FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	-----		1
STATE	STATE DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY NO.
0915	12	562	WATSON RD

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
FEDERAL AID PROJECT NO. STP 2017 (591)
BEXAR COUNTY

SPUR 66 - WATSON RD

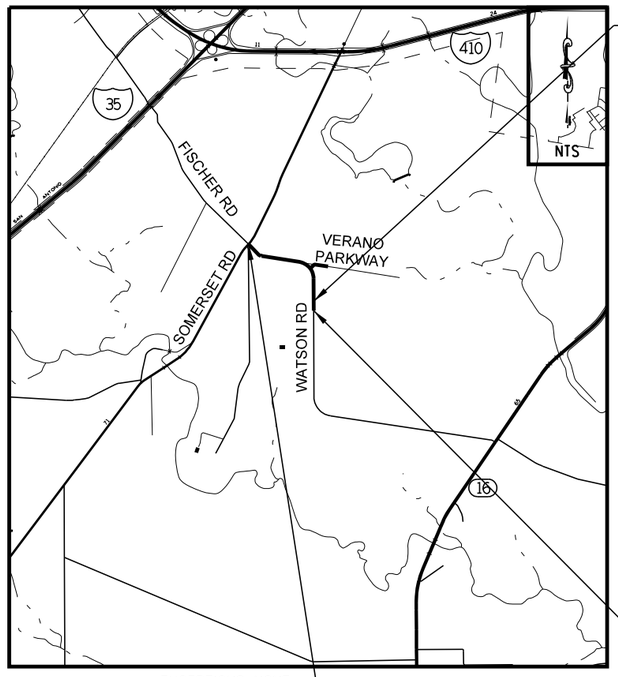
CSJ 0915-12-562 LENGTH = 3269.96 FT = 0.619 MI

LIMITS: FM 2790-SOMERSET ROAD
TO: 0.619 MI EAST TO WATSON ROAD

BEXAR COUNTY:
FM 2790-SOMERSET & WATSON RD
DESIGN SPEED = 40 MPH
ADT 3,900 (2021)
ADT 5,400 (2041)
PROJECT CLASSIFICATION - COLLECTOR
AREA OF DISTURBED SOIL = 6.40 ACRES

FINAL PLANS

PROJECT DESCRIPTION: EXPAND FROM 2 TO 4 LANES, WITH TRAFFIC CIRCLE AT SOUTHWEST VERANO PARKWAY, MULTI-USE PATH AND DRAINAGE



EXCEPTIONS: NONE
EQUATIONS: NONE

END FULL DEPTH CONSTRUCTION
BEXAR COUNTY
CONTROL 0915-12-562
STA 141+00.00

END PROJECT
BEXAR COUNTY
CONTROL 0915-12-562
STA 143+00.00

BEGIN PROJECT
BEGIN FULL DEPTH RECONSTRUCTION
BEXAR COUNTY
CONTROL 0915-12-562
STA 110+30.04

IFB 2020-XXXX

NELSON W. WOLFF	COUNTY JUDGE
SERGIO "CHICO" RODRIGUEZ	COMMISSIONER PCT. 1
JUSTIN RODRIGUEZ	COMMISSIONER PCT. 2
KEVIN A. WOLFF	COMMISSIONER PCT. 3
TOMMY CALVERT	COMMISSIONER PCT. 4
DAVID SMITH	COUNTY MANAGER
RENEE D. GREEN, P.E.	DIRECTOR OF PUBLIC WORKS/ COUNTY ENGINEER

"REGISTERED ACCESSIBILITY SPECIALIST"
"TDLR NO. EABPRJA _____"

LETTING DATE: _____

DATE CONTRACTOR BEGAN WORK: _____

DATE WORK WAS ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

FINAL PLANS STATEMENT:

THE CONSTRUCTION WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS.

P.E. _____
AREA ENGINEER DATE

TEXAS DEPARTMENT OF TRANSPORTATION

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

CEC
CIVIL ENGINEERING CONSULTANTS
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11550 IH 10 WEST, SUITE 395
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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

RECOMMENDED FOR LETTING _____
DESIGN SUPPORT DIRECTOR

RECOMMENDED FOR LETTING _____
TxDOT DISTRICT DESIGN ENGINEER

RECOMMENDED FOR LETTING _____
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMENDED FOR LETTING _____
TxDOT DISTRICT ENGINEER

RECOMMENDED FOR LETTING _____
BEXAR COUNTY DIRECTOR OF PUBLIC WORKS/ COUNTY ENGINEER

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

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PLOTTED SCALE:
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NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

INDEX OF SHEETS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	2

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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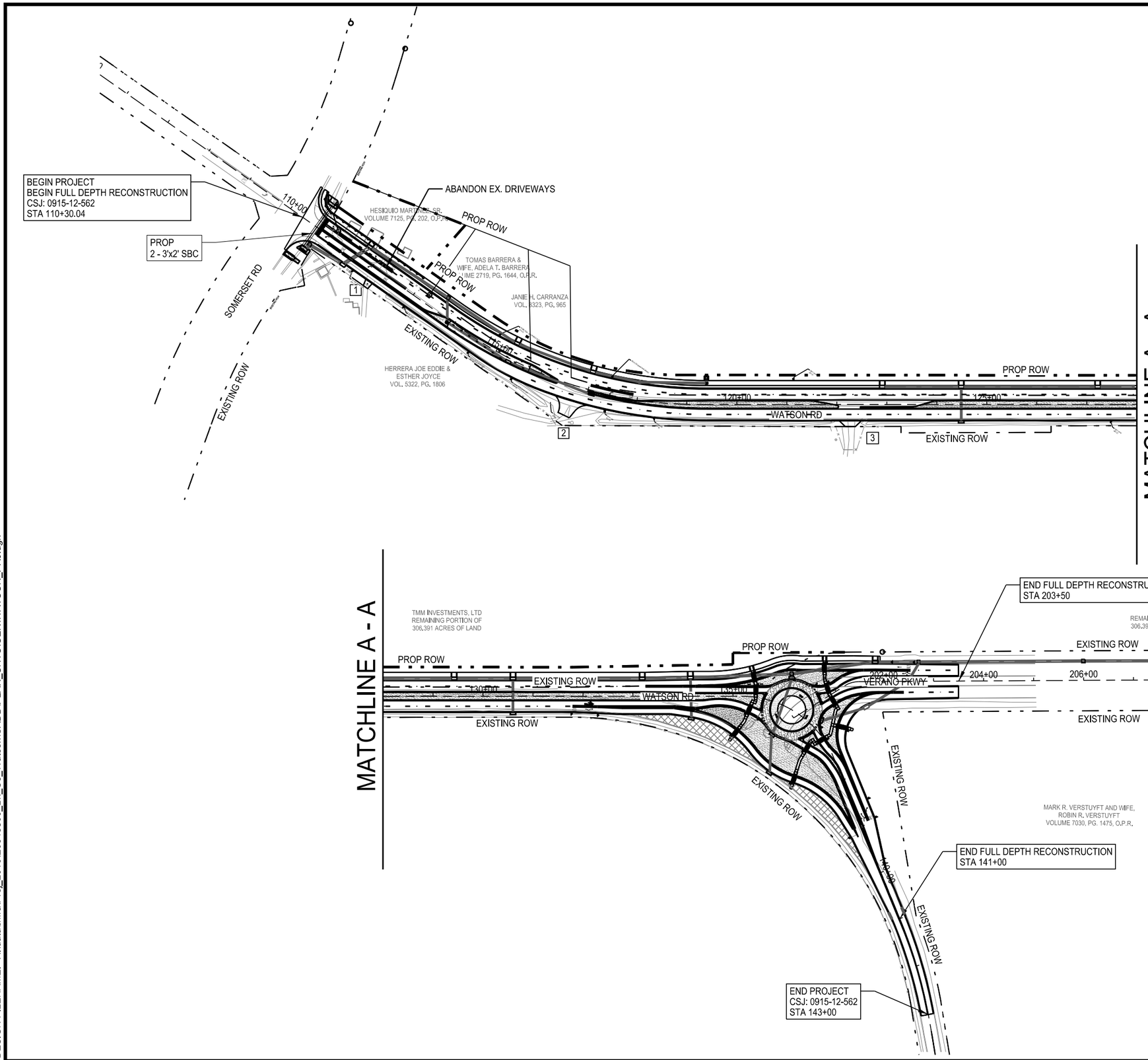

LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- CONCRETE PAVEMENT
- CONCRETE APRON
- BLOCK SOD
- 1 DRIVEWAY
- PROP TRAFFIC ARROW

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
100 50 0 100 200 300
1" = 200'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

PROJECT LAYOUT

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	---		3
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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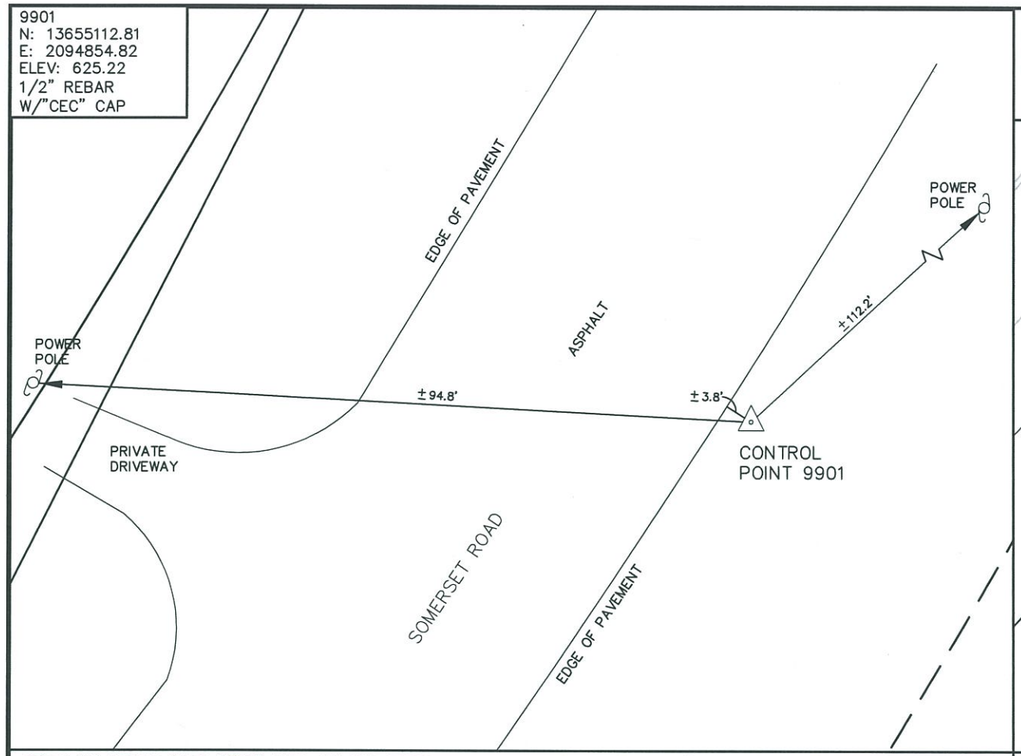
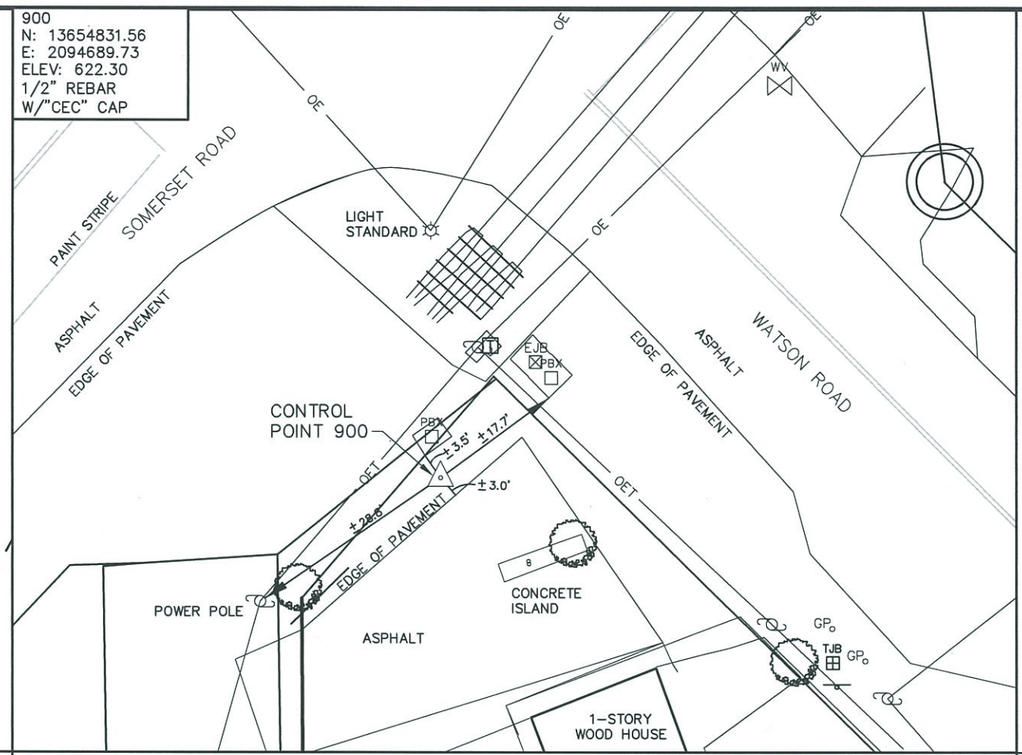


SET 1/2" REBAR WITH "CEC" CAP, ON THE EAST SIDE OF SOMERSET ROAD, +/- 264 FEET NORTH OF THE INTERSECTION OF SOMERSET ROAD AND WATSON ROAD.



SET 1/2" REBAR WITH "CEC" CAP, ON THE SOUTHWEST SIDE OF WATSON ROAD, AT THE INTERSECTION OF SOMERSET ROAD AND WATSON ROAD.

NOTES

1. BEARINGS ARE BASED ON NAD83(93), TEXAS STATE PLANE COORDINATES SYSTEM, SOUTH CENTRAL ZONE (4204). COORDINATES ARE IN U.S. SURVEY FEET. DISPLAYED COORDINATES ARE GRID. TO GET TO SURFACE MULTIPLY BY 1.00017 (SAF: 1.00017).
2. ELEVATIONS ARE NAVD 88 BASED ON COSA CONTROL POINT No. 2. ELEVATIONS SHOWN HEREON WERE ESTABLISHED BY CONVENTIONAL SURVEY METHODS.
3. THE DATA RECITED HEREIN ARE BASED ON MATHEMATICAL CALCULATIONS AND ARE SUBJECT TO THE RULES OF ROUNDING SIGNIFICANT NUMBERS.
4. SKETCHES ARE NOT TO SCALE.

NO	DATE	REVISION	APPROVED
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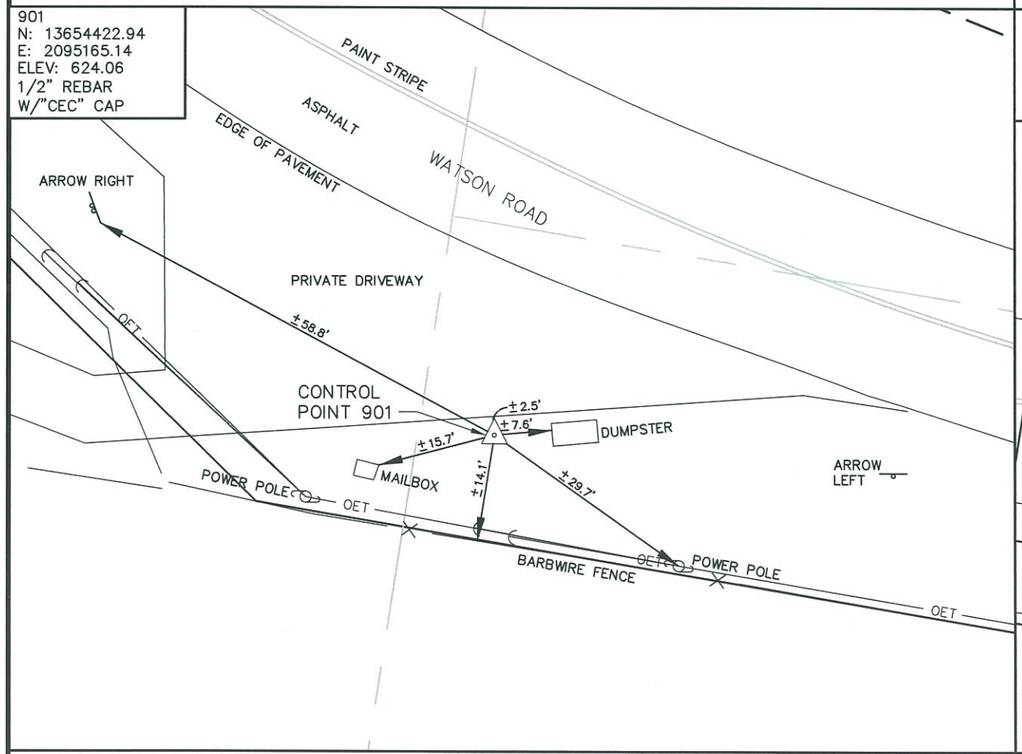
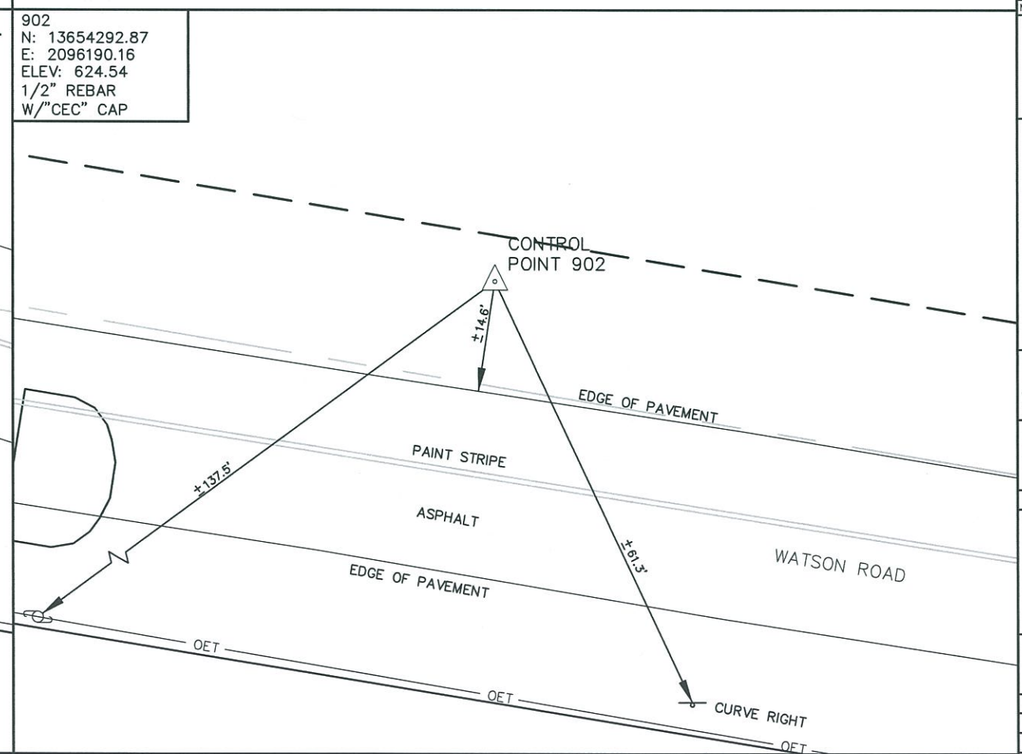
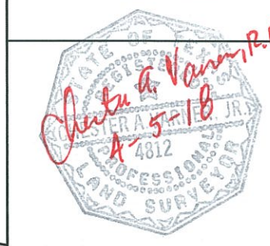


SET 1/2" REBAR WITH "CEC" CAP, ON THE SOUTH SIDE OF WATSON ROAD, +/- 687 FEET EAST OF THE INTERSECTION OF SOMERSET ROAD AND WATSON ROAD.



SET 1/2" REBAR WITH "CEC" CAP, ON THE NORTH SIDE OF WATSON ROAD, +/- 1,632 FEET EAST OF THE INTERSECTION OF SOMERSET ROAD AND WATSON ROAD.

NOT TO SCALE



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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

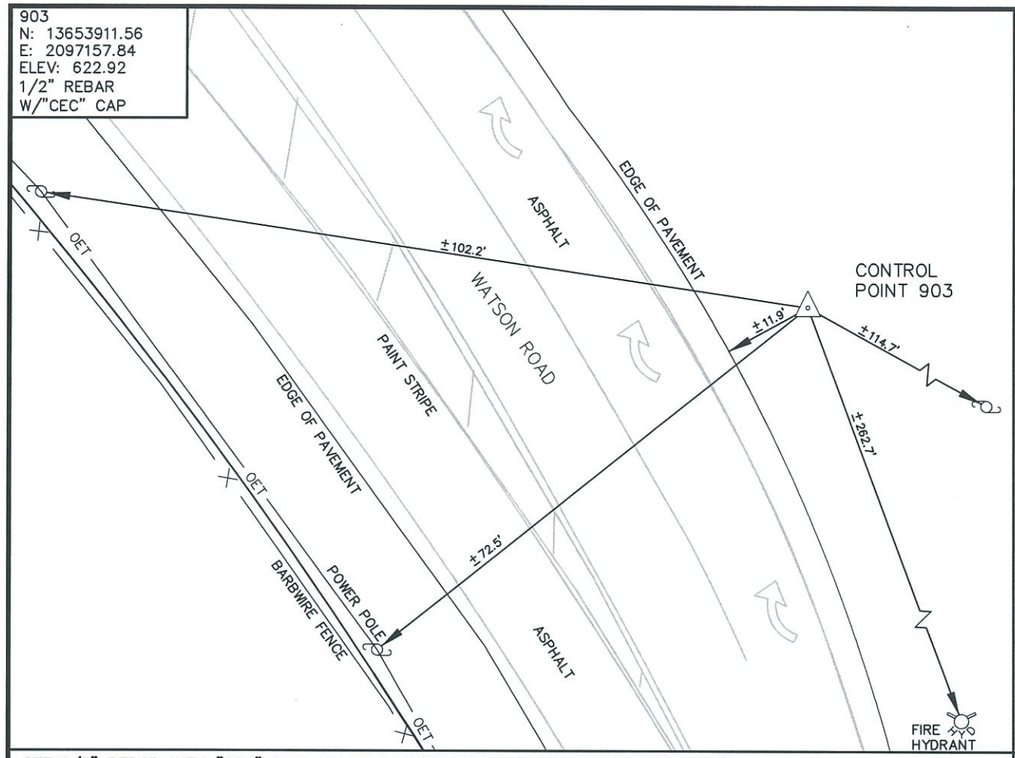
WATSON RD

PROJECT PRIMARY SURVEY CONTROL

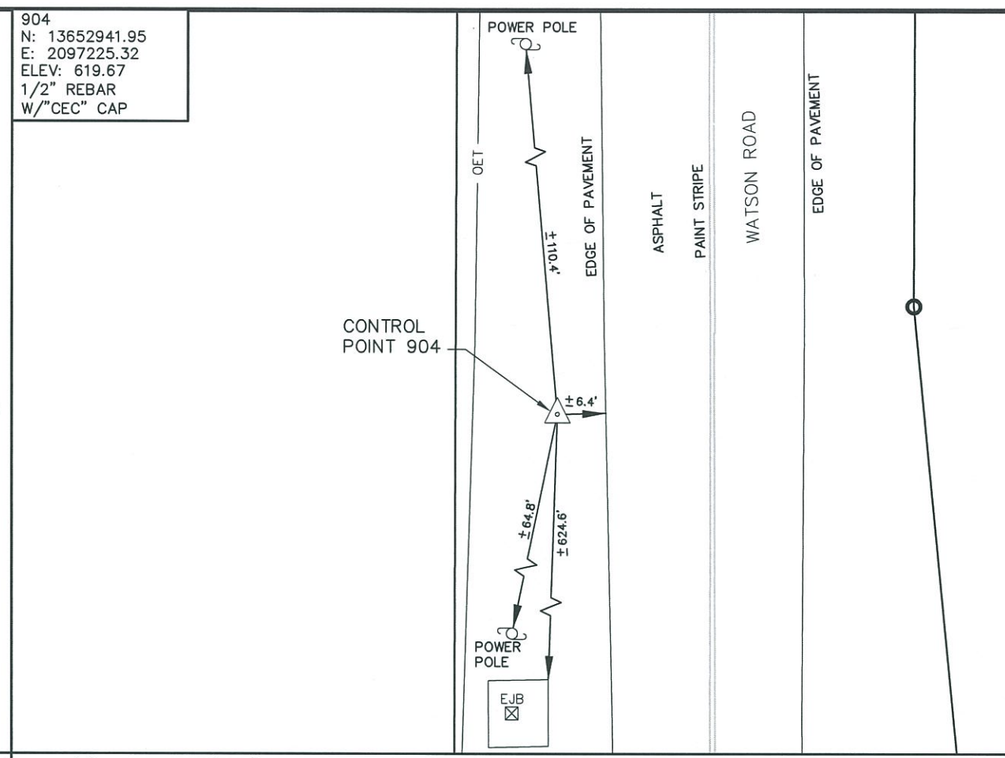
SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	--------	4

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON ROAD



SET 1/2" REBAR WITH "CEC" CAP, ON THE NORTHEAST SIDE OF WATSON ROAD, +/- 2,675 FEET SOUTHEAST OF THE INTERSECTION OF SOMERSET ROAD AND WATSON ROAD.



SET 1/2" REBAR WITH "CEC" CAP, ON THE EAST SIDE OF ATSON ROAD, +/- 3,226 FEET SOUTHEAST OF THE INTERSECTION OF SOMERSET ROAD AND WATSON ROAD.

NOTES

1. BEARINGS ARE BASED ON NAD83(93), TEXAS STATE PLANE COORDINATES SYSTEM, SOUTH CENTRAL ZONE (4204). COORDINATES ARE IN U.S. SURVEY FEET. DISPLAYED COORDINATES ARE GRID. TO GET TO SURFACE MULTIPLY BY 1.00017 (SAF: 1.00017).
2. ELEVATIONS ARE NAVD 88 BASED ON COSA CONTROL POINT No. 2. ELEVATIONS SHOWN HEREON WERE ESTABLISHED BY CONVENTIONAL SURVEY METHODS.
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4. SKETCHES ARE NOT TO SCALE.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
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NOT TO SCALE

STATE OF TEXAS
REGISTERED
CHARLES A. VARNER JR.
4464
PROFESSIONAL
LAND SURVEYOR

Charles A. Varner, R.P.L.S.
4/5/18

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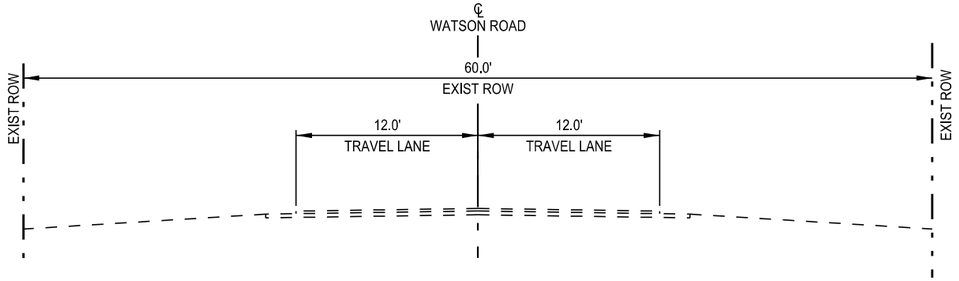
BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON RD

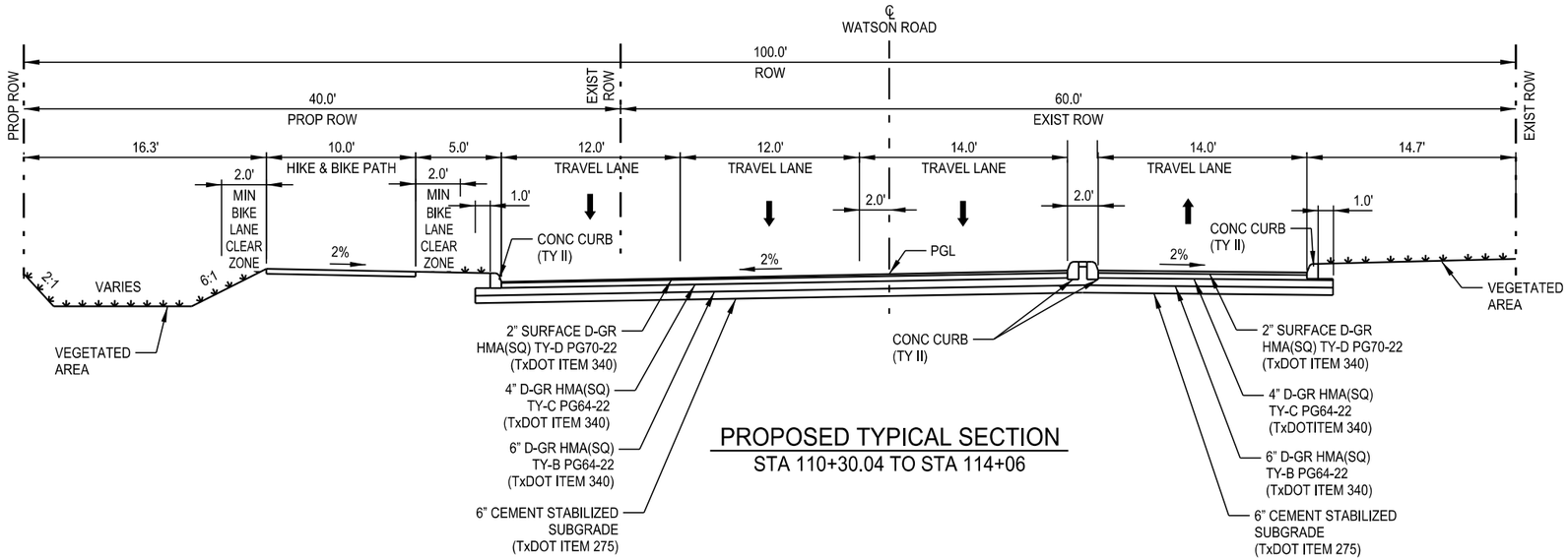
PROJECT PRIMARY SURVEY CONTROL

SHEET 2 OF 2

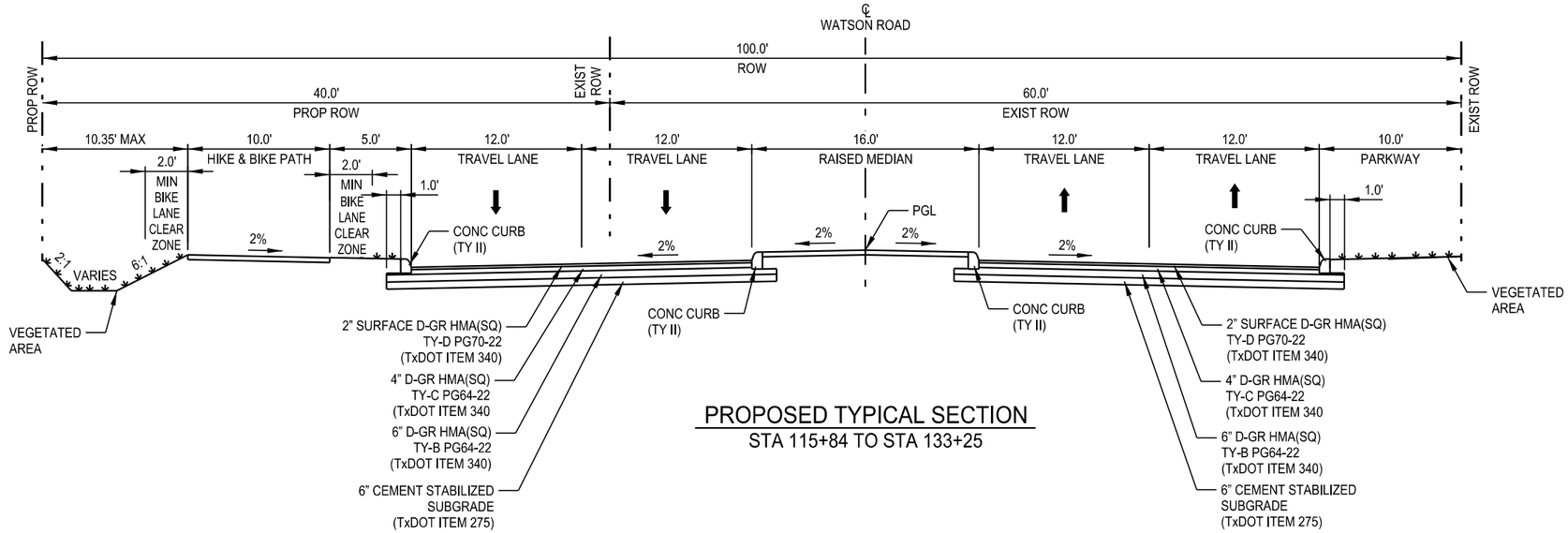
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	--------		5
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON ROAD



EXISTING TYPICAL SECTION
BEGIN STA 110+30.04 TO END STA 143+00

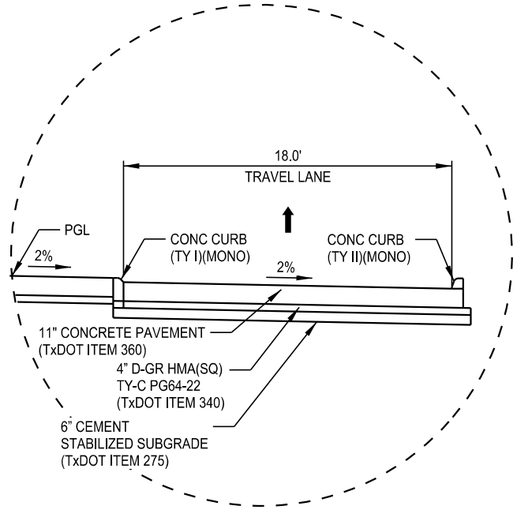


PROPOSED TYPICAL SECTION
STA 110+30.04 TO STA 114+06



PROPOSED TYPICAL SECTION
STA 115+84 TO STA 133+25

CONCRETE PAVEMENT AT ROUNDABOUT



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-	-	-	-

GRAPHIC SCALE
(IN FEET)
30 15 0 5 10 15
1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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6/25/2020

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

TYPICAL SECTIONS EXISTING AND PROPOSED

SHEET 1 OF 2

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	-—	6

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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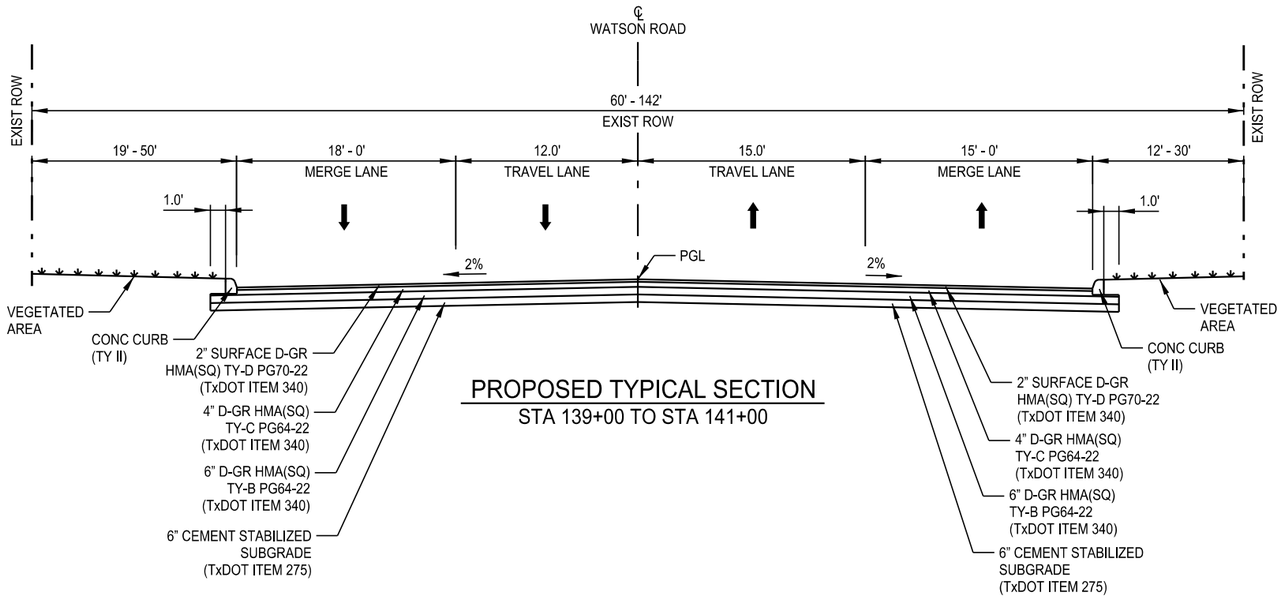

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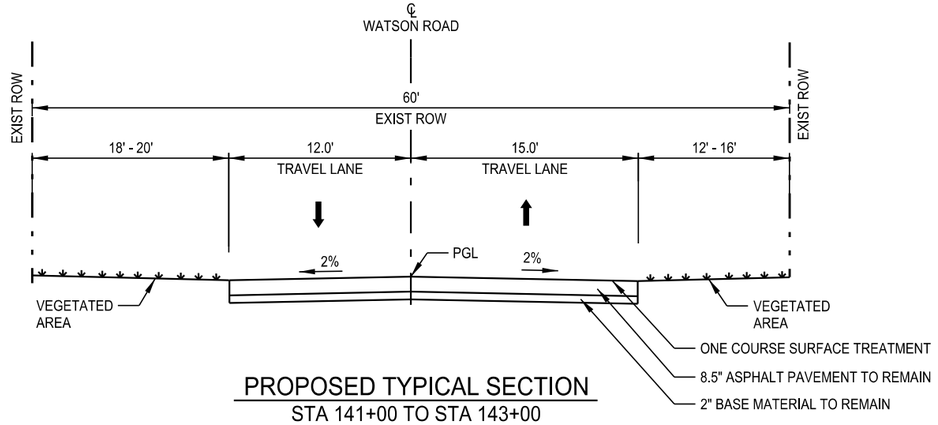
STA 139+00 TO STA 141+00



PROPOSED TYPICAL SECTION
STA 141+00 TO STA 143+00

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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
30 15 0 5 10 15
1" = 10'

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

TYPICAL SECTIONS
EXISTING AND PROPOSED

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		7
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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ADDITIONAL NOTES

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN ALL REQUIRED STORM WATER PERMITS, FEES, AND APPROVALS. NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PERMITS REQUIRED FOR CONSTRUCTION IN DRAINAGE EASEMENTS, RIGHT OF WAYS, AND FLOODPLAINS.

2. THE CONTRACTOR SHALL NOTIFY BEXAR COUNTY AT LEAST 24 HOURS PRIOR TO THE INSTALLATION OF ANY DRAINAGE FACILITY WITHIN A DRAINAGE EASEMENT OR STREET RIGHT OF WAY NOT INDICATED ON THE CONSTRUCTION PLANS.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING DRAINAGE FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING DRAINAGE SYSTEMS, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AT HIS EXPENSE. THE CONTRACTOR SHALL NOTIFY BEXAR COUNTY AS SOON AS CONFLICTS WITH UTILITIES ARE ENCOUNTERED OR ANY DRAINAGE SYSTEM IS DAMAGED DURING CONSTRUCTION.

4. CONSTRUCTION SPOILS WILL NOT BE ALLOWED TO BE DEPOSITED ANYWHERE WITHIN THE RIGHT OF WAY OR FLOODPLAIN WITHIN THE LIMITS OF THE PROJECT AND SHALL BE DISPOSED OFFSITE IN COMPLIANCE WITH CURRENT APPLICABLE REGULATIONS.

5. NO STRUCTURE, FENCES, WALLS, LANDSCAPING, OR OTHER OBSTRUCTIONS THAT IMPEDE DRAINAGE SHALL BE PLACED WITHIN THE LIMITS OF THE DRAINAGE EASEMENTS SHOWN ON THE CONSTRUCTION DOCUMENTS.

6. UPON COMPLETION OF TRENCHING, THE AREA WILL BE BACKFILLED AND COMPACTED TO ITS ORIGINAL CONDITION. TRENCHES/BORE PITS TO BE OPEN AND UNATTENDED LONGER THAN 24 HOURS SHALL BE PROTECTED TO WITHSTAND ALL HYDRODYNAMIC AND HYDROSTATIC FORCES AND PREVENT DOWNSTREAM IMPACTS. TRENCHES/BORE PITS TO BE OPEN LONGER THAN 30 DAYS AFTER STARTING EXCAVATION SHALL BE BACKFILLED WITH A SEMI-PERMANENT REPAIR BACKFILL.

7. IMPROVED SECTIONS OF EARTHEN CHANNELS AND/OR WATERWAYS WILL BE VEGETATED BY SEEDING OR SODDING. EIGHTY FIVE PERCENT OF THE CHANNEL SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE BEXAR COUNTY WILL ACCEPT THE CHANNEL FOR MAINTENANCE.

8. CONTRACTOR SHALL NOT PLACE WEEP HOLES IN PRECAST BOX CULVERTS.

9. THE CONTROL POINT FOR ALL CURB INLETS ARE TO BE TAKEN AT TOP OF CURB AT NOMINAL FACE OF CURB.

10. CAST-IN-PLACE INLETS AND PRECAST INLETS ARE PROPOSED WITHIN DESIGN. THE FOLLOWING INLETS SHALL BE CAST-IN-PLACE TO ENSURE PROPER TIE INS TO CONNECTING PIPE(S) AND/OR CULVERT(S):

    SYSTEM A:
    A20
    A30
    A50
    A55
    A60
    A65

    SYSTEM B:
    B30
    B35
    B40
    B50
    B55
    B60
    B70
    B80
    B85
    B90

    ALL OTHER INLETS AND STRUCTURES SHALL BE PRECAST.

11. NO SEPARATE TXDOT UNIT ITEM OR DESCRIPTION IS ASSOCIATED WITH CAST-IN-PLACE INLETS. CONTRACTOR'S UNIT PRICE FOR STRUCTURE SHALL INCLUDE AND ACCOUNT FOR CAST-IN-PLACE INSTALLATION FOR STRUCTURE LISTED ABOVE IN NOTE 10.

12. FOR LOCATION OF UNDERGROUND ELECTRIC AND GAS FACILITIES, TELEPHONE CABLES, AND TIME WARNER CABLE TV CALL TEXAS STATE WIDE ONE CALL LOCATOR NUMBER 1-800-545-6005 48 HOURS PRIOR BEFORE BEGINNING ANY EXCAVATION. DUE TO FEDERAL REGULATION TITLE 49, PART 192.181, C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING C.P.S. OVERHEAD AND UNDERGROUND ELECTRIC FACILITIES IF ADJACENT TO WORK AREAS. THE CONTRACTOR WILL HAVE RESPONSIBILITY TO PROTECT AND SUPPORT CABLE TV AND TELEPHONE COMPANY PLANT DURING CONSTRUCTION. THE EXISTENCE AND LOCATION OF UTILITIES INDICATED ON THE PLAN ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED TO BE ACCURATE. PROPOSED UTILITIES ARE SHOWN FOR REFERENCE ONLY. SEE FINAL RELEASED UTILITY PLANS FOR DETAILS CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITE(S) IN ORDER TO DEVELOP THE CONTRACTOR'S PLANS TO IMPLEMENT THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S PLANS SHALL PROVIDE FOR ADEQUATE TRENCH SAFETY SYSTEMS THAT COMPLY WITH, AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL DEVELOP AND IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
GENERAL NOTES

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		---	9
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PH	STG	SH #	HWY/ROAD	STATION LIMITS	0400-6008 CUT & RESTORE ASPH PAVING	0502-6001 BARRICADES SIGNS AND TRAFFIC HANDLING	0508-6001 CONSTRUCTING DETOURS	0512-6009 PORT CTB (FUR & INST) (LOW PROF) (TY 1)	0512-6010 PORT CTB (FUR & INST) (LOW PROF) (TY 2)	0512-6033 PORT CTB (MOVE) (LOW PROF) (TY 1)	0512-6034 PORT CTB (MOVE) (LOW PROF) (TY 2)	0512-6057 PORT CTB (REMOVE) (LOW PROF) (TY 1)
					SY	MO	SY	LF	LF	LF	LF	LF
1	2	SHEET 1 OF 3	WATSON	BEGIN PROJECT TO STA 117+00	85		276					
		SHEET 2 OF 3	SW VERANO	STA 200+00 TO STA 206+00	46							
		SHEET 3 OF 3	SW VERANO	STA 206+00 TO STA 211+00	36							
		PHASE 1 SUBTOTAL			167		276					
2	1	SHEET 1 OF 3	WATSON	STA 134+00 TO STA 139+00			674					
		SHEET 2 OF 3	WATSON	STA 139+00 TO END PROJECT								
		SHEET 3 OF 3	SW VERANO	STA 206+00 TO STA 211+00								
		PHASE 2 STAGE 1 SUBTOTAL					674					
2	2	SHEET 1 OF 1	WATSON	STA 135+00 TO STA 139+00								
		PHASE 2 STAGE 2 SUBTOTAL										
		PHASE 2 SUBTOTAL					674					
3	1	SHEET 1 OF 5	WATSON	BEGIN PROJEC TO STA 117+00				650	20			
		SHEET 2 OF 5	WATSON	STA 117+00 TO STA 126+00				900				
		SHEET 3 OF 5	WATSON	STA 126+00 TO STA 134+00				775				
		SHEET 4 OF 5	WATSON	STA 134+00 TO STA 139+00				295	40			
		SHEET 5 OF 5	WATSON	STA 139+00 TO END PROJECT				100	20			
		PHASE 3 STAGE 1 SUBTOTAL						2720	80			
3	2	SHEET 1 OF 2	WATSON	STA 134+00 TO STA 139+00								
		SHEET 2 OF 2	WATSON	STA 139+00 TO END PROJECT								
		PHASE 3 STAGE 2 SUBTOTAL										
3	3	SHEET 1 OF 2	WATSON	STA 134+00 TO STA 139+00								
		SHEET 2 OF 2	WATSON	STA 139+00 TO END PROJECT								
		PHASE 3 STAGE 3 SUBTOTAL										
3	4	SHEET 1 OF 1	WATSON	STA 134+00 TO STA 139+00								
		PHASE 3 STAGE 4 SUBTOTAL										
3	5	SHEET 1 OF 1	WATSON	STA 135+00 TO STA 139+00						20	200	
		PHASE 3 STAGE 5 SUBTOTAL								20	200	
		PHASE 3 SUBTOTAL						2720	80	20	200	
4	1	SHEET 1 OF 5	WATSON	BEGIN PROJEC TO STA 117+00						60	380	20
		SHEET 2 OF 5	WATSON	STA 117+00 TO STA 126+00						20	160	20
		SHEET 3 OF 5	WATSON	STA 126+00 TO STA 134+00						20	63	20
		SHEET 4 OF 5	WATSON	STA 134+00 TO STA 139+00						20	97	20
		SHEET 5 OF 5	WATSON	STA 139+00 TO END PROJECT								
		PHASE 4 STAGE 1 SUBTOTAL								120	700	80
PROJECT TOTAL					167	12	950	2720	80	140	900	80

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

SANCHEZ-SALAZAR & ASSOCIATES, LLC
TBPE FIRM REGISTRATION NO. 15685

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL SUMMARY

SHEET 1 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6		10

STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
			WATSON RD

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PH	STG	SH #	HWY/ROAD	STATION LIMITS	0512-6058 PORT CTB (REMOVE) (LOW PROF) (TY 2)	0662-6012 WK ZN PAV MRK NON-REMOV (W) 8"(SLD)	0662-6016 WK ZN PAV MRK NON-REMOV (W) 24"(SLD)	0662-6033 WK ZN PAV MRK NON-REMOV (Y) 4"(DOT	0662-6034 WK ZN PAV MRK NON-REMOV (Y) 4"(SLD)	5000 POLICE OFFICER	6001-6002 PORTABLE CHANGEABLE MESSAGE SIGN
					LF	LF	LF	LF	LF	HR	EA
1	2	SHEET 1 OF 3	WATSON	BEGIN PROJECT TO STA 117+00							
		SHEET 2 OF 3	SW VERANO	STA 200+00 TO STA 206+00							
		SHEET 3 OF 3	SW VERANO	STA 206+00 TO STA 211+00							
		PHASE 1 SUBTOTAL								288	
2	1	SHEET 1 OF 3	WATSON	STA 134+00 TO STA 139+00							
		SHEET 2 OF 3	WATSON	STA 139+00 TO END PROJECT							
		SHEET 3 OF 3	SW VERANO	STA 206+00 TO STA 211+00							
		PHASE 2 STAGE 1 SUBTOTAL								40	
2	2	SHEET 1 OF 1	WATSON	STA 135+00 TO STA 139+00							
		PHASE 2 STAGE 2 SUBTOTAL								40	
		PHASE 2 SUBTOTAL								80	
3	1	SHEET 1 OF 5	WATSON	BEGIN PROJEC TO STA 117+00			11	60	1340		
		SHEET 2 OF 5	WATSON	STA 117+00 TO STA 126+00					1800		
		SHEET 3 OF 5	WATSON	STA 126+00 TO STA 134+00					1352		
		SHEET 4 OF 5	WATSON	STA 134+00 TO STA 139+00		79	23		1141		
		SHEET 5 OF 5	WATSON	STA 139+00 TO END PROJECT					120		
		PHASE 3 STAGE 1 SUBTOTAL				79	34	60	5753	40	
3	2	SHEET 1 OF 2	WATSON	STA 134+00 TO STA 139+00							
		SHEET 2 OF 2	WATSON	STA 139+00 TO END PROJECT							
		PHASE 3 STAGE 2 SUBTOTAL								40	
3	3	SHEET 1 OF 2	WATSON	STA 134+00 TO STA 139+00							
		SHEET 2 OF 2	WATSON	STA 139+00 TO END PROJECT							
		PHASE 3 STAGE 3 SUBTOTAL								40	
3	4	SHEET 1 OF 1	WATSON	STA 134+00 TO STA 139+00							
		PHASE 3 STAGE 4 SUBTOTAL								40	
3	5	SHEET 1 OF 1	WATSON	STA 135+00 TO STA 139+00	2020						
		PHASE 3 STAGE 5 SUBTOTAL			2020					40	
		PHASE 3 SUBTOTAL			2020	79	34	60	5753	200	
4	1	SHEET 1 OF 5	WATSON	BEGIN PROJEC TO STA 117+00	380		11	63	1340		
		SHEET 2 OF 5	WATSON	STA 117+00 TO STA 126+00	160				1800		
		SHEET 3 OF 5	WATSON	STA 126+00 TO STA 134+00	63				1600		
		SHEET 4 OF 5	WATSON	STA 134+00 TO STA 139+00	97				384		
		SHEET 5 OF 5	WATSON	STA 139+00 TO END PROJECT					800		
		PHASE 4 STAGE 1 SUBTOTAL			700		11	63	5924	100	
PROJECT TOTAL					2720	79	45	123	11677	668	4

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

SANCHEZ-SALAZAR & ASSOCIATES, LLC
TBPE FIRM REGISTRATION NO. 15685

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL SUMMARY

SHEET 2 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6		11

STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
			WATSON RD

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PLAN SHEET NO.	STATIONTO STATION	0160 6003 FURNISHING AND PLACING TOPSOIL (4")	0162 6002 BLOCK SODDING	0168 6001 VEGETATIVE WATERING	0192 6013 MULCH	0506 6004 ROCK FILTER DAMS (INSTALL) (TY 4)	0506 6011 ROCK FILTER DAMS (REMOVE)	0506 6020 CONSTRUCTION EXITS (INSTALL) (TY 1)	0506 6024 CONSTRUCTION EXITS (REMOVE)	0506 6038 TEMP SEDMT CONT FENCE (INSTALL)	0506 6039 TEMP SEDMT CONT FENCE (REMOVE)	0506 6041 BIODEG EROSN CONT LOGS (INSTL) (12")	0506 6043 BIODEG EROSN CONT LOGS (REMOVE)
SW3P PHASE-1 SHEETS		SY	SY	MG	SY	LF	LF	SY	SY	LF	LF	LF	EA
52	BEGIN TO 117+00	1962	299	42	1962	30	30	444	444	1247	1247	220	220
53	117+00 TO 126+00	2733		43	2733					1810	1810	260	260
54	126+00 TO 134+00	2085		33	2085					1634	1634	180	180
55	134+00 TO 139+00	6932		108	6932	60	60			1366	1366	340	340
56	139+00 TO END	1255		20	1255			444	444	458	458	40	40
57	204+00 TO END	4463		70	4463	15	15			658	658		
	PROJECT TOTALS	19430	299	314	19430	105	105	888	888	7173	7173	1040	1040

NOTE:

1. SW3P BMPS TO BE INSTALLED CONCURRENT WITH TCP PHASING AS REQUIRED.
2. COORDINATE WITH BEXAR COUNTY REPRESENTATIVE FOR CONSTRUCTION EXIT LOCATION.

DATE

INITIALS

ORIGINATED BY:

CHECKED BY:

BACK CHECKED BY:

CORRECTED BY:

VERIFIED BY:

PLOTTED BY: evaldez
PLOTTED SCALE: 1:1
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STATE OF TEXAS
DOUGLAS V. DICICCIO
120031
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DOUGLAS V. DICICCIO, P.E. 120031

6/25/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P
SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		12
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLAN SHEET NO.	STATION TO STATION	0100 6001 * PREPARING ROW	0100 6002 PREPARING ROW	0106 6002 OBLITERATING ABANDONED ROAD	0110 6001 EXCAVATION (ROADWAY)	0132 6003 EMBANKMENT (FINAL)(ORD COMP)(TY B)	0216 6001 PROOF ROLLING	0275 6001 CEMENT	0275 6002 CEMENT TREAT (EXIST MATL) (6")	0316 6001 ASPH (MULTIOPTION)
ROADWAY SHEETS		AC	STA	SY	CY	CY	HR	TON	SY	GAL
97	BEGIN TO 113+00	1					4	20	1803	
98	113+00 TO 117+00		4				6	30	2491	
99	117+00 TO 121+50		5				7	36	2945	
100	121+50 TO 126+00		5				7	36	2750	
101	126+00 TO 130+00		4				6	32	2444	
102	130+00 TO 134+00		4	146			5	33	2538	
103	134+00 TO 139+00		5	759				42	5291	
105	139+00 TO END		4	79			5	10	936	149
PROJECT TOTALS		1	30	984	16534	715	40	239	21198	149

PLAN SHEET NO.	STATION TO STATION	0316 6175 AGGR(TY-B GR-4 SAC-B)	0340 6011 D-GR HMA(SQ) TY-B PG64-22	0340 6034 D-GR HMA(SQ) TY-C PG64-22	0340 6122 D-GR HMA(SQ) TY-D PG70-22	0360 60XX CONC PAV (JOINT REINF) (11")	0432 6001 RIPRAP (CONC)(4 IN)	0528 6001 COLORED TEXTURED CONC (4")	0529 6002 CONC CURB (TY II)	0529 6004 CONC CURB (MONO) (TY I)
ROADWAY SHEETS		CY	TON	TON	TON	SY	CY	SY	LF	LF
97	BEGIN TO 113+00		595	364	175				584	
98	113+00 TO 117+00		595	487	185		20		1424	
99	117+00 TO 121+50		972	571	219				892	
100	121+50 TO 126+00		908	528	176				900	
101	126+00 TO 130+00		807	469	156				800	
102	130+00 TO 134+00		838	490	167				800	
103	134+00 TO 139+00		1746	1208	491	1025		274	1415	270
105	139+00 TO END	8	309	197	94				403	
PROJECT TOTALS		8	6770	4314	1663	1025	20	274	7218	270

PLAN SHEET NO.	STATION TO STATION	0530 6005 DRIVEWAYS (ACP)	0531 6001 CONC SIDEWALKS (4")	0531 6004 CURB RAMPS (TY 1)	0531 6016 CURB RAMPS (TY 21)	0536 6002 CONC MEDIAN	0560 6002 MAILBOX INSTALL-D (TWG-POST) TY 1	6056 6001 PREFORMED IN-LANE(TRANS) RUMBLE STRIP
ROADWAY SHEETS		SY	SY	EA	EA	SY	EA	LF
97	BEGIN TO 113+00	20	312			64		
98	113+00 TO 117+00	135	429				1	
99	117+00 TO 121+50		487			602		
100	121+50 TO 126+00	45	500			800		
101	126+00 TO 130+00		445			711		40
102	130+00 TO 134+00		445			705		40
103	134+00 TO 139+00		505	18	2	3365		160
105	139+00 TO END							40
PROJECT TOTALS		200	3123	18	2	6247	1	280

NOTES:

* 1. PREP ROW (AC) WILL INCLUDE THE DEMOLITION OF THE 3 STRUCTURES.

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	---	13

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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DRAINAGE SUMMARY

ITEM No.	104 6009	104 6015	104 6021	160 6003	162 6002	400 6008	401 6001	402 6001	420 6002	420 6057	432 6007	450 6103	462 6001	462 6004	464 6005	464 6007	464 6008	464 6030	464 6034	496 6002	497 6007	529 6001	531 6001
SHEET No.	REMOVING CONC (RIPRAP)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (CURB)	FURNISHING AND PLACING TOPSOIL(4")	BLOCK SODDING	CUT & RESTORE ASPH PAVING	FLOWABLE FILL	TRENCH EXCAVATION PROTECTION	CL A CONC (MISC)	CL C CONC (WINGWALLS)	5" RIPRAP (CONC) (CL C)	RAIL (TY PR11)	CONC BOX CULV		REC PIPE (CL III)			RC PIPE (ARCH) (CL III) (DES 3)	RC PIPE (ARCH) (CL III) (DES 5)	REMOV STR (INLET)	REMOV STR (PIPE)	CONC CURB (TY1)	CONC SIDEWALKS (4")
													(3 FT X 2 FT)	(4 FT X 3 FT)	(24 IN)	(30 IN)	(36 IN)						
	SY	SY	LF	SY	SY	SY	CY	LF	CY	CY	CY	LF	LF	LF	LF	LF	LF	LF	LF	EA	LF	LF	SY
132	0	0	0	0	0	0	4.7	0	4	0	0	0	136	0	0	0	0	0	121	0	0	0	0
133	0	0	0	0	0	0	9.3	0	6	0	28	0	0	0	0	0	0	392	57	0	0	0	0
134	0	0	0	0	0	0	6.3	0	3	0	0	0	0	0	0	0	0	309	0	0	0	0	0
135	0	0	0	0	0	0	3.4	0	4	0	26	0	0	0	0	0	0	144	0	0	0	0	0
136	0	0	0	0	0	0	6.8	0	6	0	11	0	0	0	293	0	0	94	0	0	0	0	0
137	0	0	0	0	0	0	0.0	262	3	0	6	0	0	0	132	209	53	0	0	0	0	0	0
138	0	0	0	0	0	0	0.0	443	4	0	0	0	0	0	65	0	378	0	0	0	0	0	0
139	0	0	0	0	0	0	0.0	488	6	0	6	0	0	0	283	0	205	0	0	0	0	0	0
140	0	0	0	0	0	0	0.0	311	3	0	0	0	0	97	35	0	179	0	0	0	0	0	0
141	0	0	0	323	323	0	0.0	394	2	0	0	0	0	394	0	0	0	0	0	0	0	0	0
142	16	23	40	350	350	35	0.0	393	5	0	6	0	0	393	0	0	0	0	0	1	135	40	23
143	0	0	0	0	0	0	0.0	140	2	0	0	0	0	0	140	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0.0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0.0	198	1	18	43	86	198	0	0	0	0	0	0	0	225	0	0
TOTALS	16	23	40	673	673	35	30	2629	49	18	136	86	334	884	948	209	815	939	178	1	360	40	23

JUNCTION BOX & INLET SUMMARY

ITEM No.	465 6006	465 6009	465 6011	465 6013	465 6024	465 6054	465 6176	465 6338
SHEET No.	JCTBOX (COML) (PJB)			INLET (COMPL)				
	(4FTX4FT)	(5FTX5FT)	(6FTX6FT)	(PCO)(3FT)	(PCO)(5FT)	(PSL)(SL) (3FTX3FT)	(CURB)(TY C1)	(TY ARMOR CURB SLOT)
	EA	EA	EA	EA	EA	EA	EA	EA
132	0	1	0	0	4	0	0	0
133	0	1	0	0	4	0	0	0
134	1	0	0	0	2	0	1	0
135	2	0	0	0	0	1	0	0
136	0	0	0	2	4	2	0	0
137	0	0	0	0	4	1	0	0
138	0	0	0	2	4	0	0	0
139	0	1	0	8	2	1	0	0
140	0	0	1	0	4	0	0	0
141	0	0	1	0	0	0	0	0
142	0	0	2	0	0	0	1	0
143	0	0	0	2	2	0	0	0
144	0	0	0	0	0	0	0	2
TOTALS	3	3	4	14	30	5	2	2

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

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SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE SUMMARY

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	---	14

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:1
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PLOTTED ON: 6/24/2020 @ 11:36:16 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-DRN-SUM-01.dgn

PLAN SHEET NO.	STATIONTO STATION	0636 6001	0644 6001	0644 6017	0666 6030	0666 6036	0666 6048	0666 6054	0666 6078	0666 6099	0666 6156
		ALUMINUM SIGNS (TY A)	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(2)SA(P)	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	REFL PAV MRK TY I (W) (ARROW) (100MIL)	REFL PAV MRK TY I (W) (WORD) (100MIL)	REF PAV MRK TY I (W) 18" (YLD TRI) (100MIL)	REFL PAV MRK TY I (Y) (MED NOSE) (100MIL)
PAVEMENT MARKING SHEETS		SF	EA	EA	LF	LF	LF	EA	EA	EA	EA
186	BEGIN TO 117+00	41	5	1		375	40	4	4		1
187	117+00 TO 126+25	24	4			90		1	1		
188	126+25 TO 134+25	6	1			466		2	1		
189	134+25 TO 139+00	169	30		81	2414	340	4	2	24	
190	139+00 TO END	7	1			39				8	
	PROJECT TOTALS	247	41	1	81	3384	380	11	8	32	1

PLAN SHEET NO.	STATION TO STATION	0666 6300	0666 6303	0666 6315	0672 6009	0672 6010
		RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R
PAVEMENT MARKING SHEETS		LF	LF	LF	EA	EA
186	BEGIN TO 117+00	578	1243	880	44	19
187	117+00 TO 126+25	1809	1800	1803	91	91
188	126+25 TO 134+25	1305	1600	1600	80	66
189	134+25 TO 139+00	190	1369	1563	78	10
190	139+00 TO END		801	967	49	
	PROJECT TOTALS	3882	6813	6813	342	186

PLOTTED BY: evaldez
PLOTTED SCALE: 1:100
PEN TABLE: WATSON.TBL
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STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SIGNING, PAVEMENT MARKING AND DELINEATION SUMMARY

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6	-—		15
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

WATSON				
STA 110+50.00 TO STA 125+00.00				
	CUT	FILL	ACCUM CUT	ACCUM FILL
STATION NUMBER	(CY)	(CY)	(CY)	(CY)
110+50.00	0	0	0	0
111+00.00	76	94	76	94
111+50.00	104	26	180	120
112+00.00	112	18	292	138
112+12.60	25	5	317	143
112+50.00	63	21	380	164
113+00.00	49	51	429	215
113+50.00	34	69	463	284
114+00.00	52	64	515	348
114+50.00	83	42	598	390
115+00.00	121	21	719	411
115+50.00	169	9	888	420
116+00.00	180	6	1068	426
116+50.00	181	3	1249	429
116+71.27	79	1	1328	430
117+00.00	96	2	1424	432
117+50.00	155	10	1579	442
118+00.00	156	18	1735	460
118+50.00	157	15	1892	475
119+00.00	148	16	2040	491
119+50.00	143	18	2183	509
120+00.00	135	24	2318	533
120+50.00	137	24	2455	557
121+00.00	140	22	2595	579
121+50.00	134	25	2729	604
122+00.00	150	17	2879	621
122+27.01	94	3	2973	624
122+50.00	84	2	3057	626
123+00.00	191	4	3248	630
123+50.00	228	3	3476	633
124+00.00	260	0	3736	633
124+50.00	274	0	4010	633
125+00.00	268	0	4278	633

WATSON				
STA 125+50.00 TO STA 141+50.00				
	CUT	FILL	ACCUM CUT	ACCUM FILL
STATION NUMBER	(CY)	(CY)	(CY)	(CY)
125+50.00	231	1	4509	634
126+00.00	205	2	4714	636
126+50.00	209	2	4923	638
127+00.00	224	2	5147	640
127+50.00	240	1	5387	641
128+00.00	253	0	5640	641
128+50.00	266	0	5906	641
129+00.00	283	0	6189	641
129+50.00	302	0	6491	641
130+00.00	319	0	6810	641
130+50.00	333	0	7143	641
131+00.00	336	0	7479	641
131+50.00	312	0	7791	641
132+00.00	287	0	8078	641
132+50.00	301	0	8379	641
133+00.00	348	0	8727	641
133+50.00	397	1	9124	642
134+00.00	475	1	9599	643
134+50.00	524	0	10123	643
135+00.00	556	0	10679	643
135+50.00	583	0	11262	643
136+00.00	663	1	11925	644
136+50.00	744	1	12669	645
137+00.00	698	0	13367	645
137+50.00	563	0	13930	645
138+00.00	373	1	14303	646
138+50.00	253	3	14556	649
139+00.00	182	4	14738	653
139+50.00	108	11	14846	664
140+00.00	71	17	14917	681
140+50.00	63	14	14980	695
141+00.00	60	8	15040	703
141+50.00	0	0	15040	703

VERANO				
STA 201+50.00 TO STA 203+00.00				
	CUT	FILL	ACCUM CUT	ACCUM FILL
STATION NUMBER	(CY)	(CY)	(CY)	(CY)
201+50.00	526	3	526	3
202+00.00	450	0	976	3
202+50.00	304	4	1280	7
203+00.00	214	5	1494	12

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

STATE OF TEXAS
JULIO RAMOS
107672
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PROFESSIONAL ENGINEER

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6/25/2020

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

EARTHWORK SUMMARY

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6	---		16
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:125
PEN TABLE: WATSON.TBL
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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	Posts	Anchor Type	Mounting Designation — PREFABRICATED	Mounting Designation	BRIDGE MOUNT CLEARANCE SIGNS (SEE NOTE 2) — TYPE N	TYPE S
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 OR 2	UA=Univer-Conc UB=Univer-Bolt SA=Slip-Conc SB=Slip-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = Prefab. "T" U = Prefab. "U"	1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam WC = 1.12 #/ft Wing Chan. EXAL= Extruded Aluminum		
1 of 5													
	1	R2-1		30X36	X		10BWG	1	SA	P			
	2	W1-2		36X36	X		10BWG	1	SA	P			
	3	W1-8		18X24	X		10BWG	1	SA	P			
		W1-8		18X24	X		10BWG	1	SA	P			
		W1-8		18X24	X		10BWG						
		W1-8		18X24	X		10BWG						
	4	W3-3		30X30	X		10BWG	1	SA	P			
	5	W1-6		48X24	X		10BWG	2	SA	P			
2 of 5													
	1	W3-5		36X36	X		10BWG	1	SA	P			
	2	W1-2		36X36	X		10BWG	1	SA	P			
	3	W1-8		18X24	X		10BWG	1	SA	P			
		W1-8		18X24	X		10BWG	1	SA	P			
3 of 5													
	1	R6-5P		30X30	X		10BWG	1	SA	P			
	2	R3-8LT_R		30X30	X		10BWG	1	SA	P			
4 of 5													
	1	W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
		W11-2		36X36	X		10BWG	1	SA	P			
	1A	W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
		W16-7P		24X12	X		10BWG	1	SA	P			
	2	R1-2		48X48X48	X		10BWG	1	SA	P			
		R1-2		48X48X48	X		10BWG	1	SA	P			
		R1-2		48X48X48	X		10BWG	1	SA	P			
	3	R6-4		30X24	X		10BWG	1	SA	P			
		R6-4		30X24	X		10BWG	1	SA	P			
		R6-4		30X24	X		10BWG	1	SA	P			
	4	R6-5P		30X30	X		10BWG	1	SA	P			
		R6-5P		30X30	X		10BWG	1	SA	P			
	5	R3-8LT_R		30X30	X		10BWG	1	SA	P			
	6	R3-8LT											
5 of 5													
	1	R1-2		48X48X48	X		10BWG	1	SA	P			
					PROJECT TOTAL			45					

ALUMINUM SIGN BLANKS THICKNESS	
	Minimum Thickness
	0.080"
	0.100"
	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).

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

SMALL SIGN SUMMARY

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	-----		17
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:100
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
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DESIGN FILENAME: X:\data\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\SUM\WATSON_SUM_SM_SGN.dgn

GENERAL

A. HANDLE TRAFFIC APPROPRIATELY THROUGHOUT THE PROJECT DURING CONSTRUCTION. PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AT ALL TIMES. ROADWAY CLOSURES ARE NOT ALLOWED UNLESS OTHERWISE SPECIFIED IN THE PLANS AND/OR AS APPROVED BY THE COUNTY. PROVIDE ACCESS TO PROPERTIES AND BUSINESSES ADJACENT TO THE RIGHT-OF-WAY (ROW) AT ALL TIMES DURING THE DURATION OF THE PROJECT. THE ADEQUACY OF THE PROPERTY ACCESS WILL BE DETERMINED BY THE COUNTY. DO NOT LEAVE EQUIPMENT IN A POSITION THAT WILL ENDANGER THE TRAVELING PUBLIC. MAINTAIN ADEQUATE SAFETY PROVISIONS THROUGHOUT THE PROJECT BY INCLUSION OF SIGNING, MARKINGS, SIGNALS, BARRIERS AND BARRICADES. CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD) WHEN USING THESE PROVISIONS.

B. THE USE OF THE ROW IS NOT EXCLUSIVE. COOPERATE WITH THE COUNTY, THE VARIOUS UTILITY COMPANIES AND THEIR CONTRACTORS, AS REQUIRED TO ALLOW ADJUSTMENTS TO BE MADE BY OTHERS. IF BY THE ADJUSTMENTS OF THESES UTILITIES, THE CONTRACTOR IS DELAYED, AN EXTENSION OF THE WORKING TIME MAY BE GRANTED; IF IN THE OPINION OF THE COUNTY IT IS WARRANTED.

C. ALL DETOURS, TRAFFIC MOVEMENTS, ETC., ARE DIRECTLY RELATED TO THE SEQUENCE OF WORK; THEREFORE, PROCEED WITH CONSTRUCTION OPERATIONS IN CONFORMITY WITH THE DETAILS SHOWN ON THE PLANS AND AS REQUIRED BY THIS NARRATIVE.

D. PROPOSE AND/OR RECOMMEND ANY MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION TO THE COUNTY IN WRITING. INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, THE EFFECT OF THE OVERALL PROJECT IN TIME, AND ETC., WITH ANY MAJOR RECOMMENDED MODIFICATIONS. WRITTEN APPROVAL FROM THE COUNTY IS REQUIRED PRIOR TO PROCEEDING WITH ANY CONSTRUCTION OPERATION BASED ON A REVISED PHASE/SEQUENCE OF WORK.

E. OFF-DUTY PEACE OFFICERS MAY BE HIRED TO SUPPLEMENT THE WORK FORCE TO CONTROL TRAFFIC AT INTERSECTIONS DURING THE DETOURING OF TRAFFIC, CLOSURE OF ROADWAYS AND/OR INTERSECTIONS, AND ANY OTHER CRITICAL PHASES OF TRAFFIC HANDLING AS DETERMINED BY THE COUNTY. APPROVAL BY THE ENGINEER TO USE OFF-DUTY POLICE OFFICERS WILL BE REQUIRED, WITH A 48-HOUR PRIOR NOTICE. ANY UNAPPROVED USE OF OFFICERS WILL BE AT THE EXPENSE OF THE CONTRACTOR.

F. THE COUNTY MAY DIRECT THE CONTRACTOR TO VARY THE NUMBER AND LOCATION OF SIGNS AND BARRICADES FROM THAT INDICATED ON THE PLANS.

G. COOPERATE FULLY WITH THE VARIOUS UTILITY COMPANIES.

H. "WEEKEND" HOURS ARE DEFINED AS THE HOURS BETWEEN 9:00 PM FRIDAY TO 5:00 AM MONDAY.

I. "OFF PEAK" HOURS ARE DEFINED AS A TIME FRAME BETWEEN 8:00 PM TO 5:00 AM MONDAY THROUGH FRIDAY.

J. MAINTAIN POSITIVE DRAINAGE DURING CONSTRUCTION, INCLUDING OFFSITE DRAINAGE FROM ADJACENT PROPERTIES AND AVOID IMPEDING FLOW FROM PRIVATE PROPERTY.

K. MAINTAIN ACCESS TO DRIVEWAYS AT ALL TIMES.

L. PLACE CONSTRUCTION EXITS AS NEEDED OR AS DIRECTED BY THE COUNTY.

M. CONSTRUCT ALL ROADWAYS UP TO THE 4" WMAC TY C MAT UNTIL SUCH A TIME AS THE ENTIRE PROJECT CAN RECEIVE THE FINAL SURFACE MAT OF OVERLAY EXCEPT FOR THE CONCRETE PAVEMENT AT THE ROUNDABOUT.

II. SEQUENCE OF WORK

THE SEQUENCE OF WORK WILL BE AS FOLLOWS UNLESS OTHERWISE DIRECTED/APPROVED BY THE COUNTY.

1. THIS PROJECT WILL BE CONSTRUCTED IN THREE (3) PHASES. BEFORE THE COMMENCEMENT OF EACH PHASE, INSTALL OR MAINTAIN ADVANCE WARNING SIGNS, TEMPORARY SIGNS, BARRICADES, AND SW3P ITEMS AS SHOWN ON THE PLANS AND/OR AS DIRECTED/APPROVED BY THE COUNTY. DAILY LANE CLOSURES WILL BE USED IN ACCORDANCE WITH STATE TCP STANDARDS. DROP OFF CONDITION OF GREATER THAN 2 INCHES MUST HAVE A 3:1 SLOPE AT THE END OF EACH DAY, AS WELL AS THROUGHOUT THE PROJECT WHERE ACCESS TO ADJACENT PROPERTIES IS ALLOWED TO DRIVEWAYS AND SIDE STREETS.
2. PREPARING ROW/REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURRING, AS PER THE PHASES NOTED BELOW.
3. PERFORM PLANING, SURFACE TREATMENTS AND OVERLAYS IN THE DIRECTION OF TRAFFIC.
4. UNLESS NOTED OTHERWISE IN THE SEQUENCE OF WORK, CONSTRUCT JOINT BID UTILITIES AND DRAINAGE INFRASTRUCTURE WITHIN THE WORK ZONE OF EACH CORRESPONDING PHASE/STAGE PRIOR TO THE ROADWAY CONSTRUCTION.

A BRIEF DESCRIPTION OF EACH PHASE IS AS FOLLOWS:

PHASE 1 NARRATIVE - CULVERT CROSSING & TEMPORARY WIDENING

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE PROPOSED WATERLINE ADJACENT TO THE NORTHERN ROW & CONSTRUCT THE WATERLINE ADJUSTMENT BETWEEN STA. 111+32 & 111+78. THESE ADJUSTMENTS WILL ALLOW FOR THE CONSTRUCTION OF THE CROSSING AT STA. 110+64.09 AS WELL AS THE SYSTEM "A" LATERAL. THIS PHASE WILL ALSO CONSTRUCT THE STA. 110+64.09 CROSSING WITHIN THE EXISTING ROADWAY LIMITS, THE OUTFALL FOR STORM SEWER SYSTEM "A" TO MAINTAIN DRAINAGE AND THE WIDENING OF THE EXISTING WATSON RD SOUTHBOUND LANE FOR APPROXIMATELY 900-FT FROM SOMERSET RD.

PHASE 1 STAGE 1- WATERLINE CONSTRUCTION

CONSTRUCT THE WATERLINE RUNNING PARALLEL TO THE NORTH ROW BETWEEN WATSON RD CENTERLINE STA. 110+55 AND VERANO PKWY CENTERLINE STA. 201+46.

DURING THIS PHASE CONSTRUCT WATERLINE ADJUSTMENT LOCATED BETWEEN STA. 111+32 & 111+78. PLACE TRAFFIC IN A ONE LANE TWO-WAY TRAFFIC CONTROL CONFIGURATION FOR A WEEKEND STARTING ON FRIDAY AT 9:00 PM AND COMPLETING THE WORK ON MONDAY NO LATER THAN 4:00 AM.

FLAGGERS AND OFF DUTY POLICE OFFICERS WILL BE REQUIRED DURING ONE LANE TWO-WAY TRAFFIC CONTROL OPERATIONS WITH DEVICES BEING PLACED IN ACCORDANCE TO TXDOT STD TCP (1-2B)-18. EQUIPMENT WILL BE REMOVED FROM THE WORK AREA AT THE END OF EACH AREA AND DROP OFFS WILL BE ADDRESSED APPROPRIATELY AT THE END OF EACH WORK DAY. NO CLOSURES WILL BE PERMITTED DURING PEAK HOURS.

PHASE 1 STAGE 2 - CULVERT CROSSING & TEMPORARY WIDENING

TRAFFIC WILL BE CLOSED FOR A WEEKEND STARTING AT ON FRIDAY AT 9:00 PM AND OPENING ON MONDAY NO LATER THAN 4:00 AM. THIS WILL ALLOW FOR THE CONSTRUCTION OF THE CROSSING WITHIN THE EXISTING PAVEMENT LIMITS CUTTING AND RESTORING PAVEMENT TO EXISTING ELEVATION AS WELL AS THE CROSSING CONNECTING INLET A20 TO A30 ALL THE WAY TO THE OUTFALL. INLET A30 WILL BE PLACED IN A LATER PHASE. HEADWALL AND DISSIPATERS WILL BE DONE DURING THE CORRESPONDING PHASE. IN ADDITION WILL ALLOW FOR THE CONSTRCUTION OF CROSSING ALONG SW VERANO PKWY.

UNDER THE WEEKEND CLOSURE CONSTRUCT TEMPORARY PAVEMENT ALONG WATSON RD SOUTHBOUND LANE FROM STA. 110+59.00 TO STA. 114+73.60.

UNDER THIS WEEKEND CLOSURE WILL ALSO CONSTRUCT TRUNK LINE AND RESTORE PAVEMENT AT NORTHBOUND OF SW VERANO PKWY FROM INLET B3.1 TO MANHOLE B4 BETWEEN STA. 209+70.00 TO STA. 209+75.00.

ALSO CONSTRUCT LATERAL LINE AND RESTORE PAVMENT AT SOUTHBOUND OF SW VERANO PKWY FROM MANHOLE B7 TO INLET B140 BETWEEN STA. 201+50.00 TO STA. 202+00.00 WITHIN THE EXISTING PAVEMENT AND OVER PROPOSED DETOUR.

PHASE 2 NARRATIVE - DETOUR CONSTRUCTION AND SOUTHBOUND SW VERANO PKWY

THE INTENT OF THIS PHASE IS TO CONSTRUCT THE DETOURS AT THE INTERSECTION OF SW VERANO PKWY AND WATSON RD TO BE UTILIZED BY JUDITH A. RESNIK MIDDLE SCHOOL TRAFFIC DURING THE CONSTRUCTION OF THE PROPOSED ROUNDABOUT. A PORTION OF SB VERANO PKWY WILL CONSTRUCTED UP TO FINAL GRADES BETWEEN STA. 201+36 AND STA. 203+50 OF SOUTHBOUND SW VERANO PKWY.

PHASE 2 STAGE 1- DETOUR #2 CONSTRUCTION & SOUTHBOUND SW VERANO PKWY

MAINTAIN TRAFFIC ON EXISTING WATSON LANE CONFIGURATION. PLACE CHANNELIZING DEVICES AS SHOWN ON THE PLANS TO PROTECT THE WORK ZONE.

CONSTRUCT THE CONNECTION OF TEMPORARY DETOUR #2 BETWEEN EXISTING WATSON LANE AND VERANO PKWY FOLLOWING THE ALIGNMENTS AS SHOWN ON THE PLANS.

CLOSE LEFT LANES ON BOTH NB & SB VERANO PKWY. CONSTRUCT PROPOSED INSIDE LANE OF THE PROPOSED SOUTHBOUND SW VERANO PKWY BETWEEN STA. 201+00 AND 203+50. ALSO, CONSTRUCT CROSSOVER BETWEEN STA. 203+54 AND 205+00. INSIDE LANE OF SOUTHBOUND SW VERANO PKWY WILL BE CONSTRUCTED TO JUST BEFORE THE FINAL SURFACE COURSE. MINIMUM OF 11' LANES WILL BE MAINTAINED THROUGH THE CONSTRUCTION AREA.

CONSTRUCT SECTION OF TRUNK LINE CONNECTING INLET B160 AND B7 THAT WILL BE UNDER THE PROPOSED SECTION OF ROADWAY BEING CONSTRUCTED DURING THIS PHASE.

CONSTRUCT SECTION OF TRUNK LINE THAT WILL BE LOCATED IN THE MEDIAN OF SW VERANO PKWY EXISTING ROADWAY FROM STA. 203+50.00 TO STA. 209+78.00.

FLAGGERS AND LANE CLOSURES WILL BE PLACED IN ACCORDANCE TO TXDOT STD TCP (1-2B)-18. EQUIPMENT WILL BE REMOVED FROM THE WORK AREA AT THE END OF EACH AREA AND DROP OFFS WILL BE ADDRESSED APPROPRIATELY AT THE END OF EACH WORK DAY. NO CLOSURES WILL BE PERMITTED DURING PEAK HOURS.

PHASE 2 STAGE 2 - PROPOSED SOUTHBOUND SW VERANO PKWY

MAINTAIN TRAFFIC ON EXISTING LANE CONFIGURATION. PLACE CHANNELIZING DEVICES AS SHOWN ON THE PLANS TO PROTECT THE WORK ZONE.

SWITCH EXISTING TRAFFIC TO THE PREVIOUSLY CONSTRUCTED LEFT LANE OF SOUTHBOUND SW VERANO PKWY. CONSTRUCT PROPOSED OUTSIDE LANE OF SW VERANO PKWY BETWEEN STA. 201+22 AND 203+50. MINIMUM OF 11' LANES WILL BE MAINTAINED THROUGH THE CONSTRUCTION AREA. NOTE: DELAY CURB CONSTRUCTION BETWEEN STA. 202+00 AND 203+50 UNTIL FINAL PHASE.

FLAGGERS AND LANE CLOSURES WILL BE PLACED IN ACCORDANCE TO TXDOT STD TCP (1-2B)-18. EQUIPMENT WILL BE REMOVED FROM THE WORK AREA AT THE END OF EACH AREA AND DROP OFFS WILL BE ADDRESSED APPROPRIATELY AT THE END OF EACH WORK DAY. NO CLOSURES WILL BE PERMITTED DURING PEAK HOURS.

PHASE 3 NARRATIVE - NORTHBOUND LANES AND ROUNDABOUT CONSTRUCTION

THE INTENT OF THIS PHASE IS TO CONSTRUCT PROPOSED NB WATSON RD LANES, ROUNDABOUT, ROUNDABOUT CONNECTIONS, ILLUMINATION, DRAINAGE AND TEMPORARY DETOURS.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

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STATE OF TEXAS · FERNANDO J. SALAZAR · #92678 · LICENSED · PROFESSIONAL ENGINEER

7/6/2020

SANCHEZ-SALAZAR & ASSOCIATES, LLC
TBPE FIRM REGISTRATION NO. 15685

CEC CIVIL ENGINEERING CONSULTANTS BON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN

TCP NARRATIVE

SHEET 1 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			18
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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INSTALL LPCB, TEMPORARY PAVEMENT MARKINGS, TEMPORARY SIGNS, AND SW3P MEASURES AS PER PLAN.

PHASE 3 STAGE 1 - CONSTRUCT NORTHBOUND LANES & ROUNDABOUT

SHIFT SB WATSON RD TRAFFIC TO THE TEMPORARY WIDENING AND NB WATSON RD TRAFFIC TO EXISTING SB LANE FOR APPROXIMATELY 900-FT FROM SOMERSET RD. PLACE LPCB AS SHOWN ON THE PLANS TO PROTECT THE WORK ZONE.

SHIFT MIDDLE SCHOOL TRAFFIC TO DETOUR #2. PLACE CHANNELIZING DEVICES AS SHOWN ON THE PLANS TO PROTECT THE WORK ZONE.

CONSTRUCT ALL ROADWAY ELEMENTS EXCEPT FOR THE FINAL SURFACE COURSE AS WELL AS THE FOLLOWING CURB FOR THE MEDIAN SECTION AT THE FOLLOWING STATIONS. 111+00 AND 116+39, MEDIAN SECTION BETWEEN 133+17 AND 135+00, AS WELL AS THE CURB SECTION ON THE OUTSIDE OF THE ROUNDABOUT 135+50 AND 136+75 ON THE OUTSIDE OF THE PROPOSED EASTBOUND PORTION OF THE ROUNDABOUT IN ORDER TO CONNECT DETOUR #3.

CONSTRUCT REMAINING ELEMENTS OF THE NORTH HALF OF DRAINAGE STRUCTURE AT INTERSECTION OF SOMERSET RD AND WATSON RD.

CONSTRUCT CURB INLETS, SHARE USED PATH ALONG THE PROPOSED NORTHBOUND LANES.

CONSTRUCT ILLUMINATION UNDERGROUND INFRASTRUCTURE (CONDUIT & GROUND BOXES).

CLOSE NB SOMERSET RD SHOULDER NORTH AND SOUTH OF WATSON RD USING TXDOT TCP (2-1B)-12.

PHASE 3 STAGE 2 - CONSTRUCT ROUNDABOUT CONNECTION TO EXISTING WATSON RD

PROVIDE ONE-WAY TRAFFIC CONTROL FOR SB WATSON RD BETWEEN SW VERANO PKWY AND END OF PROJECT AS SHOWN ON PLANS.

CONSTRUCT PERMANENT PAVEMENT BETWEEN STA. 138+50 AND STA. 143+00.

UTILIZE DETOUR #4 FOR ONE-WAY TRAFFIC CONTROL.

PHASE 3 STAGE 3 - CONSTRUCT ROUNDABOUT CONNECTION TO EXISTING WATSON RD

SHIFT SB WATSON RD TO NEWLY CONSTRUCTED PAVEMENT, MAINTAIN ONE-WAY TRAFFIC CONTROL BETWEEN SW VERANO PKWY AND END OF PROJECT, AND MAINTAIN MIDDLE SCHOOL TRAFFIC ON DETOUR #2 AS SHOWN ON THE PLANS.

CONSTRUCT PERMANENT PAVEMENT BETWEEN STA. 139+20 AND STA. 141+00 AS SHOWN ON THE PLANS.

UTILIZE DETOUR #4 FOR ONE-WAY TRAFFIC CONTROL.

PHASE 3 STAGE 4 - CONSTRUCT ROUNDABOUT TEMPORARY DETOUR CONNECTION.

ELIMINATE THE EXISTING LEFT TURN LANE ONTO VERANO PKWY AND SHIFT NB WATSON RD TRAFFIC MAINTAINING ONE LANE OF TRAFFIC IN EACH DIRECTION. INTERSECTION WILL BE AN ALL STOP CONDITION.

CONSTRUCT THE CONNECTION OF TEMPORARY DETOUR #3 CONNECTING EXISTING WATSON LANE AND VERANO PRKWY ROUNDABOUT FOLLOWING THE ALIGNMENTS AS SHOWN ON THE PLANS.

PHASE 3 STAGE 5 - CONSTRUCT REMAINING CONNECTION OF THE ROUNDABOUT

MAINTAIN TWO-WAY TRAFFIC CONTROL THROUGHOUT THE PROJECT.

SHIFT MIDDLE SCHOOL TRAFFIC TO NEWLY CONSTRUCTED ROUNDABOUT AND DETOUR #3 AS SHOWN ON THE PLANS.

CONSTRUCT PERMANENT PAVEMENT FOR ROUNDABOUT AND SW VERANO PKWY AS SHOWN ON THE PLANS.

PHASE 4 NARRATIVE - SOUTHBOUND LANES CONSTRUCTION

THE INTENT OF THIS PHASE IS TO CONSTRUCT PROPOSED SOUTHBOUND LANES, MEDIAN, CURB INLET, ILLUMINATION AND SHARED USED PATH.

INSTALL LPCB, TEMPORARY PAVEMENT MARKINGS, TEMPORARY SIGNS AND SW3P MEASURES AS PER PLAN.

MAINTAIN TWO-WAY TRAFFIC AT ALL TIMES.

PHASE 4 STAGE 1 - CONSTRUCT SOUTHBOUND LANES

SHIFT TRAFFIC TO NEWLY CONSTRUCTED NB WATSON RD LANES AND THE ROUNDABOUT. PLACE LPCB AS SHOWN ON THE PLANS TO PROTECT THE WORK ZONE.

CONSTRUCT THE SB LANES ALONG WITH THE REMAINING LATERALS AND INLETS.

COMPLETE DRAINAGE STRUCTURE AT INTERSECTION OF SOMERSET RD AND WATSON RD.

CONSTRUCT ILLUMINATION POLES AND ELECTRICAL SERVICE.

CLOSE NB SOMERSET RD SHOULDER NORTH AND SOUTH OF WATSON RD USING TXDOT TCP (2-1B)-12.

PHASE 4 STAGE 2 - CONSTRUCT MEDIANS AND FINAL SURFACE

SHIFT TRAFFIC TO NEWLY CONSTRUCTED NB/SB WATSON LANES AND ROUNDABOUT AND SET UP BASED ON TYPICAL SECTION.

CONSTRUCT REMAINING SECTIONS OF CURB LINES AND RAISED MEDIANS NOT COMPLETED IN PREVIOUS PHASES.

AFTER THE CONSTRUCTION OF THE SB WATSON RD LANES, CONSTRUCT THE FINAL PAVEMENT SURFACE, SEEDING & SODDING, FINAL PAVEMENT MARKINGS, SIGNING, MILL AND OVERLAY SECTIONS AT THE BEGINNING AND END OF THE PROJECT WHERE TEMPORARY PAVEMENT MARKINGS WERE APPLIED DURING CONSTRUCTION.

OPEN ALL LANES TO TRAFFIC.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

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7/6/2020

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WATSON ROAD

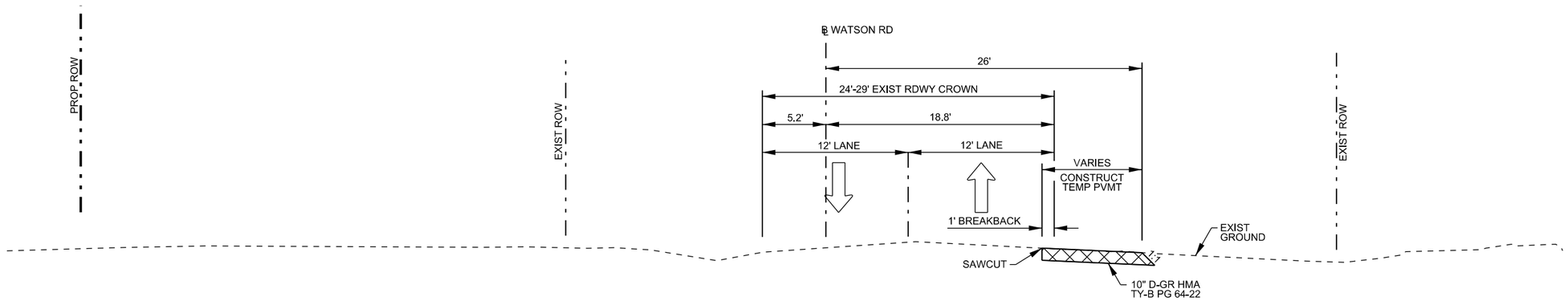
TRAFFIC CONTROL PLAN

TCP NARRATIVE

SHEET 2 OF 2

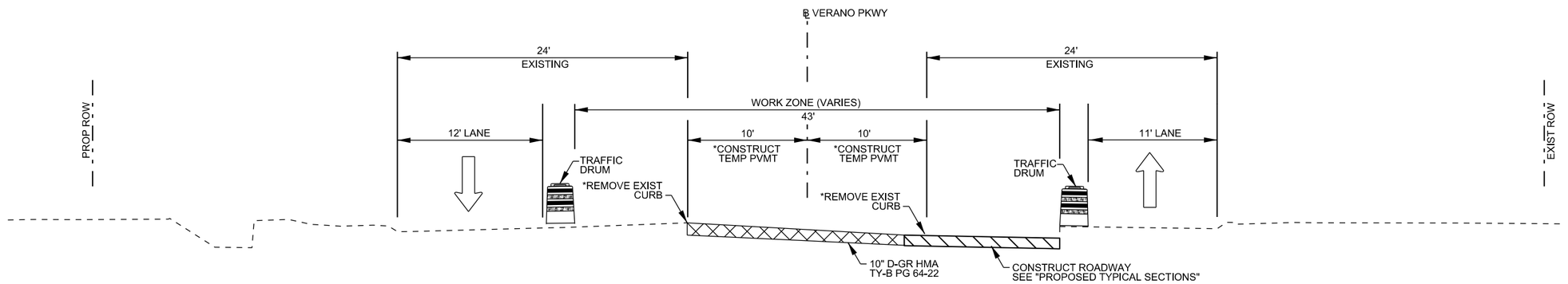
BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			19
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



TCP TYPICAL SECTION
PHASE 1 STAGE 2

STA 110+59.00 TO STA 114+73.60



TCP TYPICAL SECTION
PHASE 2 STAGE 1

STA 200+00 TO STA 204+00
*STA 203+00 TO STA 204+00

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-	-	-	-
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WATSON ROAD

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 1 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			20
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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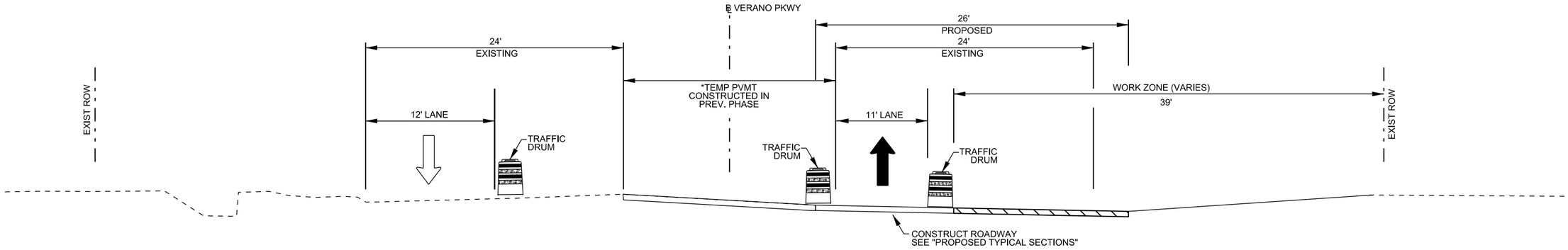
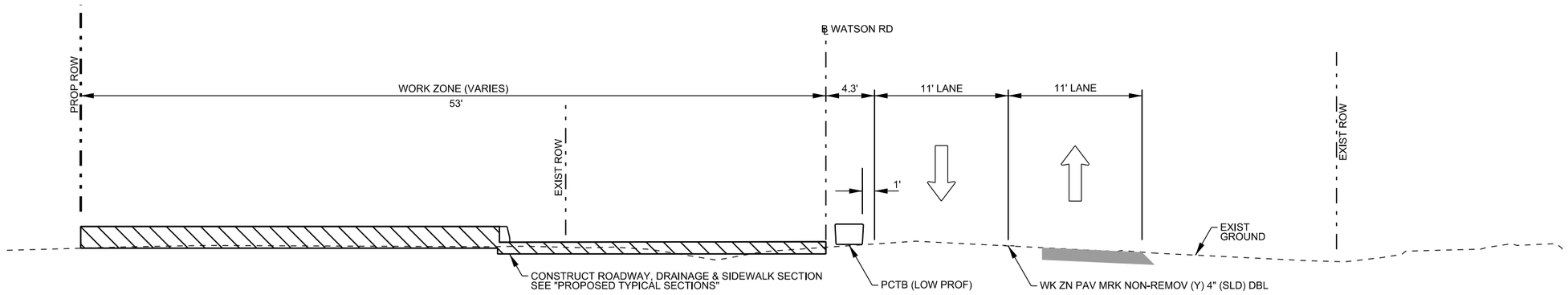


TCP TYPICAL SECTION
PHASE 2 STAGE 2

STA 200+00 TO STA 205+00
*STA 203+00 TO STA 204+00



TCP TYPICAL SECTION
PHASE 3 STAGE 1

STA 110+30 TO STA 141+00

NO	DATE	REVISION	APPROVED
-	-	-	-
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WATSON ROAD

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 2 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			21
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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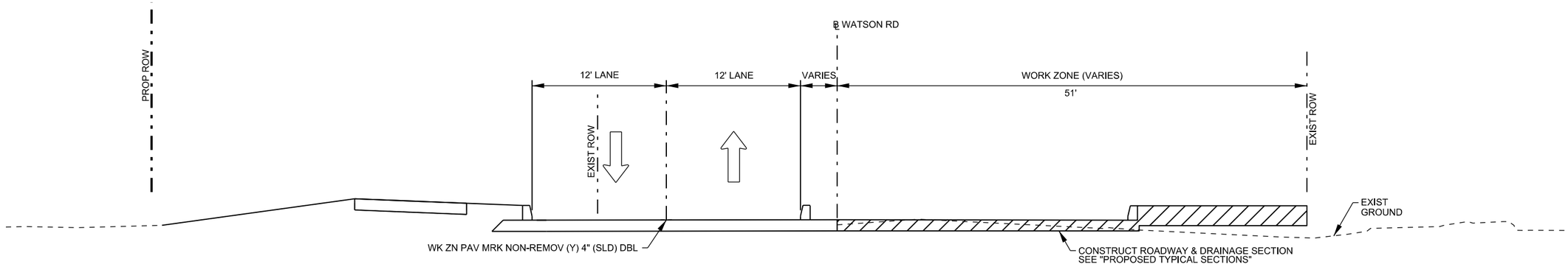
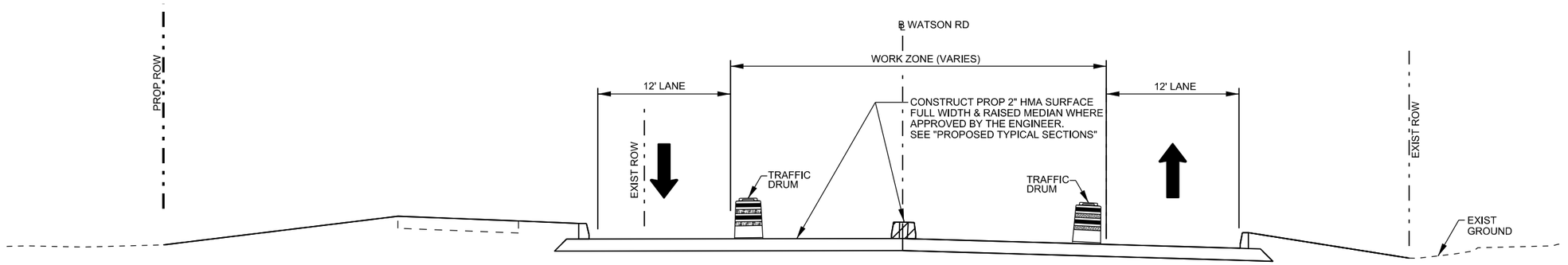


TCP TYPICAL SECTION
PHASE 4 STAGE 1

STA 110+30 TO STA 141+00



TCP TYPICAL SECTION
PHASE 4 STAGE 2

STA 110+30 TO STA 141+00

NO	DATE	REVISION	APPROVED
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WATSON ROAD

TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 3 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			22
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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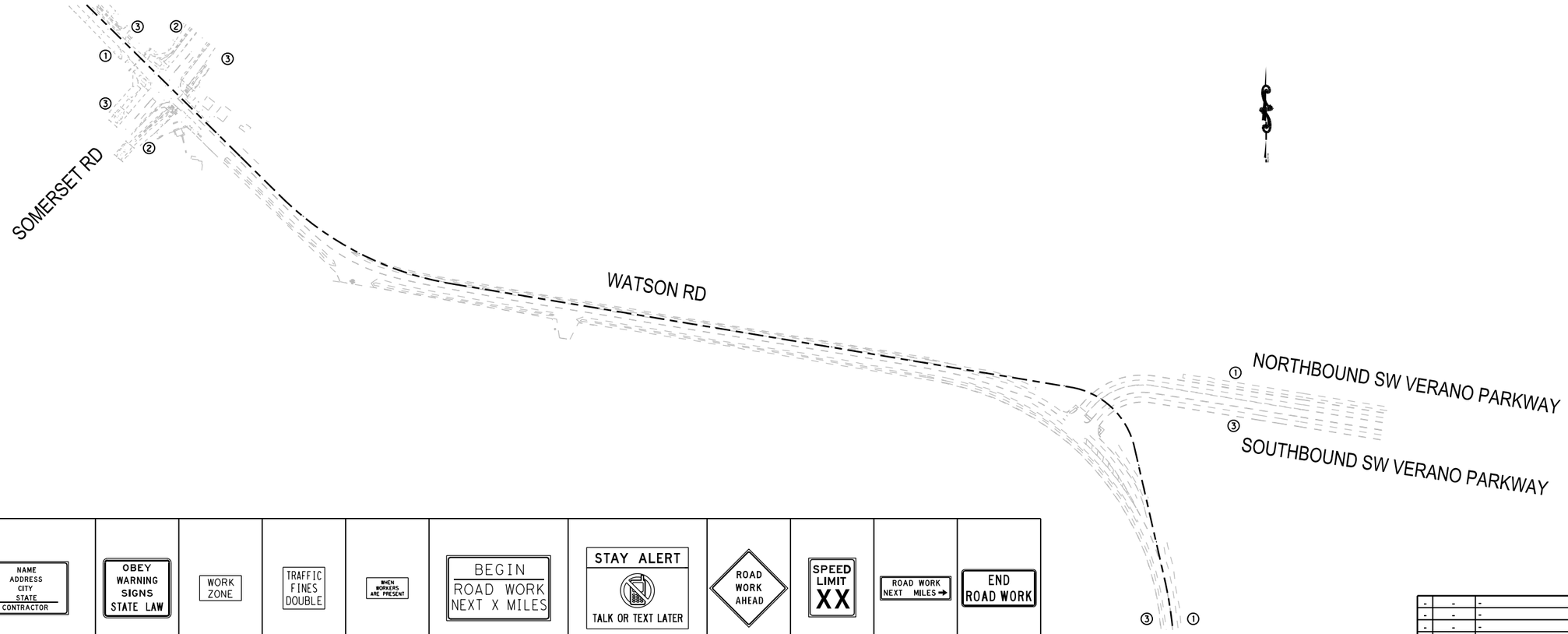

LOCATION	NAME ADDRESS CITY STATE CONTRACTOR	OBEY WARNING SIGNS STATE LAW	WORK ZONE	TRAFFIC FINES DOUBLE	WHEN WORKERS ARE PRESENT	BEGIN ROAD WORK NEXT X MILES	STAY ALERT TALK OR TEXT LATER	ROAD WORK AHEAD	SPEED LIMIT XX	ROAD WORK NEXT MILES →	END ROAD WORK
	G20-6T 48" x 30"	R20-3T 48" x 42"	G20-5aP 36" x 24"	R20-5T 36" x 36"	R20-5aTP 36" x 18"	G20-5T 48" x 24"	G20-10T 60" x 48"	CW20-1D 48" x 48"	R2-1 30" x 36"	G20-1bTL(R) 72" x 24"	G20-2 48" x 24"
1	X	X	X	X	X	X	X	X	X		
2								X		X	
3									X		X

GENERAL NOTES:

1. LOCATION NO. 1 TO BE USED AT BEGINNING OF THE PROJECT.
2. LOCATION NO. 2 TO BE USED ENTERING SIDE STREETS.
3. LOCATION NO. 3 TO BE USED AT END OF THE PROJECT AND EXITING SIDE STREETS
4. REFER TO THE CURRENT TxDOT BC STANDARDS FOR ADDITIONAL INFORMATION.
5. BARRICADES AND CONSTRUCTION SIGNS ON THIS SHEET ARE CONSIDERED TO BE THE MINIMUM REQUIRED IN ACCORDANCE WITH THE CURRENT TxDOT BC STANDARDS AND THE TMUTCD. ADDITIONAL SIGNS MAY BE REQUIRED AS PER THE DIRECTION OF THE ENGINEER.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

STATE OF TEXAS
FERNANDO J. SALAZAR
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WATSON ROAD

SCHEDULE OF TRAFFIC CONTROL ADVANCE WARNING DEVICES

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			23
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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DETOUR #2

DESCRIBE CHAIN DETOUR2

Chain DETOUR2 contains:
DETOUR210 CUR DETOUR21 CUR DETOUR22 CUR DETOUR23

Beginning chain DETOUR2 description

Point DETOUR210 N 13,653,973.9127 E 2,097,055.9798 Sta 10+00.00

Course from DETOUR210 to PC DETOUR21 N 47° 58′ 10.29" E Dist 146.1936

Curve Data

Curve DETOUR21				
P.I. Station	12+13.18	N 13,654,116.6454	E	2,097,214.3311
Delta =	51° 08′ 34.97" (RT)			
Degree =	40° 55′ 32.00"			
Tangent =	66.9912			
Length =	124.9660			
Radius =	140.0000			
External =	15.2025			
Long Chord =	120.8585			
Mid. Ord. =	13.7134			
P.C. Station	11+46.19	N 13,654,071.7931	E	2,097,164.5707
P.T. Station	12+71.16	N 13,654,106.0357	E	2,097,280.4768
C.C.		N 13,653,967.8026	E	2,097,258.3044
Back = N	47° 58′ 10.29" E			
Ahead = S	80° 53′ 14.74" E			
Chord Bear = N	73° 32′ 27.78" E			

Course from PT DETOUR21 to PC DETOUR22 S 80° 53′ 14.74" E Dist 136.3859

Curve Data

Curve DETOUR22				
P.I. Station	14+44.00	N 13,654,078.6617	E	2,097,451.1384
Delta =	25° 40′ 19.83" (LT)			
Degree =	35° 48′ 35.50"			
Tangent =	36.4571			
Length =	71.6902			
Radius =	160.0000			
External =	4.1009			
Long Chord =	71.0920			
Mid. Ord. =	3.9985			
P.C. Station	14+07.55	N 13,654,084.4356	E	2,097,415.1414
P.T. Station	14+79.24	N 13,654,089.0525	E	2,097,486.0834
C.C.		N 13,654,242.4163	E	2,097,440.4814
Back = S	80° 53′ 14.74" E			
Ahead = N	73° 26′ 25.44" E			
Chord Bear = N	86° 16′ 35.35" E			

Curve Data

Curve DETOUR23				
P.I. Station	15+15.99	N 13,654,099.5275	E	2,097,521.3120
Delta =	25° 52′ 24.83" (RT)			
Degree =	35° 48′ 35.50"			
Tangent =	36.7530			
Length =	72.2526			
Radius =	160.0000			
External =	4.1669			
Long Chord =	71.6403			
Mid. Ord. =	4.0612			
P.C. Station	14+79.24	N 13,654,089.0525	E	2,097,486.0834
P.T. Station	15+51.49	N 13,654,093.5793	E	2,097,557.5805
C.C.		N 13,653,935.6887	E	2,097,531.6854
Back = N	73° 26′ 25.44" E			
Ahead = S	80° 41′ 09.73" E			
Chord Bear = N	86° 22′ 37.85" E			

Ending chain DETOUR2 description

DETOUR #3

DESCRIBE CHAIN DETOUR3

Chain DETOUR3 contains:
DETOUR310 DETOUR311

Beginning chain DETOUR3 description

Point DETOUR310 N 13,654,033.7542 E 2,097,002.1136 Sta 10+00.00

Course from DETOUR310 to DETOUR411 N 46° 01′ 37.39" E Dist 56.9102

Point DETOUR311 N 13,654,073.2680 E 2,097,043.0701 Sta 10+56.91

Ending chain DETOUR3 description

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

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DON DURDEN, INC.

11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN
HORIZONTAL ALIGNMENT DATA
DETOURS#2, DETOUR #2 RAMP
AND DETOUR #3

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			24
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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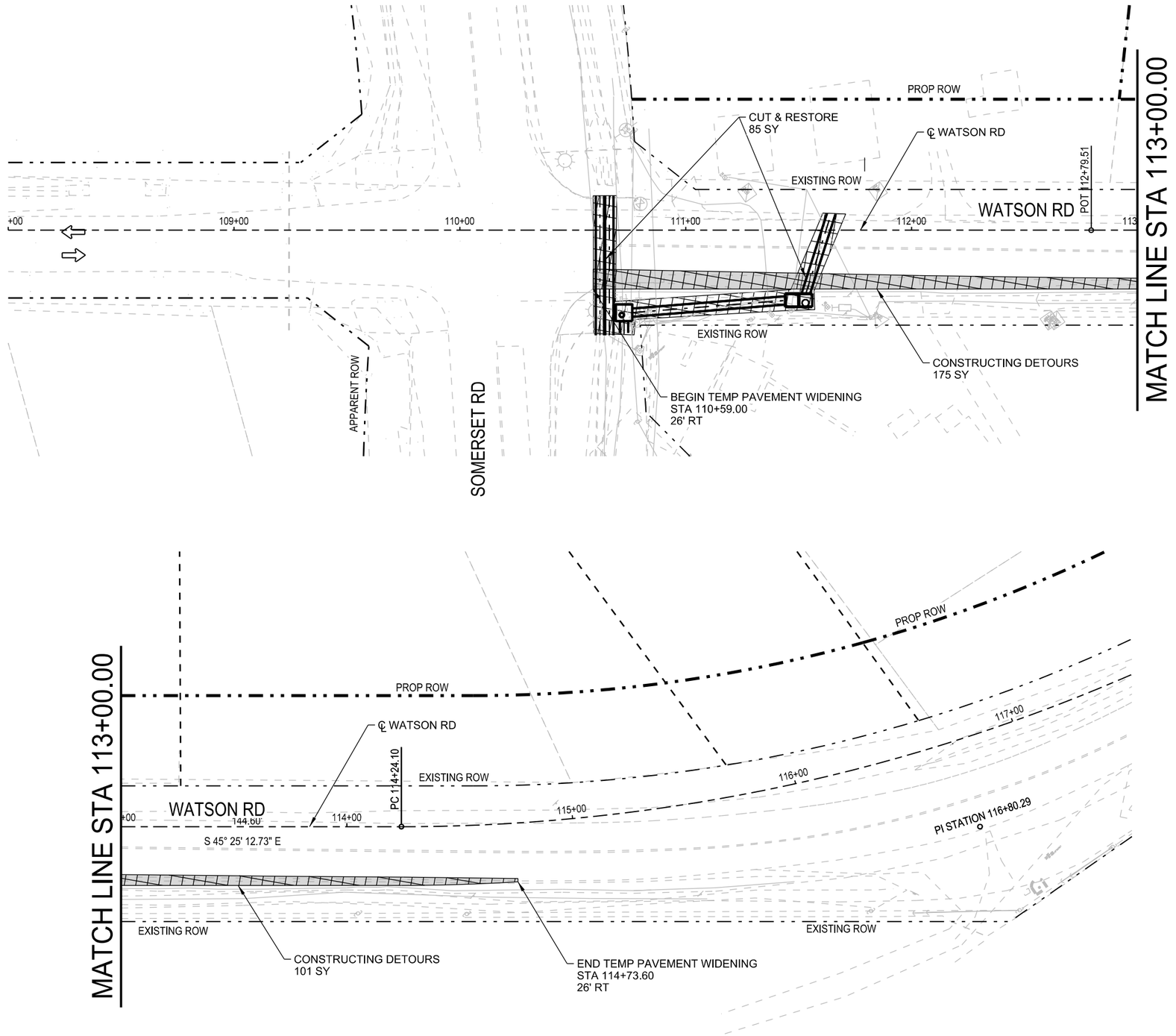

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY FERNANDO J. SALAZAR, P.E. #92678
7/6/2020

SANCHEZ-SALAZAR & ASSOCIATES, LLC
TBPE FIRM REGISTRATION NO. 15685

CEC
CIVIL ENGINEERING CONSULTANTS
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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 1 STAGE 2

BEGINNING OF PROJECT TO STA 117+00.00

SHEET 1 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			25
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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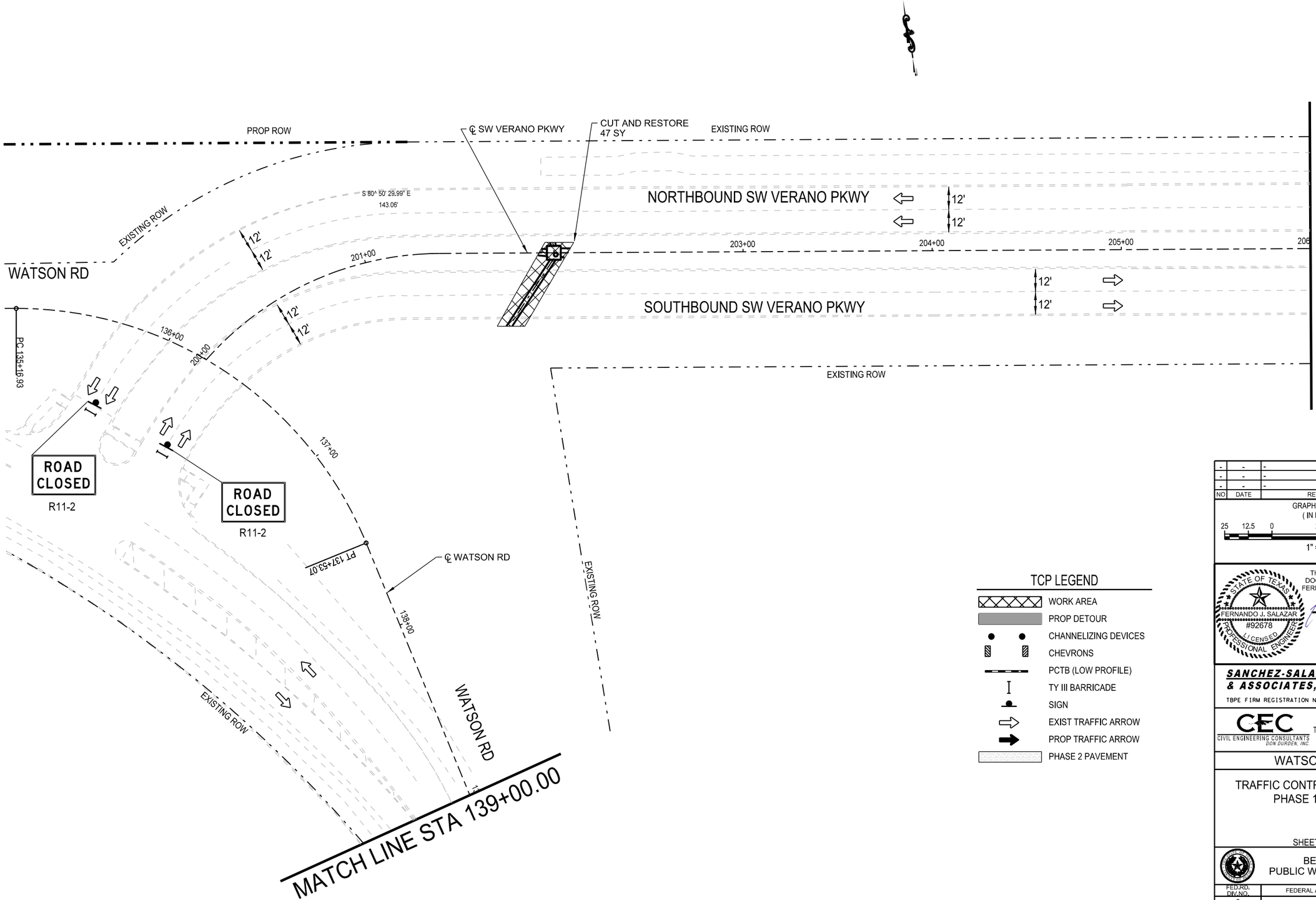

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 1 STAGE 2

SHEET 2 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			26
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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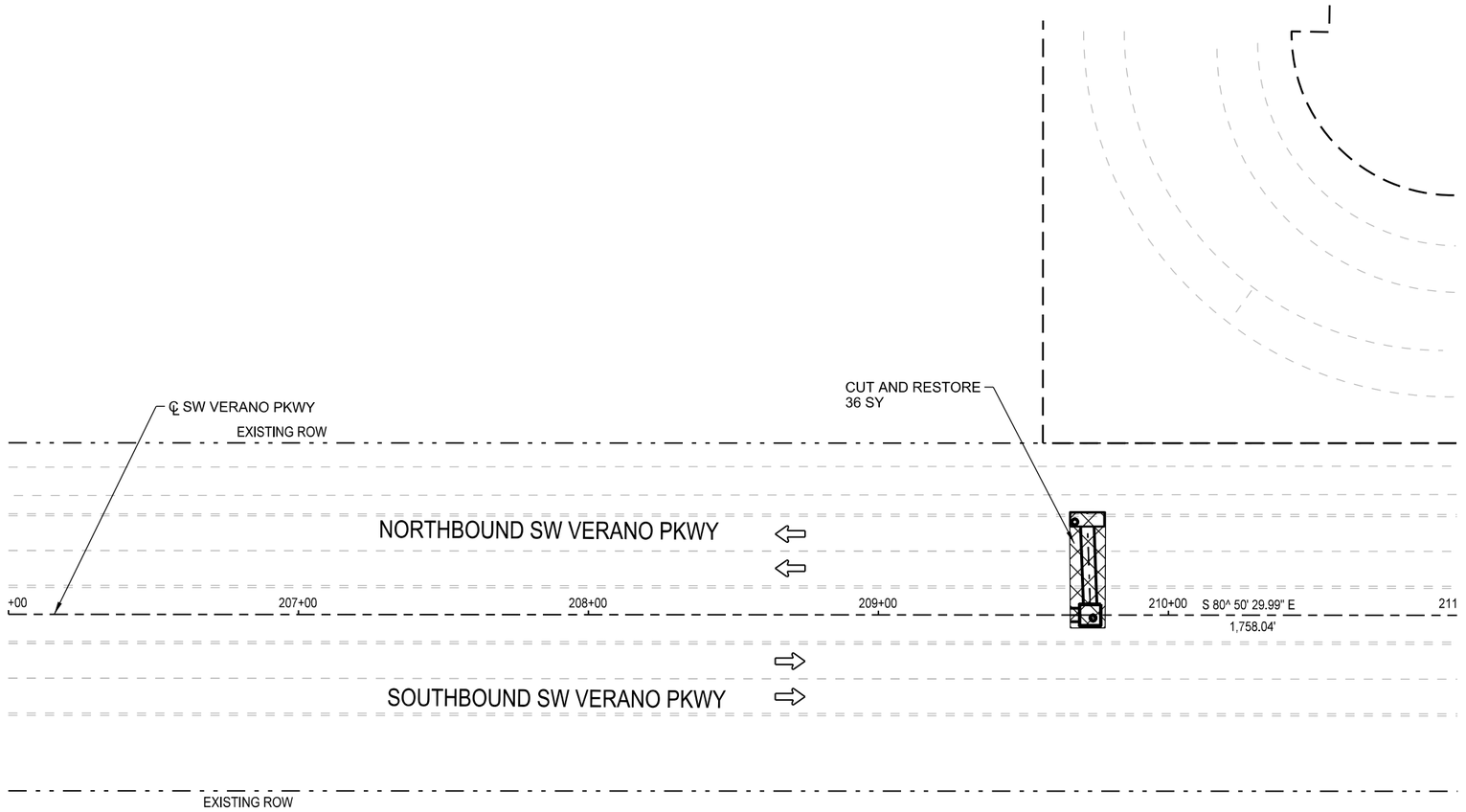

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 1 STAGE 2

SHEET 3 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			27
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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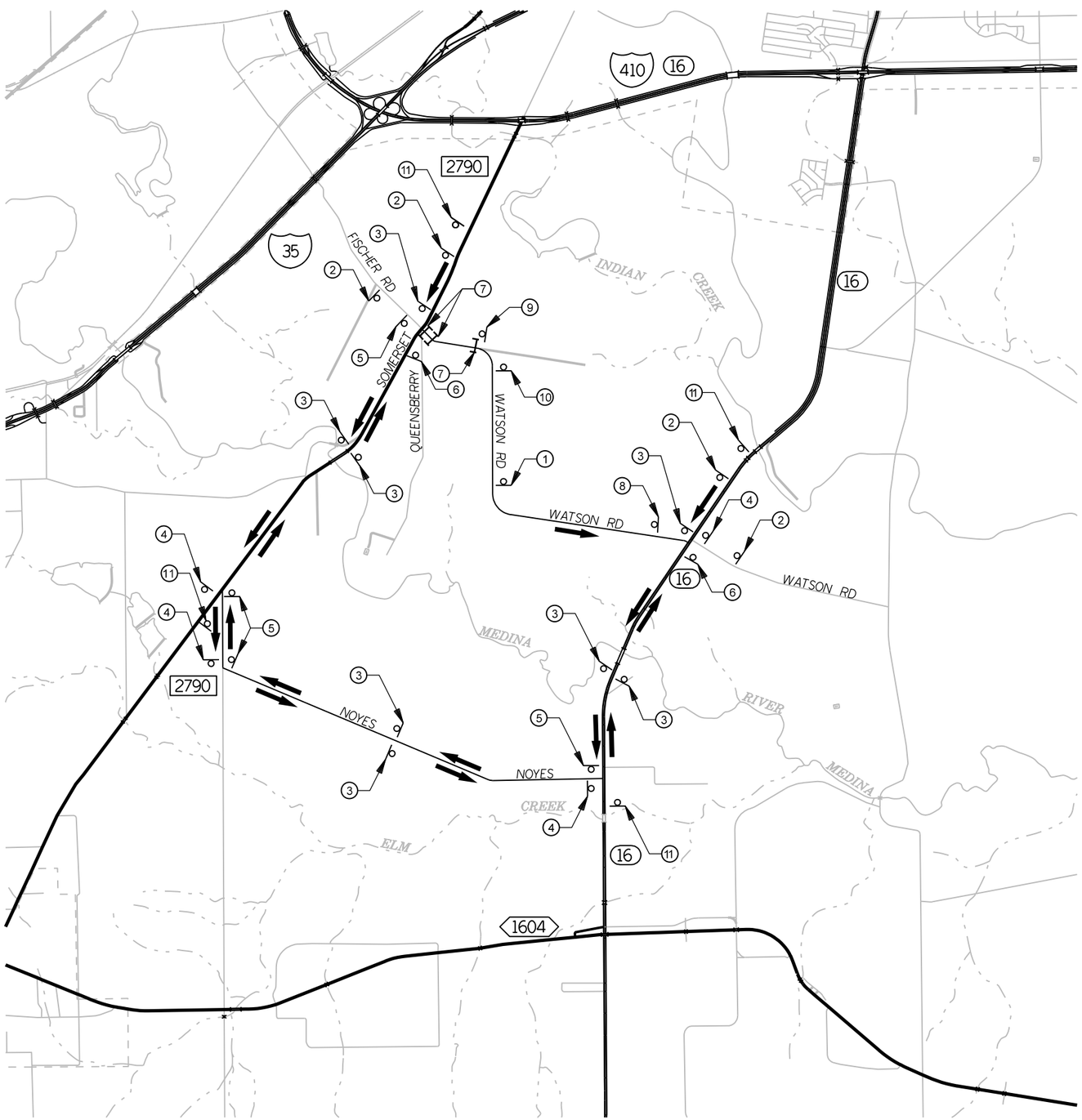

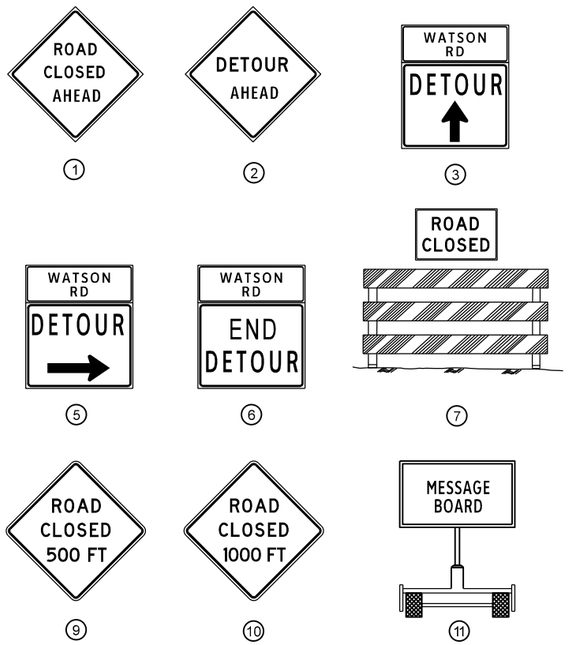

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
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PROFESSIONAL ENGINEER

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WATSON RD

TRAFFIC CONTROL PLAN DETOUR DIAGRAM

DETOUR #1

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			28
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
			WATSON RD

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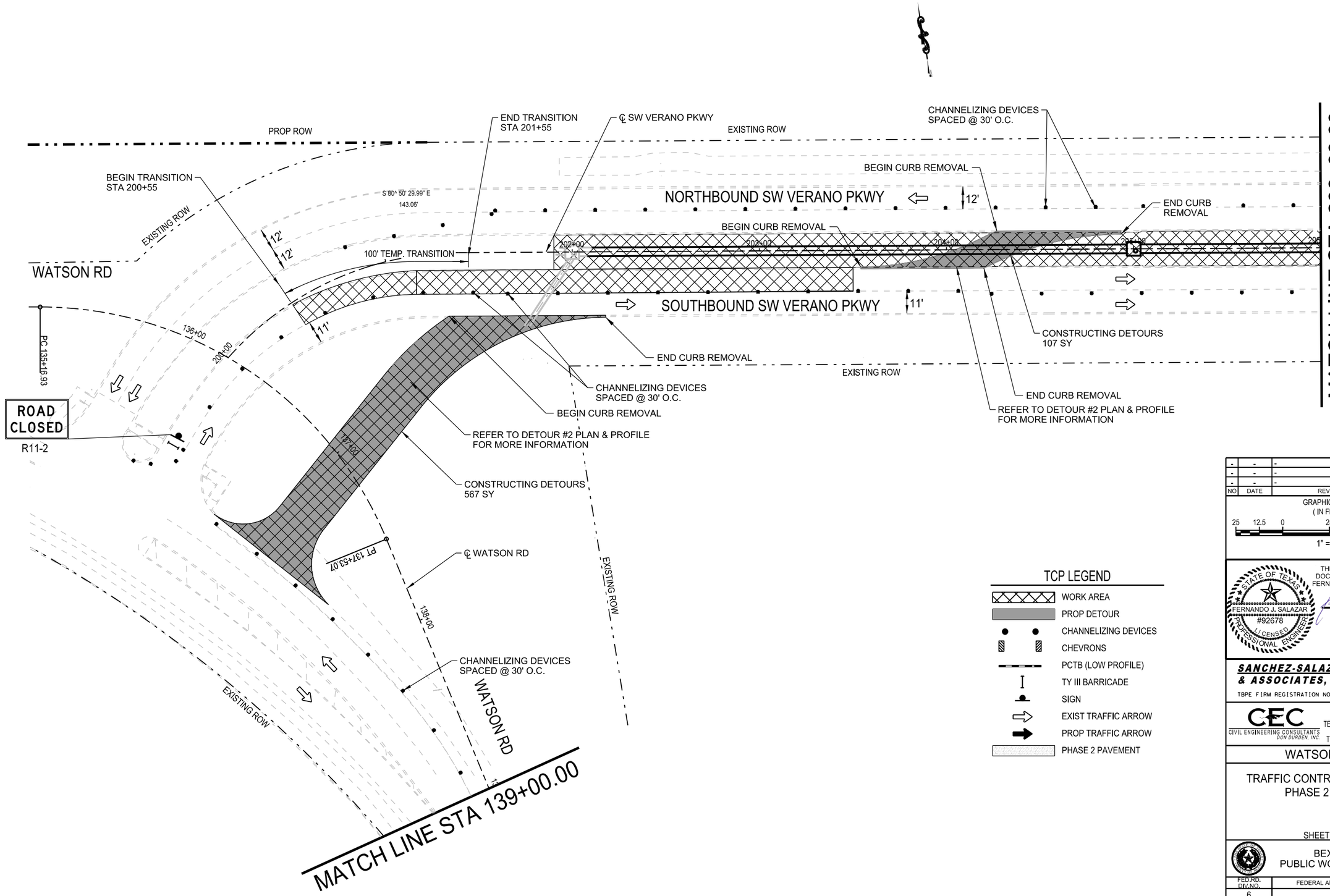

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 2 STAGE 1

SHEET 1 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			29
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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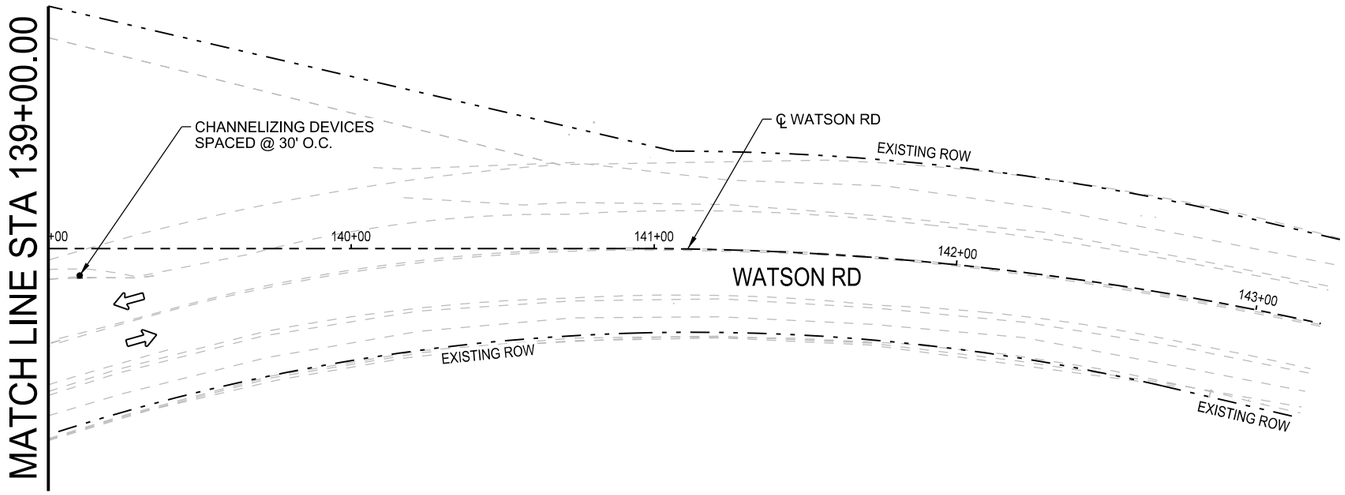

TCP LEGEND

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- CHANNELIZING DEVICES
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- PCTB (LOW PROFILE)
- TY III BARRICADE
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NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 2 STAGE 1

STA 139+00.00 TO END OF PROJECT

SHEET 2 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			30
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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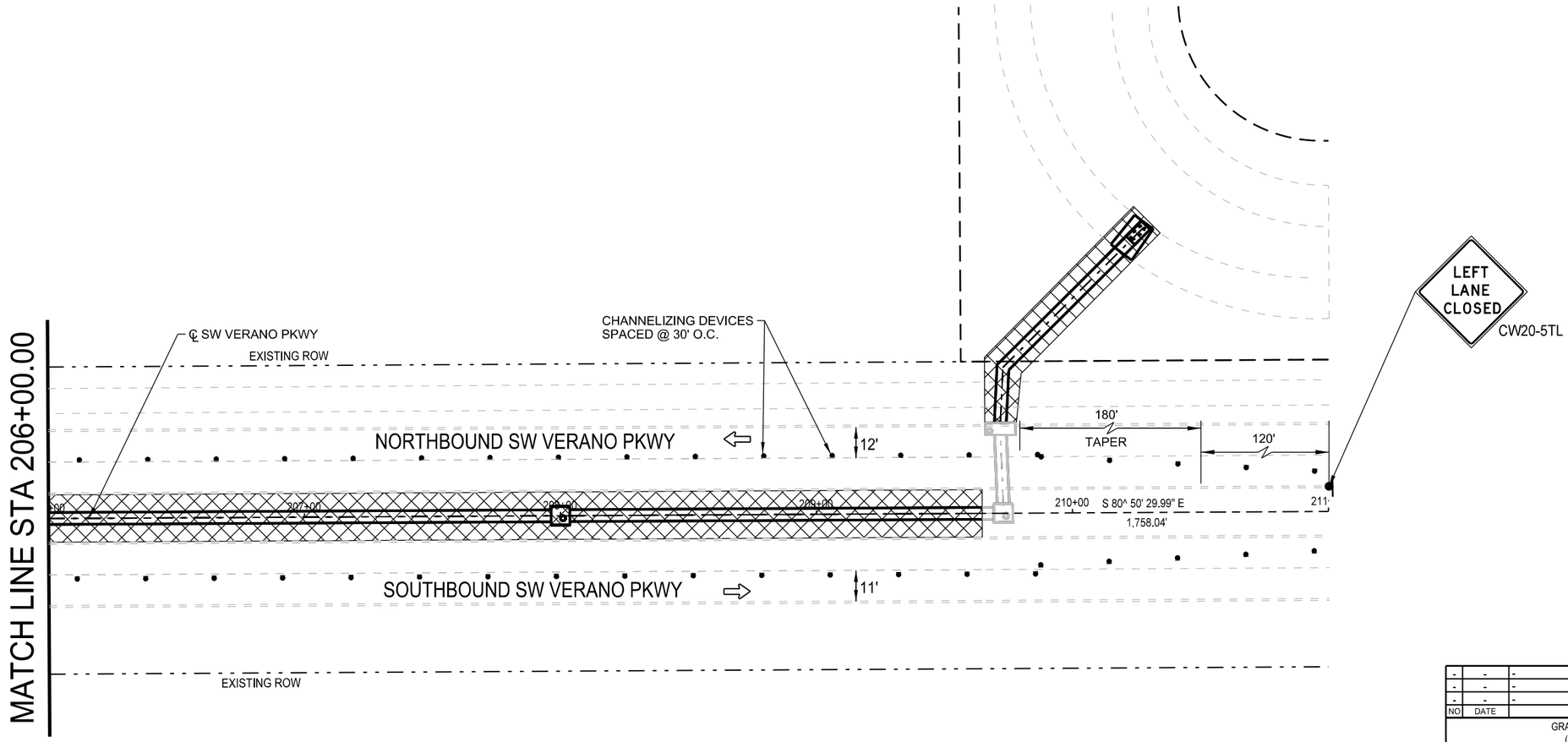

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
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- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 2 STAGE 1

SHEET 3 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			31
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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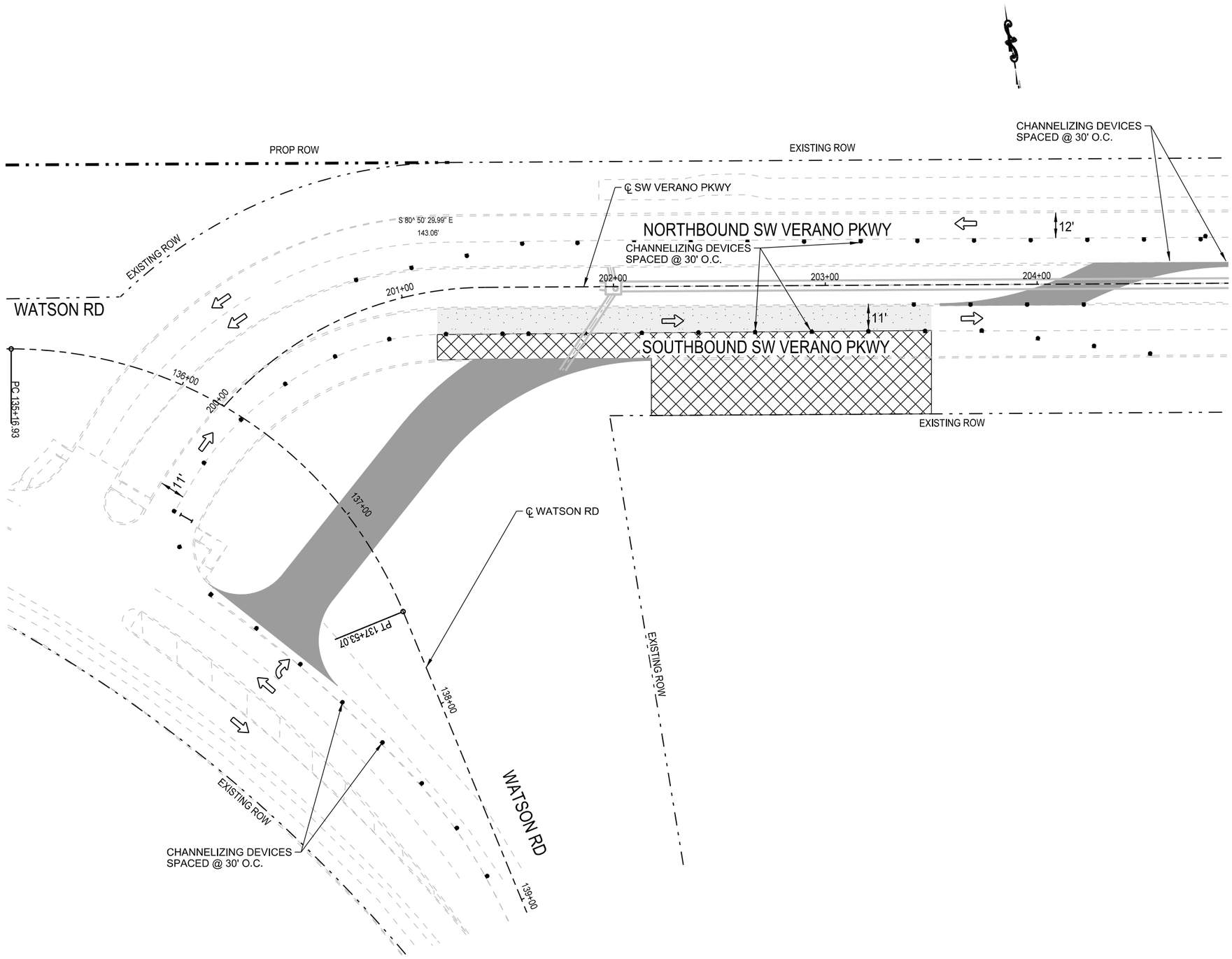

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
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- PROP TRAFFIC ARROW
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NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 2 STAGE 2

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			32
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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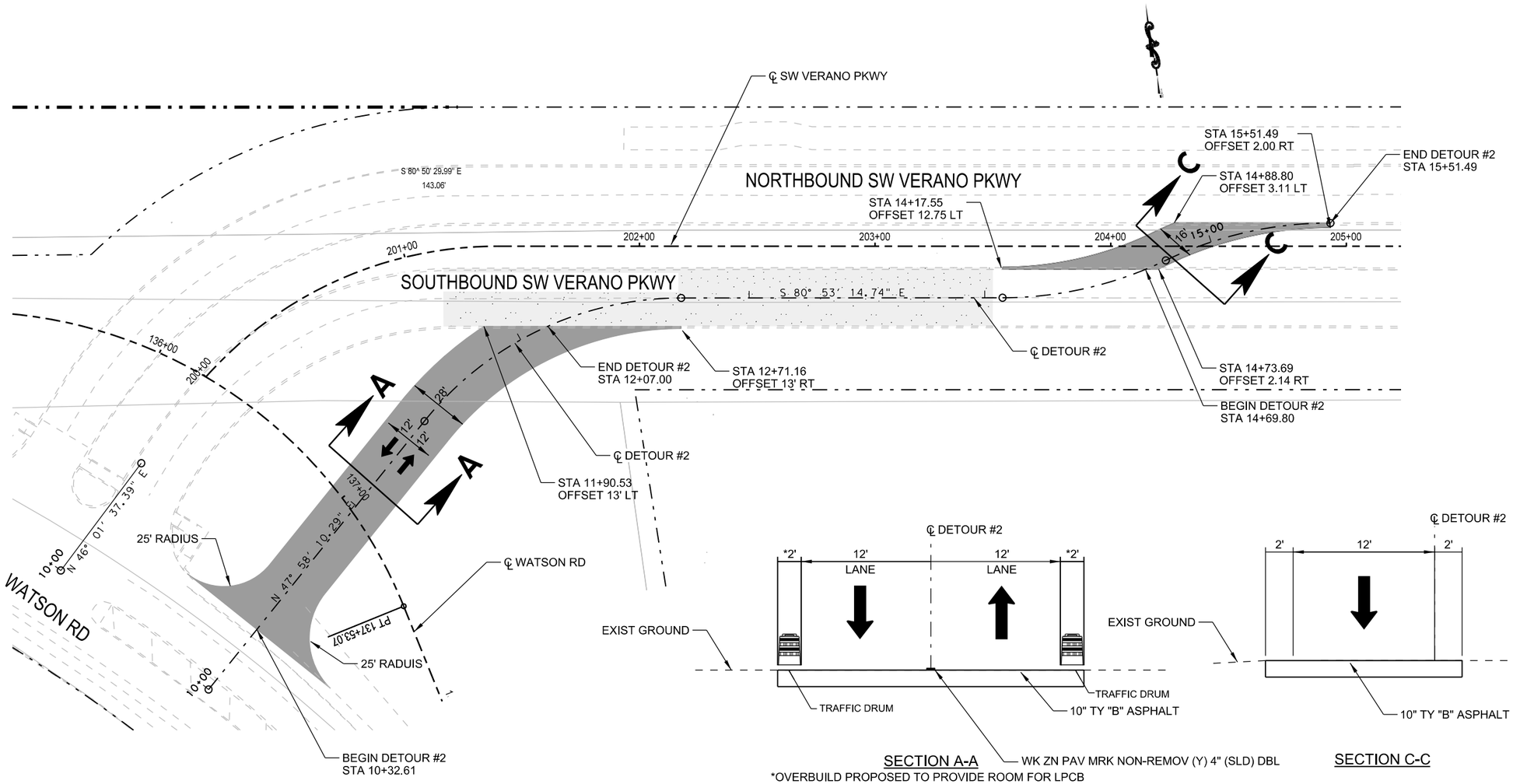

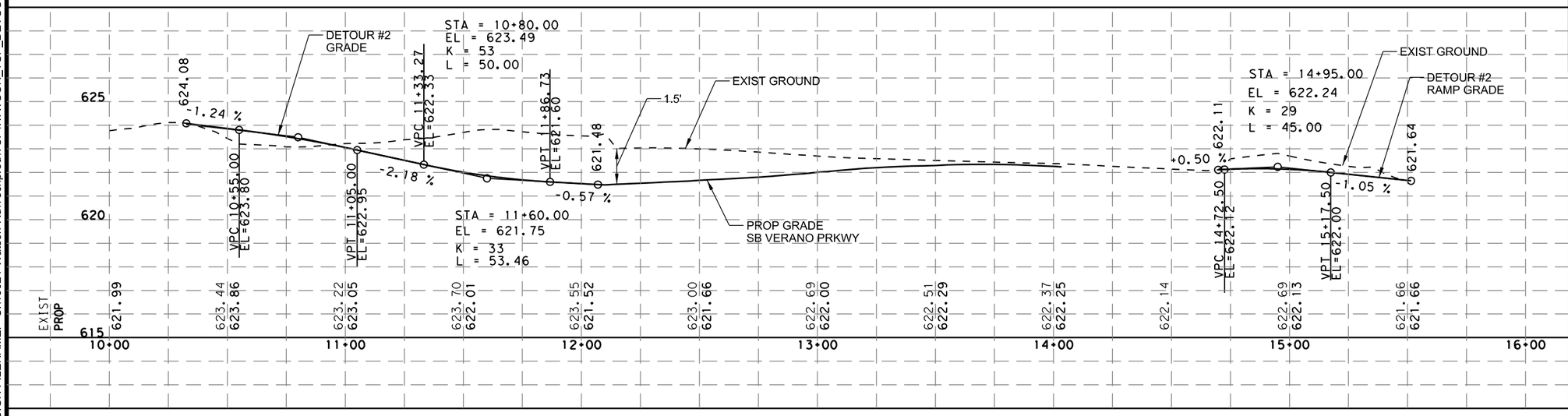

NO	DATE	REVISION	APPROVED
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-	-	-	-
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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 5'

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET

DETOUR #2

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			33
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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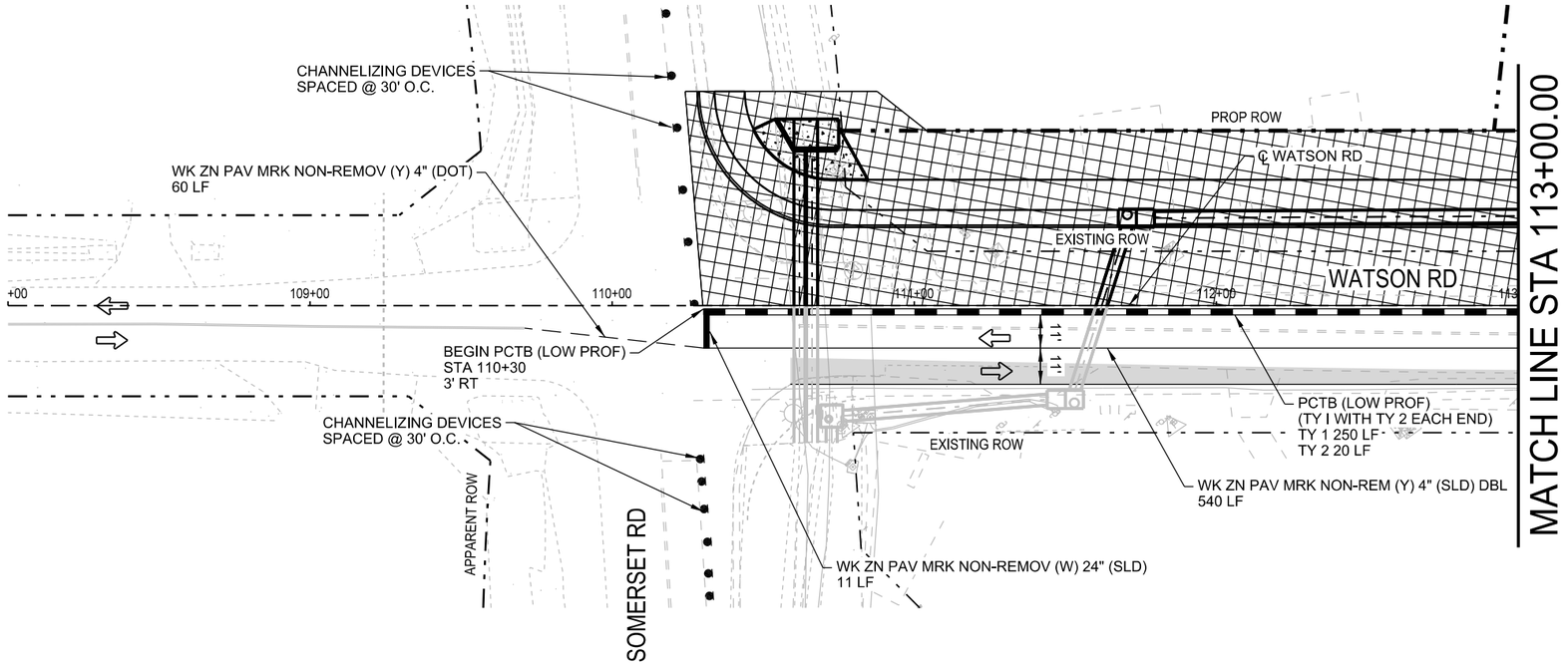

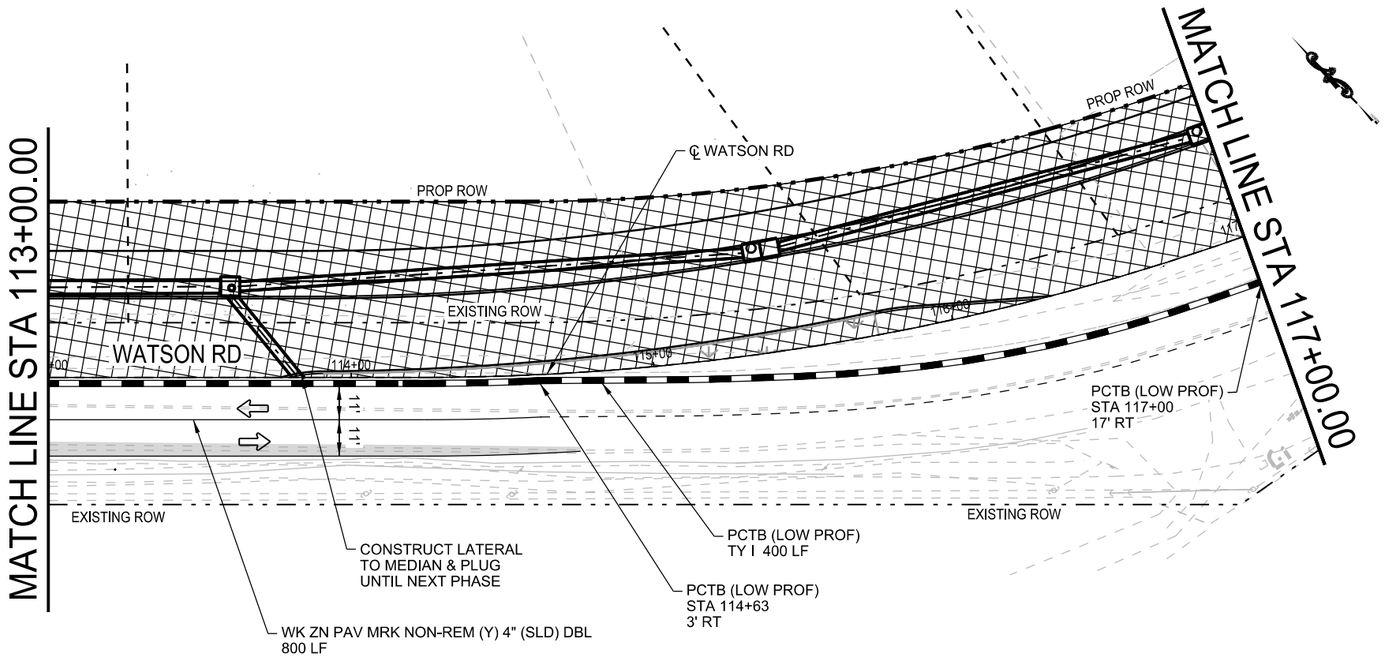

TCP LEGEND

- WORK AREA
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- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
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- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 1

BEGINNING OF PROJECT TO STA 117+00.00

SHEET 1 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			34
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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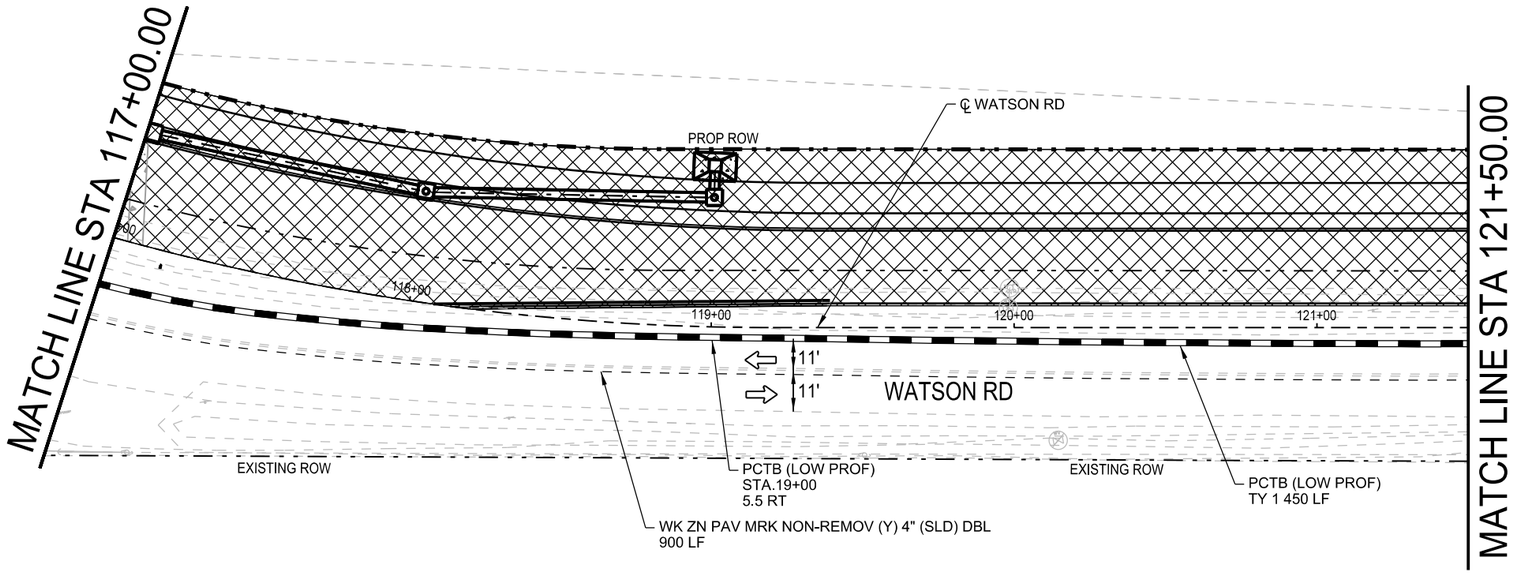

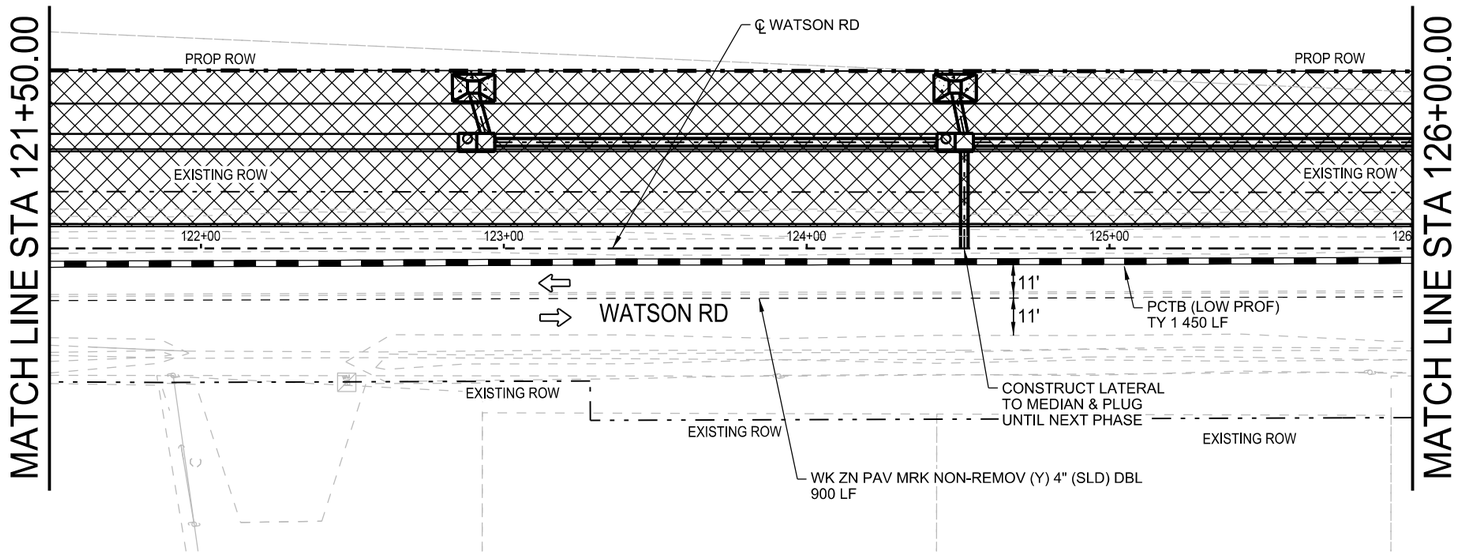

TCP LEGEND

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- CHEVRONS
- PCTB (LOW PROFILE)
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-	-	-	-
-	-	-	-

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(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY FERNANDO J. SALAZAR, P.E. #92678

7/6/2020

SANCHEZ-SALAZAR & ASSOCIATES, LLC
TBPE FIRM REGISTRATION NO. 15685

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.

11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 1

STA 117+00.00 TO STA 126+00.00

SHEET 2 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			35
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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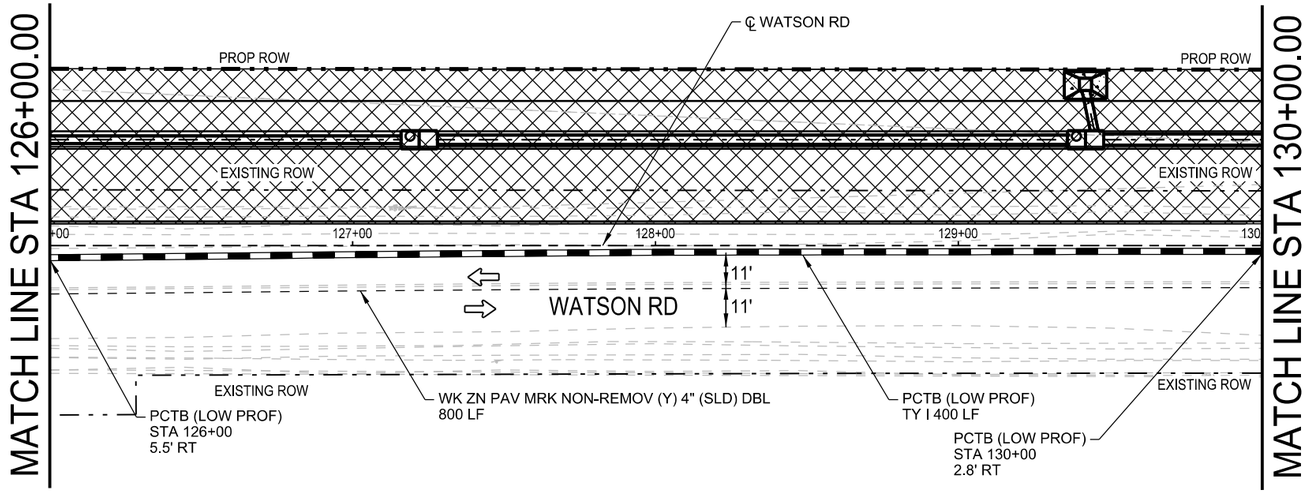

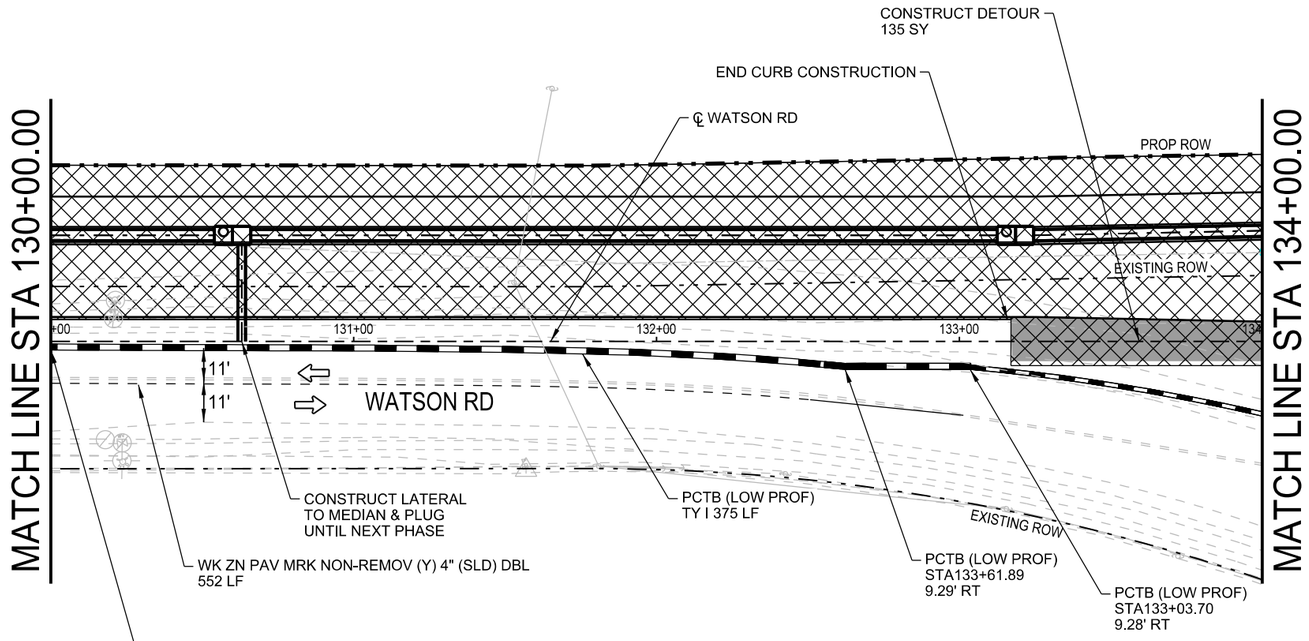

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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7/6/2020

STATE OF TEXAS
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#92678
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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 1

STA 126+00.00 TO STA 134+00.00

SHEET 3 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			36
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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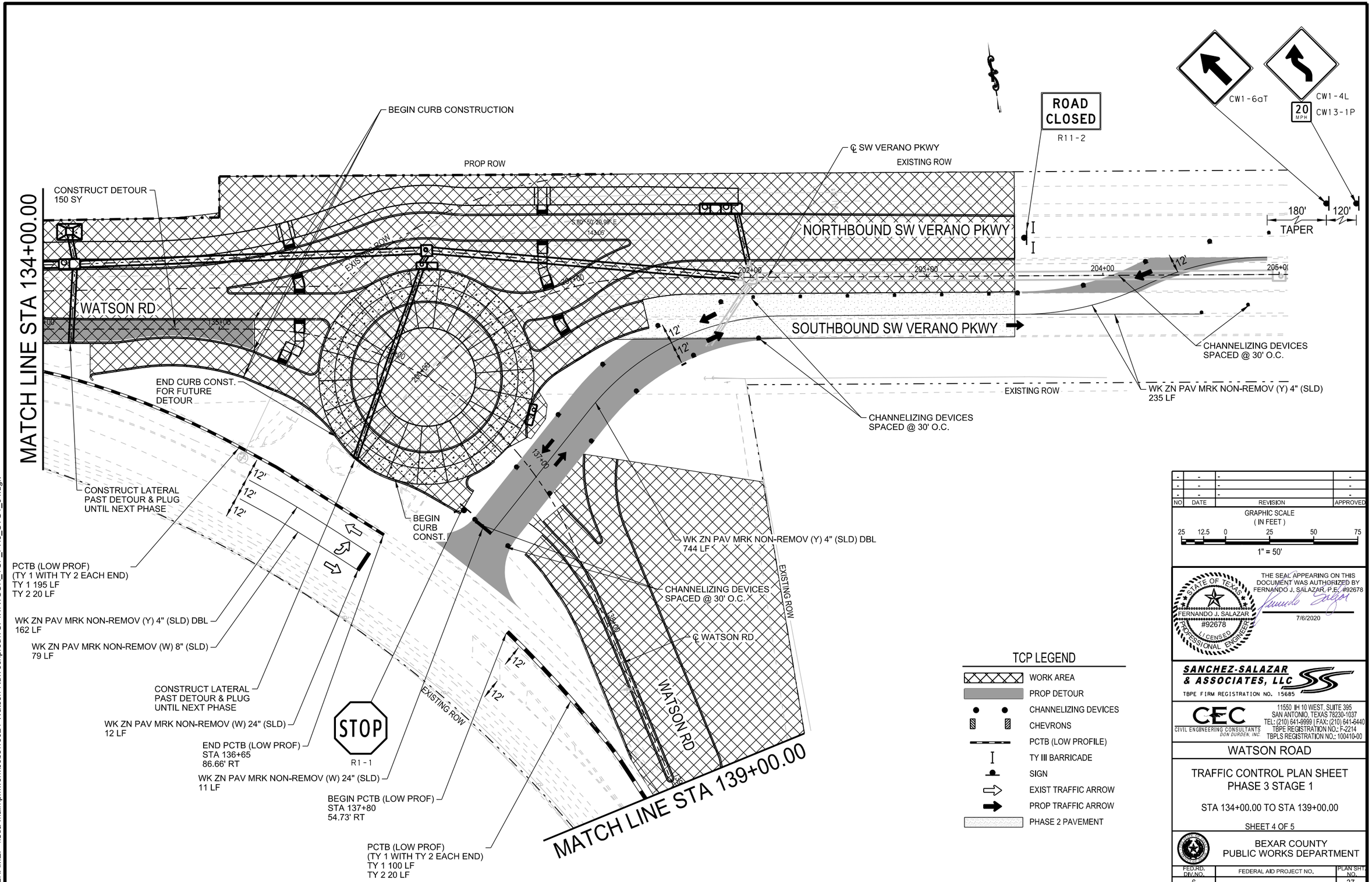

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 1

STA 134+00.00 TO STA 139+00.00

SHEET 4 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			37
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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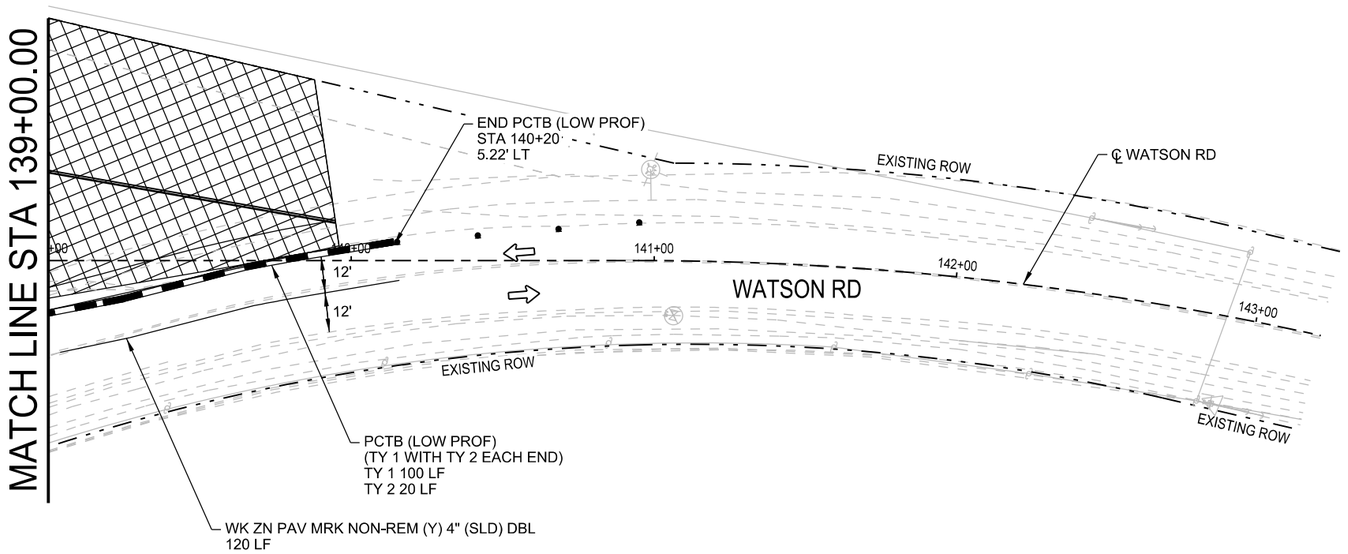

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 1

STA 139+00.00 TO END OF PROJECT

SHEET 5 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			38
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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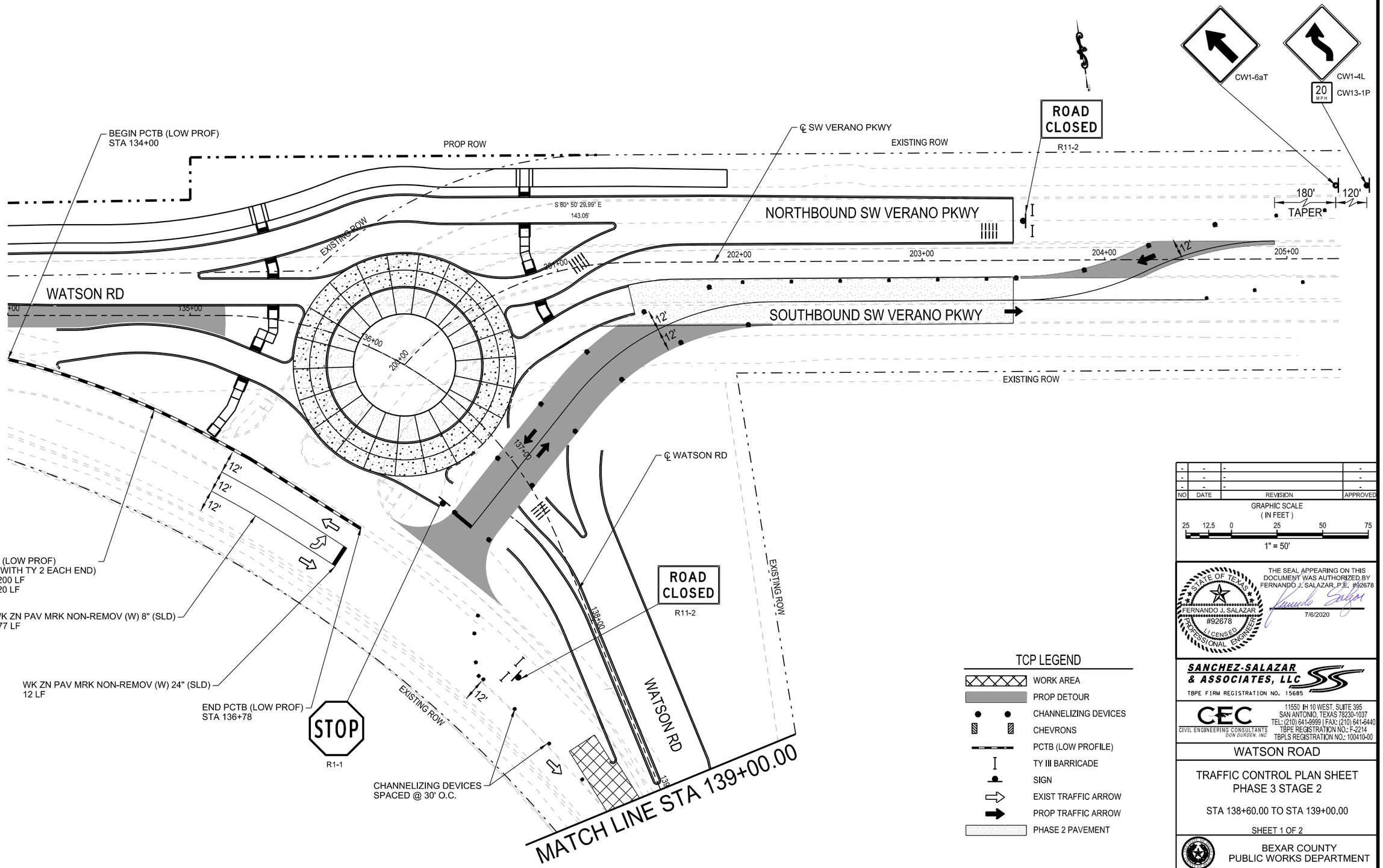

NOTE: FOR TYPICAL SECTION DETAILS SEE DETOUR #2 PLAN & PROFILE.

