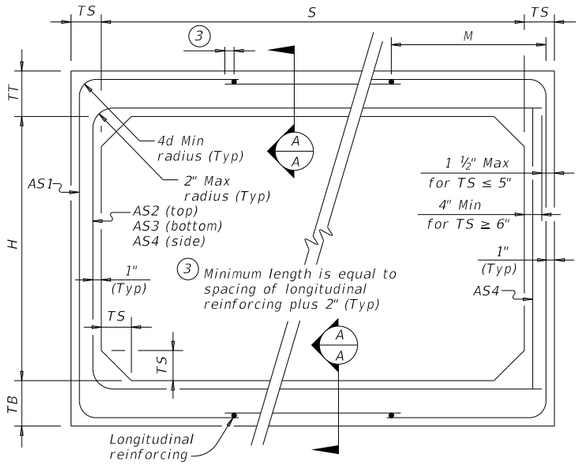
DATE: 10/14/2022 2:49:05 PM
FILE: P:\116135\04\Design\Civil\Standards\Drainage\scp05sts-20.dgn

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

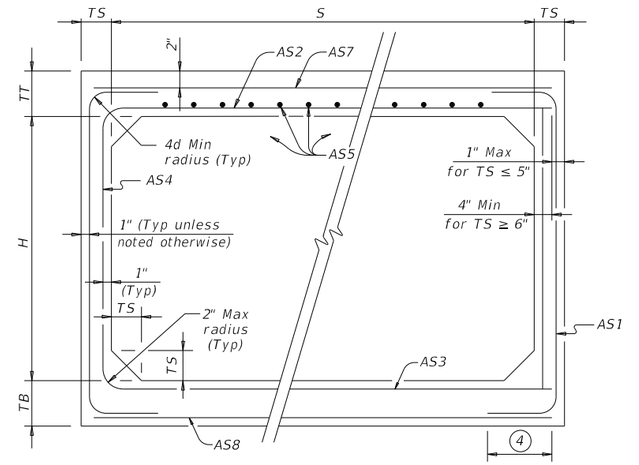
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

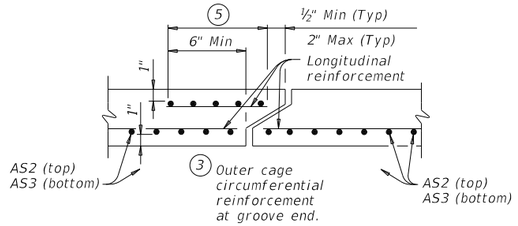
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

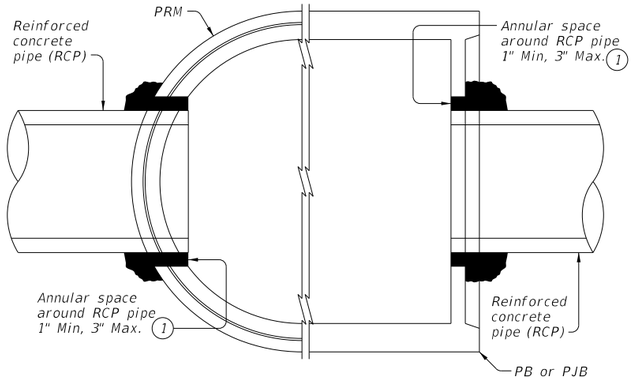
SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

FILE: scp05sts-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		120

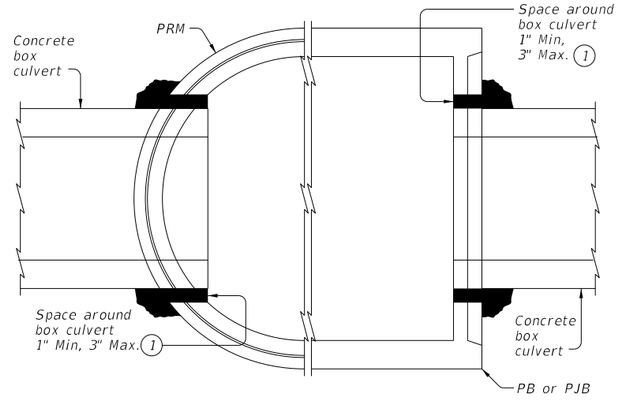
DATE: 10/14/2022 2:49:07 PM
FILE: P:\116335\04\Design\Civil\Standards\Drainage\pbgcstd1-20.dgn



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

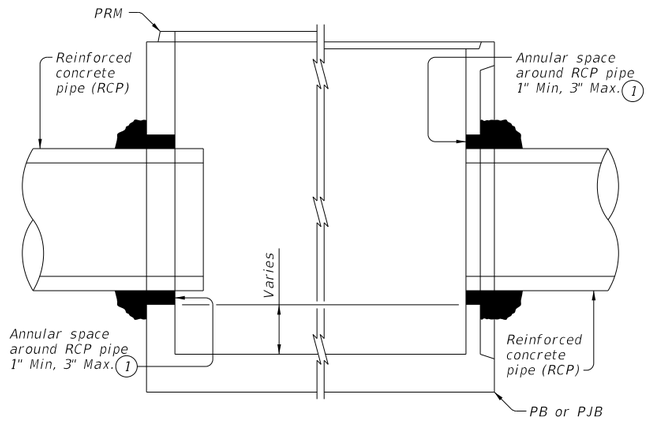
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

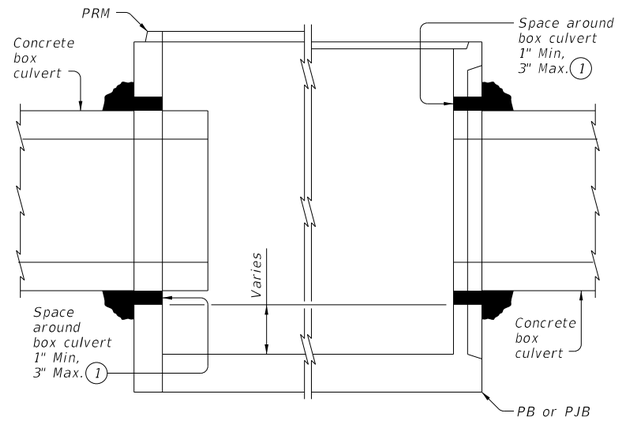
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

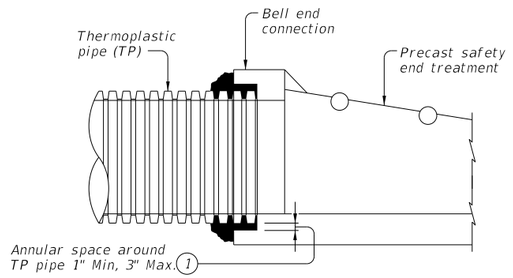
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

Texas Department of Transportation

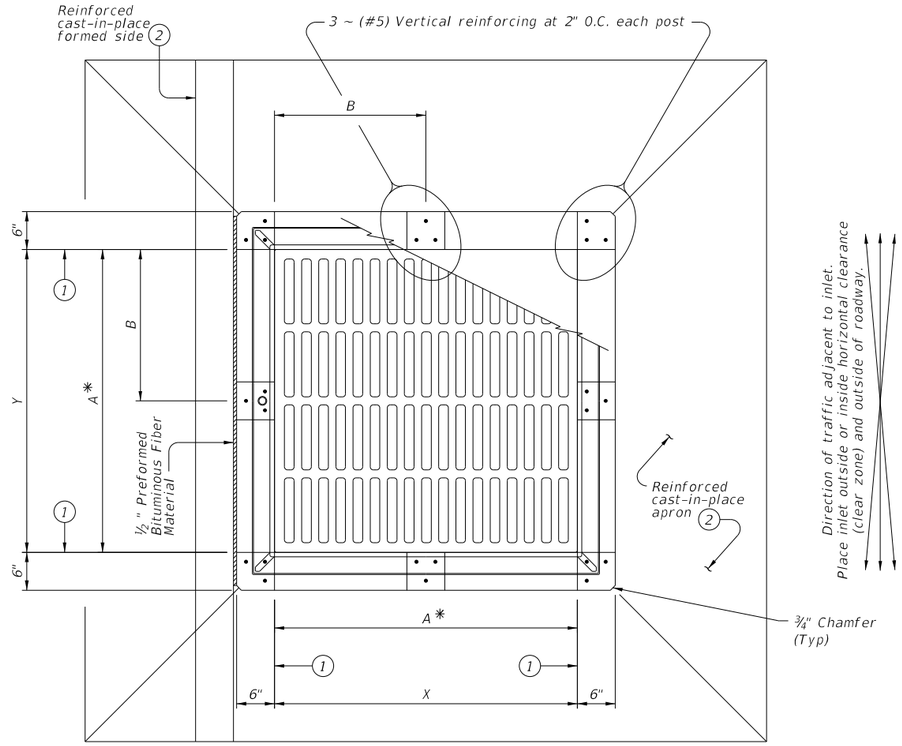
Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

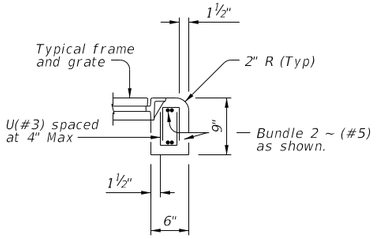
PBGC

FILE: pbgcstd1-20.dgn	DN: TxDOT	CK: TAR	DW: JTR	CK: TAR
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		121

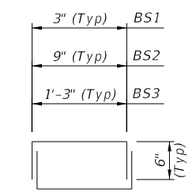
DATE: 10/14/2022 2:49:08 PM
FILE: P:\116335\04\Design\Civil\Standards\Drainage\prestd15-20.dgn



PLAN VIEW ~ STYLE 'FG' (3)



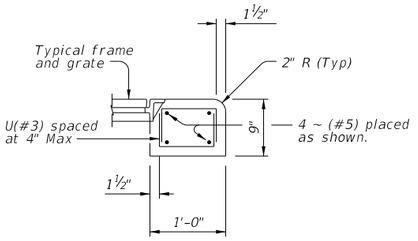
SECTION A-A ~ BS1



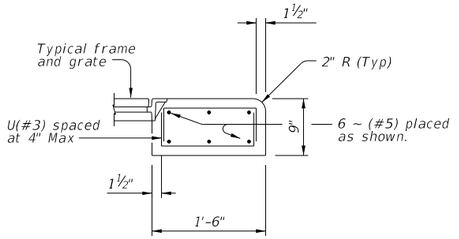
BARS U (#3)
Showing one complete bar.

Style	Size (X x Y)	A x A *	B x B	Beam Section
FG	3'x3'	3'x3'	1.5'x1.5'	BS1
FG	4'x4'	3'x3'	2'x2'	BS2
FG	4'x4'	4'x4'	2'x2'	BS1
FG	5'x5'	3'x3'	2.5'x2.5'	BS3
FG	5'x5'	4'x4'	2.5'x2.5'	BS2

* Nominal frame/grate size.



SECTION A-A ~ BS2



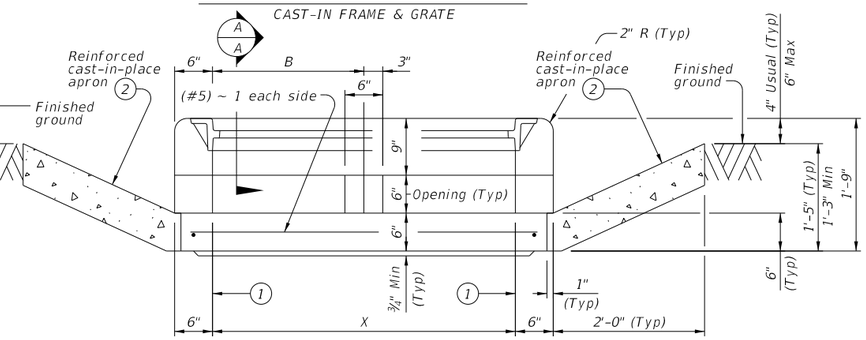
SECTION A-A ~ BS3

(1) Matches inside face of wall of precast base or riser below inlet.

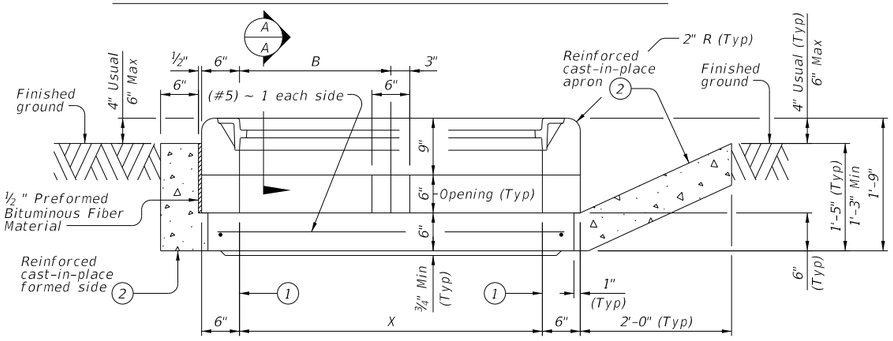
(2) Construct cast-in-place reinforced concrete with or without formed side. Place formed side/sides as directed elsewhere in the plans. Formed sides may only be used on sides parallel to traffic. Use Class "C" concrete. Apron and formed side reinforcing not shown for clarity. Apron and formed side are subsidiary to PAZD-CZ. Apron is 2'-0" width around precast zone drain, unless an optional formed side is used. For apron and formed side, provide (#4) reinforcing at 12" 0.C.

(3) Top slab reinforcing not shown for clarity.

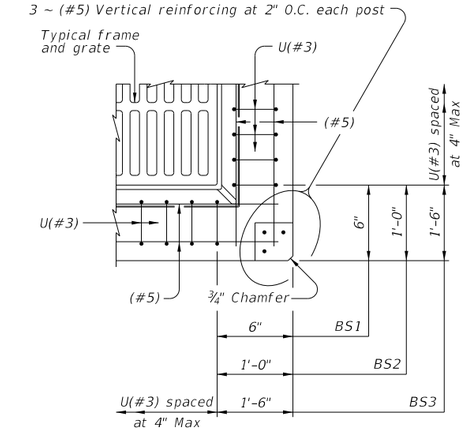
(4) Top slab reinforcing and post reinforcing not shown for clarity.



ELEVATION VIEW WITHOUT FORMED SIDE (4)



ELEVATION VIEW WITH FORMED SIDE (4)



TYPICAL CORNER REINFORCING PLAN DETAIL
Showing BS2 other beam sections similar.

FABRICATION NOTES:
1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab and 2" to reinforcing from top of slab for structural reinforcement.
4. Provide 1 ½" end cover on (#5) reinforcing.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:
1. Precast Area Zone Drain within Clear Zone (PAZD-CZ) is for use in ditches and medians outside and inside of the horizontal clearance (clear zone). PAZD-CZ is never placed in the roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:
1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

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

PRECAST AREA ZONE DRAIN WITHIN CLEAR ZONE

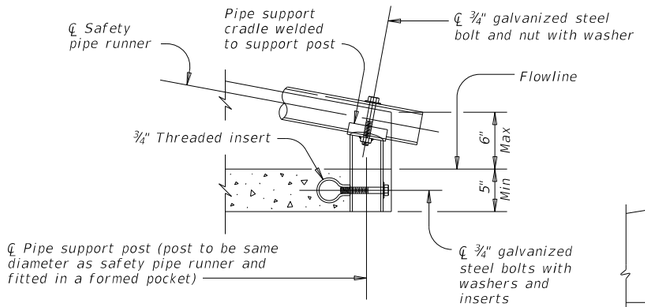
PAZD-CZ

FILE: prestd15-20.dgn	DN: SDC	CK: TAR	DW: JTR	CK: SDC
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		122

DATE: 10/14/2022 2:49:09 PM
FILE: P:\116135.04\Design\Civil\Standards\Drainage\psetscss-21.dgn

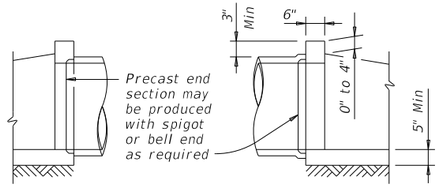
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	RCP Wall "B" Thickness	TP Wall Thickness (8)	"D" (1)	Slope	Min Length of Unit	Single Pipe		Multiple Pipes	
						Skew	Pipe Runners Required	Skew	Pipe Runners Required
12"	2"	1.15"	17.00"	3:1	2' – 11"	≤ 45°	No	≤ 45°	No
				4:1	3' – 6"				
				6:1	4' – 9"				
15"	2 ¼"	1.30"	20.50"	3:1	3' – 8"	≤ 45°	No	≤ 45°	No
				4:1	4' – 7"				
				6:1	6' – 5"				
18"	2 ½"	1.60"	24.00"	3:1	4' – 6"	≤ 45°	No	≤ 45°	No
				4:1	5' – 8"				
				6:1	8' – 0"				
24"	3"	1.95"	31.00"	3:1	6' – 2"	≤ 45°	No	= 30°	No
				4:1	7' – 10"			> 30°	Yes
				6:1	11' – 3"				
30"	3 ½"	2.65"	38.50"	3:1	7' – 10"	= 15°	No	= 15°	No
				4:1	10' – 1"	> 15°	Yes	> 15°	Yes
				6:1	14' – 8"				
36"	4"	2.75"	45.50"	3:1	9' – 5"	= 0°	No	≥ 0°	Yes
				4:1	12' – 3"	> 0°	Yes		
				6:1	17' – 11"				
42"	4 ½"	2.7"	52.50"	3:1	11' – 1"	≥ 0°	Yes	≥ 0°	Yes
				4:1	14' – 5"				
				6:1	21' – 2"				



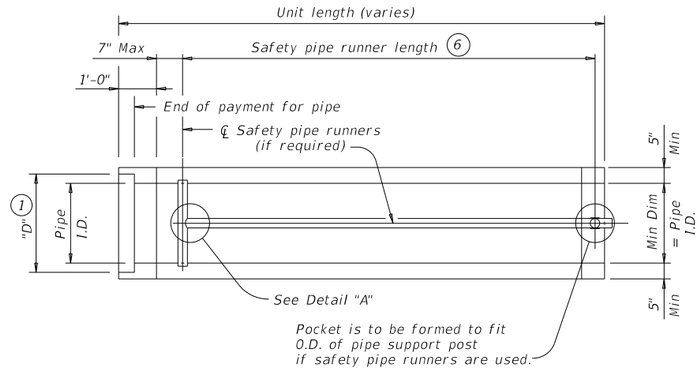
END DETAIL FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



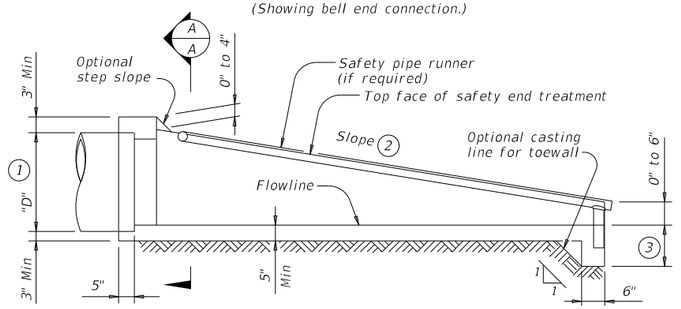
OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment)



PLAN

(Showing bell end connection.)



LONGITUDINAL ELEVATION

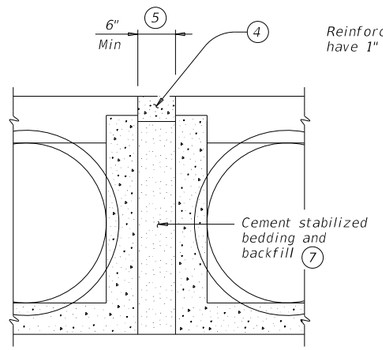
(Showing bell end connection.)

OPTION A

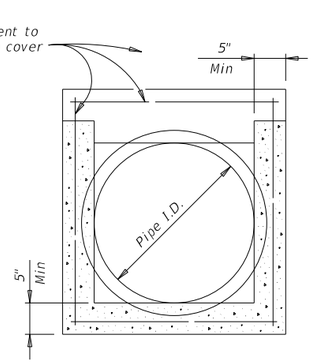
DETAIL A

(If required)

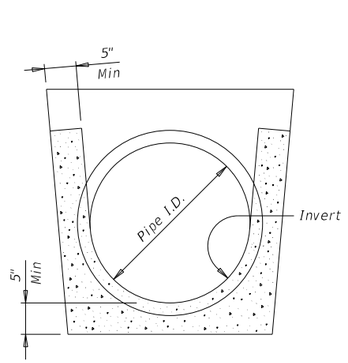
OPTION B



MULTIPLE PIPE INSTALLATION

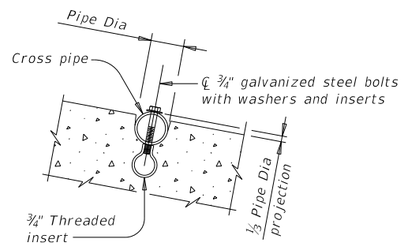


OPTION WITH SQUARE BOTTOM



OPTION WITH INVERT BOTTOM

SECTION A-A



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

SAFETY PIPE RUNNER DIMENSIONS

Max Safety Pipe Runner Length	Required Pipe Runner Size		
	Pipe Size	Pipe O.D.	Pipe I.D.
11' – 2"	3" STD	3.500"	3.068"
15' – 6"	3 ½" STD	4.000"	3.548"
20' – 10"	4" STD	4.500"	4.026"
35' – 4"	5" STD	5.563"	5.047"

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C-76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in plans. Slope of 3:1 or flatter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Measured along slope.

(7) Provide cement stabilized bedding and backfill in accordance with the Item 400, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.

(8) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as specified in Item "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

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.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" – D12 x D12 or 5"x5" – D10 x D10 welded wire reinforcement (WWR).
B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor, the next larger size of safety end treatment may be furnished as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 1,800 Lbs at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Provide safety pipe runners, cross pipes, pipe support posts, and pipe stubs meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464 "Reinforced Concrete Pipe". Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

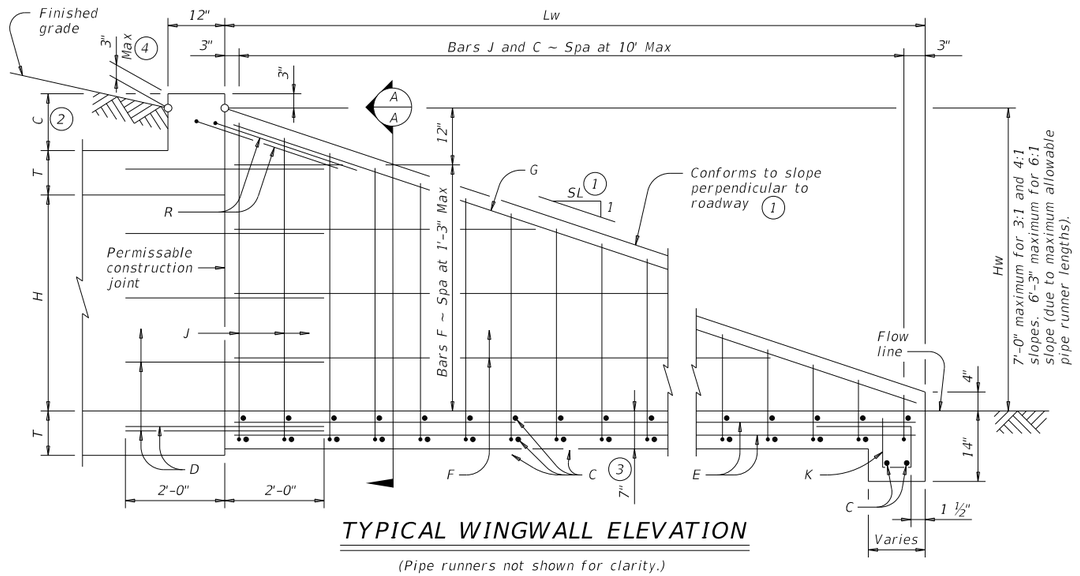
PRECAST SAFETY END TREATMENT

TYPE II ~ CROSS DRAINAGE

PSET-SC

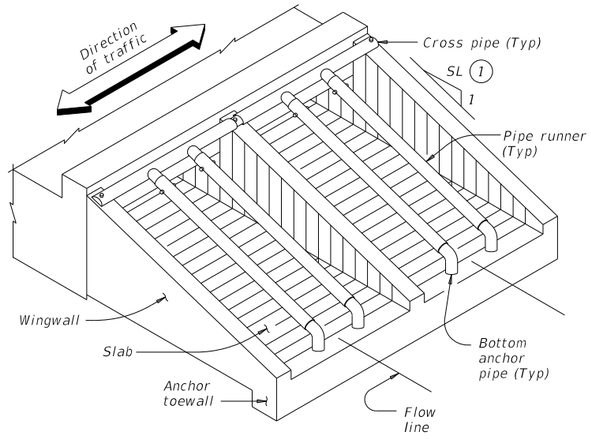
FILE: psetscss-21.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-21: Added 42" TP	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		123

DATE: 10/14/2022 2:49:11 PM
FILE: P:\116\35\04\Design\Civil\Standards\Drainage\setbcde-20.dgn



TYPICAL WINGWALL ELEVATION

(Pipe runners not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

WING DIMENSION CALCULATIONS:

$Hw = H + T + C - 0.250'$

$Lw = (Hw - 0.333') (SL)$

For cast-in-place culverts:

$Atw = (N) (S) + (N + 1) (U)$

For precast culverts:

$Atw = (N) (2U + S) + (N - 1) (0.500')$

Total Wingwall Area (SF)
$= (0.5) (Hw + 0.333') (Lw) (N + 1)$

Total Concrete Volume (CY)
$= [(\text{Wingwall Area}) (0.583') + (Lw) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] \div (27)$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length
$= (Lw) (K1) - (1.917')$

Total Reinforcing (Lb)
$= (1.55) (Lw) (Atw) + (4.43) (Atw) + (K2) (Hw) (N + 1) (\sqrt{Lw})$

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054 ~	7.45
4:1	~ 1.031 ~	8.49
6:1	~ 1.014 ~	10.30

Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Adjust reinforcing as necessary to provide a minimum clear cover of 1 ½".

Provide Class "C" concrete (f`c = 3,600 psi).

Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts.

Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.

See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.

Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

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

SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)

AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)

AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)

AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

(1) Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.

(2) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet.

(3) Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.

(4) For vehicle safety, reduce curb height, if necessary, to provide a maximum 3" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'-0" Max
R	#4	As shown

SHEET 1 OF 2

Texas Department of Transportation

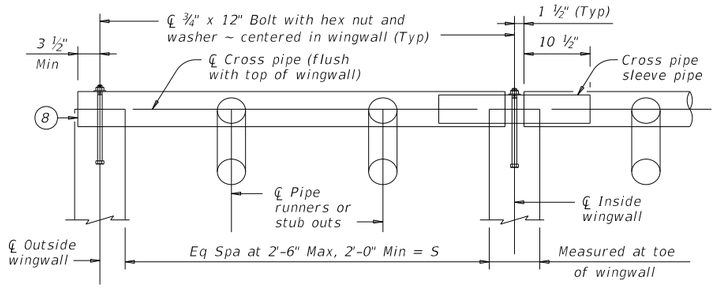
Bridge Division Standard

SAFETY END TREATMENT

FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

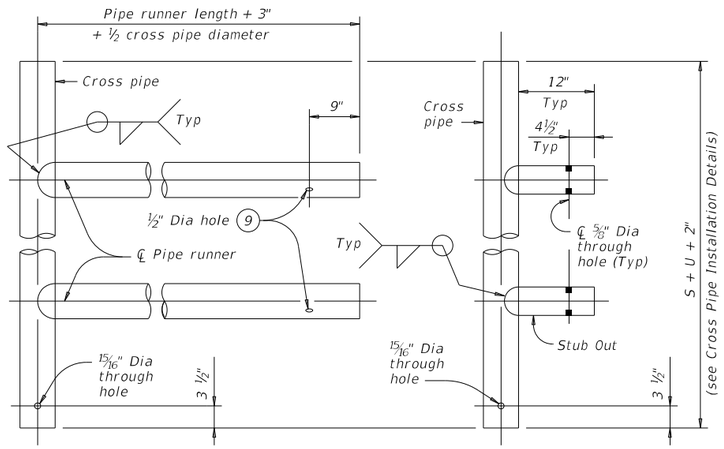
SETB-CD

FILE: setbcde-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		124



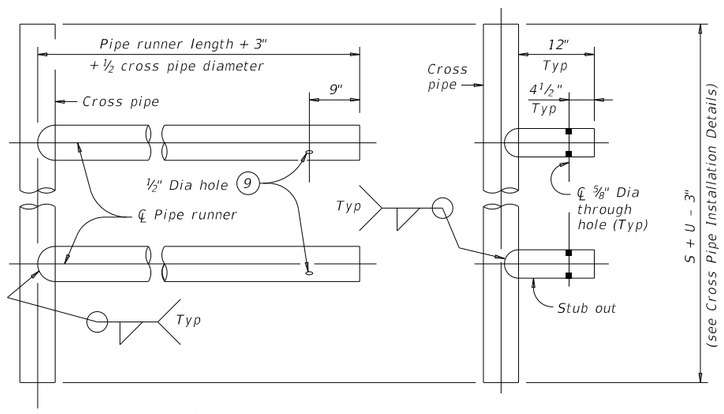
NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a 15/16" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS



OPTION A2 OPTION A1

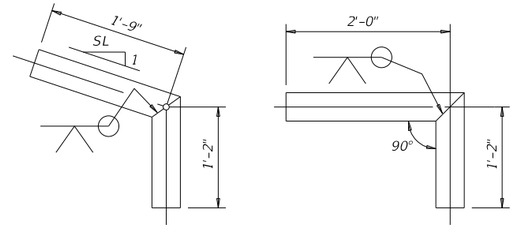
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

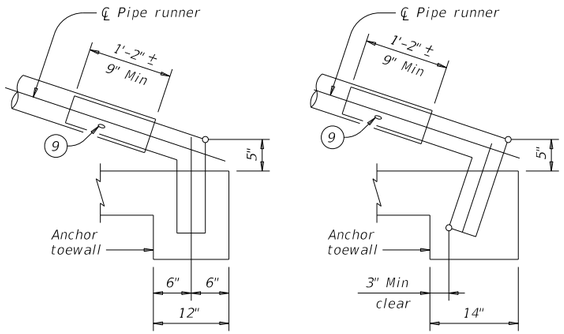
FOR USE IN INSIDE CULVERT BAY

CROSS PIPE AND CONNECTIONS DETAILS



OPTION A OPTION B

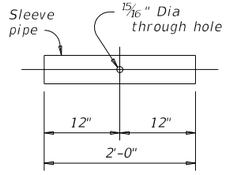
BOTTOM ANCHOR PIPE DETAILS (10)



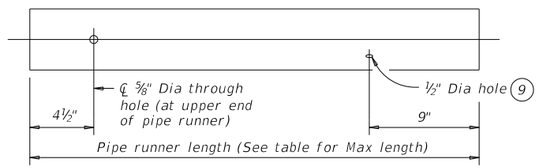
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Wingwall not shown for clarity.)

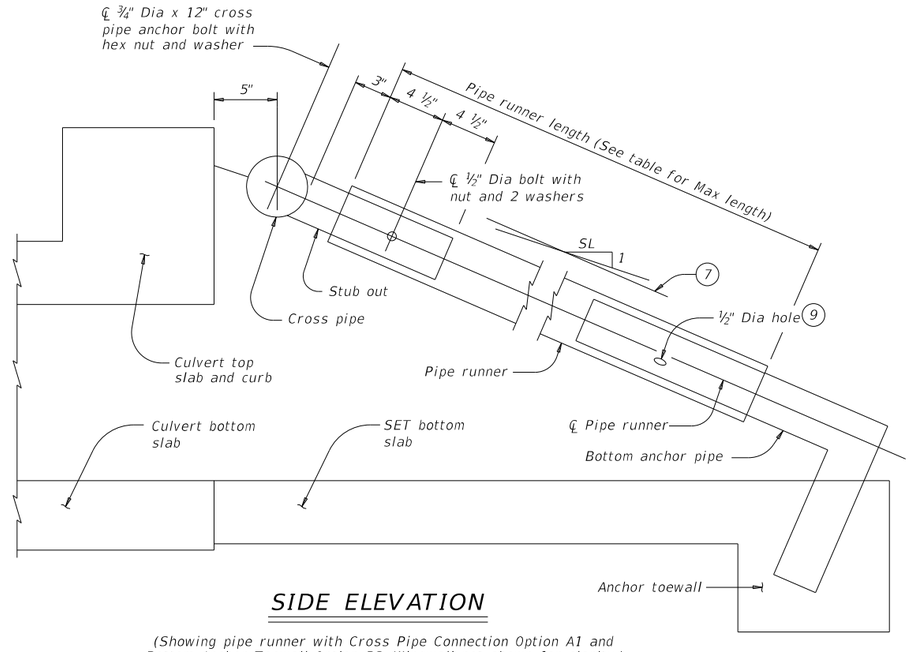


CROSS PIPE SLEEVE PIPE DETAILS



NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

(6) Cross pipe is the same size as the pipe runner. Cross pipe stub out is the same size as the anchor pipe.

(7) Note that actual slope of safety pipe runner may vary slightly from side slope.

(8) Take care to ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1#2" hole to ensure that the lap of the safety pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MAXIMUM PIPE RUNNER LENGTHS AND (6) REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES

Maximum Pipe Runner Length	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
10'- 0"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'- 8"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
34'- 2"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

DATE: 10/14/2022 2:49:12 PM
FILE: P:\116\35\04\Design\Civil\Standards\Drainage\setbcdse-20.dgn

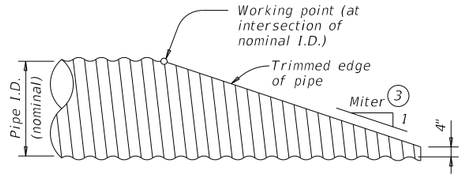
SHEET 2 OF 2

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT
FOR 0° SKEW BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE

SETB-CD

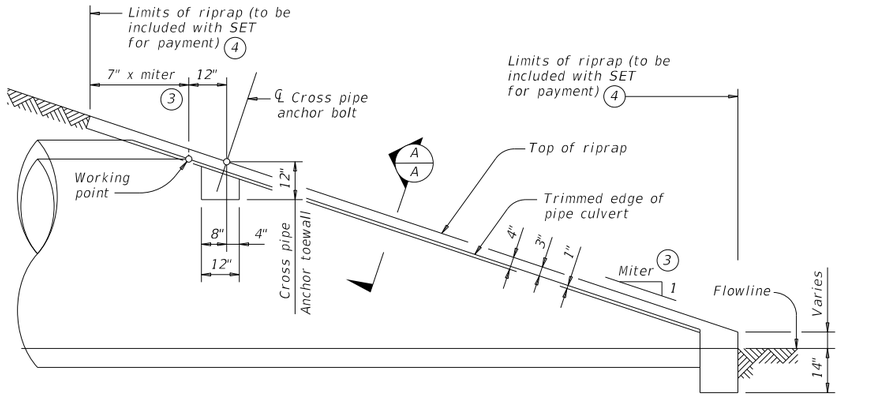
FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		125



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

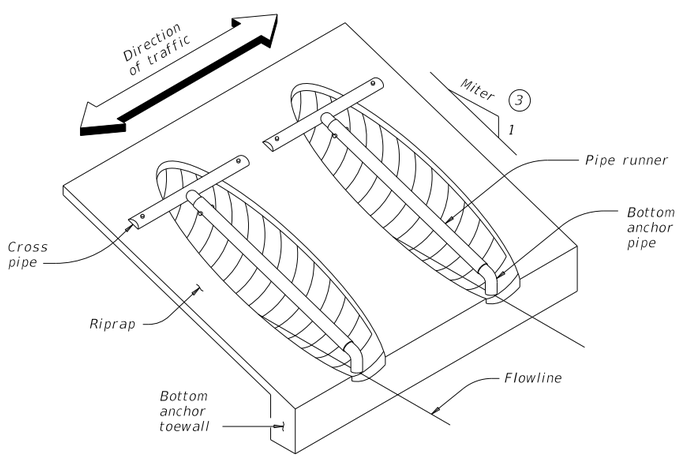
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

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" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND 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) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

DATE: 10/14/2022 2:49:14 PM
FILE: P:\116135\04\Design\Civil\Standards\Drainage\setpcdse-20.dgn

SHEET 1 OF 2

Texas Department of Transportation

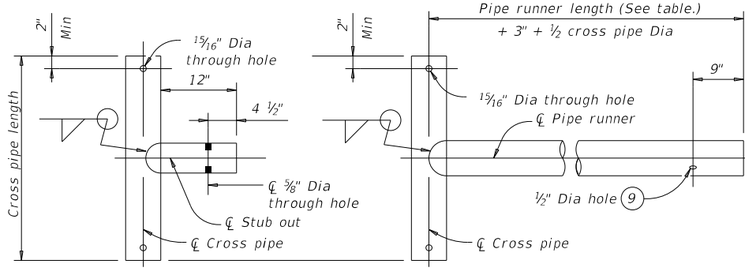
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

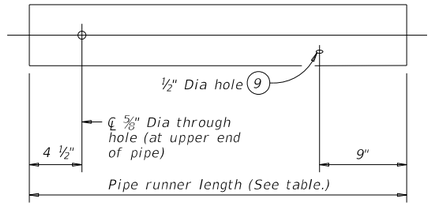
SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		126



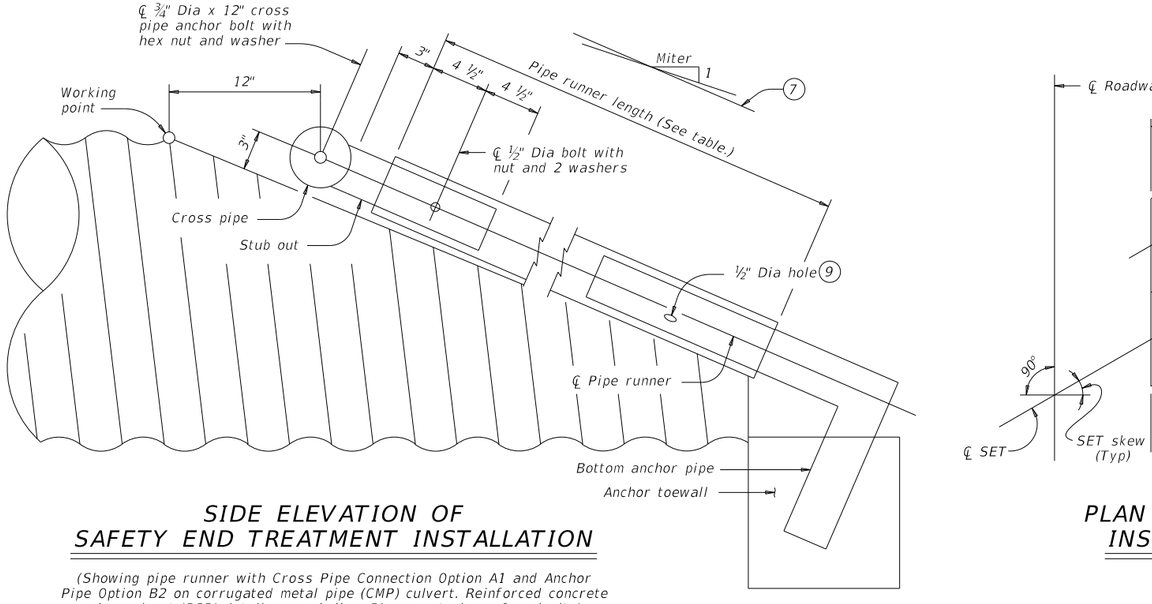
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



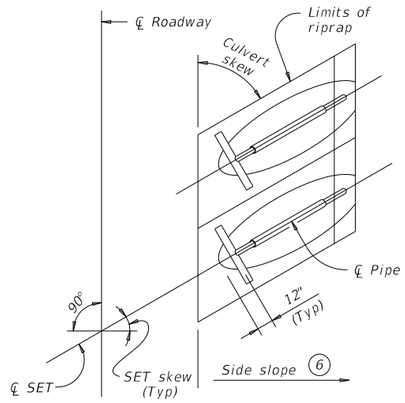
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

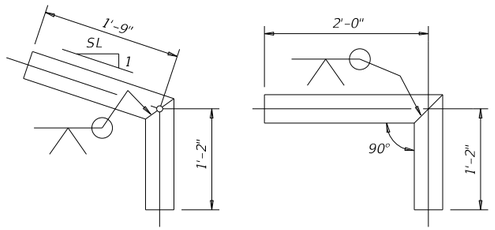


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

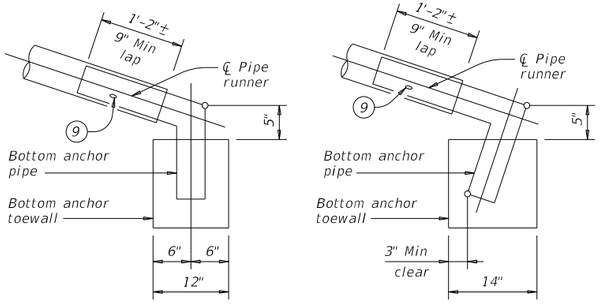


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

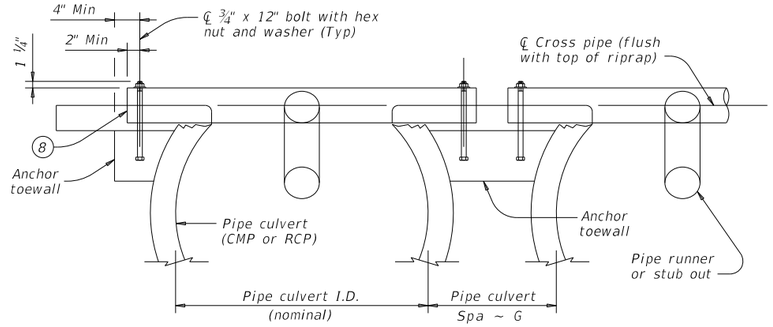
BOTTOM ANCHOR PIPE DETAILS (10)



OPTION B1 OPTION B2

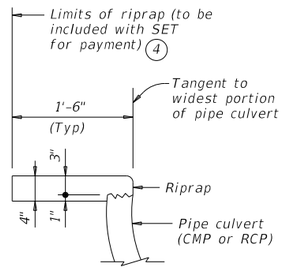
BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL

SECTION A-A



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

DATE: 10/14/2022 2:49:14 PM
FILE: P:\116735.04\Design\Civil\Standards\Drainage\setpcdse-20.dgn

Texas Department of Transportation

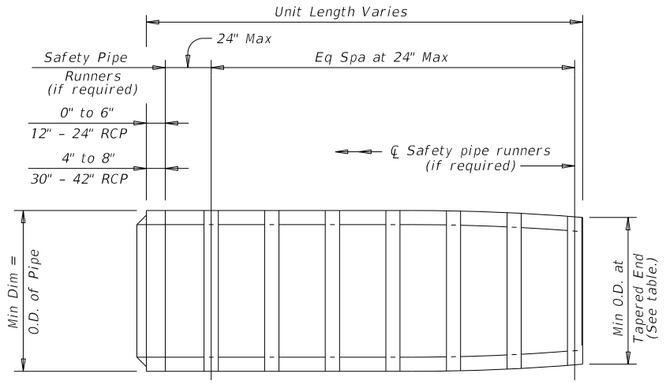
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE: setpcdse-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		127



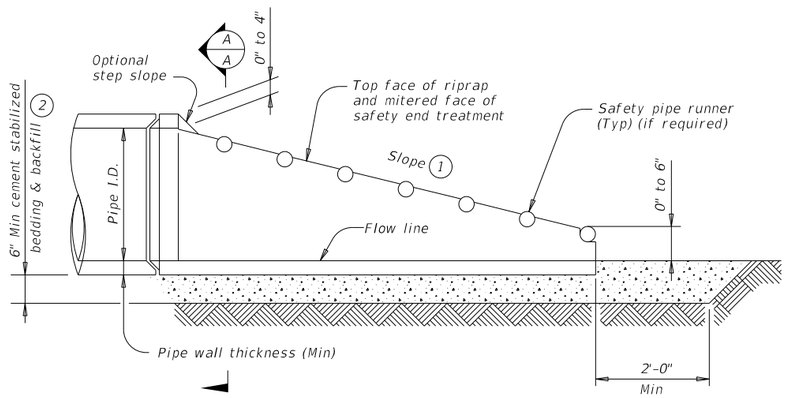
PLAN VIEW – 12" THRU 24"

(Showing spigot end connection.)

1. Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
2. Provide cement stabilized bedding and backfill in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill is considered subsidiary to the Item 467, "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill as directed by Engineer.
3. Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment".
4. Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.
5. Safety pipe runners are required for multiple pipe culverts with more than two pipes.

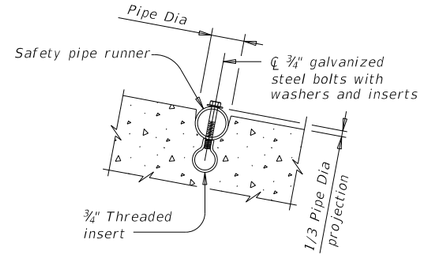
REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

Pipe I.D.	Min Wall Thickness	Min O.D.	Min O.D. at Tapered End	Min Reinf Requirements (sq. in. per ft. of Pipe)	Max Slope	Min Length of Unit	Pipe Runner Requirements		Required Pipe Runner Sizes		
							Single Pipe	Multiple Pipe	Nominal Dia	O.D.	I.D.
12"	2"	16"	16"	0.07 Circ.	6:1	4'–0"	No	(5)	3" STD	3.500"	3.068"
15"	2 ¼"	19 ½"	19"	0.07 Circ.	6:1	5'–8"	No	(5)	3" STD	3.500"	3.068"
18"	2 ½"	23"	21 ½"	0.07 Circ.	6:1	7'–3"	No	(5)	3" STD	3.500"	3.068"
24"	3"	30"	27"	0.07 Circ.	6:1	10'–6"	No	(5)	3" STD	3.500"	3.068"
30"	3 ½"	37"	31"	0.18 Circ.	6:1	12'–1"	No	Yes	4" STD	4.500"	4.026"
36"	4"	44"	36"	0.19 Ellip.	6:1	15'–4"	Yes	Yes	4" STD	4.500"	4.026"
42"	4 ½"	51"	41 ½"	0.23 Ellip.	6:1	18'–7"	Yes	Yes	4" STD	4.500"	4.026"



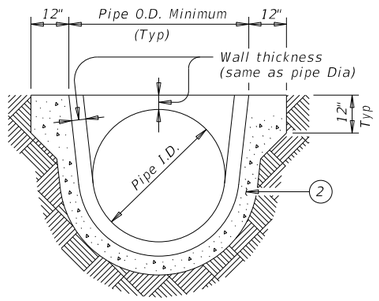
LONGITUDINAL ELEVATION - 12" THRU 24"

(Showing spigot end connection.)

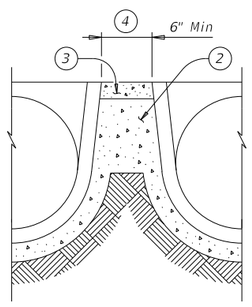


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

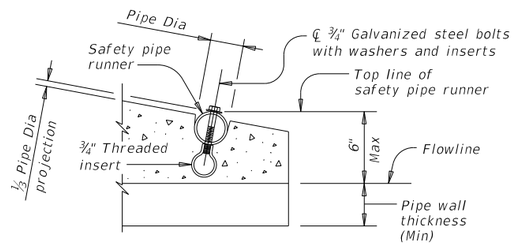
(If required)



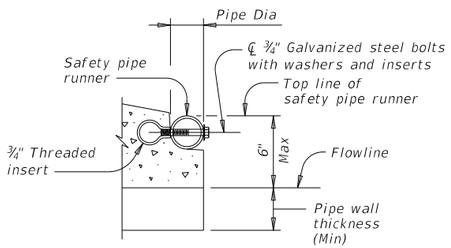
SECTION A-A



MULTIPLE PIPE INSTALLATION



OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Galvanize steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP) may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment".

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Manufacture precast concrete end sections in accordance with Item 464, "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

Provide precast concrete end sections with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for grout, mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

DATE: 10/14/2022 2:49:16 PM
FILE: P:\116335104\Design\Civil\Standards\Drainage\psetrpss-20.dgn

Texas Department of Transportation

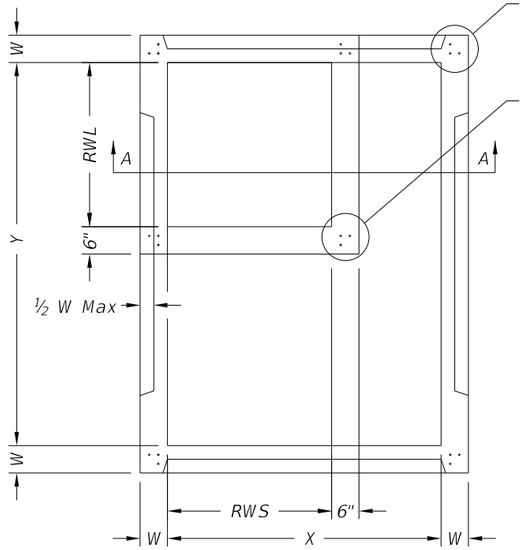
Bridge Division Standard

PRECAST SAFETY END TREATMENT

TYPE II ~ PARALLEL DRAINAGE

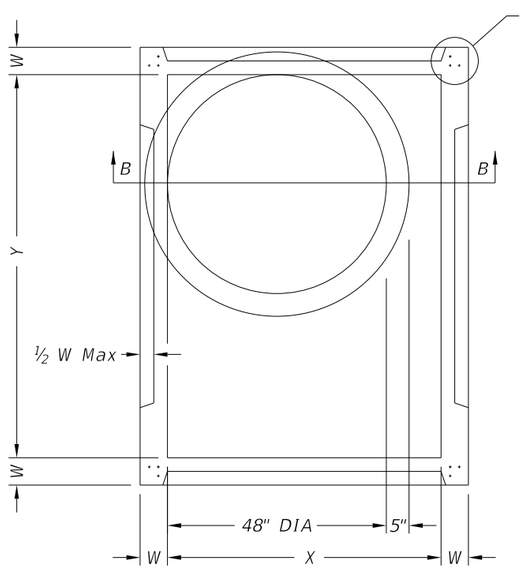
PSET-RP

FILE: psetrpss-20.dgn	DN: RLW	CK: KLR	DW: JTR	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		128



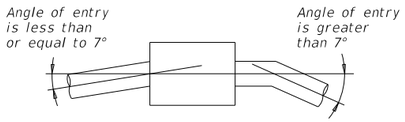
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



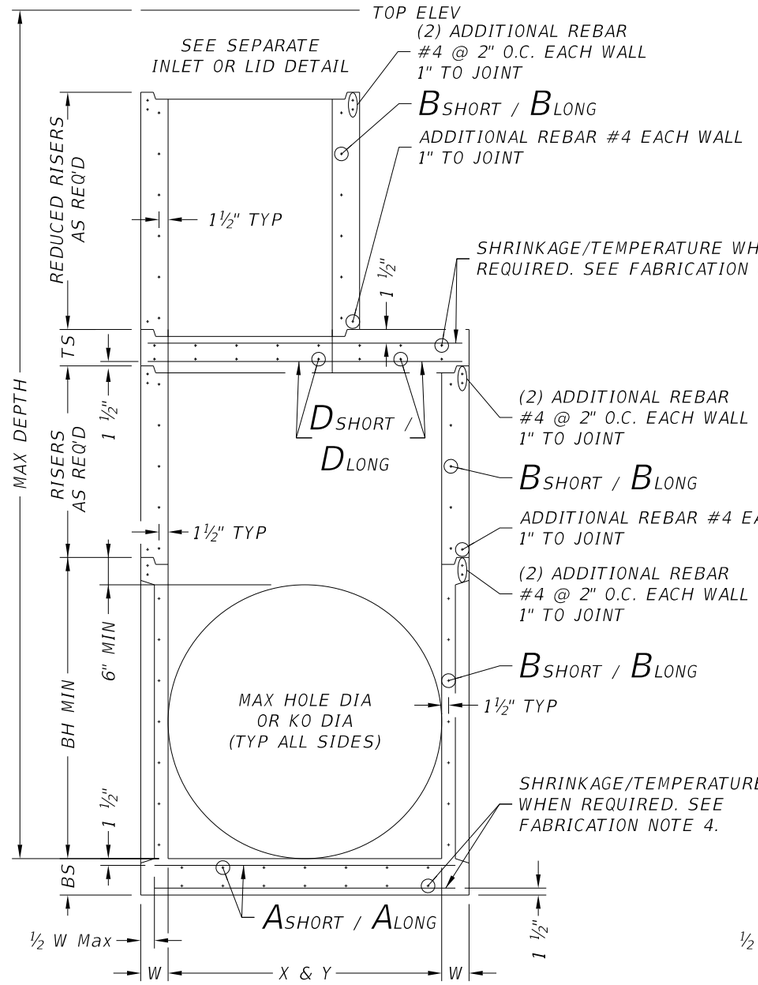
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



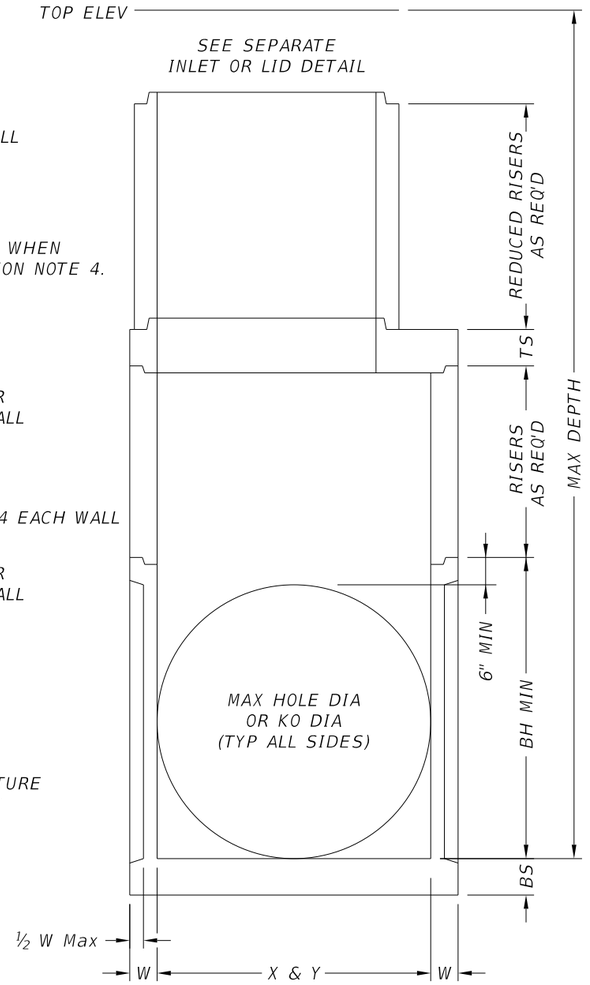
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

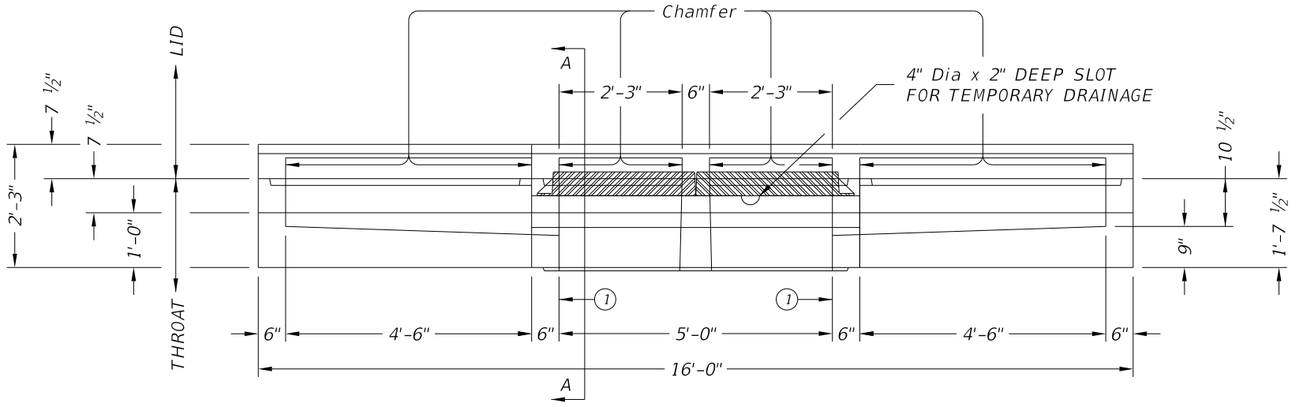
PRECAST BASE

PB

FILE: prestd01-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		129

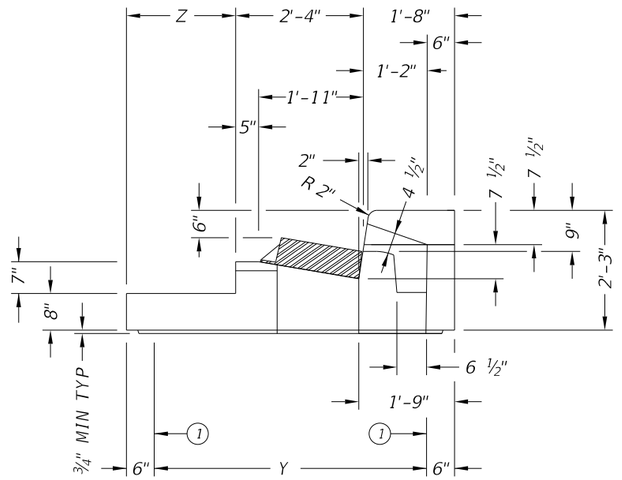
DATE: 10/14/2022 2:49:18 PM
FILE: P:\116135\04\Design\Civil\Standards\Drainage\prestd01-20.dgn

DATE: 10/14/2022 2:49:19 PM
FILE: P:\116335\04\Design\Civil\Standards\Drainage\prestd04-20.dgn

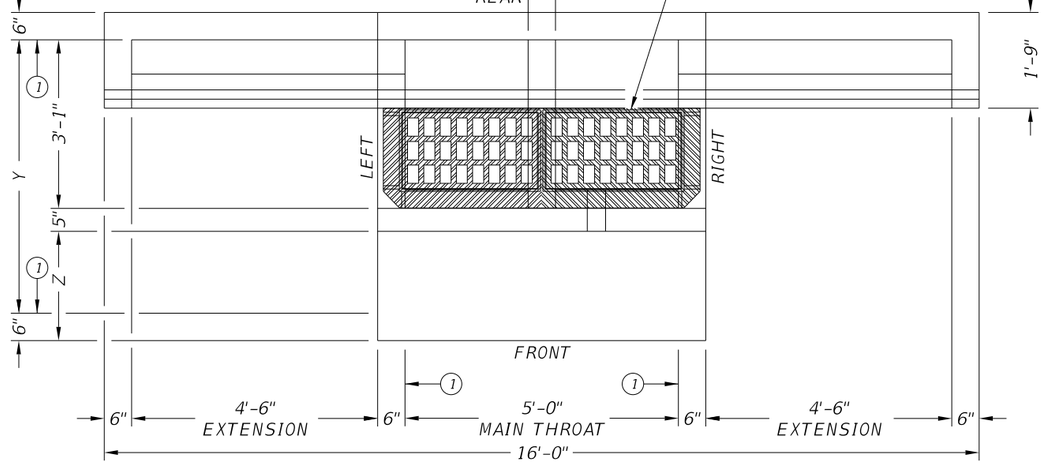


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



SECTION A-A



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

(1) Matches inside face of wall of precast base or riser below inlet.

HS20 LOADING SHEET 1 OF 2

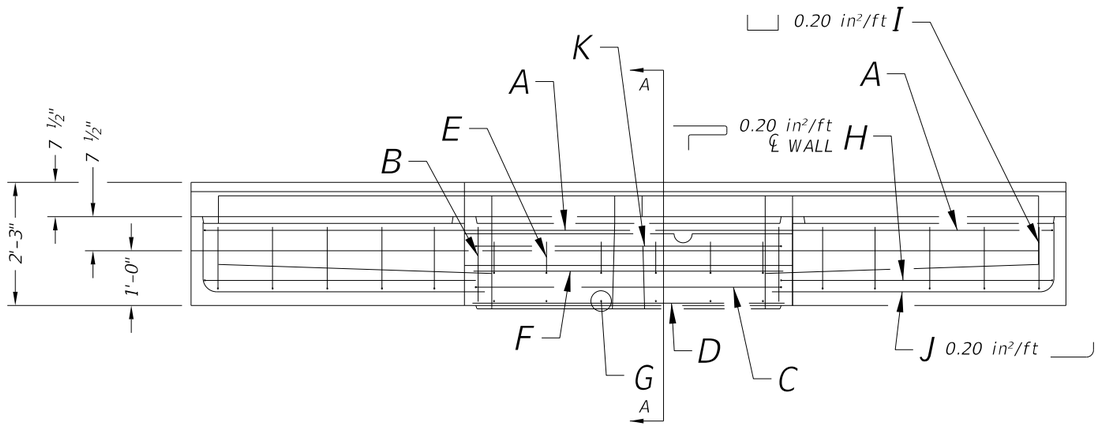
Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

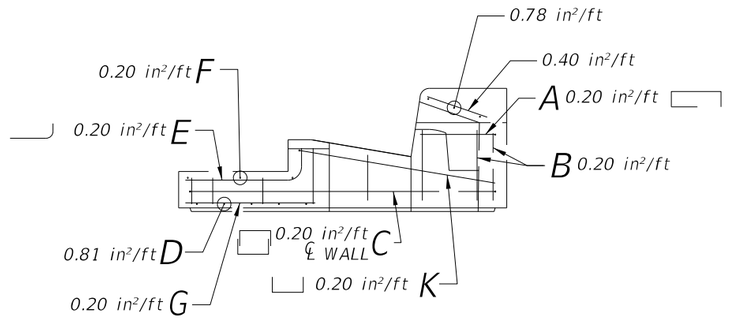
PCU

FILE: prestd04-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		130

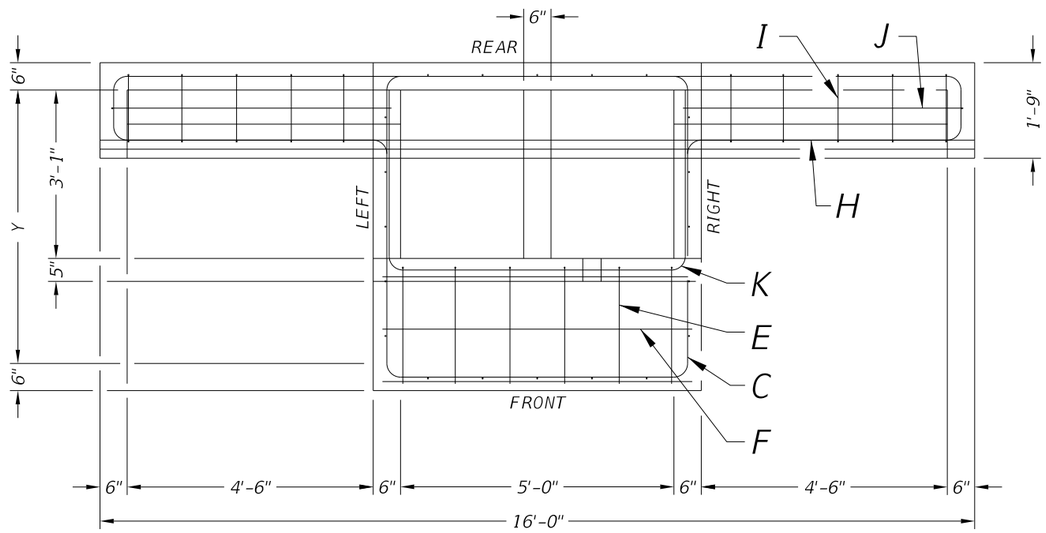


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



SECTION A-A



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel from surface of concrete or lower outside shoulder.
4. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in plans.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Top slab may employ a butt joint with dowels at the Contractor's option.
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Chamfer vertical edges on inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat is placed under roadway and intended for direct traffic. Inlet lid is not for direct traffic. Do not place Inlet lid in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 324 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes and Inlets" by type, size and extension placement. Extensions are subsidiary to inlet.

