FED. RD. DIV. NO.	STATE PROJECT NO:		SHEET NO.
6	C 3-7-64		1
STATE	STATE DIST.	COUNTY	
TEXAS	ODA	REEVES	
CONT.	SECT.	JOB	HIGHWAY NO.
0003	07	064, ETC	IH20

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE PROJECT NO: C 3-7-64

REEVES COUNTY

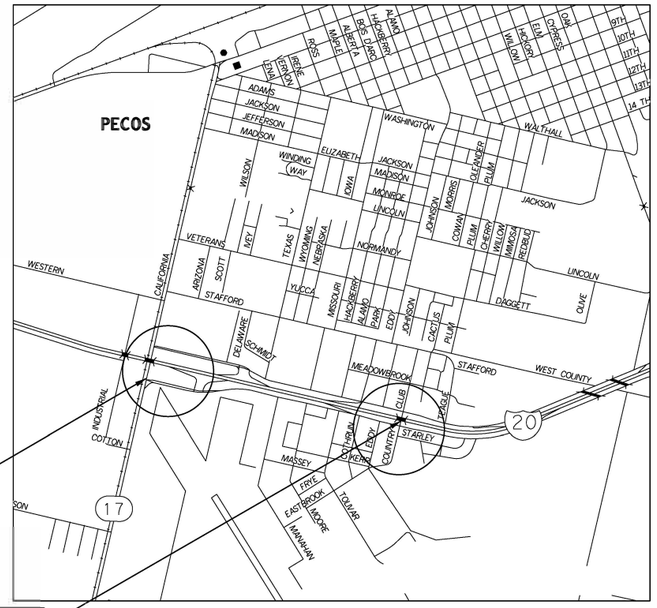
IH 20 @ SH 17
IH 20 @ COUNTRY CLUB DR

PROJECT LENGTH

IH 20 AND SH 17 LENGTH (CSJ: 0003-07-064, ETC.)= 3908.80 FT = 0.740 MILES
IH 20 AND COUNTRY CLUB DR LENGTH (CSJ: 0003-07-064, ETC.)= 5927.00 FT = 1.123 MILES
NET LENGTH OF PROJECT = 9835.80 FT = 1.863 MILES

FOR THE CONSTRUCTION OF INTERSECTION AND OPERATIONAL IMPROVEMENTS
CONSISTING OF WIDENING, GRADING, BASE, PAVEMENT, TRAFFIC SIGNALS, ILLUMINATION, SIGNING, AND PAVEMENT MARKINGS

INTERSECTION	FUNCTIONAL CLASS	HIGHWAY TYPE	DESIGN SPEED	TERRAIN	ADT
SH 17 @ IH 20	MINOR ARTERIAL	URBAN STREET	55 MPH	LEVEL	11,785(2020)
					16,499(2040)
COUNTRY CLUB DR @ IH 20	MAJOR COLLECTOR	URBAN STREET	30 MPH	LEVEL	8,163(2017)
					11,428(2040)
IH 20 NFR	MINOR ARTERIAL	URBAN STREET	55 MPH	LEVEL	6,236(2020)
					8,730(2040)
IH 20 SFR	MAJOR COLLECTOR	URBAN STREET	55 MPH	LEVEL	946(2020)
					1,324(2040)



SCALE: NOT TO SCALE

IH 20 AND SH 17	IH 20 AND COUNTRY CLUB DR
CSJ: 0003-07-064, ETC	CSJ: 0003-07-064, ETC
EXCEPTIONS: NONE	EXCEPTIONS: NONE
RR CROSSINGS: NONE	RR CROSSINGS: NONE
EQUATIONS: NONE	EQUATIONS: NONE

INDEX OF SHEETS

SEE SHEET 2

JMT TBPE REGISTRATION NO. F-16341

SUBMITTED BY: 03/30/2022
Justin W. Seal
PROJECT MANAGER

STATE OF TEXAS
JUSTIN W. SEAL
96498
LICENSED
PROFESSIONAL ENGINEER

REGISTERED ACCESSIBILITY SPECIALIST (RAS) INSPECTION REQUIRED

TDLR PROJECT NO. TABS2022012847

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOV. 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED SPECIAL LABOR PROVISIONS FOR ALL CONSTRUCTION PROJECTS (SP000---008)

FINAL PLANS

CONTRACTOR:

LETTING DATE:

DATE CONTRACTOR BEGAN WORK:

DATE WORK WAS COMPLETED:

DATE WORK WAS ACCEPTED:

FINAL CONTRACT COST:

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED CONCURRENCE: _____ 20__

_____, P.E.
AREA ENGINEER

RECOMMENDED FOR LETTING: _____ 20__

_____, P.E.
DIRECTOR OF TRANSPORTATION PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: _____ 20__

_____, P.E.
DISTRICT ENGINEER

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.