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET PHASE 3 STAGE 2

STA 138+60.00 TO STA 139+00.00

SHEET 1 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			39
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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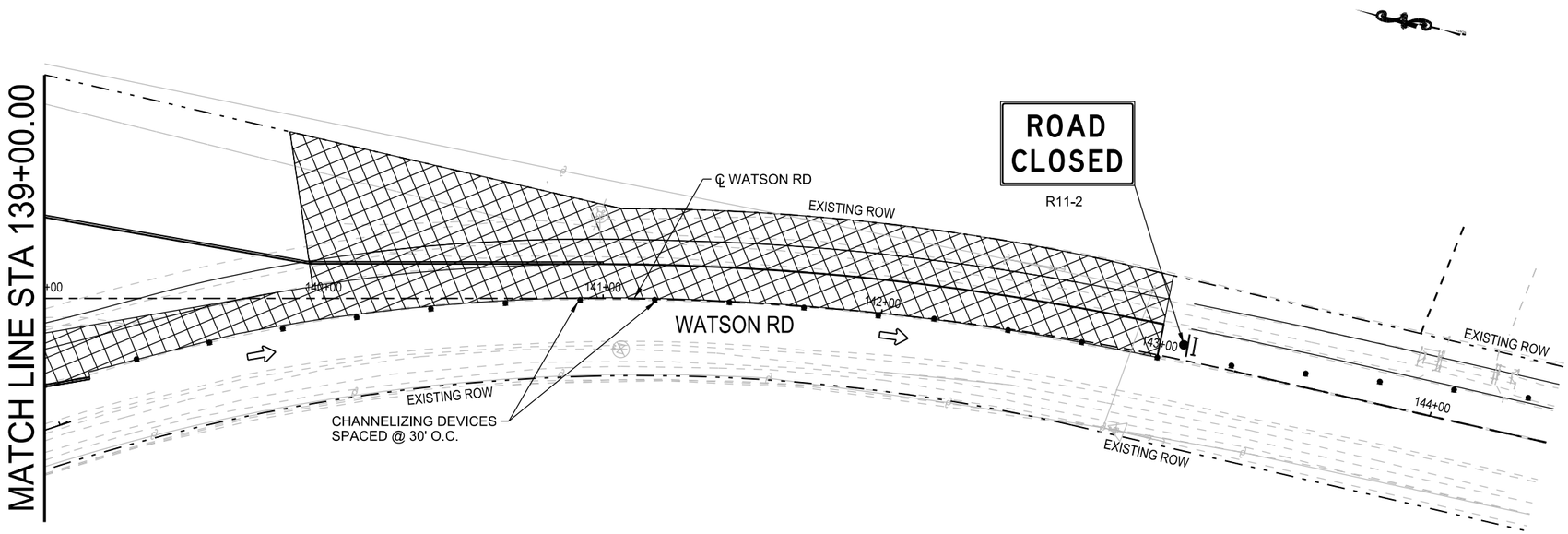

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

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1" = 50'

STATE OF TEXAS
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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 2

STA 139+00.00 TO END OF PROJECT

SHEET 2 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			40
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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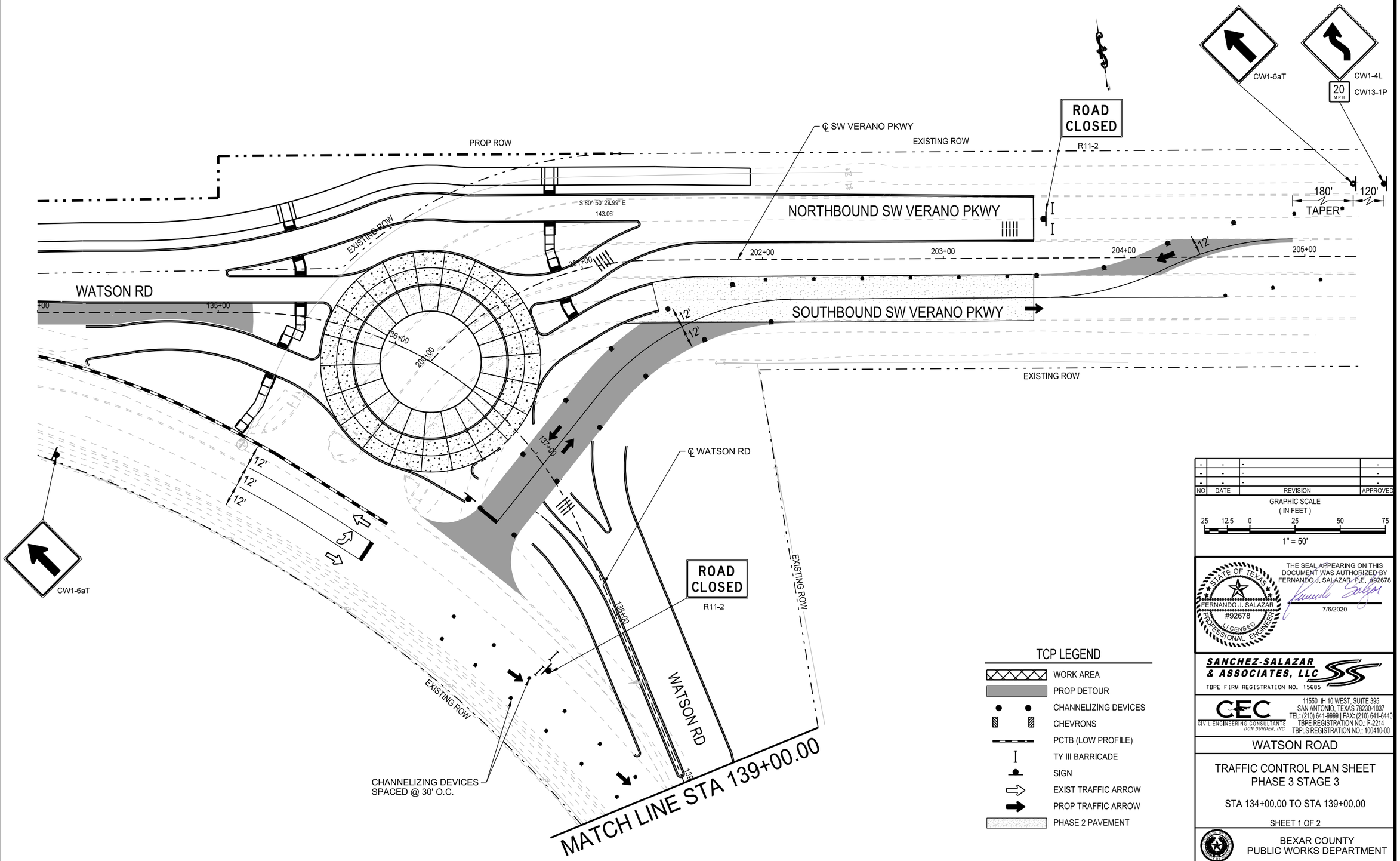

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
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STATE OF TEXAS
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7/6/2020

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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET PHASE 3 STAGE 3

STA 134+00.00 TO STA 139+00.00

SHEET 1 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			41
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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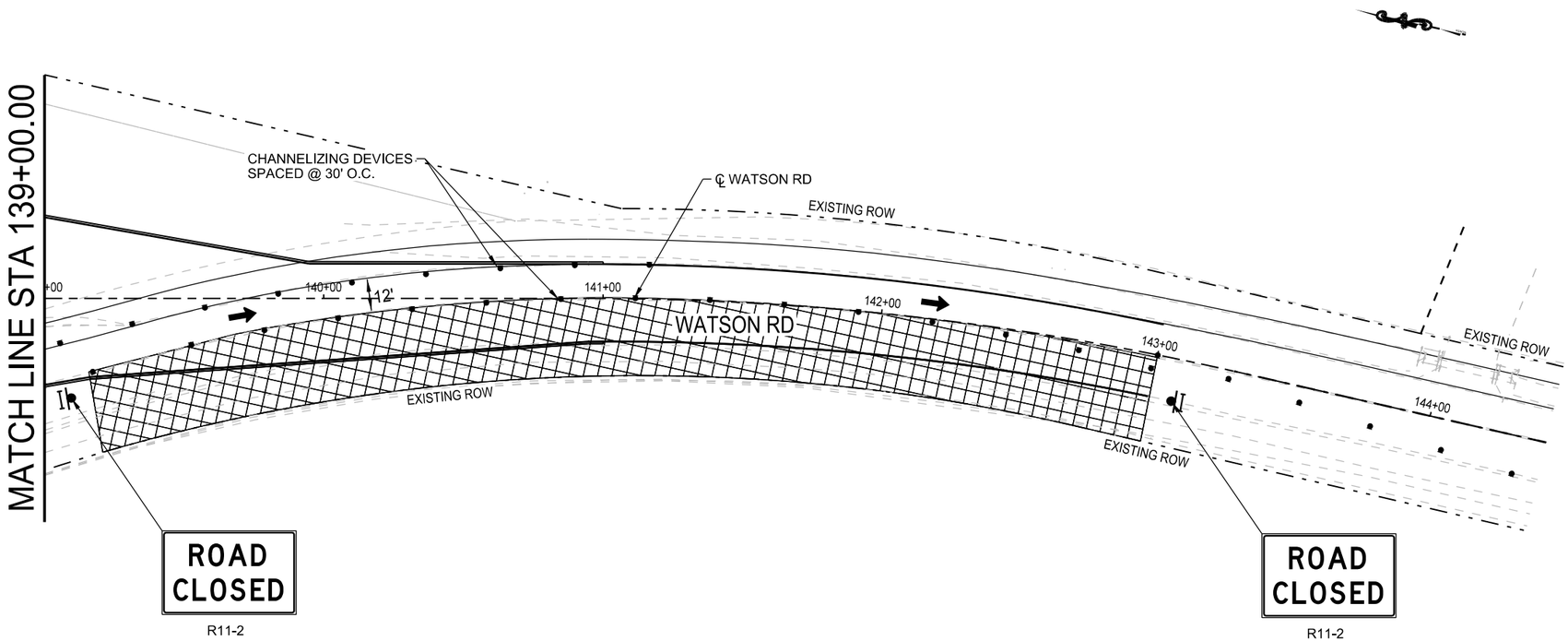

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
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- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET PHASE 3 STAGE 3

STA 139+00.00 TO END OF PROJECT

SHEET 2 OF 2

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			42
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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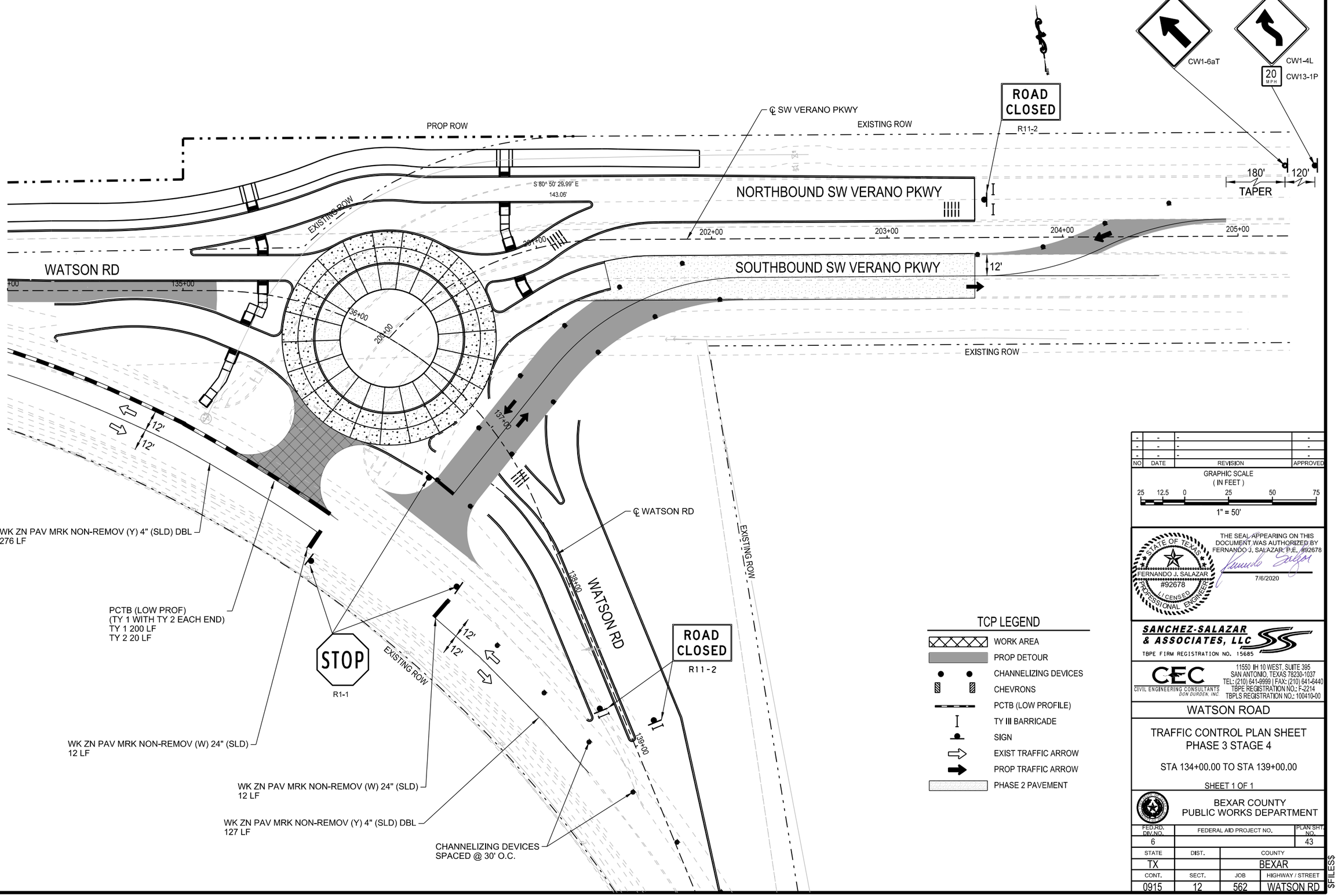

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
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- SIGN
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NO	DATE	REVISION	APPROVED
-	-	-	-
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GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

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WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 4

STA 134+00.00 TO STA 139+00.00

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			43
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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$FILESS

ROAD CLOSED
R11-2

ROAD CLOSED
R11-2

RIGHT LANE CLOSED
CW20-5TR

℄ SW VERANO PKWY

PROP ROW

EXISTING ROW

180'
TAPER

120'

NORTHBOUND SW VERANO PKWY

12'

S 80° 50' 29.99" E
143.06'

EXISTING ROW

202+00

203+00

204+00

205+00

WATSON RD

SOUTHBOUND SW VERANO PKWY

12'

135+00

136+00

204+00

EXISTING ROW

12'

12'

WK ZN PAV MRK NON-REMOV (Y) 4" (SLD) DBL
276 LF

WK ZN PAV MRK NON-REMOV (W) 24" (SLD)
12 LF

STOP
R1-1

12'

12'

STOP
R1-1

WK ZN PAV MRK NON-REMOV (W) 24" (SLD)
12 LF

WK ZN PAV MRK NON-REMOV (Y) 4" (SLD) DBL
38 LF

WK ZN PAV MRK NON-REMOV (W) 24" (SLD)
12 LF

WK ZN PAV MRK NON-REMOV (Y) 4" (SLD) DBL
1036 LF

CHANNELIZING DEVICES
SPACED @ 30' O.C.

EXISTING ROW

℄ WATSON RD

138+00

WATSON RD

139+00

ROAD CLOSED
R11-2

EXISTING ROW

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

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LICENSED PROFESSIONAL ENGINEER

7/6/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 3 STAGE 5

STA 134+00.00 TO STA 139+00.00

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			44
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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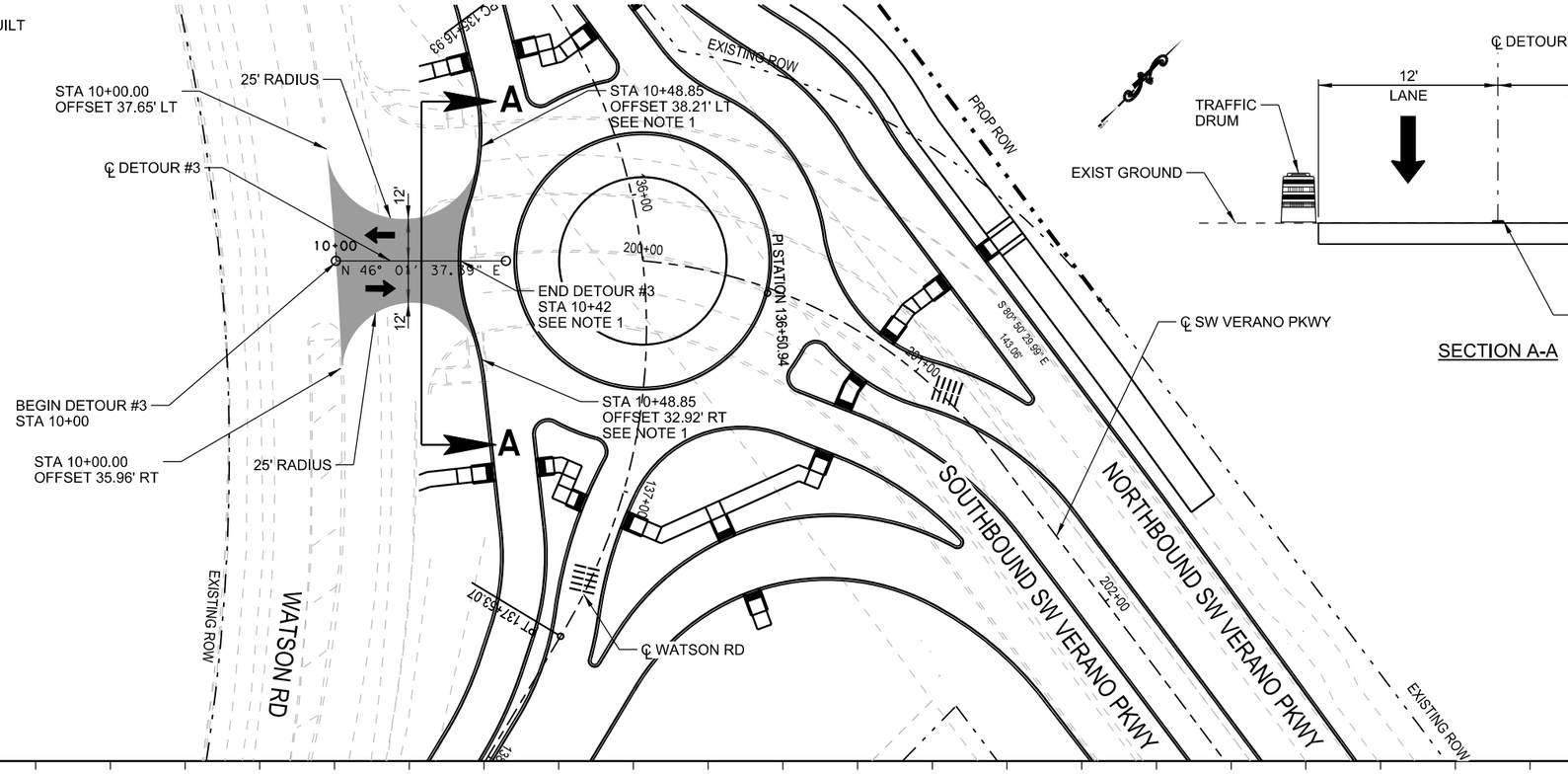
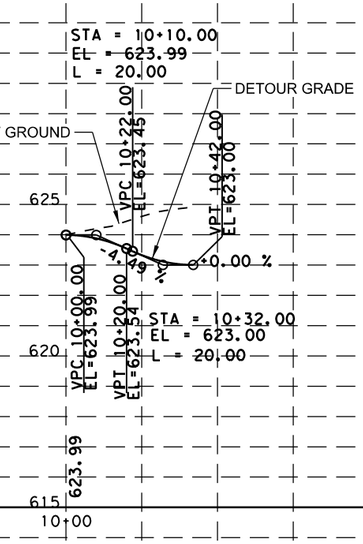
NOTES:

1. CURB WITHIN THE LIMITS OF DETOUR WILL BE BUILT DURING NEXT PHASE OF CONSTRCUTION.



SECTION A-A



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 5'

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET

DETOUR #3

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			45
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

EXIST
PROP

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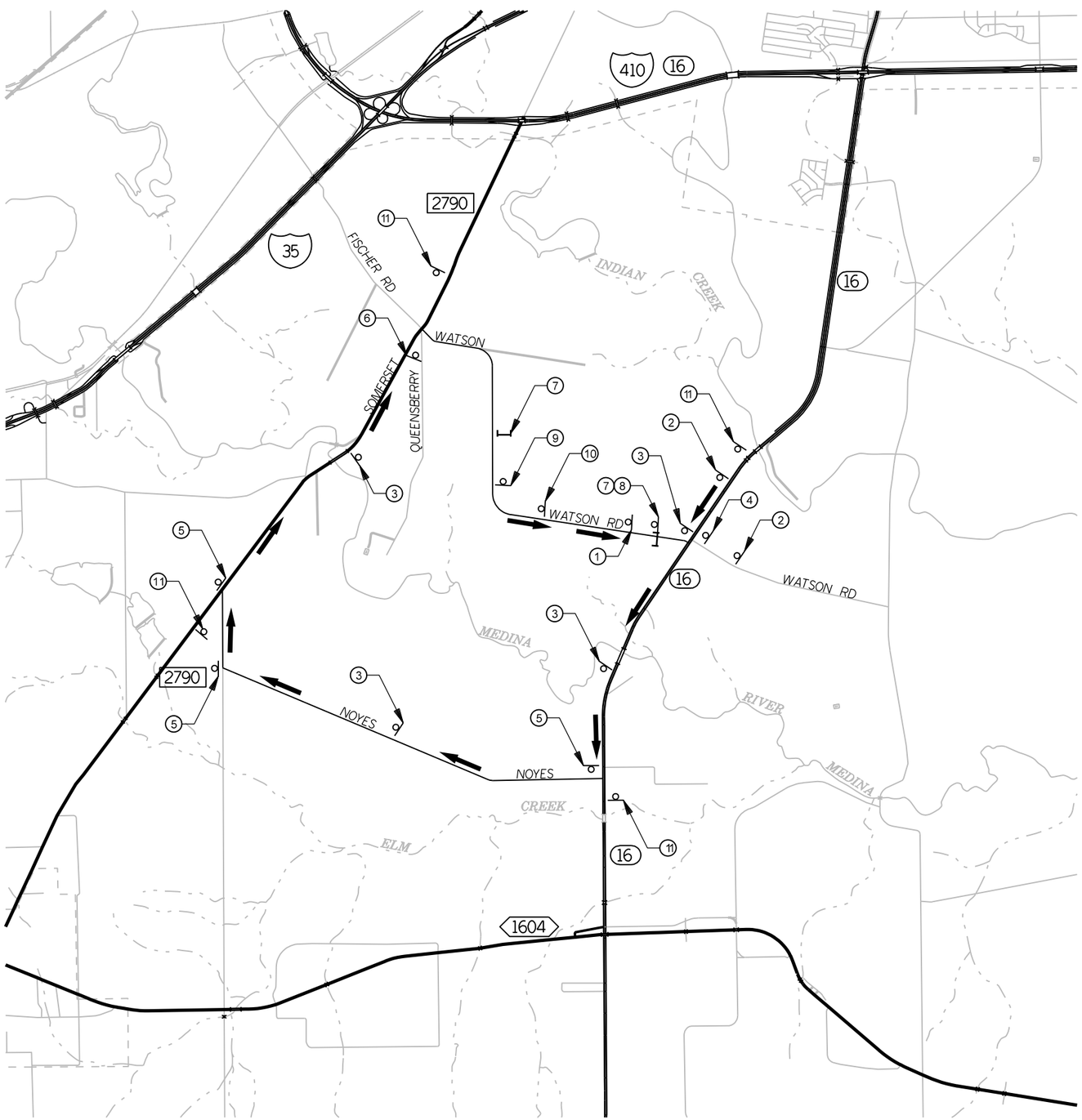

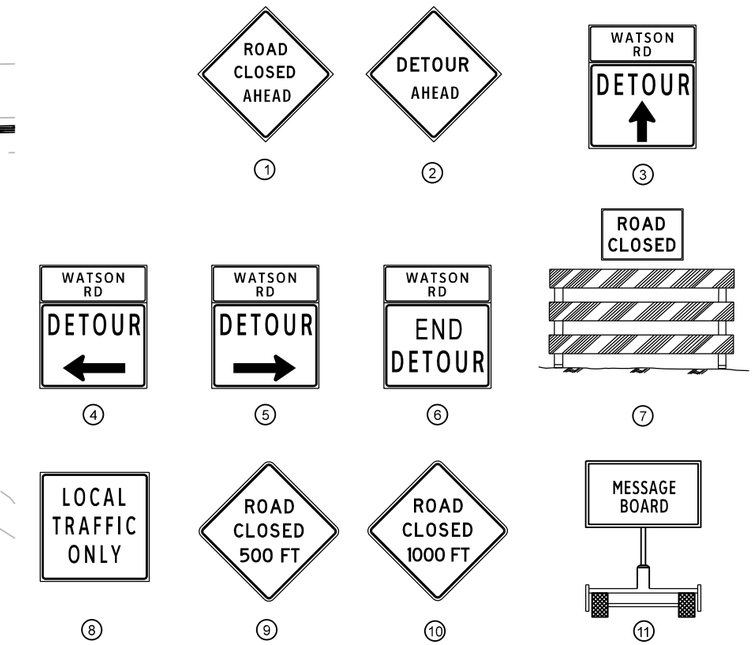

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

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STATE OF TEXAS · FERNANDO J. SALAZAR · #92678 · LICENSED PROFESSIONAL ENGINEER

7/6/2020

SANCHEZ-SALAZAR & ASSOCIATES, LLC
TBPE FIRM REGISTRATION NO. 15685

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON RD

TRAFFIC CONTROL PLAN DETOUR DIAGRAM

DETOUR #4

SHEET 1 OF 1

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			46
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
			WATSON RD

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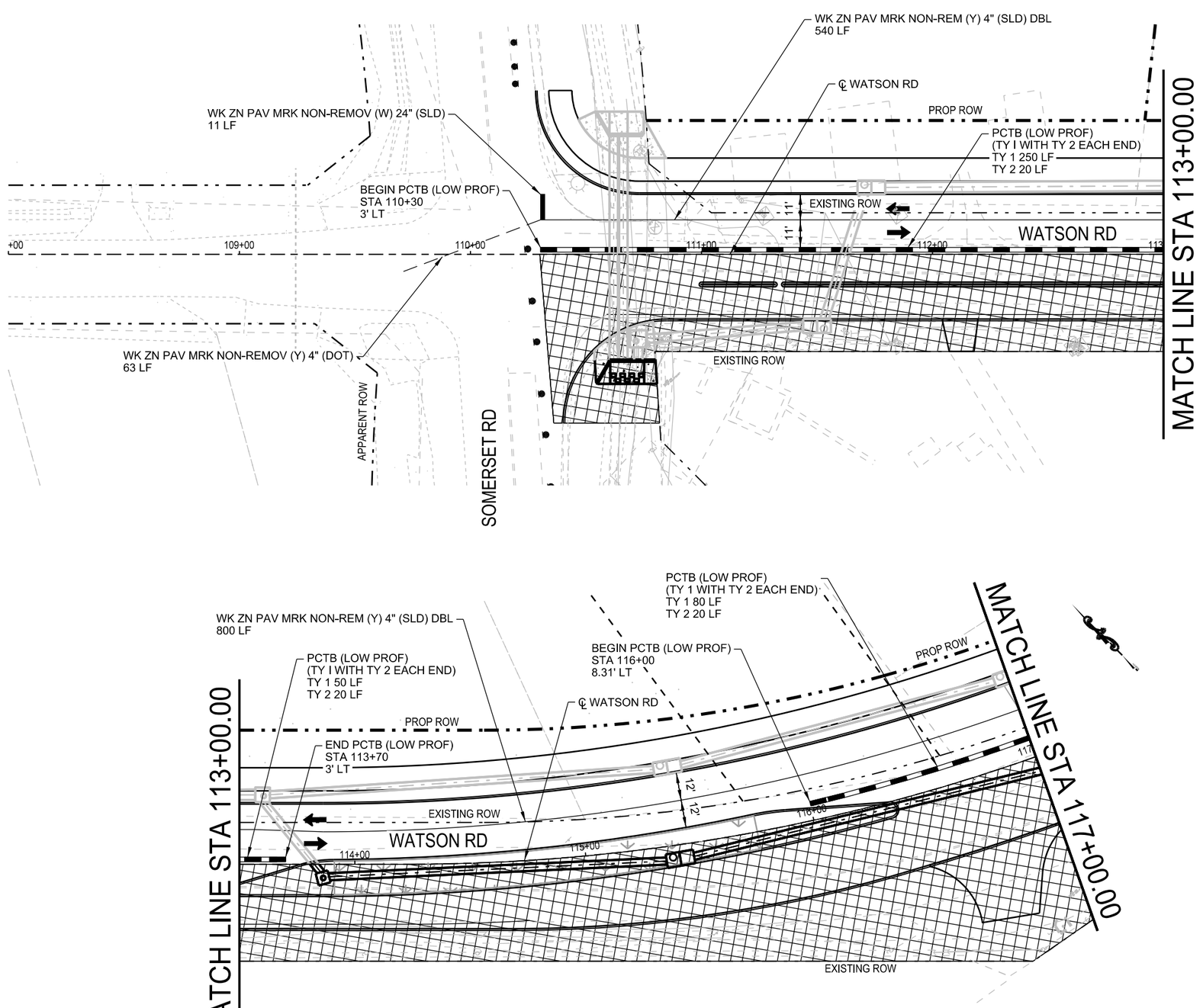

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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7/6/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 4 STAGE 1

BEGINNING OF PROJECT TO STA 117+00.00

SHEET 1 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			47
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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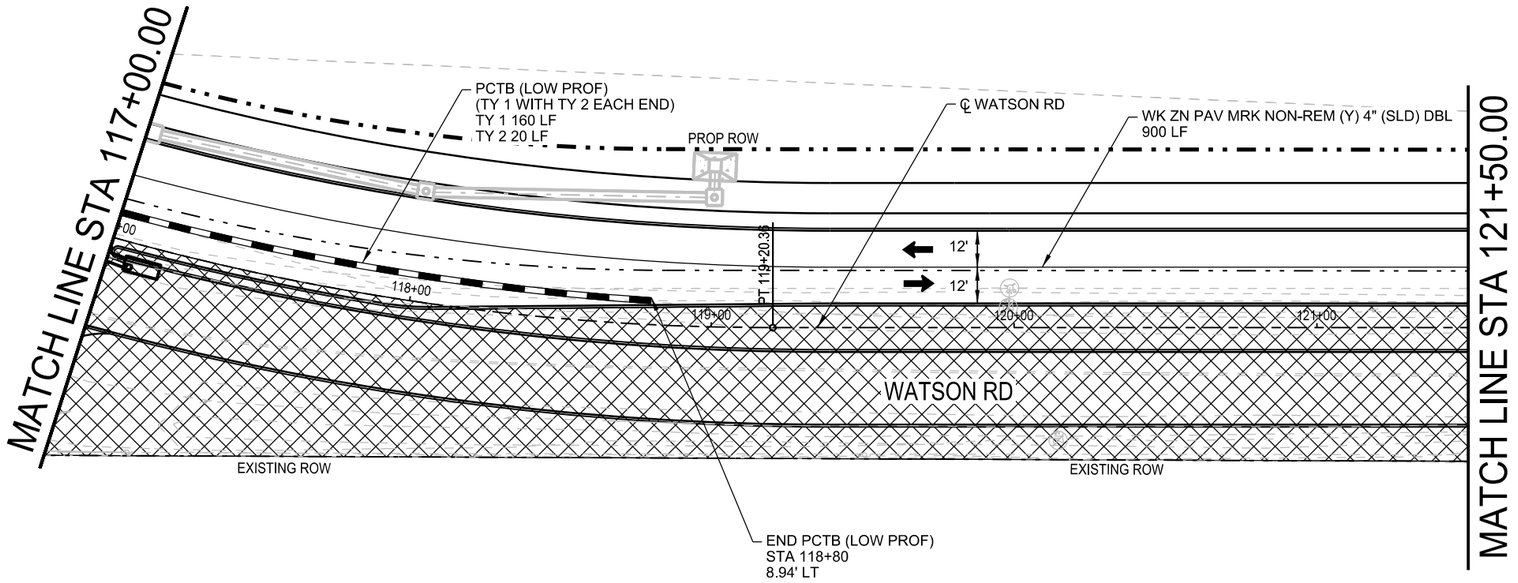

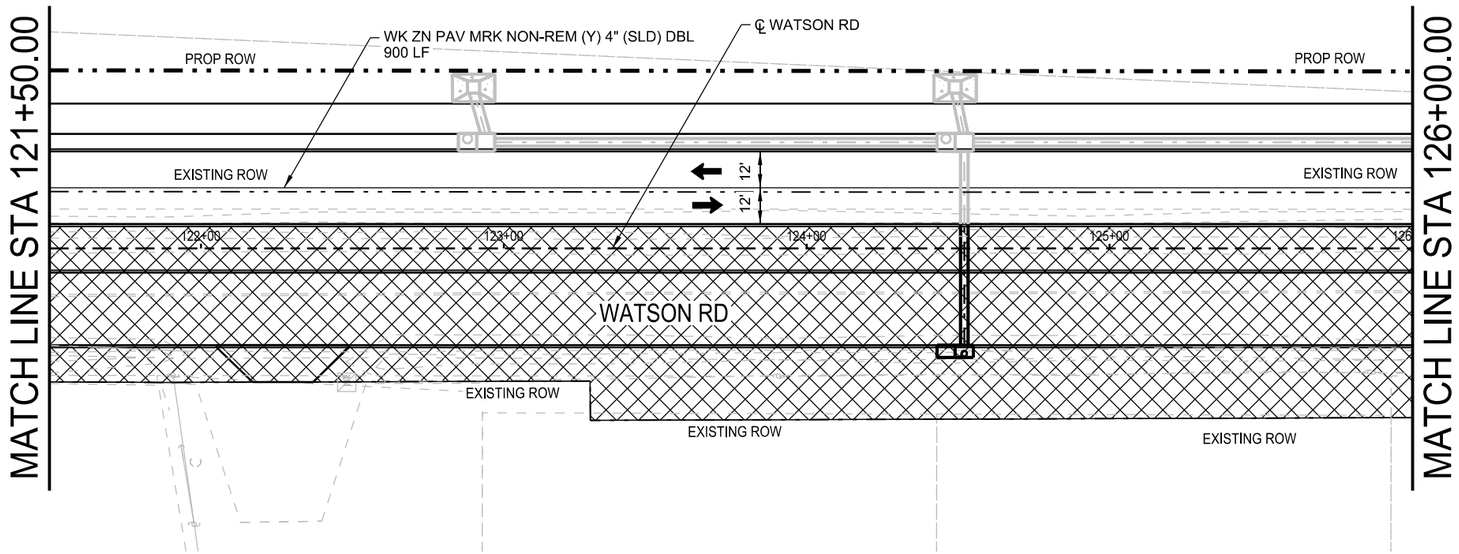

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
LICENSED
PROFESSIONAL ENGINEER

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 4 STAGE 1

STA 117+00.00 TO STA 126+00.00

SHEET 2 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			48
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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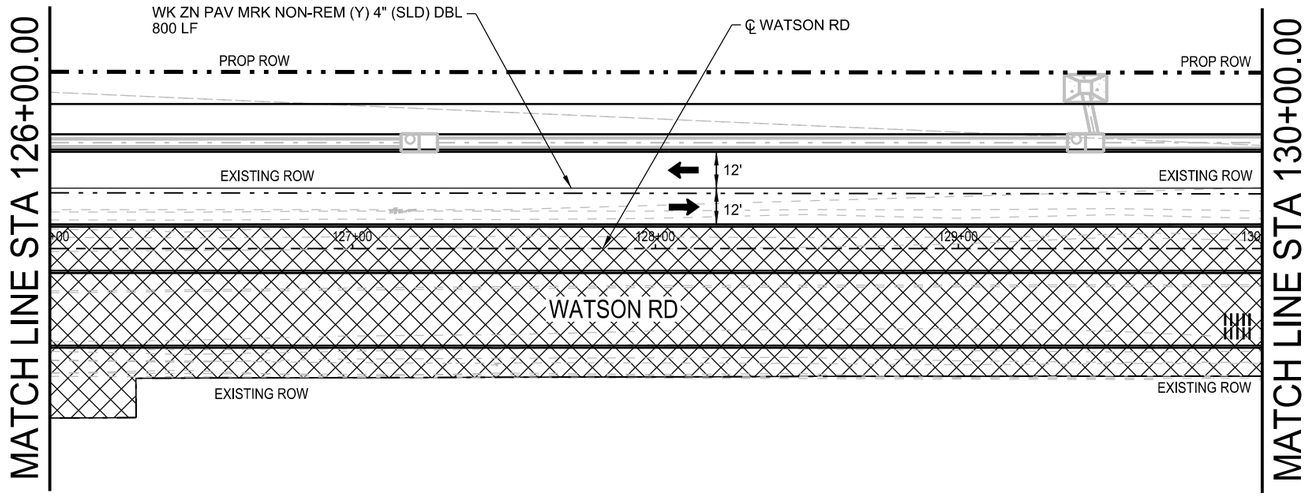

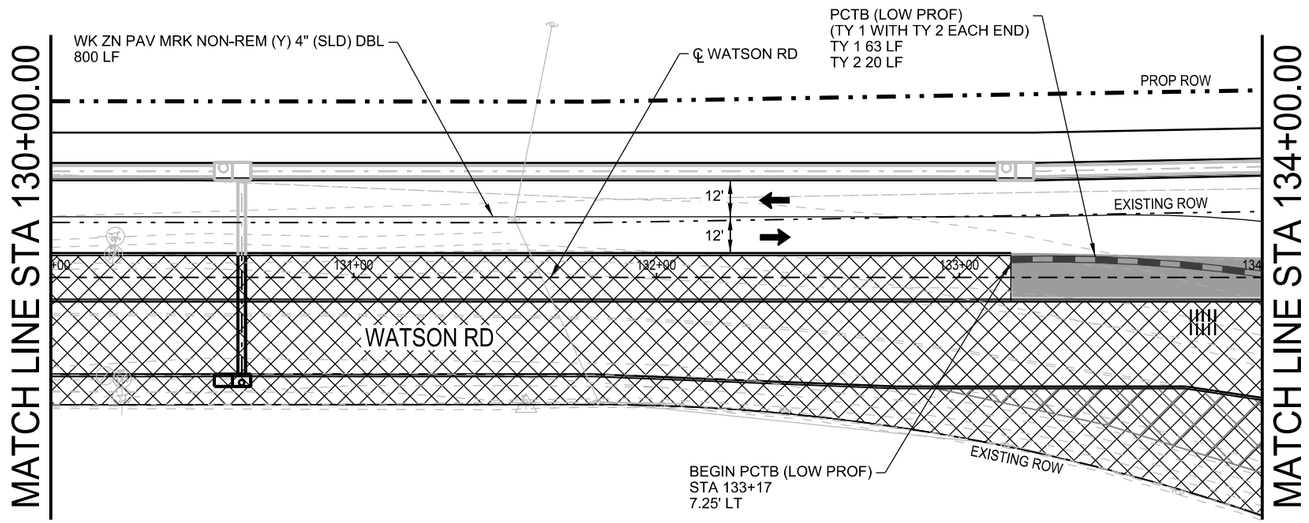

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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7/6/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 4 STAGE 1

STA 126+00.00 TO STA 134+00.00

SHEET 3 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			49
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED ON: 7/6/2020 @ 2:53:17 PM
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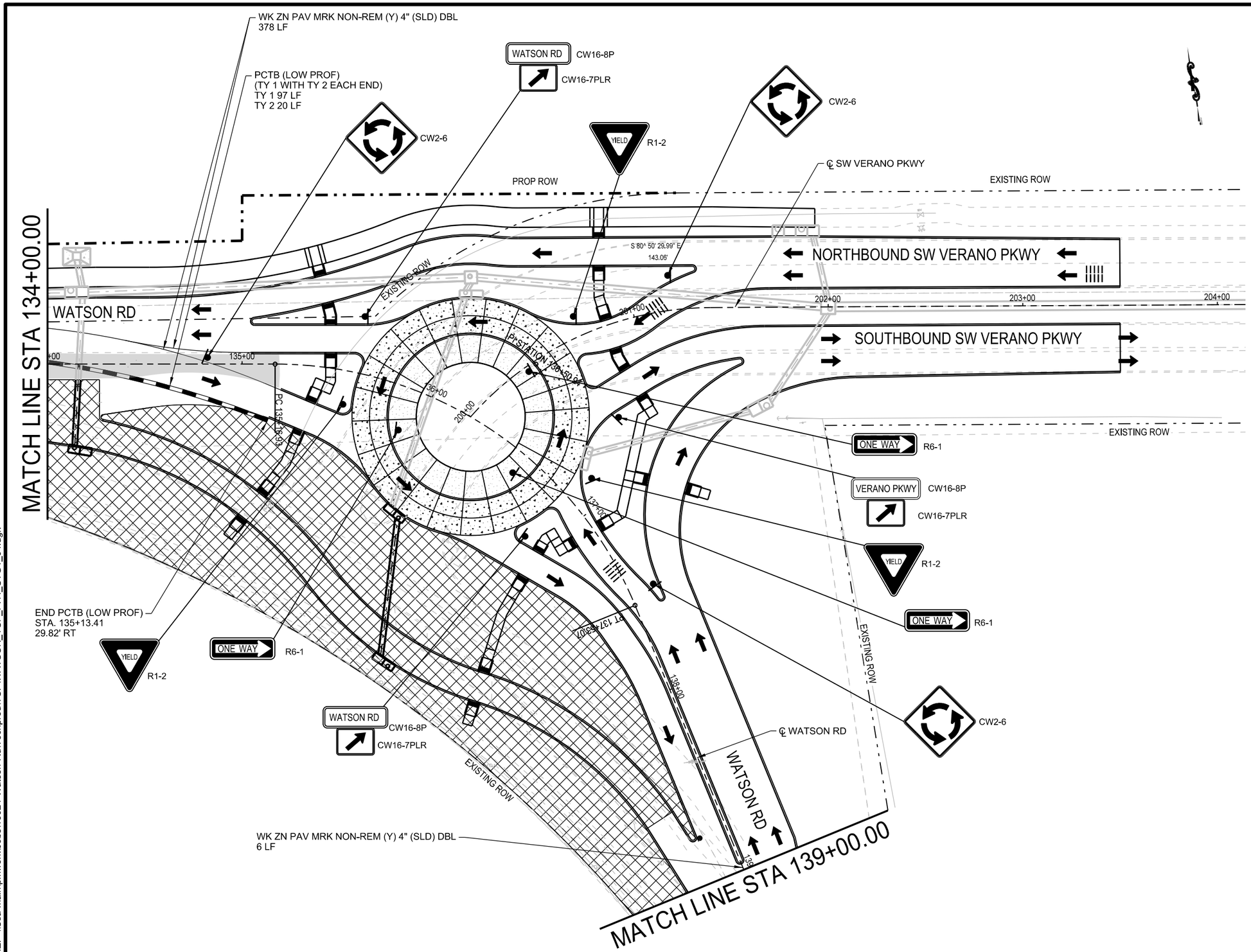

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
LICENSED
PROFESSIONAL ENGINEER

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7/6/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 4 STAGE 1

STA 134+00.00 TO STA 139+00.00

SHEET 4 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			50
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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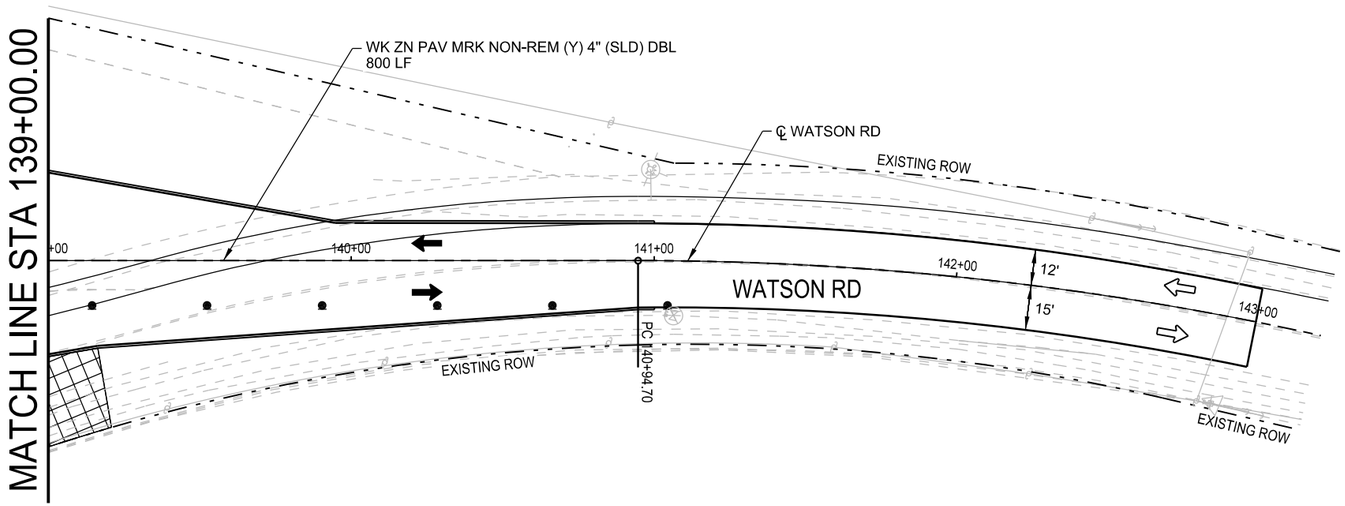

TCP LEGEND

- WORK AREA
- PROP DETOUR
- CHANNELIZING DEVICES
- CHEVRONS
- PCTB (LOW PROFILE)
- TY III BARRICADE
- SIGN
- EXIST TRAFFIC ARROW
- PROP TRAFFIC ARROW
- PHASE 2 PAVEMENT

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
LICENSED
PROFESSIONAL ENGINEER

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7/6/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

TRAFFIC CONTROL PLAN SHEET
PHASE 4 STAGE 1

STA 139+00.00 TO END OF PROJECT

SHEET 5 OF 5

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			51
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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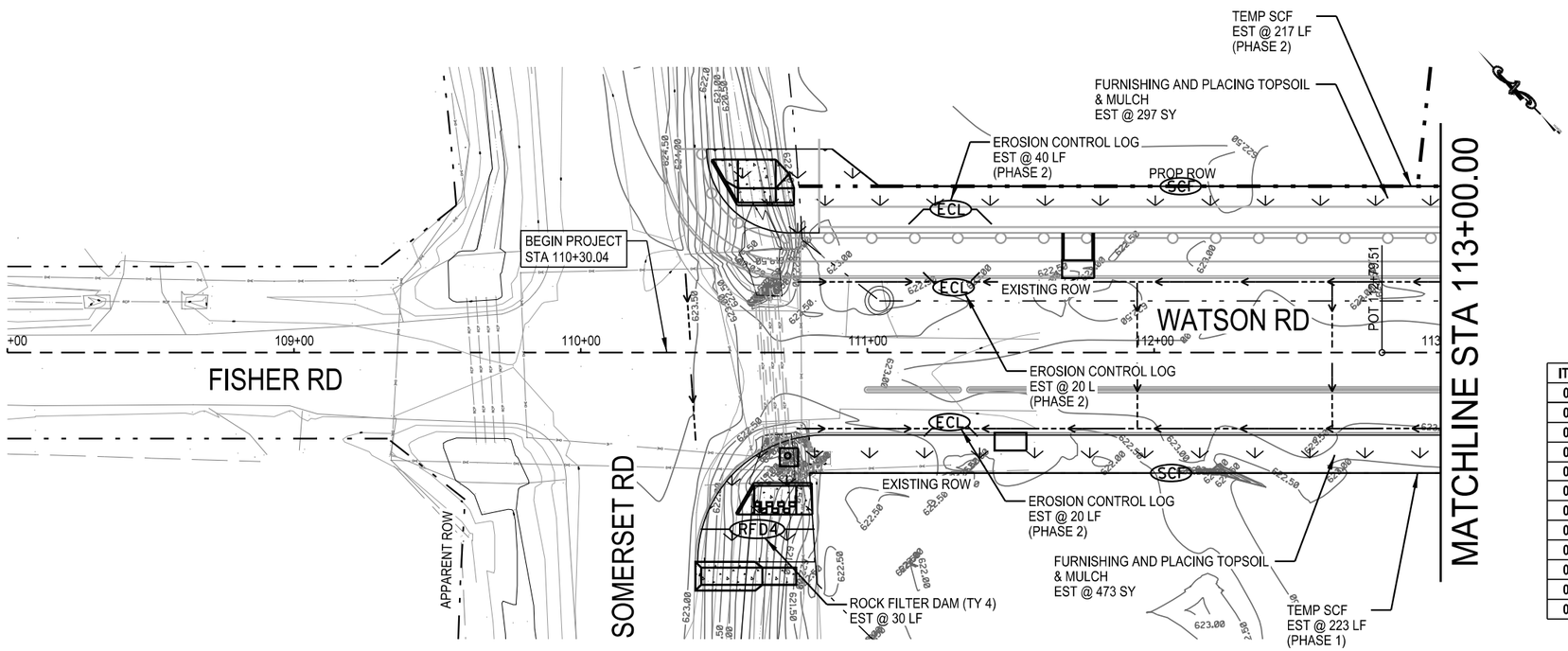

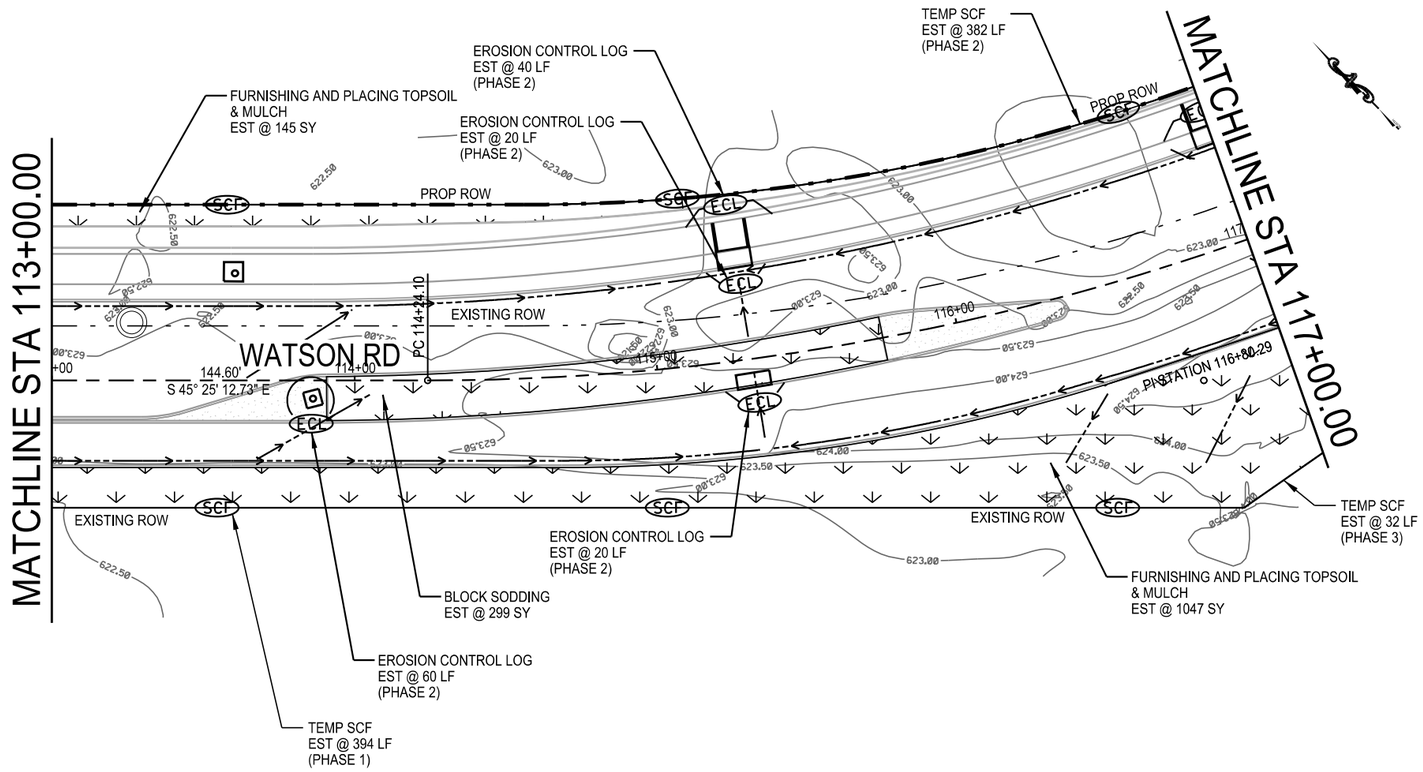

SW3P LEGEND

- ECL — EROSION CONTROL LOG (12" DIA)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD4 — ROCK FILTER DAM (TY 4)
- CONSTRUCTION EXIT
- COMP MANUF TOPSOIL & MULCH
- DRAINAGE FLOW LINES

ITEM#	DESCRIPTION	UNIT	QTY
0160	FURNISHING AND PLACING TOPSOIL (4")	SY	1962
0162	BLOCK SODDING	SY	299
0168	VEGETATIVEWATERING	MG	42
0192	MULCH	SY	1962
0506	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	30
0506	ROCK FILTER DAMS (REMOVE)	LF	30
0506	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	444
0506	CONSTRUCTION EXITS (REMOVE)	SY	444
0506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1247
0506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1247
0506	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	220
0506	BIODEG EROSN CONT LOGS (REMOVE)	EA	220

NOTE:

1. SW3P BMPS TO BE INSTALLED CONCURRENT WITH TCP PHASING AS REQUIRED.
2. COORDINATE WITH BEXAR COUNTY REPRESENTATIVE FOR CONSTRUCTION EXIT LOCATION.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
DOUGLAS V. DICICCIO
120031
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DOUGLAS V. DICICCIO, P.E. 120031

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
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11550 IH 10 WEST, SUITE 395
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P SHEETS

BEGINNING OF PROJECT TO STA 117+00.00

SHEET 1 OF 6

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	-—	52

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

ORIGINATED BY:
CHECKED BY:
BACK CHECKED BY:
CORRECTED BY:
VERIFIED BY:

INITIALS DATE

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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PLOTTED ON: 6/25/2020 @ 12:51:56 PM
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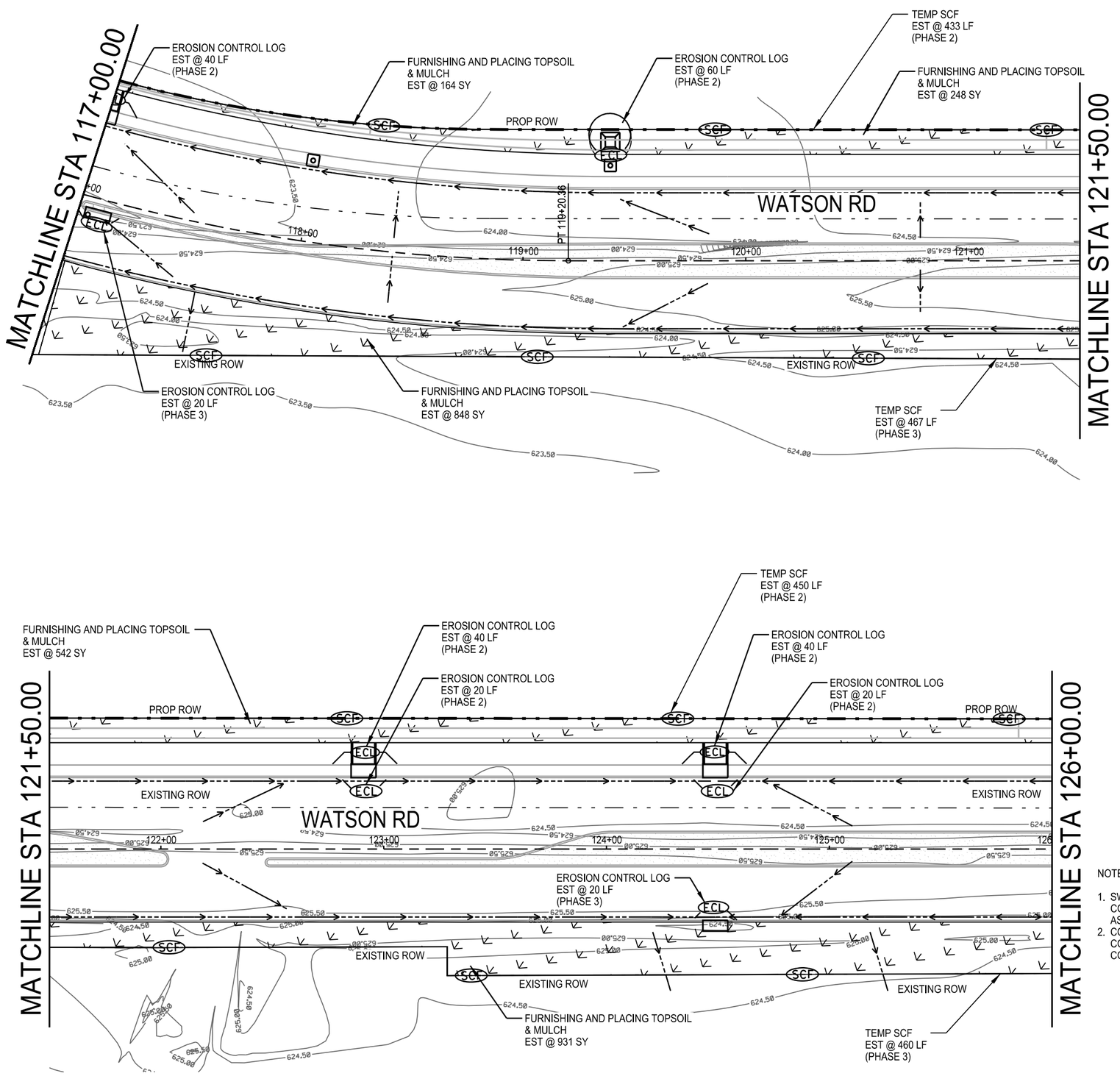

SW3P LEGEND

- ECL — EROSION CONTROL LOG (12" DIA)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD4 — ROCK FILTER DAM (TY 4)
- CONSTRUCTION EXIT
- COMP MANUF TOPSOIL & MULCH
- DRAINAGE FLOW LINES

ITEM#	DESCRIPTION	UNIT	QTY
0160	FURNISHING AND PLACING TOPSOIL (4")	SY	2733
0168	VEGETATIVE WATERING	MG	43
0192	MULCH	SY	2733
0506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1810
0506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1810
0506	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	260
0506	BIODEG EROSN CONT LOGS (REMOVE)	EA	260

NOTE:

1. SW3P BMPS TO BE INSTALLED CONCURRENT WITH TCP PHASING AS REQUIRED.
2. COORDINATE WITH BEXAR COUNTY REPRESENTATIVE FOR CONSTRUCTION EXIT LOCATION.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
DOUGLAS V. DICICCIO
120031
LICENSED
PROFESSIONAL ENGINEER

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6/25/2020

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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P SHEETS

STA 117+00.00 TO STA 126+00.00

SHEET 2 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	---	53

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

ORIGINATED BY:
CHECKED BY:
BACK CHECKED BY:
CORRECTED BY:
VERIFIED BY:

INITIALS DATE

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF.pltcfg
PLOTTED ON: 6/25/2020 @ 12:51:58 PM
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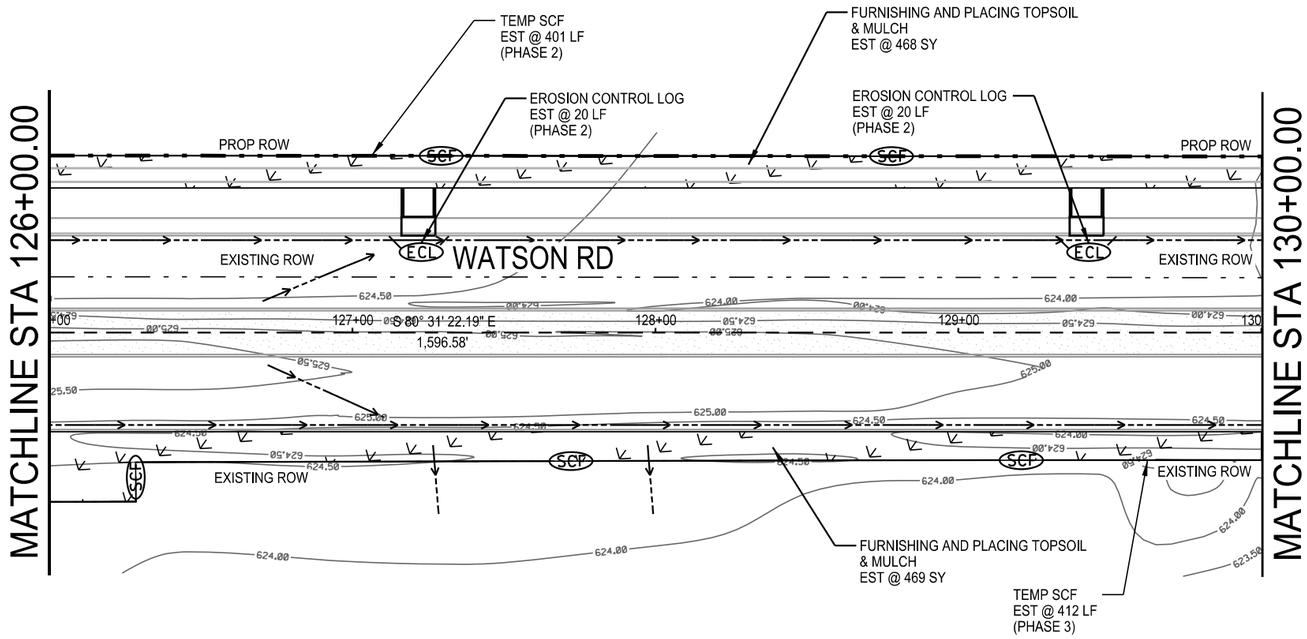

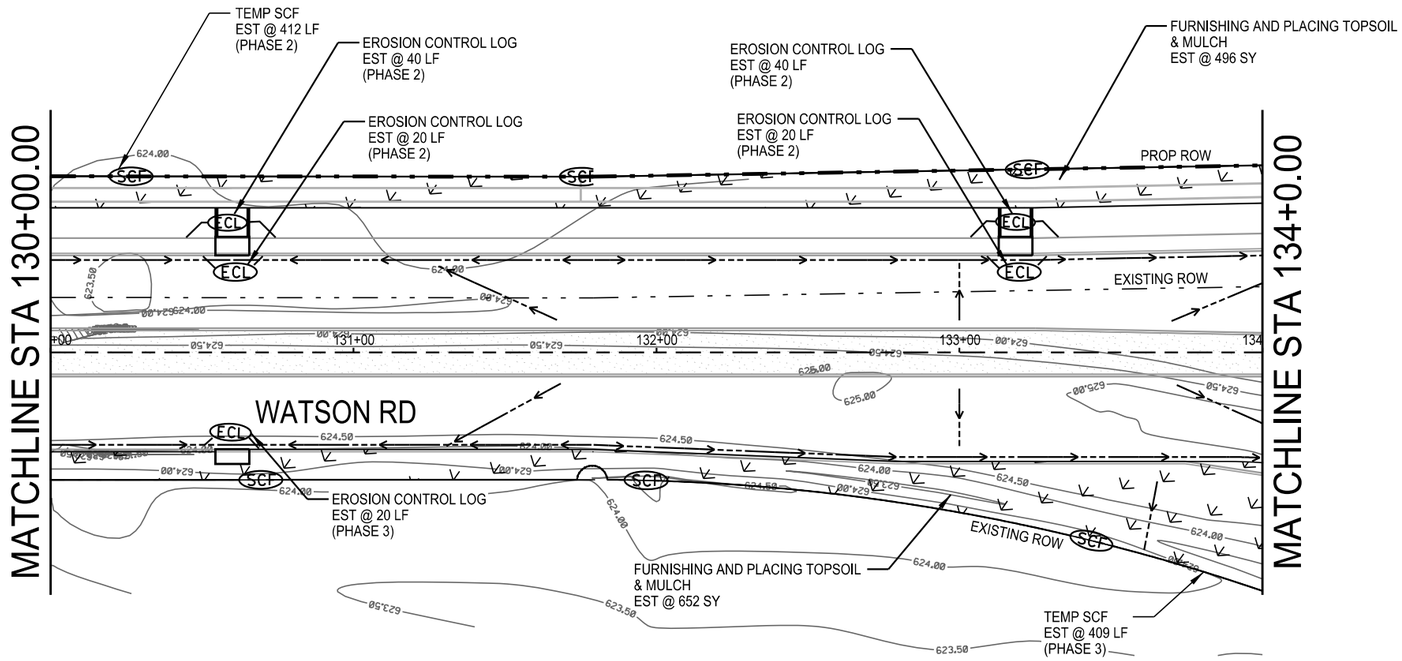

SW3P LEGEND

- ECL — EROSION CONTROL LOG (12" DIA)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD4 — ROCK FILTER DAM (TY 4)
- CONSTRUCTION EXIT
- COMP MANUF TOPSOIL & MULCH
- DRAINAGE FLOW LINES

ITEM#	DESCRIPTION	UNIT	QTY
0160	FURNISHING AND PLACING TOPSOIL (4")	SY	2085
0168	VEGETATIVE WATERING	MG	33
0192	MULCH	SY	2085
0506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1634
0506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1634
0506	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	180
0506	BIODEG EROSN CONT LOGS (REMOVE)	EA	180

NOTE:

1. SW3P BMPS TO BE INSTALLED CONCURRENT WITH TCP PHASING AS REQUIRED.
2. COORDINATE WITH BEXAR COUNTY REPRESENTATIVE FOR CONSTRUCTION EXIT LOCATION.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
DOUGLAS V. DICICCIO
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LICENSED
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6/25/2020

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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P SHEETS

STA 126+00.00 TO STA 134+00.00

SHEET 3 OF 6

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	---		54
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

ORIGINATED BY:
CHECKED BY:
BACK CHECKED BY:
CORRECTED BY:
VERIFIED BY:
INITIALS
DATE

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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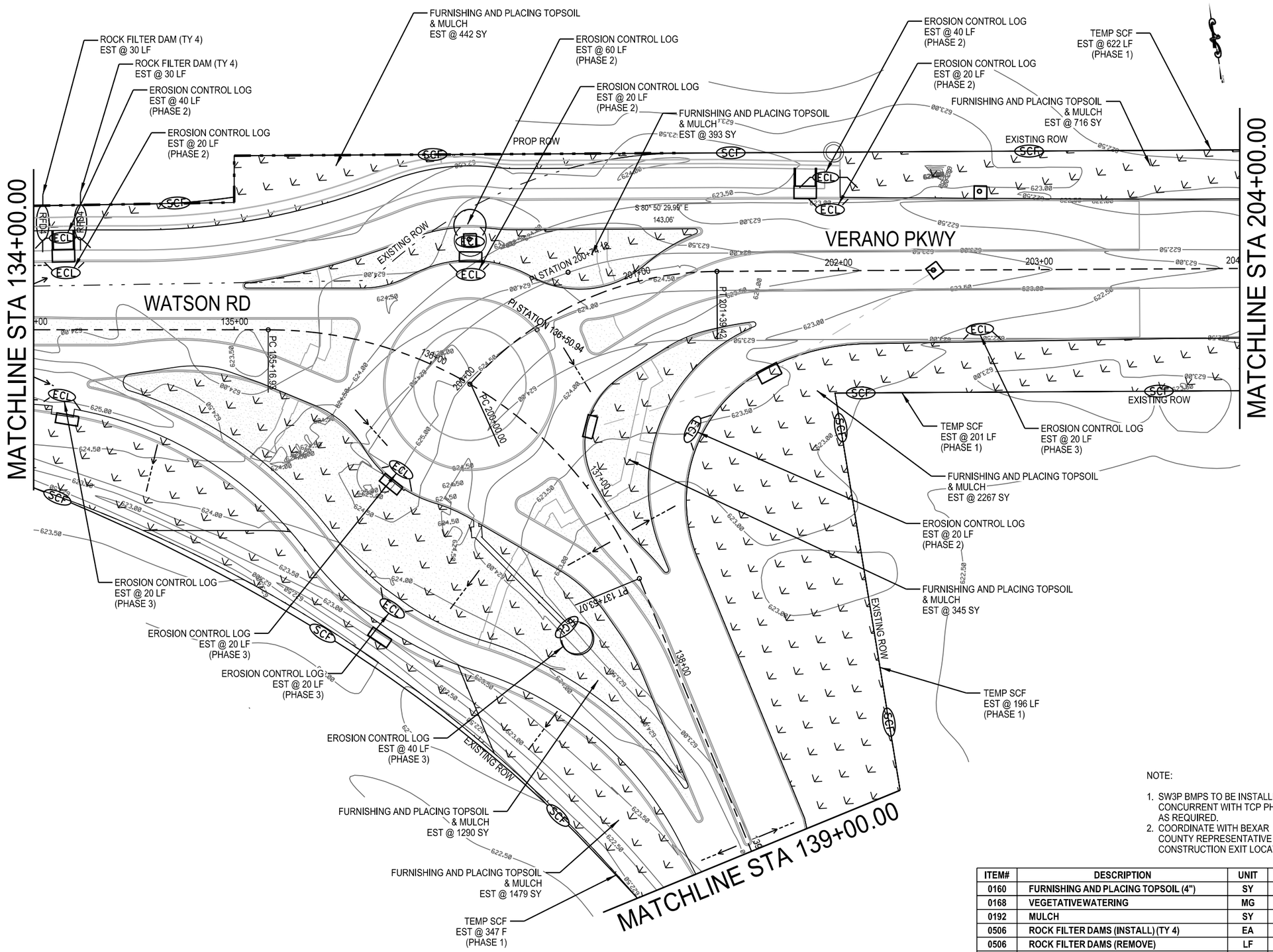

SW3P LEGEND

- ECL — EROSION CONTROL LOG (12" DIA)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD4 — ROCK FILTER DAM (TY 4)
- CONSTRUCTION EXIT
- COMP MANUF TOPSOIL & MULCH
- DRAINAGE FLOW LINES

NOTE:

1. SW3P BMPS TO BE INSTALLED CONCURRENT WITH TCP PHASING AS REQUIRED.
2. COORDINATE WITH BEXAR COUNTY REPRESENTATIVE FOR CONSTRUCTION EXIT LOCATION.

ITEM#	DESCRIPTION	UNIT	QTY
0160	FURNISHING AND PLACING TOPSOIL (4")	SY	6932
0168	VEGETATIVEWATERING	MG	108
0192	MULCH	SY	6932
0506	ROCK FILTER DAMS (INSTALL) (TY 4)	EA	60
0506	ROCK FILTER DAMS (REMOVE)	LF	60
0506	TEMP SEDMT CONT FENCE (INSTALL)	LF	1366
0506	TEMP SEDMT CONT FENCE (REMOVE)	LF	1366
0506	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	340
0506	BIODEG EROSN CONT LOGS (REMOVE)	EA	340

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
DOUGLAS V. DICICCIO
120031
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY DOUGLAS V. DICICCIO, P.E. 120031

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P SHEETS

STA 134+00.00 TO STA 139+00.00

SHEET 4 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	---		55
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

DATE
INITIALS
ORIGINATED BY:
CHECKED BY:
BACK CHECKED BY:
CORRECTED BY:
VERIFIED BY:

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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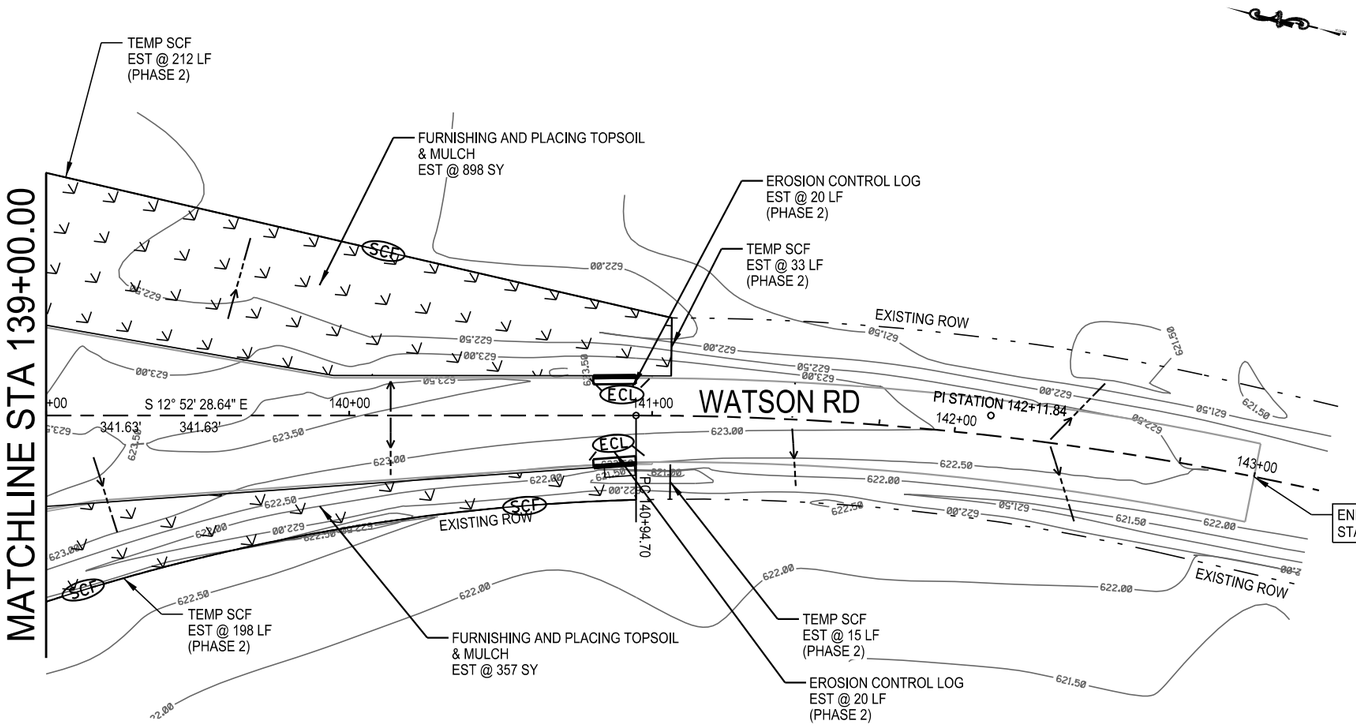
VERIFIED BY: _____ _____



SW3P LEGEND

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- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD4 — ROCK FILTER DAM (TY 4)
- CONSTRUCTION EXIT
- COMP MANUF TOPSOIL & MULCH
- DRAINAGE FLOW LINES

ITEM#	DESCRIPTION	UNIT	QTY
0160	FURNISHING AND PLACING TOPSOIL (4")	SY	1255
0168	VEGETATIVEWATERING	MG	20
0192	MULCH	SY	1255
0506	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	444
0506	CONSTRUCTION EXITS (REMOVE)	SY	444
0506	TEMP SEDMT CONT FENCE (INSTALL)	LF	458
0506	TEMP SEDMT CONT FENCE (REMOVE)	LF	458
0506	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	40
0506	BIODEG EROSN CONT LOGS (REMOVE)	EA	40

NOTE:

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NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS — DOUGLAS V. DICICCIO — 120031 — LICENSED PROFESSIONAL ENGINEER

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6/25/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P SHEETS

STA 139+00.00 TO END OF PROJECT

SHEET 5 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6	-—		56
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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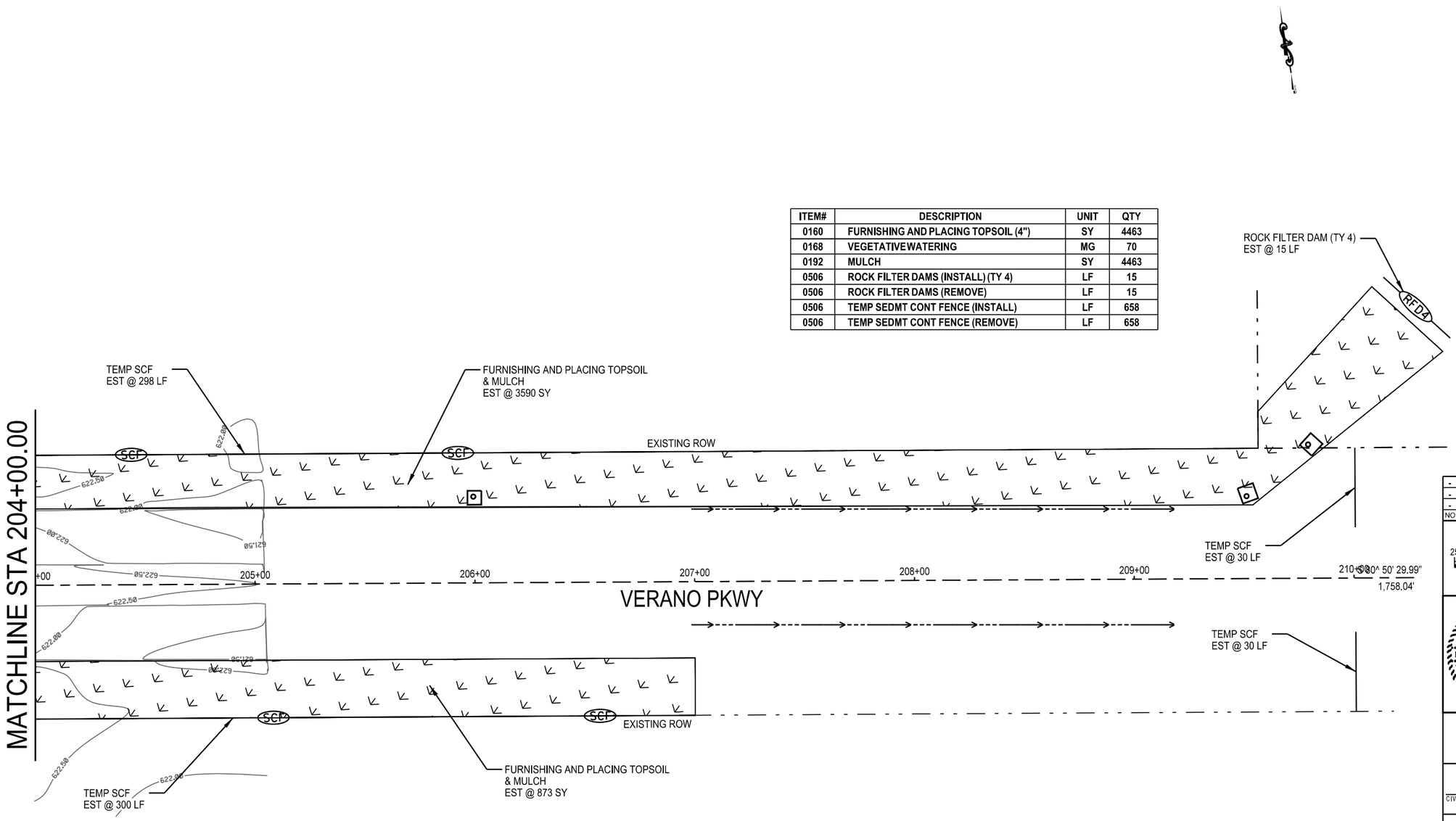
INITIALS DATE

ORIGINATED BY: _____ _____
CHECKED BY: _____ _____
BACK CHECKED BY: _____ _____
CORRECTED BY: _____ _____
VERIFIED BY: _____ _____

SW3P LEGEND

- ECL — EROSION CONTROL LOG (12" DIA)
- SCF — TEMPORARY SEDIMENT CONTROL FENCE
- RFD4 — ROCK FILTER DAM (TY 4)
- CONSTRUCTION EXIT
- COMP MANUF TOPSOIL & MULCH
- DRAINAGE FLOW LINES

ITEM#	DESCRIPTION	UNIT	QTY
0160	FURNISHING AND PLACING TOPSOIL (4")	SY	4463
0168	VEGETATIVEWATERING	MG	70
0192	MULCH	SY	4463
0506	ROCK FILTER DAMS (INSTALL) (TY 4)	LF	15
0506	ROCK FILTER DAMS (REMOVE)	LF	15
0506	TEMP SEDMT CONT FENCE (INSTALL)	LF	658
0506	TEMP SEDMT CONT FENCE (REMOVE)	LF	658



NOTE:

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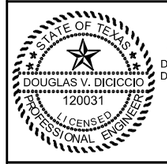
NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'



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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SW3P SHEETS

STA 204+00.00 TO END

SHEET 6 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	57

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:50
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Note To Designer:
1. Do not alter Sheet Design or Font style, size or weight - match text attributes.
2. If additional space is needed for a numbered section, fence and adjust sections up or down as needed for proportioning and readability but do not relocate from it's relative position.

A. GENERAL SITE DATA

1. PROJECT LIMITS: *FM 2790-SOMERSET ROAD TO 0.8 MI EAST OF WATSON ROAD*

2. PROJECT SITE MAPS:
   - * Project Latitude 29.683888889 Project Longitude-98.065277778
   - * Project Location Map: Shown on Title Sheet
   - * Drainage Patterns: Shown on Drainage Area Maps (Sheets 102-117)
   - * Approx. Slopes Anticipated After Major Gradings and Areas of Soil Disturbance: Shown on Typical Sections (Sheets 4-7)
   - * Major Controls and Locations of Stabilization Practices: Shown on SW3P Sheets (Sheets 165-172)
   - * Project Specific Locations: Off-site waste, borrow, or storage areas are not part of this SW3P.
   - * Surface Waters and Discharge Locations: Shown on Drainage and Culvert Layout Sheets (Sheets 97-118)

3. PROJECT DESCRIPTION: *REHAB EXISTING ROADWAY*

   * Joint-bid utilities are covered by this SW3P (Sheets 121-128)
   Non-Joint Bid Utilities are not part of this SW3P.

4. FOR MAJOR SOIL DISTURBING ACTIVITIES SEQUENCE OF EVENTS:

   1. Install controls down-slope of work area and initiate inspection and maintenance activities.

   2. Begin phased construction with interim stabilization practices. Adjust erosion and sedimentation controls during construction to meet requirements and changing conditions and as directed/approved by the Engineer.

   3. Major soil disturbing activities may include but are not limited to: right-of-way preparation, cut and/or fill to improve roadway profile, final grading and placement of topsoil and the following (if marked):

   - X Placement of road base
   - X Exstensive ditch grading
   - ____ Upgrading or replacing culverts or bridges
   - ____ Temporary detour road(s)
   - ____ Other: _____

5. EXISTING AND PROPOSED CONDITIONS:

   Description of existing vegetative cover: Mostly Roadway. Grasses along roadway, some wooded areas.
   Percentage of existing vegetative cover: Approximately 40%
   Existing vegetative cover: (mark one)
   - X Thick or uniformly established
   - ____ Thin and Patchy
   - ____ None or minimal cover

   Description of soils: (Provide classification and description of soils)
   Site Acreage: 38.73 AC Acreage disturbed: 6.40 AC
   Site runoff coefficient (pre-construction): 0.45 Site runoff coefficient (post-construction): 0.45

6. RECEIVING WATERS: (Mark all that apply)
   - ____ A classified stream does not pass through project. GUADALUPE RIVER
   - X A classified stream passes through project. Name BELOW COMAL RIVER Segment Number 1804

   Name of receiving waters that will receive discharges from disturbed areas of the project: GUADALUPE RIVER BELOW COMAL RIVER

   Site is in a Municipal Separate Storm Sewer System (MS4).
   MS4 Operator (name): _____

B. BEST MANAGEMENT PRACTICES

General timing or sequence for implementation of BMPs shall be as required and/or as directed/approved by the Engineer to provide adequate controls. BMPs shown on plan sheets are to be considered "proposed" unless/until install date is shown. BMPs are to reduce sediments from road construction activities.

1. SOIL STABILIZATION PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

   - P SEEDING
   - ____ MULCHING (Hay or Straw)
   - ____ BUFFER ZONES
   - ____ PLANTING
   - ____ COMPOST/MULCH FILTER BERM
   - P SODDING
   - ____ PRESERVATION OF NATURAL RESOURCES
   - ____ FLEXIBLE CHANNEL LINER
   - ____ RIGID CHANNEL LINER
   - ____ SOIL RETENTION BLANKET
   - P COMPOST MANUFACTURED TOPSOIL
   - P OTHER: (WINDROWS)

2. STRUCTURAL PRACTICES: (Select T = Temporary or P = Permanent, as applicable)

   - ____ SILT FENCES
   - ____ HAY BALES
   - T ROCK FILTER DAMS
   - ____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
   - P DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
   - ____ DIVERSION DIKE AND SWALE COMBINATIONS
   - ____ PIPE SLOPE DRAINS
   - P PAVED FLUMES
   - ____ ROCK BEDDING AT CONSTRUCTION EXIT
   - T TIMBER MATTING AT CONSTRUCTION EXIT
   - ____ CHANNEL LINERS
   - ____ SEDIMENT TRAPS
   - ____ SEDIMENT BASINS
   - ____ STORM INLET SEDIMENT TRAP
   - ____ STONE OUTLET STRUCTURES
   - P CURBS AND GUTTERS
   - ____ STORM SEWERS
   - ____ VELOCITY CONTROL DEVICES
   - ____ OTHER: *(Specify Practice)*

3. STORM WATER MANAGEMENT:

   The proposed facility was designed in consideration of hydraulic design standards to convey stormwater in a manner that is protective of public safety and property. The control of erosion from the facility is inherent to the design. Additional factors affecting post-construction stormwater at the project location include: (mark all that apply)

   - X Existing or new vegetation provides natural filtration.
   - X The design includes provisions for permanent erosion controls provided by strategically placed pervious and impervious surfaces.
   - ____ Project includes permanent sedimentation controls (other than grass).
   - X Velocities do not require dissipation devices.
   - ____ Velocity-dissipation devices included in the design.
   - ____ Other : _____

4. NON-STORM WATER DISCHARGES:

   Off-site discharges are prohibited except as follows:

   1. Discharges from fire fighting activities and/or fire hydrant flushings.
   2. Vehicle, external building, and pavement wash water where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed).
   3. Plain water used to control dust.
   4. Plain water originating from potable water sources.
   5. Uncontaminated groundwater, spring water or accumulated stormwater.
   6. Foundation or footing drains where flows are not contaminated with process materials such as solvents.
   7. Other: _____

Concrete truck wash water discharges on the site should be prohibited or minimized. If allowed by the Engineer, they must be managed in a manner so as not to contaminate surface water. They must not be located in areas of concentrated flow. Concrete truck wash-out locations must be shown on the SW3P Layout and included in the inspections.

Hazardous material spill/leak shall be prevented or minimized. At a minimum, this includes asphalt products, fuels, oils, lubricants, solvents, paints, acids, concrete curing compounds and chemical additives for soil stabilization. BMPs shall be implemented to the storage areas of these products. All spills must be cleaned and disposed properly and reported to the Engineer. Report any release at or above the reportable quantity during a 24 hour period to the National Response Center at 1-800-424-8802.

C. OTHER REQUIREMENTS & PRACTICES

1. MAINTENANCE:

   All erosion and sediment controls shall be maintained in good working order. If a repair is necessary, it shall be performed before the next anticipated storm event but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from equipment. If maintenance prior to the next anticipated storm event is impracticable, maintennance must be scheduled and accomplished as soon as practicable. Disturbed areas on which construction activities have ceased, temporarily or permanently, shall be stabilized within 14 calendar days unless they are scheduled to and do resume within 21 calendar days. The areas adjacent to creeks and drainageways shall have priority followed by protecting storm sewer inlets.

2. INSPECTION:

   For areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural control measures, and locations where vehicles enter or exit the site, personnel provided by the permittee and familiar with the SW3P must inspect disturbed areas at least once every seven (7) calendar days. An Inspection and Maintenance Report shall be prepared for each inspection and the controls shall be revised on the SW3P within seven (7) calendar days following the inspection.

3. WASTE MATERIALS:

   All non-hazardous municipal waste materials such as litter, rubbish, trash and garbage located on or originating from the project shall be collected and stored in a securely lidded metal dumpster, provided by the Contractor. The dumpster shall be emptied as necessary or as required by local regulation and the trash shall be hauled to a permitted disposal facility. The burying of non-hazardous municipal waste on the project shall not be permitted. Construction material waste sites, stockpiles and haul roads shall be constructed to minimize and control the amount of sediment that may enter receiving waters. Construction material waste sites shall not be located in any wetland, water body or stream bed. Construction staging areas and vehicle maintenance areas shall be constructed in a manner to minimize the runoff of pollutants.

4. OFFSITE VEHICLE TRACKING:

   Off-site vehicle tracking of sediments and the generation of dust must be minimized. Excess sediments on road shall be removed on a regular basis as directed/approved by the Engineer.

5. OTHER:

   See the EPIC sheet for additional environmental information.

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

INTERIM REVIEW
THIS DOCUMENT HAS BEEN RELEASED FOR INTERIM REVIEW PURPOSES ONLY (NOT FOR CONSTRUCTION), UNDER THE AUTHORITY OF JULIO RAMOS, P.E. 107672
ON 6/25/2020 .

, P.E.
Signature of Registrant & Date

REVISION DATE:

STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6	-----		
STATE	DISTRICT	COUNTY	
TEXAS	SAT	BEXAR	
CONTROL	SECTION	JOB	SHEET NO.
0915	12	562	58

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit (CGP) required for projects with 1 or more acres distrubed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the Storm Water Pollution Prevention Plan (SW3P) and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and Texas Commission on Environmental Quality (TCEQ), Environmental Protection Agency (EPA) or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, Contractor shall submit Notice of Intent (NOI) to TCEQ and the Engineer.

5. NOI required: Yes ☒ No ☐

Note: If amount of soil disturbance changes, permit requirements may change.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

US Army Corps of Engineers (USACE) Permit required for filling, dredging, excavating or other work in any potential USACE jurisdictional water, such as, rivers, creeks, streams, or wetlands.

The Contractor shall adhere to all of the terms and conditions associated with the following permit(s):

☒ No Permit Required
☐ Nationwide Permit (NWP) 14 - Pre-construction Notice (PCN) not Required
☐ Nationwide Permit 14 - PCN Required
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP• _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices (BMPs) planned to control erosion, sedimentation and post-project total suspended solids (TSS).

1.

2.

3.

4.

401 Best Management Practices: (Not applicable if no USACE permit)

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☒ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☒ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☐ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Sedimentation Chambers
		☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162,164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☒ Required Action

Action No.

1. MIGRATORY BIRD NESTS: Schedule construction activities as needed to meet the following requirements:

   A. Do not remove or destroy any active migratory bird nests (nests containing eggs and/or flightless birds) at any time of year. If there are any active nests, they shall not be removed until the nests become inactive.

   B. On/in structures, if there are any active nests, they shall not be removed until all nests become inactive. After inactive nests are removed and/or before nest activity begins, deterrent materials may be applied to the structures to prevent future nest building.

2. See Item 5 in General Notes.
3. Western and Eatern spotted skunk - Skunk BMP's: The Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if it is encountered, and to avoid unnecessary impacts to dens.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediated area, and contact the Engineer immediately.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropiate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the follwing are detected:

- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

Does the project involve the demolition of a span bridge?

☐ Yes ☒ No (No further action required)

If "Yes", a pre- demolition notification must be submitted to the Texas Department of State Health Services. The contractor shall contact TxDOT's Project Engineer 25 calendar days prior to the demolition of the bridges(s) on the project to assist with the notification.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.

2.

Texas Department of Transportation
San Antonio District Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic 2015-10-09 SAT.dgn	DN: TxDOT	CK: TxDOT	DW: BW	CK: GAC
© TxDOT OCTOBER 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
12-12-2011 IDS)	DIST	COUNTY		SHEET NO.
05-07-14 ADDED NOTES SECTION IV.				
01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSEY SWALES	SAT	BEXAR		59

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

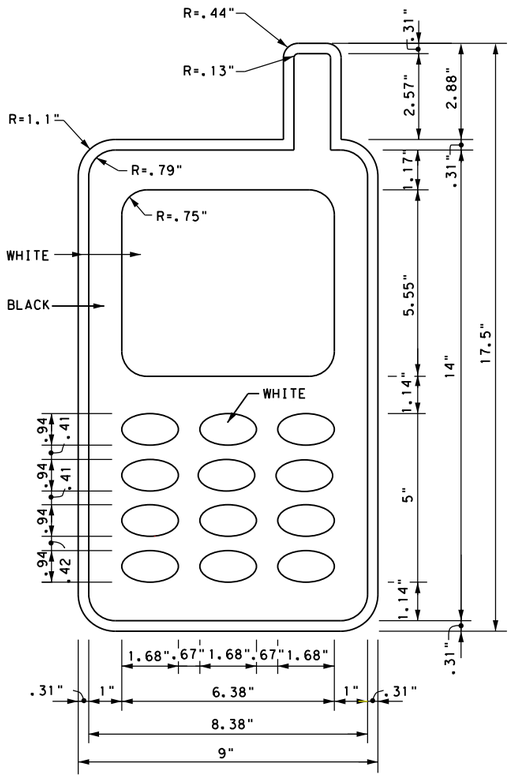
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

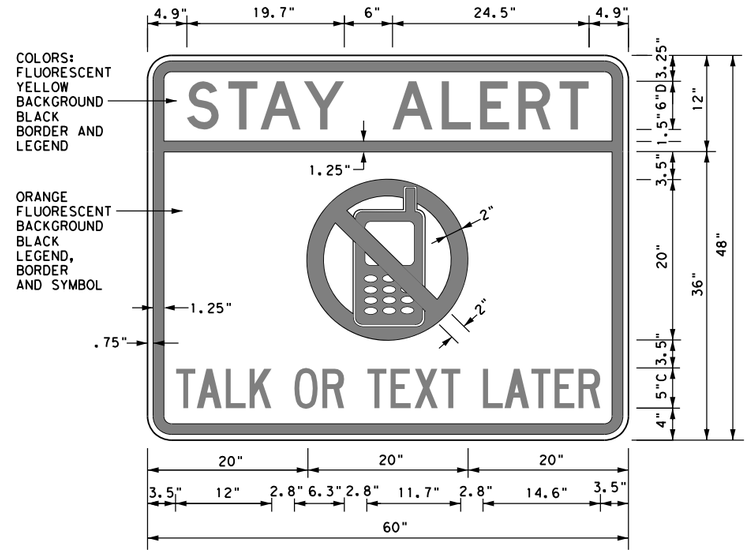
12. The Engineer has the final decision on the location of all traffic control devices.

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

WORKER SAFETY APPAREL NOTES:

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





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

SIGN DETAIL (G20-10T)

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

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

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13		BEXAR		60

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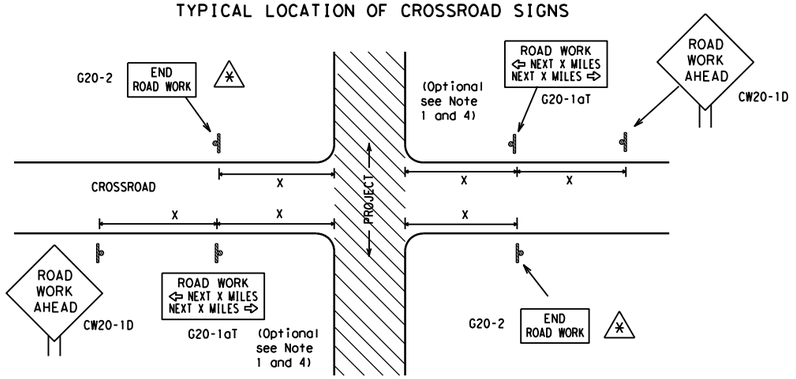
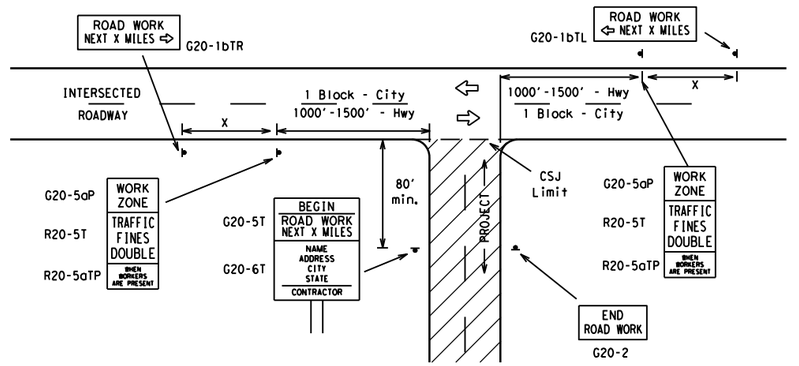
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

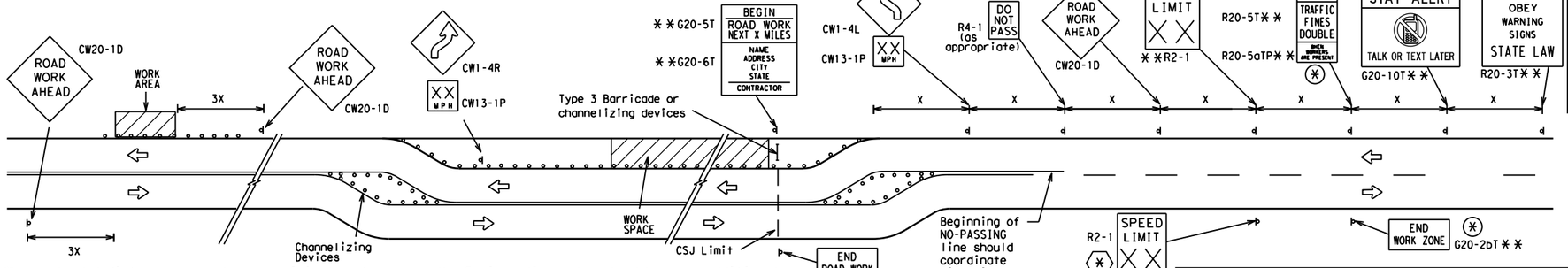
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

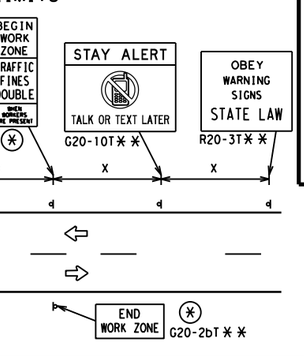
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

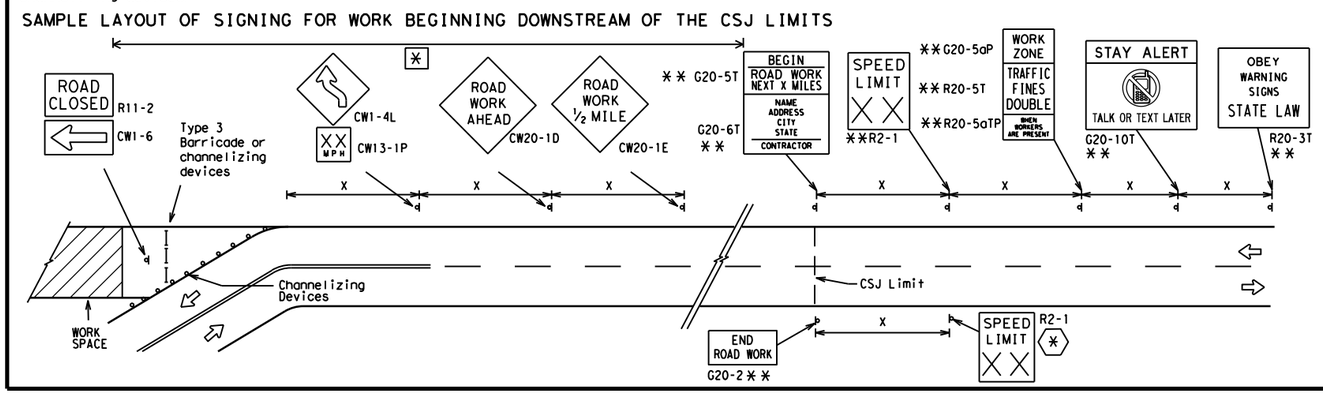


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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



NOTES

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

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

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

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

(✱) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13		BEXAR		61

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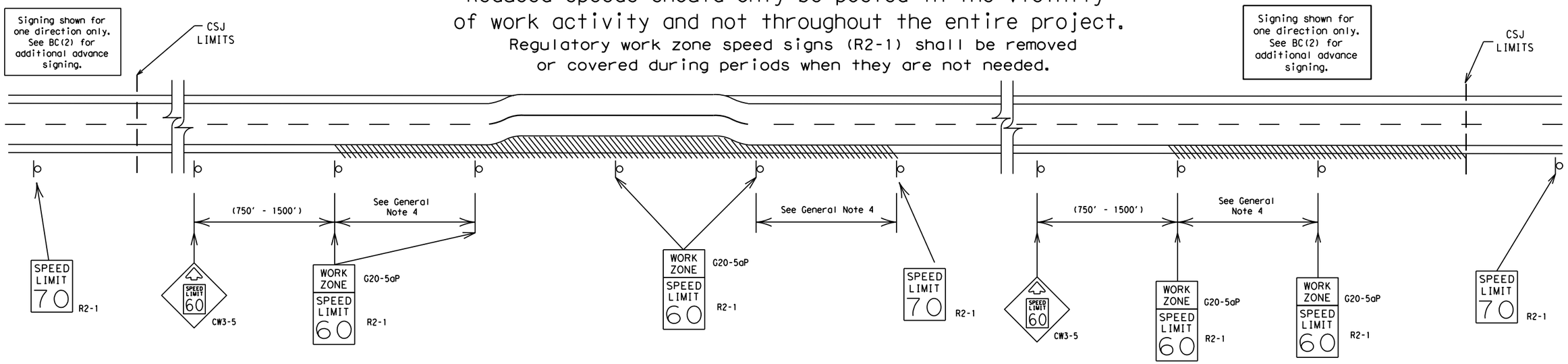
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
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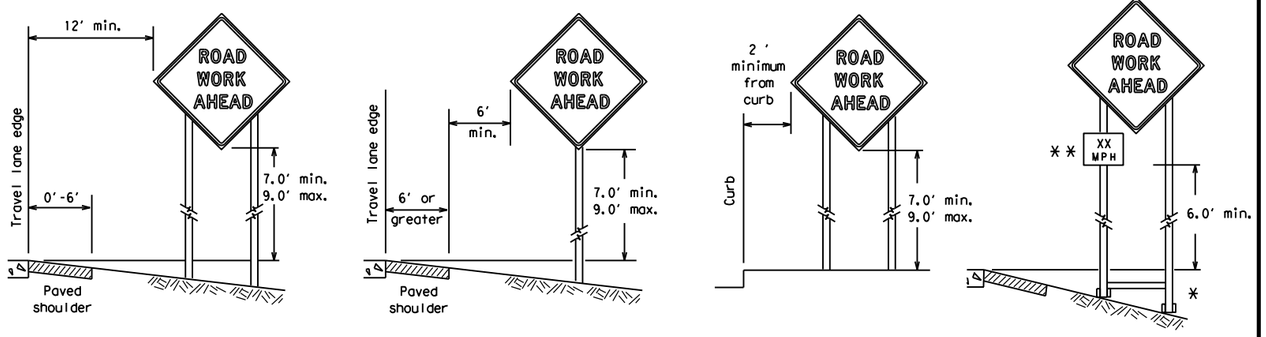
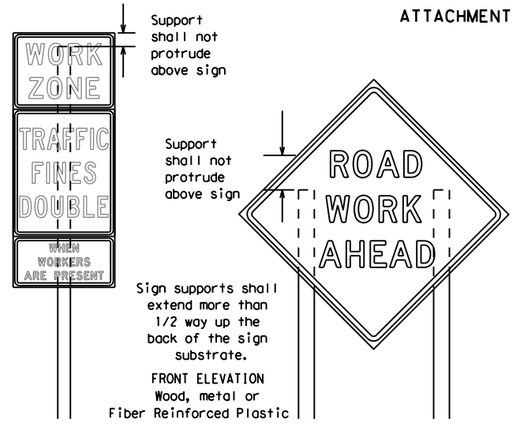
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

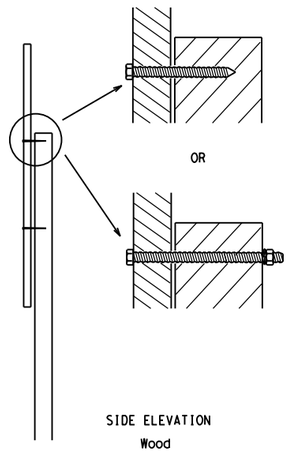


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





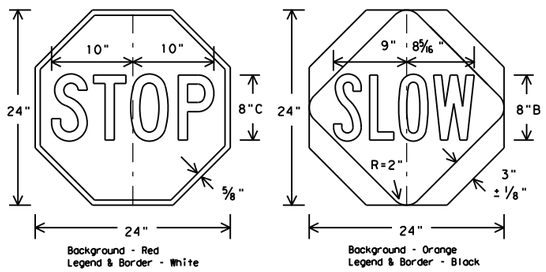
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

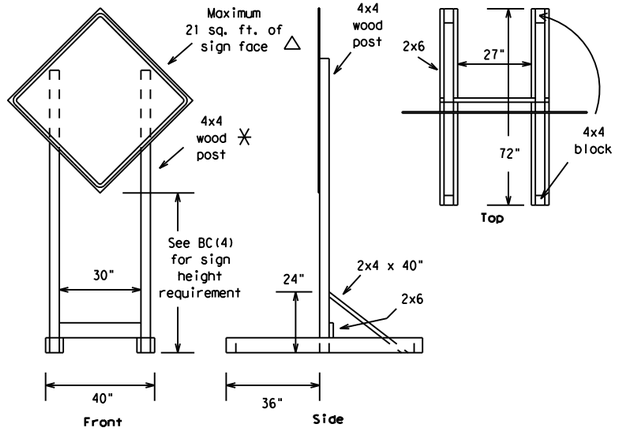
Texas Department of Transportation

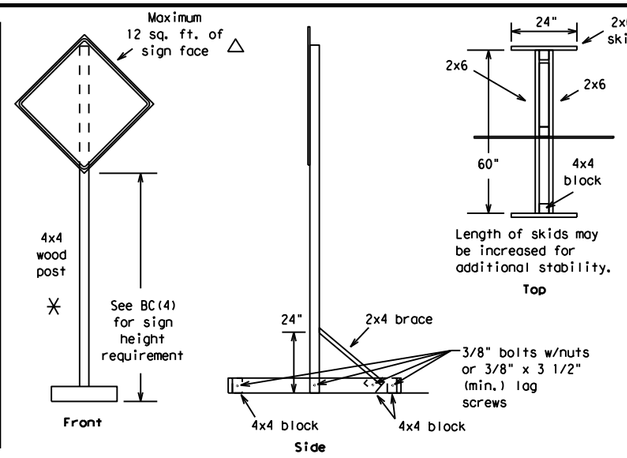
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

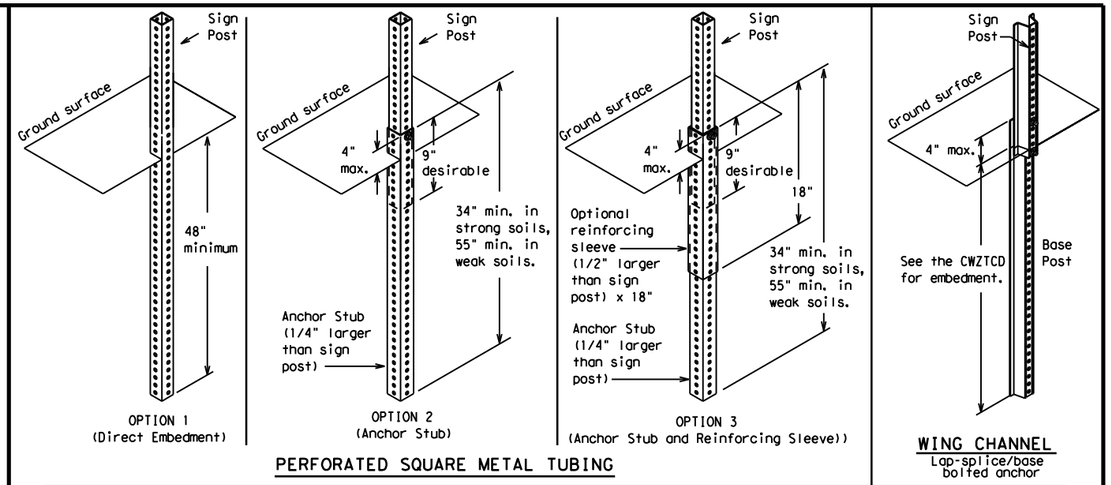
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13		BEXAR		63





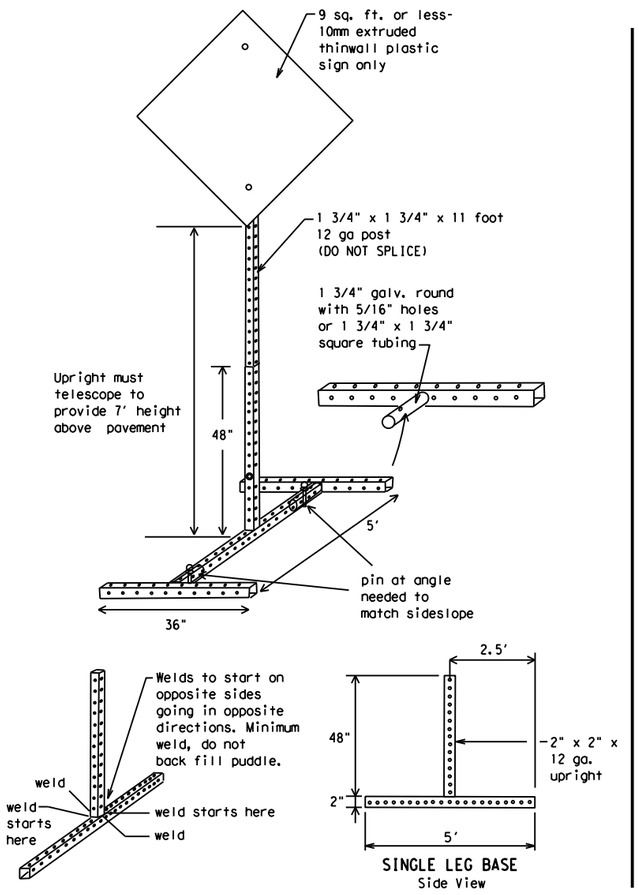
SKID MOUNTED WOOD SIGN SUPPORTS

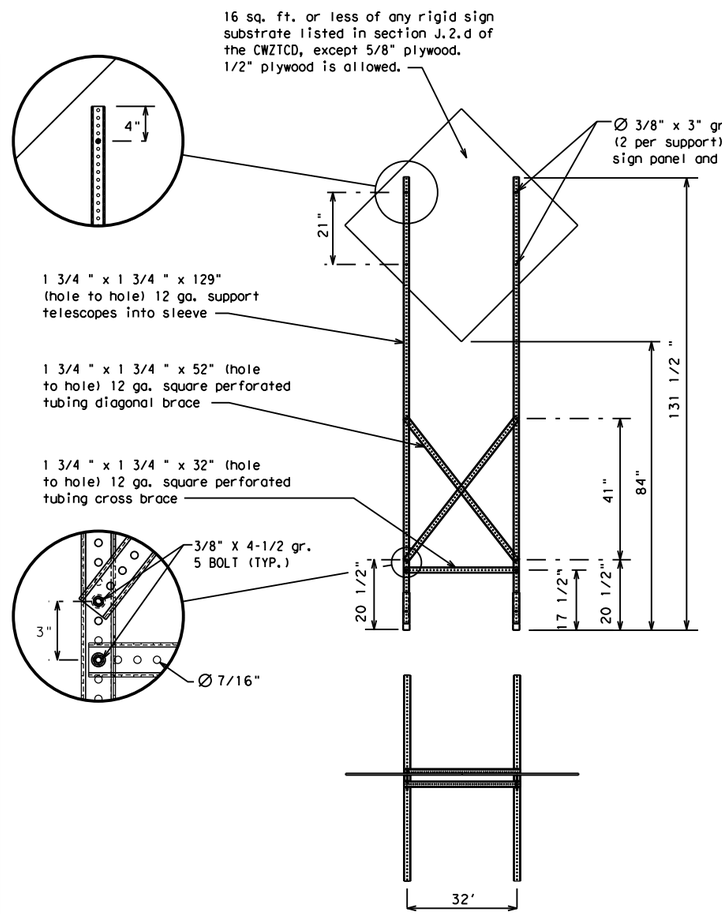
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

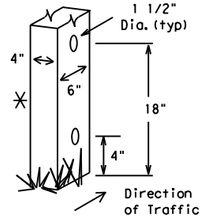


GROUND MOUNTED SIGN SUPPORTS

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.

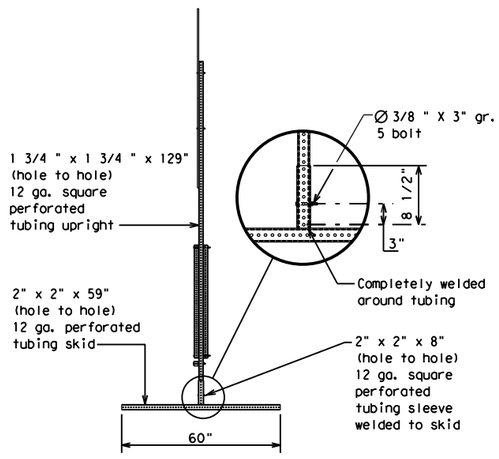






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13		BEXAR		64

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13		BEXAR		65

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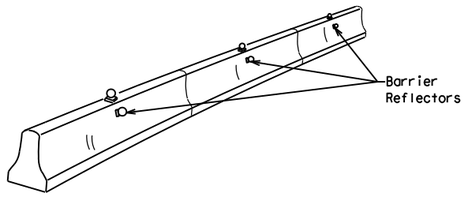
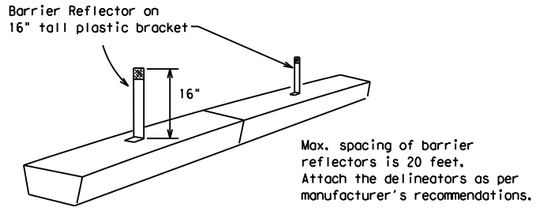
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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

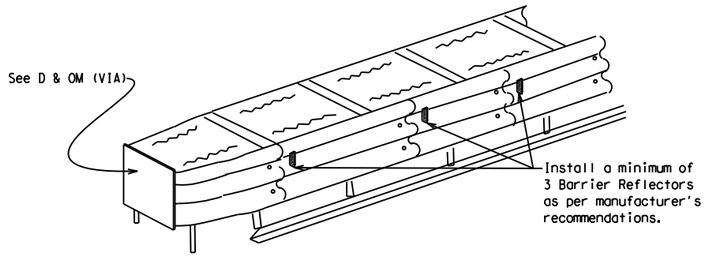


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

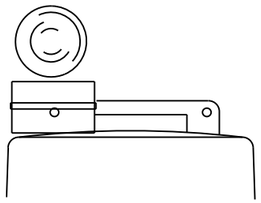


DELINEATION OF END TREATMENTS

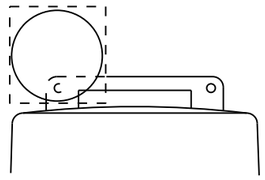
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

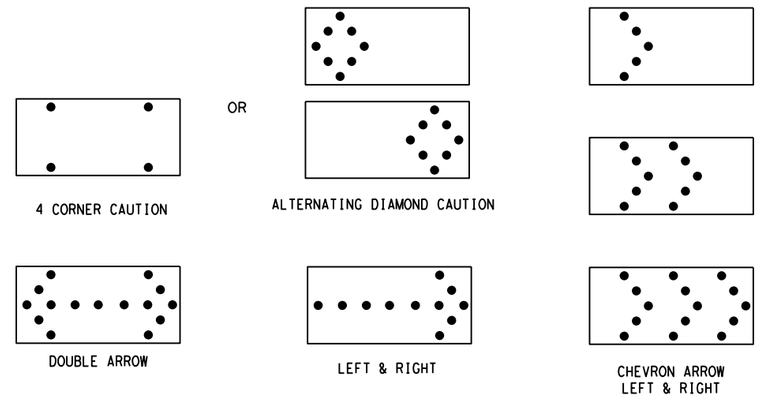
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

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

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0915	12	562	WATSON RD
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

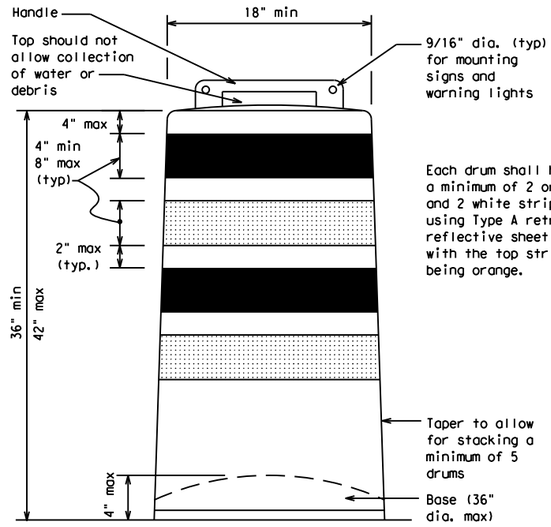
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

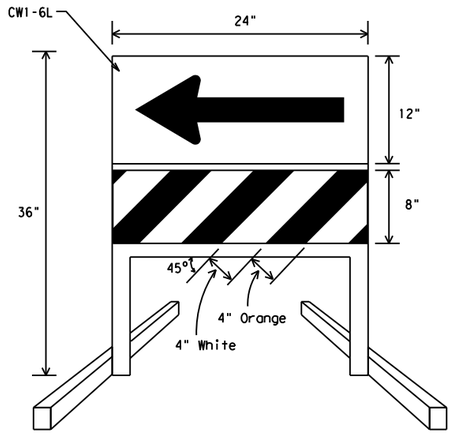
RETROREFLECTIVE SHEETING

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

BALLAST

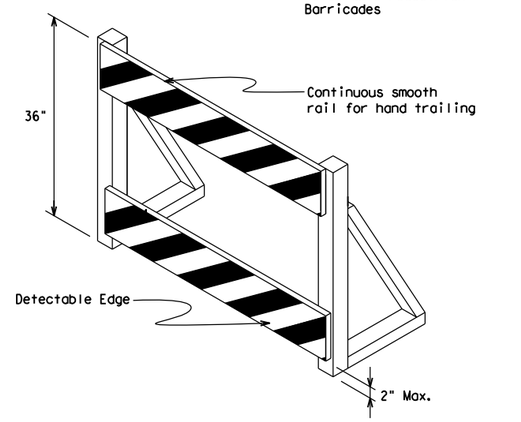
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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





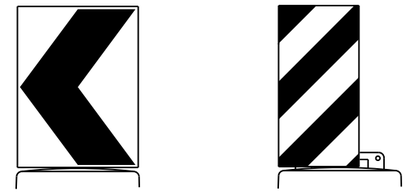
DIRECTION INDICATOR BARRICADE

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



DETECTABLE PEDESTRIAN BARRICADES

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



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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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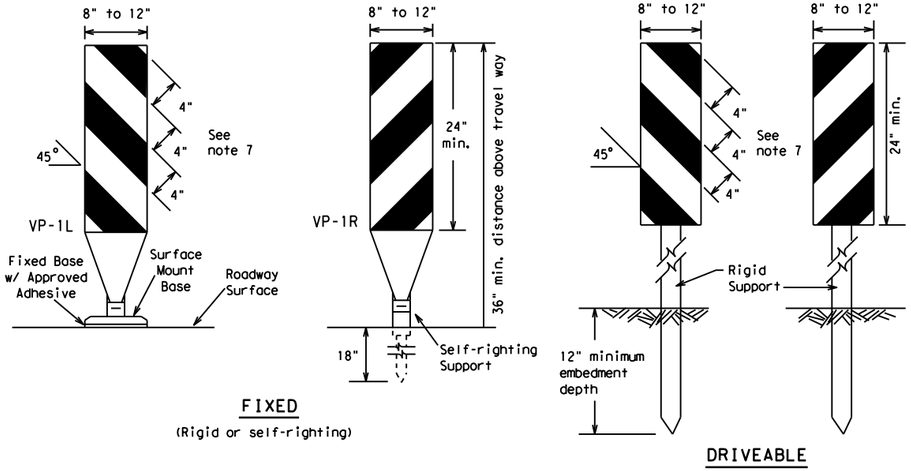
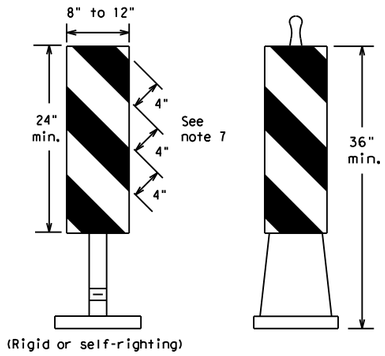


FIXED

(Rigid or self-righting)

DRIVEABLE

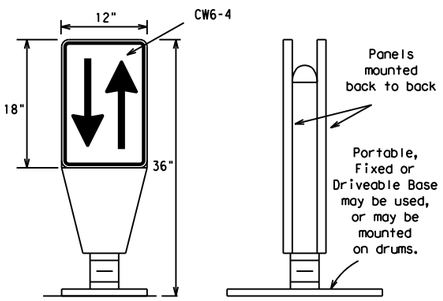


(Rigid or self-righting)

PORTABLE

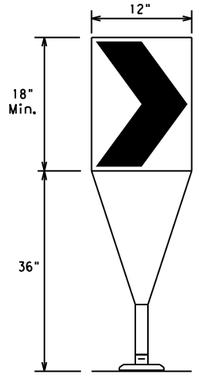
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



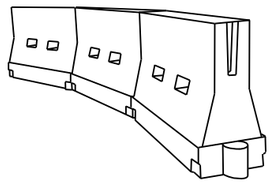
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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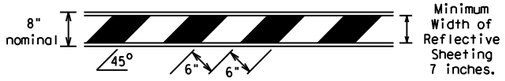
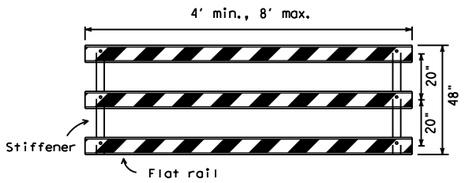
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



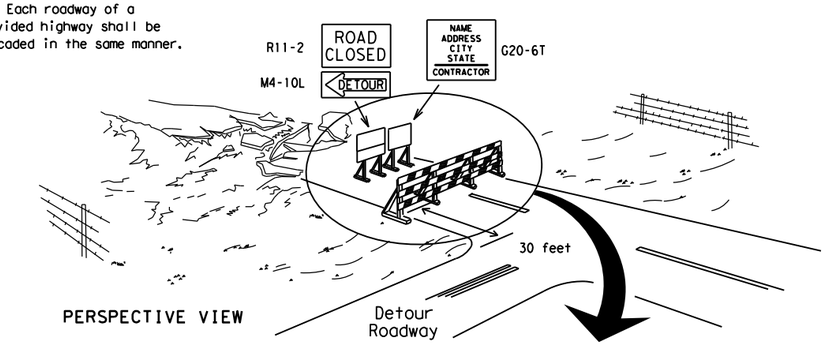
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

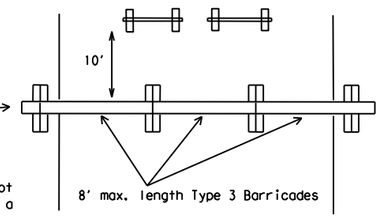
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

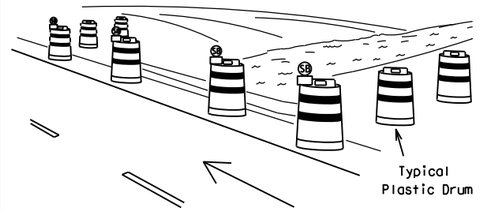
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

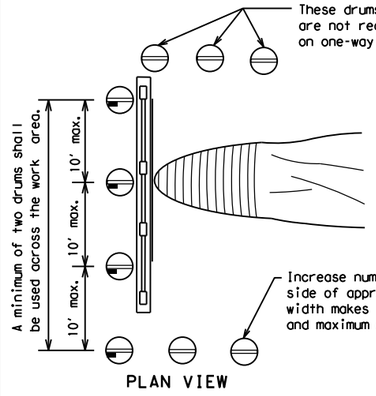
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

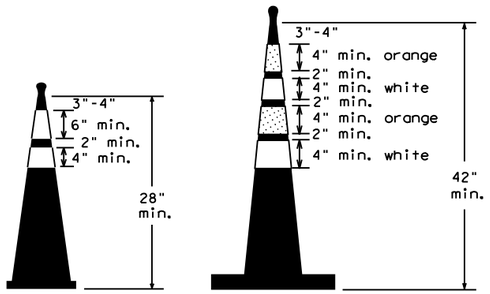
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

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

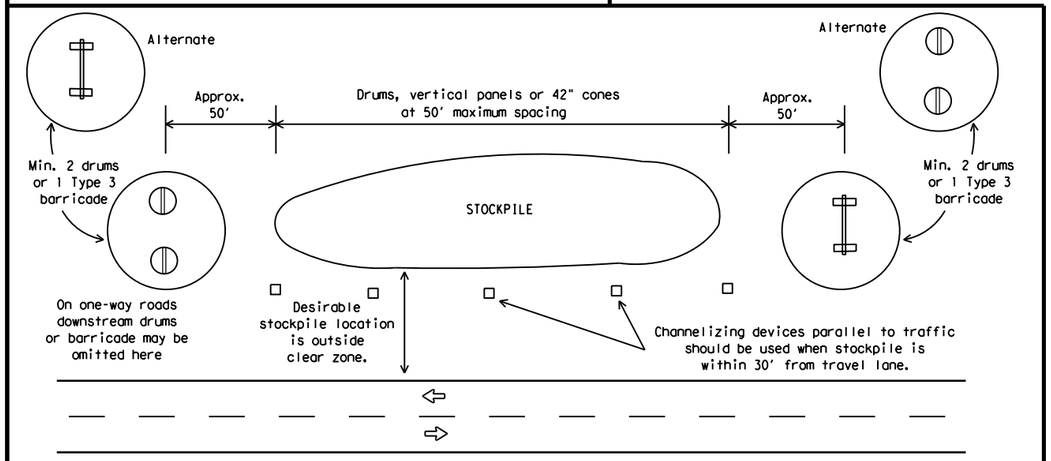
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



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

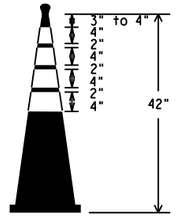
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13		BEXAR		69

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

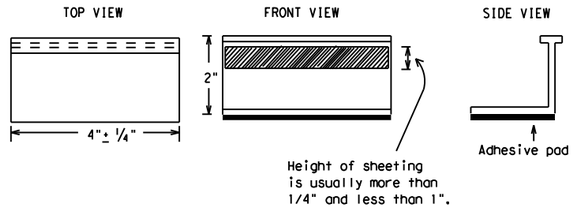
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
2-98 9-07	DIST	COUNTY		SHEET NO.
1-02 7-13		BEXAR		70
11-02 8-14				

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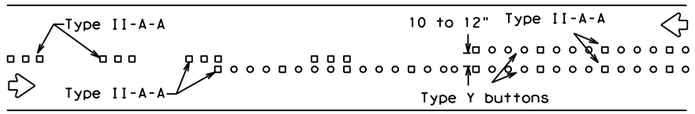
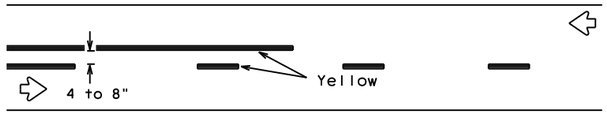
PAVEMENT MARKING PATTERNS

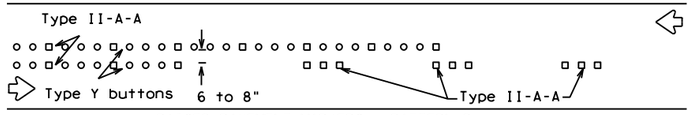
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



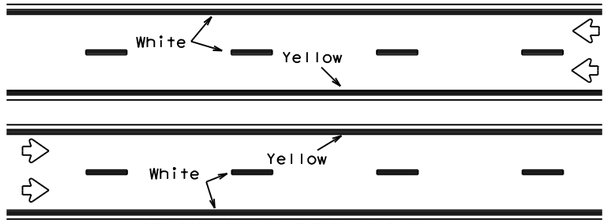
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



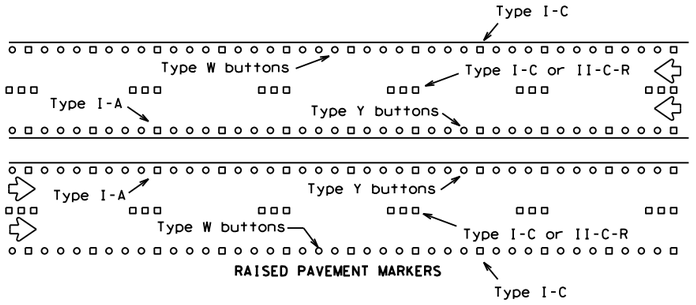
RAISED PAVEMENT MARKERS - PATTERN B

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

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



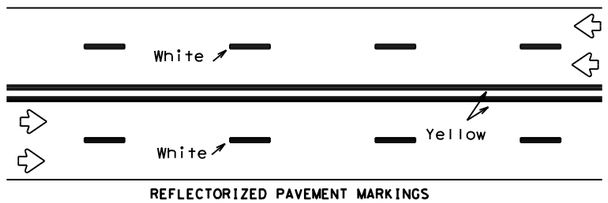
REFLECTORIZED PAVEMENT MARKINGS



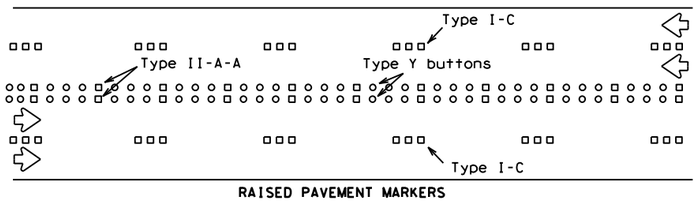
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



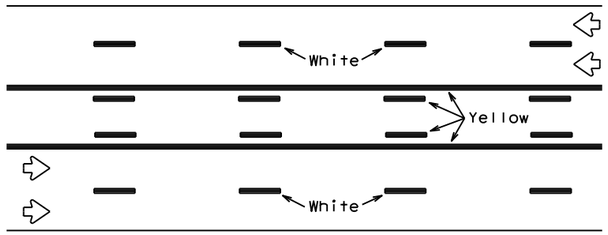
REFLECTORIZED PAVEMENT MARKINGS



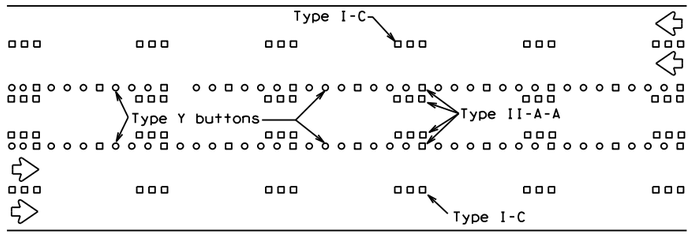
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

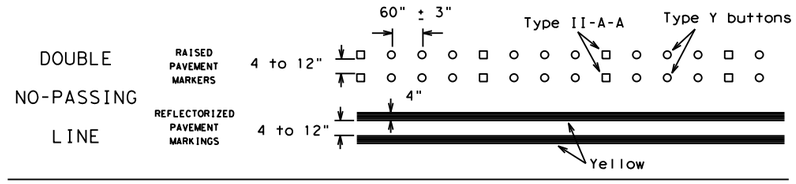
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

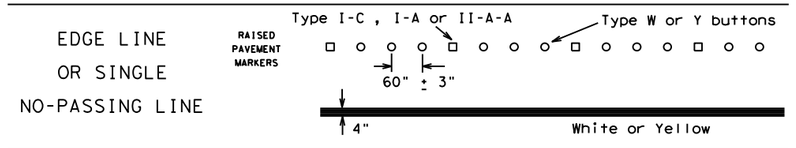
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

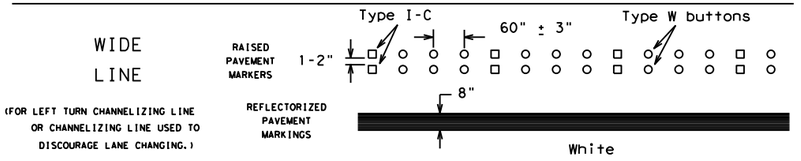


EDGE LINE OR SINGLE NO-PASSING LINE



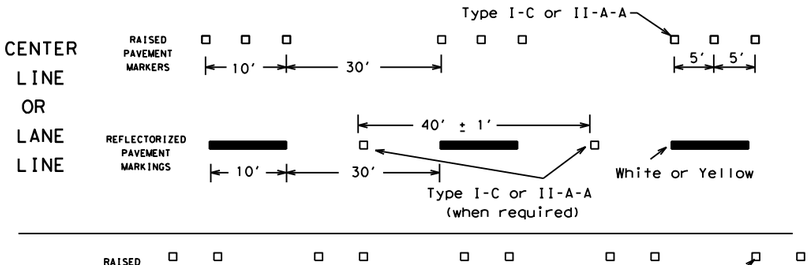
WIDE LINE

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

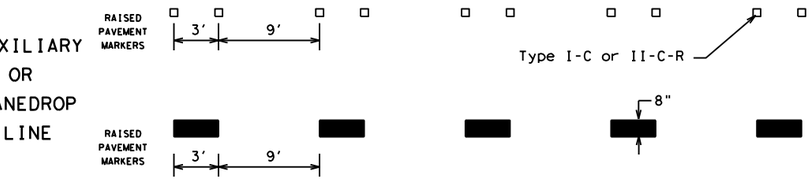


BROKEN LINES

CENTER LINE OR LANE LINE

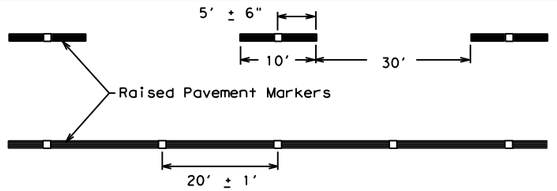


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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11-02 8-14				

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7/6/2020
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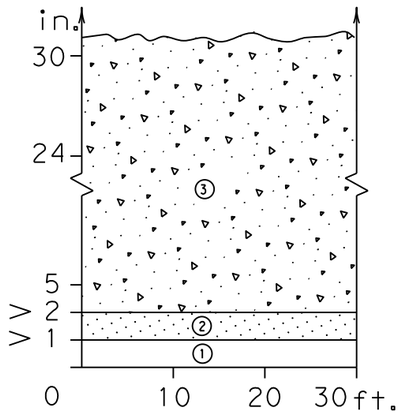
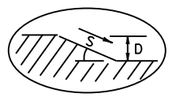
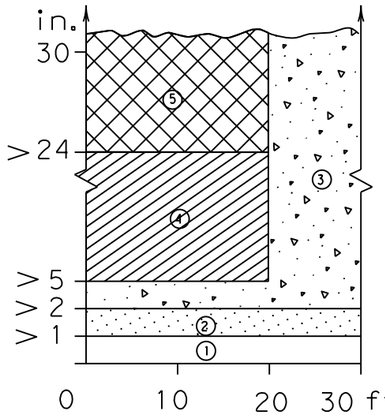
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

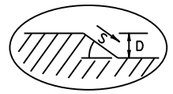


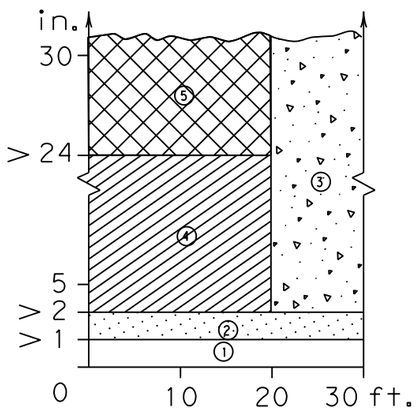
Edge Condition I
S = (3:1) (or flatter)



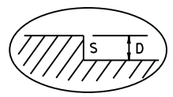


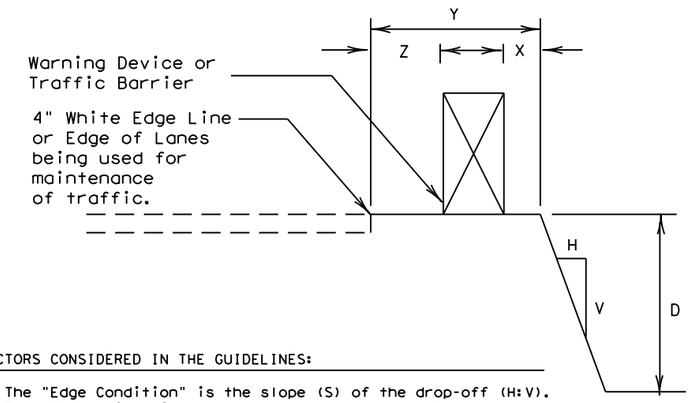
Edge Condition II
S = ((2.99):1) to (1:1)





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	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive 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:

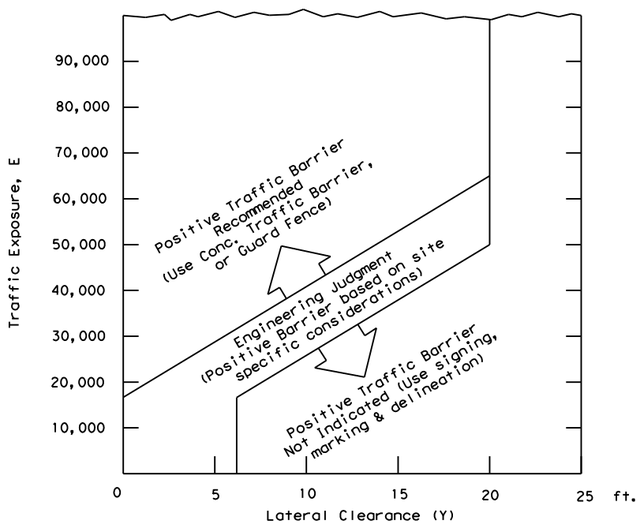
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1to 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 a lateral offset of 20 feet from the edge of the travel lane.

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.

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
03-01
08-01 correct typos

CONT	SECT	JOB	HIGHWAY
0915	12	562	WATSON RD

DIST	COUNTY	SHEET NO.
SATX	BEXAR	72

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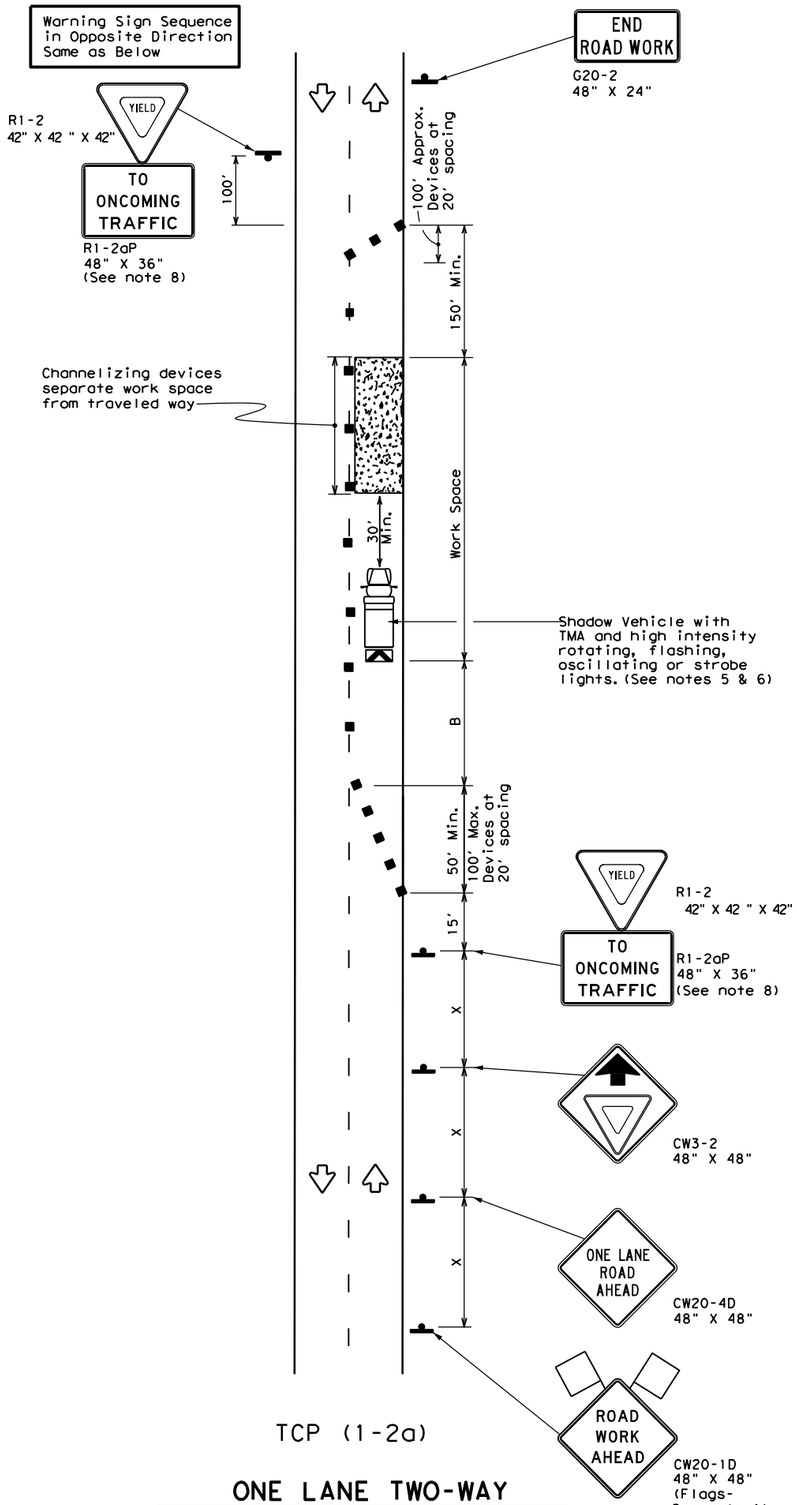
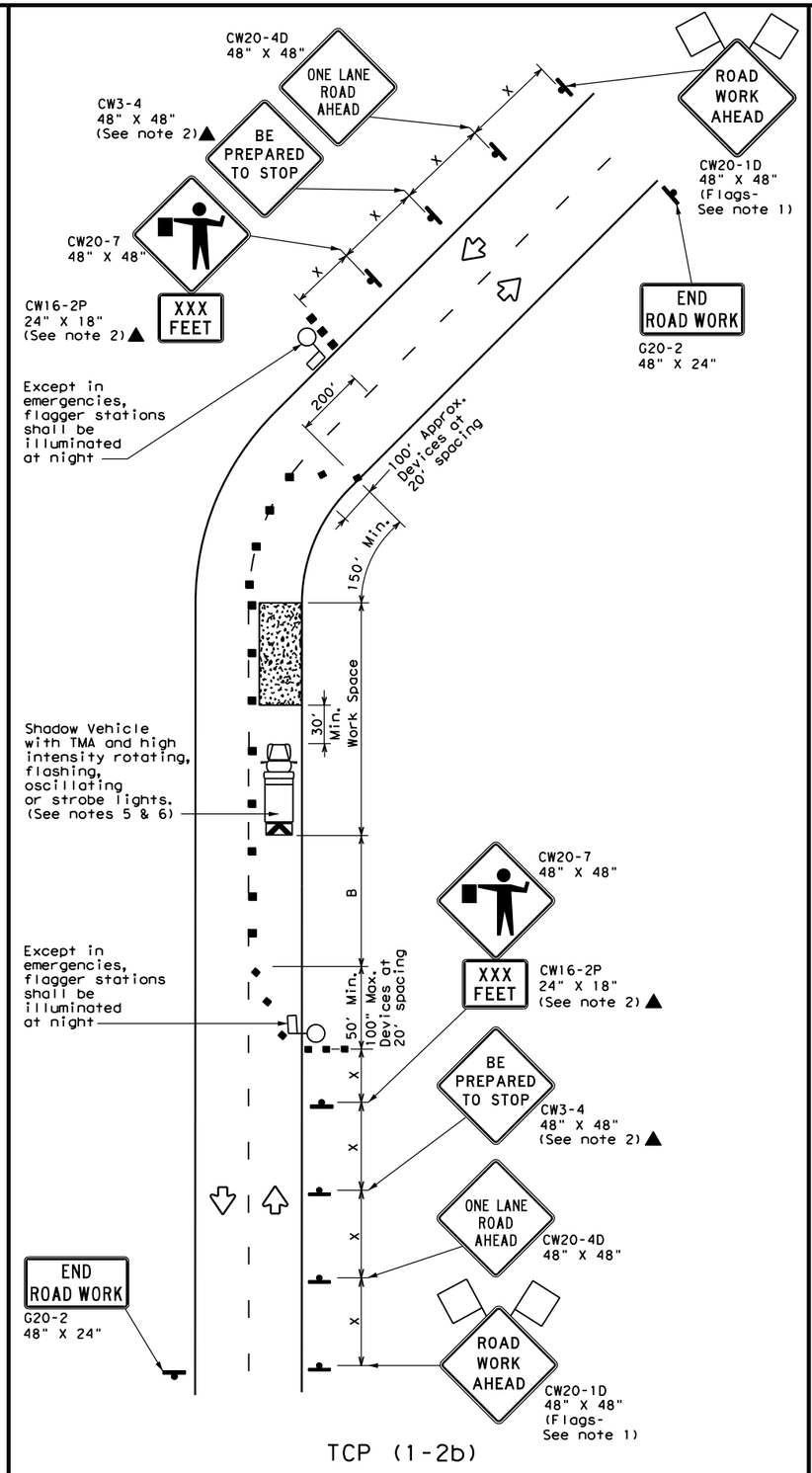


TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

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

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
		BEXAR		73

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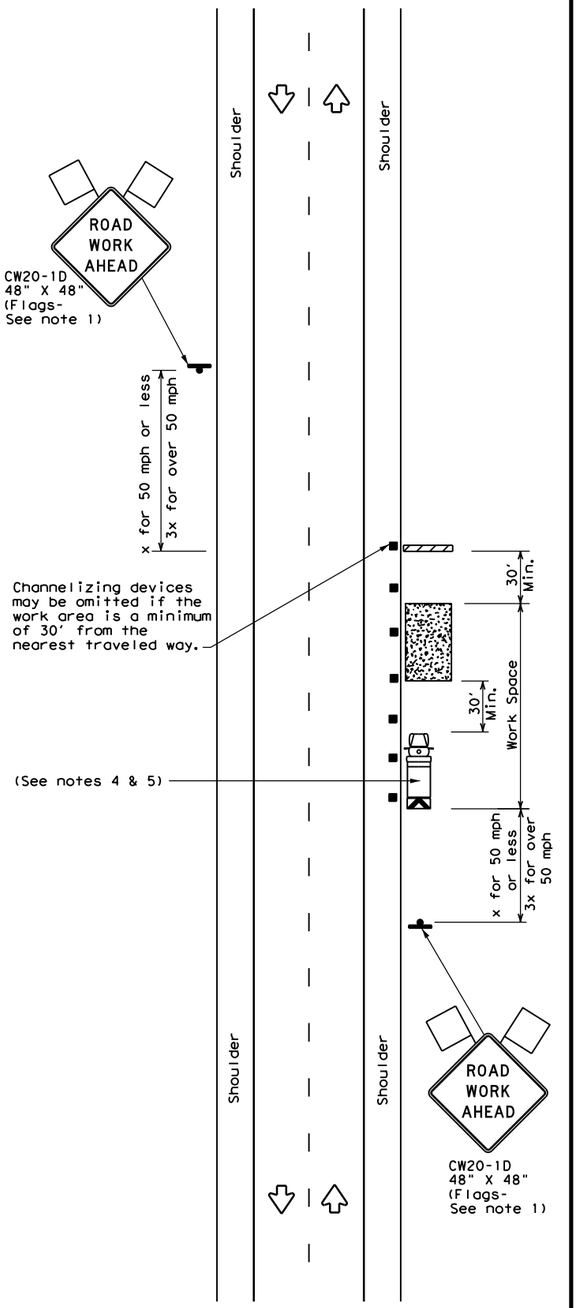
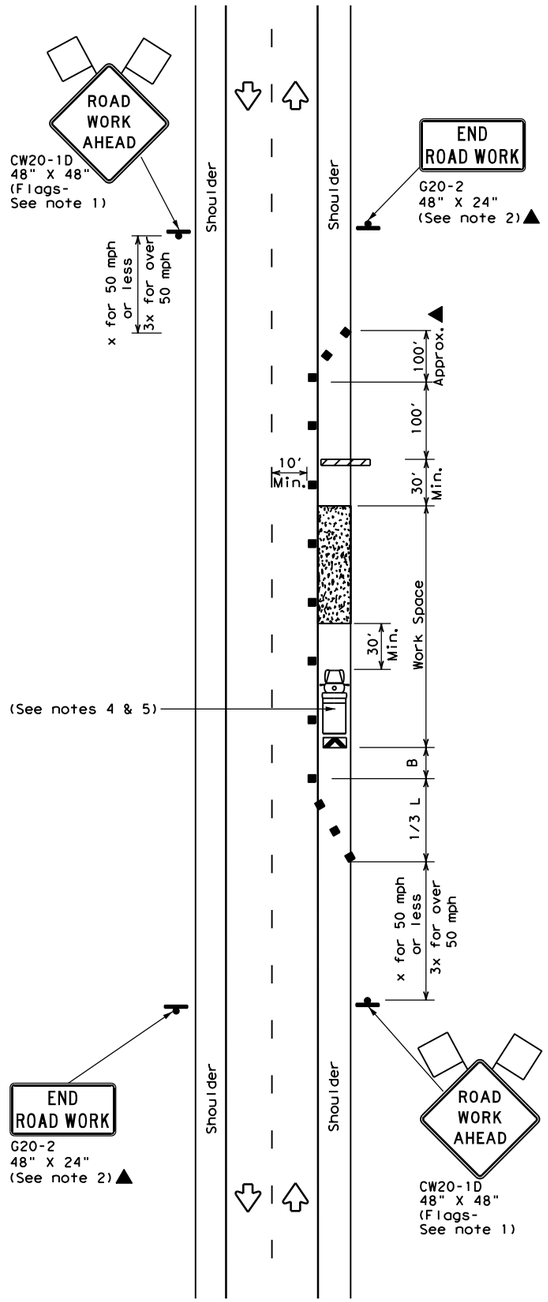
DATE:
FILE:



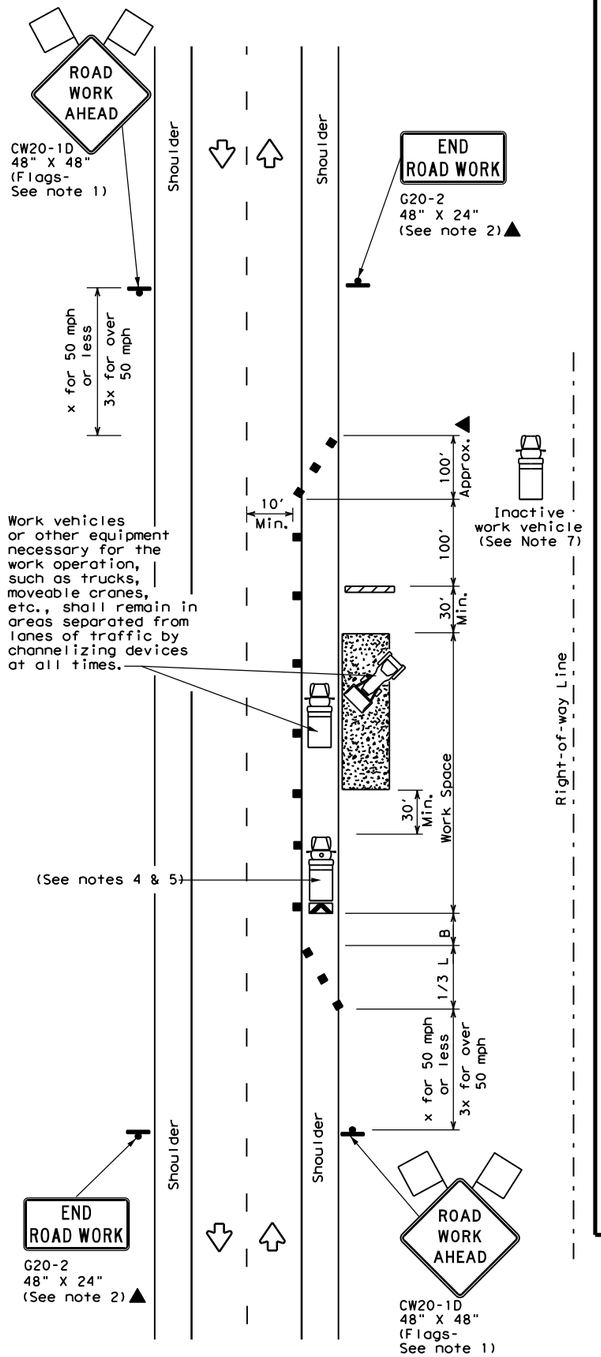
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

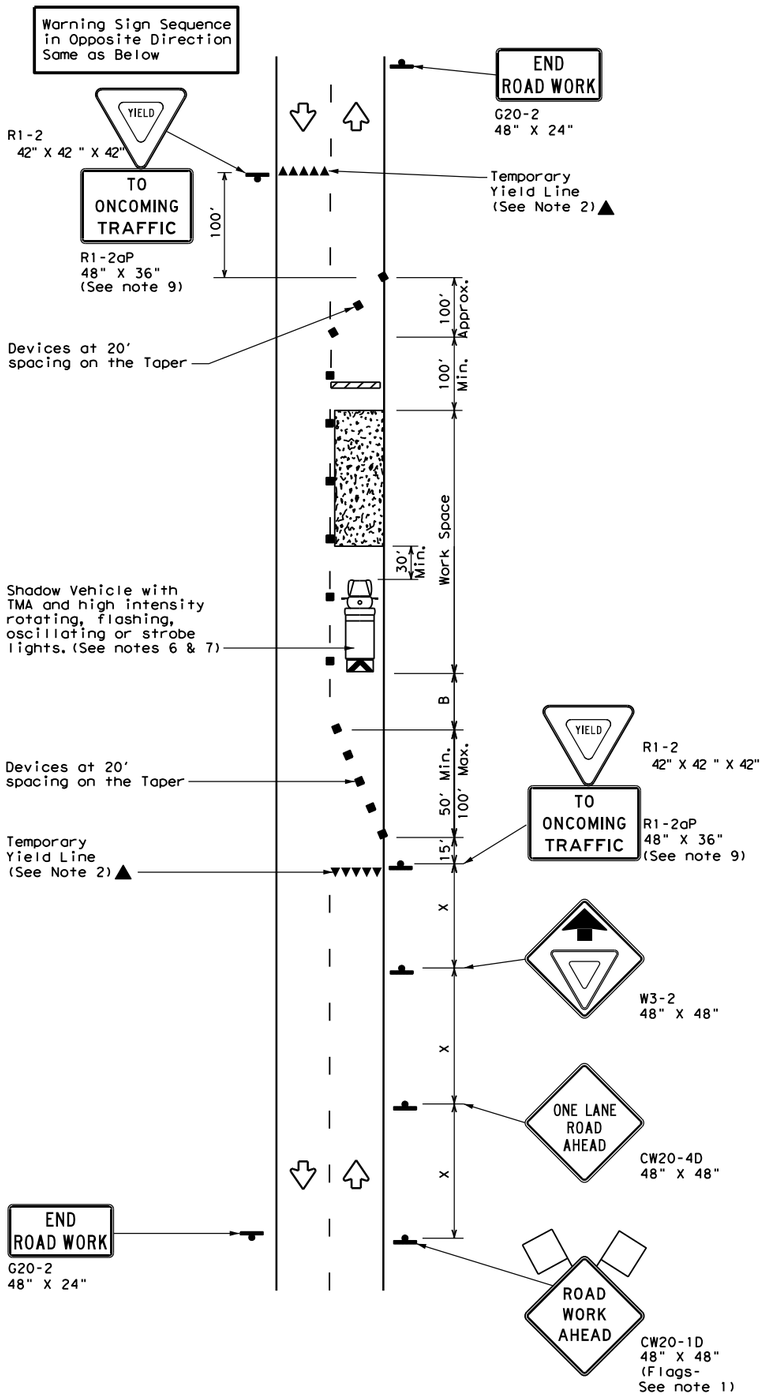
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

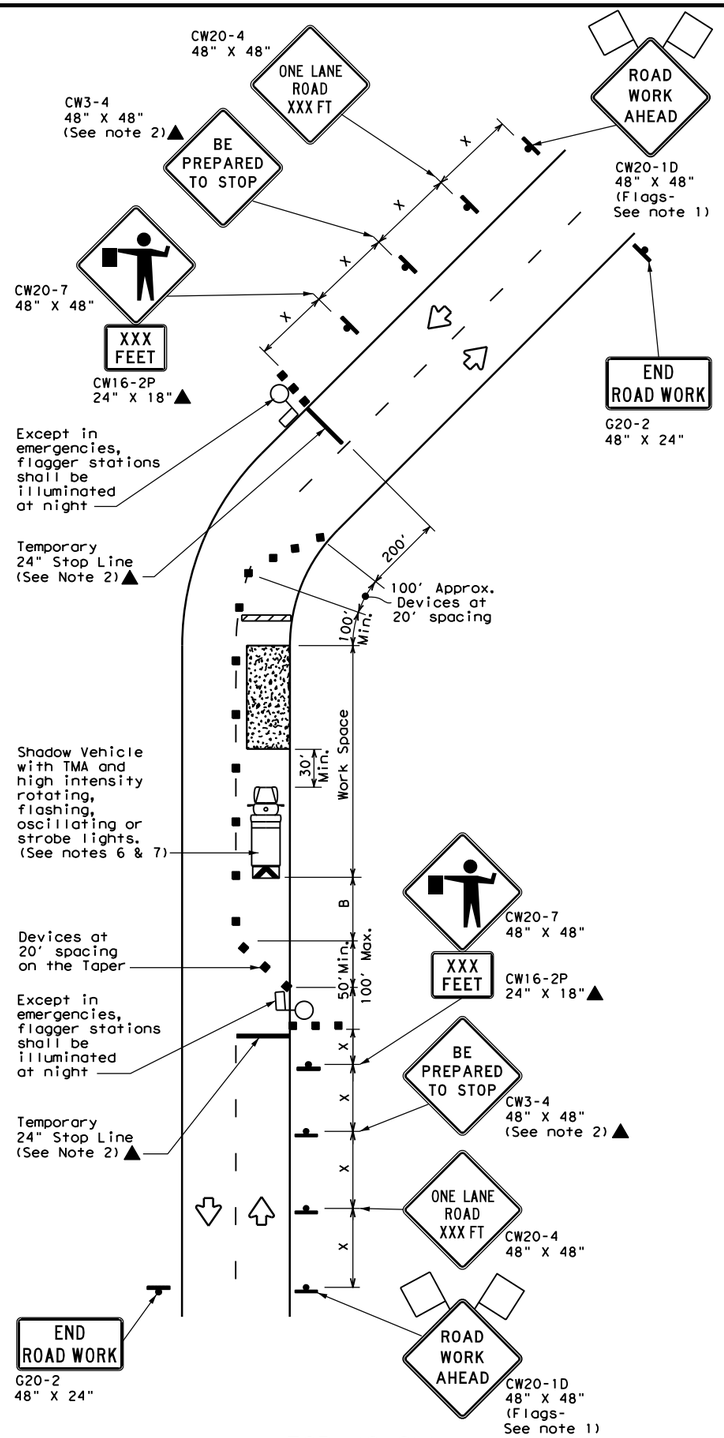
FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	SATX	BEXAR		74
1-97 2-18				

DATE:
FILE:



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0915	12	562	WATSON RD
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	SATX	BEXAR		75

DATE:
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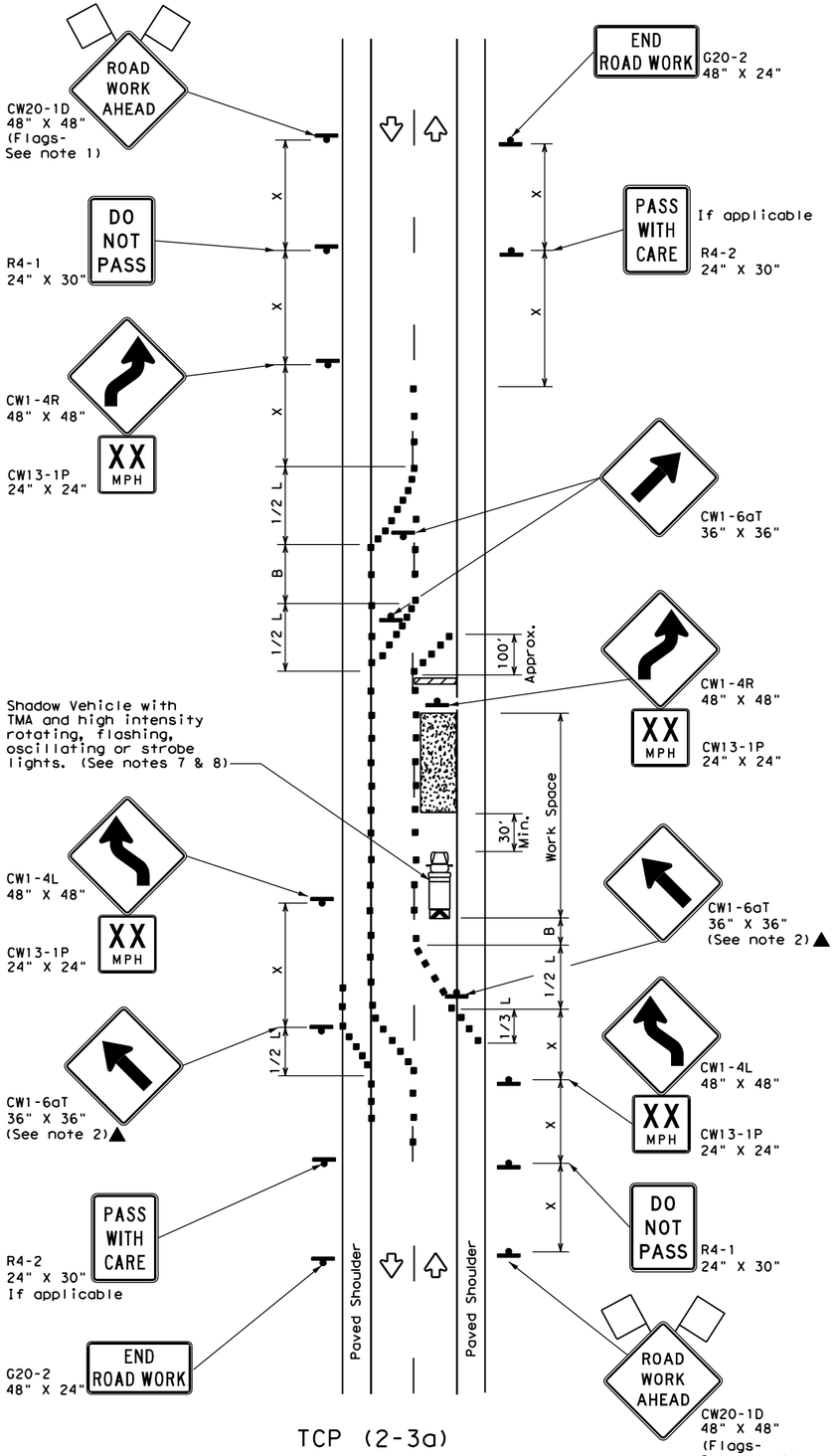
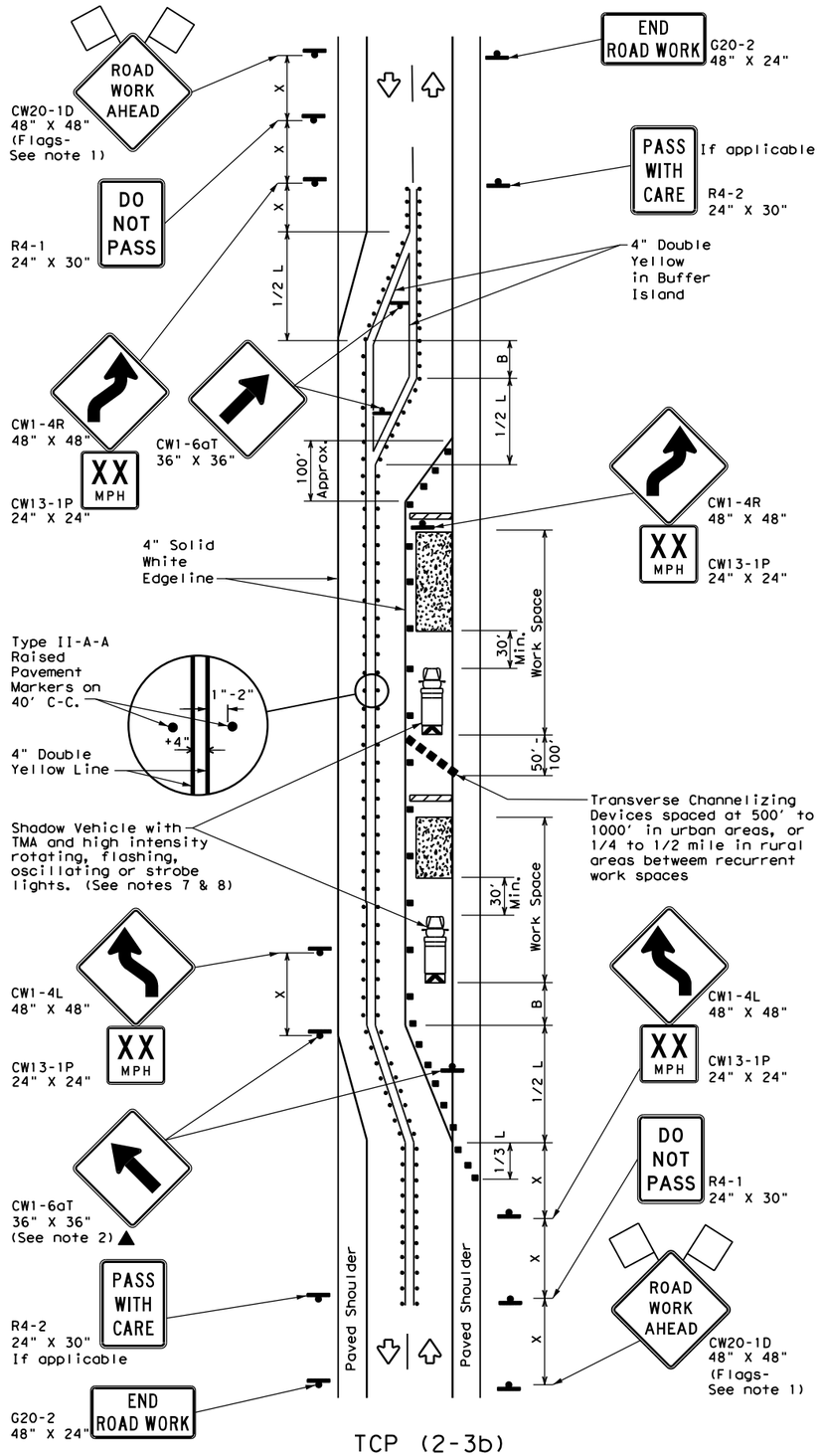


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

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 Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	SATX	BEXAR		76
4-98 2-18				

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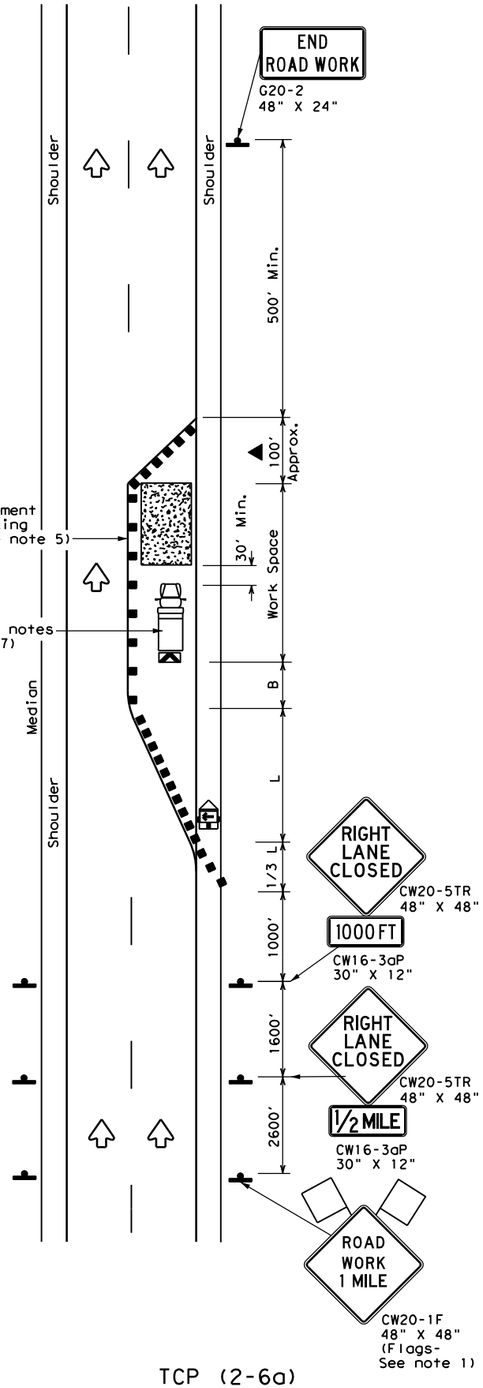
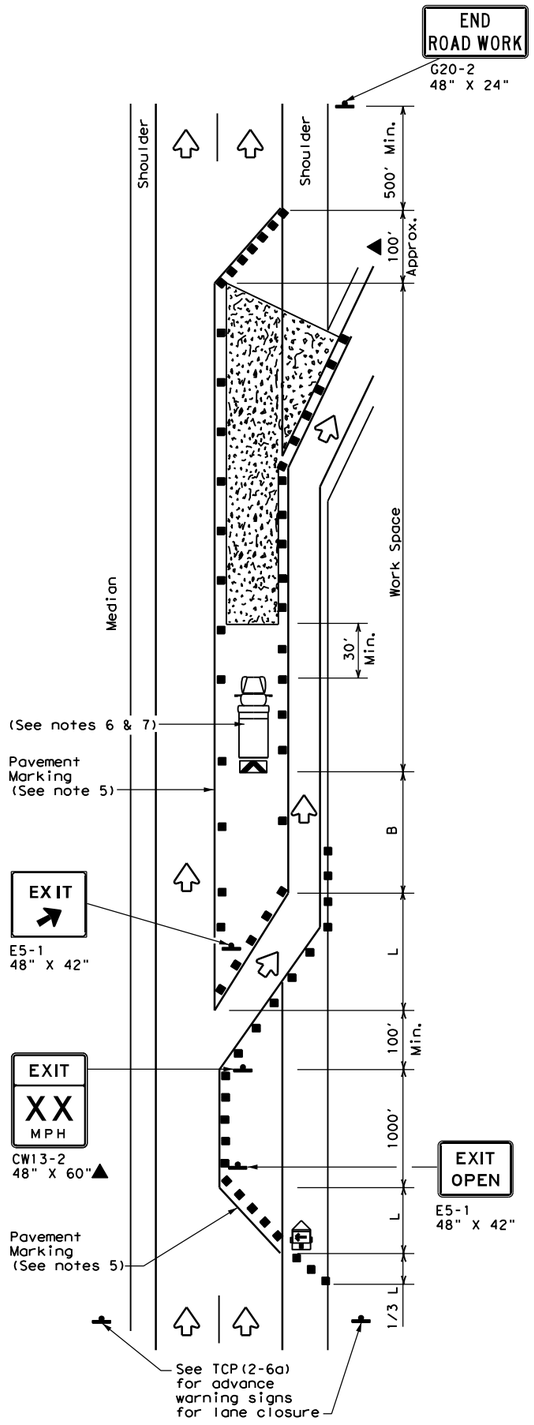
DATE:
FILE:



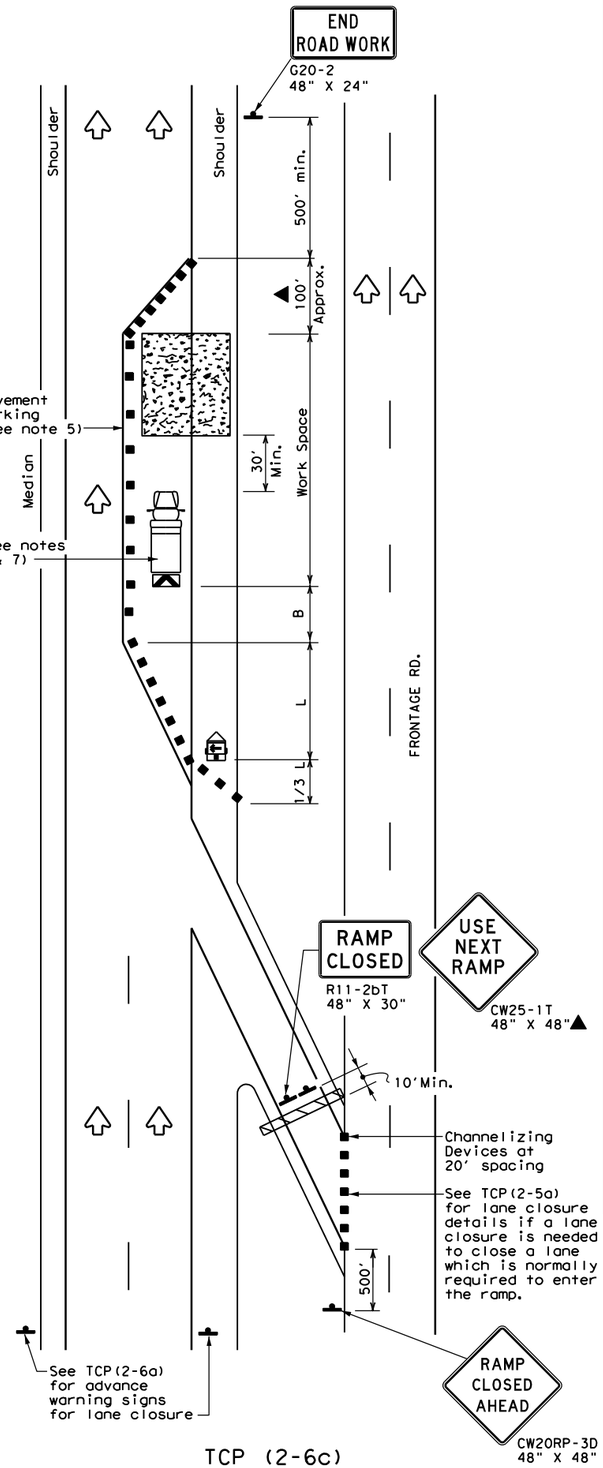
TCP (2-6a)

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	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SATX	BEXAR		77

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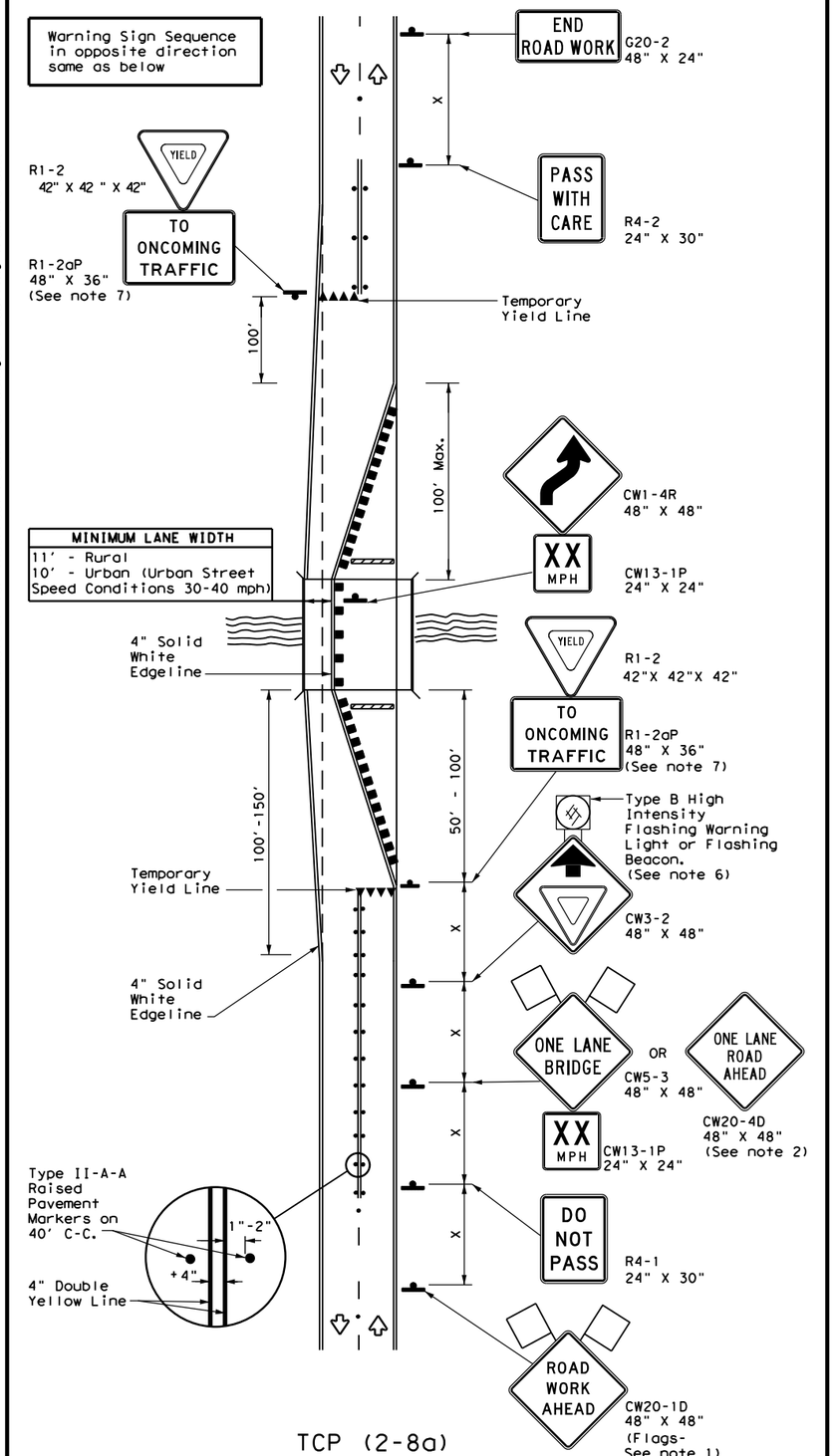
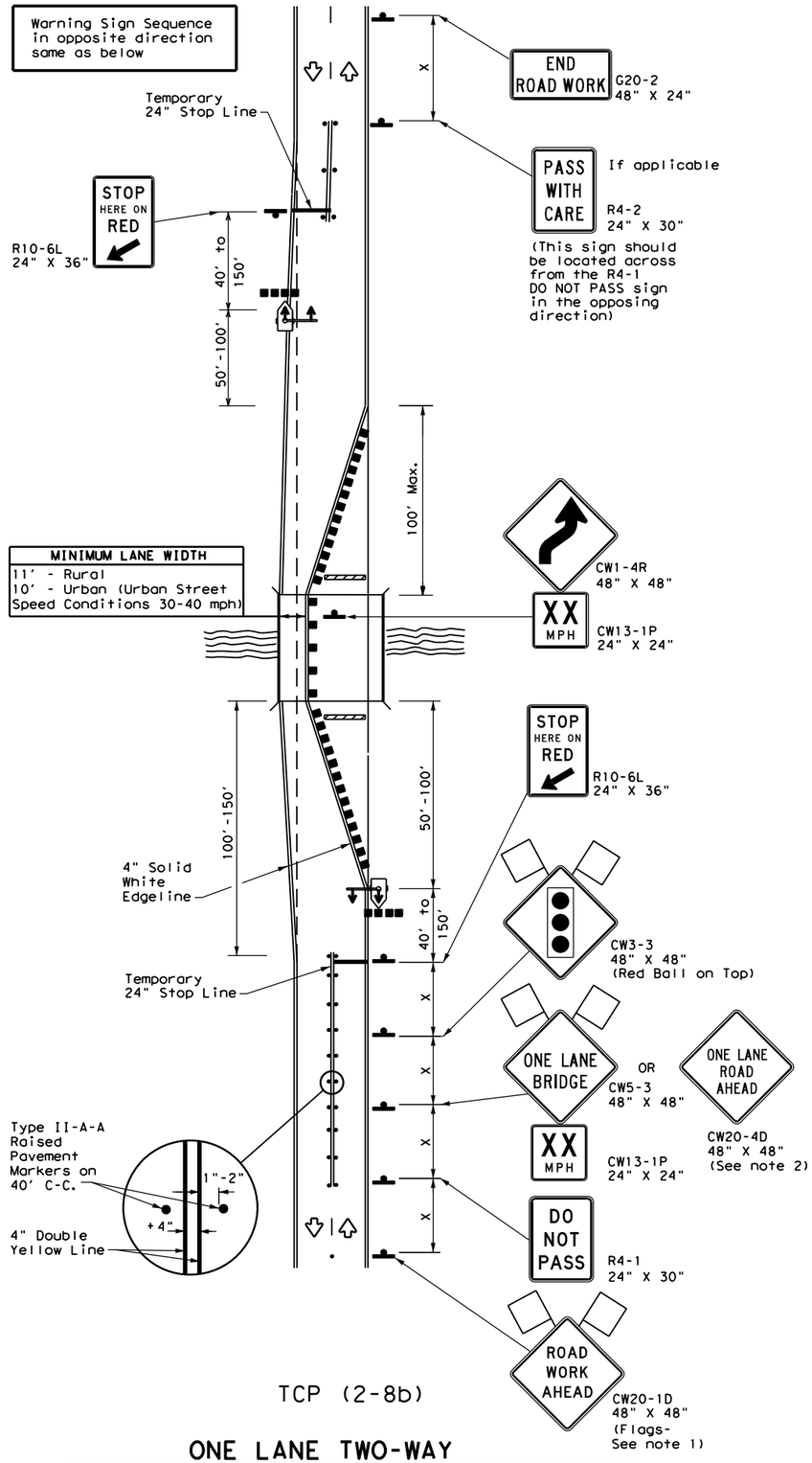
DATE:
FILE:



TCP (2-8a)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH YIELD SIGNS
(Less Than 2000 ADT-See Note 5)



TCP (2-8b)

ONE LANE TWO-WAY
TRAFFIC CONTROL WITH TRAFFIC SIGNAL

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers Ty II-AA		Temporary or Portable Traffic Signal

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
3. Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
4. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.