SIZE(Y)	Z
3'	0'
4'	1'
5'	2'
6'	3'

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

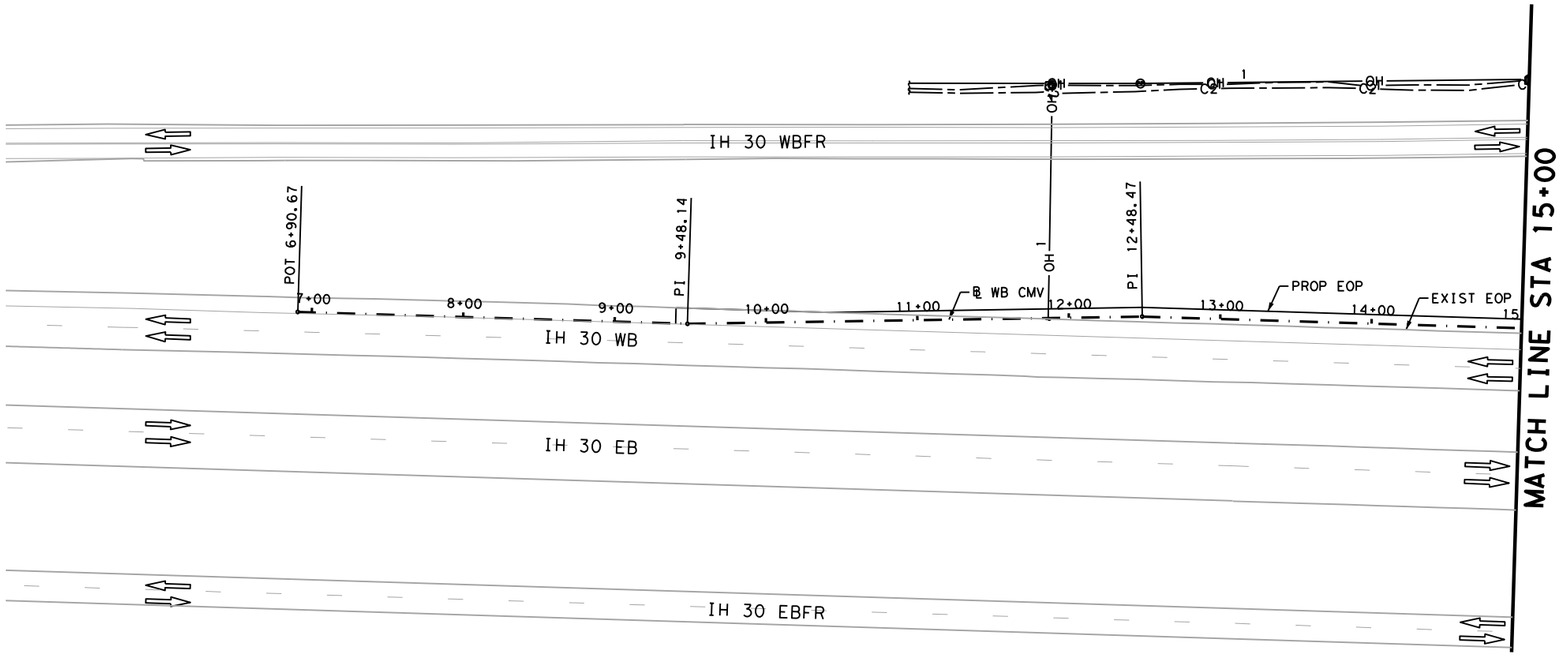
PCU

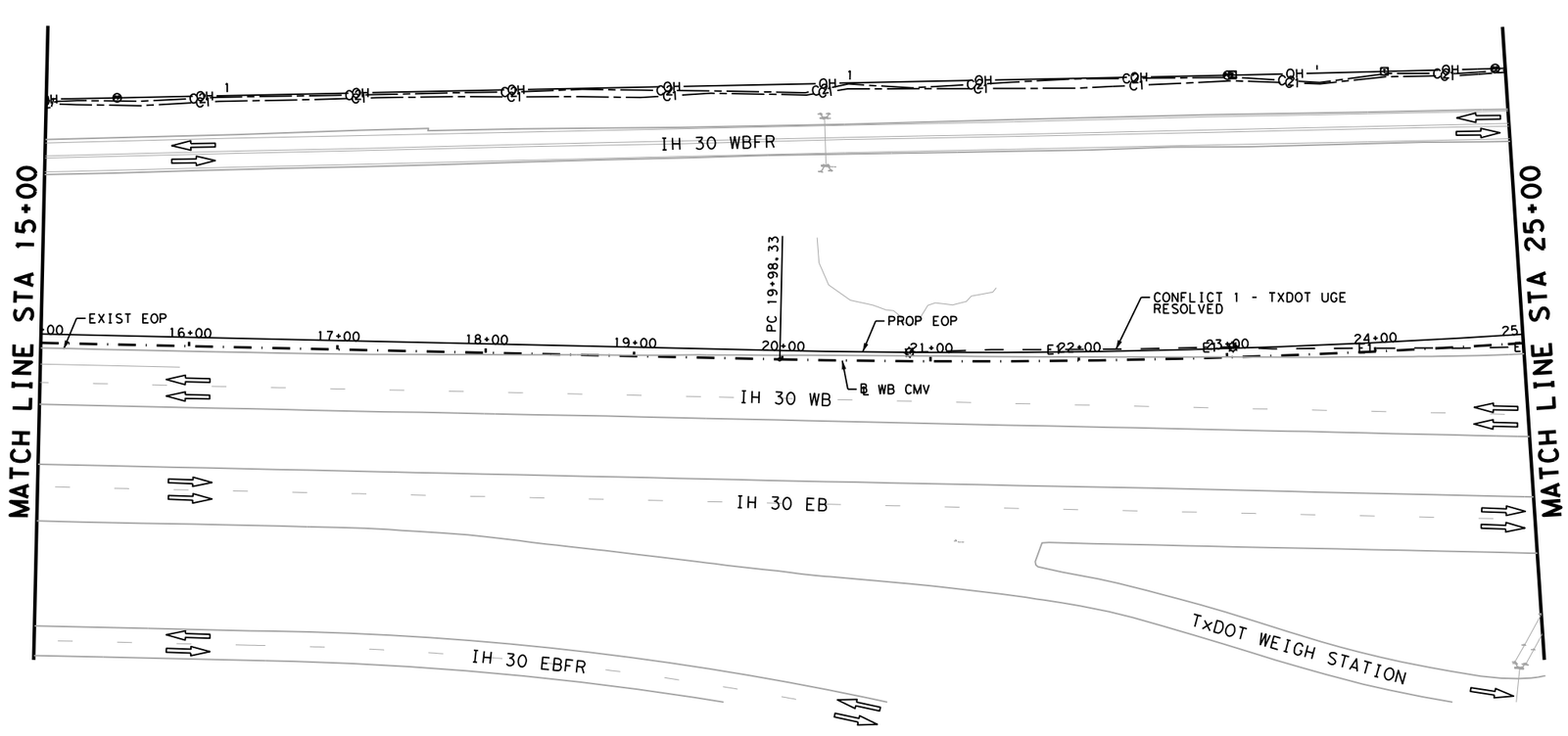
FILE: prestd04-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		131

DATE: 10/14/2022 2:49:20 PM
FILE: P:\116335\04\Design\Civil\Standards\Drainage\prestd04-20.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Utility\116350autil01.dgn





LEGEND

- OH — OVERHEAD ELECTRIC LINE
- E1 — UNDERGROUND ELECTRIC LINE
- SD1 — SD — EXISTING STORM DRAIN
- C1 — AT&T DUCT BANK
- C2 — AT&T TELEPHONE LINE
- PP — UTILITY POLE
- W1 — TRI SUD WATER LINE
- W2 — CITY OF WINFIELD WATER LINE

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

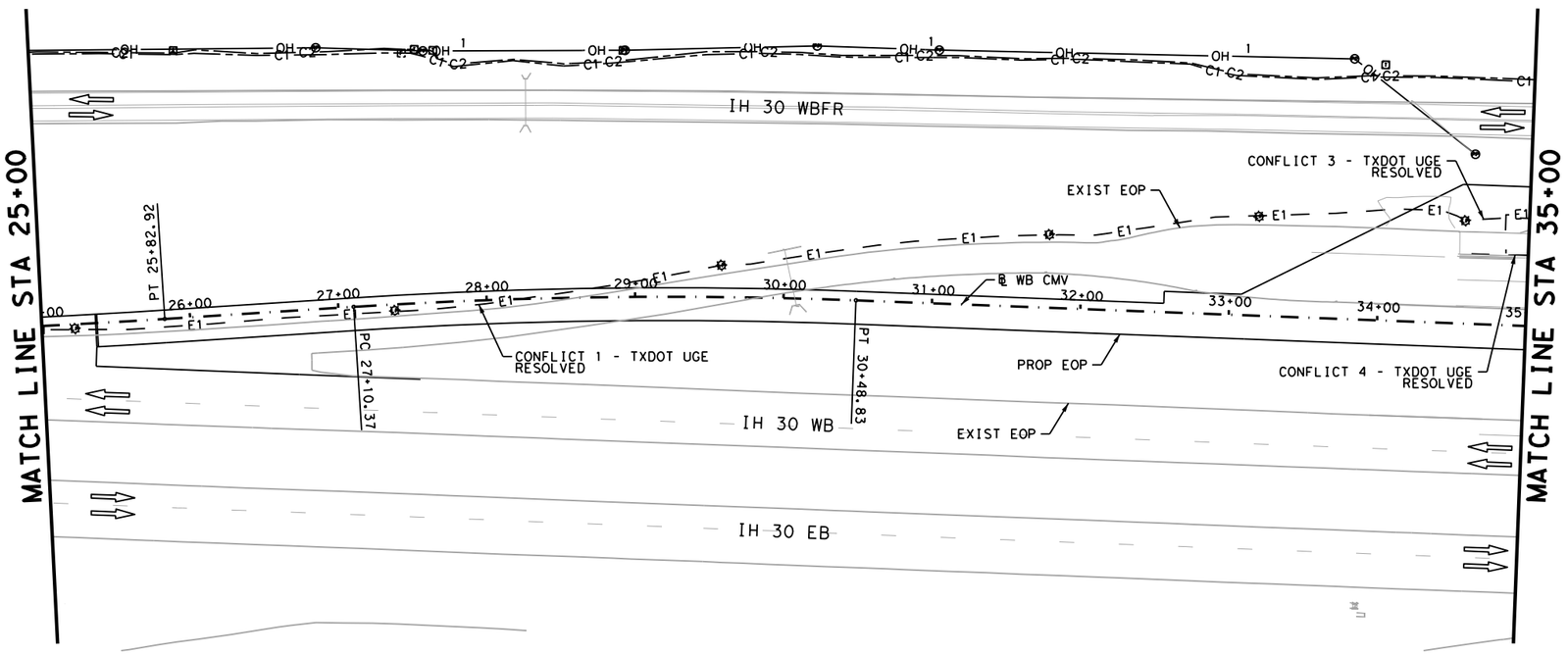
WB IH 30 CMV STATION

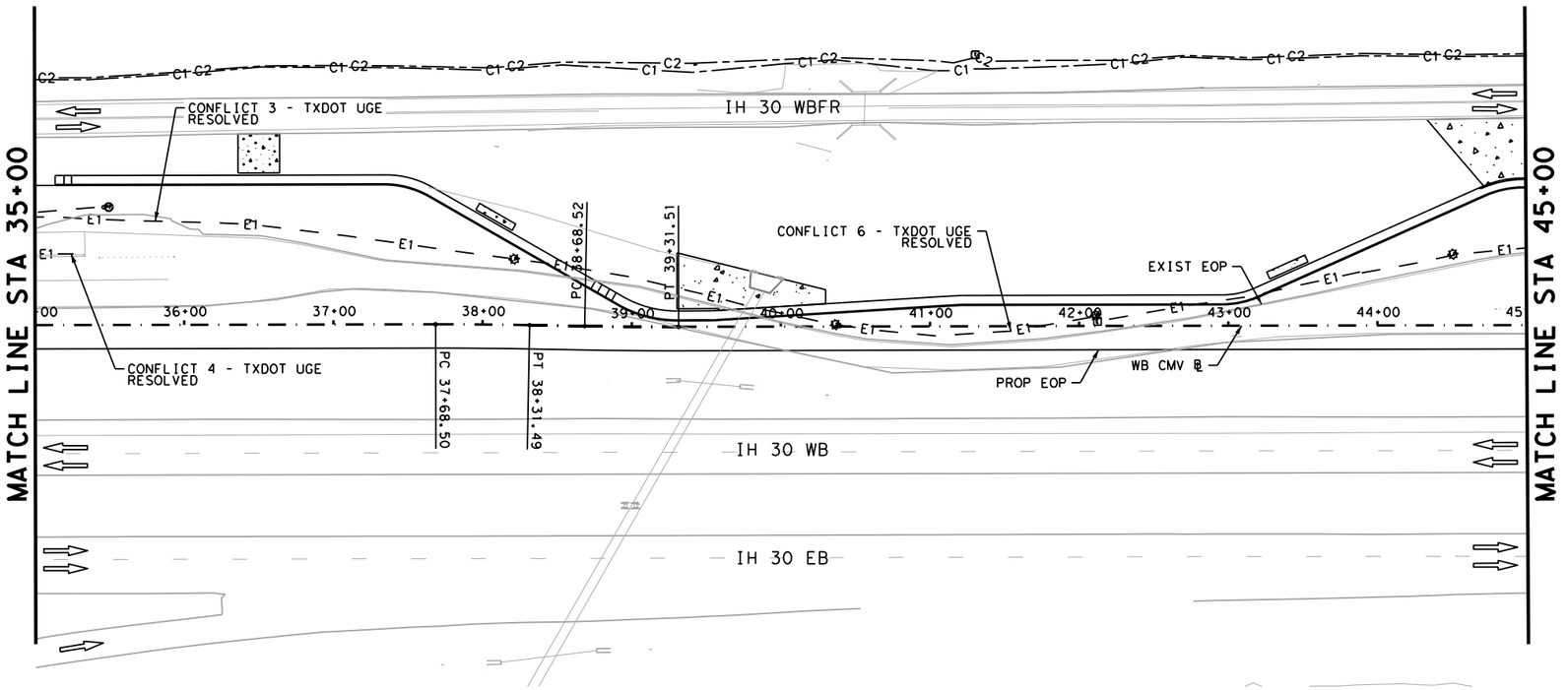
UTILITY LAYOUT

BEGIN PROJECT TO STA 25+00

SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	132





N

N

LEGEND

OH	OVERHEAD ELECTRIC LINE
E1	UNDERGROUND ELECTRIC LINE EXISTING
SD1 — SD	STORM DRAIN
C1	AT&T DUCT BANK
C2	AT&T TELEPHONE LINE
PP	UTILITY POLE
W1	TRI SUD WATER LINE
W2	CITY OF WINFIELD WATER LINE

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

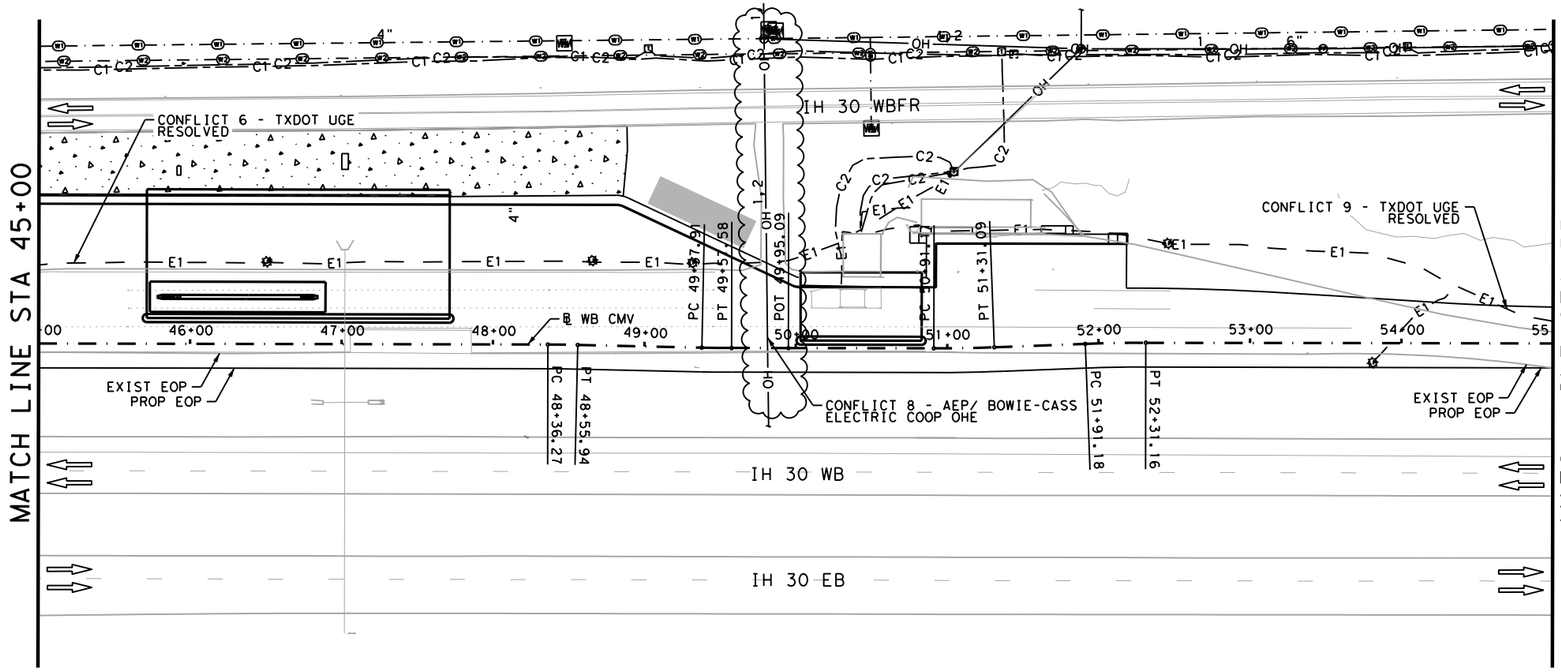
WB IH 30 CMV STATION

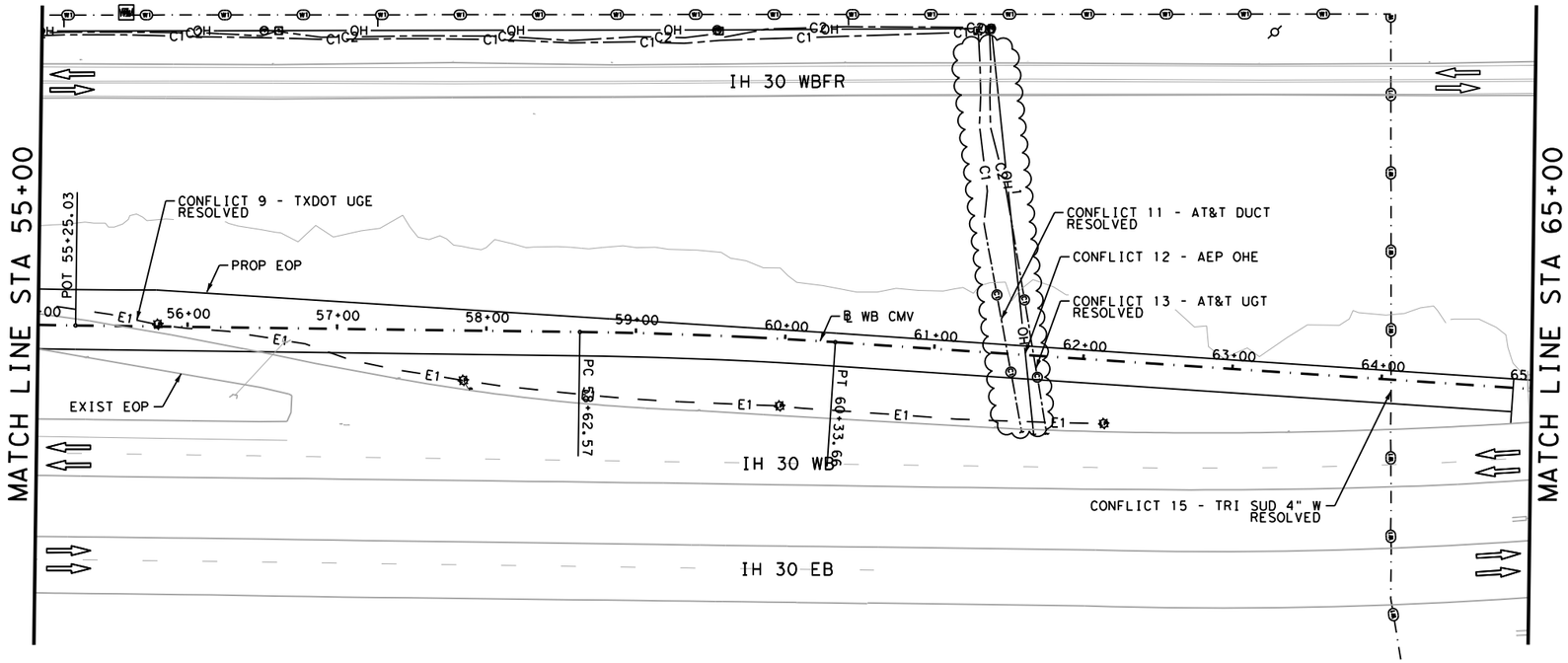
UTILITY LAYOUT

STA 25+00 TO STA 45+00

SHEET 2 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	133





N

LEGEND

- OH — OVERHEAD ELECTRIC LINE
- E1 — UNDERGROUND ELECTRIC LINE
- SD1 — SD — EXISTING STORM DRAIN
- C1 — AT&T DUCT BANK
- C2 — AT&T TELEPHONE LINE
- PP — UTILITY POLE
- W1 — TRI SUD WATER LINE
- W2 — CITY OF WINFIELD WATER LINE

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

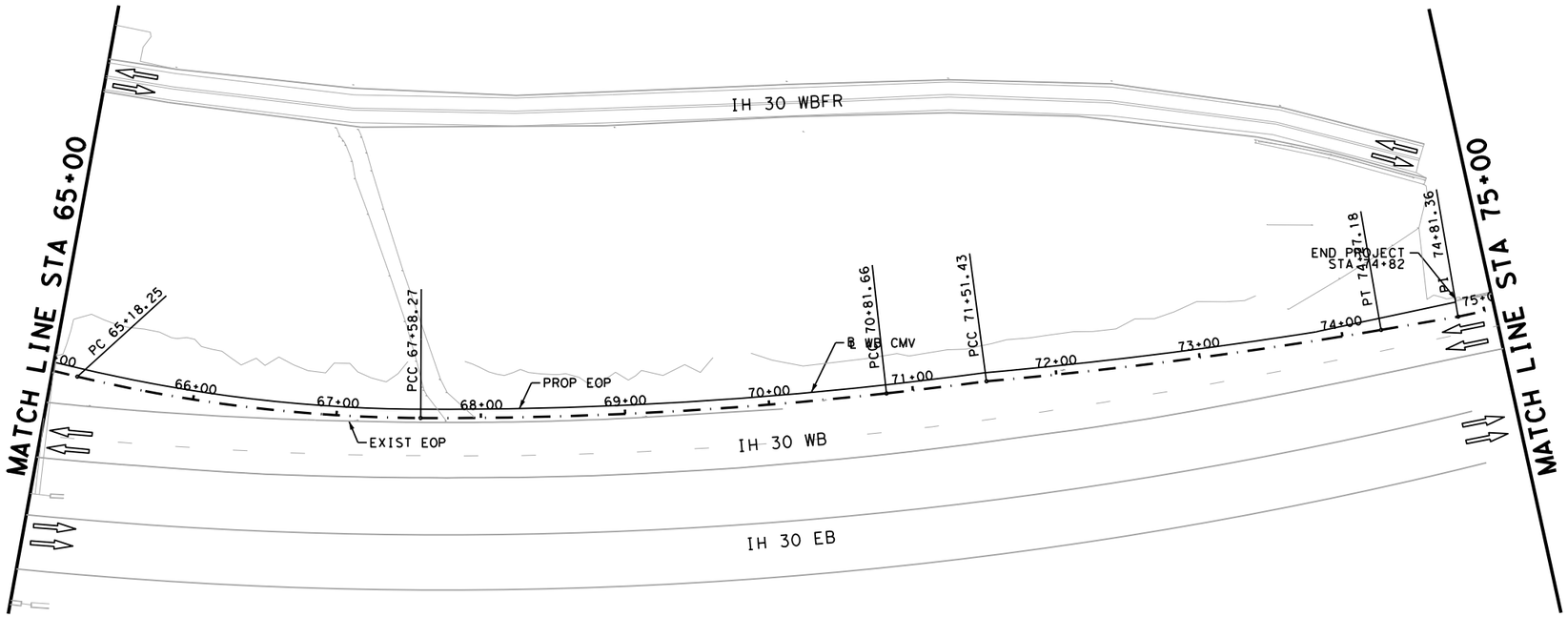
WB IH 30 CMV STATION

UTILITY LAYOUT

STA 45+00 TO STA 65+00

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	134



LEGEND

OH	OVERHEAD ELECTRIC LINE
E1	UNDERGROUND ELECTRIC LINE
SD1 — SD	EXISTING STORM DRAIN
C1	AT&T DUCT BANK
C2	AT&T TELEPHONE LINE
PP	UTILITY POLE
W1	TRI SUD WATER LINE
W2	CITY OF WINFIELD WATER LINE

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

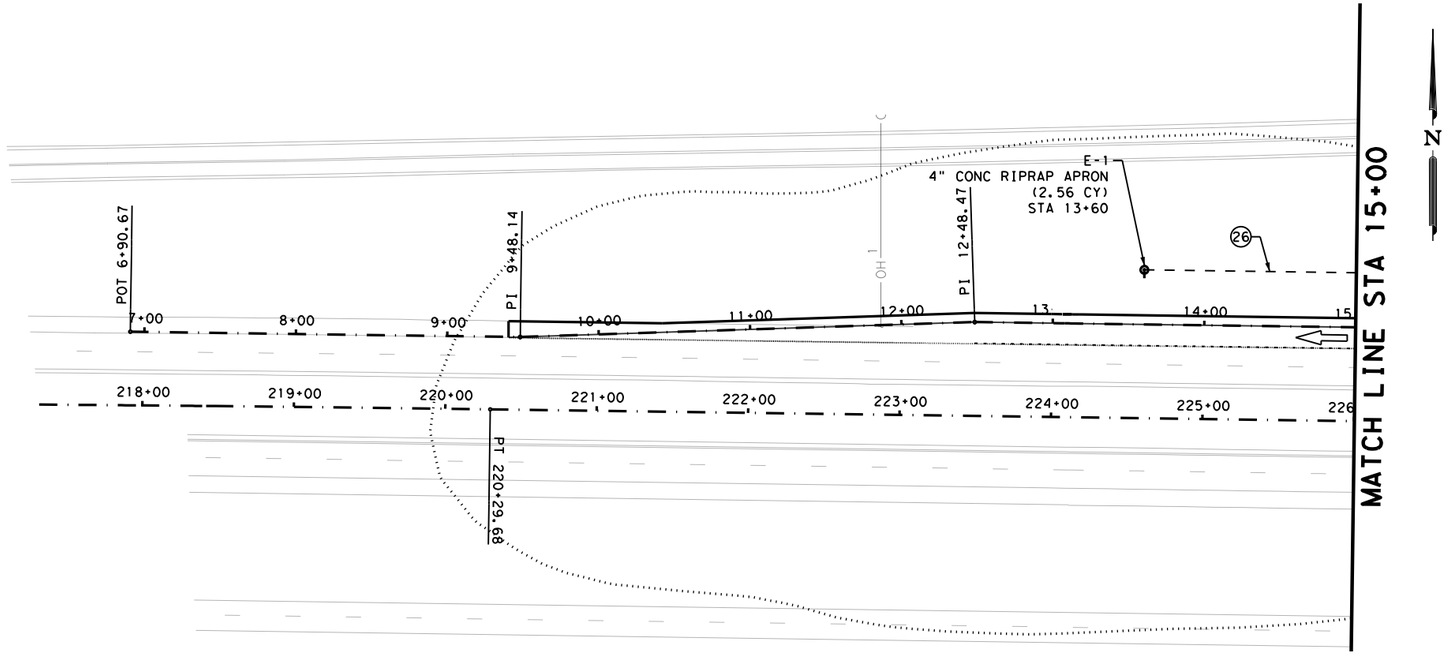
WB IH 30 CMV STATION

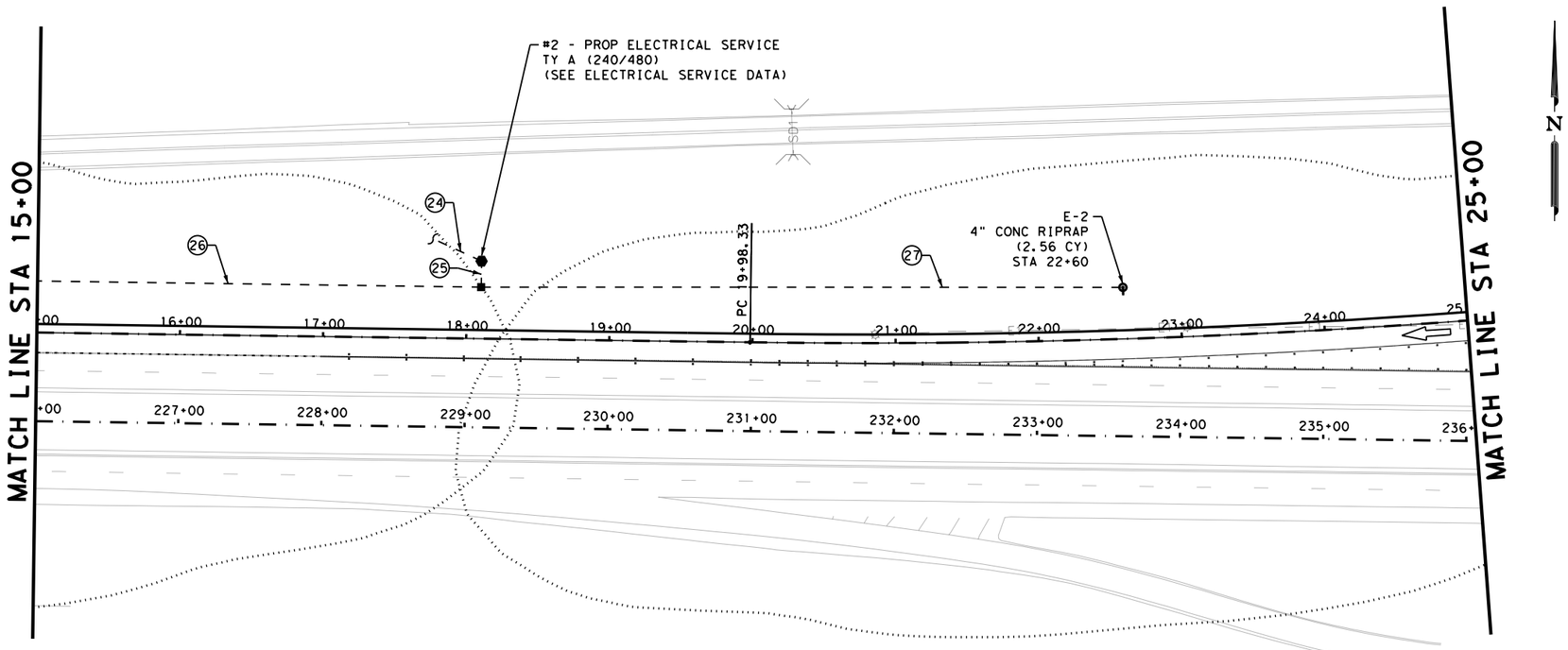
UTILITY LAYOUT

STA 65+00 TO END PROJECT

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	135

Plotted on: 10/14/2022





LEGEND

- PROPOSED EOP
- TRAFFIC FLOW ARROWS
- PROPOSED 2" CONDUIT PVC SCHD 80
- PROPOSED 2" CONDUIT PVC SCHD 80 (BORE)
- ILLUMINATION LIGHTING AREA (0.2 fc)
- (XX) CONDUIT RUN NUMBER
- SINGLE ARM ILLUMINATION ASSEMBLY
- PROPOSED GROUND BOX TY A
- HIGH MAST (W/ AIMING ARROW)

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

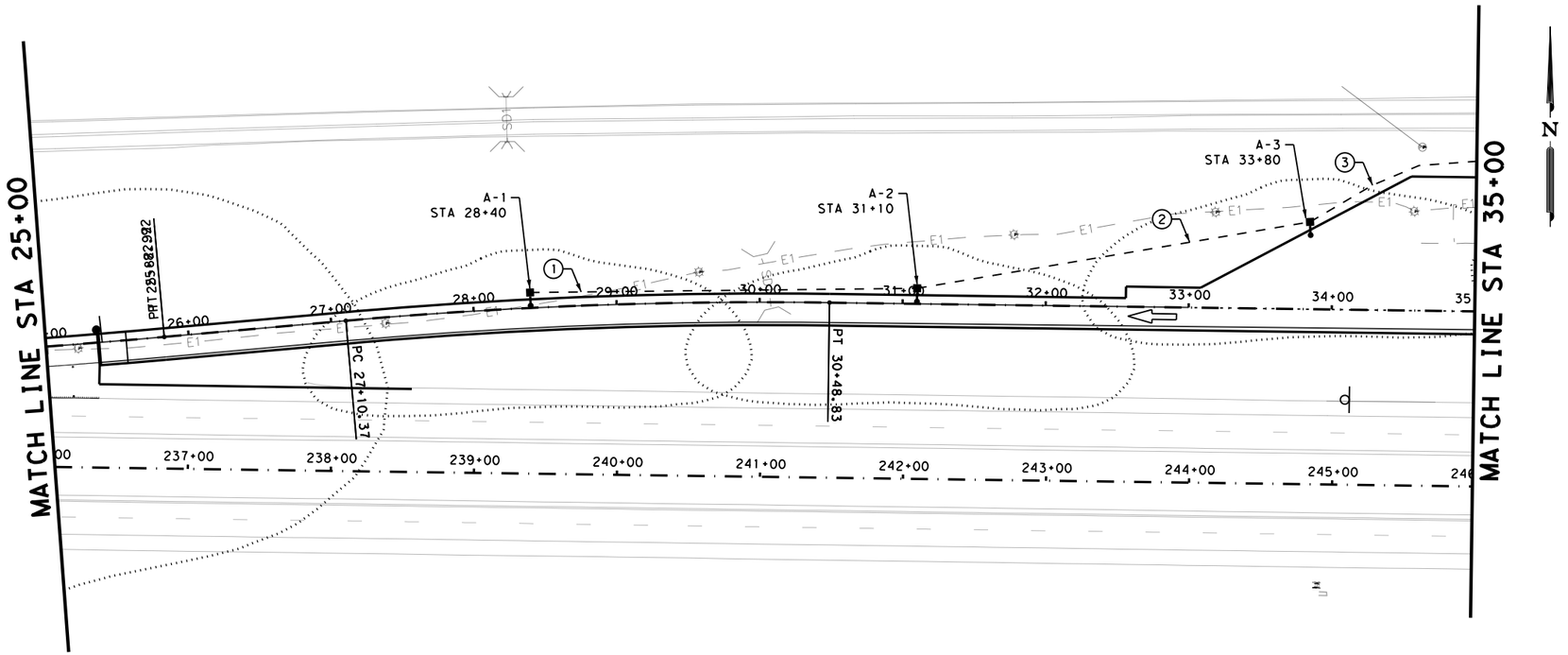
ILLUMINATION AND CONDUIT LAYOUT

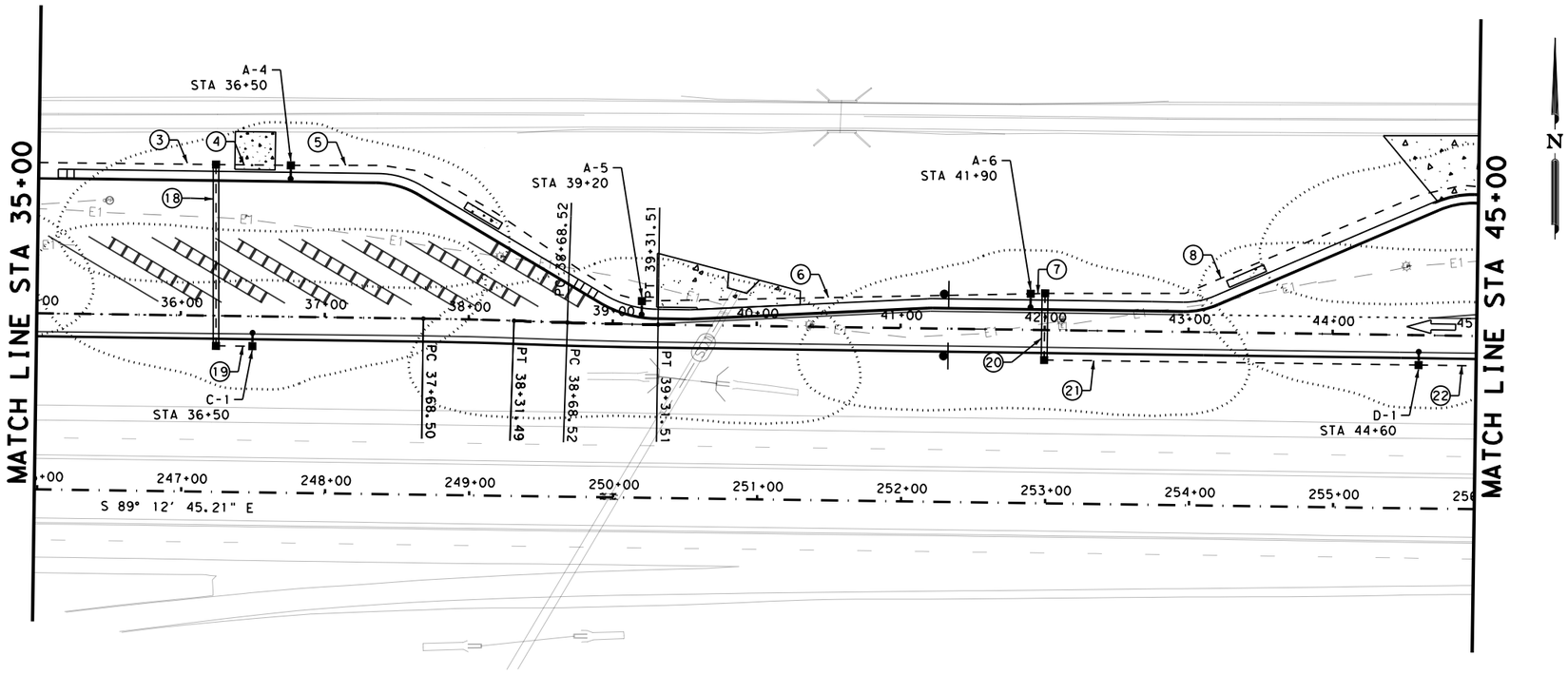
BEGIN PROJECT TO STA 25+00

SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	136

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_ILLUM01.dgn





LEGEND

- PROPOSED EOP
- TRAFFIC FLOW ARROWS
- PROPOSED 2" CONDUIT PVC SCHD 80
- PROPOSED 2" CONDUIT PVC SCHD 80 (BORE)
- ILLUMINATION LIGHTING AREA (0.2 fc)
- (XX) CONDUIT RUN NUMBER
- SINGLE ARM ILLUMINATION ASSEMBLY
- PROPOSED GROUND BOX TY A
- HIGH MAST (W/ AIMING ARROW)

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ILLUMINATION AND CONDUIT LAYOUT

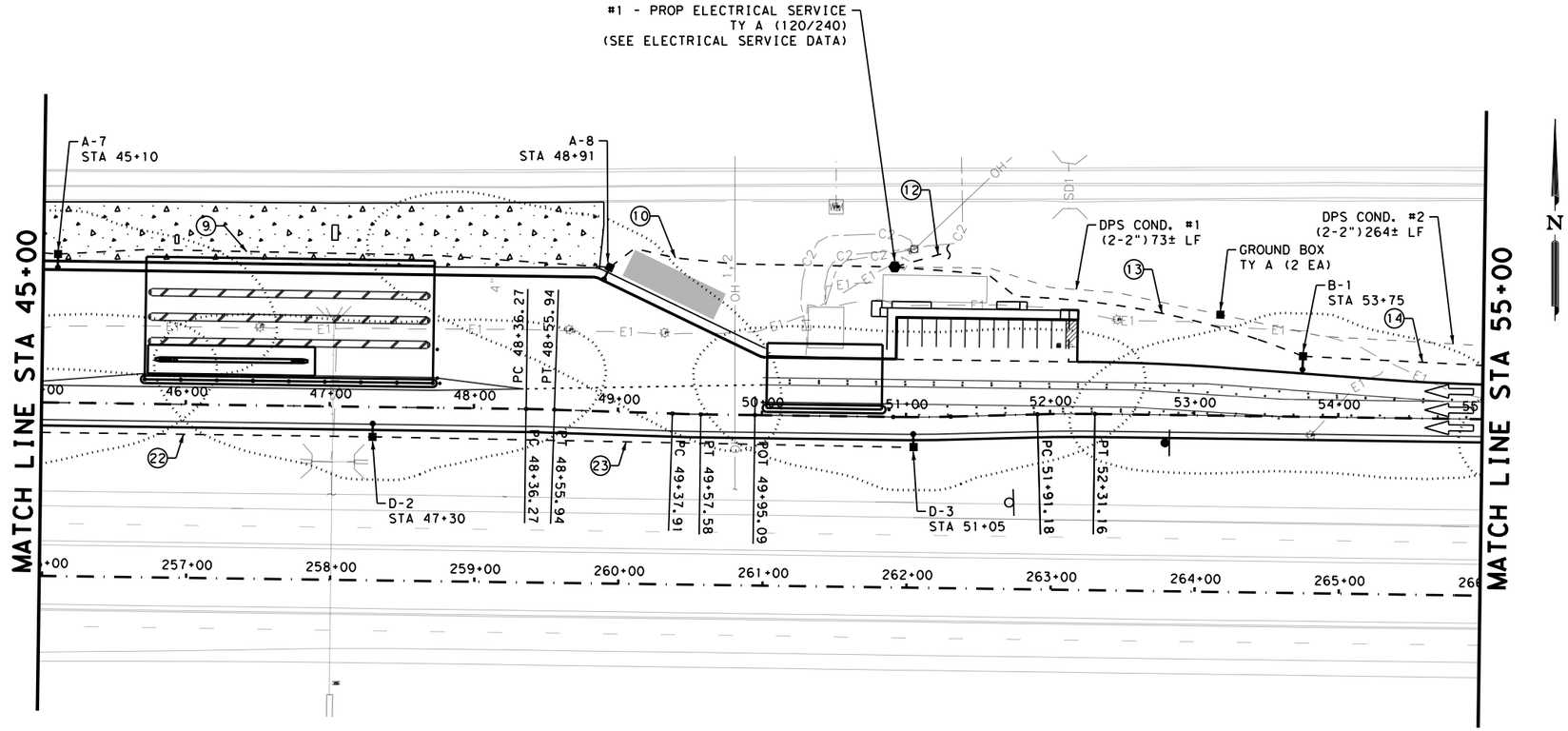
STA 25+00 TO STA 45+00

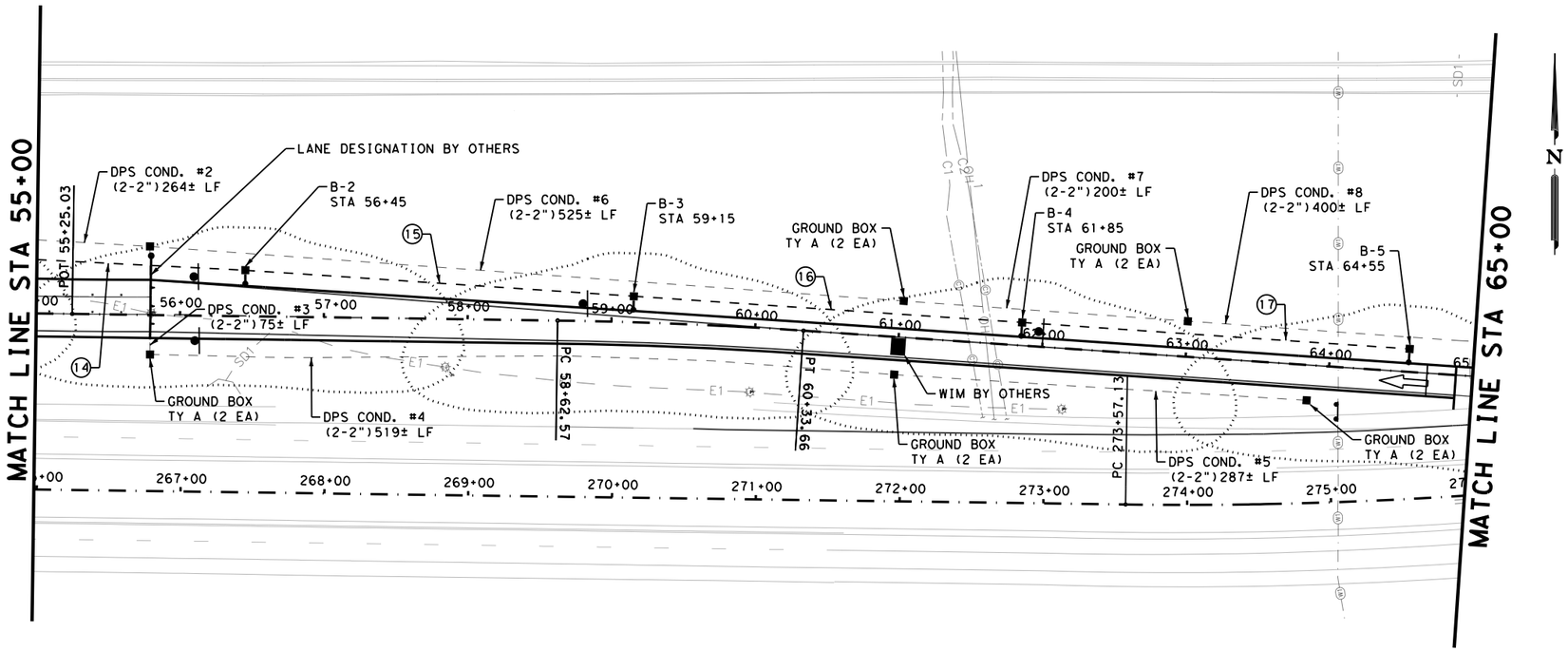
SHEET 2 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	137

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_ILLUM02.dgn





LEGEND

- PROPOSED EOP
- TRAFFIC FLOW ARROWS
- PROPOSED 2" CONDUIT PVC SCHD 80
- PROPOSED 2" CONDUIT PVC SCHD 80 (BORE)
- ILLUMINATION LIGHTING AREA (0.2 fc)
- (XX) CONDUIT RUN NUMBER
- SINGLE ARM ILLUMINATION ASSEMBLY
- PROPOSED GROUND BOX TY A
- HIGH MAST (W/ AIMING ARROW)

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ILLUMINATION AND CONDUIT LAYOUT

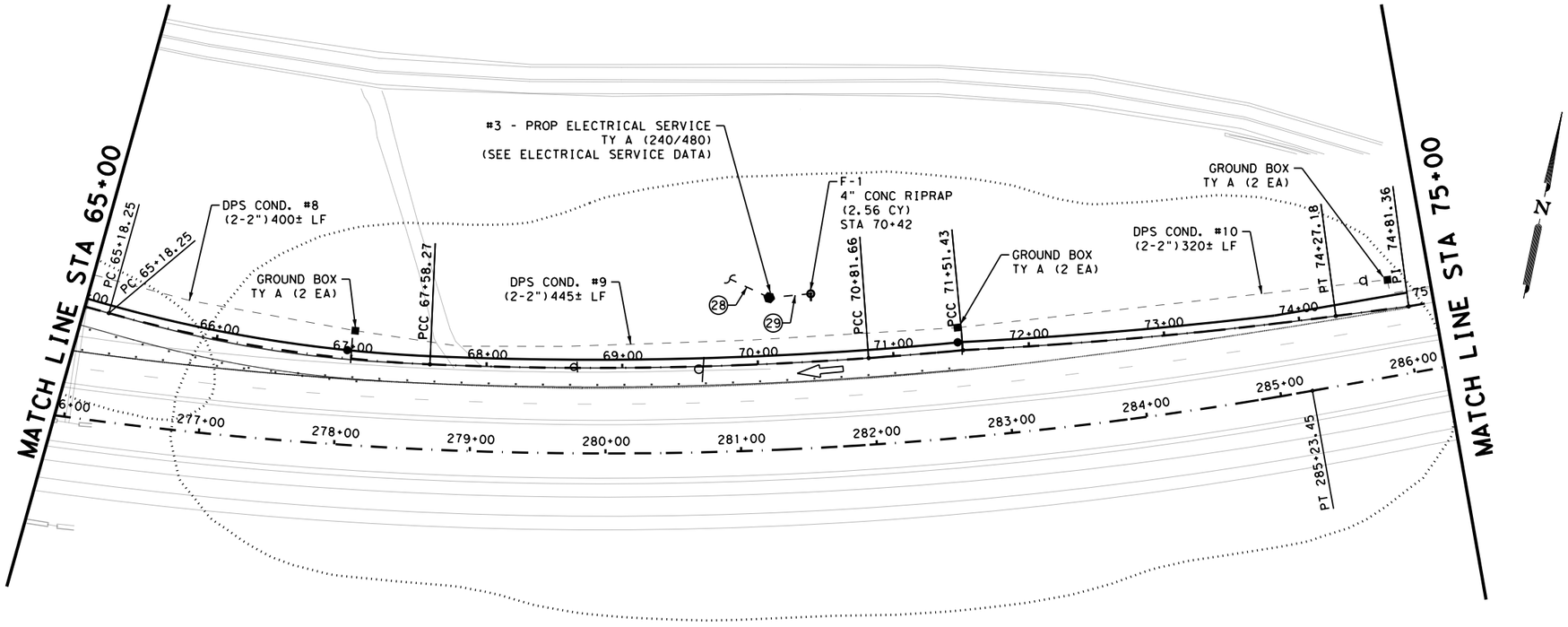
STA 45+00 TO STA 65+00

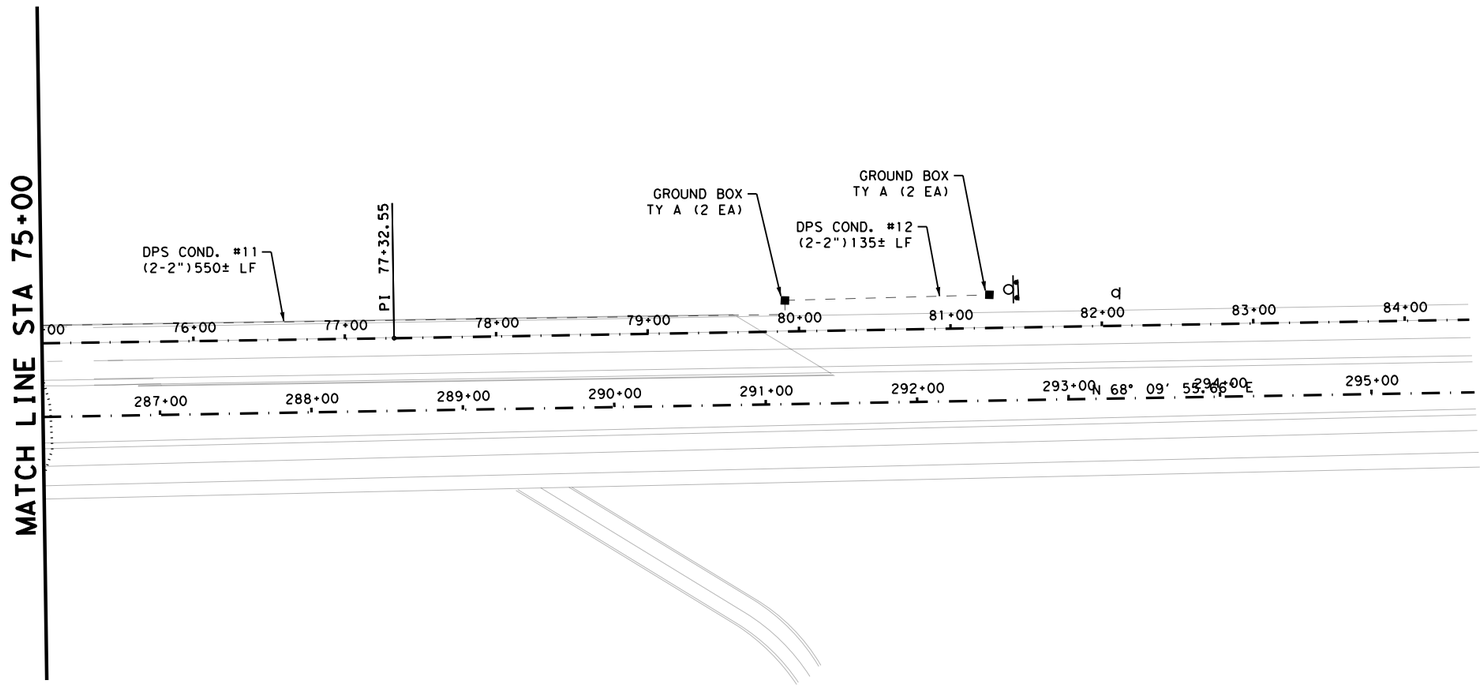
SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	138

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_ILLUM03.dgn





LEGEND

- PROPOSED EOP
- TRAFFIC FLOW ARROWS
- PROPOSED 2" CONDUIT PVC SCHD 80
- PROPOSED 2" CONDUIT PVC SCHD 80 (BORE)
- ILLUMINATION LIGHTING AREA (0.2 fc)
- (XX) CONDUIT RUN NUMBER
- SINGLE ARM ILLUMINATION ASSEMBLY
- PROPOSED GROUND BOX TY A
- HIGH MAST (W/ AIMING ARROW)

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ILLUMINATION AND CONDUIT LAYOUT

STA 65+00 TO END PROJECT

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	139

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_ILLUM04.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_ILLUM05.dgn

CONDUIT AND CONDUCTOR SCHEDULE

	CONDUIT				CONDUCTOR					
SERVICE NO.	RUN NO.	CONDT (PVC) (SCHD 80) (2")	CONDT (PVC) (SCHD 80) (2") (BORE)	# COND	ELEC CONDR (NO. 8) BARE	# BARE	ELEC CONDR (NO. 8) INSULATED	# INSUL	RUN LENGTH	CONDITION
1	1	270		1	297	1	594	2	270	PROPOSED
1	2	275		1	303	1	605	2	273	PROPOSED
1	3	275		1	303	1	605	2	274	PROPOSED
1	4	15		1	17	1	33	2	15	PROPOSED
1	5	295		1	325	1	649	2	293	PROPOSED
1	6	270		1	297	1	594	2	270	PROPOSED
1	7	10		1	11	1	22	2	10	PROPOSED
1	8	325		1	358	1	715	2	325	PROPOSED
1	9	385		1	424	1	847	2	383	PROPOSED
1	10	295		1	325	1	649	2	292	PROPOSED
1	12	TO BE PULLED BY ELECTRIC UTILITY COMPANY								PROPOSED
1	13	205		1	226	1	451	2	205	PROPOSED
1	14	270		1	297	1	594	2	270	PROPOSED
1	15	270		1	297	1	594	2	270	PROPOSED
1	16	270		1	297	1	594	2	270	PROPOSED
1	17	270		1	297	1	594	2	270	PROPOSED
1	18		125	1	138	1	275	2	125	PROPOSED
1	19	15		1	17	1	33	2	13	PROPOSED
1	20		50	1	55	1	110	2	46	PROPOSED
1	21	260		1	286	1	572	2	260	PROPOSED
1	22	270		1	297	1	594	2	270	PROPOSED
1	23	375		1	413	1	825	2	375	PROPOSED
2	24	TO BE PULLED BY ELECTRIC UTILITY COMPANY								PROPOSED
2	25	20		1	22	1	44	2	18	PROPOSED
2	26	450		1	495	1	990	2	450	PROPOSED
2	27	450		1	495	1	990	2	448	PROPOSED
3	28	TO BE PULLED BY ELECTRIC UTILITY COMPANY								PROPOSED
3	29	30		1	33	1	66	2	30	PROPOSED
TOTAL + 10% CONTINGENCY		6127	193		6320		12639			

ILLUMINATION ASSEMBLY LOCATIONS

LIGHT NO.	STATION	BASELINE	OFFSET	TYPE & SIZE
A-1	28+40	WB_CMV	11.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-2	31+10	WB_CMV	11.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-3	33+80	WB_CMV	49.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-4	36+50	WB_CMV	105.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-5	39+20	WB_CMV	16.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-6	41+90	WB_CMV	25.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-7	45+10	WB_CMV	103.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
A-8	48+91	WB_CMV	100.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
B-1	53+75	WB_CMV	43.26' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
B-2	56+45	WB_CMV	32.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
B-3	59+15	WB_CMV	18.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
B-4	61+85	WB_CMV	16.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
B-5	64+55	WB_CMV	16.00' LT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
C-1	36+50	WB_CMV	21.00' RT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
D-1	44+60	WB_CMV	21.00' RT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
D-2	47+30	WB_CMV	21.00' RT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
D-3	51+05	WB_CMV	21.00' RT	IN RD IL (TY SA) 50T-10 (400W EQ) LED
E-1	13+60	WB_CMV	36.00' LT	LED HI MST IL ASM (6-400W) (ASYM) (TY A)
E-2	22+60	WB_CMV	36.00' LT	LED HI MST IL ASM (6-400W) (ASYM) (TY A)
F-1	70+42	WB_CMV	50.00' LT	LED HI MST IL ASM (6-400W) (ASYM) (TY A)

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JUSTIN W. CLARK
P.E. SERIAL NO: 118715
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

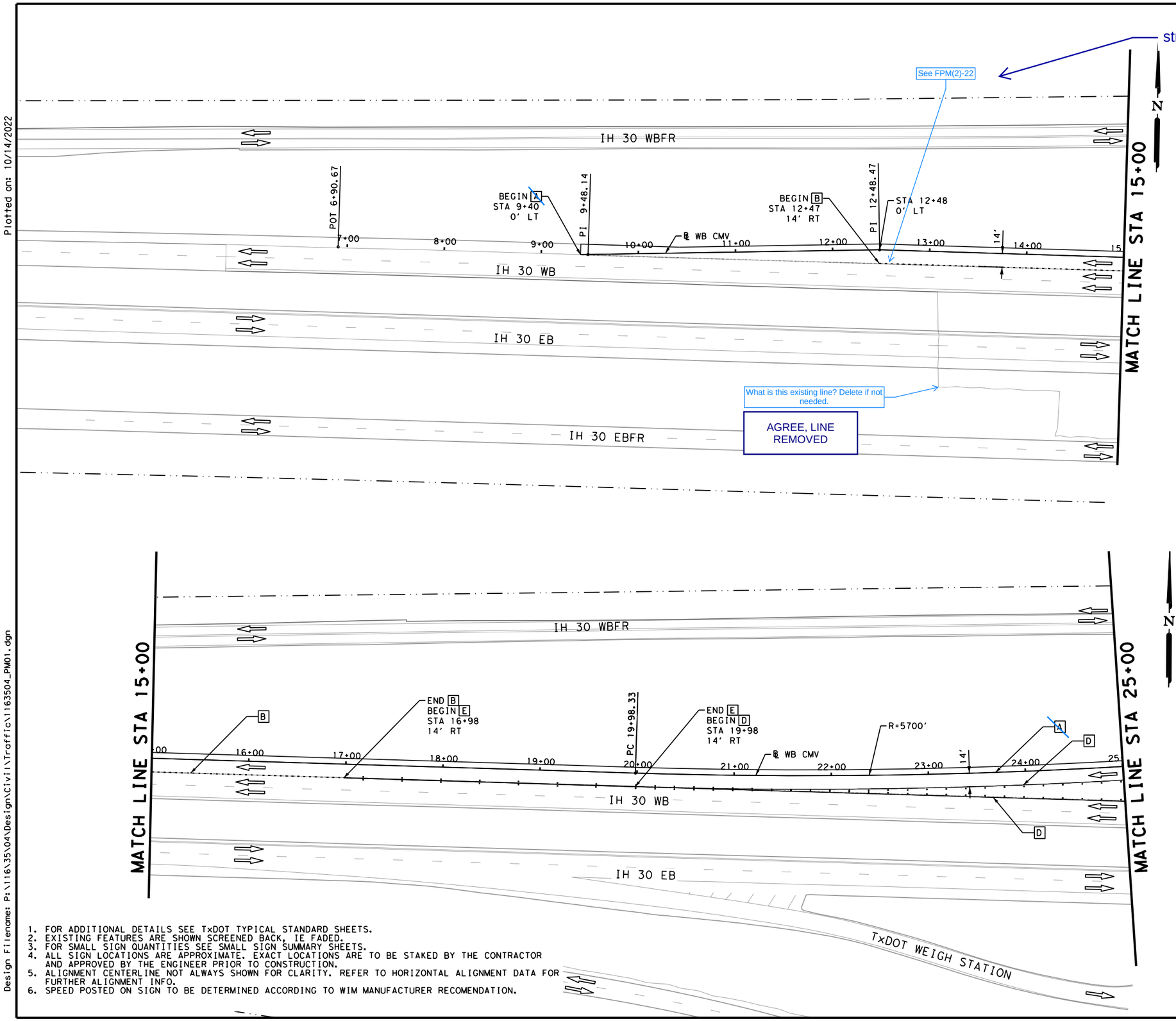
REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ILLUMINATION ASSEMBLY LOCATIONS, CONDUIT, & CONDUCTOR SUMMARY

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	140



AGREE, BID ITEMS AND LEGEND UPDATED

Correct Legend with new bid items; See Summary of Quantities Sheet 13

LEGEND

A	4" SLD (W) STRIPE	H	24" SLD (W) STRIPE
B	4" LNDP (W) STRIPE W/ TY II C-R @ 48'		TRAFFIC FLOW ARROWS
C	4" BRK (W) STRIPE W/ TY II C-R @ 80'		PROPOSED SIGN
D	8" SLD (W) STRIPE W/ TY II C-R @ 20'		EXISTING SIGN
E	12" SLD (W) STRIPE W/ SYM TY II C-R @ 40'		SAWCUT LINE
F	4" SHADOW LANE LINE	1-1	SMALL SIGN DESIGNATION
G	4" SLD (Y) STRIPE	L-X	LARGE SIGN DESIGNATION

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SIGNING & PAVEMENT MARKINGS PLAN

BEGIN PROJECT TO STA 25+00

SHEET 1 OF 4

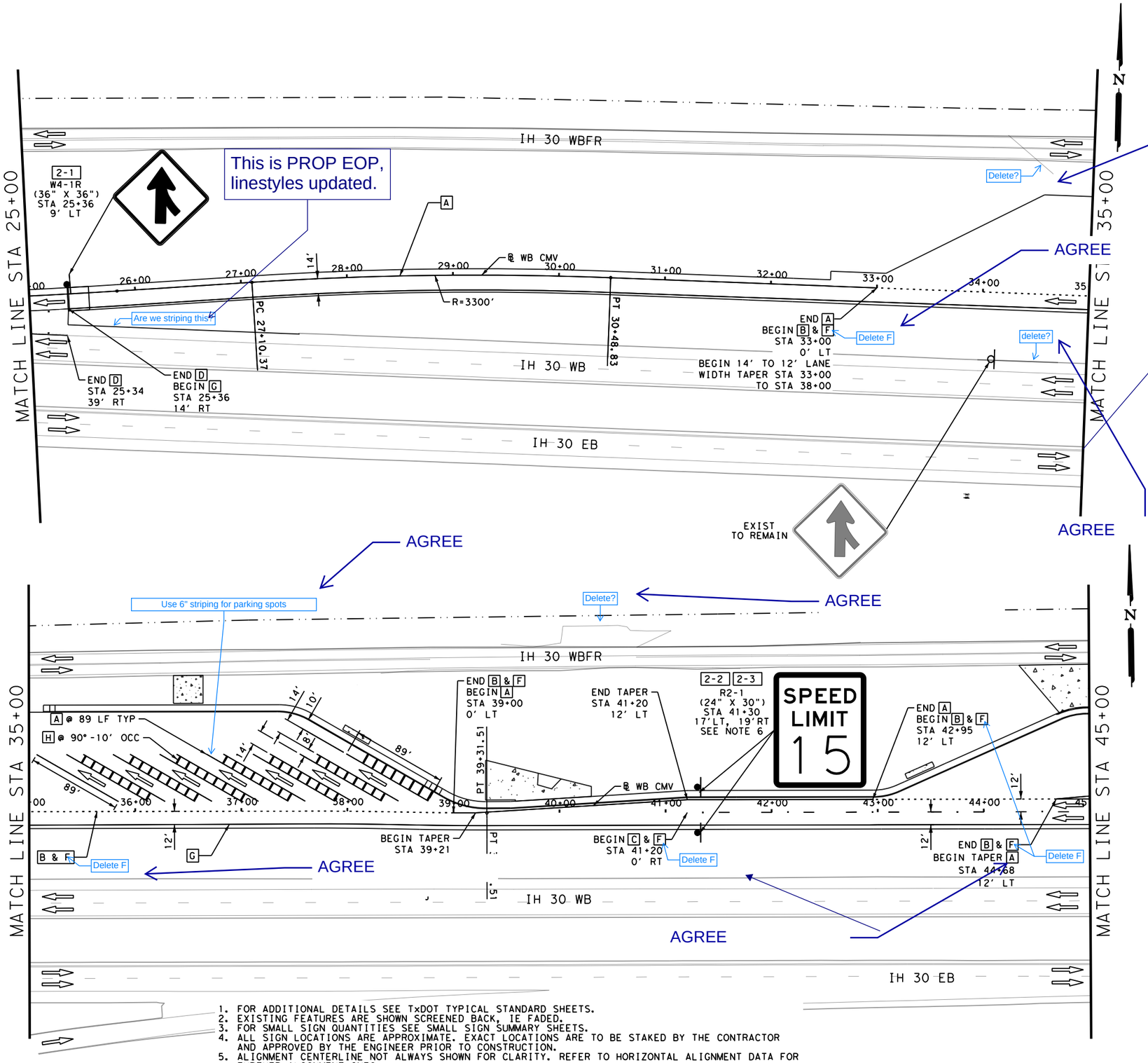
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	141

1. FOR ADDITIONAL DETAILS SEE TxDOT TYPICAL STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK, IE FADED.
3. FOR SMALL SIGN QUANTITIES SEE SMALL SIGN SUMMARY SHEETS.
4. ALL SIGN LOCATIONS ARE APPROXIMATE. EXACT LOCATIONS ARE TO BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
5. ALIGNMENT CENTERLINE NOT ALWAYS SHOWN FOR CLARITY. REFER TO HORIZONTAL ALIGNMENT DATA FOR FURTHER ALIGNMENT INFO.
6. SPEED POSTED ON SIGN TO BE DETERMINED ACCORDING TO WIM MANUFACTURER RECOMENDATION.