COUNTY REEVES PROJ. NO. C 3-7-64
HWY. NO. IH20 LETTING DATE JUNE 30, 2022
DATE ACCEPTED

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER
03/30/2022

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

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

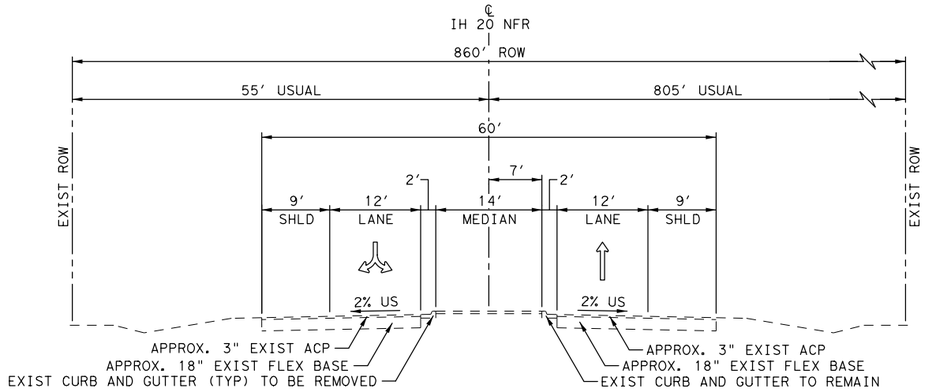
**THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

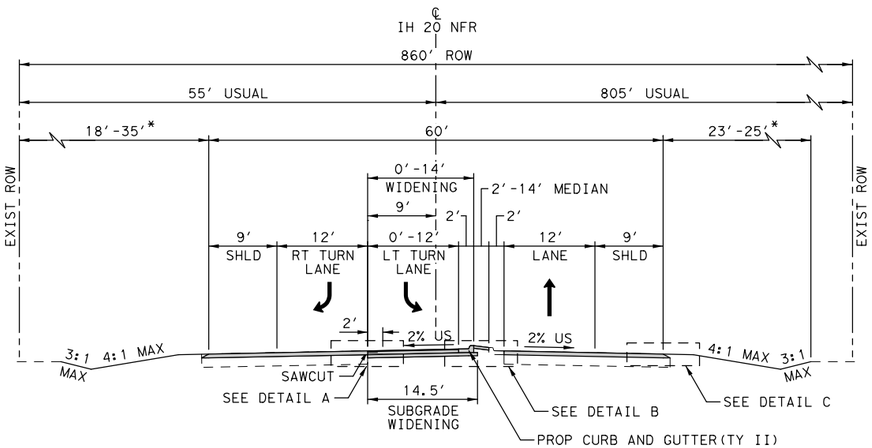
INDEX OF SHEETS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	2
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				



EXIST TYPICAL SECTION

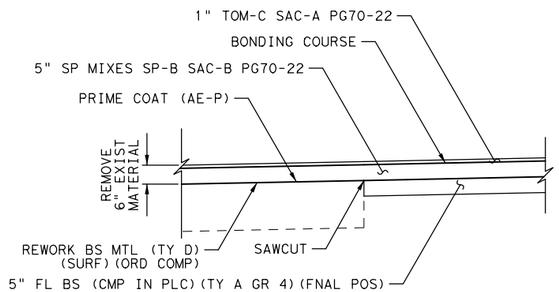
STA 0+00.00 TO STA 7+04.00



PROP TYPICAL SECTION

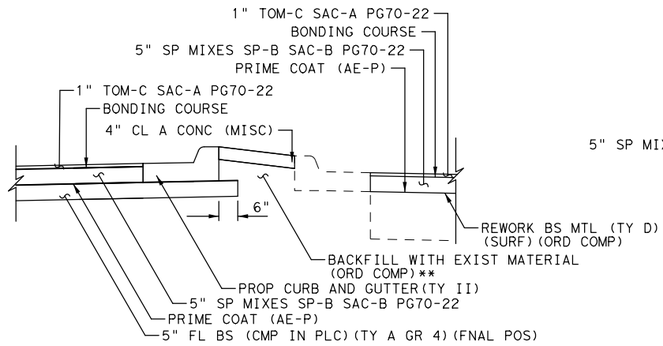
STA 0+00.00 TO STA 7+04.00

* SEEDING, AND DITCH CLEANING, AND RESHAPING LIMITS



DETAIL A

NOT TO SCALE



DETAIL B

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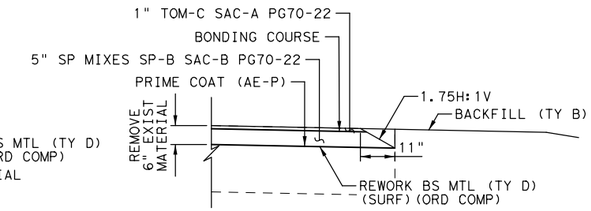