TCP (2-8a)

5. Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
6. If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
7. The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.

TCP (2-8b)

8. A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
9. Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
LONG TERM ONE-LANE TWO-WAY CONTROL

TCP(2-8)-18

FILE: tcp2-8-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	SATX	BEXAR		78
4-98 2-18				

DATE:
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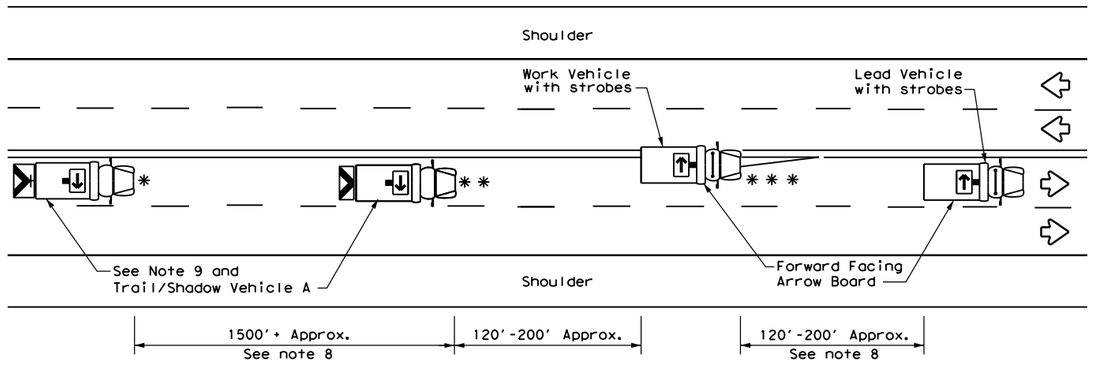
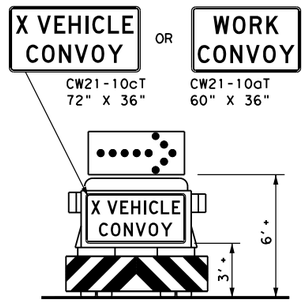


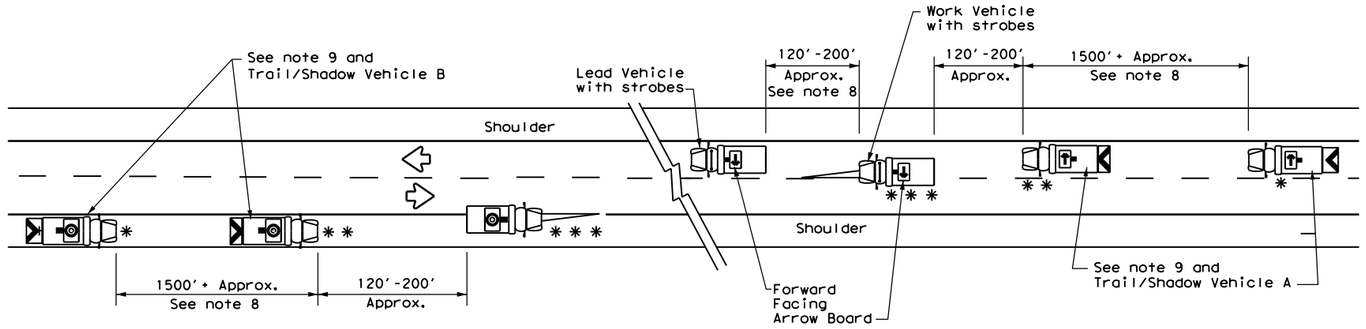
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



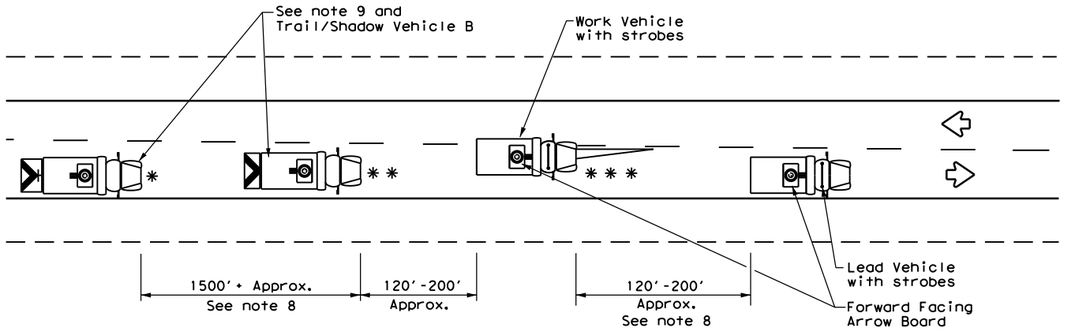
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board



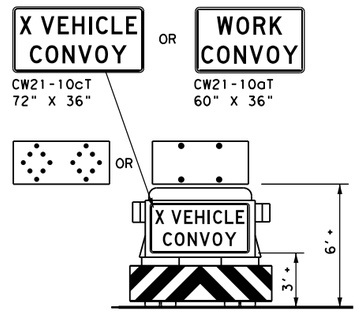
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

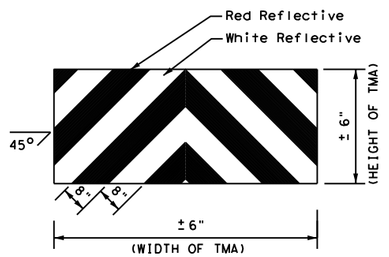
with Flashing Arrow Board in CAUTION display

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 the WORK vehicle must be equipped with an arrow board. 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 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 work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE 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. 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.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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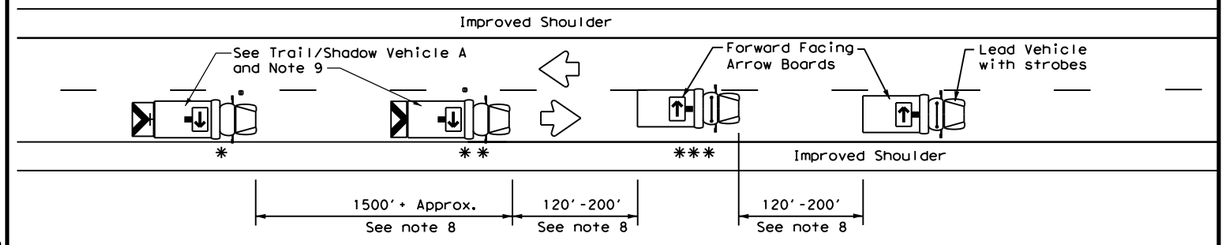
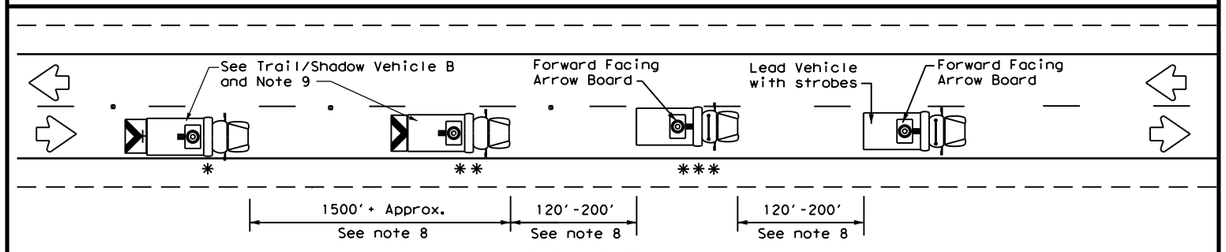


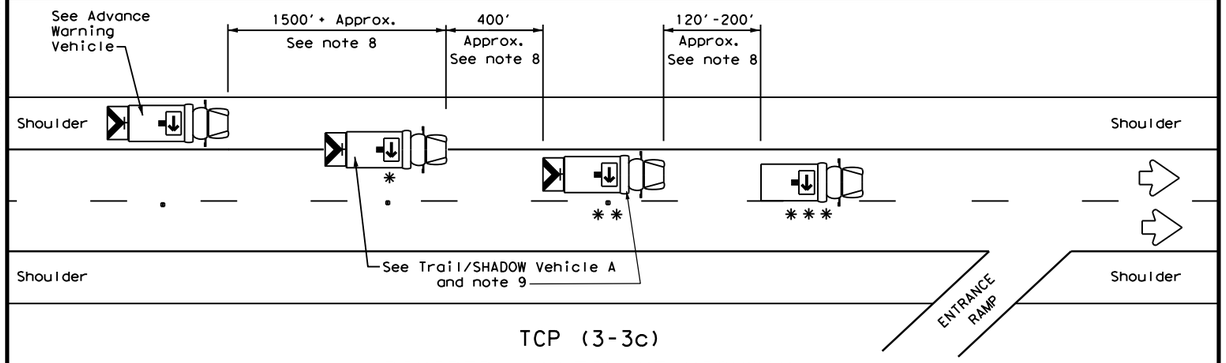
TCP (3-3a)

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



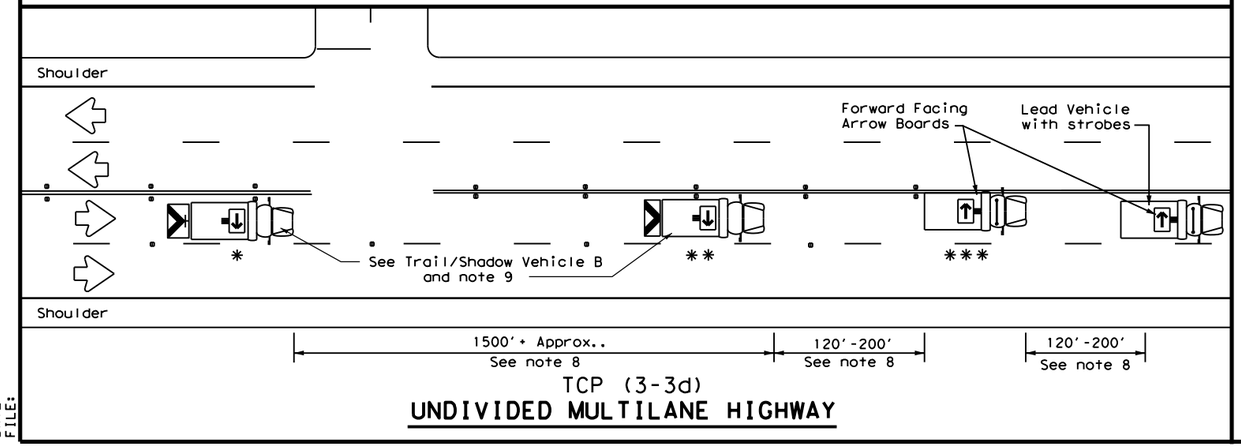
TCP (3-3b)

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



TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY

DATE:
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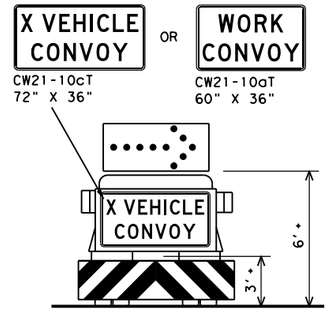
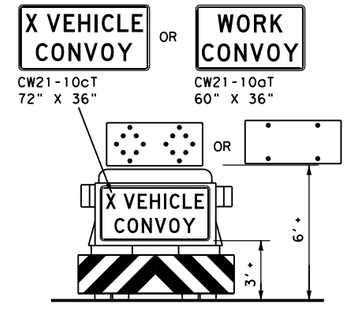


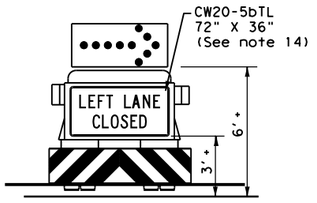
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

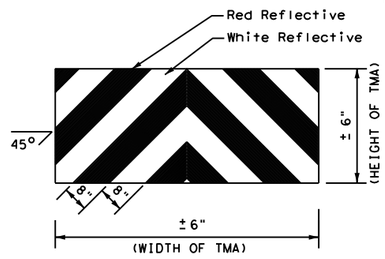


TRAIL/SHADOW VEHICLE B

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
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13		BEXAR		80
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DATE:
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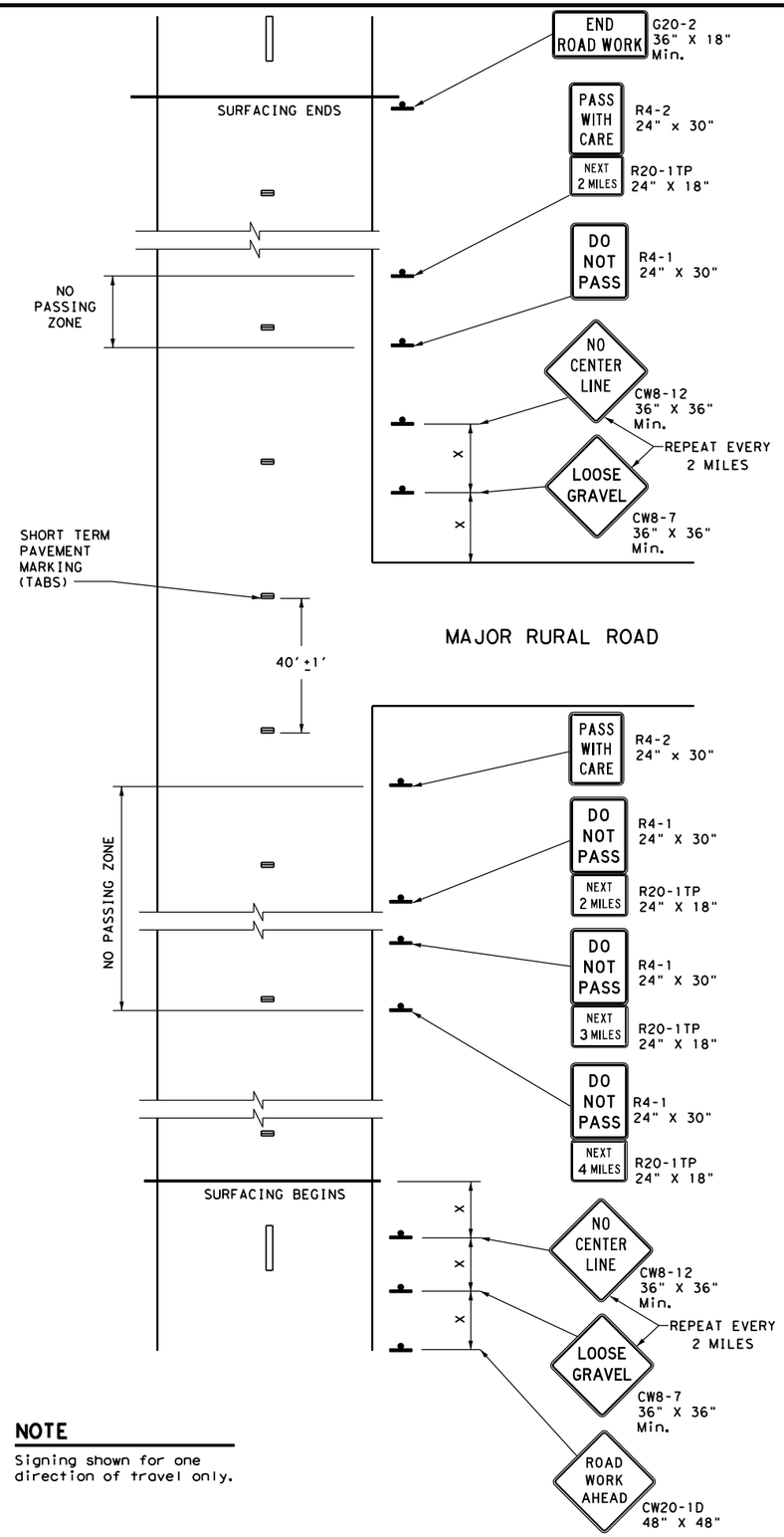
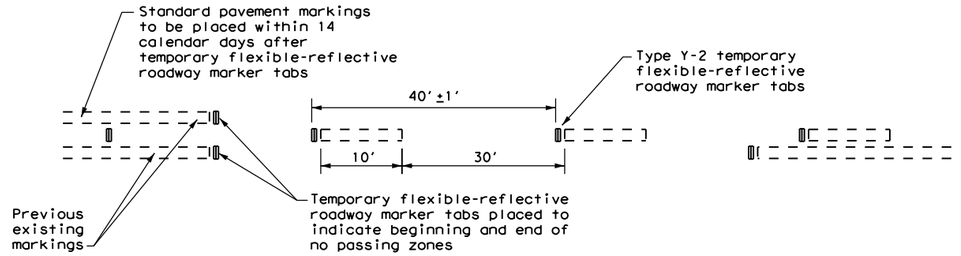


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

A. Prior to the beginning of construction, all currently striped no-passing zones shall be signed with the DO NOT PASS (R4-1) signs and PASS WITH CARE (R4-2) signs placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

B. At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES (R20-1TP) plaque may be used at the beginning of such zones. The DO NOT PASS sign and the NEXT XX MILES plaque should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of the no-passing zone may be signed with a PASS WITH CARE sign and a NEXT XX MILES plaque.

C. Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshield and lights. The DO NOT PASS sign and NEXT XX MILES plaque should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with the existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, appropriate DO NOT PASS and PASS WITH CARE signs should be placed at the beginning and end of the no-passing zones where the surfacing operation has stopped for the day.

D. R4-1 and R4-2 are to remain in place until standard pavement markings are installed.

"NO CENTER LINE" SIGN (CW8-12)

A. Center line markings are yellow pavement markings that delineate the separation of travel lanes that have opposite directions of travel on a roadway. Divided highways do not typically have center line markings.

B. At the time construction activity obliterates the existing center line markings(low volume roads may not have an existing centerline), a NO CENTER LINE (CW8-12) sign should be erected at the beginning of the work area, at approximately 2 mile intervals within the work area, beyond major intersections and other locations deemed necessary by the Engineer.

C. The NO CENTER LINE signs are to remain in place until standard pavement markings are installed.

"LOOSE GRAVEL" SIGN (CW8-7)

A. When construction begins, a LOOSE GRAVEL (CW8-7) sign should be erected at each end of the work area and repeated at intervals of approximately 2 miles in rural areas and closer in urban areas.

B. The LOOSE GRAVEL signs are to remain in place until the condition no longer exists.

PAVEMENT MARKINGS

A. Temporary markings for surfacing projects shall be Temporary Flexible-reflective Roadway Marker Tabs unless otherwise approved by the Engineer. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement
no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept, the cover over the reflective strip shall be removed.

B. Tabs shall not be used to simulate edge lines.

C. Tab placement for overlay/inlay operations shall be as shown on the WZ(STPM) standard sheet.

COORDINATION OF SIGN LOCATIONS

A. The location of warning signs at the beginning and end of a work area are to be coordinated with other signing typically shown on the Barricade and Construction Standards for project limits to ensure adequate sign spacing.

B. Where possible the ROAD WORK AHEAD (CW20-1D), LOOSE GRAVEL (CW8-7), and NO CENTER LINE (CW8-12) signs should be placed in the sequence shown following the OBEY WARNING SIGNS STATE LAW (R20-3T) and the TRAFFIC FINES DOUBLE (R20-5T) sign, and one "X" sign spacing prior to the CONTRACTOR (G20-6T)sign typically located at or near the limits of surfacing. LOOSE GRAVEL and NO CENTER LINE signs will then be repeated as described above.

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

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

GENERAL NOTES

1. The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where tabs must be placed prior to the surfacing operation which will cover or obliterate the existing pavement markings.
2. The devices shown on this sheet are to be used to supplement those required by the BC Standards or others required elsewhere in the plans.
3. Signs shall be erected as detailed on the BC Standards or the Compliant Work Zone Traffic Control Devices List (CWZTCD) on supports approved for Long-Term / Intermediate-Term Work Zone Sign Supports.
4. When surfacing operations take place on divided highways, freeways or expressways, the size of diamond shaped construction warning signs shall be 48" x 48".
5. Signs on divided highways, freeways and expressways will be placed on both right and left sides of the roadway based on roadway conditions as directed by the Engineer.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

FILE: tcp7-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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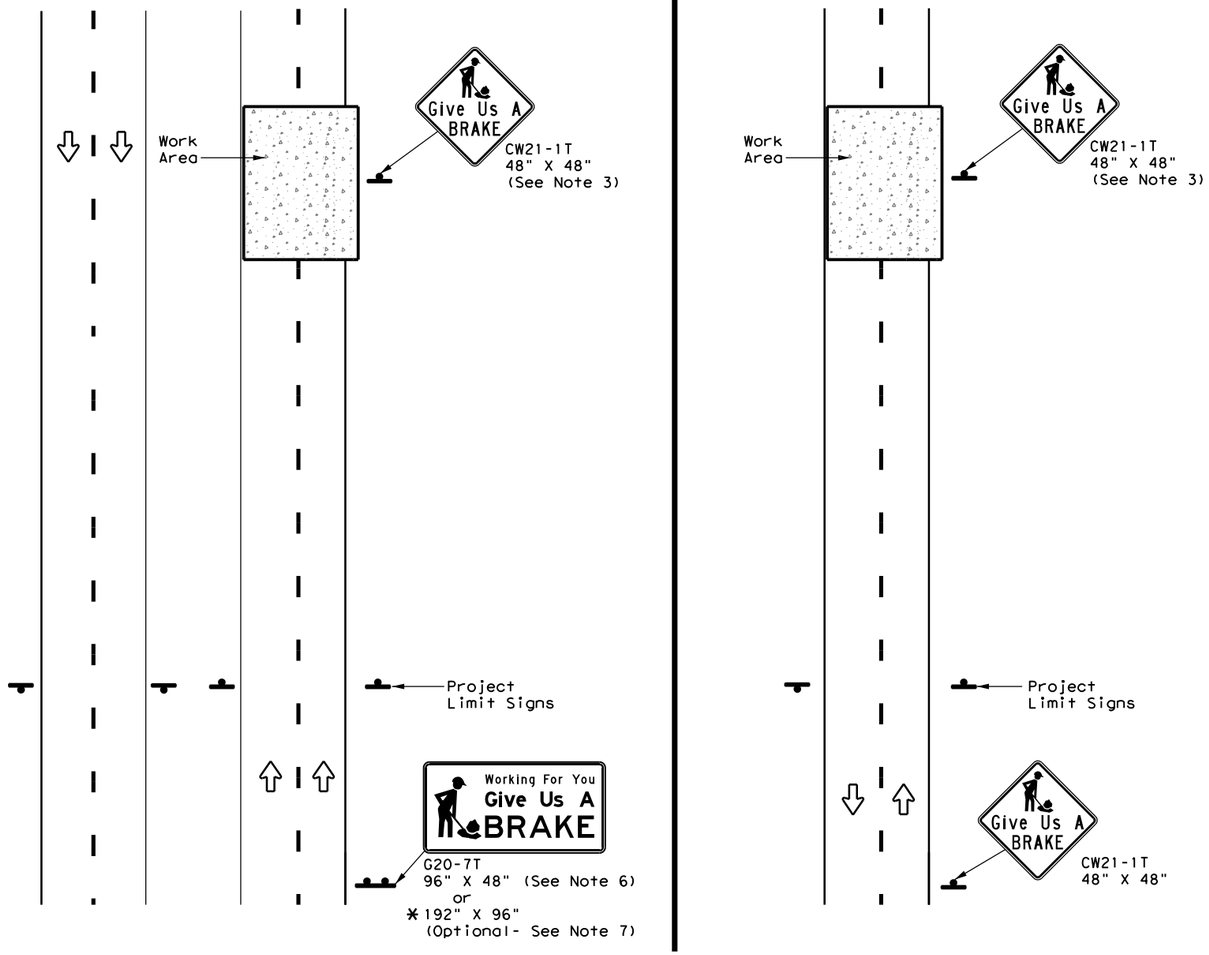
4-92 4-98	DIST	COUNTY		SHEET NO.
1-97 7-13		BEXAR		81

210



DIVIDED HIGHWAY

UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
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.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03		BEXAR		82

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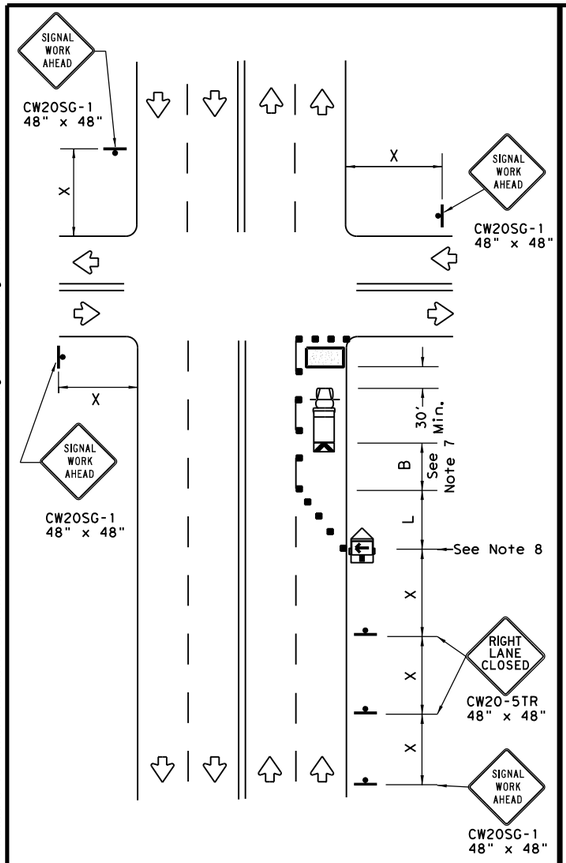
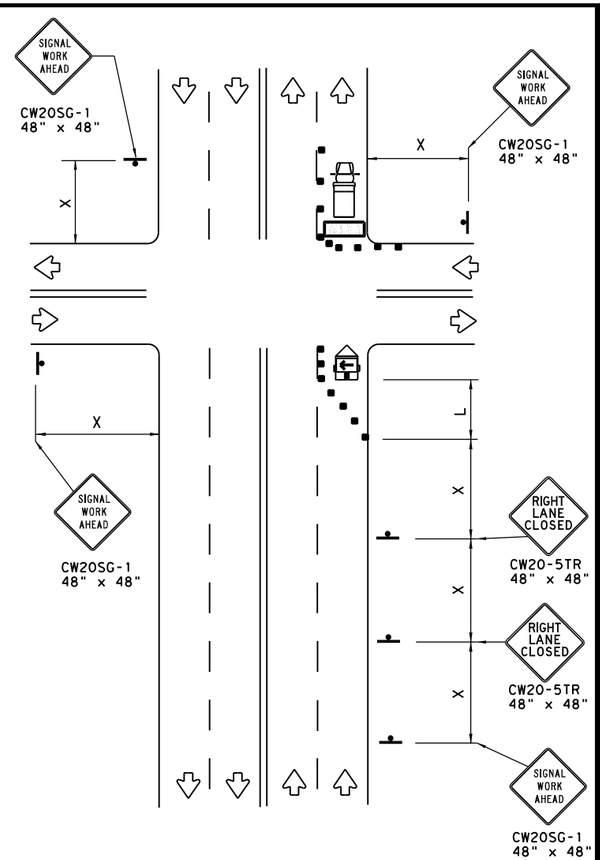


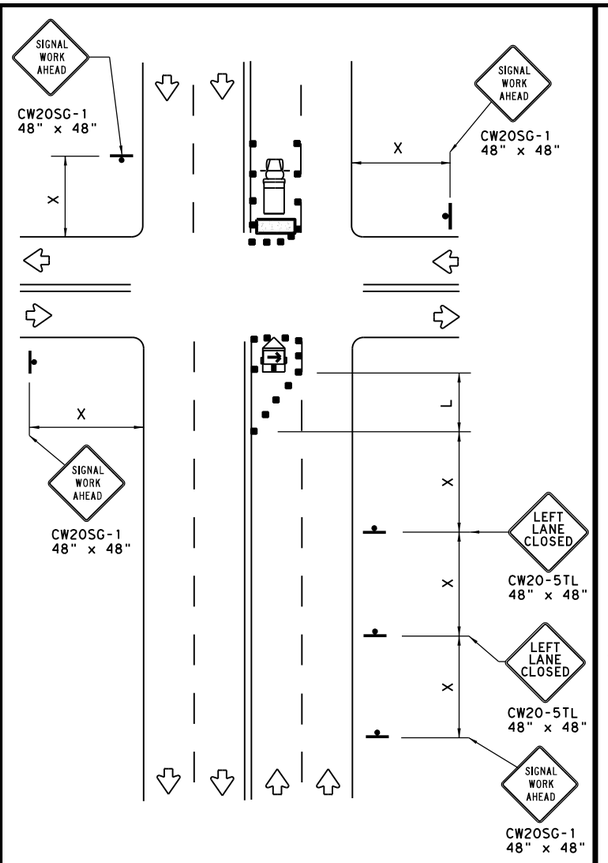
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



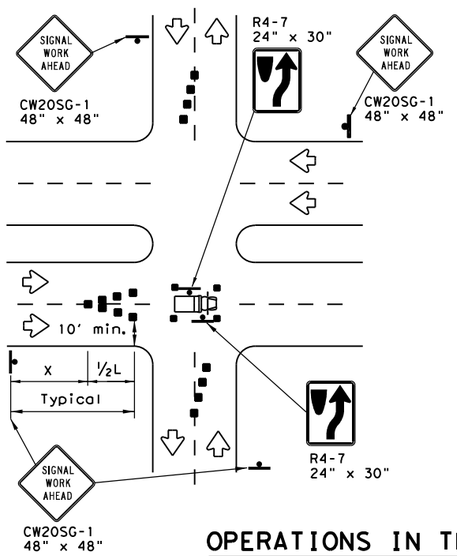
FAR SIDE RIGHT LANE CLOSURE

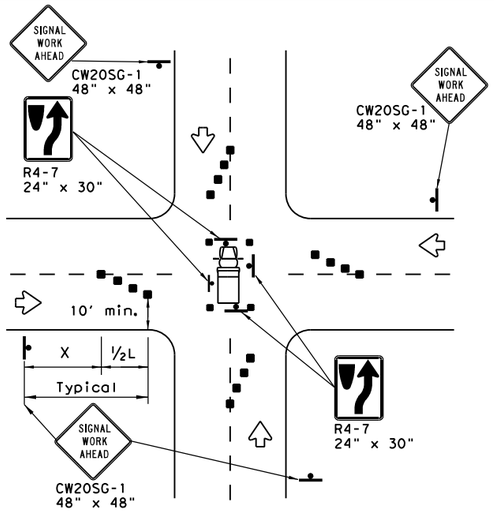
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

FILE: wzbts-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	SATX	BEXAR		83

7/6/2020
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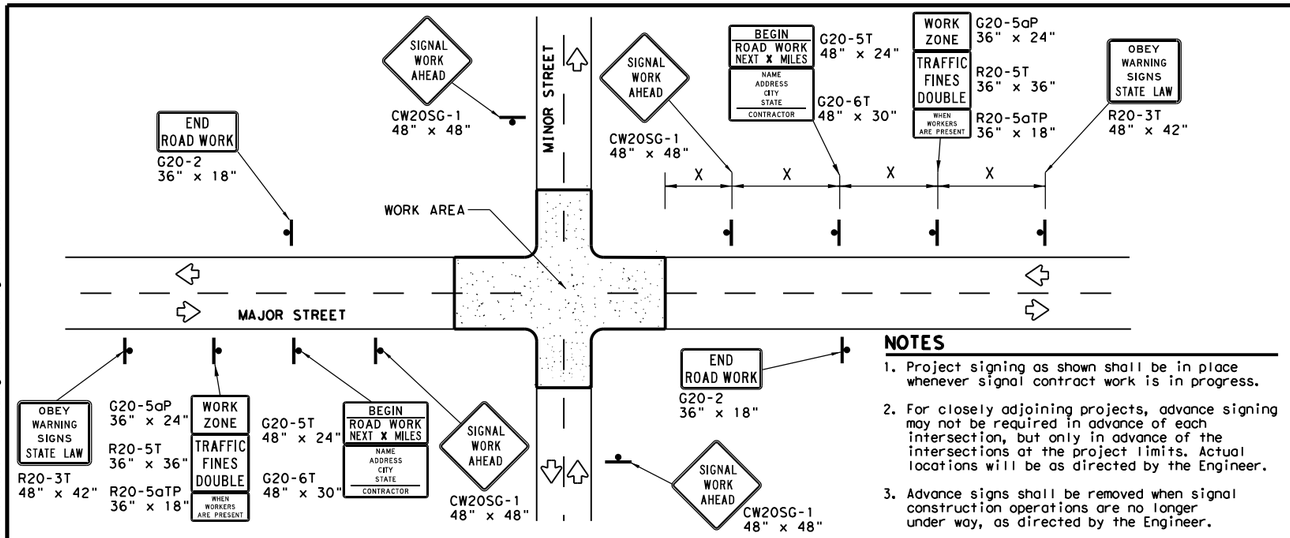


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

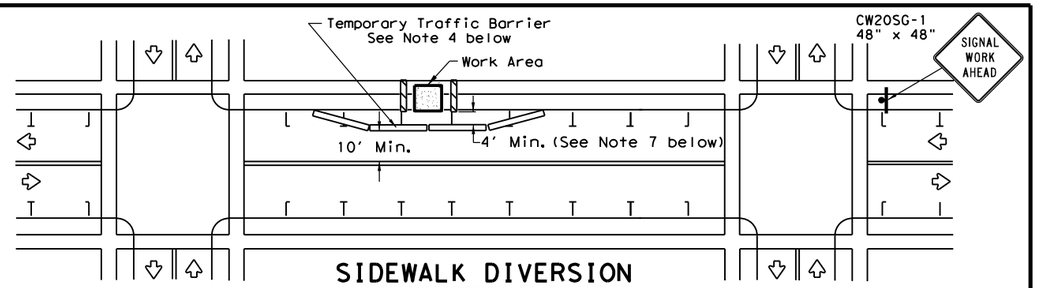
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support 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 fastners. 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.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

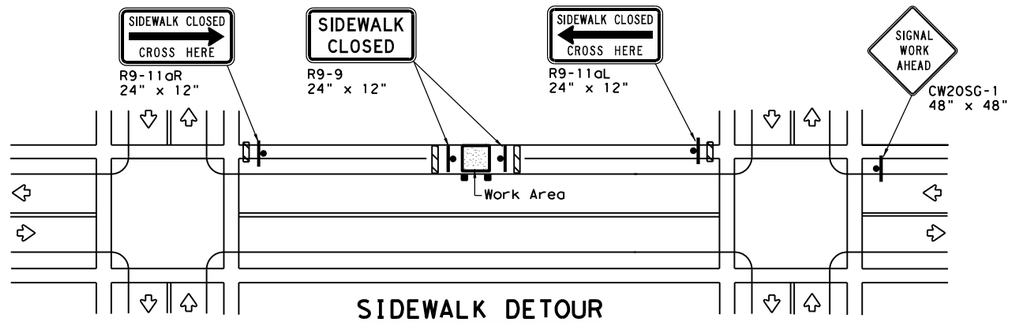
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

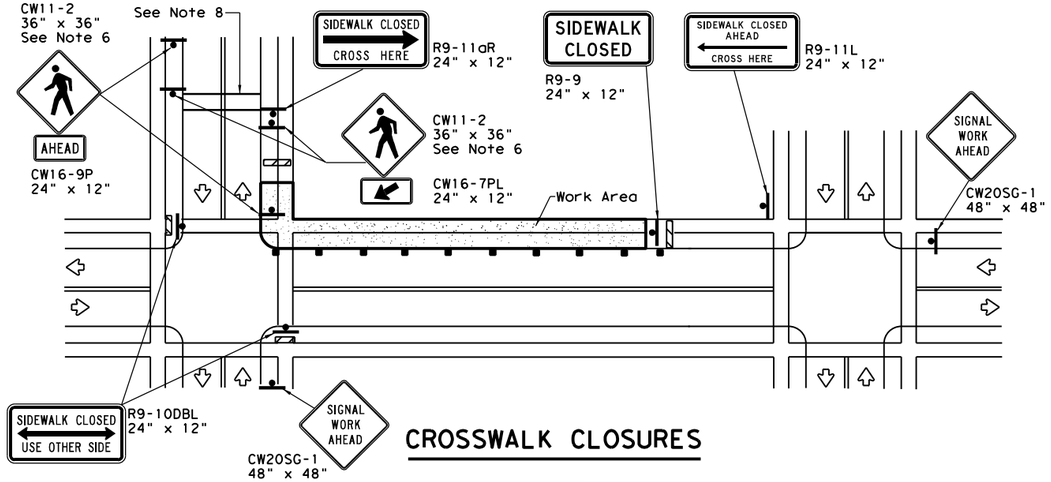
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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2-98 10-99 7-13		DIST	COUNTY		SHEET NO.
4-98 3-03		SATX	BEXAR		84

7/6/2020
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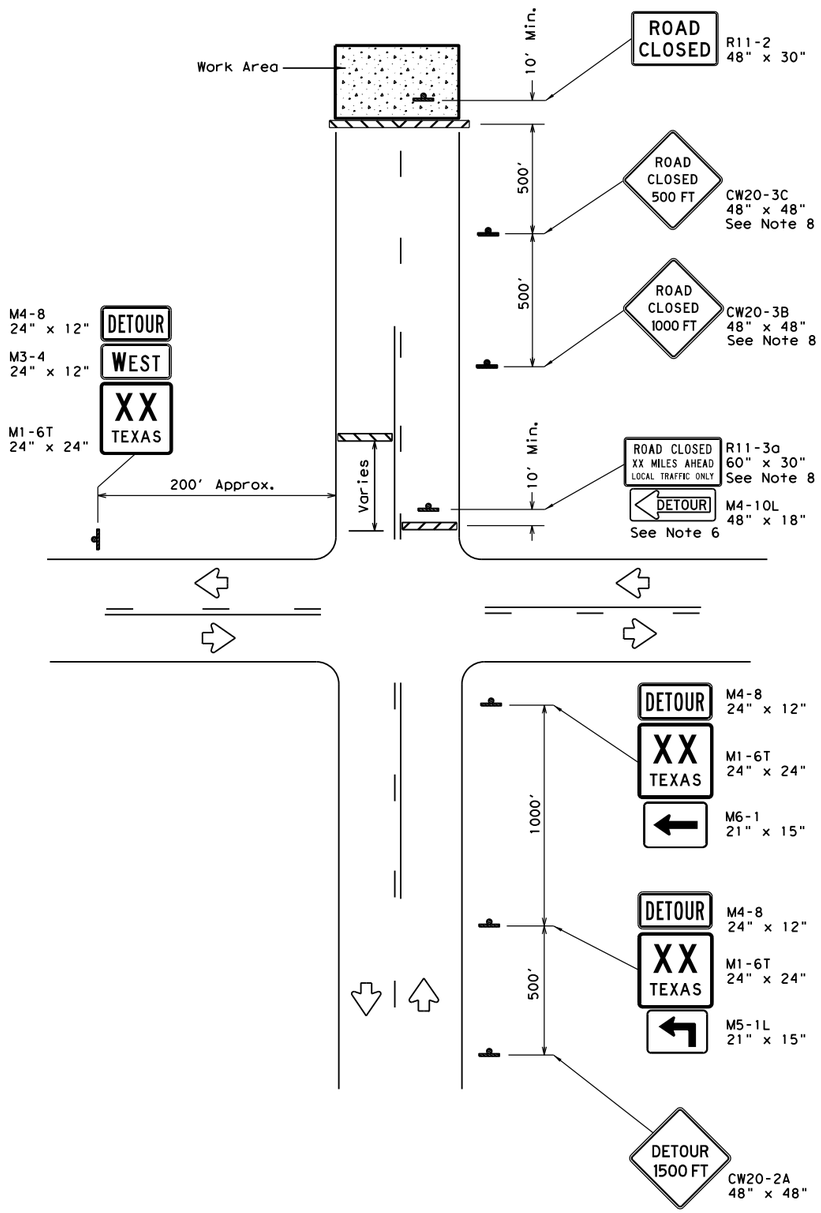
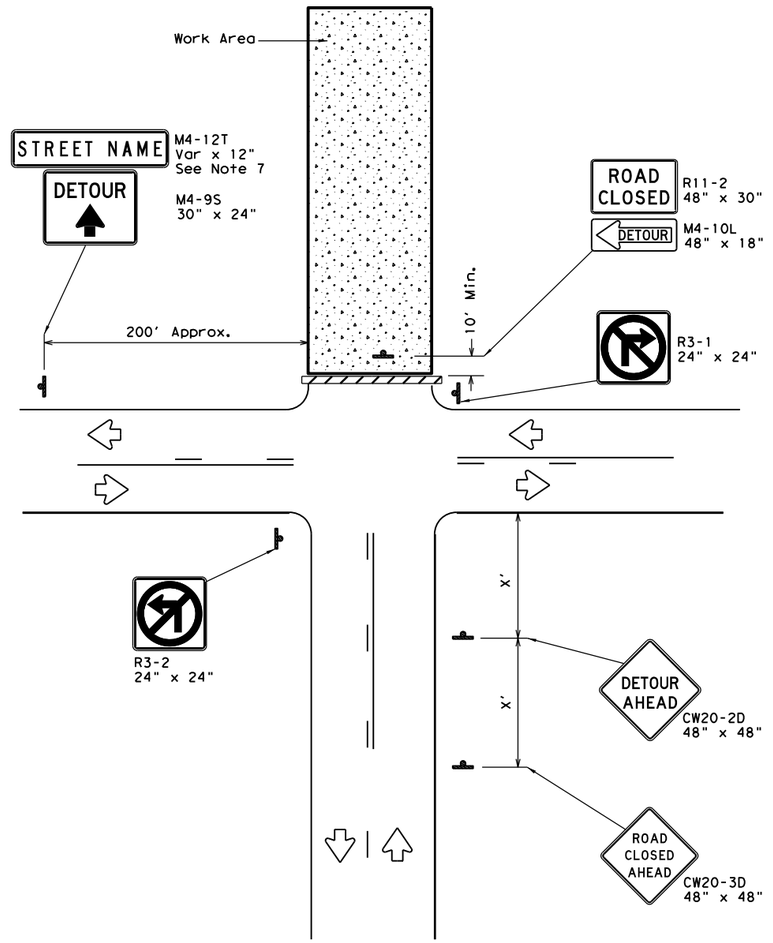


ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

WZ(RCD)-13

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© TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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2-98 3-03		BEXAR		85

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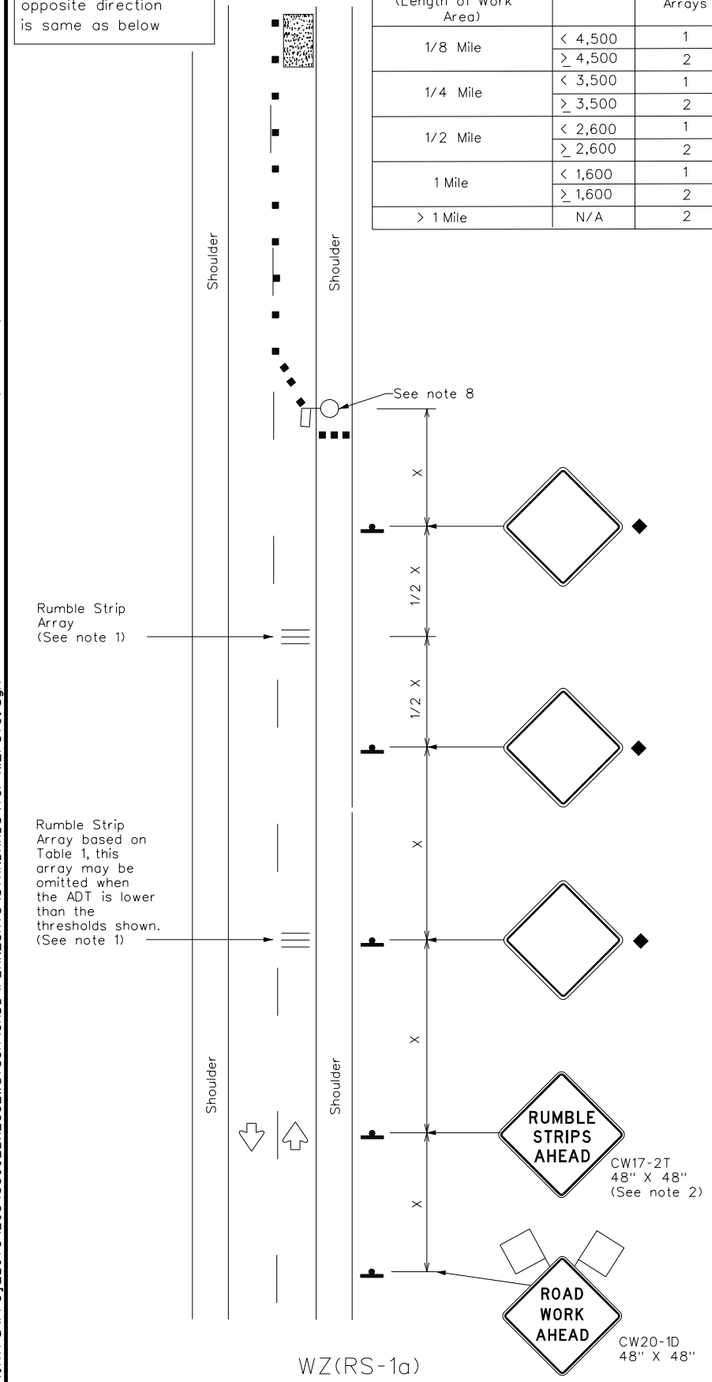
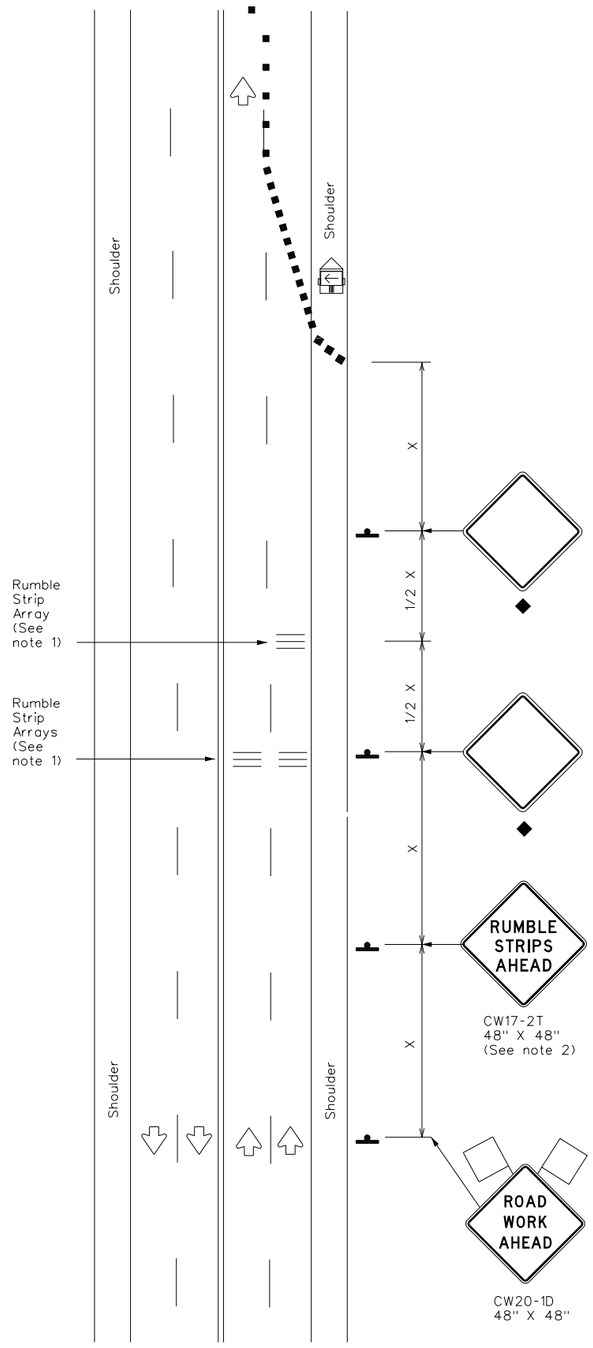
Warning sign and rumble strip sequence in opposite direction is same as below

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



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation

Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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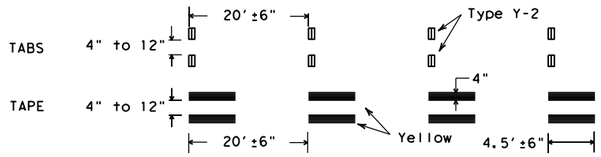
REVISIONS 2-14 4-16	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		86

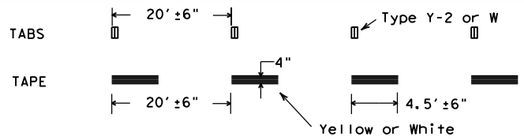
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

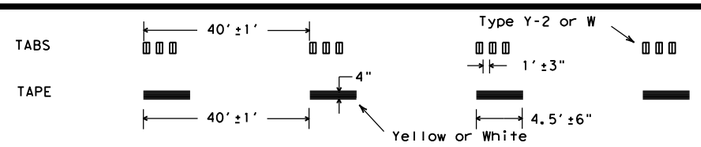


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



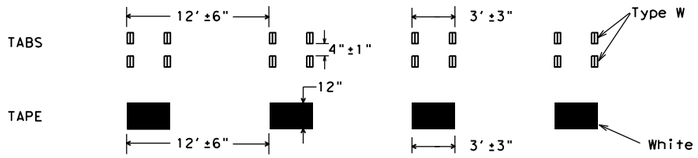
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

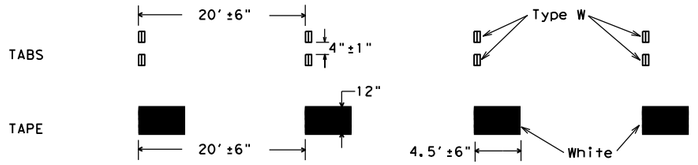


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



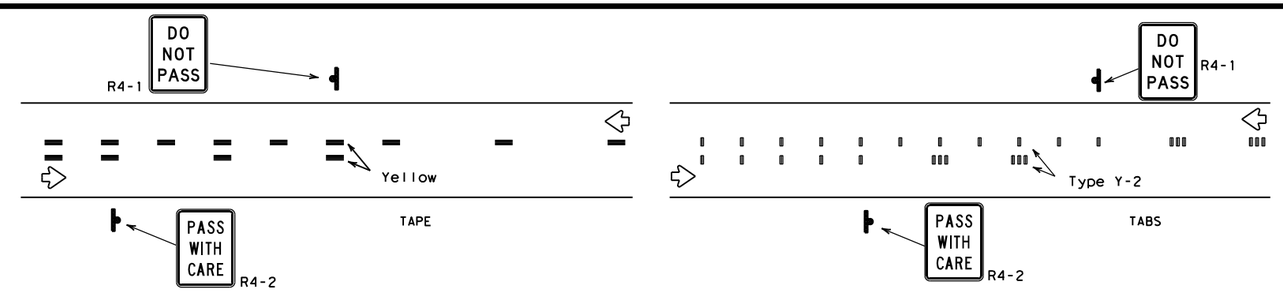
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

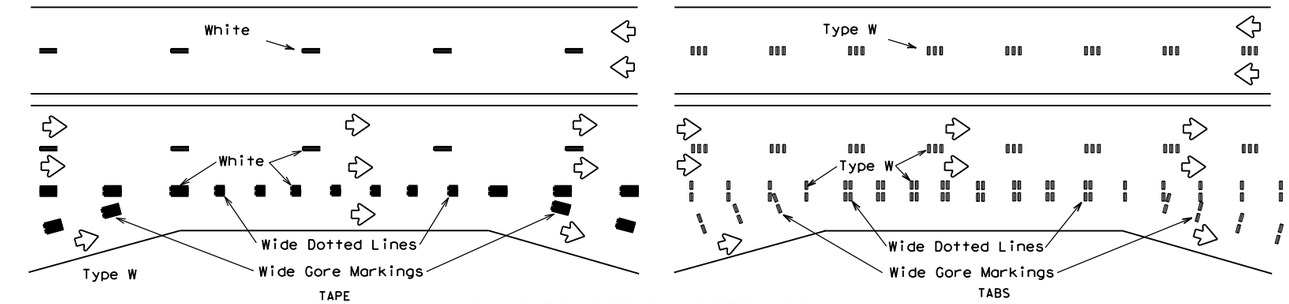
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

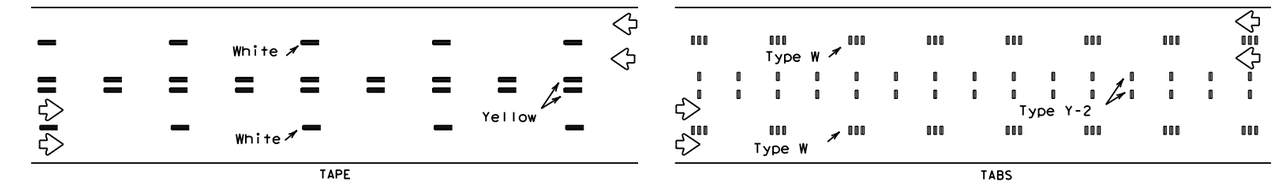
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



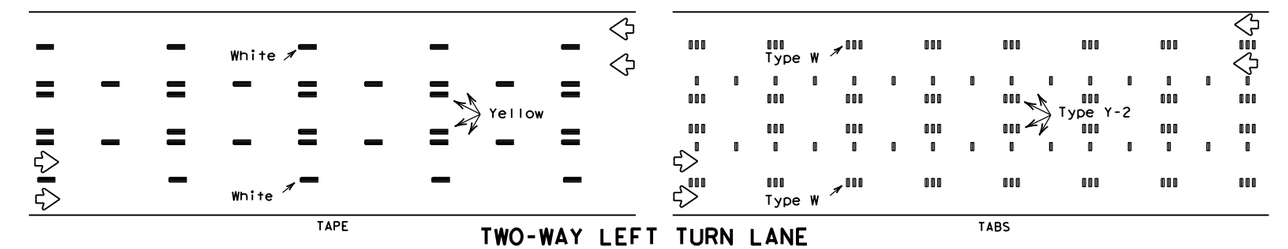
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



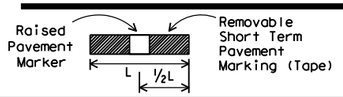
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0915	12	562	WATSON RD
1-97		DIST	COUNTY		SHEET NO.
3-03			BEXAR		87
7-13					

111

7/6/2020
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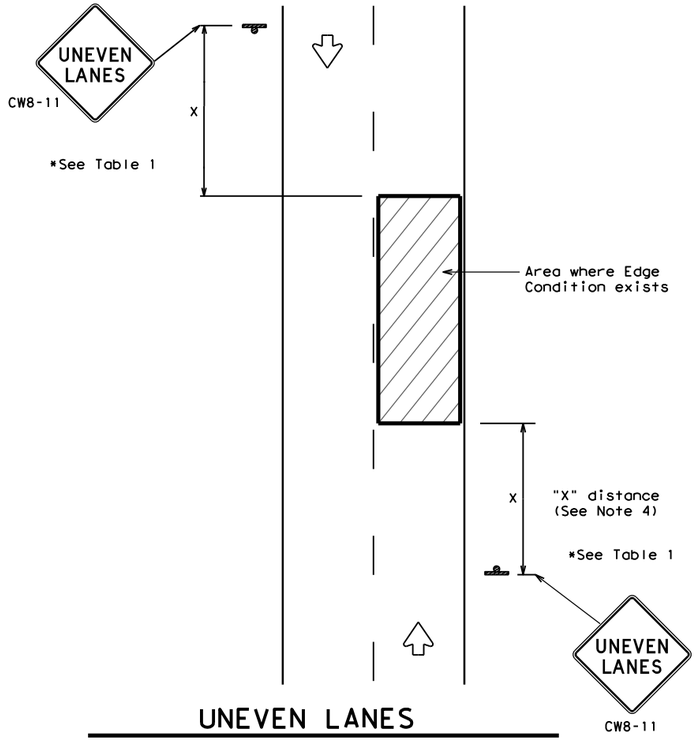
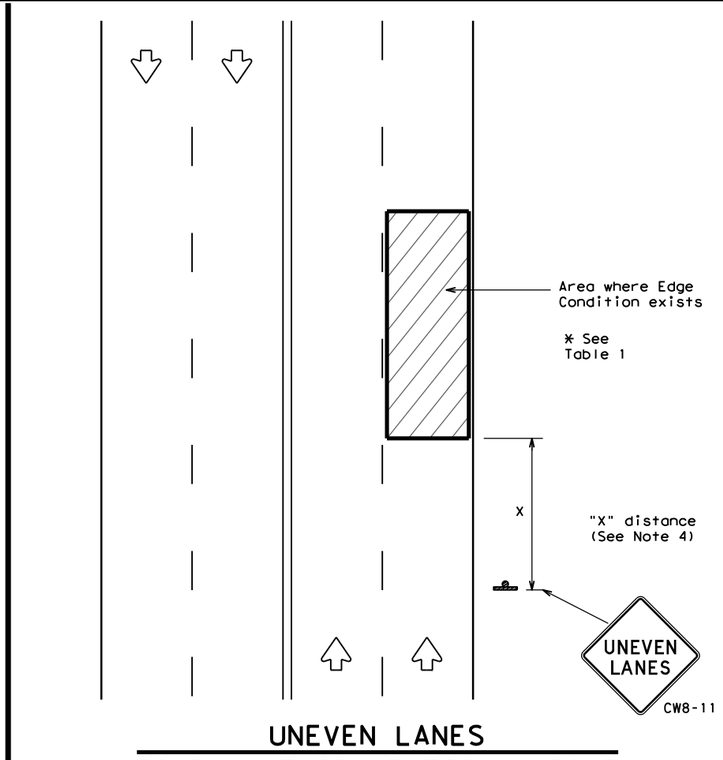
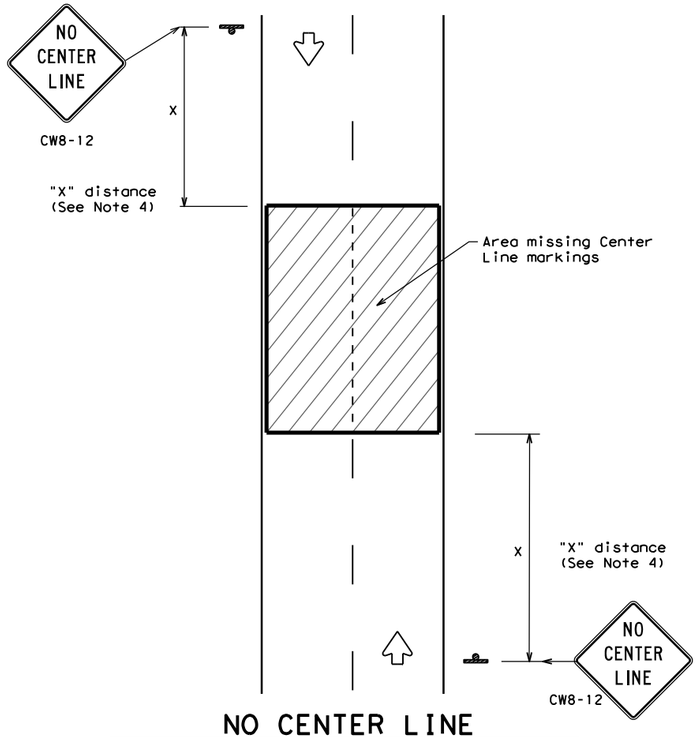


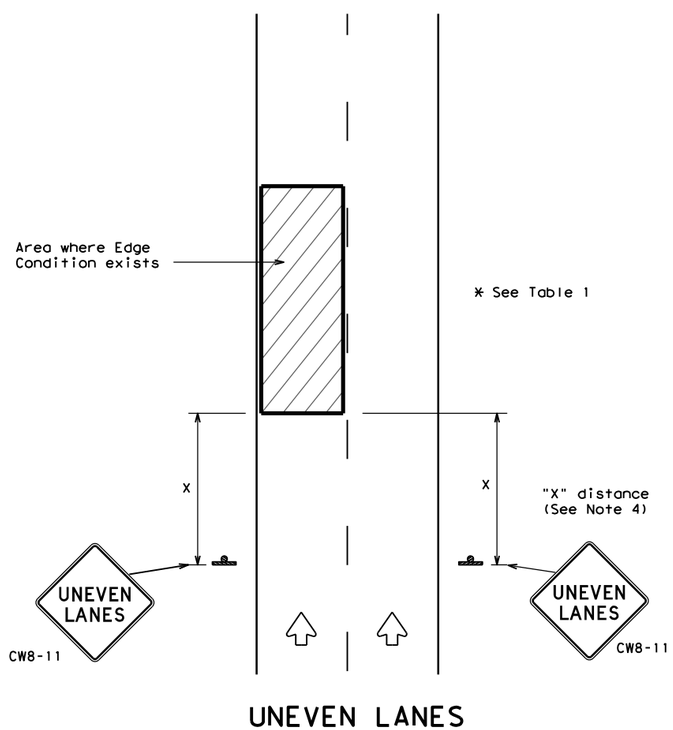
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

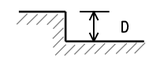
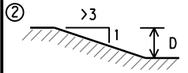
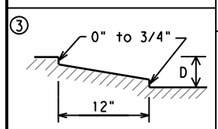
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03		BEXAR		88

112

7/6/2020
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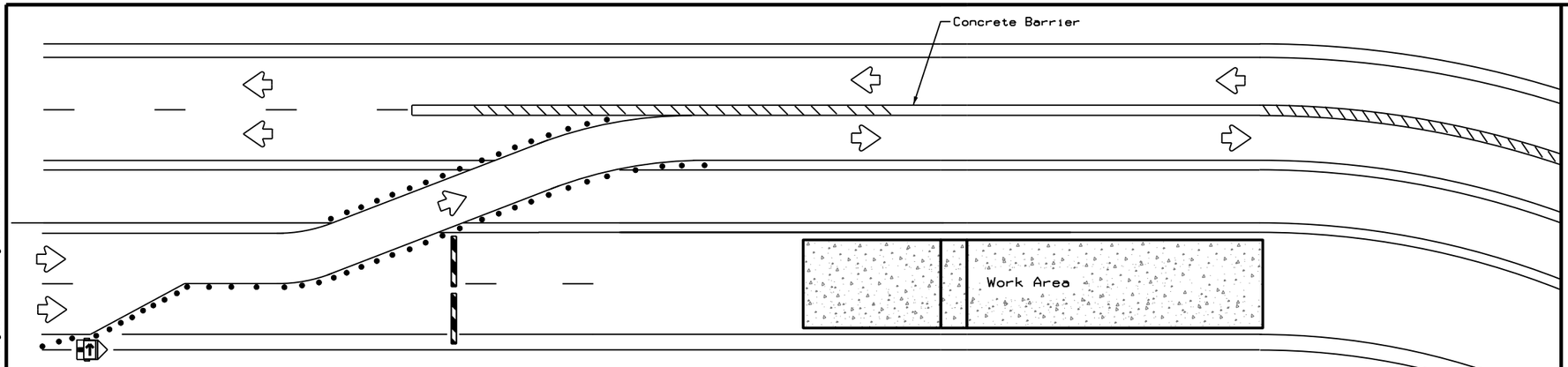


NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

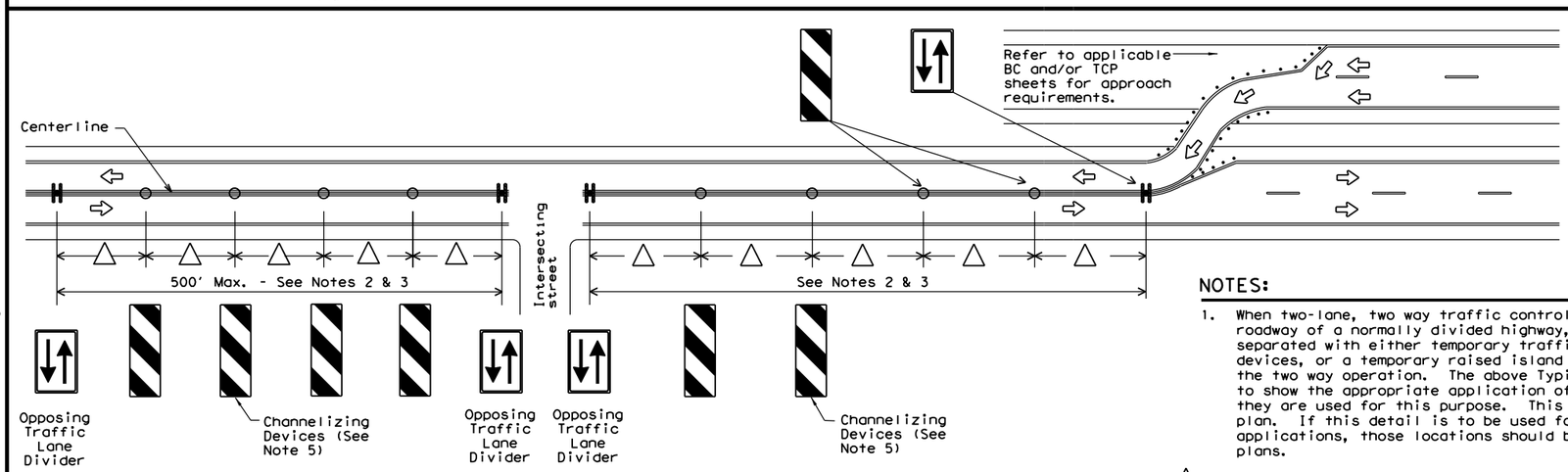
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
• • •	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
\\\\	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD)describes pre-qualified products and their sources and may be found at the following web address:

http://www.txdot.gov/business/resources/producer-list.html



VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.

△2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.

3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-17

FILE: wztd-17.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 2-17 3-03 7-13	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SATX	BEXAR		89

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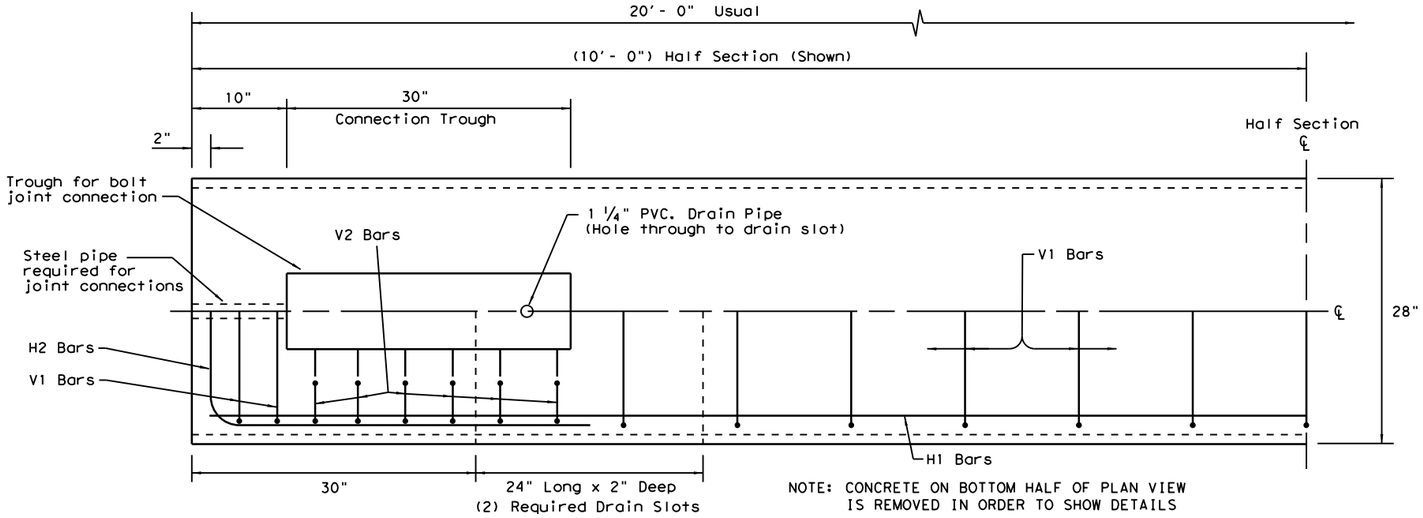
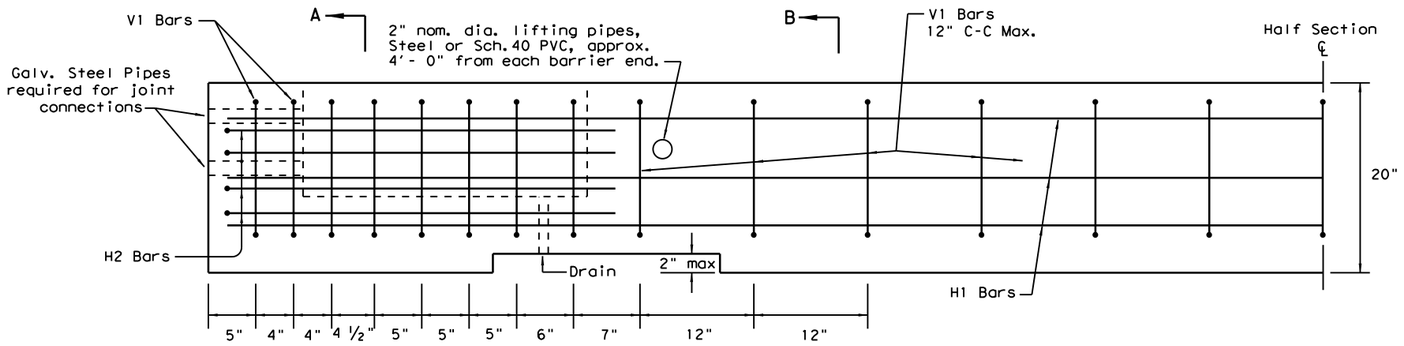
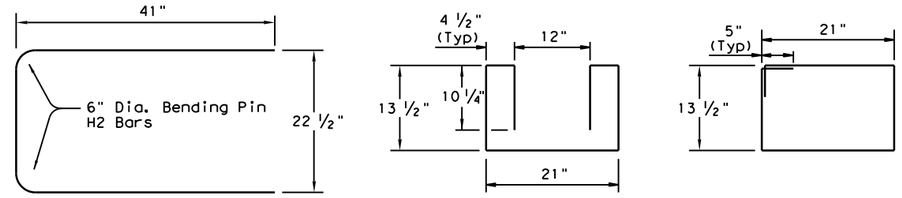


NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



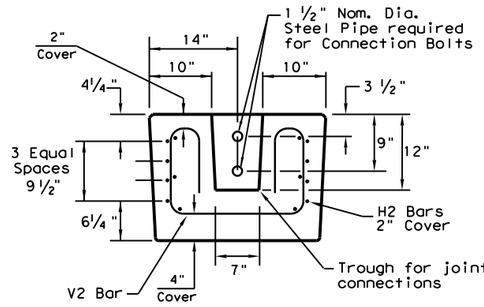
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

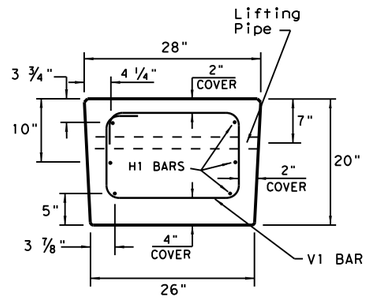
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

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



SECTION A-A



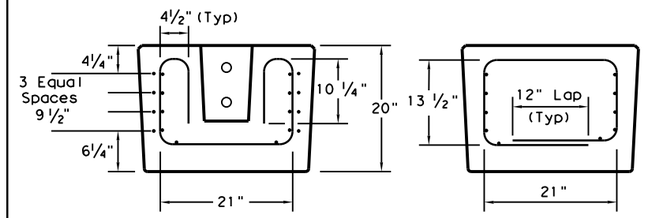
SECTION B-B

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



SECTION A-A

SECTION B-B

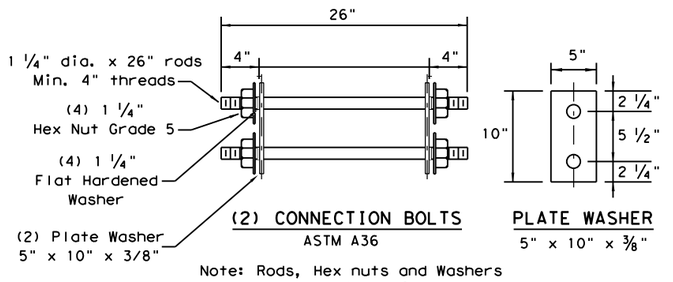
(WWR) GENERAL NOTES

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



(2) CONNECTION BOLTS
ASTM A36

PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
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7/6/2020
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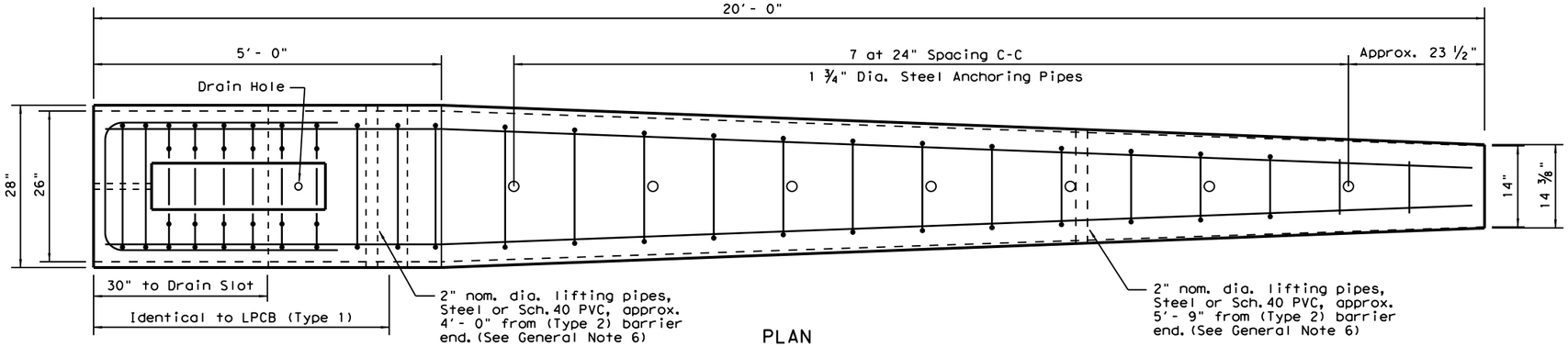
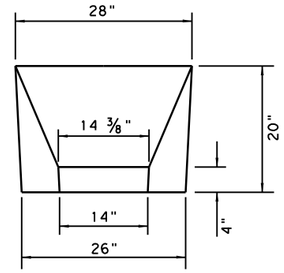
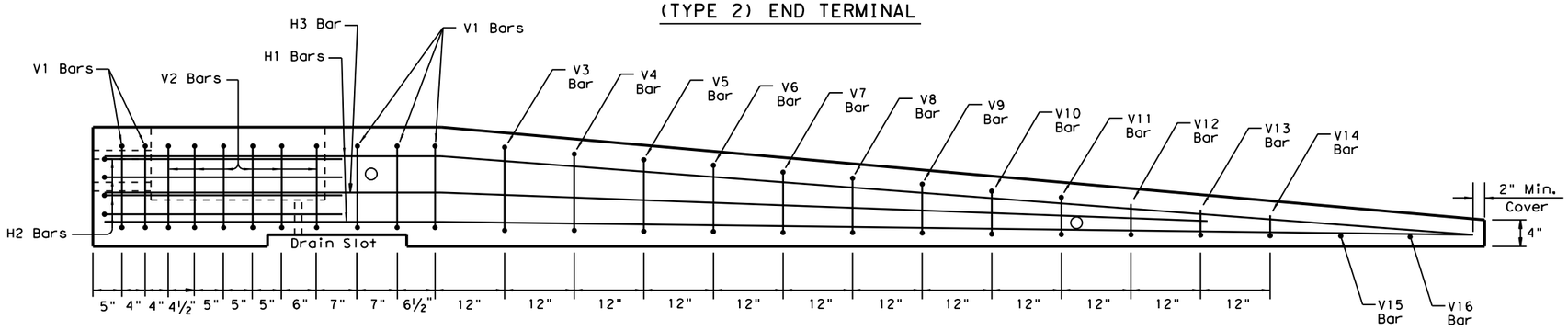


PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

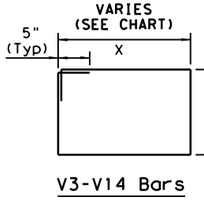


ELEVATION
(TYPE 2) END TERMINAL

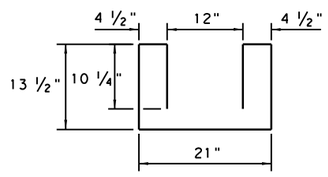
Note:
Anchoring pipes not shown in Elevation View

TYPE 2 - NOTES

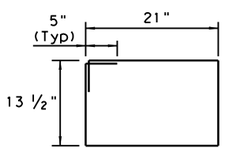
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement 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.



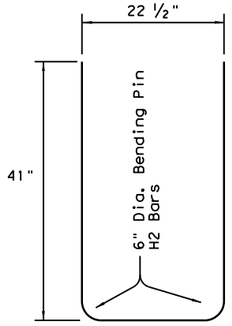
V3-V14 Bars



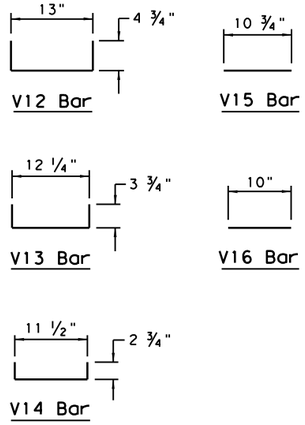
(6)~V2 Bars



(5)~V1 Bars



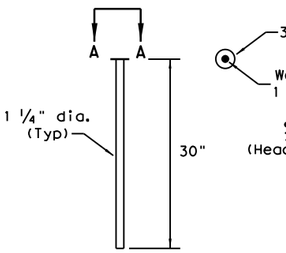
(4)~H2 Bars
(#5) Bars



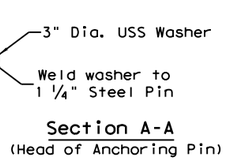
Note: All V Bars are (#4)

BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
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

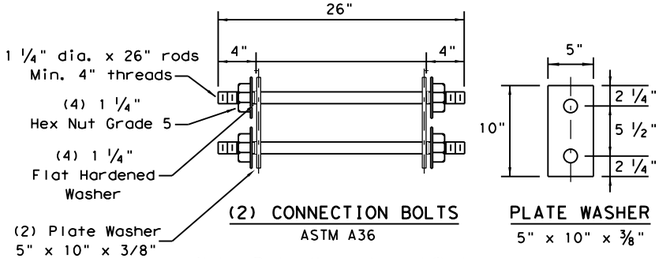
REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



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



Section A-A
(Head of Anchoring Pin)

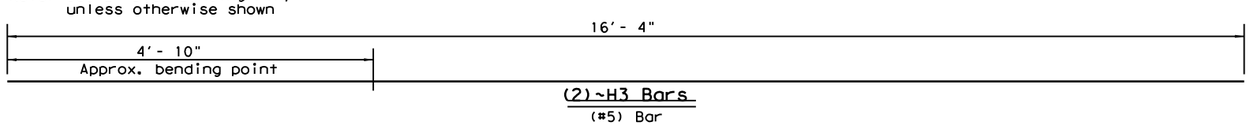


(2) CONNECTION BOLTS
ASTM A36

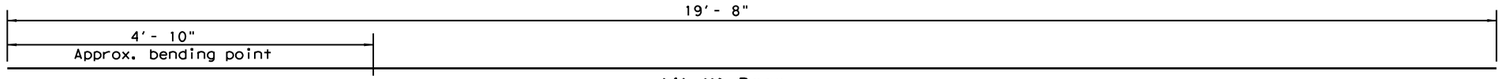
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

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

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
		BEXAR		91

7/6/2020
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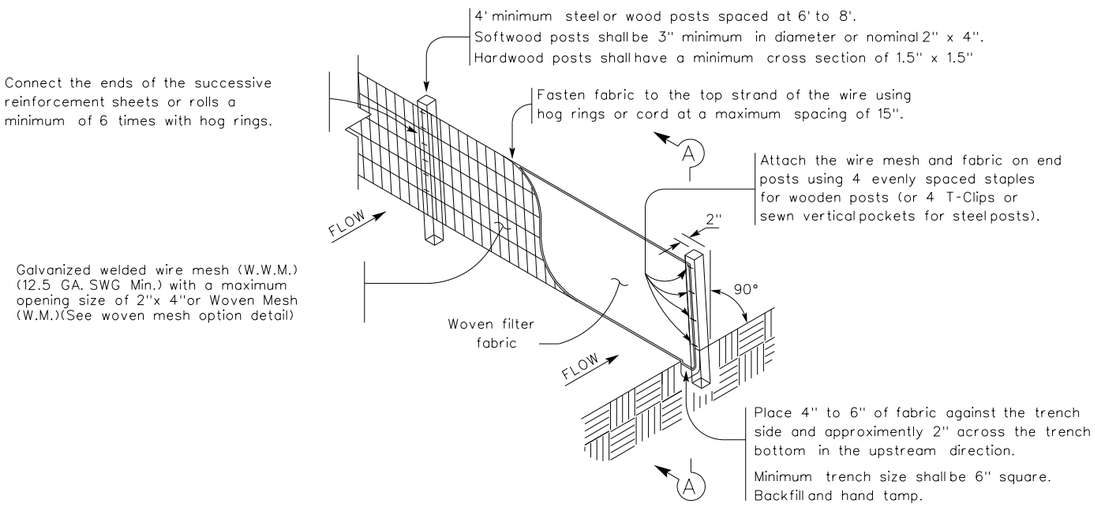
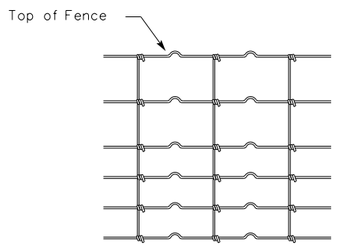
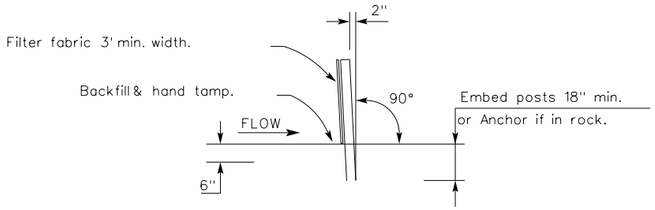


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT ^{2}. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

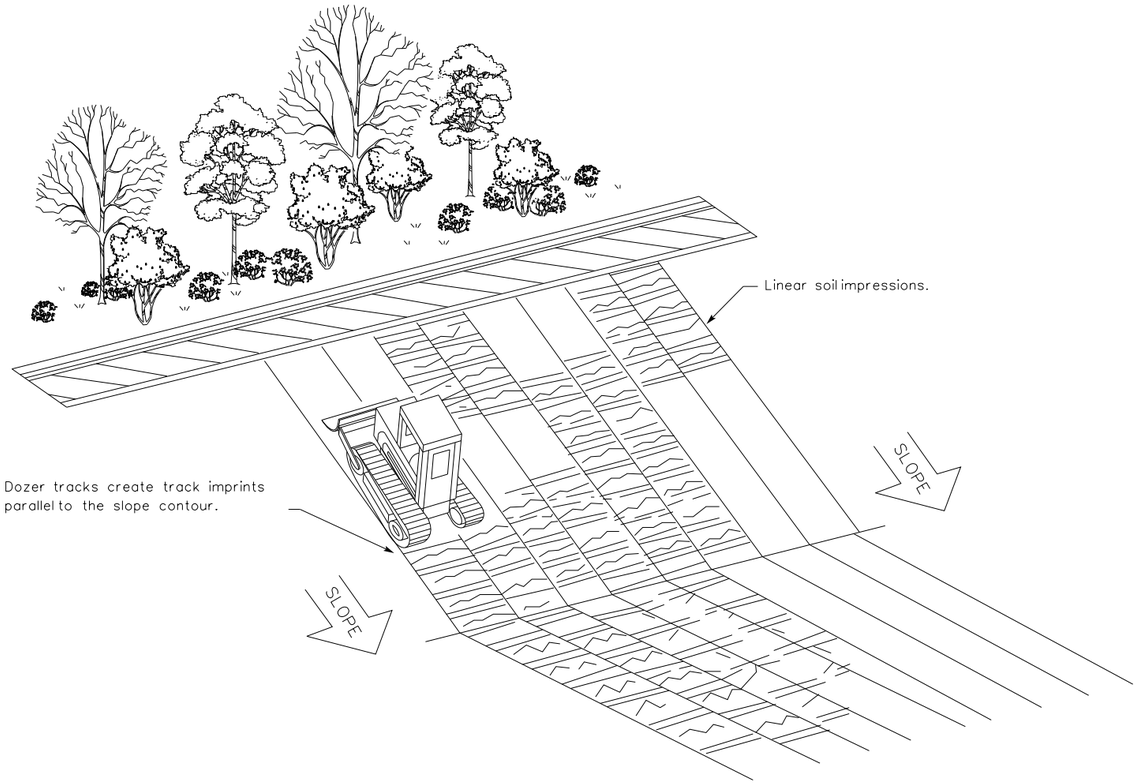
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP		DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
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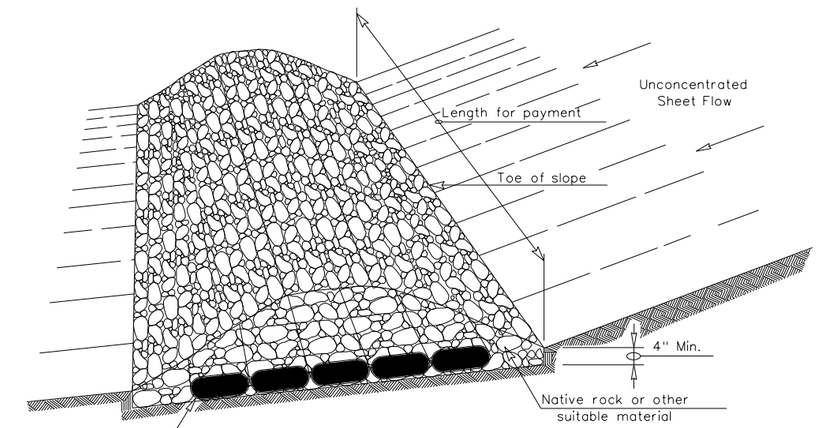
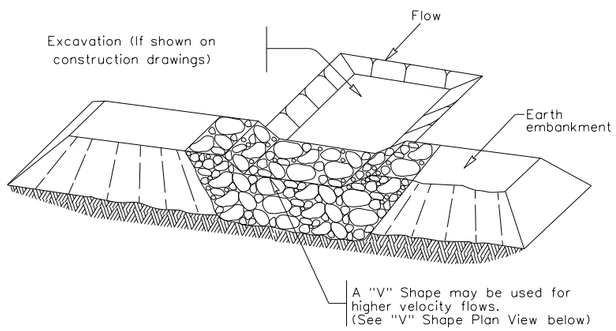


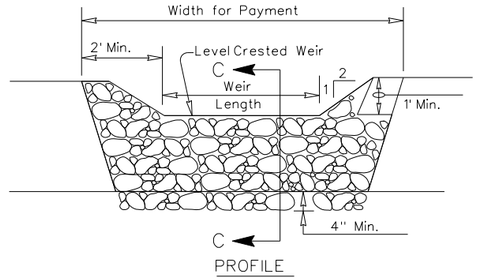
FILTER DAM AT TOE OF SLOPE

RFD1

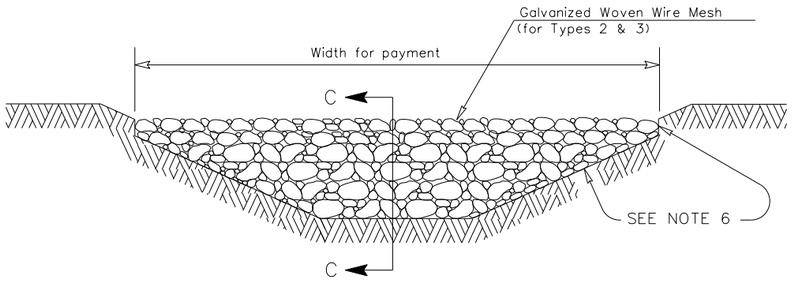


FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



PROFILE

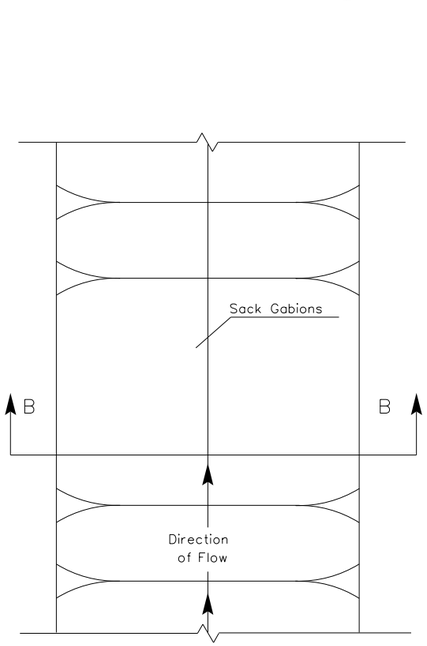


FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

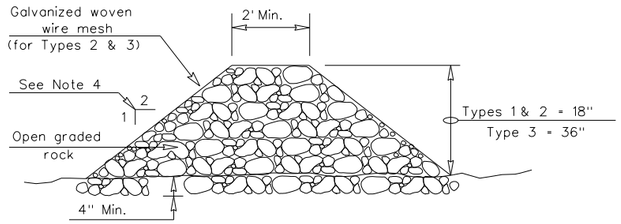
1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall 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.



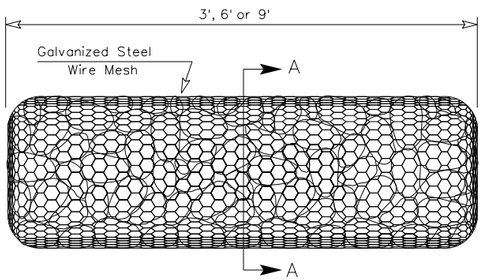
PLAN VIEW

"V" SHAPE
PLAN VIEW

¾" Dia.
Rebar Stakes



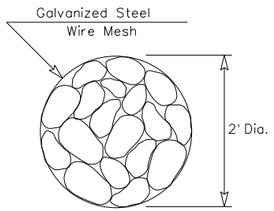
SECTION C-C



TYPE 4 (SACK GABIONS)

RFD4

SECTION B-B



SECTION A-A

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.

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
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	SAT	BEXAR		93

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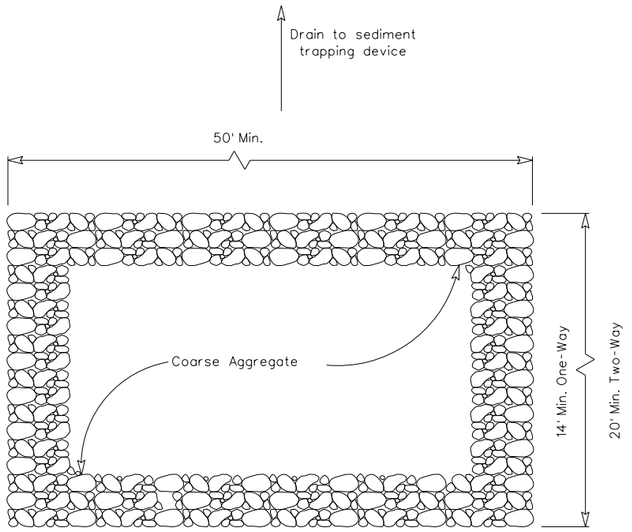
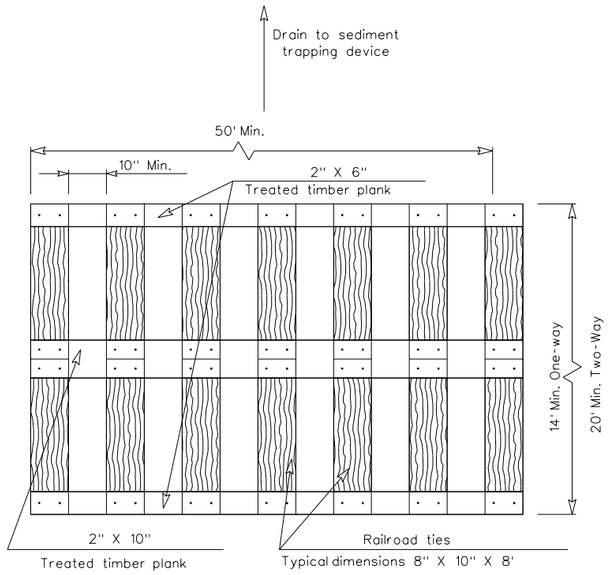


PLAN VIEW



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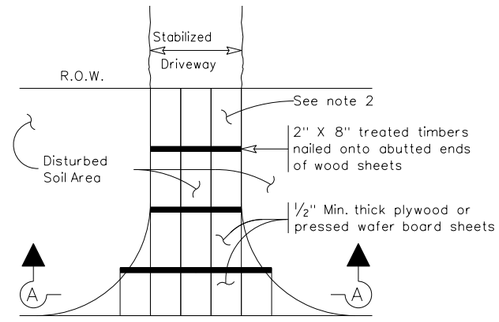

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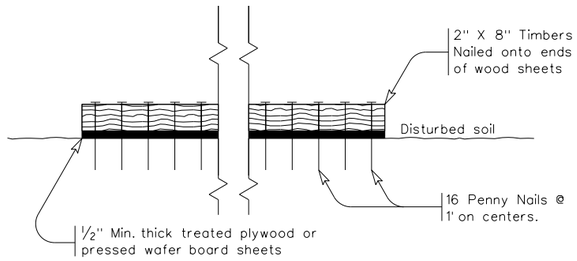
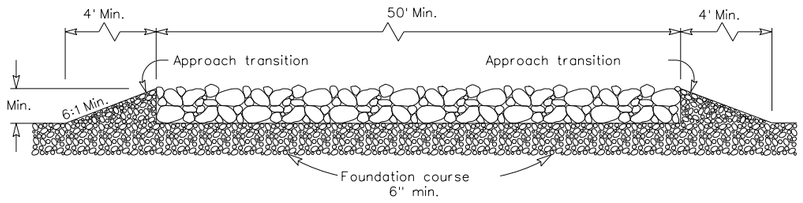


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



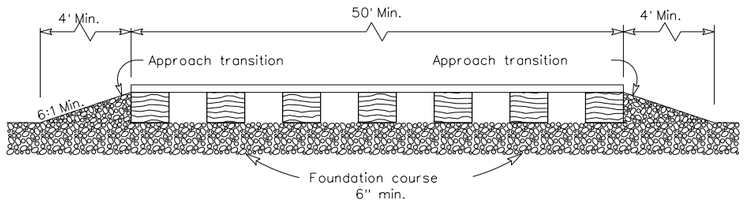
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
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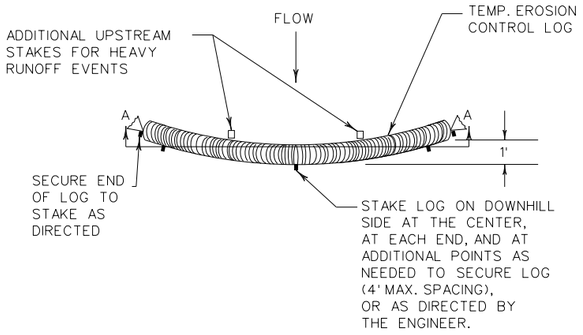
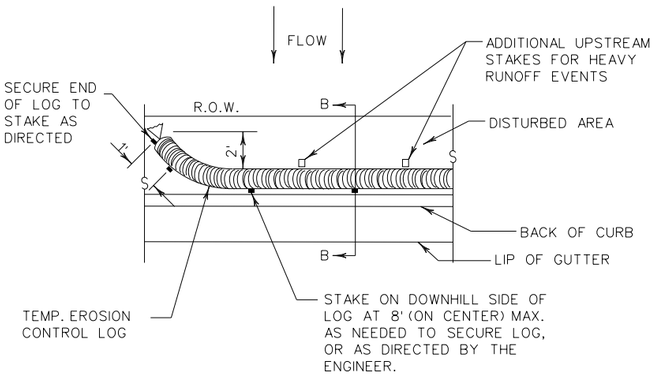


PLAN VIEW



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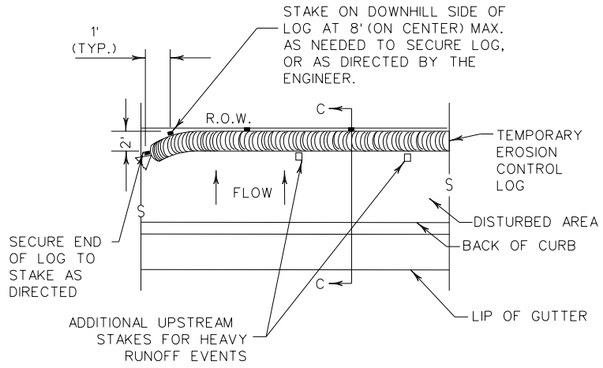

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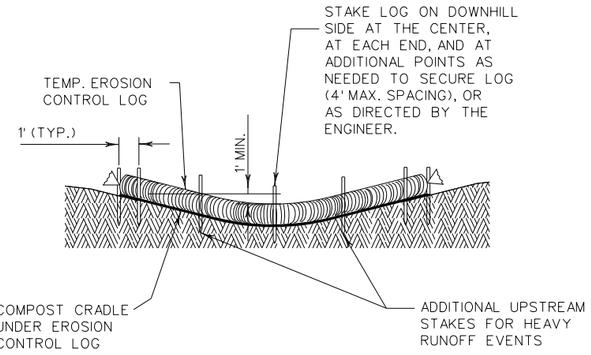
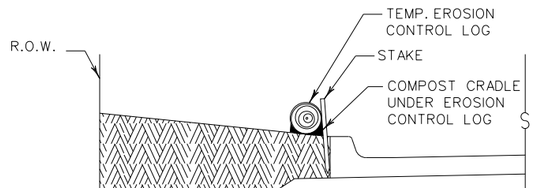


SECTION A-A

EROSION CONTROL LOG DAM

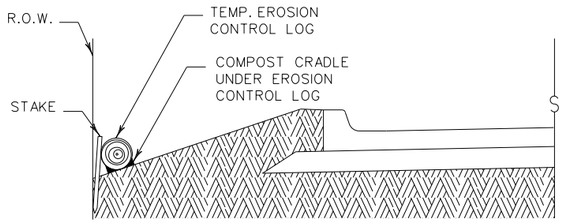
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

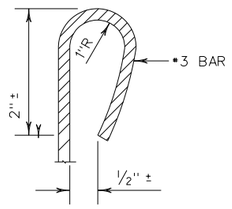
CL-BOC



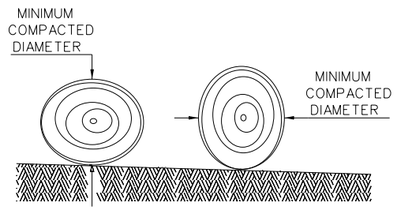
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

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

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.

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.

SHEET 1 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	0915	12	562		WATSON RD		
	DIST	COUNTY				SHEET NO.	
	SAT	BEXAR				95	

DATE: 6/25/2020
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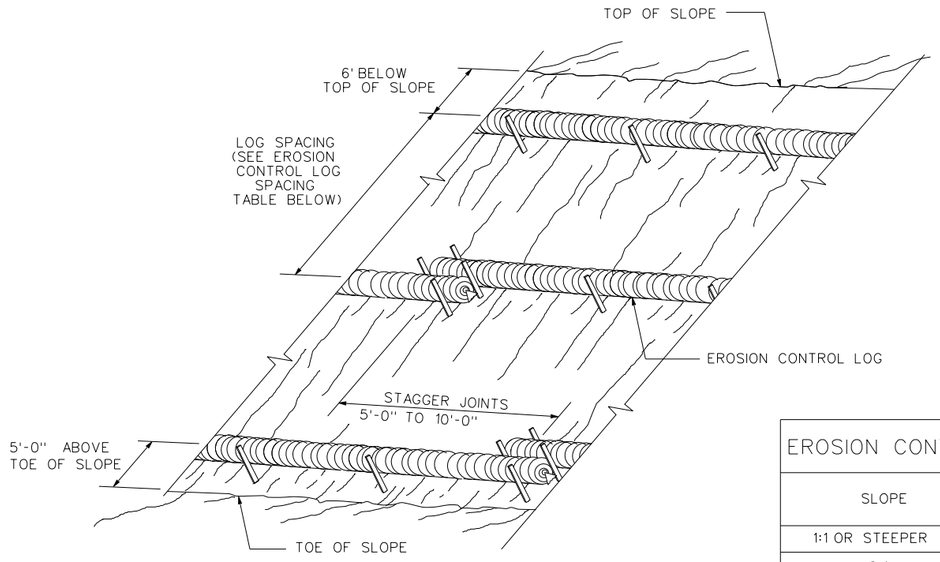
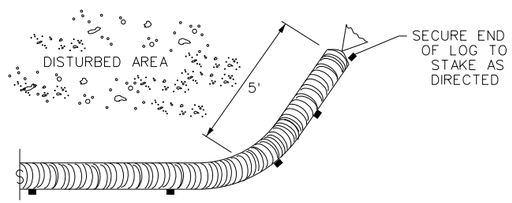


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

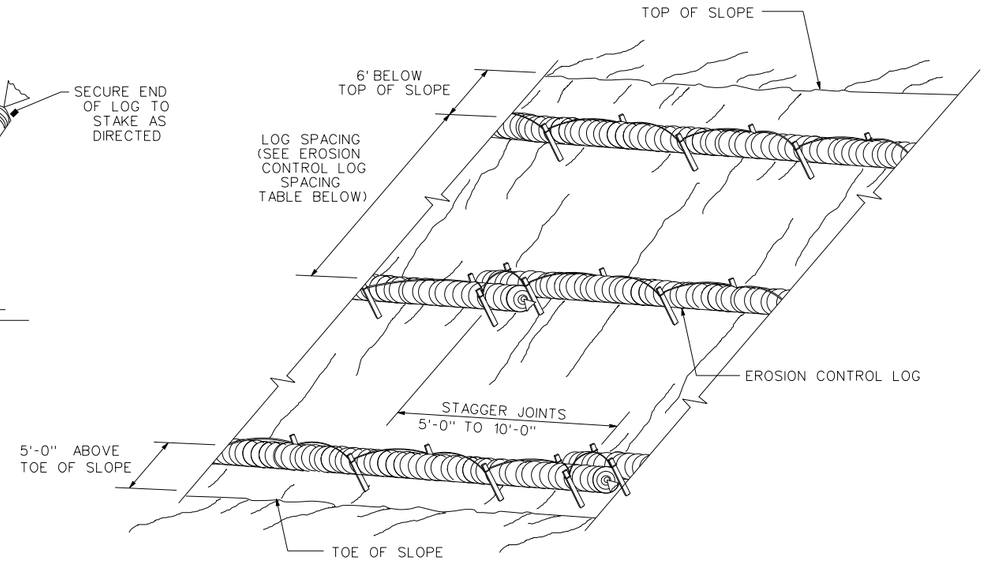
CL-SST



END SECTION RAP DETAIL

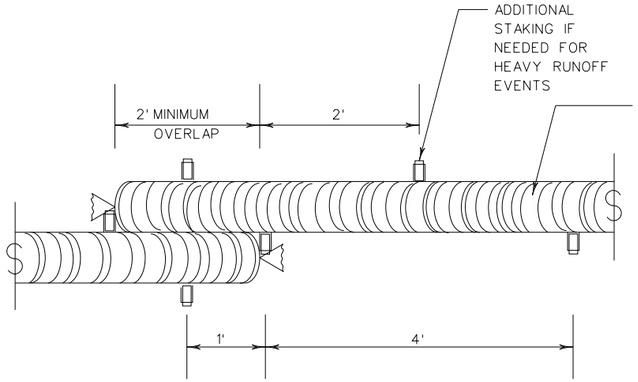
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

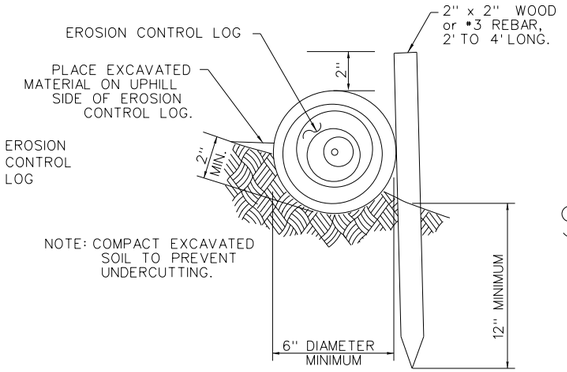
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

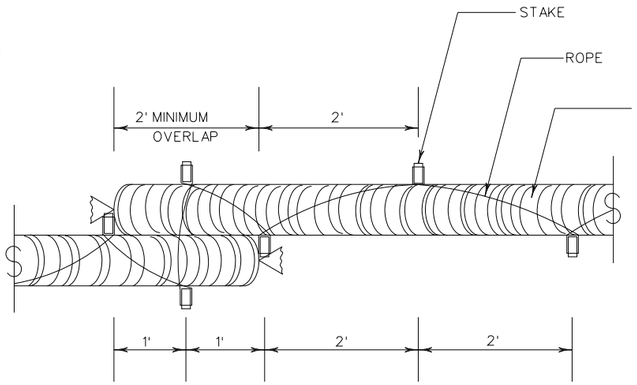


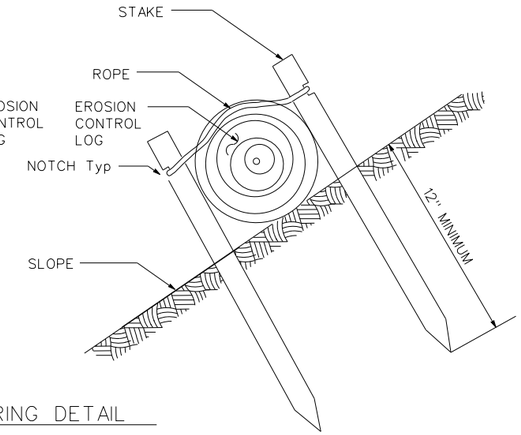


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

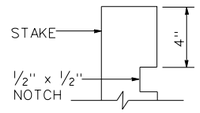
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

SHEET 2 OF 3

Texas Department of Transportation

Design Division Standard

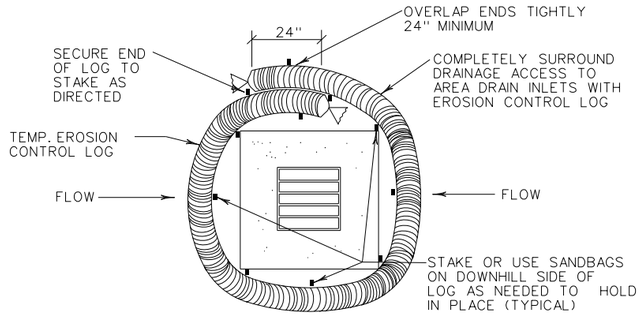
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

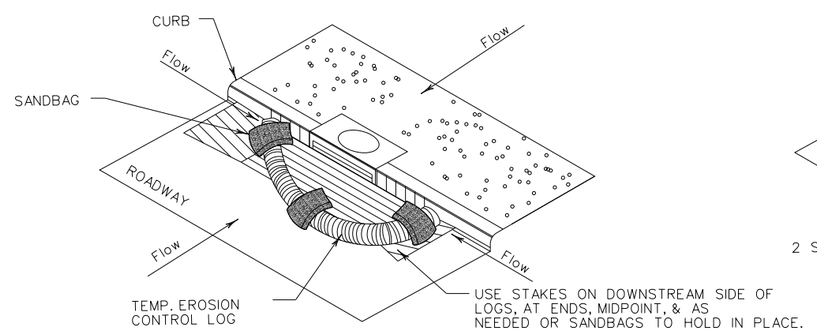
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		95A

DATE: 6/25/2020
FILE: X:\dato\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\STANDARDS\SW3P\ec916.dgn



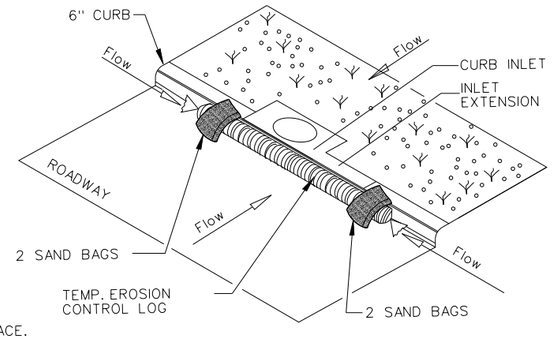
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

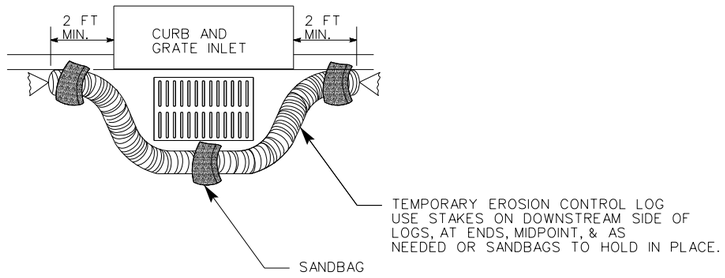
CL-CI



EROSION CONTROL LOG AT CURB INLET

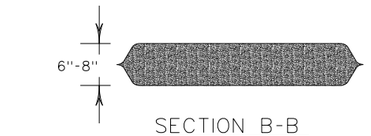
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

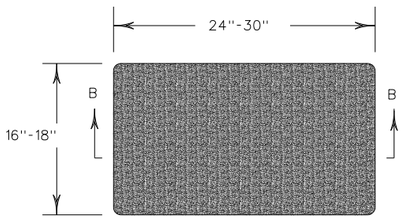


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	0915	12	562		WATSON RD		
	DIST	COUNTY			SHEET NO.		
	SAT	BEXAR			95B		

Beginning chain WATSON description
==========
Point WAT01 N 13,655,632.7926 E 2,093,957.0278 Sta 100+00.00
Course from WAT01 to PC WATSON-1 S 45° 25' 12.73" E Dist 1,424.1041

Curve Data

Curve WATSON-1
P.I. Station 116+80.29 N 13,654,453.3911 E 2,095,153.8568
Delta = 35° 06' 09.46" (LT)
Degree = 7° 04' 24.79"
Tangent = 256.1898
Length = 496.2517
Radius = 810.0000
External = 39.5488
Long Chord = 488.5269
Mid. Ord. = 37.7077
P.C. Station 114+24.10 N 13,654,633.2112 E 2,094,971.3795
P.T. Station 119+20.36 N 13,654,411.2082 E 2,095,406.5499
C.C. N 13,655,210.1528 E 2,095,539.9201
Back = S 45° 25' 12.73" E
Ahead = S 80° 31' 22.19" E
Chord Bear = S 62° 58' 17.46" E

Course from PT WATSON-1 to PC WATSON-2 S 80° 31' 22.19" E Dist 1,596.5779

Curve Data

Curve WATSON-2
P.I. Station 136+50.94 N 13,654,126.2590 E 2,097,113.5177
Delta = 67° 38' 53.55" (RT)
Degree = 28° 38' 52.40"
Tangent = 134.0102
Length = 236.1368
Radius = 200.0000
External = 40.7462
Long Chord = 222.6581
Mid. Ord. = 33.8499
P.C. Station 135+16.93 N 13,654,148.3244 E 2,096,981.3366
P.T. Station 137+53.07 N 13,653,995.6178 E 2,097,143.3777
C.C. N 13,653,951.0541 E 2,096,948.4057
Back = S 80° 31' 22.19" E
Ahead = S 12° 52' 28.64" E
Chord Bear = S 46° 41' 55.42" E

Course from PT WATSON-2 to PC WATSON-3 S 12° 52' 28.64" E Dist 341.6340

Curve Data

Curve WATSON-3
P.I. Station 142+11.84 N 13,653,548.3830 E 2,097,245.5996
Delta = 12° 51' 07.85" (RT)
Degree = 5° 30' 33.15"
Tangent = 117.1342
Length = 233.2854
Radius = 1,040.0000
External = 6.5756
Long Chord = 232.7966
Mid. Ord. = 6.5343
P.C. Station 140+94.70 N 13,653,662.5725 E 2,097,219.5000
P.T. Station 143+27.99 N 13,653,431.2488 E 2,097,245.6455
C.C. N 13,653,430.8414 E 2,096,205.6456
Back = S 12° 52' 28.64" E
Ahead = S 0° 01' 20.80" E
Chord Bear = S 6° 26' 54.72" E

Course from PT WATSON-3 to WAT02 S 0° 01' 20.80" E Dist 782.6403
Point WAT02 N 13,652,648.6085 E 2,097,245.9521 Sta 151+10.63
==========
Ending chain WATSON description

Beginning chain RPBVWB description
==========

Point VWB500 N 13,654,193.6957 E 2,096,870.5006 Sta 534+00.00
Course from VWB500 to VWB501 S 81° 40' 06.93" E Dist 24.8849
Point VWB501 N 13,654,190.0899 E 2,096,895.1229 Sta 534+24.88
Course from VWB501 to PC RPBVWB-1 S 80° 31' 22.19" E Dist 27.3405

Curve Data

Curve RPBVWB-1
P.I. Station 535+21.23 N 13,654,174.2264 E 2,096,990.1519
Delta = 21° 52' 45.35" (LT)
Degree = 16° 02' 57.26"
Tangent = 69.0035
Length = 136.3259
Radius = 357.0000
External = 6.6076
Long Chord = 135.4991
Mid. Ord. = 6.4875
P.C. Station 534+52.23 N 13,654,185.5881 E 2,096,922.0903
P.T. Station 535+88.55 N 13,654,189.0464 E 2,097,057.5452
C.C. N 13,654,537.7156 E 2,096,980.8719
Back = S 80° 31' 22.19" E
Ahead = N 77° 35' 52.46" E
Chord Bear = N 88° 32' 15.14" E

Curve Data

Curve RPBVWB-2
P.I. Station 536+10.44 N 13,654,193.7468 E 2,097,078.9203
Delta = 28° 33' 20.99" (RT)
Degree = 66° 37' 22.80"
Tangent = 21.8858
Length = 42.8618
Radius = 86.0000
External = 2.7411
Long Chord = 42.4196
Mid. Ord. = 2.6565
P.C. Station 535+88.55 N 13,654,189.0464 E 2,097,057.5452
P.T. Station 536+31.41 N 13,654,187.6578 E 2,097,099.9421
C.C. N 13,654,105.0532 E 2,097,076.0155
Back = N 77° 35' 52.46" E
Ahead = S 73° 50' 46.55" E
Chord Bear = S 88° 07' 27.05" E

Curve Data

Curve RPBVWB-3
P.I. Station 536+38.63 N 13,654,185.6512 E 2,097,106.8697
Delta = 6° 59' 43.43" (LT)
Degree = 48° 33' 20.68"
Tangent = 7.2124
Length = 14.4069
Radius = 118.0000
External = 0.2202
Long Chord = 14.3980
Mid. Ord. = 0.2198
P.C. Station 536+31.41 N 13,654,187.6578 E 2,097,099.9421
P.T. Station 536+45.82 N 13,654,184.5032 E 2,097,113.9902
C.C. N 13,654,300.9990 E 2,097,132.7715
Back = S 73° 50' 46.55" E
Ahead = S 80° 50' 29.99" E
Chord Bear = S 77° 20' 38.27" E

Course from PT RPBVWB-3 to VWB502 S 80° 50' 29.99" E Dist 143.0586
Point VWB502 N 13,654,161.7336 E 2,097,255.2252 Sta 537+88.88

==========
Ending chain RPBVWB description

Beginning chain RPBWSB description
==========
Point WSB400 N 13,654,155.9325 E 2,096,762.6711 Sta 433+00.00
Course from WSB400 to WSB401 S 80° 31' 22.19" E Dist 75.0528
Point WSB401 N 13,654,143.5747 E 2,096,836.6994 Sta 433+75.05
Course from WSB401 to PC RPBWSB-1 S 72° 06' 46.88" E Dist 41.2823

Curve Data

Curve RPBWSB-1 (Chord Definition)
P.I. Station 434+94.45 N 13,654,106.9036 E 2,096,950.3238
Delta = 44° 48' 12.67" (RT)
Degree = 30° 35' 51.10"
Tangent = 78.1131
Length = 146.4286
Radius = 189.5000
External = 15.4681
Long Chord = 144.4364
Mid. Ord. = 14.3007
P.C. Station 434+16.34 N 13,654,130.8952 E 2,096,875.9863
P.T. Station 435+62.76 N 13,654,037.4969 E 2,096,986.1618
C.C. N 13,653,950.5549 E 2,096,817.7832
Back = S 72° 06' 46.88" E
Ahead = S 27° 18' 34.21" E
Chord Bear = S 49° 42' 40.54" E

Curve Data

Curve RPBWSB-2 (Chord Definition)
P.I. Station 436+15.34 N 13,653,990.7801 E 2,097,010.2839
Delta = 36° 16' 32.70" (LT)
Degree = 36° 18' 08.98"
Tangent = 52.5769
Length = 99.9263
Radius = 160.5000
External = 8.3922
Long Chord = 99.9288
Mid. Ord. = 7.9752
P.C. Station 435+62.76 N 13,654,037.4969 E 2,096,986.1618
P.T. Station 436+62.69 N 13,653,967.3904 E 2,097,057.3717
C.C. N 13,654,111.1338 E 2,097,128.7727
Back = S 27° 18' 34.21" E
Ahead = S 63° 35' 06.91" E
Chord Bear = S 45° 26' 50.56" E

Curve Data

Curve RPBWSB-3 (Chord Definition)
P.I. Station 437+23.93 N 13,653,940.1462 E 2,097,112.2193
Delta = 38° 53' 01.12" (RT)
Degree = 33° 29' 54.90"
Tangent = 61.2414
Length = 116.0755
Radius = 173.5000
External = 10.4912
Long Chord = 115.4988
Mid. Ord. = 9.8930
P.C. Station 436+62.69 N 13,653,967.3904 E 2,097,057.3717
P.T. Station 437+78.77 N 13,653,884.5087 E 2,097,137.8116
C.C. N 13,653,812.0043 E 2,096,980.1875
Back = S 63° 35' 06.91" E
Ahead = S 24° 42' 05.79" E
Chord Bear = S 44° 08' 36.35" E

Course from PT RPBWSB-3 to WSB402 S 22° 40' 08.34" E Dist 55.9803
Point WSB402 N 13,653,832.8530 E 2,097,159.3868 Sta 438+34.75
Course from WSB402 to WSB403 S 16° 56' 15.17" E Dist 179.3132
Point WSB403 N 13,653,661.3179 E 2,097,211.6260 Sta 440+14.06
==========
Ending chain RPBWSB description

Beginning chain RPBWEB description
==========
Point WEB600 N 13,653,954.9929 E 2,097,176.2562 Sta 638+00.00
Course from WEB600 to PC RPBWEB-1 N 12° 52' 28.64" W Dist 45.7828

Curve Data

Curve RPBWEB-1
P.I. Station 639+19.31 N 13,654,070.2792 E 2,097,145.7082
Delta = 84° 59' 42.29" (RT)
Degree = 71° 23' 59.79"
Tangent = 73.5258
Length = 119.0408
Radius = 80.2463
External = 28.5908
Long Chord = 108.4221
Mid. Ord. = 21.0802
P.C. Station 638+45.78 N 13,653,999.6247 E 2,097,166.0549
P.T. Station 639+64.82 N 13,654,096.7124 E 2,097,214.3181
C.C. N 13,654,021.8313 E 2,097,243.1674
Back = N 16° 03' 54.46" W
Ahead = N 68° 55' 47.83" E
Chord Bear = N 26° 25' 56.68" E

Curve Data

Curve RPBWEB-2
P.I. Station 639+96.87 N 13,654,107.7978 E 2,097,244.3889
Delta = 28° 44' 21.49" (RT)
Degree = 45° 48' 03.11"
Tangent = 32.0490
Length = 62.7484
Radius = 125.0976
External = 4.0401
Long Chord = 62.0926
Mid. Ord. = 3.9137
P.C. Station 639+64.82 N 13,654,096.7124 E 2,097,214.3181
P.T. Station 640+27.57 N 13,654,103.0588 E 2,097,276.0856
C.C. N 13,653,979.3364 E 2,097,257.5880
Back = N 69° 45' 50.21" E
Ahead = S 81° 29' 48.29" E
Chord Bear = N 84° 08' 00.96" E

==========
Ending chain RPBWEB description

CUR VERANO1 VERANO2
Beginning chain VERANO description
==========

Curve Data

Curve VERANO1
P.I. Station 200+74.18 N 13,654,151.9909 E 2,097,133.4537
Delta = 48° 24' 48.87" (RT)
Degree = 34° 43' 28.97"
Tangent = 74.1774
Length = 139.4211
Radius = 165.0000
External = 15.9069
Long Chord = 135.3103
Mid. Ord. = 14.5082
P.C. Station 200+00.00 N 13,654,105.0532 E 2,097,076.0155
P.T. Station 201+39.42 N 13,654,140.1846 E 2,097,206.6855
C.C. N 13,653,977.2880 E 2,097,180.4236
Back = N 50° 44' 41.15" E
Ahead = S 80° 50' 29.99" E
Chord Bear = N 74° 57' 05.58" E

Course from PT VERANO1 to VERANO2 S 80° 50' 29.99" E Dist 1,758.0419

Point VERANO2 N 13,653,860.3688 E 2,098,942.3163 Sta 218+97.46

==========
Ending chain VERANO description

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	—	96

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY:
PLOTTED SCALE:
PEN TABLE:
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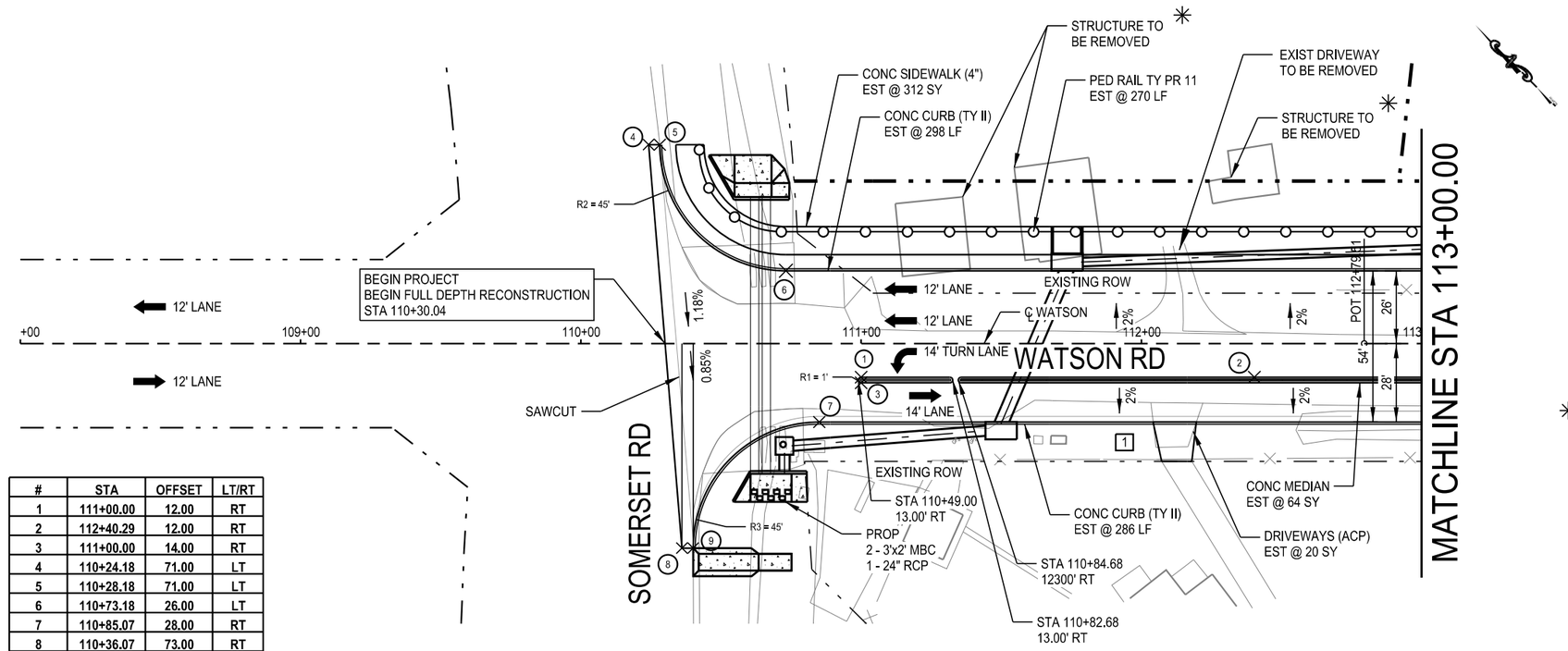
PLOTTED ON: 12:52:14 PM
DESIGN FILENAME: X:\data\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\RDWY\WATSON_HAD.dgn

ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	AC	1
0216	PROOF ROLLING	HR	4
0275	CEMENT	TON	20
0275	CEMENT TREAT (EXIST MATL) (6")	SY	1803
0340	D-GR HMA(SQ) TY-B PG64-22	TON	595
0340	D-GR HMA(SQ) TY-C PG64-22	TON	364
0340	D-GR HMA(SQ) TY-D PG70-22	TON	175
0529	CONC CURB (TY II)	LF	584
0530	DRIVEWAYS (ACP)	SY	20
0531	CONC SIDEWALKS (4")	SY	312
0536	CONC MEDIAN	SY	64

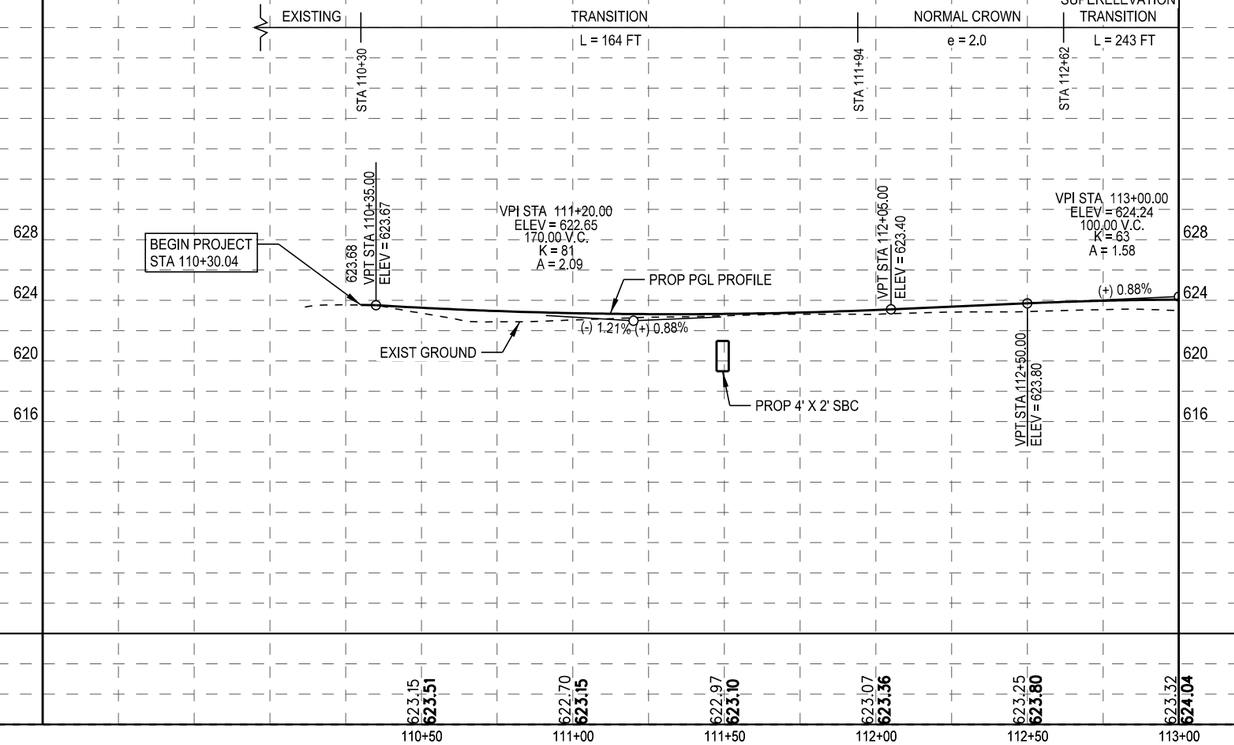


#	STA	OFFSET	LT/RT
1	111+00.00	12.00	RT
2	112+40.29	12.00	RT
3	111+00.00	14.00	RT
4	110+24.18	71.00	LT
5	110+28.18	71.00	LT
6	110+73.18	26.00	LT
7	110+85.07	28.00	RT
8	110+36.07	73.00	RT
9	110+40.07	73.00	RT

✳ ITEM TO BE PAID FOR AS ITEM 100-6001.

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS · JULIO RAMOS · 107672 · LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY PLAN AND PROFILE

BEGINNING OF PROJECT TO STA 113+00.00

SHEET 1 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			97
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
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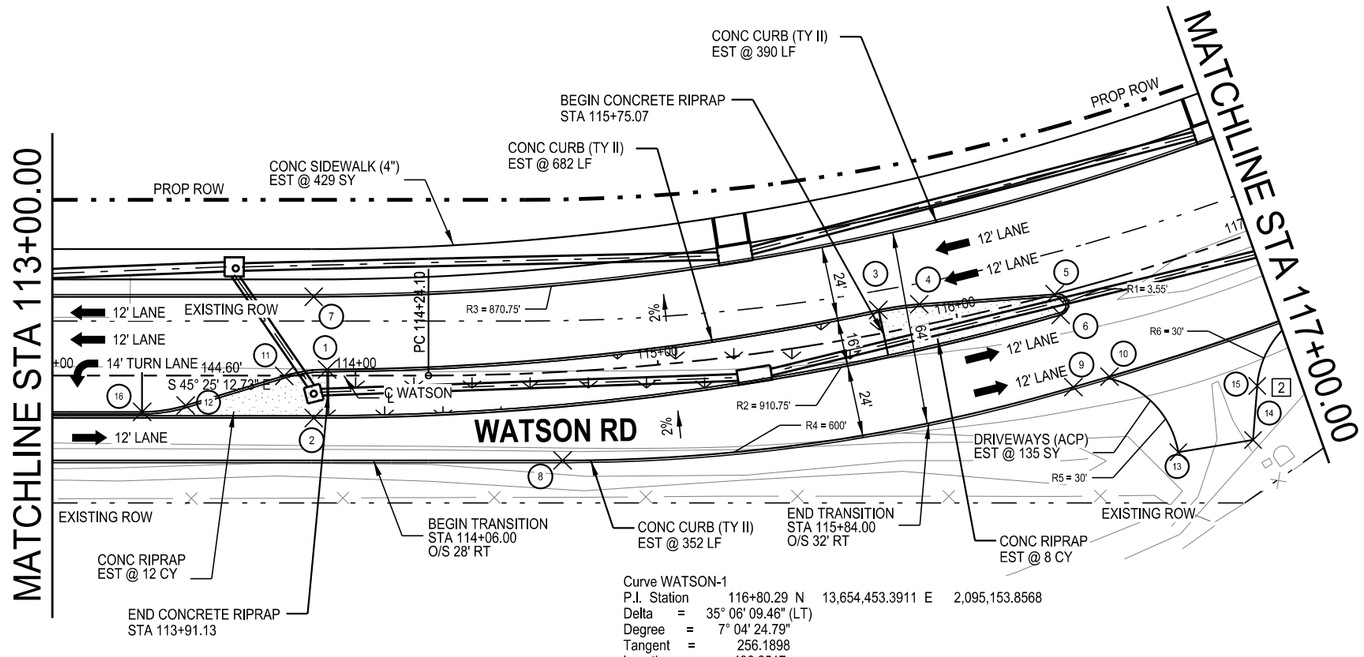


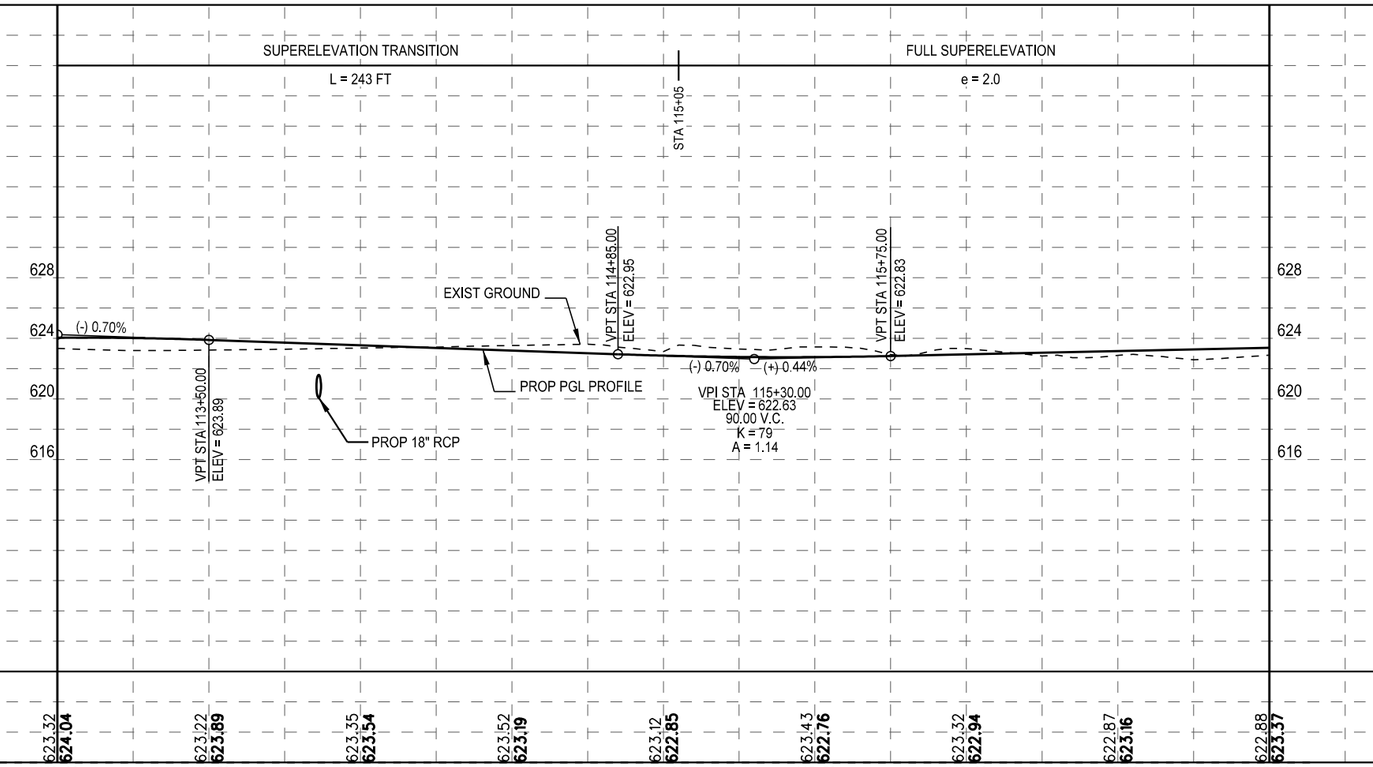
Curve WATSON-1
P.I. Station 116+80.29 N 13,654,453.3911 E 2,095,153.8568
Delta = 35° 06' 09.46" (LT)
Degree = 7° 04' 24.79"
Tangent = 256.1898
Length = 496.2517
Radius = 810.0000
External = 39.5488
Long Chord = 488.5269
Mid. Ord. = 37.7077
P.C. Station 114+24.10 N 13,654,633.2112 E 2,094,971.3795
P.T. Station 119+20.36 N 13,654,411.2082 E 2,095,406.5499

ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	4
0216	PROOF ROLLING	HR	6
0275	CEMENT	TON	30
0275	CEMENT TREAT (EXIST MATL) (6")	SY	2491
0340	D-GR HMA(SQ) TY-B PG64-22	TON	595
0340	D-GR HMA(SQ) TY-C PG64-22	TON	487
0340	D-GR HMA(SQ) TY-D PG70-22	TON	185
0432	RIPRAP (CONC)(4 IN)	CY	20
0529	CONC CURB (TY II)	LF	1424
0530	DRIVEWAYS(ACP)	SY	135
0531	CONC SIDEWALKS (4")	SY	429
0560	MAILBOX INSTALL-D (TWG-POST) TY 1	EA	1

#	STA	OFFSET	LT/RT
1	113+90.65	2.00	LT
2	113+86.23	14.00	RT
3	115+74.90	7.76	LT
4	115+88.65	7.04	LT
5	116+33.12	0.01	LT
6	116+33.29	7.09	RT
7	113+86.23	26.00	LT
8	114+66.86	29.17	RT
9	116+31.33	31.21	RT
10	116+43.27	30.94	RT
11	113+81.23	0.77	LT
12	113+44.00	9.88	RT
13	116+57.43	61.21	RT
14	116+80.41	64.66	RT
15	116+86.88	48.21	RT
16	113+29.59	12.00	RT

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 DRIVEWAY
- # STA & OFFSET
- R = # RADIUS
- PROPOSED MAILBOX



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NO	DATE	REVISION	APPROVED

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY PLAN AND PROFILE

STA 113+00.00 TO STA 117+00.00

SHEET 2 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		—	98
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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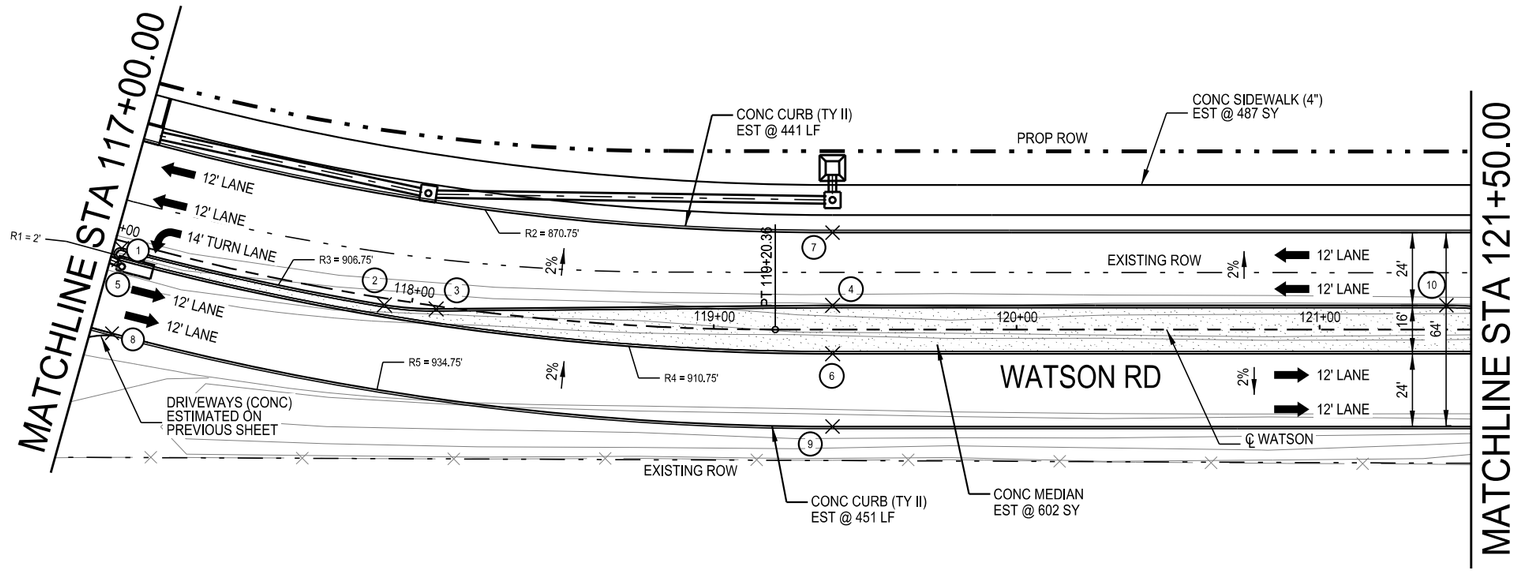
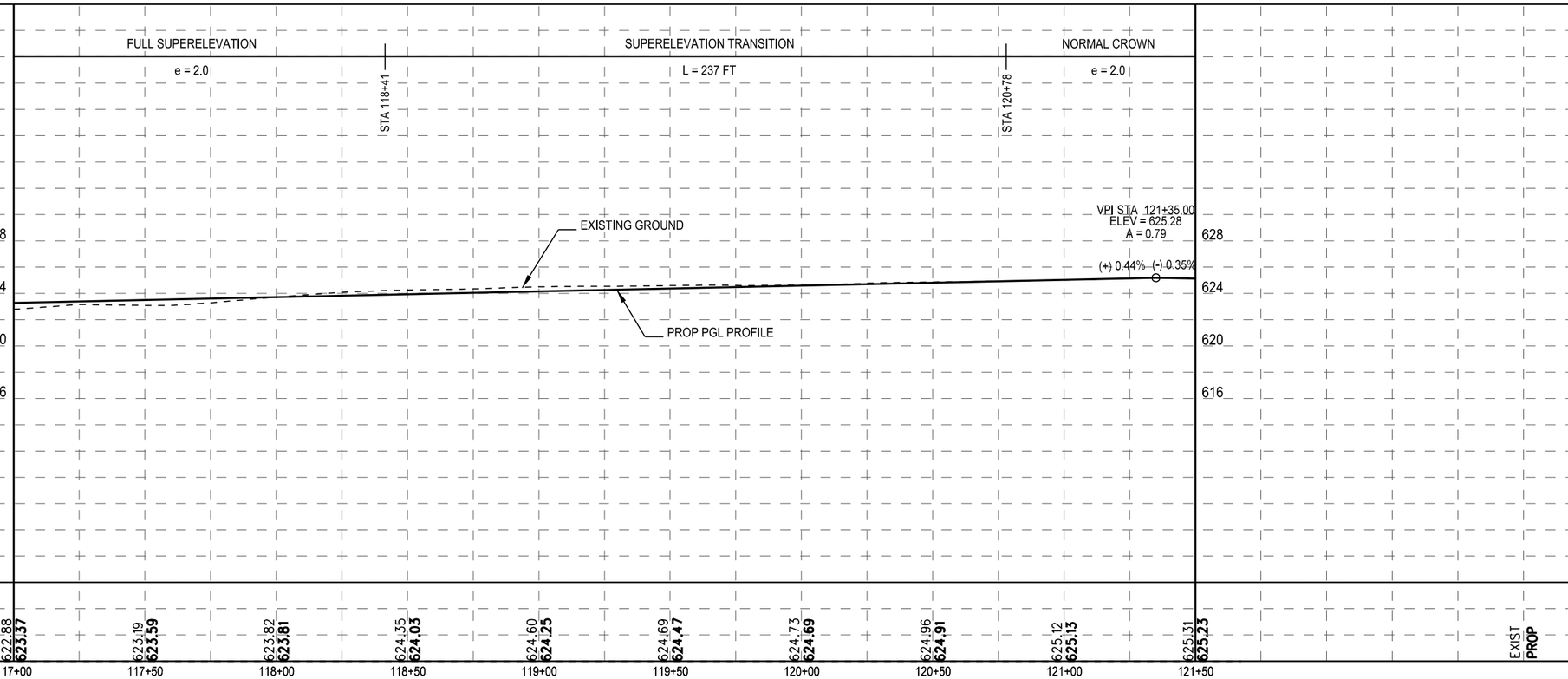
ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	5
0216	PROOF ROLLING	HR	7
0275	CEMENT	TON	36
0275	CEMENT TREAT (EXIST MATL) (6")	SY	2945
0340	D-GR HMA(SQ) TY-B PG64-22	TON	972
0340	D-GR HMA(SQ) TY-C PG64-22	TON	571
0340	D-GR HMA(SQ) TY-D PG70-22	TON	219
0529	CONC CURB (TY II)	LF	892
0531	CONC SIDEWALKS (4")	SY	487
0536	CONC MEDIAN	SY	602



#	STA	OFFSET	LT/RT
1	117+02.66	2.29	RT
2	117+91.11	2.17	RT
3	118+08.17	0.94	RT
4	119+39.25	8.00	LT
5	117+02.69	6.29	RT
6	119+39.26	8.00	RT
7	119+39.26	32.00	LT
8	117+06.83	30.26	RT
9	119+39.26	32.00	RT
10	121+41.89	8.00	LT

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX



NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
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1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY PLAN AND PROFILE

STA 117+00.00 TO STA 121+50.00

SHEET 3 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	99

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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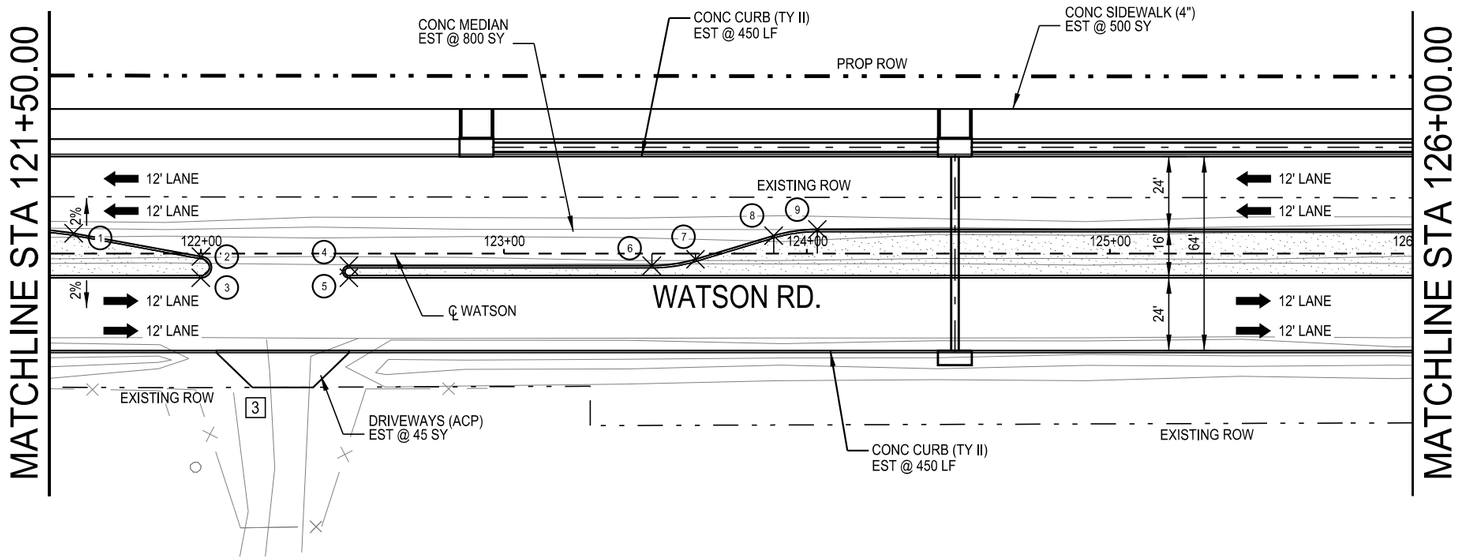
ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	5
0216	PROOF ROLLING	HR	7
0275	CEMENT	TON	36
0275	CEMENT TREAT (EXIST MATL) (6")	SY	2750
0340	D-GR HMA(SQ) TY-B PG64-22	TON	908
0340	D-GR HMA(SQ) TY-C PG64-22	TON	528
0340	D-GR HMA(SQ) TY-D PG70-22	TON	176
0529	CONC CURB (TY II)	LF	900
0530	DRIVEWAYS (ACP)	SY	45
0531	CONC SIDEWALKS (4")	SY	500
0536	CONC MEDIAN	SY	800



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3	122+00.00	8.00	RT
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5	122+48.81	8.00	RT
6	123+48.81	4.00	RT
7	123+63.22	1.88	RT
8	123+89.04	5.88	LT
9	124+03.44	8.00	LT

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- [1] DRIVEWAY
- (#) STA & OFFSET
- R = # RADIUS
- PROPOSED MAILBOX

NO	DATE	REVISION	APPROVED
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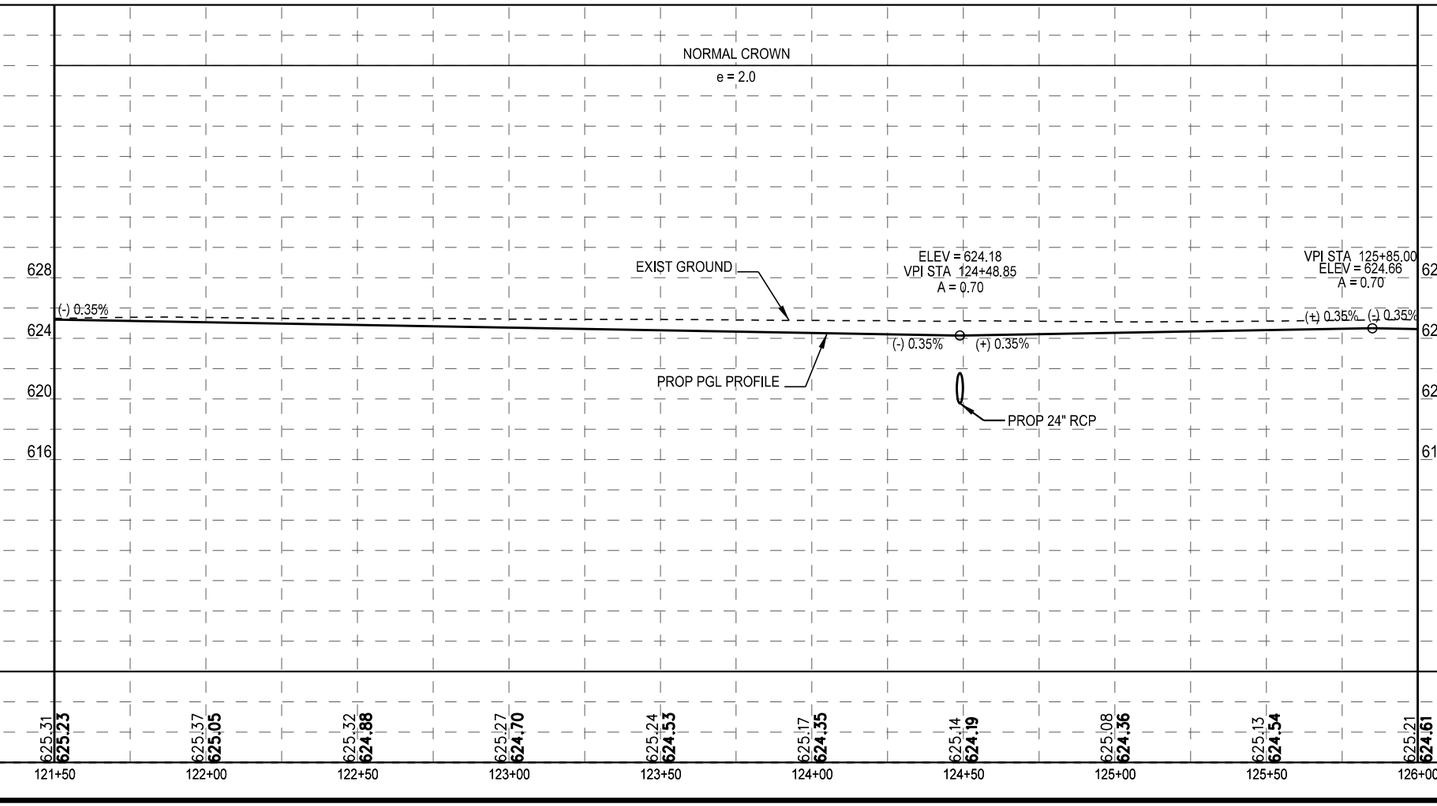

GRAPHIC SCALE
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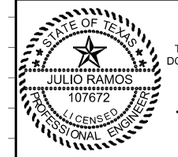
Vert: 1" = 10'



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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY PLAN AND PROFILE

STA 121+50.00 TO STA 126+00.00

SHEET 4 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		—	100
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF.pltcfg
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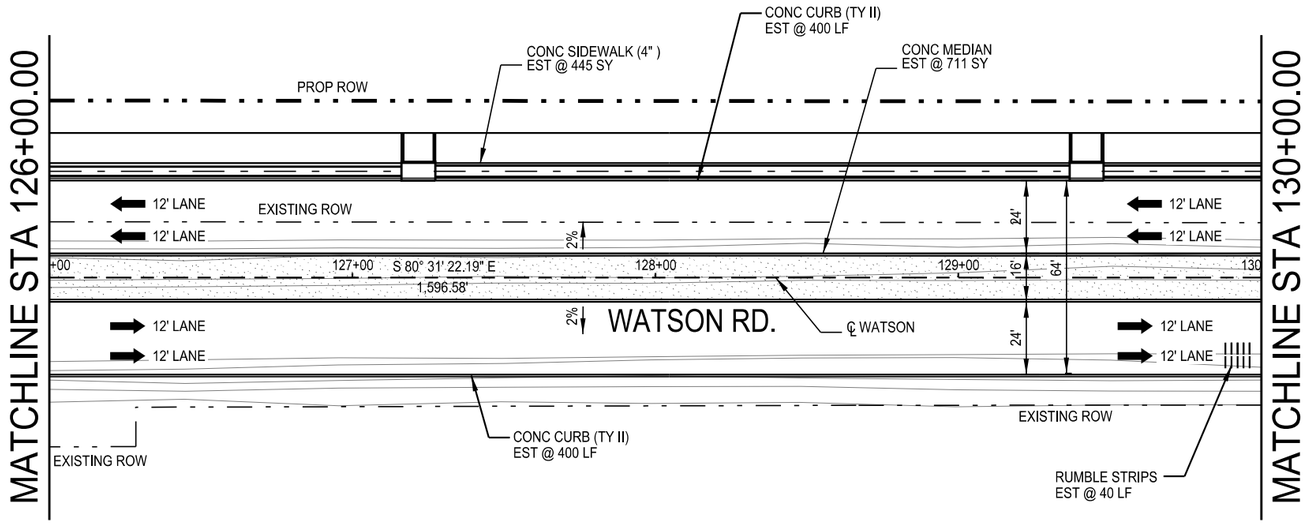
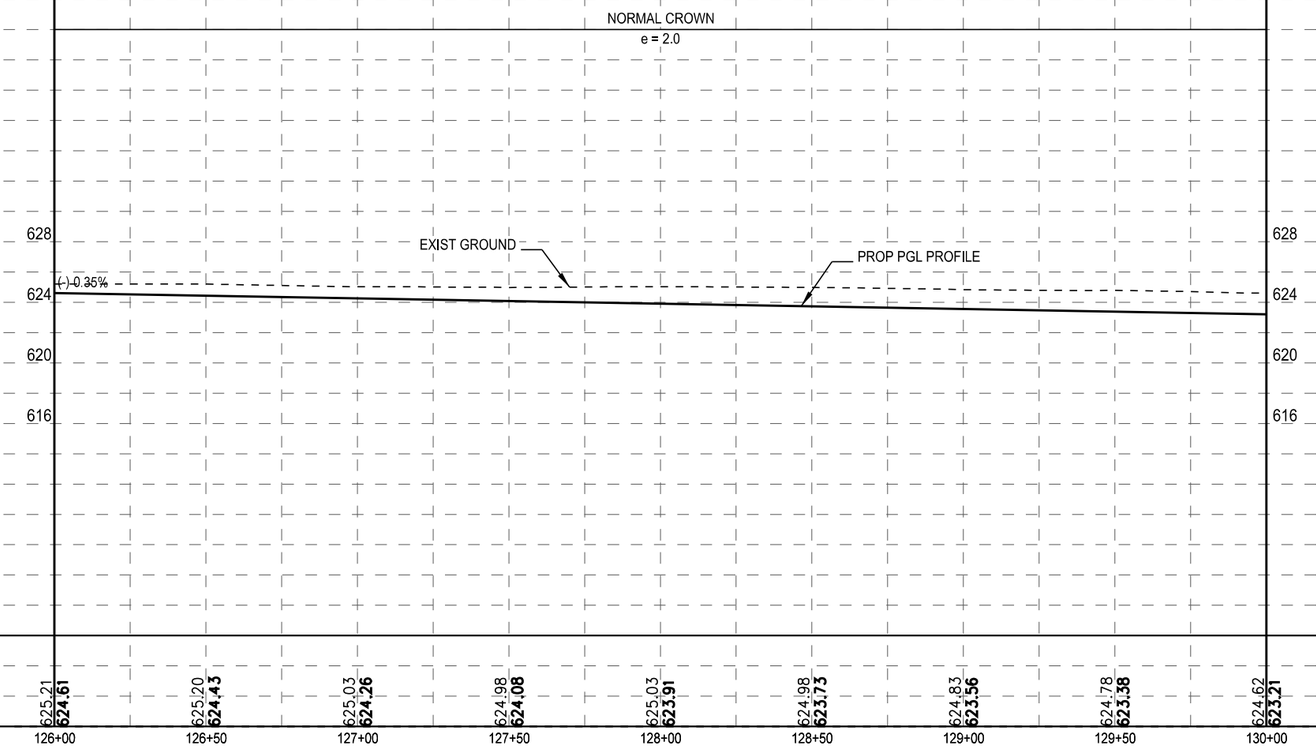


ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	4
0216	PROOF ROLLING	HR	6
0275	CEMENT	TON	32
0275	CEMENT TREAT (EXIST MATL) (6")	SY	2444
0340	D-GR HMA(SQ) TY-B PG64-22	TON	807
0340	D-GR HMA(SQ) TY-C PG64-22	TON	469
0340	D-GR HMA(SQ) TY-D PG70-22	TON	156
0529	CONC CURB (TY II)	LF	800
0531	CONC SIDEWALKS (4")	SY	445
0536	CONC MEDIAN	SY	711
6056	PREFORMED IN-LANE(TRANS) RUMBLE STRIP	LF	40

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX



NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

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6/25/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY
PLAN AND PROFILE

STA 126+00.00 TO STA 130+00.00

SHEET 5 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	---	101

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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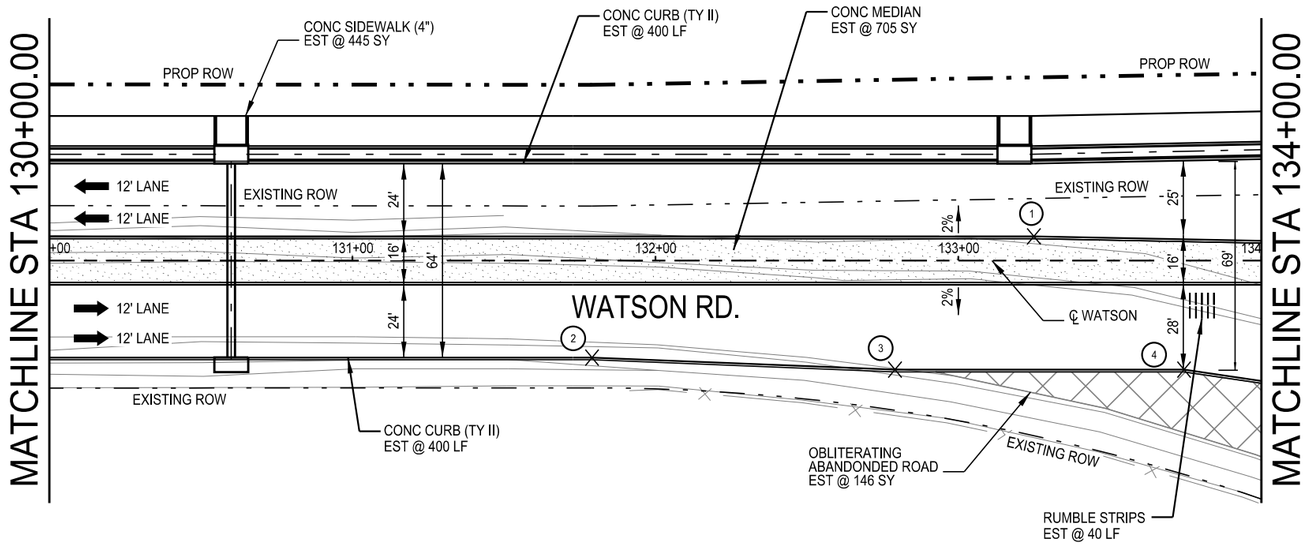
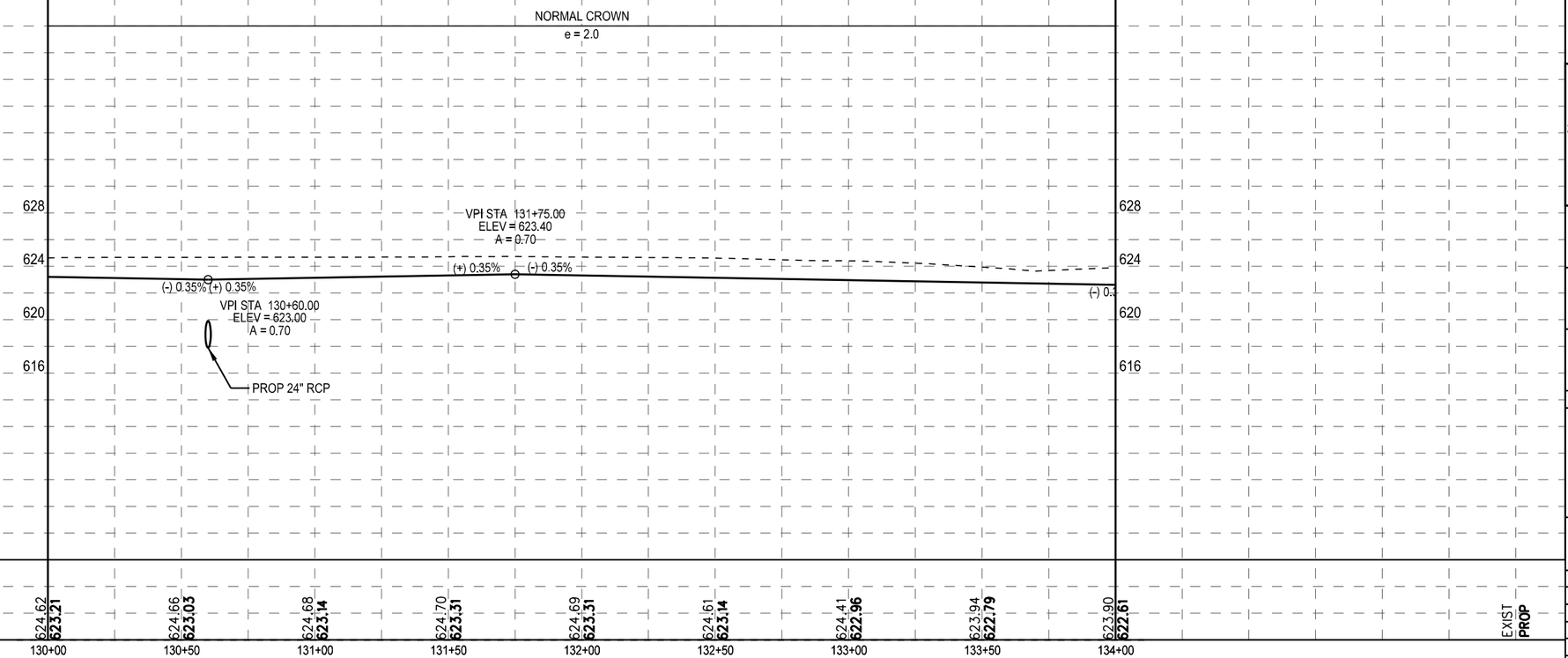
ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	4
0106	OBLITERATING ABANDONED ROAD	SY	146
0216	PROOF ROLLING	HR	5
0275	CEMENT	TON	33
0275	CEMENT TREAT (EXIST MATL) (6")	SY	2538
0340	D-GR HMA(SQ) TY-B PG64-22	TON	838
0340	D-GR HMA(SQ) TY-C PG64-22	TON	490
0340	D-GR HMA(SQ) TY-D PG70-22	TON	167
0529	CONC CURB (TY II)	LF	800
0531	CONC SIDEWALKS (4")	SY	445
0536	CONC MEDIAN	SY	705
6056	PREFORMED IN-LANE(TRANS) RUMBLE STRIP	LF	40



#	STA	OFFSET	LT/RT
1	133+24.95	8.00	LT
2	131+79.08	32.00	RT
3	132+79.08	36.00	RT
4	133+88.18	36.00	RT

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX



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GRAPHIC SCALE
(IN FEET)
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1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

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6/25/2020

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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY
PLAN AND PROFILE

STA 130+00.00 TO STA 134+00.00

SHEET 6 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			102
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:50
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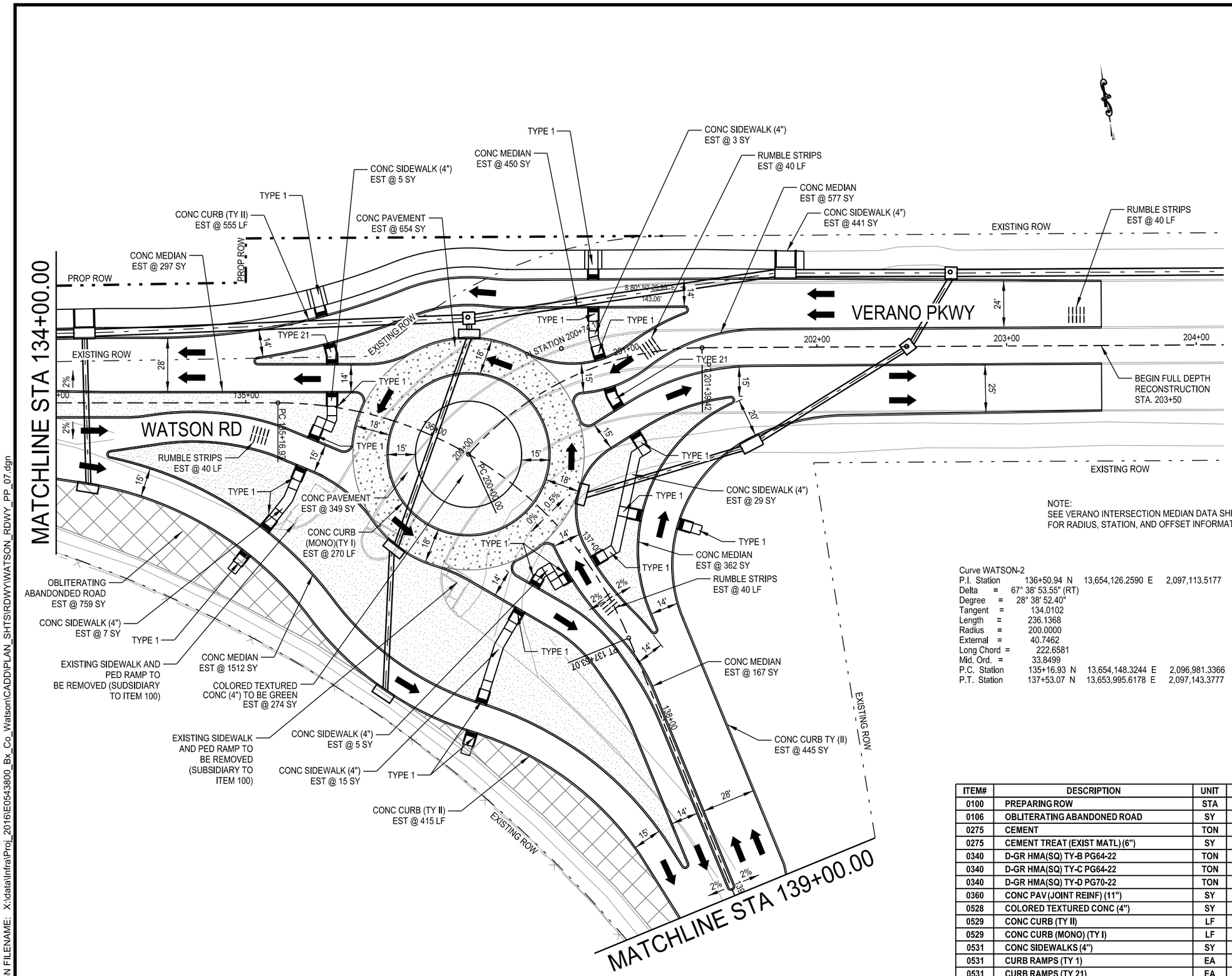

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX

NOTE:
SEE VERANO INTERSECTION MEDIAN DATA SHEET FOR RADIUS, STATION, AND OFFSET INFORMATION.