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_PM01.dgn

Plotted on: 10/14/2022



Correct Legend with new bid items

LEGEND

A	4" SLD (W) STRIPE	H	24" SLD (W) STRIPE
B	4" LNDP (W) STRIPE W/ TY II C-R @ 48'		TRAFFIC FLOW ARROWS
C	4" BRK (W) STRIPE W/ TY II C-R @ 80'		PROPOSED SIGN
D	8" SLD (W) STRIPE W/ TY II C-R @ 20'		EXISTING SIGN
E	12" SLD (W) STRIPE W/ SYM TY II C-R @ 40'		SAWCUT LINE
F	4" SHADOW LANE LINE	1-1	SMALL SIGN DESIGNATION
G	4" SLD (Y) STRIPE	L-X	LARGE SIGN DESIGNATION

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SIGNING & PAVEMENT MARKINGS PLAN

STA 25+00 TO STA 45+00

SHEET 2 OF 4

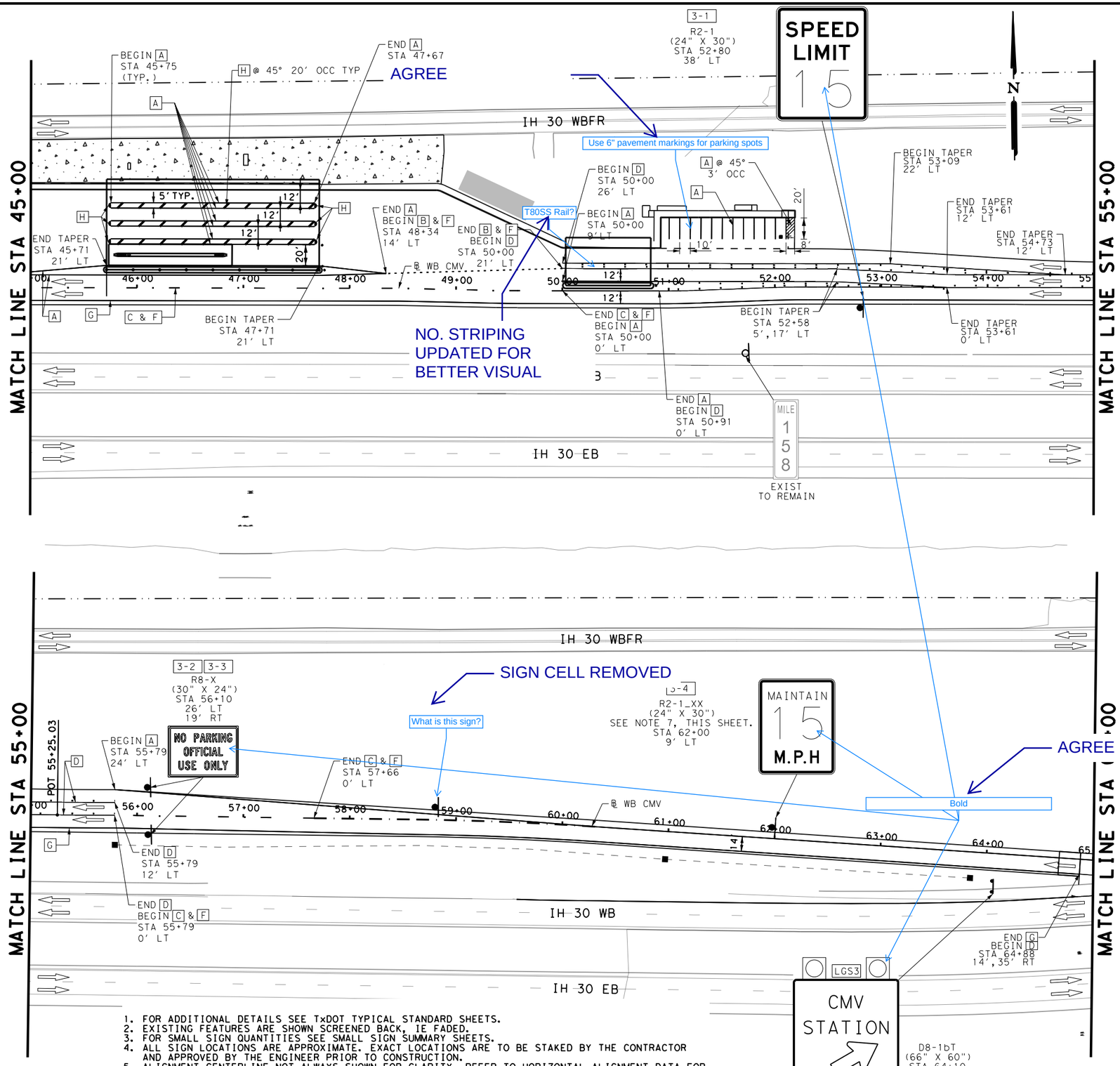
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	142

1. FOR ADDITIONAL DETAILS SEE TxDOT TYPICAL STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK, IE FADED.
3. FOR SMALL SIGN QUANTITIES SEE SMALL SIGN SUMMARY SHEETS.
4. ALL SIGN LOCATIONS ARE APPROXIMATE. EXACT LOCATIONS ARE TO BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
5. ALIGNMENT CENTERLINE NOT ALWAYS SHOWN FOR CLARITY. REFER TO HORIZONTAL ALIGNMENT DATA FOR FURTHER ALIGNMENT INFO.
6. SPEED POSTED ON SIGN TO BE DETERMINED ACCORDING TO WIM MANUFACTURER RECOMENDATION.

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_PM02.dgn

Plotted on: 10/14/2022

Design Filename: P:\116V35\04\Design\Civil\Traffic\116304_PM03.dgn



NOTES
1.) BOLD ALL ARROWS AND TEXT LIKE SHEETS 141 AND 142.
2.)ALSO MATCH CORRECTIONS FROM SHEETs 141, 142, AND SUMMARY OF QUANTITES SHEET 13

AGREE

AGREE, BID ITEMS AND LEGEND UPDATED

Correct Legend with new bid items

LEGEND

A	4" SLD (W) STRIPE	H	24" SLD (W) STRIPE
B	4" LNDP (W) STRIPE W/ TY II C-R @ 48'		TRAFFIC FLOW ARROWS
C	4" BRK (W) STRIPE W/ TY II C-R @ 80'		PROPOSED SIGN
D	8" SLD (W) STRIPE W/ TY II C-R @ 20'		EXISTING SIGN
E	12" SLD (W) STRIPE W/ SYM TY II C-R @ 40'		OBJECT MARKER
F	4" SHADOW LANE LINE		DOUBLE YELLOW DELINEATOR
G	4" SLD (Y) STRIPE	1-1	SMALL SIGN DESIGNATION
		L-X	LARGE SIGN DESIGNATION

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SIGNING & PAVEMENT MARKINGS PLAN

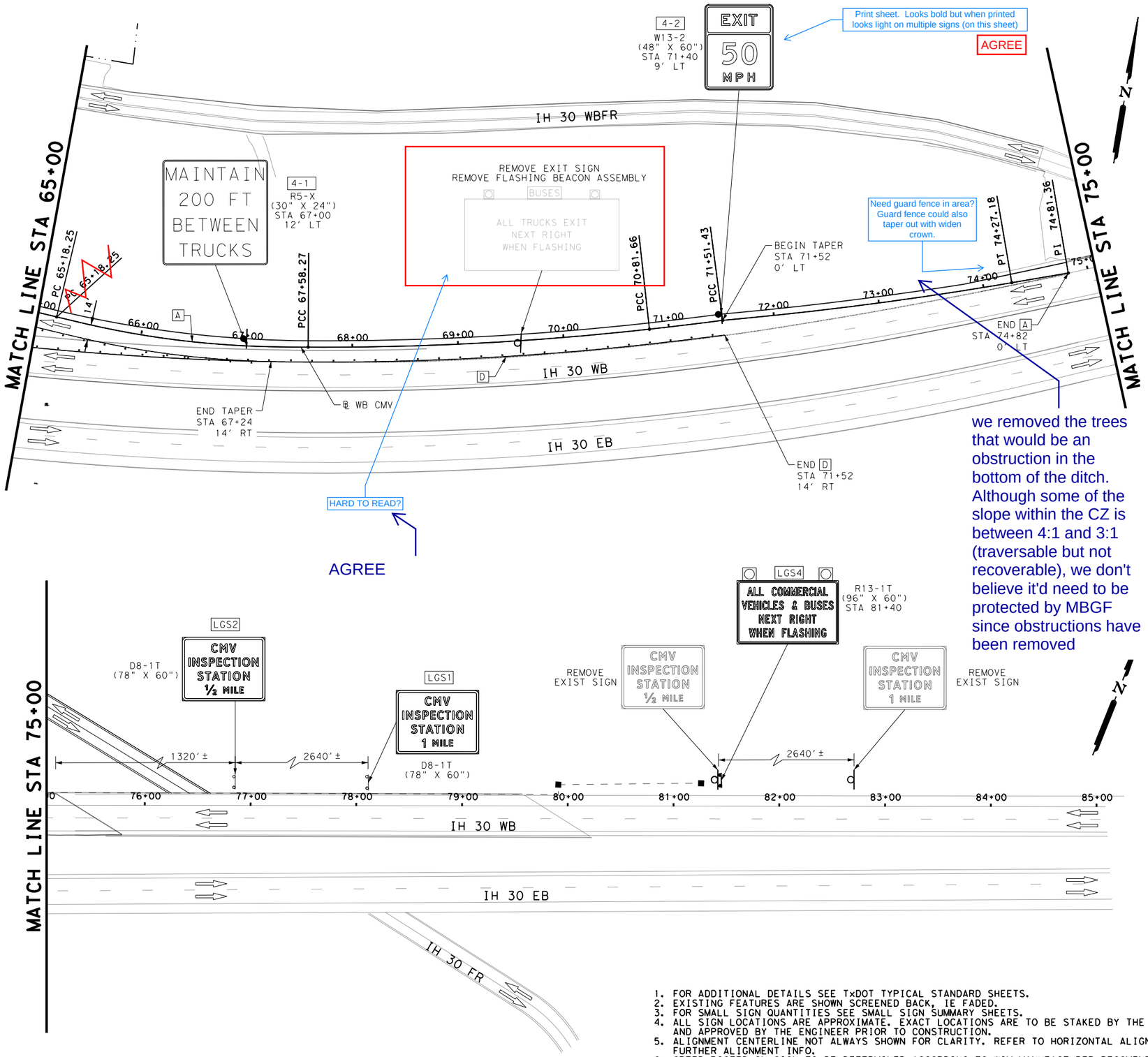
STA 45+00 TO STA 65+00

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DW:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DW:	ATL	TITUS	0610	03	095	143

1. FOR ADDITIONAL DETAILS SEE TxDOT TYPICAL STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK, IE FADED.
3. FOR SMALL SIGN QUANTITIES SEE SMALL SIGN SUMMARY SHEETS.
4. ALL SIGN LOCATIONS ARE APPROXIMATE. EXACT LOCATIONS ARE TO BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
5. ALIGNMENT CENTERLINE NOT ALWAYS SHOWN FOR CLARITY. REFER TO HORIZONTAL ALIGNMENT DATA FOR FURTHER ALIGNMENT INFO.
6. SPEED POSTED ON SIGN TO BE DETERMINED ACCORDING TO WIM MANUFACTURER RECOMENDATION.

Plotted on: 10/14/2022



NOTES
1.) BOLD ALL ARROWS AND TEXT LIKE SHEETS 141 AND 142.
2.)ALSO MATCH CORRECTIONS FROM SHEETs 141, 142, AND SUMMARY OF QUANTITES SHEET 13

AGREE, BID ITEMS AND LEGEND WILL BE UPDATED

Correct Legend with new bid items

LEGEND

A	4" SLD (W) STRIPE	H	24" SLD (W) STRIPE
B	4" LNDP (W) STRIPE W/ TY II C-R @ 48'		TRAFFIC FLOW ARROWS
C	4" BRK (W) STRIPE W/ TY II C-R @ 80'		PROPOSED SIGN
D	8" SLD (W) STRIPE W/ TY II C-R @ 20'		EXISTING SIGN
E	12" SLD (W) STRIPE W/ SYM TY II C-R @ 40'		SAWCUT LINE
F	4" SHADOW LANE LINE	1-1	SMALL SIGN DESIGNATION
G	4" SLD (Y) STRIPE	L-X	LARGE SIGN DESIGNATION

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SIGNING & PAVEMENT MARKINGS PLAN

STA 65+00 TO END PROJECT

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	144

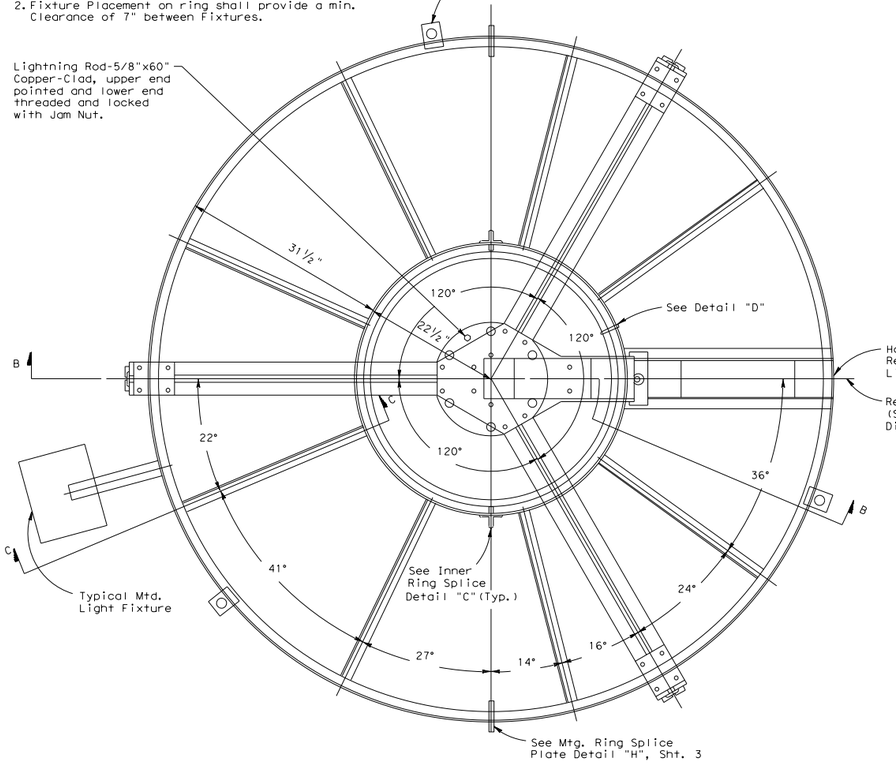
1. FOR ADDITIONAL DETAILS SEE TxDOT TYPICAL STANDARD SHEETS.
2. EXISTING FEATURES ARE SHOWN SCREENED BACK, IE FADED.
3. FOR SMALL SIGN QUANTITIES SEE SMALL SIGN SUMMARY SHEETS.
4. ALL SIGN LOCATIONS ARE APPROXIMATE. EXACT LOCATIONS ARE TO BE STAKED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
5. ALIGNMENT CENTERLINE NOT ALWAYS SHOWN FOR CLARITY. REFER TO HORIZONTAL ALIGNMENT DATA FOR FURTHER ALIGNMENT INFO.
6. SPEED POSTED ON SIGN TO BE DETERMINED ACCORDING TO WIM MANUFACTURER RECOMENDATION.

Design Filename: P:\116\35\04\Design\Civil\Traffic\1163504_PM04.dgn

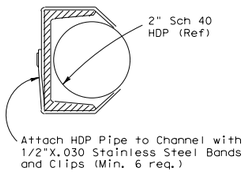
DATE: 10/14/2022 2:49:58 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmid-03.dgn

NOTES:

1. Pole, Ring, and Ring Support shall be assembled and erected so that Reference Line is parallel to center line of roadway or as shown on "Lighting Layouts" sheets.
2. Fixture Placement on ring shall provide a min. Clearance of 7" between Fixtures.

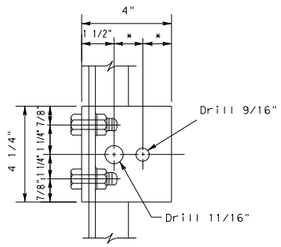


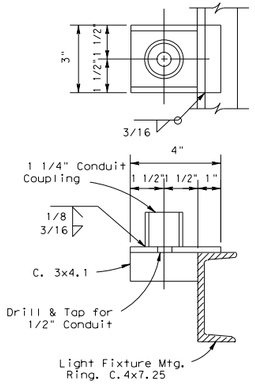
LIGHT MOUNTING RING & SUPPORT ASSEMBLY



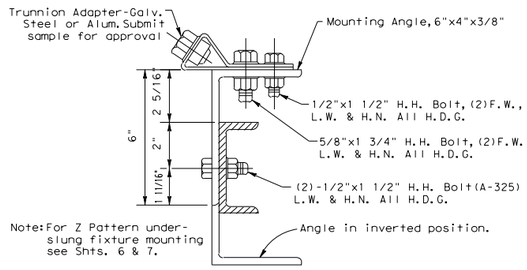
DETAIL "D"
BUMPER RING ATTACHMENT

* As required by Trunnion Adapter supplied.





DETAIL "E"
(CONDUIT ATTACHMENT FOR OBSTRUCTION LIGHTS. TYPICAL (3) PLACES)

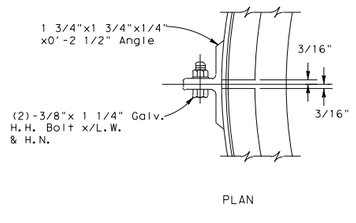


Note: For Z Pattern under-slung fixture mounting see Shts. 6 & 7.

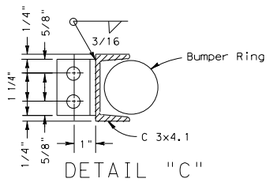
Note: Aiming capabilities may be by method shown or by Steel Mounting-Aiming Device as approved by the Engineer. Mark position of fixture with center punch or drill after fixture has been aligned to the right position on the roadway, as directed by the Engineer.

SECTION C-C
(FOR TRUNNION MOUNT)

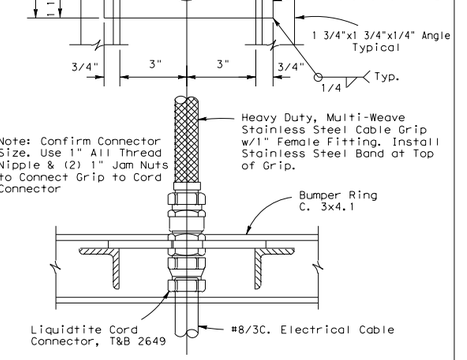
NOTE: Provide S.S. or glav. cable safety lanyard for Light Fixture when Trunnion Mount is used.



PLAN

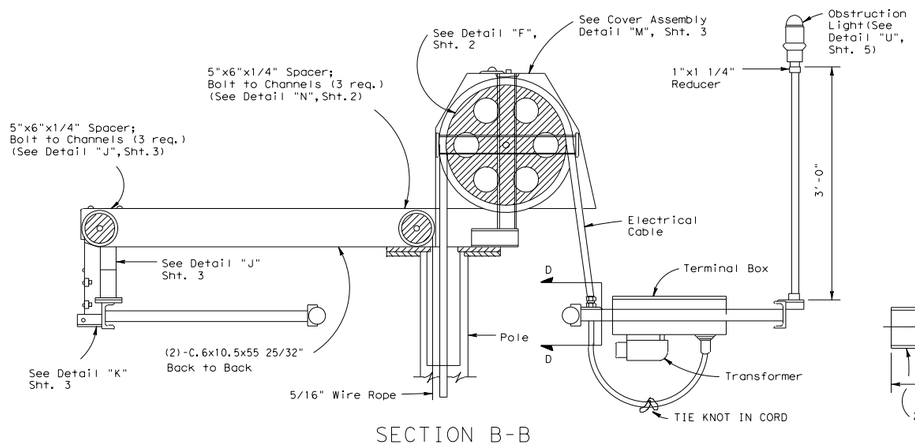


DETAIL "C"
INNER RING SPLICE

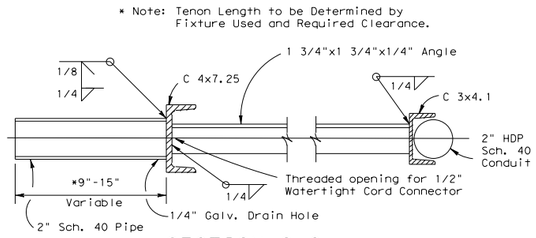


SECTION D-D

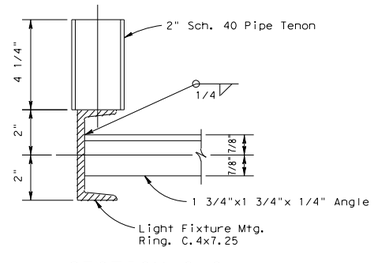
NOTE: COVER CORD WITH HEAT SHRINK TUBING FROM CABLE GRIP TO WITHIN ONE INCH OF GRIP TO CONNECTOR TRANSITION PRIOR TO INSTALLING CABLE GRIP.



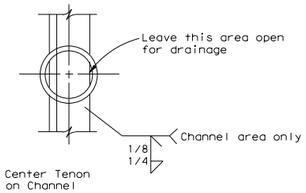
SECTION B-B



SECTION C-C
(FOR AREALIGHTS)



SECTION C-C
(FOR FLOODLIGHTS)



Note: Center Tenon on Channel

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

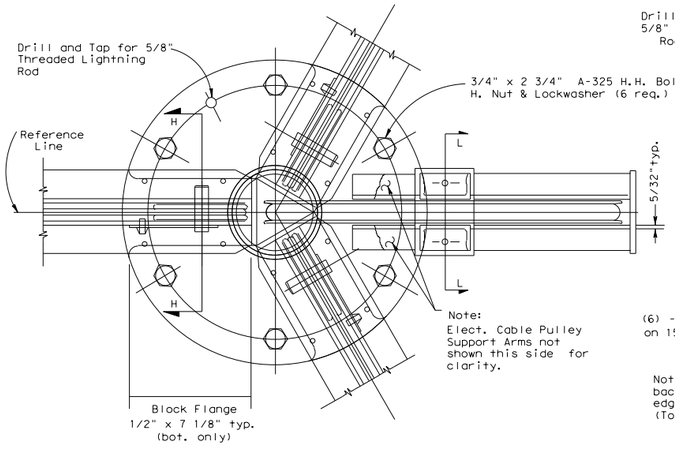
HMID(1)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

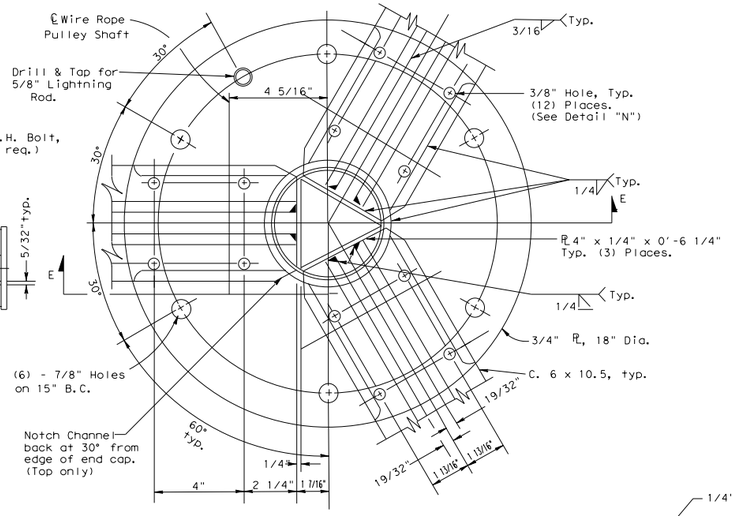
REVISIONS
5-86
4-87 10-14-87
5-87 4-96
10-1-87

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30
DIST	COUNTY		SHEET NO.
ATL	TITUS		145

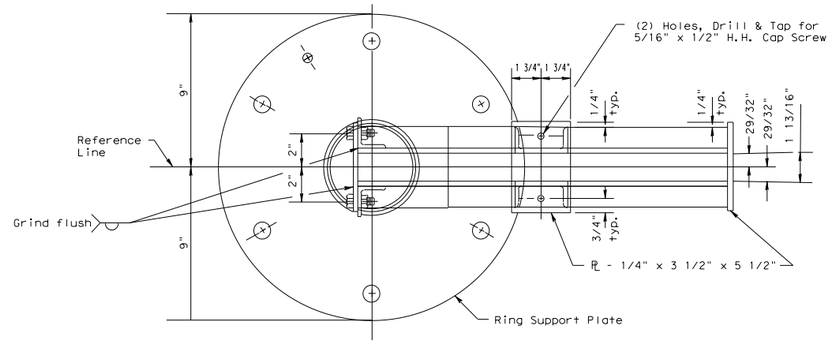
DATE: 10/14/2022 2:49:58 PM
FILE: P:\1161535\04\Design\Civil\Standards\Illumination\hmid-03.dgn



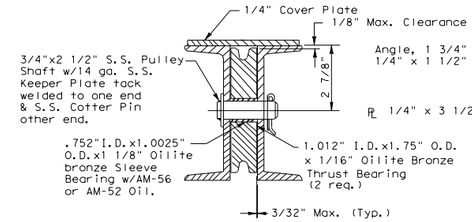
PLAN VIEW



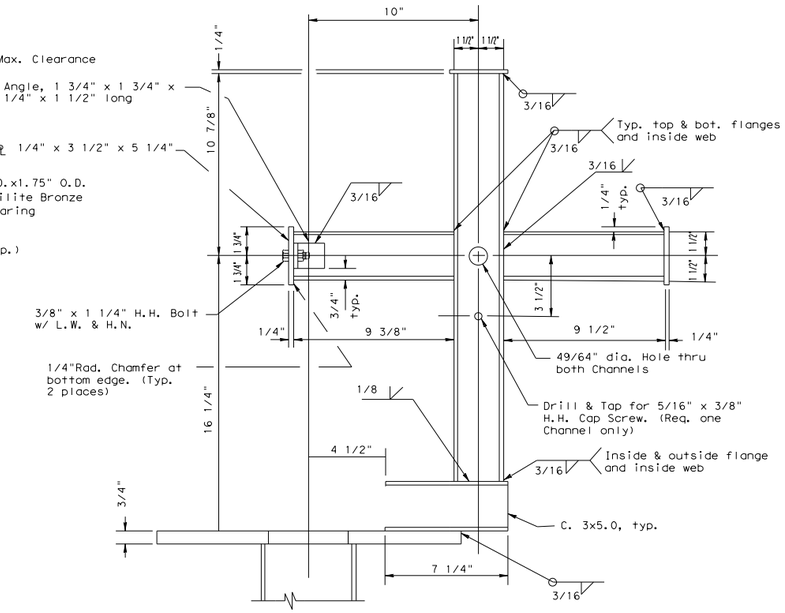
DETAIL "G"
TOP PLATE CONNECTION
(LESS ELECT. CABLE PULLEY SUPPORT)
(SEE DETAIL "L")



PLAN VIEW

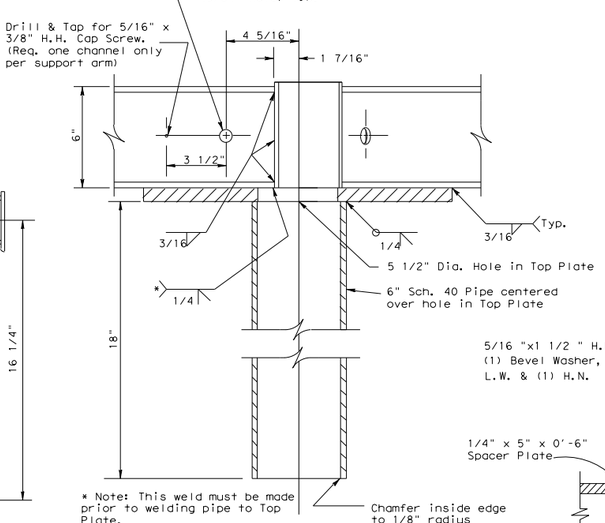


SECTION "H-H"
PULLEY MOUNTING FOR RING SUPPORT ARMS

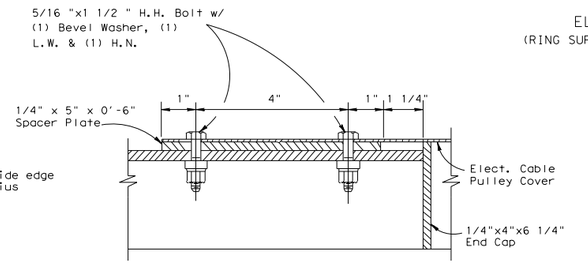


DETAIL "L"
ELECT. CABLE PULLEY SUPPORT
(RING SUPPORT ARMS NOT SHOWN FOR CLARITY)

DETAIL "F"
RING SUPPORT ASSEMBLY
(NEAR SIDE SUPPORT ARM & ELECT. CABLE PULLEY COVER NOT SHOWN FOR CLARITY)



SECTION "E - E"



DETAIL "N"

Texas Department of Transportation
Traffic Operations Division

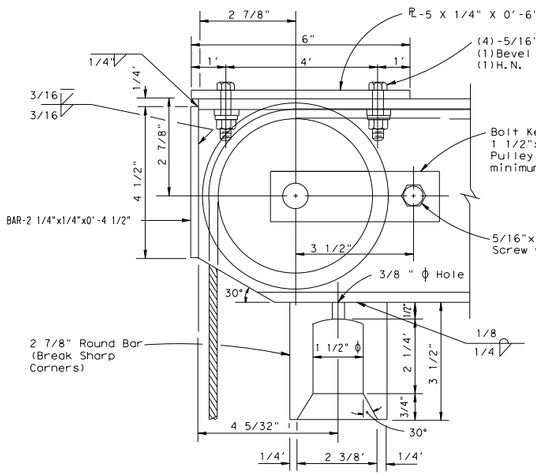
HIGH MAST ILLUMINATION DETAILS

HMID(2)-03

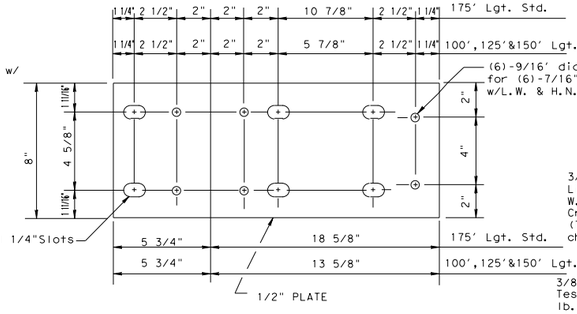
© TxDOT January 1986	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS 4-96	CONT	SECT	JOB	HIGHWAY
4-86 5-86 5-87 12-87	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		146

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

DATE: 10/14/2022 2:49:59 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmid-03.dgn



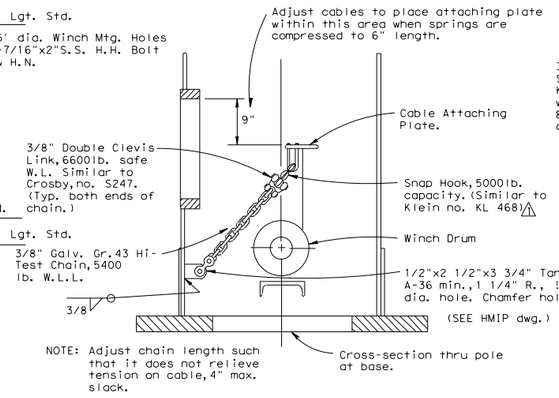
DETAIL "J"



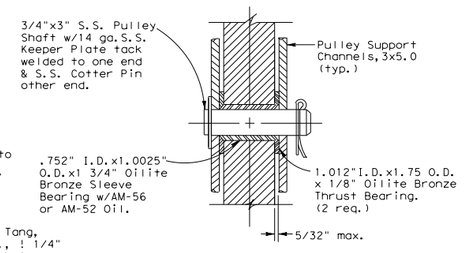
DETAIL "V"

WINCH MOUNTING PLATE

NOTE: Dimensions may vary-Verify with winch manufacturer.

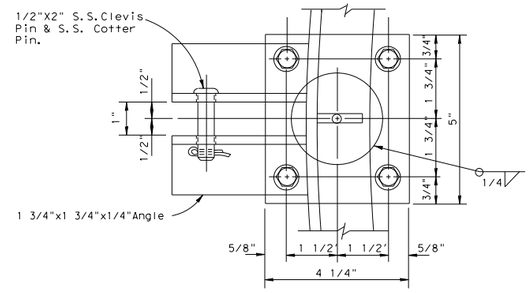


SAFETY LANYARD DETAIL

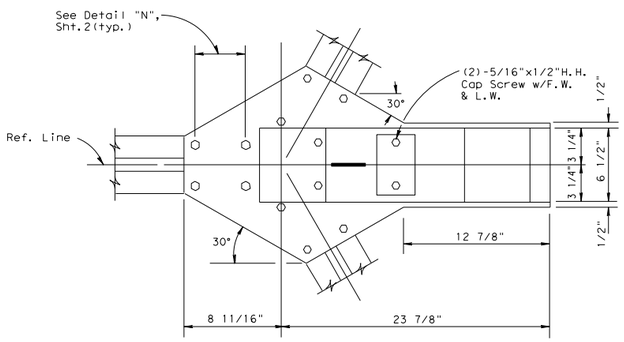


SECTION L-L

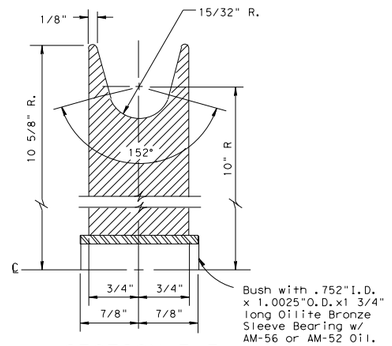
ELECTRICAL CABLE
PULLEY MOUNTING



PLAN



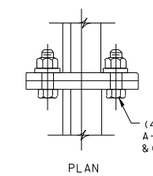
PLAN



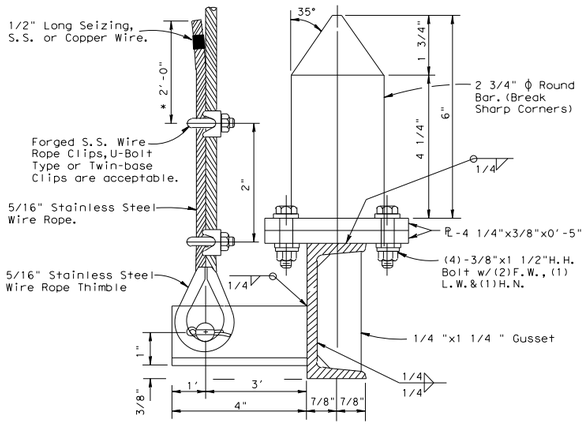
SECTION F-F

ELECTRICAL CABLE PULLEY

(Pulley material to be aluminum alloy, Type 356-T6 or equal)



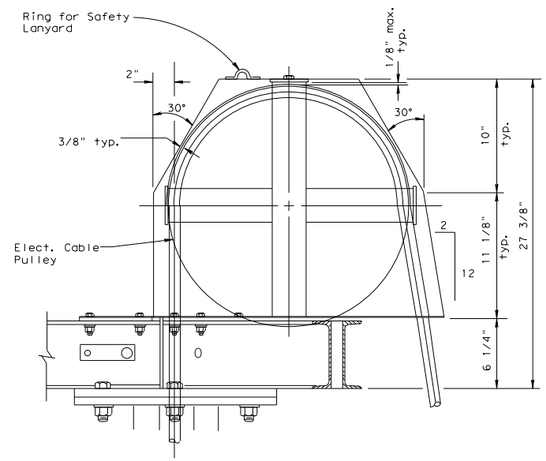
PLAN



DETAIL "K"

MOUNTING RING CONNECTION & STABILIZER

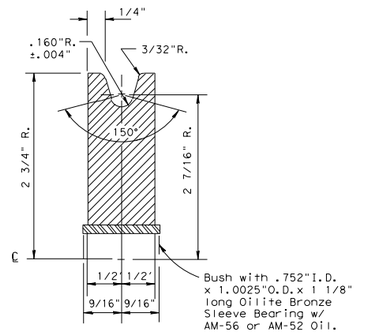
* EXTRA 2'-0" of wire cable to be attached to ring with SS Bands as directed by Engineer.



DETAIL "M"

COVER CAP ASSEMBLY

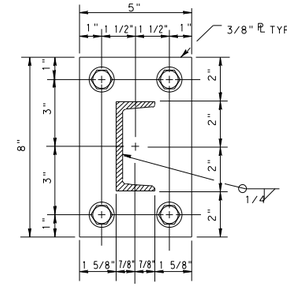
NOTE: Cover to be 14 ga. galv. sht. metal or 0.10" anodized aluminum sheet.



SECTION G-G

WIRE ROPE PULLEY

(Pulley material to be plated steel or Stainless Steel)



DETAIL "H"

MOUNTING RING SPLICE PLATE

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID(3)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

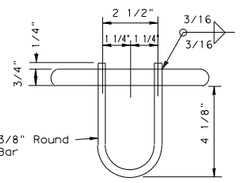
REVISIONS
5-5-86
5-10-86
10-87
10-88
4-96

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

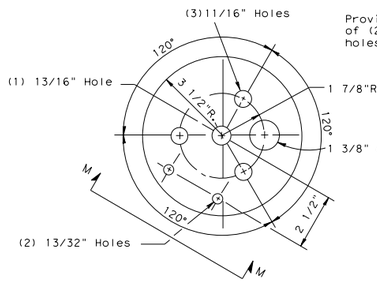
DIST	COUNTY	SHEET NO.
ATL	TITUS	147

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

DATE: 10/14/2022 2:49:59 PM
FILE: P:\116735\04\Design\Civil\Standards\Illumination\hmid-03.dgn

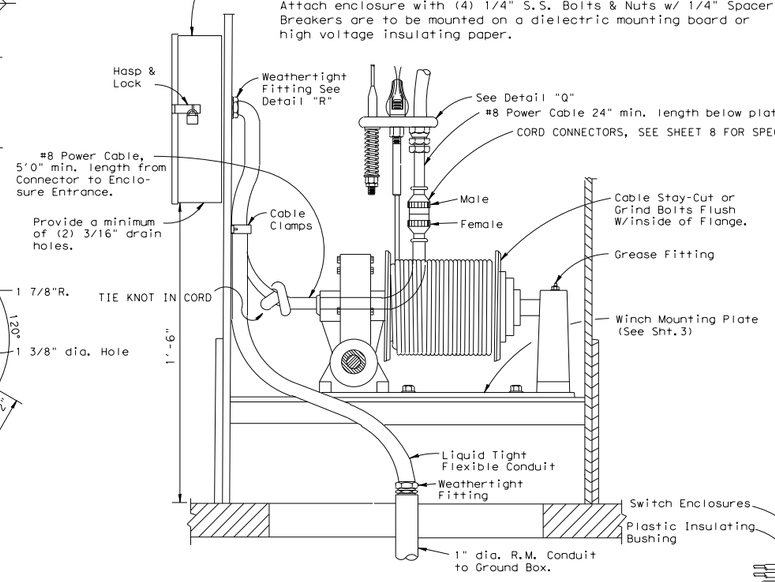


VIEW "M-M"

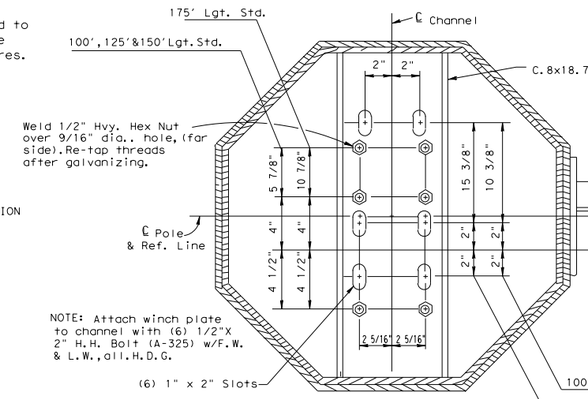


PLAN VIEW

50 A 480V. Circuit Breaker, NEMA 4 for total lamp watts exceeding 9000, 30A, 480V. Circuit Breaker, NEMA 4 for 9000 or less total lamp watts. Enclosure shall be stainless steel, 14 ga., weatherproof with full length vertical door hinge, welded hasp, lock and two sets of keys. Hinge pin shall be tack-welded to prevent removal. Lock(Master# 2195) and keys shall be furnished by the contractor and shall be the same type as used for the service enclosures. Enclosure dimensions shall be approx. 20" high x 9" wide x 5" deep. Attach enclosure with (4) 1/4" S.S. Bolts & Nuts w/ 1/4" Spacers Breakers are to be mounted on a dielectric mounting board or high voltage insulating paper.



SECTION J-J
(WINCH ASSEMBLY)



DETAIL "P"
(WINCH MOUNTING CHANNEL)
Dimensions may vary-Verify with winch manufacturer.

NOTE:
The drive train of the Power Drive Assembly between the driving motor and the winch shall be within two degrees of perfect alignment.

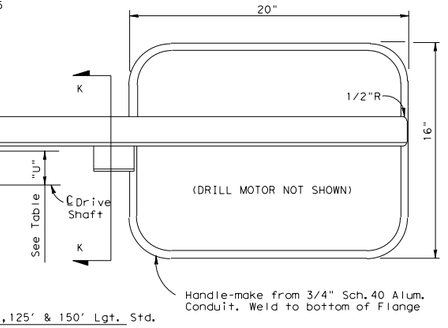
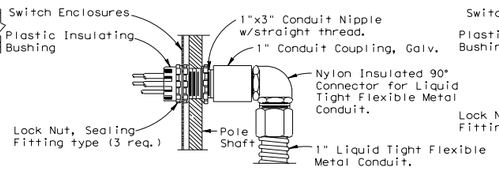
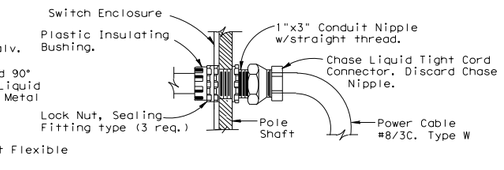


TABLE OF "U" DIMENSIONS

Pole Ht. Ft.	8 Sided 80 MPH	8 Sided 100 MPH	12 Sided 80 MPH	12 Sided 100 MPH
100	3 1/2"	3 1/2"	2 1/2"	2 1/2"
125	3 1/2"	3 1/2"	2 1/2"	2 1/2"
150	3 1/2"	3 1/2"	2 1/2"	2 1/2"
175	4 1/2"	4 1/2"	3 1/2"	3 1/2"

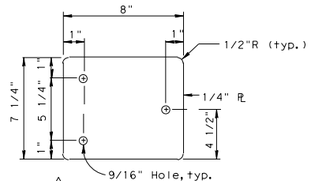


(POWER FEED FROM GROUND BOX)

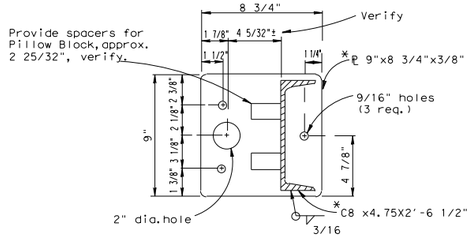


(POWER OUT TO LIGHT RING)

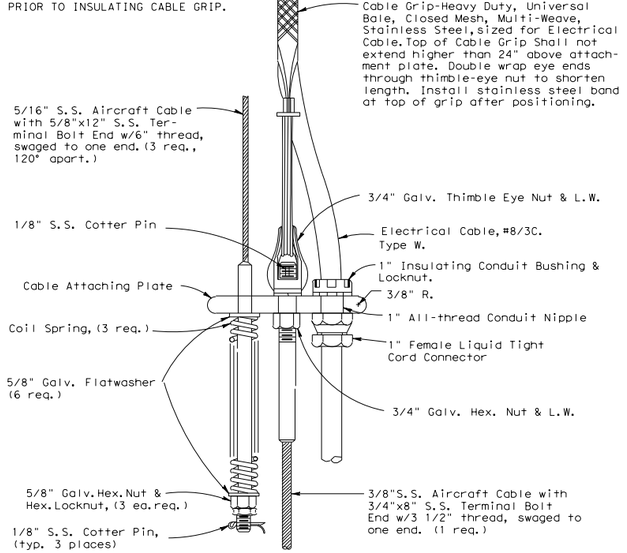
DETAIL "R"
ENCLOSURE ENTRANCES



DETAIL "S"
(WINCH DRIVE ACCESS COVER)

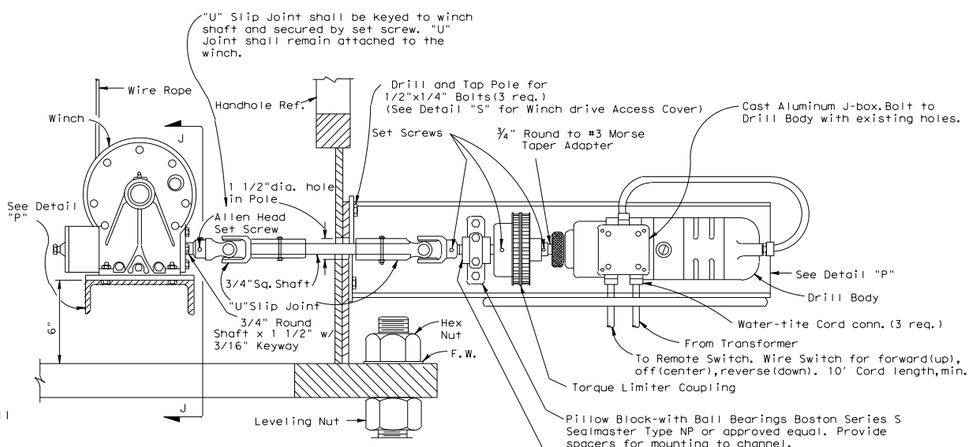


SECTION K-K
(DRILL MOTOR MOUNTING PLATE)
* Make from 6061-T6 Aluminum



DETAIL "Q"
(CABLE ATTACHING PLATE)

NOTE: 3/8"Cable for this Project shall be 19x7 Rotation Resistant per Sheet 9.



POWER DRIVE ASSEMBLY

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID(4)-03

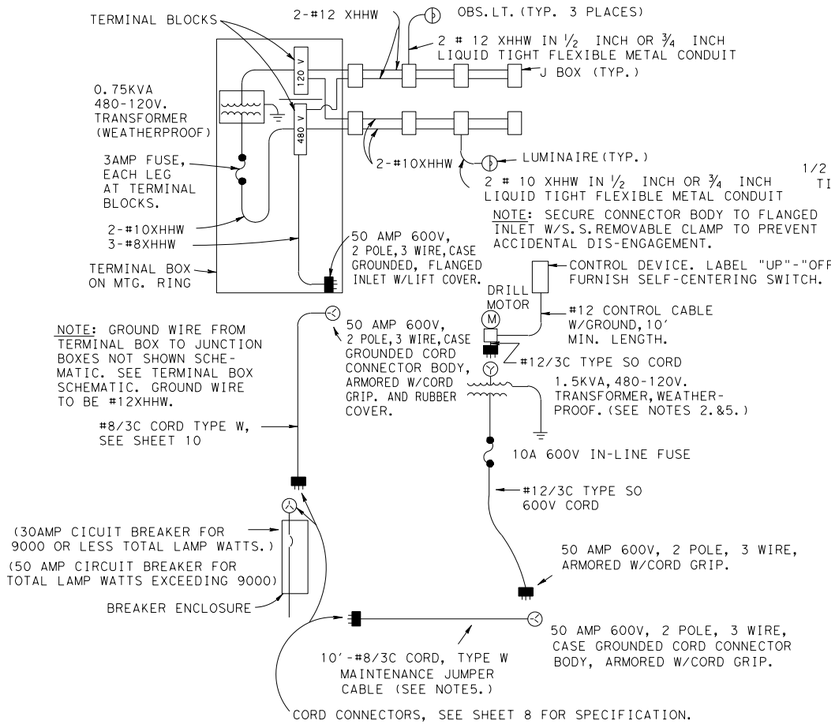
REVISIONS
4-86
5-86 12-87 4-96
12-3-86 4-89
12-8-86 10-93

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

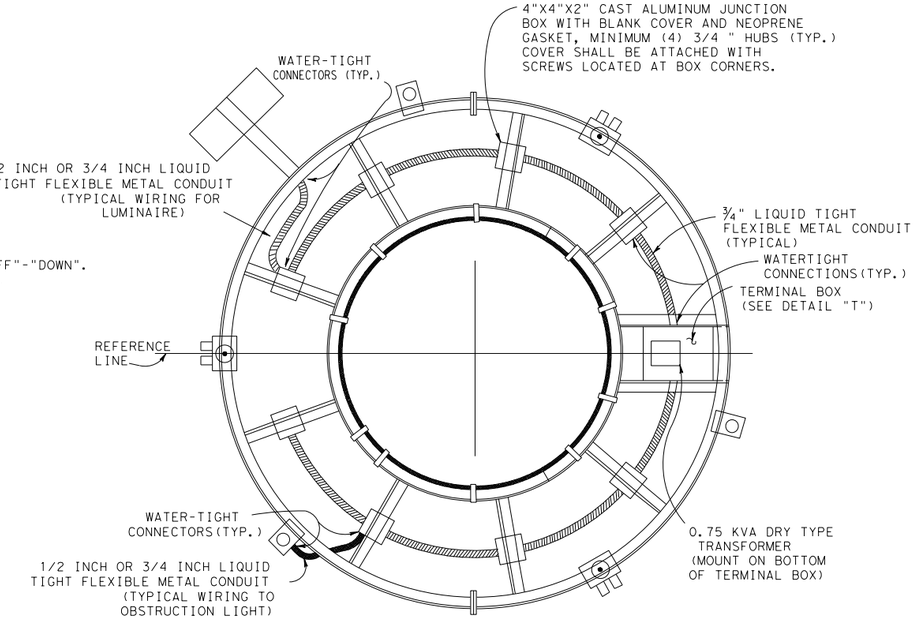
CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	148

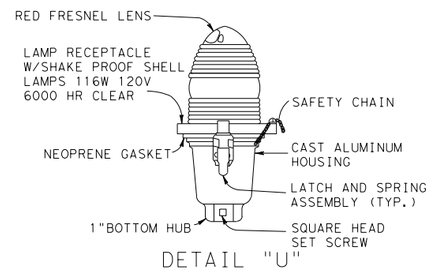
76D



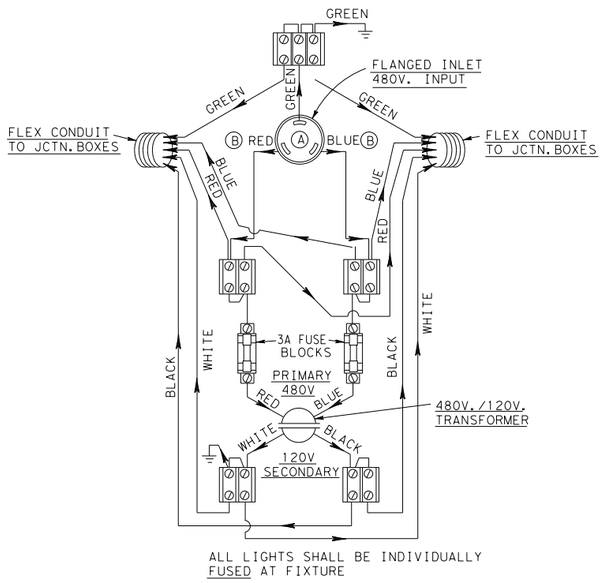
ONE-LINE SCHEMATIC



LIGHT MOUNTING RING

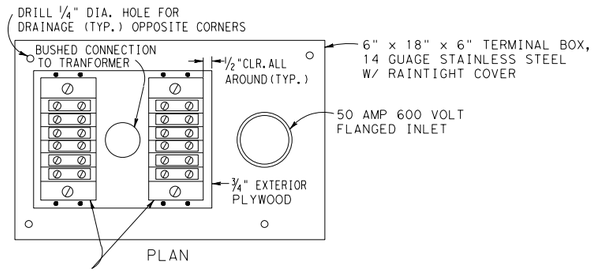


DETAIL "U"
(OBSTRUCTION LIGHT)



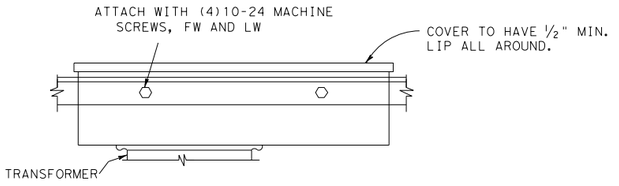
TERMINAL BOX SCHEMATIC

NOTES:
1. OBSTRUCTION LIGHTS COLOR CODE: FROM SECONDARY SIDE OF TRANSFORMER THROUGH-OUT-CIRCUIT TO SOCKET, WHITE-NEUTRAL, BLACK-LOAD.
2. POWER SUPPLY CORD TO FLANGED INLET: GREEN-GROUND, WHITE LINE, BLACK LINE. FROM FLANGED INLET (A) TO TERMINAL BLOCKS: GREEN-GROUND, RED LINE, BLUE-LINE. FROM THERE ON ALL 480V. CIRCUIT WIRES TO BE RED AND BLUE TO JUNCTION BOXES.
3. WIRE SIZE FROM POWER SUPPLY TO TERMINAL BLOCKS SHALL BE #8 AWG-SEE (B).
4. WIRE SIZE FROM TERMINAL BLOCKS TO JUNCTION BOXES SHALL BE #12 AWG.
5. MOUNT TERMINAL BLOCKS ON 3/4" EXTERIOR GRADE PLYWOOD.
6. FOR 2-WIRE, 480V. SERVICE, OMIT FUSE IN GROUNDED CONDUCTOR IN LEADS TO TRANSFORMER.



PLAN

600 VOLT TERMINAL BLOCKS



DETAIL "T"
(TERMINAL BOX)

NOTES:

1. PLUGS, CONNECTOR BODIES AND FLANGED INLETS AT CORD TO RING CONNECTION SHALL BE "TWIST LOCK" TYPE, 3-PRONG, RATED 50 AMPS AT 600V, AND 20 AMPS FOR 120 V. 50 AMP CONNECTORS SHALL BE 3 WIRE CASE GROUNDED, ARMORED, WITH CORD GRIP, 20 AMP CONNECTOR SHALL BE 3 WIRE GROUNDING WITH CORD GRIP, NEMA TYPE L5-20.
2. PROVIDE HANDLE ON 1.5KVA TRANSFORMER FOR PORTABILITY. (SEE ONE-LINE SCHEMATIC)
3. CIRCUIT BREAKERS SHALL BE ITE #E43B030 OR #E43B050, SQUARE "D" #FAL24030 S/N OR #FAL24050 S/N, OR EQUAL.
4. CONDUIT ENTRIES INTO TERMINAL BOX SHALL BE INTO THE SIDE OF THE BOX.
5. A MINIMUM OF ONE (1) MAINTENANCE JUMPER CABLE SHALL BE SUPPLIED FOR EACH PROJECT. SUPPLY ONE (1) PORTABLE TRANSFORMER FOR EACH POWER DRIVE UNIT REQUIRED FOR PROJECT.

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

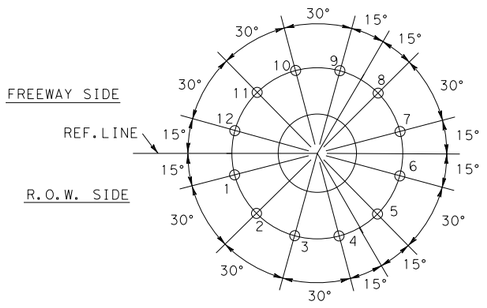
HMID(5)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
6-87
11-87
10-88
10-93
4-96

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30
DIST	COUNTY		SHEET NO.
ATL	TITUS		149

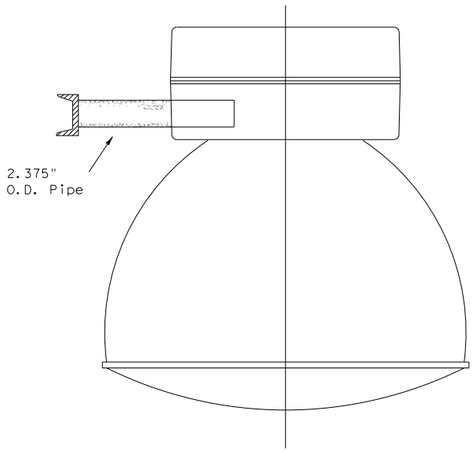
DATE: 10/14/2022 2:50:00 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmid-03.dgn



12-LIGHT SETTING

LUMINAIRE LOCATIONS

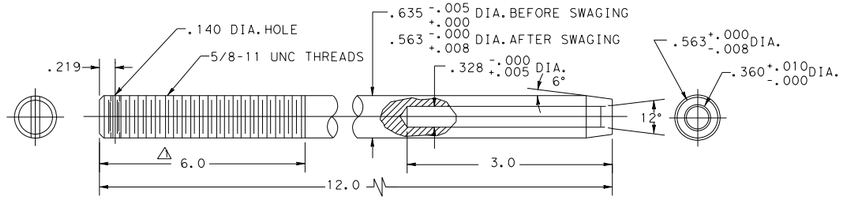
NOTE: AIRCRAFT OBSTRUCTION LIGHT LOCATIONS NOT SHOWN. THREE ARE REQUIRED LOCATED APPROX. 120° APART. LOCATIONS WILL VARY DEPENDENT ON THE LIGHT SETTING USED.