DETAIL C

NOT TO SCALE

** NOT PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO PERTINENT BID ITEMS

0' 10' 20'

SCALE IN FEET

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

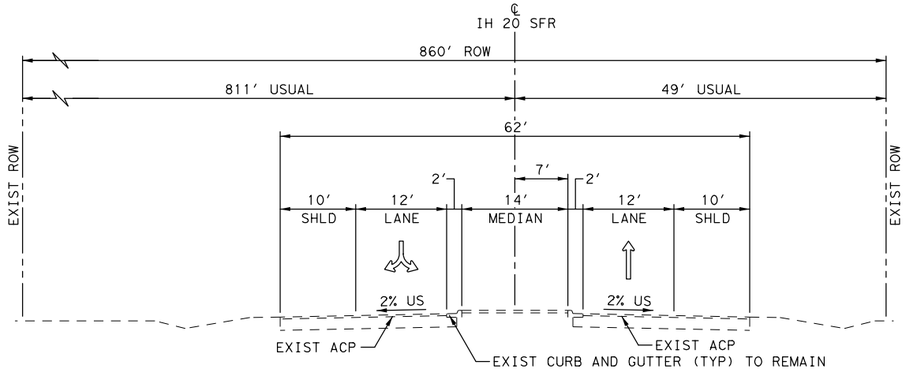
Texas Department of Transportation

IH 20 NFR
TYPICAL SECTIONS
AT SH 17

SHEET 1 OF 3

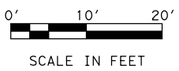
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	3
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

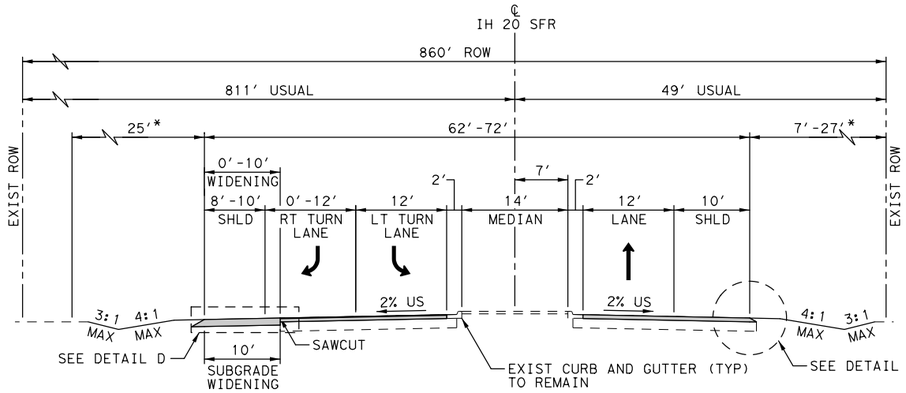
DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\ODA*T



EXIST TYPICAL SECTION

STA 0+00.00 TO STA 7+00

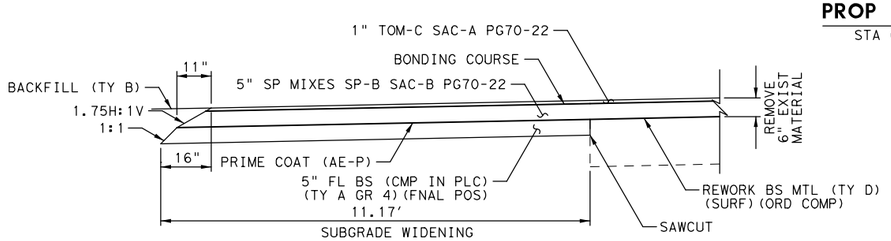




* SEEDING AND DITCH CLEANING AND RESHAPING LIMITS

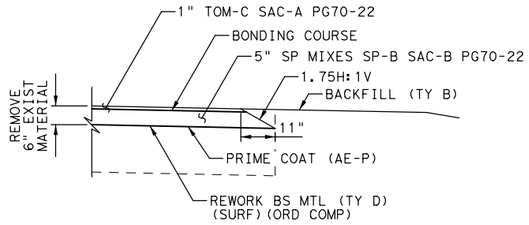
PROP TYPICAL SECTION

STA 0+00.00 TO STA 7+00



DETAIL D

NOT TO SCALE



DETAIL E

NOT TO SCALE

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

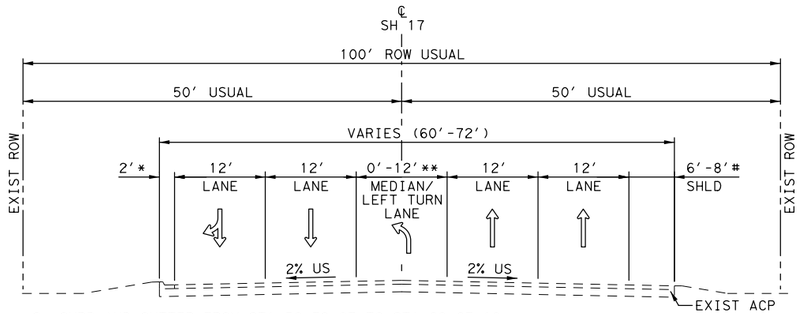
Texas Department of Transportation

IH 20 SFR
TYPICAL SECTIONS
AT SH 17

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	4
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC	