Curve WATSON-2

P.I. Station	136+50.94 N	13,654,126.2590 E	2,097,113.5177
Delta =	67° 38' 53.55" (RT)		
Degree =	28° 38' 52.40"		
Tangent =	134.0102		
Length =	236.1368		
Radius =	200.0000		
External =	40.7462		
Long Chord =	222.6581		
Mid. Ord. =	33.8499		
P.C. Station	135+16.93 N	13,654,148.3244 E	2,096,981.3366
P.T. Station	137+53.07 N	13,653,995.6178 E	2,097,143.3777

ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	5
0106	OBLITERATING ABANDONED ROAD	SY	759
0275	CEMENT	TON	42
0275	CEMENT TREAT (EXIST MATL) (6")	SY	5291
0340	D-GR HMA(SQ) TY-B PG64-22	TON	1746
0340	D-GR HMA(SQ) TY-C PG64-22	TON	1208
0340	D-GR HMA(SQ) TY-D PG70-22	TON	491
0360	CONC PAV (JOINT REINF) (11")	SY	1025
0528	COLORED TEXTURED CONC (4")	SY	274
0529	CONC CURB (TY II)	LF	1415
0529	CONC CURB (MONO) (TY I)	LF	270
0531	CONC SIDEWALKS (4")	SY	505
0531	CURB RAMPS (TY 1)	EA	18
0531	CURB RAMPS (TY 21)	EA	2
0536	CONC MEDIAN	SY	3365
6056	PREFORMED IN-LANE(TRANS) RUMBLE STRIP	LF	160

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
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6/25/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY
PLAN AND PROFILE

STA 134+00.00 TO STA 139+00.00

SHEET 7 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		103
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
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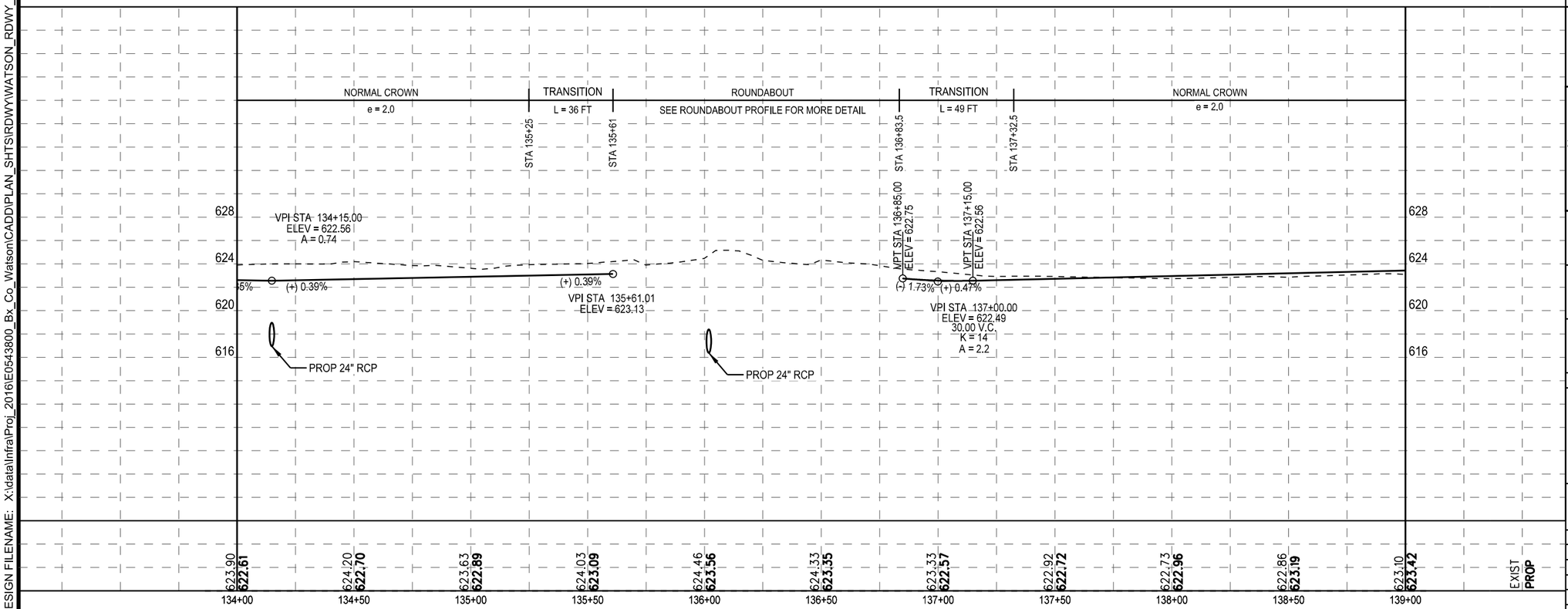
SEE PREVIOUS SHEET
FOR PLAN VIEW



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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY
PLAN AND PROFILE

STA 134+00.00 TO STA 139+00.00

SHEET 8 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6	---		104
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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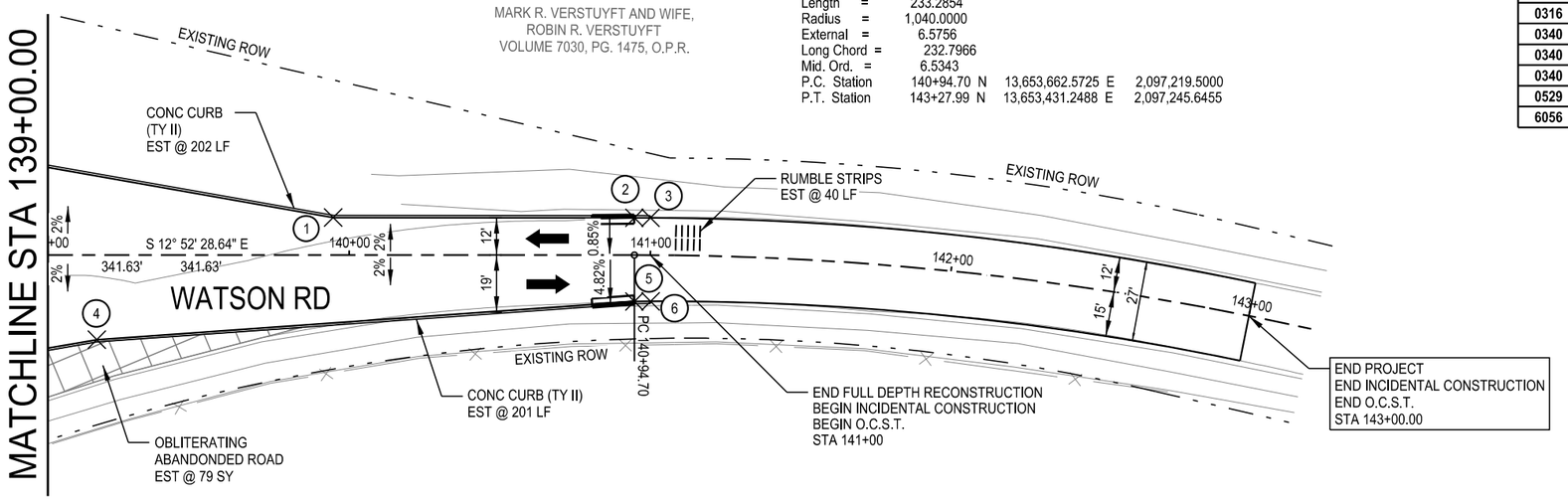
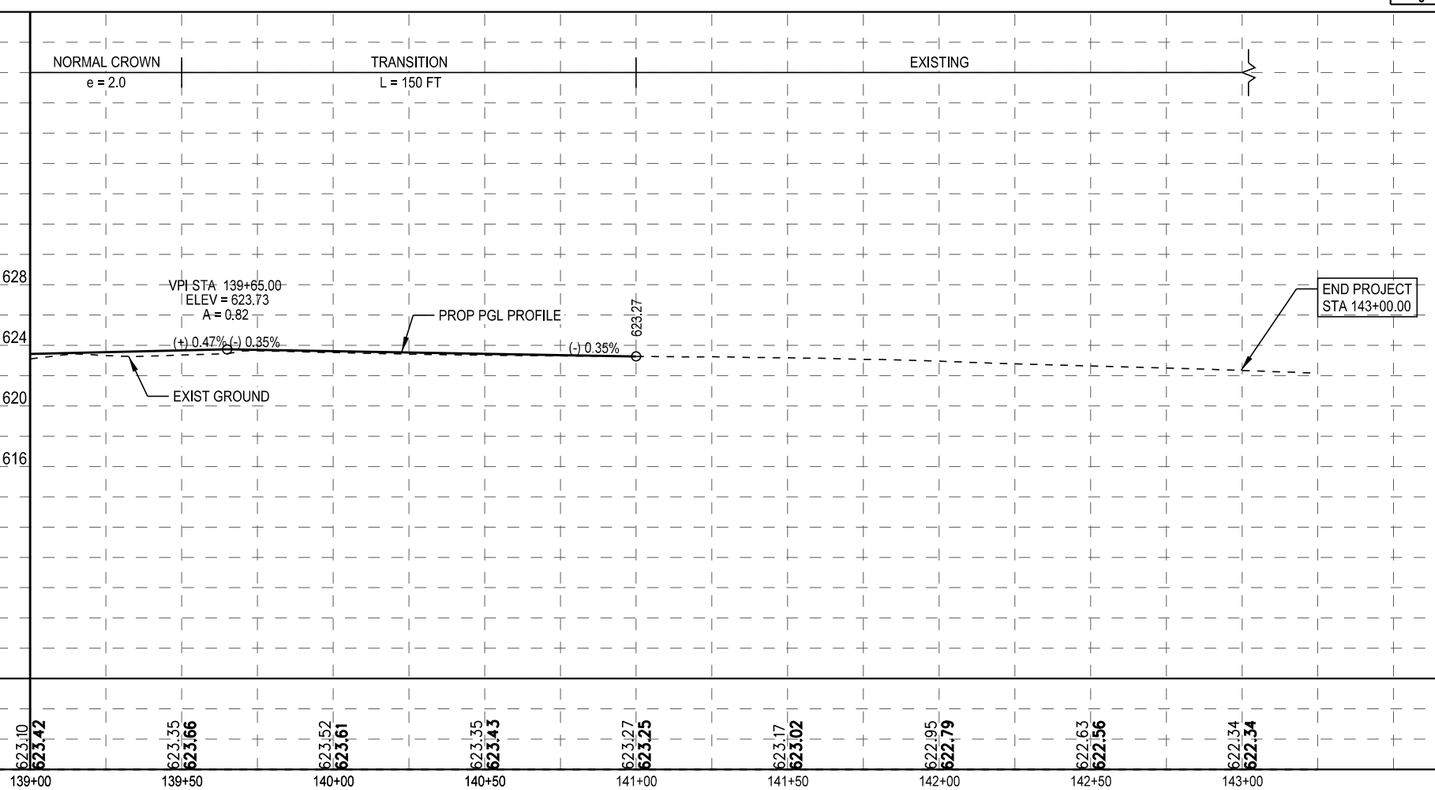
ITEM#	DESCRIPTION	UNIT	QTY
0100	PREPARING ROW	STA	4
0106	OBLITERATING ABANDONED ROAD	SY	79
0216	PROOF ROLLING	HR	5
0275	CEMENT	TON	10
0275	CEMENT TREAT (EXIST MATL) (6")	SY	936
0316	ASPH (MULTI OPTION)	GAL	149
0316	AGGR(TY-B GR-4 SAC-B)	CY	8
0340	D-GR HMA(SQ) TY-B PG64-22	TON	309
0340	D-GR HMA(SQ) TY-C PG64-22	TON	197
0340	D-GR HMA(SQ) TY-D PG70-22	TON	94
0529	CONC CURB (TY II)	LF	403
6056	PREFORMED IN-LANE(TRANS) RUMBLE STRIP	LF	40



#	STA	OFFSET	LT/RT
1	139+94.70	12.46	LT
2	140+94.70	12.35	LT
3	141+00.00	12.35	LT
4	139+16.22	28.11	RT
5	140+94.70	15.44	RT
6	141+00.15	15.38	RT

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

ROADWAY PLAN AND PROFILE

STA 139+00.00 TO END OF PROJECT

SHEET 9 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	105

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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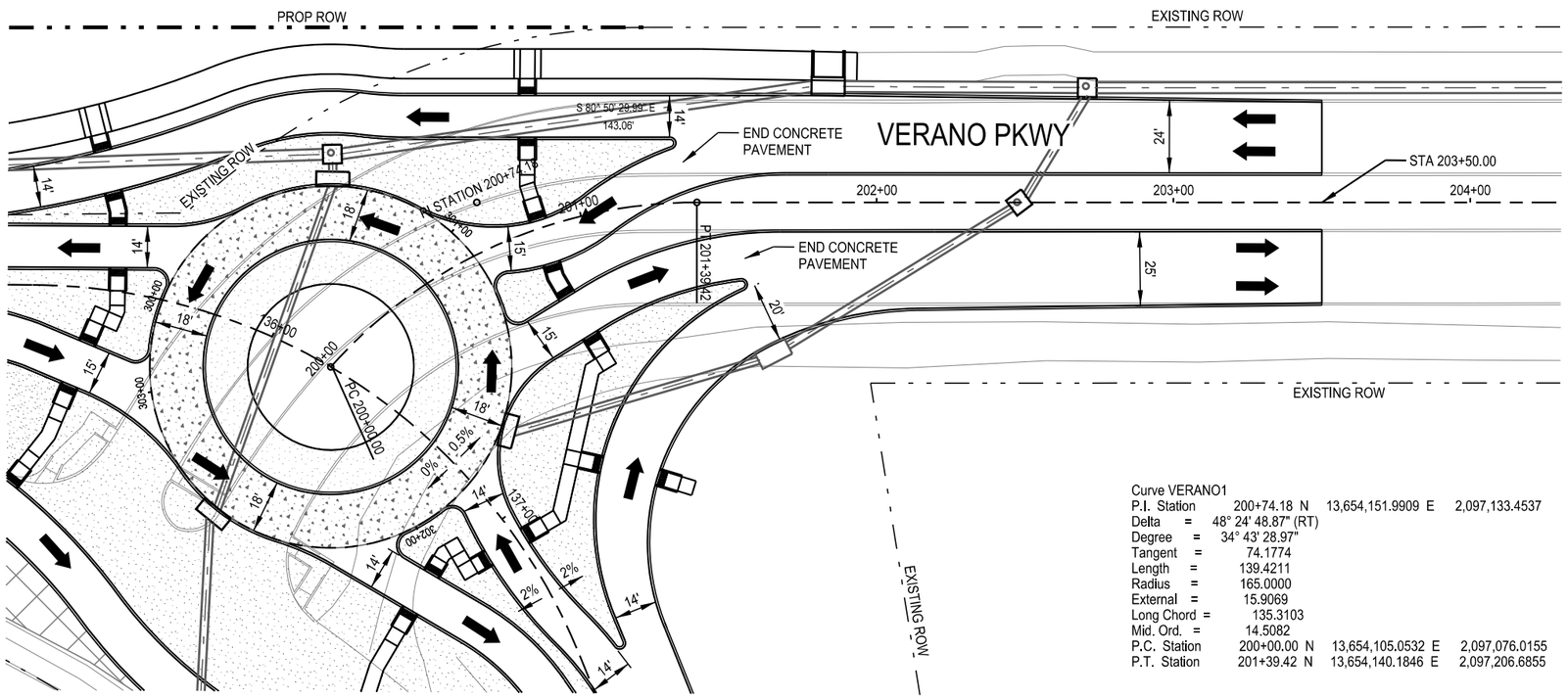


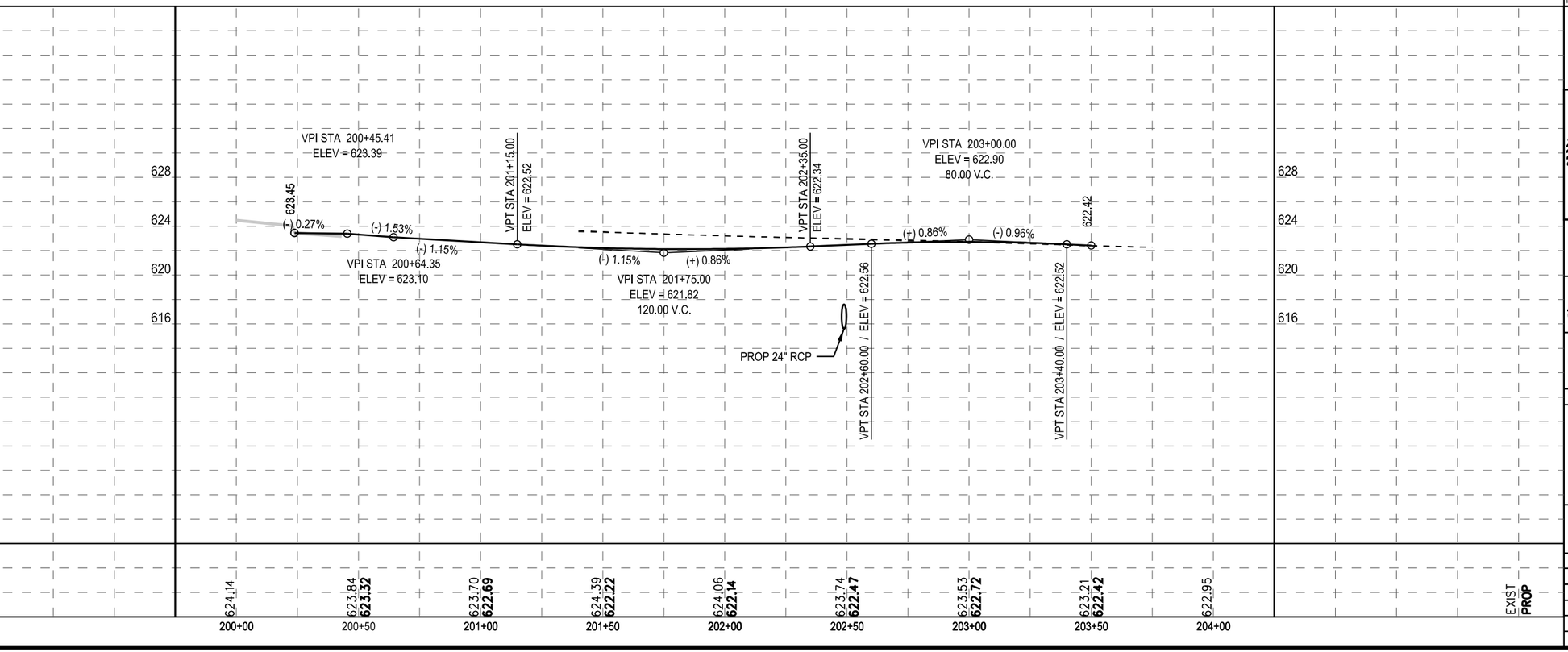
Curve VERANO1

P.I. Station	200+74.18 N	13,654,151.9909 E	2,097,133.4537
Delta =	48° 24' 48.87" (RT)		
Degree =	34° 43' 28.97"		
Tangent =	74.1774		
Length =	139.4211		
Radius =	165.0000		
External =	15.9069		
Long Chord =	135.3103		
Mid. Ord. =	14.5082		
P.C. Station	200+00.00 N	13,654,105.0532 E	2,097,076.0155
P.T. Station	201+39.42 N	13,654,140.1846 E	2,097,206.6855

NOTE:
SEE WATSON ROADWAY PLAN & PROFILE SHEET 7 OF 9 FOR ROADWAY QUANTITIES.

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 5'

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

VERANO
PLAN AND PROFILE

BEGIN TO END

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		—	106

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF.pltcfg
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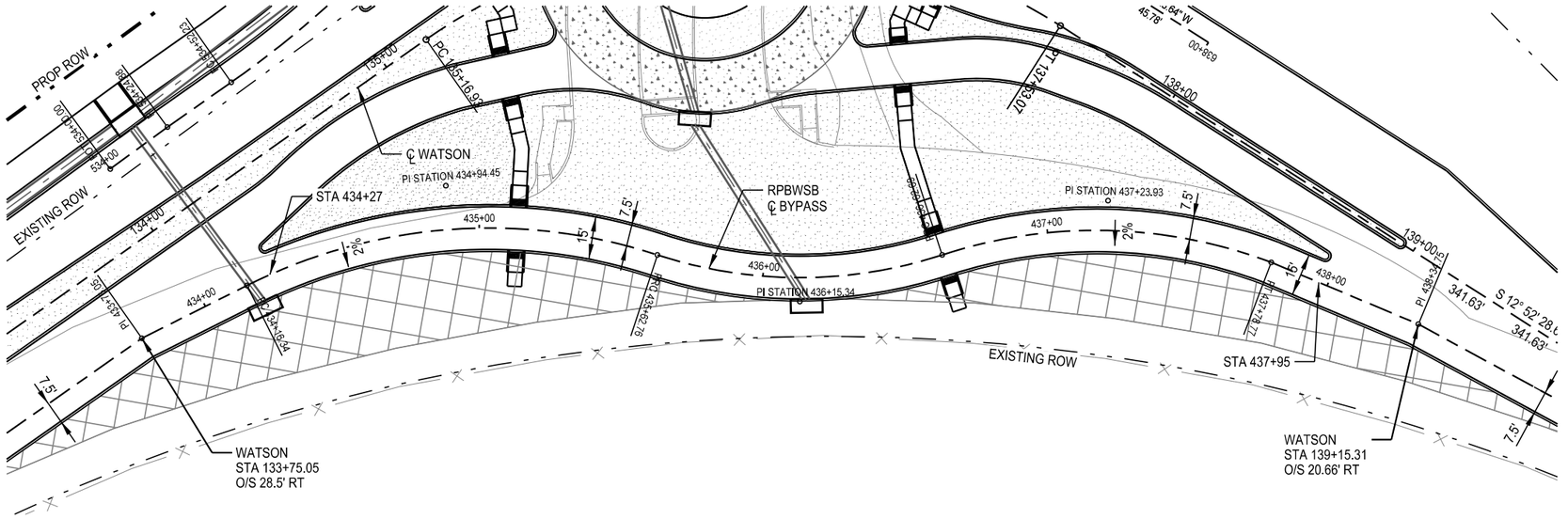

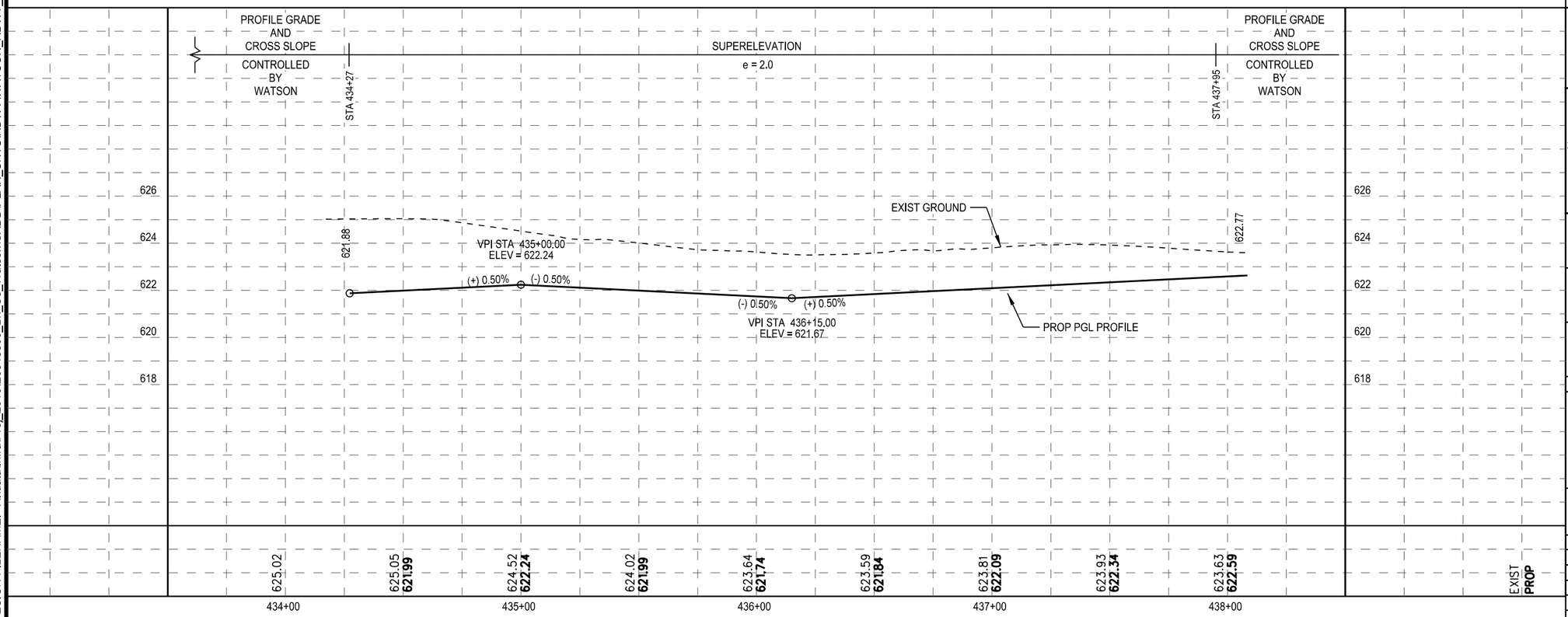

LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- CONCRETE PAVEMENT
- CONCRETE APRON
- BLOCK SOD
- 1 DRIVEWAY
- PROP TRAFFIC ARROW

NOTE:
SEE WATSON ROADWAY PLAN & PROFILE SHEET 7 OF 9 FOR ROADWAY QUANTITIES.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
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Vert: 1" = 5'

STATE OF TEXAS
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107672
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

BYPASS LANES PLAN AND PROFILE

WATSON SB

SHEET 1 OF 2

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	---	107

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
PLOTTED ON: 6/25/2020 @ 12:52:50 PM
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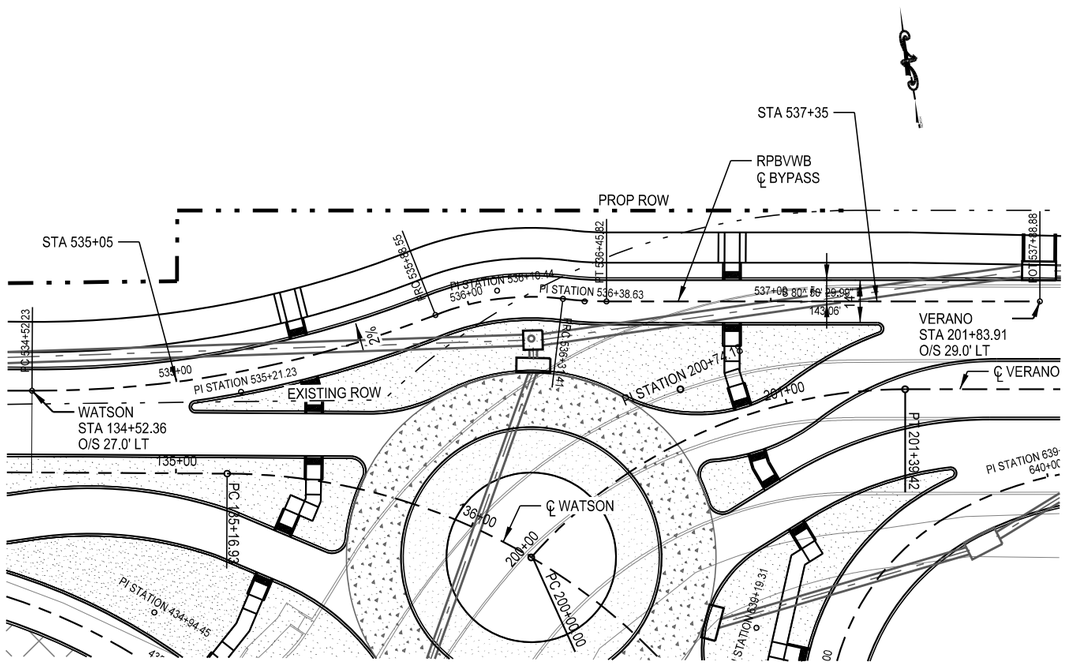

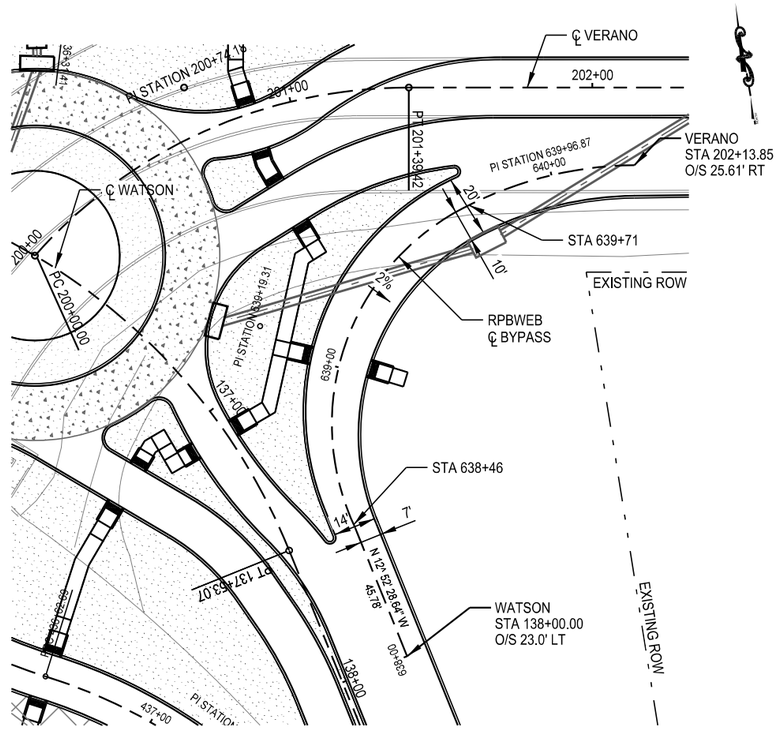

LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- CONCRETE PAVEMENT
- CONCRETE APRON
- BLOCK SOD
- 1 DRIVEWAY
- PROP TRAFFIC ARROW

NOTE:
SEE WATSON ROADWAY PLAN & PROFILE SHEET 7 OF 9 FOR ROADWAY QUANTITIES.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
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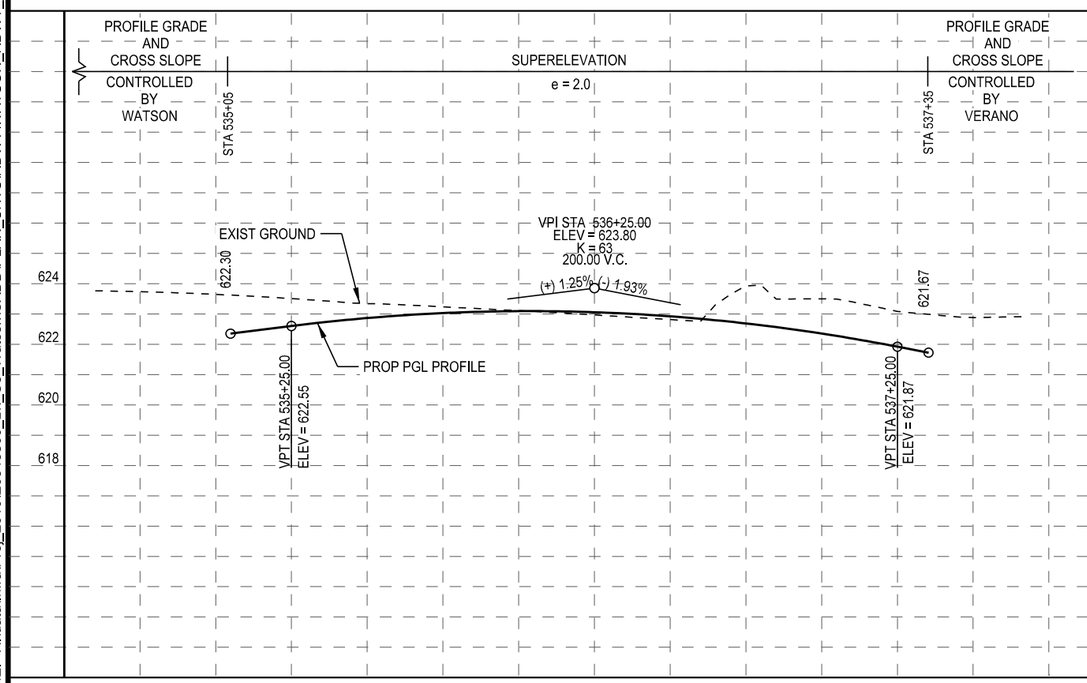
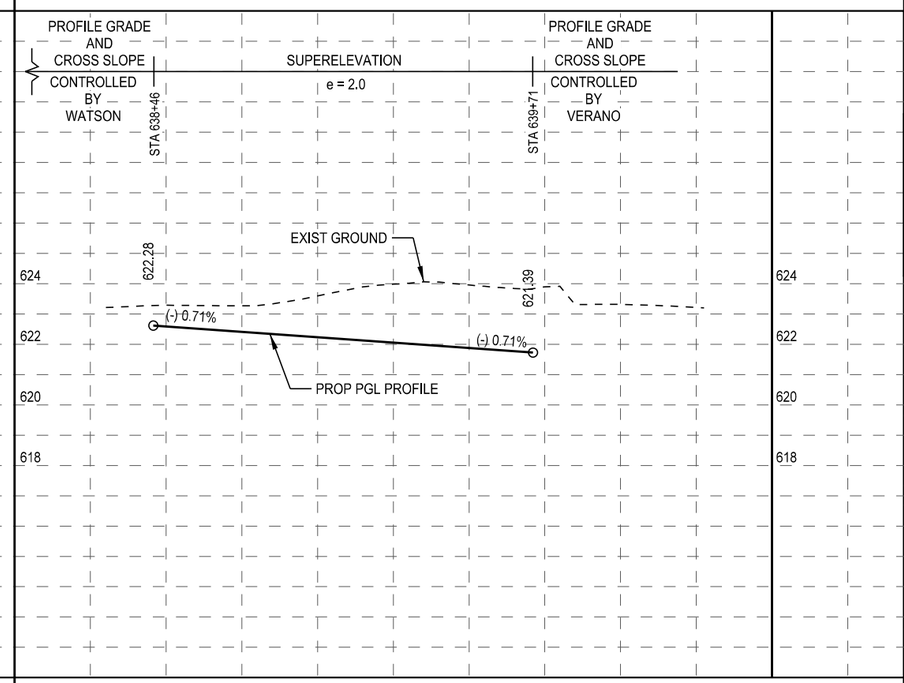
Vert: 1" = 5'





JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

BYPASS LANES PLAN AND PROFILE

VERANO WB & WATSON EB

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		108
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
PLOTTED ON: 6/25/2020 @ 12:52:52 PM
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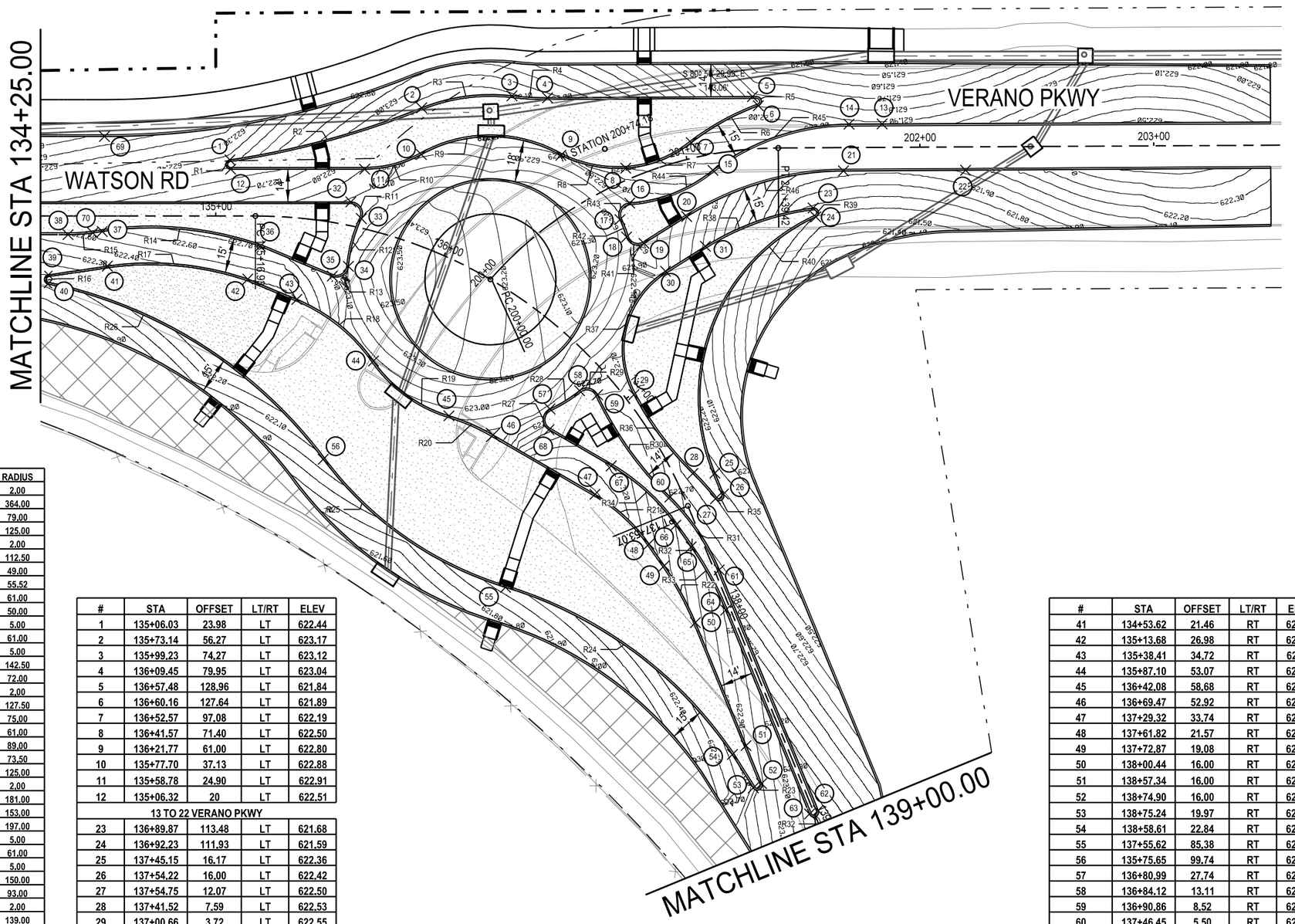

R#	RADIUS
R1	2.00
R2	364.00
R3	79.00
R4	125.00
R5	2.00
R6	112.50
R7	49.00
R8	55.52
R9	61.00
R10	50.00
R11	5.00
R12	61.00
R13	5.00
R14	142.50
R15	72.00
R16	2.00
R17	127.50
R18	75.00
R19	61.00
R20	89.00
R21	73.50
R22	125.00
R23	2.00
R24	181.00
R25	153.00
R26	197.00
R27	5.00
R28	61.00
R29	5.00
R30	150.00
R31	93.00
R32	2.00
R33	139.00
R34	87.50
R35	2.00
R36	136.00
R37	39.50
R38	112.50
R39	2.00
R40	85.00
R41	5.00
R42	61.00
R43	5.00
R44	64.00
R45	97.50
R46	127.50

#	STA	OFFSET	LT/RT	ELEV
1	135+06.03	23.98	LT	622.44
2	135+73.14	56.27	LT	623.17
3	135+99.23	74.27	LT	623.12
4	136+09.45	79.95	LT	623.04
5	136+57.48	128.96	LT	621.84
6	136+60.16	127.64	LT	621.89
7	136+52.57	97.08	LT	622.19
8	136+41.57	71.40	LT	622.50
9	136+21.77	61.00	LT	622.80
10	135+77.70	37.13	LT	622.88
11	135+58.78	24.90	LT	622.91
12	135+06.32	20	LT	622.51
13 TO 22 VERANO PKWY				
23	136+89.87	113.48	LT	621.68
24	136+92.23	111.93	LT	621.59
25	137+45.15	16.17	LT	622.36
26	137+54.22	16.00	LT	622.42
27	137+54.75	12.07	LT	622.50
28	137+41.52	7.59	LT	622.53
29	137+00.66	3.72	LT	622.55
30	136+73.48	48.72	LT	622.83
31	136+76.87	68.36	LT	622.47
32	135+56.03	10.00	LT	623.02
33	135+61.74	3.97	LT	623.11
34	135+60.78	17.17	RT	623.21
35	135+54.22	22.64	RT	622.89
36	135+19.14	12.94	RT	622.71
37	134+51.43	6.62	RT	622.57
38	134+36.79	8.00	RT	622.48
39	134+28.40	25.19	RT	622.10
40	134+28.15	29.09	RT	622.03

VERANO PKWY

#	STA	OFFSET	LT/RT	ELEV
13	201+83.91	10.00	LT	621.92
14	201+69.73	10.00	LT	621.94
15	201+10.00	6.88	RT	622.47
16	200+69.80	9.55	RT	622.81
17	200+62.43	14.11	RT	622.93
18	200+61.46	22.03	RT	622.93
19	200+67.88	27.79	RT	622.99
20	200+92.97	23.55	RT	622.70
21	201+67.24	9.99	RT	621.94
22	202+19.48	9.97	RT	622.03

#	STA	OFFSET	LT/RT	ELEV
41	134+53.62	21.46	RT	622.28
42	135+13.68	26.98	RT	622.40
43	135+38.41	34.72	RT	622.51
44	135+87.10	53.07	RT	623.07
45	136+42.08	58.68	RT	622.92
46	136+69.47	52.92	RT	622.76
47	137+29.32	33.74	RT	621.98
48	137+61.82	21.57	RT	622.35
49	137+72.87	19.08	RT	622.45
50	138+00.44	16.00	RT	622.64
51	138+57.34	16.00	RT	622.90
52	138+74.90	16.00	RT	622.99
53	138+75.24	19.97	RT	622.74
54	138+58.61	22.84	RT	622.64
55	137+55.62	85.38	RT	622.06
56	135+75.65	99.74	RT	622.08
57	136+80.99	27.74	RT	622.77
58	136+84.12	13.11	RT	622.72
59	136+90.86	8.52	RT	622.60
60	137+46.45	5.50	RT	622.60
61	137+83.47	2.00	LT	622.84
62	138+94.70	2.00	LT	623.36
63	138+94.70	2.00	RT	623.36
64	138+00.44	2.00	RT	622.92
65	137+69.79	5.42	RT	622.71
66	137+58.74	7.92	RT	622.61
67	137+21.24	21.59	RT	622.22
68	136+88.46	33.98	RT	622.43
69	134+52.36	34.00	LT	622.02
70	134+47.34	7.22	RT	622.54

PLAN VIEW LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- PROP TRAFFIC ARROW
- CONCRETE PAVEMENT
- CONCRETE APRON
- 1 — DRIVEWAY
- # — STA & OFFSET
- R = # — RADIUS
- PROPOSED MAILBOX

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

VERANO INTERSECTION
MEDIAN DATA

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	109

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
PLOTTED ON: 6/25/2020 @ 12:53:06 PM
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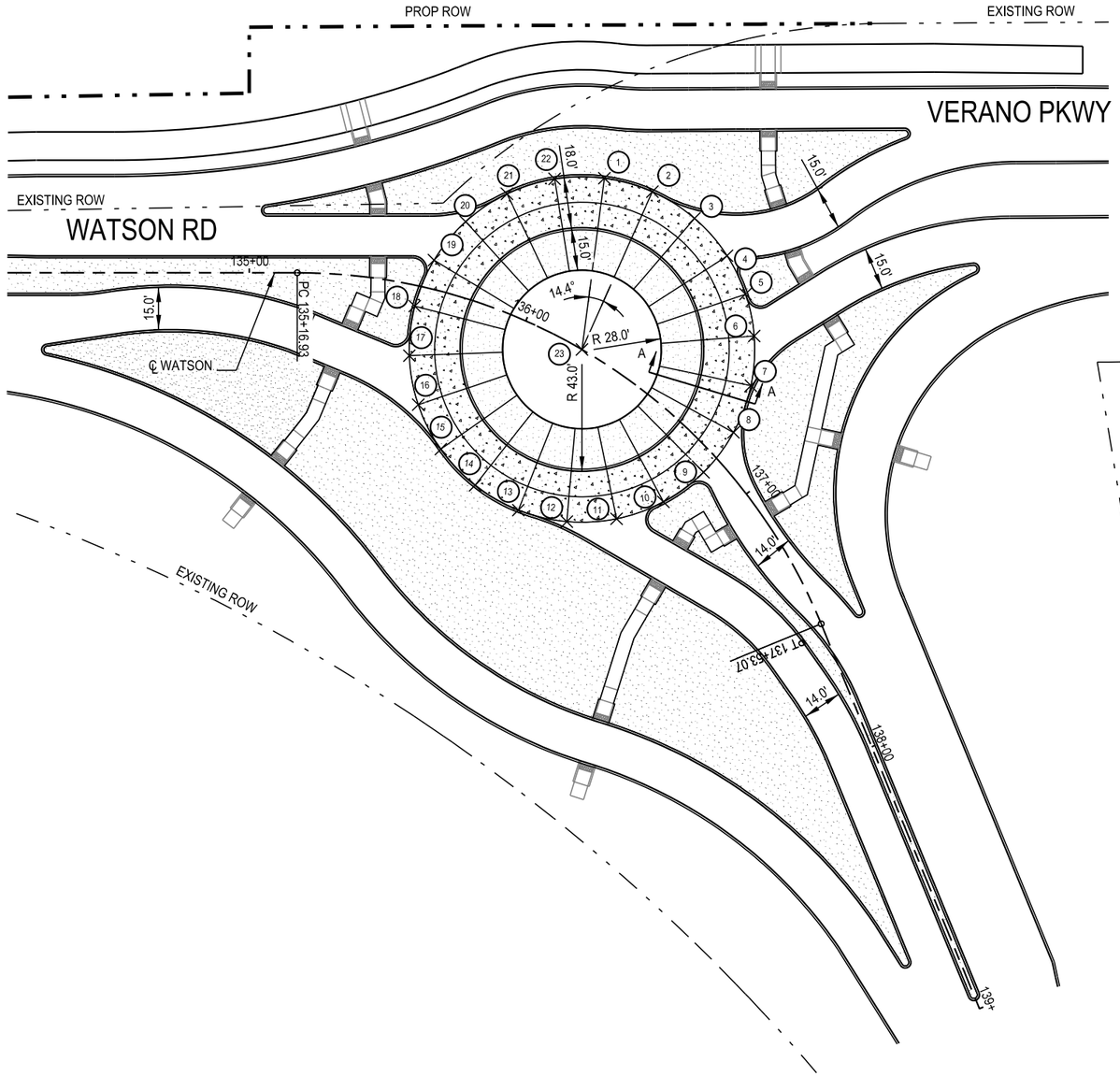
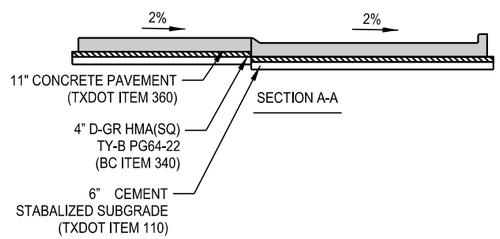


VERANO INTERSECTION			
#	STA	O/S	LT/RT
1	136+03.92	57.35	LT
2	136+17.26	60.73	LT
3	136+30.77	60.22	LT
4	136+43.98	55.83	LT
5	136+54.64	49.16	LT
6	136+64.37	39.99	LT
7	136+74.52	26.83	LT
8	136+81.00	10.60	LT
9	136+84.16	6.70	RT
10	136+82.19	24.21	RT
11	136+73.65	40.28	RT

VERANO INTERSECTION			
12	136+57.67	52.92	RT
13	136+35.22	60.03	RT
14	136+10.05	60.14	RT
15	135+87.44	53.24	RT
16	135+71.23	40.74	RT
17	135+62.46	24.75	RT
18	135+60.30	7.26	RT
19	135+63.33	10.07	LT
20	135+70.19	26.00	LT
21	135+79.78	39.61	LT
22	135+91.25	50.21	LT
23	136+22.24	0.00	RT



LEGEND

- PROP EDGE OF ROADWAY
- EXISTING FEATURES
- EXISTING RIGHT OF WAY
- PROP RIGHT OF WAY
- CONCRETE PAVEMENT
- CONCRETE APRON
- BLOCK SOD
- 1 DRIVEWAY
- PROP TRAFFIC ARROW
- # STA & OFFSET

NOTES:

1. CONCRETE JOINT TYPICAL 15' SPACING UNLESS OTHERWISE NOTED.
2. ROUNDABOUT JOINTS ARE SET AT 14.4° AT EQUAL SPACING.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC
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11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

VERANO INTERSECTION JOINT LAYOUT

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6	-—		110
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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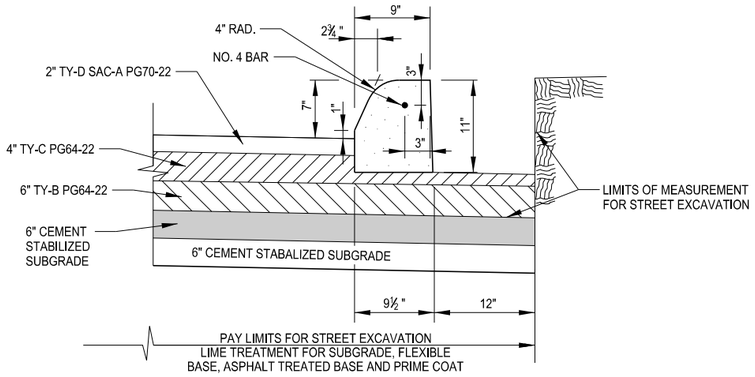
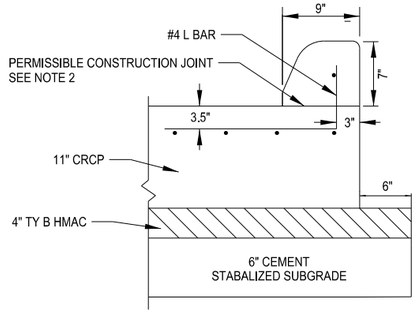
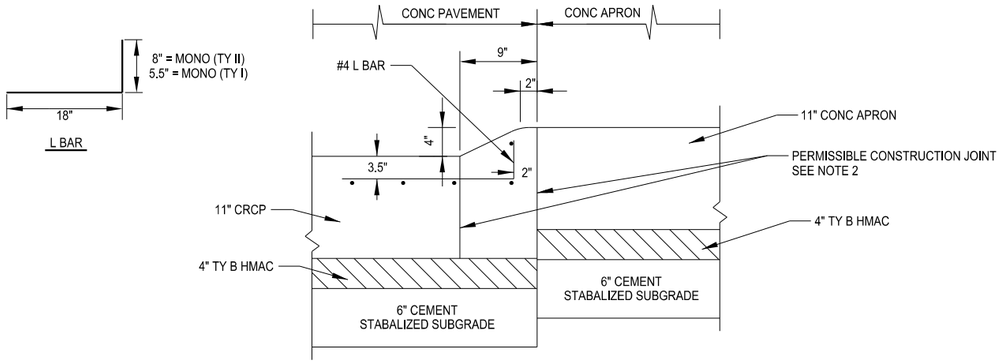


CONC CURB (TY II)



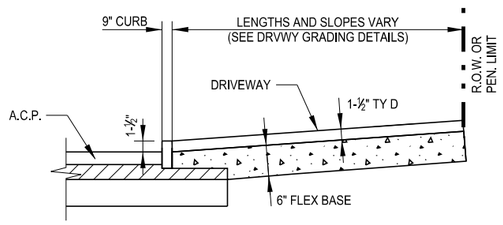
CONCRETE CURB (MONO) (TY II)

CONCRETE PAVEMENT AND CURB



CONCRETE CURB (MONO) (TY I)

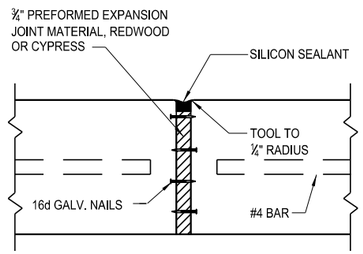
CONCRETE PAVEMENT AND CURB
(ROUNABOUT MEDIAN)



RESIDENTIAL: MIN. 1 1/2" TY D HMAC & 6" FLEXIBLE BASE

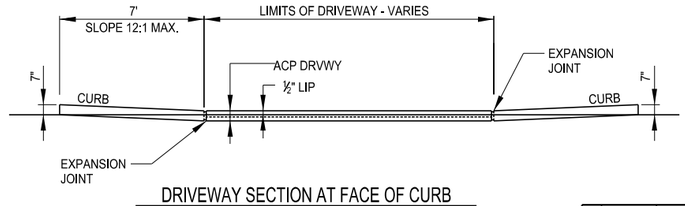
ACP CONCRETE DRIVEWAY DETAIL

*NOTE: ON ACP DRIVEWAYS, THE 6" OF FLEX BASE SHALL BE SUBSIDIARY WORK AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "ACP DRIVEWAYS".

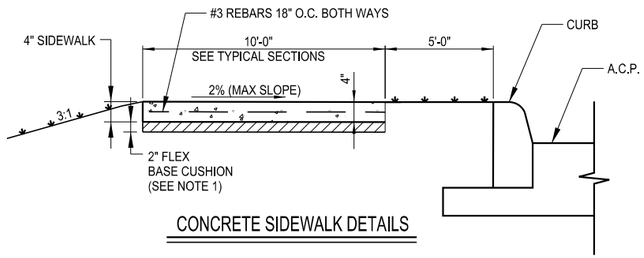


TYPICAL CURB EXPANSION JOINT DETAIL

JOINTS TO BE PLACED AT BEGINNING AND END OF CURVES AND AT OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE ENGINEER.

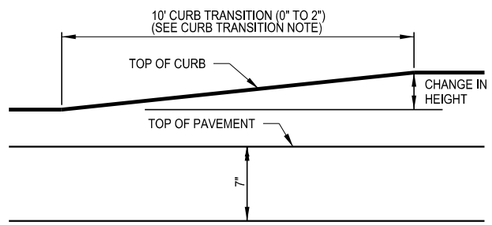


DRIVEWAY SECTION AT FACE OF CURB



CONCRETE SIDEWALK DETAILS

GROOVED JOINTS IN THE SIDEWALK SHALL BE AT A MAX. SPACING OF 10 FT.
AND SHALL HAVE ¾" EXPANSION JOINTS AT A MAX. SPACING OF 40' AND TO COINSIDE WITH THE CURB EXP. JOINTS.



CURB TRANSITION

NOTE: TO BE PAID FOR AS HIGHEST CURB

CURB TRANSITION NOTE:
FIELD CONDITIONS MAY REQUIRE A LONGER OR SHORTER TRANSITION, AND SHALL BE SHOWN ELSEWHERE IN THE PLANS, OR AS DIRECTED BY THE ENGINEER.

CURB NOTES:

1. REINFORCING BARS SHALL BE LAPPED A MINIMUM OF 15".

2. WHEN CURB IS PLACED BY A SEPARATE POUR ADJACENT TO OR ON TOP CONCRETE PAVEMENT, CURB SHALL BE TIED TO PAVEMENT IN A MANNER SATISFACTORY TO THE ENGINEER WITH 8" LONG #3 OR #4 BARS SPACED AT 5 FT AND EXPANSION AND/OR CONTRACTION JOINTS OF CURB SHALL MATCH THOSE OF PAVEMENT.

3. WHEN CURB IS NOT CONSTRUCTED ADJACENT TO CONCRETE PAVEMENT, THE FOLLOWING SHALL GOVERN:
   A. CURB SHALL HAVE FORMED, TOOLED OR SAWED CONTRACTION JOINTS AT 10' +/-. THE DEPTH OF THESE JOINTS SHALL BE SUFFICIENT TO ENSURE CRACKING AT THE JOINTS.
   B. CURB SHALL HAVE EXPANSION JOINTS AT POINTS OF CURVATURE AND LENGTHS GREATER THAN 8' BUT LESS THAN 40' IN ALL CURVES AND AT CURB INLETS, ETC.

4. ONE-HALF INCH EXPANSION JOINT MATERIAL SHALL BE PROVIDED WHERE CURB OR CURB GUTTER IS ADJACENT TO SIDEWALK OR RIPRAP.

5. UNLESS OTHERWIDE SHOWN, TRANSITIONS BETWEEN CURBS OR DIFFERING CROSS SECTION SHALL BE ACCOMPLISHED OVER A 20 FOOT LENGTH OR AS APPROVED BY THE ENGINEER.

6. CONCRETE CURB IS SUBSIDIARY TO CONCRETE MEDIANS WHERE CONCRETE MEDIANS IS CALLED OUT IN THE ROADWAY SHEET.

SIDEWALK AND DRIVEWAY NOTES:

1. THE FLEX BASE CUSHION UNDER SIDEWALKS AND DRIVEWAYS MAY BE OF ANY TYPE AND GRADE APPROVED BY THE ENGINEER. THE FLEX BASE WILL BE SPRINKLED AND ROLLED/ TAMPED AS APPROVED BY THE ENGINEER. FURNISHING AND PLACING THE BASE CUSHION WILL BE SUBSIDIARY TO THE SIDEWALKS AND DRIVEWAY ITEMS.

2. SEE TXDOT STANDARD SHEET "PED-18" FOR SIDEWALK RAMP MATERIAL DETAILS AND CURB TRANSITION DETAILS.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

MISCELLANEOUS ROADWAY DETAILS

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			111
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:11.2847
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DATE: 6/25/2020
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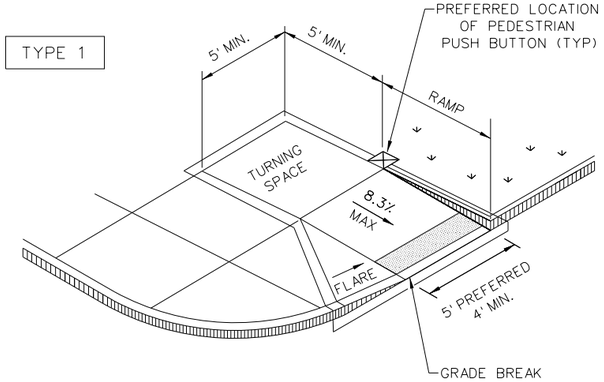
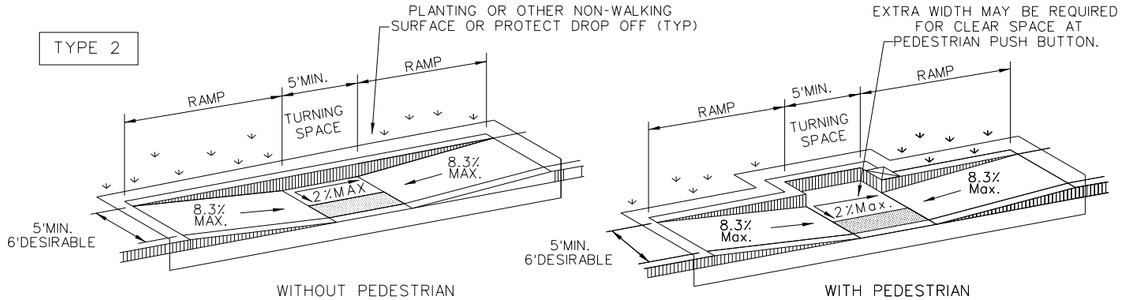
TYPE 1



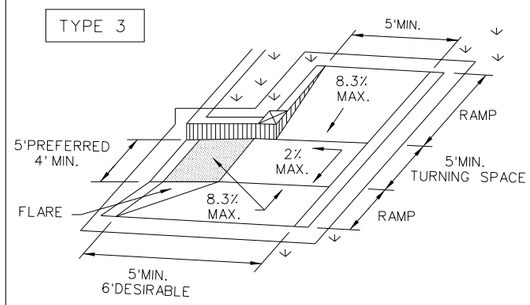
PERPENDICULAR CURB RAMP

TYPE 2

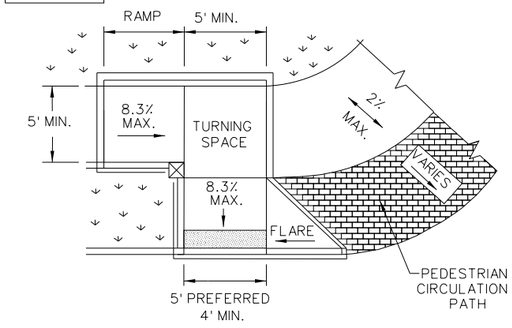


PARALLEL CURB RAMP

TYPE 3

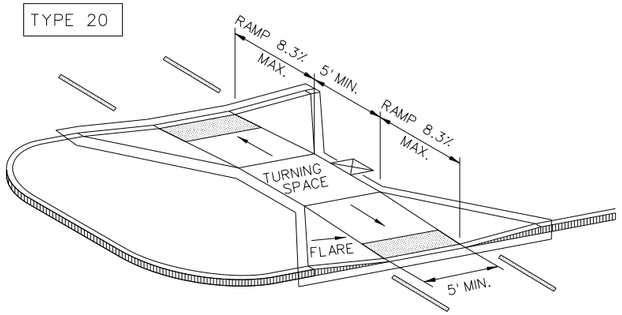


TYPE 6



COMBINATION CURB RAMPS

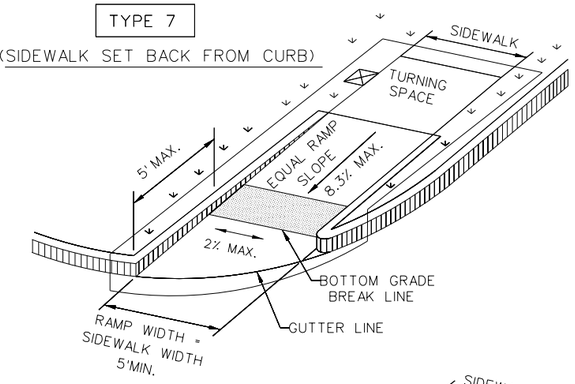
TYPE 20



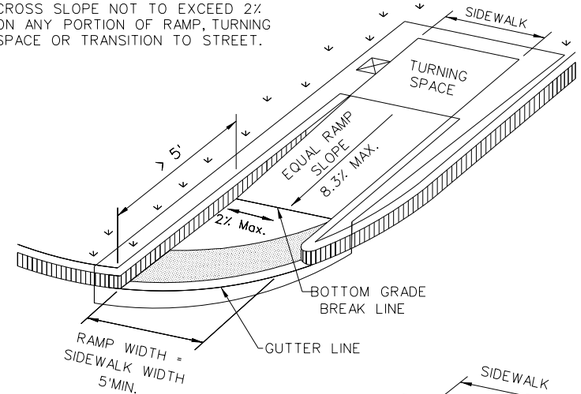
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

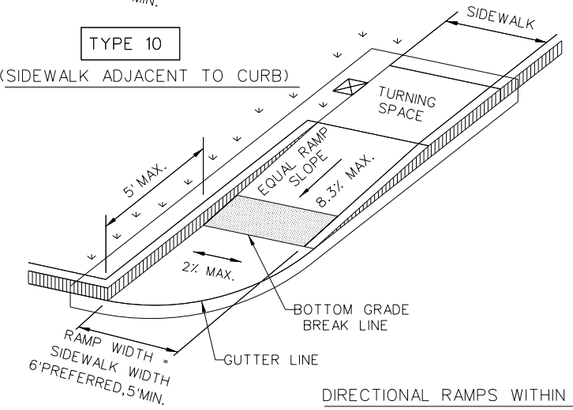


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

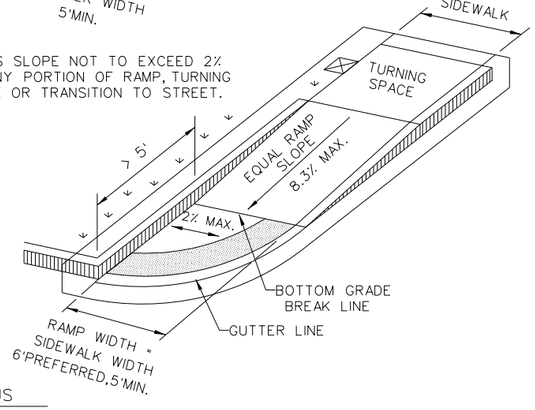


TYPE 10

(SIDEWALK ADJACENT TO CURB)

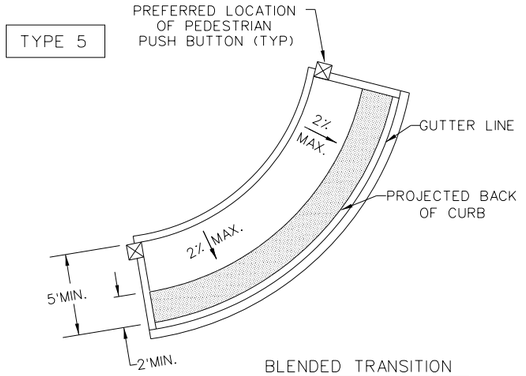


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



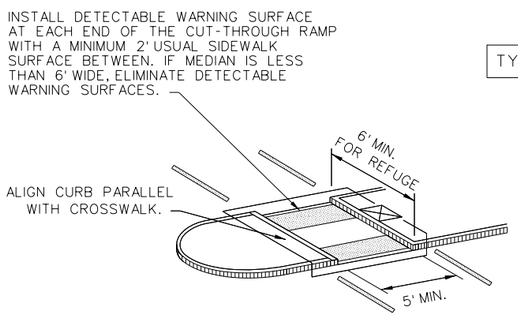
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 5



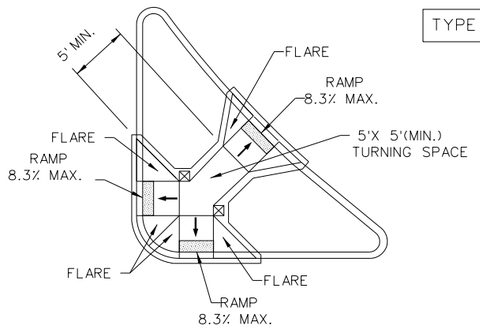
BLENDED TRANSITION
(FLUSH LANDING)

TYPE 21

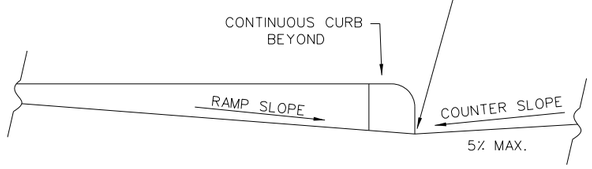


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

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	0915	12	562	WATSON RD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		112

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.

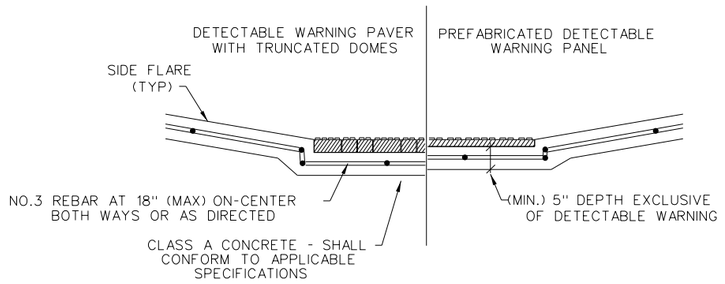
30. Changes in level greater than 1/4 inch are not permitted.

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.

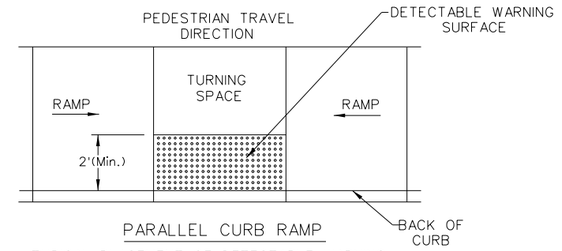
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".

34. Sidewalk details are shown elsewhere in the plans.



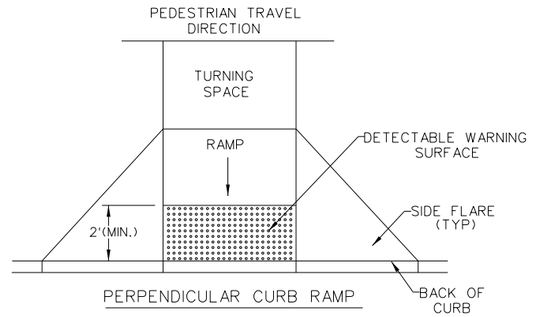
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



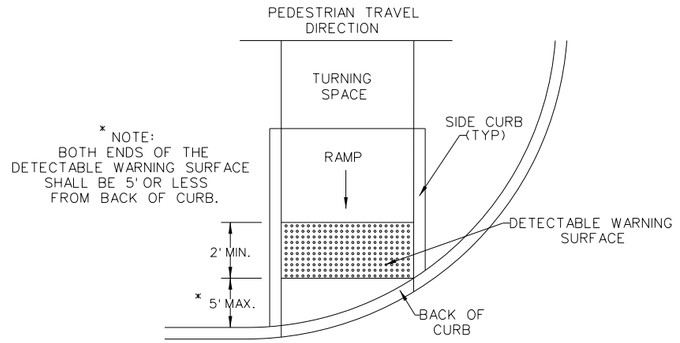
PARALLEL CURB RAMP

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.

DATE: 6/25/2020
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Texas Department of Transportation

Design Division Standard

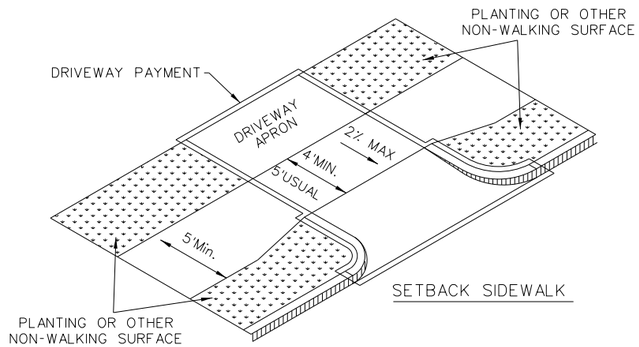
PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

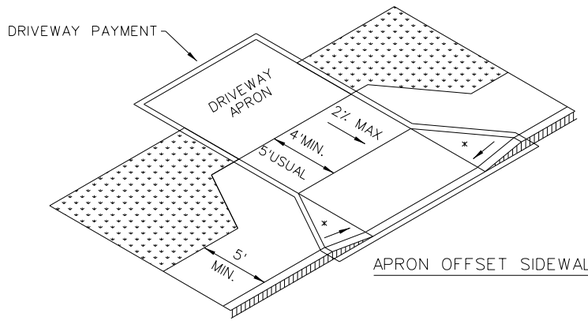
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0915	12	562		WATSON RD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	SAT	BEXAR			113

DATE: 6/25/2020
FILE: X:\dato\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\STANDARDS\RDWY\ped18.dgn

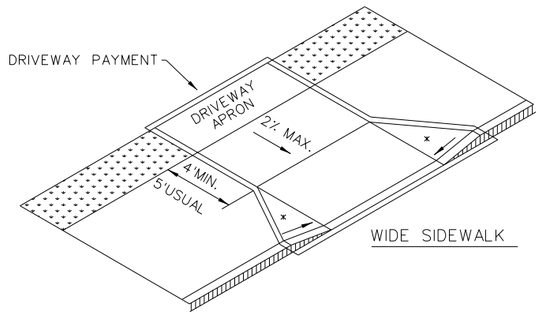
SIDEWALK TREATMENT AT DRIVEWAYS



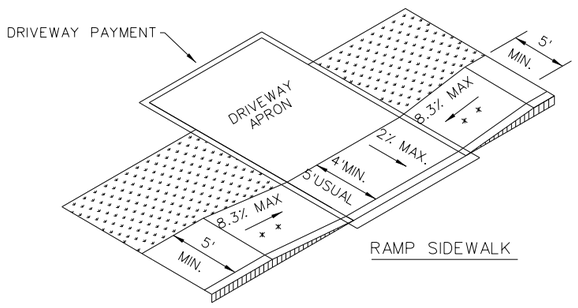
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

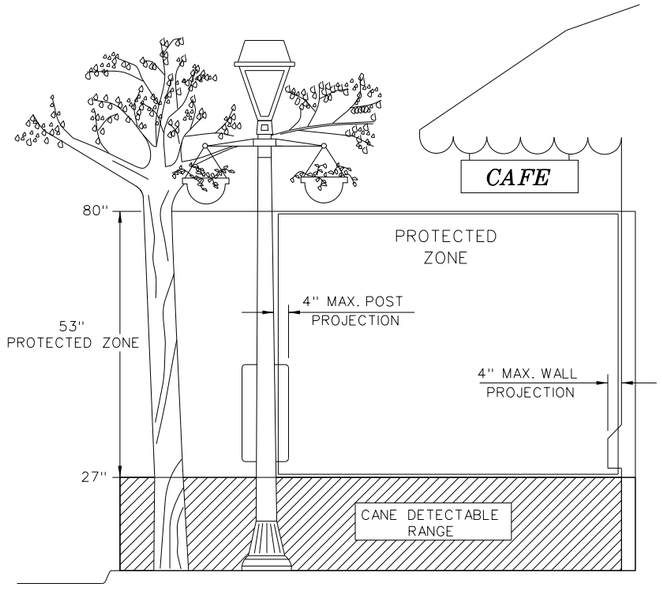


RAMP SIDEWALK

NOTES:

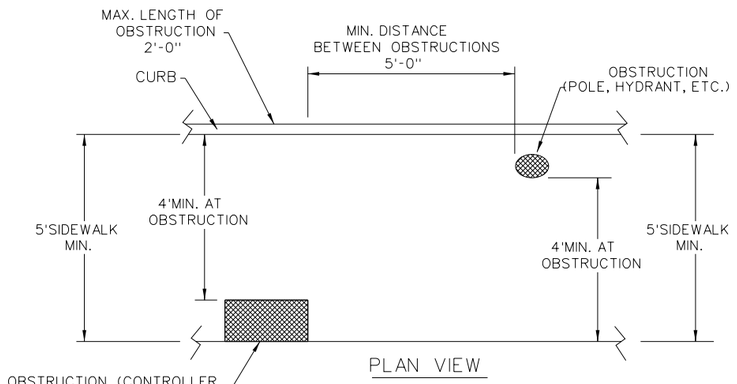
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

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



PROTECTED ZONE

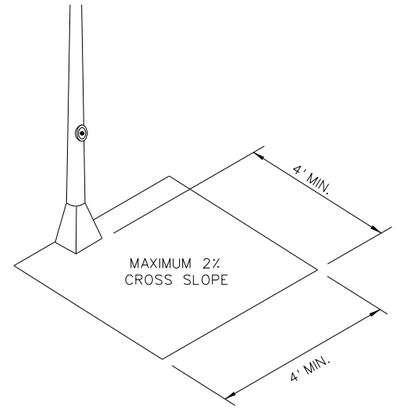
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



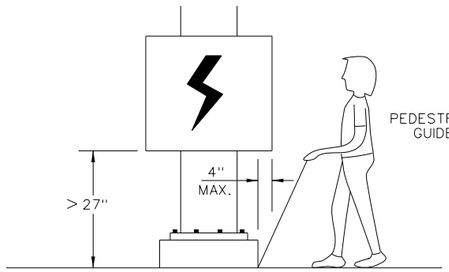
PLAN VIEW

PLACEMENT OF STREET FIXTURES

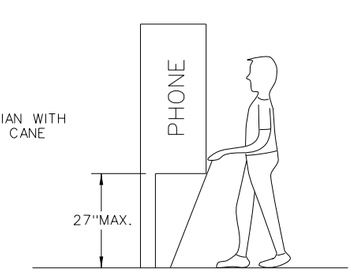
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



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

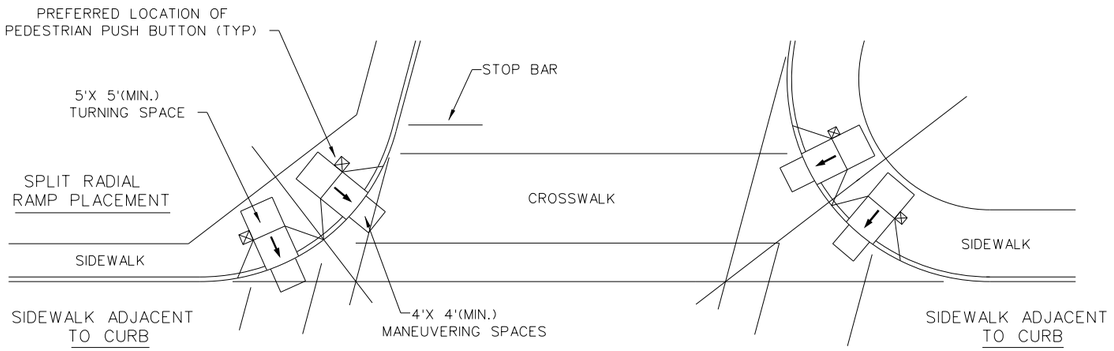
PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0915	12	562		WATSON RD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST		COUNTY		SHEET NO.
	SAT		BEXAR		114

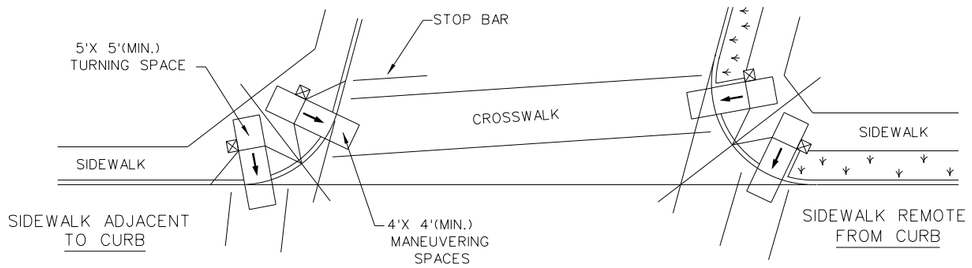
DATE: 6/25/2020
FILE: X:\data\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\STANDARDS\RDWY\ped18.dgn

TYPICAL CROSSING LAYOUTS

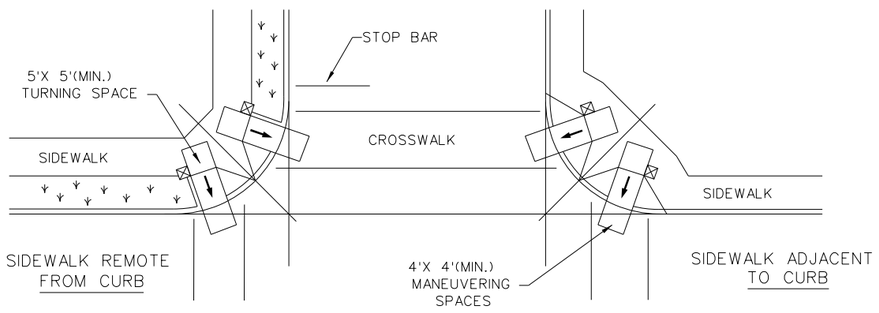
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



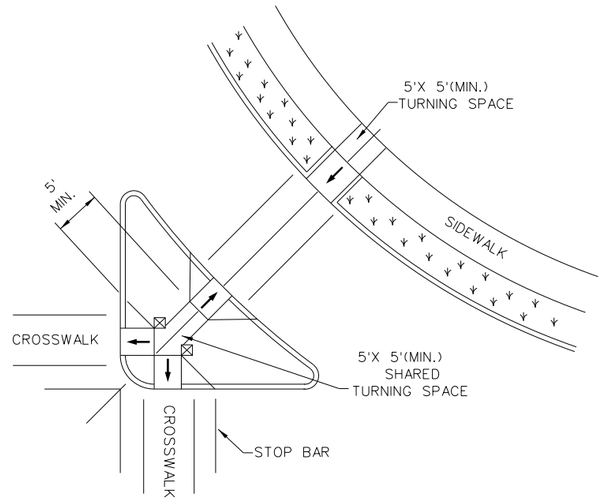
SKEWED INTERSECTION WITH "LARGE" RADIUS



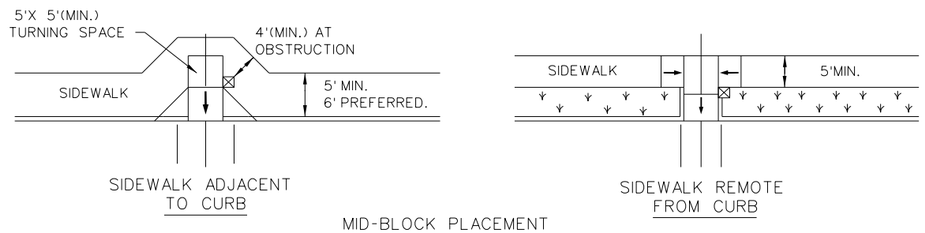
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

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	0915	12	562	WATSON RD
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		115

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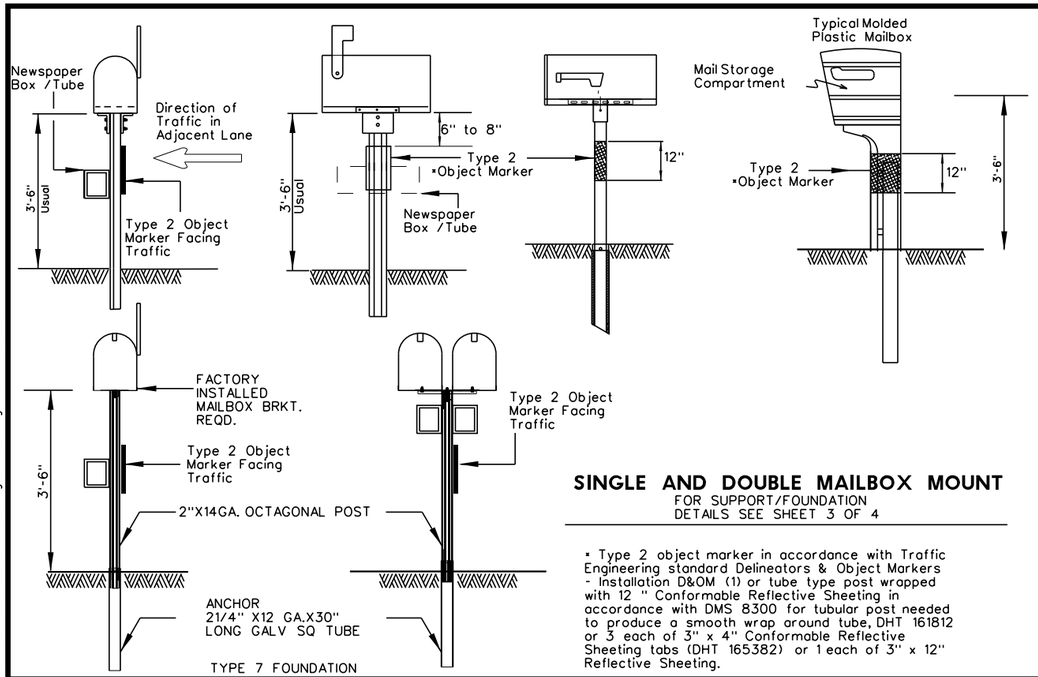


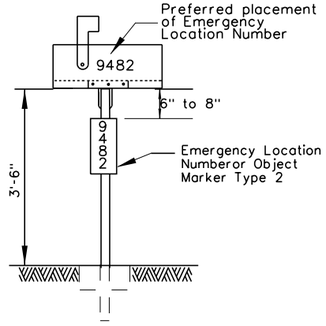
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	MAXIMUM WEIGHT (POUNDS)	
SMALL	19 1/2	6	7	5	5
MEDIUM	22 1/2	8	11 1/2	7	7
LARGE	23 1/2*	11 1/2*	13 1/2*	10	10

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

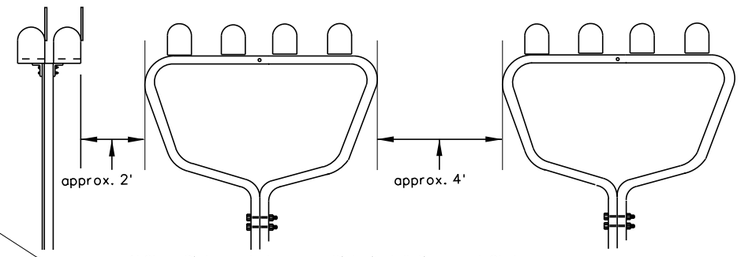
LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	
BACK	11 1/2	11 1/2		15	22.4

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES

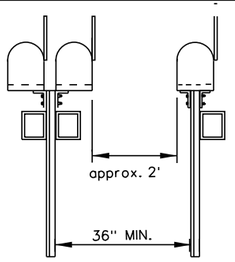
Mailboxes shall be made of light weight sheet metal or light weight plastic.
Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT *'s 164116 or 149339.

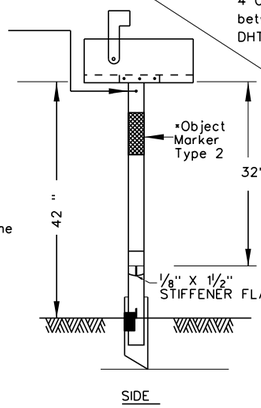
MULTIPLE MAILBOX PLACEMENT



Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

SINGLE & DOUBLE MAILBOX PLACEMENT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4



DOUBLE AND MULTIPLE MAILBOX MOUNT

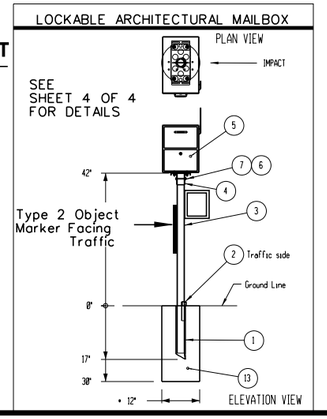
FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4
FOR DHT NUMBERS SEE SHEET 4 OF 4

NEWSPAPER RECEPTACLE

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

LOCKABLE ARCHITECTURAL MAILBOX



MULTIPLE MAILBOX MOUNT

INDEX OF MAILBOX DETAIL SHEETS

SHEET 1 OF 4

Texas Department of Transportation

Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

MB-15(1)

FILE:MB14(1).DGN	DN:JEO	CK:JEO	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		116

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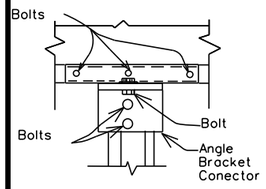
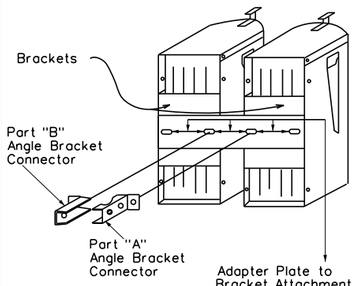


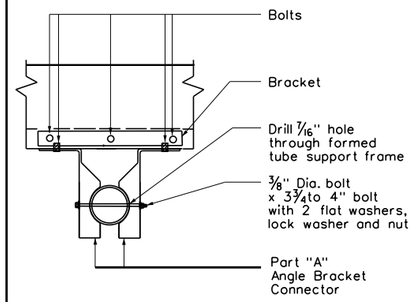
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

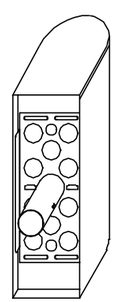


(Not permitted for Large Mailboxes)

DOUBLE MAILBOX

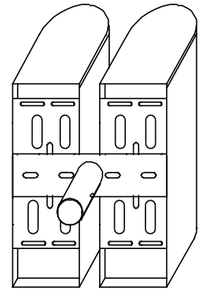


MULTIPLE MAILBOX



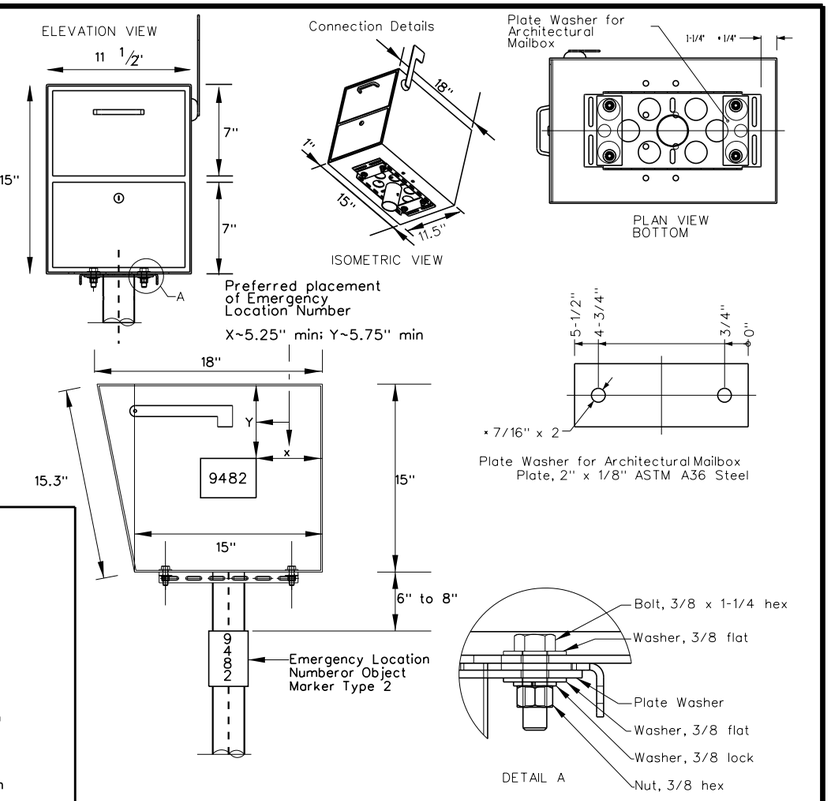
To be used with 2 3/8" OD RR or thinwall Steel posts.

WELDED SINGLE MAILBOXBRACKET

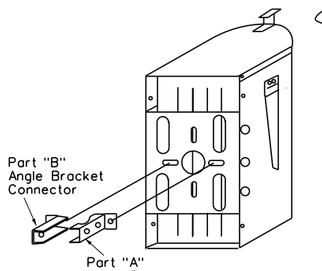


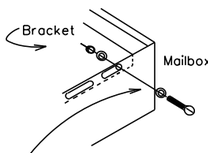
To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



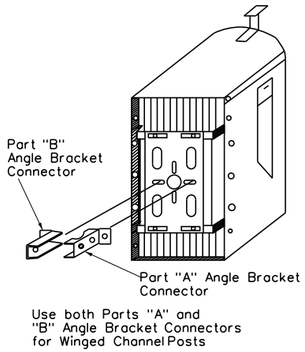


Bracket to mailbox attachment:
6 - 1/4" Dia. x 3/4" bolt w/ 2 flat washers and nut per each bolt.

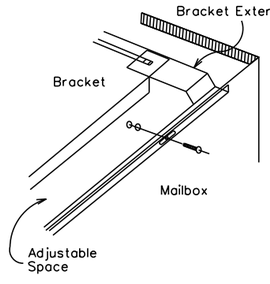
Angle to bracket attachment:
2 - 3/8" Dia. x 3/4" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to
2 - 3/8" Dia. x 2 1/2" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment:
6 - 1/4" Dia. x 3/4" bolt w/2 flat washers and nut per each bolt.

Bracket to bracket extension attachment:
2 - 1/4" Dia. x 3/4" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment:
2 - 3/8" Dia. x 3/4" bolt w/2 flat washers, lock washer and nut per each bolt.

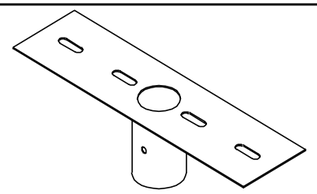
Angle to mailbox support attachment:
2 - 3/8" Dia. x 2 1/2" bolt w/2 flat washers, lock washer, and nut per each bolt.

Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES

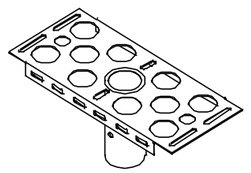
GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



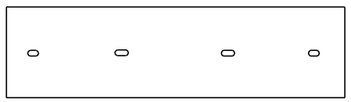
DHT 162323

For use with galvanized thinwall steel posts DHT • 143426 or powder-coated thinwall steel post DHT • 162911.



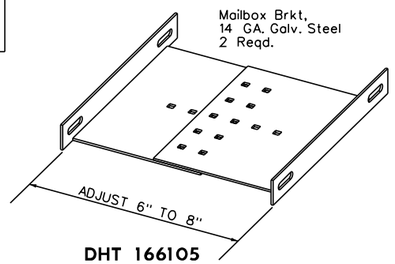
DHT 161443

For use with RCR post DHT • 161442 or galvanized thinwall steel post DHT • 143426 or powder-coated thinwall steel post. DHT • 162911.

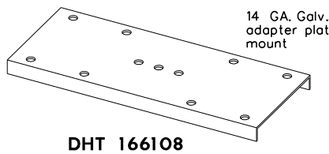


DHT #3789

Used for mounting two Mailboxes on the same post.

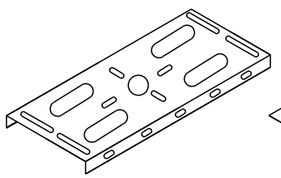


DHT 166105



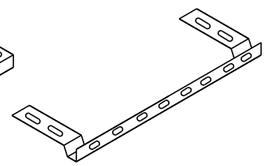
14 GA. Galv. Steel adapter plate for double mount

DHT 166108



DHT 148939

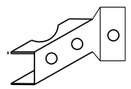
Mailbox Bracket



DHT 148938

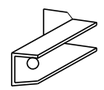
Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



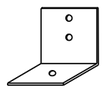
DHT 159489

Part "A" Angle Bracket Connector



DHT 159490

Part "B" Angle Bracket Connector



DHT 2917

Angle Bracket For Temporary Mailbox

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

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Maintenance Division Standard

MAILBOX BRACKET CONNECTING DETAILS

MB-15(1)

FILE:MB14(1).DGN	DN:JEO		CK:	DW:JEO	CK:
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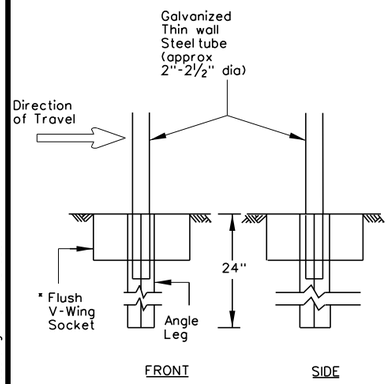
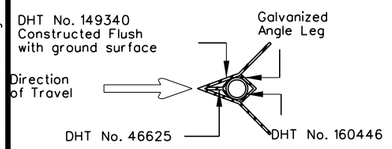
REVISIONS ADDED DHT 163730	0915	12	562		WATSON RD
	DIST	COUNTY			SHEET NO.
	SAT	BEXAR			117

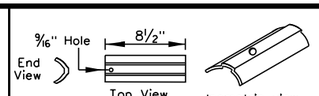




Insert formed tube 7" to 9" into V-wing socket.

TYPE 1 SUPPORT/FOUNDATION

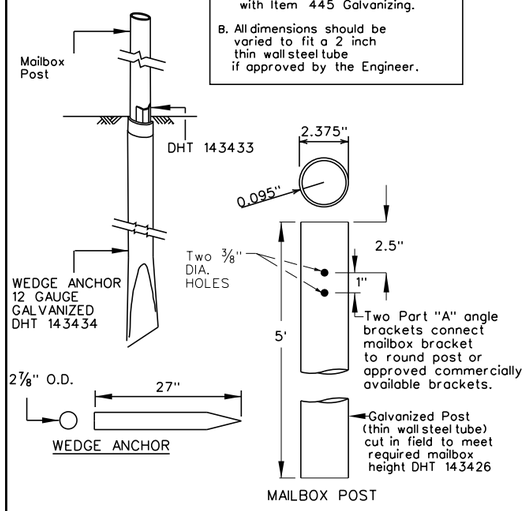
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



NOTES FOR TYPE 2 SUPPORT/FOUNDATION

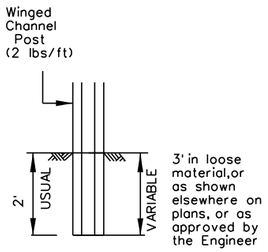
A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

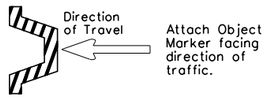
B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.



TYPE 2 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM

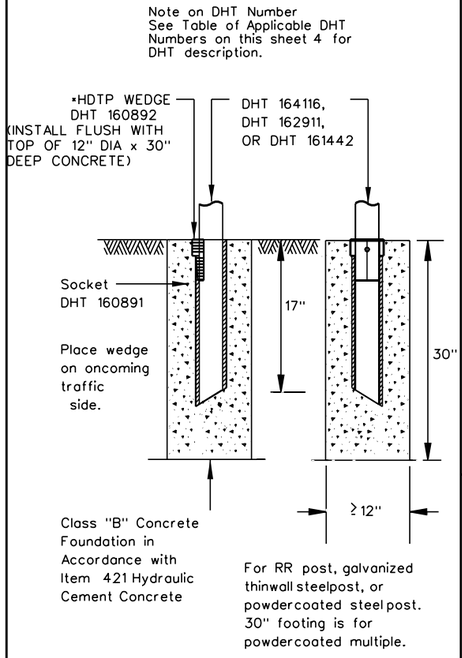




DHT No. 4289 to ASTM A 1011 SS GRADE 50, STEEL.

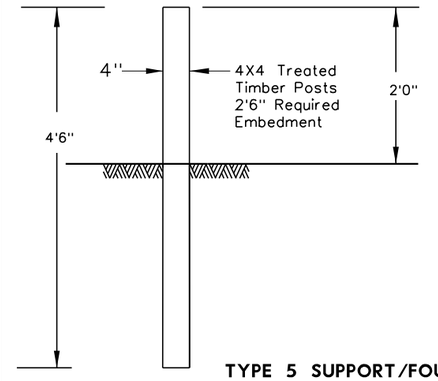
TYPE 3 SUPPORT/FOUNDATION

WINGED CHANNEL POST



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

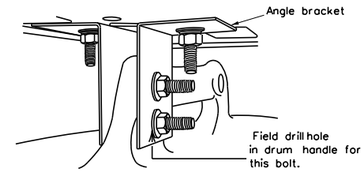


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.

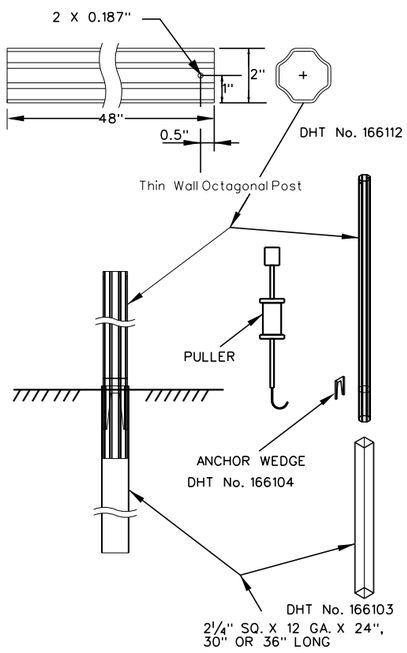


Placed on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).

Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. 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.

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

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single 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
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

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MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
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REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		118

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
*	PART NAME	PART/DHT *	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

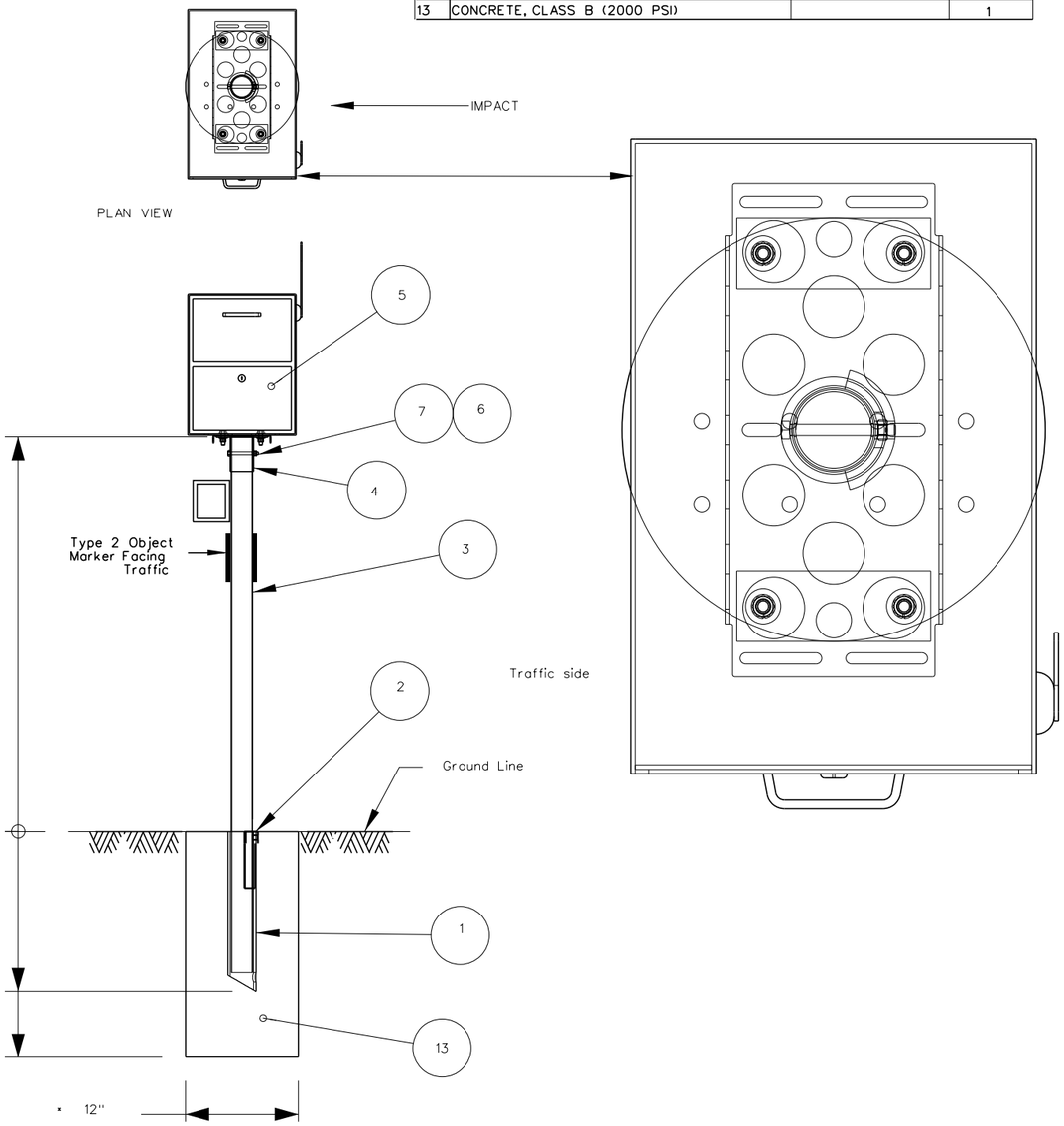

TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT:HEX HEAD, GALV:3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT:HEX HEAD, GALV:3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT:HEX HEAD, GALV:3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT:HEX HEAD, GALV:3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT:HEX HEAD, GALV:3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT:HEX HEAD, GALV:3/8"DIA X 4"L HD, W/2-FLAT WASHERS

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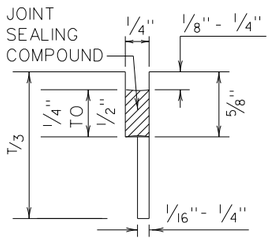
DHT NUMBERS TABLE

MB-15(1)

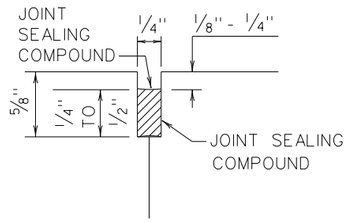
FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
© TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		119

DATE: 6/25/2020
FILE: X:\Odfo\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\STANDARDS\RDWY\js14.dgn

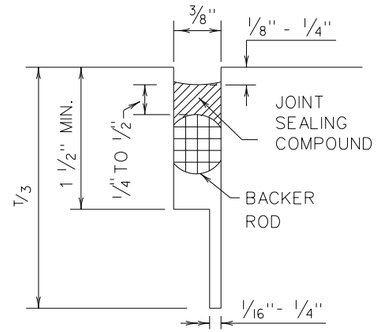
METHOD B: JOINT SEALING COMPOUND



LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



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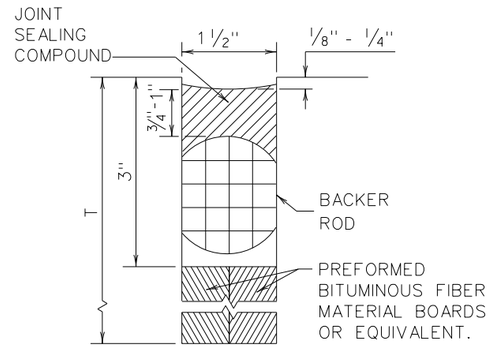
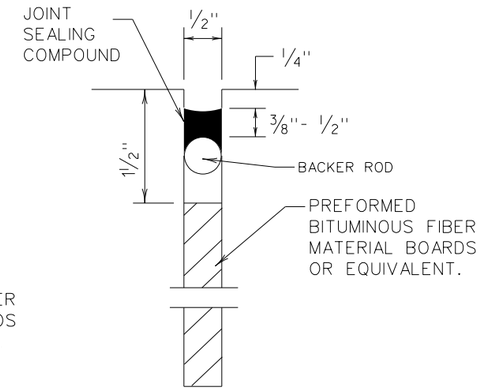
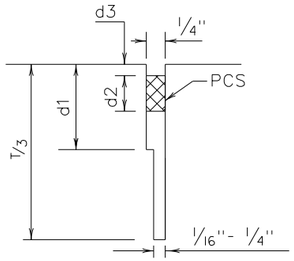


TRANSVERSE FORMED EXPANSION JOINT



FORMED ISOLATION JOINT

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



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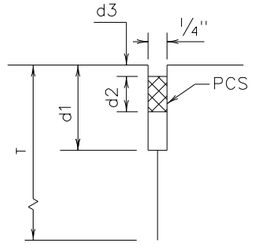
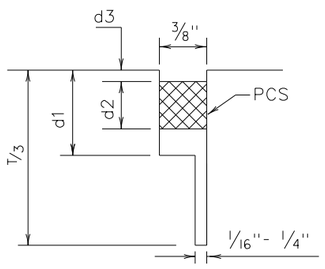


LONGITUDINAL CONSTRUCTION JOINT



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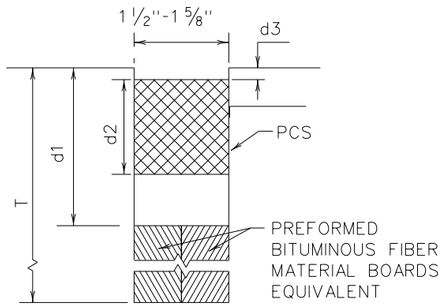

TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

CONCRETE PAVING DETAILS

JOINT SEALS

JS-14

FILE: js14.dgn	DN: TxDOT		DN: HC		DW: HC		CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB		HIGHWAY		
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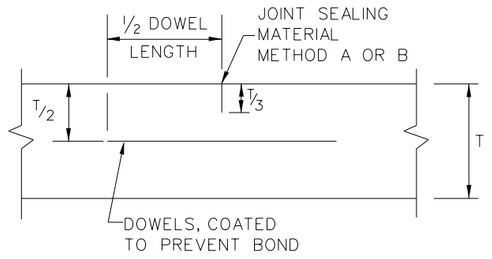
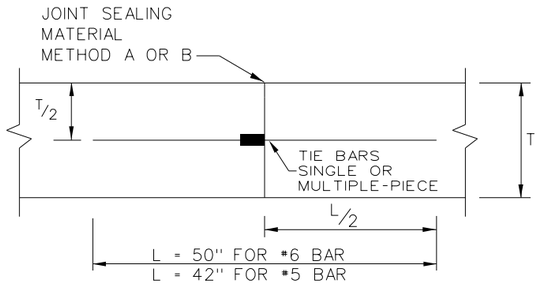
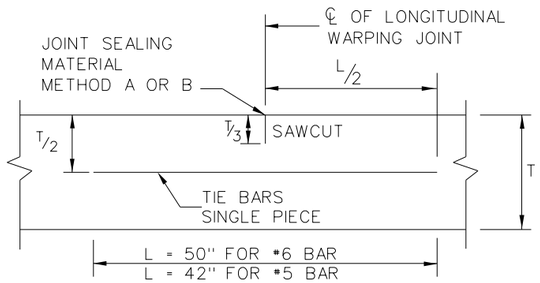
	DIST	COUNTY				SHEET NO.	
	SAT	BEXAR				120	



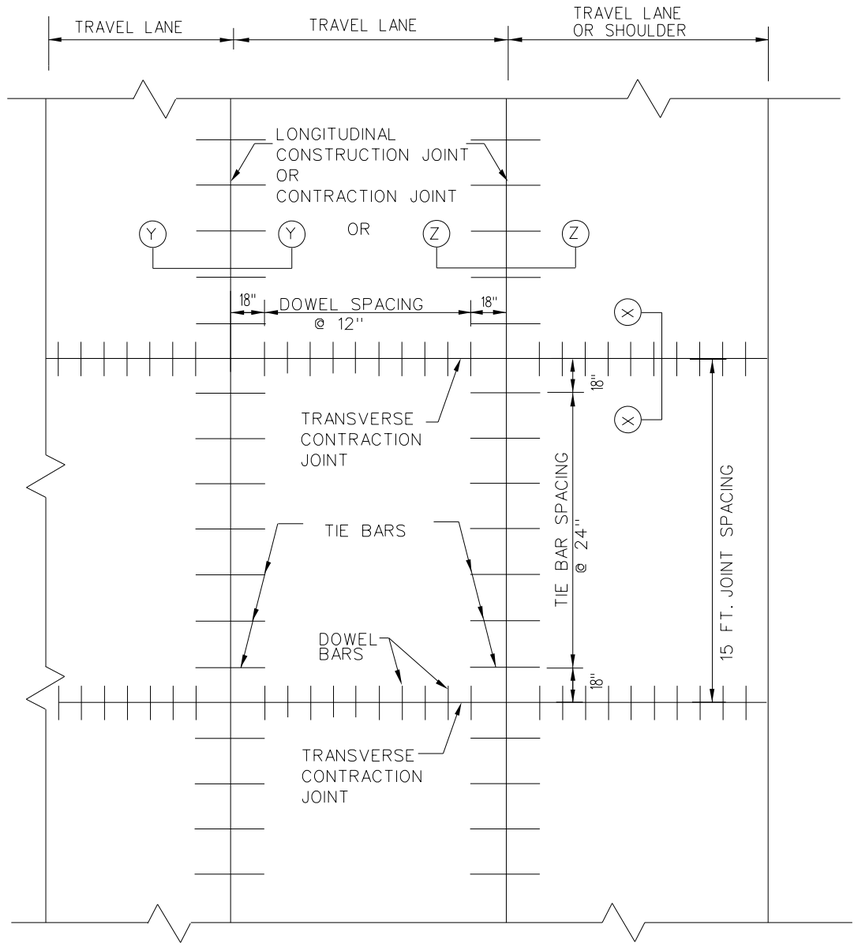
TRANSVERSE CONTRACTION JOINT
SECTION X-X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y-Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z-Z



TYPICAL PAVEMENT LAYOUT
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

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

TABLE NO.1 DOWELS (SMOOTH BARS)		
SLAB THICKNESS T (IN.)	BAR DIA. AND LENGTH	AVERAGE SPACING (IN.)
6 to 7.5	1" X 18"	12
8 to 10	1 1/4" X 18"	12
>= 10.5	1 1/2" X 18"	12

TABLE NO.2 TIE BARS (DEFORMED BARS)		
SLAB THICKNESS T (IN.)	BAR SIZE	AVERAGE SPACING (IN.)
6 to 7.5	#5	24
>= 8	#6	24

Texas Department of Transportation — Design Division Standard

CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-6 to 12 INCHES

CPCD-14

FILE: cpcd14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
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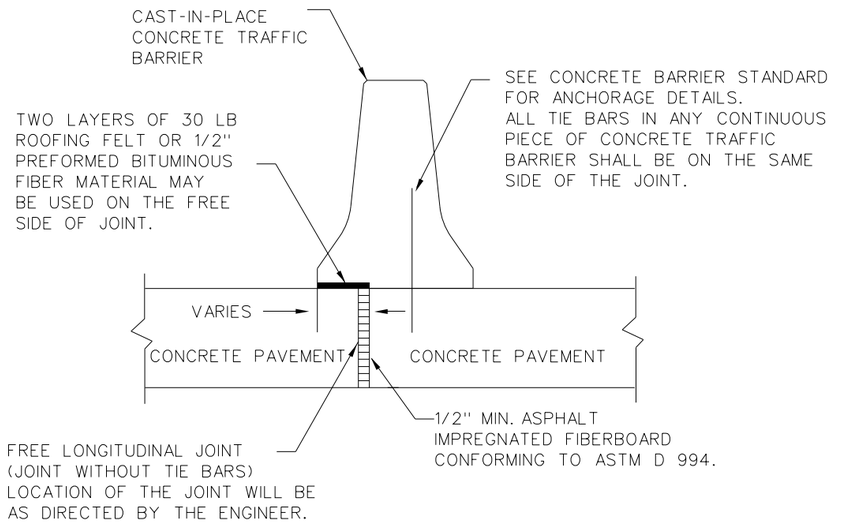
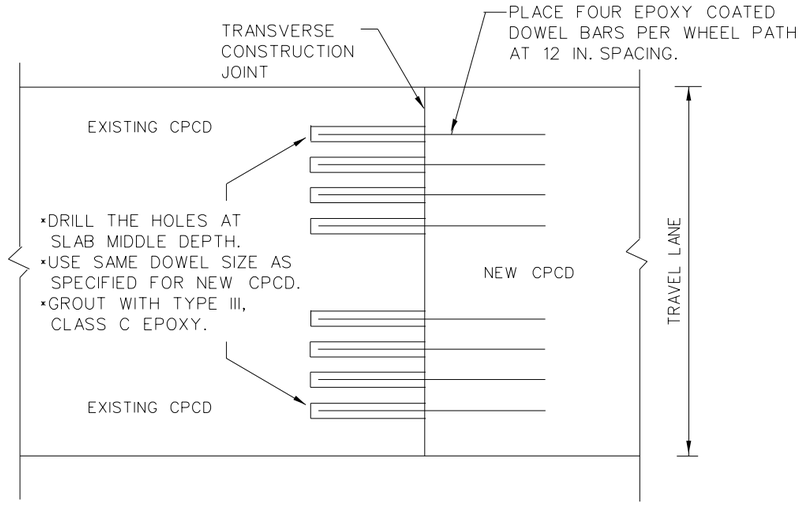


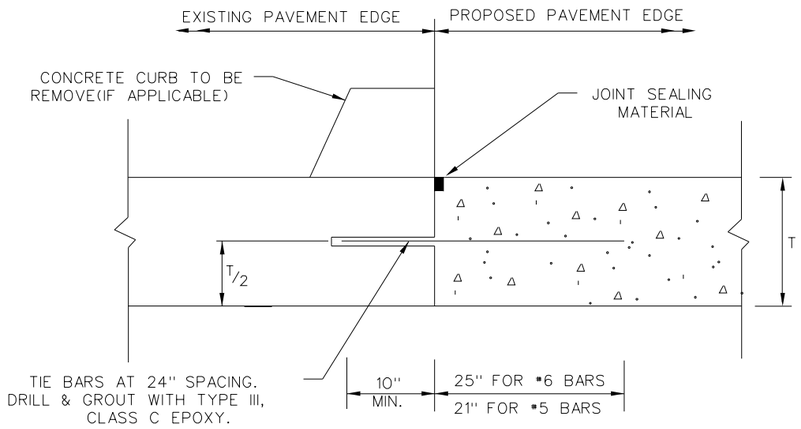
FREE LONGITUDINAL JOINT DETAIL



TRANSVERSE JOINT DETAIL

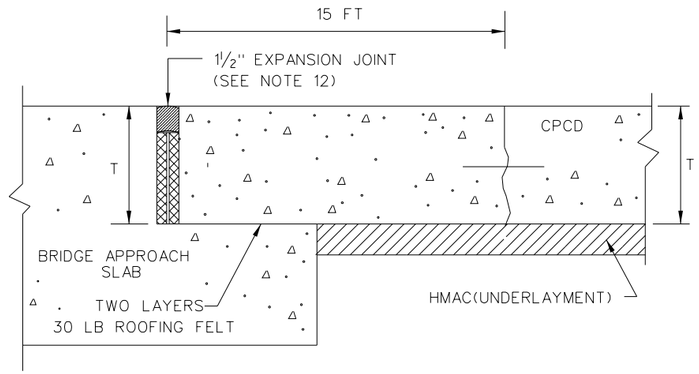
EXISTING CPCD TO NEW CPCD

PLAN VIEW (NOT TO SCALE)



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

LONGITUDINAL WIDENING JOINT DETAIL



TRANSVERSE EXPANSION JOINT DETAIL

AT BRIDGE APPROACH

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-6 to 12 INCHES

CPCD-14

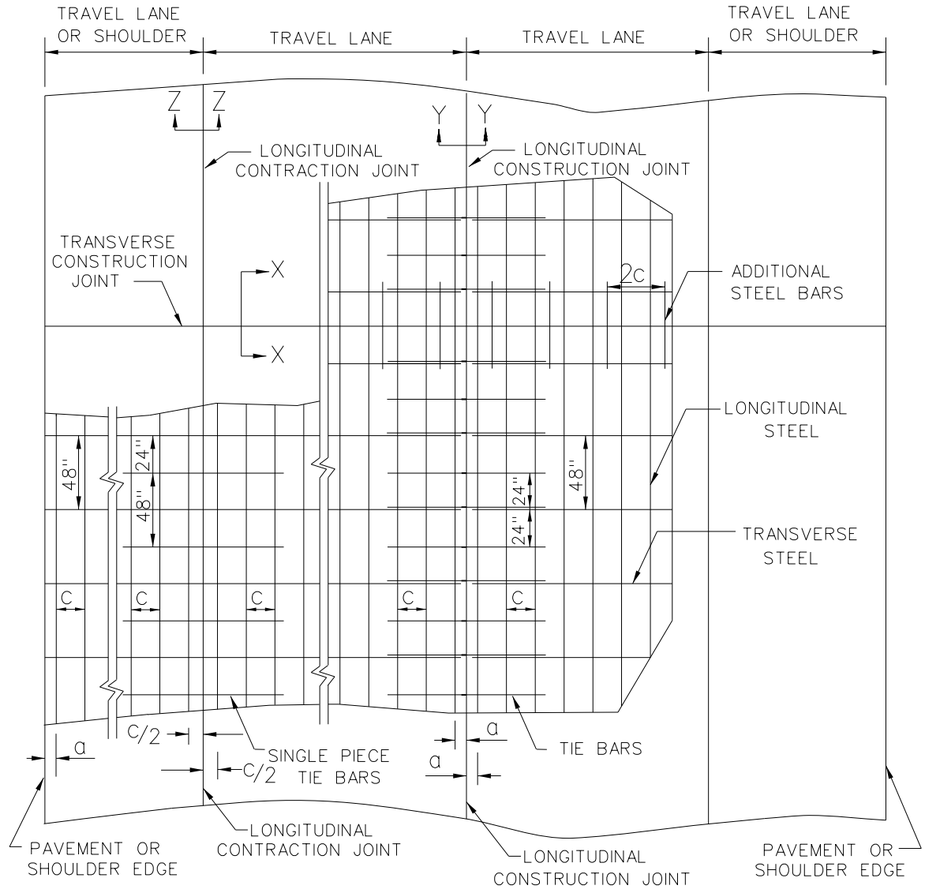
FILE: cpcd14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		122

DATE: 6/25/2020 12:53:30 PM
FILE: x:\data\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\STANDARDS\RDWY\crcp117.dgn

GENERAL NOTES

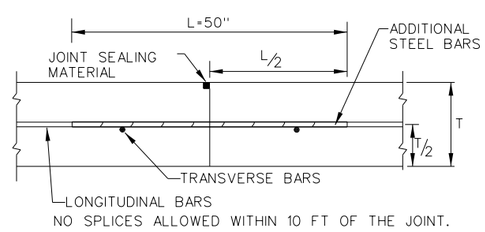
TABLE NO.1 LONGITUDINAL STEEL					
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING c (IN.)	SPACING a (IN.)	SPACING 2 x c (IN.)	LENGTH L (IN.)
7.0	#5	6.5	3 TO 4	13	50
7.5	#5	6.0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

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



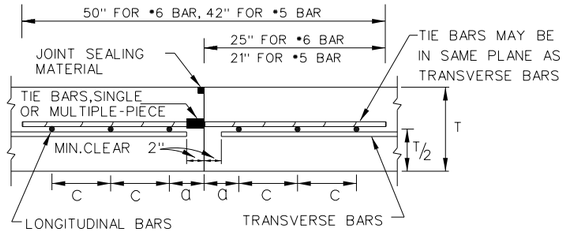
TYPICAL PAVEMENT LAYOUT

PLAN VIEW (NOT TO SCALE)



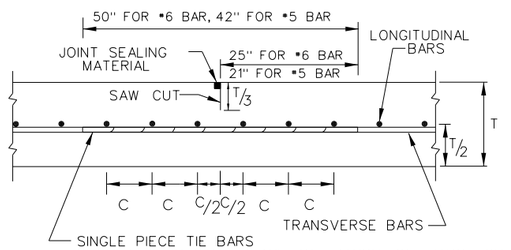
TRANSVERSE CONSTRUCTION JOINT

SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT

SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT

SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

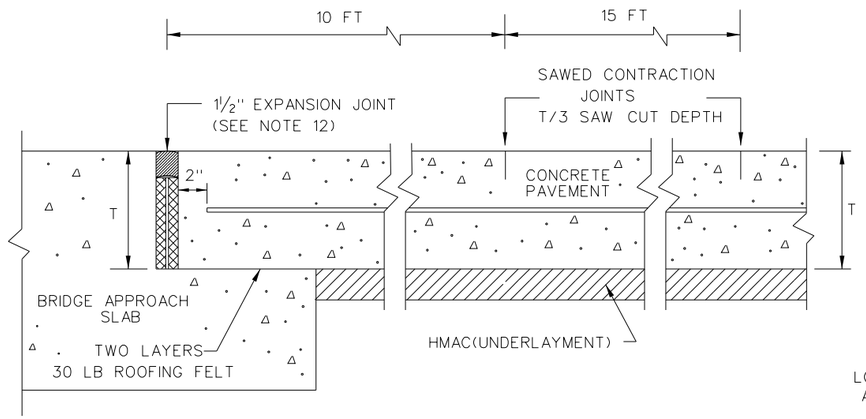
CRCP(1)-17

FILE: crcp117.dgn	DN: TxDOT	CK: AN	DW: HC	CK: VP/KM
© TxDOT: May 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10/10/2011 ADD GN #12 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS 05/05/2017 CoTE AS RATED 4.3	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		123

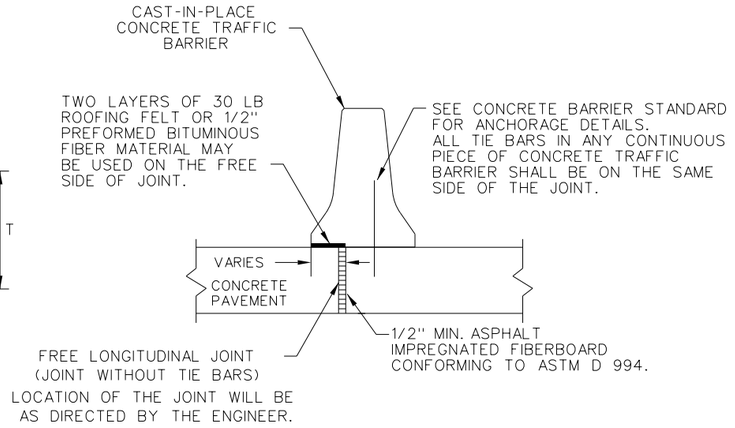
DATE: 6/25/2020 12:53:30 PM
FILE: X:\Odot\Infrov\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\STANDARDS\RDWY\crcp117.dgn

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

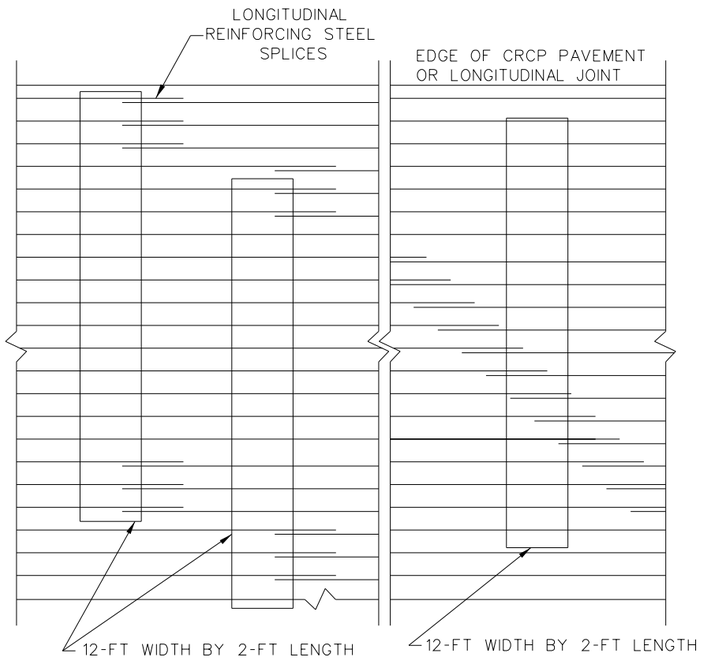
SLAB THICKNESS AND BAR SIZE		REGULAR STEEL BARS	FIRST SPACING AT EDGE OR JOINT	ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X)	
T (IN.)	BAR SIZE	SPACING c (IN.)	SPACING a (IN.)	SPACING 2 x c (IN.)	LENGTH L (IN.)
7.0	#5	7.5	3 TO 4	15	50
7.5	#5	7.0	3 TO 4	14	50
8.0	#6	10.0	3 TO 4	20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



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

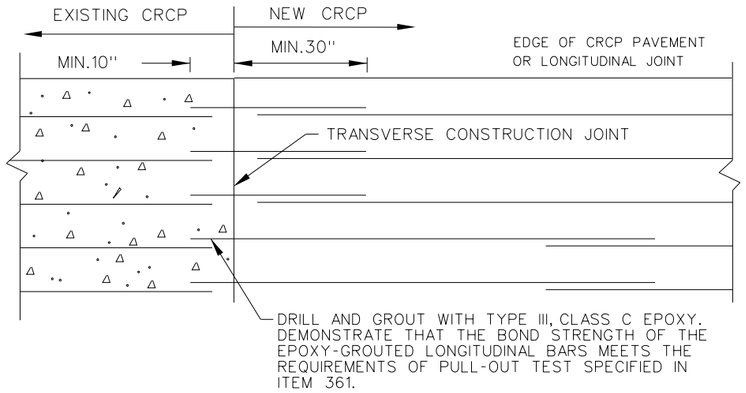


FREE LONGITUDINAL JOINT DETAIL

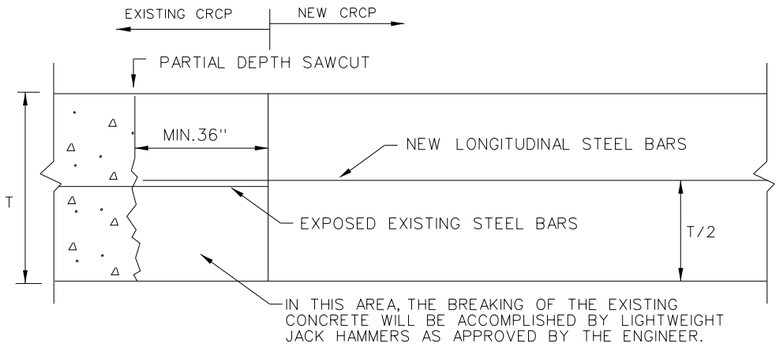


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

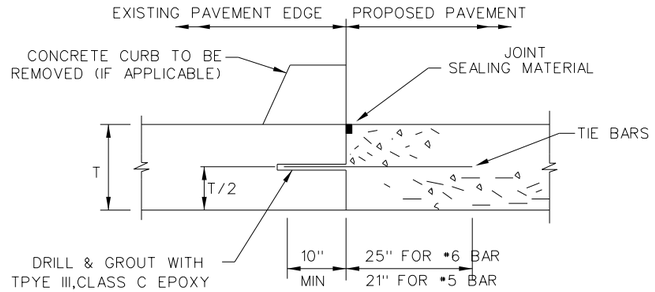


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
EXISTING CRCP TO NEW CRCP



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

LONGITUDINAL WIDENING JOINT DETAIL

Texas Department of Transportation | Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-17

FILE: crcp117.dgn	DN: TxDOT	CK: AN	DW: HC	CK: VP/KM
© TxDOT: May 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		124

LEGEND

- C10 — DRAINAGE AREA I.D.
- FLOW PATH
- EXTERIOR DRAINAGE AREA
- INTERIOR DRAINAGE AREA
- 1 FT CONTOUR

SEE SHEET 126 FOR INTERIOR DRAINAGE AREAS.

Area ID	Total Area	C_W	CA	Tc - Overland Flow			Tc - Shallow Concentrated Flow						Tc	Tc used	I_5	Q_5	I_{10}	Q_{10}	I_{100}	Q_{100}
							Reach 1			Reach 2										
	Acres			L	slope	T	Length	slope (ft/ft)	Tsc1 (min)	Length	slope (ft/ft)	Tsc2 (min)	minutes		in/hr	cfs	in/hr	cfs	in/hr	cfs
C10	57.24	0.43	24.61	100	0.30%	20.00	1703	0.31%	31.41	1209	0.16%	10.02	61.43	61.43	2.39	58.72	2.86	70.39	4.57	112.41

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
200 100 0 200 400 600
1" = 400'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

WATSON ROAD
OVERALL DRAINAGE
AREA MAP

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			125
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:400
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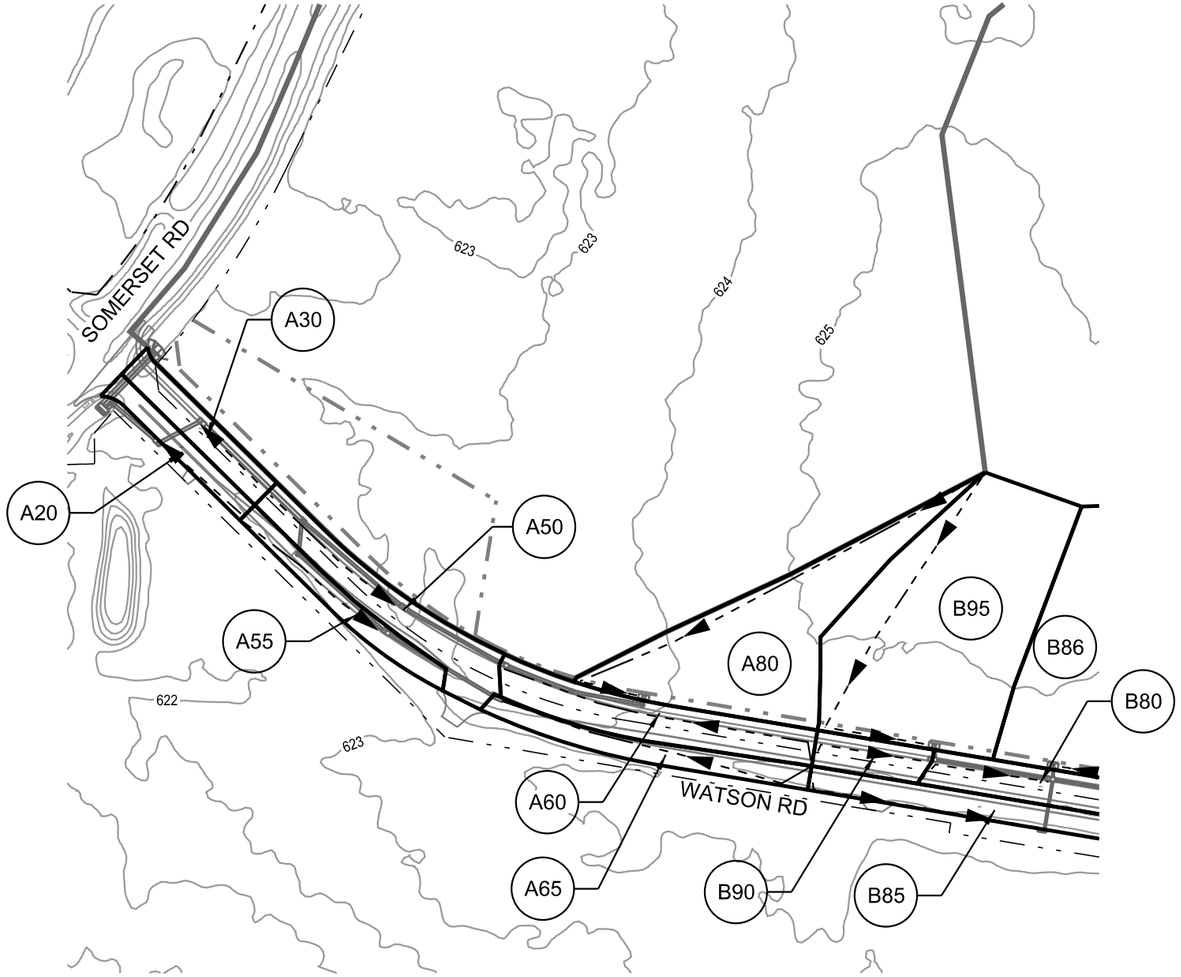

LEGEND

- C10 — DRAINAGE AREA I.D.
- FLOW PATH
- DRAINAGE BOUNDARY AREA
- 1 FT CONTOUR

Discharge Calculations w/ TxDOT Rainfall(Rational Method) Proposed

Area ID	Total Area	C_W	CA	Tc - Overland Flow			Tc - Shallow Concentrated Flow						Tc	Tc used	I_5	Q_5	I_{10}	Q_{10}	I_{100}	Q_{100}
							Reach 1			Reach 2										
	Acres			L	slope	T	Length	slope (ft/ft)	Tsc1 (min)	Length	slope (ft/ft)	Tsc2 (min)	minutes		in/hr	cfs	in/hr	cfs	in/hr	cfs
A20	0.16	0.90	0.14	22	1.37%	5.00	144	0.76%	1.36				6.36	10.00	6.73	0.97	7.83	1.13	12.13	1.76
A30	0.24	0.90	0.22	25	2.91%	5.00	118	0.67%	1.19				6.19	10.00	6.73	1.45	7.83	1.69	12.13	2.62
A50	0.45	0.90	0.41	21	3.08%	5.00	221	0.63%	2.28				7.28	10.00	6.73	2.74	7.83	3.19	12.13	4.93
A55	0.23	0.90	0.21	142	0.12%	5.00	135	0.39%	1.78				6.78	10.00	6.73	1.41	7.83	1.64	12.13	2.54
A60	0.50	0.90	0.45	32	1.84%	5.00	414	0.45%	5.07				10.07	10.07	6.71	3.04	7.81	3.54	12.10	5.49
A65	0.29	0.90	0.26	46	3.30%	5.00	385	0.23%	6.59				11.59	11.59	6.32	1.63	7.38	1.91	11.45	2.96
A80	1.13	0.43	0.49	100	0.42%	20.00	502	0.39%	8.31	85		0.24	28.54	28.54	3.94	1.91	4.67	2.27	7.36	3.57
B80	0.33	0.90	0.30	35	1.12%	5.00	151	0.36%	2.06				7.06	10.00	6.73	1.99	7.83	2.31	12.13	3.58
B85	0.33	0.90	0.30	31	1.50%	5.00	303	0.36%	4.14				9.14	10.00	6.73	2.00	7.83	2.33	12.13	3.61
B86	1.55	0.43	0.67	100	0.36%	20.00	280	0.39%	4.66	90		0.25	24.91	24.91	4.27	2.85	5.05	3.38	7.94	5.31
B90	0.17	0.90	0.15	31	0.11%	5.00	145	0.36%	1.99				6.99	10.00	6.73	1.00	7.83	1.16	12.13	1.80
B95	1.85	0.43	0.79	100	0.56%	20.00	298	0.18%	7.30	144		0.40	27.70	27.70	4.01	3.18	4.76	3.78	7.49	5.95

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)

100 50 0 100 200 300

1" = 200'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

WATSON ROAD INTERIOR DRAINAGE AREA MAP

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	-—	126

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
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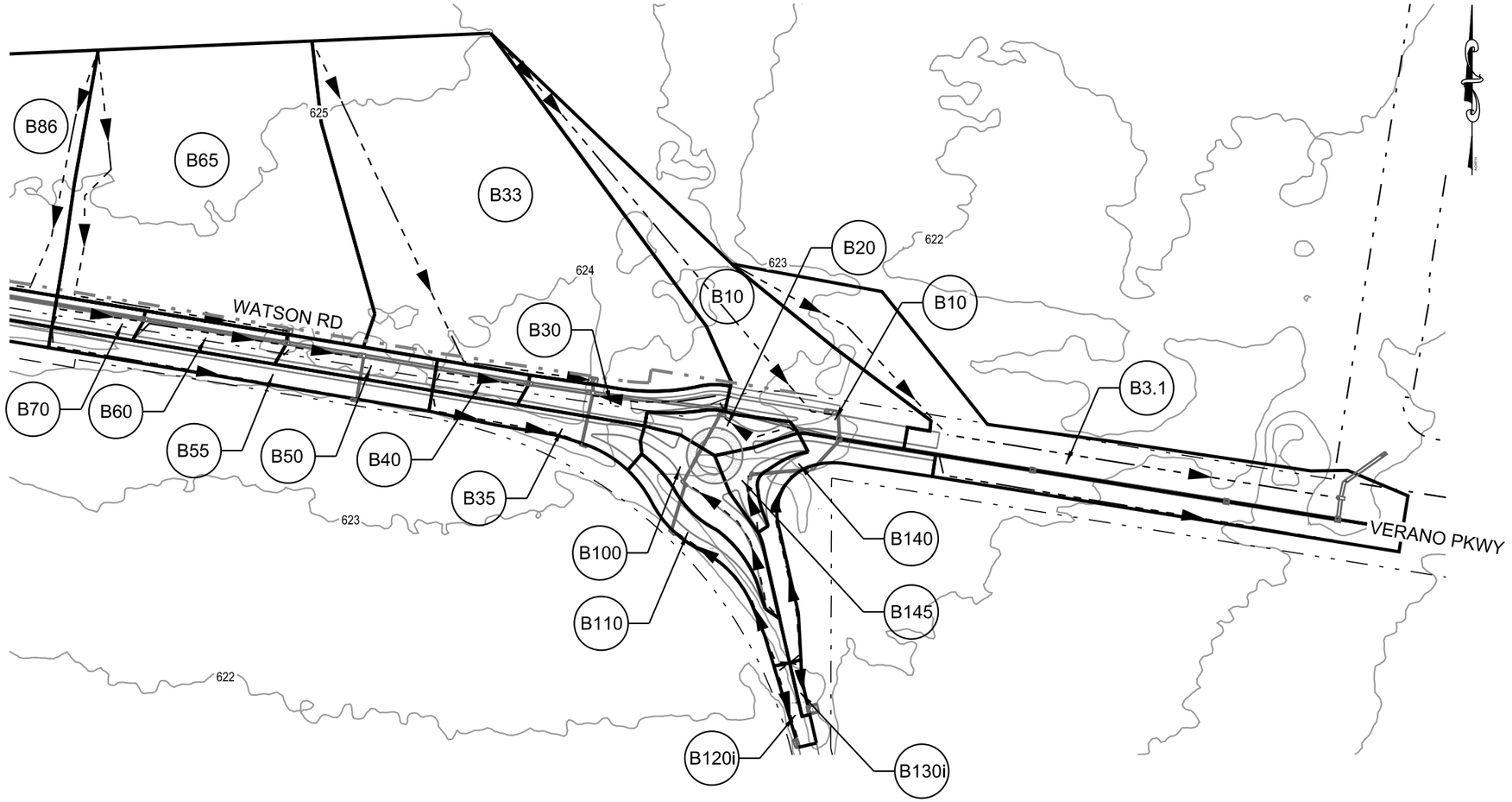

LEGEND

- C10 — DRAINAGE AREA I.D.
- FLOW PATH
- DRAINAGE BOUNDARY AREA
- 1 FT CONTOUR

Discharge Calculations w/ TxDOT Rainfall(Rational Method) Proposed

Area ID	Total Area	C_W	CA	Tc - Overland Flow			Tc - Shallow Concentrated Flow						Tc	Tc used	I_5	Q_5	I_{10}	Q_{10}	I_{100}	Q_{100}
							Reach 1			Reach 2										
	Acres			L	slope	T	Length	slope (ft/ft)	Tsc1 (min)	Length	slope (ft/ft)	Tsc2 (min)	minutes		in/hr	cfs	in/hr	cfs	in/hr	cfs
B3.1	1.78	0.67	1.20	100	0.70%	20.00	324	0.40%	4.20	609	0.21%	1.69	25.90	25.90	4.17	4.99	4.95	5.92	7.78	9.31
B10	1.59	0.83	1.32	100	0.66%	20.00	659	0.29%	12.67	32		0.09	32.76	32.76	3.62	4.77	4.30	5.67	6.80	8.96
B100	0.38	0.90	0.34	30	2.00%	5.00	232	0.21%	4.13				9.13	10.00	6.73	2.31	7.83	2.69	12.13	4.17
B110	0.29	0.90	0.26	22	2.18%	5.00	258	0.69%	2.55				7.55	10.00	6.73	1.74	7.83	2.03	12.13	3.14
B120i	0.07	0.90	0.06	23	2.44%	5.00	107	0.42%	1.36				6.36	10.00	6.73	0.44	7.83	0.51	12.13	0.79
B130i	0.03	0.90	0.02	16	1.63%	5.00	73	0.11%	1.81				6.81	10.00	6.73	0.16	7.83	0.18	12.13	0.28
B140	0.39	0.90	0.35	20	1.87%	5.00	314	0.73%	3.01				8.01	10.00	6.73	2.36	7.83	2.75	12.13	4.26
B145	0.18	0.90	0.16	25	2.00%	5.00	65	0.25%	1.06				6.06	10.00	6.73	1.08	7.83	1.26	12.13	1.95
B20	0.22	0.90	0.20	18	1.50%	5.00	59	0.22%	1.03	52		0.14	6.18	10.00	6.73	1.34	7.83	1.56	12.13	2.42
B30	0.32	0.90	0.28	27	0.35%	5.00	191	0.53%	2.15				7.15	10.00	6.73	1.91	7.83	2.23	12.13	3.45
B33	4.95	0.43	2.13	100	0.46%	20.00	458	0.51%	6.62	196		0.54	27.17	27.17	4.05	8.63	4.81	10.24	7.57	16.12
B35	0.31	0.90	0.28	31	2.01%	5.00	230	0.38%	3.06				8.06	10.00	6.73	1.86	7.83	2.16	12.13	3.35
B40	0.15	0.90	0.14	30	1.72%	5.00	134	0.36%	1.84				6.84	10.00	6.73	0.93	7.83	1.08	12.13	1.67
B50	0.26	0.90	0.23	37	1.84%	5.00	107	0.36%	1.46				6.46	10.00	6.73	1.57	7.83	1.83	12.13	2.83
B55	0.43	0.90	0.39	30	2.55%	5.00	463	0.36%	6.33				11.33	11.33	6.38	2.48	7.45	2.90	11.55	4.49
B60	0.24	0.90	0.22	36	2.70%	5.00	209	0.35%	2.90				7.90	10.00	6.73	1.47	7.83	1.71	12.13	2.64
B65	3.93	0.43	1.69	100	0.10%	20.00	294	0.34%	5.21	330		0.92	26.13	26.13	4.15	7.00	4.92	8.31	7.74	13.07
B70	0.15	0.90	0.13	30	1.55%	5.00	127	0.39%	1.67				6.67	10.00	6.73	0.88	7.83	1.03	12.13	1.59

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
100 50 0 100 200 300
1" = 200'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

WATSON ROAD
INTERIOR DRAINAGE
AREA MAP

SHEET 2 OF 2

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	-—	127

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:200
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PLOTTED ON: 6/24/2020 @ 11:36:34 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-IDAM-02.dgn

GEOPAK HYDRAULIC CONVEYANCE

U.S. Node	D.S. Node	Actual Length	Hyd. Length	N Value	Slope	No. Barrels	Span	Rise	Fs	Soffit U.S.	Soffit D.S.	Invert U.S.	Invert D.S.	Unif. Depth	Unif. Vel.	Act. Vel. D.S.	Act. Depth U.S.	Act. Depth D.S.	HGL U.S.	HGL D.S.	EGL U.S.	EGL D.S.	Sum Tc	Q_{10}	Sum Area	Avg C Value	Rainfall Intensity
A10	Aout	8.26	10.76	0.013	0.17	1	3.00	2.00	0.002	620.91	620.90	618.91	618.90	0.99	3.28	1.62	2.00	2	620.93	620.90	620.97	620.94	33.09	9.73	3.01	0.75	n/a
A20	A10	69.49	77.49	0.013	0.20	1	3.00	2.00	0.002	621.05	620.91	619.05	618.91	0.93	3.50	1.62	1.92	2.00	620.98	620.93	621.02	620.97	33.03	9.73	3.01	0.75	4.31
A30	A20	57.72	65.53	0.013	0.21	1	3.00	2.00	0.002	621.17	621.05	619.17	619.05	0.87	3.51	1.58	1.84	1.92	621.02	620.98	621.06	621.02	32.66	9.12	3.01	0.75	4.31
A40	A30	178.50	186.50	0.013	0.20	1	3.61	2.22	0.002	621.75	621.39	619.53	619.17	1.25	3.26	2.04	1.62	1.84	621.15	621.02	621.24	621.06	32.35	8.34	2.84	0.74	4.34
A50	A40	167.59	175.59	0.013	0.20	1	2.41	1.49	0.002	621.36	621.02	619.87	619.53	1.07	3.15	2.35	1.49	1.49	621.40	621.15	621.48	621.24	31.40	6.30	2.60	0.72	4.42
A60	A50	141.42	152.42	0.013	0.30	1	2.41	1.49	0.003	621.79	621.36	620.30	619.87	0.69	3.31	1.53	1.19	1.49	621.48	621.40	621.54	621.48	30.47	4.09	2.08	0.67	4.50
A90	A60	87.95	95.45	0.013	0.30	1	2.41	1.49	0.003	622.05	621.79	620.56	620.30	0.41	2.78	1.03	0.94	1.19	621.50	621.48	621.53	621.54	29.70	2.27	1.63	0.59	4.57
A70	A90	91.27	95.27	0.013	0.31	1	2.41	1.49	0.003	622.33	622.05	620.84	620.56	0.41	2.78	1.29	0.73	0.94	621.57	621.50	621.62	621.53	29.13	2.27	1.13	0.43	4.68
A80	A70	7.00	10.50	0.012	0.36	1	2.50	1.58	0.004	622.45	622.42	620.87	620.84	0.45	3.17	1.63	0.75	0.73	621.61	621.57	621.66	621.62	28.56	2.27	1.13	0.43	4.68
A45	A40	40.74	45.24	0.013	0.34	1	2.41	1.49	0.003	621.16	621.02	619.67	619.53	0.50	3.34	1.30	1.49	1.49	621.19	621.15	621.22	621.24	31.40	3.48	2.60	0.72	4.42
A55	A45	147.45	154.95	0.013	0.31	1	2.41	1.49	0.003	621.61	621.16	620.12	619.67	0.51	3.25	1.30	1.13	1.49	621.25	621.19	621.30	621.22	13.46	3.48	0.52	0.95	7.10
A65	A55	161.42	172.22	0.013	0.30	1	2.41	1.49	0.003	622.10	621.61	620.61	620.12	0.37	2.69	0.94	0.72	1.13	621.33	621.25	621.37	621.30	12.67	1.98	0.52	0.95	7.10

INLET HYDRAULICS

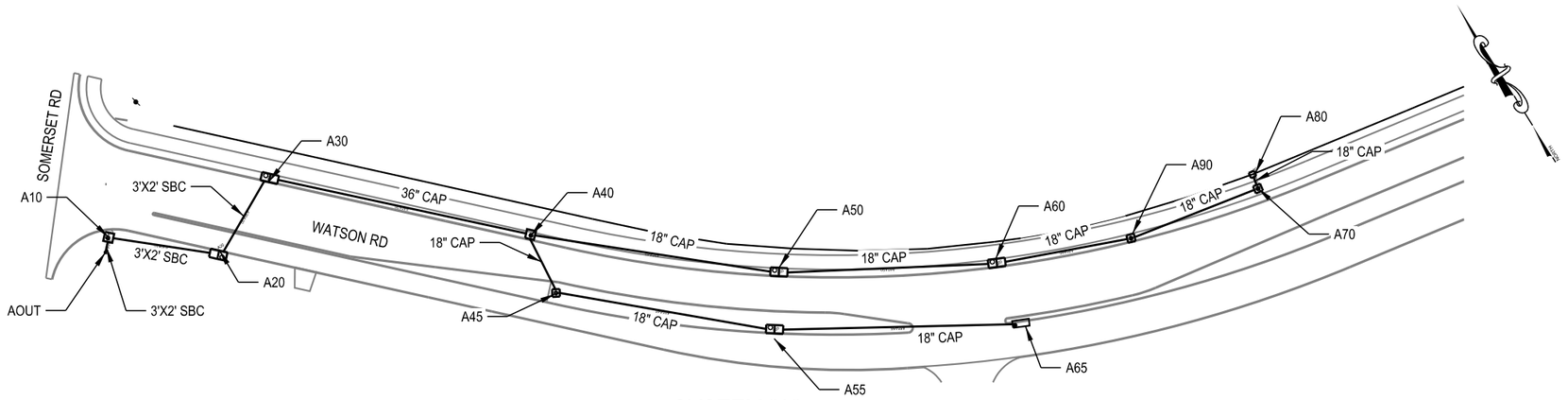
Inlet ID	Station	Type	Profile Type	Q_{10}	Cap	By Pass Flow	By Pass Flow Into	By Pass Node ID	Inlet Curb Length	Inlet Length Req'd	Computed Ponded Width	Computed Ponded Depth	Street Slope
A20	111+50.00	Curb	Sag	1.2	7.39	0.00	0.00	0.00	10	13.29	6.91	0.12	n/a
A30	111+73.50	Curb	Sag	1.69	7.39	0.00	0.00	0.00	10	13.29	7.86	0.15	n/a
A50	115+40.50	Curb	Sag	3.7	7.39	0.00	0.34	0.00	10	79.91	12.62	0.25	n/a
A60	117+00.00	Curb	On Grade	3.76	3.42	0.34	0.03	A50	10	13.59	13.18	0.26	0.44
A80	119+00.00	Curb	Sag	2.27	8.03	0.00	0.00	0.00	12	10.46	8.62	0.17	n/a
A55	115+40.50	Curb	Sag	1.73	7.39	0.00	0.00	0.00	10	9.21	7.93	0.15	n/a
A65	117+11.50	Curb	On Grade	2.01	1.98	0.03	0.00	A60	10	11.08	10.42	0.21	0.44

INLET CONFIGURATION

Inlet ID	Station	Offset	T/C Elev.	Inlet Type	Inlet Profile Type	Inlet Spread Slope	Inlet Length	Inlet Curb Dep.	Inlet Curb Height	Curb Dep. Width	Max Ponded Width	Max Ponded Depth	Grate Type	Grate Length	Grate Width	Grate Area	Grate Perimeter	Grate Clog Area
A20	111+50.00	28	623.21	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
A30	111+73.50	-26	623.34	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
A50	115+40.50	-31	622.74	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
A60	117+00.00	-33.7	623.28	Curb	On Grade	0.02	10	0.25	0.5	1.5	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
A80	119+00.00	-53.25	624.33	Curb	Sag	0.02	12	0.02	0.5	1	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
A55	115+40.50	9.1	623.48	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
A65	117+11.50	6.18	623.55	Curb	On Grade	0.02	10	0.21	0.44	3.46	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:

1. STORM SEWER TRUNKLINE AND INLETS ARE DESIGNED FOR 10-YEAR STORM EVENT.
2. HYDRAULIC COMPUTATIONS PERFORMED IN GEOPAK DRAINAGE.



SYSTEM "A"

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
50 25 0 50 100 150
1" = 100'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
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11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE HYDRAULIC COMPUTATIONS SYSTEM "A"

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	128

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:100
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DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-HYD-01.dgn

GEOPAK HYDRAULIC CONVEYANCE

U.S. Node	D.S. Node	Actual Length	Hyd. Length	N Value	Slope	No. Barrels	Span	Rise	Fs	Soffit U.S.	Soffit D.S.	Invert U.S.	Invert D.S.	Unif. Depth	Unif. Vel.	Act. Vel. D.S.	Act. Depth U.S.	Act. Depth D.S.	HGL U.S.	HGL D.S.	EGL U.S.	EGL D.S.	Sum Tc	Q_{10}	Sum Area	Avg C Value	Rainfall Intensity
B90	B80	147.00	158.00	0.013	0.31	1	n/a	2.00	0.003	622.90	622.45	620.90	620.45	0.84	3.63	1.58	1.37	1.71	622.27	622.16	622.34	622.46	28.51	4.52	4.23	0.53	4.68
B80	B70	262.00	273.00	0.013	0.31	1	n/a	2.00	0.003	622.45	621.65	620.45	619.65	1.41	4.44	4.07	1.71	1.53	622.16	621.18	622.46	621.38	29.54	10.50	4.37	0.55	4.58
B70	B60	209.00	220.00	0.013	0.31	1	n/a	2.50	0.003	622.15	621.50	619.65	619.00	1.21	4.64	2.55	1.53	2.04	621.18	621.04	621.38	621.33	30.33	10.92	8.54	0.50	4.51
B60	B50	107.00	118.00	0.013	0.33	1	n/a	3.00	0.003	622.00	621.65	619.00	618.65	1.52	5.41	3.67	2.04	2.10	621.04	620.75	621.33	621.07	30.69	19.40	9.23	0.54	4.48
B50	B40	247.50	258.50	0.013	0.30	1	n/a	3.00	0.003	621.65	620.90	618.65	617.90	1.67	5.48	3.51	2.10	2.51	620.75	620.41	621.07	620.62	31.48	22.21	9.39	0.54	4.41
B40	B30	85.46	96.46	0.013	0.35	1	n/a	3.00	0.004	620.90	620.60	617.90	617.60	1.63	5.75	3.33	2.51	2.74	620.41	620.34	620.62	620.85	31.76	22.51	14.96	0.52	4.39
B30	B25	194.79	202.79	0.013	0.31	1	n/a	3.00	0.003	620.60	620.00	617.60	617.00	2.29	5.93	5.48	2.74	2.49	620.34	619.49	620.85	620.09	32.33	34.33	15.85	0.55	4.34
B95	B90	14.39	19.80	0.012	0.35	1	2.50	1.58	0.004	622.53	622.48	620.95	620.90	0.58	3.71	1.32	1.35	1.37	622.30	622.27	622.33	622.34	27.79	3.78	2.01	0.47	4.75
B85	B80	65.00	72.26	0.012	0.54	1	2.50	1.58	0.005	622.38	622.03	620.80	620.45	0.42	3.75	0.79	1.38	1.58	622.18	622.16	622.19	622.46	28.51	2.46	4.23	0.53	4.68
B86	B80	14.56	19.97	0.012	0.48	1	2.50	1.58	0.005	622.10	622.03	620.52	620.45	0.50	4.00	1.09	1.58	1.58	622.18	622.16	622.20	622.46	28.51	3.38	4.23	0.53	4.68
B65	B60	14.56	19.97	0.013	0.34	1	n/a	2.00	0.004	621.05	621.00	619.05	619.00	1.14	4.47	2.64	2.00	2.00	621.17	621.04	621.28	621.33	30.33	8.31	8.54	0.50	4.51
B55	B50	65.00	72.26	0.013	0.38	1	n/a	2.00	0.004	620.90	620.65	618.90	618.65	0.63	3.61	0.97	1.88	2.00	620.78	620.75	620.80	621.07	30.69	3.06	9.23	0.54	4.48
B33	B30	14.92	20.33	0.013	0.67	1	n/a	2.00	0.007	619.70	619.60	617.70	617.60	1.06	6.03	3.26	2.00	2.00	620.55	620.34	620.71	620.85	31.76	10.24	14.96	0.52	4.39
B35	B30	76.76	84.02	0.013	0.52	1	n/a	2.00	0.005	620.00	619.60	618.00	617.60	0.51	3.65	0.73	2.00	2.00	620.36	620.34	620.36	620.85	31.76	2.28	14.96	0.52	4.39

INLET HYDRAULICS

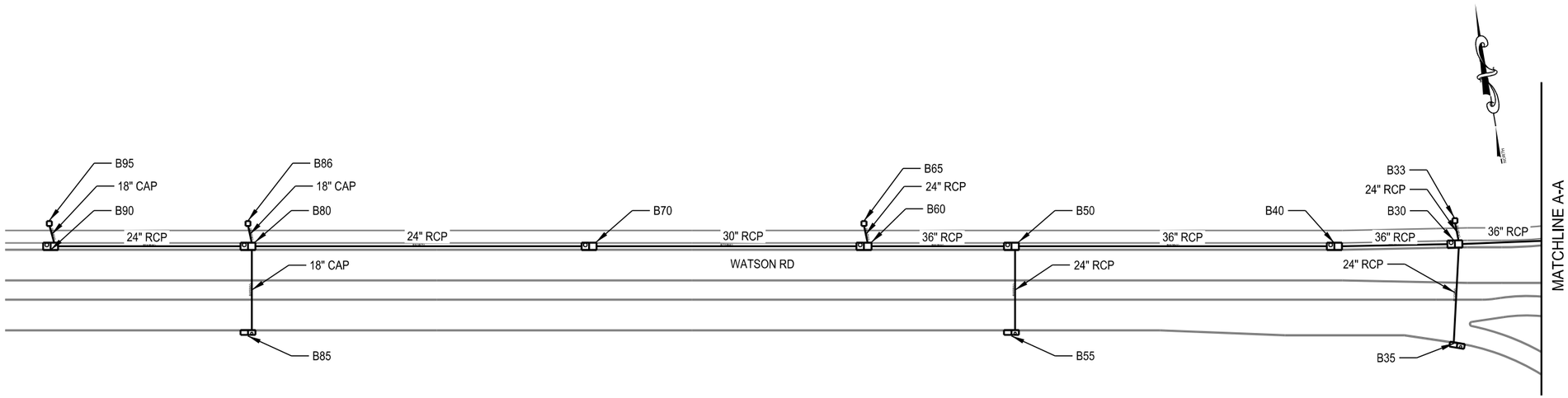
Inlet ID	Station	Type	Profile Type	Q_{10}	Cap	By Pass Flow	By Pass Flow Into	By Pass Node ID	Inlet Curb Length	Inlet Length Req'd	Computed Ponded Width	Computed Ponded Depth	Street Slope
B90	122+91.00	Curb	On Grade	1.23	1.23	0.00	0.00	B80	10	6.87	9.04	0.18	0.35
B80	124+49.00	Curb	Sag	2.44	3.43	0.00	0.00	0.00	10	10.46	9.55	0.19	n/a
B70	127+22.00	Curb	On Grade	1.08	1.08	0.00	0.00	B60	10	6.39	8.62	0.17	0.35
B60	129+42.00	Curb	On Grade	1.8	1.8	0.00	0.00	B50	10	8.52	10.42	0.21	0.35
B50	130+60.00	Curb	Sag	1.93	3.43	0.00	0.00	0.00	10	8.77	8.26	0.16	n/a
B40	133+18.50	Curb	On Grade	1.14	1.14	0.00	0.00	B30	10	6.57	8.78	0.18	0.35
B30	134+15.00	Curb	Sag	2.35	3.43	0.00	0.00	0.00	10	8.77	9.32	0.19	n/a
B95	122+90.00	Curb	Sag	3.78	8.03	0.00	0.00	0.00	12	10.46	12.1	0.24	n/a
B85	124+49.00	Curb	Sag	2.46	3.43	0.00	0.00	0.00	10	10.46	9.6	0.19	n/a
B86	124+49.00	Curb	Sag	3.38	8.03	0.00	0.00	0.00	12	10.46	11.23	0.22	n/a
B65	129+42.00	Curb	Sag	8.31	8.03	0.00	0.00	0.00	12	10.46	20.46	0.41	n/a
B55	130+60.00	Curb	Sag	3.06	3.43	0.00	0.00	0.00	10	8.77	11.12	0.22	n/a
B33	134+15.00	Curb	Sag	10.2	8.03	0.00	0.00	0.00	12	10.46	23.52	0.47	n/a
B35	134+17.00	Curb	Sag	2.28	7.39	0.00	0.00	0.00	10	10.46	9.14	0.18	n/a

INLET CONFIGURATION

Inlet ID	Station	Offset	T/C Elev.	Inlet Type	Inlet Profile Type	Inlet Spread Slope	Inlet Length	Inlet Curb Dep.	Inlet Curb Height	Curb Dep. Width	Max Ponded Width	Max Ponded Depth	Grate Type	Grate Length	Grate Width	Grate Area	Grate Perimeter	Grate Clog Area
B90	122+91.00	-32	624.68	Curb	On Grade	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B80	124+49.00	-32	624.12	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B70	127+22.00	-32	624.12	Curb	On Grade	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B60	129+42.00	-32	624.08	Curb	On Grade	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B50	130+60.00	-32	623.06	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B40	133+18.50	-32	622.84	Curb	On Grade	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B30	134+15.00	-33.8	622.46	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B95	122+90.00	-53.25	625.00	Curb	Sag	0.02	12	0.02	0.5	1	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
B85	124+49.00	32	624.12	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B86	124+49.00	-53.25	624.77	Curb	Sag	0.02	12	0.02	0.5	1	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
B65	129+42.00	-53.25	623.67	Curb	Sag	0.02	12	0.02	0.5	1	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
B55	130+60.00	32	622.94	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B33	134+15.00	-55.5	622.48	Curb	Sag	0.02	12	0.02	0.5	1	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
B35	134+17.00	42.3	622.30	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:

1. STORM SEWER TRUNKLINE AND INLETS ARE DESIGNED FOR 10-YEAR STORM EVENT.
2. HYDRAULIC COMPUTATIONS PERFORMED IN GEOPAK DRAINAGE.