AREALIGHT MOUNTING ASSEMBLY
(SYMMETRIC AND ASYMMETRIC)

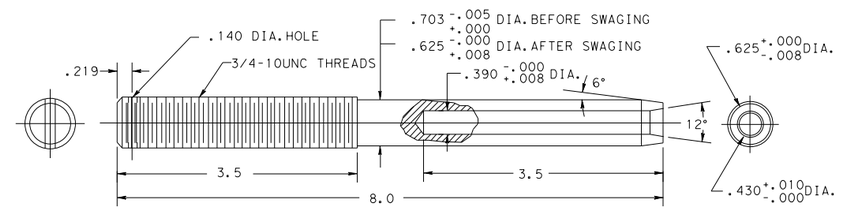
NOTES: IF ASYMMETRIC FIXTURES ARE USED, THE REFRACTORS SHALL BE ORIENTED TO PROPERLY ILLUMINATE THE ADJACENT ROADWAYS. ORIENTION SHALL BE AS SHOWN IN PLANS.

NOTE: MIN. SWAGE LENGTH = 2.06
MAX. SWAGE LENGTH = 2.94



TERMINAL FOR 5/16" WIRE ROPE
MATERIAL: STAINLESS STEEL, TYPE 303SE OR 304
WITH 115,000 P.S.I. MAX. ULTIMATE TENSILE STRENGH.

NOTE: MIN. SWAGE LENGTH = 3.12
MAX. SWAGE LENGTH = 3.44



TERMINAL FOR 3/8" WIRE ROPE
MATERIAL: STAINLESS STEEL, TYPE 303SE OR 304
WITH 115,000 P.S.I. MAX. ULTIMATE TENSILE STRENGH.

GENERAL NOTES:

1. AFTER FINAL AIMING HAS BEEN COMPLETED AND APPROVED BY THE ENGINEER, FIXTURES MUST BE LOCKED IN POSITION. CONTRACTOR MUST SUBMIT PROPOSED LOCKING SCHEME WITH THE FIXTURE SUBMITTAL. (FLOODLIGHTS ONLY).

3/03 Revision

⚠1 Removed obsolete diagrams and updated drawings.

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID(6)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
10-93
10-95
4-96
3-03

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	150

76F

DATE: 10/14/2022 2:50:01 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmid-03.dgn

DATE: 10/14/2022 2:50:01 PM
FILE: P:\116135.04\Design\Civil\Standards\Illumination\hmid-03.dgn

1. AREA LIGHTING (Bid under Item 614, "High Mast Illumination Assemblies")

A. Area lighting shall be symmetric or asymmetric, as shown on the descriptive code. The number and wattage of the fixtures on each pole shall be as shown on the lighting layouts. The lighting pattern for symmetric fixtures shall be IES Type V; for asymmetric fixtures, it shall be IES Type II, III, or IV.

B. All luminaires shall be pre-qualified before installation. A sample of each type of luminaire to be considered for pre-qualification shall be submitted to TXDOT's Traffic Operations Division - Traffic Engineering Section (TRF-TE).

Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, TX 78701-2483

Sample luminaires are non-returnable. A list of pre-qualified luminaires may be obtained by contacting TRF-TE. In addition, luminaires will be sampled and tested in accordance with Item 614. Luminaires that inconsistently pass testing or that are inconsistent with published photometric information will be removed from the pre-qualified list at the discretion of the Engineer. Once a fixture has been approved, no changes shall be made in any material or manufacturing methods without prior approval of the Department. Unapproved changes will result in rejection of all fixtures.

C. Symmetric and Asymmetric fixtures shall meet the following requirements unless otherwise approved by the Engineer:

1. Luminaire Construction

a) The luminaire housing shall be formed, cast or drawn from low copper aluminum and shall be free of cracks and excessive porosity. Formed aluminum shall have a minimum thickness of 0.090, and shall have all seams welded. The minimum thickness of cast parts shall be as approved by the Engineer. Nuts, screws, and washers shall be made of Type 316 stainless steel. The housing shall be marked with minimum 2" letters to indicate the photometric type as being either A, B, C, or S as specified. Marking shall be permanent and shall be by stencil or stick on labels similar to "wattage" label on cobra heads. Wattage label will not be required on high mast fixtures. The fixture housing shall be constructed separate from the fixture reflector.

b) Fixtures shall be natural aluminum in color or shall be painted gray.

c) The slipfitter shall securely attach the luminaire to the tenon on the ring assembly with a minimum of 2 bolts and clamp. A positive means of vertical adjustment shall be provided.

d) For optical assemblies with lenses, reflectors shall be polished aluminum with Alzak or equal coating and shall not be painted. The optic assembly shall be sealed. The lens shall be tempered glass or prismatic glass, either flat or sag. The optic assembly shall be provided with a resilient seamless or sonically welded silicone rubber gasket, and constructed so that a positive seal against weather and other contaminants will be maintained. The latches shall be stainless steel, spring loaded, and hand operated (2 latches minimum, 3 attachment points),and shall provide a positive means of maintaining closure of the luminaire.

e) For optical assemblies without lenses, optical assembly shall consist of an open ventilated borosilicate glass reflector. The reflecting prisms shall be protected from dirt depreciation by a spun on hermetically sealed aluminum cover. There shall be no glass lens/refractor on this optical assembly.

f) Asymmetric fixtures shall have field rotatable optics with accurate degree of rotation markings. Reflector shall have "house side" and "street side" markings.

g) The socket shell shall be nickel plated and shall be rigidly attached to a high grade porcelain mogul base, which shall extend and enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp. This locking means shall be a spring loaded center tip. Lamp socket shall be non-adjustable and shall be riveted, welded, or otherwise permanently installed. Lamps shall be held securely in the proper position with a lamp support.

h) The terminal block shall use nickel plated brass connectors.

i) Fixture weight including ballast shall not exceed 80 pounds, and effective projected area (EPA) shall not exceed 2.62 square feet.

j) The Contractor may be responsible for fixture testing costs. See TXDOT's "Manual of Testing Procedures," Chapter 11 - "Traffic Systems and Illumination," TEX-1110-T - "Sampling Lighting Assemblies," at http://manuals.dot.state.tx.us/dynaweb/.

2. Photometrics

a) The Contractor shall submit a computer generated light level array of the area to be lighted by high mast poles. All computer generated arrays shall have 400 watt fixtures derated to 40,000 lumens per lamp.

b) The Type "A" 400 watt asymmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

(1) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 340 ft. by 50 ft., the fixture shall pass the following tests:

(a) The fixture shall provide a measured minimum intensity of 0.15 horizontal foot-candles at any point on the surface of this area.

(b) The fixture shall provide a measured maximum to minimum light ratio, based on horizontal foot-candles, of less than 25.

(c) The fixture shall provide an average measured intensity of 0.6 horizontal foot-candles on the surface area.

(2) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 260 ft. by 30 ft., the fixture shall provide a measured minimum intensity of 0.30 horizontal foot-candles at any point on the surface of this area.

c) The Type "B" 400 watt asymmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

(1) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 260 ft. by 65 ft., the fixture shall pass the following tests:

(a) The fixture shall provide a measured minimum intensity of 0.15 horizontal foot-candles at any point on the surface of this area.

(b) The fixture shall provide a measured maximum to minimum light ratio, based on horizontal foot-candles, of less than 25.

(c) The fixture shall provide an average measured intensity of 0.6 horizontal foot-candles on the surface area.

(2) When mounted in the level position, 50 ft. above the midpoint and 20 ft outside of either long side of a rectangular area measuring 200 ft. by 40 ft., the fixture shall provide a measured minimum intensity of 0.30 horizontal foot-candles at any point on the surface of this area.

d) The Type "C" 400 watt asymmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

(1) When mounted in the level position, 50 ft. above the midpoint and 20 ft. outside of either long side of a rectangular area measuring 220 ft. by 80 ft., the fixture shall pass the following tests:

(a) The fixture shall provide a measured minimum intensity of 0.15 horizontal foot-candles at any point on the surface of this area.

(b) The fixture shall provide a measured maximum to minimum light ratio, based on horizontal foot-candles, of less than 25.

(c) The fixture shall provide an average measured intensity of 0.6 horizontal foot-candles on the surface area.

(2) When mounted in the level position, 50 ft. above the midpoint and 20 ft. outside of either long side of a rectangular area measuring 160 ft. by 50 ft., the fixture shall provide a measured minimum intensity of 0.30 horizontal foot-candles at any point on the surface of this area.

e) The Type "S" 400 watt Symmetric fixture shall be IES cutoff. The Department will use the measured photometric data of sampled fixtures to run the following tests on a computer simulation:

(1) When mounted in the level position at 50 foot mounting height, the fixture shall provide the minimum light levels as shown below:

(a) 0.15 horizontal foot-candles within a 130 foot radius.

(b) 0.30 horizontal foot-candles within a 100 foot radius.

(c) 0.50 horizontal foot-candles within a 60 foot radius.

3. Ballasts

a) All ballasts shall be isolated-winding lag-type magnetic regulators designed to operate 400 watt high pressure sodium lamps rated 480 volts. Ballasts shall be capable of starting lamps at an ambient temperature of -20 degrees F. Ballast wiring shall include a grounding terminal bonded to metal housing. Ballasts shall be fused with a 5 amp time-delay fuse in an insulated fuse holder. Fuse holders shall be internal to the housing. Ballast wiring to the terminal board shall be through a quick-disconnect plug. Windings shall be made from copper wire.

b) When the circuit voltage indicated on the plans is applied, the ballast input wattage during fluctuations of the test voltage of +10% and -10% shall not exceed 552 watts for a 400 watt HPS lamp.

3/03 Revision

⚠1 Revised Area Lighting Requirements

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID(7)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
9-91
10-93
4-96
3-03

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	151

76G

DATE: 10/14/2022 2:50:02 PM
FILE: P:\116735\04\Design\Civil\Standards\Illumination\hmid-03.dgn

c) During fluctuation of the line voltage of +10% or -10%, the lamp wattage fluctuation shall not exceed a total of 20%. Ballast shall maintain lamp wattage between 280 and 475 watts for a 400 watt HPS lamp.

d) The power factor of any ballast when tested at the circuit voltage indicated in the plans shall not be less than 90% at any point in life. Ballast factor shall be between .95 and 1.0.

e) The electronic starting aid shall provide a starting pulse with an amplitude of 2500 volts minimum, 4000 volts maximum. The pulse width shall be a minimum of 0.8 microseconds at 2250 volts. The pulse shall occur when the open-circuit voltage is equal to or greater than 90 percent of peak open-circuit voltage. Pulse repetition rate shall be a minimum of one per cycle and pulse current shall be a minimum of 0.18 amperes. Electronic starting aids shall be replaceable without the use of tools. The starting aid shall discontinue to pulse when the lamp starts. Starter shall sense an inoperative or missing HPS lamp and automatically shut down luminaire to protect ballast after 10 minutes.

f) Ballasts shall permanently and clearly indicate the following: lamp type, catalog number, voltage rating, connection diagram, and manufacturer. Capacitors in all luminaires shall be non-PCB type.

4. Lamps

a) All lamps shall be new and of recent manufacture.

b) Lamps shall be high pressure sodium and shall meet ANSI C78 requirements. Lamps shall be the type that extinguish at the end of usable lamp life and remain extinguished without cycling. 400 watt lamps shall contain less than 4.0 mg of mercury. Lamps shall be lead free and shall pass the Federal Toxic Characteristic Leachate Procedure (TCLP). Lamp shall be Osram-Sylvania LU400/Eco Plus. No alternatives will be approved.

c) 400 watt high pressure sodium lamps shall have average initial lumens of 50000 and average rated life of 24000 hours.

1 2. GENERAL

A. All material shall be in accordance with the applicable sections of the NEC. All conduit and conductors shall be in accordance with the materials and construction methods requirements of Items 618 and 620. Heat shrink tubing for use with cable grips and cable splicing shall meet the requirements of Item 620.

B. Where stainless steel bands are called for on the HMID sheets, stainless steel hose clamps may be provided. Stainless steel bands and stainless steel hose clamps shall be provided with stainless steel clips or stainless steel screws.

C. Obstruction Lights

1. When obstruction lights are required by layout sheets, summary sheets or general notes, the entire high mast assembly shall be controlled by an FAA approved photocell mounted inside the service enclosure. Ring mounted luminaires shall be controlled by up to 4 additional ring mounted photocells, with each photocell controlling up to 3 fixtures. Photocells shall meet the following requirements:

a) All photocells shall consist of a photoelectric cell, an internal lightning arrestor, and a relay or bimetallic switch mounted inside a weather proof enclosure with standard 3-prong twist lock photocell plug and receptacle. The enclosure shall be made of poly-acrylic with clear acrylic window. Enclosure chassis shall be molded thermosetting plastic. The photocell shall have an arrestor rated 2.0kV sparkover with 5000 amps follow-through. Relay or switch shall be time delay type with normally closed contacts. Photocell shall be rated a minimum of 1800 VA.

b) Service enclosure mounted photocell (FAA photocell) shall turn on at light levels below 35 foot-candles and off at levels above 58 foot-candles, in accordance with FAA requirements. This photocell shall be rated for operation at 240 volts. A permanent placard shall be installed on the inside of the service enclosure door to indicate that an FAA approved photocell is required.

c) High mast assembly ring mounted photocells (one foot-candle photocells) shall turn on at light levels below 1.0 (plus or minus 0.5) foot-candle, and shall turn off at 2 foot-candles higher than this level. These photocells shall be rated for operation at 480 volts. Photocells shall be mounted upright on the terminal box or on various junction boxes around the ring as approved by the Engineer. Conduit entries shall not be made into the top of the terminal box or junction boxes. The Contractor shall submit mounting details to the Engineer for approval.

2. When obstruction lights are not required, eliminate the 3 obstruction light fixtures, 3 mounting posts, 480/120 volt transformer, 120 volt wiring, and 3 mounting post support connections shown on detail "E", sheet 1.

D. The male cord connector on the lower end of the Type W cord running up the pole, the female cord connector for the Type W cord running to the circuit breaker enclosure and the male connector on the maintenance jumper shall meet the following or approved equal specifications:

1. Arrow Hart pin and sleeve watertight connectors UL listed, catalog numbers AH330C7W and AH330P6W.

2. Bryant watertight pin and sleeve connectors UL listed, catalog numbers 330C6W and 330P6W.

3. Hubble pin and sleeve connectors UL listed, catalog numbers HBL330C7W and HBL 330P7W.

4. The male connector for use with the Type W maintenance jumper shall be a pin and sleeve connector of one of the above types. The Contractor shall attach a 50 amp twist lock receptacle to the opposite end of the maintenance jumper to match the flange mounted plug on the ring and the portable transformer.

5. The Contractor shall make a brochure submittal on the cord connectors.

E. When shown on the plans, spill light shall be restricted to less than 0.15 horizontal footcandles.

F. The Contractor shall provide shop drawings for high mast illumination assemblies in accordance with this Item and Item 441. An Engineer licensed in the State of Texas shall seal the shop drawings.

3. TESTING

A. Fixtures, lamps and ballasts will be sampled and tested in accordance with the Department "Manual of Testing Procedures" except as noted in these specifications.

B. Ballasts and fixtures will be tested using a reference lamp.

C. The Department will bear the cost of all testing of equipment that complies with the specification requirements. However, the source of supply of fixtures and ballasts must be approved as required in Article 6.1 of the Standard Specifications. Such approval will be contingent on the supplier agreeing to bear the cost of testing any equipment that fails to comply with the specification requirements listed in this specification.

D. All other equipment will be tested in accordance with Item 614 of the Standard Specifications and Materials and Test Division Test Standards.

E. After High Mast Assembly has been completely assembled, the Engineer may require Contractor to fully lower and raise each high mast ring one time to demonstrate proper operation of the lowering mechanism, or may require the ring to be lowered for ring or fixture inspection. If any malfunction occurs, the problem shall be corrected at the Contractor's expense and the lowering test will be repeated.

4. MOUNTING RING AND SUPPORT ASSEMBLY

A. Ring and support assembly shall be fabricated from steel having a minimum yield strength of 36 KSI.

B. Cover assemblies, fittings and miscellaneous parts shall be as outlined on the plans.

C. All hardware shall be hot-dipped galvanized per ASTM A153 or shall be stainless steel, unless noted otherwise on the plans.

5. WINCH

A. Housing shall be high tensile strength die-cast silicon aluminum. Cable drum shall be fabricated from seamless steel tubing with stamped steel flanges and shall be hot-dipped galvanized. Drum shall have a minimum diameter of 4.5 inches. Drum shall be keyed to drum shaft. Drum and flanges shall be sized so that, when the fixture mounting ring is in the raised position, the cable including one full layer will fill the drum to no more than two-thirds of full capacity. Drum shaft shall be ground from stainless steel and mounted on lubricated bronze bearings with seals. Wormgear shall be made of nickel-bronze and worm shaft shall be high-strength stress-proofed steel, ground and polished and supported by tapered roller bearings.

B. Gear ratio shall be 36:1 with safe hoisting capacity of not less than 4000 pounds.

C. Winch shall incorporate adjustable automatic brake to assure positive load suspension. Brake shall be multiple disc with friction plates running in oil bath and one-direction clutch which operates only when load is suspended or lowered. Winch shall not have throw-out clutch.

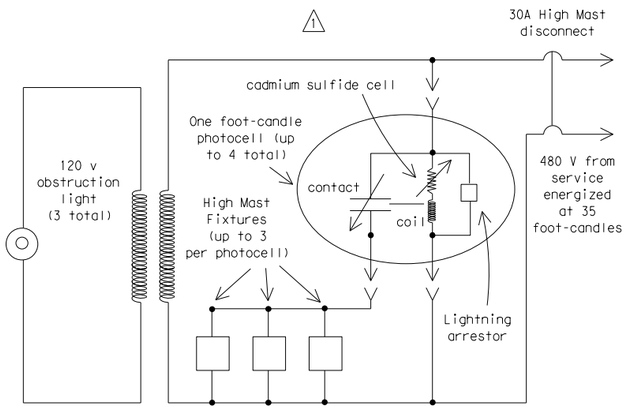
D. Any winch that is operated without oil shall be considered damaged and shall be replace by the contractor at the contractor's expense.

2 6. WIRE ROPE AND TERMINALS

A. 5/16 and 3/8 wire rope shall be 19x7 Rotation Resistant IWRC stainless steel. 19x7 rotation resistant wire rope shall meet the construction requirements of Fed. Spec. RR-W-410D, Type IV, class 2, modified for stainless steel with a nominal breaking strength of 11,100 lbs. All wire rope shall be pre-formed and factory lubricated. Wire rope shall meet the requirements of the applicable specification except where modified by this specification. Quality Assurance testing shall be the responsibility of the manufacturer and shall meet recognized wire rope industry standards. No special tensile or torsion testing will be required. Mill Test Reports shall be furnished.

B. Winch cable shall be of sufficient length to leave a minimum of one full layer of cable on the drum when the fixture mounting ring is in the full down position.

C. Wire rope terminals shall be stainless steel, solid stud type as shown on Sheet 7. All terminals shall be drilled for cotter pin. Material to be 303 SE or 304 stainless steel with a maximum tensile strength of 115,000 p.s.i. Mill Test Reports shall be furnished.



One foot-candle photocell keeps High Mast fixtures
off when FAA photocell energizes
circuit at 35 foot-candles. Fixtures
come on when sun goes down at 1 foot-candle.

One Foot-candle Photocell Schematic

Use on ring when obstruction lights are installed
and FAA photocell is installed in electrical service.

3/03 Revision

1 Revised General requirements; add diagram

2 Revised Wire Rope and Terminals

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID(8)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS: 4-89, 10-93, 4-96, 3-03

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	152

DATE: 10/14/2022 2:50:02 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmid-03.dgn

D. All terminals shall be proof-tested by the manufacturer to 40% of rated strength of the wire rope. Each terminal shall be identified by manufacturer's logo permanently incised on terminal. Manufacturer shall furnish certification of tests. Contractor shall also furnish one sample of each size of terminal with 5 ft. of wire rope for load tests by the State. Samples tested must withstand test load not less than 100% of rated breaking strength of wire rope. If sample fails test, all terminals of same size will be rejected.

E. Wire rope shall be delivered from the manufacturer on a reel.

7. SPRINGS

A. Provide three steel springs as shown on plans.

B. Springs shall have an uncompressed length of approximately 8 inches and shall compress 3 inches under 700-pound load.

C. Springs shall contain approximately 19 total coils with ID of 0.875 and OD of 1.375 inches. Ends shall be closed and ground. Springs shall be zinc-plated.

D. Springs shall be made from 1/4" diameter oil-tempered MB Steel treated for overstress. Springs shall not develop permanent set from 3-inch compression.

8. ELECTRICAL POWER CABLE

A. Power cable shall be No. 8 AWG three-conductor round Type W, rated 90 degrees C, 600 volt or 2000 volt. Each conductor shall be tinned copper and shall consist of 133 strands. Insulation shall be ethylene propylene rubber. Jacket shall be chlorosulfonated polyethylene (CSPE), with glass fiber or nylon reinforcing mesh between two layers of CSPE. Nominal diameter shall be 0.91". Filler shall be rubber compound or other approved non-hygroscopic compound. Jacket shall be Hypalon Power Flex 90, with no substitutions allowed.

9. POWER DRIVE ASSEMBLY (ONE ONLY THIS CONTRACT UNLESS OTHERWISE SHOWN ELSEWHERE ON THE PLANS)

A. Drive Motor

1. Drive motor shall be 1-1/4" heavy-duty reversible portable electric drill modified as shown on plans.

2. Shall have a minimum of 6 radial ball bearings, one thrust bearing, and one needle bearing.

3. Shall have No. 3 Morse Taper socket.

4. Shall be designed for 115 volt 60 Hertz single phase operation 250 RPM at no load.

5. Shall be designed for continuous rated duty of 160 RPM and 15 amperes at 115 volts with delivery of 33-pound-feet of torque. Drill motor to be operated only at low speed range. (i.e. 150 to 160 RPM)

6. Shall develop 240 pound-feet of torque at stalled rotor condition.

B. Torque Limiter Coupling

1. Torque limiter coupling shall consist of standard torque limiter with Type A sprocket center member coupled to a Type B sprocket by an ASA double strand roller chain. Type A sprocket shall be chrome-plated.

2. Coupling shall have torque capacity minimum of 15 pound-feet and a maximum of 55 pound-feet.

3. Limiter section of coupling shall consist of integral hub and pressure plate, two friction facings, sintered iron bushing, pilot plate, disk spring, lock washer and hex adjustment nut. All major components except spring and friction facings shall be cadmium-plated with dichromate treatment.

4. Type A center sprocket shall have ground face (63 micro-inch) and shall be run-in for 4 minutes at approximately 60 RPM at a torque setting 70% to 80% of spring rating. Contractor shall provide written certification that run-in has been accomplished.

5. The torque limiter coupling shall, after run-in, be set to a torque limit of 35 pound-feet or as directed by the Engineer. The proper setting of the coupling shall be demonstrated to the Engineer.

C. Universal Joints

1. Shall be slip-type with 4-inch barrel. A grease fitting shall be so located in the spider that all caps and needle bearings may be adequately serviced. The assembly shall be disassembled and zinc-plated, then reassembled and properly lubricated.

2. Shall have a minimum torque rating of 1270 inch-pounds at 200 RPM.

3. Shall have set screw and keyed coupling as shown on plans.

⚠1

10. CONSTRUCTION METHODS

A. Fabrication

1. Fabrication and welding shall be in accordance with Item 441, "Steel Structures".

2. All holes supporting pulley shafts shall be drilled (not punched) prior to galvanizing.

3. All component parts shall be galvanized where galvanizing is applicable, after fabrication.

4. Galvanizing on all parts which have become scratched, chipped or otherwise damaged shall be thoroughly cleaned and the cleaned area painted with two coats of zinc dust-zinc oxide paint conforming to the requirements of repair compounds meeting Federal Specification TT-P-641 b.

5. Mounting rings and ring support assemblies shall be fabricated with the use of jigs that have been inspected and approved by Material and Test Division personnel prior to their usage.

6. The fabricator shall submit his proposed welding procedures in accordance with Item 441, "Steel Structures".

B. Installing Wire Rope

1. Extreme care shall be used to prevent wire rope from kinking, nicking, or from sustaining other damage during installation. Rope shall not be installed by pulling from flat coil, but shall be carefully unrolled its full length or placed on a horizontal axis and unreeled according to wire rope industry standards.

2. For right lay rope, the rope shall be attached to the drum on the end opposite the winch gear train, and wound on drum so that the free end of the rope comes off the backside of the drum during normal operation of the winch. Rope must be unreeled carefully as stated above. Care must be taken to insure that all layers lay full and tight on drum.

3. Installation of all wire rope shall be accomplished only under direct supervision of the Engineer or his authorized representative. Contractor shall not remove wire rope from manufacturer's reel until authorized by the Engineer. Installation of wire rope on winch shall be in accordance with the above and accepted industry practice. Installation of the three hoist cables shall be made from the top end of the pole and as directed by the Engineer or his representative.

C. Installing Wire Rope Clips

1. Turn back approx. 2' 3" of rope, measured from the top of thimble. Apply seizing to pigtail end of wire rope prior to cutting to length. See detail "K", Sheet 3. Apply first clip approx. 3" from the dead end of the wire rope with U-bolt over dead end and live end in clip saddle. Tighten nuts evenly to 30 pound-feet of torque, or as recommended by manufacturer.

2. Install second clip as near loop as possible, take out slack and torque nuts evenly to 30 pound-feet or as recommended by manufacturer.

3. After final erection and assembly of the pole and high mast assembly, retighten nuts to required torque.

D. Installing Light Ring and Luminaires

1. Prior to mounting luminaires to the light ring, Contractor shall ensure the ring is level. Luminaires shall be mounted level on the light ring. Luminaires shall be oriented as shown on plans.

3/03 Revision

⚠1 Revised Construction Methods.

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION DETAILS

HMID(9)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS: 10-93, 10-95, 4-96, 3-03

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	153

761

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

DATE: 10/14/2022 2:50:04 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmip-16.dgn

℄ 4 Permissible 1" Dia assembly holes 180° apart. (Typ each splice)

4 additional 1" Dia holes are permissable 12" from assembly holes

6" Min
12" Max

12"

12"

SPLICE DETAIL

7/8" Dia Holes equally spaced on 15" Dia Bolt Circle

85 Percent Minimum Penetration

3/4"

3/8"

HM-6

7 1/4" Dia

Match Mark

Reference Line

VIEW C

8"

1/4" Plate

1"

5 1/4"

1"

3 1/2"

7 1/4"

1"

6"

1"

Provide 3~ 1/2" Dia x1 1/4" bolts

WINCH DRIVE ACCESS COVER

Reference Line

O.D. of Base Plate

Match marks

C 8x18.75 for mounting winch (See Detail)

VIEW E (2 opposite corners)

℄ 2 ~ 1 3/8" Dia holes 24" above Base Plate

2 3/4" Dia Bolt Holes equally spaced on Bolt circle

℄ Pole

2"

2"

I.D. Base Plate

T

Galvanizing drain slots are not permitted in base plate. Drain to small end.

SECTION A-A

℄ Winch Drive

Reference Line

U

Cut channel to fit for 100' & 125' 12 Sided Poles

4 1/2" 4" 5 7/8", 100',125' & 150' Poles

10 7/8" 175' Pole

6 ~ 1/2" Heavy Hex Nuts welded under 9/16" Dia holes. Tap nuts after galvanizing.

2 5/16"

2 5/16"

℄ Channel

2"2"

6 ~ 1"x2" Slots 2"2" 10 3/8" 100',125' & 150' Poles

15 3/8" 175' Pole

WINCH MOUNTING CHANNEL

Reference Line

U

6 ~ 5/8"x1 1/4" Slots 4 1/2" 4" 5 7/8" 100',125' & 150' Poles

10 7/8" 175' Pole

2 1/2"

1 1/4"

2"2"2"

2 1/2"

1 1/4"

1 11/16"

8"

4 5/8"

2"

4"

2"

1 11/16"

1/2" Plate

6 ~ 9/16" Dia holes 2"2" 10 3/8" 100',125' & 150' Poles

15 3/8" 175' Pole

WINCH MOUNTING PLATE

G

HM-9

G

S

A bent and welded handhole frame is permissable. Heating, bending, and finish grinding must be approved with the HM-9 weld procedure.

OPTIONAL HANDHOLE FRAME

Nominal Pole Height

Taper 0.1600 in/ft(for 80 MPH) and 0.1900 in/ft(for 100 MPH)

Splice Length

A
B
C
D
E
F

8 SIDED

Taper 0.1750 in/ft(for 80 MPH) and 0.1850 in/ft(for 100 MPH)

VIEW C

A
B
C
D

Section Length

12 SIDED

POLE ELEVATIONS

(Showing 175 Ft Poles)

T

1/2"

Handhole Frame

HM-3

1/4

3/4x 3/8

1/4

HM-7

Winch Drive Access Cover

Tang

Channel

8"

6"

VIEW F

VIEW D

HM-8

3/8"

1/2"x2 1/2"x3 3/4" Tang, A36 Min, 1 1/4" R, 1 1/4" Dia chamfered hole. Place Tang on flat adjacent to handhole.

SECTION B-B

1'-0"

B

Access Cover to be 1/4" Plate

Drill and tap for 1/2"x1" cap screw (4 req'd)

A

Ground Sleeve

1/4" Typ

S

R=3 1/2"

A

1'-6"

Drill and Tap for 3 1/2" bolts.

1 1/2" Dia Hole

5 1/4"

5 5/16"

3"3"

8 7/8"

8 7/8"

1'-0"

1'-7"

See HMIF for Anchor Bolt Detail

3/8" U

6"

VIEW G

B

ELEV OF POLE BASE

3/8"

1/4

HM-1

t

t x 3/8

t

STANDARD WELD

1/4

Chip & Grind

OPTIONAL WELD STEP 1

(a) Prepare Shaft and ground sleeve.
(b) Weld shaft to base plate, chip and grind flush (1/8 " max radius.)

3/8"

1/4

HM-2

t

t x 3/8

t

OPTIONAL WELD STEP 2

(c) Positiion ground sleeve.
(d) Weld to base plate with tapered reinforcement.

VIEWS D

85% Minimum penetration

HM-5

Ground sleeve to be same thickness as lower pole section, except shall not be less than 0.375 inch

Provide 100% penetration in outer sections at splices and at base plates for 1.5 pole diameters plus 6". Also provide 100% penetration for ground sleeve seam welds.

VIEW E

t

HM-4

7/8x t

7/8"

VIEW F

℄ Winch Drive

1 3/8" Min

G

Provide welded and ground filler or cover plate where winch drive conflicts with bend line in ground sleeve for the 8 sided, 80 mph, 100' pole, the 12 sided, 100 mph, 100' pole, and the 12 sided, 80 mph, 175', 125' and 100' poles.

VIEW G

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

HIGH MAST ILLUMINATION POLES 100' - 125' - 150' - 175'

HMIP(1)-16

FILE: hmip-16.dgn	DN:	CK:	DW:	CK:
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
5-98 8-16	DIST	COUNTY		SHEET NO.
	ATL	TITUS		154

77A

DATE: 10/14/2022 2:50:04 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmip-16.dgn

TABLE OF VARIABLE POLE DIMENSIONS

	Ht (ft)	Section	8 SIDED POLE Diameter (Inches) Bottom	Top	Thickness (inches)	Length (feet)	Splice (inches)	12 SIDED POLE Diameter (Inches) Bottom	Top	Thickness (inches)	Length (feet)	Splice (inches)
80 MPH DESIGNS	175	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.42	32	32.625	23.583	.313	51.67	48
		D	25.375	20.948	.438	27.67	36	36.250	31.175	.375	29.00	~
		E	28.375	23.895	.500	28.00	41					
		F	31.250	26.703	.500	28.42	~					
	150	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.42	32	32.625	23.583	.313	51.67	~
		D	25.375	20.948	.438	27.67	36					
		E	28.375	23.895	.500	28.00	~					
	125	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.92	25	24.858	15.817	.313	51.67	36
		C	22.250	16.583	.375	35.67	32	28.250	23.583	.313	26.67	~
		D	25.375	20.948	.438	27.67	~					
	100	A	13.083	7.750	.250	33.33	19	16.792	7.750	.250	51.67	24
		B	17.792	12.205	.375	34.67	25	24.625	15.817	.313	50.33	~
		C	22.250	16.583	.375	35.67	~					
100 MPH DESIGNS	175	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	33.750	24.176	.438	51.75	49
		D	29.000	23.680	.500	28.00	42	37.375	31.995	.500	29.08	~
		E	32.625	27.210	.563	28.50	47					
		F	36.125	30.631	.563	28.92	~					
	150	A	14.208	7.875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	33.750	24.176	.438	51.75	~
		D	29.00	23.680	.500	28.00	42					
		E	32.625	27.210	.563	28.50	~					
	125	A	14.208	7.785	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.747	16.173	.438	51.75	37
		C	25.250	18.473	.438	35.67	36	29.125	24.176	,438	26.75	~
		D	29.00	23.680	.500	28.00	~					
	100	A	14.208	7,875	.313	33.33	20	17.433	7.875	.375	51.67	25
		B	19.792	13.142	.375	35.00	28	25.500	16.173	.375	50.42	~
		C	25.250	18.473	.438	35.67	~					

Diameters are measured across the flats.

TABLE OF VARIABLE BASE DIMENSIONS

	Ht (ft)	O.D. (inches)	I.D. (inches)	Bolt Cir (inches)	No. Bolts	S (inches)	T (inches)	U (inches)
	8 SIDED POLE							
80 MPH DESIGNS	175'	47	22	41	16	2.00	3.75	4.50
	150'	44	18	38	12	2.00	4.00	3.50
	125'	41	16	35	8	2.00	4.50	3.50
	100'	37	14	31	6	2.00	5.00	3.50
	12 SIDED POLE							
	175'	50	24	44	12	1.75	3.50	3.50
	150'	47	22	41	10	1.75	3.50	2.50
	125'	42	18	36	8	1.75	3.75	2.50
	100'	38	13	32	6	1.75	4.00	2.50
	8 SIDED POLE							
100 MPH DESIGNS	175'	52	27	46	20	1.75	3.50	4.50
	150'	49	23	43	16	1.75	4.00	3.50
	125'	45	21	39	12	1.75	4.50	3.50
	100'	40	17	34	10	1.75	4.50	3.50
	12 SIDED POLE							
	175'	52	27	46	16	1.75	3.25	3.50
	150'	50	25	44	12	1.75	3.50	2.50
	125'	46	22	40	10	1.75	3.75	2.50
	100'	42	19	36	6	1.75	4.00	2.50

NOTE: Base Plate may be round or with 8 or 12 equal segments matching the pole.

MATERIALS

Polygonal Shafts Ground Sleeves	ASTM A709 Grade 50 A572 Grade 50 (1) (2)
Base Plate and Handhole Frame	ASTM A709 Grade 50 A572 Grade 50 (1) A633 Grade C (1)
Miscellaneous Steel	ASTM A36 or equal

(1) ASTM A572 and A633 may have higher yield strength but shall not have less elongation than the grade indicated.

(2) The silicon content of all steel shall be controlled to ensure high quality galvanizing and to avoid discoloration.

GENERAL NOTES:

1. Design conforms to AASHTO 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals and Interim Revisions thereto. The Design Wind Speed is 80 mph or 100 mph.

2. The required design height and wind speed shall be as shown elsewhere in the plans.

3. Each pole section, top flange plate and base plate shall be permanently marked on the reference line. The required mark locations are shown on the baseplate, top plate, and foundation plan details. These marks shall be used in pole assembly and erection alignment. The reference line and anchor bolt orientation shall be parallel to roadway centerline unless otherwise shown on Lighting Layouts.

Texas Department of Transportation — Traffic Operations Division Standard

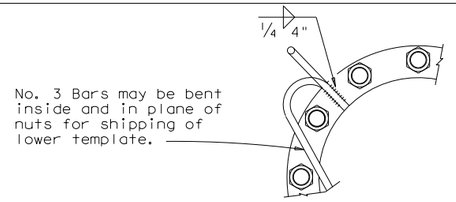
HIGH MAST ILLUMINATION POLES 100' - 125' - 150' - 175'

HMIP(2)-16

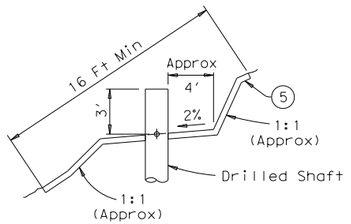
FILE: hmip-16.dgn	DN:	CK:	DW:	CK:
© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-98 8-16	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		155

77B

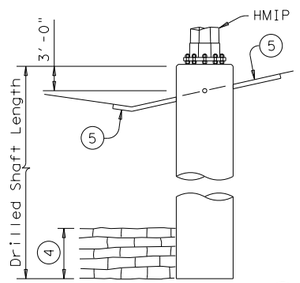
DATE: 10/14/2022 2:50:06 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmif98.dgn



ANCHOR BOLT TEMPLATES

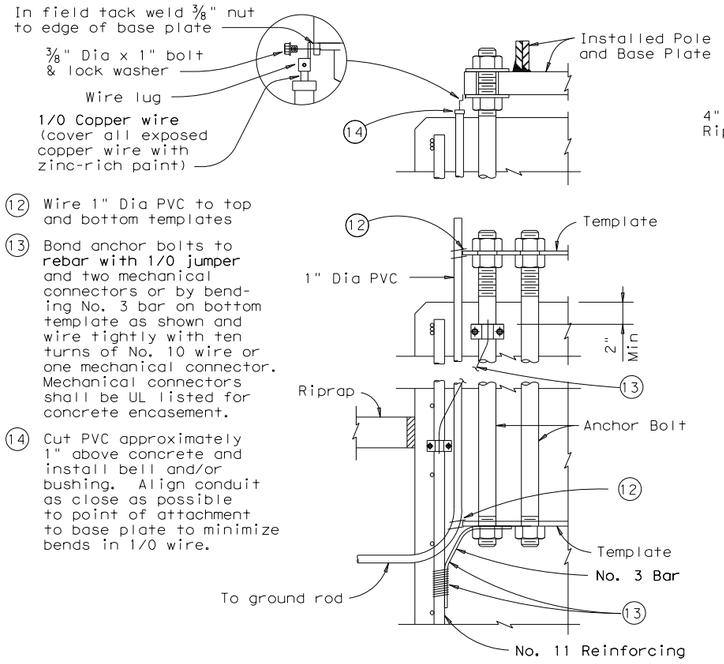


RIPRAP ON SLOPES



(5) Match slope of finished ground if slope is less than approx 4 to 1. For steeper slopes, bench to provide work area with approx 2 % slope around pole base. Other configurations may be shown elsewhere on the plans.

(4) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

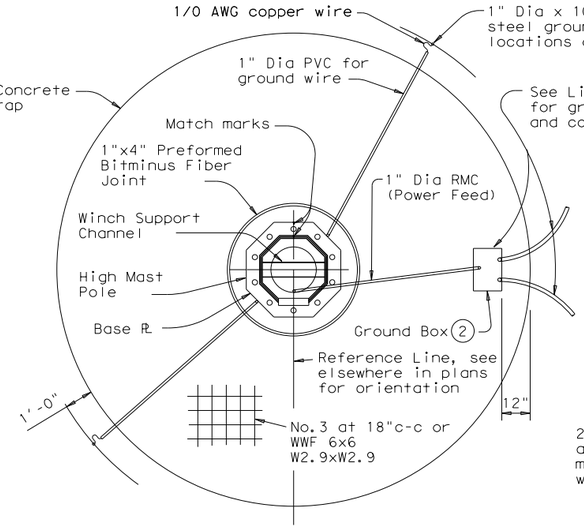


(12) Wire 1" Dia PVC to top and bottom templates

(13) Bond anchor bolts to **rebar with 1/0 jumper** and two mechanical connectors or by bending No. 3 bar on bottom template as shown and wire tightly with ten turns of No. 10 wire or one mechanical connector. Mechanical connectors shall be UL listed for concrete encasement.

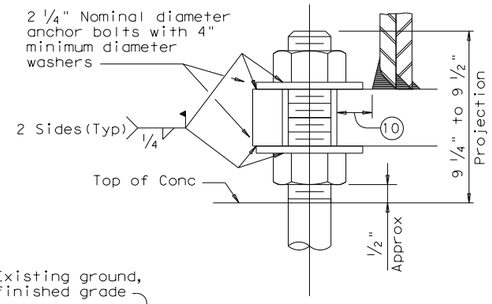
(14) Cut PVC approximately 1" above concrete and install bell and/or bushing. Align conduit as close as possible to point of attachment to base plate to minimize bends in 1/0 wire.

LIGHTNING PROTECTION SYSTEM



(2) Place ground box cover flush with riprap.

(10) If, due to tolerances in fabrication, the anchor bolt hole to ground sleeve weld is less than approx 3/8", clipped 1/2" thick washers shall be supplied at those



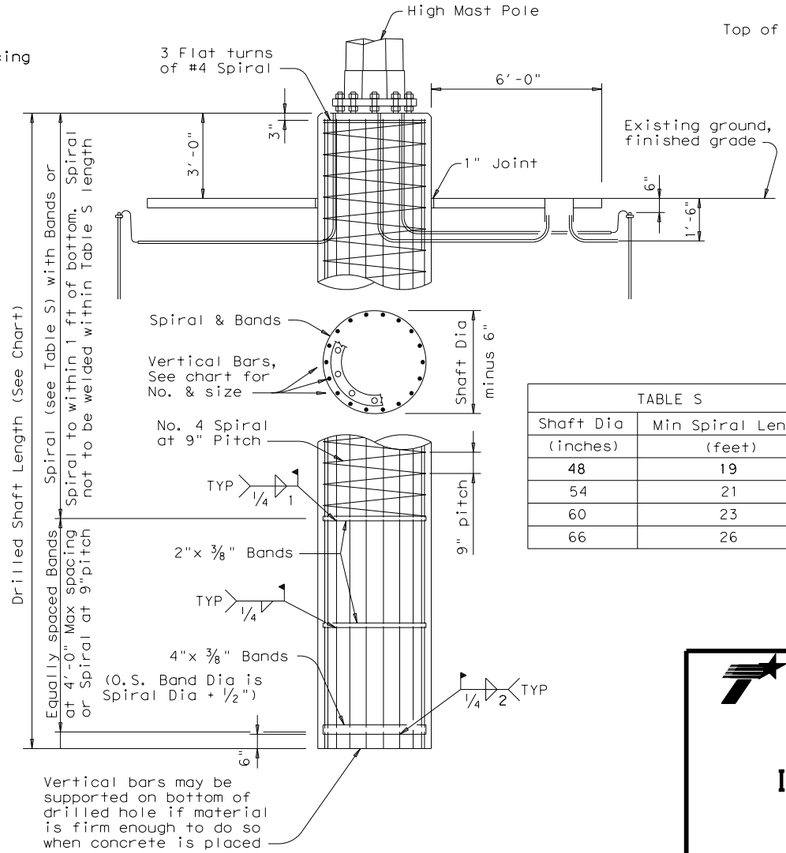
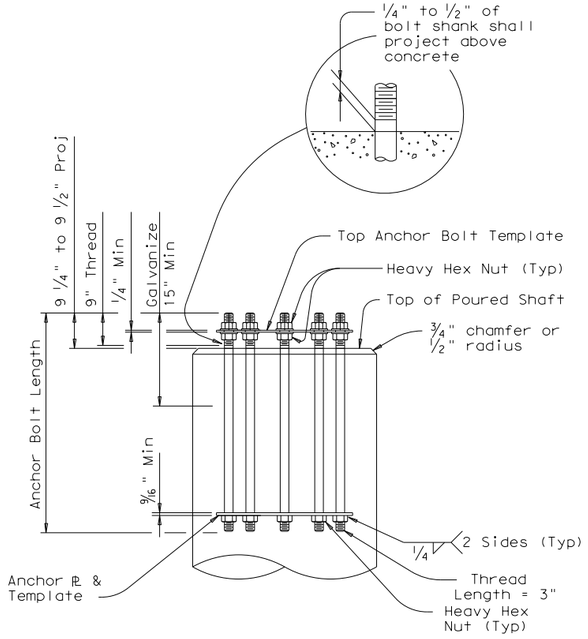


TABLE S	
Shaft Dia (inches)	Min Spiral Length (feet)
48	19
54	21
60	23
66	26

DRILLED SHAFT FOUNDATION DETAIL



ANCHOR BOLT ASSEMBLY

(See Anchor Bolt Table for number of bolts required)

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 1 OF 2 **HMIF(1)-98**

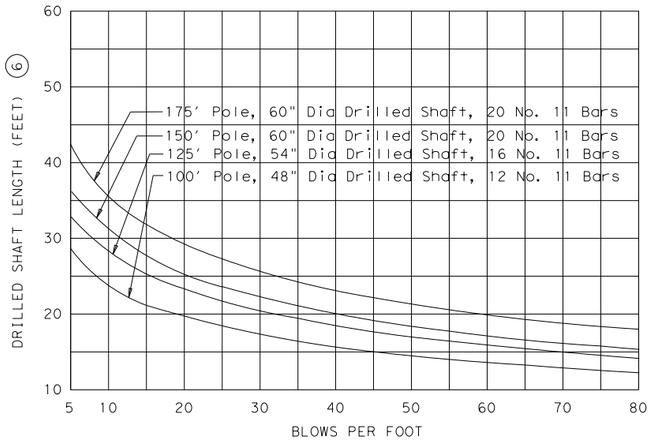
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
11-97
5-98 ~ Anchor Bolt Circle Dia

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30
DIST	COUNTY		SHEET NO.
ATL	TITUS		156

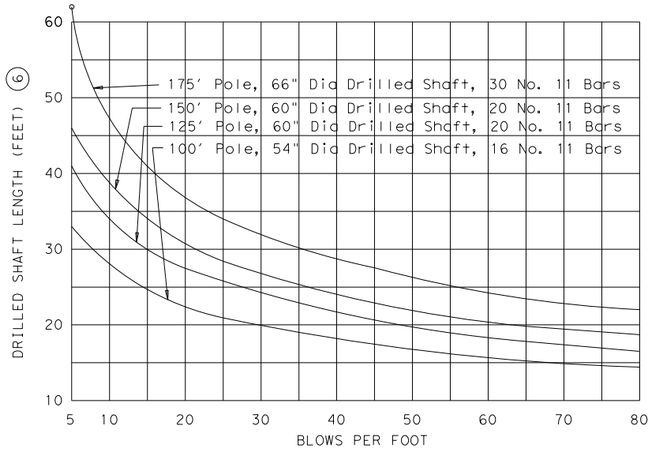
DATE: 10/14/2022 2:50:06 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\hmif98.dgn

⑥ Includes normal 3 Ft exposure. Shafts with more than 3 Ft exposure must have additional length.



80 MPH POLES

Do not extrapolate below 5 Blows/Ft. A special design will be required for soil less than 5 Blows/Ft.



100 MPH POLES

Do not extrapolate below 5 Blows/Ft. A special design will be required for soil less than 5 Blows/Ft.

TEXAS CONE PENETROMETER TEST TABLES

NOTE: Use average "N" value over the top third of the embedded shaft. Ignore the top 2′ of soil.

ANCHOR BOLT TABLE

	Pole Height	Bolt Diameter	Bolt Length	Bolt Templates O D	Bolt Templates I D	No. of Bolts	Bolt Cir Dia
	(feet)	(inches)	(feet)	(inches)	(inches)	~	(inches)
80 MPH DESIGNS	8 SIDED POLE						
	175	2.25	4.83	45.5	36.5	16	41
	150	2.25	4.83	42.5	33.5	12	38
	125	2.25	4.83	39.5	30.5	8	35
	100	2.25	4.83	35.5	26.5	6	31
	12 SIDED POLE						
	175	2.25	4.83	48.5	39.5	12	44
	150	2.25	4.83	45.5	36.5	10	41
	125	2.25	4.83	40.5	31.5	8	36
	100	2.25	4.83	36.5	27.5	6	32
100 MPH DESIGNS	8 SIDED POLE						
	175	2.25	4.83	50.5	41.5	20	46
	150	2.25	4.83	47.5	38.5	16	43
	125	2.25	4.83	43.5	34.5	12	39
	100	2.25	4.83	38.5	29.5	10	34
	12 SIDED POLE						
	175	2.25	4.83	50.5	41.5	16	46
	150	2.25	4.83	48.5	39.5	12	44
	125	2.25	4.83	44.5	35.5	10	40
	100	2.25	4.83	40.5	31.5	6	36

MISCELLANEOUS QUANTITIES - ONE HMIF

Shaft Diameter	(in)	⑦	48	54	60
Concrete Riprap	(CY)		2.33	2.44	2.56
Reinforcing	(Lbs)	⑧	94	99	103
Ground Box	(ea)		1	1	1
R O W Marker	(ea)	⑨	1	1	1

⑦ See elsewhere on plans for length of Drilled Shaft required.
⑧ For Contractors information only.
⑨ Designated elsewhere on plans if required.

GENERAL NOTES:

Unless otherwise noted, the welded steel bands may be replaced with spiral as shown on the foundation details.

Anchor bolts shall be placed in foundation so there are always two bolts on reference line.

Drilled shaft lengths as determined from the foundation design chart or other acceptable methods are to be as shown elsewhere on the plans.

ODSR may not be used for HMIF drilled shafts.

Concrete for drilled shafts shall be Class C.

Repair welded areas with zinc-rich paint.

All Anchor Bolts, Nuts and Washers shall be galvanized in accordance with Item 445, "Galvanizing".

Texas Department of Transportation
Traffic Operations Division

HIGH MAST ILLUMINATION POLE FOUNDATIONS

SHEET 2 OF 2 HMIF(2)-98

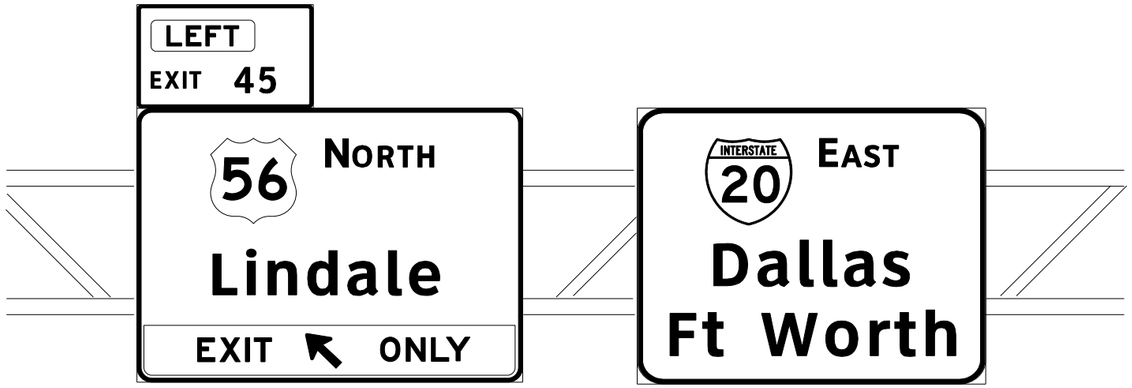
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
5-98 - Anchor Bolt Circle Dia

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30
DIST	COUNTY		SHEET NO.
ATL	TITUS		157

REQUIREMENTS FOR OVERHEAD AND LARGE GROUND-MOUNTED SIGNS

TYPICAL EXAMPLES



GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign summary sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Black legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod, or F).
   White legend shall use the Clearview Alphabet.
   The following Clearview fonts shall be used to replace the existing white FHWA lettering, when not specified in the SHSD or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. 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 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 cut-out white sheeting applied to colored background sheeting.
6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius need not be trimmed or rounded if fabricated from an extruded material.
7. Sign substrate for ground-mounted signs shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative. Sign substrate for overhead signs shall be any material that meets DMS-7110. Exit Number Panels attached above the parent sign shall be made with the same substrate and sheeting as the parent sign.
8. Mounting details of attachments to parent sign face are shown on Standard Plan Sheet TSR(5). Mounting details of exit number panels above parent sign are shown in the "SMD series" Standard Plan Sheets.
9. Background sheeting shall be applied to the substrate per sheeting manufacturer's recommendations. Sheeting will not be allowed to bridge the horizontal gap between panels.
10. Cut all legend, symbols, borders, and direct applied sign attachments at panel joints.

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/

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE B OR C SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(1)-13

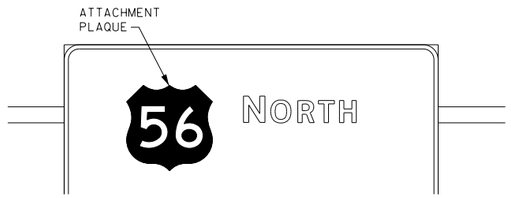
FILE: tsr1-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	TITUS		158

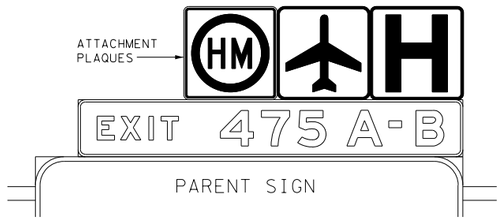
1

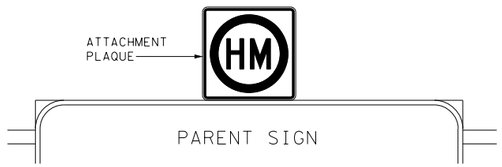
DATE: 10/14/2022 2:50:07 PM
FILE: P:\116335\04\Design\Civil\Standards\Signing\tsr1-13.dgn

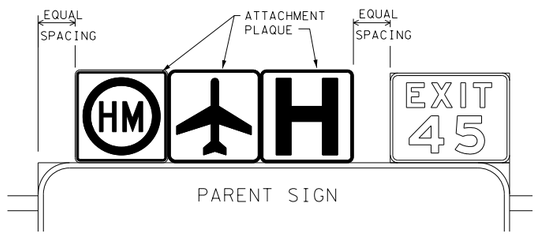
DATE: 10/14/2022 2:50:08 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\tsr2-13.dgn

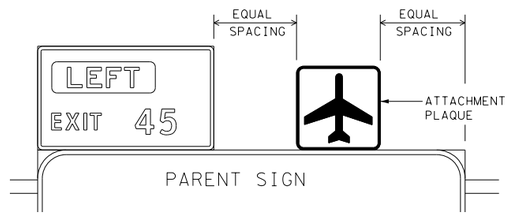
REQUIREMENTS FOR ATTACHMENTS TO OVERHEAD AND LARGE GROUND MOUNTED SIGNS











DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B OR C SHEETING

GENERAL NOTES

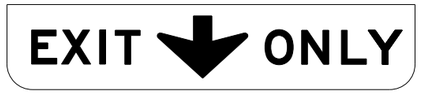
1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Route Marker legends (ie. IH, US, SH and FM shields) shall use the Federal 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 and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to white background sheeting, or combination thereof.
7. Route markers and other attachments within the parent sign face shall be direct applied unless otherwise specified in the plans. Attachments not direct applied shall use 0.063 inch thick one piece sheet aluminum signs (Type A).
8. General Service Plaques shall be 0.080 inch thick and Routing Plaques shall be 0.100 inch thick.
9. The priority for Routing Plaques shall be (left to right) Hazardous Material, Airport then Hospital. See examples for mounting location.
10. Mounting details of attachments to parent signs face are shown on Standard Plan Sheet TSR(5). Mounting details of sign plaque attachments above and below parent sign are shown in the "SMD series" Standard Plan Sheets.
11. Plaques shall be horizontally centered at the top of the parent sign. If an exit number panel exists, the plaque shall be centered between the edge of the parent sign and the edge of the exit number panel. The plaque may be placed above the exit number panel when there is insufficient space.

TYPICAL EXAMPLES

REQUIREMENTS FOR EXIT ONLY AND LEFT EXIT PANELS

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

SHEETING REQUIREMENTS FOR OVERHEAD EXIT PANELS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLUORESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND	BLACK	ACRYLIC NON-REFLECTIVE FILM



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD). Individual panel sizes shown in the plans may be adjusted to fit actual parent sign sizes if necessary.
2. Exit Panel legend shall use the Federal Highway Administration (FHWA)Standard Highway Alphabets E Series.
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 shall be applied by screening process or cut-out acrylic non-reflective black film to yellow background sheeting, or combination thereof.
5. Exit Only and Left Exit panels within the parent sign face shall be direct applied unless otherwise specified in the plans. Panels not direct applied shall use 0.063 inch thick one piece sheet aluminum signs (Type A).
6. Mounting details of Exit Only and Left Exit panel attachments to parent signs face are shown on Standard Plan Sheet TSR(5).

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(2)-13

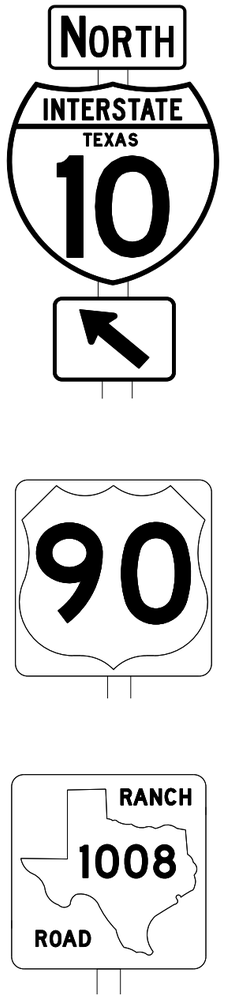
FILE: tsr2-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	TITUS		159

2

DATE: 10/14/2022 2:50:10 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\tsr3-13.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

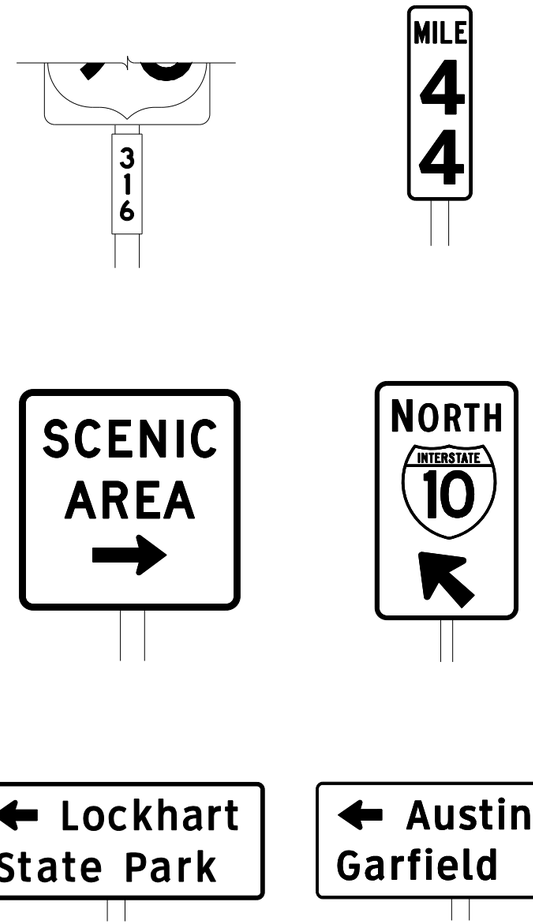
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

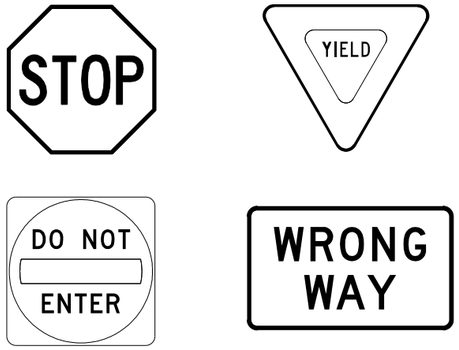
TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	TITUS		160

DATE: 10/14/2022 2:50:11 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\tsr4-13.dgn

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

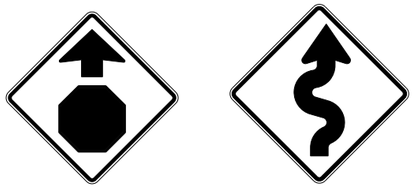
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

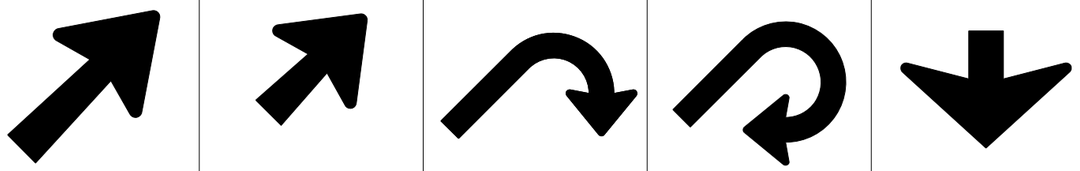
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	TITUS		161

DATE: 10/14/2022 2:50:13 PM
FILE: P:\116335104\Design\Civil\Standards\Signing\tsr5-13.dgn

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

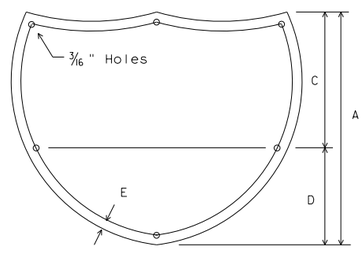
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

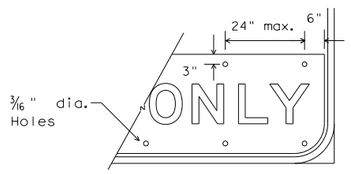
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

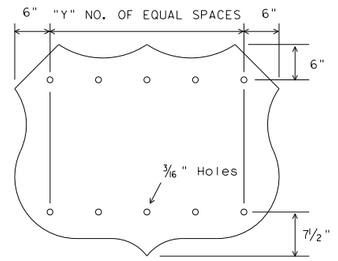


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

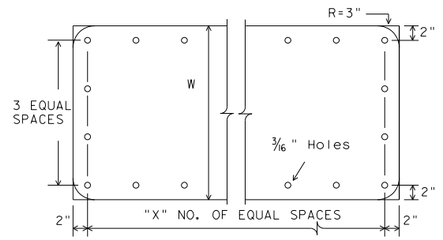


EXIT ONLY PANEL



U.S. ROUTE MARKERS

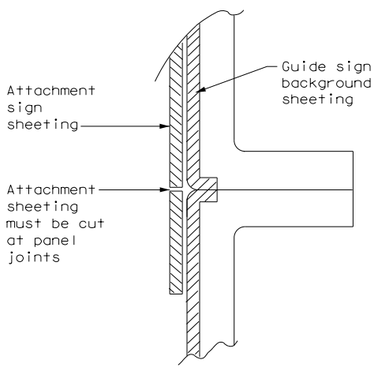
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

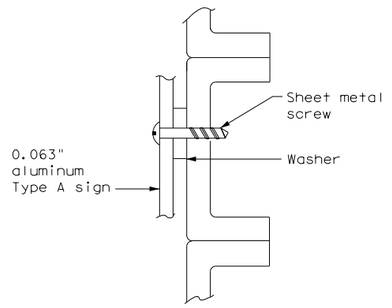
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



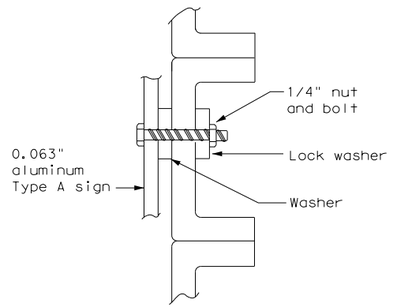
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



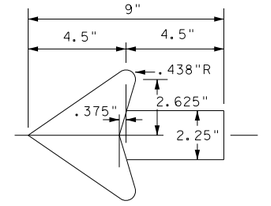
NUT/BOLT ATTACHMENT

NOTE:

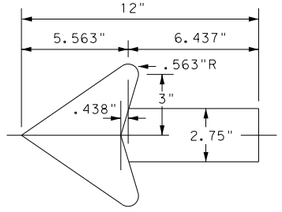
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

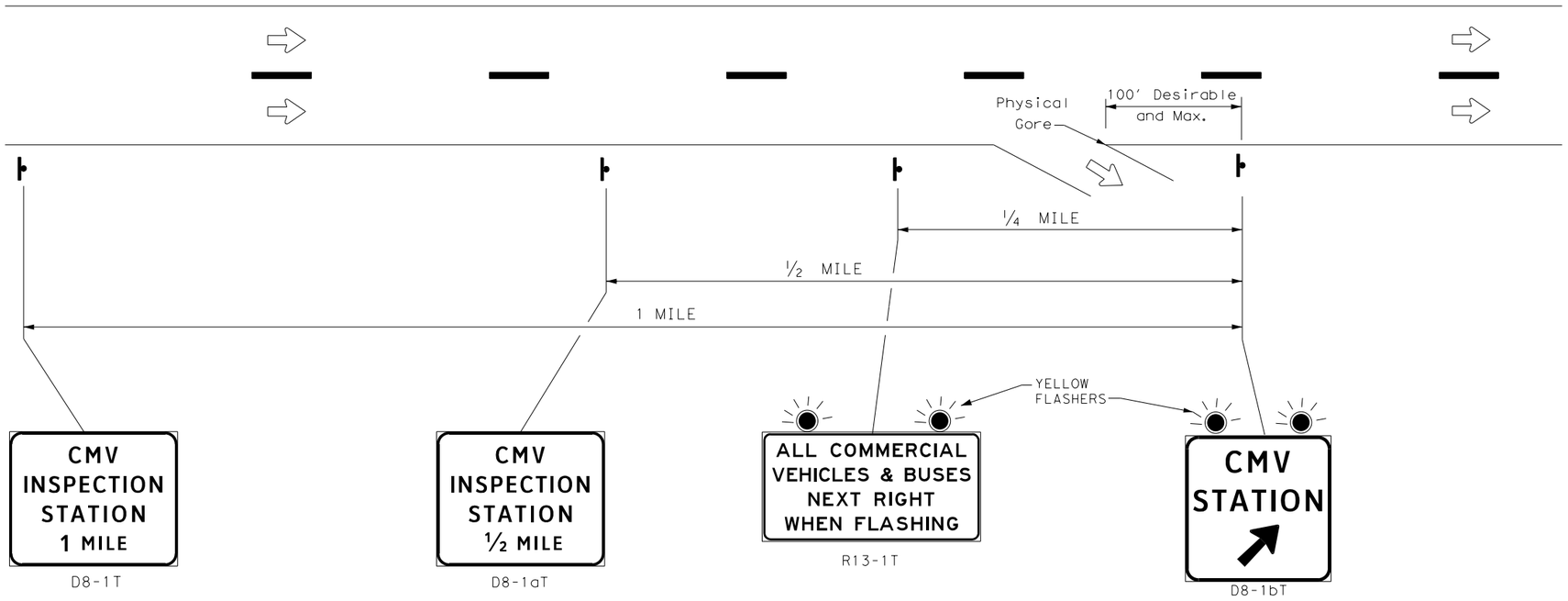
Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ATL	TITUS		162

DATE: 10/14/2022 2:50:14 PM
FILE: P:\116335104\Design\Civil\Standards\Signing\cmv-19.dgn



LEGEND	
	Sign
	Traffic Flow

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

HIGHWAY SIGN SIZES		
Nomenclature	Conventional	Expressway/ Freeway
R13-1T	96x48	156x78
D8-1T	78x60	120x96
D8-1aT	78x60	120x96
D8-1bT	60x60	66x66

CMV INSPECTION STATION SIGNING FOR CONVENTIONAL HIGHWAYS , EXPRESSWAYS AND FREEWAYS

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	GREEN	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM

GENERAL NOTES

1. Signs to be furnished shall conform to the tables on this standard sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Black legends shall use the Federal Highway Administration(FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F). White legends shall use the Clearview Alphabet.
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legends shall provide a balanced appearance when spacing is not shown.
4. White legends shall be cut-out white sheeting applied to green background sheeting. Black legends shall be applied by screening process,cut-out acrylic non-reflective film or combination thereof.
5. Sign substrate shall be any material that meets the Department Material Specification requirements for permanent sign substrates.
6. Mounting and electrical details are shown in the "SMD" and "ED" series Standard Plan Sheets.

