PARKER COUNTY
TRANSPORTATION BOND PROGRAM

DRIVING FORWARD

PARKER COUNTY TRANSPORTATION BOND

CONSTRUCTION PLANS FOR

EAST BANKHEAD HIGHWAY WIDENING - PART 1
FROM VERNON ROAD TO FM1187

PAVING, DRAINAGE, AND TRAFFIC SIGNAL IMPROVEMENTS
PRECINCT NO. 4

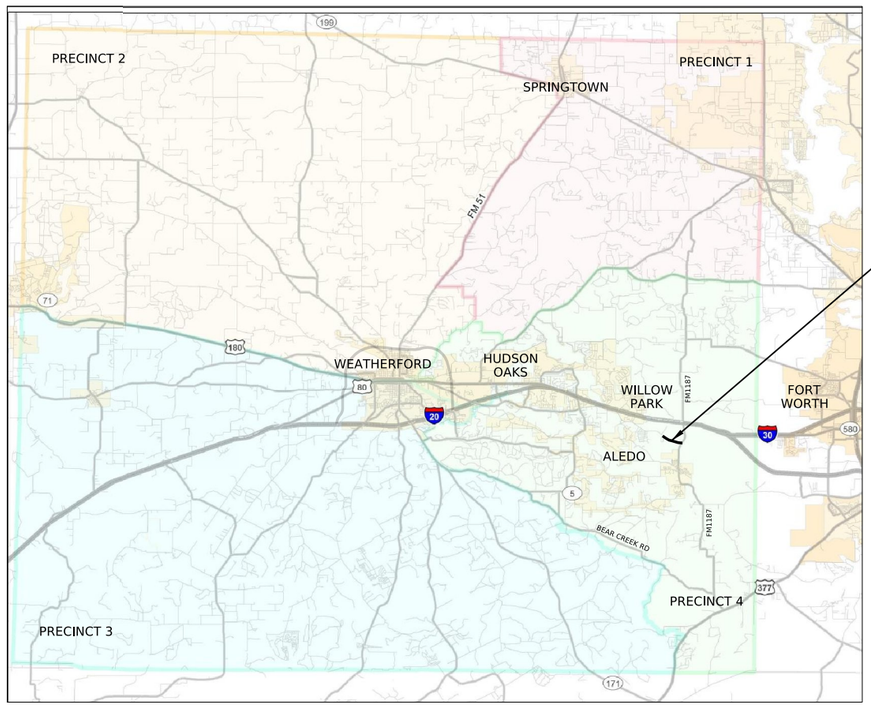
COUNTY JUDGE
PAT DEEN

PRECINCT 1 COMMISSIONER
GEORGE CONLEY

PRECINCT 2 COMMISSIONER
JACOB HOLT

PRECINCT 3 COMMISSIONER
LARRY WALDEN

PRECINCT 4 COMMISSIONER
MIKE HALE



PROJECT LOCATION
EAST BANKHEAD HIGHWAY
FROM VERNON ROAD TO FM 1187

PARKER COUNTY MAP
N.T.S.

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING
FIRM F-2144

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock

ISSUED FOR BIDDING
AUGUST 2026

NOTES:

1. *ALL CONTRUCTION WITHIN THE STATE RIGHT-OF-WAY WILL REQUIRE COMPLIANCE WITH TXDOT STANDARD SPECIFICATIONS, STANDARD PLANS, AND TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.*
2. *SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024, GOVERN ON THIS PROJECT FOR ALL WORK WITHIN THE STATE RIGHT-OF-WAY.*
3. *CONTRACTOR SHALL COORDINATE CONSTRUCTION PHASING AND TRAFFIC CONTROL WITH TXDOT A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO BEGINNING WORK WITHIN TXDOT RIGHT-OF-WAY.*

PRK24109

DATE: 8/27/2026 7:31:49 PM
FILE: \\icsM-freesepw21\ICS_pdf_work dir\5610154719_2\cv-109-gn-cover01.dgn

CK
DW
CK
DW

GENERAL

	1	COVER SHEET
	2	INDEX OF SHEETS
	3	ABBREVIATIONS & GENERAL NOTES
	4	PROJECT LAYOUT / SURVEY CONTROL
	5-7	TYPICAL SECTIONS

RIGHT OF WAY PLAN

	8-10	RIGHT OF WAY PLAN

TRAFFIC CONTROL PLAN

	11	DETOUR PLAN
	12-14	TRAFFIC CONTROL TYPICAL SECTIONS
	15	TRAFFIC CONTROL PLAN / PHASE 0 CONSTRUCTION PLAN
	16-18	TRAFFIC CONTROL PLAN / PHASE 1 CONSTRUCTION PLAN
	19	TRAFFIC CONTROL PLAN / PHASE 2 CONSTRUCTION PLAN
	20-22	TRAFFIC CONTROL PLAN / PHASE 3 CONSTRUCTION PLAN

TRAFFIC CONTROL PLAN STANDARD DETAILS

#	23	BC(1)-21 - BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS
#	24	BC(2)-21 - PROJECT LIMIT
#	25	BC(3)-21 - WORK ZONE SPEED LIMIT
#	26	BC(4)-21 - TEMPORARY SIGN NOTES
#	27	BC(5)-21 - TYPICAL SIGN SUPPORT
#	28	BC(6)-21 - PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
#	29	BC(7)-21 - ARROW PANEL, REFLECTORS, LIGHTS & ATTENUATOR
#	30	BC(8)-21 - CHANNELIZING DEVICES
#	31	BC(9)-21 - CHANNELIZING DEVICES
#	32	BC(10)-21 - CHANNELIZING DEVICES
#	33	BC(11)-21 - PAVEMENT MARKINGS
#	34	BC(12)-21 - PAVEMENT MARKING PATTERNS
#	35	TCP(2-1)-18 - CONVENTIONAL ROAD SHOULDER WORK
#	36	TCP(2-3)-23 - TRAFFIC SHIFTS ON TWO-LANE ROADS
#	37	TCP(2-6)-18 - LANE CLOSURES ON DIVIDED HIGHWAYS
#	38	TCP(3-3)-14 - MOBILE OPERATIONS - RAISED PAVEMENT MARKER
#	39-40	LPCB-26 LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 1 & 2)

ROADWAY PLAN

	41-45	ROADWAY ALIGNMENT DATA
	46-52	REMOVAL PLAN
	53-64	PAVING PLAN & PROFILE
	65-68	SIDESTREET PLAN & PROFILES
	69-70	DRIVEWAY PROFILE SHEETS
	71-72	FUTURE ACCESS POINT AND DRIVEWAY PROFILES
	73	GRADING PLAN - DRIVEWAY "F"

ROADWAY PLAN STANDARD DETAILS

#	74-75	CRCP(1)-24 - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
#	76	GF(31)-19 - METAL BEAM GUARD FENCE
#	77	GF(31)DAT-19 - METAL BEAM GUARD FENCE DOWNSTREAM TERMINAL ANCHOR
#	78	GF(31)MS-19 - METAL BEAM GUARD FENCE MOW STRIP
#	79	SGT(12S)31-18 - SINGLE GUARDRAIL TERMINAL (MSKT) (STEEL POST)
#	80	MB(1)-21 MAILBOX MOUNTING AND ASSEMBLY
#	81	MB(2)-21 XL LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY
#	82	MB(3)-21 MAILBOX SUPPORT AND FOUNDATION
#	83	MB(4)-21 NIGP PARTS LIST AND COMPATIBILITY
#	84	TREATMENT FOR VARIOUS EDGE CONDITIONS
#	85	CCCG (FTW) - CONCRETE CURB AND GUTTER DETAILS
#	86	CDD (FTW) CONCRETE DRIVEWAY DETAILS
#	87	CSWD (FTW) CONCRETE SIDEWALK DETAILS
#	88-91	PED-18 - PEDESTRIAN FACILITIES CURB RAMPS

RETAINING WALL PLAN

	92	RETAINING WALL PLAN AND PROFILE

RETAINING WALL STANDARD DETAILS

#	93	RW(SCF) - RETAINING WALL SPREAD FOOTING
#	94	RW(SF) - RETAINING WALL SPREAD FOOTING MISCELLANEOUS DETAILS
#	95-98	COMBINATION RAIL

DRAINAGE PLAN

	99	EXISTING DRAINAGE AREA MAP
	100-102	PROPOSED DETAILED DRAINAGE AREA MAP
	103-104	DRAINAGE CALCULATIONS
	105	DRAINAGE PLAN & PROFILE CULVERT F
	106-107	DRAINAGE PLAN & PROFILE CULVERT G
	108-118	DRAINAGE PLAN & PROFILE STORM DRAINS
	119-126	STORM DRAIN LATERAL PROFILES

DRAINAGE PLAN STANDARD DETAILS

#	127	CCR - CONCRETE RIPRAP AND SHOULDER DRAIN
#	128-129	SRR - STONE RIPRAP
#	130	FW-0 - CONCRETE WINGWALLS FLARED WINGS FOR 0 DEG SKEW
#	131	FW-S - CONCRETE WINGWALLS FLARED WINGS FOR SKEWS
#	132	PW - CONCRETE WINGWALLS PARALLEL WINGS SKEWED/NON SKEWED
#	133	CH-FW-0 - CONCRETE HEADWALLS FLARED WINGS FOR 0 DEG SKEW
#	134	SETP-PD - SAFETY END TREATMENT PARALLEL DRAINAGE 12"-72" DIA PIPES
#	135-136	SETP-CD - SAFETY END TREATMENT CROSS DRAINAGE 12"-60" DIA PIPES
#	137-138	SETB-PD - SAFETY END TREATMENT PARALLEL DRAINAGE MAX HW 7' FOR BOX CULVERTS
#	139-140	SETB-CD - SAFETY END TREATMENT CROSS DRAINAGE MAX HW 7' FOR BOX CULVERTS
#	141-142	SCC-8 - CAST-IN-PLACE SINGLE BOX CULVERTS - 0' TO 30' FILL
#	143-145	SCC-10 - CAST-IN-PLACE SINGLE BOX CULVERTS - 0' TO 30' FILL
#	146	SCC-MD - CAST-IN-PLACE SINGLE BOX CULVERTS - MISCELLANEOUS DETAILS
#	147	SCP-8 - PRECAST SINGLE BOX CULVERT 8' SPAN
#	148	SCP-10 - PRECAST SINGLE BOX CULVERT 10' SPAN
#	149	SCP-MD - BOX CULVERTS PRECAST - MISCELLANEOUS DETAILS
#	150	ECD - EXTENDED CURB DETAILS
#	151	BCS - BOX CULVERT SUPPLEMENT - WING & END TREATMENTS
#	152-153	I-CO (FTW) - CURB INLET OUTSIDE PAVEMENT FOR USE W/ TYPE II CURB
#	154-155	I-CU (FTW) - CURB INLET UNDER PAVEMENT FOR USE W/ TYPE II CURB
#	156-157	I-AD (FTW) - AREA DITCH INLET - TYPE AD
#	158-160	MDD (FTW) - MISCELLANEOUS DRAINAGE DETAILS
#	161-162	MH-SD (FTW) - STORM DRAIN MANHOLE DETAILS
#	163	PB-20 - PRECAST BASE
#	164	PAZD-CZ-20 - PRECAST AREA ZONE DRAIN WITHIN CLEAR ZONE
#	165	PDD-20 - DESIGN DATA FOR PRECAST BASE & JUNCTION BOX

EXISTING UTILITIES

	166-168	EXISTING UTILITIES PLAN
	169	PROPOSED UTILITIES PLAN

TRAFFIC SIGNAL PLAN

	170	CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY EXISTING CONDITIONS
	171	CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY PROPOSED SIGNAL
	172	CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY SIGNAL SUMMARY
	173	CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY TERMINATION & PHASING
	174	CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY SIGNAGE
	175	FM 1187 & EAST BANKHEAD HIGHWAY EXISTING CONDITIONS
	176	FM 1187 & EAST BANKHEAD HIGHWAY PROPOSED CONDITIONS
	177	FM 1187 & EAST BANKHEAD HIGHWAY SIGNAL SUMMARY
	178	FM 1187 & EAST BANKHEAD HIGHWAY TERMINATION & PHASING

TRAFFIC SIGNAL PLAN STANDARD DETAILS

	179	TRAFFIC SIGNAL GENERAL NOTES
&	180	ED(1)-25 ELECTRICAL DETAILS - CONDUIT & NOTES
&	181	ED(3)-25 ELECTRICAL DETAILS - CONDUCTORS
&	182	ED(4)-25 ELECTRICAL DETAILS - GROUND BOXES
&	183	ED(5)-25 ELECTRICAL DETAILS - SERVICE NOTES & DATA
&	184	ED(6)-25 ELECTRICAL DETAILS - SERVICE SCHEMATICS & NOTES
&	185	ED(8)-25 ELECTRICAL DETAILS - TYPICAL TRAFFIC SIGNAL, SYSTEM DETAILS
&	186	ED(9)-25 ELECTRICAL DETAILS - PEDESTAL SERVICE TYPE PS
&	187	ED(11)-25 ELECTRICAL DETAILS - DUCT CABLE / HDPE CONDUIT
&	188	MA-C-12 STANDARD ASSBMELY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM CONNECTIONS
&	189	MA-D-12 TRAFFIC SIGNAL SUPPORT STRUCTURES - MAST ARM POLE DETAILS
&	190	MA-DPD-12 MAST ARM DAMPING PLATE DETAILS
&	191	LUM-A-12 STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES ARM DETAILS
&	192	CFA-12 CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM
&	193-194	SMA-80(1-2)-12 TRAFFIC SIGNAL SUPPORT STRUCTURES SINGLE MAST ARM ASSEMBLY
&	195	TS-BP-20 TRAFFIC SIGNAL HEAD WITH BACKPLATE
&	196	TS-CF-21 - TRAFFIC SIGNAL CONTROLLER CABINET - BASE & PAD
&	197	WV & IZ-14 WIND VELOCITY & ICE ZONES

PAVEMENT MARKINGS & SIGNAGE PLAN

	198-204	PAVEMENT MARKINGS & SIGNAGE PLAN FROM BEGIN TO STA. 25+00.00

PAVEMENT MARKINGS & SIGNAGE PLAN STANDARD DETAILS

#	205	D&OM(1)-20 - DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION
#	206	D&OM(2)-20 - DELINEATOR & OBJECT MARKER INSTALLATION
#	207	D&OM(3)-20 - DELINEATOR & OBJECT MARKER PLACEMENT DETAILS
#	208	D&OM(4)-20 - DELINEATOR & OBJECT MARKER PLACEMENT DETAILS
#	209	D&OM(5)-20 - DELINEATOR & OBJECT MARKER PLACEMENT DETAILS
#	210	PM(1)-22 - TYPICAL STANDARD PAVEMENT MARKINGS
#	211	PM(2)-22 - POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS
#	212	PM(3)-22 - TWO WAY LEFT TURN LANES, RURAL LEFT TURN BAYS AND LANE REDUCTION PAVEMENT MARKINGS
#	213	PM(4)-22A - CROSSWALK PAVEMENT MARKINGS
#	214	PM(5)-22 - ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT
#	215-216	SOSS - SUMMARY OF SMALL SIGNS
#	217	SMD(GEN)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS
#	218	SMD(SLIP-1)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM
#	219	SMD(SLIP-2)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM
#	220	SMD(SLIP-3)-08 - SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM
#	221	SMD(2-3)-24 - SIGN MOUNTING DETAILS SIGN PANELS & HARDWARE EXTRUDED ALUMINUM
#	222	TSR(3)-13 - TYPICAL SIGN REQUIREMENTS (INDEPENDENT MOUNTED SIGNS)
#	223	TSR(4)-13 - TYPICAL SIGN REQUIREMENTS (INDEPENDENT MOUNTED SIGNS)

EROSION CONTROL PLAN

	224-226	EROSION CONTROL PLAN FROM BEGIN TO STA. 25+00.00

EROSION CONTROL PLAN STANDARD DETAILS

#	227-228	SWP3 - STORMWATER POLLUTION PREVENTION PLAN
#	229	EC(1)-16 - TEMPORARY EROSION CONTROL MEASRUES FENCE AND VERTICAL TRACKING
#	230	EC(2)-16 TEMPORARY EROSION CONTROL MEASURES ROCK FILTER DAMS
#	231	EC(3)-16 - TEMPORARY EROSION CONTROL MEASURES CONSTRUCTION EXITS
#	232-234	EC(9)-16 - TEMPORARY EROSION CONTROL MEASURES EROSION CONTROL LOG

CROSS SECTIONS

	235-260	EAST BANKHEAD HIGHWAY CROSS SECTIONS

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A "#"
HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Matt L. Willoughby P.E. 8/27/2026
DATE

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE BY A "&"
HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Dustin Blaylock P.E. 8/27/2026
DATE

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

Dustin Blaylock P.E. 8/27/2026
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

INDEX OF SHEETS

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	2

DATE: 8/27/2026 7:31:34 PM
FILE: \\cfw09fsp\projects\2021\21109\work dir\5610154719_3\cv-109-gn-Index01.dgn

GENERAL NOTES

I. GENERAL

1. THE CONTRACTOR SHALL GIVE THE COUNTY A MINIMUM OF 48 HOURS NOTICE BEFORE BEGINNING CONSTRUCTION. THE NOTIFICATION SHALL BE DIRECTED TO JONATHAN CAPPS WITH FREESE AND NICHOLS AT JONATHAN.CAPPS@FREESE.COM.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND THE TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES" (MOST RECENT VERSION AS SUPPLEMENTED).
3. THERE WILL BE NO SEPARATE PAYMENT FOR WORK SHOWN ON THESE PLANS UNLESS SPECIFICALLY ESTABLISHED IN THE BID PROPOSAL OF THE CONTRACT DOCUMENTS. INCLUDE COST OF THIS WORK IN THE CONTRACT UNIT PRICE FOR ITEMS OF WHICH THIS WORK IS ALSO A COMPONENT OR INCIDENTAL.
4. CONTRACTOR MAY STAGE EQUIPMENT WITHIN THE ROADWAY RIGHT OF WAY.
5. CONTRACTOR TO PROTECT DRIVEWAYS FROM ANY DAMAGE DUE TO WORK ACTIVITIES, SUCH AS PRIME COAT/FOG SEAL OVER SPRAY.

II. CONSTRUCTION

1. DISPOSAL OF ALL BRUSH, TRASH OR DEBRIS SHALL BE IN COMPLIANCE WITH THE REGULATIONS SET FORTH BY THE TEXAS AIR QUALITY CONTROL BOARD AND ALL CITY AND COUNTY REQUIREMENTS.
2. CONTRACTOR SHALL "SAWCUT AND MATCH EXISTING PAVEMENT" AT ALL STREET TIE-IN'S. SAWCUTTING WILL NOT BE MEASURED OR PAID FOR DIRECTLY BUT SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
3. ANY EXISTING SIDEWALK, CURB, DRIVEWAY, FENCING OR PAVEMENT WHICH IS NOT SCHEDULED TO BE ALTERED OR REMOVED, BUT WHICH IS DISTURBED BY CONSTRUCTION, SHALL BE REMOVED AND RESTORED WITH MATERIALS EQUAL OR BETTER THAN THE ORIGINAL AT THE CONTRACTOR'S EXPENSE PRIOR TO FINAL APPROVAL OF THE JOB.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND RELOCATING ANY MAIL BOXES THAT ARE IN THE WAY OF CONSTRUCTION AND TAKE MEASURES TO ASSURE THAT MAIL DELIVERY WILL NOT BE INTERRUPTED AS A RESULT OF THE CONSTRUCTION ACTIVITIES.
5. PRIOR TO BEGINNING ANY CONSTRUCTION, THE TEMPORARY EROSION CONTROL ITEMS SHALL BE IN PLACE.
6. THE CONTRACTOR WILL BE REQUIRED TO SPRINKLE FOR DUST CONTROL, IF NECESSARY OR AS DIRECTED BY THE OWNER OR OWNER'S AGENT. NO DIRECT PAYMENT WILL BE MADE FOR THIS WORK BUT IT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
7. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE REGRADED TO MATCH EXISTING CONDITIONS PRIOR TO PLACING FOUR (4) INCHES CLEAN TOPSOIL, FREE OF STONES AND DEBRIS, CAPABLE OF SUSTAINING HEALTHY PLANT LIFE AND SEEDED FOR EROSION CONTROL.

III. TRAFFIC CONTROL

1. ALL SIGNS, BARRICADES, PAVEMENT MARKINGS AND TRAFFIC CONTROL DEVICES, INCLUDING PLACEMENT, SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2. ALL TRAFFIC CONTROL DEVICES USED AT NIGHT SHALL BE REFLECTORIZED AND/OR ILLUMINATED. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT BATTERIES IN ILLUMINATED DEVICES ARE CHARGED SUCH THAT NO DEVICE FAILS TO OPERATE DURING THE NIGHT.
3. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN BARRICADES, WARNING SIGNS, FLASHERS, AND OTHER DEVICES OF THE TYPE AND SIZE INDICATED IN THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT REVISION.
4. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES DURING CONSTRUCTION.
5. SINGLE LANE CLOSURES, EXCEPT AS OTHERWISE SHOWN IN THE PLANS, WILL BE RESTRICTED TO OFF-PEAK HOURS AS DEFINED IN THE FOLLOWING TABLE:

PEAK HOURS		OFF-PEAK HOURS	
6 TO 9 AM MONDAY THROUGH FRIDAY	3 TO 7 PM MONDAY THROUGH FRIDAY	9 AM TO 3 PM AND 7 PM TO 6 AM MONDAY THROUGH FRIDAY	ALL DAY SATURDAY AND SUNDAY

SPECIAL EVENTS/ SPECIAL SITUATIONS /ALEDO ISD EVENTS WILL BE HANDLED ON A CASE-BY-CASE BASIS. NO WORK RESTRICTING LANE CLOSURES IS ALLOWED FROM 3 PM A DAY BEFORE TO 9 AM THE DAY AFTER THE SPECIAL EVENT OR SPECIAL SITUATION.

IV. DRAINAGE/EXCAVATION/UTILITIES

1. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY DISTRICT OR COMPANY AT LEAST 48 HOURS BEFORE COMMENCING WORK THAT WOULD AFFECT UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL UNDERGROUND UTILITIES. UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE BASED ON THE MOST CURRENT INFORMATION AVAILABLE DURING THE DESIGN PERIOD AND ARE FOR REFERENCE PURPOSES ONLY.
2. THE INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND AND OTHER UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
3. ANY OBSTRUCTIONS TO EXISTING DRAINAGE DUE TO THE CONTRACTOR'S OPERATIONS WILL BE REMOVED BY THE CONTRACTOR AS REQUIRED BY THE ENGINEER AT THE CONTRACTOR'S ENTIRE EXPENSE. ANY DAMAGE TO EXISTING FACILITIES AS A RESULT OF THE CONTRACTOR OBSTRUCTING EXISTING DRAINAGE WAY WILL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
4. CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL EXISTING ELECTRICAL, TELEPHONE, GAS AND CABLE TV LINES TO BE RELOCATED BY OTHERS.
6. IN THE EVENT THAT THE DESIGN IS CHANGED DURING CONSTRUCTION BY EITHER FIELD ORDER OR A CHANGE ORDER, IT IS THE CONTRACTOR'S RESPONSIBLITY TO COORDINATE WITH ALL UTILITIES AFFECTED BY THE CHANGE.
7. THE CONTRACTOR SHALL CALL DIG-TESS AND FIELD VERIFY THE LOCATION OF ALL EXISTING UTILITES.

VI. ENVIROMENTAL MANAGEMENT

1. THE CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY EROSION AND SEDIMENTATION CONTROLS UNTIL REVEGETATION IS COMPLETED TO PREVENT OFF-SITE TRANSPORT OF SEDIMENT AND DEBRIS FROM THE PROJECT. OWNER OR OWNER'S AGENT MAY DIRECT THE CONTRACTOR TO ADJUST LOCATIONS OR ADD FOOTAGE IN AREAS WHERE IT IS OBSERVED INADEQUATE TO PREVENT OFF-SITE SEDIMENTATION.
2. THE CONTRACTOR SHALL INSPECT THE CONTROLS AT LEAST WEEKLY AND AFTER EVERY SIGNIFICANT RAINFALL, TO DETERMINE IF THE CONTROLS ARE INTACT AND FUNCTIONING, AND OBSERVE IF SEDIMENTATION HAS EXCEEDED SPECIFICATIONS. THE CONTRACTOR SHALL PERFORM ALL NECESSARY REPAIRS AND REMOVE EXCESS SEDIMENT TO SPOIL AREAS WITHIN 48 HOURS. THE CONTRACTOR IS RESPONSIBLE UNDER THIS CONTRACT TO PERFORM THE REQUIRED ROUTINE TEMPORARY CONTROL MAINTENANCE WITH SPECIFIED TIME FRAMES.
3. THE CONTRACTOR SHALL NOT DISCHARGE PUMPED WATER CONTAINING SUSPENDED SOLIDS FROM EXCAVATIONS AND STREAM CROSSINGS OFF SITE OR INTO WATERWAYS WITHOUT TAKING MEASURES TO PREVENT SEDIMENTATION OF THE WATERWAY.

LEGEND OF UTILITY TYPES

ABANDONED UTILITY —X—X—X—X—

GAS / PETROLEUM

PRAIRE PIPELINE — QL "B" — · — PL1 — · —

PRAIRE PIPELINE — QL "C"/QL "D" — · — (PL1) — · —

CITY OF WEATHERFORD — QL "B" — · — W1 — · —

CITY OF WEATHERFORD — QL "C"/QL "D" — · — (W1) — ·

LEGEND OF UTILITY SYMBOLS

END CAP
QUALITY LEVEL CHANGE
TEST HOLE
UTILITY CONTINUATION

FIRE HYDRANT
WATER MANHOLE
WATER METER (WM)
WATER VALVE
WATER VAULT (W)

TYPICAL ABBREVIATIONS

ABBRE	ABBREVIATION
AH	AHEAD
@	AT
APPROX	APPROXIMATE
ARV	AIR RELEASE VALVE
AVE	AVENUE
BK	BACK
BOC	BACK OF CURB
℄ OR B/L	BASE LINE
BM	BENCHMARK
BLDG	BUILDING
BLK	BLOCK
BRD	BURIES
C/C	CENTER TO CENTER
CF	CUBIC FEET
CI	CAST IRON
℄ OR CL	CENTERLINE
CONC	CONCRETE
CY	CUBIC YARD
DESC	DESCRIPTION
DIA	DIAMETER
DWY	DRIVE WAY
DI	DUCTILE IRON
E	EAST
EG	EXISTING GROUND
ELEV OR EL	ELEVATION
ESMT	EASEMENT
EJ	EXPANSION JOINT
FV	FIELD VERIFY
FH OR FIRE HYD	FIRE HYDRANT
FLG	FLANGED
FLG X MJ	FLANGED BY MECHANICAL JOINTS
FLEX BASE	FLEXIBLE BASE
℄ OR FL	FLOW LINE
GALV	GALVANIZED
GMH	GAS MANHOLE
GM	GAS METER
G SIGN	GAS SIGN
GV	GAS VALVE
GV'S	GAS VALVES
GND	GROUND
HDPE	HIGH DENSITY POLYETHYLENE
HDWL	HEADWALL
HMAC	HOT MIX ASPHALTIC CONCRETE
HORZ	HORIZONTAL
HWY	HIGHWAY
ID	INSIDE DIAMETER
IRF	IRON ROD FOUND
IRS	IRON ROD SET
JTS	JOINTS
LF	LINEAR FEET
LT	LEFT
LP	LIGHT POLE
MH	MANHOLE
MAX	MAXIMUM
MJ	MECHANICAL JOINT
MIN	MINIMUM
N	NORTH
OD	OUTSIDE DIAMETER
OH	OVERHEAD
PVMT	PAVEMENT
PED	PEDESTAL
PE LINE	PETROLEUM LINE
PE	PLAIN END
PGL	PROFILE GROUND LINE
PVC	POLYVINYL CHLORIDE PIPE
PP	POWER POLE
PCCP	PRETENSIONED CONCRETE CYLINDER PIPE
× OR PL	PROPERTY LINE
PI	POINT OF INTERSECTION
POL	PULVERIZATION & OVERLAY
PROP	PROPOSED
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
RR	RAILROAD
REHAB	REHABILITATE
REM	REMOVE
RCP	REINFORCED CONCRETE PIPE
RT	RIGHT
ROW	RIGHT-OF-WAY
REQ	REQUIRED
SIG BOX	TRAFFIC SIGNAL BOX
S	SOUTH
SCF	SILT CONTROL FENCE
STD	STANDARD
STA	STATION
ST	STREET
SL	STREET LIGHT
SD	STORM DRAIN
SQFT OR SF	SQUARE FOOT
SPEC	SPECIFICATION
SURF	SURFACE
TEMP	TEMPORARY
TOC	TOP OF CONCRETE OR CURB
TOP	TOP OF PIPE
T SIGN	TRAFFIC SIGN
TYP	TYPICAL
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VC	VERTICAL CURVATURE
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENT
W	WEST
W/	WITH
WL	WATER LINE
WM	WATER METER
WV	WATER VALVE
WV'S	WATER VALVES

SURVEY LEGEND

- GUY ANCHOR
- UTILITY CABINET
- CLEAN OUT
- ELECTRICAL METER
- FIRE HYDRANT
- FIBER OPTIC MANHOLE
- FIBER OPTIC MARKER
- GAS METER
- GAS MARKER
- TEST STATION
- LIGHT / LIGHT POLE
- MAILBOX
- POWER POLE
- BUSH
- TELEPHONE PEDESTAL
- VENT
- WATER METER
- WATER MANHOLE
- SIGN
- UTILITY SIGN

STATE OF TEXAS · DUSTIN BLAYLOCK · 115500 · LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock P.E. _____
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ABBREVIATIONS AND GENERAL NOTES

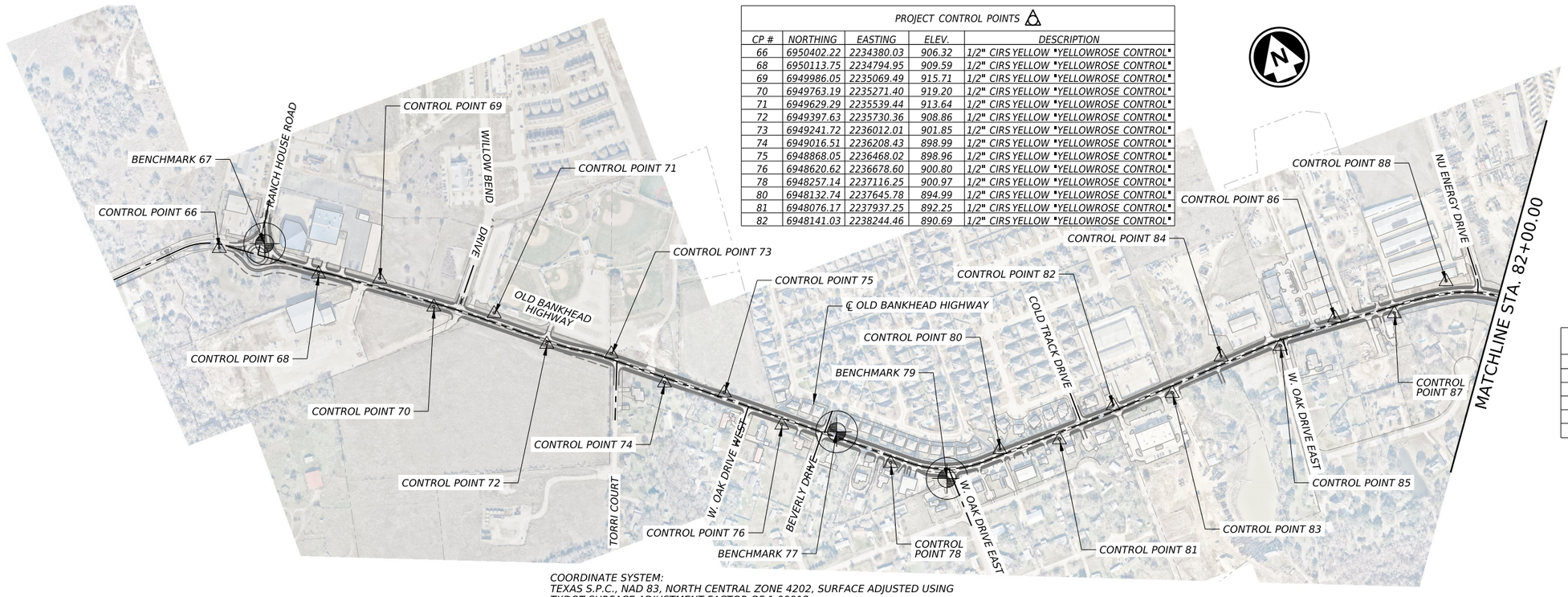
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	3

DATE: 8/27/2026 7:31:53 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\15610154719_4\cv-109-gn-notes01.dgn

CK
DW
CK
DW



PROJECT CONTROL POINTS

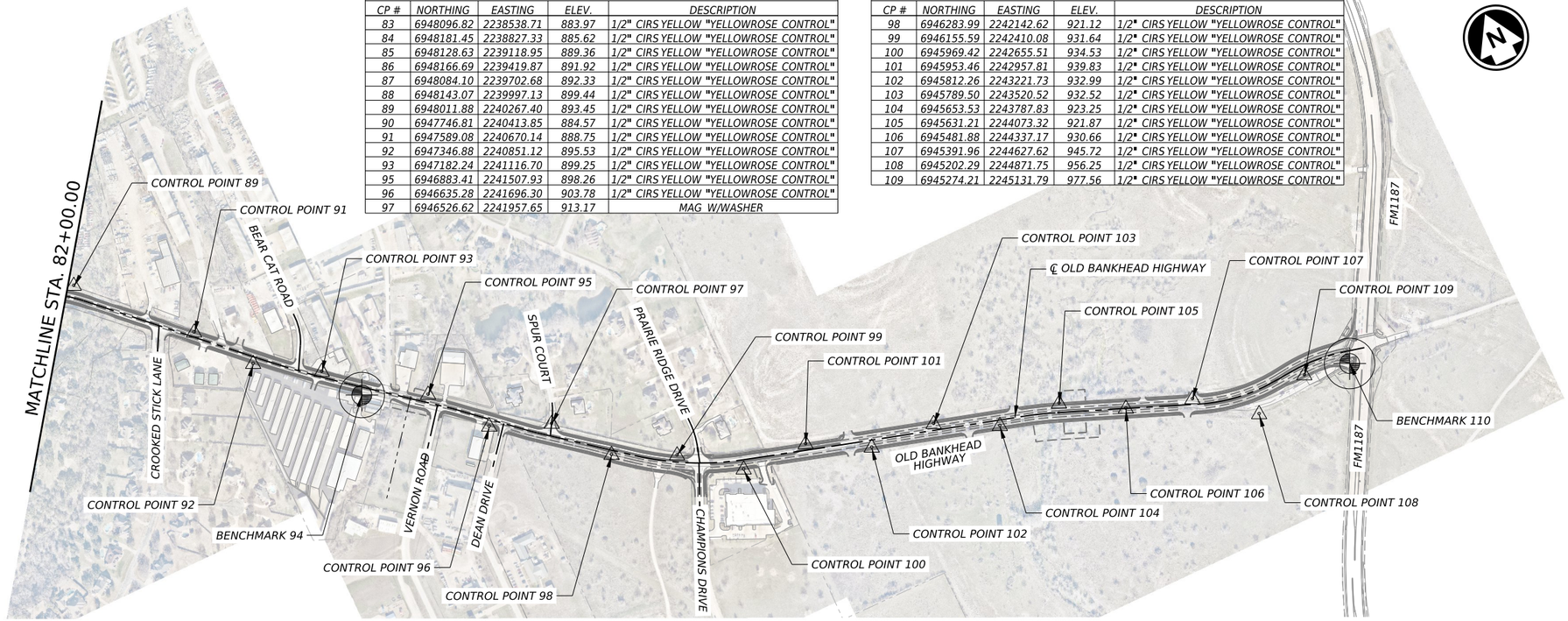
CP #	NORTHING	EASTING	ELEV.	DESCRIPTION
66	6950402.22	2234380.03	906.32	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
68	6950113.75	2234794.95	909.59	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
69	6949986.05	2235069.49	915.71	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
70	6949763.19	2235271.40	919.20	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
71	6949629.29	2235539.44	913.64	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
72	6949397.63	2235730.36	908.86	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
73	6949241.72	2236012.01	901.85	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
74	6949016.51	2236208.43	898.99	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
75	6948868.05	2236468.02	898.96	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
76	6948620.62	2236678.60	900.80	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
78	6948257.14	2237116.25	900.97	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
80	6948132.74	2237645.78	894.99	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
81	6948076.17	2237937.25	892.25	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
82	6948141.03	2238244.46	890.69	1/2" CIRS YELLOW "YELLOWROSE CONTROL"

BENCHMARK POINTS

BM #	NORTHING	EASTING	ELEV.	DESCRIPTION
67	6950343.57	2234596.70	911.04	BOX CUT W/ X
77	6948492.24	2236919.88	903.34	BOX CUT W/ X
79	6948087.52	2237350.29	897.90	BOX CUT W/ X
94	6947007.59	2241234.89	899.21	BOX CUT W/ X
110	6945232.71	2245338.83	987.22	BOX CUT W/ X

COORDINATE SYSTEM:
TEXAS S.P.C., NAD 83, NORTH CENTRAL ZONE 4202, SURFACE ADJUSTED USING
TXDOT SURFACE ADJUSTMENT FACTOR OF 1.00012

ELEVATION DATA:
NAVD 88 (GEOID12B)



PROJECT CONTROL POINTS

CP #	NORTHING	EASTING	ELEV.	DESCRIPTION
83	6948096.82	2238538.71	883.97	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
84	6948181.45	2238827.33	885.62	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
85	6948128.63	2239118.95	889.36	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
86	6948166.69	2239419.87	891.92	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
87	6948084.10	2239702.68	892.33	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
88	6948143.07	2239997.13	899.44	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
89	6948011.88	2240267.40	893.45	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
90	6947746.81	2240413.85	884.57	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
91	6947589.08	2240670.14	888.75	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
92	6947346.88	2240851.12	895.53	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
93	6947182.24	2241116.70	899.25	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
95	6946883.41	2241507.93	898.26	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
96	6946635.28	2241696.30	903.78	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
97	6946526.62	2241957.65	913.17	MAG W/WASHER

PROJECT CONTROL POINTS

CP #	NORTHING	EASTING	ELEV.	DESCRIPTION
98	6946283.99	2242142.62	921.12	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
99	6946155.59	2242410.08	931.64	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
100	6945969.42	2242655.51	934.53	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
101	6945953.46	2242957.81	939.83	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
102	6945812.26	2243221.73	932.99	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
103	6945789.50	2243520.52	932.52	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
104	6945653.53	2243787.83	923.25	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
105	6945631.21	2244073.32	921.87	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
106	6945481.88	2244337.17	930.66	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
107	6945391.96	2244627.62	945.72	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
108	6945202.29	2244871.75	956.25	1/2" CIRS YELLOW "YELLOWROSE CONTROL"
109	6945274.21	2245131.79	977.56	1/2" CIRS YELLOW "YELLOWROSE CONTROL"

0 200 400 600
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

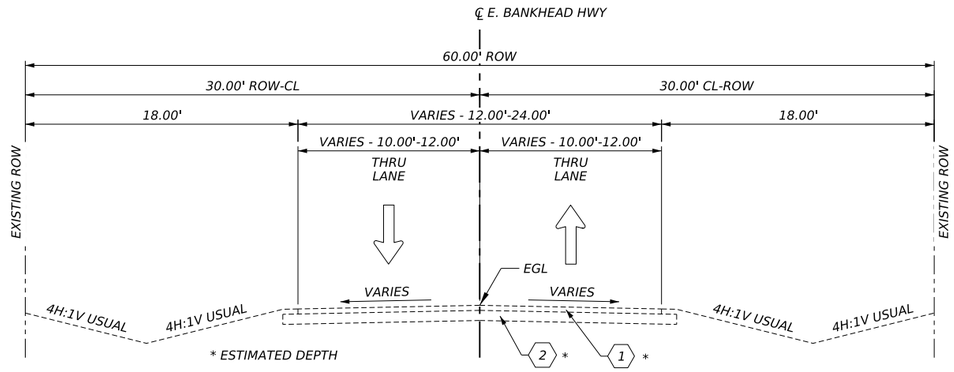
PROJECT LAYOUT AND SURVEY CONTROL

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	4

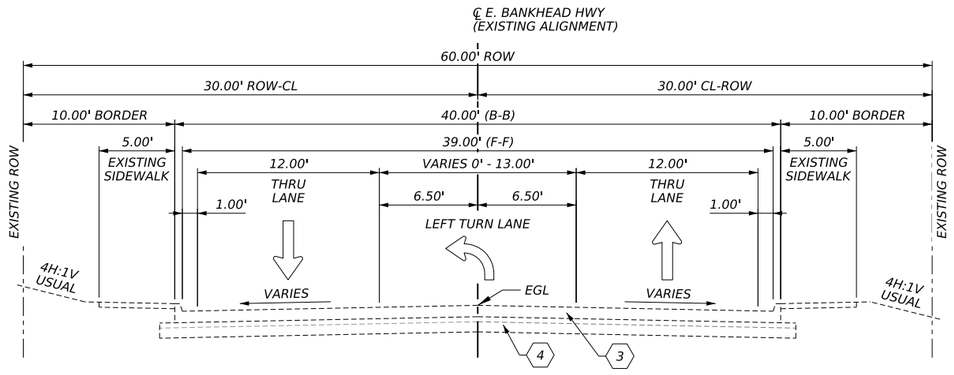
DATE: 8/27/2026 7:33:25 PM
FILE: \\cosfile09\projects\2011\011685\work_dir\5610\54719_5\cv-109-pl-cont01.dgn



EAST BANKHEAD HWY
EXISTING TYPICAL SECTION RURAL

E 1

NOT TO SCALE
BEGINNING TO STA. 139+95



EAST BANKHEAD HWY
EXISTING TYPICAL SECTION URBAN @ FM1187

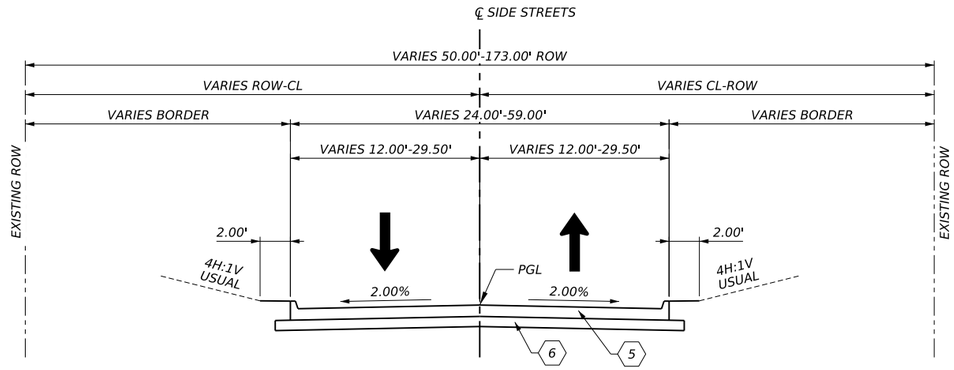
E 2

NOT TO SCALE
STA. 139+95 TO END

LEGEND

1	EXISTING 4" HMAC (ESTIMATED)
2	EXISTING 8" FLEXIBLE BASE (ESTIMATED)
3	EXISTING 9" CONCRETE PAVEMENT
4	EXISTING BASE: 4" HMAC 8" LTS
5	8" CONCRETE PAVEMENT (CRCP)
6	8" LIME TREATED BASE
7	4" CONCRETE SIDEWALK
8	4" HMAC - D-GR (TY D)(SAC B PG 70-22)
9	6" FLEXIBLE BASE (TY A GR 1-2)
10	PRIME COAT (MC-30)
11	RETAINING WALL (SEE PLAN FOR LOCATION AND TYPE)
12	6" CONCRETE CURB (TY II) (MONOLITHIC)
13	6" STAMPED AND COLORED CONCRETE
14	4" TOP SOIL AND BLOCK SODDING

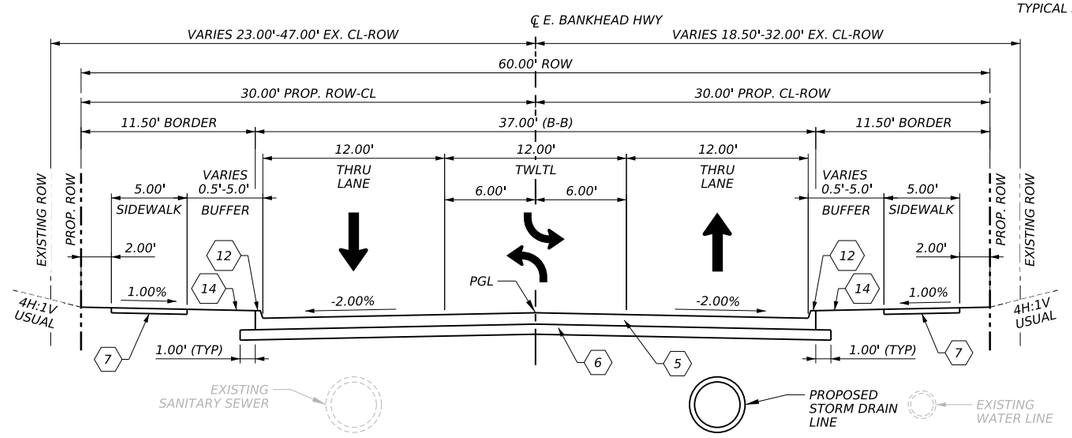
NOTE: CONTRACTOR SHALL REFERENCE ROADWAY STANDARD DETAILS FOR REBAR SIZING AND SPACING FOR TYPICAL SECTIONS.



E BANKHEAD HWY
PROPOSED TYPICAL SECTION SIDE STREETS

P 5

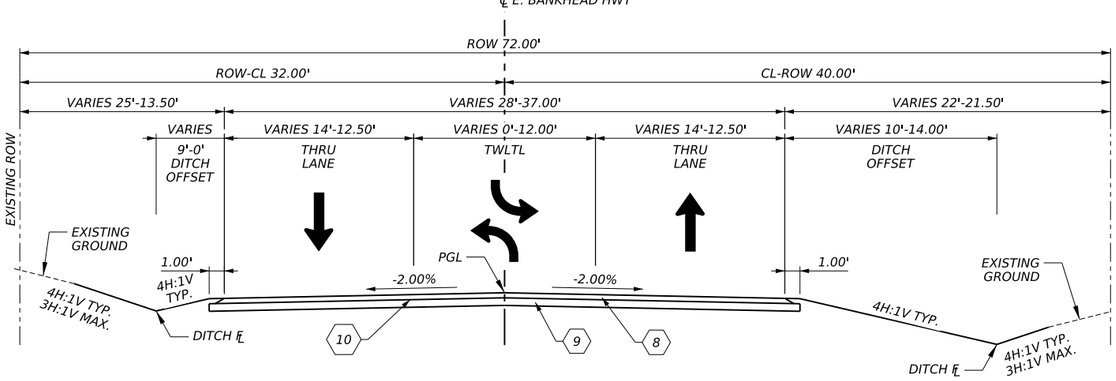
NOT TO SCALE



PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
URBAN 2 LANE - UNDIVIDED W/ TWLTL

P 1

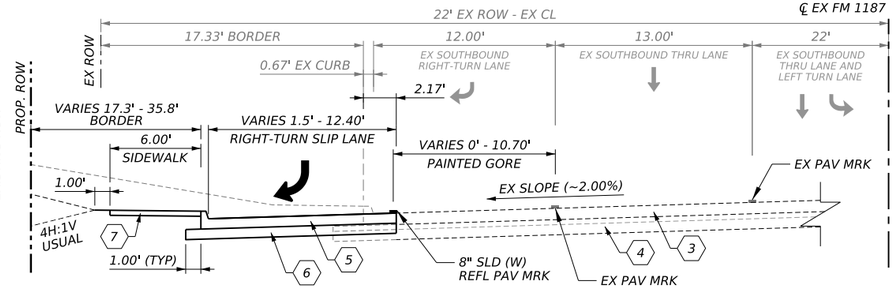
NOT TO SCALE
BEGINNING TO STA. 103+00



PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
ASPHALT TRANSITION

P 2

NOT TO SCALE
STA. 94+26 TO STA. 95+88



FM 1187 - PROPOSED TYPICAL SECTION
RIGHT-TURN SLIP LANE @ BANKHEAD HWY

P -

NOT TO SCALE
(BANKHEAD) STA. 142+44, OFF. 177' LT TO STA. 142+20, OFF. 85' LT
(FM 1187) STA. 103+45 TO STA. 104+41

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

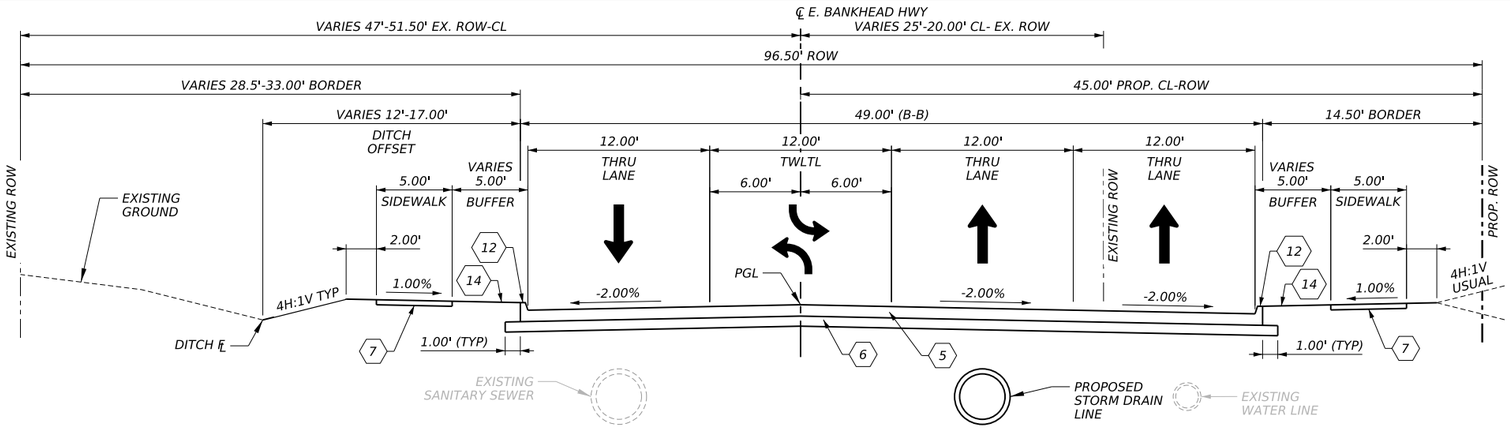
TYPICAL SECTIONS EXISTING SECTIONS AND PROPOSED SECTIONS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

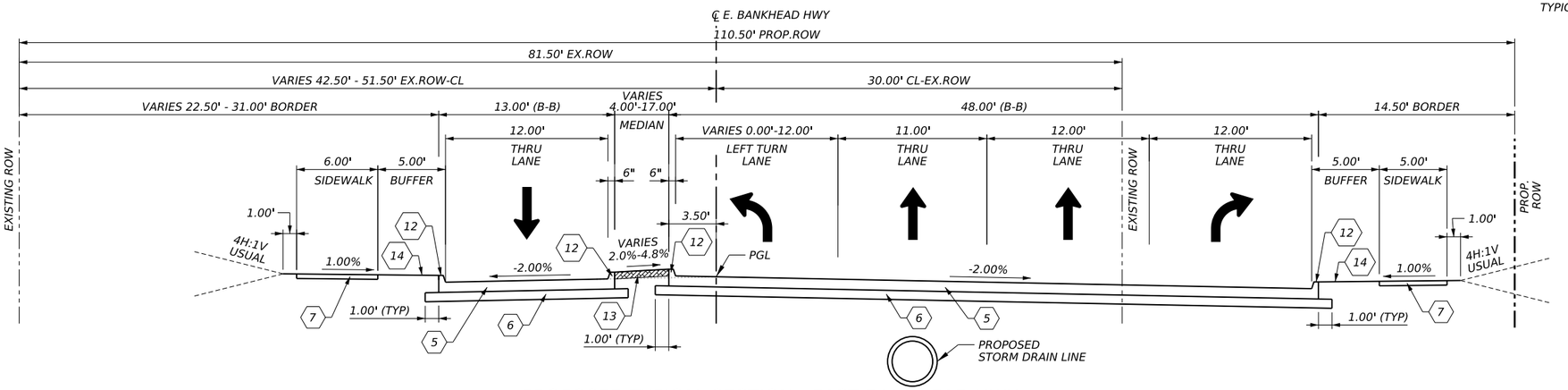
DIST	COUNTY	SHEET NO.
	PARKER	5

DATE: 8/27/2026 7:31:55 PM
FILE: \\dfs06\groups\prj\21105_pdf_work_dln\5610\54719_1\cv-109-gn-typ01.dgn



PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
URBAN 3 LANE - UNDIVIDED W/ TWLTL

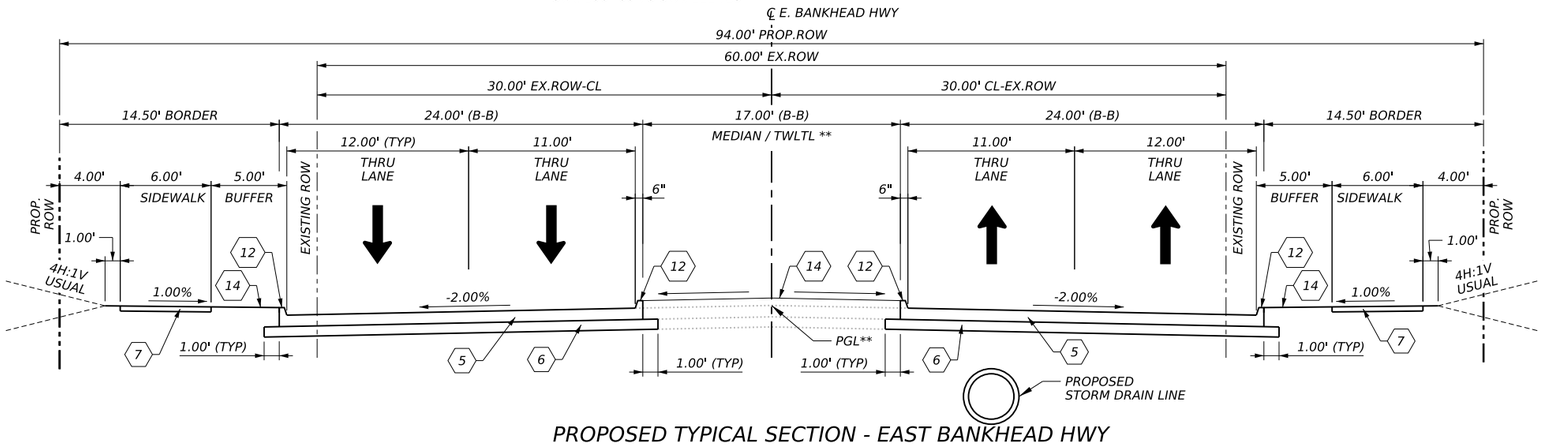
NOT TO SCALE
STA. 103+00 TO STA. 106+00



PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
URBAN 4 LANE - DIVIDED W/ EASTBOUND LEFT AND RIGHT TURN LANES

3B

NOT TO SCALE
STA. 106+00 TO STA. 111+15



PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
URBAN 4 LANE - DIVIDED

3

NOT TO SCALE
STA. 112+23 TO STA. 138+02

** SEE PLANS FOR MEDIAN OPENING / CENTER TURN LANE LOCATIONS **
STA. 118+09 TO STA. 128+19 **
STA. 133+49 TO STA. 134+76 **

LEGEND

1	EXISTING 4" HMAC (ESTIMATED)
2	EXISTING 8" FLEXIBLE BASE (ESTIMATED)
3	EXISTING 9" CONCRETE PAVEMENT
4	EXISTING BASE: 4" HMAC 8" LTS
5	8" CONCRETE PAVEMENT (CRCP)
6	8" LIME TREATED BASE
7	4" CONCRETE SIDEWALK
8	4" HMAC - D-GR (TY D)(SAC B PG 70-22)
9	6" FLEXIBLE BASE (TY A GR 1-2)
10	PRIME COAT (MC-30)
11	RETAINING WALL (SEE PLAN FOR LOCATION AND TYPE)
12	6" CONCRETE CURB (TY II) (MONOLITHIC)
13	6" STAMPED AND COLORED CONCRETE
14	4" TOP SOIL AND BLOCK SODDING

NOTE: CONTRACTOR SHALL REFERENCE ROADWAY STANDARD DETAILS FOR REBAR SIZING AND SPACING FOR TYPICAL SECTIONS.

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

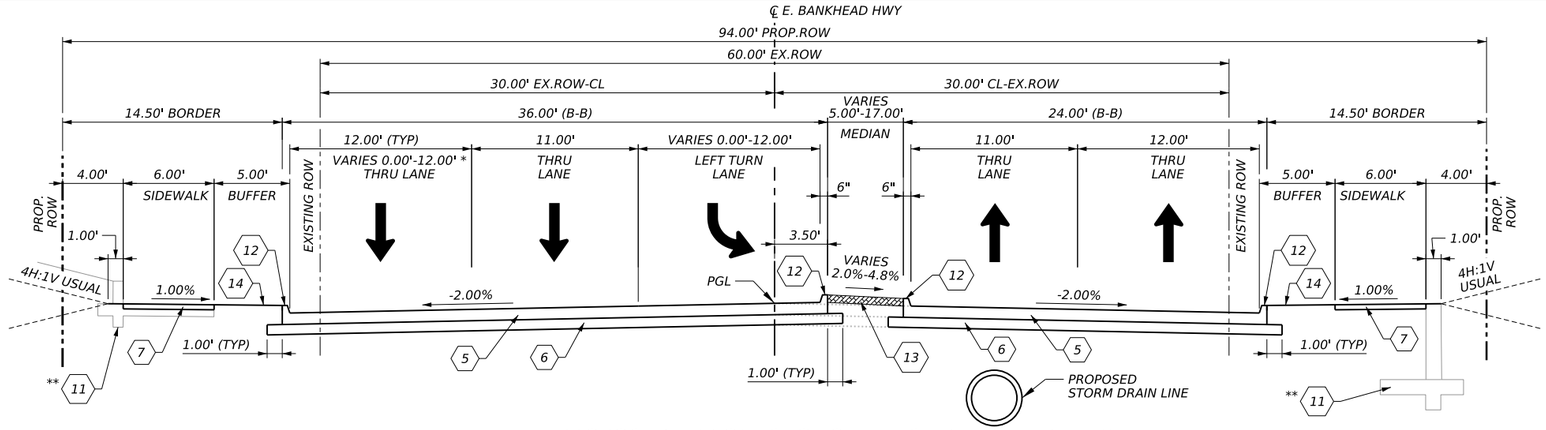
TYPICAL SECTIONS EXISTING SECTIONS AND PROPOSED SECTIONS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	6

DATE: 8/27/2026 7:32:16 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_dir\56101054719_19\cv-109-gn-typ02.dgn

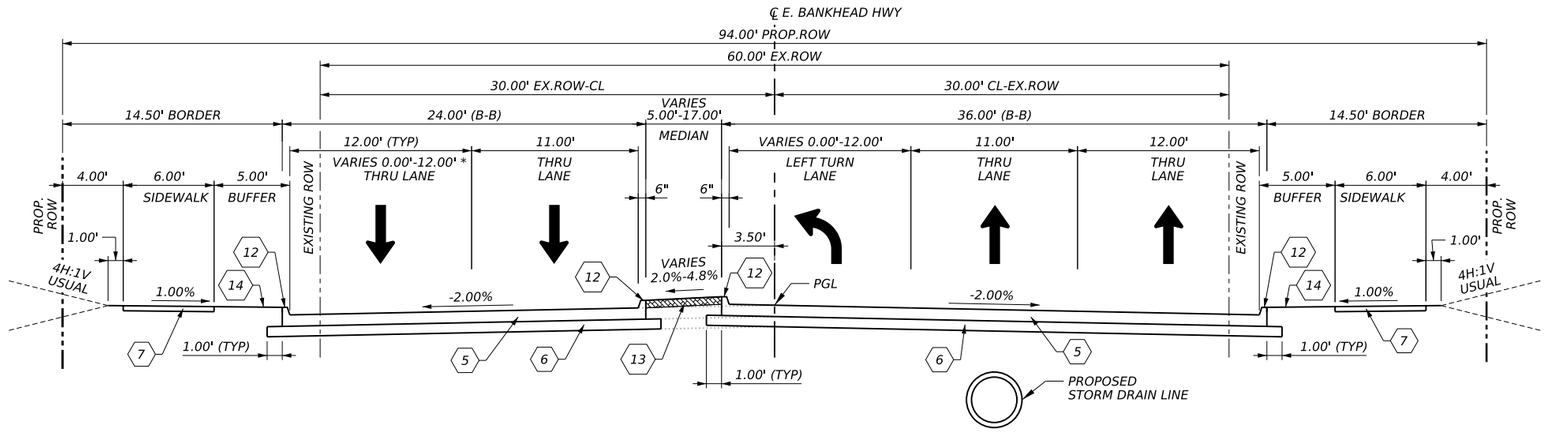


PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
URBAN 4 LANE - DIVIDED W/ WESTBOUND LEFT TURN LANE

P 3B

NOT TO SCALE
STA. 112+23 TO STA. 116+40
STA. 134+76 TO STA. 137+45

* SEE PLANS FOR LANE DROP LOCATIONS *
STA. 112+23 TO STA. 116+40 *
** SEE PLANS FOR RETAINING WALL LOCATIONS **
(RIGHT) STA. 112+23 TO STA. 114+28 **
(LEFT) STA. 114+00 TO STA. 114+80 **

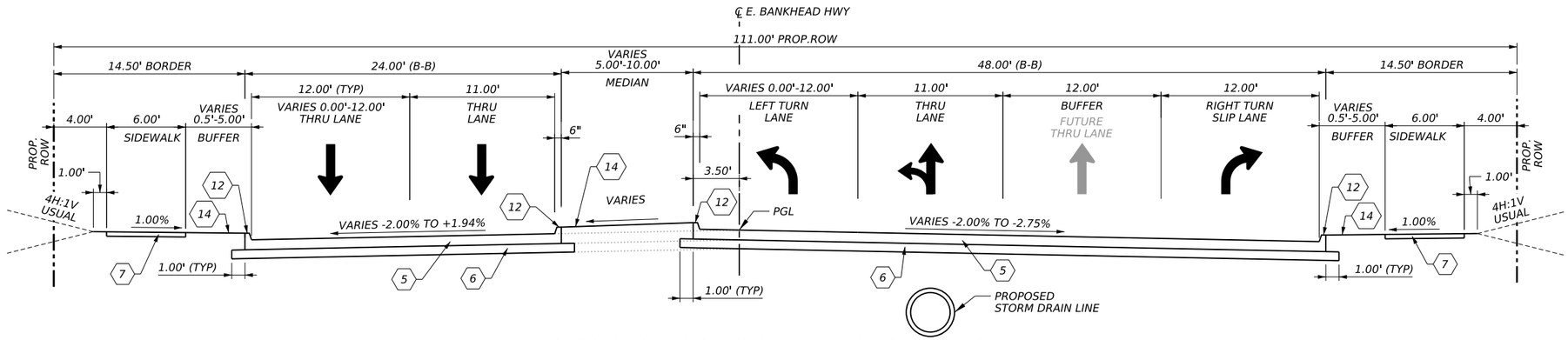


PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
URBAN 4 LANE - DIVIDED W/ EASTBOUND LEFT TURN LANE

P 3A

NOT TO SCALE
STA. 115+91 TO STA. 118+10
STA. 129+77 TO STA. 133+49

* SEE PLANS FOR LANE DROP LOCATIONS *
STA. 115+91 TO STA. 118+10 *



PROPOSED TYPICAL SECTION - EAST BANKHEAD HWY
EAST BANKHEAD HWY / FM 1187 INTERSECTION

P 4

NOT TO SCALE
STA. 138+02 TO STA. 141+69

LEGEND

1. EXISTING 4" HMAC (ESTIMATED)
2. EXISTING 8" FLEXIBLE BASE (ESTIMATED)
3. EXISTING 9" CONCRETE PAVEMENT
4. EXISTING BASE: 4" HMAC 8" LTS
5. 8" CONCRETE PAVEMENT (CRCP)
6. 8" LIME TREATED BASE
7. 4" CONCRETE SIDEWALK
8. 4" HMAC - D-GR (TY D)(SAC B PG 70-22)
9. 6" FLEXIBLE BASE (TY A GR 1-2)
10. PRIME COAT (MC-30)
11. RETAINING WALL (SEE PLAN FOR LOCATION AND TYPE)
12. 6" CONCRETE CURB (TY II) (MONOLITHIC)
13. 6" STAMPED AND COLORED CONCRETE
14. 4" TOP SOIL AND BLOCK SODDING

NOTE: CONTRACTOR SHALL REFERENCE ROADWAY STANDARD DETAILS FOR REBAR SIZING AND SPACING FOR TYPICAL SECTIONS.

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

TYPICAL SECTIONS EXISTING SECTIONS AND PROPOSED SECTIONS

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	7

DATE: 8/27/2026 7:32:34 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56101\54719_27\cv-109-gn-typ03.dgn

CK:
DW:
CK:
DW:

LEGEND

EX ROW

PROP ROW

EX ESMT

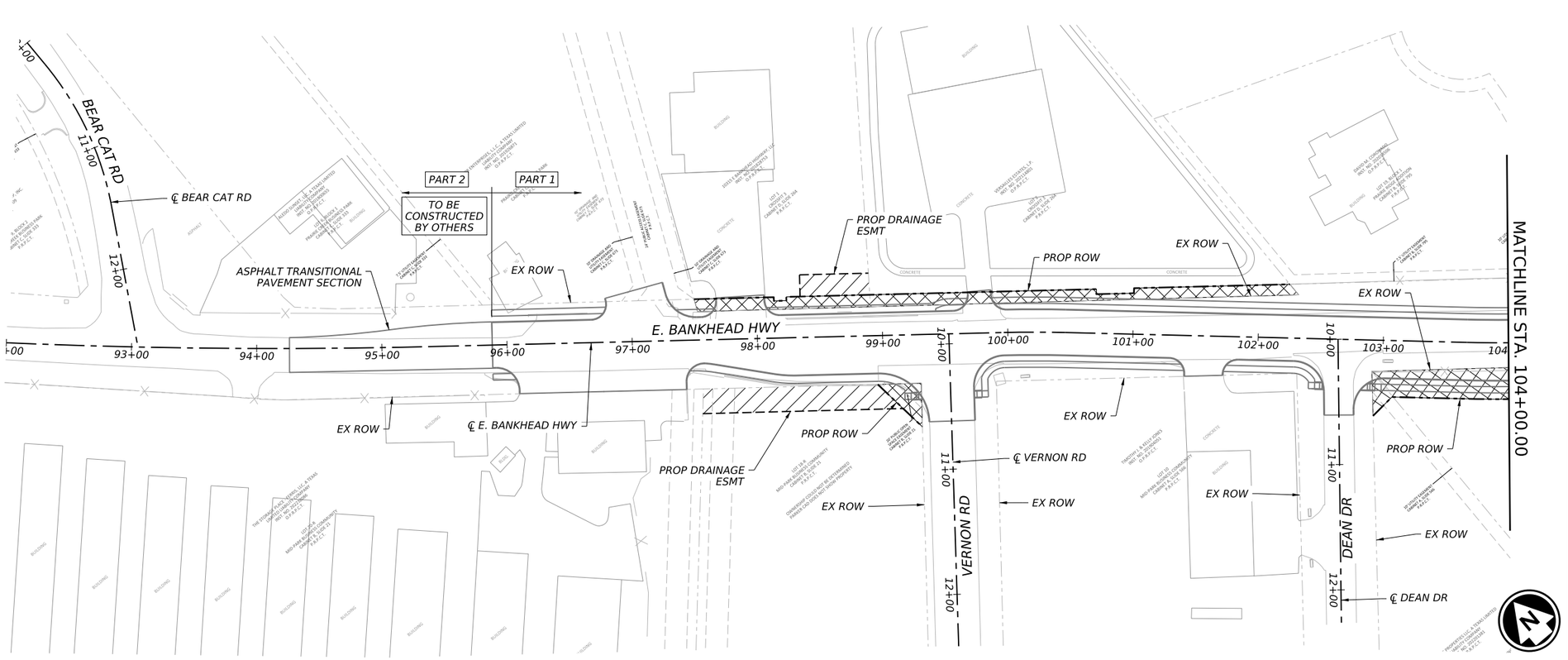
PROP ESMT

ROW ACQUISITION

TEMPORARY CONSTRUCTION EASEMENT

PERMANENT DRAINAGE EASEMENT

PARCEL NUMBER (X)



0 50 100

SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

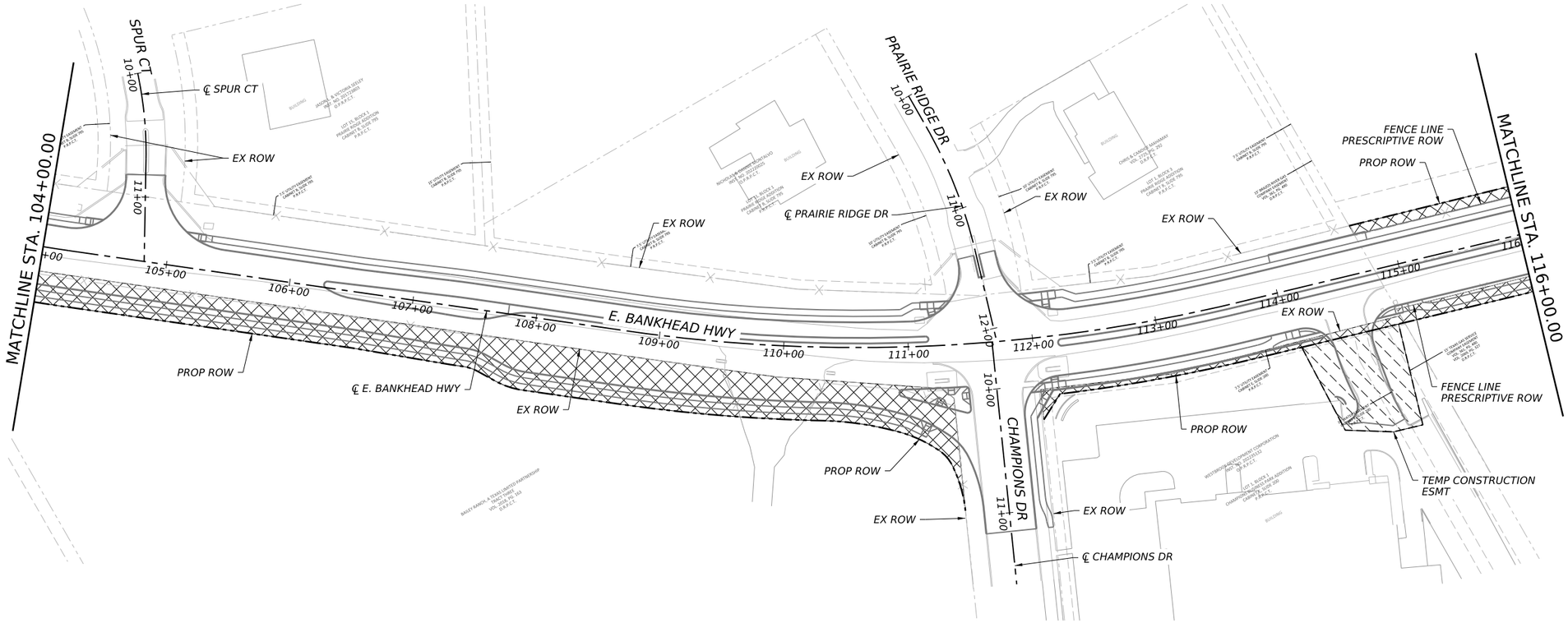
RIGHT-OF-WAY LAYOUT FROM STA. 95+50 TO STA. 104+00

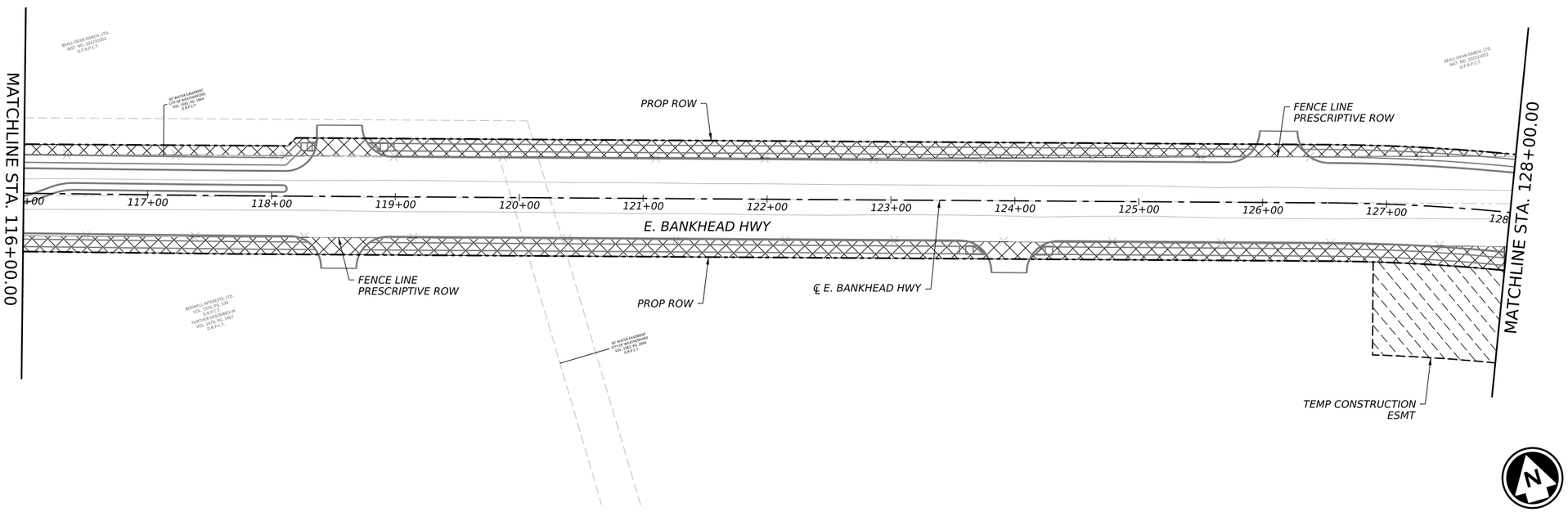
SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	8

DATE: 8/27/2026 7:32:20 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56101\54709_3\cv-109-pl-row04.dgn





LEGEND

- EX ROW
- PROP ROW
- EX ESMT
- PROP ESMT
- ROW ACQUISITION
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT DRAINAGE EASEMENT
- PARCEL NUMBER (X)

0 50 100

SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

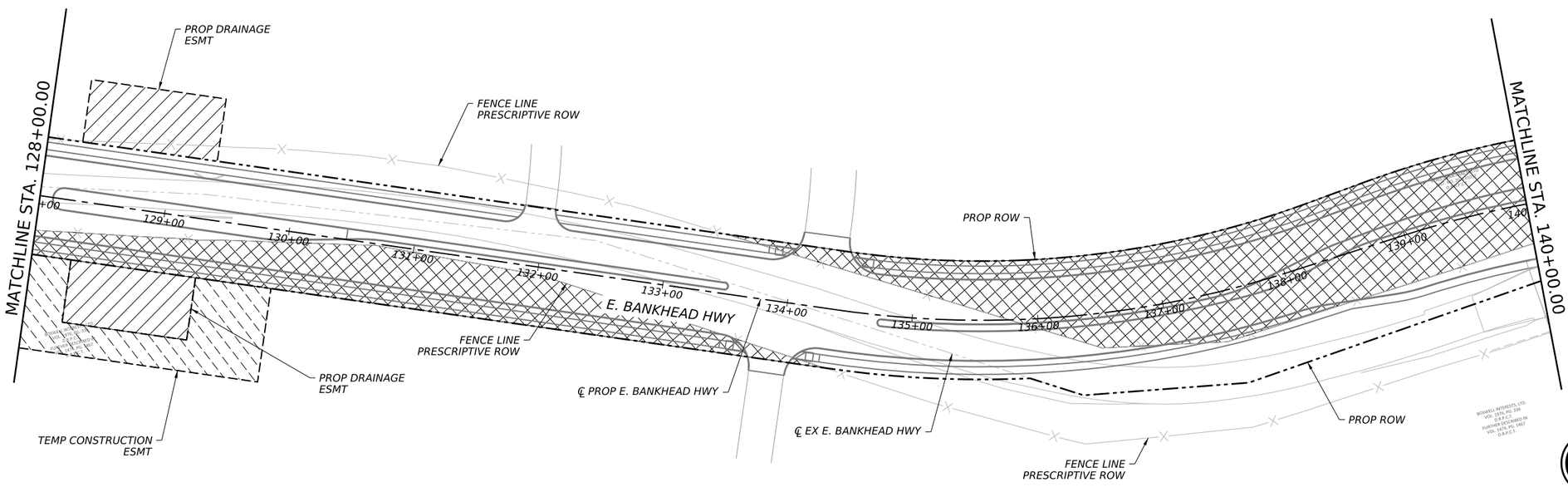
RIGHT-OF-WAY LAYOUT FROM STA. 104+00 TO STA. 128+00

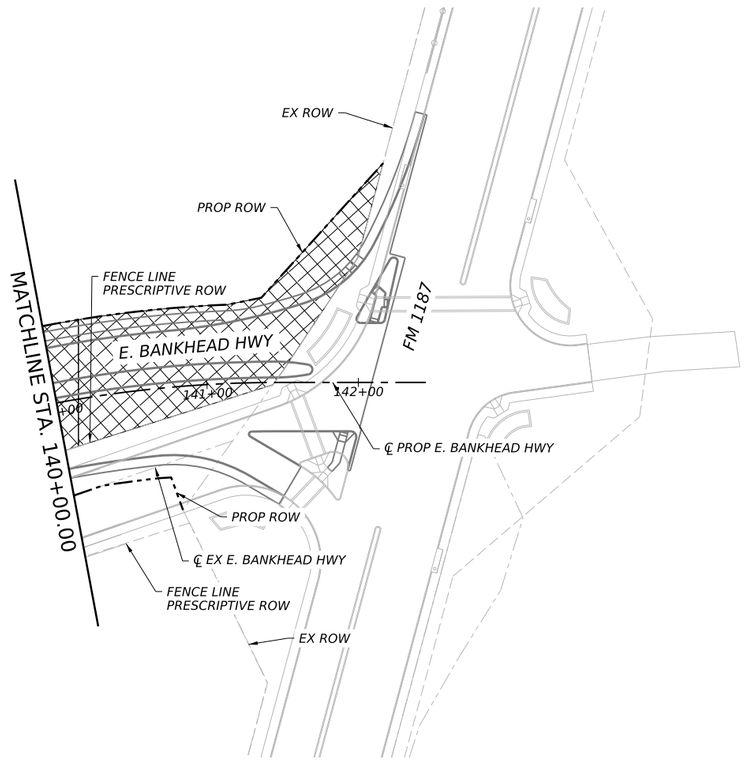
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	9

DATE: 8/27/2026 7:32:52 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56101\54709_1\cv-109-pl-row05.dgn





LEGEND

- EX ROW
- PROP ROW
- EX ESMT
- PROP ESMT
- ROW ACQUISITION
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT DRAINAGE EASEMENT
- PARCEL NUMBER (X)

0 50 100

SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

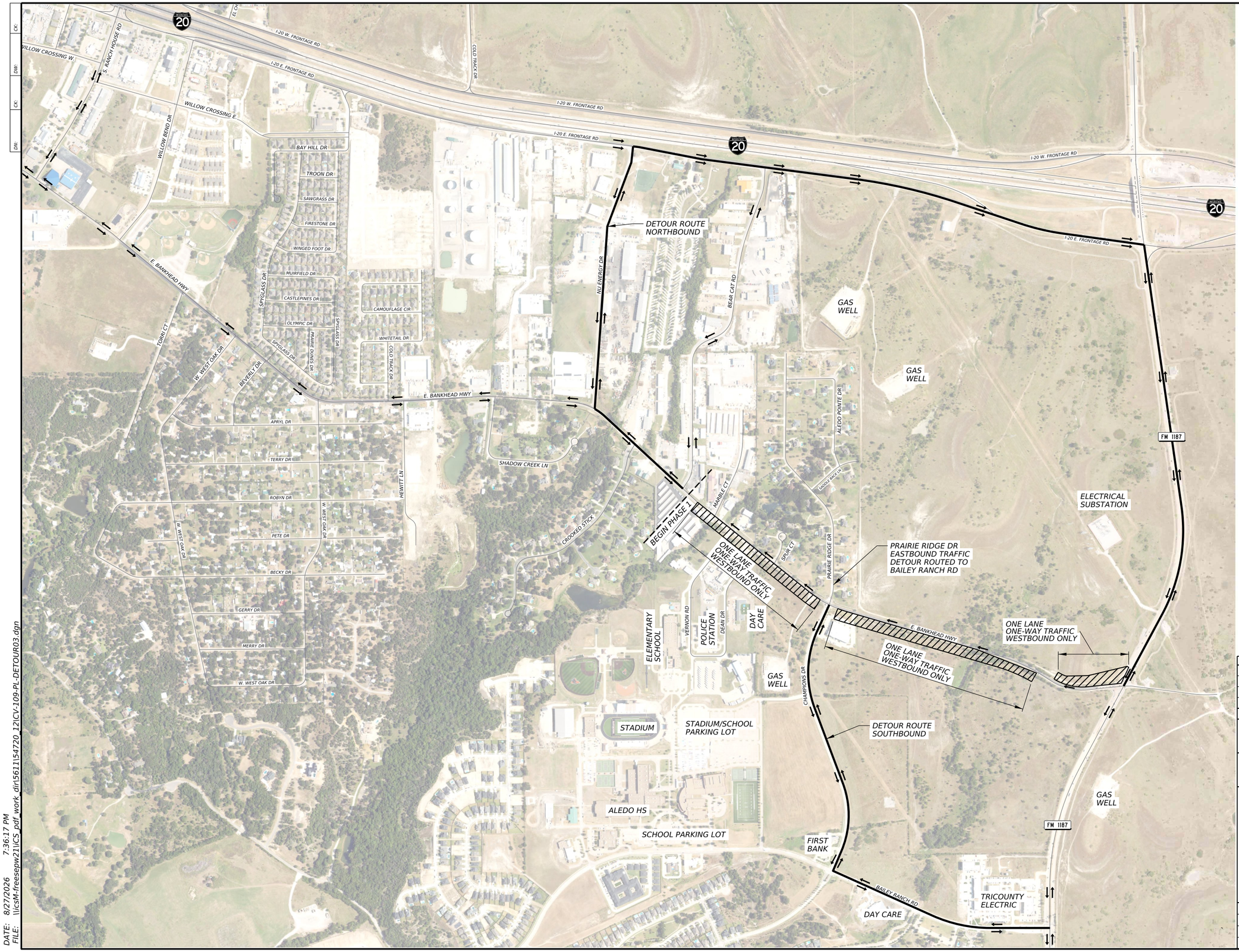
RIGHT-OF-WAY LAYOUT FROM STA. 128+00 TO END

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	10

DATE: 8/27/2026 8:01:11 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56101\54709_2\cv-109-pl-row06.dgn



STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

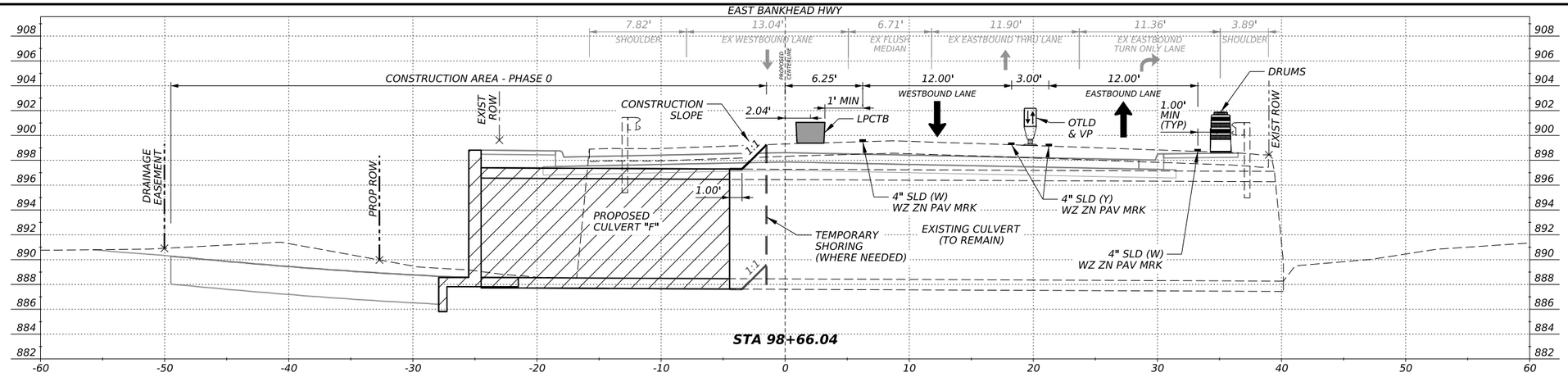
DETOUR PLAN
ONE WAY TRAFFIC
BEAR CAT RD - CHAMPIONS DR (EB)

SHEET OF

CONT	SECT	JOB	HIGHWAY

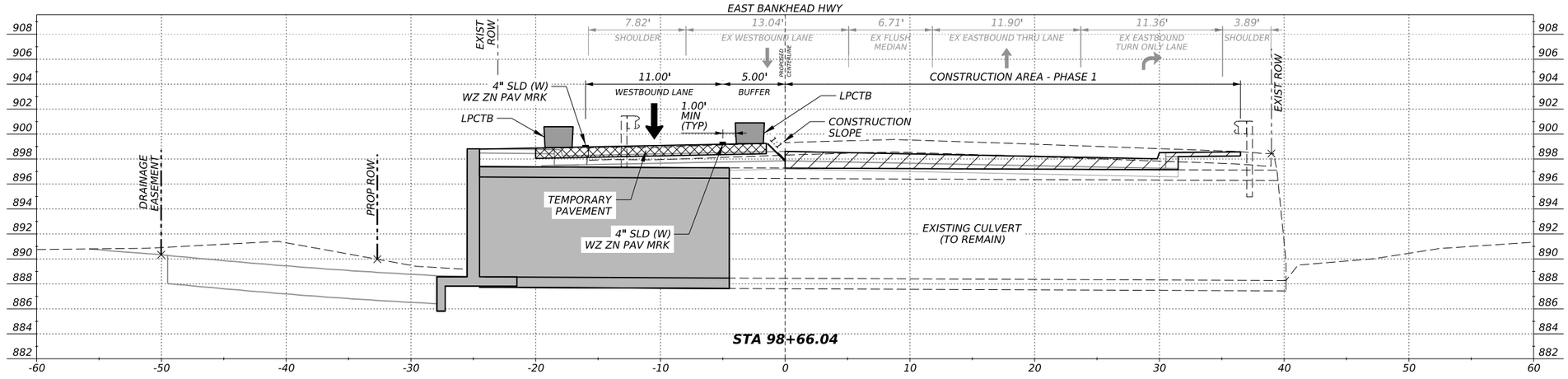
DIST	COUNTY	SHEET NO.
	PARKER	11

DATE: 8/27/2026 7:36:17 PM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\56111\54720_12\CV-109-PL-DETOUR03.dgn



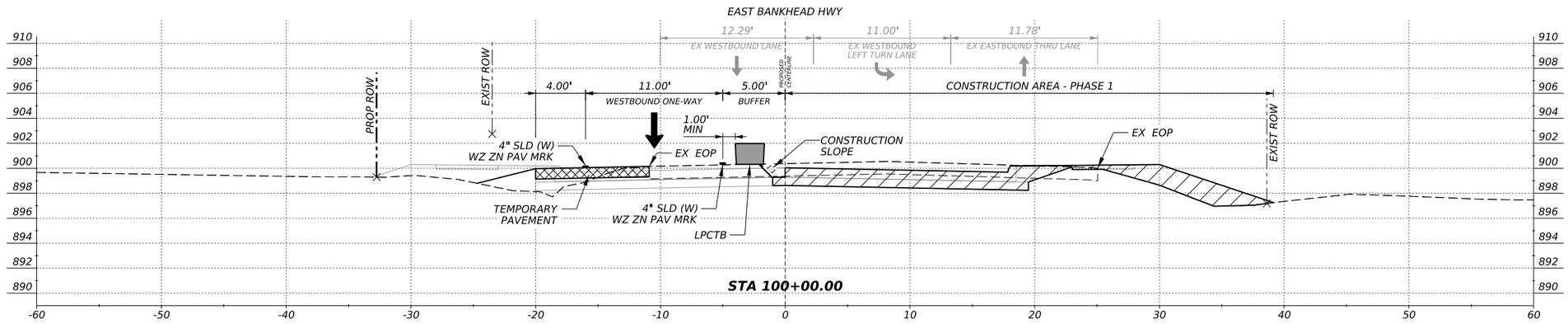
CONSTRUCTION SECTIONS - PHASE 0
CULVERT REMOVAL AND CONSTRUCTION

SCALE 1" = 10'



CONSTRUCTION PHASE 1 - SECTIONS 1F
WESTBOUND TRAFFIC - ONE-WAY

SCALE 1" = 10'



CONSTRUCTION PHASE 1 - SECTIONS 1E
WESTBOUND TRAFFIC - ONE-WAY

SCALE 1" = 10'

SECTION LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE:
  - 3" HMAC - D-GR (TY D) (SAC B PG 70-22)
  - 8" FLEXIBLE BASE (TY A GR 1-2) (SEE NOTE 2)
  - 6" COMPACTED SUBGRADE
- EXISTING GROUND
- OVERALL CONSTRUCTION
- TEMPORARY SHORING
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB) (SEE TXDOT DETAILS LPCB-26)
- PLASTIC DRUMS
- OPPOSING TRAFFIC LANE DIVIDER (OTLD)
- EXISTING PAVEMENT MARKINGS
- TEMPORARY TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
2. 8" FLEXIBLE BASE FOR TEMPORARY PAVEMENT SHALL BE PLACED IN 2 LIFTS.

0 2 4 6 8 10

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

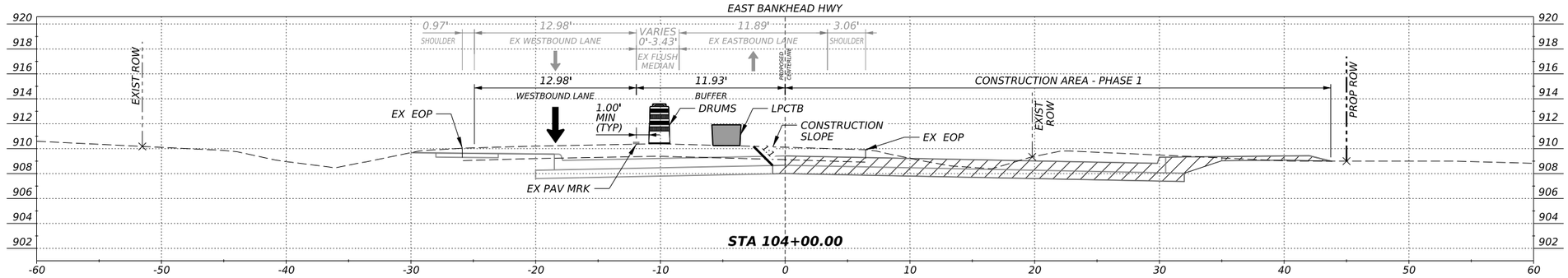
TRAFFIC CONTROL TYPICAL SECTIONS

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	12

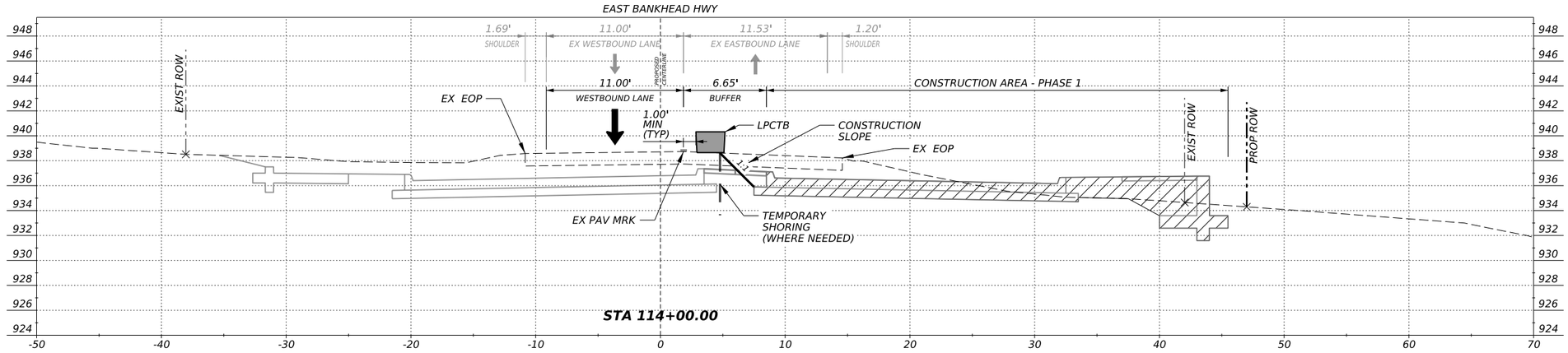
DATE: 8/27/2026 7:57:55 PM
FILE: \\cosfile09\projects\2021\11\21115611\54720_16\cv-109-gn-tcp-typ01.dgn



CONSTRUCTION PHASE 1 - SECTIONS 1C
WESTBOUND TRAFFIC - ONE-WAY

1 ~

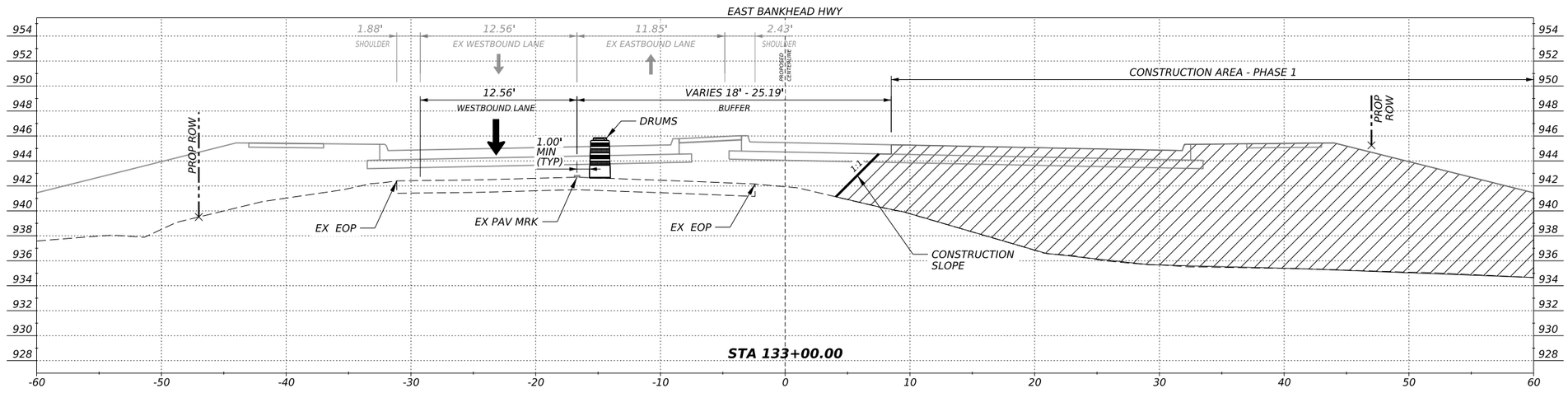
SCALE 1" = 10'



CONSTRUCTION PHASE 1 - SECTIONS 1D
WESTBOUND TRAFFIC - ONE-WAY

1 ~

SCALE 1" = 10'



CONSTRUCTION PHASE 1 - SECTIONS 1B
WESTBOUND TRAFFIC - ONE-WAY

1 ~

SCALE 1" = 10'

SECTION LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE:
  - 3" HMAC - D-GR (TY D) (SAC B PG 70-22)
  - 8" FLEXIBLE BASE (TY A GR 1-2) (SEE NOTE 2)
  - 6" COMPACTED SUBGRADE
- EXISTING GROUND
- OVERALL CONSTRUCTION
- TEMPORARY SHORING
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB) (SEE TXDOT DETAILS LPCB-26)
- PLASTIC DRUMS
- OPPOSING TRAFFIC LANE DIVIDER (OTLD)
- EXISTING PAVEMENT MARKINGS
- TEMPORARY TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
2. 8" FLEXIBLE BASE FOR TEMPORARY PAVEMENT SHALL BE PLACED IN 2 LIFTS.

0 2 4 6 8 10

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

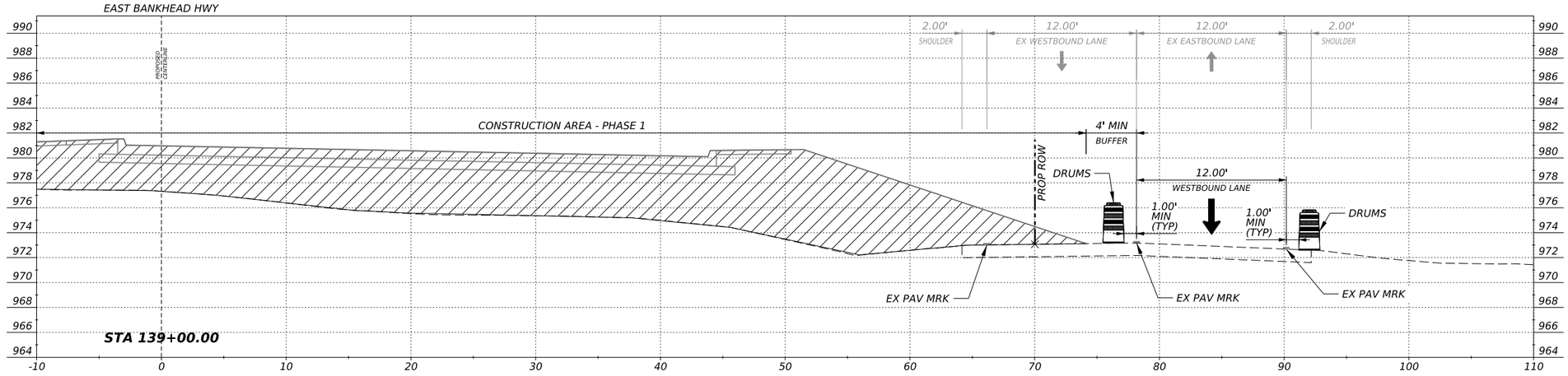
TRAFFIC CONTROL TYPICAL SECTIONS

SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

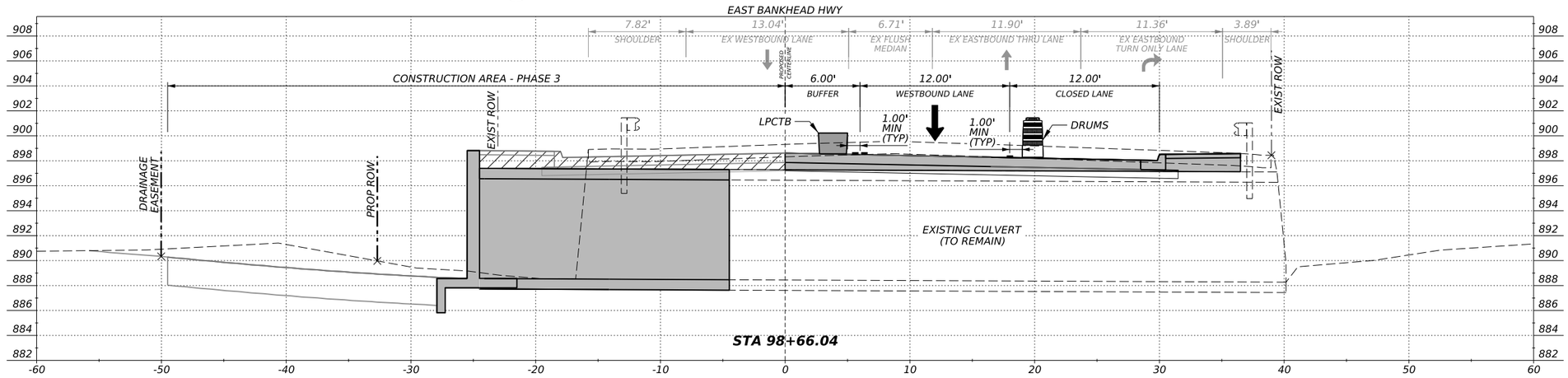
DIST	COUNTY	SHEET NO.
	PARKER	13

DATE: 8/27/2026 8:02:43 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56121\54720_17\cv-109-gn-tcp-typ02.dgn



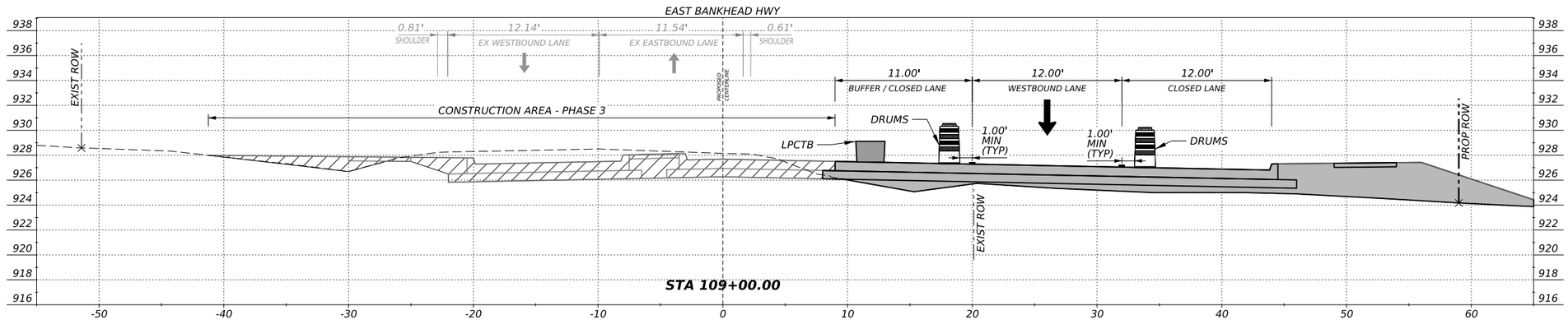
CONSTRUCTION PHASE 1 - SECTIONS 1A
WESTBOUND TRAFFIC - ONE-WAY

SCALE 1" = 10'



CONSTRUCTION PHASE 3 - SECTIONS 3E
WESTBOUND TRAFFIC - ONE-WAY

SCALE 1" = 10'



CONSTRUCTION PHASE 3 - SECTIONS 3A
WESTBOUND TRAFFIC - ONE-WAY

SCALE 1" = 10'

SECTION LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE:
  - 3" HMAC - D-GR (TY D) (SAC B PG 70-22)
  - 8" FLEXIBLE BASE (TY A GR 1-2) (SEE NOTE 2)
  - 6" COMPACTED SUBGRADE
- EXISTING GROUND
- OVERALL CONSTRUCTION
- TEMPORARY SHORING
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB) (SEE TXDOT DETAILS LPCB-26)
- PLASTIC DRUMS
- OPPOSING TRAFFIC LANE DIVIDER (OTLD)
- EXISTING PAVEMENT MARKINGS
- TEMPORARY TRAFFIC FLOW
- EXISTING TRAFFIC FLOW

NOTES:

1. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
2. 8" FLEXIBLE BASE FOR TEMPORARY PAVEMENT SHALL BE PLACED IN 2 LIFTS.

0 2 4 6 8 10
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

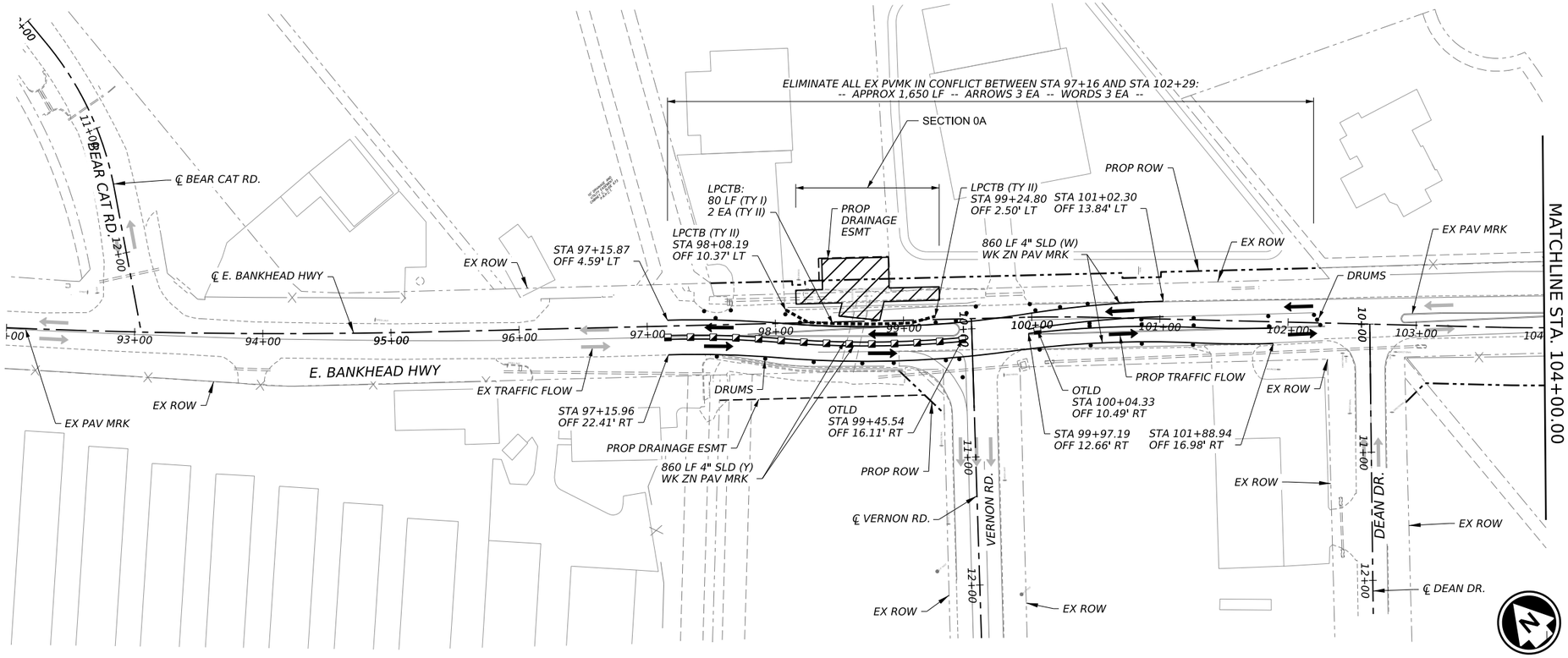
TRAFFIC CONTROL TYPICAL SECTIONS

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	14

DATE: 8/27/2026 7:34:17 PM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\56111\54720_18\cv-109-gn-tcp-typ03.dgn



PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

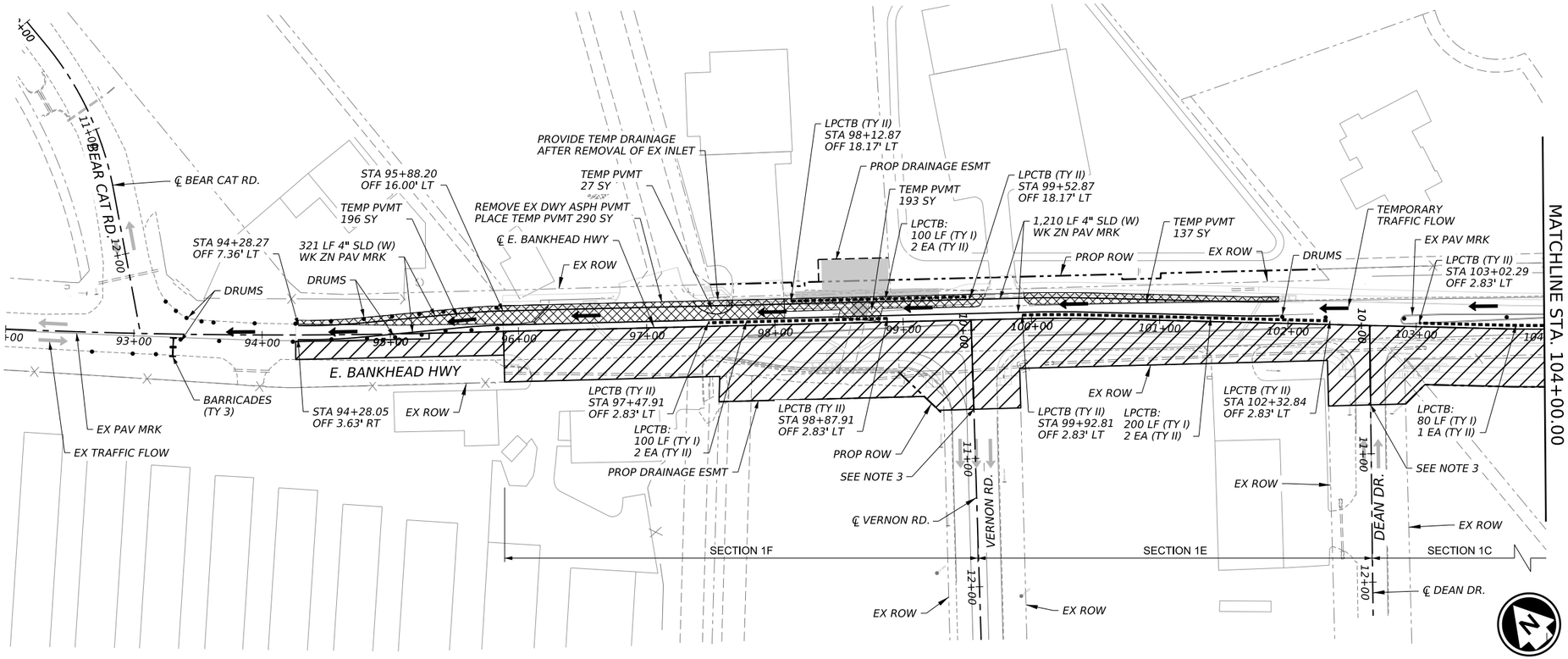
PHASE 0
CONSTRUCTION PHASING PLAN
FROM STA 95+50
TO STA 104+00

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	15

DATE: 8/27/2026 7:37:17 PM
FILE: \\fcsM-freesepw21\fcs_pdf_work_dir\56111\54720_19\cv-109-pl-const_phase0-04.dgn



PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

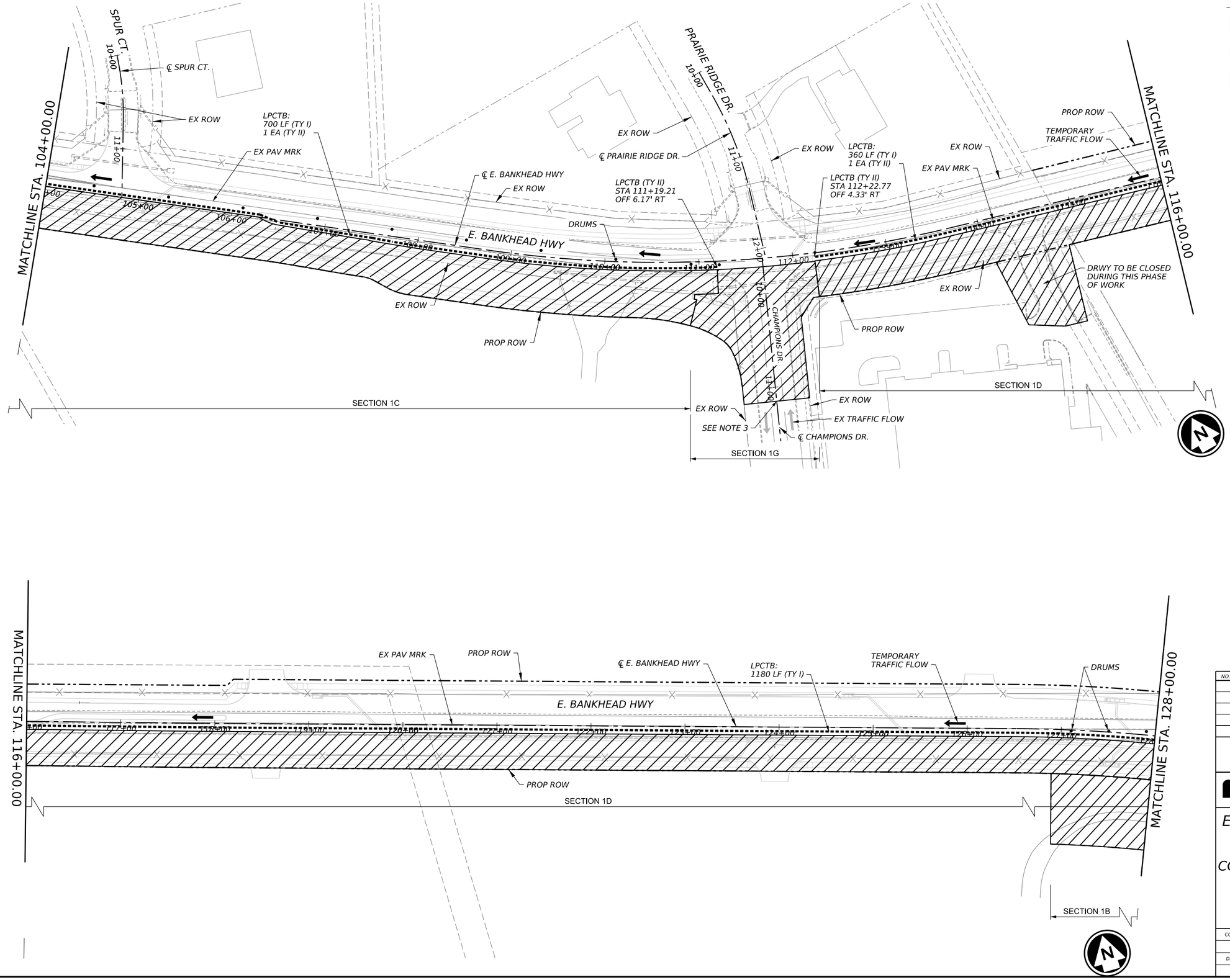
PHASE 1
CONSTRUCTION PHASING PLAN
FROM STA. 95+50
TO STA. 104+00

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	16

DATE: 8/27/2026 7:36:55 PM
FILE: \\fcsM-freesepw21\fcs_pdf_work_dir\561154720_3\cv-109-pl-const_phase1-04.dgn



PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

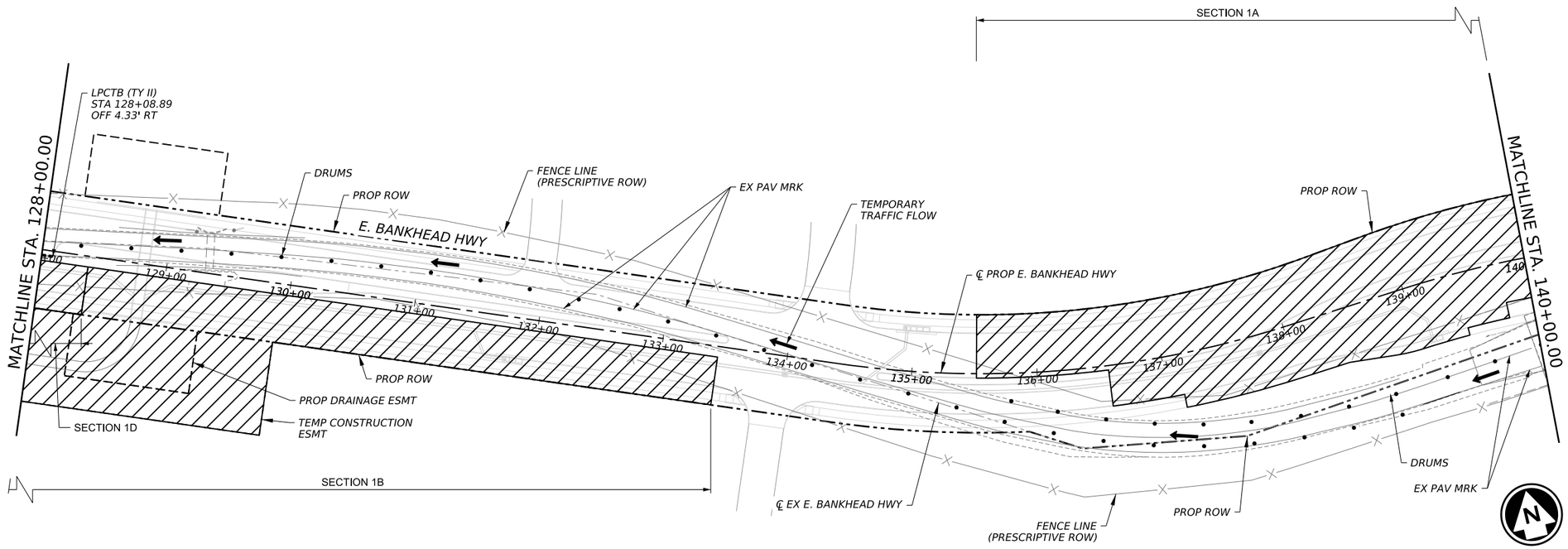
PHASE 1
CONSTRUCTION PHASING PLAN
FROM STA. 104+00
TO STA. 128+00

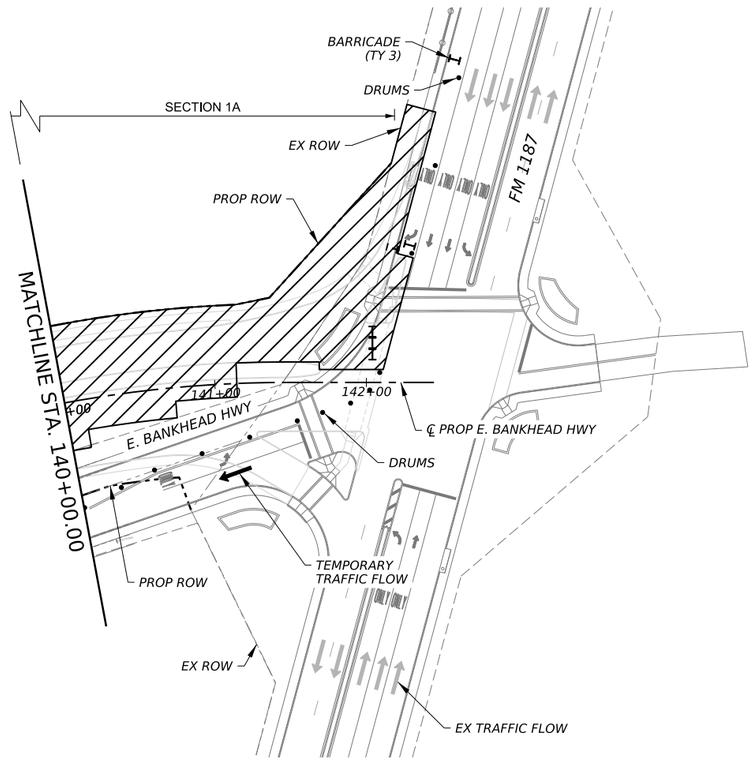
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	17

DATE: 8/27/2026 7:57:25 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56111\54720_1\cv-109-pl-const_phase1-05.dgn





PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

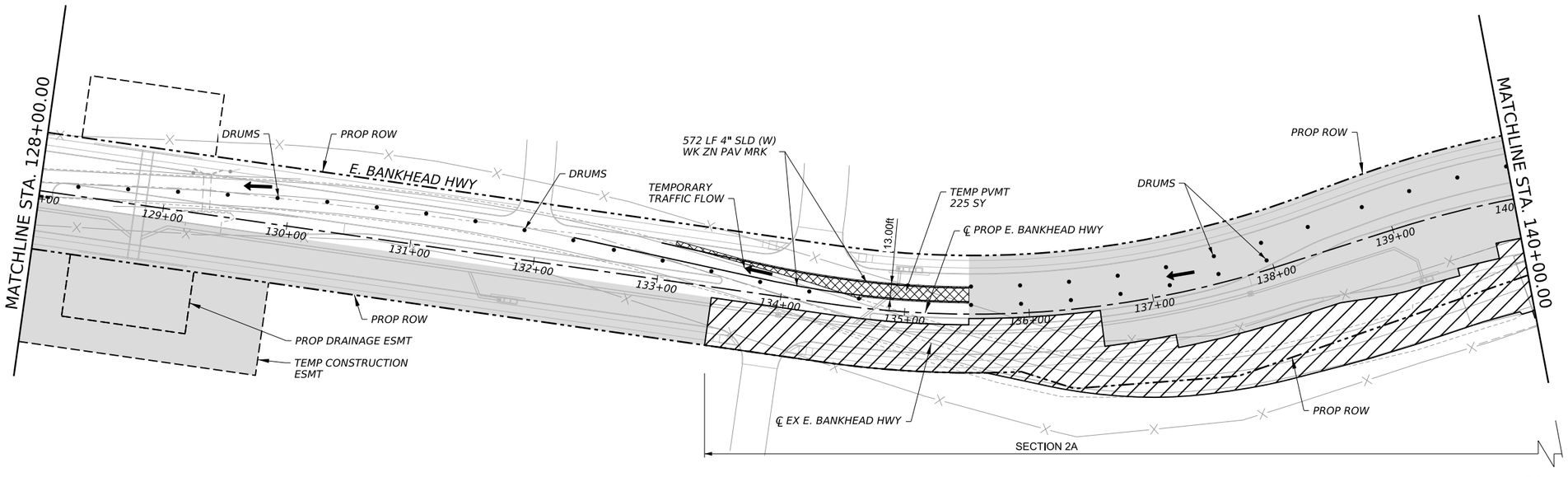
PHASE 1
CONSTRUCTION PHASING PLAN
FROM STA. 128+00
TO END

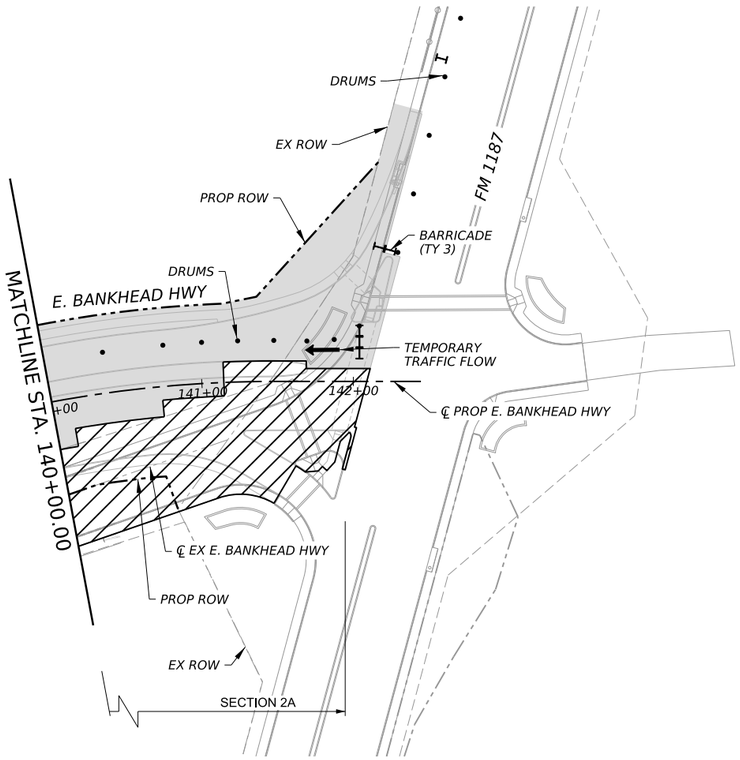
SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	18

DATE: 8/27/2026 7:33:35 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56211\54720_2\cv-109-pl-const_phase1-06.dgn





PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

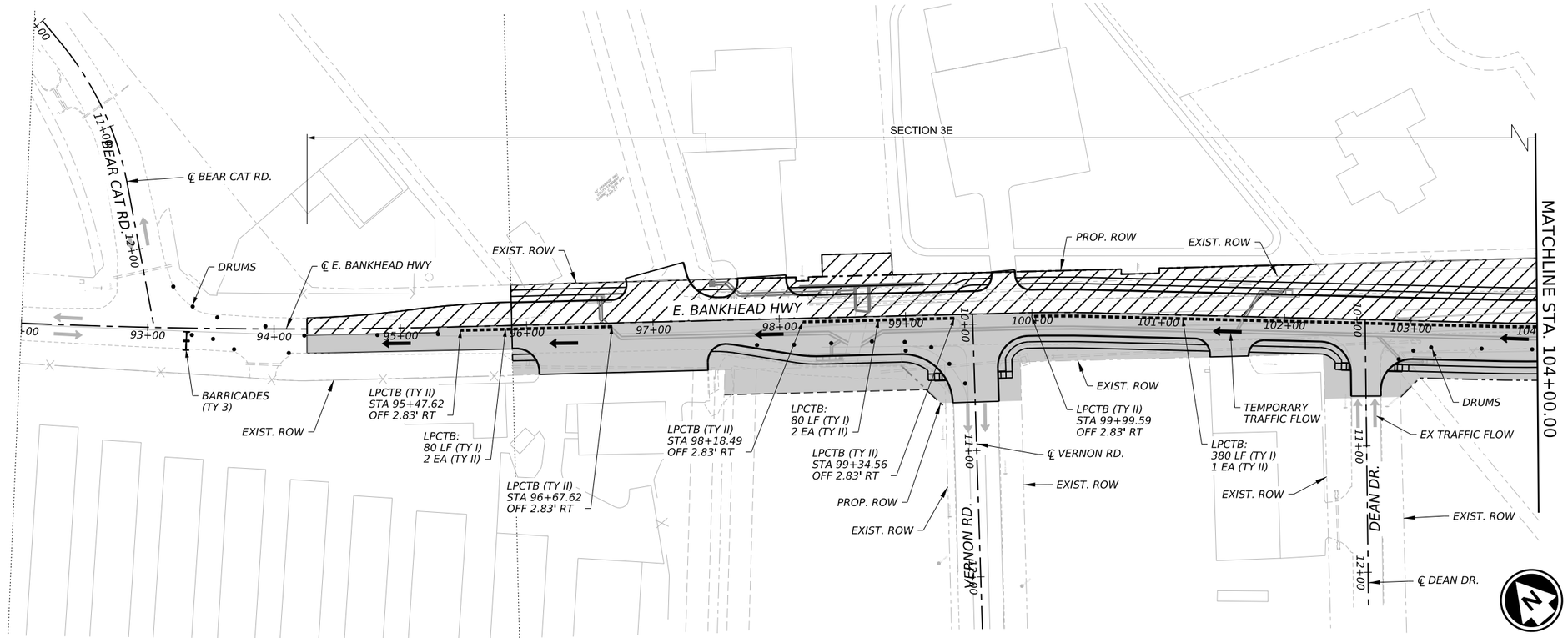
PHASE 2
CONSTRUCTION PHASING PLAN
FROM STA. 128+00
TO END

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	19

DATE: 8/27/2026 7:32:58 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56111\54720_5\cv-109-pl-const_phase2-06.dgn



PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

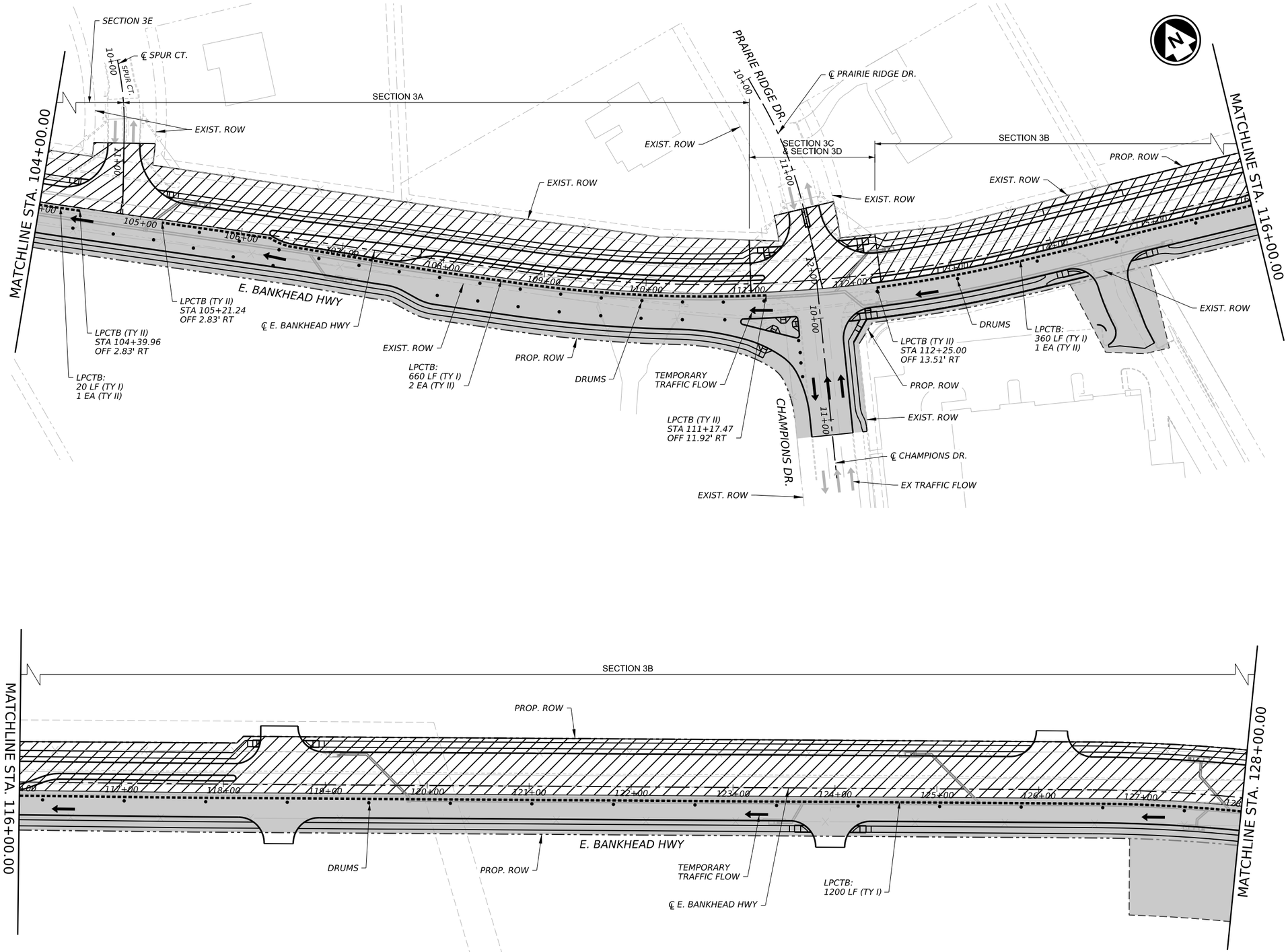
PHASE 3
CONSTRUCTION PHASING PLAN
FROM STA. 95+50
TO STA. 104+00

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	20

DATE: 8/27/2026 7:33:34 PM
FILE: \\fcsM-freesepw211\ICS_pdf_work_dir\56111154720_9\cv-109-pl-const_phase3-04.dgn



PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

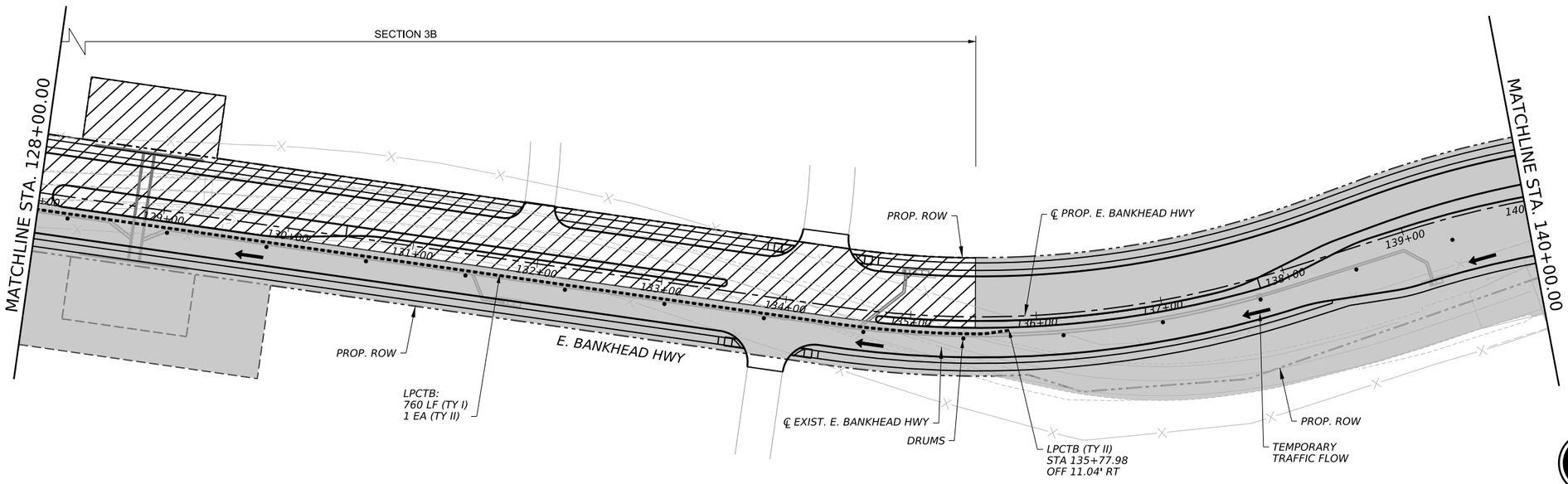
PHASE 3
CONSTRUCTION PHASING PLAN
FROM STA. 104+00
TO STA. 128+00

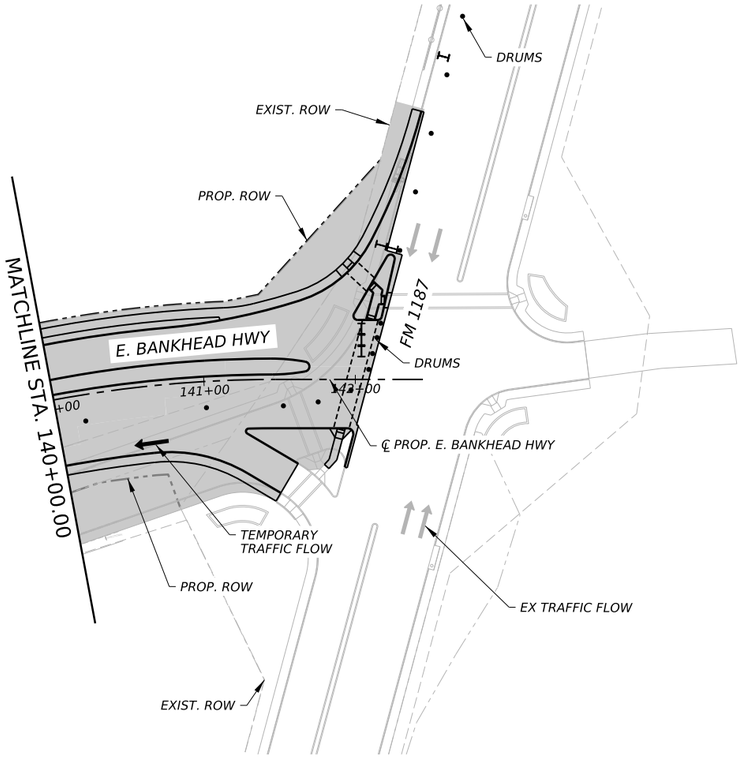
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	21

DATE: 8/27/2026 7:33:42 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56211\54720_7\cv-109-pl-const_phase3-05.dgn





PLAN LEGEND

- PERMANENT CONTRUCTION THIS PHASE
- CONSTRUCTED IN PREVIOUS PHASES
- TEMPORARY ASPHALT PAVEMENT CONSTRUCTED THIS PHASE
- PLASTIC DRUMS
- LOW PROFILE CONCRETE TRAFFIC BARRIERS (LPCTB)
- TEMPORARY BARRICADES (TY 3)
- VP (VERTICAL PANELS)
- OTLD (OPPOSING TRAFFIC LANE DIVIDERS)
- TEMPORARY TRAFFIC FLOW (NOT PAVEMENT MARKINGS)
- EXISTING TRAFFIC FLOW (NOT PAVEMENT MARKINGS)

NOTES:

1. SIGNAGE TO BE EXTENDED ALONG FM-1187 SB, NB, AND ALONG IH-20 FRONTAGE ROAD IN ACCORDANCE WITH BC STANDARDS. CONSTRUCTION SPEED LIMIT TO BE SIGNED AT 40 MPH.
2. TEMPORARY PAVEMENT TO BE REMOVED PRIOR TO PROJECT COMPLETION.
3. SPECIFIED SIDESTREETS SHALL BE BUILT IN HALVES, AND SHALL NOT RESTRICT ACCESS.

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PHASE 3
CONSTRUCTION PHASING PLAN
FROM STA. 128+00
TO END

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	22

DATE: 8/27/2026 7:37:51 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56111\54720_8\cv-109-pl-const_phase3-06.dgn

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.

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

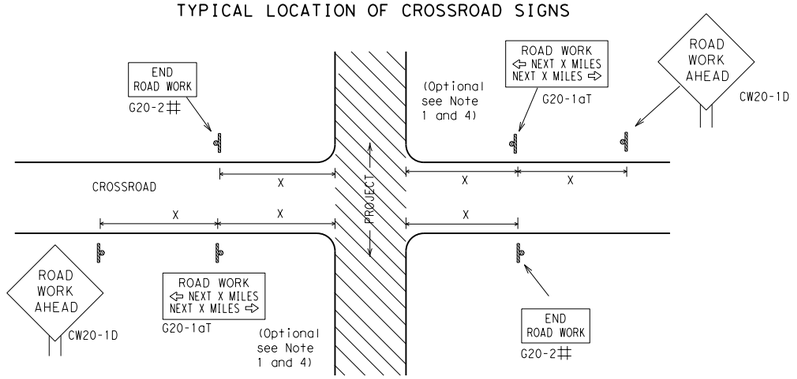
BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	DIST	COUNTY		SHEET NO.
		PARKER		23

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(1)-21.dgn

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.

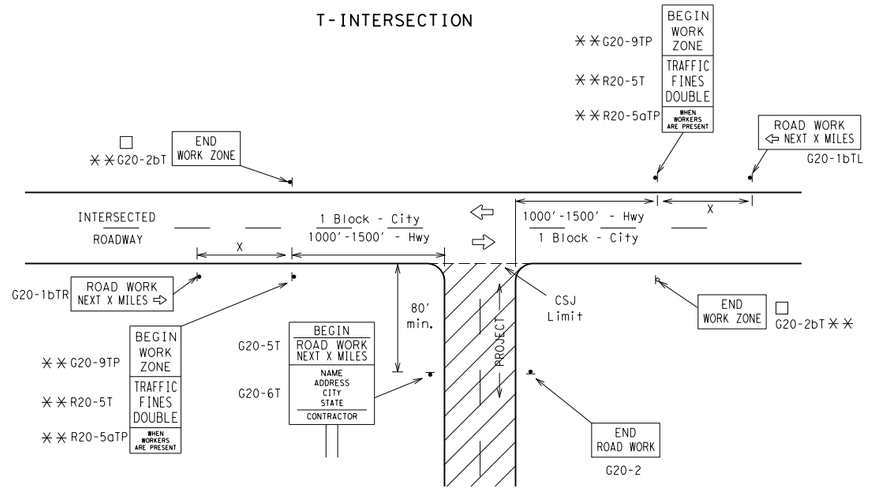
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

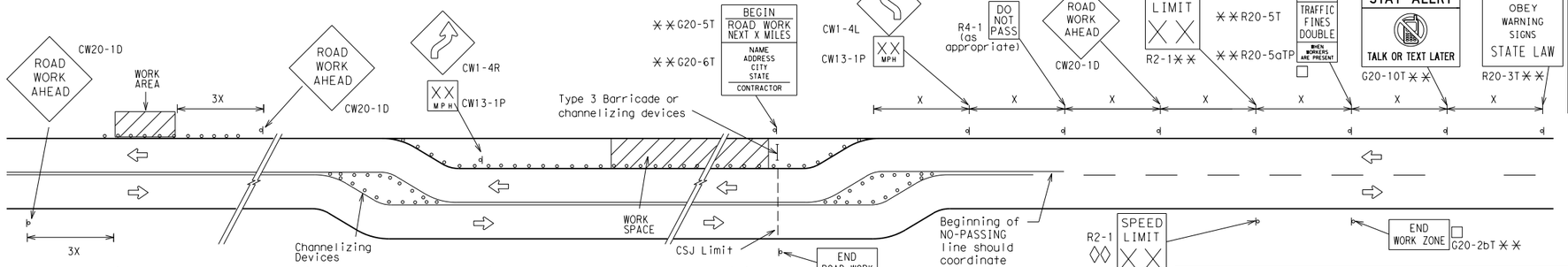
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

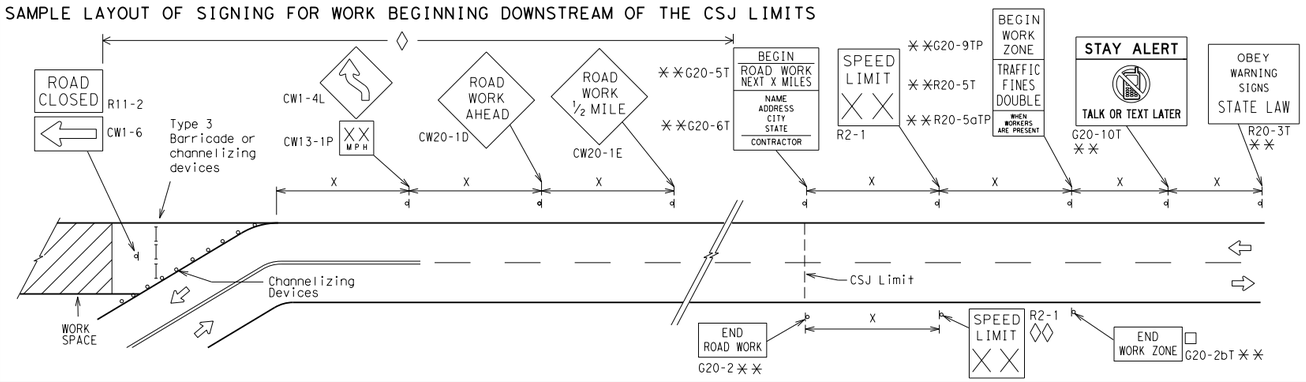
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		24

DATE: 8/27/2026
FILE: cv-109 TS TxDot BC(2)-21.dgn

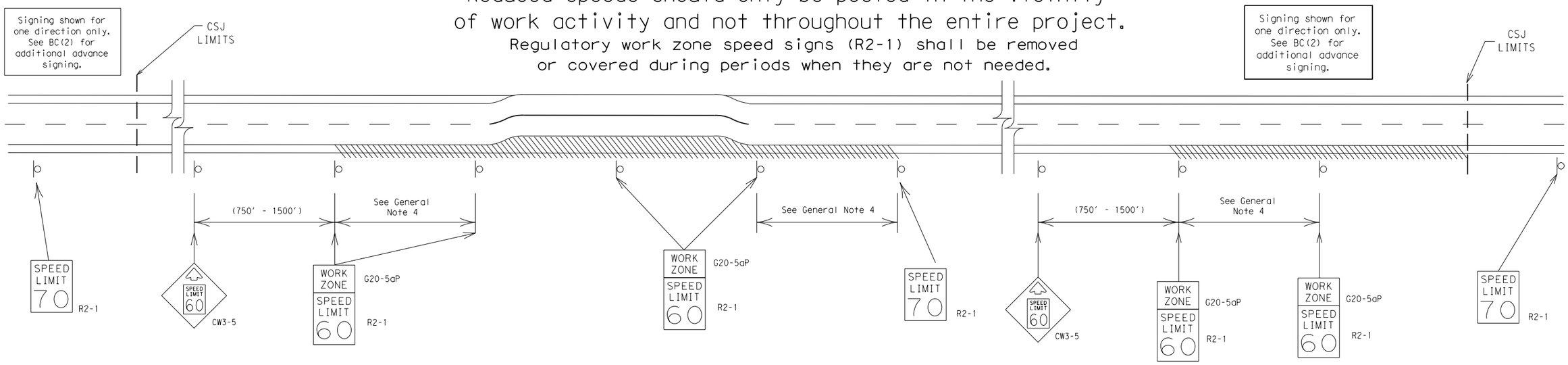
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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

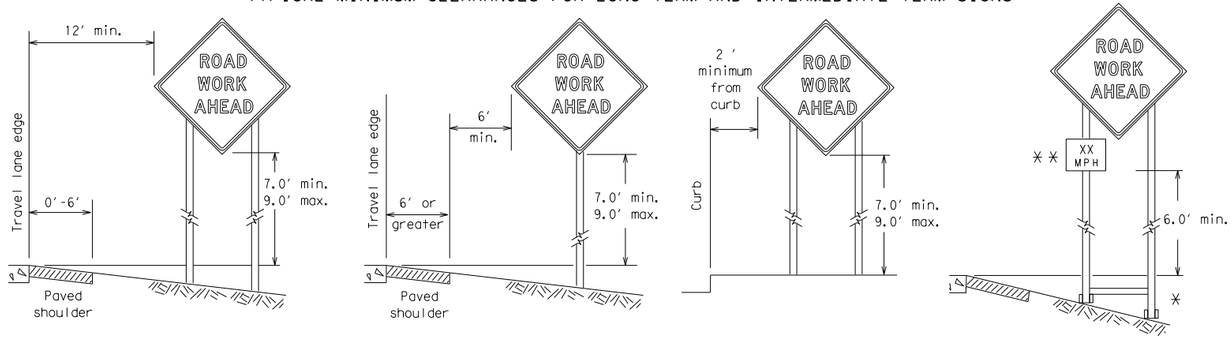
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	DIST	COUNTY		SHEET NO.
		PARKER		25

97

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(3)-21.dgn

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.

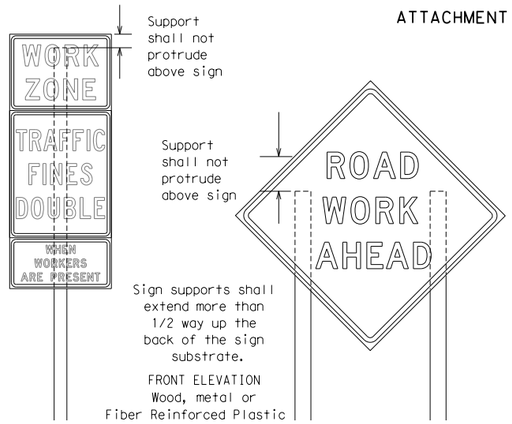
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

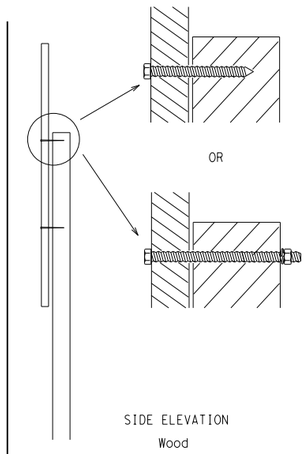


⚹ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

⚹⚹ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





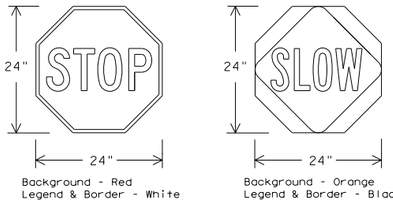
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation | Traffic Safety Division Standard

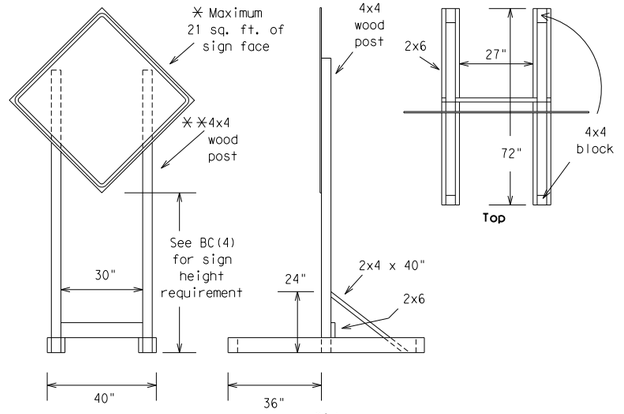
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

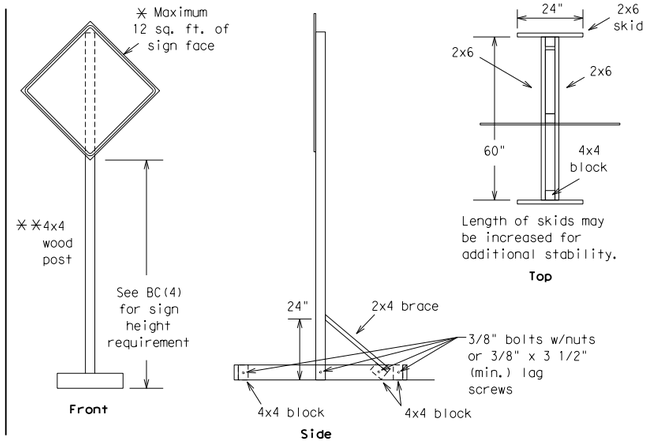
BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		26

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(4)-21.dgn

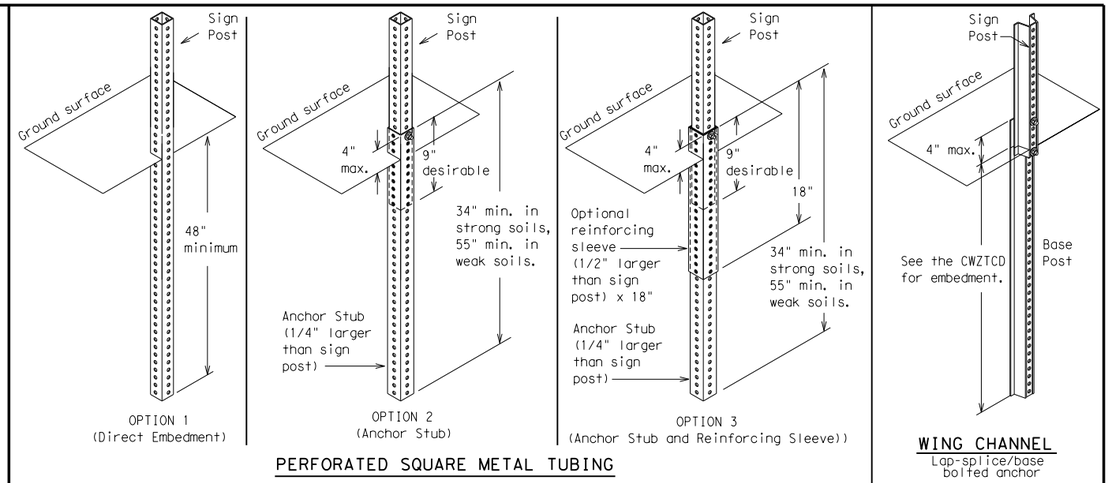
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.





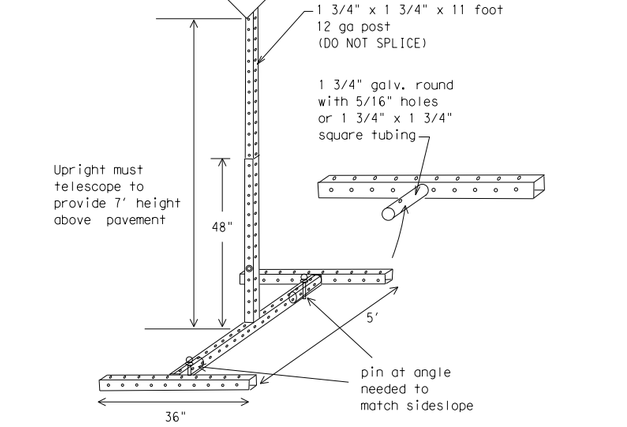
SKID MOUNTED WOOD SIGN SUPPORTS

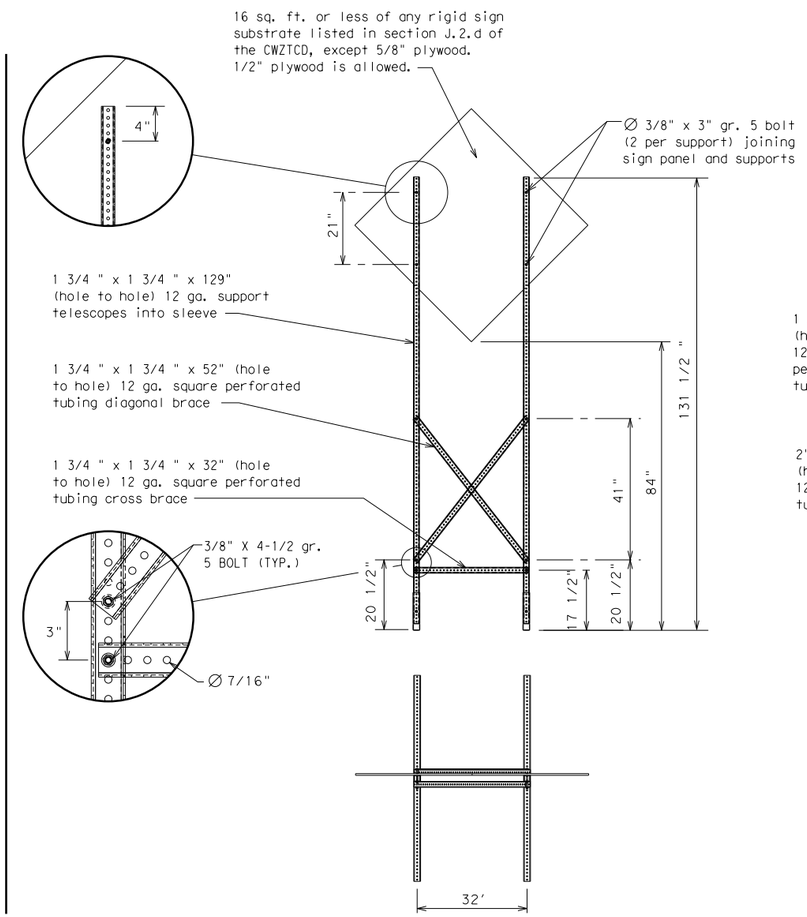
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

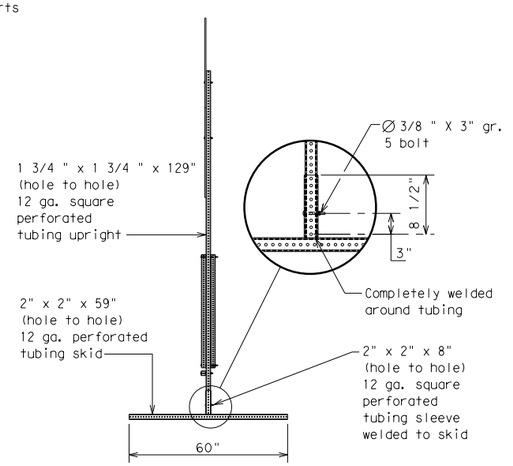


GROUND MOUNTED SIGN SUPPORTS

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				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		27

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(5)-21.dgn

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.

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 *

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

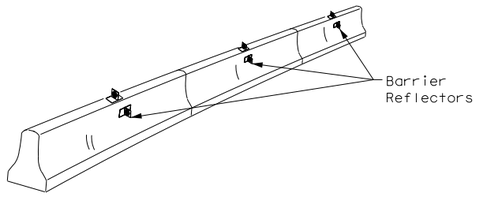
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		28

100

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(6)-21.dgn

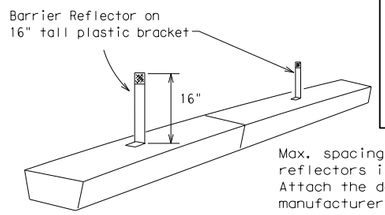
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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.

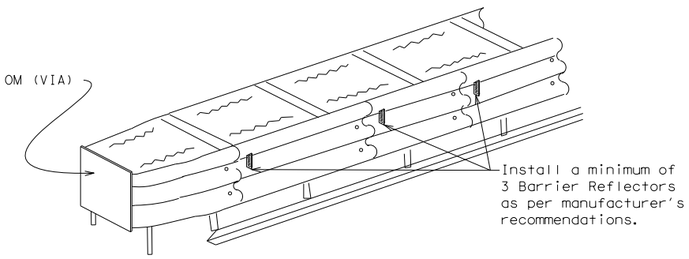


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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

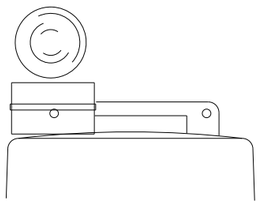
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

WARNING LIGHTS

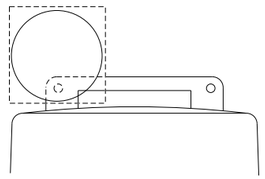
1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this 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.



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

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.



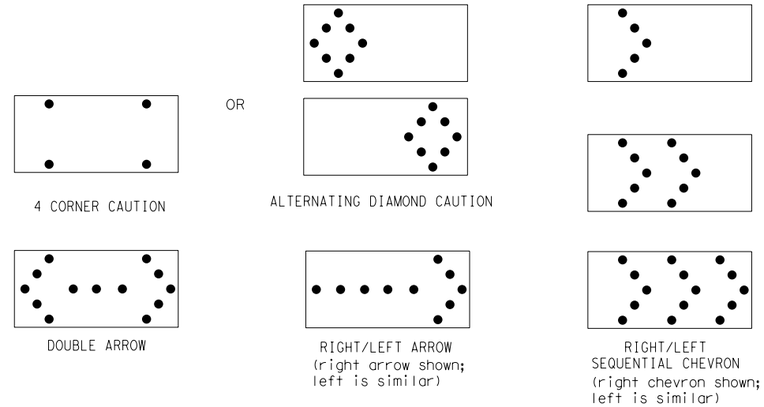
Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

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				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		29

101

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(7)-21.dgn

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.

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:

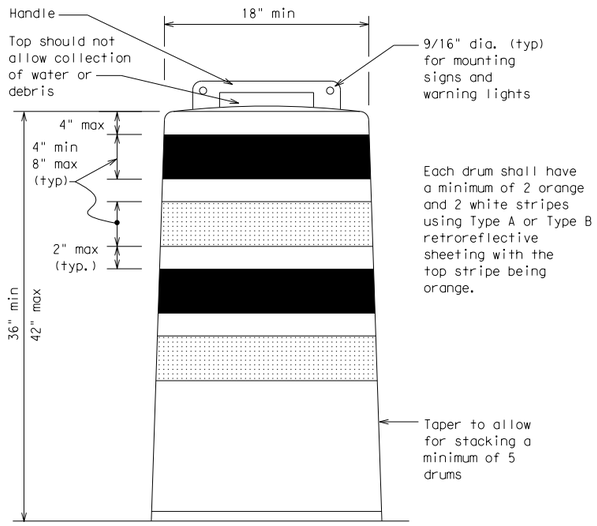
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

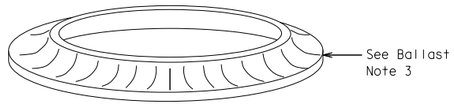
RETROREFLECTIVE SHEETING

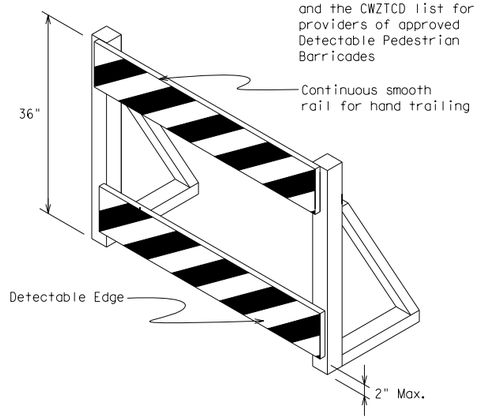
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

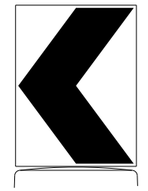




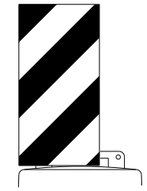


DETECTABLE PEDESTRIAN BARRICADES

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

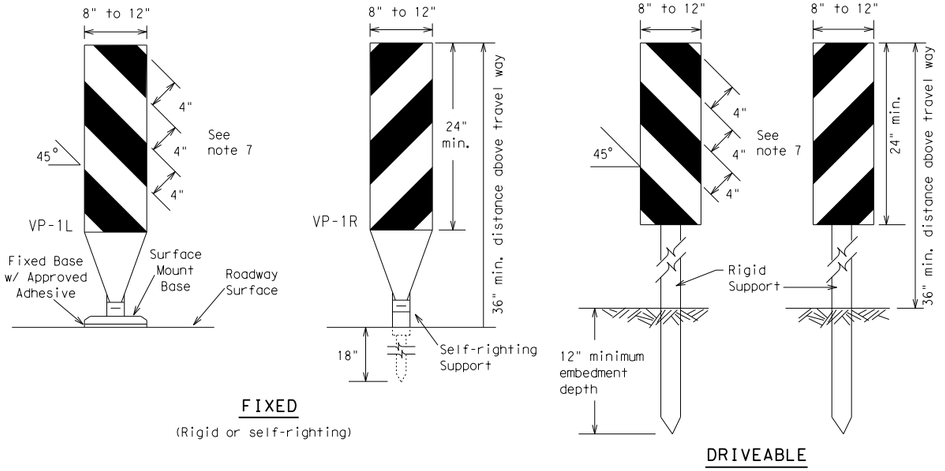
BC(8)-21

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

102

DATE: 8/27/2026
FILE: cv-109 TS TxDot BC(8)-21.dgn

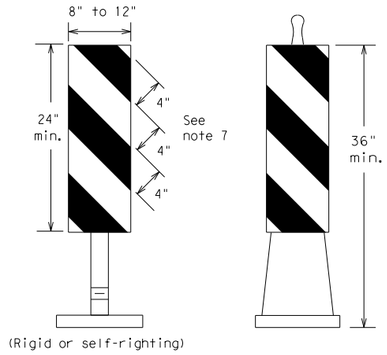
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



FIXED

(Rigid or self-righting)

DRIVEABLE

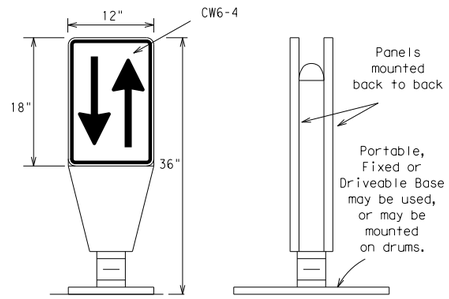


(Rigid or self-righting)

PORTABLE

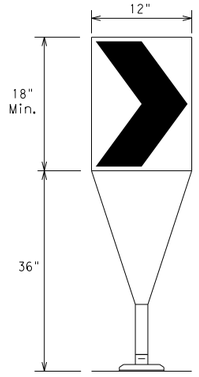
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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.

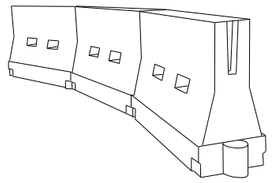
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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



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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		31

103

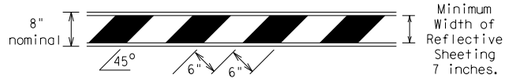
DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(9)-21.dgn

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.

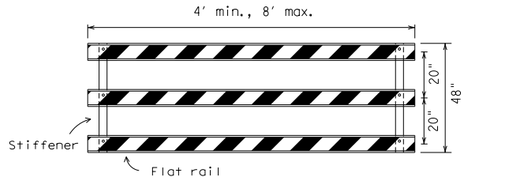
TYPE 3 BARRICADES

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.



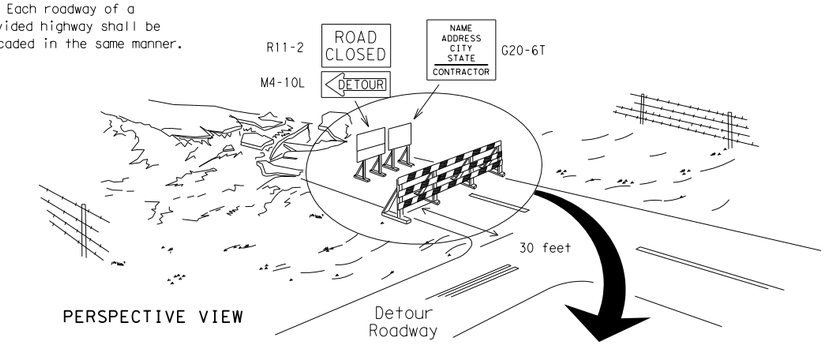
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

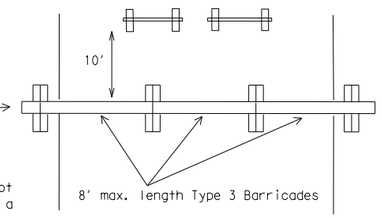
Each roadway of a divided highway shall be barricaded in the same manner.



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.

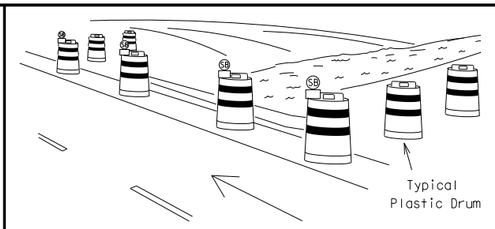
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

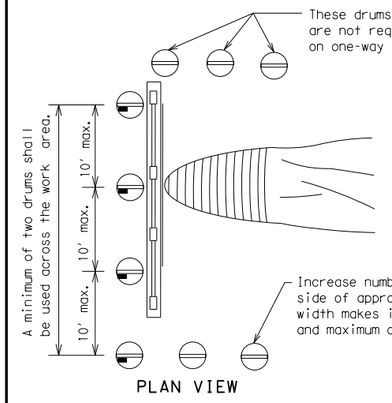
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

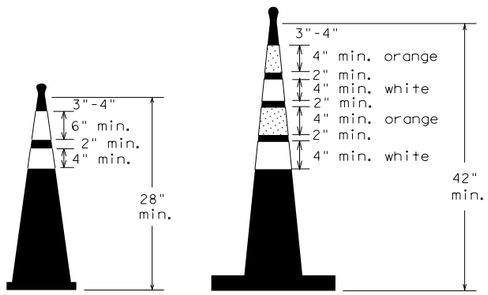
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

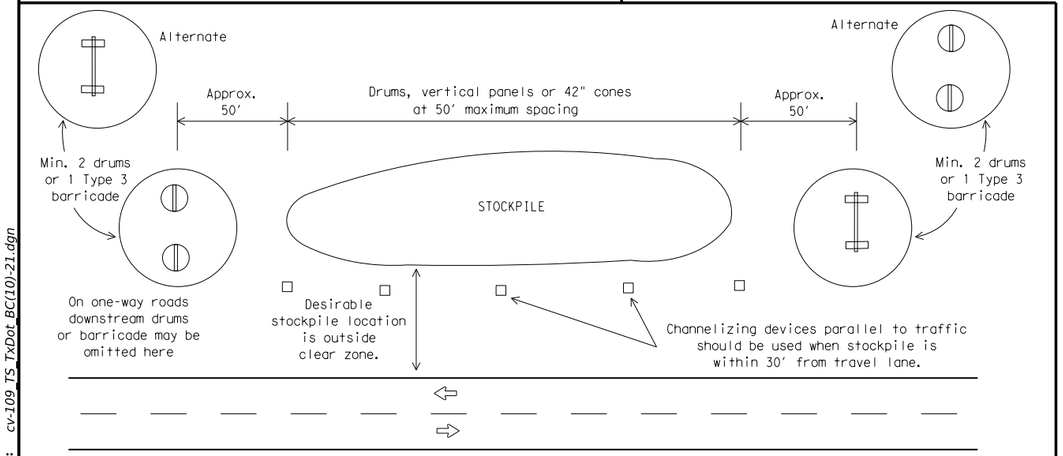
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

DATE: 8/27/2026
FILE: cv-109 TS TxDot BC(10)-21.dgn

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				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21		PARKER		32

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.

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.

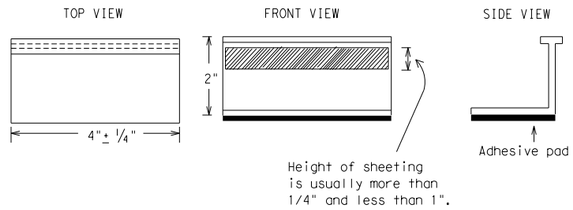
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

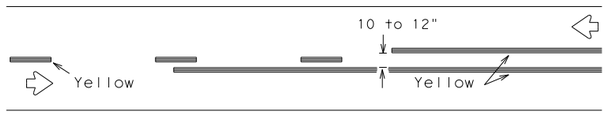
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-98 9-07 5-21				
1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14		PARKER		33

105

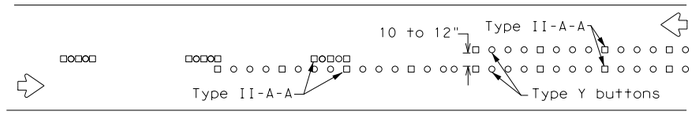
DATE: 8/27/2026
FILE: cv-109-TS_TxDot_BC(11)-21.dgn

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.

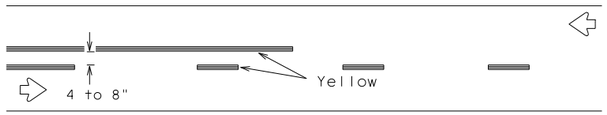
PAVEMENT MARKING PATTERNS



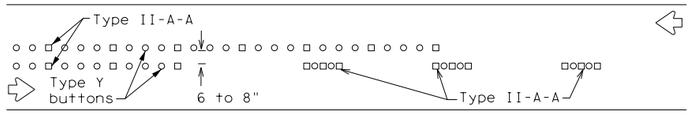
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



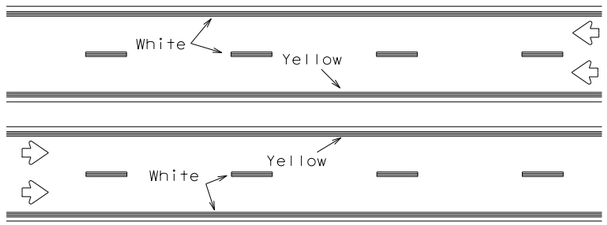
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



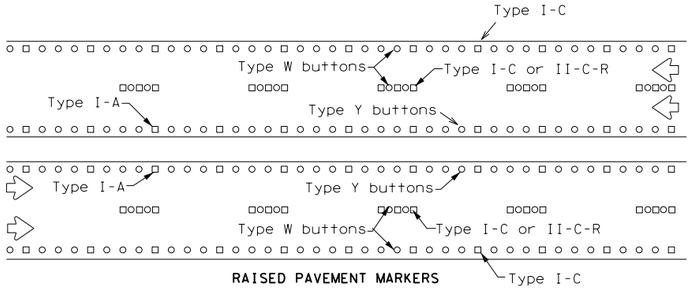
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

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



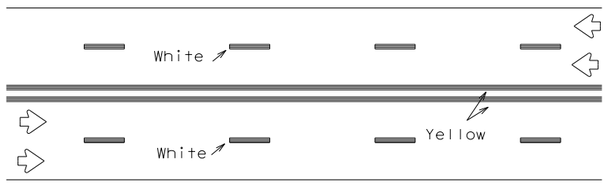
REFLECTORIZED PAVEMENT MARKINGS



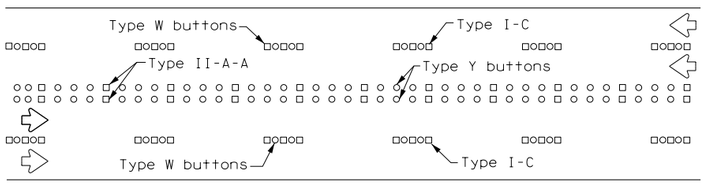
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



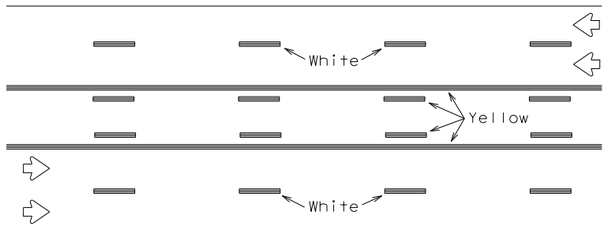
REFLECTORIZED PAVEMENT MARKINGS



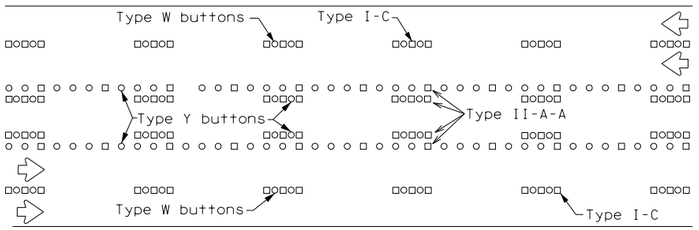
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

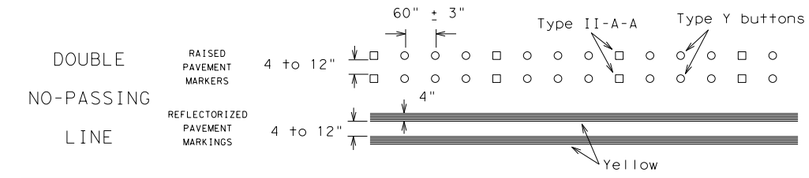
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

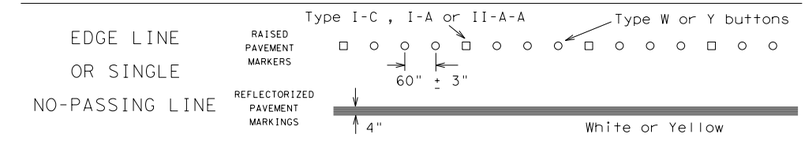
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

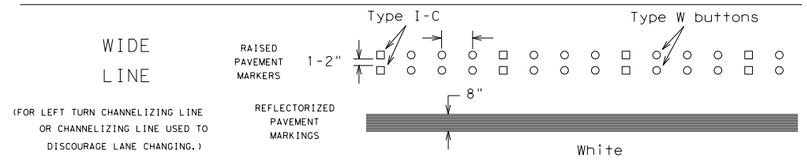


EDGE LINE OR SINGLE NO-PASSING LINE



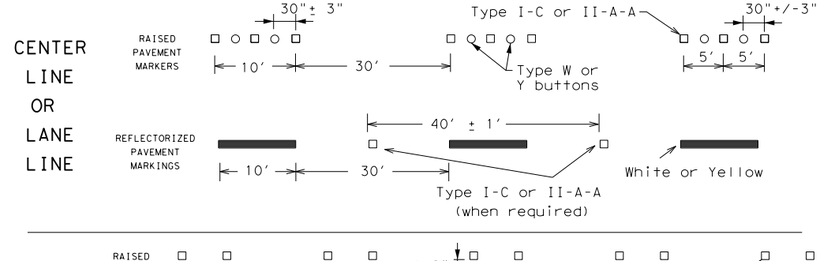
WIDE LINE

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

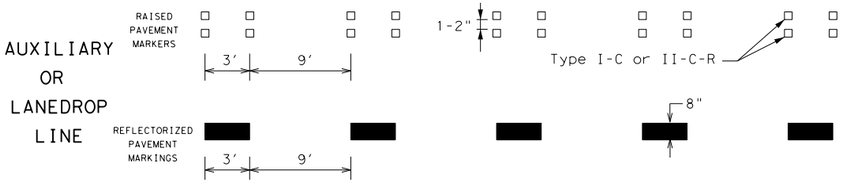


BROKEN LINES

CENTER LINE OR LANE LINE

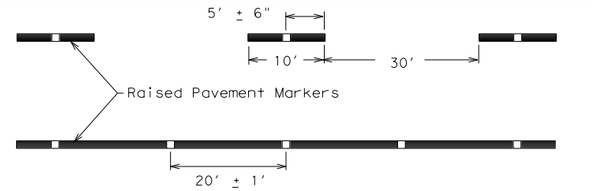


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

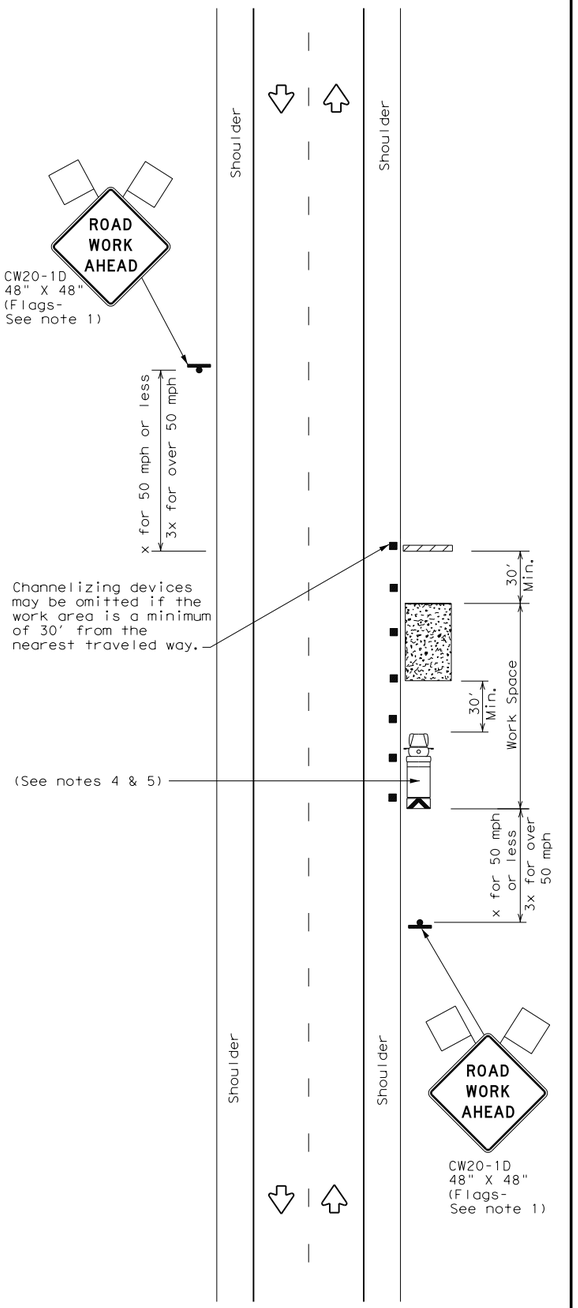
BC(12)-21

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	DIST	COUNTY		SHEET NO.
		PARKER		34

106

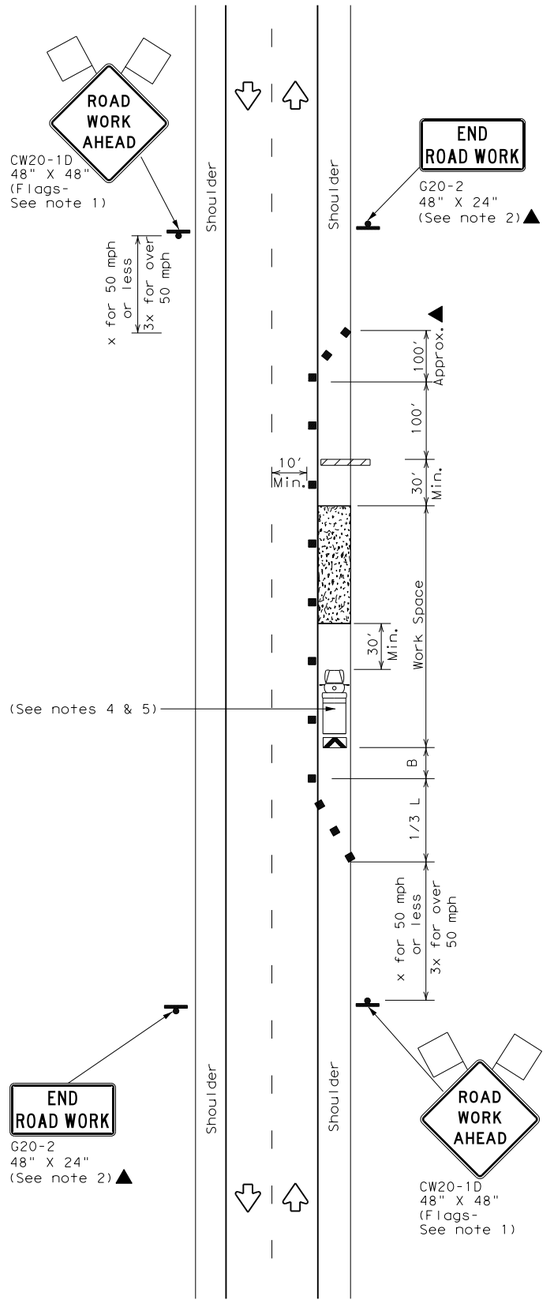
DATE: 8/27/2026
FILE: cv-109_TS_TxDot_BC(12)-21.dgn

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.



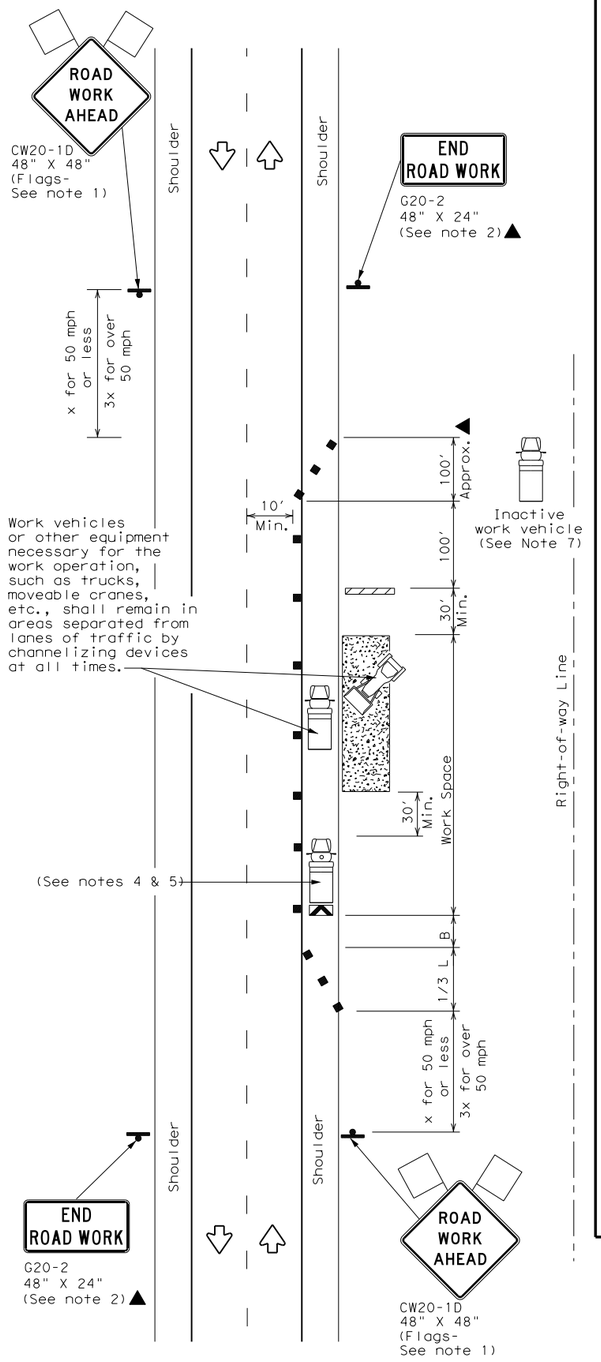
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

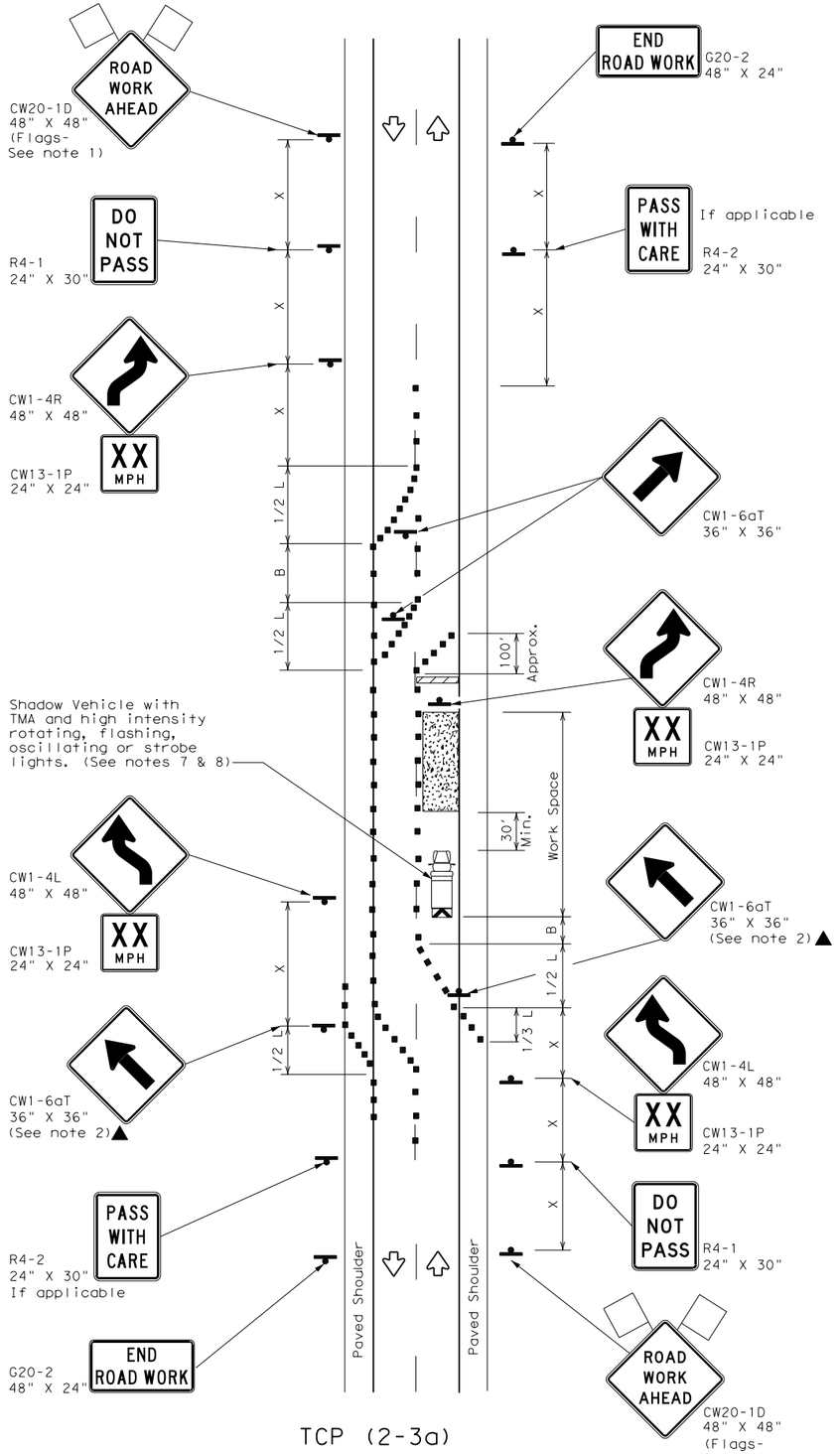
TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12		PARKER		35
1-97 2-18				

161

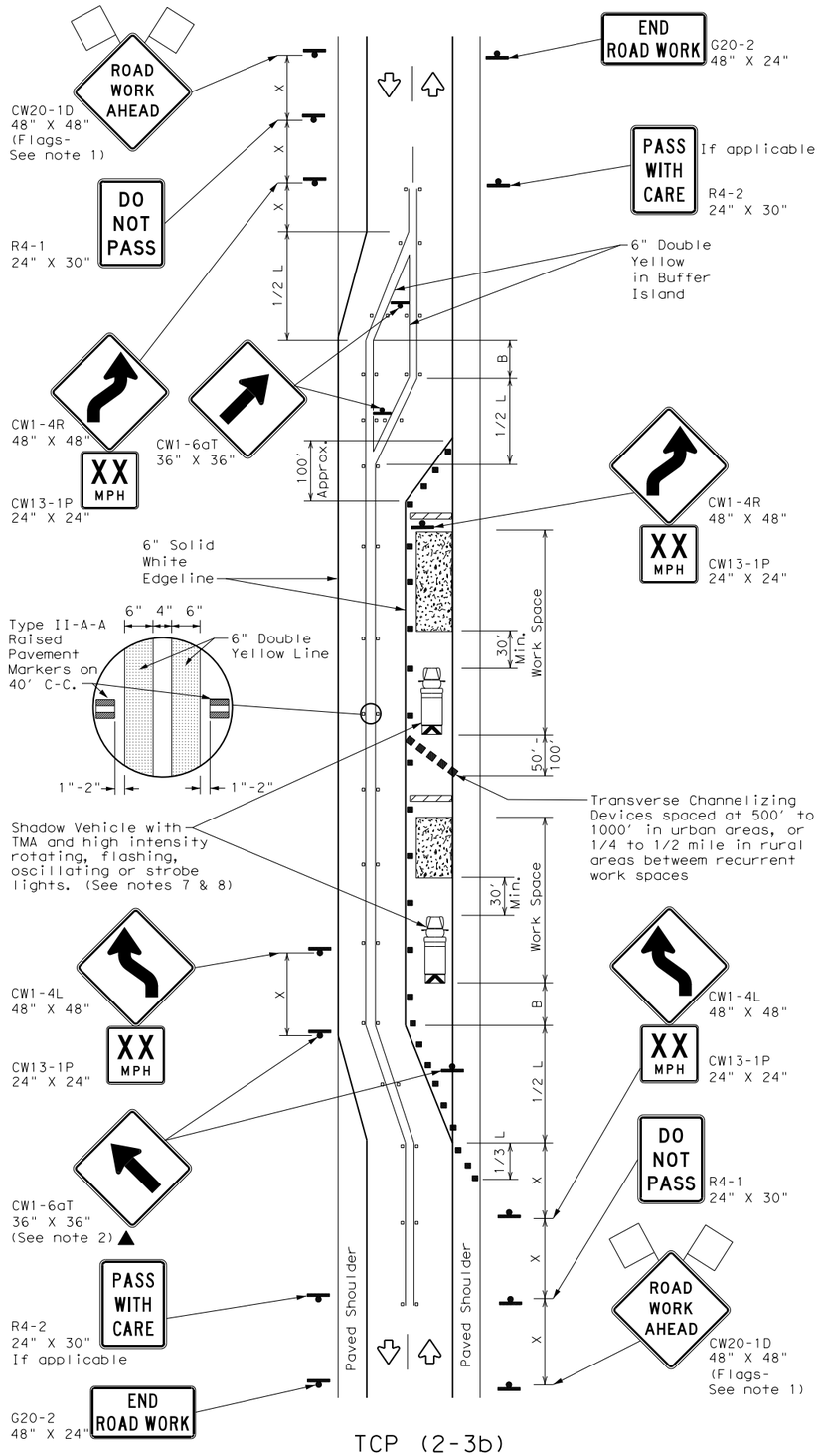
DATE: 8/27/2026
FILE: cv-109_TS_TxDot_TCP(2-1)-18.dgn

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.



TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Raised Pavement Markers Ty II-AA
	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
				TCP(2-3b)ONLY
			✓	✓

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. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. 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.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation | Traffic Safety Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

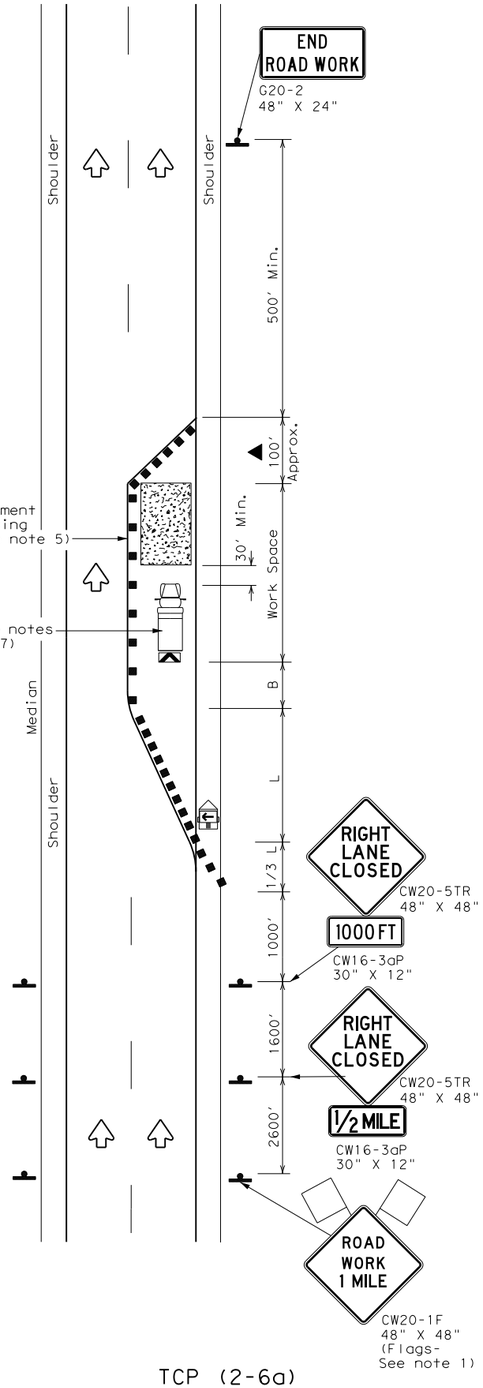
TCP(2-3)-23

FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	DIST	COUNTY		SHEET NO.
		PARKER		36

163

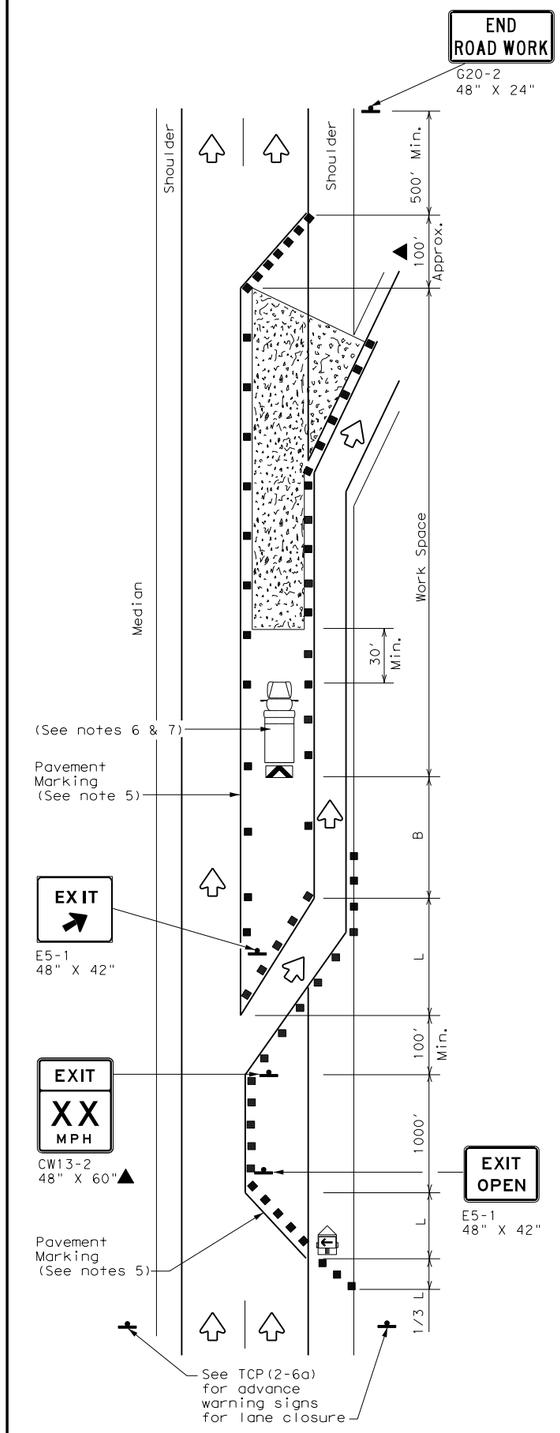
DATE: 8/27/2026
FILE: cv-109-TS TxDot TCP(2-3)-23.dgn

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.



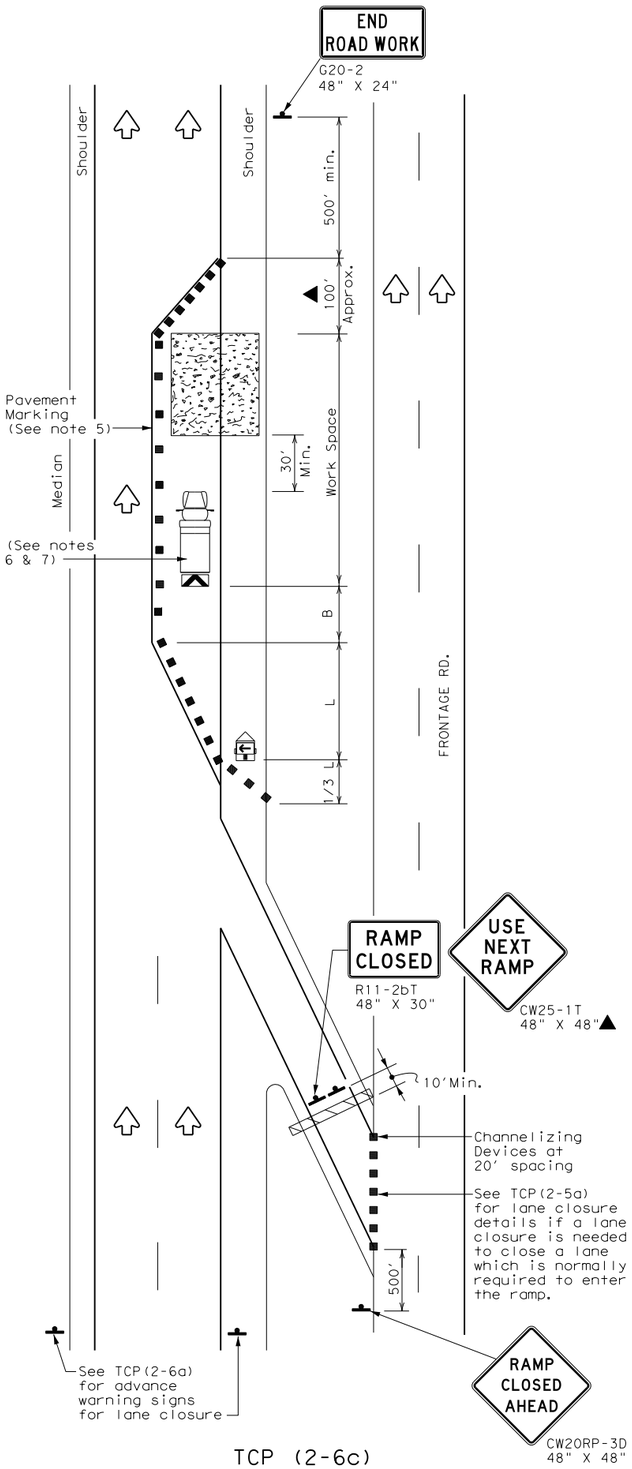
TCP (2-6a)

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

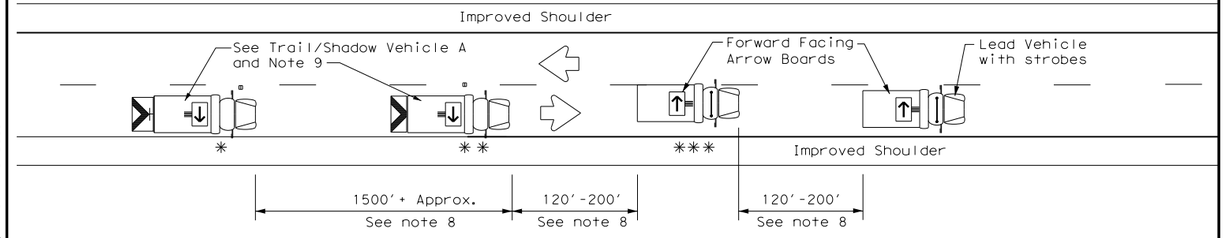
TCP(2-6)-18

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	DIST	COUNTY		SHEET NO.
		PARKER		37

166

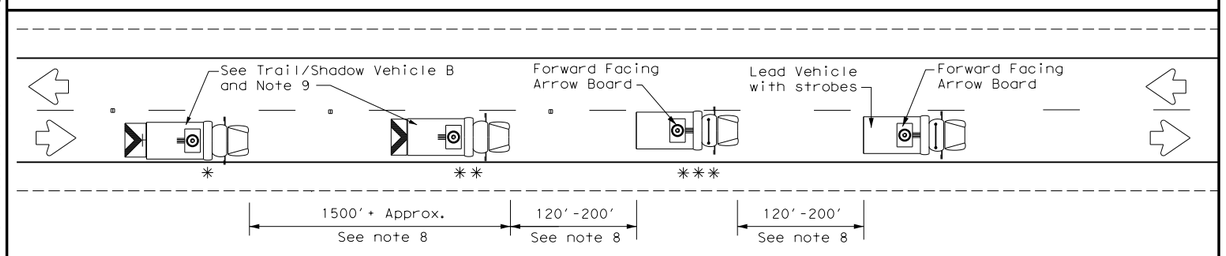
DATE: 8/27/2026
FILE: cv-109-TS TxDot_TCP(2-6)-18.dgn

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.



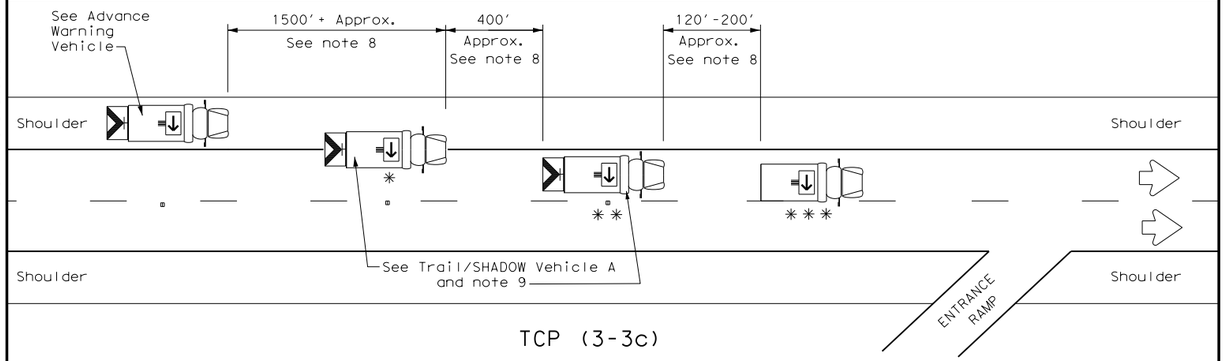
TCP (3-3a)

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



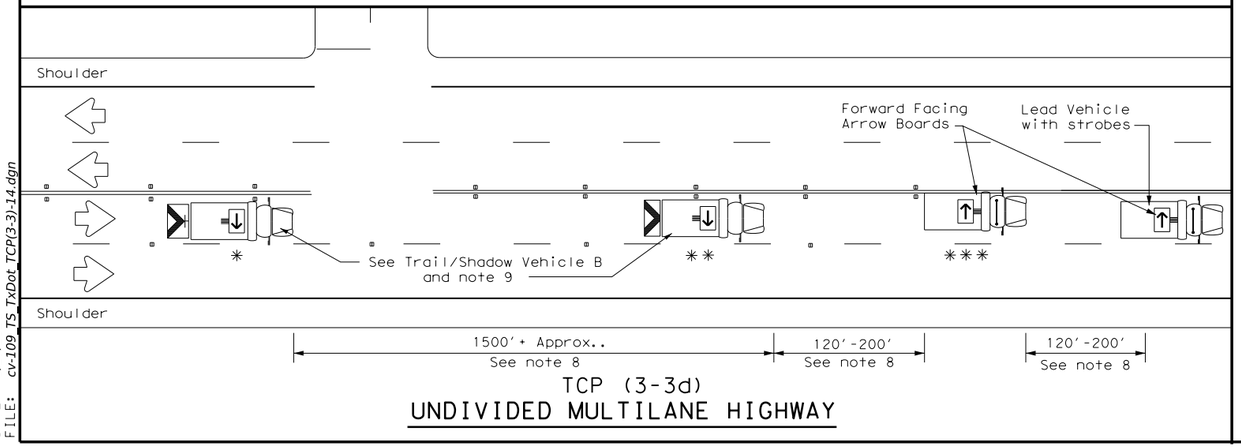
TCP (3-3b)

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



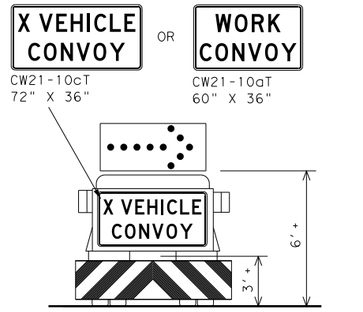
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



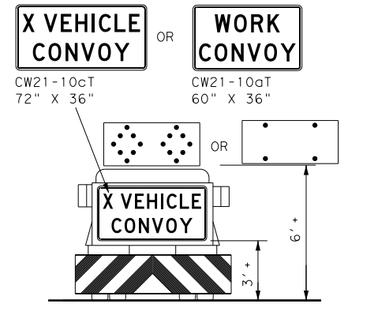
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



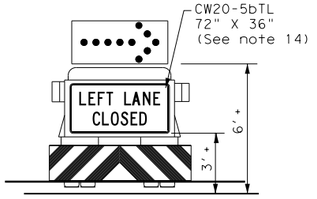
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

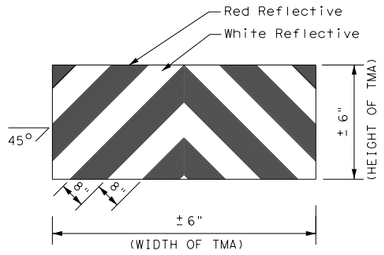


TRAIL/SHADOW VEHICLE B

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

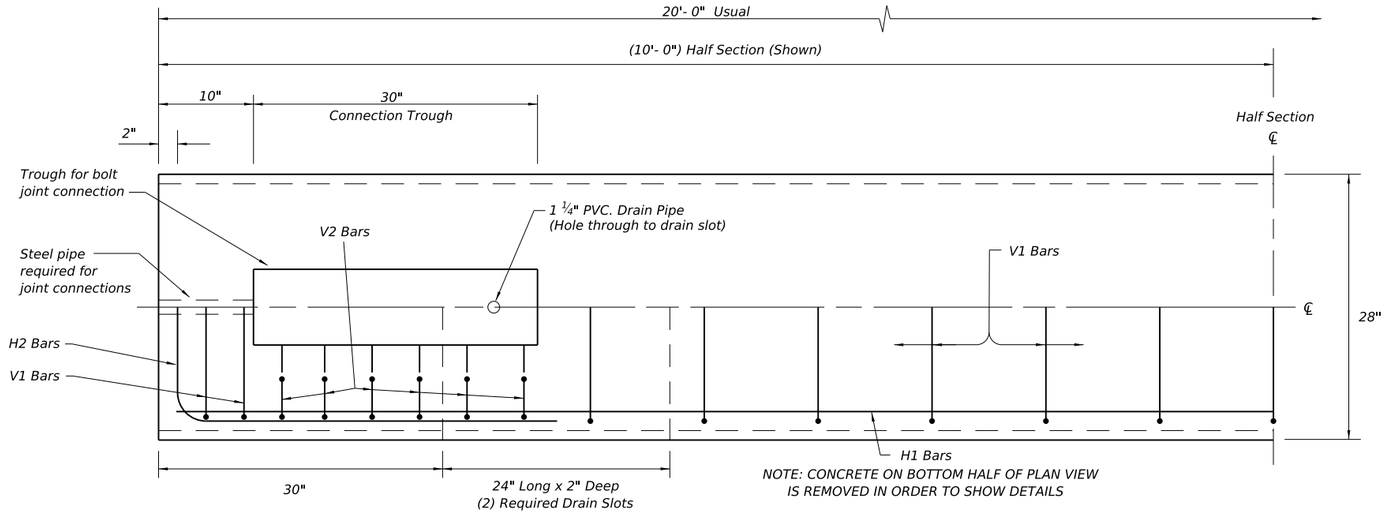
FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13		PARKER		38
1-97 7-14				

177

DATE: 8/27/2026
FILE: cv-109 TS_TxDot_TCP(3-3)-14.dgn

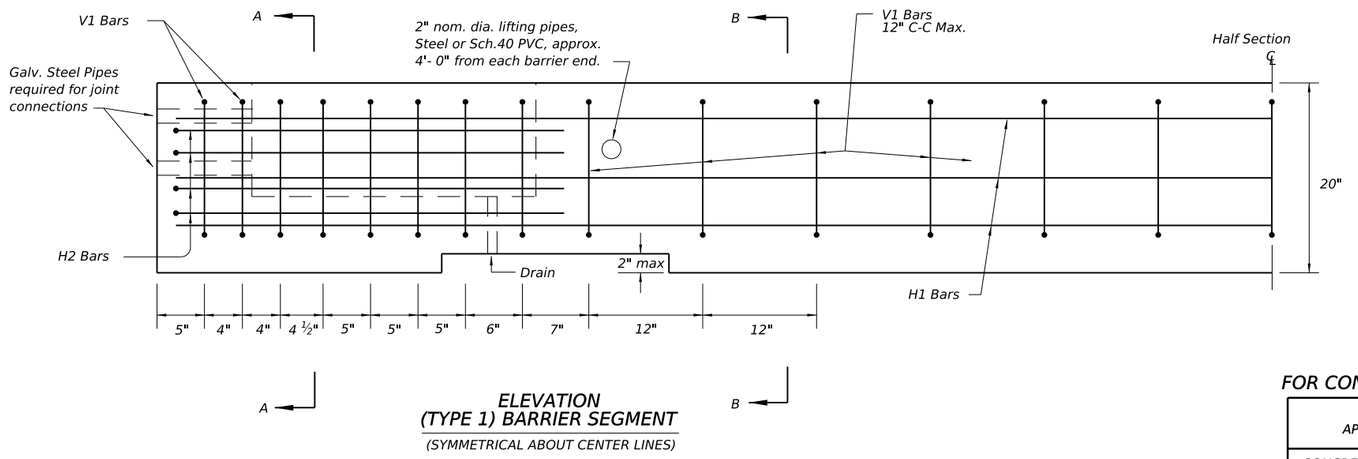
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/27/2026
FILE: \\tcsm-freesepw21\ICS_pdf_work_dir\5612\54721_17\cv-109_TS_TxDot_LPCB-26-1.dgn



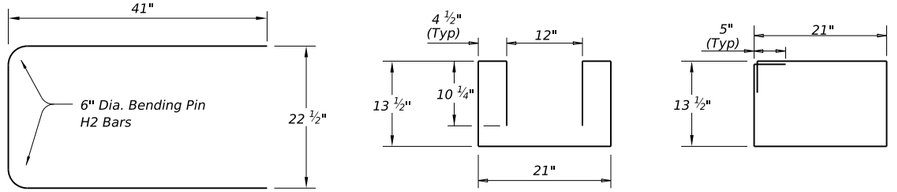
PLAN
(TYPE 1) BARRIER SEGMENT

(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT

(SYMMETRICAL ABOUT CENTER LINES)



(8)~H2 Bars (#5) Bars

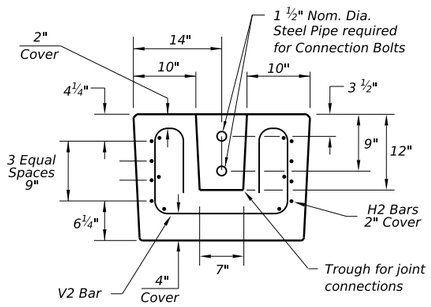
(12)~V2 Bars (#4) Bars

(17)~V1 Bars (#4) Bars

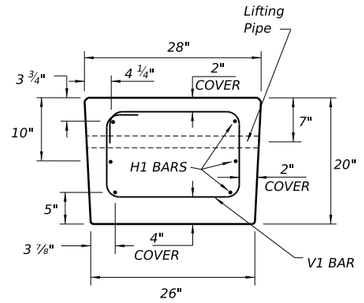
REINFORCING STEEL DETAILS

TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



SECTION B-B

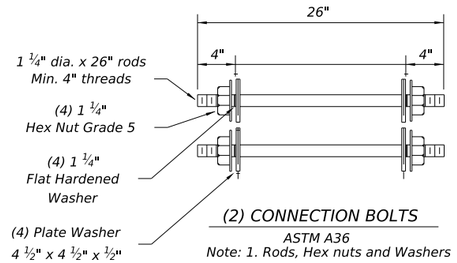
GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts," and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445,"Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

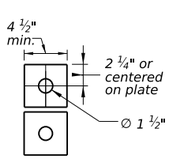
FOR CONTRACTORS INFORMATION ONLY

(TYPE 1)
APPROX. QUANTITIES 20 FT. SECTION

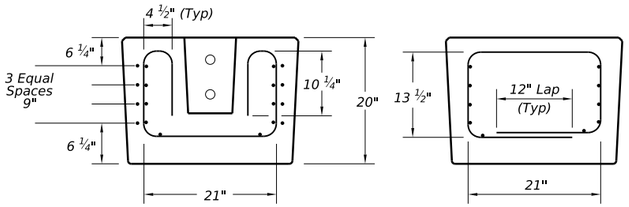
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



(2) CONNECTION BOLTS
ASTM A36
Note: 1. Rods, Hex nuts and Washers shall be Galvanized.



(4)PLATE WASHERS
4 ½" x 4 ½" x ½"



SECTION A-A SECTION B-B

(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING

SHEET 1 OF 2

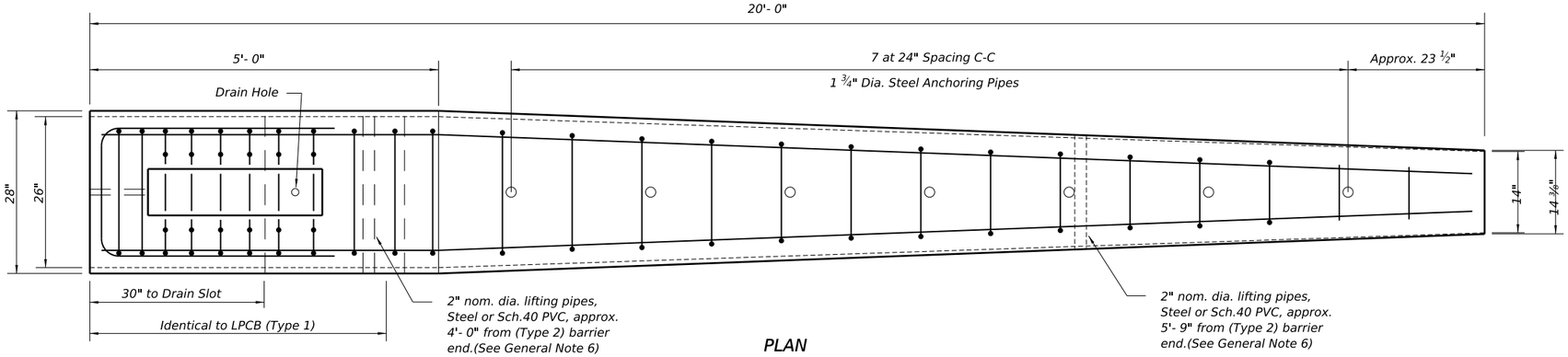
Texas Department of Transportation — Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-26

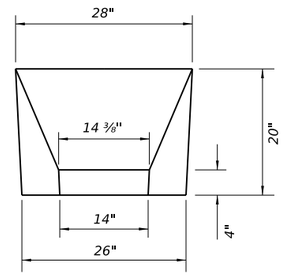
FILE: lpcb26.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
©TxDOT May 2026	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		39

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.

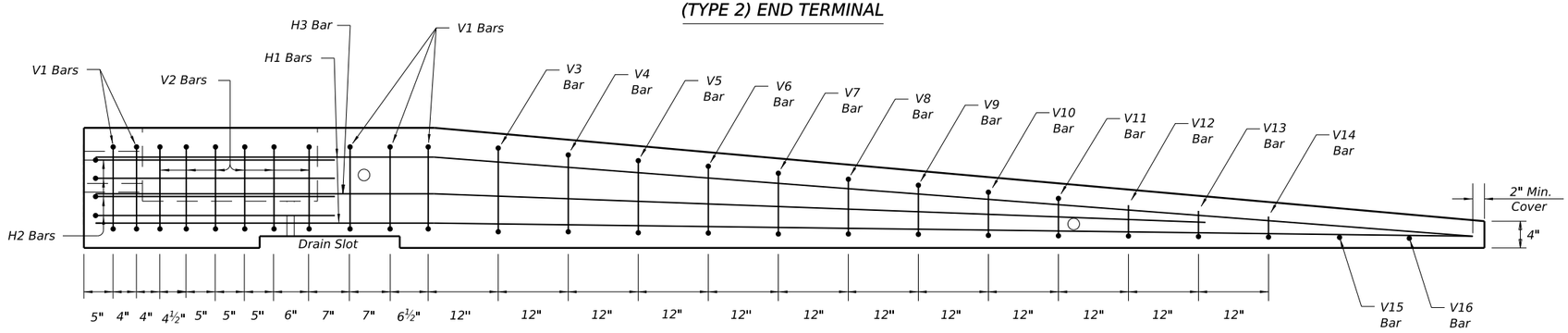
DATE: 8/27/2026
FILE: \\tcsm-freesepw21\ICS_pdf_work_dir\5612\54721_18\cv-109_TS_TxDot_LPCB-26-2.dgn



PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

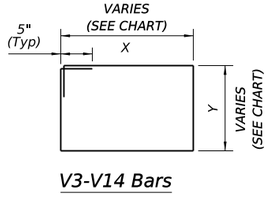


ELEVATION
(TYPE 2) END TERMINAL

Note:
Anchoring pipes not shown in Elevation View

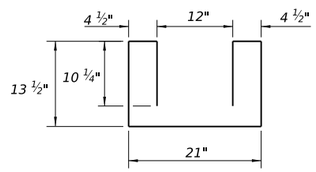
TYPE 2 - NOTES

1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment.The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.

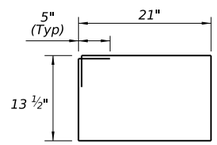


V3-V14 Bars

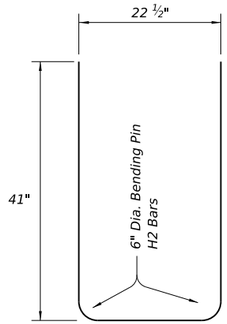
BAR(#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¾
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6



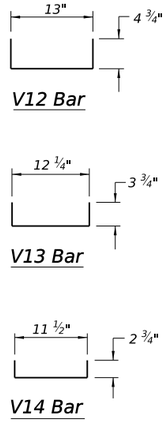
(6)~V2 Bars

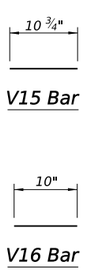


(5)~V1 Bars



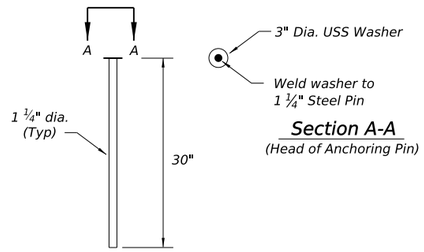
(4)~H2 Bars
(#5) Bars





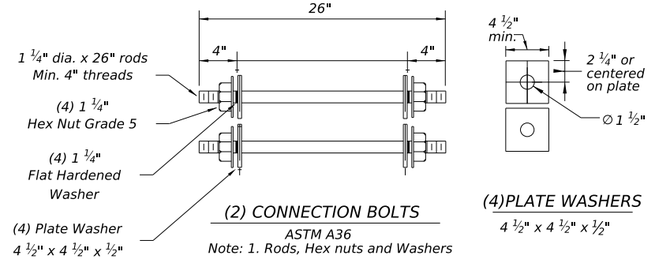
REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL

Note: All V Bars are (#4)



Section A-A
(Head of Anchoring Pin)

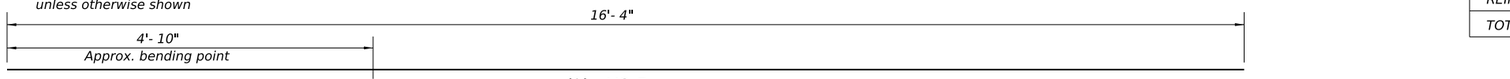
(7) Anchor Pins
ASTM A36 Steel (See Note 3)



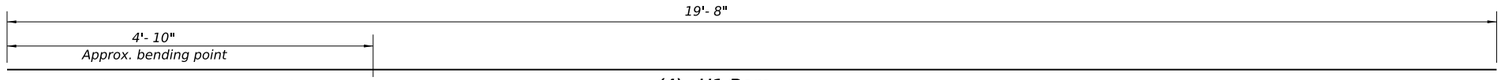
(2) CONNECTION BOLTS
ASTM A36
Note: 1. Rods, Hex nuts and Washers shall be Galvanized.

(4)PLATE WASHERS
4 ½" x 4 ½" x ½"

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-26

FILE: lpcb26.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
© TxDOT May 2026	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		40

Horizontal Alignment Review Report

Report Created: Wednesday, February 25, 2026
Time: 4:21:42 PM

Project: Default
Description:
File Name: c:\pwworkingdir\freese-pw.bentley.com_freese-pw-01\dms41452\cv-109-pl-align01.dgn
Last Revised: 2/25/2026 16:16:19

Note: All units in this report are in feet unless specified otherwise.

Alignment Name: EAST BANKHEAD HWY
Alignment Description:
Alignment Style: Alignment\Baseline

		Station	Northing	Easting
Element: Linear				
POT	(POT)	10+00.00 R1	6950435.56	2233836.45
PC	(PC)	13+71.35 R1	6950461.90	2234206.86
Tangential Direction:		N85.932°E		
Tangential Length:		371.35		
Element: Circular				
PC	(PC)	13+71.35 R1	6950461.90	2234206.86
HPI	(HPI)	14+85.68 R1	6950470.01	2234320.91
CC	(CC)		6950152.68	2234228.86
PT	(PT)	15+90.42 R1	6950402.13	2234412.91
Radius:		310.00		
Delta:		40.490 Right		
Degree of Curvature (Arc):		18.483		
Length:		219.07		
Tangent:		114.33		
Chord:		214.54		
Middle Ordinate:		19.15		
External:		20.41		
Back Tangent Direction:		N85.932°E		
Back Radial Direction:		S4.068°E		
Chord Direction:		S73.823°E		
Ahead Radial Direction:		S36.422°W		
Ahead Tangent Direction:		S53.578°E		
Element: Linear				
PT	(PT)	15+90.42 R1	6950402.13	2234412.91
PI	(PI)	17+56.34 R1	6950303.62	2234546.42
Tangential Direction:		S53.578°E		
Tangential Length:		165.92		
Element: Linear				
PI	(PI)	17+56.34 R1	6950303.62	2234546.42
PC	(PC)	19+93.20 R1	6950164.35	2234738.01
Tangential Direction:		S53.987°E		

Tangential Length:		236.86		
Element: Circular				
PC	(PC)	19+93.20 R1	6950164.35	2234738.01
HPI	(HPI)	20+11.49 R1	6950153.60	2234752.81
CC	(CC)		6950801.05	2235200.83
PT	(PT)	20+29.77 R1	6950143.54	2234768.09
Radius:		787.13		
Delta:		2.662 Left		
Degree of Curvature (Arc):		7.279		
Length:		36.58		
Tangent:		18.29		
Chord:		36.57		
Middle Ordinate:		0.21		
External:		0.21		
Back Tangent Direction:		S53.987°E		
Back Radial Direction:		S36.013°W		
Chord Direction:		S55.318°E		
Ahead Radial Direction:		S33.351°W		
Ahead Tangent Direction:		S56.649°E		
Element: Linear				
PT	(PT)	20+29.77 R1	6950143.54	2234768.09
PC	(PC)	21+04.41 R1	6950102.51	2234830.43
Tangential Direction:		S56.649°E		
Tangential Length:		74.63		
Element: Circular				
PC	(PC)	21+04.41 R1	6950102.51	2234830.43
HPI	(HPI)	21+22.61 R1	6950092.50	2234845.64
CC	(CC)		6949443.86	2234396.94
PT	(PT)	21+40.81 R1	6950081.80	2234860.36
Radius:		788.50		
Delta:		2.645 Right		
Degree of Curvature (Arc):		7.266		
Length:		36.40		
Tangent:		18.20		
Chord:		36.40		
Middle Ordinate:		0.21		
External:		0.21		
Back Tangent Direction:		S56.649°E		
Back Radial Direction:		S33.351°W		
Chord Direction:		S55.326°E		
Ahead Radial Direction:		S35.996°W		
Ahead Tangent Direction:		S54.004°E		
Element: Linear				
PT	(PT)	21+40.81 R1	6950081.80	2234860.36
PC	(PC)	26+59.09 R1	6949777.19	2235279.68
Tangential Direction:		S54.004°E		
Tangential Length:		518.28		

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ALIGNMENT DATA

SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	41

DATE: 8/27/2026 8:08:02 PM
FILE: \\CsM-freesepw21\CS_pdf_work_din\56131\54719_6\cv-109-pl-data01.dgn

Element: Circular

PC	(PC)	26+59.09 R1	6949777.19	2235279.68
HPI	(HPI)	27+46.48 R1	6949725.83	2235350.39
CC	(CC)		6947362.56	2233525.61
PT	(PT)	28+33.83 R1	6949670.42	2235417.97
Radius:		2984.50		
Delta:		3.355 Right		
Degree of Curvature (Arc):		1.920		
Length:		174.74		
Tangent:		87.39		
Chord:		174.71		
Middle Ordinate:		1.28		
External:		1.28		
Back Tangent Direction:		S54.004°E		
Back Radial Direction:		S35.996°W		
Chord Direction:		S52.327°E		
Ahead Radial Direction:		S39.351°W		
Ahead Tangent Direction:		S50.649°E		

Element: Linear

PT	(PT)	28+33.83 R1	6949670.42	2235417.97
PC	(PC)	32+99.84 R1	6949374.94	2235778.33
Tangential Direction:		S50.649°E		
Tangential Length:		466.01		

Element: Circular

PC	(PC)	32+99.84 R1	6949374.94	2235778.33
HPI	(HPI)	33+48.79 R1	6949343.90	2235816.18
CC	(CC)		6949993.56	2236285.58
PT	(PT)	33+97.62 R1	6949317.71	2235857.54
Radius:		800.00		
Delta:		7.003 Left		
Degree of Curvature (Arc):		7.162		
Length:		97.79		
Tangent:		48.95		
Chord:		97.72		
Middle Ordinate:		1.49		
External:		1.50		
Back Tangent Direction:		S50.649°E		
Back Radial Direction:		S39.351°W		
Chord Direction:		S54.151°E		
Ahead Radial Direction:		S32.347°W		
Ahead Tangent Direction:		S57.653°E		

Element: Linear

PT	(PT)	33+97.62 R1	6949317.71	2235857.54
PC	(PC)	34+47.62 R1	6949290.95	2235899.78
Tangential Direction:		S57.653°E		
Tangential Length:		50.00		

Element: Circular

PC	(PC)	34+47.62 R1	6949290.95	2235899.78
HPI	(HPI)	34+96.78 R1	6949264.65	2235941.31
CC	(CC)		6948615.10	2235471.74
PT	(PT)	35+45.81 R1	6949233.47	2235979.30
Radius:		800.00		
Delta:		7.032 Right		
Degree of Curvature (Arc):		7.162		
Length:		98.19		
Tangent:		49.16		
Chord:		98.13		
Middle Ordinate:		1.51		
External:		1.51		
Back Tangent Direction:		S57.653°E		
Back Radial Direction:		S32.347°W		
Chord Direction:		S54.137°E		
Ahead Radial Direction:		S39.379°W		
Ahead Tangent Direction:		S50.621°E		

Element: Linear

PT	(PT)	35+45.81 R1	6949233.47	2235979.30
PI	(PI)	43+01.69 R1	6948753.89	2236563.57
Tangential Direction:		S50.621°E		
Tangential Length:		755.88		

Element: Linear

PI	(PI)	43+01.69 R1	6948753.89	2236563.57
PC	(PC)	51+35.26 R1	6948222.43	2237205.75
Tangential Direction:		S50.389°E		
Tangential Length:		833.57		

Element: Circular

PC	(PC)	51+35.26 R1	6948222.43	2237205.75
HPI	(HPI)	53+29.84 R1	6948098.38	2237355.65
CC	(CC)		6948629.20	2237542.38
PT	(PT)	55+08.11 R1	6948101.26	2237550.20
Radius:		528.00		
Delta:		40.459 Left		
Degree of Curvature (Arc):		10.851		
Length:		372.84		
Tangent:		194.58		
Chord:		365.15		
Middle Ordinate:		32.57		
External:		34.71		
Back Tangent Direction:		S50.389°E		
Back Radial Direction:		S39.611°W		
Chord Direction:		S70.619°E		
Ahead Radial Direction:		S0.848°E		
Ahead Tangent Direction:		N89.152°E		

Element: Linear

PT	(PT)	55+08.11 R1	6948101.26	2237550.20
PC	(PC)	61+52.74 R1	6948110.80	2238194.76

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ALIGNMENT DATA

SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	42

DATE: 8/27/2026 7:44:12 PM
FILE: \\cs\M-freesepw211\CS_pdf_work_dir\56135\54719_7\cv-109-pl-data02.dgn

Tangential Direction:		N89.152°E		
Tangential Length:		644.63		
Element: Circular				
PC	(PC)	61+52.74 R1	6948110.80	2238194.76
HPI	(HPI)	61+70.82 R1	6948111.07	2238212.84
CC	(CC)		6949110.69	2238179.95
PT	(PT)	61+88.90 R1	6948111.99	2238230.91
Radius:		1000.00		
Delta:		2.072 Left		
Degree of Curvature (Arc):		5.730		
Length:		36.17		
Tangent:		18.09		
Chord:		36.17		
Middle Ordinate:		0.16		
External:		0.16		
Back Tangent Direction:		N89.152°E		
Back Radial Direction:		S0.848°E		
Chord Direction:		N88.116°E		
Ahead Radial Direction:		S2.921°E		
Ahead Tangent Direction:		N87.079°E		
Element: Linear				
PT	(PT)	61+88.90 R1	6948111.99	2238230.91
PC	(PC)	70+19.48 R1	6948154.31	2239060.41
Tangential Direction:		N87.079°E		
Tangential Length:		830.58		
Element: Circular				
PC	(PC)	70+19.48 R1	6948154.31	2239060.41
HPI	(HPI)	70+70.00 R1	6948156.88	2239110.86
CC	(CC)		6947305.41	2239103.71
PT	(PT)	71+20.40 R1	6948153.46	2239161.26
Radius:		850.00		
Delta:		6.803 Right		
Degree of Curvature (Arc):		6.741		
Length:		100.92		
Tangent:		50.52		
Chord:		100.86		
Middle Ordinate:		1.50		
External:		1.50		
Back Tangent Direction:		N87.079°E		
Back Radial Direction:		S2.921°E		
Chord Direction:		S89.519°E		
Ahead Radial Direction:		S3.882°W		
Ahead Tangent Direction:		S86.118°E		
Element: Linear				
PT	(PT)	71+20.40 R1	6948153.46	2239161.26
PC	(PC)	77+57.57 R1	6948110.32	2239796.97
Tangential Direction:		S86.118°E		
Tangential Length:		637.17		

Element: Circular				
PC	(PC)	77+57.57 R1	6948110.32	2239796.97
HPI	(HPI)	78+67.74 R1	6948102.87	2239906.88
CC	(CC)		6946913.08	2239715.73
PCC	(PCC)	79+77.29 R1	6948075.52	2240013.60
Radius:		1200.00		
Delta:		10.491 Right		
Degree of Curvature (Arc):		4.775		
Length:		219.71		
Tangent:		110.16		
Chord:		219.41		
Middle Ordinate:		5.02		
External:		5.05		
Back Tangent Direction:		S86.118°E		
Back Radial Direction:		S3.882°W		
Chord Direction:		S80.873°E		
Ahead Radial Direction:		S14.373°W		
Ahead Tangent Direction:		S75.627°E		
Element: Circular				
PCC	(PCC)	79+77.29 R1	6948075.52	2240013.60
HPI	(HPI)	81+32.85 R1	6948036.90	2240164.30
CC	(CC)		6947494.30	2239864.66
PT	(PT)	82+81.72 R1	6947929.93	2240277.25
Radius:		600.00		
Delta:		29.071 Right		
Degree of Curvature (Arc):		9.549		
Length:		304.43		
Tangent:		155.57		
Chord:		301.18		
Middle Ordinate:		19.20		
External:		19.84		
Back Tangent Direction:		S75.627°E		
Back Radial Direction:		S14.373°W		
Chord Direction:		S61.092°E		
Ahead Radial Direction:		S43.444°W		
Ahead Tangent Direction:		S46.556°E		
Element: Linear				
PT	(PT)	82+81.72 R1	6947929.93	2240277.25
PC	(PC)	91+13.27 R1	6947358.12	2240881.00
Tangential Direction:		S46.556°E		
Tangential Length:		831.55		
Element: Circular				
PC	(PC)	91+13.27 R1	6947358.12	2240881.00
HPI	(HPI)	93+25.55 R1	6947212.15	2241035.12
CC	(CC)		6950988.36	2244319.21
PT	(PT)	95+37.57 R1	6947079.77	2241201.06
Radius:		5000.00		
Delta:		4.862 Left		

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ALIGNMENT DATA

SHEET 3 OF 5

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	43

DATE: 8/27/2026 7:44:11 PM
FILE: \\CS\M-freesepw21\CS_pdf_work_dir\5613\54719_8\cv-109-pl-data03.dgn

Degree of Curvature (Arc):	1.146			
Length:	424.30			
Tangent:	212.28			
Chord:	424.17			
Middle Ordinate:	4.50			
External:	4.50			
Back Tangent Direction:	S46.556°E			
Back Radial Direction:	S43.444°W			
Chord Direction:	S48.987°E			
Ahead Radial Direction:	S38.582°W			
Ahead Tangent Direction:	S51.418°E			

Element: Linear

PT	(PT)	95+37.57 R1	6947079.77	2241201.06
PC	(PC)	99+96.78 R1	6946793.39	2241560.04
Tangential Direction:		S51.418°E		
Tangential Length:		459.21		

Element: Circular

PC	(PC)	99+96.78 R1	6946793.39	2241560.04
HPI	(HPI)	100+21.40 R1	6946778.04	2241579.28
CC	(CC)		6946011.67	2240936.41
PT	(PT)	100+46.00 R1	6946761.76	2241597.74
Radius:		1000.00		
Delta:		2.820 Right		
Degree of Curvature (Arc):		5.730		
Length:		49.22		
Tangent:		24.61		
Chord:		49.21		
Middle Ordinate:		0.30		
External:		0.30		
Back Tangent Direction:		S51.418°E		
Back Radial Direction:		S38.582°W		
Chord Direction:		S50.008°E		
Ahead Radial Direction:		S41.402°W		
Ahead Tangent Direction:		S48.598°E		

Element: Linear

PT	(PT)	100+46.00 R1	6946761.76	2241597.74
PC	(PC)	103+66.92 R1	6946549.52	2241838.46
Tangential Direction:		S48.598°E		
Tangential Length:		320.92		

Element: Circular

PC	(PC)	103+66.92 R1	6946549.52	2241838.46
HPI	(HPI)	103+93.83 R1	6946531.73	2241858.64
CC	(CC)		6947299.61	2242499.79
PT	(PT)	104+20.72 R1	6946515.05	2241879.75
Radius:		1000.00		
Delta:		3.082 Left		
Degree of Curvature (Arc):		5.730		
Length:		53.80		

Tangent:	26.91			
Chord:	53.79			
Middle Ordinate:	0.36			
External:	0.36			
Back Tangent Direction:	S48.598°E			
Back Radial Direction:	S41.402°W			
Chord Direction:	S50.139°E			
Ahead Radial Direction:	S38.319°W			
Ahead Tangent Direction:	S51.681°E			

Element: Linear

PT	(PT)	104+20.72 R1	6946515.05	2241879.75
PC	(PC)	108+74.18 R1	6946233.88	2242235.52
Tangential Direction:		S51.681°E		
Tangential Length:		453.46		

Element: Circular

PC	(PC)	108+74.18 R1	6946233.88	2242235.52
HPI	(HPI)	111+23.52 R1	6946079.28	2242431.14
CC	(CC)		6947253.82	2243041.58
PT	(PT)	113+66.87 R1	6946008.03	2242670.08
Radius:		1300.00		
Delta:		21.715 Left		
Degree of Curvature (Arc):		4.407		
Length:		492.69		
Tangent:		249.34		
Chord:		489.75		
Middle Ordinate:		23.27		
External:		23.70		
Back Tangent Direction:		S51.681°E		
Back Radial Direction:		S38.319°W		
Chord Direction:		S62.538°E		
Ahead Radial Direction:		S16.605°W		
Ahead Tangent Direction:		S73.395°E		

Element: Linear

PT	(PT)	113+66.87 R1	6946008.03	2242670.08
PI	(PI)	117+71.14 R1	6945892.50	2243057.49
Tangential Direction:		S73.395°E		
Tangential Length:		404.27		

Element: Linear

PI	(PI)	117+71.14 R1	6945892.50	2243057.49
PC	(PC)	126+52.95 R1	6945644.73	2243903.77
Tangential Direction:		S73.681°E		
Tangential Length:		881.81		

Element: Circular

PC	(PC)	126+52.95 R1	6945644.73	2243903.77
HPI	(HPI)	127+28.82 R1	6945623.41	2243976.59
CC	(CC)		6944109.19	2243454.20
PT	(PT)	128+04.58 R1	6945595.30	2244047.06

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ALIGNMENT DATA

SHEET 4 OF 5

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	44

DATE: 8/27/2026 7:42:26 PM
FILE: \\CsM-freesepw21\CS_pdf_work_din\56131\54719_9\cv-109-pl-data04.dgn

Radius:	1600.00
Delta:	5.430 Right
Degree of Curvature (Arc):	3.581
Length:	151.63
Tangent:	75.87
Chord:	151.57
Middle Ordinate:	1.80
External:	1.80
Back Tangent Direction:	S73.681°E
Back Radial Direction:	S16.319°W
Chord Direction:	S70.966°E
Ahead Radial Direction:	S21.749°W
Ahead Tangent Direction:	S68.251°E

Element: Linear

PT	(PT)	128+04.58 R1	6945595.30	2244047.06
PC	(PC)	134+41.23 R1	6945359.39	2244638.40

Tangential Direction:	S68.251°E
Tangential Length:	636.66

Element: Circular

PC	(PC)	134+41.23 R1	6945359.39	2244638.40
HPI	(HPI)	136+24.90 R1	6945291.33	2244808.99
CC	(CC)		6946102.44	2244934.83
PT	(PT)	138+02.31 R1	6945304.50	2244992.18

Radius:	800.00
Delta:	25.860 Left
Degree of Curvature (Arc):	7.162
Length:	361.08
Tangent:	183.67
Chord:	358.02
Middle Ordinate:	20.28
External:	20.81
Back Tangent Direction:	S68.251°E
Back Radial Direction:	S21.749°W
Chord Direction:	S81.181°E
Ahead Radial Direction:	S4.111°E
Ahead Tangent Direction:	N85.889°E

Element: Linear

PT	(PT)	138+02.31 R1	6945304.50	2244992.18
PC	(PC)	139+02.46 R1	6945311.68	2245092.08

Tangential Direction:	N85.889°E
Tangential Length:	100.15

Element: Circular

PC	(PC)	139+02.46 R1	6945311.68	2245092.08
HPI	(HPI)	140+25.92 R1	6945320.53	2245215.22
CC	(CC)		6944513.74	2245149.43
PT	(PT)	141+47.44 R1	6945291.85	2245335.29

Radius:	800.00
Delta:	17.545 Right

Degree of Curvature (Arc):	7.162
Length:	244.98
Tangent:	123.45
Chord:	244.02
Middle Ordinate:	9.36
External:	9.47
Back Tangent Direction:	N85.889°E
Back Radial Direction:	S4.111°E
Chord Direction:	S85.339°E
Ahead Radial Direction:	S13.434°W
Ahead Tangent Direction:	S76.566°E

Element: Linear

PT	(PT)	141+47.44 R1	6945291.85	2245335.29
POT	(POT)	142+44.62 R1	6945269.28	2245429.81

Tangential Direction:	S76.566°E
Tangential Length:	97.18

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

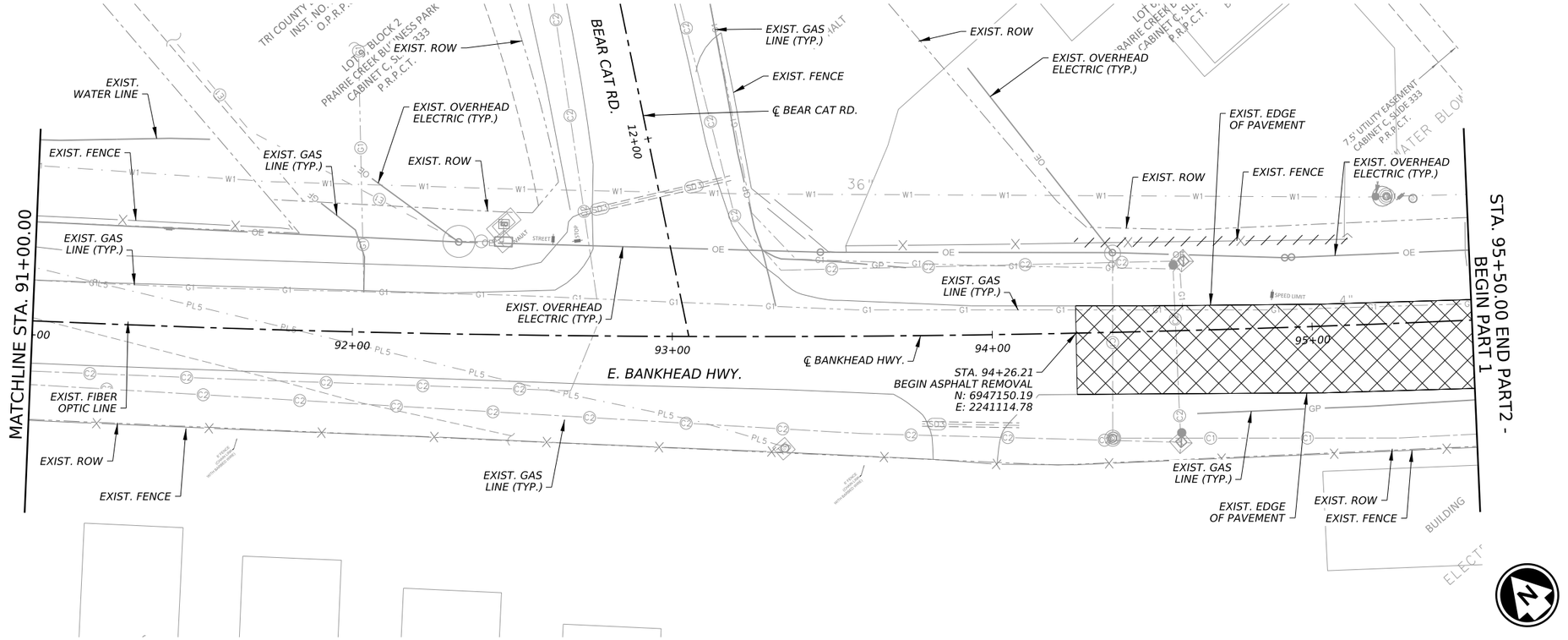
ALIGNMENT DATA

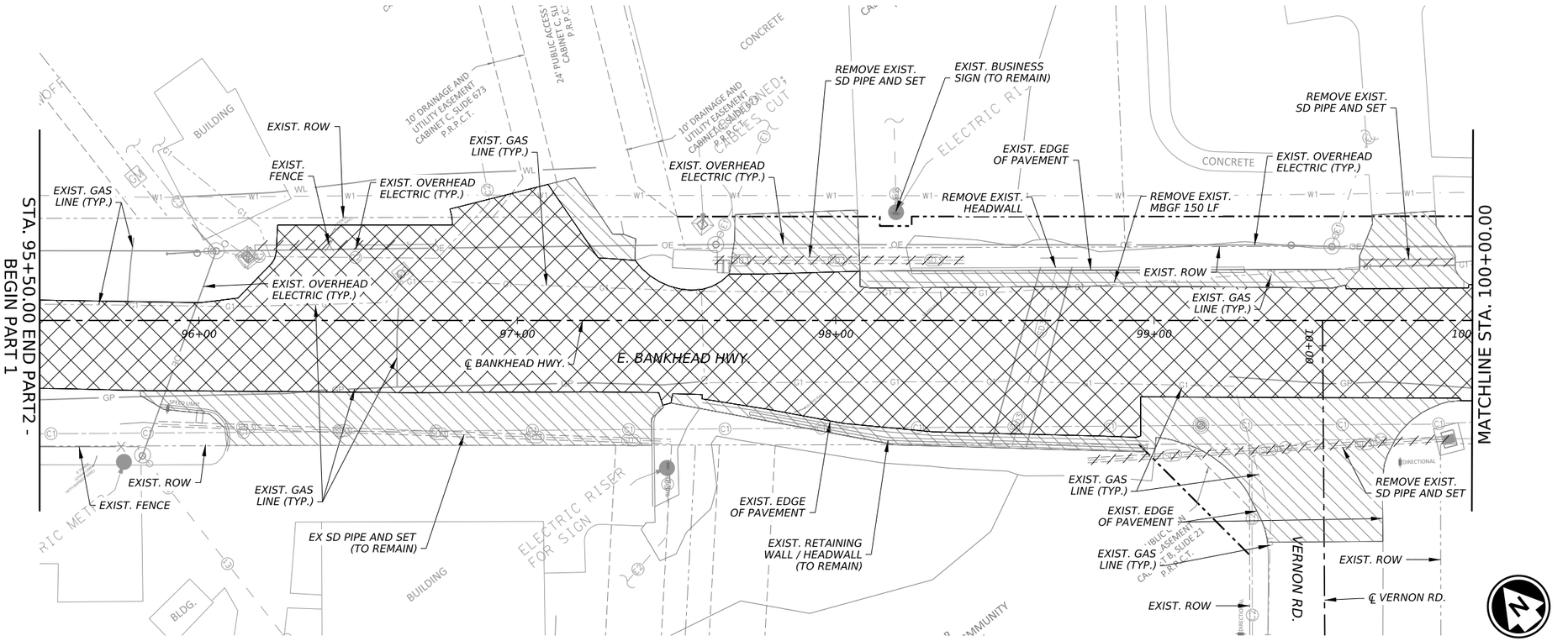
SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	45

DATE: 8/27/2026 7:45:15 PM
FILE: \\CsM-freesepw21\CS_pdf_work_din\56213\54719_10\cv-109-pl-data05.dgn





LEGEND

- ASPHALT DRIVEWAY & PAVEMENT REMOVAL
- CONC DRIVEWAY, SIDEWALK & PAVEMENT REMOVAL
- GRAVEL DRIVEWAY & PAVEMENT REMOVAL
- FENCE / PIPE REMOVAL

NOTES:

1. CONTRACTOR SHALL CONTACT 811 AT LEAST 48 HOURS PRIOR TO BEGINNING REMOVAL OF ANY MATERIALS ON THE PROJECT.

2. REMOVAL OF EXISTING ELEMENTS TO COMPLETE PROPOSED ACTIONS ARE SUBSIDIARY TO REMOVAL BID ITEM, UNLESS NOTED OTHERWISE.

3. ONLY THE TREES MARKED FOR REMOVAL SHALL BE CONSIDERED FOR REMOVAL. EVERY EFFORT SHALL BE MADE BY THIS CONTRACTOR TO PRESERVE AS MANY TREES AS POSSIBLE. ENGINEER SHALL BE NOTIFIED PRIOR TO REMOVAL OF TREE MARKED BY CONTRACTOR FOR VERIFICATION.

4. CONTRACTORS SHALL PROTECT EXISTING FENCES, UNLESS OTHERWISE NOTED.

5. ALL REQUIRED FRANCHISE UTILITY ADJUSTMENTS AND RELOCATIONS BY OTHERS ARE SHOWN ON THE EXISTING UTILITY PLAN SHEETS.

6. ANY IRRIGATION ADJUSTMENTS WILL BE CONSIDERED SUBSIDIARY TO THE ROW PREP ITEM.

0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER
8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

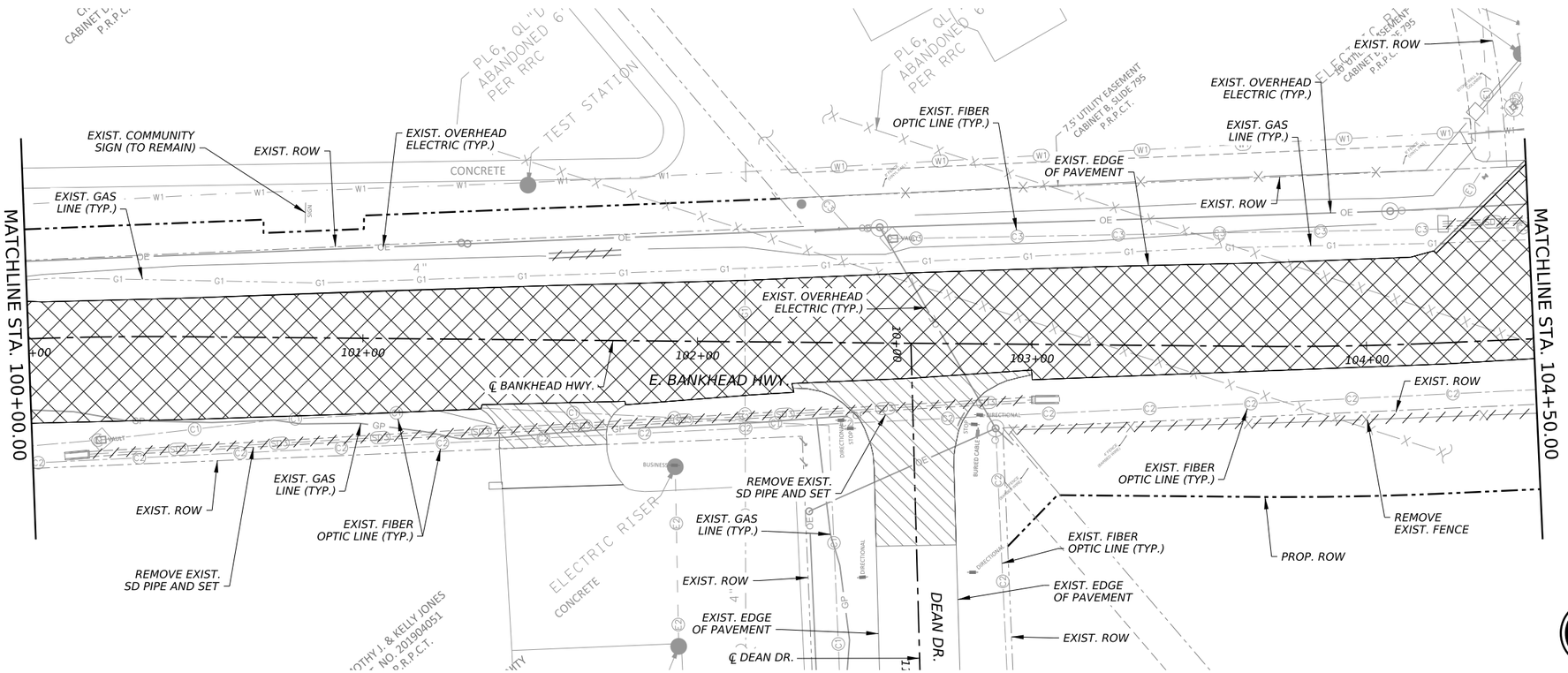
REMOVAL PLAN FROM STA. 91+00 TO STA. 100+00

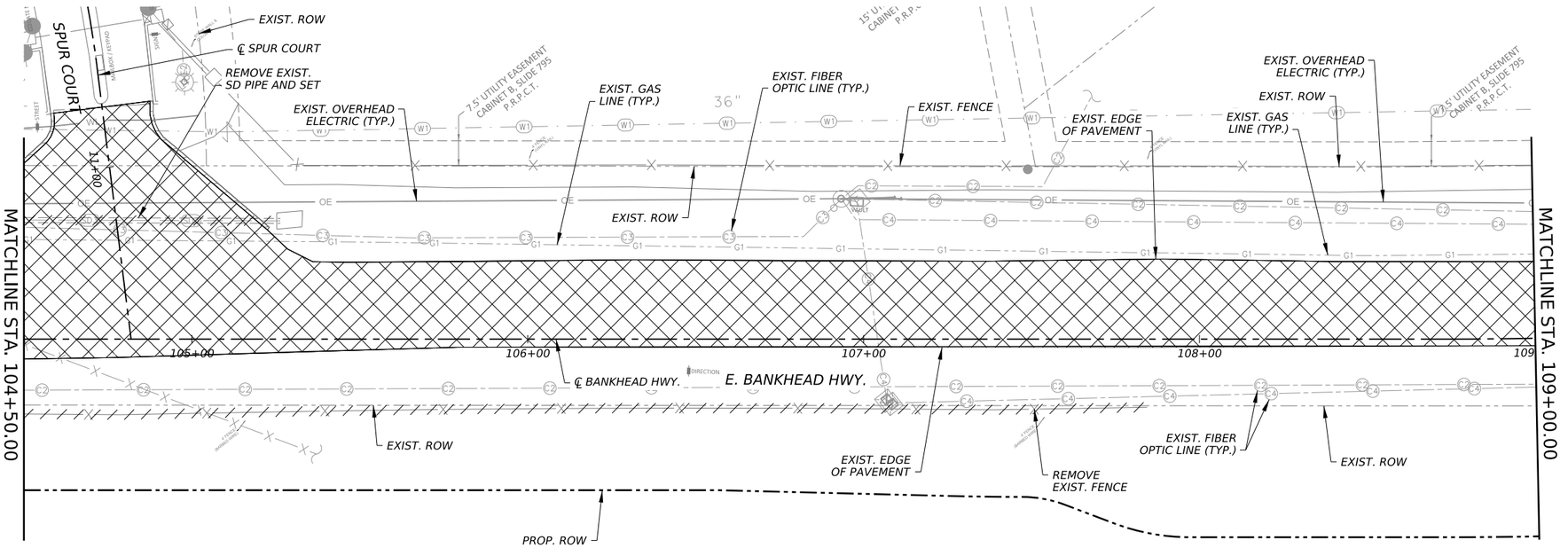
SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	46

DATE: 8/27/2026 7:35:37 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\56131\54719_26\cv-109-pl-demo10.dgn





LEGEND

- ASPHALT DRIVEWAY & PAVEMENT REMOVAL
- CONC DRIVEWAY, SIDEWALK & PAVEMENT REMOVAL
- GRAVEL DRIVEWAY & PAVEMENT REMOVAL
- FENCE / PIPE REMOVAL

NOTES:

1. CONTRACTOR SHALL CONTACT 811 AT LEAST 48 HOURS PRIOR TO BEGINNING REMOVAL OF ANY MATERIALS ON THE PROJECT.
2. REMOVAL OF EXISTING ELEMENTS TO COMPLETE PROPOSED ACTIONS ARE SUBSIDIARY TO REMOVAL BID ITEM, UNLESS NOTED OTHERWISE.
3. ONLY THE TREES MARKED FOR REMOVAL SHALL BE CONSIDERED FOR REMOVAL. EVERY EFFORT SHALL BE MADE BY THIS CONTRACTOR TO PRESERVE AS MANY TREES AS POSSIBLE. ENGINEER SHALL BE NOTIFIED PRIOR TO REMOVAL OF TREE MARKED BY CONTRACTOR FOR VERIFICATION.
4. CONTRACTORS SHALL PROTECT EXISTING FENCES, UNLESS OTHERWISE NOTED.
5. ALL REQUIRED FRANCHISE UTILITY ADJUSTMENTS AND RELOCATIONS BY OTHERS ARE SHOWN ON THE EXISTING UTILITY PLAN SHEETS.
6. ANY IRRIGATION ADJUSTMENTS WILL BE CONSIDERED SUBSIDIARY TO THE ROW PREP ITEM.

0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER
8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

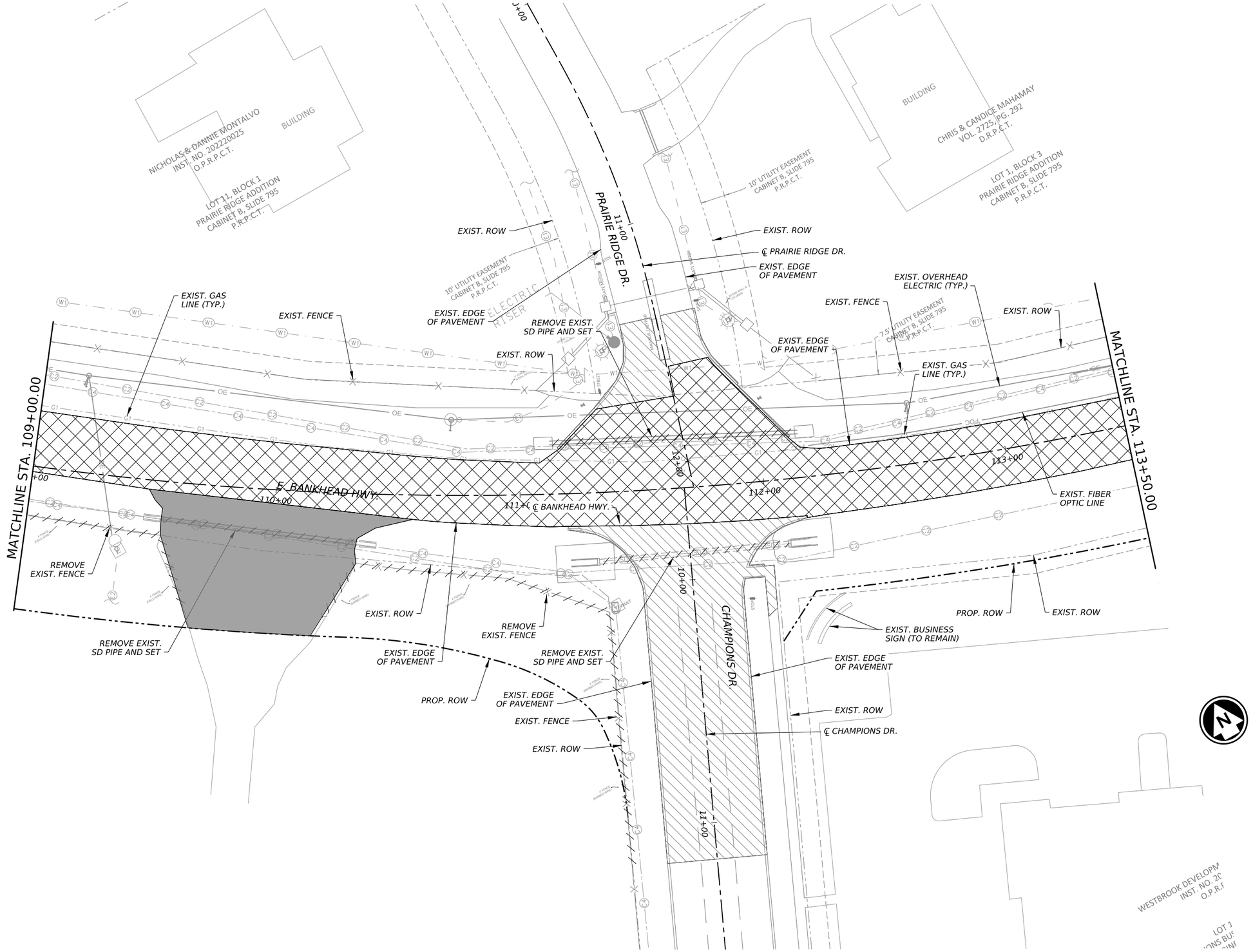
REMOVAL PLAN FROM STA. 100+00 TO STA. 109+00

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	47

DATE: 8/27/2026 7:36:32 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_din\56131\54719_20\cv-109-pl-demo11.dgn



STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER
8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

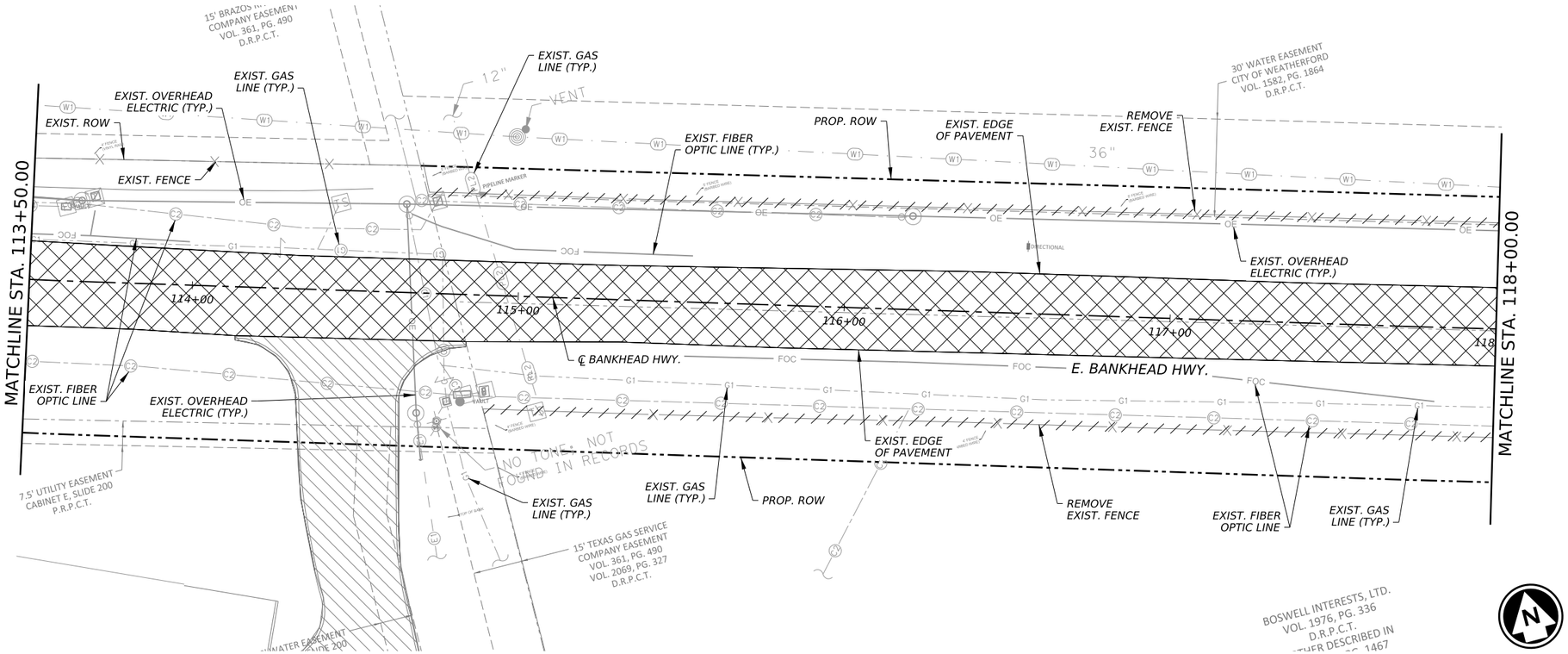
E BANKHEAD HWY PART 1

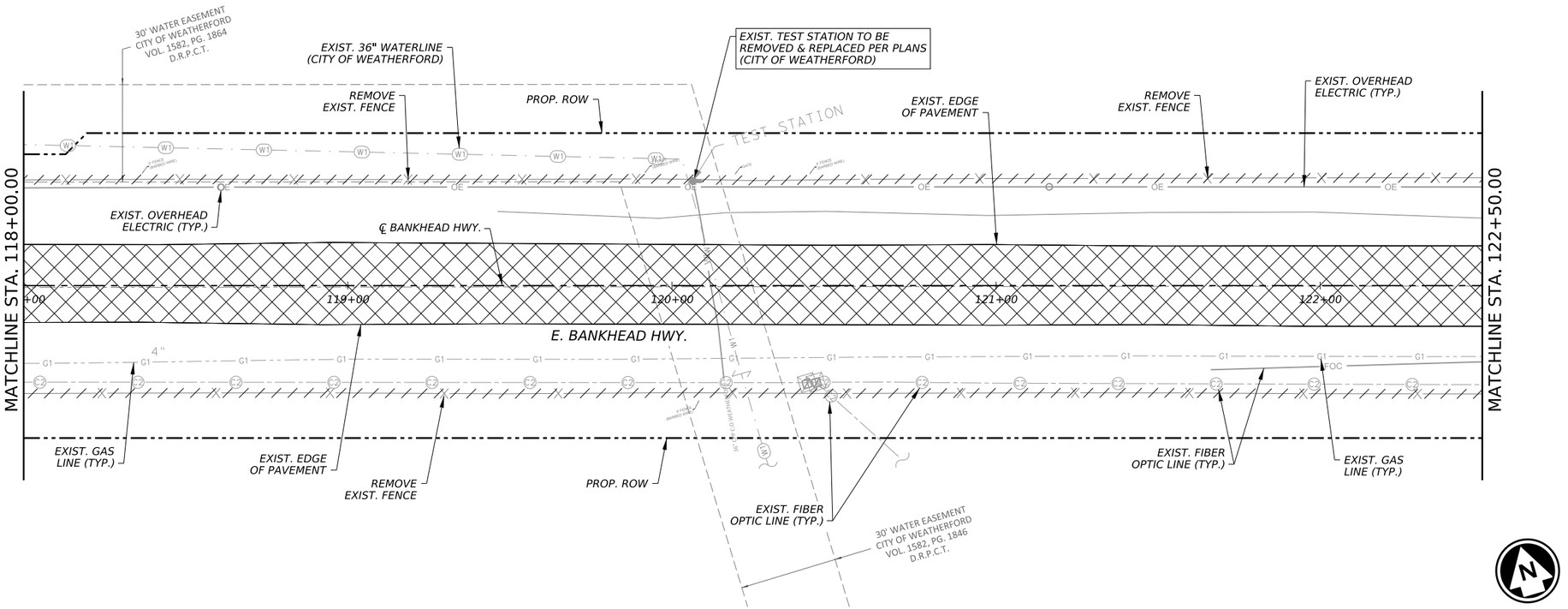
REMOVAL PLAN FROM STA. 109+00 TO STA. 113+50

SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		48

DATE: 8/27/2026 8:04:39 PM
FILE: \\ics\M-freesepw21\ICS_pdf_work_dir\56131\54719_21\cv-109-pl-demo12.dgn





LEGEND

- ASPHALT DRIVEWAY & PAVEMENT REMOVAL
- CONC DRIVEWAY, SIDEWALK & PAVEMENT REMOVAL
- GRAVEL DRIVEWAY & PAVEMENT REMOVAL
- FENCE / PIPE REMOVAL

NOTES:

1. CONTRACTOR SHALL CONTACT 811 AT LEAST 48 HOURS PRIOR TO BEGINNING REMOVAL OF ANY MATERIALS ON THE PROJECT.
2. REMOVAL OF EXISTING ELEMENTS TO COMPLETE PROPOSED ACTIONS ARE SUBSIDIARY TO REMOVAL BID ITEM, UNLESS NOTED OTHERWISE.
3. ONLY THE TREES MARKED FOR REMOVAL SHALL BE CONSIDERED FOR REMOVAL. EVERY EFFORT SHALL BE MADE BY THIS CONTRACTOR TO PRESERVE AS MANY TREES AS POSSIBLE. ENGINEER SHALL BE NOTIFIED PRIOR TO REMOVAL OF TREE MARKED BY CONTRACTOR FOR VERIFICATION.
4. CONTRACTORS SHALL PROTECT EXISTING FENCES, UNLESS OTHERWISE NOTED.
5. ALL REQUIRED FRANCHISE UTILITY ADJUSTMENTS AND RELOCATIONS BY OTHERS ARE SHOWN ON THE EXISTING UTILITY PLAN SHEETS.
6. ANY IRRIGATION ADJUSTMENTS WILL BE CONSIDERED SUBSIDIARY TO THE ROW PREP ITEM.

0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER
8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

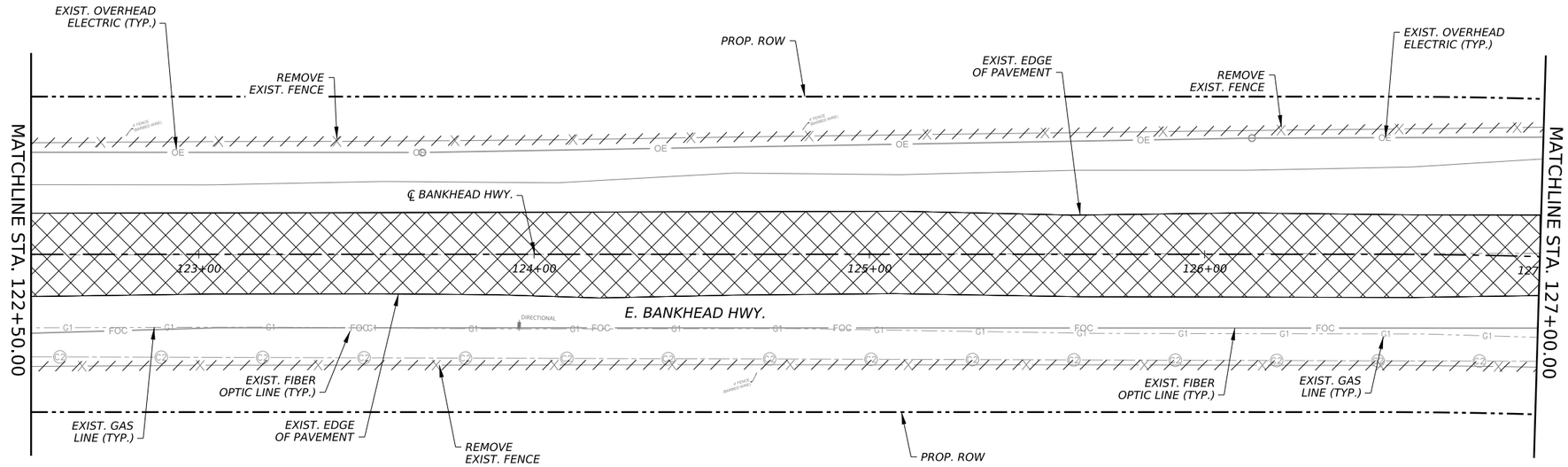
REMOVAL PLAN FROM STA. 113+50 TO STA. 122+50

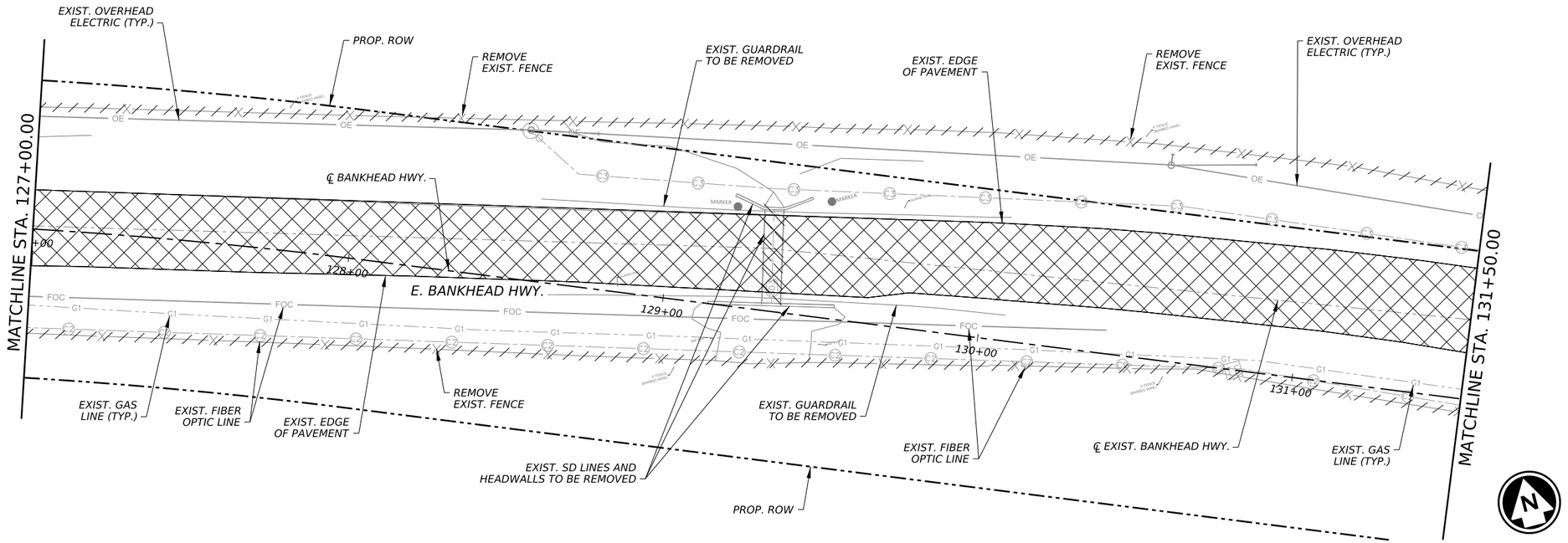
SHEET 4 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	49

DATE: 8/27/2026 7:36:19 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_din\56131\54719_22\cv-109-pl-demo13.dgn





LEGEND

- ASPHALT DRIVEWAY & PAVEMENT REMOVAL
- CONC DRIVEWAY, SIDEWALK & PAVEMENT REMOVAL
- GRAVEL DRIVEWAY & PAVEMENT REMOVAL
- FENCE / PIPE REMOVAL

NOTES:

1. CONTRACTOR SHALL CONTACT 811 AT LEAST 48 HOURS PRIOR TO BEGINNING REMOVAL OF ANY MATERIALS ON THE PROJECT.

2. REMOVAL OF EXISTING ELEMENTS TO COMPLETE PROPOSED ACTIONS ARE SUBSIDIARY TO REMOVAL BID ITEM, UNLESS NOTED OTHERWISE.

3. ONLY THE TREES MARKED FOR REMOVAL SHALL BE CONSIDERED FOR REMOVAL. EVERY EFFORT SHALL BE MADE BY THIS CONTRACTOR TO PRESERVE AS MANY TREES AS POSSIBLE. ENGINEER SHALL BE NOTIFIED PRIOR TO REMOVAL OF TREE MARKED BY CONTRACTOR FOR VERIFICATION.

4. CONTRACTORS SHALL PROTECT EXISTING FENCES, UNLESS OTHERWISE NOTED.

5. ALL REQUIRED FRANCHISE UTILITY ADJUSTMENTS AND RELOCATIONS BY OTHERS ARE SHOWN ON THE EXISTING UTILITY PLAN SHEETS.

6. ANY IRRIGATION ADJUSTMENTS WILL BE CONSIDERED SUBSIDIARY TO THE ROW PREP ITEM.

0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

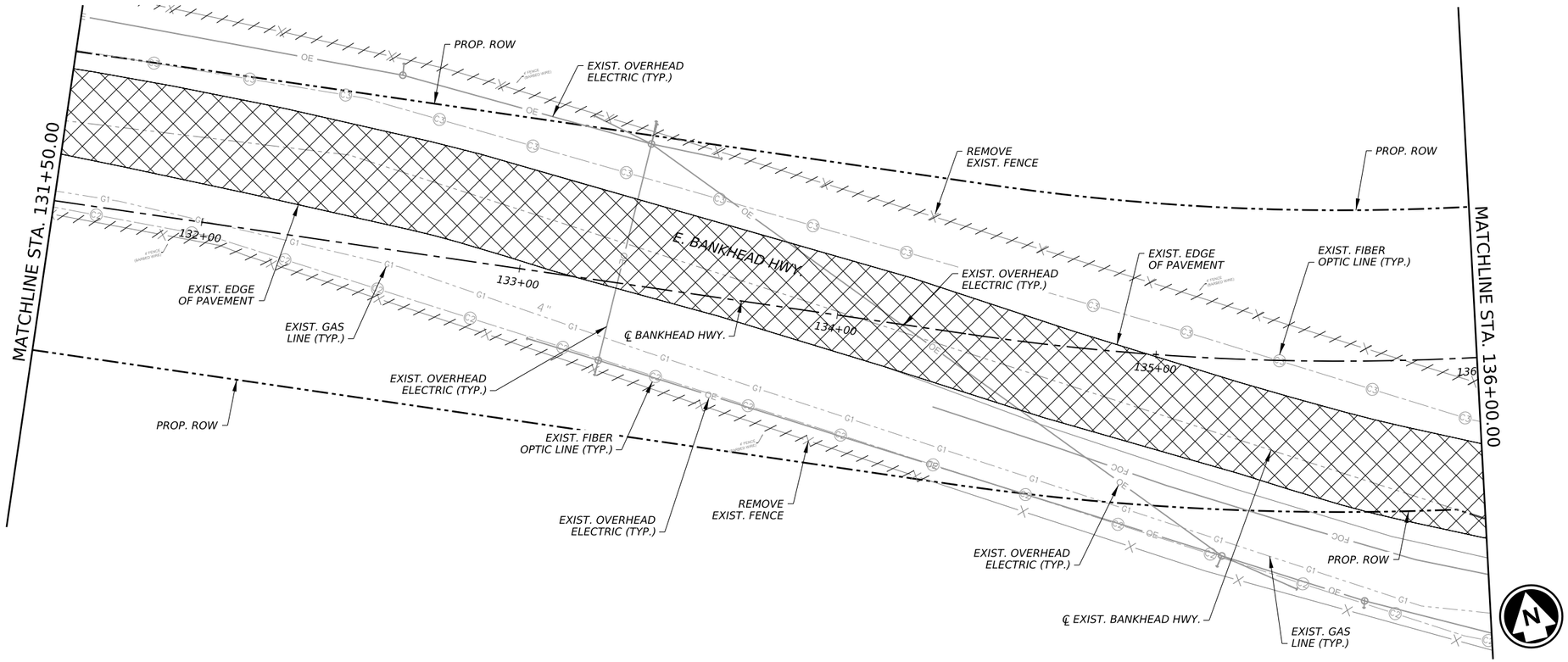
REMOVAL PLAN FROM STA. 122+50 TO STA. 131+50

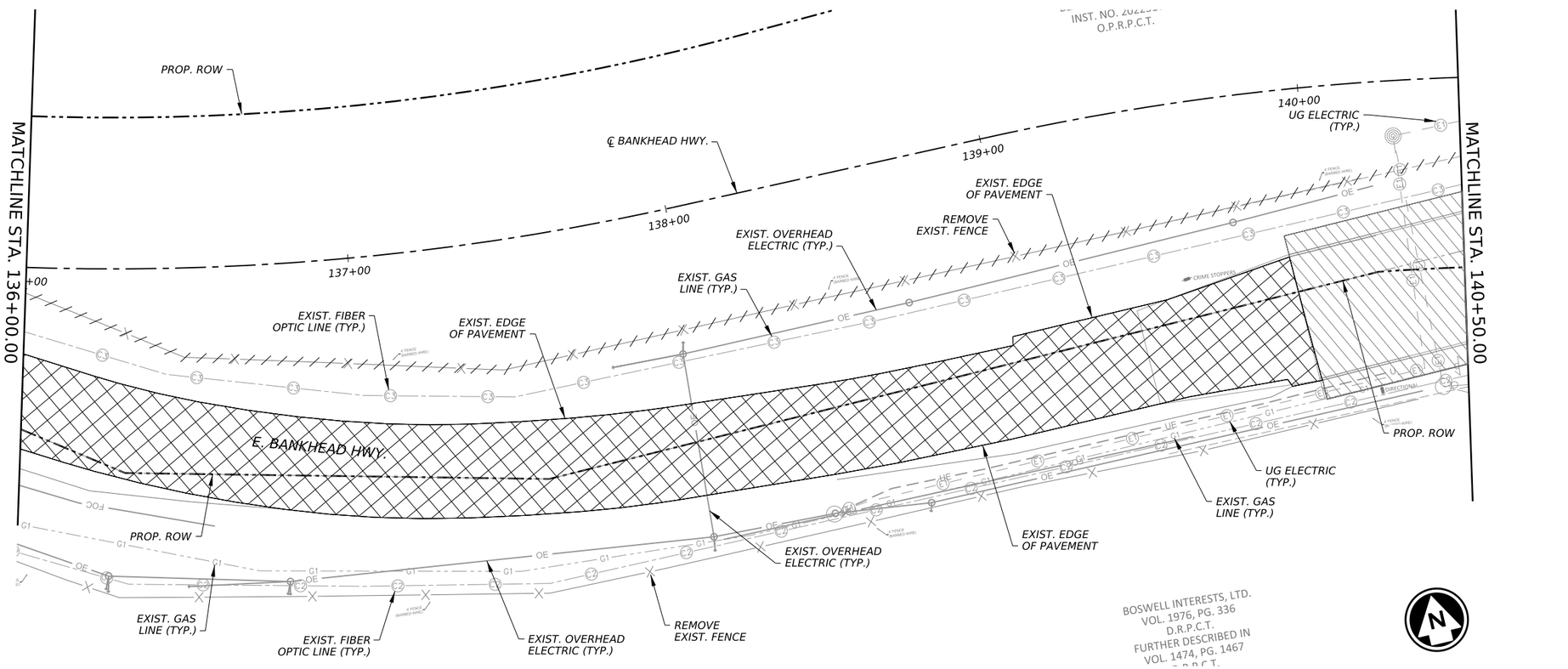
SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	50

DATE: 8/27/2026 7:38:52 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5613\54719_23\cv-109-pl-demo14.dgn





LEGEND

- ASPHALT DRIVEWAY & PAVEMENT REMOVAL
- CONC DRIVEWAY, SIDEWALK & PAVEMENT REMOVAL
- GRAVEL DRIVEWAY & PAVEMENT REMOVAL
- FENCE / PIPE REMOVAL

NOTES:

1. CONTRACTOR SHALL CONTACT 811 AT LEAST 48 HOURS PRIOR TO BEGINNING REMOVAL OF ANY MATERIALS ON THE PROJECT.
2. REMOVAL OF EXISTING ELEMENTS TO COMPLETE PROPOSED ACTIONS ARE SUBSIDIARY TO REMOVAL BID ITEM, UNLESS NOTED OTHERWISE.
3. ONLY THE TREES MARKED FOR REMOVAL SHALL BE CONSIDERED FOR REMOVAL. EVERY EFFORT SHALL BE MADE BY THIS CONTRACTOR TO PRESERVE AS MANY TREES AS POSSIBLE. ENGINEER SHALL BE NOTIFIED PRIOR TO REMOVAL OF TREE MARKED BY CONTRACTOR FOR VERIFICATION.
4. CONTRACTORS SHALL PROTECT EXISTING FENCES, UNLESS OTHERWISE NOTED.
5. ALL REQUIRED FRANCHISE UTILITY ADJUSTMENTS AND RELOCATIONS BY OTHERS ARE SHOWN ON THE EXISTING UTILITY PLAN SHEETS.
6. ANY IRRIGATION ADJUSTMENTS WILL BE CONSIDERED SUBSIDIARY TO THE ROW PREP ITEM.

0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

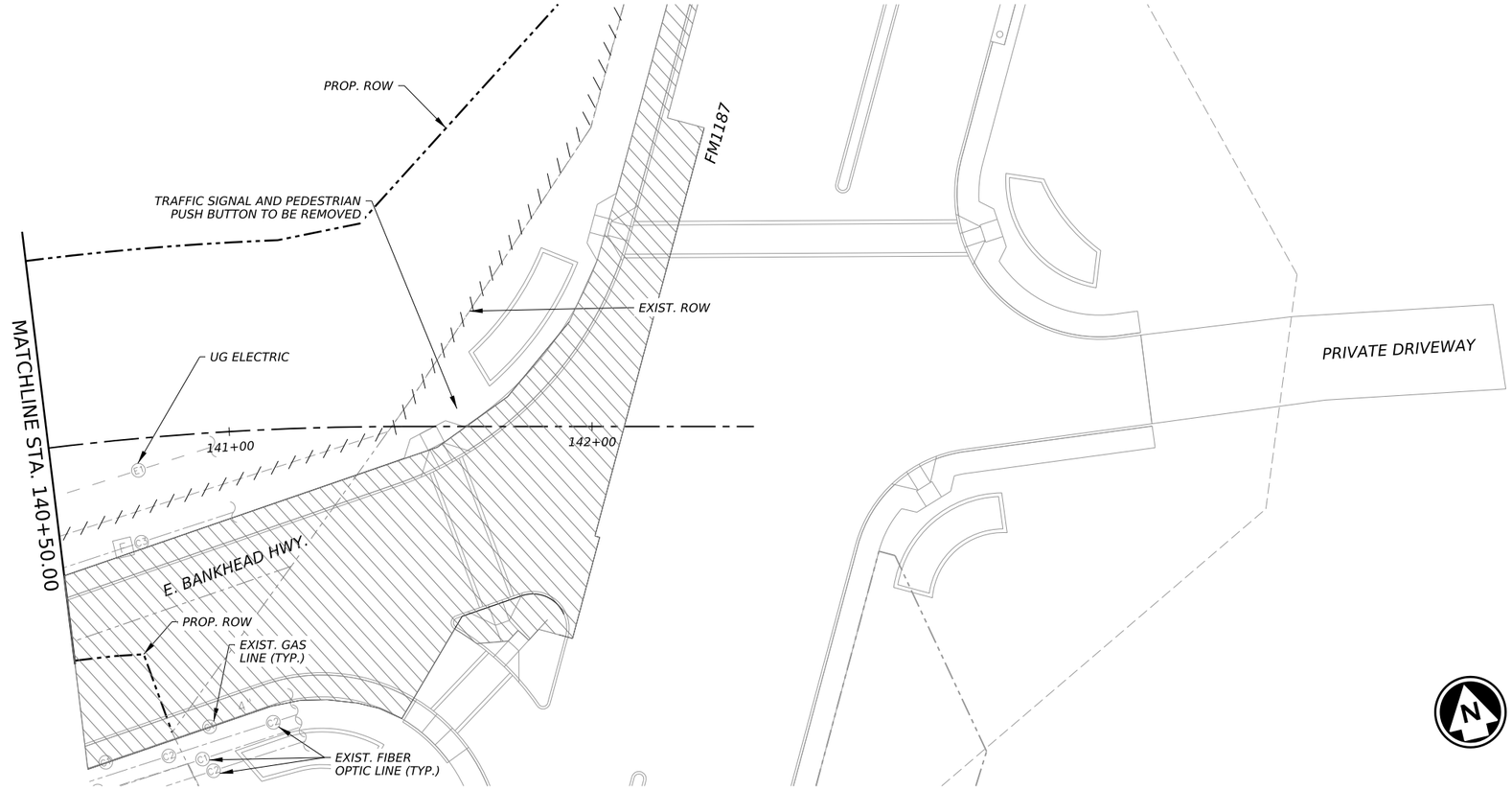
REMOVAL PLAN FROM STA. 131+50 TO STA. 140+50

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	51

DATE: 8/27/2026 7:39:55 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\56131\54719_24icv-109-pl-demo15.dgn



LEGEND

- ASPHALT DRIVEWAY & PAVEMENT REMOVAL
- CONC DRIVEWAY, SIDEWALK & PAVEMENT REMOVAL
- GRAVEL DRIVEWAY & PAVEMENT REMOVAL
- FENCE / PIPE REMOVAL

NOTES:

1. CONTRACTOR SHALL CONTACT 811 AT LEAST 48 HOURS PRIOR TO BEGINNING REMOVAL OF ANY MATERIALS ON THE PROJECT.

2. REMOVAL OF EXISTING ELEMENTS TO COMPLETE PROPOSED ACTIONS ARE SUBSIDIARY TO REMOVAL BID ITEM, UNLESS NOTED OTHERWISE.

3. ONLY THE TREES MARKED FOR REMOVAL SHALL BE CONSIDERED FOR REMOVAL. EVERY EFFORT SHALL BE MADE BY THIS CONTRACTOR TO PRESERVE AS MANY TREES AS POSSIBLE. ENGINEER SHALL BE NOTIFIED PRIOR TO REMOVAL OF TREE MARKED BY CONTRACTOR FOR VERIFICATION.

4. CONTRACTORS SHALL PROTECT EXISTING FENCES, UNLESS OTHERWISE NOTED.

5. ALL REQUIRED FRANCHISE UTILITY ADJUSTMENTS AND RELOCATIONS BY OTHERS ARE SHOWN ON THE EXISTING UTILITY PLAN SHEETS.

6. ANY IRRIGATION ADJUSTMENTS WILL BE CONSIDERED SUBSIDIARY TO THE ROW PREP ITEM.

0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

REMOVAL PLAN FROM STA. 140+50 TO END

SHEET 7 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	52

DATE: 8/27/2026 7:38:23 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\5613154719_25lcv-109-pl-demo16.dgn

#	STATION	OFFSET
1	94+26.21	8.67' LT
2	94+26.21	19.13' RT
3	95+05.99	14.03' LT

LEGEND

- CONCRETE PAVEMENT
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- CONCRETE DRIVEWAY
- ASPHALT DRIVEWAY
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

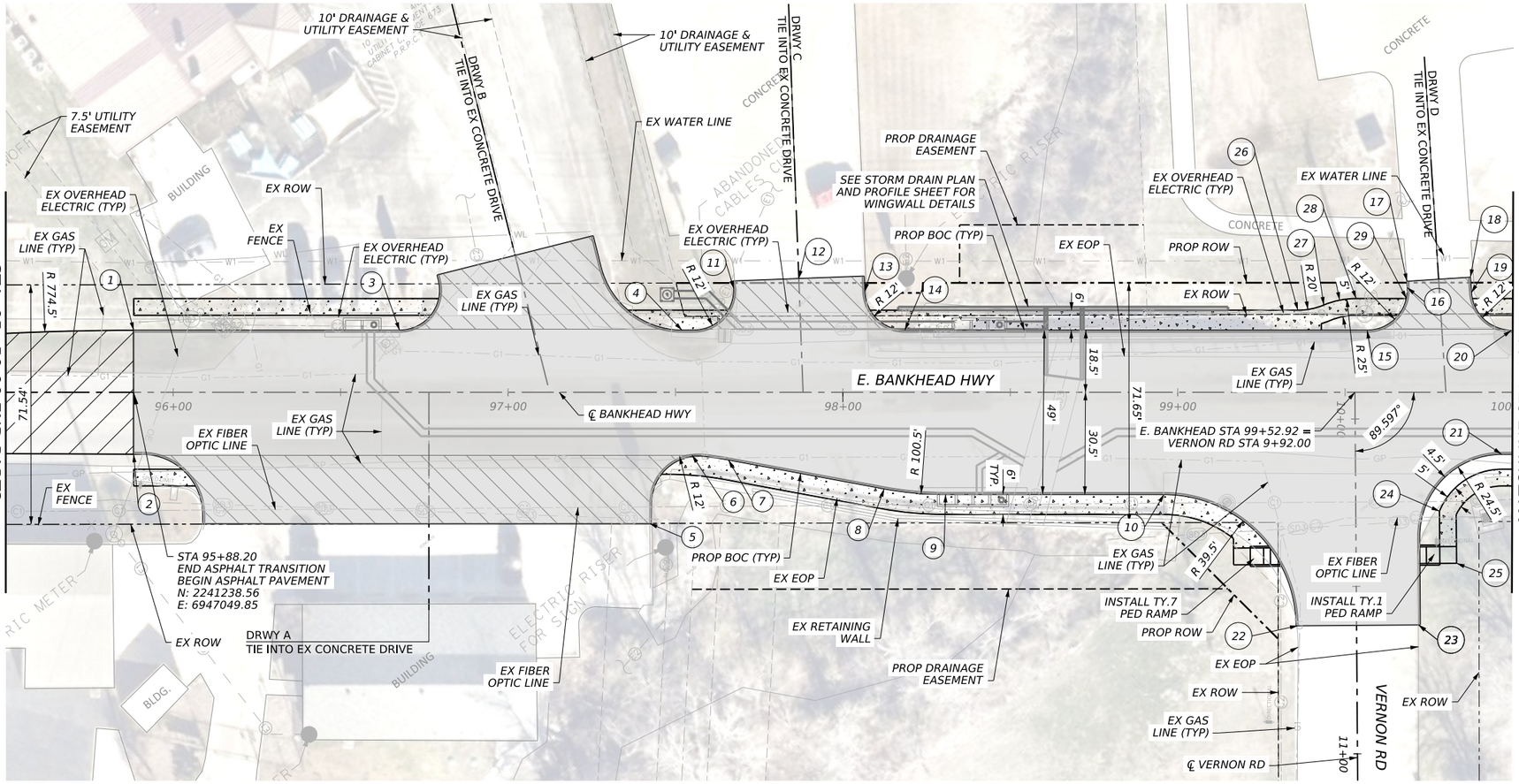
ROADWAY PLAN AND PROFILE FROM STA. 91+00 TO STA. 95+50

SHEET 1 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	53

DATE: 8/27/2026 7:42:36 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\5613\54709_24\cv-109-pp-road19-INTERIM.dgn



LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

#	STATION	OFFSET
1	95+88.20	18.50' LT
2	95+88.20	18.50' RT
3	96+67.62	18.50' LT
4	97+51.99	18.50' LT
5	97+42.23	39.17' RT
6	97+54.97	18.77' RT
7	97+65.81	20.17' RT
8	98+12.36	28.81' RT
9	98+30.70	30.50' RT
10	98+95.92	30.50' RT
11	97+67.44	30.95' LT
12	97+86.84	33.93' LT
13	98+06.50	30.05' LT
14	98+18.49	18.50' LT
15	99+56.59	18.50' LT
16	99+68.56	31.27' LT
17	99+68.44	33.10' LT
18	99+87.41	34.32' LT
19	99+87.70	29.73' LT
20	99+99.59	18.50' LT
21	99+96.73	18.50' RT
22	99+35.41	69.73' RT
23	99+72.41	69.47' RT
24	99+78.17	35.53' RT
25	99+83.28	18.50' RT
26	99+35.88	24.50' LT
27	99+43.62	26.06' LT
28	99+53.28	28.00' LT
29	99+68.32	28.00' LT

PROFILE LEGEND

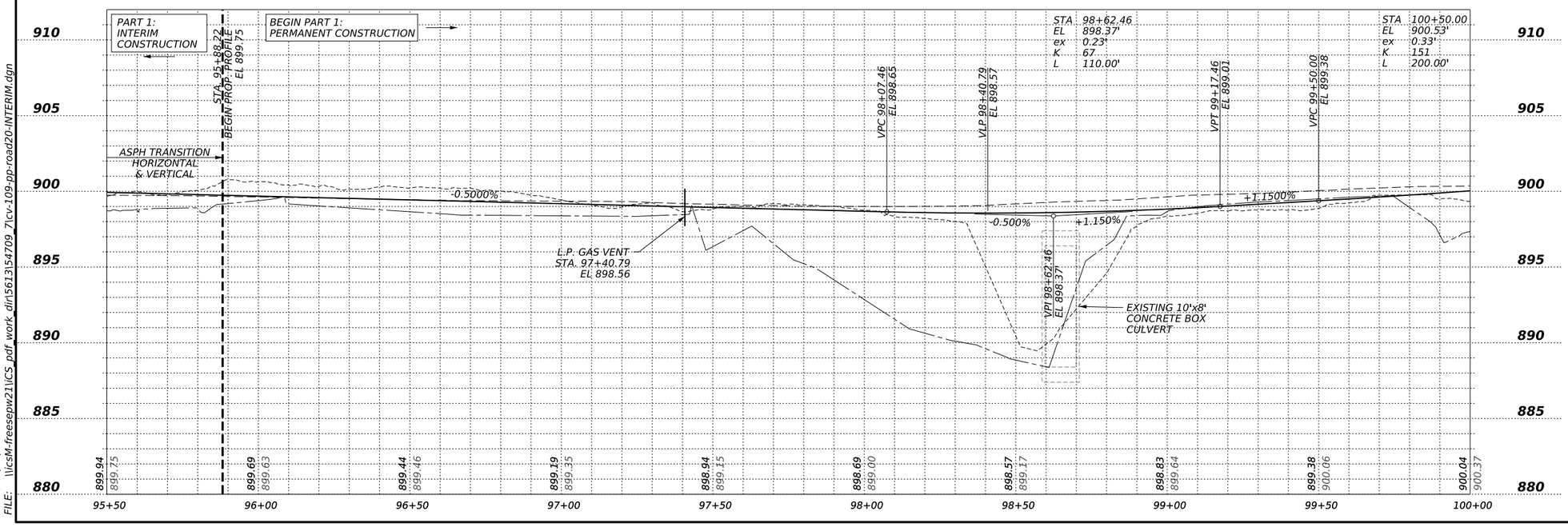
- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET



STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 95+50 TO STA. 100+00

SHEET 2 OF 12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		54

DATE: 8/27/2026 7:39:06 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\5613154709_7\cv-109-pp-road20-INTERIM.dgn

#	STATION	OFFSET
1	101+29.49	18.50' RT
2	101+41.48	30.00' RT
3	101+42.09	44.56' RT
4	101+78.26	43.05' RT
5	101+72.65	33.38' RT
6	101+72.55	31.00' RT
7	101+84.54	18.50' RT
8	102+28.86	18.50' RT
9	103+02.35	30.50' RT
10	101+67.69	105.93' RT
11	104+17.99	18.50' LT

LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET
0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

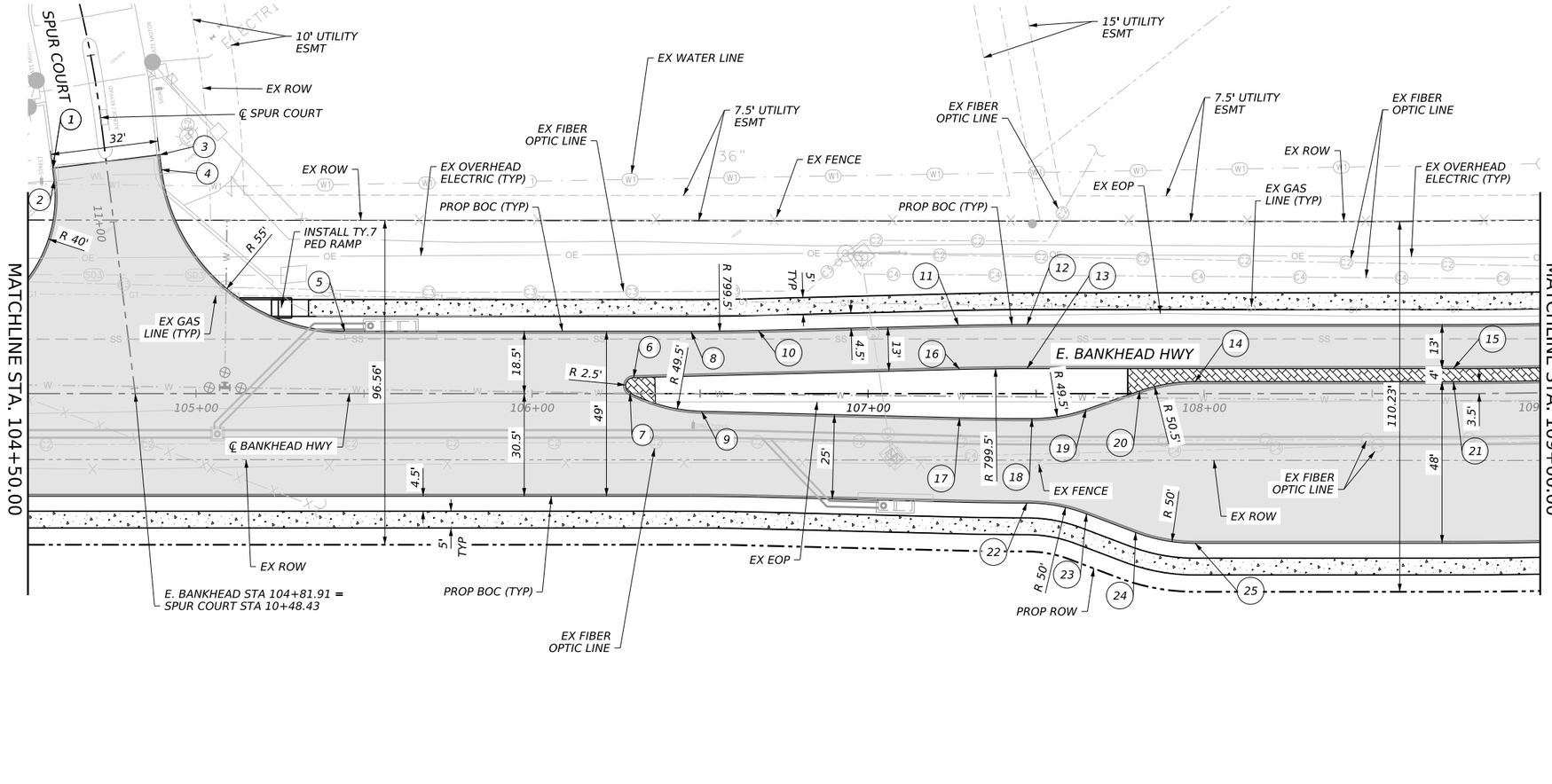
ROADWAY PLAN AND PROFILE FROM STA. 100+00 TO STA. 104+50

SHEET 3 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	55

DATE: 8/27/2026 7:39:11 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5613154709_8\cv-109-pp-road21.dgn



#	STATION	OFFSET
1	104+57.36	67.08' LT
2	104+57.84	63.47' LT
3	104+89.14	71.05' LT
4	104+89.69	66.67' LT
5	105+44.27	18.50' LT
6	106+30.23	4.82' LT
7	106+29.16	0.09' LT
8	106+47.30	18.50' LT
9	106+50.45	5.32' RT
10	106+67.33	18.75' LT
11	107+26.94	20.25' LT
12	107+47.30	20.50' LT
13	107+47.30	7.50' LT
14	107+97.30	3.50' LT
15	108+74.18	7.50' LT
16	107+27.27	7.25' LT
17	107+27.21	7.25' RT
18	107+48.76	7.50' RT
19	107+64.84	4.79' RT
20	107+80.81	0.73' LT
21	108+74.18	3.50' LT
22	107+47.30	32.50' RT
23	107+64.99	35.74' RT
24	107+79.60	41.26' RT
25	107+97.30	44.50' RT

LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

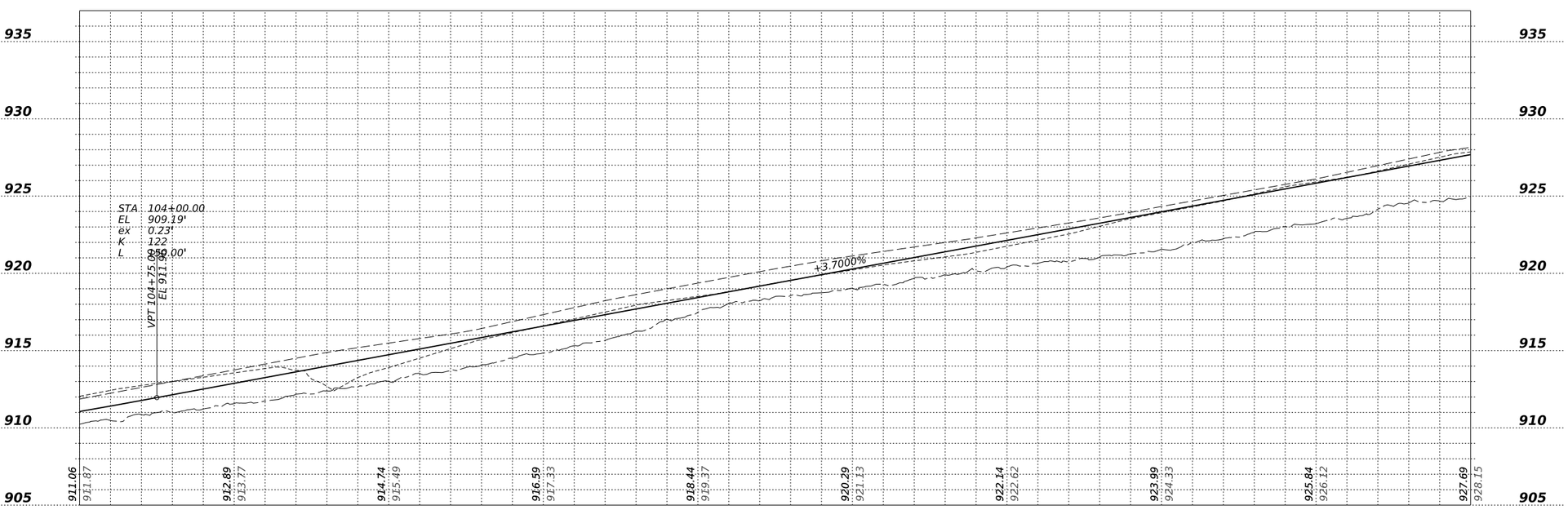
1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 — EXISTING GRADE
- 913.43 — PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET



STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 104+50 TO STA. 109+00

SHEET 4 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	56

DATE: 8/27/2026 7:39:40 PM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\56131541709_9\cv-109-pp-road22.dgn

#	STATION	OFFSET
1	111+02.61	20.50' LT
2	111+14.21	5.50' LT
3	112+29.95	20.50' LT
4	110+32.05	44.50' RT
5	110+88.99	52.51' RT
6	110+93.02	53.68' RT
7	111+30.10	73.47' RT
8	111+42.39	90.51' RT
9	112+22.77	6.00' RT
10	112+16.72	32.50' RT
11	110+96.69	37.03' RT
12	111+43.77	37.00' RT
13	111+44.32	52.52' RT

LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

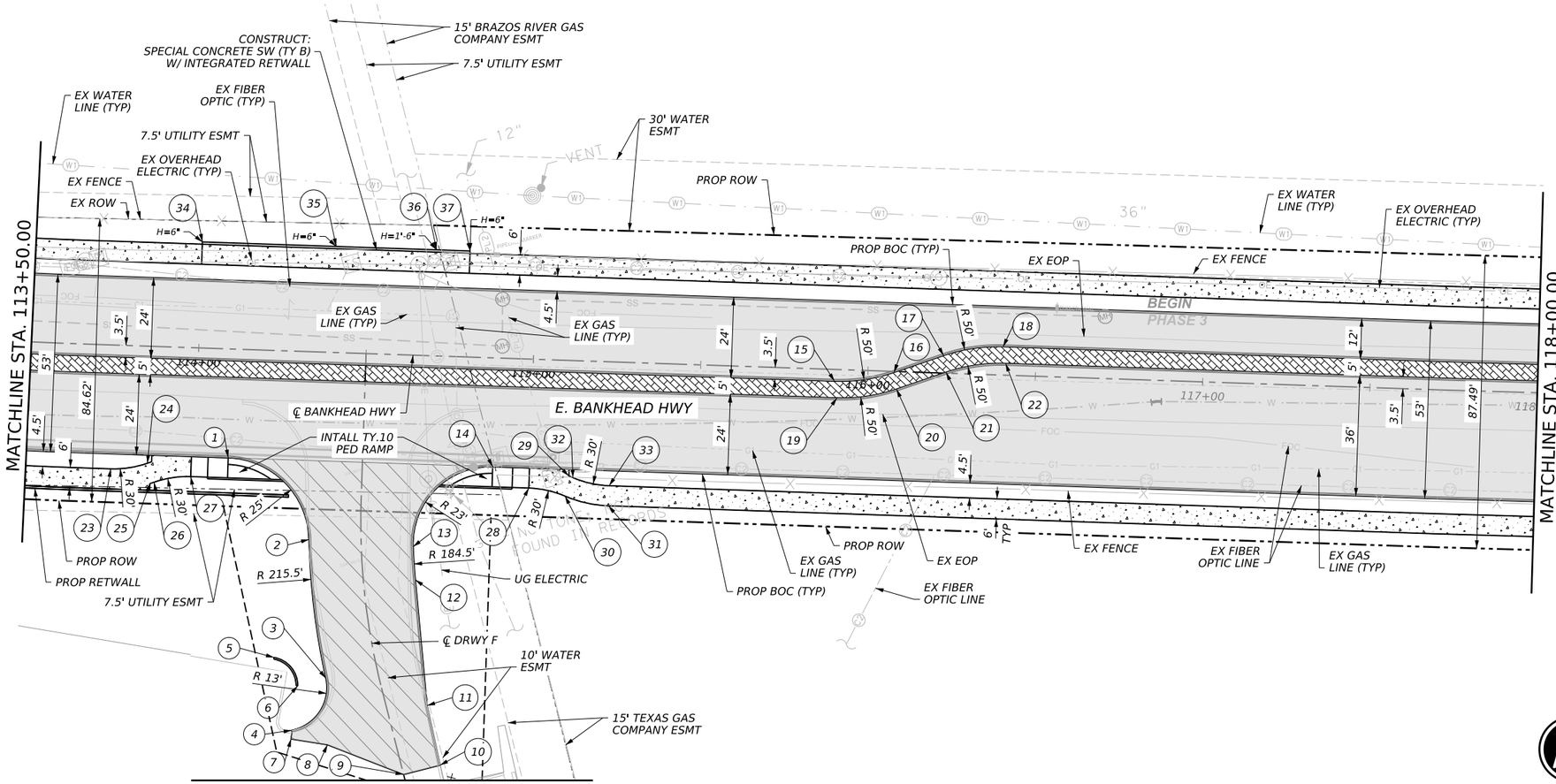
ROADWAY PLAN AND PROFILE FROM STA. 109+00 TO STA. 113+50

SHEET 5 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	57

DATE: 8/27/2026 7:41:52 PM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\56131541709_10\cv-109-pp-road23.dgn



#	STATION	OFFSET
1	114+09.92	32.50' RT
2	114+34.88	56.07' RT
3	114+41.30	97.33' RT
4	114+31.63	113.23 RT
5	114+25.60	91.65' RT
6	114+32.98	99.86' RT
7	114+31.51	115.81' RT
8	114+42.43	117.18' RT
9	114+65.47	125.28' RT
10	114+76.26	122.14' RT
11	114+71.78	104.48' RT
12	114+67.01	67.05' RT
13	114+66.02	57.18' RT
14	114+88.95	32.50' RT
15	115+90.11	3.50' RT
16	116+07.81	0.26' RT
17	116+22.40	5.26' LT
18	116+40.11	8.50' LT
19	115+91.03	8.50' RT
20	116+08.72	5.26' RT
21	116+23.33	0.26' LT
22	116+41.03	3.50' LT
23	113+74.97	37.00' RT
24	113+85.85	34.95' RT
25	113+86.80	41.00' RT
26	113+88.04	40.54' RT
27	113+98.92	38.50' RT
28	114+99.95	38.50' RT
29	115+11.79	34.50' RT
30	115+10.84	40.55' RT
31	115+23.91	43.00' RT
32	115+13.02	34.95' RT
33	115+23.91	37.00' RT
34	114+00.02	36.34' LT
35	114+40.02	38.23' LT
36	114+70.02	37.95' LT
37	114+80.02	42.63' LT

LEGEND

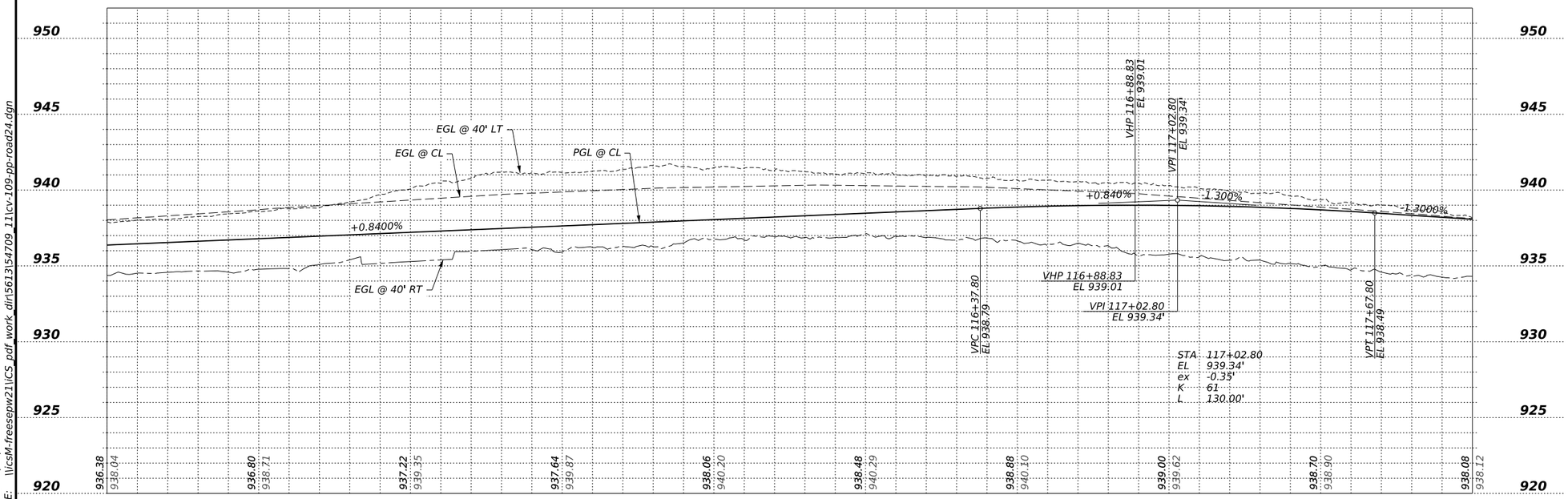
- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 113+50 TO STA. 118+00

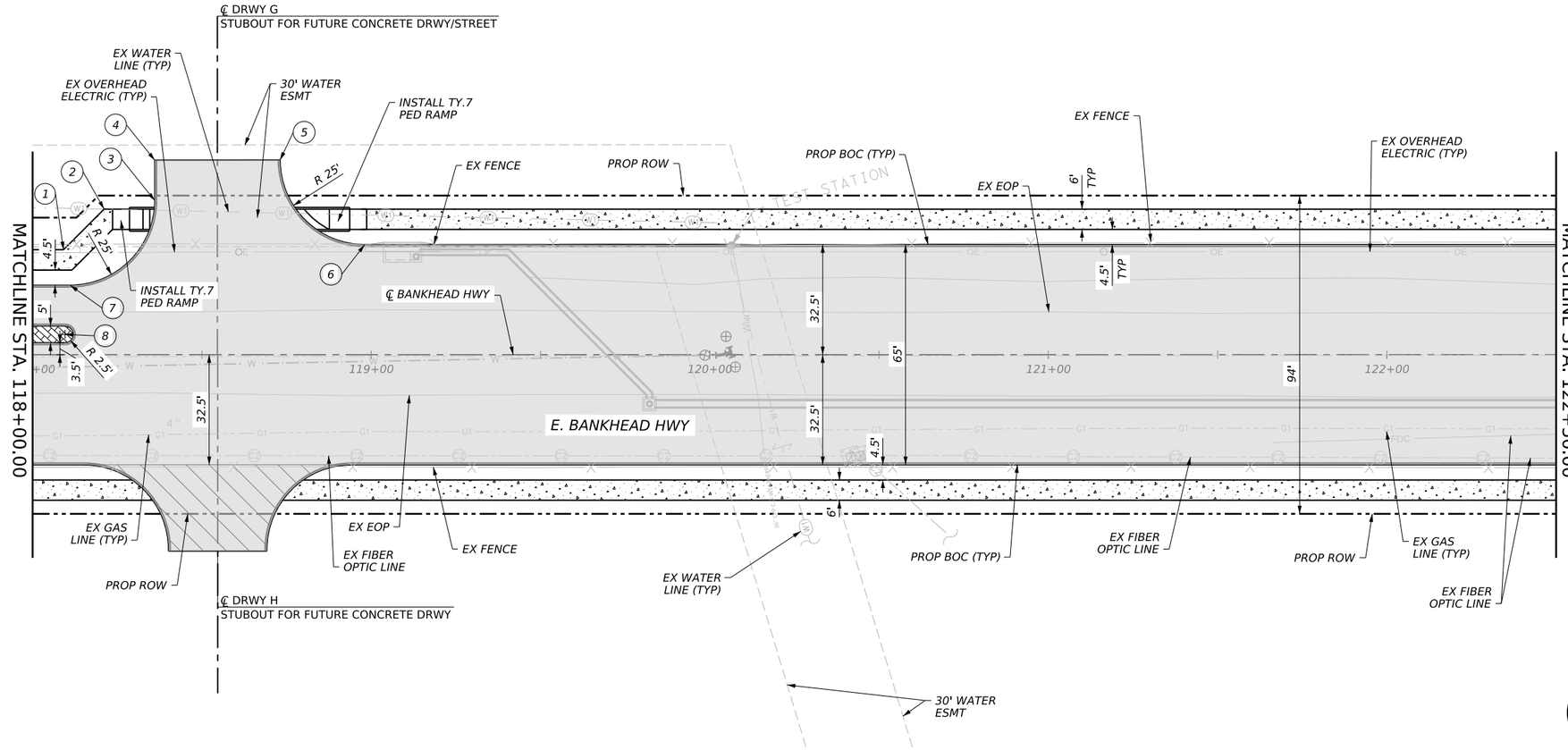
SHEET 6 OF 12

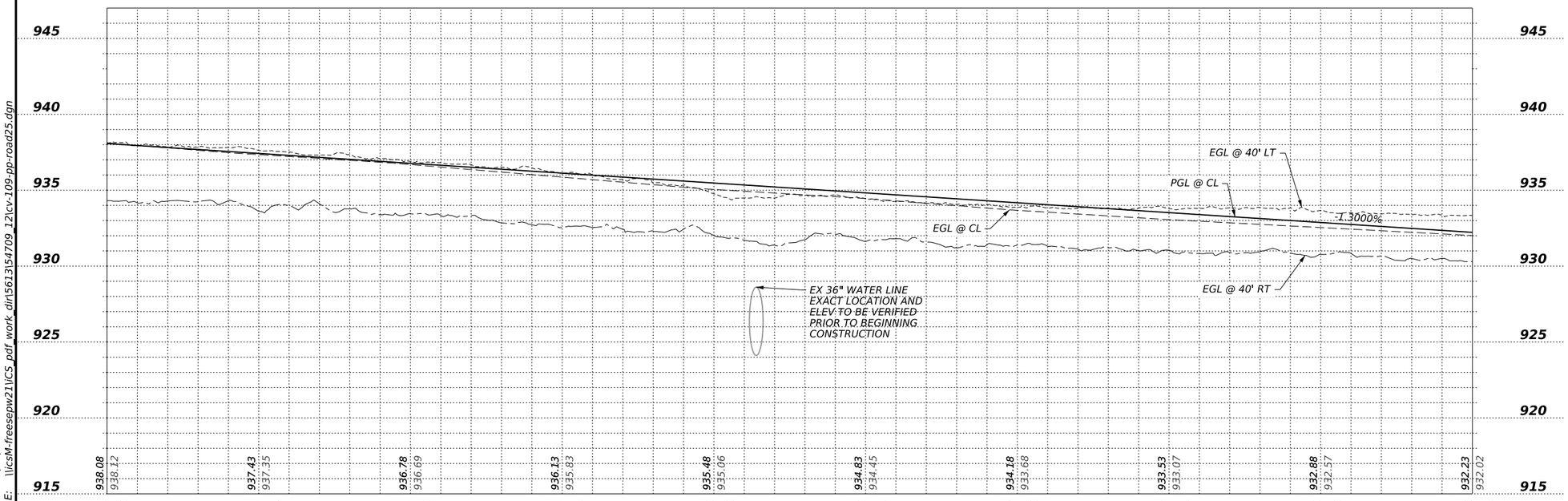
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	58

DATE: 8/27/2026 7:40:13 PM
FILE: \\fcsm-freesepw21\fcs_pdf_work_dir\5613154709_11\cv-109-pp-road24.dgn

#	STATION	OFFSET
1	118+09.11	31.00' LT
2	118+21.11	43.00' LT
3	118+36.09	42.52' LT
4	118+36.09	57.44' LT
5	118+73.08	57.48' LT
6	118+98.08	32.50' LT
7	118+11.09	20.50' LT
8	118+09.58	6.00' LT





LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 118+00 TO STA. 122+50

SHEET 7 OF 12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		59

DATE: 8/27/2026 7:40:27 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_dir\56131547O9_12\cv-109-pp-road25.dgn

#	STATION	OFFSET
1	123+56.17	32.50' RT
2	123+81.17	57.50' RT
3	123+81.17	58.00' RT
4	124+10.17	58.00' RT
5	124+10.17	57.50' RT
6	124+35.17	32.50' RT
7	125+71.95	32.50' LT
8	125+96.95	57.40' LT
9	125+96.95	57.73' LT
10	126+27.95	57.60' LT
11	126+52.95	32.50' LT

LEGEND

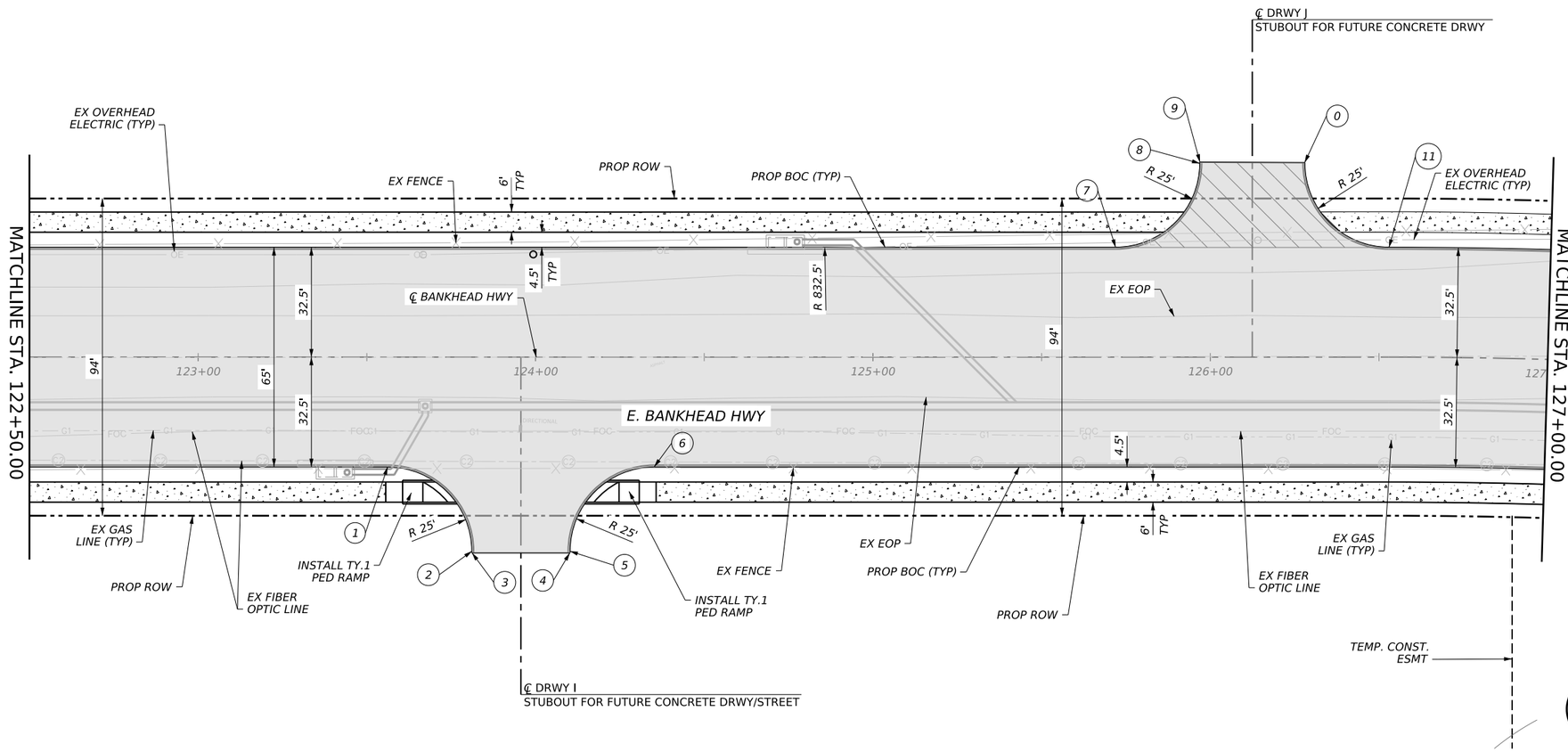
- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

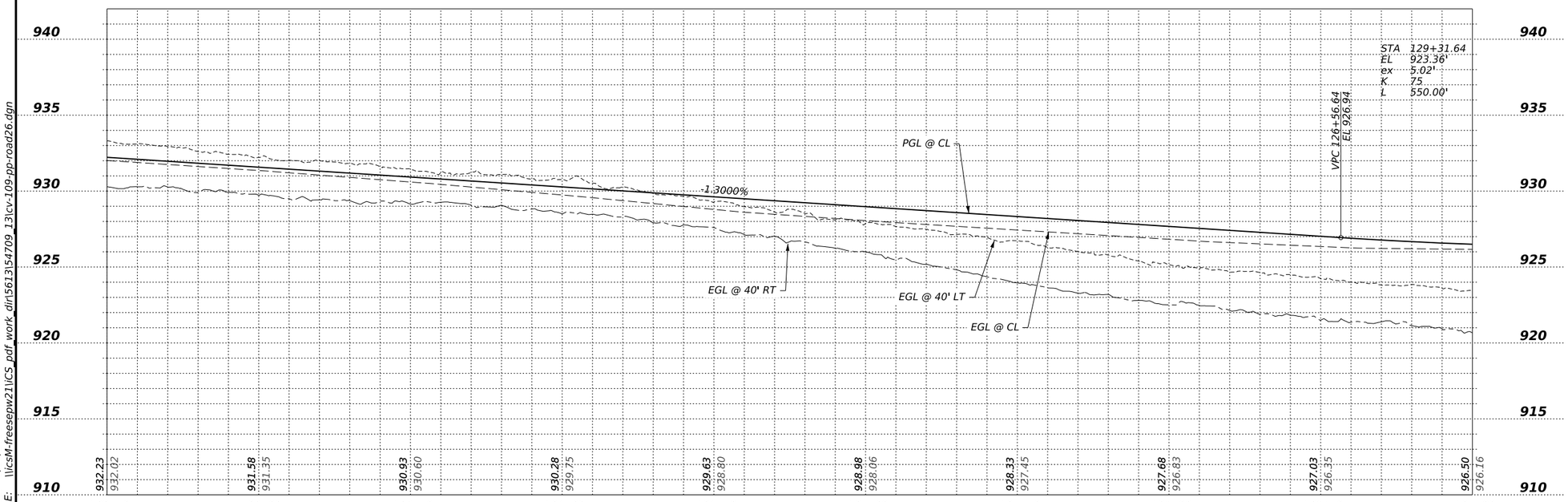
NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE





0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 122+50 TO STA. 127+00

SHEET 8 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	60

DATE: 8/27/2026 8:05:43 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\56131\54709_13\cv-109-pp-road26.dgn

#	STATION	OFFSET
1	128+19.17	0.00' RT
2	129+76.77	8.17' RT
3	129+99.96	6.70' RT
4	130+53.57	1.69' LT
5	130+76.77	3.50' LT

LEGEND

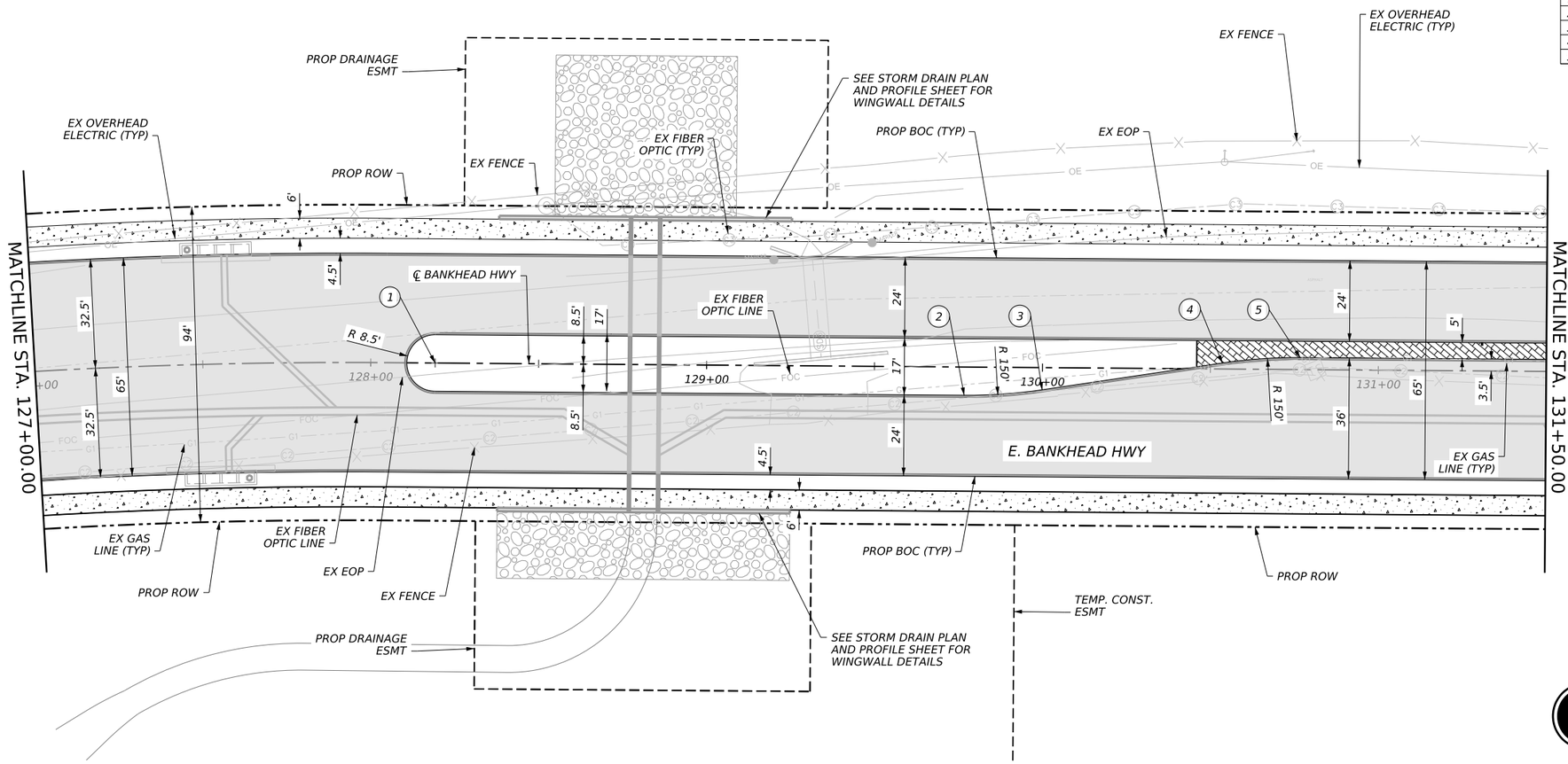
- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

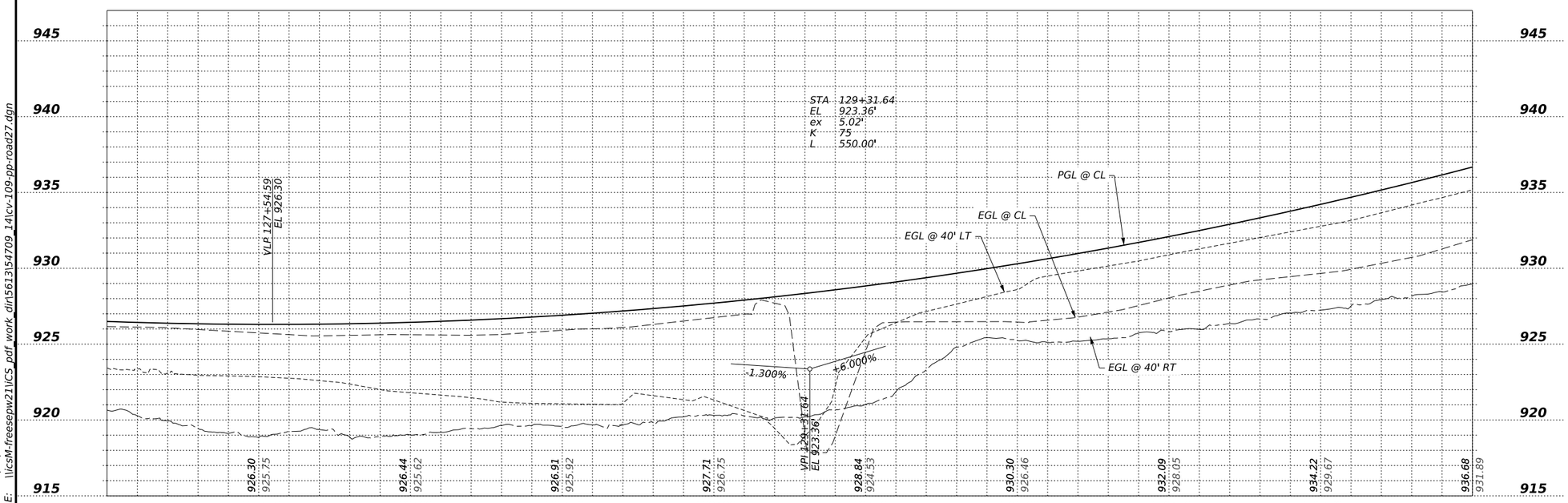
NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE





0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 127+00 TO STA. 131+50

SHEET 9 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	61

DATE: 8/27/2026 7:40:58 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_dir\5613154709_14\cv-109-pp-road27.dgn

#	STATION	OFFSET
1	131+67.61	32.50' LT
2	131+82.61	47.50' LT
3	132+07.61	47.50' LT
4	132+22.61	32.50' LT
5	133+80.37	32.50' LT
6	134+05.37	57.50' LT
7	134+42.46	57.96' LT
8	134+69.40	32.98' LT
9	133+48.77	6.00' LT
10	134+75.54	5.26' RT
11	133+51.77	32.50' RT
12	133+76.77	57.50' RT
13	134+05.77	57.50' RT
14	134+30.77	32.50' RT

LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE

℄ DRWY K
STUBOUT FOR FUTURE CONCRETE DRWY

℄ DRWY M
STUBOUT FOR FUTURE CONCRETE DRWY/STREET

℄ DRWY L
STUBOUT FOR FUTURE CONCRETE DRWY/STREET

MATCHLINE STA. 131+50.00

MATCHLINE STA. 136+00.00

E. BANKHEAD HWY

℄ BANKHEAD HWY

EX FENCE

EX OVERHEAD ELECTRIC (TYP)

INSTALL TY.1 PED RAMP

EX FIBER OPTIC LINE

EX EOP

PROP ROW

PROP BOC (TYP)

EX GAS LINE (TYP)

R 15'

R 25'

R 2.5'

6' TYP

4.5' TYP

5'

24'

94'

65'

36'

3.5'

132+00

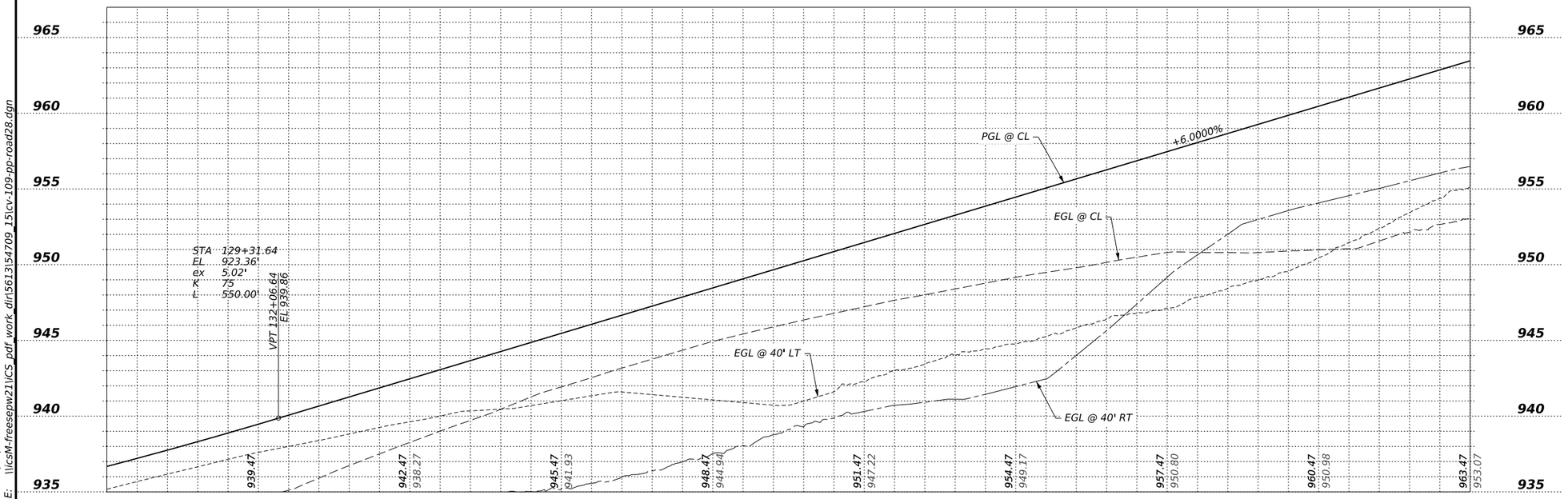
133+00

134+00

135+00

HORIZ. SCALE IN FEET
0 20 40

VERT. SCALE IN FEET
0 4 8



STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

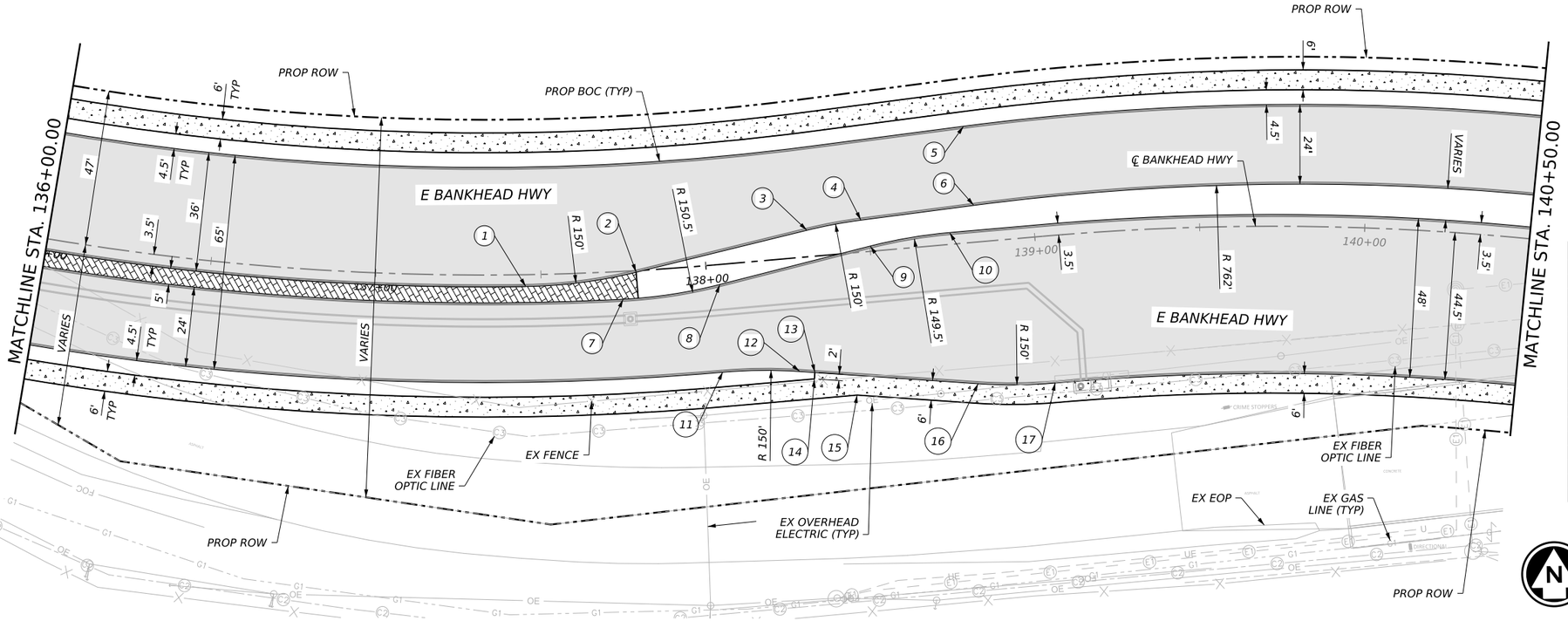
ROADWAY PLAN AND PROFILE FROM STA. 131+50 TO STA. 136+00

SHEET 10 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	62

DATE: 8/27/2026 7:40:14 PM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\56135\54709_15\cv-109-pp-road28.dgn



LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE

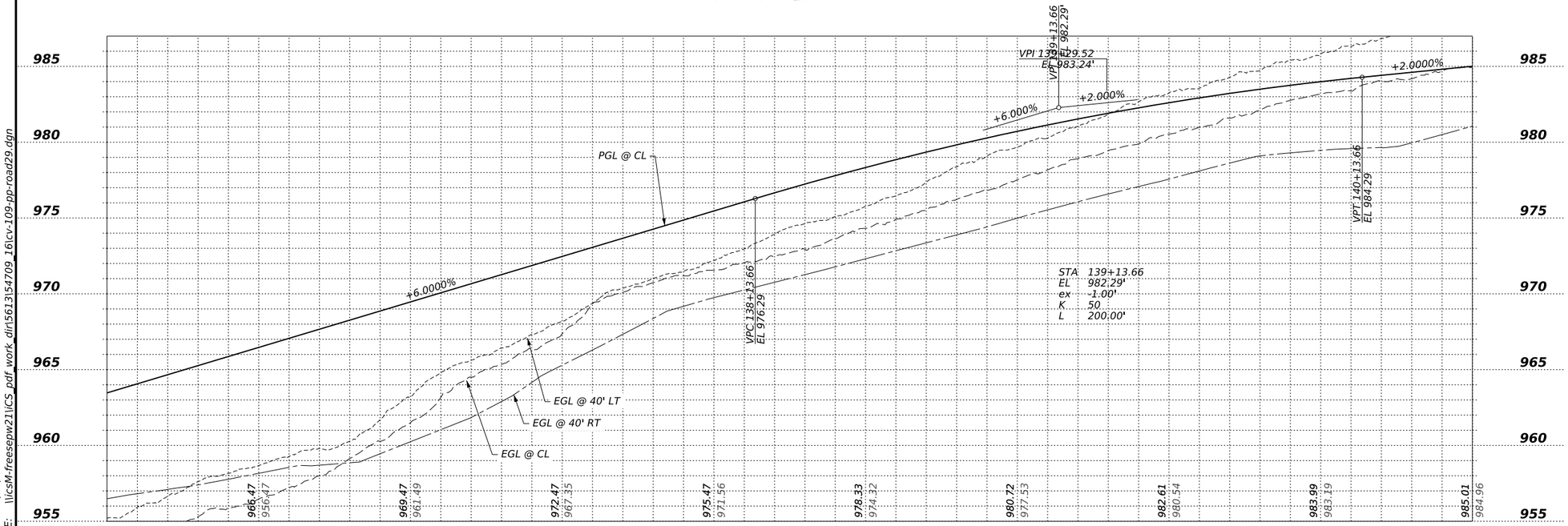
912.14 EXISTING GRADE

913.43 PROPOSED GRADE

#	STATION	OFFSET
1	137+45.32	3.50' RT
2	137+78.81	0.41' RT
3	138+31.39	8.10' LT
4	138+47.95	9.73' LT
5	138+81.36	35.19' LT
6	138+82.39	11.21' LT
7	137+74.44	8.01' RT
8	138+03.71	6.11' RT
9	138+50.11	1.51' LT
10	138+74.44	3.50' LT
11	138+02.31	32.50' RT
12	138+25.52	34.31' RT
13	138+30.10	35.02' RT
14	138+29.79	37.00' RT
15	138+42.25	43.00' RT
16	138+79.07	42.69' RT
17	139+02.31	44.50' RT

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET



STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

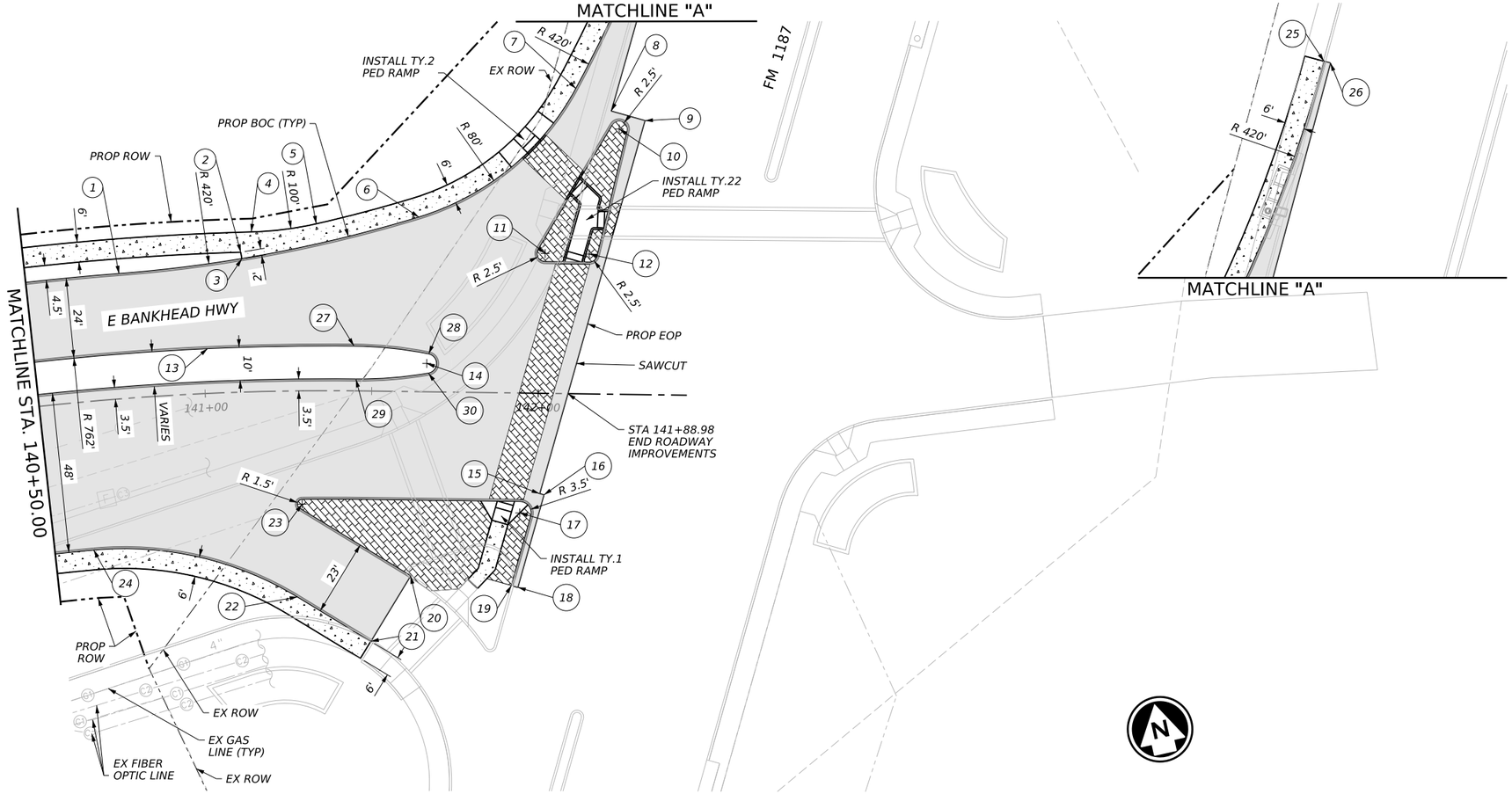
ROADWAY PLAN AND PROFILE FROM STA. 136+00 TO STA. 140+50

SHEET 11 OF 12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	63

DATE: 8/27/2026 8:06:35 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\56131\54709_16\cv-109-pp-road29.dgn



#	STATION	OFFSET
1	140+76.88	37.47' LT
2	141+11.99	42.00' LT
3	141+12.25	40.01' LT
4	141+15.15	47.99' LT
5	141+33.56	50.13' LT
6	141+63.51	52.39' LT
7	142+10.13	91.62' LT
8	142+20.78	84.99' LT
9	142+30.94	82.27' LT
10	142+23.26	79.67' LT
11	141+01.52	42.00' LT
12	141+14.76	42.00' LT
13	141+01.35	12.15' LT
14	141+66.47	8.50' LT
15	141+30.16	30.16' RT
16	141+02.10	30.50' RT
17	141+94.93	36.00' RT
18	141+94.64	58.35' RT
19	141+92.71	57.83' RT
20	141+62.41	55.32' RT
21	141+50.72	75.13' RT
22	141+27.01	61.84' RT
23	141+28.77	34.00' RT
24	140+62.27	44.50' RT
25	142+43.38	177.03' LT
26	142+45.31	176.51' LT
27	141+44.56	13.50' LT
28	141+67.02	11.45' LT
29	141+45.25	3.50' LT
30	141+67.02	5.55' LT

LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

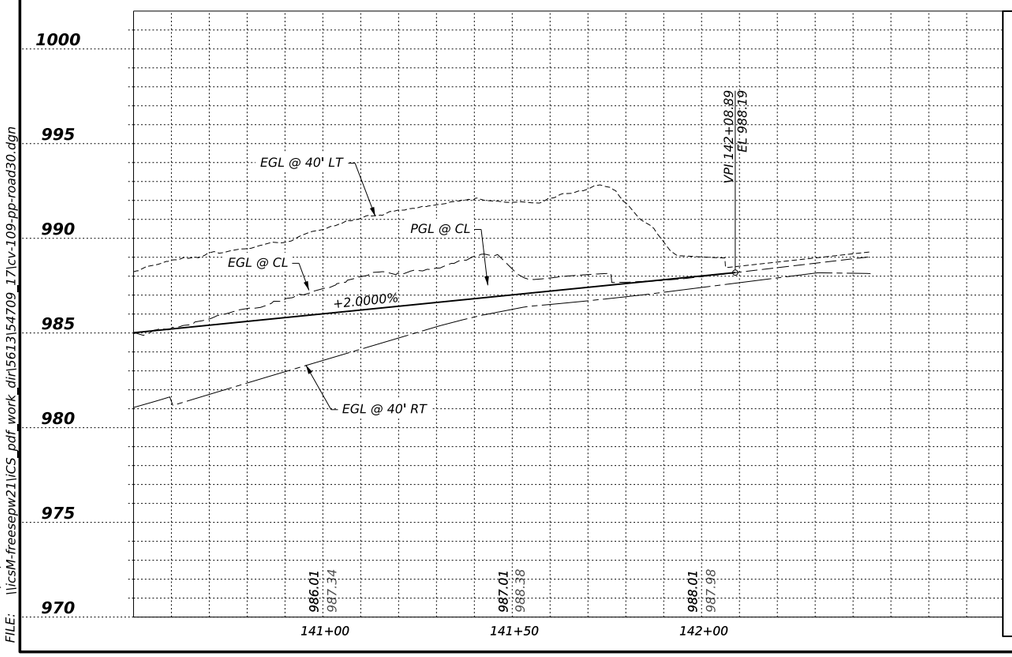
NOTES:

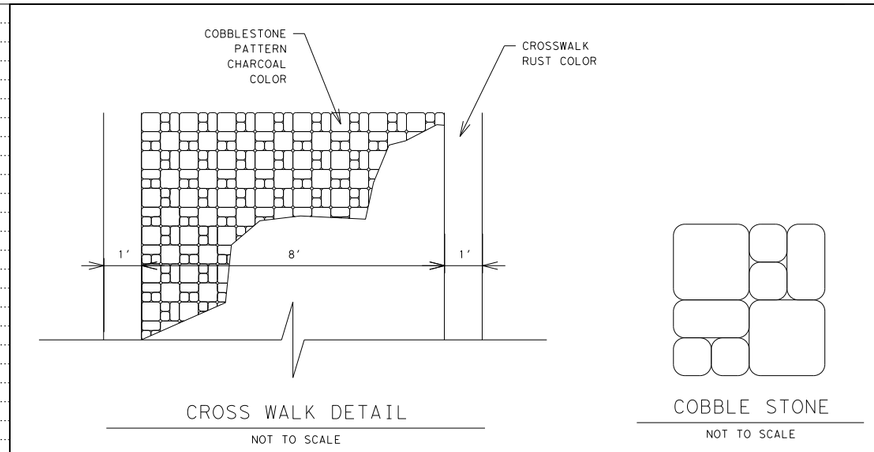
1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET
0 4 8
VERT. SCALE IN FEET





CROSS WALK NOTES

1) CROSS WALK PATTERS AND STAIN ARE TO BE APPLIED TO THE CONCRETE PAVEMENT IN ACCORDANCE WITH ITEM 427, "SURFACE FINISHES FOR CONCRETE", AND ITEM 528, "COLORED TEXTURED CONCRETE AND LANDSCAPE PAVERS" AT THE LOCATIONS SHOWN ON THE PLANS.

2) CONTRACTOR SHALL SUBMIT COLOR SAMPLES FOR APPROVAL BY THE ENGINEER OF RECORD.

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

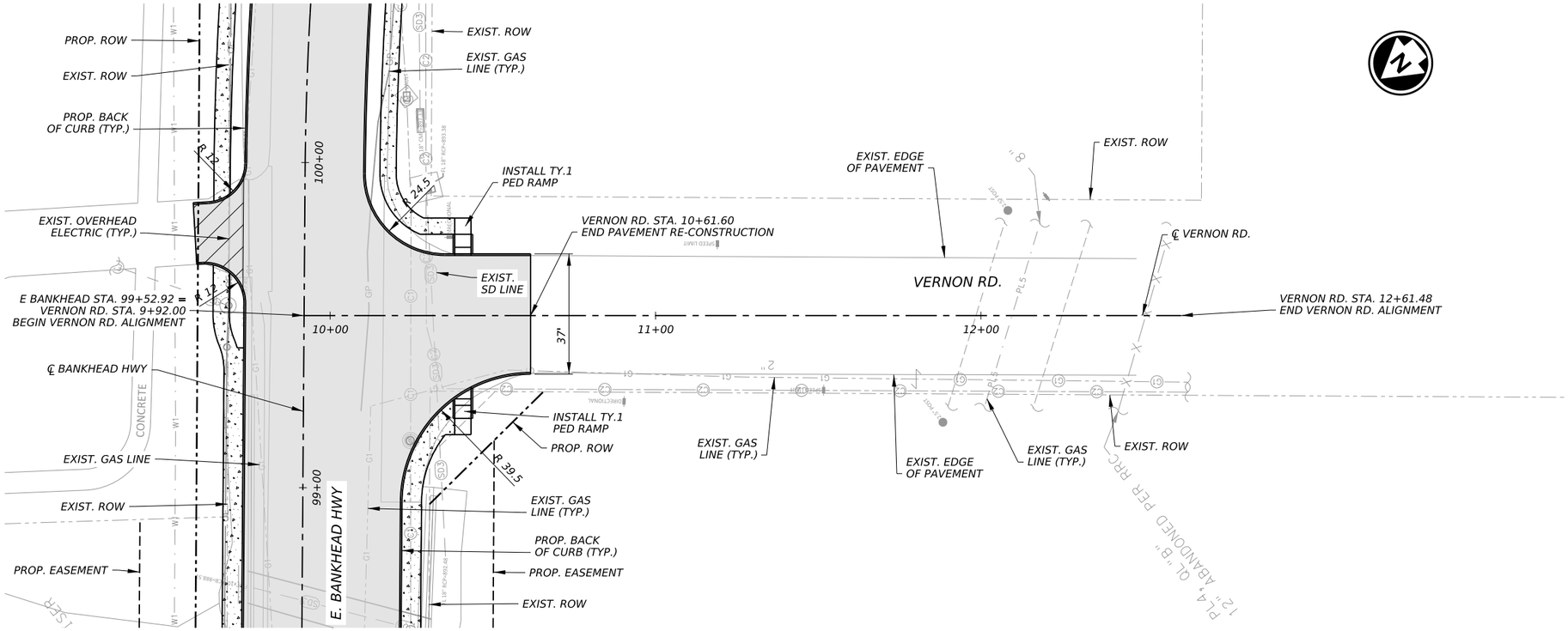
E BANKHEAD HWY PART 1

ROADWAY PLAN AND PROFILE FROM STA. 140+50 TO END

SHEET 12 OF 12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		64

DATE: 8/27/2026 7:42:35 PM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\5613\54709_17\cv-109-pp-road30.dgn



LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

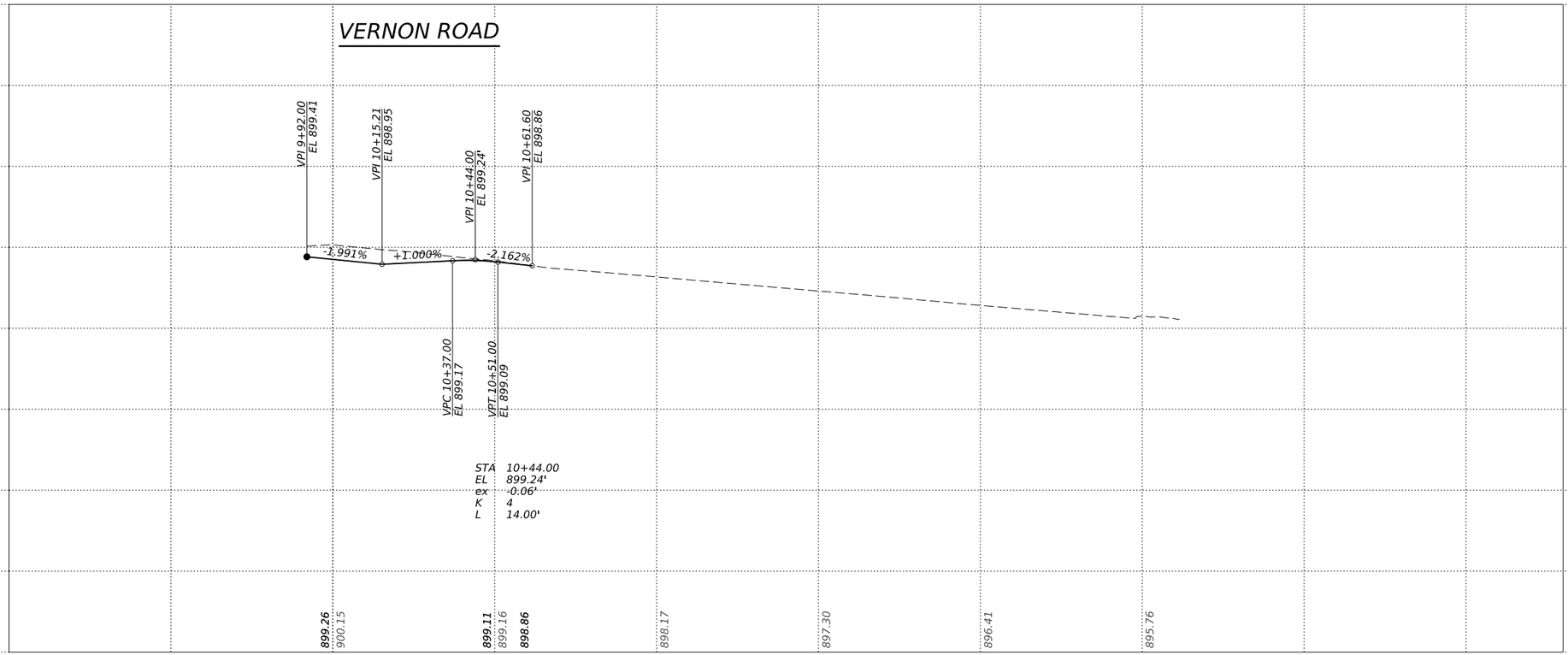
1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

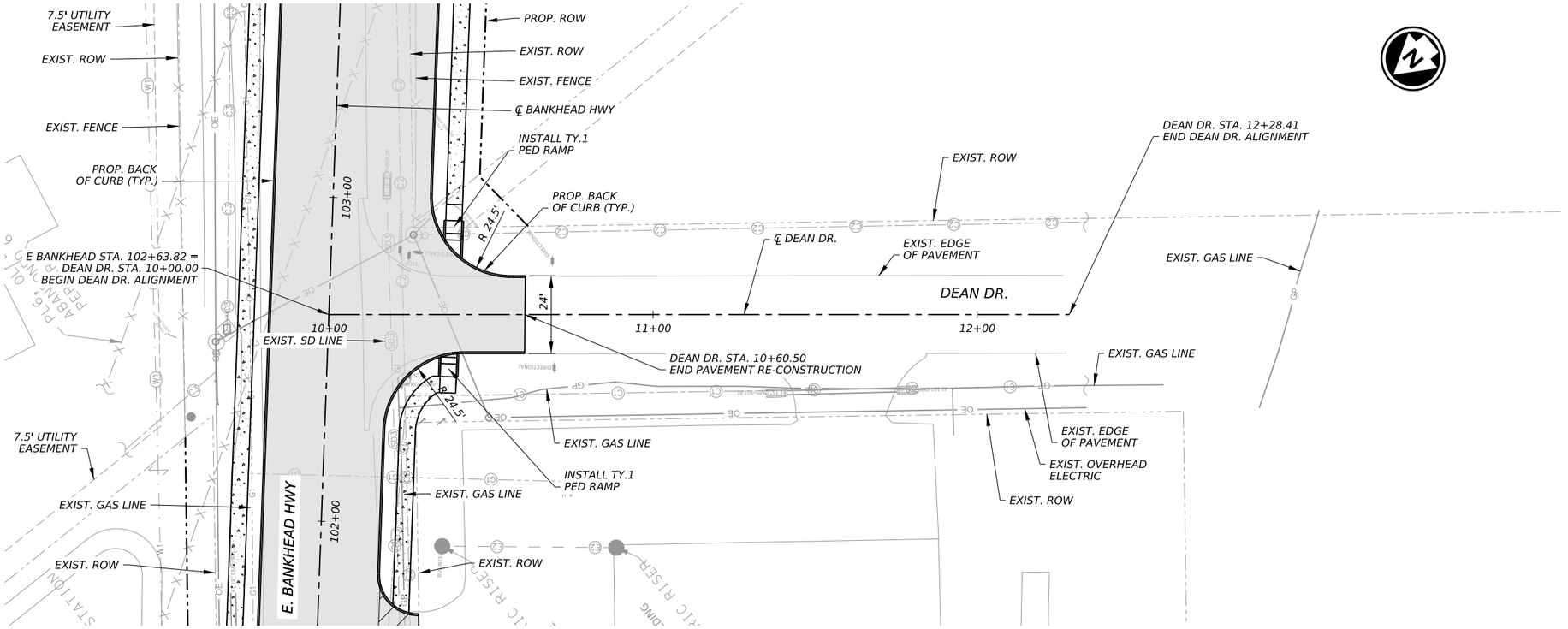
ROADWAY PLAN AND PROFILE VERNON ROAD

2025 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	65

DATE: 8/27/2026 7:41:36 PM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\56131\54709_20\cv-109-pp-Vernon-01.dgn



LEGEND

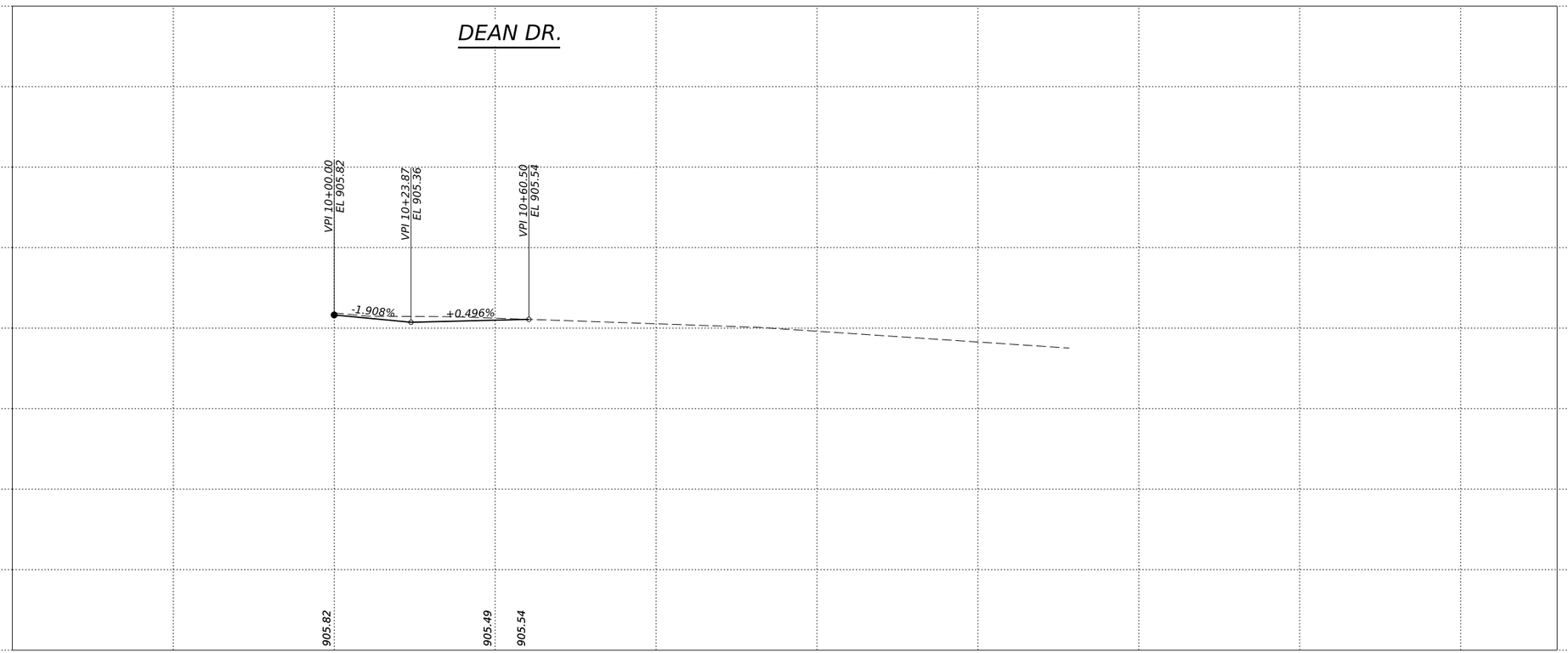
- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

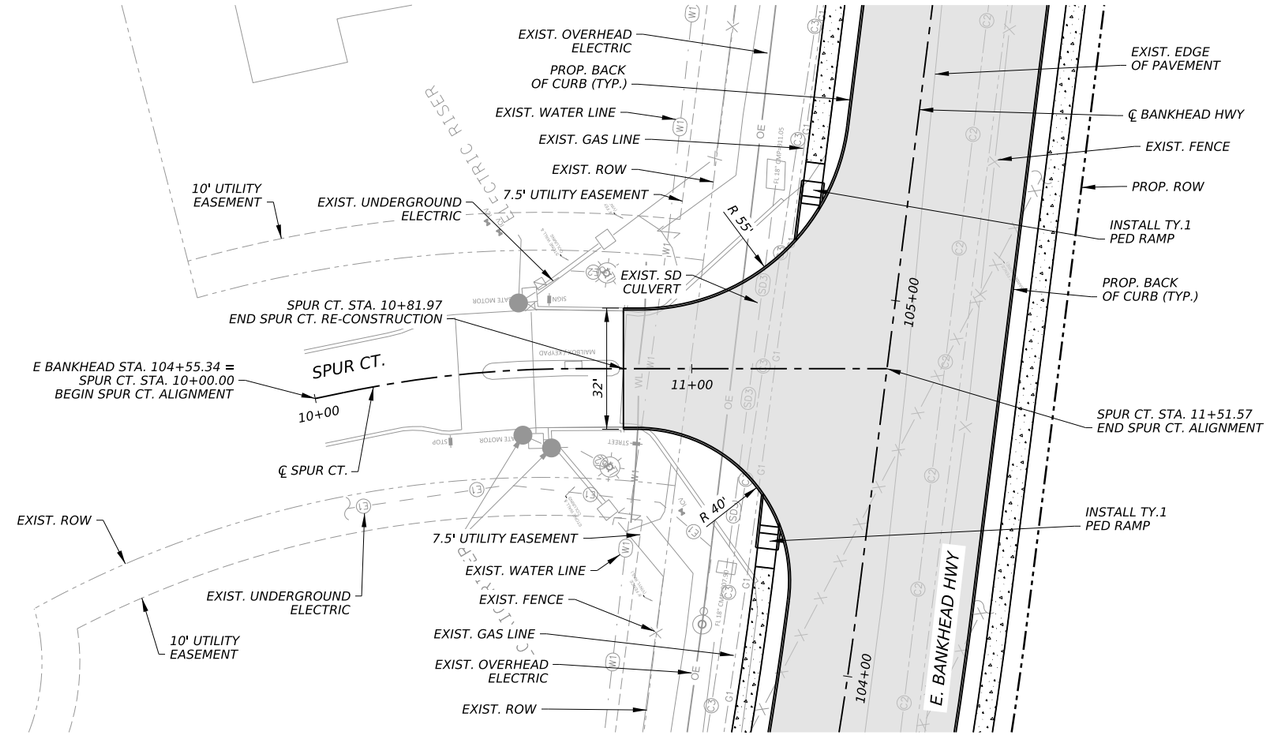
ROADWAY PLAN AND PROFILE DEAN DR

2025 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	66

DATE: 8/27/2026 7:41:05 PM
FILE: \\fcsM-freesepw221\fCS_pdf_work_dir\5613\54709_19\cv-109-pp-Dean-01.dgn



LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

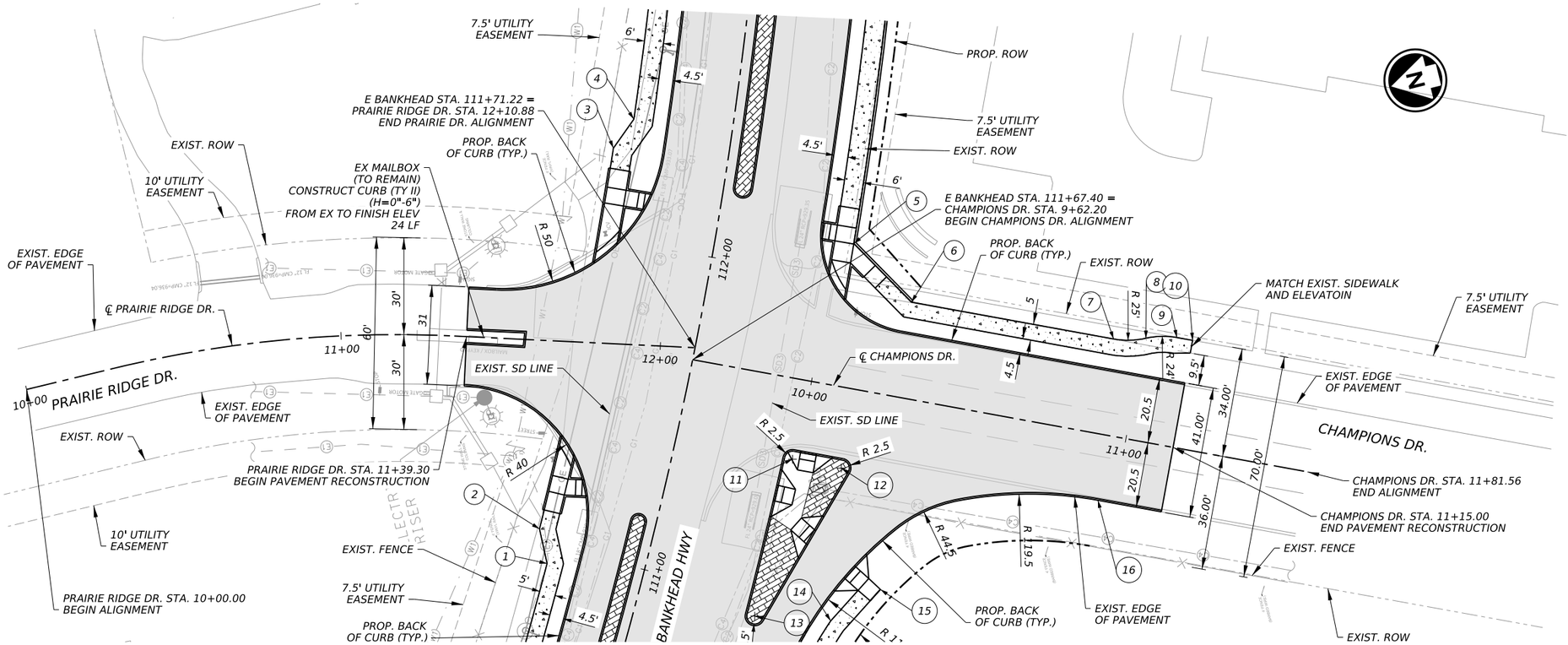
ROADWAY PLAN AND PROFILE SPUR CT.

2025 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	67

DATE: 8/27/2026 7:41:46 PM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\56131\54709_23\cv-109-pp-Spur Ct-01.dgn



LEGEND

- CONCRETE PAVEMENT
- CONCRETE DRIVEWAY
- ASPHALT PAVEMENT
- 4" CONCRETE SIDEWALK
- STAMPED AND INTEGRAL COLOR CONCRETE

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

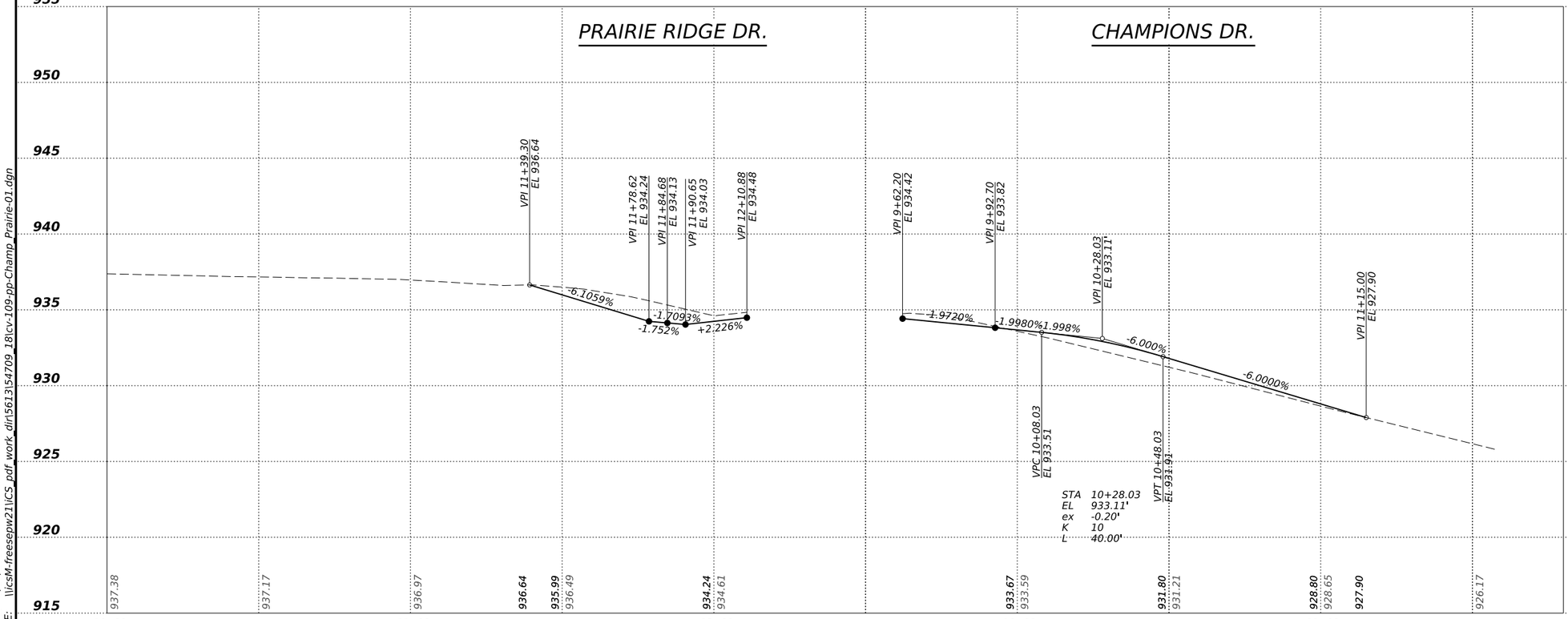
PROFILE LEGEND

- EXISTING GROUND @ ℄
- EXISTING GROUND @ 40' LT
- EXISTING GROUND @ 40' RT
- PROPOSED GRADE LINE
- 912.14 EXISTING GRADE
- 913.43 PROPOSED GRADE

#	STATION	OFFSET
1	110+94.16	30.00 'LT
2	111+04.31	35.00 'LT
3	112+29.06	36.00 'LT
4	112+39.23	31.00 'LT
5	112+11.56	43.00 'RT
6	111+97.16	63.88 'RT
7	111+96.94	128.18 'RT
8	111+98.75	138.09 'RT

#	STATION	OFFSET
9	112+00.47	147.59 'RT
10	112+00.44	152.59 'RT
11	111+43.77	37.00 'RT
12	111+43.42	52.52 'RT
13	110+94.69	36.89 'RT
14	110+99.03	60.40 'RT
15	111+11.73	73.08 'RT
16	111+51.11	133.10 'RT

NOTE: ALL STATION / OFFSET'S ARE BASED ON THE EAST BANKHEAD ALIGNMENT.