SYSTEM "B"

SEE SHEET 130 FOR FOR B20.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
50 25 0 50 100 150
1" = 100'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD
DRAINAGE
HYDRAULIC COMPUTATIONS
SYSTEM "B"

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	-—	129

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:100
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PLOTTED ON: 6/24/2020 @ 11:36:49 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-HYD-02.dgn

GEOPAK HYDRAULIC CONVEYANCE

U.S. Node	D.S. Node	Actual Length	Hyd. Length	N Value	Slope	No. Barrels	Span	Rise	Fs	Soffit U.S.	Soffit D.S.	Invert U.S.	Invert D.S.	Unif. Depth	Unif. Vel.	Act. Vel. D.S.	Act. Depth U.S.	Act. Depth D.S.	HGL U.S.	HGL D.S.	EGL U.S.	EGL D.S.	Sum Tc	Q_{10}	Sum Area	Avg C Value	Rainfall Intensity
B10	B7	34.33	46.67	0.013	0.29	1	n/a	2.00	0.003	618.45	618.35	616.45	616.35	0.97	3.78	1.85	1.87	1.89	618.32	618.24	618.38	618.81	32.97	5.69	18.01	0.58	4.29
B25	B7	178.71	184.21	0.013	0.31	1	n/a	3.00	0.003	619.90	619.35	616.90	616.35	2.46	6.06	7.53	2.59	2.00	619.49	618.35	620.09	618.81	32.97	37.64	18.01	0.58	4.29
B7	B6	294.00	300.00	0.013	0.31	1	4.00	3.00	0.003	619.35	618.45	616.35	615.45	1.86	6.09	5.11	1.89	2.21	618.24	617.66	618.81	618.07	33.79	45.18	18.01	0.58	4.29
B6	B5	294.00	300.00	0.013	0.31	1	4.00	3.00	0.003	618.45	617.55	615.45	614.55	1.86	6.09	3.94	2.21	2.87	617.66	617.42	618.07	617.66	34.61	45.18	18.01	0.58	4.29
B5	B4	167.00	173.00	0.013	0.33	1	4.00	3.00	0.003	617.55	617.00	614.55	614.00	1.79	6.32	3.77	2.87	3.00	617.42	617.23	617.66	617.46	35.07	45.18	18.58	0.59	4.13
B4	B3.1	28.14	32.98	0.013	0.36	1	4.00	3.00	0.004	617.00	616.90	614.00	613.90	1.76	6.47	3.80	3.00	3.00	617.23	617.03	617.46	617.31	35.15	45.61	20.36	0.60	4.12
B3.1	B2	22.24	24.07	0.013	0.45	1	4.00	3.00	0.005	616.90	616.80	613.90	613.80	1.72	7.35	4.21	3.00	3.00	617.03	616.97	617.31	617.25	35.21	50.46	20.36	0.60	4.12
B2	Bout	78.68	78.68	0.013	0.32	1	4.00	3.00	0.003	616.80	616.55	613.80	613.55	1.95	6.47	4.21	3.00	3.00	616.97	616.72	617.25	616.99	35.41	50.46	20.36	0.60	n/a
B110	B100	70.93	77.63	0.013	0.42	1	n/a	2.00	0.004	619.70	619.40	617.70	617.40	0.51	3.36	0.68	1.89	2.00	619.59	619.58	619.60	619.61	10.38	2.14	0.67	0.95	7.72
B100	B20	114.34	121.04	0.013	0.31	1	n/a	2.00	0.003	619.40	619.05	617.40	617.05	0.87	3.77	1.56	2.00	2.00	619.58	619.51	619.61	619.57	10.92	4.91	0.89	0.95	7.56
B20	B25	5.45	11.30	0.013	0.92	1	n/a	2.00	0.009	619.05	619.00	617.05	617.00	0.74	6.02	2.04	2.00	2.00	619.51	619.49	619.57	620.09	32.33	6.41	15.85	0.55	4.34
B145	B140	85.16	94.01	0.013	0.31	1	n/a	2.00	0.003	618.81	618.55	616.81	616.55	0.44	2.61	0.46	1.48	1.73	618.29	618.28	618.29	618.31	10.60	1.34	0.57	0.95	7.65
B140	B7	54.53	63.03	0.013	0.37	1	n/a	2.00	0.004	618.55	618.35	616.55	616.35	0.76	3.81	1.35	1.73	1.89	618.28	618.24	618.31	618.81	32.97	4.14	18.01	0.58	4.29

INLET HYDRAULICS

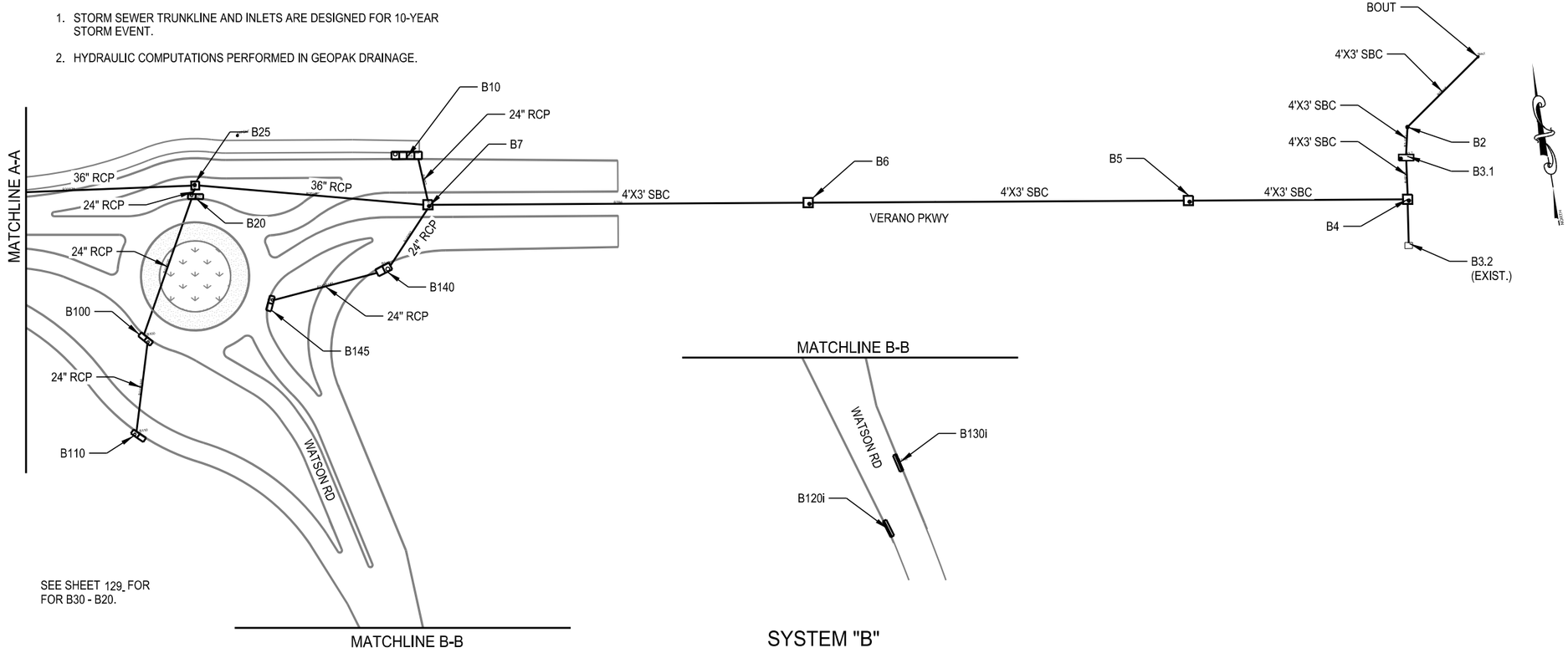
Inlet ID	Station	Type	Profile Type	Q_{10}	Cap	By Pass Flow	By Pass Flow Into	By Pass Node ID	Inlet Curb Length	Inlet Length Req'd	Computed Ponded Width	Computed Ponded Depth	Street Slope
B20	135+98.33	Curb	Sag	1.65	3.43	0.00	0.00	0.00	10	6.8	7.79	0.15	n/a
B10	201+83.50	Curb	Sag	5.69	6.14	0.00	0.00	0.00	20	11.22	12.38	0.23	n/a
B3.2	209+73.63	Curb	Sag	3.72	8.8	0.00	0.00	0.00	5	10.46	16.4	0.33	n/a
B100	136+10.00	Curb	Sag	2.84	3.43	0.00	0.00	0.00	10	6.8	10.58	0.21	n/a
B110	136+89.50	Curb	Sag	2.14	3.43	0.00	0.00	0.00	10	6.8	8.77	0.18	n/a
B145	200+33.50	Curb	Sag	1.34	3.43	0.00	0.00	0.00	10	6.8	7.19	0.13	n/a
B140	137+05.00	Curb	Sag	2.9	3.43	0.00	0.00	0.00	10	6.8	10.73	0.21	n/a
B120i	140+88.00	Curb	On Grade	0.54	0.54	0.00	0.00	0.00	10	8.59	6.62	0.13	0.35
B130i	140+43.00	Curb	On Grade	0.19	0.19	0.00	0.00	0.00	10	5.25	4.51	0.09	0.35

INLET CONFIGURATION

Inlet ID	Station	Offset	T/C Elev.	Inlet Type	Inlet Profile Type	Inlet Spread Slope	Inlet Length	Inlet Curb Dep.	Inlet Curb Height	Curb Dep. Width	Max Ponded Width	Max Ponded Depth	Grate Type	Grate Length	Grate Width	Grate Area	Grate Perimeter	Grate Clog Area
B20	135+98.33	-54.72	623.28	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B10	201+83.50	-36	621.98	Curb	Sag	0.02	20	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B3.2	209+73.63	34.04	619.38	Curb	Sag	0.02	5	0.21	0.52	2	13	0.58	n/a	n/a	n/a	n/a	n/a	n/a
B100	136+10.00	60.1	623.58	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B110	136+89.50	125.03	622.10	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B145	200+33.50	54.7	623.34	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B140	137+05.00	-107	621.79	Curb	Sag	0.02	10	0.25	0.5	1.5	12	0.24	n/a	n/a	n/a	n/a	n/a	n/a
B120i	140+88.00	15.75	623.14	Curb	On Grade	0.02	10	0.04	0.58	2	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a
B130i	140+43.00	-12	624.00	Curb	On Grade	0.02	10	0.04	0.58	2	12	0.4	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:

1. STORM SEWER TRUNKLINE AND INLETS ARE DESIGNED FOR 10-YEAR STORM EVENT.
2. HYDRAULIC COMPUTATIONS PERFORMED IN GEOPAK DRAINAGE.



NO	DATE	REVISION	APPROVED
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-	-	-	-

GRAPHIC SCALE
(IN FEET)
50 25 0 50 100 150
1" = 100'

STATE OF TEXAS
CARLOS LUNA III
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LICENSED PROFESSIONAL ENGINEER

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WATSON ROAD
DRAINAGE
HYDRAULIC COMPUTATIONS
SYSTEM "B"

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	--		130
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:100
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:36:59 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-HYD-03.dgn

HY - 8 Culvert Analysis Report

Table 1.1 - Summary of Culvert Flows at Crossing: Existing

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Existing Discharge (cfs)	Roadway Discharge (cfs)	Iterations
622.7	5 year	65	62.82	0	100
622.71	10 year	76	62.96	12.73	7
622.71	100 year	121	63.11	56.71	3
622.7	Overtopping	62.87	62.87	0	Overtopping

Table 1.2 - Summary of Culvert Flows at Crossing: Proposed

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Proposed Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
622.12	5 year	58.72	58.72	0	1
622.5	10 year	70.39	70.39	0	1
623.1	100 year	112.41	86.63	25.51	7
622.77	Overtopping	77.9	77.9	0	Overtopping

Table 2.1 - Culvert Summary Table: Existing

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	65	62.82	622.7	3.089	3.32	4-FFf	2	1.638	2	1.605	6.666	2.718
10 year	76	62.96	622.71	3.096	3.439	4-FFf	2	1.64	2	1.716	6.68	2.832
100 year	121	63.11	622.71	3.104	3.825	4-FFf	2	1.641	2	2.095	6.696	3.195

Table 2.2 - Culvert Summary Table: Proposed Culvert

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5 year	58.72	58.72	622.12	2.318	1.34	5-S2n	1.15	1.438	1.19	0.659	8.223	5.355
10 year	70.39	70.39	622.5	2.704	2.064	5-S2n	1.314	1.623	1.361	0.733	8.618	5.703
100 year	112.41	86.63	623.1	3.3	2.777	5-S2n	1.534	1.864	1.589	0.96	9.086	6.686

****

Straight Culvert

Inlet Elevation (invert): 619.40 ft, Outlet Elevation (invert): 618.90 ft

Culvert Length: 80.00 ft, Culvert Slope: 0.0063

****

Site Data - Existing

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 619.40 ft
Outlet Station: 80.00 ft
Outlet Elevation: 618.90 ft
Number of Barrels: 3

Culvert Data Summary - Existing

Barrel Shape: Circular
Barrel Diameter: 2.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: Square Edge with Headwall
Inlet Depression: None

****

Straight Culvert

et Elevation (invert): 619.80 ft, Outlet Elevation (invert): 618.90 ft

Culvert Length: 98.83 ft, Culvert Slope: 0.0091

****

Site Data - Proposed Culvert

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 619.80 ft
Outlet Station: 98.83 ft
Outlet Elevation: 618.90 ft
Number of Barrels: 2

Culvert Data Summary - Proposed

Barrel Shape: Concrete Box
Barrel Span: 3.00 ft
Barrel Rise: 2.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0130
Culvert Type: Straight
Inlet Configuration: 1:1 Bevel (45º flare) Wingwall
Inlet Depression: None

HY - 8 Culvert Analysis Report

Table 3 - Downstream Channel Rating Curve (Crossing)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
58.72	619.56	0.66	5.36	0.19	1.23
70.39	619.63	0.73	5.7	0.21	1.25
112.41	619.86	0.96	6.69	0.27	1.29

Tailwater Channel Data - Proposed

Tailwater Channel Option: Irregular Channel
Channel Slope: 0.0045
User Defined Channel Cross-Section:

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0	621.98	0.013
2	11.55	618.9	0.013
3	26.26	618.9	0.013
4	31.87	621.6	0.013

Roadway Data for Crossing: Proposed

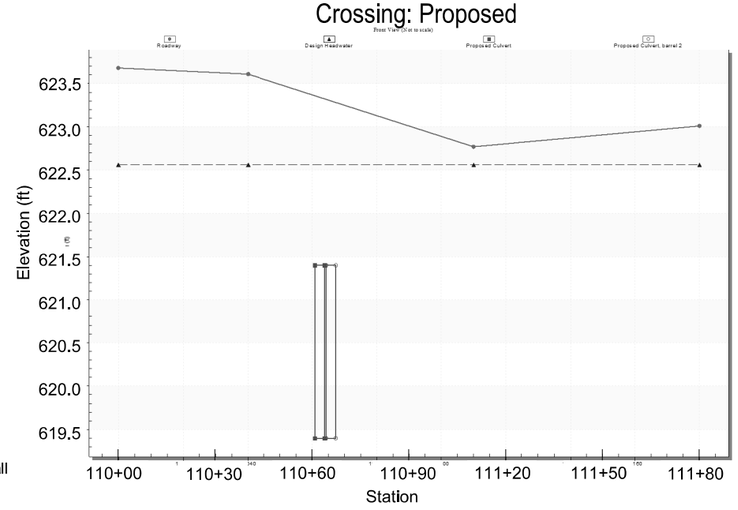
Roadway Profile Shape: Irregular Roadway Shape (coordinates)
Irregular Roadway Cross-Section:

Coord No.	Station (ft)	Elevation (ft)
0	11000	623.68
1	11040	623.61
2	11110	622.77
3	11180	623.01

Roadway Surface: Paved
Roadway Top Width: 54.00 ft

NOTES:

1. CROSS CULVERTS ARE DESIGNED FOR 10-YEAR STORM EVENT.
2. CULVERT HYDRAULIC ANALYSIS PERFOMED IN HY-8 SOFTWARE.



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GRAPHIC SCALE
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50 25 0 50 100 150
1" = 100'

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WATSON ROAD
DRAINAGE
HYDRAULIC COMPUTATIONS
SBC CULVERTS

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			131
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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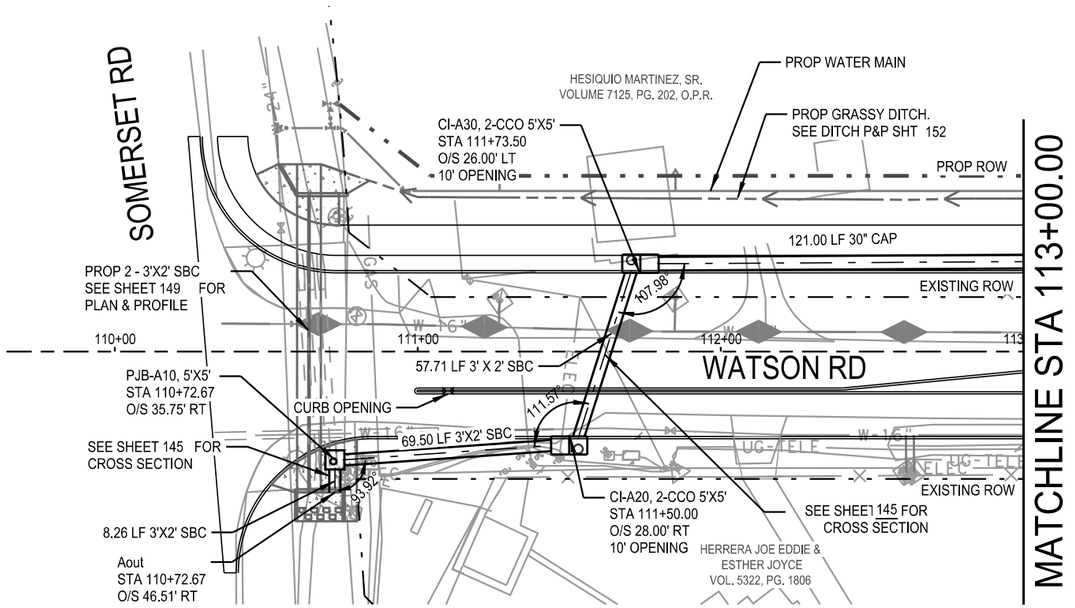


PLAN VIEW LEGEND

CI = CURB INLET
CS = CURB SLOT
CAP = CONC ARCH PIPE
DI = DROP INLET
PJB = JUNCTION BOX
RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT
- T — TELEPHONE PEDESTAL
- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

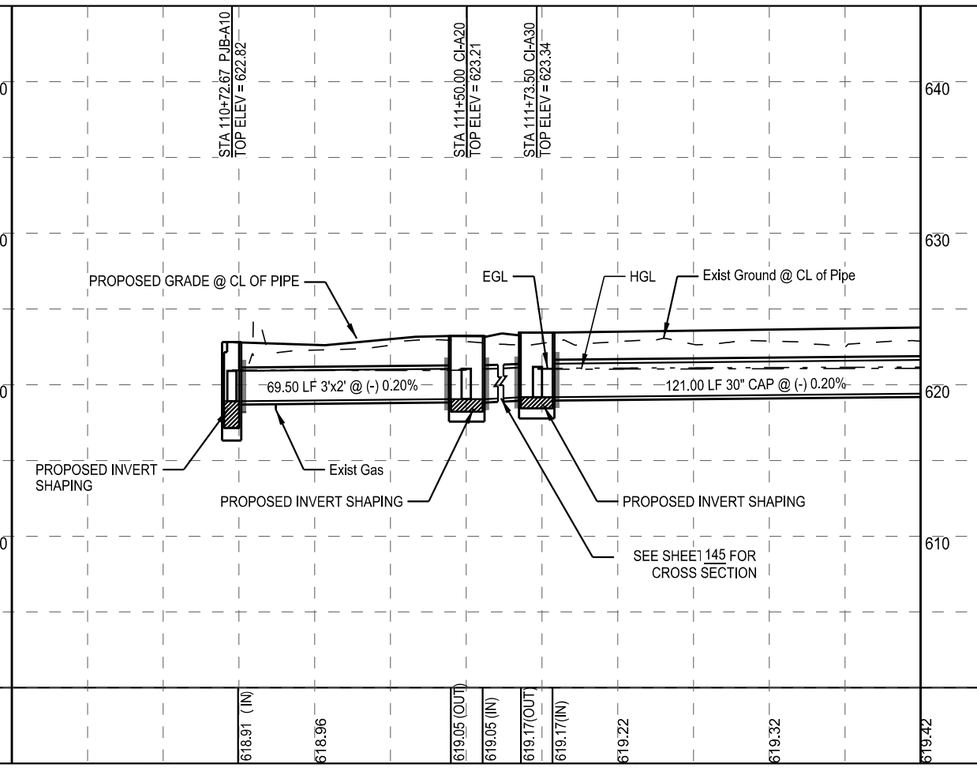
- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
420 6002	CL A CONC (MISC)	CY	4
462 6001	CONC BOX CULV (3 FT X 2 FT)	LF	136
464 6034	RC PIPE (ARCH) (CL III)(DES 5)	LF	121
465 6009	JCTBOX (COML) (PJB) (5FTX5FT)	EA	1
465 6024	INLET (COMPL)(PCO)(5FT)	EA	4

NOTES:

1. FOR CURB INLETS STATION LOCATIONS AND OFFSETS ARE AT THE FACE OF CURB AND THE MIDPOINT OF THE INLET(S). THE CONTROL POINTS ARE TO BE TAKEN AT TOP OF CURB AT NOMINAL FACE OF CURB.
2. STATION LOCATIONS AND OFFSETS OF DROP INLETS, MANHOLES, AND JUNCTION BOXES ARE AT THE GEOMETRIC CENTER OF THE STRUCTURE.
3. LENGTH OF PIPE SHOWN MEASURES FROM INSIDE FACE TO INSIDE FACE OF INLETS, MANHOLES, JUNCTIONS BOXES, AND BENDS.
4. CONTRACTOR SHALL GROUT BOTTOM OF INLETS OR STRUCTURES TO ENSURE POSITIVE DRAINAGE. GROUTING AND INVERT SHAPING IS SUBSIDIARY TO RESPECTIVE STRUCTURE.



NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

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WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "A"

BEGINNING OF PROJECT TO STA 113+00.00

SHEET 1 OF 4

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	132

STATE	DIST.	COUNTY	
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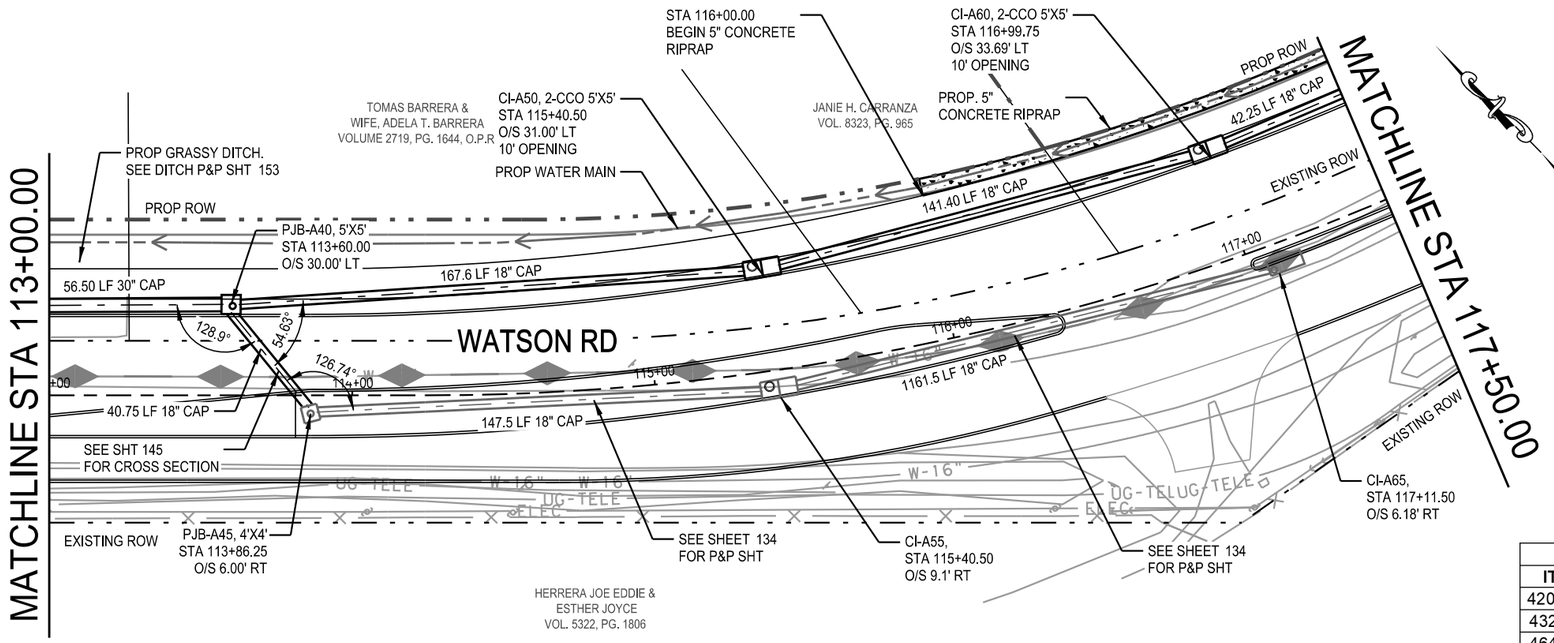

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CS = CURB SLOT	PJB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT
- T — TELEPHONE PEDESTAL
- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
420 6002	CL A CONC (MISC)	CY	6
432 6007	RIPRAP (CONC)(CL C)	CY	28
464 6030	RC PIPE (ARCH) (CL III)(DES 3)	LF	392
464 6034	RC PIPE (ARCH) (CL III)(DES 5)	LF	57
465 6009	JCTBOX (COML) (PJB) (5FTX5FT)	EA	1
465 6024	INLET (COMPL)(PCO)(5FT)	EA	4

NOTES:

1. FOR CURB INLETS STATION LOCATIONS AND OFFSETS ARE AT THE FACE OF CURB AND THE MIDPOINT OF THE INLET(S). THE CONTROL POINTS ARE TO BE TAKEN AT TOP OF CURB AT NOMINAL FACE OF CURB.
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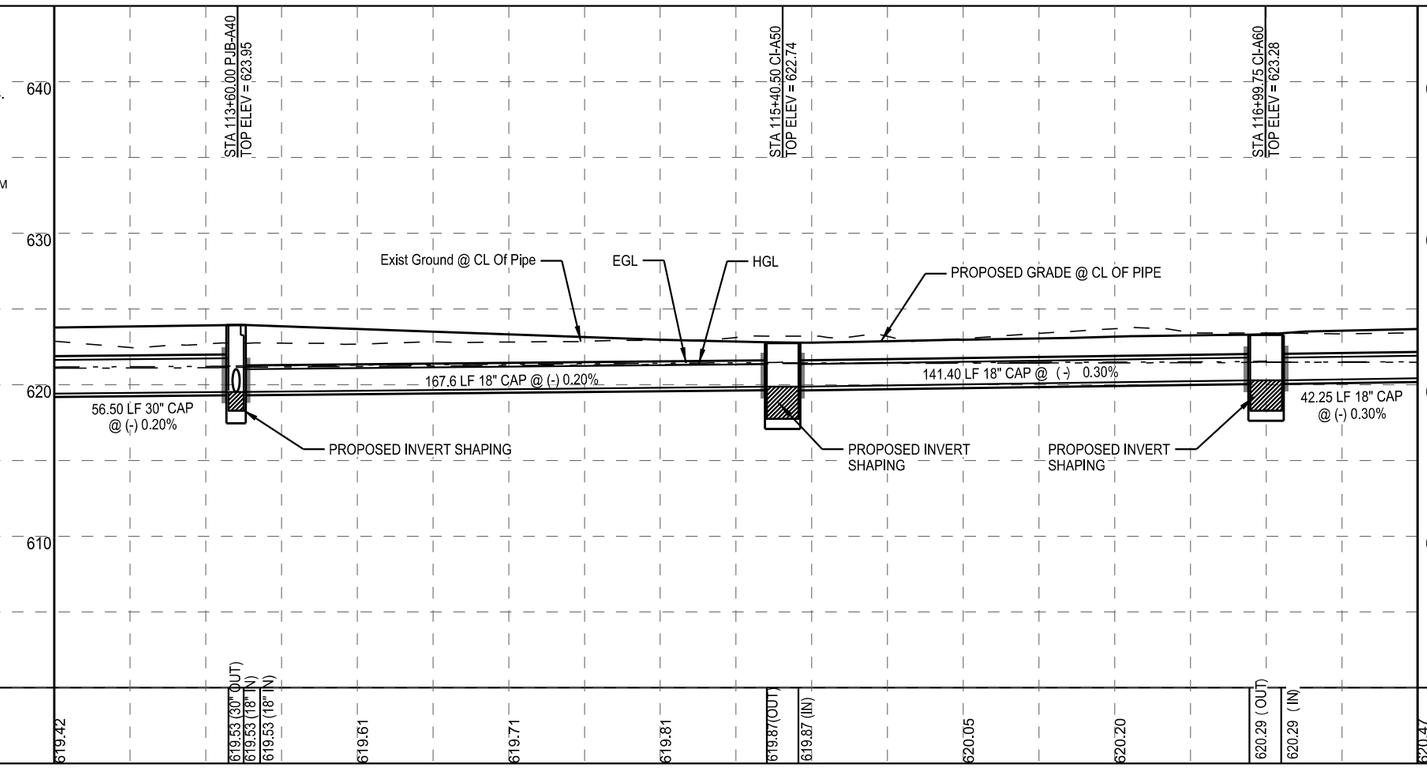
3. LENGTH OF PIPE SHOWN MEASURES FROM INSIDE FACE TO INSIDE FACE OF INLETS, MANHOLES, JUNCTIONS BOXES, AND BENDS.
4. CONTRACTOR SHALL GROUT BOTTOM OF INLETS OR STRUCTURES TO ENSURE POSITIVE DRAINAGE. GROUTING AND INVERT SHAPING IS SUBSIDIARY TO RESPECTIVE STRUCTURE.



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GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE PLAN AND PROFILE STORM SYSTEM "A"

STA 113+00.00 TO STA 117+00.00

SHEET 2 OF 4

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	133

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:50
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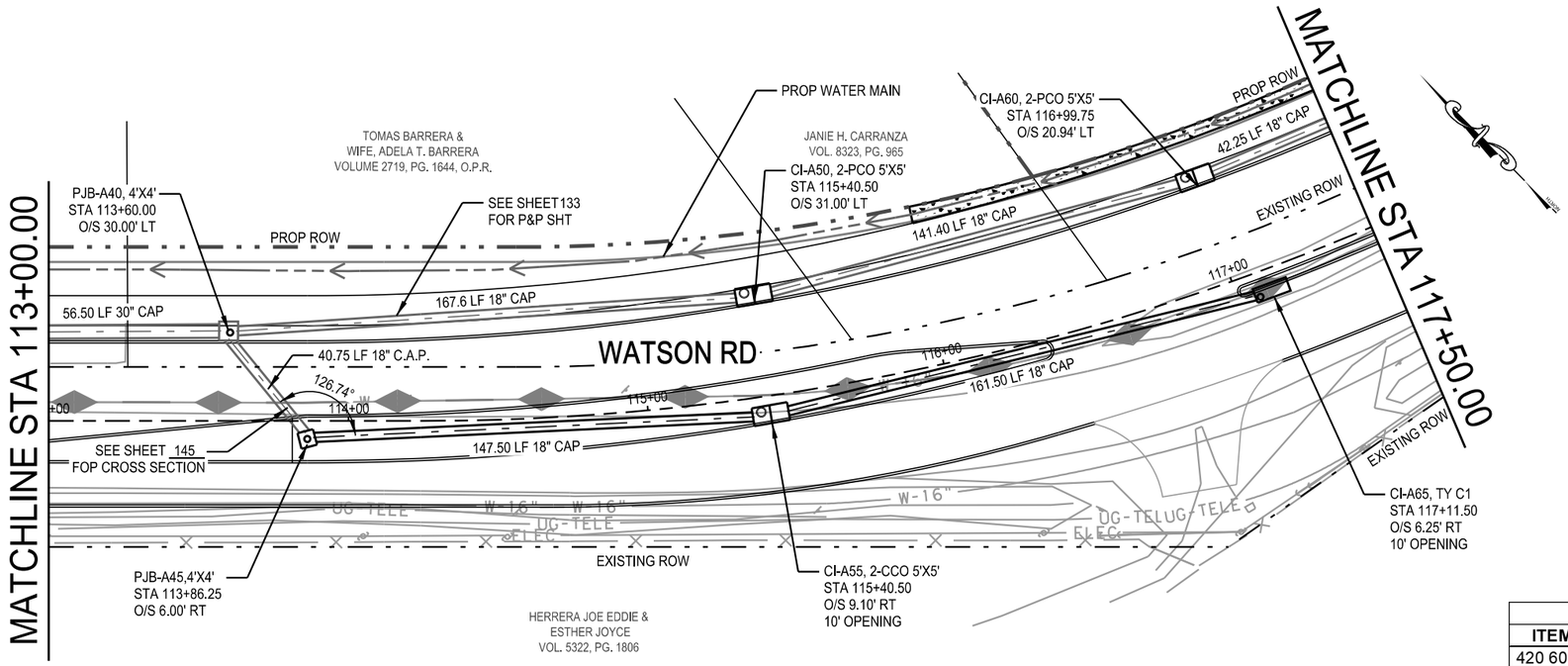

PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	PJB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- UG TELE — UNDERGROUND TELE
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- UTILITY POLE
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- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
420 6002	CL A CONC (MISC)	CY	3
464 6029	RC PIPE (ARCH)(CL III)(DES 3)	LF	309
465 6006	JCTBOX (COML) (PJB) (4FTX4FT)	EA	1
465 6176	INLET (COMPL)(CURB)(TY C1)	EA	1
465 6024	INLET (COMPL)(PCO)(5FT)	EA	2

NOTES:

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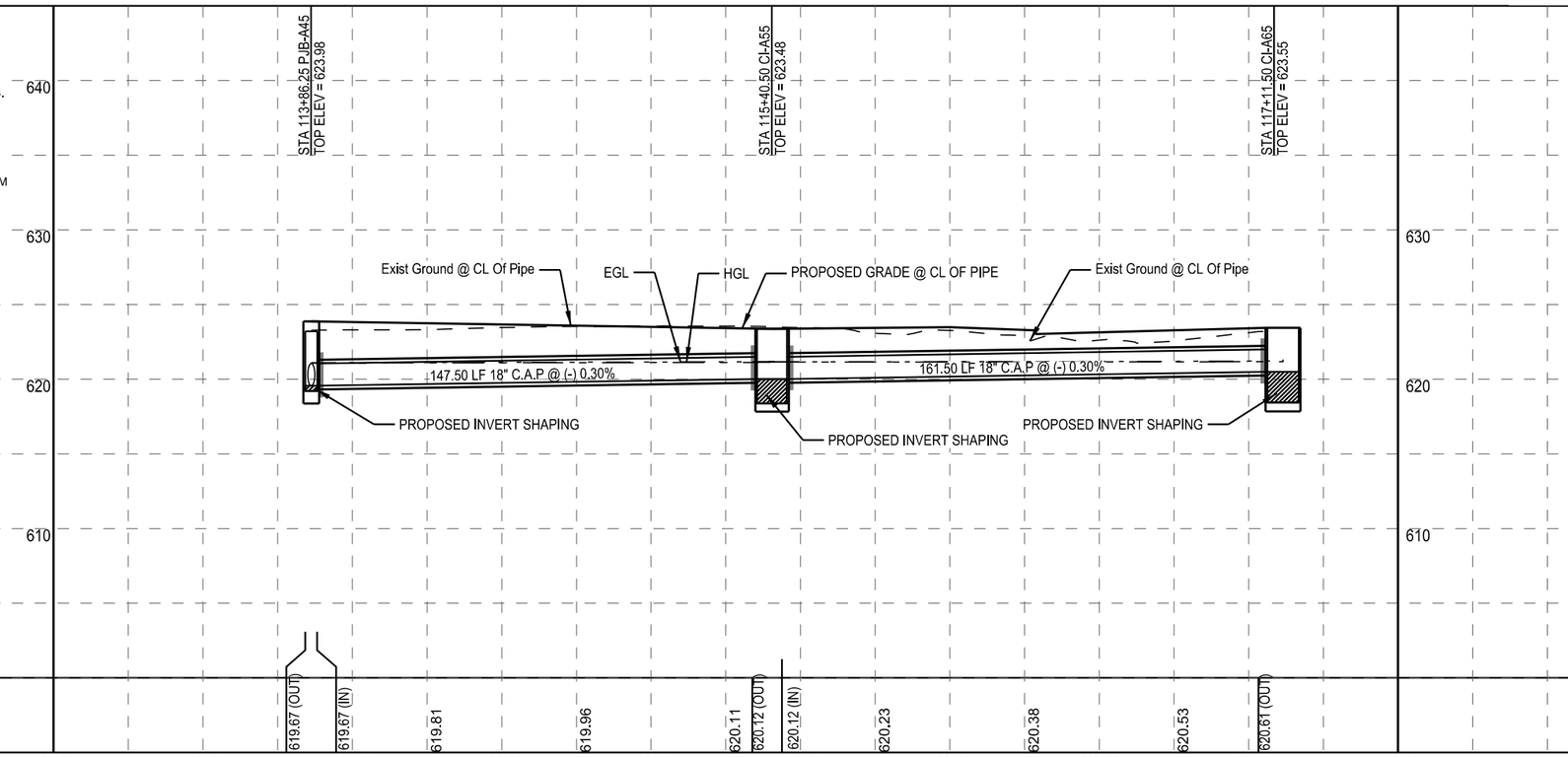

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GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

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6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
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TBPLS No.: 10194506

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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE PLAN AND PROFILE STORM SYSTEM "A"

STA 113+00.00 TO STA 117+00.00

SHEET 3 OF 4

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	134

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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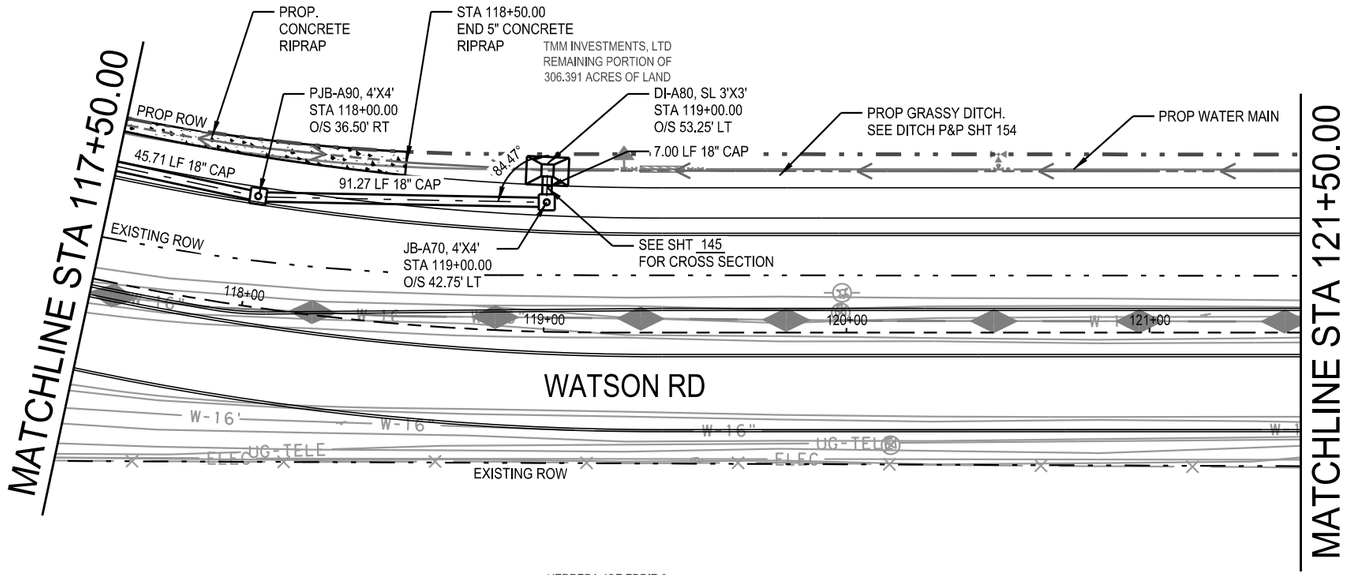

PLAN VIEW LEGEND

CI = CURB INLET — DI = DROP INLET
CS = CURB SLOT — PJB = JUNCTION BOX
CAP = CONC ARCH PIPE — RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
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- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
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- UTILITY POLE
- WV — WATER VALVE
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- T — TELEPHONE PEDESTAL
- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
420 6002	CL A CONC (MISC)	CY	4
432 6007	RIPRAP (CONC)(CL C)	CY	26
464 6030	REC PIPE (ARCH) (CL III)(DES 3)	LF	144
465 6006	JCTBOX (COML) (PJB) (4FTX4FT)	EA	2
465 6054	INLET (COMPL)(PSL)(SL)(3FTX3FT)	EA	1

NOTES:

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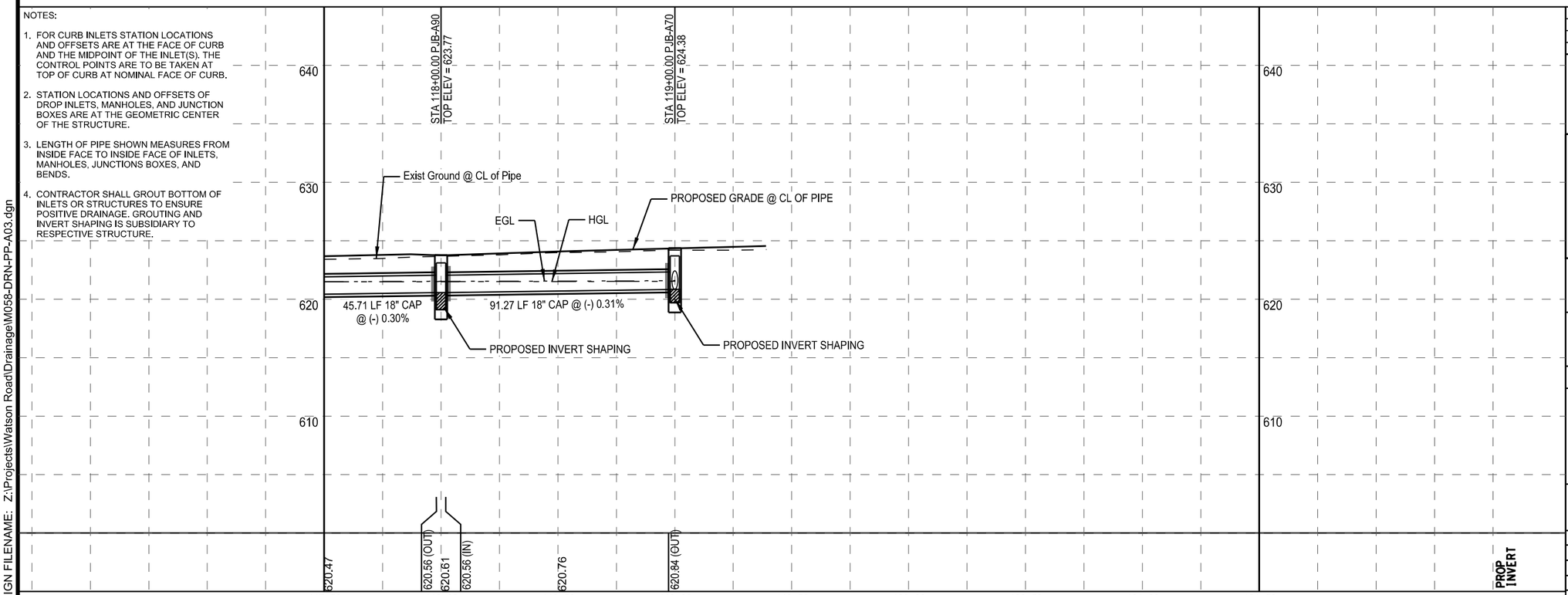

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GRAPHIC SCALE (IN FEET)
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1" = 50'
Vert: 1" = 10'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

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6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
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CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE PLAN AND PROFILE STORM SYSTEM "A"

STA 117+00.00 TO STA 121+50.00

SHEET 4 OF 4

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	135

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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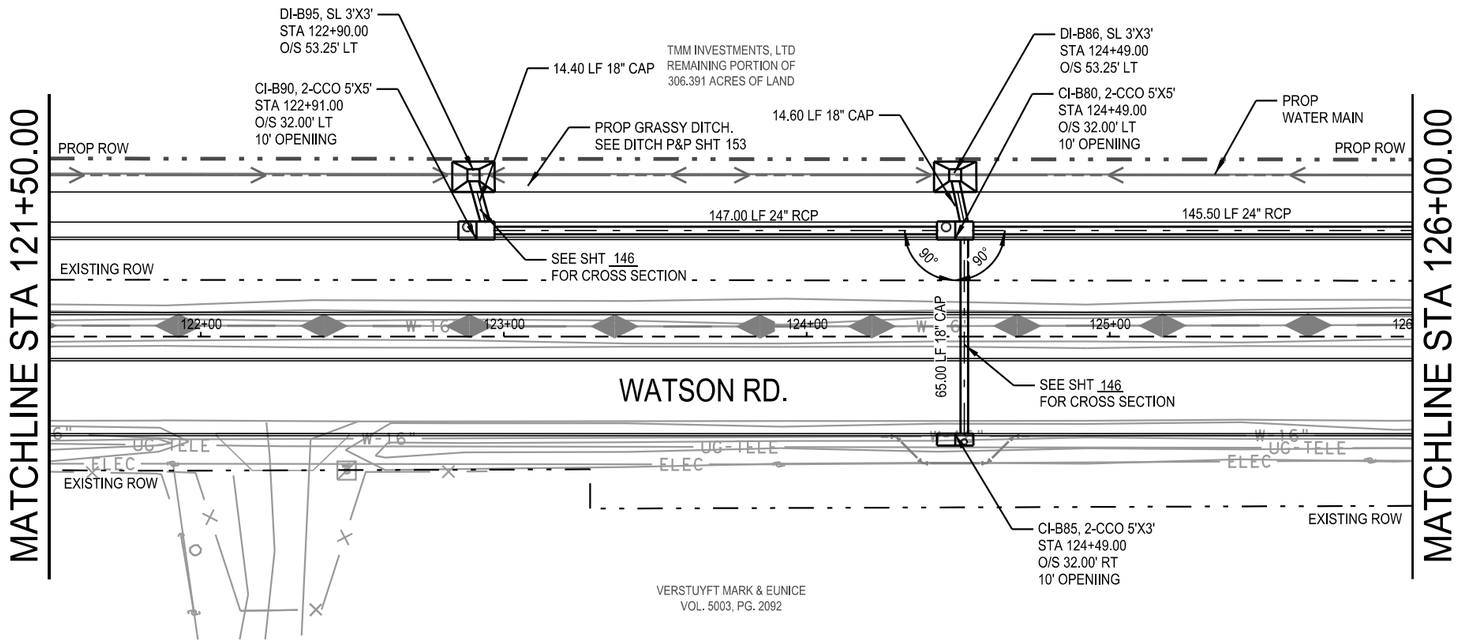

PLAN VIEW LEGEND

CI = CURB INLET
CS = CURB SLOT
CAP = CONC ARCH PIPE
DI = DROP INLET
PJB = JUNCTION BOX
RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT
- T — TELEPHONE PEDESTAL
- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
420 6002	CL A CONC (MISC)	CY	6
432 6007	RIPRAP (CONC)(CL C)	CY	11
464 6005	REC PIPE (CL III)(24 IN)	LF	293
464 6030	RC PIPE (ARCH)(CL III)(DES 3)	LF	94
465 6024	INLET (COMPL)(PCO)(5FT)	EA	4
465 6054	INLET (COMPL)(PSL)(SL)(3FTX3FT)	EA	2
465 6013	INLET (COMPL)(PCO)(3FT)	EA	2

NOTES:

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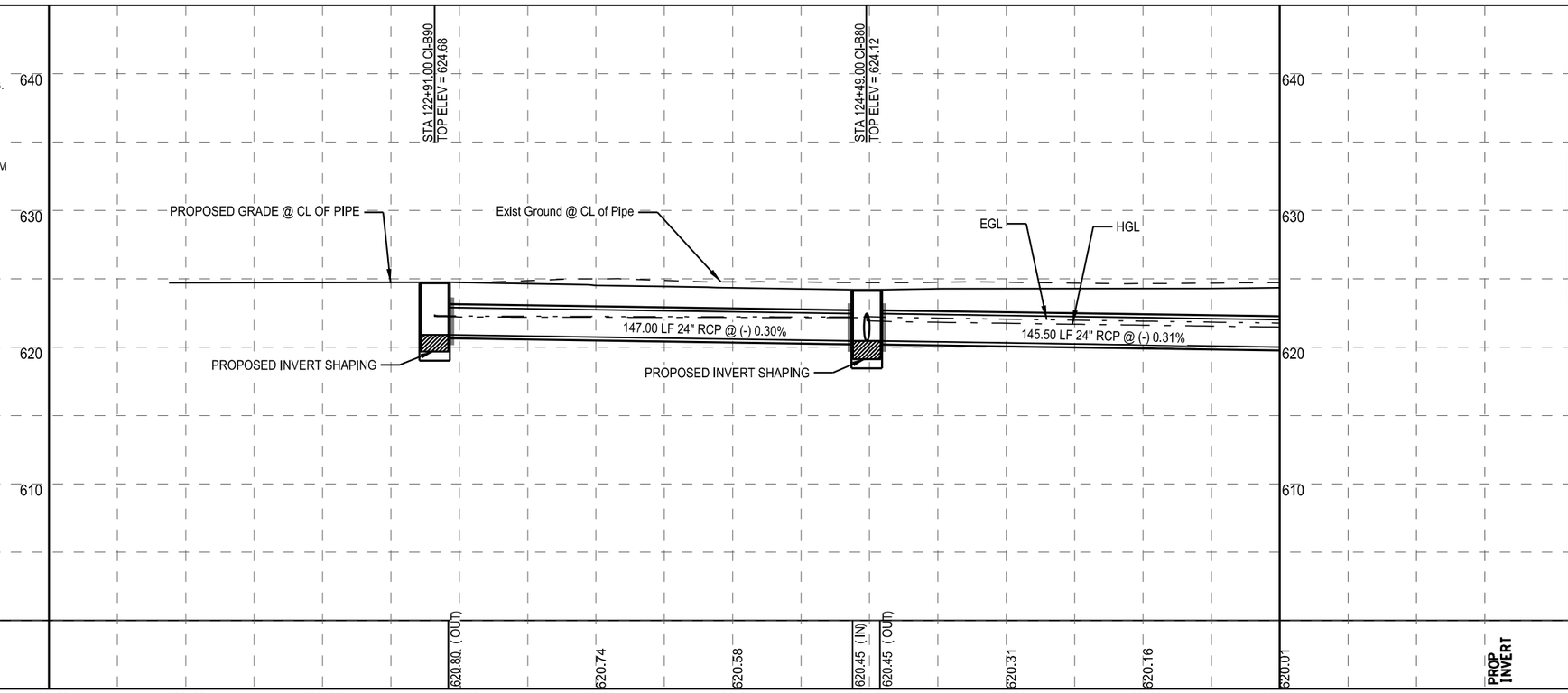

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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B"
STA 121+50.00 TO STA 126+00.00

SHEET 1 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	136

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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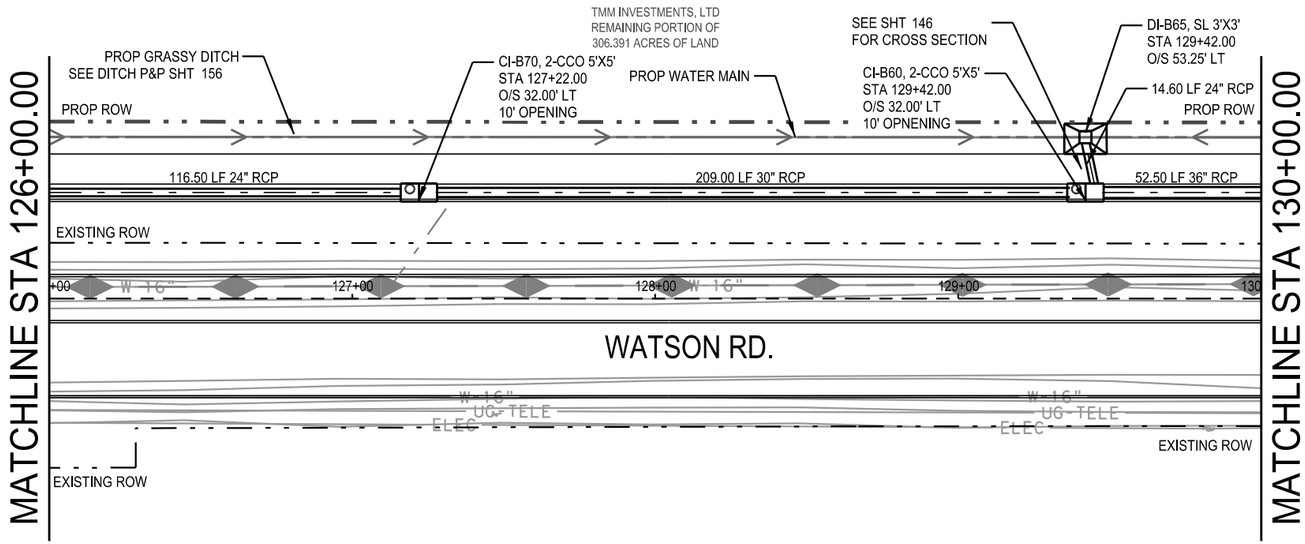

PLAN VIEW LEGEND

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CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
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- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
402 6001	TRENCH EXCAVATION PROTECTION	LF	262
420 6002	CL A CONC (MISC)	CY	3
432 6007	RIPRAP (CONC)(CL C)	CY	6
402 6002	REC PIPE (CL III)(24 IN)	LF	132
464 6007	REC PIPE (CL III)(30 IN)	LF	209
464 6008	REC PIPE (CL III)(36 IN)	LF	53
465 6024	INLET (COMPL)(PCO)(5FT)	EA	4
465 6054	INLET (COMPL)(PSL)(SL)(3FTX3FT)	EA	1

NOTES:

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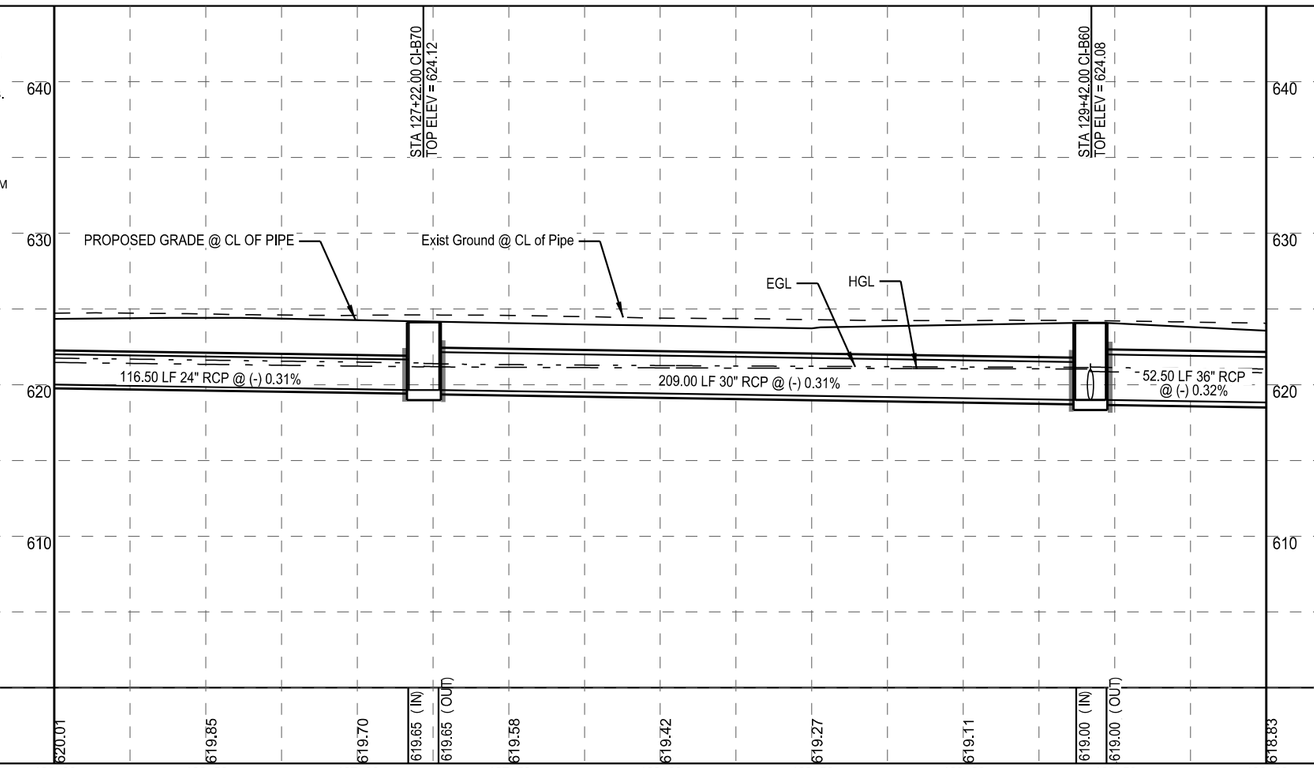

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-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B"

STA 126+00.00 TO STA 130+00.00

SHEET 2 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	137

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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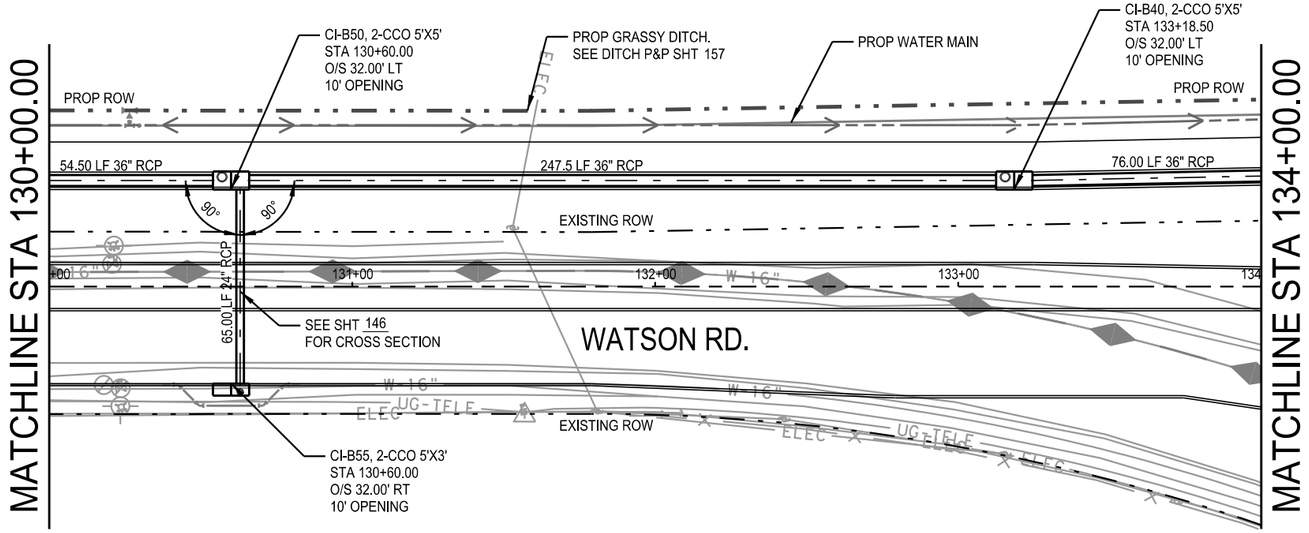

PLAN VIEW LEGEND

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- PROPOSED STRUCTURE
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PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
402 6001	TRENCH EXCAVATION PROTECTION	LF	443
420 6002	CL A CONC (MISC)	CY	4
464 6005	REC PIPE (CL III)(24 IN)	LF	65
464 6008	REC PIPE (CL III)(36 IN)	LF	378
465 6024	INLET (COMPL)(PCO)(5FT)	EA	4
465 6013	INLET (COMPL)(PCO)(3FT)	EA	2

NOTES:

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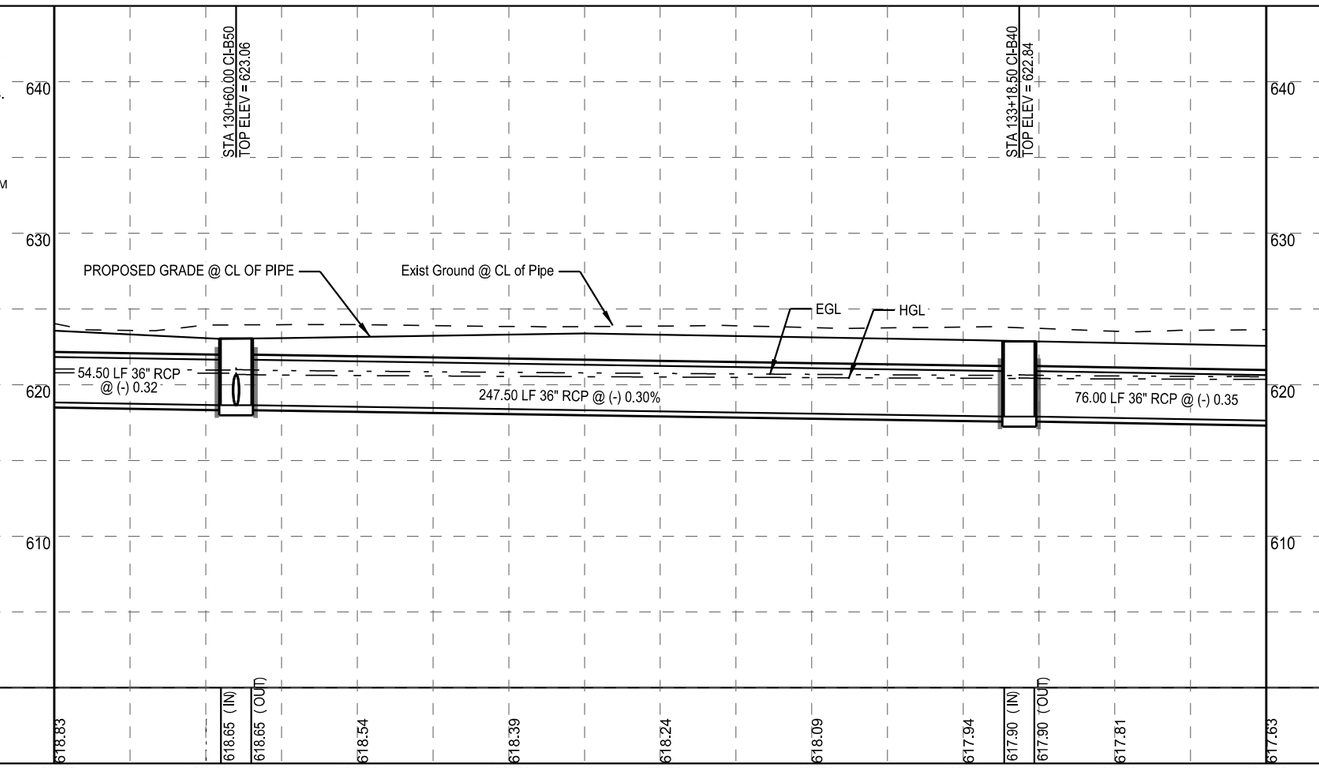

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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B"

STA 130+00.00 TO STA 134+00.00

SHEET 3 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	138

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
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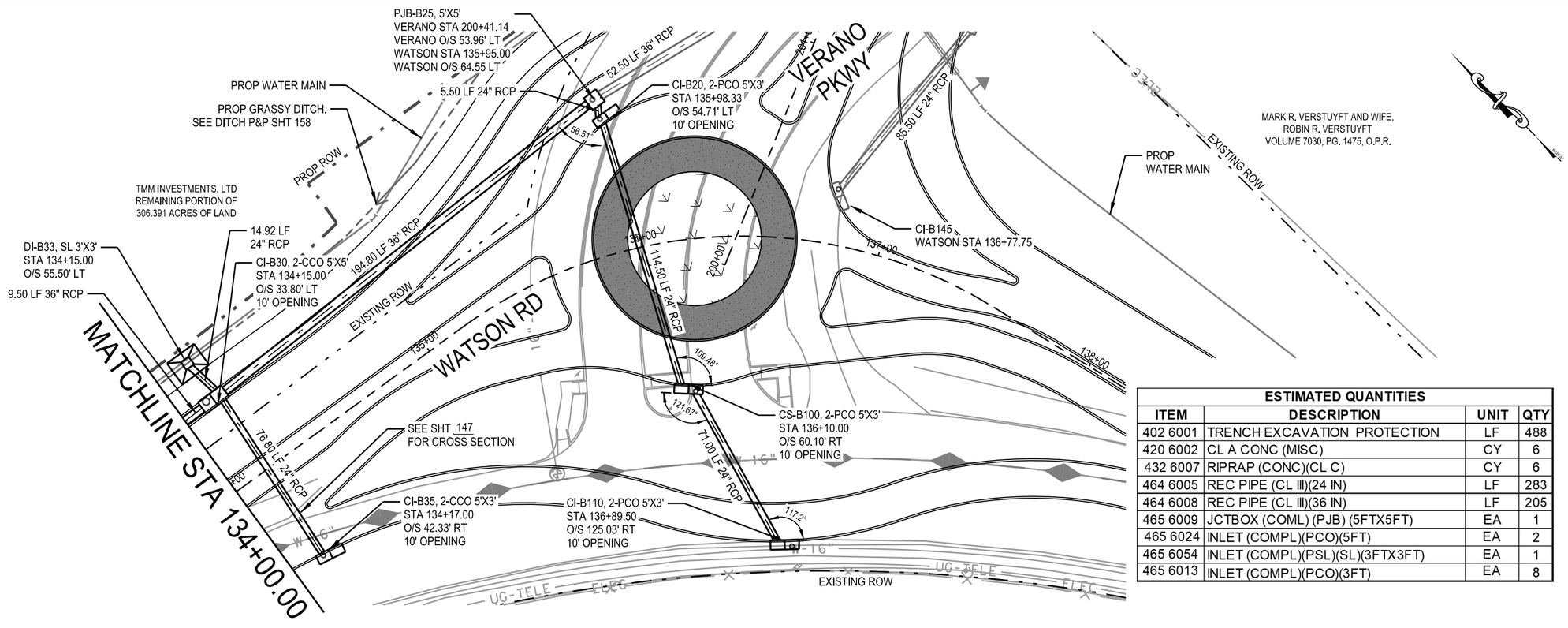

PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE

- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT
- T — TELEPHONE PEDESTAL
- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
402 6001	TRENCH EXCAVATION PROTECTION	LF	488
420 6002	CL A CONC (MISC)	CY	6
432 6007	RIPRAP (CONC)(CL C)	CY	6
464 6005	REC PIPE (CL III)(24 IN)	LF	283
464 6008	REC PIPE (CL III)(36 IN)	LF	205
465 6009	JCTBOX (COML) (PJB) (5FTX5FT)	EA	1
465 6024	INLET (COMPL)(PCO)(5FT)	EA	2
465 6054	INLET (COMPL)(PSL)(SL)(3FTX3FT)	EA	1
465 6013	INLET (COMPL)(PCO)(3FT)	EA	8

NOTES:

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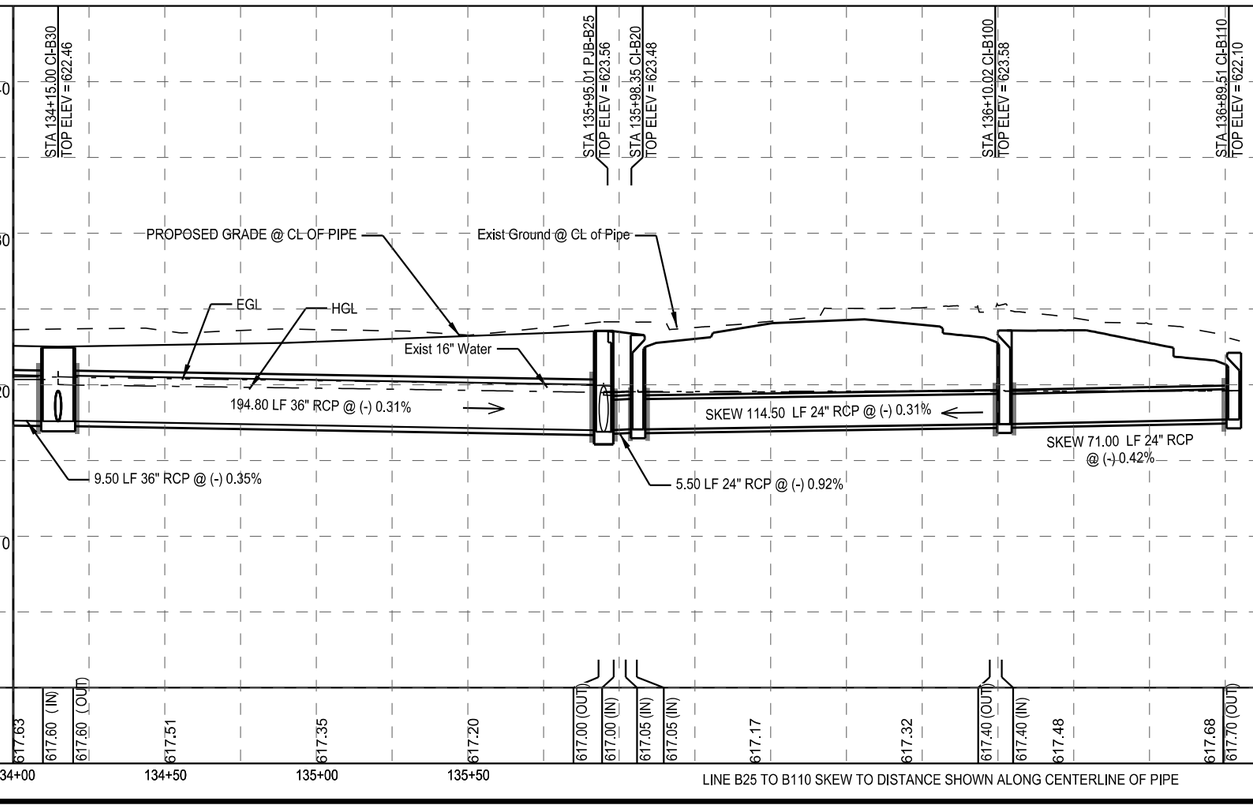

NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
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25 12.5 0 25 50 75
1" = 50'
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STATE OF TEXAS
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6/24/2020

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WATSON ROAD

DRAINGAE
PLAN AND PROFILE
STORM SYSTEM "B"
STA 134+00.00 TO STA 139+00.00

SHEET 4 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	139

STATE	DIST.	COUNTY
TX	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:50
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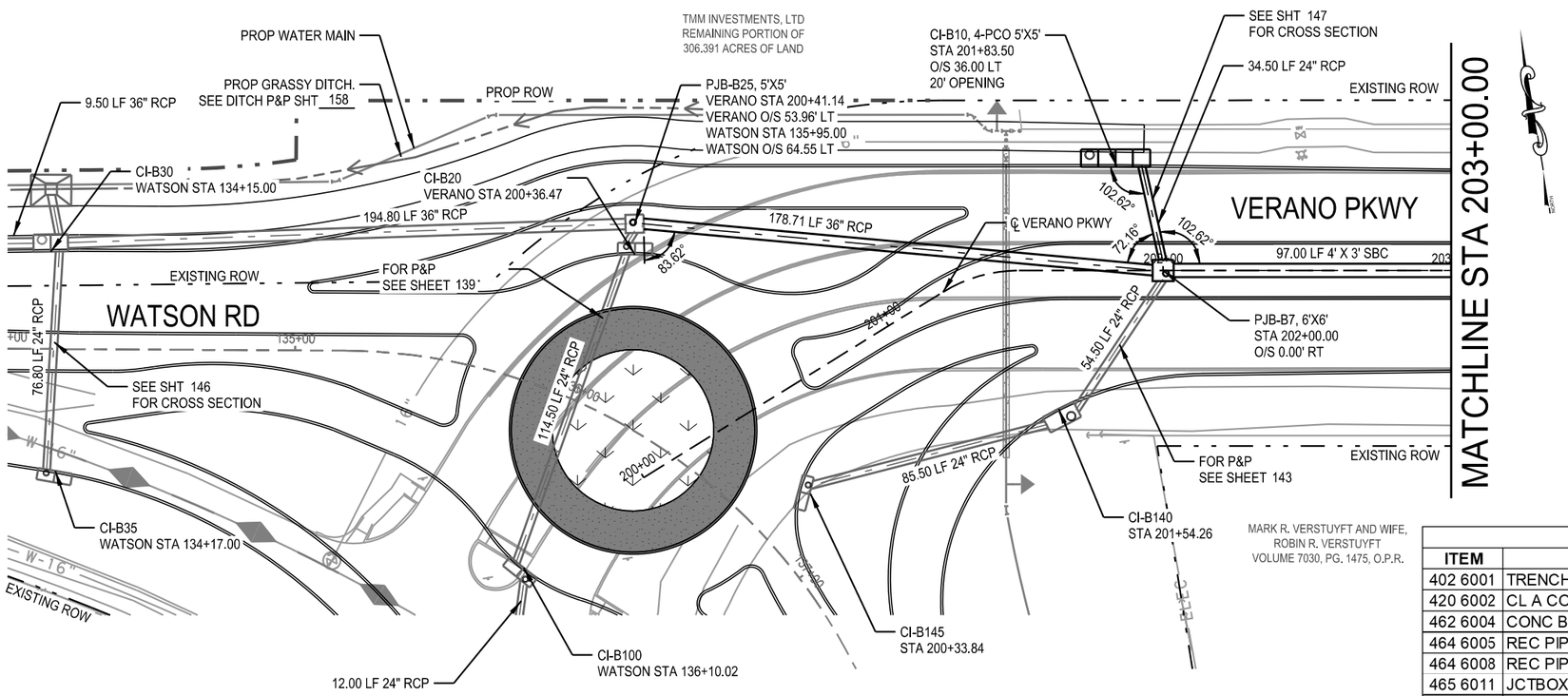

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PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
402 6001	TRENCH EXCAVATION PROTECTION	LF	311
420 6002	CL A CONC (MISC)	CY	3
462 6004	CONC BOX CULV (4 FT X 3 FT)	LF	97
464 6005	REC PIPE (CL III)(24 IN)	LF	35
464 6008	REC PIPE (CL III)(36 IN)	LF	179
465 6011	JCTBOX (COML) (PJB) (6FTX6FT)	EA	1
465 6024	INLET (COMPL)(PCO)(5FT)	EA	4

NOTES:

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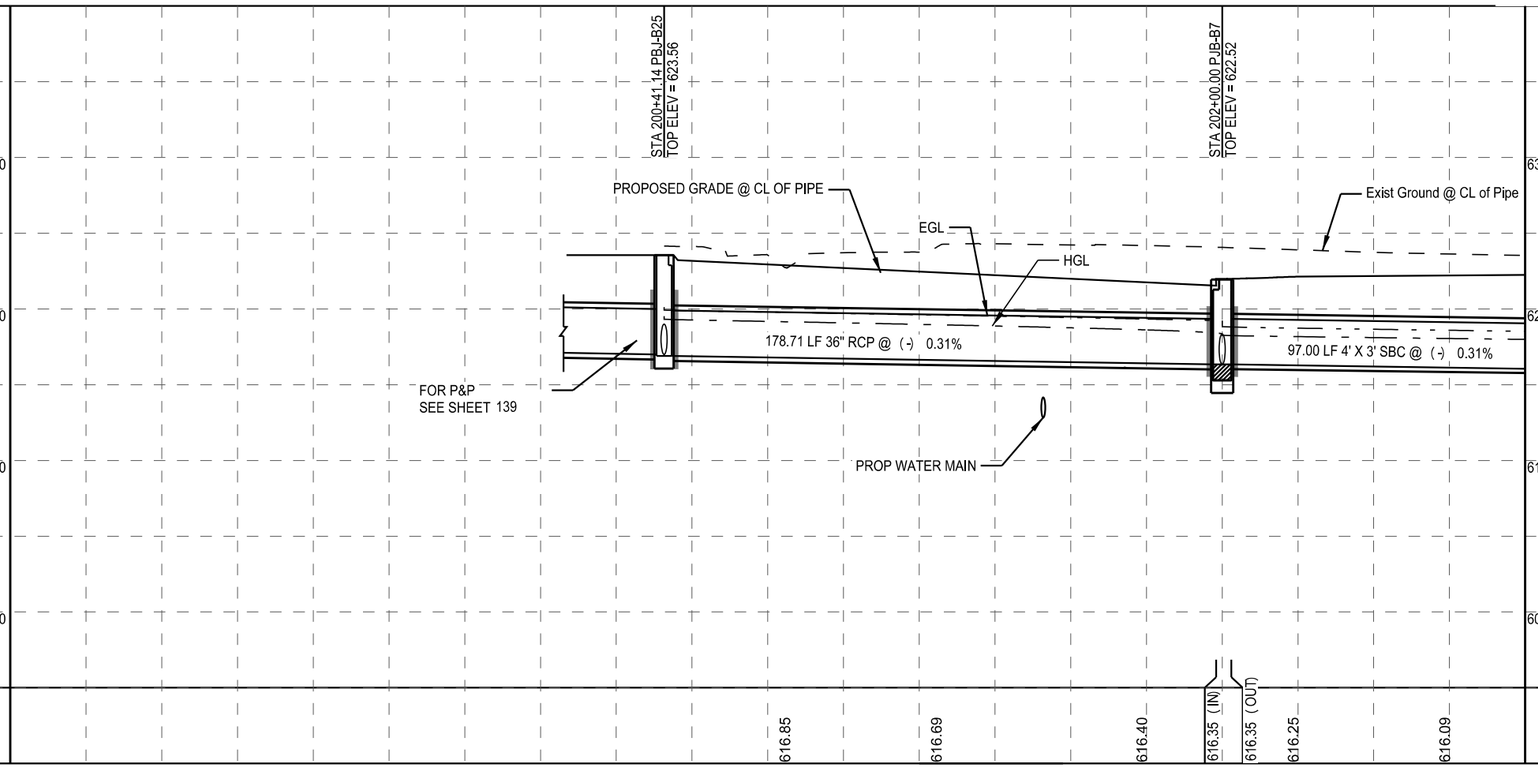

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(IN FEET)
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1" = 50'
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STATE OF TEXAS
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6/24/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B" - VERANO LEFT

VERANO STA 200+00.00 TO STA 203+00.00

SHEET 5 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	140

STATE	DIST.	COUNTY
TX	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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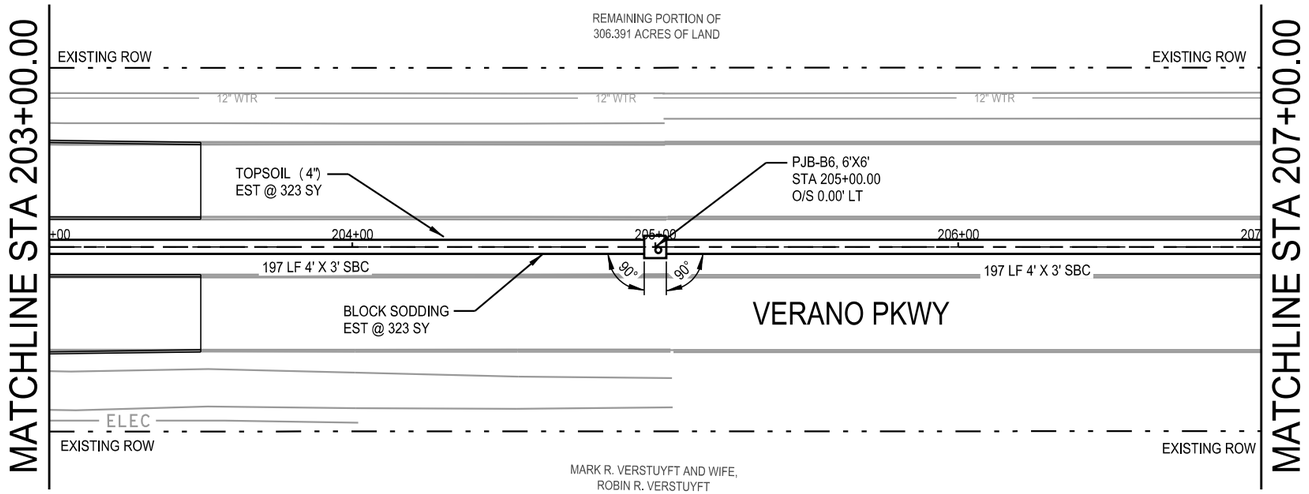

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PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
160 6003	FURNISHING AND PLACING TOPSOIL(4")	SY	323
162 6002	BLOCK SODDING	SY	323
402 6001	TRENCH EXCAVATION PROTECTION	LF	394
420 6002	CL A CONC (MISC)	CY	2
462 6004	CONC BOX CULV (4 FT X 3 FT)	LF	394
465 6009	JCTBOX (COML) (PJB) (6FTX6FT)	EA	1

NOTES:

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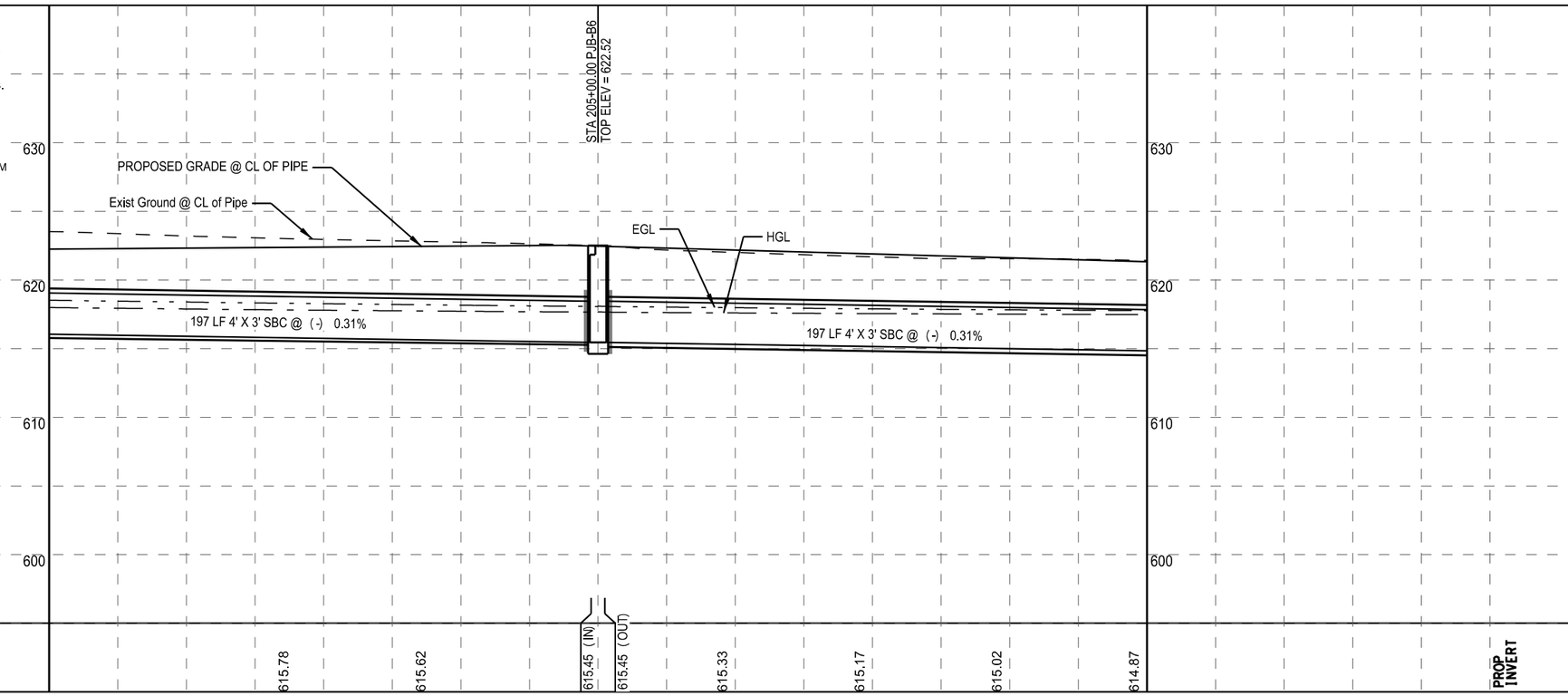

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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

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6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B" - VERANO LEFT
VERANO STA 203+00.00 TO STA 207+00.00

SHEET 6 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	141

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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PLOTTED SCALE: 1:50
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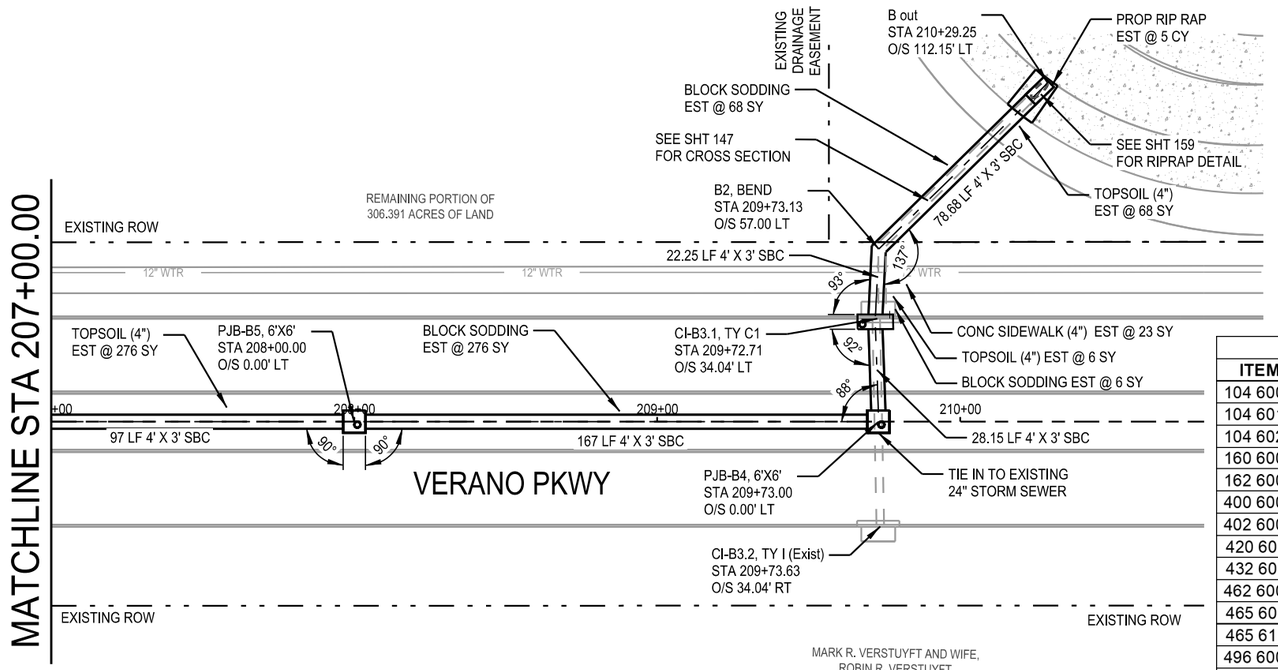

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- EJB — ELECTRIC JUNCTION BOX
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PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
104 6009	REMOVING CONC (RIPRAP)	SY	16
104 6015	REMOVING CONC (SIDEWALKS)	SY	23
104 6021	REMOVING CONC (CURB)	LF	40
160 6003	FURNISHING AND PLACING TOPSOIL(4")	SY	350
162 6002	BLOCK SODDING	SY	350
400 6008	CUT & RESTORE ASPH PAVING	SY	35
402 6001	TRENCH EXCAVATION PROTECTION	LF	393
420 6002	CL A CONC (MISC)	CY	5
432 6007	RIPRAP (CONC)(CL C)	CY	6
462 6004	CONC BOX CULV (4 FT X 3 FT)	LF	393
465 6011	JCT BOX (COML) (PJB) (6FTX6FT)	EA	2
465 6176	INLET (COMPL)(CURB)(TY C1)	EA	1
496 6002	REMOV STR (INLET)	EA	1
497 6007	REMOV STR (PIPE)	LF	135
529 6001	CONC CURB (TY I)	LF	40
531 6001	CONC SIDEWALKS (4")	SY	23

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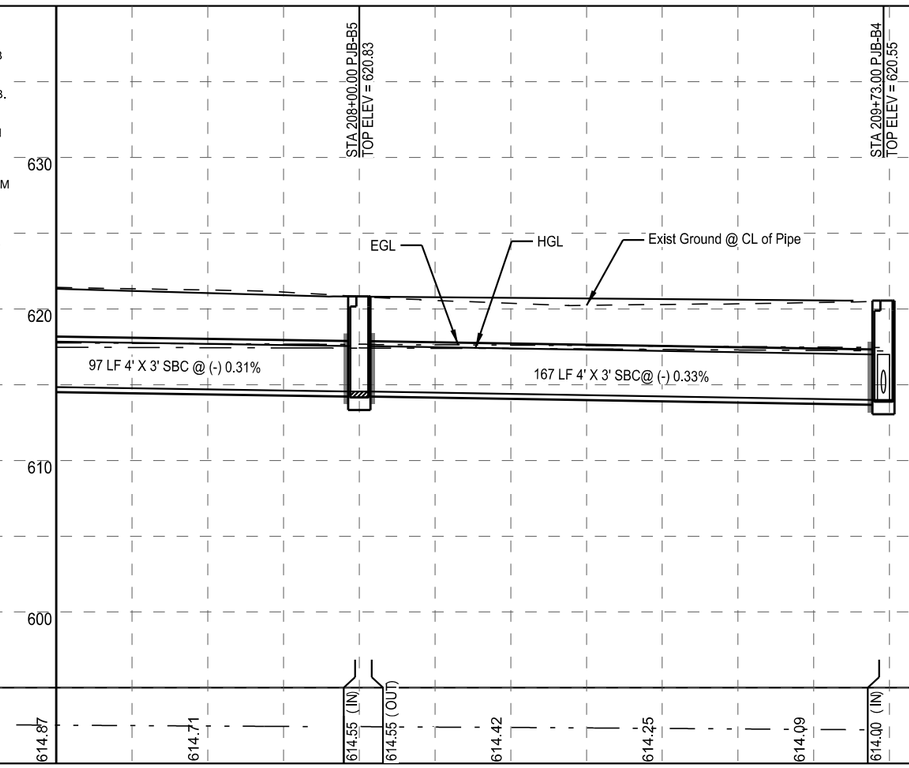

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GRAPHIC SCALE (IN FEET)
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STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

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WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B" - VERANO LEFT
VERANO STA 207+00.00 TO STA 210+50.00

SHEET 7 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	142

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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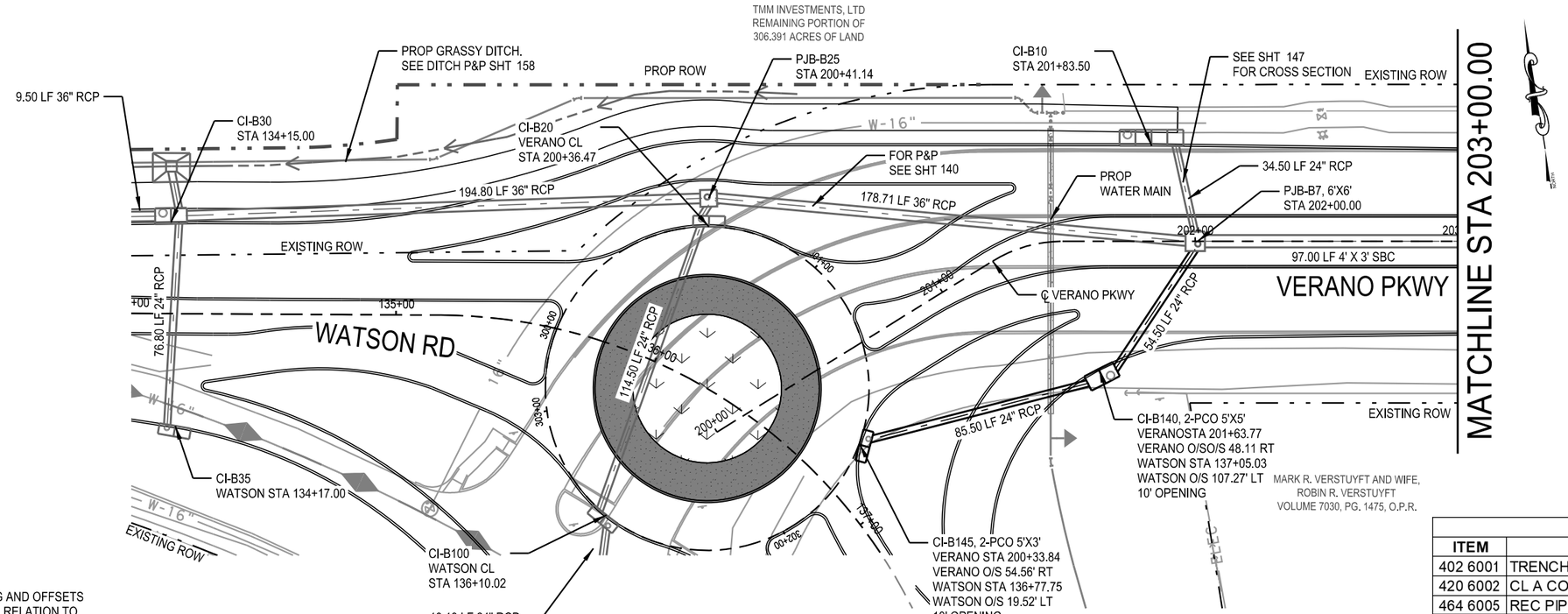

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PROFILE VIEW LEGEND

- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
402 6001	TRENCH EXCAVATION PROTECTION	LF	140
420 6002	CL A CONC (MISC)	CY	2
464 6005	REC PIPE (CL III)(24 IN)	LF	140
465 6024	INLET (COMPL)(PCO)(5FT)	EA	2
465 6013	INLET (COMPL)(PCO)(3FT)	EA	2

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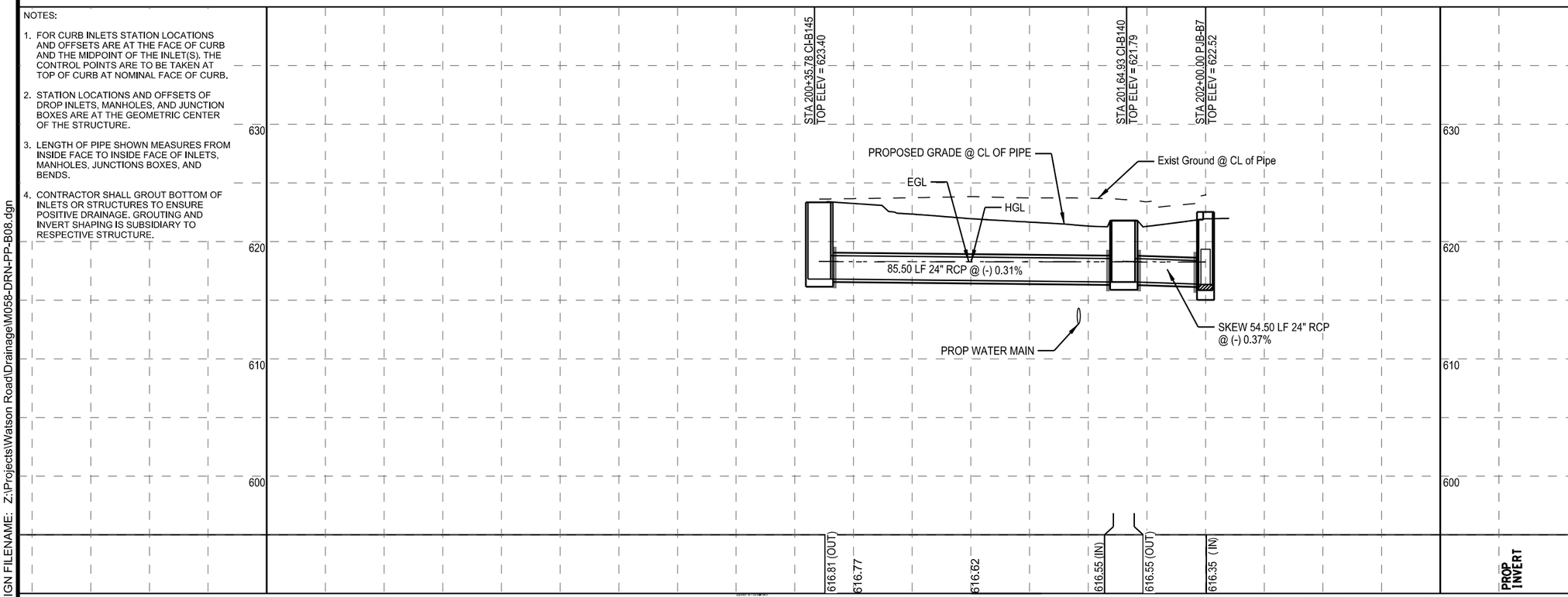

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

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6/24/2020

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(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

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CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTEM "B" - VERANO RIGHT

VERANO STA 200+00.00 TO STA 203+00.00

SHEET 8 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	143

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
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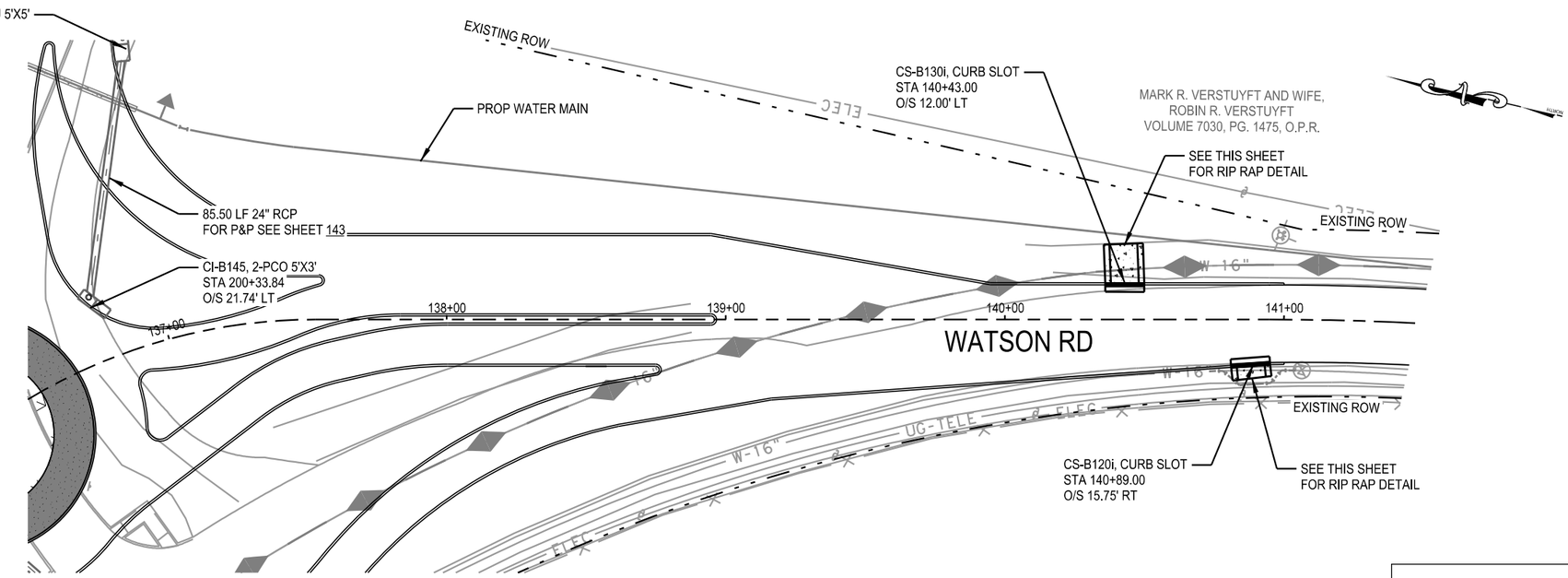


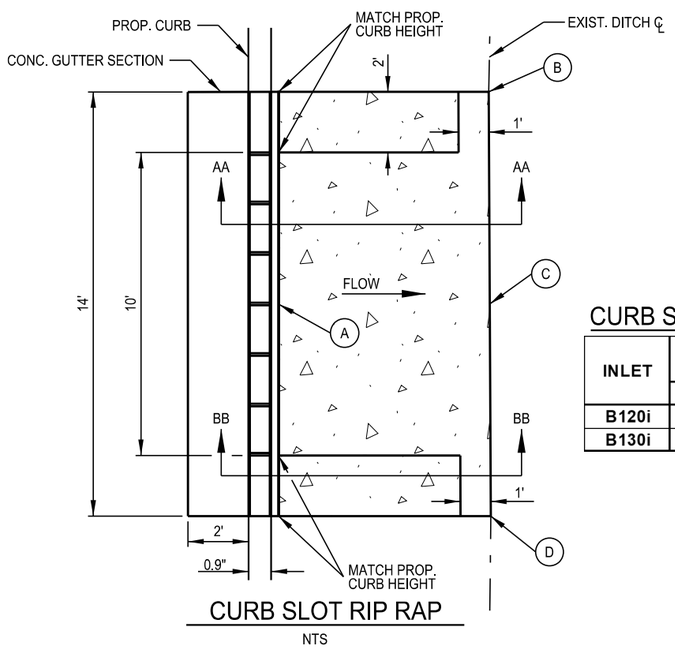
NOTE: ALL STATIONING AND OFFSETS ON THIS SHEET ARE IN RELATION TO WATSON ROAD HORIZONTAL ALIGNMENT UNLESS OTHERWISE NOTED.

PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	PJB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE

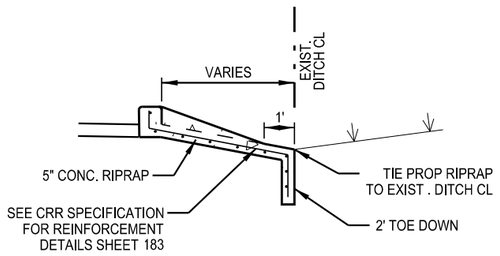
- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT
- T — TELEPHONE PEDESTAL
- EJB — ELECTRIC JUNCTION BOX
- PBX — PULL BOX

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QTY
432 6007	RIPRAP (CONC)(CL C)	CY	10
465 6338	INLET (COMP)(TY ARMOR CURB SLOT)	EA	2

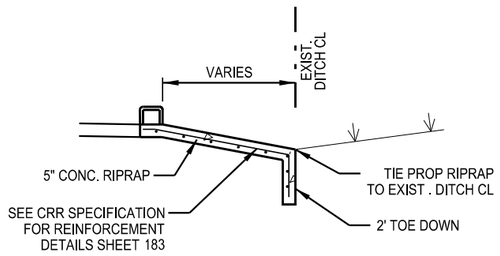


CURB SLOT RIP RAP

NTS



SECTION AA-AA



SECTION BB-BB

CURB SLOT RIP RAP TABLE

INLET	INLET STA	INLET ELEV. AT TOP OF CURB	A			B			C			D		
			STA	O/S	ELEV.	STA	O/S	ELEV.	STA	O/S	ELEV.	STA	O/S	ELEV.
	WATSON RD CL	FT.		FT.	FT.		FT.	FT.		FT.	FT.		FT.	FT.
B120i	140+88.00	623.14	140+88.00	15.75 RT	622.56	140+95.53	20.30 RT	621.11	140+88.56	21.08 RT	621.28	140+81.61	21.86 RT	621.45
B130i	140+43.00	624.00	140+43.00	12.00 LT	623.42	140+35.46	26.77 LT	622.36	140+43.45	27.04 LT	622.3	140+49.44	27.31 LT	622.24

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DRAINAGE
PLAN AND PROFILE
STORM SYSTME "B"
STA 139+00.00 TO END OF PROJECT

SHEET 9 OF 9

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	144

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
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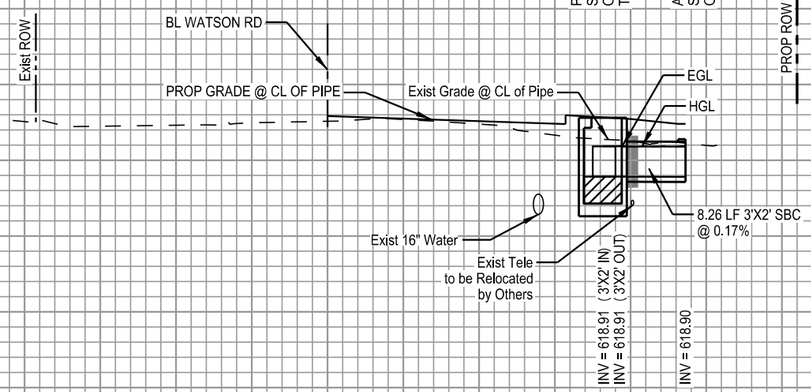
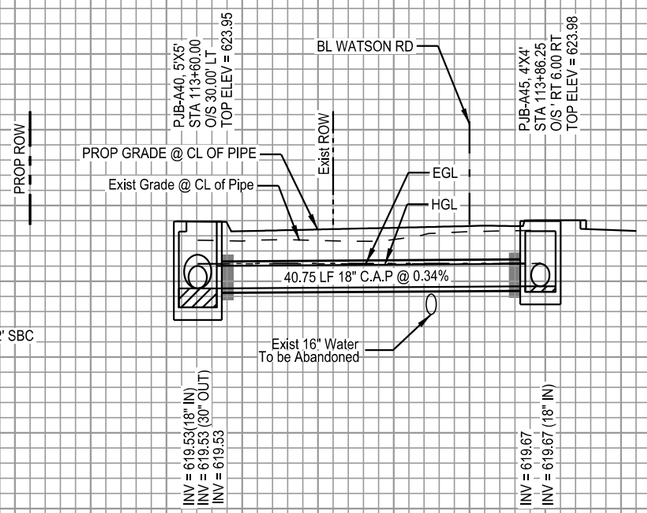
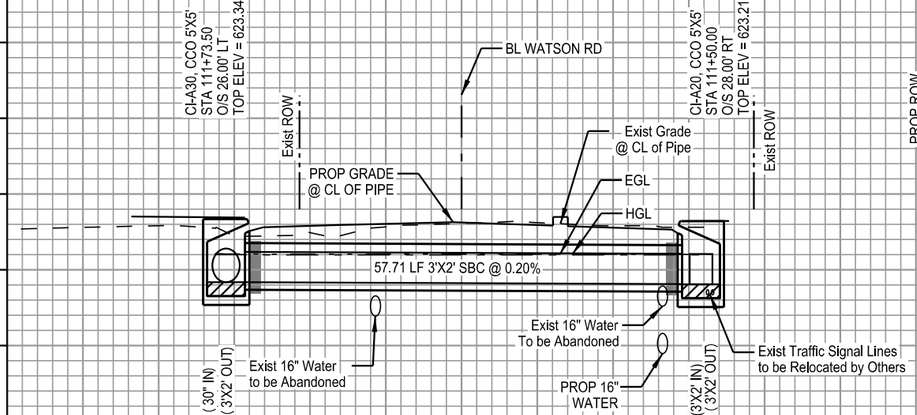


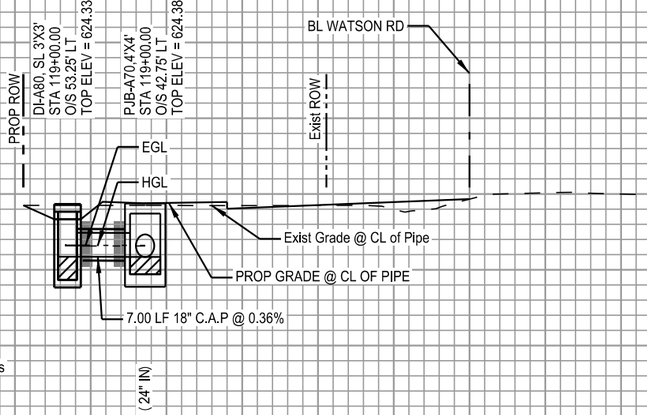
STA 110+72.67



STA 113+86.23



STA 111+50.00



STA 119+00.00

LINE A30 TO A20 SKEW TO DISTANCE SHOWN ALONG CENTERLINE OF PIPE

SCALE

HORZ: 1" = 20'
VERT: 1" = 10'

LEGEND

CI = CURB INLET
DI = DROP INLET
PJB = JUNCTION BOX
CAP = CONCRETE ARCH PIPE
INVERT SHAPING
CONCRETE COLLAR SEE DETAIL ON SHEET 160

NOTES:

1.STATION LOCATIONS AND OFFSETS OF CURB INLETS ARE AT THE FACE OF CURB AND THE MIDPOINT OF THE INLET(S).

2.STATION LOCATIONS AND OFFSETS OF DROP INLETS, MANHOLES, AND JUNCTION BOXES ARE AT THE GEOMETRIC CENTER OF THE STRUCTURE.

3.LENGTH OF PIPE SHOWN MEASURES FROM INSIDE FACE TO INSIDE FACE OF INLETS, MANHOLES, JUNCTIONS BOXES, AND BENDS.

4. CONTRACTOR SHALL GROUT BOTTOM OF INLETS OR STRUCTURES TO ENSURE POSITIVE DRAINAGE. GROUTING AND INVERT SHAPING IS SUBSIDIARY TO RESPECTIVE STRUCTURE.

5. THE LOCATION AND DEPTHS OF EXISTING UTILITIES, INCLUDING SERVICES LATERALS, SHOWN ON THE PLANS ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR 48 HOURS PRIOR TO CONSTRUCTION AND IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
10 5 0 10 20 30
1" = 20'

STATE OF TEXAS
CARLOS LUNA III
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6/24/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

STORM SYSTEM "A" INLET CROSS SECTIONS

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	145

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:20
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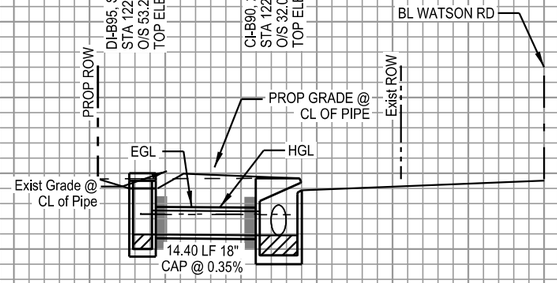

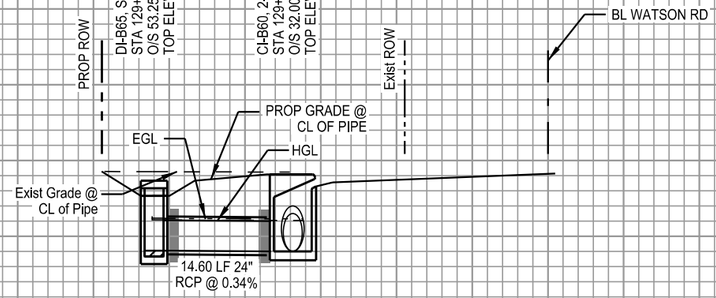

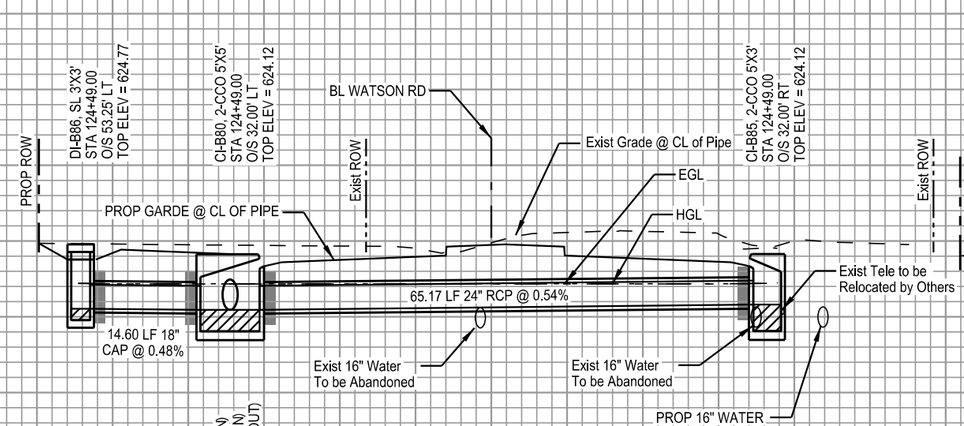

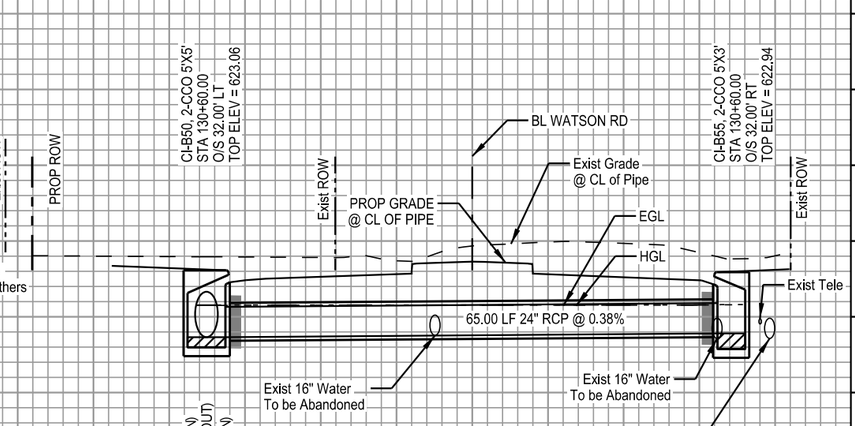

SCALE

HORZ: 1" = 20'
VERT: 1" = 10'

LEGEND

CI = CURB INLET
DI = DROP INLET
PJB = JUNCTION BOX
CAP = CONCRETE ARCH PIPE
INVERT SHAPING
CONCRETE COLLAR SEE DETAIL ON SHEET 160

NOTES:

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NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
10 5 0 10 20 30
1" = 20'

STATE OF TEXAS
CARLOS LUNA III
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LICENSED PROFESSIONAL ENGINEER

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

STORM SYSTEM "B"
INLET CROSS SECTIONS

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		146
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:20
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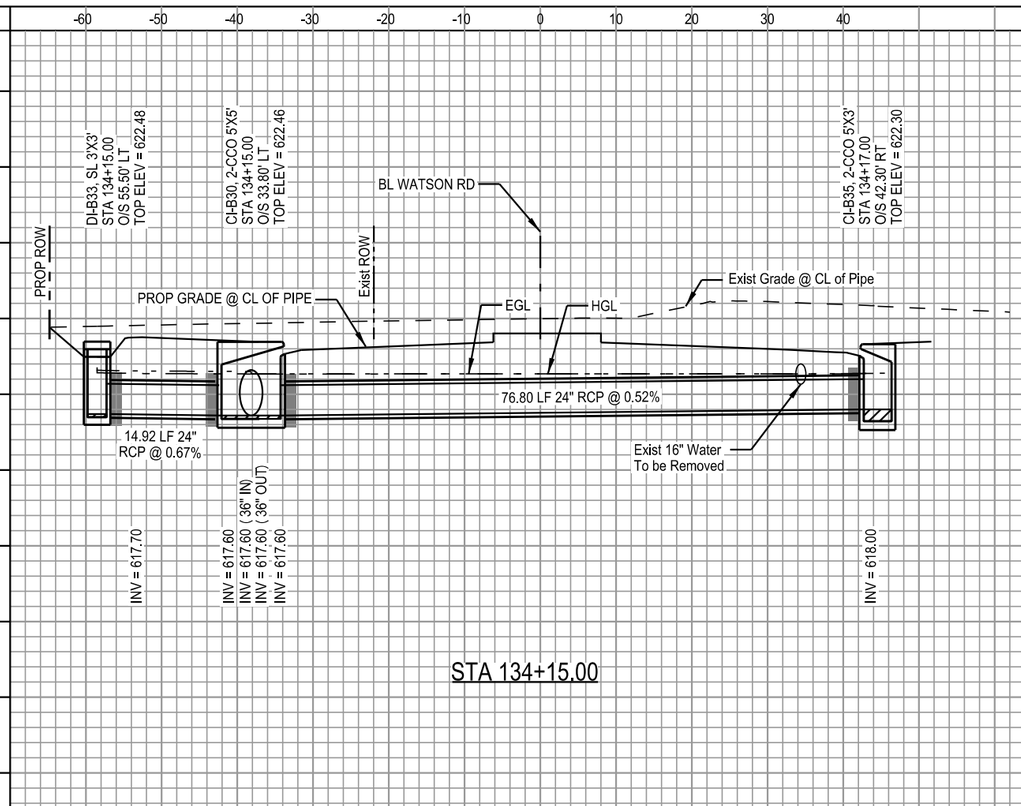

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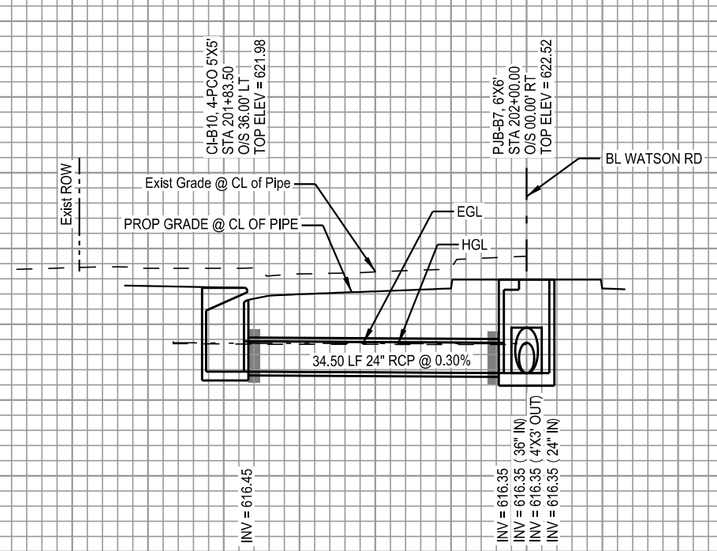

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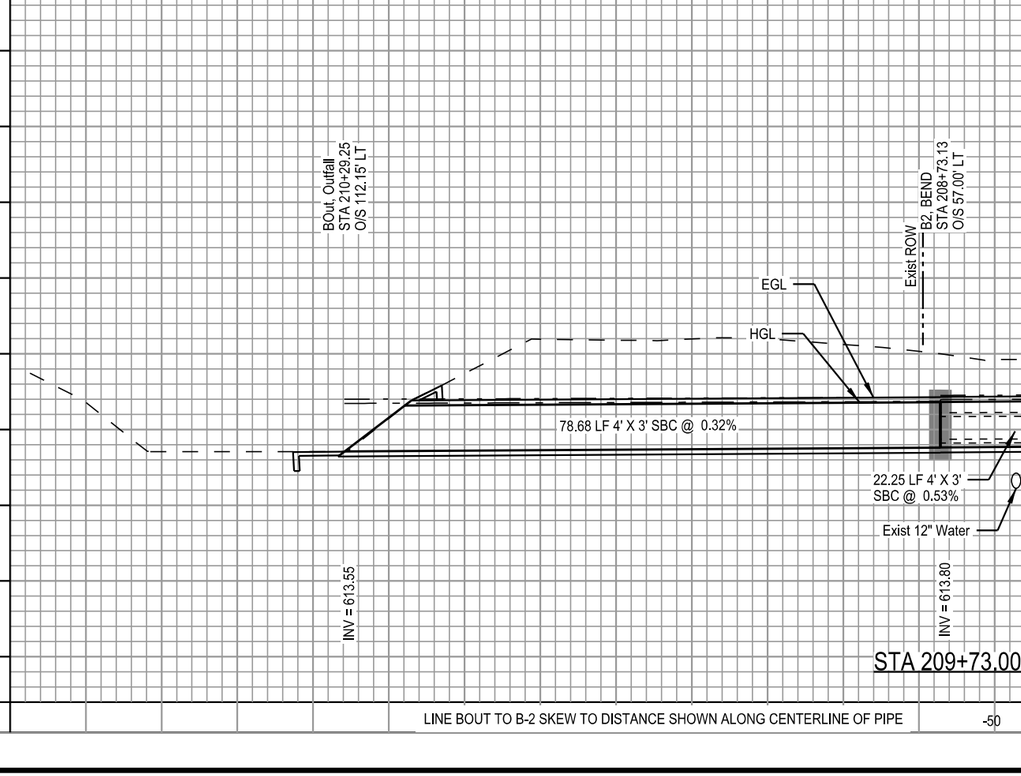

STA 209+73.00 (VERANO CL)

LINE BOUT TO B-2 SKEW TO DISTANCE SHOWN ALONG CENTERLINE OF PIPE

SCALE

HORZ: 1" = 20'
VERT: 1" = 10'

LEGEND

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PJB = JUNCTION BOX
CAP = CONCRETE ARCH PIPE
INVERT SHAPING
CONCRETE COLLAR SEE DETAIL ON SHEET 160

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-	-	-	-

GRAPHIC SCALE
(IN FEET)
10 5 0 10 20 30
1" = 20'

STATE OF TEXAS
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WATSON ROAD

STORM SYSTEM "B"
INLET CROSS SECTIONS

SHEET 2 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		147
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:20
PEN TABLE: M058_pentbl.tbl
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PLOTTED ON: 6/24/2020 @ 11:37:56 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Xsec\M058-DRN-XSEC-03.dgn

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 (1) Height of Wingwall (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 (C.Y.)	Class "C" Conc (Curb) (2) (C.Y.)	Class "C" Conc (Wingwall) (3) (C.Y.)	Total Wingwall Area (S.F.)
Sta 110+64.09 (LT) (UPSTREAM)	2 ~3'x 2'	3.70'	SCP-3	PW-1	0°	3:1	7"	4"	1.12'	3.71'	N/A	N/A	11.13'	7.83'	N/A	0	0.3	6.5	83
Sta 110+64.09 (RT) (UPSTREAM)	2 ~3'x 2'	3.70'	SCP-3	FW-0	0°	3:1	7"	4"	1.12'	3.46'	9.38'	5.4'	10.82'	N/A	N/A	1.9	0.3	3.0	41
Sta 110+64.09 (BOTH) (DOWNSTREAM)	3 ~3'x 2'	3.50'	SCP-3	SW-0	0°	3:1	7"	4"	0.92'	3.25'	N/A	N/A	8.75'	N/A	N/A	3.0	0.8	4.8	54

NOTES:

Skew Angle = 0° for SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standards.
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 shall 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.

U = Box Culvert Wall Thickness. Dimension can be found on the applicable Box Culvert Standard.

C = Curb Height.

See applicable wing or end treatment standards 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 S.F. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) The wall heights shown will be rounded to the nearest Foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the RAC standard, quantities shown must be increased by a factor of 2. If Class "S" concrete is required for the top slab of the culvert, the curb concrete shall also be Class "S". Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wing, footing, culvert toewall (if any), anchor toewall (if any) and wingwall toewall. Riprap apron, culvert and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor shall have 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 shall be 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 97 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 shall be signed, sealed, and dated by a licensed Professional Engineer.

STATE OF TEXAS
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125042
LICENSED PROFESSIONAL ENGINEER

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6/24/2020

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

FILE: bcsstde1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				148

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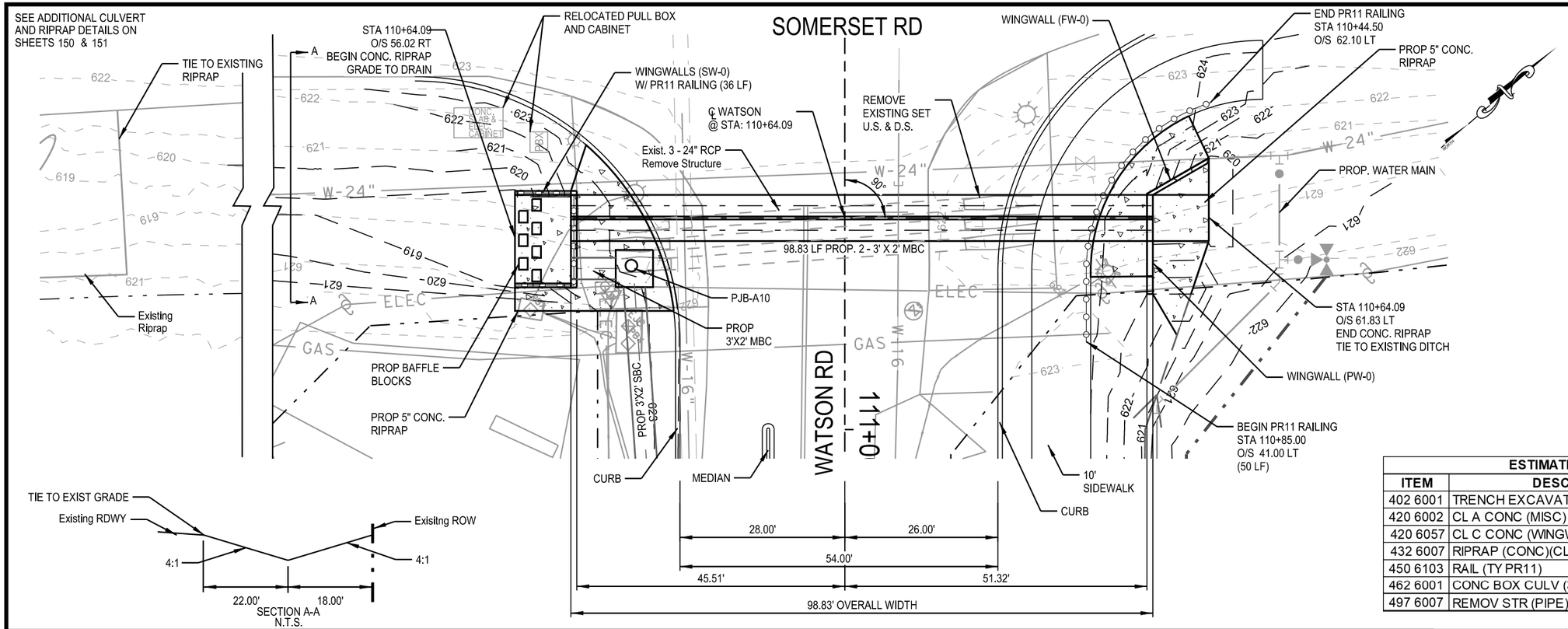
DATE:
FILE:



PLAN VIEW LEGEND

PJB = JUNCTION BOX

- PROPOSED STRUCTURE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROP 1' CONTOUR
- EXIST 1' CONTOUR
- EXIST FEATURES
- UNDERGROUND TELE
- GAS LINE
- WATER LINE
- OVERHEAD ELECTRIC
- UTILITY POLE
- WATER VALVE
- FIRE HYDRANT
- TELEPHONE PEDESTAL
- ELECTRIC JUNCTION BOX
- PULL BOX

PROFILE VIEW LEGEND

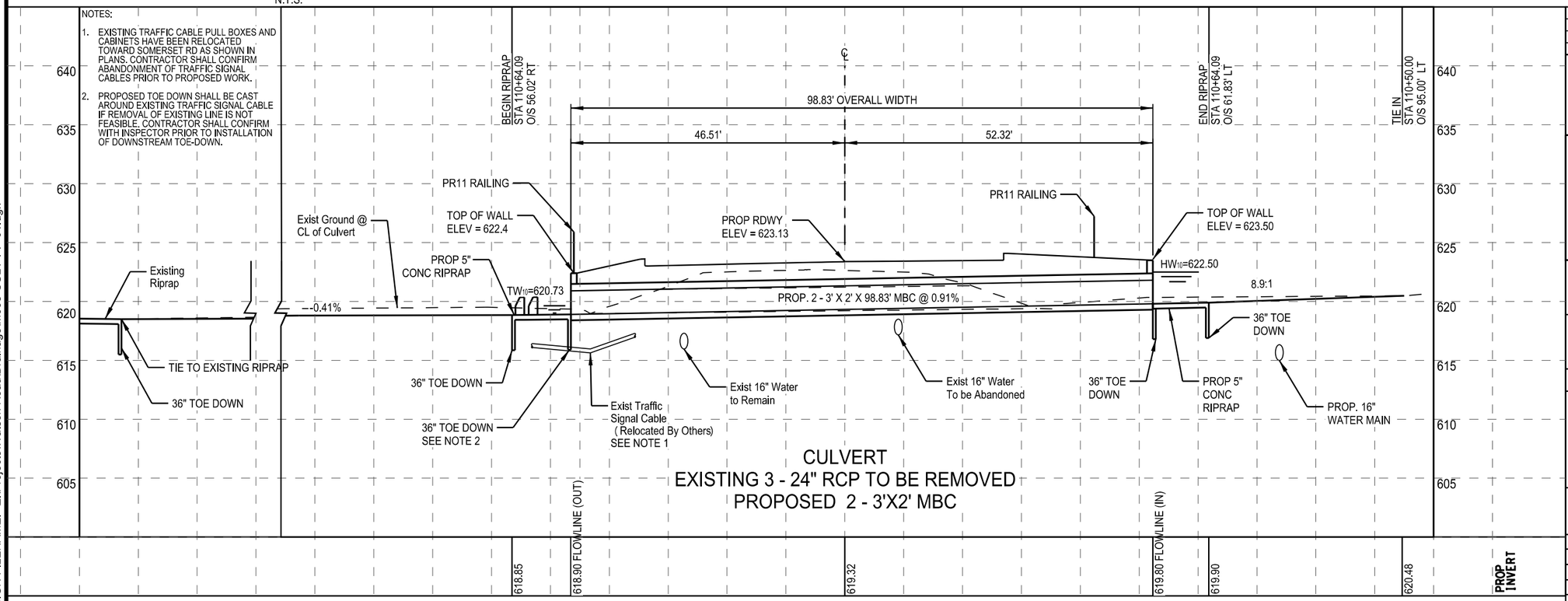
- 10 YR EGL
- 10 YR HGL
- EXISTING GROUND @ CL OF PIPE
- PROPOSED GRADE @ CL OF PIPE
- CONCRETE COLLAR SEE DETAIL ON SHEET 160

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
402 6001	TRENCH EXCAVATION PROTECTION	LF	198
420 6002	CL A CONC (MISC)	CY	1
420 6057	CL C CONC (WINGWALLS)	CY	18
432 6007	RIPRAP (CONC)(CL C)	CY	43
450 6103	RAIL (TY PR11)	LF	86
462 6001	CONC BOX CULV (3 FT X 2 FT)	LF	198
497 6007	REMOV STR (PIPE)	LF	225

NOTES:

1. EXISTING TRAFFIC CABLE PULL BOXES AND CABINETS HAVE BEEN RELOCATED TOWARD SOMERSET RD AS SHOWN IN PLANS. CONTRACTOR SHALL CONFIRM ABANDONMENT OF TRAFFIC SIGNAL CABLES PRIOR TO PROPOSED WORK.
2. PROPOSED TOE DOWN SHALL BE CAST AROUND EXISTING TRAFFIC SIGNAL CABLE IF REMOVAL OF EXISTING LINE IS NOT FEASIBLE. CONTRACTOR SHALL CONFIRM WITH INSPECTOR PRIOR TO INSTALLATION OF DOWNSTREAM TOE-DOWN.



CULVERT
EXISTING 3 - 24" RCP TO BE REMOVED
PROPOSED 2 - 3'X2' MBC

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)

10 5 0 10 20 30

1" = 20'

Vert: 1" = 10'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
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TBPE No.: F-333
TBPLS No.: 10194506

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
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TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

WATSON ROAD
CULVERT PLAN & PROFILE

STA 110+64.09

SHEET 1 OF 1

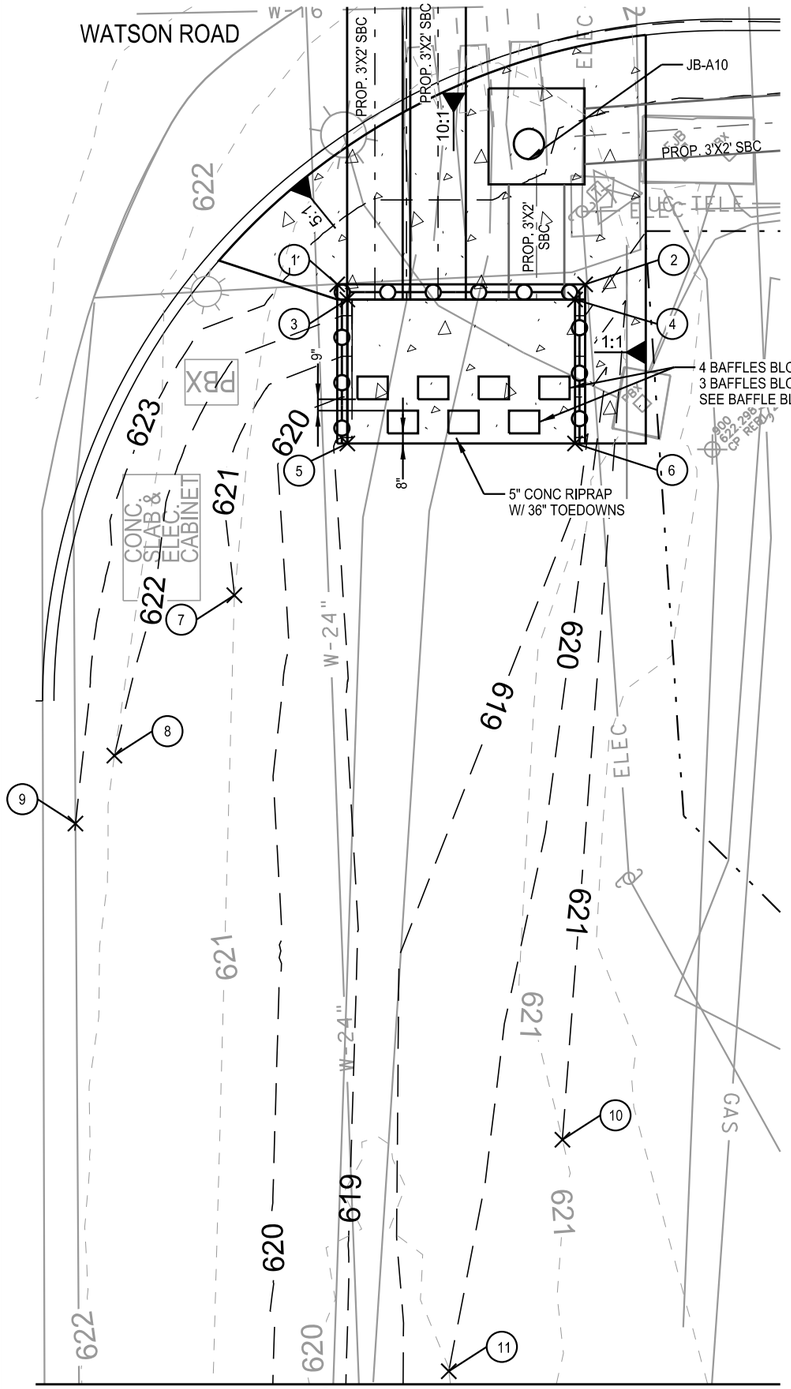
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	149

STATE	DIST.	COUNTY
TX	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

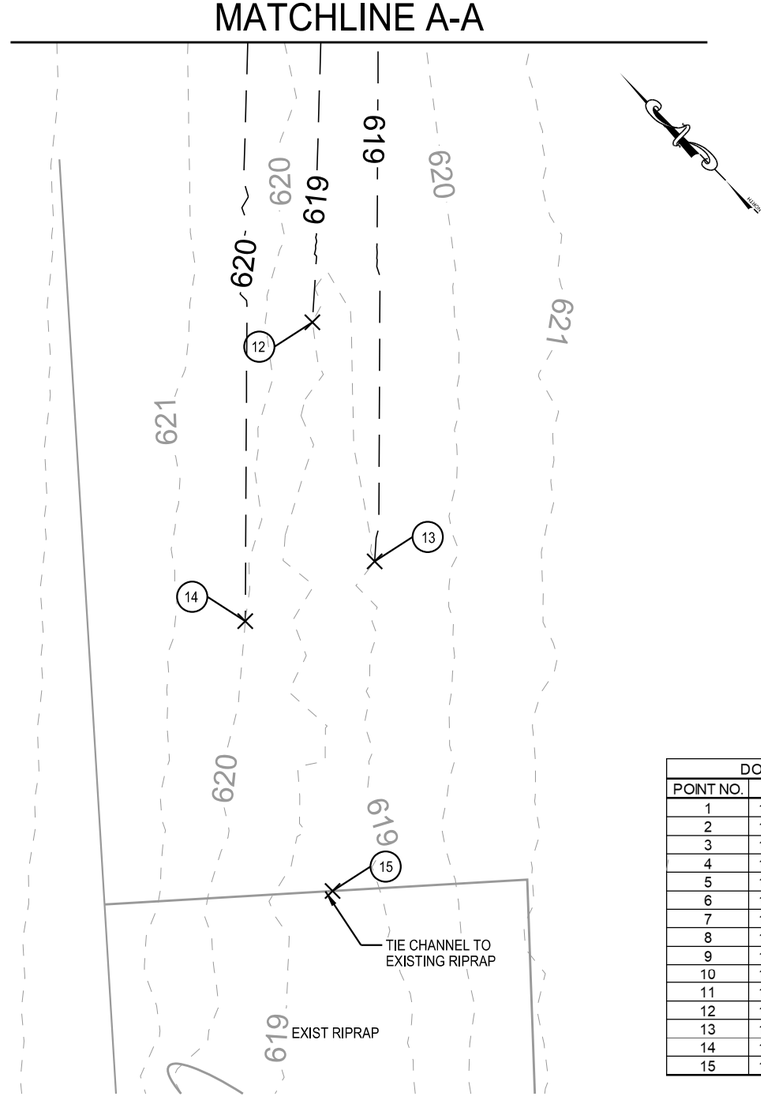
PLOTTED BY: ivette
PLOTTED SCALE: 1:20
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:15 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-CULV-PP-01.dgn

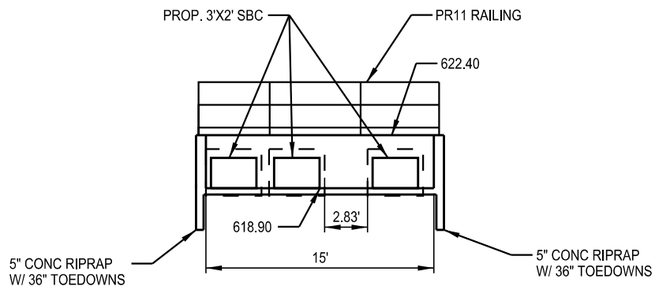


MATCHLINE A-A

WATSON RD CULVERT STA 110+64.09
DOWNSTREAM RIPRAP DETAIL
TYPE SW-0 WINGWALL W/ HANDRAIL TYPE PR11

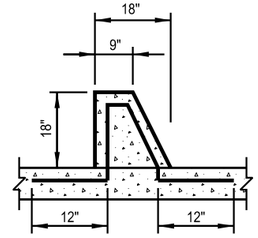
SCALE: 1" = 10'



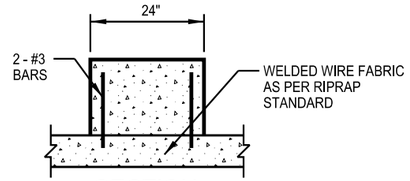


WATSON RD CULVERT STA 110+64.09
HEADWALL ELEVATION DOWNSTREAM
TYPE SW-0 WINGWALL W/ HANDRAIL TYPE PR11

SCALE: 1" = 10'



ELEVATION



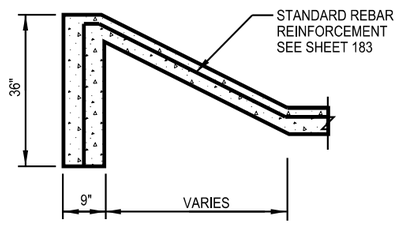
SECTION

BAFFLE BLOCKS

NOT TO SCALE

NOTES:
1. ALL BARS SHALL HAVE MINIMUM 2" COVER
2. EACH BAFFLE IN THE OPPOSITE ROW OF THE NEXT BAFFLE SHALL BE ALIGNED SUCH THAT THEY WOULD TOUCH ENDS IF IT WAS ONE CONTINUOUS ROW.

DOWNSTREAM ELEVATIONS			
POINT NO.	STATION	O/S	ELEVATION
1	110+59.50	45.51 RT	622.40
2	110+75.90	45.51 RT	622.40
3	110+60.20	46.51 RT	618.90
4	110+75.20	46.51 RT	618.90
5	110+60.20	56.02 RT	618.85
6	110+75.20	56.02 RT	618.85
7	110+52.73	66.00 RT	621.00
8	110+44.80	76.60 RT	622.00
9	110+42.24	81.00 RT	623.00
10	110+74.97	101.97 RT	621.00
11	110+66.88	117.25 RT	620.00
12	110+59.53	136.60 RT	619.00
13	110+63.64	152.38 RT	619.00
14	110+55.00	156.50 RT	620.00
15	110+60.86	174.15 RT	618.50



TOEDOWN

NOT TO SCALE

NOTE: ALL BARS SHALL HAVE MINIMUM 2" COVER

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
30 15 0 5 10 15
1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

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TBPLS No.: 10194506

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

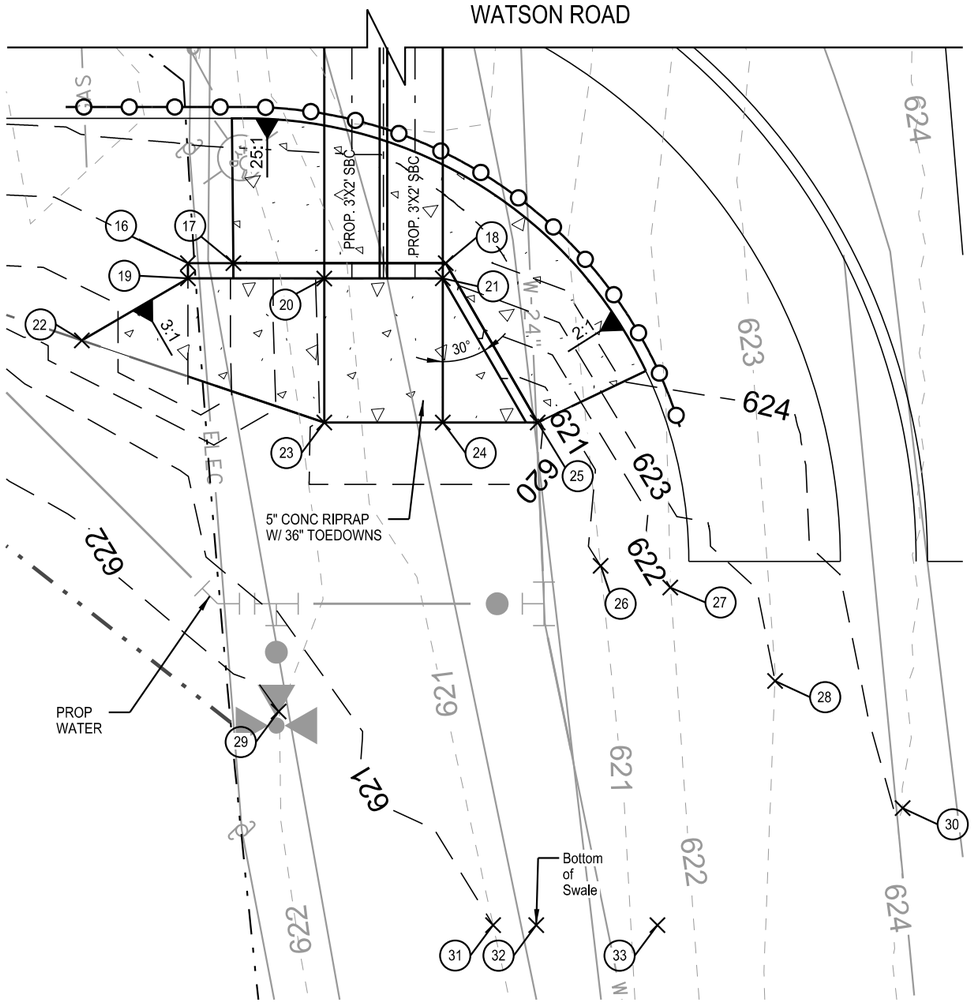
WATSON ROAD
DOWNSTREAM RIPRAP
CULVERT DETAILS
STA 110+64.09

SHEET 1 OF 2

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	150

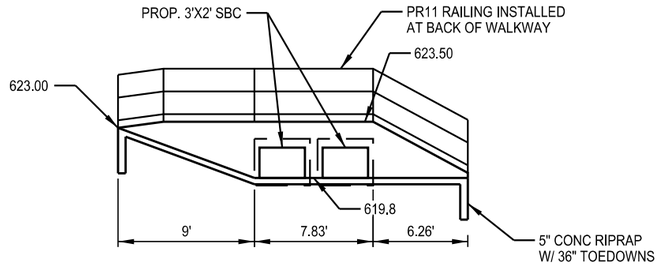
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:10
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:17 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-CULV-DET-01.dgn



WATSON RD CULVERT STA: 110+64.09
UPSTREAM RIPRAP DETAIL
W/ TYPE FW-0 & PW-0 WINGWALLS
W/ HANDRAIL TYPE PR11

SCALE: 1" = 10



WATSON RD CULVERT STA: 110+64.09
HEADWALL ELEVATION UPSTREAM
W/ TYPE FW-0 & PW-0 WINGWALLS
W/ HANDRAIL TYPE PR11

SCALE: 1" = 10'

UPSTREAM ELEVATIONS			
POINT NO.	STATION	O/S	ELEVATION
16	110+77.00	51.32 LT	623.00
17	110+74.00	51.32 LT	623.50
18	110+60.00	51.32 LT	623.50
19	110+77.00	52.32 LT	623.00
20	110+68.00	52.32 LT	619.80
21	110+60.00	52.32 LT	619.80
22	110+84.00	56.41 LT	620.35
23	110+68.00	61.83 LT	619.90
24	110+60.00	61.83 LT	619.90
25	110+53.90	61.83 LT	619.90
26	110+49.76	71.29 LT	621.00
27	110+45.15	72.72 LT	622.00
28	110+38.24	78.90 LT	623.00
29	110+71.00	80.90 LT	622.00
30	110+30.00	87.50 LT	624.00
31	110+56.85	98.00 LT	621.00
32	110+54.00	95.00 LT	620.46
33	110+46.00	95.00 LT	621.41

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
30 15 0 5 10 15
1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

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6/24/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

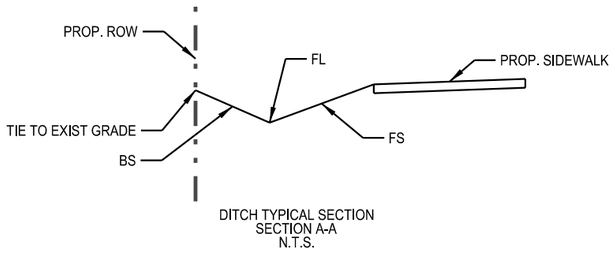
WATSON ROAD
UPSTREAM RIPRAP
CULVERT DETAILS
STA 110+64.09

SHEET 2 OF 2

 Texas Department of Transportation

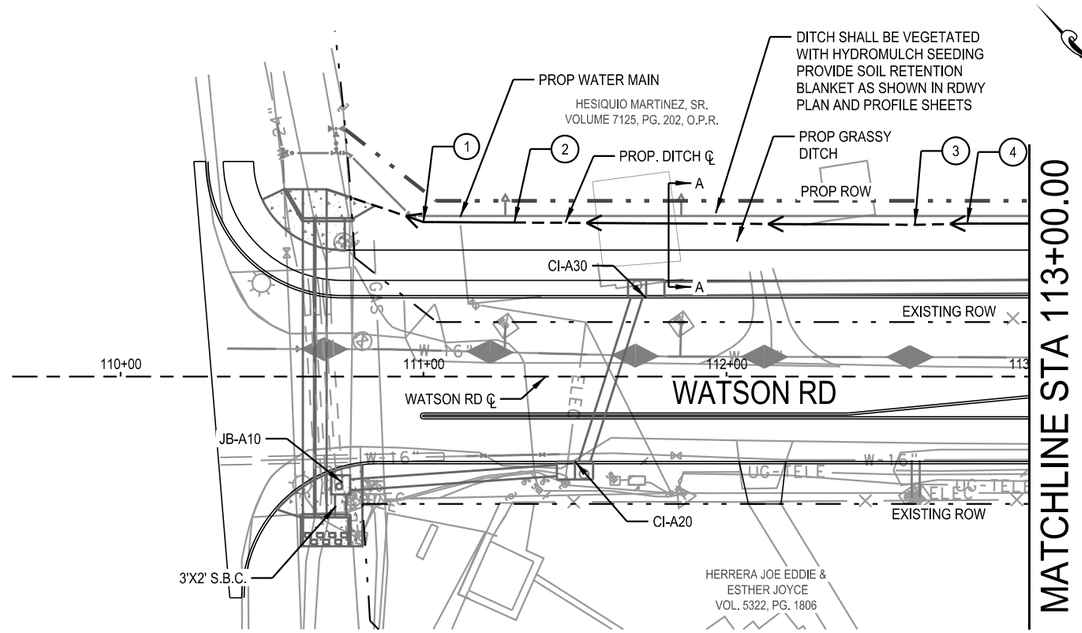
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		151
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:10
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:19 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-CULV-DET-02.dgn



DITCH TYPICAL SECTION
SECTION A-A
N.T.S.

POINT	STA	O/S LT	FS	FL	BS
1	111+00.00	51.0	3.0 : 1	620.79	4.6 : 1
2	111+30.00	50.8	3.2 : 1	620.91	6.0 : 1
3	112+62.22	50.1	3.0 : 1	621.44	6.1 : 1
4	112+79.50	50.0	3.1 : 1	621.51	5.5 : 1



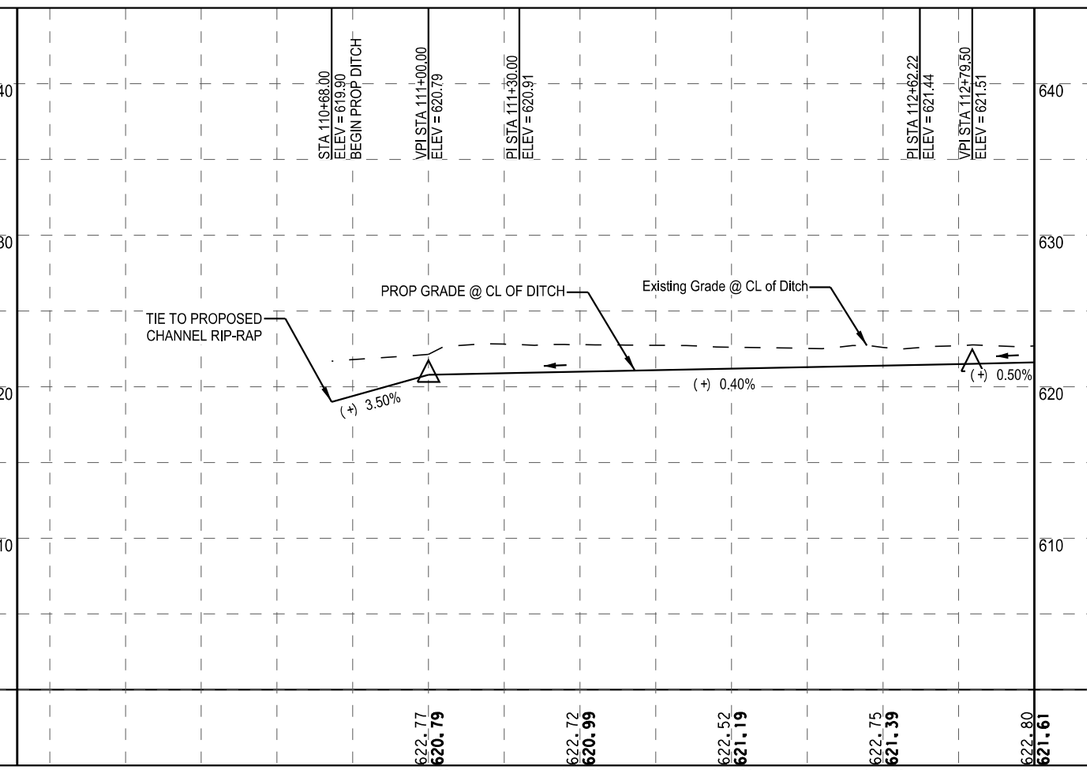
PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE
HP = HIGH POINT	LP= LOW POINT

- DITCH CENTERLINE POINT NO.
- PROPOSED DITCH CENTERLINE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- EXIST CONTOURS
- PROPOSE CONTOURS
- UNDERGROUND TELE
- GAS LINE
- WATER LINE
- OVERHEAD ELECTRIC
- UTILITY POLE
- WATER VALVE
- FIRE HYDRANT

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

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6/24/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DITCH
PLAN AND PROFILE
SHEETS

BEGINNING OF PROJECT TO STA 113+00.00

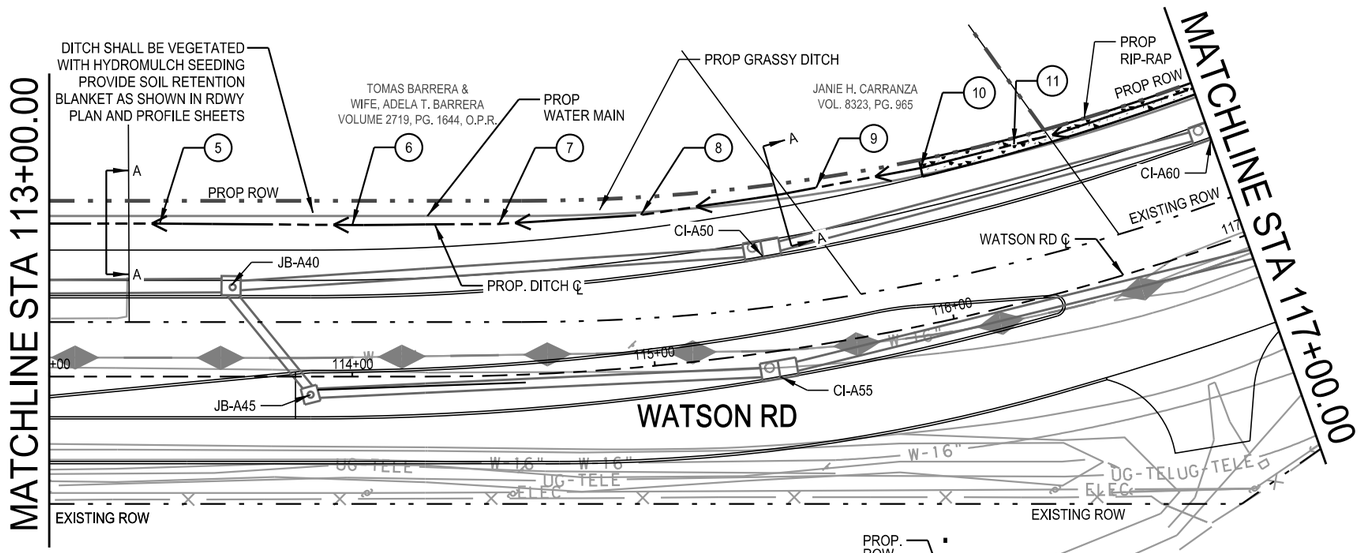
SHEET 1 OF 7

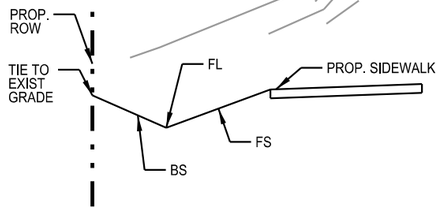
Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	152

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:22 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-DITCH-PP-01.dgn





DITCH TYPICAL SECTION
N.T.S.

POINT	STA	O/S LT	FS	FL	BS
5	113+36.45	50.5	3.5 : 1	621.79	10.4 : 1
6	114+00.00	50.0	4.5 : 1	622.11	16.5 : 1
7	114+50.00	50.0	5.5 : 1	622.35	16.7 : 1
8	115+00.00	50.0	8.1 : 1	622.58	19.0 : 1
9	115+50.00	51.0	21.0 : 1	622.82	10.6 : 1
10	116+00.00	51.0	23.3 : 1	623.06	26.3 : 1
11	116+50.00	51.0	9.0 : 1	623.15	5.4 : 1

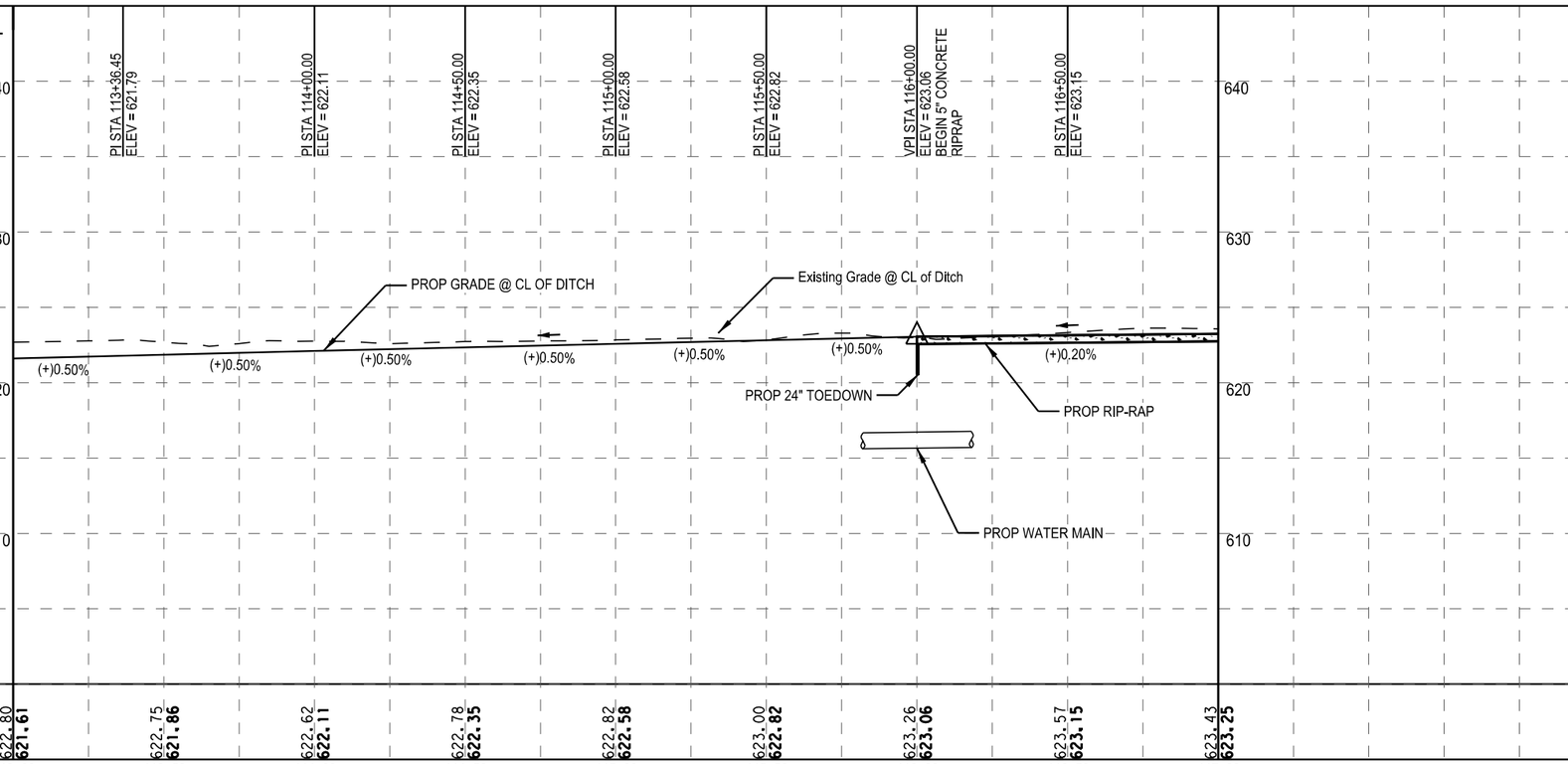
PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE
HP = HIGH POINT	LP= LOW POINT

- XXX — DITCH CENTERLINE POINT NO.
- PROPOSED DITCH CENTERLINE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- XXX — EXIST CONTOURS
- XXX — PROPOSE CONTOURS
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

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6/24/2020

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DITCH PLAN AND PROFILE SHEETS

STA 113+00.00 TO STA 117+00.00

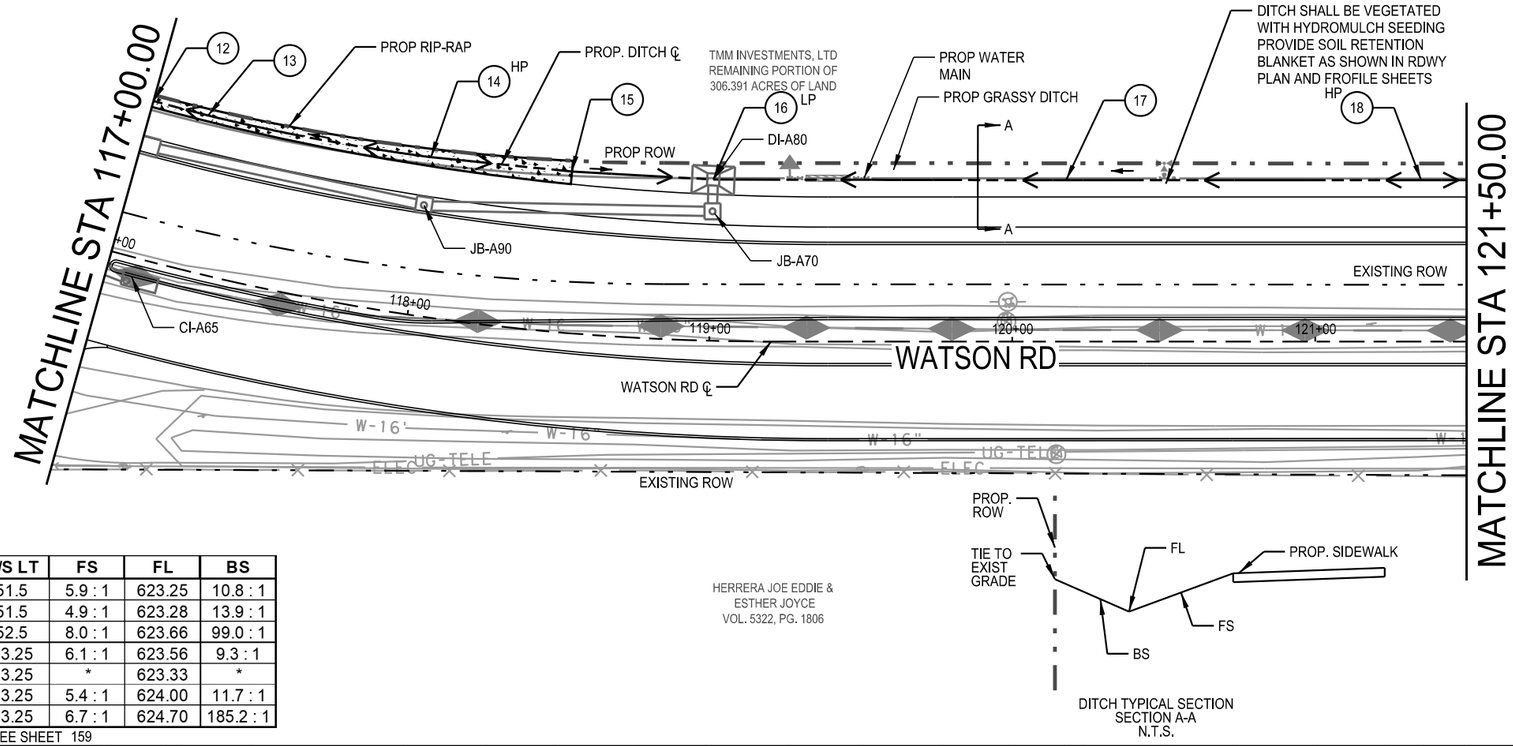
SHEET 2 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	153

STATE	DIST.	COUNTY
TX	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:23 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-DITCH-PP-02.dgn



DITCH TYPICAL SECTION
SECTION A-A
N.T.S.

POINT	STA	O/S LT	FS	FL	BS
12	117+00.00	51.5	5.9 : 1	623.25	10.8 : 1
13	117+20.00	51.5	4.9 : 1	623.28	13.9 : 1
14	118+00.00	52.5	8.0 : 1	623.66	99.0 : 1
15	118+50.00	53.25	6.1 : 1	623.56	9.3 : 1
16	119+00.00	53.25	*	623.33	*
17	120+17.75	53.25	5.4 : 1	624.00	11.7 : 1
18	121+35.00	53.25	6.7 : 1	624.70	185.2 : 1

* DROP INLET LOCATION. SEE SHEET 159

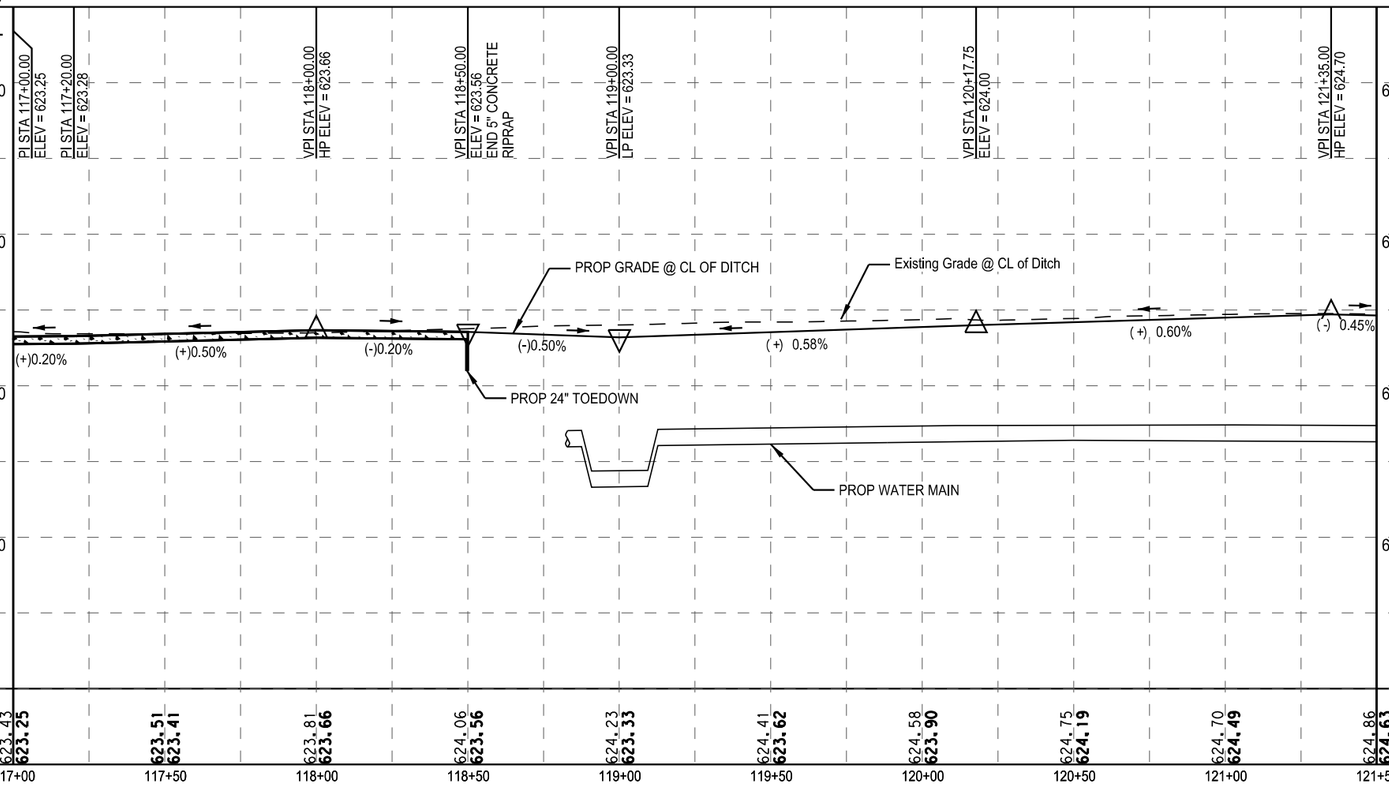
PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE
HP = HIGH POINT	LP= LOW POINT

- XXX — DITCH CENTERLINE POINT NO.
- PROPOSED DITCH CENTERLINE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- XXX — EXIST CONTOURS
- XXX — PROPOSE CONTOURS
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DITCH
PLAN AND PROFILE
SHEETS

STA 117+00.00 TO STA 121+50.00

SHEET 3 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		—	154
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:25 AM
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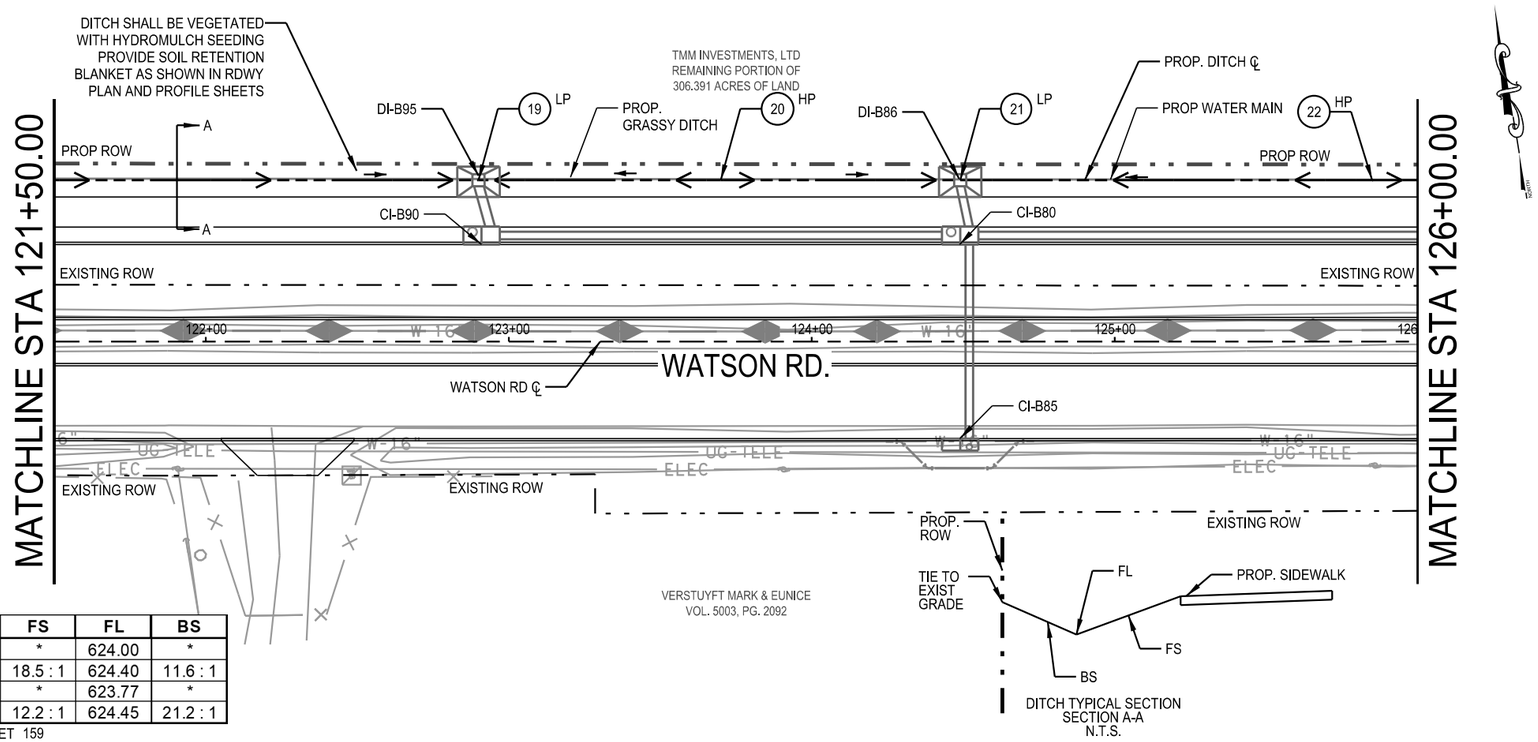


POINT	STA	O/S LT	FS	FL	BS
19	122+90.00	53.25	*	624.00	*
20	123+70.00	53.25	18.5 : 1	624.40	11.6 : 1
21	124+49.00	53.25	*	623.77	*
22	125+85.00	53.25	12.2 : 1	624.45	21.2 : 1

* DROP INLET LOCATION. SEE SHEET 159

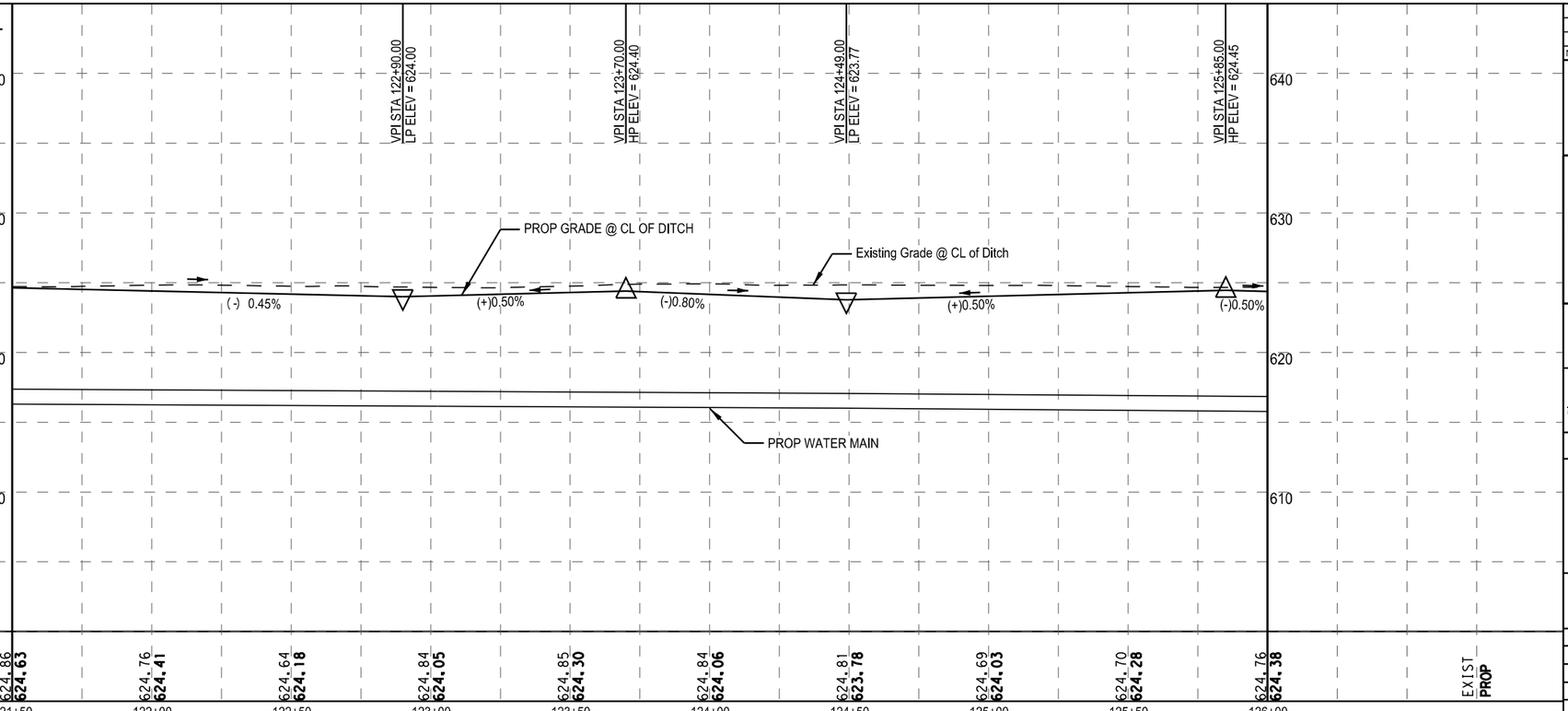
PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE
HP = HIGH POINT	LP= LOW POINT

- XXX — DITCH CENTERLINE POINT NO.
- PROPOSED DITCH CENTERLINE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- XXX — EXIST CONTOURS
- XXX — PROPOSE CONTOURS
- UG TELE — UNDERGROUND TELE
- GAS — GAS LINE
- W - X" — WATER LINE
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS — CARLOS LUNA III — 125042 — LICENSED PROFESSIONAL ENGINEER

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6/24/2020

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WATSON ROAD

DITCH PLAN AND PROFILE SHEETS

STA 121+50.00 TO STA 126+00.00

SHEET 4 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	155

STATE	DIST.	COUNTY
TX	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
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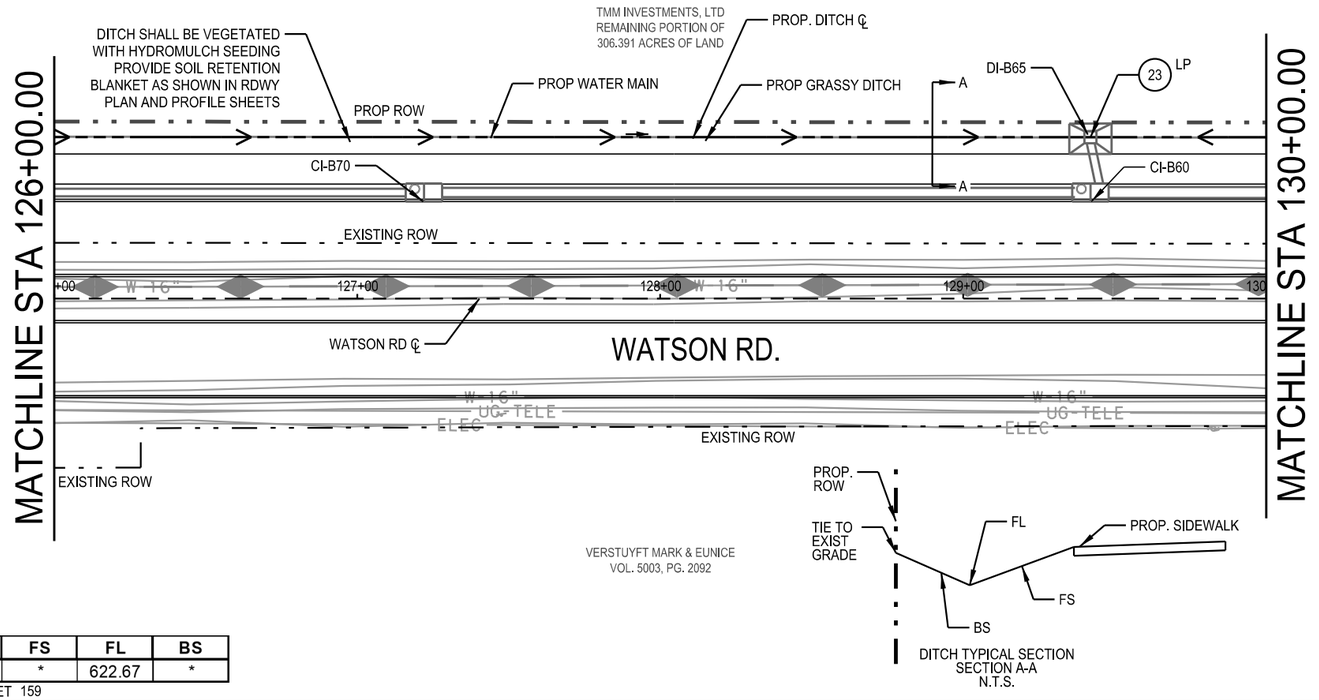


POINT	STA	O/S LT	FS	FL	BS
23	129+42.00	53.25	*	622.67	*

* DROP INLET LOCATION. SEE SHEET 159

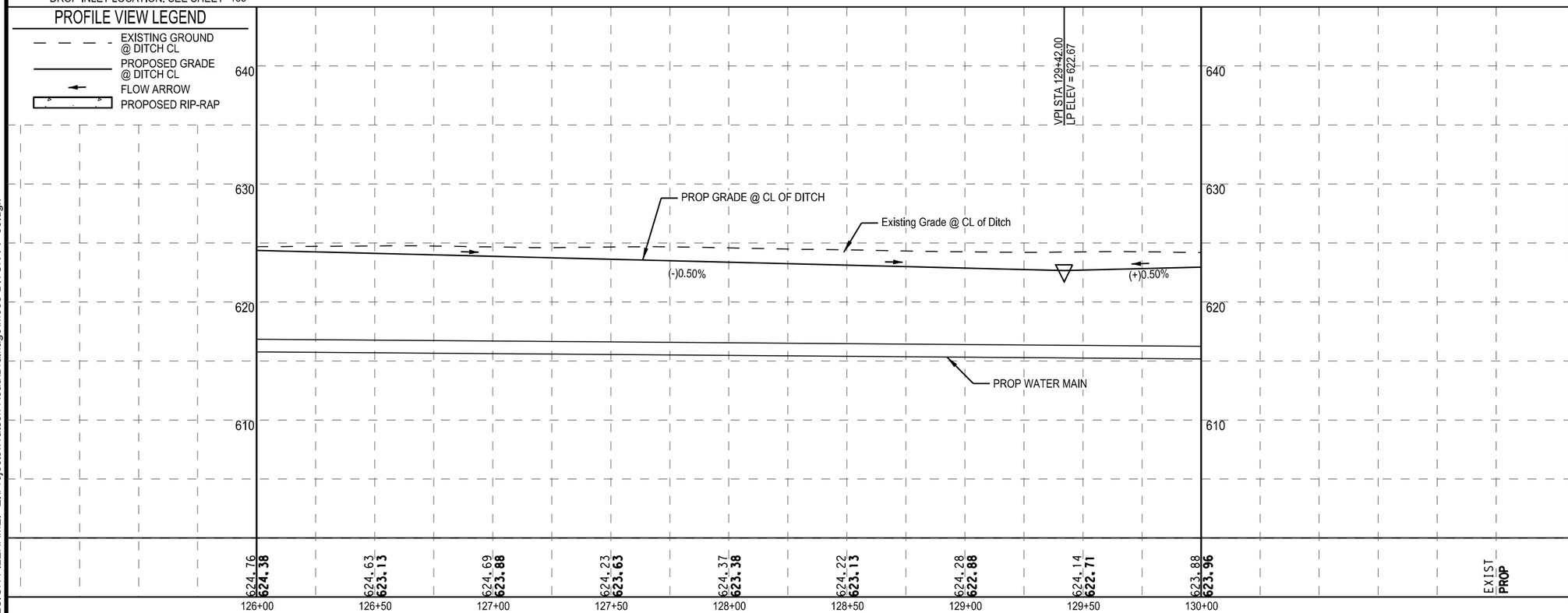
PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
CAP = CONC ARCH PIPE	RCP = REINF CONC PIPE
HP = HIGH POINT	LP= LOW POINT

- DITCH CENTERLINE POINT NO.
- PROPOSED DITCH CENTERLINE
- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- EXIST CONTOURS
- PROPOSE CONTOURS
- UNDERGROUND TELE
- GAS LINE
- WATER LINE
- OVERHEAD ELECTRIC
- UTILITY POLE
- WATER VALVE
- FIRE HYDRANT

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
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1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

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6/24/2020

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WATSON ROAD

DITCH PLAN AND PROFILE SHEETS

STA 126+00.00 TO STA 130+00.00

SHEET 5 OF 7

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	156

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
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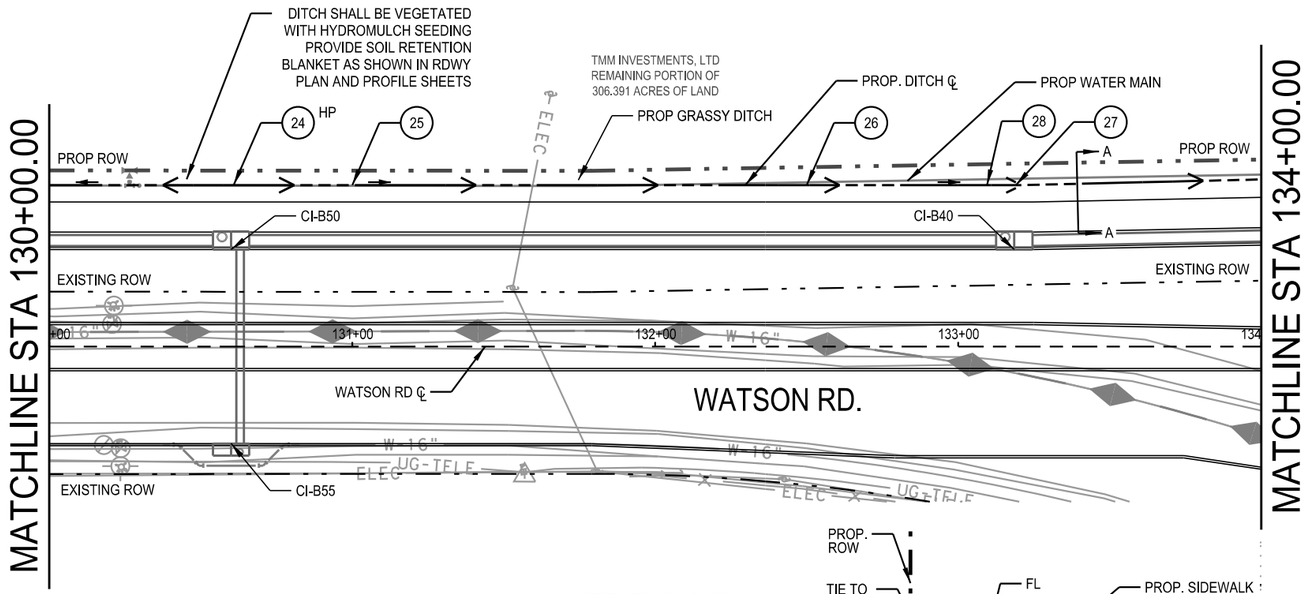
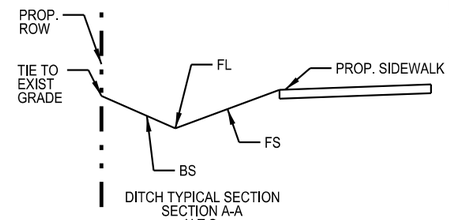


POINT	STA	O/S LT	FS	FL	BS
24	130+60.00	53.25	181.8 : 1	623.26	6.3 : 1
25	131+00.00	53.25	13.0 : 1	623.06	5.0 : 1
26	132+50.00	53.25	5.1 : 1	622.31	3.8 : 1
27	133+00.00	53.25	4.8 : 1	622.06	3.8 : 1
28	133+19.00	53.25	4.7 : 1	621.96	4.1 : 1

VERSTUYFT MARK & EUNICE
VOL. 5003, PG. 2092



DITCH TYPICAL SECTION
SECTION A-A
N.T.S.