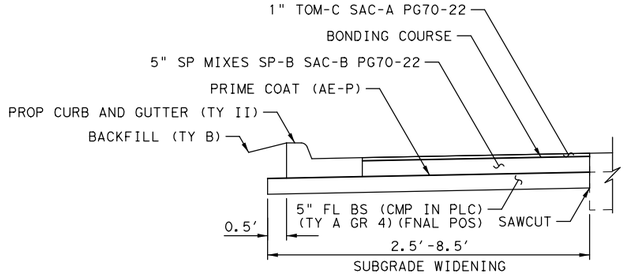
DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\ODA*T



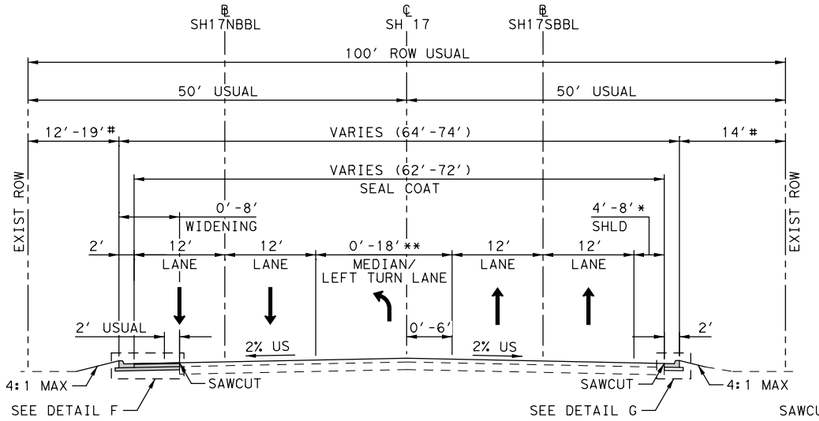
*2' CURB AND GUTTER FROM STA 56+39.03 TO STA 68+67.10
6' SHOULDER WITHOUT CURB AND GUTTER FROM STA 68+67.10 TO STA 81+43.83
**LEFT TURN LANE FROM STA 66+30.00 TO STA 68+30.00 AND STA 73+90.00 TO STA 75+90.00
#TRANSITION 8' TO 6' SHOULDER STA 64+71.00 TO STA 65+20.00

EXIST TYPICAL SECTION

STA 56+39.03 TO STA 81+43.83



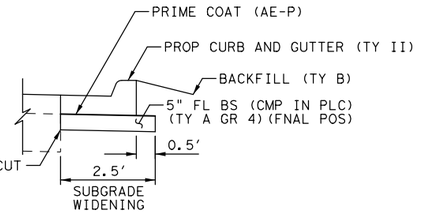
DETAIL F
NOT TO SCALE



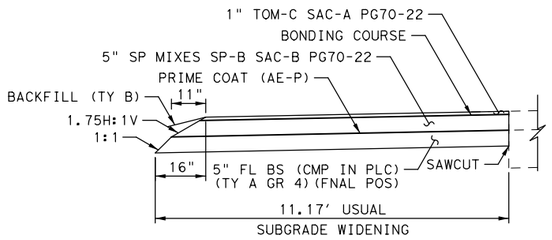
*TRANSITION 8' TO 6' SHOULDER STA 64+71.00 TO STA 65+20.00
PROP CURB AND GUTTER (TY II) WITH 4' SHOULDER FROM STA 67+50 TO STA 76+75 ONLY
**LEFT TURN LANE FROM STA 62+11.00 TO STA 68+21.00 AND STA 73+00.00 TO STA 75+90.00
#SEEDING, AND DITCH CLEANING, AND RESHAPING LIMITS