Texas Department of Transportation

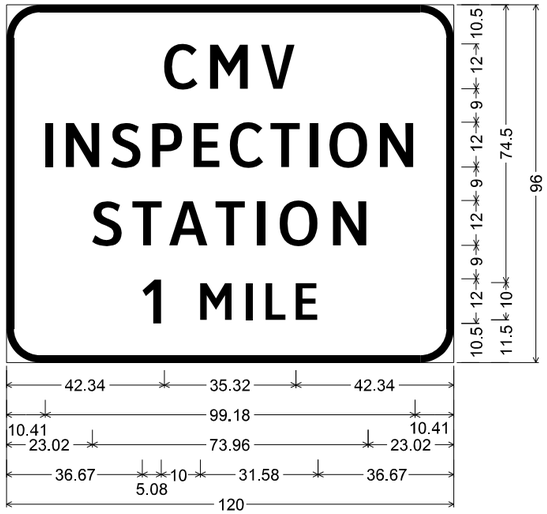
Traffic Safety Division Standard

CMV INSPECTION STATION SIGNING

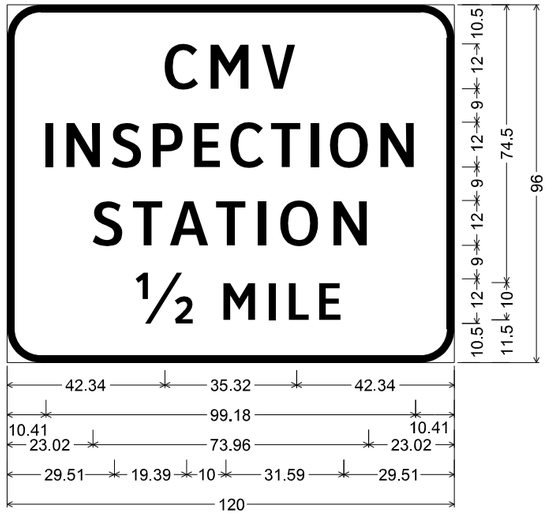
CMV-19

FILE: cmv-19.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
9-19	DIST	COUNTY		SHEET NO.
	ATL	TITUS		163

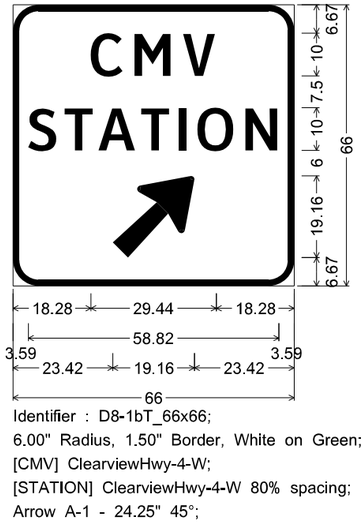
10A



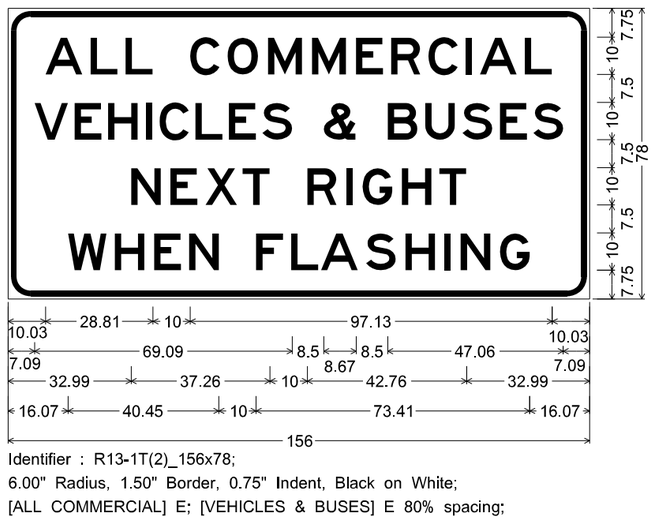
Identifier : D8-1T_120x96;
9.00" Radius, 2.00" Border, White on Green;
[CMV] ClearviewHwy-4-W;
[INSPECTION] ClearviewHwy-4-W 80% spacing;
[STATION] ClearviewHwy-4-W;
[1 MILE] ClearviewHwy-4-W;



Identifier : D8-1aT_120x96;
9.00" Radius, 2.00" Border, White on Green;
[CMV] ClearviewHwy-4-W;
[INSPECTION] ClearviewHwy-4-W 80% spacing;
[STATION] ClearviewHwy-4-W;
[½ MILE] ClearviewHwy-4-W;

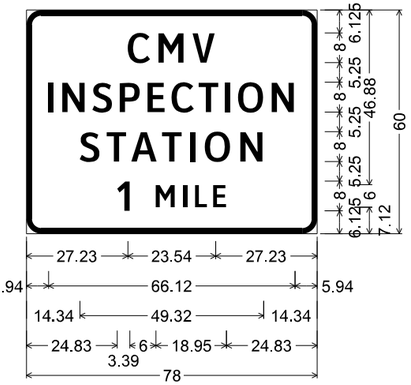


Identifier : D8-1bT_66x66;
6.00" Radius, 1.50" Border, White on Green;
[CMV] ClearviewHwy-4-W;
[STATION] ClearviewHwy-4-W 80% spacing;
Arrow A-1 - 24.25" 45°;

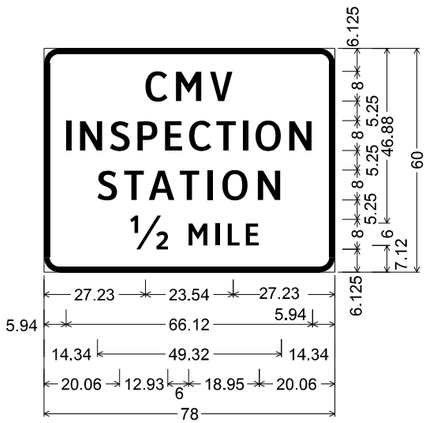


Identifier : R13-1T(2)_156x78;
6.00" Radius, 1.50" Border, 0.75" Indent, Black on White;
[ALL COMMERCIAL] E; [VEHICLES & BUSES] E 80% spacing;
[NEXT RIGHT] E; [WHEN FLASHING] E;

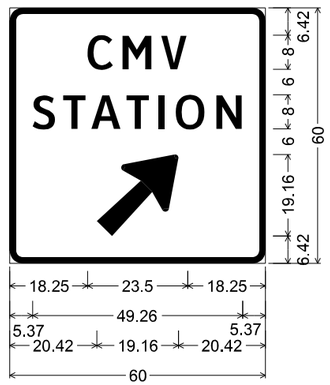
EXPRESSWAY/FREEWAY SIGN DETAILS



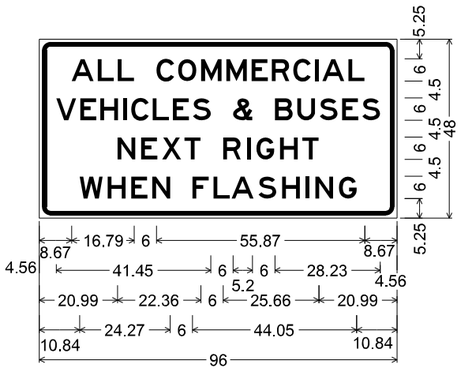
Identifier : D8-1T_78x60;
4.00" Radius, 1.50" Border, White on Green;
[CMV] ClearviewHwy-4-W;
[INSPECTION] ClearviewHwy-4-W 80% spacing;
[STATION] ClearviewHwy-4-W;
[1 MILE] ClearviewHwy-4-W;



Identifier : D8-1aT_78x60;
4.00" Radius, 1.50" Border, White on Green;
[CMV] ClearviewHwy-4-W;
[INSPECTION] ClearviewHwy-4-W 80% spacing;
[STATION] ClearviewHwy-4-W;
[½ MILE] ClearviewHwy-4-W;



Identifier : D8-1bT_60x60;
3.00" Radius, 1.50" Border, White on Green;
[CMV] ClearviewHwy-4-W;
[STATION] ClearviewHwy-4-W;
Arrow A-1 - 24.25" 45°;



Identifier : R13-1T_96x48;
3.00" Radius, 1.25" Border, 0.75" Indent, Black on White;
[ALL COMMERCIAL] E 80% spacing;
[VEHICLES & BUSES] E 80% spacing;
[NEXT RIGHT] E; [WHEN FLASHING] E;

CONVENTIONAL HIGHWAY SIGN DETAILS

Texas Department of Transportation

Traffic Safety Division Standard

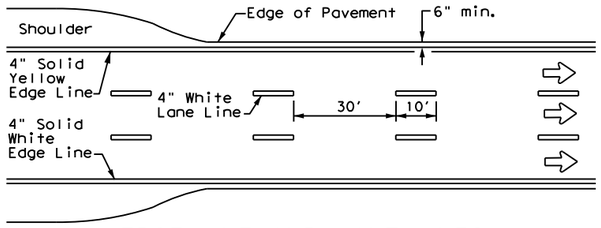
CMV INSPECTION STATION SIGN DETAILS

CMV(SD)-19

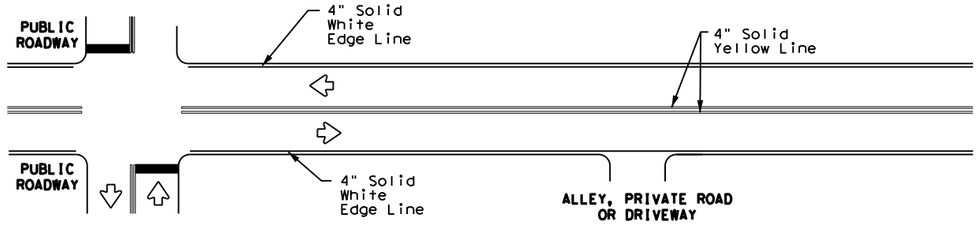
FILE: cmv(sd)19.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		164

TOB

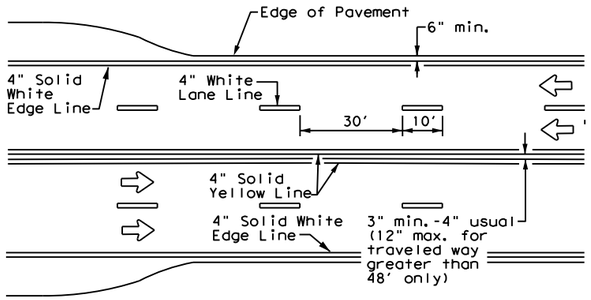
DATE: 10/14/2022 2:50:15 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\cmv(sd)-19.dgn



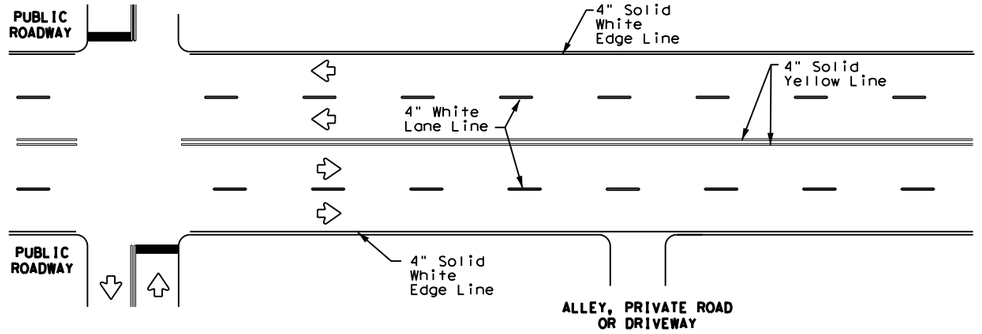
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



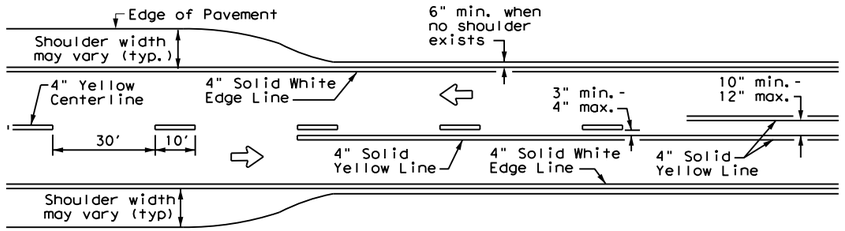
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



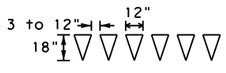
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



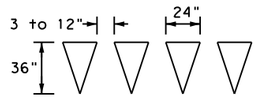
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

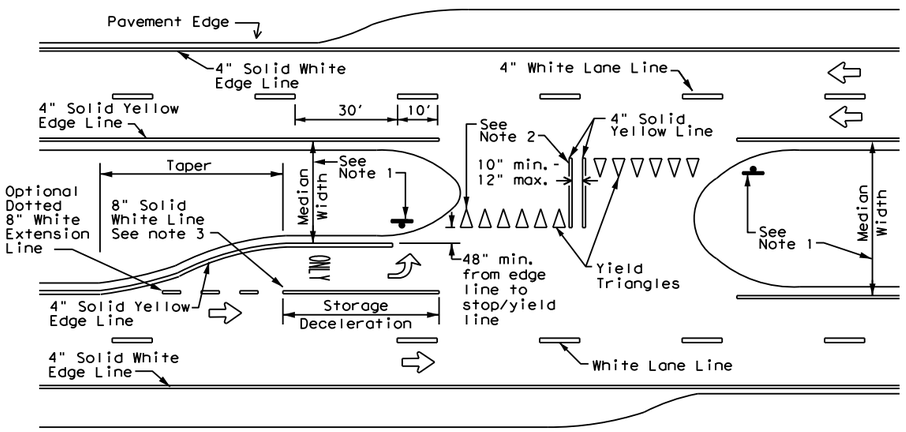


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

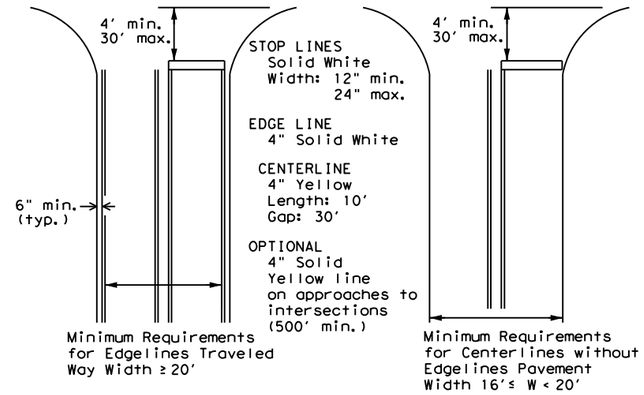
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

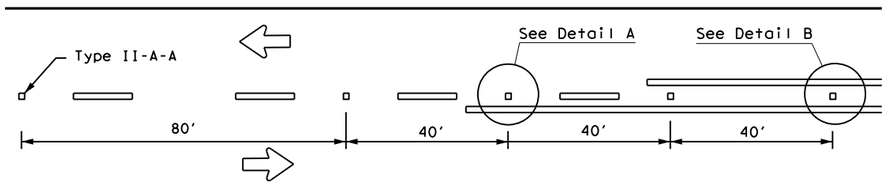
PM(1)-20

FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0610	03	095	IH 30
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	ATL	TITUS		165

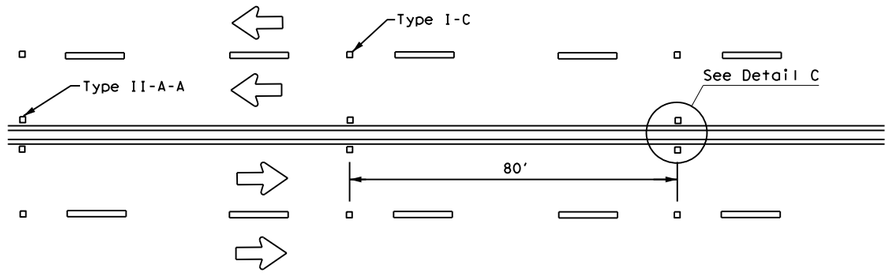
22A

DATE: 10/14/2022 2:50:16 PM
FILE: P:\116\35\04\Design\Civil\Standards\PavementMarkers\pm1-20.dgn

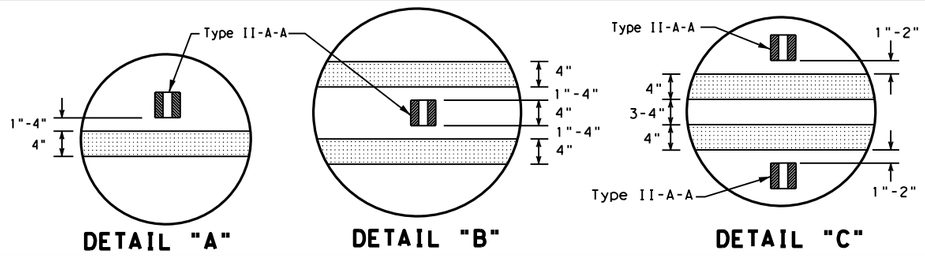
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



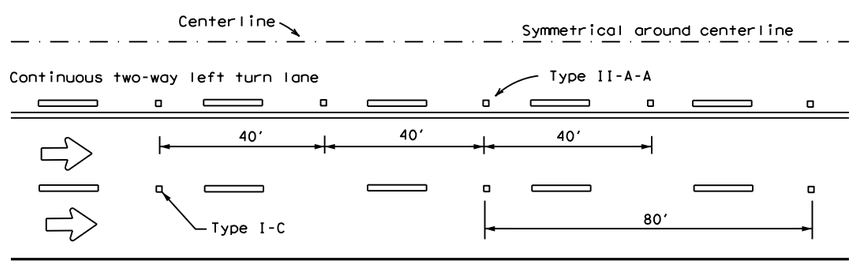
CENTERLINE FOR ALL TWO LANE ROADWAYS



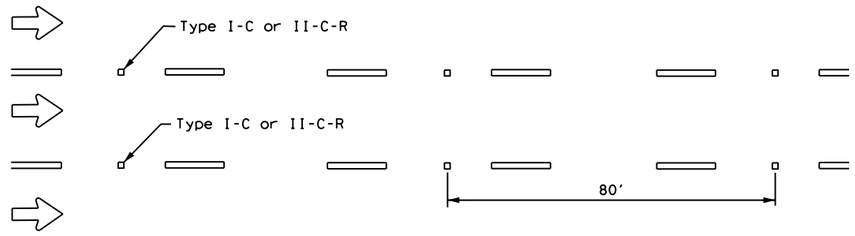
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

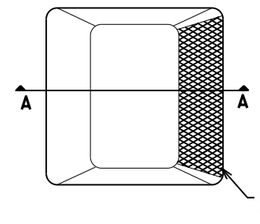


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

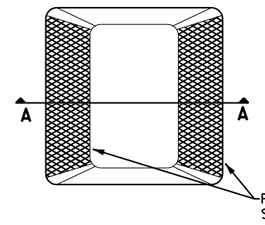
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

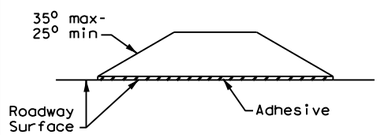
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

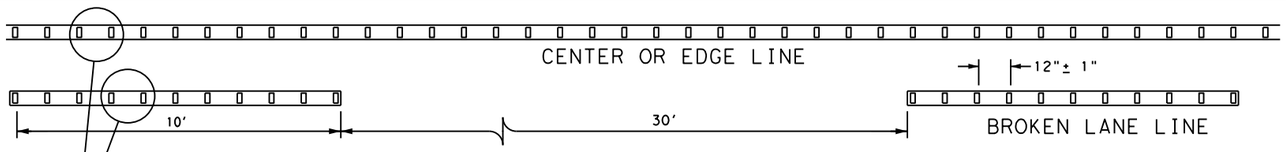


Type II (Top View)



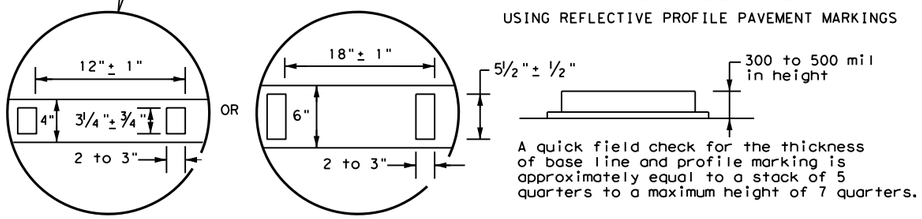
SECTION A

RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

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.

Texas Department of Transportation

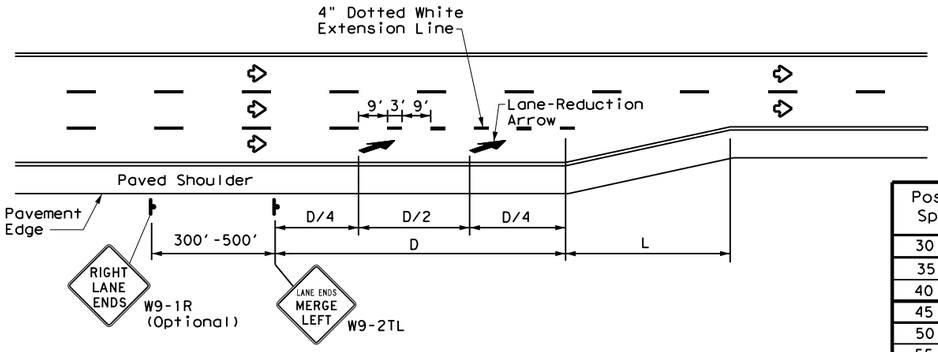
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10	0610	03	095	IH 30
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	ATL	TITUS		166

22B

DATE: 10/14/2022 2:50:17 PM
FILE: P:\116\35\04\Design\Civil\Standards\PavementMarkers\pm2-20.dgn

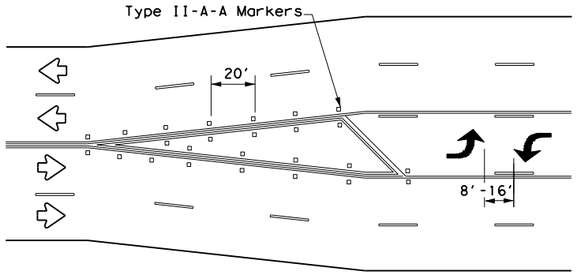


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



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.

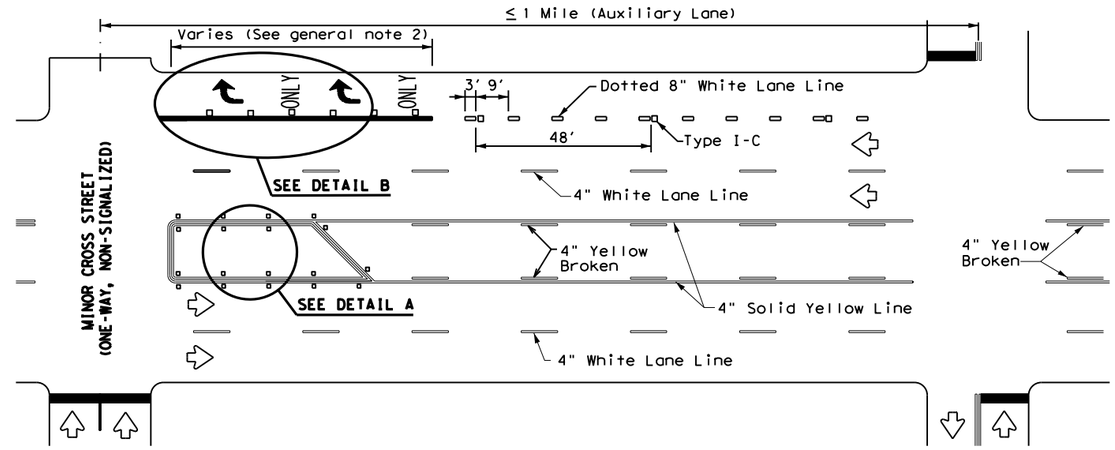
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

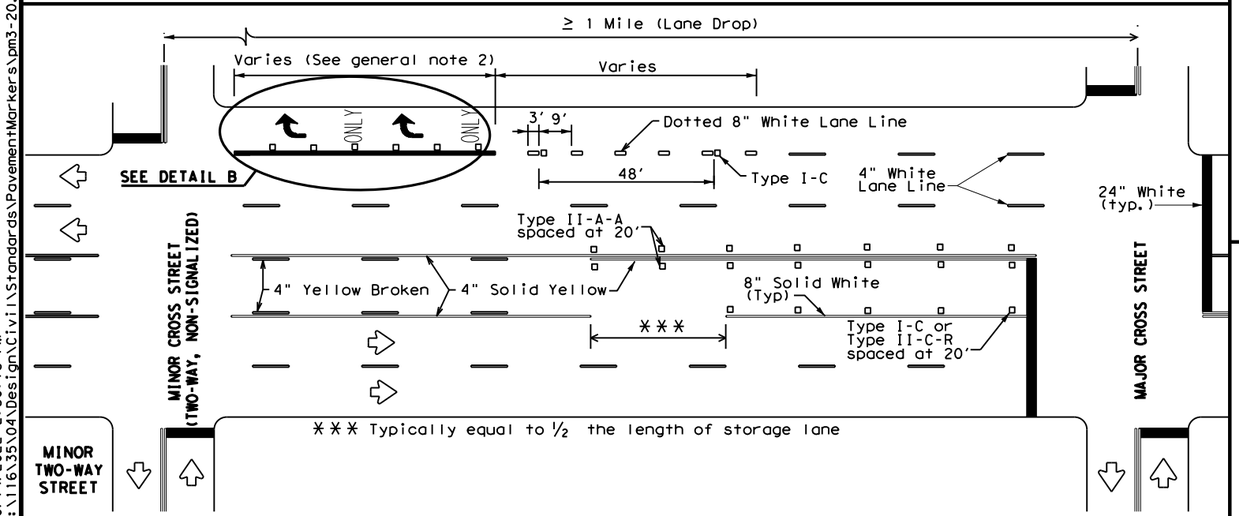
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

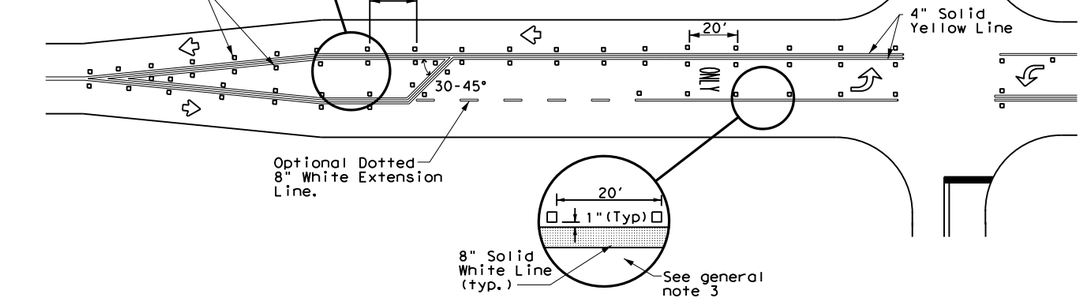
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



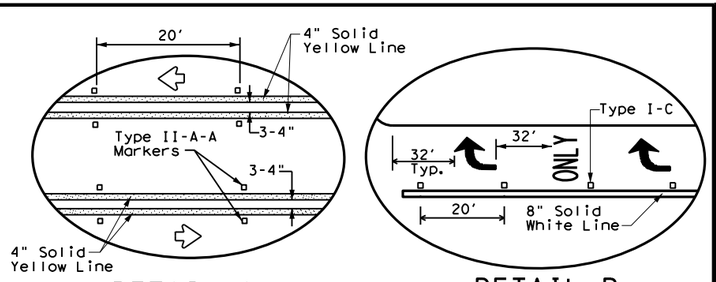
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



Texas Department of Transportation

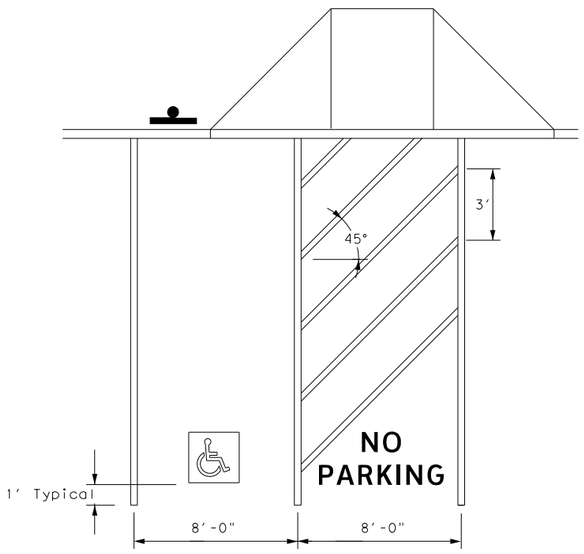
Traffic Safety Division Standard

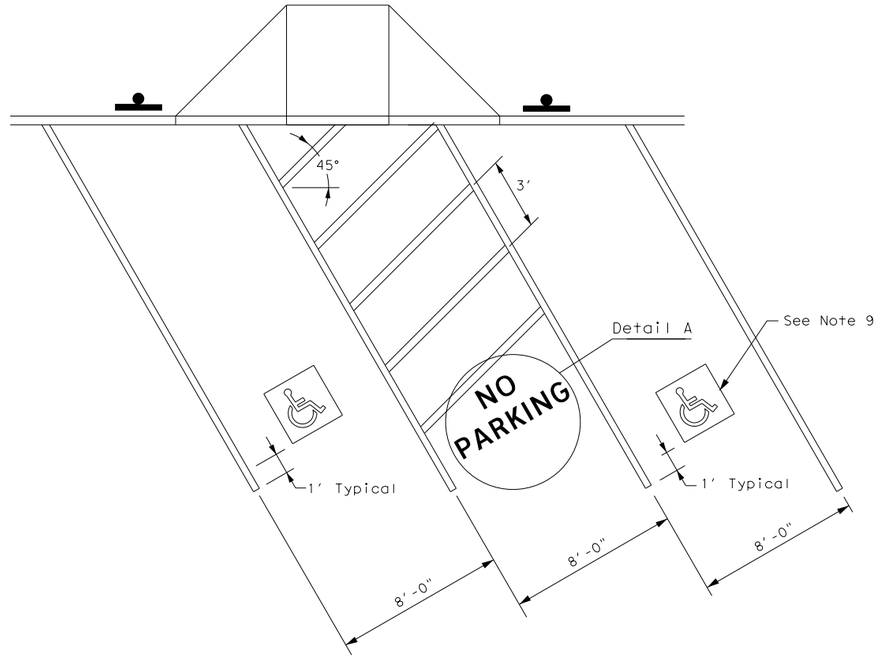
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	ATL	TITUS		167
3-03 6-20				

22C

DATE: 10/14/2022 2:50:18 PM
FILE: P:\116350\04\Design\Civil\Standards\PavementMarkers\pm3-20.dgn





PERPENDICULAR OR ANGLED ACCESSIBLE PARKING SPACE DIMENSIONS

GENERAL NOTES:

1. All paved accessible parking space limit lines shall be 4" solid white lines.
2. Paved accessible parking spaces must include a white International Symbol of Accessibility applied conspicuously on the surface in a color that contrasts the pavement. A blue background with white border may supplement the symbol for additional contrast.
3. The words "NO PARKING" must be applied on any access aisle adjacent to the parking space. The words must be white, applied:
   a) in all capital letters.
   b) centered within each access aisle adjacent to the parking space.
4. RESERVED PARKING (R7-8T) sign including the International Symbol of Accessibility.
   a) shall be REQUIRED for each accessible parking space.
   b) shall NOT be placed between two accessible parking spaces.
   c) shall NOT be placed in a location that restricts movement of wheelchairs within the adjacent sidewalk.
   d) shall have a mounting height of 7 feet to the bottom of the sign.
5. A sign identifying the consequences of parking illegally in a paved accessible parking space. Must:
   a) at a minimum state "VIOLATORS SUBJECT TO FINE AND TOWING" (Plaque)(R7-8aPT).
   b) be mounted on a pole, post, wall or freestanding board.
   c) be no more than eight inches (8") below sign R7-8T a sign required by the Texas Accessibility Standards, 502.6.
   d) be installed so that the bottom edge of the sign is no lower than 48 inches and no higher than 80 inches above the ground level.
6. Signs identifying van parking spaces shall contain the designation "VAN ACCESSIBLE" (R7-8P) Signs shall be 60 inches minimum above the ground level measured to the bottom of the sign.
7. Perpendicular or angled parking spaces shall be 8 feet wide minimum with an access aisle 8 feet minimum wide (van accessible). Two parking spaces are permitted to share a common access aisle.
8. Access aisles shall be at street level, extend the full length of the parking space they serve, follow ADA surface requirements, and marked to discourage parking in the access aisle. Curb ramps shall connect the access aisle to the adjacent pedestrian access route. Curb ramps shall not be located within the access aisle.
9. International Symbol of Accessibility Parking Space Marking and sign details can be found in The Standard Highway Sign Designs for Texas (SHSD) at the following website. http://www.txdot.gov/

R7-8T

R7-8P

R7-8aPT

ACCESSIBLE PARKING SIGNS

Detail A

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
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
SIGN FACE MATERIALS	DMS-8300

Texas Department of Transportation

Traffic Safety Division Standard

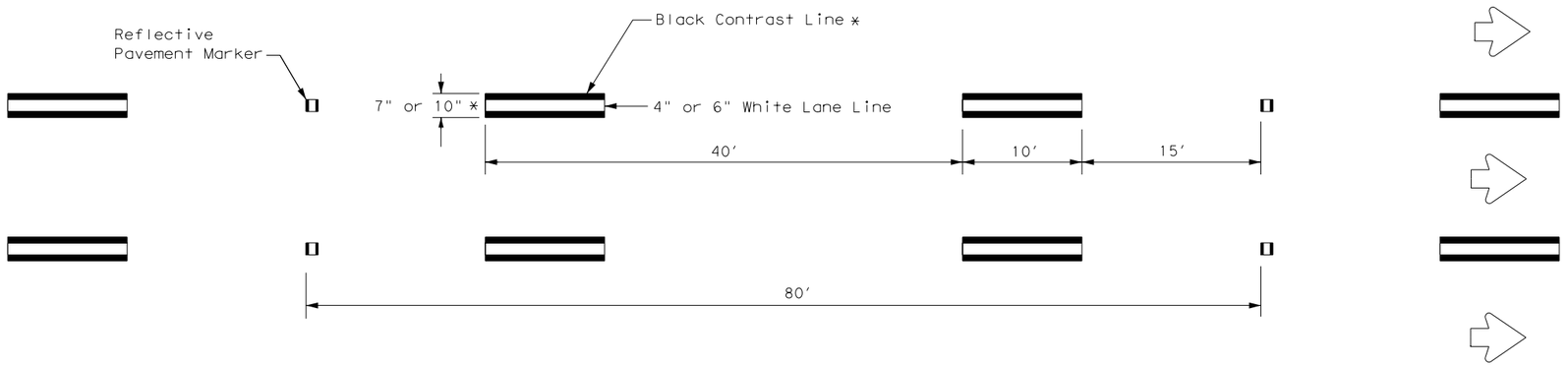
PAVEMENT MARKINGS AND SIGNING FOR ACCESSIBLE PARKING

PM(AP)-21

FILE: pm(ap)-21	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT July 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		168

22F

DATE: 10/14/2022 2:50:20 PM
FILE: P:\116\35\04\Design\Civil\Standards\PavementMarkers\pm(ap)-21.dgn



CONTRAST LANE LINE DESIGN

* See contrast line dimensions table for width of black line.

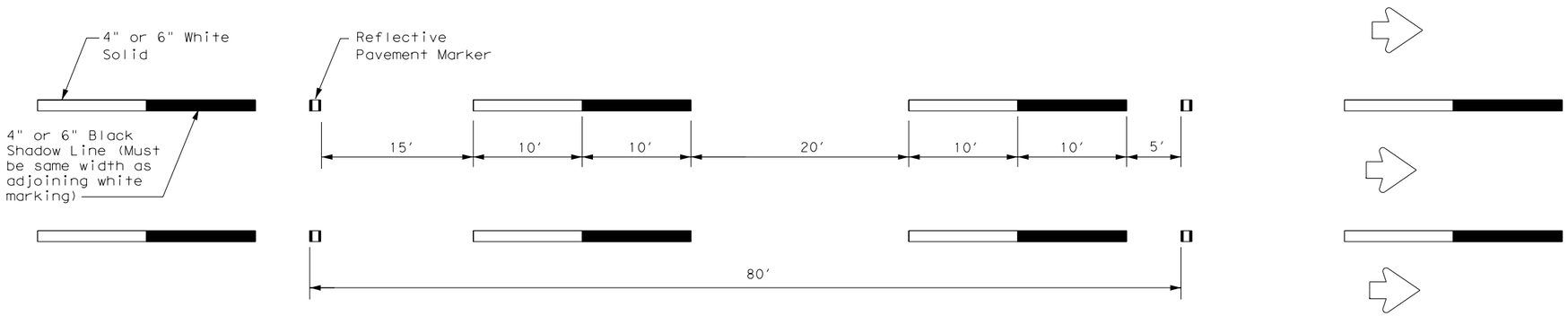
CONTRAST LINE DIMENSIONS		
White	Black (per side)	Total Width
4"	1.5"	7"
6"	2"	10"

GENERAL NOTES

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.

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.



SHADOW LANE LINE DESIGN

Texas Department of Transportation

Traffic Operations Division Standard

CONTRAST AND SHADOW PAVEMENT MARKINGS

CPM(1)-14

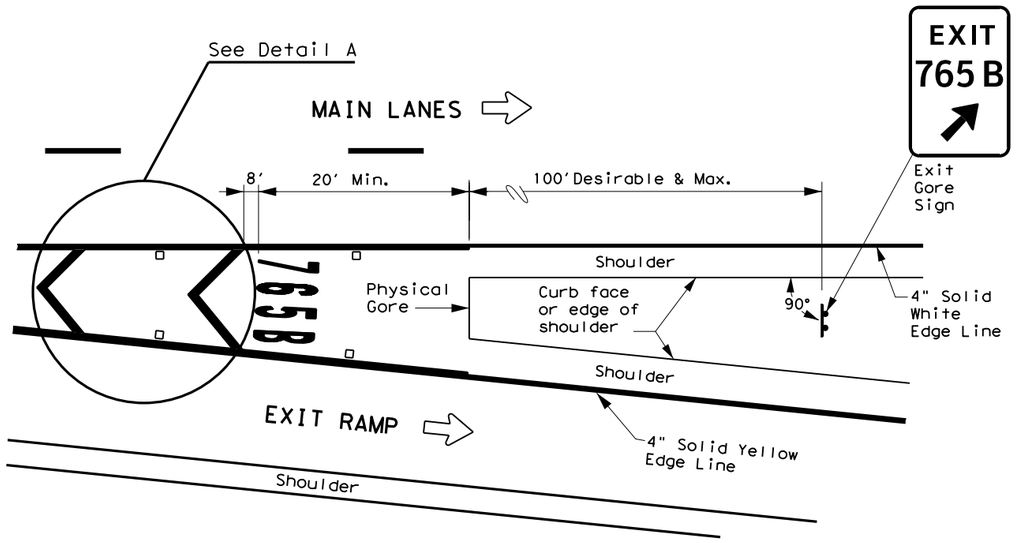
FILE: CPM(1)14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		169

22N

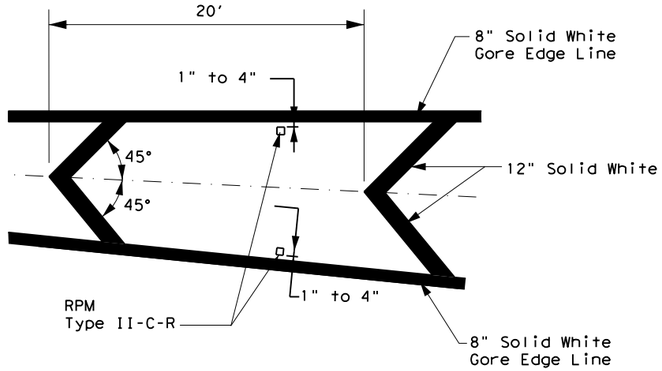
DATE: 10/14/2022 2:50:33 PM
FILE: P:\116135\04\Design\Civil\Standards\PavementMarkers\cpm(1)-14.dgn

EXIT NUMBER PAVEMENT MARKING NOTES

1. Minimum 8 foot white markings should be used, unless otherwise noted.
2. Spacing between letters and numbers should be approximately 4 inches.
3. Pavement markings are to be located as specified elsewhere in the plans.
4. All pavement marking materials shall meet the required Departmental Material Specifications or as specified in these plans.
5. Numbers and Letters details can be found in the Standard Highway Design for Texas (SHSD) Chapter 12 at http://www.txdot.gov



MARKINGS WITH EXIT NUMBER



NOTES

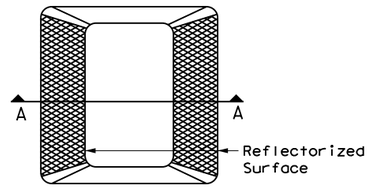
1. Raised pavement markers shall be centered between chevron or gore lines.
2. For more information, see Reflectorized Raised Pavement Marker Detail.

DETAIL A

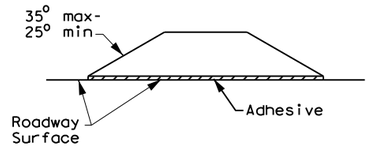
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

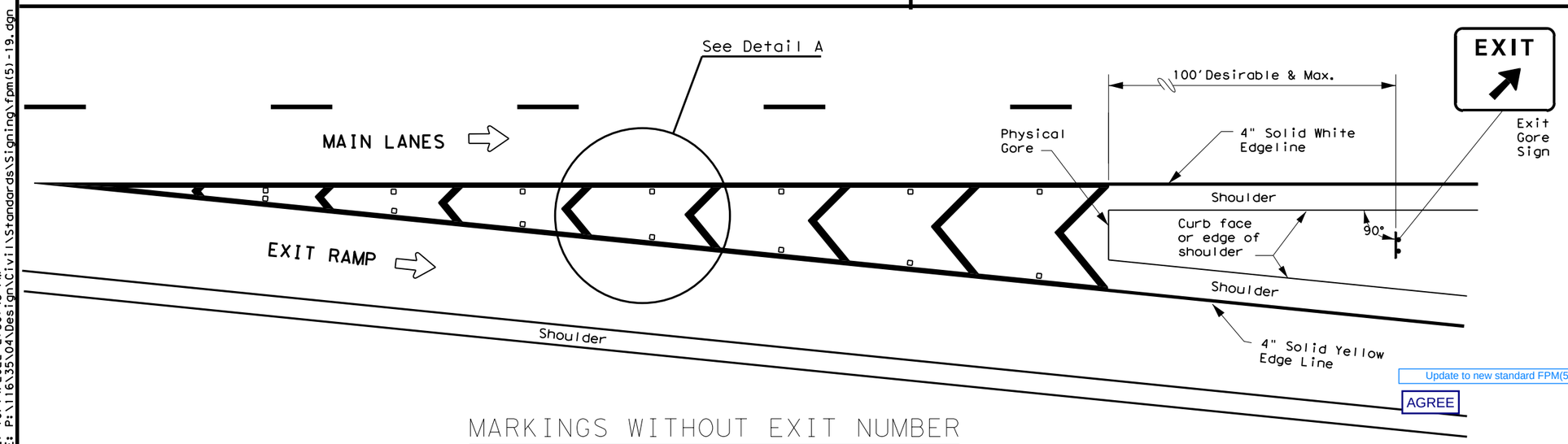
LEGEND	
⇦	Traffic flow
▫	Reflectorized Raised Markers (RPM) Type II-C-R



Type II (Top View)



SECTION A



MARKINGS WITHOUT EXIT NUMBER

REFLECTORIZED RAISED PAVEMENT MARKER (RPM)

Texas Department of Transportation

Traffic Safety Division Standard

EXIT GORE PAVEMENT MARKINGS

Update to new standard FPM(5)-22

AGREE

FPM(5)-19

FILE: fpm(5)-19.dgn	DN:	CK:	DW:	CK:
© TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		170

23F

DATE: 10/14/2022 2:50:45 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\fpm(5)-19.dgn

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)

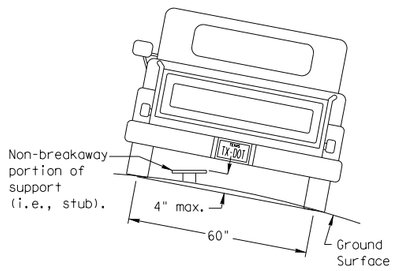
Anchor Type

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))

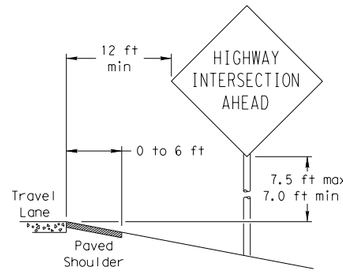
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

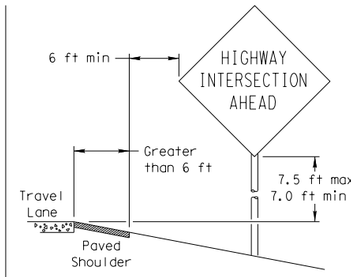
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

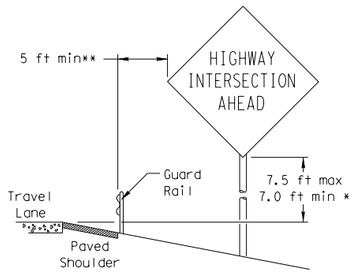
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



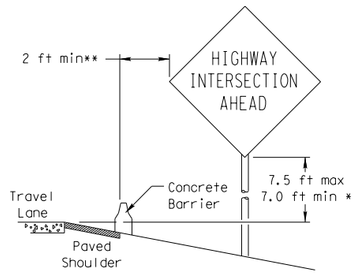
GREATER THAN 6 FT. WIDE

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



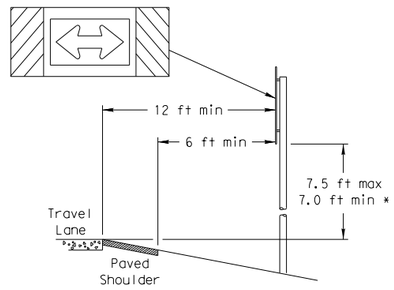
BEHIND GUARDRAIL



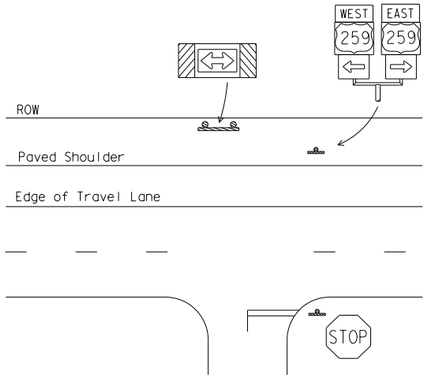
BEHIND CONCRETE BARRIER

**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

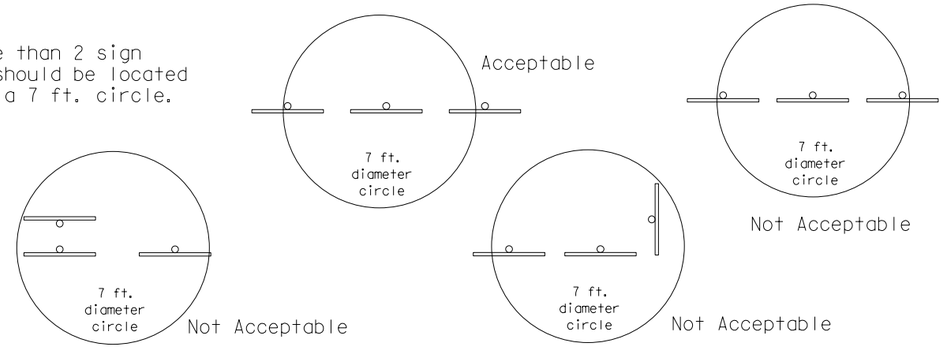
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

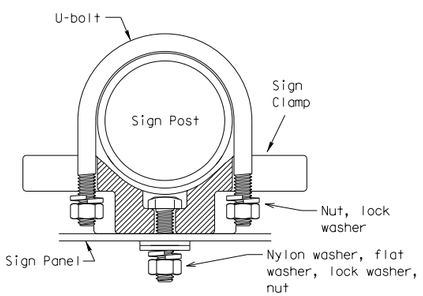
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

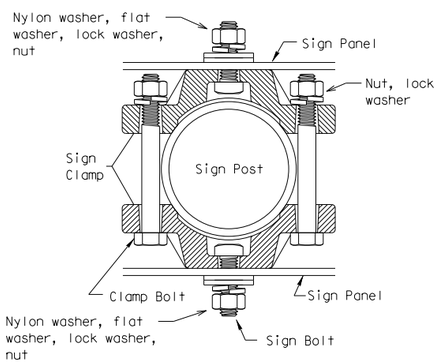


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

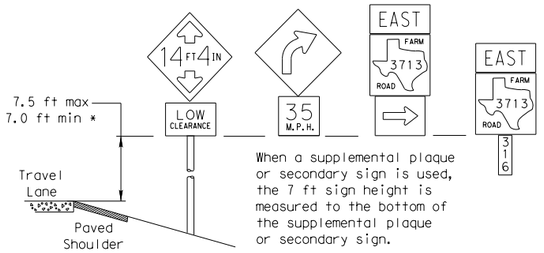
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



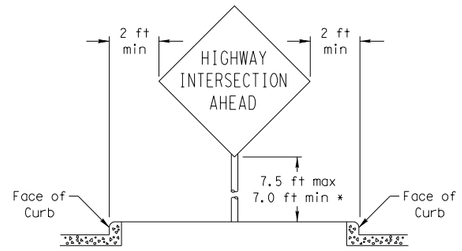
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



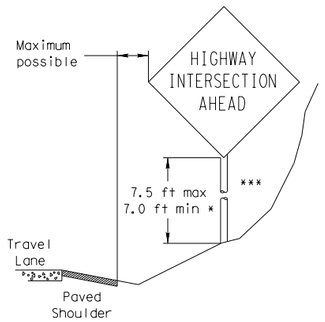
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

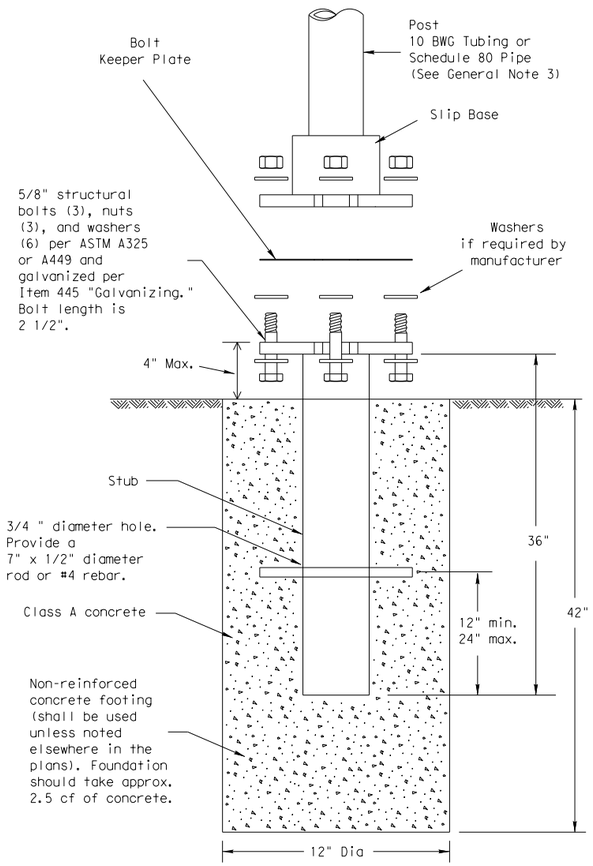
REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30
DIST	COUNTY		SHEET NO.
ATL	TITUS		171

DATE: 10/14/2022 2:50:46 PM
FILE: P:\116335104\Design\Civil\Standards\Signing\smdgen.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

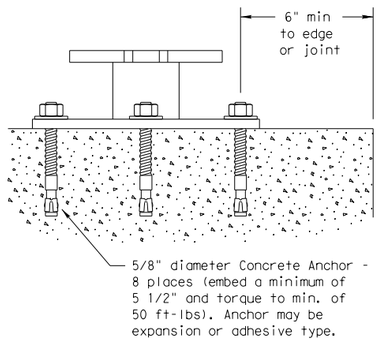
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   21% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

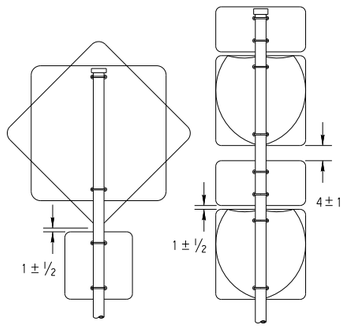
SMD(SLIP-1)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS			
9-08			

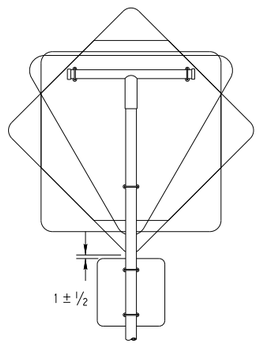
CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	172

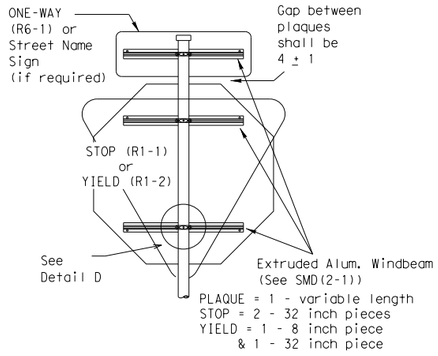
DATE: 10/14/2022 2:50:47 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\smds1.dgn



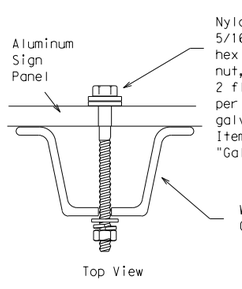
SM RD SGN ASSM TY XXXXX(1)XX(P)



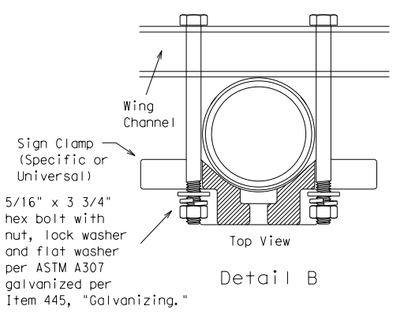
SM RD SGN ASSM TY XXXXX(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



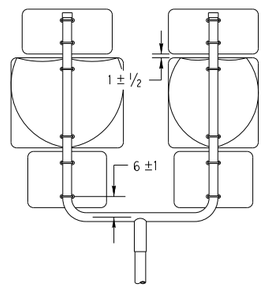
Detail B

GENERAL NOTES:

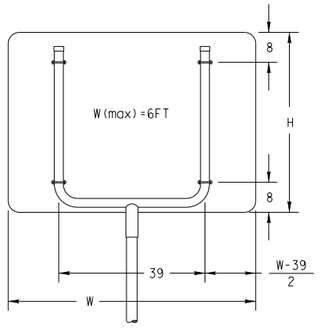
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

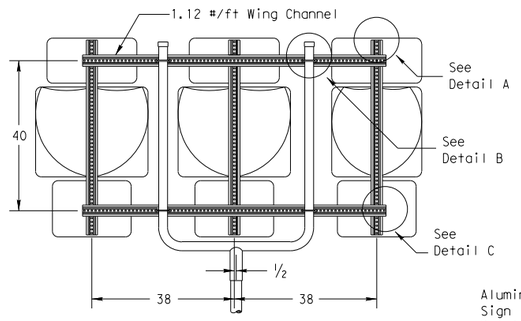
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



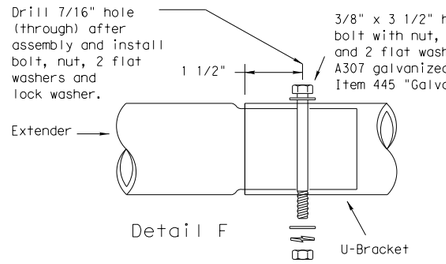
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

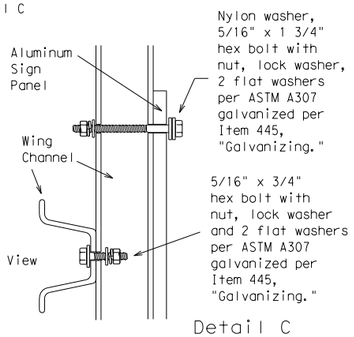


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

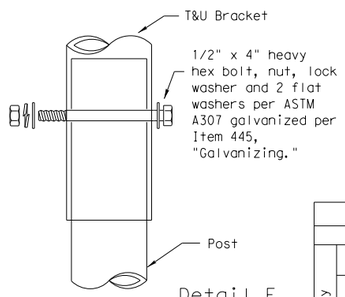


Detail F

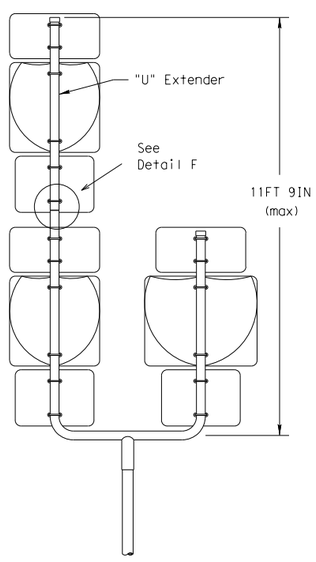
Splices shall only be allowed behind the sign substrate.