PLAN VIEW LEGEND

CI = CURB INLET	DI = DROP INLET
CS = CURB SLOT	JB = JUNCTION BOX
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- PROPOSED CURB
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- EXISTING EASEMENT
- EXIST FEATURES
- BARB WIRE FENCE
- XXX — EXIST CONTOURS
- XXX — PROPOSE CONTOURS
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- GAS — GAS LINE
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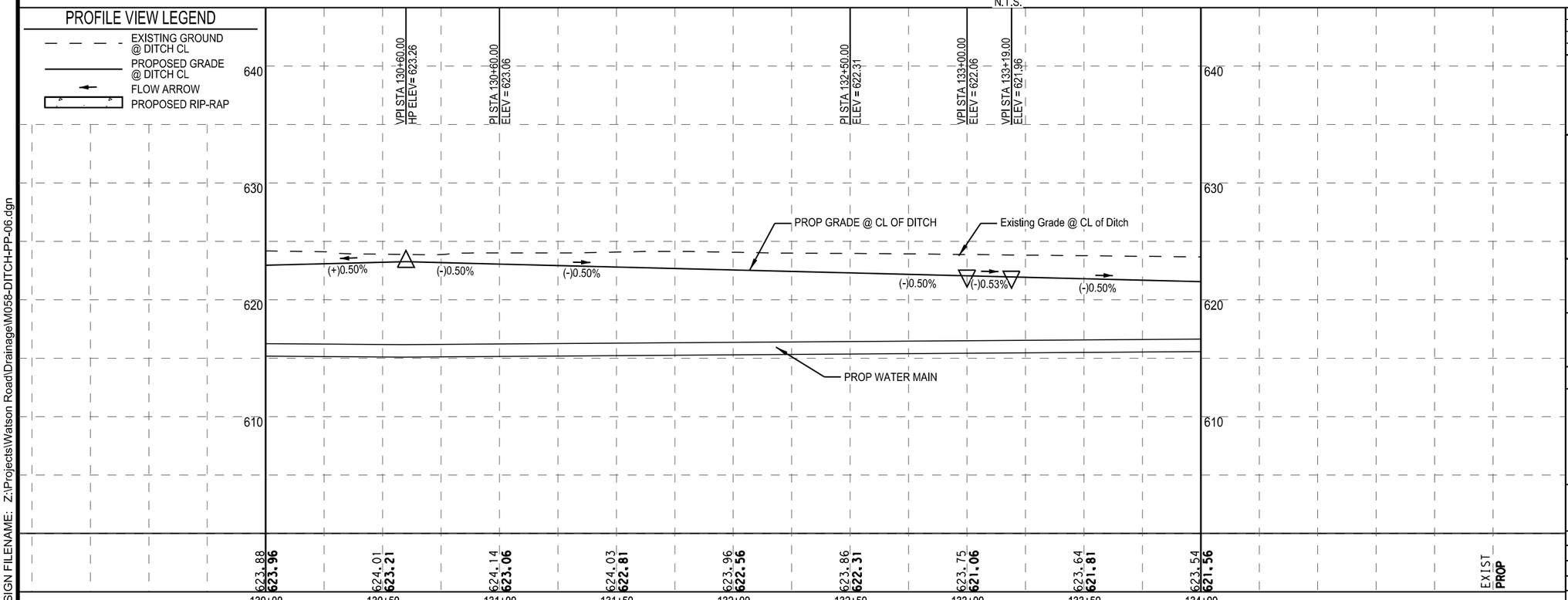
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

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6/24/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DITCH
PLAN AND PROFILE
SHEETS

STA 130+00.00 TO STA 134+00.00

SHEET 6 OF 7

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			157

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
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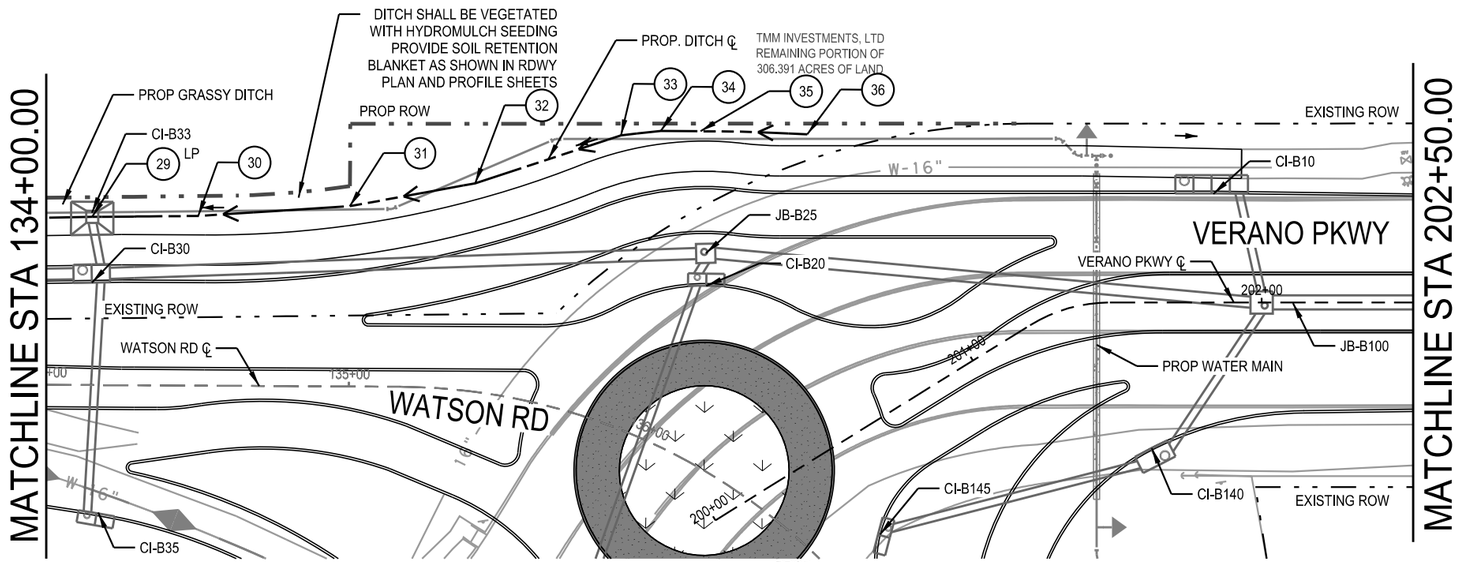

PLAN VIEW LEGEND

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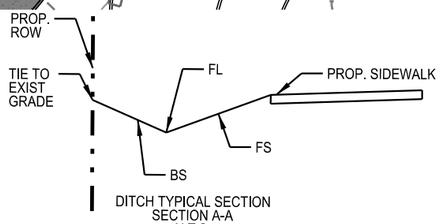
- ELEC — OVERHEAD ELECTRIC
- UTILITY POLE
- WV — WATER VALVE
- FIRE HYDRANT

POINT	STA	O/S LT	FS	FL	BS
29	134+15.00	55.5	*	621.48	*
30	134+50.00	56.0	5.1 : 1	621.66	3.6 : 1
31	135+00.00	59.5	5.5 : 1	621.91	4.5 : 1
32	135+35.15	68.4	3.6 : 1	622.12	9.8 : 1
33	200+40.30	101.9	3.6 : 1	622.37	5.3 : 1
34	200+47.68	95.9	3.3 : 1	622.50	3.0 : 1
35	200+62.41	82.9	3.9 : 1	622.76	5.9 : 1
36	200+75.87	72.9	6.4 : 1	623.00	20.7 : 1

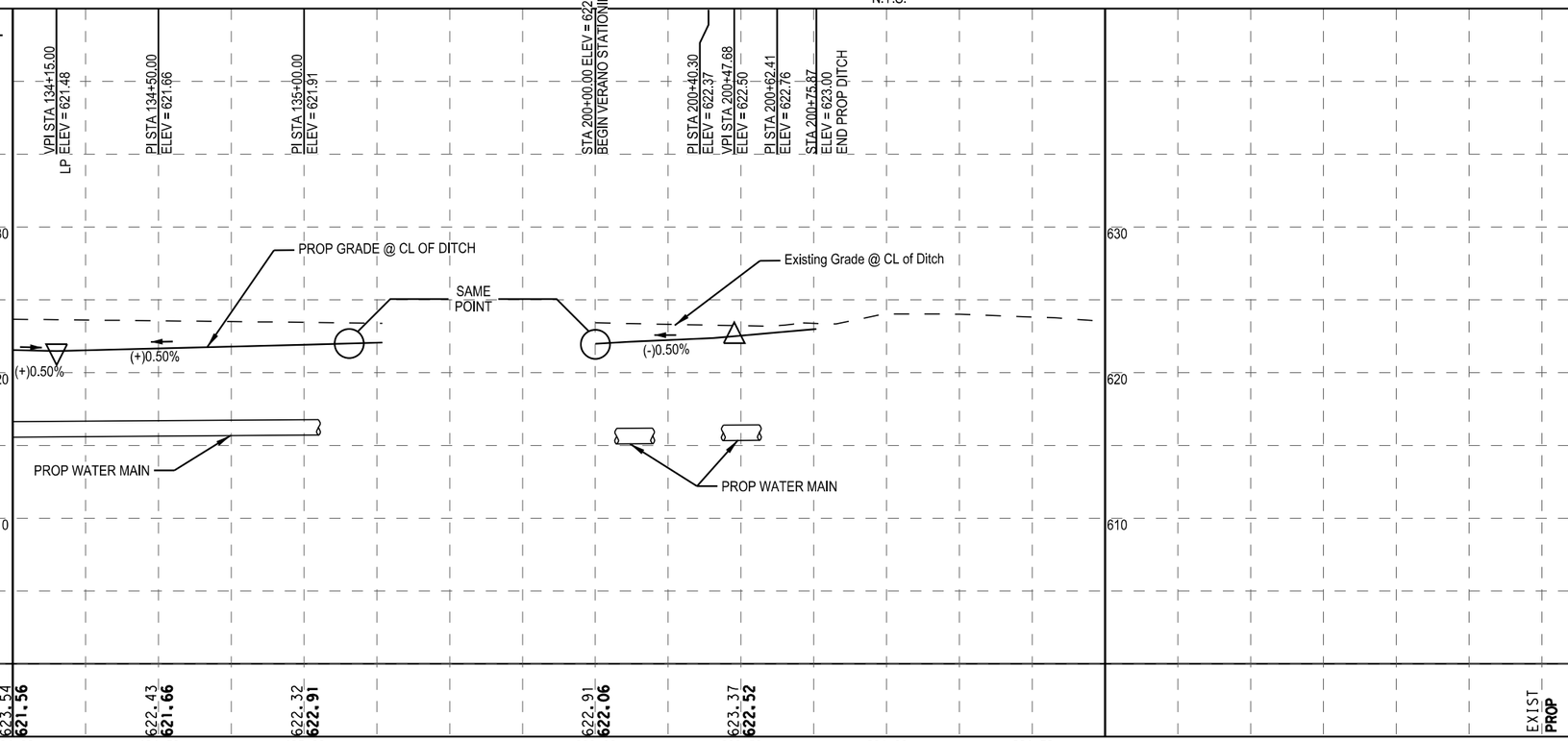
* DROP INLET LOCATION. SEE SHEET 159



DITCH TYPICAL SECTION
SECTION A-A
N.T.S.

PROFILE VIEW LEGEND

- EXISTING GROUND @ DITCH CL
- PROPOSED GRADE @ DITCH CL
- FLOW ARROW
- PROPOSED RIP-RAP



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)
25 12.5 0 25 50 75
1" = 50'
Vert: 1" = 10'

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED PROFESSIONAL ENGINEER

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TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

DITCH
PLAN AND PROFILE SHEETS
VERANO LEFT

VERANO STA 200+00.00 TO STA 203+00.00

SHEET 7 OF 7

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	—	158

STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:50
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PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
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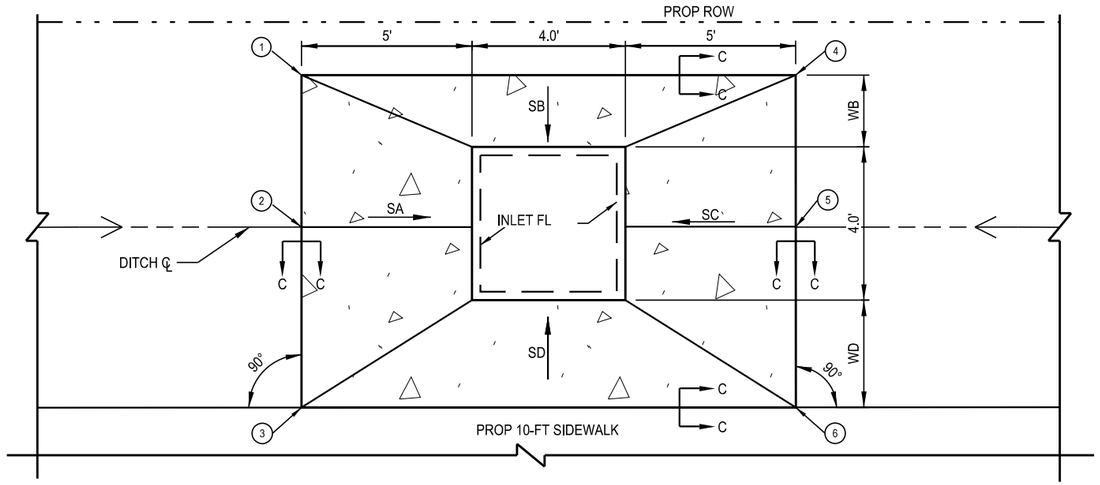
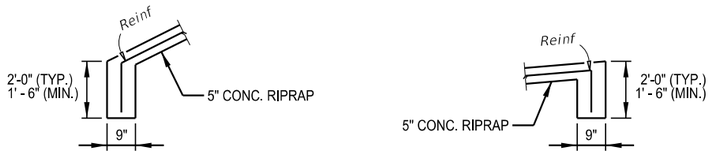


4-WAY INLET

NTS

NOTES:

1. PROPOSED CONCRETE RIPRAP IN DITCH AND AT 4-WAY INLETS SHALL HAVE CONCRETE TOE DOWNS AS SHOWN IN SECTION DETAIL C-C.
2. REFER TO TXDOT CONCRETE RIPRAP STANDARD (CRR) FOR ADDITIONAL NOTES AND REINFORCEMENT DETAILS.

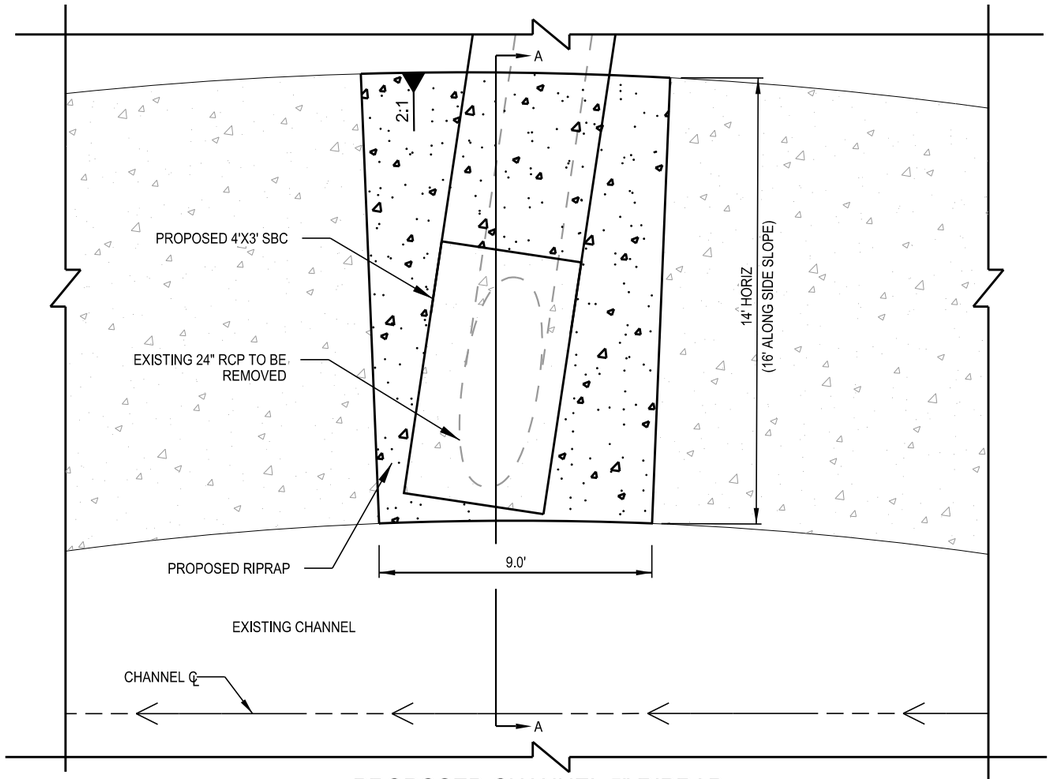


C-C

NTS

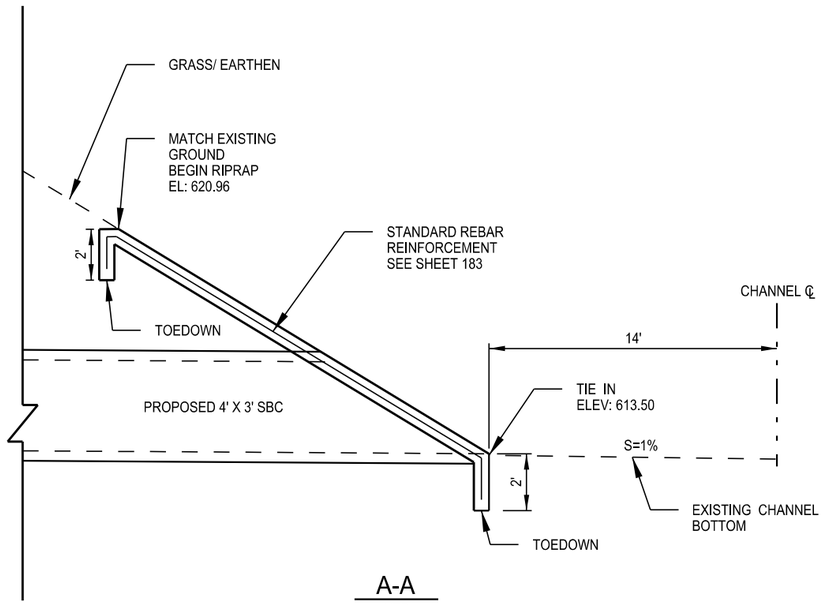
4-WAY INLET TABLE

INLET	INLET STA	INLET ELEV. AT FLOWLINE	WIDTH		SLOPE				POINT ELEVATION					
			WB	WD	SA	SB	SC	SD	1	2	3	4	5	6
	WATSON RD CL	FT.	FT.	FT.	%	%	%	%	FT.	FT.	FT.	FT.	FT.	FT.
A80	119+00.00	623.33	2.5	2.89	0.7	25.36	0.81	39.98	623.97	623.37	624.45	623.96	623.37	624.52
B95	122+90.00	624.00	2.5	3.5	0.64	21.91	0.70	28.15	624.54	624.03	625.00	624.56	624.04	624.95
B86	124+49.00	623.77	2.5	3.5	1.12	31.95	0.71	18.6	624.57	623.83	624.44	624.57	623.81	624.45
B65	129+42.00	622.67	2.5	3.25	0.61	58.85	0.61	28.38	624.14	622.70	623.68	624.14	622.70	623.63
B33	134+15.00	621.48	3	3.95	0.70	49.47	0.70	20.83	623.08	621.52	622.79	622.76	621.52	622.79



PROPOSED CHANNEL 5" RIPRAP

NTS



A-A

NTS

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
2.5 1.25 0 2.5 5 7.5
1" = 5'

STATE OF TEXAS
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WATSON ROAD

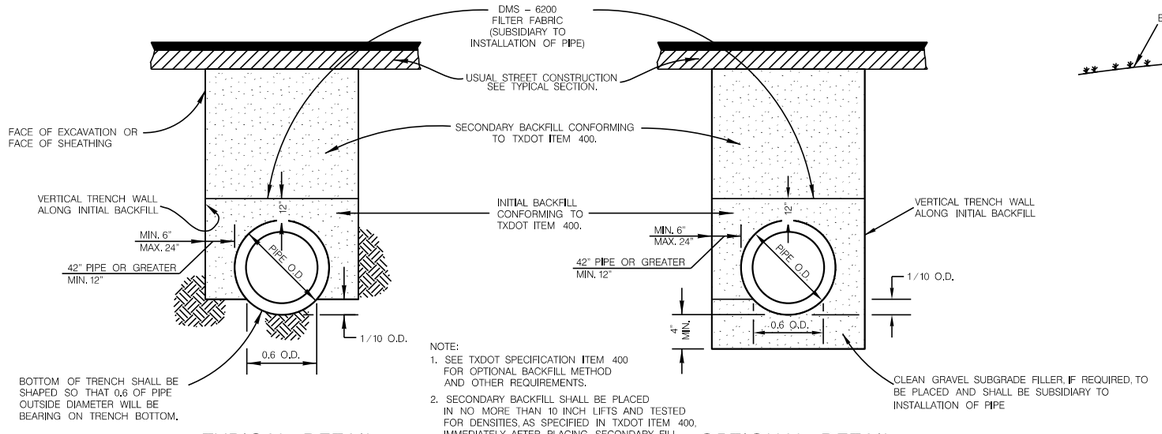
4-WAY INLET
AND
RIPRAP DETAIL

SHEET 1 OF 1

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		---	159
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: ivette
PLOTTED SCALE: 1:5
PEN TABLE: M058_pentbl.tbl
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: 6/24/2020 @ 11:38:35 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-ELV-SW-DET-01.dgn

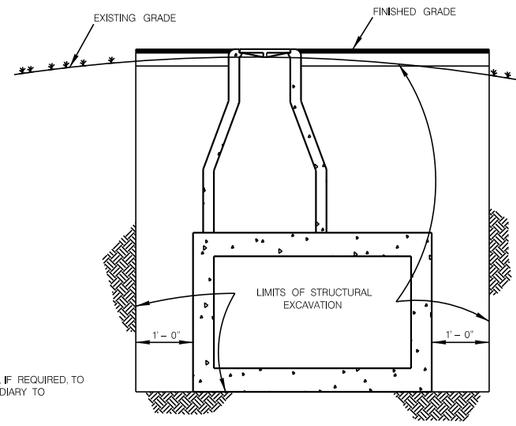


TYPICAL DETAIL

OPTIONAL DETAIL

NOTE:
1. SEE TXDOT SPECIFICATION ITEM 400 FOR OPTIONAL BACKFILL METHOD AND OTHER REQUIREMENTS.
2. SECONDARY BACKFILL SHALL BE PLACED IN NO MORE THAN 10 INCH LIFTS AND TESTED FOR DENSITIES, AS SPECIFIED IN TXDOT ITEM 400, IMMEDIATELY AFTER PLACING SECONDARY FILL.

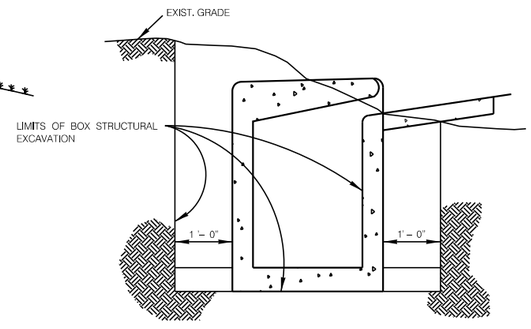
PIPE BEDDING & BACKFILL DETAILS



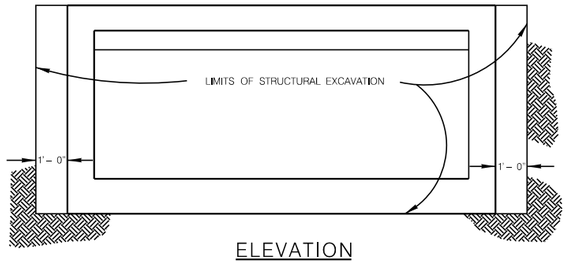
COST OF STRUCTURAL EXCAVATION TO BE INCLUDED WITH UNIT BID PRICE FOR JUNCTION BOX – TXDOT ITEM 465.

STRUCTURAL EXCAVATION AT JUNCTION BOXES

NO SCALE



SIDE VIEW

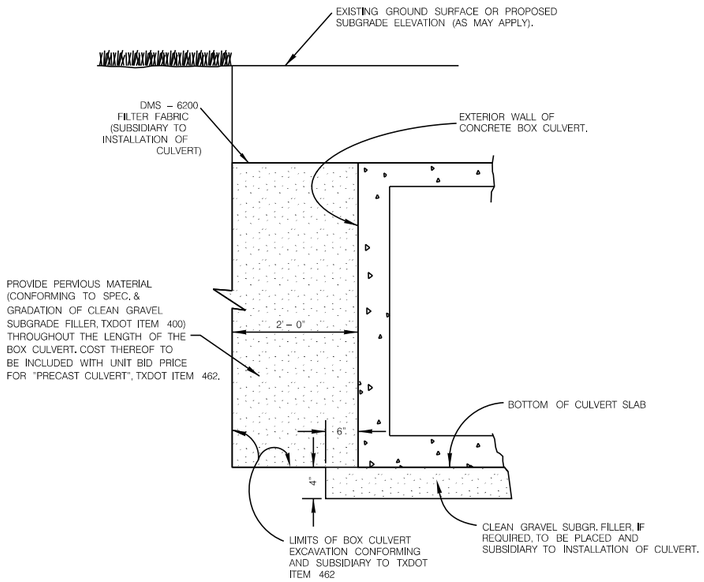


ELEVATION

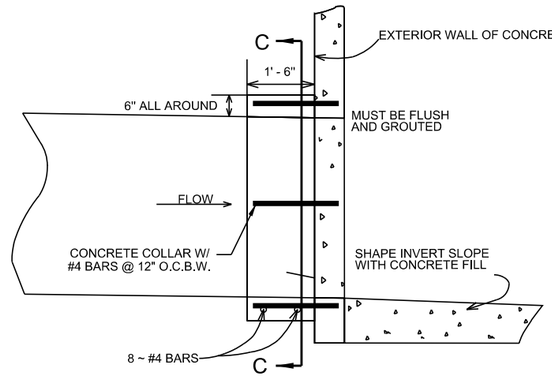
COST OF STRUCTURAL EXCAVATION TO BE INCLUDED WITH UNIT BID PRICE FOR INLETS – TXDOT ITEM 465.

STRUCTURAL EXCAVATIONS AT DRAINAGE INLETS

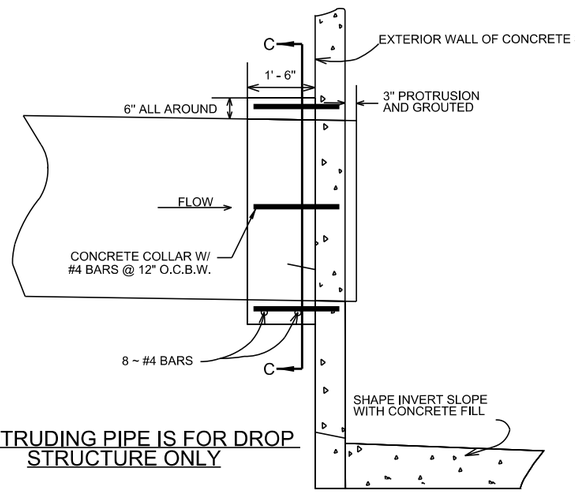
NO SCALE



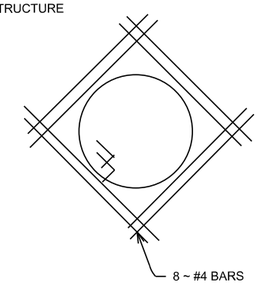
PRECAST CONCRETE BOX CULVERT

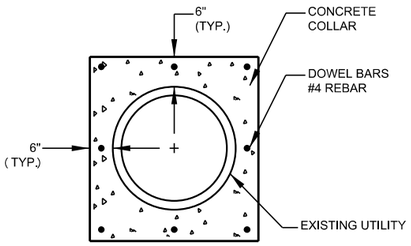


PIPE FLUSH WITH INVERT



PROTRUDING PIPE IS FOR DROP STRUCTURE ONLY





SECTION C-C

NOT TO SCALE

CONCRETE COLLAR DETAIL

NOT TO SCALE

1. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3,000 P.S.I. AT 28 DAYS.
2. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4".
3. REINFORCED STEEL SHALL BE NEW BILLET STEEL, INTERMEDIATE GRADE, ASTM. A-15. THE DEFORMATION SHALL CONFORM TO ASTM. A-305.
4. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
5. ALL BARS INTERCEPTING MANHOLE PENING AND REINFORCED CONCRETE PIPE SHALL BE FIELD-CUT.
6. WHERE LAPPING OF BARS IS REQUIRED, A MINIMUM LAP OF 33 DIAMETERS SHALL BE USED.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

NOT TO SCALE

STATE OF TEXAS
CARLOS LUNA III
125042
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

MAESTAS
8122 DATAPOINT DR., STE. 840
SAN ANTONIO, TX 78229
(210) 366-1988
TBPE No.: F-333
TBPLS No.: 10194506

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

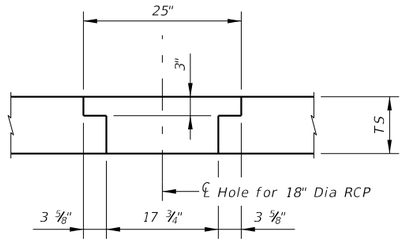
PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS

SHEET 1 OF 1

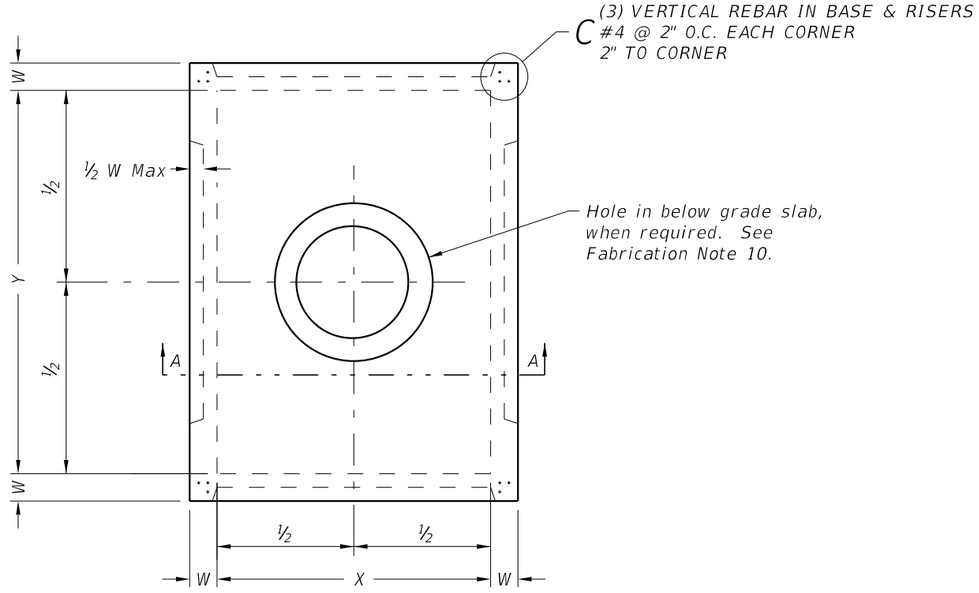
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		160
STATE	DIST.	COUNTY	
TX	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: .
PLOTTED SCALE: .
PEN TABLE: .
PLOT DRIVER: WATSON_BW_PDF_CEC.pltcfg
PLOTTED ON: . 11:38:45 AM
DESIGN FILENAME: Z:\Projects\Watson Road\Drainage\M058-PIPE-BDNG-MISC-01.dgn

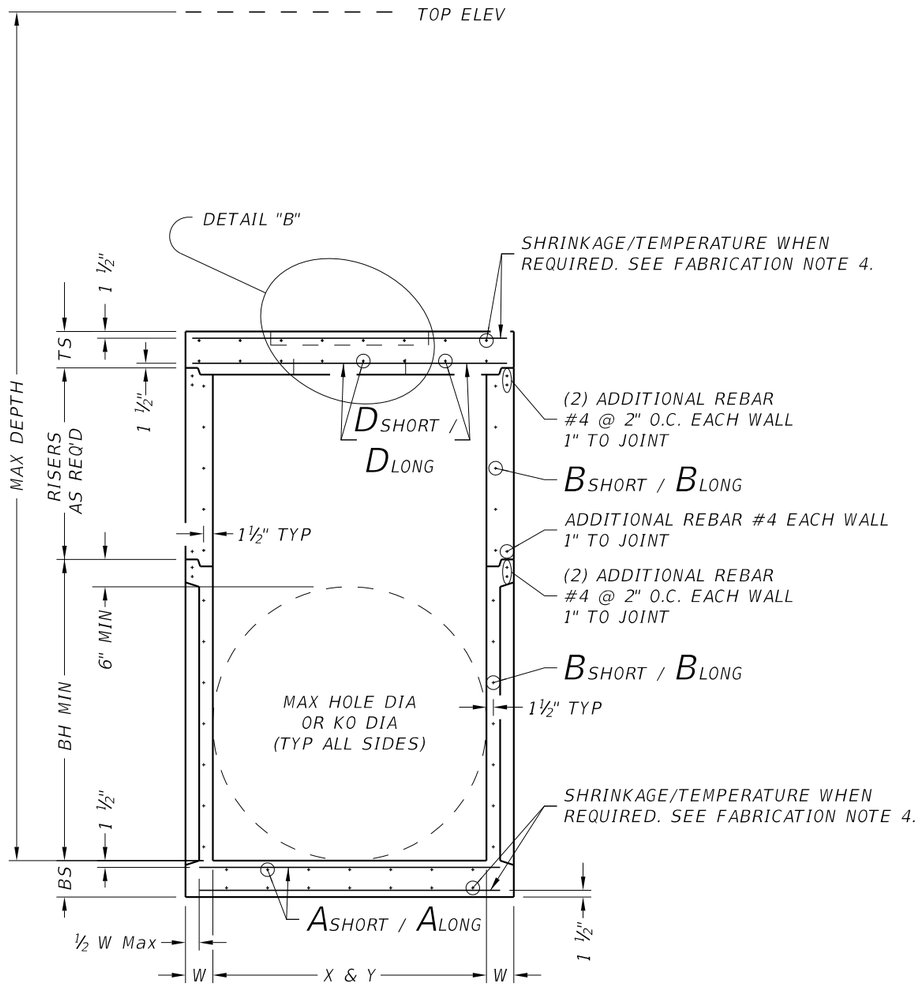
DATE:
FILE:



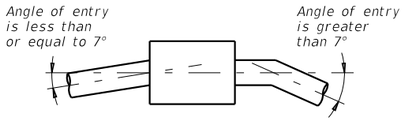
DETAIL "B"



PLAN VIEW



SECTION A-A



PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PJB wall.
If necessary, use pipe elbow or curved approach
alignment to stay within this limit.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.
10. Provide hole in below grade slab only when PJB is installed with inlet type POD.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to junction box.
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 Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for junction box is per Item 465 "Junction Boxes, Manholes, and Inlets" by type and size.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

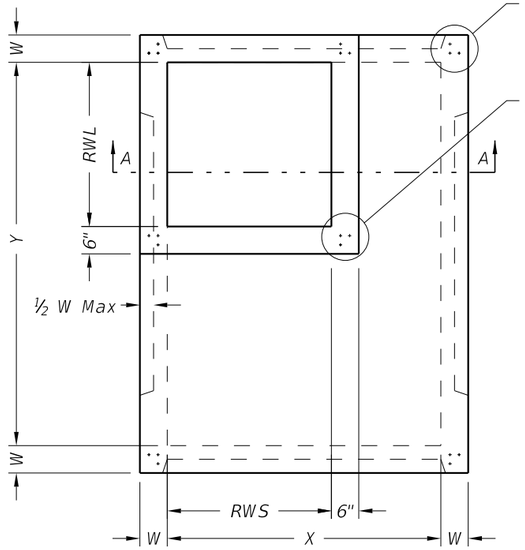
Bridge Division Standard

PRECAST JUNCTION BOX

PJB

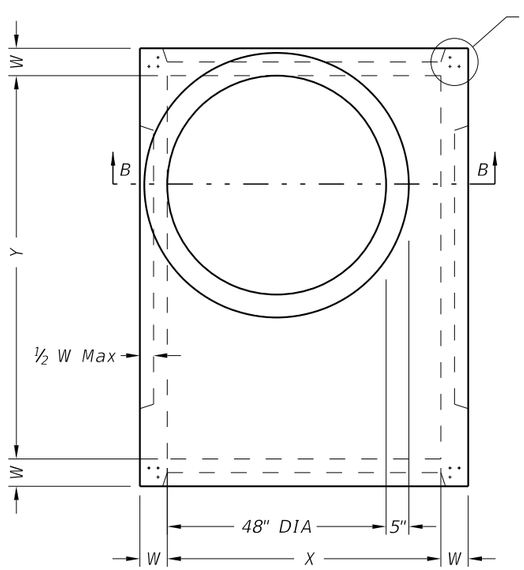
FILE: prestd09.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.
				161

DATE:
FILE:



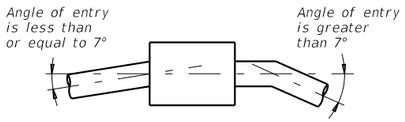
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



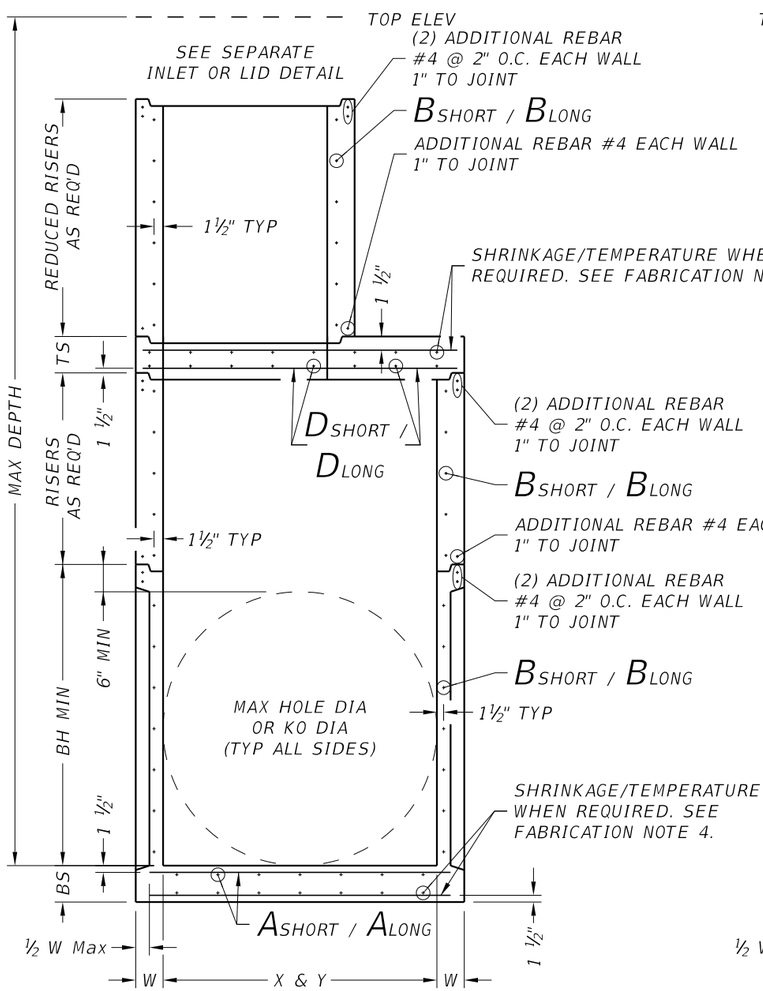
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



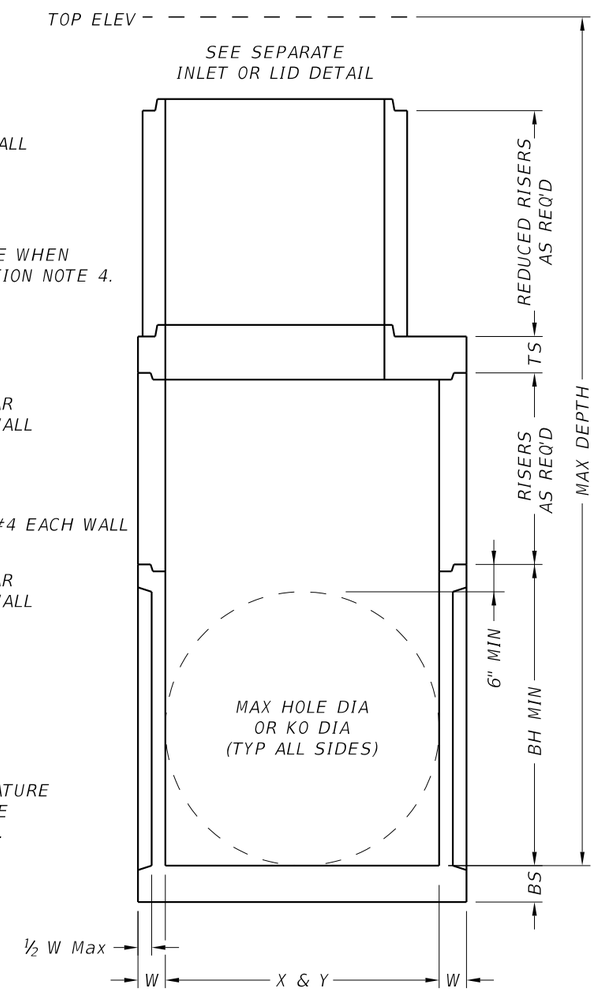
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in^2/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

PB

FILE: prestd01.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				162

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DATE:
FILE:

	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

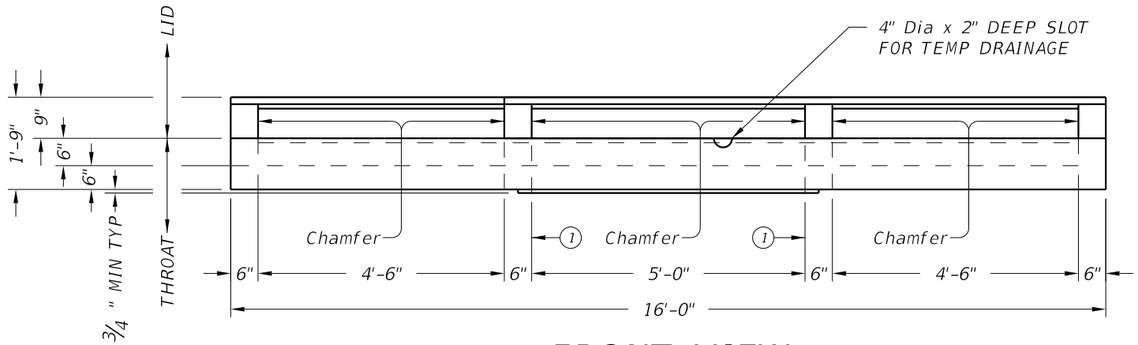
Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

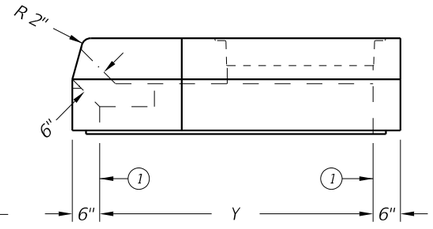
FILE: prestd10.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				163

DATE:
FILE:



FRONT VIEW

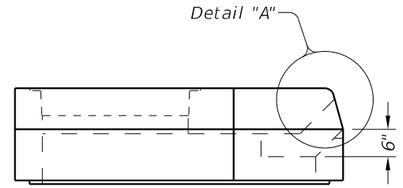
(SHOWING LEFT AND RIGHT EXTENSIONS)



RIGHT VIEW

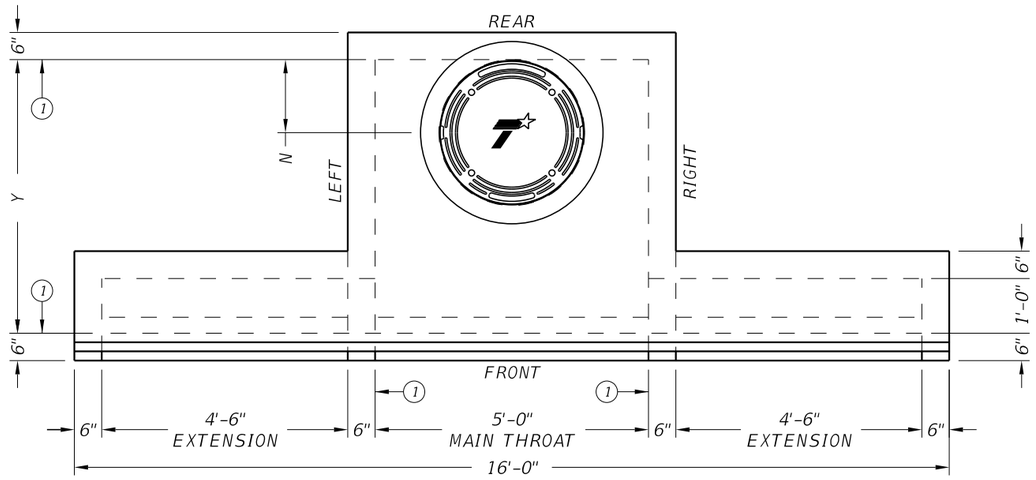
REAR VIEW

(EXTENSIONS NOT SHOWN)



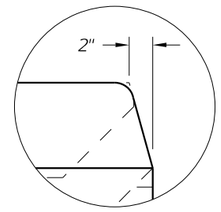
LEFT VIEW

(1) Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



DETAIL "A"

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: prestd03.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				164

DATE:
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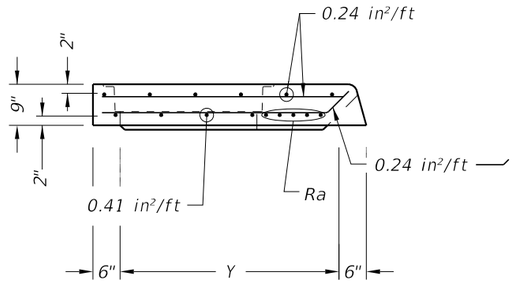
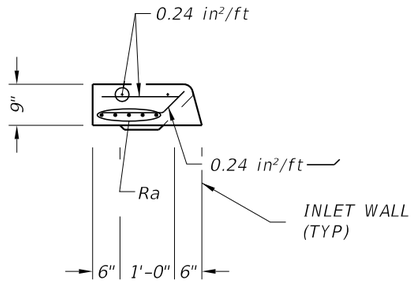
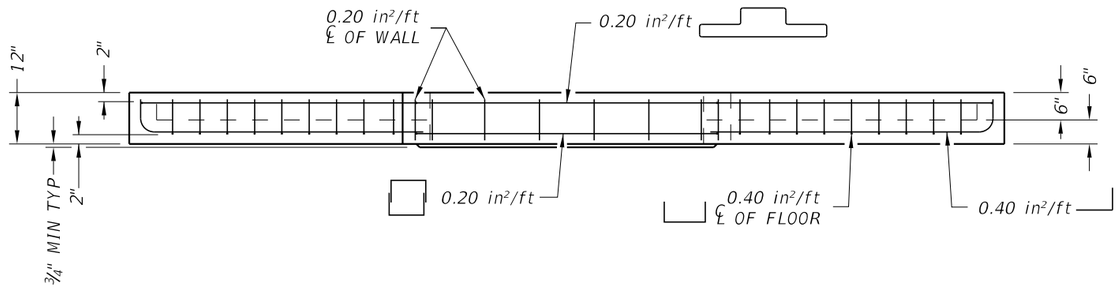


LID SECTION A-A

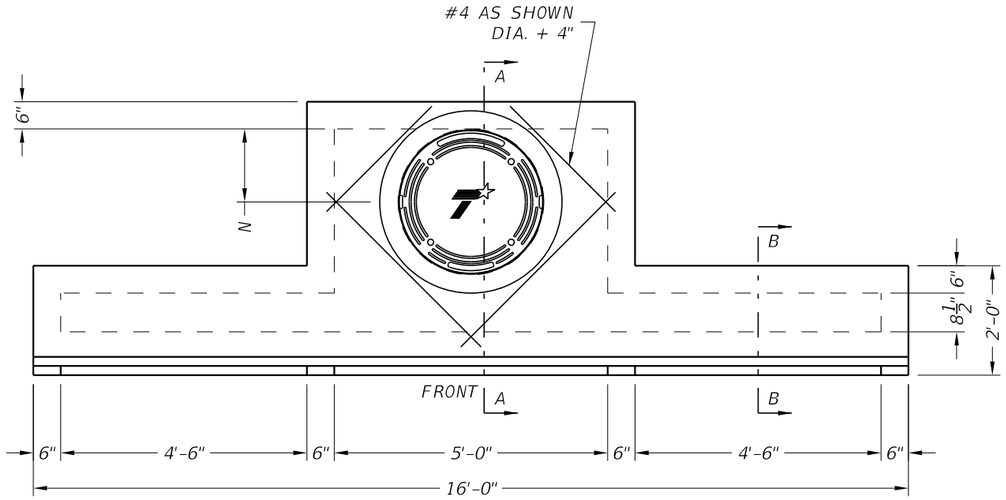


LID SECTION B-B



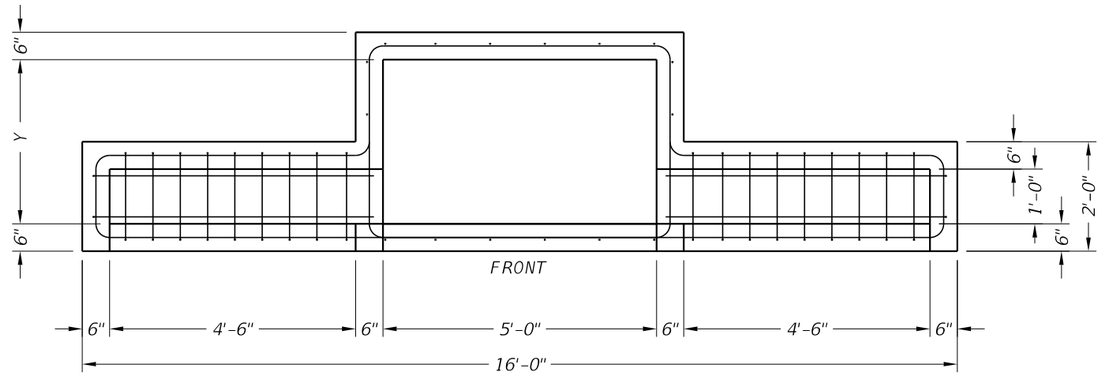
THROAT ELEVATION VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



LID PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



THROAT PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

SIZE(Y)	N	MH DIA*	Ra
3'	9"	18"	(4) #5 Additional
4'	16"	32"	(4) #5 Additional
5'	16"	32"	(4) #5 Additional
6'	16"	32"	(4) #5 Additional

* Nominal ring and cover size.

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. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET OUTSIDE ROADWAY

PCO

FILE: prestd03.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
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DATE:
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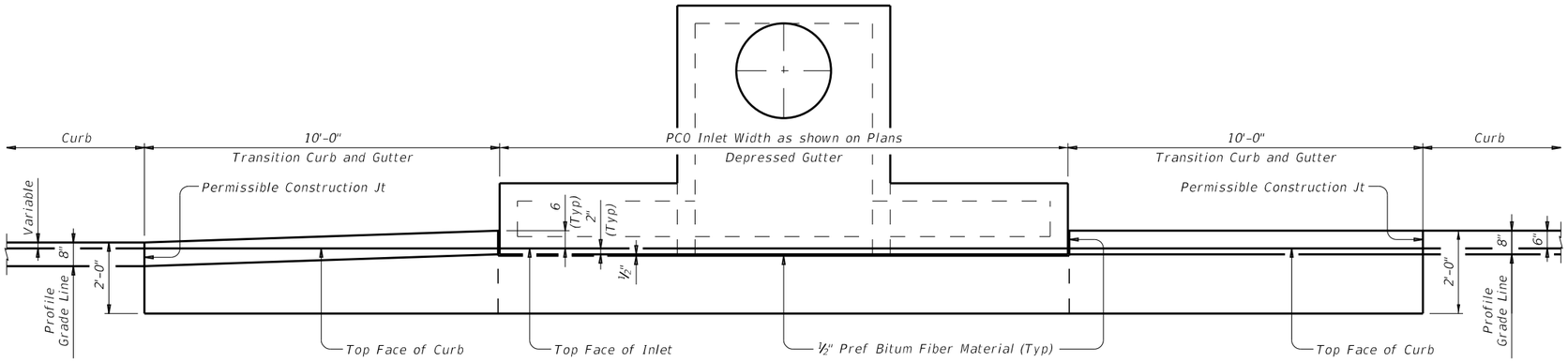
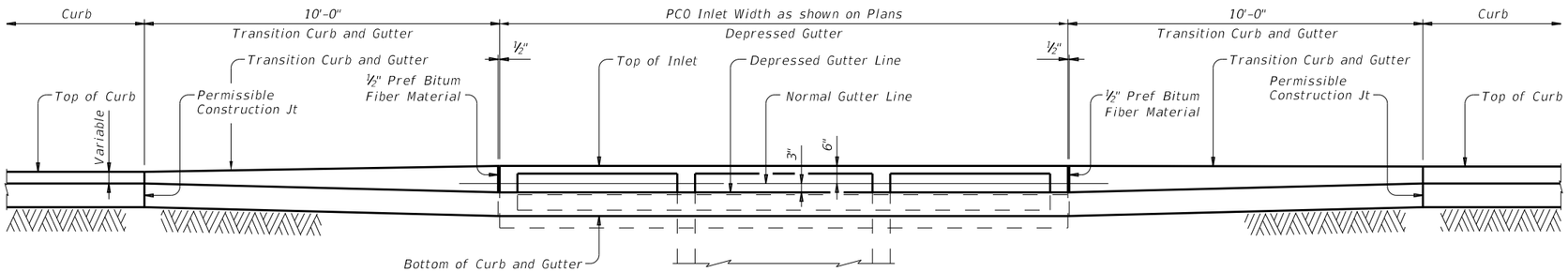


SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

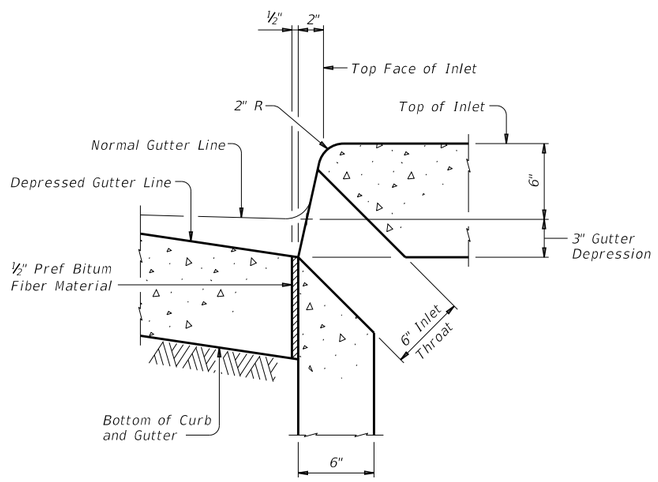
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

Reinforcing steel not shown for clarity.

CONSTRUCTION NOTES:
Align top face of curb with PCO Inlet as shown.

MATERIAL NOTES:
Provide ½" Preformed Bituminous Fiber Material.

GENERAL NOTES:
See Precast Curb Inlet Outside Roadway (PCO) standard for details and notes not shown.
See Concrete Curb and Curb and Gutter (CCCG-12) standard for details and notes not shown.
Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
Preformed Bituminous Fiber Material is subsidiary to PCO Inlet.

Texas Department of Transportation

Bridge Division Standard

CURB AND GUTTER TRANSITION DETAILS FOR PCO INLET

CGT-PCO

FILE: prestd13.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				166

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DATE: 6/24/2020 11:38:58 AM
FILE: Z:\Projects\Watson Road\Standards\TXDOT\ccostds1.dgn

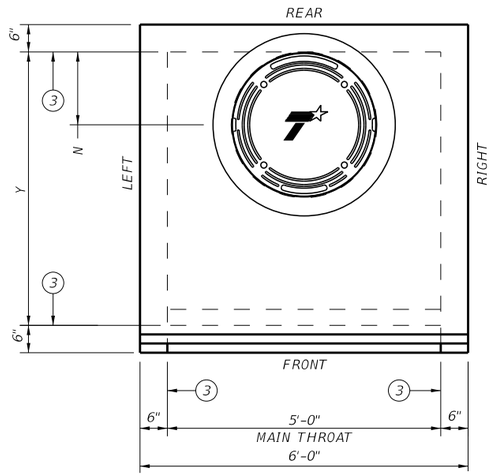
Size (Y)	N	MH Dia (2)
3'	9"	18"
4'	16"	32"
5'	16"	32"
6'	16"	32"

BAR TABLE	
BAR	SIZE
A1	#3
A2	#3
A3 (1)	#3
A4 (1)	#3
B1	#4
B2	#4
B3 (1)	#4
C (1)	#4
G	#4
L (1)	#5
Ra	#5
U1 (1)	#5
U2 (1)	#5

(1) Reinforcing bar used only with extension(s).

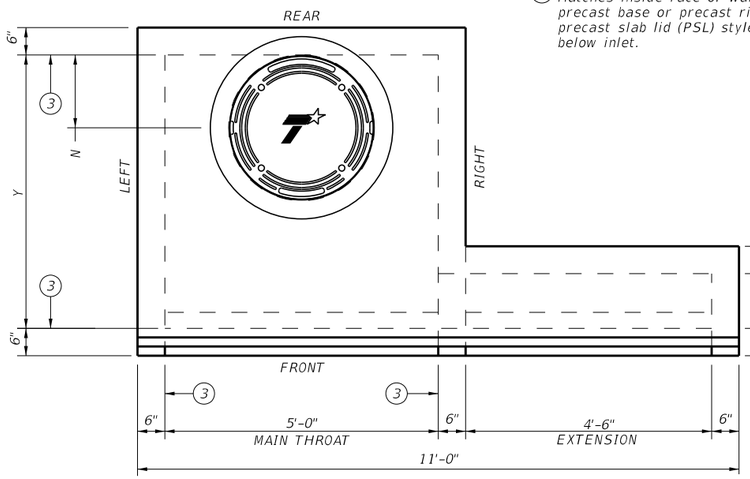
(2) Nominal ring and cover size.

(3) Matches inside face of wall of precast base or precast riser or precast slab lid (PSL) style "S1" below inlet.



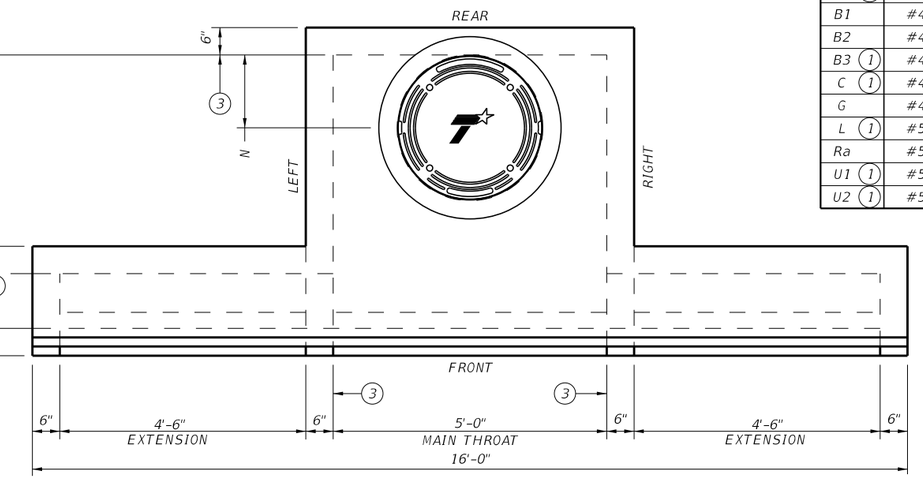
PLAN VIEW

(Shown without extensions.)
See SHEET 2 0F 4 for details.



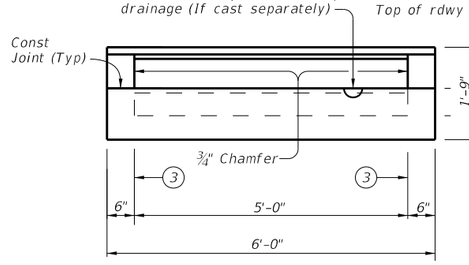
PLAN VIEW

(Showing one extension.)
See SHEET 3 0F 4 for details.



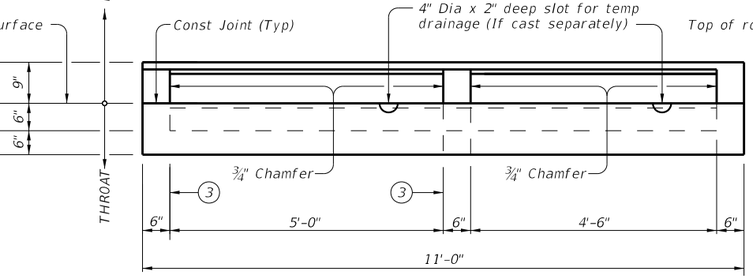
PLAN VIEW

(Showing extension on each side)
See SHEET 4 0F 4 for details.



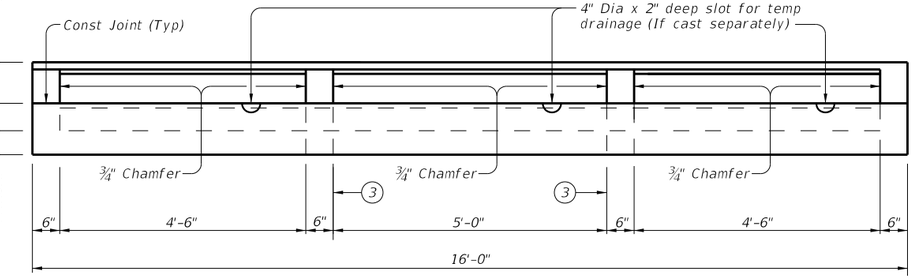
FRONT VIEW

(Shown without extensions.)
See SHEET 2 0F 4 for details.



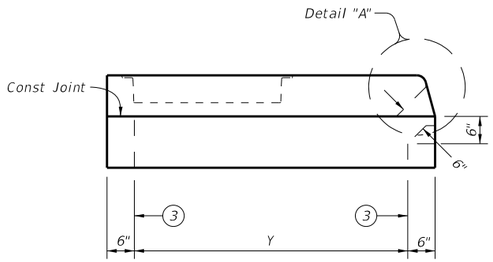
FRONT VIEW

(Showing one extension.)
See SHEET 3 0F 4 for details.



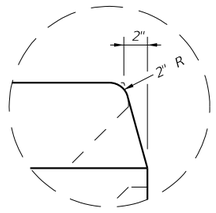
FRONT VIEW

(Showing extension on each side.)
See SHEET 4 0F 4 for details.



LEFT SIDE VIEW

(Extensions not shown for clarity.)



DETAIL "A"

CONSTRUCTION NOTES:

Chamfer all vertical edges of inlet lid ¾" as shown in Front View, Sheet 1 of 4.
Maintain 1 ½" clear cover to ends of all vertical reinforcing bars, unless otherwise noted.

MATERIAL NOTES:

Provide Class "S" concrete (f'c = 4,000 psi).
Provide Grade 60 reinforcing steel or equivalent area of WWR.
Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The intent of this standard is to provide a cast-in-place lid to be used with precast base, precast riser or precast slab lid style "S1".
Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
Lid and throat may be cast monolithically or separately.
See Precast Base (PB) standard for details and notes not shown.
See Precast Slab Lid (PSL) standard for details and notes not shown.
See Curb & Gutter Transitions Details (CGT-PCO) standard for transition examples.
Extensions may be right, left, both, or none. Provide extensions as specified elsewhere in the plans.
Shop drawings for approval are not required.
Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.
Open area of main throat = 360 sq in.
Open area of one extension throat = 324 sq in.

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

HL93 LOADING SHEET 1 OF 4

Texas Department of Transportation

Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

CCO

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REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
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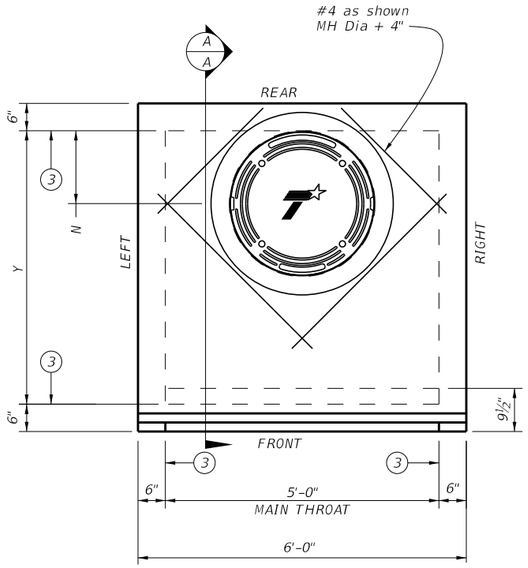
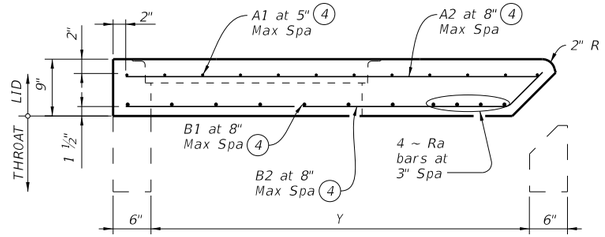
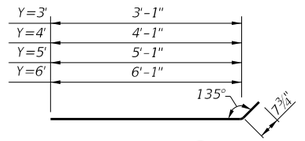


LID PLAN VIEW

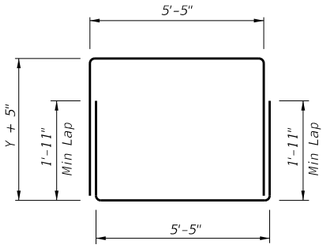
(Shown without extensions)



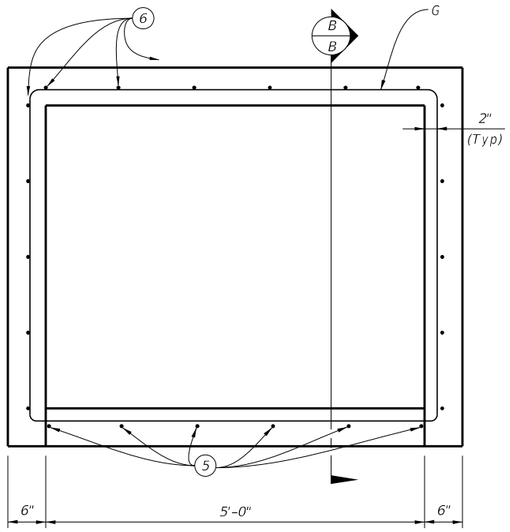
LID SECTION A-A



BARS B2 (4)

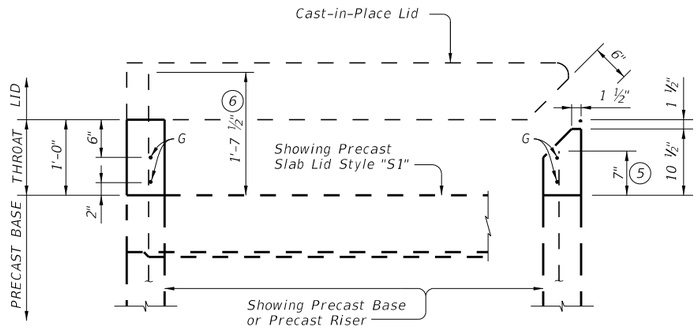


BARS G
Showing one complete bar.



THROAT PLAN VIEW

(Shown without extensions)



THROAT SECTION B-B

(Showing reinforcing bar extended from pecast base or precast riser or precast slab lid style "S1".)

(3) Matches inside face of wall of precast base or precast riser or precast slab lid style "S1" below inlet.

(4) Cut reinforcing bars as needed to provide 1 ½" clear to manhole.

(5) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 7".

(6) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 1'-7 ½".

HL93 LOADING SHEET 2 OF 4

Texas Department of Transportation

Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

CCO

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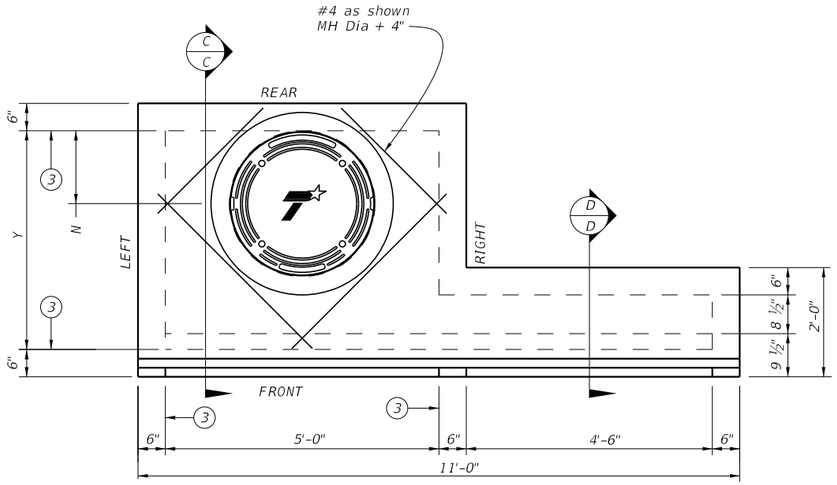
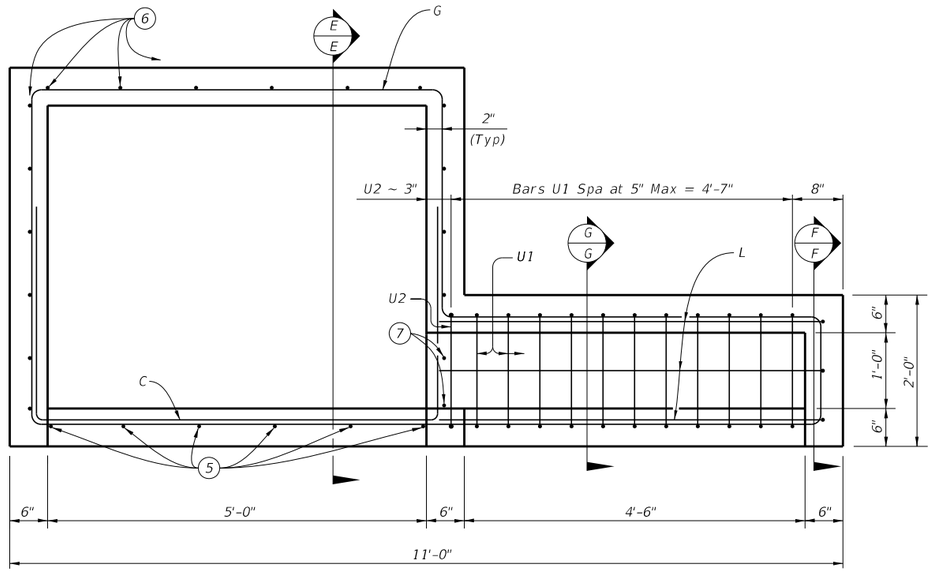


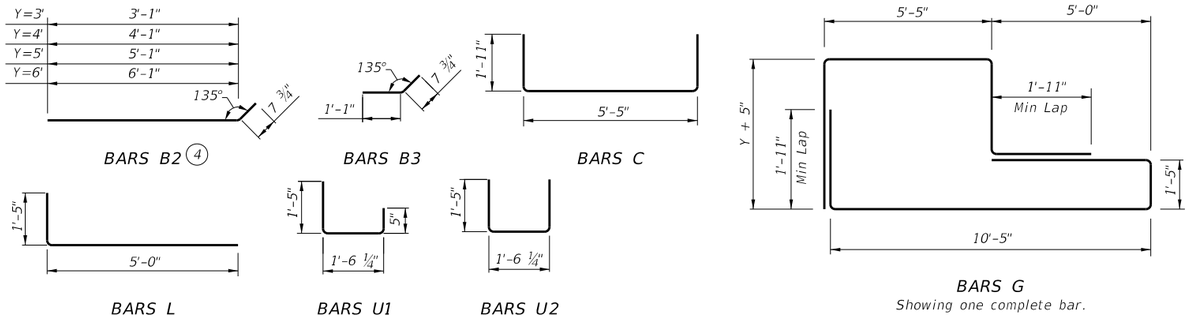
LID PLAN VIEW

(Showing one extension.)



THROAT PLAN VIEW

(Showing one extension.)



BARS B2 (4)

BARS B3

BARS C

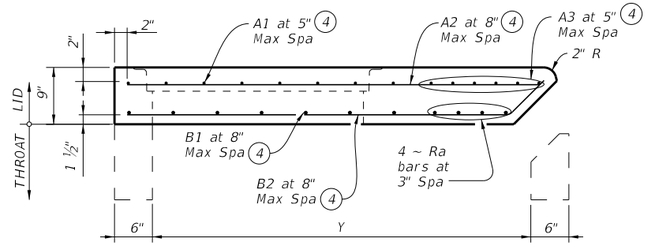
BARS L

BARS U1

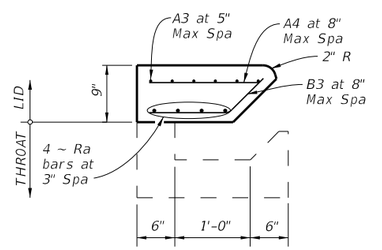
BARS U2

BARS G

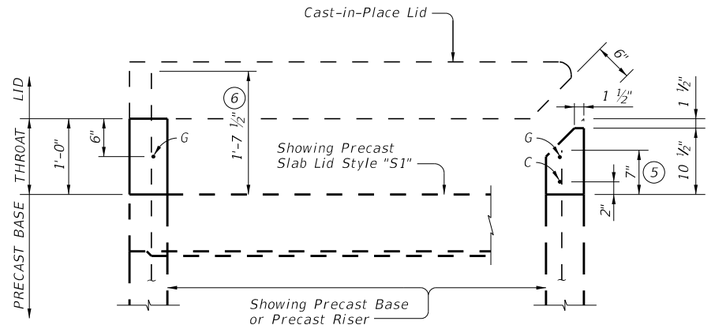
Showing one complete bar.



LID SECTION C-C

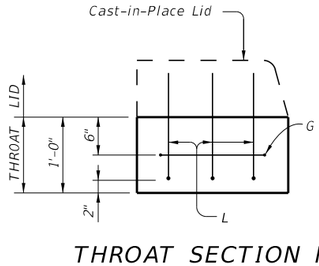


LID SECTION D-D

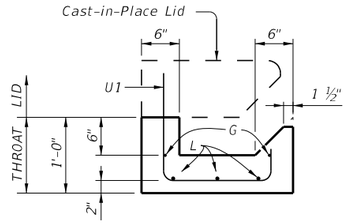


THROAT SECTION E-E

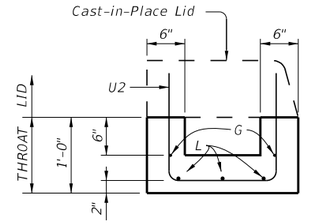
(Showing reinforcing bar extended from precast base or precast riser or precast slab lid style "S1".)



THROAT SECTION F-F



BARS U1 LOCATION



BARS U2 LOCATION

THROAT SECTION G-G

(3) Matches inside face of wall of precast base or precast riser or precast slab lid style "S1" below inlet.

(4) Cut reinforcing bars as needed to provide 1 ½" clear to manhole.

(5) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 7".

(6) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 1'-7 ½".

(7) Do not extend reinforcing bars from precast base.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

CCO

FILE: ccostds1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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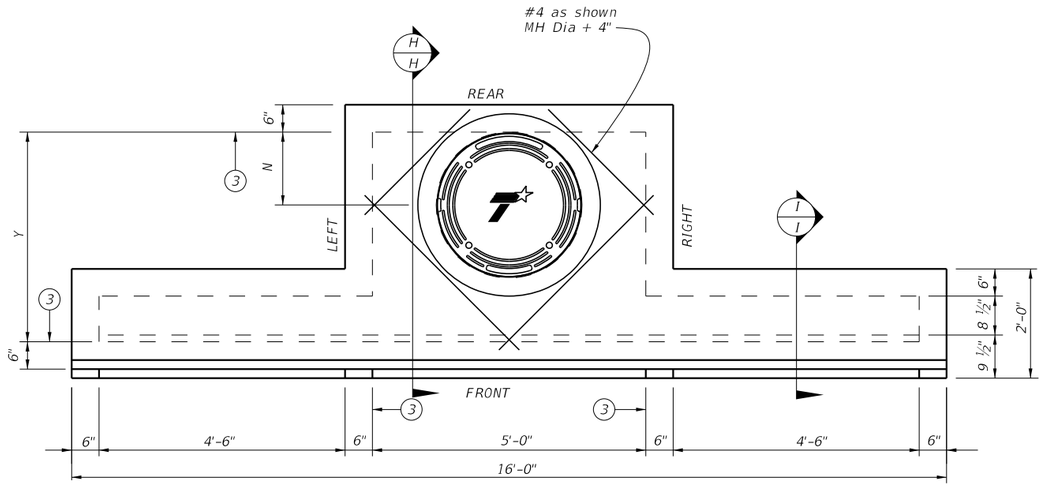
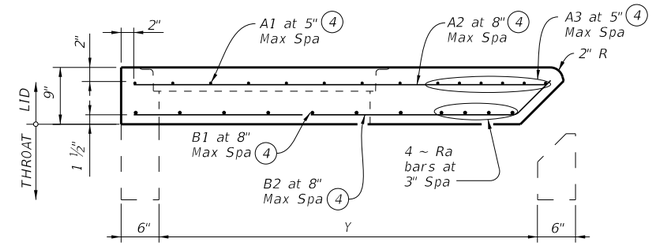
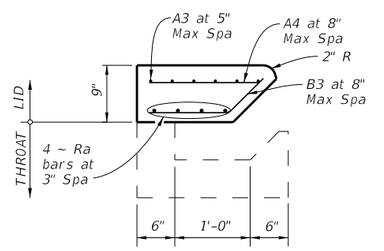


LID PLAN VIEW

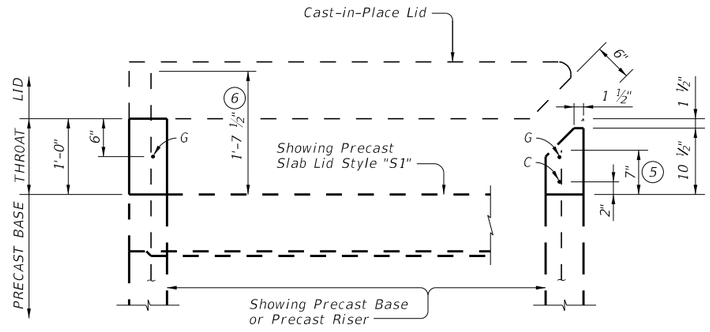
(Showing extension on each side.)



LID SECTION H-H

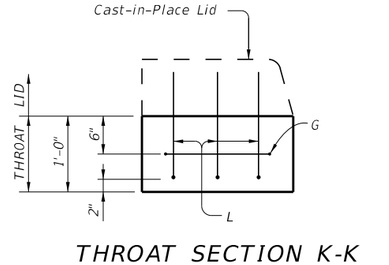


LID SECTION I-I

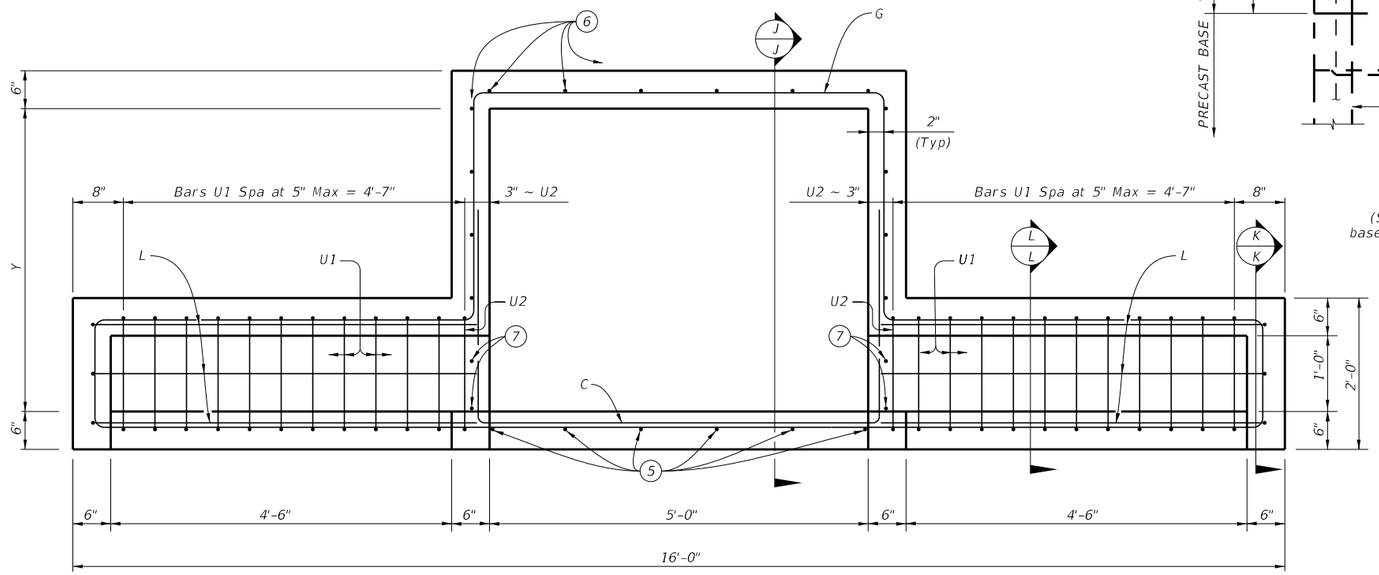


THROAT SECTION J-J

(Showing reinforcing bar extended from pecast base or precast riser or precast slab lid style "S1".)

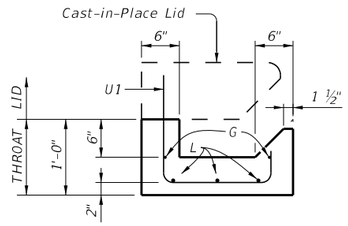


THROAT SECTION K-K

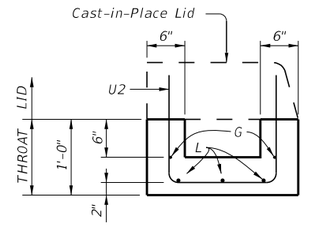


THROAT PLAN VIEW

(Showing extension on each side.)

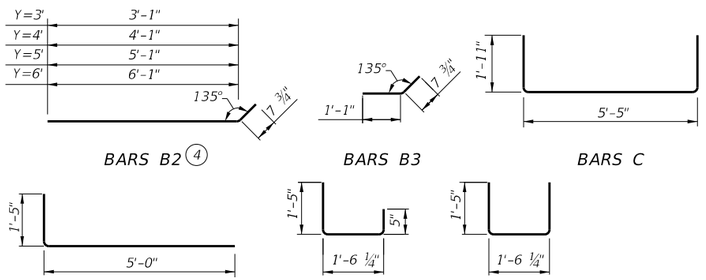


BARS U1 LOCATION

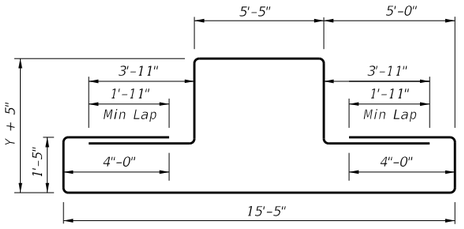


BARS U2 LOCATION

THROAT SECTION L-L



BARS B2 (4) | BARS B3 | BARS C | BARS L | BARS U1 | BARS U2



BARS G
Showing one complete bar.

(3) Matches inside face of wall of precast base or precast riser or precast slab lid style "S1" below inlet.

(4) Cut reinforcing bars as needed to provide 1 ½" clear to manhole.

(5) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 7".

(6) Extend reinforcing bars from precast base or precast riser or precast slab lid style "S1" 1'-7 ½".

(7) Do not extend reinforcing bars from precast base.

HL93 LOADING SHEET 4 OF 4

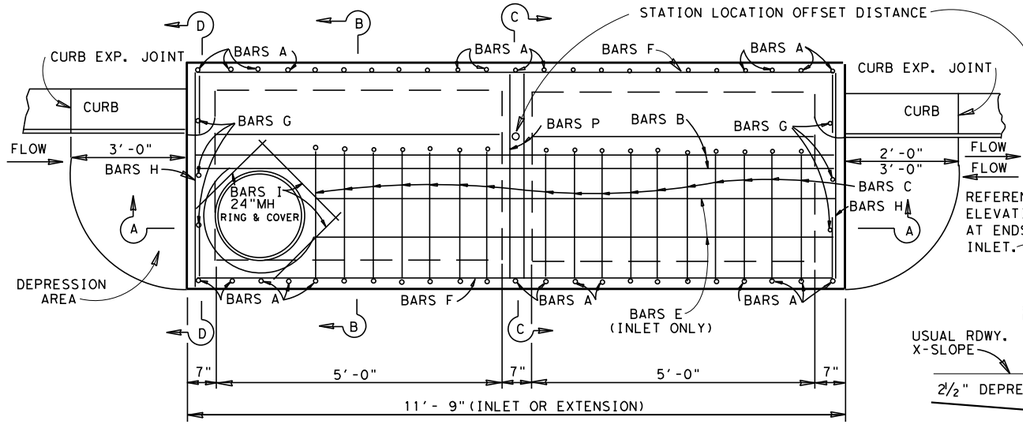
Texas Department of Transportation

Bridge Division Standard

CAST-IN-PLACE CURB INLET OUTSIDE ROADWAY

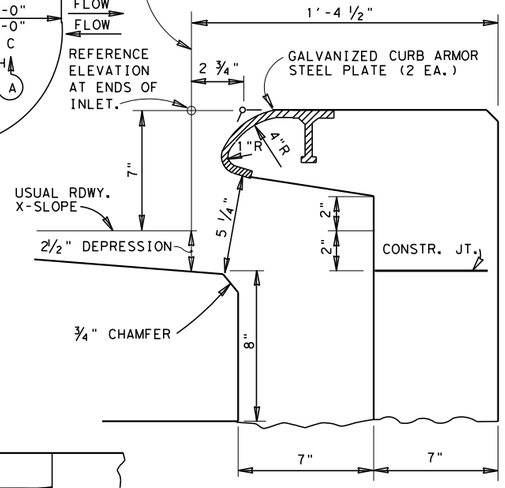
CCO

FILE: ccostds1-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		170

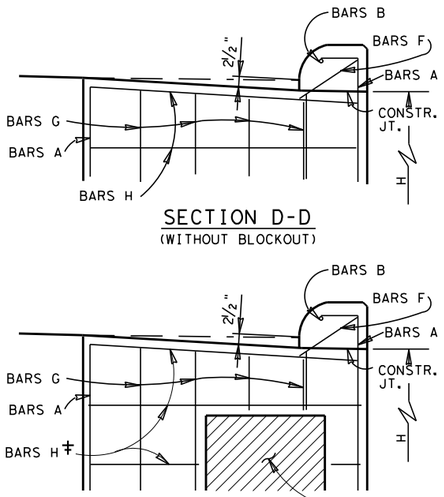


PLAN
(INLET OR EXTENSION)

NOTE: RING & COVER SHOWN ABOVE IS TO BE PLACED IN INLET ONLY.
FOR EXTENSION, CONTINUE REINF. STEEL THRU THIS AREA.



THROAT DETAIL



SECTION D-D
(WITHOUT BLOCKOUT)

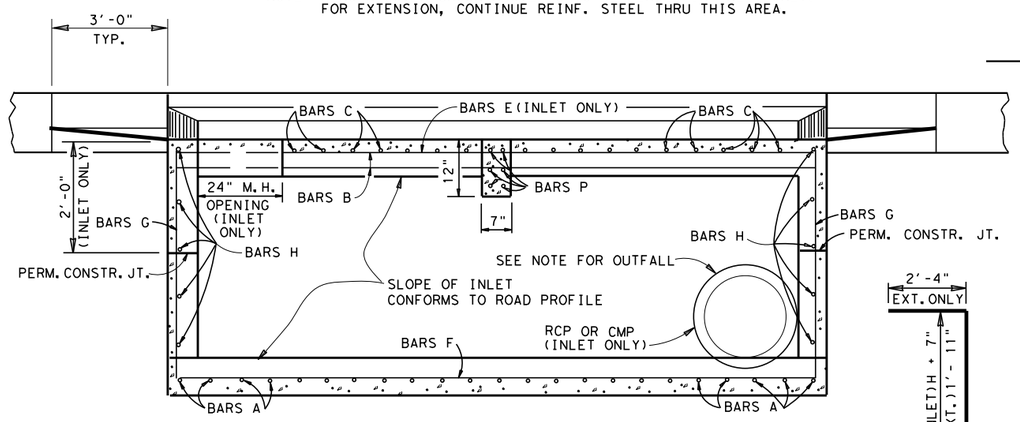
SECTION D-D
(WITH BLOCKOUT)

‡CUT OR BEND STEEL FOR BLOCKOUT AREA.

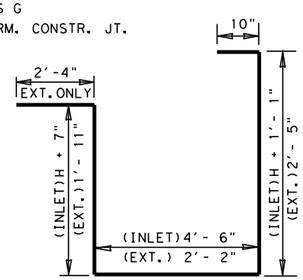
REINFORCING STEEL

ESTIMATED QUANTITIES - FOR "H" = 4'-10"					
BAR	NO.	SIZE	SPAC	LENGTH	WEIGHT
A	29	#4	5"	16'-8"	323
B	5	#5	3"	11'-5"	60
C	17	#5	6"	5'-7"	99
D	2	#5	—	7'-8"	16
E	2	#4	8"	9'-5"	13
F	17	#4	11"	14'-1"	160
G	6	#4	11"	4'-11"	20
H	10	#4	11"	4'-4"	29
I	3	#4	-	2'-4"	5
P	6	#5	-	4'-4"	27
TOTAL - REINF. STEEL - LBS.					752 ✳
TOTAL - CLASS "C" CONC. - CY.					5.60 ✳

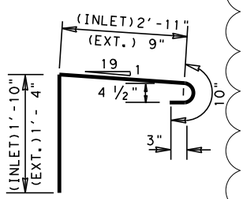
✳ FOR CONTRACTOR'S INFORMATION ONLY.
NO DEDUCTION MADE FOR PIPES.
QUANTITIES SHOWN ARE FOR "H" = 4'-10".
"H" MAY VARY



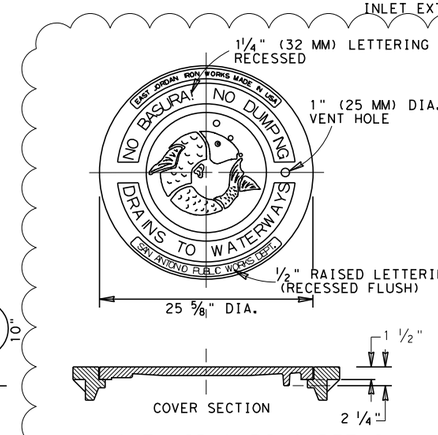
SECTION A-A



BAR A

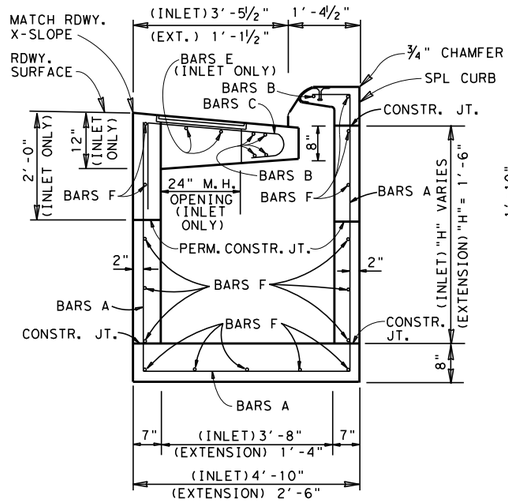


BAR C

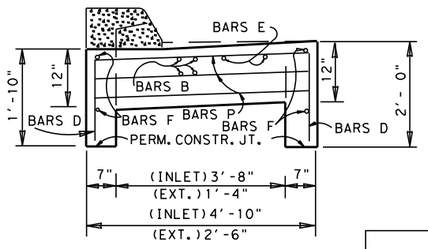


MANHOLE LID & RING DETAIL
(ITEM 409)

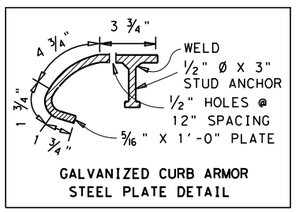
MODIFICATION
USED CITY OF SAN ANTONIO MANHOLE LID & RING INSTEAD OF TxDOT MANHOLE LID & RING



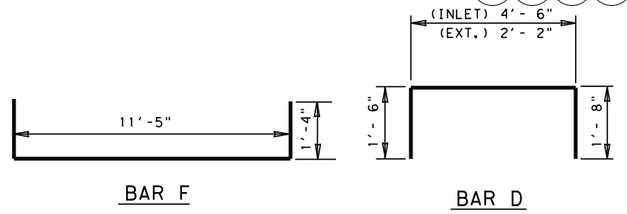
SECTION B-B



SECTION C-C
BEAM DETAIL



GALVANIZED CURB ARMOR STEEL PLATE DETAIL



BAR F

BAR D

BAR DETAILS

GENERAL NOTES :

CURB MUST BE CAST-IN-PLACE FROM BEGIN GUTTER TRANSITION TO END GUTTER TRANSITION INCLUDING OVER INLET.

OUTFALL PIPES WHICH LAY TRANSVERSE TO ROADWAY, AT INLETS ON GRADE, WILL BE PLACED AT LOW END OF INLET. OTHER PIPES MAY BE PLACED ON ANY SIDE OF INLET.

ALL EXPOSED CORNERS SHALL HAVE A ¾" CHAMFER.

FOR REINFORCING STEEL AND CONCRETE QUANTITIES FOR THE EXTENSION, SEE SHEET 2 OF 2.

IF THE ROADWAY CURB HEIGHT DOES NOT MATCH THE TOP OF THE INLET, TRANSITION THE ROADWAY CURB AT 40:1

PAYMENT FOR CONC., REINF. STEEL, M H RING & COVER, CURB ARMOR AND STEPS SHALL BE INCLUDED IN UNIT COST OF ITEM 465 "MANHOLE & INLETS".

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY CARLOS LUNA III, P.E. 125042

6/24/2020

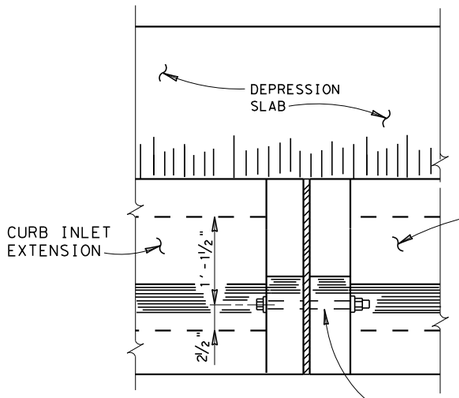
SAN ANTONIO DISTRICT STANDARD
CURB INLET TYPE C WITH INLET EXTENSION TYPE C-E (MOD)

SHEET 1 OF 2

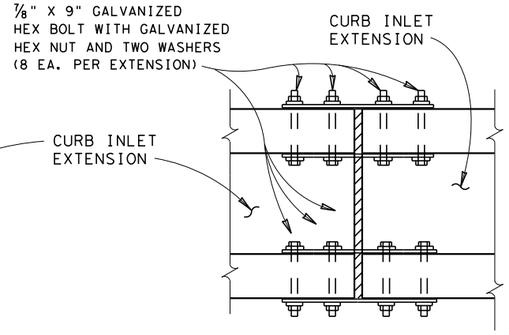
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			171
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.

3/01

STRUCTURE DESIGN
/BRIDGE/STDS/CURBINCE.DGN

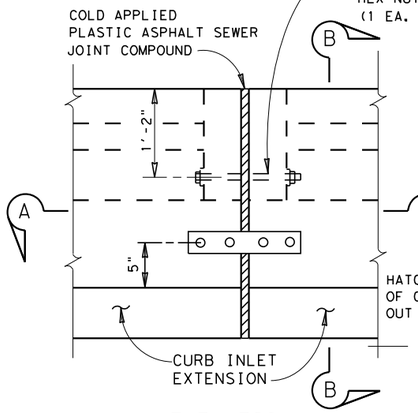


PLAN VIEW

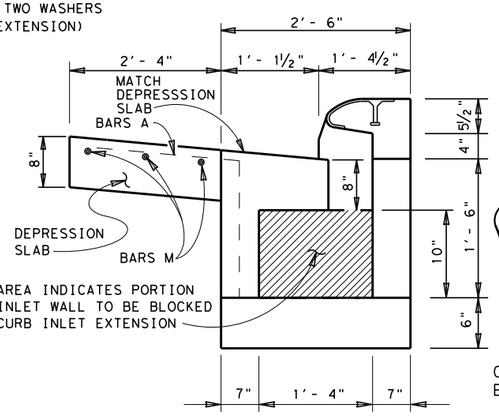


SECTION A-A

⅞" X 1'-3½" GALVANIZED HEX BOLT WITH GALVANIZED HEX NUT AND TWO WASHERS (1 EA. PER EXTENSION)



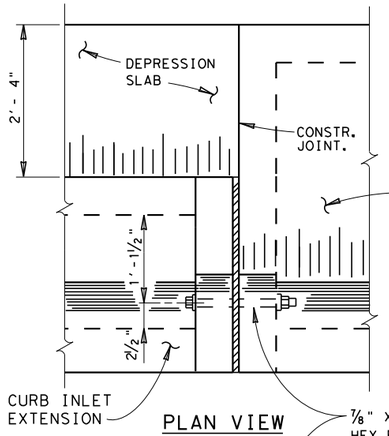
ELEVATION



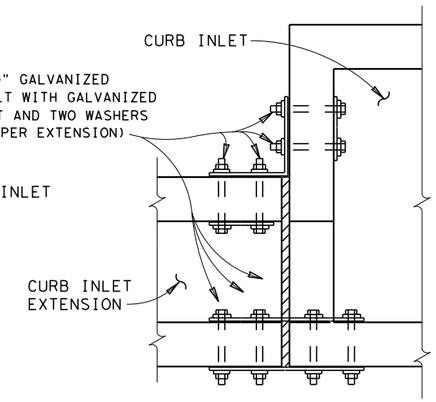
SECTION B-B

INLET BOLTING DETAILS

(SHOWING EXTENSION TO EXTENSION)

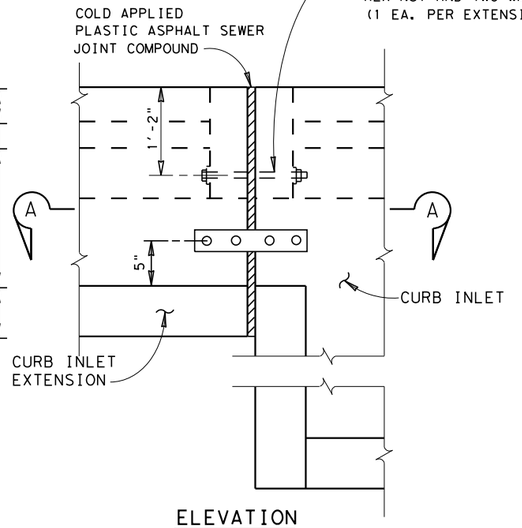


PLAN VIEW



SECTION A-A

⅞" X 1'-3½" GALVANIZED HEX BOLT WITH GALVANIZED HEX NUT AND TWO WASHERS (1 EA. PER EXTENSION)



ELEVATION

INLET BOLTING DETAILS

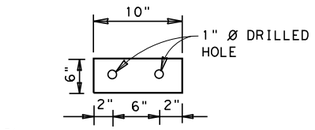
(SHOWING CURB INLET TO EXTENSION)

REINFORCING STEEL

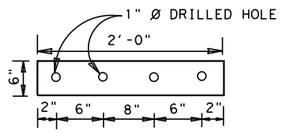
ESTIMATED QUANTITIES - (EXTENSION)

BAR	NO.	SIZE	SPAC	LENGTH	WEIGHT
A	29	#4	5"	9'-8"	187
B	5	#5	3"	11'-5"	60
C	20	#5	6"	2'-11"	61
F	12	#4	11"	14'-1"	113
G	4	#4	11"	1'-11"	5
H	6	#4	11"	2'-2"	9
P	4	#5	-	2'-2"	9
M	3	#4	10"	11'-5"	23
D	2	#5	-	5'-0"	11
TOTAL - REINF. STEEL - LBS.					478 ✳
TOTAL - CLASS "C" CONC. - CY.					3.55 ✳
TOTAL - CLASS "C" CONC. - CY. DEPRESSION SLAB					0.80 ✳

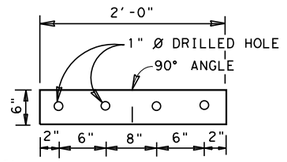
✳ FOR CONTRACTOR'S INFORMATION ONLY. NO DEDUCTION MADE FOR PIPES. QUANTITIES SHOWN ARE FOR "H" = 4'-10". "H" MAY VARY



⅜" X 6" X 10" GALVANIZED STEEL BOLTING EXTENSION TO CURB INLET
2 EACH REQUIRED



⅜" X 6" X 24" GALVANIZED STEEL BOLTING EXTENSION TO CURB INLET
2 EACH REQUIRED
BOLTING EXTENSION TO EXTENSION
4 EACH REQUIRED



⅜" X 6" X 24" GALVANIZED STEEL BOLTING EXTENSION TO CURB INLET
1 EACH REQUIRED

PLATES

NOTES:
WHEN INLET EXTENSIONS ARE REQUIRED FOR ON GRADE INLETS THE EXTENSION(S) SHALL BE PLACED ON THE UPSTREAM END OF THE INLET.
FOR CURB INLET EXTENSION REINFORCING STEEL, NOTES & VARIOUS OTHER APPLICABLE DETAILS NOT FOUND ON THIS SHEET, REFER TO SHEET 1.

SAN ANTONIO DISTRICT STANDARD

CURB INLET EXTENSION

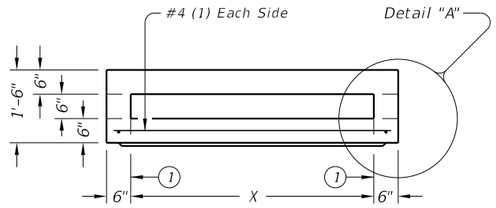
TYPE C-E

FED.RD. DIV.NO.	PROJECT NO.			SHEET NO.
6				172
STATE	STATE DISTRICT	COUNTY		
TEXAS	SAT			
CONT.	SECT.	JOB	HIGHWAY NO.	

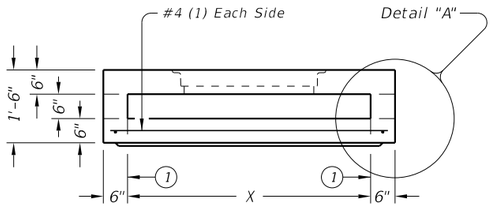
8/01

T:/ENGDATA/STANDARDS/CURBINCE.DGN

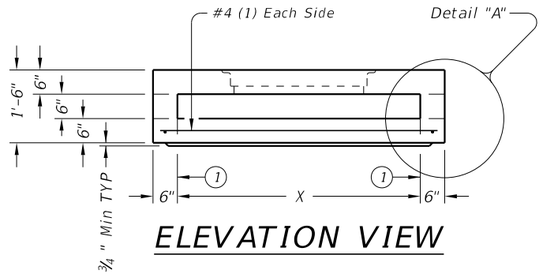
DATE:
FILE:



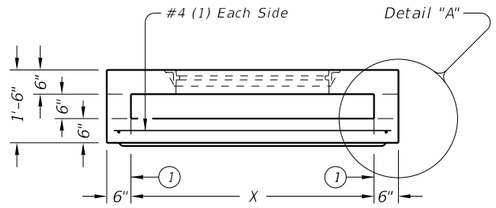
ELEVATION VIEW



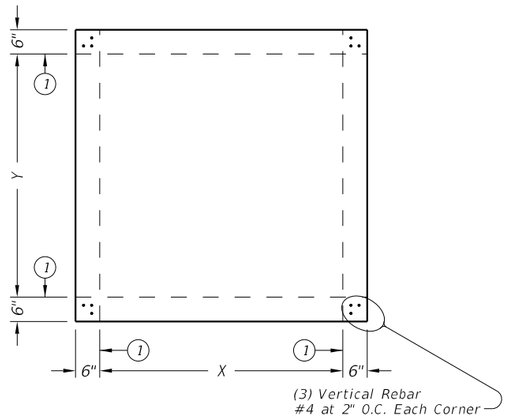
ELEVATION VIEW



ELEVATION VIEW

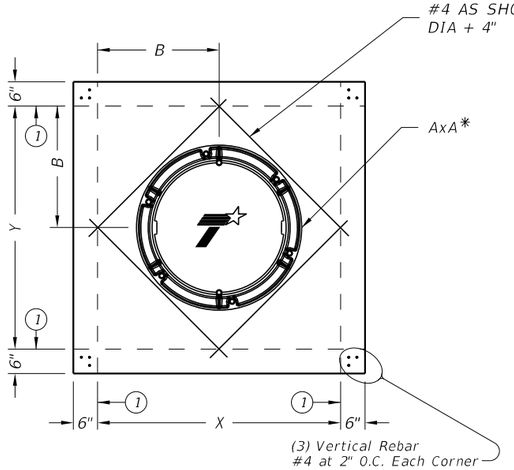


ELEVATION VIEW



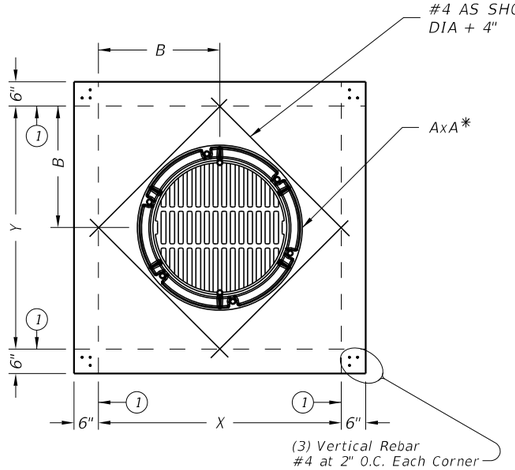
PLAN VIEW
NO OPENINGS

STYLE 'SL'



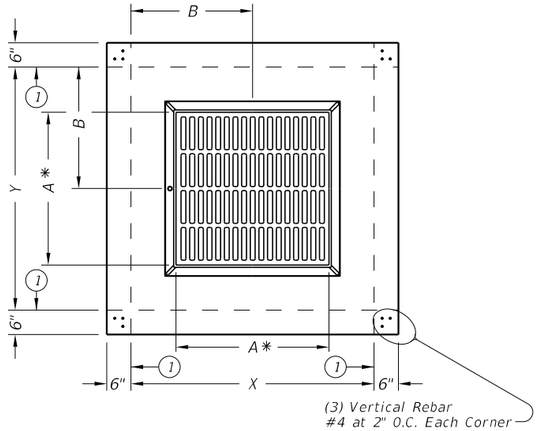
PLAN VIEW
32" DIA CAST-IN RING & COVER

STYLE 'RC'



PLAN VIEW
32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW
CAST-IN FRAME & GRATE

STYLE 'FG'

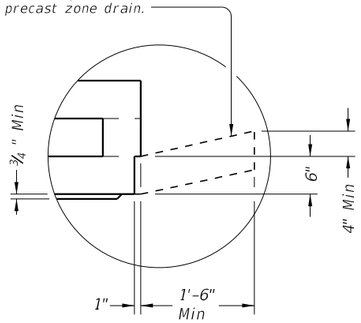
(1) Matches inside face of wall of precast base or riser below inlet.

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 for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
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. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct traffic and may not be placed in 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).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"
(Reinforcing not shown for clarity)
When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

Style	Size (X x Y)	A x A*	B x B	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	n/a	n/a	0.37 in²/ft	0.37 in²/ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
SL	4'x4'	n/a	n/a	0.34 in²/ft	0.34 in²/ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	3'x3'	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	4'x4'	2'x2'	0.34 in²/ft	0.34 in²/ft
SL	5'x5'	n/a	n/a	0.43 in²/ft	0.43 in²/ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in²/ft	0.68 in²/ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft

* Nominal frame/grate or ring/cover size.

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Bridge Division Standard

PRECAST AREA ZONE DRAIN

PAZD

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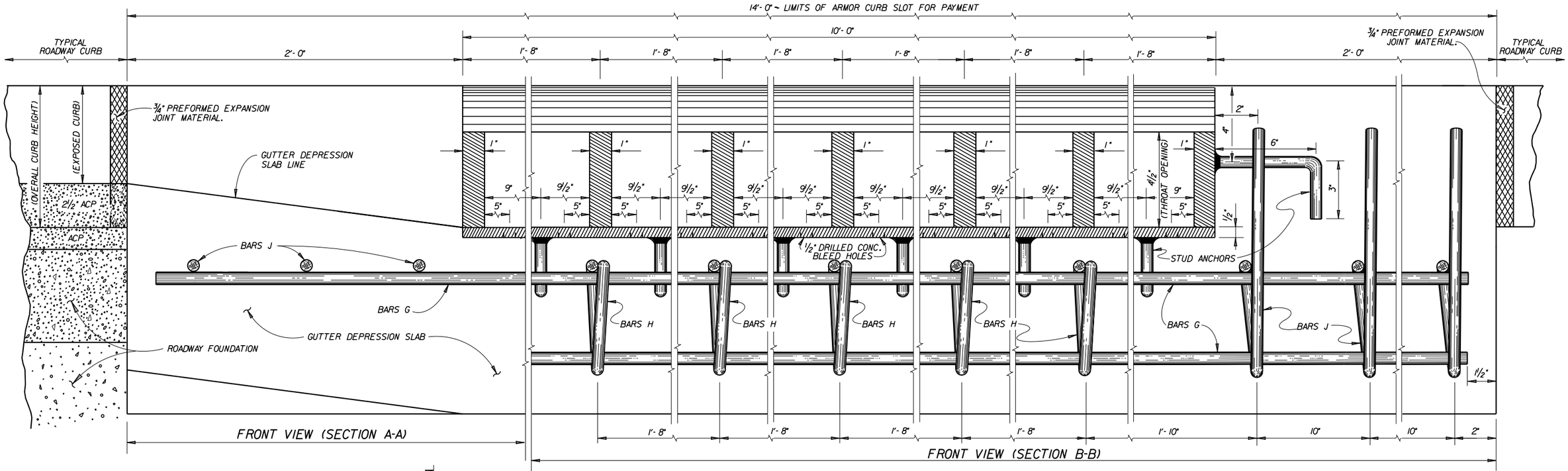
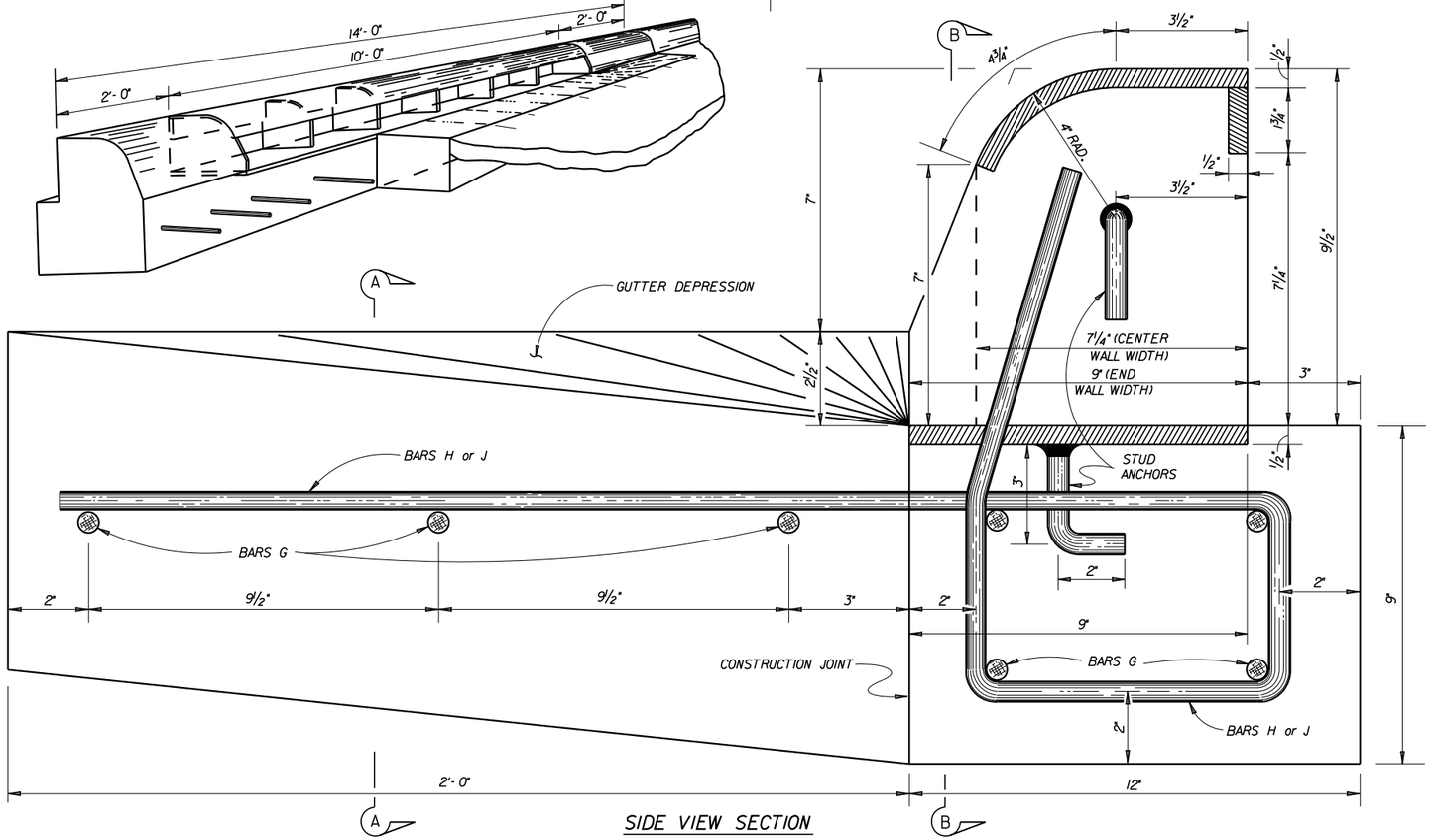
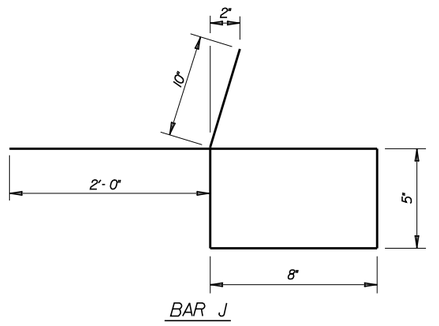
REVISIONS				
	DIST	COUNTY		SHEET NO.
				173







ESTIMATED QUANTITIES FOR REINFORCING STEEL

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
G	7	#4	SHOWN	13'- 9"	64
H	5	#4	1'- 8"	4'- 6"	15
J	6	#4	8"	5'- 0"	20
TOTAL WEIGHT *				LBS.	99
CONCRETE FOR FOUNDATION *				C.Y.	0.47
CONCRETE FOR GUTTER DEPRESSION *				C.Y.	0.78

STRUCTURAL STEEL FOR ARMOR CURB SLOT		
STUD ANCHORS (1/2" DIA.)	LBS.	3.5
STEEL PLATE	LBS.	451
TOTAL WEIGHT *	LBS.	454.5

* FOR CONTRACTORS INFO ONLY.

GENERAL NOTES:

ALL CONCRETE SHALL BE CL."A".

ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.

ALL SIDES OF ARMOR CURB SLOT AND STUD ANCHORS SHALL BE 1/4" FILLET WELDS.

ALL EXPOSED STRUCTURAL STEEL (ARMOR) SHALL BE GALVANIZED.

ALL EXPOSED EDGES ON ARMOR CURB SHALL RECEIVE A 1/8" BEVEL.

THE SHAPE OF THE TYPICAL ROADWAY CURB SHALL TRANSITION TO THE ARMOR CURB AS APPROVED BY THE ENGINEER.

ARMOR CURB SLOT

WITH CONCRETE FOUNDATION

SAN ANTONIO DISTRICT STANDARDS

10/95
REV. 07/01

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			174
STATE	STATE DISTRICT	COUNTY	
TEXAS	SAT		
CONT.	SECT.	JOB	HIGHWAY NO.

STRUCTURE DESIGN
/BRIDGE/STDS/ARMORCURB.DGN

DATE:
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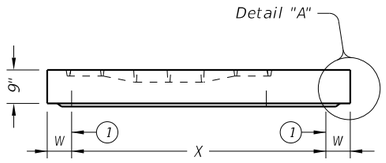
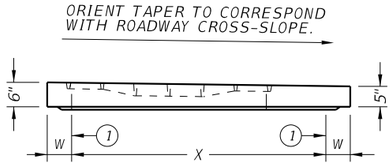
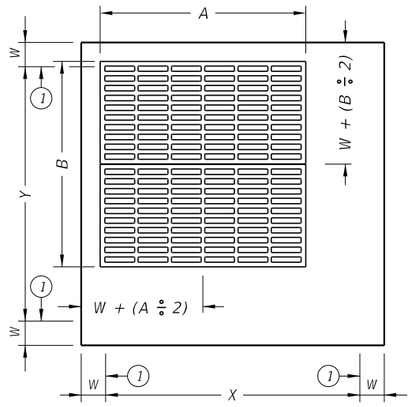


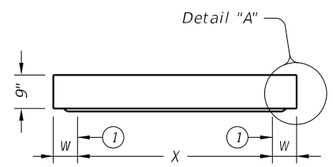
STYLE 'FG'



STYLE 'SFG'
ELEVATION VIEW

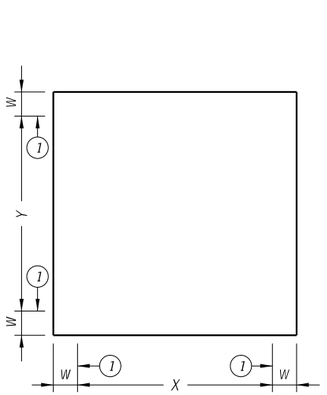


PLAN VIEW
CAST-IN FRAME & GRATE
STYLES 'FG' & 'SFG'

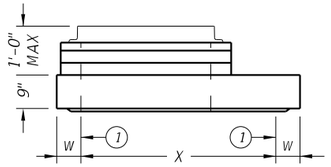


ELEVATION VIEW

STYLE 'SL'

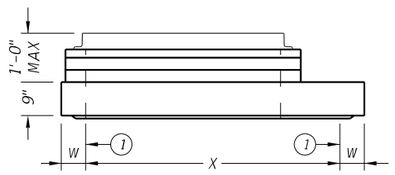


PLAN VIEW
NO OPENINGS

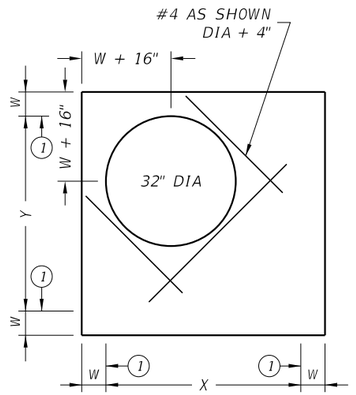


ELEVATION VIEW

STYLE 'SH'

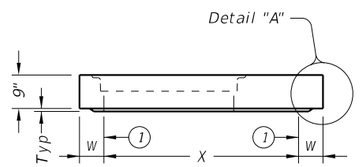


ELEVATION VIEW

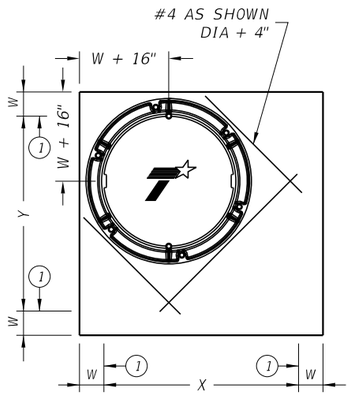


PLAN VIEW
SHIP LOOSE RING & COVER

STYLE 'RH'

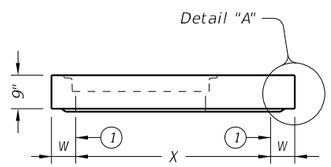


ELEVATION VIEW

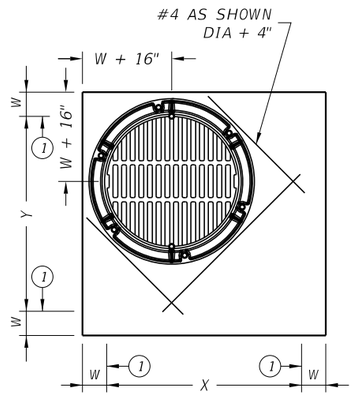


PLAN VIEW
32" DIA CAST-IN RING & COVER

STYLE 'RC'

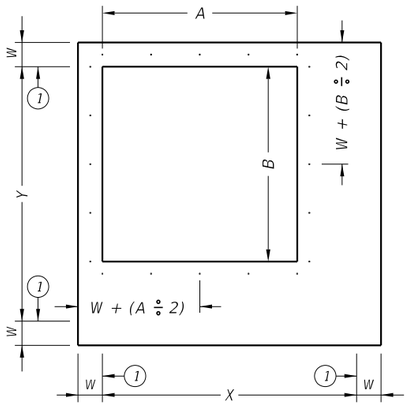


ELEVATION VIEW



PLAN VIEW
32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW
SHIP LOOSE FRAME & GRATE

STYLE 'SH'

PLAN VIEW
EXPOSED REBAR

STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING

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PRECAST SLAB LID

PSL

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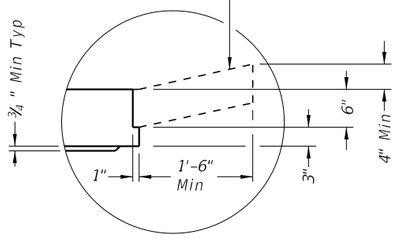
Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
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.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in 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.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid 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.

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Bridge Division Standard

PRECAST SLAB LID

PSL

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				176

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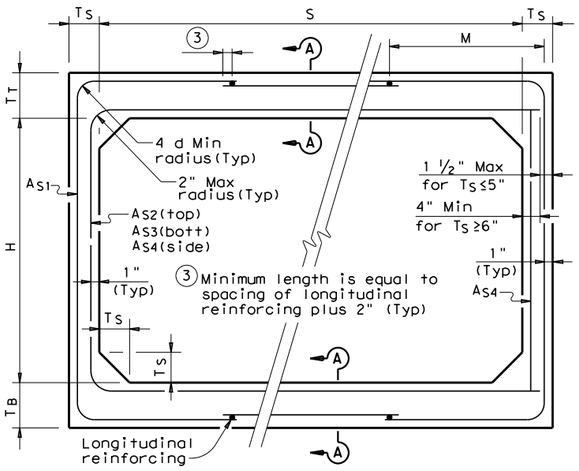
BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (in²/ft) ②								① Liff Weight (Tons)
S (ft)	H (ft)	T_T (in)	T_B (in)	T_S (in)	(ft)	(in)	A_{S1}	A_{S2}	A_{S3}	A_{S4}	A_{S5}	A_{S6}	A_{S7}	A_{S8}	
3	2	7	6	4	<2	-	0.17	0.25	0.16	0.10	0.17	0.17	0.17	0.14	3.3
3	2	4	4	4	2<3	31	0.13	0.19	0.18	0.10	-	-	-	-	2.4
3	2	4	4	4	3-5	31	0.10	0.11	0.12	0.10	-	-	-	-	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	-	-	-	-	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	-	-	-	-	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	-	-	-	-	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	-	-	-	-	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	-	-	-	-	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	-	-	-	-	2.4
3	3	7	6	4	<2	-	0.17	0.27	0.17	0.10	0.17	0.17	0.17	0.14	3.7
3	3	4	4	4	2<3	31	0.10	0.22	0.21	0.10	-	-	-	-	2.8
3	3	4	4	4	3-5	31	0.10	0.14	0.14	0.10	-	-	-	-	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	-	-	-	-	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	-	-	-	-	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	-	-	-	-	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	-	-	-	-	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	-	-	-	-	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	-	-	-	-	2.8

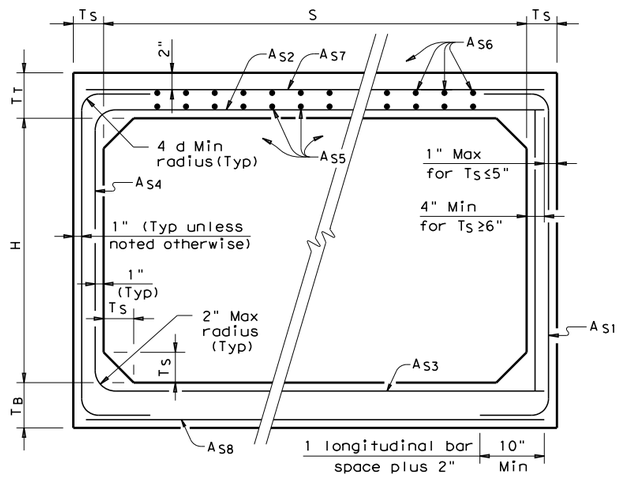
① For Box Length = 8'-0"

② A_{S1} thru A_{S4}, A_{S7} and A_{S8} are minimum required areas of reinforcement per linear foot of box length. A_{S6} and A_{S5} are minimum required areas of reinforcement per linear foot of box width.



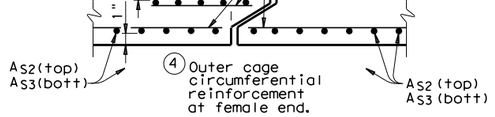
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT



SECTION A-A

(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)

GENERAL NOTES:

Designs shown conform to ASTM C1577.

Refer to ASTM C1577 for information or details not shown.

All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.

See SCP-MD standard sheet for miscellaneous 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. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

3'-0" SPAN

SCP-3

FILE: scp03sts.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT	CK: GAF
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	DIST	COUNTY		SHEET NO.
				177

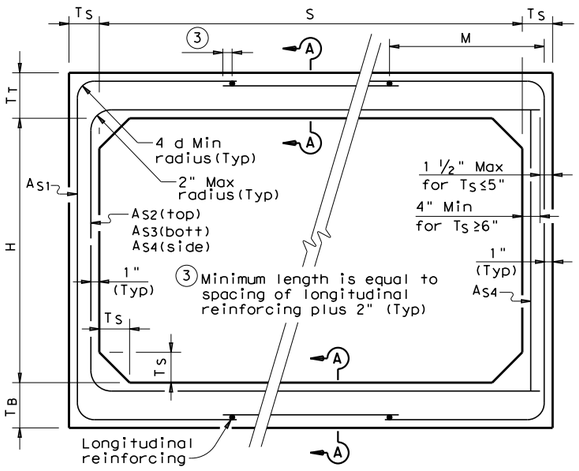
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (in²/ft) ②								① Lift Weight (Tons)
S (ft)	H (ft)	T_T (in)	T_B (in)	T_S (in)	(ft)	(in)	A_{S1}	A_{S2}	A_{S3}	A_{S4}	A_{S5}	A_{S6}	A_{S7}	A_{S8}	
4	2	7.5	6	5	<2	-	0.18	0.27	0.15	0.12	0.18	0.18	0.18	0.14	4.5
4	2	5	5	5	2<3	38	0.18	0.19	0.17	0.12	-	-	-	-	3.6
4	2	5	5	5	3-5	38	0.13	0.13	0.13	0.12	-	-	-	-	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	-	-	-	-	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	-	-	-	-	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	-	-	-	-	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	-	-	-	-	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	-	-	-	-	3.6
4	3	7.5	6	5	<2	-	0.18	0.31	0.18	0.12	0.18	0.18	0.18	0.14	5.0
4	3	5	5	5	2<3	38	0.15	0.23	0.20	0.12	-	-	-	-	4.1
4	3	5	5	5	3-5	38	0.12	0.16	0.16	0.12	-	-	-	-	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	-	-	-	-	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	-	-	-	-	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	-	-	-	-	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	-	-	-	-	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	-	-	-	-	4.1
4	4	7.5	6	5	<2	-	0.18	0.33	0.20	0.12	0.18	0.18	0.18	0.14	5.5
4	4	5	5	5	2<3	38	0.12	0.26	0.23	0.12	-	-	-	-	4.6
4	4	5	5	5	3-5	38	0.12	0.18	0.18	0.12	-	-	-	-	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	-	-	-	-	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	-	-	-	-	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	-	-	-	-	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	-	-	-	-	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	-	-	-	-	4.6

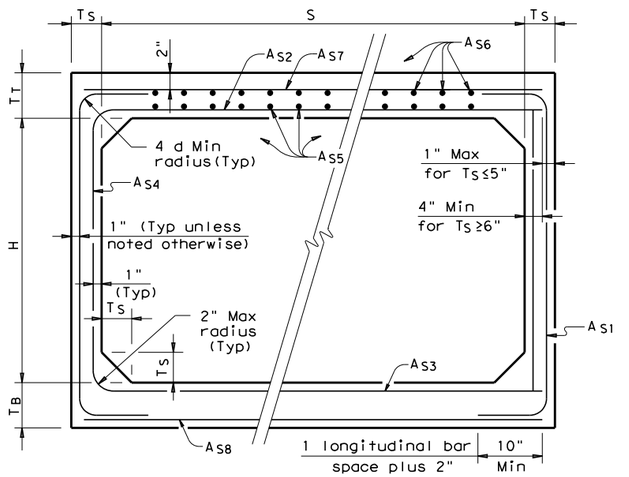
① For Box Length = 8'-0"

② A_{S1} thru A_{S4}, A_{S7} and A_{S8} are minimum required areas of reinforcement per linear foot of box length. A_{S6} and A_{S5} are minimum required areas of reinforcement per linear foot of box width.



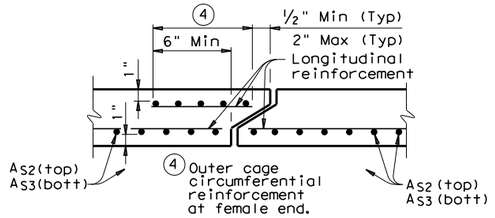
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT



SECTION A-A

(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)

GENERAL NOTES:

Designs shown conform to ASTM C1577.

Refer to ASTM C1577 for information or details not shown.

All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.

See SCP-MD standard sheet for miscellaneous 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. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

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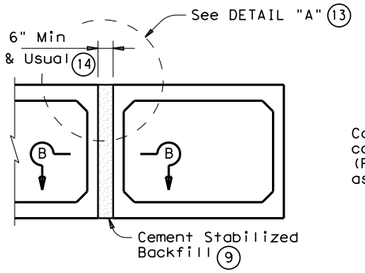
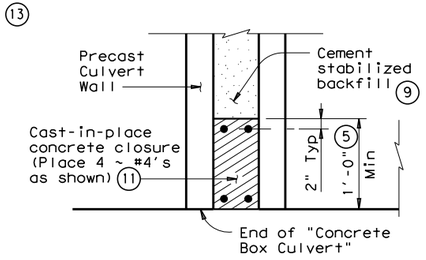
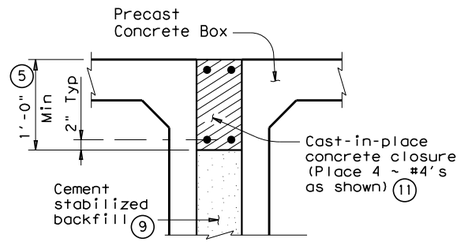


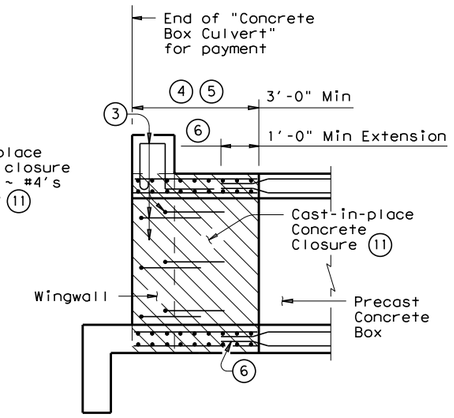
MULTIPLE UNIT PLACEMENT



SECTION B-B

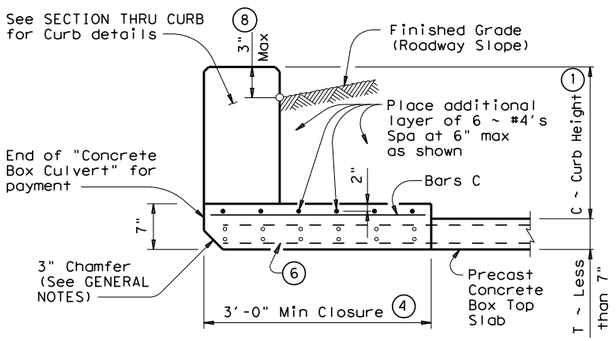


DETAIL "A" (13)

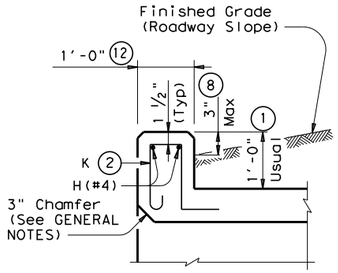


WINGWALL CONNECTION

(Also applies to Safety End Treatment)

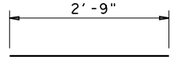


SECTION THRU TOP SLABS LESS THAN 7"

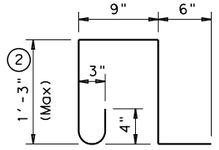


SECTION THRU CURB

(10) QUANTITIES PER FOOT OF CURB	
Reinforcing Steel	4.18 Lb
Concrete	0.037 CY



BARS C ~ #4
(Spa = 1'-0" Max)



BARS K ~ #4
(Spa = 1'-0" Max)
(Length = 4'-3")

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 ECD standard. For structures with T6 traffic rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
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. Curb, Wingwall or Safety End Treatment reinforcing shall extend into concrete closure. Any reinforcing that does not fit into the closure shall be bent or trimmed as necessary.
4. Cast-in-place concrete closure shall be 3'-0" min. Boxes shall be cast short or broken back in the field. All reinforcing in the closure shall be the same size and spacing as in the precast box section. Except where shown otherwise, the cast-in-place closure shall be flush with the inside and outside faces of the precast box section.
5. For multiple unit placements the length of the closure for the interior walls may be adjusted as necessary. The length of the top slab, bottom slab, and exterior wall closure shall not be less than 3'-0". See Section B-B detail when interior walls are cast full length.
6. Precast box reinforcing shall extend a minimum of 1'-0" into concrete closure (Typ).
7. Bands of reinforcing matching the inside and outside face reinforcing shall be placed in the gaps of the top and bottom slabs. A band matching the outside face reinforcing of the wall shall be placed in the gaps of the walls (placed in the outside face only). The bands shall be tack welded to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
   - For structures with bridge rail, curbs shall be flush with finished grade.

   Curb heights shall be reduced, 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 shall be considered as subsidiary to the Concrete Box Culvert.
12. 1'-0" typical. 2'-0" when RAC standard 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.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

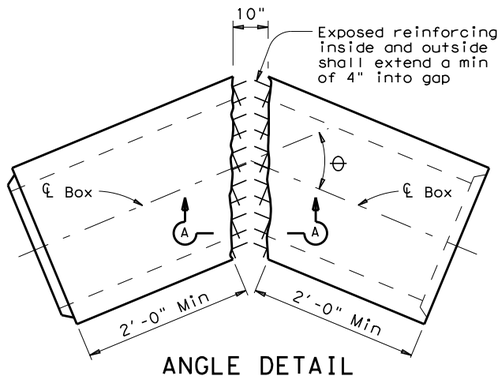
All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the Item, "Concrete Substructures".

Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert.

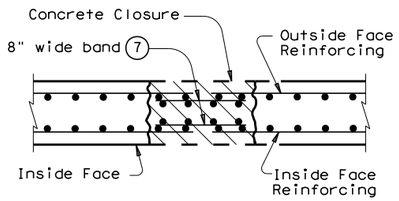
Refer to the Single Box Culverts Precast standard for details not shown.

The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.

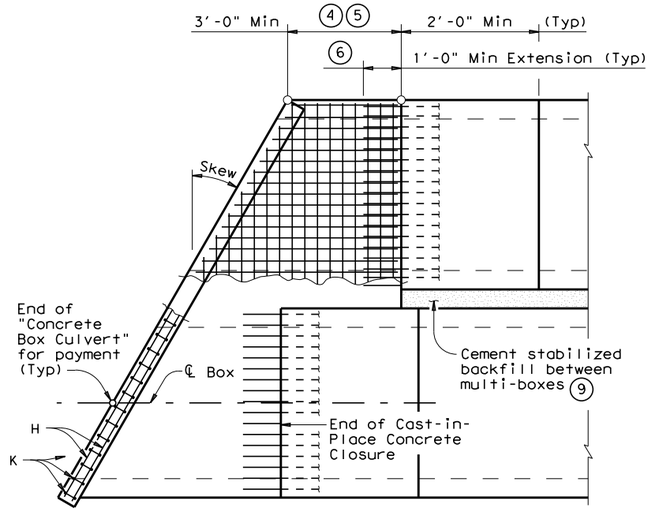
HL93 LOADING



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement)

Texas Department of Transportation

Bridge Division Standard

BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

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TABLE OF DIMENSIONS & 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 (3) per ft of wing length (2~Wings) 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

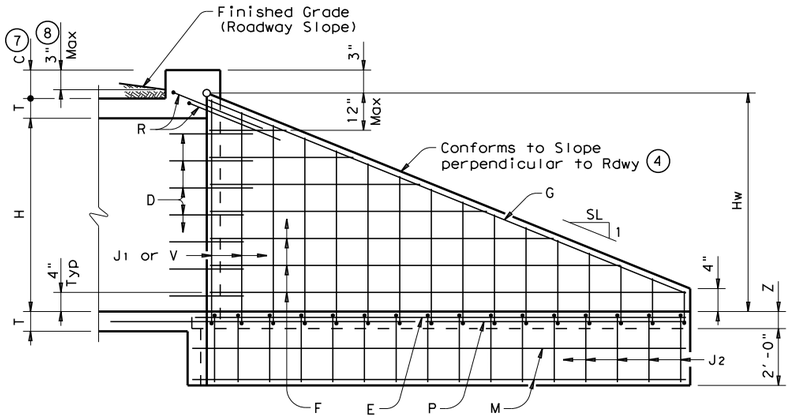
WING DIMENSION CALCULATIONS:

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) (0.500')
Total Wingwall Area (Two Wings ~ S.F.) = (Hw + 0.333') (Lw)

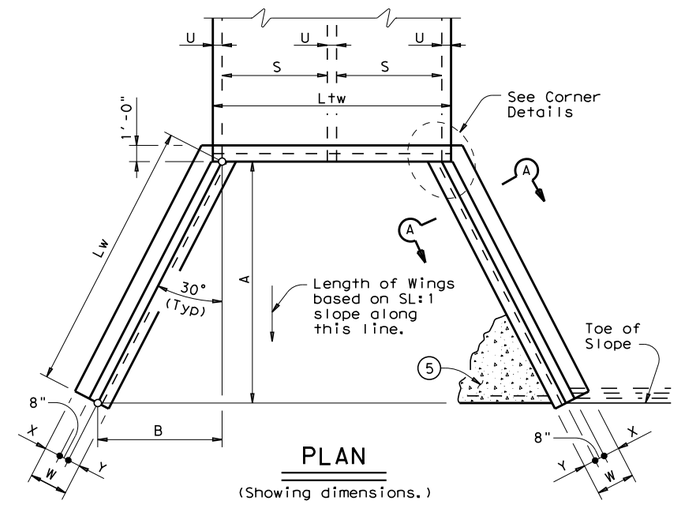
Hw = Height of Wingwall
SL:1 = Side Slope Ratio (Horizontal:1 Vertical)
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans

See applicable box culvert standard for H, S, T, and U values.



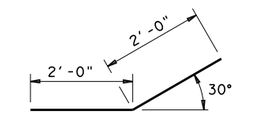
INSIDE ELEVATION

(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)

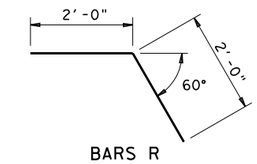


PLAN

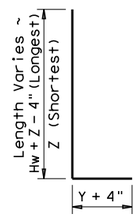
(Showing dimensions.)



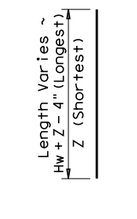
BARS D



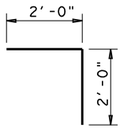
BARS R



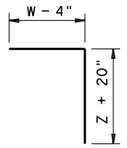
BARS J1



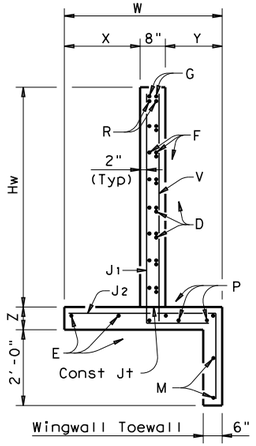
BARS V



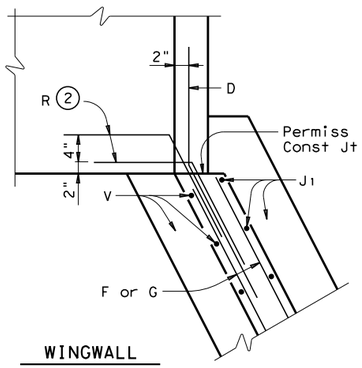
BARS L



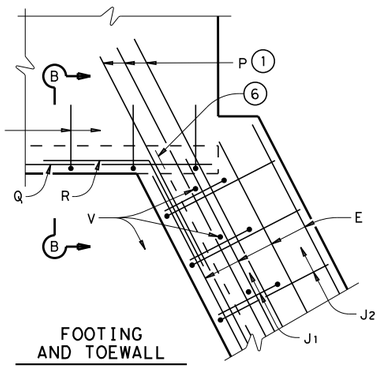
BARS J2



SECTION A-A



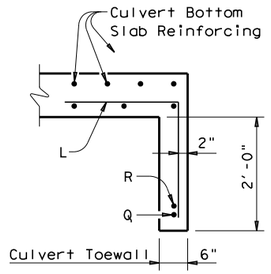
WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS

(Culvert and Culvert Toewall reinforcing not shown for clarity.)



SECTION B-B (5)

1. Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.
2. Adjust to fit as necessary to maintain 1 ¼" 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 Slope are: 2:1, 3:1, 4:1, & 6:1.
5. When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Payment for riprap shall be as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, the riprap shall have a 6" wide by 1'-6" deep reinforced concrete toewall along all edges adjacent to natural ground; the toewall shall be reinforced by extending typical riprap reinforcing into the toewall; construction joints or grooved joints, oriented in the direction of flow, shall extend 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 from that shown as necessary.
7. 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 ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
8. For vehicle safety, curb heights and wall heights shall be reduced, 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.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

All reinforcing steel shall be Grade 60.

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.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

All reinforcing bars shall be adjusted to provide a minimum of 1 ¼" clear cover.

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 BCS 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.

Texas Department of Transportation

Bridge Division Standard

CONCRETE WINGWALLS
WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

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TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

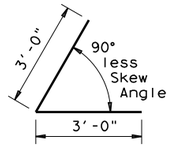
Dimensions					Variable Reinforcing				Estimated ④ Quantities per ft of wing (2~Wings)		Estimated Quantities per ft of Toewall (1~Toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'- 0"	7"	#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)

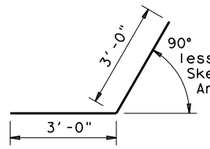
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

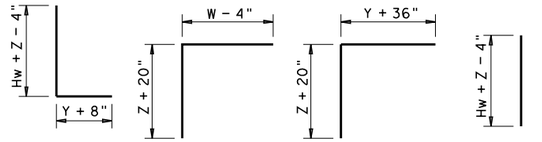
Bar	Size	No	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



BARS D1



BARS D2



BARS J1 BARS J2 BARS J3 BARS V

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

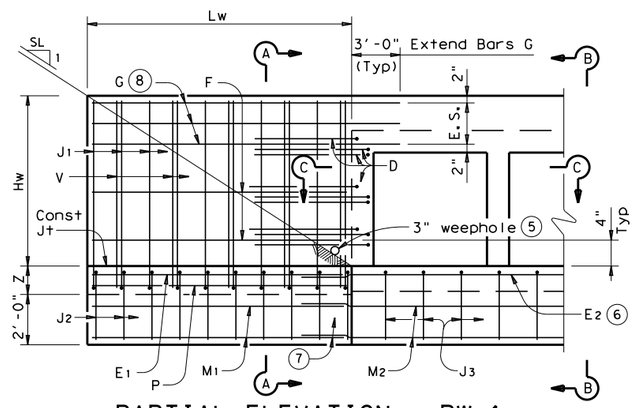
Hw = H + T + C
Lw = (Hw) (SL) ÷ Cosine θ for Ty PW-1
= (Hw - 1') (SL) ÷ Cosine θ for Ty PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ Cosine θ for Ty PW-2 and Hw < 4'

For Cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ Cosine θ

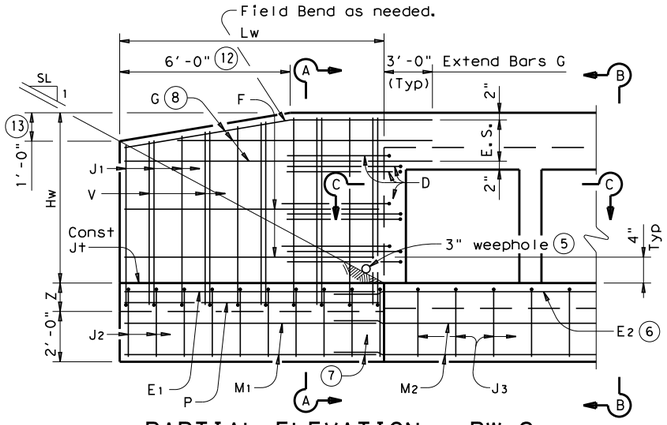
For Precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ Cosine θ
Total Wingwall Area (Two Wings ~ SF)
= (2)(Hw)(Lw) for Ty PW-1
= (2)(Hw)(Lw) - 6 SF for Ty PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Ty PW-2 and Hw < 4'

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

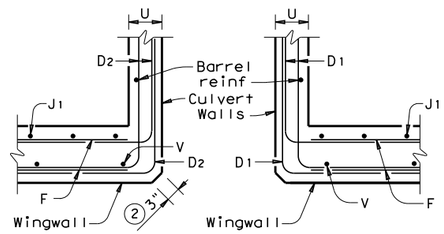
See applicable box culvert standard for S, H, T and U values.



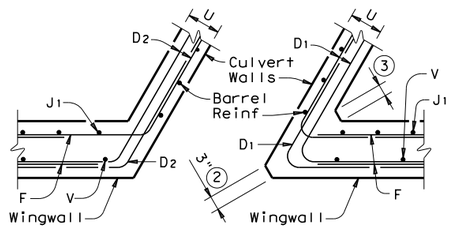
PARTIAL ELEVATION - PW-1



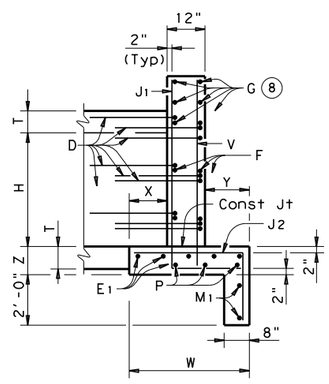
PARTIAL ELEVATION - PW-2



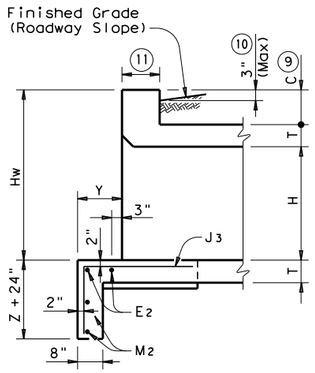
SECTION C-C



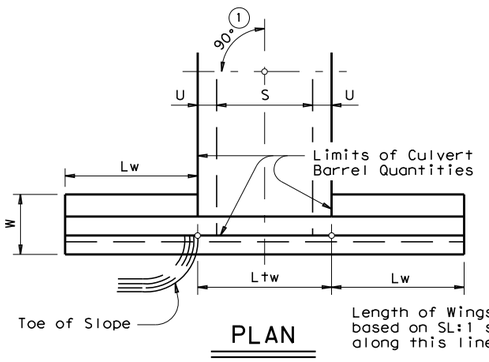
SECTION C-C



SECTION A-A
(Showing Wing Reinf)

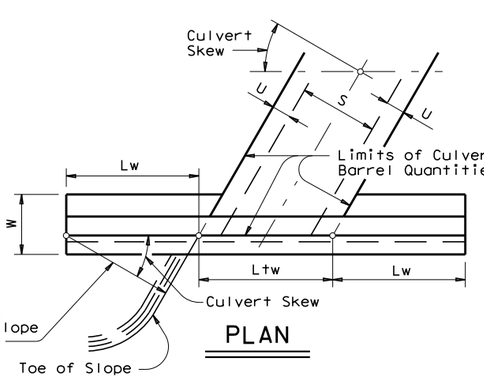


SECTION B-B
(Showing Wing Reinf)



PLAN

DETAILS FOR
NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR
SKEWED BOX CULVERTS
(Showing 30° Skew)

① Skew Angle = 0°

② At discharge end, chamfer may be ¾".

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 Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair 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, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

⑩ For vehicle safety, the following requirements must be met:
- For structures without bridge rail, curbs cannot project more than 3" above finished grade.
- For structures with bridge rail, build 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'-0" typical when RAC standard is referenced elsewhere in the plans.

⑫ 3'-0" for Hw < 4'.

⑬ 6" for Hw < 4'.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.
Provide 1 ¼" Min clear cover to reinforcing steel.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See BCS sheet for wingwall type and additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

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.

Texas Department of Transportation
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

FILE: pwstde01.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2.	DIST	COUNTY		SHEET NO.
				181

DATE:
FILE:

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

Dimensions					Variable Reinforcing				Estimated ③ Quantities per ft of wing length (2~Wings)	
					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

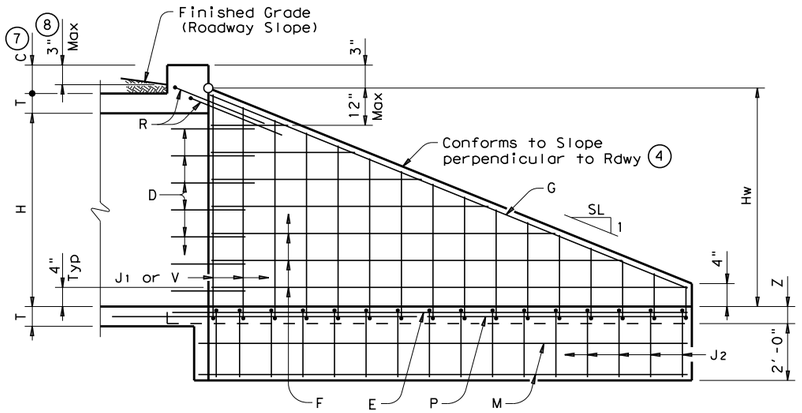
Bar	Size	No.	Spa
L	#4	~	1'-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)
Hw = H + T + C - 0.250'
Lw = (Hw - 0.333') (SL)
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 ~ S.F.) = (Hw + 0.333') (Lw)

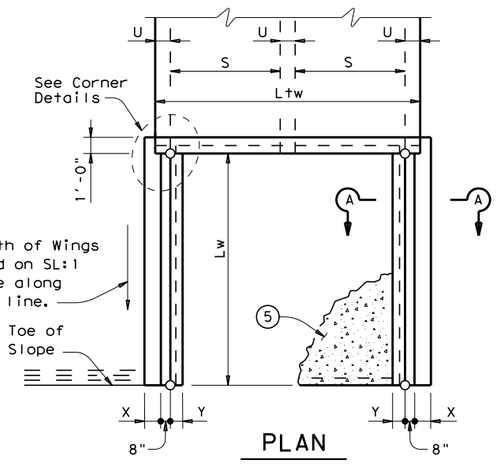
Hw = Height of Wingwall
SL:1 = Side Slope Ratio (Horizontal:1 Vertical)
Lw = Length of Wingwall
Ltw = Culvert Toewall Length
N = Number of Culvert Spans

See applicable box culvert standard for H, S, T, and U values.



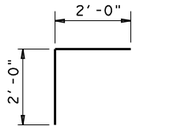
INSIDE ELEVATION

(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)

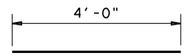


PLAN

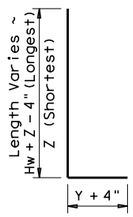
(Showing Dimensions)



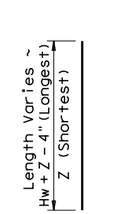
BARS R



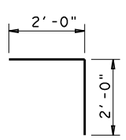
BARS D



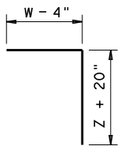
BARS J1



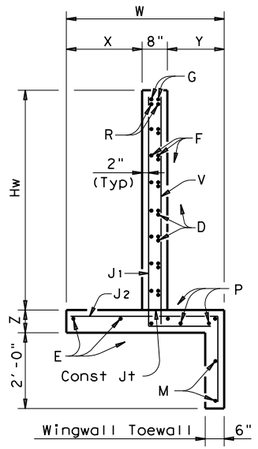
BARS V



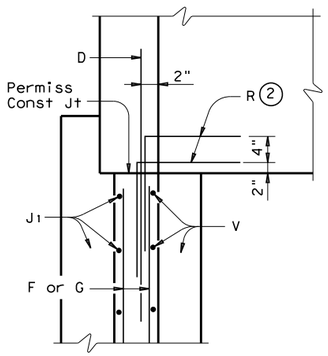
BARS L



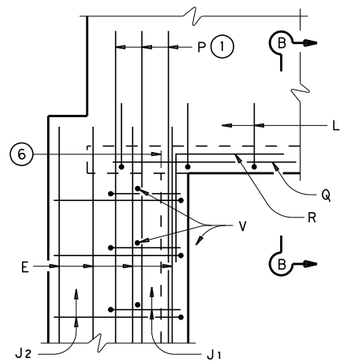
BARS J2



SECTION A-A

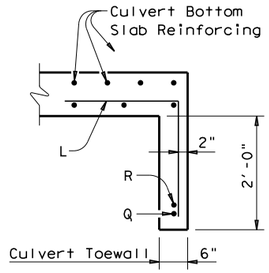


WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS



SECTION B-B ⑤

① Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.

② Adjust to fit as necessary to maintain 1 ¼" 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 Slope are: 2:1, 3:1, 4:1, & 6:1.

⑤ When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Payment for riprap shall be as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, the riprap shall have a 6" wide by 1'-6" deep reinforced concrete toewall along all edges adjacent to natural ground; the toewall shall be reinforced by extending typical riprap reinforcing into the toewall; construction joints or grooved joints, oriented in the direction of flow, shall extend 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 from that shown as necessary.

⑦ 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 ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.

⑧ For vehicle safety, curb heights and wall heights shall be reduced, 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.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

All reinforcing steel shall be Grade 60.

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.

All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

All reinforcing bars shall be adjusted to provide a minimum of 1 ¼" clear cover.

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 BCS 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.