PROP TYPICAL SECTION

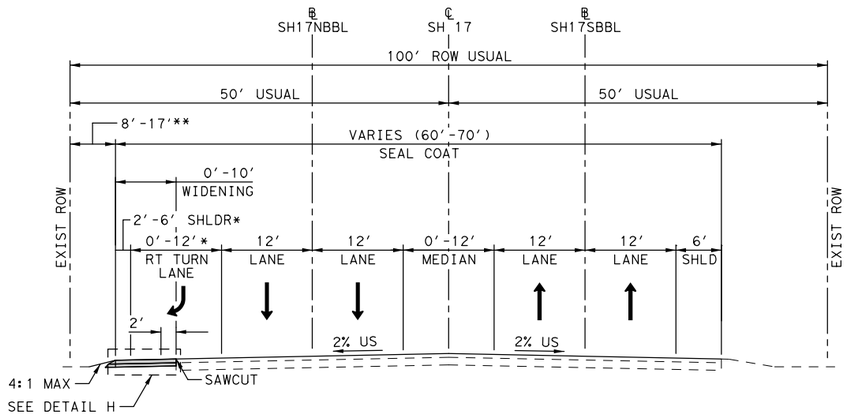
STA 56+39.03 TO STA 76+31.00



DETAIL G
NOT TO SCALE



DETAIL H
NOT TO SCALE



*RIGHT TURN LANE WITH 2'-6' SHOULDER FROM STA 76+31.00 TO STA 79+44.47
**SEEDING, AND DITCH CLEANING, AND RESHAPING LIMITS

PROP TYPICAL SECTION

STA 76+31.00 TO STA 81+43.83

0' 10' 20'

SCALE IN FEET

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

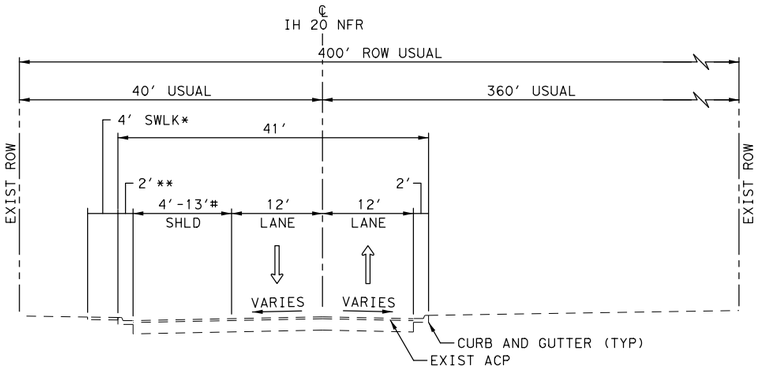
Texas Department of Transportation

SH 17
TYPICAL SECTIONS
AT IH 20

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	5
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

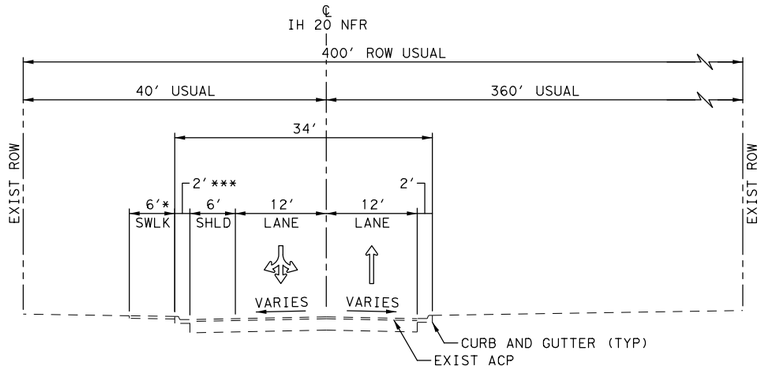
DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\ODA*T



*4'SIDEWALK FROM STA 54+40.01 TO STA 56+00.25
**2'CURB AND GUTTER FROM STA 50+47.86 TO STA 57+48.98
#4'SHOULDER FROM STA 46+50.00 TO STA 47+48.73
TRANSITION 4' TO 13' SHOULDER STA 47+48.73 TO STA 50+47.86