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

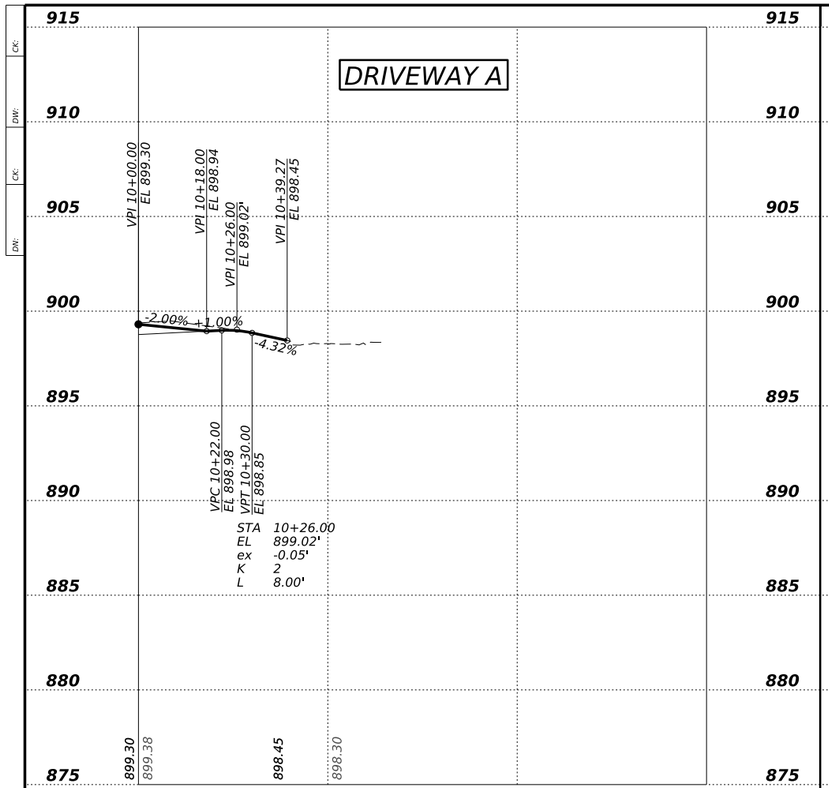
ROADWAY PLAN AND PROFILE PRAIRIE RIDGE DR. AND CHAMPIONS DRIVE

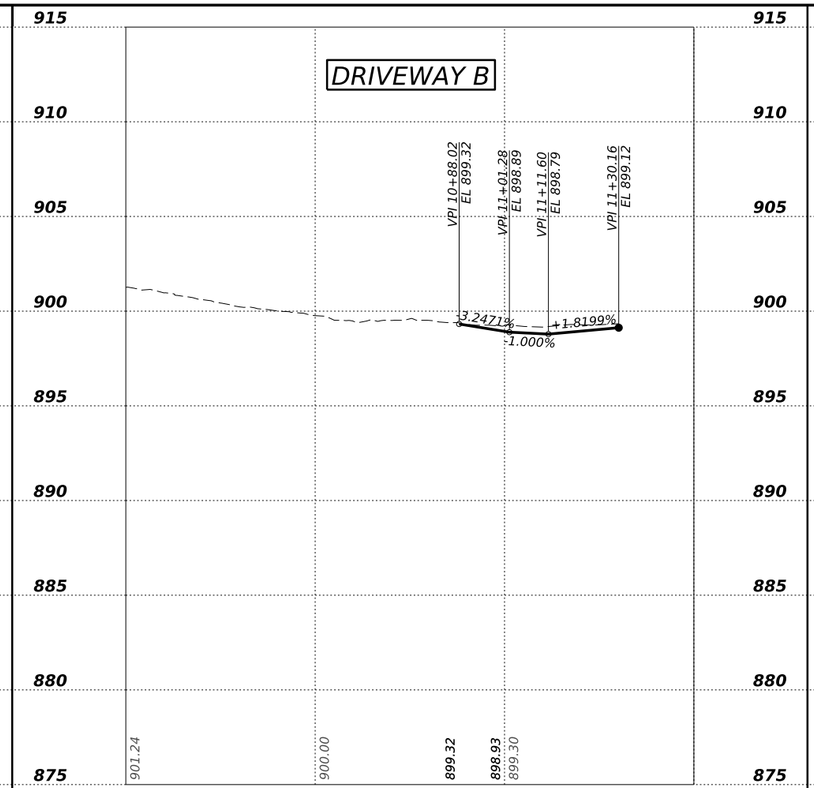
2025 SHEET 1 OF 1

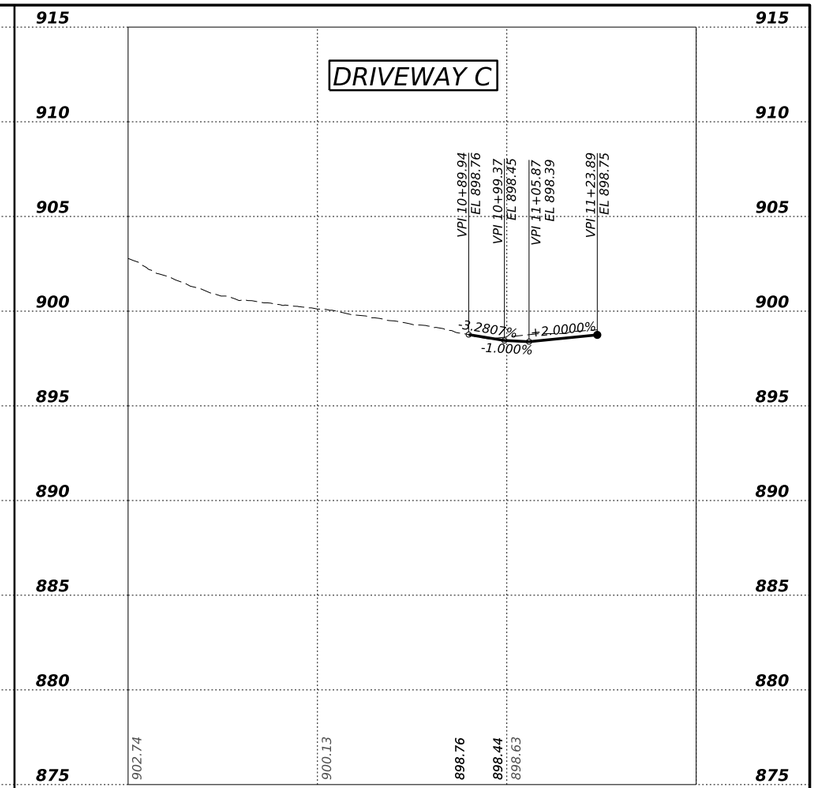
CONT	SECT	JOB	HIGHWAY

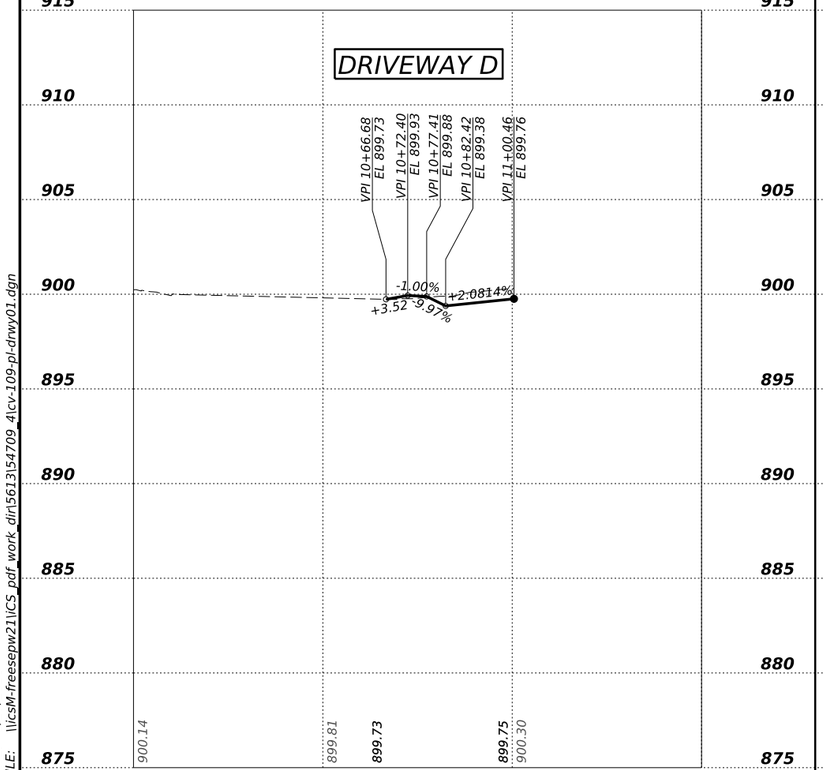
DIST	COUNTY	SHEET NO.
	PARKER	68

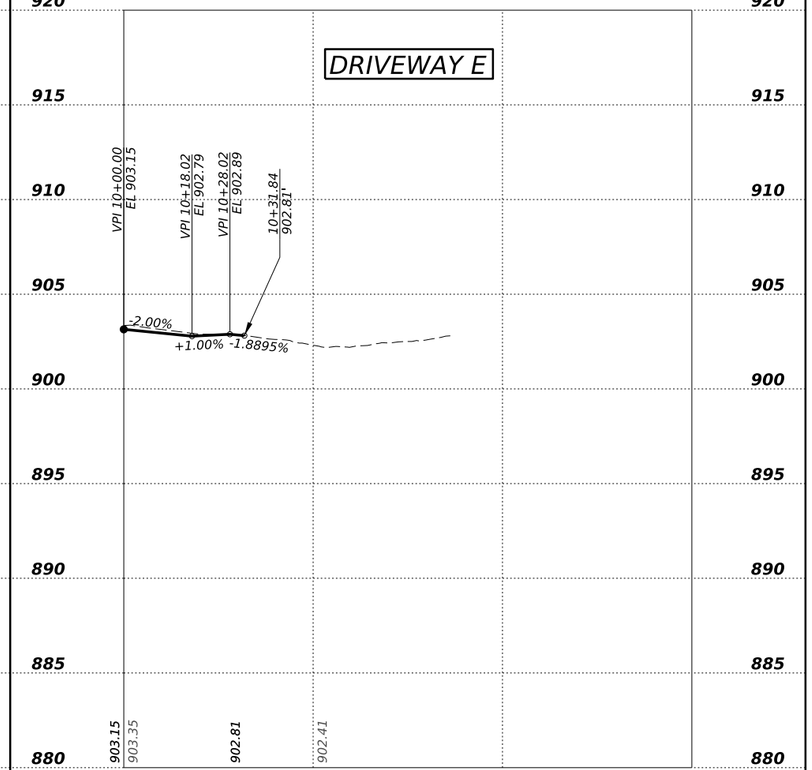
DATE: 8/27/2026 7:43:06 PM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\56131\54709_18\cv-109-pp-Champ_Prairie-01.dgn











PROFILE LEGEND

EXISTING GROUND @ ℄

PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE

0 20 40

HORIZ. SCALE IN FEET

0 4 8

VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

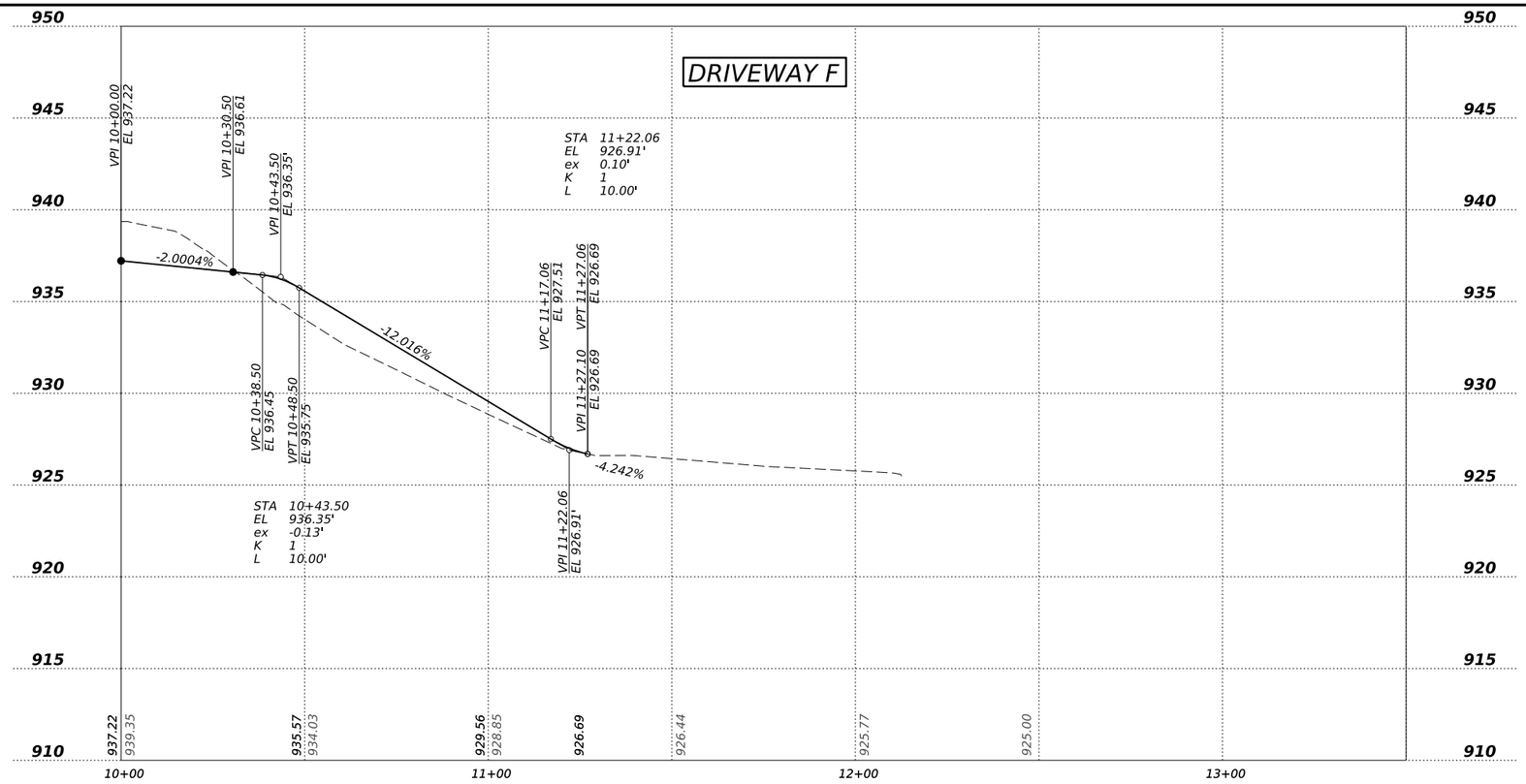
DRIVEWAY PROFILES

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	69

DATE: 8/27/2026 7:43:27 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56213\54709_4\cv-109-pl-drwy01.dgn



PROFILE LEGEND

EXISTING GROUND @ ℄

PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE

0 20 40

HORIZ. SCALE IN FEET

0 4 8

VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

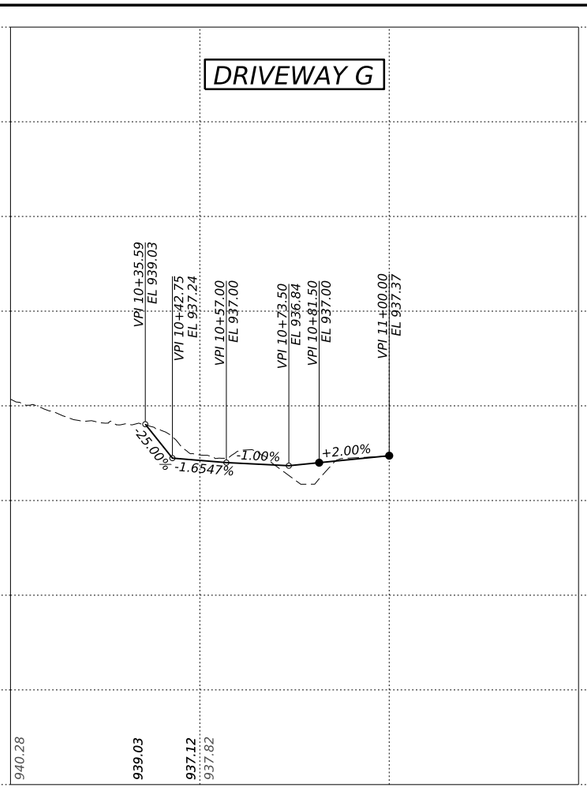
DRIVEWAY PROFILES

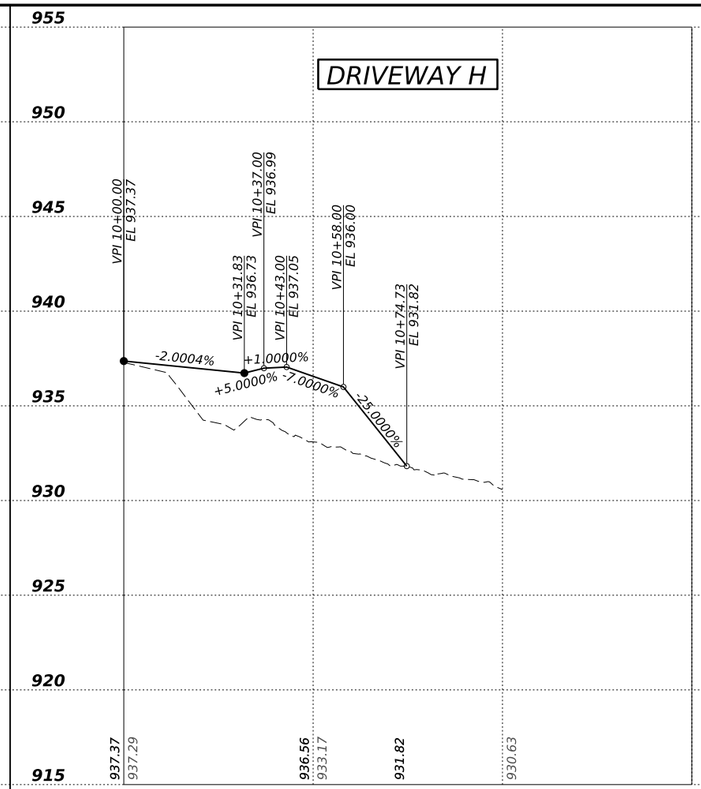
2025 SHEET 2 OF 4

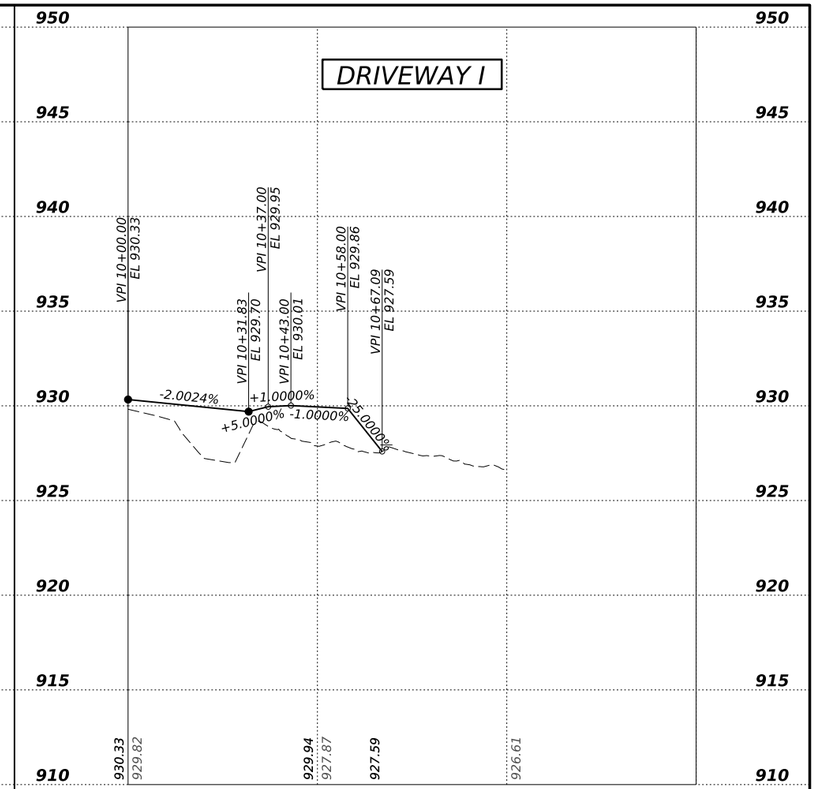
CONT	SECT	JOB	HIGHWAY

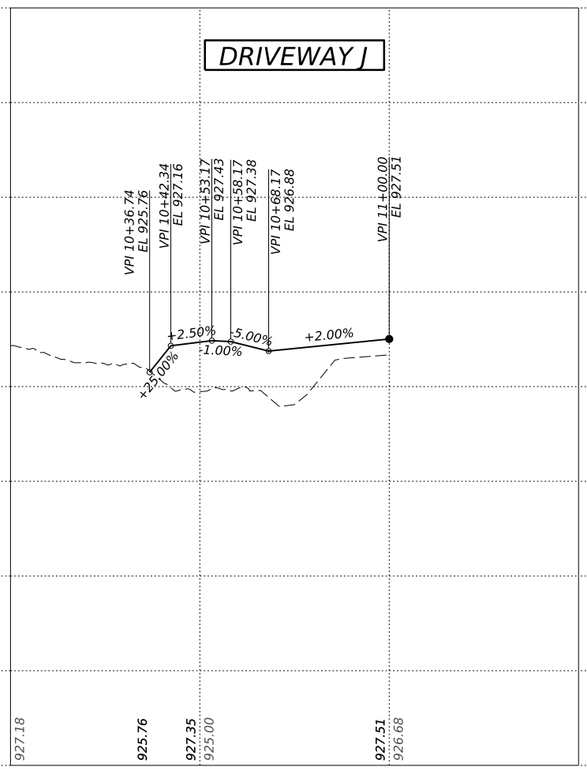
DIST	COUNTY	SHEET NO.
	PARKER	70

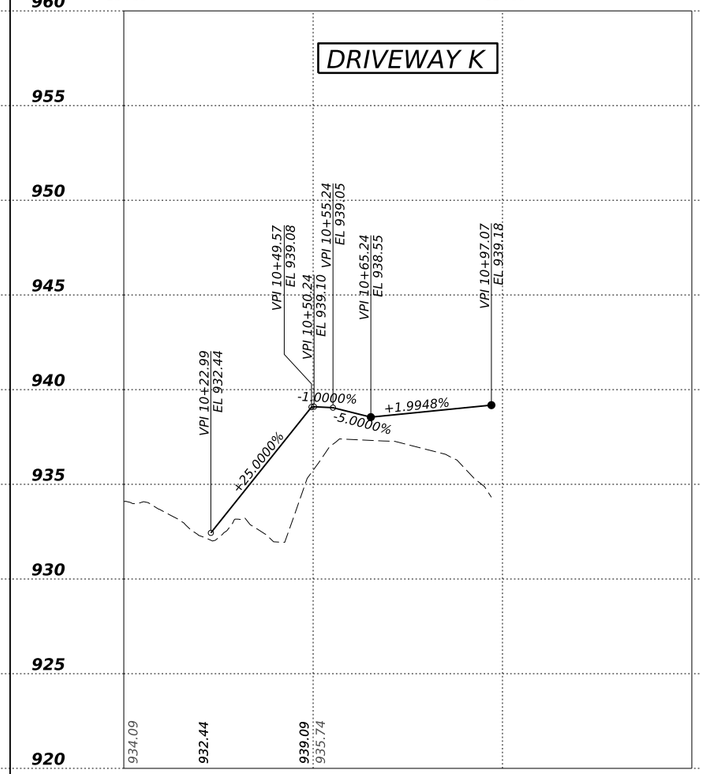
DATE: 8/27/2026 7:41:49 PM
FILE: \\fcsfs-freesepw21\ICS_pdf_work_dir\5613154709_5\cv-109-pl-drwy02.dgn











PROFILE LEGEND

EXISTING GROUND @ ℄

PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE

0 20 40

HORIZ. SCALE IN FEET

0 4 8

VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

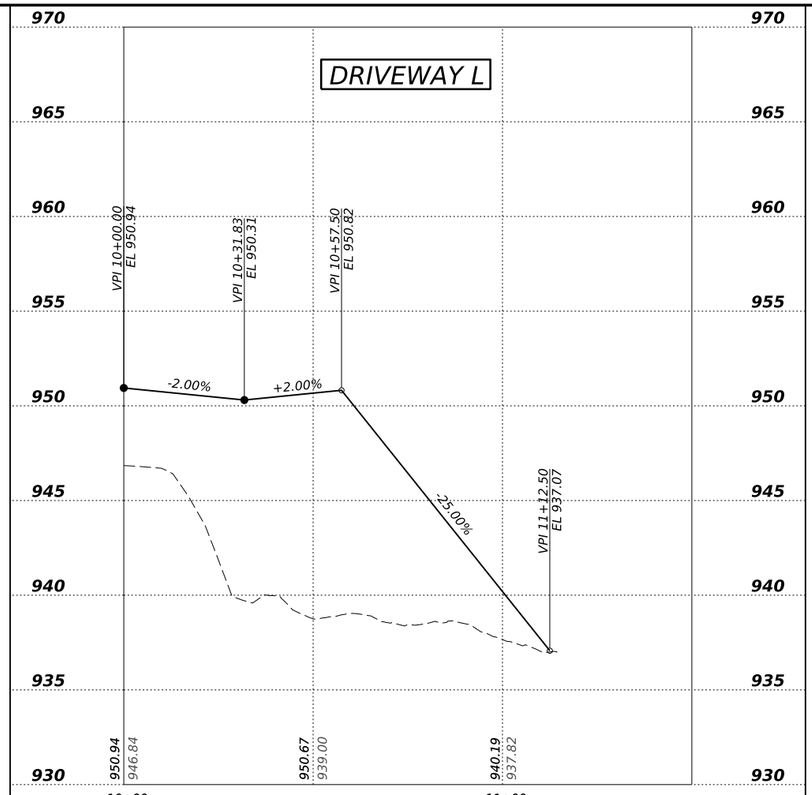
DRIVEWAY PROFILES

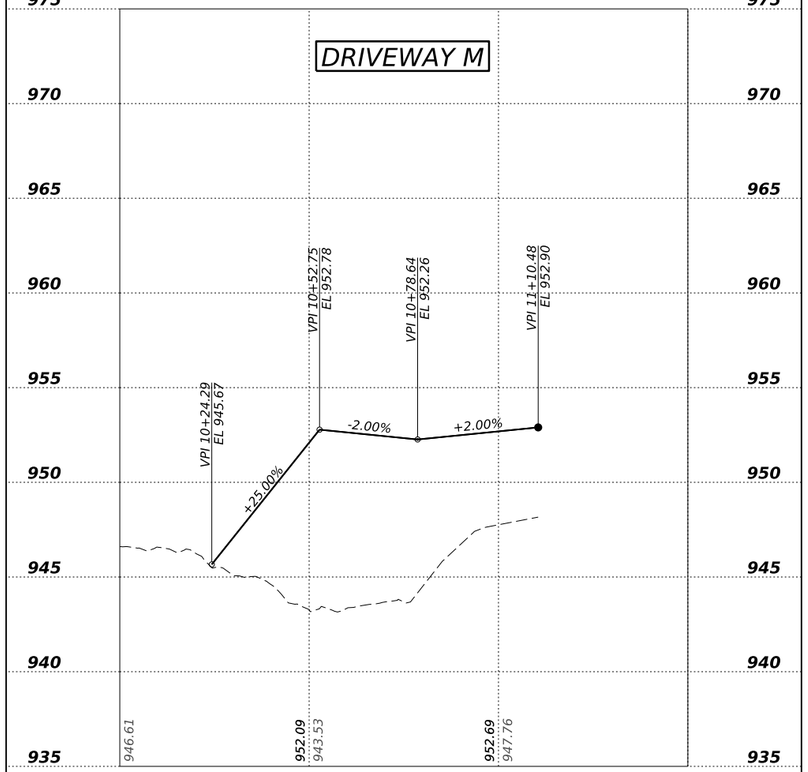
2025 SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	71

DATE: 8/27/2026 8:07:22 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5613\54709 6\cv-109-pl-drwy03.dgn





PROFILE LEGEND

EXISTING GROUND @ ℄

PROPOSED GRADE LINE

912.14 EXISTING GRADE

913.43 PROPOSED GRADE

0 20 40

HORIZ. SCALE IN FEET

0 4 8

VERT. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

DRIVEWAY PROFILES

2025 SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	72

DATE: 8/27/2026 7:43:32 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_dir\5613154709_26\cv-109-pl-drwy04.dgn

DEAN RANCH PROPERTY

BOSEWELL PROPERTY

FRED DISNEY'S PROPERTY

EAST BANKHEAD HWY

℄ E. BANKHEAD HWY

PROP ROW

PROP ROW

12" VENT

PIPELINE MARKER

MH

MH

10+00

43.70

11+00

-3.00%

-6.00%

+3.00%

+3.00%

+2.00%

4:1 TYP

4:1 TYP

4:1

935.5'
935.0'
934.5'
934.0'
933.5'
933.0'
932.5'
932.0'
931.5'
931.0'
930.5'
930.0'
929.5'
929.0'
928.5'
928.0'
927.5'
927.0'
926.5'
926.0'

936.5'
936.0'
935.5'
935.0'
934.5'
934.0'
933.5'
933.0'
932.5'
932.0'
931.5'
931.0'
930.5'
930.0'
929.5'
929.0'
928.5'
928.0'
927.5'
927.0'

934.5'
934.0'
933.5'
933.0'
932.5'
932.0'
931.5'
931.0'
930.5'
930.0'
929.5'
929.0'
928.5'
928.0'
927.5'

933.0'
932.5'
932.0'
931.5'
931.0'
930.5'
930.0'
929.5'
929.0'
928.5'
928.0'
927.5'

932.0'
931.5'
931.0'
930.5'
930.0'
929.5'
929.0'

UTILITY ESMT

EX ℄

℄ DRWY F

TEMP CONST ESMT

EX ℄

TOP OF CURB
DRWY F STA 10+94.34
OFF 24.19' RT
ELEV = 927.81'

VARIABLE HEIGHT CURB
HEIGHT VARY 6" - 9"
12.0 LF, RADIUS 8.5'

TOP OF CURB
DRWY F STA 10+85.80
OFF 29.49' RT
ELEV = 927.78'

PROP RET WALL (WALL01)

UTILITY ESMT

PROP ROW

LEGEND

EXISTING CONTOURS

850.5 MAJOR CONTOUR (0.5' = 6")

MINOR CONTOUR (0.25' = 3")

PROPOSED CONTOURS

850.5 MAJOR CONTOUR (0.5' = 6")

MINOR CONTOUR (0.25' = 3")

NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.

0 20 40

HORIZ. SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

FREESE NICHOLS

801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

GRADING PLAN DRIVEWAY "F"

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	73

DATE: 8/27/2026 7:44:19 PM
FILE: \\cs\M-freesepw211\CS_pdf_work_dir\56135\54709_25\cv-109-pl-grading01-DRWYF.dgn

CK: DW: CK: DW:

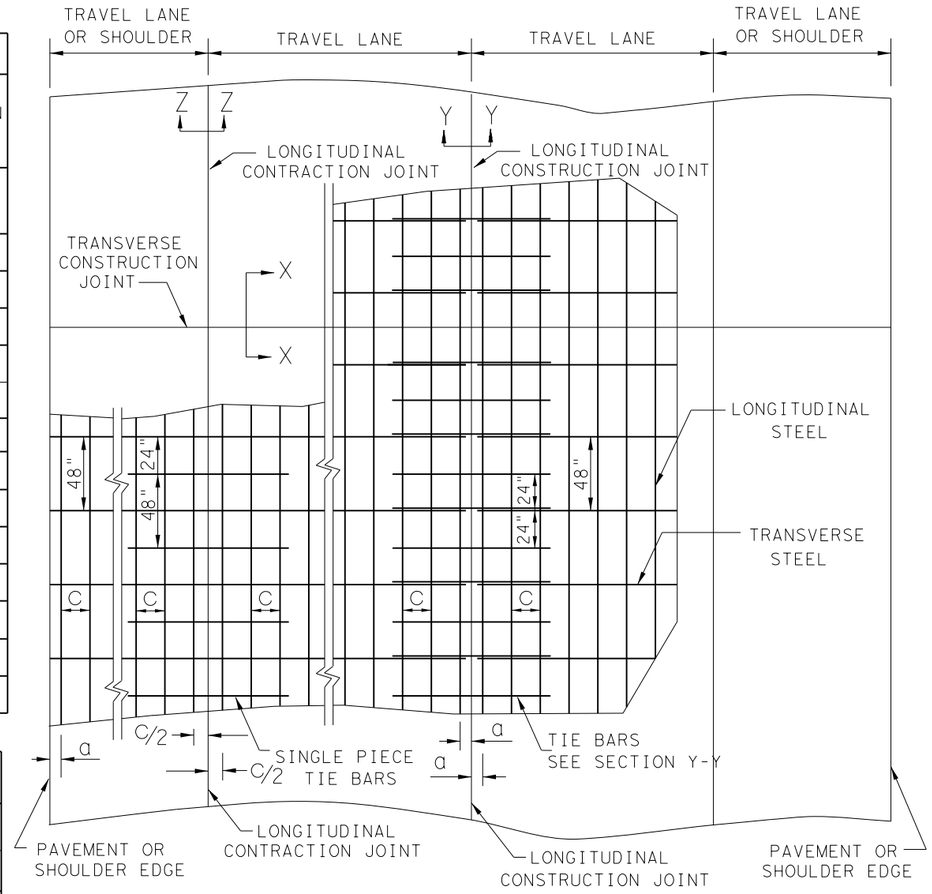
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

GENERAL NOTES

TABLE NO. 1 LONGITUDINAL STEEL				
SLAB THICKNESS AND BAR SIZE		LONGITUDINAL STEEL BARS	FIRST SPACING AT EDGE OR JOINT	LONG. STEEL VERTICAL POSITION FROM BOTTOM OF PAVEMENT
T (IN.)	BAR SIZE	SPACING C (IN.)	SPACING a (IN.)	T1 (IN.)
7.0	#5	6.5	3 TO 4	3.5
7.5	#5	6.0	3 TO 4	3.75
8.0	#6	9.0	3 TO 4	4.0
8.5	#6	8.5	3 TO 4	4.25
9.0	#6	8.0	3 TO 4	4.5
9.5	#6	7.5	3 TO 4	4.75
10.0	#6	7.0	3 TO 4	5.0
10.5	#6	6.75	3 TO 4	5.5
11.0	#6	6.5	3 TO 4	6.0
11.5	#6	6.25	3 TO 4	6.5
12.0	#6	6.0	3 TO 4	7.0
12.5	#6	5.75	3 TO 4	7.5
13.0	#6	5.5	3 TO 4	8.0

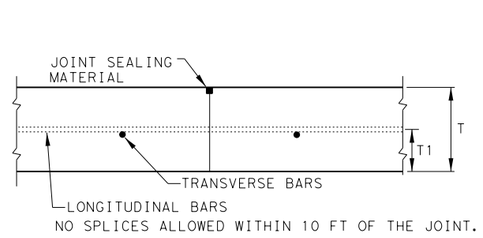
TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS						
SLAB THICKNESS (IN.)	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
7.0 - 7.5	#5*	48	#5*	48	#5*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

*CONTRACTOR MAY USE #6 REINFORCING STEEL INSTEAD OF #5 REINFORCING STEEL OR COMBINATION OF EACH SIZE

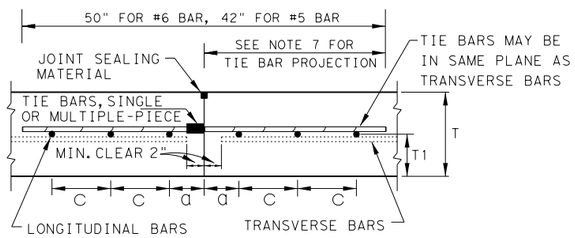


TYPICAL PAVEMENT LAYOUT

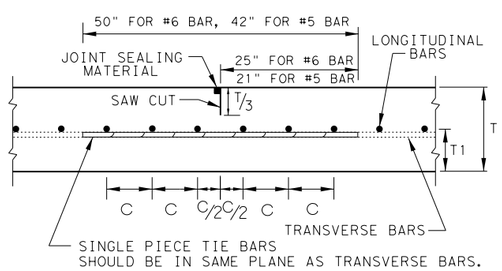
PLAN VIEW (NOT TO SCALE)



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

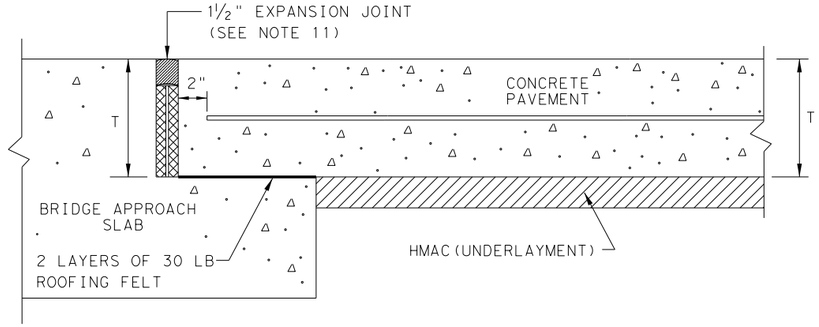
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-24

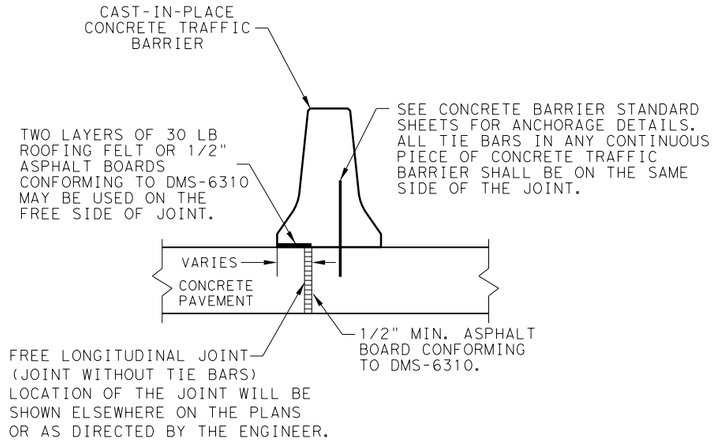
FILE: crcp124.dgn	DN: CES	CK: KM	DW: CES	CK: AN
©TxDOT: Sept 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		74

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_crcp124-1.dgn

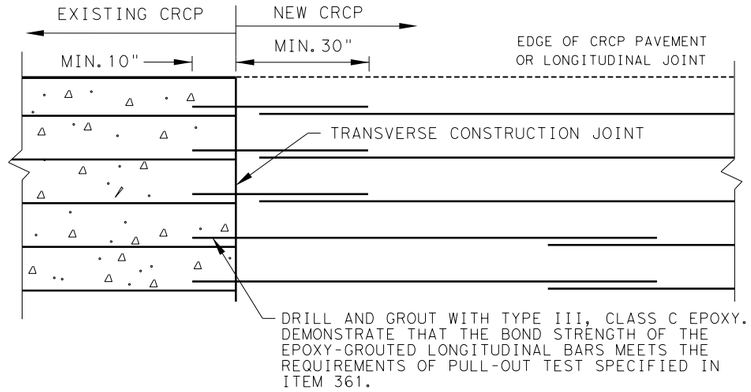
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



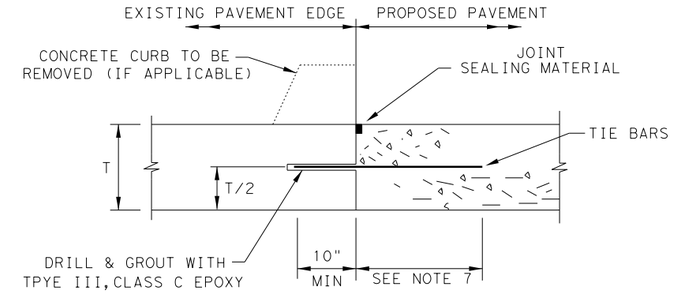
TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH



CENTERLINE FREE LONGITUDINAL JOINT DETAIL

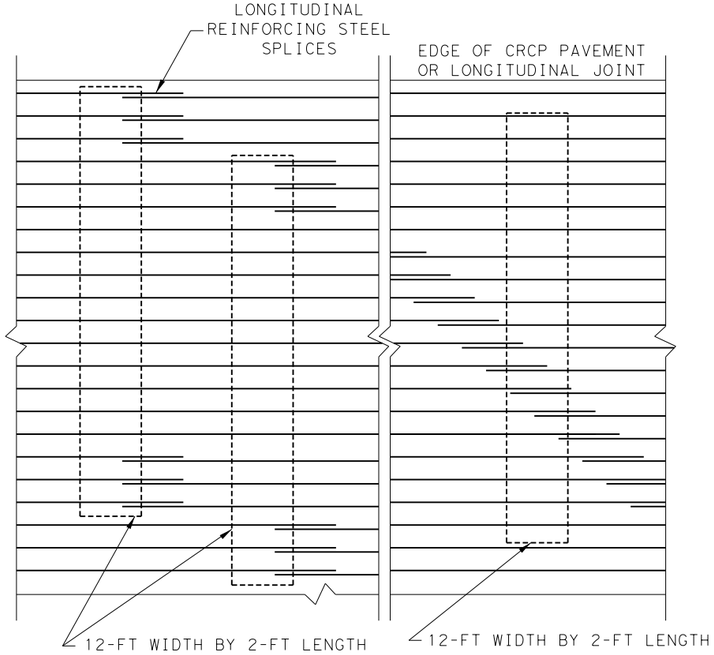


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



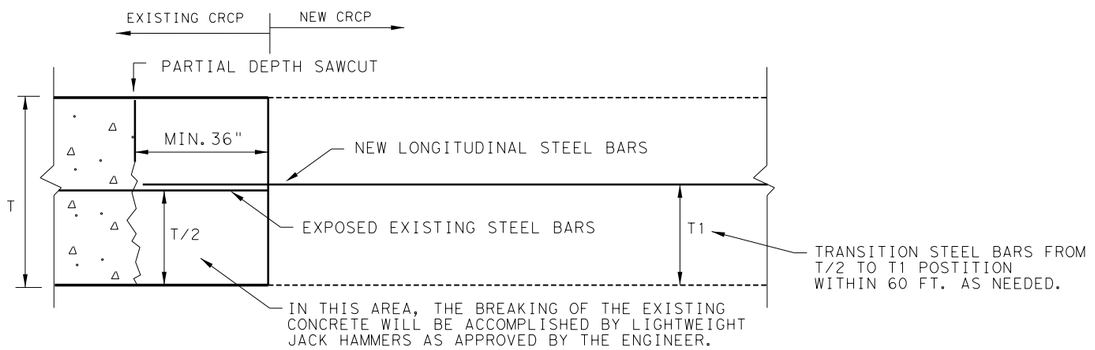
1. BEFORE CONCRETE PLACEMENT, PERFORM PULL-OUT TESTS ON EPOXY-GROUTED TIE BARS IN ACCORDANCE WITH ITEM 360.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER PAVEMENTS, USE #5 TIE BARS FOR LESS THAN 8" THICK PAVEMENTS.

LONGITUDINAL WIDENING JOINT DETAIL



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

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_crcp124-2.dgn

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

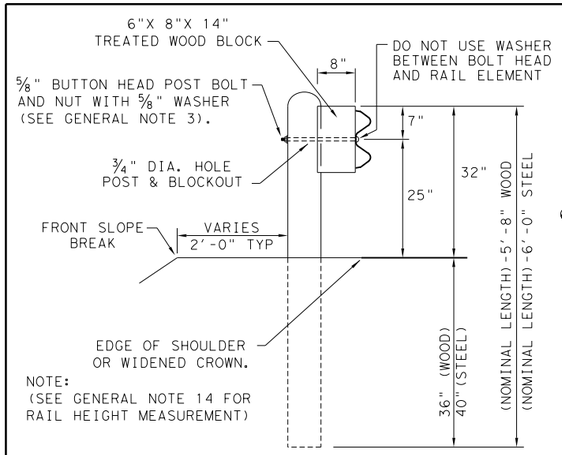
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

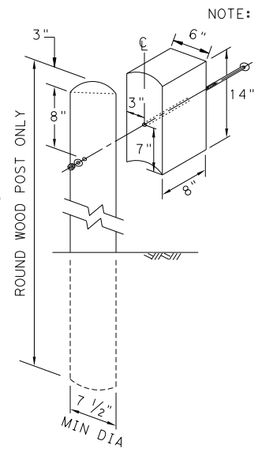
CRCP(1)-24

FILE: crcp124.dgn	DN: TxDOT	CK: KM	DW: CES	CK: AN
©TxDOT: Sept 2024 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
		PARKER		75

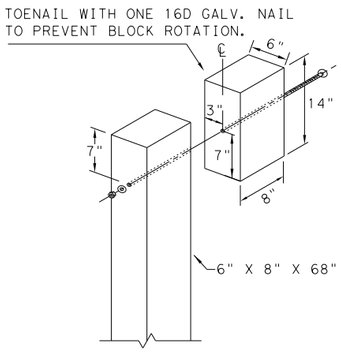
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



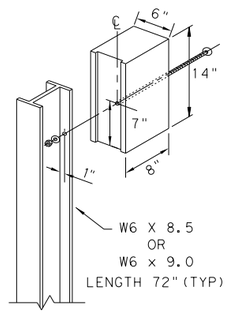
TYPICAL POST PLACEMENT



WOOD BLOCK TO
ROUND WOOD POST

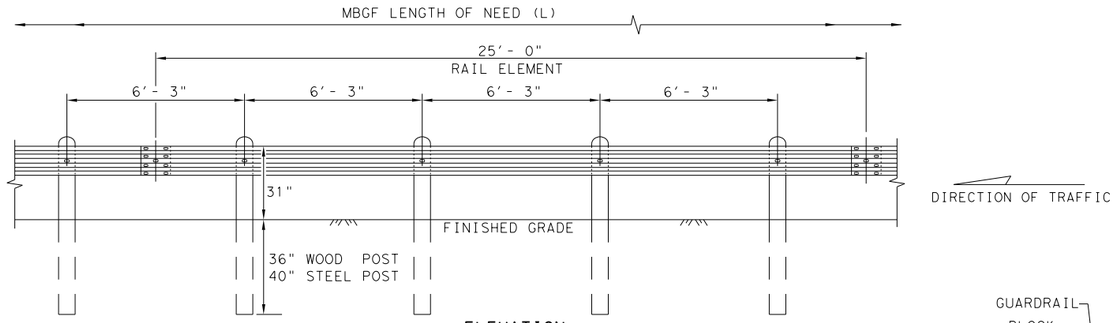


WOOD BLOCK TO
RECTANGULAR WOOD POST



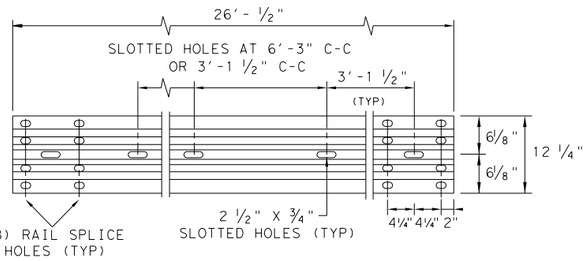
ROUTED WOOD BLOCK
TO I-BEAM STEEL POST

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



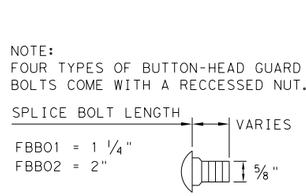
ELEVATION
MID-SPAN RAIL SPLICE

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



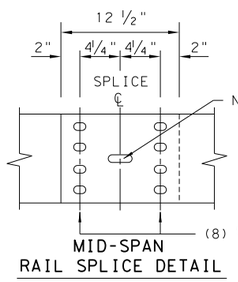
ELEVATION 25'- 0"(NOM.) W-BEAM SECTION

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



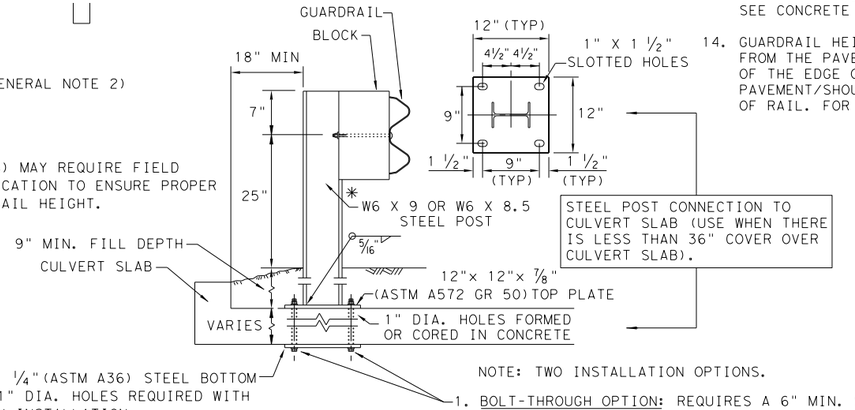
BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN
RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.



LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

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

Texas Department of Transportation — Design Division Standard

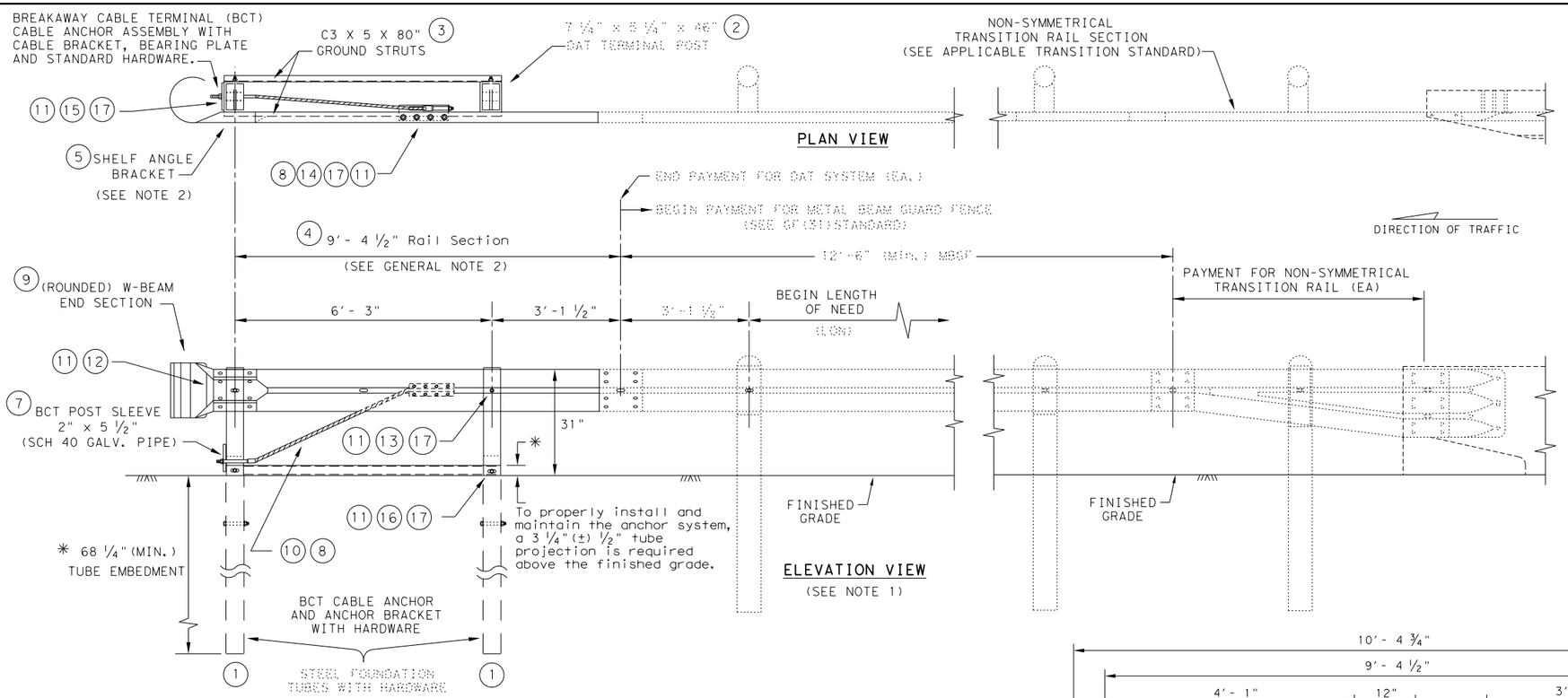
METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG	
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
	DIST	COUNTY		SHEET NO.	
		PARKER		76	

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_GF(31)-19.dgn

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

DATE:
FILE:



DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

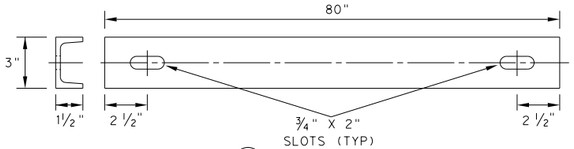
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 ¾" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

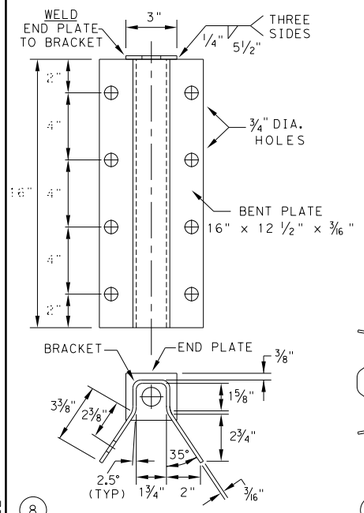
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 ¼" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	⅝" X 2" HEX HEAD BOLT	8
(15)	⅝" X 8" HEX HEAD BOLT	4
(16)	⅝" X 10" HEX HEAD BOLT	2
(17)	⅝" FLAT WASHER	18

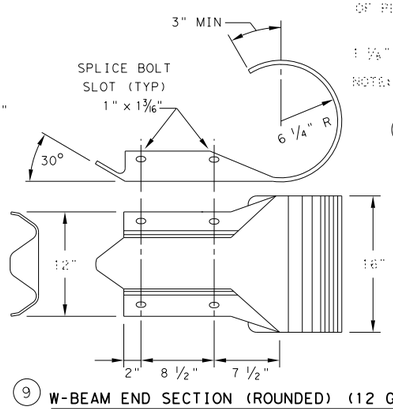
(4) TERMINAL RAIL ELEMENT FOR DAT



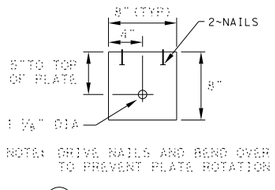
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

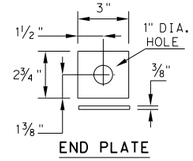


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

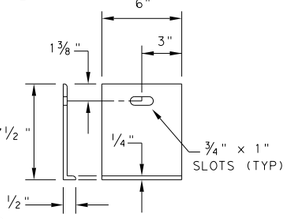


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

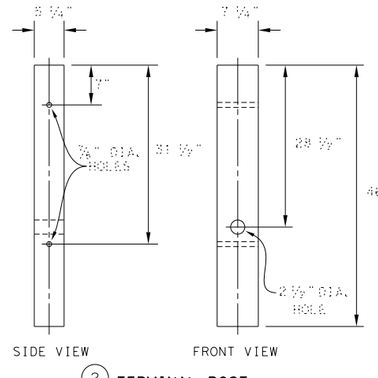
(6) BEARING PLATE
8"x 8"x ⅝" R



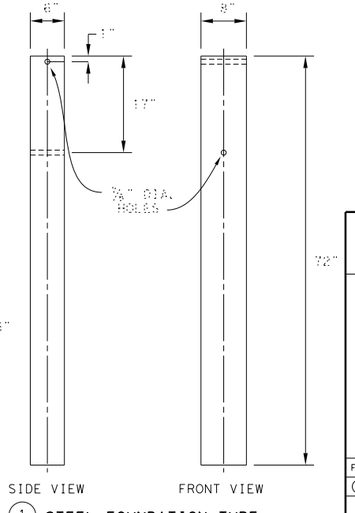
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 ¼"x 5 ¼"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x ⅛" x 72" STEEL TUBE

Texas Department of Transportation

Design Division Standard

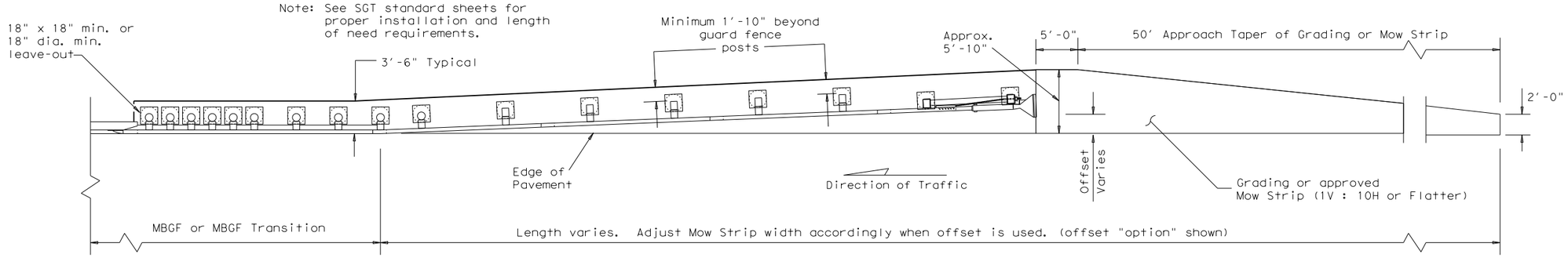
METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

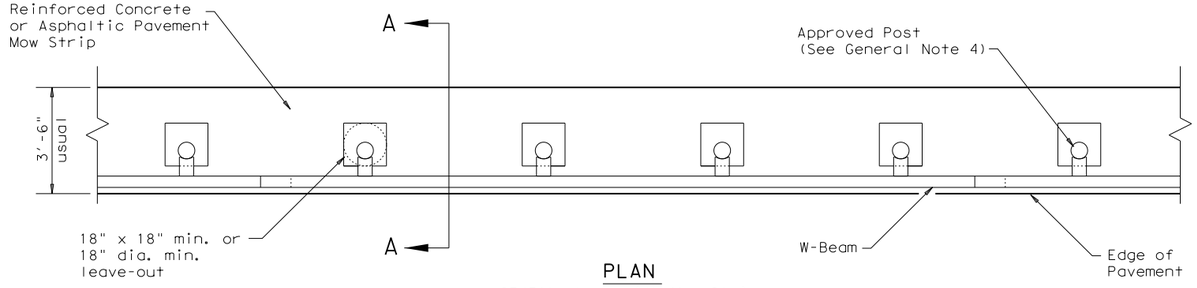
FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				77

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: 8/27/2026
FILE: cv-109_TRT_TxDot_GF(31)MS-19.dgn

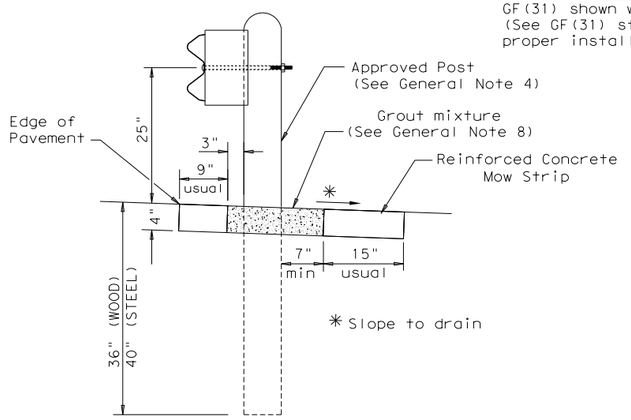


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



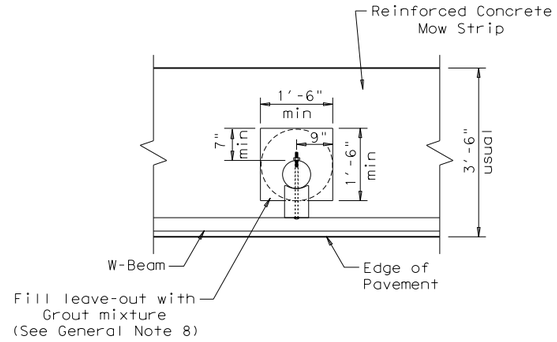
PLAN

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



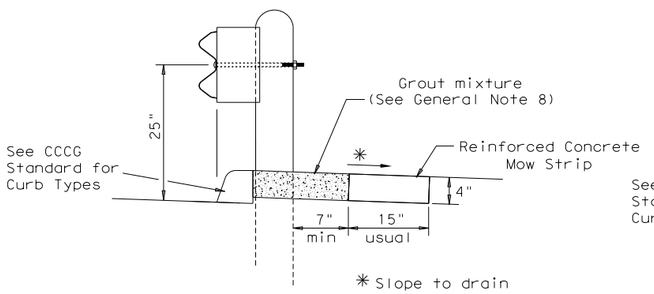
SECTION A-A

Typical



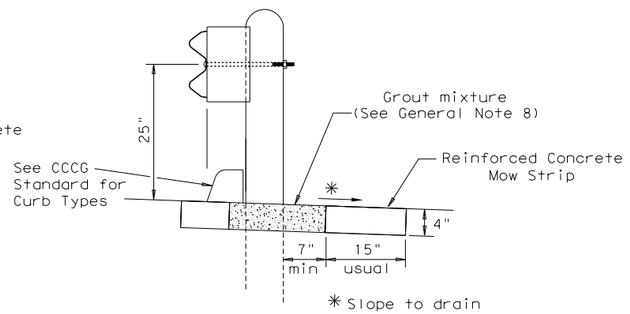
MOW STRIP DETAIL

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



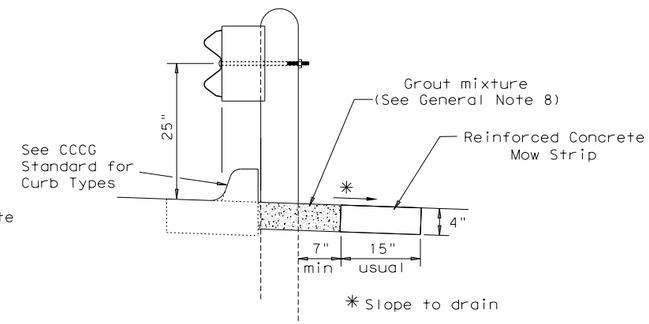
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

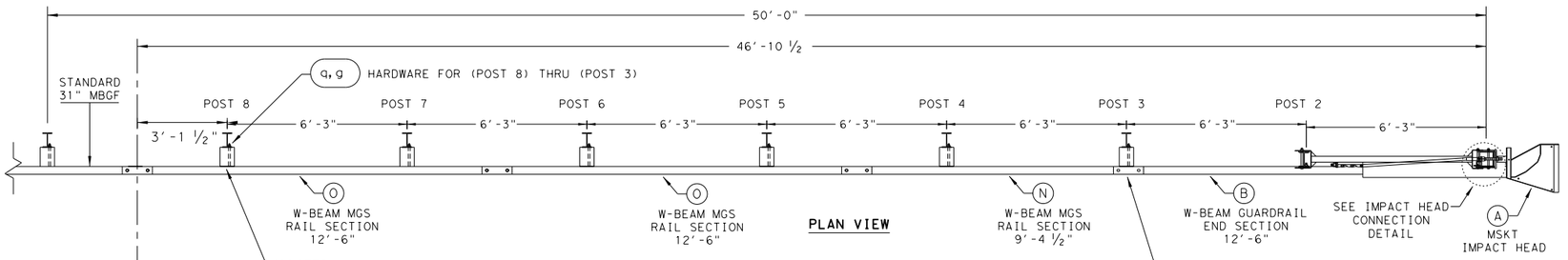
Design Division Standard

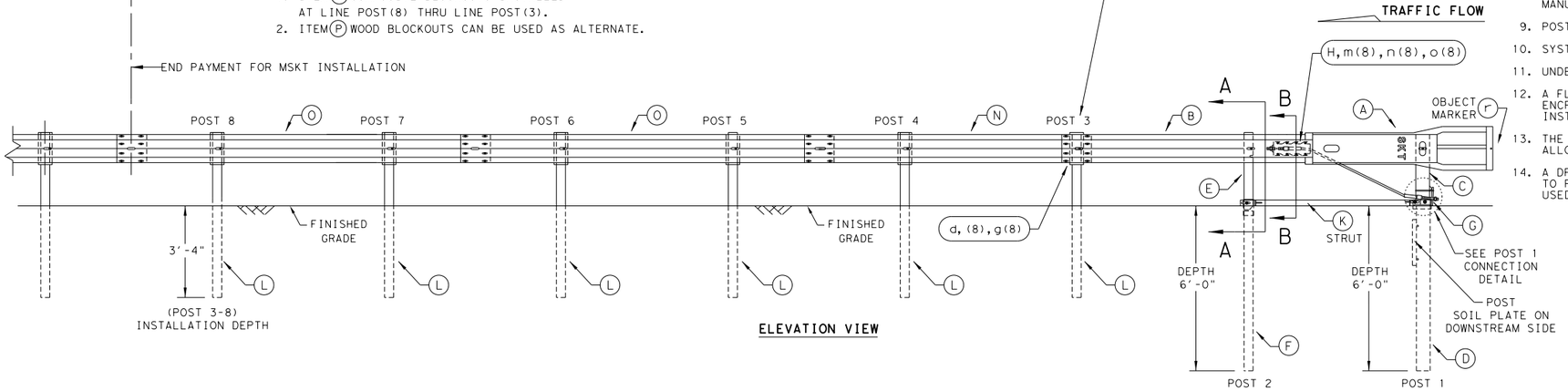
METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

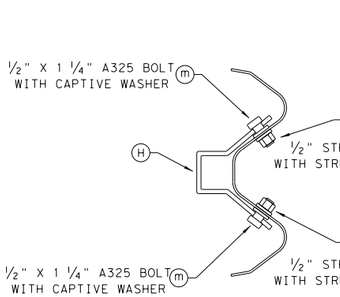
FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		78

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 CONVERSIONOF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

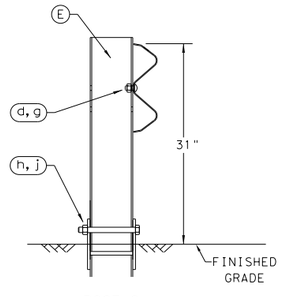




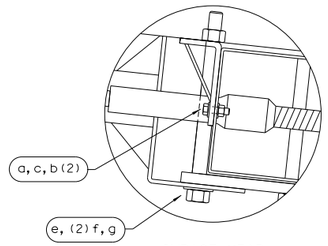
NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.



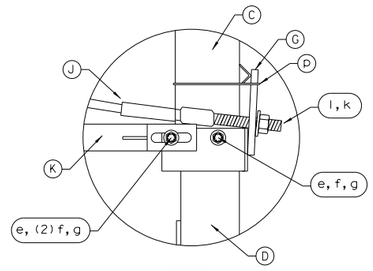
SECTION B-B
ANCHOR BRACKET



POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL

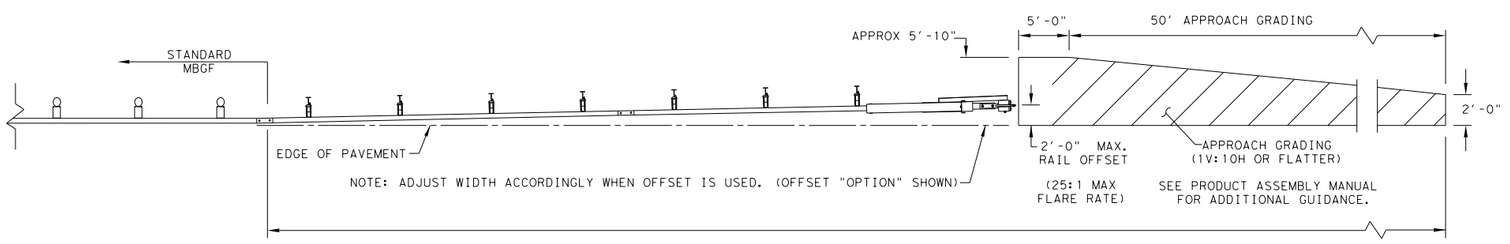
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X 1/8" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 1/2")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	5/8" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	5/8" WASHER	W0516
c	2	5/8" HEX NUT	N0516
d	25	5/8" Dia. x 1 1/4" SPLICE BOLT (POST 2)	B580122
e	2	5/8" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	5/8" WASHER	W050
g	33	5/8" Dia. H.G.R NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT (GRD A449)	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	1/2" x 1 1/4" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	1/2" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	5/8" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

SEE NOTES: ✳

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



APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL

MSKT-MASH-TL-3

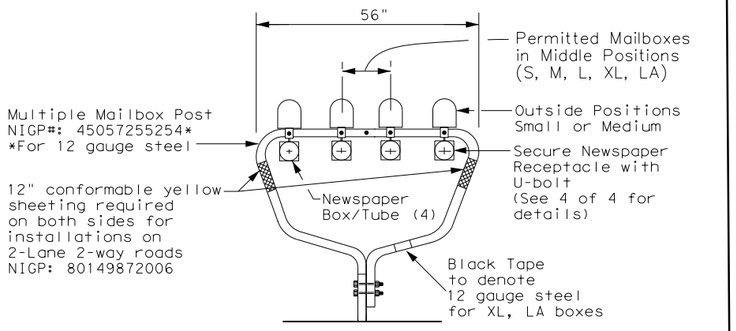
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN:TxDOT	CK:KM	DW:VP	CK:CL	
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
	DIST	COUNTY		SHEET NO.	
		PARKER		79	

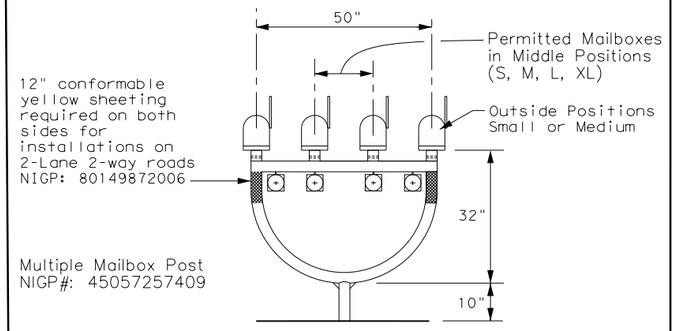
DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_SGT(12S)31-18.dgn

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.

TYPE 1 - MULTIPLE



TYPE 4 - MULTIPLE



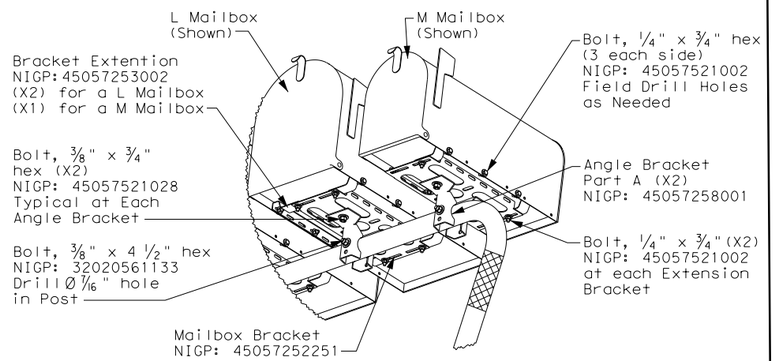
MAILBOX SIZES

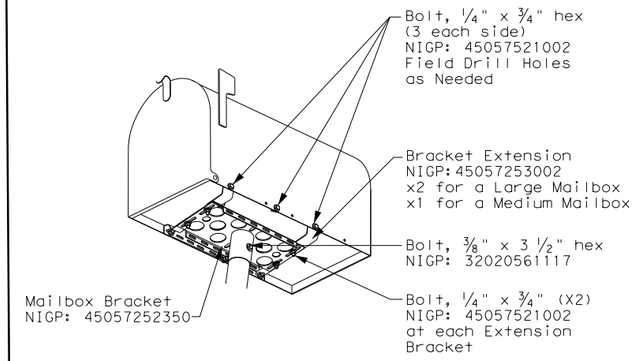
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 ½"	6"	7"	6 LBS
MEDIUM	22 ½" *	8" *	11 ½" *	8 LBS
LARGE	23 ½"	11 ½"	13 ½"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 ½"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

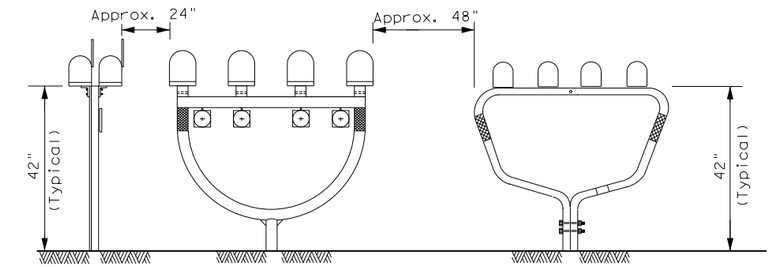
GENERAL NOTES:

1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.





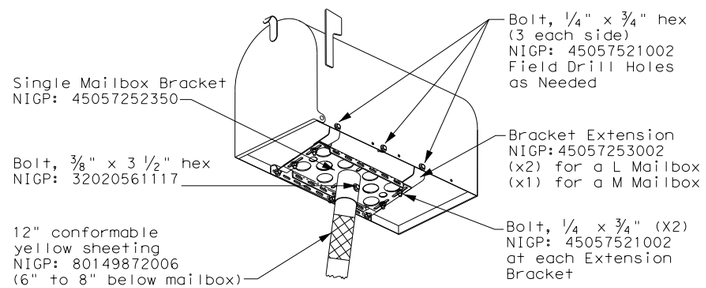
TYPICAL INSTALLATION MEASUREMENTS

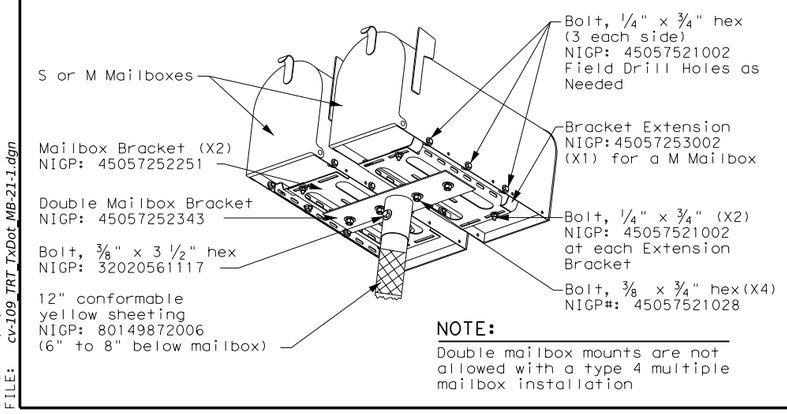


NOTE:

Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

TYPE 2 and 4 - SINGLE/DOUBLE

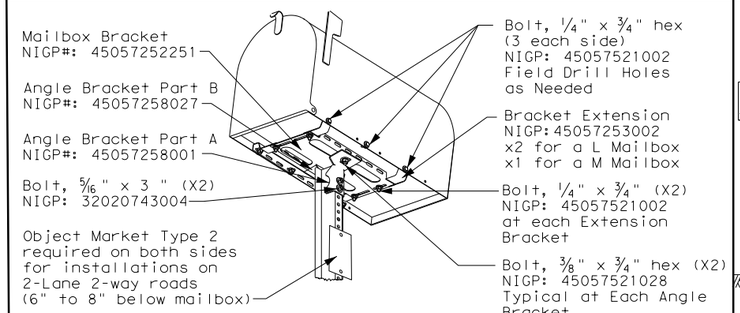


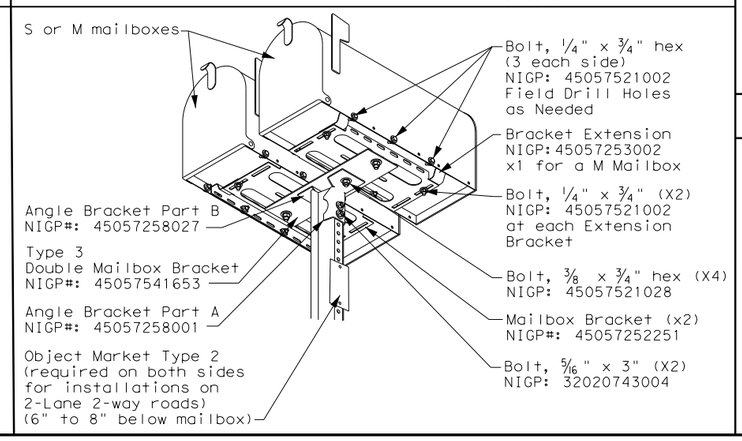


NOTE:

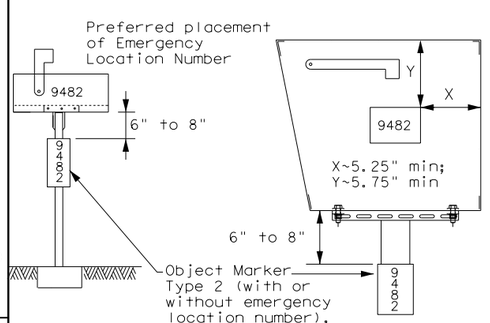
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

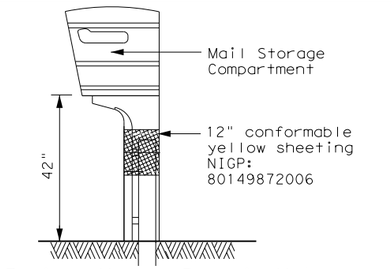


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation — Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

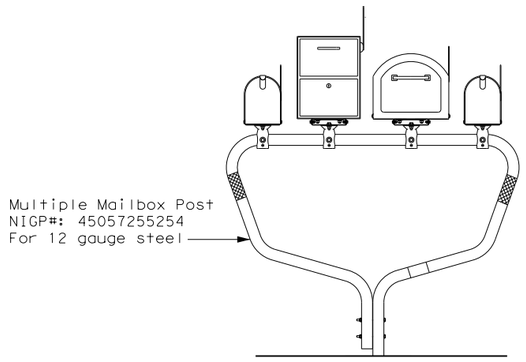
MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO.
		PARKER		80

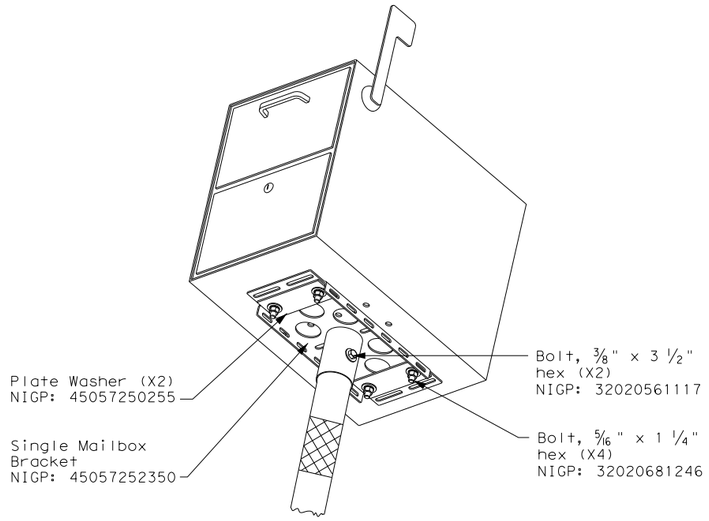
DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_MB-21-1.dgn

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.

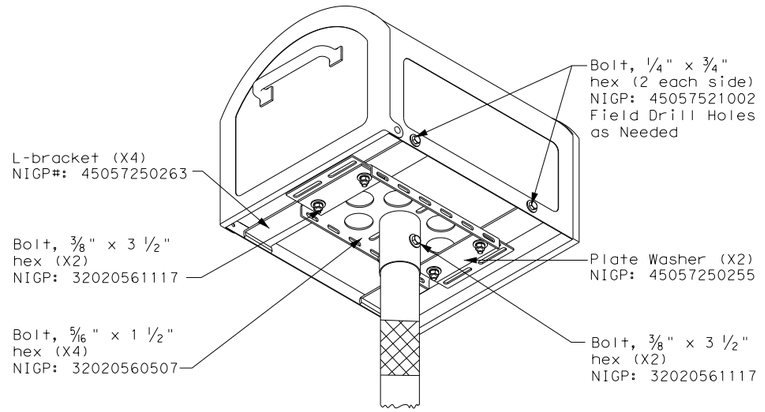
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

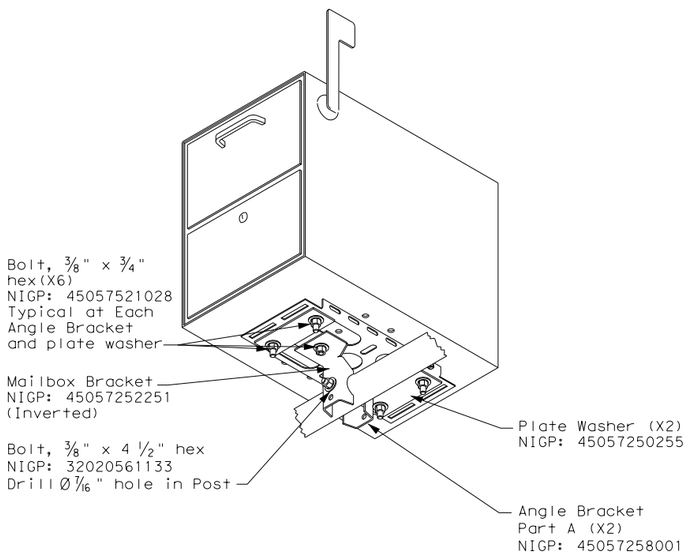


TYPE 2/4 - SINGLE XL MAILBOX

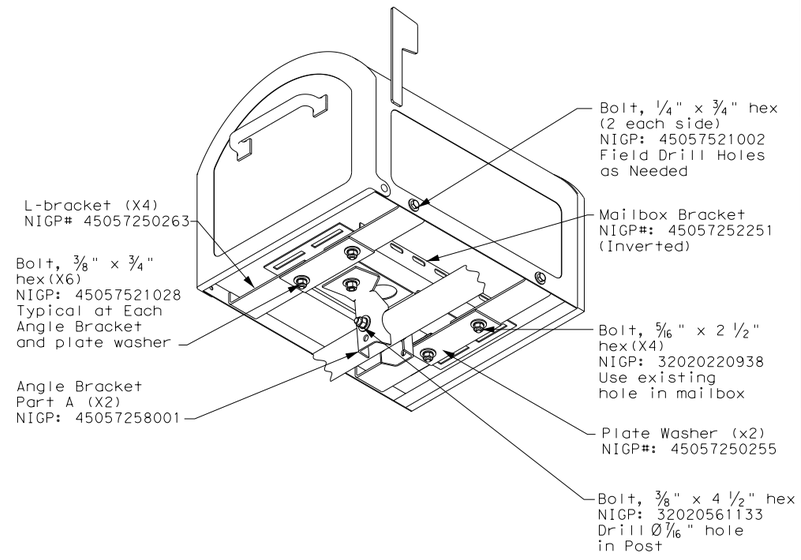


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

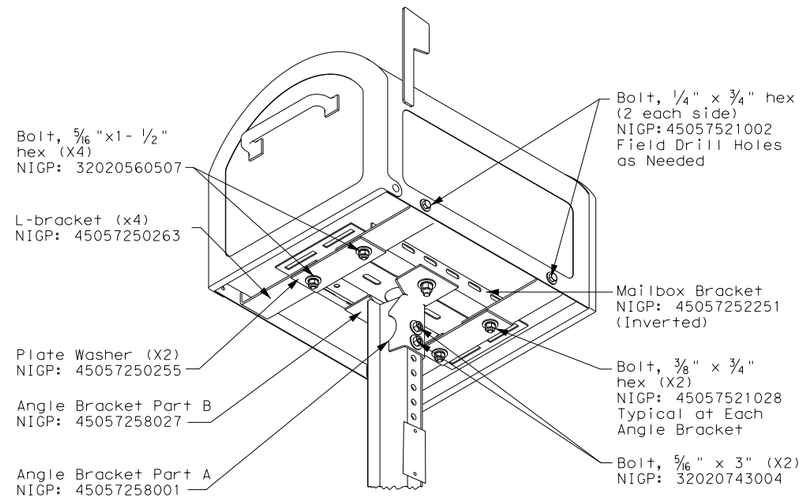
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation

Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

MB(2)-21

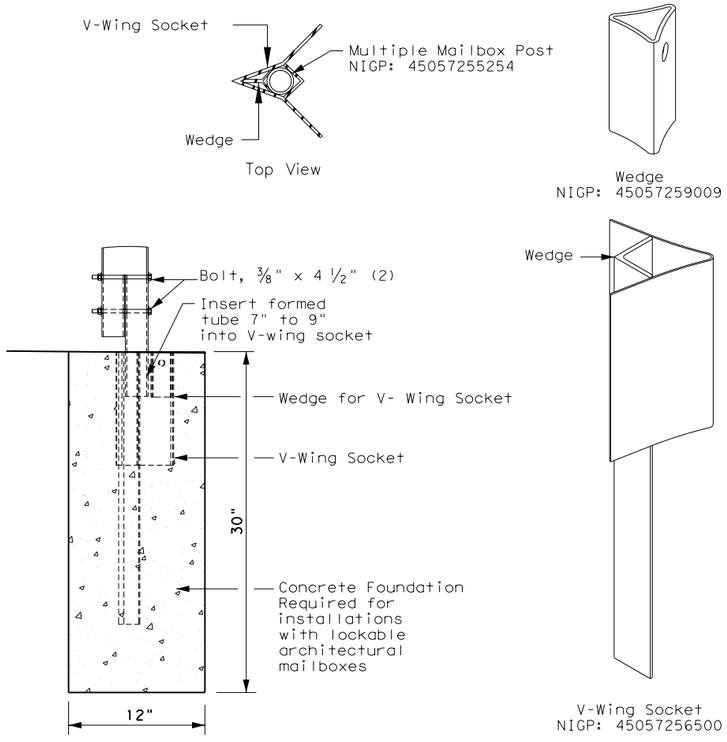
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO.
		PARKER		81

DATE: 8/27/2026
FILE: cv-109 TRT TxDot MB-21-2.dgn

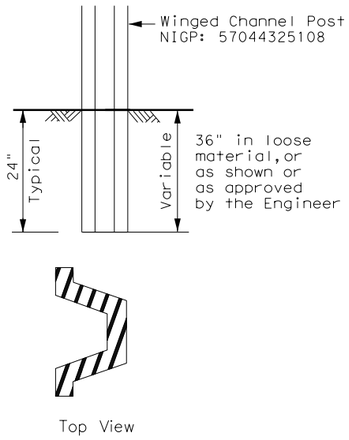
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_MB-21-3.dgn

TYPE 1 - SUPPORT/FOUNDATION
Thin Wall Tube w/ V-LOC Anchorage

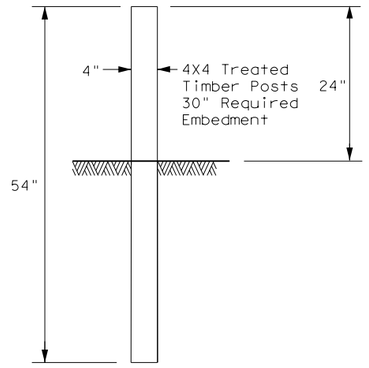


TYPE 3 - SUPPORT/FOUNDATION

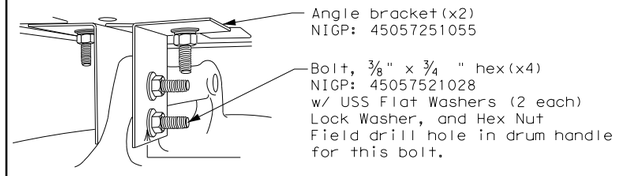


NOTES:
1. Attach Object Marker(OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT

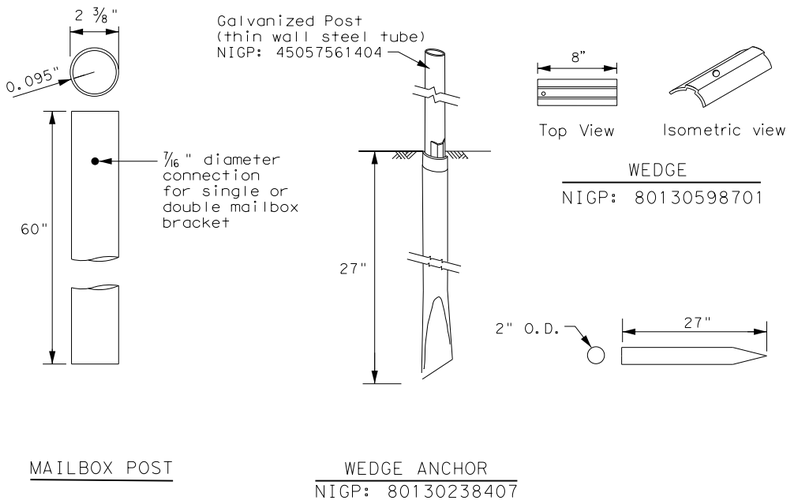


Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:
1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

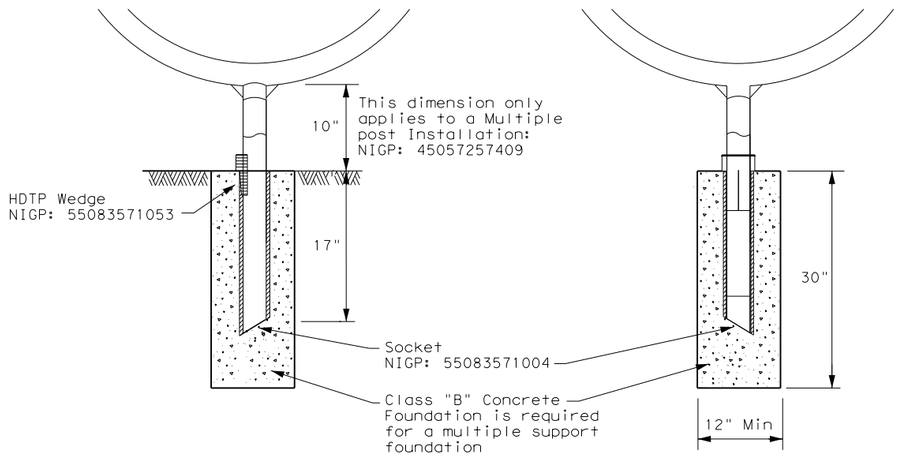
TYPE 2 - SUPPORT/FOUNDATION
Thin Wall Steel Tube w/Wedge Anchor System



MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION
Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

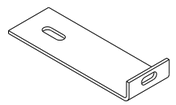
Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

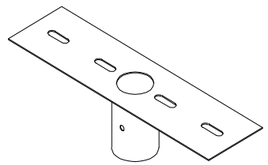
MB(3)-21

FILE: MB-21.dgn	DN:	CK:	DW:	CK:
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO.
		PARKER		82

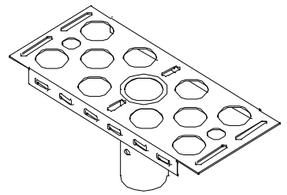
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



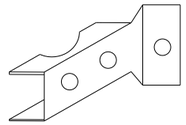
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



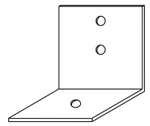
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



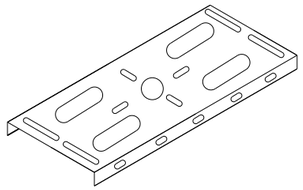
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



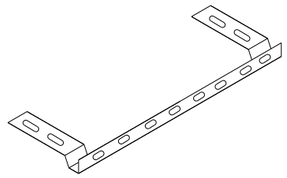
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



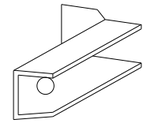
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



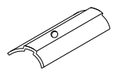
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



NIGP: 45057253002
Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



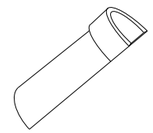
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



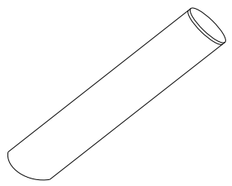
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

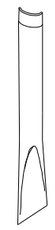
NIGP: 45057541653
Type 3 double mailbox bracket



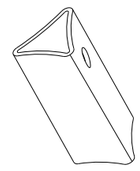
NIGP: 55083571053
Type 4 Mailbox Wedge



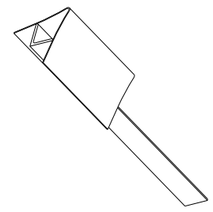
NIGP: 55083571004
Type 4 Mailbox Socket



NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

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: 8/27/2026
FILE: cv-109_TRT TxDot MB-21-4.dgn

SHEET 4 OF 4

Texas Department of Transportation | Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

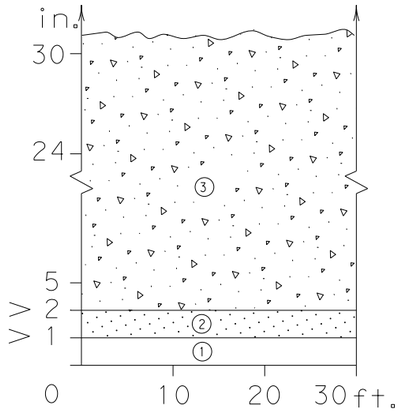
MB(4)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO.
		PARKER		83

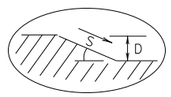
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

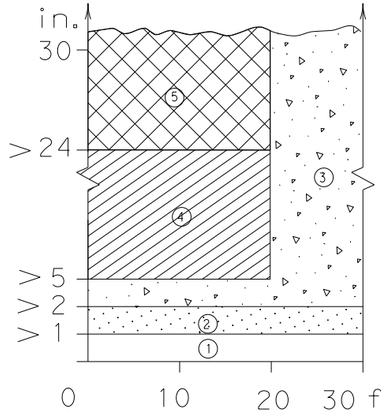
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

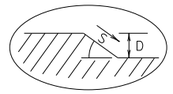


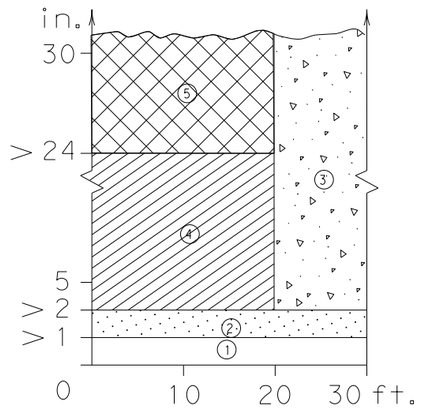
Edge Condition I
S = (3:1) (or flatter)



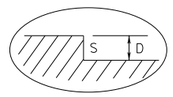


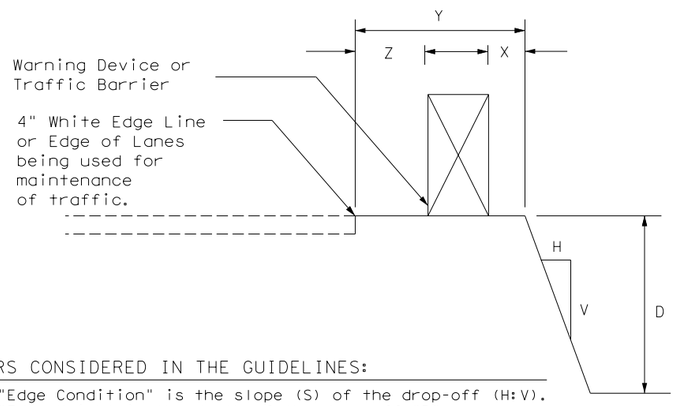
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

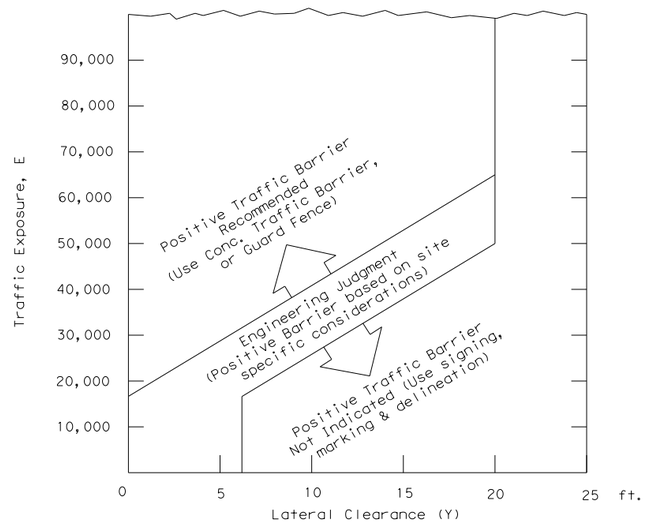
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

Date _____

Texas Department of Transportation

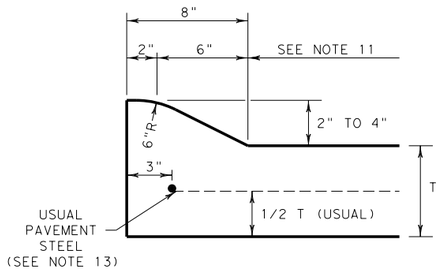
Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

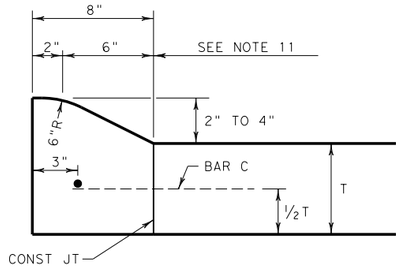
FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS				
03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
		PARKER		84

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_edgecon-21.dgn

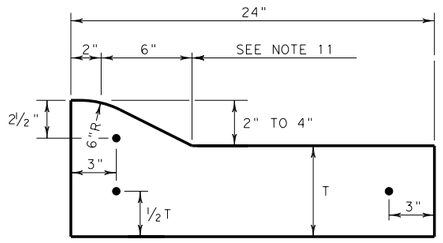
DISCLAIMER :
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



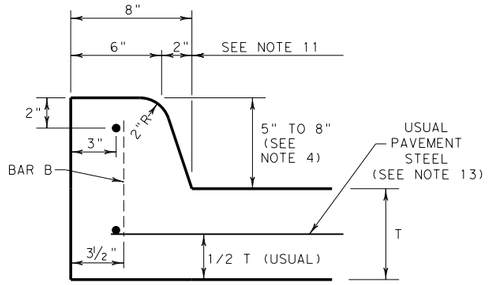
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



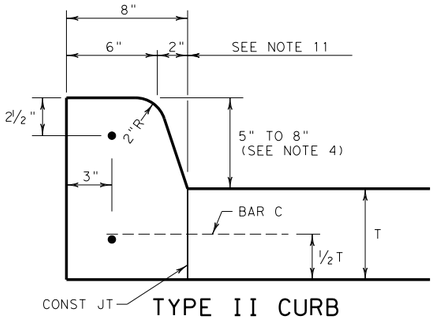
TYPE I CURB
2" - 4" HEIGHT



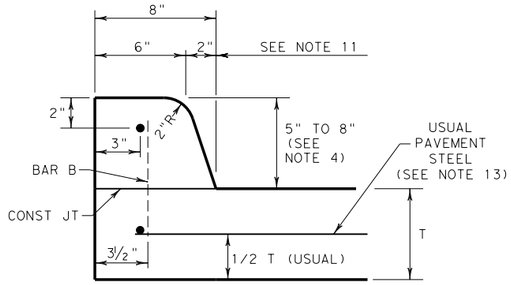
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



TYPE II CURB (MONOLITHIC)
5" - 8" HEIGHT



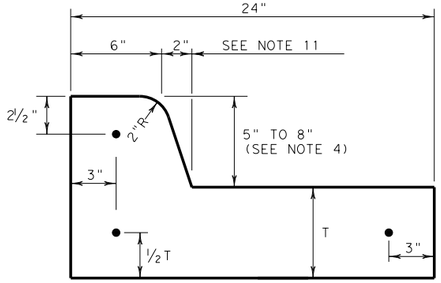
TYPE II CURB
5" - 8" HEIGHT
DOWELED VERTICAL JOINT



TYPE II CURB
5" - 8" HEIGHT
DOWELED HORIZONTAL JOINT

GENERAL NOTES

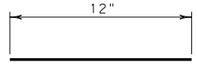
1. ALL MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ITEM 529, "CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER".
2. ALL CONCRETE SHALL BE CLASS "A".
3. ALL REINFORCING BARS SHALL BE #4, UNLESS OTHERWISE SHOWN.
4. UNLESS OTHERWISE SHOWN, ALL TYPE II CURB SHALL BE 6" HEIGHT .
5. ROUND EXPOSED SHARP EDGES WITH A ROUNDING TOOL, TO A MINIMUM RADIUS OF 1/4".
6. ALL EXISTING CURBS AND DRIVEWAYS TO BE REMOVED SHALL BE SAW CUT FULL DEPTH OR REMOVED AT EXISTING JOINTS.
7. WHERE CONCRETE CURB IS PLACED ON EXISTING CONCRETE PAVEMENT, THE PAVEMENT SHALL BE DRILLED AND THE REINFORCING BARS GROUTED OR EPOXIED IN PLACE.
8. EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED TO MATCH PAVEMENT JOINTS IN ALL CURBS OR 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 OR DRIVEWAYS, AND AT LOCATIONS DIRECTED BY THE ENGINEER.
9. VERTICAL AND HORIZONTAL DOWELS BARS AND TRANSVERSE REINFORCING BARS SHALL BE PLACED AT 4' C-C.
10. DIMENSION "T" SHOWN IS THE THICKNESS OF ADJACENT CONCRETE PAVEMENT, OR, WHEN CURB IS INSTALLED ADJACENT TO FLEXIBLE PAVEMENT, "T" IS 6" MINIMUM, 8" MAXIMUM.
11. USUAL PROFILE GRADE LINE. REFER TO TYPICAL SECTIONS AND PLAN-PROFILE SHEETS FOR EXACT LOCATIONS.
12. A SEALED, 1/2" EXPANSION JOINT SHALL BE PROVIDED WHERE CURB AND GUTTER IS ADJACENT TO SIDEWALK OR RIPRAP.
13. LONGITUDINAL AND TRANSVERSE PAVEMENT STEEL SHALL BE PLACED IN ACCORDANCE WITH PAVEMENT DETAILS SHOWN ELSEWHERE IN THE PLANS.



TYPE II CURB AND GUTTER
5" - 8" HEIGHT

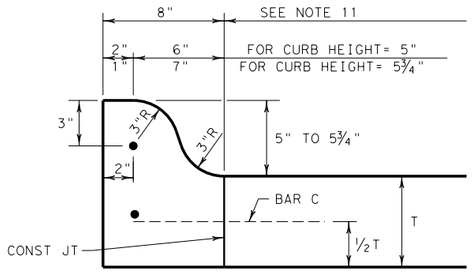
BAR B

L = (T/2) + (H- 1 1/2")
WHERE "H" = CURB HEIGHT
FOR NEW PAVEMENT, EMBED T/2 INTO FRESH CONCRETE.
FOR EXISTING PAVEMENT, DRILL 3/8" DIAM HOLE T/2 + 1/4" INTO PAVEMENT.
SECURE WITH TY III EPOXY, CLASS "E" OR "F".

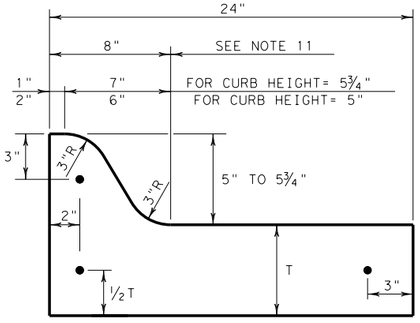


BAR C

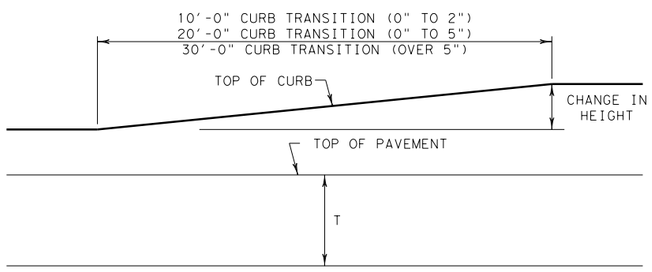
EMBED 6" INTO EXISTING CONCRETE PAVEMENT.
DRILL 3/8" X 6 1/4" HOLE
SECURE WITH TY III EPOXY, CLASS "E" OR "F".



TYPE IIA CURB
5" - 5 3/4" HEIGHT

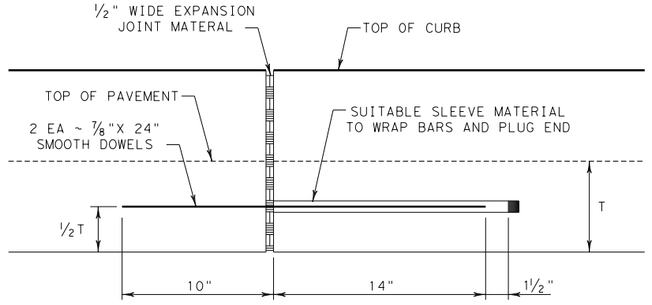


TYPE IIA CURB AND GUTTER
5" - 5 3/4" HEIGHT



CURB TRANSITION

NOTE: TO BE PAID FOR AS HIGHEST CURB



EXPANSION JOINT DETAIL

©2022 by Texas Department of Transportation;
All Rights Reserved

Texas Department of Transportation

Fort Worth District Standard

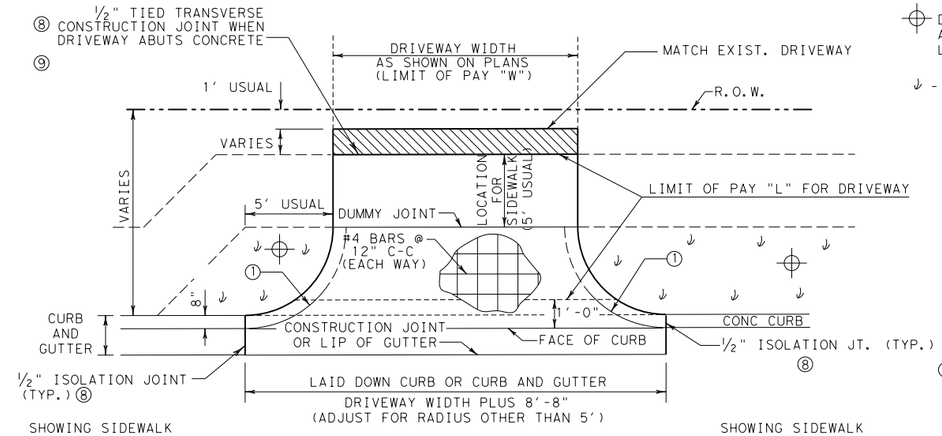
CONCRETE CURB AND CURB AND GUTTER DETAILS

CCCG (FTW)

ORIGINAL DRAWING: 05/2019	cccg-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		85
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
07/2022	DESIGNATE USUAL 6" HEIGHT	TEXAS	FTW	PARKER
		CONT.	SECT.	JOB / HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 7:46:21 PM
$PATH$ 8/27/2026
\\csM-fs2\wo$\dgn\5614\54722_5\cv-109_TRT_TxDot_CCCG-FTW.dgn
dc109 TRT TxDot CCCG-FTW.dgn

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.



PLAN VIEW

⊕ DO NOT PAVE AREA BETWEEN SIDEWALK AND DRIVEWAY CURB. SEED, SOD, OR LANDSCAPE AS DIRECTED.

↓ - SEEDING OR OTHER SURFACE NOT SUITABLE AS PEDESTRIAN WALKWAY.

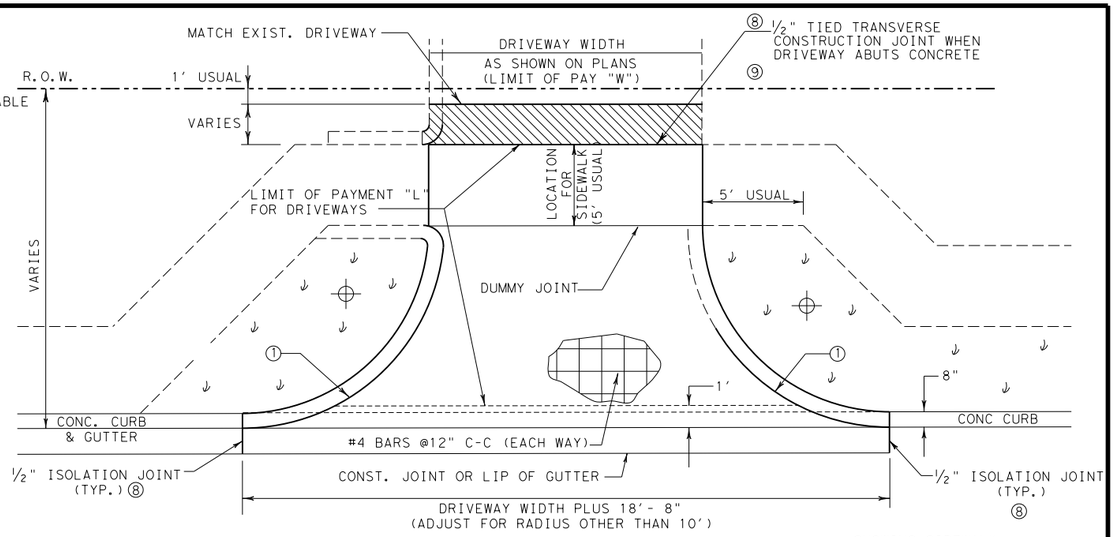
PAY AREA FOR DRIVEWAY SHALL BE THE PRODUCT OF "L" x "W"

S.Y. NON-PAY CONCRETE IN DRIVEWAY RADIUS	
2-90° RADII (FT)	NON-PAY CONC. (S.Y.)
5	0.42
10	3.04
15	10.73
20	15.36
25	29.81
30	37.19

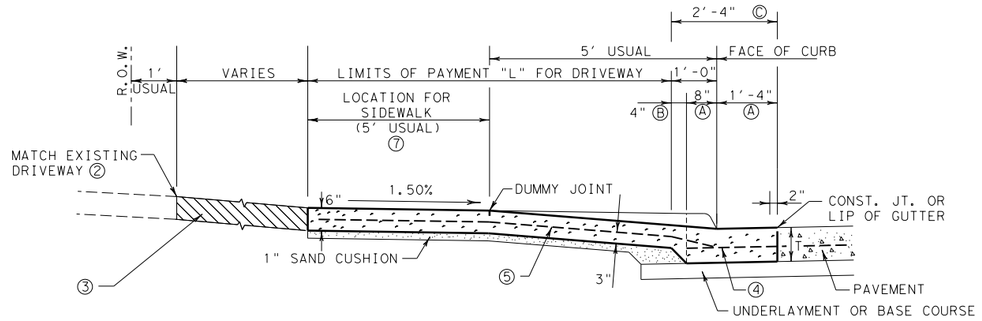
① RADII AS SHOWN ON PLANS

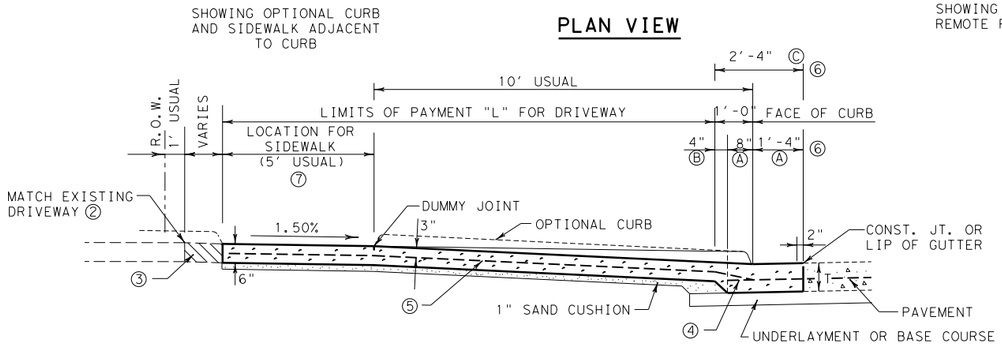
SEE ROADWAY DESIGN MANUAL, APPENDIX C FOR RECOMMENDED RADII.

② FULL DEPTH SAW CUT IF CONCRETE



PLAN VIEW





SECTION VIEW

CONCRETE RESIDENTIAL DRIVEWAY

③ REPLACE EXISTING DRIVEWAY WITH EQUAL OR BETTER MATERIAL:

IF CONCRETE, PAY FOR AS CONCRETE DRIVEWAY.

IF HOT MIX OR OTHER MATERIAL, PAY FOR IN ACCORDANCE WITH APPROPRIATE BID ITEMS.

④ WHERE DRIVEWAY IS ADJACENT TO CONCRETE PAVEMENT, 36" - #4 TIE BAR, 12" EMBEDMENT INTO PAVEMENT (CAST-IN-PLACE OR DRILLED AND GROUTED). SPACING TO MATCH TRANSVERSE STEEL IN CONCRETE PAVEMENT.

MULTIPLE-PIECE TIE BARS OR 24" EXTENSION OF TRANSVERSE PAVING STEEL MAY BE USED IN LIEU OF TIE BARS.

LONGITUDINAL STEEL IN GUTTER PORTION TO MATCH CONCRETE PAVEMENT OR CONCRETE CURB AND GUTTER DETAILS.

⑤ #4 BARS @ 12" C-C EACH WAY (EXTEND TO FACE OF CURB) BEND AS REQ'D TO TIE TO PAVING STEEL OR TIE BARS.

SECTION VIEW

CONCRETE COMMERCIAL DRIVEWAY

⑥ IF ADJACENT TO CONCRETE PAVEMENT:
Ⓐ PAID FOR AS CONCRETE PAVEMENT,
Ⓑ PAID FOR AS CONCRETE CURB.

IF ADJACENT TO HOT MIX OR FLEXIBLE PAVEMENT:
Ⓒ PAID FOR AS CONCRETE CURB AND GUTTER.

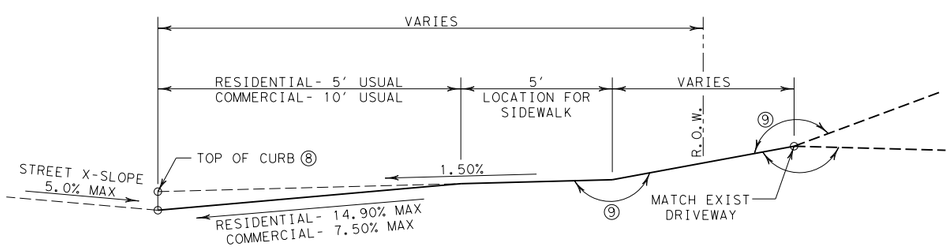
T = THICKNESS OF CONCRETE PAVEMENT OR CONCRETE CURB AND GUTTER

⑦ LOCATION FOR SIDEWALK TO BE PROVIDED ON ALL DRIVEWAYS

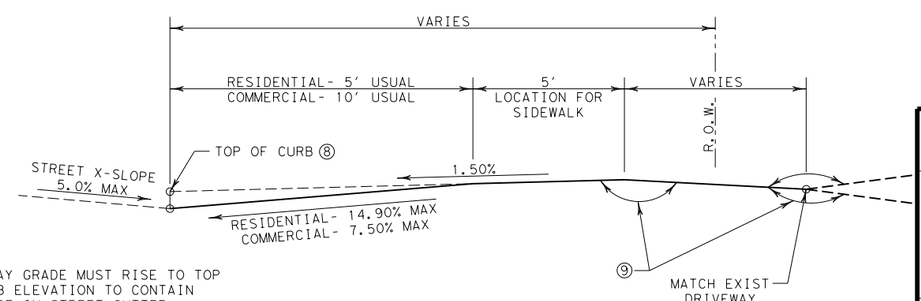
FOR SIDEWALK DETAILS, SEE STANDARD CSWD(FTW)

⑧ SEE STANDARD JS (FTW) FOR JOINT DETAILS.

⑨ IF, IN THE OPINION OF THE ENGINEER, ADJACENT CONCRETE IS NOT SOUND, 1/2" ISOLATION JOINT MAY BE USED IN LIEU OF TIED JOINT.



SAG CONDITION



CREST CONDITION

⑧ DRIVEWAY GRADE MUST RISE TO TOP OF CURB ELEVATION TO CONTAIN DRAINAGE IN STREET GUTTER.

⑨ 8% MAX CHANGE IN GRADE (VERTICAL CURVE REQ'D IF 4% OR GREATER).

ALLOWABLE DRIVEWAY GRADES

©2024 by Texas Department of Transportation; All Rights Reserved

Texas Department of Transportation

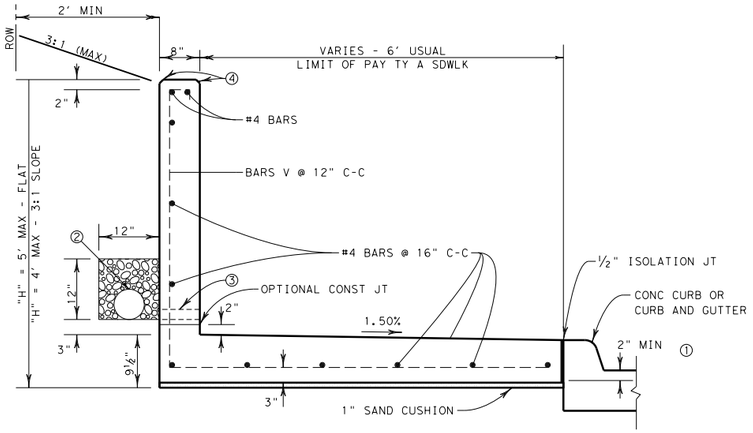
Fort Worth District Standard

CONCRETE DRIVEWAY DETAILS CDD (FTW)

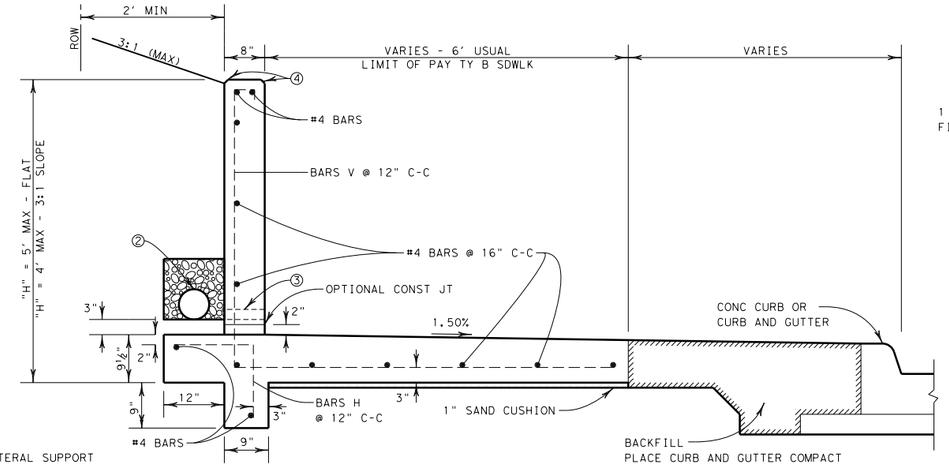
ORIGINAL DRAWING: 05/2019	cdd-ftw.dgn	PROJECT NO.			SHEET NO.
DATE	REVISIONS				86
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY	
11/2020	REVISED JOINT NOMENCLATURE REVISED NOTE 4 ADD NOTE 9	TEXAS	FTW	PARKER	
07/2022 08/2024	ELIMINATE 1" RISE AT GUTTER LINE REVISED NOTE 9	CONT.	SECT.	JOB	HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:08:52 PM
$PATH$
\\icsm-fs\ftw\TxDot\CDD\FTW\dgn\CDD-FTW.dgn
(c) 08 FTW TxDot CDD FTW.dgn
\\icsm-fs\ftw\TxDot\CDD\FTW\pdf_work\cdd-ftw.pdf
\\icsm-fs\ftw\TxDot\5614\54722_2\cv-109_TRI_TxDot_CDD-FTW.dgn

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.

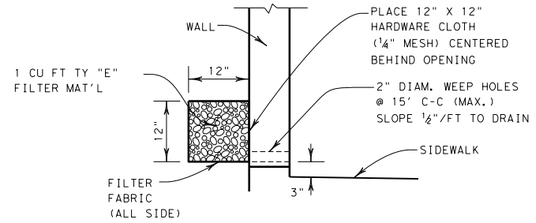


TYPE A SIDEWALK-ADJACENT TO CURB



TYPE B SIDEWALK-REMOTE FROM CURB

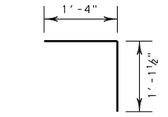
① 2" MINIMUM REQUIRED FOR LATERAL SUPPORT
② INSTALL 6" PIPE UNDERDRAIN (TY. 5, 6, 7, OR 8) ENTIRE LENGTH OF WALL. USE TY. "E" FILTER MATERIAL. SLOPE TO DRAIN AND CONNECT TO STORM DRAIN.
③ IF, IN THE OPINION OF THE ENGINEER, USE OF UNDERDRAIN IS IMPRACTICAL, INSTALL WEEP HOLES AS SHOWN.
④ ¾" CHAMFER



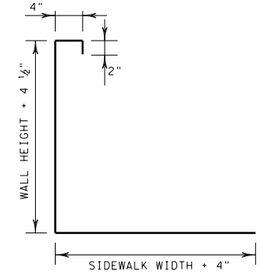
WEEP HOLE DETAIL

SPECIAL CONCRETE SIDEWALK w/ INTEGRATED RETAINING WALL

N. T. S.

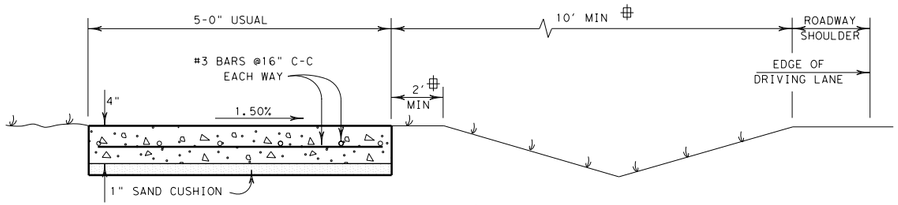


#4 BARS H @ 12" C-C



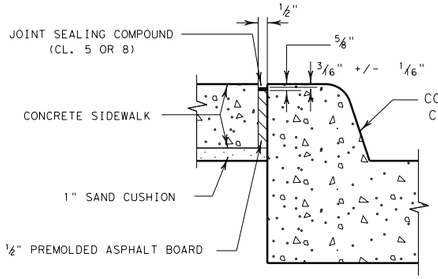
#4 BARS V @ 12" C-C

REINFORCING STEEL DETAILS



SIDEWALK TO BE 10' MIN. FROM EDGE OF SHOULDER OR 2' MIN. FROM TOP OF DITCH BACK SLOPE, WHICHEVER IS GREATER (10' MIN. FROM EDGE OF SHOULDER IF NO DITCH.)

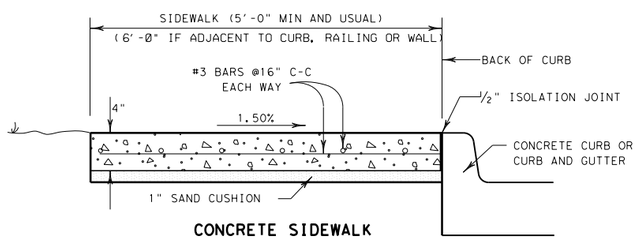
CONCRETE SIDEWALK
(ROADWAY W/O CURB)



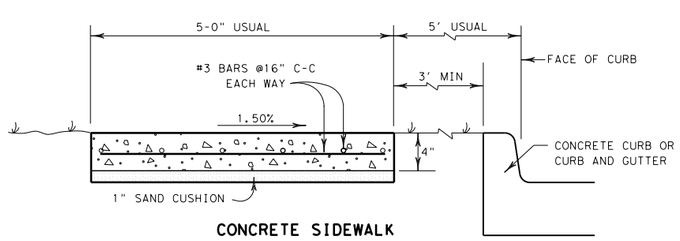
1/2" ISOLATION JOINT
(SIDEWALK ADJACENT TO CURB)

GENERAL NOTES:

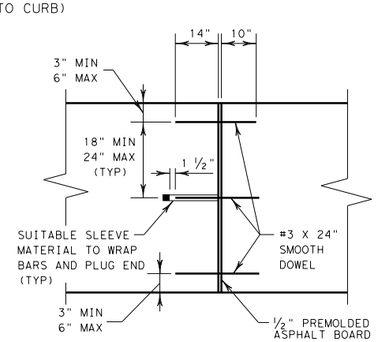
1. CONCRETE FOR SPECIAL CONCRETE SIDEWALK W/ INTEGRATED RETAINING WALL SHALL BE CLASS "C". ALL OTHER CONCRETE SIDEWALK SHALL BE CLASS "A".
2. ALL REINFORCING STEEL SHALL BE GRADE 60, # 4 BARS UNLESS OTHERWISE INDICATED.
3. SEE PLAN SHEETS FOR LOCATIONS OF SIDEWALKS AND RETAINING WALLS.
4. LONGITUDINAL SLOPE OF SIDEWALKS SHALL NOT EXCEED 5% EXCEPT IN CASES WHERE THE ADJACENT ROADWAY SLOPE EXCEEDS 5%. IF ROADWAY SLOPE EXCEEDS 5%, LONGITUDINAL SLOPE OF SIDEWALK MAY MATCH THAT OF ROADWAY.
5. IF SIDEWALK WIDTH IS LESS THAN 5', PROVIDE 5' X 5' PASSING AREAS AT INTERVALS NOT TO EXCEED 200' SPACING.
6. RETAINING WALL WILL BE SUBSIDIARY TO THE ITEM, "CONC SIDEWALKS (SPECIAL) (TYPE A)" OR "CONC SIDEWALKS (SPECIAL)(TYPE B)", WITH LIMITS OF PAY AS SHOWN.
7. SURFACE TREATMENT OF RETAINING WALL FACE DETAILED ELSEWHERE IN THE PLANS.
8. SEE PED STANDARDS FOR TREATMENT AT INTERSECTIONS AND CROSSWALKS.



CONCRETE SIDEWALK
(ADJACENT TO CURB)



CONCRETE SIDEWALK
(REMOTE FROM CURB)



TRANSVERSE EXPANSION JOINT

CONCRETE SIDEWALK DETAILS

N. T. S.

©2020 by Texas Department of Transportation;
All Rights Reserved

Texas Department of Transportation

Fort Worth District Standard

CONCRETE SIDEWALK DETAILS
CSWD (FTW)

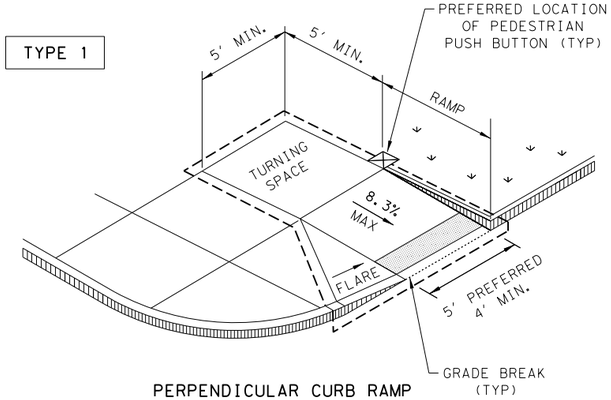
ORIGINAL DRAWING: 05/2019	cswd-ftw.dgn	PROJECT NO.			SHEET NO.
DATE	REVISIONS				87
05/2019	NEW STANDARD	STATE	STATE DIST. NO.	COUNTY	
11/2020	REVISE JOINT NOMENCLATURE, REVISE ALLOWABLE SEALANT TYPES	TEXAS	FTW	PARKER	
10/2024	REVISE NOTE 1 FOR CONCRETE CLASS	CONT.	SECT.	JOB	HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026
7:44:55 PM
$PATH$
\\icsM-fresno01\Projects\Standards\CAD\FTW\dgn\5614\54722_1\cv-109_TRT_TxDot_CSWD-FTW.dgn
(CV109_TRT_TxDot_CSWD-FTW.dgn)
\\icsM-fresno01\Projects\Standards\CAD\FTW\dgn\5614\54722_1\cv-109_TRT_TxDot_CSWD-FTW.pdf

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.

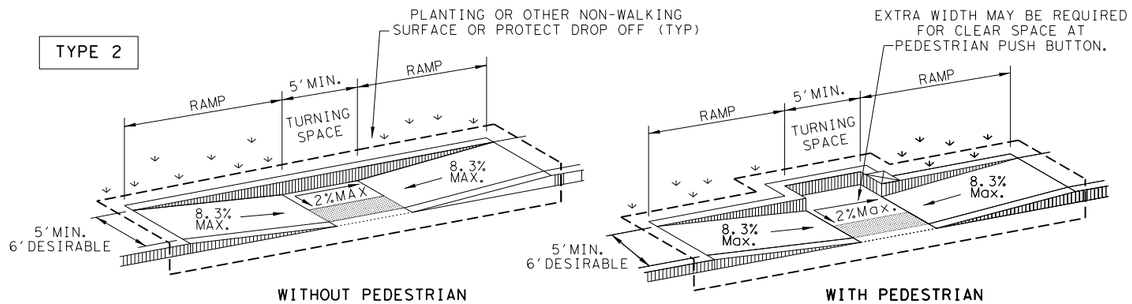
DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_PED-18-1.dgn

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

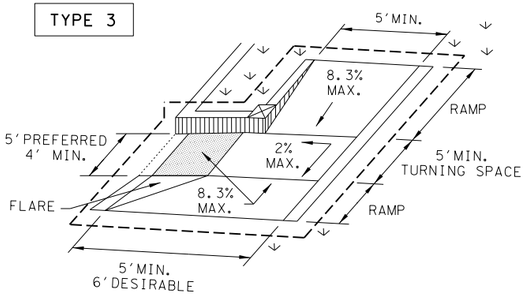


WITHOUT PEDESTRIAN PUSH BUTTON

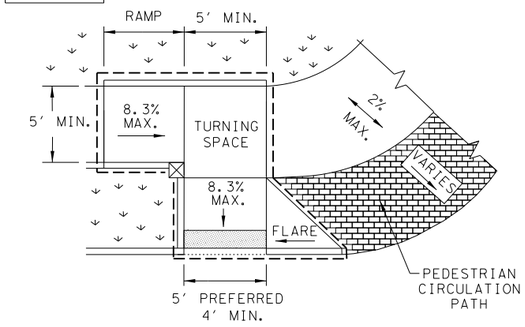
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

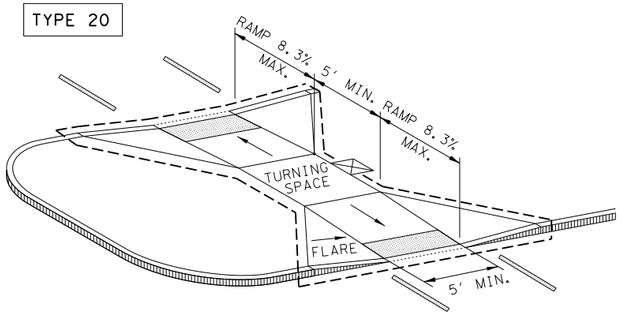


TYPE 6



COMBINATION CURB RAMPS

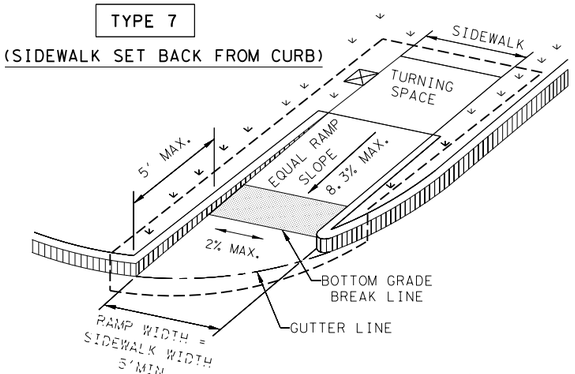
TYPE 20



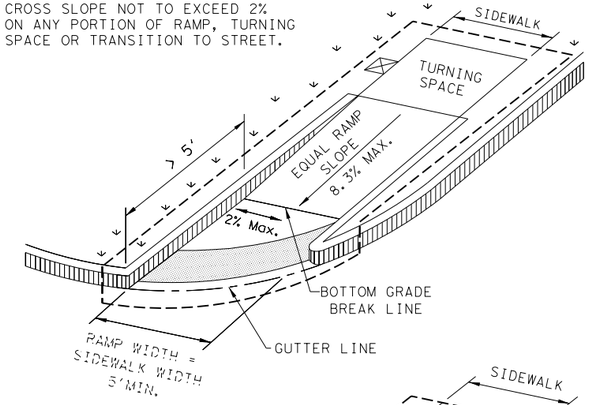
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

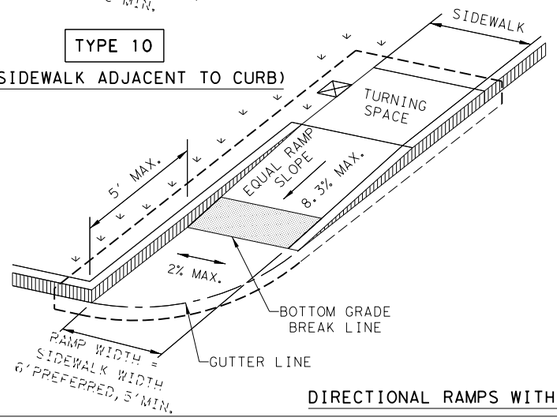


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

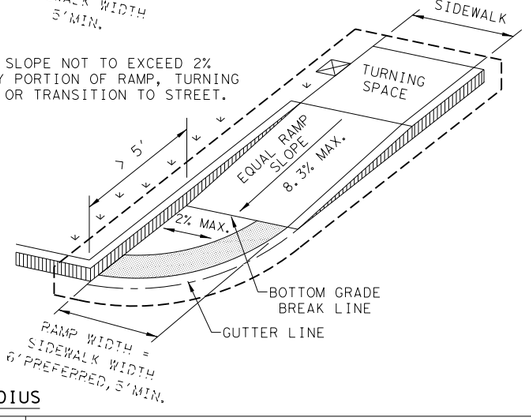


TYPE 10

(SIDEWALK ADJACENT TO CURB)

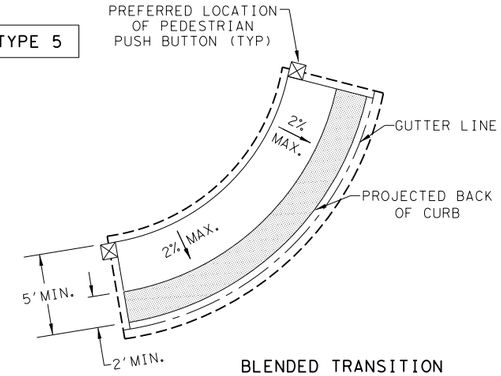


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

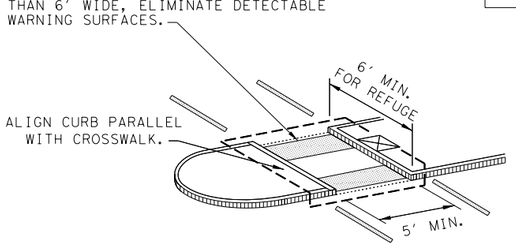
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

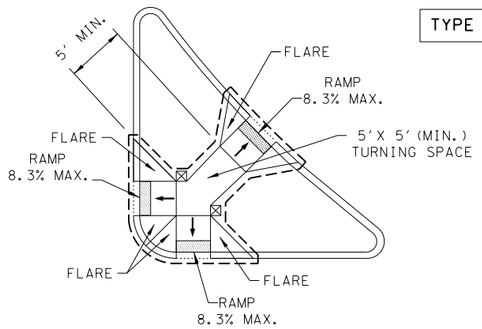
TYPE 21

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

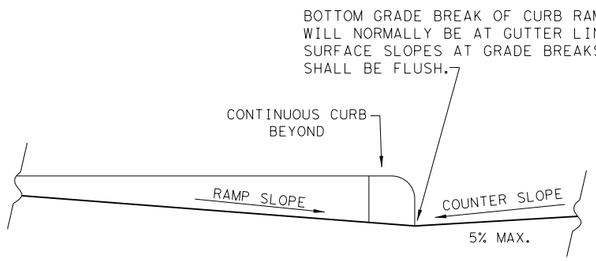


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



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				
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
		PARKER		88

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: 8/27/2026
FILE: cv-109_TRT_TxDot_PED-18-2.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

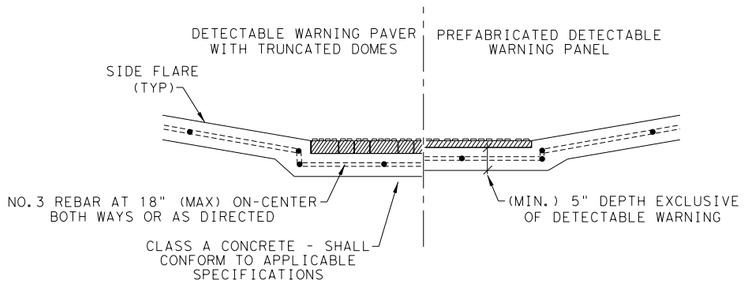
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

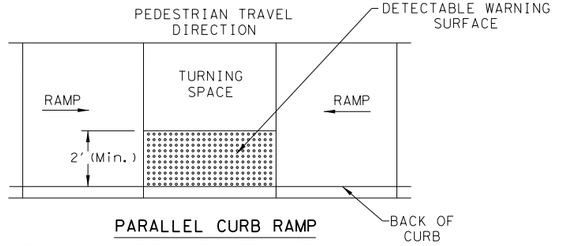
SIDEWALKS

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.

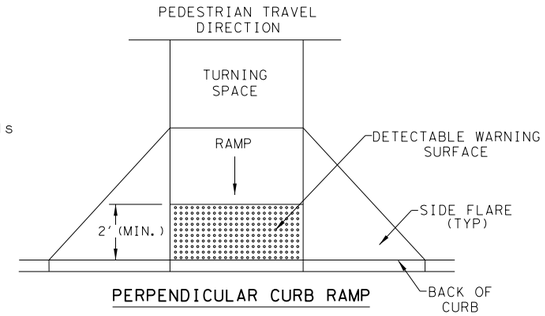


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

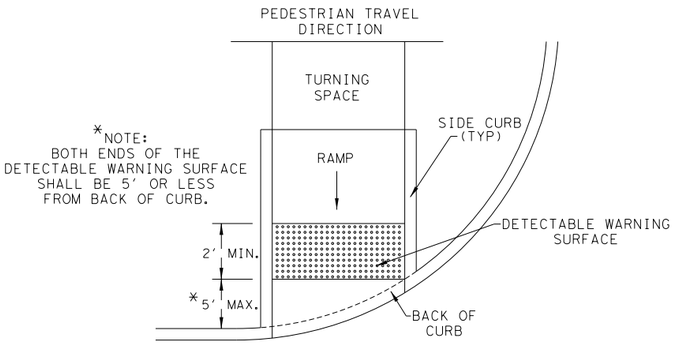
DETECTABLE WARNING SURFACE DETAILS



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

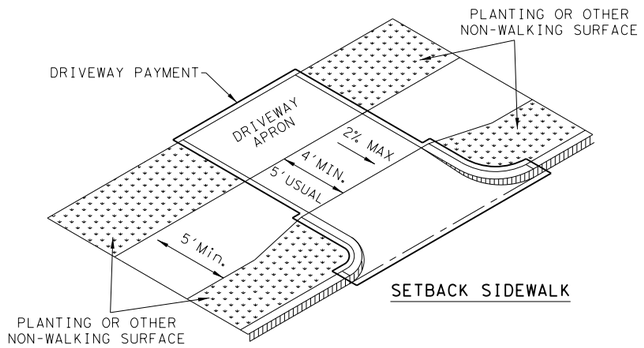
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

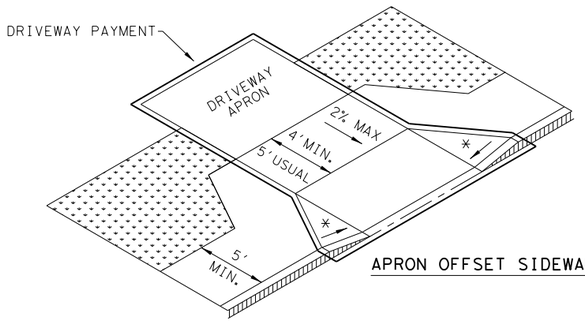
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
		PARKER		89

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.

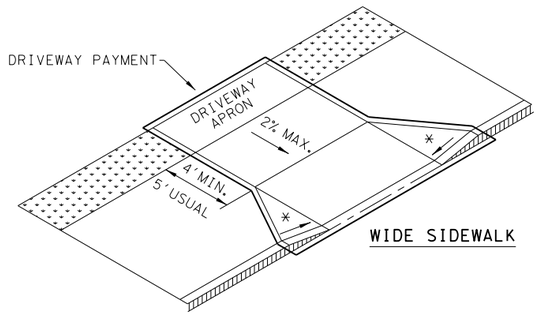
SIDEWALK TREATMENT AT DRIVEWAYS



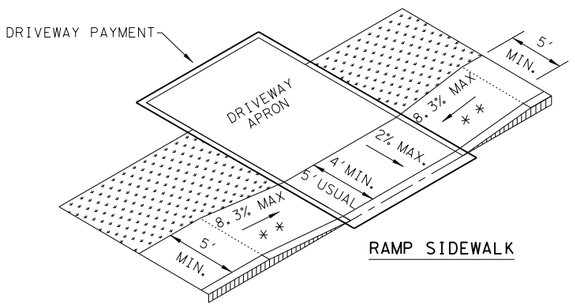
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

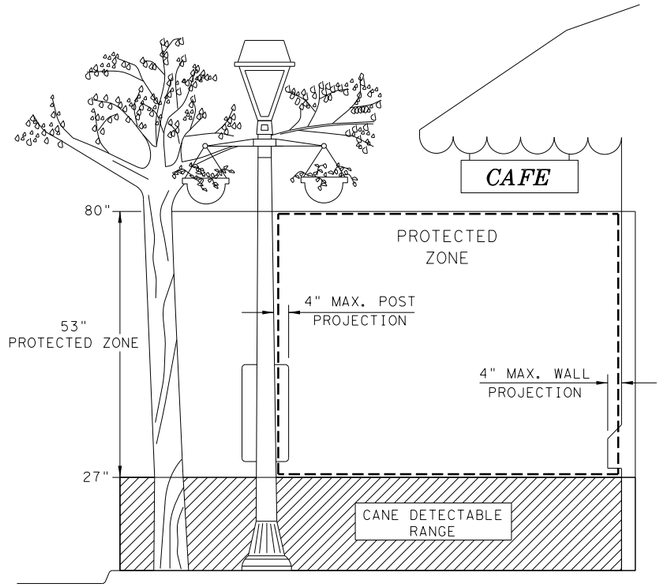


RAMP SIDEWALK

NOTES:

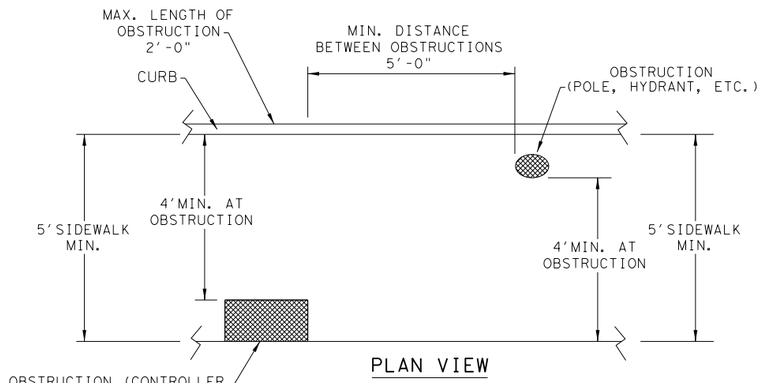
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * 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

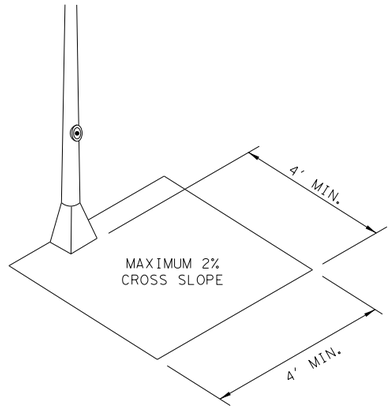
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



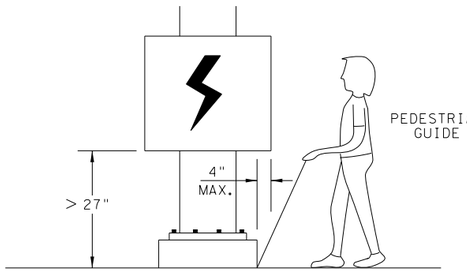
PLAN VIEW

PLACEMENT OF STREET FIXTURES

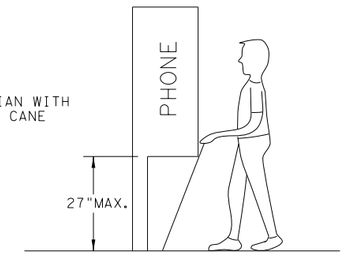
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



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 REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
		PARKER		90

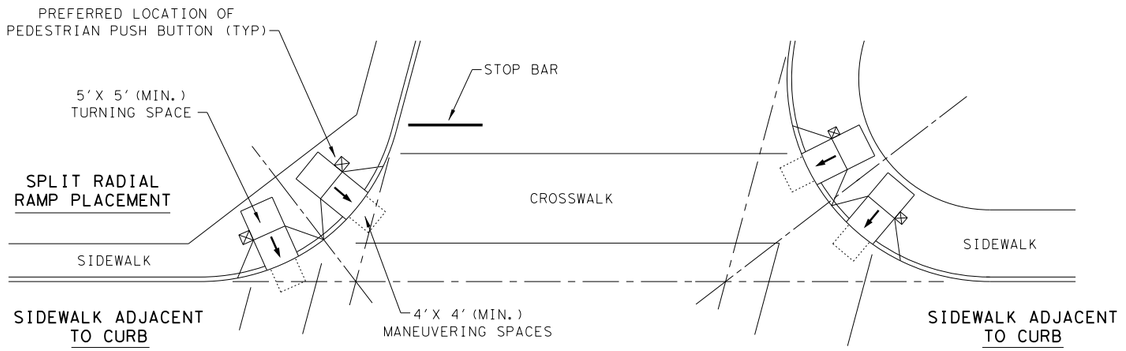
DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_PED-18-3.dgn

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.

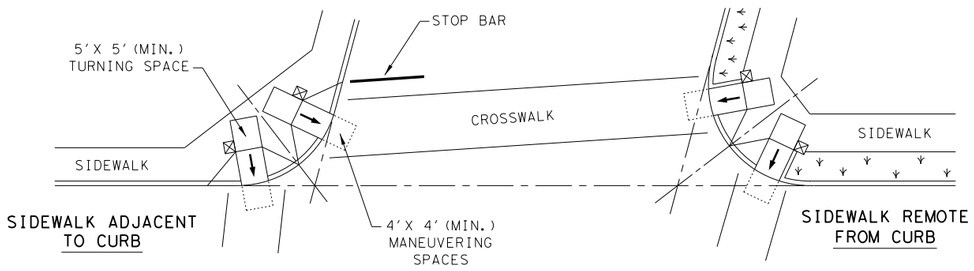
DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_PED-18-4.dgn

TYPICAL CROSSING LAYOUTS

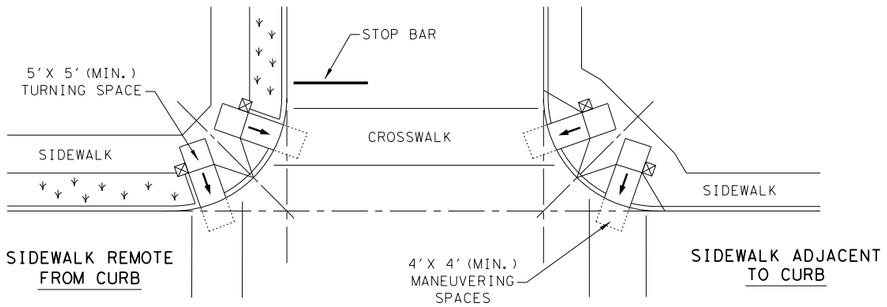
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



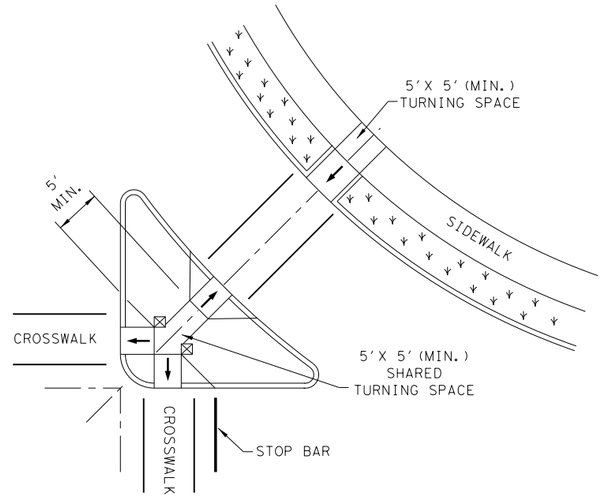
SKEWED INTERSECTION WITH "LARGE" RADIUS



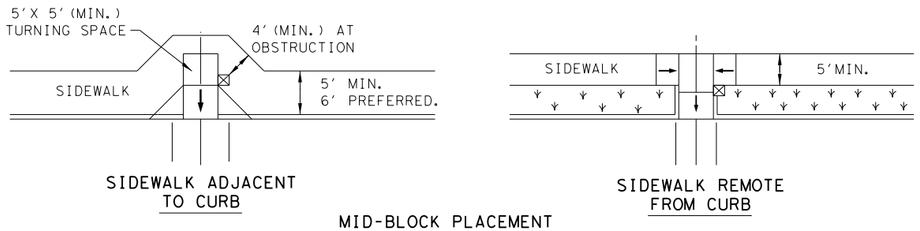
SKEWED INTERSECTION WITH "SMALL" RADIUS



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.

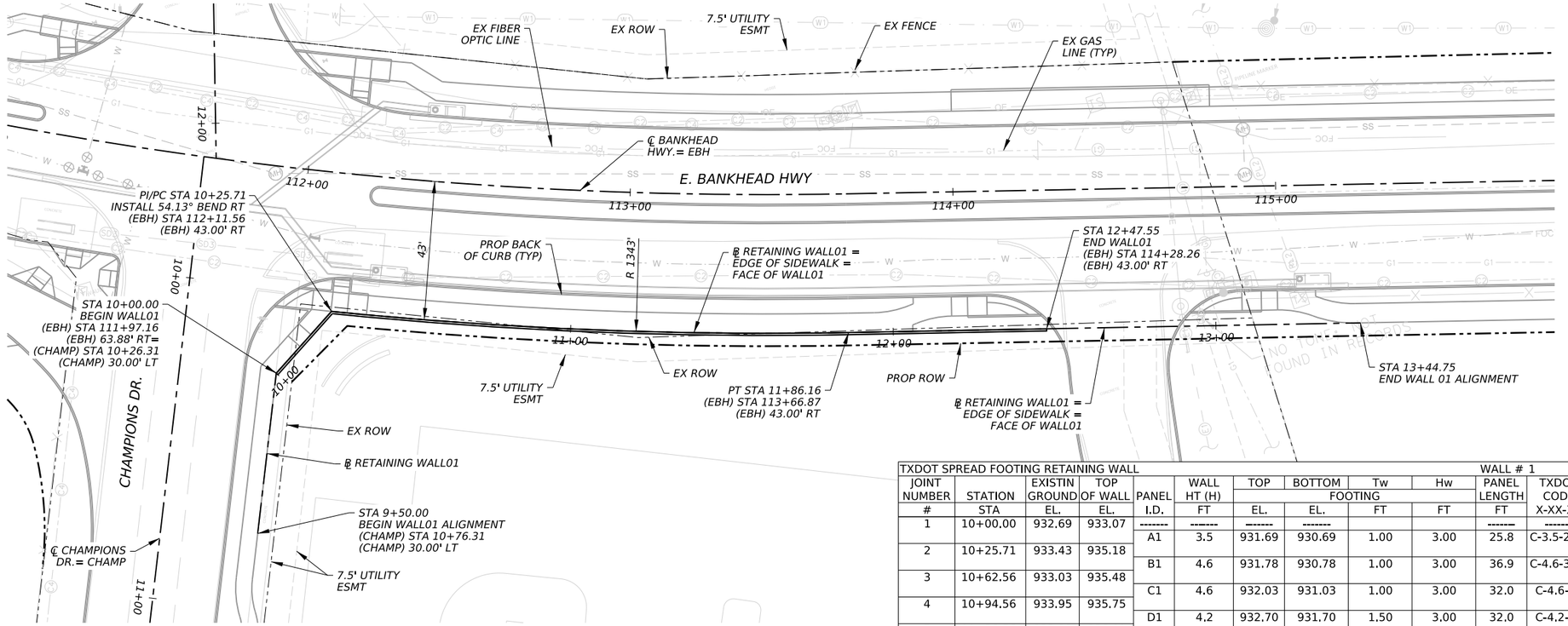
Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

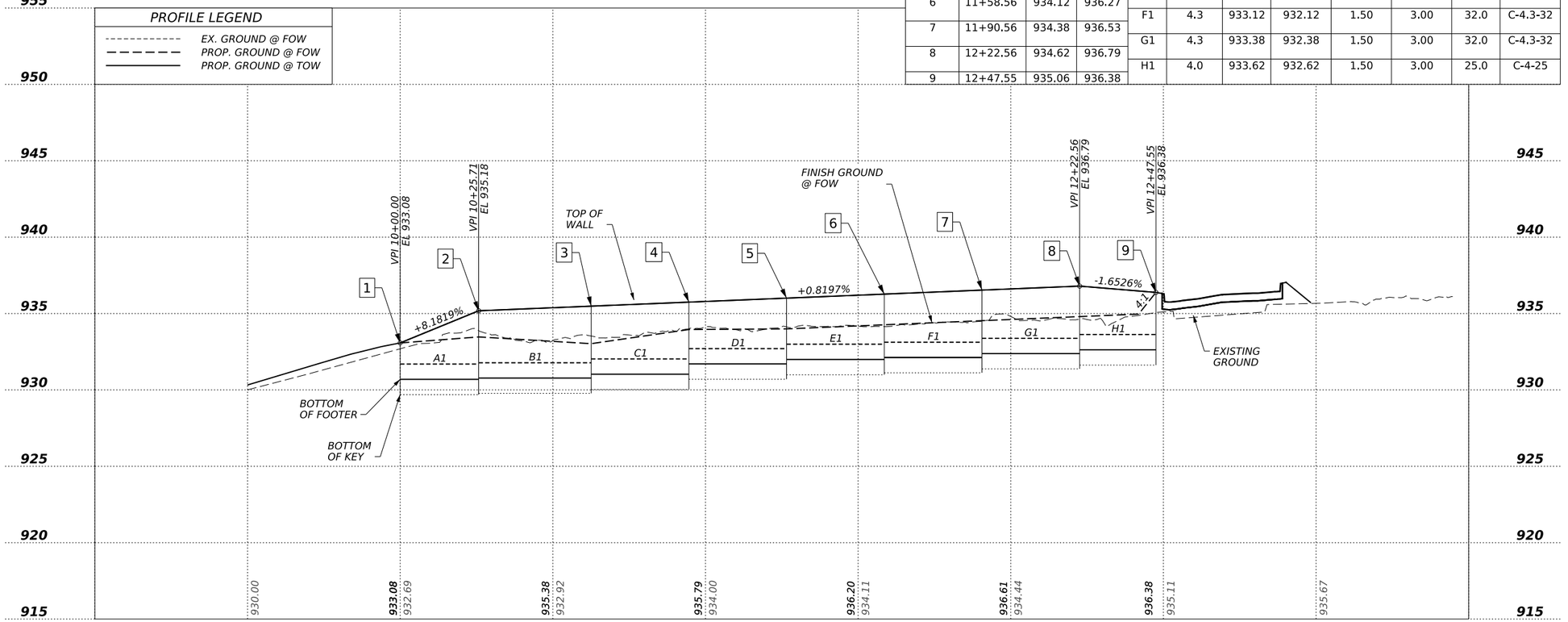
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
		PARKER		91



LEGEND

- PROP RETAINING WALL
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT

TXDOT SPREAD FOOTING RETAINING WALL												WALL # 1
JOINT NUMBER	STATION	EXISTIN GROUND	TOP OF WALL	PANEL I.D.	WALL HT (H)	TOP	BOTTOM	Tw	Hw	PANEL LENGTH	TXDOT CODE
						FOOTING					
#	STA	EL.	EL.		FT	EL.	EL.	FT	FT	FT	X-XX-XX
1	10+00.00	932.69	933.07	-------	-------	-------	-------			-------	-------
2	10+25.71	933.43	935.18	A1	3.5	931.69	930.69	1.00	3.00	25.8	C-3.5-25.8
3	10+62.56	933.03	935.48	B1	4.6	931.78	930.78	1.00	3.00	36.9	C-4.6-36.9
4	10+94.56	933.95	935.75	C1	4.6	932.03	931.03	1.00	3.00	32.0	C-4.6-32
5	11+26.56	933.99	936.01	D1	4.2	932.70	931.70	1.50	3.00	32.0	C-4.2-32
6	11+58.56	934.12	936.27	E1	4.2	932.99	931.99	1.50	3.00	32.0	C-4.2-32
7	11+90.56	934.38	936.53	F1	4.3	933.12	932.12	1.50	3.00	32.0	C-4.3-32
8	12+22.56	934.62	936.79	G1	4.3	933.38	932.38	1.50	3.00	32.0	C-4.3-32
9	12+47.55	935.06	936.38	H1	4.0	933.62	932.62	1.50	3.00	25.0	C-4-25



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

RETAINING WALL01
PLAN AND PROFILE

2025 SHEET 1 OF 1

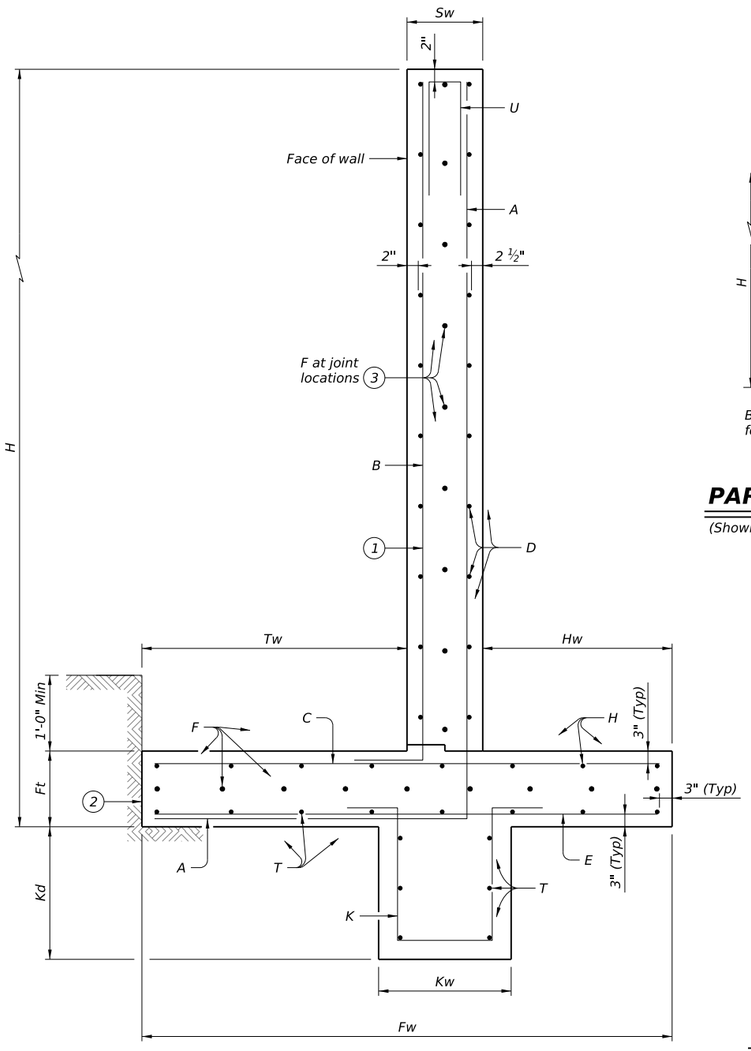
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	92

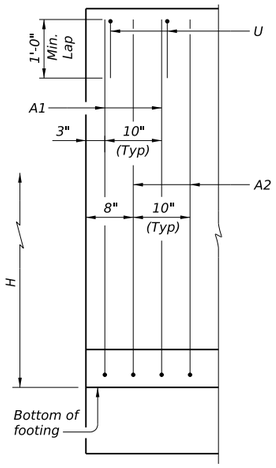
DATE: 8/27/2026 7:48:37 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\15615\54710_1ICV-109-PP-WALL01-01.dgn

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.

Wall Height "H"	PROPERTIES								REINFORCING STEEL FOR ONE 32' PANEL (DESIGN C)																																QUANTITY FOR ONE 32' PANEL		Wall Height "H"
	WALL DIMENSIONS							MAX SOIL PRESS	Bars A1					Bars A2					Bars B					Bars C					Bars E					Bars K					D (#5) at 12" Max.		Dowel F at 12" Max.		H (#5) at 12" Max.		T (#5) at 12" Max.		U ~ 39 #5 at 10" Max.				
									No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Size	Spa.	Length	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	Length	Weight	Conc (CY)	REINF (LB)	
(Ft)	Fw	Tw	Sw	Hw	Ft	Kw	Kd	T/SF																																					(Ft)
2	5'- 0"	1'- 0"	1'- 0"	3'- 0"	1'- 0"	1'- 0"	1'- 0"	0.218	39	#4	10"	3'- 2"	83	39	#4	10"	3'- 2"	83	39	#4	10"	1'- 11"	50	39	#4	10"	4'- 6"	118	39	#4	10"	4'- 6"	118	39	#4	10"	4'- 4"	113	4	132	8	65	6	198	6	198	2'- 0"	82	8.3	1240	2
4	5'- 0"	1'- 0"	1'- 0"	3'- 0"	1'- 0"	1'- 0"	1'- 0"	0.321	39	#4	10"	5'- 2"	135	39	#4	10"	5'- 2"	135	39	#4	10"	3'- 11"	103	39	#4	10"	4'- 6"	118	39	#4	10"	4'- 6"	118	39	#4	10"	4'- 4"	113	8	263	10	81	6	198	6	198	6'- 0"	245	10.7	1707	4
6	5'- 6"	1'- 6"	1'- 0"	3'- 0"	1'- 0"	1'- 0"	1'- 0"	0.395	39	#4	10"	7'- 8"	200	39	#4	10"	7'- 8"	200	39	#4	10"	5'- 11"	155	39	#4	10"	5'- 0"	131	39	#4	10"	5'- 0"	131	39	#4	10"	4'- 4"	113	12	395	12	97	6	198	6	198	8'- 5"	343	13.7	2161	6
8	7'- 4"	1'- 9"	1'- 1"	4'- 6"	1'- 0"	1'- 0"	1'- 0"	0.500	39	#4	10"	10'- 0"	261	39	#4	10"	10'- 0"	261	39	#4	10"	7'- 11"	207	39	#4	10"	6'- 10"	179	39	#4	10"	6'- 10"	179	39	#4	10"	4'- 4"	113	16	526	16	129	8	263	8	263	8'- 6"	346	18.9	2727	8
10	8'- 8"	2'- 4"	1'- 1"	5'- 3"	1'- 2"	1'- 6"	1'- 6"	0.590	39	#5	10"	12'- 7"	512	39	#4	10"	12'- 7"	328	39	#4	10"	9'- 9"	255	39	#5	10"	8'- 2"	333	39	#4	10"	8'- 2"	213	39	#4	10"	5'- 10"	152	20	658	20	161	10	329	10	329	8'- 6"	346	26.0	3616	10
12	10'- 4"	2'- 11"	1'- 2"	6'- 3"	1'- 4"	1'- 9"	1'- 9"	0.684	39	#5	10"	15'- 3"	621	39	#4	10"	15'- 3"	398	39	#4	10"	11'- 7"	302	39	#5	10"	9'- 10"	400	39	#4	10"	9'- 10"	257	39	#4	10"	6'- 7"	172	24	789	23	185	11	362	11	362	8'- 7"	350	34.8	4198	12
14	11'- 8"	3'- 6"	1'- 4"	6'- 10"	1'- 7"	2'- 0"	2'- 0"	0.769	39	#5	10"	18'- 0"	733	39	#4	10"	18'- 0"	469	39	#4	10"	13'- 4"	348	39	#5	10"	11'- 2"	455	39	#4	10"	11'- 2"	291	39	#4	10"	7'- 4"	192	28	920	27	217	13	428	13	428	8'- 9"	356	46.3	4837	14
16	13'- 1"	4'- 0"	1'- 6"	7'- 7"	1'- 9"	2'- 0"	2'- 0"	0.853	39	#5	10"	20'- 8"	841	39	#4	10"	20'- 8"	841	39	#4	10"	15'- 2"	396	39	#6	10"	12'- 7"	738	39	#4	10"	12'- 7"	329	39	#4	10"	7'- 4"	192	32	1052	30	241	14	460	14	460	8'- 11"	363	57.3	5912	16
18	14'- 7"	4'- 6"	1'- 8"	8'- 5"	1'- 9"	2'- 0"	2'- 0"	0.937	39	#6	10"	23'- 4"	1367	39	#5	10"	23'- 4"	950	39	#4	10"	17'- 2"	448	39	#7	10"	14'- 1"	1124	39	#4	10"	14'- 1"	368	39	#4	10"	7'- 4"	192	36	1183	34	273	16	526	16	526	9'- 1"	370	67.1	7325	18
20	16'- 5"	5'- 0"	1'- 10"	9'- 7"	2'- 0"	2'- 0"	2'- 0"	1.039	39	#6	10"	26'- 0"	1524	39	#6	10"	26'- 0"	1524	39	#4	10"	18'- 11"	493	39	#7	10"	17'- 11"	1429	39	#4	10"	17'- 11"	467	39	#4	10"	7'- 4"	192	38	1249	36	289	17	559	17	559	9'- 3"	377	82.8	8662	20

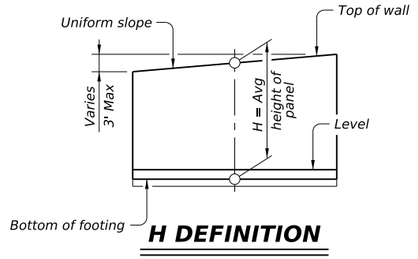


SECTION

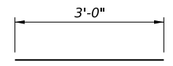


PARTIAL WALL ELEVATION

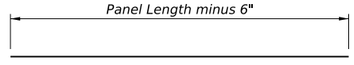
(Showing vertical reinforcing pattern in back face.)



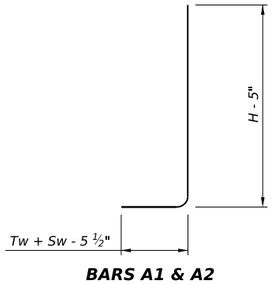
H DEFINITION



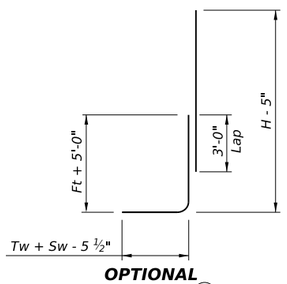
BARS F (3)



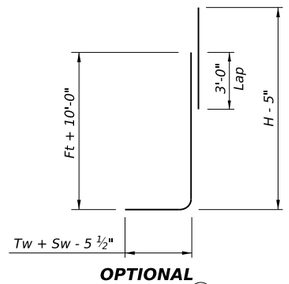
BARS D, H, and T



BARS A1 & A2

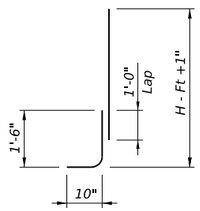


OPTIONAL BARS A1 (4)

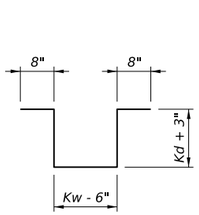


OPTIONAL BARS A2 (4)

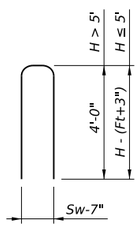
BARS B



OPTIONAL BARS B (4)



BARS K



BARS U

1. Place vertical bars inside of horizontal bars (Typical both faces).
2. Place footing toe against undisturbed soil.
3. See Retaining Wall Miscellaneous Details (RW(SF)) standard for size.
4. Optional bars splices not included in above table.

MATERIAL NOTES:

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

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Walls are designed assuming unit weight of soil = 120 pcf and a friction angle = 30 degrees for foundation and retained soil.

See Retaining Wall Miscellaneous Details (RW(SF)) standard for details and notes not shown.

These details provide designs for wall heights of 2 to 20 feet. For heights not shown, round up "H" to determine wall dimensions and reinforcing. (For example, a 9-foot high wall would use the 10-foot high dimensions and reinforcing.)

Quantities are based on "H" being average height of panel.

Retaining walls are designed to be coded as follows on Retaining Wall Layout Sheets:

C - 15 - 32
- 32: Panel length ~ 32 ft. is standard; 28 ft. requires special quantities.
- 15: Average height (H) of panel.
- C: Design A = No surcharge or slope above wall. Design B = No surcharge; slopes to 3:1. Design C = Traffic surcharge; no slope above wall.

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

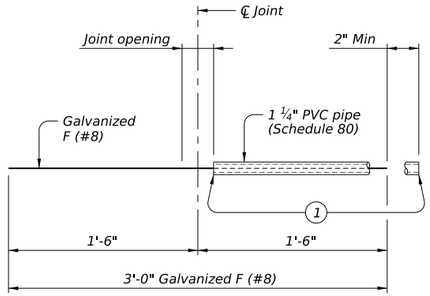
SPREAD FOOTING RETAINING WALL

RW(SFC)

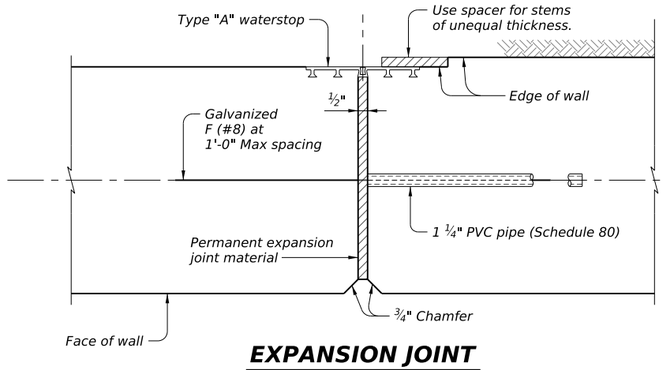
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				
8-22: Constructability update. 5-25: Modified Bars K	DIST	COUNTY		SHEET NO.
		PARKER		93

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_RW-SFC-25.dgn

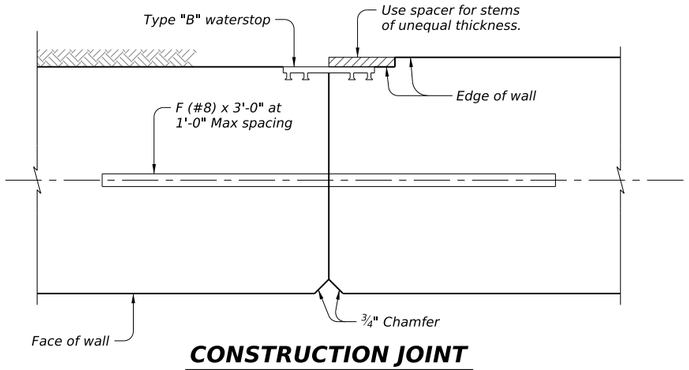
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



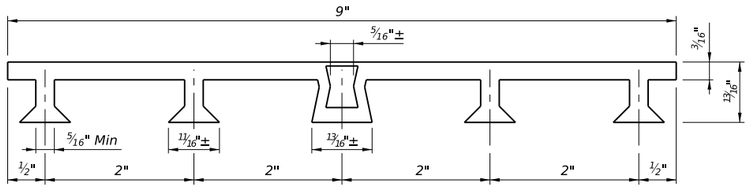
BAR F (#8) ASSEMBLY DETAIL



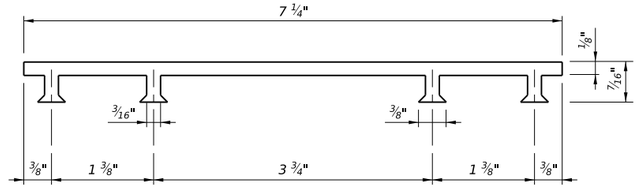
EXPANSION JOINT



CONSTRUCTION JOINT

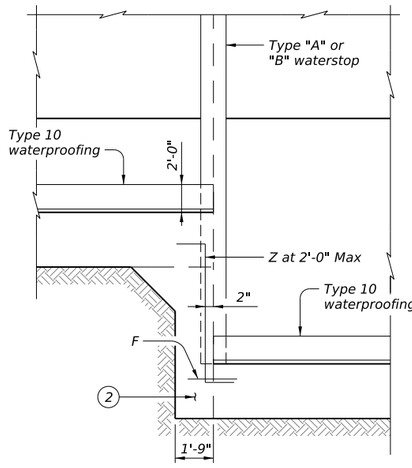


PVC WATERSTOP TYPE "A"

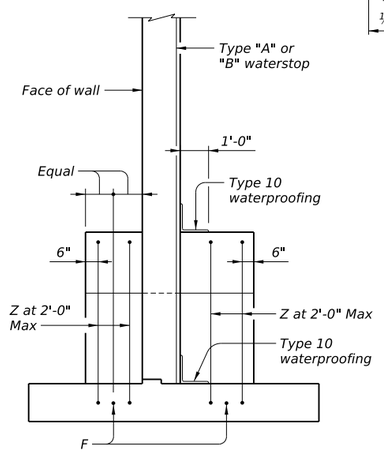


PVC WATERSTOP TYPE "B"

Note: Dimensions and shapes may vary slightly depending on manufacturer.

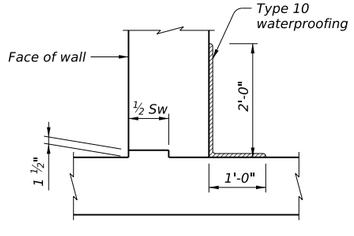


PARTIAL ELEVATION

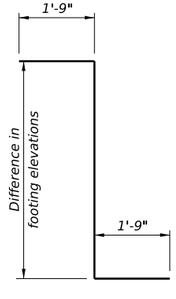


PARTIAL SECTION

SHOWING WATERSTOP AT FOOTING ELEVATION TRANSITION



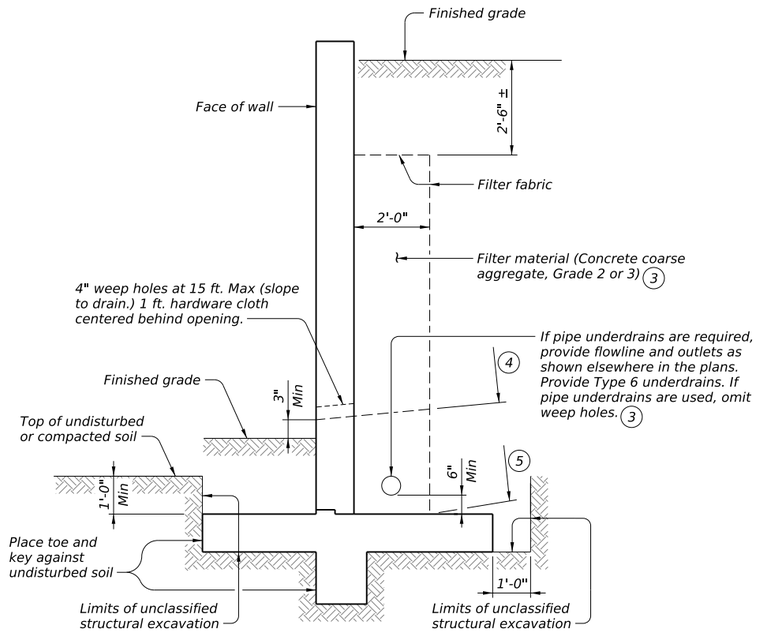
JOINT AND WATERSTOP DETAILS



BARS Z (#5)

Omit Bars Z when difference in top of footing elevations is less than 2 ft.

1. Tape ends of 1 ¼" PVC Schedule 80 to prevent concrete or mortar from seeping in.
2. Class C unreinforced concrete when difference in top of footing elevations is less than 2 feet. Omit when Dowel Bars F can be placed between adjacent footings with 4-inch cover top and bottom. Footing elevation difference not to exceed 4 feet.
3. Underdrain pipe to be in accordance with Item 556, "Pipe Underdrains."
4. Stop coarse aggregate at this level when weep holes are used.
5. Use coarse aggregate to here when underdrains are used.



DRAINAGE DETAILS AND EXCAVATION DIAGRAM

MATERIAL NOTES:

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

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Walls are designed assuming unit weight of soil = 120 pcf and a friction angle = 30 degrees for foundation and retained soil.

The undisturbed or compacted soil depth in front of walls must not measure less than Kd + Ft + 1 foot as measured upwards from bottom of key.

Retaining walls are detailed to be placed on grades up to 10% with level footing, with no changes in reinforcing steel. Steeper grades can be accommodated by shortening Bars A and Bars B and increasing the length of legs of Bars U by the same amount. No change in quantities will be required.

Retaining walls may be placed on horizontal curves by adjusting lengths of Bars T and Bars H in the footing. Minor revisions to concrete quantities may be required as a result.

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

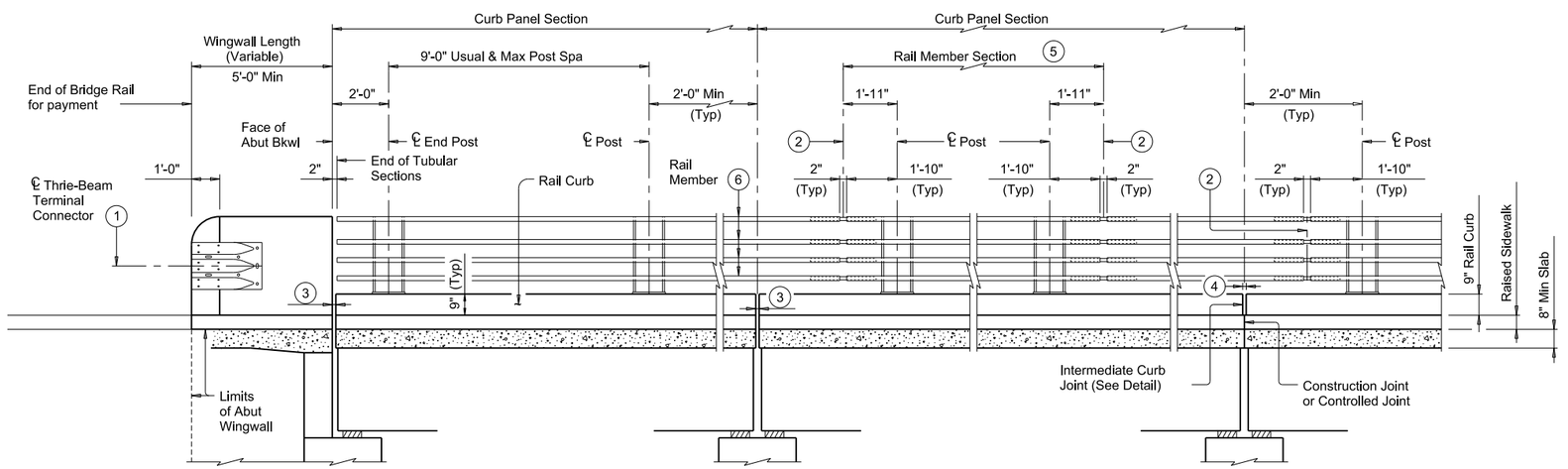
SPREAD FOOTING RETAINING WALL MISCELLANEOUS DETAILS

RW(SF)

FILE: RW-SF-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				
8-22: Updated underain requirements. 5-25: Editorial updates.	DIST	COUNTY		SHEET NO.
		PARKER		94

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_RW-SF-25.dgn

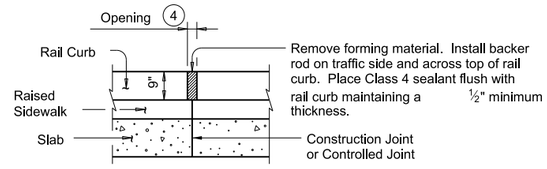
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



AT ABUTMENTS | AT BENTS WITH SLAB EXP JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

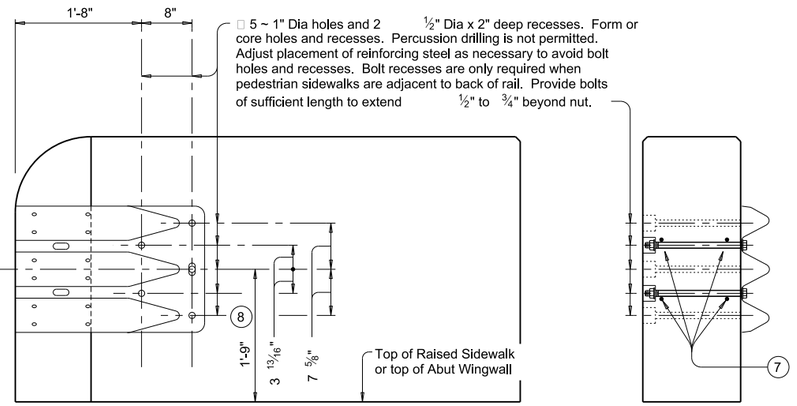
ROADWAY ELEVATION OF RAIL

Showing combination rail on a raised sidewalk.



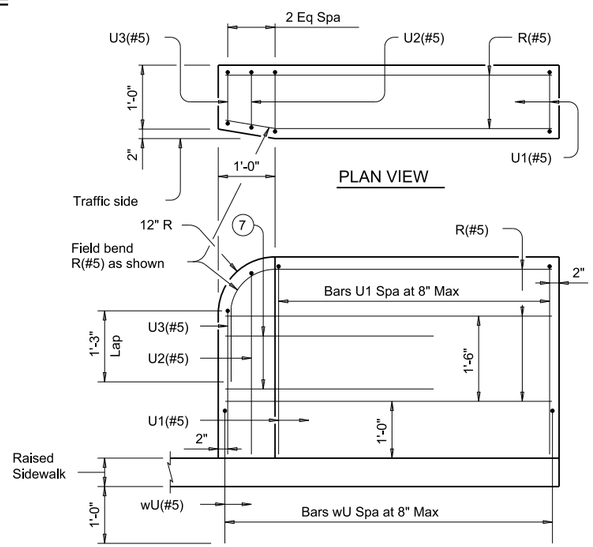
INTERMEDIATE CURB JOINT DETAIL

Provide at all interior bents without slab expansion joints.



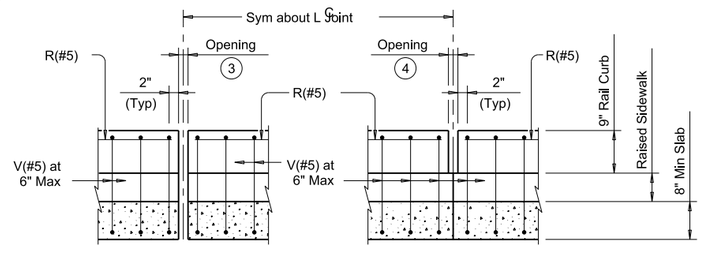
ELEVATION | SECTION

TERMINAL CONNECTION DETAILS



PLAN VIEW

AT ABUTMENT WINGWALL



AT BENTS WITH SLAB EXPANSION JOINTS | AT BENTS WITHOUT SLAB EXP JOINTS

ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT

Showing with raised sidewalk

1. Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence." Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
2. ℄ Expansion Joint or Splice Joint as required.
3. Same as slab joint opening. (5" Max Expansion Joint).
4. ¼" Min, ¾" Max.
5. Rail member sections must have at least two posts but not more than four.
6. HSS 6 x 2 x ¼ (ASTM-A1085 or A500 Grade B).
7. Place 4 additional Bars R(#5) 3'-8" in length inside Bars U(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
8. Increase 2" for structures with Overlay.

Texas Department of Transportation | Bridge Division Standard

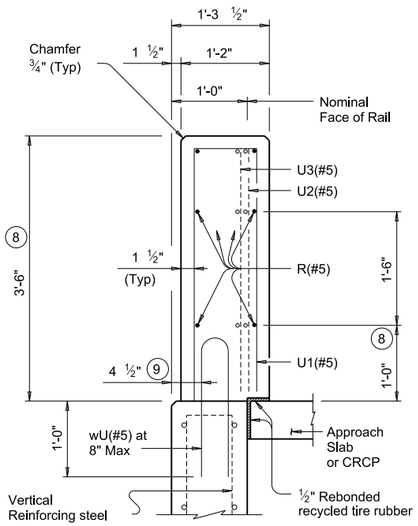
COMBINATION RAIL

TYPE C1W

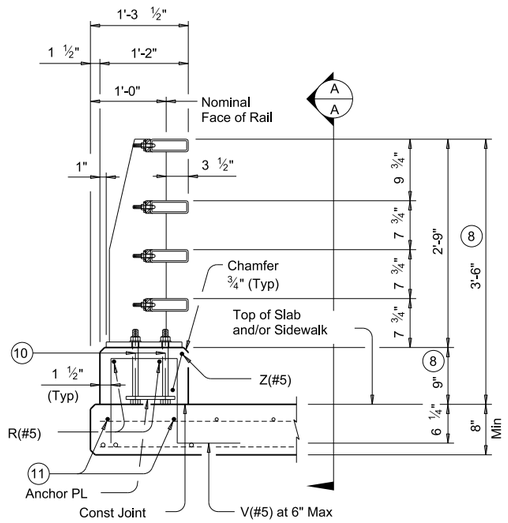
FILE: RL-C1W-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		95

DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_RL-C1W-19_1.dgn

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.

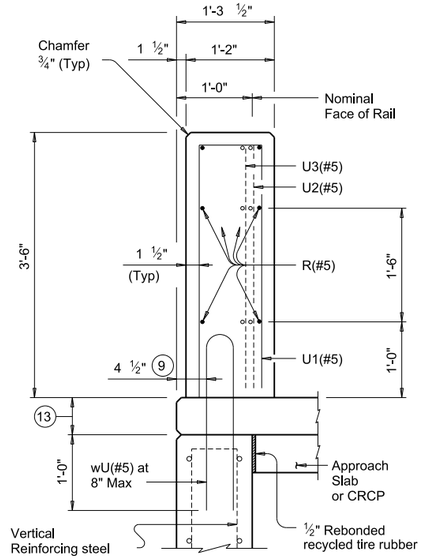


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS

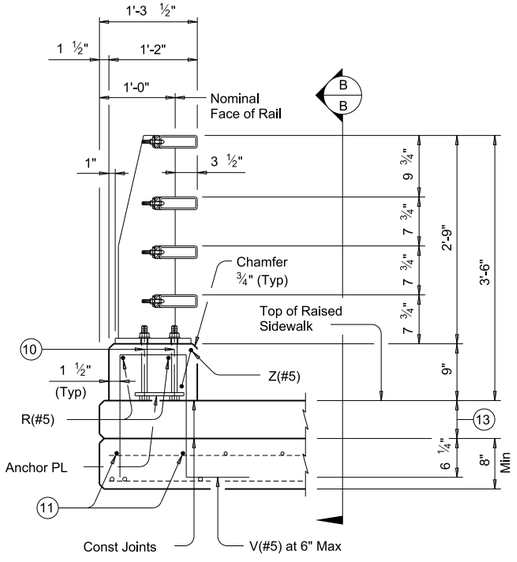


ON BRIDGE SLAB

SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK

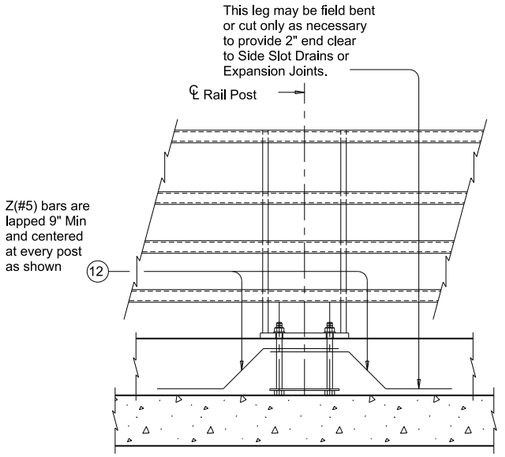


ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



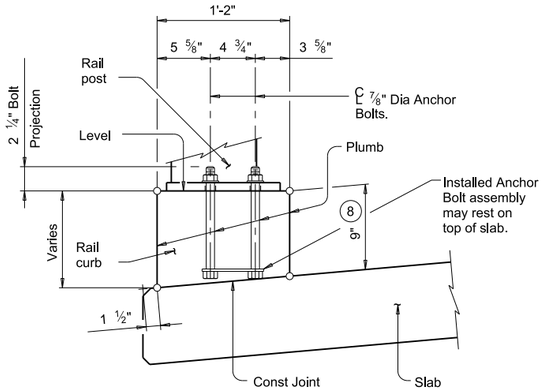
ON BRIDGE SLAB

SECTIONS THRU RAIL WITH RAISED SIDEWALK

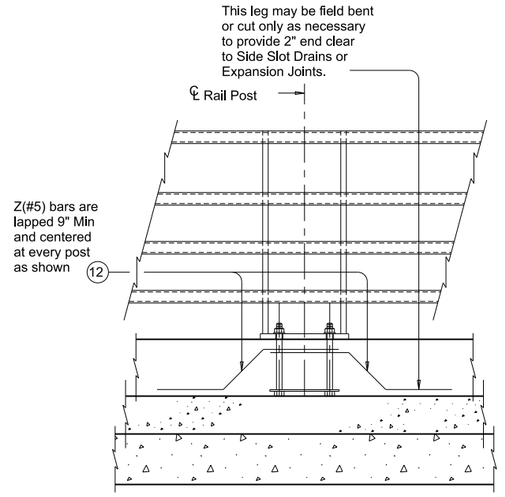


VIEW A-A

Bars V and R omitted for clarity.
Showing without raised sidewalk.

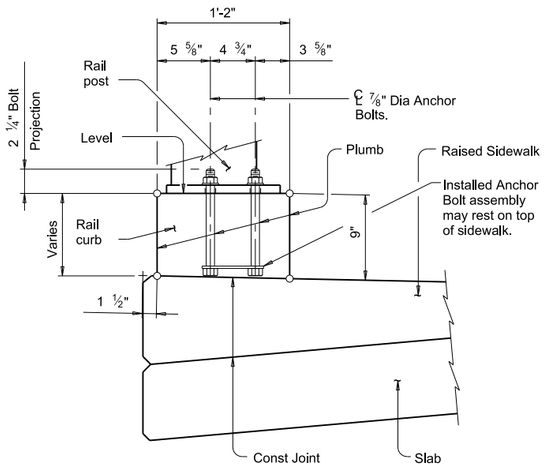


WITHOUT RAISED SIDEWALK



VIEW B-B

Bars V and R omitted for clarity.
Showing with raised sidewalk.



WITH RAISED SIDEWALK

RAIL CURB FORMING DETAIL

Reinforcing steel and rail curb chamfers not shown for clarity.

(8) Increase 2" for structures with Overlay.

(9) 5 ¼" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

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

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

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

(13) Raised Sidewalk.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

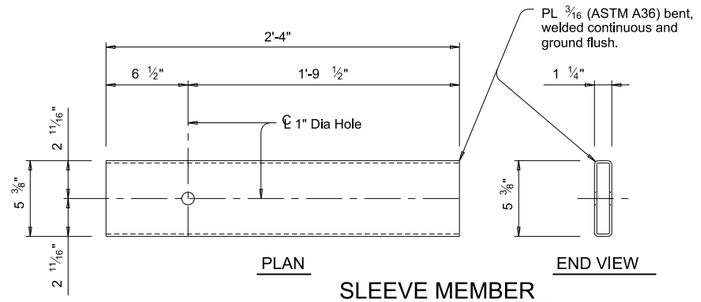
TYPE C1W

FILE:	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
		PARKER		96

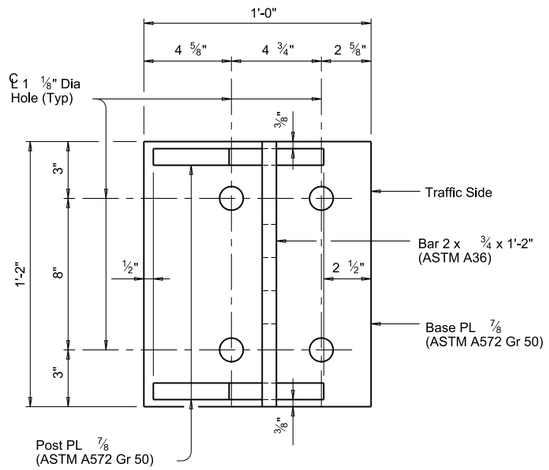
DATE: 8/27/2026
FILE: cv-109_TRT_TxDot_RL-C1W-19_2.dgn

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: 8/27/2026
FILE: cv-109_TRT_TxDot_RL-C1W-19_3.dgn

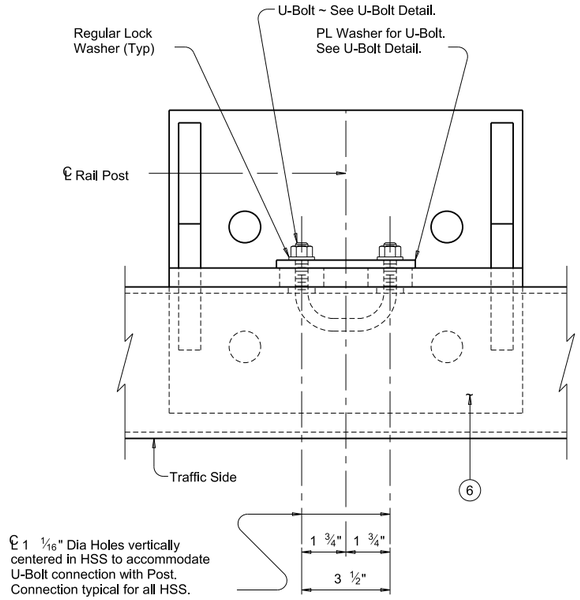


SLEEVE MEMBER



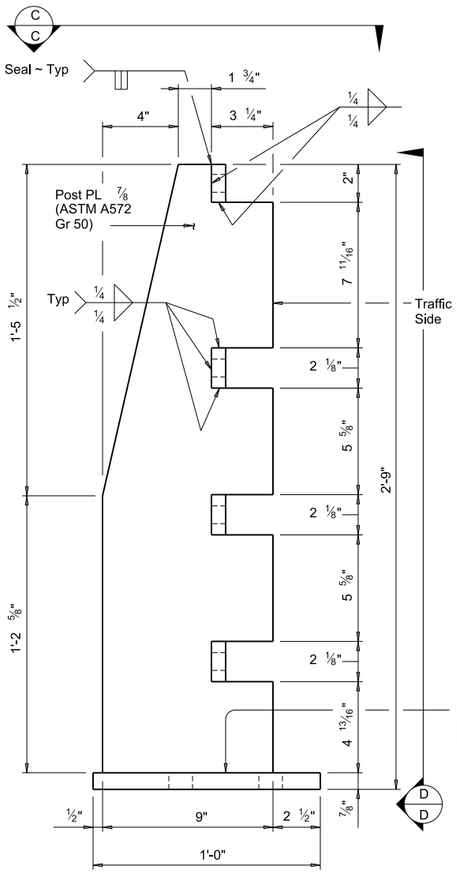
VIEW C-C

(Showing Hole location in Base PL)

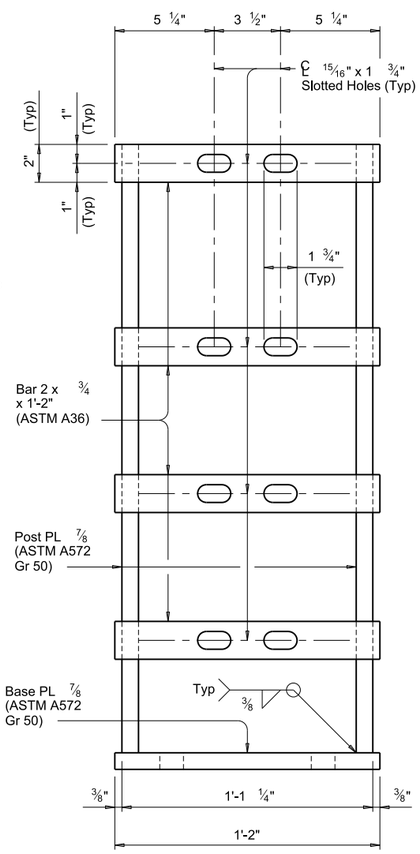


TOP VIEW OF RAIL POST

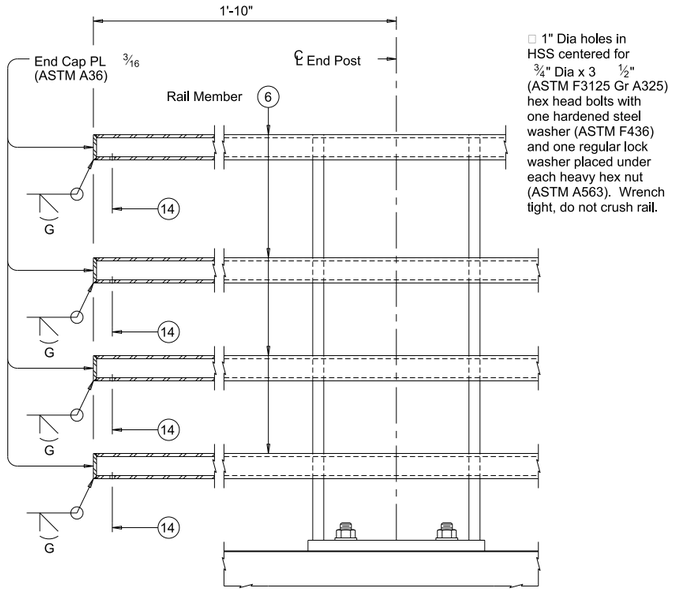
(Showing connection for rail post and HSS.)