Texas Department of Transportation

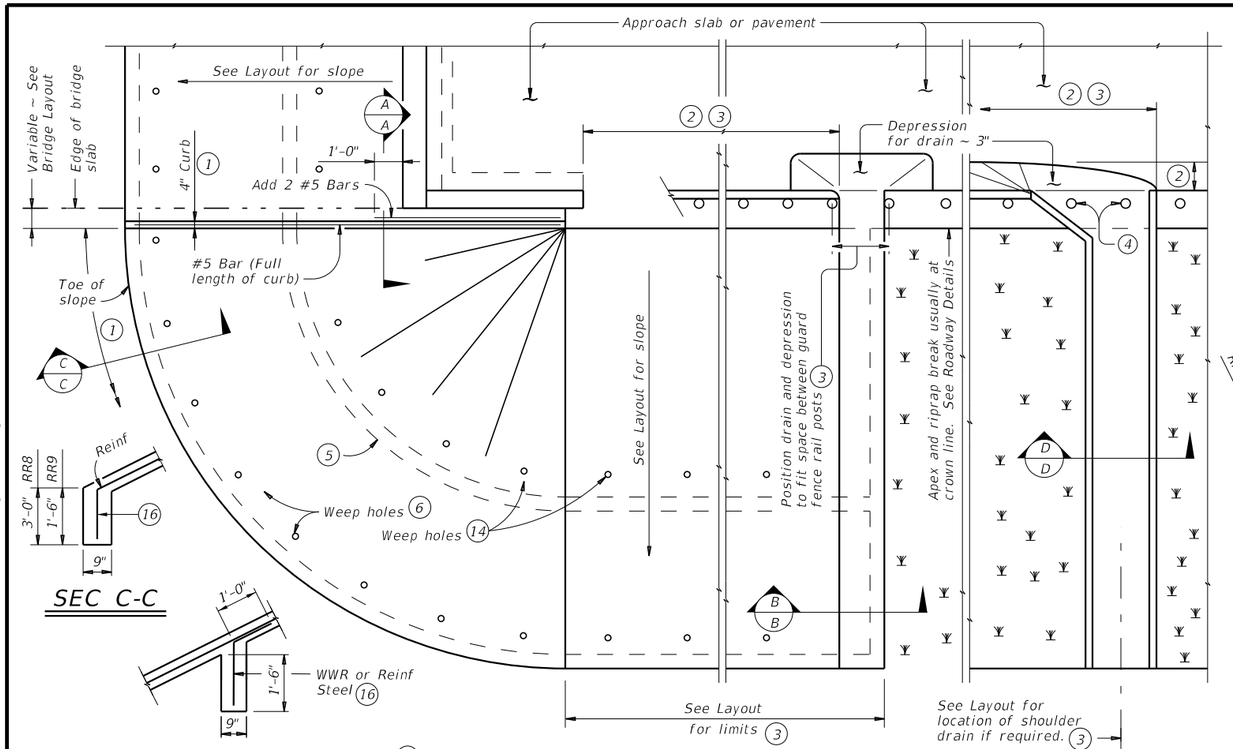
Bridge Division Standard

CONCRETE WINGWALLS
WITH STRAIGHT WINGS FOR 0° SKEW BOX CULVERTS

SW-0

FILE: sw-0std e.dgn	DN: GAF	CK: CAT	DW: TxDOT	CK: GAF
©TxDOT February 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
11-10: Add note for synthetic fibers.	DIST	COUNTY		SHEET NO.
				182

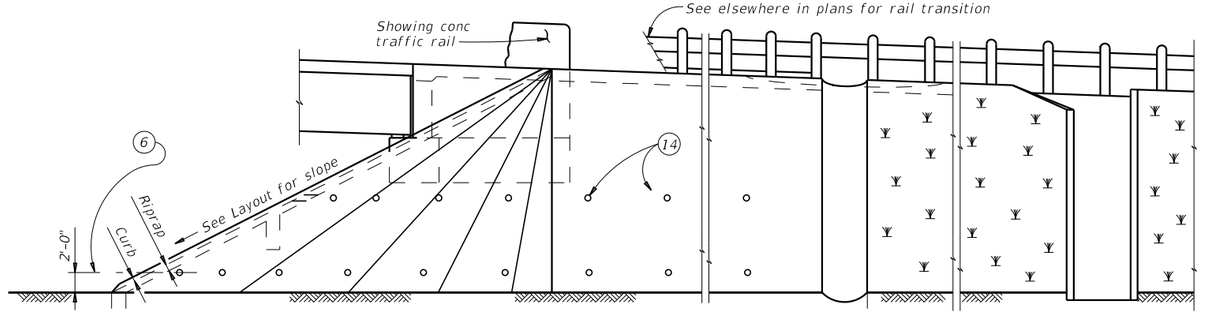
DATE:
FILE:



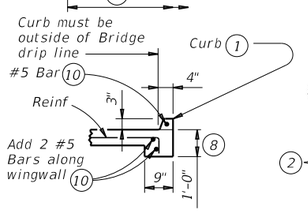
SEC C-C

INTERMEDIATE TOEWALL 5

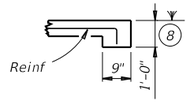
PLAN



ELEVATION

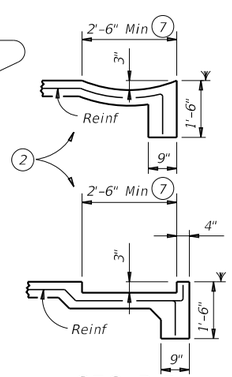


SEC A-A



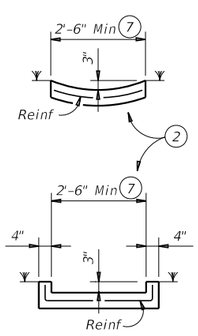
SEC B-B

(No drain)



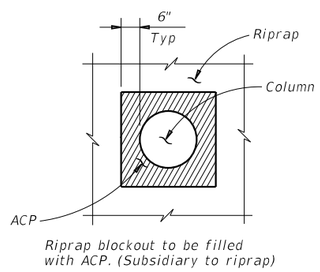
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

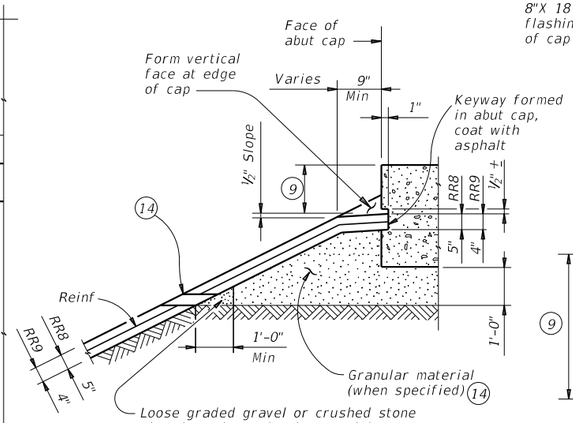
(Shoulder drain)



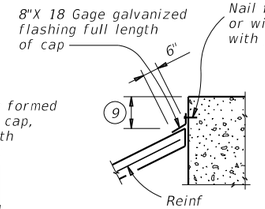
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

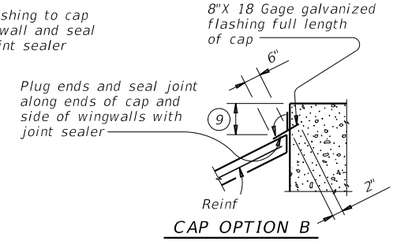
(As directed by the Engineer)



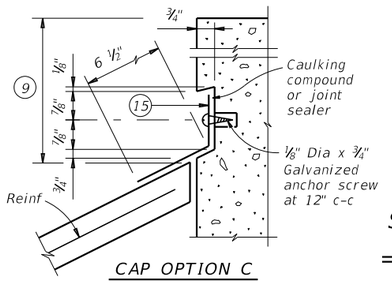
SHOWING KEYWAY OPTION



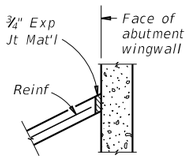
CAP OPTION A



CAP OPTION B

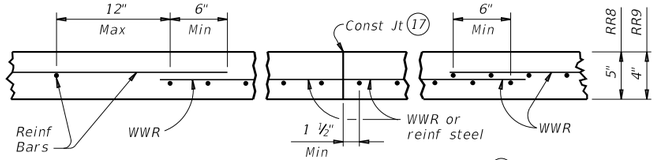


CAP OPTION C



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 Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-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 Galv 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 Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO. 183

DATE:
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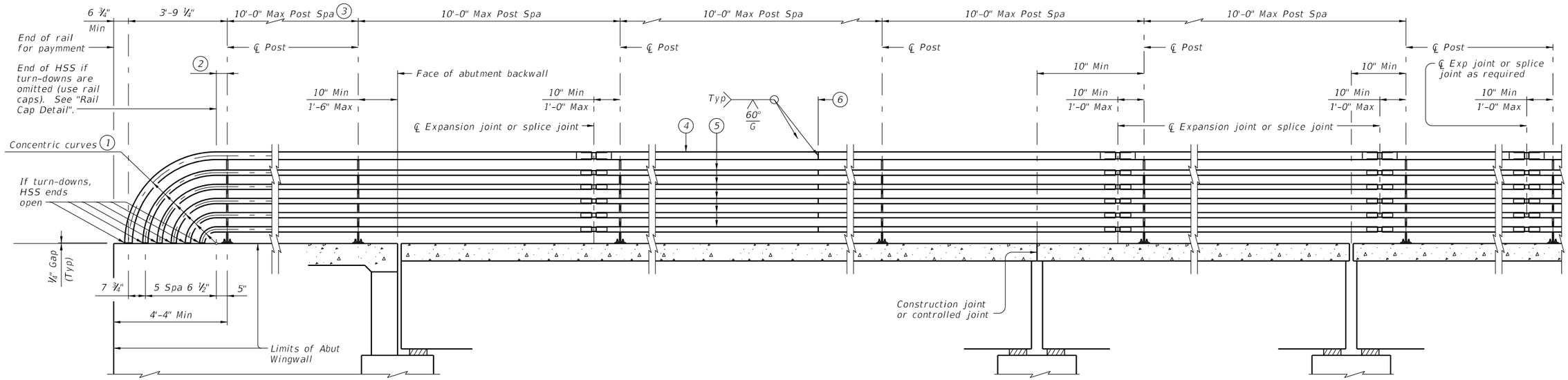
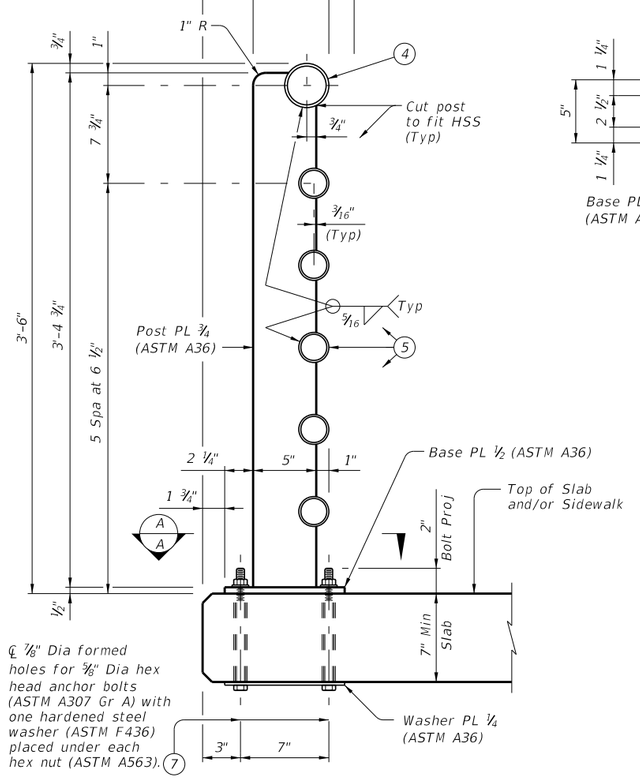


AT ABUTMENTS

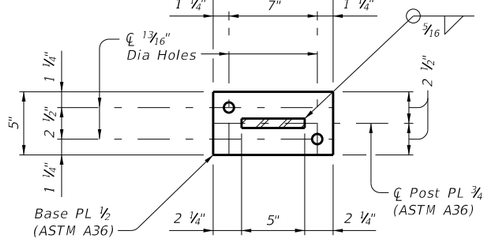
AT BENTS WITHOUT SLAB EXP JOINTS

AT BENTS WITH SLAB EXP JOINTS

ROADWAY ELEVATION OF RAIL

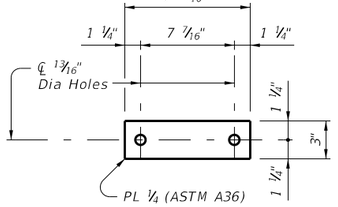


ON BRIDGE SLAB

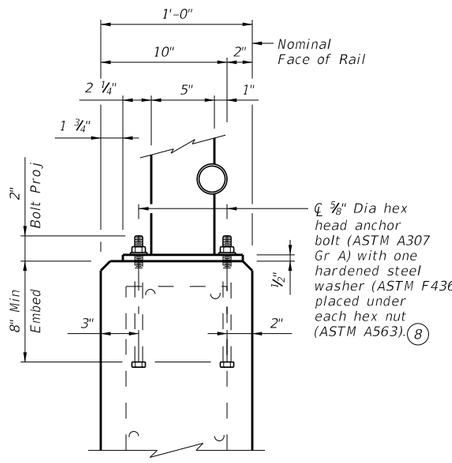


SECTION A-A

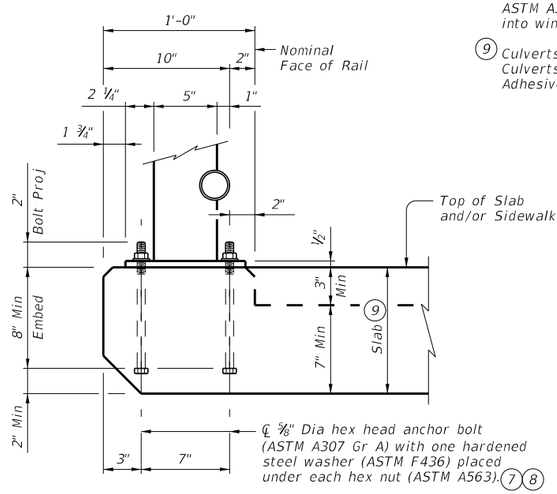
Showing base plate detail.



WASHER PLATE DETAIL



ON ABUTMENT WINGWALLS OR CIP RETAINING WALLS



ON CULVERTS WITH OR WITHOUT CURBS

Used with 1'-0" Min thick parallel wings on culverts.

SECTIONS THRU RAIL

(1) Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.

(2) 10" Min ~ 1'-6" Max if turn-downs are omitted.

(3) Min of 2 posts required on wingwall.

(4) HSS 3.500 x 0.216 (Rail Member)

(5) HSS 2.375 x 0.154 (Rail Member)

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

(7) At Contractor's option, adhesive anchors may be used. Adhesive anchors must be ⅝" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 5" into slabs or culverts without curbs. See "Material Notes" for adhesive anchor requirements.

(8) At Contractor's option, adhesive anchors may be used. Adhesive anchors must be ⅝" Dia ASTM A307 Grade A fully threaded rods. Minimum adhesive anchor embedment depth is 7" into wingwalls or culverts with curbs. See "Material Notes" for adhesive anchor requirements.

(9) Culverts without curbs for cast-in-place anchor bolts require a 10" Min slab thickness. Culverts with curbs for cast-in-place anchor bolts require a curb plus slab thickness of 10" Min. Adhesive anchors may be used with a 7" Min slab thickness or culverts with curbs.

Texas Department of Transportation

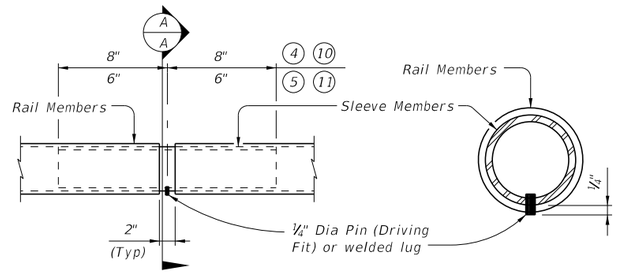
Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR11

FILE: rlstd028-18.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT March 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				184

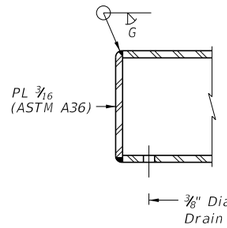
DATE:
FILE:



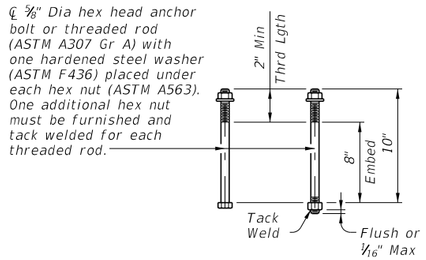
AT SPLICES OR EXP JTS

SECTION A-A

PIPE SPLICE DETAIL



RAIL CAP DETAIL



CAST-IN-PLACE & FORMED HOLE ANCHOR BOLT OPTIONS

4 HSS 3.500 x 0.216 (Rail Member)

5 HSS 2.375 x 0.154 (Rail Member)

10 HSS 2.875 x 0.203 (Sleeve Member)

11 HSS 1.900 x 0.145 (Sleeve Member)

CONSTRUCTION NOTES:

Panel lengths of railing must be attached to a minimum of three posts except at abutment wingwalls.

At the Contractor's option anchor bolts may be an adhesive anchorage system. See "Material Notes".

Test adhesive anchors in accordance with Item 450.3.3, "Tests". Test 3 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

Face of rail and posts must be vertical transversely unless otherwise approved. Posts must be perpendicular to adjacent roadway grade. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist.

For curved railing applications, fabricate the HSS rail to the radius when the radius is 600' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

MATERIAL NOTES:

Provide ASTM A500 Gr B, A1085 or A53 Gr B for all HSS.

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.

Anchor bolts must be ⅝" Dia ASTM A307 Gr A with one hardened steel washer (ASTM F436) placed under each hex nut or ASTM A307 Gr A threaded rods with one tack welded hex nut each and with one hex nut with one hardened steel washer (ASTM F436) each. Nuts must conform to ASTM A563 requirements.

Optional adhesive anchorage system must be ⅝" Dia ASTM A307 Gr A fully threaded rods with one hex nut and one hardened steel washer (ASTM F436). Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into slab, wingwalls, or culvert curbs using a Type III, Class C, D, E, or F anchor adhesive. Anchor adhesive chosen must be able to achieve a nominal bond strength in tension, Na, of a single anchor of 10 kips (edge distance must be accounted for). Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

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

For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval.

Average weight of railing is 30 plf.

Texas Department of Transportation

Bridge Division Standard

PEDESTRIAN RAIL

TYPE PR11

FILE: rlstd028-18.dgn	DN: TAR	CK: TBE	DW: JTR	CK: TAR
©TxDOT March 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.
				185

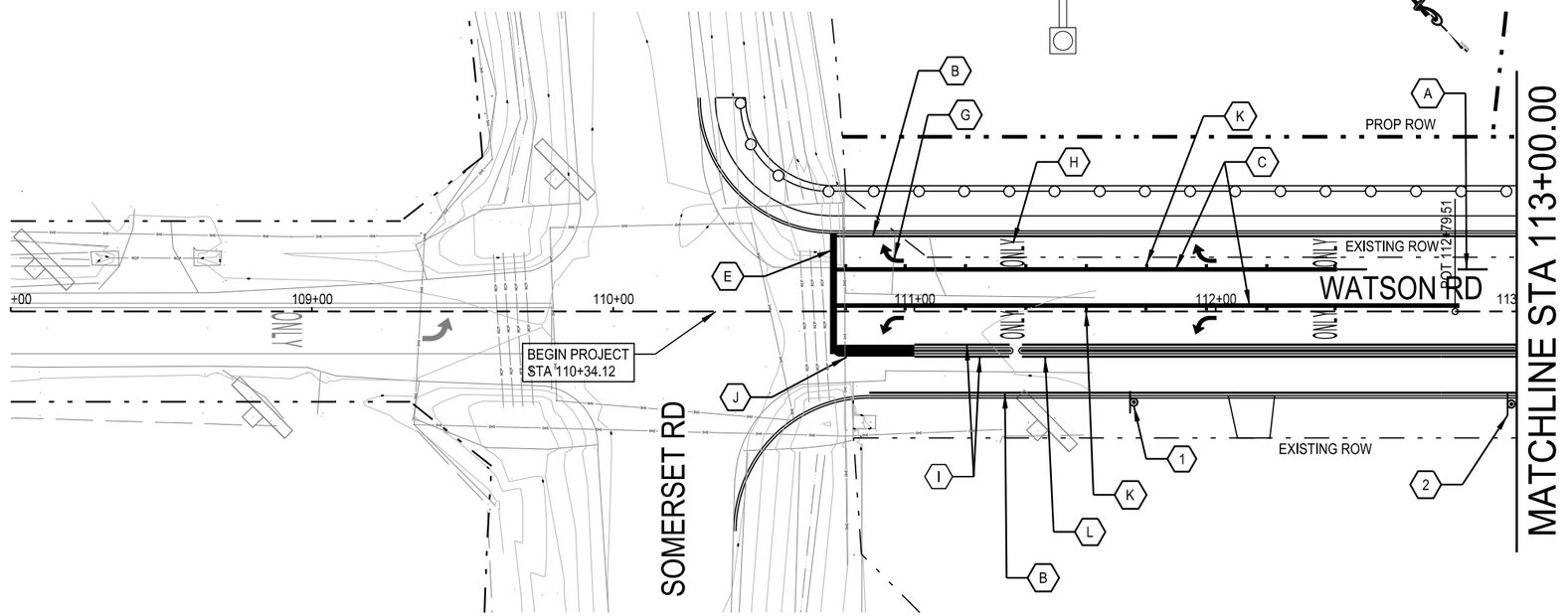
1 SPEED LIMIT 40 R2-1 30 x 36

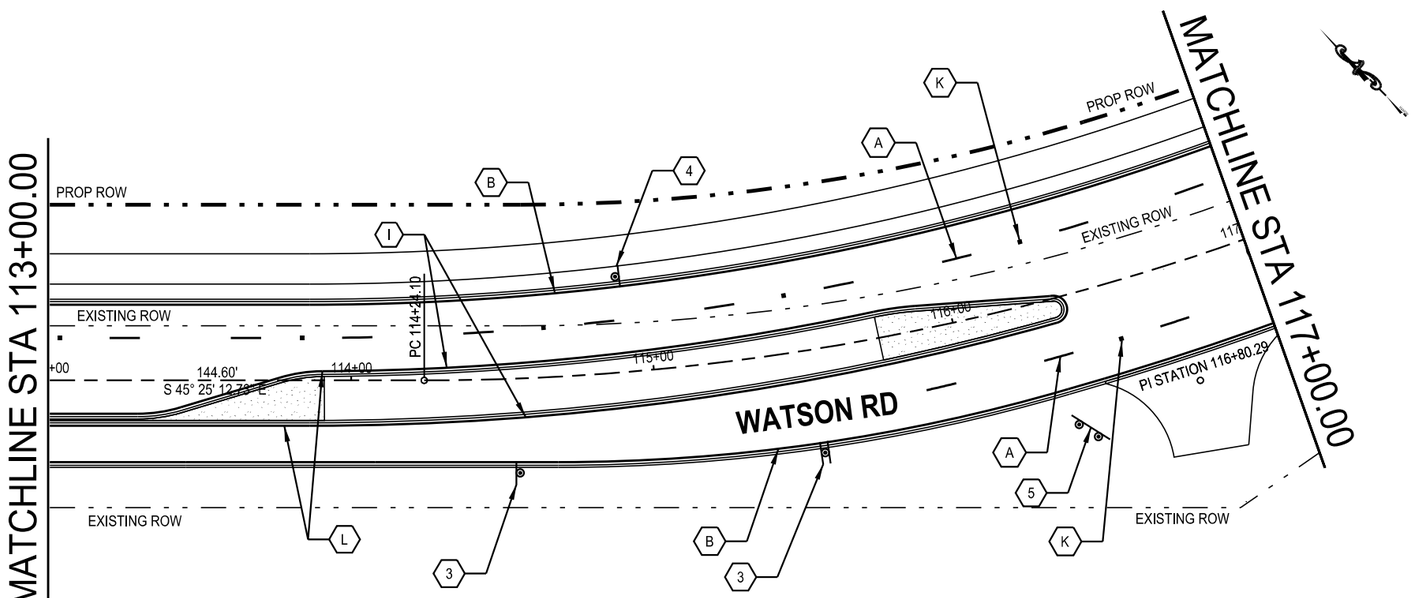
2 W1-2L 36 X 36

3 W1-8L 18 X 24

4 W3-3LT 30 x 30

5 W1-6R 48 X 24





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B	0666	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	LF	1243
C	0666	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	375
D	0666	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	LF	
E	0666	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	40
F	0666	REF PAV MRK TY I (W) 18" (YLD TRI) (100MIL)	EA	
G	0666	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	4
H	0666	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	4
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K	0666	REFL PAV MRKR TY II-C-R	EA	19
L	0666	REFL PAV MRKR TY II-A-A	EA	44

SIGNING AND PAV MRK LEGEND

- LANE DIRECTION
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN MOUNTED BACK TO BACK
- (#) PROPOSED SMALL SIGN
- ⬠ # EXISTING SMALL SIGN TO REMAIN
- [#] EXISTING SMALL SIGN TO BE RELOCATED
- △ # EXISTING SMALL SIGN TO BE REMOVED

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SIGNING, PAVEMENT MARKING AND DELINEATION SHEETS

BEGINNING OF PROJECT TO STA 117+00.00

SHEET 1 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	--		186
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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D	0666	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	LF	
E	0666	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	
F	0666	REF PAV MRK TY I (W) 18" (YLD TRI) (100MIL)	EA	
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H	0666	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	1
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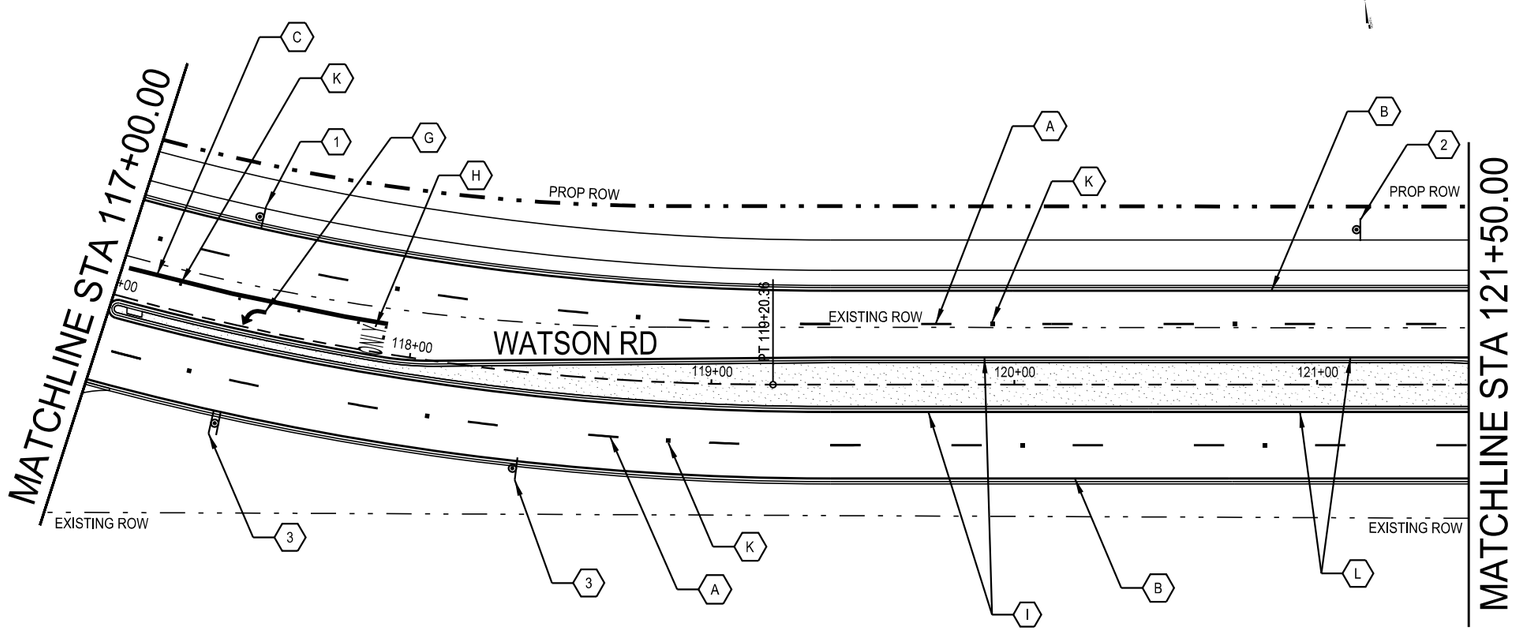
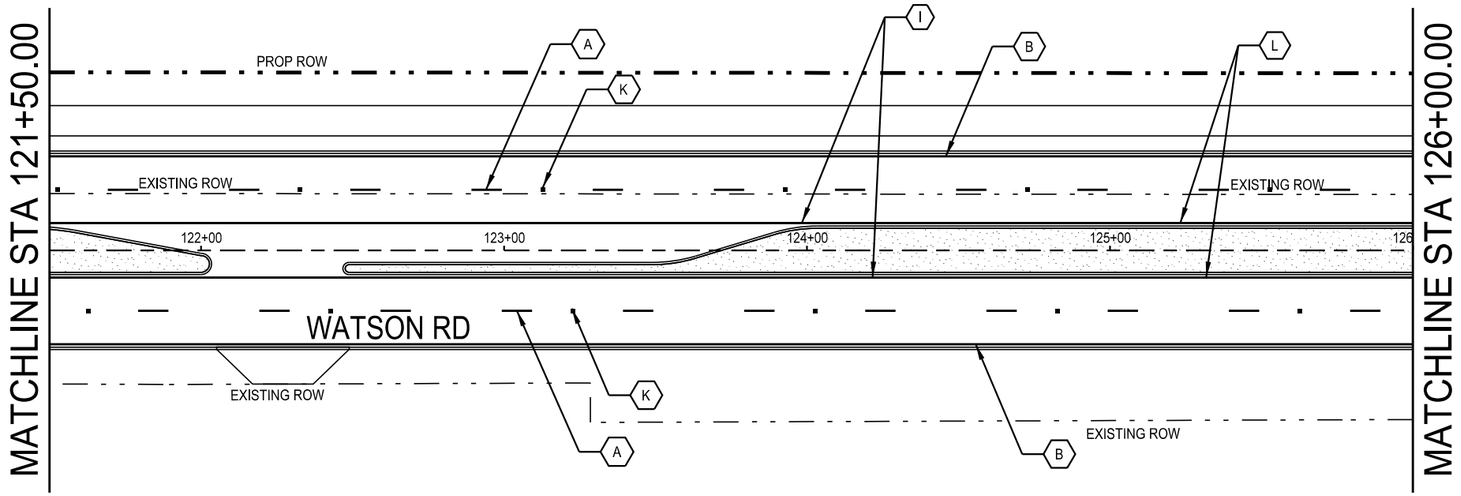
1 W3-5 36 X 36

2 W1-2R 36 X 36

3 W1-8L 18 X 24





SIGNING AND PAV MRK LEGEND

- LANE DIRECTION
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN MOUNTED BACK TO BACK
- (#) PROPOSED SMALL SIGN
- (#) EXISTING SMALL SIGN TO REMAIN
- [#] EXISTING SMALL SIGN TO BE RELOCATED
- <#> EXISTING SMALL SIGN TO BE REMOVED

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS — JULIO RAMOS 107672 — LICENSED PROFESSIONAL ENGINEER

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6/25/2020

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SIGNING, PAVEMENT MARKING AND DELINEATION SHEETS

STA 117+00.00 TO STA 126+00.00

SHEET 2 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	---		187
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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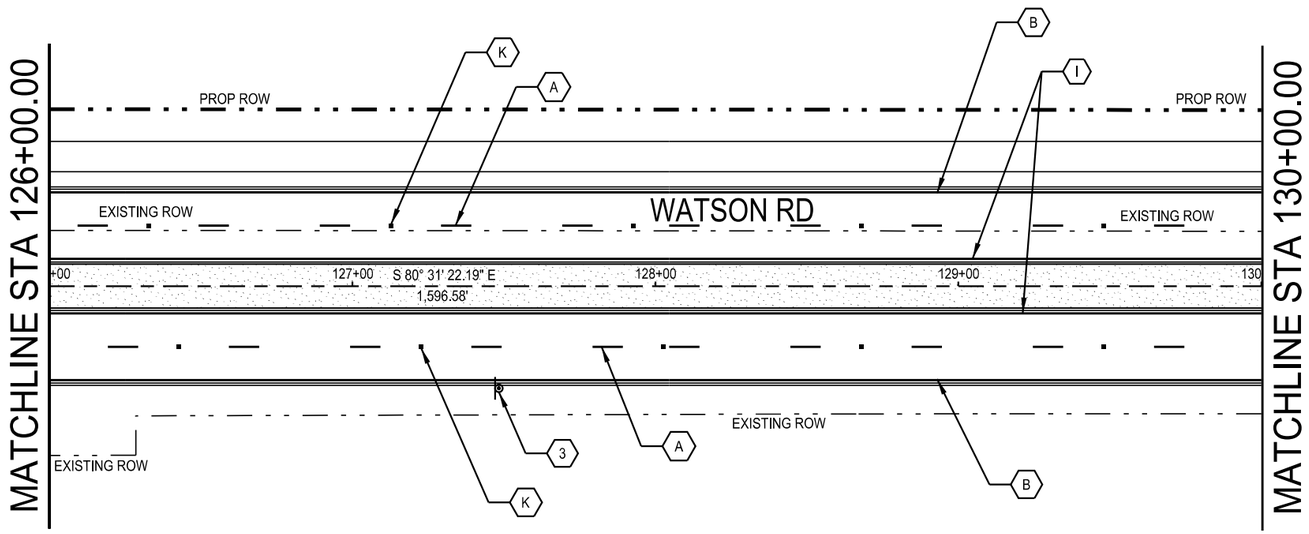
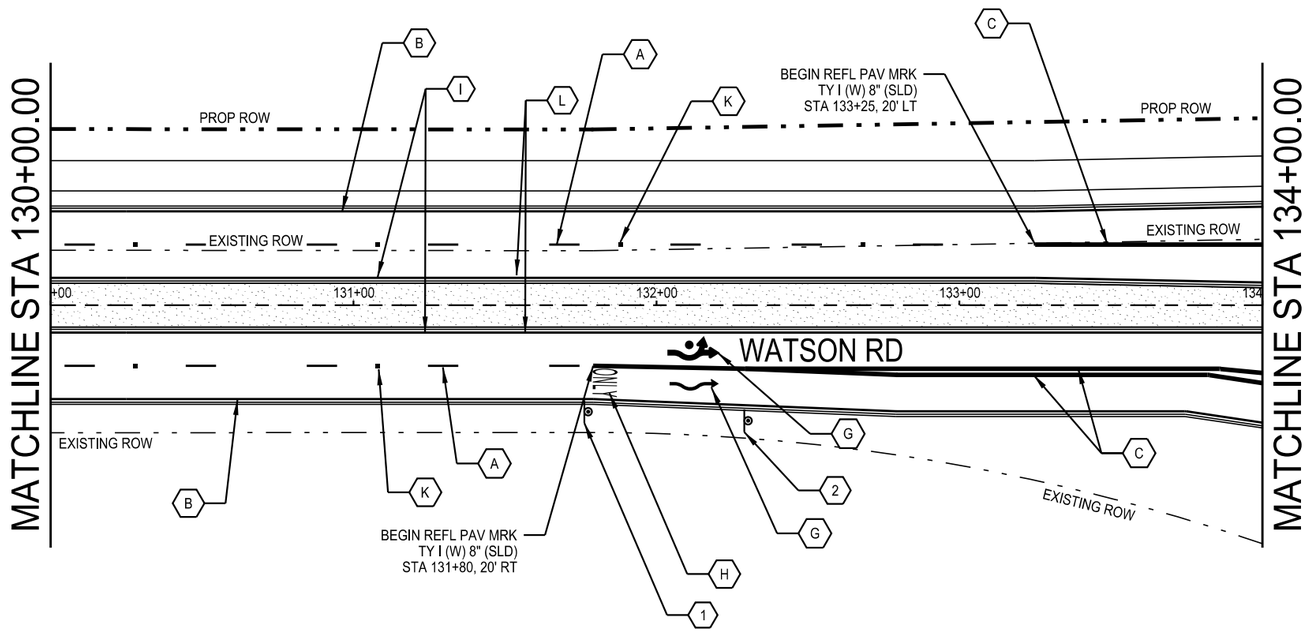
	SHEET SUMMARY OF ESTIMATED QUANTITIES			
	ITEM#	DESCRIPTION	UNIT	QTY
A	0666	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	LF	1305
B	0666	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	LF	1600
C	0666	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	466
D	0666	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	LF	
E	0666	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	
F	0666	REF PAV MRK TY I (W) 18" (YLD TRI) (100MIL)	EA	
G	0666	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	2
H	0666	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	1
I	0666	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	1600
J	0666	REFL PAV MRK TY I (Y) (MED NOSE) (100MIL)	EA	
K	0666	REFL PAV MRKR TY II-C-R	EA	66
L	0666	REFL PAV MRKR TY II-A-A	EA	80

1 R6-5P 30 X 30

2 R3-8LT_R 30 X 30

3 SOUTHWEST LEGACY HIGH SCHOOL / RESNIK MIDDLE SCHOOL — PROPOSED SIGN STA. 94+40.00,LT 120" X 30"





SIGNING AND PAV MRK LEGEND

- LANE DIRECTION
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN MOUNTED BACK TO BACK
- (#) PROPOSED SMALL SIGN
- ⬠ (#) EXISTING SMALL SIGN TO REMAIN
- [#] EXISTING SMALL SIGN TO BE RELOCATED
- △ (#) EXISTING SMALL SIGN TO BE REMOVED

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE (IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS — JULIO RAMOS 107672 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC CIVIL ENGINEERING CONSULTANTS DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SIGNING, PAVEMENT MARKING AND DELINEATION SHEETS

STA 126+00.00 TO STA 134+00.00

SHEET 3 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	--		188
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
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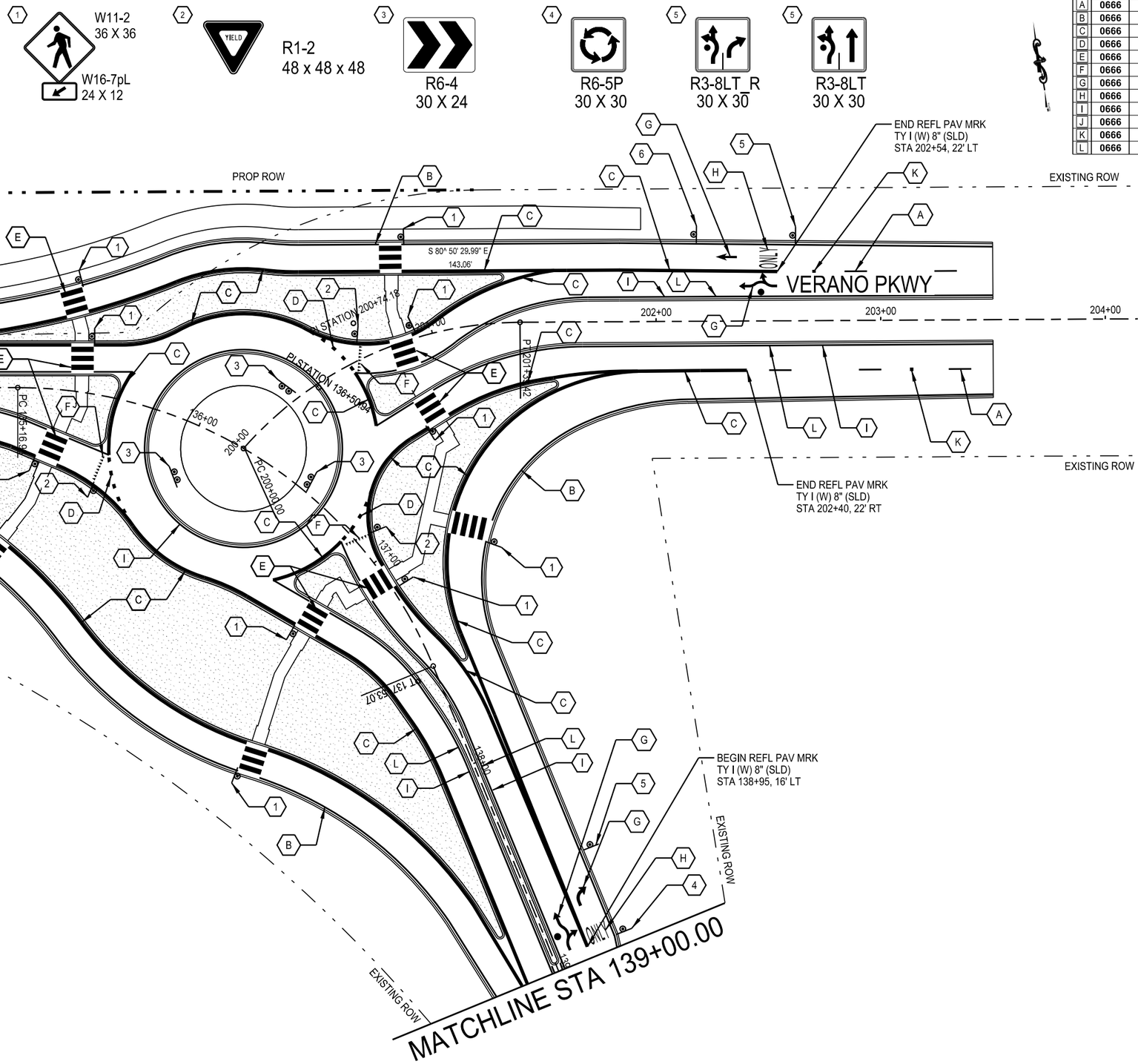

SHEET SUMMARY OF ESTIMATED QUANTITIES				
	ITEM#	DESCRIPTION	UNIT	QTY
A	0666	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	LF	199
B	0666	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	LF	1369
C	0666	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	2414
D	0666	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	LF	81
E	0666	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	340
F	0666	REF PAV MRK TY I (W) 18" (YLD TRI) (100MIL)	EA	24
G	0666	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	4
H	0666	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	2
I	0666	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	1563
J	0666	REFL PAV MRK TY I (Y) (MED NOSE) (100MIL)	EA	
K	0666	REFL PAV MRKR TY II-C-R	EA	10
L	0666	REFL PAV MRKR TY II-A-A	EA	78

SIGNING AND PAV MRK LEGEND

- LANE DIRECTION
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN MOUNTED BACK TO BACK
- (#) PROPOSED SMALL SIGN
- (#) EXISTING SMALL SIGN TO REMAIN
- [#] EXISTING SMALL SIGN TO BE RELOCATED
- <#> EXISTING SMALL SIGN TO BE REMOVED

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SIGNING, PAVEMENT MARKING AND DELINEATION SHEETS

STA 134+00.00 TO STA 139+00.00

SHEET 4 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	--		189
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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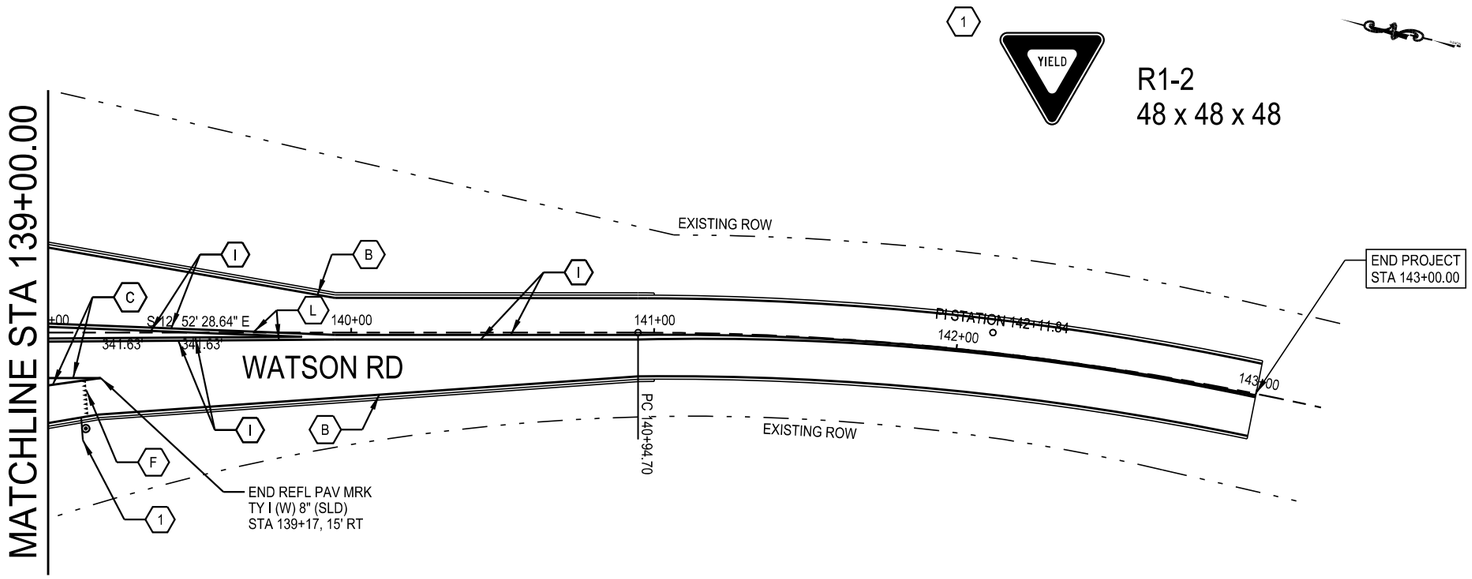

	SHEET SUMMARY OF ESTIMATED QUANTITIES			
	ITEM#	DESCRIPTION	UNIT	QTY
A	0666	RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL)	LF	
B	0666	RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	LF	801
C	0666	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	LF	39
D	0666	REFL PAV MRK TY I (W) 8" (DOT) (100MIL)	LF	
E	0666	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	LF	
F	0666	REF PAV MRK TY I (W) 18" (YLD TRI) (100MIL)	EA	8
G	0666	REFL PAV MRK TY I (W) (ARROW) (100MIL)	EA	
H	0666	REFL PAV MRK TY I (W) (WORD) (100MIL)	EA	
I	0666	RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	LF	967
J	0666	REFL PAV MRK TY I (Y) (MED NOSE) (100MIL)	EA	
K	0666	REFL PAV MRKR TY II-C-R	EA	
L	0666	REFL PAV MRKR TY II-A-A	EA	49

SIGNING AND PAV MRK LEGEND

- LANE DIRECTION
- EXISTING SIGN
- PROPOSED SIGN
- PROPOSED SIGN MOUNTED BACK TO BACK
- (#) PROPOSED SMALL SIGN
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NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

SIGNING, PAVEMENT MARKING AND DELINEATION SHEETS

STA 139+00.00 TO END OF PROJECT

SHEET 5 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT. NO.
6	---	190

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
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DESIGN FILENAME: X:\data\Infra\Proj_2016\E0543800_Bx_Co_Watson\CADD\PLAN_SHTS\SPM\WATSON_SPM_05.dgn

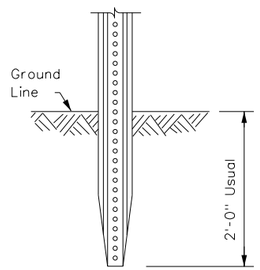
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

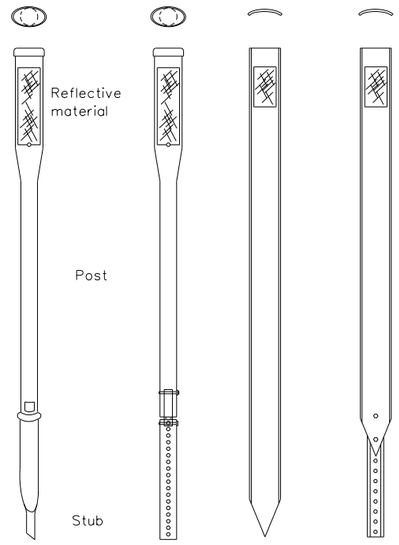


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

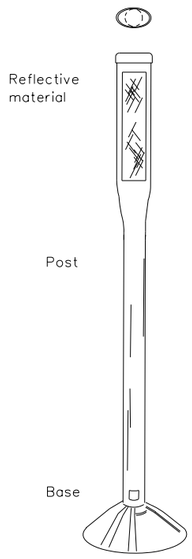
FLEXIBLE POSTS (FLX)

GND



EMBEDDED

SRF



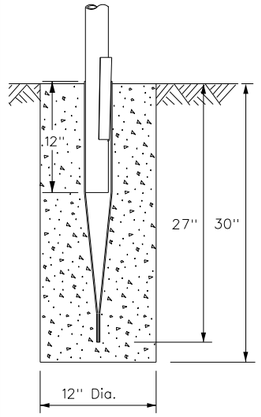
SURFACE MOUNT

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.

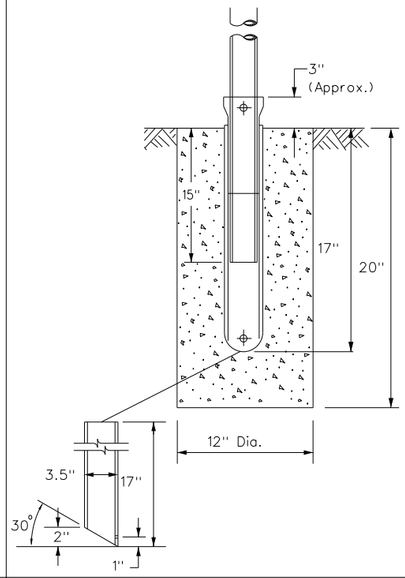
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

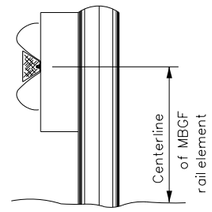
NOTE

1. Install per manufacturer's recommendations.

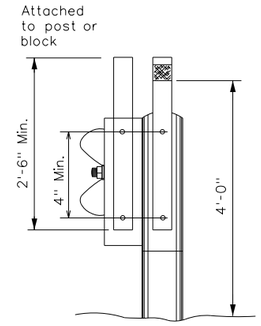
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

GF1

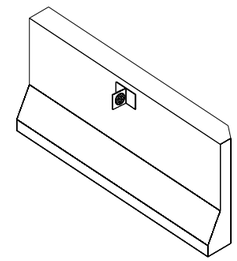


GF2



CONCRETE BARRIER / BRIDGE RAIL

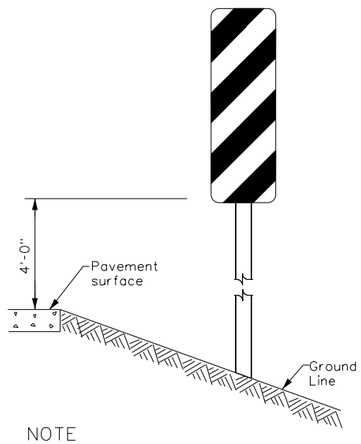
CTB



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.

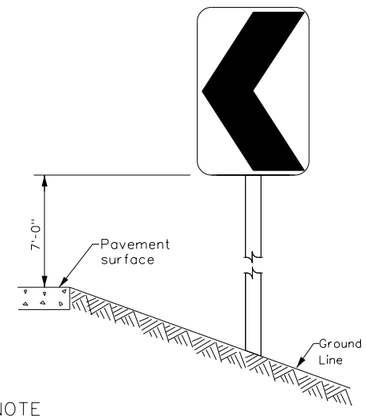
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

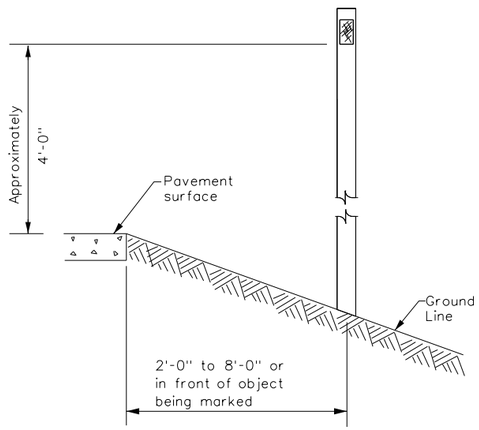
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTIONAL LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

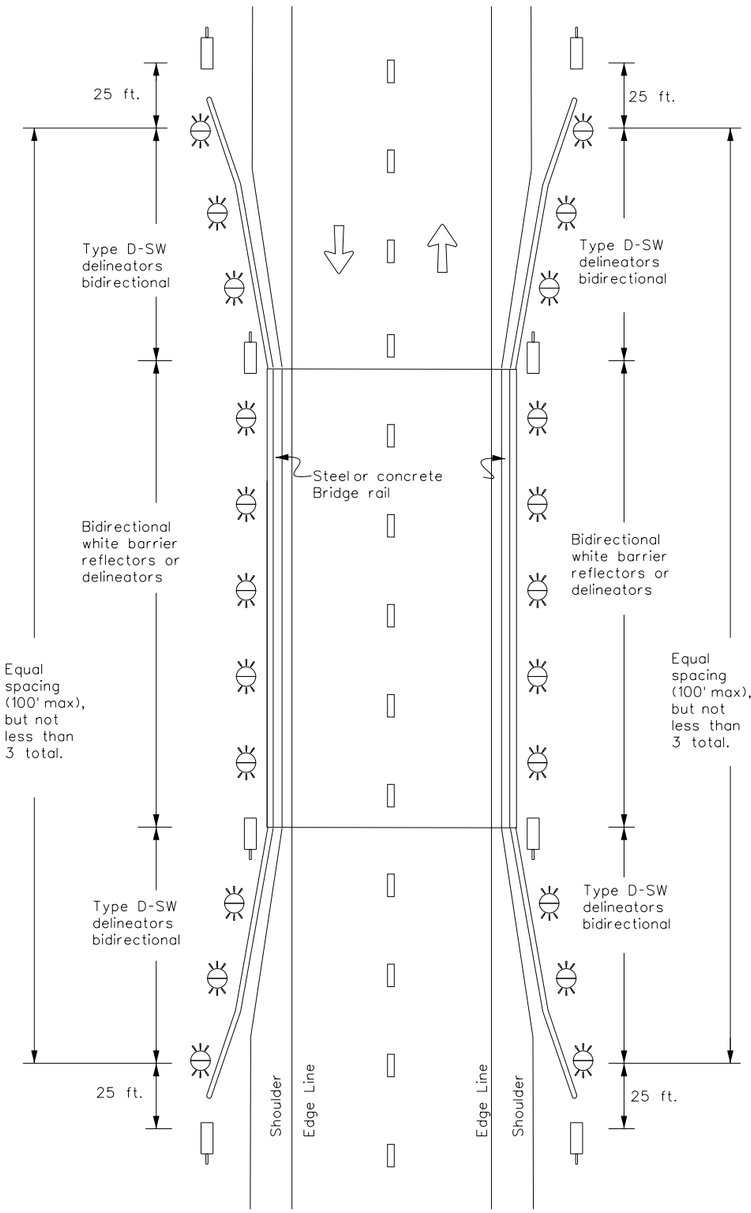
D&OM (2)-15

FILE: dom2-15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10	SAT	BEXAR		191

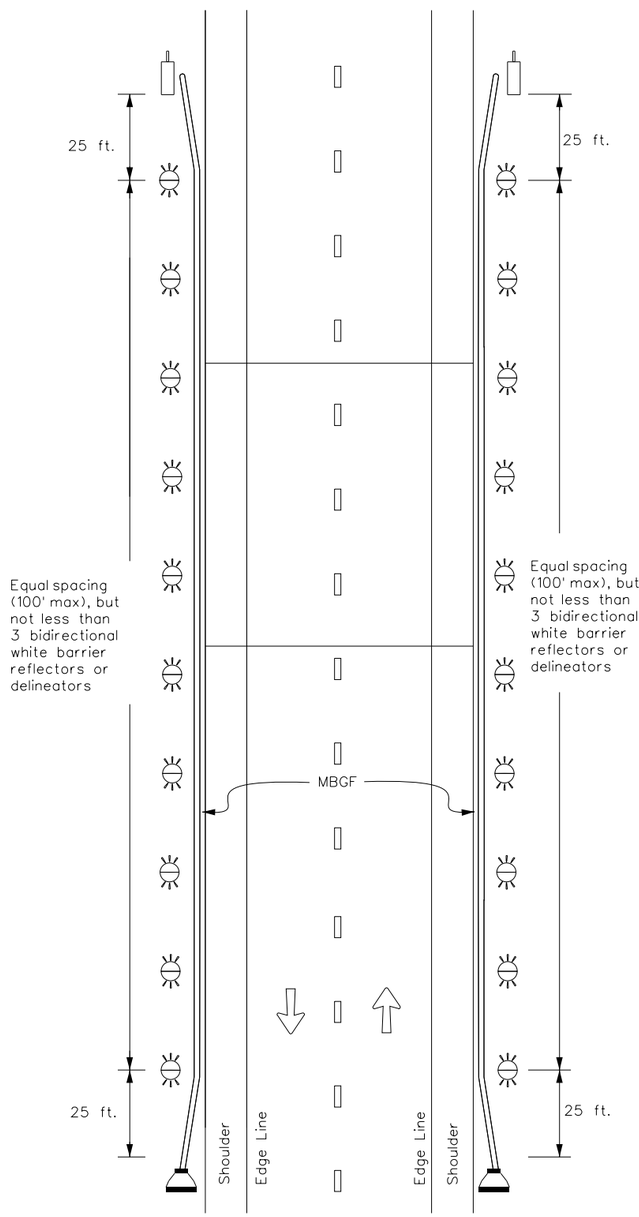
20B

DATE:
FILE:

TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



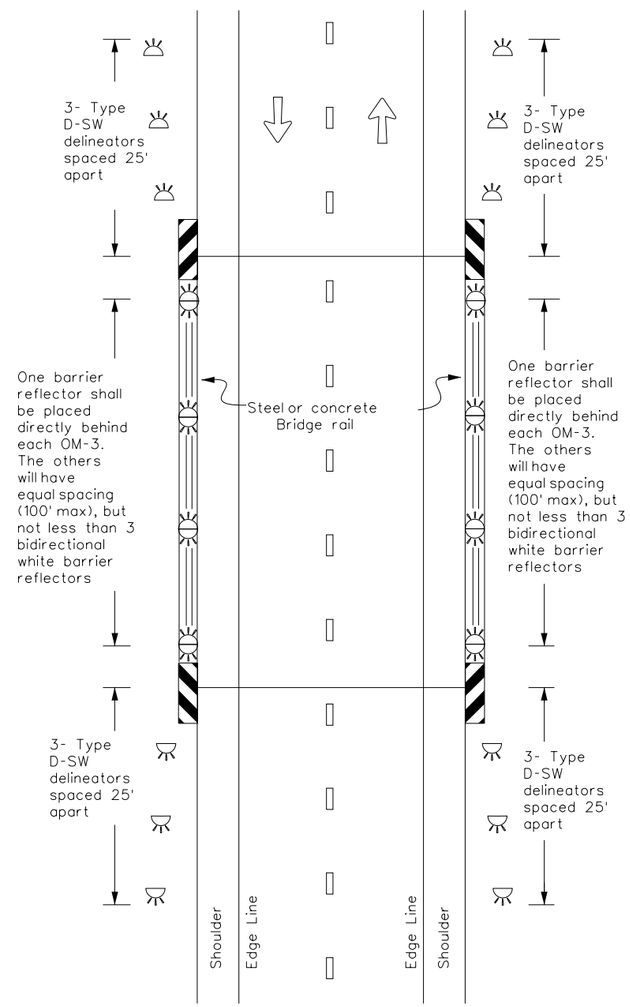
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

If terminal ends include an object marker, there is no need to install an OM-2 in front of terminal.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	TRAFFIC FLOW

Texas Department of Transportation

Traffic Operations Division Standard

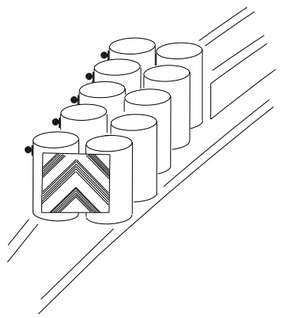
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

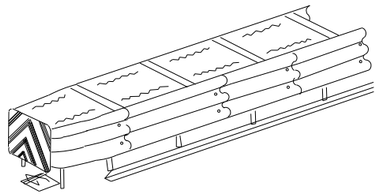
D&OM (5)-15

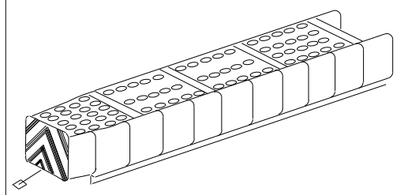
FILE: dom5-15.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		192

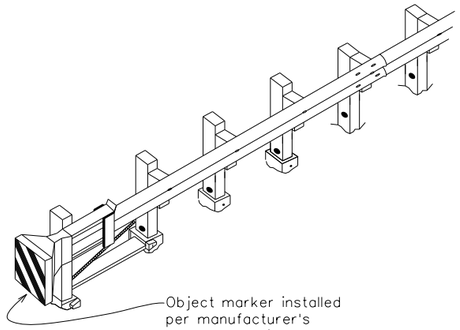
20E

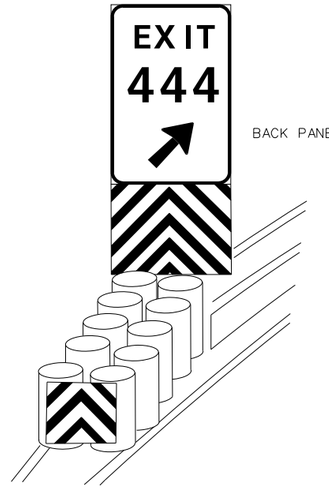
DATE:
FILE:

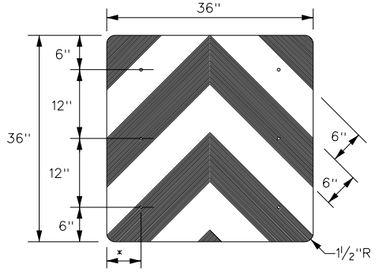


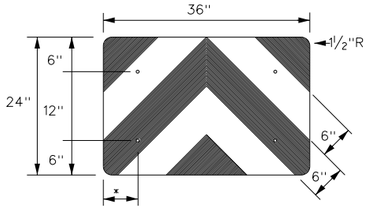




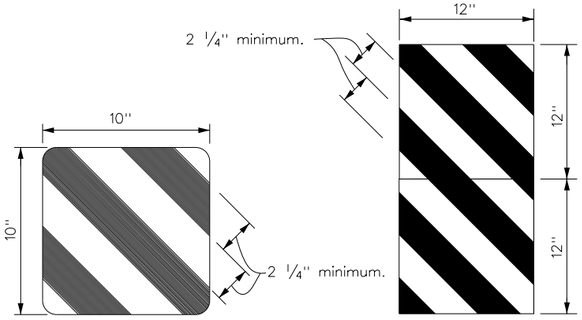




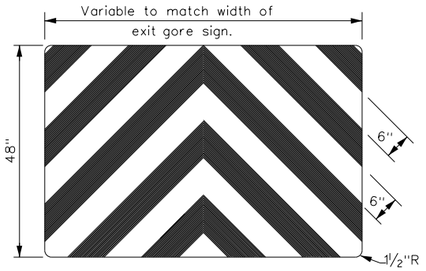


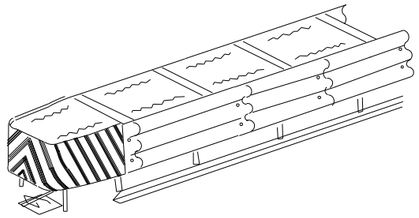


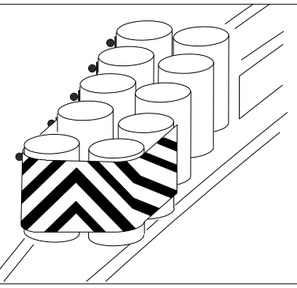
x Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

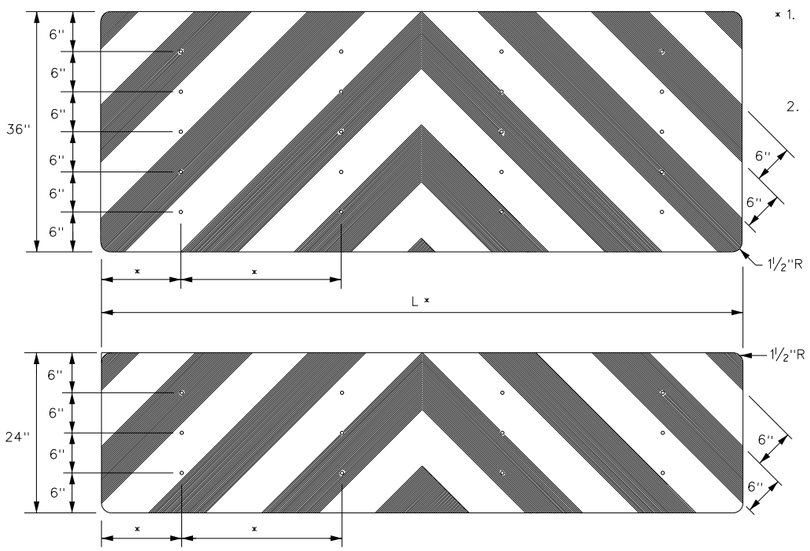


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

× 1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

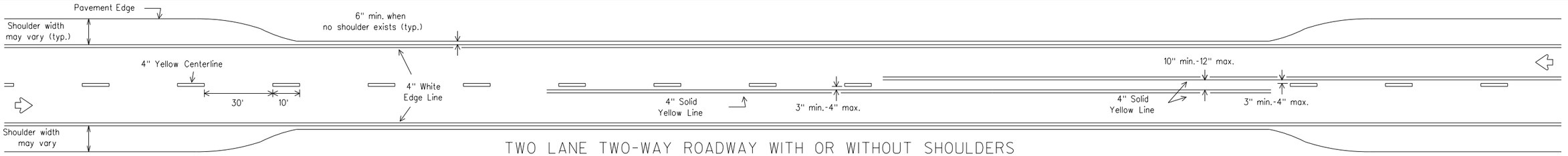
Traffic Operations Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

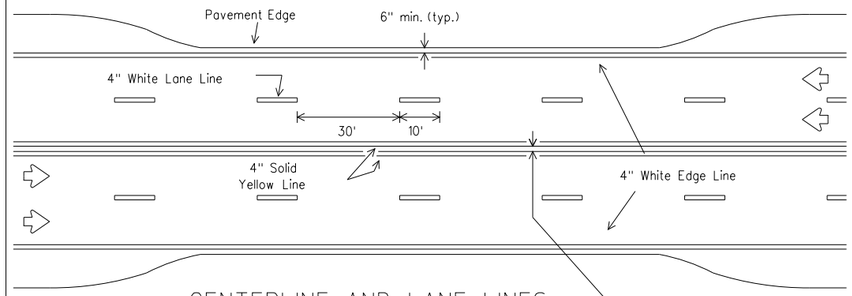
D&OM (VIA)-15

FILE: domvia15.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
4-92 8-04	DIST	COUNTY		SHEET NO.
8-95 3-15	SAT	BEXAR		193
4-98				
20G				

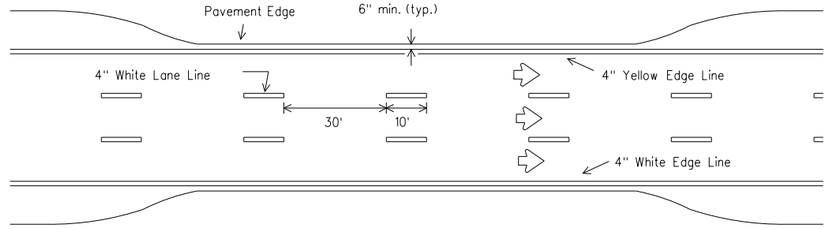
DATE:
FILE:



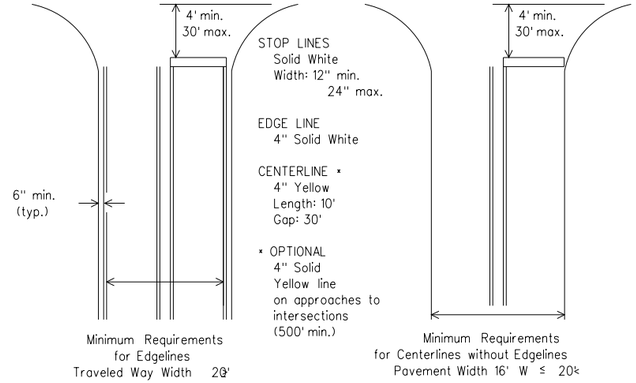
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

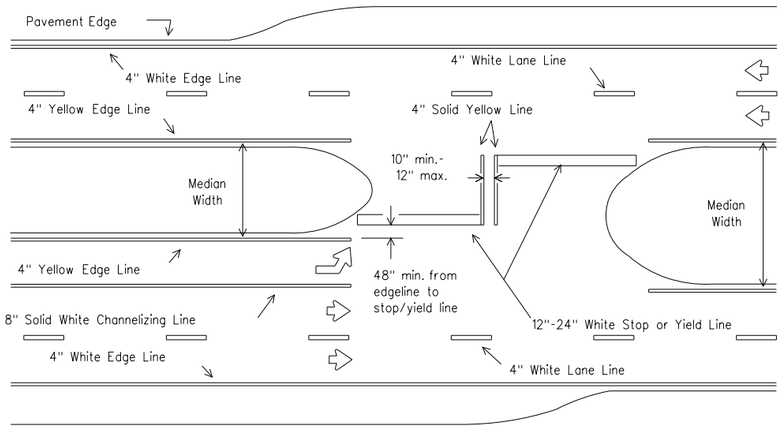


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



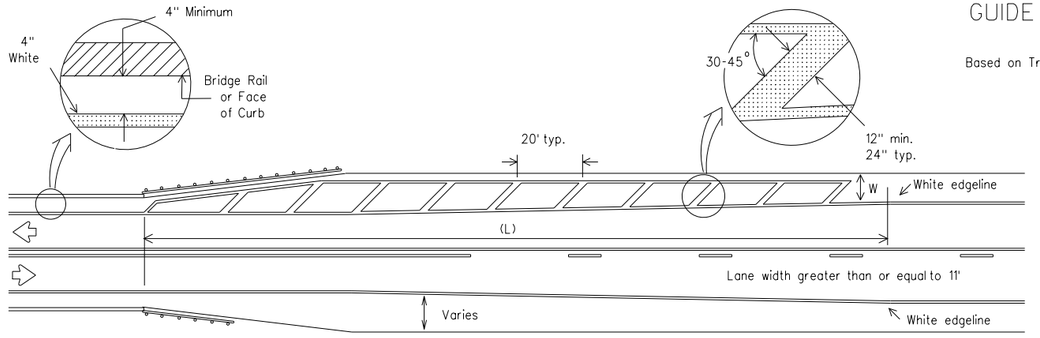
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and of opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching is not required if delineators or barrier reflectors are used along the structure.
5. For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed *	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	L=WS

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.

L=Length of Crosshatching (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

EXAMPLES:

An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the cross-hatching should be:

L = 8 x 70 = 560 ft.

A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the cross-hatching should be:

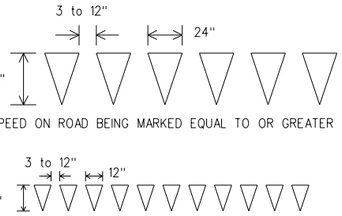
L = 4(40) ² 60 = 106.67 ft. rounded to 110 ft.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



FOR POSTED SPEED ON ROAD BEING MARKED EQUAL TO OR GREATER THAN 45 MPH

FOR POSTED SPEED ON ROAD BEING MARKED EQUAL TO OR LESS THAN 40 MPH

YIELD LINES

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

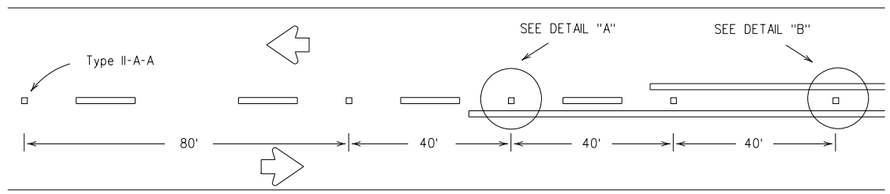
PM (1)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

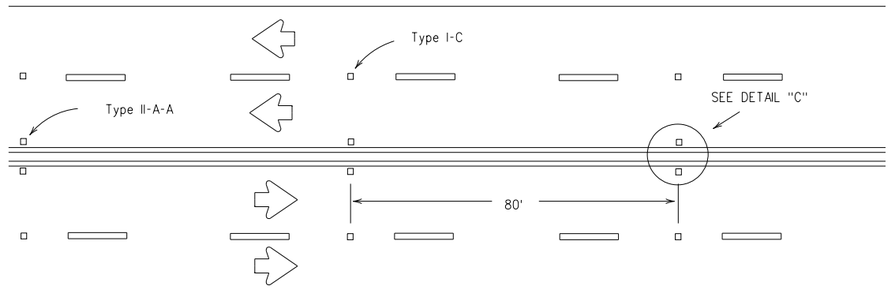
REVISIONS	CONT	SECT	JOB	HIGHWAY
8-95 2-12	0915	12	562	WATSON RD
5-00	DIST	COUNTY		SHEET NO.
8-00	SAT	BEXAR		194
3-03				

22A

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

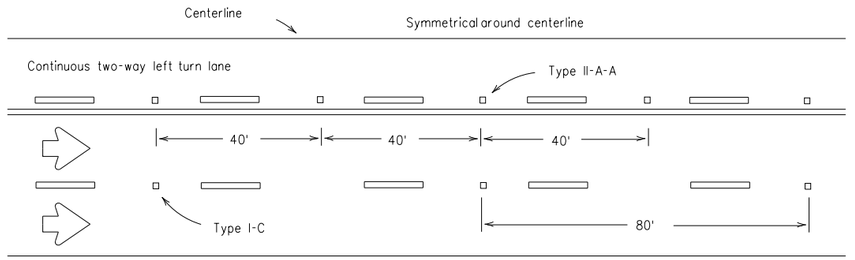


CENTERLINE FOR ALL TWO LANE ROADWAYS

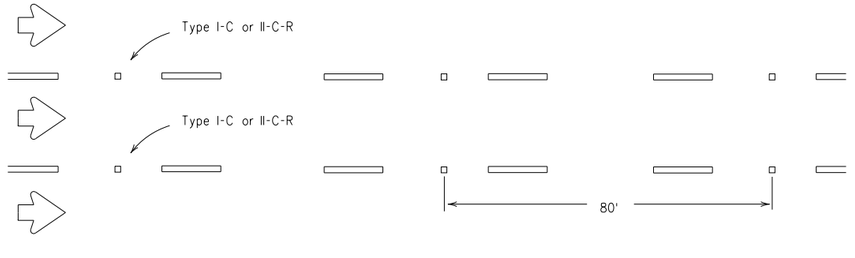


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.

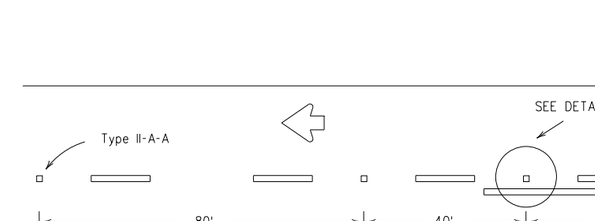


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

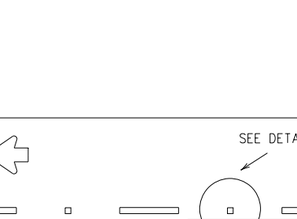


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

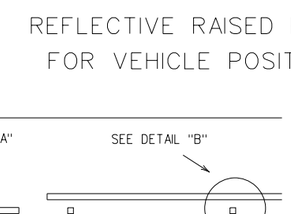
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



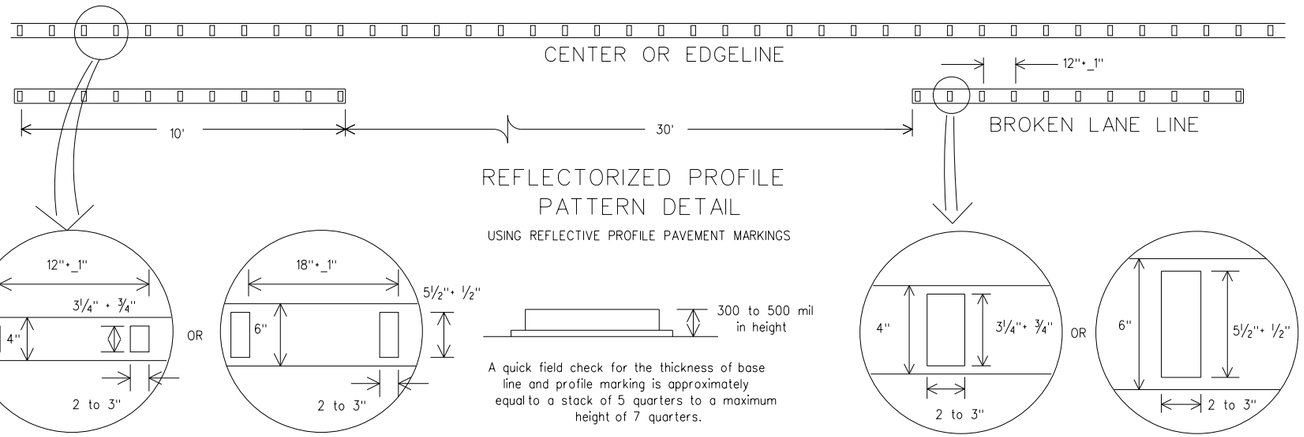
DETAIL "A"



DETAIL "B"



DETAIL "C"



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.

4" EDGE LINE OR CENTERLINE

OPTIONAL 6" EDGE LINE OR CENTERLINE

4" LANE LINE

OPTIONAL 6" LANE LINE

NOTE:

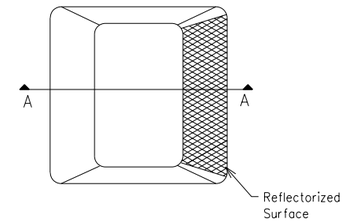
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

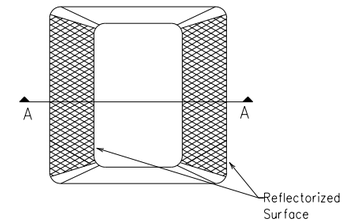
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

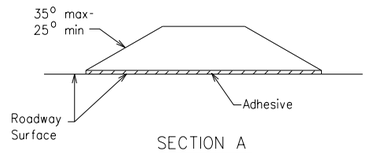
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS
REFLECTORIZED PROFILE MARKINGS

PM (2)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS		CONT	SECT	JOB	HIGHWAY
4-92	2-10	0915	12	562	WATSON RD
5-00	2-12	DIST	COUNTY		SHEET NO.
8-00		SAT	BEXAR		195
2-08					

22B

DATE:
FILE:

DATE:
FILE:

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)

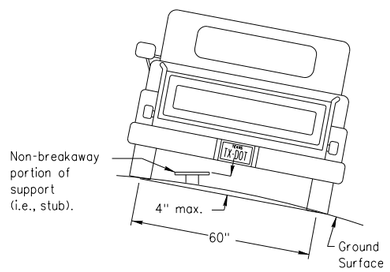
Anchor Type

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

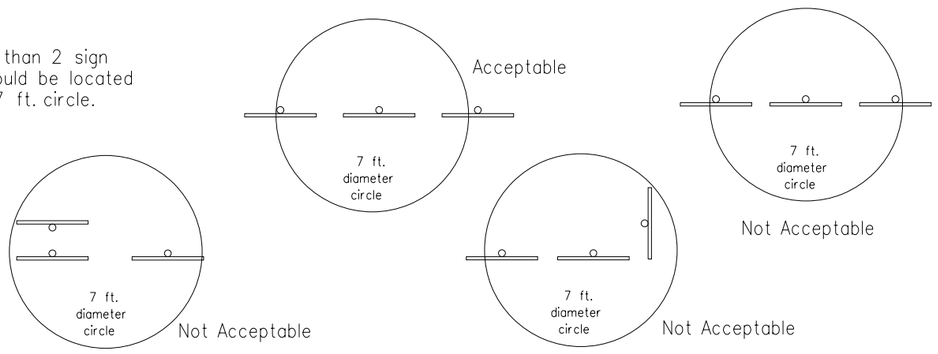
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 */ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



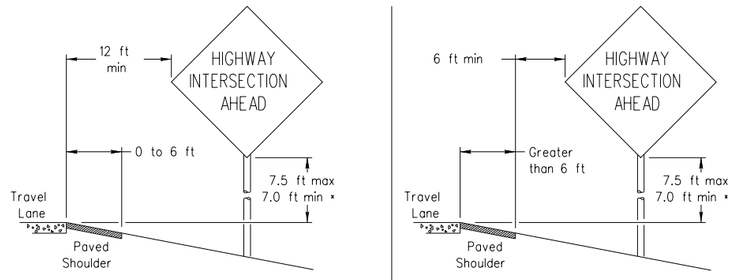
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



SIGN LOCATION

PAVED SHOULDERS



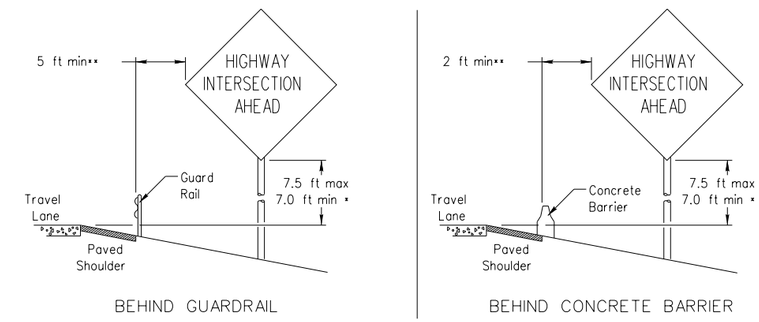
LESS THAN 6 FT. WIDE

When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.

GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER

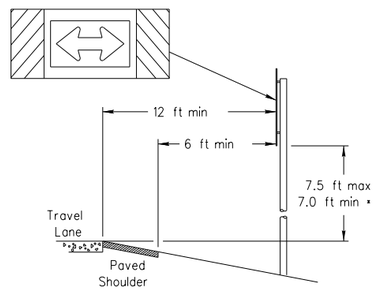


BEHIND GUARDRAIL

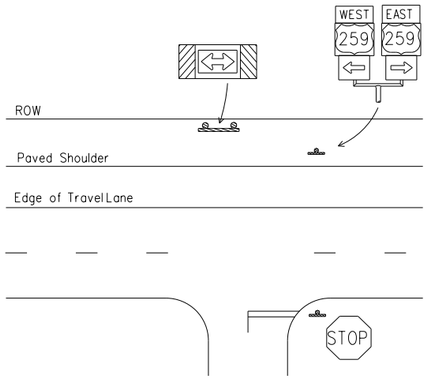
BEHIND CONCRETE BARRIER

**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.

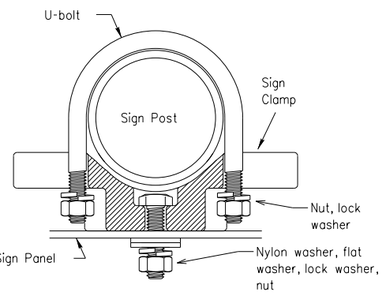
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

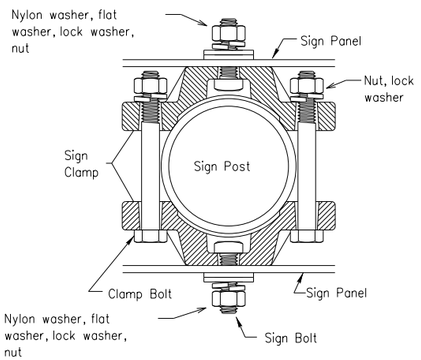
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



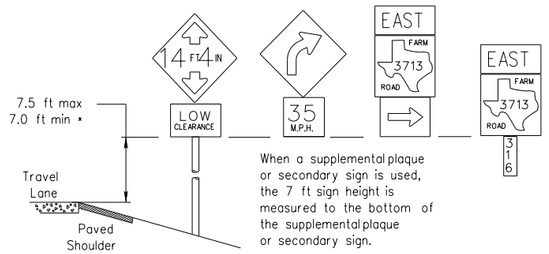
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

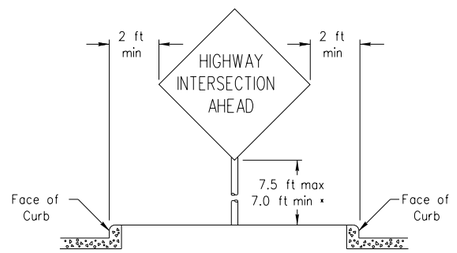
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



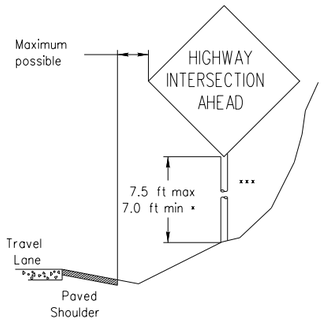
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

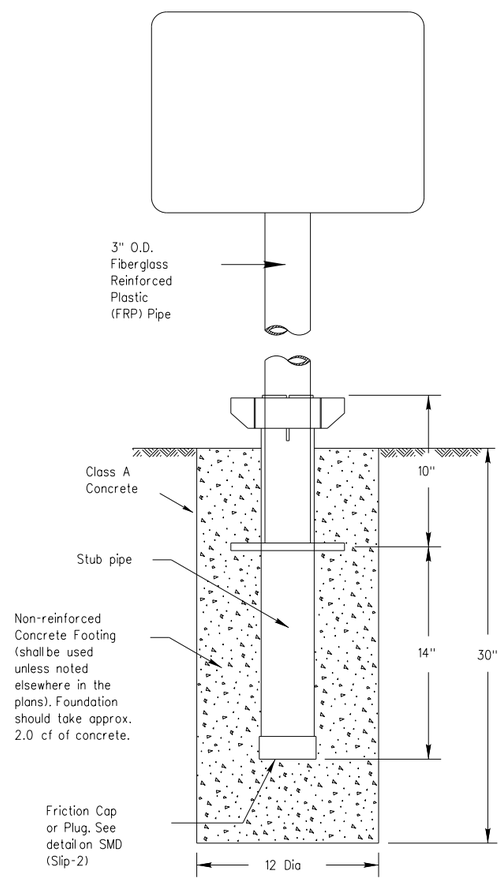
SMD (GEN)-08

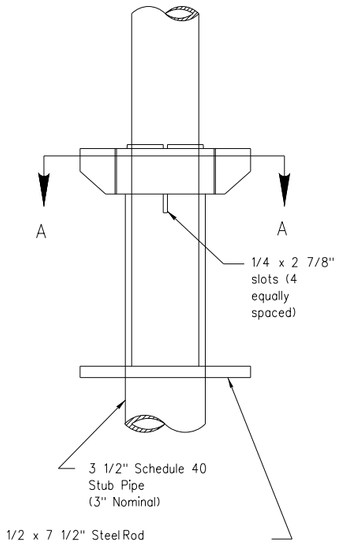
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		196

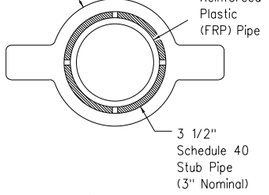
26A

Universal Anchor System with Fiberglass Reinforced Plastic (FRP) Post



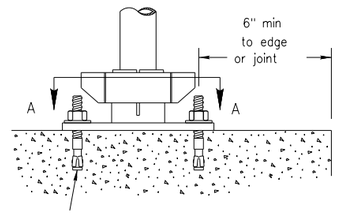


1/2 x 7 1/2" Steel Rod
Acts as a "stop" for the sign post and prevents stub from turning in the foundation.



View A-A

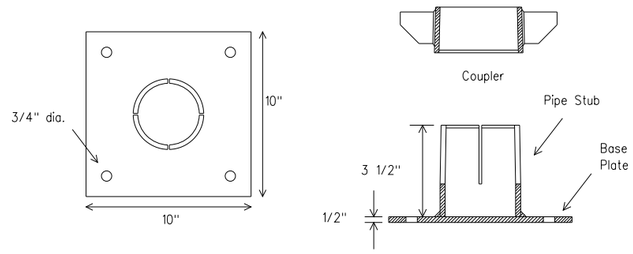
SM RD SGN ASSM TY FRP(X)UA(P)



5/8" diameter Concrete Anchor - 4 places (embed a min. of 3 3/8" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.

BOLT-DOWN DETAILS



SM RD SGN ASSM TY FRP(X)UB(P)

GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

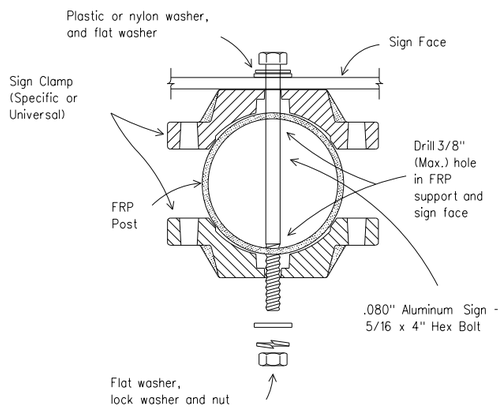
UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Insert base post in foundation hole to depths shown and fill hole with concrete. Cut base post from bottom and ensure a minimum of 18" embedment if installed in solid rock.
4. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer. Bottom of base post slots shall be above the concrete footing.
5. Attach sign to FRP post.
6. Insert sign post into base post. Lower until the post comes to rest on the steel rod.
7. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
8. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

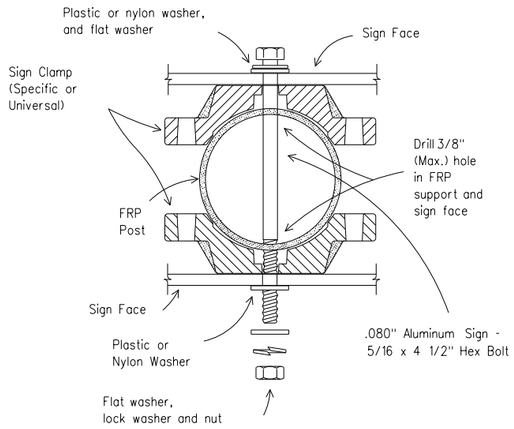
BOLT DOWN SIGN SUPPORT

1. Position base plate with coupler on existing concrete.
2. Drill holes into concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten nuts.
3. Attach sign to FRP post.
4. Insert bottom of sign post into pipe stub.
5. Use hammer to ensure the coupler is firmly seated. Top of coupler should be level with top of base post in most instances.
6. Check sign to ensure there is no twist. If loose, increase the tightening of coupler.

Typical Sign Mounting Detail for FRP Support with Single Sign



Typical Sign Mounting Detail for FRP Support with Back-to-Back Signs



DATE:
FILE:

Texas Department of Transportation
Traffic Operations Division

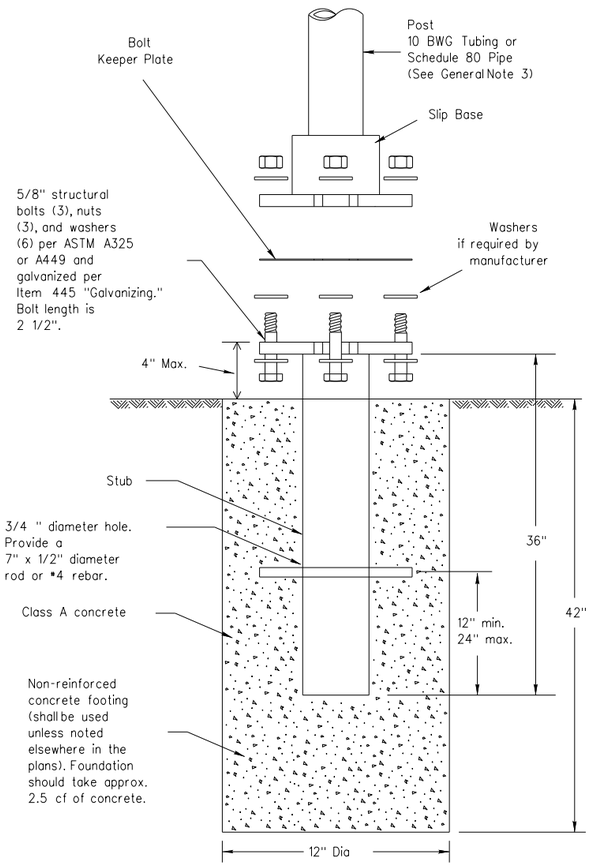
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS UNIVERSAL ANCHOR SYSTEM WITH FRP POST

SMD (FRP)-08

© TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		197

26F

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

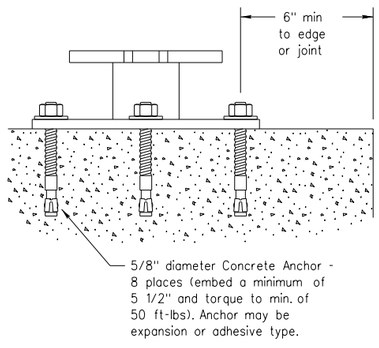
Foundation

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	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		198

26B

DATE:
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DATE:
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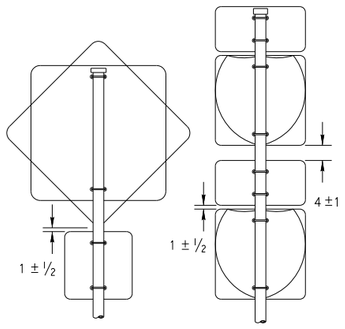
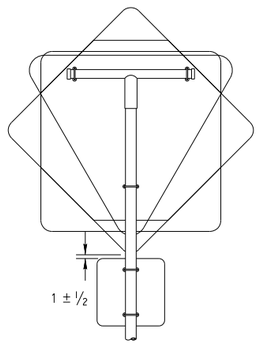
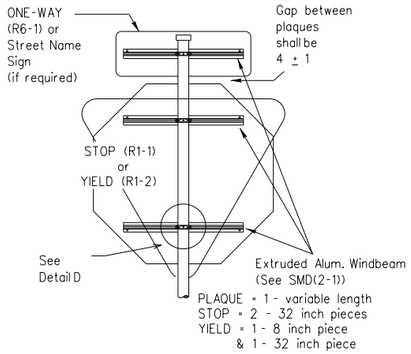


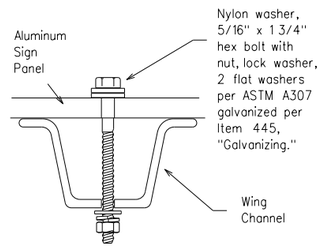
SM RD SGN ASSM TY XXXXX(1)XX(P)



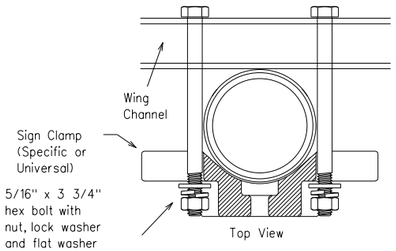
SM RD SGN ASSM TY XXXXX(1)XX(T)



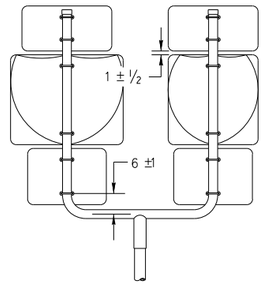
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



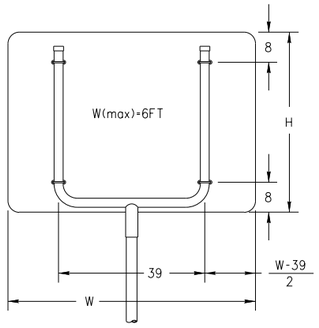
Detail A



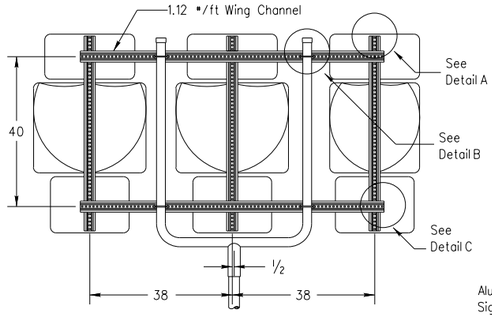
Detail B



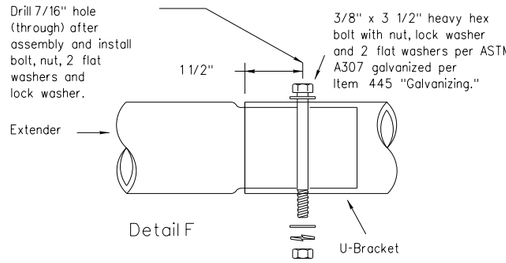
SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)

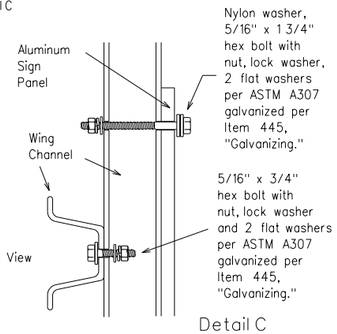


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

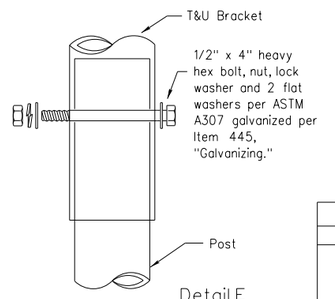


Detail F

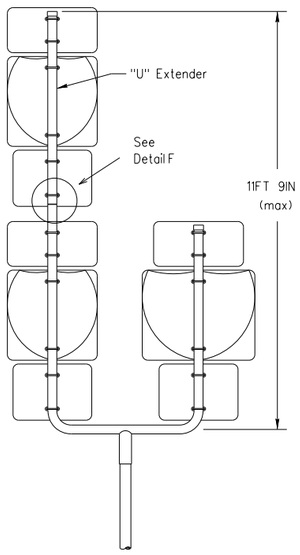
Splices shall only be allowed behind the sign substrate.



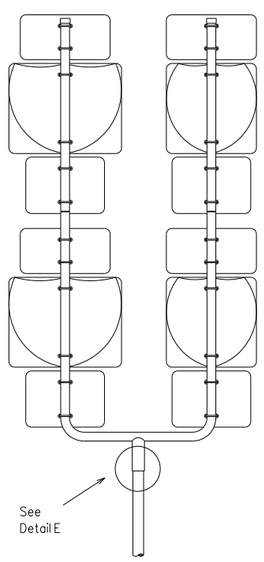
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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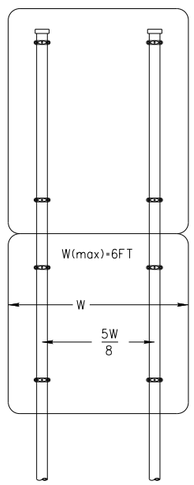
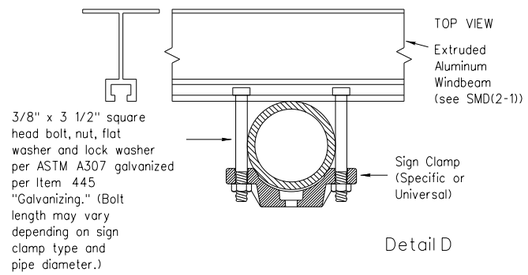
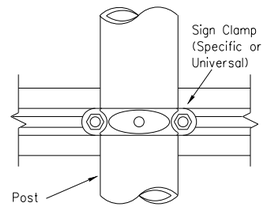


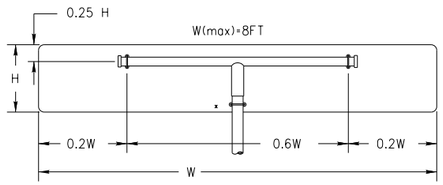
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

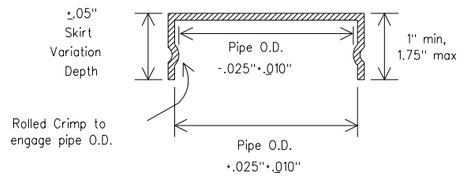




All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

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:

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.
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

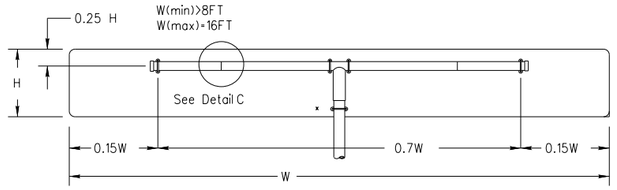
SMD (SLIP-2)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

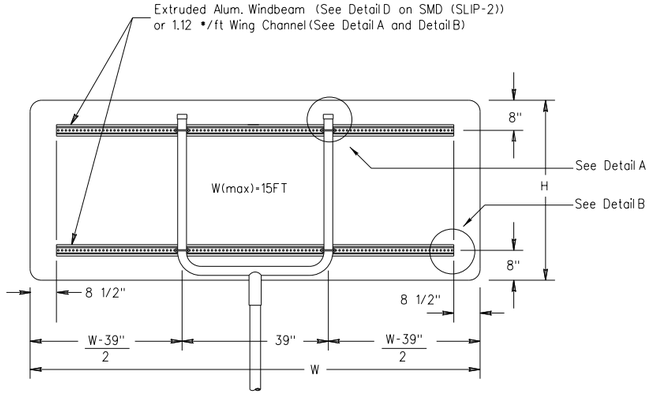
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0915	12	562	WATSON RD
	DIST	COUNTY		SHEET NO.
	SAT	BEXAR		199

26C

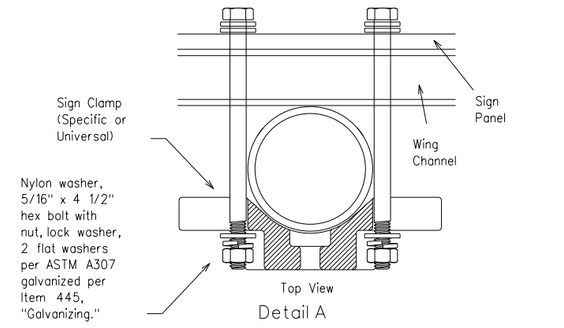
DATE:
FILE:



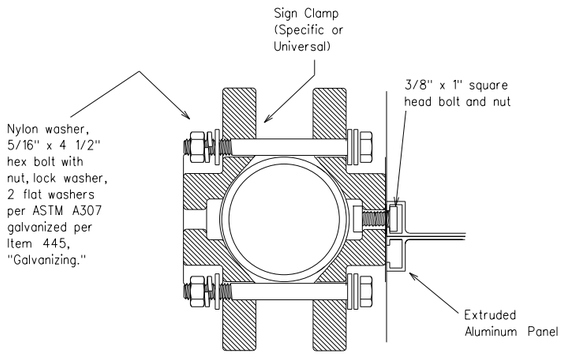
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



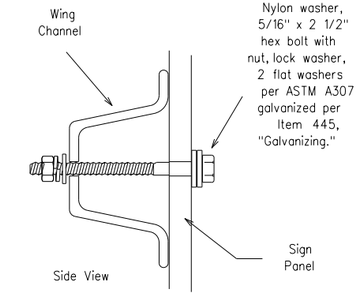
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



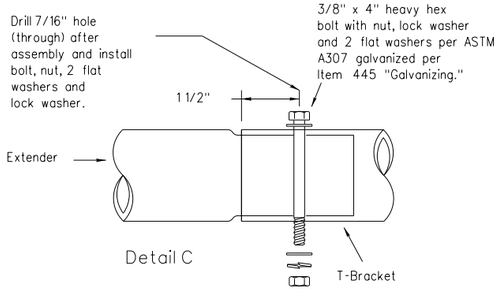
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET

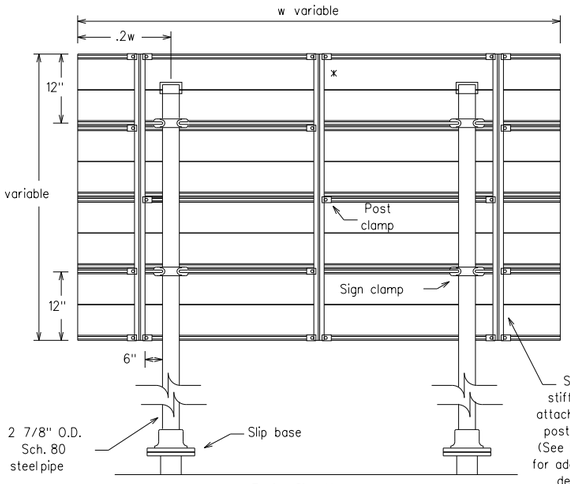


Detail B



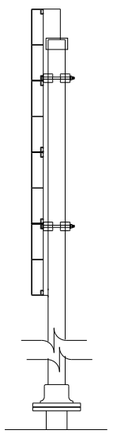
Detail C

Splices shall only be allowed behind the sign substrate.

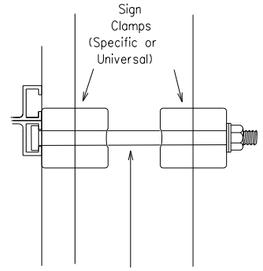


Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

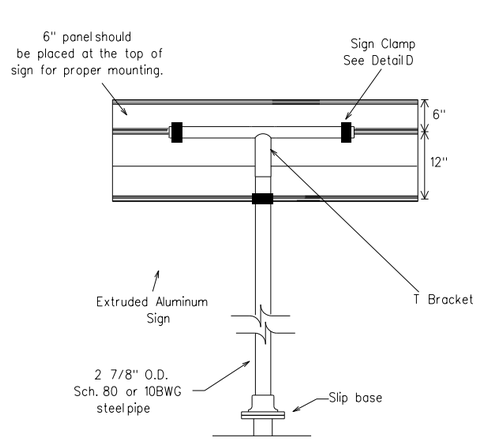
* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



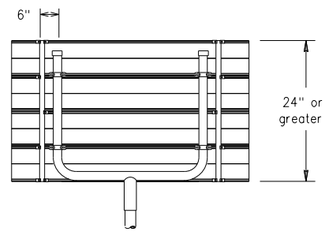
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD (SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

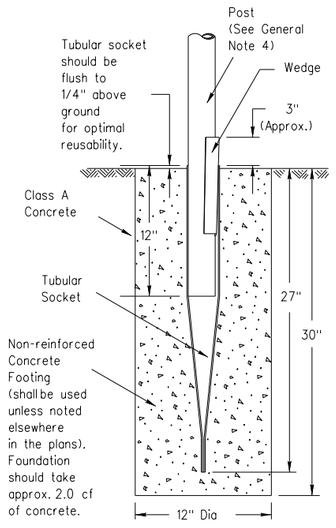
REVISIONS
9-08

CONT	SECT	JOB	HIGHWAY
0915	12	562	WATSON RD
DIST	COUNTY		SHEET NO.
SAT	BEXAR		200

26D

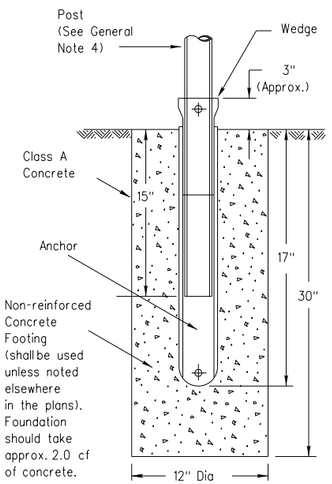
DATE:
FILE:

Wedge Anchor Steel System



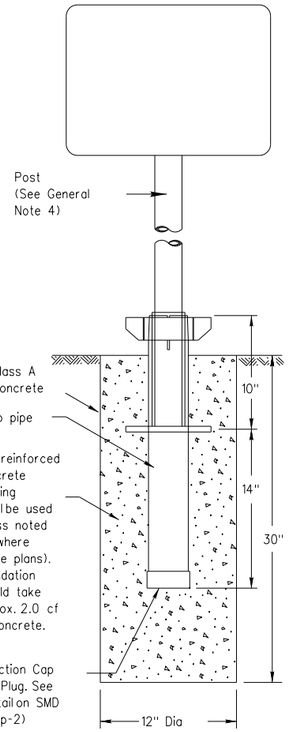
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System

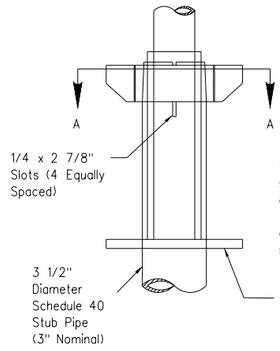


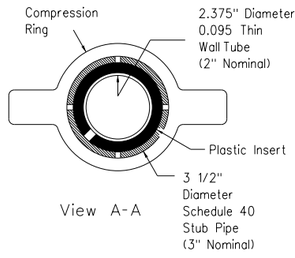
SMD RD SGN ASSM TY TWT(X)WP(X)

Universal Anchor System with Thin-Walled Tubing Post



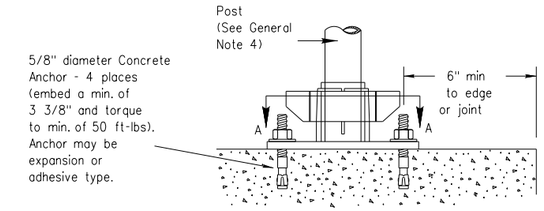
SM RD SGN ASSM TY TWT(X)UA(P)



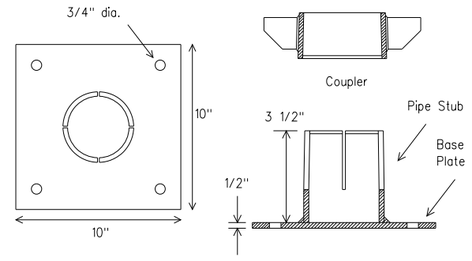


View A-A

Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

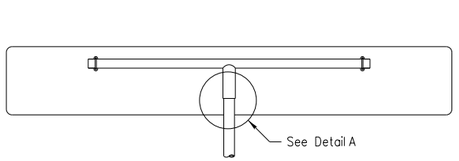


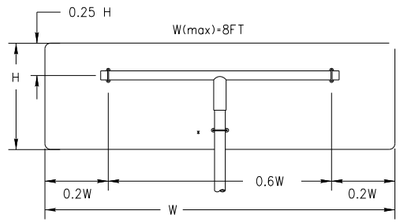
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. 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.



SM RD SGN ASSM TY TWT(X)UB(P)

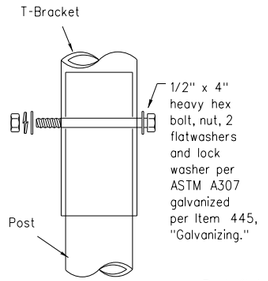
Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post





SM RD SGN ASSM TY TWT(X)XX(T)

(x - See General Note 6)



Detail A

9/16" hole may need to be drilled through post to accommodate bolt.

NOTE

The devices shall be installed per manufacturer's recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer list.htm
4. Material used as post with this system shall conform to the following specifications:
   13 BWG Tubing (2.375" outside diameter) (TWT)
   0.095" nominal wall thickness
   Seamless or electric-resistance welded steel tubing
   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
   18% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of .083" to .099"
   Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
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. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximaely 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer..
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD (TWT)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0915	12	562	WATSON RD
DIST	COUNTY		SHEET NO.
SAT	BEXAR		201

26E

DATE: 6/25/2020 12:53:55 PM
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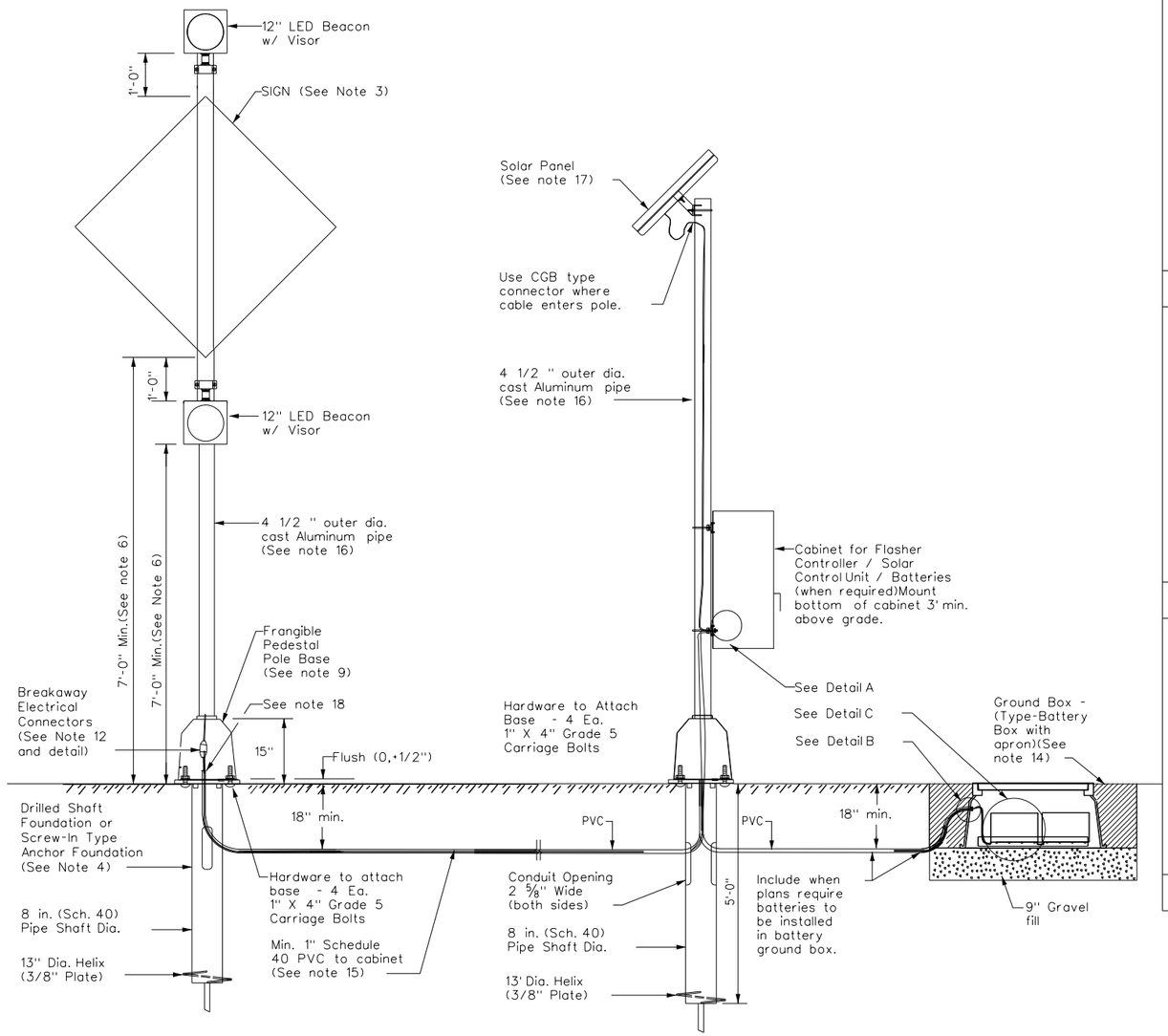
GENERAL NOTES:

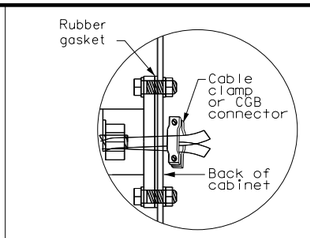
1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
7. Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
8. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
10. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
11. Install the cable clamp in the bottom third of the back of the cabinet. See Detail A.
12. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies". Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse (slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
13. Install the batteries in a battery box. Place the batteries on a 3/16" thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16 " plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
14. See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
15. Unless otherwise shown on the plans or recommended by the manufacturer, use the following table to determine the wire size from cabinet to beacons.

Distance from Cabinet to Beacons (ft.)	Minimum Required Wire Size (AWG)
0 - 35	*14
35 - 60	*12
60 - 100	*10
> 100	*8

16. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
17. Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
18. Ensure height of conduit is below top of anchor bolts.

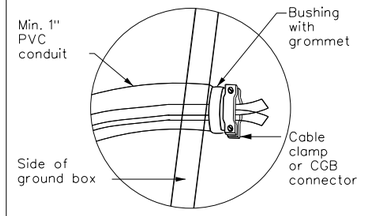


DETAIL FOR SOLAR PANEL, CABINET, AND BATTERIES LOCATED
OUT OF CLEAR ZONE ON SEPARATE ALUMINUM POLE ASSEMBLY

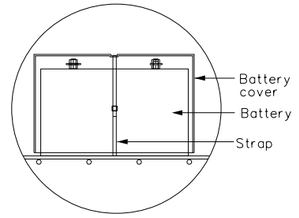


Pull conductors to remove slack in run between cabinet and ground box. Clamp cable at conduit end in ground box and in cabinet at entry as shown.

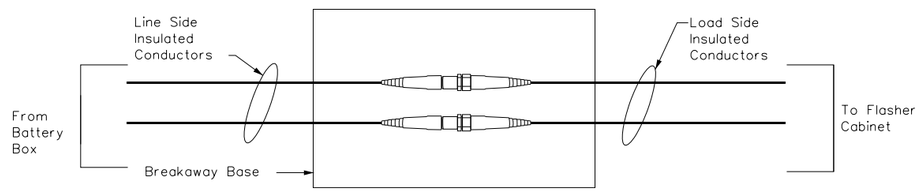
DETAIL A



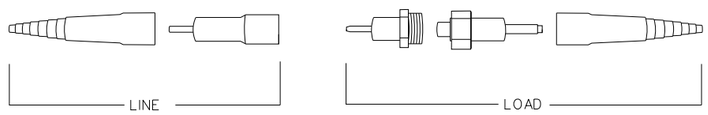
DETAIL B



DETAIL C



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation — WATSON ROAD — Traffic Operations Division Standard

SOLAR POWERED ROADSIDE FLASHING BEACON ASSEMBLY DETAILS (ALUMINUM)

SPRFBA(3)-13

FILE: spb3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
12-04	DIST	COUNTY		SHEET NO.
3-13	SAT	BEXAR		202

75C

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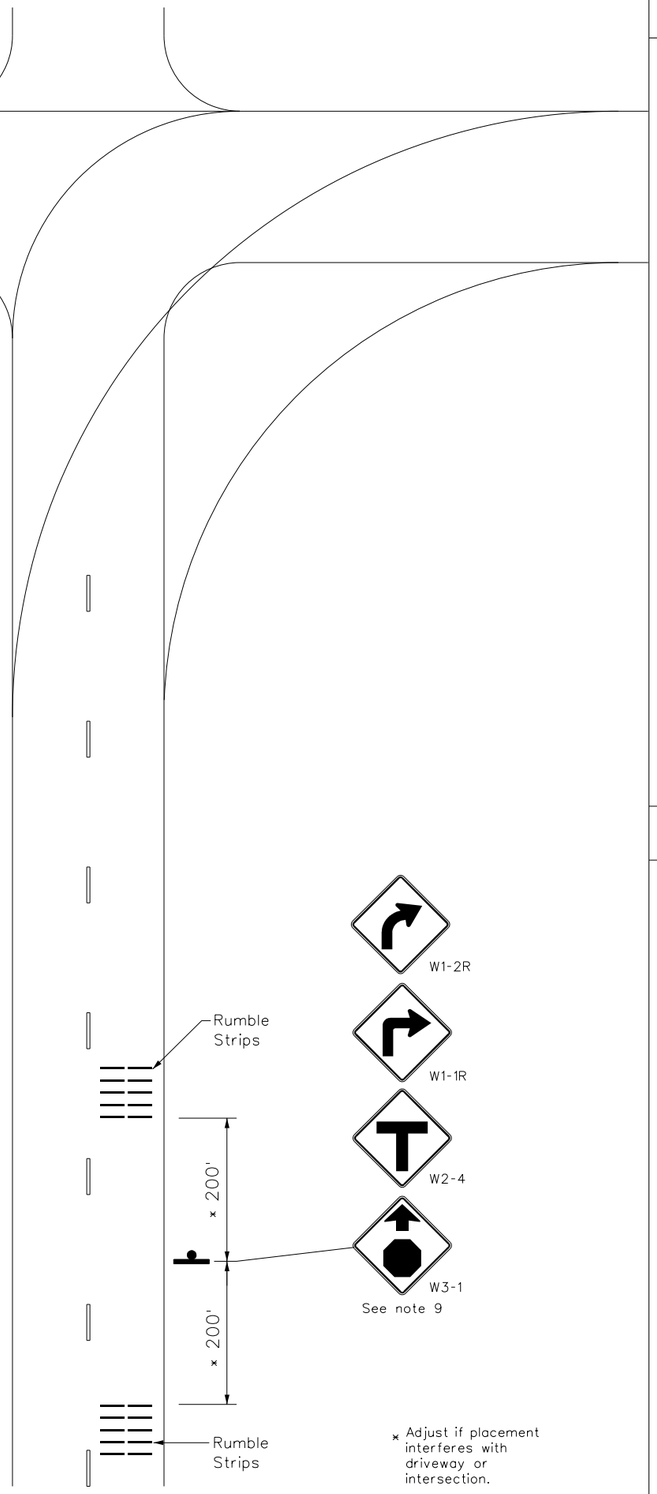
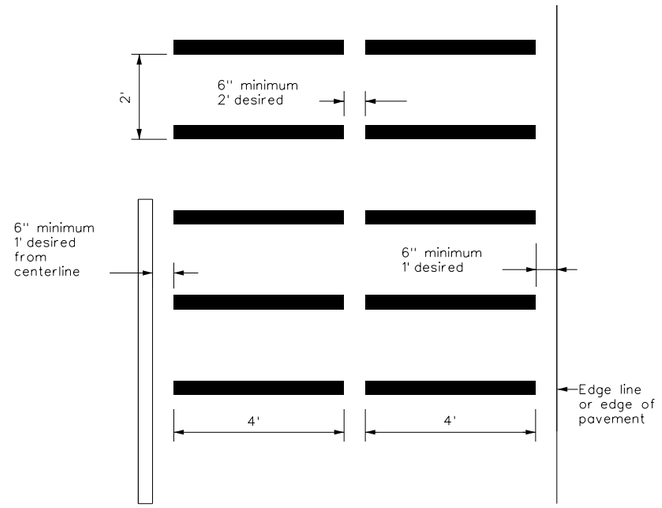
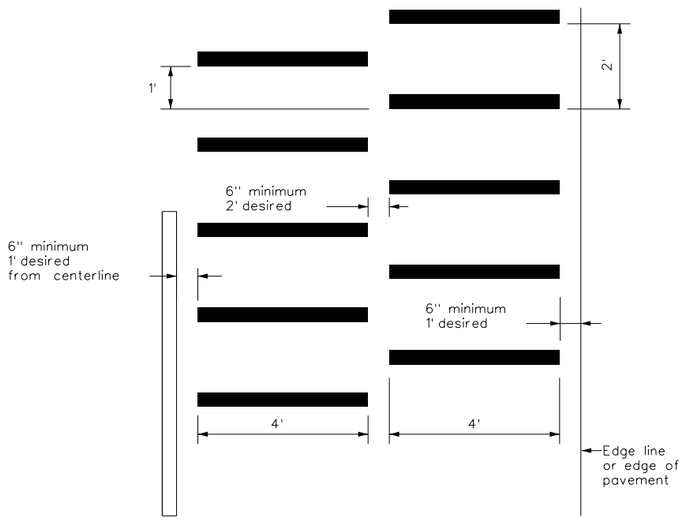


STANDARD PATTERN



ALTERNATIVE PATTERN



GENERAL NOTES

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

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

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

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

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

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

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

W17-2T

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

9. Other signs can be used as conditions warrant.

Texas Department of Transportation

Traffic Operations Division Standard

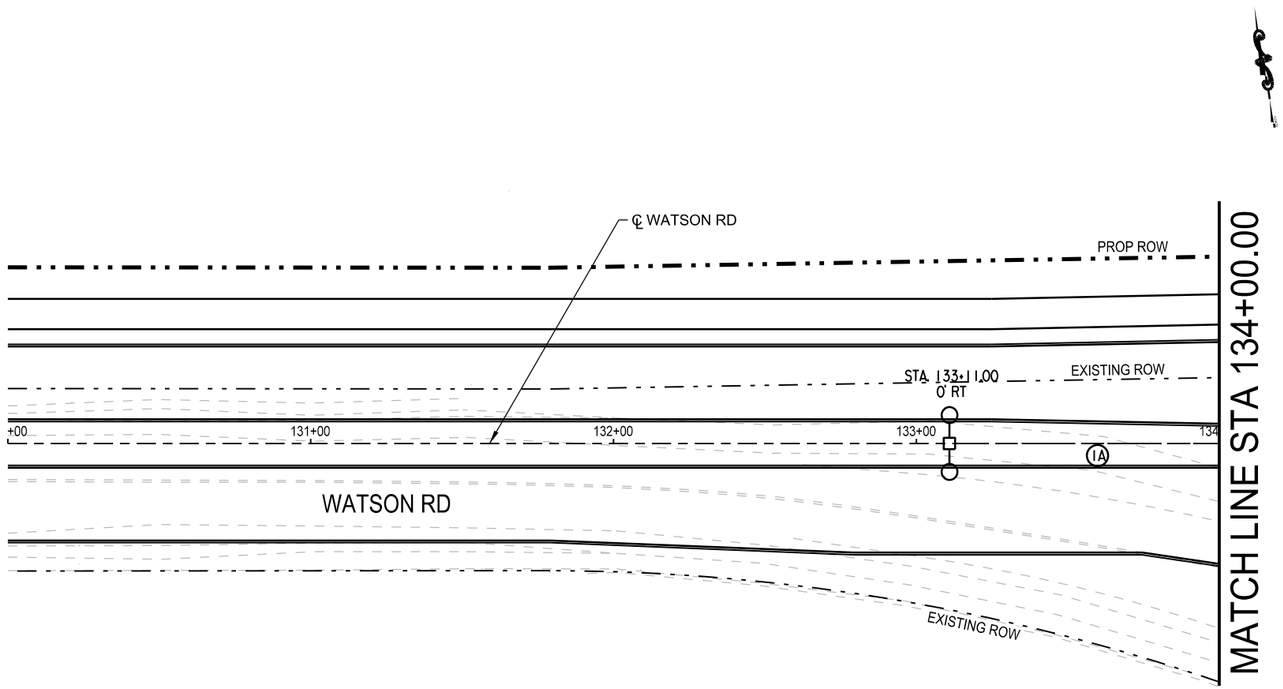
TRANSVERSE OR IN-LANE RUMBLE STRIPS

RS(5)-13

FILE: rs(5)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT April 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
2-10	DIST	COUNTY		SHEET NO.
10-13	SAT	BEXAR		203

LEGEND

- IN RD IL (TY SA) 40T-8 (250W EQ) LED
- IN RD IL (TY SA) 40T-8-8 (250W EQ) LED
- (1) CONDUCTOR IN CONDUIT AND CONDUIT RUN NUMBER
- GROUND BOX (TY A) (122311) W/APRON
- ELECTRICAL SERVICE



CABLE AND CONDUIT RUN				
RUN	0618 2018 CONDT (PVC)(SCHD 40)(2")	0620 2011 ELEC CONDR (NO. 8) BARE	0620 2012 ELEC CONDR (NO. 8) INSULATED	RUN LENGTH FEET
1A	87	87	174	87
TOTAL LF	87	87	174	

NOTE: ALL WIRE LENGTHS HAVE 2 FEET ADDITIONAL LENGTH FOR EACH END CALCULATED.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
FERNANDO J. SALAZAR
#92678
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY FERNANDO J. SALAZAR, P.E. #92678
7/6/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

ILLUMINATION PLAN SHEET

STA 130+00.00 TO STA 134+00.00

SHEET 1 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			204
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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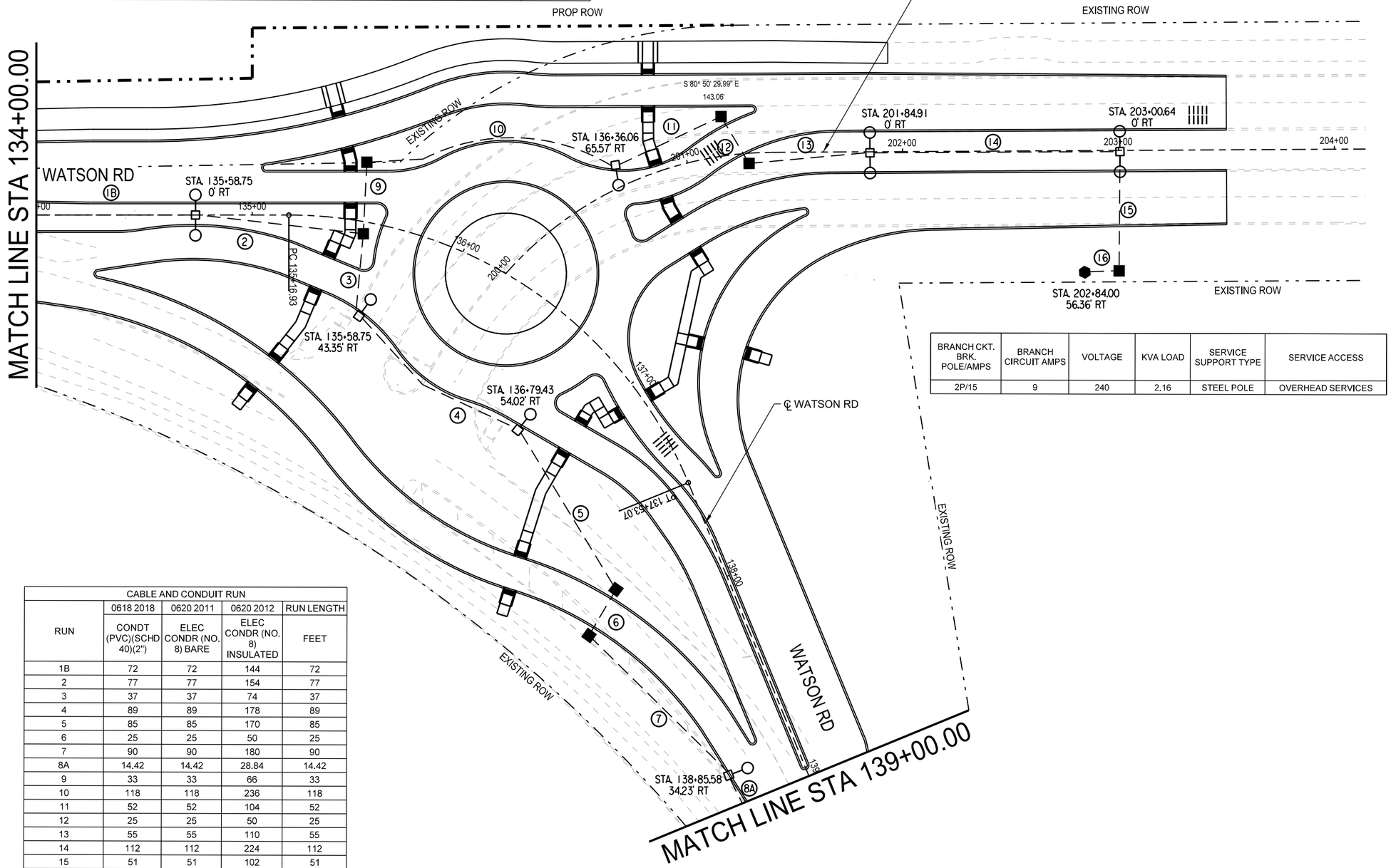
SUMMARY OF ILLUMINATION								
ILLUMINATION SHEET NUMBERS	ITEM 416	ITEM 610	ITEM 610	ITEM 618	ITEM 620	ITEM 620	ITEM 624	ITEM 628
	0416 2003	0610 6214	610 6215	0618 2018	0620 2011	0620 2012	0624 2008	0628 2005
	DRILL SHAFT (30 IN)	IN RD IL (TY SA) 40T-8 (250W EQ) LED	IN RD IL (TY SA) 40T-8-8 (250W EQ) LED	CONDT (PVC)(SCHD 40)(2")	ELEC CONDR (NO. 8)BARE	ELEC CONDR (NO. 8) INSULATED	GROUND BOX TY A (122311) W/APRON	ELE SRV TY A 120/240 060 (NS)SS(E)SP(O)
	LF	EA	EA	LF	LF	LF	EA	EA
SHEET 1 OF 3	6		1	87	87	174		
SHEET 2 OF 3	42	4	3	946.42	946.42	1892.84	6	1
SHEET 3 OF 3	6	1		177	177	354		
TOTAL	54	5	4	1210.42	1210.42	2420.84	6	1

LEGEND

- IN RD IL (TY SA) 40T-8 (250W EQ) LED
- IN RD IL (TY SA) 40T-8-8 (250W EQ) LED
- (1) CONDUCTOR IN CONDUIT AND CONDUIT RUN NUMBER
- GROUND BOX (TY A) (122311) W/APRON
- ELECTRICAL SERVICE



BRANCH CKT. BRK. POLE/AMPS	BRANCH CIRCUIT AMPS	VOLTAGE	KVA LOAD	SERVICE SUPPORT TYPE	SERVICE ACCESS
2P/15	9	240	2.16	STEEL POLE	OVERHEAD SERVICES

CABLE AND CONDUIT RUN				
RUN	0618 2018 CONDT (PVC)(SCHD 40)(2")	0620 2011 ELEC CONDR (NO. 8) BARE	0620 2012 ELEC CONDR (NO. 8) INSULATED	RUN LENGTH FEET
1B	72	72	144	72
2	77	77	154	77
3	37	37	74	37
4	89	89	178	89
5	85	85	170	85
6	25	25	50	25
7	90	90	180	90
8A	14.42	14.42	28.84	14.42
9	33	33	66	33
10	118	118	236	118
11	52	52	104	52
12	25	25	50	25
13	55	55	110	55
14	112	112	224	112
15	51	51	102	51
16	11	11	22	11
TOTAL LF	946.42	946.42	1892.84	

NOTE: ALL WIRE LENGTHS HAVE 2 FEET ADDITIONAL LENGTH FOR EACH END CALCULATED.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY FERNANDO J. SALAZAR, P.E. #92678

STATE OF TEXAS · FERNANDO J. SALAZAR · #92678 · LICENSED PROFESSIONAL ENGINEER

7/6/2020

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

ILLUMINATION PLAN SHEET

STA 134+00.00 TO STA 139+00.00

SHEET 2 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6		205

STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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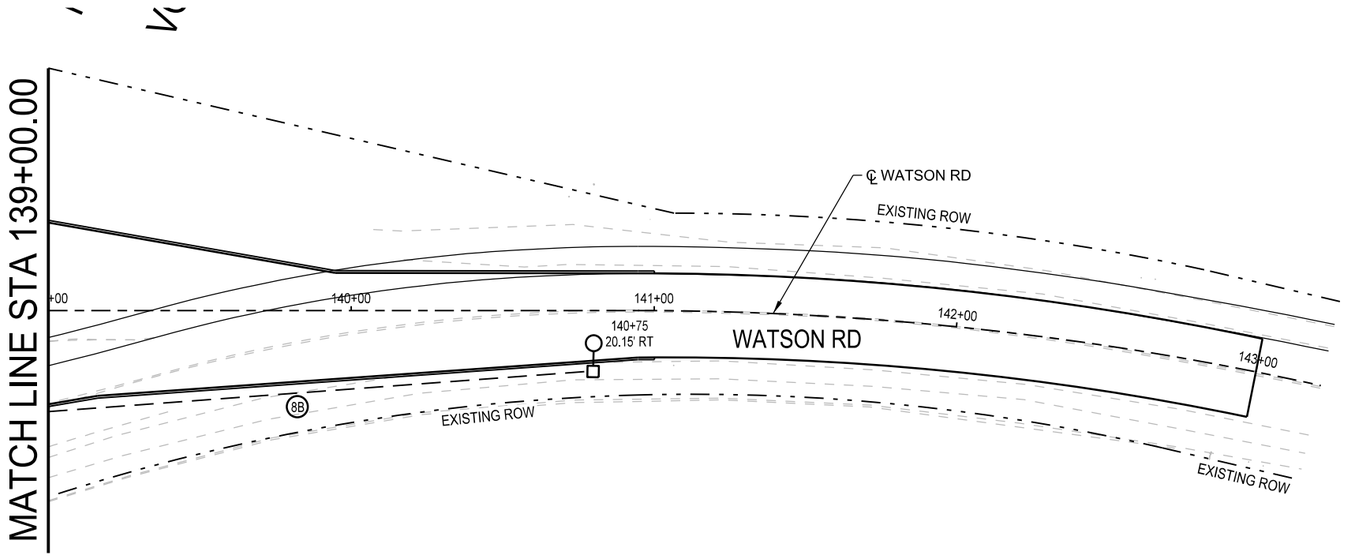

LEGEND

- IN RD IL (TY SA) 40T-8 (250W EQ) LED
- IN RD IL (TY SA) 40T-8-8 (250W EQ) LED
- (1) CONDUCTOR IN CONDUIT AND CONDUIT RUN NUMBER
- GROUND BOX (TY A) (122311) W/APRON
- ELECTRICAL SERVICE

CABLE AND CONDUIT RUN				
RUN	0618 2018	0620 2011	0620 2012	RUN LENGTH
	CONDT (PVC)(SCHD 40)(2")	ELEC CONDR (NO. 8) BARE	ELEC CONDR (NO. 8) INSULATED	FEET
8B	177	177	354	177
TOTAL LF	177	177	354	

NOTE: ALL WIRE LENGTHS HAVE 2 FEET ADDITIONAL LENGTH FOR EACH END CALCULATED.

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

WATSON ROAD

ILLUMINATION PLAN SHEET

STA 139+00.00 TO END OF PROJECT

SHEET 3 OF 3

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			206
STATE	DIST.	COUNTY	
TX		BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
©TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0915	12	562	WATSON RD
		DIST	COUNTY		SHEET NO.
			BEXAR		207

71A

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.
12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

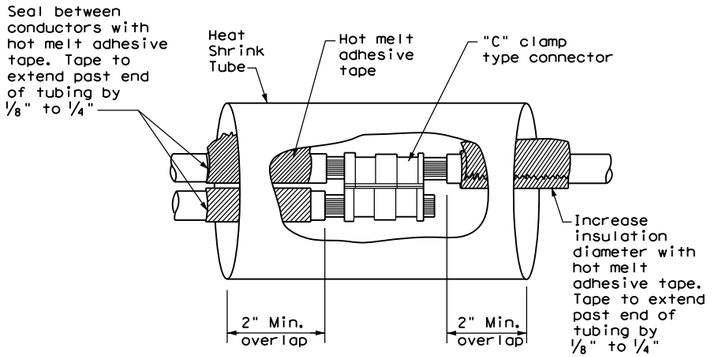
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

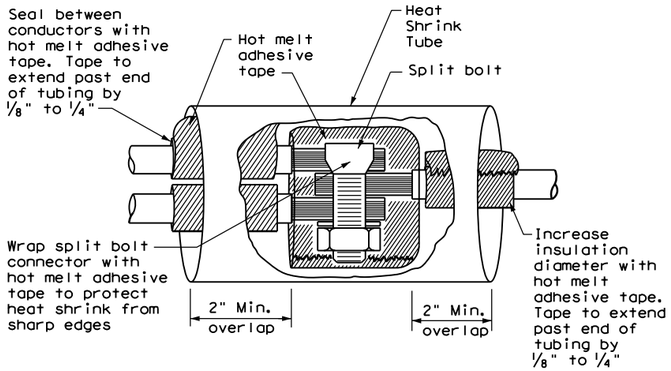
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

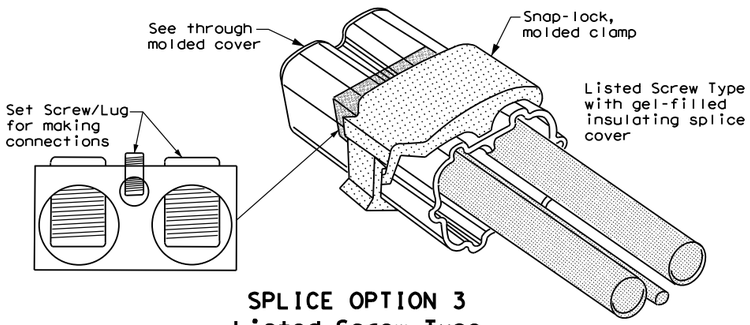
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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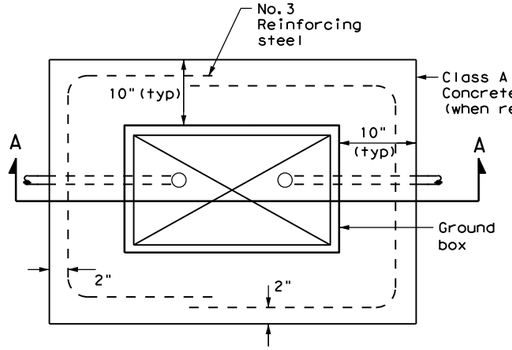
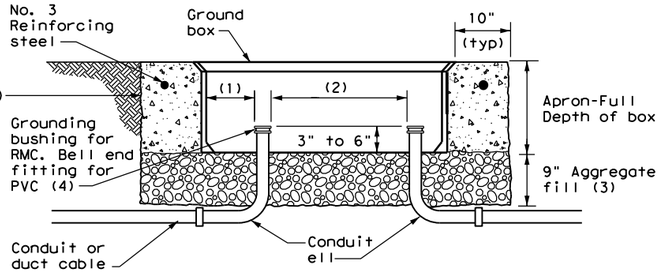


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

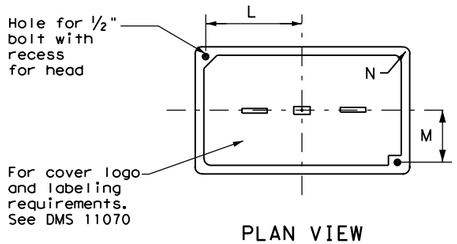
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

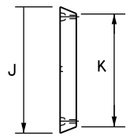
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

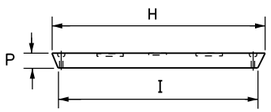
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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		BEXAR		209

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

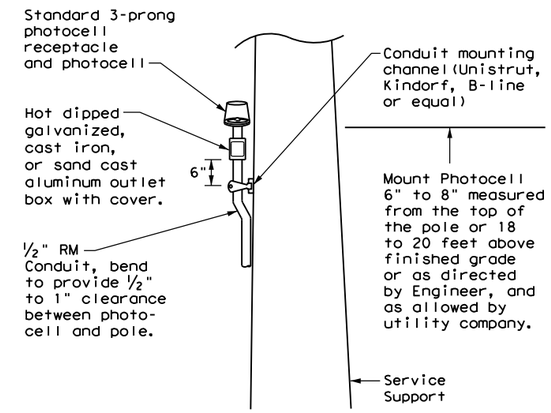
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5)-14

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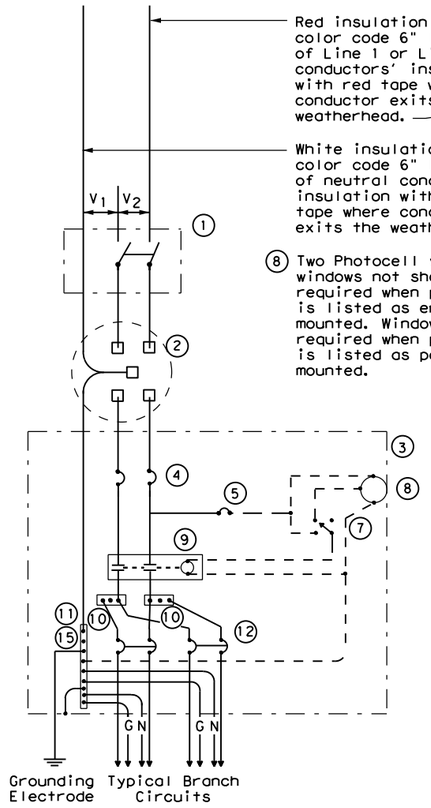
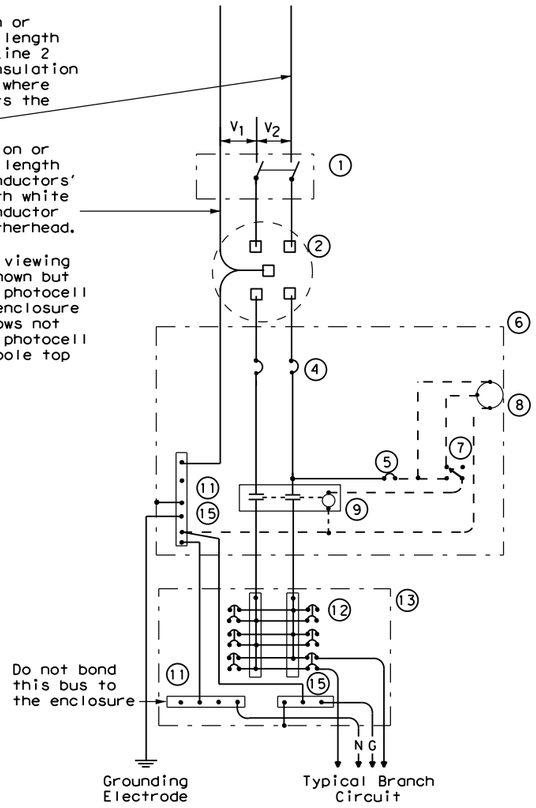
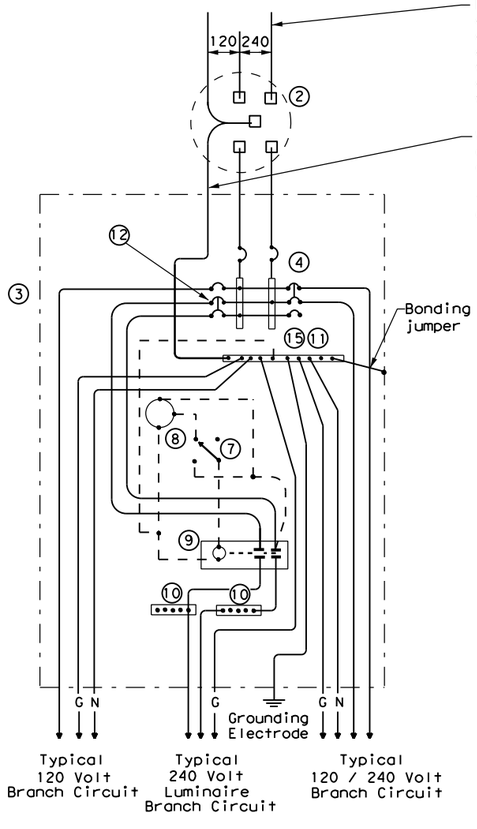


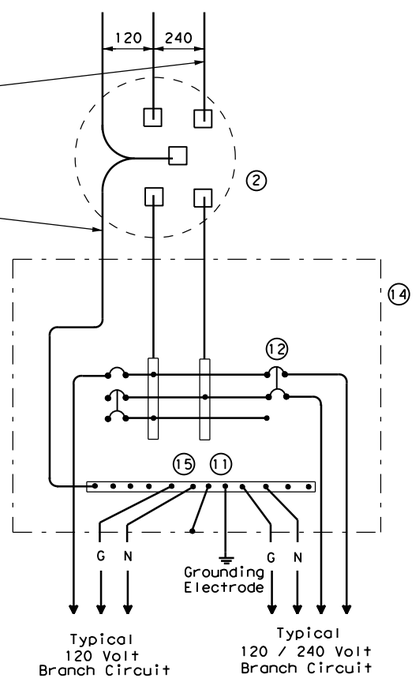
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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SUPPORT TYPE STEEL POLE (SP) AND STEEL FRAME (SF)

1. Provide steel pole and steel frame supports as per TxDOT Departmental Material Specification (DMS)11080 "Electrical Services." Mount all equipment and conduit on 12 gauge galvanized steel or stainless steel channel strut, 1 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ in. deep Unistrut, Kindorf, B-line or equal. Bolt or weld all channel and hardware to vertical members as approved. Do not stack channel. File smooth and paint field cut ends of all channel with zinc-rich paint before installing.

2. Provide poles for overhead service with an eyebolt or similar fitting for attachment of the service drop to the pole in conformance with the electric utility provider's specifications.

3. Provide and install galvanized ¾ in. x 18 in. x 4 in. (dia. x length x hook length) anchor bolts for underground service supports. Provide and install galvanized ¾ in. x 56 in. x 4 in. anchor bolts for overhead service supports. Ensure anchor bolts have 3 in of thread, with 3 ¼ in. to 3 ½ in. of the exposed anchor bolt projecting above finished foundation. Provide and install leveling nuts for all anchor bolts.

4. Bond one of the anchor bolts to the rebar cage with 6 AWG bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. See Inset B.

5. Furnish and install rigid metallic ells in all steel pole and steel frame foundations for all conduits entering the service from underground.

6. Use class C concrete for foundations. Ensure reinforcing steel is Grade 60 with 3" of unobstructed concrete cover.

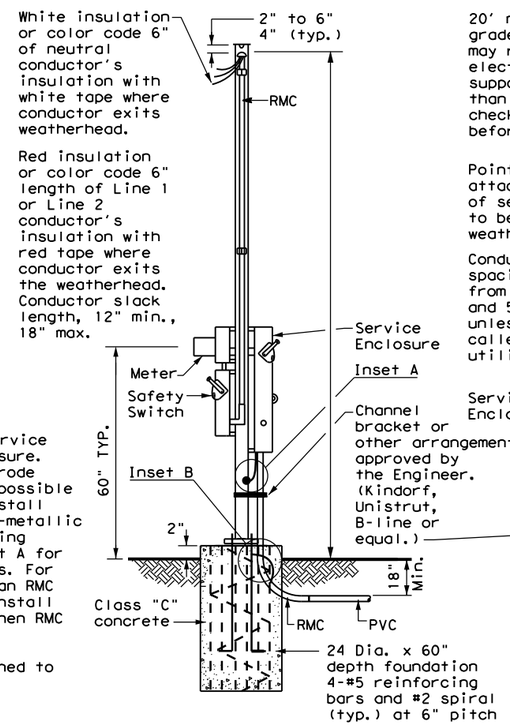
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. For steel frame service supports, provide and install tank ground fitting on steel frame post. Install service grounding electrode conductor in a non-metallic conduit or tubing from the enclosure to the steel frame post. Connect electrical service grounding electrode conductor to the tank ground fitting. See steel frame and steel pole details and Inset A for more information. Size service entrance conduit and branch circuit conduit as shown in the plans. For underground conduit runs from the electrical service, extend RMC from the service enclosure to an RMC elbow, and then connect the schedule type and size of conduit shown in the plans. Provide and install grounding bushings where RMC terminates in the enclosure. Grounding bushings are not required when RMC is fitted into a sealing hub or threaded boss.

8. If Steel pole or frame is painted, bond each separate painted piece with a bonding jumper attached to a tapped hole.

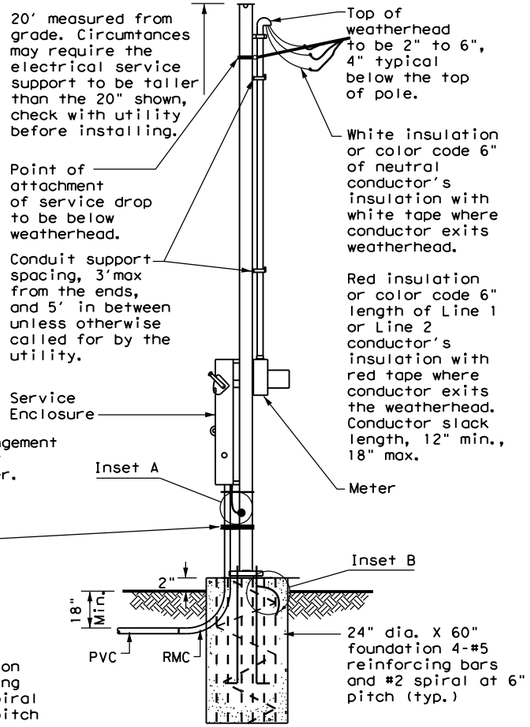
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

10. Avoid contact of the service drop and service entrance conductors with the metal pole to prevent abrasion of the insulated conductors.

11. Shop drawings are not required for service support structure unless specifically stated elsewhere or directed by the Engineer.

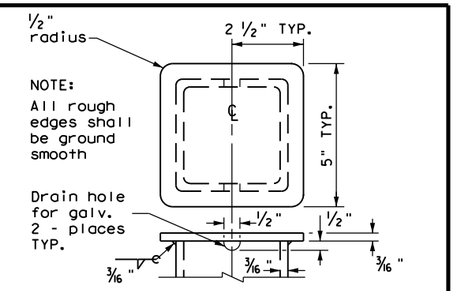


WITH SAFETY SWITCH

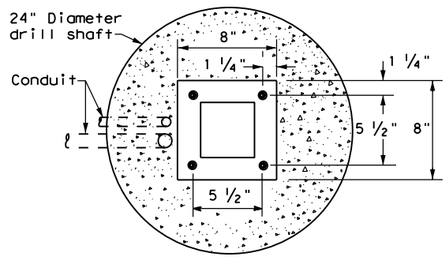


WITHOUT SAFETY SWITCH

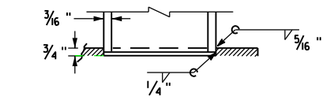
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

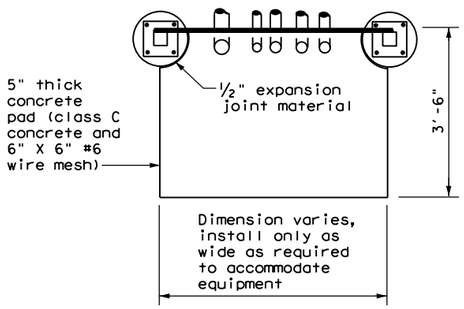


BASE PLATE DETAIL



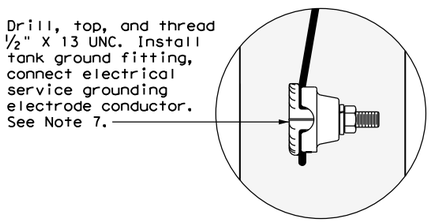
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



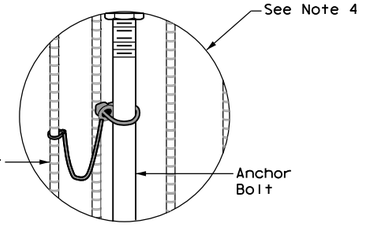
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

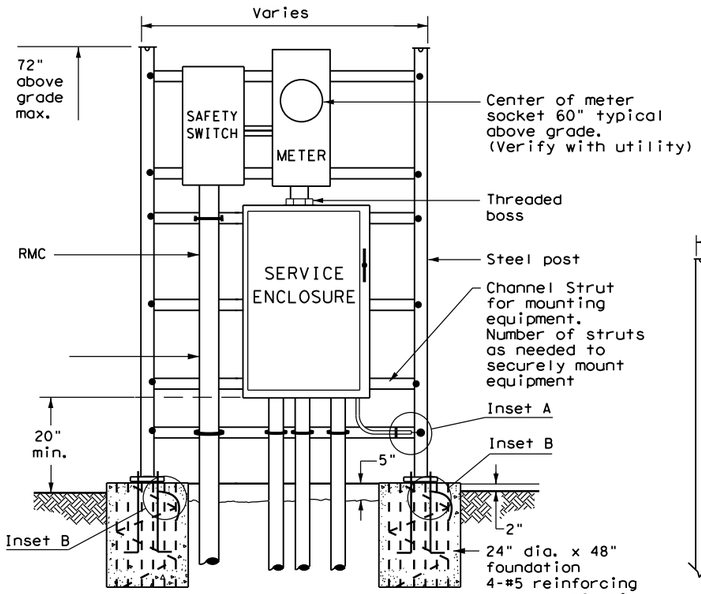


FRONT VIEW

INSET A

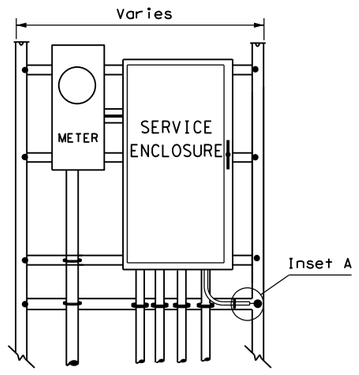


INSET B

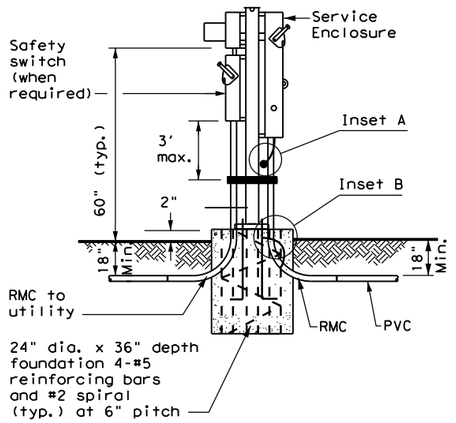


WITH SAFETY SWITCH

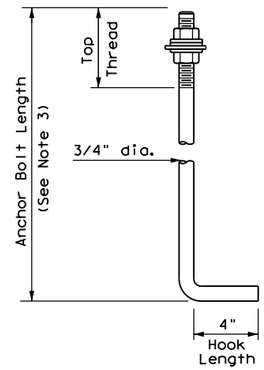
FRONT VIEW



WITHOUT SAFETY SWITCH



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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		BEXAR		212

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TIMBER POLE (TP) SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrial service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to 5/8 in. max. depth and 1 7/8 in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 3/4 in. maximum depth, and 1 1/2 in. to 1 5/8 in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, 1/4 in. minimum diameter by 1 1/2 in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stack channel.
6. When excess length must be trimmed from poles, trim from the top end only.

(1) Class 5 pole, height as required

(2) Service drop from utility company (attached below weatherhead)

(3) Service conduit (RMC) and service entrance conductors - One Red, One Black, One White (See Electrical Service Data)

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in 1/2 in. PVC to ground rod - extend 1/2 in. PVC 6 in. underground.

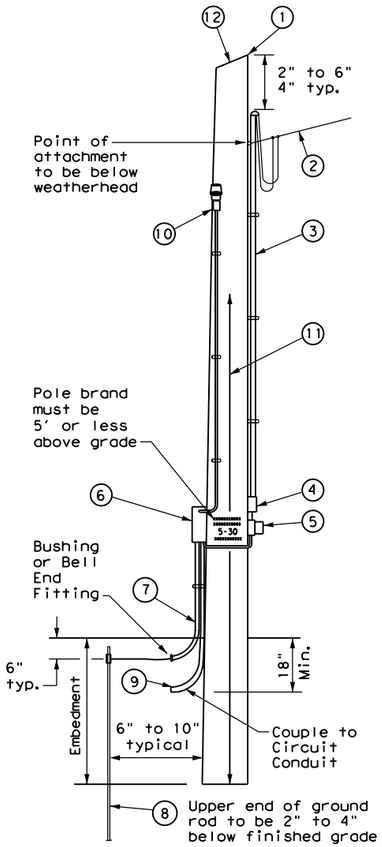
(8) 5/8 in. x 8 ft. Copper clad ground rod - drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

(10) See pole-top mounted photocell detail on ED(5).

(11) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.

(12) When required by utility, cut top of pole at an angle to enhance rain run off.

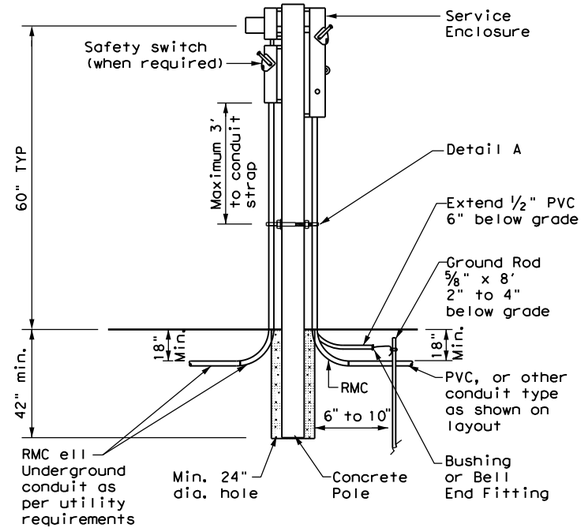


SERVICE SUPPORT TYPE TP (O)

GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

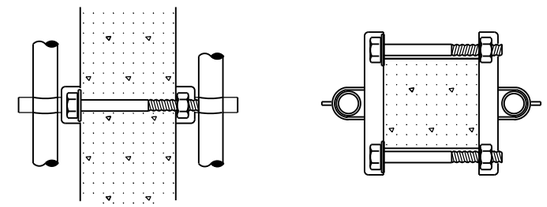
Ensure electrical service support structures bid as type Granite Concrete (GC) or Other Concrete (OC) meet the following requirements.

1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 1/2 in. or 1 5/8 in. wide by 1 in. up to 3 3/4 in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stack channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



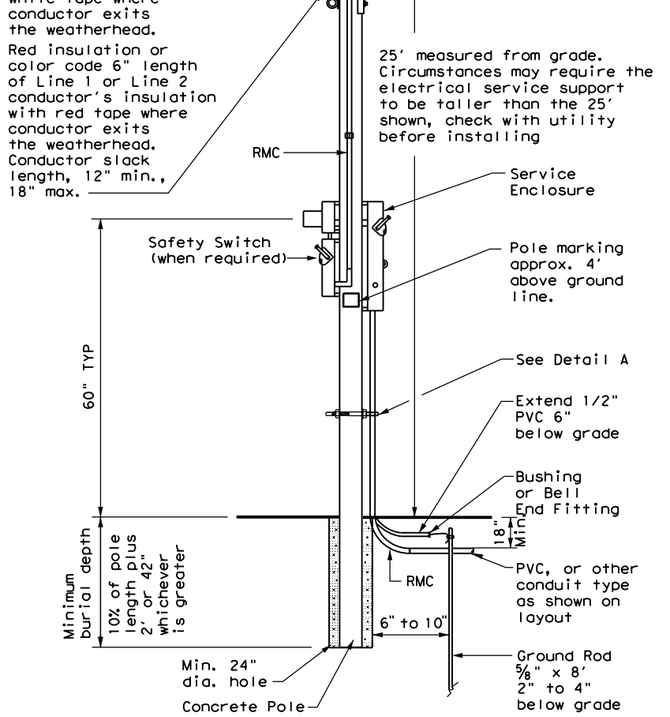
CONCRETE SERVICE SUPPORT

Underground (U)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.



CONCRETE SERVICE SUPPORT

Overhead (O)

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

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DUCT CABLE & HDPE CONDUIT NOTES

1. Provide duct cable in accordance with Departmental Material Specification (DMS) 11060 "Duct Cable" and Item 622 "Duct Cable." Provide duct cable as listed on the Material Producer List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 622.

2. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 11060 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 RMC elbows are called for in the plans and any portion of the RMC elbow is buried less than 18" from possible contact, ground the RMC elbow.

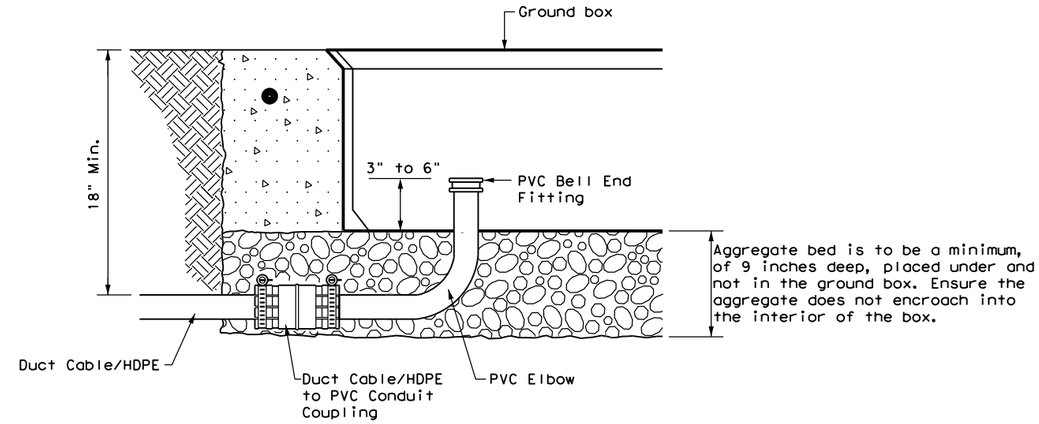
5. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electrical Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nonmetallic Underground Conduit with Conductors: Type NUCC."

6. 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.

7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved method after completing the pull tests required by Item 622.

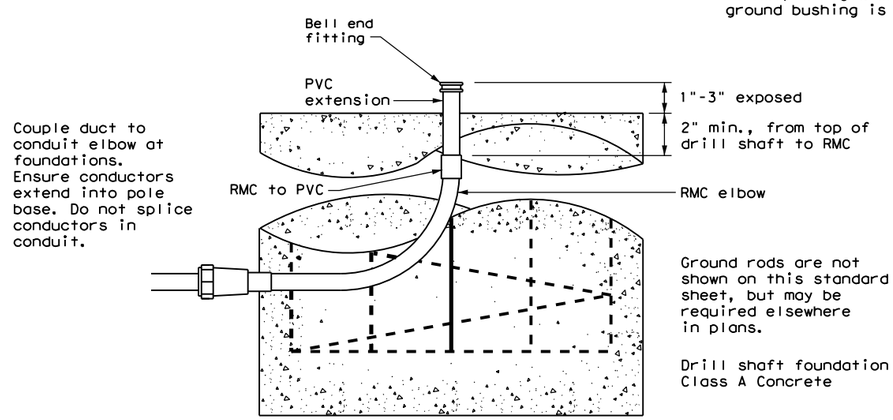
8. Provide minimum cover of 24 in. under roadways, 18 in. in other locations, or as shown on the plans.

9. 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 coupling 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 all installed in accordance with their manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect conduit with heat shrink tubing.

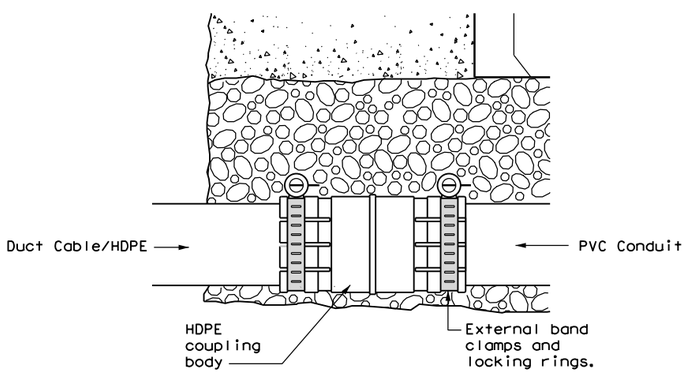


DUCT CABLE/HDPE AT GROUND BOX

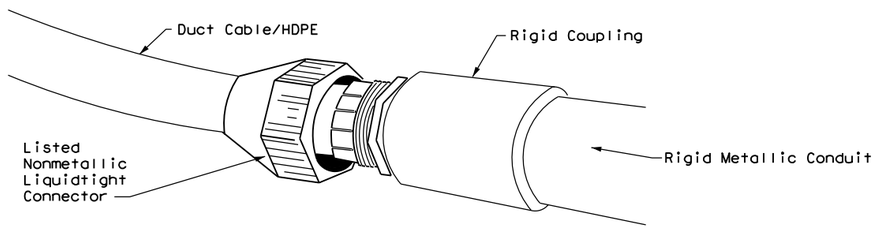
When the upper end of an RMC Ell does not enter the ground box, it may be extended with a SCH-40 PVC conduit nipple and bell end, provided there is a minimum of 18" of cover over all parts of the elbow. If not, a rigid extension and ground bushing is required.



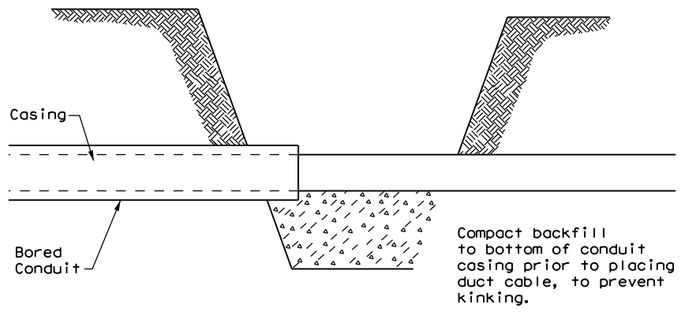
DUCT CABLE / HDPE AT FOUNDATION



DUCT CABLE/HDPE TO PVC



DUCT CABLE/HDPE TO RMC



BORE PIT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS DUCT CABLE/ HDPE CONDUIT

ED(11)-14

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BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

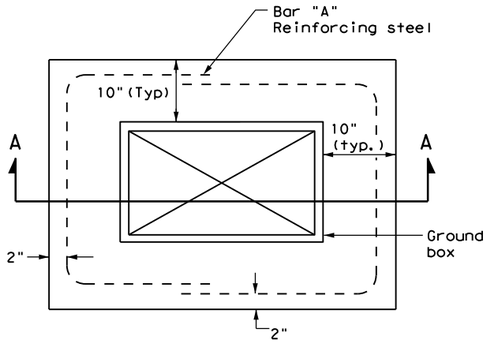
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

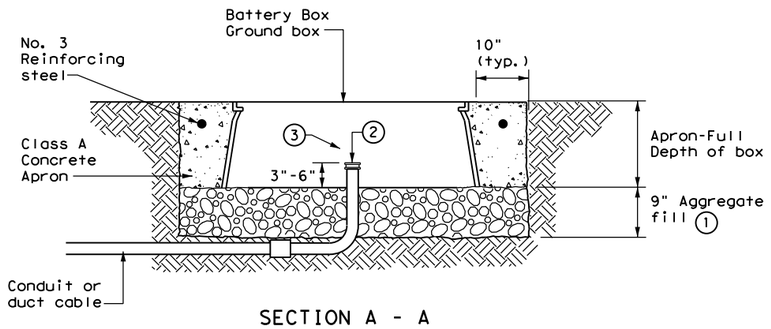
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior to setting the box. Install battery box ground box on top of aggregate.

3. Cast battery box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

4. Bolt covers down when not working in battery box ground boxes. Keep bolt holes in the box clear of dirt.



PLAN VIEW



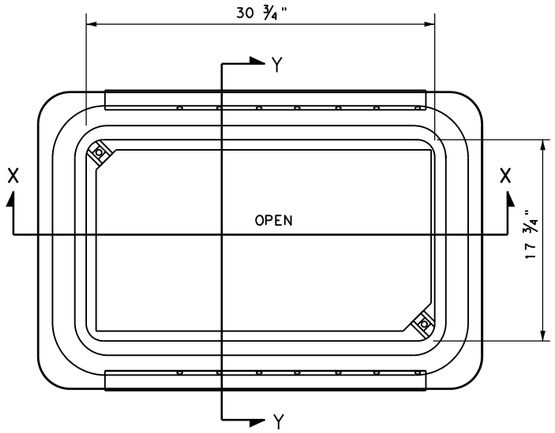
SECTION A - A

APRON FOR BATTERY BOX GROUND BOXES

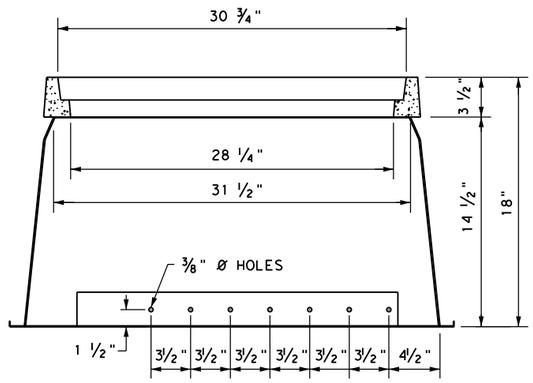
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

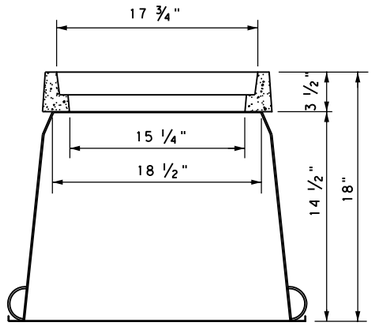
(3) Install all conduits in a neat and workmanlike manner.



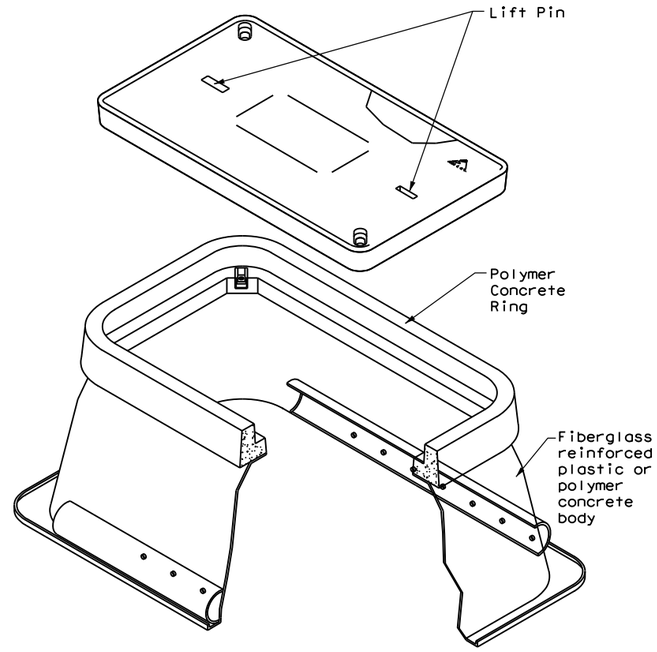
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS BATTERY BOX GROUND BOXES

ED(12)-14

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ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

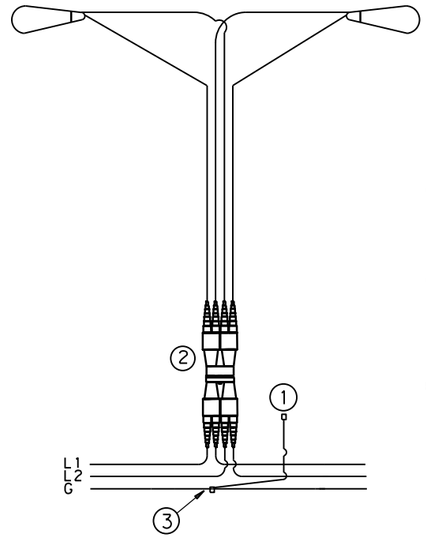
      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

NOTES:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.

Texas Department of Transportation

Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-17

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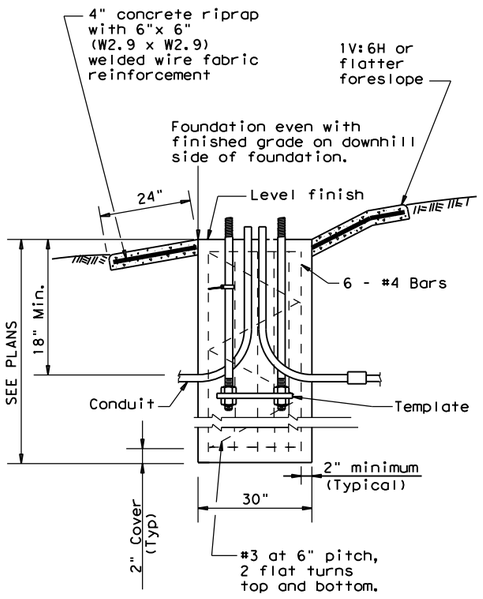
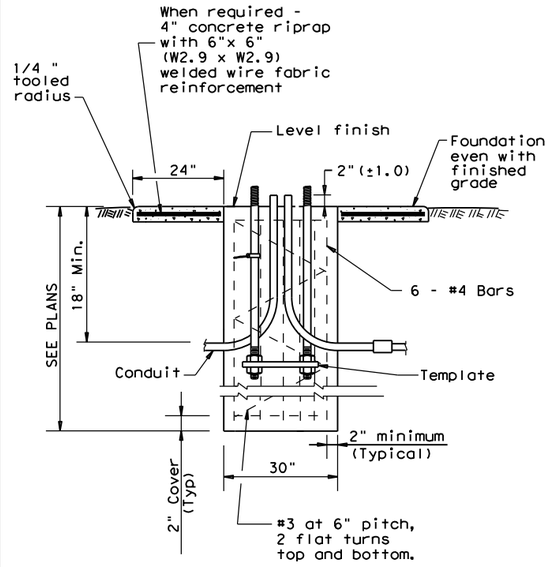


SECTION A-A
SHOWING SLOPED GRADE



SECTION A-A
SHOWING CONSTANT GRADE

TABLE 1

ANCHOR BOLTS

POLE MOUNTING HEIGHT	BOLT CIRCLE		ANCHOR BOLT SIZE
	Shoe Base	T-Base	
<40 ft.	13 in.	14 in.	1in. x 30in.
40-50 ft.	15 in.	17 ¼in.	1 ¼in. x 30in.