EXIST TYPICAL SECTION

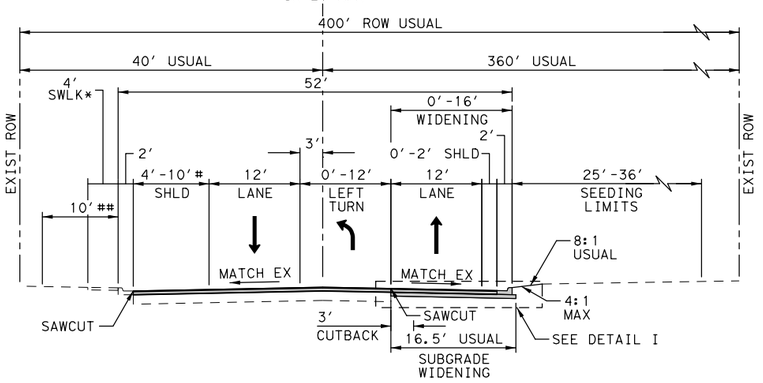
STA 46+50.00 TO STA 57+48.98



*6' SIDEWALK FROM STA 57+48.98 TO STA 61+60.71
***2' CURB AND GUTTER FROM STA 57+48.98 TO 61+60.71

EXIST TYPICAL SECTION

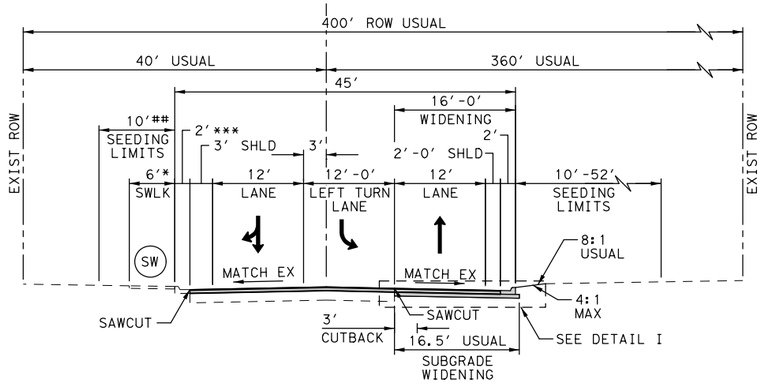
STA 57+48.98 TO STA 75+00.00



#4'SHOULDER FROM STA 46+50.00 TO STA 47+48.73
RANSITION 4' TO 10' SHOULDER STA 47+48.73 TO STA 50+47.86
SEEDING LIMITS FROM STA 48+26.07 TO STA 50+48.47

PROP TYPICAL SECTION

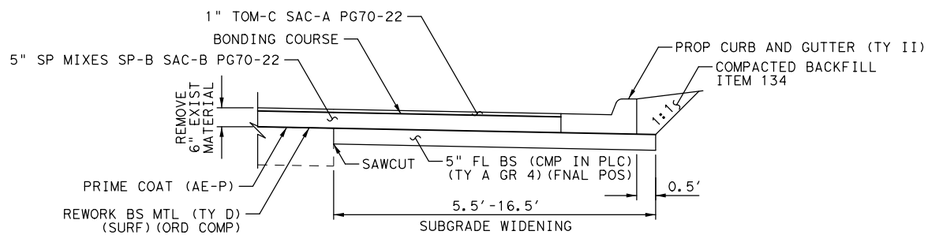
STA 46+50.00 TO STA 57+48.98 (1)



*6' SIDEWALK FROM STA 57+48.98 TO STA 61+60.71
***2' CURB AND GUTTER FROM STA 57+48.98 TO 61+60.71
SEEDING LIMITS FROM STA 62+12.94 TO STA 66+75.63

PROP TYPICAL SECTION

STA 57+48.98 TO STA 75+00.00 (1)



DETAIL I

NOT TO SCALE

0' 10' 20'

SCALE IN FEET

(SW) SEE MISCELLANEOUS SIDEWALK DETAILS FOR SIDEWALK LIMITS.

(1) SEE ROADWAY PLAN SHEETS FOR LIMITS OF PAVEMENT CONSTRUCTION.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
TYPICAL SECTIONS
AT COUNTRY CLUB DR

SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB / 6
	0003	07	064,ETC

DATE: 3/30/2022
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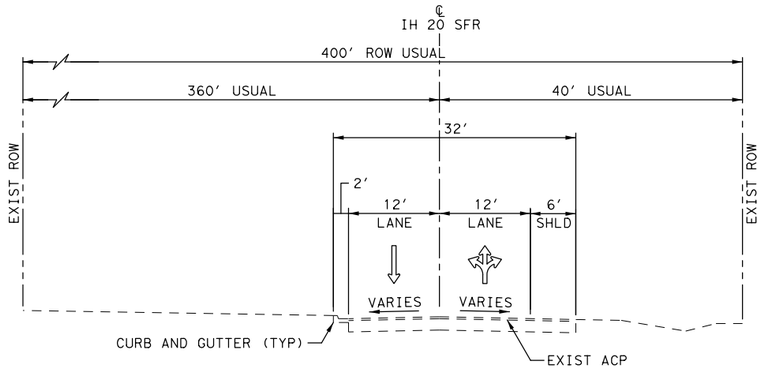
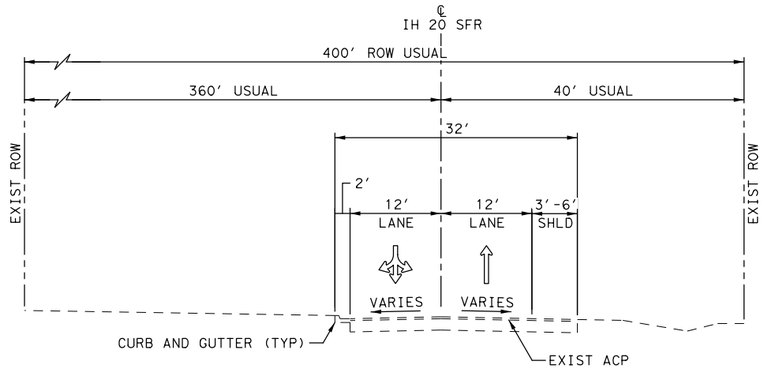