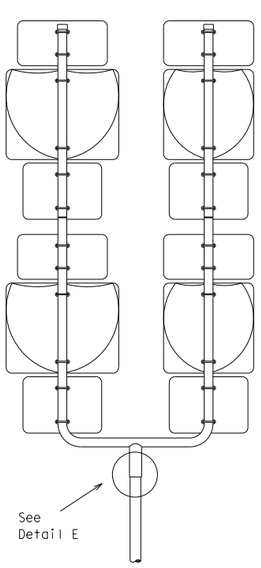
Detail C



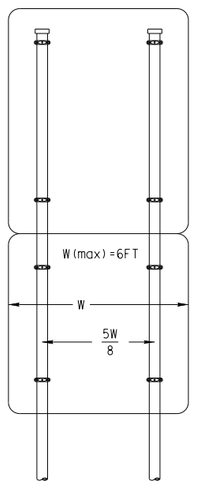
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

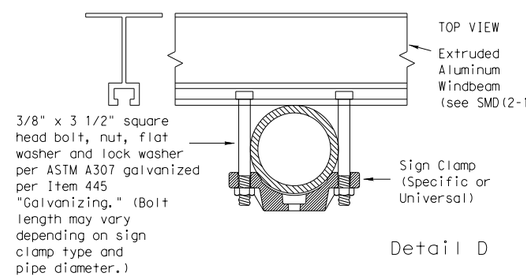


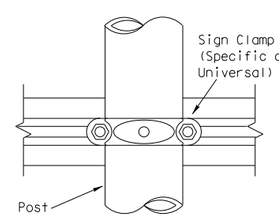
SM RD SGN ASSM TY S80(1)XX(U-2EXT)



SM RD SGN ASSYM TY XXXXX(2)XX(P)

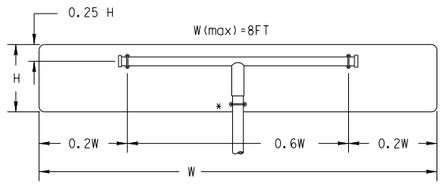
SIDE VIEW





Detail D

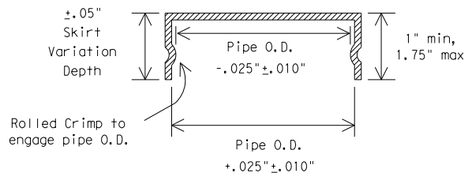
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

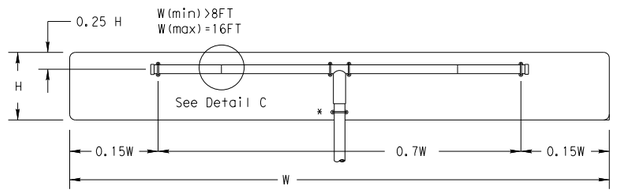
CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	173

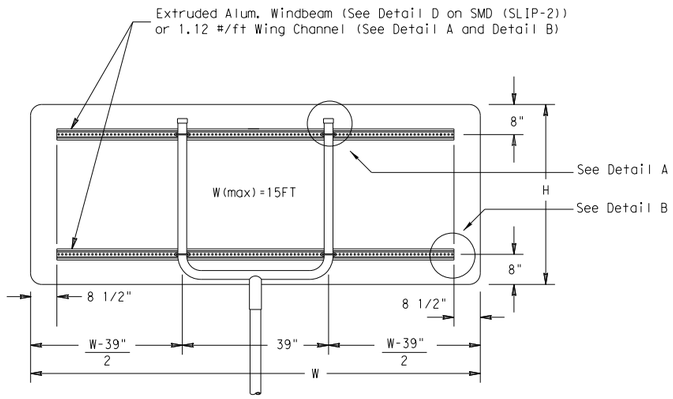
9-08 REVISIONS

26C

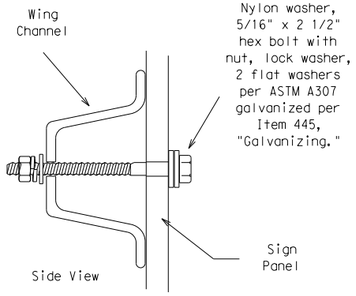
DATE: 10/14/2022 2:50:48 PM
FILE: P:\116135\04\Design\Civil\Standards\Signing\smds2.dgn



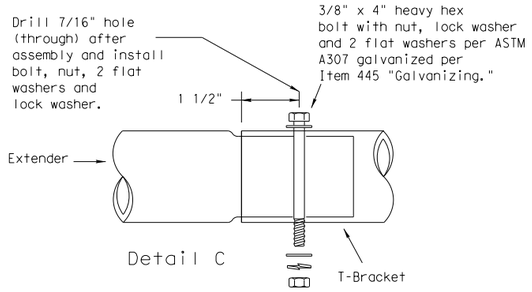
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



Detail B



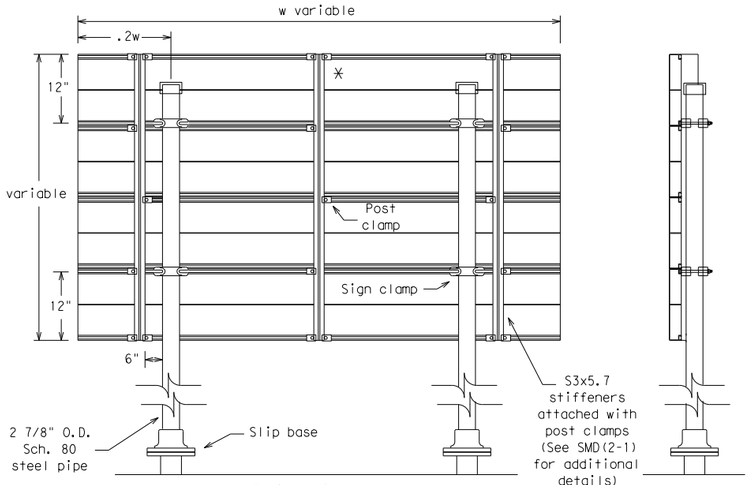
Detail C

Splices shall only be allowed behind the sign substrate.

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

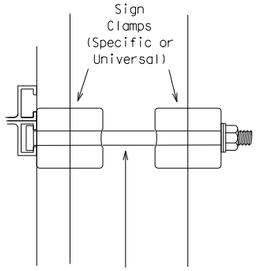
1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.



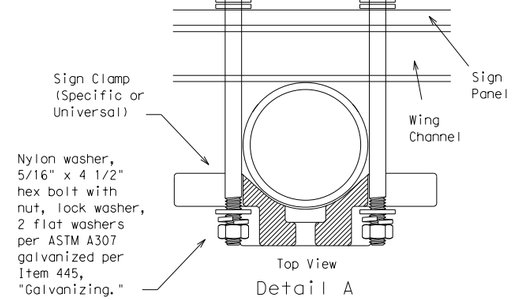
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

See Detail E
for clamp installation

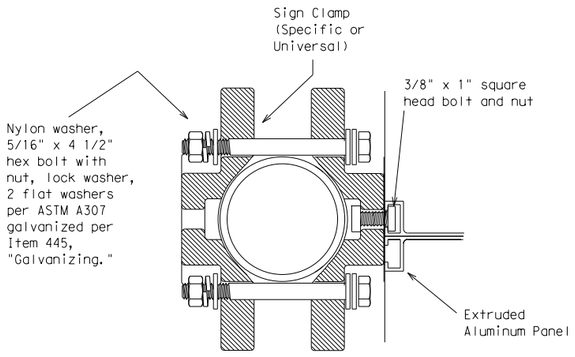


Detail E

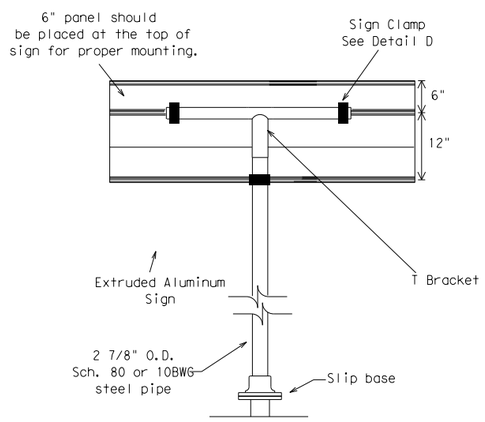


Top View

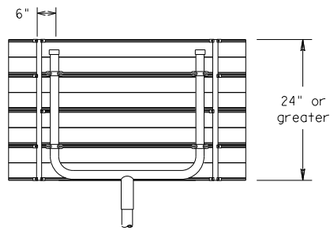
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS
9-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0610	03	095	IH 30

DIST	COUNTY	SHEET NO.
ATL	TITUS	174

DATE: 10/14/2022 2:50:49 PM
FILE: P:\116\35\04\Design\Civil\Standards\Signing\smds3.dgn

Plotted on: 7/15/2022

Design Filename: I:\36000s\36999\001\CADD\Sheets\RCH\36999_095_GENERAL NOTES.dgn

ELECTRICAL LEGEND

POWER		LIGHTING	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SINGLE RECEPTACLE		HIGH BAY LIGHTING FIXTURE
	DUPLEX RECEPTACLE		FLOOD LIGHTING FIXTURE
	QUADRUPLEX RECEPTACLE		PIT LIGHTING FIXTURE
	DUPLEX RECEPTACLE GFI		ROADWAY LIGHTING FIXTURE (BY OTHERS)
	SPLIT WIRED DUPLEX RECEPTACLE	$	SINGLE POLE SINGLE THROW SWITCH
	ISOLATED GROUND RECEPTACLE	$LV	LOW VOLTAGE CONTROL SWITCH
	SPECIAL RECPATCLE	$3	THREE WAY SWITCH
	FLOOR RECEPTACLE FLUSH MOUNTED	$M	MANUAL MOTOR STARTER HP RATED
JB	WALL MOUNTED JUNCTION BOX	PP	POWER POLE
TC	TIME CLOCK	DPP	POWER POLE W/ TWO RECESSED RECEPTACLES
JB	CEILING MOUNTED JUNCTION BOX		
	DISCONNECT, FUSED		
	DISCONNECT, NON-FUSED		
LC	LIGHTING CONTACTOR		
MC	MECH. HELD MULTIPOLE CONTACTOR		
HOA	HAND OFF AUTO SELECTOR SWITCH		
	PUSH BUTTON		
	BELL/BUZZER		
	ENCLOSED CIRCUIT BREAKER		
	LOW VOLTAGE PANEL		
	ELECTRICAL EQUIPMENT RACK		
T	TRANSFORMER		
	OVERHEAD HIGHMAST POLE AND FIXTURE BY OTHERS		
SPD	SURGE PROTECTIVE DEVICE		
	PROPOSED NEW TY A ELECTRICAL SERVICE		
	UTILITY POLE		
—OHE—	OVERHEAD ELECTRICAL UTILITY LINES		
—UGE—	UNDERGROUND ELECTRICAL UTILITY LINES		
—UGT—	UNDERGROUND TELECOM CONDUIT		

GENERAL ELECTRICAL NOTES

1. STUDY THE COMPLETE CONTRACT DOCUMENTS TO DETERMINE THE FULL SCOPE OF WORK AND TO IDENTIFY WORK PERFORMED BY OTHER TRADES. THE ELECTRICAL CONSTRUCTION WILL BE COORDINATED WITH THE WORK OF OTHER TRADES. EXAMINE THE SITE TO DETERMINE CONDITIONS THAT WILL AFFECT THE WORK AND INCLUDE ALL WORK RELATED TO THE SITE CONDITIONS IN THE BID PROPOSAL. PERFORM THE WORK WITH COMPETENT MECHANICS, SKILLED IN THEIR TRADES, TIMELY PLACING ALL MATERIALS AS THE CONSTRUCTION PROGRESSES.

2. THE BIDDER SHALL VISIT THE SITE OF THE PROPOSED WORK AND SHALL FULLY INFORM HIMSELF REGARDING THE FACILITIES. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR WORK OR MATERIALS OMITTED FROM BIDDER'S CONTRACT PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF BY SUCH INVESTIGATION.

3. EXISTING UTILITY LOCATIONS SHOWN ARE GENERALLY SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. CONTRACTOR WILL ASSUME RESPONSIBILITY FOR FACILITIES, WHETHER SHOWN OR NOT.

4. THE CONTRACTOR WILL PROTECT EXISTING PROPERTY FROM DAMAGE. ANY DAMAGES THAT MAY OCCUR TO REAL PROPERTY OR EXISTING IMPROVEMENTS SHALL BE RESTORED BY THE CONTRACTOR TO AT LEAST THE SAME CONDITION THAT THE REAL PROPERTY OR EXISTING IMPROVEMENTS WERE IN PRIOR TO THE DAMAGES. THIS RESTORATION WILL BE SUBJECT TO THE RESPECTIVE OWNER'S APPROVAL. RESTORATION OF EXISTING CONDITIONS WILL NOT BE A BASIS FOR ADDITIONAL COMPENSATION TO THE CONTRACTOR.

5. THE CONTRACTOR WILL COORDINATE HIS WORK WITH THE CONSTRUCTION MANAGER, GENERAL CONTRACTOR, AND ALL OTHER TRADES, AND WILL CONTACT ALL UTILITY COMPANIES (I.E. ELECTRICAL, TELEPHONE, CABLE, ETC.) AS NECESSARY TO CONFIRM, SCHEDULE, AND COORDINATE ELECTRICAL SERVICE ENTRANCES, NEW SERVICE ENTRANCE SUPPORT STRUCTURES, AND NEW ILLUMINATION ASSEMBLIES AS INDICATED ON THESE DRAWINGS, WITH EXISTING SITE CONDITIONS, EXISTING UTILITIES AND ALL OTHER UTILITY COMPANY REQUIREMENTS.

6. COORDINATE ALL ELECTRICAL SERVICE ENTRANCE REQUIREMENTS WITH SWEPCO ELECTRIC PRIOR TO ANY CONSTRUCTION.
   UTILITY CO. CONTACT: JASON R. MARTIN
   PHONE: 903-767-2438
   E-MAIL: JRMARTIN1@AEP.COM

7. ANY BRANCH CIRCUITING ROUTED UNDER ROADWAY WILL BE INSTALLED IN CONDUIT SLEEVES THAT EXTEND A MINIMUM OF 3'-0" BEYOND PAVEMENT.

8. ALL BRANCH CIRCUITS, CONDUITS, AND DUCT BANK SYSTEMS WILL BE GROUPED TOGETHER AND ROUTED BELOW GRADE TO THEIR RESPECTIVE TERMINATION POINTS, IN A SINGLE TRENCH, WHERE POSSIBLE.

9. THE ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR ALL EXCAVATION, TRENCHING, AND BACK FILL REQUIRED FOR ALL ELECTRICAL WORK SHOWN ON PLAN DRAWINGS. CONDUIT AND RACEWAY SYSTEM ROUTING INDICATED IS DIAGRAMMATIC OR SCHEMATIC AND SHALL BE CONSIDERED AS RECOMMENDED ROUTING ONLY. EXACT TRENCH AND CONDUIT/RACEWAY SYSTEM ROUTING INDICATED SHALL BE FIELD COORDINATED AND VERIFIED WITH ALL CIVIL, STRUCTURAL, MECHANICAL, AND PLUMBING DRAWINGS AND ALL OTHER TRADES PRIOR TO BEGINNING WORK. PROVIDE ALL EXCAVATION AND BACK FILL AS NECESSARY FOR THE INSTALLATION OF SPECIFIED WORK AND INCIDENTAL TO THE PAY ITEMS.

10. DO NOT SCALE DIMENSIONS OR DISTANCES FROM THE DRAWING TO DETERMINE MATERIAL QUANTITIES AND LABOR NEEDS FOR THE WORK SHOWN.

11. THE LOCATIONS OF ELECTRICAL ITEMS ON THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO GIVE COMPLETE AND ACCURATE DETAIL IN REGARDS TO LOCATION. THE EXACT LOCATION SHOULD BE DETERMINED BY ACTUAL MEASUREMENTS AT THE BUILDING AND WILL IN ALL CASES BE SUBJECT TO THE APPROVAL OF THE ENGINEER. THE ENGINEER RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES ON THE LOCATIONS INDICATED WITHOUT ANY ADDITIONAL COST.

12. THE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. ALL ELECTRICAL SYSTEMS RECEPTACLES, CABINETS JUNCTION BOXES, MOTOR FRAMES, MISCELLANEOUS EQUIPMENT, ETC. SHALL BE GROUNDED BY A GREEN-WIRE GROUND CONDUCTOR. METAL CONDUIT SHALL NOT BE USED AS THE ONLY EQUIPMENT GROUNDING CONDUCTOR.

13. THE MINIMUM CONDUIT SIZE FOR ELECTRICAL CIRCUITS SHALL BE 3/4". ALL CONDUIT EMERGING FROM FINISHED GRADE TO ABOVE FINISHED GRADE OF 6' SHALL BE RMC FOR PHYSICAL PROTECTION. EMT MAY BE USED FOR EXTERIOR USE ABOVE 6' BUT SHALL REQUIRE RAIN TIGHT FITTINGS.

14. THE ELECTRICAL CONTRACTOR SHALL GUARANTEE AGAINST DEFECTS IN ANY OR ALL MATERIALS, EQUIPMENT, OR WORKMANSHIP FURNISHED BY OTHERS AND SHALL MAKE GOOD, REPAIR, OR REPLACE, AT HIS OWN EXPENSE ANY DEFECTIVE WORK MATERIAL, OR PART WHICH MAY BECOME EVIDENT WITHIN A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF THE WORK. NECESSARY SERVICE AND ADJUSTMENT DURING THE EARLY STAGES OF OPERATION AFTER OCCUPANCY SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT ADDITIONAL COST TO THE OWNER.

15. ALL ELECTRICAL WIRING AND WIRING TERMINATIONS INCLUDING BREAKERS SHALL BE RATED FOR 90°C.

ELECTRICAL ABBREVIATIONS

AC - ABOVE COUNTER
AF - AMPERE FUSE SIZE
AS - AMPERE SWITCH FRAME SIZE
AFF - ABOVE FINISHED FLOOR
AFFC - ABOVE FINISHED ACCESSIBLE CEILING
AFG/AG - ABOVE FINISHED GRADE
AFP - ACR FAULT PROTECTION
AHU - AIR HANDLING UNIT
A/I - ANALOG INPUT
APPROX - APPROXIMATE
ARCH - ARCHITECTURAL
ATS - AUTOMATIC TRANSFER SWITCH
AWG - AMERICAN WIRE GAUGE
BLDG - BUILDING
C - CONDUIT
CB - CIRCUIT BREAKER
CCTV - CLOSED CIRCUIT TELEVISION
CKT - CIRCUIT
CLG - CEILING
CONT - CONTINUATION
CU - COPPER
DB - DIRECT BURIED
DE - DEMO
DEMO - DEMOLISHED
D/I - DIGITAL INPUT
D/O - DIGITAL OUPUT
DIA - DIAMETER
DN - DOWN
DWG/DWG'S - DRAWING/DRAWINGS
EX, EXIST - EXISTING
EC - EMPTY CONDUIT
ELECT - ELECTRICAL
ELEV - ELEVATION
EMERG - EMERGENCY
EQ - EQUAL
EST - ELEVATED STORAGE TANK
EWC - ELECTRIC WATER COOLER
EWH - ELECTRIC WATER HEATER
°F - DEGREES FAHRENHEIT
FA - FIRE ALARM
FAAP - FIRE ALARM COMMUNI
FACP - FIRE ALARM CONTROL PANEL
FCU - FAN COIL UNIT
FIXT - FIXTURE
FLUOR - FLUORESCENT
FLR - FLOOR
FT OR ' - FOOT, FEET
FUT - FUTURE
G/GND/GRD - GROUND
GEN - GENERATOR
GFI/GFCI - GROUND FAULT CIRCUIT INTERRUPTER PROTECTION
GRS - RIGID GALVANIZED STEEL
HOA - HAND OFF AUTOMATIC
HP - HORSE POWER
HV - HIGH VOLTAGE
HVAC - HEATING, VENTILATION AND AIR CONDITIONING
ID - INSIDE DIAMETER
IG - ISOLATED GROUND
IN OR " - INCH
INCAND - INCANDESCENT
J, JB, J BOX - JUNCTION BOX
KVA - KILOVOLT - AMPERE
LB - CONDUIT BODY
LTS - LIGHTS
LTG - LIGHTING
LV - LOW VOLTAGE
M - METER
MATV - MASTER ANTENNA TELEVISION
MAX - MAXIMUM
MCB - MAIN CIRCUIT BREAKER
MCC - MOTOR CONTROL CENTER
MDP - MAIN DISTRIBUTION PANEL
MIN - MINIMUM
MLO - MAIN LUGS ONLY
MH - MAN HOLE
MTD - MOUNTED
MTG - MOUNTING
MSB - MAIN SWITCHBOARD
N, (N) - NEW
N/A - NOT APPLICABLE
NIC - NOT IN CONTRACT
NO. OR # - NUMBER
OC - ON CENTER
OD - OUTSIDE DIAMETER
P - POLE
PB - PULL BOX
PLBG - PLUMBING
PNL - PANEL
PWR - POWER
RECEPT - RECEPTACLE
RTU - REMOTE TERMINAL UNIT
SER - SERVICE ENTRANCE RATED
SF OR SQFT - SQUARE FEET
SS - SAFETY SWITCHES
STRL - STRUCTURAL
SWBD - SWITCHBOARD
SWGR - SWITCHGEAR
TELE - TELEPHONE
THRU - THROUGH
TYP - TYPICAL
UGE - UNDERGROUND ELCTRICAL
UIT - UNIT HEATER
UNO - UNLESS NOTED OTHERWISE
UPS - UNINTERRUPTIBLE POWER SUPPLY
V - VOLTAGE
W/ - WITH
WC - WATER CLOSET
WHM - WATT-HOUR METER
W/O - WITHOUT
WP - WEATHERPROOF
XFMR - TRANSFORMER
*- PHASE
3R - NEMA 3R RATED

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

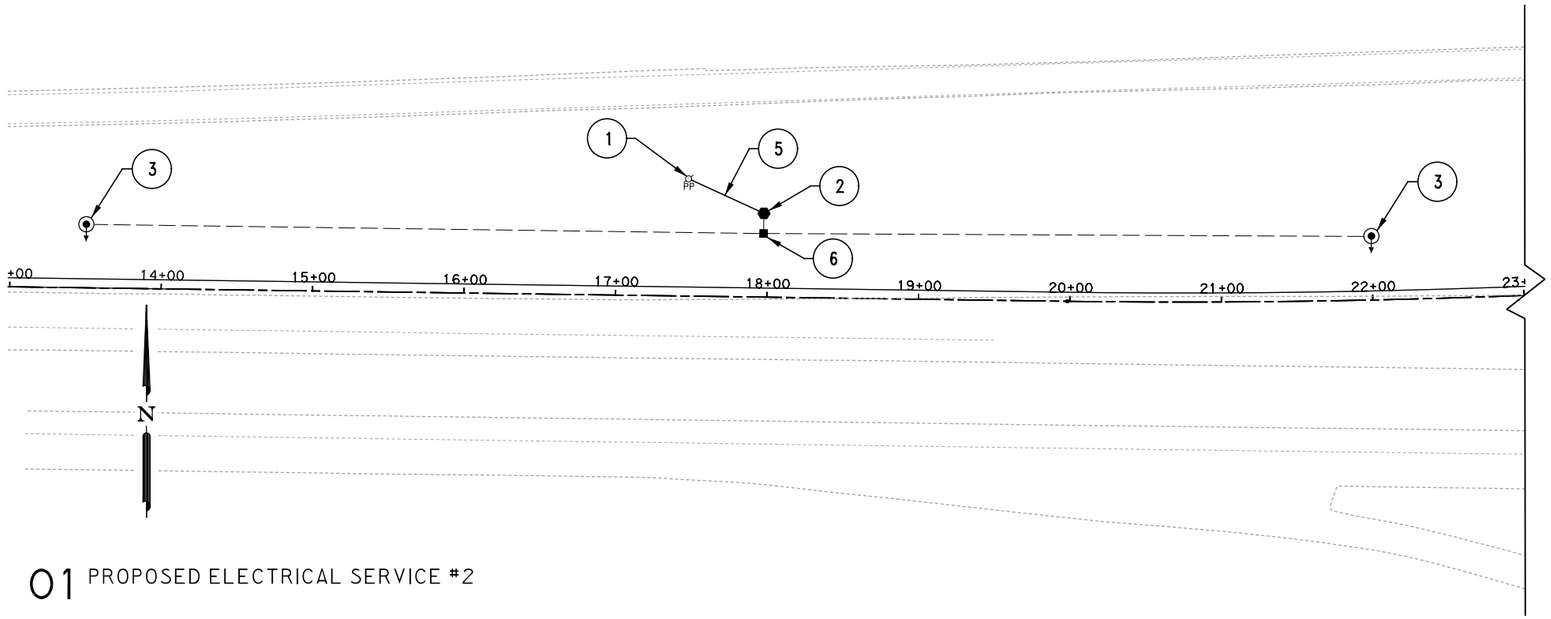
ELECTRICAL NOTES, LEGEND, AND ABBREVIATION

Add comma
AGREE

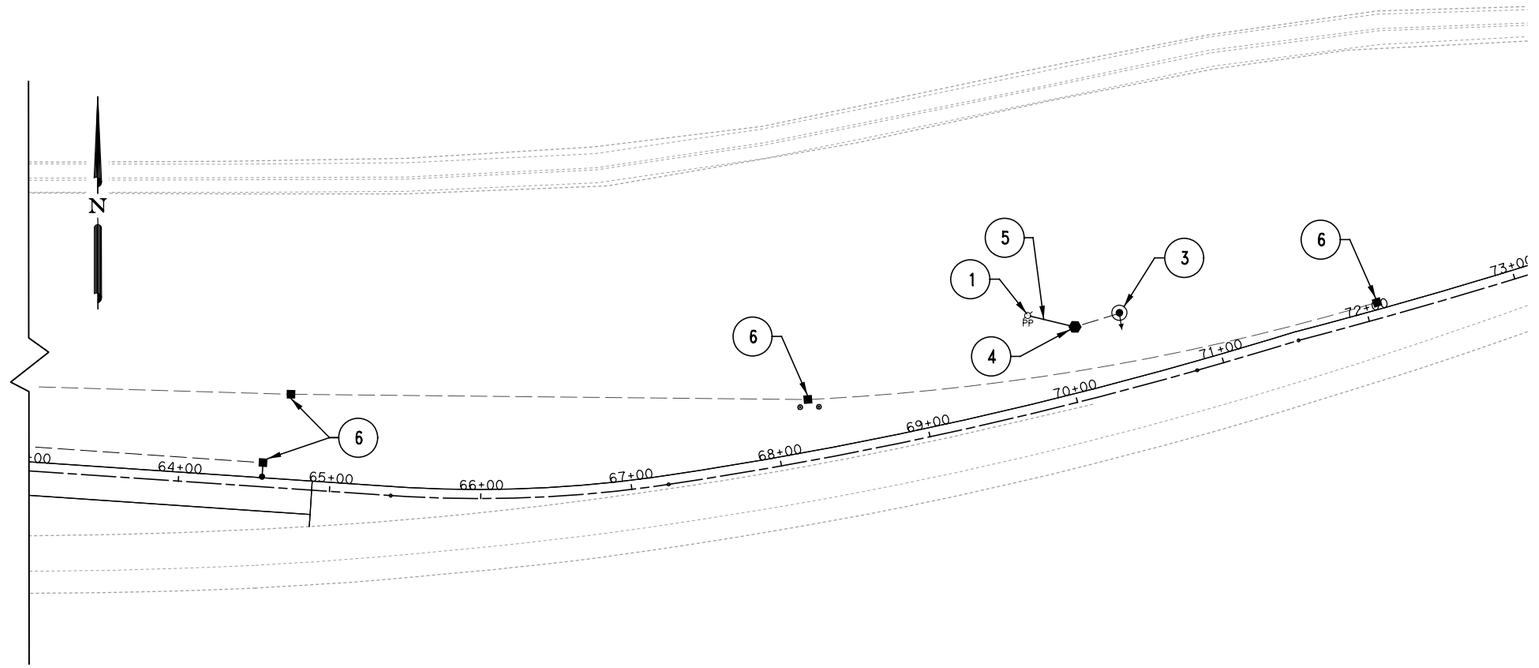
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	175

Plotted on: 7/15/2022

Design Filename: I:\36000s\36999\001\CADD\Sheet+sRCH\36999_096_ILLUMINATION LAYOUT.dgn



01 PROPOSED ELECTRICAL SERVICE #2



02 PROPOSED ELECTRICAL SERVICE #3

0 50 100 150

SCALE: 1"= 100'

GENERAL NOTES:

A. REFER TO ILLUMINATION AND CINDUIT LAYOUT SHEETS FOR MORE INFORMATION.

KEYNOTES BY SYMBOL: (#)

1. PROPOSED NEW UTILITY POWER POLE.
2. PROPOSED NEW ELECTRICAL SERVICE #2. REFER TO ELECTRICAL SERVICE DATA ON ELECTRICAL SCHEDULES SHEET FOR INFORMATION. REFER TO TXDOT ED(5)-14 FOR ADDITIONAL DETAILS.
3. HIGH MAST LIGHTINGS AND BRANCH CIRCUITINGS ARE BY OTHERS.
4. PROPOSED NEW ELECTRICAL SERVICE #3. REFER TO ELECTRICAL SERVICE DATA ON ELECTRICAL SCHEDULE SHEET FOR INFORMATION. REFER TO TXDOT ED(5)-14 FOR ADDITIONAL DETAILS.
5. OVERHEAD LINE FROM UTILITY POWER POLE TO STEEL SERVICE POLE. COORDINATE LOCATIONS WITH UTILITY COMPANY.
6. ROADWAY LIGHTING AND BRANCH CIRCUITING ARE BY OTHERS.

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.

ENGINEER: PHILLIP R. APPLEBAUM

P.E. SERIAL NO: 68404

DATE: 07/15/2022

HALFF

1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

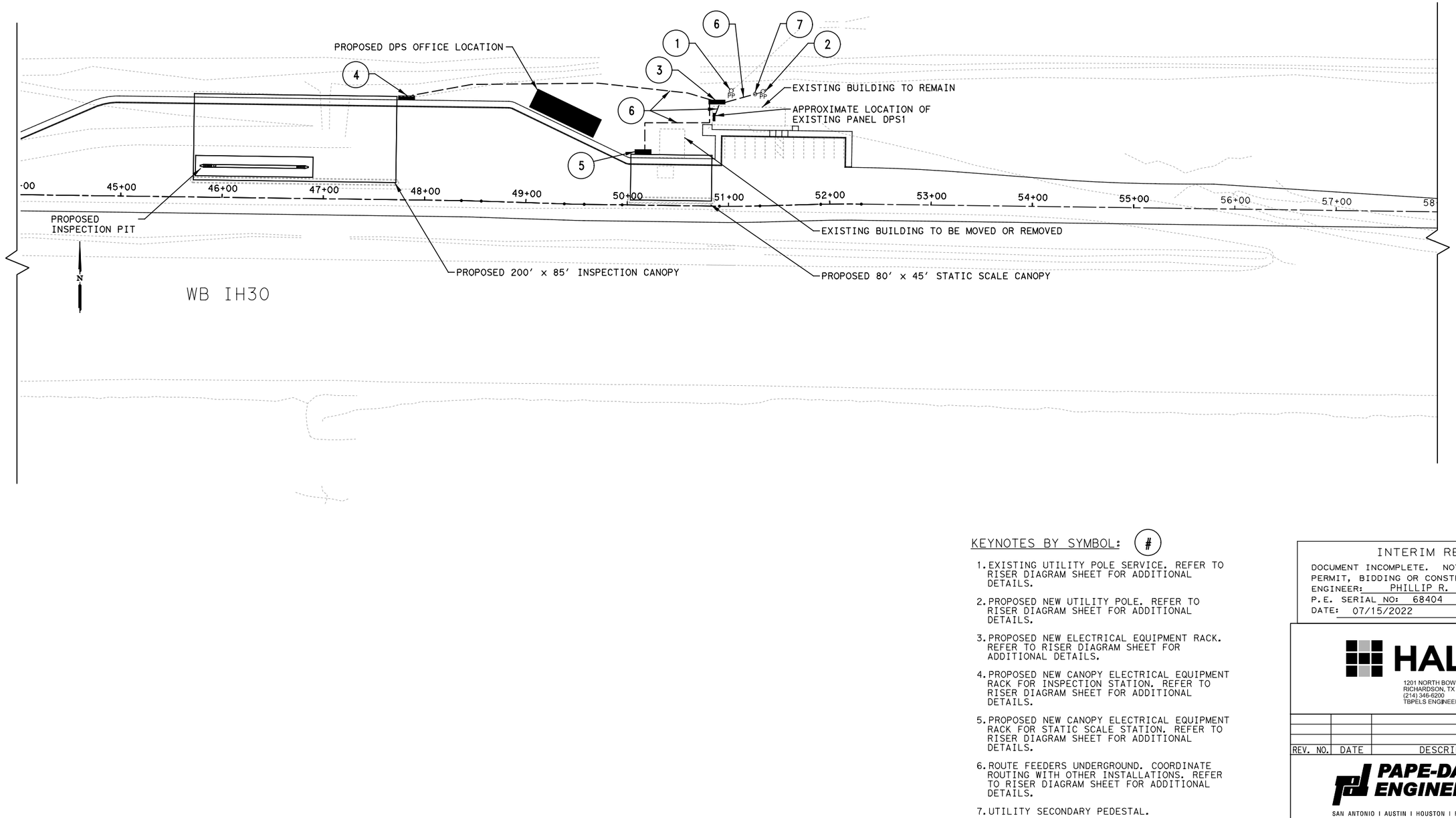
PAPE-DAWSON ENGINEERS

SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ELECTRICAL SERVICE LOCATIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	176



KEYNOTES BY SYMBOL: (#)

1. EXISTING UTILITY POLE SERVICE. REFER TO RISER DIAGRAM SHEET FOR ADDITIONAL DETAILS.
2. PROPOSED NEW UTILITY POLE. REFER TO RISER DIAGRAM SHEET FOR ADDITIONAL DETAILS.
3. PROPOSED NEW ELECTRICAL EQUIPMENT RACK. REFER TO RISER DIAGRAM SHEET FOR ADDITIONAL DETAILS.
4. PROPOSED NEW CANOPY ELECTRICAL EQUIPMENT RACK FOR INSPECTION STATION. REFER TO RISER DIAGRAM SHEET FOR ADDITIONAL DETAILS.
5. PROPOSED NEW CANOPY ELECTRICAL EQUIPMENT RACK FOR STATIC SCALE STATION. REFER TO RISER DIAGRAM SHEET FOR ADDITIONAL DETAILS.
6. ROUTE FEEDERS UNDERGROUND. COORDINATE ROUTING WITH OTHER INSTALLATIONS. REFER TO RISER DIAGRAM SHEET FOR ADDITIONAL DETAILS.
7. UTILITY SECONDARY PEDESTAL.

0 50 100 150
SCALE: 1"= 100'

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

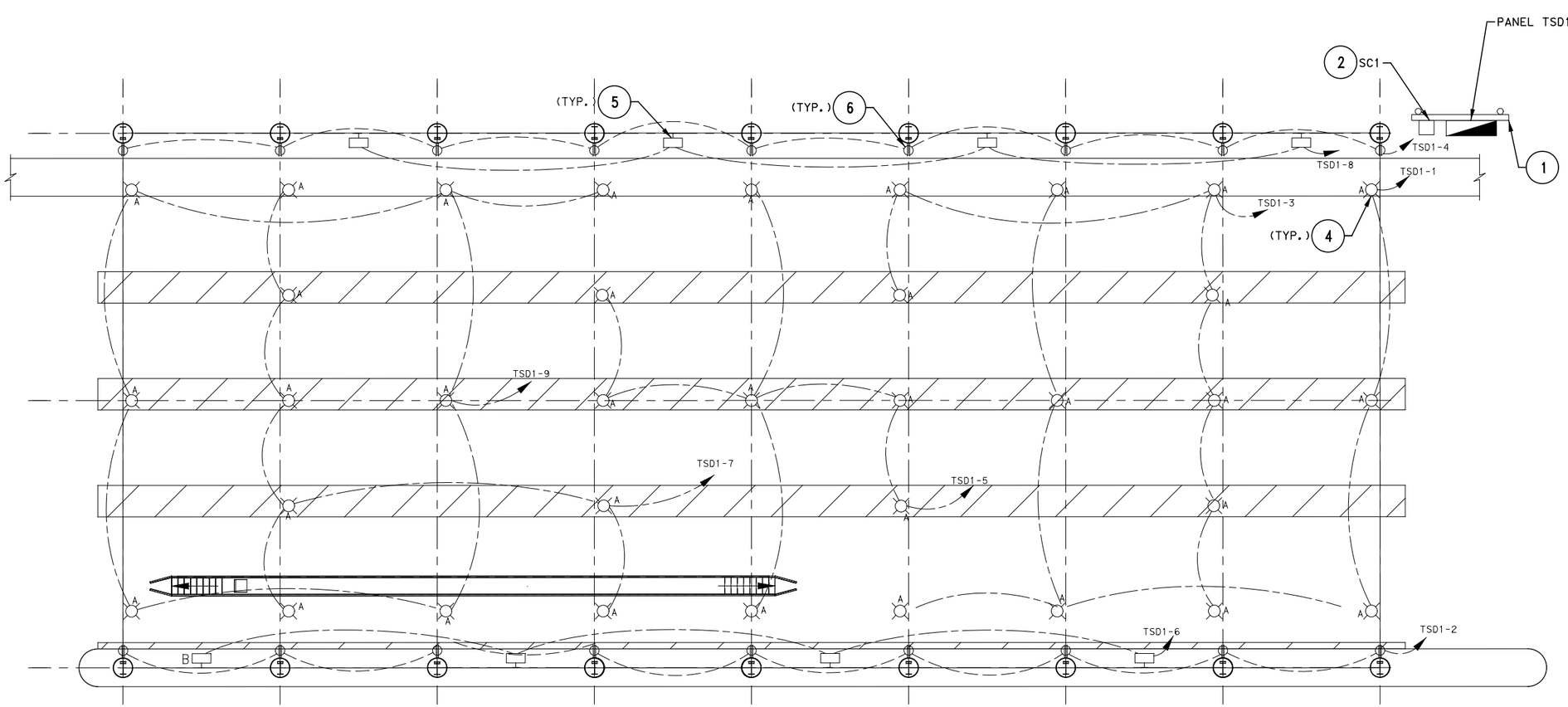
WB IH 30 CMV STATION

ELECTRICAL LAYOUT

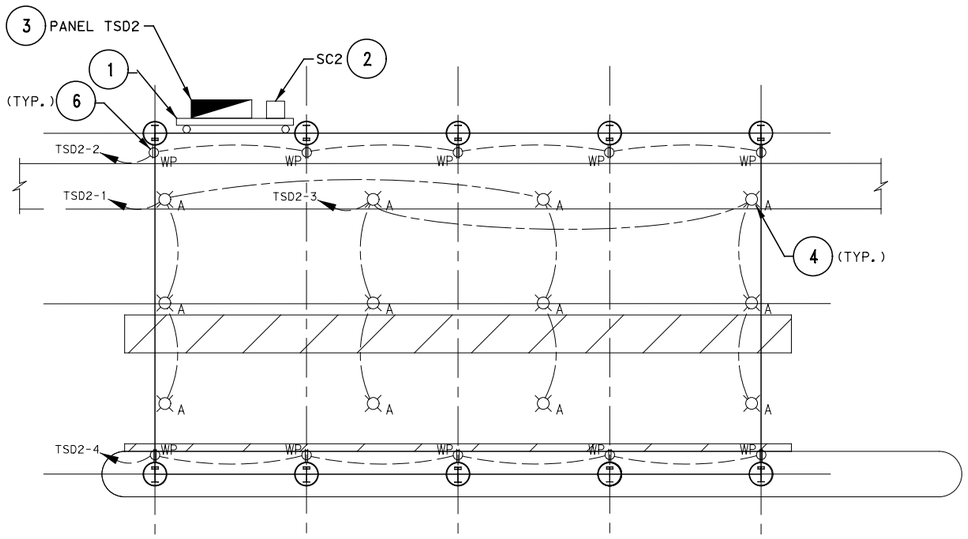
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	177

Plotted on: 7/15/2022

Design Filename: I:\36000s\36999\001\CADD\Sheets\RCH\36999_097_SITE PLAN.dgn



01 PROPOSED INSPECTION CANOPY ELECTRICAL AND LIGHTING PLAN
SCALE: 1" = 20'



02 STATIC SCALE CANOPY ELECTRICAL AND LIGHTING PLAN
SCALE: 1" = 20'

KEYNOTES BY SYMBOL: #

1. PROVIDE AND INSTALL A GALVANIZED STEEL FRAME TO SUPPORT NEW INSPECTION FACILITY ELECTRICAL EQUIPMENT. FRAME SHALL BE SUPPORTED UPRIGHT BY 2" RIGID METAL PIPES WITH A MINIMUM OF 2' DRILL SHAFT FOUNDATIONS. ALL WELDS AND CUTS SHALL BE FILED TO A SMOOTHED FINISH. COAT THE ENDS OF FRAME AND SUPPORT MEMBERS WITH GALVANIZED COMPOUND PAINT. ALL NUTS, BOLTS AND WASHERS SHALL BE MADE OF STAINLESS STEEL OR RUST PROOF MATERIAL. LOCATION OF ELECTRICAL RACK IS APPROXIMATE. COORDINATE IN FIELD WITH ENGINEER FOR FINAL PLACEMENT.

2. PROVIDE AND RACK MOUNT A NEW 20"x 20"x 6" NEMA 3R CABINET WITH HINGED DOORS FOR LIGHT SWITCHES. ROUTE ALL LIGHTING CIRCUITS THROUGH CABINETS AND LABEL CABINET.

3. PROVIDE A NEW 125 AMP, 120/240V, WITH 100 AMP MCB ELECTRICAL PANEL FOR NEW CANOPY FACILITY POWER.

4. PROVIDE PENDANT MOUNTED HI BAY LIGHT FIXTURES AS SHOWN ON ELECTRICAL SCHEDULES. MOUNT FIXTURES AT A MINIMUM CLEARANCE OF 19' AFG. REFER TO LIGHTING FIXTURE DATA FOR TYPE, SIZE, AND MOUNTING INFORMATION.

5. PROVIDE GIRDER MOUNTED FLOOD LIGHT FIXTURES AS SHOWN ON ELECTRICAL SCHEDULES. MOUNT FIXTURES AT A MINIMUM CLEARANCE OF 14' AFG. REFER TO LIGHTING FIXTURE DATA FOR TYPE, SIZE AND MOUNTING INFORMATION.

6. PROVIDE COLUMN MOUNTED WEATHERPROOF GFCI OUTLETS AS SHOWN ON ELECTRICAL AND LIGHTING PLAN SHEET. MOUNT OUTLETS AT A MINIMUM CLEARANCE OF 48" AFG.

GENERAL NOTES:
A. REFER TO INSPECTION AND STATIC SCALE CANOPY LIGHTING SECTIONS FOR SECTION DETAILS.

B. REFER TO SEA (STRUCTURAL ENGINEERING ASSOCIATES) DRAWINGS ON SHEETS 40 TO 43 FOR ADDITIONAL INFORMATIONS.

0 10 20 30
SCALE: 1"= 20'

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

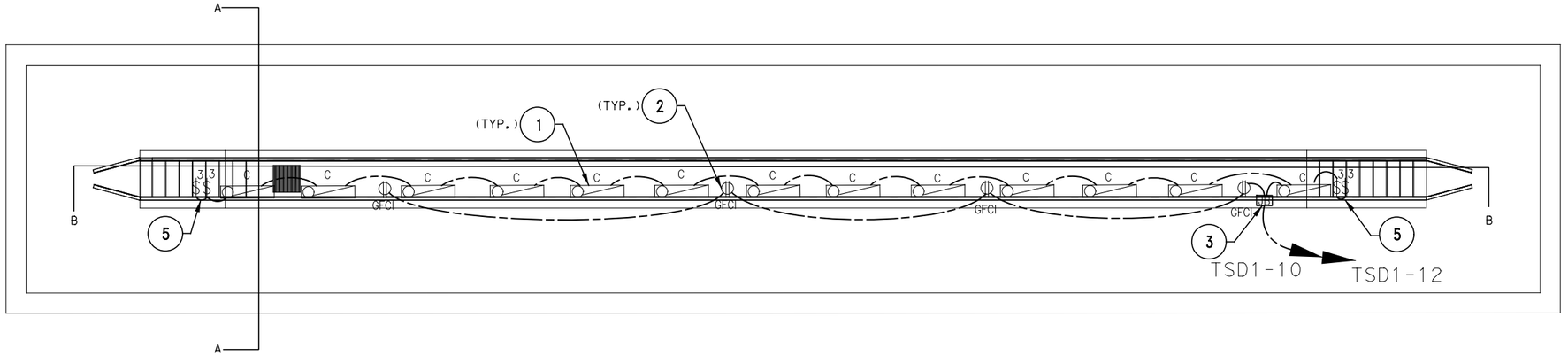
PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

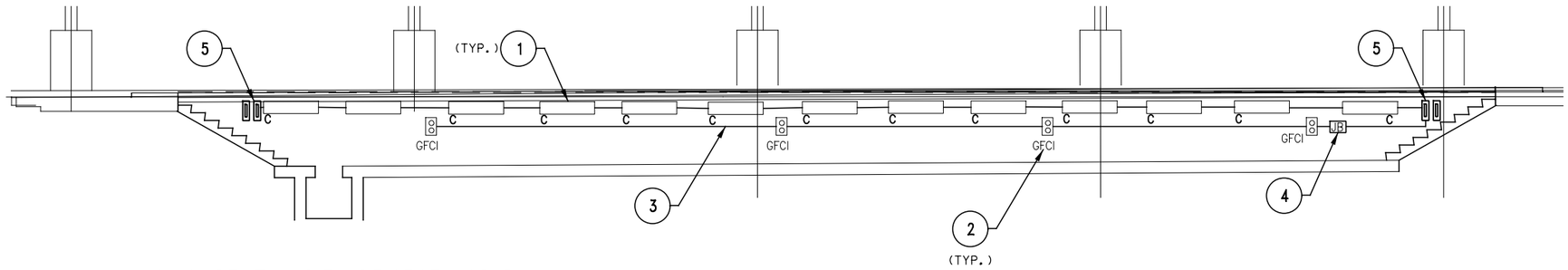
INSPECTION AND STATIC CANOPY ELECTRICAL & LIGHTING PLAN

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	178

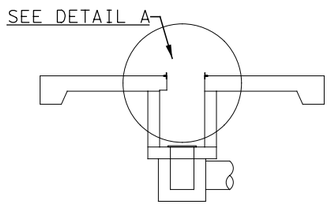
Plotted on: 7/15/2022
Design Filename: I:\36000s\36999\001\CADD\Sheets\RCH\36999_098_ENLARGED CANOPY.dgn



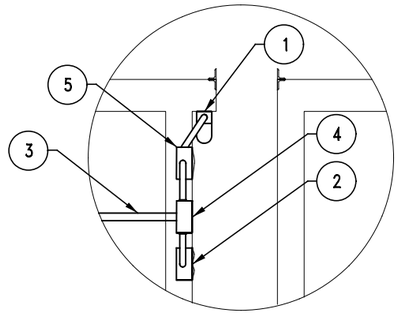
01 INSPECTION PIT ELECTRICAL AND LIGHTING PLAN
SCALE: N.T.S.



02 INSPECTION PIT SIDE SECTION B-B
SCALE: N.T.S.



03 INSECTION PIT FRONT SECTION A-A
SCALE: N.T.S.



DETAIL A

KEYNOTES BY SYMBOL: (#)

1. PROVIDE AND INSTALL PIT LIGHT FIXTURES (TYPE "C") SURFACE MOUNTED UNDERNEATH THE PIT LEDGE.

2. INSTALL 1-1 GANG RECEPTACLE BOX RECESSED MOUNTED AT APPROXIMATE LOCATIONS SHOWN. FINAL PLACEMENT SHALL BE DETERMINED IN THE FIELD. PROVIDE GFCI RECEPTACLES AT EACH LOCATION WITH WEATHERPROOF COVERS.

3. ROUTE CIRCUITS UNDERGROUND VIA 3/4" PVC CONDUIT TO NEW ELECTRICAL EQUIPMENT LOCATION. STUB-UP CONDUIT BENEATH NEW ELECTRICAL EQUIPMENT AND MAKE CONNECTIONS USING RMC AND RAIN TIGHT FITTINGS ABOVE FINISHED GRADE. REFER TO ELECTRICAL SCHEDULE, PANELBOARD 'TDS1' FOR ADDITIONAL INFORMATION.

4. PROVIDE AND INSTALL RECESSED 6x6x4 JUNCTION BOX AT APPROXIMATE LOCATIONS SHOWN ON DETAIL FOR PIT LIGHTS AND RECEPTACLES. FINAL PLACEMENT WILL BE DETERMINED IN THE FIELD AND INSTALLED AS TO NOT INTERFERE WITH THE STRUCTURAL INTEGRITY OF THE PIT. PROVIDE WEATHER PROOF COVER. REFER TO INSPECTION PIT SIDE SECTION AND DETAIL A FOR ADDITIONAL INFORMATION.

5. INSTALL 1-2 GANG SWITCH BOX RECESSED MOUNTED AT EACH END OF PIT ADJACENT TO STAIRS. FINAL PLACEMENT SHALL BE DETERMINED IN THE FIELD. PROVIDE WEATHERPROOF 2-3 WAY SWITCHES AT EACH END FOR SWITCHING PIT LIGHTS. ONE SET OF 3-WAY SWITCHES SHALL CONTROL EVERY OTHER LIGHT FIXTURE. FOLLOW SAME CIRCUIT SWITCHING PATTERN FOR SUBSEQUENT 3-WAY SET.

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

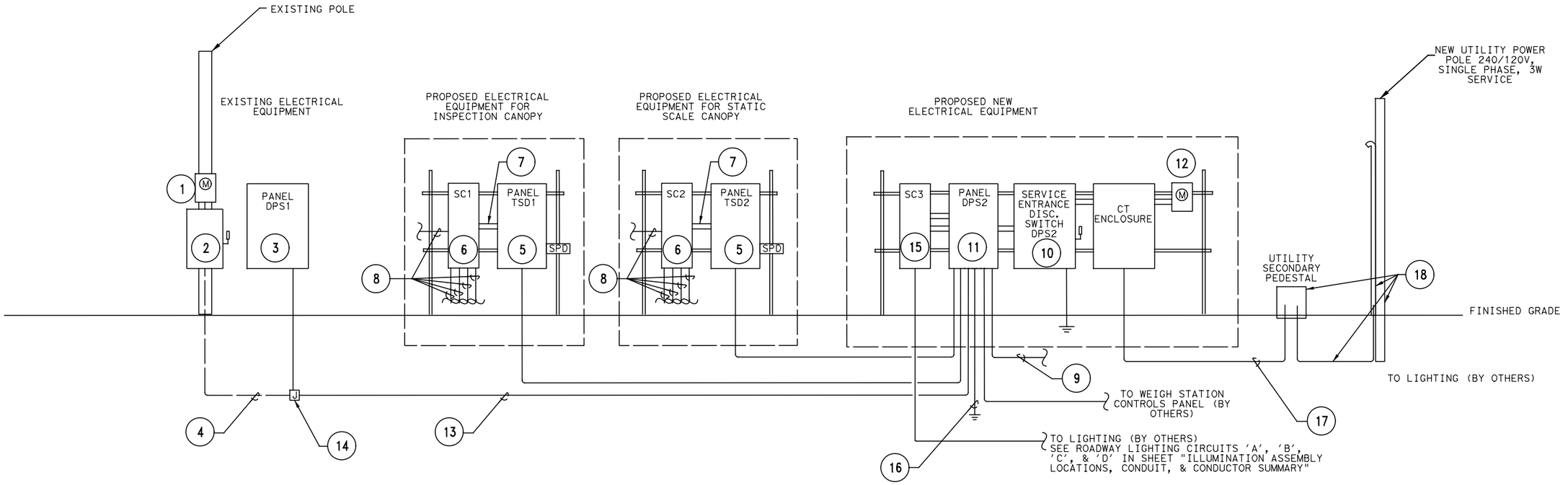
REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

INSPECTION PIT ELECTRICAL AND LIGHTING PLAN

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	179



NOTES:

A. ALL CONDUITS 6'-0" ABOVE FINISHED GRADE TO 1'-0" BELOW GRADE SHALL BE RMC. BELOW GRADE RMC TO BE WRAPPED BY CORROSION PROTECTION TAPE APPROVED FOR USE ON ELECTRICAL CONDUITS.

B. ALL CONDUITS BELOW GRADE SHALL BE SCH 40 PVC AT DEPTHS REQUIRED BY NEC.

C. ALL CONDUCTORS SHALL BE UL LISTED, AWG SIZE AS SHOWN ON PLANS AND WITH TYPE THWN INSULATION, UNLESS SHOWN OTHERWISE ON THE PLANS.

D. SURGE SUPPRESSION DEVICE (SPD) UL 1449 CLASS 1 GRADE A TO BE PLACED AT NEW INSPECTION STATION AND NEW WEIGH STATION ELECTRICAL PANELS TSD1 AND TSD2.

E. LEAVE SUFFICIENT LENGTH OF WIRE TO TERMINATE OR SPLICE IN DISCONNECTS, PANELS AND BOXES WITHOUT A SPLICE DURING WIRE PULLS.

F. PROVIDE AND INSTALL 10" WIDE x 8" LONG, WHITE ON RED PHENOLIC NAMEPLATE OR PLACARD WITH THE ONE-LINE DIAGRAM DESIGN, THIS SHEET AND PLACE AT EVERY ELECTRICAL LOCATION.

KEYNOTES BY SYMBOL: (#)

1. EXISTING METER TO BE REMOVED.
2. EXISTING 200A, 240V DISCONNECT SWITCH TO BE REMOVED.
3. EXISTING PANEL DPS1, 200A MCB, 240/120V, SINGLE PHASE, 3W LOCATED IN EXISTING BUILDING TO REMAIN. PANEL SHALL BE REFED FROM NEW PANEL DPS2.
4. EXISTING UNDERGROUND CONDUIT AND CONDUCTORS TO BE REMOVED.
5. PROVIDE NEW 125A PANEL MOUNTED ON RACK.
6. PROVIDE 20"x20"x8" NEMA 3R, HINGED LOCKABLE CABINET TO ACCOMMODATE LIGHTING CONTROL SYSTEM FOR CANOPY LIGHTING. PENDANT MOUNT AND FLOOD LIGHTS WILL BE CONTROLLED BY (2) SEPARATE SWITCHES AS SHOWN ON LIGHTING PLAN.
7. NEW RMC NIPPLE WITH SCALING LOCKNUTS. REFER TO PANEL SCHEDULE ON ELECTRICAL SCHEDULES FOR CANOPY AND PIT LIGHT CIRCUIT INFORMATION, BRANCH CIRCUIT NUMBERS AND SIZES.
8. PROVIDE 3/4" RMC CONDUITS ABOVE FINISHED GRADE FOR LIGHTING AND RECEPTACLES. CONVERT CONDUIT TO PVC UNDERGROUND.
9. PROVIDE 2" CONDUIT UNDERGROUND TO PROPOSED DPS OFFICE BUILDING LOCATION.
10. PROVIDE NEW SERVICE ENTRANCE RATED FUSED DISCONNECT SWITCH, 600A, 240V, 2P, NEMA 3R.
11. PROVIDE NEW 600A PANEL DPS2 MOUNTED ON RACK.
12. NEW METER PER UTILITY COMPANY'S REQUIREMENTS.
13. INTERCEPT EXISTING CONDUIT AND CONDUCTORS FEEDING EXISTING PANEL DPS1 AND EXTEND CONDUIT AND CONDUCTORS TO NEW PANEL DPS2. MATCH EXISTING CONDUIT AND CONDUCTORS. ESTIMATED CONDUIT AND CONDUCTOR SIZES ARE 3#3/0, 1#6G, 2"C.
14. NEW IN-GROUND PULLBOX.
15. PROVIDE 20"x20"x8" NEMA 3R, HINGED LOCKABLE CABINET TO ACCOMMODATE LIGHTING CONTROL SYSTEM FOR LIGHTING (BY OTHERS).
16. SERVICE GROUND PER NEC 250.
17. TWO SET OF 3#350 IN 2-1/2"C, FROM PEDESTAL TO SERVICE DISCONNECT VIA CT ENCLOSURE.
18. PROVIDED BY ELECTRIC UTILITY.

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

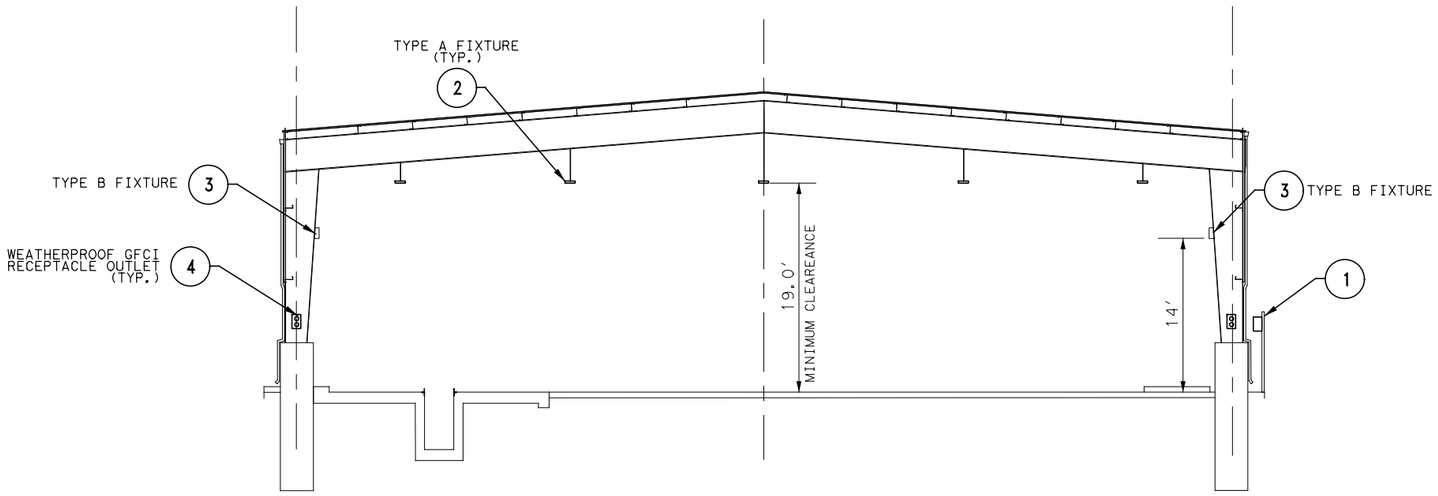
WB IH 30 CMV STATION

RISER DIAGRAM

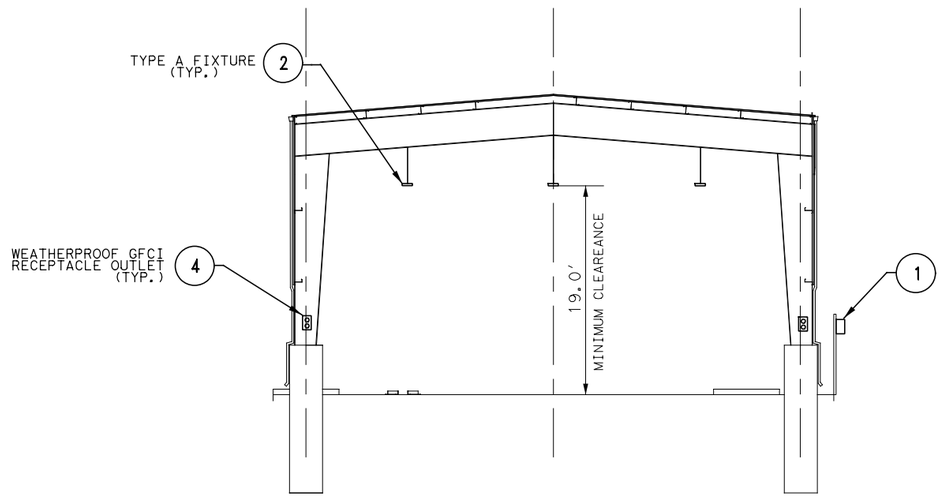
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	180

Plotted on: 7/15/2022

Design Filename: I:\36000s\36999\001\CADD\Sheets\RCH\36999_100_RISER.dgn



01 PROPOSED INSPECTION CANOPY ELECTRICAL LIGHTING SECTION
SCALE: N.T.S.



02 PROPOSED STATIC SCALE CANOPY ELECTRICAL & LIGHTING SECTION
SCALE: N.T.S.

KEYNOTES BY SYMBOL: (#)

1. PROVIDE AND INSTALL A GALVANIZED STEEL FRAME TO SUPPORT NEW INSPECTION FACILITY ELECTRICAL EQUIPMENT. FRAME SHALL BE SUPPORTED UPRIGHT BY 2" RIGID METAL PIPES WITH A MINIMUM OF 2' DRILL SHAFT FOUNDATIONS. ALL WELDS AND CUTS SHALL BE FILED TO A SMOOTH FINISH. COAT THE ENDS OF FRAME AND SUPPORT MEMBERS WITH GALVANIZED COMPOUND PAINT. ALL NUTS, BOLTS AND WASHERS SHALL BE MADE OF STAINLESS STEEL OR RUST PROOF MATERIAL. LOCATION OF RACK IS APPROXIMATE. COORDINATE IN FIELD WITH ENGINEER FOR FINAL PLACEMENT.

2. PROVIDE PENDANTS MOUNTED HIGH BAY LIGHT FIXTURES AS SHOWN ON ELECTRICAL AND LIGHTING FIXTURE SCHEDULE ON SHEET 74. MOUNT FIXTURES AS SHOWN ON ELECTRICAL AND LIGHTING SCHEDULE. MOUNT FIXTURES AT A MINIMUM CLEARANCE OF 19' AFG. REFER TO LIGHTING SCHEDULE FOR TYPE, SIZE AND MOUNTING INFORMATION.

3. PROVIDE GIRDER MOUNTED FLOOD LIGHT FIXTURES AS SHOWN ON ELECTRICAL AND LIGHTING SCHEDULE. MOUNT FIXTURES AT A MINIMUM CLEARANCE OF 14' AFG. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET 74 FOR TYPE, SIZE AND MOUNTING INFORMATION.