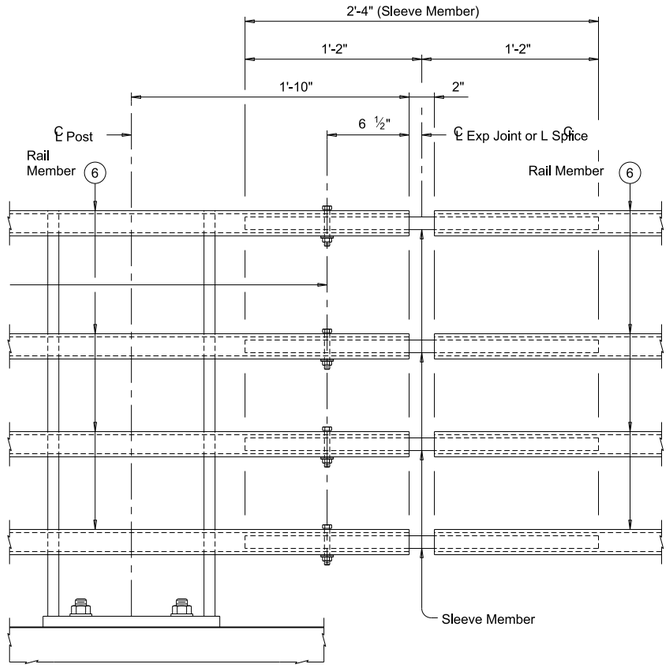
POST DETAIL



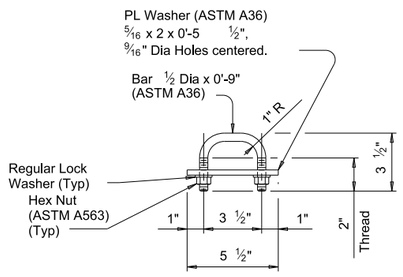
VIEW D-D



END CAPS ON HSS AT END POST



EXPANSION JOINT OR SPLICE



U-BOLT DETAIL

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

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

(14) ℄ 3/8" Dia Drain Hole in bottom of HSS.

SHEET 3 OF 4

Texas Department of Transportation

Bridge Division Standard

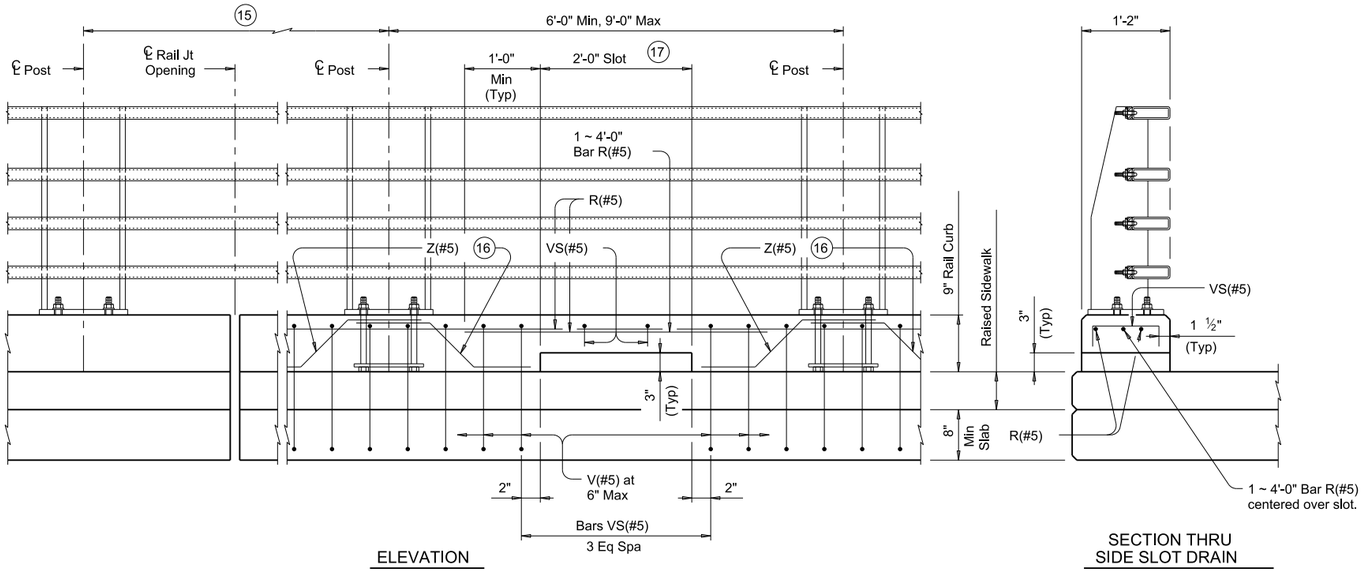
COMBINATION RAIL

TYPE C1W

FILE: RL-C1W-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		97

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: 8/27/2026
FILE: cv-109_TRT_TxDot_RL-C1W-19_4.dgn

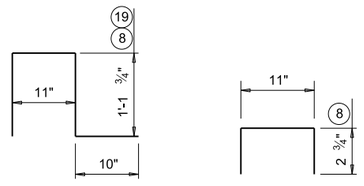


ELEVATION

SECTION THRU SIDE SLOT DRAIN

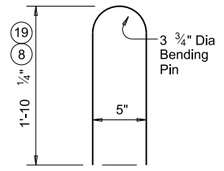
OPTIONAL SIDE SLOT DRAIN DETAILS (18)

Showing side slot drain on raised sidewalk, without raised sidewalk similar.

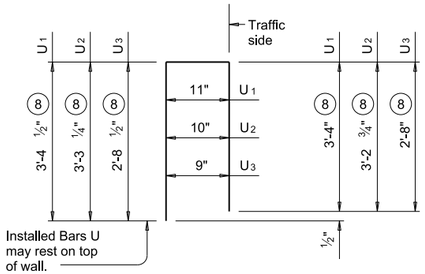


BARS V(#5)

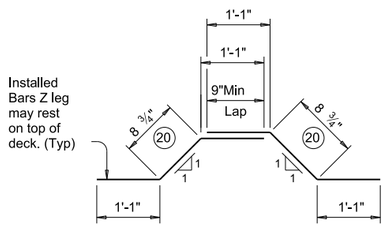
BARS VS(#5)



BARS wU(#5)



BARS U(#5)



BARS Z(#5)

CONSTRUCTION NOTES:

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

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

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

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

Chamfer all exposed concrete corners.

MATERIAL NOTES:

Provide ASTM A1085 or A500 Gr B for all HSS.

Provide Grade 60 reinforcing steel.

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

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

Provide 7/8" Dia ASTM F3125 Gr A325 or A449 bolts (or ASTM A193 Gr B7 or F1554 Gr 105 threaded rods with one tack welded heavy hex nut each) with one hardened steel washer (ASTM F436) placed under each heavy hex nut that conforms to ASTM A563 requirements.

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

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

Provide bar laps, where required, as follows:

Uncoated or galvanized ~ #5 = 2'-0"

Epoxy coated ~ #5 = 3'-0"

GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-4 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less.

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

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

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

Average weight of railing with no overlay:

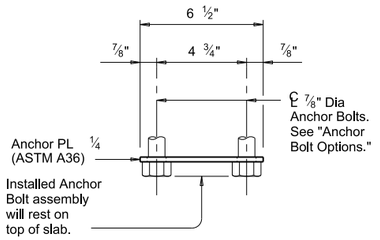
205 plf total

131 plf (Conc)

74 plf (Steel).

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

PLAN OF ANCHOR PLATE



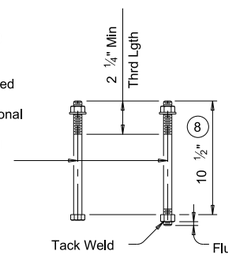
ELEVATION

ANCHOR BOLT ASSEMBLY DETAILS

PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

⅞" Dia heavy hex head anchor bolt (ASTM F3125 Gr A325 or A449) or threaded rod (ATSM A193 Gr B7 or F1554 Gr 105) with one hardened steel washer (ASTM F436) placed under heavy hex nut (ASTM A563). One additional heavy hex nut must be furnished and tack welded for each threaded rod.



ANCHOR BOLT OPTIONS

(Showing Anchor Bolts for Base Plate)

(8) Increase 2" for structures with Overlay.

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

(16) Bars Z(#5). See "Section Thru Rail" and "View A-A or B-B" for Bar Z placement and spacing.

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

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

(19) For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.

(20) Increase 2 ¾" for structures with Overlay.

Texas Department of Transportation

Bridge Division Standard

COMBINATION RAIL

TYPE C1W

FILE: RL-C1W-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		98

LEGEND

- DRAINAGE AREA DESIGNATION
- DRAINAGE AREA (ACRES)
- EXISTING DRAINAGE AREA BOUNDARY
- EXISTING CONTOUR LINE (5' INTERVAL)
- 100-YEAR FEMA FLOODPLAIN
- FLOW DIRECTION ARROW

N

0 200 1000

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

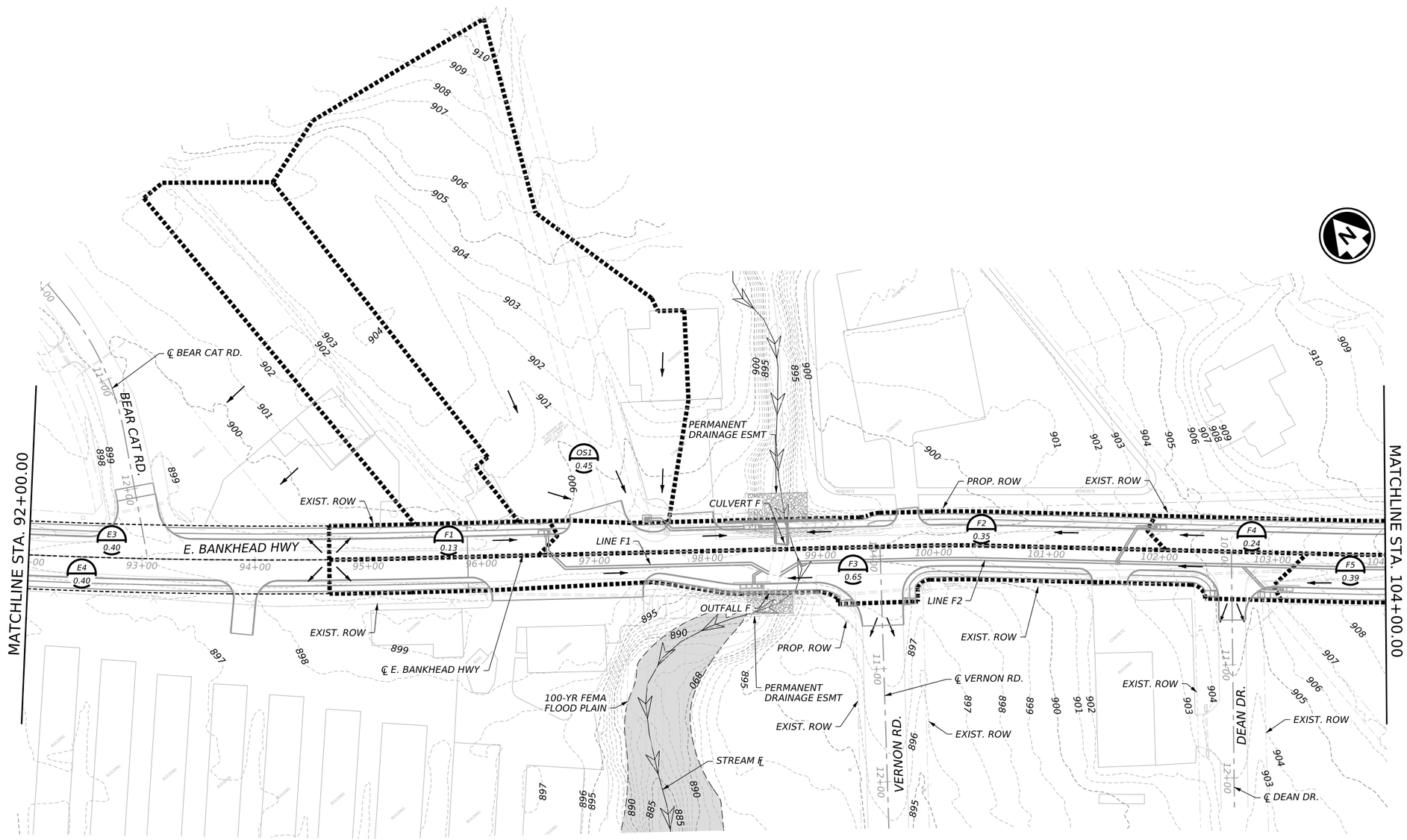
EXISTING OVERALL DRAINAGE AREA MAP

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	99

DATE: 8/27/2026 7:46:55 PM
FILE: \\ics\M-freesepw21\ICS_pdf_work_dir\5617\54711_3\cv-109-pl-exdam01.dgn



LEGEND

- # / ~ — DRAINAGE AREA DESIGNATION / DRAINAGE AREA (ACRES)
- PROPOSED DRAINAGE AREA BOUNDARY
- 700 — EXISTING CONTOUR LINE (1' INTERVAL)
- 100-YEAR FEMA FLOODPLAIN
- FLOW DIRECTION ARROW

NOTES:

1. REFERENCE OVERALL DRAINAGE AREA MAP SHEET FOR DRAINAGE AREA BOUNDARIES THAT EXCEED THE VIEW OF THIS SHEET.

0 50 100

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

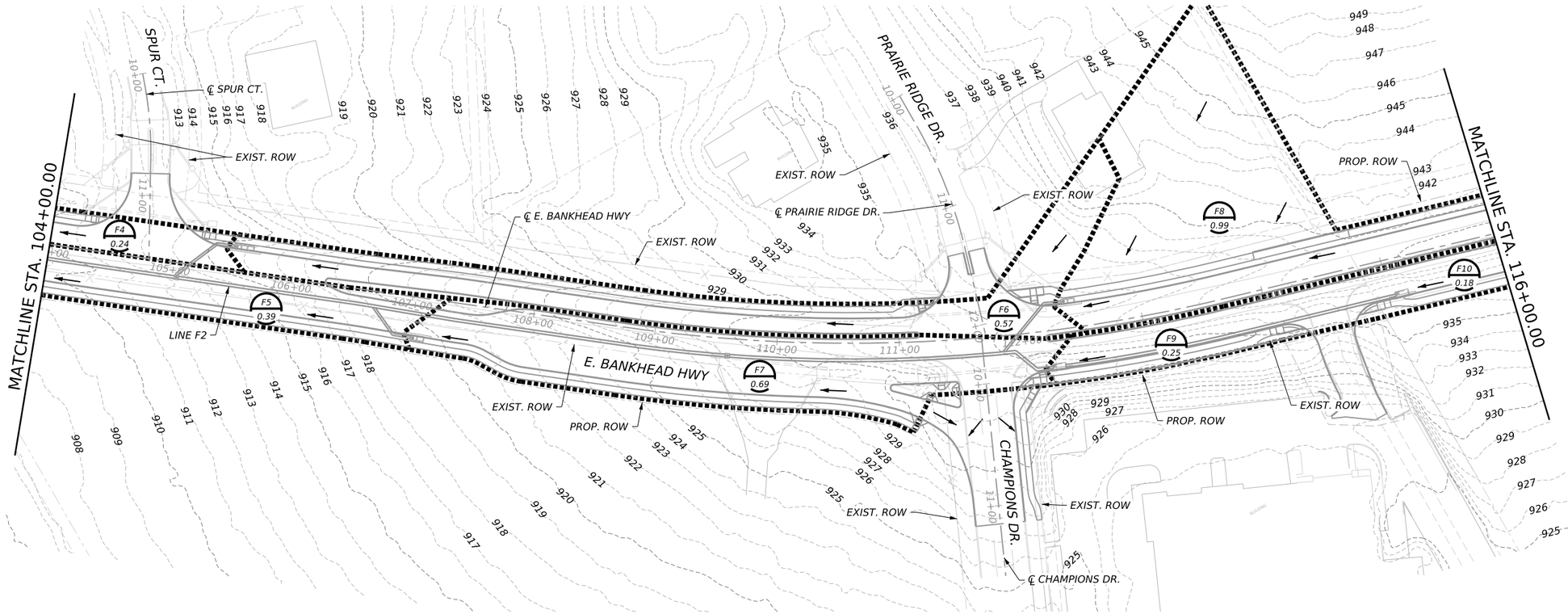
PROP. DRAINAGE AREA MAP FROM STA. 80+00 TO STA. 104+00

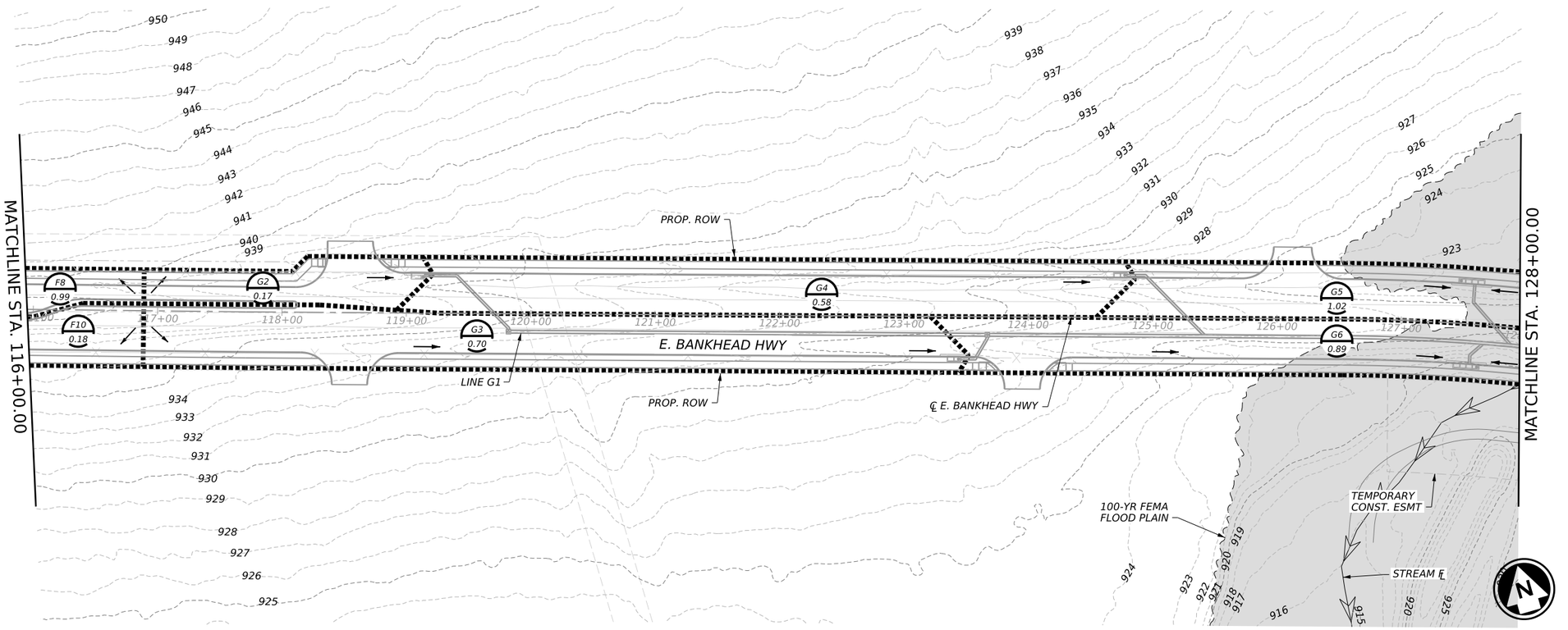
SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	100

DATE: 8/27/2026 7:47:54 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\561\54711_1\cv-109-pl-dam04.dgn





0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

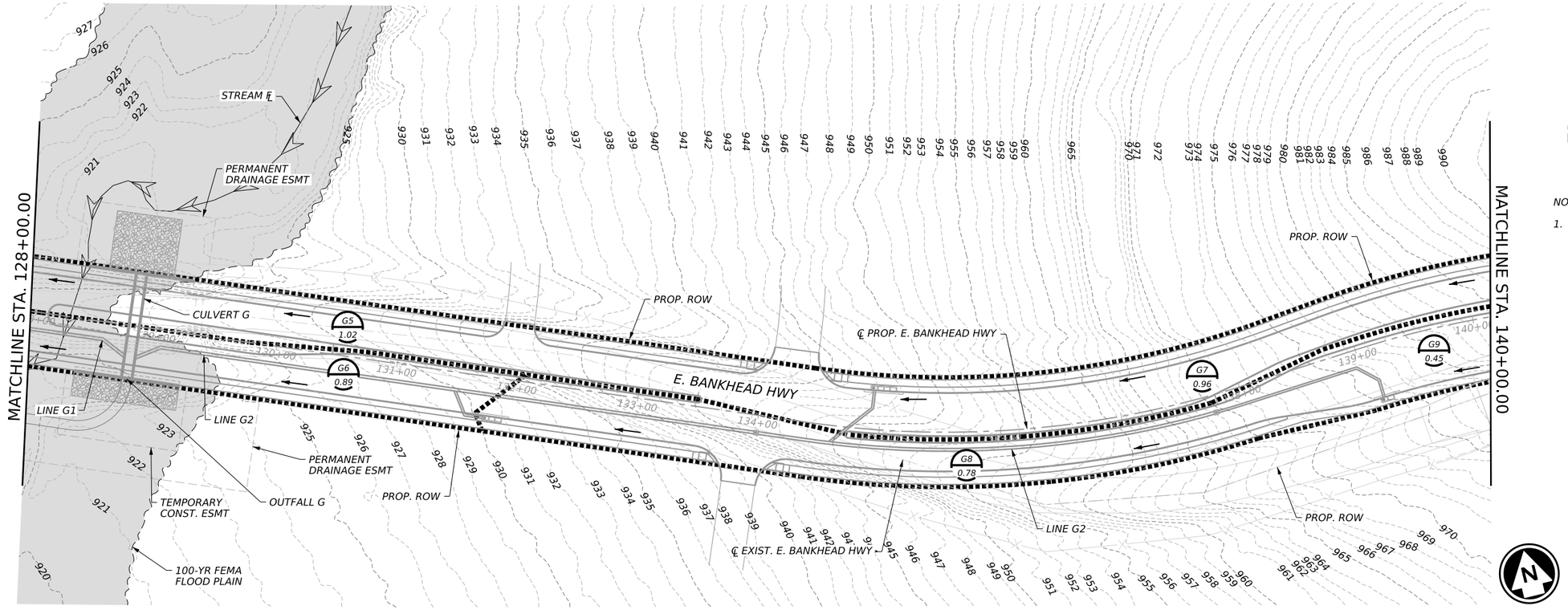
PROP. DRAINAGE AREA MAP FROM STA. 104+00 TO STA. 128+00

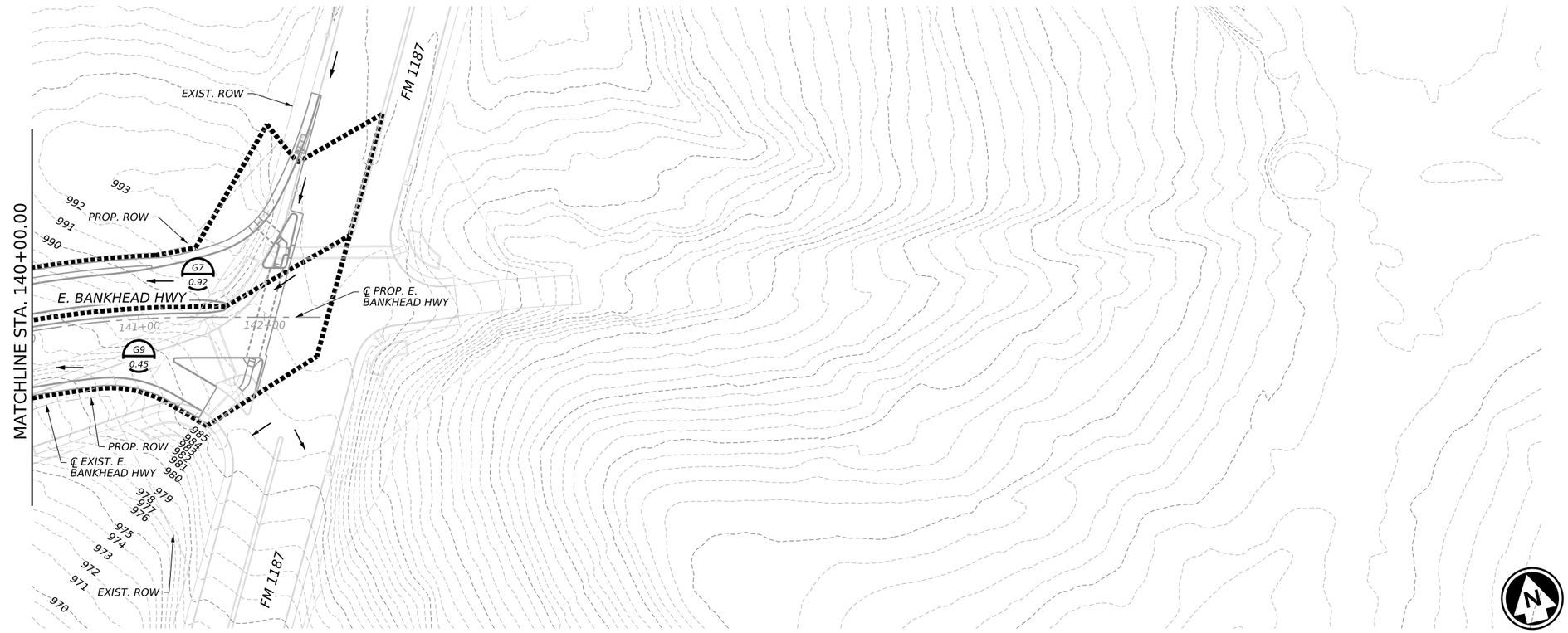
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	101

DATE: 8/27/2026 7:46:03 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_din\56171\54711_7\cv-109-pl-dam05.dgn





LEGEND

- DRAINAGE AREA DESIGNATION
- DRAINAGE AREA (ACRES)
- PROPOSED DRAINAGE AREA BOUNDARY
- EXISTING CONTOUR LINE (1' INTERVAL)
- 100-YEAR FEMA FLOODPLAIN
- FLOW DIRECTION ARROW

NOTES:

1. REFERENCE OVERALL DRAINAGE AREA MAP SHEET FOR DRAINAGE AREA BOUNDARIES THAT EXCEED THE VIEW OF THIS SHEET.

0 50 100

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PROP. DRAINAGE AREA MAP FROM STA. 128+00 TO END

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	102

DATE: 8/27/2026 7:48:26 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56171\54711_13\cv-109-pl-dam06.dgn

RATIONAL METHOD SUB-AREA RUNOFF CALCULATIONS

DESIGN POINT	DRAINAGE AREA (ac)	TOTAL Tc (min)	RUNOFF COEF. "C"	5 YR INTENSITY I (in/hr)	25 YR INTENSITY I (in/hr)	100 YR INTENSITY I (in/hr)	5 YR PEAK FLOW Q (cfs)	25 YR PEAK FLOW Q (cfs)	100 YR PEAK FLOW Q (cfs)
1	2	3	4	7	9	11	14	16	18
EX-F	185.29	23.09	0.45	3.71	5.18	6.54	309.65	432.72	546.24
EX-G	222.18	25.00	0.41	3.55	4.96	6.26	321.03	448.84	566.96
F-01	0.13	10.00	0.90	5.53	7.69	9.64	0.67	0.93	1.17
F-02	0.35	10.00	0.90	5.53	7.69	9.64	1.74	2.41	3.03
F-03	0.65	10.00	0.90	5.53	7.69	9.64	3.24	4.51	5.66
F-04	0.24	10.00	0.90	5.53	7.69	9.64	1.21	1.69	2.12
F-05	0.39	10.00	0.90	5.53	7.69	9.64	1.92	2.67	3.35
F-06	0.57	10.00	0.90	5.53	7.69	9.64	2.82	3.93	4.92
F-07	0.69	10.00	0.90	5.53	7.69	9.64	3.42	4.75	5.96
F-08	0.99	10.00	0.65	5.53	7.69	9.64	3.59	4.99	6.26
F-09	0.25	10.00	0.90	5.53	7.69	9.64	1.25	1.74	2.18
F-10	0.18	10.00	0.90	5.53	7.69	9.64	0.89	1.24	1.56
G-02	0.17	10.00	0.90	5.53	7.69	9.64	0.84	1.16	1.46
G-03	0.70	10.00	0.90	5.53	7.69	9.64	3.48	4.84	6.07
G-04	0.58	10.00	0.90	5.53	7.69	9.64	2.90	4.03	5.06
G-05	1.02	10.00	0.90	5.53	7.69	9.64	5.06	7.04	8.83
G-06	0.89	10.00	0.90	5.53	7.69	9.64	4.43	6.16	7.73
G-07	0.96	10.00	0.90	5.53	7.69	9.64	4.77	6.63	8.32
G-08	0.78	10.00	0.90	5.53	7.69	9.64	3.89	5.42	6.79
G-09	0.53	10.00	0.90	5.53	7.69	9.64	2.65	3.68	4.62
OS-01	0.45	10.00	0.90	5.53	7.69	9.64	2.22	3.08	3.86

RAINFALL INTENSITY PARAMETERS for PARKER COUNTY

	1-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
e	-	0.77774	0.772891	0.769516	0.76559	0.763266	0.76028
b	-	44.72655	54.53239	62.81964	74.3942	83.6772	92.76293
d	-	9.478015	9.318545	9.308029	9.375064	9.513669	9.640066

2-yr, 24-hr rainfall depth, P, (in)
3.780 (TAKEN FROM ATLAS 14 WEBSITE)

$$I = \frac{b}{(T+d)^e}$$

CULVERT F CALCS

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1	2	3		1	2	3	4	5	6	7	8	9	10
5 year	309.65	309.65	0.00	893.82	5.25	3.17	1-S2n	2.59	3.10	2.75	2.21	11.25	7.42
25 year	432.72	432.72	0.00	895.11	6.54	4.30	1-S2n	3.28	3.87	3.49	2.61	12.40	8.12
100 year	546.24	546.24	0.00	896.22	7.65	5.38	1-S2n	3.87	4.53	4.12	2.92	13.26	8.64
Overtopping	805.68	805.68	0.00	898.82									

CULVERT G CALCS

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Roadway Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1	2	3		1	2	3	4	5	6	7	8	9	10
5 year	321.03	321.03	0.00	923.99	6.26	4.41	5-S2n	3.14	3.68	3.28	3.64	12.24	3.90
25 year	448.84	448.84	0.00	925.89	8.16	7.14	5-S2n	4.02	4.61	4.18	4.23	13.41	4.25
100 year	566.96	534.84	31.49	927.39	9.66	8.39	5-S2n	4.59	5.18	4.75	4.69	14.06	4.52
Overtopping	532.09	532.09	0.00	927.34									

CURB INLETS ON GRADE

INLET		DRAINAGE AREA NO.				Cross Slope "S" (ft/ft)	Long Slope "S" (ft/ft)	X-Slope Gutter "S'w" (ft/ft)	Depth of Flow "Y" (ft)	Spread of Flow "T" (ft)	Equivalent Cross Slope "S" (ft/ft)	Street Section (type)	Manning's coefficient pavement "n"	5-yr Intensity (in/hr)	5-yr Runoff (cfs)	5-yr Carryover Flow (cfs)	5-yr Total Gutter Q (cfs)	25-yr Intensity (in/hr)	25-yr Runoff (cfs)	25-yr Carryover Flow	25-yr Total Gutter Q (cfs)	100-yr Intensity (in/hr)	100-yr Runoff (cfs)	100-yr Carryover Flow (cfs)	100-yr Total Gutter Q (cfs)	ROW Capacity (cfs)	Design Storm	Length Required "L" (ft)	Actual Provided Length "L" (ft)	L/L	Efficiency "E"	5-yr Inlet Capacity (cfs)	25-yr Inlet Capacity (cfs)	100-yr Inlet Capacity (cfs)	Bypass Target	5-yr Bypass Flow "q" (cfs)	25-yr Bypass Flow "q" (cfs)	100-yr Bypass Flow "q" (cfs)
Design Point	Inlet No.	Area No.	"A" (acres)	Runoff "C"	"T." (min)																																
1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
F-01	F-01	F-01	0.13	0.90	10.00	0.020	0.005	0.167	0.14	6.89	0.120	Straight	0.015	5.53	0.67	0.00	0.67	7.69	0.93	0.00	0.93	9.64	1.17	0.00	1.17	34.56	5-yr	4.59	10	1.00	1.00	0.67	0.93	1.17	F-02L	0.00	0.00	0.00
F-04	F-04	F-04	0.24	0.90	10.00	0.020	0.025	0.167	0.13	6.37	0.126	Straight	0.015	5.53	1.21	0.00	1.21	7.69	1.69	0.00	1.69	9.64	2.12	0.00	2.12	76.93	5-yr	9.25	10	1.00	1.00	1.21	1.69	1.99	F-02R	0.00	0.00	0.12
F-05	F-05	F-05	0.39	0.90	10.00	0.020	0.037	0.167	0.15	7.62	0.113	Straight	0.015	5.53	1.92	0.47	2.39	7.69	2.67	0.47	3.14	9.64	3.35	1.79	5.14	94.10	5-yr	14.81	10	0.68	0.87	2.07	2.67	3.32	F-03L	0.32	0.48	1.82
F-06	F-06	F-06	0.57	0.90	10.00	0.020	0.037	0.167	0.17	8.41	0.106	Straight	0.015	5.53	2.82	0.29	3.11	7.69	3.93	0.29	4.22	9.64	4.92	1.49	6.41	94.10	5-yr	17.18	15	0.87	0.98	3.04	4.05	5.07	F-02R	0.08	0.16	1.34
F-07	F-07	F-07	0.69	0.90	10.00	0.020	0.016	0.167	0.20	10.19	0.094	Straight	0.015	5.53	3.42	0.00	3.42	7.69	4.75	0.00	4.75	9.64	5.96	0.00	5.96	61.88	5-yr	14.96	10	0.67	0.86	2.95	3.99	4.17	F-05	0.47	0.77	1.79
F-08	F-08	F-08	0.99	0.65	10.00	0.020	0.008	0.167	0.23	11.71	0.086	Straight	0.015	5.53	3.59	0.00	3.59	7.69	4.99	0.00	4.99	9.64	6.26	0.00	6.26	44.84	5-yr	13.29	10	0.75	0.92	3.30	4.48	4.77	F-06	0.29	0.51	1.49
F-09	F-09	F-09	0.25	0.90	10.00	0.020	0.008	0.167	0.16	7.88	0.110	Straight	0.015	5.53	1.25	0.00	1.25	7.69	1.74	0.00	1.74	9.64	2.18	0.00	2.18	44.84	5-yr	7.32	10	1.00	1.00	1.25	1.74	2.18	F-07	0.00	0.00	0.00
F-10	F-10	F-10	0.18	0.90	10.00	0.020	0.008	0.167	0.14	6.95	0.119	Straight	0.015	5.53	0.89	0.00	0.89	7.69	1.24	0.00	1.24	9.64	1.56	0.00	1.56	44.84	5-yr	6.07	10	1.00	1.00	0.89	1.24	1.56	F-09	0.00	0.00	0.00
G-02	G-02	G-02	0.17	0.90	10.00	0.020	0.013	0.167	0.12	6.25	0.127	Straight	0.015	5.53	0.84	0.00	0.84	7.69	1.16	0.00	1.16	9.64	1.46	0.00	1.46	55.78	5-yr	6.48	10	1.00	1.00	0.84	1.16	1.46	G-04	0.00	0.00	0.00
G-03	G-03	G-03	0.70	0.90	10.00	0.020	0.013	0.167	0.21	10.67	0.091	Straight	0.015	5.53	3.48	0.00	3.48	7.69	4.84	0.00	4.84	9.64	6.07	0.00	6.07	55.78	5-yr	14.42	10	0.69	0.88	3.07	4.15	4.36	G-06L	0.41	0.69	1.70
G-04	G-04	G-04	0.58	0.90	10.00	0.020	0.013	0.167	0.20	9.96	0.095	Straight	0.015	5.53	2.90	0.00	2.90	7.69	4.03	0.00	4.03	9.64	5.06	0.00	5.06	55.78	5-yr	13.00	10	0.77	0.93	2.69	3.66	3.91	G-05L	0.21	0.37	1.15
G-07	G-07	G-07	0.96	0.90	10.00	0.020	0.060	0.167	0.18	9.01	0.101	Straight	0.015	5.53	4.77	0.00	4.77	7.69	6.63	0.00	6.63	9.64	8.32	0.00	8.32	119.83	5-yr	24.40	20	0.82	0.95	4.55	6.20	6.71	G-05R	0.22	0.43	1.61
G-08	G-08	G-08	0.78	0.90	10.00	0.020	0.057	0.167	0.18	8.93	0.102	Straight	0.015	5.53	3.89	0.64	4.53	7.69	5.42	0.64	6.05	9.64	6.79	2.48	9.26	116.59	5-yr	23.40	15	0.64	0.84	3.81	4.96	5.87	G-06R	0.72	1.09	3.39
G-09	G-09	G-09	0.53	0.90	10.00	0.020	0.035	0.167	0.16	8.01	0.109	Straight	0.015	5.53	2.65	0.00	2.65	7.69	3.68	0.00	3.68	9.64	4.62	0.00	4.62	91.00	5-yr	15.45	10	0.65	0.85	2.24	3.03	3.16	G-08	0.41	0.65	1.46
OS-01	OS-01	OS-01	0.45	0.90	10.00	0.020	0.035	0.167	0.15	7.50	0.114	Straight	0.015	5.53	2.22	0.00	2.22	7.69	3.08	0.00	3.08	9.64	3.86	0.00	3.86	91.00	5-yr	13.98	10	0.72	0.90	1.99	2.69	2.85	G-08	0.23	0.39	1.02

CURB INLETS AND DROP INLETS IN SUMPS

Inlet No.	Gutter/Ditch Slope S (ft/ft)	Crown Slope of Pavement θ (ft/ft)	100-yr Gutter Flow Qo (cfs)	100-yr Carryover Flow (cfs)	100-yr Total Gutter Flow Qo (cfs)	100-yr Depth of Gutter Flow Yo (ft)	Depth of Depression a (ft)	Depth of Flow at Opening Y (ft)	Capacity of Inlet per Foot of Length (Q/L) (cfs/ft)	Length of Inlet/ Pipe Opening L (ft)	Capacity of Inlet/Pipe Q (cfs)	Bypass into Overflow (cfs)	% 100-yr Captured By Inlet	Inlet type	5-yr Spread Left (ft)	5-yr Spread Right (ft)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18
F-02	0.005	0.02	3.03	0.00	3.03	0.24	0.33	0.58	1.35	15	20.25	0.00	100%	Curb	6.41	7.28
F-03	0.005	0.02	5.66	0.00	5.66	0.31	0.33	0.64	1.58	20	31.63	0.00	100%	Curb	8.81	8.78
G-05	0.007	0.02	8.83	0.00	8.83	0.35	0.33	0.68	1.73	20	34.51	0.00	100%	Curb	8.74	9.25
G-06	0.007	0.02	7.73	0.00	7.73	0.33	0.33	0.66	1.66	20	33.24	0.00	100%	Curb	10.09	7.82
OS-01	0.010	0.1	3.86	0.00	3.86	0.43	0.33	0.76	0.32	3'x3'	23.88	0.00	100%	Yard		

NOTES:

1. *DRAINAGE CALCULATIONS REFLECT FUTURE CONDITIONS, UNLESS NOTED OTHERWISE.*
2. *ALL RAINFALL INTENSITY COEFFICIENTS ARE BASED ON THE 2018 UPDATE OF ATLAS 14, AS RECOMMENDED BY THE TXDOT HDM (2019). SEE CITATION BELOW:*

   Rainfall intensity coefficients, NOAA Atlas 14 Precipitation-Frequency Atlas of United States, Volume 11 Version 2.0: Texas (Perica et al. 2018)

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

DRAINAGE CALCULATIONS

SHEET 1 OF 2

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	103

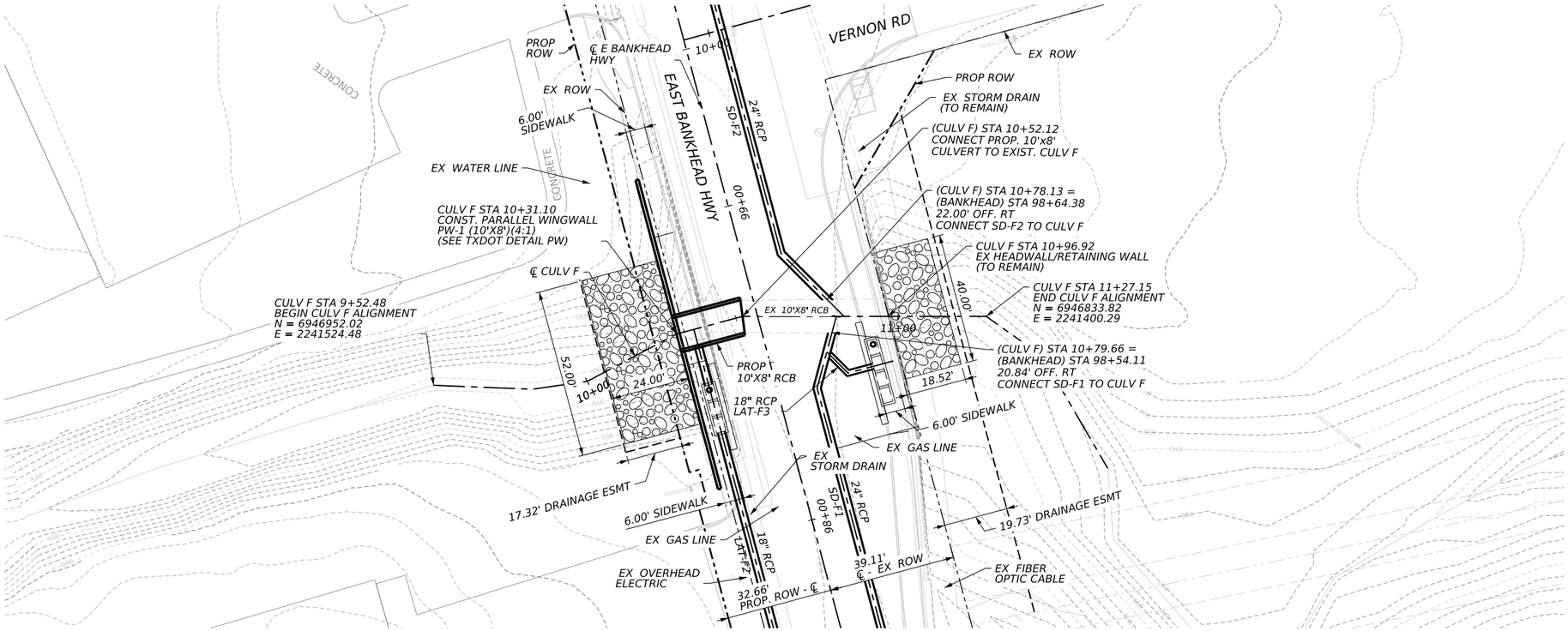
DATE: 8/27/2026 7:47:32 PM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\56171547114_4\cv-109-gn-dcalcs01.dgn

25-YR STORM DRAIN HYDRAULIC CALCULATIONS TABLE

FROM	TO	PIPE LENGTH	Drainage Area			Runoff "c"	Incr. cA	Total cA	Time of Concentration			5-yr Intensity	25-yr Intensity	100-yr Intensity	Q5 Runoff	Q25 Runoff	Q100 Runoff	U/S Inlets for Bypass			25-yr Total Inlet Bypass	Q_25 pipe	Pipe Size	No. of Barrels	n	Sf	HGL		HEAD LOSS CALCULATIONS							Design U/S HGL	T/C ELEV.	Depth T/C	DESCRIPTION
			Incremental		Total Area				Inlet	Travel	Total							Inlet 1	Inlet 2	Inlet 3							D/S	U/S	V1 (in)	V2 (out)	V1/2G	V2/2G	Kj	KjV1/2G	Hk				
		feet	No.	Area					min.	min.	min.	in/hr.	in/hr.	in/hr.	cfs	cfs	cfs				cfs	cfs	in.			ft/ft	Elev.	Elev.	ft/sec	ft/sec	ft.	ft.		ft.	ft.	Elev.	Elev.	ft.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	37		38
LINE F-01																																							
12+24.12	12+09.13	14.99	F-01	0.13	0.13	0.90	0.12	0.12	10.00	0.47	10.00	5.53	7.69	9.64	0.67	0.93	1.17				0.00	0.93	18	1	0.013	0.0001	896.74	896.75	0.53	0.53	0.004	0.004	1.25	0.01	0.10	896.85	899.52	2.67	Inlet at Beg. of Line
12+09.13	11+87.20	21.93		0.00	0.13			0.12	0.00	1.23	10.47	5.43	7.55	9.47	0.66	0.92	1.15				0.00	0.93	24	1	0.013	0.0000	896.64	896.64	0.53	0.30	0.004	0.001	0.35	0.00	0.10	896.74	899.52	2.78	Bends where radius = diam, 45º Bend
11+87.20	10+22.86	164.34		0.00	0.13			0.12	0.00	9.21	11.70	5.18	7.21	9.05	0.63	0.88	1.10				0.00	0.93	24	1	0.013	0.0000	896.54	896.54	0.30	0.30	0.001	0.001	0.35	0.00	0.10	896.64	899.45	2.81	Bends where radius = diam, 45º Bend
10+22.86	10+11.30	11.56		0.00	0.13			0.12	0.00	0.65	20.92	3.91	5.46	6.89	0.47	0.66	0.84				0.00	0.93	24	1	0.013	0.0000	896.44	896.44	0.30	0.30	0.001	0.001	0.35	0.00	0.10	896.54	898.46	1.92	Bends where radius = diam, 45º Bend
10+11.30	10+05.18	6.12	F-03	0.65	0.79	0.90	0.59	0.71	10.00	0.10	21.56	3.85	5.38	6.78	2.73	3.81	4.80	F-05			0.48	3.33	24	1	0.013	0.0002	896.34	896.34	0.30	1.06	0.001	0.017	0.75	0.00	0.10	896.44	898.46	2.02	45º Wye connection
																											*NOTE: DOWNSTREAM ASSESSMENT SHOWED XX.X" DEPTH OF FLOW FOR 100-YR EVENT. STARTING HGL ASSUMED TO BE TOP OF CULVERT BOX															
LAT F-03																																							
10+17.34	10+09.25	8.09	F-03	0.65	0.65	0.90	0.59	0.59	10.00	0.06	10.00	5.53	7.69	9.64	3.24	4.51	5.66	F-05			0.48	4.04	18	1	0.013	0.0015	896.56	896.57	2.28	2.28	0.081	0.081	1.25	0.10	0.10	896.67	898.47	1.80	Inlet at Beg. of Line
10+09.25	10+00.00	9.25		0.00	0.65			0.59	0.00	0.06	10.06	5.52	7.67	9.62	3.24	4.50	5.64				0.00	4.50	18	1	0.013	0.0018	896.44	896.46	2.28	2.55	0.081	0.101	0.35	0.03	0.10	896.56	898.47	1.91	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-F-01													
LINE F-02																																							
26+65.91	23+79.35	286.56	F-10	0.18	0.18	0.90	0.16	0.16	10.00	12.09	10.00	5.53	7.69	9.64	0.89	1.24	1.56				0.00	1.24	24	1	0.013	0.0000	899.32	899.33	0.40	0.40	0.002	0.002	1.25	0.00	0.10	899.43	935.17	35.74	Inlet at Beg. of Line
23+79.35	23+66.04	13.31	F-09	0.25	0.43	0.90	0.23	0.39	10.00	0.34	22.09	3.80	5.31	6.70	1.47	2.05	2.59				0.00	2.05	24	1	0.013	0.0001	899.22	899.22	0.40	0.65	0.002	0.007	0.50	0.00	0.10	899.32	935.01	35.69	Inlet on Main Line
23+66.04	23+43.02	23.02		0.00	0.43			0.39	0.00	0.59	22.43	3.77	5.26	6.64	1.46	2.04	2.57				0.00	2.05	24	1	0.013	0.0001	899.11	899.12	0.65	0.65	0.007	0.007	0.35	0.00	0.10	899.22	935.01	35.79	Bends where radius = diam, 45º Bend
23+43.02	23+32.83	10.19		0.00	0.43			0.39	0.00	0.26	23.01	3.71	5.19	6.55	1.44	2.01	2.54				0.00	2.05	24	1	0.013	0.0001	899.01	899.01	0.65	0.65	0.007	0.007	0.35	0.00	0.10	899.11	934.71	35.60	Bends where radius = diam, 45º Bend
23+32.83	21+07.06	225.77	F-08	0.99	1.42	0.65	0.65	1.04	10.00	2.21	23.27	3.69	5.16	6.51	3.82	5.34	6.75				0.00	5.34	24	1	0.013	0.0006	898.79	898.91	0.65	1.70	0.007	0.045	0.75	0.00	0.10	899.01	934.55	35.54	45º Wye connection
21+07.06	18+14.36	292.70		0.00	1.42			1.04	0.00	2.87	25.49	3.51	4.91	6.20	3.63	5.08	6.42				0.00	5.34	24	1	0.013	0.0006	898.52	898.69	1.70	1.70	0.045	0.045	1.25	0.06	0.10	898.79	929.43	30.64	MH at Beg. of Line
18+14.36	16+52.07	162.29	F-07	0.69	2.11	0.90	0.62	1.65	10.00	1.11	28.35	3.30	4.62	5.84	5.46	7.64	9.66	F-09			0.00	7.64	24	1	0.013	0.0011	898.24	898.42	1.70	2.43	0.045	0.092	0.75	0.03	0.10	898.52	919.04	20.52	45º Wye connection
16+52.07	14+18.61	233.46	F-06	0.57	2.67	0.90	0.51	2.16	10.00	1.32	29.47	3.23	4.52	5.71	6.98	9.78	12.36	F-08			0.51	9.26	24	1	0.013	0.0017	897.75	898.14	2.43	2.95	0.092	0.135	0.50	0.05	0.10	898.24	912.90	14.66	MH on Trunk Line w/45º Branch Lat
14+18.61	13+08.66	109.95	F-05	0.39	3.06	0.90	0.35	2.51	10.00	0.56	30.79	3.14	4.40	5.57	7.90	11.06	13.99	F-07			0.77	10.29	24	1	0.013	0.0021	897.42	897.65	2.95	3.28	0.135	0.167	0.75	0.10	0.10	897.75	905.97	8.22	45º Wye connection
13+08.66	10+27.40	281.26	F-04	0.24	3.30	0.90	0.22	2.73	10.00	1.25	31.35	3.11	4.36	5.51	8.50	11.90	15.06	F-06			0.16	11.73	24	1	0.013	0.0027	896.50	897.26	3.28	3.74	0.167	0.217	0.35	0.06	0.16	897.42	903.44	6.02	MH on Line w/60º Lat
10+27.40	10+07.06	20.34		0.00	3.30			2.73	0.00	0.09	32.60	3.04	4.26	5.39	8.30	11.62	14.71				0.00	11.73	24	1	0.013	0.0027	896.35	896.40	3.74	3.74	0.217	0.217	0.35	0.08	0.10	896.50	898.59	2.09	Bends where radius = diam, 45º Bend
																											*NOTE: DOWNSTREAM ASSESSMENT SHOWED XX.X" DEPTH OF FLOW FOR 100-YR EVENT. STARTING HGL ASSUMED TO BE TOP OF CULVERT BOX															
LAT OS01/F-02																																							
11+20.81	11+10.32	10.49	OS-01	0.45	0.45	0.90	0.40	0.40	10.00	0.10	10.00	5.53	7.69	9.64	2.22	3.08	3.86				0.00	3.08	18	1	0.013	0.0009	896.98	896.99	1.74	1.74	0.047	0.047	1.25	0.06	0.10	897.09	899.08	1.99	Inlet at Beg. of Line
11+10.32	10+97.35	12.97		0.00	0.45			0.40	0.00	0.12	10.10	5.51	7.66	9.61	2.21	3.07	3.85				0.00	3.08	18	1	0.013	0.0009	896.87	896.88	1.74	1.74	0.047	0.047	0.35	0.02	0.10	896.98	898.98	2.00	Bends where radius = diam, 45º Bend
10+97.35	10+25.24	72.11		0.00	0.45			0.40	0.00	0.69	10.22	5.48	7.62	9.56	2.20	3.06	3.83				0.00	3.08	18	1	0.013	0.0009	896.71	896.77	1.74	1.74	0.047	0.047	0.35	0.02	0.10	896.87	898.71	1.84	Bends where radius = diam, 45º Bend
10+25.24	10+05.00	20.24	F-02	0.35	0.79	0.90	0.31	0.71	10.00	0.11	10.91	5.34	7.43	9.32	3.81	5.31	6.66	F-01	F-04		0.00	5.31	18	1	0.013	0.0026	896.54	896.59	1.74	3.00	0.047	0.140	0.50	0.02	0.12	896.71	898.74	2.03	Inlet on Main Line
																											*NOTE: DOWNSTREAM ASSESSMENT SHOWED XX.X" DEPTH OF FLOW FOR 100-YR EVENT. STARTING HGL ASSUMED TO BE TOP OF CULVERT BOX															
LAT F-03																																							
10+17.34	10+09.25	8.09	F-03	0.65	0.65	0.90	0.59	0.59	10.00	0.06	10.00	5.53	7.69	9.64	3.24	4.51	5.66	F-05			0.48	4.04	18	1	0.013	0.0015	896.56	896.57	2.28	2.28	0.081	0.081	1.25	0.10	0.10	896.67	904.28	7.61	Inlet at Beg. of Line
10+09.25	10+00.00	9.25		0.00	0.65			0.59	0.00	0.06	10.06	5.52	7.67	9.62	3.24	4.50	5.64				0.00	4.50	18	1	0.013	0.0018	896.44	896.46	2.28	2.55	0.081	0.101	0.43	0.03	0.10	896.56	903.89	7.33	Bends where radius = diam, 60º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-F-01													
LAT F-04																																							
10+51.52	10+36.52	15.00	F-04	0.24	0.24	0.90	0.22	0.22	10.00	0.29	10.00	5.53	7.69	9.64	1.21	1.69	2.12	F-06			0.16	1.53	18	1	0.013	0.0002	897.53	897.53	0.86	0.86	0.012	0.012	1.25	0.01	0.10	897.63	904.28	6.65	Inlet at Beg. of Line
10+36.52	10+00.00	36.52		0.00	0.24			0.22	0.00	0.64	10.29	5.47	7.61	9.54	1.20	1.67	2.09				0.00	1.67	18	1	0.013	0.0003	897.42	897.43	0.86	0.94	0.012	0.014	0.43	0.00	0.10	897.53	903.89	6.36	Bends where radius = diam, 60º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-F-02													
LAT F-05																																							
10+43.28	10+28.28	15.00	F-05	0.39	0.39	0.90	0.35	0.35	10.00	0.23	10.00	5.53	7.69	9.64	1.92	2.67	3.35	F-07			0.77	1.91	18	1	0.013	0.0003	897.87	897.87	1.08	1.08	0.018	0.018	1.25	0.02	0.10	897.97	906.84	8.87	Inlet at Beg. of Line
10+28.28	10+00.00	28.28		0.00	0.39			0.35	0.00	0.31	10.23	5.48	7.62	9.56	1.90	2.65	3.32				0.00	2.65	18	1	0.013	0.0006	897.75	897.77	1.08	1.50	0.018	0.035	0.35	0.01	0.10	897.87	906.46	8.59	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-F-02													
LAT F-06																																							
10+62.75	10+45.25	17.50	F-06	0.57	0.57	0.90	0.51	0.51	10.00	0.15	10.00	5.53	7.69	9.64	2.82	3.93	4.92	F-08			0.51	3.41	18	1	0.013	0.0011	898.40	898.42	1.93	1.93	0.058	0.058	1.25	0.07	0.10	898.52	914.91	16.39	Inlet at Beg. of Line
10+45.25	10+00.00	45.25		0.00	0.57			0.51	0.00	0.34	10.15	5.50	7.65	9.59	2.81	3.90	4.90				0.00	3.90	18	1	0.013	0.0014	898.24	898.30	1.93	2.21	0.058	0.076	0.35	0.02	0.10	898.40	914.36	15.96	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-F-02													
LAT F-07																																							
10+43.28	10+28.28	15.00	F-07	0.69	0.69	0.90	0.62	0.62	10.00	0.09	10.00	5.53	7.69	9.64	3.42	4.75	5.96	F-09			0.00	4.75	18	1	0.013	0.0020	898.68	898.71	2.69	2.69	0.112	0.112	1.25	0.14	0.14	898.85	920.28	21.43	Inlet at Beg. of Line
10+28.28	10+00.00	28.28		0.00	0.69			0.62	0.00	0.18	10.09	5.51	7.66	9.61	3.40	4.73	5.94				0.00	4.75	18	1	0.013	0.0020	898.52	898.58	2.69	2.69	0.112	0.112	0.35	0.04	0.10	898.68	919.78	21.10	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-F-02													
LAT F-08																																							
10+66.91	10+52.37	14.54	F-08	0.99	0.99	0.65	0.65	0.65	10.00	0.09	10.00	5.53	7.69	9.64	3.59	4.99	6.26				0.00	4.99	18	1	0.013	0.0023	899.23	899.26	2.82	2.82	0.124	0.124	1.25	0.15	0.15	899.42	935.62	36.20	Inlet at Beg. of Line
10+52.37	10+00.00	52.37		0.00	0.99			0.65	0.00	0.31	10.09	5.51	7.67	9.61	3.58	4.97	6.24				0.00	4.99	18	1	0.013	0.0023	899.01	899.13	2.82	2.82	0.124	0.124	0.35	0.04	0.10	899.23	935.38	36.15	Bends where radius = diam, 45º Bend

25-YR STORM DRAIN HYDRAULIC CALCULATIONS TABLE

FROM	TO	PIPE LENGTH	Drainage Area			Runoff "c"	Incr. cA	Total cA	Time of Concentration			5-yr Intensity	25-yr Intensity	100-yr Intensity	Q5 Runoff	Q25 Runoff	Q100 Runoff	U/S Inlets for Bypass			25-yr Total Inlet Bypass	Q_25 pipe	Pipe Size	No. of Barrels	n	Sf	HGL		HEAD LOSS CALCULATIONS							Design U/S HGL	T/C ELEV.	Depth T/C	DESCRIPTION
			Incremental		Total Area				Inlet	Travel	Total							Inlet 1	Inlet 2	Inlet 3							D/S	U/S	V1 (in)	V2 (out)	V1/2G	V2/2G	Kj	KjV1/2G	Hk				
		feet	No.	Area					min.	min.	min.	in/hr.	in/hr.	in/hr.	cfs	cfs	cfs				cfs	cfs	in.			ft/ft	Elev.	Elev.	ft/sec	ft/sec	ft.	ft.		ft.	ft.	Elev.	Elev.	ft.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	37		38
LINE G-01																																							
19+01.65	15+16.54	385.11	G-02	0.17	0.17	0.90	0.15	0.15	10.00	17.34	10.00	5.53	7.69	9.64	0.84	1.16	1.46				0.00	1.16	24	1	0.013	0.0000	924.46	924.47	0.37	0.37	0.002	0.002	0.25	0.00	0.10	924.57	938.99	14.42	MH on Trunk Line w/90º Branch Lat
15+16.54	13+41.33	175.21	G-03	0.70	0.87	0.90	0.63	0.78	10.00	2.49	27.34	3.37	4.72	5.96	2.63	3.68	4.65				0.00	3.68	24	1	0.013	0.0003	924.31	924.36	0.37	1.17	0.002	0.021	0.25	0.00	0.10	924.46	927.76	3.30	MH on Trunk Line w/90º Branch Lat
13+41.33	11+17.24	224.09	G-04	0.58	1.45	0.90	0.52	1.30	10.00	2.01	29.83	3.20	4.48	5.67	4.18	5.85	7.40	G-02			0.00	5.85	24	1	0.013	0.0007	924.06	924.21	1.17	1.86	0.021	0.054	0.75	0.02	0.10	924.31	927.06	2.75	45º Wye connection
11+17.24	10+95.30	21.94	G-06	0.89	2.34	0.90	0.80	2.11	10.00	0.14	31.84	3.08	4.32	5.46	6.49	9.09	11.50	G-03			0.69	8.40	24	1	0.013	0.0014	923.93	923.96	1.86	2.67	0.054	0.111	0.75	0.04	0.10	924.06	926.10	2.04	45º Wye connection
10+95.30	10+27.71	67.59	G-05	1.02	3.36	0.90	0.92	3.02	10.00	0.28	31.97	3.07	4.31	5.45	9.29	13.01	16.47	G-04			0.37	12.63	24	1	0.013	0.0031	923.56	923.77	2.67	4.02	0.111	0.251	0.75	0.08	0.17	923.93	926.16	2.23	45º Wye connection
10+27.71	10+04.61	23.10		0.00	3.36			3.02	0.00	0.09	32.25	3.06	4.28	5.42	9.24	12.94	16.38				0.00	12.94	24	1	0.013	0.0033	923.38	923.46	4.02	4.12	0.251	0.264	0.35	0.09	0.10	923.56	927.64	4.08	Bends where radius = diam, 45º Bend
																											*NOTE: DOWNSTREAM ASSESSMENT SHOWED 4.7' DEPTH OF FLOW FOR 25-YR EVENT. STARTING HGL ASSUMED TO BE TOP OF CULVERT BOX															
LAT G-02																																							
10+88.20	10+64.99	23.21	G-02	0.17	0.17	0.90	0.15	0.15	10.00	0.59	10.00	5.53	7.69	9.64	0.84	1.16	1.46				0.00	1.16	18	1	0.013	0.0001	924.68	924.68	0.66	0.66	0.007	0.007	1.25	0.01	0.10	924.78	936.89	12.11	Inlet at Beg. of Line
10+64.99	10+00.00	64.99		0.00	0.17			0.15	0.00	1.65	10.59	5.40	7.52	9.43	0.82	1.14	1.43				0.00	1.16	18	1	0.013	0.0001	924.57	924.58	0.66	0.66	0.007	0.007	0.35	0.00	0.10	924.68	936.69	12.01	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-G-01													
LAT G-03																																							
10+34.52	10+22.52	12.00	G-03	0.70	0.70	0.90	0.63	0.63	10.00	0.07	10.00	5.53	7.69	9.64	3.48	4.84	6.07				0.00	4.84	18	1	0.013	0.0021	924.61	924.63	2.74	2.74	0.116	0.116	1.25	0.15	0.15	924.78	930.81	6.03	Inlet at Beg. of Line
10+22.52	10+00.00	22.52		0.00	0.70			0.63	0.00	0.14	10.07	5.51	7.67	9.62	3.47	4.83	6.05				0.00	4.84	18	1	0.013	0.0021	924.46	924.51	2.74	2.74	0.116	0.116	0.43	0.05	0.10	924.61	930.65	6.04	Bends where radius = diam, 60º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-G-01													
LAT G-04																																							
10+83.59	10+68.59	15.00	G-04	0.58	0.58	0.90	0.52	0.52	10.00	0.11	10.00	5.53	7.69	9.64	2.90	4.03	5.06	G-02			0.00	4.03	18	1	0.013	0.0015	924.52	924.54	2.28	2.28	0.081	0.081	1.25	0.10	0.10	924.64	928.58	3.94	Inlet at Beg. of Line
10+68.59	10+00.00	68.59		0.00	0.58			0.52	0.00	0.50	10.11	5.51	7.66	9.60	2.89	4.02	5.04				0.00	4.03	18	1	0.013	0.0015	924.31	924.42	2.28	2.28	0.081	0.081	0.35	0.03	0.10	924.52	928.39	3.87	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-G-01													
LAT G-05																																							
10+60.80	10+45.80	15.00	G-05	1.02	1.02	0.90	0.92	0.92	10.00	0.07	10.00	5.53	7.69	9.64	5.06	7.04	8.83	G-04	G-07		0.80	6.24	18	1	0.013	0.0035	924.24	924.29	3.53	3.53	0.194	0.194	1.25	0.24	0.24	924.53	926.09	1.56	Inlet at Beg. of Line
10+45.80	10+00.00	45.80		0.00	1.02			0.92	0.00	0.19	10.07	5.51	7.67	9.62	5.05	7.02	8.81				0.00	7.02	18	1	0.013	0.0045	923.93	924.14	3.53	3.97	0.194	0.245	0.35	0.07	0.10	924.24	926.09	1.85	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-G-01													
LAT G-06																																							
10+22.27	10+17.77	4.50	G-06	0.89	0.89	0.90	0.80	0.80	10.00	0.03	10.00	5.53	7.69	9.64	4.43	6.16	7.73	G-03	G-08		1.78	4.39	18	1	0.013	0.0017	924.23	924.23	2.48	2.48	0.096	0.096	1.25	0.12	0.12	924.35	926.09	1.74	Inlet at Beg. of Line
10+17.77	10+00.00	17.77		0.00	0.89			0.80	0.00	0.08	10.03	5.52	7.68	9.63	4.43	6.16	7.72				0.00	6.16	18	1	0.013	0.0034	924.06	924.13	2.48	3.48	0.096	0.189	0.35	0.03	0.10	924.23	926.09	1.86	Bends where radius = diam, 45º Bend
																											*NOTE: STARTING HGL OBTAINED FROM SD-G-01													
LINE G-02																																							
20+61.31	20+46.29	15.02	G-09	0.53	0.53	0.90	0.48	0.48	10.00	0.21	10.00	5.53	7.69	9.64	2.65	3.68	4.62				0.00	3.68	24	1	0.013	0.0003	925.67	925.67	1.17	1.17	0.021	0.021	1.25	0.03	0.10	925.77	982.94	57.17	Inlet at Beg. of Line
20+46.29	20+25.32	20.97		0.00	0.53			0.48	0.00	0.30	10.21	5.48	7.63	9.56	2.63	3.65	4.58				0.00	3.68	24	1	0.013	0.0003	925.56	925.57	1.17	1.17	0.021	0.021	0.35	0.01	0.10	925.67	983.09	57.42	Bends where radius = diam, 45º Bend
20+25.32	19+04.60	120.72		0.00	0.53			0.48	0.00	1.72	10.51	5.42	7.54	9.46	2.60	3.61	4.53				0.00	3.68	24	1	0.013	0.0003	925.43	925.46	1.17	1.17	0.021	0.021	0.35	0.01	0.10	925.56	982.61	57.05	Bends where radius = diam, 45º Bend
19+04.60	15+82.38	322.22		0.00	0.53			0.48	0.00	4.58	12.23	5.08	7.08

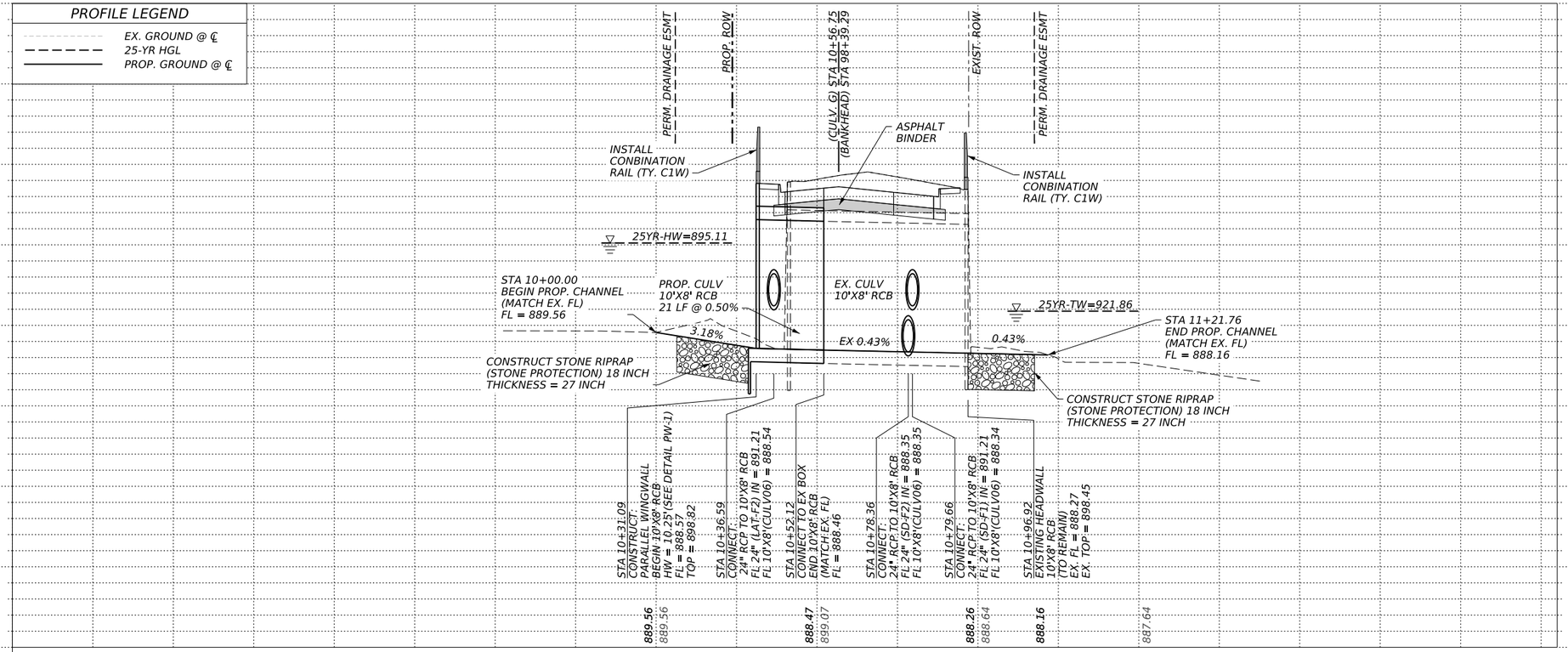


LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

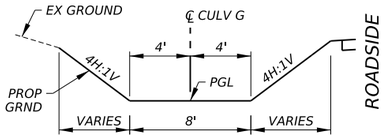
STORM DRAIN PLAN & PROFILE CULVERT F FROM BEGINNING TO END

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

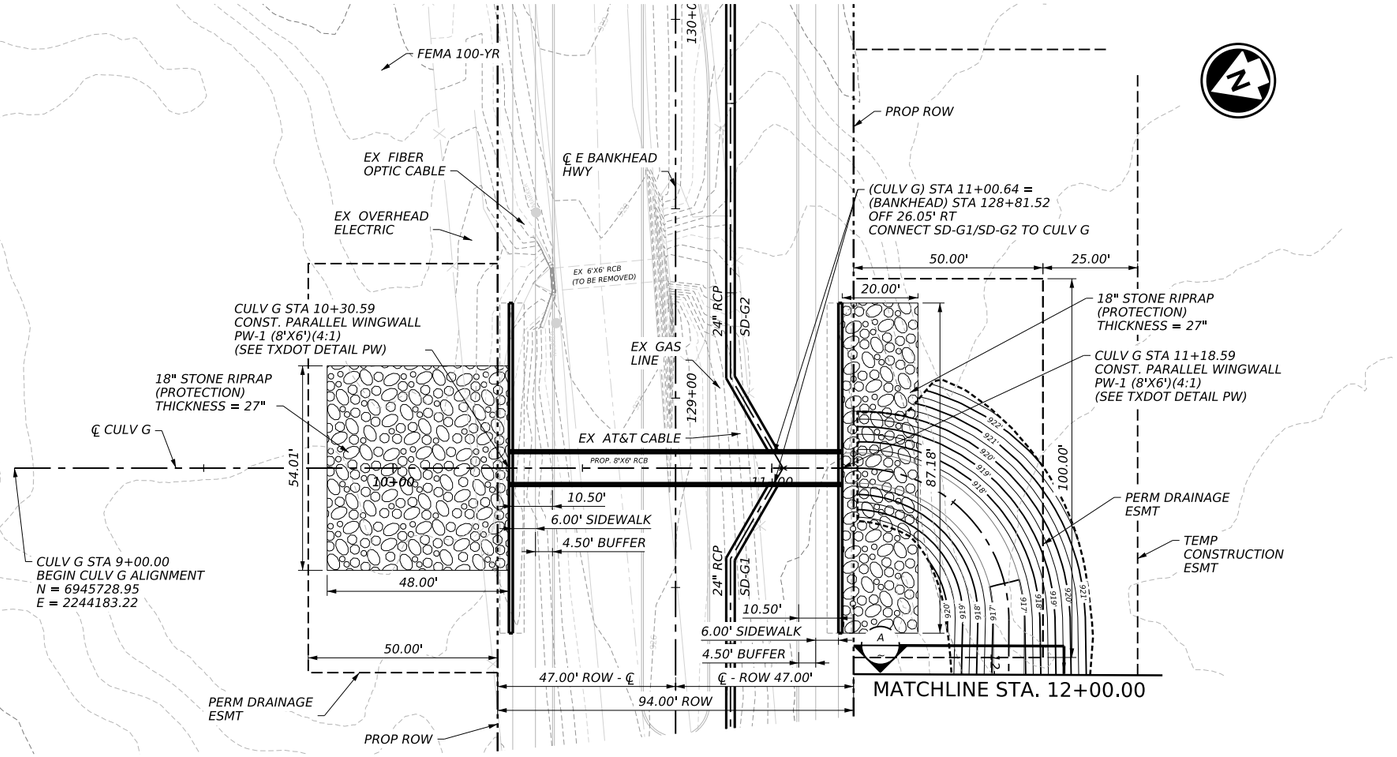
DIST	COUNTY	SHEET NO.
	PARKER	105

DATE: 8/27/2026 7:51:46 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\56171\54711_10\cv-109-pp-sd-culvert_F.dgn



CULVERT G CHANNEL DETAIL 1

NOT TO SCALE
STA 11+18.59 TO 12+60.08



LEGEND

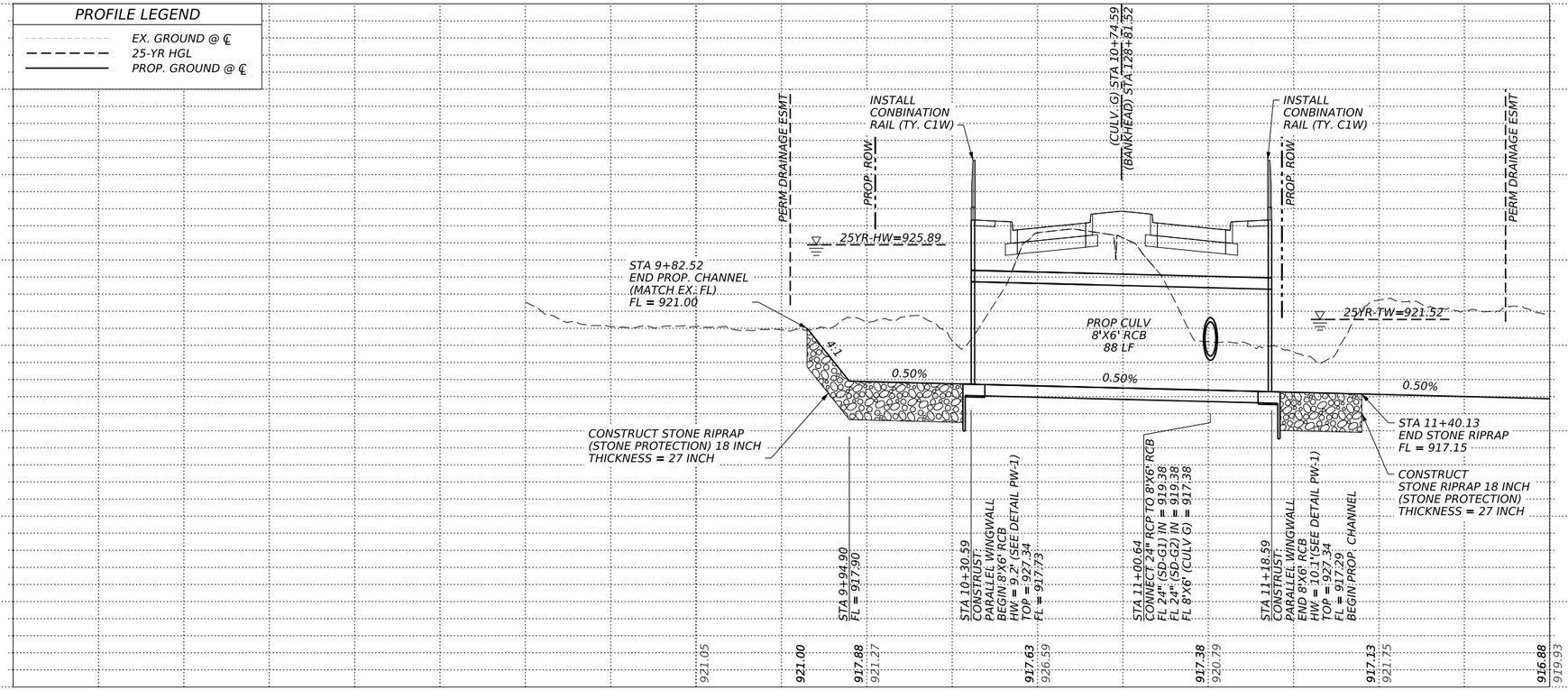
- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET



STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

NO.	ISSUE	BY	DATE

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

STORM DRAIN PLAN & PROFILE CULVERT G BEGINNING TO STA.12+00

2025 SHEET 1 OF 2

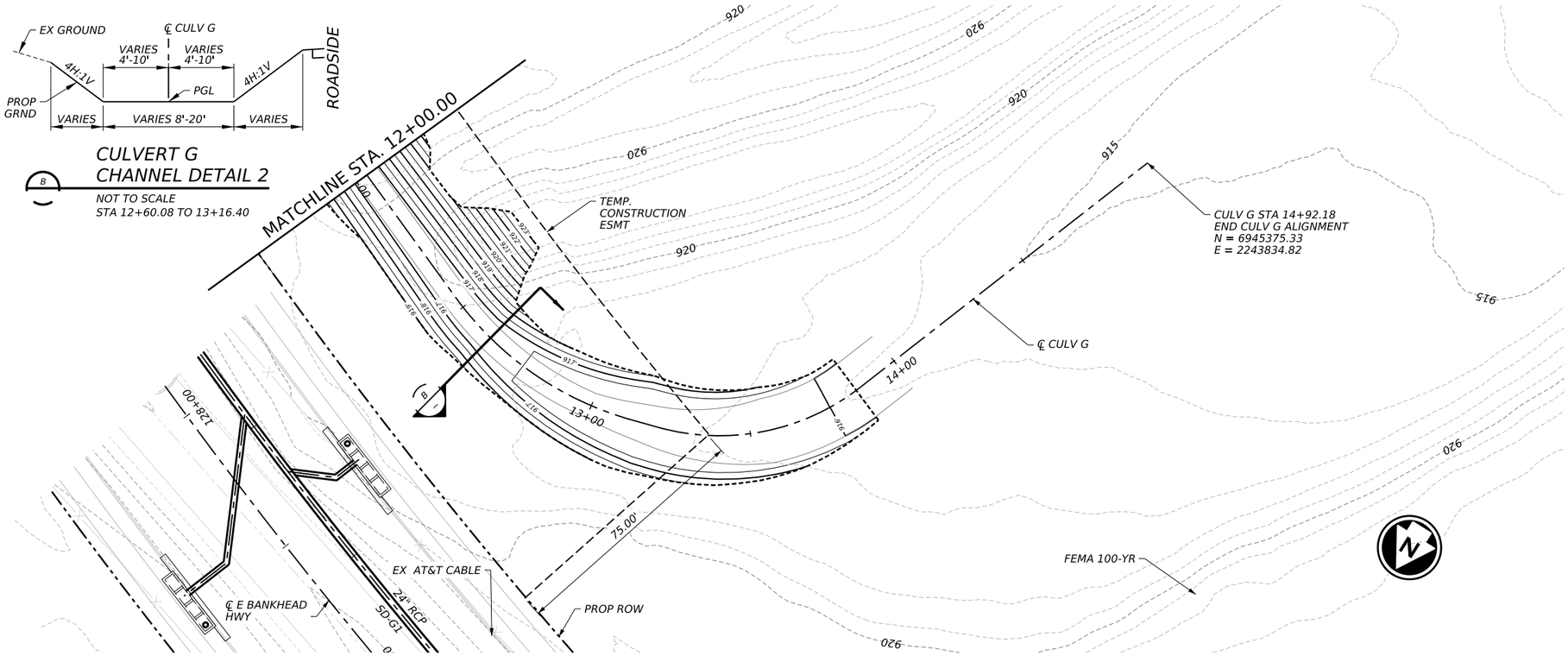
CONT	SECT	JOB	HIGHWAY

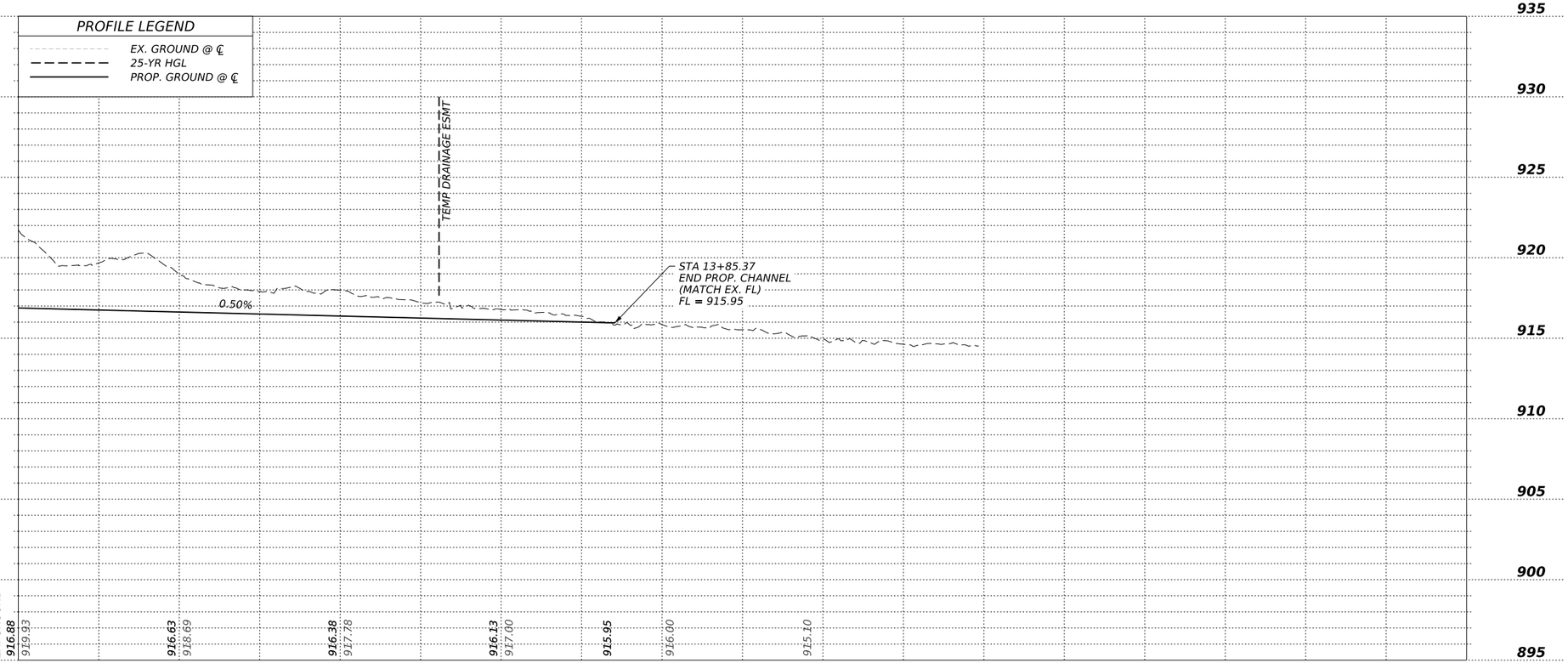
DIST	COUNTY	SHEET NO.
	PARKER	106

DATE: 8/27/2026 8:15:41 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5617\54711_11\cv-109-pp-sd-culvert_G1.dgn

CULVERT G CHANNEL DETAIL 2

NOT TO SCALE
STA 12+60.08 TO 13+16.40





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

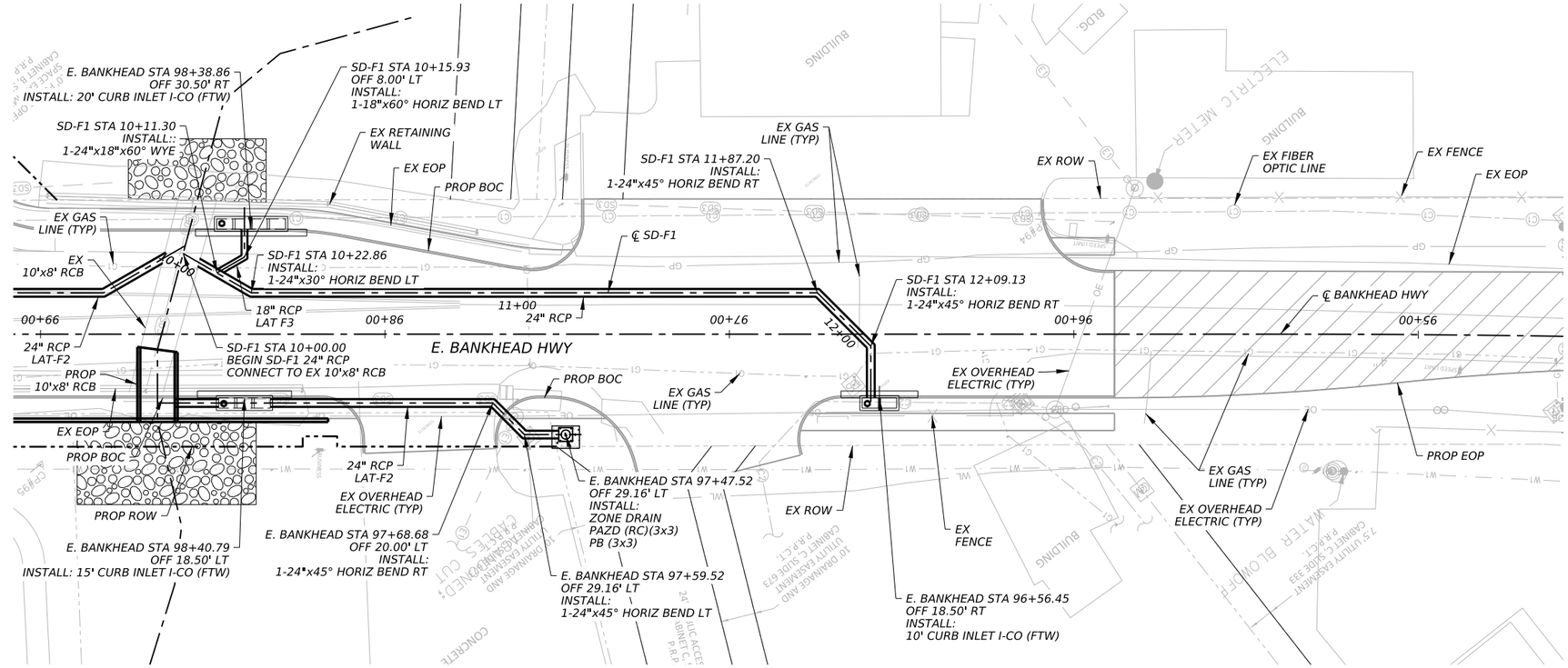
STORM DRAIN PLAN & PROFILE CULVERT G FROM STA.12+00 TO END

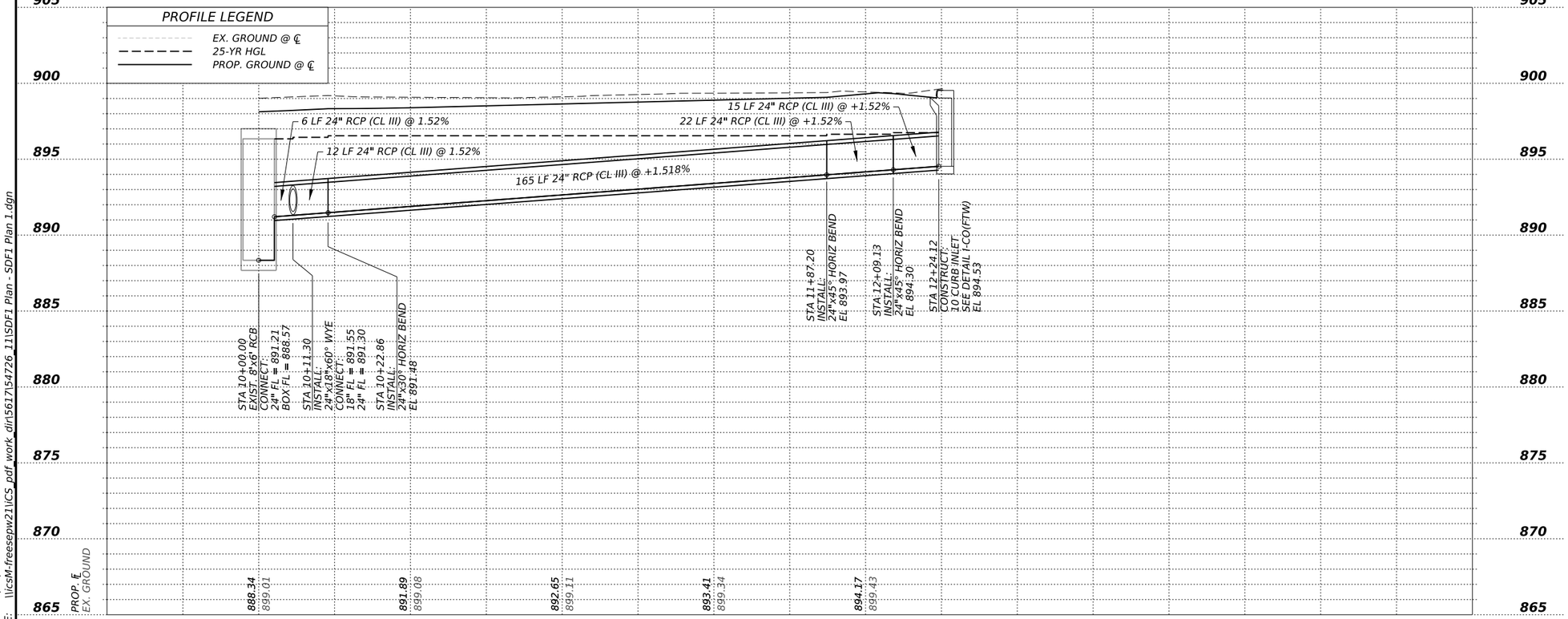
2025 SHEET 2 OF 2

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	107

DATE: 8/27/2026 7:59:02 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\5617\54711_12\cv-109-pp-sd-culvert_G2.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

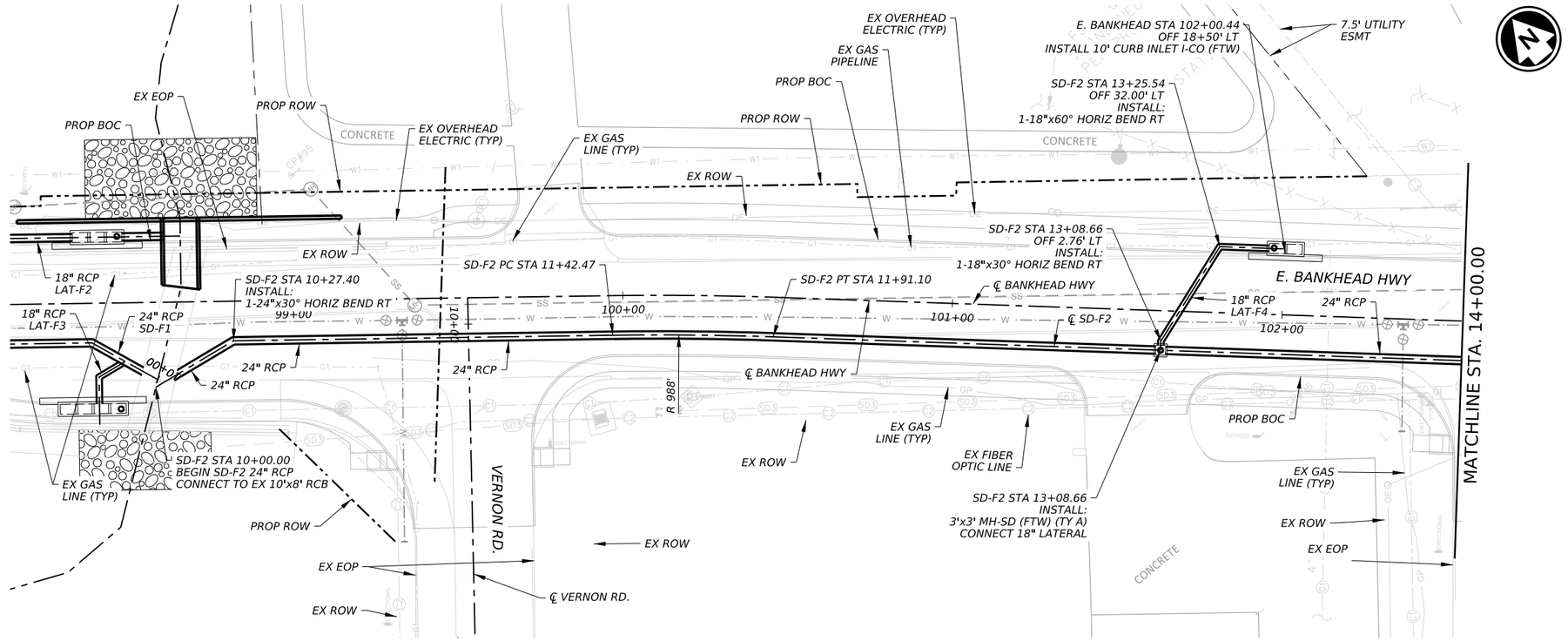
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE F1
FROM BEGINNING TO END

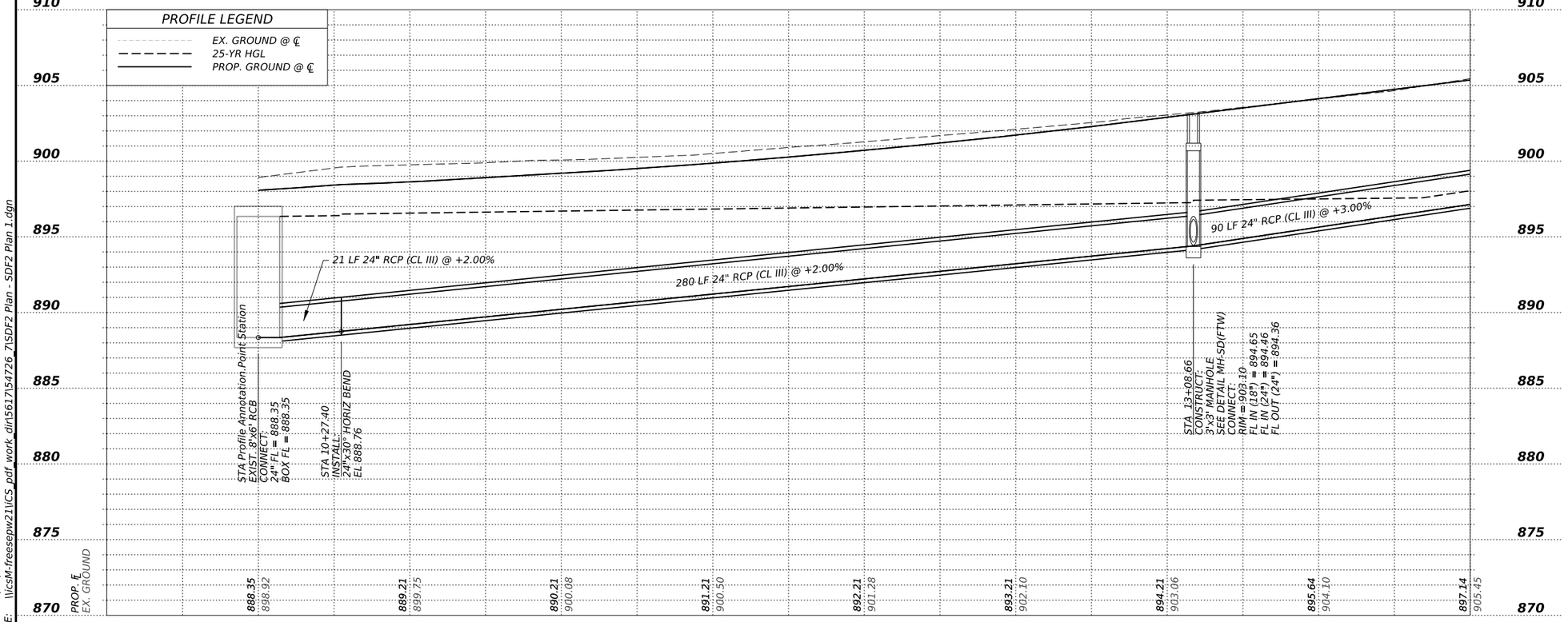
2025 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	108

DATE: 8/27/2026 7:49:53 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\5617\54726_11\SDF1 Plan - SDF1 Plan 1.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

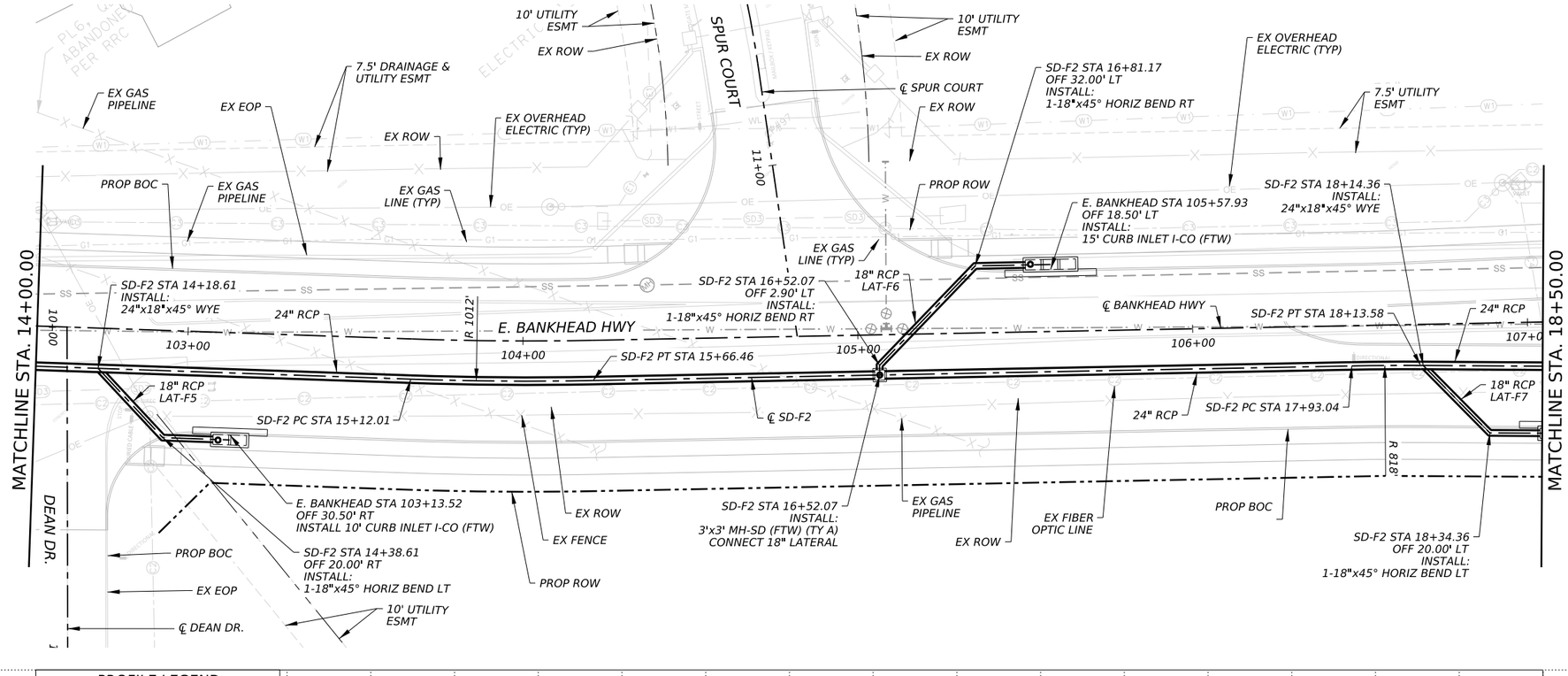
STORM DRAIN PLAN & PROFILE STORM DRAIN LINE F2 BEGINNING TO STA. 14+00

2025 SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	109

DATE: 8/27/2026 7:50:56 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\5617\54726_7\SDF2 Plan - SDF2 Plan 1.dgn



LEGEND

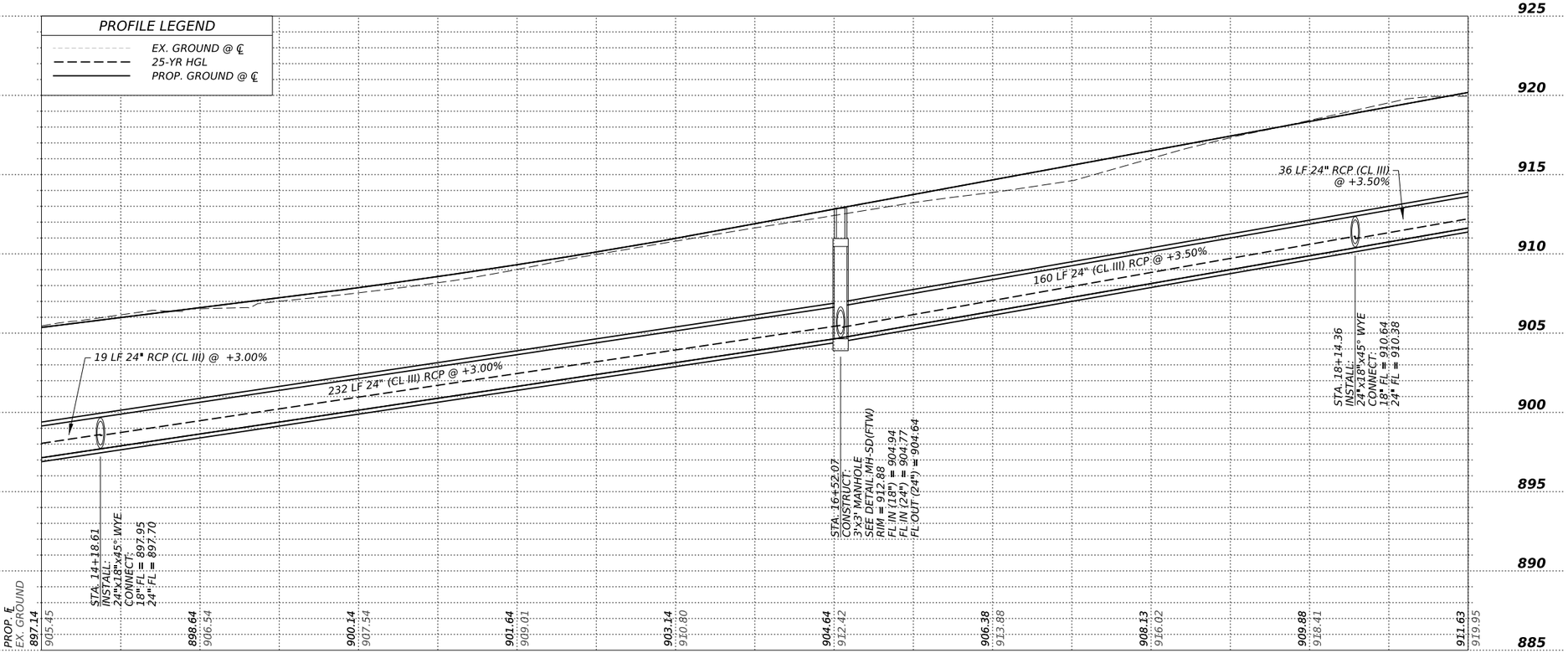
- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET



STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

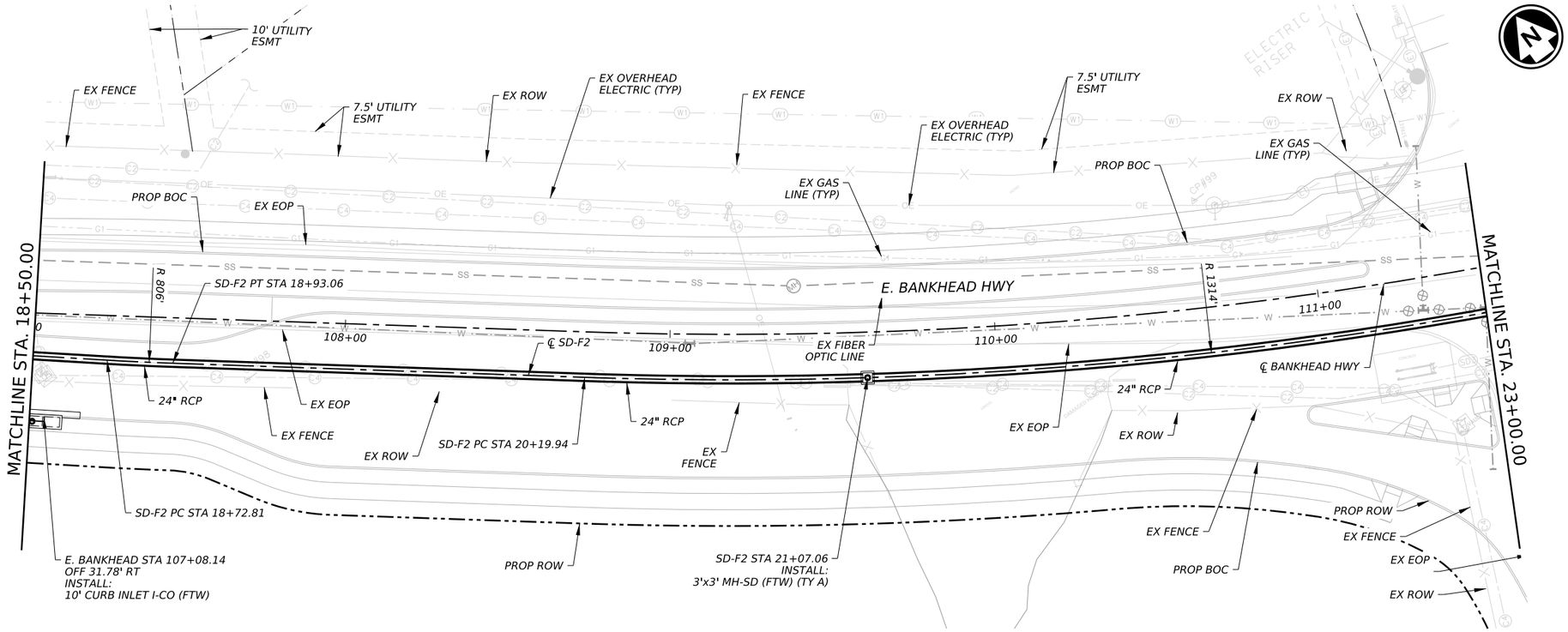
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE F2
STA. 14+00 TO STA. 18+50

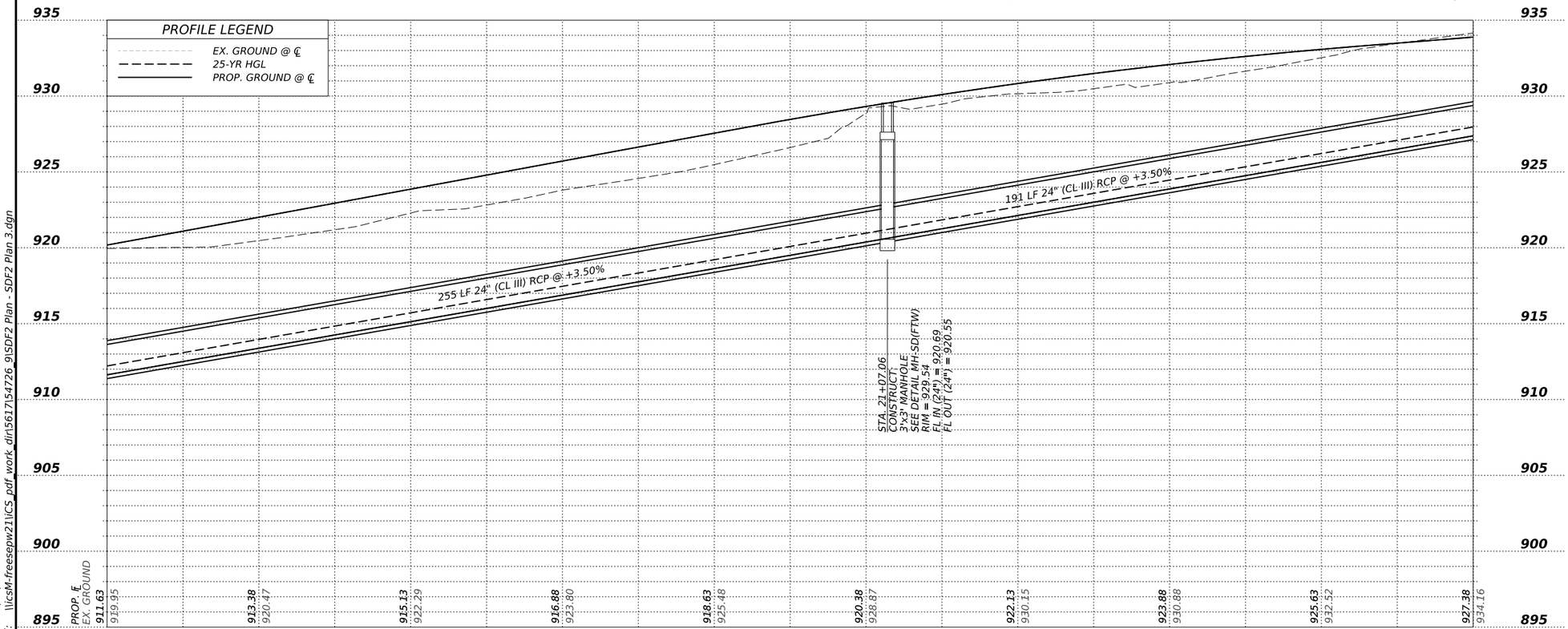
2025 SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	110

DATE: 8/27/2026 7:53:33 PM
FILE: \\cs\M-freesepw21\CS_pdf work din\56171547268\SDF2 Plan - SDF2 Plan 2.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

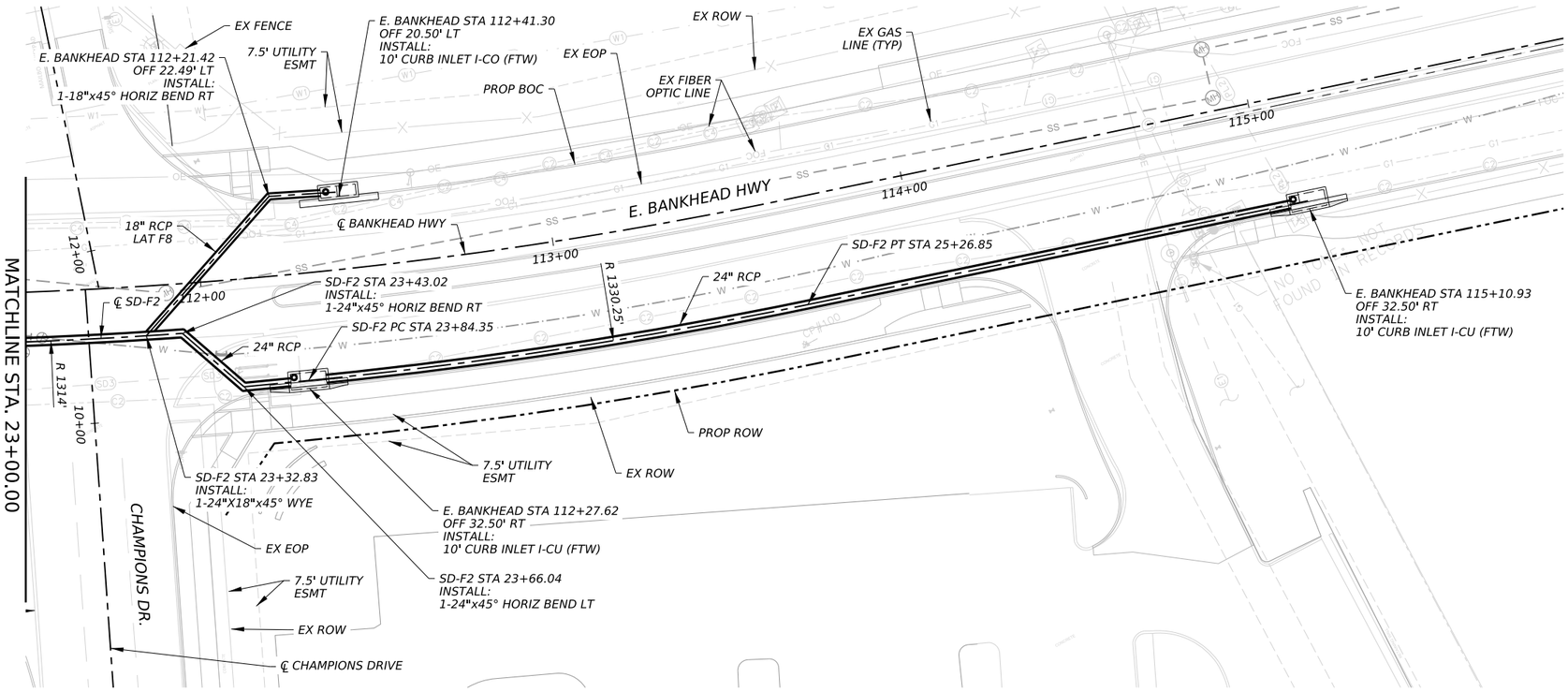
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE F2
STA. 18+50 TO STA. 23+00

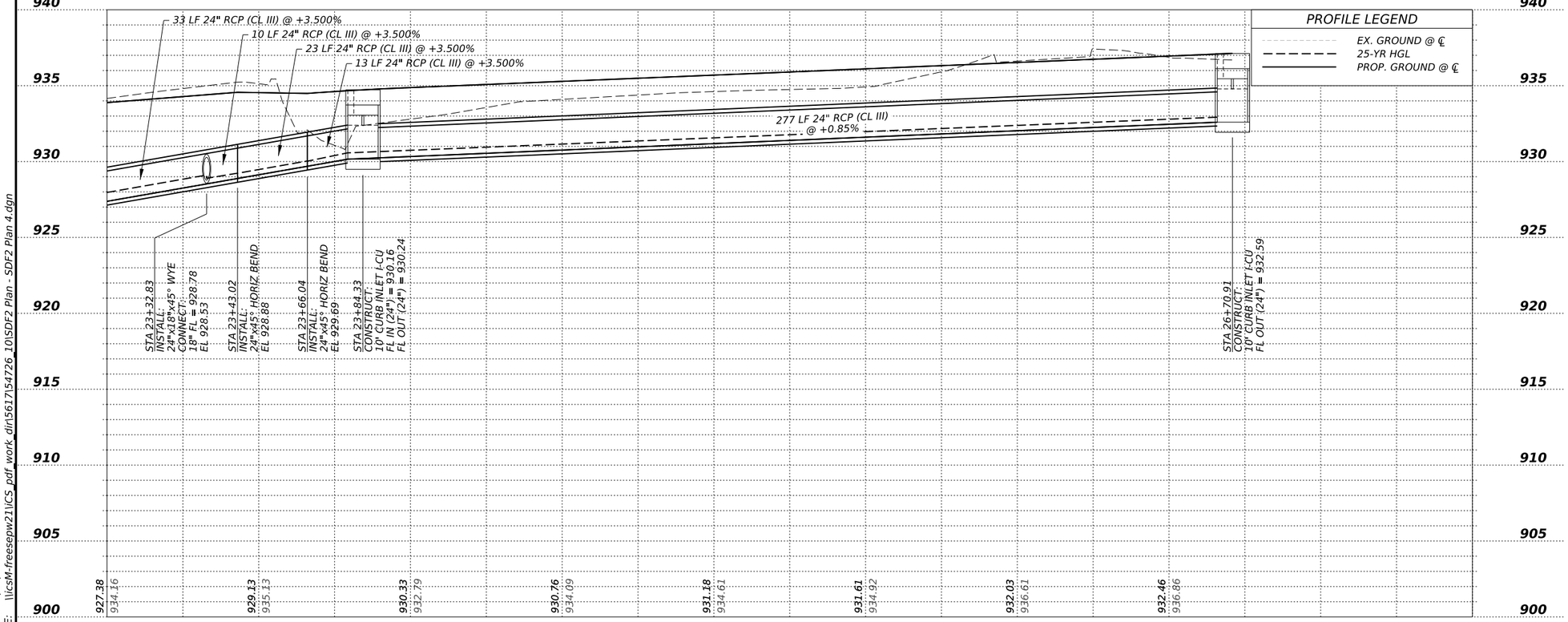
2025 SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	111

DATE: 8/27/2026 7:51:36 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5617\54726 9\SDF2 Plan - SDF2 Plan 3.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

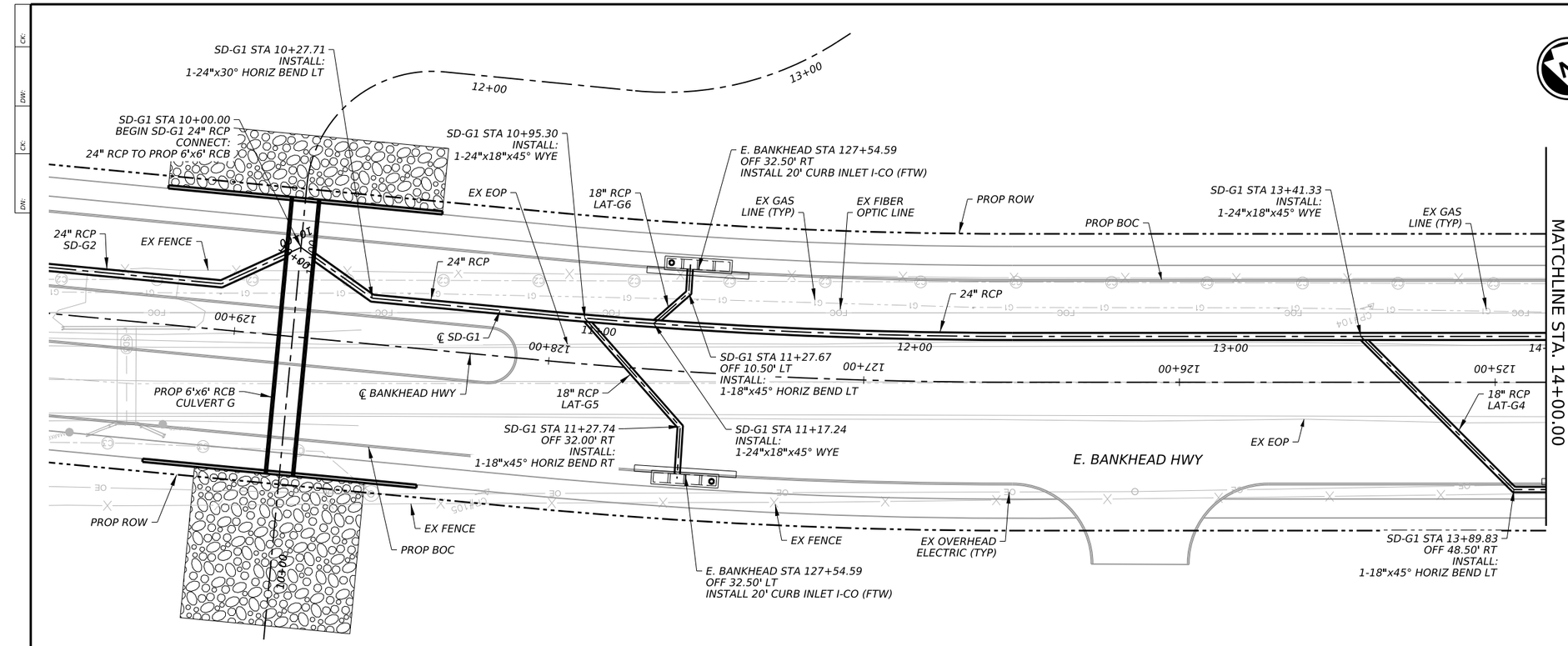
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE F2
FROM STA. 27+50 TO END

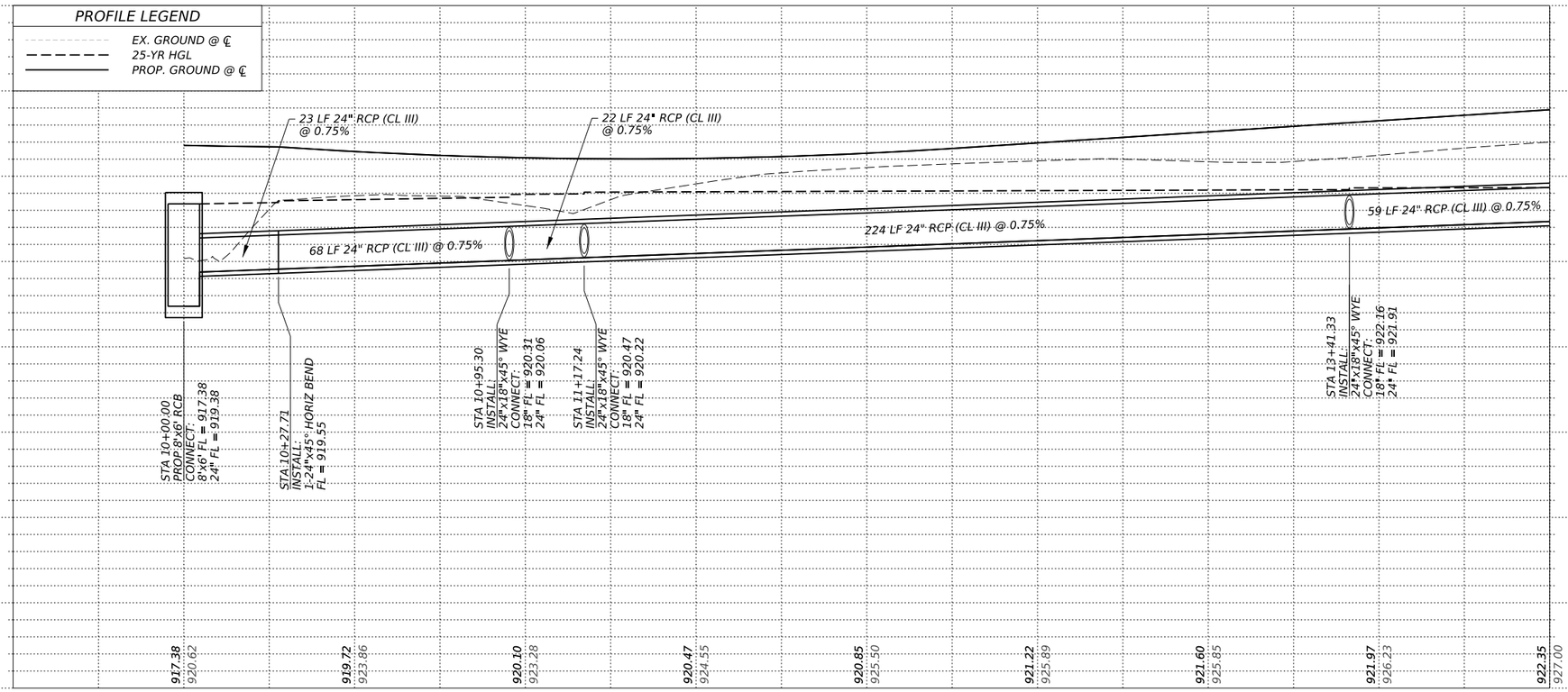
2025 SHEET 4 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	112

DATE: 8/27/2026 7:55:02 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5617\54726_10\SDF2 Plan - SDF2 Plan 4.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES. AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

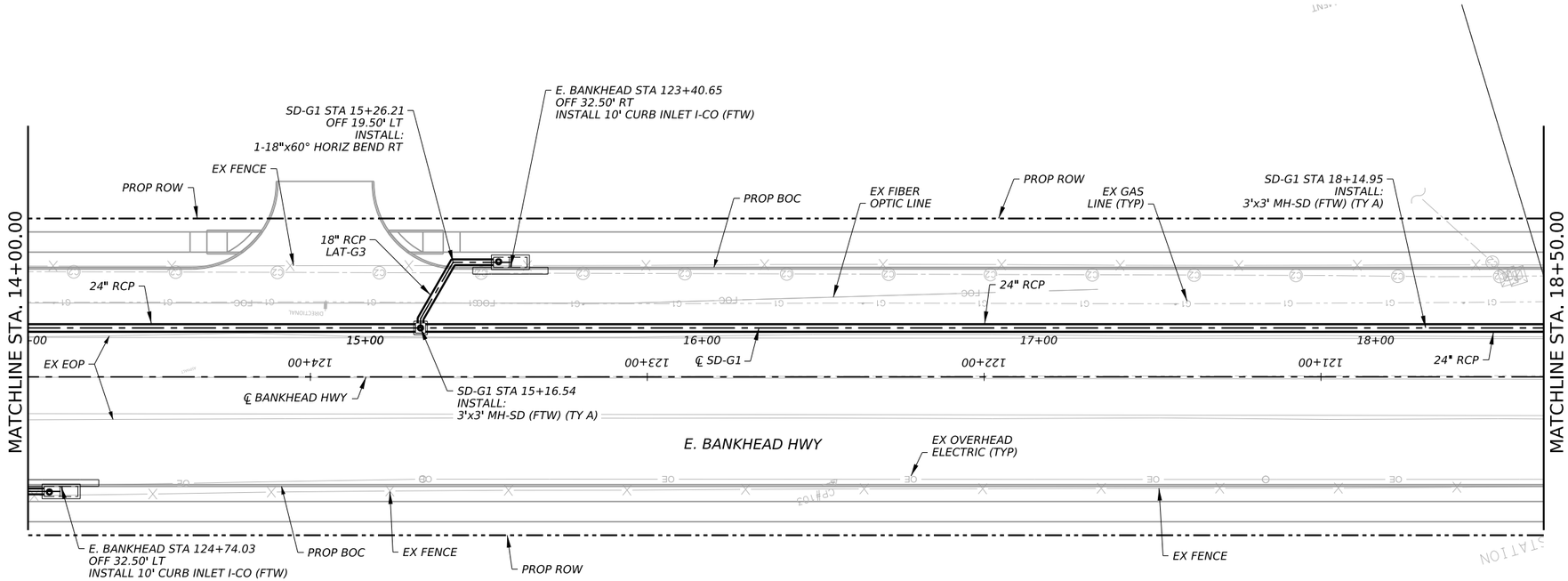
STORM DRAIN PLAN & PROFILE STORM DRAIN LINE G1 BEGINNING TO STA. 14+00

2025 SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	113

DATE: 8/27/2026 7:48:13 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\5617\54726_1\SDG1 Plan - SDG1 Plan 1.dgn

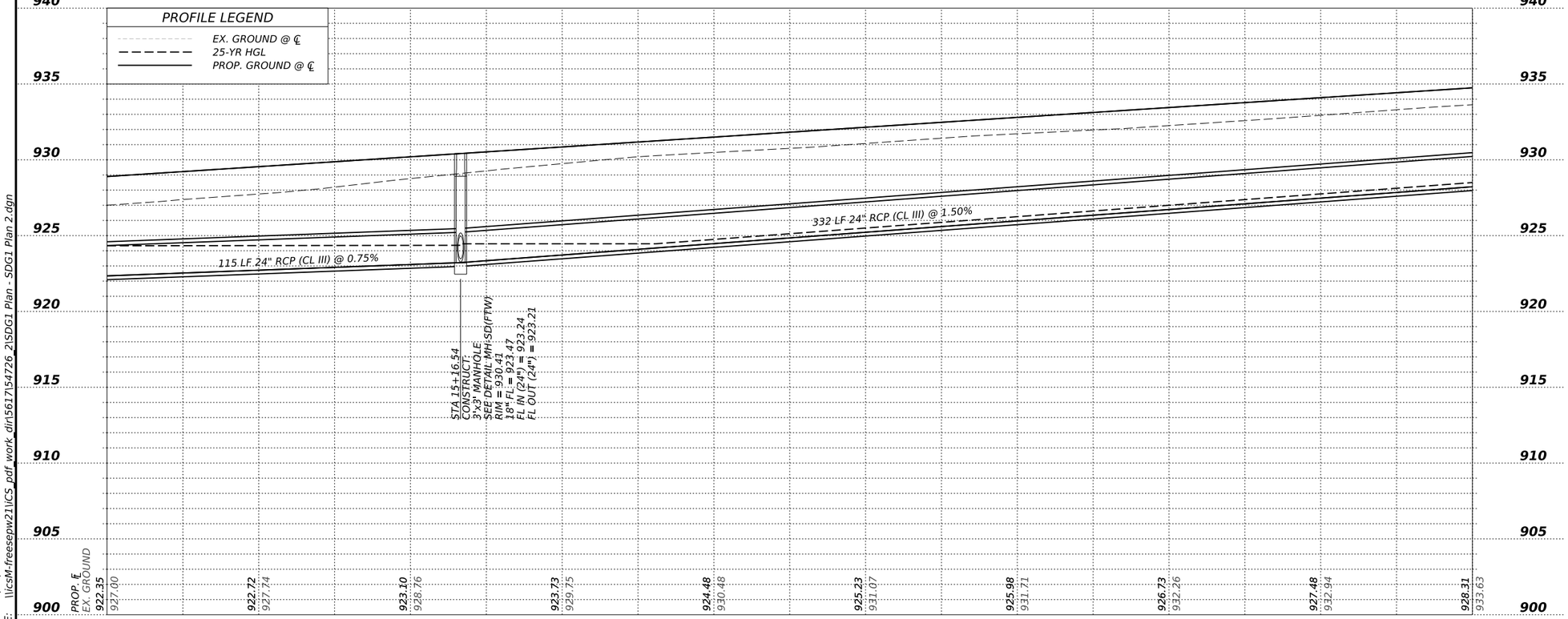


LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

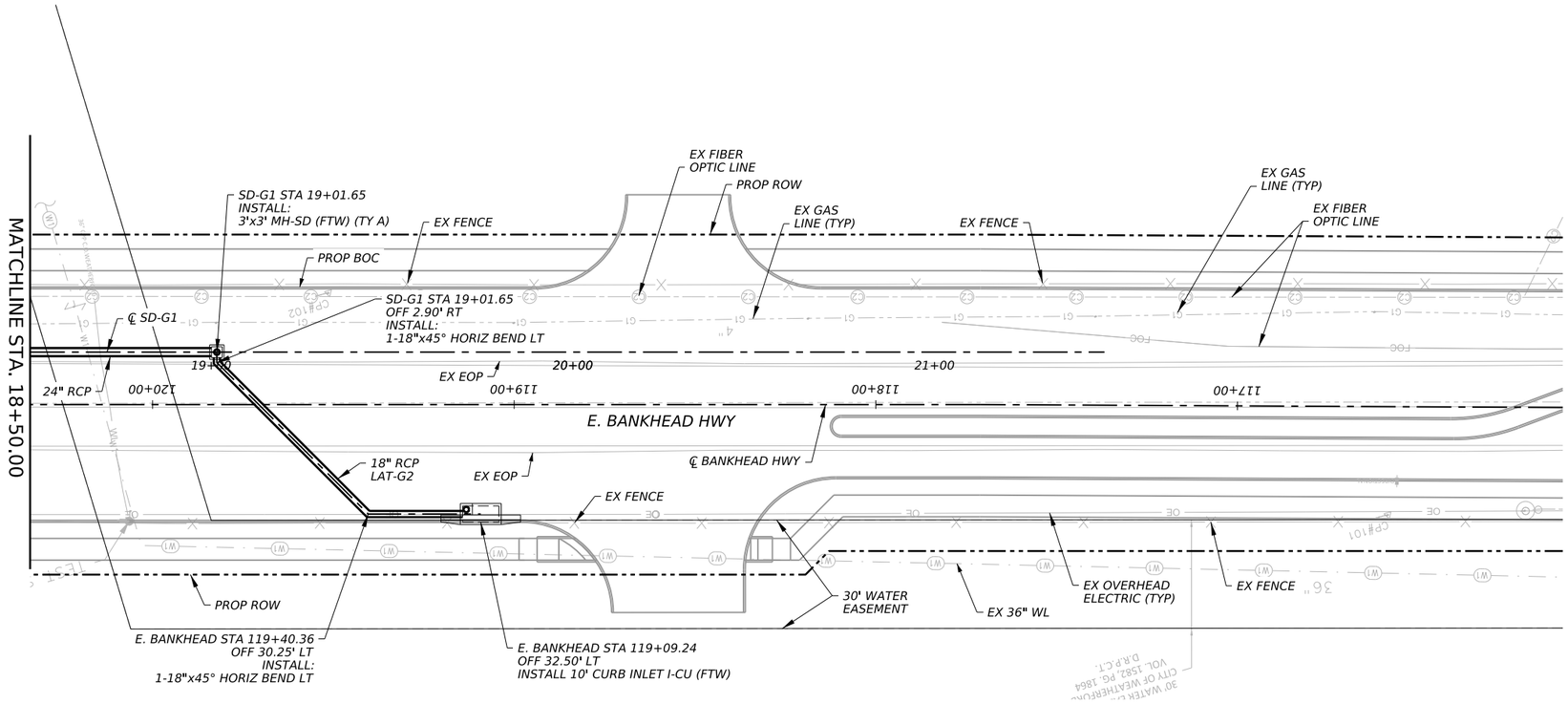
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE G1
STA. 14+00 TO STA. 18+50

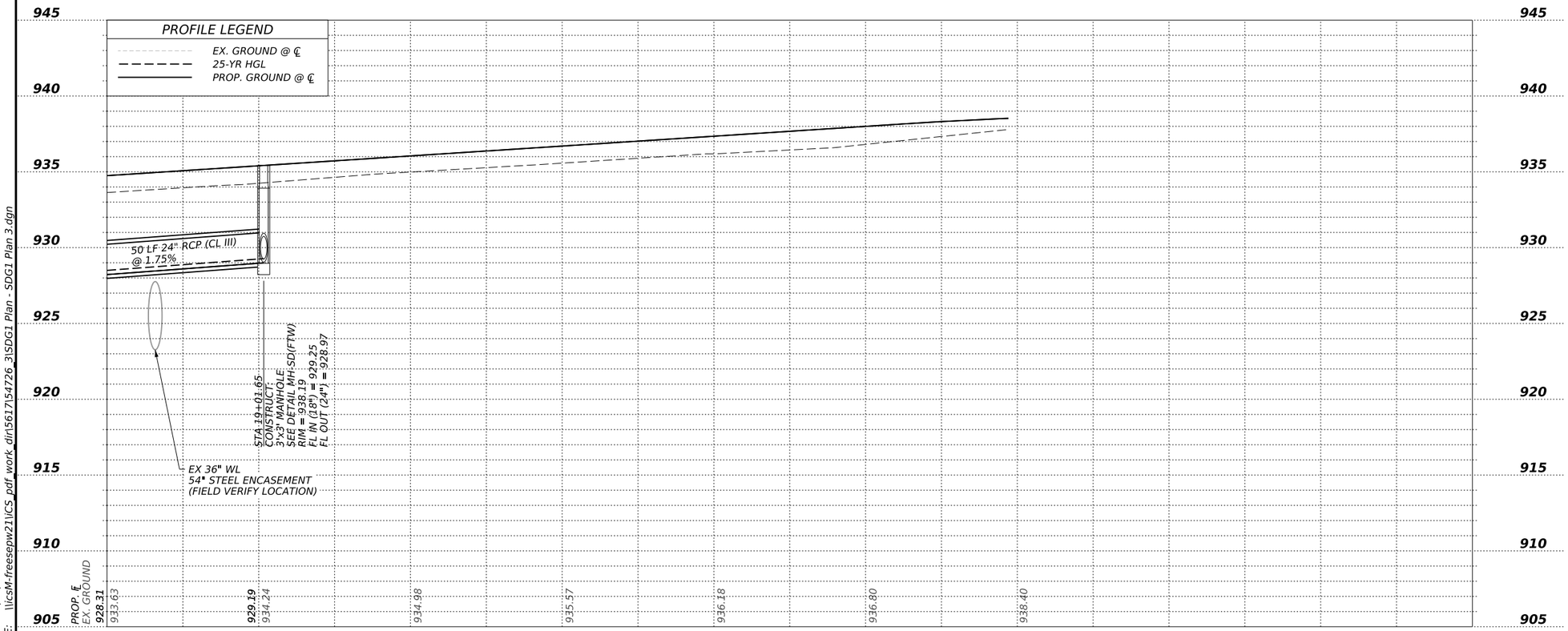
2025 SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	114

DATE: 8/27/2026 7:52:47 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5617\54726_2\SDG1 Plan - SDG1 Plan 2.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

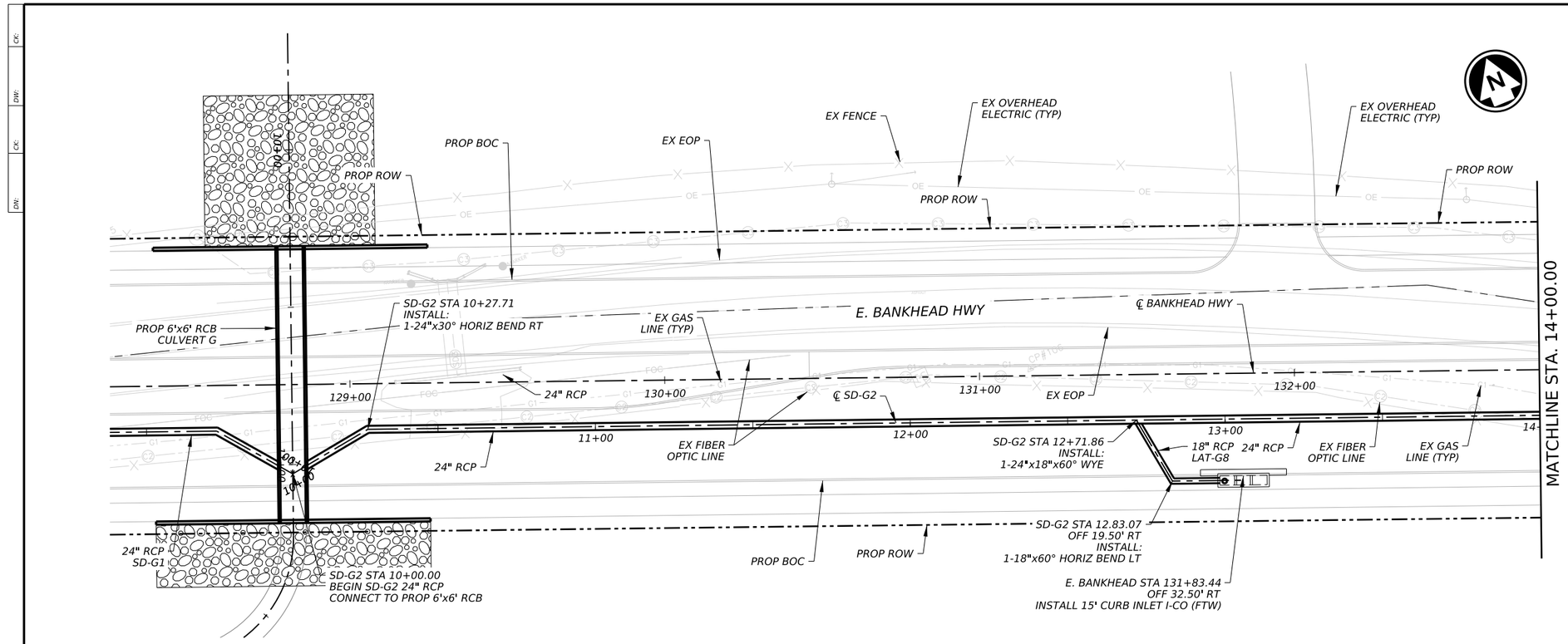
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE G1
FROM STA. 18+50 TO END

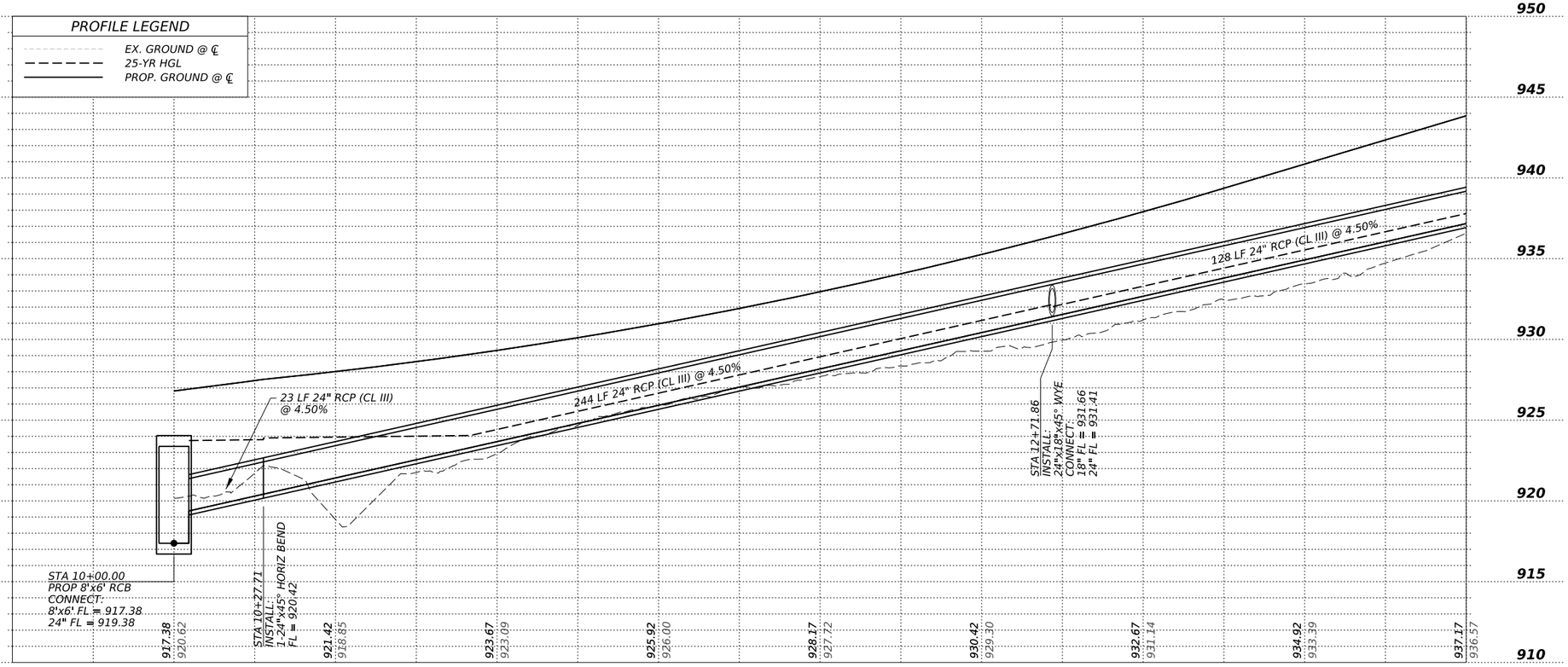
2025 SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	115

DATE: 8/27/2026 8:12:54 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\5617\54726_3\SDG1 Plan - SDG1 Plan 3.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

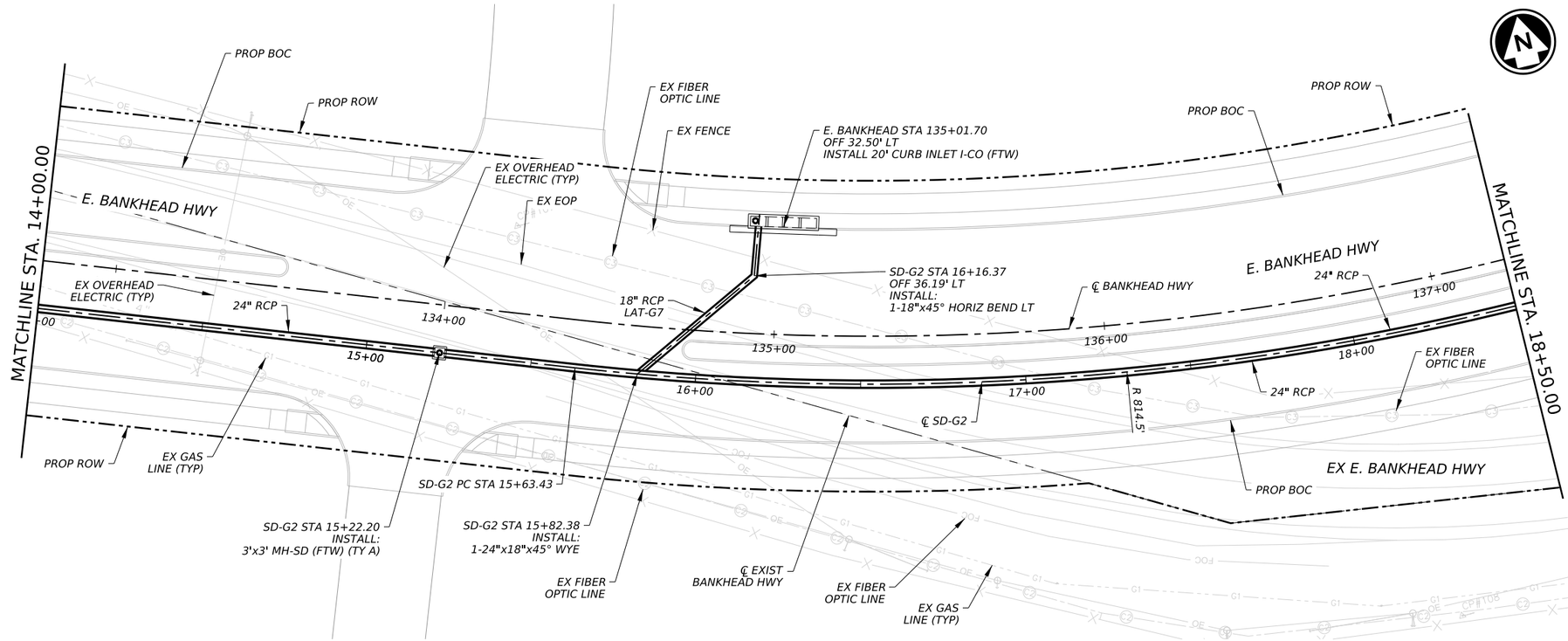
STORM DRAIN PLAN & PROFILE STORM DRAIN LINE G2 BEGINNING TO STA. 14+00

2025 SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	116

DATE: 8/27/2026 8:17:00 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\56171\54726_4\SDG2 Plan - SDG2 Plan 1.dgn

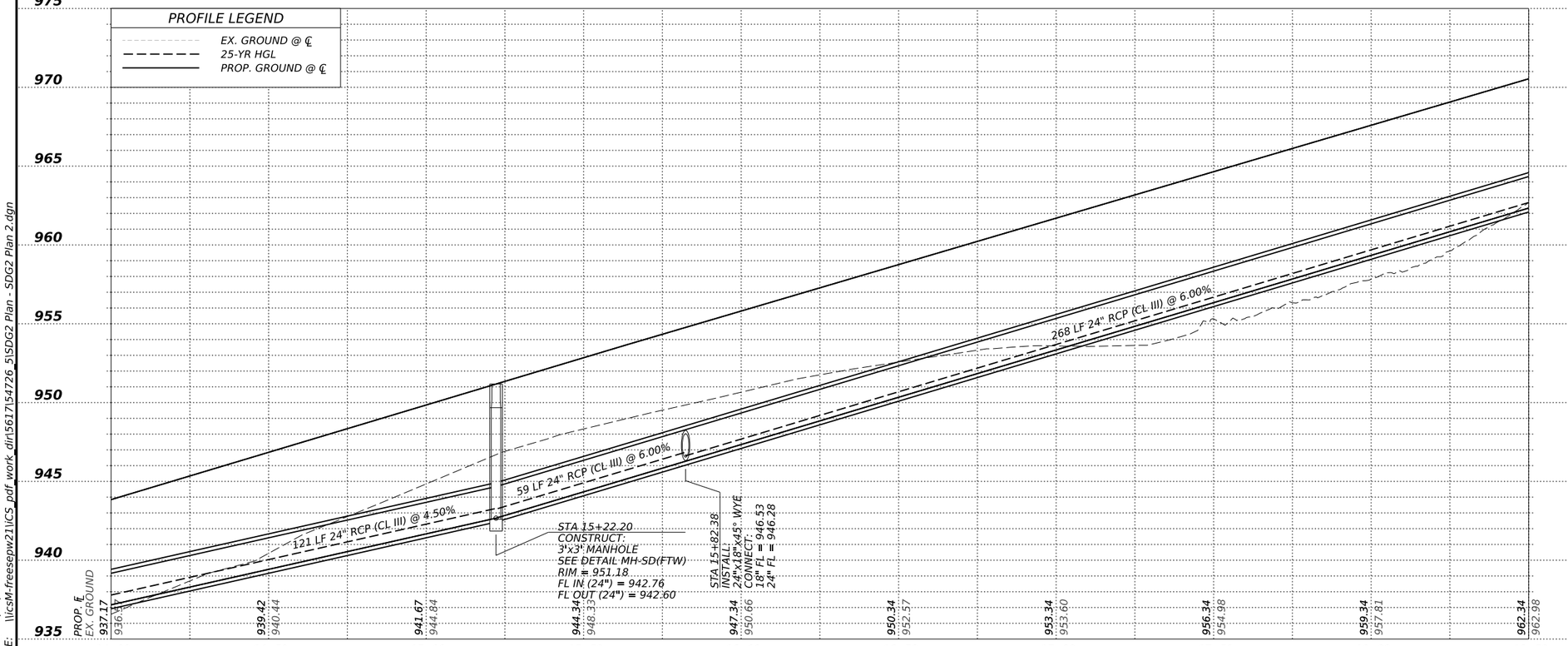


LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.



0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

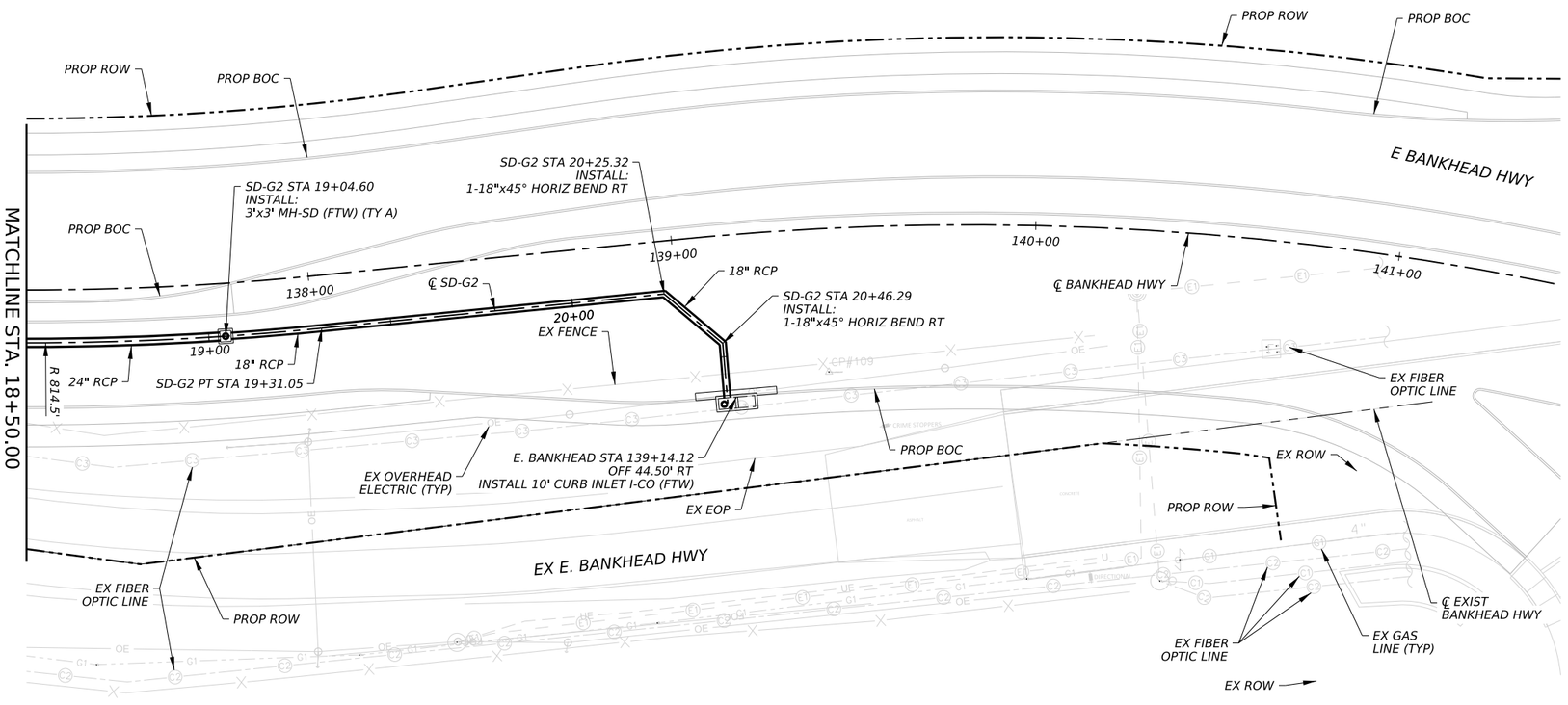
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE G2
STA. 14+00 TO STA. 18+50

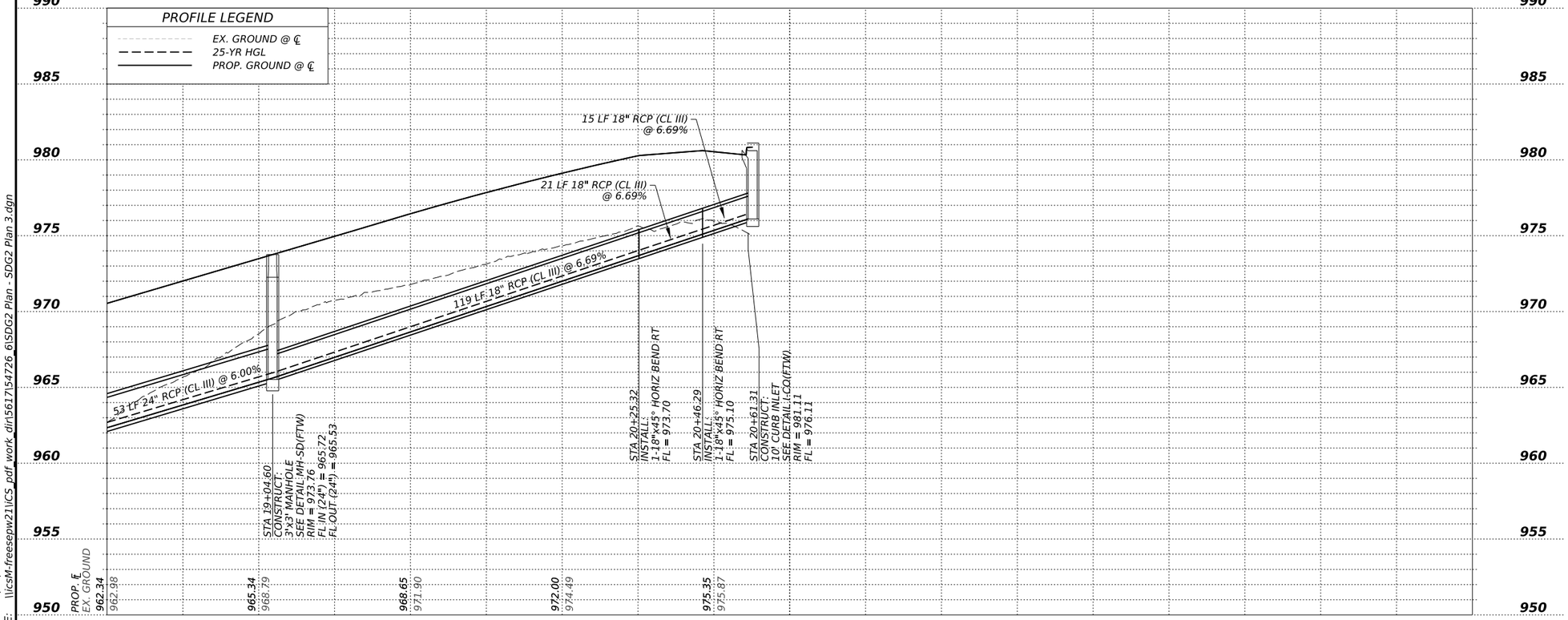
2025 SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	117

DATE: 8/27/2026 7:50:49 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\56171\54726_5\SDG2 Plan - SDG2 Plan 2.dgn





LEGEND

- PROP DRAIN PIPE
- PROP RIGHT-OF-WAY
- PROP DRAINAGE EASEMENT
- TEMP RIGHT OF ENTRY
- CURB INLET
- JUNCTION BOX/ DROP INLET

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.
7. CONTRACTOR TO CLEAN EXISTING CULVERT PRIOR TO CONSTRUCTION EXTENSIONS OR HEADWALLS.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

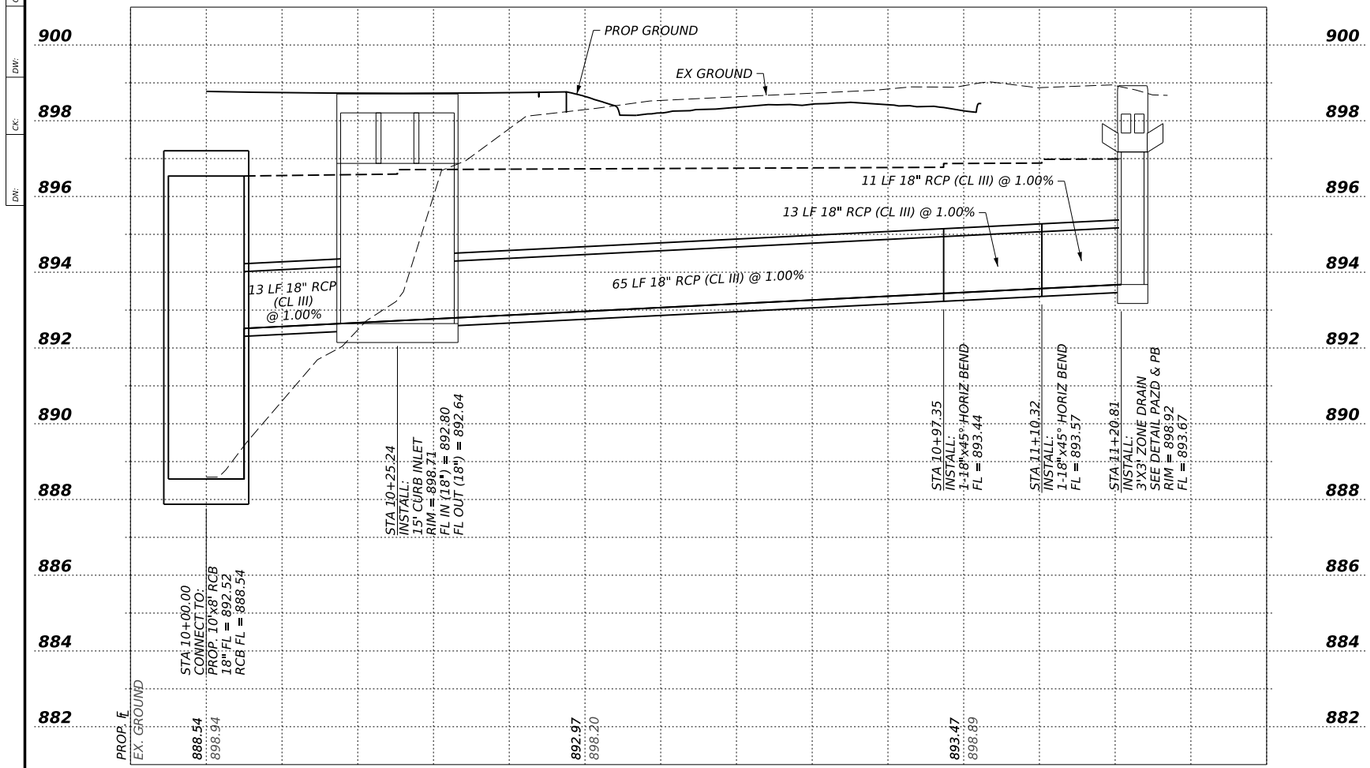
STORM DRAIN PLAN & PROFILE
STORM DRAIN LINE G2
FROM STA. 18+50 TO END

2025 SHEET 3 OF 3

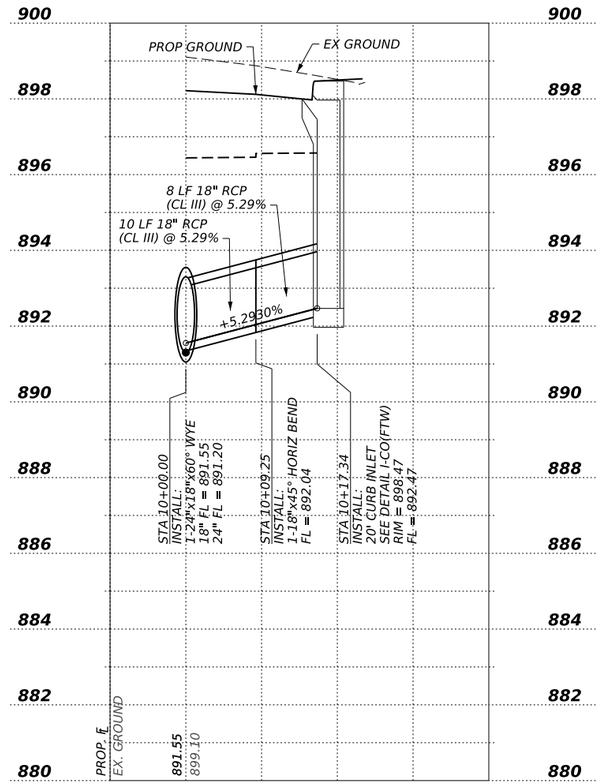
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	118

DATE: 8/27/2026 7:54:18 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\56171\54726_6\SDG2 Plan - SDG2 Plan 3.dgn



LAT F2



LAT F3

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.

6' ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

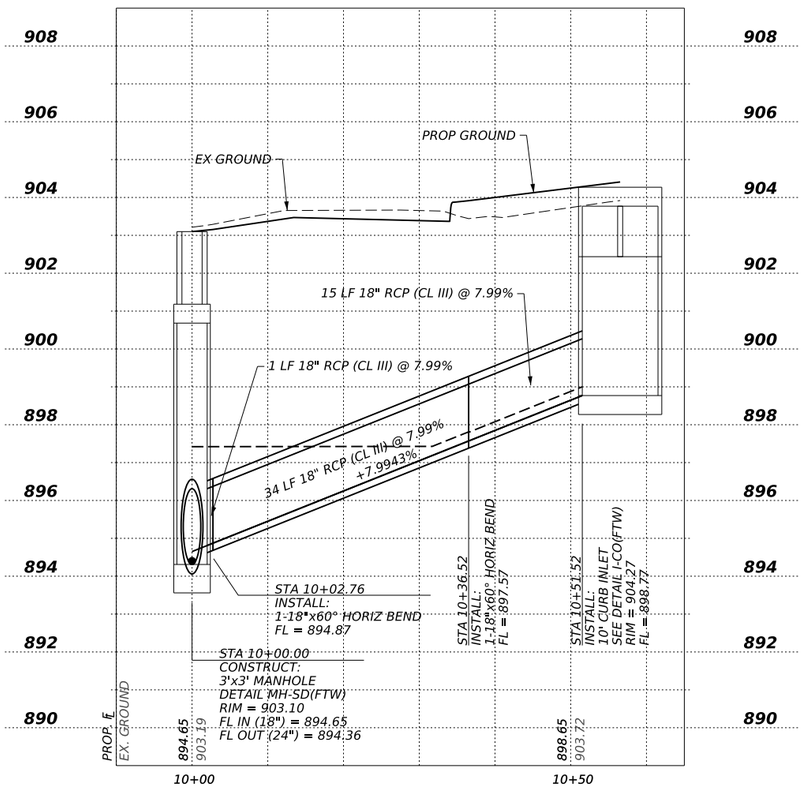
STORM DRAIN PROFILES
SD F LATERALS F2 AND F3

SHEET 1 OF 4

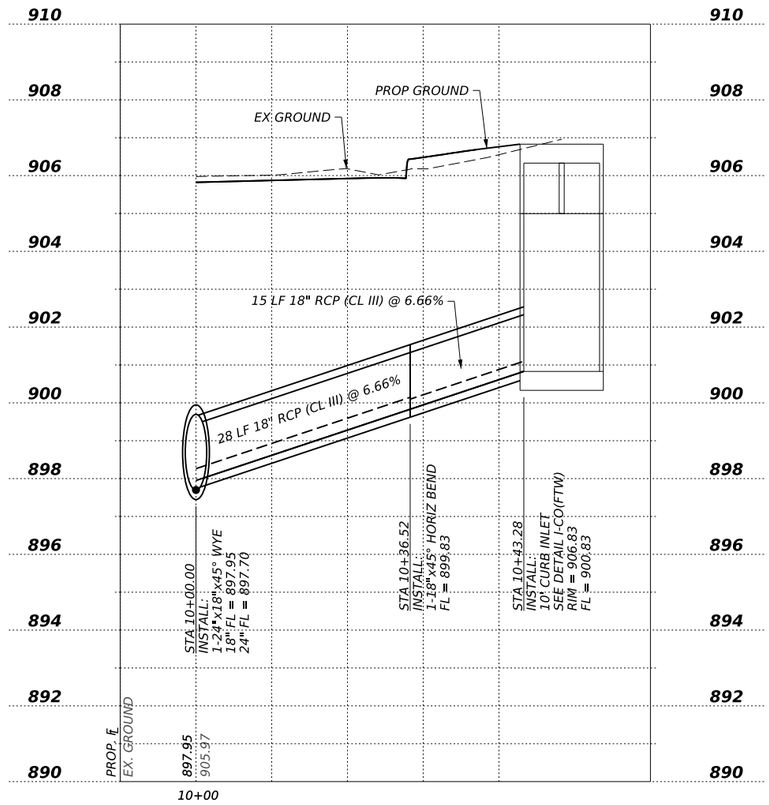
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	119

DATE: 8/27/2026 7:52:25 PM
FILE: \\CentralData\Projects\Parker_CTY_TRANS_BOND_Update_dln\56171\54726_22\CV-109-SD_F_LATERALS01.dgn



LAT F4



LAT F5

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

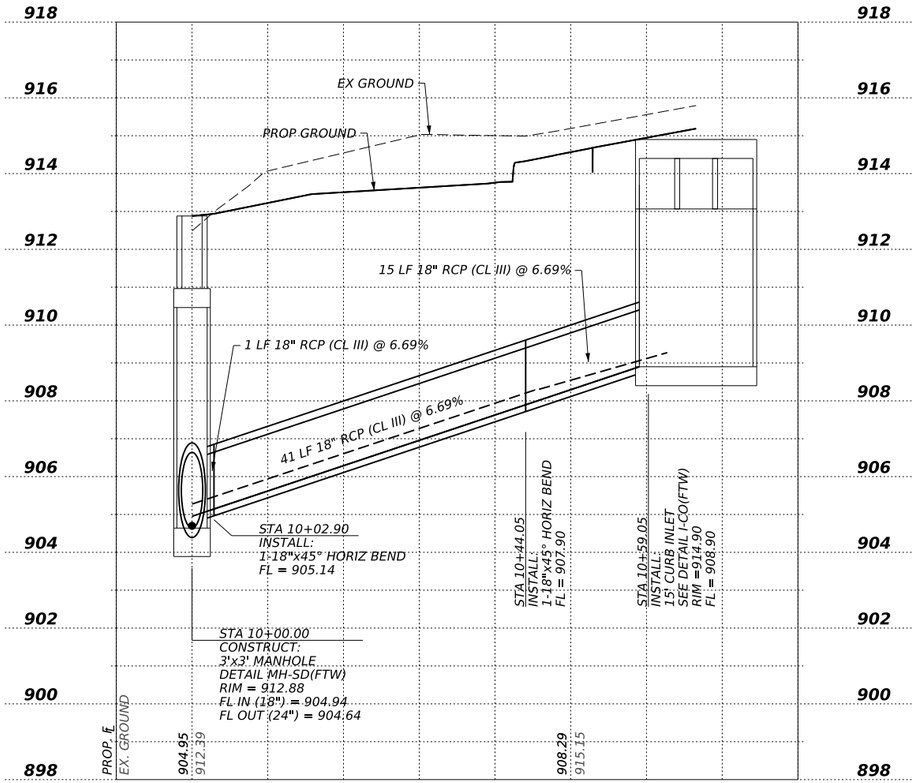
STORM DRAIN PROFILES
SD F LATERALS F4 AND F5

SHEET 2 OF 4

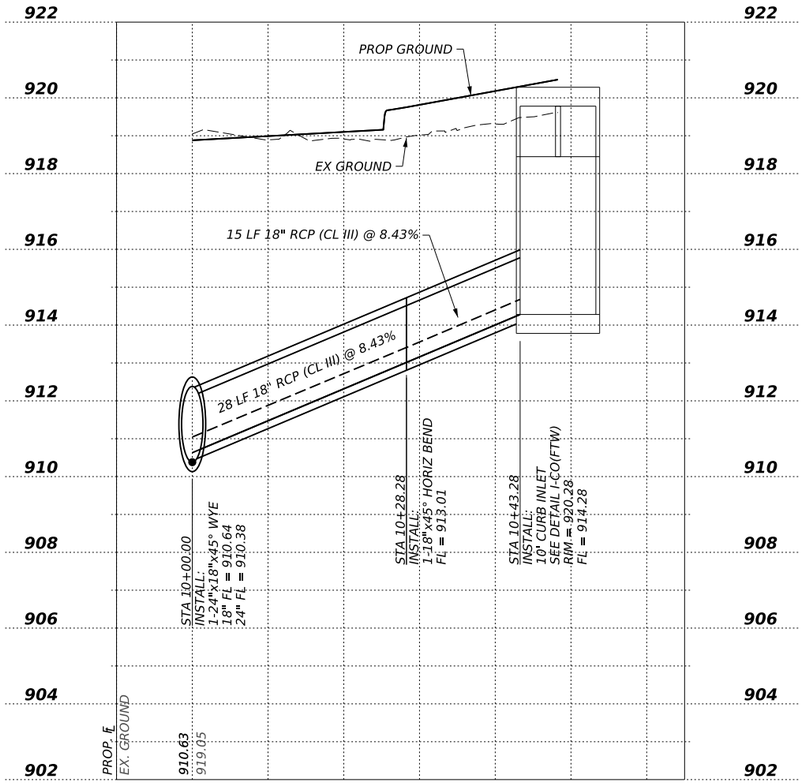
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	120

DATE: 8/27/2026 7:53:07 PM
FILE: \\CentralData\Projects\Parker_County_Transportation_Bond_2021\561754726 - E Bankhead Hwy Part 1\Design\Drainage\din\561754726_23|CV-109-SD_F_LATERALS02.dgn



LAT F6



LAT F7

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.

6' ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

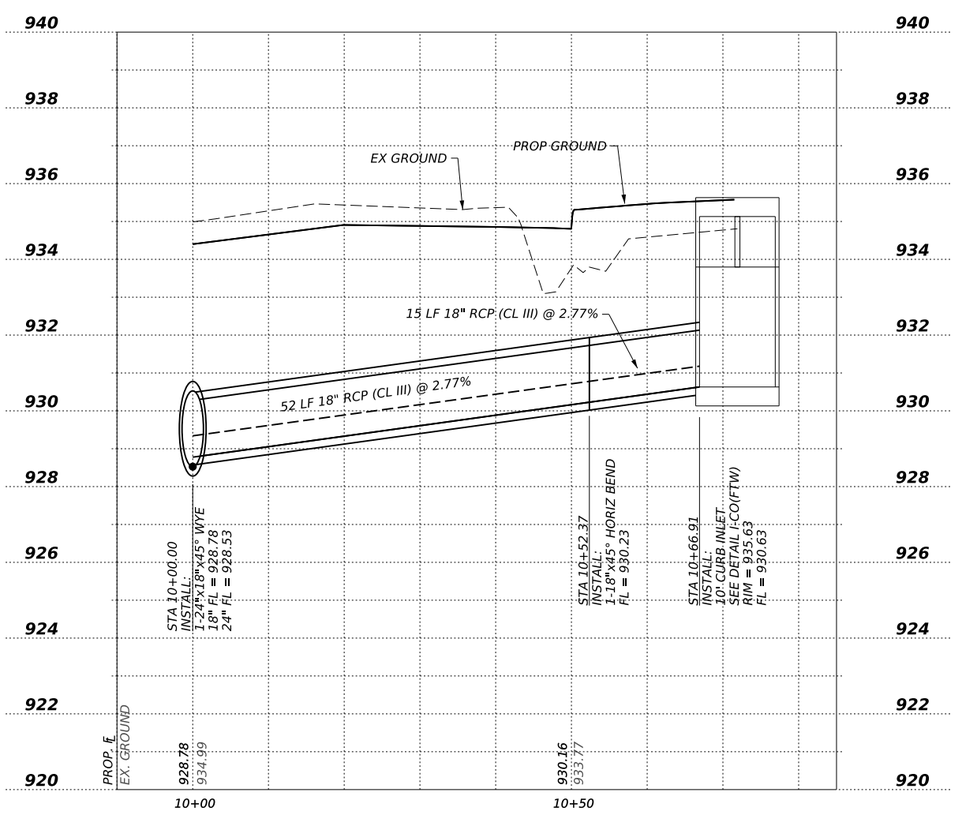
STORM DRAIN LATERALS
SD F LATERALS F6 AND F7

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	121

DATE: 8/27/2026 7:51:59 PM
FILE: \\CFW1\Projects\CFW_Projects\Projects\Parker County\Bankhead Hwy\din\56171\54726_24ICV-109-SD_F_LATERALS03.dgn



LAT F8

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.

6' ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

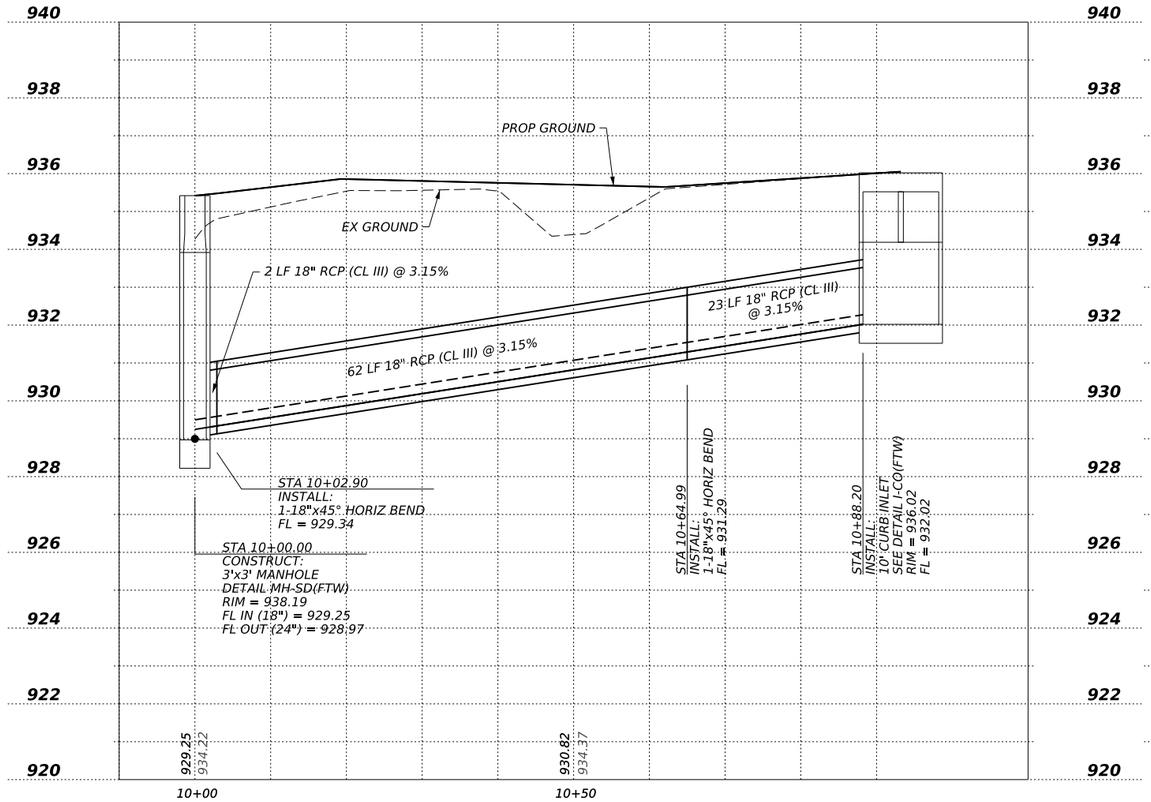
STORM DRAIN LATERALS
SD F LATERAL F8

SHEET 4 OF 4

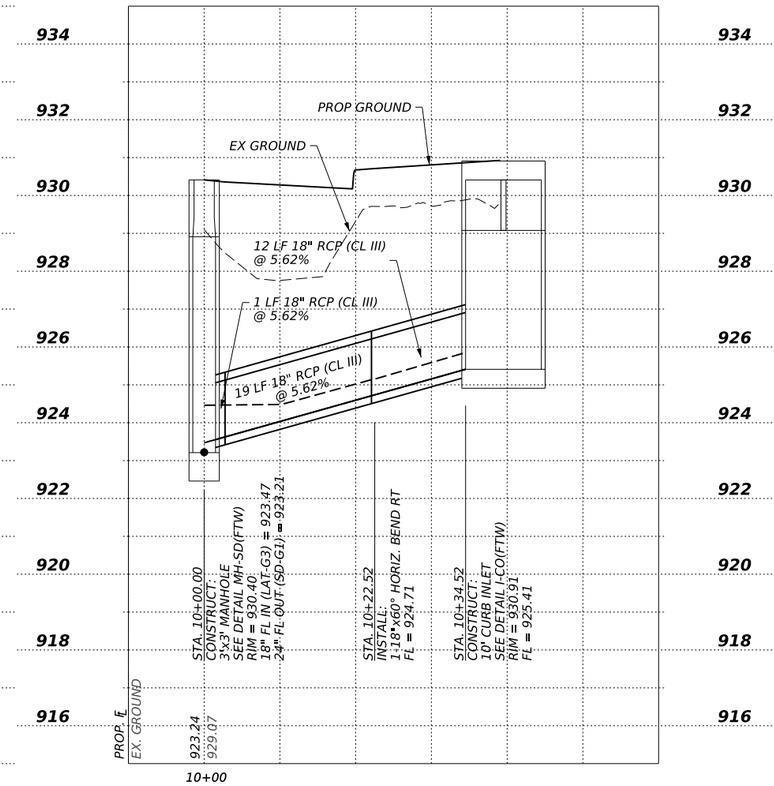
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	122

DATE: 8/27/2026 8:01:37 PM
FILE: \\CFW1\Projects\PARKER\CO\TRANS\Design\Roadway\dln\561754726_25\CV-109-SD_F_LATERALS04.dgn



LAT G2



LAT G3

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

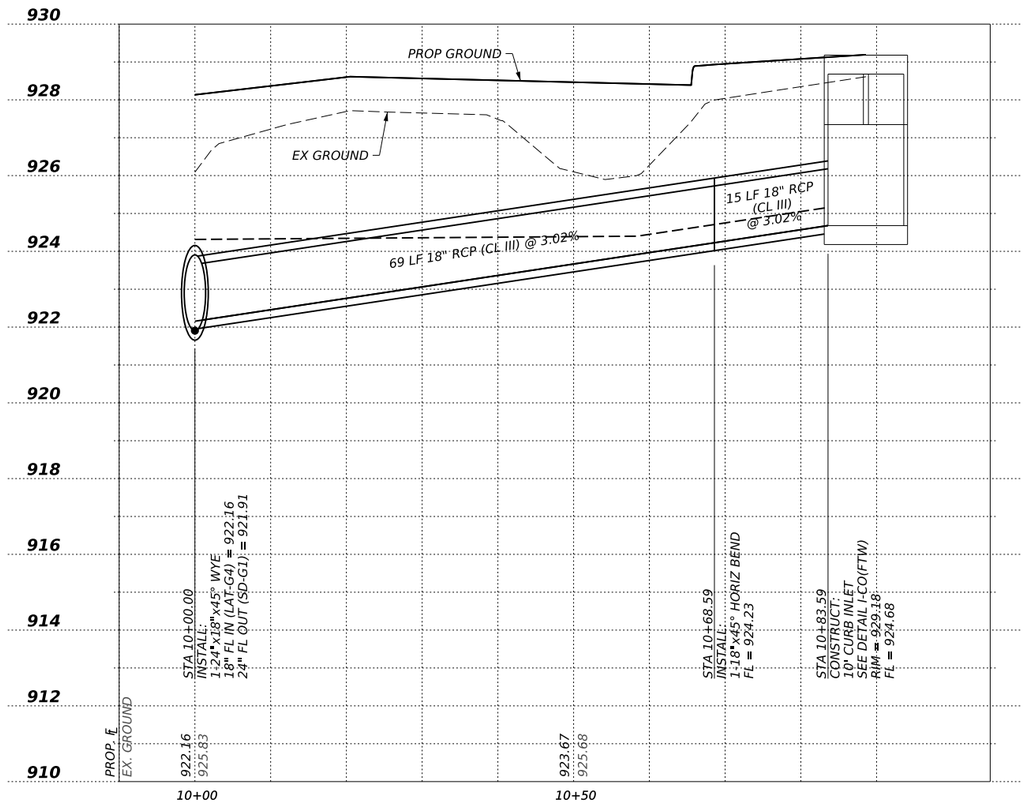
STORM DRAIN PROFILES
SD G LATERALS G2 AND G3

SHEET 1 OF 4

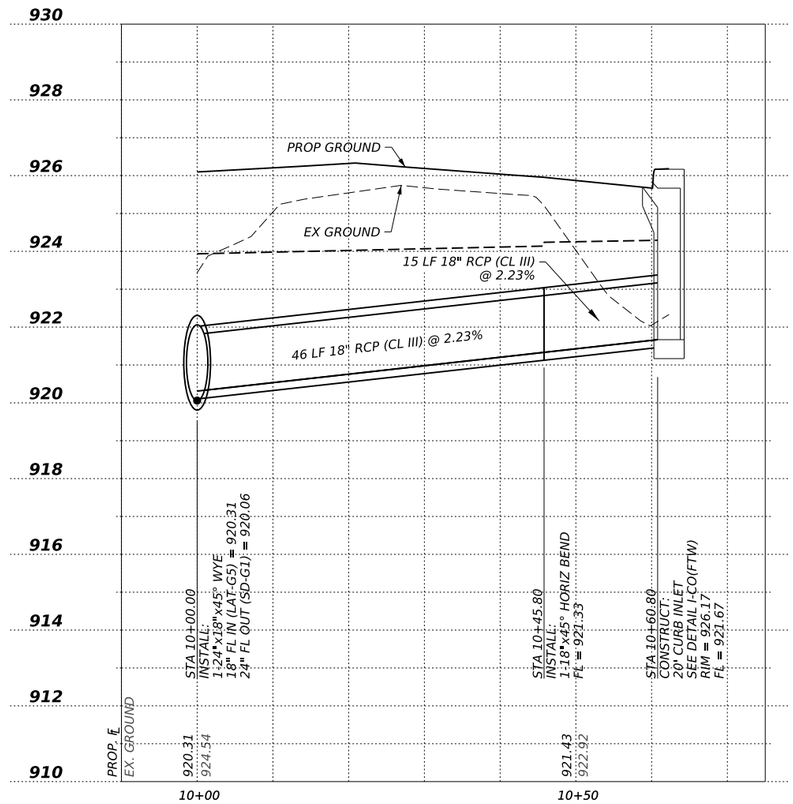
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	123

DATE: 8/27/2026 7:51:27 PM
FILE: \\CWMS\Projects\065\10\11540\Design\Drainage\Storm Drain\din\561754726_18ICV-109-SD_G_LATERALS01.dgn



LAT G4



LAT G5

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

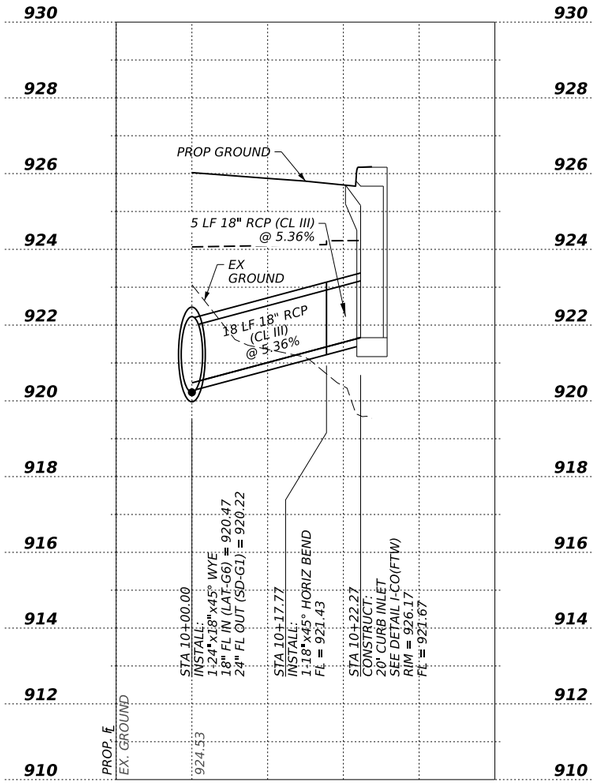
STORM DRAIN PROFILES SD G LATERALS G4 AND G5

SHEET 2 OF 4

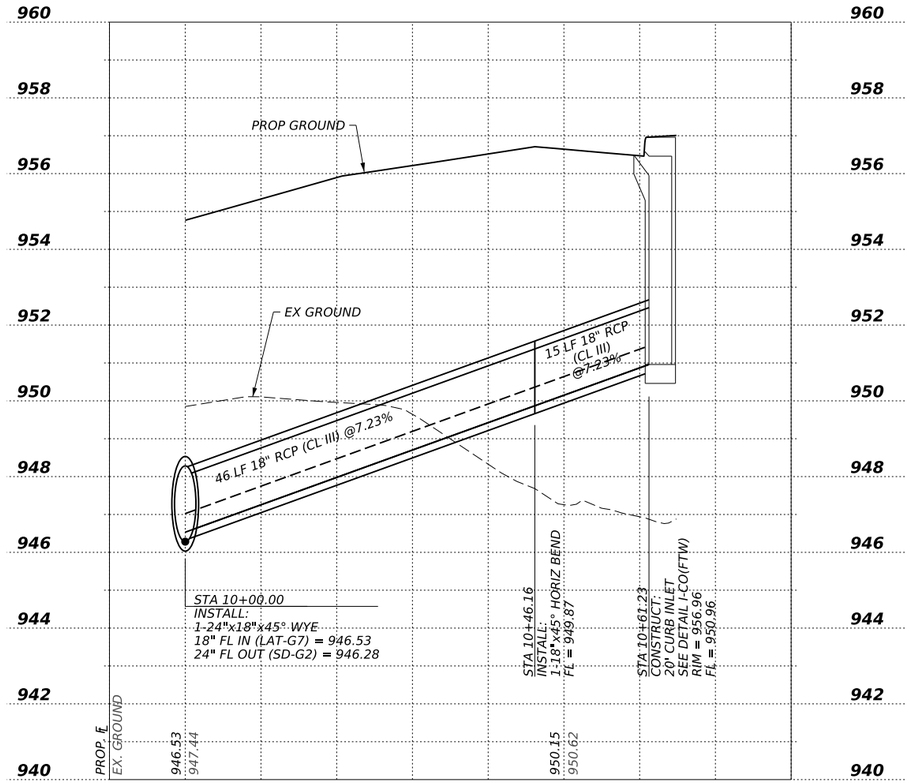
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	124

DATE: 8/27/2026 7:52:33 PM
FILE: \\CentralData\Projects\Parker_CountyTransportation_Bond_Program_(CTB)\Bankhead_Hwy_Part_1\Design\Drainage\Storm\Sheets\CV-109-SD_G_LATERALS02.dgn



LAT G6



LAT G7

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.

6' ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

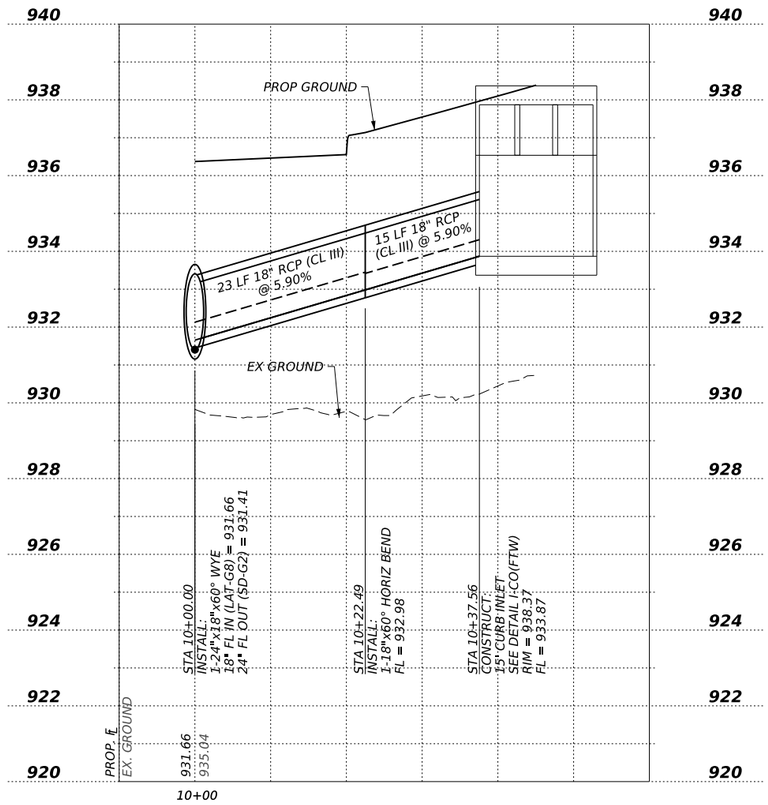
STORM DRAIN PROFILES SD G LATERALS G6 AND G7

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	125

DATE: 8/27/2026 7:55:49 PM
FILE: I:\CM\Projects\Bankhead Hwy\Design\din\561754726_20\CV-109-SD_G_LATERALS03.dgn



LAT G8

PROFILE LEGEND

- EX. GROUND @ ℄
- 25-YR HGL
- PROP. GROUND @ ℄

NOTES:

1. ALL PROPOSED RCP TO BE CLASS III UNLESS NOTED OTHERWISE IN PROFILE.
2. CONTRACTOR TO CONFIRM UTILITY LOCATION PRIOR TO EXCAVATION.
3. CONCRETE COLLARS SHALL BE CONSTRUCTED AT ALL PROPOSED PIPE TO EXISTING PIPE CONNECTIONS, AT ALL CONCRETE PIPE SIZE CHANGES, AT ALL VPI'S AND AT ALL CONCRETE PIPE JOINTS WITH MORE THAN HALF PIPE TONGUE EXPOSURE. COLLARS ARE CONSIDERED SUBSIDIARY TO OTHER DRAINAGE ITEMS.
4. FACTORY FABRICATED 45° OR 60° WYES SHALL BE INSTALLED AT ALL PIPE CONNECTIONS. ALL PIPE BENDS SHALL BE STANDARD 15°, 30°, 45° OR 60° FACTORY FABRICATED BENDS.
5. ALL CONTROL POINTS ARE TO BACK OF CURB UNLESS NOTED OTHERWISE.
6. ALL LATERAL LEADS SHALL BE A MINIMUM 18" DIAMETER AND ALL CURB INLET DEPTH SHALL BE 4.5', UNLESS NOTES OTHERWISE.

0 20 40
HORIZ. SCALE IN FEET

0 4 8
VERT. SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

STORM DRAIN PROFILES
SD G LATERAL G8

SHEET 4 OF 4

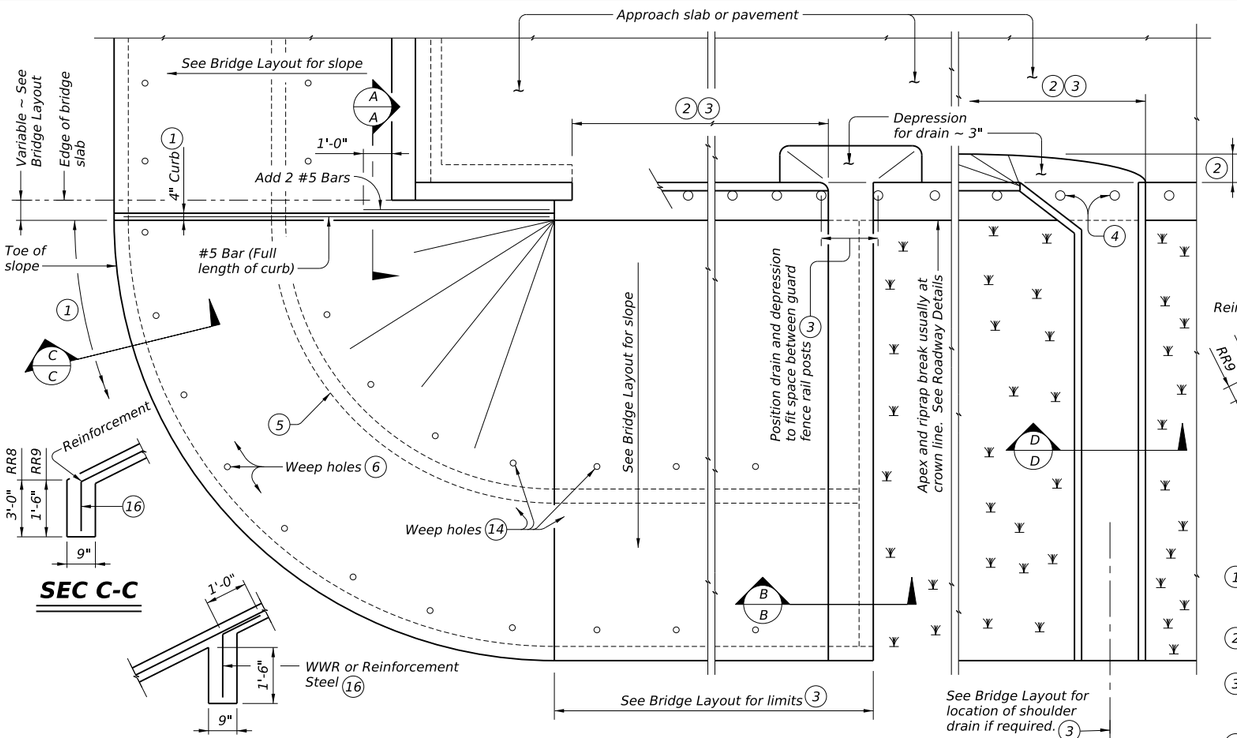
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	126

DATE: 8/27/2026 7:53:00 PM
FILE: I:\CV\109\SD_G_LATERALS04.dgn din1561754726 21|CV-109-SD_G_LATERALS04.dgn

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.

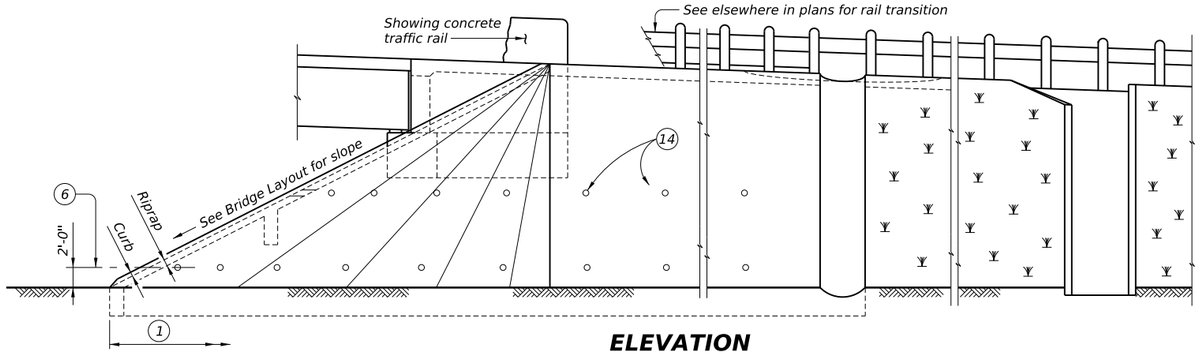
DATE: 7/2/2026 11:00:08 AM
FILE:



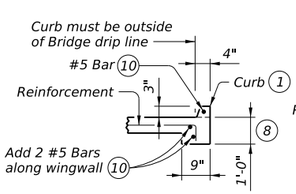
PLAN

SEC C-C

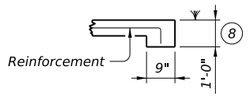
INTERMEDIATE TOEWALL (5)



ELEVATION

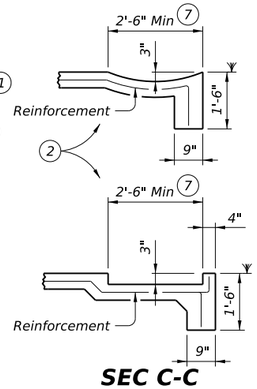


SEC A-A



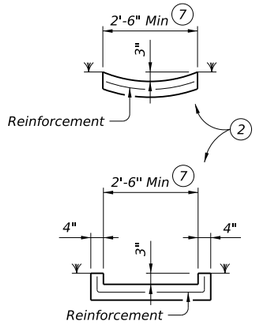
SEC B-B

(No drain)



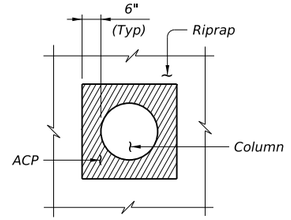
SEC C-C

(Shoulder drain integral with riprap)



SEC D-D

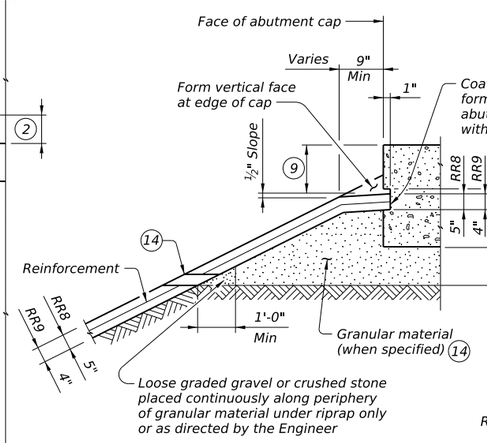
(Shoulder drain)



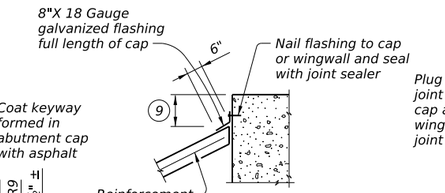
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

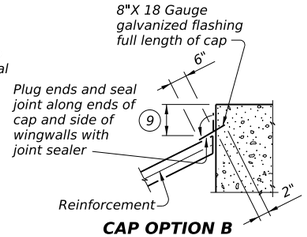
(As directed by the Engineer)



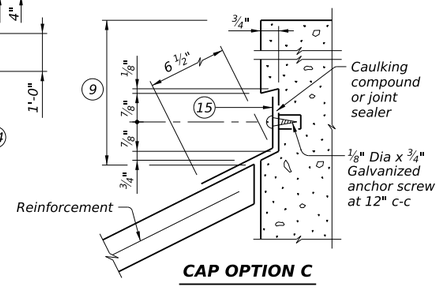
SHOWING KEYWAY OPTION



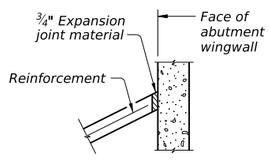
CAP OPTION A



CAP OPTION B

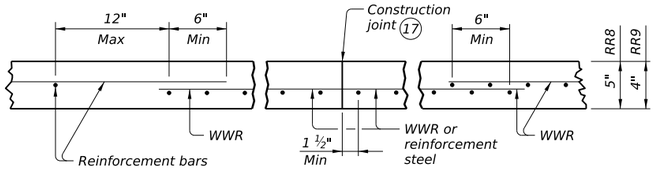


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to expansion joint material if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide welded wire reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage galvanized sheet metal.
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete ($f'c$ = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer.

Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap."

See Bridge Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

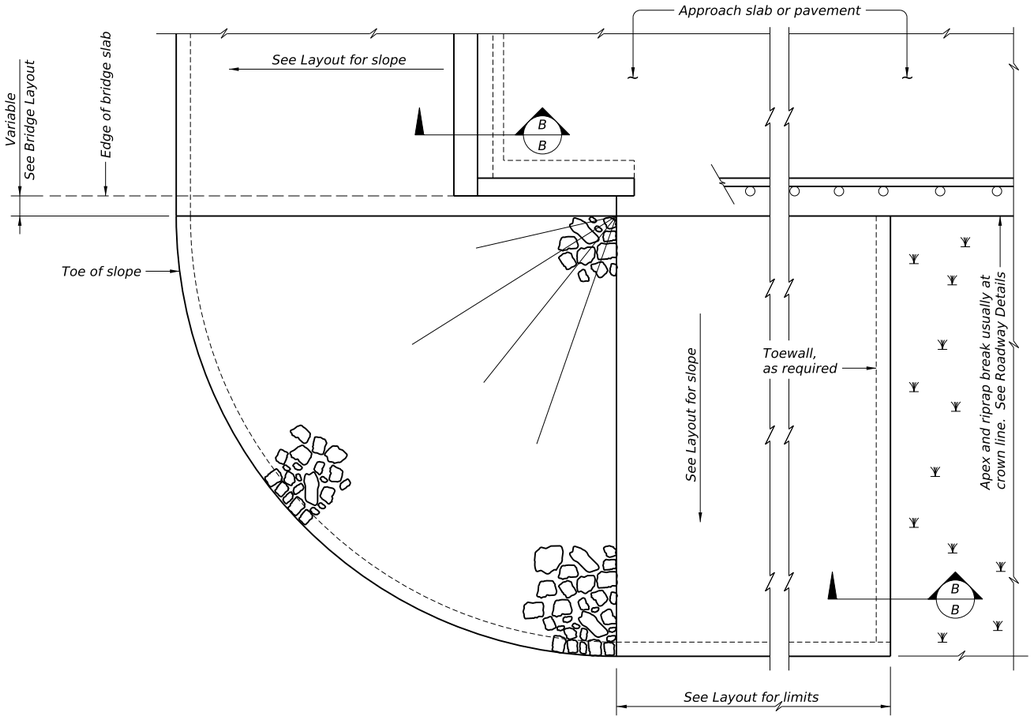
Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

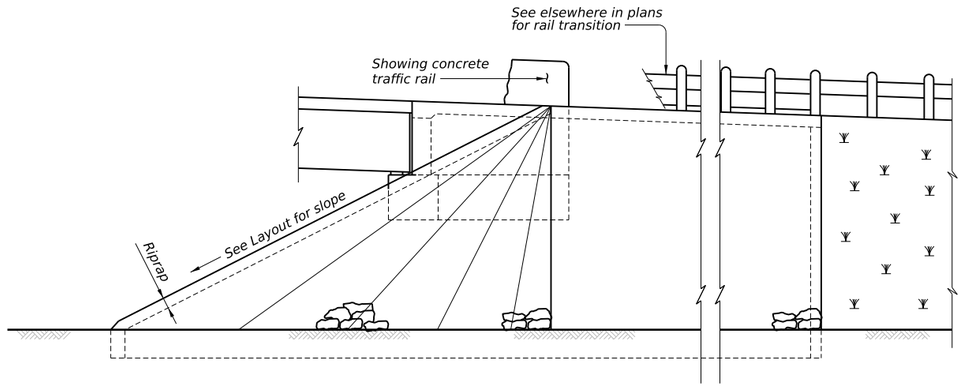
CRR

FILE: CV-109_TS_TxDot_CRR-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		127

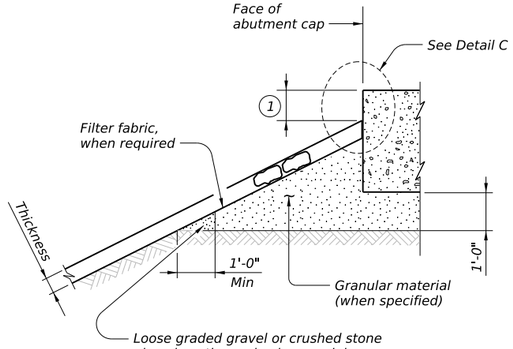
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



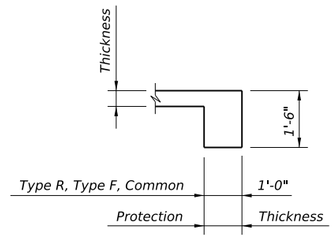
PLAN



ELEVATION



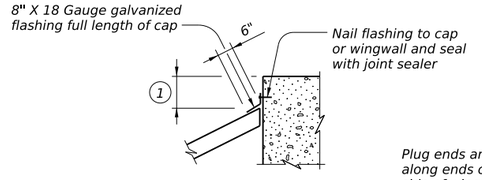
SECTION A-A AT CAP



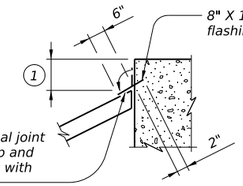
SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

(1) *Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.*



CAP OPTION A



CAP OPTION B

DETAIL C

GENERAL NOTES:

Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.

See elsewhere in plans for locations and details of shoulder drains.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		128

DATE: 8/27/2026
FILE: CV-109-TS_TxDot_SRR_1.dgn

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.

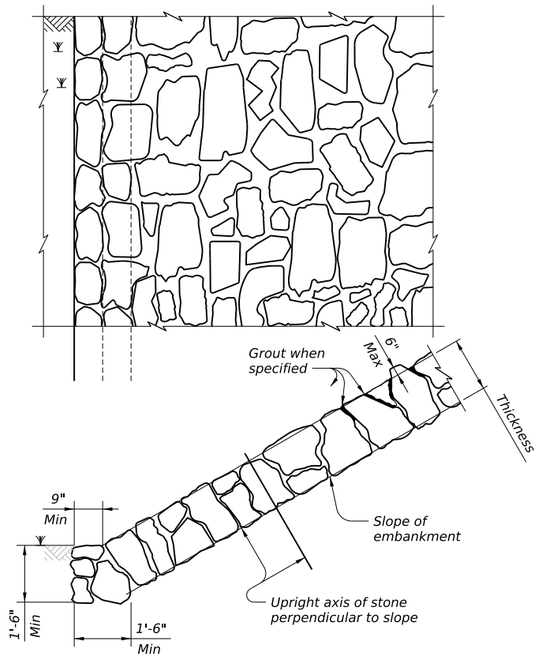


FIGURE 1 ~ TYPE R STONE RIPRAP

Dry or grouted

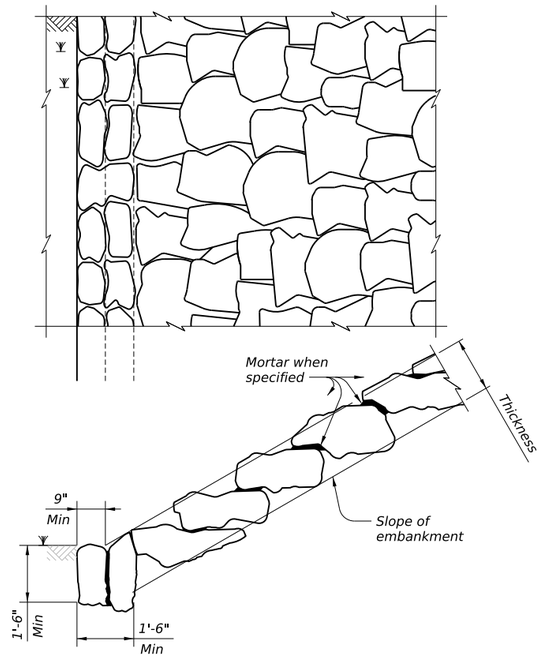


FIGURE 2 ~ TYPE F STONE RIPRAP

Dry or mortared

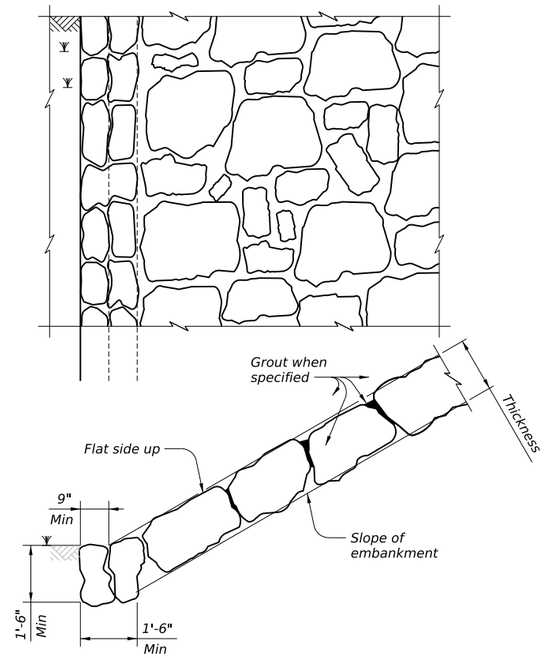


FIGURE 3 ~ TYPE F STONE RIPRAP

Grouted

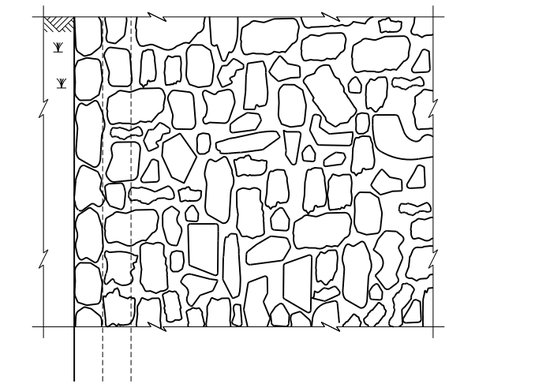


FIGURE 4 ~ COMMON STONE RIPRAP

Dry or grouted

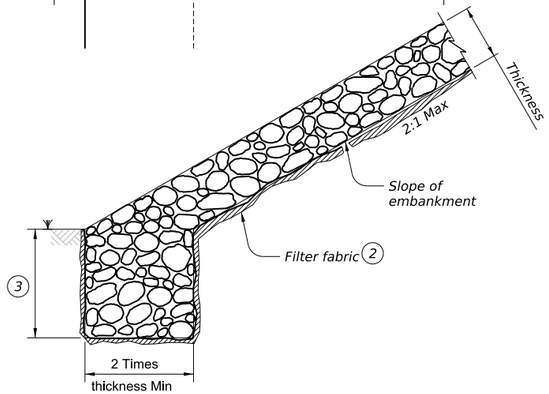


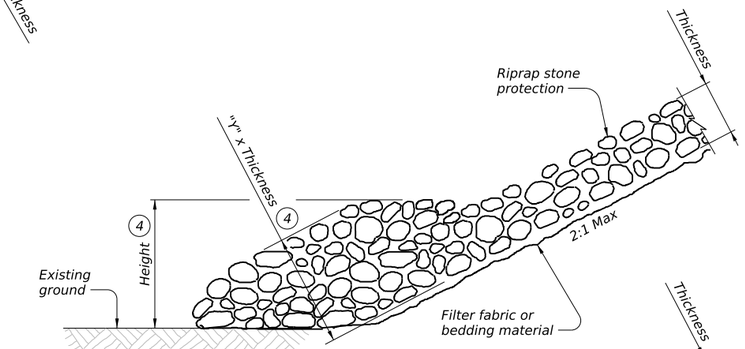
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) *Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.*

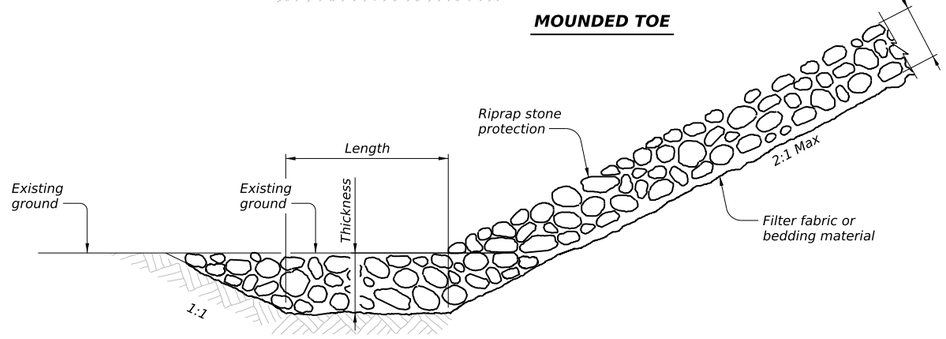
(3) *Minimum toe depth is 2 times the riprap thickness (typical) or as shown elsewhere in the plans.*

(4) *"Y" and Height need to be defined. See layout or detail sheet for values if this option is used.*

(5) *List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.*
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		129

DATE: 8/27/2026
FILE: CV-109-TS_TxDot_SRR_2.dgn

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: 7/2/2026 11:26:04 AM
FILE:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing length (2~wings) (3)	
					Bars J1		Bars J2			
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

Hw = H + T + C - 0.250'
A = (Hw - 0.333') (SL)
B = (A) tangent (30°)
Lw = (A) ÷ cosine (30°)

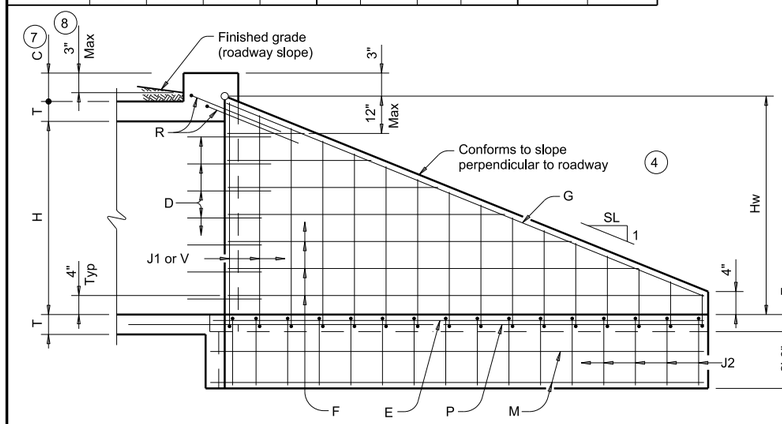
For cast-in-place culverts:
Ltw = (N) (S) + (N + 1) (U)

For precast culverts:
Ltw = (N) (2U + S) + (N - 1) (0.5')

Total wingwall area (two wings ~ SF) = (Hw + 0.333') (Lw)

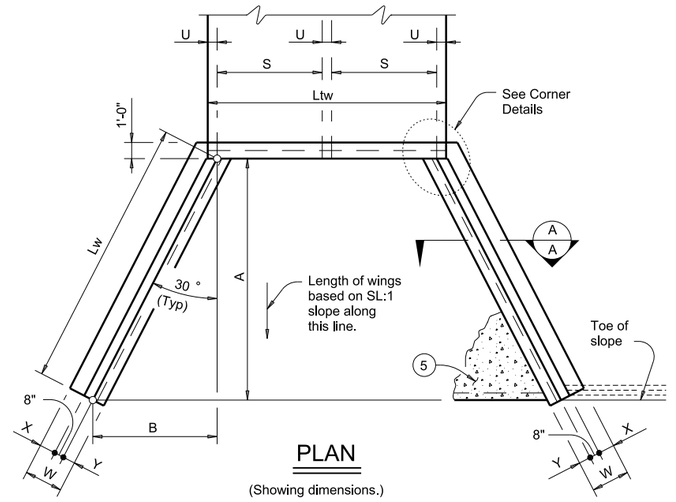
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

See applicable box culvert standard sheet for H, S, T, and U values.



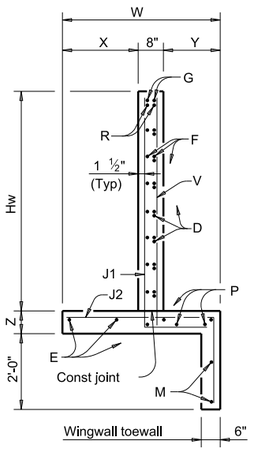
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

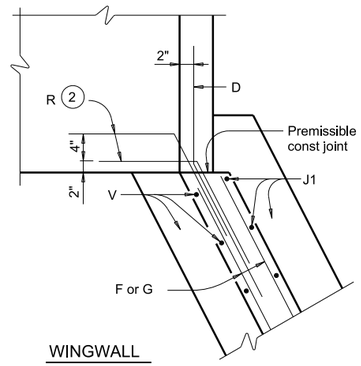


PLAN

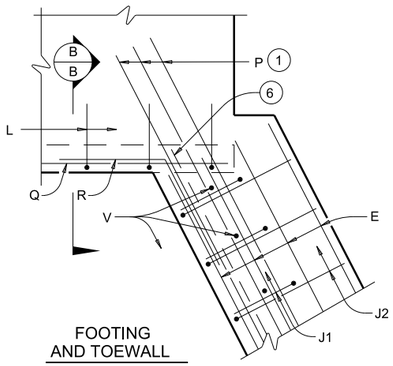
(Showing dimensions.)



SECTION A-A



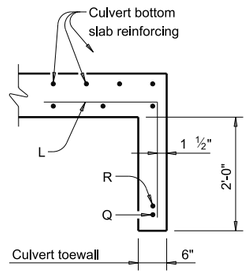
WINGWALL



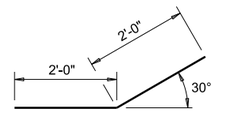
FOOTING AND TOEWALL

CORNER DETAILS

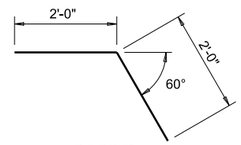
(Culvert and culvert toewall reinforcing not shown for clarity.)



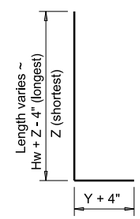
SECTION B-B (5)



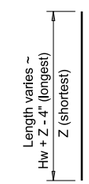
BARS D



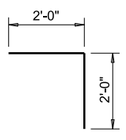
BARS R



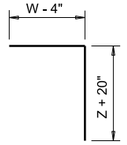
BARS J1



BARS V



BARS L



BARS J2

(1) Extend Bars P 3'-0" minimum into bottom slab of box culvert.

(2) Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

(3) Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.

(4) Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

(5) When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.

(6) At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

(7) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

FILE: CV-109-TS-Txdot-CD-FW0-20.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				130

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: 8/27/2026
FILE: CV-109 TS TxDot FW-S.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Maximum Wingwall Height Hw	W	X	Y	Z	Variable Reinforcing Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities per ft of wing length (2~wings) ③ Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-6"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING
(2~wings)

Bar	Size	No.	Spa
DL	#5	~	1'-0"
DS	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
RS	#5	3	~
RL	#5	3	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:

(All values are in feet.)

Hw = H + T + C - 0.250'
A = (Hw - 0.333')(SL)
B = (A) [tangent (θ + 15°)]
Lw = (A) ÷ [cosine (θ + 15°)]

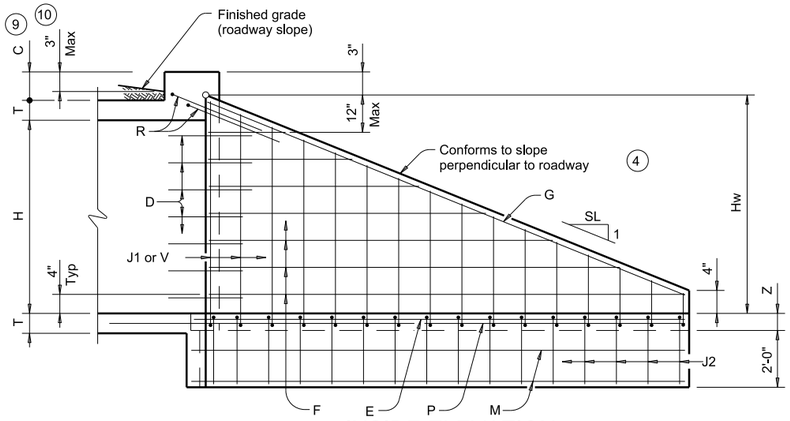
For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine θ

For precast culverts:
Ltw = [(N) (2U + S) + (N - 1) (0.5')] ÷ cosine θ

Total wingwall area (two wings ~ SF) = 0.5 (Hw + 0.333') (Lw + A)

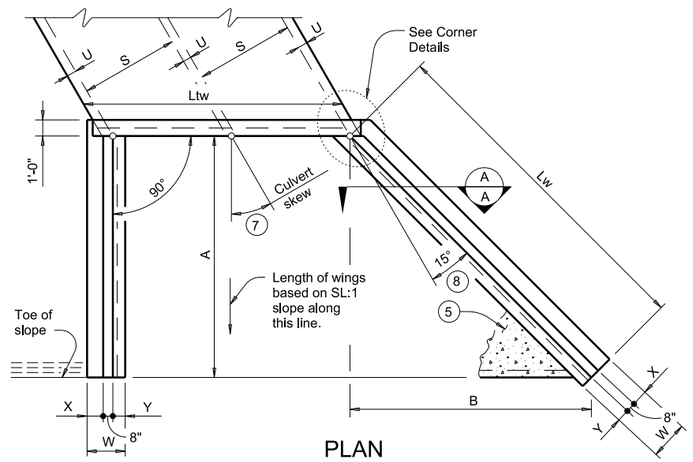
Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
A = Length of short wingwalls
Lw = Length of long wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
θ = Culvert skew

See applicable box culvert standard sheet for H, S, T, and U values.



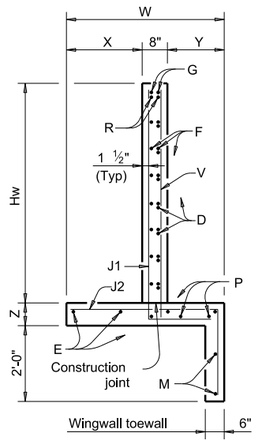
INSIDE ELEVATION

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

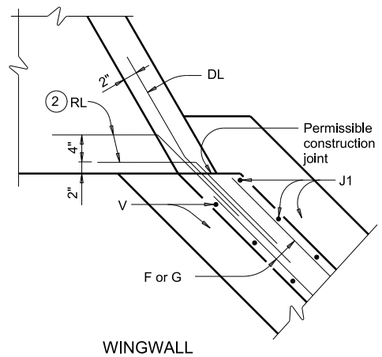


PLAN

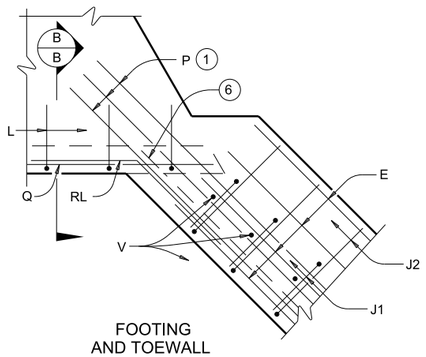
(Showing dimensions and 30° skew.)



SECTION A-A



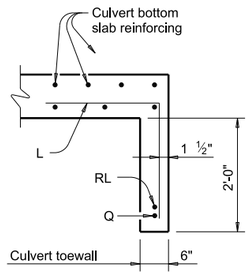
WINGWALL



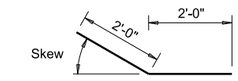
FOOTING AND TOEWALL

CORNER DETAILS

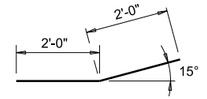
(Culvert and culvert toewall reinforcing not shown for clarity.)



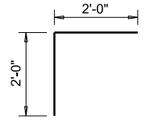
SECTION B-B ⑤



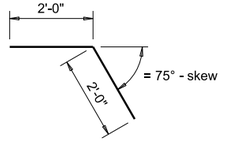
BARS DS
(Short wing)



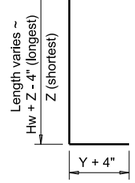
BARS DL
(Long wing)



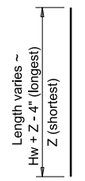
BARS RS
(Short wing)



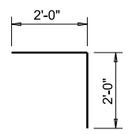
BARS RL
(Long wing)



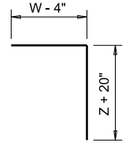
BARS J 1



BARS V



BARS L



BARS J2

① Extend Bars P 3'-0" minimum into bottom slab of box culvert.

② Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.

③ Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by 0.5 x (A + Lw).

④ Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.

⑤ When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete toewall along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending typical riprap reinforcing into the toewall; and extend construction joints or grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.

⑥ At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.

⑦ Applicable values of skew are: 15°, 30°, and 45°.

⑧ Typical wingwall angle for all skews.

⑨ 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

⑩ For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade.

Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:

Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete, 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.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

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

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR SKEWED BOX CULVERTS

FW-S

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		131

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: 8/27/2026
FILE: CV-109_TS_TxDot_PW.dgn

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

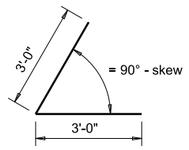
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1		Bars J2					
					Size	Spa	Size	Spa	Reinf Lb/Ft	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

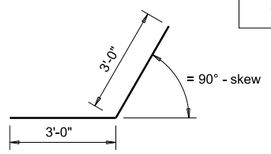
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

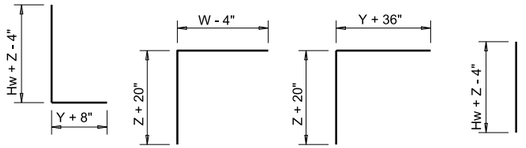
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

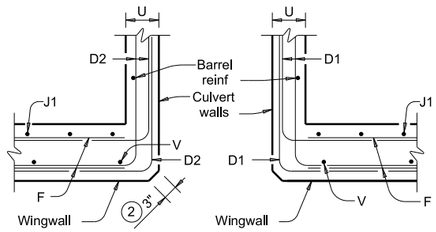
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw 4' ≥
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw 4' <

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

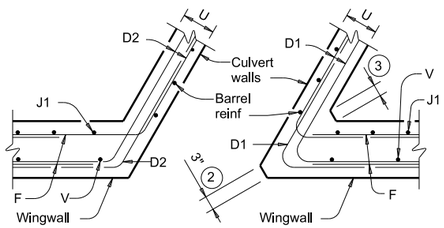
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw 4' ≥
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw 4' <

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

See applicable box culvert standard sheet for S, H, T, and U values.



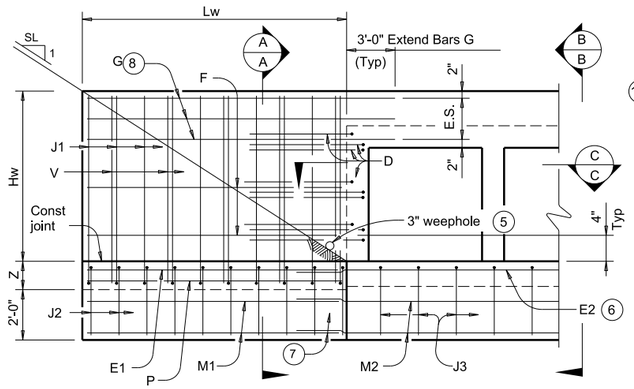
SECTION C-C - PW-1



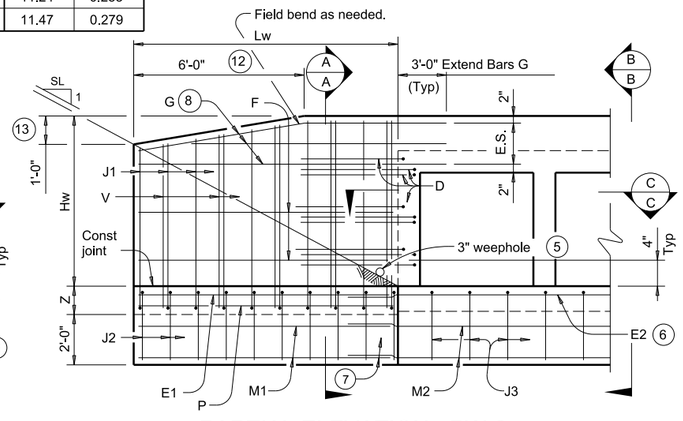
SECTION C-C - PW-2

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

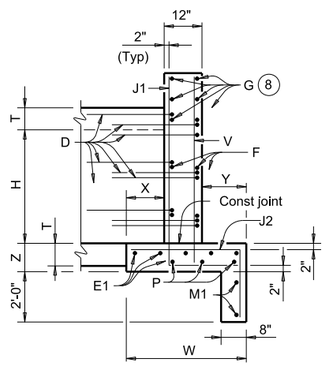
    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.



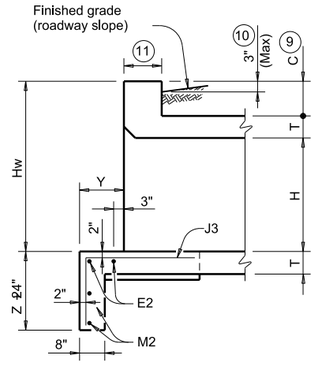
PARTIAL ELEVATION - PW-1



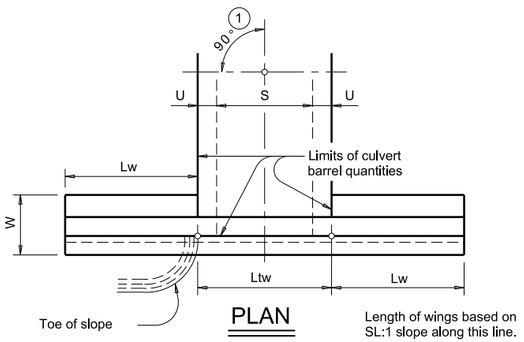
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)



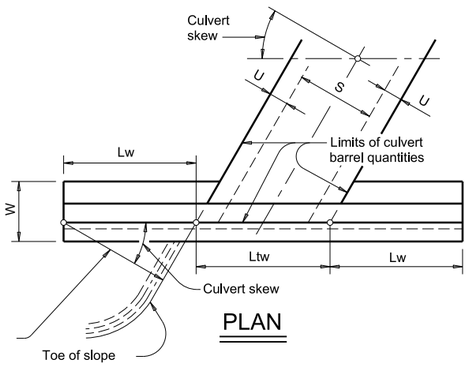
SECTION B-B
(Showing wing reinforcement.)



PLAN

Length of wings based on SL:1 slope along this line.

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

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

Texas Department of Transportation
Bridge Division Standard

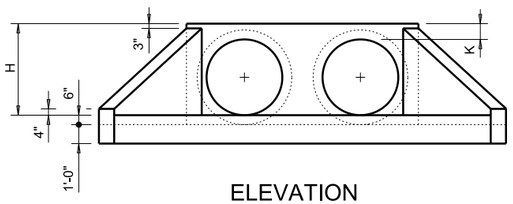
CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		132

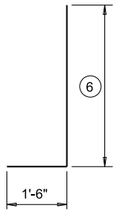
TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

Slope	Dia of Pipe (D)	Values for One Pipe W	X	Y	L	Reinf (Lbs)	Conc (CY) (1)	Values to be Added for Each Addt'l Pipe X and W	Reinf (Lbs)	Conc (CY) (1)
2:1	12"	4' - 7 ½"	2' - 6"	2' - 10"	3' - 3 ¼"	88	0.6	1' - 9"	20	0.2
	15"	5' - 5 ¾"	2' - 9 ½"	3' - 4"	3' - 10 ¼"	103	0.7	2' - 2"	24	0.3
	18"	6' - 4 ¼"	3' - 1"	3' - 10"	4' - 5"	124	0.9	2' - 8"	32	0.3
	21"	7' - 2 ¾"	3' - 4 ½"	4' - 4"	5' - 0"	143	1.1	3' - 1"	43	0.4
	24"	8' - 2 ½"	3' - 9 ½"	4' - 10"	5' - 7"	164	1.3	3' - 7"	50	0.5
	27"	9' - 1"	4' - 1"	5' - 4"	6' - 2"	179	1.5	3' - 11"	56	0.6
	30"	9' - 11 ½"	4' - 4 ½"	5' - 10"	6' - 8 ¾"	203	1.7	4' - 4"	65	0.8
	33"	10' - 10"	4' - 8"	6' - 4"	7' - 3 ¾"	224	2.0	4' - 8"	71	0.9
	36"	11' - 8 ¼"	4' - 11 ½"	6' - 10"	7' - 10 ¾"	249	2.2	5' - 1"	81	1.0
	42"	13' - 5 ¼"	5' - 6 ½"	7' - 10"	9' - 0 ½"	298	2.8	5' - 10"	97	1.3
	48"	15' - 9"	6' - 1 ½"	9' - 4"	10' - 9 ¼"	360	3.8	6' - 7"	117	1.7
	54"	17' - 5 ¾"	6' - 8 ½"	10' - 4"	11' - 11 ¼"	427	4.5	7' - 6"	151	2.1
	60"	19' - 2 ¾"	7' - 3 ½"	11' - 4"	13' - 1"	481	5.3	8' - 3"	174	2.5
	66"	20' - 11 ½"	7' - 10 ½"	12' - 4"	14' - 3"	544	6.2	8' - 9"	194	2.9
	72"	22' - 8 ½"	8' - 5 ½"	13' - 4"	15' - 4 ¾"	601	7.1	9' - 4"	213	3.3
3:1	12"	6' - 3"	2' - 6"	4' - 3"	4' - 11"	118	0.8	1' - 9"	22	0.2
	15"	7' - 5"	2' - 9 ½"	5' - 0"	5' - 9 ¼"	137	1.1	2' - 2"	28	0.3
	18"	8' - 6 ¾"	3' - 1"	5' - 9"	6' - 7 ¾"	170	1.3	2' - 8"	37	0.5
	21"	9' - 8 ¾"	3' - 4 ½"	6' - 6"	7' - 6"	195	1.6	3' - 1"	48	0.6
	24"	11' - 0"	3' - 9 ½"	7' - 3"	8' - 4 ½"	227	2.0	3' - 7"	58	0.7
	27"	12' - 2"	4' - 1"	8' - 0"	9' - 2 ¾"	251	2.3	3' - 11"	67	0.8
	30"	13' - 4"	4' - 4 ½"	8' - 9"	10' - 1 ¼"	293	2.7	4' - 4"	77	1.0
	33"	14' - 5 ¾"	4' - 8"	9' - 6"	10' - 11 ¾"	318	3.1	4' - 8"	84	1.2
	36"	15' - 7 ¾"	4' - 11 ½"	10' - 3"	11' - 10"	351	3.5	5' - 1"	96	1.4
	42"	17' - 11 ½"	5' - 6 ½"	11' - 9"	13' - 6 ¾"	432	4.5	5' - 10"	119	1.7
	48"	21' - 1 ¾"	6' - 1 ½"	14' - 0"	16' - 2"	537	6.1	6' - 7"	146	2.3
	54"	23' - 5 ½"	6' - 8 ½"	15' - 6"	17' - 10 ¾"	630	7.3	7' - 6"	186	2.9
	60"	25' - 9 ¼"	7' - 3 ½"	17' - 0"	19' - 7 ½"	719	8.7	8' - 3"	219	3.4
	66"	28' - 1"	7' - 10 ½"	18' - 6"	21' - 4 ¼"	811	10.1	8' - 9"	242	3.9
	72"	30' - 4 ¾"	8' - 5 ½"	20' - 0"	23' - 1 ¼"	924	11.7	9' - 4"	272	4.4
4:1	12"	7' - 10 ¾"	2' - 6"	5' - 8"	6' - 6 ½"	148	1.1	1' - 9"	24	0.3
	15"	9' - 4"	2' - 9 ½"	6' - 8"	7' - 8 ½"	181	1.5	2' - 2"	32	0.4
	18"	10' - 9 ½"	3' - 1"	7' - 8"	8' - 10 ¼"	221	1.9	2' - 8"	42	0.5
	21"	12' - 2 ¾"	3' - 4 ½"	8' - 8"	10' - 0"	260	2.3	3' - 1"	57	0.7
	24"	13' - 9 ½"	3' - 9 ½"	9' - 8"	11' - 2"	301	2.8	3' - 7"	67	0.9
	27"	15' - 3"	4' - 1"	10' - 8"	12' - 3 ¾"	334	3.3	3' - 11"	77	1.0
	30"	16' - 8 ¼"	4' - 4 ½"	11' - 8"	13' - 5 ¾"	385	3.8	4' - 4"	89	1.3
	33"	18' - 1 ¾"	4' - 8"	12' - 8"	14' - 7 ½"	425	4.5	4' - 8"	101	1.4
	36"	19' - 7"	4' - 11 ½"	13' - 8"	15' - 9 ¼"	472	5.1	5' - 1"	115	1.7
	42"	22' - 5 ¾"	5' - 6 ½"	15' - 8"	18' - 1"	583	6.5	5' - 10"	141	2.1
	48"	26' - 6 ¼"	6' - 1 ½"	18' - 8"	21' - 6 ¾"	730	8.9	6' - 7"	175	2.8
	54"	29' - 5"	6' - 8 ½"	20' - 8"	23' - 10 ¼"	875	10.7	7' - 6"	226	3.6
	60"	32' - 3 ¾"	7' - 3 ½"	22' - 8"	26' - 2"	996	12.7	8' - 3"	264	4.3
	66"	35' - 2 ½"	7' - 10 ½"	24' - 8"	28' - 5 ¾"	1,140	14.9	8' - 9"	300	4.9
	72"	38' - 1 ¼"	8' - 5 ½"	26' - 8"	30' - 9 ½"	1,297	17.3	9' - 4"	334	5.6
6:1	12"	11' - 2"	2' - 6"	8' - 6"	9' - 9 ¾"	224	1.9	1' - 9"	28	0.4
	15"	13' - 2 ¼"	2' - 9 ½"	10' - 0"	11' - 6 ½"	268	2.5	2' - 2"	37	0.5
	18"	15' - 2 ½"	3' - 1"	11' - 6"	13' - 3 ¼"	330	3.2	2' - 8"	50	0.7
	21"	17' - 2 ¾"	3' - 4 ½"	13' - 0"	15' - 0 ¼"	387	3.9	3' - 1"	69	0.9
	24"	19' - 4 ½"	3' - 9 ½"	14' - 6"	16' - 9"	453	4.8	3' - 7"	80	1.2
	27"	21' - 4 ¾"	4' - 1"	16' - 0"	18' - 5 ¾"	512	5.7	3' - 11"	96	1.4
	30"	23' - 5 ¼"	4' - 4 ½"	17' - 6"	20' - 2 ½"	593	6.7	4' - 4"	110	1.7
	33"	25' - 5 ½"	4' - 8"	19' - 0"	21' - 11 ¼"	675	7.8	4' - 8"	127	2.0
	36"	27' - 5 ¾"	4' - 11 ½"	20' - 6"	23' - 8"	735	9.0	5' - 1"	144	2.3
	42"	31' - 6 ¼"	5' - 6 ½"	23' - 6"	27' - 1 ½"	922	11.5	5' - 10"	179	3.0
	48"	37' - 3 ½"	6' - 1 ½"	28' - 0"	32' - 4"	1,191	15.9	6' - 7"	231	4.0
	54"	41' - 4 ¼"	6' - 8 ½"	31' - 0"	35' - 9 ½"	1,424	19.2	7' - 6"	300	5.0
	60"	45' - 4 ¾"	7' - 3 ½"	34' - 0"	39' - 3"	1,631	22.9	8' - 3"	353	6.0

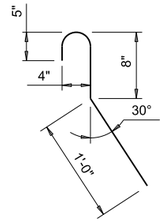


ELEVATION

(Showing dimensions.)



BARS V



BARS CL

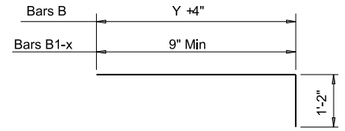
(Length = 2'-5")

TABLE OF REINFORCING STEEL (5)

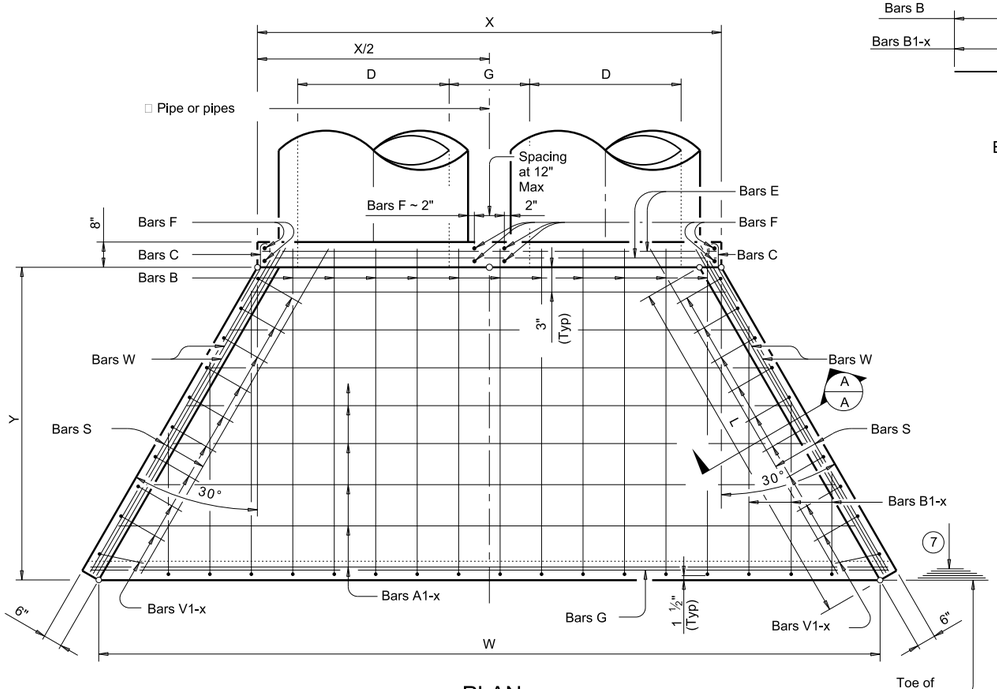
Bar	Size	Spa	No.
A	#4	1' - 0"	~
B	#3	1' - 6"	~
C	#4	1' - 0"	~
D	#3	1' - 0"	~
E	#5	~	4
F	#5	~	~
G	#3	~	2
S	#4	~	6
V	#4	1' - 0"	~
W	#5	~	4

TABLE OF CONSTANT DIMENSIONS

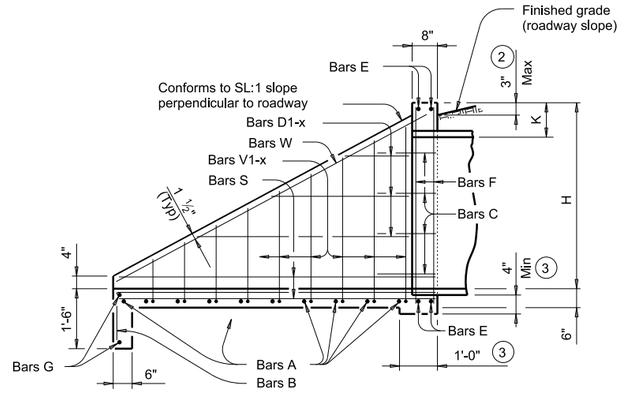
Dia of Pipe (D)	G	K (4)	H
12"	0' - 9"	1' - 0"	2' - 0"
15"	0' - 11"	1' - 0"	2' - 3"
18"	1' - 2"	1' - 0"	2' - 6"
21"	1' - 4"	1' - 0"	2' - 9"
24"	1' - 7"	1' - 0"	3' - 0"
27"	1' - 8"	1' - 0"	3' - 3"
30"	1' - 10"	1' - 0"	3' - 6"
33"	1' - 11"	1' - 0"	3' - 9"
36"	2' - 1"	1' - 0"	4' - 0"
42"	2' - 4"	1' - 0"	4' - 6"
48"	2' - 7"	1' - 3"	5' - 3"
54"	3' - 0"	1' - 3"	5' - 9"
60"	3' - 3"	1' - 3"	6' - 3"
66"	3' - 3"	1' - 3"	6' - 9"
72"	3' - 4"	1' - 3"	7' - 3"



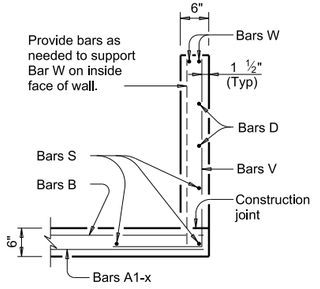
BARS B and B1-x



PLAN



TYPICAL WING ELEVATION



SECTION A-A

(1) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(2) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(3) Provide a 1'-0" footing as shown where required to maintain 4" minimum cover for pipes.

(4) Dimensions shown are usual and maximum.

(5) Quantities shown are for one structure end only (one headwall).

(6) Min Length = 6" + 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$

Max Length = 12 x H - 3" x $\left(\frac{12 \times H - 7}{12 \times L}\right)$ - 1"

(7) Lengths of wings based on SL:1 slope along this line.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

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

Texas Department of Transportation

Bridge Division Standard

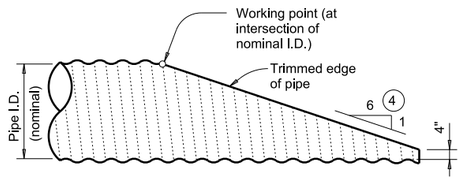
CONCRETE HEADWALLS
WITH FLARED WINGS FOR 0° SKEW PIPE CULVERTS

CH-FW-0

FILE: CV-109-TS-Txdot-CD-CH-FW0-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		133

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.

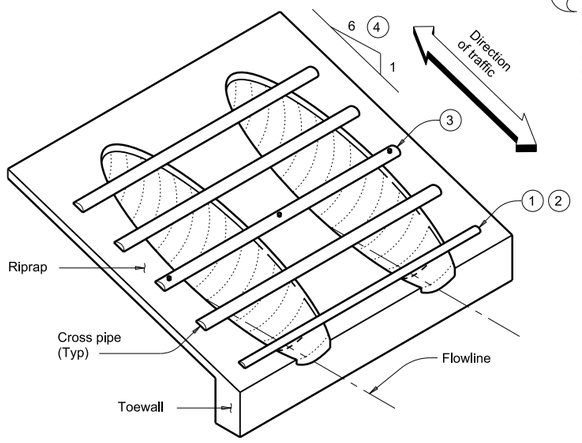
DATE: 8/27/2026
FILE: CV-109-TS-Txdot-CD-CH-FW0-20.dgn



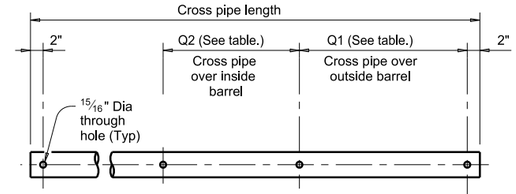
NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

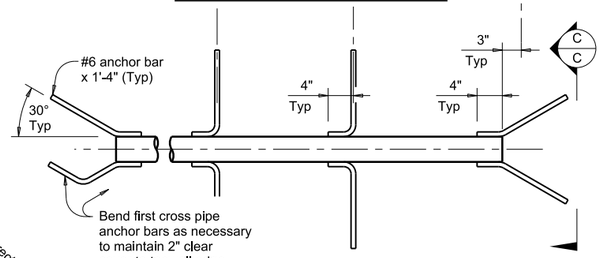
(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



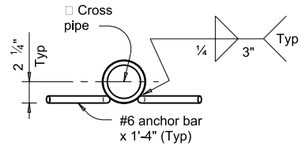
ISOMETRIC VIEW OF TYPICAL INSTALLATION



PIPE WITH BOLTED ANCHOR

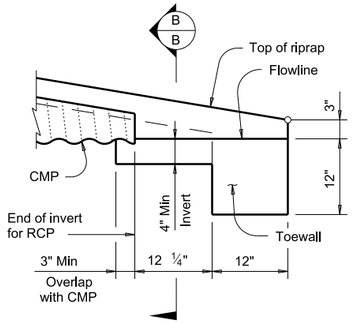


PIPE WITH ANCHOR BARS



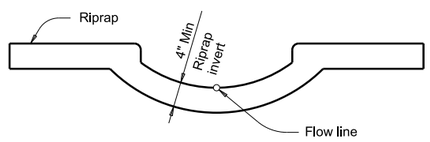
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' - 9"	N/A	2' - 1"	1' - 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' - 11"	N/A	2' - 5"	2' - 2"		
18"	0.8	1' - 2"	N/A	2' - 10"	2' - 8"		
21"	0.9	1' - 4"	N/A	3' - 2"	3' - 1"		
24"	0.9	1' - 7"	N/A	3' - 6"	3' - 7"		
27"	1.0	1' - 8"	N/A	3' - 10"	3' - 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' - 10"	N/A	4' - 2"	4' - 4"	2 or more pipe culverts	
33"	1.2	1' - 11"	4' - 2"	4' - 5"	4' - 8"	All pipe culverts	
36"	1.3	2' - 1"	4' - 5"	4' - 9"	5' - 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' - 4"	4' - 11"	5' - 5"	5' - 10"		
48"	1.7	2' - 7"	5' - 5"	6' - 0"	6' - 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' - 0"	5' - 11"	6' - 9"	7' - 6"		
60"	2.2	3' - 3"	6' - 5"	7' - 4"	8' - 3"		
66"	2.4	3' - 3"	6' - 11"	7' - 10"	8' - 9"		
72"	2.7	3' - 4"	7' - 5"	8' - 5"	9' - 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap."

(6) 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.

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 cross pipes that meet 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.

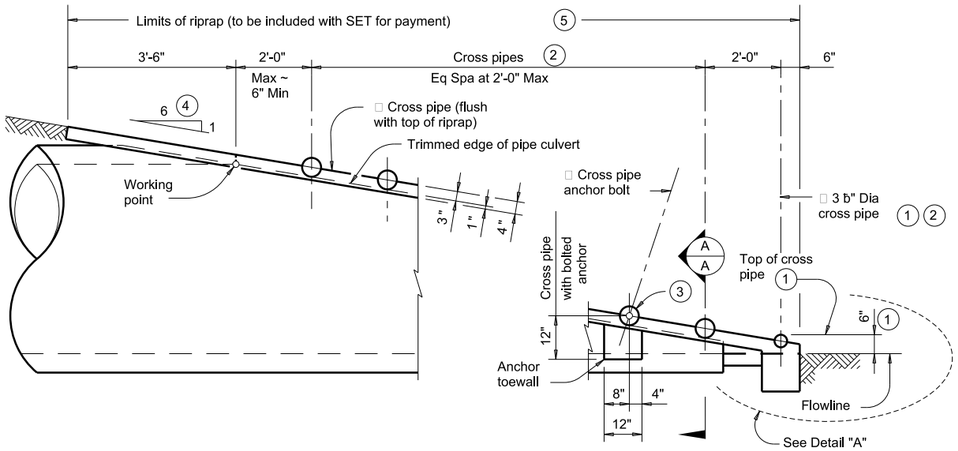
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-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 cross pipes.

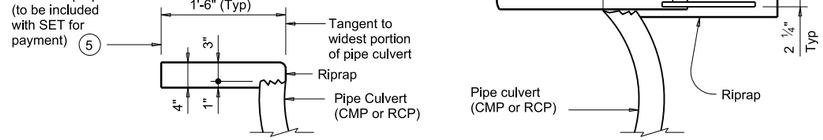
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap."

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



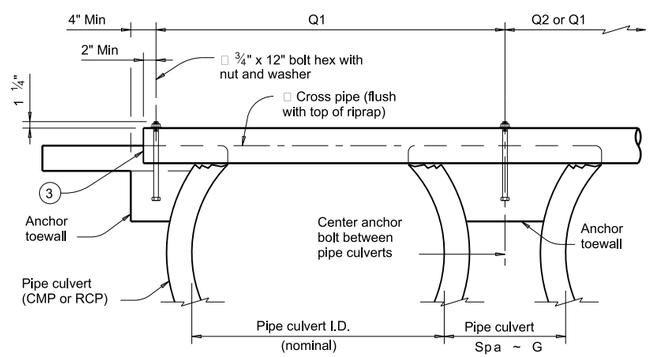
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

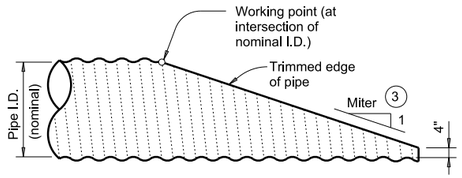
FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: CV-109_TS_TxDot_CD-SETP-PD-20.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
		PARKER		134

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

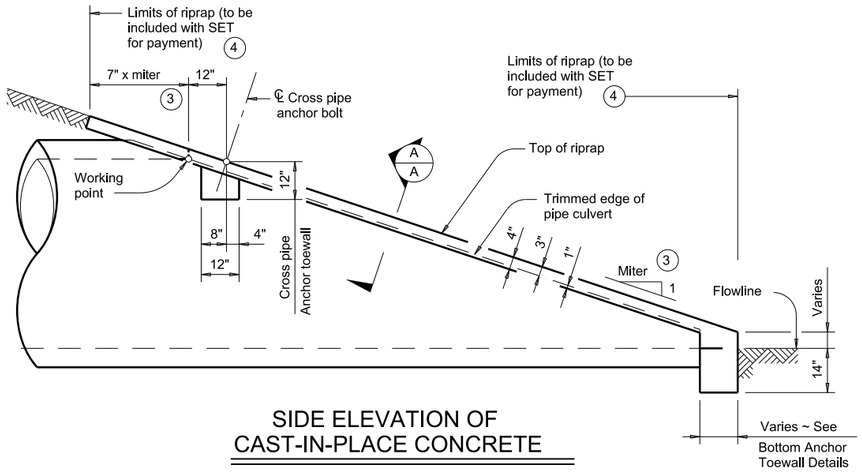
DATE:
FILE:



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.

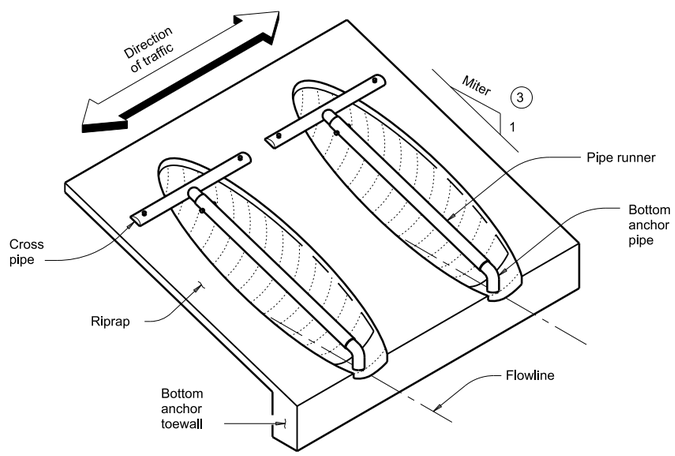
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(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.

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: 8/27/2026
FILE: CV-109 TS_TxDot_SETP-CD-1.dgn

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

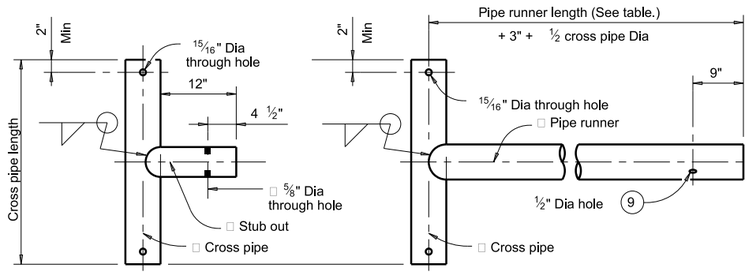
SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

FILE:	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		135

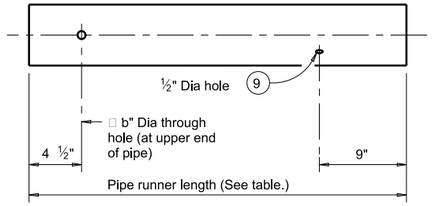
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/27/2026
FILE: CV-109_TS_TxDot_SETP-CD-2.dgn



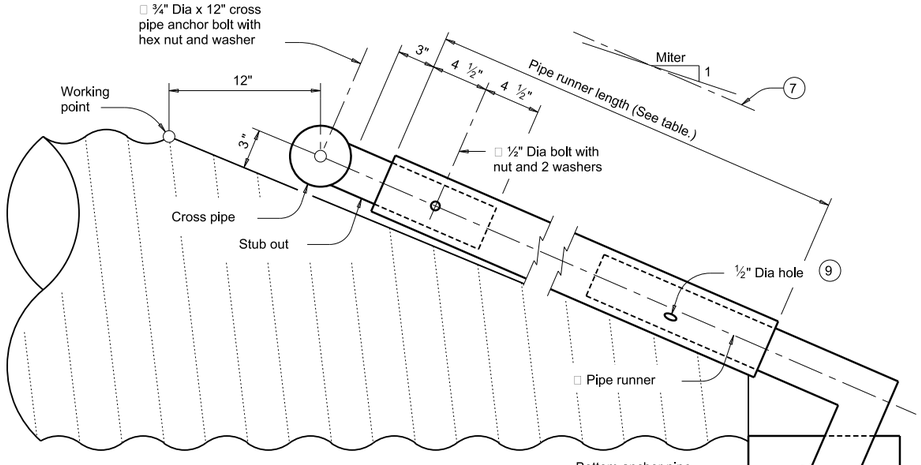
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



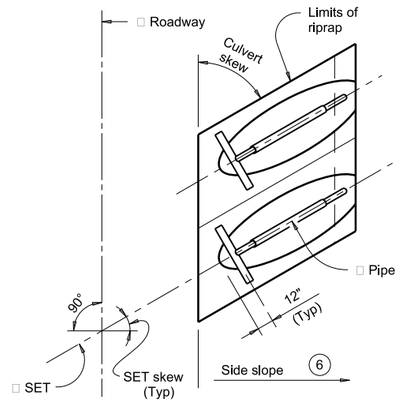
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

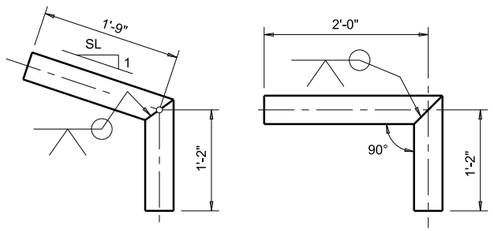


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(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)

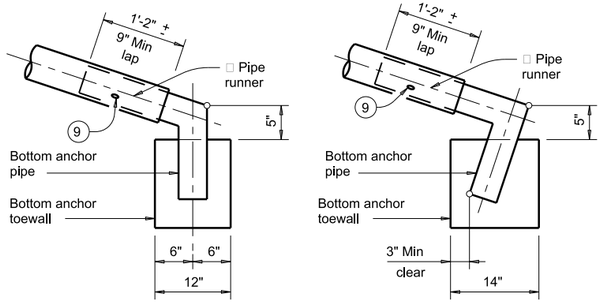


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

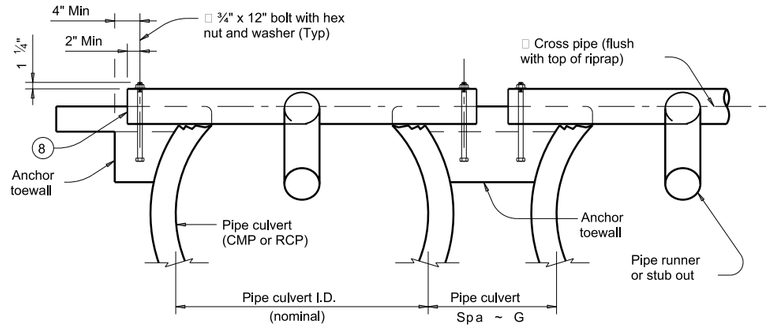
BOTTOM ANCHOR PIPE DETAILS (10)



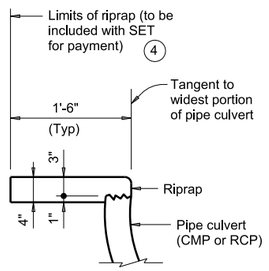
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(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."

SHEET 2 OF 2

Texas Department of Transportation

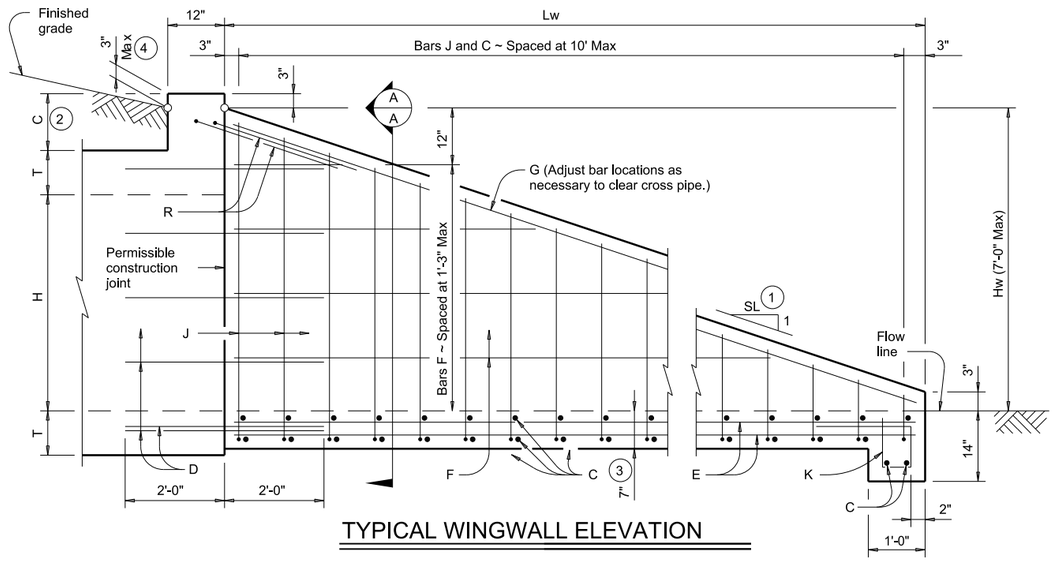
Bridge Division Standard

SAFETY END TREATMENT
FOR 12" DIA TO 60" DIA PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

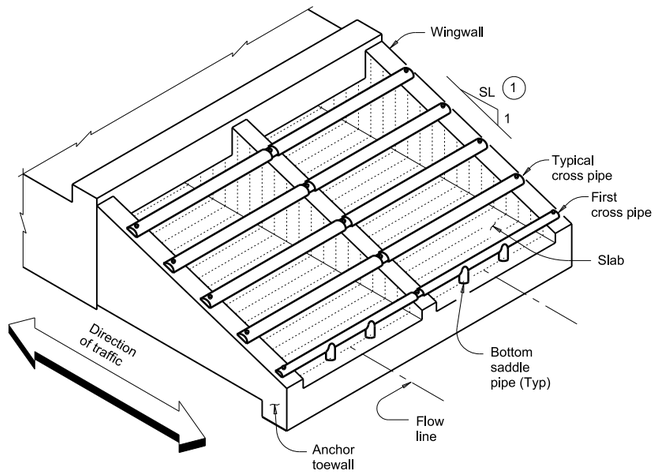
FILE:	DN: GAF	CK: CAT	DW: JRP	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		136

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.



TYPICAL WINGWALL ELEVATION

(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing bolted anchor option.)

WING DIMENSION CALCULATIONS:

Hw = H + T + C - 0.250'
Lw = (Hw - 0.250') (SL)

For cast-in-place culverts:
Atw = (N) (S) + (N + 1) (U)

For precast culverts:
Atw = (N) (2U + S) + (N - 1) (0.500')

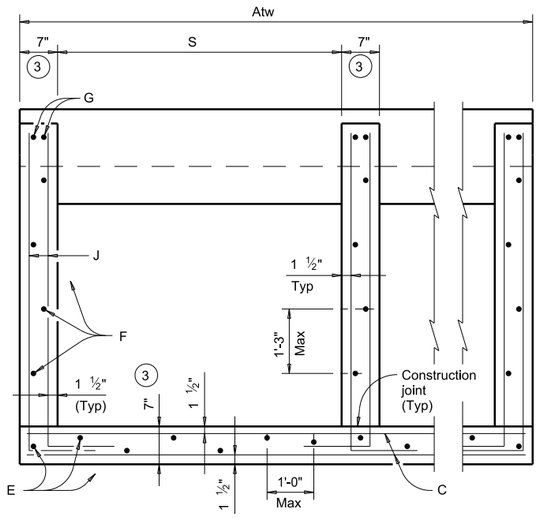
Total Wingwall Area (SF)
= (0.5) (Hw + 0.250') (Lw) (N - 1)

Total Concrete Volume (CY)
= [(Wingwall Area) (0.583') +
(Lw) (Atw) (0.583') +
(Atw) (1.000') (1.167' - 0.583')] ÷ (27)

Total Reinforcing (Lb)
= (1.55) (Lw) (Atw) +
(4.43) (Atw) +
(K) (Hw) (N + 1) (Lw)

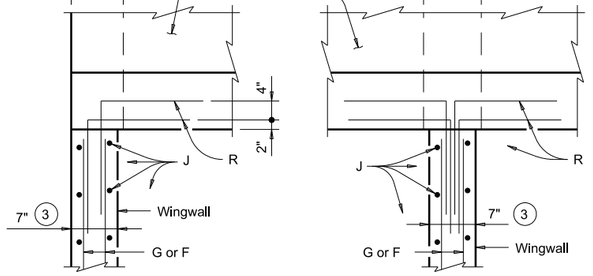
C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas
Slope SL:1 K
6:1 ~ 10.41
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.



SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

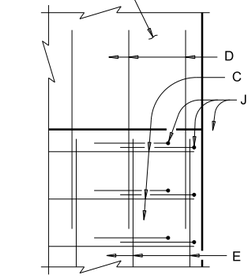


AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)

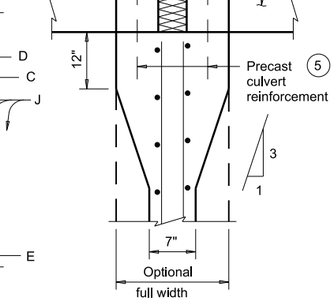
AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

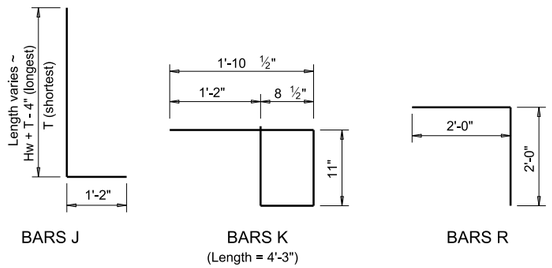


TABLE OF REINFORCING BAR SIZES AND SPACING		
Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'- 0" Max
F	#4	1'- 3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'- 0" Max
R	#4	As shown

1. Provide 6:1 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 Extended Curb Details 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 height, if necessary, to provide a maximum 3" projection above finished grade. 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.

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 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 cross pipes.
Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
The quantities for concrete, reinforcing steel, and cross pipes 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.

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

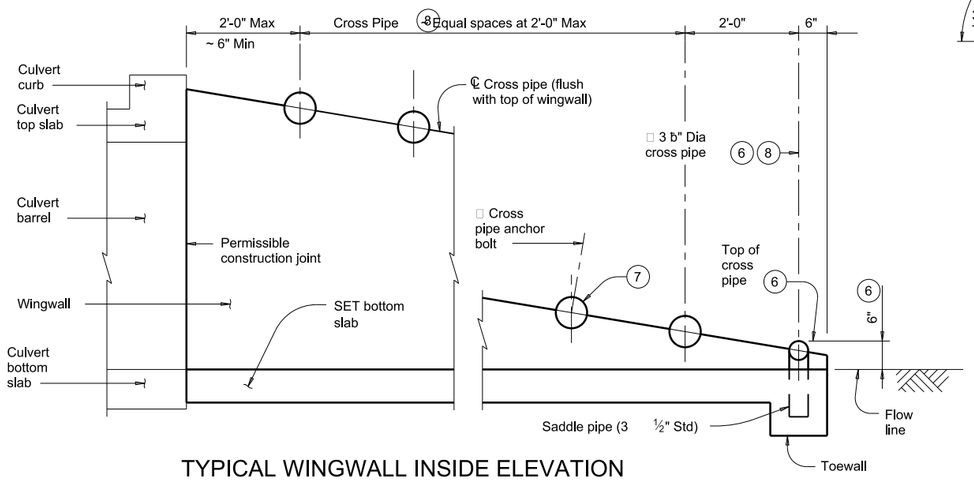
SAFETY END TREATMENT
FOR BOX CULVERTS (MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 06-2022 ~ Wing dimensions				
	DIST	COUNTY		SHEET NO.
		PARKER		137

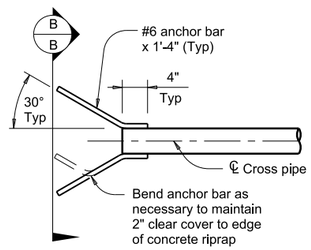
DATE: 8/27/2026
FILE: CV-109_TS_TxDot_SETB-PD-22-1.DGN.dgn

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.

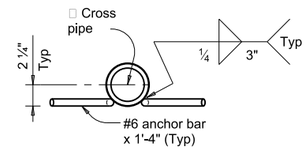


TYPICAL WINGWALL INSIDE ELEVATION

(Showing installation of cross pipes.)



PART PLAN



SECTION B-B

OPTIONAL ANCHOR BAR DETAILS

REQUIRED PIPE SIZES (8)		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)
First Pipe	3 ½" STD	2 ½" STD
30" to 42"	4" STD	3" STD
48" to 72"	5" STD	4" STD
78" to 120"	6" STD	5" STD

STANDARD PIPE SIZES		
Pipe Size	Pipe O.D.	Pipe I.D.
2 ½" STD	2.875"	2.469"
3" STD	3.500"	3.068"
3 ½" STD	4.000"	3.548"
4" STD	4.500"	4.026"
5" STD	5.563"	5.047"
6" STD	6.625"	6.065"

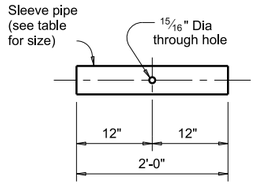
(6) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe at no more than 6" above the flow line.

(7) Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

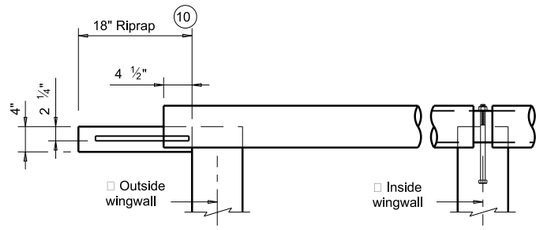
(8) Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 1#2" saddle pipes for the 3 1#2" first cross pipe.

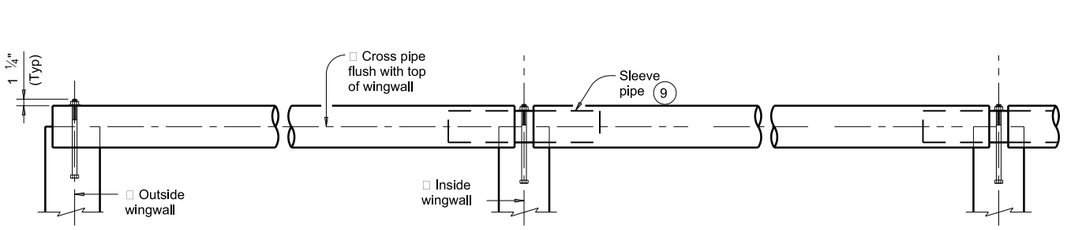
(9) At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15#16" diameter throughhole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.

(10) Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap."



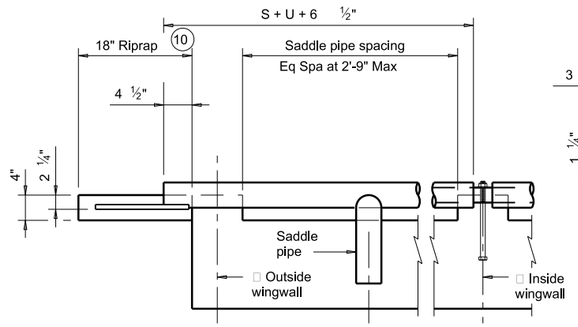
SLEEVE PIPE DETAILS (9)

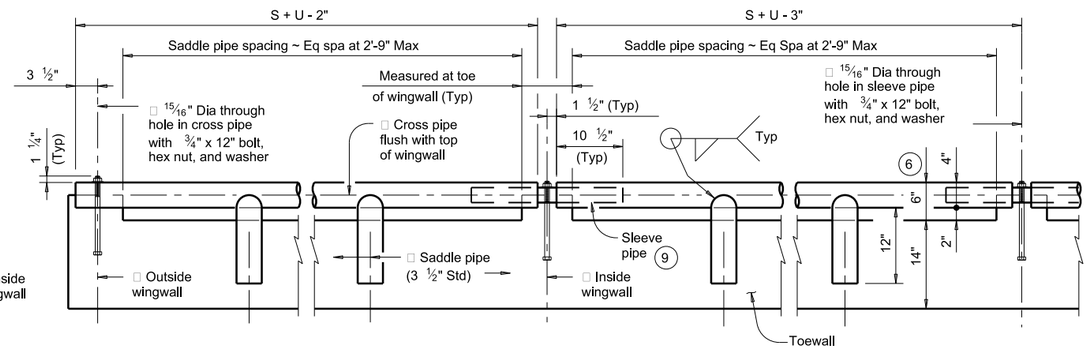




SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE

(Anchor details and dimensions are similar to those shown below in Section Through Installation of 3 b" First Cross Pipe detail.)





SECTION THROUGH INSTALLATION OF 3 ½" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

INSIDE CULVERT BARREL

CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

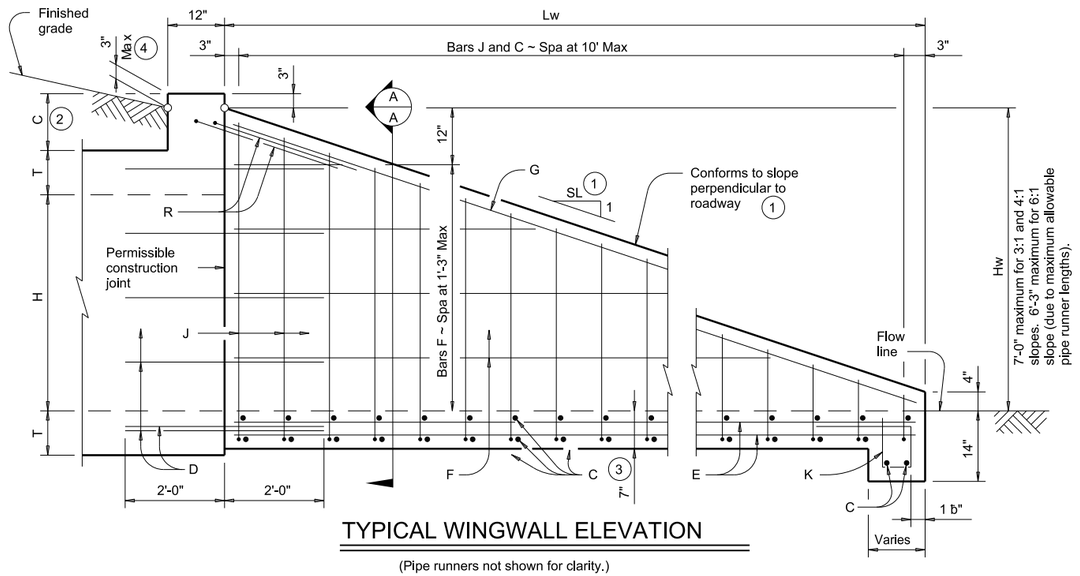
SAFETY END TREATMENT
FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 06-2022 ~ Wing dimensions	DIST	COUNTY		SHEET NO.
		PARKER		138

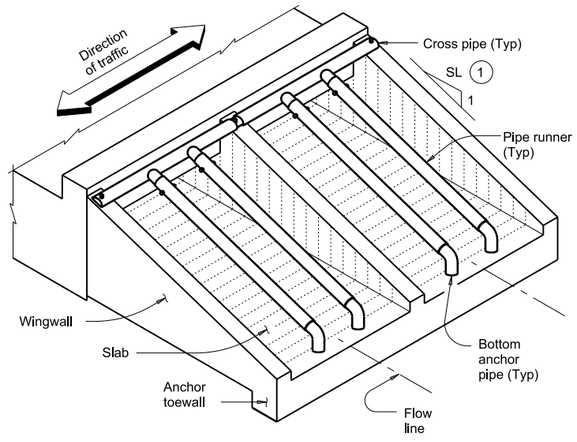
DATE: 8/27/2026
FILE: CV-109_TS_TxDot_SETB-PD-22-2.dgn

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.



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)
= [(Wingwall Area) (0.583') +
(Lw) (Atw) (0.583') +
(Atw) (1.167') (1.167' - 0.583')] ÷ (27)

PIPE RUNNER DIMENSION CALCULATIONS:

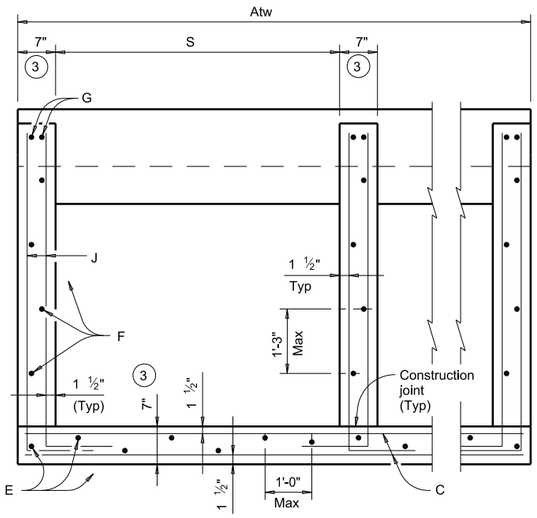
Pipe Runner Length
= (Lw) (K1) (1.917')
Total Reinforcing (Lb)
= (1.55) (Lw) (Atw) +
(4.43) (Atw) +
(K2) (Hw) (N + 1) (Lw) √

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

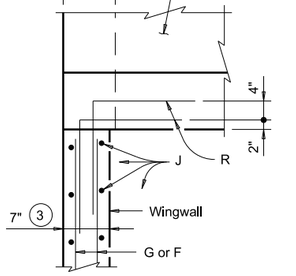
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.



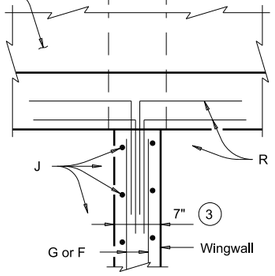
SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)



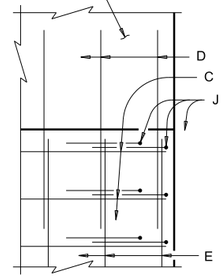
AT TOP OF EXTERIOR WINGWALL

(Cast-in-place culvert)



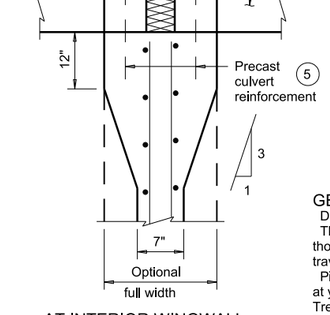
AT TOP OF INTERIOR WINGWALL

(Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB

(Cast-in-place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

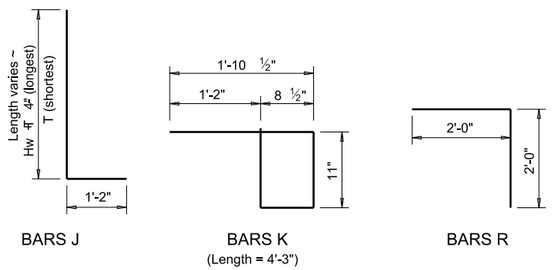
MATERIAL NOTES:

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.



BARS J | BARS K (Length = 4'-3") | BARS R

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

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.

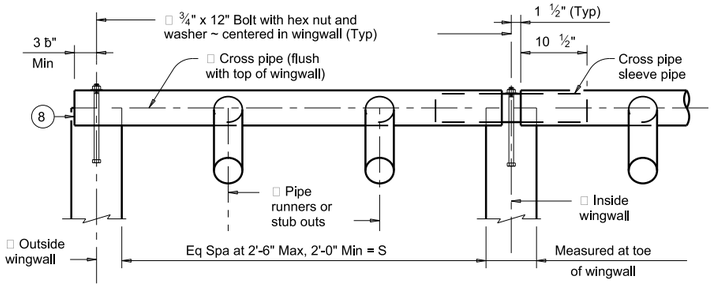
Texas Department of Transportation | Bridge Division Standard

SAFETY END TREATMENT
FOR 0° SKEW BOX CULVERTS (MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE
SETB-CD

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		139

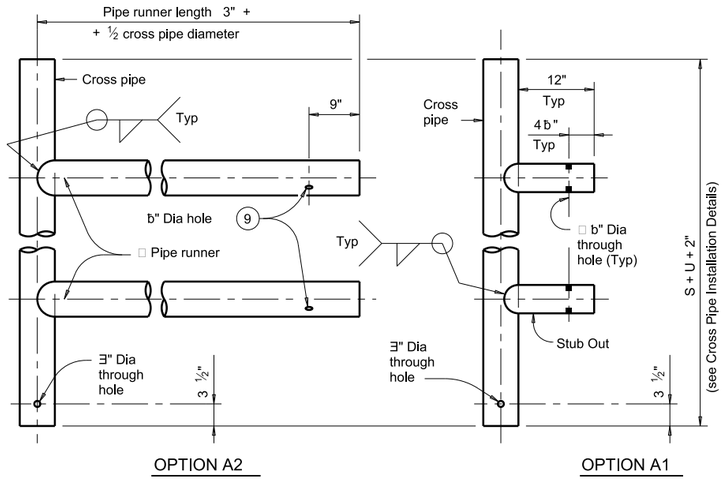
DATE: 8/27/2026
FILE: CV-109_TS_TxDot_SETB-CD-1.dgn

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.



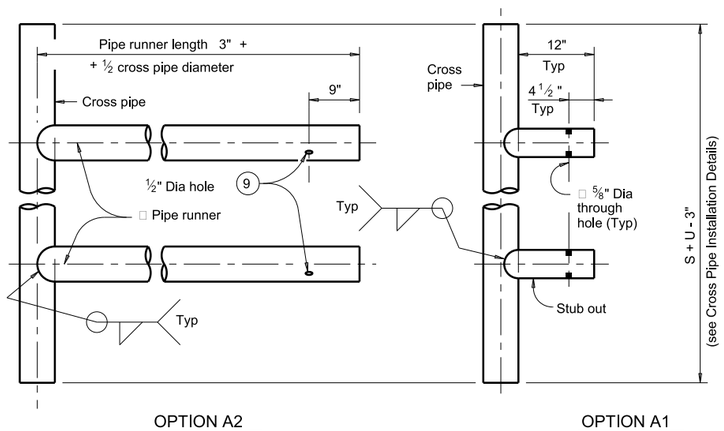
NOTE: At Contractor's option, make the cross pipe continuous across the inside wingwalls. If option is selected, omit the sleeve pipe and make a ∃" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

CROSS PIPE INSTALLATION DETAILS



OPTION A2 OPTION A1

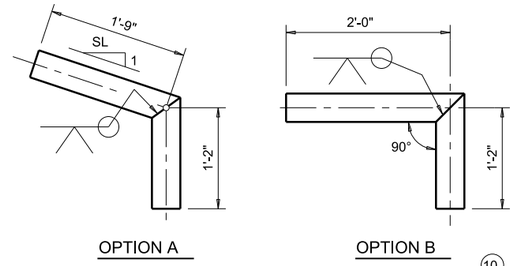
FOR USE IN OUTSIDE CULVERT BAY



OPTION A2 OPTION A1

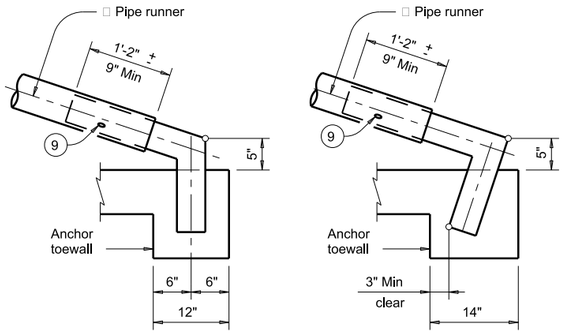
FOR USE IN INSIDE CULVERT BAY

CROSS PIPE AND CONNECTIONS DETAILS



OPTION A OPTION B

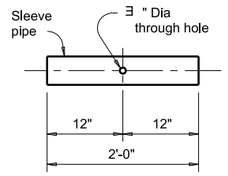
BOTTOM ANCHOR PIPE DETAILS



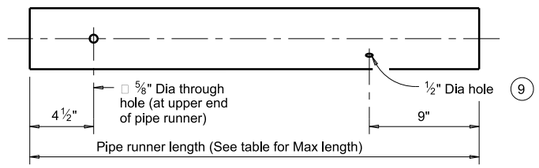
OPTION B1 OPTION B2

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

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.

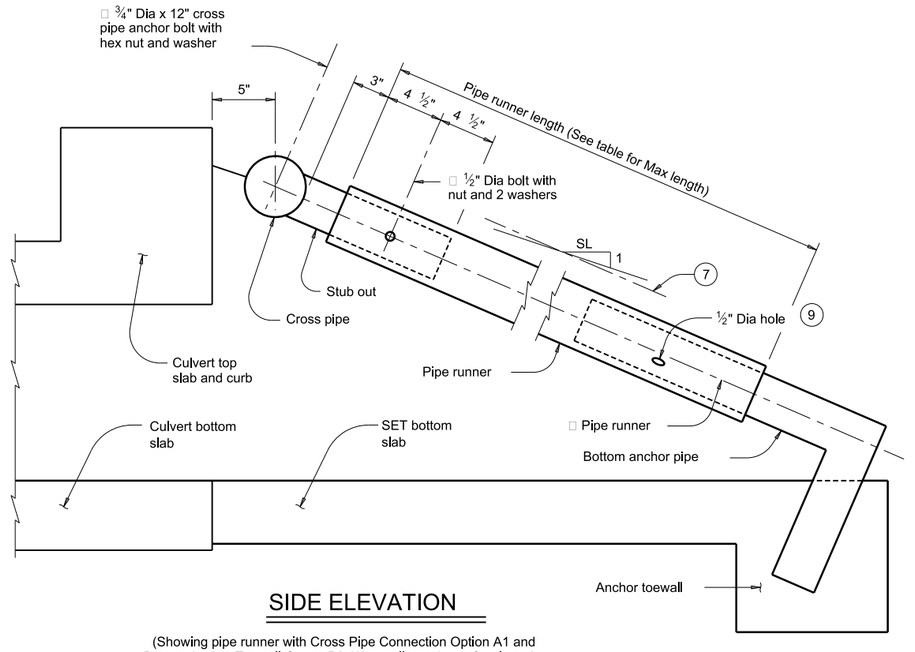
8 Take care to ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

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 REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES (6)

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"



SIDE ELEVATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

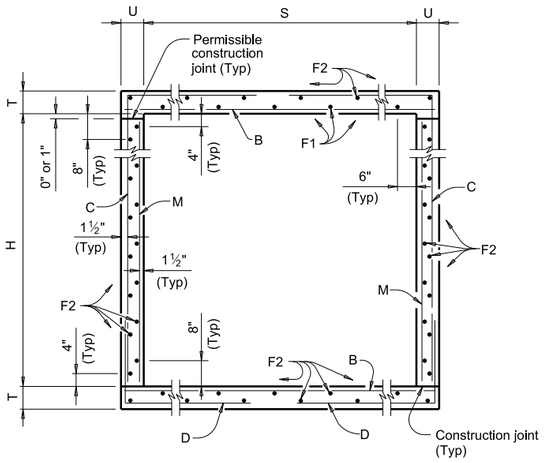
SAFETY END TREATMENT
FOR 0° SKEW BOX CULVERTS (MAXIMUM Hw = 7'-0")
TYPE I ~ CROSS DRAINAGE
SETB-CD

FILE:	DN: GAF	CK: CAT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
		PARKER		140

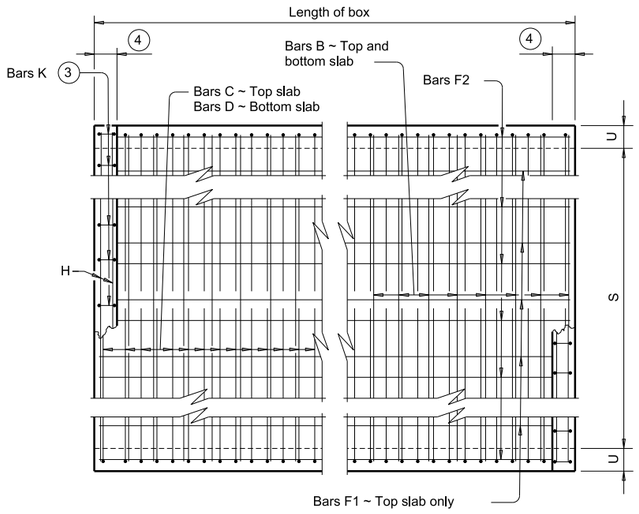
DATE: 8/27/2026
FILE: CV-109 TS_TxDot_SETB-CD-2.dgn

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.

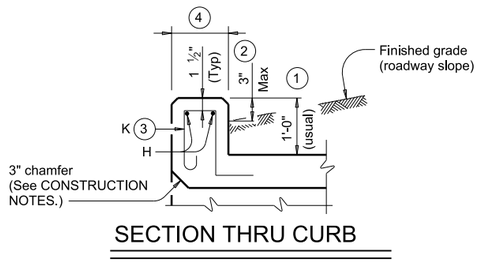
DATE: 8/27/2026 8:03:51 PM
FILE: \\icsm-freesepw21\ICS_pdf_work_dir\5618\54723_46\CV-109_TS_TxDOT_SCC-08-1.dgn



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   · For structures without bridge rail, construct curbs no more than 3" above finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

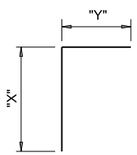
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
· culverts with overlay,
· culverts with 1-to-2 course surface treatment, or
· culverts with the top slab as the final riding surface.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min
· Uncoated or galvanized ~ #5 = 2'-1" Min
· Uncoated or galvanized ~ #6 = 2'-6" Min

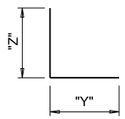
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

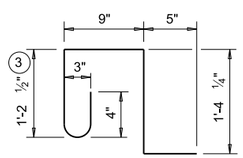
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

SCC-8

FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
		PARKER		141

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: 8/27/2026 8:01:52 PM
FILE: \\tcsm-freesepw21\tcs_pdf_work_dir\56184\54723_47\CV-109_TS_TxDot_SCC-08-2.dgn

SECTION DIMENSIONS				⑤ FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Weight	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
8' - 0"	3' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	8' - 8"	1,406	3' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.582	153.5	0.7	80	24.0	6,219
8' - 0"	3' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	8' - 8"	1,406	3' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.582	153.5	0.7	80	24.0	6,219
8' - 0"	3' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	8' - 10"	1,433	3' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	3' - 0"	164	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.724	154.5	0.7	85	29.6	6,266
8' - 0"	3' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	8' - 11"	1,446	3' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	3' - 0"	164	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.782	155.2	0.7	85	32.0	6,293
8' - 0"	3' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	9' - 2"	1,487	3' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	3' - 0"	216	6	39' - 9"	159	32	39' - 9"	850	9' - 3"	25	22	61	0.929	159.6	0.7	86	37.9	6,468
8' - 0"	4' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	9' - 8"	1,568	4' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.626	159.4	0.7	80	25.7	6,454
8' - 0"	4' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	9' - 8"	1,568	4' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	8' - 11"	24	20	56	0.626	159.4	0.7	80	25.7	6,454
8' - 0"	4' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	9' - 10"	1,595	4' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	4' - 0"	219	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.774	160.0	0.7	85	31.6	6,483
8' - 0"	4' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	9' - 11"	1,609	4' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	4' - 0"	219	6	39' - 9"	159	32	39' - 9"	850	9' - 1"	24	22	61	0.831	160.7	0.7	85	33.9	6,511
8' - 0"	4' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	10' - 2"	1,649	4' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	4' - 0"	289	6	39' - 9"	159	32	39' - 9"	850	9' - 3"	25	22	61	0.985	165.4	0.7	86	40.1	6,703
8' - 0"	5' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	10' - 8"	1,730	5' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	8' - 11"	24	20	56	0.669	167.9	0.7	80	27.4	6,794
8' - 0"	5' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	10' - 8"	1,730	5' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	8' - 11"	24	20	56	0.669	167.9	0.7	80	27.4	6,794
8' - 0"	5' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	10' - 10"	1,757	5' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	5' - 0"	274	6	39' - 9"	159	36	39' - 9"	956	9' - 1"	24	22	61	0.823	168.0	0.7	85	33.6	6,806
8' - 0"	5' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	10' - 11"	1,771	5' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	5' - 0"	274	6	39' - 9"	159	36	39' - 9"	956	9' - 1"	24	22	61	0.881	168.7	0.7	85	35.9	6,834
8' - 0"	5' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	11' - 2"	1,811	5' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	5' - 0"	361	6	39' - 9"	159	36	39' - 9"	956	9' - 3"	25	22	61	1.040	173.9	0.7	86	42.3	7,043
8' - 0"	6' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	11' - 8"	1,893	6' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.712	176.4	0.7	80	29.2	7,135
8' - 0"	6' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	108	#6	9"	11' - 8"	1,893	6' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.712	176.4	0.7	80	29.2	7,135
8' - 0"	6' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	108	#6	9"	11' - 10"	1,920	6' - 8"	5' - 2"	108	#6	9"	8' - 5"	1,365	5' - 2"	3' - 3"	82	12"	6' - 0"	329	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.872	176.1	0.7	85	35.6	7,130
8' - 0"	6' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	108	#6	9"	11' - 11"	1,933	6' - 9"	5' - 2"	108	#6	9"	8' - 6"	1,379	5' - 2"	3' - 4"	82	12"	6' - 0"	329	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.930	176.8	0.7	85	37.9	7,157
8' - 0"	6' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	108	#6	9"	12' - 2"	1,974	6' - 11"	5' - 3"	108	#6	9"	8' - 9"	1,419	5' - 3"	3' - 6"	108	9"	6' - 0"	433	6	39' - 9"	159	40	39' - 9"	1,062	9' - 3"	25	22	61	1.096	182.5	0.7	86	44.5	7,384
8' - 0"	7' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	12' - 8"	2,055	7' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.755	182.2	0.7	80	30.9	7,369
8' - 0"	7' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	162	#6	6"	12' - 8"	3,082	7' - 6"	5' - 2"	162	#6	6"	8' - 3"	2,007	5' - 2"	3' - 1"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	8' - 11"	24	20	56	0.755	224.6	0.7	80	30.9	9,065
8' - 0"	7' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	162	#6	6"	12' - 10"	3,123	7' - 8"	5' - 2"	162	#6	6"	8' - 5"	2,048	5' - 2"	3' - 3"	82	12"	7' - 0"	383	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.922	224.6	0.7	85	37.6	9,070
8' - 0"	7' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	162	#6	6"	12' - 11"	3,143	7' - 9"	5' - 2"	162	#6	6"	8' - 6"	2,068	5' - 2"	3' - 4"	82	12"	7' - 0"	383	6	39' - 9"	159	40	39' - 9"	1,062	9' - 1"	24	22	61	0.979	225.6	0.7	85	39.8	9,110
8' - 0"	7' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	162	#6	6"	13' - 2"	3,204	7' - 11"	5' - 3"	162	#6	6"	8' - 9"	2,129	5' - 3"	3' - 6"	108	9"	7' - 0"	505	6	39' - 9"	159	40	39' - 9"	1,062	9' - 3"	25	22	61	1.151	232.8	0.7	86	46.7	9,396
8' - 0"	8' - 0"	8"	7"	13'	162	#6	6"	8' - 11"	2,170	108	#6	9"	13' - 8"	2,217	8' - 6"	5' - 2"	108	#6	9"	8' - 3"	1,338	5' - 2"	3' - 1"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	8' - 11"	24	20	56	0.798	190.7	0.7	80	32.6	7,709
8' - 0"	8' - 0"	8"	7"	16'	162	#6	6"	8' - 11"	2,170	162	#6	6"	13' - 8"	3,325	8' - 6"	5' - 2"	162	#6	6"	8' - 3"	2,007	5' - 2"	3' - 1"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	8' - 11"	24	20	56	0.798	235.2	0.7	80	32.6	9,486
8' - 0"	8' - 0"	10"	8"	20'	162	#6	6"	9' - 1"	2,210	162	#6	6"	13' - 10"	3,366	8' - 8"	5' - 2"	162	#6	6"	8' - 5"	2,048	5' - 2"	3' - 3"	108	9"	8' - 0"	577	6	39' - 9"	159	44	39' - 9"	1,168	9' - 1"	24	22	61	0.971	238.2	0.7	85	39.5	9,613
8' - 0"	8' - 0"	11"	8"	23'	162	#6	6"	9' - 1"	2,210	162	#6	6"	13' - 11"	3,386	8' - 9"	5' - 2"	162	#6	6"	8' - 6"	2,068	5' - 2"	3' - 4"	162	6"	8' - 0"	866	6	39' - 9"	159	44	39' - 9"	1,168	9' - 1"	24	22	61	1.029	246.4	0.7	85	41.8	9,942
8' - 0"	8' - 0"	13"	9"	30'	162	#6	6"	9' - 3"	2,251	162	#6	6"	14' - 2"	3,447	8' - 11"	5' - 3"	162	#6	6"	8' - 9"	2,129	5' - 3"	3' - 6"	162	6"	8' - 0"	866	6	39' - 9"	159	44	39' - 9"	1,168	9' - 3"	25	22	61	1.207	250.5	0.7	86	49.0	10,106

⑤ For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

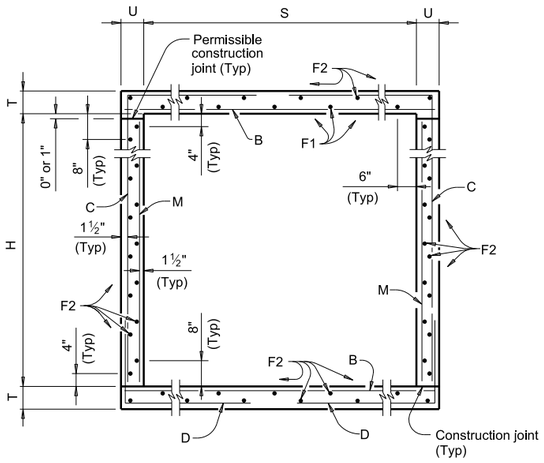
0' TO 30' FILL

SCC-8

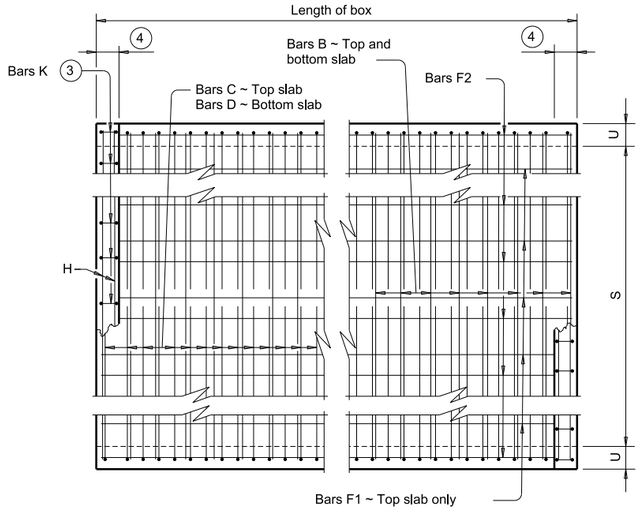
FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
		PARKER		142

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.

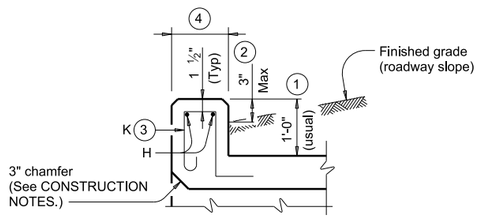
DATE: 8/27/2026 8:05:49 PM
FILE: \\fcsm-freesepw21\ICS_pdf_work_dir\5618\54723_48\CV-109_TS_TxDot_SCC-10-1.dgn



TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   · For structures without bridge rail, construct curbs no more than 3" above finished grade.
   · For structures with bridge rail, construct curbs flush with finished grade.
   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

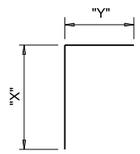
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
· culverts with overlay,
· culverts with 1-to-2 course surface treatment, or
· culverts with the top slab as the final riding surface.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min
· Uncoated or galvanized ~ #5 = 2'-1" Min
· Uncoated or galvanized ~ #6 = 2'-6" Min
· Uncoated or galvanized ~ #7 = 3'-3" Min

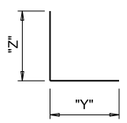
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

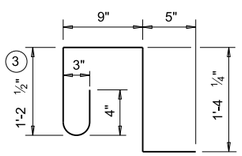
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.



BARS C



BARS D



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

HL93 LOADING SHEET 1 OF 3

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

SCC-10

FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
		PARKER		143

SECTION DIMENSIONS				⑤	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U	FILL HEIGHT	No.	Size	Spa	Length	Weight	No.	Size	Spa	Length	Weight	" X "	" Y "	No.	Size	Spa	Length	Weight	" Y "	" Z "	No.	Spa	Length	Wt	No.	Length	Wt	No.	Length	Weight	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
10' - 0"	4' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	10' - 4"	2,514	4' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	4' - 0"	289	7	39' - 9"	186	37	39' - 9"	982	10' - 11"	29	24	67	0.724	219.9	0.8	96	29.8	8,893
10' - 0"	4' - 0"	9"	7"	10'	162	#6	6"	10' - 11"	2,656	162	#6	6"	10' - 5"	2,535	4' - 7"	5' - 10"	162	#6	6"	9' - 0"	2,190	5' - 10"	3' - 2"	108	9"	4' - 0"	289	7	39' - 9"	186	37	39' - 9"	982	10' - 11"	29	24	67	0.793	221.0	0.8	96	32.5	8,934
10' - 0"	4' - 0"	10"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	10' - 7"	2,575	4' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	82	12"	4' - 0"	219	7	39' - 9"	186	37	39' - 9"	982	11' - 1"	30	26	72	0.897	222.2	0.8	102	36.7	8,991
10' - 0"	4' - 0"	11"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	10' - 8"	2,595	4' - 9"	5' - 11"	162	#6	6"	9' - 3"	2,251	5' - 11"	3' - 4"	82	12"	4' - 0"	219	7	39' - 9"	186	37	39' - 9"	982	11' - 1"	30	26	72	0.967	223.3	0.8	102	39.5	9,032
10' - 0"	4' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	10' - 10"	2,636	4' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	108	9"	4' - 0"	289	7	39' - 9"	186	37	39' - 9"	982	11' - 3"	30	26	72	1.074	228.0	0.8	102	43.8	9,223
10' - 0"	4' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	10' - 11"	2,656	4' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	108	9"	4' - 0"	289	7	39' - 9"	186	37	39' - 9"	982	11' - 5"	31	26	72	1.183	230.1	0.9	103	48.2	9,306
10' - 0"	4' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	11' - 1"	2,697	5' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	108	9"	4' - 0"	289	7	39' - 9"	186	37	39' - 9"	982	11' - 7"	31	26	72	1.294	233.1	0.9	103	52.6	9,428
10' - 0"	4' - 0"	15"	12"	30'	162	#6	6"	11' - 9"	2,859	162	#6	6"	11' - 3"	2,737	5' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	108	9"	4' - 0"	289	7	39' - 9"	186	37	39' - 9"	982	11' - 9"	31	26	72	1.407	236.2	0.9	103	57.2	9,549
10' - 0"	5' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	11' - 4"	2,758	5' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	5' - 0"	361	7	39' - 9"	186	41	39' - 9"	1,089	10' - 11"	29	24	67	0.767	230.5	0.8	96	31.5	9,316
10' - 0"	5' - 0"	9"	7"	10'	162	#6	6"	10' - 11"	2,656	162	#6	6"	11' - 5"	2,778	5' - 7"	5' - 10"	162	#6	6"	9' - 0"	2,190	5' - 10"	3' - 2"	108	9"	5' - 0"	361	7	39' - 9"	186	41	39' - 9"	1,089	10' - 11"	29	24	67	0.836	231.5	0.8	96	34.3	9,356
10' - 0"	5' - 0"	10"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	11' - 7"	2,819	5' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	82	12"	5' - 0"	274	7	39' - 9"	186	41	39' - 9"	1,089	11' - 1"	30	26	72	0.947	232.4	0.8	102	38.7	9,397
10' - 0"	5' - 0"	11"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	11' - 8"	2,839	5' - 9"	5' - 11"	162	#6	6"	9' - 3"	2,251	5' - 11"	3' - 4"	82	12"	5' - 0"	274	7	39' - 9"	186	41	39' - 9"	1,089	11' - 1"	30	26	72	1.016	233.4	0.8	102	41.5	9,438
10' - 0"	5' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	11' - 10"	2,879	5' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	108	9"	5' - 0"	361	7	39' - 9"	186	41	39' - 9"	1,089	11' - 3"	30	26	72	1.130	238.6	0.8	102	46.0	9,645
10' - 0"	5' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	11' - 11"	2,900	5' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	108	9"	5' - 0"	361	7	39' - 9"	186	41	39' - 9"	1,089	11' - 5"	31	26	72	1.245	240.7	0.9	103	50.7	9,729
10' - 0"	5' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	12' - 1"	2,940	6' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	108	9"	5' - 0"	361	7	39' - 9"	186	41	39' - 9"	1,089	11' - 7"	31	26	72	1.362	243.7	0.9	103	55.4	9,850
10' - 0"	5' - 0"	15"	12"	30'	162	#7	6"	11' - 9"	3,891	162	#6	6"	12' - 3"	2,981	6' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	108	9"	5' - 0"	361	7	39' - 9"	186	41	39' - 9"	1,089	11' - 9"	31	26	72	1.481	272.5	0.9	103	60.1	11,004
10' - 0"	6' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	12' - 4"	3,001	6' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	6' - 0"	433	7	39' - 9"	186	45	39' - 9"	1,195	10' - 11"	29	24	67	0.811	241.0	0.8	96	33.3	9,737
10' - 0"	6' - 0"	9"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	12' - 6"	3,042	6' - 7"	5' - 11"	162	#6	6"	9' - 1"	2,210	5' - 11"	3' - 2"	82	12"	6' - 0"	329	7	39' - 9"	186	45	39' - 9"	1,195	11' - 1"	30	26	72	0.926	241.5	0.8	102	37.9	9,761
10' - 0"	6' - 0"	10"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	12' - 7"	3,062	6' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	82	12"	6' - 0"	329	7	39' - 9"	186	45	39' - 9"	1,195	11' - 1"	30	26	72	0.996	242.5	0.8	102	40.7	9,801
10' - 0"	6' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	12' - 10"	3,123	6' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	108	9"	6' - 0"	433	7	39' - 9"	186	45	39' - 9"	1,195	11' - 3"	30	26	72	1.185	249.1	0.8	102	48.2	10,067
10' - 0"	6' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	12' - 11"	3,143	6' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	108	9"	6' - 0"	433	7	39' - 9"	186	45	39' - 9"	1,195	11' - 5"	31	26	72	1.307	251.2	0.9	103	53.1	10,150
10' - 0"	6' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	13' - 1"	3,183	7' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	108	9"	6' - 0"	433	7	39' - 9"	186	45	39' - 9"	1,195	11' - 7"	31	26	72	1.430	254.2	0.9	103	58.1	10,271
10' - 0"	6' - 0"	15"	12"	30'	162	#7	6"	11' - 9"	3,891	162	#6	6"	13' - 3"	3,224	7' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	108	9"	6' - 0"	433	7	39' - 9"	186	45	39' - 9"	1,195	11' - 9"	31	26	72	1.556	283.1	0.9	103	63.1	11,425
10' - 0"	7' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	13' - 4"	3,244	7' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	7' - 0"	505	7	39' - 9"	186	45	39' - 9"	1,195	10' - 11"	29	24	67	0.854	248.9	0.8	96	35.0	10,052
10' - 0"	7' - 0"	8"	7"	10'	162	#6	6"	10' - 11"	2,656	162	#6	6"	13' - 4"	3,244	7' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	7' - 0"	505	7	39' - 9"	186	45	39' - 9"	1,195	10' - 11"	29	24	67	0.854	248.9	0.8	96	35.0	10,052
10' - 0"	7' - 0"	9"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	13' - 6"	3,285	7' - 7"	5' - 11"	162	#6	6"	9' - 1"	2,210	5' - 11"	3' - 2"	82	12"	7' - 0"	383	7	39' - 9"	186	45	39' - 9"	1,195	11' - 1"	30	26	72	0.975	248.9	0.8	102	39.8	10,058
10' - 0"	7' - 0"	10"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	13' - 7"	3,305	7' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	82	12"	7' - 0"	383	7	39' - 9"	186	45	39' - 9"	1,195	11' - 1"	30	26	72	1.045	249.9	0.8	102	42.6	10,098
10' - 0"	7' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	13' - 10"	3,366	7' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	108	9"	7' - 0"	505	7	39' - 9"	186	45	39' - 9"	1,195	11' - 3"	30	26	72	1.241	257.0	0.8	102	50.5	10,382
10' - 0"	7' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	13' - 11"	3,386	7' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	108	9"	7' - 0"	505	7	39' - 9"	186	45	39' - 9"	1,195	11' - 5"	31	26	72	1.368	259.1	0.9	103	55.6	10,465
10' - 0"	7' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	14' - 1"	3,427	8' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	108	9"	7' - 0"	505	7	39' - 9"	186	45	39' - 9"	1,195	11' - 7"	31	26	72	1.498	262.1	0.9	103	60.8	10,587
10' - 0"	7' - 0"	15"	12"	30'	162	#7	6"	11' - 9"	3,891	162	#6	6"	14' - 3"	3,467	8' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	108	9"	7' - 0"	505	7	39' - 9"	186	45	39' - 9"	1,195	11' - 9"	31	26	72	1.630	290.9	0.9	103	66.1	11,740
10' - 0"	8' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	14' - 4"	3,488	8' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	8' - 0"	577	7	39' - 9"	186	49	39' - 9"	1,301	10' - 11"	29	24	67	0.897	259.5	0.8	96	36.7	10,474
10' - 0"	8' - 0"	8"	7"	10'	162	#6	6"	10' - 11"	2,656	162	#6	6"	14' - 4"	3,488	8' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	8' - 0"	577	7	39' - 9"	186	49	39' - 9"	1,301	10' - 11"	29	24	67	0.897	259.5	0.8	96	36.7	10,474
10' - 0"	8' - 0"	9"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	14' - 6"	3,528	8' - 7"	5' - 11"	162	#6	6"	9' - 1"	2,210	5' - 11"	3' - 2"	82	12"	8' - 0"	438	7	39' - 9"	186	49	39' - 9"	1,301	11' - 1"	30	26	72	1.025	259.0	0.8	102	41.8	10,462
10' - 0"	8' - 0"	10"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	14' - 7"	3,548	8' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	82	12"	8' - 0"	438	7	39' - 9"	186	49	39' - 9"	1,301	11' - 1"	30	26	72	1.095	260.0	0.8	102	44.6	10,502
10' - 0"	8' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	14' - 10"	3,609	8' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	108	9"	8' - 0"	577	7	39' - 9"	186	49	39' - 9"	1,301	11' - 3"	30	26	72	1.296	267.5	0.8	102	52.7	10,803
10' - 0"	8' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	14' - 11"	3,630	8' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	108	9"	8' - 0"	577	7	39' - 9"	186	49	39' - 9"	1,301	11' - 5"	31	26	72	1.430	269.6	0.9	103	58.1	10,887
10' - 0"	8' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	15' - 1"	3,670	9' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	108	9"	8' - 0"	577	7	39' - 9"	186	49	39' - 9"	1,301	11' - 7"	31	26	72	1.566	272.6	0.9	103	63.5	11,008
10' - 0"	8' - 0"	15"	12"	30'	162	#7	6"	11' - 9"	3,891	162	#6	6"	15' - 3"	3,711	9' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	108	9"	8' - 0"	577	7	39' - 9"	186	49	39' - 9"	1,301	11' - 9"	31	26	72	1.704	301.5	0.9	103	69.0	12,162

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: 8/27/2026 8:19:58 PM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\5618\54723_49\CV-109_TS_TxDot_SCC-10-2.dgn

⑤ For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

HL93 LOADING SHEET 2 OF 3

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

0' TO 30' FILL

SCC-10

FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
		PARKER		144

SECTION DIMENSIONS				(5) FILL HEIGHT	BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C							Bars D							Bars M ~ #4				Bars F1 ~ #4 at 18" Spa			Bars F2 ~ #4 at 18" Spa			Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
S	H	T	U		No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	" X "	" Y "	No.	Size	Spa	Length	Wt	" Y "	" Z "	No.	Spa	Length	Wt	No.	Length	Wt	No.	Length	Wt	Length	Wt	No.	Wt	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)	Conc (CY)	Reinf (Lb)
10' - 0"	9' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	15' - 4"	3,731	9' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	9' - 0"	649	7	39' - 9"	186	53	39' - 9"	1,407	10' - 11"	29	24	67	0.940	270.0	0.8	96	38.4	10,895
10' - 0"	9' - 0"	8"	7"	10'	162	#6	6"	10' - 11"	2,656	162	#6	6"	15' - 4"	3,731	9' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	108	9"	9' - 0"	649	7	39' - 9"	186	53	39' - 9"	1,407	10' - 11"	29	24	67	0.940	270.0	0.8	96	38.4	10,895
10' - 0"	9' - 0"	9"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	15' - 6"	3,772	9' - 7"	5' - 11"	162	#6	6"	9' - 1"	2,210	5' - 11"	3' - 2"	108	9"	9' - 0"	649	7	39' - 9"	186	53	39' - 9"	1,407	11' - 1"	30	26	72	1.074	273.0	0.8	102	43.8	11,023
10' - 0"	9' - 0"	10"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	15' - 7"	3,792	9' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	162	6"	9' - 0"	974	7	39' - 9"	186	53	39' - 9"	1,407	11' - 1"	30	26	72	1.144	282.2	0.8	102	46.6	11,388
10' - 0"	9' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	15' - 10"	3,853	9' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	162	6"	9' - 0"	974	7	39' - 9"	186	53	39' - 9"	1,407	11' - 3"	30	26	72	1.352	286.2	0.8	102	54.9	11,550
10' - 0"	9' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	15' - 11"	3,873	9' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	162	6"	9' - 0"	974	7	39' - 9"	186	53	39' - 9"	1,407	11' - 5"	31	26	72	1.492	288.3	0.9	103	60.5	11,633
10' - 0"	9' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	16' - 1"	3,913	10' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	162	6"	9' - 0"	974	7	39' - 9"	186	53	39' - 9"	1,407	11' - 7"	31	26	72	1.634	291.3	0.9	103	66.2	11,754
10' - 0"	9' - 0"	15"	12"	30'	162	#7	6"	11' - 9"	3,891	162	#6	6"	16' - 3"	3,954	10' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	162	6"	9' - 0"	974	7	39' - 9"	186	53	39' - 9"	1,407	11' - 9"	31	26	72	1.778	320.1	0.9	103	72.0	12,908
10' - 0"	10' - 0"	8"	7"	7'	162	#6	6"	10' - 11"	2,656	162	#6	6"	16' - 4"	3,974	10' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	10' - 11"	29	24	67	0.984	286.9	0.8	96	40.2	11,571
10' - 0"	10' - 0"	8"	7"	10'	162	#6	6"	10' - 11"	2,656	162	#6	6"	16' - 4"	3,974	10' - 6"	5' - 10"	162	#6	6"	8' - 11"	2,170	5' - 10"	3' - 1"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	10' - 11"	29	24	67	0.984	286.9	0.8	96	40.2	11,571
10' - 0"	10' - 0"	9"	8"	13'	162	#6	6"	11' - 1"	2,697	162	#6	6"	16' - 6"	4,015	10' - 7"	5' - 11"	162	#6	6"	9' - 1"	2,210	5' - 11"	3' - 2"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	11' - 1"	30	26	72	1.123	289.9	0.8	102	45.8	11,699
10' - 0"	10' - 0"	10"	8"	16'	162	#6	6"	11' - 1"	2,697	162	#6	6"	16' - 7"	4,035	10' - 8"	5' - 11"	162	#6	6"	9' - 2"	2,230	5' - 11"	3' - 3"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	11' - 1"	30	26	72	1.193	290.9	0.8	102	48.6	11,739
10' - 0"	10' - 0"	12"	9"	20'	162	#6	6"	11' - 3"	2,737	162	#6	6"	16' - 10"	4,096	10' - 10"	6' - 0"	162	#6	6"	9' - 5"	2,291	6' - 0"	3' - 5"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	11' - 3"	30	26	72	1.407	295.0	0.8	102	57.1	11,901
10' - 0"	10' - 0"	13"	10"	23'	162	#6	6"	11' - 5"	2,778	162	#6	6"	16' - 11"	4,116	10' - 11"	6' - 0"	162	#6	6"	9' - 6"	2,312	6' - 0"	3' - 6"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	11' - 5"	31	26	72	1.553	297.0	0.9	103	63.0	11,984
10' - 0"	10' - 0"	14"	11"	26'	162	#6	6"	11' - 7"	2,819	162	#6	6"	17' - 1"	4,157	11' - 0"	6' - 1"	162	#6	6"	9' - 8"	2,352	6' - 1"	3' - 7"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	11' - 7"	31	26	72	1.702	300.1	0.9	103	69.0	12,106
10' - 0"	10' - 0"	15"	12"	30'	162	#7	6"	11' - 9"	3,891	162	#6	6"	17' - 3"	4,197	11' - 1"	6' - 2"	162	#6	6"	9' - 10"	2,393	6' - 2"	3' - 8"	162	6"	10' - 0"	1,082	7	39' - 9"	186	53	39' - 9"	1,407	11' - 9"	31	26	72	1.852	328.9	0.9	103	75.0	13,259

(5) For direct traffic culverts (fill height ≤ 2 ft.), identify the required box size and select the option with the minimum fill height.

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: 8/27/2026 7:57:15 PM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\5618\54723_50\CV-109_TS_TxDot_SCC-10-3.dgn

HL93 LOADING SHEET 3 OF 3

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE

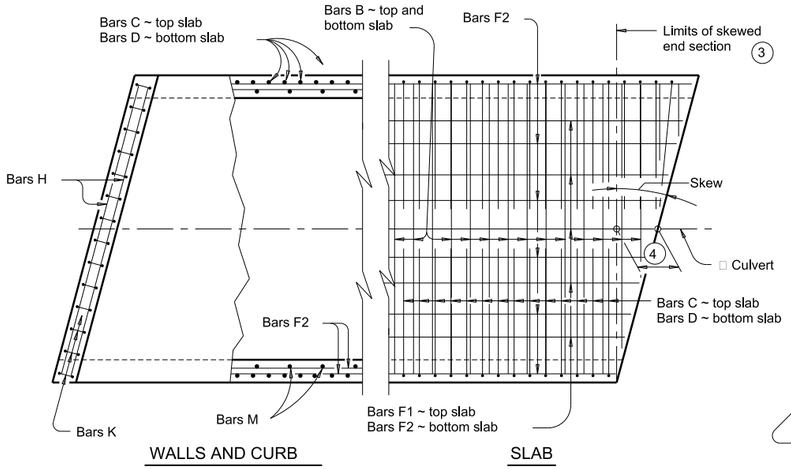
0' TO 30' FILL

SCC-10

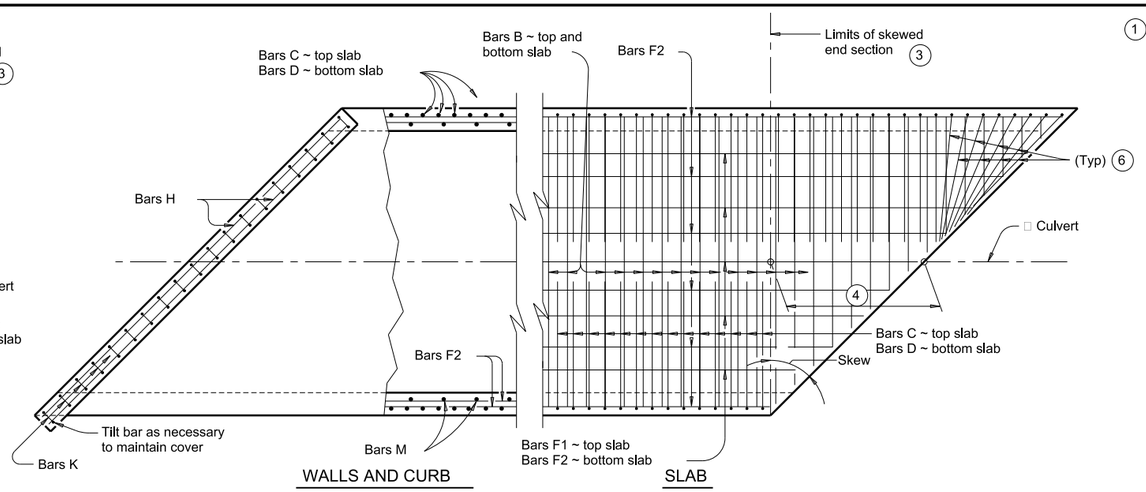
FILE:	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
04/2021 Updated X values.	DIST	COUNTY		SHEET NO.
		PARKER		145

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.

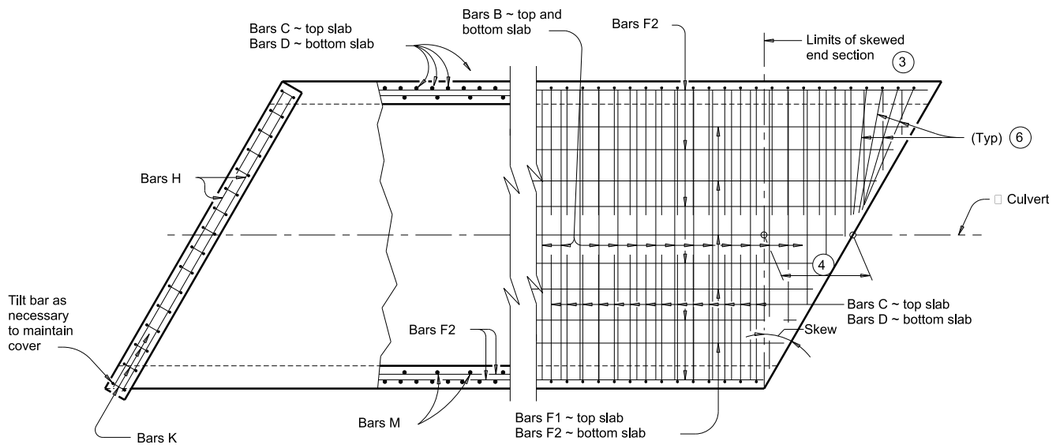
DATE: 8/27/2026 8:06:23 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_dir\5618\54723_53\CV-109_TS_TxDot_SCC-MD-20.dgn



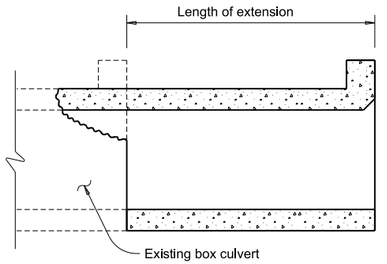
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



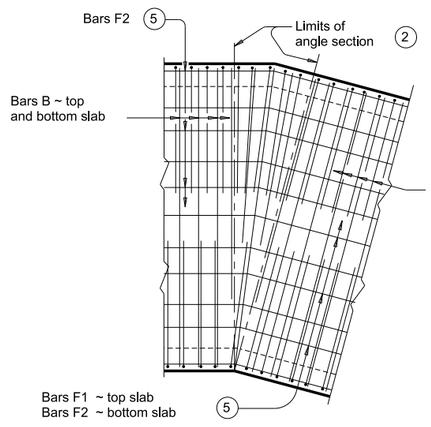
PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



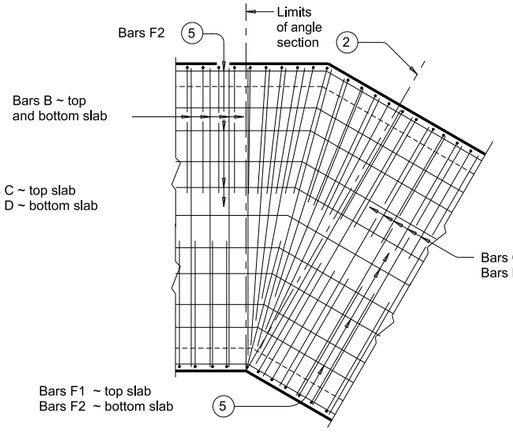
PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



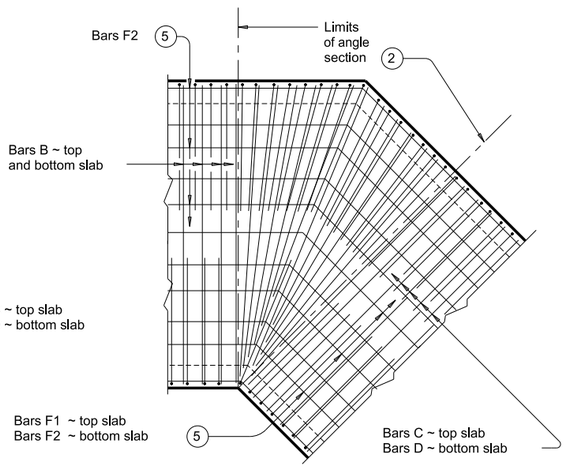
LENGTHENING DETAIL (1)



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, C, D , E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B vary in the skewed end sections.

(4) [One half of overall width] x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, and D parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B shown on the Single Box Culverts Cast-In-Place (SCC) standards sheets to accommodate the skew.

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for details of straight sections of culvert.

For skewed sections and angle sections, refer to Single Box Culverts Cast-in-Place (SCC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.

For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the culvert Single Box Culverts Cast-In-Place (SCC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

SCC-MD

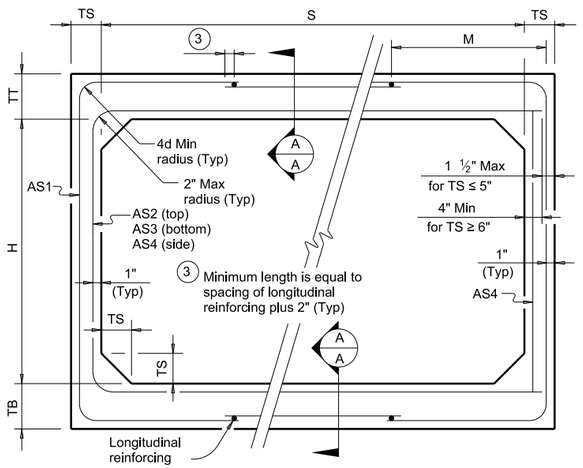
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
		PARKER		146

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)
8	3	8	8	8	< 2	-	0.31	0.35	0.25	0.19	0.19	0.19	0.19	10.4
8	3	8	8	8	2 < 3	55	0.35	0.29	0.28	0.19	-	-	-	10.4
8	3	8	8	8	3 - 5	50	0.28	0.23	0.24	0.19	-	-	-	10.4
8	3	8	8	8	10	45	0.29	0.25	0.26	0.19	-	-	-	10.4
8	3	8	8	8	15	45	0.39	0.33	0.34	0.19	-	-	-	10.4
8	3	8	8	8	20	45	0.51	0.43	0.44	0.19	-	-	-	10.4
8	3	8	8	8	25	45	0.63	0.53	0.54	0.19	-	-	-	10.4
8	4	8	8	8	< 2	-	0.27	0.38	0.29	0.19	0.19	0.19	0.19	11.2
8	4	8	8	8	2 < 3	50	0.31	0.34	0.32	0.19	-	-	-	11.2
8	4	8	8	8	3 - 5	50	0.25	0.27	0.27	0.19	-	-	-	11.2
8	4	8	8	8	10	45	0.26	0.28	0.29	0.19	-	-	-	11.2
8	4	8	8	8	15	41	0.34	0.37	0.38	0.19	-	-	-	11.2
8	4	8	8	8	20	41	0.44	0.48	0.49	0.19	-	-	-	11.2
8	5	8	8	8	< 2	-	0.24	0.40	0.32	0.19	0.19	0.19	0.19	12.0
8	5	8	8	8	2 < 3	50	0.28	0.37	0.35	0.19	-	-	-	12.0
8	5	8	8	8	3 - 5	45	0.23	0.29	0.30	0.19	-	-	-	12.0
8	5	8	8	8	10	45	0.23	0.31	0.32	0.19	-	-	-	12.0
8	5	8	8	8	15	41	0.30	0.41	0.42	0.19	-	-	-	12.0
8	5	8	8	8	20	41	0.39	0.52	0.54	0.19	-	-	-	12.0
8	6	8	8	8	< 2	-	0.22	0.42	0.35	0.19	0.19	0.19	0.19	12.8
8	6	8	8	8	2 < 3	50	0.25	0.40	0.38	0.19	-	-	-	12.8
8	6	8	8	8	3 - 5	50	0.21	0.32	0.33	0.19	-	-	-	12.8
8	6	8	8	8	10	45	0.22	0.33	0.34	0.19	-	-	-	12.8
8	6	8	8	8	15	41	0.28	0.43	0.45	0.19	-	-	-	12.8
8	6	8	8	8	20	41	0.36	0.55	0.57	0.19	-	-	-	12.8
8	7	8	8	8	< 2	-	0.20	0.44	0.37	0.19	0.19	0.19	0.19	13.6
8	7	8	8	8	2 < 3	55	0.23	0.43	0.41	0.19	-	-	-	13.6
8	7	8	8	8	3 - 5	55	0.19	0.34	0.35	0.19	-	-	-	13.6
8	7	8	8	8	10	50	0.20	0.34	0.36	0.19	-	-	-	13.6
8	7	8	8	8	15	41	0.26	0.45	0.47	0.19	-	-	-	13.6
8	7	8	8	8	20	41	0.33	0.57	0.60	0.19	-	-	-	13.6
8	8	8	8	8	< 2	-	0.20	0.45	0.40	0.19	0.19	0.19	0.19	14.4
8	8	8	8	8	2 < 3	65	0.21	0.45	0.44	0.19	-	-	-	14.4
8	8	8	8	8	3 - 5	65	0.19	0.36	0.38	0.19	-	-	-	14.4
8	8	8	8	8	10	55	0.19	0.35	0.38	0.19	-	-	-	14.4
8	8	8	8	8	15	45	0.24	0.46	0.49	0.19	-	-	-	14.4
8	8	8	8	8	20	45	0.31	0.59	0.62	0.19	-	-	-	14.4

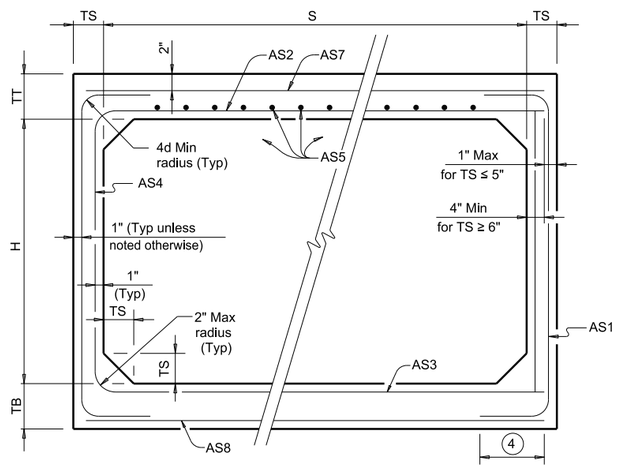
(1) For box length = 8'-0"

(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"

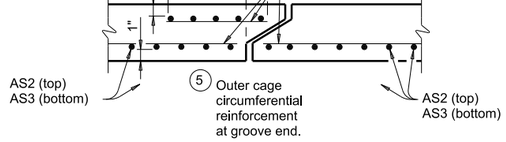
FILL HEIGHT 2 FT AND GREATER



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

8'-0" SPAN

SCP-8

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		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: 8/27/2026 8:03:19 PM
FILE: \\fcsM-freesepw21\fcs_pdf_work_dir\5618\54723_51\CV-109_TS_TxDot_SCP-08-1.dgn

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.

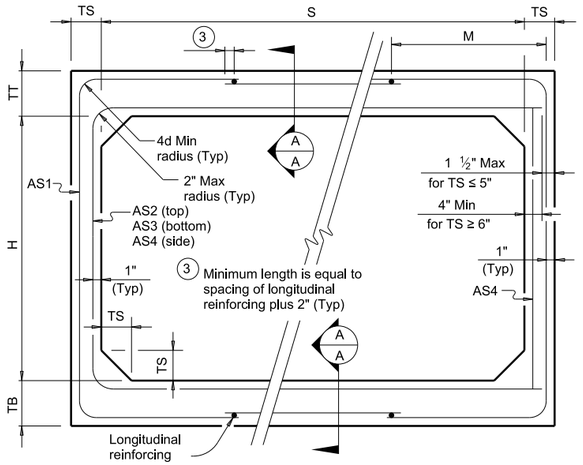
DATE: 8/27/2026 7:57:06 PM
FILE: \\fcsM-freesepw21\fcs_pdf_work_dir\56181\54723_52\CV-109_TS_TxDot_SCP-10-1.dgn

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)
10	4	10	10	10	< 2	-	0.33	0.34	0.27	0.24	0.24	0.24	0.24	16.5
10	4	10	10	10	2 < 3	58	0.38	0.35	0.30	0.24	-	-	-	16.5
10	4	10	10	10	3 - 5	53	0.31	0.28	0.27	0.24	-	-	-	16.5
10	4	10	10	10	10	52	0.36	0.32	0.33	0.24	-	-	-	16.5
10	4	10	10	10	15	52	0.47	0.42	0.43	0.24	-	-	-	16.5
10	4	10	10	10	20	52	0.61	0.54	0.55	0.24	-	-	-	16.5
10	4	10	10	10	25	52	0.75	0.67	0.68	0.24	-	-	-	16.5
10	5	10	10	10	< 2	-	0.30	0.36	0.30	0.24	0.24	0.24	0.24	17.5
10	5	10	10	10	2 < 3	58	0.35	0.39	0.34	0.24	-	-	-	17.5
10	5	10	10	10	3 - 5	52	0.28	0.31	0.30	0.24	-	-	-	17.5
10	5	10	10	10	10	52	0.33	0.35	0.36	0.24	-	-	-	17.5
10	5	10	10	10	15	47	0.42	0.46	0.47	0.24	-	-	-	17.5
10	5	10	10	10	20	47	0.55	0.59	0.61	0.24	-	-	-	17.5
10	5	10	10	10	25	47	0.68	0.73	0.75	0.24	-	-	-	17.5
10	6	10	10	10	< 2	-	0.28	0.38	0.33	0.24	0.24	0.24	0.24	18.5
10	6	10	10	10	2 < 3	58	0.32	0.42	0.37	0.24	-	-	-	18.5
10	6	10	10	10	3 - 5	53	0.26	0.34	0.33	0.24	-	-	-	18.5
10	6	10	10	10	10	52	0.30	0.38	0.39	0.24	-	-	-	18.5
10	6	10	10	10	15	47	0.39	0.49	0.51	0.24	-	-	-	18.5
10	6	10	10	10	20	47	0.50	0.63	0.65	0.24	-	-	-	18.5
10	6	10	10	10	25	47	0.61	0.78	0.80	0.24	-	-	-	18.5
10	7	10	10	10	< 2	-	0.25	0.40	0.36	0.24	0.24	0.24	0.24	19.5
10	7	10	10	10	2 < 3	58	0.30	0.45	0.40	0.24	-	-	-	19.5
10	7	10	10	10	3 - 5	58	0.24	0.36	0.35	0.24	-	-	-	19.5
10	7	10	10	10	10	52	0.28	0.40	0.42	0.24	-	-	-	19.5
10	7	10	10	10	15	47	0.36	0.52	0.54	0.24	-	-	-	19.5
10	7	10	10	10	20	47	0.46	0.67	0.69	0.24	-	-	-	19.5
10	7	10	10	10	25	47	0.56	0.82	0.85	0.24	-	-	-	19.5
10	8	10	10	10	< 2	-	0.24	0.41	0.38	0.24	0.24	0.24	0.24	20.5
10	8	10	10	10	2 < 3	64	0.27	0.47	0.43	0.24	-	-	-	20.5
10	8	10	10	10	3 - 5	58	0.24	0.38	0.38	0.24	-	-	-	20.5
10	8	10	10	10	10	52	0.26	0.42	0.44	0.24	-	-	-	20.5
10	8	10	10	10	15	47	0.34	0.54	0.57	0.24	-	-	-	20.5
10	8	10	10	10	20	47	0.43	0.69	0.72	0.24	-	-	-	20.5
10	9	10	10	10	< 2	-	0.24	0.42	0.41	0.24	0.24	0.24	0.24	21.5
10	9	10	10	10	2 < 3	70	0.26	0.50	0.46	0.24	-	-	-	21.5
10	9	10	10	10	3 - 5	64	0.24	0.40	0.40	0.24	-	-	-	21.5
10	9	10	10	10	10	58	0.25	0.43	0.46	0.24	-	-	-	21.5
10	9	10	10	10	15	52	0.32	0.56	0.59	0.24	-	-	-	21.5
10	9	10	10	10	20	47	0.40	0.71	0.75	0.24	-	-	-	21.5
10	10	10	10	10	< 2	-	0.24	0.44	0.44	0.24	0.24	0.24	0.24	22.5
10	10	10	10	10	2 < 3	79	0.25	0.52	0.48	0.24	-	-	-	22.5
10	10	10	10	10	3 - 5	70	0.24	0.42	0.43	0.24	-	-	-	22.5
10	10	10	10	10	10	64	0.24	0.44	0.48	0.24	-	-	-	22.5
10	10	10	10	10	15	52	0.30	0.57	0.61	0.24	-	-	-	22.5
10	10	10	10	10	20	52	0.38	0.73	0.77	0.24	-	-	-	22.5

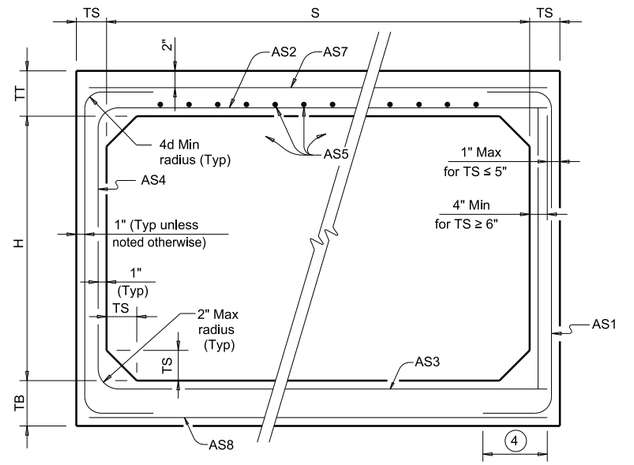
① For box length = 8'-0"

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"

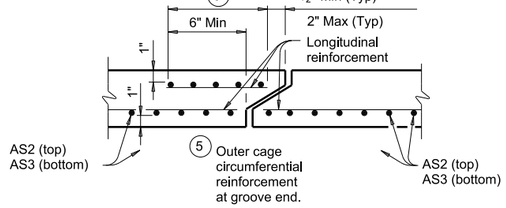
FILL HEIGHT 2 FT AND GREATER



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

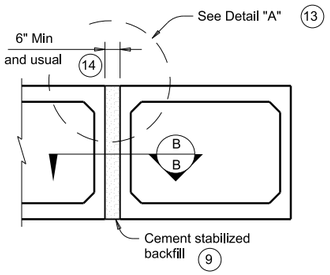
SINGLE BOX CULVERTS PRECAST
10'-0" SPAN

SCP-10

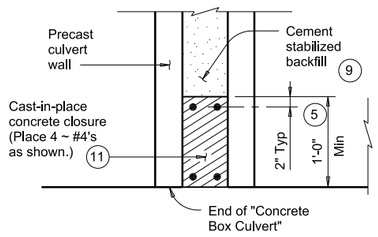
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		148

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.

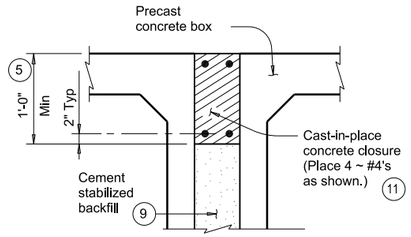
DATE: 8/27/2026
FILE: CV-109_TS_TxDot_SCP-MD-20.dgn



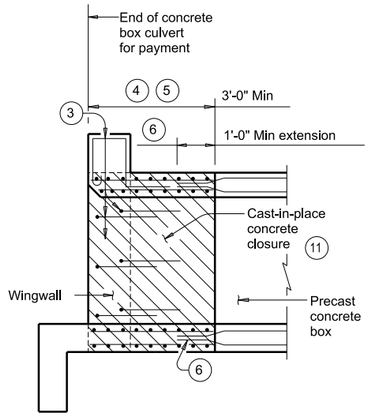
MULTIPLE UNIT PLACEMENT



SECTION B-B

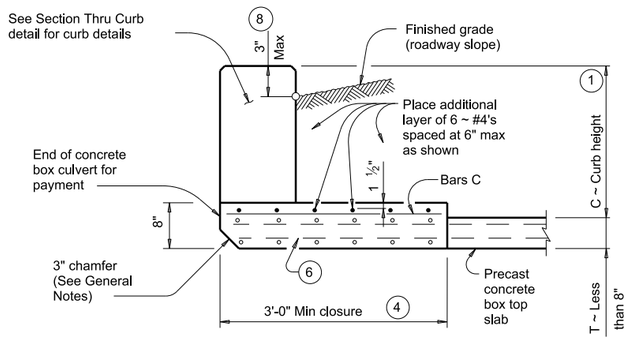


DETAIL "A" (13)

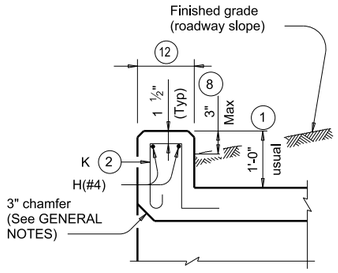


WINGWALL CONNECTION

(Also applies to safety end treatment.)

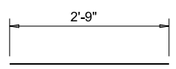


SECTION THRU TOP SLABS LESS THAN 8"

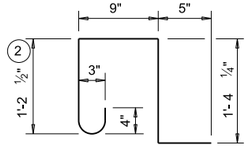


SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)
(Spa = 1'-0" Max)



BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
4. Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
6. Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is considered part of the box culvert for payment.
11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
12. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box." No payment will be made for any additional material in the gap between adjacent boxes.

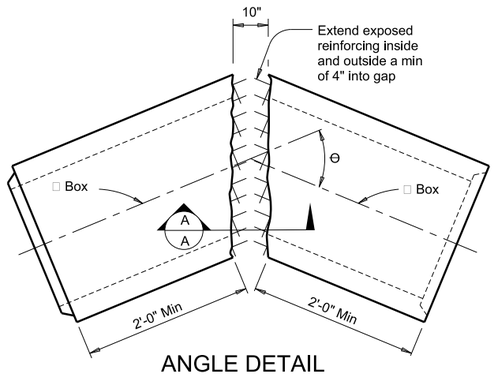
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

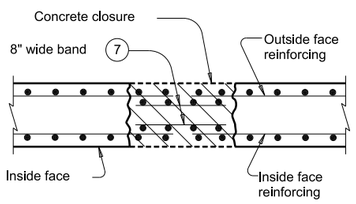
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

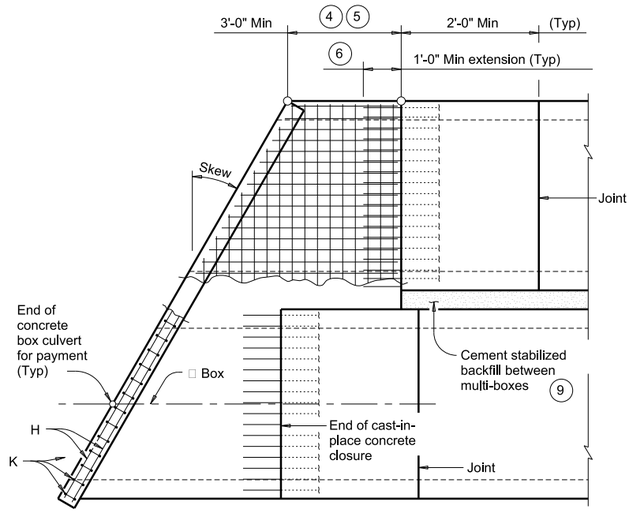
Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out-to-out of bars.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

HL93 LOADING

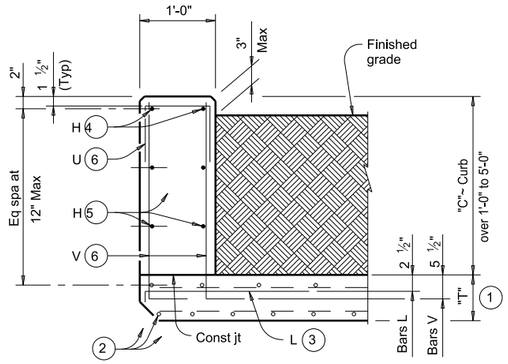
Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

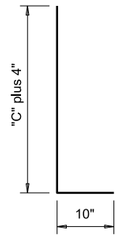
SCP-MD

FILE:	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		149

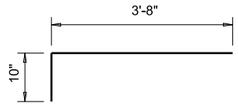


TYPICAL SECTION

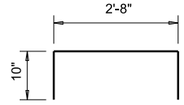
Used for curbs over 1'-0" to 5'-0"



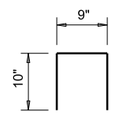
BARS V (#5) 6
Spaced at 12" Max



BARS L (#5) 3
Spaced at 12" Max



OPTIONAL BARS L (#5) 3 7
Spaced at 12" Max



BARS U (#4) 6
Spaced at 12" Max

1. "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.
2. Adjust normal culvert slab bars as necessary to clear obstructions.
3. Place bars L as shown. Tilt hook as necessary to maintain cover.
4. Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.
5. Additional bars H(#4) as required to maintain 12" Max spacing.
6. Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
7. Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
8. Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.
For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.
Provide bar laps, where required, as follows:
· Uncoated or galvanized ~ #4 = 1'-8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.
This Curb is considered as part of the Box Culvert for payment.

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

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: 8/27/2026
FILE: CV-109_TS_TxDot_ECD-20.dgn

Texas Department of Transportation

Bridge Division Standard

EXTENDED CURB DETAILS
FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE:	DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		150

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw Height of Wingwall (1) (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
STA 98+40 CULVERT F (Lt)	1 ~ 10' X 8'	1'	SCP-10	PW-1	0	4:1	10"	10"	1.500	10.333	N/A	N/A	41.333	11.667	N/A	0.0	0.6	52.4	854
STA 128+82 CULVERT G (Lt)	1 ~ 8' X 6'	2'	SCP-8	PW-1	0	4:1	8"	8"	3.000	9.667	N/A	N/A	38.667	9.333	N/A	0.0	1.0	48.8	748
STA 128+82 CULVERT G (Rt)	1 ~ 8' X 6'	2'	SCP-8	PW-1	0	4:1	8"	8"	3.333	10.000	N/A	N/A	40.000	9.333	N/A	0.0	1.2	50.5	800

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
· Side slope at culvert for flared or straight wingwalls.
· Channel slope for parallel wingwalls.
· Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

Texas Department of Transportation

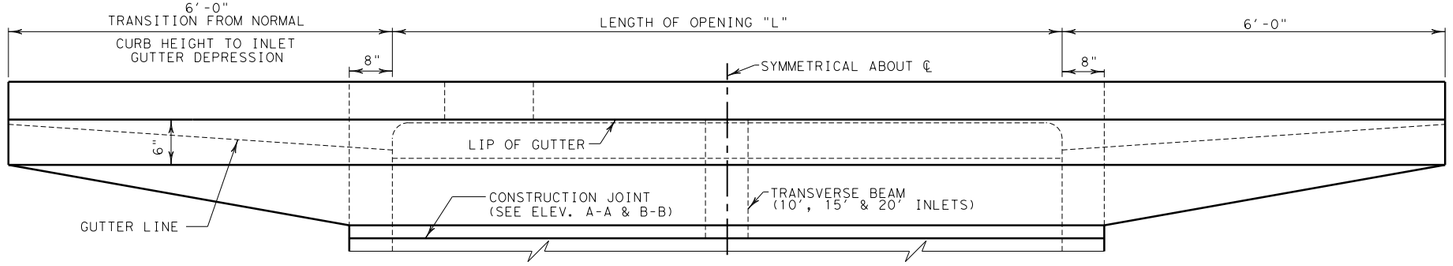
Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

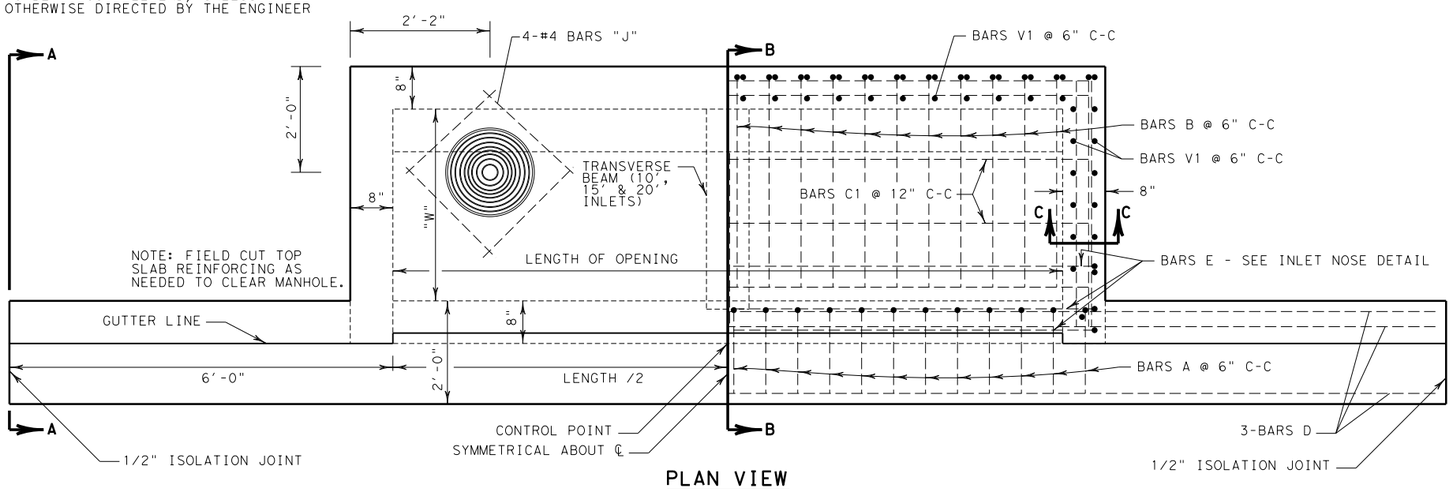
FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		151

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.

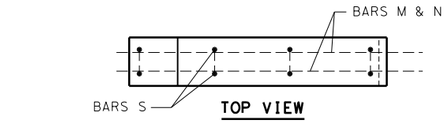


FRONT ELEVATION VIEW
N.T.S.

NOTE: LOCATION OF RING AND COVER TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE ENGINEER

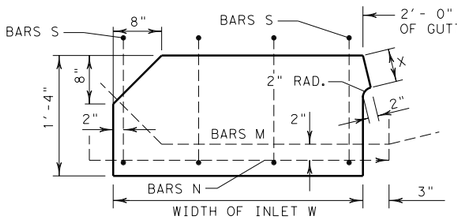


PLAN VIEW
(ONLY TOP LAYER OF SLAB REINFORCING SHOWN, FOR CLARITY)
N.T.S.

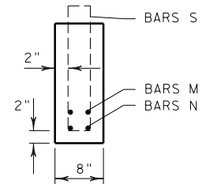


TOP VIEW

BARS S @ EQUAL SPACES
3' WIDTH = 4 BARS
4' WIDTH = 5 BARS
5' WIDTH = 6 BARS

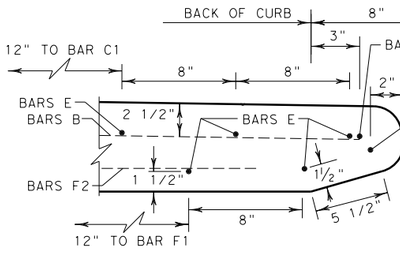


SIDE SECTION

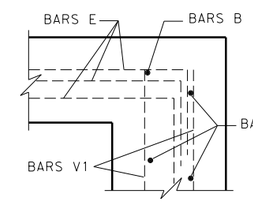


END VIEW

TRANSVERSE BEAM DETAIL
BEAMS AT 5' C - C (10', 15' & 20' INLETS)
N.T.S.



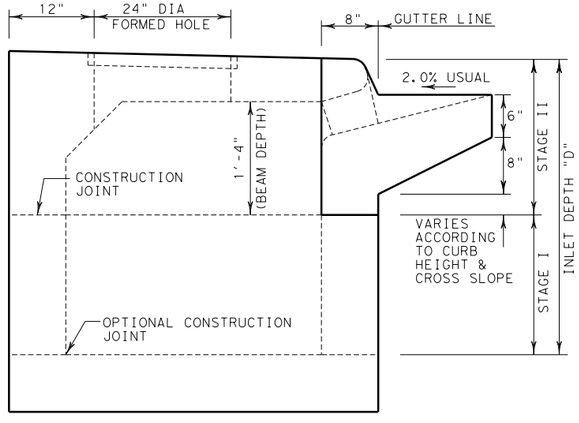
SIDE SECTION



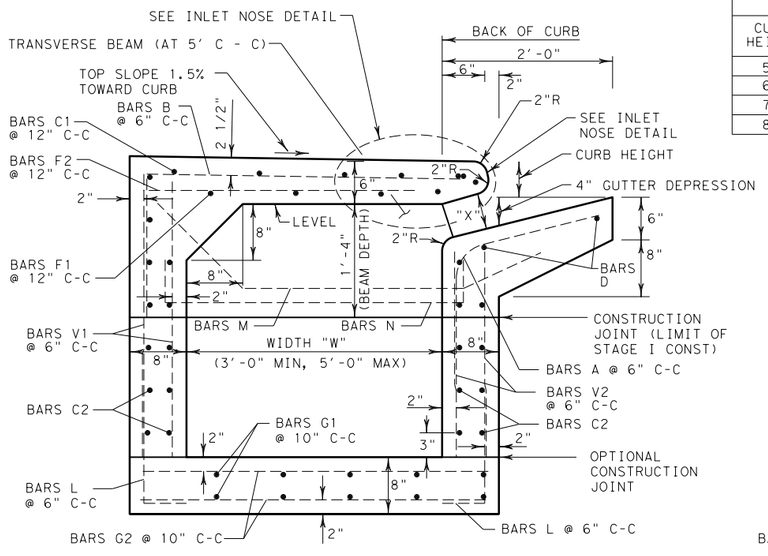
SLAB/WALL CONNECTION

INLET NOSE DETAIL
N.T.S.

SEE SHEET 2 OF 2 FOR DETAILS OF REINFORCING, BILL OF REINFORCING STEEL, SUMMARY OF QUANTITIES, TABLE OF MAXIMUM CONDUIT SIZES AND GENERAL NOTES.

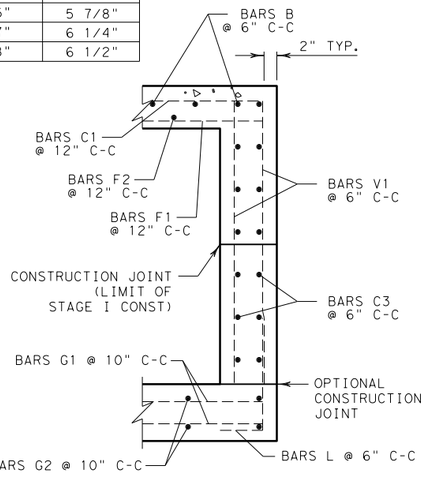


SIDE ELEVATION "A-A"
N.T.S.



SECTION "B-B"
N.T.S.

THROAT DIMENSION	
CURB HEIGHT	"X"
5"	5"
6"	5 7/8"
7"	6 1/4"
8"	6 1/2"



SECTION "C-C"
N.T.S.

©2020 by Texas Department of Transportation;
All Rights Reserved

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

Fort Worth District Standard

CURB INLET OUTSIDE PAVEMENT FOR USE WITH TYPE II CURB
I-CO (FTW)

ORIGINAL DRAWING: 05/2019	ico-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
04/2020	ADD MAX CONDUIT SIZE TABLE	TEXAS	FTW	
11/2020	REVISED JOINT NOMENCLATURE	CONT.	SECT.	JOB / HIGHWAY NO.
			PARKER	152

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 7:54:51 PM
$PATH$
\\icsM-fs\projects\5618\54723_29\cv-109_TS_TxDot_ICO FTW-1.dgn

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.

BILL OF REINFORCING STEEL FOR "D" = 4'

Width "W"	Length "L"	Bars A		Bars B			Bars C1		Bars C2		Bars C3		Bars D		Bars E		Bars F1		Bars F2		Bars G1		Bars G2		Bars J	
		#4	at 6" Spa	#4		at 6" Spa	#5	at 12" Spa	#5	at 6" Spa	#5	at 6" Spa	#4		#5		#4	at 12" Spa	#4	at 12" Spa	#5	at 10" Spa	#5	at 10" Spa	#4	
[ft]	[ft]	No	Wt	No	Length	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
3.0	5.0	13	37	10	5.417	36	2	13	29	181	27	113	3	33	6	48	1	4	7	12	10	63	14	58	4	8
4.0	5.0	13	37	10	6.417	43	3	19	29	181	27	141	3	33	6	48	2	8	7	16	12	75	14	73	4	8
5.0	5.0	13	37	10	7.417	50	4	25	29	181	27	169	3	33	6	48	3	12	7	21	14	88	14	88	4	8
3.0	10.0	23	65	20	5.417	72	2	23	29	333	27	113	3	43	6	80	1	7	12	20	10	115	26	108	4	8
4.0	10.0	23	65	20	6.417	86	3	34	29	333	27	141	3	43	6	80	2	15	12	28	12	138	26	136	4	8
5.0	10.0	23	65	20	7.417	99	4	46	29	333	27	169	3	43	6	80	3	22	12	36	14	161	26	163	4	8
3.0	15.0	33	94	30	5.417	109	2	33	29	484	27	113	3	53	6	111	1	11	17	28	10	167	38	159	4	8
4.0	15.0	33	94	30	6.417	129	3	50	29	484	27	141	3	53	6	111	2	21	17	40	12	200	38	198	4	8
5.0	15.0	33	94	30	7.417	149	4	67	29	484	27	169	3	53	6	111	3	32	17	51	14	234	38	238	4	8
3.0	20.0	43	122	40	5.417	145	2	44	29	635	27	113	3	63	6	142	1	14	22	37	10	219	50	209	4	8
4.0	20.0	43	122	40	6.417	171	3	66	29	635	27	141	3	63	6	142	2	28	22	51	12	263	50	261	4	8
5.0	20.0	43	122	40	7.417	198	4	88	29	635	27	169	3	63	6	142	3	42	22	66	14	307	50	313	4	8

BILL OF REINFORCING STEEL FOR "D" = 4' (CONTINUED)

Width "W"	Length "L"	Bars L		Bars M		Bars N		Bars S		Bars V1		Bars V2	
		#5	at 6" Spa	#4		#5		#4	at 12" Spa	#5	at 6" Spa	#5	at 6" Spa
[ft]	[ft]	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
3.0	5.0	36	125	0	0	0	0	0	0	58	232	26	77
4.0	5.0	40	139	0	0	0	0	0	0	66	264	26	77
5.0	5.0	44	153	0	0	0	0	0	0	74	296	26	77
3.0	10.0	56	195	2	7	2	11	4	11	78	312	46	136
4.0	10.0	60	209	2	8	2	13	5	14	86	344	46	136
5.0	10.0	64	223	2	9	2	15	6	17	94	376	46	136
3.0	15.0	76	264	4	13	4	22	8	22	98	392	66	195
4.0	15.0	80	278	4	16	4	26	10	28	106	424	66	195
5.0	15.0	84	292	4	19	4	30	12	33	114	456	66	195
3.0	20.0	96	334	6	20	6	32	12	33	118	472	86	254
4.0	20.0	100	348	6	24	6	39	15	42	126	504	86	254
5.0	20.0	104	362	6	28	6	45	18	50	134	536	86	254

SUMMARY OF QUANTITIES

Total Reinf Weight	Steel Qty Adjust. P.L.F.	Class "C" Concrete	Concrete Qty Adjust. P.L.F.
[Lb]	[Lb]	[CY]	[CY]
1,040	171.1	3.8	0.46
1,163	187.7	4.3	0.51
1,286	204.4	4.8	0.56
1,659	254.5	5.9	0.71
1,829	271.2	6.6	0.76
2,000	287.9	7.3	0.81
2,278	337.9	7.9	0.95
2,496	354.6	8.9	1.00
2,714	371.3	9.8	1.05
2,896	421.4	9.9	1.20
3,162	438.1	11.2	1.25
3,428	454.7	12.4	1.30

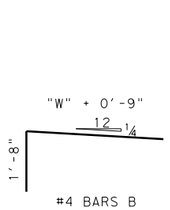
MAXIMUM PARALLEL * CONDUIT SIZE

INLET WIDTH	PIPE DIAMETER (IN)	BOX SPAN (FT)
3'	24	-
4'	36	3
5'	48	4

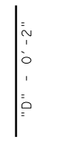
* PARALLEL TO ROADWAY

NOTE:
AT CONTRACTOR'S OPTION, BARS L MAY BE FABRICATED TO BE CONTINUOUS WITH BARS V1 AND/OR V2.

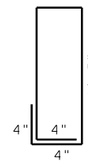
AT CONTRACTOR'S OPTION, BARS A MAY BE FABRICATED TO BE CONTINUOUS WITH BARS V2.



#4 BARS B



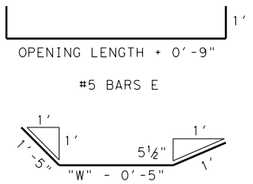
#5 BARS V1



#4 BARS S

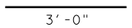
#5 BARS V2

#5 BARS L

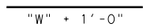


#5 BARS E

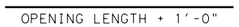
#4 BARS M



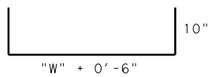
#4 BARS J



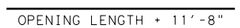
#5 BARS C3 & G2



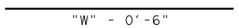
#5 BARS C1, C2 & G1
#4 BARS F1



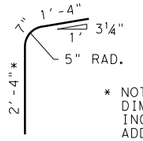
#5 BARS N



#4 BARS D



#4 BARS F2



#4 BARS A

* NOTE:
DIMENSION SHOWN FOR 5" CURB.
INCREASE LENGTH BY 1" FOR EACH ADDITIONAL 1" OF CURB HEIGHT.

GENERAL NOTES

1. DESIGNED ACCORDING TO AASHTO LRFD SPECIFICATIONS FOR PEDESTRIAN LOADING AND HL-93 LOADING UNDER "EXTREME EVENT II" LOAD COMBINATION.
2. ALL CONCRETE FOR CAST-IN-PLACE STRUCTURES SHALL BE CLASS "C"; ALL CONCRETE FOR PRECAST STRUCTURES SHALL BE CLASS "H"(MINIMUM 5000 PSI DESIGN STRENGTH).
3. ALL REINFORCING STEEL SHALL BE GRADE 60.
4. STAGE I MAY BE EITHER CAST-IN-PLACE OR PRECAST. FABRICATE PRECAST STRUCTURES USING REBAR AS DETAILED HEREON, WITH BARS A, V1, AND V2 TO BE INCLUDED WITH STAGE I. SPLICING OF BARS WILL NOT BE PERMITTED, EXCEPT AS NOTED.
5. STAGE II SHALL BE CAST-IN-PLACE.
6. CHAMFER ALL EXPOSED CORNERS 3/4", EXCEPT WHERE NOTED OTHERWISE.
7. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTERS OF BARS
8. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMMODATE STORM DRAIN PIPE.
9. FOR PIPE AND BOX CONNECTIONS TO PRECAST INLETS, SEE STANDARD SHEET PPGC.
10. INSTALL RING AND COVER AT OUTFALL END OF INLET, UNLESS OTHERWISE DIRECTED. CAST IRON RING AND COVER SHALL CONFORM TO ITEM 471. SEE STANDARD MDD (FTW) FOR RING AND COVER DETAILS.
11. DEPTHS OTHER THAN THOSE SHOWN MAY BE USED WHENEVER NECESSARY, UP TO A MAXIMUM DEPTH OF 15'. QUANTITIES FOR OTHER DEPTHS MAY BE DETERMINED BY INTERPOLATION.
12. DO NOT COMMENCE WITH STAGE II CONSTRUCTION UNTIL CONCRETE PAVEMENT AND CURB, OR CONCRETE CURB AND GUTTER CONSTRUCTION IS COMPLETED AT THE INLET SITE.
13. INSTALL A TEMPORARY WOOD COVER AFTER STAGE I IS COMPLETED, TO REMAIN IN PLACE UNTIL STAGE II CONSTRUCTION BEGINS.
14. THE LOCATION OF INLET AS SHOWN IN THE PLAN REFERS TO THE CONTROL POINT AT THE FACE OF CURB AND MID-POINT OF THE INLET.
15. PLACE A SEALED 1/2" ISOLATION JOINT ALONG ALL VERTICAL FACES ABUTTING CONCRETE PAVEMENT, CURB, CURB AND GUTTER, OR SIDEWALK. USE CLASS 5 OR 8 JOINT SEALANT TO SEAL THE JOINT. SEE STANDARD JS (FTW) FOR ADDTIONAL INFORMATION.

Texas Department of Transportation

Fort Worth District Standard

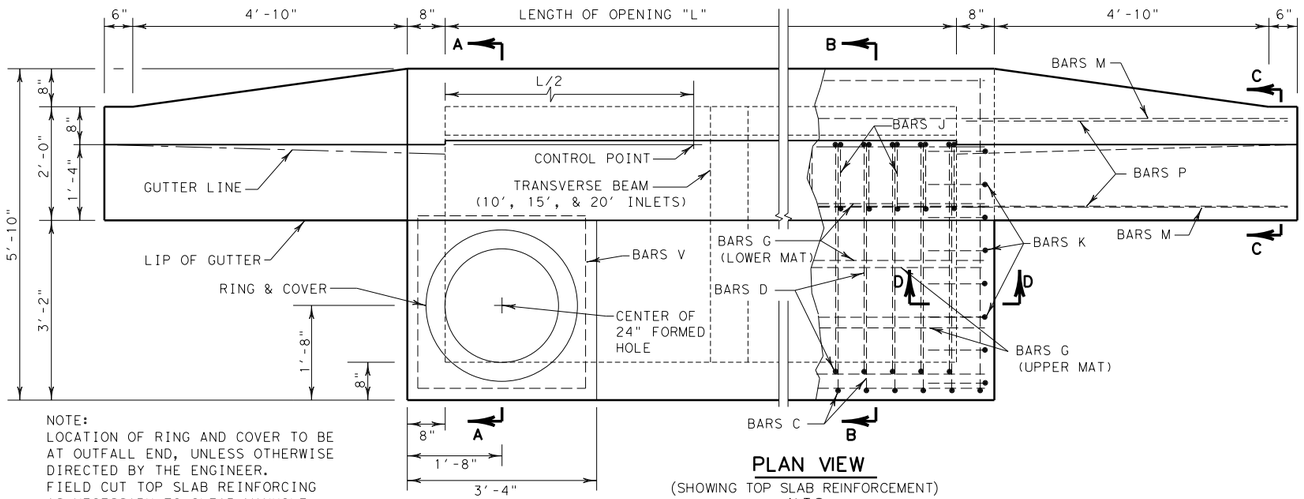
CURB INLET OUTSIDE PAVEMENT FOR USE WITH TYPE II CURB I-CO (FTW)

ORIGINAL DRAWING: 05/2019	ico-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
04/2020	ADD MAX CONDUIT SIZE TABLE	TEXAS	FTW	
11/2020	REVISED JOINT NOMENCLATURE	CONT.	SECT. JOB	HIGHWAY NO.
01/2021	REVISE MAX CONDUIT SIZE TABLE		PARKER	153

©2020 by Texas Department of Transportation; All Rights Reserved

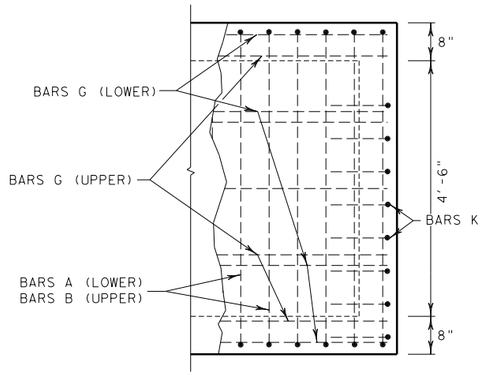
http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 7:55:08 PM
$PATH$
\\icsM-fs\projects\ICS_proj_work_dir\5618\54723_30\cv-109_TS_TxDot_ICO FTW-2.dgn
CV109 TS TxDot ICO FTW-2.dgn

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.

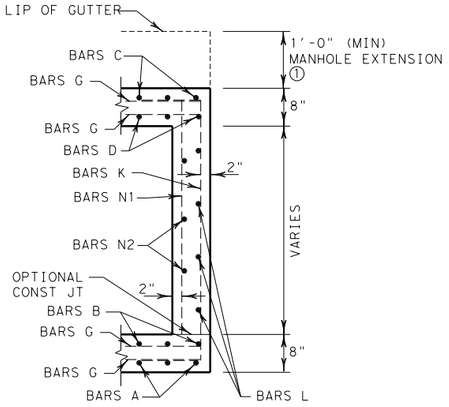


NOTE:
LOCATION OF RING AND COVER TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. FIELD CUT TOP SLAB REINFORCING AS NECESSARY TO CLEAR MANHOLE.

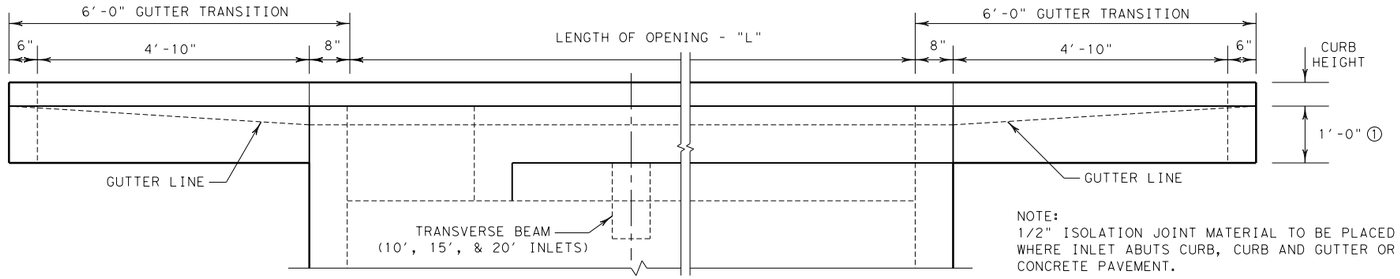
PLAN VIEW
(SHOWING TOP SLAB REINFORCEMENT)
N.T.S.



PARTIAL PLAN VIEW
(SHOWING BOTTOM SLAB REINFORCEMENT)
N.T.S.

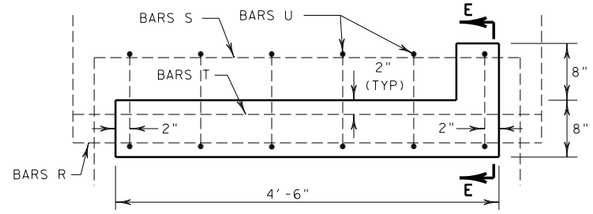


SECTION "D-D"
N.T.S.

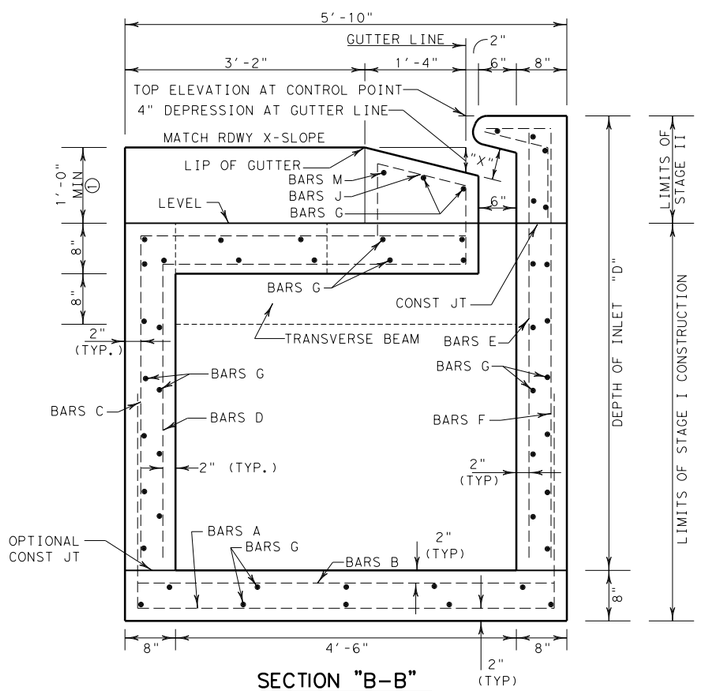


NOTE:
1/2" ISOLATION JOINT MATERIAL TO BE PLACED WHERE INLET ABUTS CURB, CURB AND GUTTER OR CONCRETE PAVEMENT.

FRONT ELEVATION VIEW
N.T.S.



TRANSVERSE BEAM DETAIL
BEAMS AT 5' C-C (10', 15', & 20' INLETS)
N.T.S.

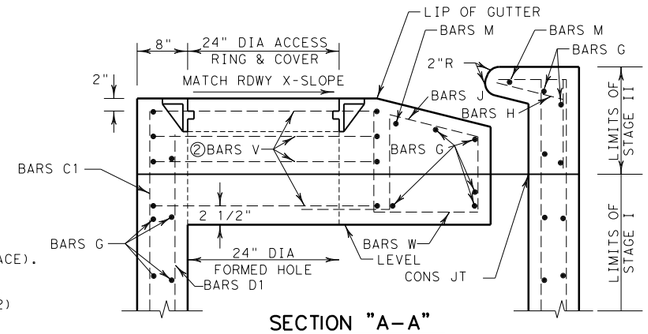


SECTION "B-B"
N.T.S.

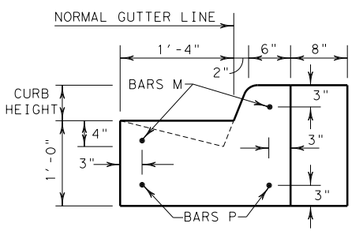
THROAT DIMENSION	
CURB HEIGHT (IN)	"X"
5	5"
6	5 7/8"
7	6 1/4"
8	6 1/2"

① MATCH DEPTH OF PAVEMENT STRUCTURE (BASE AND SURFACE). ADJUST BAR LENGTHS AS DIRECTED BY THE ENGINEER. (SEE DETAIL, SHEET 2 OF 2)

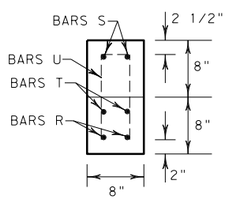
② STAGE II BARS V @ 3 EQUAL SPACES



SECTION "A-A"
N.T.S.



SECTION "C-C"
N.T.S.



SECTION "E-E"
N.T.S.

MAXIMUM PARALLEL * CONDUIT SIZE	
PIPE DIAMETER (IN)	BOX SPAN (FT)
42	3

* PARALLEL TO ROADWAY

NOTE:
SEE SHEET 2 OF 2 FOR DETAILS OF REINFORCING STEEL, ESTIMATED QUANTITIES, AND GENERAL NOTES.

SHEET 1 OF 2 SHEETS

©2020 by Texas Department of Transportation; All Rights Reserved

Texas Department of Transportation

Fort Worth District Standard

CURB INLET UNDER PAVEMENT FOR USE WITH TYPE II CURB
I-CU (FTW)

ORIGINAL DRAWING: 05/2019	icu-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
DATE	REVISIONS	6			
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY	
04/2020	ADD MAX CONDUIT SIZE TABLE	TEXAS	FTW		
11/2020	REVISE JOINT NOMENCLATURE	CONT.	SECT.	JOB	HIGHWAY NO.
			PARKER		154

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 7:56:51 PM
$PATH$ 8/27/2026
\\icsM-fpfs01\ics_pdf_work_dir\5618\54723_31\cv-109_TS_TxDot_ICU FTW-1.dgn
cv-109_TS_TxDot_ICU FTW-1.dgn

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.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:03:48 PM
$PATH$
\\icsM-fpfs02\ICS_dgn_work_dir\5618\54723_32\cv-109_TS_TxDot_ICU FTW-2.dgn
cv-109 TS TxDot ICU FTW-2.dgn

BILL OF REINFORCING STEEL FOR "D" = 6'

Length L	Bars A		Bars B		Bars C		Bars C1		Bars D		Bars D1		Bars E		Bars F		Bars G		Bars H		Bars J		Bars K		Bars L		Bars M		Bars N1		Bars N2	
	#5	at 6" Spa	#5	at 6" Spa	#5	at 6" Spa	#5	at 6" Spa	#5	at 6" Spa	#5	at 6" Spa	#5	at 6" Spa	#5	at 6" Spa	#5		#4	at 12" Spa	#4	at 12" Spa	#4	at 7" Spa	#5	at 6" Spa	#4		#4	at 12" Spa	#4	at 12" Spa
[ft]	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
5.0	13	151	13	75	6	54	7	39	4	38	7	37	11	67	13	90	54	338	7	9	7	21	16	72	14	138	2	22	10	29	8	29
10.0	23	268	23	132	16	145	7	39	14	131	7	37	21	128	23	160	54	620	12	15	12	35	16	72	14	138	2	29	10	29	8	29
15.0	33	384	33	189	26	235	7	39	24	225	7	37	31	189	33	229	54	901	17	21	17	50	16	72	14	138	2	36	10	29	8	29
20.0	43	501	43	247	36	325	7	39	34	319	7	37	41	249	43	299	54	1183	22	27	22	65	16	72	14	138	2	42	10	29	8	29

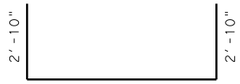
BILL OF REINFORCING STEEL FOR "D" = 6' (CONTINUED)

Length L	Bars P		Bars R		Bars S		Bars T		Bars U		Bars V		Bars W	
	#4		#6		#6		#6		#4	at 10" Spa	#4		#4	
[ft]	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
5.0	4	15	0	0	0	0	0	0	0	0	4	35	6	11
10.0	4	15	2	23	2	21	2	17	6	13	4	35	6	11
15.0	4	15	4	45	4	43	4	33	12	26	4	35	6	11
20.0	4	15	6	68	6	64	6	50	18	39	4	35	6	11

* BASED ON 6" CURB HEIGHT. ADJUST FOR OTHER CURB HEIGHTS.

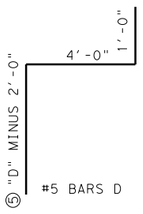
SUMMARY OF QUANTITIES

Total Reinf Steel	Steel Qty Adjust.	Class "C" Concrete	Concrete Qty Adjust.
Weight	P.L.F.		P.L.F.
[Lb]	[Lb]	[CY]	[CY]
1,269	157.9	5.43	0.54
2,139	236.1	8.31	0.78
3,010	314.3	11.19	1.03
3,881	392.5	14.07	1.28



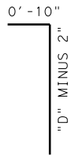
5'-6"
#5 BARS B

⑤ "D" MINUS 0'-8"
#5 BARS C1



⑤ "D" MINUS 1'-0"
#5 BARS D1

"D" MINUS 2"
#5 BARS E

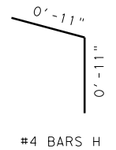


"L" + 1'-0"
#5 BARS G

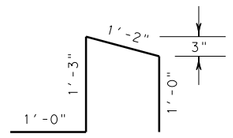
BAR G SPACING:

BOTTOM SLAB, LOWER MAT – 1'-4"
BOTTOM SLAB, UPPER MAT – 1'-2"
BACK WALL, OUTER MAT – 0'-6"
BACK WALL, INNER MAT – 0'-8"
FRONT WALL, OUTER MAT – 0'-6"
FRONT WALL, INNER MAT – 0'-8"
UPPER SLAB, LOWER MAT – 1'-0"
UPPER SLAB, UPPER MAT – 1'-0 3/4"
GUTTER – PLACE AS SHOWN

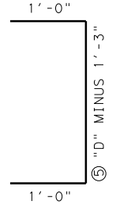
⑤ BASED ON 6" CURB HEIGHT. ADJUST FOR OTHER CURB HEIGHTS.