EXIST TYPICAL SECTION

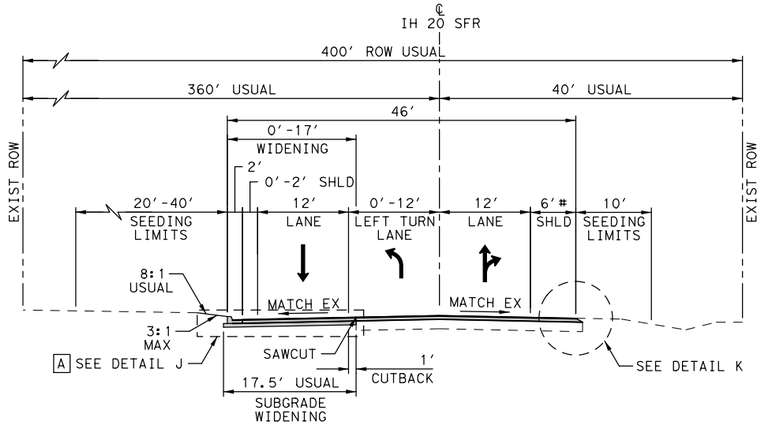
STA 45+75.00 TO STA 57+70.29



EXIST TYPICAL SECTION

STA 57+70.29 TO STA 68+26.00

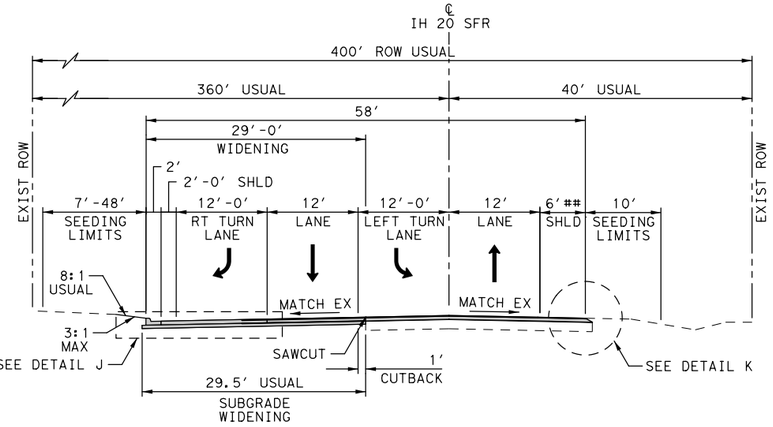
(1) SEE ROADWAY PLAN SHEETS FOR LIMITS OF PAVEMENT CONSTRUCTION.



##TRANSITION 6' TO 5' SHOULDER STA 56+65.00 TO STA 57+19.64

PROP TYPICAL SECTION

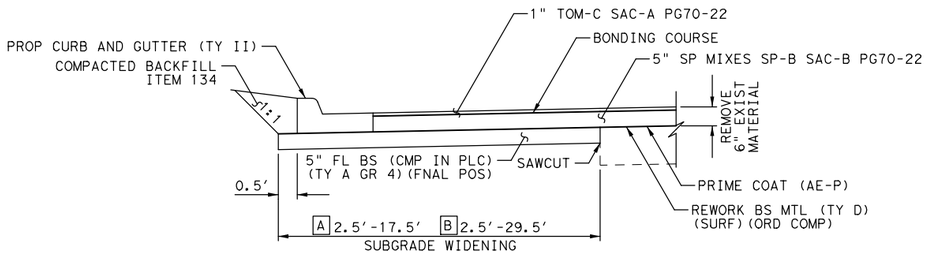
STA 45+75.00 TO STA 57+70.29 (1)



##TRANSITION 3' TO 6' SHOULDER STA 58+62.15 TO STA 60+73.00

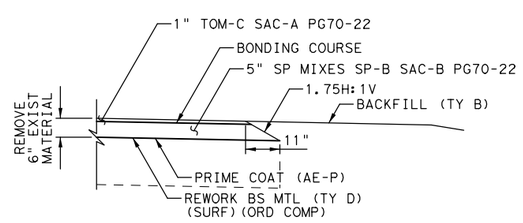
PROP TYPICAL SECTION

STA 57+70.29 TO STA 68+26.00 (1)