TABLE 2

RECOMMENDED FOUNDATION LENGTHS (See note 1)

MOUNTING HEIGHT	TEXAS CONE PENETROMETER N Blows/ft		
	10	15	40
≤20 ft.	6′	6′	6′
>20 ft. to 30 ft.	8′	6′	6′
>30 ft. to 40 ft.	8′	8′	6′
>40 ft. to 50 ft.	10′	8′	6′

TABLE 3

PAY QUANTITY OF RIPRAP PER FOUNDATION (Install only when shown on the plans)

Foundation Diameter	RIPRAP DIAMETER	RIPRAP (CONC) (CL B)
30 in.	78 in.	0.35 CY

GENERAL NOTES:

1. "Recommended Foundation Lengths" table is for information purposes only. Foundation lengths shall be as shown on the plans, or as directed by the Engineer. Foundations will be paid for under Item 416, "Drilled Shaft Foundations," unless otherwise shown on the plans.
2. Erect roadway illumination assembly poles plumb and true. Form and level the top 6" of the foundation so the pole will be plumb. Use leveling nuts to plumb shoe base poles. Do not use shims or leveling nuts under transformer bases. Do not grout between baseplate and the foundation.
3. Ensure Class 2A and 2B fit for anchor bolts and nuts. Tap and chase nuts after galvanizing. Anchor bolt body with rolled threads need not be full size.
4. Use appropriate class of concrete as specified in Items 416 and 432. Concrete for riprap may be upgraded to Class C at no extra cost to the Department.
5. Place riprap around the foundation when called for elsewhere in the plans. Riprap will be paid for under Item 432.
6. Locate breakaway roadway illumination assemblies as shown in the placement table, unless otherwise dimensioned on the plans. Protect non-breakaway illumination assemblies from vehicular impact (i.e. 2.5 ft. behind guard rail or mounted on traffic barrier), or located outside the clear zone, except that 2.5 ft. from curb face is minimum desired for light poles on city streets, 45 mph or less. See Roadway Design Manual for further information.
7. Use 4 hold down and 4 connecting washers on transformer base poles as recommended by the manufacturer and supplied with base.
8. Install a minimum of 2 conduits in each foundation. See lighting layout sheets for locations of foundations with more than 2 conduits. Cap unused conduits in foundations on both ends.
9. Conduit location in foundations is critical for breakaway devices. Place conduits 2 in. apart on centerline as shown.
10. Bond anchor bolt to rebar cage with #6 bare stranded copper conductor. Use listed mechanical connectors rated for embedment in concrete. The bonded steel in the foundation creates a concrete encased grounding electrode which replaces the ground rod.
11. Use riprap on T-base foundations that are located on sloped grades.

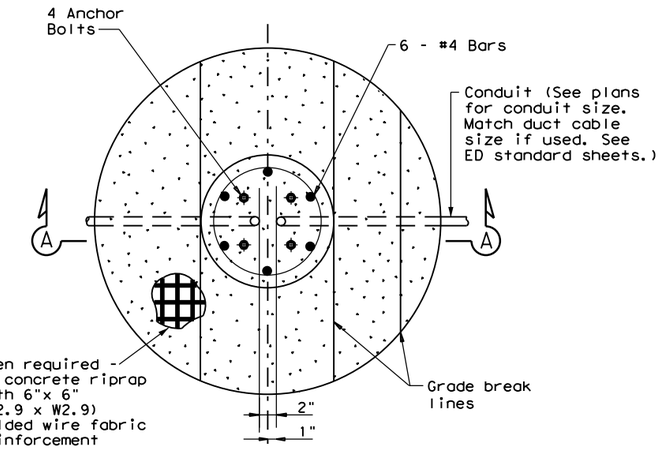
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

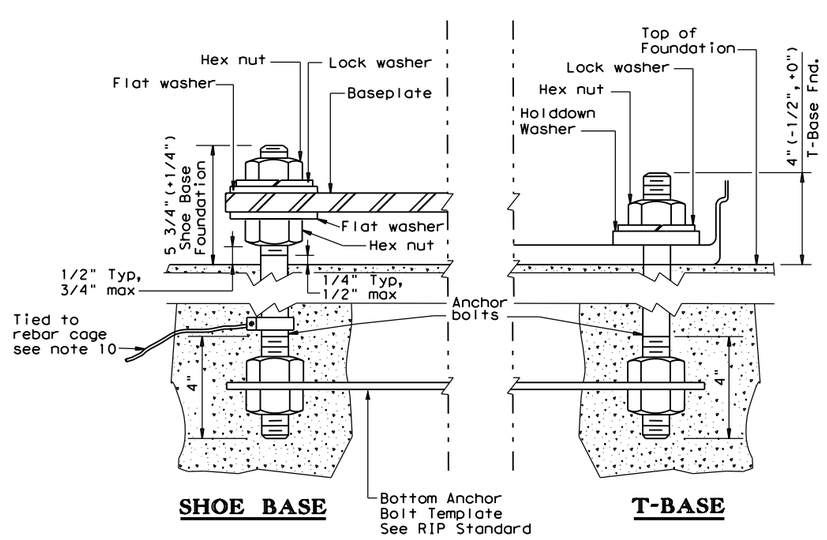
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Operations Division Standard

ROADWAY ILLUMINATION DETAILS (RDWY ILLUM FOUNDATIONS)

RID(2)-17

FILE: rid2-17.dgn	DN:	CK:	DW:	CK:
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SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation				Quantity	T-Base Designation				Quantity	CSB/SSCB Mounted Designation				Quantity
	Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire		Pole	A1	A2	Luminaire	
20	(Type SA 20 S - 4)			(150W EQ) LED		(Type SA 20 T - 4)			(150W EQ) LED						
	(Type SA 20 S - 4 - 4)			(150W EQ) LED		(Type SA 20 T - 4 - 4)			(150W EQ) LED						
30	(Type SA 30 S - 4)			(250W EQ) LED		(Type SA 30 T - 4)			(250W EQ) LED		(Type SP 28 S - 4)			(250W EQ) LED	
	(Type SA 30 S - 4 - 4)			(250W EQ) LED		(Type SA 30 T - 4 - 4)			(250W EQ) LED		(Type SP 28 S - 4 - 4)			(250W EQ) LED	
	(Type SA 30 S - 8)			(250W EQ) LED		(Type SA 30 T - 8)			(250W EQ) LED		(Type SP 28 S - 8)			(250W EQ) LED	
	(Type SA 30 S - 8 - 8)			(250W EQ) LED		(Type SA 30 T - 8 - 8)			(250W EQ) LED		(Type SP 28 S - 8 - 8)			(250W EQ) LED	
40	(Type SA 40 S - 4)			(250W EQ) LED		(Type SA 40 T - 4)			(250W EQ) LED		(Type SP 38 S - 4)			(250W EQ) LED	
	(Type SA 40 S - 4 - 4)			(250W EQ) LED		(Type SA 40 T - 4 - 4)			(250W EQ) LED		(Type SP 38 S - 4 - 4)			(250W EQ) LED	
	(Type SA 40 S - 8)			(250W EQ) LED		(Type SA 40 T - 8)			(250W EQ) LED	5	(Type SP 38 S - 8)			(250W EQ) LED	
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED	4	(Type SP 38 S - 8 - 8)			(250W EQ) LED	
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED		(Type SP 38 S - 10)			(250W EQ) LED	
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	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED		(Type SP 38 S - 12)			(250W EQ) LED	
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED		(Type SP 38 S - 12 - 12)			(250W EQ) LED	
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED		(Type SP 48 S - 4)			(400W EQ) LED	
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	(Type SA 50 S - 8)			(400W EQ) LED		(Type SA 50 T - 8)			(400W EQ) LED		(Type SP 48 S - 8)			(400W EQ) LED	
	(Type SA 50 S - 8 - 8)			(400W EQ) LED		(Type SA 50 T - 8 - 8)			(400W EQ) LED		(Type SP 48 S - 8 - 8)			(400W EQ) LED	
	(Type SA 50 S - 10)			(400W EQ) LED		(Type SA 50 T - 10)			(400W EQ) LED		(Type SP 48 S - 10)			(400W EQ) LED	
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	(Type SA 50 S - 12)			(400W EQ) LED		(Type SA 50 T - 12)			(400W EQ) LED		(Type SP 48 S - 12)			(400W EQ) LED	
	(Type SA 50 S - 12 - 12)			(400W EQ) LED		(Type SA 50 T - 12 - 12)			(400W EQ) LED		(Type SP 48 S - 12 - 12)			(400W EQ) LED	

OTHER Designation				Quantity
Pole	A1	A2	Luminaire	

GENERAL NOTES:

1. All work, materials and services not shown on the plans which may be necessary for complete and proper construction shall be performed, furnished and installed by the Contractor. Faulty fabrication or poor workmanship in any material, equipment or installation will be considered justification for rejection. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the Department such warranties or guarantees.

2. The location of poles and fixtures are diagrammatic only and may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Standard Steel Pole Designs. Steel poles fabricated in accordance with the details and dimensions shown herein, shall be considered standard designs. Submission of shop drawings and design calculations for standard designs is not required.

4. Optional Steel Pole Designs. Multi-sided steel poles may be allowed as optional designs, if steel poles are permitted or required, pending approval by the Department as outlined below.

   a. Shop Drawings. Optional designs require submission of shop drawings and design calculations bearing the seal of an engineer licensed in the State of Texas, in accordance with Item 441, "Steel Structures." The Department may elect to pre-approve some shop drawings for optionally designed poles. Submission of shop drawings and design calculations is not required for structures fabricated in accordance with the details of shop drawings on the pre-approved list maintained by the TxDOT Traffic Operations Division. Any deviation from the pre-approved shop drawings will require submission of shop drawings of the complete assembly and design calculations as described above.
   b. Structural Support Design for Luminaires. Lighting support structures shall be designed for a 25 year design life in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto. All poles shall be designed for 110 mph 3-second gust wind speeds. The Gust Factor, G, and Wind Importance Factor, Ir, shall be applied as per the AASHTO Specifications assuming a 25-year design life. The design wind pressure for hurricane wind velocities greater than 100 mph shall not be less than the design wind pressure using 100 mph with the non-hurricane Wind Importance Factor, Ir, value. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. All transformer bases shall have been structurally tested to resist the theoretical plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with the shop drawings. Shop drawings shall show breakaway base model number, and manufacturer's name and logo. Manufacturer's shop drawings shall include the ASTM designations for all materials to be used.
   c. Mast Arm Attachments. All poles and attachments shall be structurally designed to support two 12-foot mast arms and luminaires. Poles shall be supplied with mast arm combinations as shown in the plans. All mast arms shall be designed for a 60-pound luminaire having an effective projected area of 1.6 square feet.
   d. Anchor Bolt Assembly. Anchor bolt assemblies for optionally designed poles shall be the same as those shown herein.

5. Aluminum Pole Designs. Aluminum pole designs may be allowed, if aluminum poles are permitted or required, pending approval by the Department as outlined below.

   a. Meet all of the requirements stated above for optional steel pole designs and the following:
      1. Aluminum poles shall be fabricated in accordance with "Structural Welding Code-Aluminum" AWS D1.2.
      2. Aluminum pole designs shall use the same anchor bolt assembly and be subject to the same geometric restraints and other requirements for steel poles specified herein.
      3. Aluminum poles shall be equipped with vibration mitigation devices, as approved by the engineer.
      4. Pole components shall be constructed using the following material:
         Shaft: ASTM B221 or B241 Alloy 6063-T6, ASTM B209 Alloy 5086-H34, ASTM B221 Alloy 6005-T5.
         Base Flange: ASTM B26 Alloy 356.0-T6 or ASTM B108 Alloy 356.0-T6 (Yield strength test required).
         Mast Arm Fitting: ASTM B209 Alloy 6061-T6 or ASTM B221 Alloy 6005-T5.
         Mast Arms: ASTM B241 Alloy 6061-T6 or Alloy 6063-T6.
         Pole Cap: ASTM B209 Alloy 5086-H32 or ASTM B108 or B26 Alloy 356.0-T6.
         Bolts: Stainless Steel AISI 300 series. Bolts threading into aluminum threads shall be treated with anti-seize compound, Never-Seez Compound, Permatex 133K or equal.

6. Special Designs. Poles with architectural treatments shall meet the requirements shown elsewhere in the plans.

7. Luminaire Mounting Height. Actual luminaire mounting height shall be the nominal mounting height given on RIP(2) for all pole-arm combinations except for poles with 4 ft. luminaire arms, which shall be 3'-0" lower than the nominal height, unless otherwise shown or directed.

EXPLANATION OF ROADWAY ILLUMINATION ASSEMBLY DESIGNATIONS

(TYPE SA 50 T - X - X) (400W EQ) LED

- SA: Pole and mast arm may be steel or aluminum.
- ST: Pole and mast arm must be steel.
- AL: Pole and mast arm must be aluminum.
- SP: Special (ovalized) steel or aluminum pole for installing on CSB or SSCB. See standard sheet CSB (4), or SSCB (4).

Two numerical digits denote nominal mounting height in feet.

Next letter denotes type of base, (S-Shoe Base, T-Transformer Base, or B-Bridge/Ret.Wall Mount)

First number denotes length of mast arm in feet.

Use of second mast arm is indicated by second dashed number which denotes length in feet.

Luminaire rating in watts (i.e. 400W). Equivalent wattage LED fixtures will include EQ (i.e. 400W EQ)

Last letters indicate light source (S - High Pressure Sodium; LED - LED luminaire)

SHEET 1 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(1)-19

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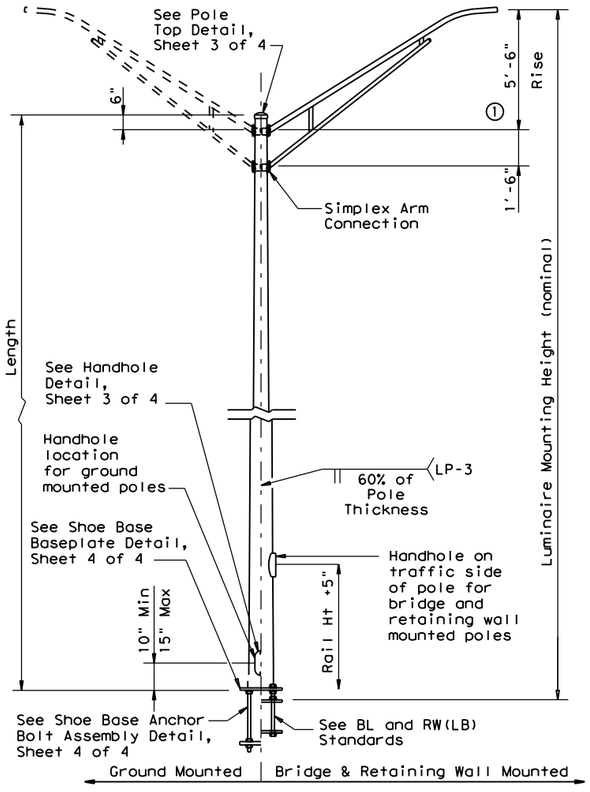
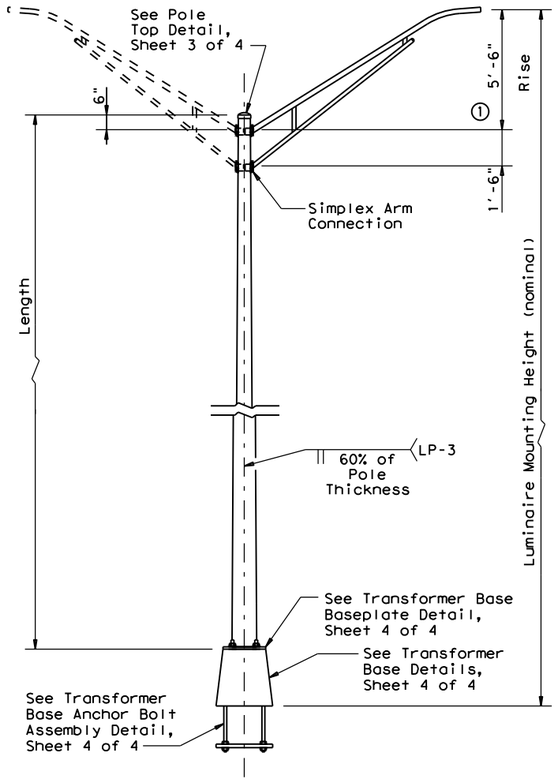


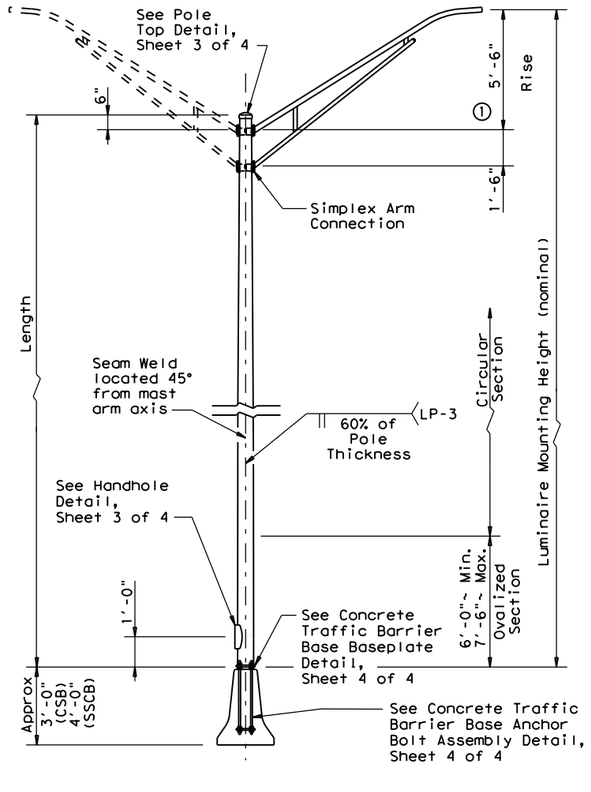
SHOE BASE POLE

SHOE BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	4.90	15.00	0.1196	7.1
30.00	7.50	4.00	25.00	0.1196	13.2
31.00-39.00	8.00	4.36-3.24	26.00-34.00	0.1196	20.7
40.00	8.50	3.60	35.00	0.1196	20.7
50.00	10.50	4.20	45.00	0.1196	30.3



TRANSFORMER BASE POLE

TRANSFORMER BASE POLE					
Luminaire Mounting Height (Nominal) (ft)	Base Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)
20.00	7.00	5.11	13.50	0.1196	7.1
30.00	7.50	4.21	23.50	0.1196	13.2
31.00-39.00	8.00	4.57-3.45	24.50-32.50	0.1196	20.7
40.00	8.50	3.81	33.50	0.1196	20.7
50.00	10.00	3.91	43.50	0.1196	30.3



CONCRETE TRAFFIC BARRIER BASE POLE

CONCRETE TRAFFIC BARRIER BASE POLE (CSB/SSCB)						
Luminaire Mounting Height (Nominal) (ft)	Base ② Diameter (in)	Top Diameter (in)	Length (ft)	Pole Thickness (in)	Design Moment (K-ft)	
					About ℄ of Rail	Perp. to Rail
28.00	9.00	5.78	23.00	0.1196	10.3	13.2
38.00	9.00	4.38	33.00	0.1196	16.6	20.8
48.00	10.50	4.48	43.00	0.1345	25.1	30.5

MATERIAL DATA		
COMPONENT	ASTM DESIGNATION	MIN. YIELD (ksi)
Pole Shaft (0.14"/ft. Taper)	A572 Gr 50, A595 Gr A, A1011 HSLAS Gr 50 Cl 2 ③, or A1008 HSLAS Gr 50 Cl 2	50
Base Plate and Handhole Frame	A572 Gr.50, or A36	36
T-Base Connecting Bolts	F3125 Gr A325	92
Anchor Bolts	F1554 Gr 55, A193-B7 or A321	55 105
Anchor Bolt Templates	A36	36
Heavy Hex (H.H.) Nuts	A194 Gr 2H, or A563 Gr DH	
Flat Washers	F436	

NOTES:

① 2'-6" rise for 4 ft. luminaire arms.

② Before ovalized as shown on Concrete Traffic Barrier Base Baseplate details, Sheet 4 of 4.

③ A1011 SS Gr 50 may be used instead of HSLAS, provided the material meets the elongation requirements for HSLAS.

POLE ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Shaft length	+1"
I.D. of outside piece of slip fitting pieces	+1/8", -1/16"
O.D. of inside piece of slip fitting pieces	+1/32", -1/8"
Shaft diameter: other	+3/16"
Out of "round"	1/4"
Straightness of shaft	±1/4" in 10 ft
Twist in multi-sided shaft	4° in 50 ft
Perpendicular to baseplate	1/8" in 24"
Pole centered on baseplate	±1/4"
Location of Attachments	±1/4"
Bolt hole spacing	±1/16"

GENERAL NOTES:

1. Designs conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals , 6th Edition (2013) and Interim Revisions thereto. Design 3-Second Gust Wind Speed equals 110 mph with a 1.14 gust factor. A wind importance factor of 0.80 is applied to adjust the wind speed to a 25 year recurrence interval. Design moments listed in tables assume base of pole is 25' above natural ground level.
2. Structures are designed to support two 12' luminaire mast arms and luminaires. Mast arms are designed to support a 60-pound luminaire having an effective projected area of 1.6 square feet.
3. Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Do not submit shop drawings for roadway illumination pole assemblies fabricated in accordance with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of these sheets and the Specifications. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
4. For mounting heights between values shown in the tables, use base diameter and thickness values for the larger height.
5. Unless otherwise noted, all steel parts shall be galvanized in accordance with Item 445, "Galvanizing."
6. Steel poles shall be fabricated in accordance with Item 441, "Steel Structures." Longitudinal seam welds for pole sections shall have 60% minimum penetration. All welding shall be in accordance with AWS D1.1, Structural Welding Code-Steel.
7. Two-section poles joined by circumferential welds will not be permitted, unless otherwise shown on the plans. Poles may be fabricated in two sections and field-assembled by the lap-joint method. The two sections shall telescope together with a lap length of not less than 1-1/2 times the shaft diameter at the lap joint.
8. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.
9. Lubricate and tighten anchor bolts, when erecting shoe base poles and concrete traffic barrier base poles, in accordance with Item 449, "Anchor Bolts."
10. All poles, except Transformer Base Poles, shall have hand holes with reinforcing frames and covers. For ground mounted shoe base poles, hand holes shall be placed 90 degrees to mast arm unless otherwise noted on the plans. For poles mounted on a concrete traffic barrier with one luminaire arm, hand holes shall be located 180 degrees from luminaire arm. For poles mounted on a concrete traffic barrier with two luminaire arms, all hand holes shall be on the same side of the barrier. For poles mounted on a bridge lighting bracket or a retaining wall lighting bracket, hand hole shall be on traffic side of the pole, at a height that will clear the barrier.
11. The finished pole shall have a smooth, uniform finish free of pits, blisters, or other defects. Scratched, chipped, and other damaged galvanized areas on poles and mast arms shall be repaired in accordance with Item 445, "Galvanizing."
12. Pole length is based on a 5'-6" luminaire arm rise. 4 ft. luminaire arms have a 2'-6" rise. A pole with 4 ft. luminaire arms will have an actual mounting height 3'-0" less than the nominal mounting height. Increasing the pole length to meet the nominal mounting height is allowed, but unnecessary unless otherwise directed by the engineer.
13. Erect transformer base poles in accordance with sheet RID(1).

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Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(2)-19

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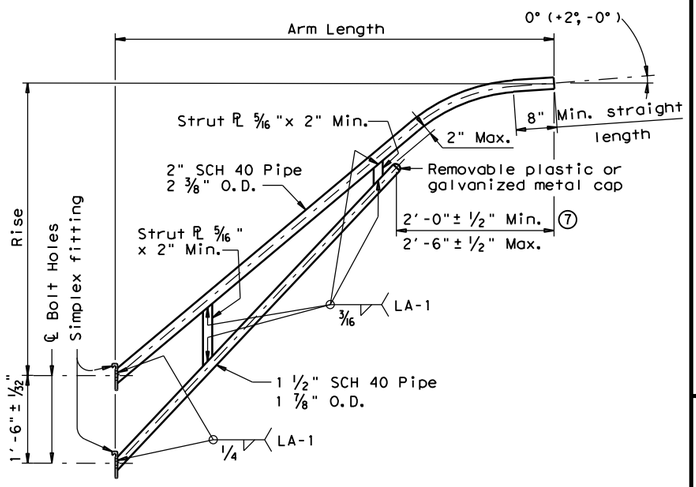
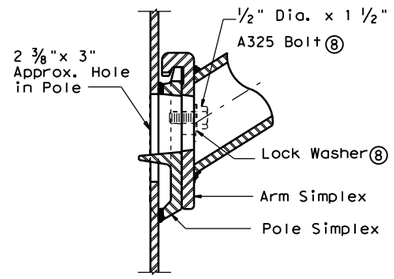


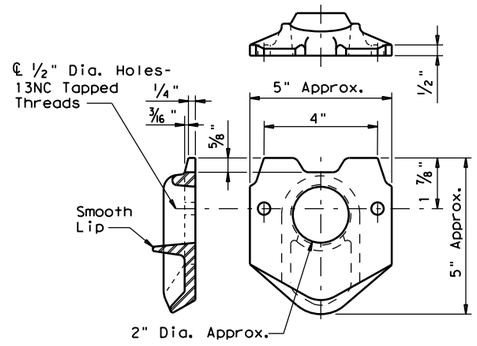
LUMINAIRE ARM

LUMINAIRE ARM DIMENSIONS		
Nominal Arm Length	Arm Length	Rise
4'-0"	3'-6"	2'-6"
6'-0"	5'-6"	5'-6"
8'-0"	7'-6"	5'-6"
10'-0"	9'-6"	5'-6"
12'-0"	11'-6"	5'-6"

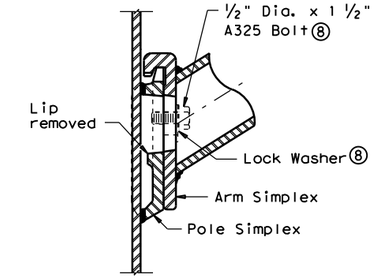
ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"



UPPER SIMPLEX FITTING
(Gusset not shown for clarity)

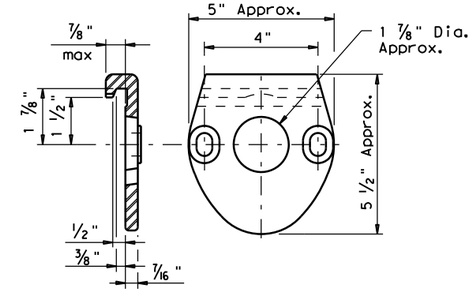


POLE SIMPLEX DETAIL ⑨



LOWER SIMPLEX FITTING
(Gusset not shown for clarity)

SECTION B-B



ARM SIMPLEX DETAIL ⑨

NOTES:

④ Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

⑤ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

⑥ A572, A1008 HSLAS-F, and A1011 HSLAS-F materials may have higher yield strengths but shall not have less elongation than the grade indicated.

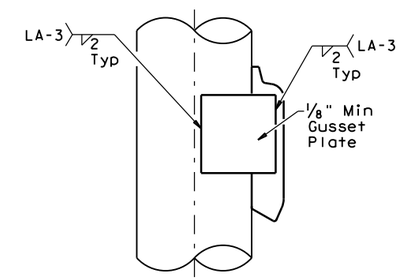
⑦ Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

⑧ Each pole simplex fitting shall be supplied with 2 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans.

⑨ Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

⑩ A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 ⑤, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 ⑥, or A1011 HSLAS-F Gr 50 ⑥
Arm Struts and Gusset Plates ④	ASTM A36, A572 Gr 50 ⑥, or A588
Misc.	ASTM designations as noted



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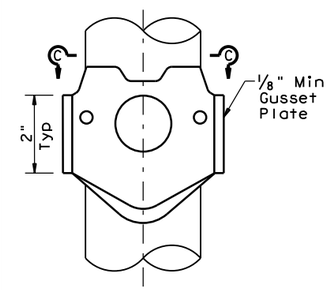

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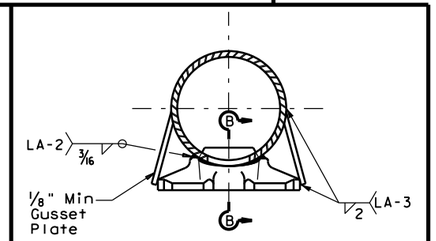
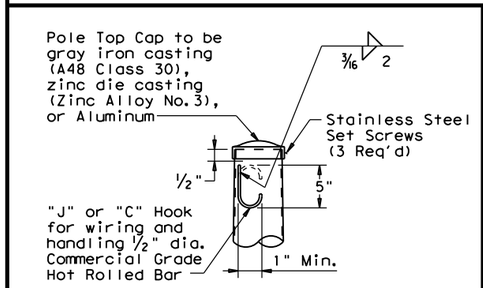
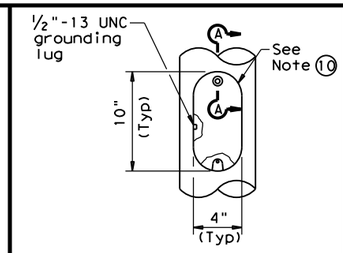


SECTION C-C

SIMPLEX ATTACHMENT DETAIL



POLE TOP



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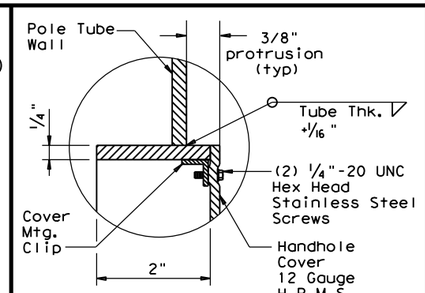


SECTION A-A

HANDHOLE

SHEET 3 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

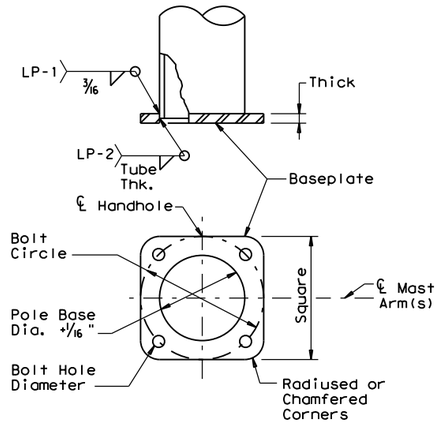
ROADWAY ILLUMINATION POLES

RIP(3)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0915	12	562	WATSON RD
7-17	DIST	COUNTY		SHEET NO.
12-19		BEXAR		220

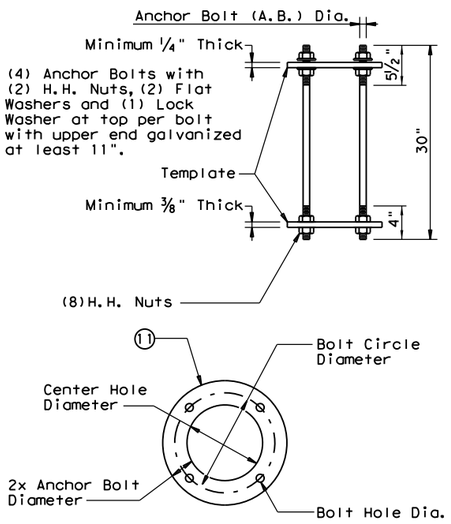
73C

DATE:
FILE:



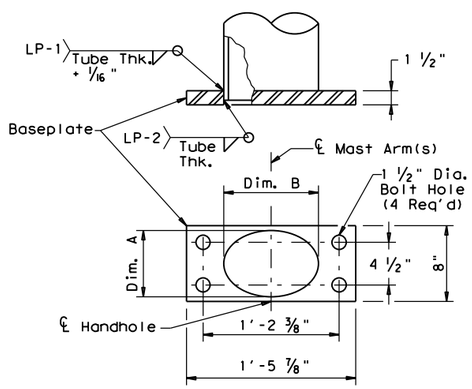
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20' - 39'	13"	13"	1 1/4"	1 1/4"
40'	15"	15"	1 1/4"	1 1/2"
50'	15"	15"	1 1/2"	1 1/2"



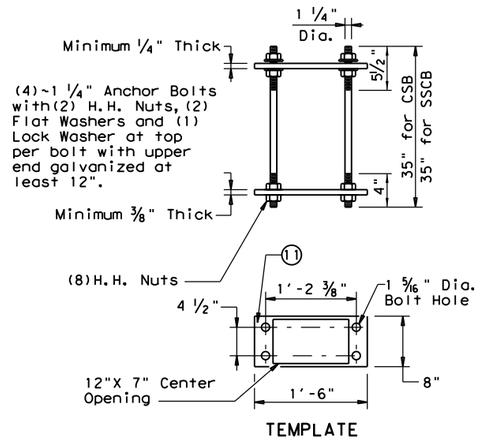
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20'-39'	1"	13"	11"	1 1/16"
40'-50'	1 1/4"	15"	12 1/2"	1 5/16"



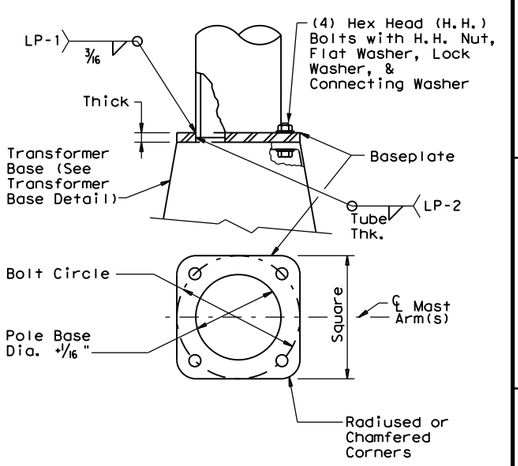
CONCRETE TRAFFIC BARRIER BASE BASEPLATE

CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28' - 38'	9"	7" ± 1/4"	10" ± 1/4"
48'	10 1/2"	7" ± 1/4"	13" ± 1/4"



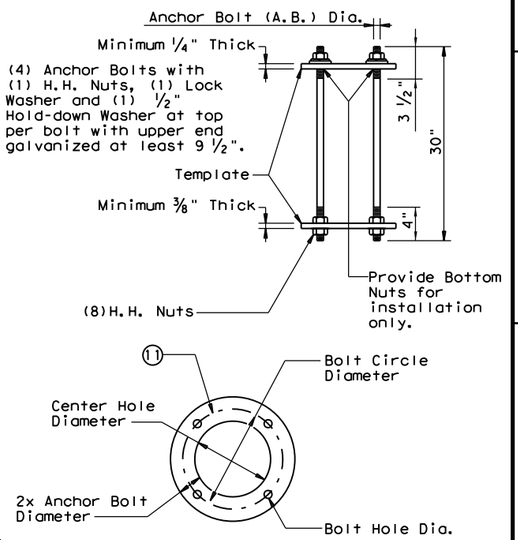
CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20' - 39'	1"	14"	12"	1 1/16"
40' - 50'	1 1/4"	17 1/4"	14 3/4"	1 5/16"



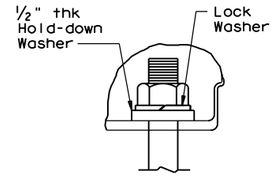
TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20' - 39'	13"	13"	1 1/4"	1"	1 1/4"	A
40'	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50'	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

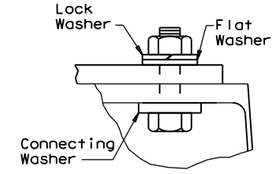


TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

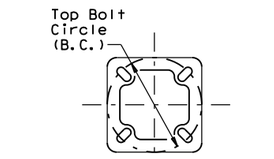
TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



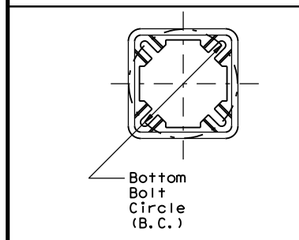
DETAIL A



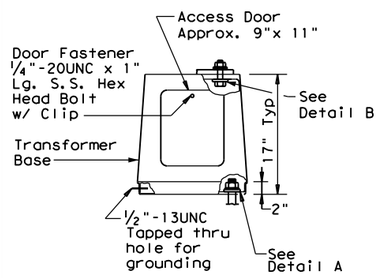
DETAIL B



TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (2013) and Interim Revisions thereto, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to resist 150% of the design moment.
3. Transformer bases shall be cast from aluminum, ASTM B108 or B26 Alloy 356.0-T6, or other material approved by the Engineer. Four Hex Head (H.H.) bolts with four H.H. nuts, four lock washers, four flat washers, and connecting and hold-down washers as recommended by the manufacturer, galvanized to ASTM A153 Class C or D, or B695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A563 grade DH galvanized.
4. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.
5. Doors for transformer bases shall be made of plastic, fiberglass or other non-metallic material approved by the Engineer and shall be attached with stainless steel screws or bolts. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

NOTES:

(11) Anchor Bolt Templates do not need to be galvanized.

(12) Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
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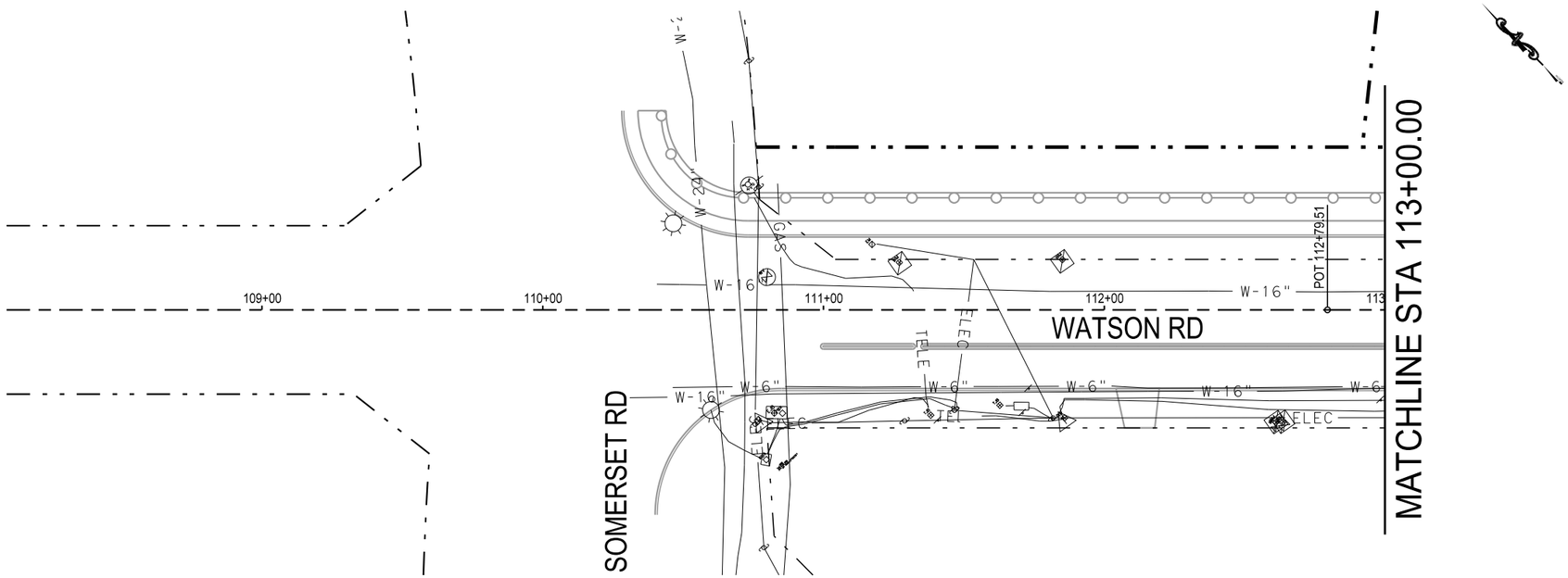
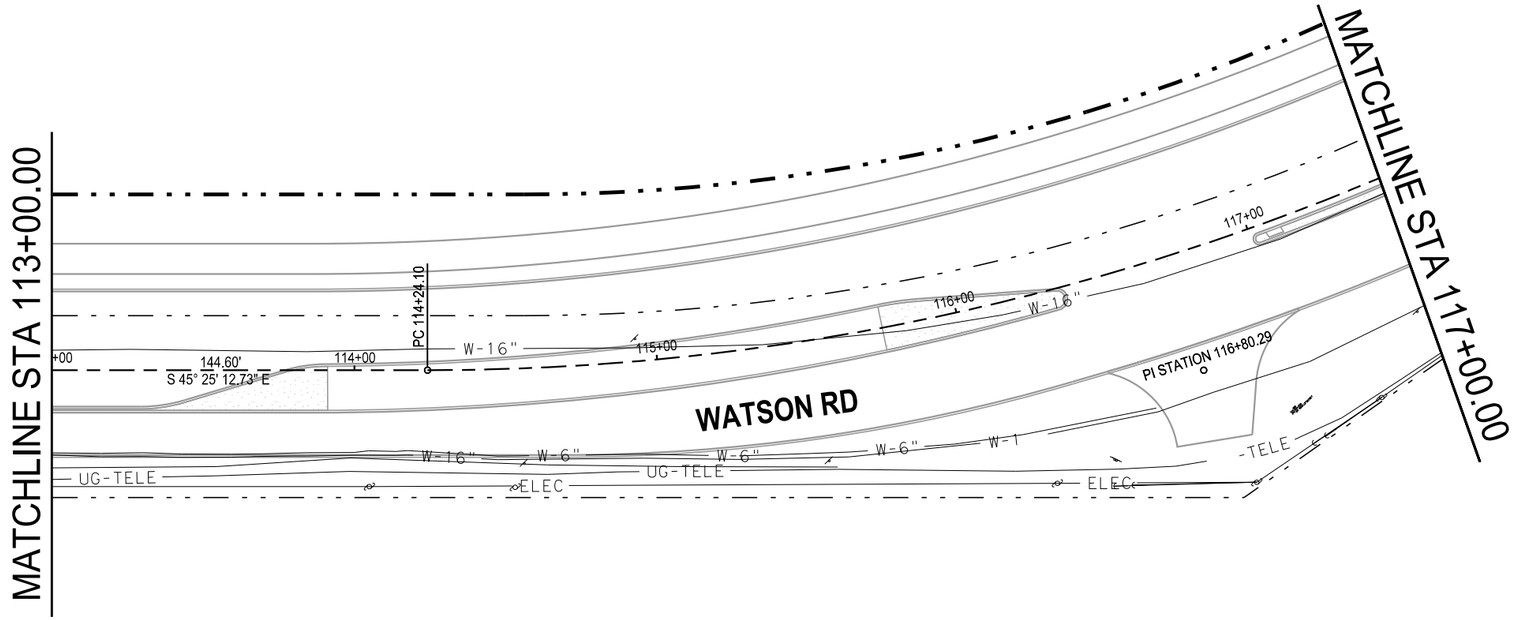
	DIST	COUNTY		SHEET NO.
		BEXAR		221

730





UTILITY LEGEND

- OP — CPS ELECTRIC O/H
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- GUY WIRE
- ROAD SIGN
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- GAS METER
- WATER METER
- MANHOLES
- STORM DRAIN
- CENTER POINT OF TREE
- TELEPHONE PEDESTAL
- TV CABLE CONTROL BOX

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

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6/25/2020

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11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

EXISTING UTILITY LAYOUT

BEGINNING OF PROJECT TO STA 117+00.00

SHEET 1 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			222
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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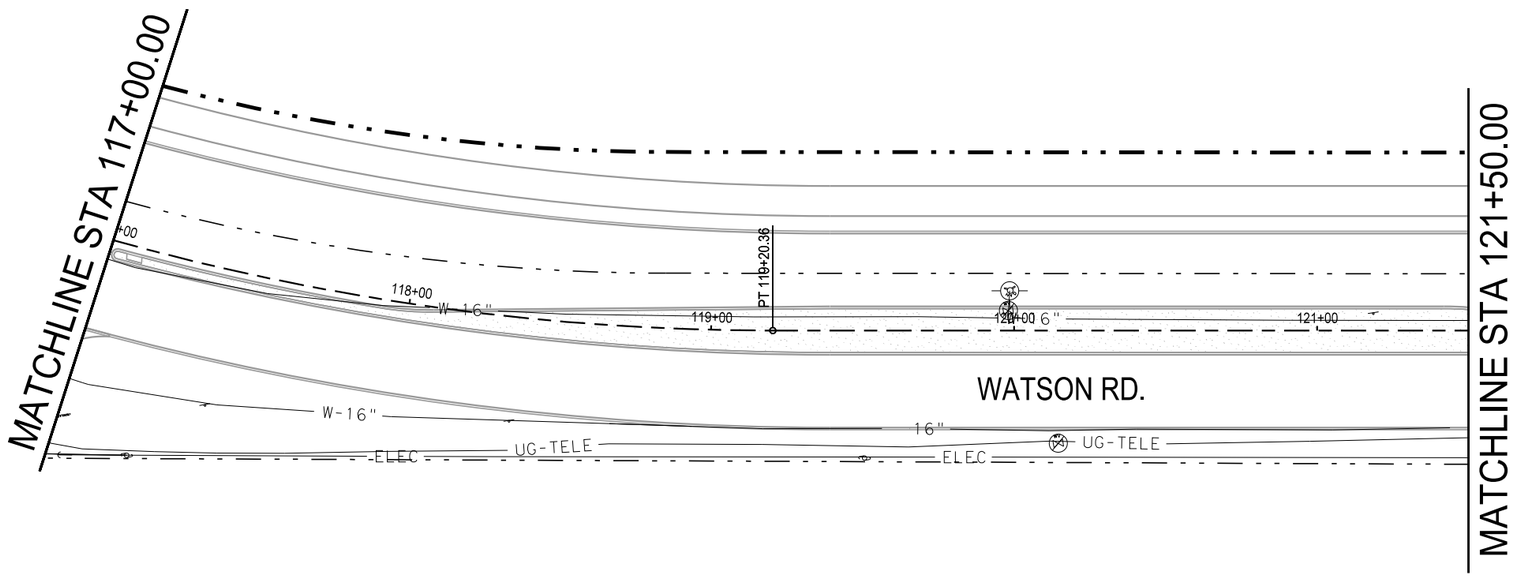

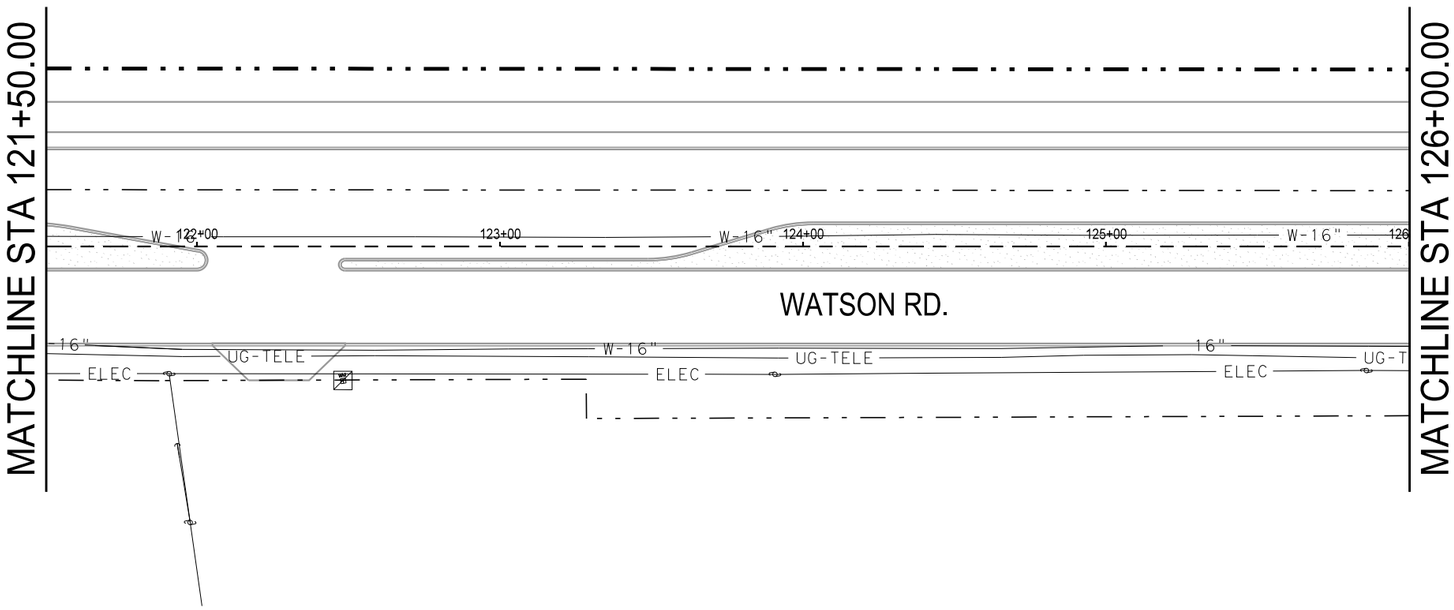

UTILITY LEGEND

- OP — CPS ELECTRIC O/H
- EG — ENTERPRISE GAS LINE
- CG — CPS GAS
- UT — SBC U/G TELEPHONE LINE
- OT — SBC O/H TELEPHONE LINE
- WW — SANITARY SEWER LINE
- X Water — SAWS
- EXISTING R.O.W.
- UTILITY POLE
- GUY WIRE
- ROAD SIGN
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- GAS METER
- WATER METER
- MANHOLES
- STORM DRAIN
- CENTER POINT OF TREE
- TELEPHONE PEDESTAL
- TV CABLE CONTROL BOX

NO	DATE	REVISION	APPROVED
-	-	-	-
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-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

JULIO RAMOS 107672 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

EXISTING UTILITY LAYOUT

STA 117+00.00 TO STA 126+00.00

SHEET 2 OF 5

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6			223
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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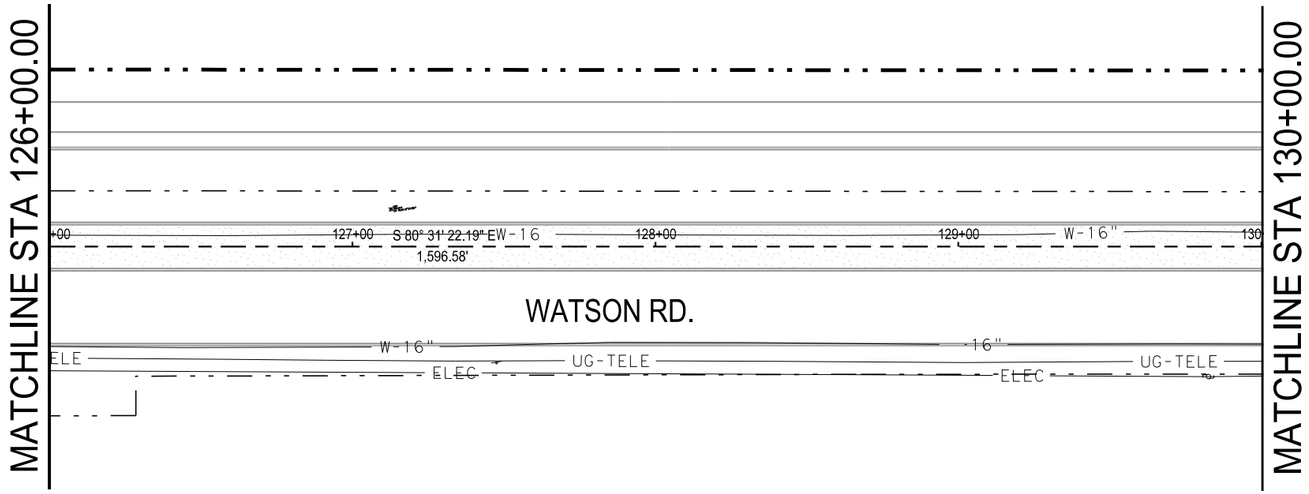

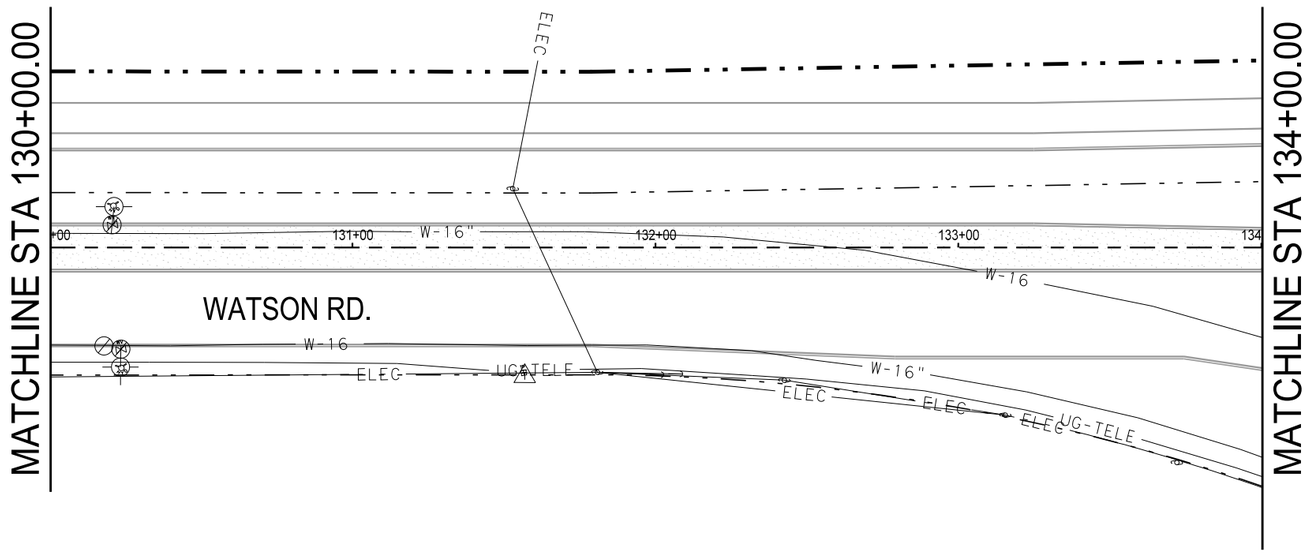

UTILITY LEGEND

OP	CPS ELECTRIC O/H
EG	ENTERPRISE GAS LINE
CG	CPS GAS
UT	SBC U/G TELEPHONE LINE
OT	SBC O/H TELEPHONE LINE
WW	SANITARY SEWER LINE
X Water	SAWS
	EXISTING R.O.W.
	UTILITY POLE
	GUY WIRE
	ROAD SIGN
	FIRE HYDRANT
	WATER VALVE
	GAS VALVE
	GAS METER
	WATER METER
	MANHOLES
	STORM DRAIN
	CENTER POINT OF TREE
	TELEPHONE PEDESTAL
	TV CABLE CONTROL BOX

NO	DATE	REVISION	APPROVED
-	-	-	-
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-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

EXISTING UTILITY LAYOUT

STA 126+00.00 TO STA 134+00.00

SHEET 3 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6		---	224
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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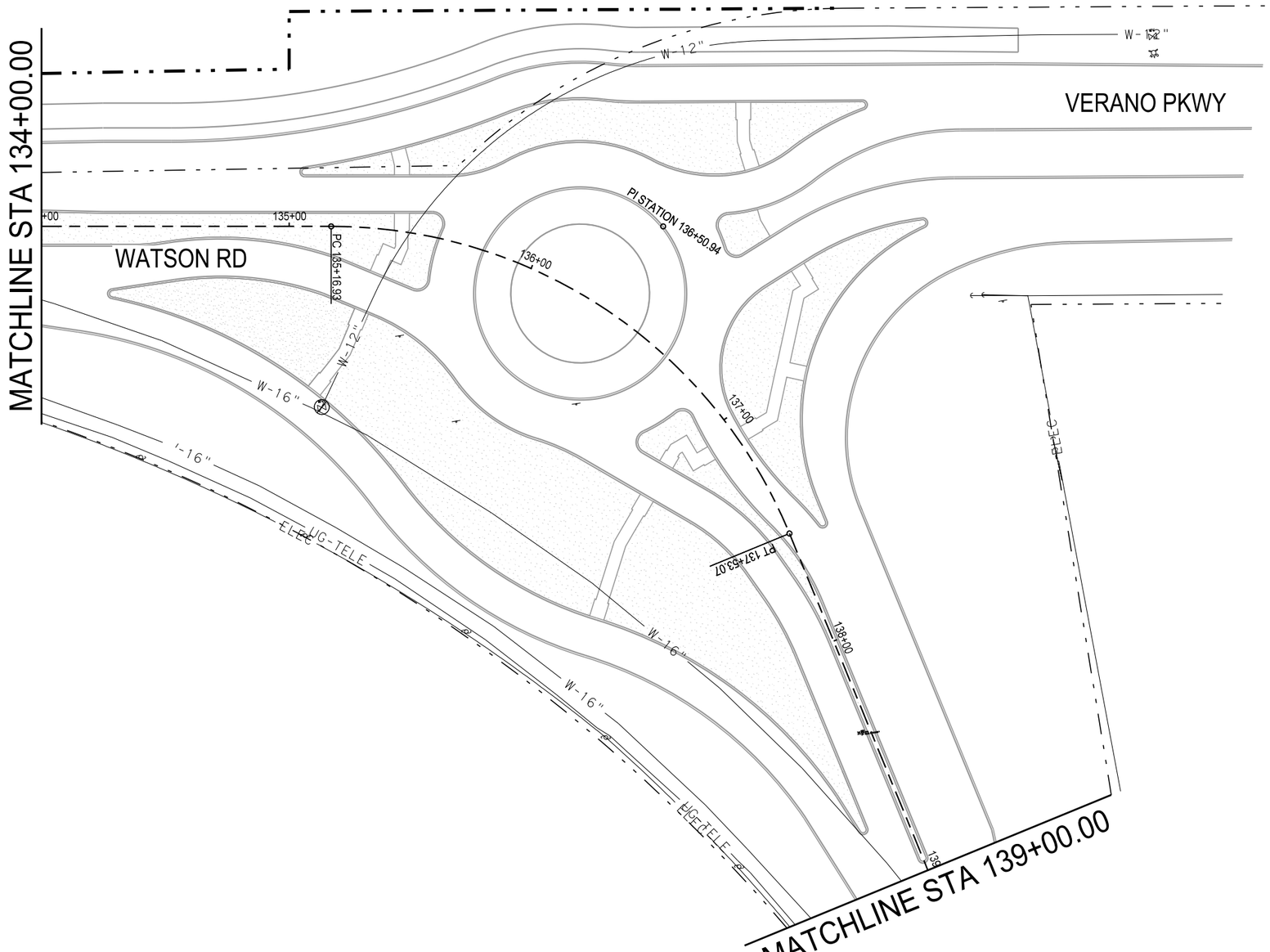

UTILITY LEGEND

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NO	DATE	REVISION	APPROVED
-	-	-	-
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GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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PUBLIC WORKS DEPARTMENT

WATSON ROAD

EXISTING UTILITY LAYOUT

STA 134+00.00 TO STA 139+00.00

SHEET 4 OF 5

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			225
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

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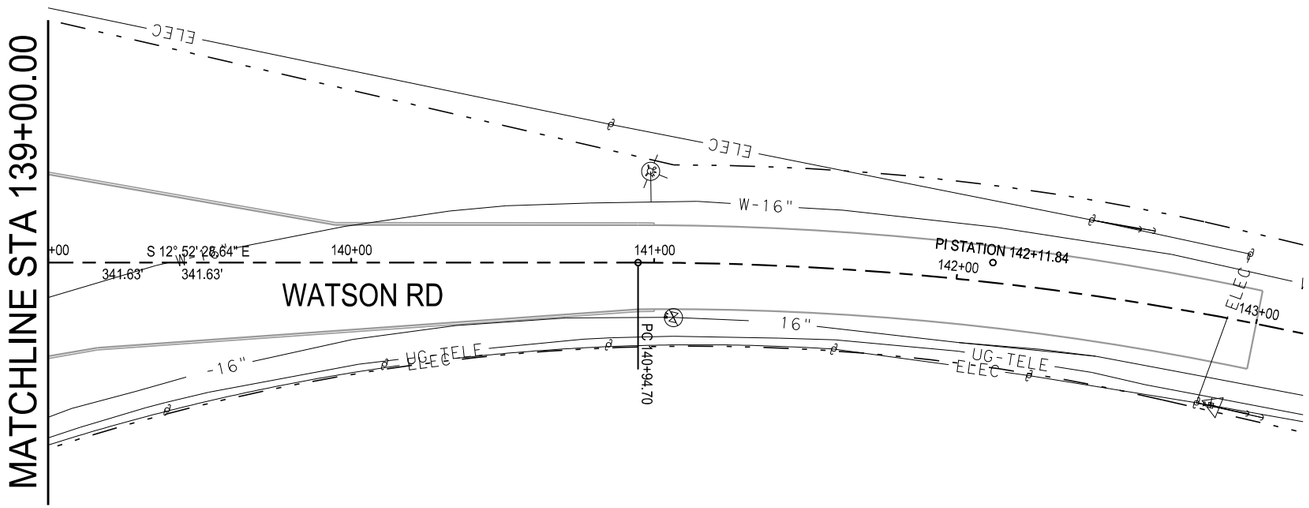

UTILITY LEGEND

- OP — CPS ELECTRIC O/H
- EG — ENTERPRISE GAS LINE
- CG — CPS GAS
- UT — SBC U/G TELEPHONE LINE
- OT — SBC O/H TELEPHONE LINE
- WW — SANITARY SEWER LINE
- X Water — SAWS
- EXISTING R.O.W.
- UTILITY POLE
- GUY WIRE
- ROAD SIGN
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- GAS METER
- WATER METER
- MANHOLES
- STORM DRAIN
- CENTER POINT OF TREE
- TELEPHONE PEDESTAL
- TV CABLE CONTROL BOX

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.

11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

EXISTING UTILITY LAYOUT

STA 139+00.00 TO END OF PROJECT

SHEET 5 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT NO.
6	-—		226
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:50
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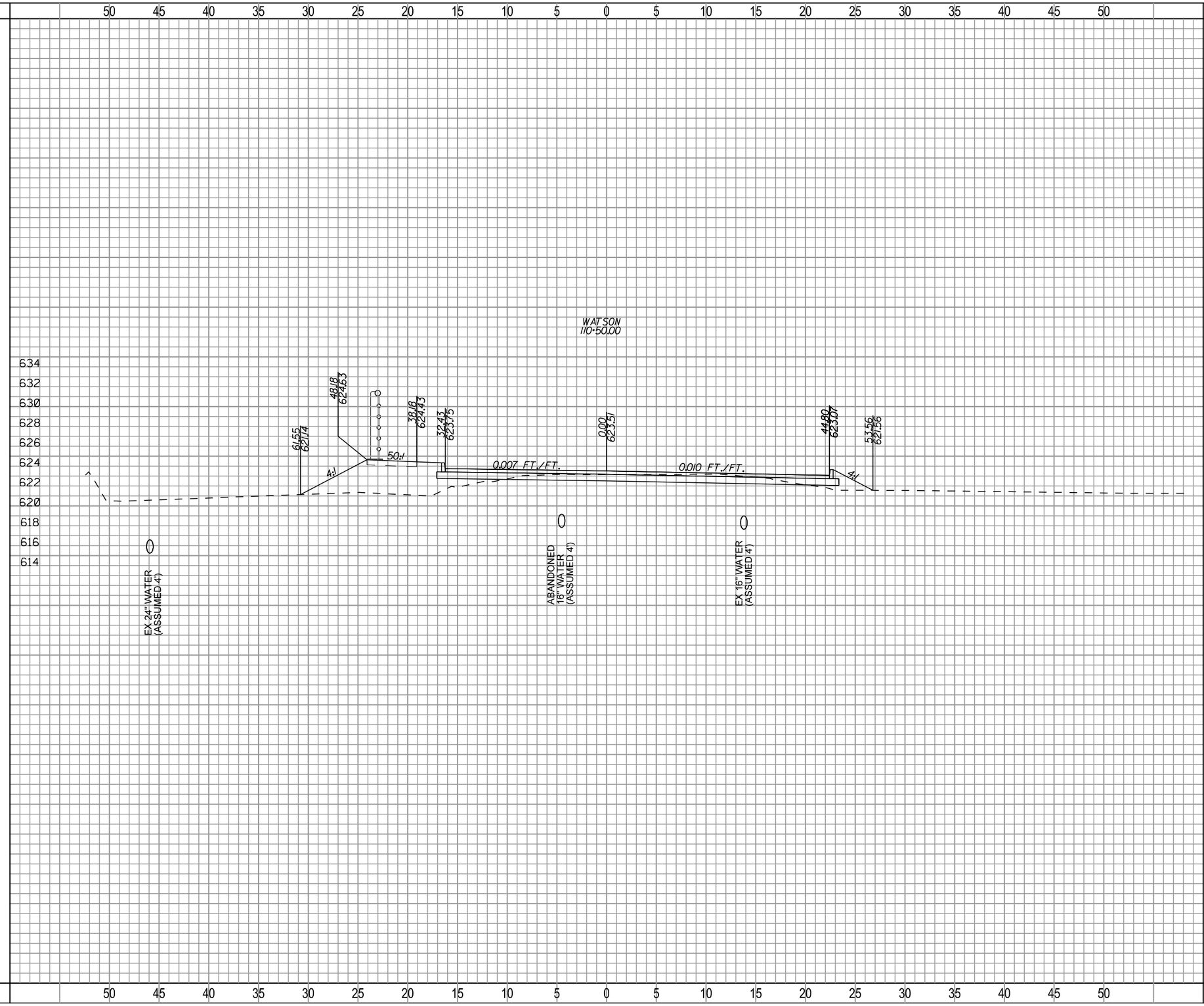

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NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

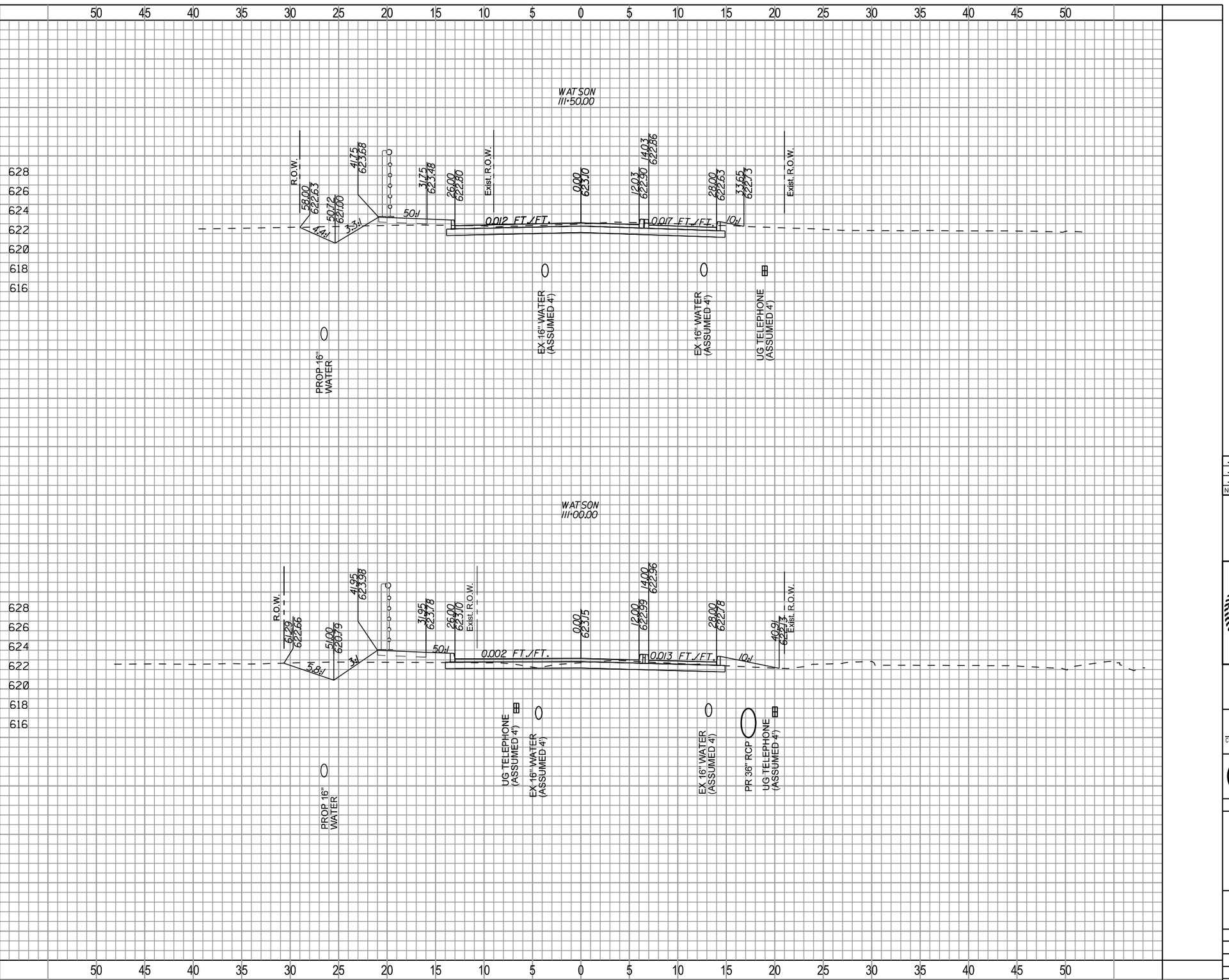
WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 1 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		227
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 2 OF 27

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			228
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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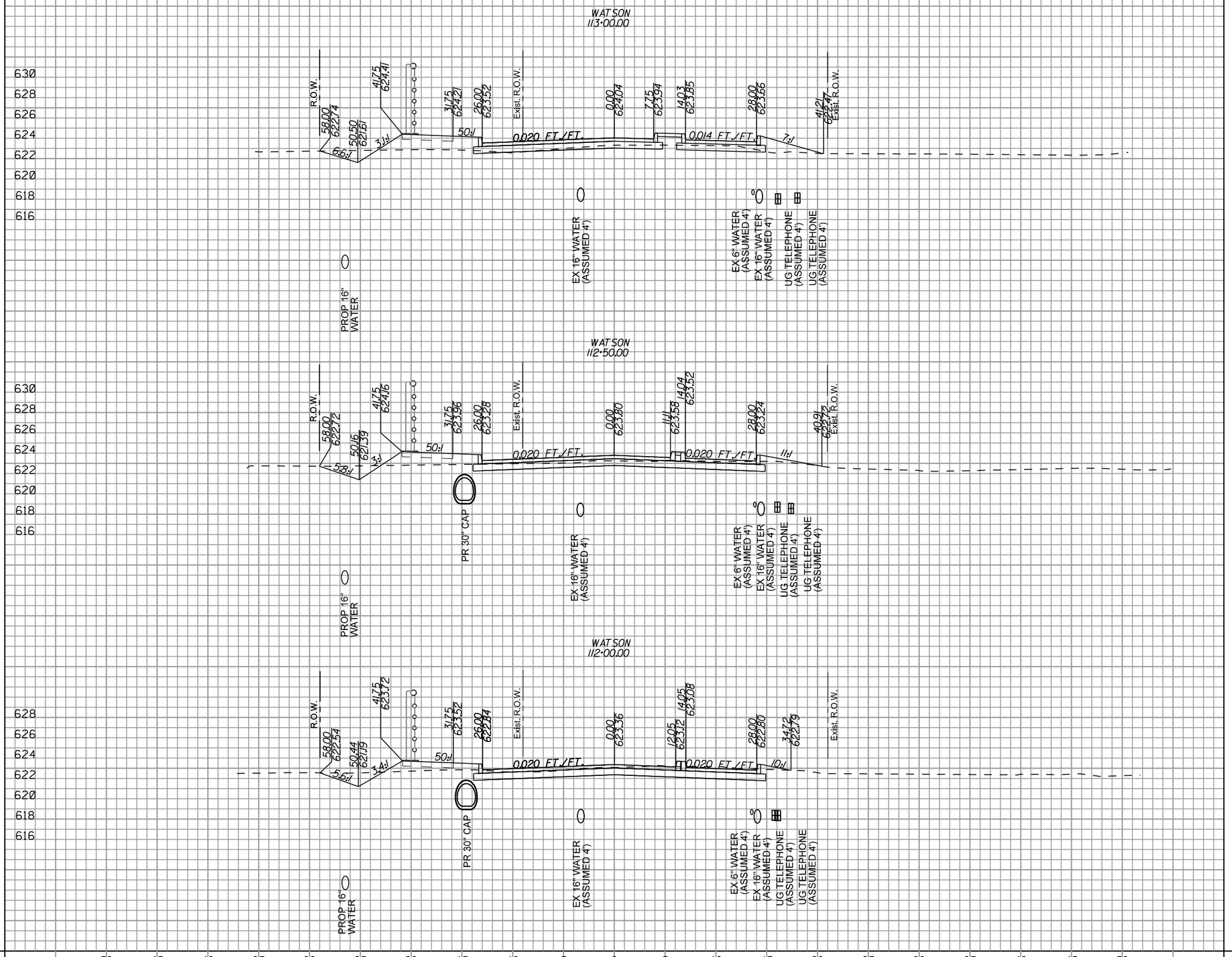

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 3 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			229
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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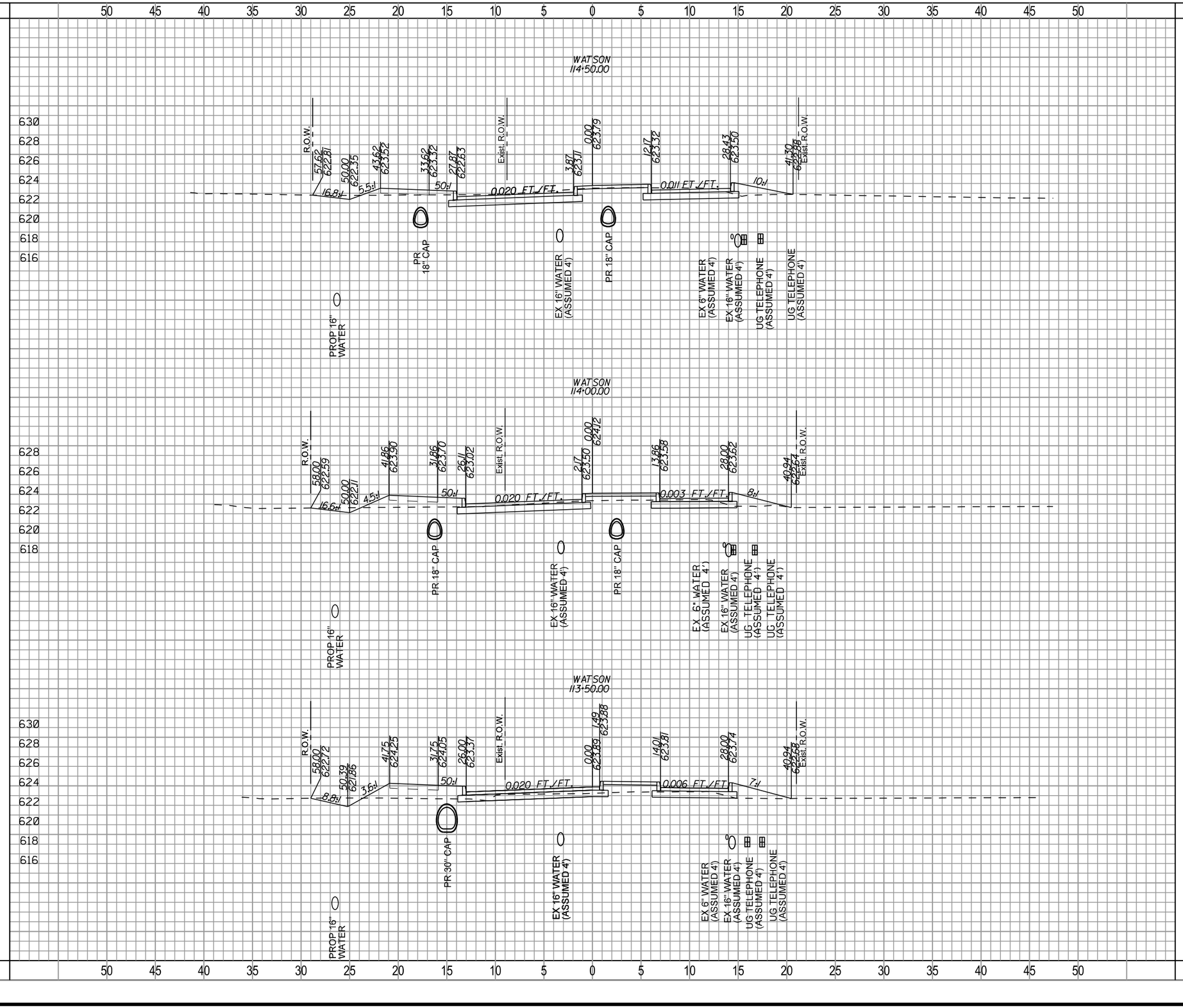

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 4 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			230
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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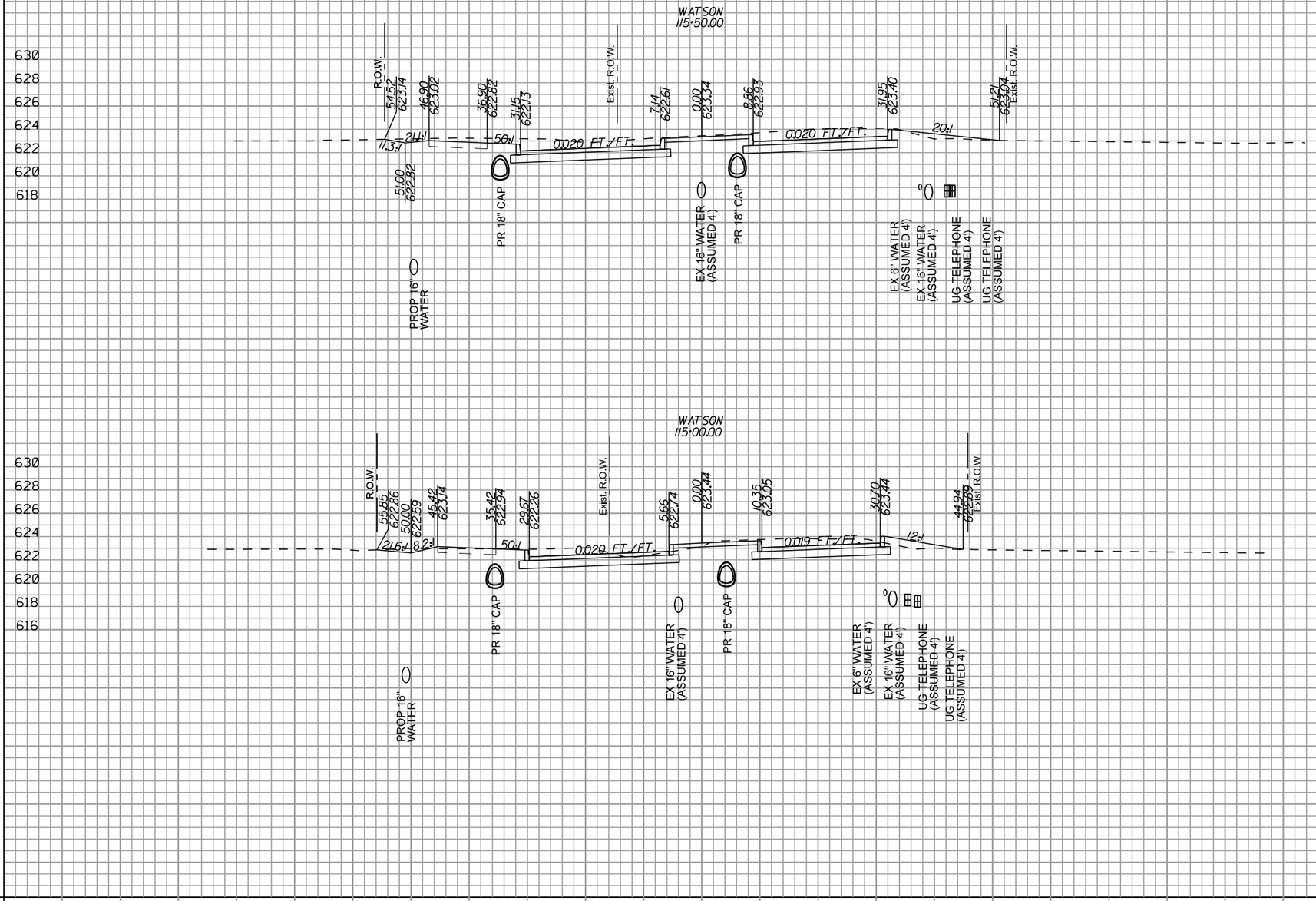

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

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STATE OF TEXAS
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 5 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			231
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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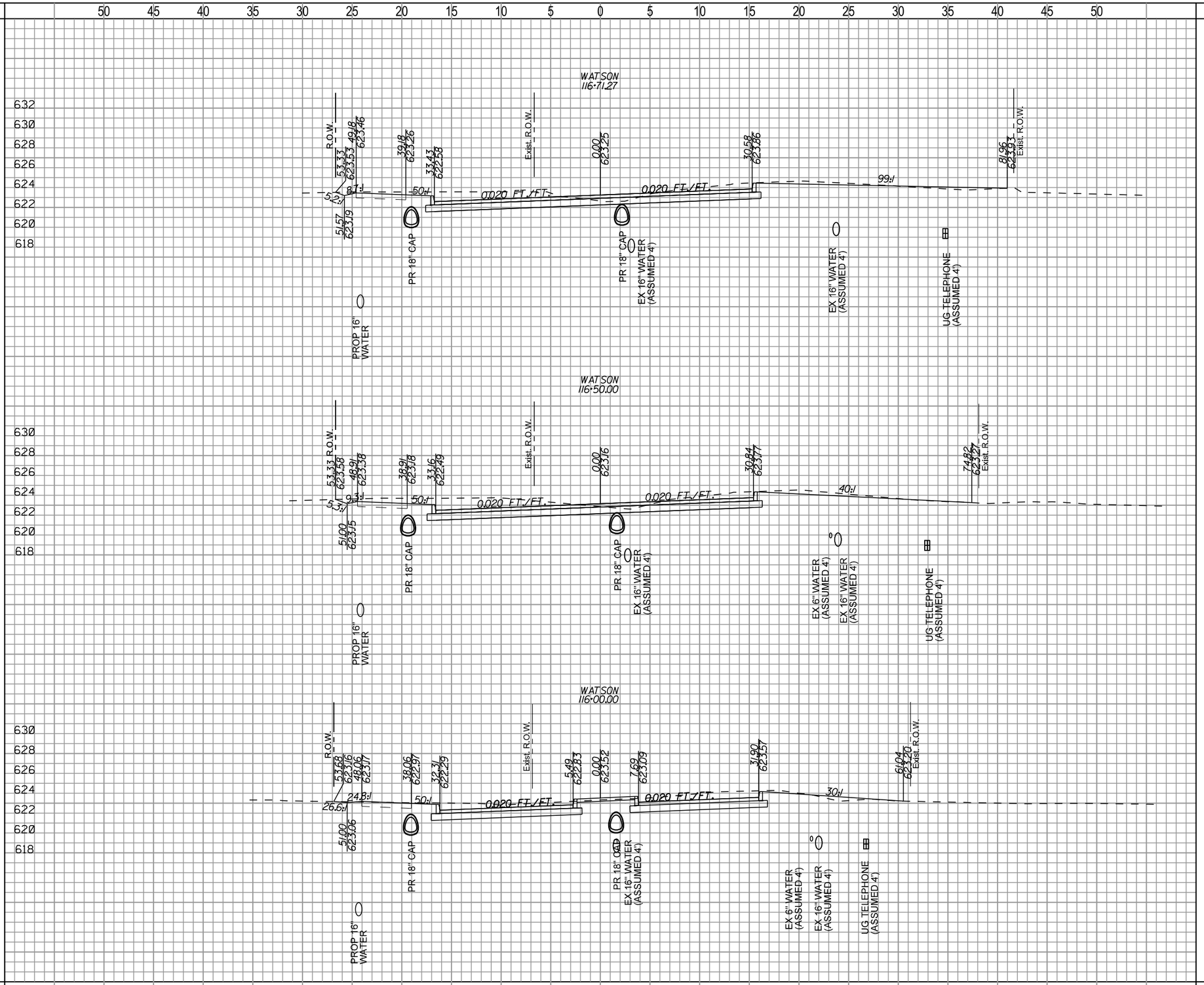

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NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
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1" = 50'

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TBPE REGISTRATION NO.: F-2214
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

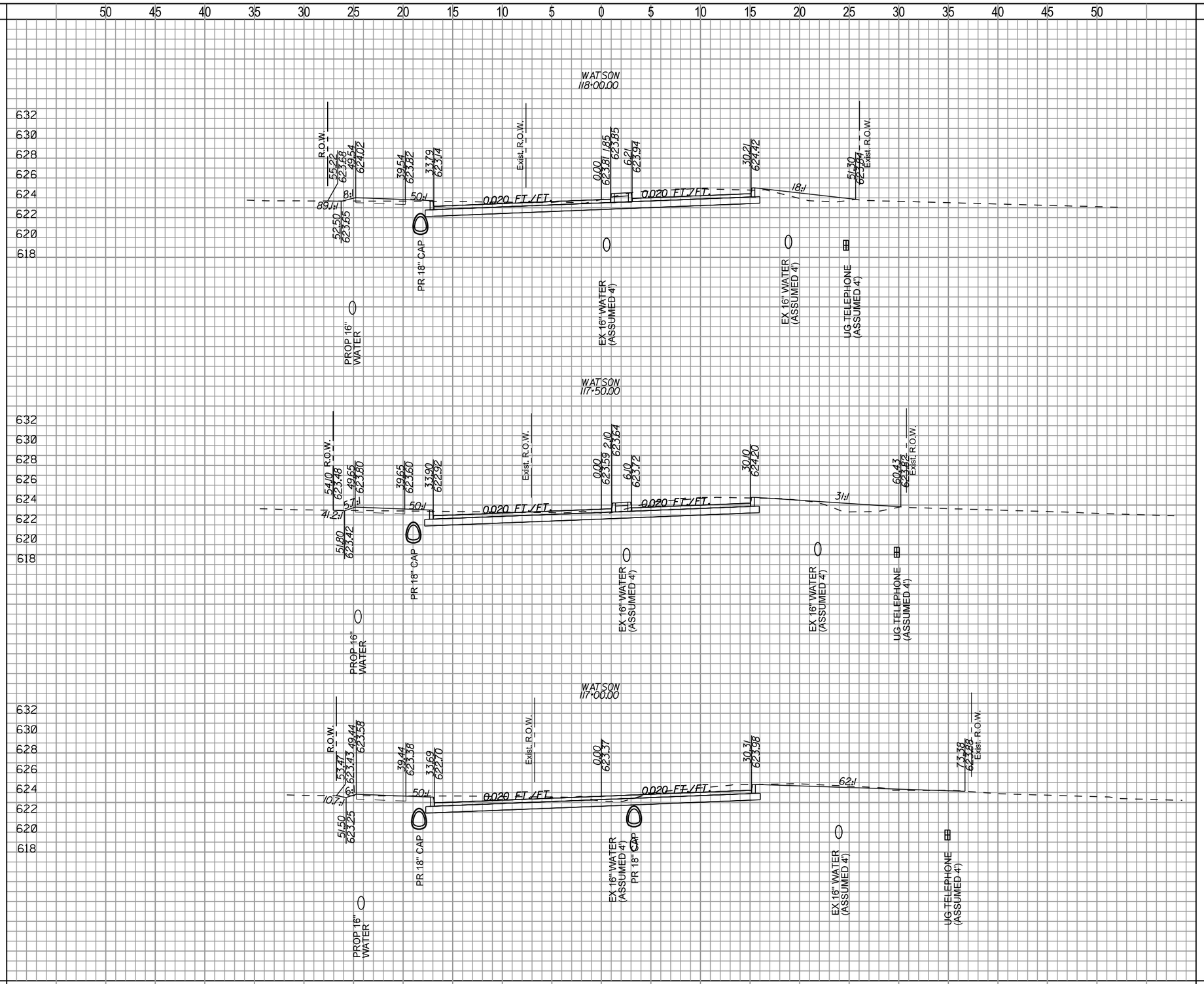
WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 6 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			232
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



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NO	DATE	REVISION	APPROVED

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 7 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			233
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
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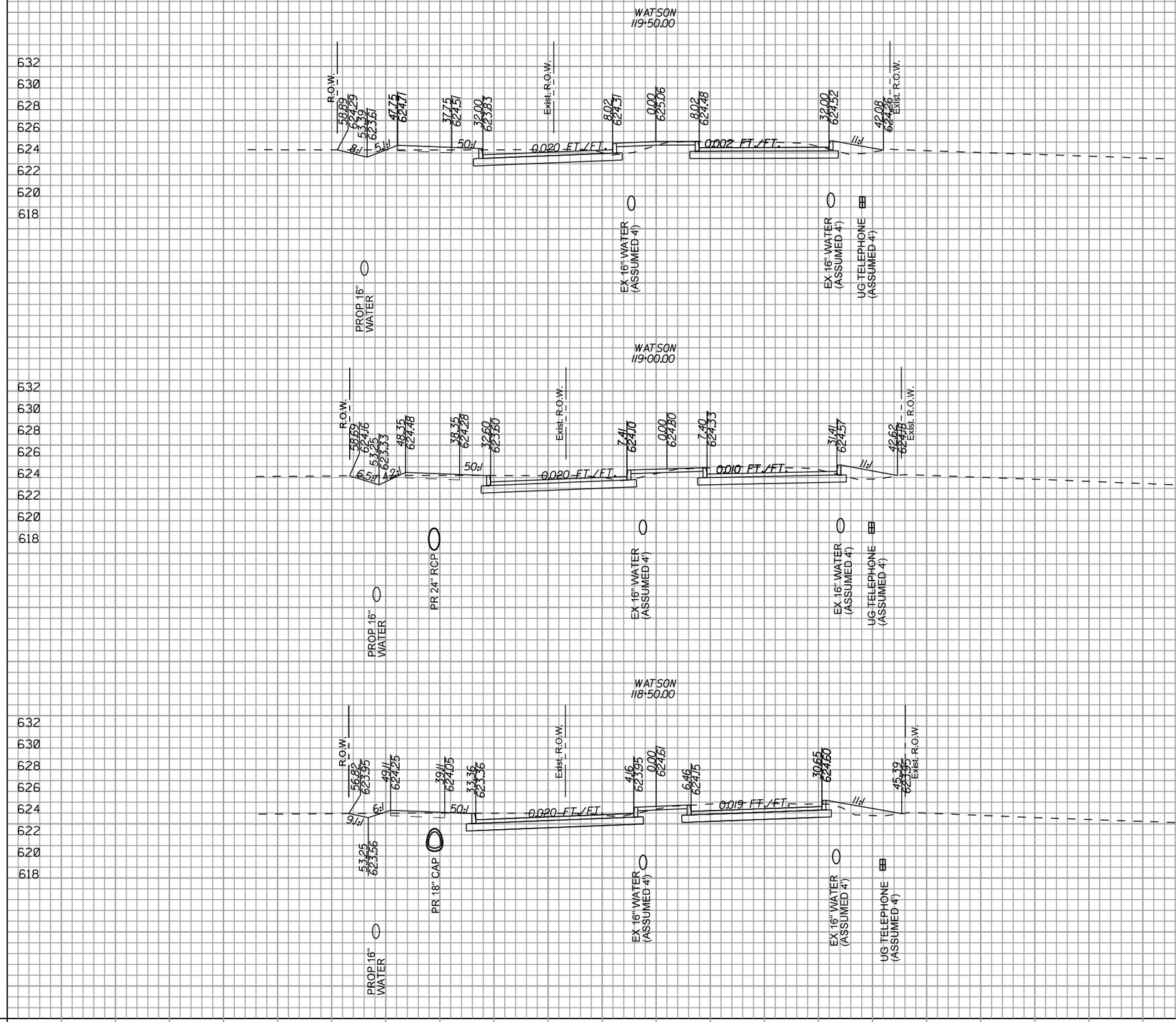

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-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
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TBPLS REGISTRATION NO.: 100410-00

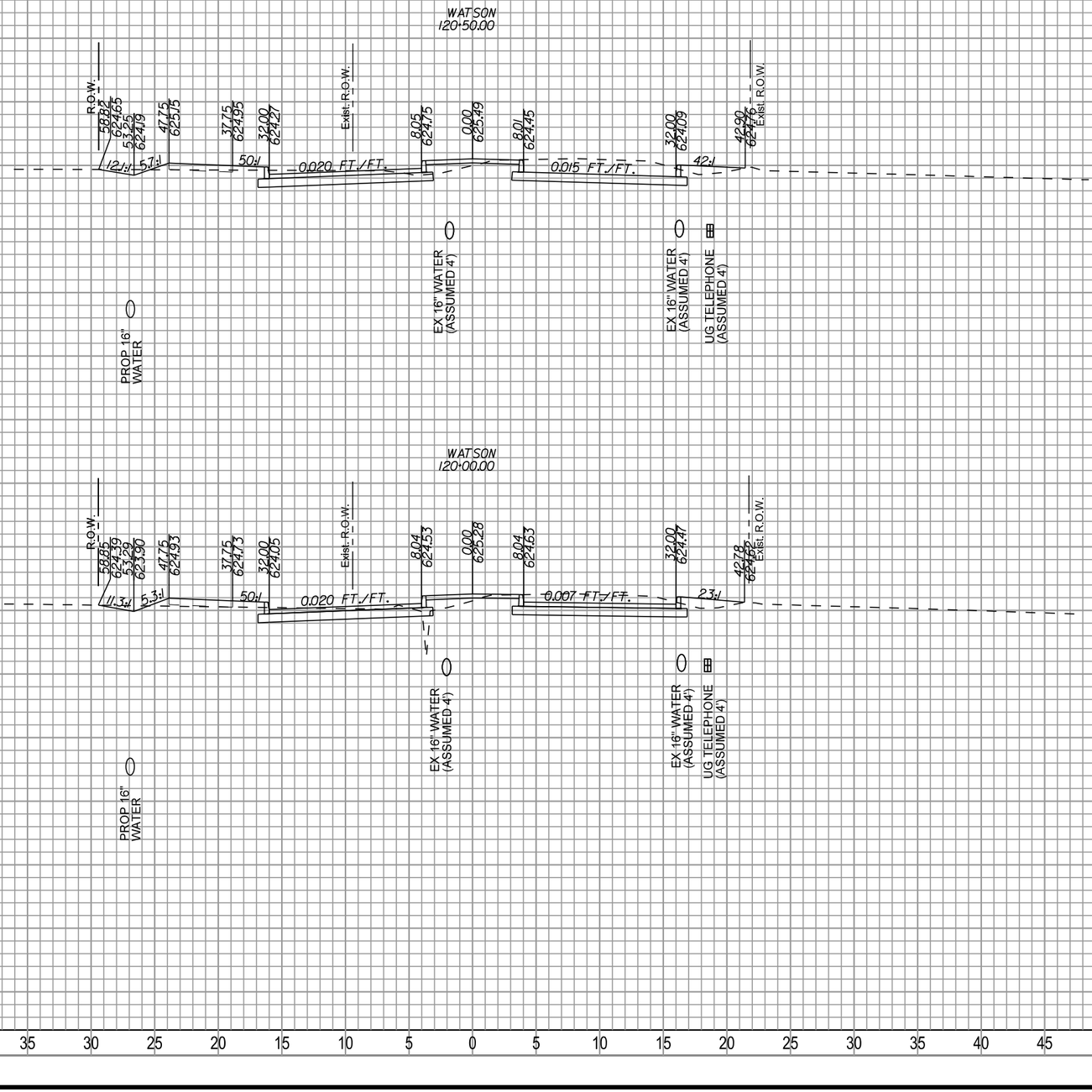
BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 8 OF 27

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			234
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



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GRAPHIC SCALE
(IN FEET)

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 9 OF 27

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			235
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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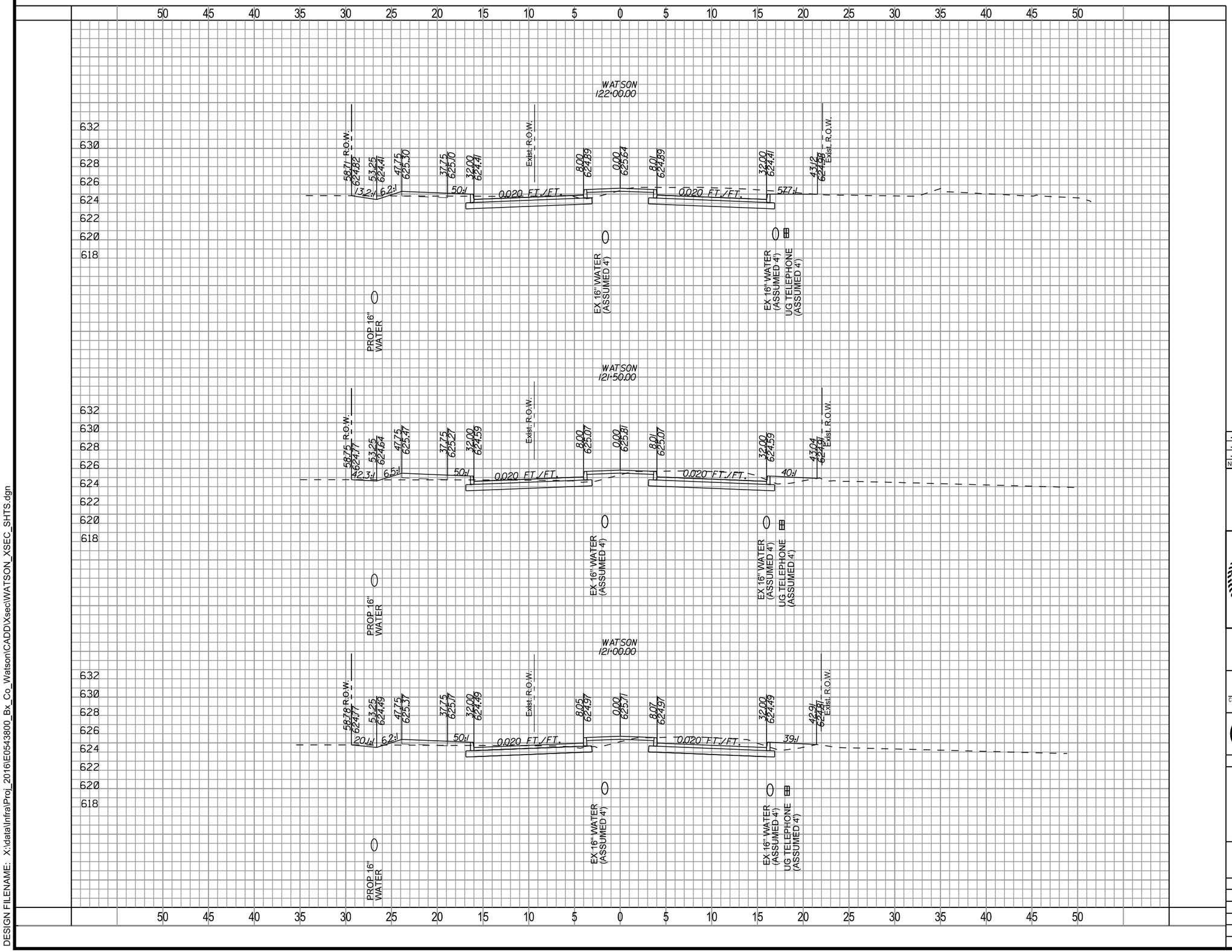

NO	DATE	REVISION	APPROVED
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-	-	-	-

GRAPHIC SCALE
(IN FEET)

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 10 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	---	236

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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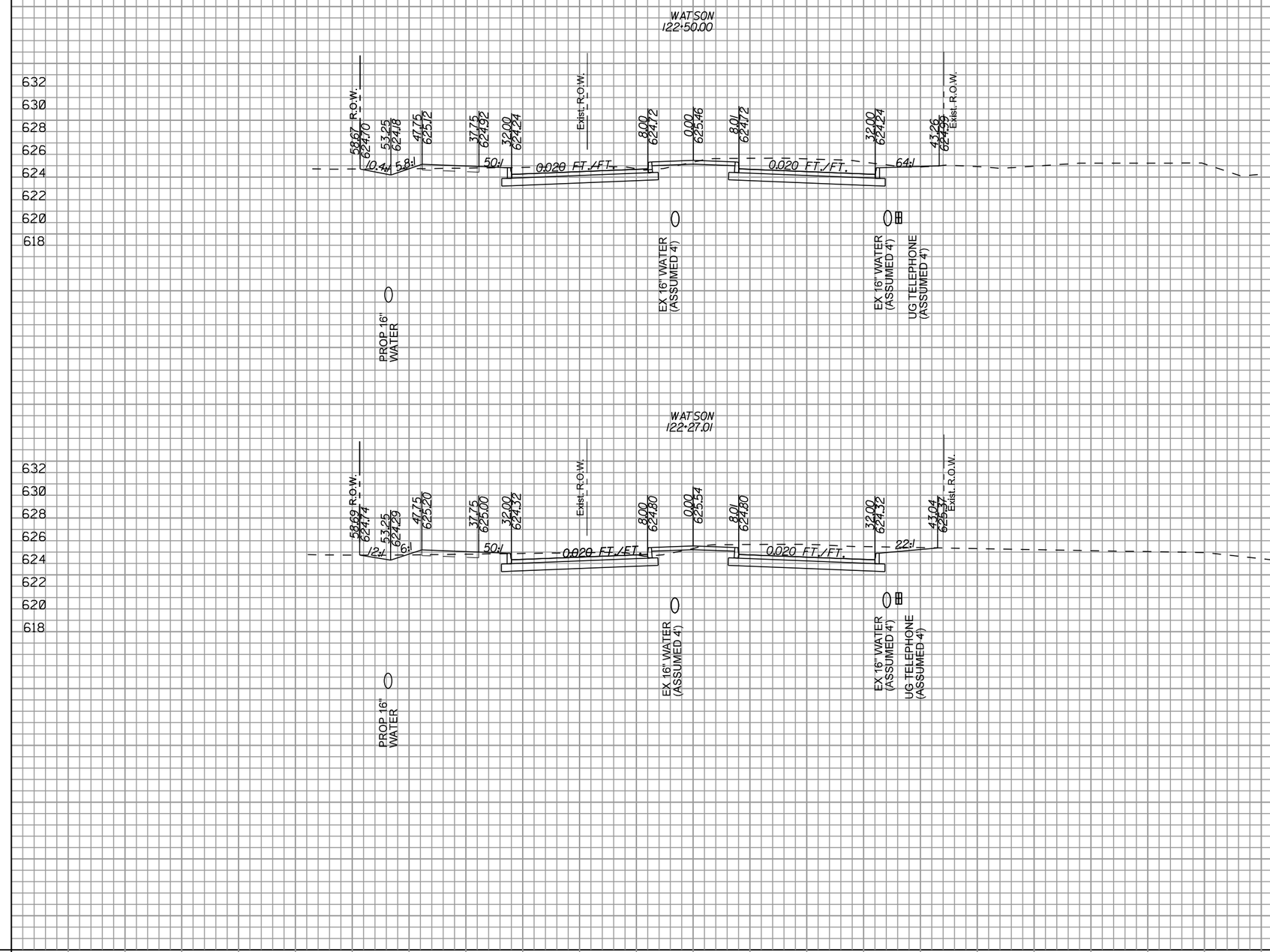

NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 11 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			237
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
PLOTTED ON: 6/25/2020 @ 1:57:00 PM
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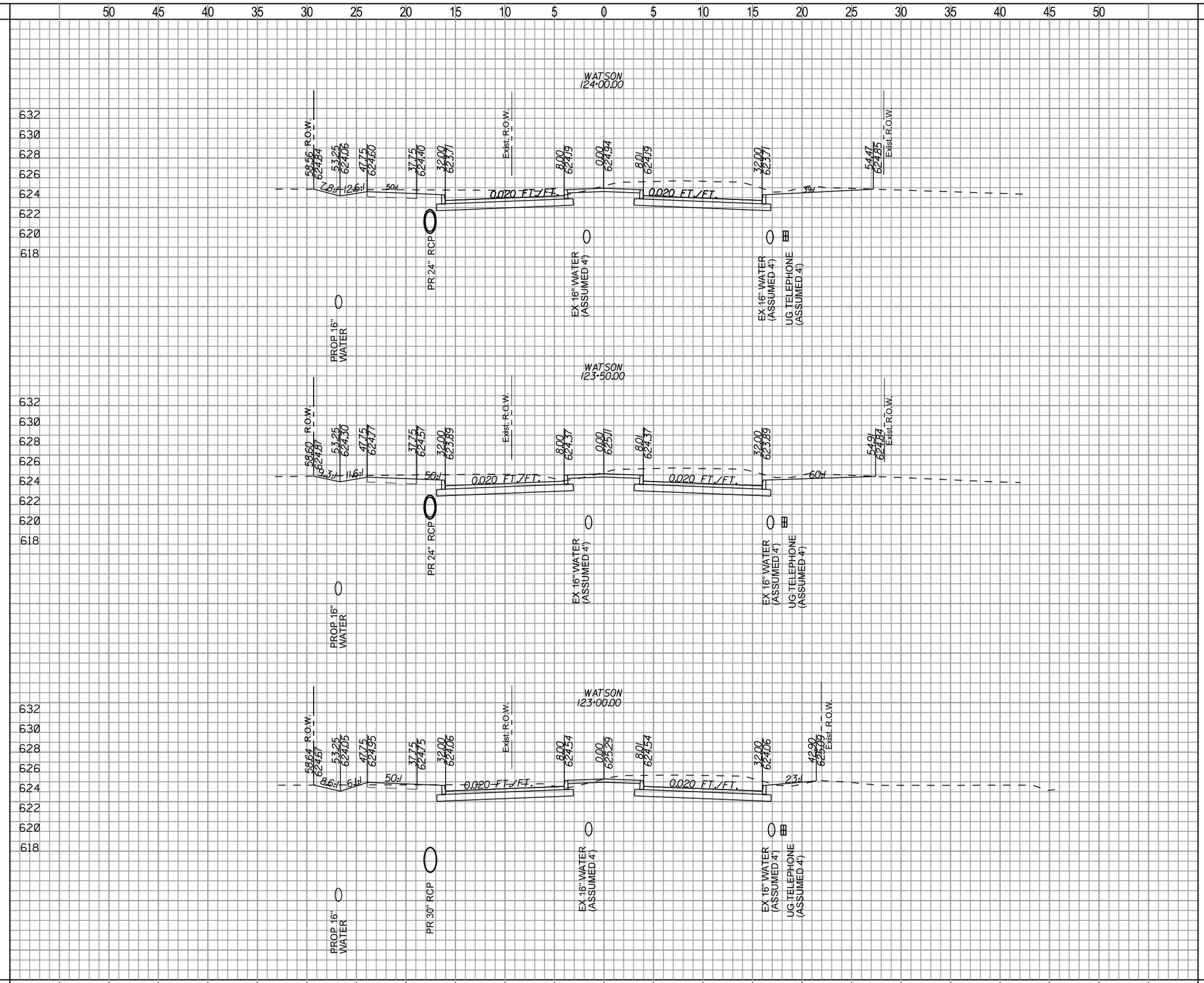

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
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CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.

11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 12 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			238
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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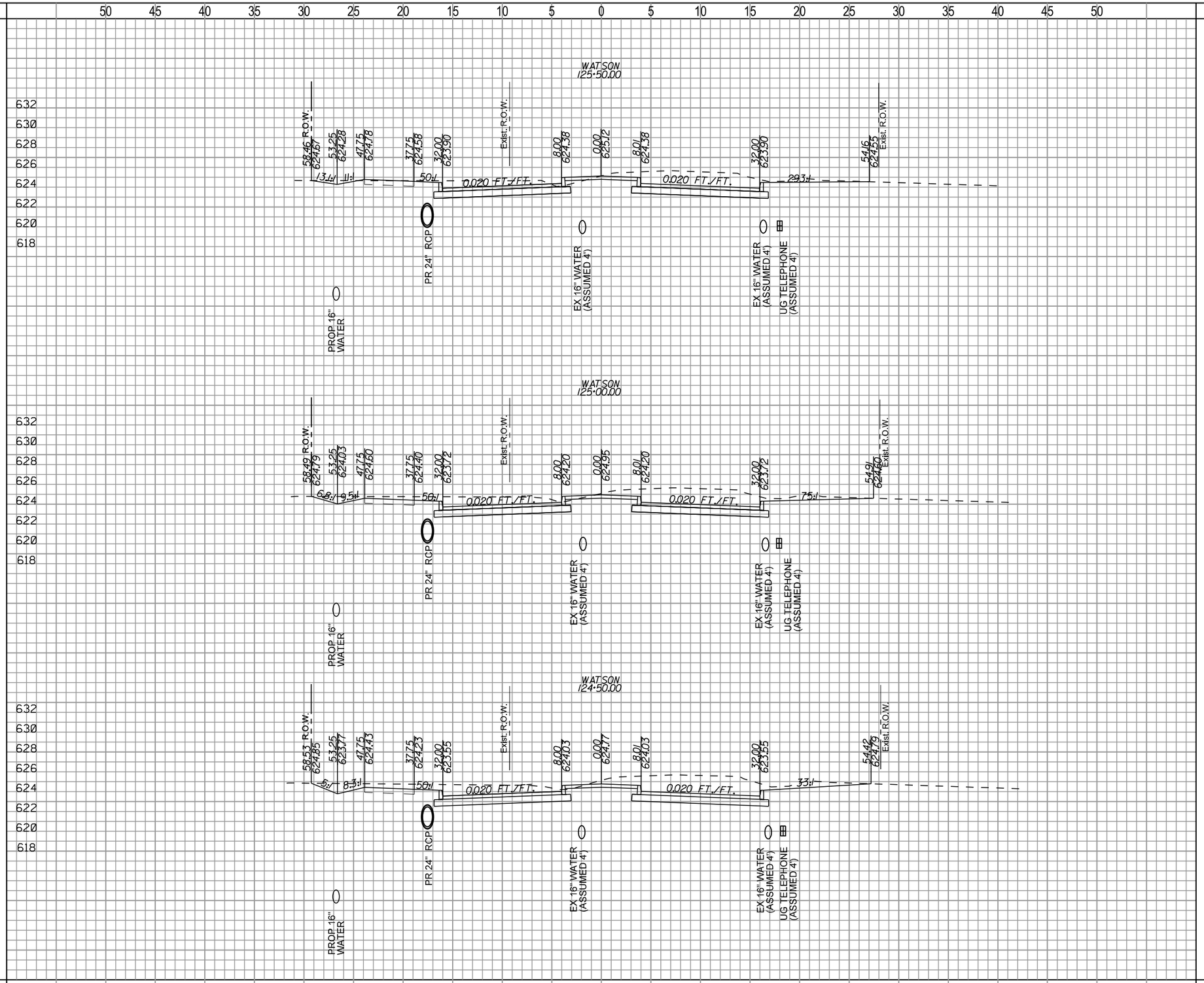

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 13 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			239
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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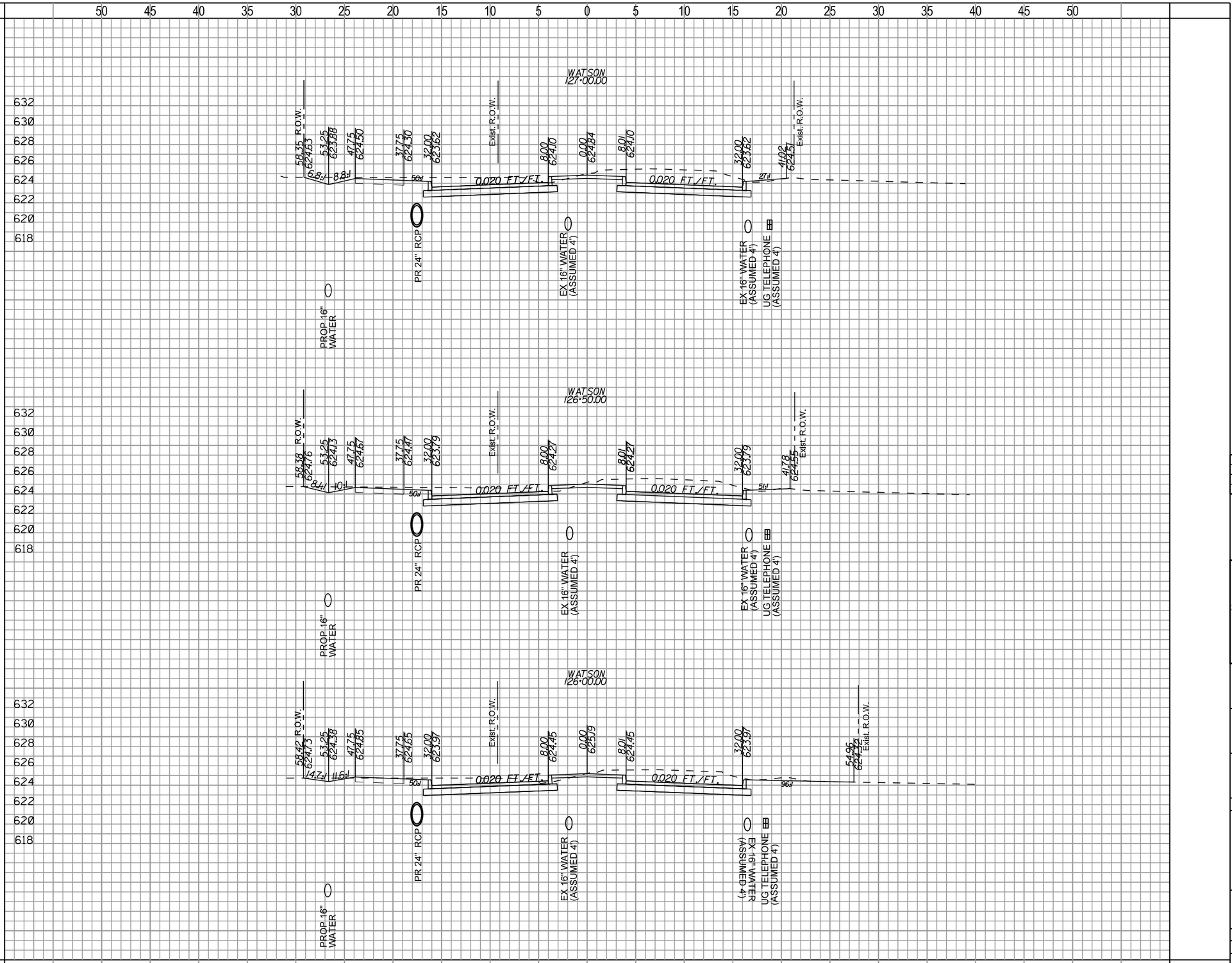

NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 14 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			240
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
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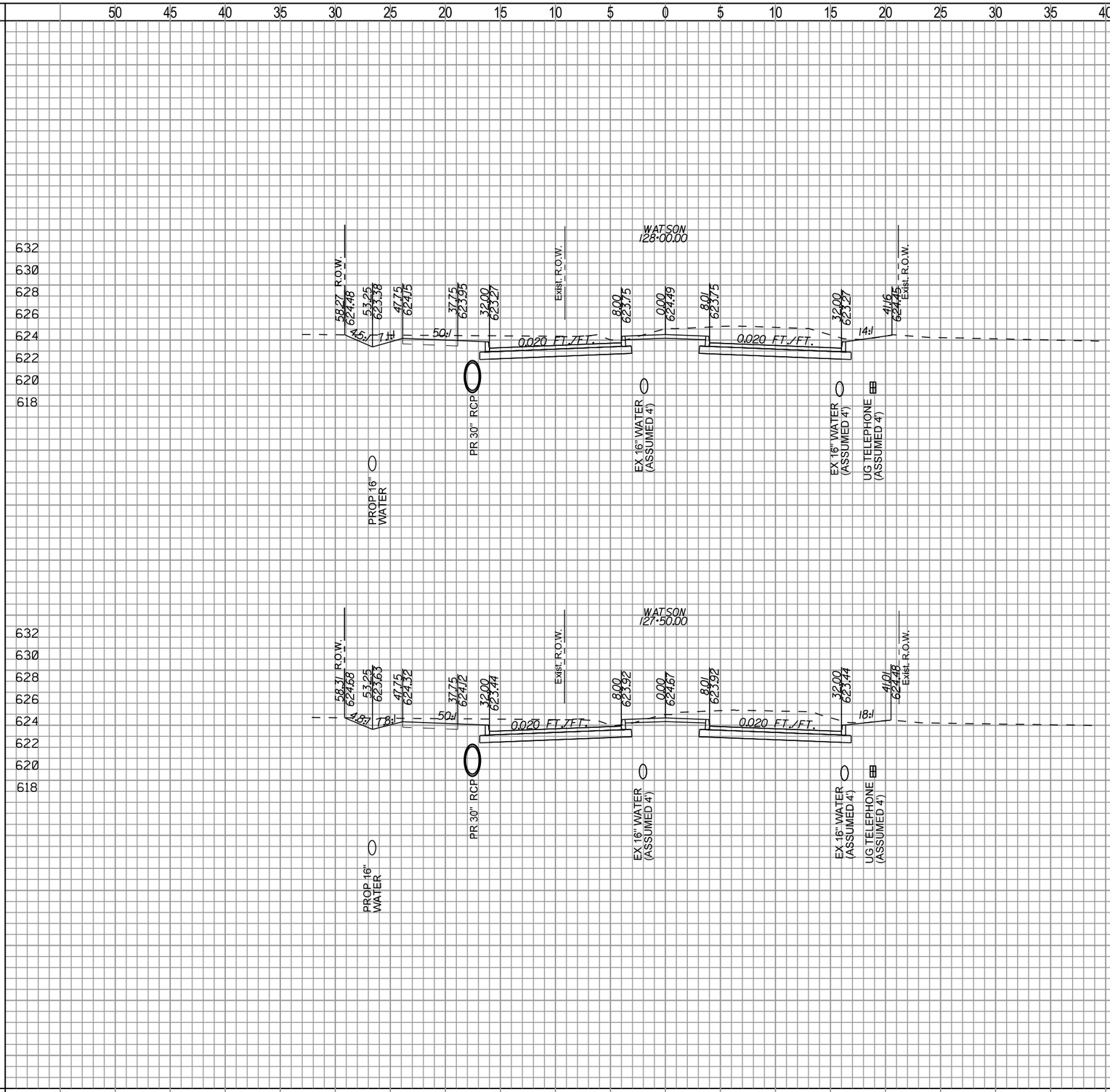

NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
(IN FEET)

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1" = 50'

STATE OF TEXAS
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 15 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			241
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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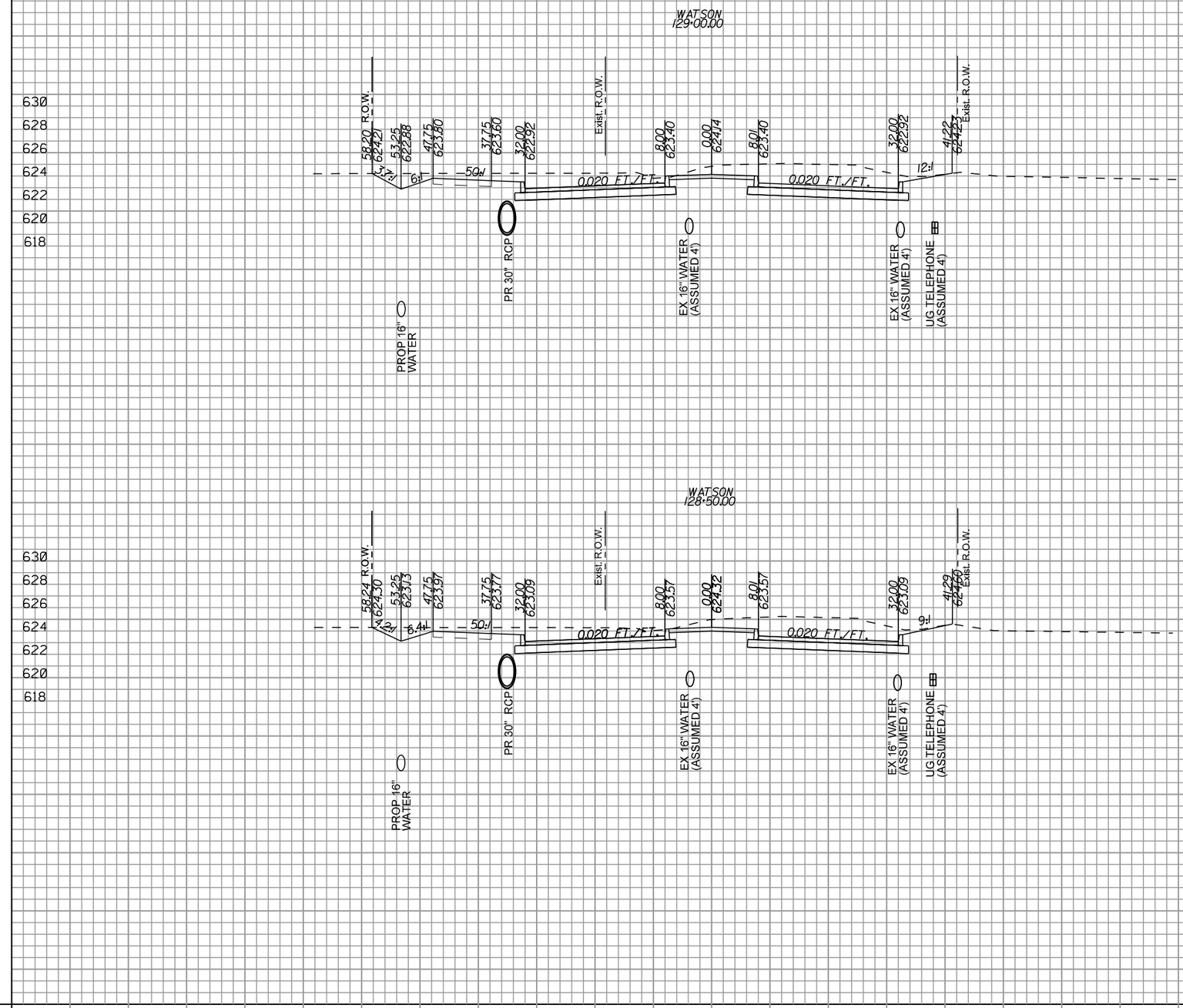

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
JULIO RAMOS
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 16 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			242
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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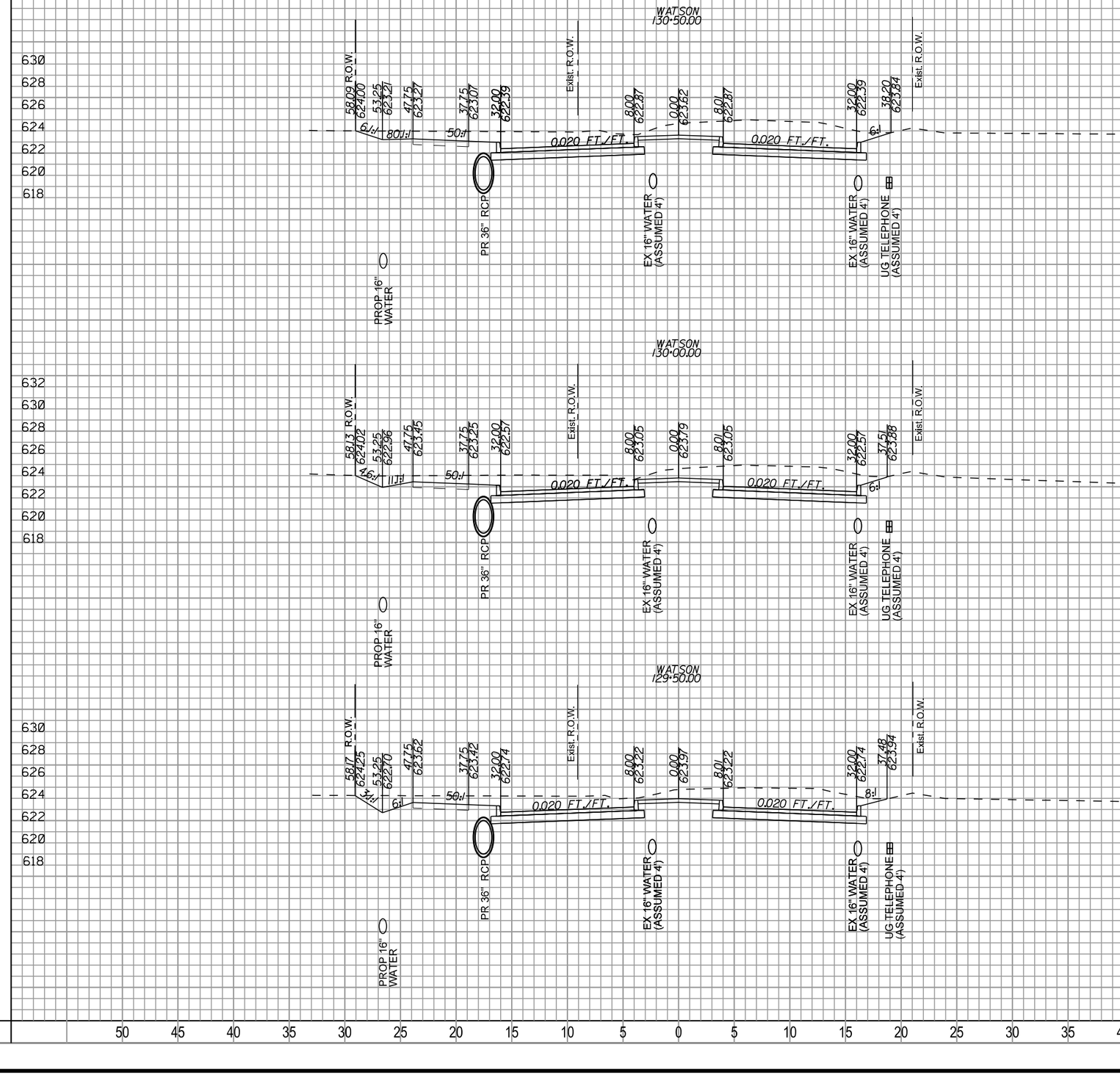

NO	DATE	REVISION	APPROVED
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-	-	-	-

GRAPHIC SCALE
(IN FEET)

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1" = 50'

STATE OF TEXAS
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 17 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			243
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
PEN TABLE: WATSON.TBL
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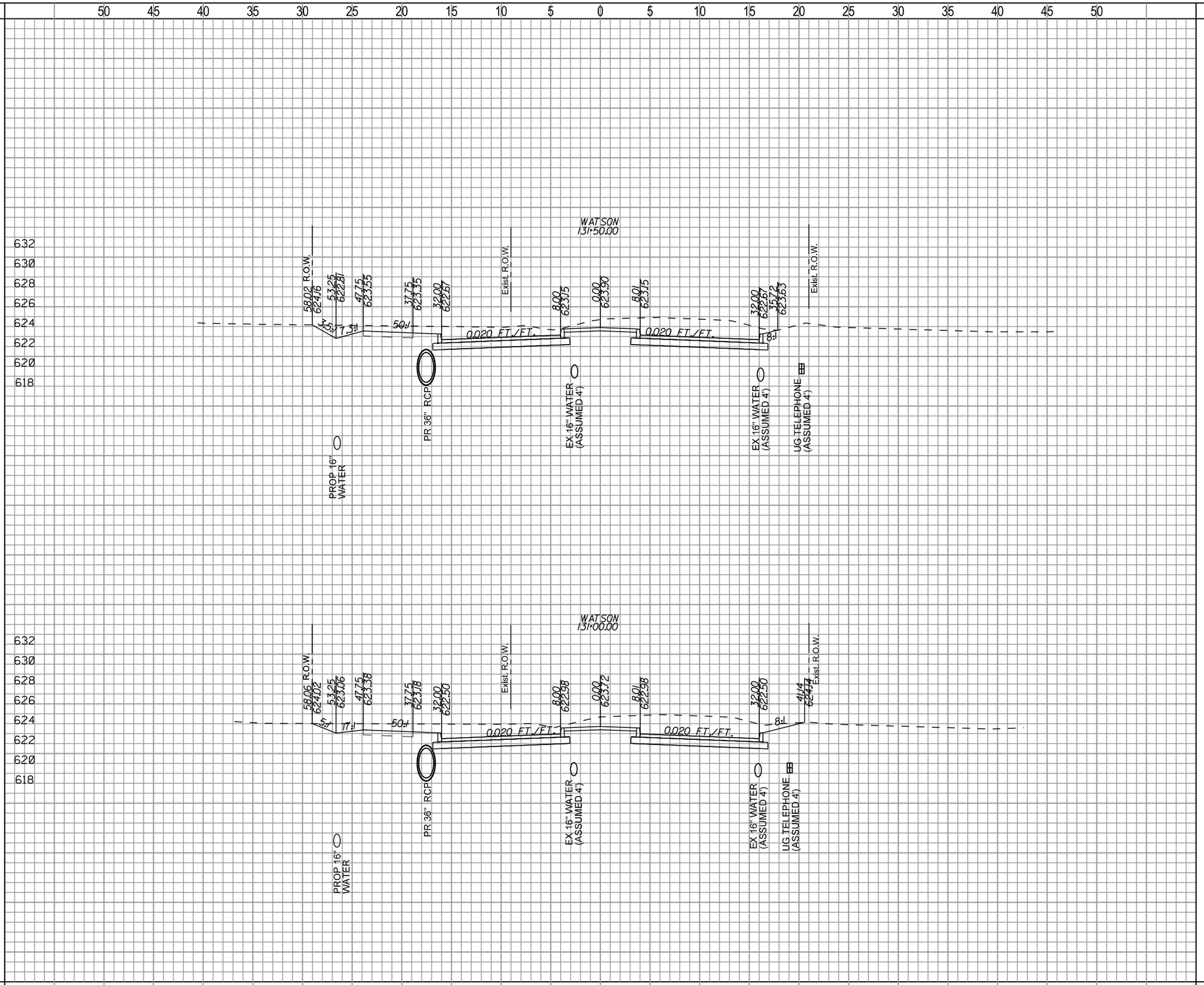

NO	DATE	REVISION	APPROVED
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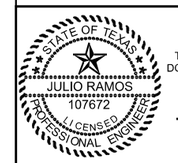
GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'



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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 18 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			244
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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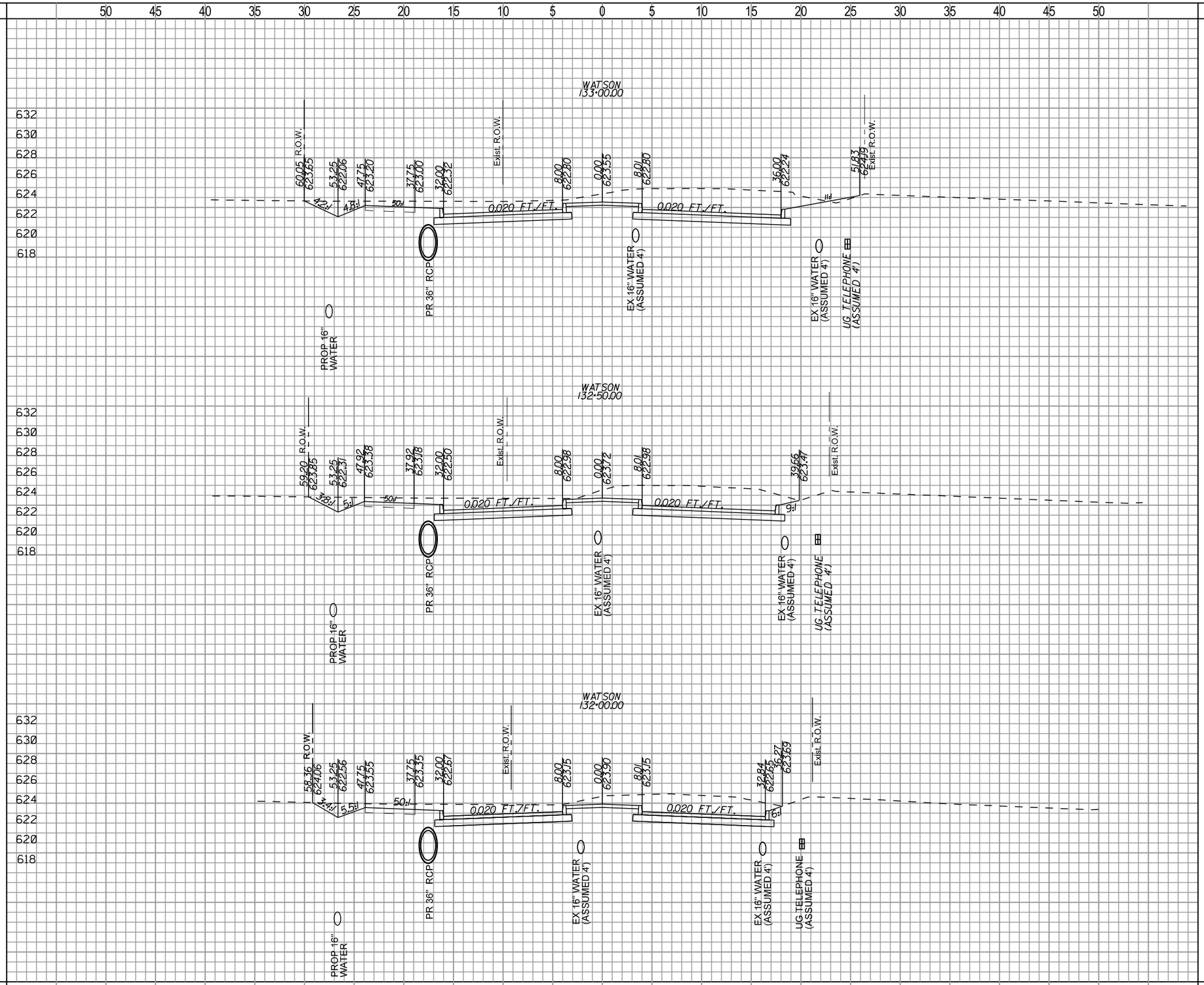

NO	DATE	REVISION	APPROVED
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-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 19 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			245
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
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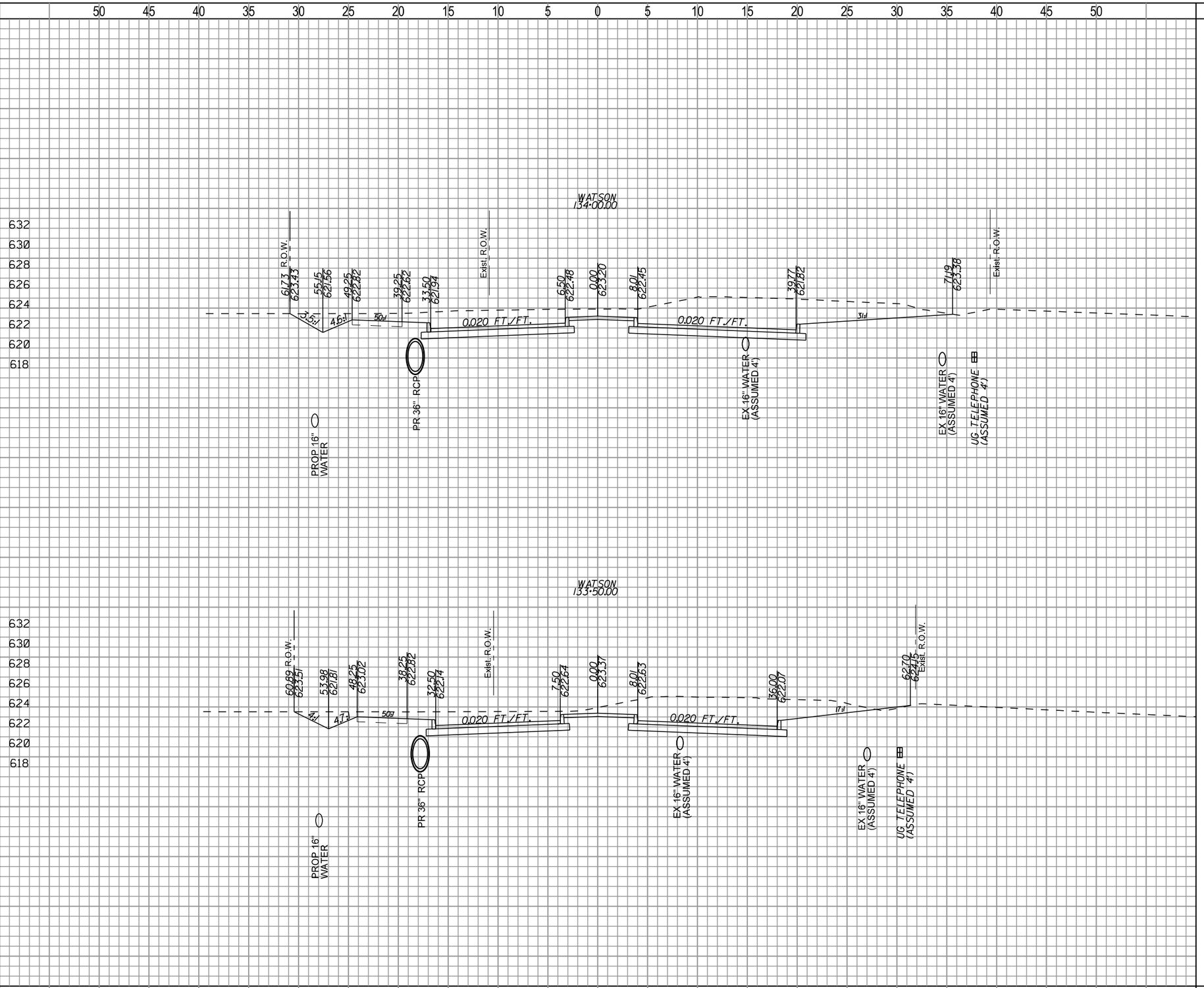

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NO	DATE	REVISION	APPROVED
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-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

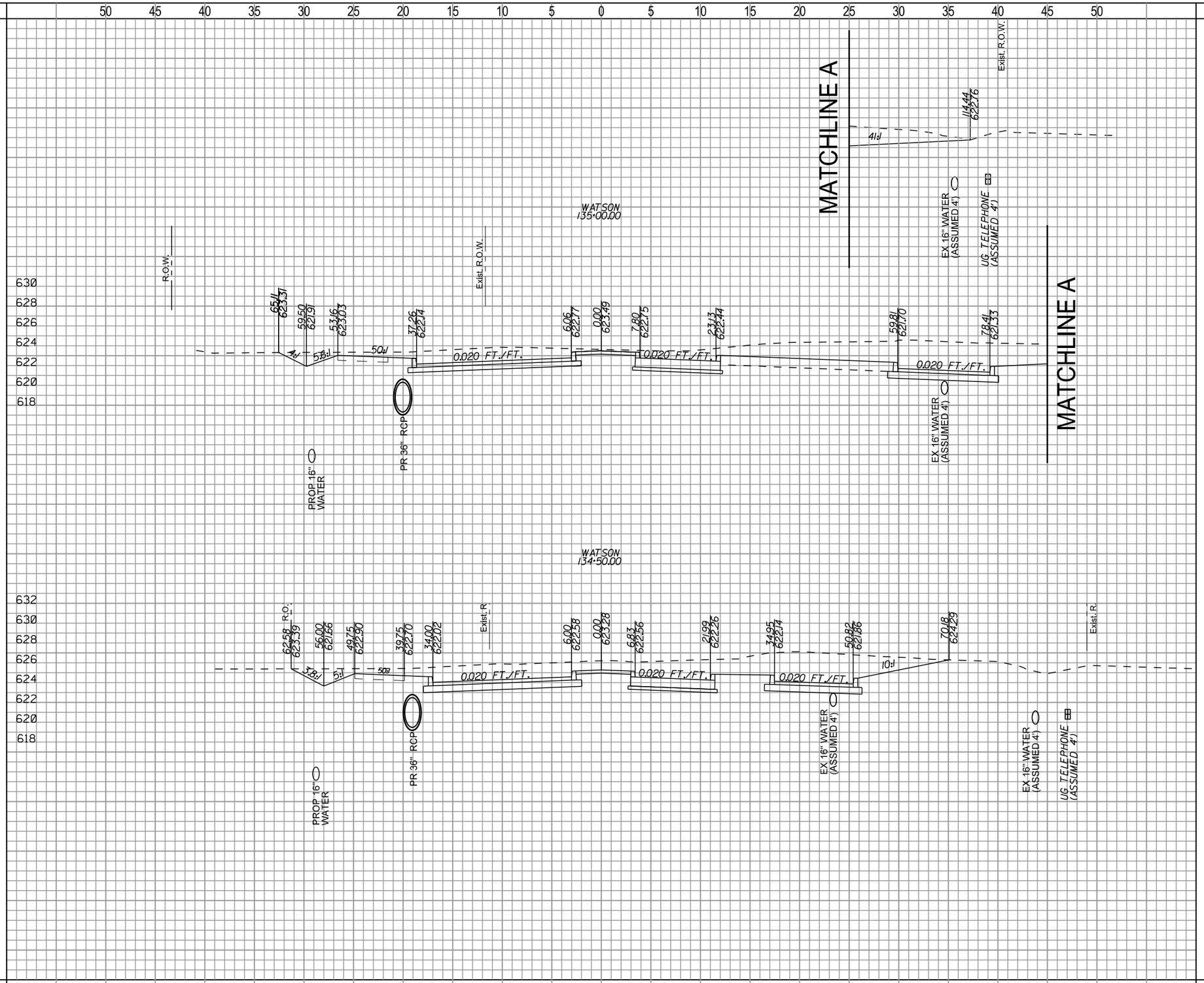
WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 20 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		246
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



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NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE
(IN FEET)
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TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 21 OF 27

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		247
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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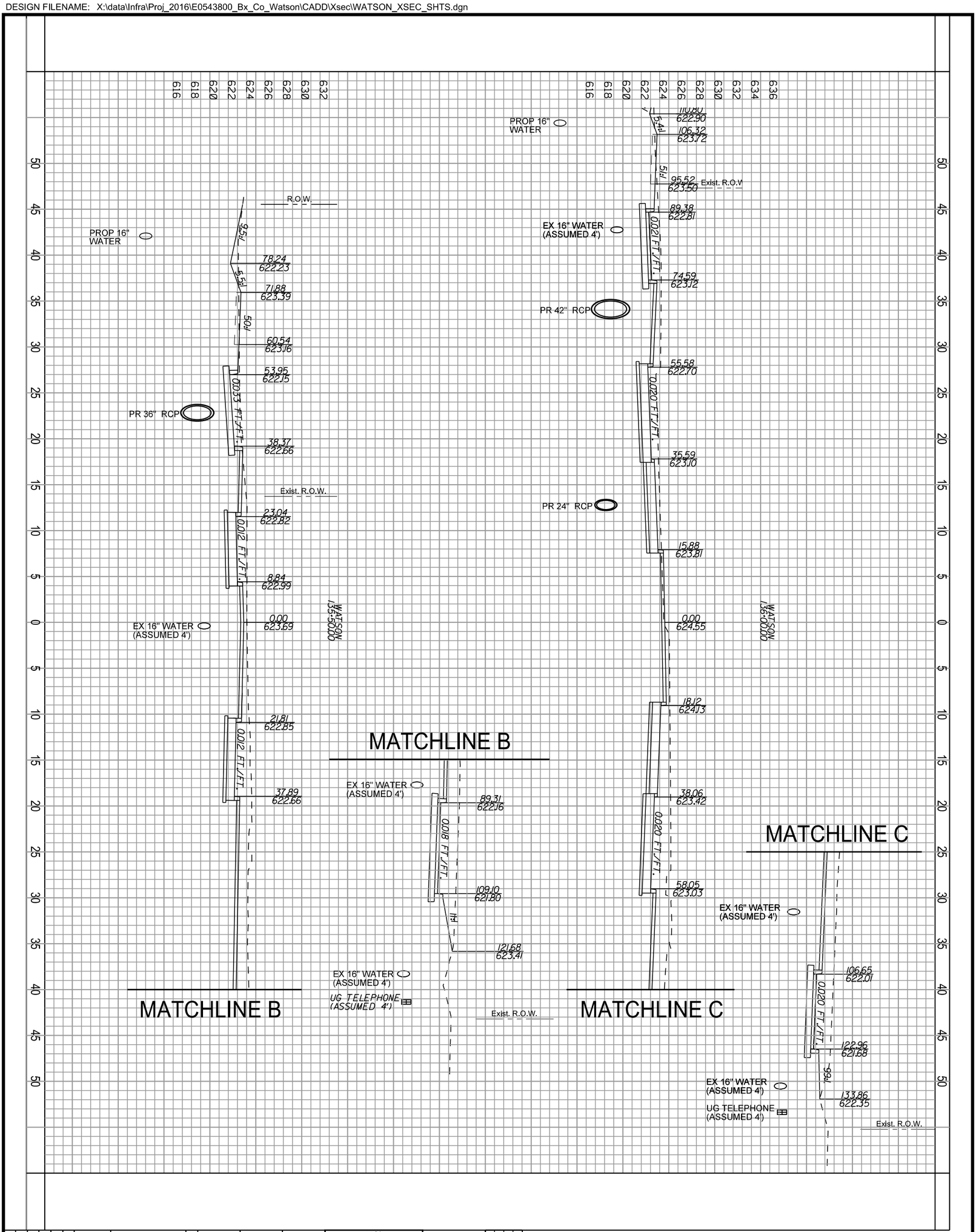

NO	DATE	REVISION	APPROVED
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GRAPHIC SCALE (IN FEET)
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STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

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TEL: (210) 641-9999 | FAX: (210) 641-3440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 10041000

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD
WATSON RD
CROSS-SECTION

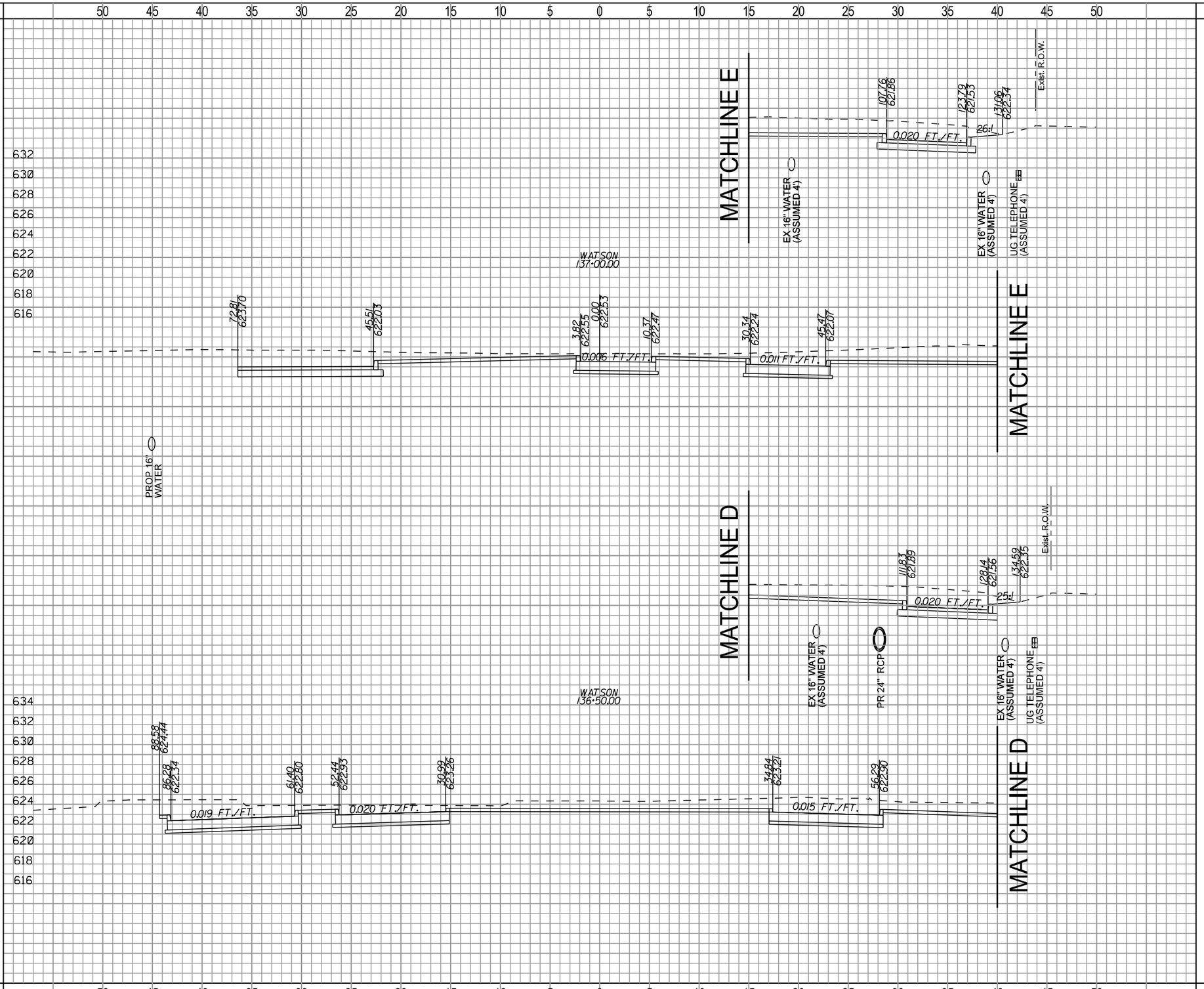
SHEET 22 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	—	248

STATE	DIST.	COUNTY
TEXAS	SAT	BEXAR

CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



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NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

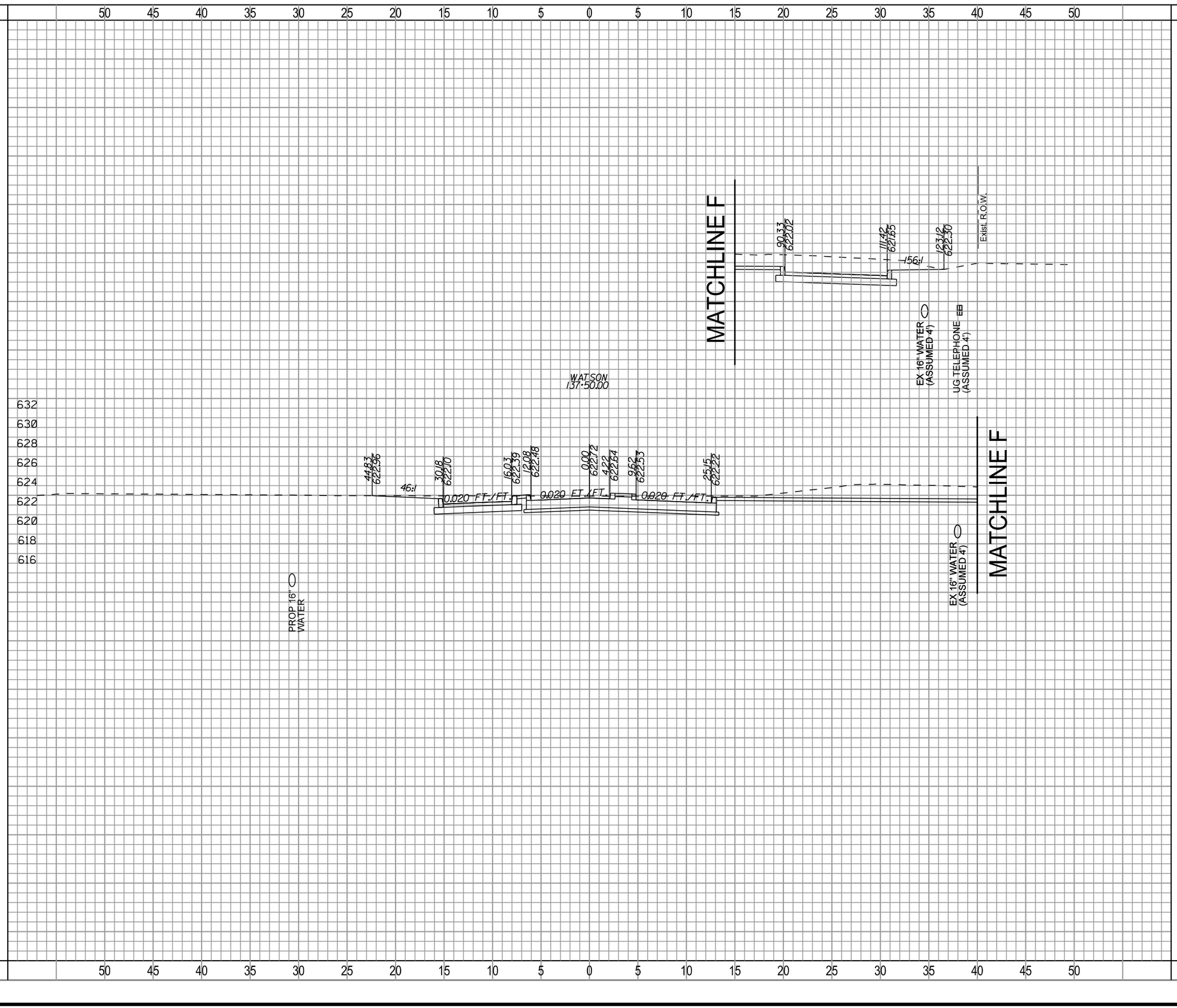
WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 23 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			249
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



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NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

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TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

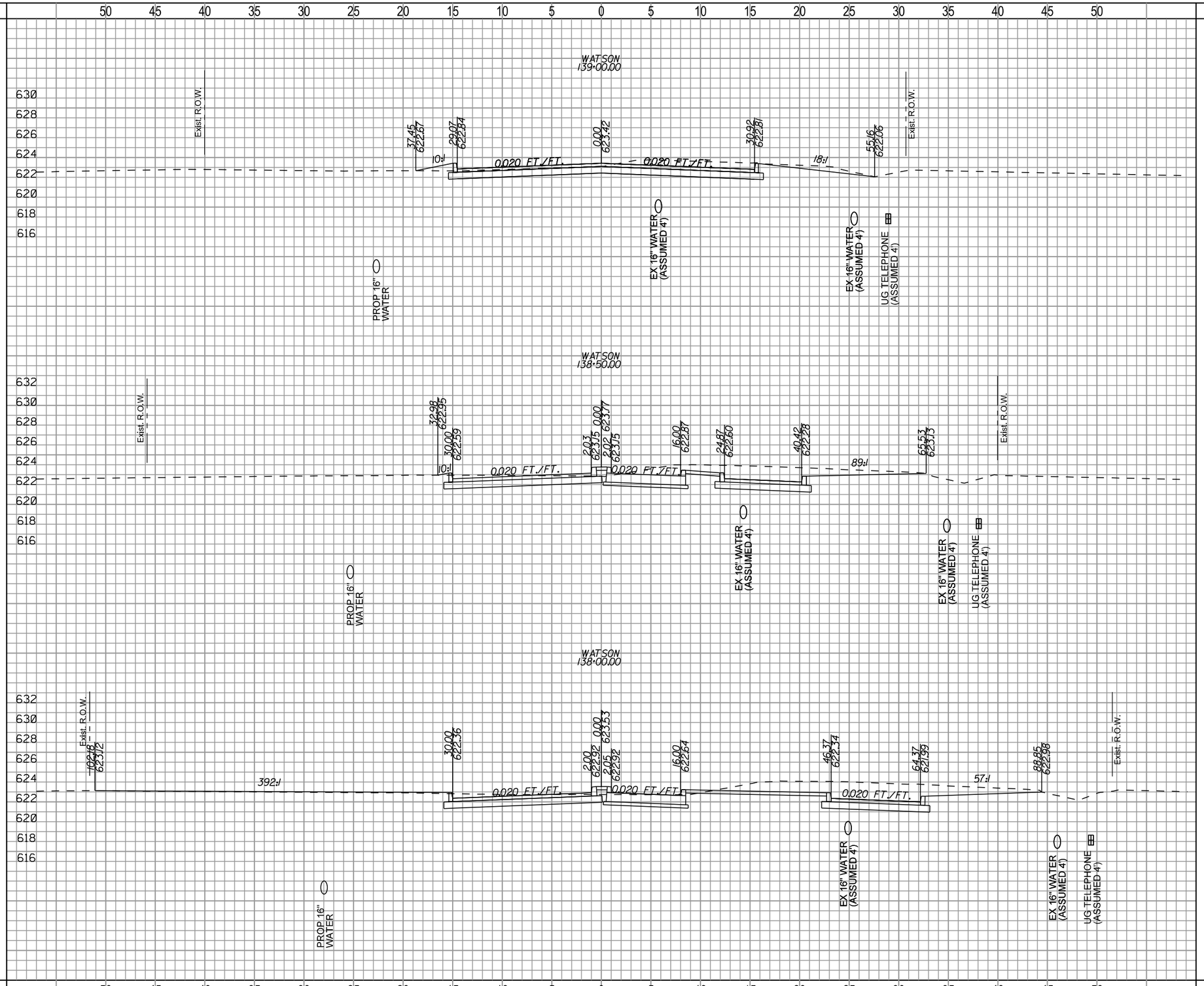
WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 24 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		250
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



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NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)
25 12.5 0 25 50 75
1" = 50'

STATE OF TEXAS
JULIO RAMOS
107672
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JULIO RAMOS, P.E. 107672

6/25/2020

CEC
CIVIL ENGINEERING CONSULTANTS
DON DURDEN, INC.
11550 IH 10 WEST, SUITE 395
SAN ANTONIO, TEXAS 78230-1037
TEL: (210) 641-9999 | FAX: (210) 641-6440
TBPE REGISTRATION NO.: F-2214
TBPLS REGISTRATION NO.: 100410-00

BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

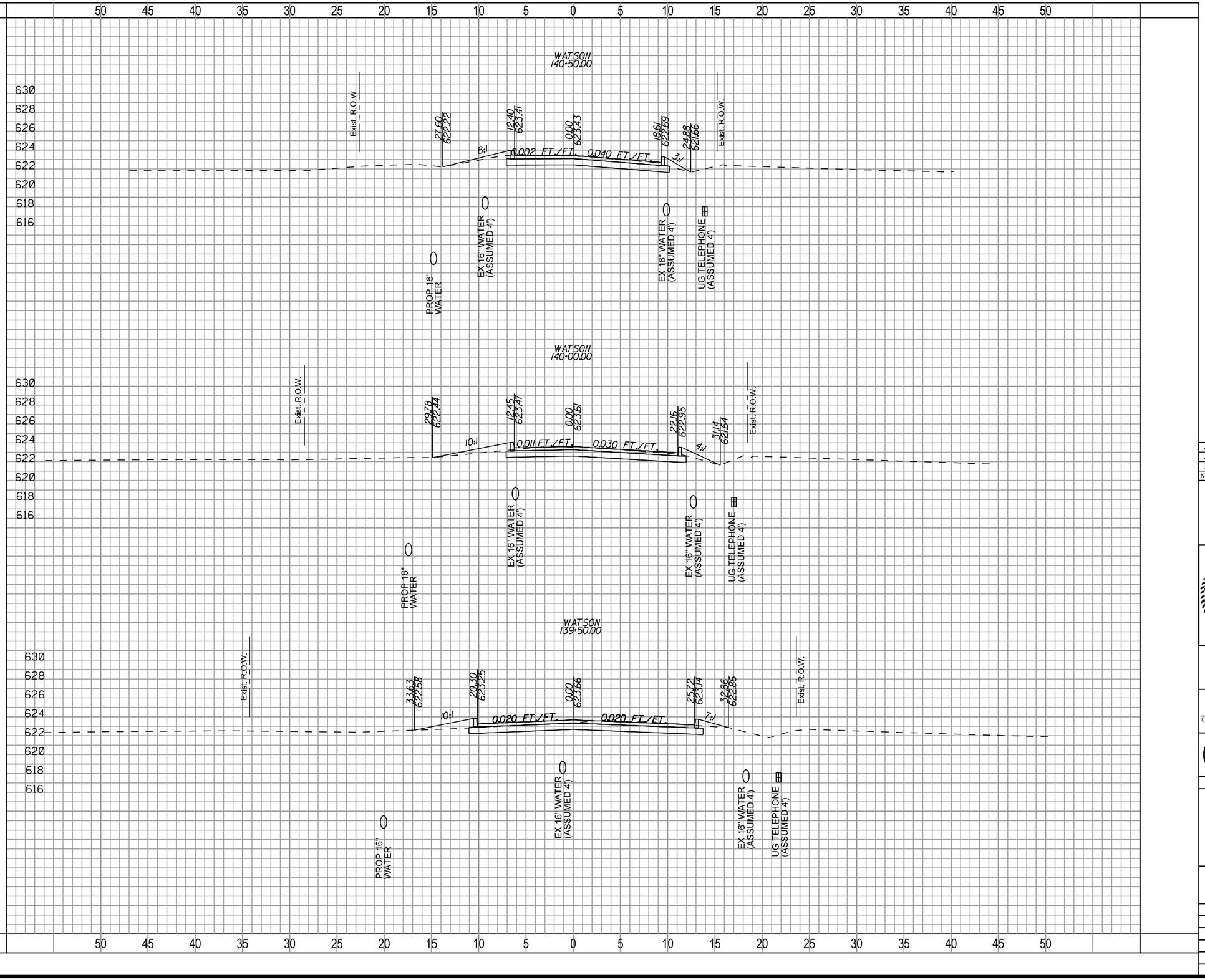
WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 25 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		251
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD



NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 26 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			252
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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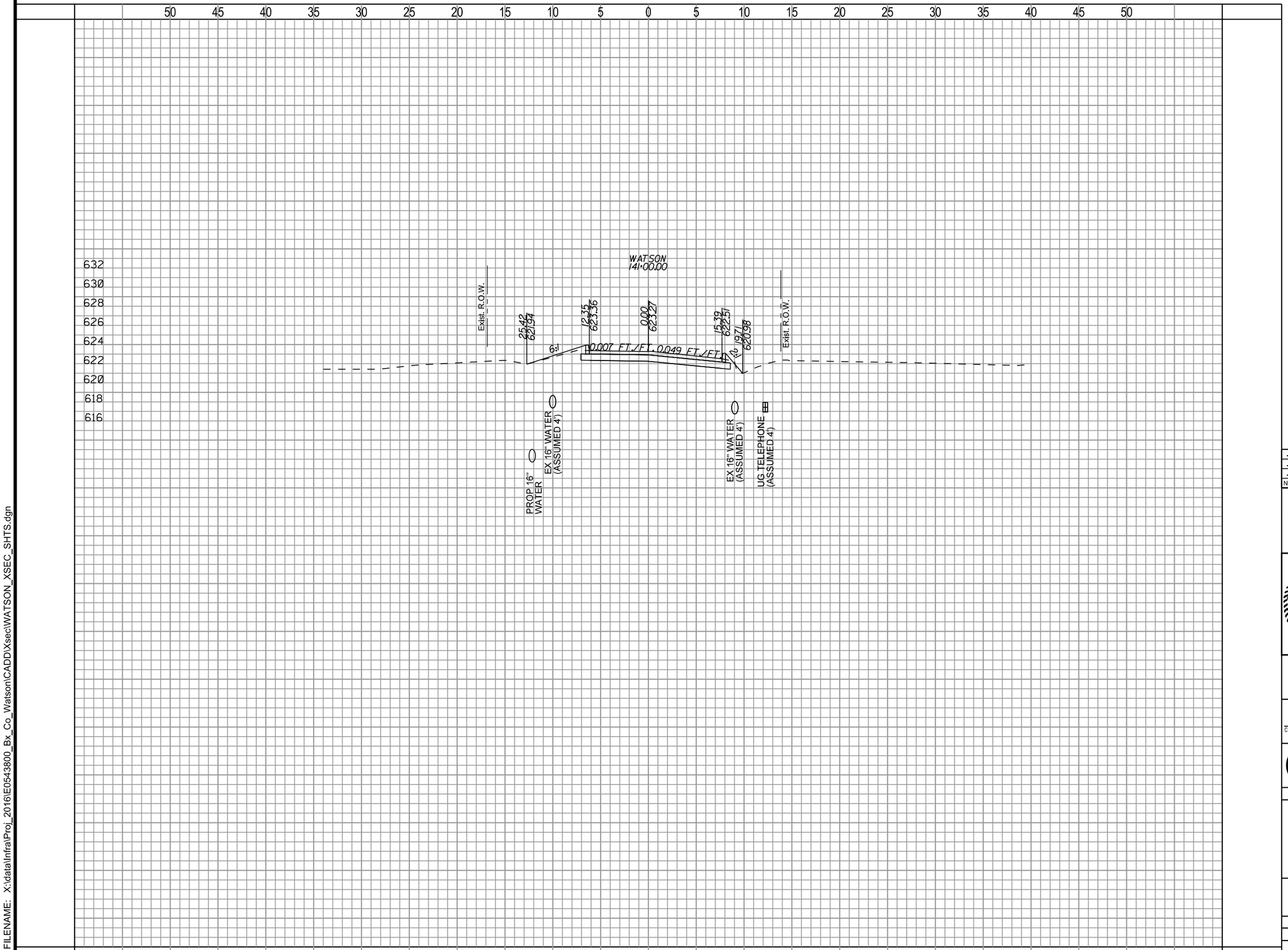

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

25 12.5 0 25 50 75

1" = 50'

STATE OF TEXAS
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

WATSON RD
CROSS-SECTION

SHEET 27 OF 27

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6	—		253
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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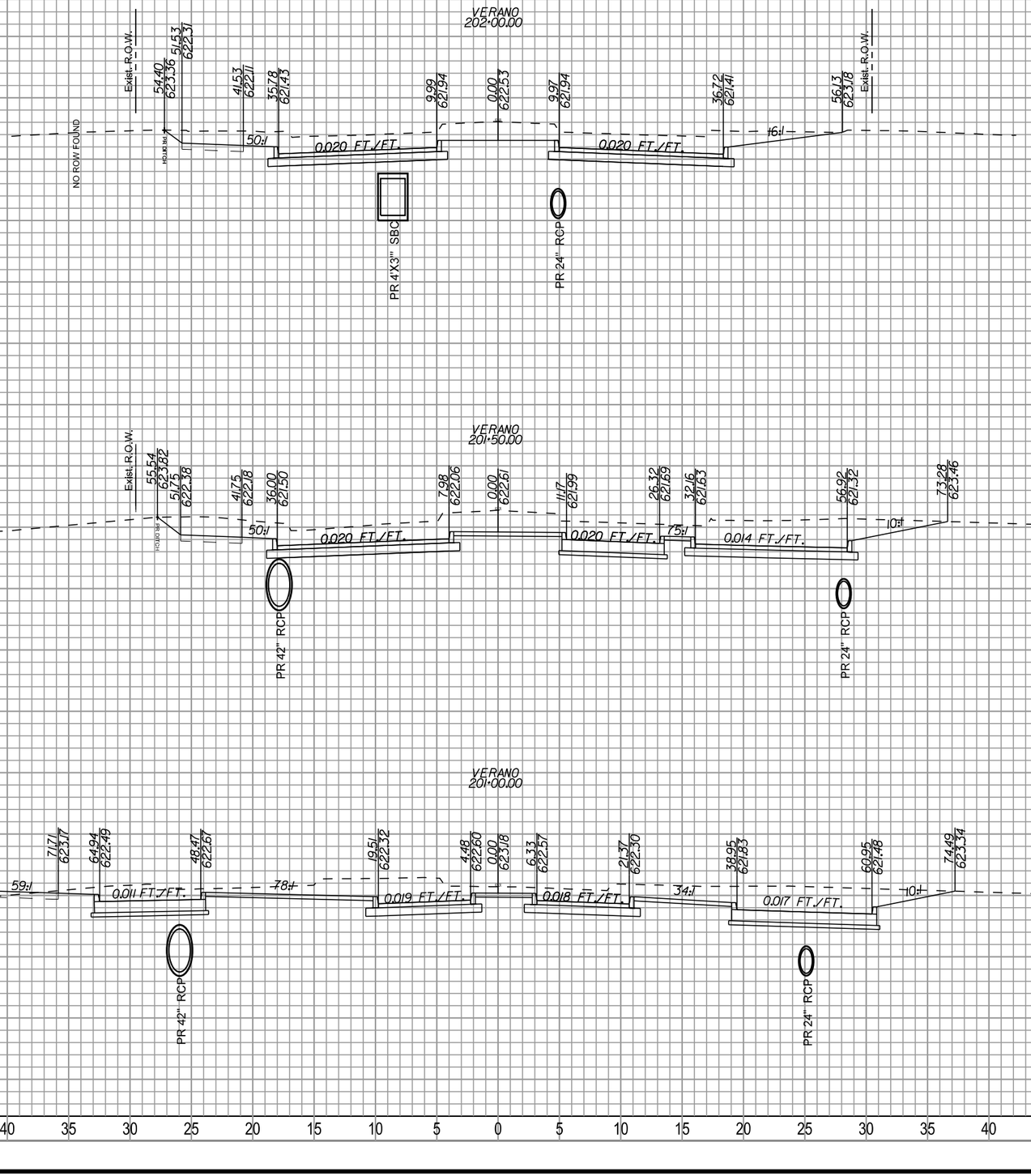

NO	DATE	REVISION	APPROVED
-	-	-	-
-	-	-	-
-	-	-	-

GRAPHIC SCALE
(IN FEET)

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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

VERANO PKWY
CROSS-SECTION

SHEET 1 OF 2

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	PLAN SHT NO.
6	---	254

STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
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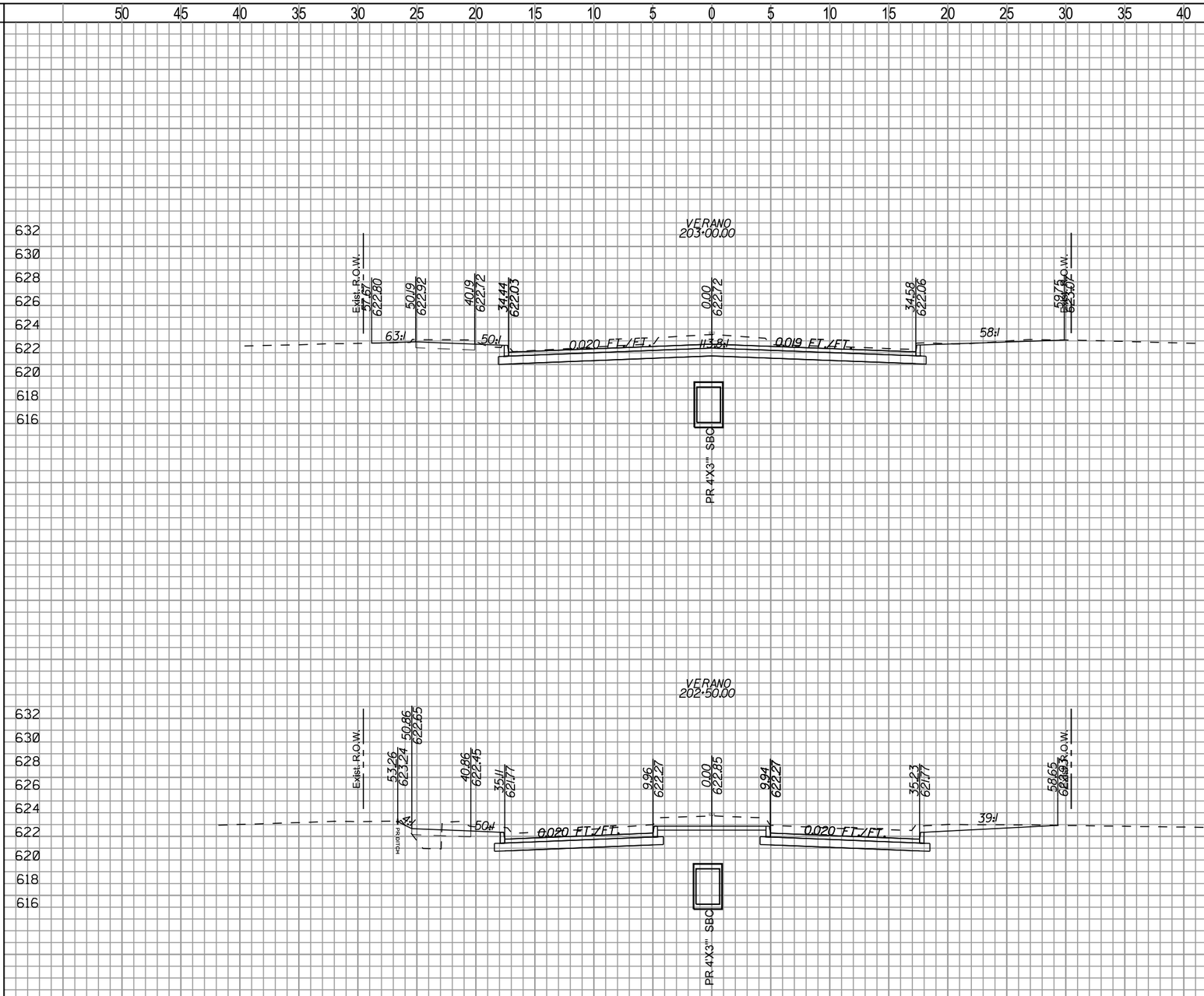

NO	DATE	REVISION	APPROVED
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-	-	-	-
-	-	-	-

GRAPHIC SCALE
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BEXAR COUNTY
PUBLIC WORKS DEPARTMENT

WATSON ROAD

VERANO PKWY
CROSS-SECTION

SHEET 2 OF 2

Texas Department of Transportation

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		PLAN SHT. NO.
6			255
STATE	DIST.	COUNTY	
TEXAS	SAT	BEXAR	
CONT.	SECT.	JOB	HIGHWAY / STREET
0915	12	562	WATSON RD

PLOTTED BY: evaldez
PLOTTED SCALE: 1:20
PEN TABLE: WATSON.TBL
PLOT DRIVER: WATSON_BW_PDF.pltcfg
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