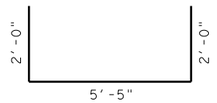
#4 BARS H



#4 BARS J



#4 BARS K

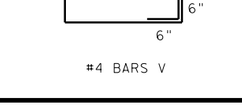


#5 BARS L

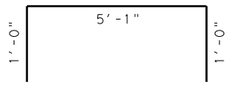
"L" + 11'-8"
#4 BARS M
PLACE AS SHOWN

⑤ "D" MINUS 1'-8" (N1)
5'-6" (N2)
#4 BARS N

5'-8"
#4 BARS P
PLACE AS SHOWN

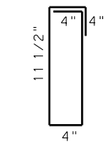


#6 BARS R
PLACE AS SHOWN

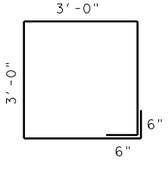


#6 BARS S
PLACE AS SHOWN

5'-6"
#6 BARS T
PLACE AS SHOWN



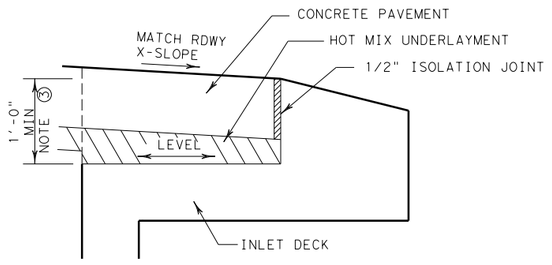
#4 BARS U



#4 BARS V

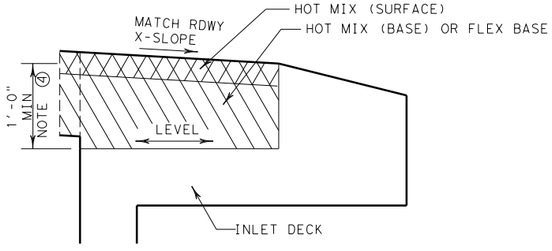
BARS W:
6 TOTAL TO BE PLACED AT 16" SPACING ALONG GUTTER SIDE AND INLET SIDE OF RING. (3 EACH SIDE)

#4 BARS W



③ THICKNESS OF CONCRETE PAVEMENT PLUS HOT MIX UNDERLAYMENT; IF LESS THAN 1'-0", INCREASE DEPTH OF HOT MIX UNDERLAYMENT.

INLET ADJACENT TO CONCRETE PAVEMENT



④ THICKNESS OF HOT MIX (SURFACE) PLUS HOT MIX (BASE) OR FLEX BASE. IF LESS THAN 1'-0", INCREASE DEPTH OF HOT MIX (BASE) OR FLEX BASE OVER INLET DECK.

MAXIMUM THICKNESS = 1'-6"

PLACE FLEX BASE IN MINIMUM 4" LIFTS

INLET ADJACENT TO HOT MIX PAVEMENT

GENERAL NOTES

1. DESIGNED FOR AASHTO LRFD HL-93 LOADING.
2. ALL CONCRETE FOR CAST-IN-PLACE STRUCTURES SHALL BE CLASS "C"; ALL CONCRETE FOR PRECAST STRUCTURES SHALL BE CLASS "H" (MINIMUM 5000 PSI DESIGN STRENGTH).
3. ALL REINFORCING STEEL SHALL BE GRADE 60.
4. STAGE I MAY BE EITHER CAST-IN-PLACE OR PRECAST. FABRICATE PRECAST STRUCTURES USING REBAR AS DETAILED HEREON, WITH BARS C, D, E, F AND J TO BE INCLUDED WITH STAGE I. SPLICING OF BARS WILL NOT BE PERMITTED, EXCEPT AS NOTED.
5. STAGE II SHALL BE CAST-IN-PLACE.
6. CHAMFER ALL EXPOSED CORNERS 3/4", EXCEPT WHERE NOTED OTHERWISE.
7. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTERS OF BARS.
8. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMMODATE STORM DRAIN PIPE.
9. FOR PIPE AND BOX CONNECTIONS TO PRECAST INLETS, SEE STANDARD DETAIL SHEET PBGC.
10. INSTALL RING AND COVER AT OUTFALL END OF INLET, UNLESS OTHERWISE DIRECTED. CAST IRON RING AND COVER SHALL CONFORM TO ITEM 471. SEE STANDARD MDD (FTW) FOR RING AND COVER DETAILS.
11. DEPTHS OTHER THAN THOSE SHOWN MAY BE USED WHENEVER NECESSARY, UP TO A MAXIMUM DEPTH OF 15'. QUANTITIES FOR OTHER DEPTHS MAY BE DETERMINED BY INTERPOLATION.
12. DO NOT COMMENCE WITH STAGE II CONSTRUCTION UNTIL CONCRETE PAVEMENT AND CURB, OR CONCRETE CURB AND GUTTER CONSTRUCTION IS COMPLETED AT THE INLET SITE.
13. INSTALL A TEMPORARY WOOD COVER AFTER STAGE I IS COMPLETED, TO REMAIN IN PLACE UNTIL STAGE II CONSTRUCTION BEGINS.
14. THE LOCATION OF INLET AS SHOWN IN THE PLAN REFERS TO THE CONTROL POINT AT THE FACE OF CURB AND MID-POINT OF THE INLET.
15. IF CONCRETE PAVEMENT IS PLACED WITHOUT UNDERLAYMENT, PLACE BOND BREAKER (3 LAYERS OF 30# ROOFING FELT OR 1/2" EXPANSION JOINT MATERIAL) BETWEEN INLET DECK AND CONCRETE PAVEMENT.
16. PLACE A SEALED 1/2" ISOLATION JOINT ALONG ALL VERTICAL FACES ABUTTING CONCRETE PAVEMENT, CURB, CURB AND GUTTER, OR SIDEWALK. USE CLASS 5 OR 8 JOINT SEALANT TO SEAL THE JOINT. SEE STANDARD JS (FTW) FOR ADDTIONAL INFORMATION.

Texas Department of Transportation

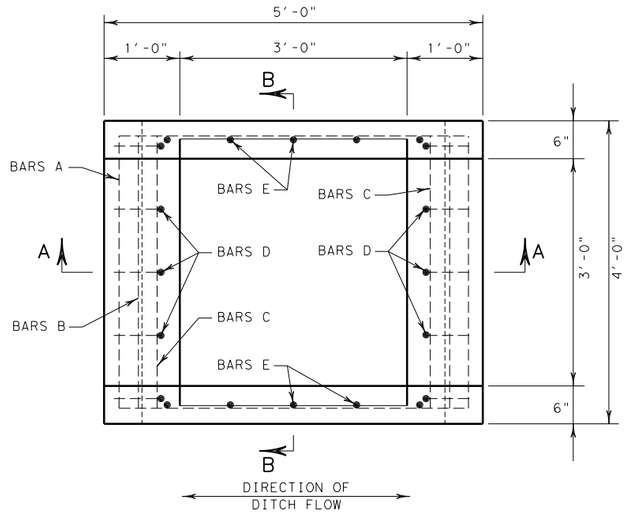
Fort Worth District Standard

CURB INLET UNDER PAVEMENT FOR USE WITH TYPE II CURB I-CU (FTW)

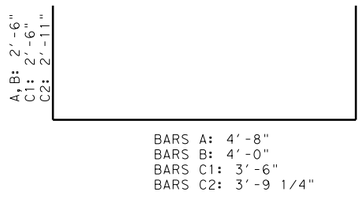
ORIGINAL DRAWING: 05/2019	icu-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
DATE	REVISIONS	6			
05/2019	REPLACES C1-2-08(FW)	STATE	STATE DIST.NO.	COUNTY	
04/2020	ADD MAX CONDUIT SIZE TABLE	TEXAS	FTW		
11/2020	REVISE JOINT NOMENCLATURE	CONT.	SECT.	JOB	HIGHWAY NO.
			PARKER		155

©2020 by Texas Department of Transportation; All Rights Reserved

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.

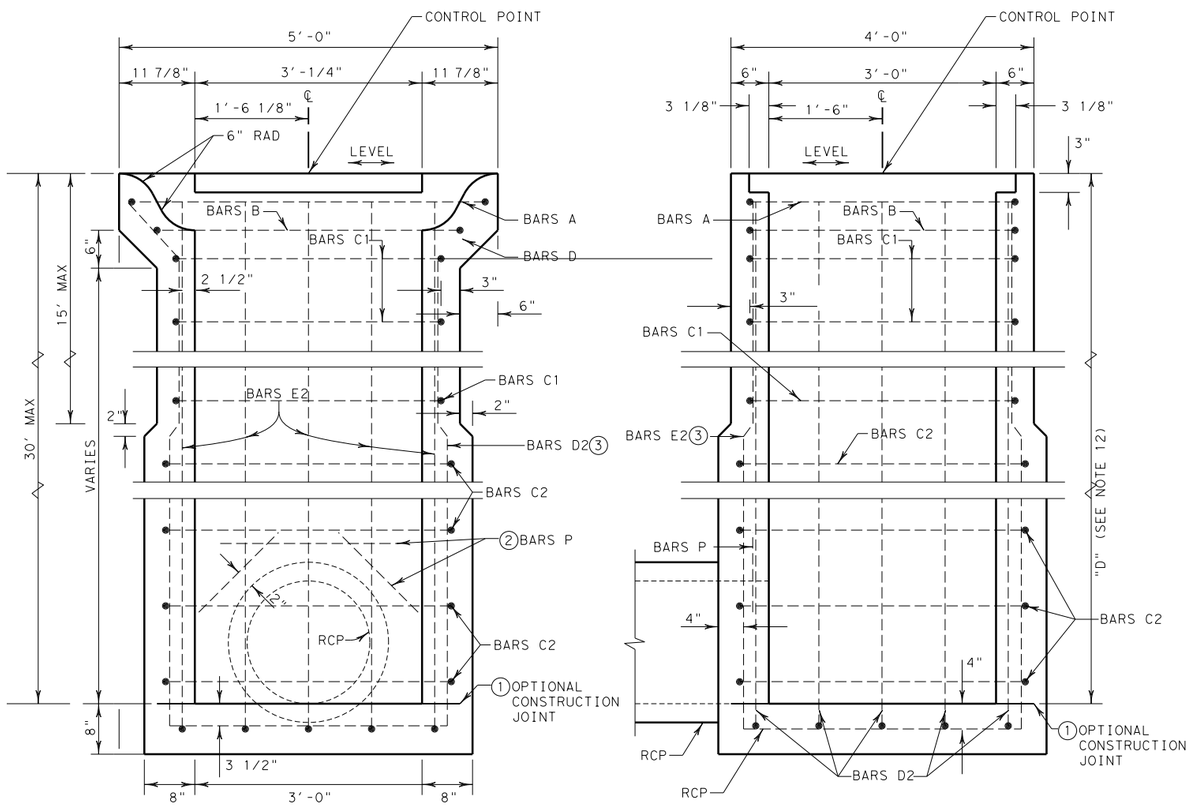


PLAN VIEW
N.T.S.



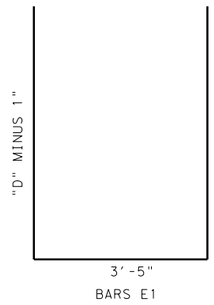
BARS A: 4'-8"
BARS B: 4'-0"
BARS C1: 3'-6"
BARS C2: 3'-9 1/4"

TYPE AD INLET (FREE-STANDING) BILL OF REINFORCING STEEL										
			"D" = 4.00'			"D" = 15.00'			"D" = 30.00'	
BAR	SIZE	SPACING (IN)	NO.	LENGTH (FT)	WT (LBS)	NO.	LENGTH (FT)	WT (LBS)	NO.	LENGTH (FT)	WT (LBS)
A	#4	-	2	9.667	13	2	9.667	13	2	9.667	13
B	#4	-	2	9.000	12	2	9.000	12	2	9.000	12
C1	#4	10	8	8.500	45	30	8.500	170	30	8.500	170
C2	#5	12	-		0	-		0	30	9.604	301
D1	#4	10	5	11.500	38	5	33.500	112	-		0
D2	#5	10	-		0	-		0	10	32.875	343
E1	#4	10	5	11.250	38	5	33.250	111	-		0
E2	#5	10	-		0	-		0	10	33.125	345
SUMMARY OF QUANTITIES											
TOTAL REINFORCING STEEL (LBS)					146			418			1184
CLASS "C" CONCRETE (CY)					1.52			4.38			9.87
ADJUSTMENT FOR DEPTHS OTHER THAN THOSE SHOWN ABOVE											
FOR "D" = 4' TO 15'						FOR "D" = 15' TO 30'					
REINFORCING STEEL (LBS)			146 + 25 #/LF			REINFORCING STEEL (LBS)			571+ 41 #/LF		
CLASS "C" CONCRETE (CY)			1.52 + 0.26 CY/LF			CLASS "C" CONCRETE (CY)			4.44 + 0.36 CY/LF		

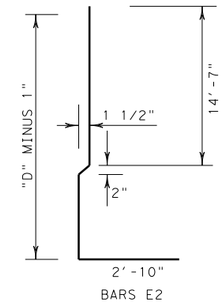


SECTION A–A

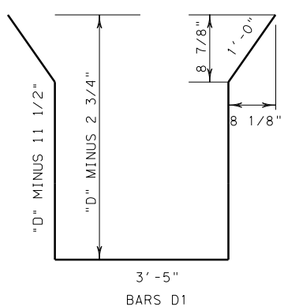
SECTION B–B



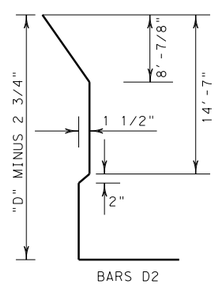
BARS E1



BARS E2



BARS D1



BARS D2

①CIP CONSTRUCTION ONLY

②BARS P LENGTH = PIPE O.D. + 9"
PLACE 3 BARS P AS SHOWN AT EACH PIPE OPENING WITH 2" CLEAR COVER OVER PIPE POSITIONED AS NEEDED TO PROVIDE 2" CLEAR COVER AT WALLS

③BARS D2 AND E2 SHOWN; BARS D1 AND E1 ARE FOR DEPTHS LESS THAN 15'

GENERAL NOTES

1. DESIGNED FOR AASHTO LRFD HL 93 LOADING. TYPE AD INLETS ARE NOT INTENDED FOR USE IN AREAS DESIGNATED FOR TRAFFIC OR PEDESTRIAN ACCESS. INLETS MAY BE USED IN DITCHES LOCATED WITHIN THE ROADWAY CLEAR ZONE.
2. PRECAST UNITS WITH EQUIVALENT REINFORCING MAY BE FURNISHED. SUBMIT SEALED ENGINEERING CALCULATIONS AND DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
3. USE CLASS "C"CONCRETE FOR CAST-IN-PLACE STRUCTURES; USE CLASS "H" (MINIMUM 5000 PSI COMPRESSIVE STRENGTH) CONCRETE FOR PRECAST STRUCTURES.
4. USE GRADE 60 STEEL FOR ALL REINFORCING.
5. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTERS OF BARS.
6. FIELD CUT OR BEND BARS AS NECESSARY TO ACCOMMODATE STORM DRAIN PIPE. DO NOT USE WITH STORM DRAIN PIPE LARGER THAN 24" NOMINAL DIAMETER.
7. FABRICATE GRATES FROM WELDED STEEL, IN ACCORDANCE WITH ITEM 471.
8. LOCATION OF INLET AS SHOWN IN THE PLANS REFERS TO THE CONTROL POINT SHOWN HEREON AND DETAILED ON THE "DRAINAGE STRUCTURE CONTROL DATA" SHEET. FOR INLET RISERS LOCATED ON BASE STRUCTURE, LOCATE AND POSITION BASE AS DETAILED ON THE DRAINAGE STRUCTURE CONTROL DATA SHEET, OR AS DIRECTED. FOR INLETS LOCATED ON BOX CULVERT LESS THAN 4' SPAN, USE WITH BASE STRUCTURE.
9. CONSTRUCT INLET WITH LEVEL TOP, TO ALIGN WITH DITCHES OR AS DIRECTED. ALIGN INLET SO THAT GRATE VANES ARE PARALLEL TO DITCH FLOW.
10. FABRICATE BOTTOM OF PRECAST INLET TOP TO MATCH BASE OR RISER.
11. FOR PLACEMENT ON BOX SEWER, SEE STANDARD MI-CBC (FTW). DO NOT USE WITH BOX CULVERTS WITH LESS THAN 4' SPAN. FOR USE WITH BOX CULVERTS LESS THAN 4' SPAN, BASE AND RISER MUST BE USED. SEE STANDARD MI-B&R (FTW) FOR ADDITIONAL INFORMATION.
12. MAXIMUM DEPTH "D" FOR CAST-IN-PLACE FREE-STANDING INLETS IS 30', WITH INCREASED WALL THICKNESS AND ADDITIONAL REINFORCEMENT FOR DEPTHS GREATER THAN 15', AS DETAILED. MAXIMUM DEPTH "D" FOR PRECAST INLETS, OR "C" FOR RISERS ON BASE STRUCTURES, IS 25' TO THE TOP OF THE BASE SLAB, IN ACCORDANCE WITH STANDARD MI-B&R (FTW). DETERMINE QUANTITIES FOR DEPTHS OTHER THAN THOSE SHOWN HEREON BY INTERPOLATION.
13. FOR PIPE CONNECTIONS TO PRECAST STRUCTURES, SEE STANDARD DETAIL SHEET, PBGC.

TYPE AD – FREE-STANDING INLET
MAXIMUM CONDUIT SIZE = 24" DIA
N.T.S.

©2022 by Texas Department of Transportation;
All Rights Reserved

Texas Department of Transportation

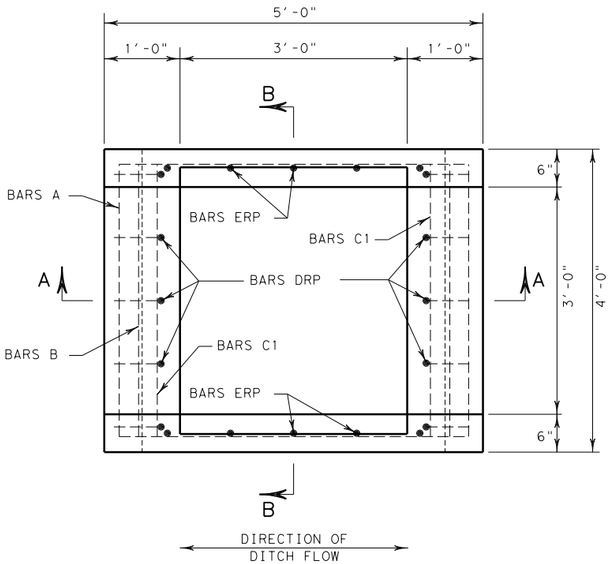
Fort Worth District Standard

AREA-DITCH INLET TYPE AD I-AD (FTW)

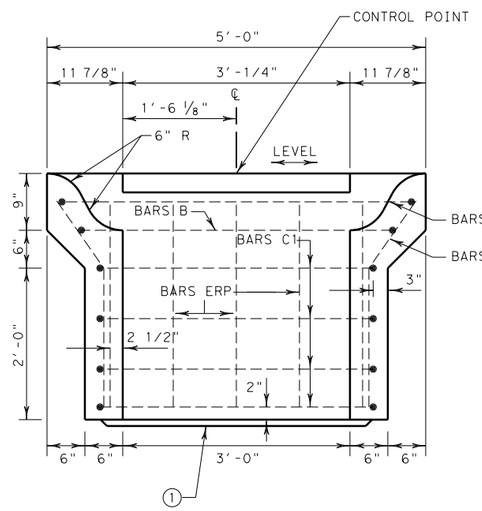
ORIGINAL DRAWING: 05/2019	iad-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
DATE	REVISIONS	6			156
05/2019	REPLACES DI-1-02(FW)	STATE	STATE DIST.NO.	COUNTY	
07/2022	REVISE NOTES AND ADD DETAILS FOR USE WITH PRECAST BASE & RISER	TEXAS	FTW	PARKER	
		CONT.	SECT.	JOB	HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 7:55:43 PM
$PATH$
\\icsM-fs65\icsM_projects\CV-0015-TxDot-IAD-FTW1.dgn
\\icsM-fs65\icsM_projects\work_dir\5618\54723_24\CV-109-TS-Txdot-IAD FTW-1.dgn
8/27/2026 7:55:43 PM

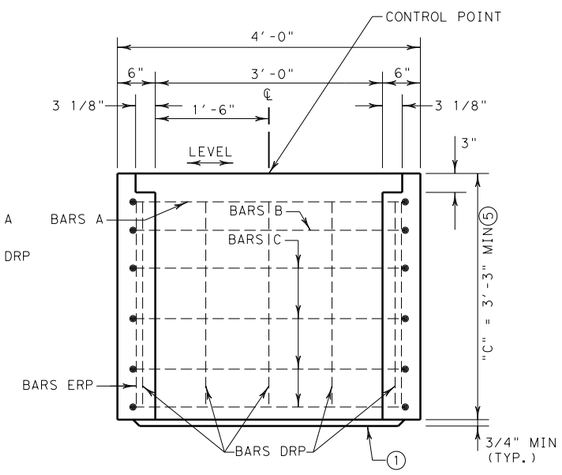
DISCLAIMER :
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



PLAN VIEW
N.T.S.



SECTION A–A

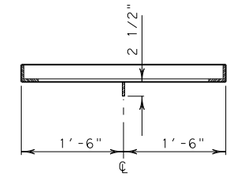


1 SEE GENERAL NOTE 10

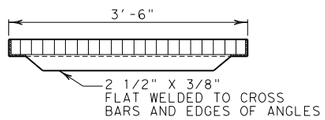
5 MINIMUM TO RESIST TIPPING

SECTION B–B

TY AD INLET (PRECAST RISER ONLY) BILL OF REINFORCING STEEL					
			"C" = 3.25'		
BAR	SIZE	SPACING (IN)	NO.	LENGTH (FT)	WT (LBS)
A	#4	-	2	9.667	13
B	#4	-	2	9.000	12
C1	#4	10	6	8.500	34
DRP	#4	10	10	2.833	19
ERP	#4	10	10	2.667	18
SUMMARY OF QUANTITIES					
TOTAL REINFORCING STEEL (LBS)					96
CL "H" CONC (F'c = 5000 PSI) (CY)					0.96
ADDITIONAL QUANTITIES					
REINFORCING STEEL (LBS/LF)					25
CLASS "H" CONC (CY/LF)					0.26

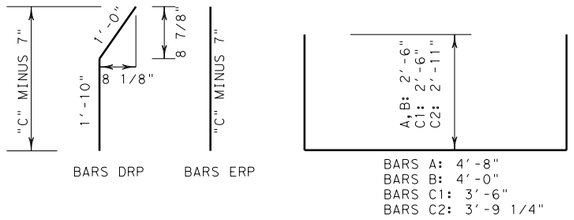


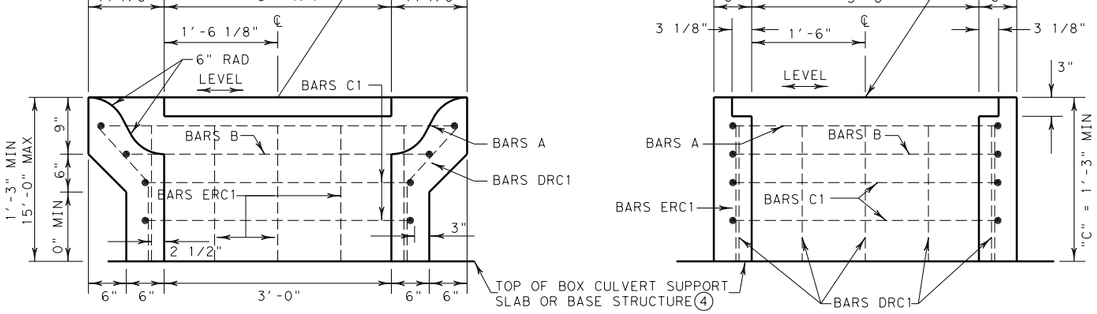
SECTION C-C



SECTION D-D

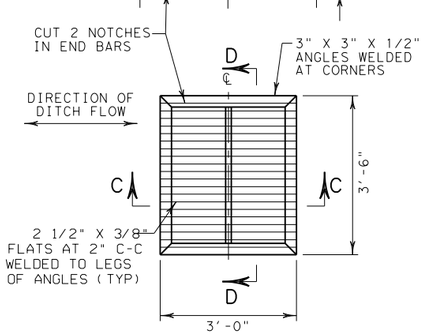
PRECAST INLET TOP
FOR USE WITH PRECAST RISER
SEE MI-B&R (FTW)
N.T.S.





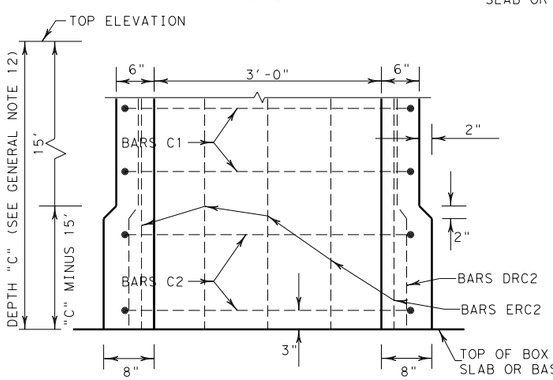
SECTION A–A

TYPE AD INLET (CIP RISER ONLY) BILL OF REINFORCING STEEL										
			"C" = 1.25'			"C" = 15.00'			"C" = 30.00'	
BAR	SIZE	SPACING (IN)	NO.	LENGTH (FT)	WT (LBS)	NO.	LENGTH (FT)	WT (LBS)	NO.	LENGTH (FT)	WT (LBS)
A	#4		2	9.667	13	2	9.667	13	2	9.667	13
B	#4		2	9.000	12	2	9.000	12	2	9.000	12
C1	#4	10	2	8.500	11	30	8.500	170	30	8.500	170
C2	#5	12			0			0	30	9.604	301
DRC1	#4	10	10	1.000	7	10	14.75	99			0
DRC2	#5				0			0	10	29.927	312
ERC1	#4	10	10	0.833	6	10	14.625	98			0
ERC2	#5				0			0	10	29.625	309
SUMMARY OF QUANTITIES											
TOTAL REINFORCING STEEL (LBS)				49			392				1117
CLASS "C" CONCRETE (CY)				0.41			3.98				9.41
ADJUSTMENT FOR DEPTHS OTHER THAN THOSE SHOWN ABOVE											
FOR "D" = 4' TO 15'						FOR "D" = 15' TO 30'					
REINFORCING STEEL (LBS) 49 + 25 #/LF						REINFORCING STEEL (LBS) 571+ 41 #/LF					
CLASS "C" CONCRETE (CY) .41 + 0.26 CY/LF						CLASS "C" CONCRETE (CY) 3.98 + 0.36 CY/LF					

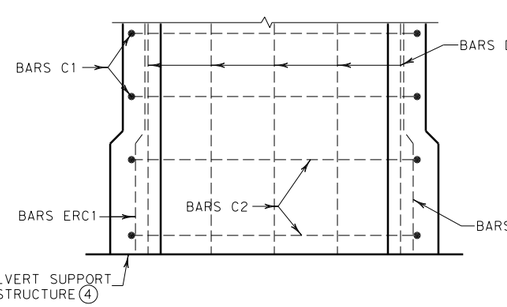


PLAN VIEW

GRATE DETAIL
N.T.S.



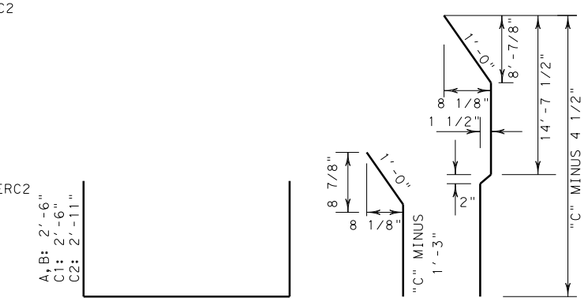
SECTION A–A



SECTION B–B

CAST-IN-PLACE INLET RISER
FOR PLACEMENT DIRECTLY ON BOX CULVERT OR BASE DO NOT USE WITH BOX CULVERT SPAN LESS THAN 4' FOR BOX CULVERT LESS THAN 4' SPAN, SEE MI-B&R
N.T.S.

4 SEE STANDARD MI-CBC (FTW) FOR CONNECTION TO BOX CULVERT AND SUPPORT SLAB DETAILS. SEE STANDARD MI-B&R (FTW) FOR CONNECTION TO BASE STRUCTURE.



©2022 by Texas Department of Transportation; All Rights Reserved

SHEET 2 OF 2 SHEETS

Texas Department of Transportation

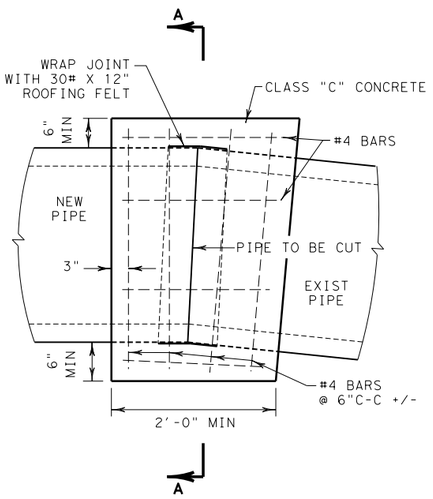
Fort Worth District Standard

AREA-DITCH INLET TYPE AD
I-AD (FTW)

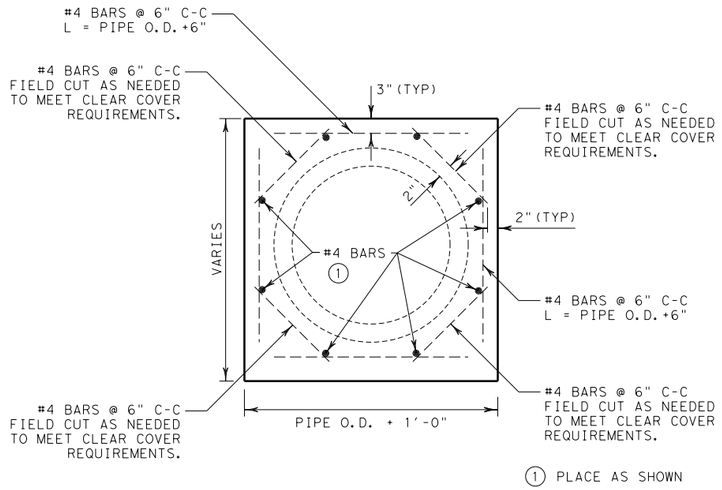
ORIGINAL DRAWING: 05/2019	i-ad-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		157
05/2019	REPLACES DI-1-02(FW)	STATE	STATE DIST.NO.	COUNTY
07/2022	REVISE NOTES AND ADD DETAILS FOR USE WITH PRECAST BASE & RISER	TEXAS	FTW	PARKER
		CONT.	SECT.	JOB / HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:19:02 PM
$PATH$
\\icsM-fs03\projects\work dir\5618\54723_25\CV-109-TS-Txdot-IAD FTW-2.dgn
CV-109-TS-Txdot-IAD FTW-2.dgn

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.



PLAN/ELEVATION



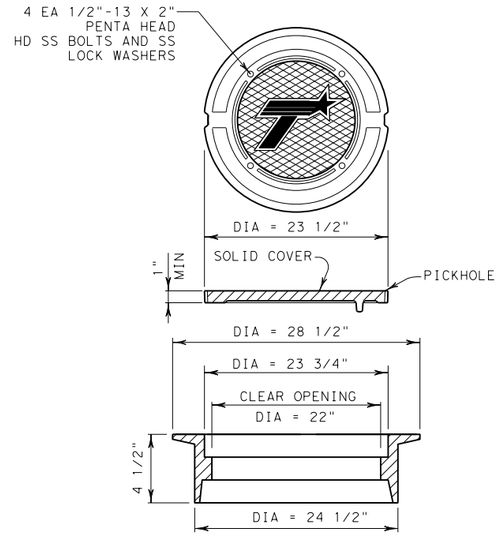
SECTION A-A

PIPE COLLAR GENERAL NOTES

1. THE CONTRACTOR SHALL TAKE STEPS TO ENSURE A SMOOTH JOINT ALONG THE INSIDE WALL OF PIPE.
2. ANY SPILLAGE OF CONCRETE THROUGH THE JOINT SHALL BE REMOVED AND THE INSIDE PIPE SURFACES SMOOTHED AS DIRECTED BY THE ENGINEER.
3. PIPE COLLARS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 464.

PIPE COLLAR DETAIL

FOR HORIZONTAL OR VERTICAL PLACEMENT
N.T.S.



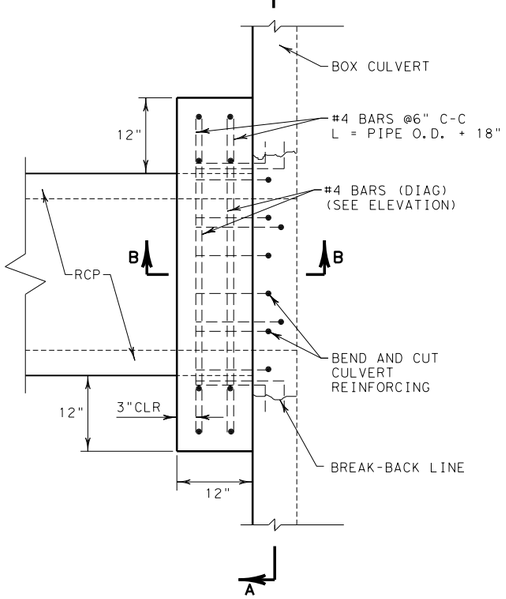
RING AND COVER DETAILS

MANHOLES AND CURB INLETS
N.T.S.

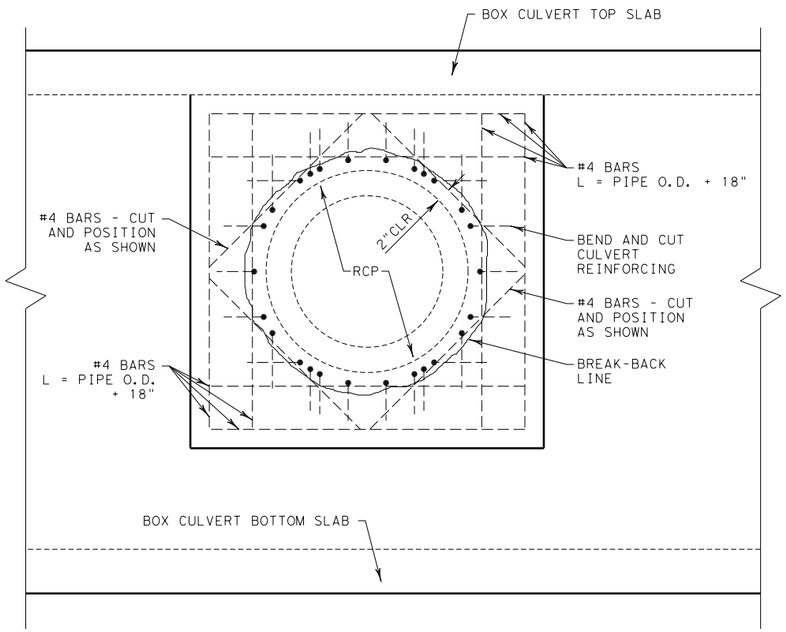
RING AND COVER SHALL CONFORM TO THE REQUIREMENTS OF ITEM 471 AND SHALL BE INCLUDED IN THE CURRENT TXDOT "APPROVED CAST IRON PRODUCTS SHEETS"

DIMENSIONS SHOWN ARE APPROXIMATE; ACTUAL DIMENSIONS PER MANUFACTURE/FABRICATOR.

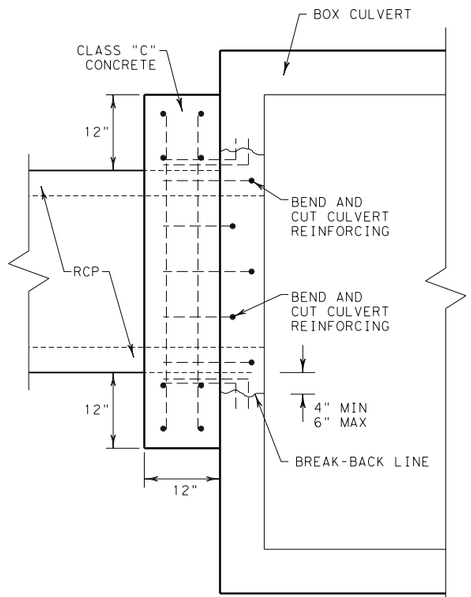
IF RING AND COVER ARE LOCATED IN PAVEMENT; SECURE COVER WITH BOLTS AS SHOWN.



PLAN VIEW



SECTION A-A



SECTION B-B

PIPE STUB-IN GENERAL NOTES

1. SAW CUT A MAXIMUM 1/2" DEPTH AT BREAK-BACK LINE. USE REMOVAL METHODS THAT WILL NOT DAMAGE REMAINING CONCRETE OR CULVERT REINFORCING.
2. EXPOSE AND CLEAN BOX CULVERT REINFORCING. BEND BARS INTO PROPOSED CONNECTION AND TIE TO CONNECTION REINFORCING.
3. ROUGHEN AND CLEAN EXISTING CONCRETE SURFACES THAT ARE IN CONTACT WITH NEW CONCRETE BEFORE PLACING FORMS.
4. MATERIAL & LABOR FOR PIPE/BOX CONNECTIONS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO ITEMS 462 AND 464.

PIPE STUB-IN CONNECTION TO BOX CULVERT OR EXISTING DRAINAGE STRUCTURE

N.T.S.

©2022 by Texas Department of Transportation; All Rights Reserved

Texas Department of Transportation

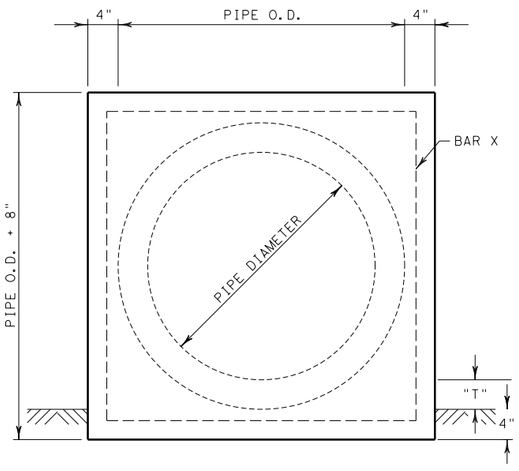
Fort Worth District Standard

MISCELLANEOUS DRAINAGE DETAILS
MDD(FTW)

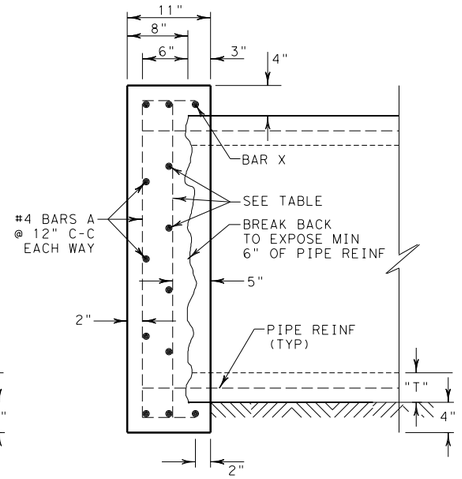
ORIGINAL DRAWING: 05/2019	mdd-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		158
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
07/2022	REVISE AND CORRECT RING AND COVER NOTES	TEXAS	FTW	PARKER
		CONT.	SECT.	JOB / HIGHWAY NO.

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 7:55:19 PM
$PATH$
\\icsM-fs650\FTS\Projects\CVG_pdf_work_dir\5618\54723_26\CV-109-TS-Txdot-MDD FTW-1.dgn
CV-109-TS-Txdot-MDD FTW-1.dgn

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.

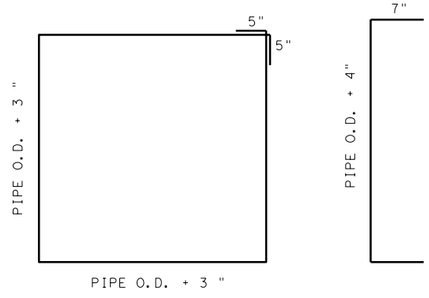


FRONT ELEVATION



SIDE ELEVATION

INNER REINFORCING SIZE/SPACING		
PIPE DIA(IN)	MAXIMUM DEPTH	
	15'	30'
<48	#4 @ 12" C-C	#4 @ 12" C-C
60	#4 @ 12" C-C	#4 @ 10" C-C
72	#4 @ 12" C-C	#5 @ 10" C-C
84	#4 @ 10" C-C	#5 @ 8" C-C



#4 BAR X

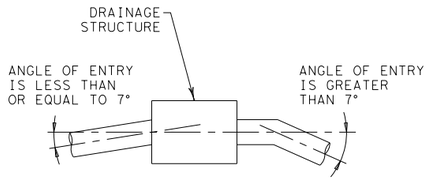
#4 BAR A

PIPE END CAP GENERAL NOTES

1. "T" = PIPE WALL THICKNESS.
2. ALL CONCRETE SHALL BE CLASS "C".
3. ALL REINFORCING STEEL SHALL BE GRADE 60.
4. OCTAGONAL PLUG MAY BE USED IN LIEU OF SQUARE. PROVIDE 4" MINIMUM COVER OVER OUTSIDE OF PIPE. DIMENSIONS OF PIPE PLUG AND REINFORCING TO BE AS APPROVED.

DRAINAGE PIPE END CAP OR PLUG DETAILS

N.T.S.

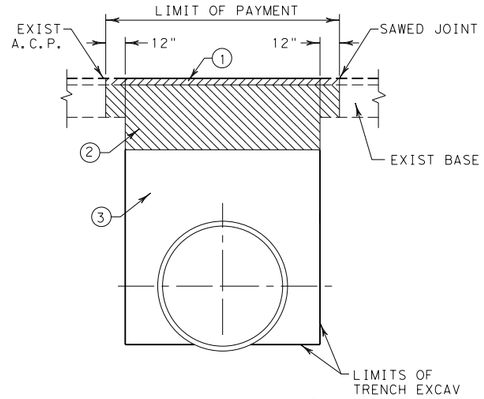


CONNECT PIPES WITHIN 7° OF NORMAL TO INLET OR MANHOLE. IF NECESSARY, USE PIPE ELBOW OR CURVED APPROACH ALIGNMENT TO STAY WITHIN THIS LIMIT.

PIPE CONNECTION

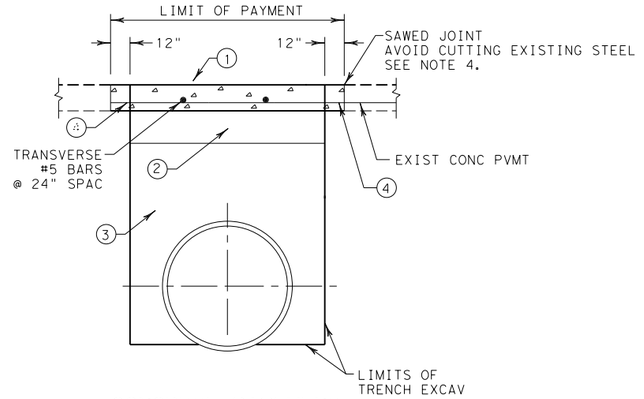
N.T.S.

1. APPROX 2" HOT MIX, TYPE C, OR AS DIRECTED.
2. APPROX 10" HOT MIX BASE, TYPE B, OR AS DIRECTED.
3. CEMENT STABILIZED BACKFILL IN ACCORDANCE WITH ITEM 400.3.3.1, 400.3.3.2, 400.3.3.3., AND 400.3.3.4.



ASPHALT PAVEMENT

1. CLASS "A", "P", OR "HES" CONCRETE PAVEMENT. MATCH EXISTING PAVEMENT DEPTH. USE CLASS "HES" IF OPENING TO TRAFFIC LESS THAN 72 HOURS AFTER PLACEMENT.
2. 4" COLD MIX ASPHALT BASE. PLACE BASE MATERIAL IN ACCORDANCE WITH ITEM 361.2.2.2.
3. CEMENT STABILIZED BACKFILL IN ACCORDANCE WITH ITEM 400.3.3.1, 400.3.3.2, 400.3.3.3., AND 400.3.3.4.
4. AT CONTRACTOR'S OPTION, USE FULL-DEPTH SAW CUT AND TIE TO EXISTING PAVEMENT IN ACCORDANCE WITH ITEM 361.4.2. FOR PARTIAL DEPTH SAW CUT, EXPOSE MINIMUM 8" OF LONGITUDINAL REINFORCING AND CONSTRUCT 8" WELDED LAP (MATCH LONGITUDINAL PAVEMENT REINFORCEMENT).



CONCRETE PAVEMENT

CUTTING AND RESTORING PAVEMENT DETAILS

N.T.S.

CUTTING AND RESTORING PAVEMENT GENERAL NOTES

1. HOT MIX OR CONCRETE PAVEMENT WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO CUTTING AND RESTORING PAVEMENT.
2. CONCRETE CURB OR CURB AND GUTTER WILL BE INCLUDED IN AREA OF "CUTTING AND RESTORING PAVEMENT". CONSTRUCT CURB OR CURB AND GUTTER ACCORDING TO PLAN DETAILS, OR AS DIRECTED. REMOVAL AND REPLACMENT OF CONCRETE CURB OR CURB AND GUTTER WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO CUTTING AND RESTORING PAVEMENT.
3. CEMENT STABILIZED BACKFILL WILL BE MEASURED AND PAID FOR IN ACCORDANCE WITH ITEM 400.
4. SEE STANDARD JS (FTW) FOR JOINT SEALING DETAILS.
5. "NON-EXCAVATABLE" FLOWABLE BACKFILL, AS DEFINED BY ITEM 401, TABLE 2, MAY BE USED AS A SUBSITITUTE FOR CEMENT STABILIZED BACKFILL, WITH THE FOLLOWING CONSTRAINTS:
   a). PLACE FLOWABLE FILL IN LIFTS NOT EXCEEDING 2 FEET IN DEPTH; PLACE EACH SUCCESSIVE LIFT WHEN THE PREVIOUS LIFT HAS STIFFENED/HARDENED (HAS LOST ITS FLOWABILITY).
   b). NO ADJUSTMENT IN PAYMENT WILL BE MADE FOR SUBSTITUTION OF FLOWABLE FILL IN LIEU OF CEMENT STABILIZED BACKFILL.

Texas Department of Transportation

Fort Worth District Standard

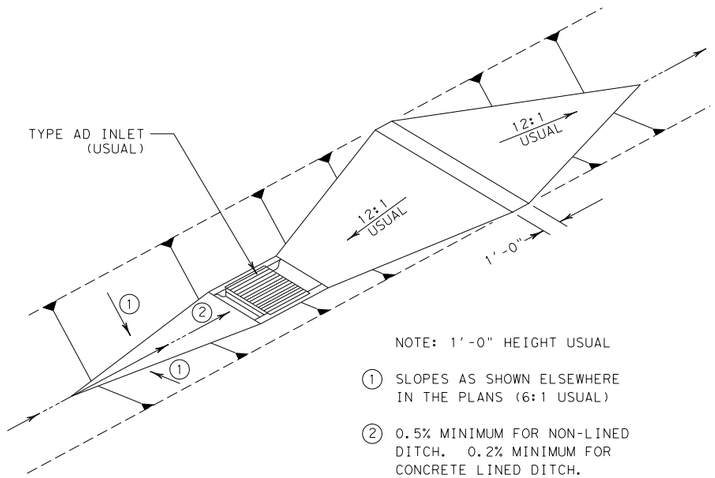
MISCELLANEOUS DRAINAGE DETAILS
MDD(FTW)

ORIGINAL DRAWING: 05/2019	mdd-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		159
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
07/2022	REVISE CUT & RESTORE PAVEMENTS FOR CSB & FLOWABLE FILL; ALLOW OCTAGONAL PIPE PLUG; EDIT GENERAL NOTES	TEXAS	FTW	PARKER
		CONT.	SECT.	JOB / HIGHWAY NO.

©2022 by Texas Department of Transportation; All Rights Reserved

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:02:07 PM
$PATH$ 8/27/2026
\\icsM-ifs\projects\HCS_pdf_work_dir\5618\54723_27\CV-109-TS-Txdot-MDD FTW-2.dgn
CV-109-TS-Txdot-MDD FTW-2.dgn

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.

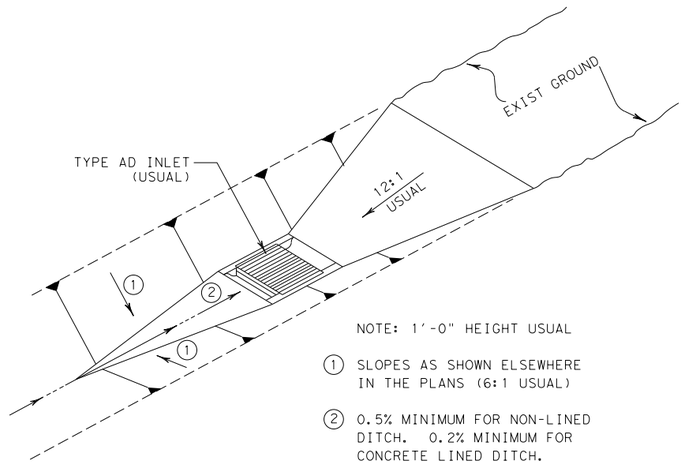


NOTE: 1'-0" HEIGHT USUAL

(1) SLOPES AS SHOWN ELSEWHERE IN THE PLANS (6:1 USUAL)

(2) 0.5% MINIMUM FOR NON-LINED DITCH. 0.2% MINIMUM FOR CONCRETE LINED DITCH.

CONTINUOUS DITCH

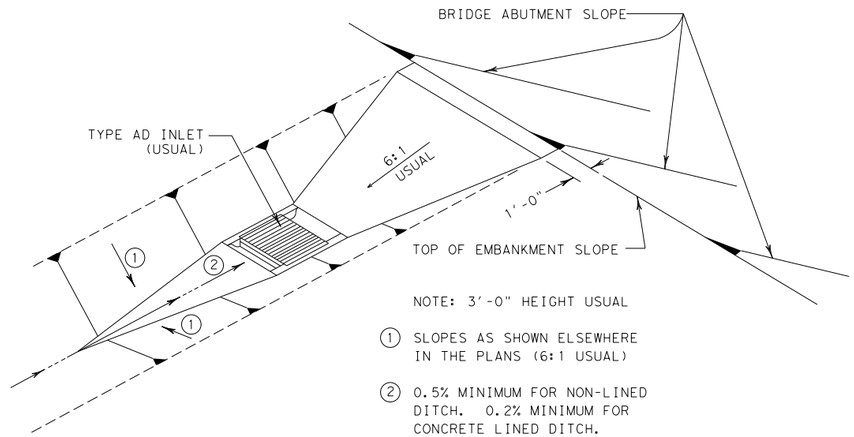


NOTE: 1'-0" HEIGHT USUAL

(1) SLOPES AS SHOWN ELSEWHERE IN THE PLANS (6:1 USUAL)

(2) 0.5% MINIMUM FOR NON-LINED DITCH. 0.2% MINIMUM FOR CONCRETE LINED DITCH.

DITCH TERMINATION



NOTE: 3'-0" HEIGHT USUAL

(1) SLOPES AS SHOWN ELSEWHERE IN THE PLANS (6:1 USUAL)

(2) 0.5% MINIMUM FOR NON-LINED DITCH. 0.2% MINIMUM FOR CONCRETE LINED DITCH.

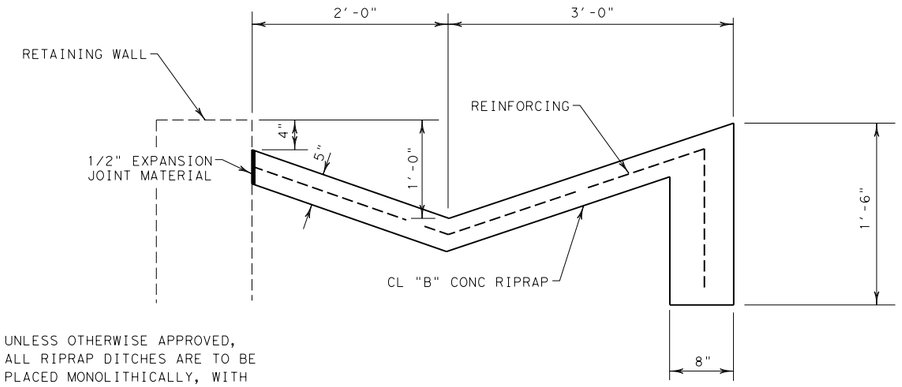
DITCH TERMINATION AT BRIDGE END

DITCH BLOCK GENERAL NOTES

1. DITCH BLOCK AND INLET LOCATIONS SHOWN ELSEWHERE IN THE PLANS.
2. DITCH BLOCKS WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

DITCH BLOCK DETAILS

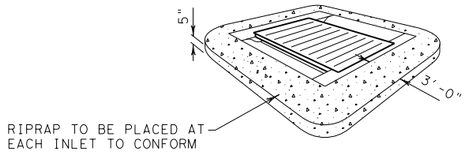
N.T.S.



UNLESS OTHERWISE APPROVED, ALL RIPRAP DITCHES ARE TO BE PLACED MONOLITHICALLY, WITH NO CONSTRUCTION JOINTS.

RIPRAP DITCH AT RETAINING WALL

N.T.S.



RIPRAP TO BE PLACED AT EACH INLET TO CONFORM TO ADJACENT SLOPES.
SINGLE INLET: 1 CY
DOUBLE INLET: 2 CY

TYPICAL RIPRAP APRON DETAIL

TYPE AD INLET SHOWN
TYPE AD-2 INLET IS SIMILAR

Texas Department of Transportation

Fort Worth District Standard

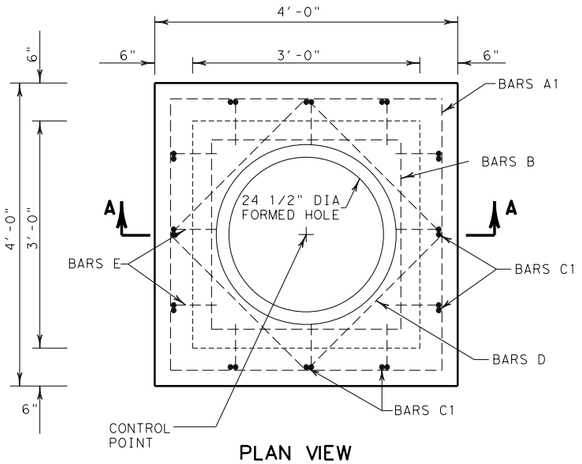
MISCELLANEOUS DRAINAGE DETAILS
MDD(FTW)

ORIGINAL DRAWING: 05/2019	mdd-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		160
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
07/2022	ADD NOTE FOR MONOLITHIC PLACEMENT OF RIPRAP DITCHES	TEXAS	FTW	PARKER
		CONT.	SECT.	JOB / HIGHWAY NO.

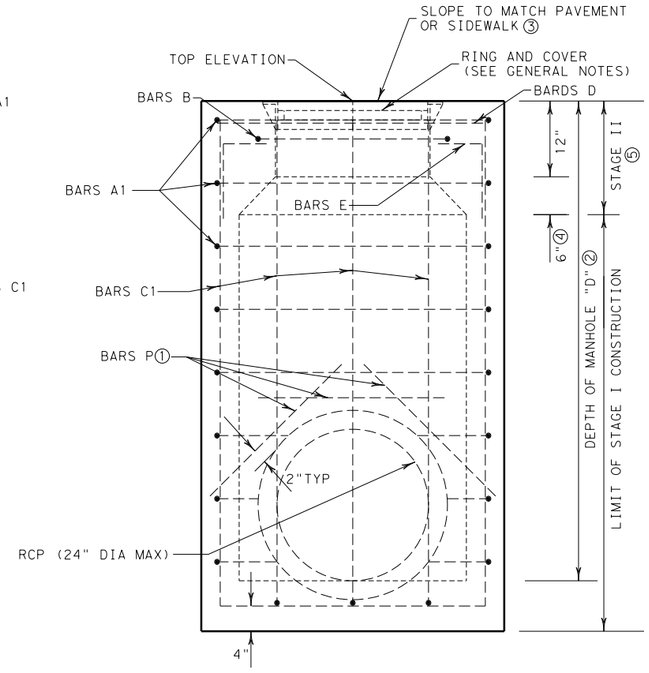
©2022 by Texas Department of Transportation; All Rights Reserved

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:04:21 PM
$PATH$ 8/27/2026
\\icsm-f4s6q02\ICS_pdf_work_dir\5618\54723_28\CV-109-TS-Txdot-MDD FTW-3.dgn
CV-109-TS-Txdot-MDD FTW-3.dgn

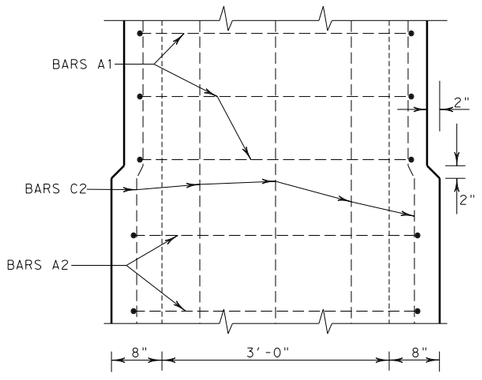
DISCLAIMER :
THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



PLAN VIEW
(SHOWING "D" >/= 15")



SECTION A–A
(SHOWING "D" >/= 15")



WALL THICKNESS TRANSITION DETAIL
FOR DEPTHS 15"–30"

① BARS P LENGTH = PIPE O.D. + 9"
PLACE 3 BARS P AS SHOWN, AT EACH PIPE OPENING, WITH 2" CLEAR COVER OVER PIPES.
POSITION AS NEEDED TO PROVIDE 2" CLEAR COVER AT WALLS.

② SEE WALL THICKNESS TRANSITION DETAIL FOR DEPTHS 15'-30'.

③ LEVEL IF NOT LOCATED IN PAVEMENT OR SIDEWALK.

④ TRANSITION FROM 24 1/2" DIA FORMED HOLE TO 3' SQUARE MANHOLE.

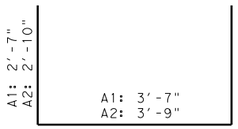
⑤ STAGE II DEPTH = 18" IF OUTSIDE PAVEMENT; DEPTH TO TOP OF SUBGRADE IF UNDER PAVEMENT.

TABLE OF QUANTITIES - FREE-STANDING MANHOLE

Bar	Size	Spacing	D=4'-0"			D=10'-0"			D=20'-0"			D=30'-0"		
		(in)	No	Length	Wt	No	Length	Wt	No	Length	Wt	No	Length	Wt
A1	#4	10"	8	8.750	47	22	8.750	129	36	8.750	210	36	8.750	210
A2	#5	12"	0	0.000	0	0	0.000	0	10	9.416	98	30	9.416	295
B	#4	-	2	6.500	9	2	6.500	9	2	6.500	9	2	6.500	9
C1	#4	12"	6	11.667	47	6	23.667	95	0	0.000	0	0	0.000	0
C2	#5	12"	0	0.000	0	0	0.000	0	12	22.916	287	12	32.916	412
D	#4	-	4	2.500	7	4	2.500	7	4	2.500	7	4	2.500	7
E	#4	-	12	1.583	13	12	1.583	13	12	1.583	13	12	1.583	13
Total Steel - Lbs					122			251			624			945
Class "C" Concrete - CY					1.70			3.26			6.43			10.05

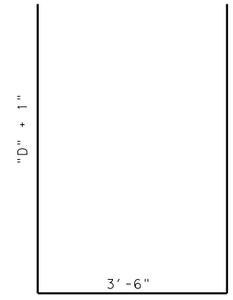
D=3' TO D=15'
Lbs Steel = 102 + 21.38 LD/Lf
CY Conc. = 1.44 + 0.259 CY/Lf

D=15' TO D=30'
Lbs Steel = 362 + 32.16 LD/Lf
CY Conc. = 4.55 + 0.362 CY/Lf

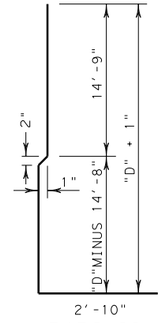


BARS A1 & A2

BARS B



BARS C1
("D"=</15')



BARS C2
("D"=15'-30')

BARS E

BARS D

SEE SHEET 2 OF 2 FOR GENERAL NOTES

TYPE A STORM DRAIN MANHOLE (FREE-STANDING)
MAXIMUM PIPE SIZE – 24" DIAMETER
N.T.S.

Texas Department of Transportation
Fort Worth District Standard

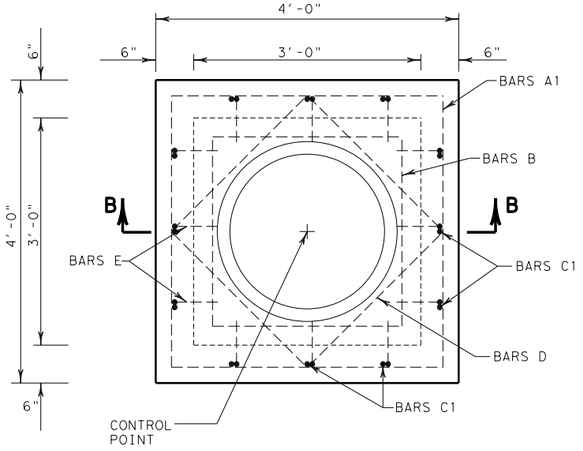
STORM DRAIN MANHOLE DETAILS
TYPE A
MH-SD (FTW)

ORIGINAL DRAWING: 05/2019	mhsd-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		
05/2019	NEW STANDARD	STATE	STATE DIST.NO.	COUNTY
11/2020	REVISE JOINT NOMENCLATURE	TEXAS	FTW	
07/2022	REVISE NOTES AND ADD DETAILS FOR USE WITH PRECAST BASE AND RISER	CONT.	SECT. JOB	HIGHWAY NO.
			PARKER	161

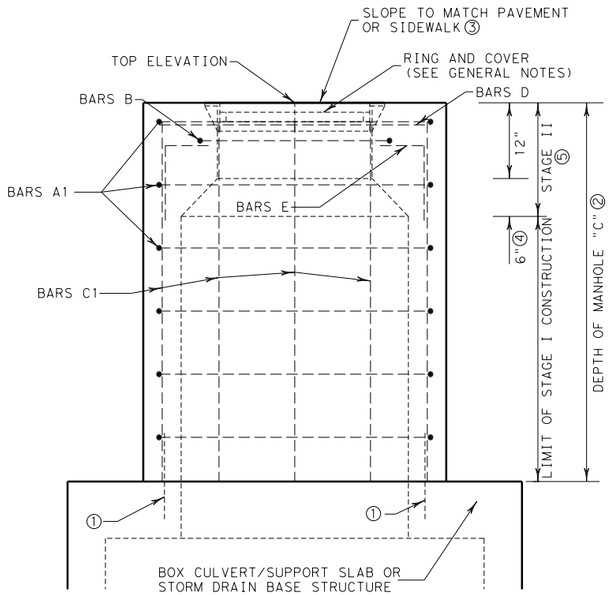
©2022 by Texas Department of Transportation; All Rights Reserved

http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:04:59 PM
$PATH$
\\icsM-fs\projects\Traffic\Projects\5618\54723_42\CV-109_TS_TxDot_MH-SD(FTW)_1.dgn
CV-109 TS TxDot MH-SD(FTW)_1.dgn
8/27/2026 VCS pdf version

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.



PLAN VIEW



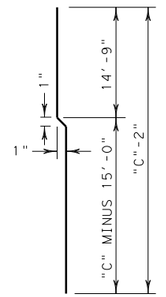
SECTION B–B
(SHOWING "D" >/= 15")

TABLE OF QUANTITIES - MANHOLE (RISER ONLY)													
Bar	Size	Spacing	C-1'-6"			C-10'-0"			C-20'-0"			C-30'-0"		
		(in)	No	Length	Wt	No	Length	Wt	No	Length	Wt	No	Length	Wt
A1	#4	10"	4	8.750	23	24	8.750	140	36	8.750	210	36	8.750	210
A2	#5	12"	0	0.000	0	0	0.000	0	10	9.416	98	30	9.416	295
B	#4	-	2	6.500	9	2	6.500	9	2	6.500	9	2	6.500	9
C1	#4	12"	0	0.000	0	6	9.833	39	0	0.000	0	0	0.000	0
C2	#5	12"	0	0.000	0	0	0.000	0	12	19.833	248	12	29.833	373
D	#4	-	4	2.500	7	4	2.500	7	4	2.500	7	4	2.500	7
E	#4	-	12	1.583	13	12	1.583	13	12	1.583	13	12	1.583	13
Total Steel - Lbs					51			208			585			906
Class "C" Concrete - CY					0.66			2.86			5.97			9.59

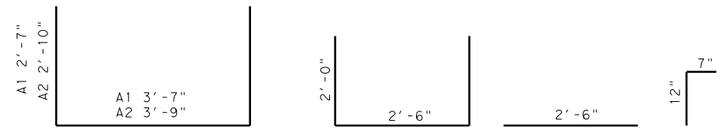
C=1'-6" TO C=15'
Lbs Steel = 51 + 14.03 Lb/Lf
CY Conc. = 0.66 + 0.259 CY/Lf

C=15' TO C=30'
Lbs Steel = 238 + 32.16 Lb/Lf
CY Conc. = 4.16 + 0.362 CY/Lf

BARS C1
("C"</=15')



BARS C2
("C"15'-30')



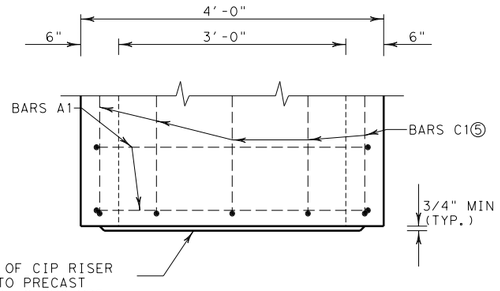
BARS A1 & A2 | BARS B | BARS D | BARS E

GENERAL NOTES:

1. DESIGNED FOR AASHTO LRFD HL 93 LOADING.
2. STAGE I MAY BE EITHER CAST-IN-PLACE OR PRECAST. IF PRECAST, A MINIMUM 2' DEPTH AT TOP OF STAGE I TO BE FABRICATED USING REBAR AS SHOWN, WITH BARS C1 AND/OR C2 TO BE INCLUDED WITH STAGE I. SPLICING OF BARS WILL NOT BE PERMITTED.
3. STAGE II SHALL BE CAST-IN-PLACE. CONSTRUCT TOP TO CONFORM TO SLOPE OF SURFACE. STAGE II MAY BE CAST MONOLITHICALLY WITH CONCRETE PAVEMENT. IF NOT CAST MONOLITHICALLY, PLACE A SEALED 1/2" ISOLATION JOINT AROUND THE TOP OF THE MANHOLE STRUCTURE, TO THE DEPTH OF CONCRETE PAVEMENT. USE CLASS 5 OR 8 JOINT SEALANT TO SEAL THE JOINT. SEE STANDARD JS (FTW) FOR ADDITIONAL INFORMATION.
4. USE CLASS "C" CONCRETE FOR CAST-IN-PLACE STRUCTURES; USE CLASS "H" CONCRETE (MINIMUM 5000 PSI DESIGN STRENGTH) FOR PRECAST STRUCTURES.
5. USE GRADE 60 STEEL FOR ALL REINFORCING.
6. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO THE CENTERS OF BARS.
7. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMMODATE STORM DRAIN PIPE.
8. FABRICATE CAST IRON RING AND COVER CONFORMING TO ITEM 471. SEE MISCELLANEOUS DRAINAGE DETAILS FOR RING AND COVER DETAILS.FOR MANHOLES LOCATED IN PAVEMENT, SECURE COVER WITH 4-1/2"-13X2" BOLTS.
9. FOR CAST-IN-PLACE STRUCTURES, A CONSTRUCTION JOINT MAY BE PLACED AT EACH 5' (MIN) INCREMENT OF DEPTH.
10. FOR PIPE OR BOX CONNECTIONS TO PRECAST STRUCTURES, SEE STANDARD PBGC.
11. MAXIMUM DEPTH "D" FOR CAST-IN-PLACE FREE-STANDING MANHOLE IS 30', WITH INCREASED WALL THICKNESS AND ADDITIONAL REINFORCEMENT FOR DEPTHS GREATER THAN 15', AS DETAILED. MAXIMUM DEPTH "D" FOR MANHOLES USING PRECAST UNITS IN STAGE I, OR "C" FOR RISERS ON BASE STRUCTURES, IS 25' TO THE TOP OF THE BASE SLAB, IN ACCORDANCE WITH STANDARD MI-B&R (FTW). DETERMINE QUANTITIES FOR DEPTHS OTHER THAN THOSE SHOWN HEREON BY INTERPOLATION.
12. DO NOT COMMENCE WITH STAGE II CONSTRUCTION UNTIL PERMISSION IS GRANTED BY THE ENGINEER.
13. INSTALL A TEMPORARY WOOD COVER AFTER STAGE I IS COMPLETED, TO REMAIN IN PLACE UNTIL STAGE II CONSTRUCTION BEGINS.
14. LOCATION OF MANHOLE AS SHOWN IN THE PLANS REFERS TO THE CONTROL POINT SHOWN HEREON AND DETAILED ON THE "DRAINAGE STRUCTURE CONTROL DATA" SHEET. FOR MANHOLE RISERS LOCATED ON BASE STRUCTURE, LOCATE AND POSITION BASE AS DETAILED ON THE DRAINAGE STRUCTURE CONTROL DATA SHEET, OR AS DIRECTED. FOR MANHOLES LOCATED ON BOX CULVERT LESS THAN 4' SPAN,USE WITH BASE STRUCTURE.

TYPE A STORM DRAIN MANHOLE (RISER ONLY)

LOCATED ON BASE STRUCTURE OR BOX CULVERT
DO NOT USE WITH BOX CULVERT SPAN LESS THAN 4'
SEE MI-CBC FOR CULVERT SPAN >/= 4'
SEE MI-B&R FOR CULVERT SPAN < 4'
N.T.S.



CONNECTION TO PRECAST
RISER OR PRECAST BASE STRUCTURE
(STAGE I DEPTH > 2')

① REFER TO STANDARD MI-CBC (FTW) FOR DETAILS OF CONNECTION TO BOX CULVERT SUPPORT SLAB. SEE MI-B&R (FTW) FOR DETAILS OF CONNECTION TO BASE STRUCTURE.
② SEE WALL THICKNESS TRANSITION DETAIL FOR DEPTHS 15'-30'.
③ LEVEL IF NOT LOCATED IN PAVEMENT OR SIDEWALK.
④ TRANSITION FROM 24 1/2" DIA FORMED HOLE TO 3" SQUARE MANHOLE.
⑤ IF USED IN CONJUCTION WITH PRECAST RISER, MORE THAN 2' BELOW TOP OF STAGE 1, ADJUST LENGTH OF BARS C1 AS SHOWN.
⑥ STAGE II DEPTH = 18" IF OUTSIDE PAVEMENT; DEPTH TO TOP OF SUBGRADE IF UNDER PAVEMENT.

©2022 by Texas Department of Transportation;
All Rights Reserved

SHEET 2 OF 2 SHEETS

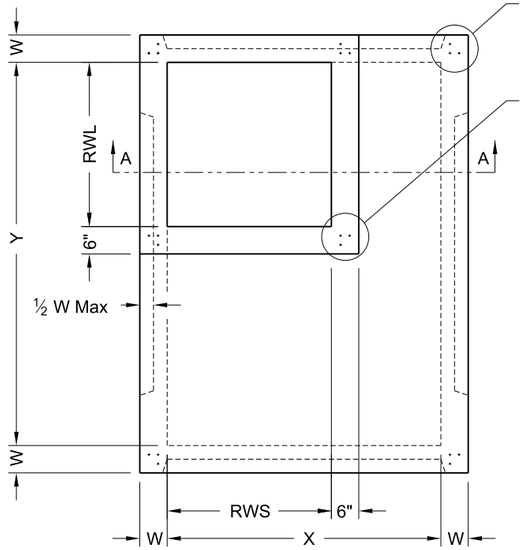
Texas Department of Transportation | Fort Worth District Standard

STORM DRAIN MANHOLE DETAILS
TYPE A
MH-SD (FTW)

ORIGINAL DRAWING: 05/2019	mhsd-ftw.dgn	FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
DATE	REVISIONS	6		
05/2019	REPLACES MH-1-02 (FW)	STATE	STATE DIST.NO.	COUNTY
11/2020	REVISE JOINT NOMENCLATURE	TEXAS	FTW	
07/2022	REVISE NOTES AND ADD DETAILS FOR USE WITH PRECAST BASE AND RISER	CONT.	SECT.	JOB / HIGHWAY NO.
			PARKER	162

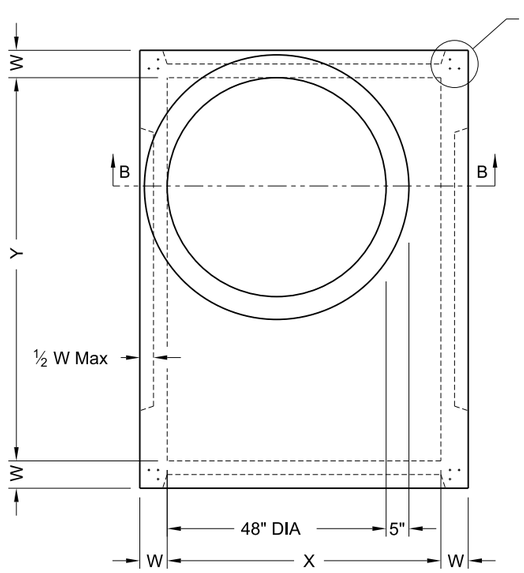
http://www.dot.state.tx.us/ftw/specinfo/standard.htm
8/27/2026 8:19:40 PM
$PATH$ 8/27/2026
\\icsM-fs\Projects\CAD\Projects\5618\54723_43\CV-109_TS_TxDot_MH-SD(FTW)_2.dgn
C:\Bentley\ProjectWise\Documents\Projects\5618\54723_43\CV-109_TS_TxDot_MH-SD(FTW)_2.dgn

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.



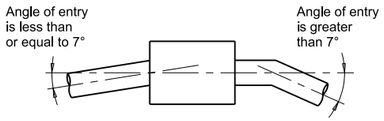
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



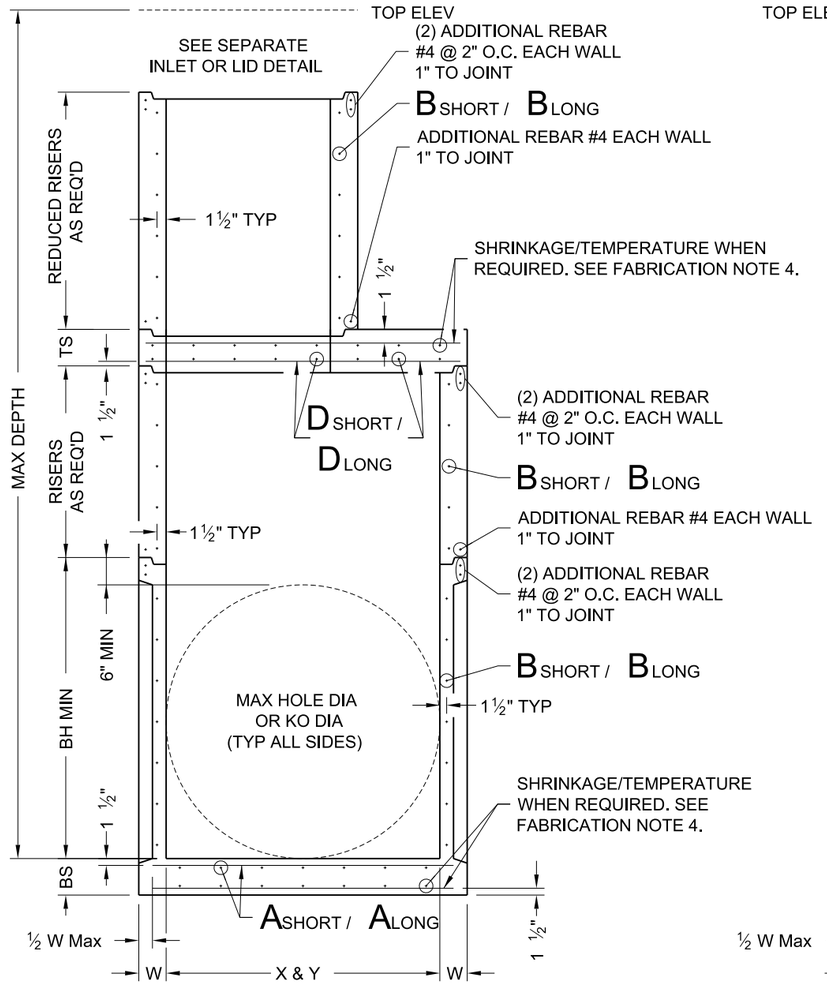
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



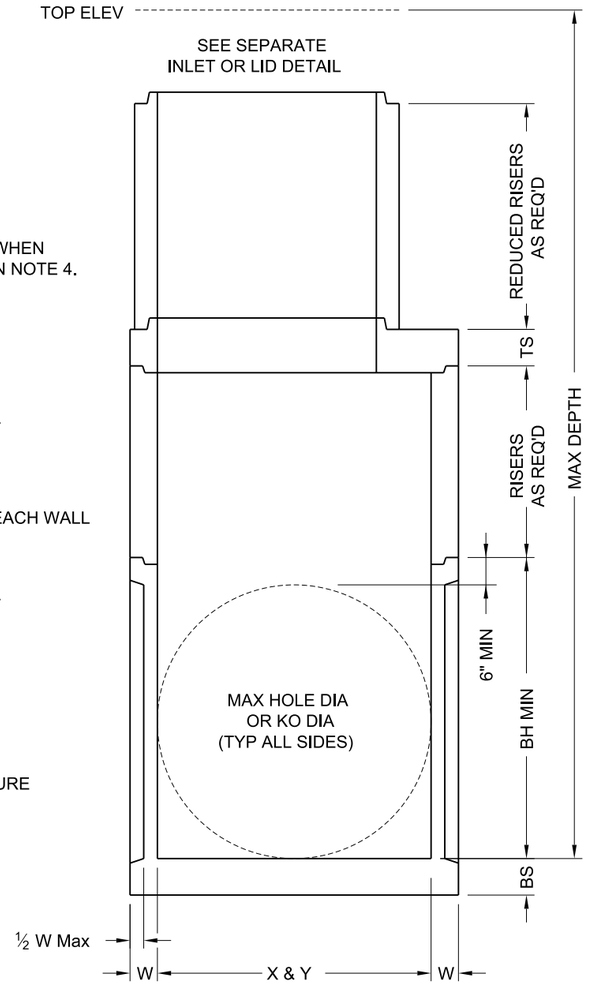
PIPE CONNECTION DETAIL

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 in²/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

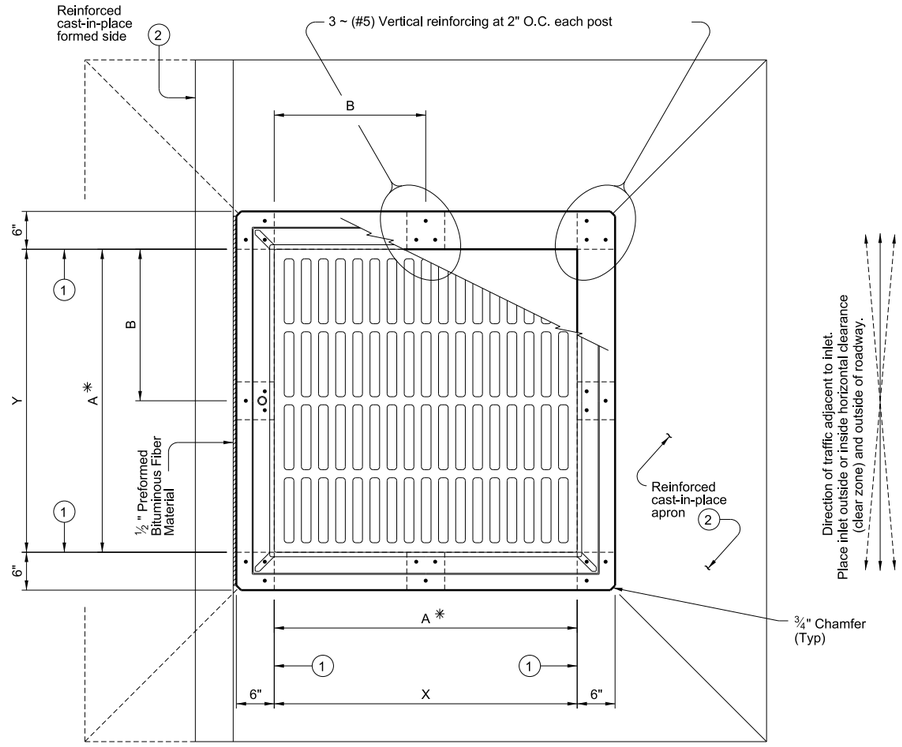
PB

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		163

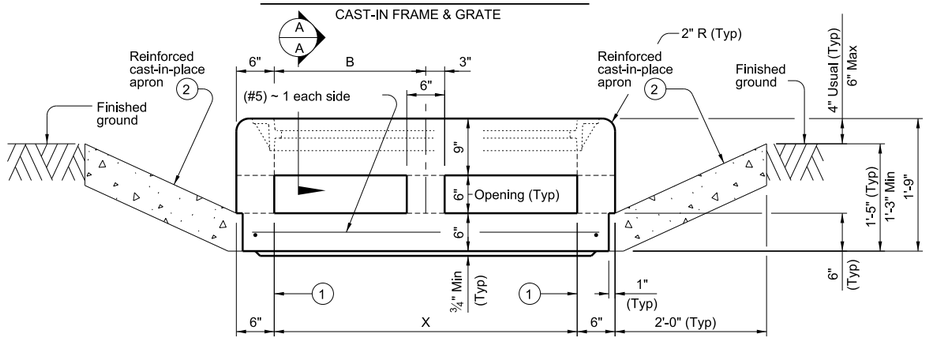
DATE: 8/27/2026
FILE: CV-109_TS_TxDot_PB-20.dgn

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.

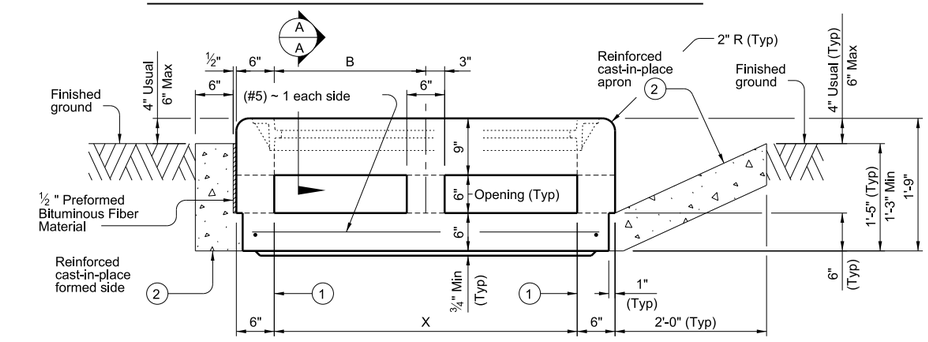
DATE: 8/27/2026
FILE: CV-109 TS TxDot PAZD-CZ-20.dgn



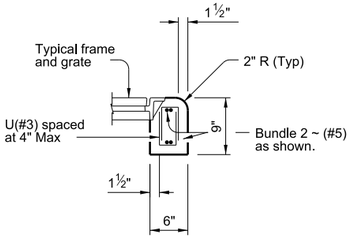
PLAN VIEW ~ STYLE 'FG' 3



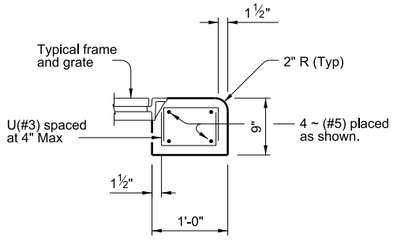
ELEVATION VIEW WITHOUT FORMED SIDE 4



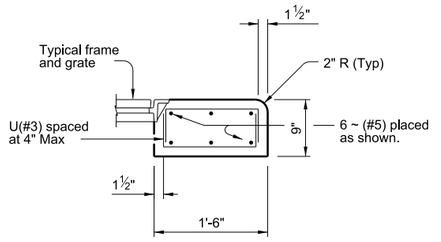
ELEVATION VIEW WITH FORMED SIDE 4



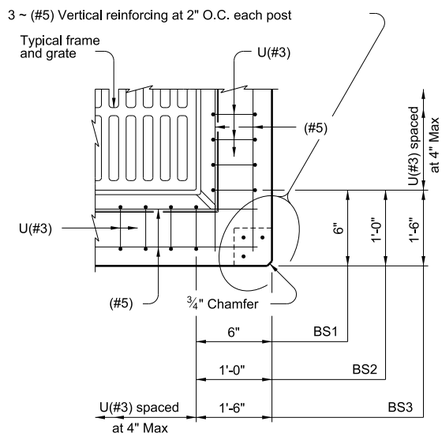
SECTION A-A ~ BS1



SECTION A-A ~ BS2

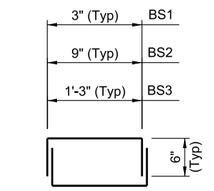


SECTION A-A ~ BS3



TYPICAL CORNER REINFORCING PLAN DETAIL

Showing BS2 other beam sections similar.



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.

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" O.C.
3. Top slab reinforcing not shown for clarity.
4. Top slab reinforcing and post reinforcing not shown for clarity.

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:	DN: SDC	CK: TAR	DW: JTR	CK: SDC
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		164

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		165

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: 8/27/2026
FILE: CV-109_TS_TxDot_PDD-20.dgn

SEE PART 2 FOR CONTINUATION
BEGIN PROJECT TO STA. 95+50.00

LEGEND OF UTILITY TYPES

ABANDONED UTILITY
UNKNOWN UTILITY

COMMUNICATIONS — QL "C"/QL "D"
- AT&T (FO/DUCT) — C1
- AT&T (TELE) — C2
- ZAYO (FO/DUCT) — C3
- TRI COUNTY FIBER (FO/DUCT) — C4

ELECTRIC / POWER — QL "C"/QL "D"
- ONCOR — E1
- PRIVATE — E2

GAS / PETROLEUM — QL "B"
- TEXAS GAS SERVICE — G1
- EAGLERIDGE — PL1
- ENLINK — PL2
- FORESTA GATHERING — PL3
- MAGELLAN — PL4
- ENTERPRISE — PL5

QL "C"/QL "D"
- TEXAS GAS SERVICE — G1
- EAGLERIDGE — PL1
- ENLINK — PL2
- FORESTA GATHERING — PL3
- MAGELLAN — PL4
- ENTERPRISE — PL5

SANITARY SEWER — QL "C"/QL "D"
- CITY OF WEATHERFORD — WW1
- CITY OF WILLOW PARK — WW2

STORM DRAIN — QL "C"/QL "D"
- CITY OF WEATHERFORD — SD1
- CITY OF WILLOW PARK — SD2
- CITY OF ALEDO — SD2

POTABLE WATER — QL "B"
- CITY OF WEATHERFORD — W1
- CITY OF WILLOW PARK — W2
- CITY OF ALEDO — W3

QL "C"/QL "D"
- CITY OF WEATHERFORD — W1
- CITY OF WILLOW PARK — W2
- CITY OF ALEDO — W3

LEGEND OF UTILITY SYMBOLS

END CAP
QUALITY LEVEL CHANGE
TEST HOLE
UTILITY CONTINUATION

CATV CABINET — C
CATV HANDHOLE — C
CATV PEDESTAL — C

FIBER HANDHOLE — F
TELEPHONE CABINET — T
TELEPHONE HANDHOLE (VAULT) — T
TELEPHONE MANHOLE — T
TELEPHONE PEDESTAL — TP
TELEPHONE POLE

TELEPHONE POLE W/RISER — E
ELECTRIC HANDHOLE — E
ELECTRIC JUNCTION BOX (CABINET)
ELECTRIC MANHOLE
ELECTRIC POLE (POWER) — PP
ELECTRIC POLE W/RISER
LIGHT POLE — LP
SIGNAL POLE — SP
SIGNAL HANDHOLE/BOX — SB
TRANSMISSION POLE

GAS METER — GM
GAS TEST STATION — TS
GAS VALVE
GAS VENT PIPE (GAS RISER)

STORM INLET — INL
STORM OUTFALL
STORM MANHOLE
WASTE WATER CLEANOUT
WASTE WATER MANHOLE

FIRE HYDRANT
WATER MANHOLE
WATER METER — WM
WATER VALVE
WATER VAULT — W

YELLOW ROSE MAPPING LLC

SUBSURFACE UTILITY ENGINEERING
LAND SURVEY

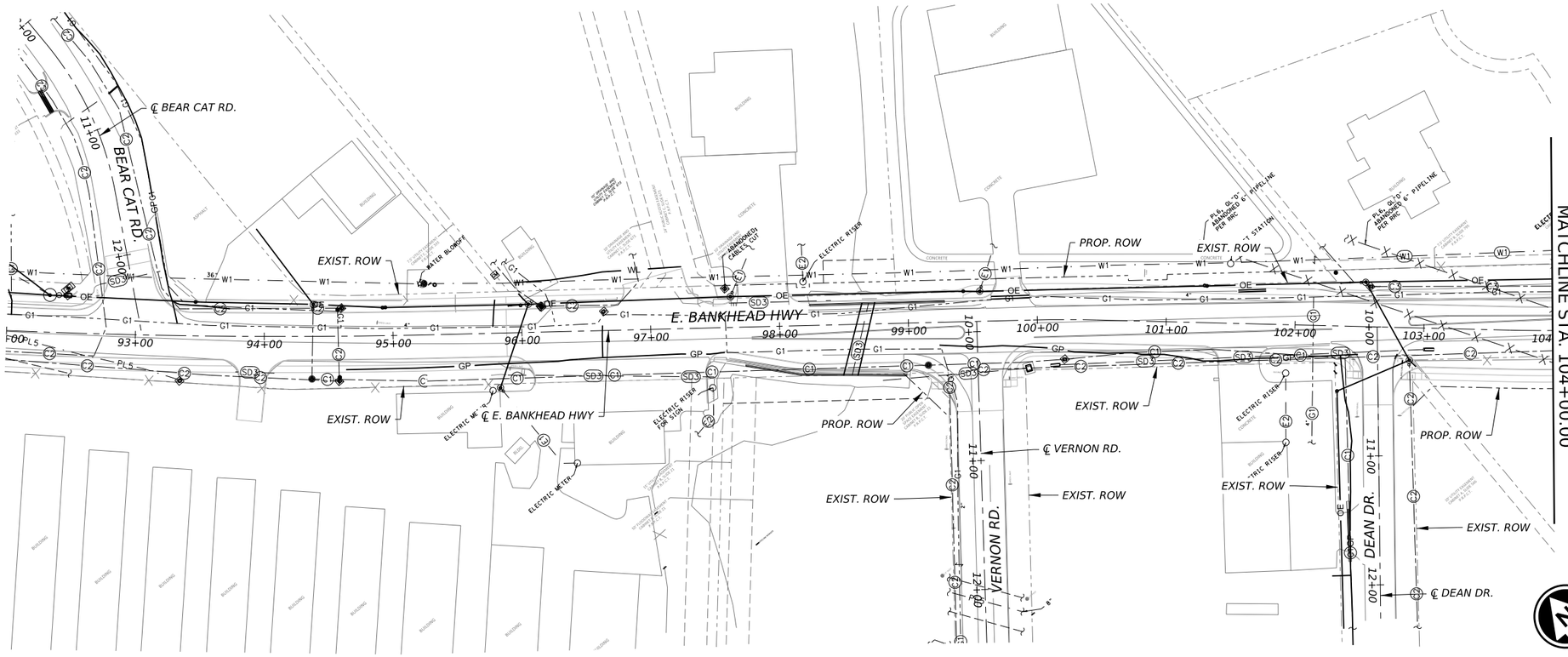
2011 Woodland Hills Lane
Weatherford, Texas 76087
817.703.6578

*WATER METERS THAT ARE NOT CONNECTED TO SUE LINEWORK COULD NOT BE TONED AND WERE NOT FOUND IN RECORDS.

LEGEND

- Light Pole
- Power Pole
- OHE — Overhead Electric
- Guy Wire
- UE — Underground Electric
- Electric Utility
- UT — Telecom
- G — Existing Gas Line
- Existing Storm Drain
- Water Manhole
- Fire Hydrant
- Water Valve
- Water Line Marker
- W — Existing Water Line
- Traffic Light
- Telecom Vault

NOTE: CONTRACTOR REQIRED TO LOCATE ALL UTILITY LINES PRIOR TO BEGINNING CONSTRUCTION.



YELLOW ROSE MAPPING LLC

SUBSURFACE UTILITY ENGINEERING
LAND SURVEY

2011 Woodland Hills Lane
Weatherford, Texas 76087
817.703.6578

0 50 100
SCALE IN FEET

NOT FOR CONSTRUCTION

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DUSTIN BLAYLOCK, P.E. TEXAS NO: 115500 DATE: JULY 2026 IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

_____, P.E. _____
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

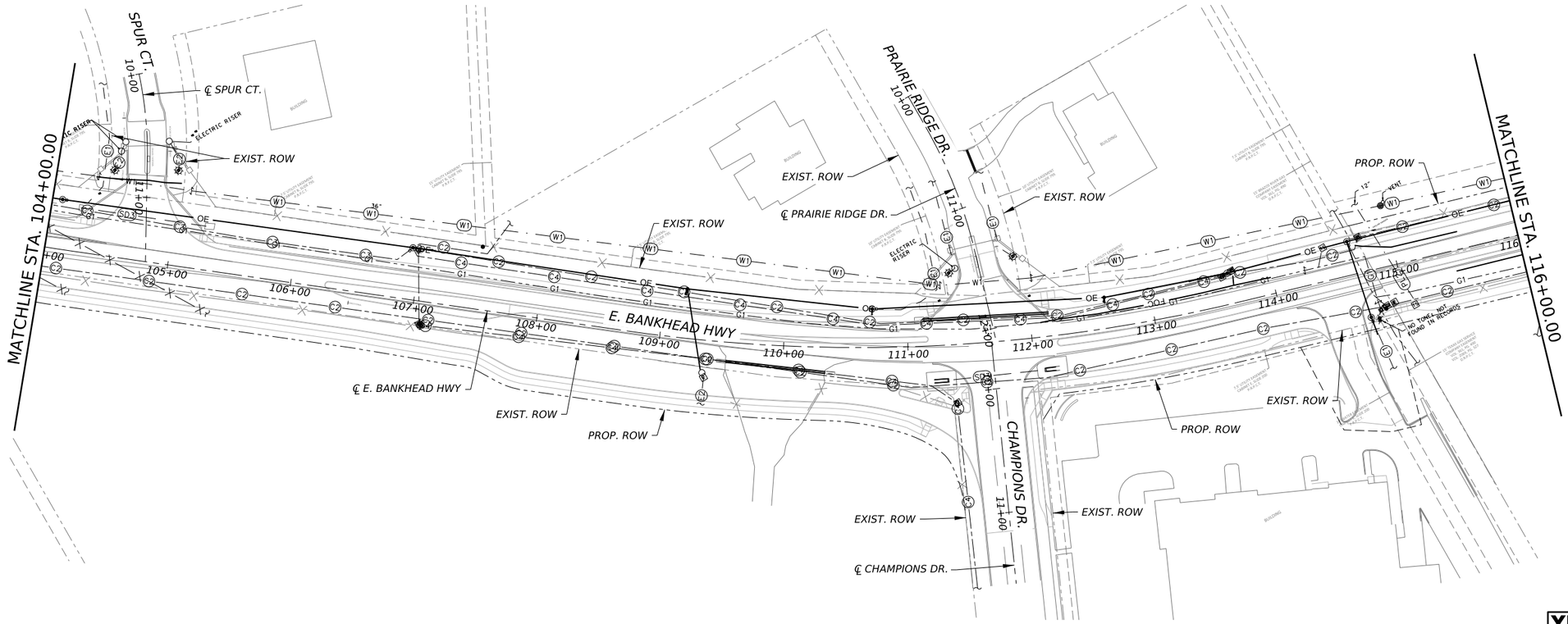
E BANKHEAD HWY PART 1

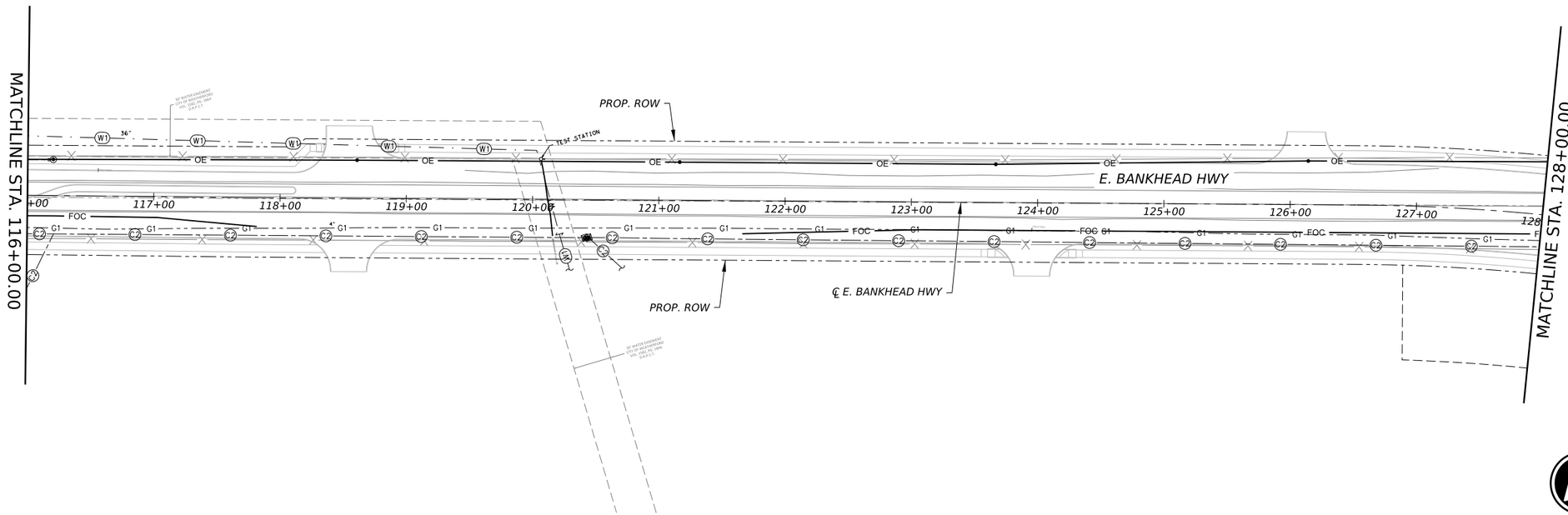
EXISTING UTILITY LAYOUT FROM STA. 95+50 TO STA. 104+00

SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		166

DATE: 8/27/2026 7:57:38 PM
FILE: \\cc-fs\projects\2024\Grand work dir\156191547\12_3\cv-109-pl-exutil04.dgn





LEGEND

- Light Pole
- Power Pole
- OHE — Overhead Electric
- Guy Wire
- UE — Underground Electric
- Electric Utility
- UT — UT — Telecom
- G — Existing Gas Line
- Existing Storm Drain
- Water Manhole
- Fire Hydrant
- Water Valve
- Water Line Marker
- W — Existing Water Line
- Traffic Light
- Telecom Vault

NOTE: CONTRACTOR REQIRED TO LOCATE ALL UTILITY LINES PRIOR TO BEGINNING CONSTRUCTION.

NOTE: SEE SHEET 1 OF EXISTING UTILITY SHEETS FOR REMAINDER OF LEGEND.

YELLOW ROSE MAPPING LLC
SUBSURFACE UTILITY ENGINEERING
LAND SURVEY
2011 Woodland Hills Lane
Weatherford, Texas 76087
817.703.6578

0 50 100
SCALE IN FEET

NOT FOR CONSTRUCTION

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DUSTIN BLAYLOCK, P.E. TEXAS NO: 115500 DATE: JULY 2026 IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

_____, P.E. _____
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

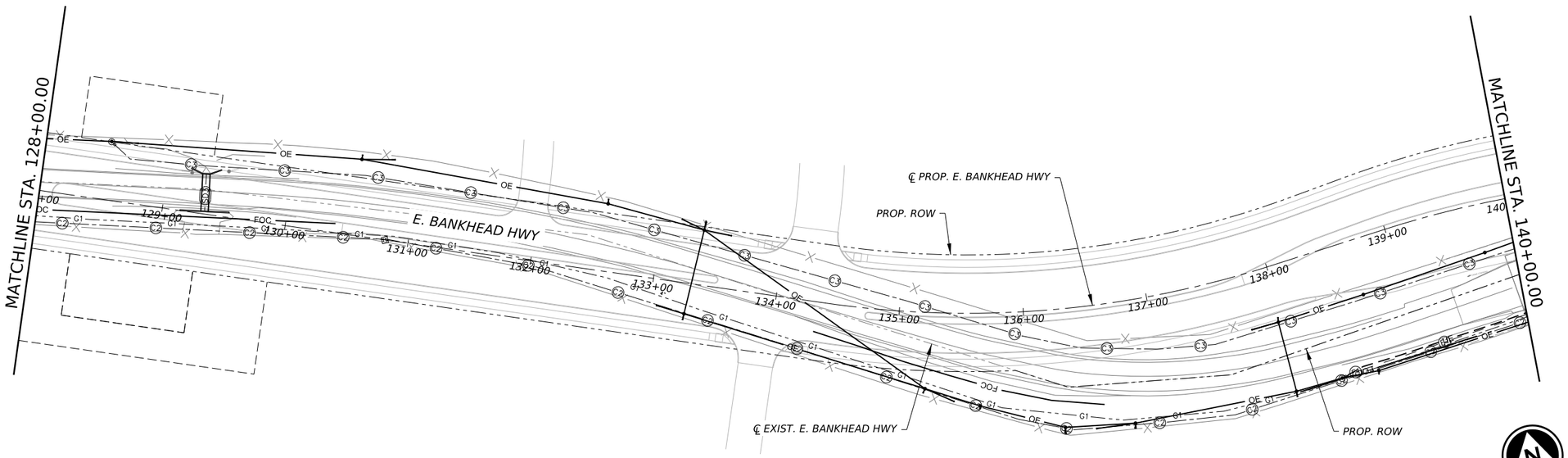
EXISTING UTILITY LAYOUT FROM STA. 104+00 TO STA. 128+00

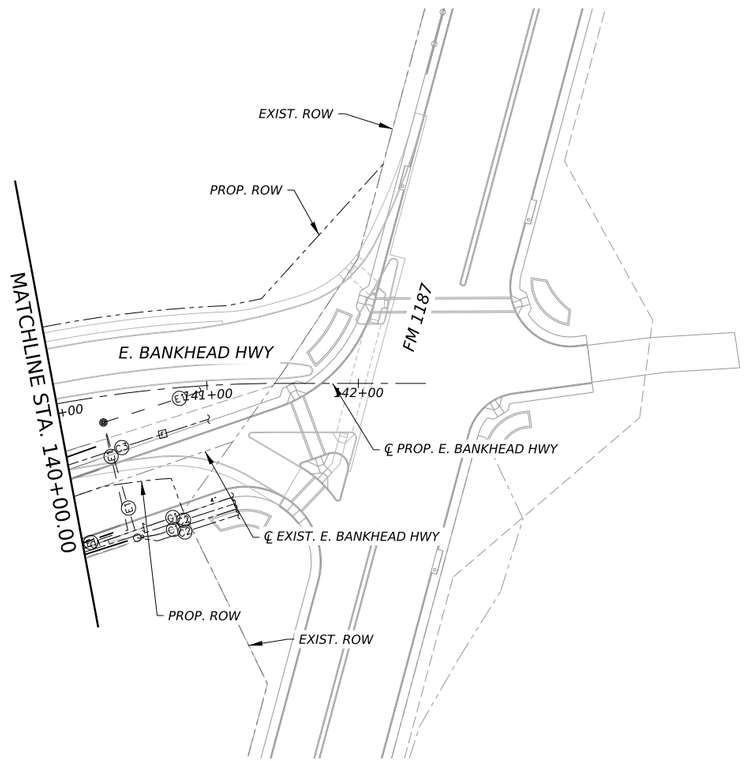
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	167

DATE: 8/27/2026 8:07:57 PM
FILE: \\cs\-freesepw21\CS_pdf_work_dir\15619154712_1\cv-109-pl-exutil05.dgn





NOTE: SEE SHEET 1 OF EXISTING UTILITY SHEETS FOR REMAINDER OF LEGEND.

LEGEND

- Light Pole
- Power Pole
- OHE — Overhead Electric
- Guy Wire
- UE — Underground Electric
- Electric Utility
- UT — UT — Telecom
- G — Existing Gas Line
- Existing Storm Drain
- Water Manhole
- Fire Hydrant
- Water Valve
- Water Line Marker
- W — Existing Water Line
- Traffic Light
- Telecom Vault

NOTE: CONTRACTOR REQIRED TO LOCATE ALL UTILITY LINES PRIOR TO BEGINNING CONSTRUCTION.

YELLOW ROSE MAPPING LLC
SUBSURFACE UTILITY ENGINEERING
LAND SURVEY
2011 Woodland Hills Lane
Weatherford, Texas 76087
817.703.6578

0 50 100
SCALE IN FEET

NOT FOR CONSTRUCTION

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DUSTIN BLAYLOCK, P.E. TEXAS NO: 115500 DATE: JULY 2026 IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

_____,P.E. _____
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

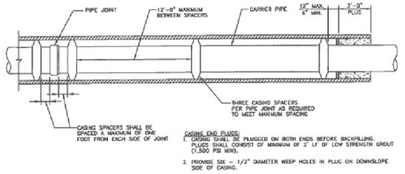
EXISTING UTILITY LAYOUT FROM STA. 128+00 TO END

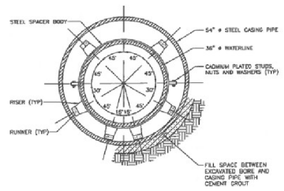
SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	168

DATE: 8/27/2026 8:20:45 PM
FILE: \\fcsM-freesepw211\CS_pdf_work dir\5619154712_2\cv-109-pl-exutil06.dgn

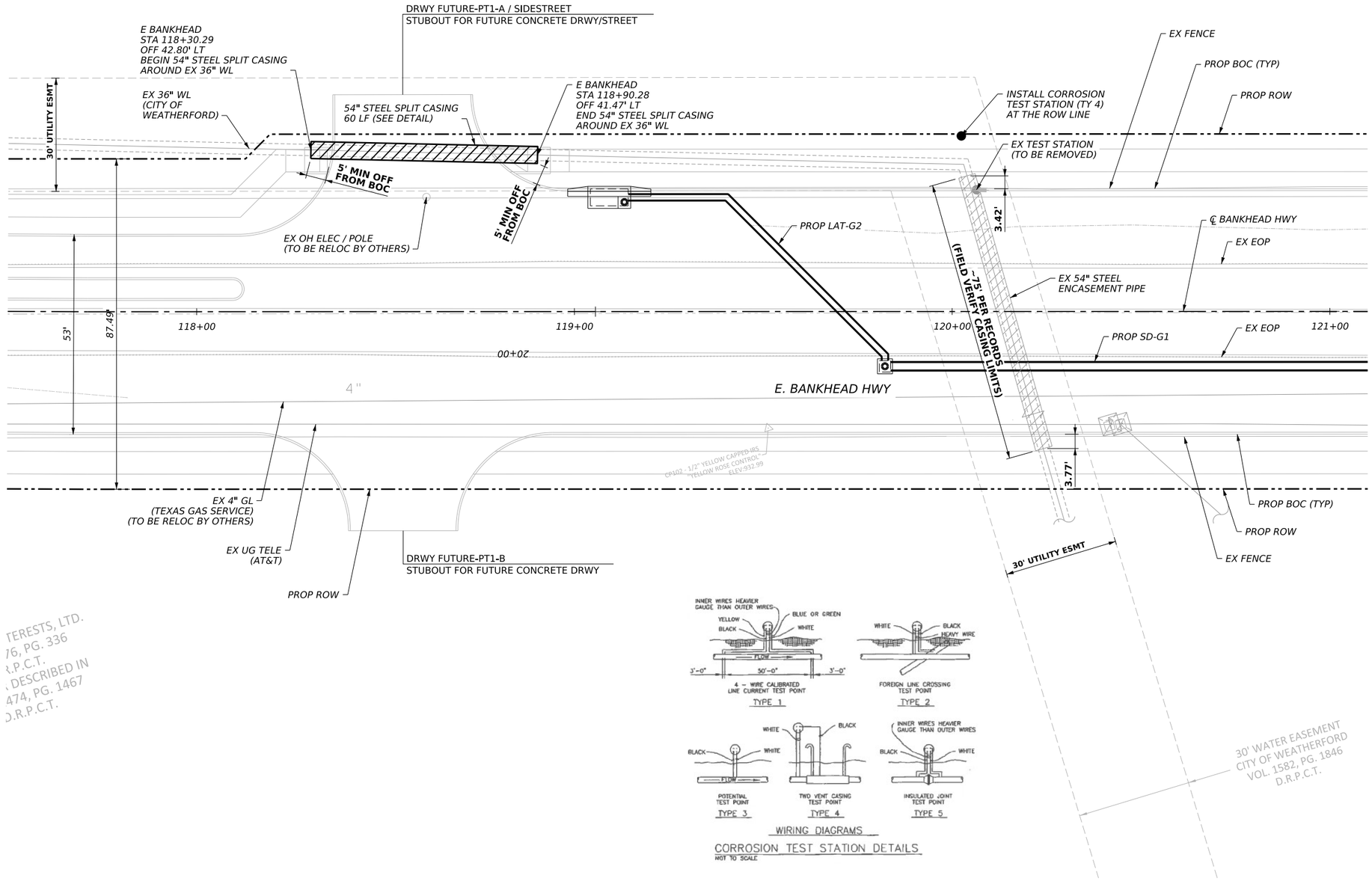




TYPICAL PIPELINE ENCASEMENT DETAIL
NOT TO SCALE

LEGEND

- PROPOSED UTILITY PROTECTION
- EXISTING UTILITY PROTECTION



WIRING DIAGRAMS

CORROSION TEST STATION DETAILS
NOT TO SCALE

0 10 20 30
SCALE IN FEET

NOT FOR CONSTRUCTION

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF DUSTIN BLAYLOCK, P.E. TEXAS NO: 115500 DATE: JULY 2026 IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

_____, P.E. _____
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PROPOSED UTILITY PLAN FROM STA 117+50 TO STA 121+10

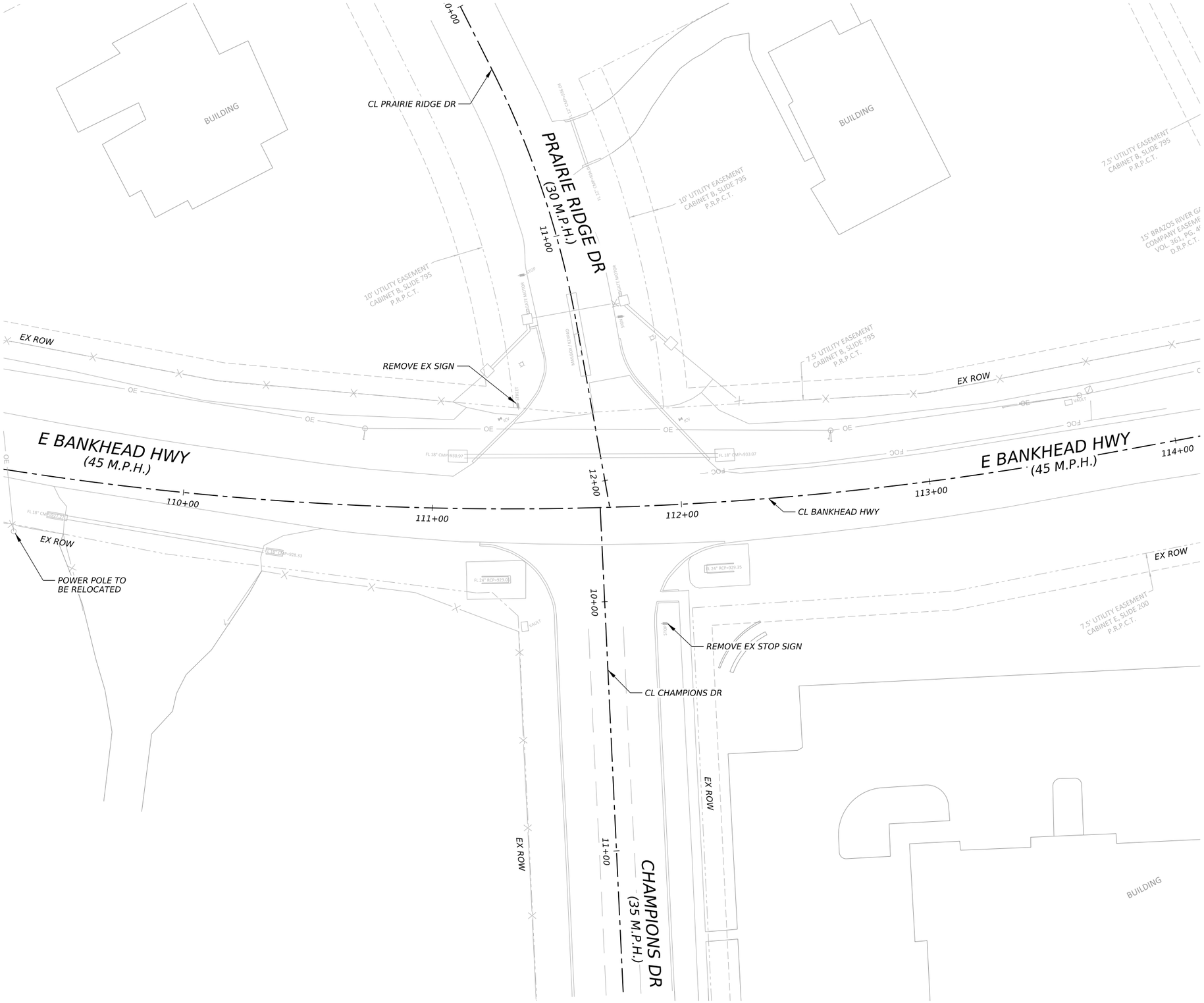
SHEET OF

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	169

DATE: 8/27/2026 8:08:10 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\56191547124\cv-109-pl-prop_utility_Sheet01.dgn

CK: DW: CK: DW:



0 20 40

SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY EXISTING CONDITIONS

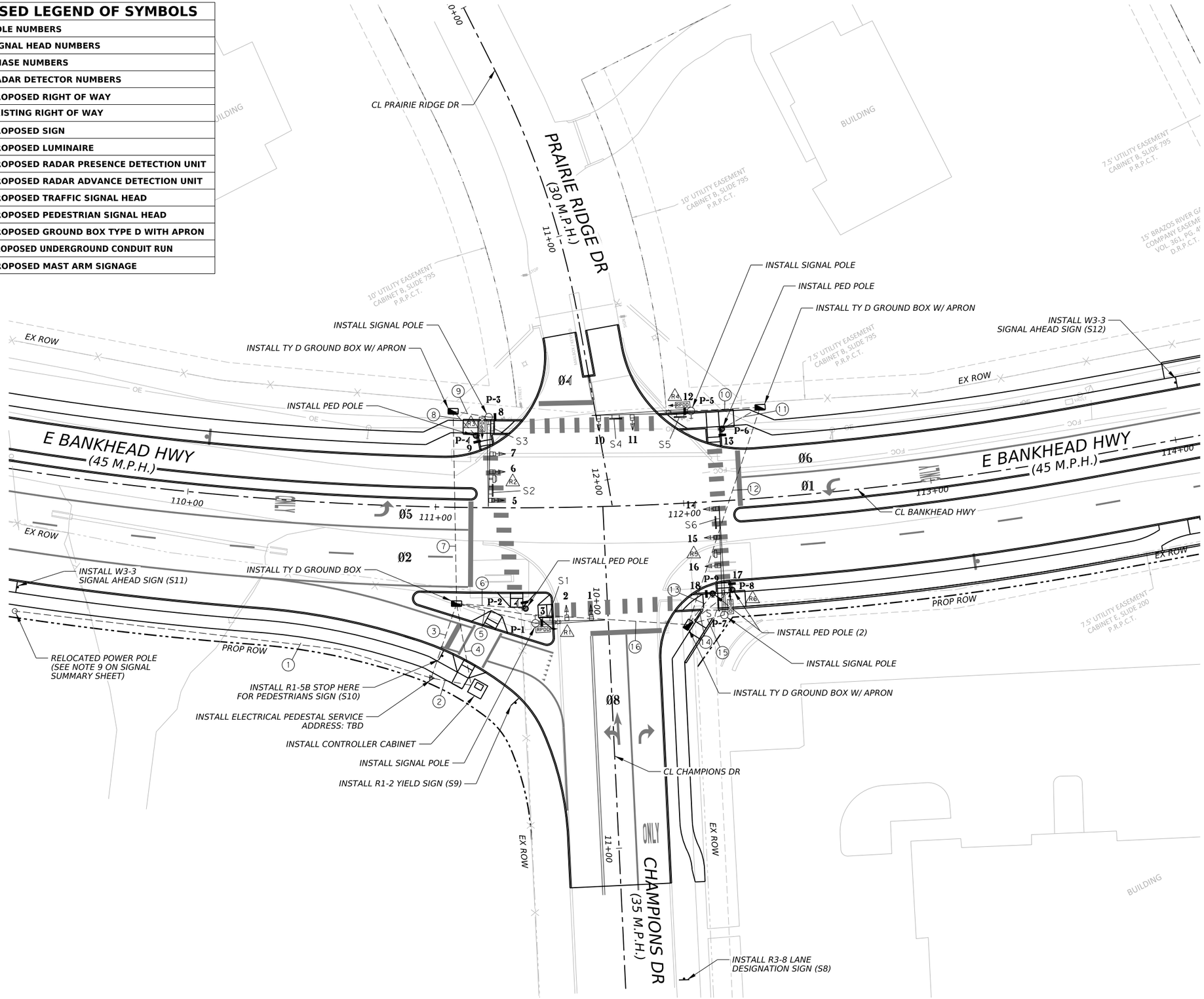
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	170

DATE: 8/27/2026 7:58:57 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_dir\5621154714_1\cv-109-pl-excond01.dgn

PROPOSED LEGEND OF SYMBOLS	
P-2	POLE NUMBERS
2	SIGNAL HEAD NUMBERS
Ø2	PHASE NUMBERS
R2	RADAR DETECTOR NUMBERS
	PROPOSED RIGHT OF WAY
	EXISTING RIGHT OF WAY
	PROPOSED SIGN
	PROPOSED LUMINAIRE
RPDU	PROPOSED RADAR PRESENCE DETECTION UNIT
	PROPOSED RADAR ADVANCE DETECTION UNIT
	PROPOSED TRAFFIC SIGNAL HEAD
	PROPOSED PEDESTRIAN SIGNAL HEAD
	PROPOSED GROUND BOX TYPE D WITH APRON
	PROPOSED UNDERGROUND CONDUIT RUN
	PROPOSED MAST ARM SIGNAGE



0 20 40
SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY PROPOSED SIGNAL

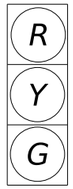
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	171

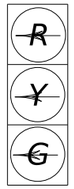
DATE: 8/27/2026 7:58:56 PM
FILE: \\CsM-freesepw211\CS_pdf_work_dir\5621154714_2\cv-109-pl-propsig01.dgn

V3



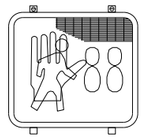
SH 1, 2, 6, 7
10, 11, 15, 16

V3LT



SH 5, 14

LED COUNTDOWN
PED HEAD



SH 3, 4, 8, 9,
12, 13, 17, 18

GROUND BOX QUANTITIES	
ITEM 624	
GROUND BOX TY D	1
GROUND BOX TY D W/APRON	3

NOTES:

1. INCISE ALL FOUNDATIONS WHERE THE CONDUIT LEAVES THE FOUNDATION.
2. COMPLETE ALL PAVEMENT MARKINGS WORK PRIOR TO FLASHING SIGNALS.
3. SALVAGING TRAFFIC SIGNALS WILL BE MEASURED AS EACH TRAFFIC SIGNAL LOCATION WHERE SALVAGE IS AUTHORIZED.
4. ALL CONDUCTORS SHALL BE TERMINATED AT THE TERMINAL BLOCK IN THE SIGNAL POLE HAND HOLE.
5. CONTRACTOR SHALL INSTALL A PULL ROPE IN ALL NEW CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).
6. CONTRACTOR SHALL COORDINATE ALL TRAFFIC SIGNAL POLE ASSEMBLY FOUNDATION WORK WITHE THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED PRIOR TO THE DRILLING OF FOUNDATIONS, CONTRACTOR SHALL NOTIFY THE COUNTY AND ENGINEER TO ARRANGE A FIELD MEETING TO DETERMINE IF THE FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL FOUNDATIONS ARE POURED PRIOR TO INSTALLATION OF THE CURB RAMPS, THE CURB RAMPS AND SIDEWALKS SHALL BE ADJUSTED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS IS 10" OR LESS.
7. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX SLOPE IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF THE ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. PAYMENT FOR THE EXTENDER SHALL BE CONSIDERED SUBSIDIARY TO ITM 688.
8. PROPOSED CURB RAMP LANDINGS SHALL BE POURED UP TO THE SIGNAL FOUNDATIONS, LEAVING NO GAPS.
9. CONTRACTOR SHALL COORDINATE WITH ONCOR ELECTRIC DELIVERY TO ARRANGE ELECTRICAL SERVICE. CONTACT XXX AT (XXX)XXX-XXXX OR XXX@ONCOR.COM REGARDING ELECTRICAL POWER SOURCE AND PEDESTAL SERVICE. REFERENCE PROJECT NUMBER XXXXX.

CONDUIT RUNS AND IN-POLE SUMMARY

RUN NO.	CONDUIT STATUS	LENGTH	POLE NO.	ITEM 618 CONDUIT TYPE				ITEM 620 ELECTRICAL CONDUCTORS				APS CABLE (TY-C, 12AWG)	ITEM 684 SIGNAL CABLE (TY-A, 14 AWG)			ITEM 6008 RADD	ITEM 6008 RPDD
				2" PVC TRENCH (LF)	3" PVC TRENCH (LF)	4" PVC TRENCH (LF)	4" PVC BORE (LF)	NO. 6 BARE (LF)	NO. 6 XHHW (LF)	NO. 8 XHHW (LF)	NO. 12 XHHW (LF)	2 CNDR CABLE (LF)	5 CNDR CABLE (LF)	12 CNDR CABLE (LF)	16 CNDR CABLE (LF)	RADAR CABLE (LF)	RADAR CABLE (LF)
1	I	170		1				1	2								
2	I	20			1			1	2								
3	I	35			1			1		4							
4	I	35				1		1				4		3	2	1	2
	I	35				1		1				4		2	2	1	2
5	I	35			1			1		2		1			1		1
6	I	30			1			1				1		1			
7	I	80					1	1				2		1	1	1	1
8	I	15			1			1				1		1			
9	I	15			1			1				1			1	1	1
10	I	30			1			1		2		1			1		1
11	I	20			1			1				1		1			
12	I	95					1	1		2		2		1	1		1
13	I	20			1			1				1		1			
14	I	25			1			1				1		1			
15	I	20			1			1		2					1	1	1
16	I	95					1	1		4		4		3	2	1	2
SUBTOTAL (LF)				170	265	70	270	775	380	880	0	1200	0	745	605	280	605
			P-1								105	5	90				18
			P-2									5	10				
			P-3									5	110			19	18
			P-4									5	10				
			P-5								105	5	110				18
			P-6									5	10				
			P-7								105		150			19	18
			P-8									5	10				
			P-9									5	10				
TOTAL (LF)				**170**	**270**	**70**	**270**	**780**	**380**	**880**	**320**	**1240**	**510**	**750**	**610**	**320**	**680**

CONDUIT STATUS: E-EXISTING; I=INSTALL
P-#: REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

DETECTION ZONE DETAILS

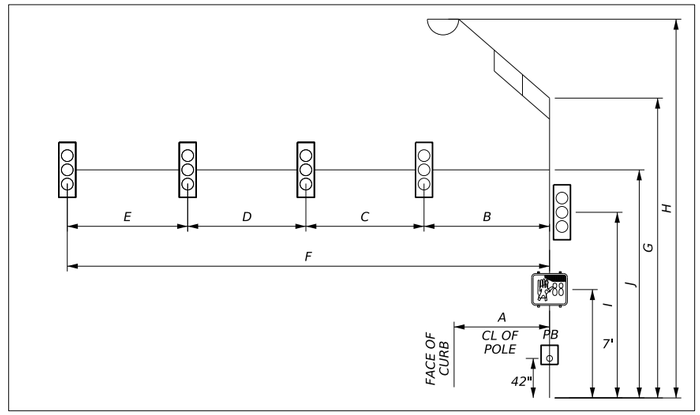
RADAR DETECTOR	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE LOCATION	ZONE	SETBACK DISTANCE	DISTANCE TO NEAREST TRAVEL LANE	DISTANCE TO FARTHEST TRAVEL LANE
R1	P-1 SIGNAL POLE	18'	STOP BAR	Ø8	N/A	23'	37'
R2	P-3 MAST ARM	19'	ADVANCED	Ø6	700'	N/A	N/A
R3	P-3 SIGNAL POLE	18'	STOP BAR	Ø2, Ø5	N/A	34'	57'
R4	P-5 SIGNAL POLE	18'	STOP BAR	Ø4	N/A	38'	N/A
R5	P-7 MAST ARM	19'	ADVANCED	Ø2	700'	N/A	N/A
R6	P-7 SIGNAL POLE	18'	STOP BAR	Ø1, Ø6	N/A	43'	55'

RADAR DETECTION ARC		
SENSOR 1	Ø8	RPDD
SENSOR 2	Ø6	RADD
SENSOR 3	Ø2, Ø5	RPDD
SENSOR 4	Ø4	RPDD
SENSOR 5	Ø2	RADD
SENSOR 6	Ø1, Ø6	RPDD

SIGNAL HEAD AND POLE PLACEMENT

POLE	MAST ARM LENGTH	ITEM 682 BACK PLATE 3-SEC	5-SEC	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)	I (FT)	J (FT)	LUM.	DR. SHAFT LENGTH (LF)*** ITEM 416 24" DIA	30" DIA	36" DIA	FDN. TYPE
P-1	28'	2	-	7.5	13	11	-	-	28	30	35	-	18	1	-	12	-	30-A
P-2	-	-	-	6.5	PEDESTRIAN SIGNAL POLE							-	-	-	6	-	-	24-A
P-3	36'	3	-	12.5	22	13	-	-	36	30	-	-	18	-	-	-	14	36-A
P-4	-	-	-	6.5	PEDESTRIAN SIGNAL POLE							-	-	-	6	-	-	24-A
P-5	40'	2	-	14	24	13	-	-	40	30	35	-	18	1	-	-	14	36-A
P-6	-	-	-	7.5	PEDESTRIAN SIGNAL POLE							-	-	-	6	-	-	24-A
P-7	44'	3	-	14	20	12	12	-	44	30	35	-	18	1	-	-	14	36-A
P-8	-	-	-	4	PEDESTRIAN SIGNAL POLE							-	-	-	6	-	-	24-A
P-9	-	-	-	4	PEDESTRIAN SIGNAL POLE							-	-	-	6	-	-	24-A
TOTAL		10	0											3	30	12	42	

ALL SIGNAL POLES WITH MAST ARMS OVER 32' IN LENGTH REQUIRE A DAMPING PLATE
ALL DRILL SHAFT LENGTHS ARE BASED ON AN AVERAGE 10 BLOWS/FT



TRAFFIC SIGNAL DETAIL
NOT TO SCALE

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY SIGNAL SUMMARY

SHEET 1 OF 1

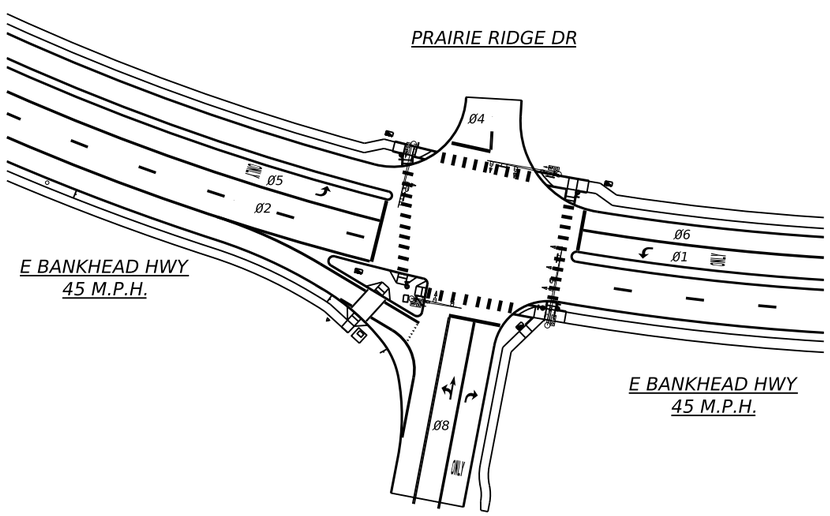
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		172

DATE: 8/27/2026 8:06:59 PM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\5621154714_15\cv-109-gn-sigsum01.dgn

CABLE TERMINATION CHART										
	CNDR. COLOR	CABLE FROM P-1 TO CNTRL. 16 CNDR.	CABLE FROM P-2 TO CNTRL. 12 CNDR.	CABLE FROM P-3 TO CNTRL. 16 CNDR.	CABLE FROM P-4 TO CNTRL. 12 CNDR.	CABLE FROM P-5 TO CNTRL. 16 CNDR.	CABLE FROM P-6 TO CNTRL. 12 CNDR.	CABLE FROM P-7 TO CNTRL. 16 CNDR.	CABLE FROM P-8 TO CNTRL. 12 CNDR.	CABLE FROM P-9 TO CNTRL. 12 CNDR.
1	BLACK	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON
2	WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON
3	RED	SH 1, 2 Ø4 R	SPARE	SH 6, 7 Ø6 R	SPARE	SH 10, 11 Ø8 R	SPARE	SH 15, 16 Ø2 R	SPARE	SPARE
4	GREEN	SH 1, 2 Ø4 G	SPARE	SH 6, 7 Ø6 G	SPARE	SH 10, 11 Ø8 G	SPARE	SH 15, 16 Ø2 G	SPARE	SPARE
5	ORANGE	SH 1, 2 Ø4 Y	SPARE	SH 6, 7 Ø6 Y	SPARE	SH 10, 11 Ø8 Y	SPARE	SH 15, 16 Ø2 Y	SPARE	SPARE
6	BLUE	SH 3 Ø2 DW	SH 4 Ø4 DW	SH 8 Ø6 DW	SH 9 Ø4 DW	SH 12 Ø6 DW	SH 13 Ø8 DW	SPARE	SH 17 Ø8 DW	SH 18 Ø2 DW
7	WHITE/ BLACK	SH 3 Ø2 W	SH 4 Ø4 W	SH 8 Ø6 W	SH 9 Ø4 W	SH 12 Ø6 W	SH 13 Ø8 W	SPARE	SH 17 Ø8 W	SH 18 Ø2 W
8	RED/ BLACK	SPARE	SPARE	SH 5 Ø1 R (LT ARW)	SPARE	SPARE	SPARE	SH 14 Ø5 R (LT ARW)	SPARE	SPARE
9	GREEN/ BLACK	SPARE	SPARE	SH 5 Ø1 G (LT ARW)	SPARE	SPARE	SPARE	SH 14 Ø5 G (LT ARW)	SPARE	SPARE
10	ORANGE/ BLACK	SPARE	SPARE	SH 5 Ø1 Y (LT ARW)	SPARE	SPARE	SPARE	SH 14 Ø5 Y (LT ARW)	SPARE	SPARE
11	BLUE/ BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
12	BLACK/ WHITE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
13	RED/ WHITE	SPARE		SPARE		SPARE		SPARE		
14	GREEN/ WHITE	SPARE		SPARE		SPARE		SPARE		
15	BLUE/ WHITE	SPARE		SPARE		SPARE		SPARE		
16	BLACK/ RED	SPARE		SPARE		SPARE		SPARE		

R = RED BALL; Y = YELLOW BALL; G = GREEN BALL;
RT = RIGHT TURN; LT = LEFT TURN; DW = DON'T WALK; W = WALK

ELECTRICAL SERVICE DETAILS										
ELECTRIC SERVICE NO.	SHEET NO.	ELECTRICAL SERVICE DESCRIPTION SEE ED(5), ED(6) & ED(7) - 14	SERVICE CONDUIT SIZE (PVC)	SERVICE CONDUCTORS NO./ SIZE	SAFETY SWITCH AMPS	MAIN CIRCUIT BREAKER	TWO-POLE CONTACTOR AMPS	PANEL BD./LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CIRCUIT BREAKER POLE/AMPS	KVA LOAD
1		ELEC SRV TY D 120/240 070 (NS)SS(E)SP(O)	2"	3/#6	N/A	2P/70	30	100	TS	1P/50	<7.1
									LUM	2P/20	

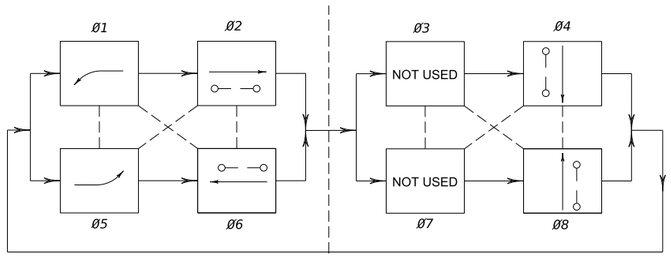


INTERSECTION LAYOUT
N.T.S.

APS MESSAGE CHART			
POLE NUMBER	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-1	PHASE 2	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS CHAMPIONS DR AT E BANKHEAD HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	CHAMPIONS DR, WALK SIGN IS ON TO CROSS CHAMPIONS DR
P-2	PHASE 4	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT CHAMPIONS DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO CROSS E BANKHEAD HWY
P-3	PHASE 6	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS CHAMPIONS DR AT E BANKHEAD HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	CHAMPIONS DR, WALK SIGN IS ON TO CROSS CHAMPIONS DR
P-4	PHASE 4	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT CHAMPIONS DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO CROSS E BANKHEAD HWY
P-5	PHASE 6	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS CHAMPIONS DR AT E BANKHEAD HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	CHAMPIONS DR, WALK SIGN IS ON TO CROSS CHAMPIONS DR
P-6	PHASE 8	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT CHAMPIONS DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO CROSS E BANKHEAD HWY
P-8	PHASE 8	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT CHAMPIONS DR
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO CROSS E BANKHEAD HWY
P-9	PHASE 2	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS CHAMPIONS DR AT E BANKHEAD HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	CHAMPIONS DR, WALK SIGN IS ON TO CROSS CHAMPIONS DR

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS.
CONTRACTOR SHALL VERIFY THE SPEECH MESSAGES WITH THE COUNTY PRIOR TO PROGRAMMING THE APS UNITS.
APS FILES SHALL BE PROVIDED TO THE COUNTY AFTER PROGRAMMING OF THE APS UNITS.

SIGNAL POLE CHART																				
POLE NUMBER	P-1			P-2	P-3				P-4	P-5			P-6	P-7			P-8	P-9		
MAST ARM LENGTH	28'			PED POLE	36'				PED POLE	40'			PED POLE	44'			PED POLE	PED POLE		
FND. WIDTH/DEPTH	30-A			24-A	36-A				24-A	36-A			24-A	36-A			24-A	24-A		
WITH LUMINAIRES	YES			N/A	NO				N/A	YES			N/A	YES			N/A	N/A		
SIGNS	STREET NAME, R10-3EL			R10-3EL	R10-5L, STREET NAME, R10-3ER				R10-3EL	STREET NAME, R3-8, R10-3EL			R10-3ER	R10-5L, STREET NAME			R10-3EL	R10-3EL		
SIZE OF LENS	12"			N/A	12"				N/A	12"			N/A	12"			N/A	N/A		
SIGNAL TYPE	V3	V3	PED SIG SEC (LED) COUNTDOWN	PED SIG SEC (LED) COUNTDOWN	V3LT	V3	V3	PED SIG SEC (LED) COUNTDOWN	PED SIG SEC (LED) COUNTDOWN	V3	V3	PED SIG SEC (LED) COUNTDOWN	PED SIG SEC (LED) COUNTDOWN	V3LT	V3	V3	PED SIG SEC (LED) COUNTDOWN	PED SIG SEC (LED) COUNTDOWN		
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
12" LED SIGNAL INDICATIONS	R	R	N/A	N/A	←R	R	R	N/A	N/A	R	R	N/A	N/A	←R	R	R	N/A	N/A		
	Y	Y			←Y	Y	Y			Y	Y			←Y	Y	Y				
	G	G			←G	G	G			G	G			←G	G	G				



PHASE DIAGRAM CHAMPIONS DR AT BANKHEAD HWY
N.T.S.

NOTES:

1. SIGNAL PHASE Ø1, Ø5 ARE PROTECTED LEFT TURN ONLY.
2. DURING MAINTENANCE FLASH: ALL SIGNAL HEADS SHALL FLASH RED.
3. DURING EMERGENCY FLASH: ALL SIGNAL HEADS SHALL FLASH RED.

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER
8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY TERMINATION AND PHASING

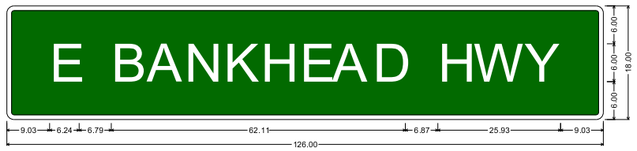
2025 SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	173

DATE: 8/27/2026 7:58:13 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\562115\4714_14\cv-109-gn-phas01.dgn

S1, S5



1.50" Radius, 1.00" Border, White on Green;
"E BANKHEAD HWY ", ClearviewHwy-3-W 62% spacing

S3, S7

1.50" Radius, 1.00" Border, White on Green;
"CHAMPIONS DR ", ClearviewHwy-3-W 62% spacing

TRAFFIC SIGNAL SIGNS SUMMARY						
ID	TYPE	LEGEND	STATUS	SIZE	QNTY	LOCATION
S1	STREET NAME	E BANKHEAD HWY	FURNISH & INSTALL	VARIES	1	P-1 MAST ARM
S2	R10-5L	LEFT ON GREEN ARROW ONLY	FURNISH & INSTALL	30"x36"	1	P-3 MAST ARM
S3	STREET NAME	CHAMPIONS DR	FURNISH & INSTALL	VARIES	1	P-3 MAST ARM
S4	R3-8	LANE DESIGNATION	FURNISH & INSTALL	30"x30"	1	P-5 MAST ARM
S5	STREET NAME	E BANKHEAD HWY	FURNISH & INSTALL	VARIES	1	P-5 MAST ARM
S6	R10-5L	LEFT ON GREEN ARROW ONLY	FURNISH & INSTALL	30"x36"	1	P-7 MAST ARM
S7	STREET NAME	CHAMPIONS DR	FURNISH & INSTALL	VARIES	1	P-7 MAST ARM
S8	R3-8	LANE DESIGNATION	FURNISH & INSTALL	30"x30"	1	POLE MOUNTED
S9	R1-2	YIELD	FURNISH & INSTALL	36"x36"	1	POLE MOUNTED
S10	R1-5B	STOP HERE FOR PEDESTRIANS	FURNISH & INSTALL	36"x36"	1	POLE MOUNTED
S11	W3-3	SIGNAL AHEAD	FURNISH & INSTALL	36"x36"	1	POLE MOUNTED
S12	W3-3	SIGNAL AHEAD	FURNISH & INSTALL	36"x36"	1	POLE MOUNTED
PS-3	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-1 SIGNAL POLE
PS-4	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-2 PED POLE
PS-7	R10-3ER	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-3 SIGNAL POLE
PS-8	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-4 PED POLE
PS-11	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-5 SIGNAL POLE
PS-12	R10-3ER	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-6 PED POLE
PS-16	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-8 PED POLE
PS-17	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-9 PED POLE

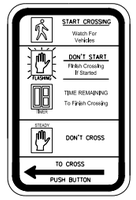
S2, S6

R10-5L
30"X36"

S4, S8

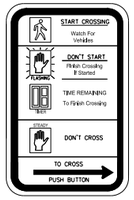
R3-8
30"X30"

PS3, PS4, PS8, PS11, PS16, PS17



R10-3EL

PS7, PS12



R10-3ER

S9

R1-2
36"x36"

S10

R1-5B
36"x36"

S11, S12

W3-3
36"x36"

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

CHAMPIONS DRIVE & EAST BANKHEAD HIGHWAY SIGNS SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	174

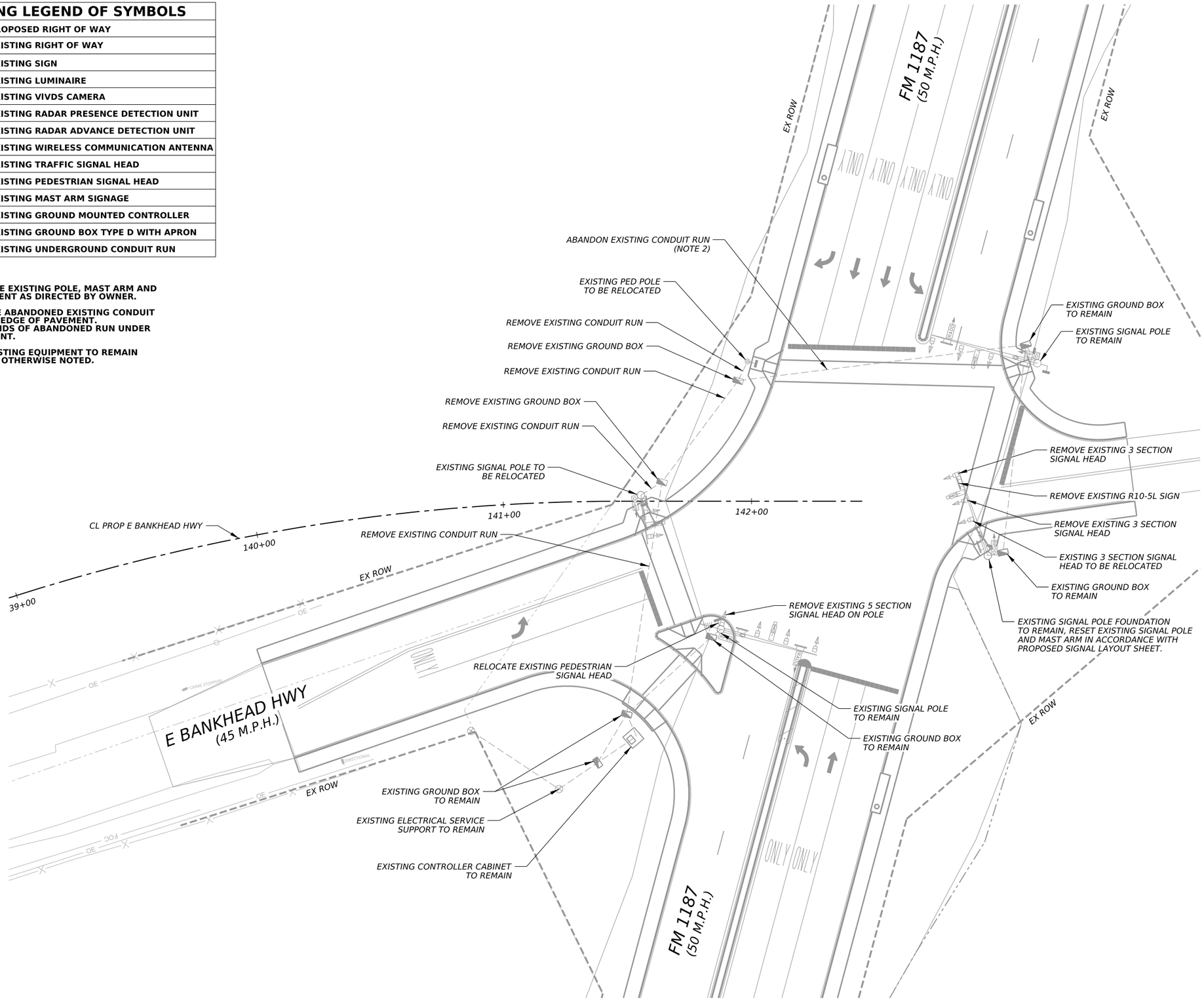
DATE: 8/27/2026 7:58:28 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_dir\5621154714_23\cv-109-gn-sign01.dgn

EXISTING LEGEND OF SYMBOLS

	PROPOSED RIGHT OF WAY
	EXISTING RIGHT OF WAY
	EXISTING SIGN
	EXISTING LUMINAIRE
	EXISTING VIVDS CAMERA
RPDD	EXISTING RADAR PRESENCE DETECTION UNIT
RADD	EXISTING RADAR ADVANCE DETECTION UNIT
	EXISTING WIRELESS COMMUNICATION ANTENNA
	EXISTING TRAFFIC SIGNAL HEAD
	EXISTING PEDESTRIAN SIGNAL HEAD
	EXISTING MAST ARM SIGNAGE
	EXISTING GROUND MOUNTED CONTROLLER
	EXISTING GROUND BOX TYPE D WITH APRON
	EXISTING UNDERGROUND CONDUIT RUN

NOTES:

1. **SALVAGE EXISTING POLE, MAST ARM AND EQUIPMENT AS DIRECTED BY OWNER.**
2. **REMOVE ABANDONED EXISTING CONDUIT RUN TO EDGE OF PAVEMENT. PLUG ENDS OF ABANDONED RUN UNDER PAVEMENT.**
3. **ALL EXISTING EQUIPMENT TO REMAIN UNLESS OTHERWISE NOTED.**



0 20 40

SCALE IN FEET

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.

Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

FM 1187 & EAST BANKHEAD HIGHWAY EXISTING CONDITIONS

SHEET 1 OF 1

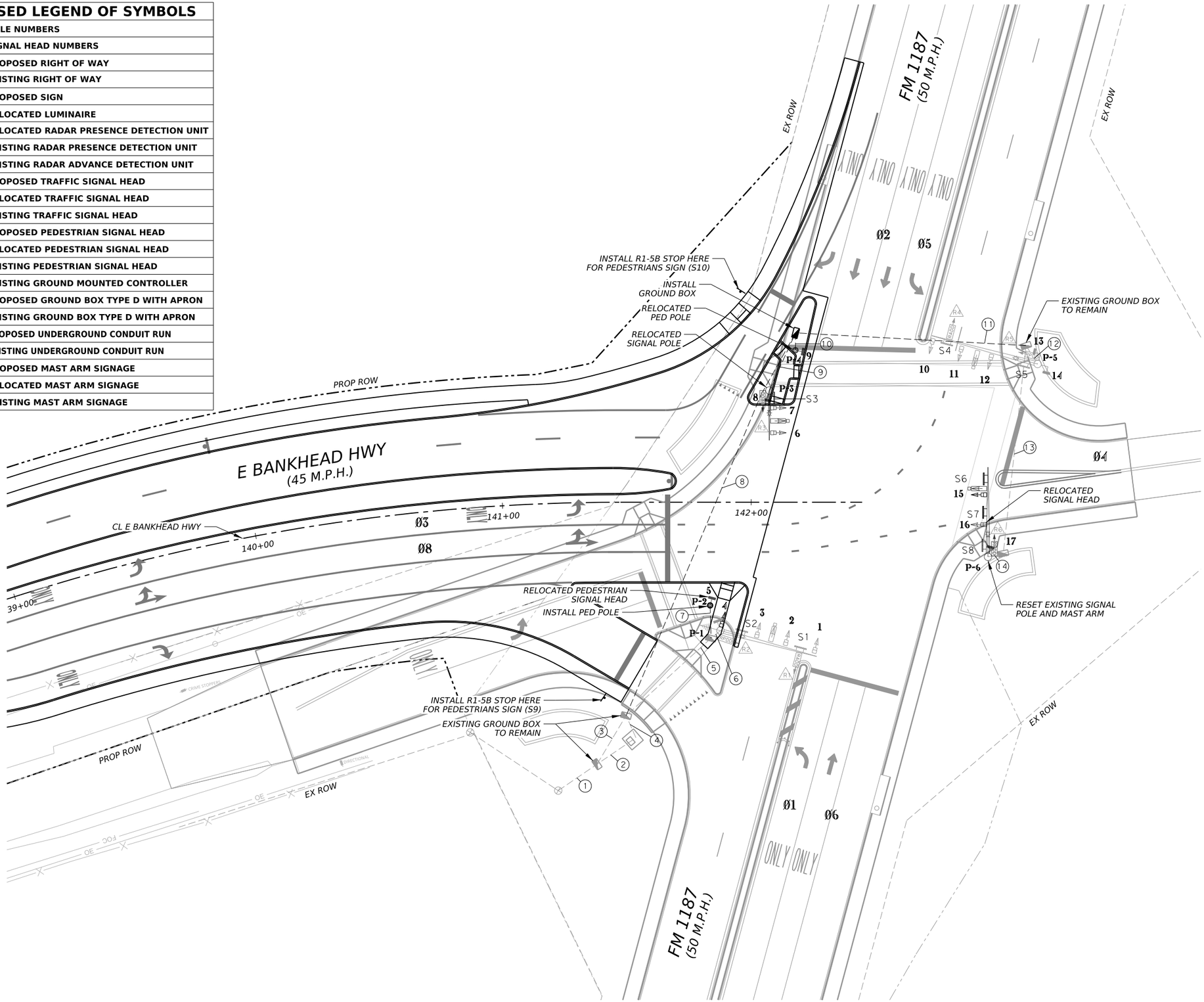
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	175

DATE: 8/27/2026 7:59:15 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\5621154714_10\cv-109-pl-excond02.dgn

PROPOSED LEGEND OF SYMBOLS

P-2	POLE NUMBERS
2	SIGNAL HEAD NUMBERS
	PROPOSED RIGHT OF WAY
	EXISTING RIGHT OF WAY
	PROPOSED SIGN
	RELOCATED LUMINAIRE
RPDD	RELOCATED RADAR PRESENCE DETECTION UNIT
RPDD	EXISTING RADAR PRESENCE DETECTION UNIT
RADD	EXISTING RADAR ADVANCE DETECTION UNIT
	PROPOSED TRAFFIC SIGNAL HEAD
	RELOCATED TRAFFIC SIGNAL HEAD
	EXISTING TRAFFIC SIGNAL HEAD
	PROPOSED PEDESTRIAN SIGNAL HEAD
	RELOCATED PEDESTRIAN SIGNAL HEAD
	EXISTING PEDESTRIAN SIGNAL HEAD
	EXISTING GROUND MOUNTED CONTROLLER
	PROPOSED GROUND BOX TYPE D WITH APRON
	EXISTING GROUND BOX TYPE D WITH APRON
	PROPOSED UNDERGROUND CONDUIT RUN
	EXISTING UNDERGROUND CONDUIT RUN
	PROPOSED MAST ARM SIGNAGE
	RELOCATED MAST ARM SIGNAGE
	EXISTING MAST ARM SIGNAGE



STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

FM 1187 & EAST BANKHEAD HIGHWAY PROPOSED SIGNAL

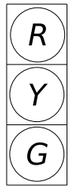
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	176

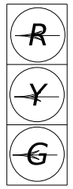
DATE: 8/27/2026 7:59:46 PM
FILE: \\tcsM-freesepw211\CS_pdf_work_dir\5621154714_11\cv-109-pl-propsig02.dgn

V3



SH 2, 3, 4, 6, 7, 11, 12, 16

V3LT

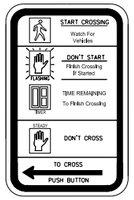


SH 1, 10

V5LT

SH 15

R10-3EL



PS8, PS13, PS17

R10-3ER

PS5, PS9, PS14

S1, S4

R10-5L
30"X36"

S6

R10-12
30"x36"

S7

R3-8L
30"X30"

S9, S10

R1-5B
36"x36"

NOTES:

1. INCISE ALL FOUNDATIONS WHERE THE CONDUIT LEAVES THE FOUNDATION.
2. COMPLETE ALL PAVEMENT MARKINGS WORK PRIOR TO FLASHING SIGNALS.
3. SALVAGING TRAFFIC SIGNALS WILL BE MEASURED AS EACH TRAFFIC SIGNAL LOCATION WHERE SALVAGE IS AUTHORIZED.
4. ALL CONDUCTORS SHALL BE TERMINATED AT THE TERMINAL BLOCK IN THE SIGNAL POLE HAND HOLE.
5. CONTRACTOR SHALL INSTALL A PULL ROPE IN ALL NEW CONDUIT RUNS ALONG WITH SIGNAL CABLES (FOR FUTURE USE).
6. EXISTING CONDUIT RUNS, ELECTRICAL CONDUCTORS AND SIGNAL CABLES TO REMAIN UNLESS OTHERWISE NOTED.
7. CONTRACTOR SHALL COORDINATE ALL TRAFFIC SIGNAL POLE ASSEMBLY FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED PRIOR TO THE DRILLING OF FOUNDATIONS, CONTRACTOR SHALL NOTIFY THE COUNTY AND ENGINEER TO ARRANGE A FIELD MEETING TO DETERMINE IF THE FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL FOUNDATIONS ARE POURED PRIOR TO INSTALLATION OF THE CURB RAMPS, THE CURB RAMPS AND SIDEWALKS SHALL BE ADJUSTED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS IS 10" OR LESS.
8. PROPOSED APS UNITS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX SLOPE IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF THE ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. PAYMENT FOR THE EXTENDER SHALL BE CONSIDERED SUBSIDIARY TO ITM 688.
9. PROPOSED CURB RAMP LANDINGS SHALL BE POURED UP TO THE SIGNAL FOUNDATIONS, LEAVING NO GAPS.

SIGNAL HEAD AND POLE PLACEMENT

POLE	MAST ARM LENGTH	ITEM 682 BACK PLATE 3-SEC	5-SEC	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)	I (FT)	J (FT)	LUM.	DR. SHAFT LENGTH (LF)*** 24" DIA	36" DIA	48" DIA	FDN. TYPE
															ITEM 416			
P-1	EXISTING	1	-	6.5	EXISTING										-	-	-	-
P-2	-	-	-	10	PEDESTRIAN SIGNAL POLE							10	-	-	6	-	-	24-A
P-3	EXISTING			5	EXISTING										-	14	-	36-A
P-4	-	-	-	4	PEDESTRIAN SIGNAL POLE							10	-	-	6	-	-	24-A
P-5	EXISTING			13.5	EXISTING										-	-	-	-
P-6	EXISTING	-	1	13	12	12	-	-	EXISTING					-	-	-	-	-
TOTAL		1	1											0	12	14	-	

NOTE: POLE P-1, P-3, P-4, P-6 ARE EXISTING
POLE P-1 TO REMAIN IN PLACE. ADDITION OF NEW SIGNAL HEAD
POLE P-2 IS A NEW PED POLE
POLE P-3 & P-4 ARE BEING RELOCATED AND WILL REQUIRE NEW FOUNDATIONS
POLE P-5 WILL REMAIN UNTOUCHED
POLE P-6 TO BE ROTATED TO ALIGN WITH ROADWAY. ADDITION OF NEW SIGNAL HEAD, FOUNDATION TO REMAIN

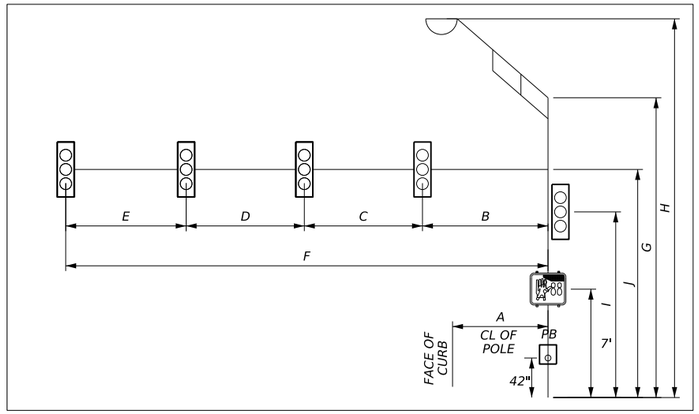
CONDUIT RUNS AND IN-POLE SUMMARY

RUN NO.	CONDUIT STATUS	LENGTH	POLE NO.	ITEM 618 CONDUIT TYPE 3" PVC BORE (LF)	4" PVC TRENCH (LF)	4" PVC BORE (LF)	ITEM 620 ELECTRICAL CONDUCTORS NO. 6 BARE (LF)	ITEM 621 TRAY CABLE 4 CNDR NO. 12 (LF)	ITEM 684 APS CABLE (TY-C, 12AWG) 2 CNDR CABLE (LF)	ITEM 684 SIGNAL CABLE (TY-A, 14 AWG) 5 CNDR CABLE (LF)	7 CNDR CABLE (LF)	12 CNDR CABLE (LF)	16 CNDR CABLE (LF)	ITEM 6002 VIVDS COAX CABLE (LF)	ITEM 6008 RADD RADAR CABLE (LF)	ITEM 6008 RPDD RADAR CABLE (LF)
1	E	20						3								
2	E	30														
3	E	25						3								
	E	25														
4	E	20							6			2	3	3	1	3
5	E	50							1			1				
6	E	10														
7	I	15		1			1		1			1				
8	I	165				1	1	2	5			1	3	3	1	3
9	I	30				1	1	1	1				1	1		1
10	I	10		1			1		1			1				
11	I	95				1	1	2	3				2	2	1	2
12	E	10			1			2	2				1	1	1	1
13	E	85						2	1				1	1		1
14	E	10						2	1				1	1		1
SUBTOTAL (LF)				25	10	290	315	895	1450	0	0	280	880	880	290	880
			P-1													
			P-2						5	10						
			P-3						5					30		18
			P-4													
			P-5											30	30	18
			P-6							13	42			30		18
TOTAL (LF)				**30**	**10**	**290**	**320**	**900**	**1460**	**30**	**50**	**280**	**880**	**970**	**320**	**940**

CONDUIT STATUS: E-EXISTING; I=INSTALL
P-#: REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

TRAFFIC SIGNAL SIGNS SUMMARY

ID	TYPE	LEGEND	STATUS	SIZE	QNTY	LOCATION
S1	R10-5L	LEFT ON GREEN ARROW ONLY	EXISTING	30"x36"	1	P-1 MAST ARM
S2	STREET NAME	E BANKHEAD HWY	EXISTING	EXISTING	1	P-1 MAST ARM
S3	STREET NAME	FM 1187	EXISTING	EXISTING	1	P-3 MAST ARM
S4	R10-5L	LEFT ON GREEN ARROW ONLY	EXISTING	30"x36"	1	P-5 MAST ARM
S5	STREET NAME	E BANKHEAD HWY	EXISTING	EXISTING	1	P-5 MAST ARM
S6	R10-12	LEFT TURN YIELD ON GREEN	FURNISH & INSTALL	30"x36"	1	P-6 MAST ARM
S7	R3-8L	INTERSECTION LANE CONTROL (2 LANE)	FURNISH & INSTALL	30"x30"	1	P-6 MAST ARM
S8	STREET NAME	FM 1187	EXISTING	EXISTING	1	P-6 MAST ARM
S9	R1-5B	STOP HERE FOR PEDESTRIANS	FURNISH & INSTALL	36"x36"	1	POLE MOUNTED
S10	R1-5B	STOP HERE FOR PEDESTRIANS	FURNISH & INSTALL	36"x36"	1	POLE MOUNTED
PS-5	R10-3ER	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-2 PED POLE
PS-8	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-3 SIGNAL POLE
PS-9	R10-3ER	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-4 PED POLE
PS-13	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-5 SIGNAL POLE
PS-14	R10-3ER	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-5 SIGNAL POLE
PS-17	R10-3EL	PED PUSH BUTTON	FURNISH & INSTALL	9"x15"	1	P-6 SIGNAL POLE



TRAFFIC SIGNAL DETAIL
NOT TO SCALE

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

FM 1187
& EAST BANKHEAD HIGHWAY
SIGNAL SUMMARY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	177

DATE: 8/27/2026 7:59:27 PM
FILE: \\icsM-freesepw21\ICS_pdf_work dir\5621\54714_12\cv-109-gn-sigsum02.dgn

CK:
DW:
CK:
DW:

CABLE TERMINATION CHART							
	CNDR. COLOR	CABLE FROM P-1 TO CNTRL. 16 CNDR.	CABLE FROM P-2 TO CNTRL. 12 CNDR.	CABLE FROM P-3 TO CNTRL. 16 CNDR.	CABLE FROM P-4 TO CNTRL. 12 CNDR.	CABLE FROM P-5 TO CNTRL. 16 CNDR.	CABLE FROM P-6 TO CNTRL. 16 CNDR.
1	BLACK	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON	P.B. COMMON
2	WHITE	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON	S. COMMON
3	RED	SH 2, 3, 4 Ø2 R	SPARE	SH 6, 7 Ø4 R	SPARE	SH 11, 12 Ø6 R	SH 15, 16 Ø8 R
4	GREEN	SH 2, 3, 4 Ø2 G	SPARE	SH 6, 7 Ø4 G	SPARE	SH 11, 12 Ø6 G	SH 15, 16 Ø8 G
5	ORANGE	SH2, 3, 4 Ø2 Y	SPARE	SH 6, 7 Ø4 Y	SPARE	SH 11, 12 Ø6 Y	SH 15, 16 Ø8 Y
6	BLUE	SPARE	SH 5 Ø2 DW	SH 8 Ø2 DW	SH 9 Ø4 DW	SH 13 Ø4 DW	SH 17 Ø6 DW
7	WHITE/ BLACK	SPARE	SH 5 Ø2 W	SH 8 Ø2 W	SH 9 Ø4 W	SH 13 Ø4 W	SH 17 Ø6 W
8	RED/ BLACK	SH 1 Ø5 R (LT ARW)	SPARE	SPARE	SPARE	SH 10 Ø1 R (LT ARW)	SPARE
9	GREEN/ BLACK	SH 1 Ø5 G (LT ARW)	SPARE	SPARE	SPARE	SH 10 Ø1 G (LT ARW)	SH 15 Ø3 G (LT ARW)
10	ORANGE/ BLACK	SH 1 Ø5 Y (LT ARW)	SPARE	SPARE	SPARE	SH 10 Ø1 Y (LT ARW)	SH 15 Ø3 Y (LT ARW)
11	BLUE/ BLACK	SPARE	SPARE	SPARE	SPARE	SH 14 Ø6 DW	SPARE
12	BLACK/ WHITE	SPARE	SPARE	SPARE	SPARE	SH 14 Ø6 W	SPARE
13	RED/ WHITE	SPARE		SPARE		SPARE	SPARE
14	GREEN/ WHITE	SPARE		SPARE		SPARE	SPARE
15	BLUE/ WHITE	SPARE		SPARE		SPARE	SPARE
16	BLACK/ RED	SPARE		SPARE		SPARE	SPARE

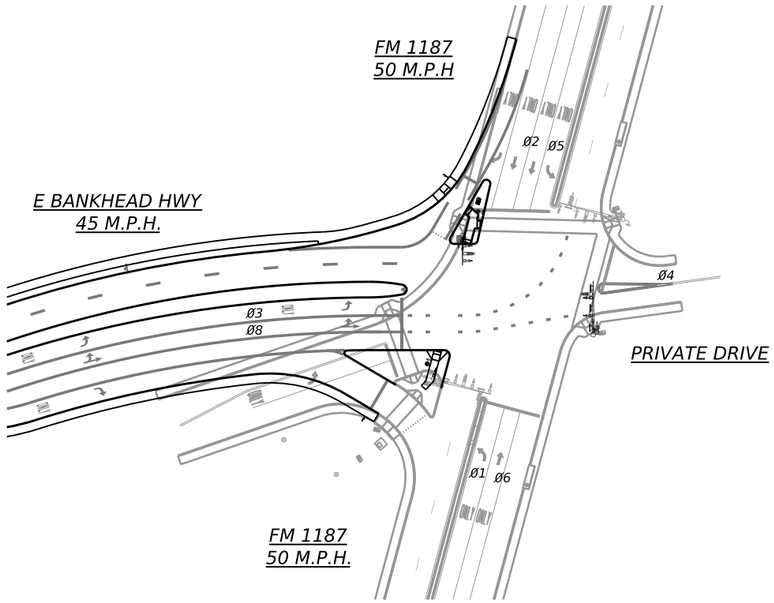
APS MESSAGE CHART			
POLE NUMBER	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-2	PHASE 2	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT FM 1187
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO E BANKHEAD HWY
P-3	PHASE 2	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT FM 1187
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO E BANKHEAD HWY
P-4	PHASE 4	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS FM 1187 AT E BANKHEAD HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	FM 1187, WALK SIGN IS ON TO FM 1187
P-5	PHASE 4	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS FM 1187 AT E BANKHEAD HWY
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	FM 1187, WALK SIGN IS ON TO FM 1187
P-5	PHASE 6	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT FM 1187
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO E BANKHEAD HWY
P-6	PHASE 6	BUTTON PUSH ON DON'T WALK	WAIT
		EXTENDED BUTTON PUSH	WAIT TO CROSS E BANKHEAD HWY AT FM 1187
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	E BANKHEAD HWY, WALK SIGN IS ON TO E BANKHEAD HWY

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS.
CONTRACTOR SHALL VERIFY THE SPEECH MESSAGES WITH THE COUNTY PRIOR TO PROGRAMMING THE APS UNITS.
APS FILES SHALL BE PROVIDED TO THE COUNTY AFTER PROGRAMMING OF THE APS UNITS.

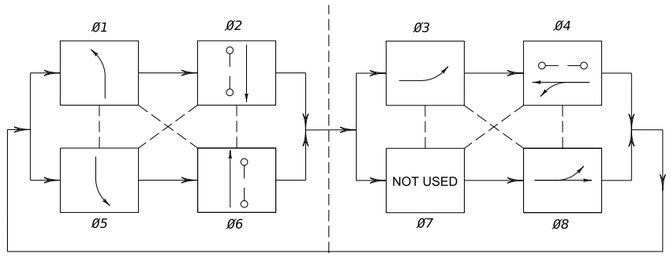
RADAR DETECTION CHART			
EXIST	SENSOR 1	Ø2	RADD
EXIST	SENSOR 2	Ø1, Ø6	RPDD
EXIST	SENSOR 3	Ø3, Ø8	RPDD
EXIST	SENSOR 4	Ø6	RADD
EXIST	SENSOR 5	Ø2, Ø5	RPDD
EXIST	SENSOR 6	Ø4	RPDD

ALL RADAR DETECTION UNITS ARE EXISTING

SIGNAL POLE CHART																					
POLE NUMBER	P-1				P-2	P-3			P-4	P-5					P-6						
MAST ARM LENGTH	EXIST				PED POLE	EXIST			PED POLE	EXIST					EXIST						
FND. WIDTH/DEPTH	EXIST				24-A	36-A			24-A	EXIST					EXIST						
WITH LUMINAIRES	EXIST				N/A	EXIST			N/A	EXIST					EXIST						
SIGNS	R10-5L, STREET NAME				R10-3ER	R10-3EL, STREET NAME			R10-3ER	R10-5L, R10-3EL, R10-3ER, STREET NAME					R3-8L, R10-12, R10-3EL, STREET NAME						
SIZE OF LENS	12"				EXIST	EXIST			EXIST	EXIST					12"						
SIGNAL TYPE	V3LT	V3	V3	V3	PED SIG SEC (LED) (COUNTDOWN)	V3	V3	PED SIG SEC (LED) (COUNTDOWN)	PED SIG SEC (LED) (COUNTDOWN)	V3LT	V3	V3	PED SIG SEC (LED) (COUNTDOWN)		V5LT	V3	PED SIG SEC (LED) (COUNTDOWN)				
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17				
12" LED SIGNAL INDICATIONS	EXIST	EXIST	EXIST	R	N/A	EXIST	EXIST	N/A	N/A	EXIST	EXIST	EXIST	N/A		R	EXIST	N/A				
	EXIST	EXIST	EXIST	Y		EXIST	EXIST			EXIST	EXIST	EXIST			Y	EXIST					
	EXIST	EXIST	EXIST	G		EXIST	EXIST			EXIST	EXIST	EXIST			G	EXIST					
															←Y	-					
															←G	-					



INTERSECTION LAYOUT
N.T.S.



PHASE DIAGRAM FM 1187
AT E BANKHEAD HWY
N.T.S.

NOTES:

1. SIGNAL PHASE Ø1, Ø5 ARE PROTECTED LEFT TURN ONLY.
2. DURING MAINTENANCE FLASH: ALL SIGNAL HEADS SHALL FLASH RED.
3. DURING EMERGENCY FLASH: ALL SIGNAL HEADS SHALL FLASH RED.

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

FM 1187 & EAST BANKHEAD HIGHWAY TERMINATION AND PHASING

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	178

DATE: 8/27/2026 8:00:41 PM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\15621\54714_13\cv-109-gn-phas02.dgn

TRAFFIC SIGNAL GENERAL NOTES

TEST PERIOD FOR SIGNALS

1. ONCE THE PERMANENT SIGNAL MODIFICATIONS HAVE TAKEN PLACE AND HAVE BEEN PLACED IN OPERATION, THEY SHALL OPERATE CONTINUOUSLY FOR A MINIMUM OF 30 CALENDAR DAYS IN A SATISFACTORY MANNER. EQUIPMENT FAILURES DURING THESE 30 DAYS WILL CAUSE THE TEST PERIOD TO START OVER.

CONDUIT

2. UNDERGROUND CONDUIT FOR CABLE SHALL BE PVC. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF. CONDUIT TO BE PLACED UNDER EXISTING PAVEMENT SHALL BE PLACED AT A MINIMUM DEPTH OF THREE (3) FEET BELOW THE PAVEMENT SURFACE.

SIGNAL HEADS

3. UNLESS OTHERWISE SHOWN IN THE PLANS, ALL NEW TRAFFIC AND LED COUNTDOWN PEDESTRIAN SIGNAL HEADS SHALL MATCH EXISTING TRAFFIC AND LED COUNTDOWN PEDESTRIAN SIGNAL HEADS IN MATERIAL, STYLE, COLOR AND MOUNTING ORIENTATION. REFERENCE THE E BANKHEAD HIGHWAY AND FM 1187 INTERSECTION.

4. ALL SIGNAL HEADS AND PEDESTRIAN HEADS SHALL BE COVERED WITH BURLAP OR OTHER APPROVED MATERIAL FROM THE TIME OF INSTALLATION UNTIL THE SIGNAL HAS BEEN PLACED IN OPERATION.

5. CONTRACTOR SHALL FURNISH AND INSTALL ALL NEW TRAFFIC AND LED COUNTDOWN PEDESTRIAN SIGNAL HEADS.

WIRING

6. EXTRA CABLE LENGTH SHALL BE INCLUDED IN EACH RUN TO PROVIDE ADEQUATE SLACK AT EACH GROUND BOX AND FOUNDATION. CONTRACTOR TO PROVIDE 10 EXTRA FEET OF CABLE AT EACH GROUND BOX AND FOUNDATION.

POLE AND CABINET FOUNDATIONS

7. NO MAST ARM POLES SHALL BE PLACED ON THE FOUNDATIONS PRIOR TO SEVEN (7) DAYS FOLLOWING THE PLACEMENT OF CONCRETE. THE DIMENSIONS SHOWN ON THE PLANS FOR THE LOCATION OF SIGNAL FOUNDATIONS, CONDUIT, AND OTHER ITEMS MAY BE VARIED TO MEET LOCAL CONDITIONS, SUBJECT TO APPROVAL BY THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE.

8. THE FINAL LOCATION OF SIGNAL AND PED POLE FOUNDATIONS SHALL BE VERIFIED WITH THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE BEFORE DRILLING.

9. THE CONTRACTOR SHALL NOTIFY THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE AT LEAST 48 HOURS BEFORE PLACING CONCRETE. TESTING WILL BE IN ACCORDANCE WITH TXDOT SPECIFICATION 416.

10. ALL EXPOSED SIGNAL POLE AND CONTROLLER FOUNDATIONS SHALL RECEIVE A CLASS C FINISH AS PER TXDOT SPECIFICATION 416.

EXISTING UTILITIES

11. THE CONTRACTOR IS ADVISED THAT SEVERAL UTILITIES EXIST IN THE AREA. THE APPROXIMATE LOCATION OF KNOWN UNDERGROUND UTILITIES HAS BEEN SHOWN ON THE PLAN SHEETS. THE EXACT LOCATION OF THE UNDERGROUND UTILITIES IS NOT CERTAIN. THE CONTRACTOR SHALL CONTACT UTILITY COMPANIES WITH UTILITIES IN THE AREA FOR EXACT LOCATION PRIOR TO DRILLING FOR FOUNDATIONS AND ANY OTHER WORK THAT MIGHT INTERFERE WITH OR DAMAGE PRESENT UTILITIES. NO ADDITIONAL PAYMENT WILL BE MADE FOR RELOCATION OF ANY FOUNDATIONS DUE TO UTILITIES.

12. BIDDERS SHALL BE AWARE THAT DELAY MAY OCCUR AS A RESULT OF CONFLICTS DISCOVERED. NO SEPARATE PAY WILL BE CONSIDERED, BUT RATHER UNDERSTOOD AS ROUTINE CIRCUMSTANCE REGARDING THIS WORK.

13. TEXAS STATE LAW, ARTICLE 1436C, MAKES UNLAWFUL THE OPERATION OF EQUIPMENT OR MACHINES WITHIN 10 FEET OF ANY OVERHEAD ELECTRICAL LINE UNLESS DANGER AGAINST CONTACT WITH HIGH VOLTAGE OVERHEAD LINES HAS BEEN EFFECTIVELY GUARDED AGAINST PURSUANT TO THE PROVISIONS OF THE ARTICLE. WHEN CONSTRUCTION OPERATIONS REQUIRE WORKING NEAR AN OVERHEAD ELECTRIC LINE, THE CONTRACTOR SHALL CONTACT THE OWNER/OPERATOR OF THE OVERHEAD ELECTRICAL LINE TO MAKE ADEQUATE ARRANGEMENTS AND TO TAKE NECESSARY SAFETY PRECAUTIONS TO ENSURE THAT ALL LAWS, ELECTRICAL LINE OWNER/OPERATOR REQUIREMENTS, AND STANDARD INDUSTRY SAFETY PRACTICES ARE MET.

SIGNAL AND CONTROLLER CABINET

14. CONTROLLER CONSISTENT WITH CURRENT TXDOT STANDARDS. SIGNAL CONTROLLER AND CABINET INSTALLATION SHALL BE WIRED IN ACCORDANCE WITH THE PHASE DIAGRAM. TIME INTERVALS, PHASING, AND CYCLES SHALL BE ADJUSTED AND SET AS DIRECTED BY THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE.

15. ALL FURNISHED SIGNAL EQUIPMENT SHALL BE APPROVED BY THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE PRIOR TO PURCHASING BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS/CUT SHEETS FOR APPROVAL. ANY SUBSTITUTION OF EQUIPMENT MUST BE APPROVED BY THE COUNTY OR COUNTY REPRESENTATIVE PRIOR TO PURCHASE OF EQUIPMENT.

LUMINAIRES

16. CONTRACTOR SHALL FURNISH AND INSTALL LUMINAIRES WITH ALL LED COMPONENTS.

POLE ASSEMBLIES

17. CRITICAL POLE ASSEMBLY FEATURES AND DIMENSIONS REQUIRED FOR THIS PROJECT ARE SHOWN ON THE PLAN DETAIL SHEETS. POLE SHAFT/MAST ARM IDENTIFICATION NUMBERS SHALL BE STENCILED ON POLE SHAFTS AND MAST ARMS BEFORE SHIPMENT TO ENSURE MATCHING OR POLES AND MAST ARMS DURING FIELD ASSEMBLY.

SERVICE CONNECTIONS

18. THE CONTRACTOR SHALL COORDINATE WITH ONCOR AND THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE FOR POWER SOURCE LOCATION AND INSTALLATION OF ELECTRICAL SERVICE (PEDESTAL SERVICE TYPE PS).

SIGNING

19. ALL SIGNS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

20. SIGN LOCATIONS SHOWN ON PLANS ARE DIAGRAMMATIC. THE CONTRACTOR SHALL PLACE SIGNS IN CONFORMANCE WITH THE 2023 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" OR CURRENT EDITION. BLOCK NUMBERS AND CARDINAL DIRECTIONS SHALL BE INCLUDED ON STREET NAME SIGNS AND VERIFIED PRIOR TO SIGN FABRICATION. THE CONTRACTOR SHALL SUBMIT THE SIGN DESIGN TO THE COUNTY OR COUNTY DESIGNATED REPRESENTATIVE FOR APPROVAL PRIOR TO SIGN FABRICATION.

21. ALPHABETS AND LETTER SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE STATE OF TEXAS "STANDARD HIGHWAY SIGN DESIGNS, 2012" OR CURRENT EDITION AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE AS TO PROVIDE A BALANCED APPEARANCE.

22. SIGN BACKGROUNDS SHALL BE OF FLAT SURFACE REFLECTIVE SHEETING (DG3 TYPE XI SHEETING) CONFORMING WITH THE SPECIFICATIONS UNLESS OTHERWISE NOTED IN THE PLANS. SIGN LEGENDS SHALL BE APPLIED USING E.C. FILM ONLY. SIGN BLANKS ATTACHED TO SIGNAL POLES SHALL BE ONE PIECE ALUMINUM ALLOY 0.080 THICK CONFORMING TO THE TXDOT ITEM "ALUMINUM SIGNS (TYPE A)".

CONTRACTOR'S RESPONSIBILITY FOR THE WORK

23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INSTALLATIONS UNTIL ACCEPTED BY THE COUNTY AS REQUIRED BY THE GENERAL PROVISIONS AND REQUIREMENTS. SHOULD "DAMAGE" OCCUR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LABOR TO REINSTALL SAID EQUIPMENT AT NO ADDITIONAL COSTS TO THE COUNTY. IF NEW EQUIPMENT IS REQUIRED, AS DETERMINED BY THE COUNTY, THE CONTRACTOR SHALL PROVIDE REPLACEMENT EQUIPMENT AT NO ADDITIONAL COST TO THE COUNTY.

REFERENCES

24. SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012)

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED
PROFESSIONAL ENGINEER

8/27/2026

Dustin Blaylock, P.E.
Signature of Registrant & Date

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

TRAFFIC SIGNAL GENERAL NOTES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	179

DATE: 8/27/2026 8:00:18 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_din\562115471417\cv-109-gn-signotes01.dgn

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: 8/27/2026
FILE: cv-109_TS_TxDot_ed-1-25.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, unused, and undamaged materials. Ensure that all materials and installations comply with 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 CSA Group, Intertek Testing Services, or FM Approvals 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 NEMA. 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 1/2 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 an 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 Producer 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 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 Metal 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 are present, count the conductors as if all are of the larger size. For situations not applicable to this table, size junction boxes per the NEC.

JUNCTION BOX SIZES

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 internal volumes up to 100 cu. in. and that are supported by entering raceways must have threaded entries or hubs identified for the intended purpose and be supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the box or within 18 in. of the box if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. in.

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 sized as directed above, listed and approved for outdoor use, unless otherwise noted on the plans. 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, unless otherwise shown in the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system.

A. MATERIALS (CONTINUED)

9. 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. below grade or bottom of the ground box, ground the RMC elbow with 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. Elbows are subsidiary to various bid items.

10. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to DMS-11060, "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors according to DMS-11030 for PVC conduit bid under Item 618. Provide conduit of the size and schedule as shown on the plans. Do not extend HDPE conduit into ground boxes or foundations. Provide PVC elbows at all ground boxes and foundations.

11. Use two-hole straps or strut straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized strut straps or stand-off 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 surfaces of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit supports 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 subgrade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the subbase 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. 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 affix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

7. Ensure conduit entry into the top of an 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.

8. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding bushing on all metal conduit terminations.

9. 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.

10. 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).

11. After completion of conductor installation, immediately seal ends of all conduits emerging from ground with duct seal, expandable foam, or other methods approved by the Engineer. Do not use silicone caulking. Do not use duct tape as a permanent seal.

12. File smooth the cut ends of all mounting strut and conduit. To avoid overspray, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% min. zinc content as specified on DMS-8103 and listed on the MPL for Galvanizing Repair Paints) before installing. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with zinc rich paint as an alternative for materials required to be galvanized.

13. For all conduits, ensure the burial depth is 18" min. For conduits placed under a roadway, ensure the burial depth is 24" min.

Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-25

FILE:	ed1-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS					
1-92 3-03 4-25		DIST	COUNTY		SHEET NO.
4-98 5-03			PARKER		180
12-00 10-14					

71A

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.

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated copper conductors in accordance with Departmental Material Specification DMS-11040, "Conductors" and Item 620, "Electrical Conductors." Provide conductors as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620.

2. 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 at each accessible location.

3. Insulated grounding conductors may be substituted for bare conductors, unless otherwise shown in the plans. Insulated grounding conductors must be color coded green in accordance with Note 2.

4. Provide a 6 AWG bare solid copper 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.

5. Where two or more circuits are present in one conduit or enclosure, permanently label the conductors of each branch circuit by attaching a non-metallic, weather resistant tag around both circuit conductors at each accessible location. Provide one-piece tags with two $\frac{3}{16}$" 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.

6. Use listed compression connectors, mechanical lugs, 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.

2. Leave 2 ft. to 3 ft. of length for each conductor up to the splice in ground boxes. Leave 3 ft. to 4 ft. of length for each conductor in ground boxes when pulled through with no splice. Leave 1 ft. to 1.5 ft. of length for each conductor at enclosures and pole bases. Leave 1.5 ft. to 3 ft. of length as required by electric utility for conductors exiting weatherheads.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression connectors, mechanical lugs, 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 each conductor 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 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.

B. CONSTRUCTION METHODS (CONTINUED)

10. Do not terminate more than one conductor under a single lug unless it is rated for multiple conductors. Do not exceed the lug's listing for maximum number and size of conductors allowed.

11. 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 a 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 in the conduit. Bond all EGCs together at every accessible location. For ITS installations, bond and ground metal ground box covers and other metal equipment as shown on ITS standards.

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 powering 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. When 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 locations. Concrete encased grounding electrodes may be called for in some locations including electrical services — see plan sheets.

B. CONSTRUCTION METHODS

1. Furnish and install ground rods 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 or concrete pole.

3. Install ground rods so the imprinted part number is at the upper end of the rod.

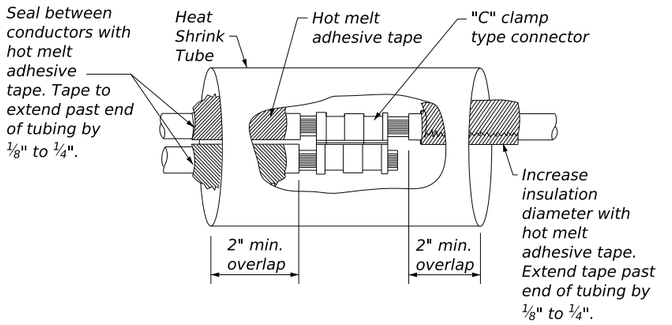
4. Remove all non-conductive material such as concrete splatter from the rod at the clamp location.

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 4 in.

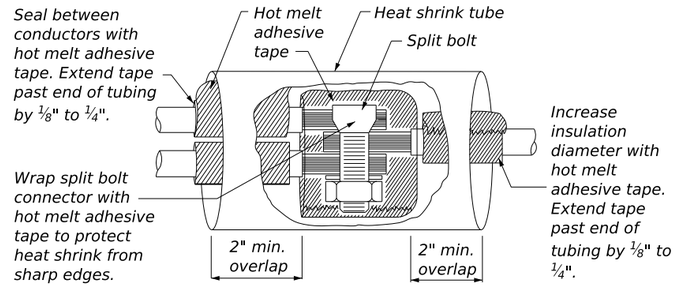
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding bushing and properly sized bonding jumper on each end of the metal conduit.

7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.

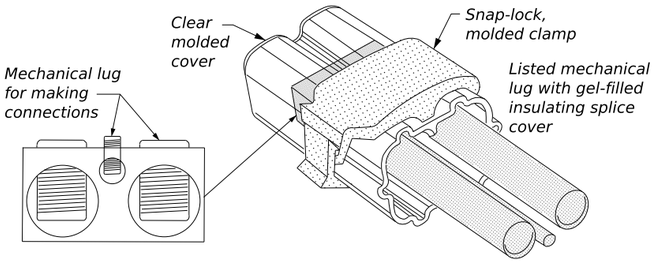
COMPRESSION SPLICE
OPTION 1



SPLIT BOLT SPLICE
OPTION 2



GEL-FILLED INSULATED SPLICE
OPTION 3



Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-25

FILE: ed3-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
1-92 12-00 10-14 10-93 3-03 4-25 4-98 5-03	DIST	COUNTY		SHEET NO.
		PARKER		181

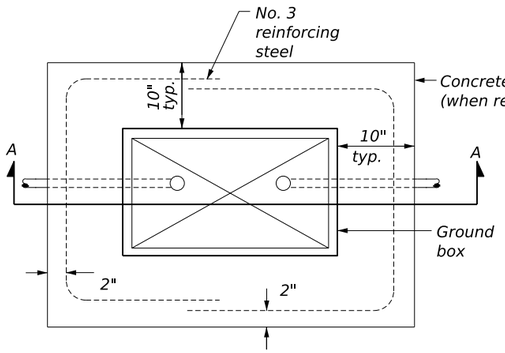
71C

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_ed-3-25.dgn

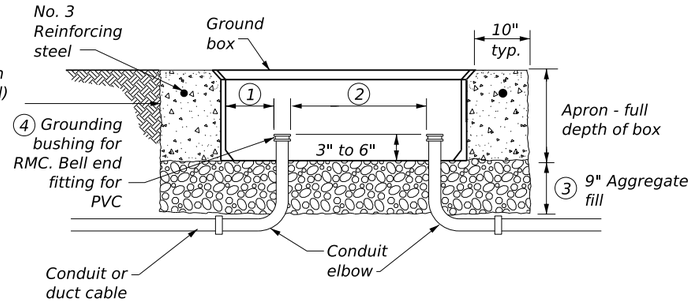
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

APRON FOR GROUND BOX

PLAN VIEW



SECTION A - A



SECTION A - A NOTES:

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 BOXES	
TYPE	OUTSIDE DIMENSIONS (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"

NOTES:

A. MATERIALS

1. *Provide polymer concrete ground boxes measuring 16 in. x 30 in. x 24 in. (W x L x D) 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.*

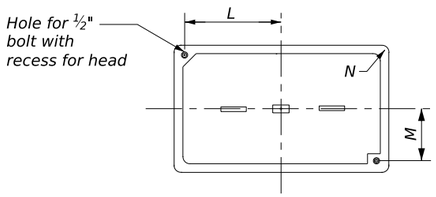
B. CONSTRUCTION METHODS

1. *Before setting ground box and after placing and capping conduits, lay an aggregate bed a minimum of 9 in. deep that extends 10 in. beyond the sides of the ground box. Provide coarse aggregate sized 3/4 in. to 2 in., with no more than 20% material passing through a no. 8 sieve, and as defined by the current ASTM C33/33M standard. Clean aggregate and dirt from conduits according to Item 618.*
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 elbows in a professional and skillful 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. 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 seal. Do not use silicone caulk as a sealant.*
7. *Bond all equipment grounding conductors in a ground box together with listed connectors.*
8. *When a Type B or D ground box is stacked to meet volume requirements, an appropriately sized hole may be cut for conduit entry in the side wall at least 18 in. 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 that is 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.*

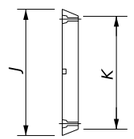
GROUND BOX COVERS								
TYPE	DIMENSIONS							
	H	I	J	K	L	M	N	P
A, B & E	23 ¼"	23"	13 ¾"	13 ½"	9 ⅞"	5 ⅛"	1 ⅜"	2"
C & D	30 ½"	30 ¼"	17 ½"	17 ¼"	13 ¼"	6 ¾"	1 ⅜"	2"

GROUND BOX COVER

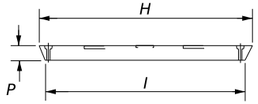
PLAN VIEW



END



SIDE



Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-25

FILE: ed4-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
1-92 3-03 4-25 4-98 5-03 12-00 10-14	DIST	COUNTY		SHEET NO.
		PARKER		182

71D

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_ed-4-25.dgn

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.

ELECTRICAL SERVICES NOTES

1. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS)-11080, "Electrical Services" and Item 628, "Electrical Services." 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.

2. 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.

3. Provide a Master Lock, Model No. 2, M1, or 6121, keyed to code 2195. Master Lock 2195 keys and locks become property of the Department. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

4. 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.

5. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

6. 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 conductors per ED(3). 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 1.5 ft. to 3 ft. as required by electric utility.

7. 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 shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 in. underground and then couple to the type and schedule of the conduit shown on the plans. Install a grounding bushing on the RMC where it terminates in the service enclosure.

8. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees from each other. Size this LFMC the same size as the service entrance conduit. LFMC must not exceed 3 ft. in length. Strap LFMC within 1 ft. of each end. Terminate each end of the LFMC with a grounding bushing or fitting. The LFMC must contain a grounded (neutral) conductor. Ensure bends in LFMC do not exceed 180 degrees. A pull test is required on all installed conductors, with at least 6 in. of free conductor movement demonstrated to the satisfaction of the Engineer.

9. Ensure all mounting hardware and installation details of services conform to utility company specifications.

10. Provide the following documents in the electrical service document pocket: schematic drawing unique to the service from the UL 508 shop; plan sheet showing Electrical Service Data Chart for the service; plan sheets for the circuits powered by the service; and red lined plan sheets if installation differs from the original design. Reduce larger sheets to 8 ½ in. x 11 in. and laminate all documents.

11. 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. When the enclosure has no door pocket, deliver these drawings to the Engineer before completion of the work.

12. 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 watertight conduit hub or meter hub.

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 (EXAMPLE) ∗

ELEC. SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION	SERVICE CONDUIT SIZE ∗∗	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CKT. BKR. POLE/AMPS	LIGHTING CONTACTOR AMPS	PANELBOARD/ 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	2P/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	2P/30	100	Sig. Controller	1P/30	23	5.3
									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.

ELECTRICAL SERVICE BID ITEM DESCRIPTIONS

ELEC SERV TY X XXX/XXX XXX(XX)XX(X)XX(X)

SCHEMATIC TYPE

SERVICE VOLTAGE

DISCONNECT AMP RATING
NOTE: 000 indicates main lug only, typically Type T

SAFETY SWITCH
(SS) = Safety Switch Ahead of Meter - Check with Utility
(NS) = No Safety Switch Ahead of Meter - Check with Utility

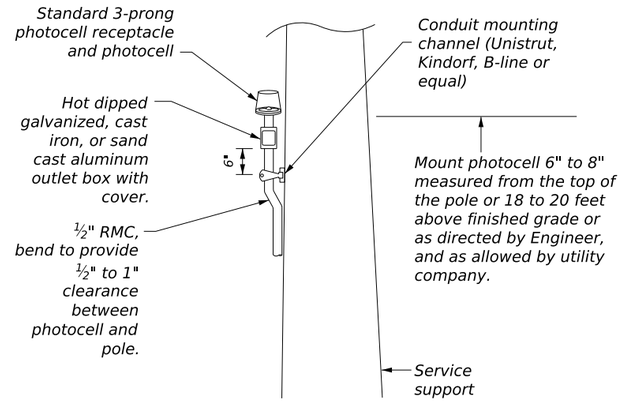
ENCLOSURE TYPE
GS = Galvanized steel ("off the shelf")
SS = Stainless steel (Custom Enclosure) - See MPL
AL = Aluminum (Custom Enclosure) - See MPL

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

SERIVCE FEED
O = Overhead Service Feed from Utility
U = Underground Service Feed from Utility

TOP MOUNTED PHOTOCELL



Install conduit strap maximum 3 ft. from box. Spacing between straps supporting conduit is 5 ft. maximum.

Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-25

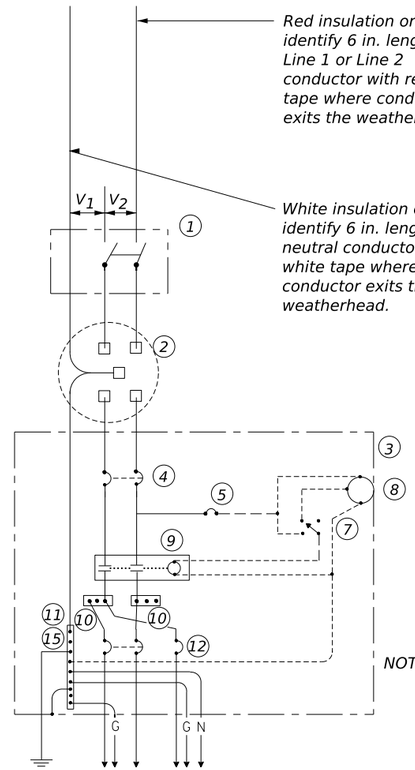
FILE: ed5-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-98 10-14 12-00 4-25 3-03	DIST	COUNTY		SHEET NO.
		PARKER		183

71E

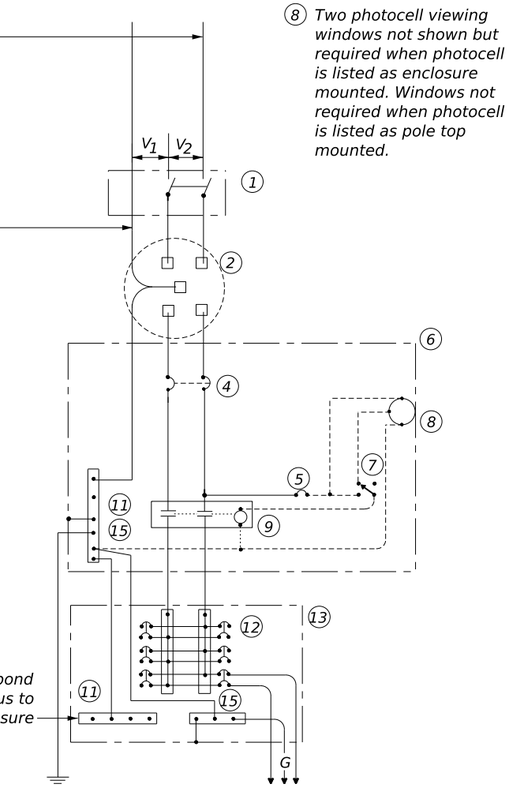
DATE: 8/27/2026
FILE: cv-109 TS_TxDot_ed-5-25.dgn

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.

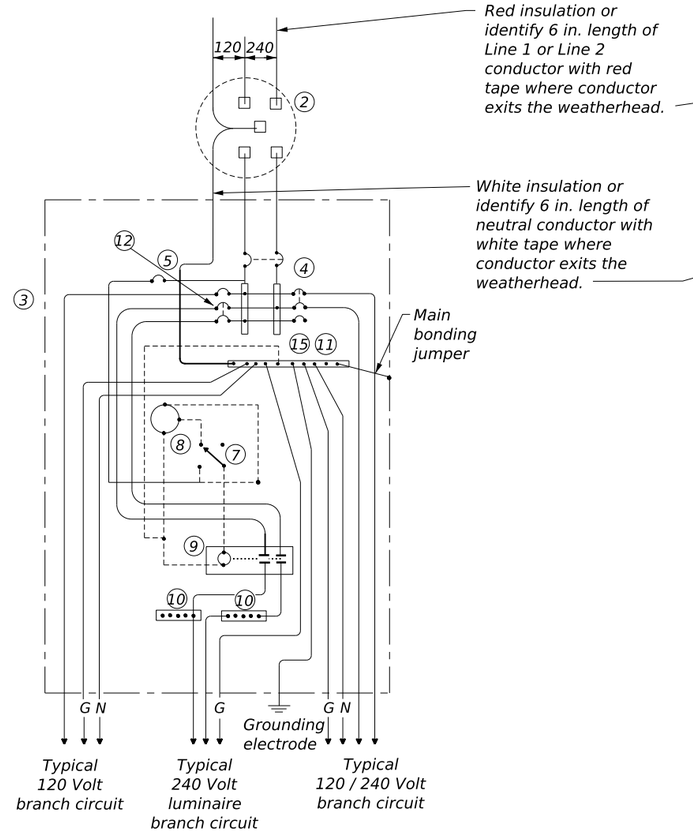
TYPE A
THREE WIRE



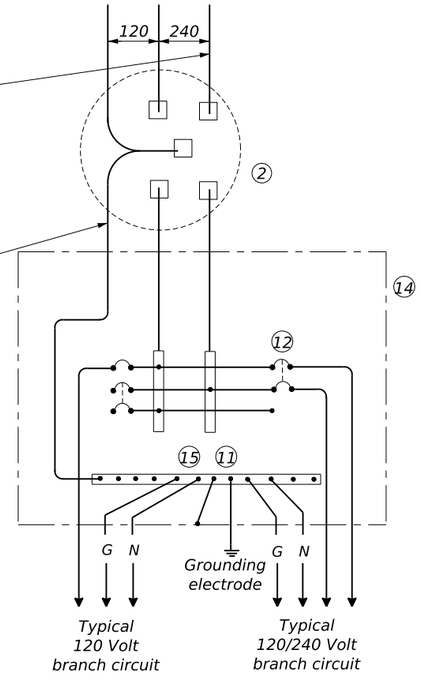
TYPE C
THREE WIRE



TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



TYPE T
120/240 VOLTS - THREE WIRE



NOTE: Galvanized steel - "off the shelf" only. When a photocell is required, install at top of pole or on luminaire only.

WIRING LEGEND	
———	Power Wiring
- - - - - - - - -	Control Wiring
——N——	Neutral Conductor
——G——	Equipment grounding conductor (always required)

SCHEMATIC NOTES:

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 Safety Division Standard

ELECTRICAL DETAILS SERVICE SCHEMATICS AND NOTES

ED(6)-25

FILE: ed6-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-98 10-14 12-00 4-25 3-03	DIST	COUNTY		SHEET NO.
		PARKER		184

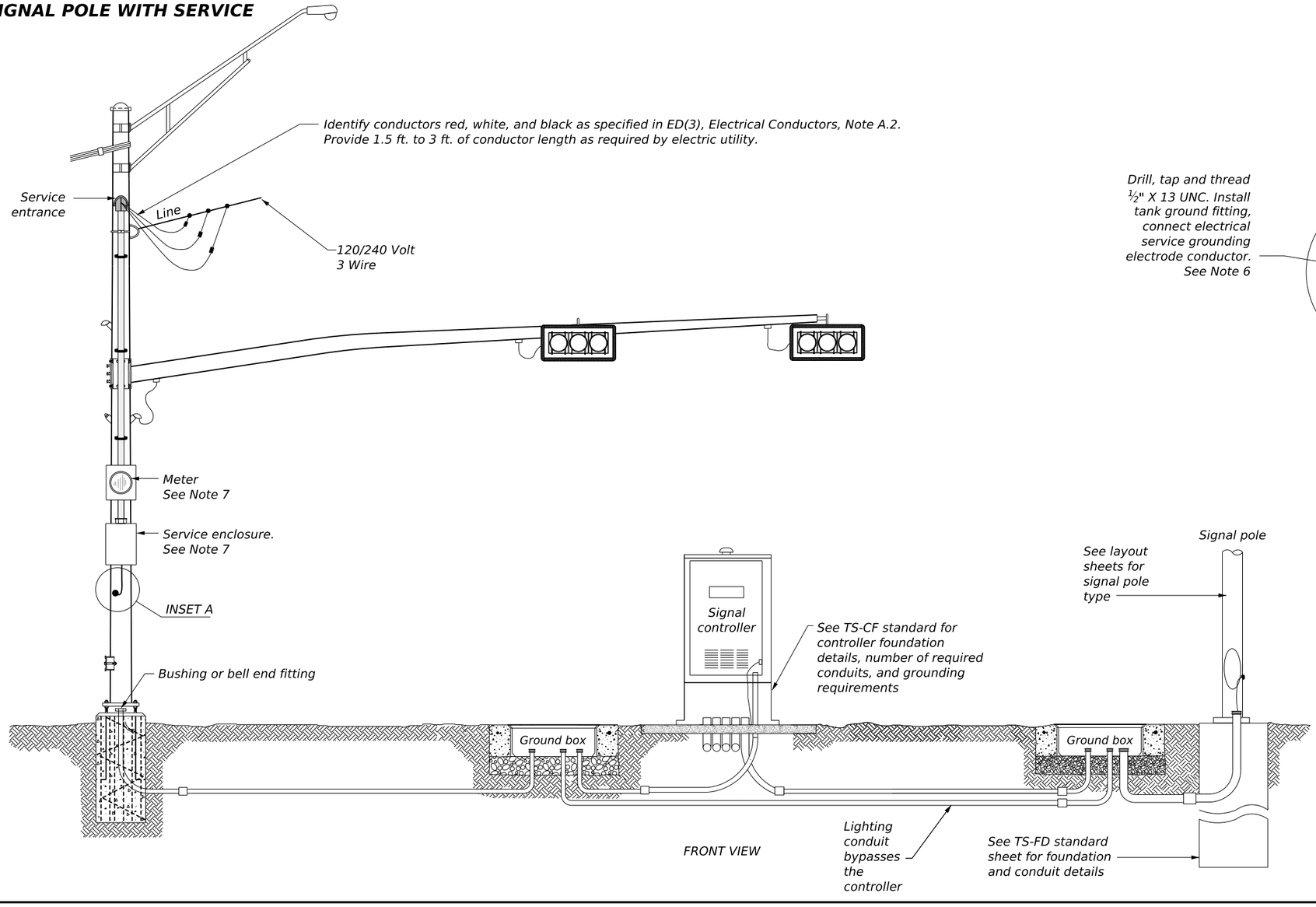
71F

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_ed-6-25.dgn

NOTES:

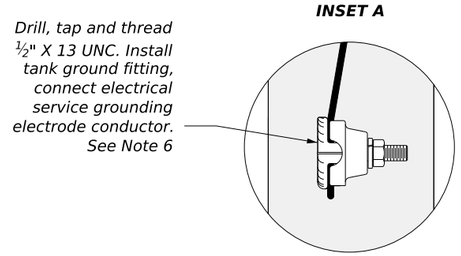
1. *Do not pass luminaire conductors through the signal controller cabinet.*
2. *Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.*
3. *Provide roadway luminaires, when required, in accordance with Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.*
4. *Ground internally lighted street name (ILSN) signs to the pole with a 12 AWG green XHHW conductor.*
5. *Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.*
6. *Drill and tap signal poles for ½ in. x 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.*
7. *Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are at least ¾ in. wide. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.*
8. *Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.*
9. *Terminate conduits entering the top of enclosures with a watertight conduit hub or meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.*

SIGNAL POLE WITH SERVICE



FRONT VIEW

INSET A



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: 8/27/2026
FILE: cv-109_TS_TxDot_ed-8-25.dgn

Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-25

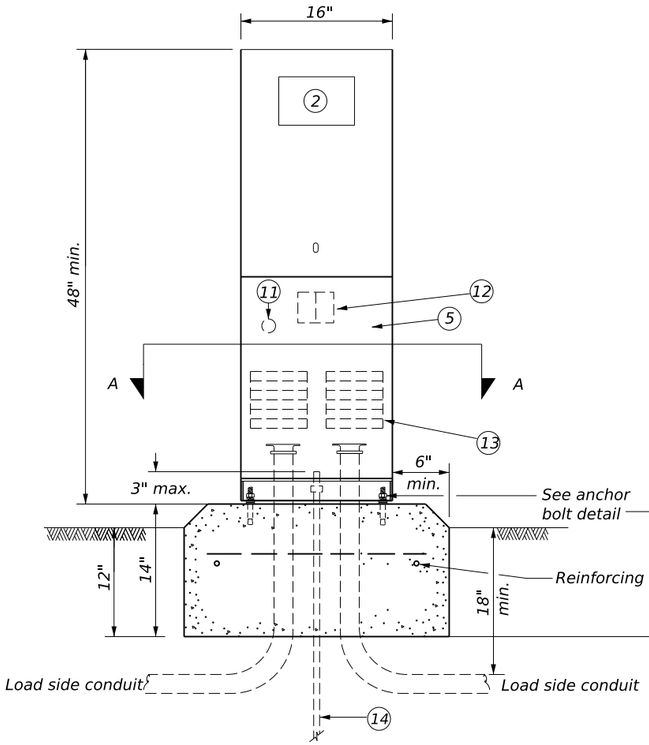
FILE: ed8-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-92 3-03 4-25 4-98 5-03 12-00 10-14	DIST	COUNTY		SHEET NO.
		PARKER		185

71H

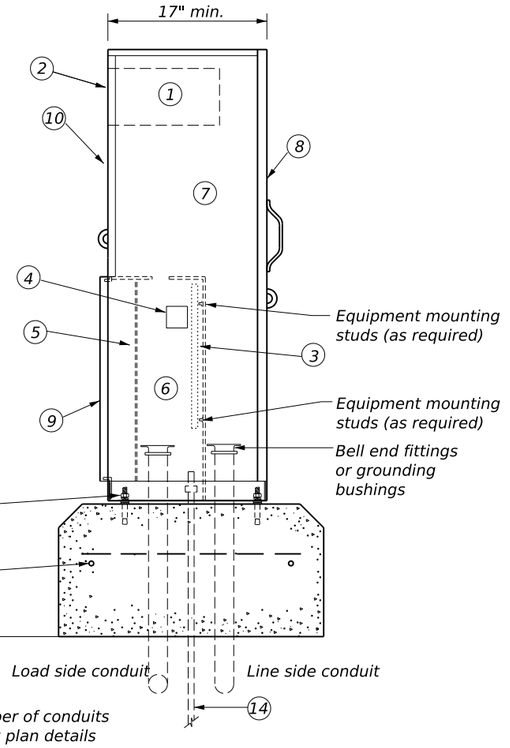
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_ed-9-25.dgn

FRONT VIEW

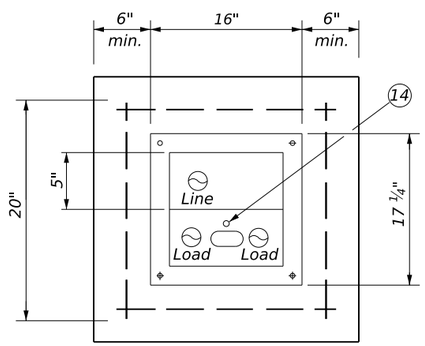


SIDE VIEW

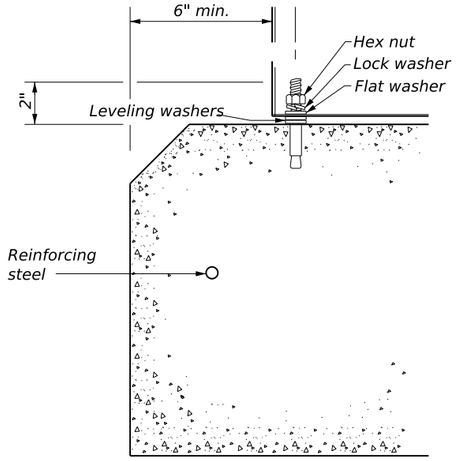


NOTE: Type D shown, Type A similar except that Type A shall have circuit breakers (CB) mounted on an equipment mounting panel. CB handles shall protrude through hinged deadfront trim.

SECTION A-A



ANCHOR BOLT DETAIL



NOTES:

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications DMS-11080, "Electrical Services," DMS-11085, "Electrical Services-Pedestal (PS)" and Item 628, "Electrical Services." Provide pedestal electrical services listed on the Material Producer list (MPL) under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a 100 amp (minimum) rating that complies with local utility requirements.
3. Provide concrete for pedestal service foundations in accordance with Item 656, "Foundations for Traffic Control Devices" except that concrete will not be paid for directly but is considered subsidiary to Item 628.
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install ½ in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Match anchor location to mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
6. Finish top of concrete foundation in a professional and skillful manner. If leveling washers are used, ensure no more than ⅛ in. of gap exists at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. Ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the Department.
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal services.
8. Ensure all elbows in the foundation are sized to meet utility provider's conduit requirements for underground conduit and feeders. PVC conduit extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a properly terminated bonding jumper.

DETAIL CALLOUTS:

1. Meter socket (when required)
2. Meter socket window (when required)
3. Equipment mounting panel
4. Photoelectric control window (when required)
5. Hinged deadfront trim
6. Load side conduit area
7. Line side conduit area
8. Utility access door, with handle
9. Pedestal door
10. Hinged meter access
11. Control station (H-O-A switch)
12. Main disconnect
13. Branch circuit breakers
14. Copper clad ground rod (in load side of cabinet) - 5/8" x 10'

Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS
PEDESTAL SERVICE TYPE PS

ED(9)-25

FILE: ed9-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-98 5-03 12-00 10-14 3-03 4-25	DIST	COUNTY		SHEET NO.
		PARKER		186

71J

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.

NOTES:

1. Provide duct cable in accordance with Departmental Material Specification DMS-11060, "Duct Cable" and Special Specification 6000, "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Special Specification 6000 - Duct Cable. Provide and install duct cable according to NEC Article 354, Nonmetallic Underground Conduit with Conductors (NUCC).

2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS-11030 and Item 618, "Conduit." Provide HDPE as listed on the MPL on the Department web site under "Roadway Illumination and Electrical Supplies," Item 618.

3. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Bend duct cable and HDPE conduit as recommended by the manufacturer, with a minimum bending radius of 26 in. for 2 in. duct. Follow manufacturers' recommendations when handling duct cable and HDPE conduit reels and during installation of duct cable and HDPE conduit.

4. Do not splice conductors within duct cable or HDPE conduit. Couple duct cable and HDPE entering a ground box or foundation to a PVC elbow. When galvanized steel rigid metal conduit (RMC) elbows are called for in the plans and any portion of the RMC elbow is buried less than 18 in. from possible contact, ground the RMC elbow.

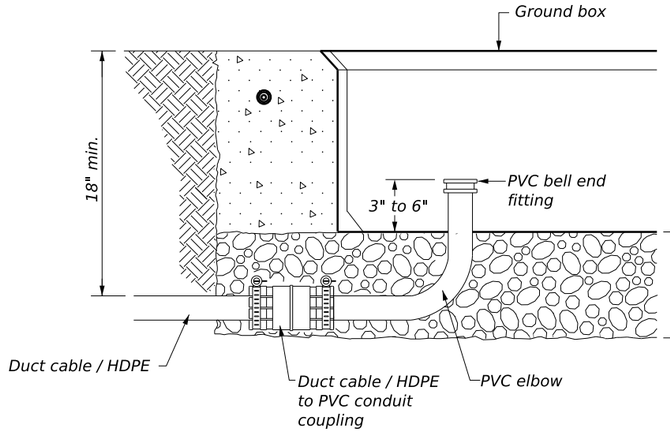
5. When conduit casing is called for in the plans, extend duct cable or HDPE conduit through the conduit casing in one continuous length without connection to the casing.

6. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after installation.

7. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.

8. Furnish and install listed fittings to couple duct cable or HDPE conduit to other types of conduit. Duct cable and HDPE conduit may be field-threaded and spliced with PVC or RMC threaded couplings; connected with listed tie-wrap fittings; connected using listed couplings made of HDPE with stainless steel external banding clamps and locking rings; connected with approved electrofusion conduit couplings; or connected using an approved chemical fusion method using an epoxy or adhesive specifically designed for HDPE couplings and connectors. Install connectors in accordance with manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

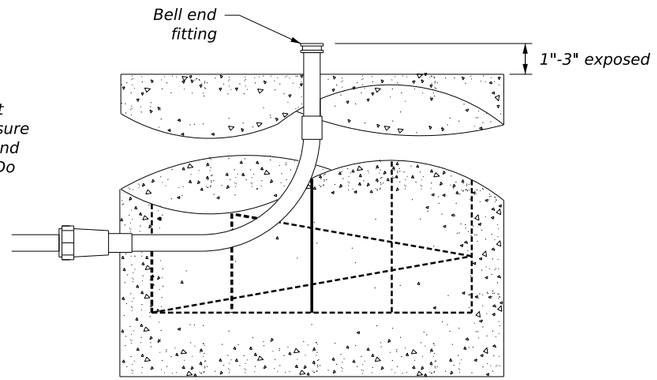
DUCT CABLE/HDPE AT GROUND BOX



When the upper end of an RMC elbow does not enter the ground box,it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18 in. of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.

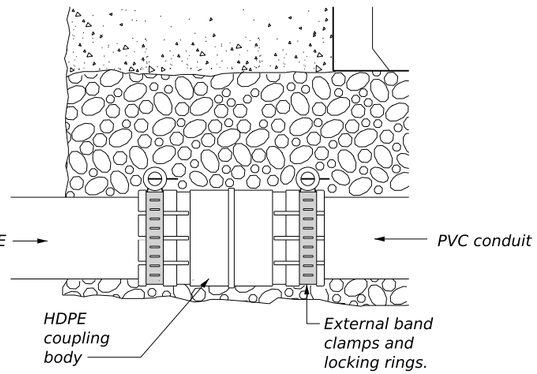
Bed of aggregate is to be a minimum of 9 in. deep, placed under and not in the ground box. Ensure the aggregate does not encroach into the interior of the box.

DUCT CABLE / HDPE AT FOUNDATION

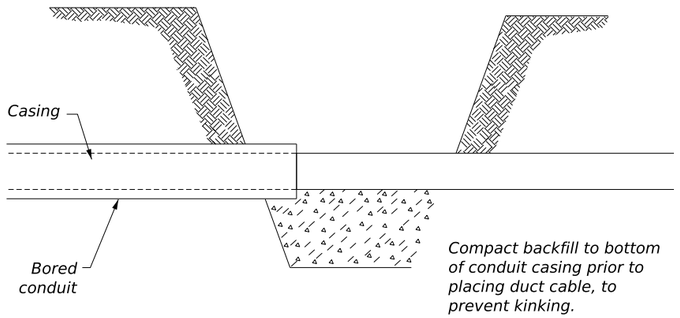


Couple duct to conduit elbow at foundations. Ensure conductors extend into pole base. Do not splice conductors in conduit.

DUCT CABLE / HDPE TO PVC



BORE PIT DETAIL



Compact backfill to bottom of conduit casing prior to placing duct cable, to prevent kinking.

Texas Department of Transportation

Traffic Safety Division Standard

ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT

ED(11)-25

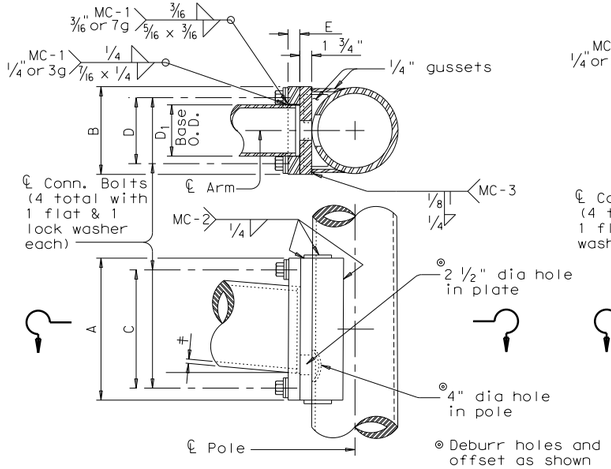
FILE: ed11-25.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2025	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-98 10-14 12-00 4-25 3-03	DIST	COUNTY		SHEET NO.
		PARKER		187

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_ed-11-25.dgn

71L

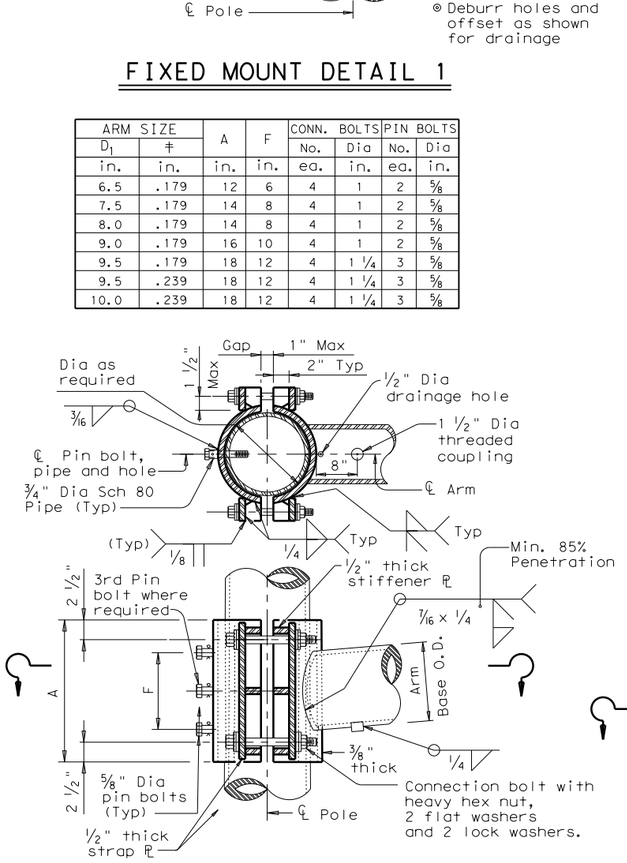
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



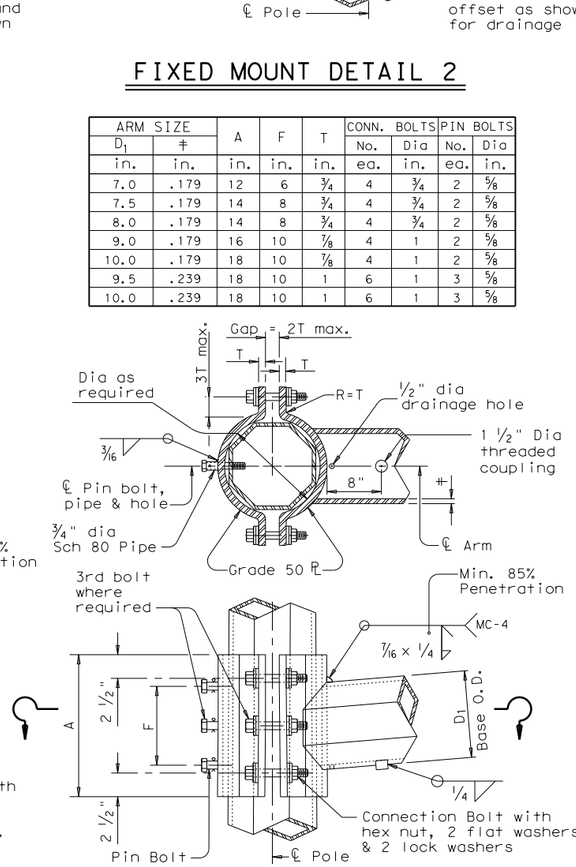
FIXED MOUNT DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 ¼	3	5/8
9.5	.239	18	12	4	1 ¼	3	5/8
10.0	.239	18	12	4	1 ¼	3	5/8



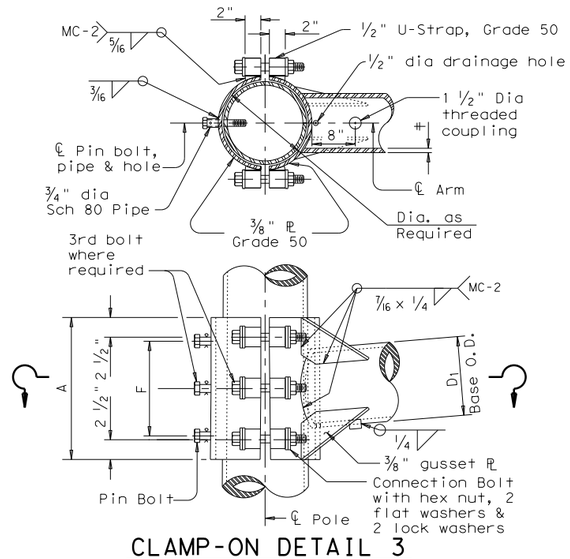
CLAMP-ON DETAIL 1

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	6	¾	4	¾	2	5/8
7.5	.179	14	8	¾	4	¾	2	5/8
8.0	.179	14	8	¾	4	¾	2	5/8
9.0	.179	16	10	⅞	4	1	2	5/8
10.0	.179	18	10	⅞	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

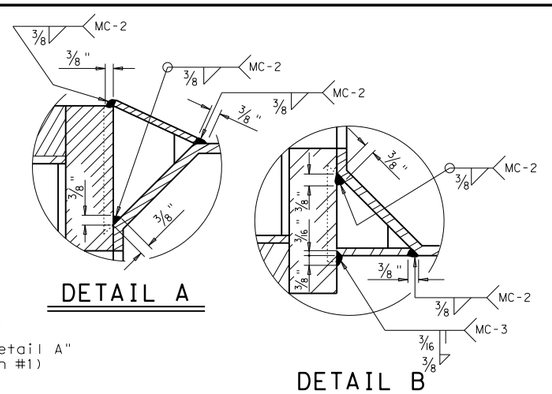


CLAMP-ON DETAIL 2

ARM SIZE D_1 in.	ARM SIZE ǂ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

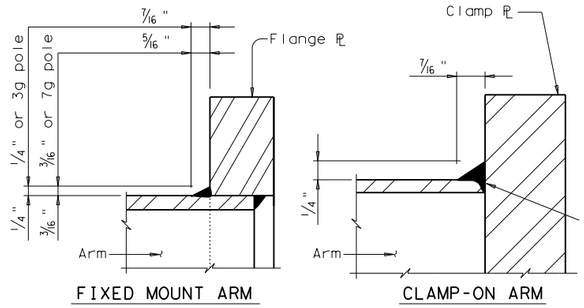


CLAMP-ON DETAIL 3



DETAIL A

DETAIL B



FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 5/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

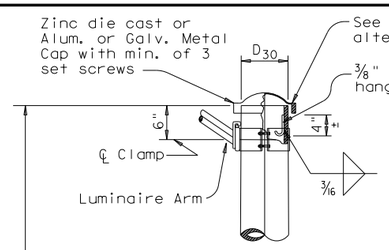
©TxDOT August 1995	DGN: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS 5-96 5-09 1-12	DIST	COUNTY		SHEET NO.
		PARKER		188

126A

DATE: 8/27/2026
FILE: cv-109 TS TxDot MA-C-12.dgn

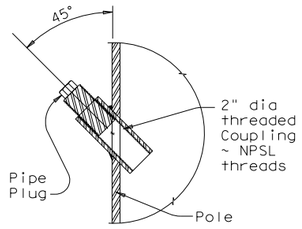
13141516

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.

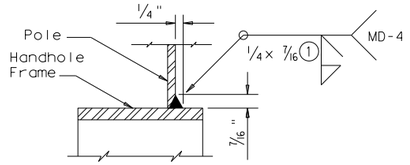


DETAIL A

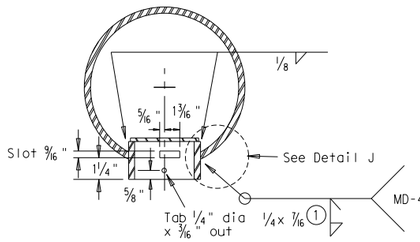
(for pole with luminaire)



POLE COUPLING DETAIL

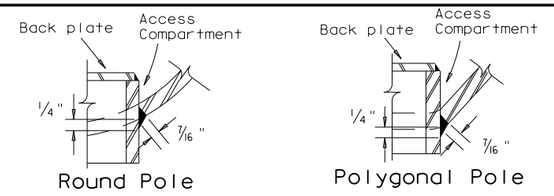


DETAIL G

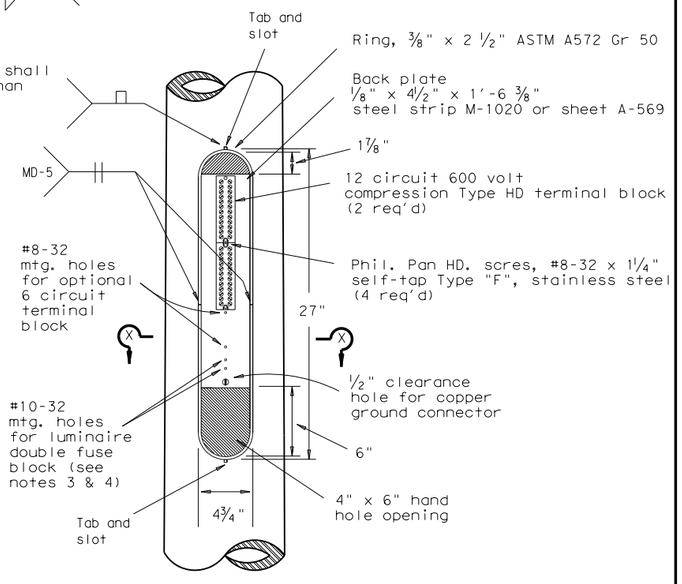


SECTION X-X

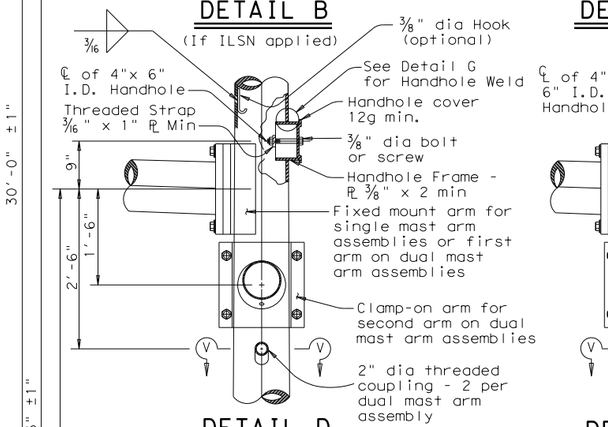
Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



DETAIL J

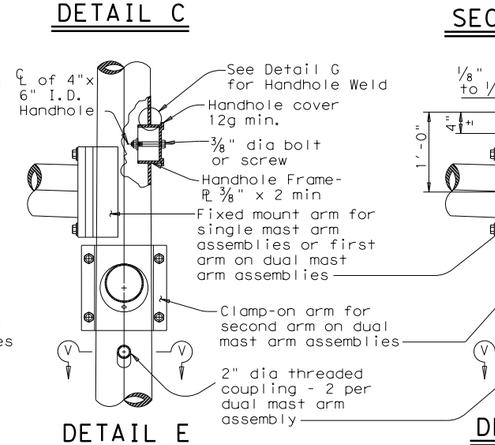


ACCESS COMPARTMENT



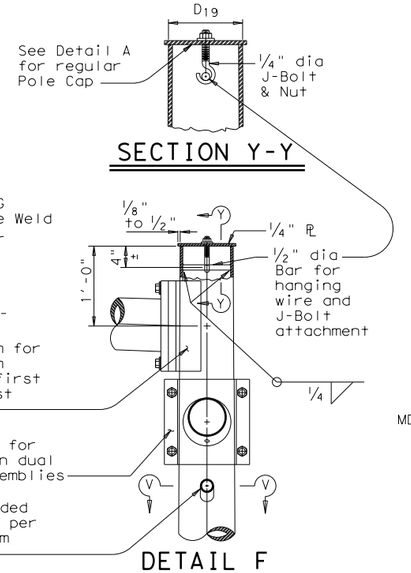
DETAIL D

(for 30' pole with luminaire and ILSN sign)



DETAIL E

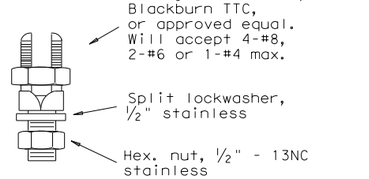
(for 24' pole with ILSN sign and no luminaire)



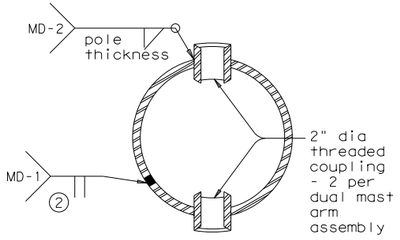
SECTION Y-Y

DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

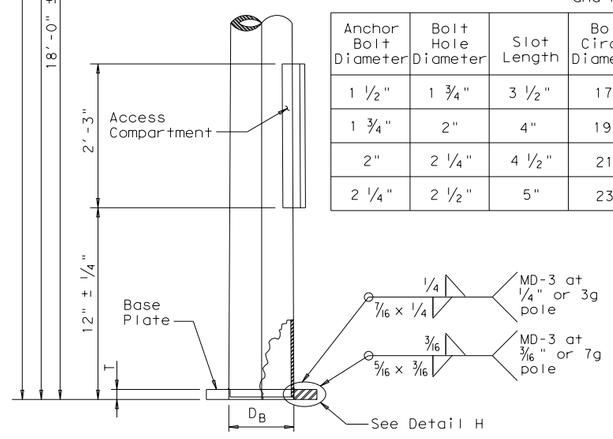


COPPER GROUND CONNECTOR

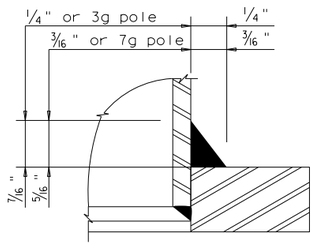


SECTION V-V

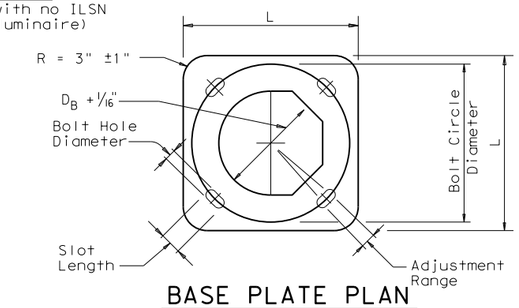
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



POLE ELEVATION



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

© TxDOT August 1995

DSN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS

DATE	DESCRIPTION
8-99	
1-12	

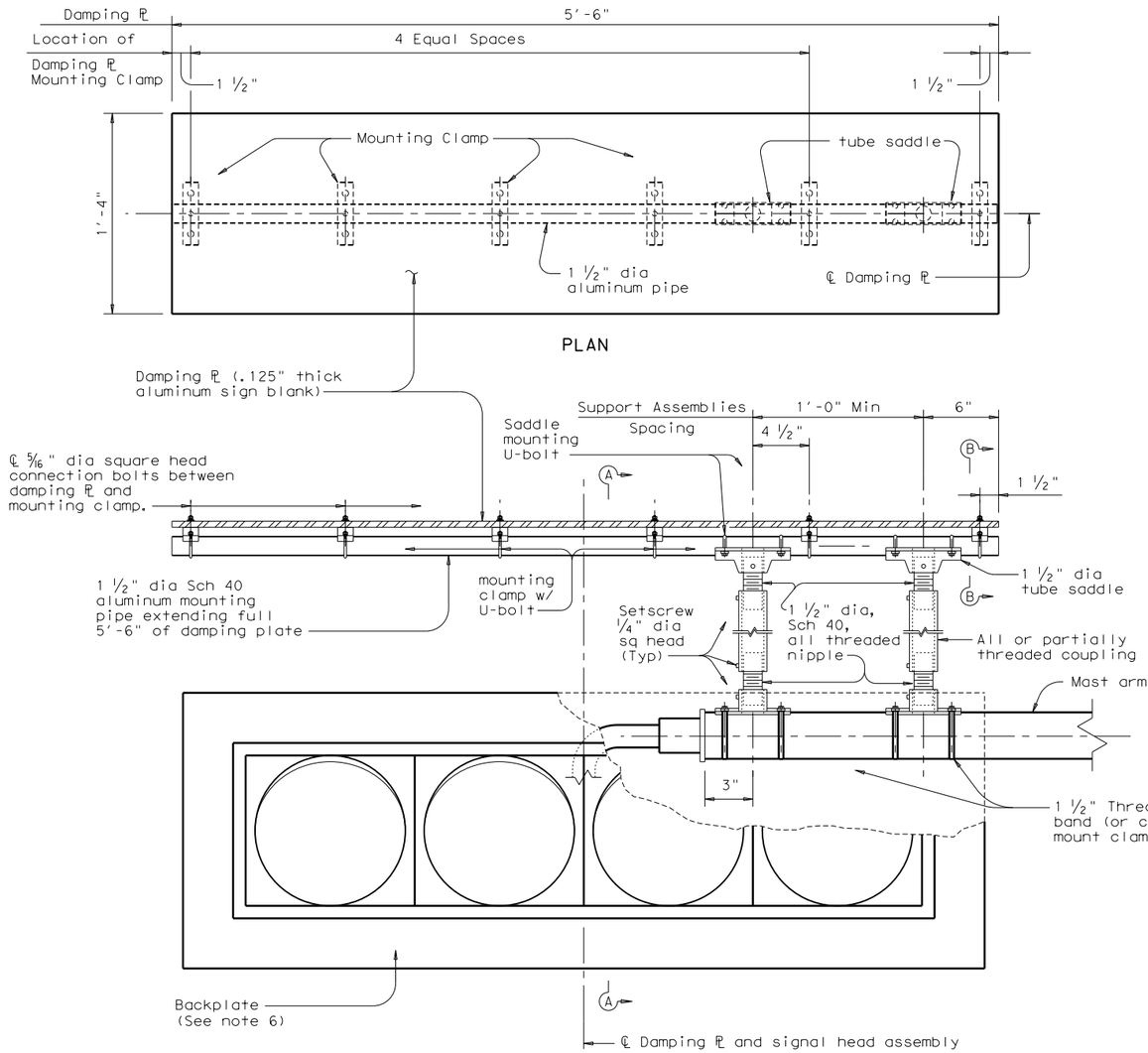
DIST	COUNTY	SHEET NO.
	PARKER	189

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_MA-D-12.dgn

13141516

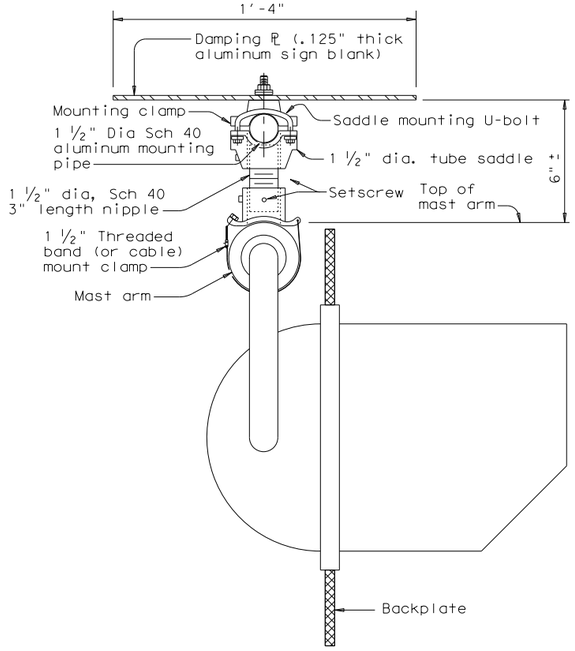
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/27/2026
cv-109_TS_TxDot_MA-DPD-20.dgn



DAMPING PLATE MOUNTING DETAILS

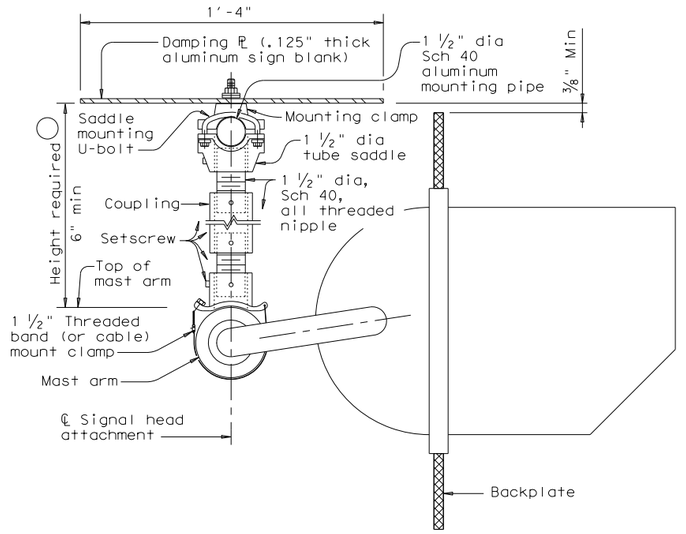
(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)

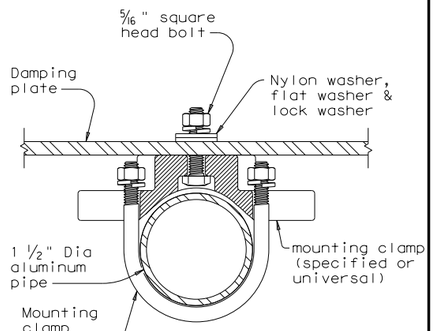
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

(Showing alternate placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)



SECTION B-B

(Showing damping plate attachment)

◯ Recommended supporting assemblies to achieve required height for horizontal section heads

Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.

3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

5. Contractor will verify applicable field dimensions before the installation.

6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B or C retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.

Texas Department of Transportation

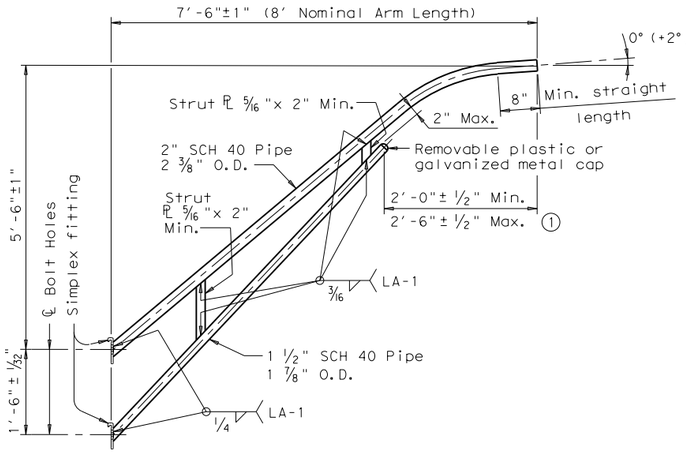
Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

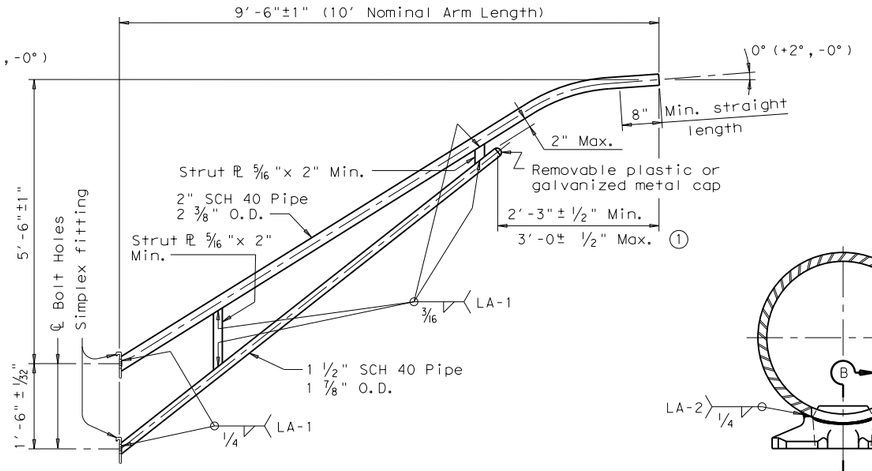
MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
◯ January 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS				
6-20	DIST	COUNTY		SHEET NO.
		PARKER		190

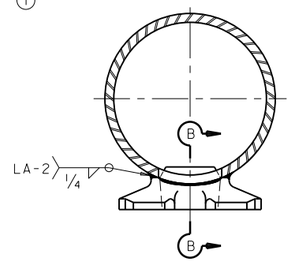
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



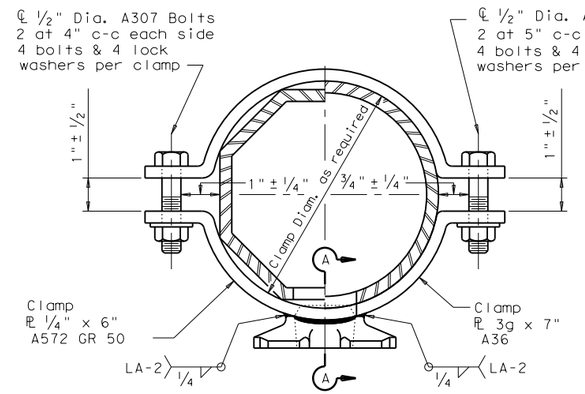
8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM

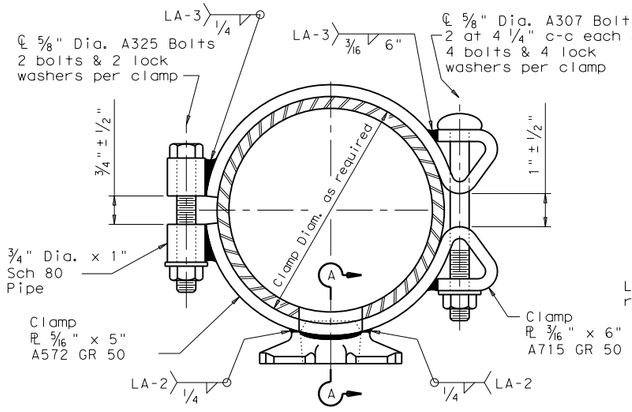


DETAIL



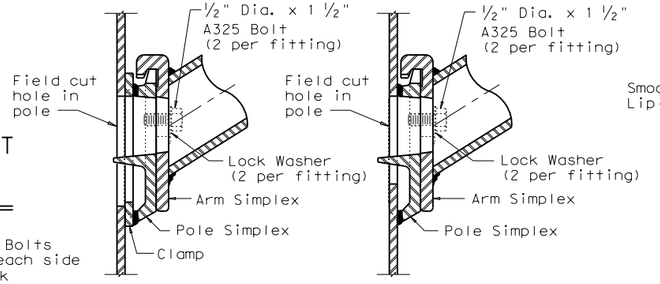
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



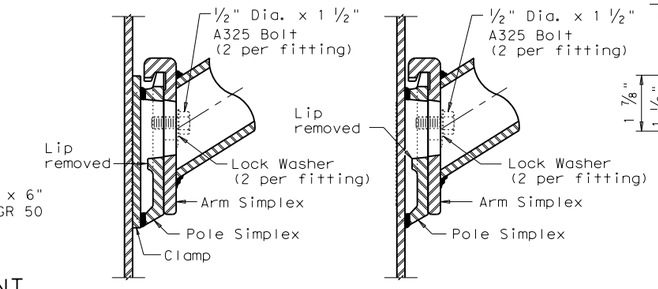
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING

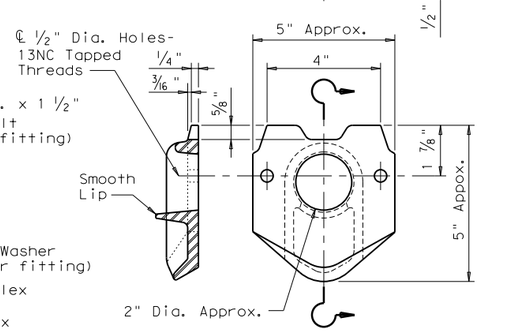


LOWER SIMPLEX FITTING

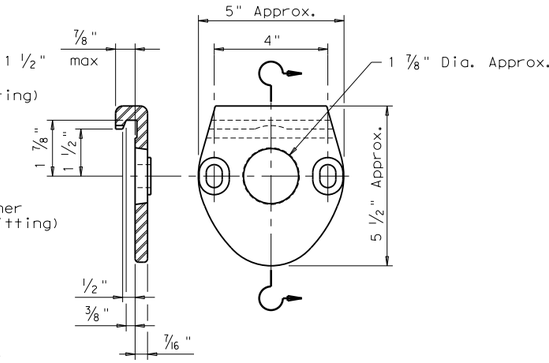
LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



POLE SIMPLEX DETAIL



ARM SIMPLEX DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

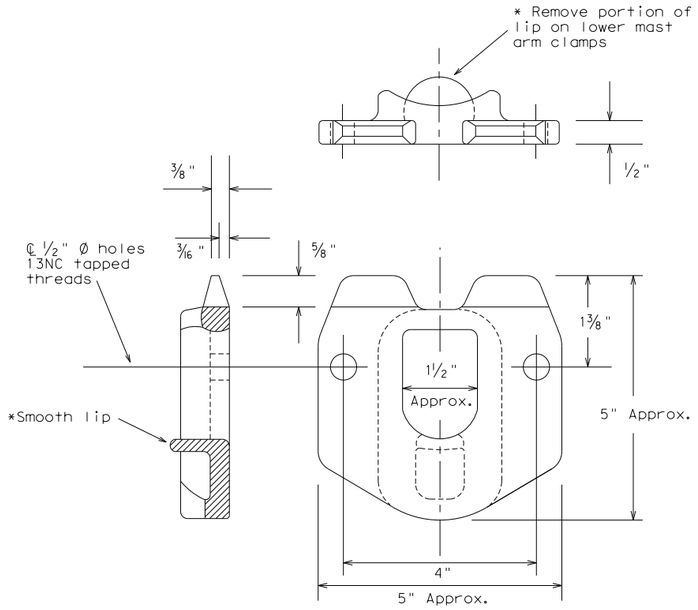
LUM-A-12

© TxDOT August 1995

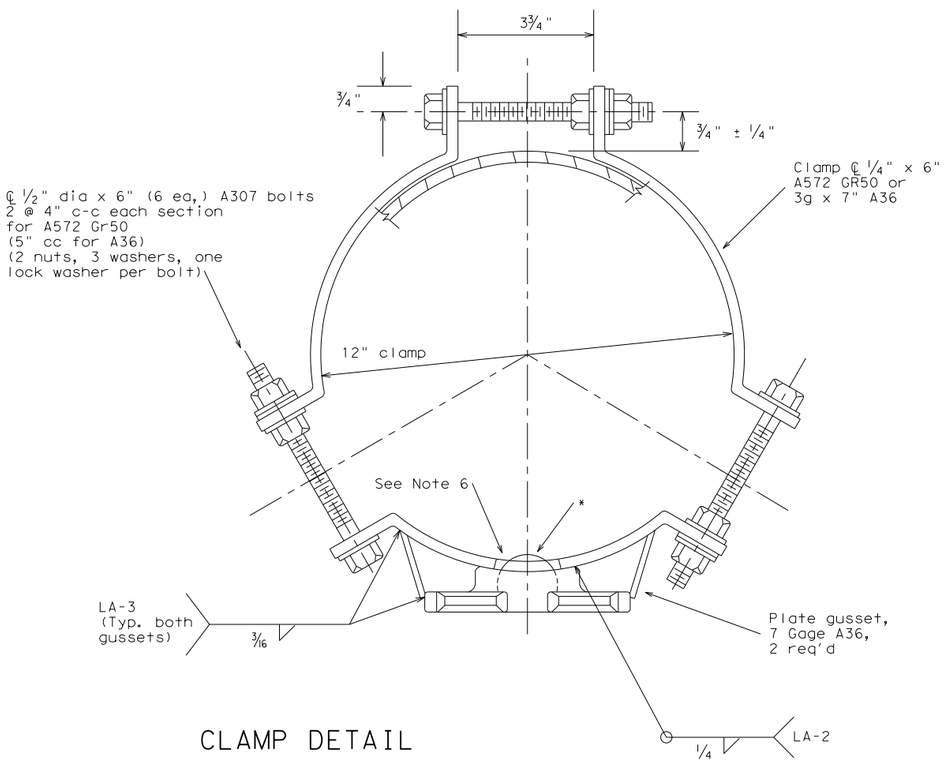
DSN: LEH	CK: JSY	DW: LTT	CK: TEB
REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96				
1-99				
1-12				
	DIST	COUNTY		SHEET NO.
		PARKER		191

DATE: 8/27/2026
FILE: cv-109-TS TxDot LUM-A-12.dgn

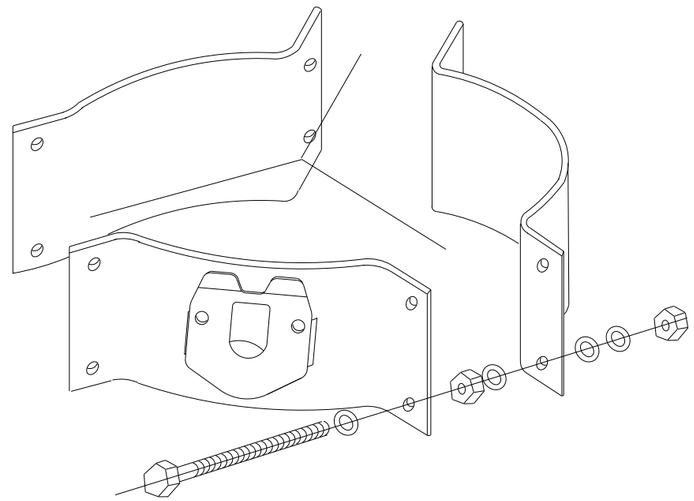
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



POLE SIMPLEX DETAILS



CLAMP DETAIL



PROJECTION

OTHER MATERIALS:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, 1/2in. X 1 1/2in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

© TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS				
11-99				
1-12				
	DIST	COUNTY		SHEET NO.
		PARKER		192

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_cfa.dgn

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.

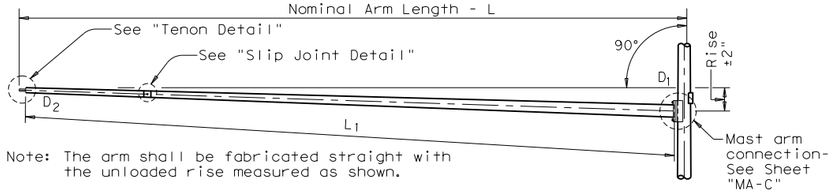
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

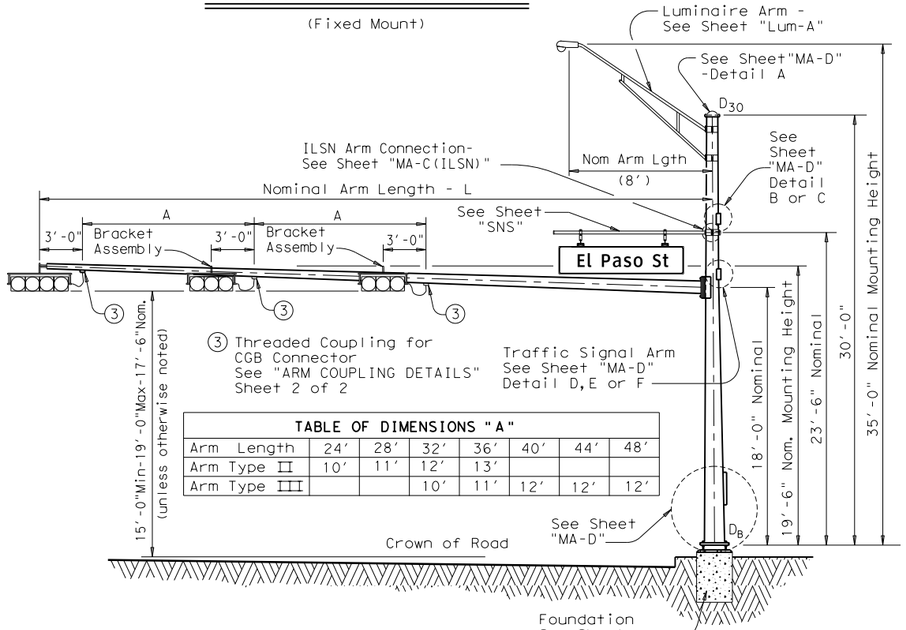


TABLE OF DIMENSIONS "A"							
Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80	1	28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80	1	36S-80		36-80	
40	40L-80	1	40S-80		40-80	
44	44L-80	1	44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1		
32			32II-80		32III-80	
36			36II-80		36III-80	1
40					40III-80	1
44					44III-80	1
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	3

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	1
1 ¾"	3'-10"	3

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

STATE OF TEXAS
DUSTIN BLAYLOCK
115500
LICENSED PROFESSIONAL ENGINEER

8/27/2026
Dustin Blaylock, P.E.
Signature of Registrant & Date

FREESE NICHOLS
TEXAS REGISTERED ENGINEERING FIRM F-2144

801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

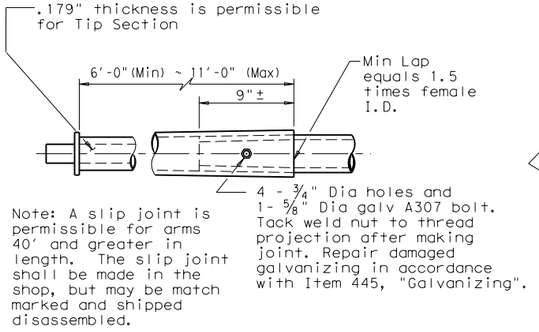
SMA-80(1)-12

© TxDOT	DGN: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96				
11-99				
1-12	DIST	COUNTY		SHEET NO.
		PARKER		193

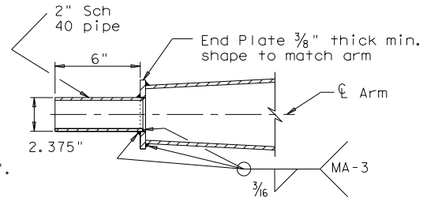
122A

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_SMA-80(1)-12.dgn

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.



SLIP JOINT DETAIL



TENON DETAIL

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

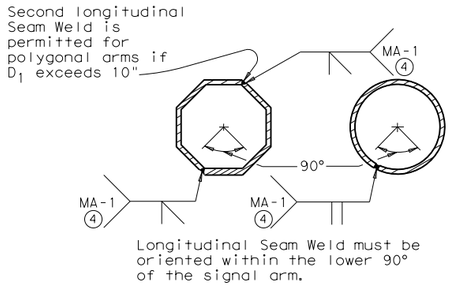
If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

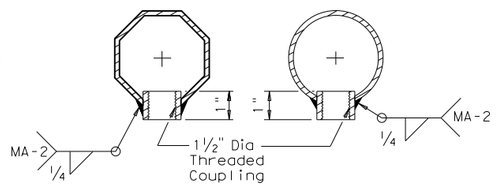
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

© TxDOT

DGN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS	FILE	DATE	DESCRIPTION
5-96			
1-12			

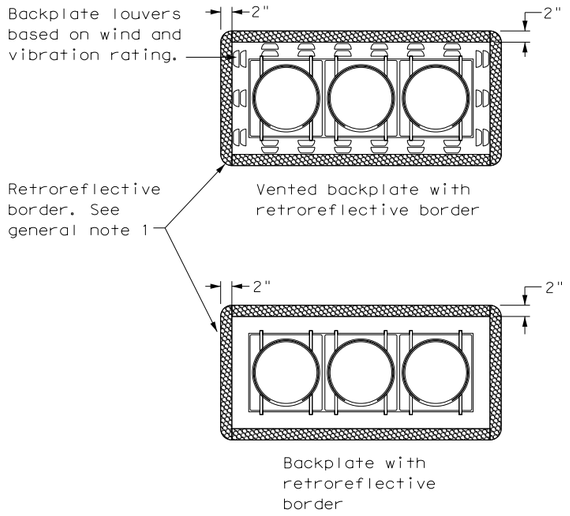
DIST	COUNTY	SHEET NO.
	PARKER	194

122B

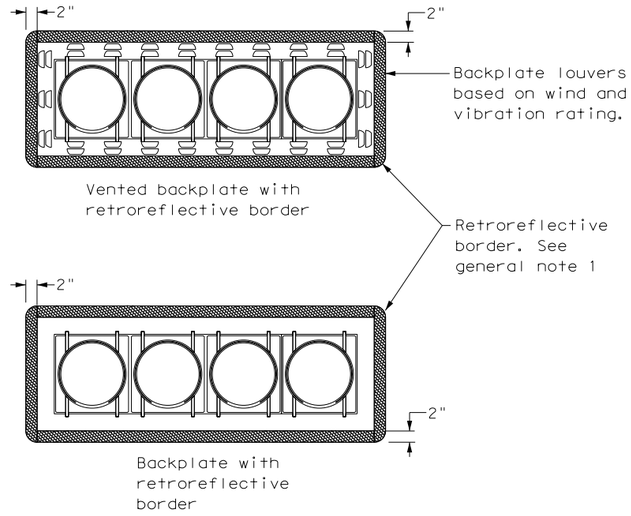
13141516

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_SMA-80(2)-12.dgn

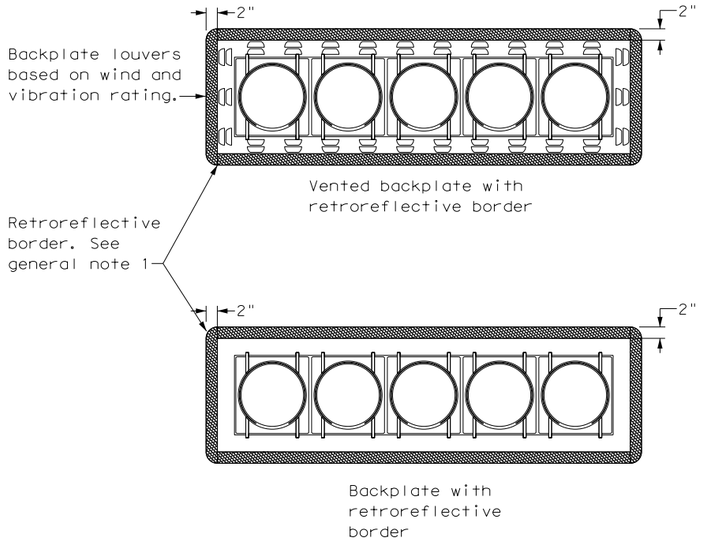
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



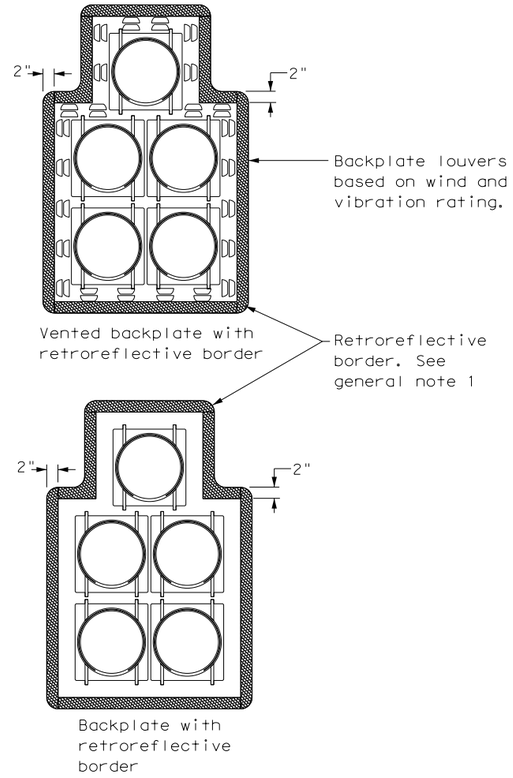
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



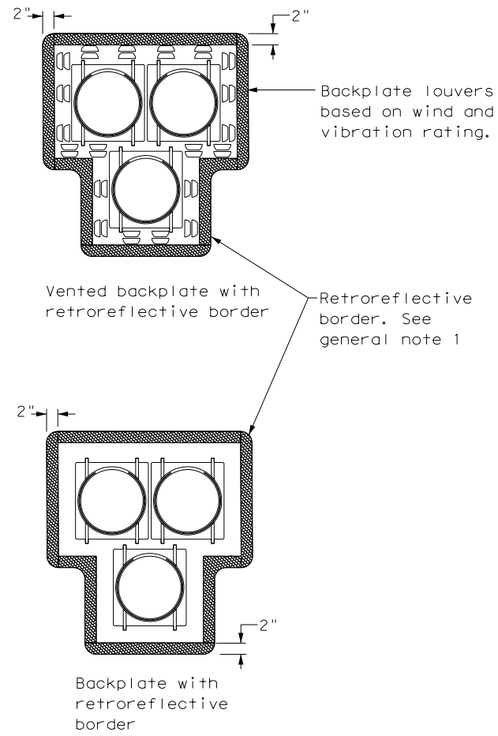
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B or C retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

Texas Department of Transportation

Traffic Safety Division Standard

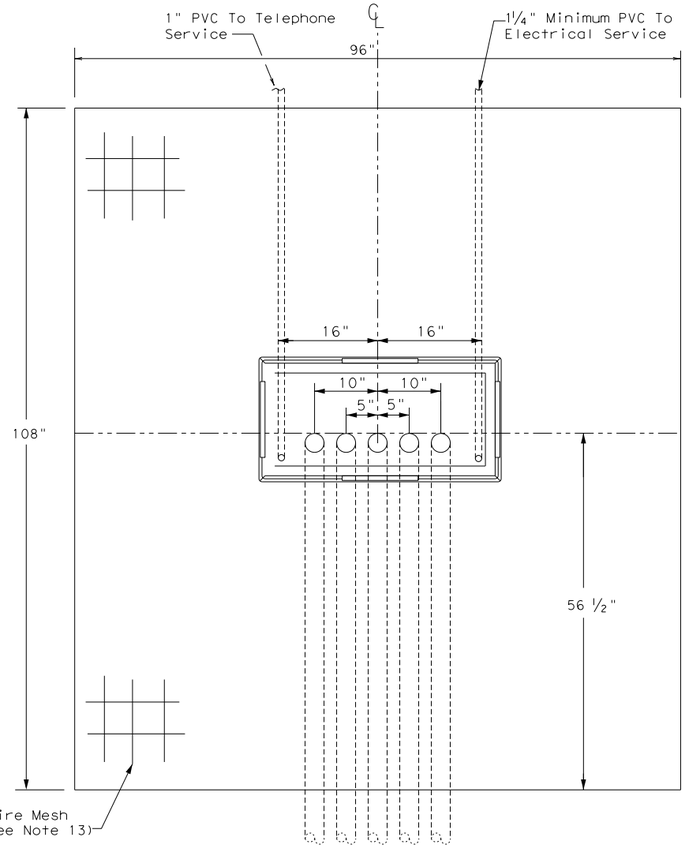
TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

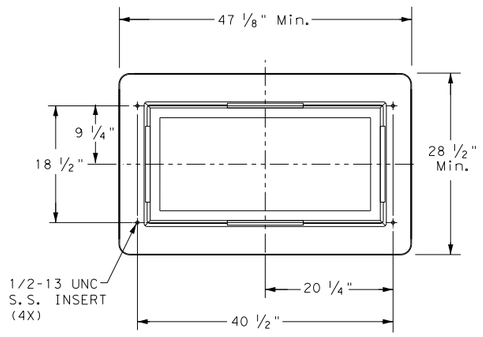
FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
○ June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		195

DATE: 8/27/2026
cv-109_TS_TxDot_TS-BP-20.dgn

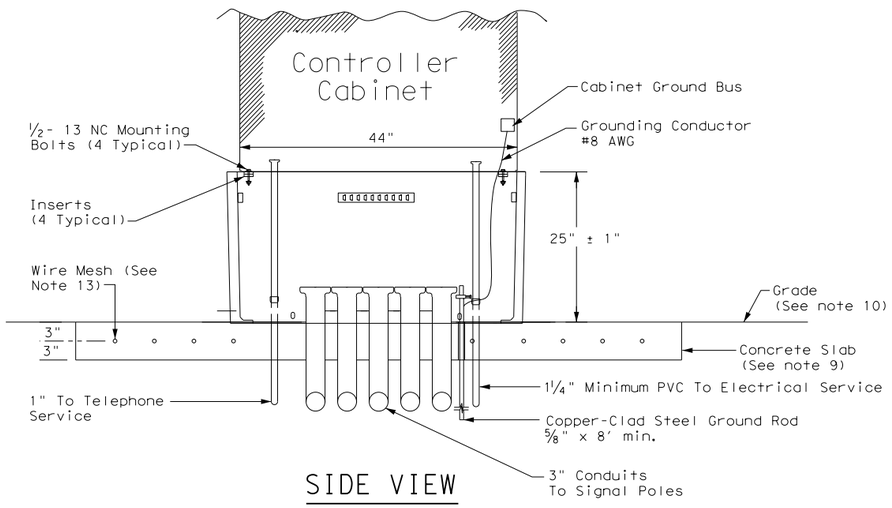
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



TOP VIEW



CABINET BASE



SIDE VIEW

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Safety Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four 1#2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9#16x 3#16inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1#2"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Grade earthwork such that it is flush with the concrete pad on all four sides, unless otherwise shown on the plans. Subsidiary to ITEM 680, four inch rip rap may be used in lieu of earthwork. Slopes shall gradually contour to match plans.
11. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
12. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
13. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
14. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

15. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
16. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
17. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
18. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

19. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
20. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

21. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-21

FILE: ts-cf-21.dgn	DN:	CK:	DW:	CK:
© TxDOT October 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS				
12-04	DIST	COUNTY		SHEET NO.
2-21		PARKER		196

132

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_CF-21.dgn

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.

NOTE: Structures north of ice line to be designed for ice.

ICE LINE

ZONE 2
(90 MPH WIND)

ZONE 3
(80 MPH WIND)

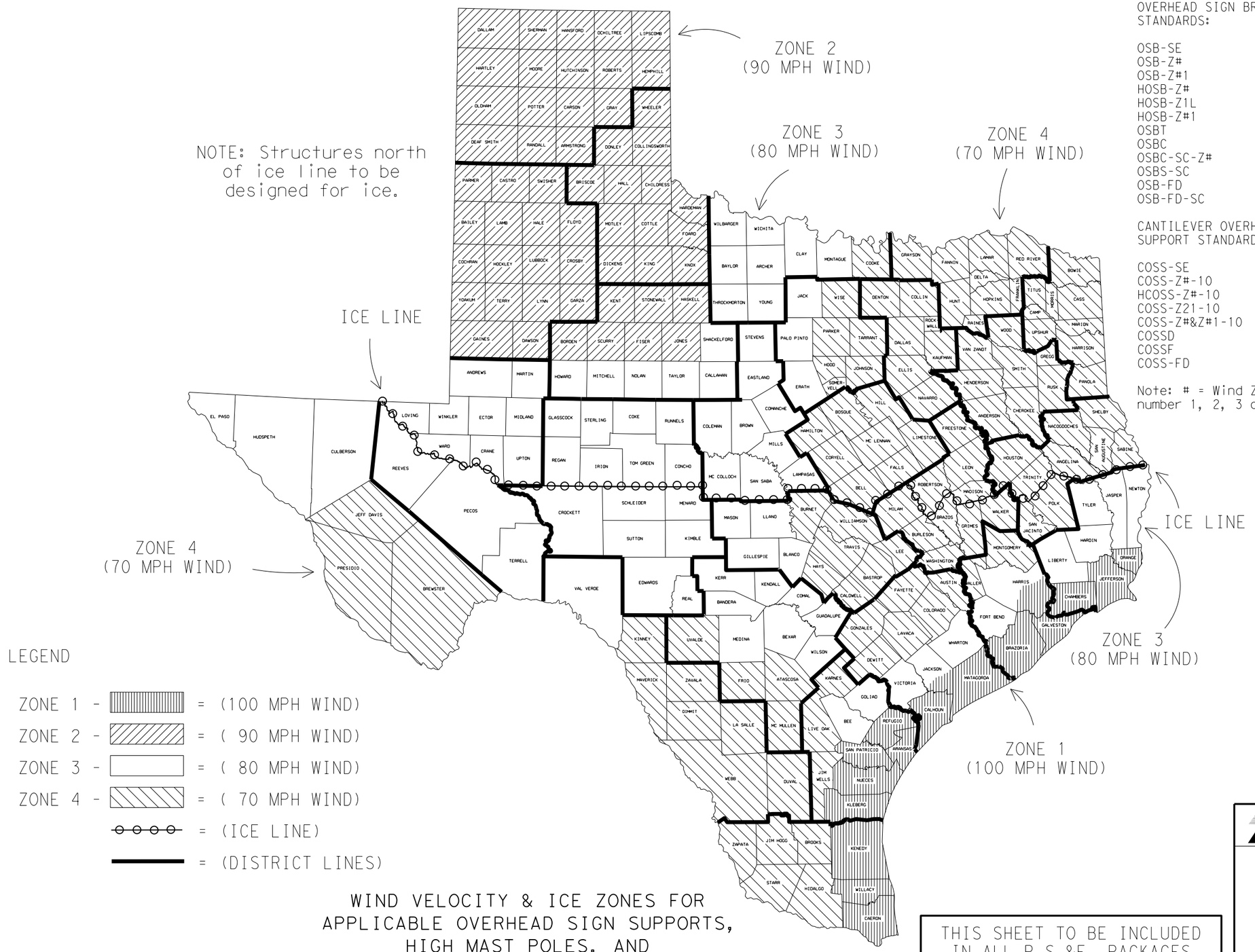
ZONE 4
(70 MPH WIND)

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 3
(80 MPH WIND)

ZONE 1
(100 MPH WIND)



LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation

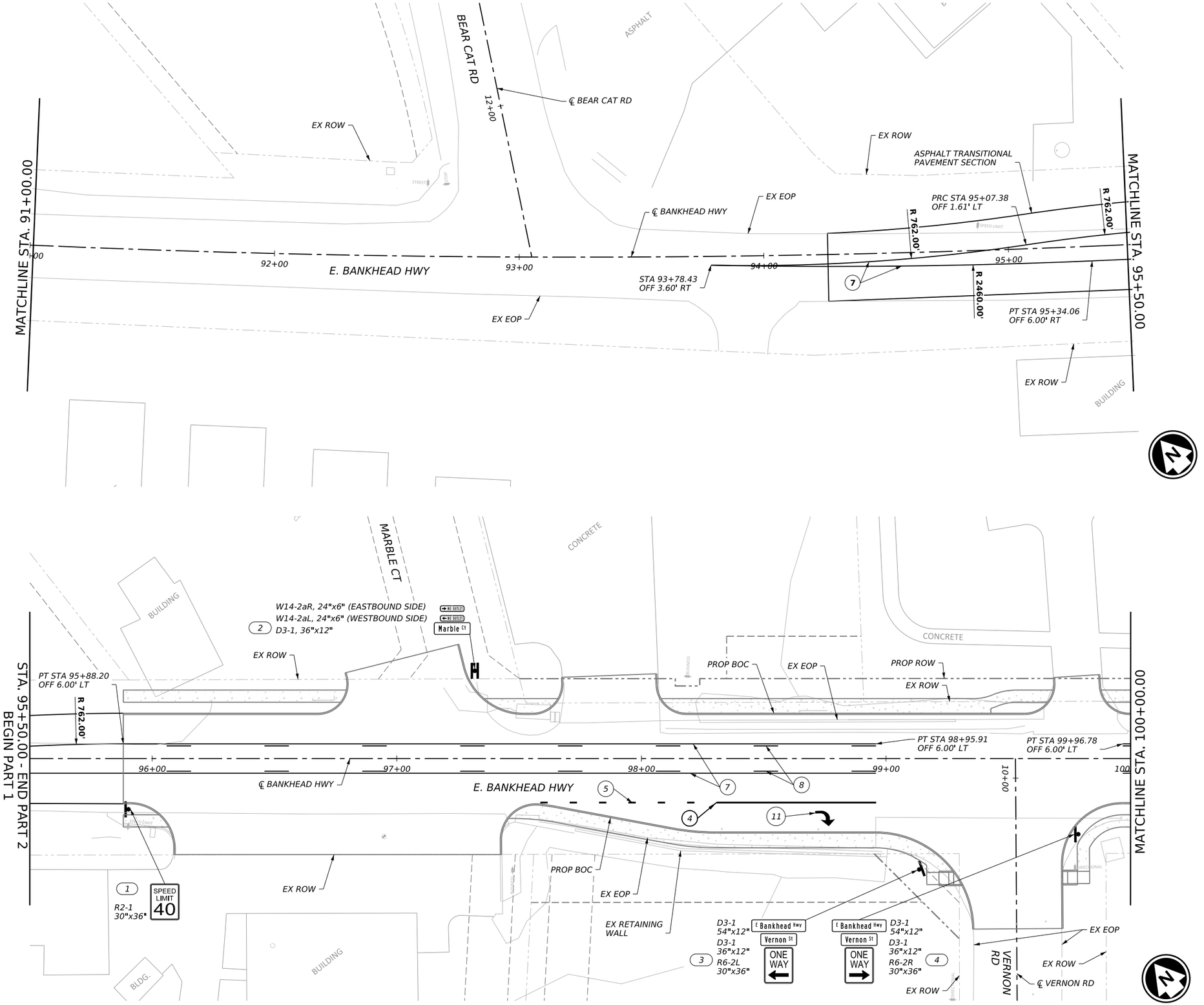
Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

WV & IZ-14

FILE: windice.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
○ April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		197

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_WV & IZ-14.dgn



LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

- EXISTING ROW
- PROPOSED ROW
- PROPOSED DRAINAGE EASEMENT
- MAILBOX RELOCATION
- SIGN
- OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

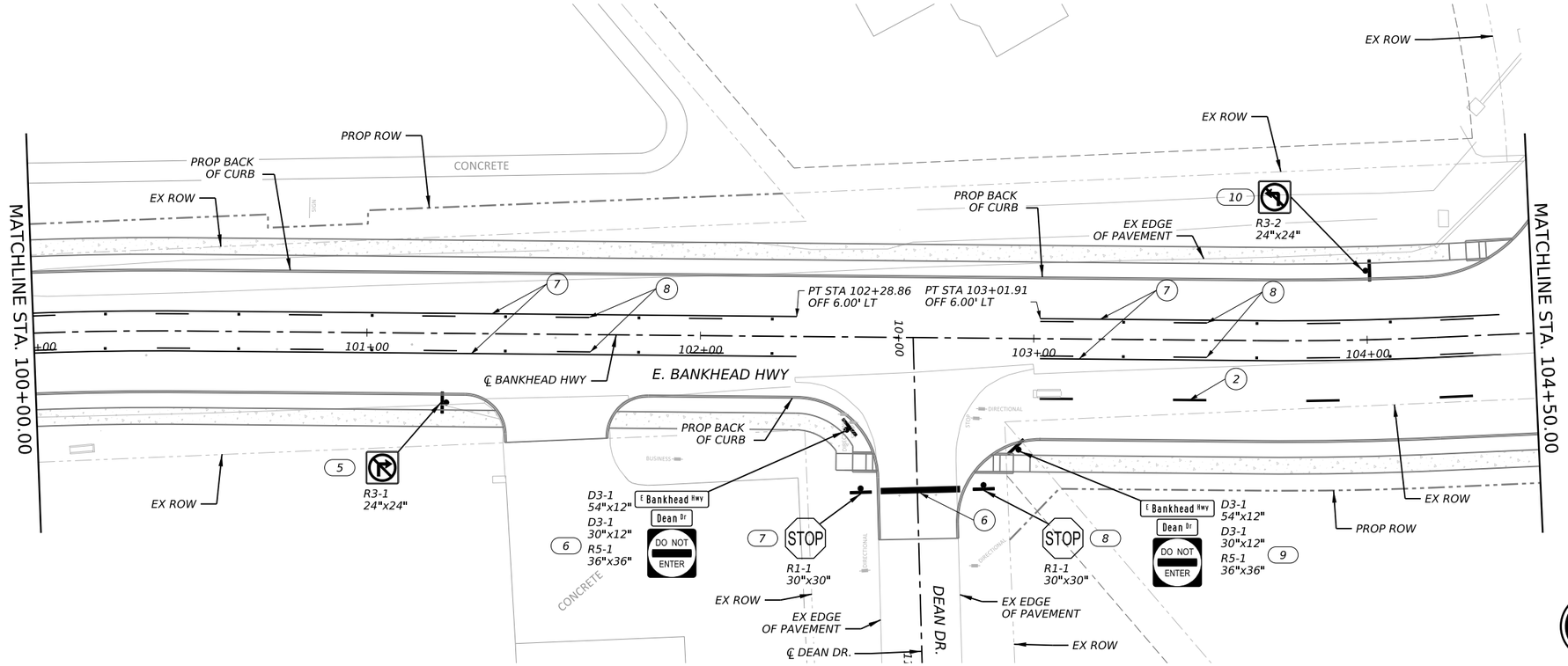
PAVEMENT MARKING AND SIGNAGE STA. 95+50 TO STA. 100+00

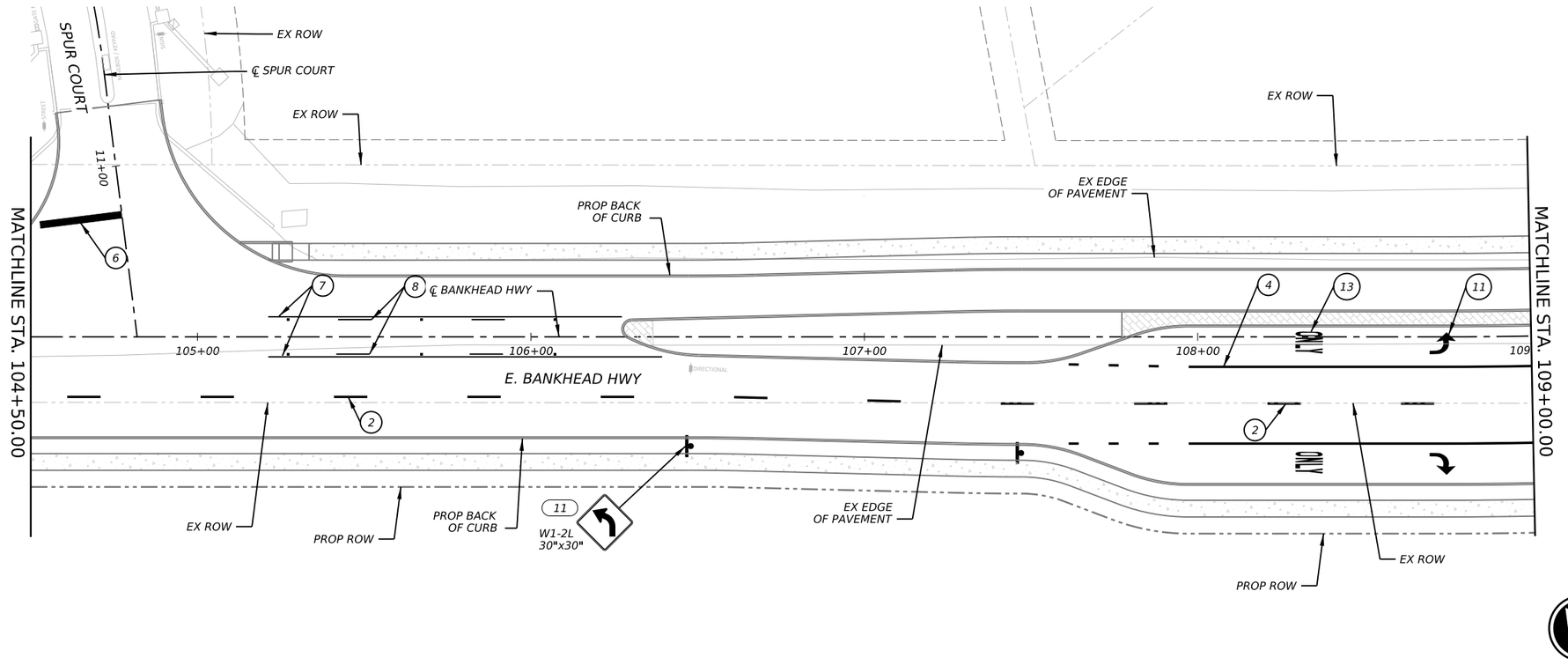
SHEET 1 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	198

DATE: 8/27/2026 8:21:43 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_din\5623\54714 9\cv-109-pl-pvmk10.dgn





LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

EXISTING ROW
PROPOSED ROW
PROPOSED DRAINAGE EASEMENT
MAILBOX RELOCATION
SIGN
OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

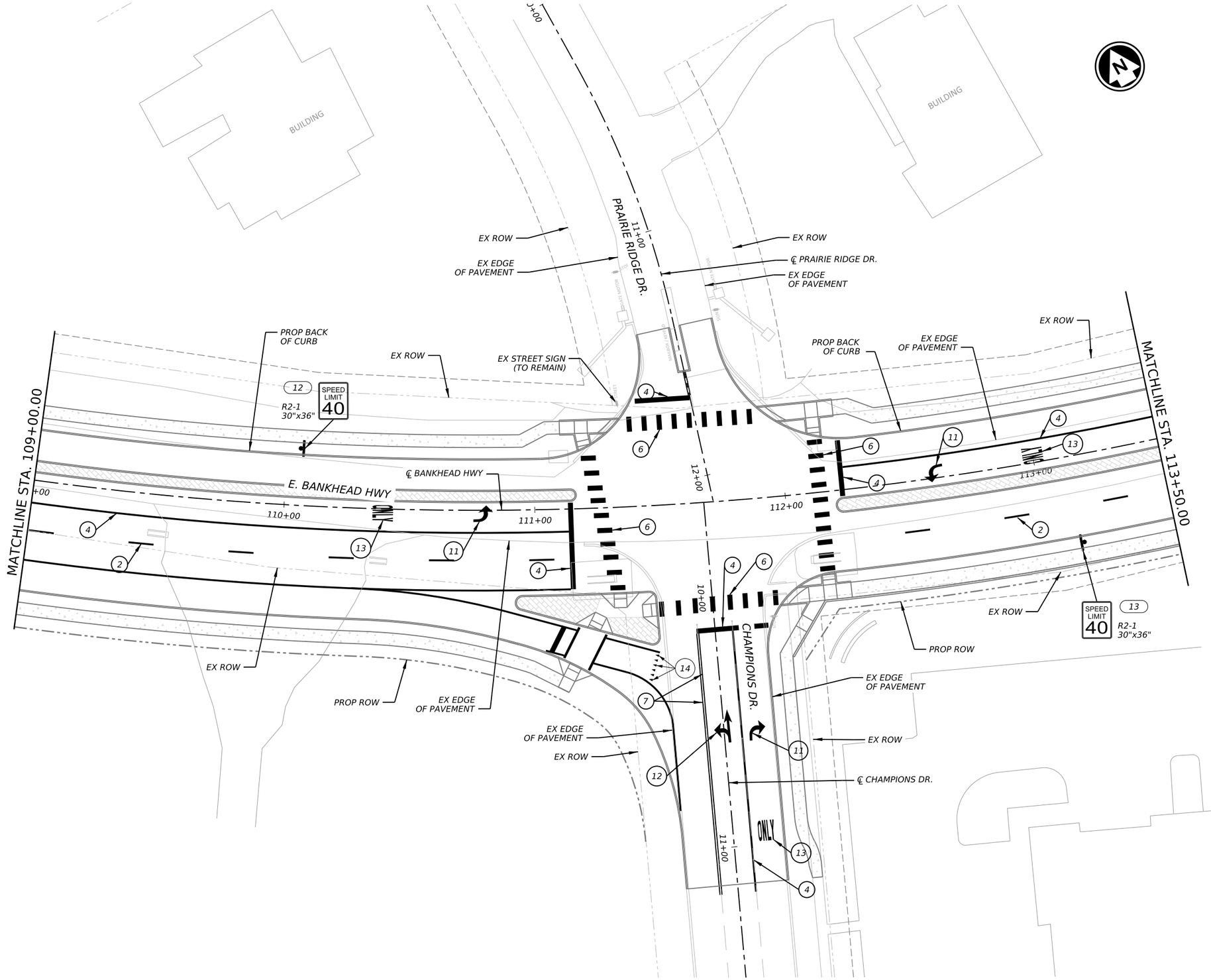
PAVEMENT MARKING AND SIGNAGE STA. 100+00 TO STA. 109+00

SHEET 2 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	199

DATE: 8/27/2026 8:11:15 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\5623\54714 3\cv-109-pl-pvmk11.dgn



LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

- EXISTING ROW
- PROPOSED ROW
- PROPOSED DRAINAGE EASEMENT
- MAILBOX RELOCATION
- SIGN
- OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

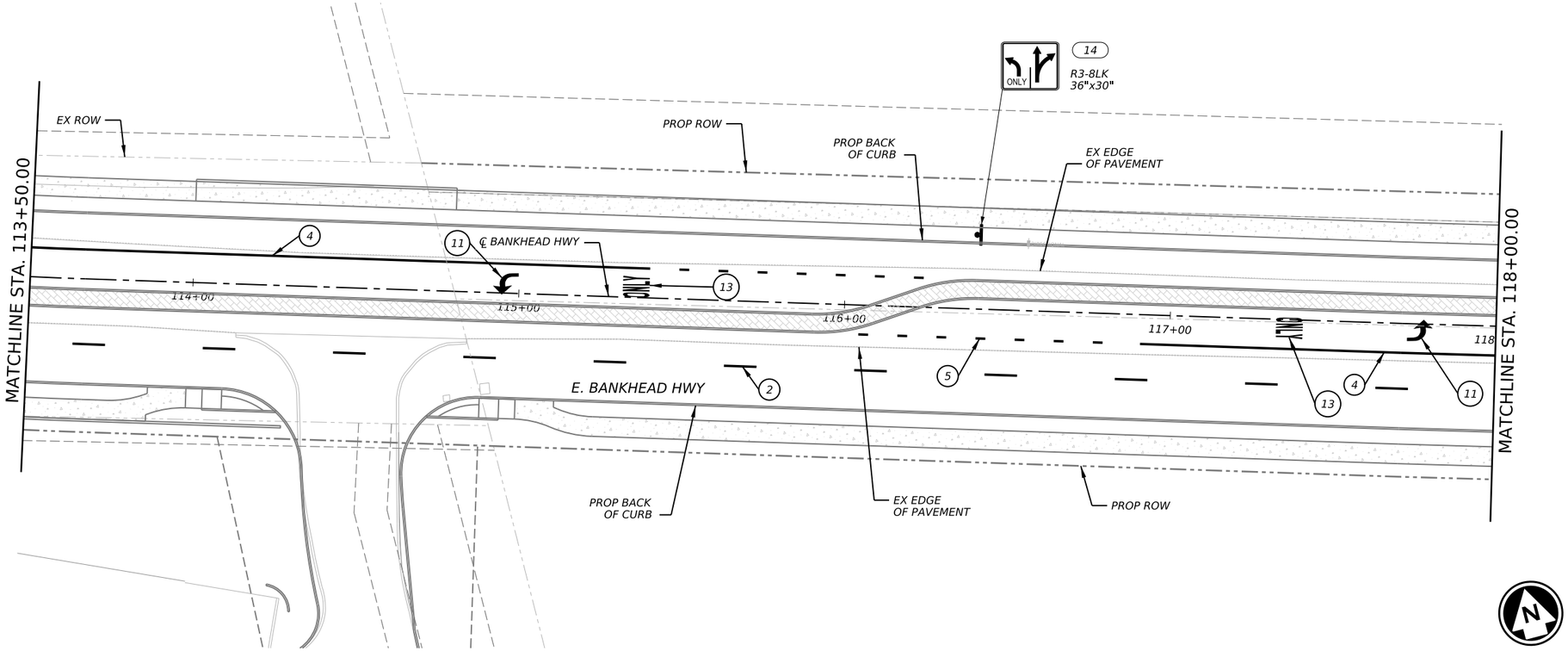
PAVEMENT MARKING AND SIGNAGE
STA. 109+00 TO STA. 113+50

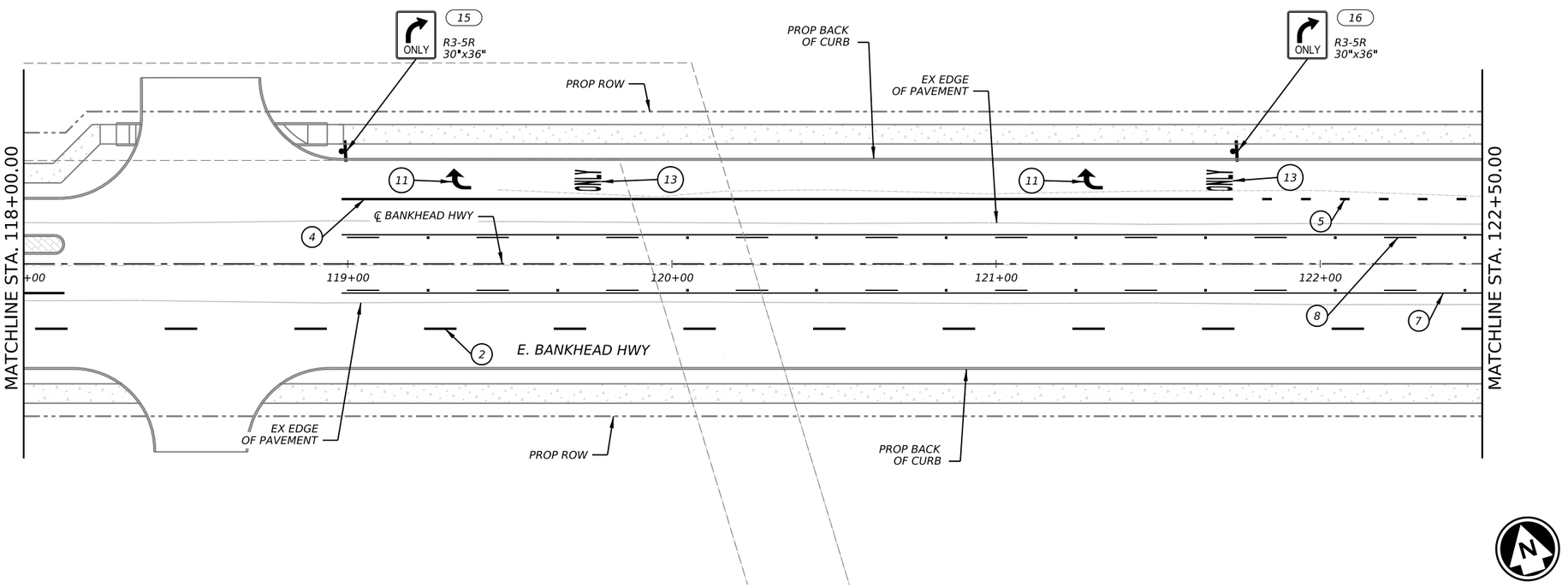
SHEET 3 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	200

DATE: 8/27/2026 8:02:56 PM
FILE: \\csM-freesepw21\CS_pdf_work_din\5623154714_4\cv-109-pl-pvmk12.dgn





LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

EXISTING ROW
PROPOSED ROW
PROPOSED DRAINAGE EASEMENT
MAILBOX RELOCATION
SIGN
OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PAVEMENT MARKING AND SIGNAGE STA. 113+50 TO STA. 122+50

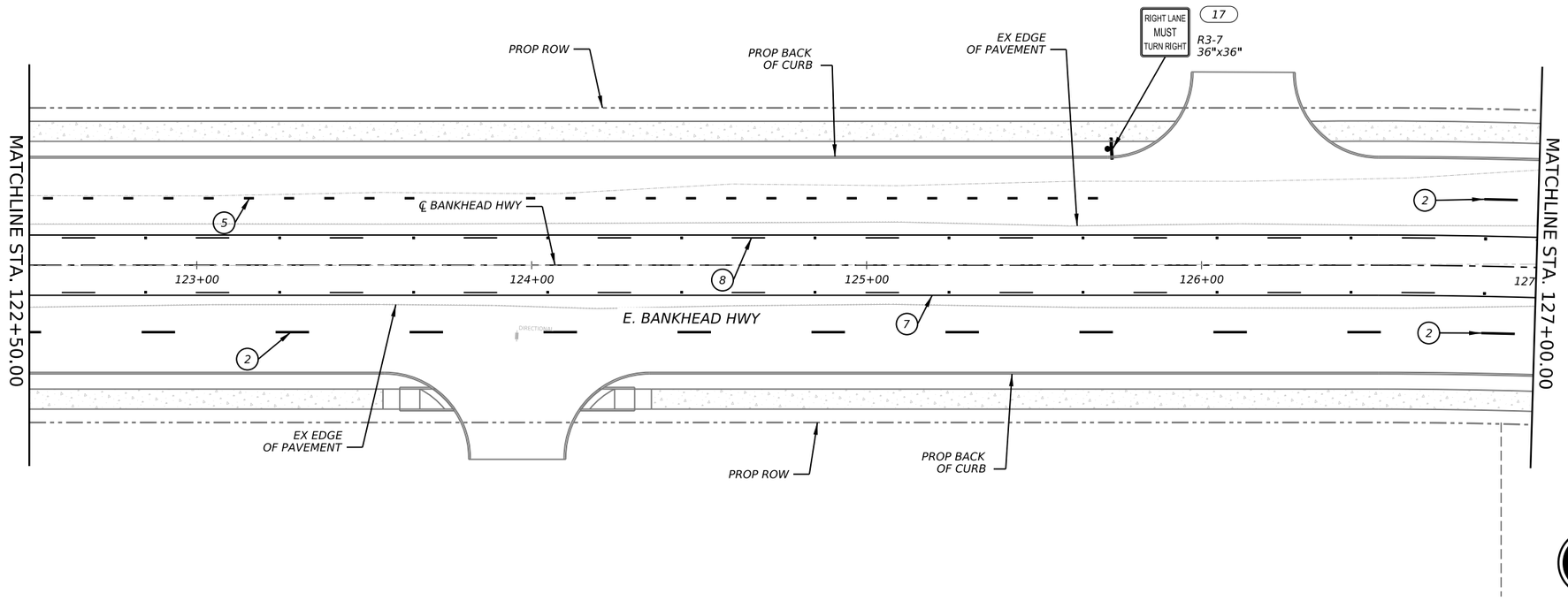
SHEET 4 OF 7

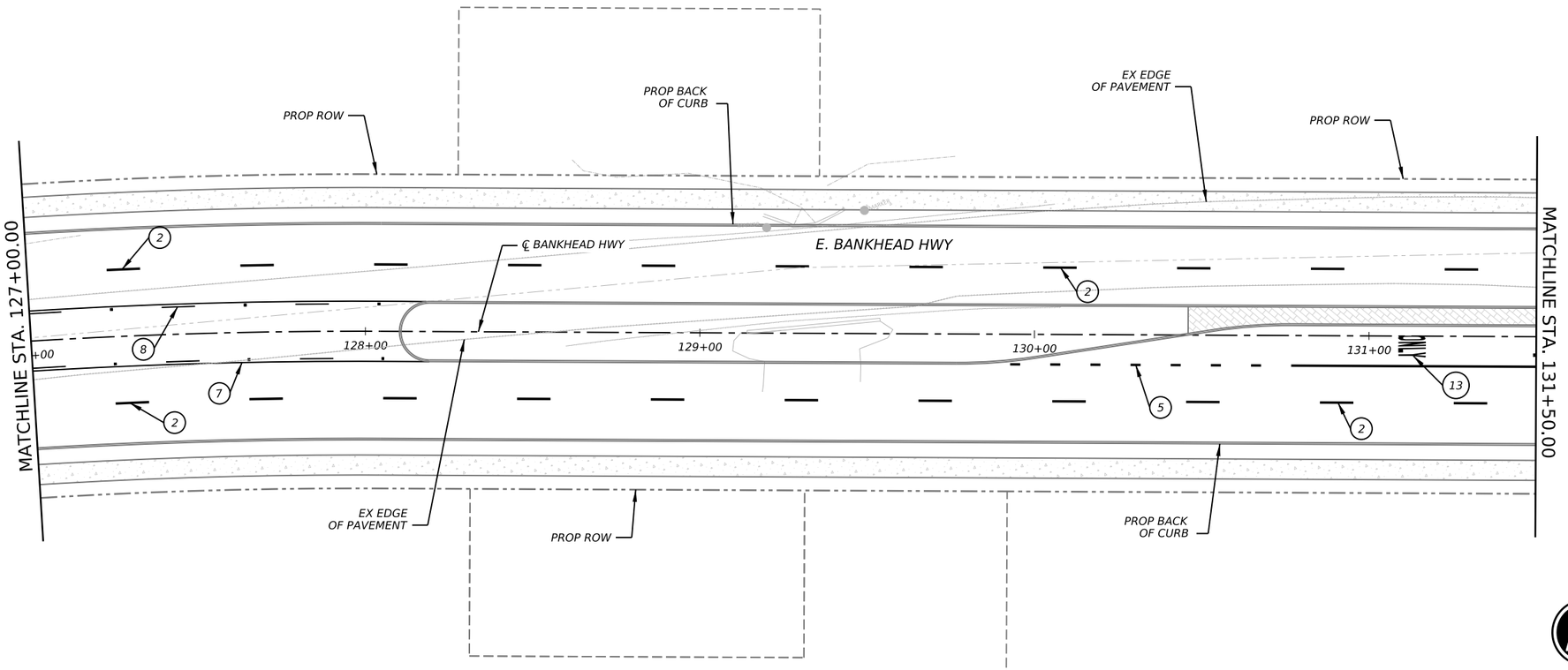
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	201

DATE: 8/27/2026 8:02:41 PM
FILE: \\fcsM-freesepw21\fCS_pdf_work_din\5623\54714_5\cv-109-pl-pvmk13.dgn

CK: DW: CK: DW:





LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

- EXISTING ROW
- PROPOSED ROW
- PROPOSED DRAINAGE EASEMENT
- MAILBOX RELOCATION
- SIGN
- OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

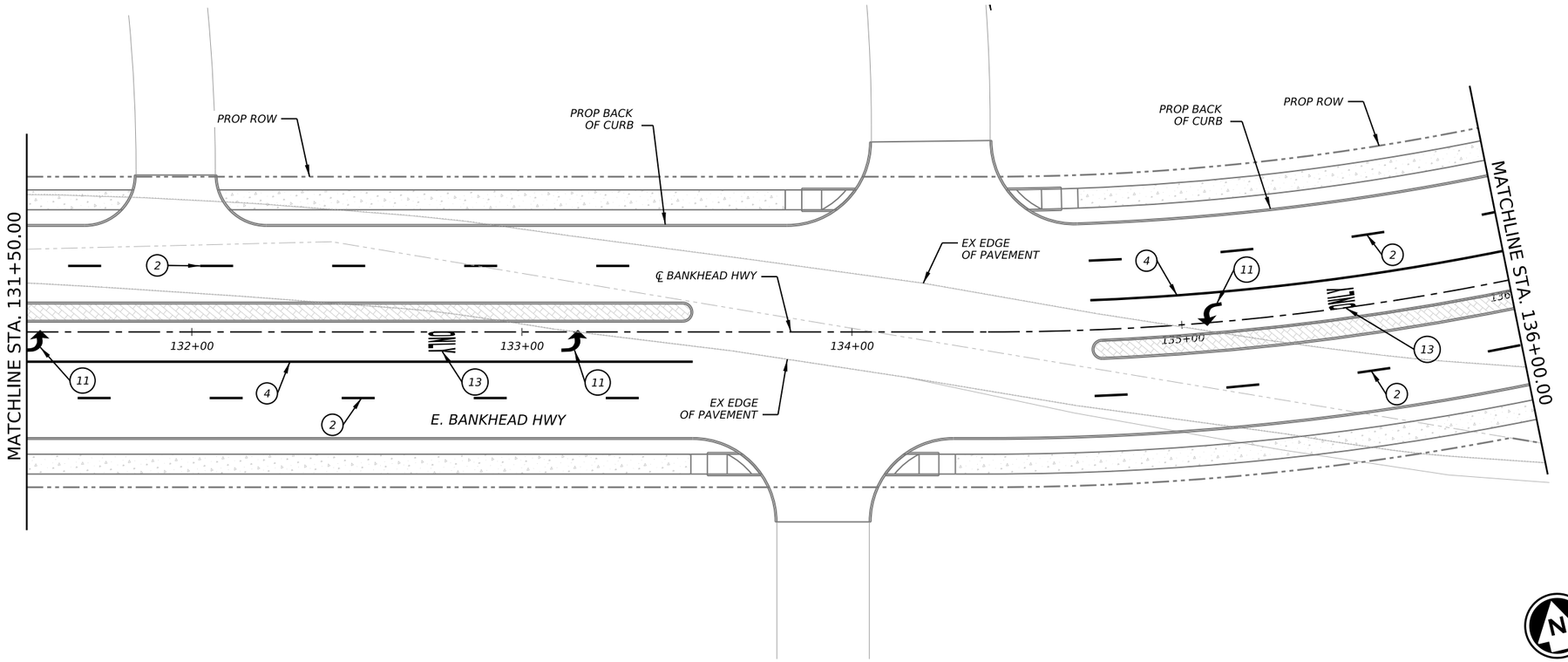
PAVEMENT MARKING AND SIGNAGE STA. 122+50 TO STA. 131+50

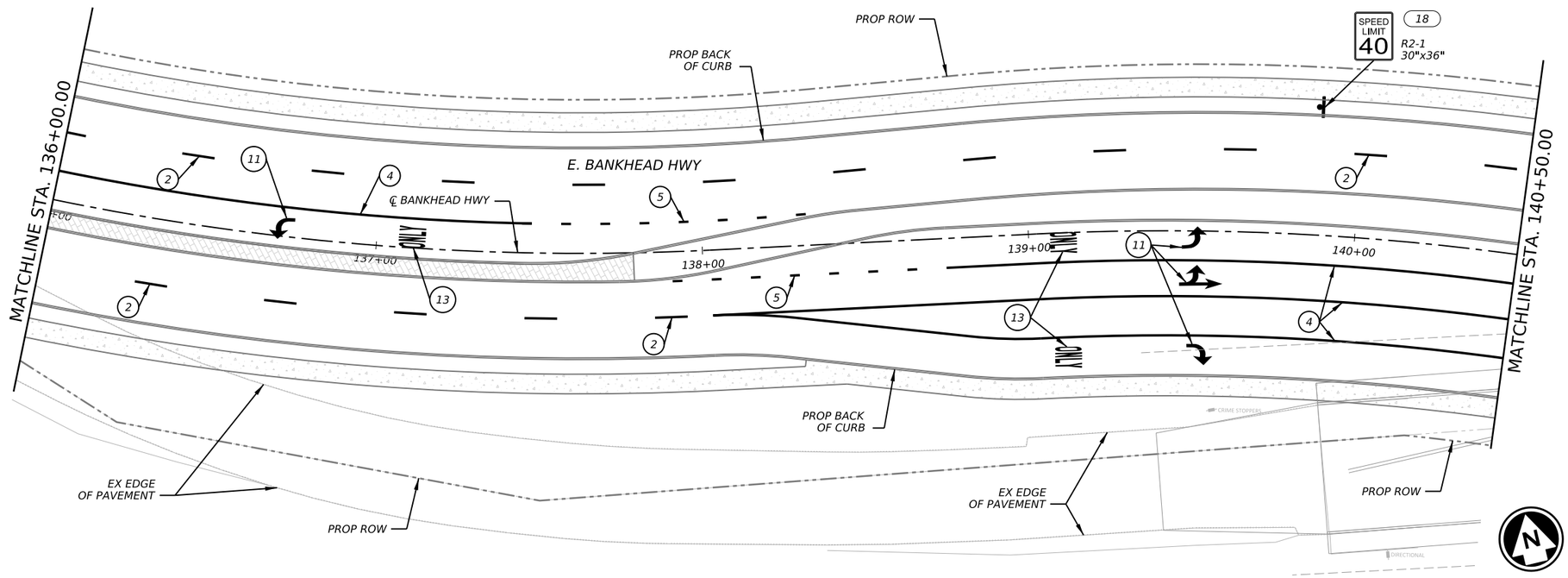
SHEET 5 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	202

DATE: 8/27/2026 8:11:58 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\5623\54714 6\cv-109-pl-pvmk14.dgn





LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

EXISTING ROW
PROPOSED ROW
PROPOSED DRAINAGE EASEMENT
MAILBOX RELOCATION
SIGN
OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

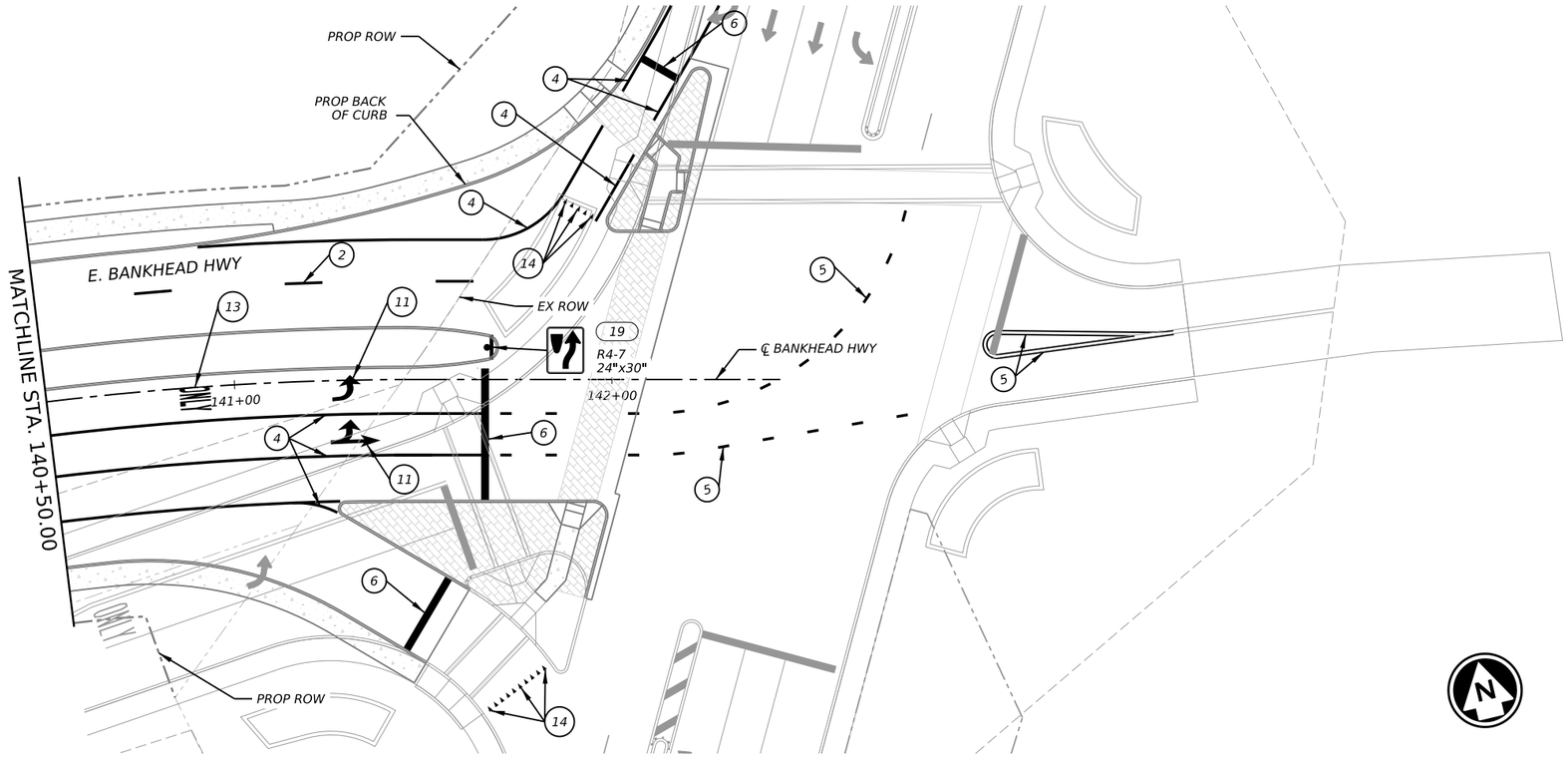
PAVEMENT MARKING AND SIGNAGE STA. 131+50 TO STA. 140+50

SHEET 6 OF 7

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	203

DATE: 8/27/2026 8:05:17 PM
FILE: \\fcsM-freesepw21\ICS_pdf_work_din\56231\54714_7\cv-109-pl-pvmk15.dgn



LEGEND

1. REFL PAV MRK TY I (W) (SLD) (6") (100 MIL)
2. REFL PAV MRK TY I (W) (BRK) (6") (100 MIL)
3. REFL PAV MRK TY I (W) (DOT) (6") (100 MIL)
4. REFL PAV MRK TY I (W) (SLD) (8") (100 MIL)
5. REFL PAV MRK TY I (W) (DOT) (8") (100 MIL)
6. REFL PAV MRK TY I (W) (SLD) (24") (100 MIL)
7. REFL PAV MRK TY I (Y) (SLD) (6") (100 MIL)
8. REFL PAV MRK TY I (Y) (BRK) (6") (100 MIL)
9. REFL PAV MRK TY I (Y) (SLD) (12") (100 MIL)
10. REFL PAV MRK TY II-A-A
11. REFL PAV MRK TY I (W) (SLD) (ARROW) (100 MIL)
12. REFL PAV MRK TY I (W) (SLD) (DBL ARROW) (100 MIL)
13. REFL PAV MRK TY I (W) (WORD) (100 MIL)
14. REFL PAV MRK TY I (W) (YLD TRI) (18") (100 MIL)

EXISTING ROW
PROPOSED ROW
PROPOSED DRAINAGE EASEMENT
MAILBOX RELOCATION
SIGN
OBJECT MARKER (OM-3L)

0 20 40
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PAVEMENT MARKING AND SIGNAGE STA. 140+50 TO END

SHEET 7 OF 7

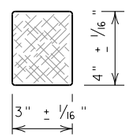
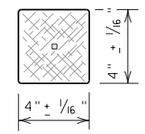
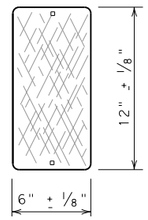
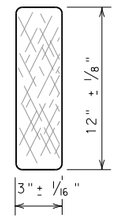
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	204

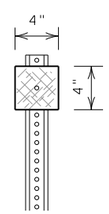
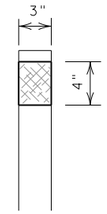
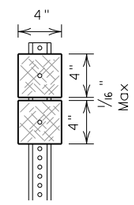
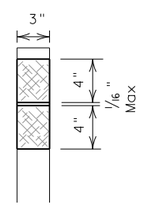
DATE: 8/27/2026 8:03:29 PM
FILE: \\cosfs09\groups\Projects\21GCS\pdf_work_dir\5623\54714_8\cv-109-pl-pvmk16.dgn

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.

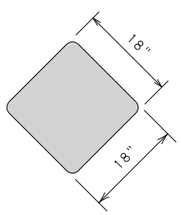
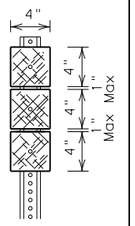
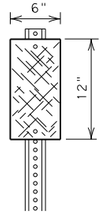
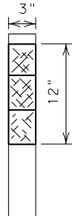
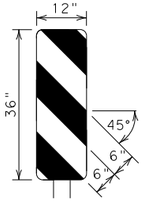
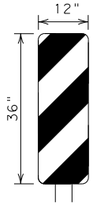
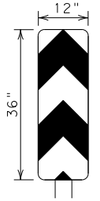
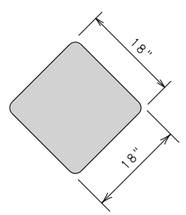
REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

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

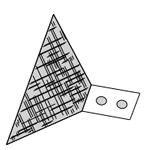
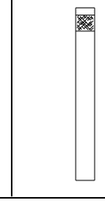
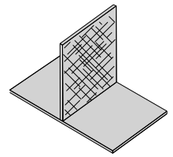
DELINEATORS

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

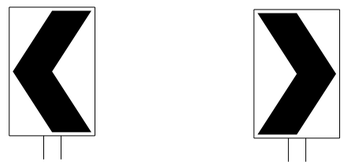
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- YFLX = Yellow Flexible Post
- WFLX = White Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

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

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

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

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

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

DIRECTION
If Required
- BI = Bi-Directional

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20				205

DATE:
FILE:

20A

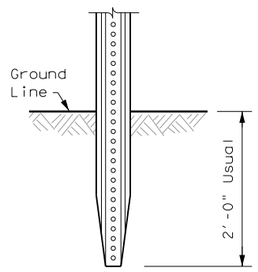
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

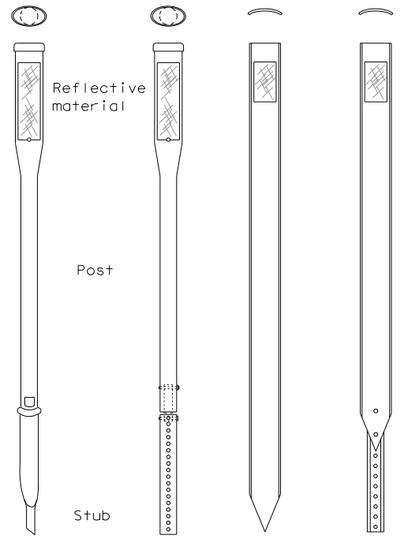


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

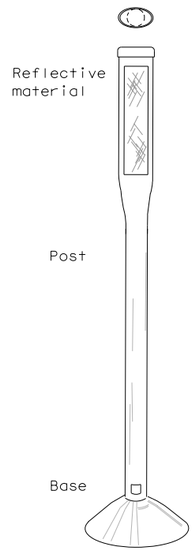
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



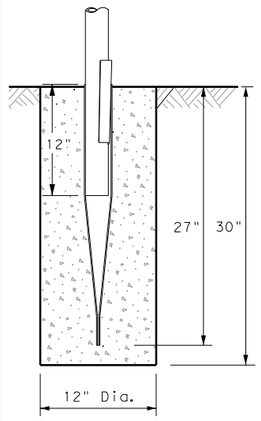
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

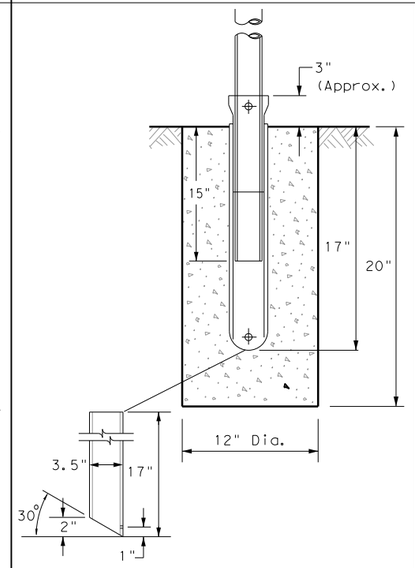
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

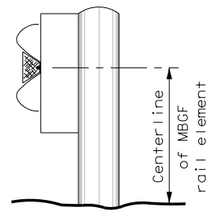
NOTE

1. Install per manufacturer's recommendations.

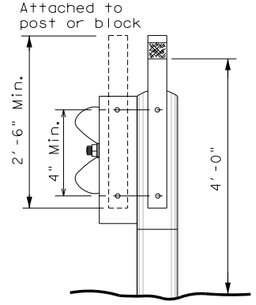
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

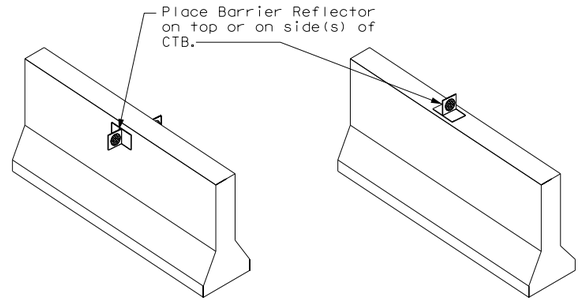
GF1



GF2



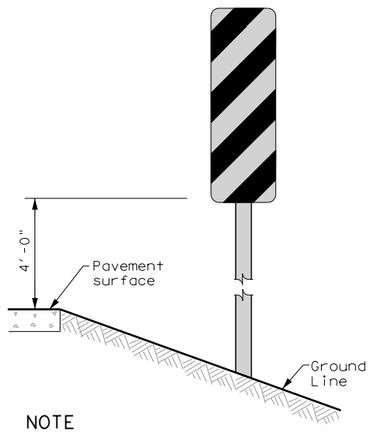
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

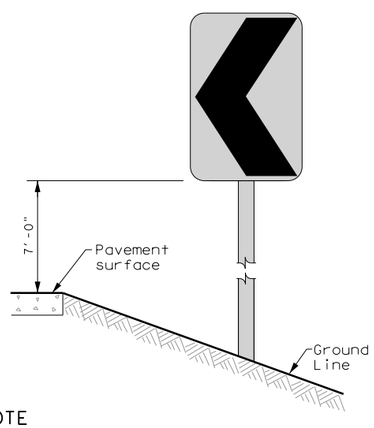
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

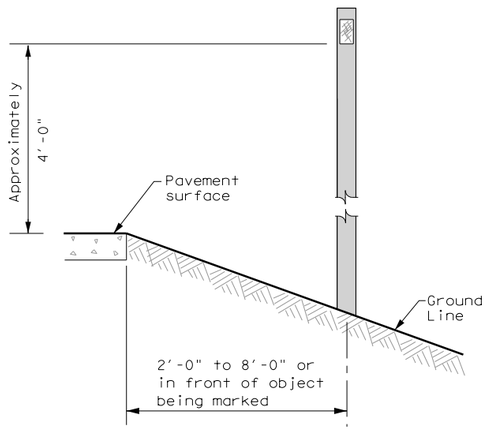
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20				206

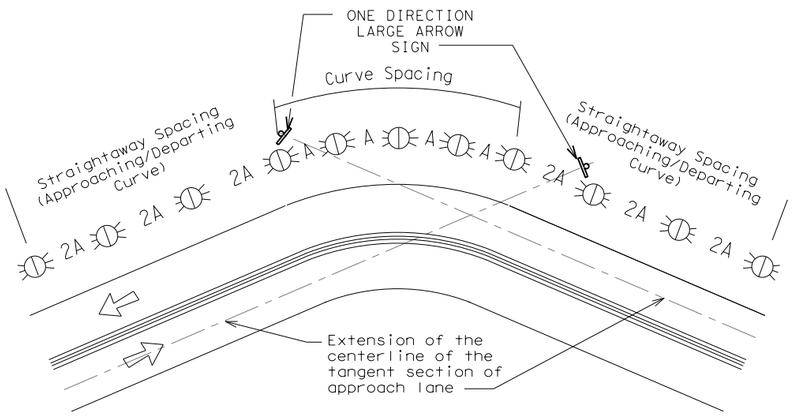
20B

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.

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

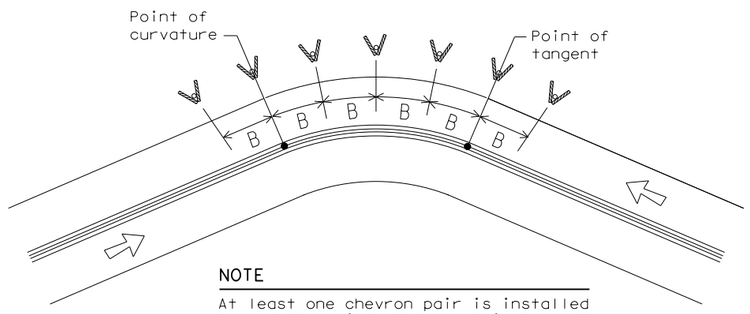
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20				207

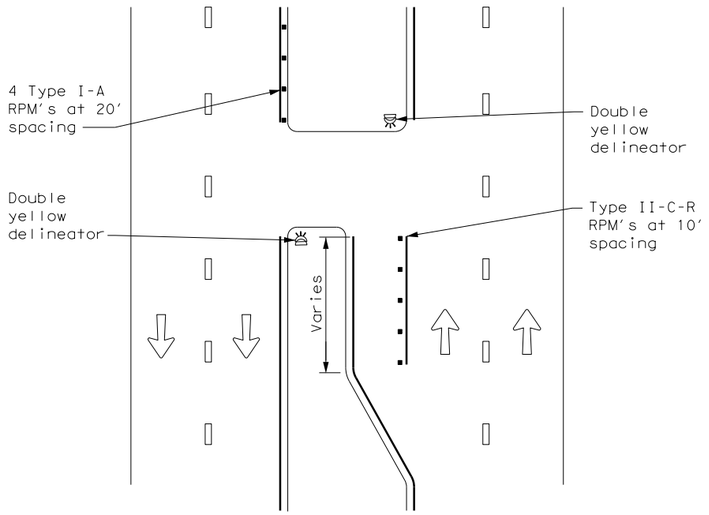
20C

DATE:
FILE:

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

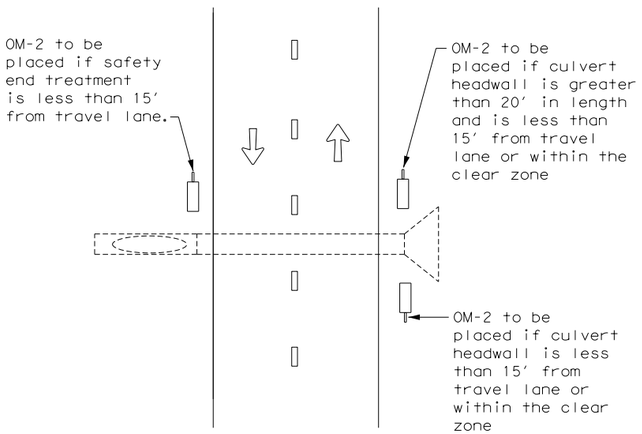
DATE:
FILE:

CROSSOVERS



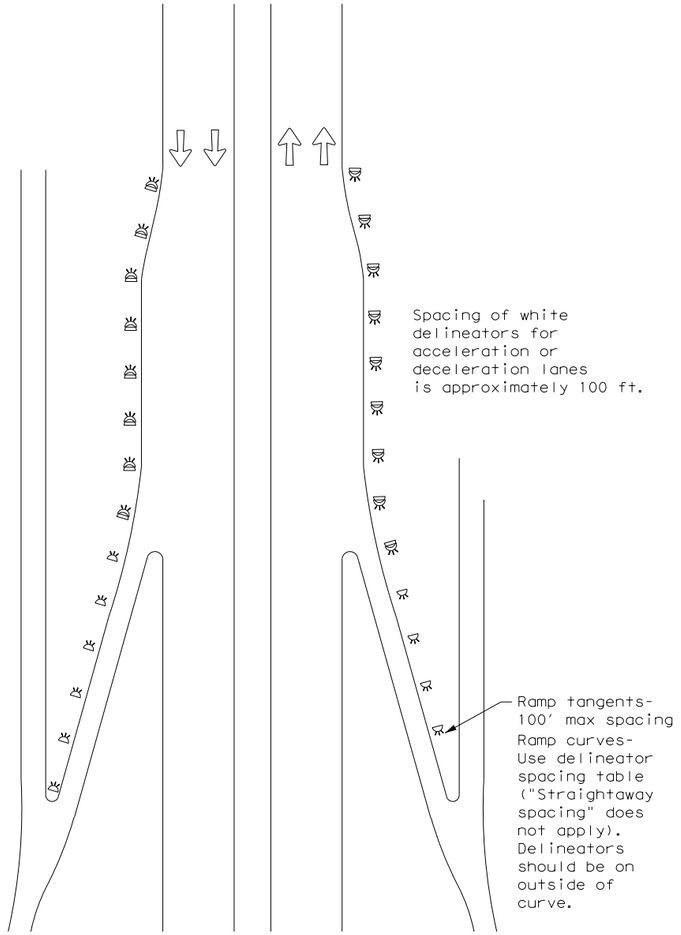
DETAIL 1

FOR CULVERTS WITHOUT MBGF



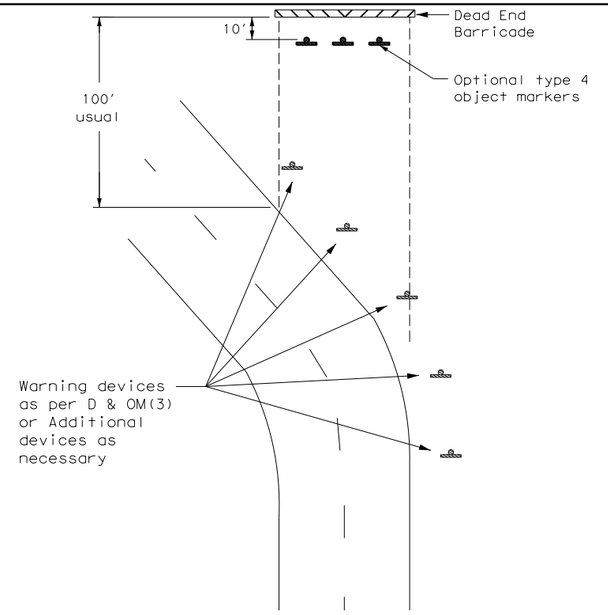
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



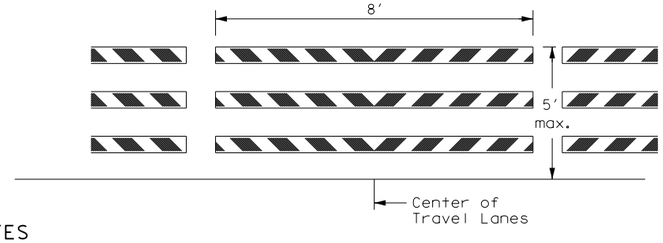
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

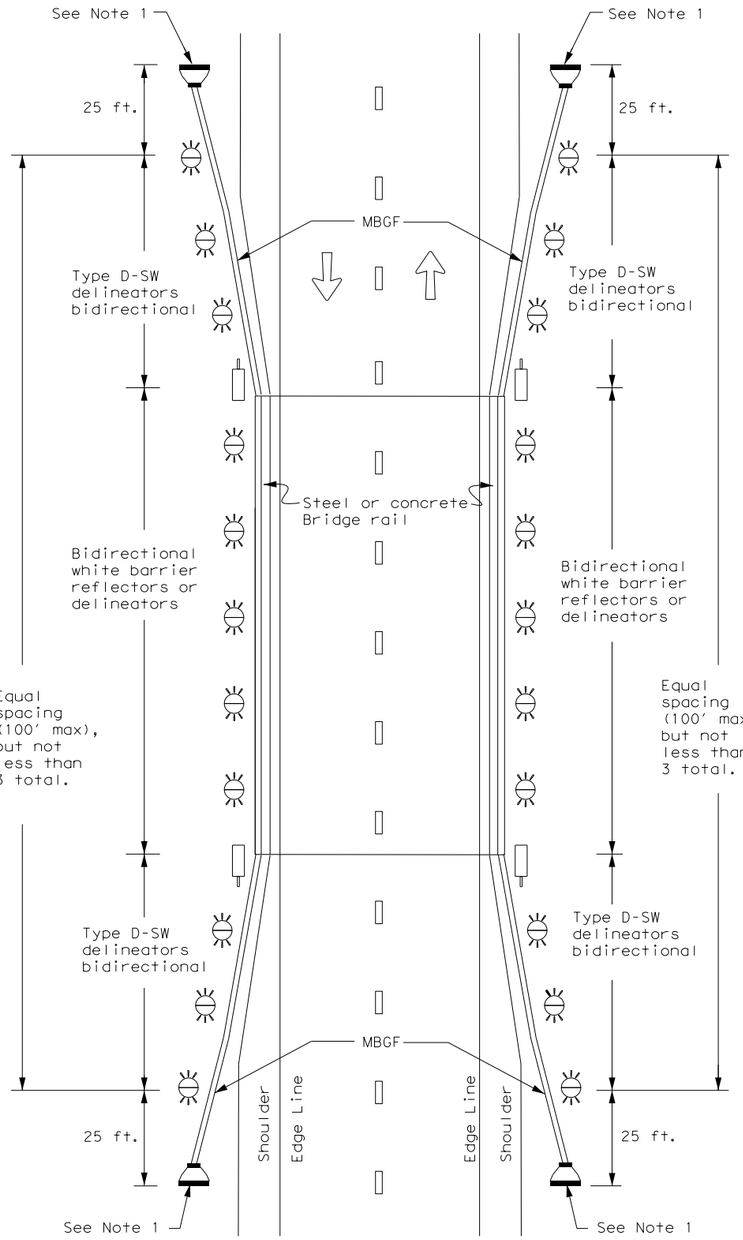
FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				
3-15	DIST	COUNTY		SHEET NO.
7-20				208

20D

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

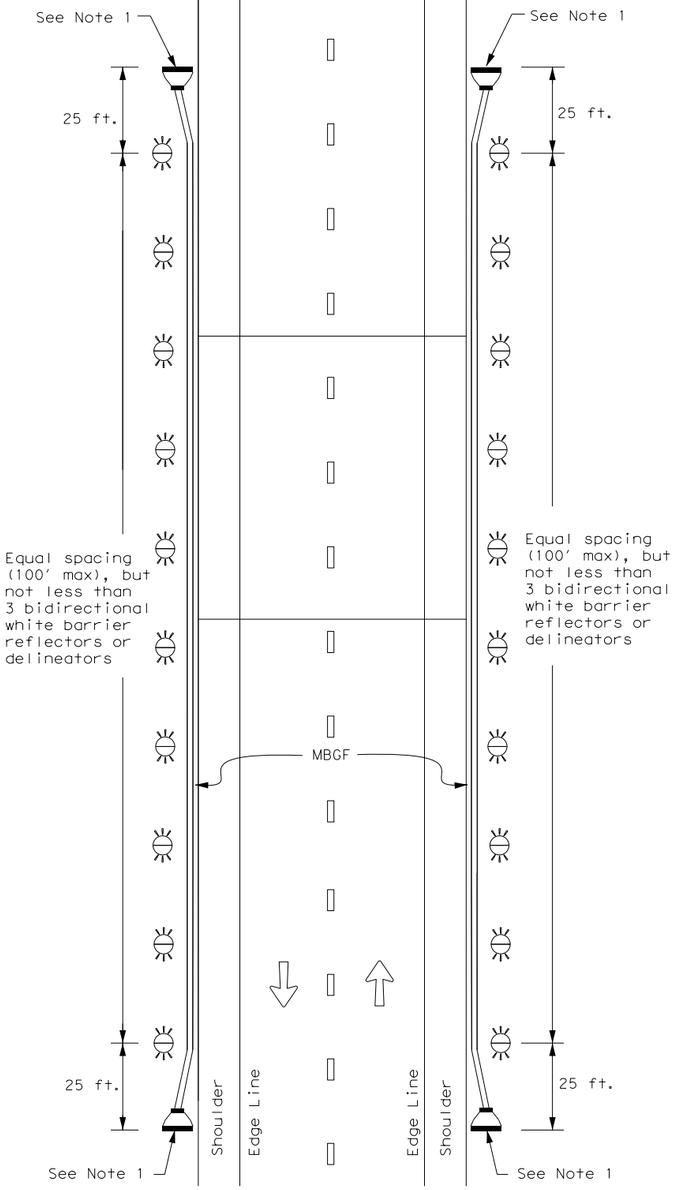
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

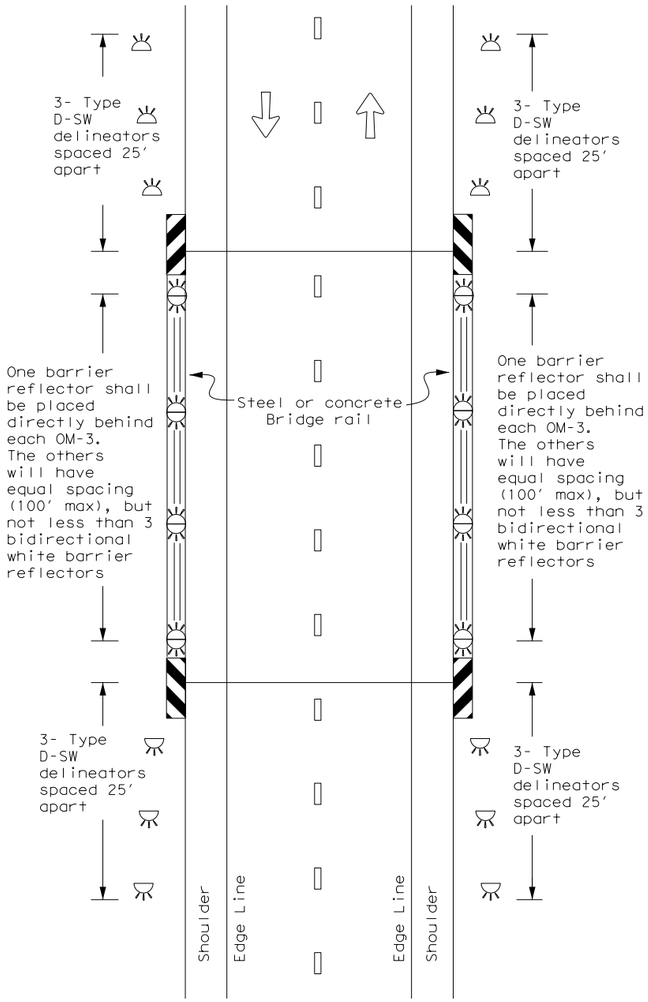
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

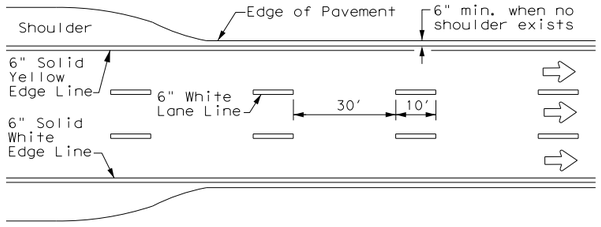
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

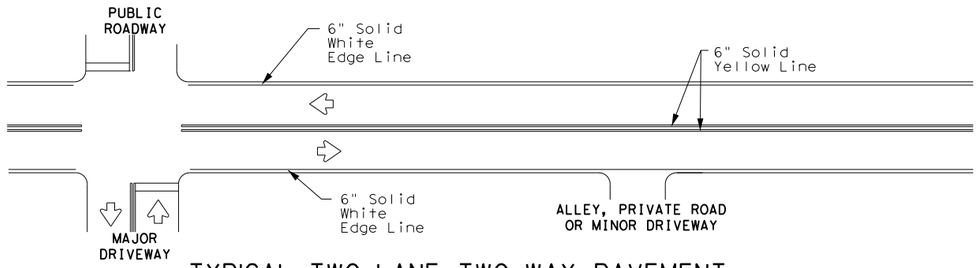
FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-20	DIST	COUNTY		SHEET NO. 209

20E

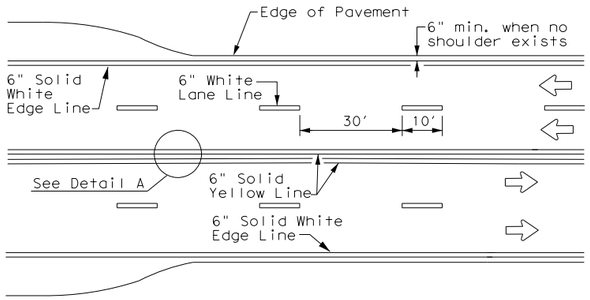
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

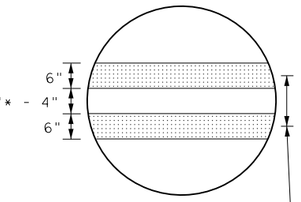


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





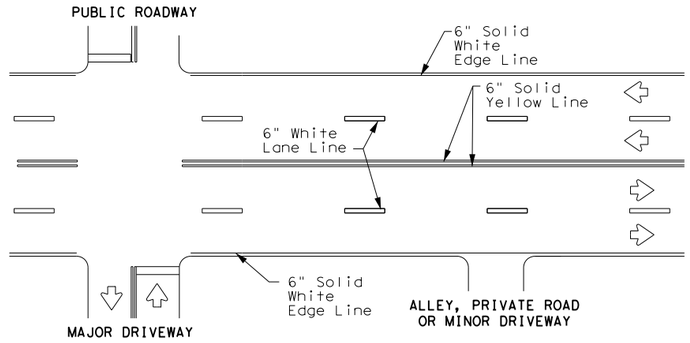
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

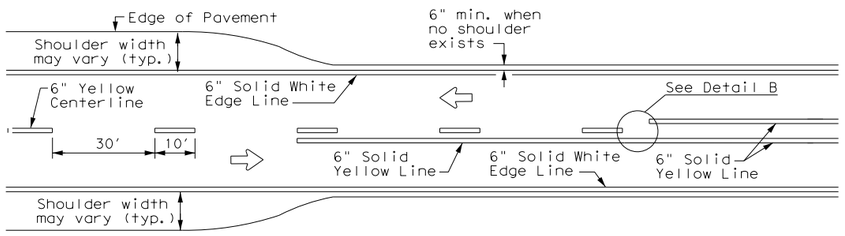
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

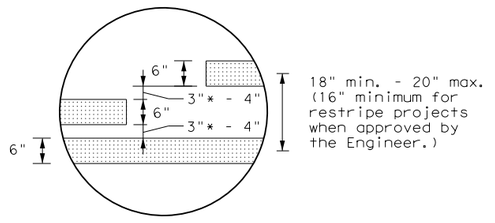
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

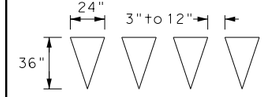


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



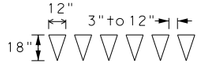
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

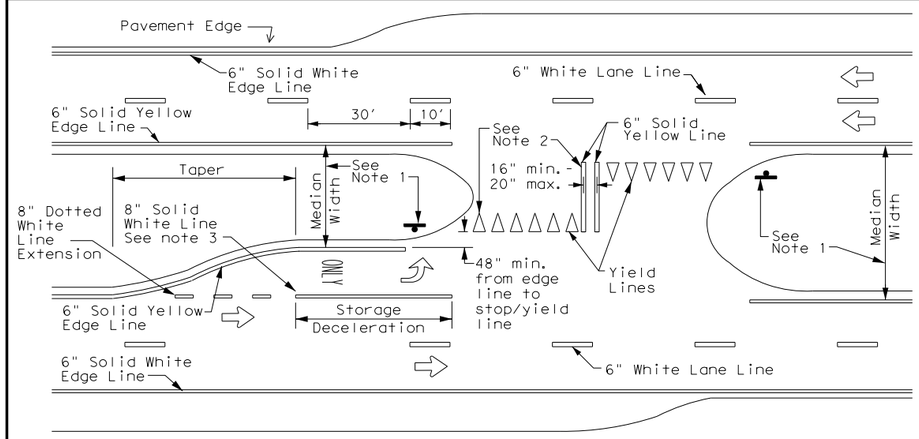


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

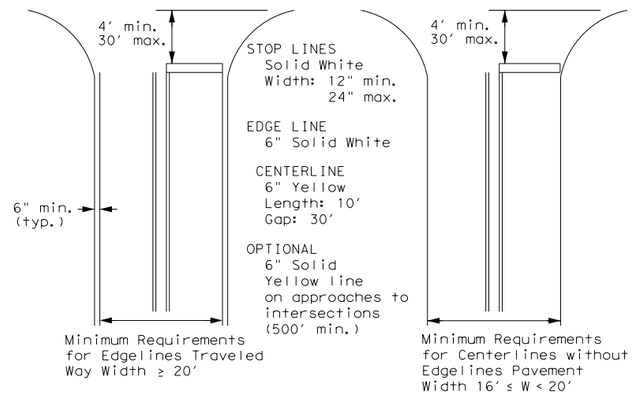
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines 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. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines 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 center of edge line to the center of edge line 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.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

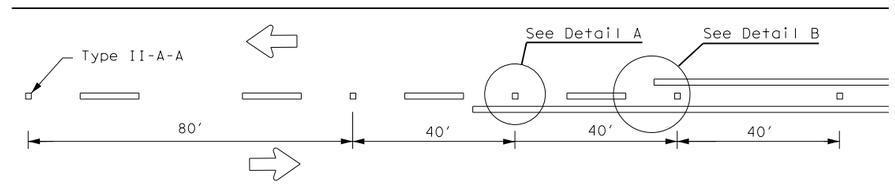
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-78 8-00 6-20	DIST	COUNTY		SHEET NO.
8-95 3-03 12-22				210
5-00 2-12				

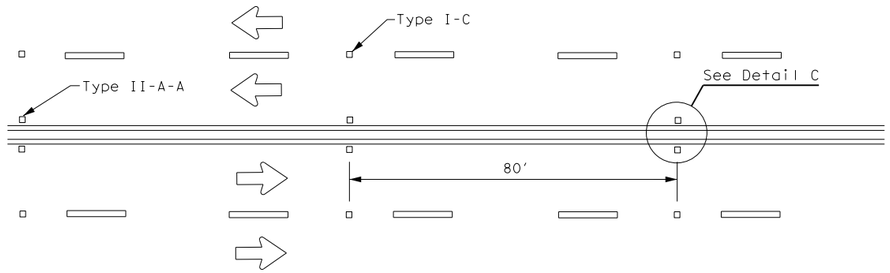
22A

DATE:
FILE:

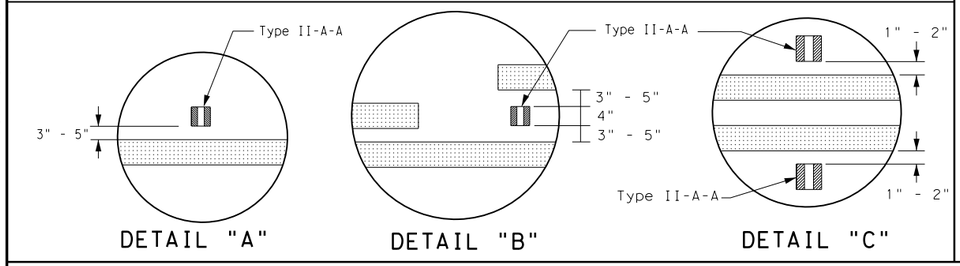
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



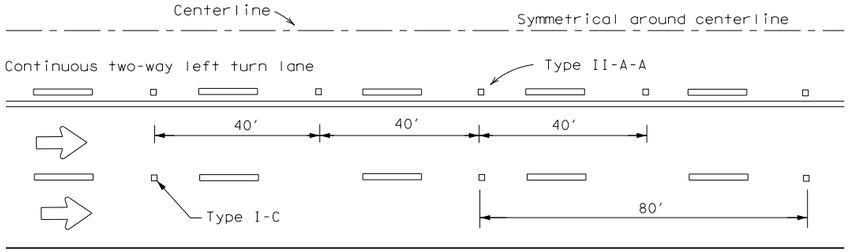
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



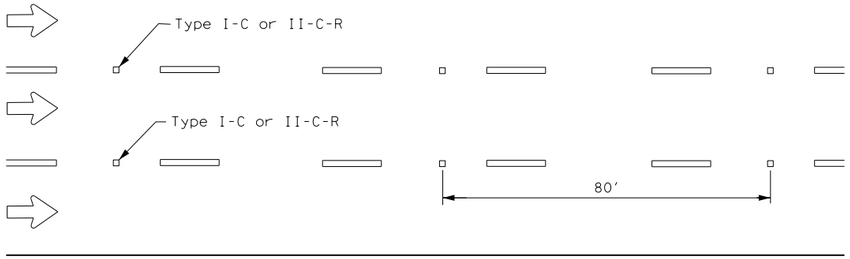
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" DETAIL "B" DETAIL "C"



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



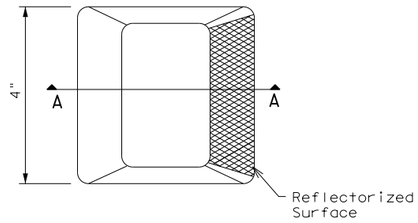
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

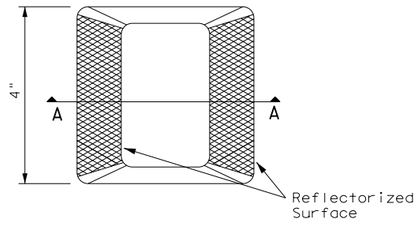
See Note 3.

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

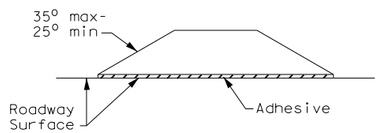
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

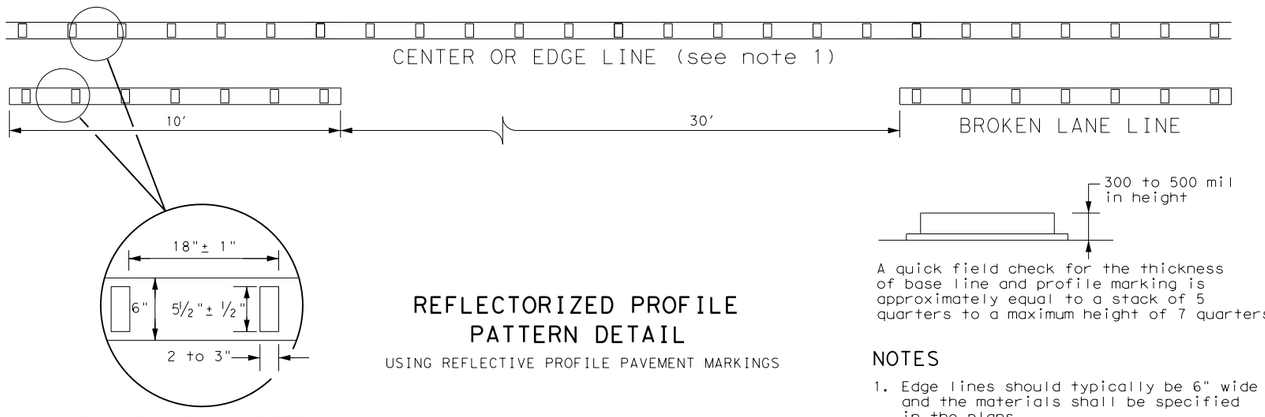


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. 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 along 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.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2)-22

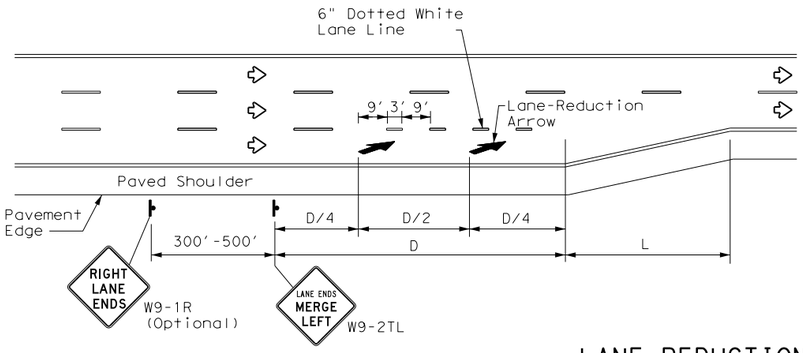
FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	DIST	COUNTY		SHEET NO. 211

22B

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

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.

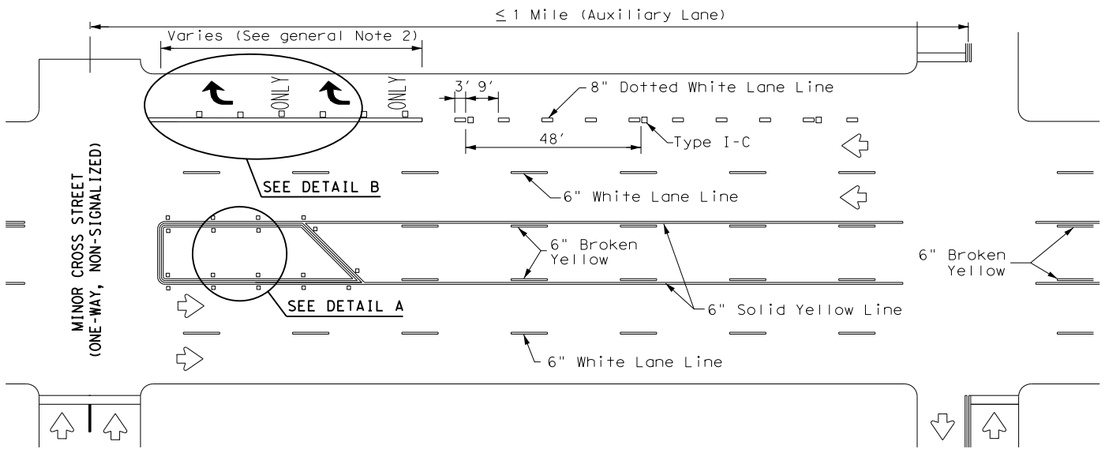


LANE REDUCTION

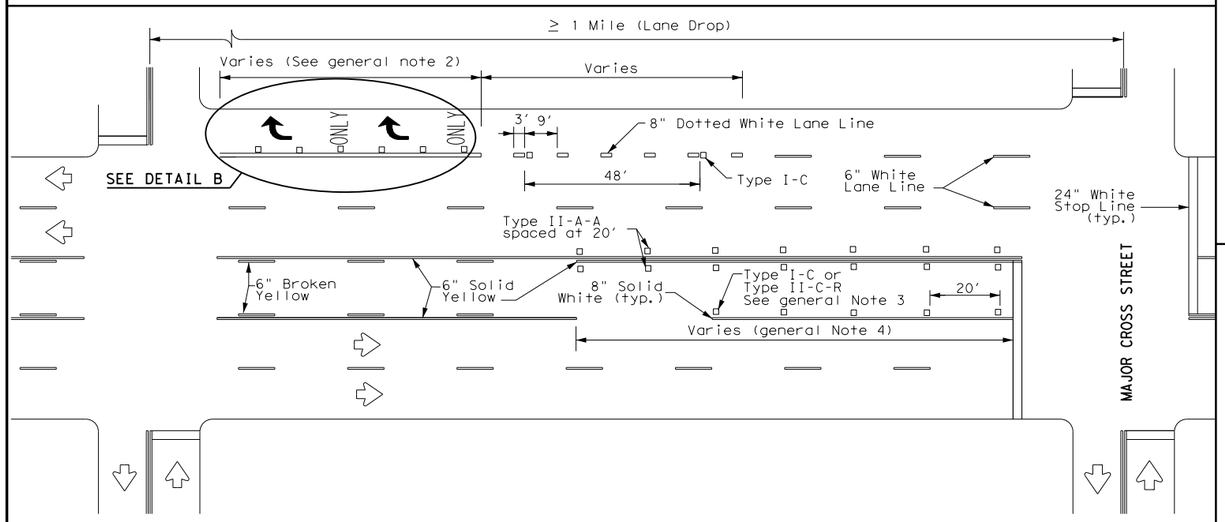
NOTES

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 RIGHT LANE ENDS (W9-1R) 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.

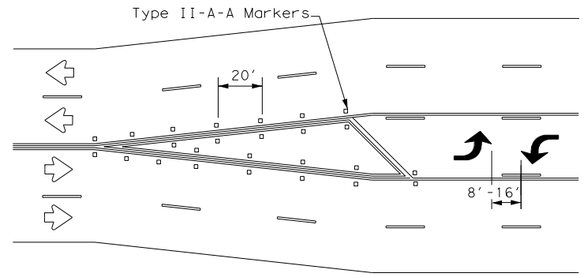
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE

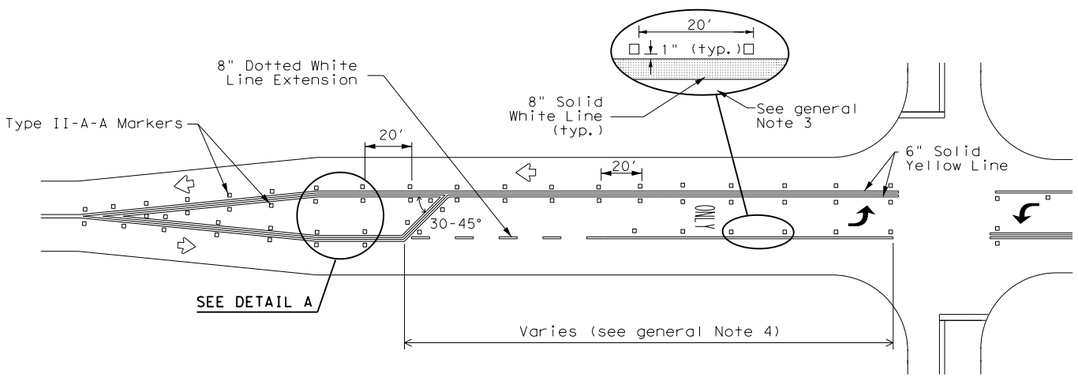


TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



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



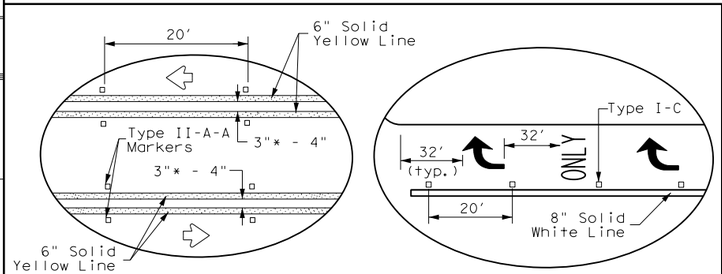
TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS

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. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

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.



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

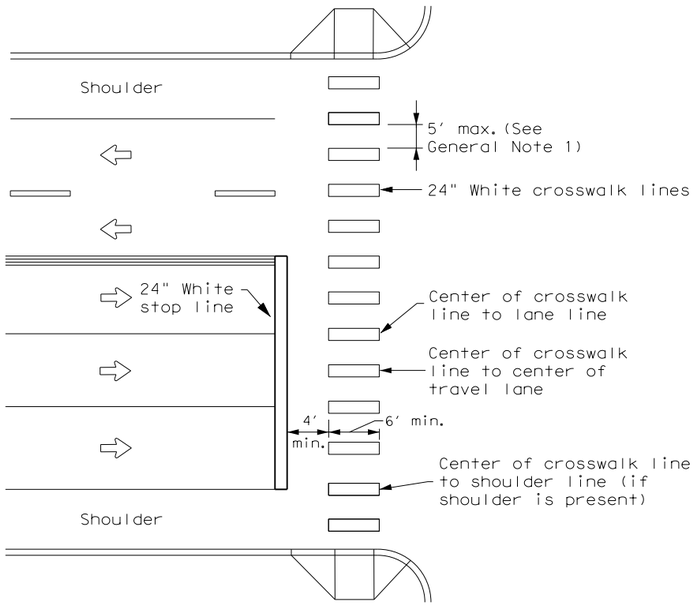
PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	DIST	COUNTY		SHEET NO. 212

22C

DATE:
FILE:

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.



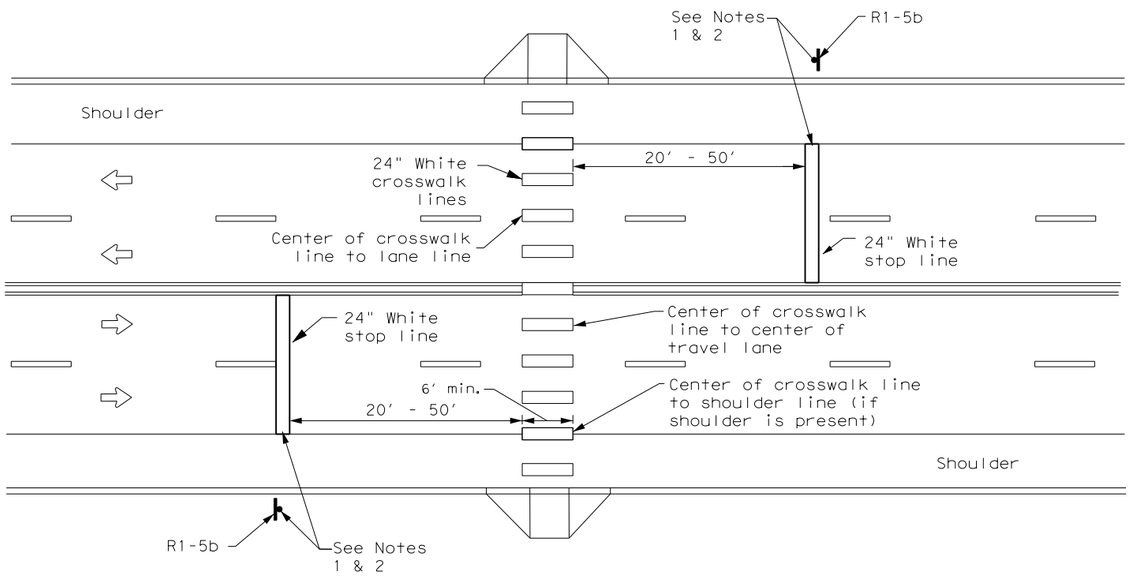
HIGH-VISIBILITY LONGITUDINAL CROSSWALK
AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6′ wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY
LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

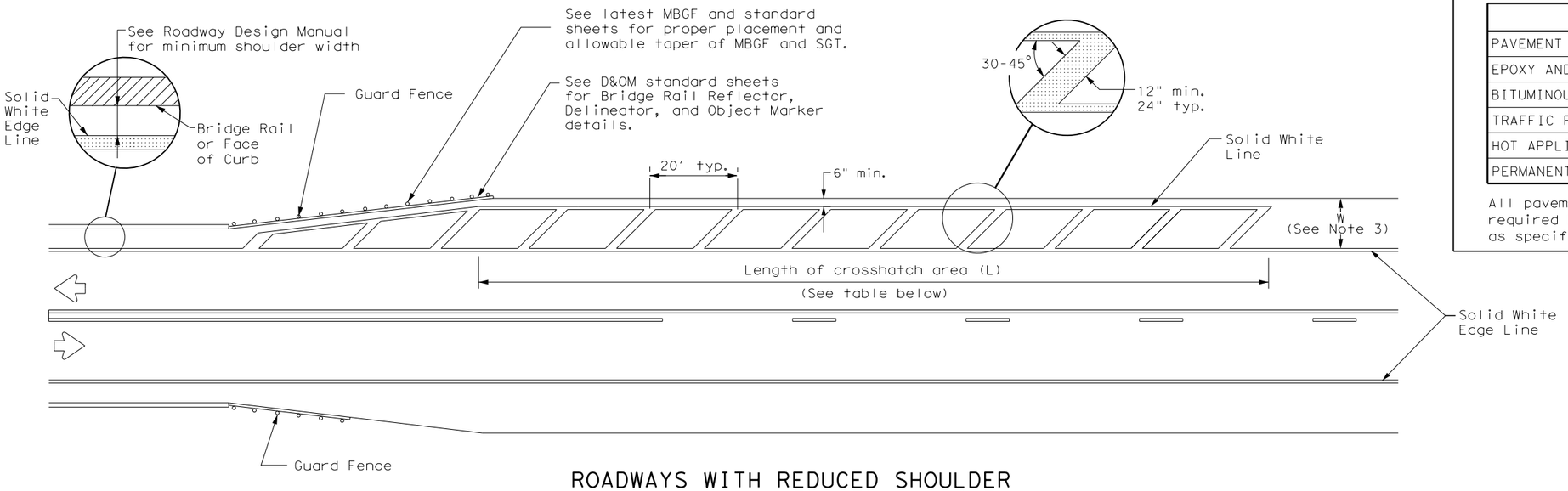
PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				
6-20	DIST	COUNTY		SHEET NO.
6-22		PARKER		213
12-22				
22D				

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_PM4-22a.dgn

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:



ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

CROSSHATCH LENGTH (L)	
Posted Speed (MPH)	L (ft)
30	300 ft
35	
40	
45	
50	500 ft
55	
60	
65	
70	
75	

NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 4 inches from the bridge rail or face of curb or 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions.
2. No-passing zone on bridge approach is optional. If used, the no-passing zone shall be a minimum 500 feet long from the beginning of the bridge.
3. The crosshatching should be required if the shoulder width in advance of the bridge is 4 feet or wider and a reduction of at least 3 feet in shoulder width across the bridge occurs.
4. On divided highways, review both the right and left shoulder widths for the need for narrow bridge pavement markings.

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.

Texas Department of Transportation

Traffic Safety Division Standard

PAVEMENT MARKINGS FOR ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

PM(5)-22

FILE: pm5-22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
				214

22E

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
1 of 7	1	R2-1	SPEED LIMIT 40	30"X36"	X		10BWG	1	SA	P		
	2	W14-2aR	← NO OUTLET	24"X6"	X		10BWG	1	SA	P		
		W14-2aR	NO OUTLET →	24"X6"	X							
		D3-1	Marble CT	36"X12"	X							
	3	D3-1	E Bankhead Hwy	54"X12"	X		10BWG	1	SA	P		
		D3-1	Vernon St	36"X12"	X							
		R6-2L	ONE WAY ←	30"X36"	X							
	4	D3-1	E Bankhead Hwy	54"X12"	X		10BWG	1	SA	P		
		D3-1	Vernon St	36"X12"	X							
		R6-2R	ONE WAY →	30"X36"	X							
2 of 7	5	R3-1		24"X24"	X		10BWG	1	SA	P		
	6	D3-1	E Bankhead Hwy	54"X12"	X		10BWG	1	SA	P		
		D3-1	Dean Dr	30"X12"	X							
		R5-1	DO NOT ENTER	36"X36"	X							
	7	R1-1	STOP	30"X30"	X		10BWG	1	SA	P		
	8	R1-1	STOP	30"X30"	X		10BWG	1	SA	P		
	9	D3-1	E Bankhead Hwy	54"X12"	X		10BWG	1	SA	P		
		D3-1	Dean Dr	30"X12"	X							
		R5-1	DO NOT ENTER	36"X36"	X							

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

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

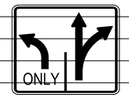
SUMMARY OF SMALL SIGNS

SOSS

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-16	DIST	COUNTY		SHEET NO.
8-16				215

18

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
2 of 7	10	R3-2		24"X24"	X		10BWG	1	SA	P		
	11	W1-2L		30"X30"	X		10BWG	1	SA	P		
3 of 7	12	R2-1		30"X36"	X		10BWG	1	SA	P		
	13	R2-1		30"X36"	X		10BWG	1	SA	P		
4 of 7	14	R3-8LK		36"X30"	X		10BWG	1	SA	P		
	15	R3-5R		30"X36"	X		10BWG	1	SA	P		
	16	R3-5R		30"X36"	X		10BWG	1	SA	P		
5 of 7	17	R3-7		36"X36"	X		10BWG	1	SA	P		
6 of 7	18	R2-1		30"X36"	X		10BWG	1	SA	P		
7 of 7	19	R4-7		24"X30"	X		10BWG	1	SA	P		

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

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				
4-16	DIST	COUNTY		SHEET NO.
8-16				216

T8

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.

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)

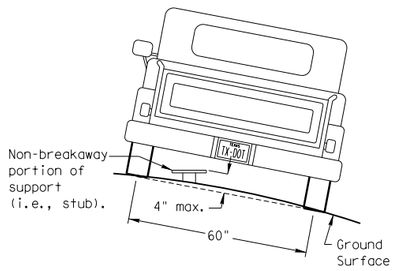
Anchor Type

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))

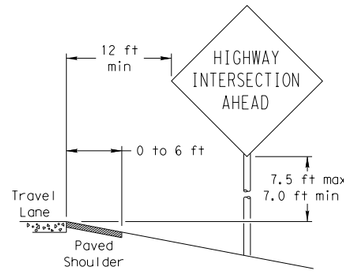
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

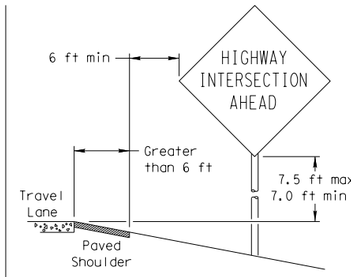
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

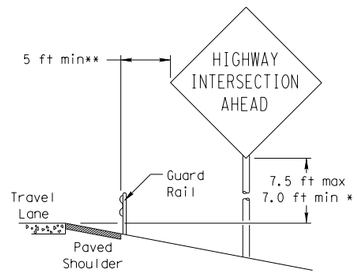
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



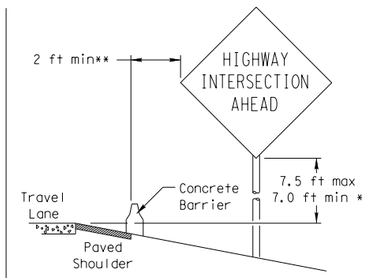
GREATER THAN 6 FT. WIDE

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



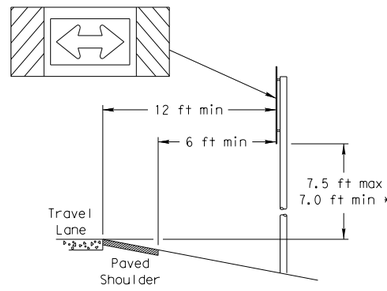
BEHIND GUARDRAIL



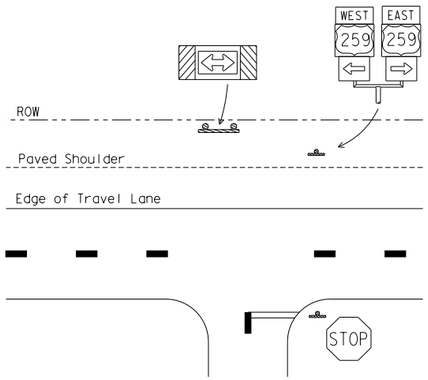
BEHIND CONCRETE BARRIER

**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

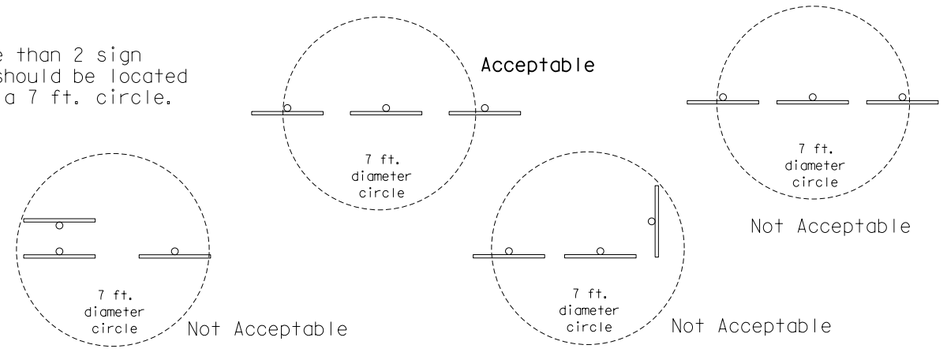
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

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.

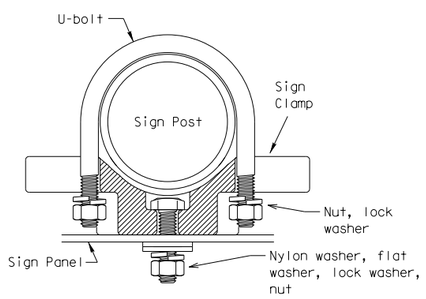
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

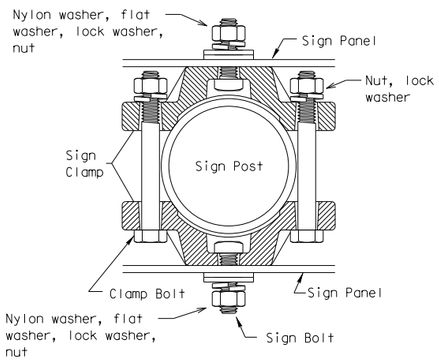


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

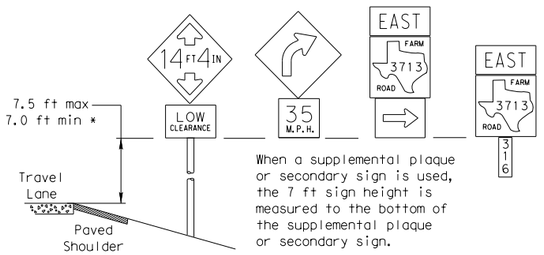
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



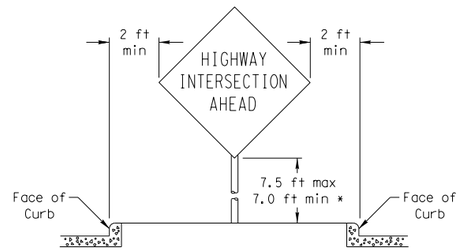
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



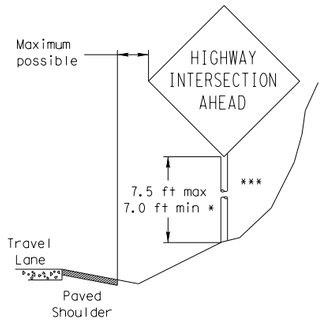
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

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

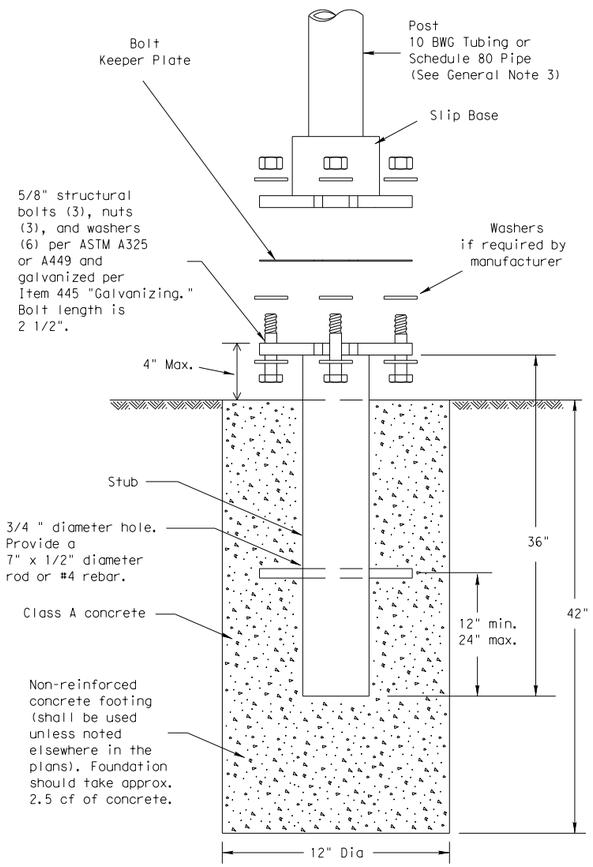
©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
		PARKER		217

26A

DATE: 8/27/2026
FILE: cv-109 TS TxDot SMD(GEN)-08.dgn

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.

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.

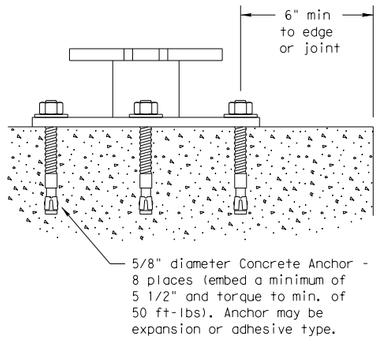
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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

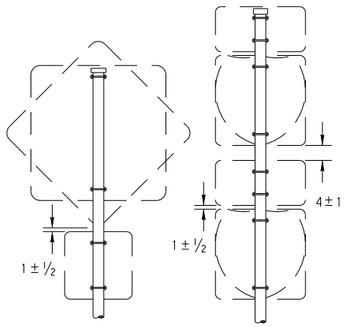
SMD(SLIP-1)-08

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08				
	DIST	COUNTY		SHEET NO.
		PARKER		218

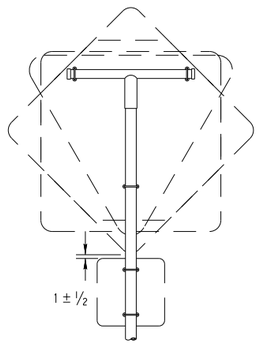
26B

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_SMD(SLIP-1)-08.dgn

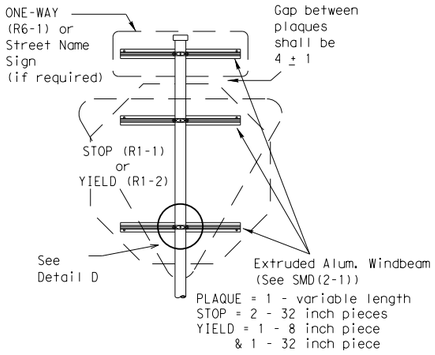
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



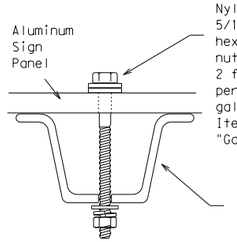
SM RD SGN ASSM TY XXXXX(1)XX(P)



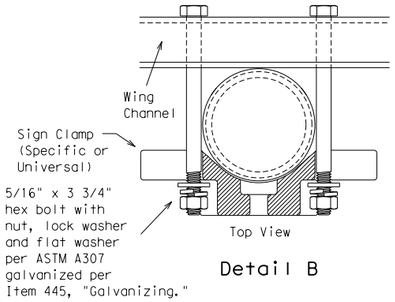
SM RD SGN ASSM TY XXXXX(1)XX(T)



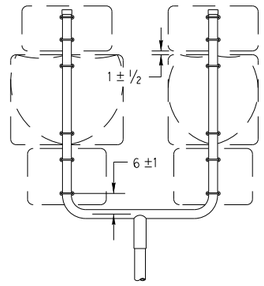
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



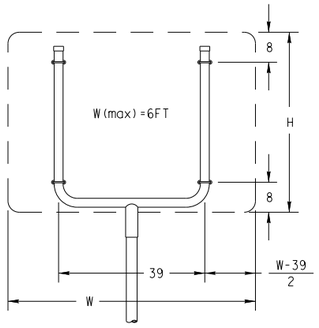
Detail A



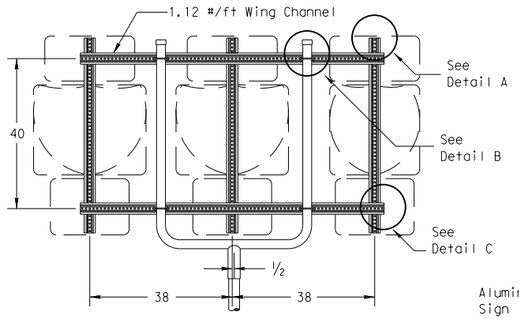
Detail B



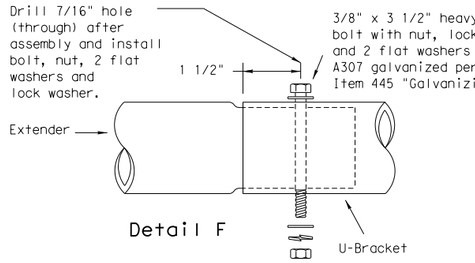
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

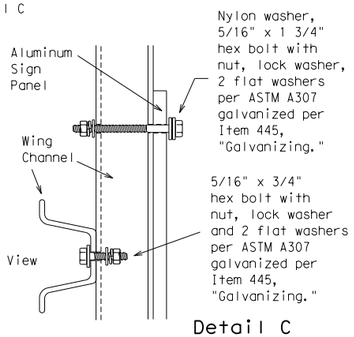


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

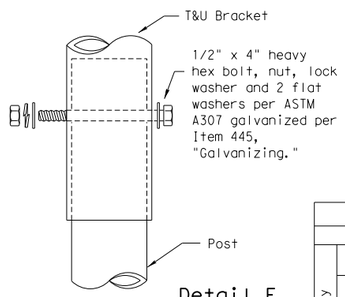


Detail F

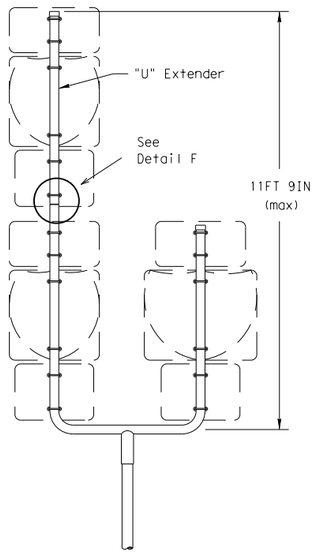
Splices shall only be allowed behind the sign substrate.



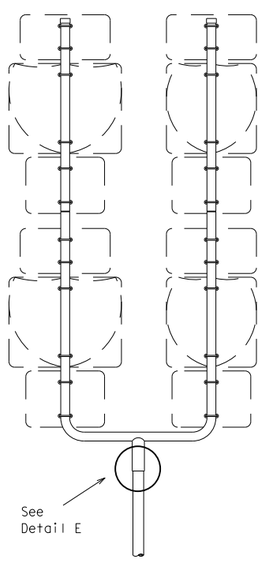
Detail C



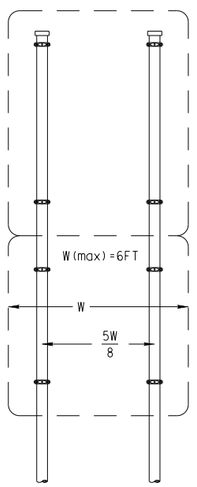
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

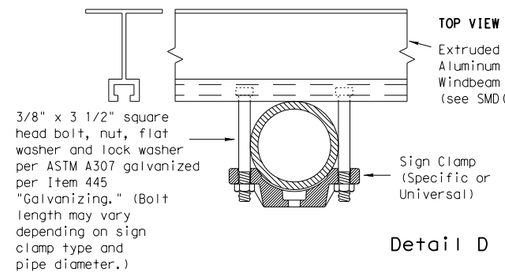


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

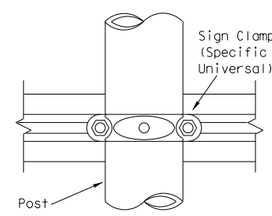


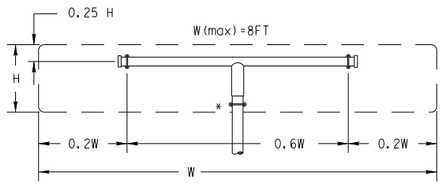
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

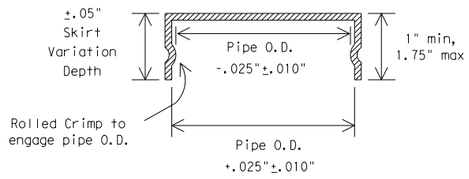




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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.

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.

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-2)-08

©TxDOT July 2002

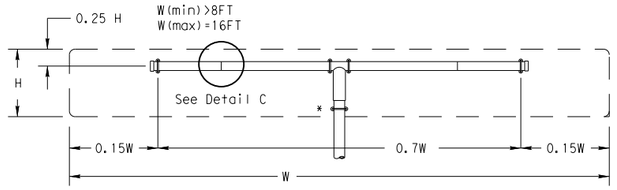
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		219

9-08 REVISIONS

26C

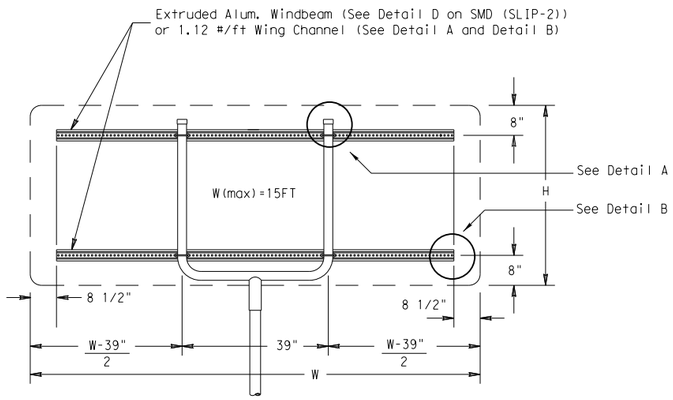
DATE: 8/27/2026
FILE: cv-109 TS TxDot SMD(SLIP-2)-08.dgn

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.