4. PROVIDE COLUMN MOUNTED WEATHER PROOF GFCI OUTLETS AS SHOWN ON ELECTRICAL AND LIGHTING PLAN SHEET. MOUNT OUTLETS AT A MINIMUM CLEARANCE OF 48" AFG. REFER TO SYMBOLS LEGEND AND GENERAL NOTES ON SHEET 095 FOR ADDITIONAL INFORMATION.

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

INSPECTION AND STATIC SCALE CANOPY LIGHTING SECTIONS

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	181

Plotted on: 7/15/2022

Design Filename: I:\36000s\36999\001\CADD\Sheets\RCH\36999_102_SCHEDULES.dgn

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	MODEL NUMBER	MOUNTING HEIGHT	LAMPS	WATTS	TEMP.	VOLTAGE	DESCRIPTION
A	ALS	HB-150-40-PC-Finish-UD -MOUNT-HB-P OR EQUIVALENT	19'	LED	150	4000K	120/277	LED BAY LIGHT WITH CLEAR LENS, IP66, PENDANT MOUNT, 24390 LUMEN, (SEMI-GLOSS BLACK OR WHITE FINISH?)
B	STONCO	FL80-NW-G1-T-FL-8-BZ OR EQUIVALENT	14'	LED	80	4000K	120/277	LED FLOODLIGHT, WITH TRUNNION MOUNTING KIT, BRONZE COLOR, IP66
C	LINMORE LED	HD20S-A1-06K-4N-40-80-BC-LV-MLT-SSLCH-HZLOC OR EQUIVALENT		LED	40	4000K	120/277	SURFACE MOUNTED PIT FIXTURE, CLASS I DIVISION II, CLEAR RIBBED LENS

ELECTRICAL SERVICE DATA

ELECT SERV NO.	SHEET NO.	ELECTRICAL SERVICE DESCRIPTION (5) -14) (SEE ED	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT		TWO-POLE CONTACTOR AMPS	PANEL BD, / LOADCENTER AMP RATING	CIRCUIT	BRANCH CKT. BKR. POLE/AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
						SWITCH AMP/FUSE	CKT. BKR. POLE/AMP						
#1	ELECTRICAL LAYOUT	CUSTOM 600A 120240V 1PH 3W SERVICE TO SERVE BUILDINGS, CANOPIES, & ROADWAY LIGHTING REFER TO RISER DIAGRAM	(2) 2-1/2"	(2) 350KCMIL	600	600/600	N/A	N/A	NOTES 1 & 2	NOTE 1	NOTE1	NOTE 1	NOTE 1
#2	ELECTRICAL SERVICE	ELEC SRV TY A 120/240 060 (SS) SS(E) SP (O)	1-1/4"	3/#6	100	N/A	2P/60	100	N/A	E	2P/40	5	2.4
#3	ELECTRICAL SERVICE	ELEC SRV TY A 120/240 060 (SS) SS (E) SP (O)	1-1/4"	3/#6	100	N/A	2P/60	100	N/A	F	2P/40	5	2.4

NOTES:
1. SEE PANELBOARD SCHEDULES "DPS2", "TSD1", & "TSD2".
2. SEE ELECTRICAL RISER DIAGRAM.

PANELBOARD SCHEDULE DPS2

DESIGNATION	FEEDER NO.	POLES & AMPS	LOAD, VA LTG.	RECPT.	OTHER	CK	PH	CK	LOAD, VA LTG.	RECPT.	OTHER	POLES & AMPS	FEEDER NO.	DESIGNATION
DPS1	3	2/200				1	A	2			5610	2/125	4	TSD1
EXISTING PANELBOARD						3	C	4			4760			NEW PANELBOARD
PROPOSED DPS OFFICE	3	2/200				5	A	6			1140	2/125	4	TSD2
						7	C	8			1140			NEW PANELBOARD
SPARE		2/20				9	A	10				1/20		SPARE
						11	C	12				1/20		SPARE
ROADWAY LTG CKT A	5	2/40	2600			13	A	14				1/20		SPARE
			2600			15	C	16				1/20		SPARE
ROADWAY LTG CKT B	5	2/40	1300			17	A	18						SPACE
			1300			19	C	20						SPACE
ROADWAY LTG CKT C	5	2/40	1820			21	A	22						SPACE
			1820			23	C	24						SPACE
ROADWAY LTG CKT D	5	2/40	1560			25	A	26						SPACE
			1560			27	C	28						SPACE
SPACE						29	A	30						SPACE
SPACE						31	C	32						SPACE
SECTION SUB-TOTALS			14560	0	0				0	0	12650			SECTION SUB-TOTALS

CATEGORY	CONN. LOAD KVA	AMPS	DESIGN LOAD DIV.	KVA	AMPS
LIGHTING:	21.5	89.4	1.25	26.8	111.7
RECEPTACLE:	5.8	24.0	1.00	5.8	24.0
MOTORS:	0.0	0.0	1.00	0.0	0.0
SPECIAL LOADS:	0.0	0.0	1.00	0.0	0.0
ELECTRIC HEATING:	0.0	0.0	1.00	0.0	0.0
WATER HEATING:	0.0	0.0	1.00	0.0	0.0
TOTAL:	27.2	113.4		32.6	135.7

MOUNTING:	SURFACE
VOLTS:	120/240
PHASE/WIRE:	1/3
MAINS SIZE:	600 AMPS
MAINS TYPE:	MLO
BUSS TYPE:	COPPER
BRKR TYPE:	BOLT-IN
AIC (RMS):	65,000
A Pha 14.0	Connected Kva
C Pha 13.2	Connected Kva

REMARKS:

FEEDER NO.:
1 = 2 #12, #12G - 3/4"C
2 = 2 #10, #10G - 3/4"C
3 = 3 #3/0, #6G - 2"C
4 = 3 #1/0, #6G - 1.5"C
5 = 2 #8, #10G - 1"C

NOTE:
1. FOR ROADWAY LIGHTING CIRCUITS 'A', 'B', 'C', & 'D', REFER TO "ILLUMINATION AND CONDUIT LAYOUT" AND ILLUMINATION ASSEMBLY LOCATIONS, CONDUIT, & CONDUCTOR SUMMARY SHEETS".

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ELECTRICAL SCHEDULES

SHEET 1 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	182

Plotted on: 7/15/2022

Design Filename: I:\36000s\36999\001\CADD\Sheets\RCH\36999_103_SCHEDULES.dgn

PANELBOARD SCHEDULE TSD1

DESIGNATION	FEEDER NO.	POLES & AMPS	LOAD, VA LTG.	RECPT.	OTHER	C K	P H	C K	LOAD, VA LTG.	RECPT.	OTHER	POLES & AMPS	FEEDER NO.	DESIGNATION
CANOPY HI-BAY LTG	1	1/20	1050			1	A	2		1620		1/20	2	GFCI RECEPTS SOUTH
CANOPY HI-BAY LTG	1	1/20	1050			3	C	4		1620		1/20	2	GFCI RECEPTS NORTH
CANOPY HI-BAY LTG	1	1/20	1050			5	A	6	320			1/20	1	FLOOD LIGHT SOUTH
CANOPY HI-BAY LTG	1	1/20	1050			7	C	8	320			1/20	1	FLOOD LIGHT NORTH
CANOPY HI-BAY LTG	1	1/20	1050			9	A	10	520			1/20	1	PIT LIGHTS
SPARE		1/20				11	C	12		720		1/20	2	PIT RECEPTS
SPARE		1/20				13	A	14				1/20		SPARE
SPARE		1/20				15	C	16				1/20		SPARE
SPARE		1/20				17	A	18				1/20		SPARE
SPARE		1/20				19	C	20				1/20		SPARE
SPARE		1/20				21	A	22				1/20		SPARE
SPARE		1/20				23	C	24				1/20		SPARE
SPARE		1/20				25	A	26				1/20		SPARE
SPARE		1/20				27	C	28				1/20		SPARE
SPARE		1/20				29	A	30				1/20		SPARE
SPACE						31	C	32						SPACE
SECTION SUB-TOTALS			5250	0	0				1160	3960	0			SECTION SUB-TOTALS

CATEGORY	CONN. LOAD KVA	AMPS	DESIGN LOAD DIV.	KVA	AMPS
LIGHTING:	6.4	26.7	1.25	8.0	33.4
RECEPTACLE:	4.0	16.5	1.00	4.0	16.5
MOTORS:	0.0	0.0	1.00	0.0	0.0
SPECIAL LOADS:	0.0	0.0	1.00	0.0	0.0
ELECTRIC HEATING:	0.0	0.0	1.00	0.0	0.0
WATER HEATING:	0.0	0.0	1.00	0.0	0.0
TOTAL:	10.4	43.2		12.0	49.9

MOUNTING:	SURFACE
VOLTS:	120/240
PHASE/WIRE:	1/3
MAINS SIZE:	125 AMPS
MAINS TYPE:	MCB
BUSS TYPE:	COPPER
BRKR TYPE:	BOLT-IN
A.I.C. (RMS)	30,000
A Pha 5.6	Connected Kva
C Pha 4.8	Connected Kva

REMARKS:

FEEDER NO.:
1 = 2 #12, #12G - 3/4"C
2 = 2 #10, #10G - 3/4"C

PANELBOARD SCHEDULE TSD2

DESIGNATION	FEEDER NO.	POLES & AMPS	LOAD, VA LTG.	RECPT.	OTHER	C K	P H	C K	LOAD, VA LTG.	RECPT.	OTHER	POLES & AMPS	FEEDER NO.	DESIGNATION
CANOPY HI-BAY LTG	1	1/20	240			1	A	2		900		1/20	2	RECEPTACLES
CANOPY HI-BAY LTG	1	1/20	240			3	C	4		900		1/20	2	RECEPTACLES
SPARE		1/20				5	A	6				1/20		SPARE
SPARE		1/20				7	C	8				1/20		SPARE
SPARE		1/20				9	A	10				1/20		SPARE
SPARE		1/20				11	C	12				1/20		SPARE
SPARE		1/20				13	A	14				1/20		SPARE
SPARE		1/20				15	C	16				1/20		SPARE
SPARE		1/20				17	A	18				1/20		SPARE
SPARE		1/20				19	C	20				1/20		SPARE
SPARE		1/20				21	A	22				1/20		SPARE
SPARE		1/20				23	C	24				1/20		SPARE
SECTION SUB-TOTALS			0	0	0				0	0	0			SECTION SUB-TOTALS

CATEGORY	CONN. LOAD KVA	AMPS	DESIGN LOAD DIV.	KVA	AMPS
LIGHTING:	0.5	2.0	1.25	0.6	2.5
RECEPTACLE:	1.8	7.5	1.00	1.8	7.5
MOTORS:	0.0	0.0	1.00	0.0	0.0
SPECIAL LOADS:	0.0	0.0	1.00	0.0	0.0
ELECTRIC HEATING:	0.0	0.0	1.00	0.0	0.0
WATER HEATING:	0.0	0.0	1.00	0.0	0.0
TOTAL:	2.3	9.5		2.4	10.0

MOUNTING:	SURFACE
VOLTS:	120/240
PHASE/WIRE:	1/3
MAINS SIZE:	125 AMPS
MAINS TYPE:	MCB
BUSS TYPE:	COPPER
BRKR TYPE:	BOLT-IN
A.I.C. (RMS)	30,000
A Pha 1.1	Connected Kva
C Pha 1.1	Connected Kva

REMARKS:

FEEDER NO.:
1 = 2 #12, #12G - 3/4"C
2 = 2 #10, #10G - 3/4"C

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: PHILLIP R. APPLEBAUM
P.E. SERIAL NO: 68404
DATE: 07/15/2022

HALFF
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
(214) 346-6200
TBPELS ENGINEERING FIRM #312

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

ELECTRICAL SCHEDULES

SHEET 2 OF 2

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	183

DATE: 10/14/2022 2:50:50 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\ed1-14 (1).dgn

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

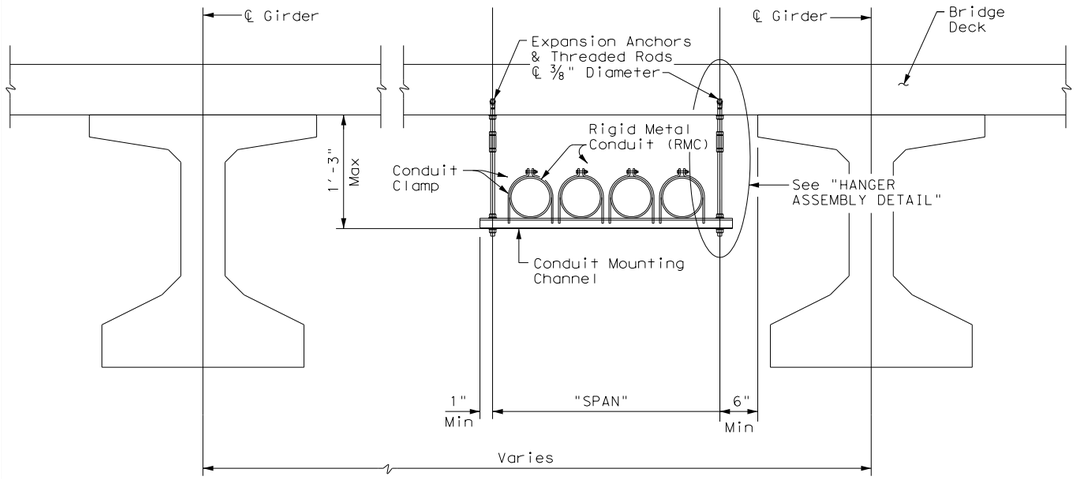
Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:		CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB		HIGHWAY
REVISIONS		0610	03	095		IH 30
		DIST		COUNTY		SHEET NO.
		ATL		TITUS		184

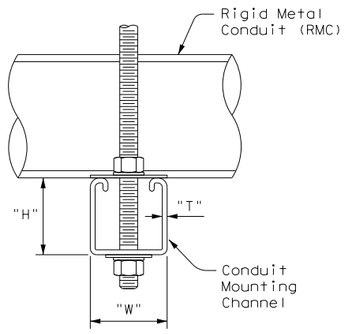
DATE: 10/14/2022 2:50:52 PM
FILE: P:\116135\04\Design\Civil\Standards\Illumination\ed2-14 (1).dgn

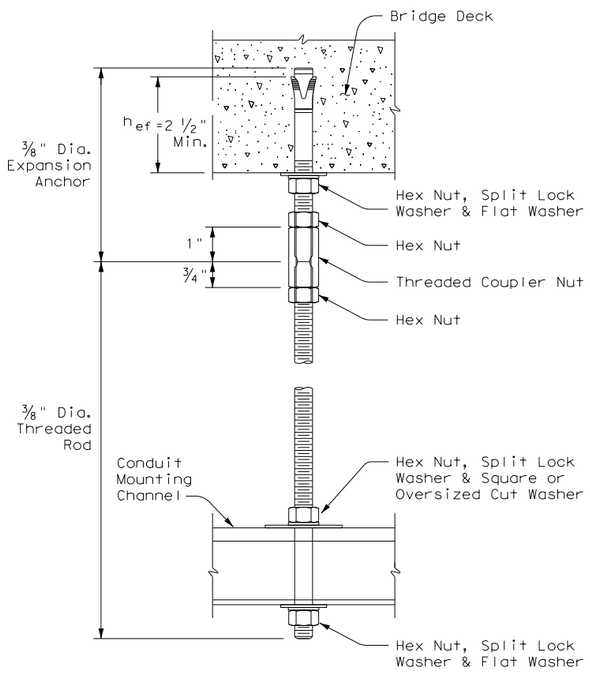


CONDUIT HANGING DETAIL

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.

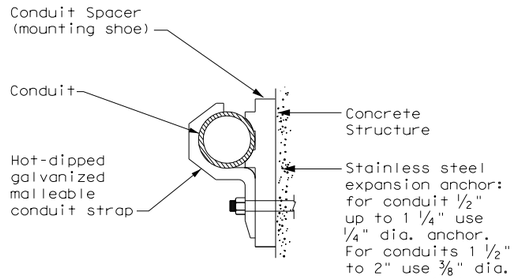
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

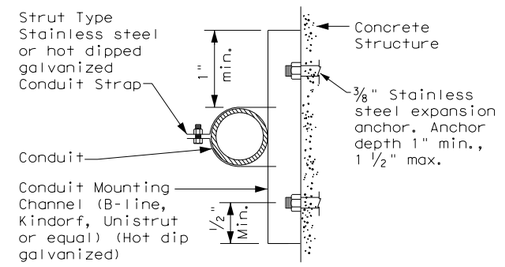




HANGER ASSEMBLY DETAIL

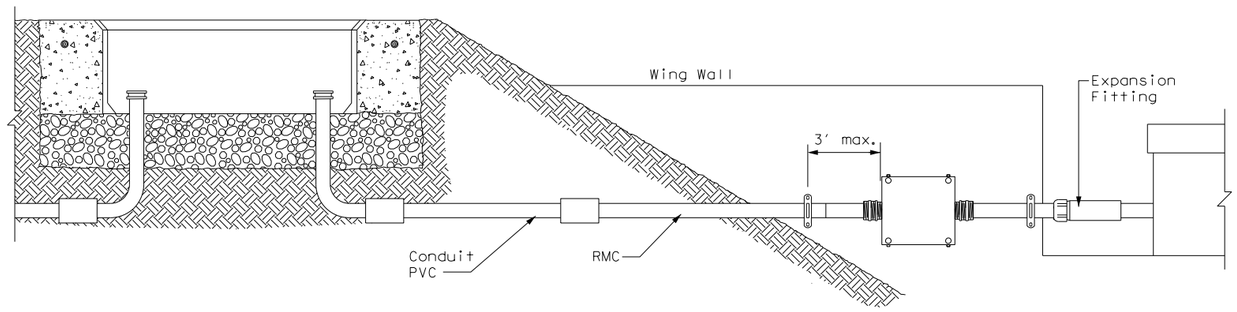
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





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

FILE: ed2-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		185

DATE: 10/14/2022 2:50:53 PM
FILE: P:\116335104\Design\Civil\Standards\Illumination\ed3-14 (1).dgn

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.

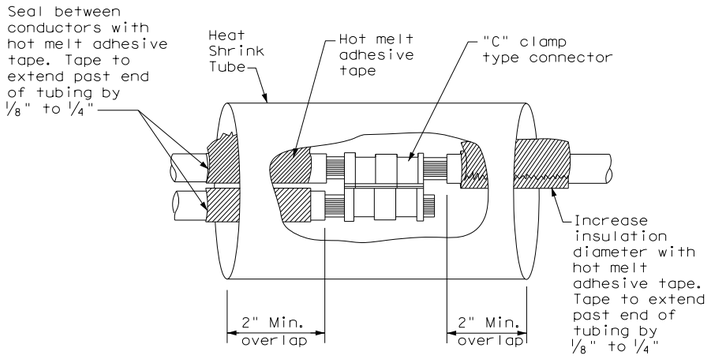
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

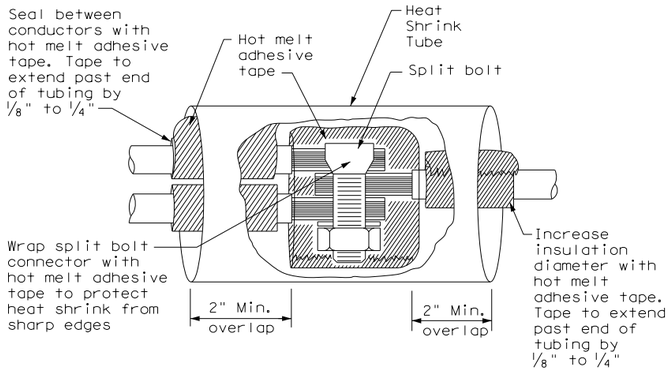
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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.

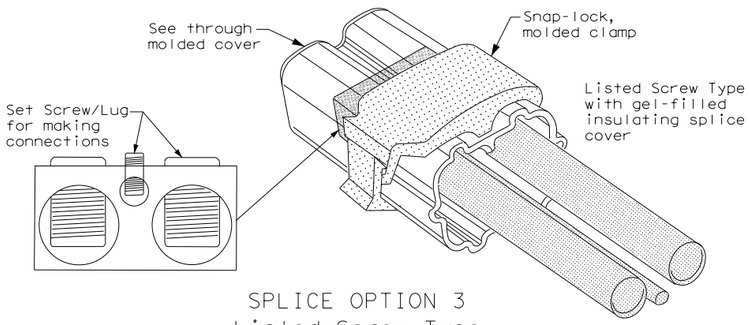
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



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

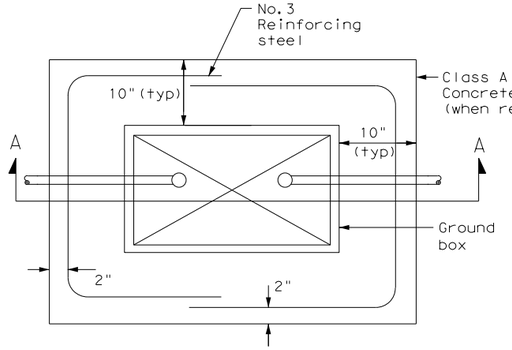
ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

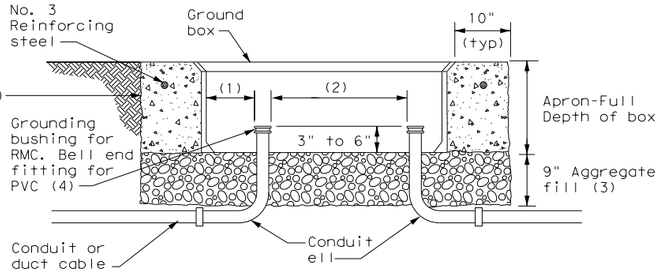
FILE:	ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0610	03	095	IH 30
		DIST	COUNTY		SHEET NO.
		ATL	TITUS		186

71C

DATE: 10/14/2022 2:50:54 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\ed4-14 (1).dgn



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.

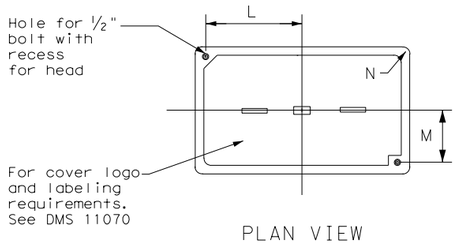
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

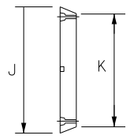
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

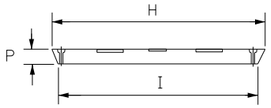
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		187

DATE: 10/14/2022 2:50:55 PM
FILE: P:\116335\04\Design\Civil\Standards\Illumination\ed5-14 (1).dgn

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

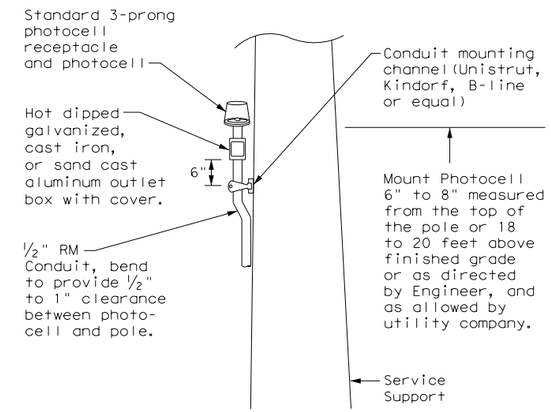
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

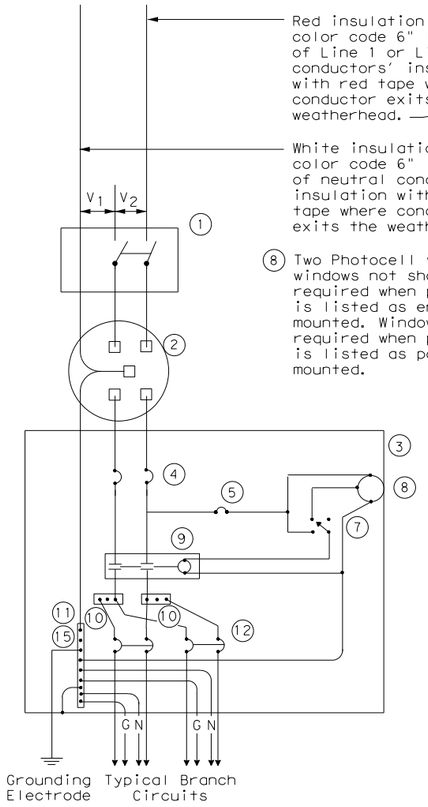
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

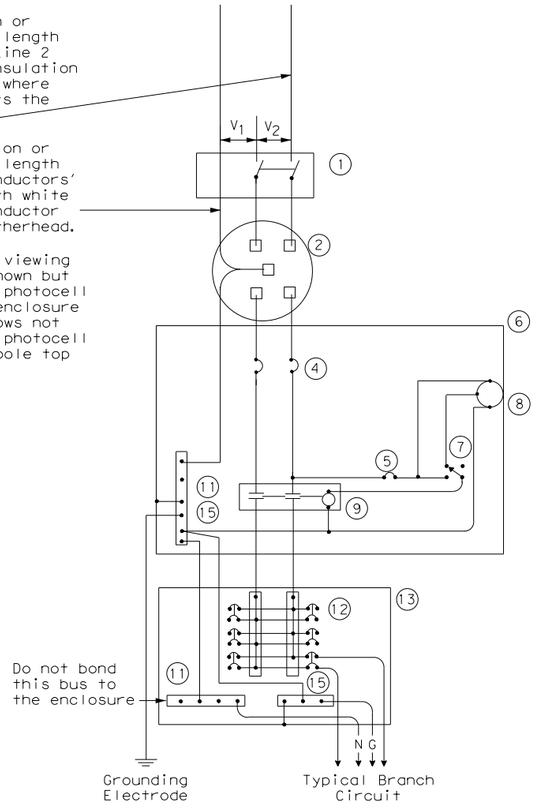
ED(5)-14

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		188

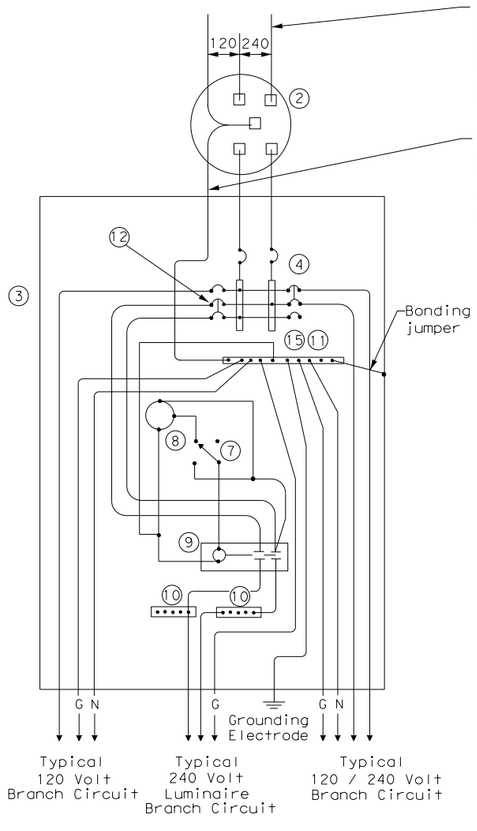
DATE: 10/14/2022 2:50:56 PM
FILE: P:\116350\04\Design\Civil\Standards\Illumination\ed6-14 (1).dgn



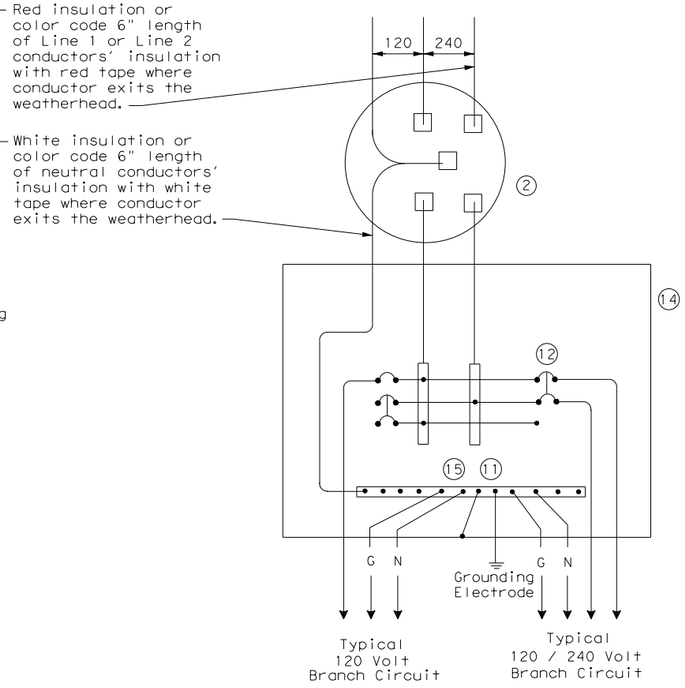
SCHEMATIC TYPE A
THREE WIRE



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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		189

71F

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

DATE: 10/14/2022 2:50:57 PM
FILE: P:\1161135\04\Design\Civil\Standards\Illumination\ed7-14 (1).dgn

SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

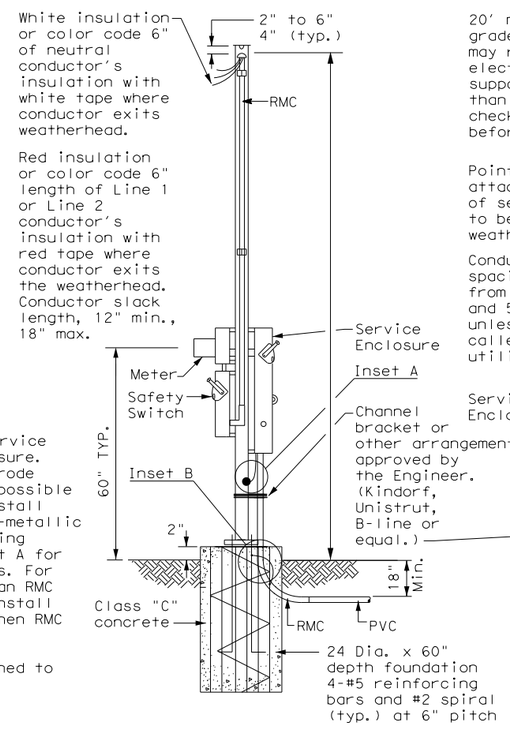
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

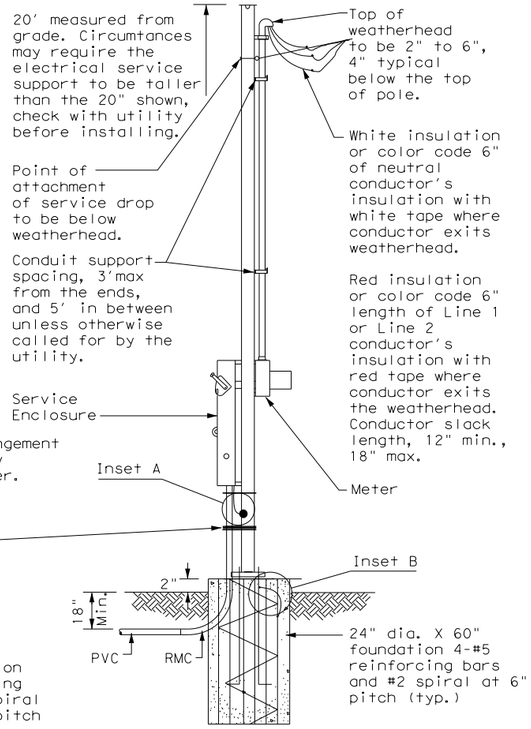
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

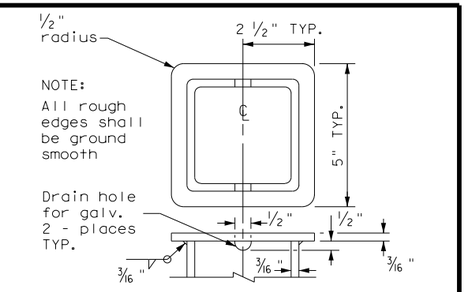


WITH SAFETY SWITCH

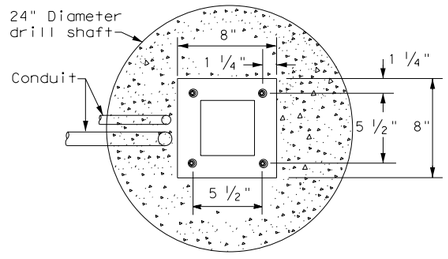


WITHOUT SAFETY SWITCH

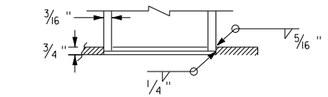
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

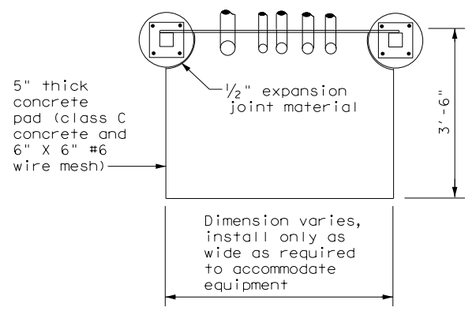


BASE PLATE DETAIL



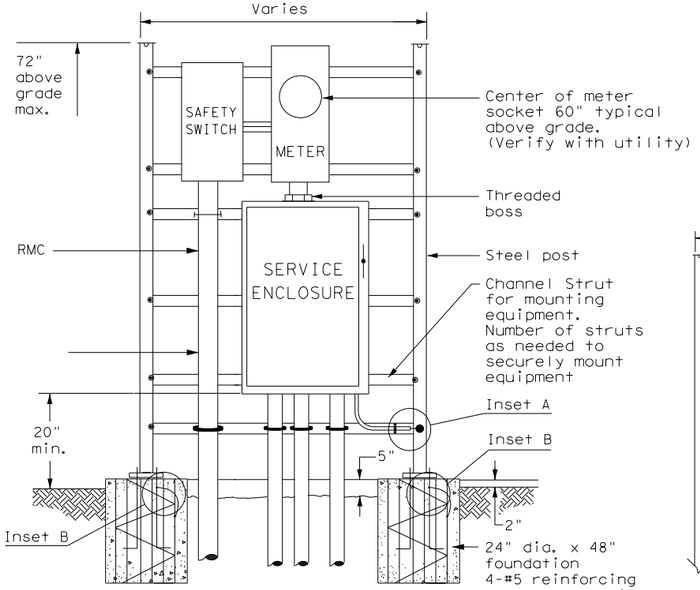
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP

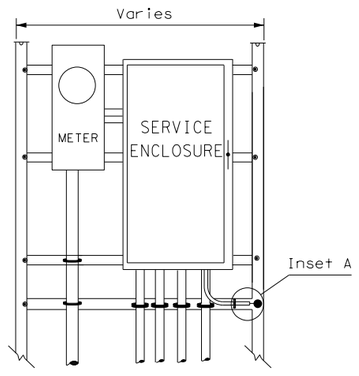


TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

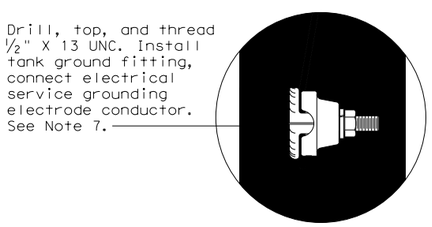


WITH SAFETY SWITCH
FRONT VIEW

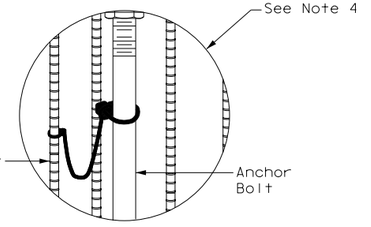


WITHOUT SAFETY SWITCH

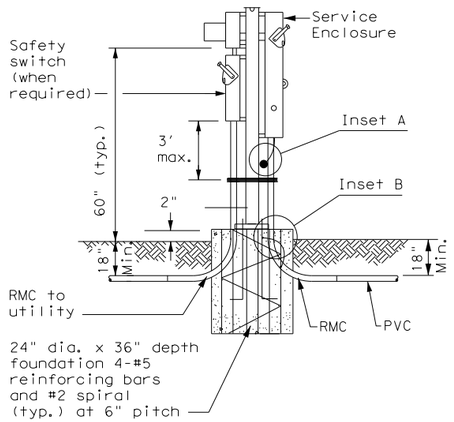
SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



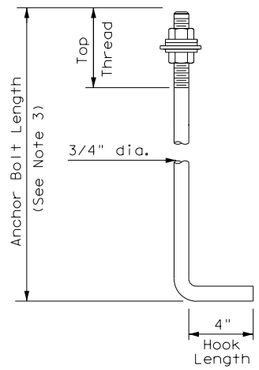
FRONT VIEW
INSET A



INSET B



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		190

71G

DATE: 10/14/2022 2:50:59 PM
FILE: P:\116335\04\Design\Civil\Standards\Illumination\rid1-20 (1).dgn

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

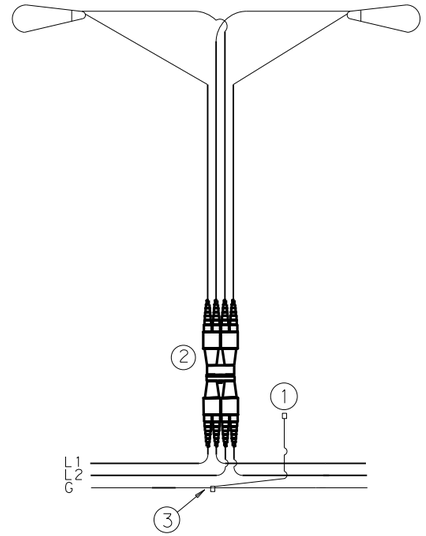
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.



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.

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

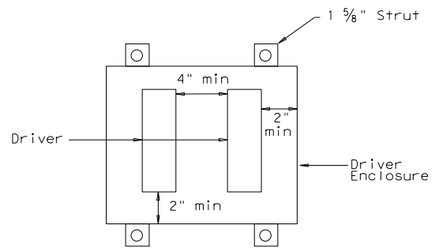
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation

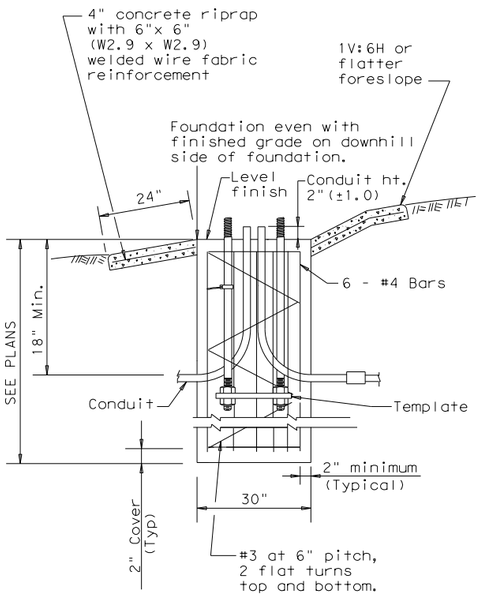
Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

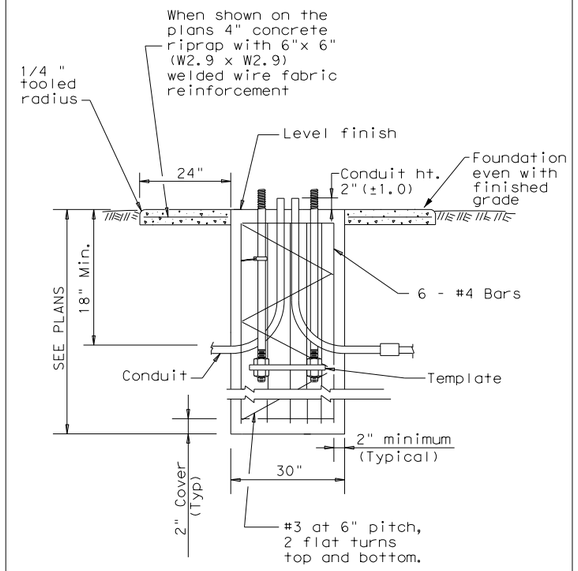
RID(1)-20

FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
7-17	DIST	COUNTY		SHEET NO.
12-20	ATL	TITUS		191

72A



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.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS (See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.

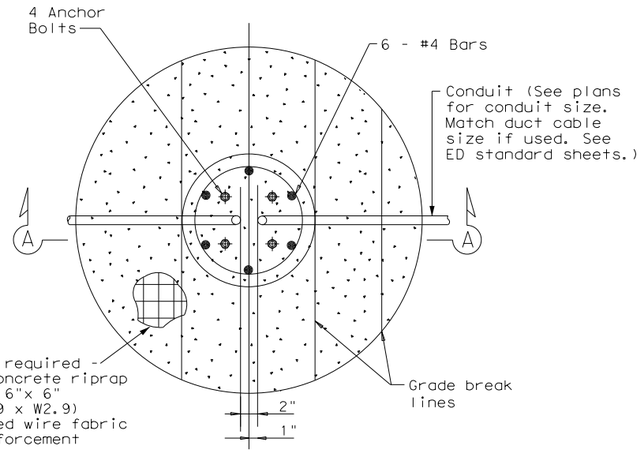
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

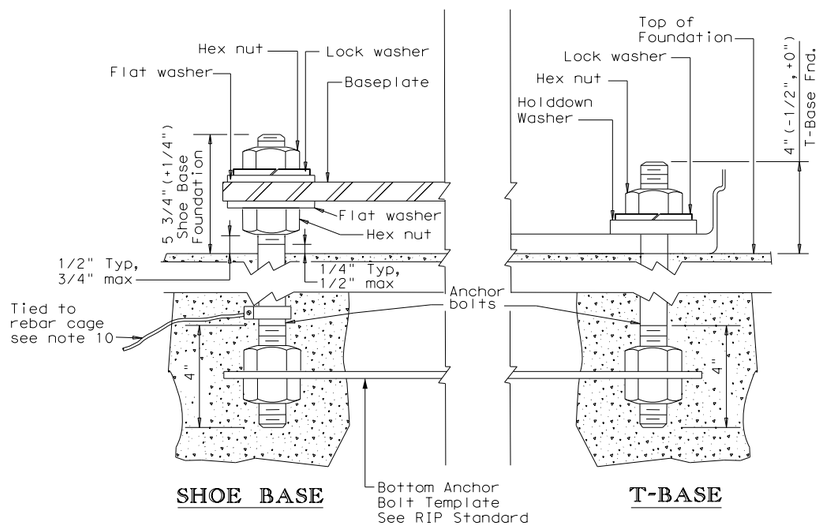
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS)

RID(2)-20

FILE: rid2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
1-11	DIST	COUNTY		SHEET NO.
7-17	ATL	TITUS		192
12-20				

72B

DATE: 10/14/2022 2:51:00 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\rid2-20 (1).dgn

DATE: 10/14/2022 2:51:01 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\rip(1-4)-19 (1).dgn

SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation				Quantity	T-Base Designation				Quantity	CSB/SSCB Mounted Designation				Quantity
	Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire	
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	
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED		(Type SP 38 S - 10)			(250W EQ) LED	
	(Type SA 40 S - 10 - 10)			(250W EQ) LED		(Type SA 40 T - 10 - 10)			(250W EQ) LED		(Type SP 38 S - 10 - 10)			(250W EQ) LED	
	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED		(Type SP 38 S - 12)			(250W EQ) LED	
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED		(Type SP 38 S - 12 - 12)			(250W EQ) LED	
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED		(Type SP 48 S - 4)			(400W EQ) LED	
	(Type SA 50 S - 4 - 4)			(400W EQ) LED		(Type SA 50 T - 4 - 4)			(400W EQ) LED		(Type SP 48 S - 4 - 4)			(400W EQ) LED	
	(Type SA 50 S - 8)			(400W EQ) LED		(Type SA 50 T - 8)			(400W EQ) LED		(Type SP 48 S - 8)			(400W EQ) LED	
	(Type SA 50 S - 8 - 8)			(400W EQ) LED		(Type SA 50 T - 8 - 8)			(400W EQ) LED		(Type SP 48 S - 8 - 8)			(400W EQ) LED	
	(Type SA 50 S - 10)			(400W EQ) LED		(Type SA 50 T - 10)			(400W EQ) LED	17	(Type SP 48 S - 10)			(400W EQ) LED	
	(Type SA 50 S - 10 - 10)			(400W EQ) LED		(Type SA 50 T - 10 - 10)			(400W EQ) LED		(Type SP 48 S - 10 - 10)			(400W EQ) LED	
	(Type SA 50 S - 12)			(400W EQ) LED		(Type SA 50 T - 12)			(400W EQ) LED		(Type SP 48 S - 12)			(400W EQ) LED	
	(Type SA 50 S - 12 - 12)			(400W EQ) LED		(Type SA 50 T - 12 - 12)			(400W EQ) LED		(Type SP 48 S - 12 - 12)			(400W EQ) LED	

OTHER Designation				Quantity
Pole	A1	A2	Luminaire	

GENERAL NOTES:

1. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.

2. The location of poles and fixtures are diagrammatic only and 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. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.

4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.

   a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
   b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design 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.
   c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
   d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.

5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.

   a. Meet all of the requirements stated above for optional steel pole designs and the following:
      1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
      2. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
      3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
      4. Pole components shall be constructed using the following material:
         Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
         Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
         Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
         Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
         Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
         Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.

6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.

7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

- SA: Pole and mast arm may be steel or aluminum.
- ST: Pole and mast arm must be steel.
- AL: Pole and mast arm must be aluminum.
- SP: Special (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Bridge/Ret.Wall Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure Sodium; LED - LED luminaire)

SHEET 1 OF 4

Texas Department of Transportation

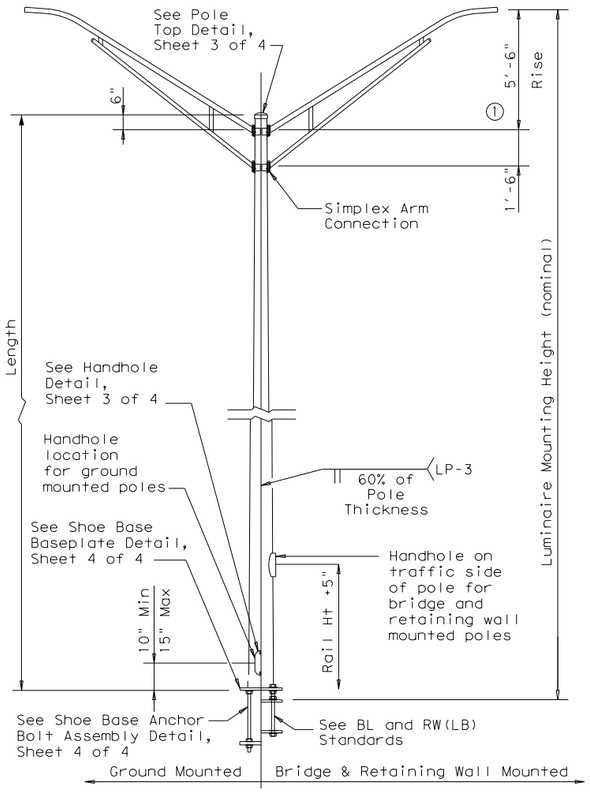
Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(1)-19

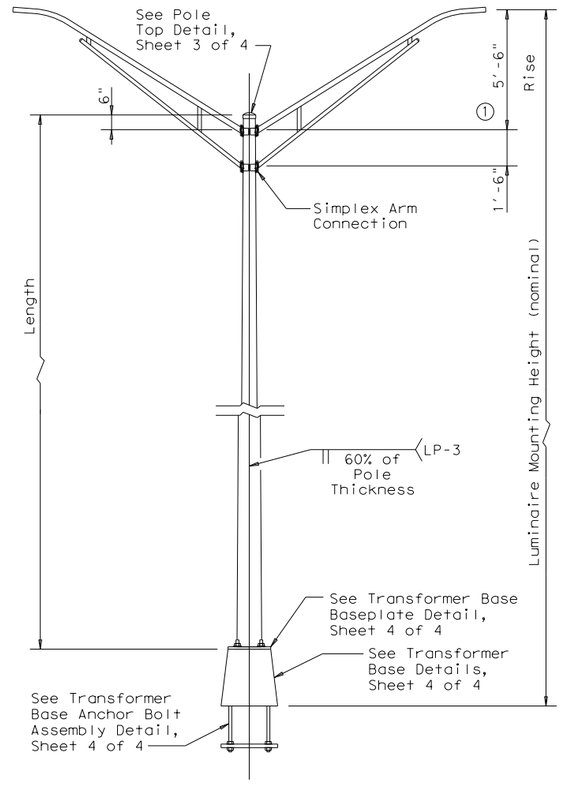
FILE: rip-19.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-17 12-19	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		193

73A



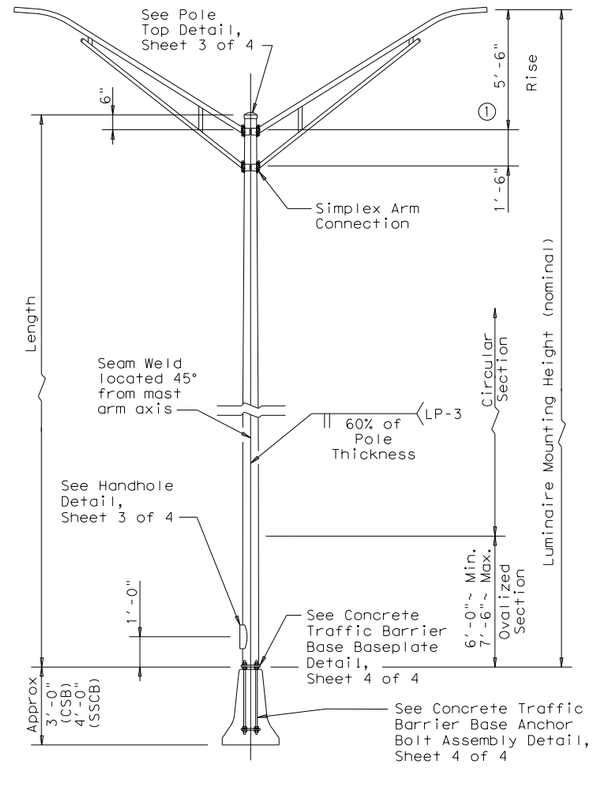
SHOE BASE POLE

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	3.91	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	F3125 Gr A325	92
Anchor Bolts	**F1554 Gr 55, A193-B7 or A321**	**55 105**
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

① 2'-6" rise for 4 ft. luminaire arms.

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 multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

GENERAL NOTES:

1. Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals , 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
2. Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
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 height.
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 AWS D1.1, Structural Welding Code-Steel.
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. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
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.
13. Erect transformer base poles in accordance with sheet RID(1).

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

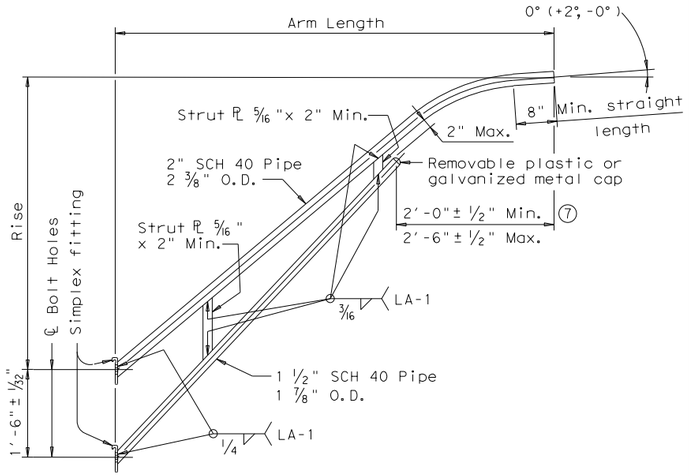
RIP(2)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
7-17	DIST	COUNTY		SHEET NO.
12-19	ATL	TITUS		194

73B

DATE: 10/14/2022 2:51:02 PM
FILE: P:\116135\04\Design\Civil\Standards\Illumination\rip(1-4)-19 (1).dgn

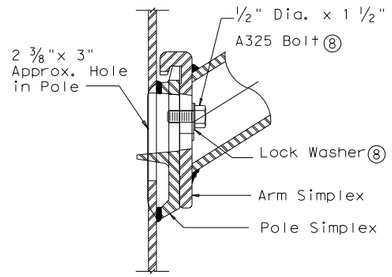
DATE: 10/14/2022 2:51:03 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\rip(1-4)-19 (1).dgn



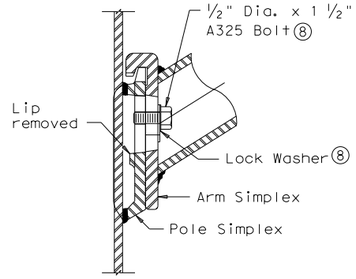
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"

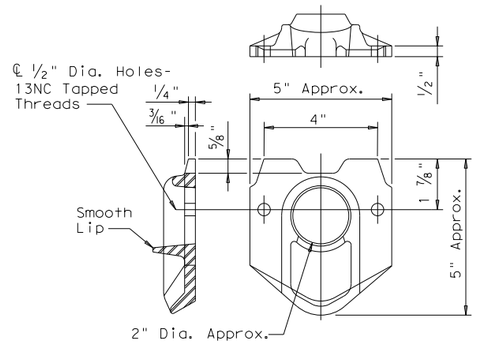


UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

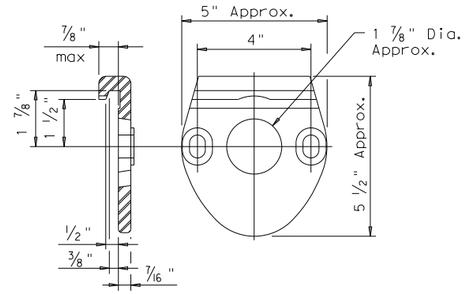


LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

SECTION B-B



POLE SIMPLEX DETAIL 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.

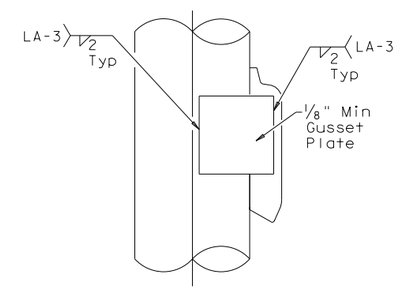
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

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.