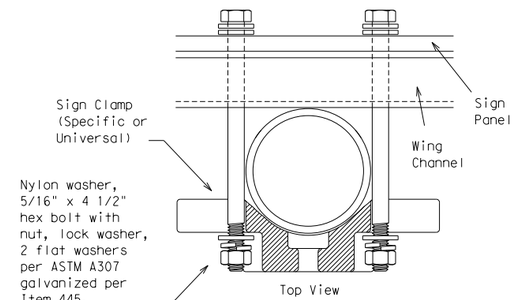


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

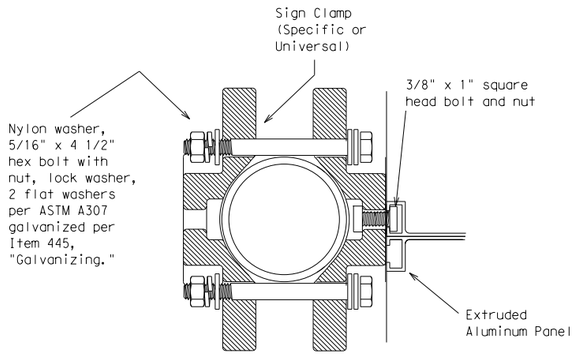
(* - See Note 12)



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

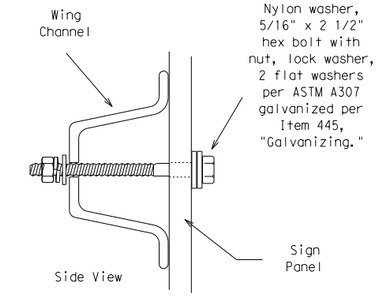


Detail A

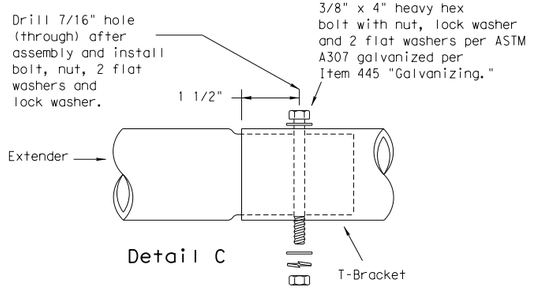


Detail D

EXTRUDED ALUMINUM SIGN WITH T BRACKET

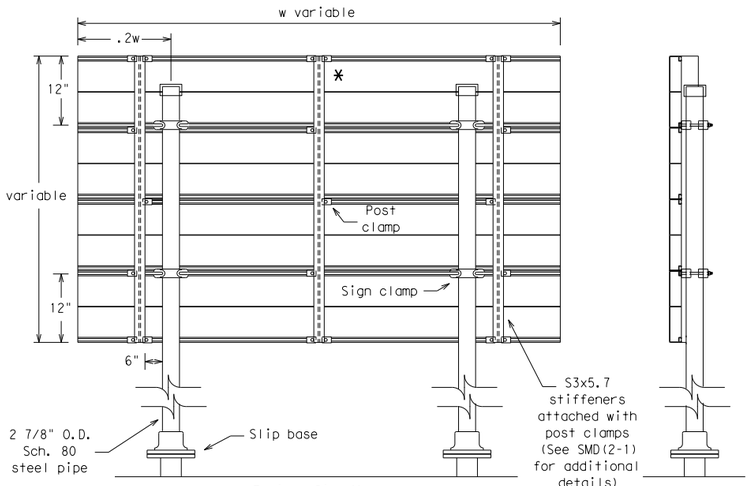


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

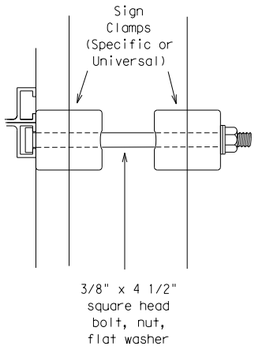


Typical Sign Mount

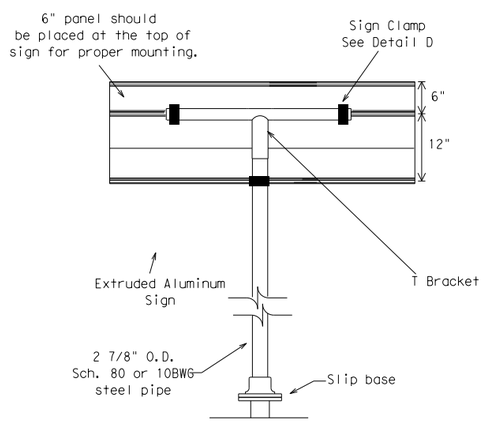
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

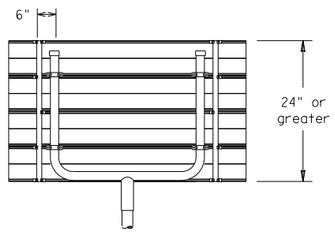
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. 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.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. 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.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. 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.
6. 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.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. 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."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. 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.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

© TxDOT July 2002

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	220

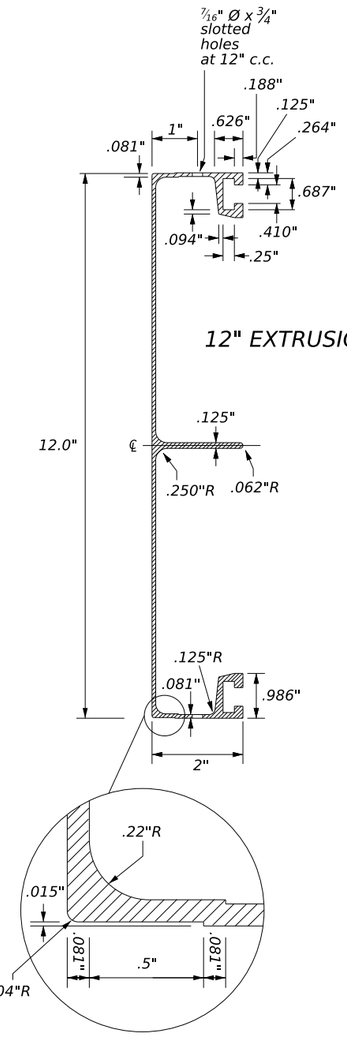
REVISIONS

9-08

DATE: 8/27/2026
FILE: cv-109_TS_TxDot SMD(SLIP-3)-08.dgn

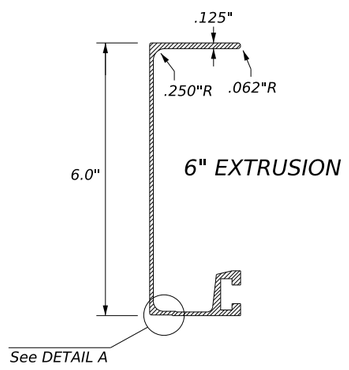
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

ALUMINUM SIGN PANEL EXTRUSION DETAILS

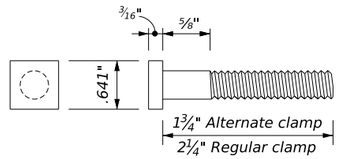


12" EXTRUSION

DETAIL A

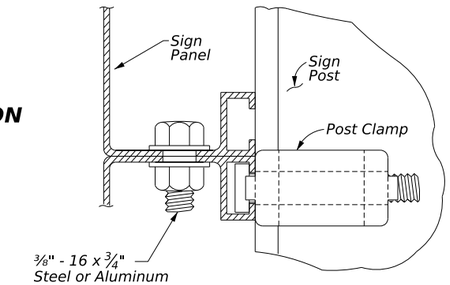


6" EXTRUSION



POST CLAMP BOLT DETAIL

PANEL CONNECTION DETAIL



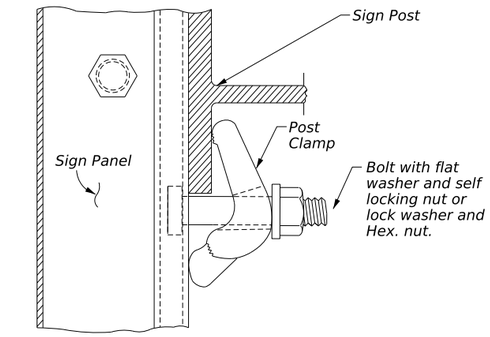
SIDE VIEW OF PANELS

GENERAL NOTES:

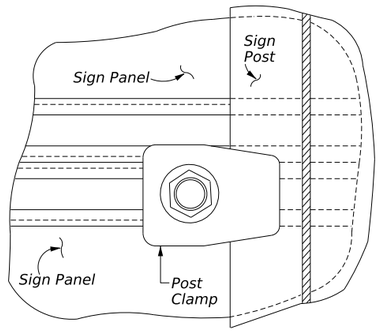
1. Design conforms with the 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (Large Roadside Signs with a 25-year Mean Recurrence Interval, MRI, and Overhead Signs with a 50-year MRI).
2. Materials and fabrication shall conform to the requirements of the Department Material Specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN HARDWARE	DMS-7120

POST CONNECTION DETAIL

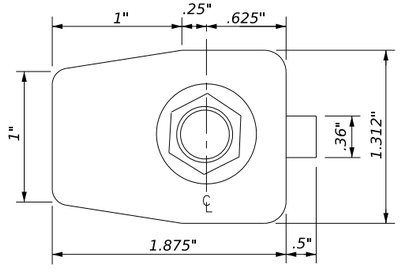


TOP VIEW OF POST

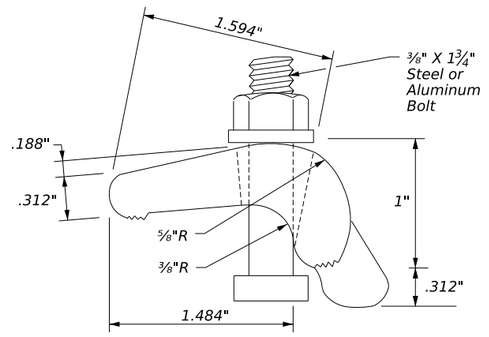


TOP VIEW OF CLAMP

REGULAR POST CLAMP DETAIL



PLAN

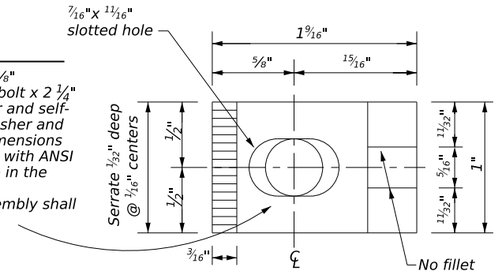


ELEVATION

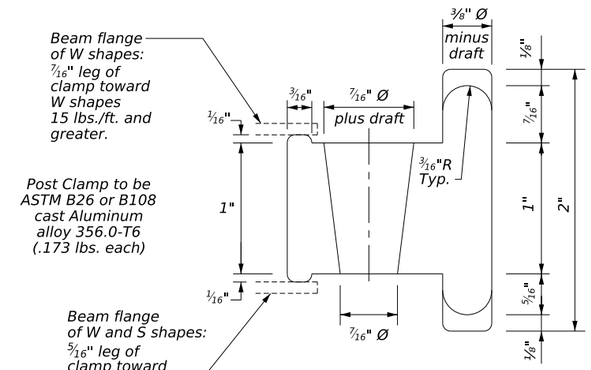
ALTERNATE POST CLAMP DETAIL

NOTE:

Centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.

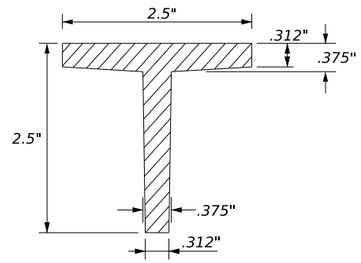


PLAN



ELEVATION

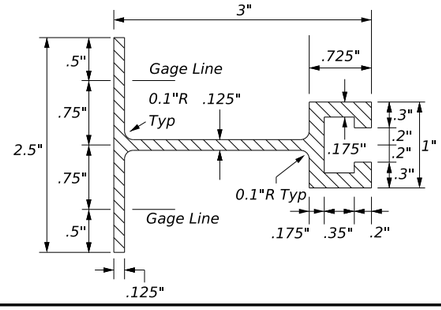
ALUMINUM T SECTION OR APPROVED ALTERNATIVE



1.912 lbs/ft

WINDBEAM CROSS SECTION

Windbeam to be extruded aluminum (1.175 lbs./ft.) or approved alternative



Texas Department of Transportation

Traffic Safety Division Standard

SIGN MOUNTING DETAILS SIGN PANELS & HARDWARE EXTRUDED ALUMINUM

SMD(2-3)-24

FILE: smd(2-3)-24.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2024	CONT	SECT	JOB	HIGHWAY
REVISIONS 2001 9-08 5-24	DIST	COUNTY		SHEET NO. 221

27C

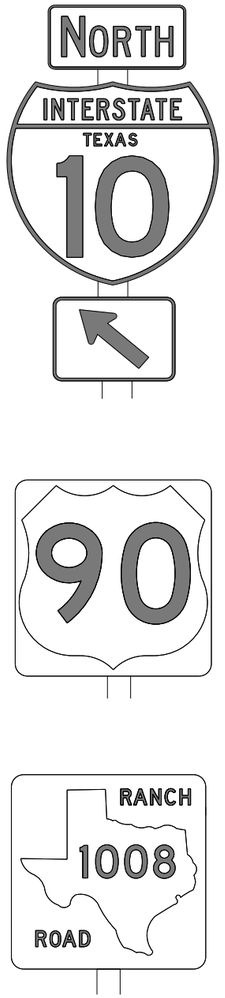
DATE:
FILE:

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

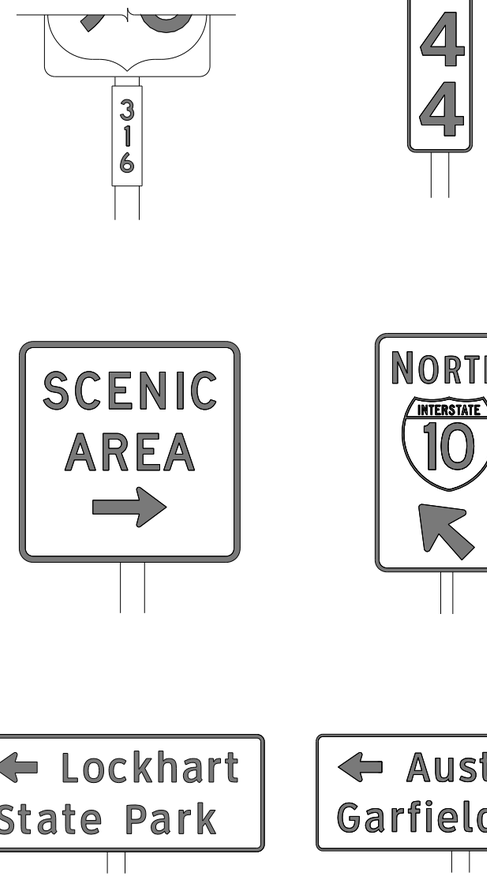
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



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

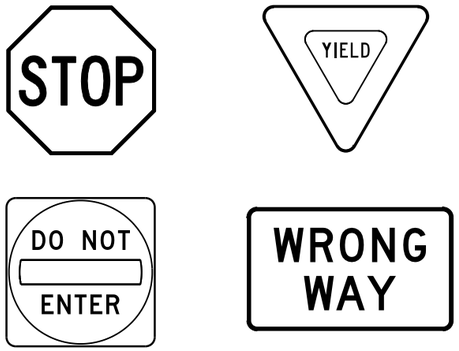
FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS				
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08				222

3

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS
(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

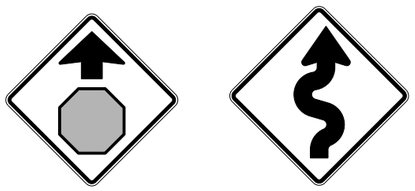
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

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

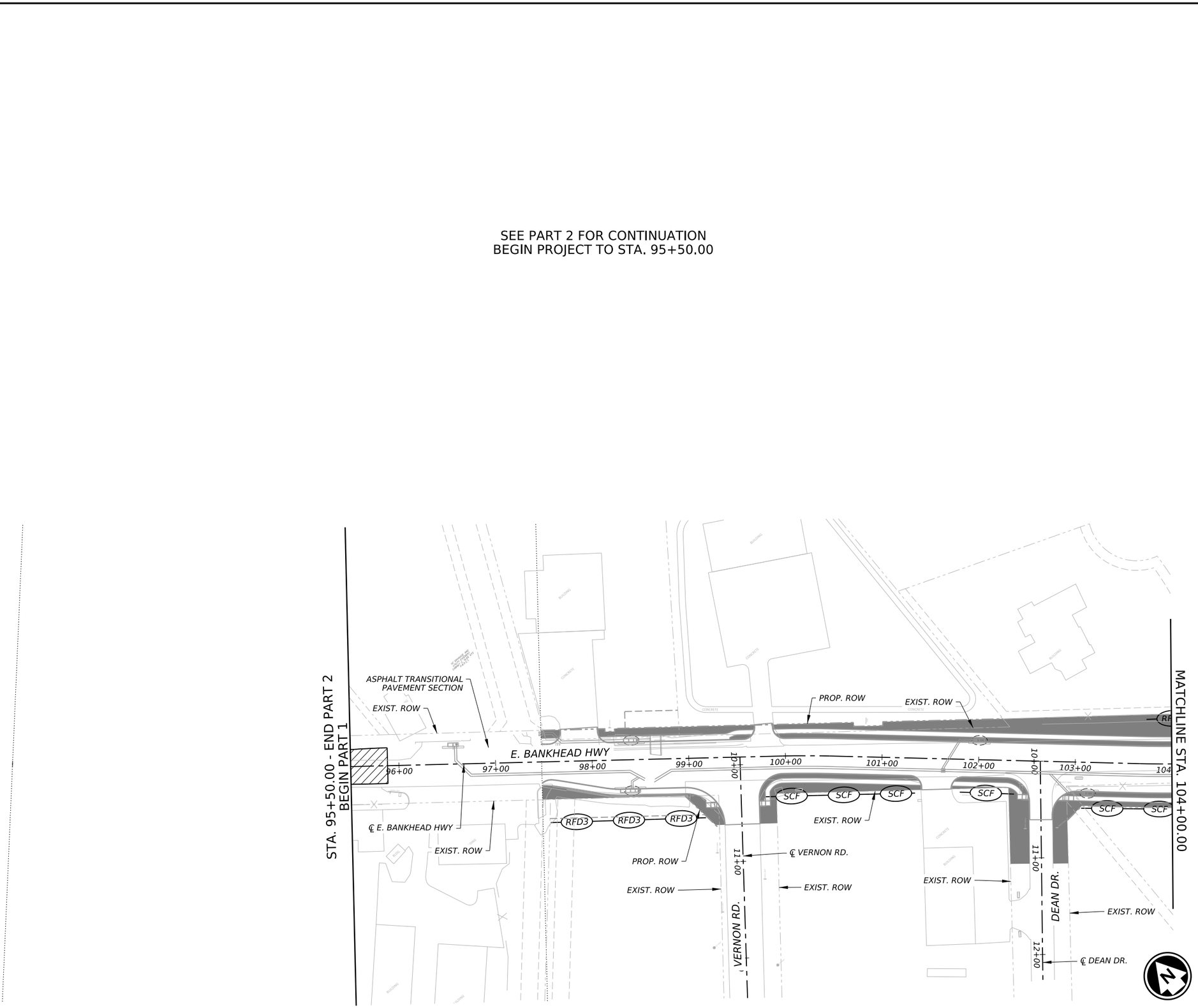
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS				
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08				223

4

CK:
DW:
CK:
DW:

SEE PART 2 FOR CONTINUATION
BEGIN PROJECT TO STA. 95+50.00



LEGEND

- HYDROMULCH SEEDING
- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM TY 2
- RFD3 — ROCK FILTER DAM TY 3
- INLET PROTECTION

0 50 100
SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

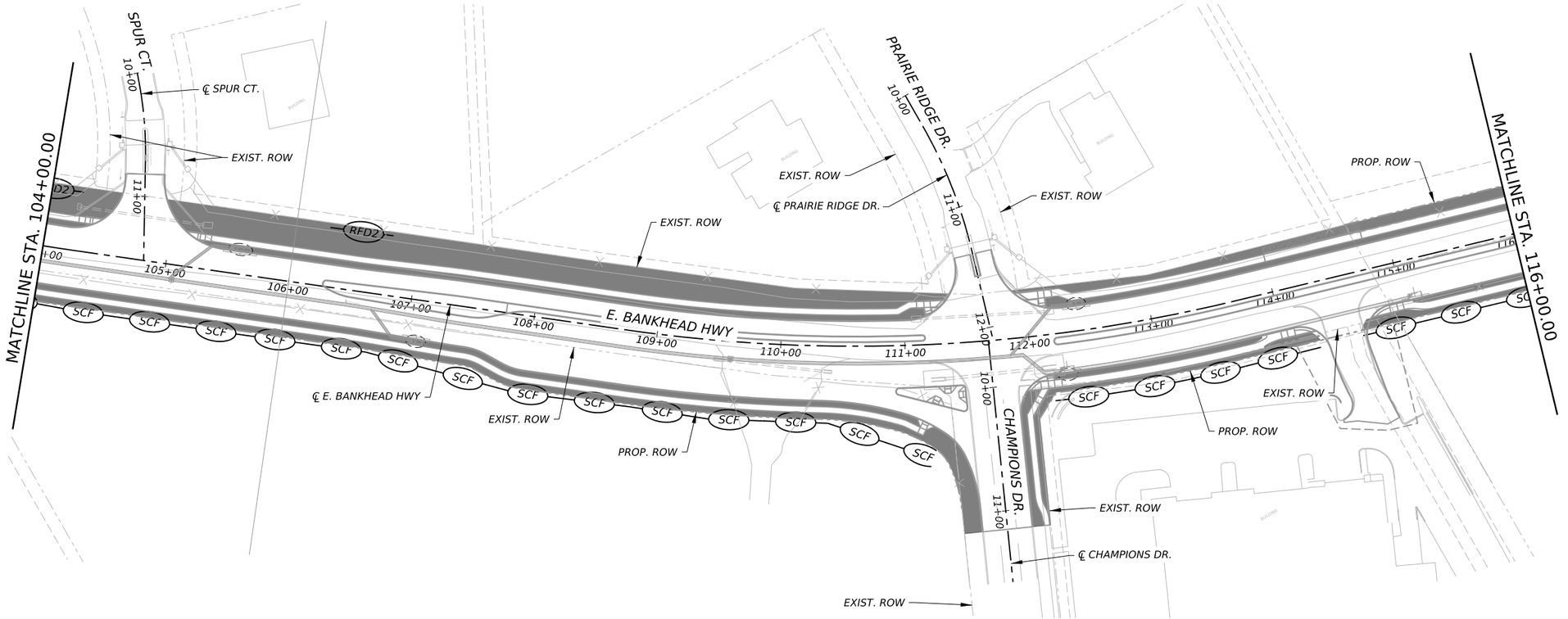
EROSION CONTROL PLAN FROM STA. 95+50 TO STA. 104+00

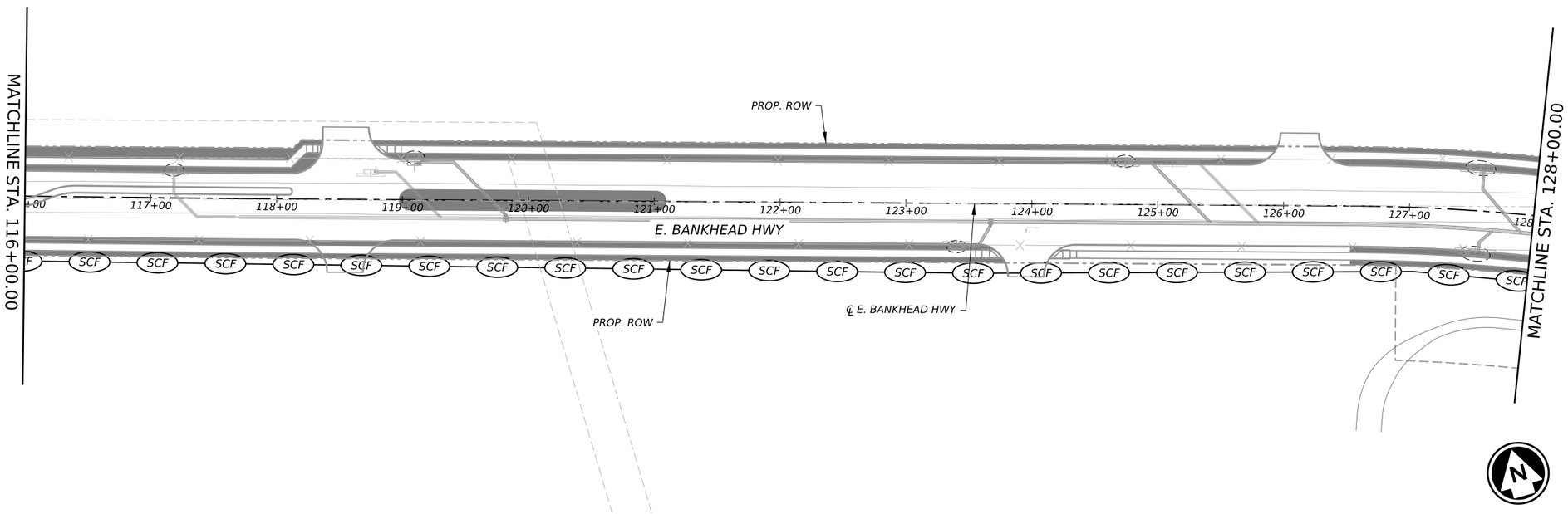
SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	224

DATE: 8/27/2026 8:08:40 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56251\54715_3\cv-109-pl-eros04.dgn





LEGEND

- HYDROMULCH SEEDING
- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM TY 2
- RFD3 — ROCK FILTER DAM TY 3
- INLET PROTECTION

0 50 100

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

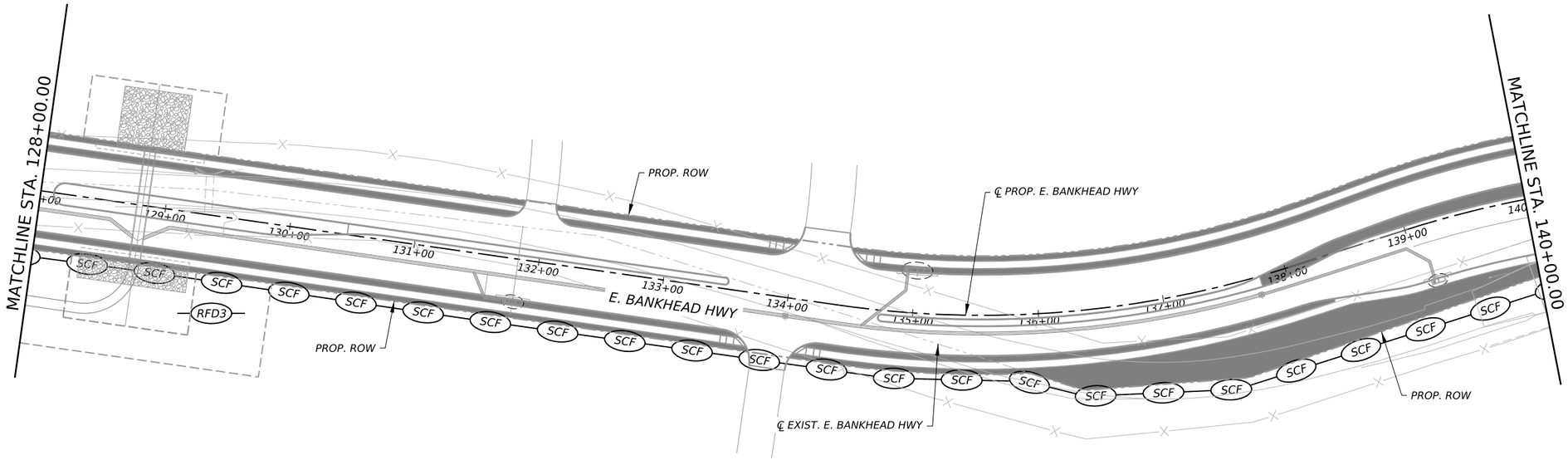
EROSION CONTROL PLAN FROM STA. 104+00 TO STA. 128+00

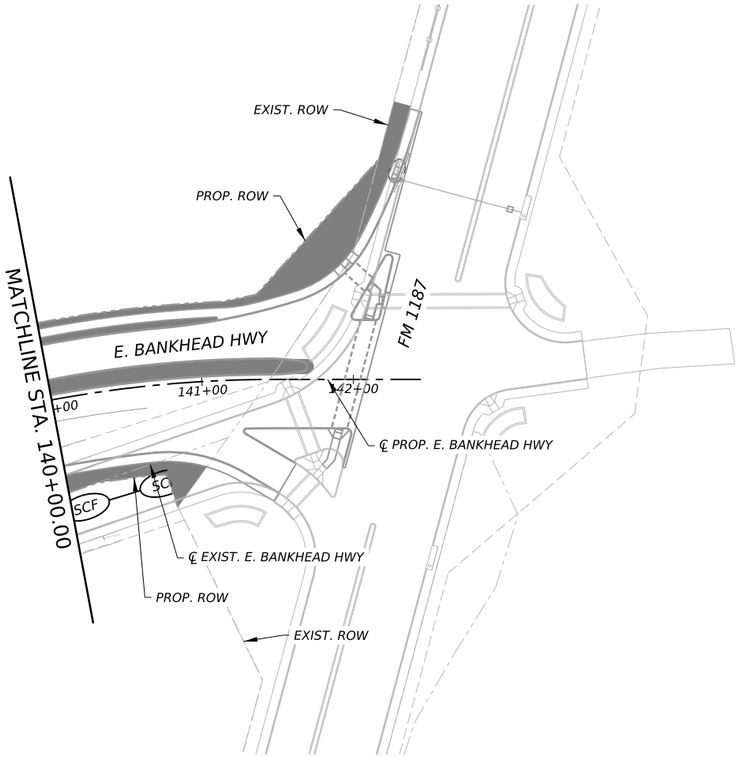
SHEET 2 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	225

DATE: 8/27/2026 8:14:05 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56251\54715_1\cv-109-pl-eros05.dgn





LEGEND

- HYDROMULCH SEEDING
- SCF — SEDIMENT CONTROL FENCE
- RFD2 — ROCK FILTER DAM TY 2
- RFD3 — ROCK FILTER DAM TY 3
- INLET PROTECTION

0 50 100

SCALE IN FEET

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

EROSION CONTROL PLAN FROM STA. 128+00 TO END

SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	226

DATE: 8/27/2026 8:07:20 PM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\56251\54715_2\cv-109-pl-eros06.dgn

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):

_____

1.2 PROJECT LIMITS:

From:_____

To:_____

1.3 PROJECT COORDINATES:

BEGIN: (Lat)_____,(Long)_____

END: (Lat)_____,(Long)_____

1.4 TOTAL PROJECT AREA (Acres): _____

1.5 TOTAL AREA TO BE DISTURBED (Acres): _____

1.6 NATURE OF CONSTRUCTION ACTIVITY:

_____

_____

_____

1.7 MAJOR SOIL TYPES:

Soil Type	Description
SELDEN LOAMY FINE SAND	LOAMY FINE SAND
NIMROD FINE SAND	FINE SAND

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 2.3.)

☐ Mobilization
☐ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☐ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ 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
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ 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
BRAZOS	RIVER

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

☒ Development of plans and specifications
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
_____
☐ Other: _____
_____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

☒ Day To Day Operational Control
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☐ Other: _____
_____
☐ Other: _____
_____
☐ Other: _____
_____

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

© 2023

July 2023 Sheet 1 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			227
STATE	STATE DIST.	COUNTY	
TEXAS		PARKER	
CONT.	SECT.	JOB	HIGHWAY NO.

STORMWATER POLLUTION PRVENTION 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

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☒ Permanent Planting, Sodding or Seeding
- ☐ ☐ Biodegradable Erosion Control Logs
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☒ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☒ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☒ ☐ Sediment Control Fence
- ☐ ☐ 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

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
SODDING	**BEGIN**	**END**

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☒ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☒ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ 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
SODDING	**BEGIN**	**END**

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- ☒ Fire hydrant flushings
- ☒ Irrigation drainage
- ☒ Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- ☒ Potable water sources
- ☒ Springs
- ☒ Uncontaminated groundwater
- ☒ Water used to wash vehicles or control dust
- ☒ Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 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 2.3 of this SWP3 .

2.10 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 2.3 of this SWP3.

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

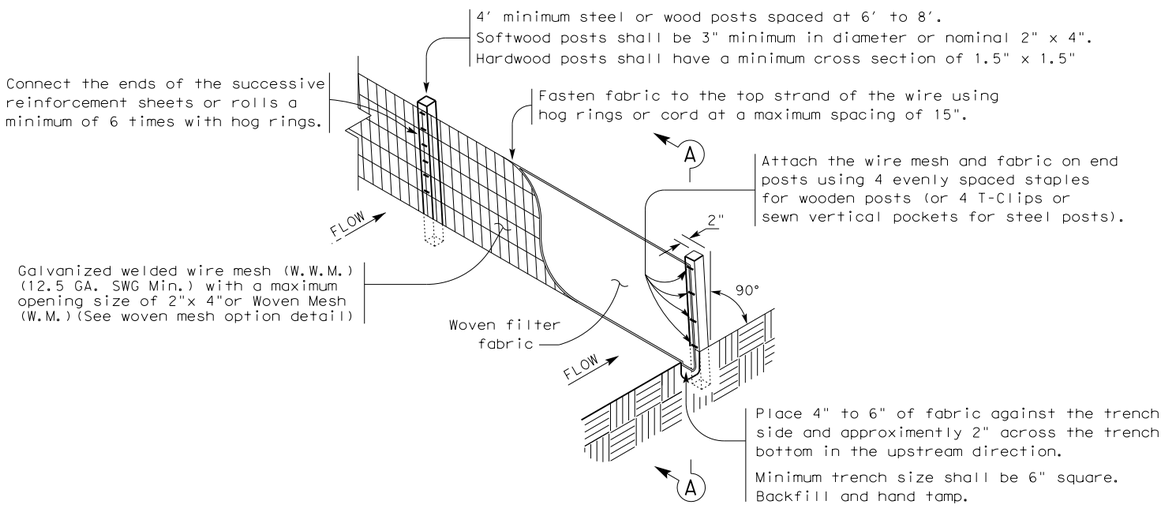
© 2023

July 2023 Sheet 2 of 2

Texas Department of Transportation

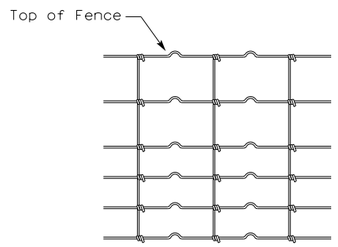
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			228
STATE	STATE DIST.	COUNTY	
TEXAS		PARKER	
CONT.	SECT.	JOB	HIGHWAY NO.

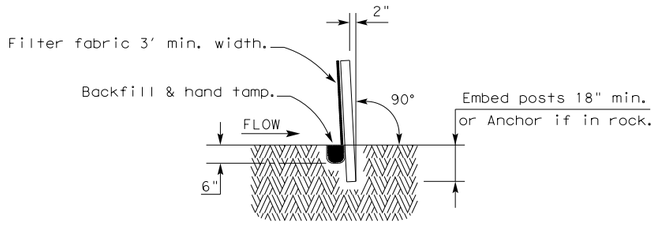
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



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.

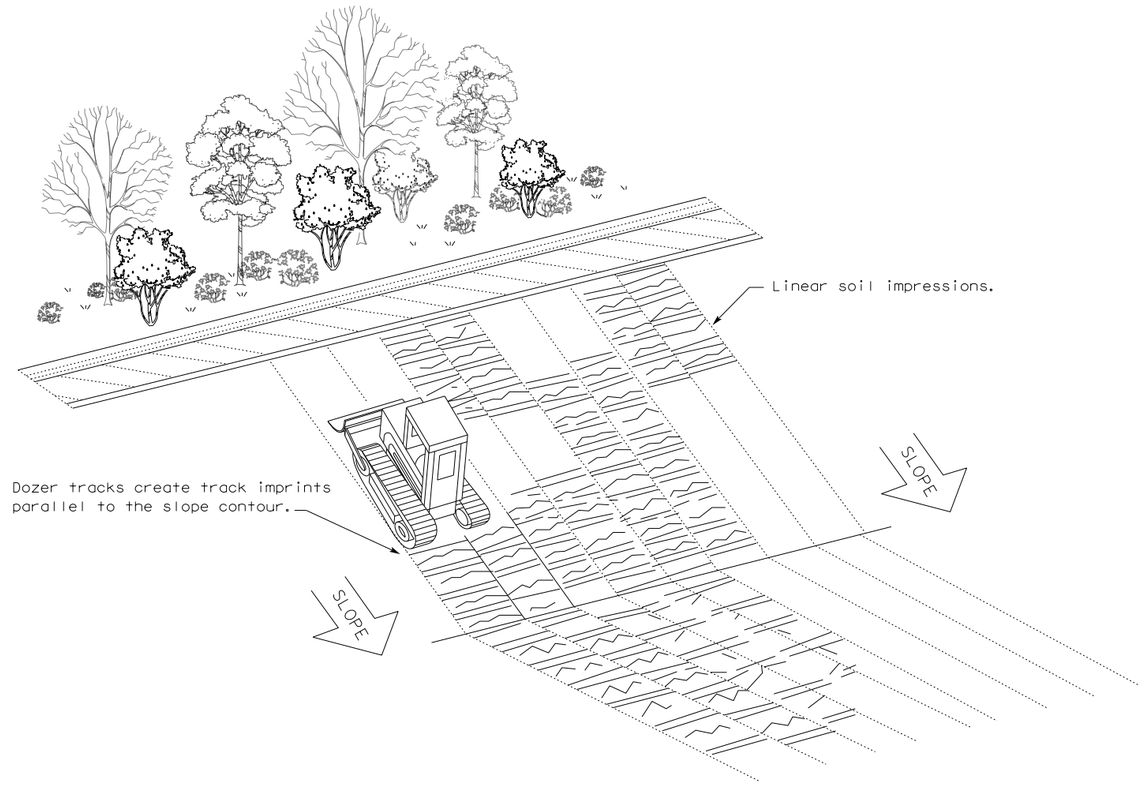
LEGEND

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

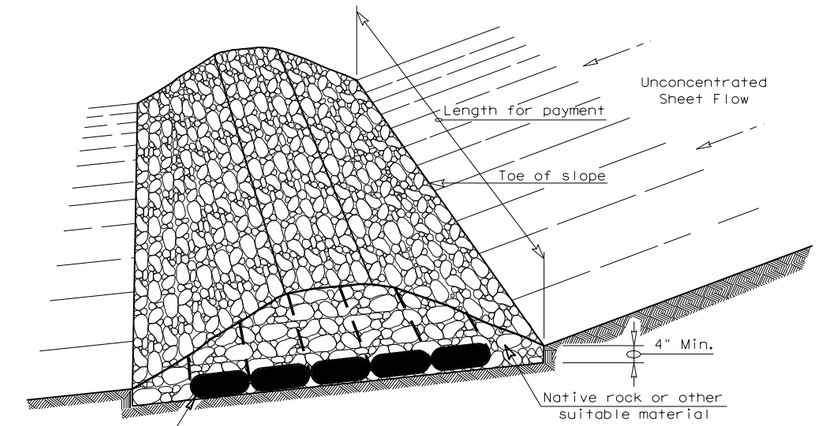
FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		229

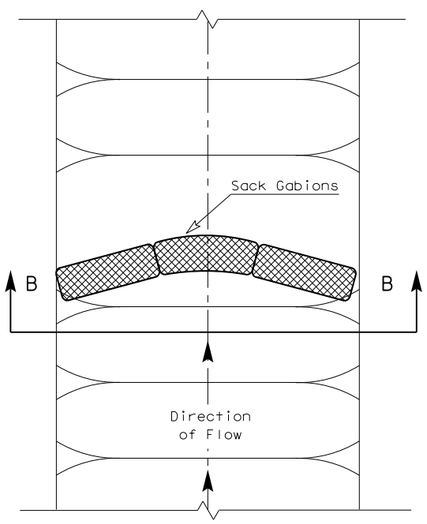
DATE 8/27/2026
FILE cv-109_TS_TxDot_EC(1)-16.dgn

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.

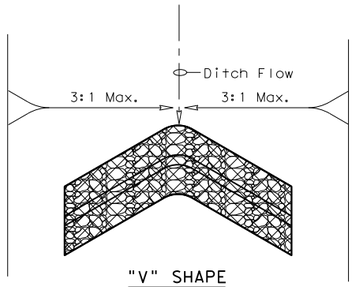


FILTER DAM AT TOE OF SLOPE

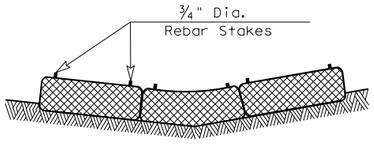
RFD1



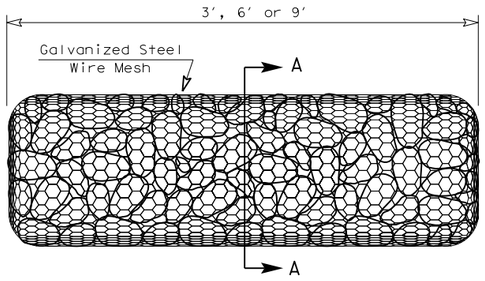
PLAN VIEW



"V" SHAPE
PLAN VIEW

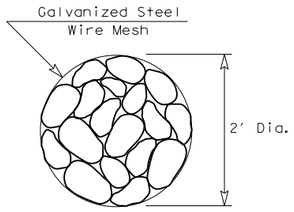


SECTION B-B

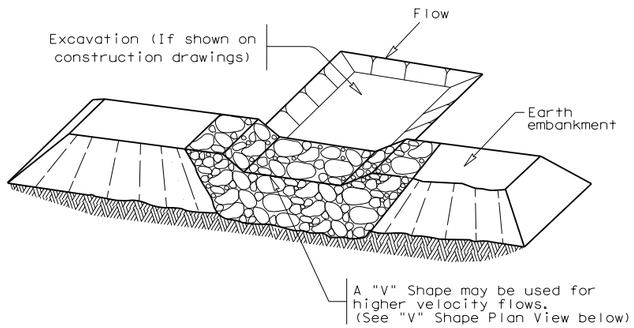


TYPE 4 (SACK GABIONS)

RFD4

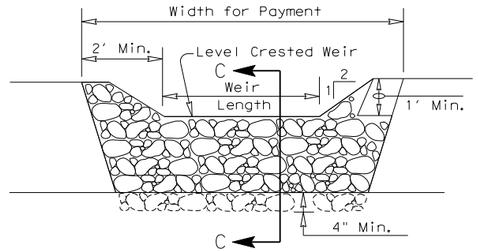


SECTION A-A

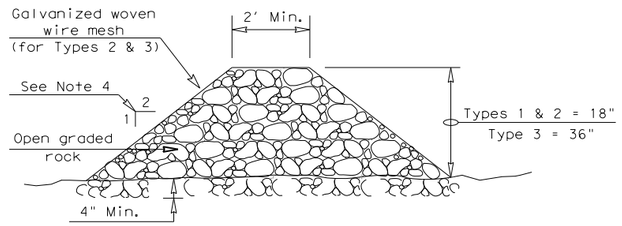


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE



SECTION C-C

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.

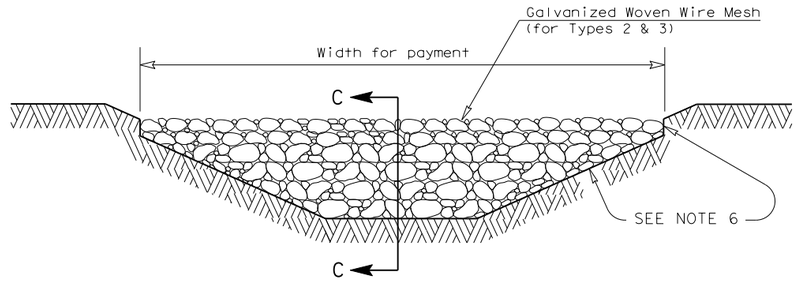
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity 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.



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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

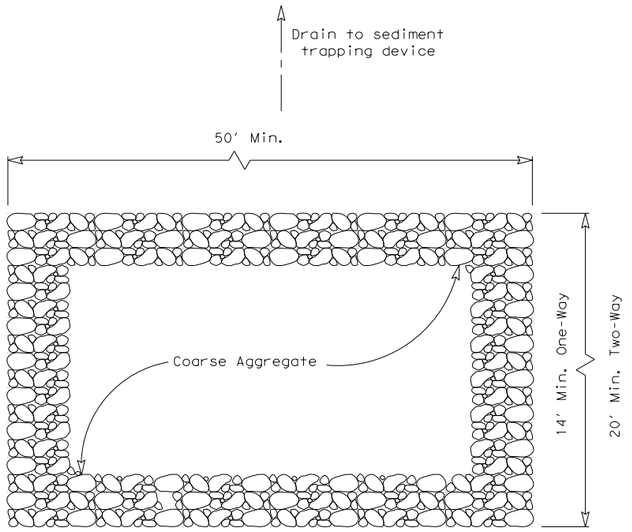
ROCK FILTER DAMS

EC(2)-16

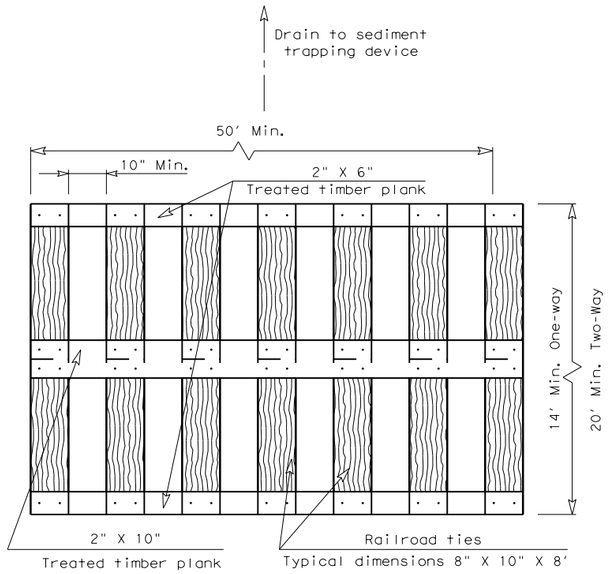
FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
		PARKER		230

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_EC(2)-16.dgn

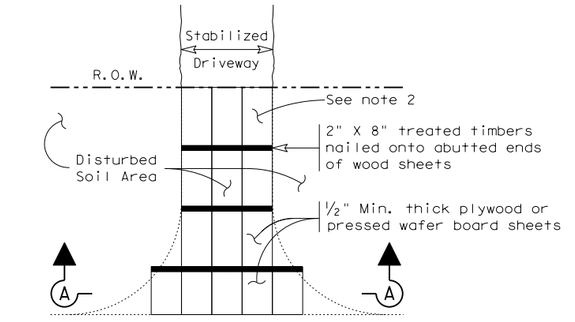
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



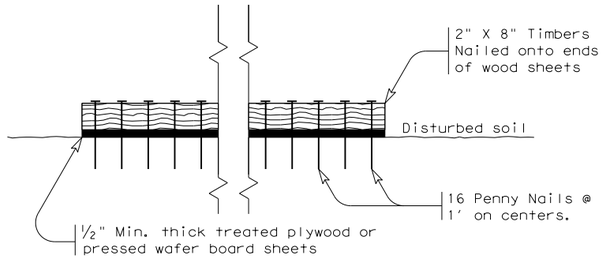
PLAN VIEW



PLAN VIEW



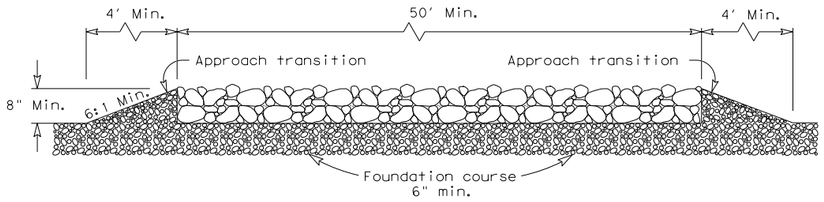
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

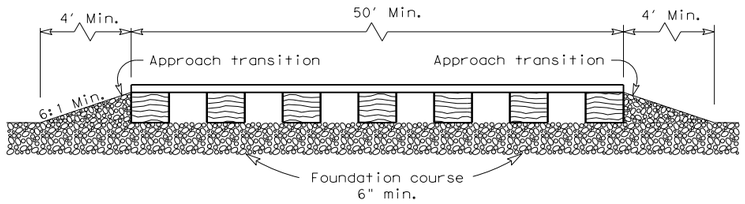
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER 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.

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

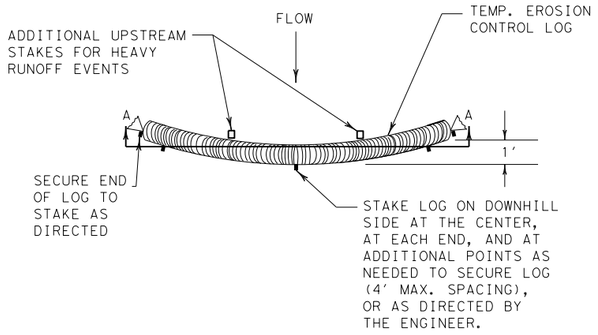
CONSTRUCTION EXITS

EC(3)-16

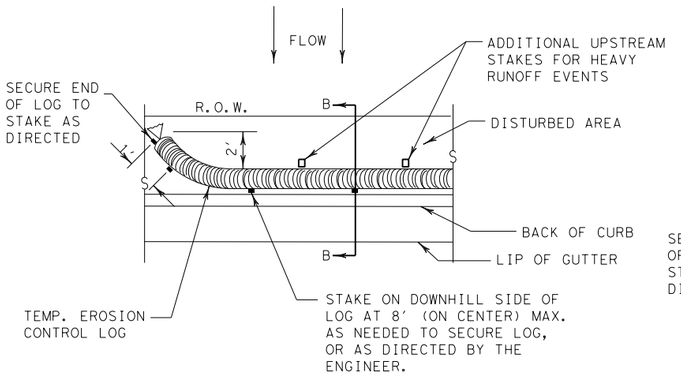
FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
	DIST	COUNTY		SHEET NO.	
		PARKER		231	

DATE: 8/27/2026
FILE: cv-109_TS_TxDot_EC(3)-16.dgn

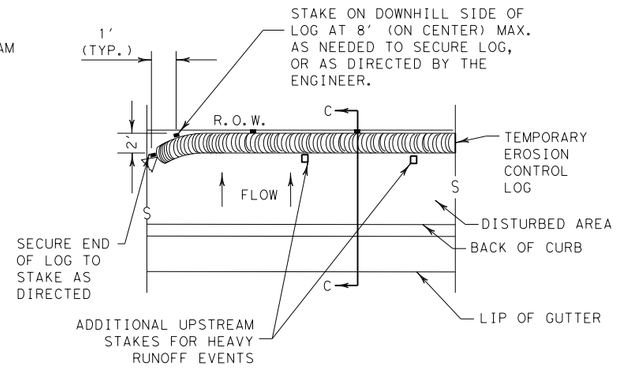
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



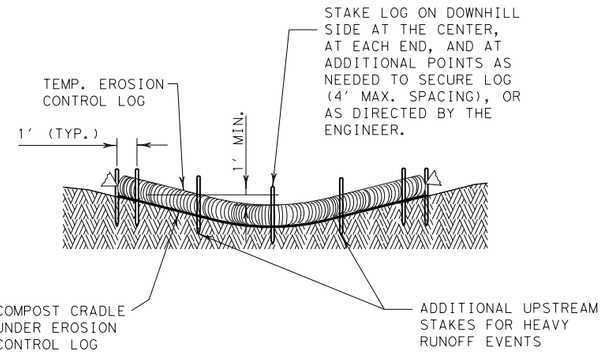
PLAN VIEW



PLAN VIEW



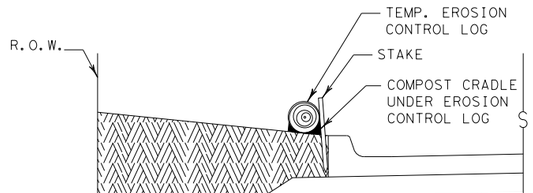
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

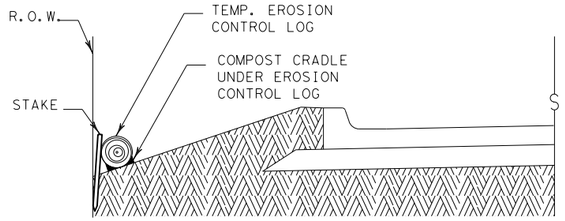
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

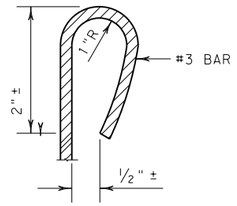
CL-BOC



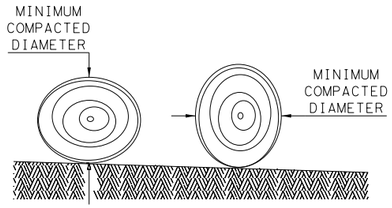
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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.

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

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

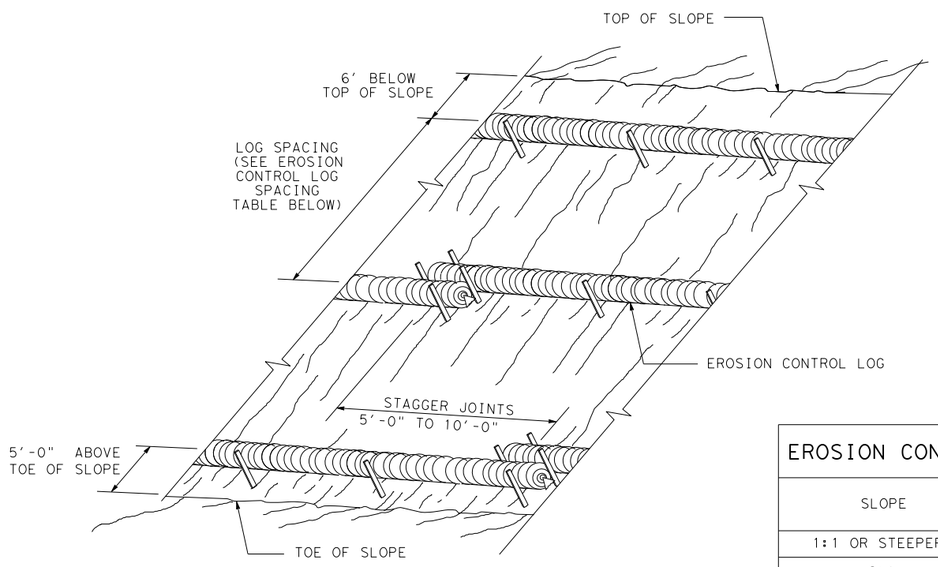
EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
	DIST	COUNTY		SHEET NO.	
		PARKER		232	

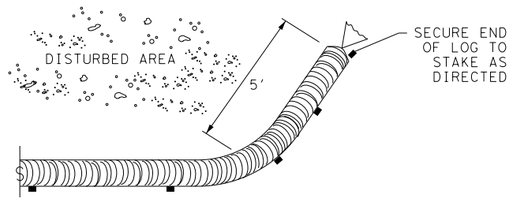
DATE: 8/27/2026
FILE: cv-109_TS_TxDot_EC(9)-16-1.dgn

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.



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

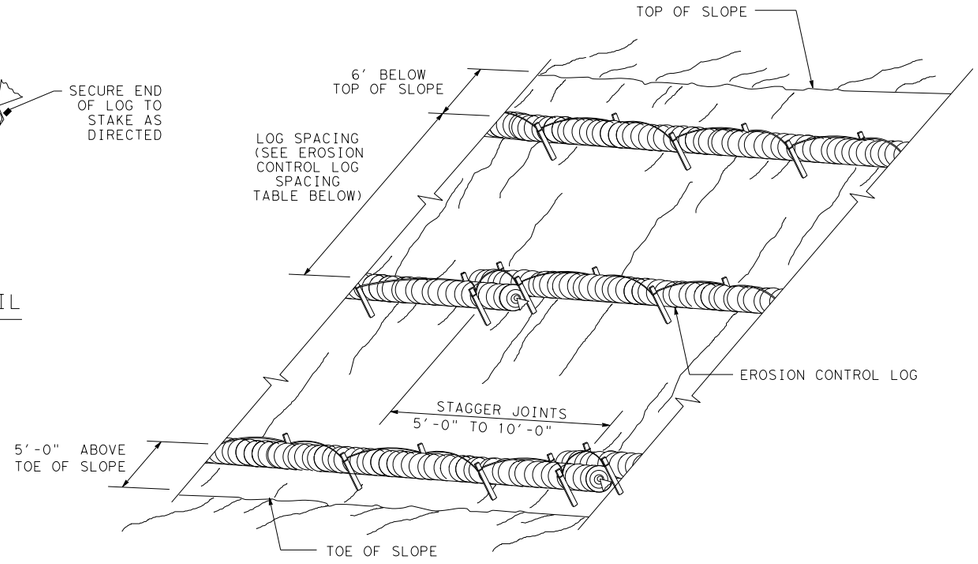
CL-SST



END SECTION RAP DETAIL

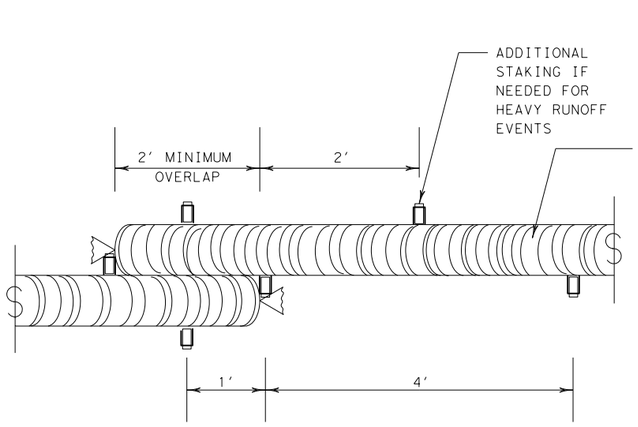
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

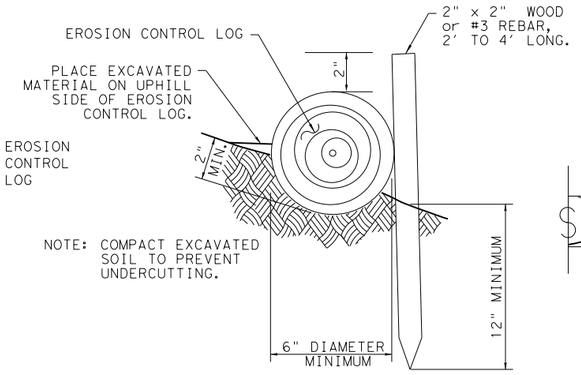
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

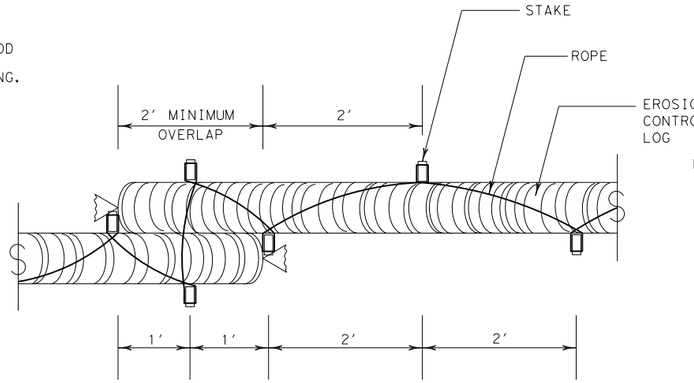




STAKE AND TRENCHING ANCHORING DETAIL

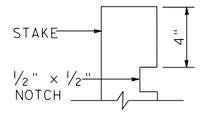
CL-SST

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

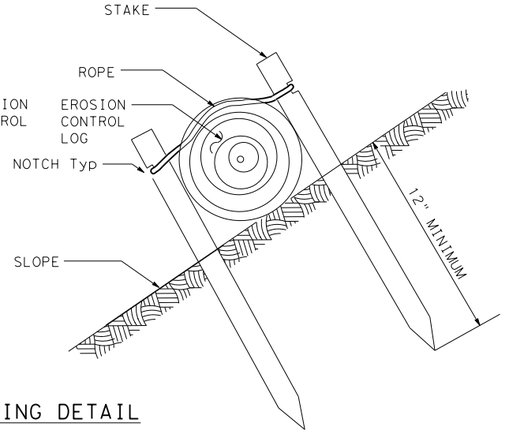


STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL



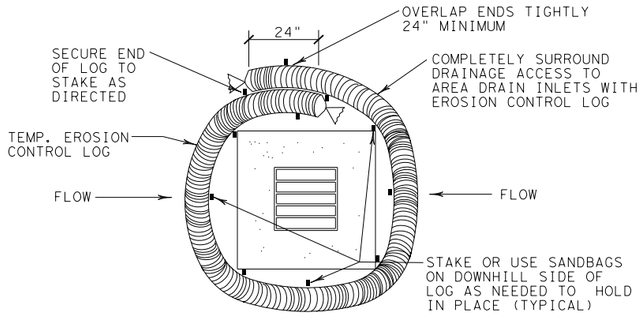
Texas Department of Transportation — Design Division Standard

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						
	DIST	COUNTY				SHEET NO.
		PARKER				233

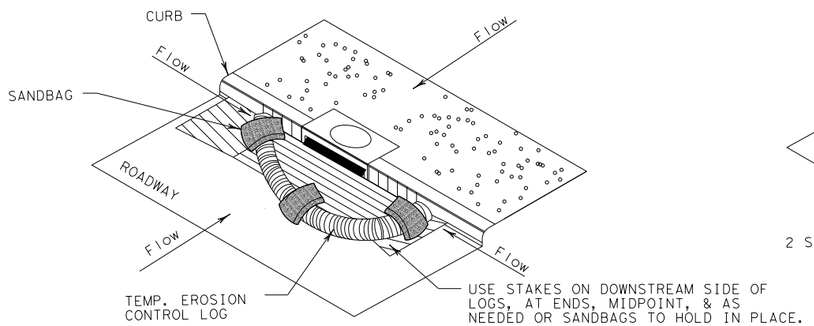
DATE: 8/27/2026
FILE: cv-109_TS_TxDot_EC(9)-16-2.dgn

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.



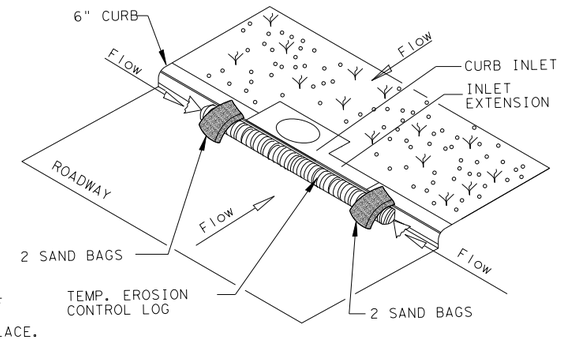
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

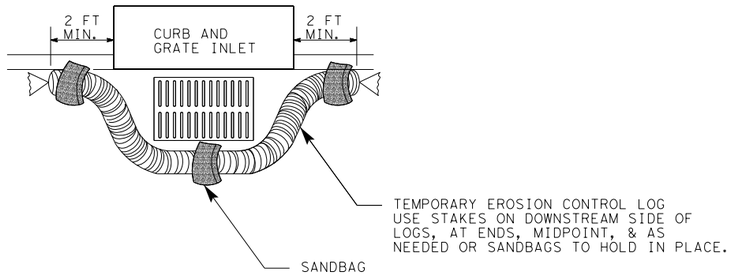
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

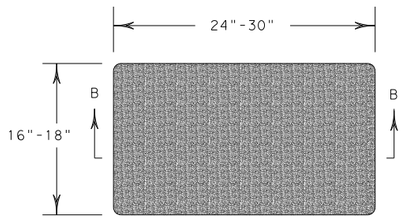
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



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

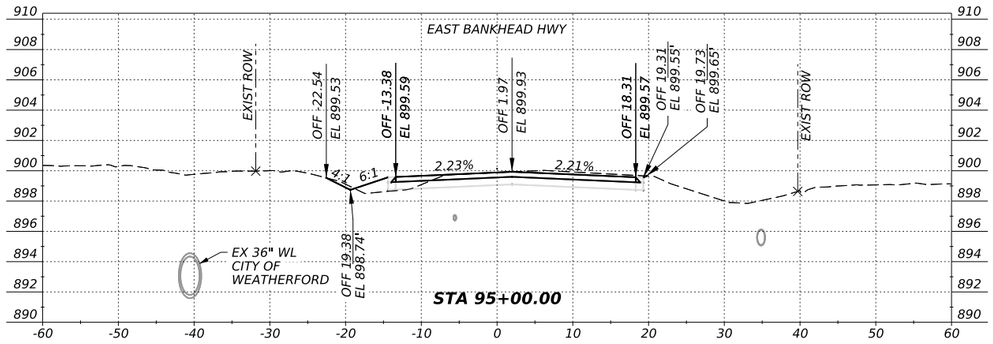
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

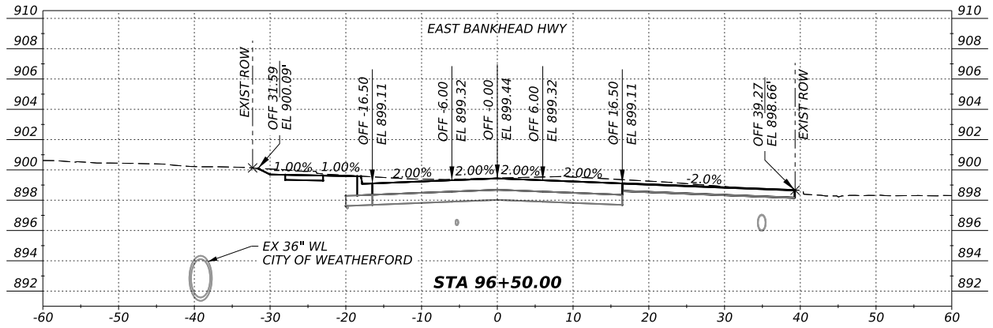
EROSION CONTROL LOG

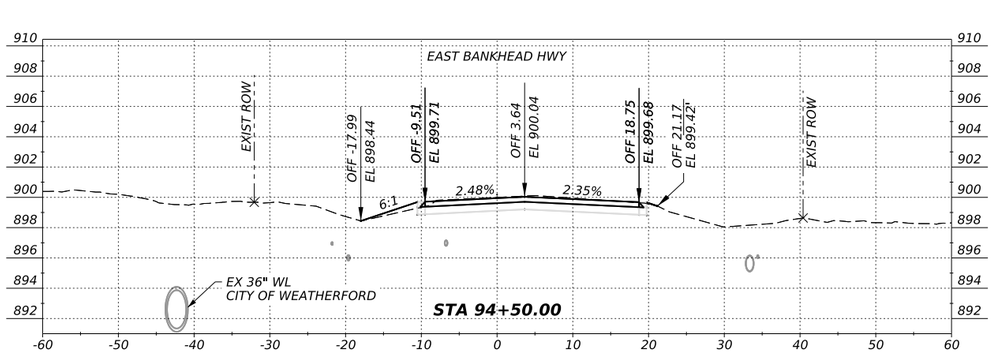
EC(9)-16

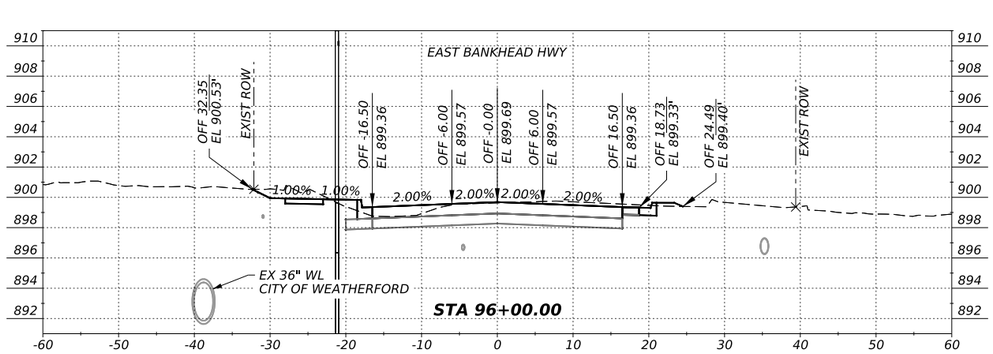
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS			
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY			
REVISIONS							
	DIST	COUNTY		SHEET NO.			
		PARKER		234			

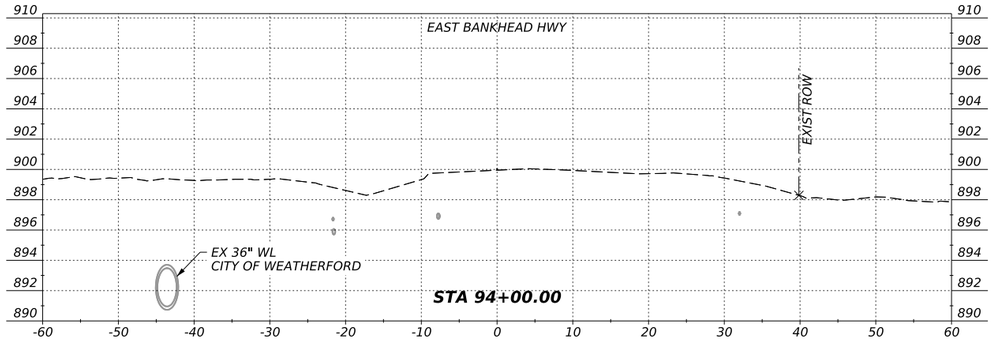
DATE: 8/27/2026
FILE: cv-109_TS_TxDot_EC(9)-16-3.dgn

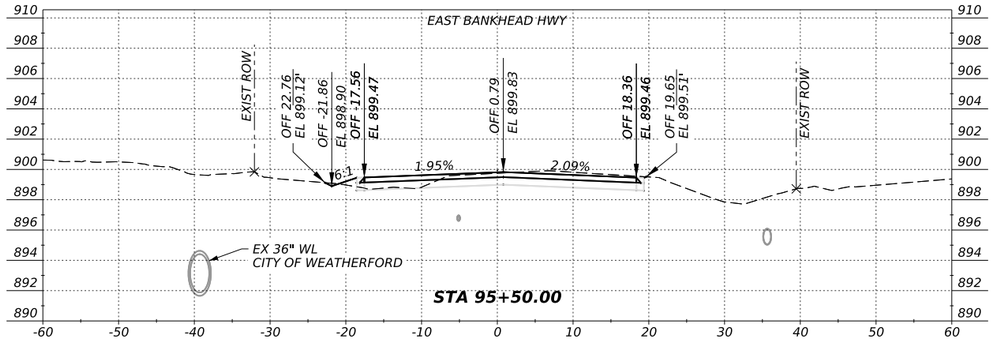












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

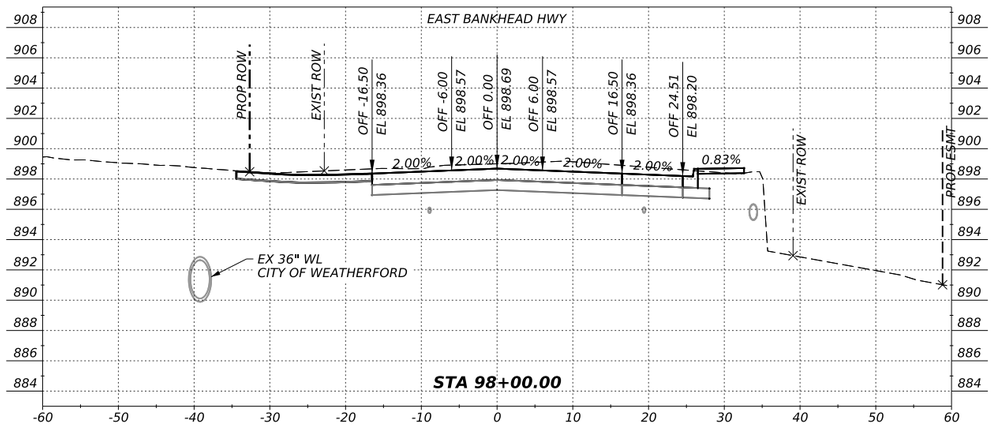
E BANKHEAD HWY PART 1

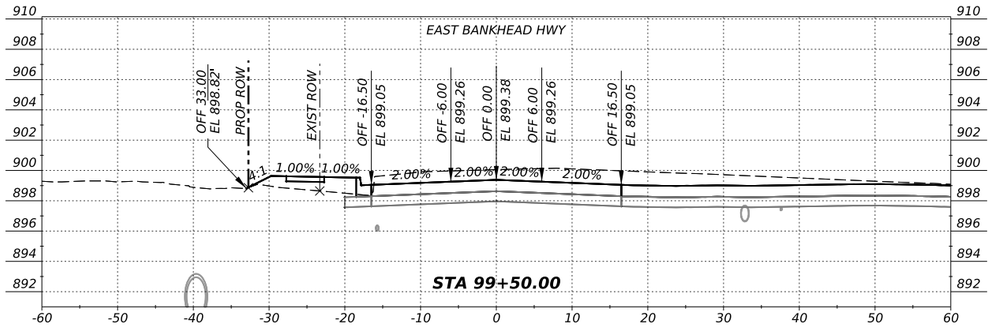
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

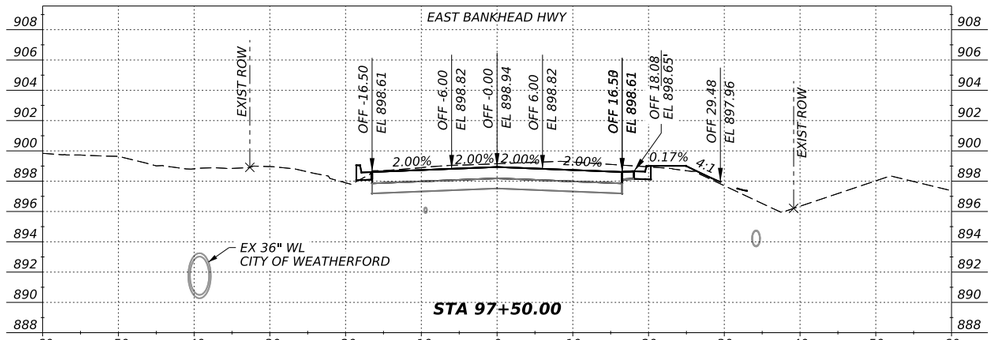
CONT	SECT	JOB	HIGHWAY

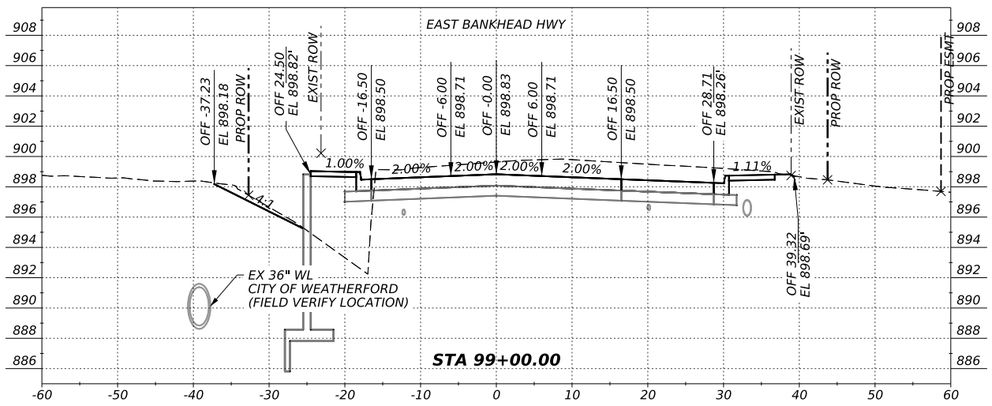
DIST	COUNTY	SHEET NO.
	PARKER	235

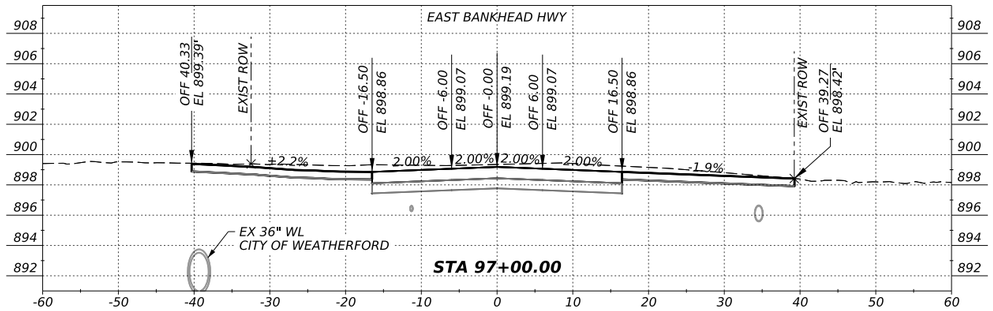
DATE: 8/14/2026 6:15:05 AM
FILE: \\fcsM-freesepw21\FCS_pdf_work_dir\4954154718_2\cv-109-XS-EB_pt1.dgn

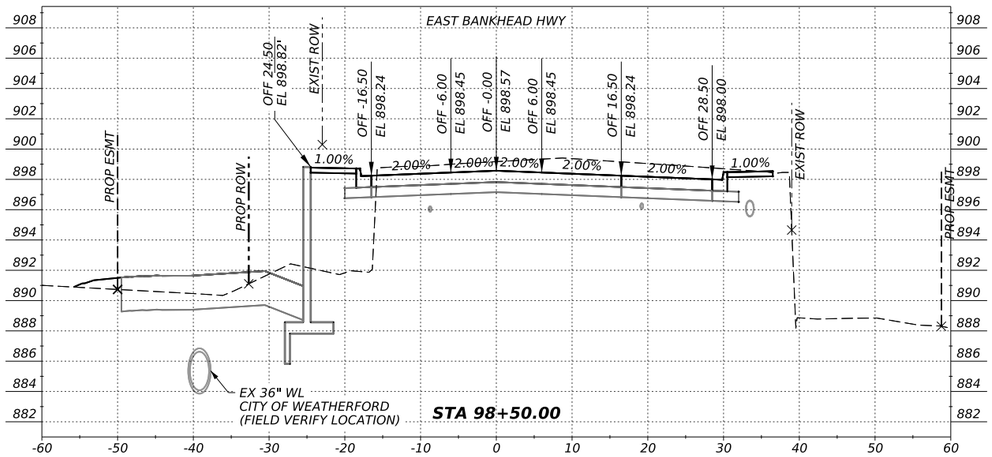












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

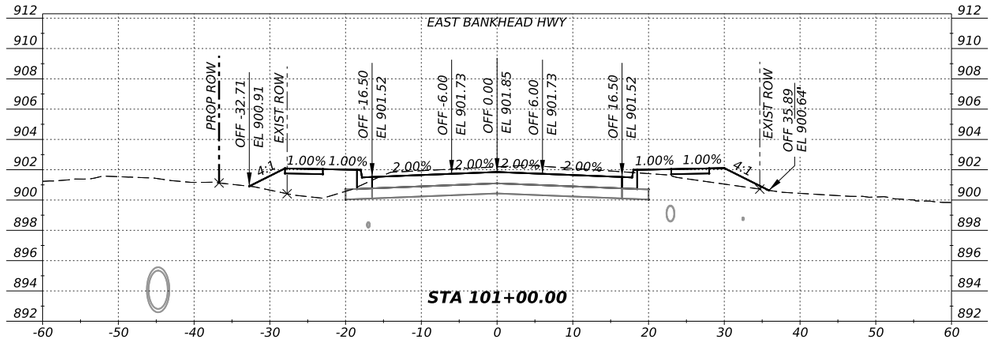
E BANKHEAD HWY PART 1

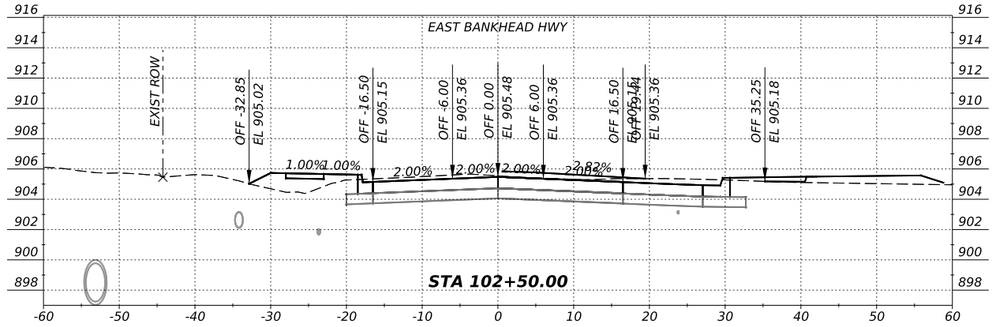
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

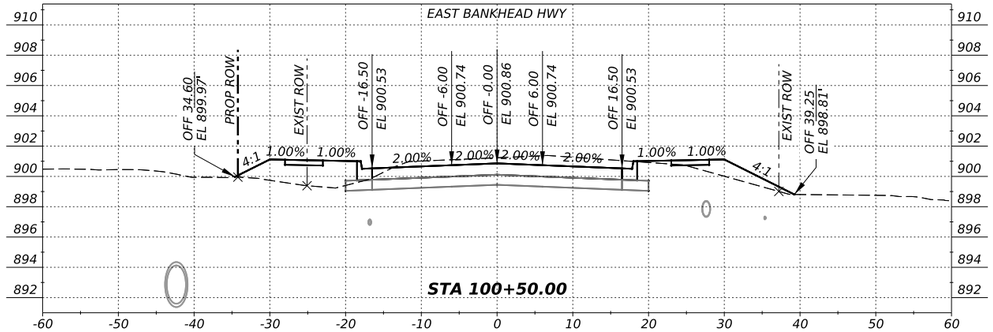
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		236

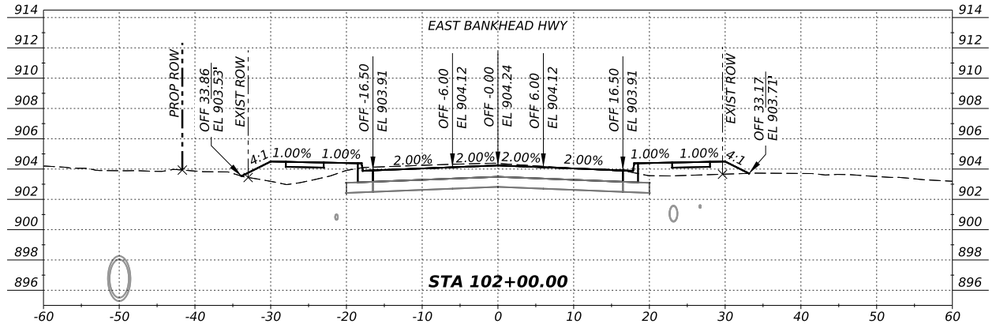
DATE: 8/14/2026 5:54:21 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\49541547 18_2\cv-109-XS-EB_pt1.dgn

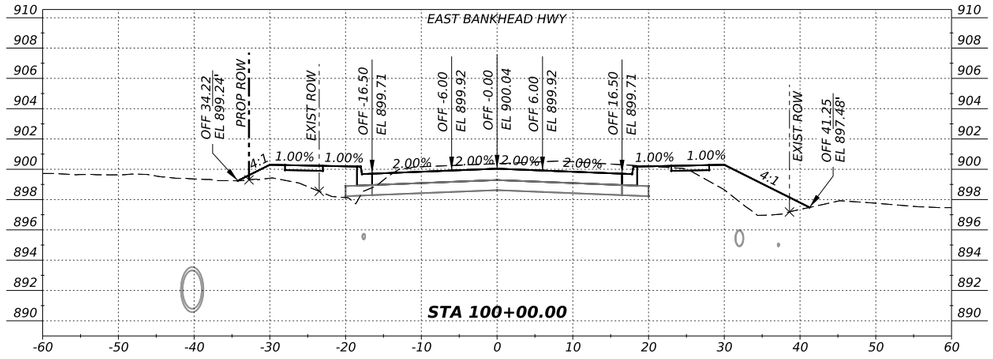
CK:
DW:
CK:
DW:

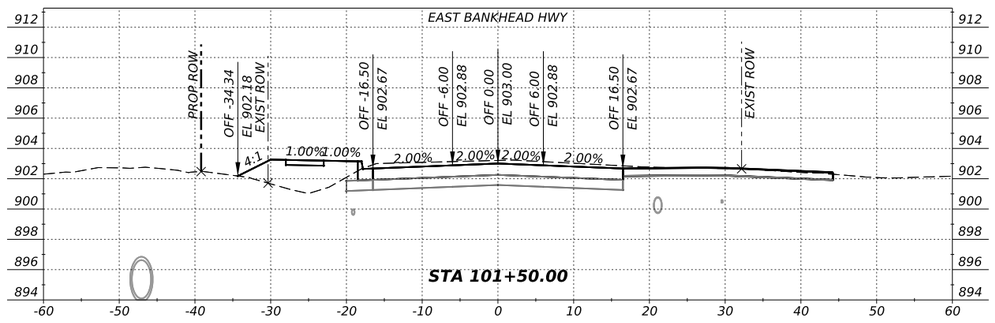












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

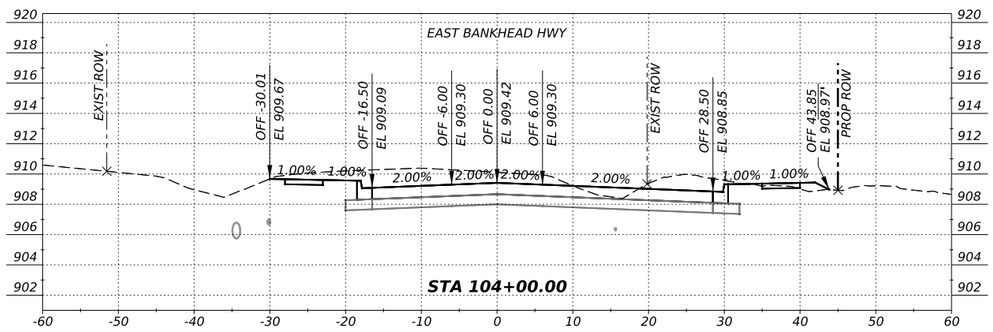
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

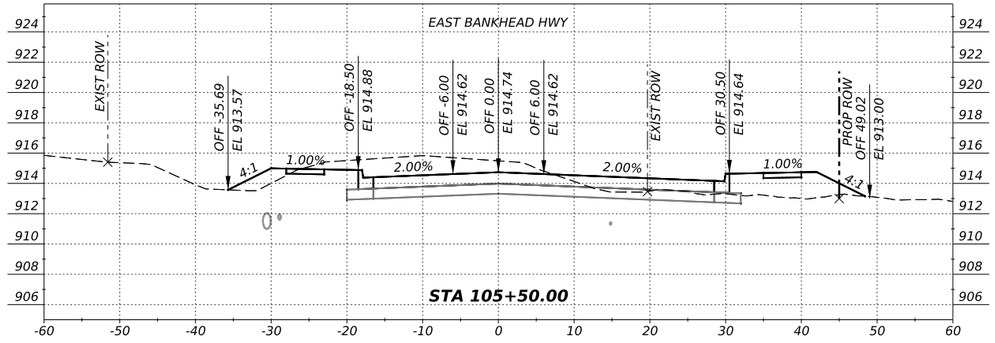
E BANKHEAD HWY PART 1

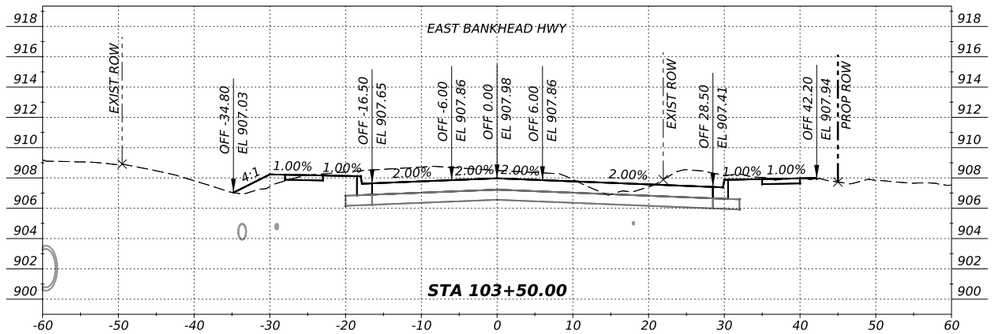
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

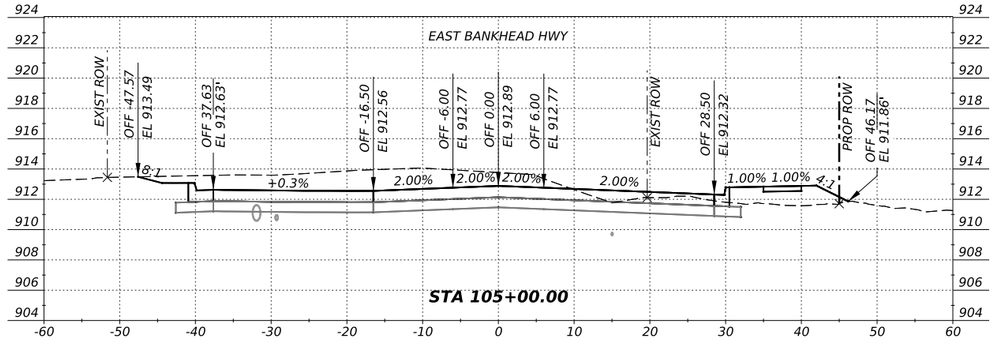
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		237

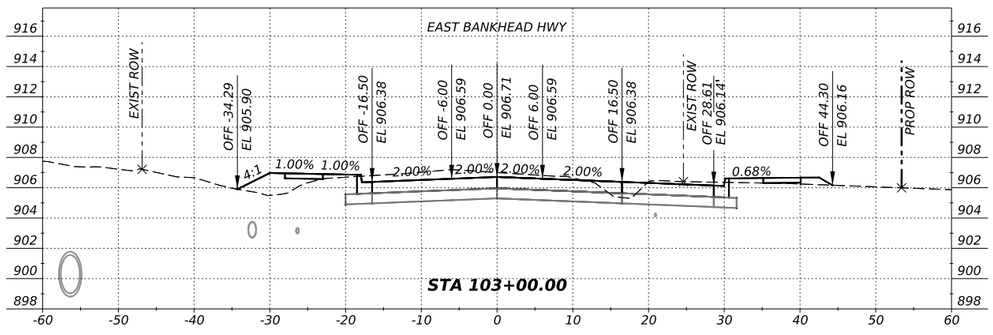
DATE: 8/14/2026 5:55:12 AM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\495454718_2\cv-109-XS-EB_pt1.dgn

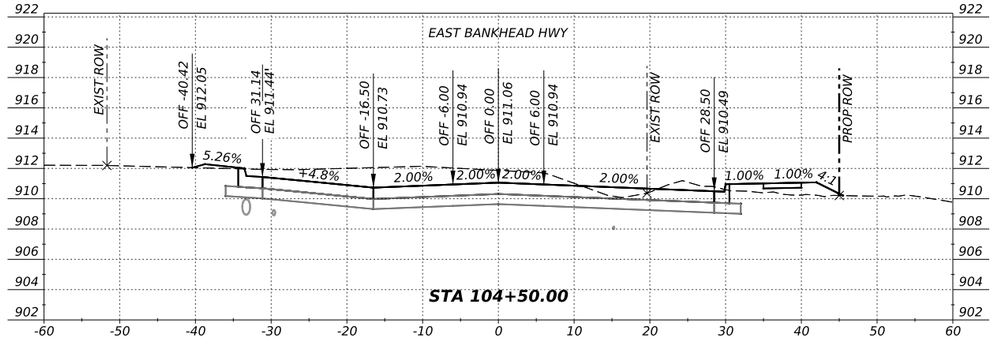












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

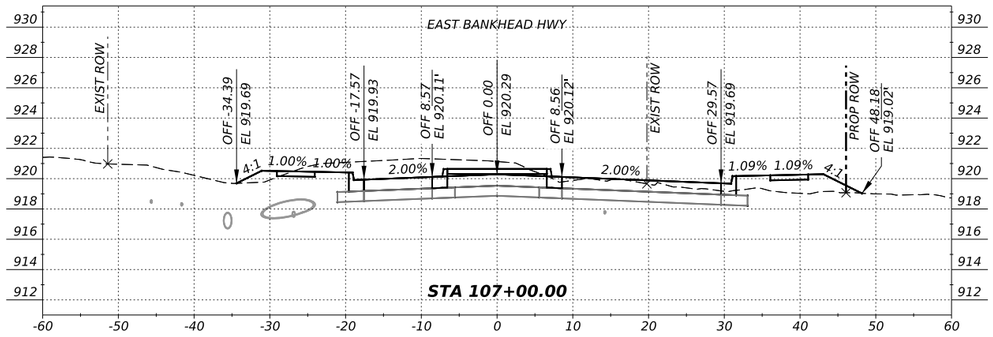
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

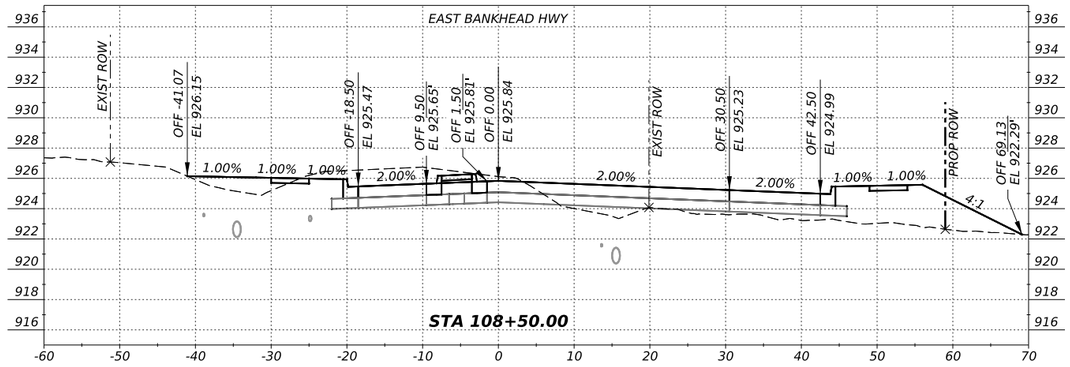
E BANKHEAD HWY PART 1

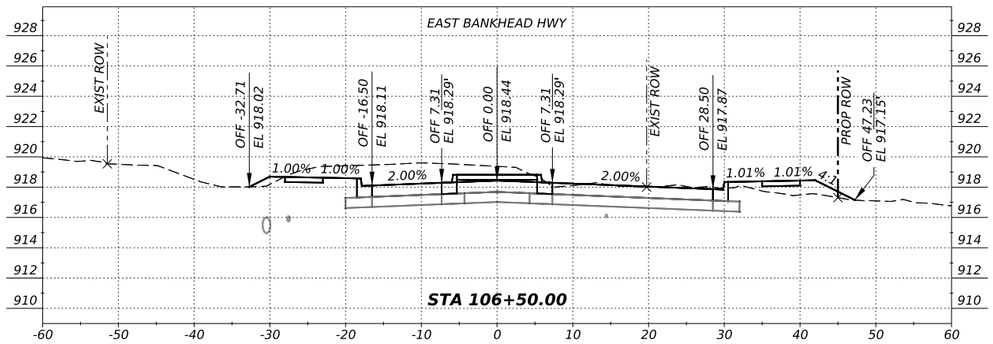
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

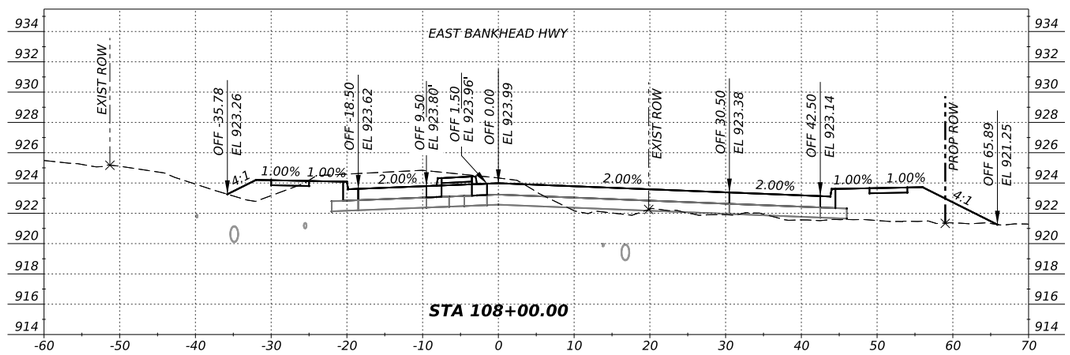
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		238

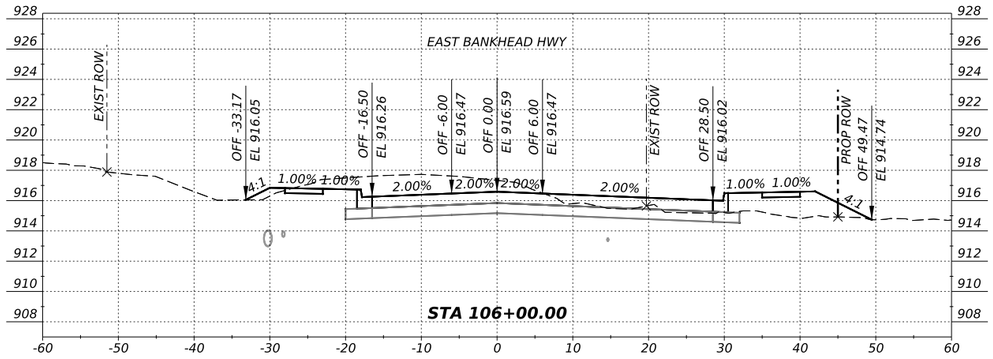
DATE: 8/14/2026 5:56:14 AM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\49554154718_2\cv-109-XS-EB_pt1.dgn

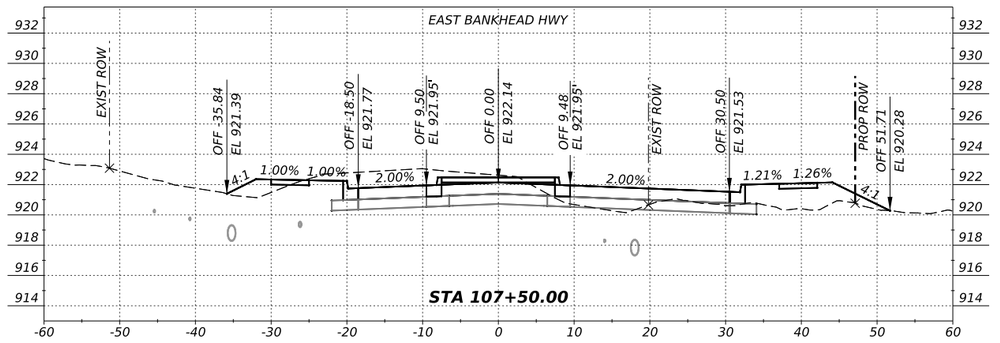












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

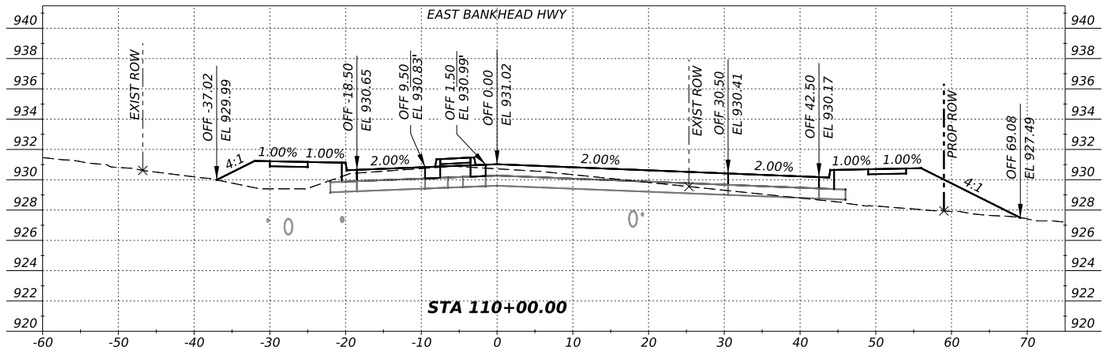
E BANKHEAD HWY PART 1

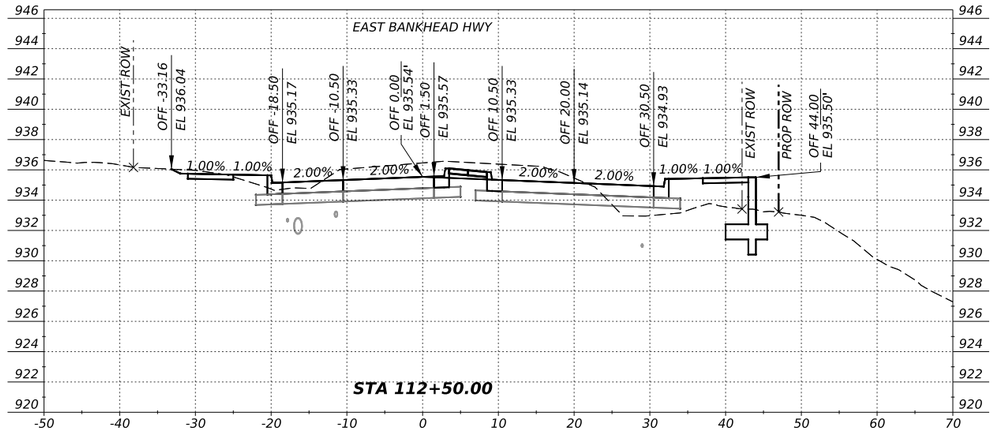
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

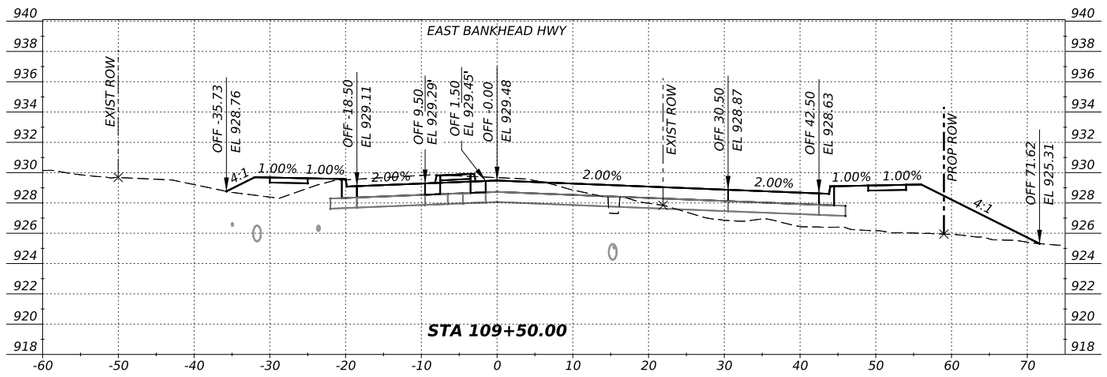
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		239

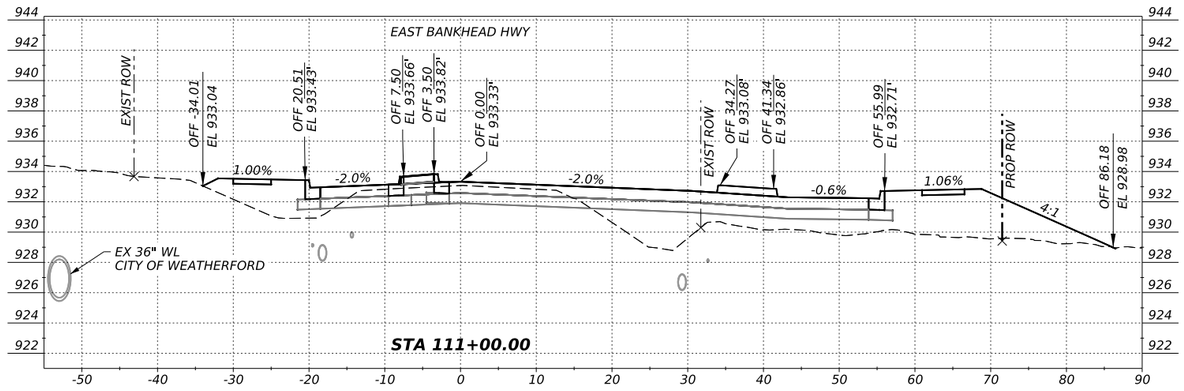
DATE: 8/14/2026 5:57:14 AM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\49541\54718_2\cv-109-XS-EB_pt1.dgn

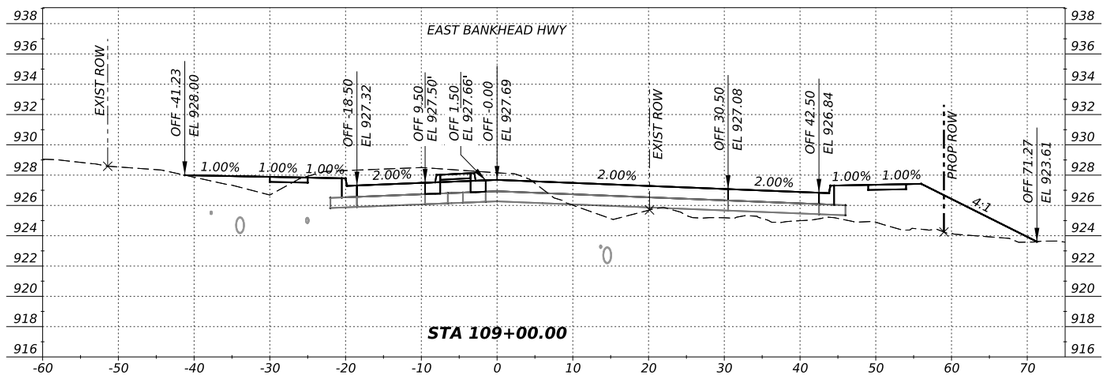
CK
DW
CK
DW

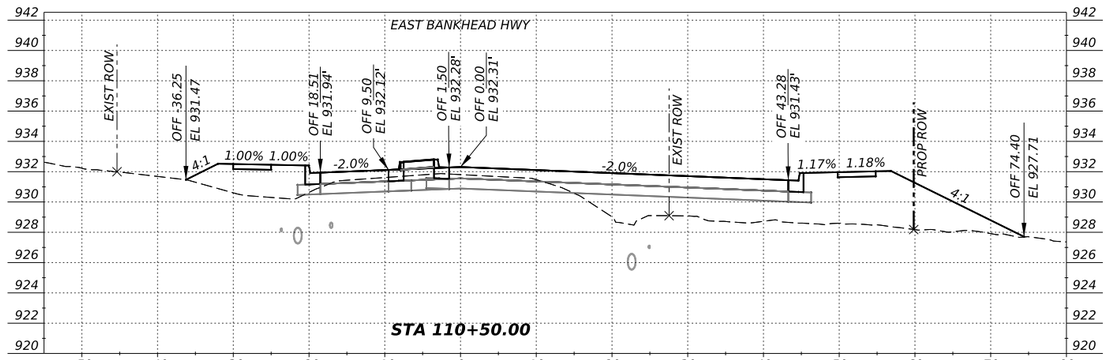












FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

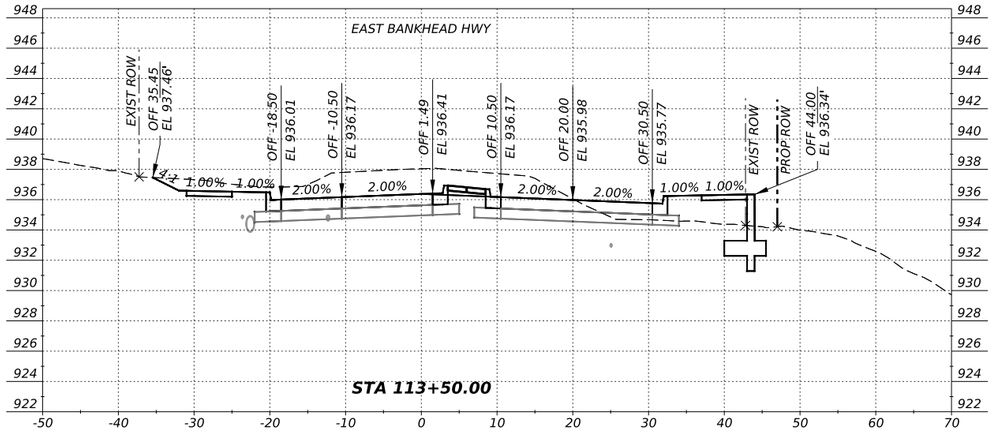
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

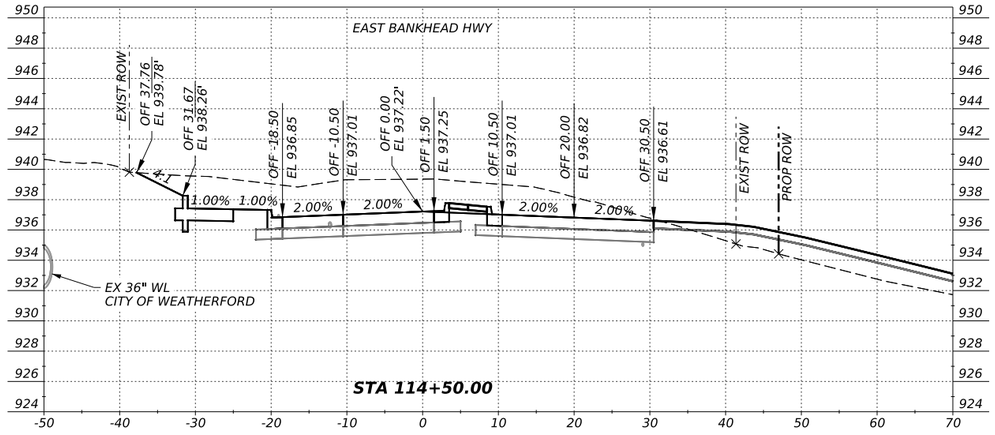
E BANKHEAD HWY PART 1

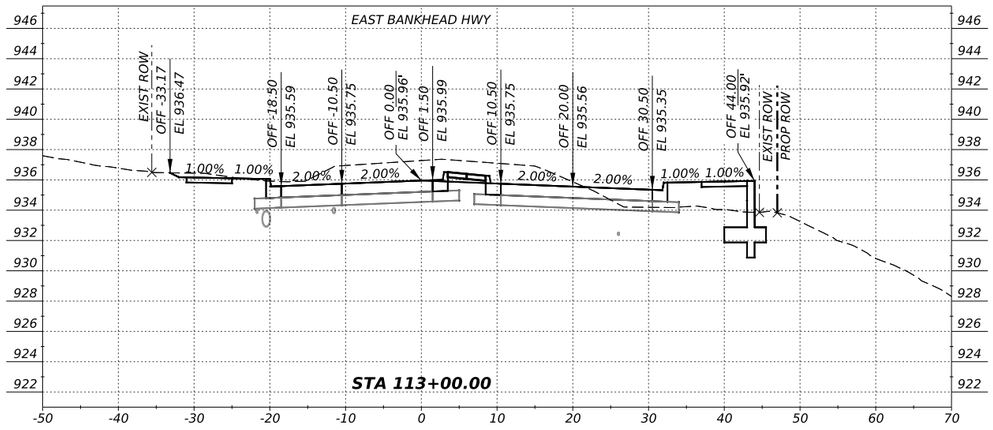
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

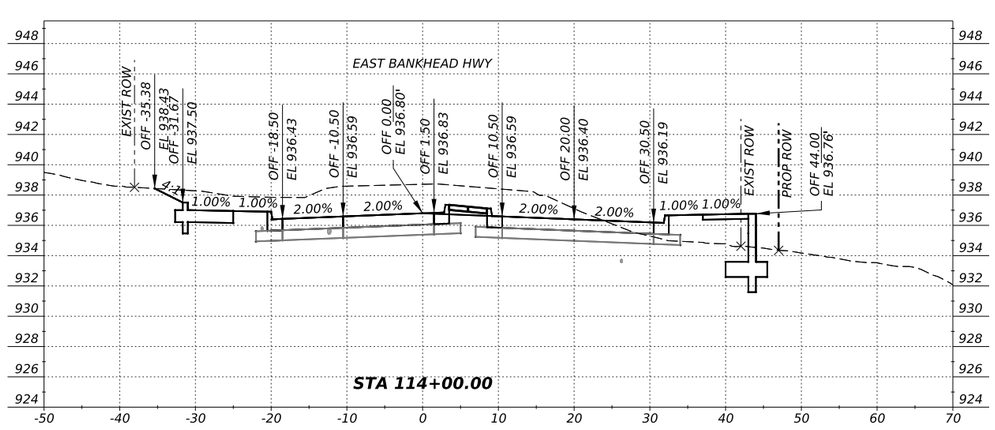
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		240

DATE: 8/14/2026 5:58:17 AM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\49541547 18_2\cv-109-XS-EB_pt1.dgn









DATE: 8/14/2026 5:59:18 AM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\4954\54718_2\cv-109-XS-EB_pt1.dgn

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

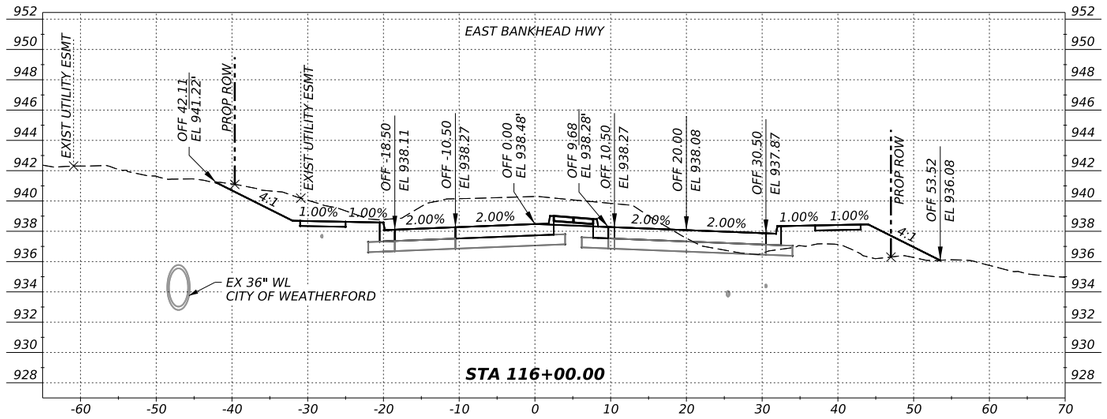
TEXAS REGISTERED ENGINEERING FIRM F-2144

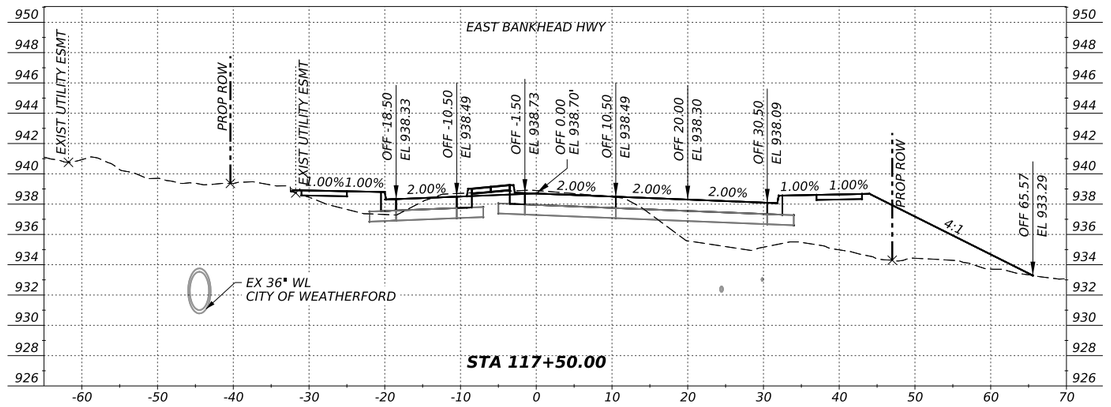
E BANKHEAD HWY PART 1

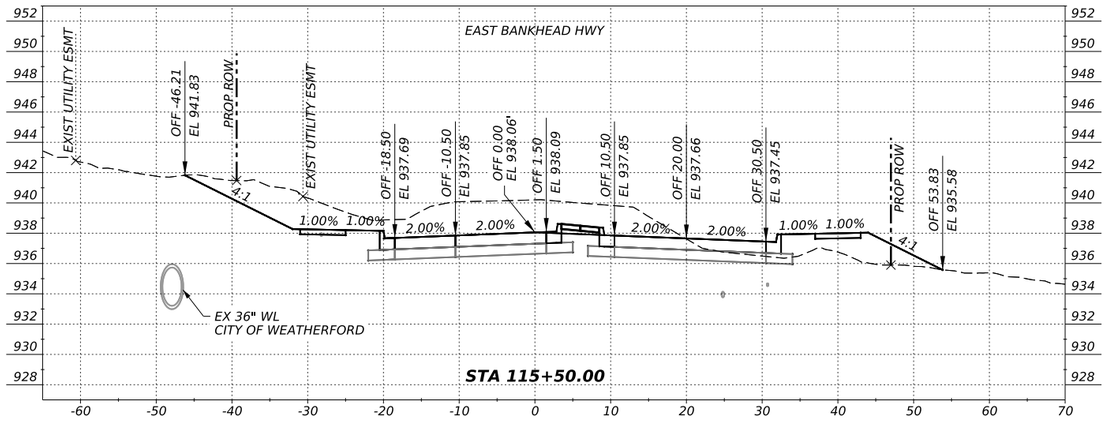
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

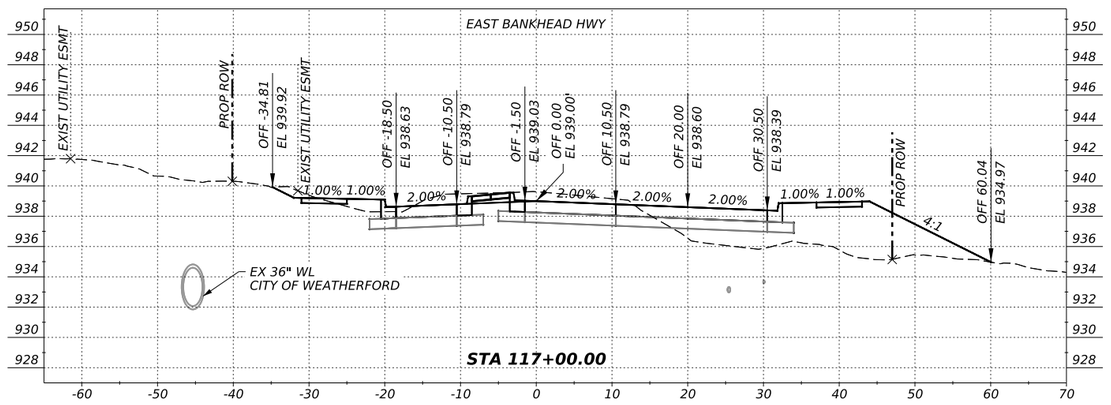
CONT	SECT	JOB	HIGHWAY

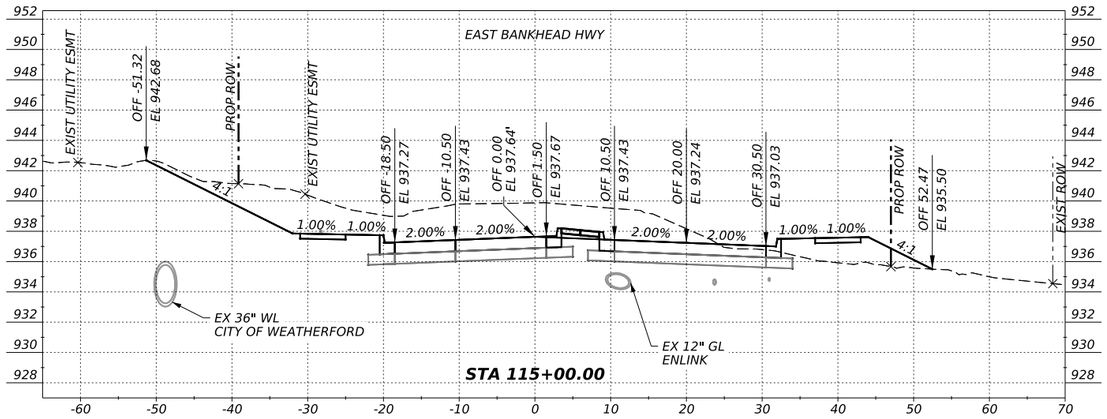
DIST	COUNTY	SHEET NO.
	PARKER	241

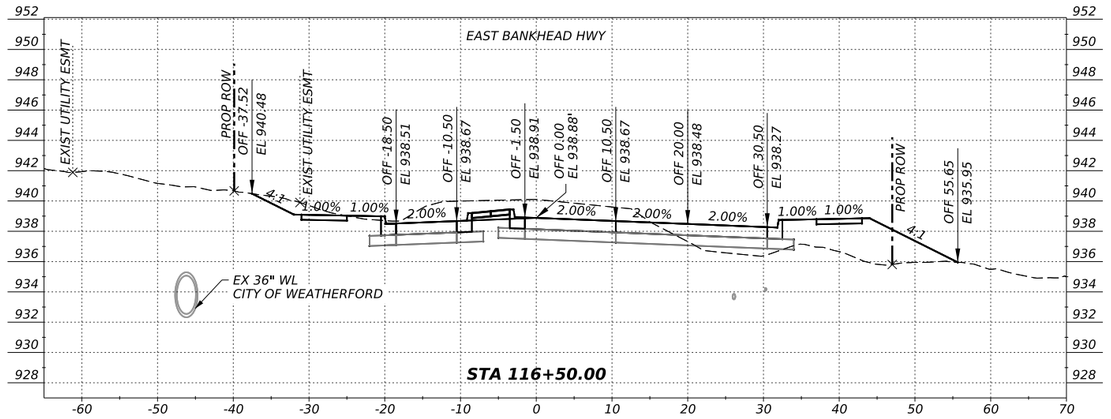












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

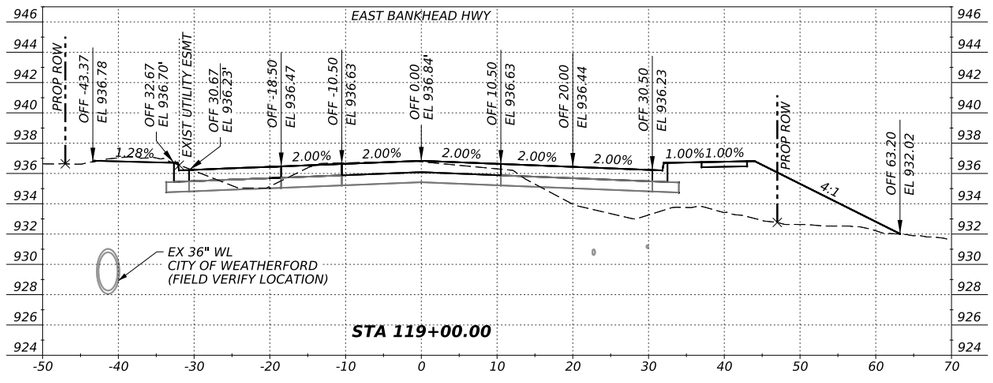
E BANKHEAD HWY PART 1

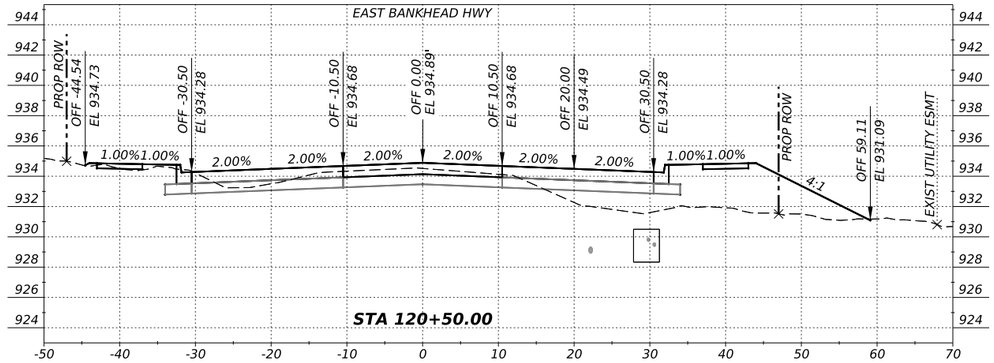
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

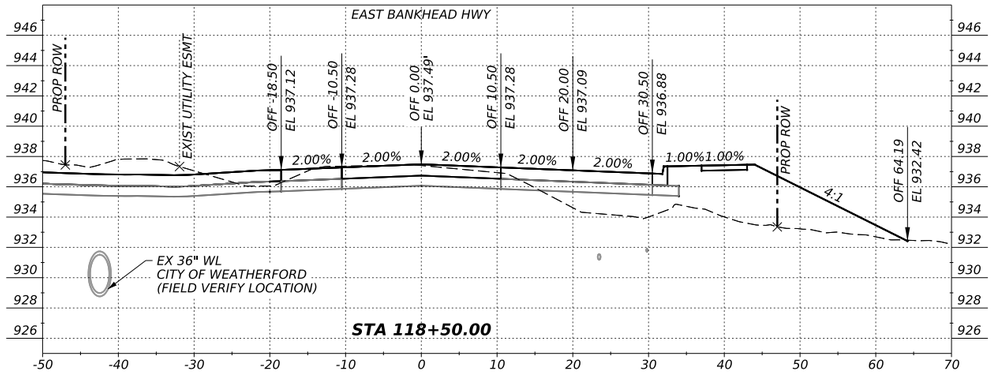
CONT	SECT	JOB	HIGHWAY

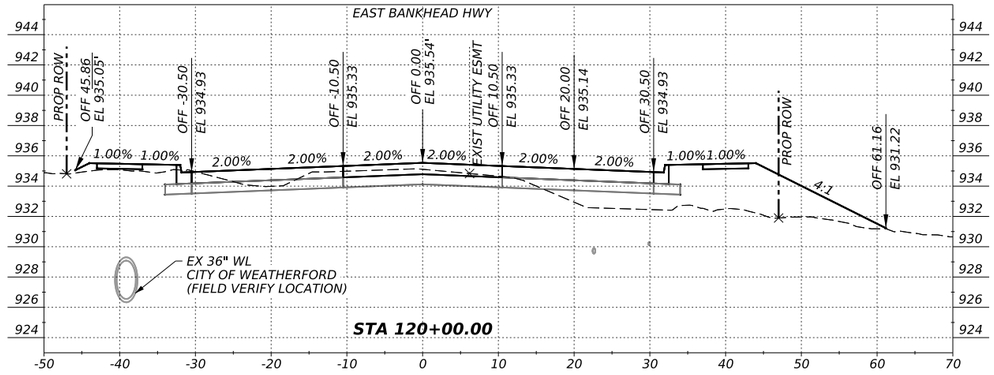
DIST	COUNTY	SHEET NO.
	PARKER	242

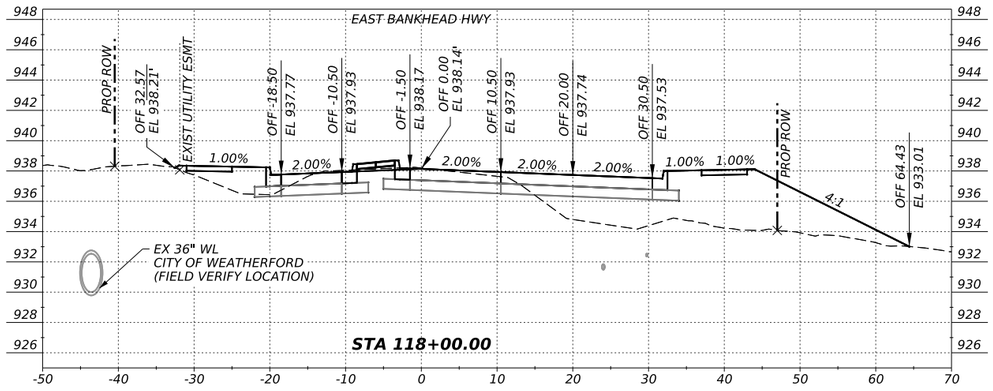
DATE: 8/14/2026 6:00:24 AM
FILE: \\fcsM-freesepw21\CS_pdf_work_dir\49541\54718_2\cv-109-XS-EB_pt1.dgn

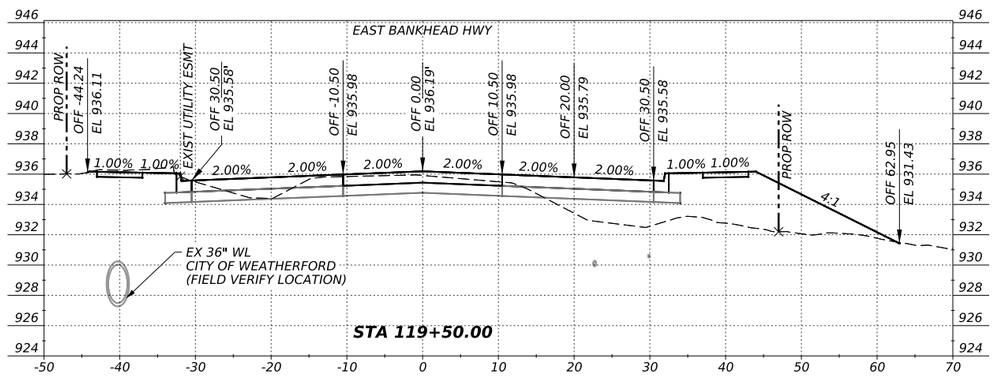












STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

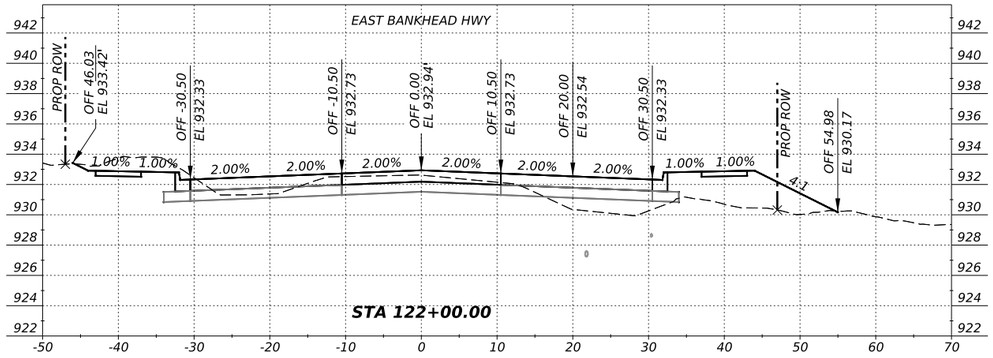
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

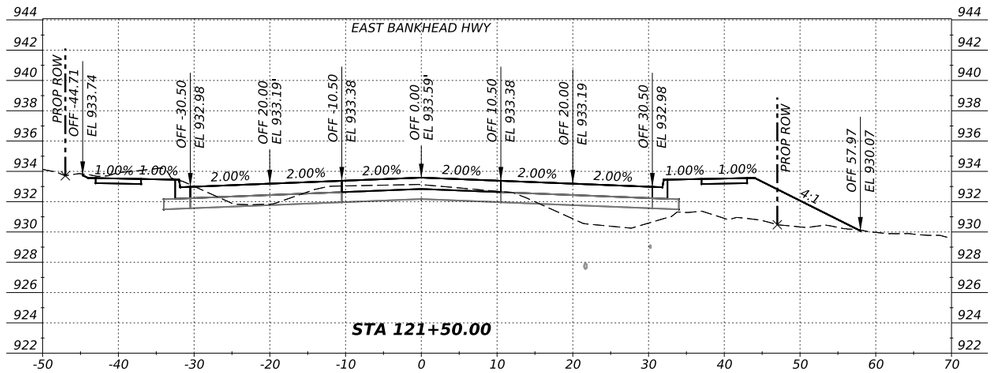
CONT	SECT	JOB	HIGHWAY

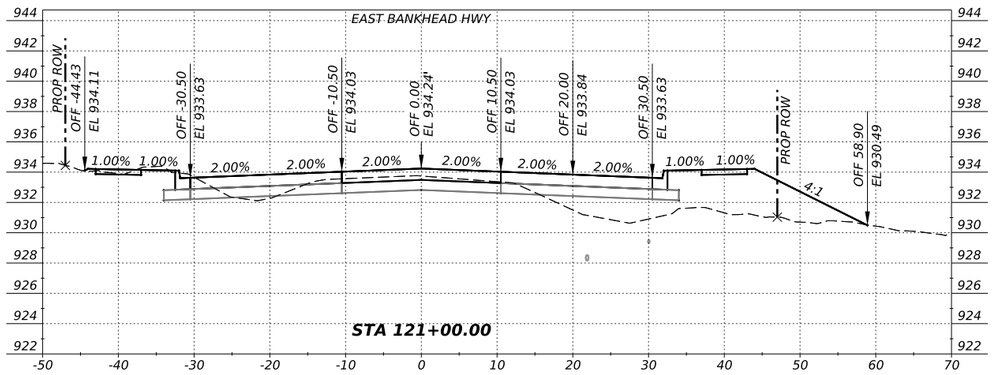
DIST	COUNTY	SHEET NO.
	PARKER	243

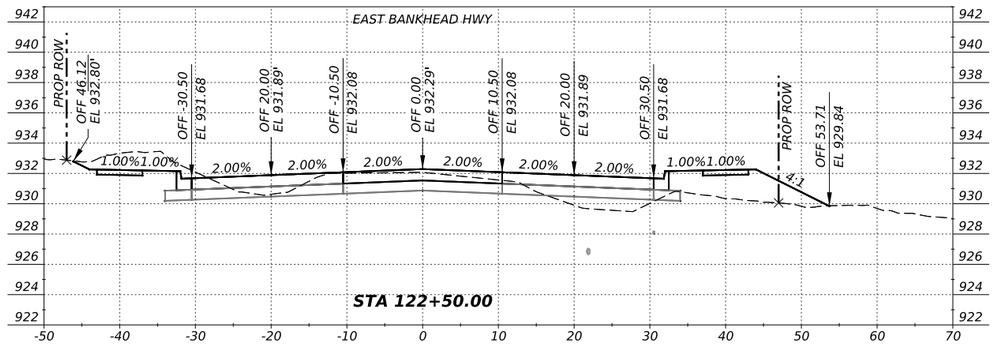
DATE: 8/14/2026 6:01:29 AM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\495154718_2\cv-109-XS-EB pt1.dgn

CK: DW: CK: DW:









STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET
0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

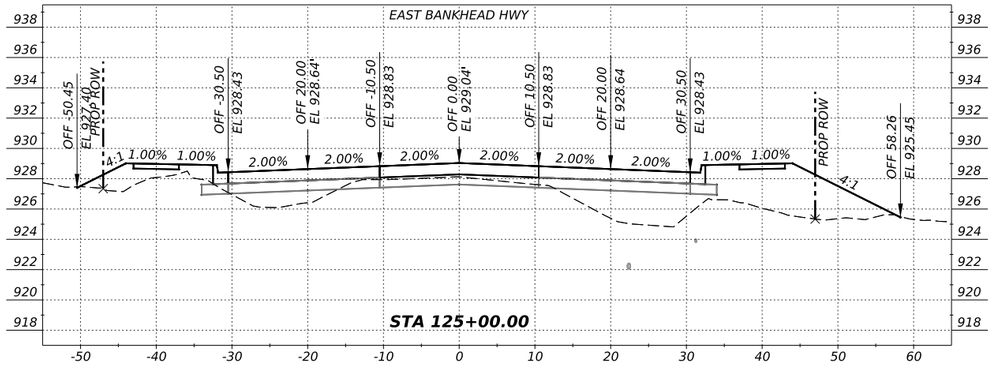
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

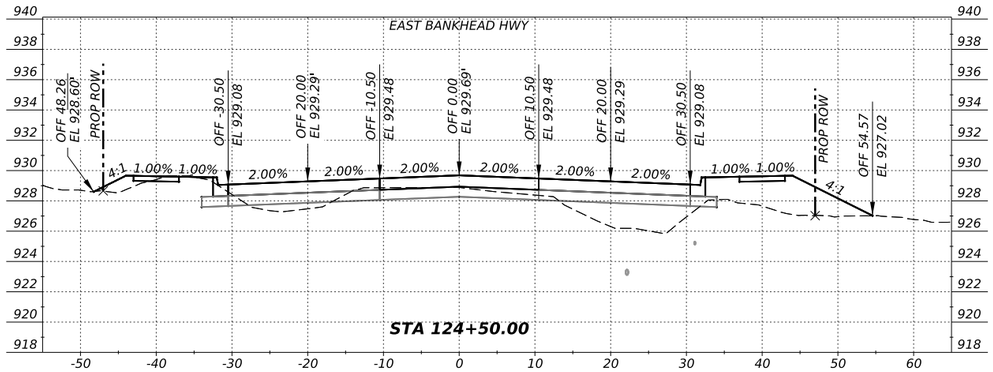
E BANKHEAD HWY PART 1

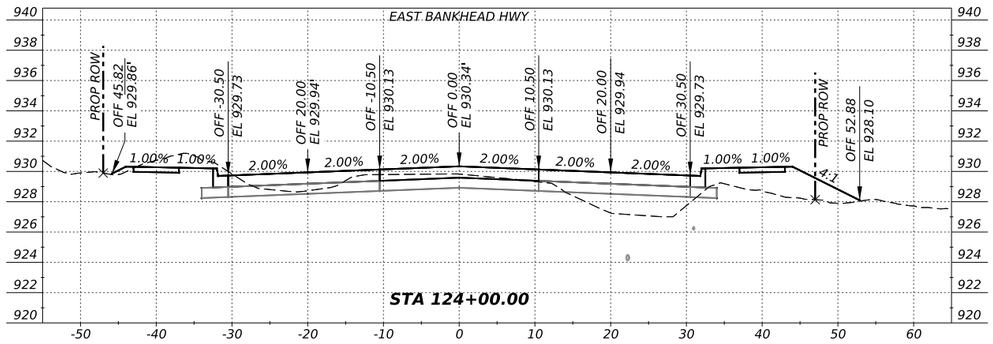
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		244

DATE: 8/14/2026 6:02:33 AM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\49541547\18_2\cv-109-XS-EB_pt1.dgn







STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

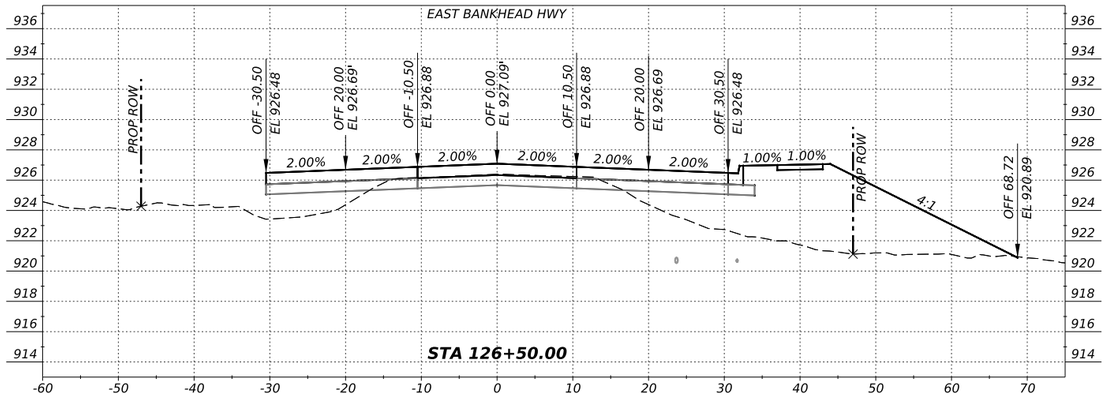
TEXAS REGISTERED ENGINEERING FIRM F-2144

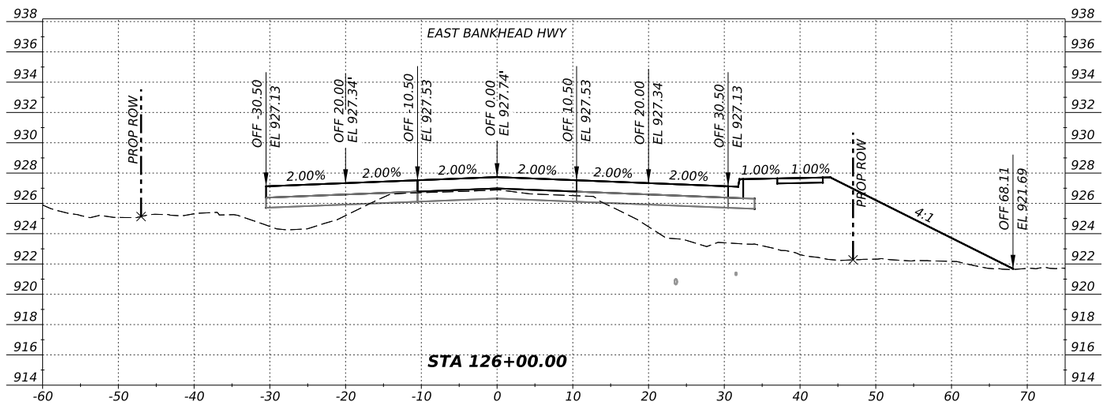
E BANKHEAD HWY PART 1

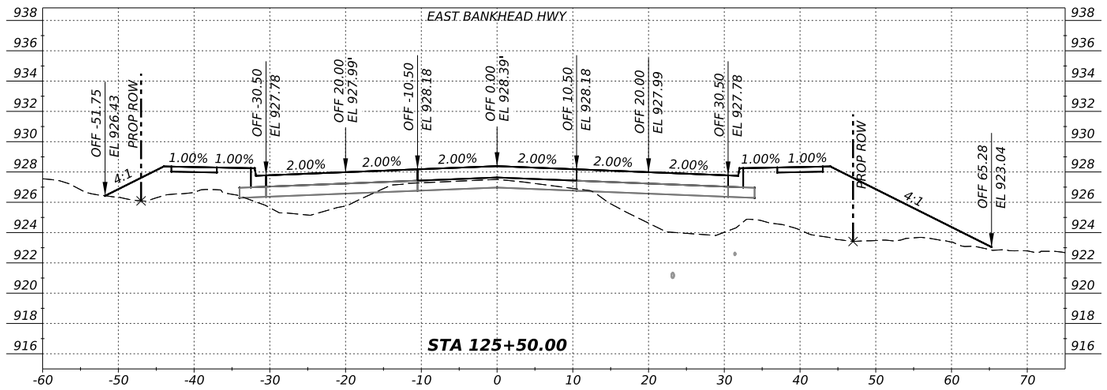
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		245

DATE: 8/14/2026 6:03:32 AM
FILE: \\ICSM-freesepw211\ICS_pdf_work_dir\49541\54718_2\cv-109-XS-EB_pt1.dgn







STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

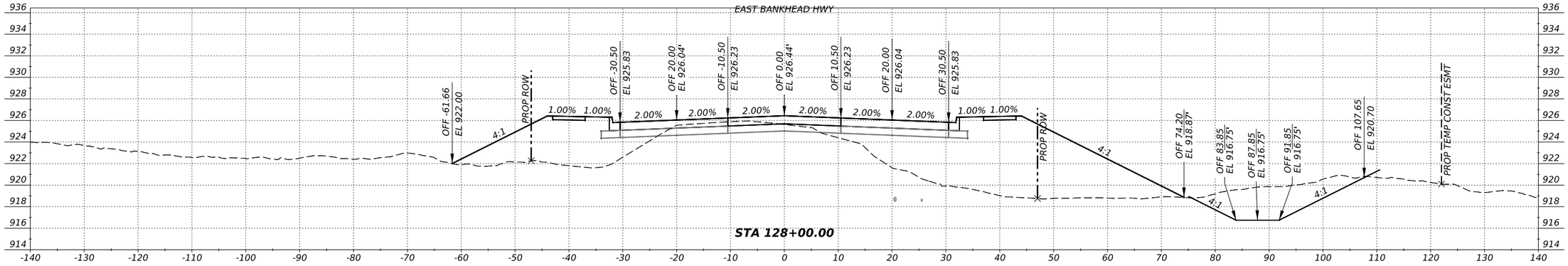
E BANKHEAD HWY PART 1

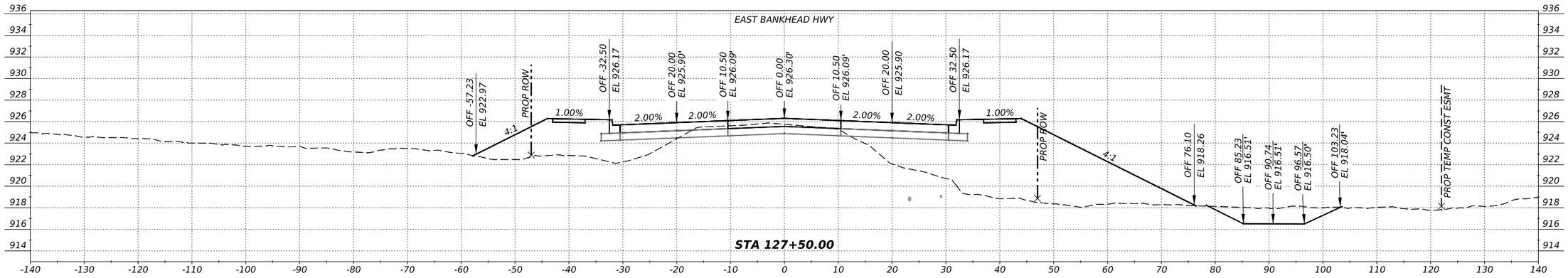
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

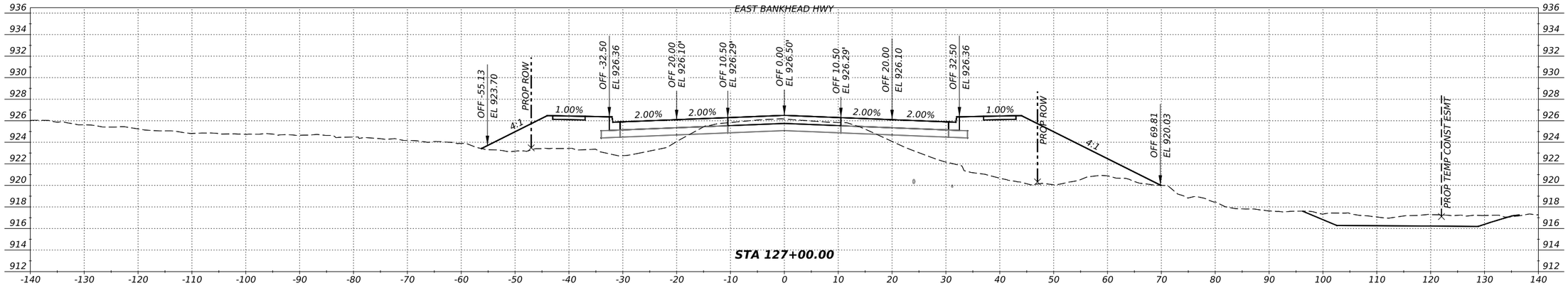
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	246

DATE: 8/14/2026 6:04:18 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\4954154718_2\cv-109-XS-EB_pt1.dgn







STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

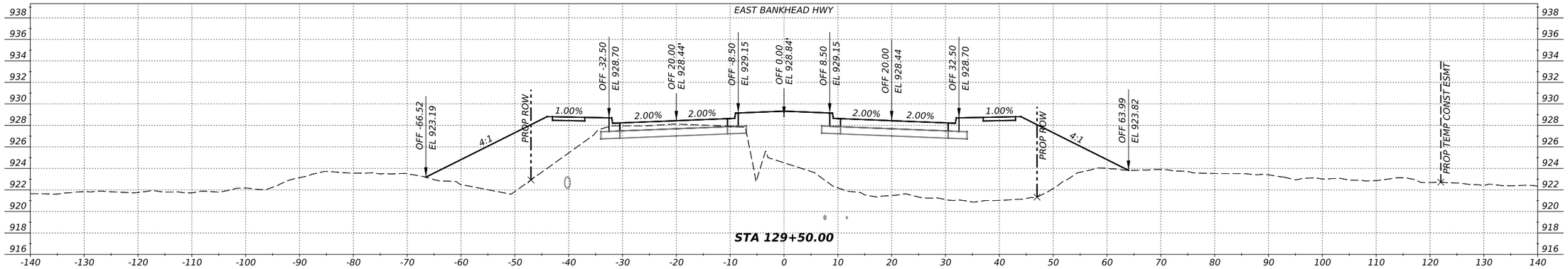
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

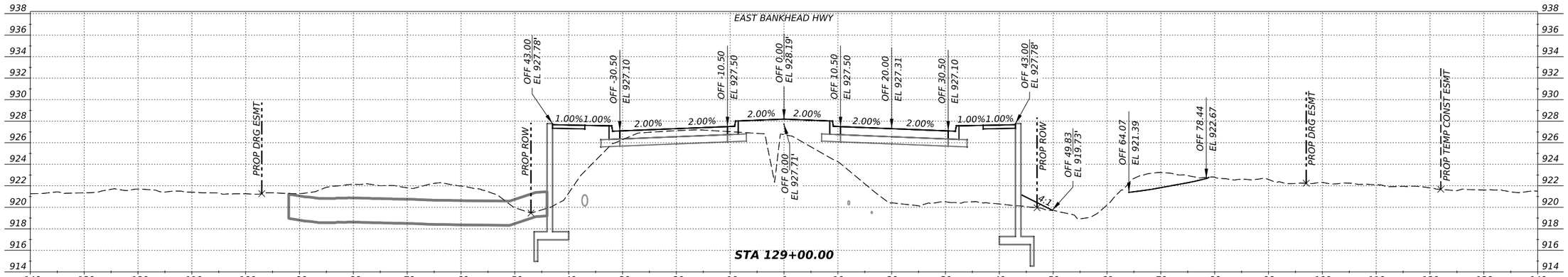
CONT	SECT	JOB	HIGHWAY

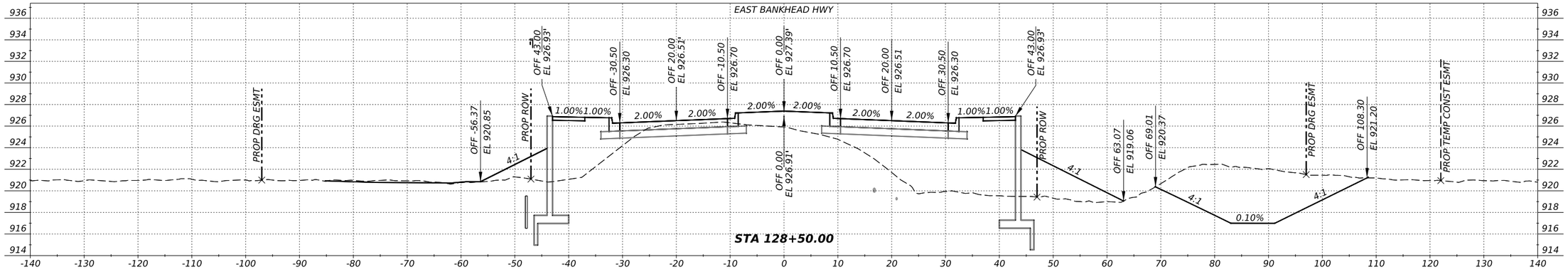
DIST	COUNTY	SHEET NO.
	PARKER	247

DATE: 8/14/2026 6:05:01 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\4954154718_2\cv-109-XS-EB_pt1.dgn

CK
DW
CK
DW







STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

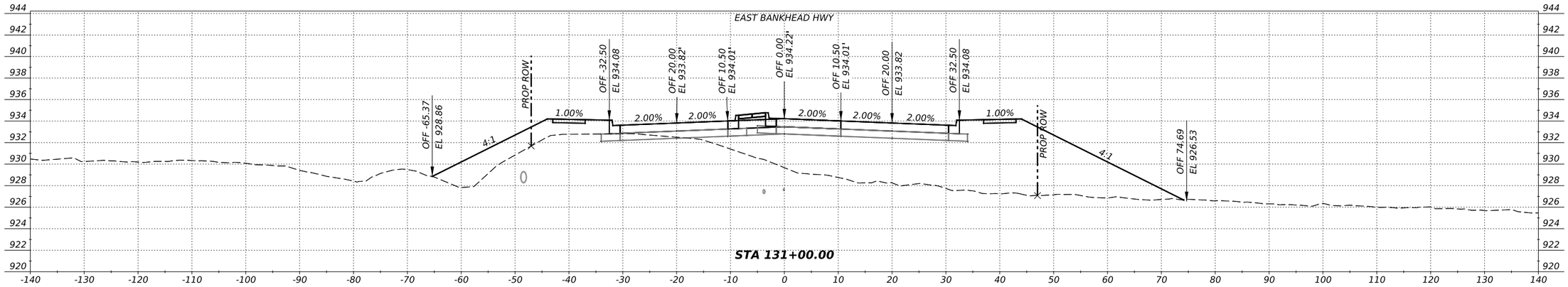
E BANKHEAD HWY PART 1

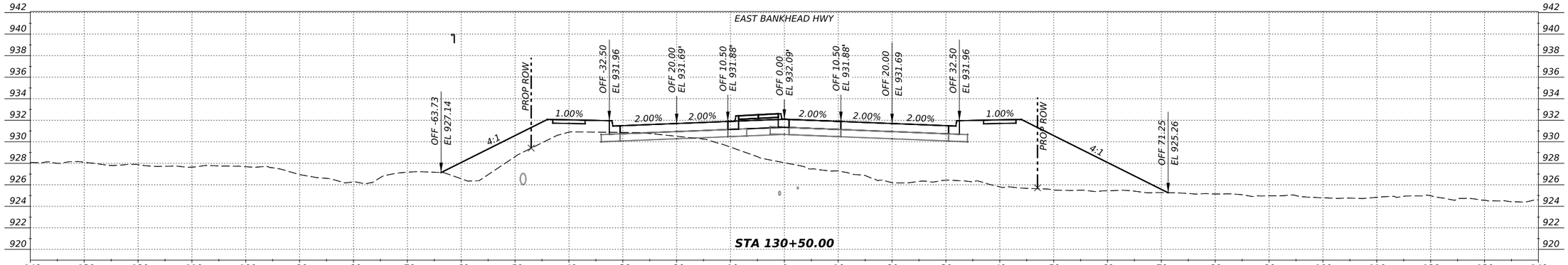
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

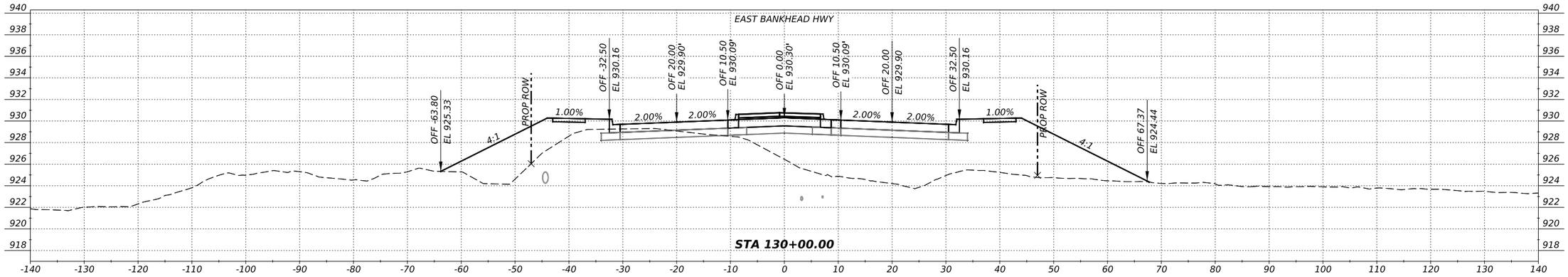
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	248

DATE: 8/14/2026 6:05:46 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\4954154718_2\cv-109-XS-EB_pt1.dgn







STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET
0 10 20

VERT. SCALE IN FEET
0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

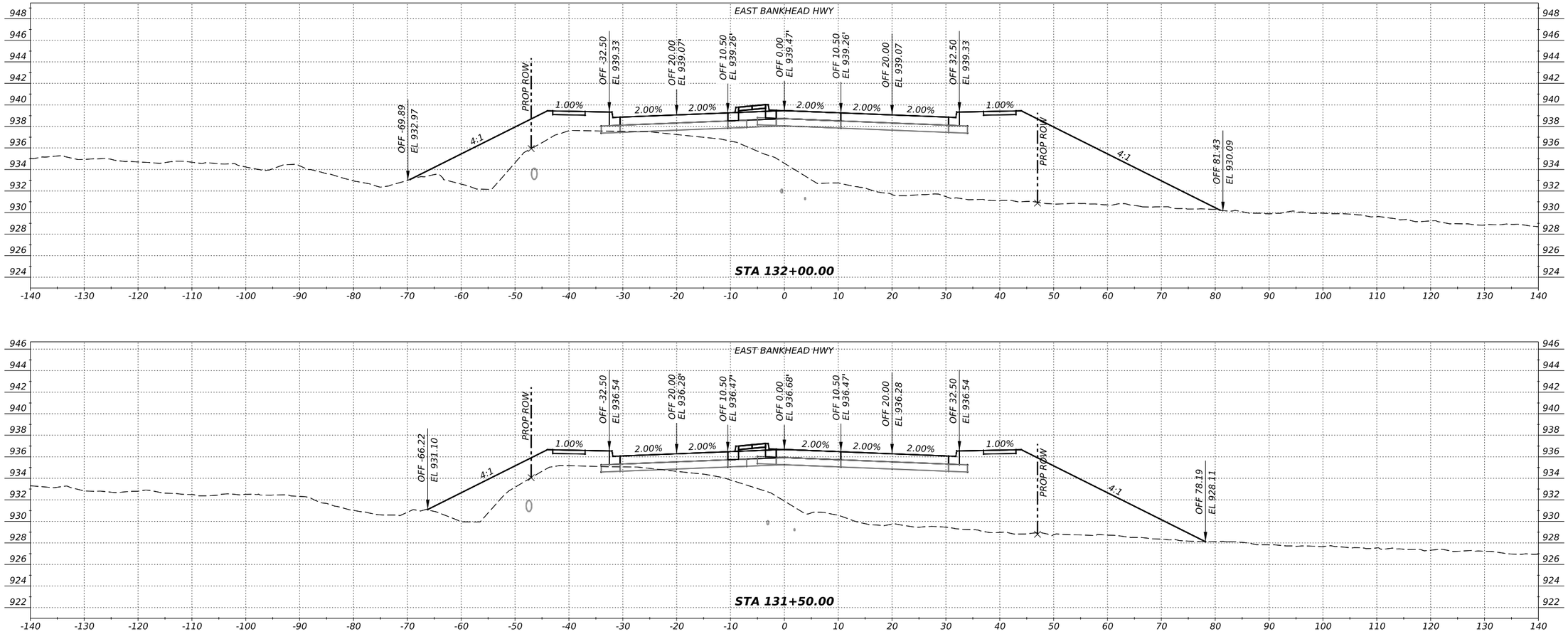
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		249

DATE: 8/14/2026 6:06:31 AM
FILE: \\icsM-freesepw21\ICS_pdf_work_dir\49541547 18_2\cv-109-XS-EB_pt1.dgn



STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

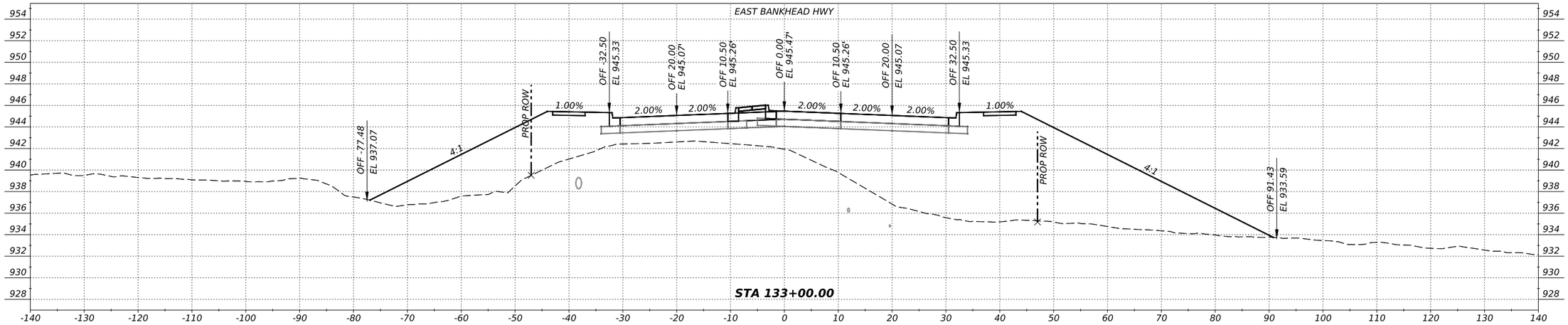
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

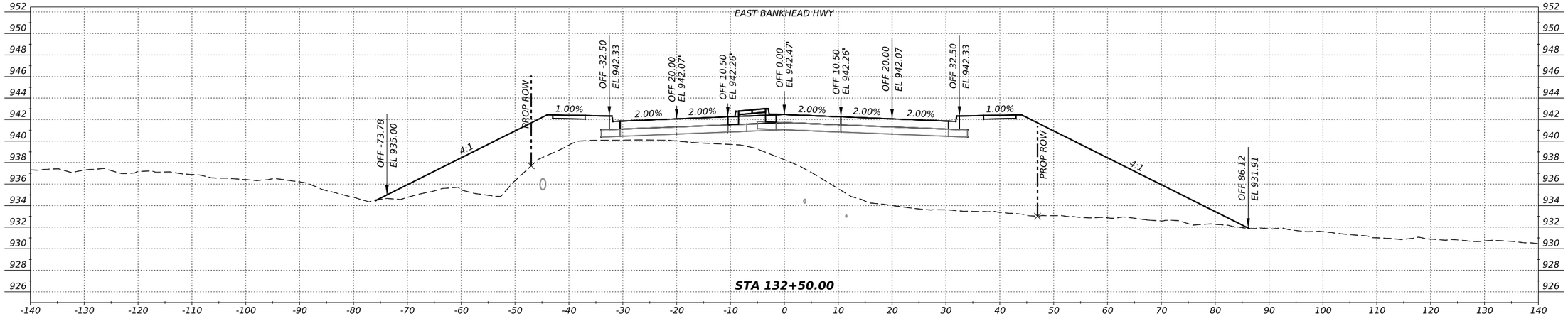
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	250

DATE: 8/14/2026 6:07:14 AM
FILE: \\fcsM-freesepw211\CS_pdf_work_dir\49541547 18_2\cv-109-XS-EB_pt1.dgn

CK: DW: CK: DW:





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

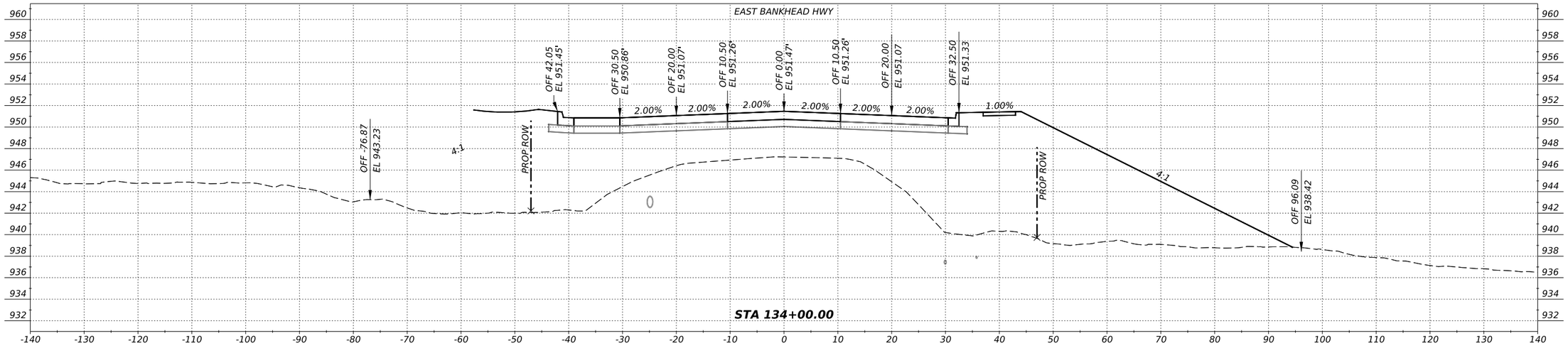
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

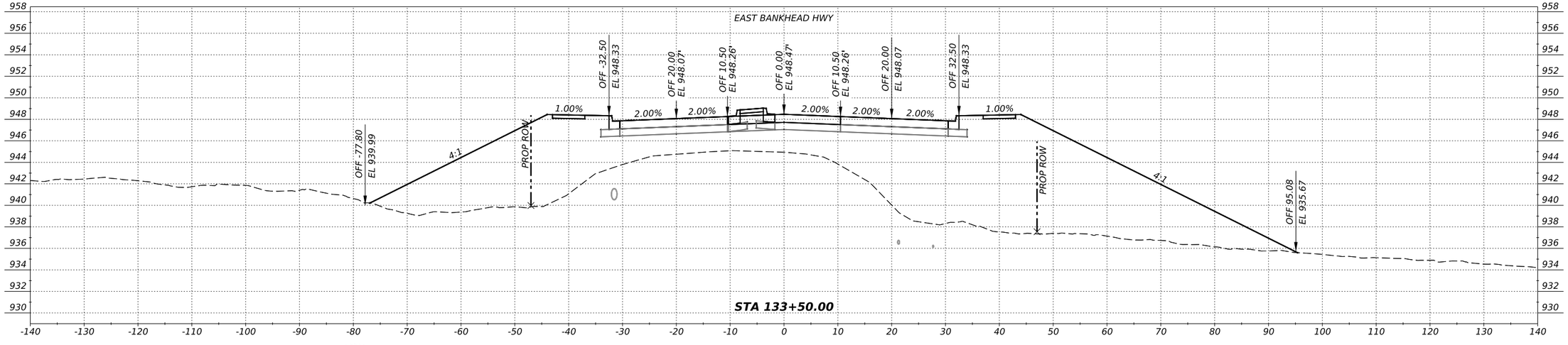
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	251

DATE: 8/14/2026 6:07:57 AM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\495154718_2\cv-109-XS-EB_pt1.dgn

CK: DW: CK: DW:





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

TEXAS REGISTERED ENGINEERING FIRM F-2144

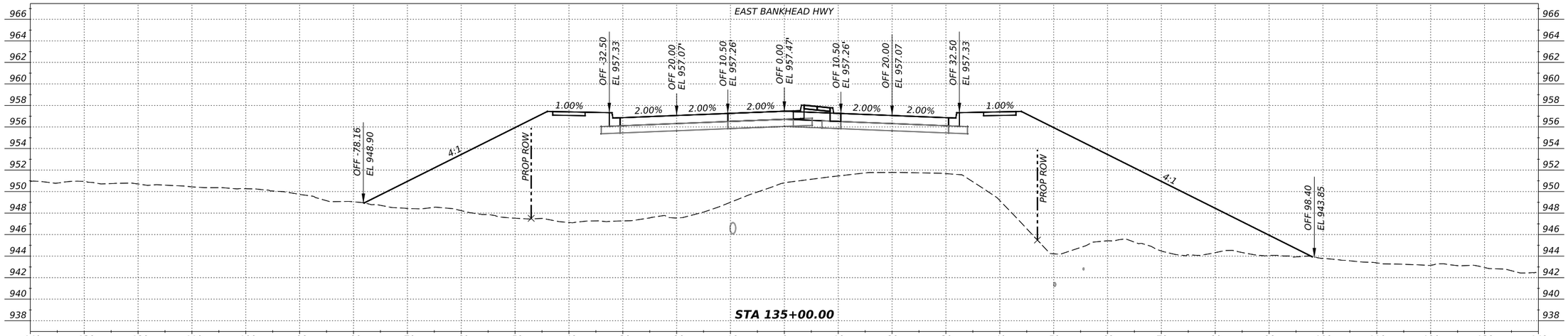
E BANKHEAD HWY PART 1

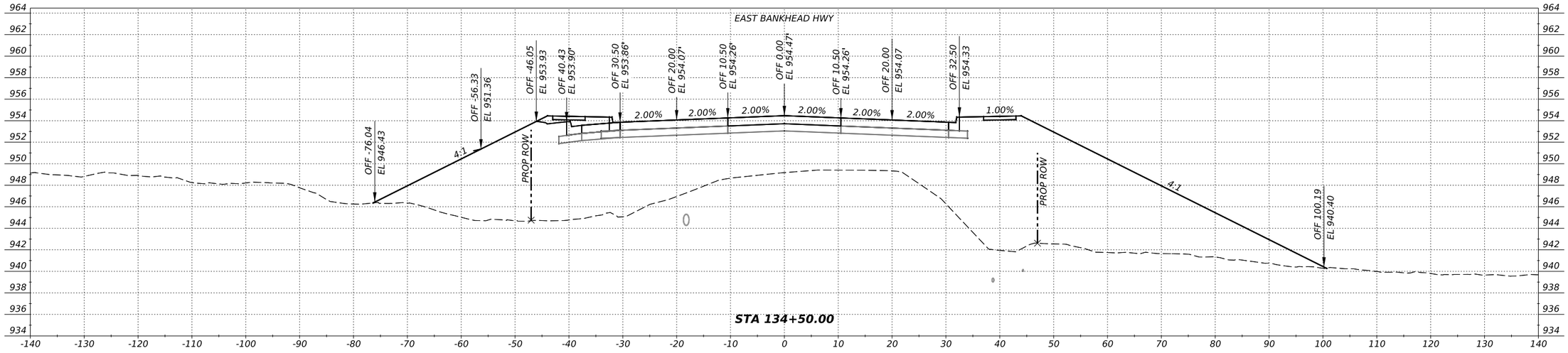
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	252

DATE: 8/14/2026 6:08:39 AM
FILE: \\fcsM-freesepw21\CS_pdf_work_din\495415471 8_2\cv-109-XS-EB_pt1.dgn





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

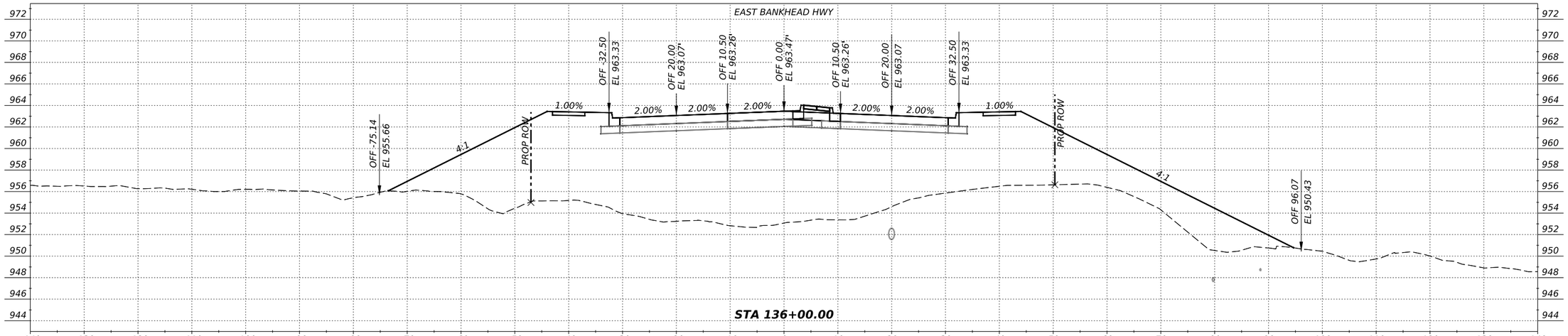
E BANKHEAD HWY PART 1

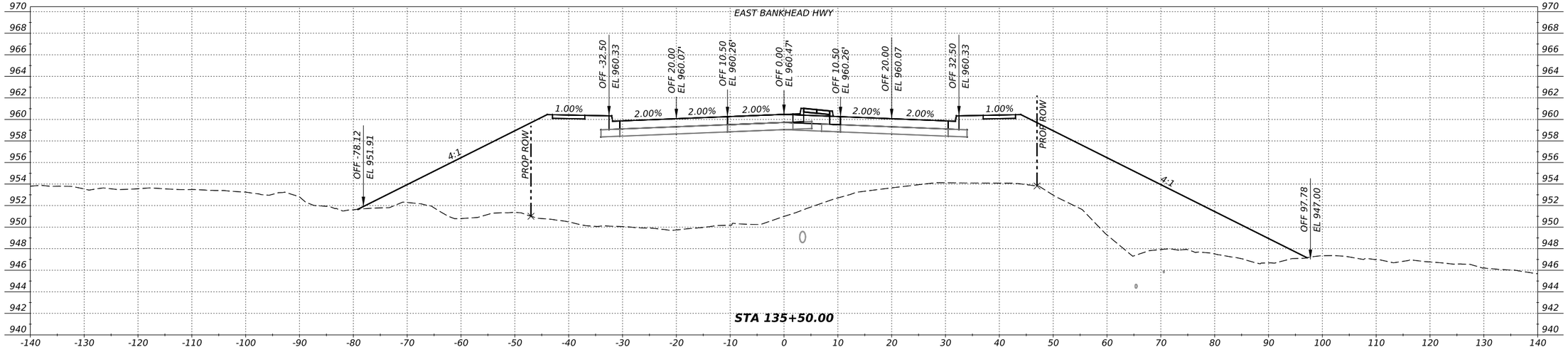
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		253

DATE: 8/14/2026 6:09:21 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\49541547l8_2\cv-109-XS-EB_pt1.dgn

CK: DW: CK: DW:





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

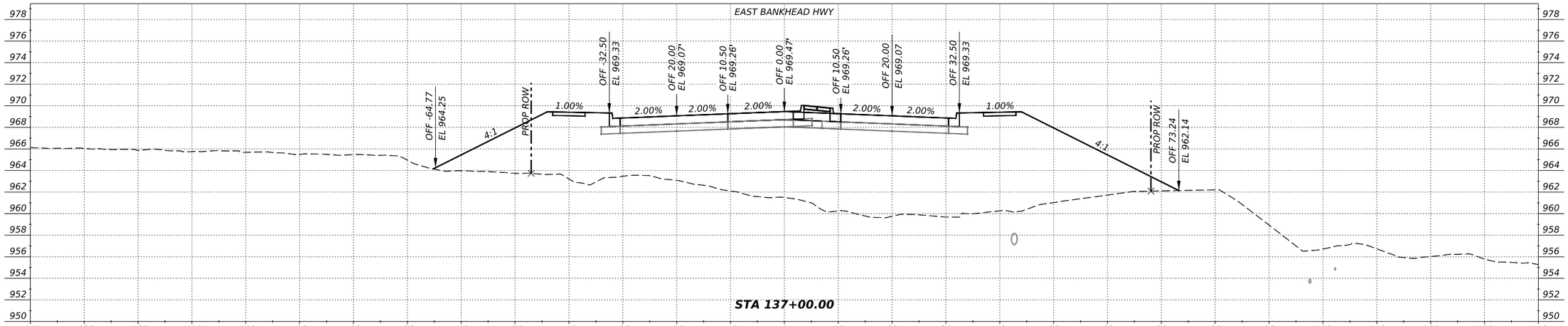
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

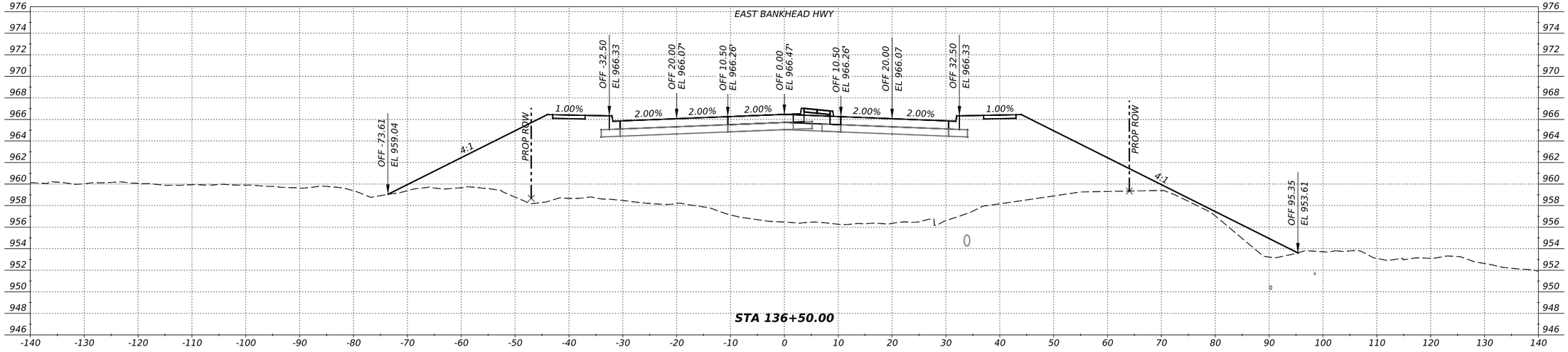
E BANKHEAD HWY PART 1

PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		254

DATE: 8/14/2026 6:10:05 AM
FILE: \\ics\M-freesepw21\ICS_pdf_work_dir\49541547l8_2\cv-109-XS-EB_pt1.dgn





DATE: 8/14/2026 6:10:47 AM
FILE: \\icsM-freesepw221\ICS_pdf_work_dir\49541547l8_2\cv-109-XS-EB_pt1.dgn

STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET
0 10 20

VERT. SCALE IN FEET
0 5 10

NO.	ISSUE	BY	DATE

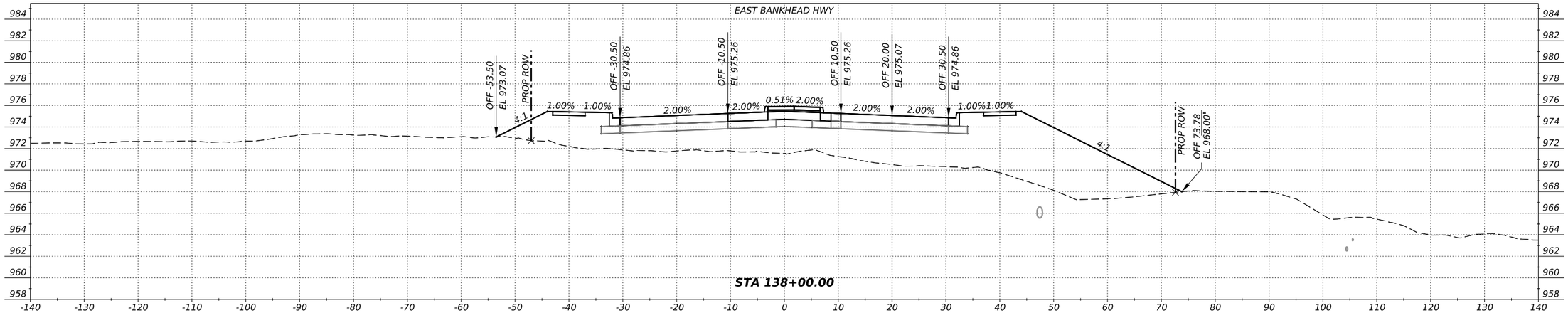
DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

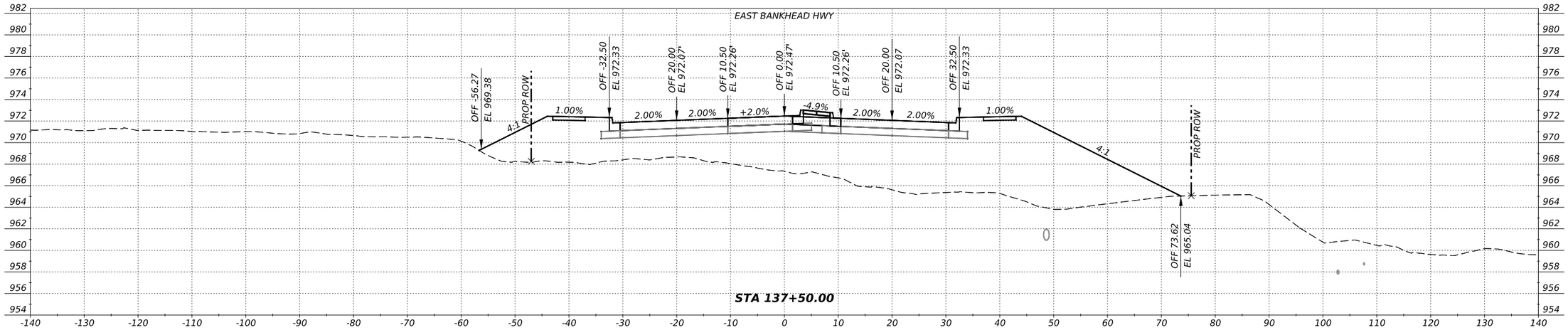
FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		255





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

0 10 20
HORIZ. SCALE IN FEET

0 5 10
VERT. SCALE IN FEET

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

TEXAS REGISTERED ENGINEERING FIRM F-2144

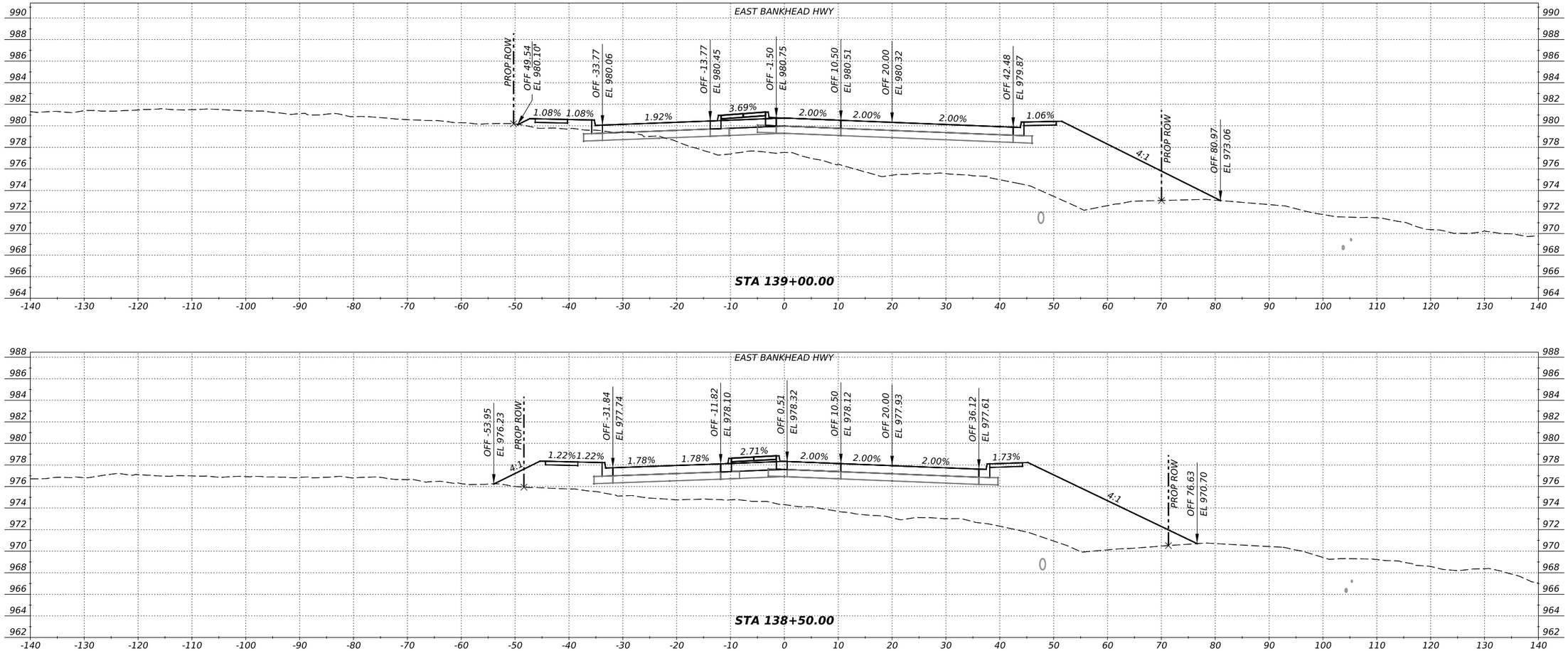
E BANKHEAD HWY PART 1

PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		256

DATE: 8/14/2026 6:11:30 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\495415471 8_2\cv-109-XS-EB_pt1.dgn

CK
DW
CK
DW



STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

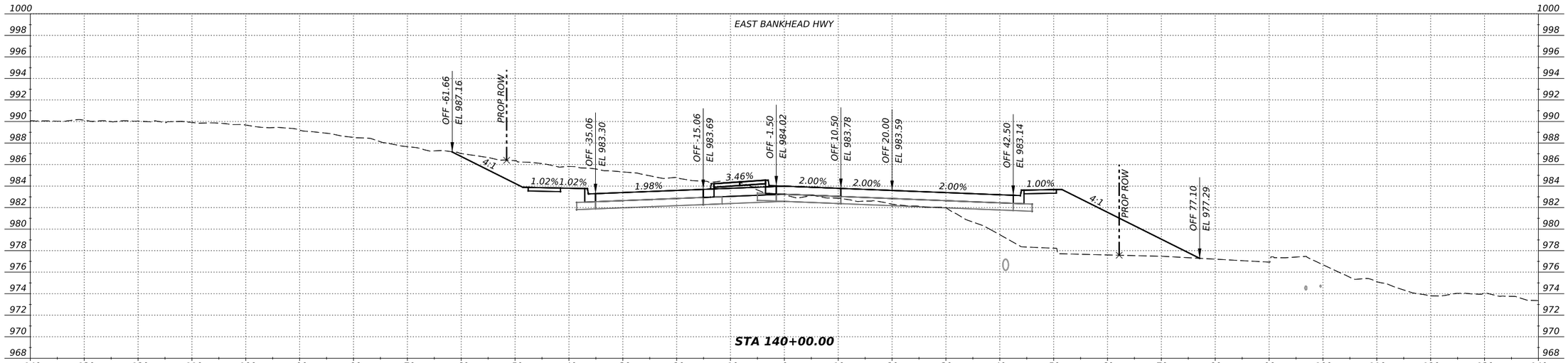
E BANKHEAD HWY PART 1

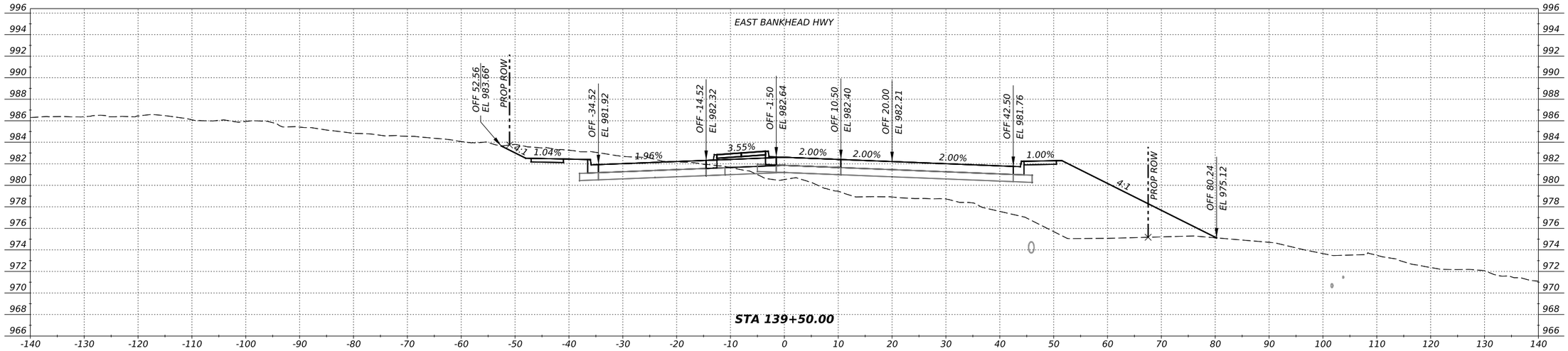
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	257

DATE: 8/14/2026 6:12:13 AM
FILE: \\cs\M-freesepw21\CS_pdf_work_dir\49541\54718_2\cv-109-XS-EB_pt1.dgn





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com

TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

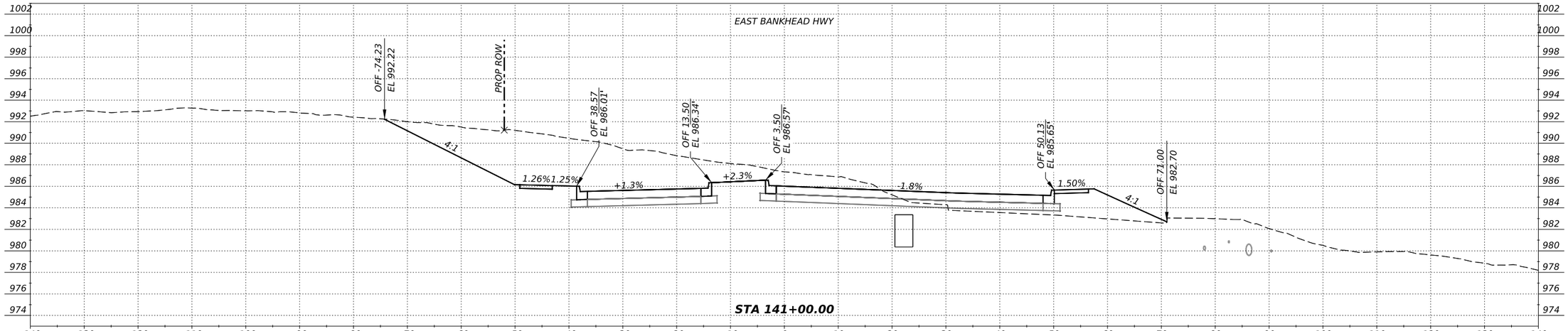
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

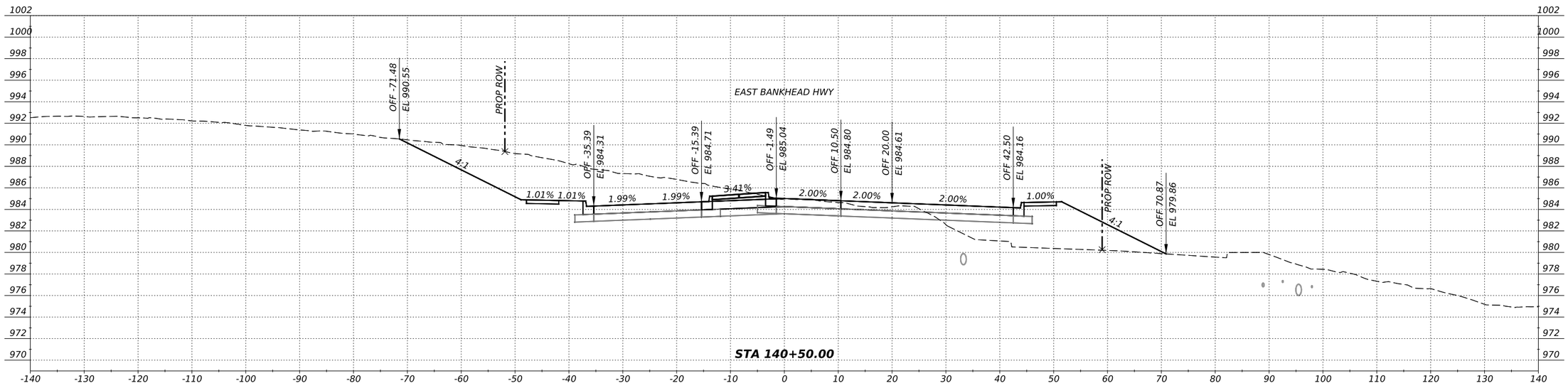
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	258

DATE: 8/14/2026 6:12:56 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\49541547l8_2\cv-109-XS-EB_pt1.dgn

CK: DW: CK: DW:





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET 0 10 20

VERT. SCALE IN FEET 0 5 10

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

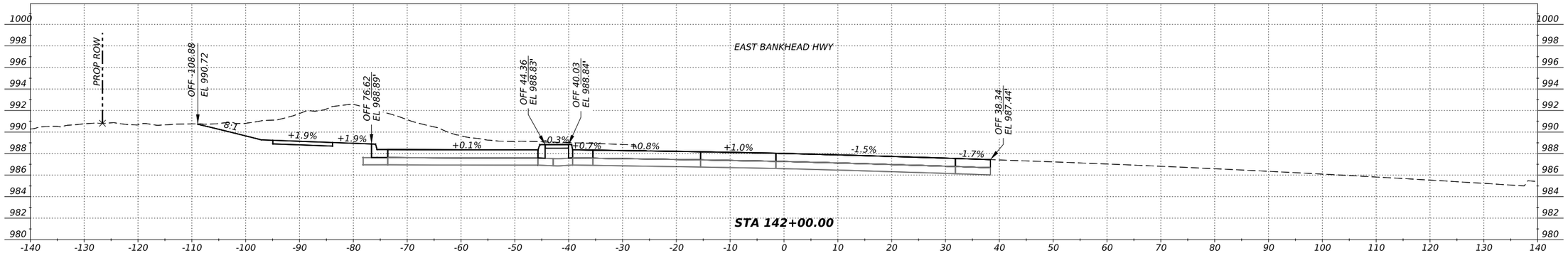
E BANKHEAD HWY PART 1

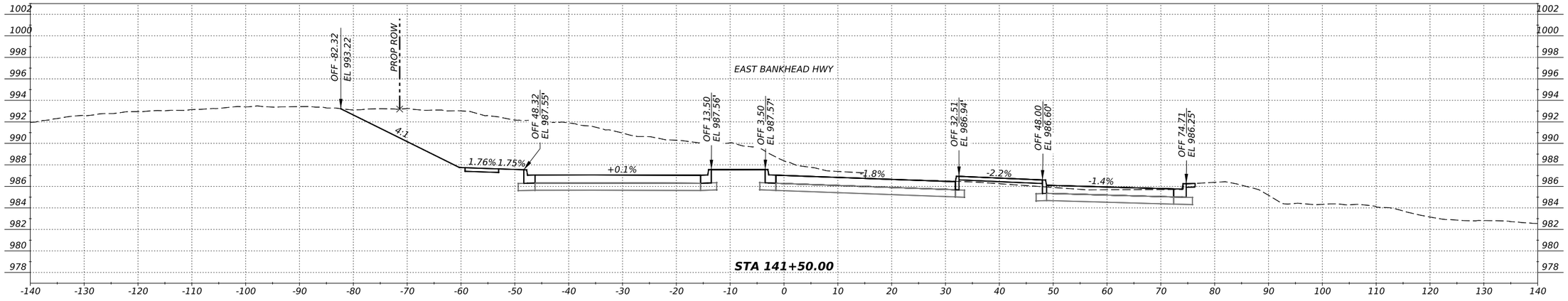
PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
	PARKER	259

DATE: 8/14/2026 6:13:39 AM
FILE: \\fcsfs-freesepw21\ICS_pdf_work_dir\49541547182\cv-109-XS-EB_pt1.dgn





STATE OF TEXAS
MATT L. WILLOUGHBY
143449
LICENSED
PROFESSIONAL ENGINEER
08/27/26

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

LEGEND

EXISTING GROUND

PROPOSED GROUND

HORIZ. SCALE IN FEET (0, 10, 20)

VERT. SCALE IN FEET (0, 5, 10)

NO.	ISSUE	BY	DATE

DRIVING FORWARD
PARKER COUNTY TRANSPORTATION BOND

FREESE AND NICHOLS
801 Cherry Street, Suite 2800
Fort Worth, TX 76102
Phone - (817) 735-7300
Web - www.freese.com
TEXAS REGISTERED ENGINEERING FIRM F-2144

E BANKHEAD HWY PART 1

PROPOSED CROSS SECTIONS - E BANKHEAD HWY

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
	PARKER		260

DATE: 8/14/2026 6:14:22 AM
FILE: \\cs\M-freesepw21\ICS_pdf_work_dir\4954\54718_2\cv-109-XS-EB_pt1.dgn

CK
DW
CK
DW