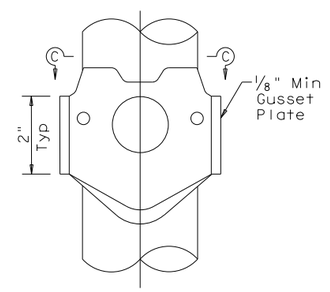
⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

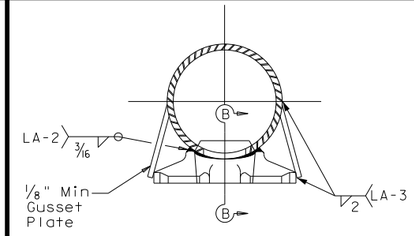
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted



SIDE

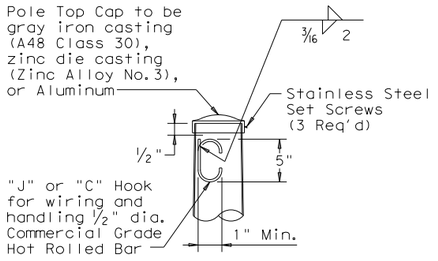


ELEVATION

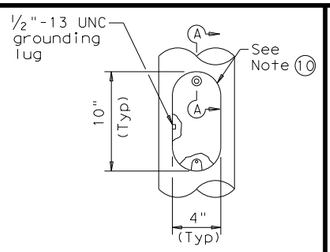


SECTION C-C

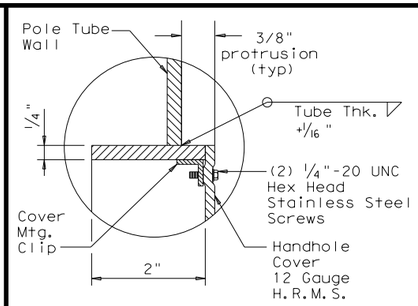
SIMPLEX ATTACHMENT DETAIL



POLE TOP



ELEVATION



SECTION A-A

HANDHOLE

SHEET 3 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

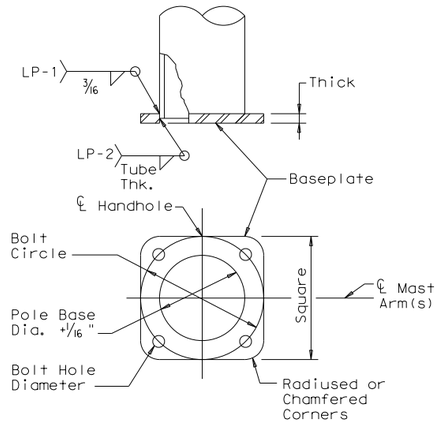
ROADWAY ILLUMINATION POLES

RIP(3)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
7-17	DIST	COUNTY		SHEET NO.
12-19	ATL	TITUS		195

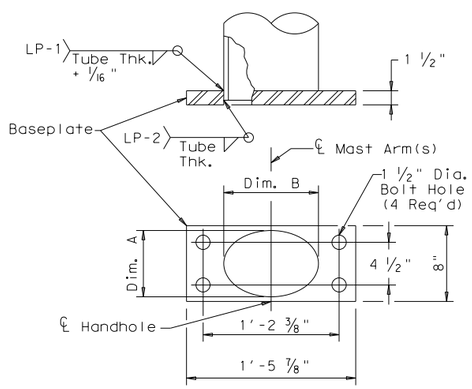
73C

DATE: 10/14/2022 2:51:03 PM
FILE: P:\116\35\04\Design\Civil\Standards\Illumination\rip(1-4)-19 (1).dgn



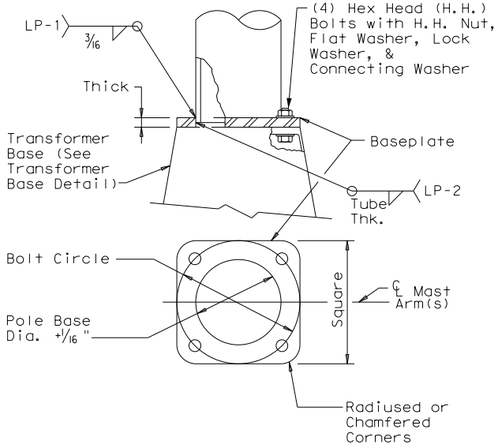
SHOE BASE BASEPLATE

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"



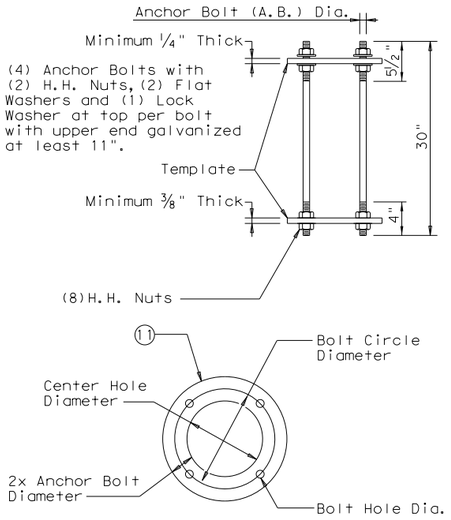
CONCRETE TRAFFIC BARRIER BASE BASEPLATE

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"



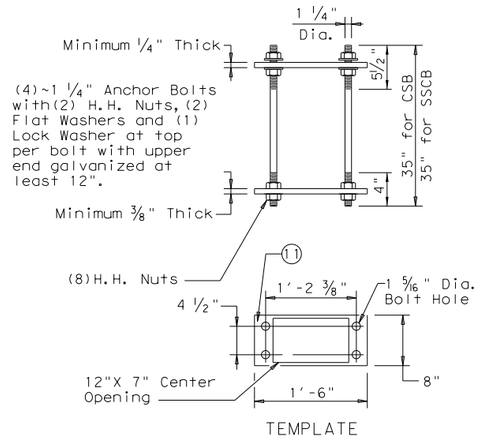
TRANSFORMER BASE BASEPLATE

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



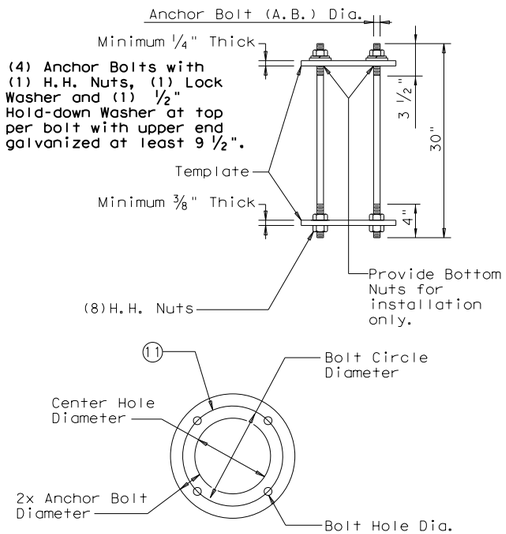
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′-39′	1"	13"	11"	1 1/16"
40′-50′	1 1/4"	15"	12 1/2"	1 5/16"



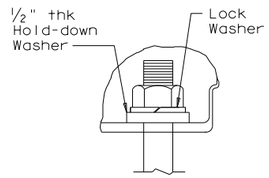
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′- 39′	1"	14"	12"	1 1/16"
40′- 50′	1 1/4"	17 1/4"	14 3/4"	1 5/16"

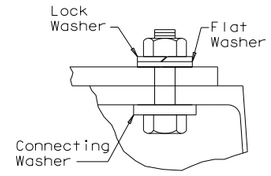


TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

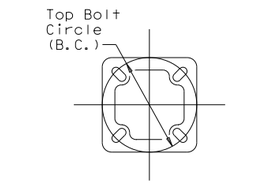
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



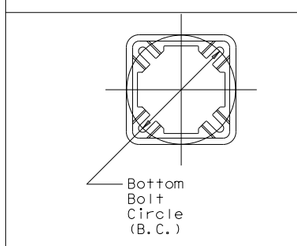
DETAIL A



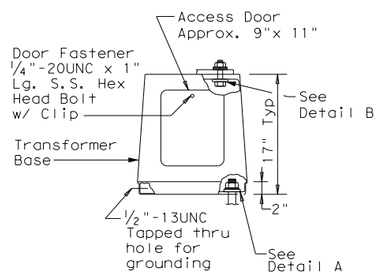
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
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"

Texas Department of Transportation — Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-17 12-19	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		196

730

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept in the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0610-03-095

1.2 PROJECT LIMITS:
From: 1.7 MI W OF US 67, WB
To: 1.0 MI W OF US 67, WB

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 33.159039 ,(Long) -95.056271
END: (Lat) 33.158907 ,(Long) -95.034993

1.4 TOTAL PROJECT AREA (Acres): 12.92

1.5 TOTAL AREA TO BE DISTURBED (Acres): 12.92

1.6 NATURE OF CONSTRUCTION ACTIVITY:
WORK CONSISTING OF CONSTRUCTING WEIGH STATION AND RAMPS.

1.7 MAJOR SOIL TYPES:

Soil Type	Description
FRB	FREESTONE FINE SANDY LOAM
NA	NAHATCHE LOAM
WOE	WOODTELL FINE SANDY LOAM

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

☐ PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☒ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

☒ Mobilization
☒ Install sediment and erosion controls
☒ Blade existing topsoil into windrows, prep ROW, clear and grub
☒ Remove existing pavement, other removal items
☒ Grading operations, excavation, and embankment
☒ Excavate and prepare subgrade for proposed pavement widening
☒ Remove existing culverts, safety end treatments (SETs)
☒ Install culverts, culvert extensions, SETs
☒ Place flex base
☒ Install proposed pavement per plans
☒ Rework slopes, grade ditches
☒ Blade windrowed material back across slopes
☒ Revegetation of unpaved areas
☒ Achieve site stabilization and remove sediment and erosion control measures

☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☒ Sediment laden stormwater from stormwater conveyance over disturbed area
☒ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☒ Solvents, paints, adhesives, etc. from various construction activities
☒ Transported soils from offsite vehicle tracking
☒ Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☒ Sanitary waste from onsite restroom facilities
☒ Trash from various construction activities/receptacles
☒ Long-term stockpiles of material and waste
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
UNNAMED TRIBUTARY 0404R	DRAGOO CREEK (0404O)

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☐ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☒ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:

MS4 Entity

STORMWATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			197
STATE	STATE DIST.	COUNTY	
TEXAS	ATL	TITUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0610	03	095	IH 30

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [X] [ ] Protection of Existing Vegetation
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [X] [ ] Temporary Seeding
- [ ] [X] Permanent Planting, Sodding or Seeding
- [X] [ ] Biodegradable Erosion Control Logs
- [X] [ ] Rock Filter Dams/ Rock Check Dams
- [X] [ ] Vertical Tracking
- [ ] [ ] Interceptor Swale
- [ ] [X] Riprap
- [ ] [ ] Diversion Dike
- [ ] [ ] Temporary Pipe Slope Drain
- [ ] [X] Embankment for Erosion Control
- [ ] [ ] Paved Flumes
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- [X] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [X] [ ] Inlet Protection
- [X] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [ ] [ ] Sediment Control Fence
- [X] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

T / P

- [ ] [ ] Sediment Trap
  - [ ] Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - [ ] 3,600 cubic feet of storage per acre drained
- [ ] [ ] Sedimentation Basin
  - [ ] Not required (<10 acres disturbed)
  - [X] Required (>10 acres) and implemented.
    - [ ] Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - [ ] 3,600 cubic feet of storage per acre drained
  - [X] Required (>10 acres), but not feasible due to:
    - [X] Available area/Site geometry
    - [ ] Site slope/Drainage patterns
    - [ ] Site soils/Geotechnical factors
    - [ ] Public safety
    - [ ] Other: _____

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [X] Excess dirt/mud on road removed daily
- [X] Haul roads dampened for dust control
- [X] Loaded haul trucks to be covered with tarpaulin
- [X] Stabilized construction exit
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [X] Chemical Management
- [X] Concrete and Materials Waste Management
- [X] Debris and Trash Management
- [X] Dust Control
- [X] Sanitary Facilities
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [X] Fire hydrant flushings
- [X] Irrigation drainage
- [X] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [X] Potable water sources
- [X] Springs
- [X] Uncontaminated groundwater
- [X] Water used to wash vehicles or control dust
- [X] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

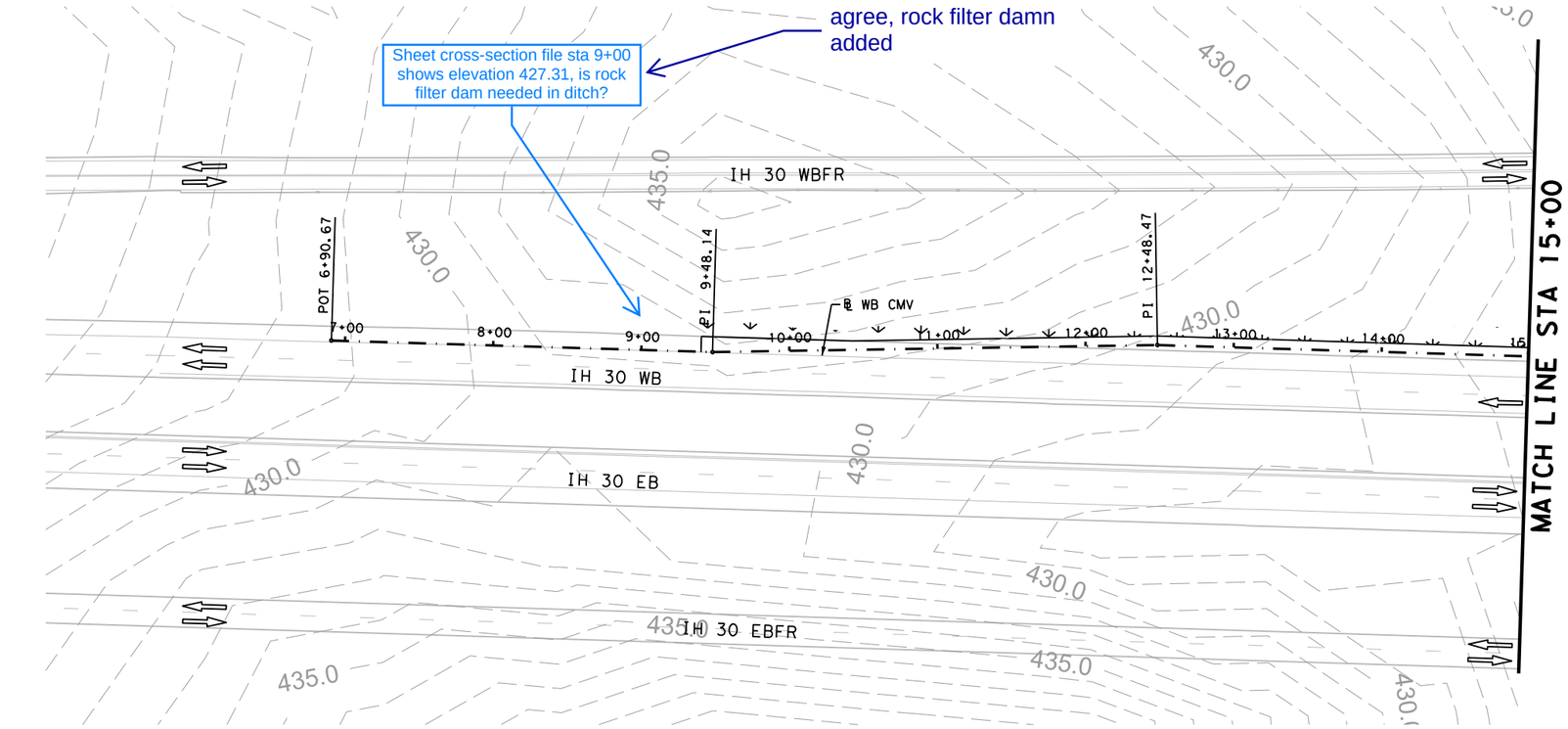
STORMWATER POLLUTION PREVENTION PLAN (SWP3)

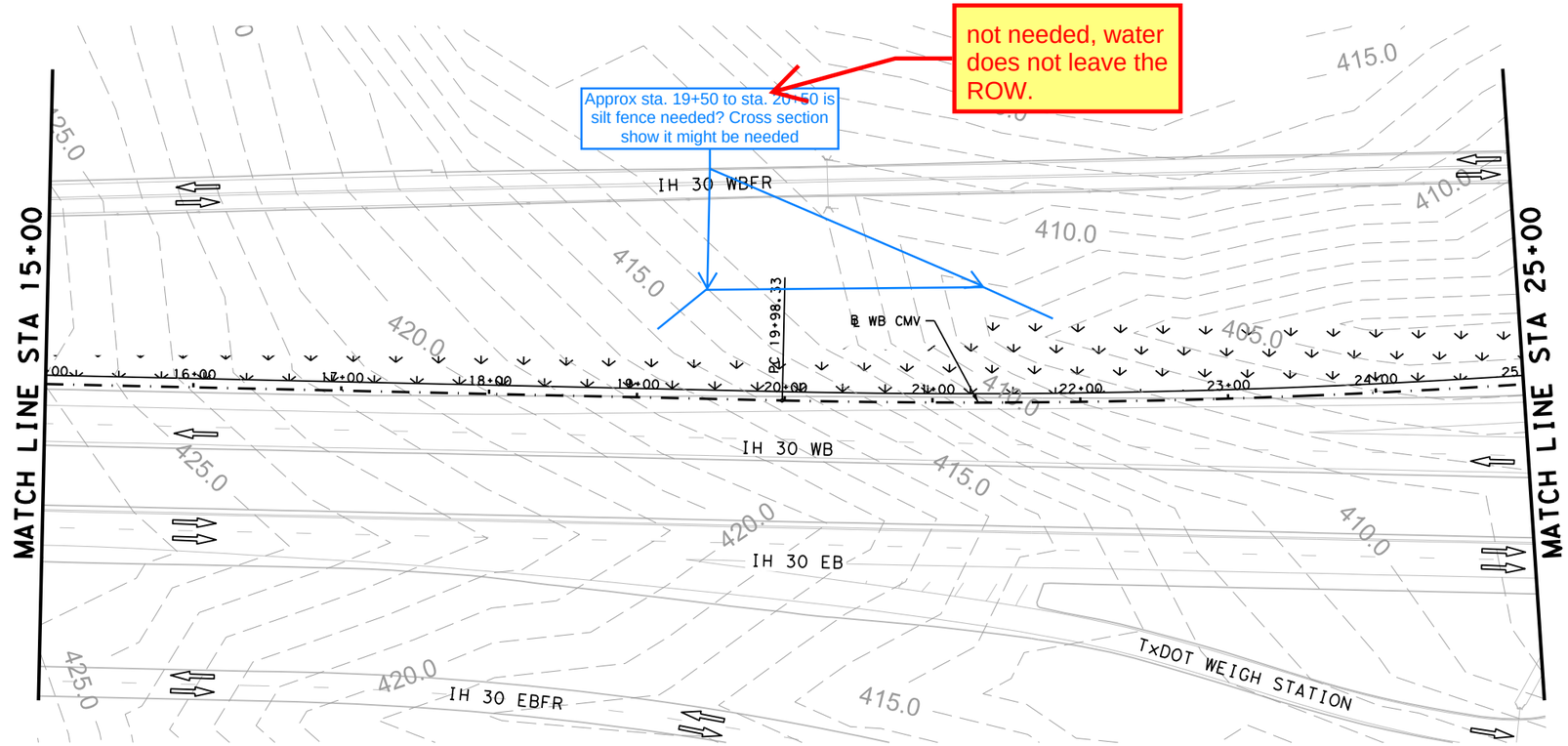
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			198
STATE	STATE DIST.	COUNTY	
TEXAS	ATL	TITUS	
CONT.	SECT.	JOB	HIGHWAY NO.
0610	03	095	IH 30

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\SW3P\1163504_SW3P01.dgn





N

SW3P LEGEND

- EXISTING CONTOUR
- ROCK FILTER DAM TYPE 1 (RFD1)
- FLOW ARROW
- SEEDING

SW3P NOTES

1. REFER TO TXDOT SW3P STANDARD SHEETS FOR DETAILS.
2. INSTALLED MEASURES SHALL REMAIN IN PLACE AND BE INSPECTED WEEKLY. ALL ITEMS SHALL BE MAINTAINED AND REPAIRED THROUGHOUT DURATION OF USE.
3. SW3P MEASURES SHOWN ARE MINIMUM REQUIREMENTS BASED UPON PROJECT DESIGN. INSTALLATION OF SW3P MEASURES WILL BE SHOWN AND MODIFIED TO ACCOMMODATE ACTUAL FIELD CONDITIONS.
4. CONSTRUCTION EXITS SHALL BE FIELD LOCATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
5. EXISTING CONTOURS ARE SHOWN SCREENED BACK I.E. FADED

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1" = 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

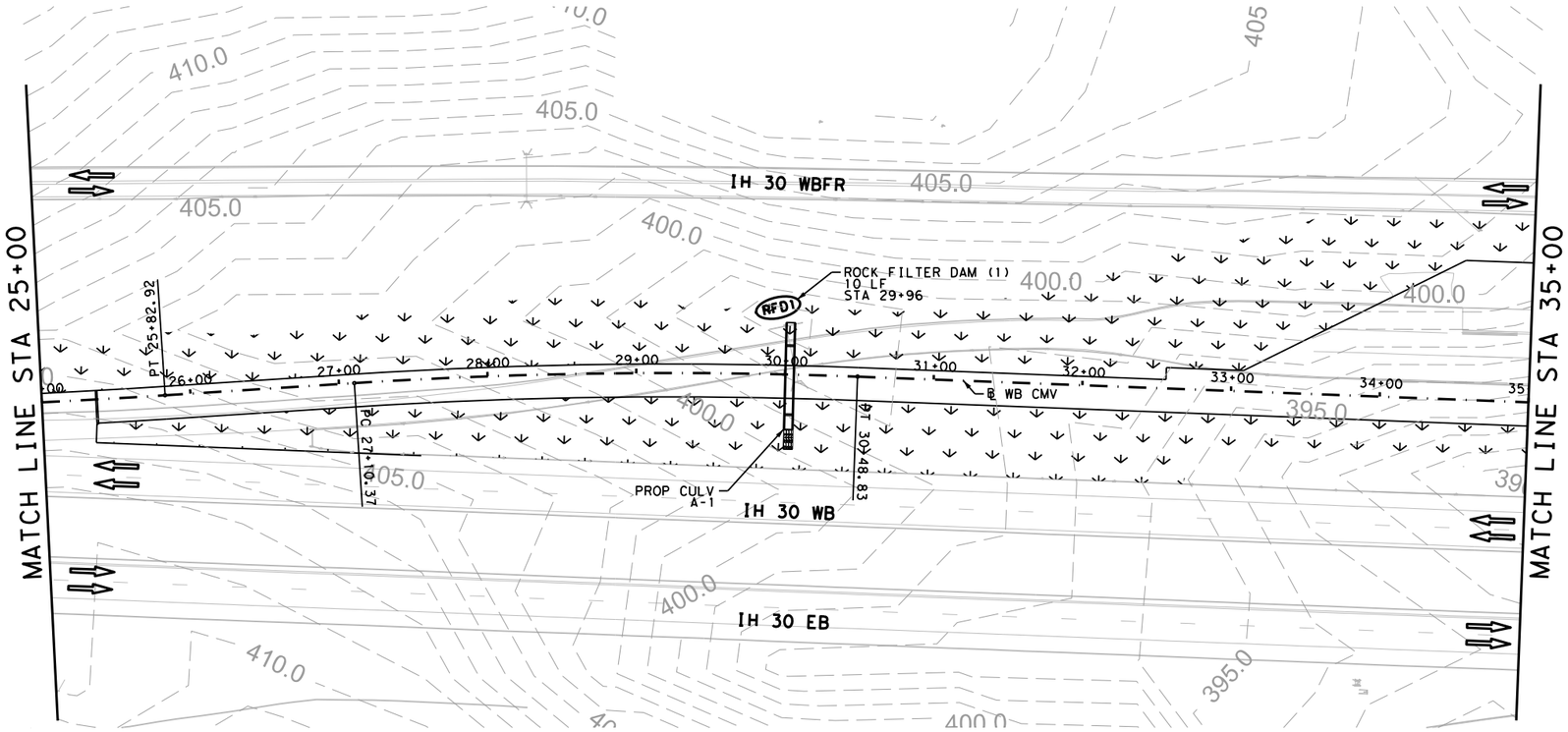
Match txdot spec book terminology - SWP3 → SW3P PLAN

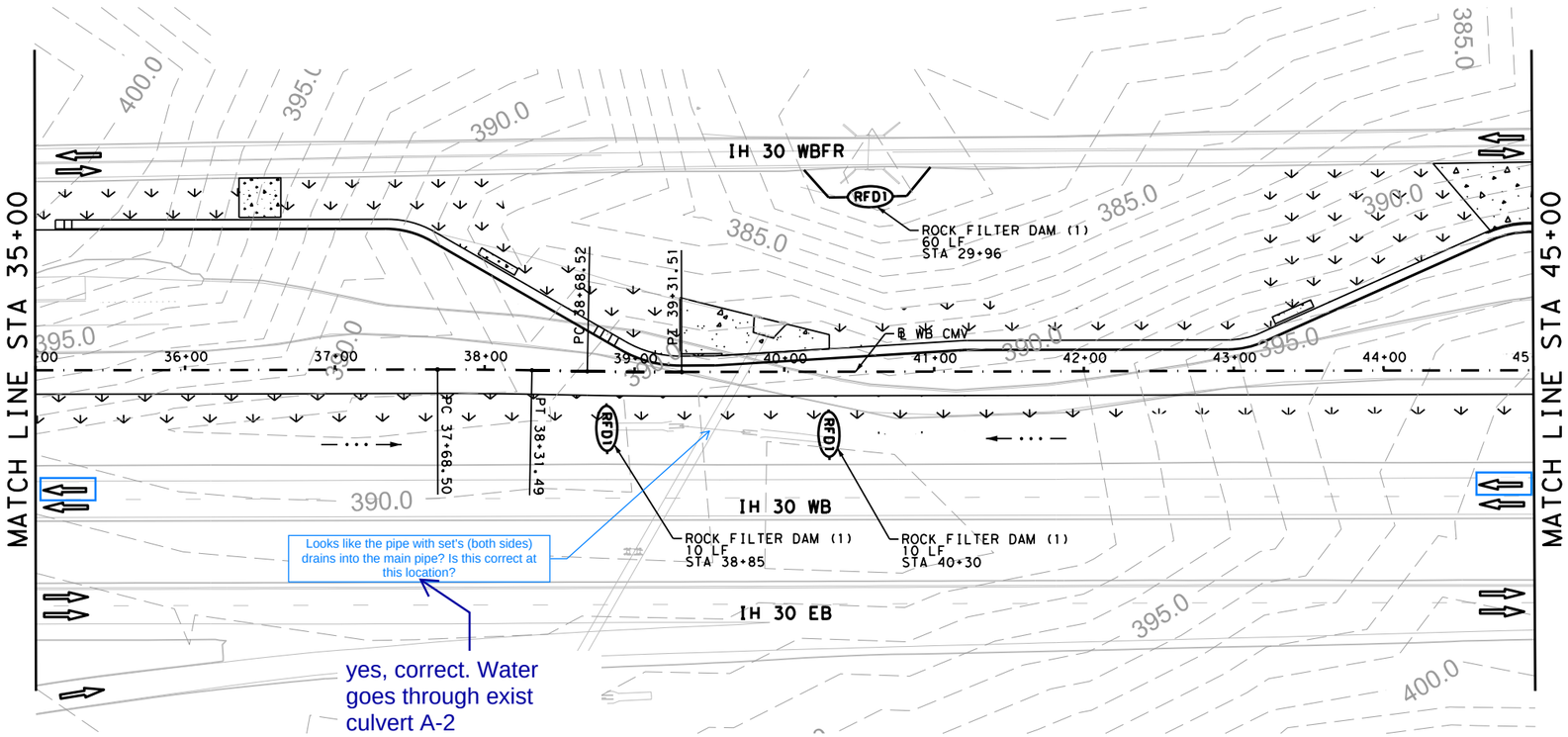
AGREE

BEGIN PROJECT TO STA 25+00

SHEET 1 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	199





SW3P LEGEND

- EXISTING CONTOUR
- RFD1 — ROCK FILTER DAM TYPE 1
- FLOW ARROW
- SEEDING

SW3P NOTES

1. REFER TO TXDOT SW3P STANDARD SHEETS FOR DETAILS.
2. INSTALLED MEASURES SHALL REMAIN IN PLACE AND BE INSPECTED WEEKLY. ALL ITEMS SHALL BE MAINTAINED AND REPAIRED THROUGHOUT DURATION OF USE.
3. SW3P MEASURES SHOWN ARE MINIMUM REQUIREMENTS BASED UPON PROJECT DESIGN. INSTALLATION OF SW3P MEASURES WILL BE SHOWN AND MODIFIED TO ACCOMMODATE ACTUAL FIELD CONDITIONS.
4. CONSTRUCTION EXITS SHALL BE FIELD LOCATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
5. EXISTING CONTOURS ARE SHOWN SCREENED BACK I.E. FADED

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

Match txdot spec book terminology - SWP3

AGREE

WB IH 30 CMV STATION

SW3P PLAN

STA 25+00 TO STA 45+00

SHEET 2 OF 4

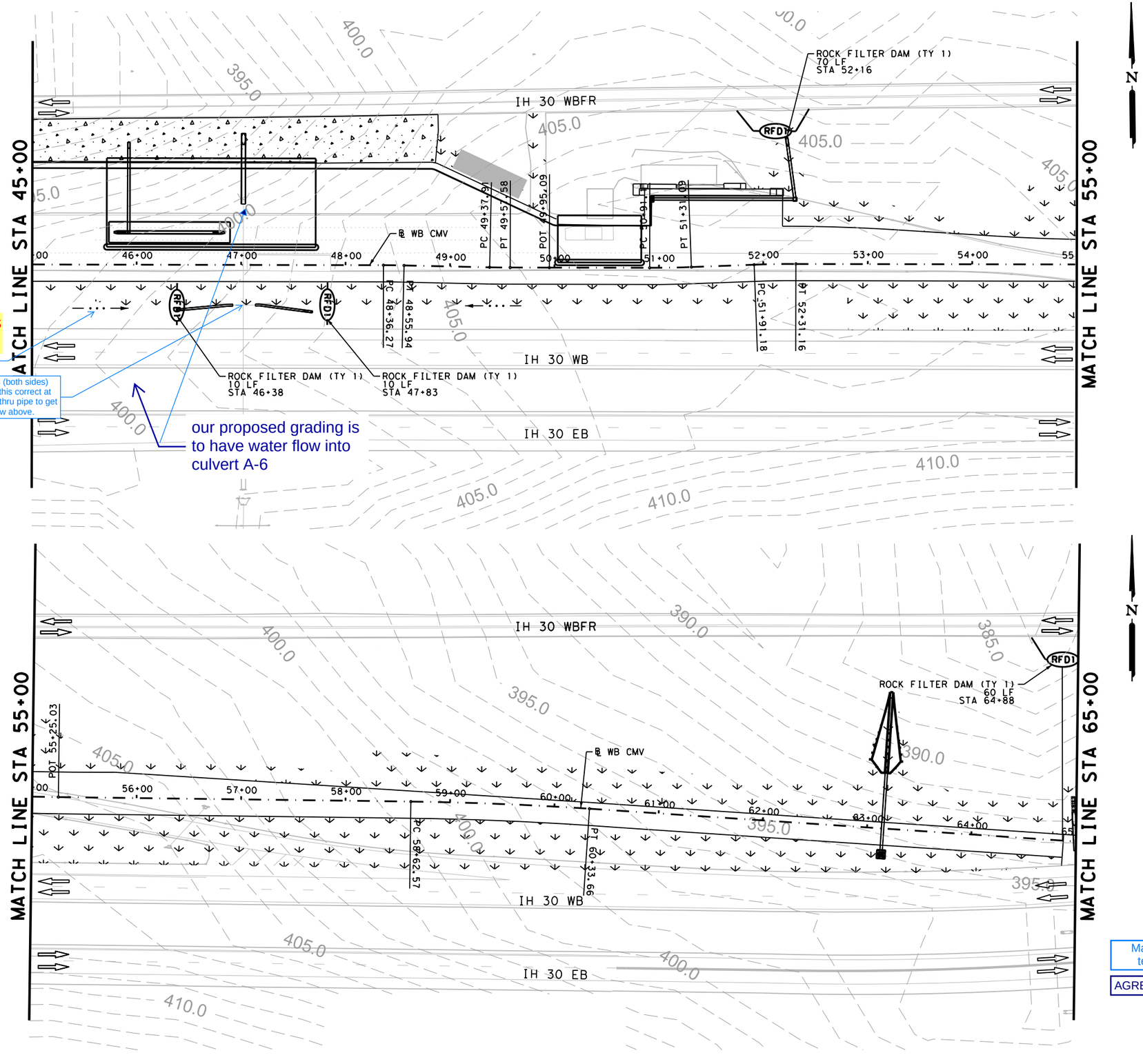
DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	200

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\SW3P\1163504_SW3P02.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\SW3P\1163504_SW3P03.dgn



SW3P LEGEND

- EXISTING CONTOUR
- ROCK FILTER DAM TYPE 1
- FLOW ARROW
- SEEDING

SW3P NOTES

1. REFER TO TXDOT SW3P STANDARD SHEETS FOR DETAILS.
2. INSTALLED MEASURES SHALL REMAIN IN PLACE AND BE INSPECTED WEEKLY. ALL ITEMS SHALL BE MAINTAINED AND REPAIRED THROUGHOUT DURATION OF USE.
3. SW3P MEASURES SHOWN ARE MINIMUM REQUIREMENTS BASED UPON PROJECT DESIGN. INSTALLATION OF SW3P MEASURES WILL BE SHOWN AND MODIFIED TO ACCOMMODATE ACTUAL FIELD CONDITIONS.
4. CONSTRUCTION EXITS SHALL BE FIELD LOCATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
5. EXISTING CONTOURS ARE SHOWN SCREENED BACK I.E. FADED

DESIGN

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW

DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

Match txdot spec book terminology - SWP3

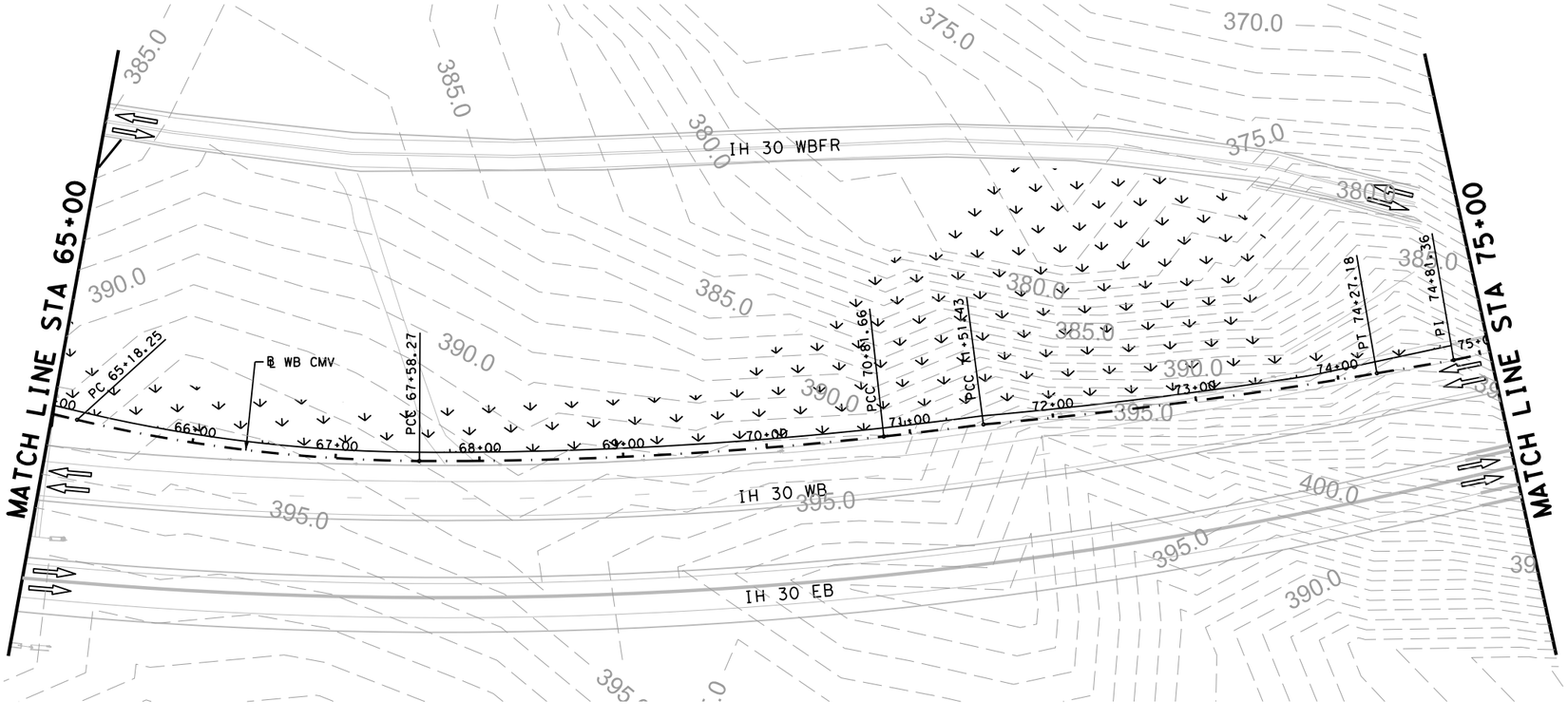
SW3P PLAN

AGREE

STA 45+00 TO STA 65+00

SHEET 3 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	201



N

SW3P LEGEND

- EXISTING CONTOUR
- ROCK FILTER DAM TYPE 1 (RFD1)
- FLOW ARROW
- SEEDING

SW3P NOTES

1. REFER TO TXDOT SW3P STANDARD SHEETS FOR DETAILS.
2. INSTALLED MEASURES SHALL REMAIN IN PLACE AND BE INSPECTED WEEKLY. ALL ITEMS SHALL BE MAINTAINED AND REPAIRED THROUGHOUT DURATION OF USE.
3. SW3P MEASURES SHOWN ARE MINIMUM REQUIREMENTS BASED UPON PROJECT DESIGN. INSTALLATION OF SW3P MEASURES WILL BE SHOWN AND MODIFIED TO ACCOMMODATE ACTUAL FIELD CONDITIONS.
4. CONSTRUCTION EXITS SHALL BE FIELD LOCATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
5. EXISTING CONTOURS ARE SHOWN SCREENED BACK I.E. FADED

DESIGN

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: STEVEN J. TATE
P.E. SERIAL NO: 131443
DATE: 10/14/2022

APPROVAL

INTERIM REVIEW
DOCUMENT INCOMPLETE. NOT INTENDED FOR PERMIT, BIDDING OR CONSTRUCTION.
ENGINEER: JAMES A. LUTZ
P.E. SERIAL NO: 84722
DATE: 10/14/2022

0 50 100 150
SCALE: 1"= 100'

REV. NO.	DATE	DESCRIPTION	BY

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

WB IH 30 CMV STATION

SW3P PLAN

STA 65+00 TO END PROJECT

SHEET 4 OF 4

DGN:	FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
CHK DGN:	6	TEXAS				IH 30
DWG:	DIST.	COUNTY	CONT. NO.	SECT. NO.	JOB NO.	SHEET NO.
CHK DWG:	ATL	TITUS	0610	03	095	202

Match txdot spec book terminology - SWP3

AGREE

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\SW3P\1163504_SW3P04.dgn

Plotted on: 10/14/2022

Design Filename: P:\116\35\04\Design\Civil\SW3P\1163504_EPIC.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☐ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

☐ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☐ Temporary Vegetation	☐ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☐ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

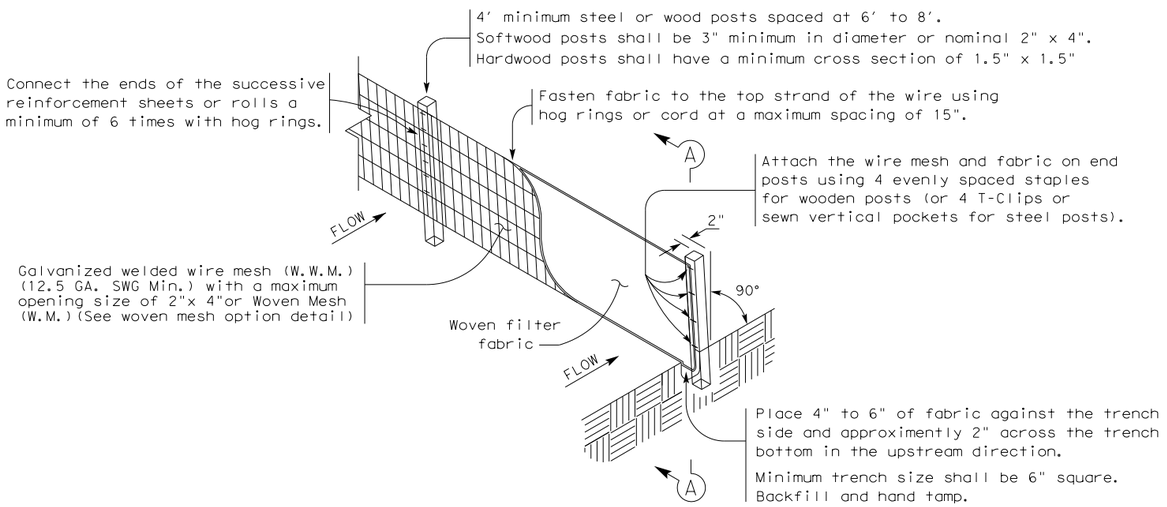
Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

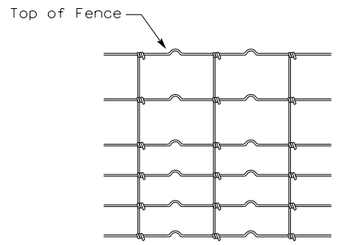
FILE: epic.dgn	DN:TxDOT	CK: RG	DW: VP	CK: AR
© TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
12-12-2011 (DS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTE SECTION IV.	ATL	TITUS		203
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.				

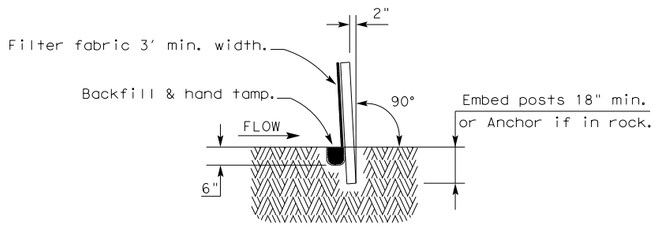
DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\SW3P\ec116.dgn



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

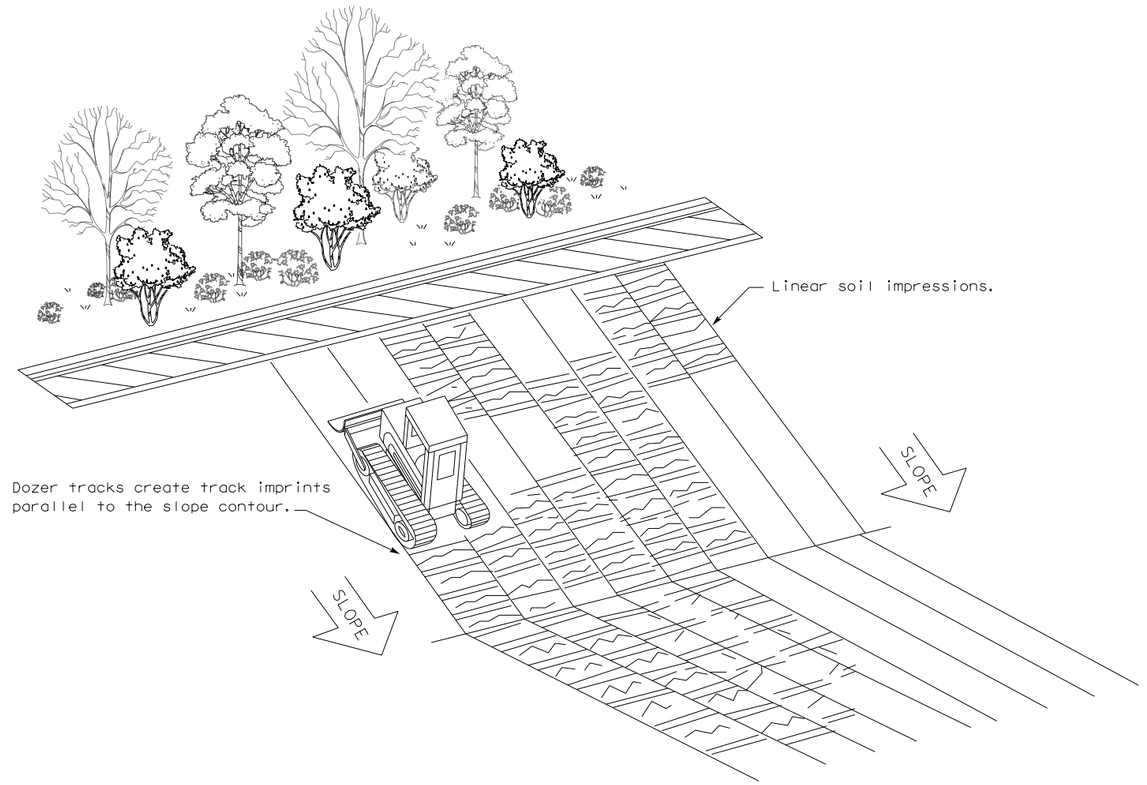
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

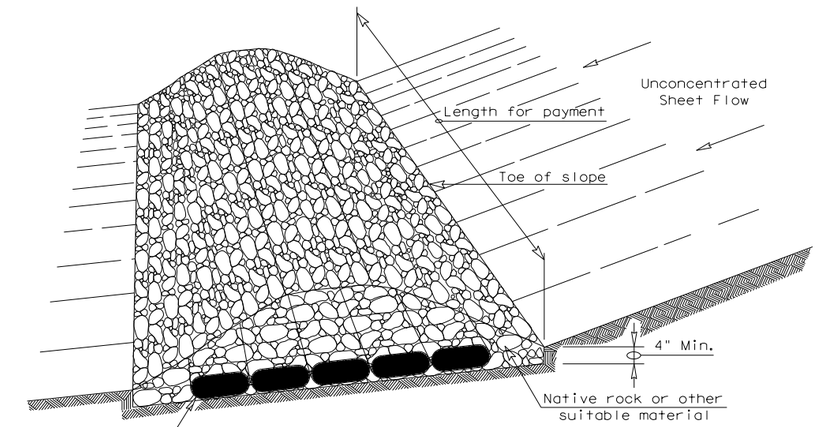
Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

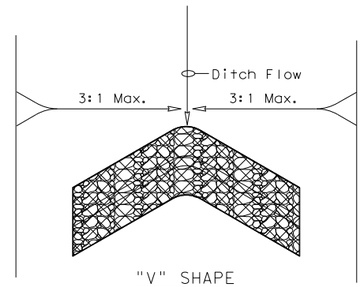
EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		204

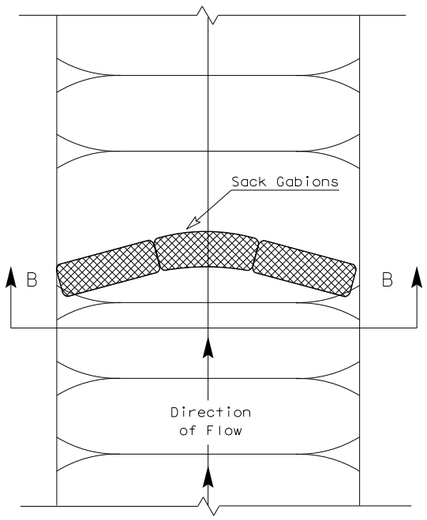


FILTER DAM AT TOE OF SLOPE

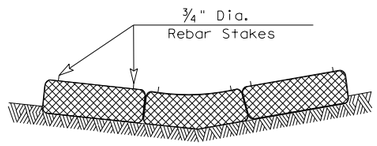
RFD1



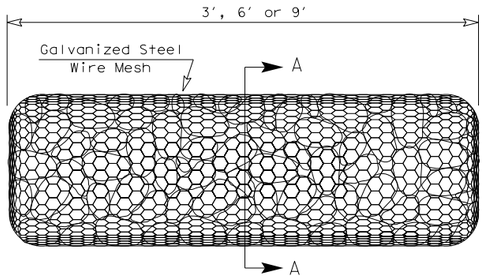
"V" SHAPE
PLAN VIEW



PLAN VIEW

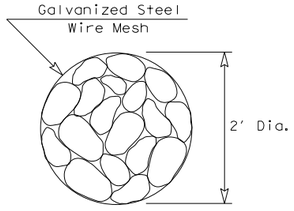


SECTION B-B

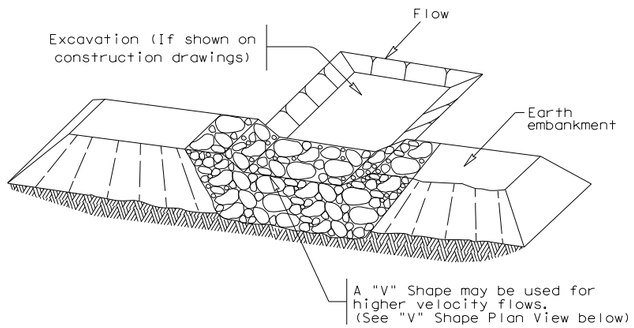


TYPE 4 (SACK GABIONS)

RFD4

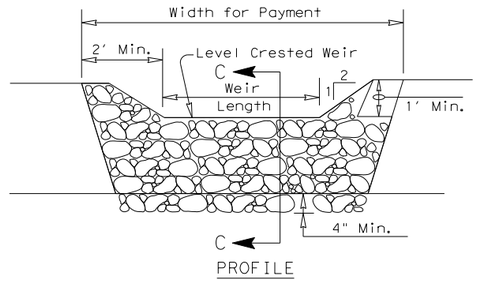


SECTION A-A

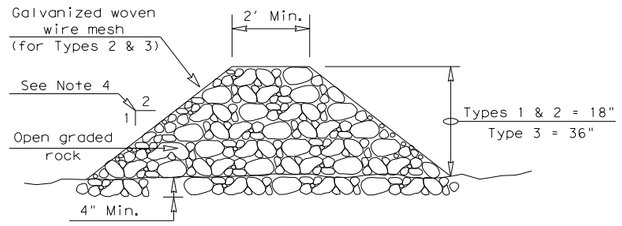


FILTER DAM AT SEDIMENT TRAP

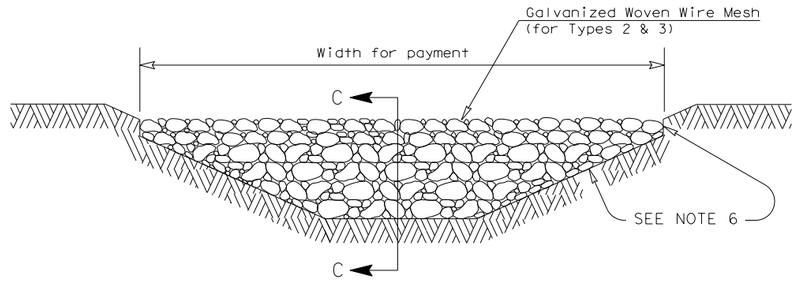
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

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

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.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

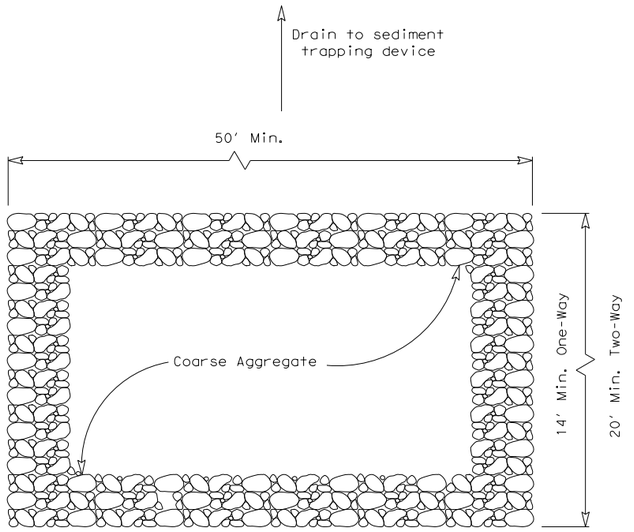
EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		205

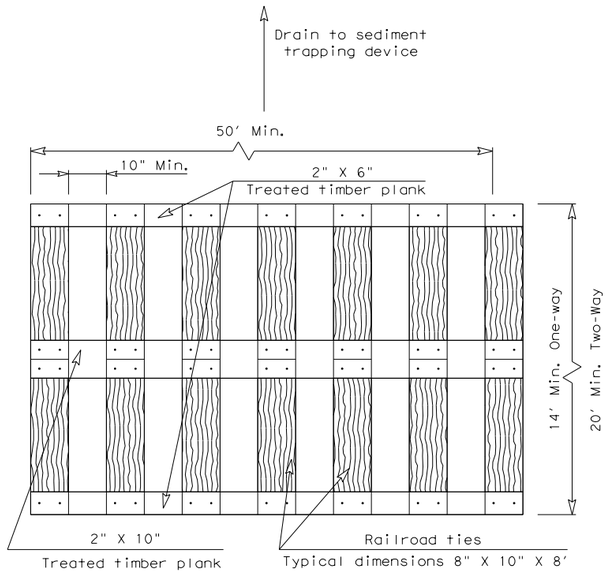
DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\SW3P\ec216.dgn

095

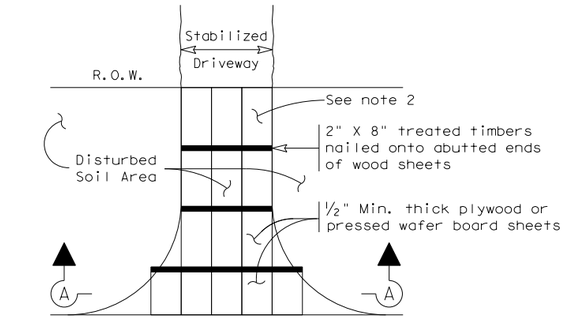
DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\SW3P\ec316.dgn



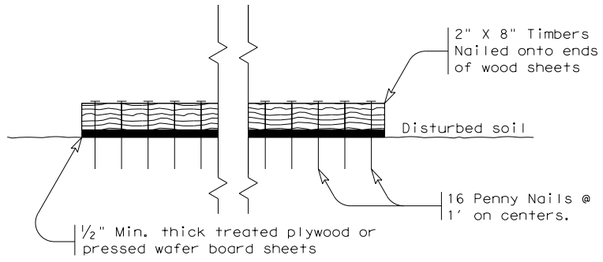
PLAN VIEW



PLAN VIEW



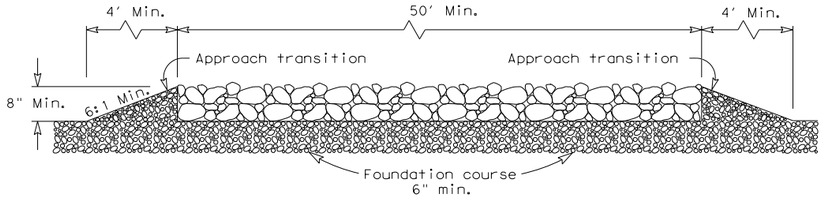
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



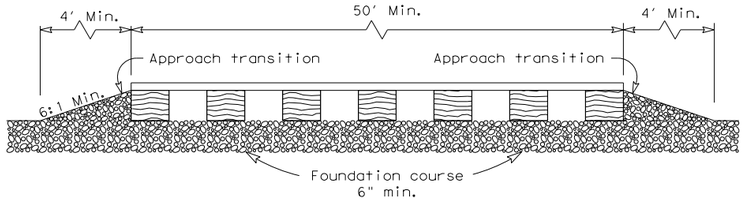
ELEVATION VIEW

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

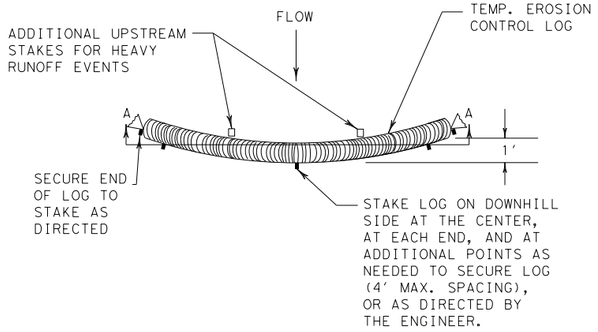
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

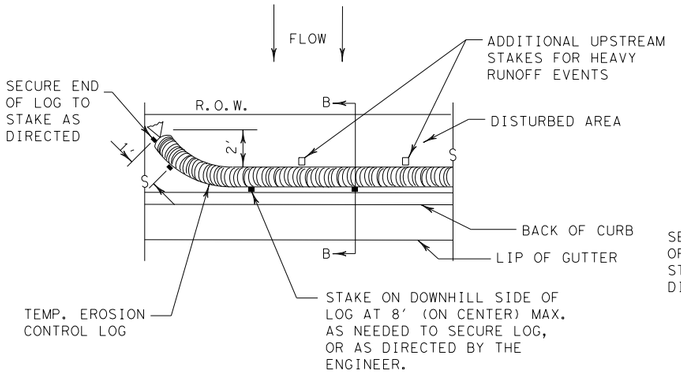
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		206

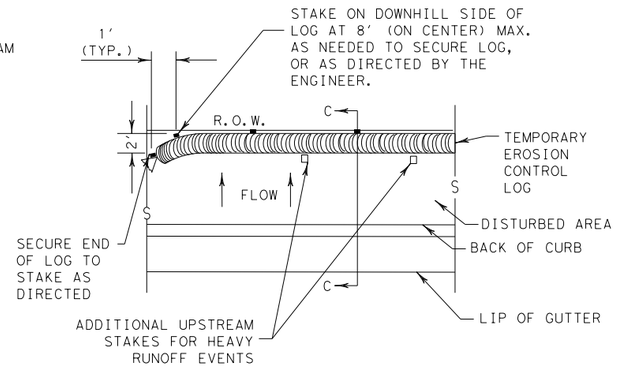
DATE: 10/14/2022
FILE: P:\116335\04\Design\Civil\Standards\SW3P\ec916_1.dgn



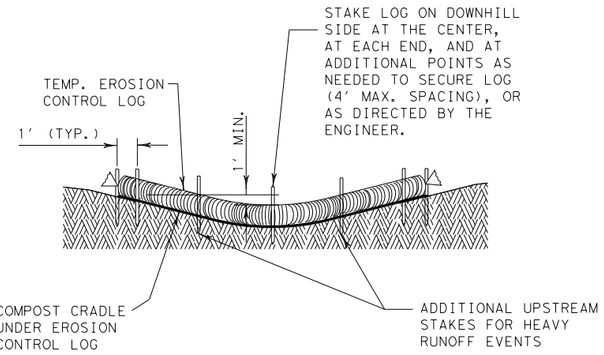
PLAN VIEW



PLAN VIEW



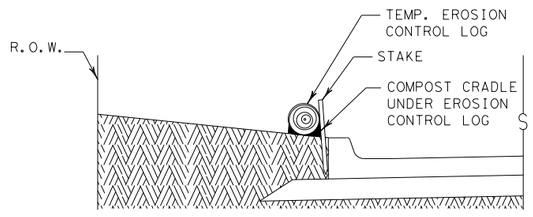
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

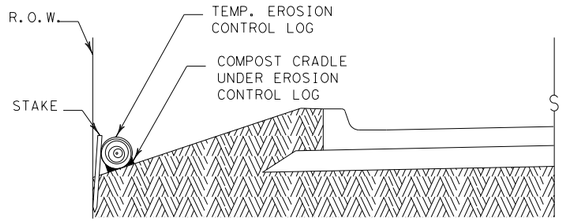
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



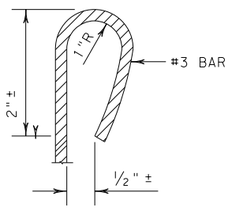
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

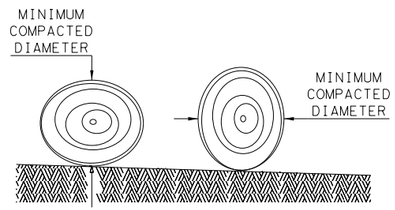
- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

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

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

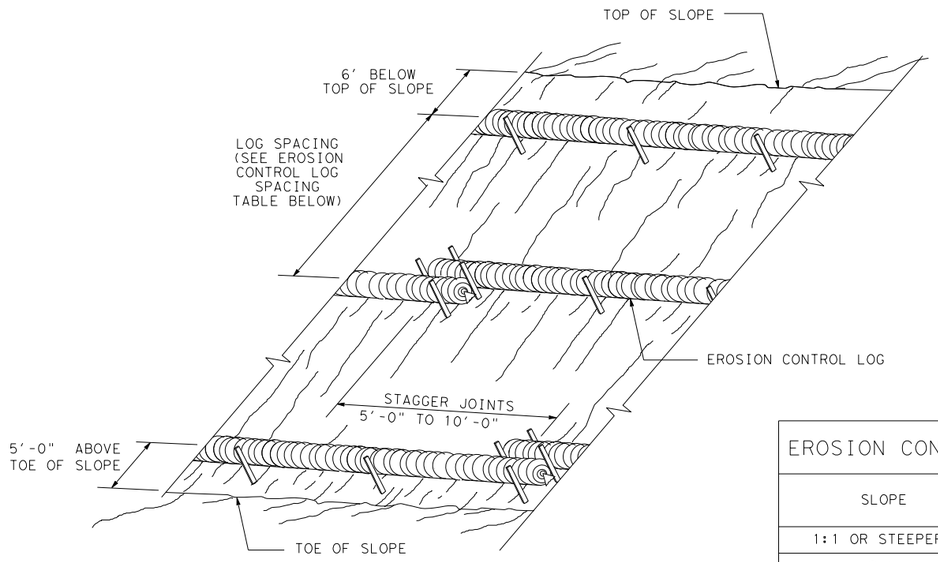
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

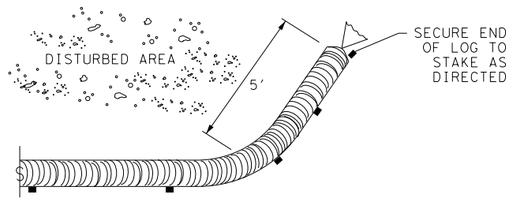
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0610	03	095	IH 30
	DIST	COUNTY		SHEET NO.
	ATL	TITUS		207

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\SW3P\ec916_2.dgn



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

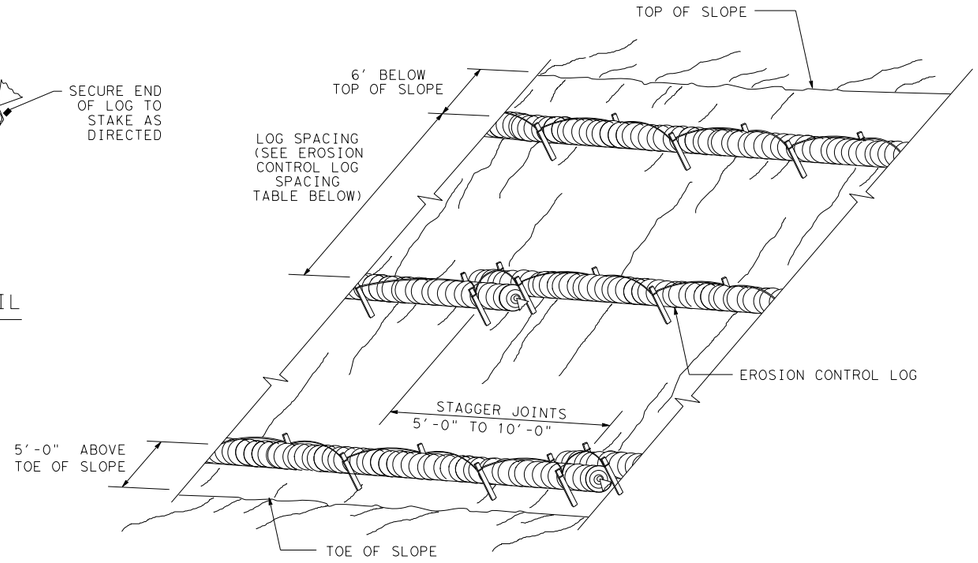
CL-SST



END SECTION RAP DETAIL

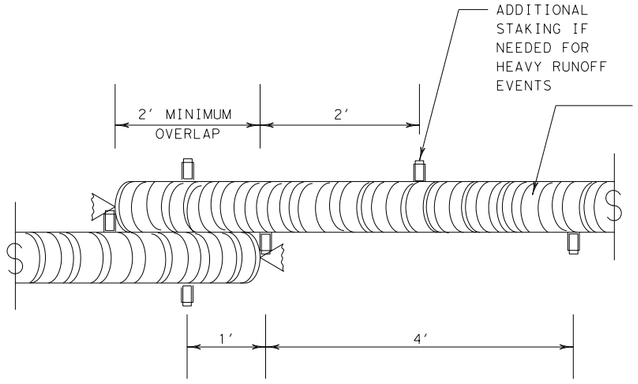
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

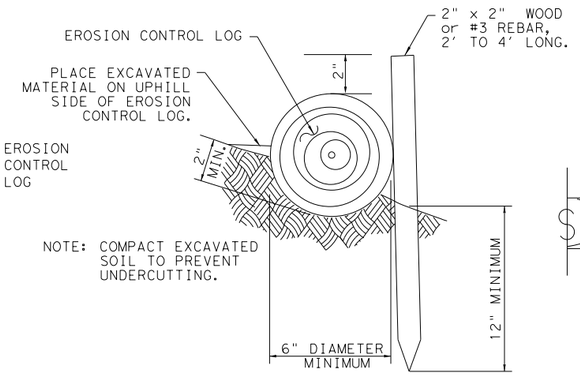
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

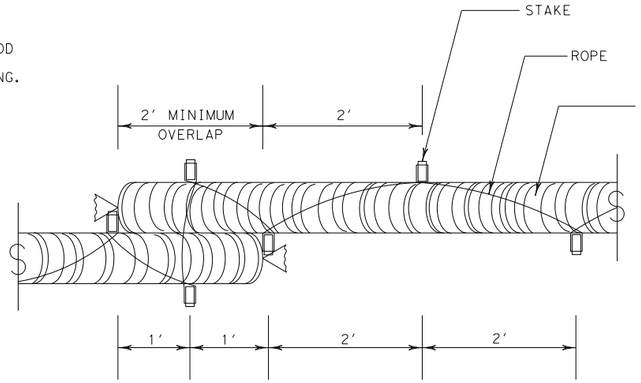


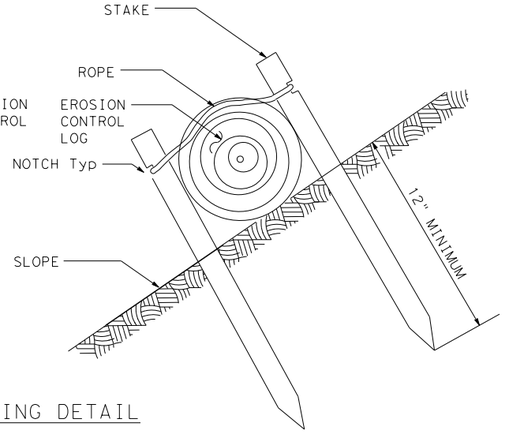


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

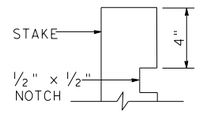
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

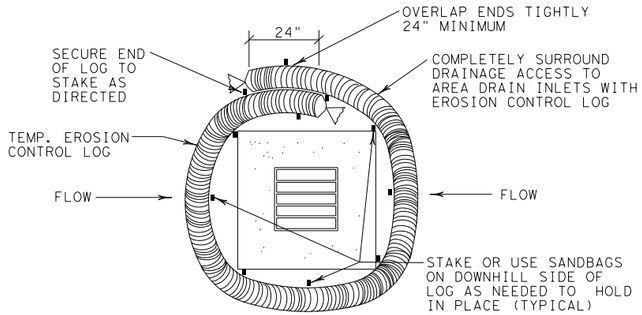
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

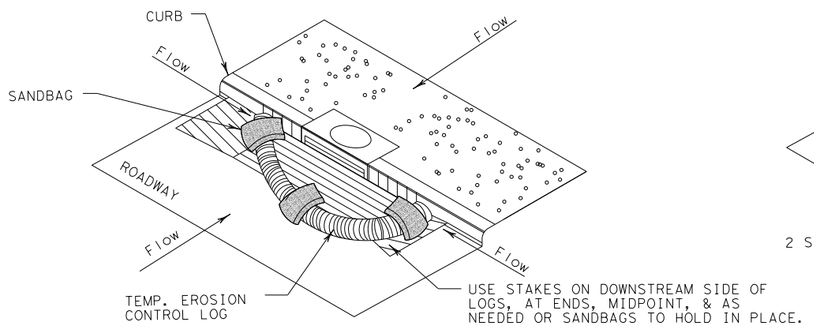
FILE: ec116	DN: TxDOT		CK: KM		DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0610	03	095		IH 30	
	DIST	COUNTY			SHEET NO.	
	ATL	TITUS			208	

DATE: 10/14/2022
FILE: P:\116\35\04\Design\Civil\Standards\SW3P\ec916_3.dgn



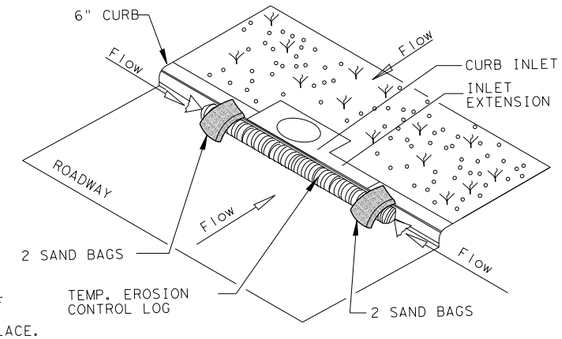
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

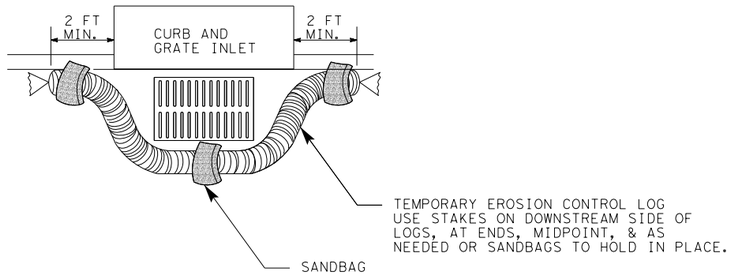
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

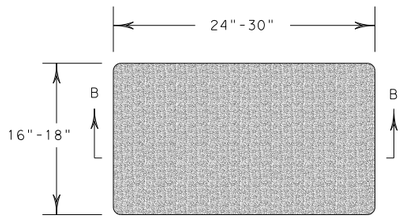
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0610	03	095		IH 30		
	DIST	COUNTY			SHEET NO.		
	ATL	TITUS			209		