DETAIL J

NOT TO SCALE



DETAIL K

NOT TO SCALE

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R Perry

JMT TBPE REGISTRATION NO. F-163341

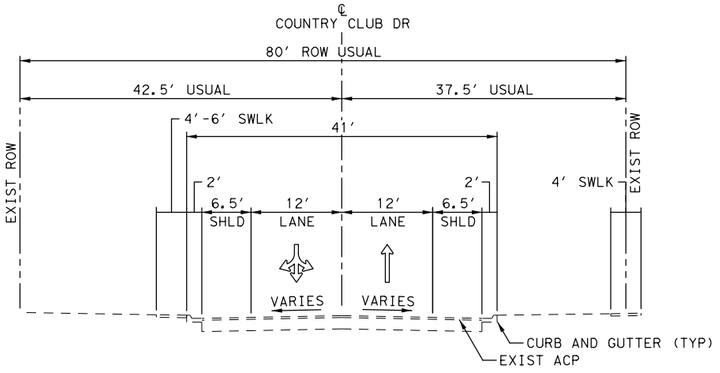
Texas Department of Transportation

IH 20 SFR
TYPICAL SECTIONS
AT COUNTRY CLUB DR

SHEET 2 OF 4

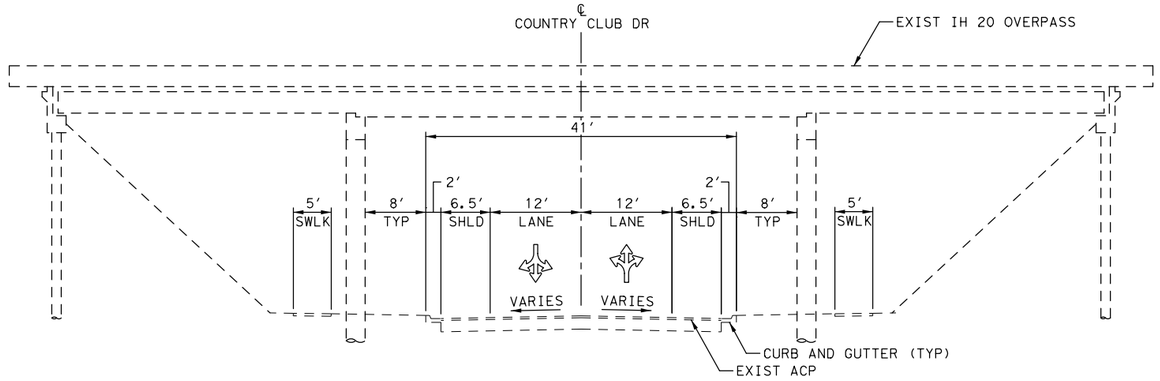
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	7
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\CCD*T



EXIST TYPICAL SECTION

STA 110+75.00 TO STA 114+32.13



EXIST TYPICAL SECTION

STA 114+32.13 TO STA 117+59.15

0' 10' 20'

SCALE IN FEET

(SW) SEE MISCELLANEOUS SIDEWALK DETAILS FOR SIDEWALK LIMITS.

(1) SEE ROADWAY PLAN SHEETS FOR LIMITS OF PAVEMENT CONSTRUCTION.

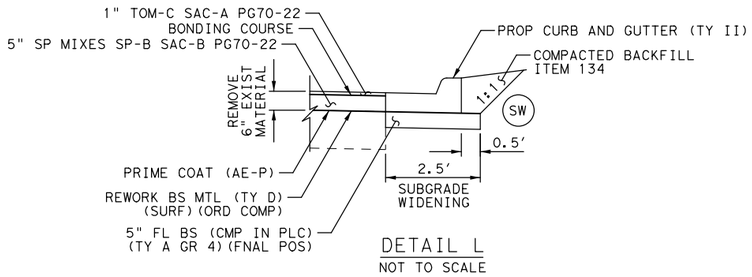
PROP TYPICAL SECTION

STA 110+75.00 TO STA 114+32.13 (1)

#NORTHBOUND LEFT TURN LANE FROM STA 114+85.00 TO STA 116+20.00 AND
SOUTHBOUND LEFT TURN LANE FROM STA 115+70.00 TO STA 117+05.00
##LANDSCAPING GRAVEL

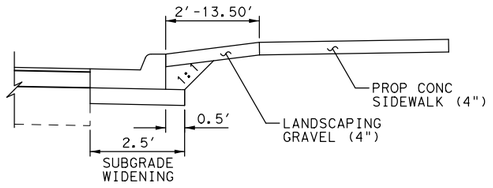
PROP TYPICAL SECTION

STA 114+32.13 TO STA 117+59.15 (1)



DETAIL L

NOT TO SCALE



(SW) SIDEWALK DETAIL

NOT TO SCALE

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

TBPE REGISTRATION NO. F-16341

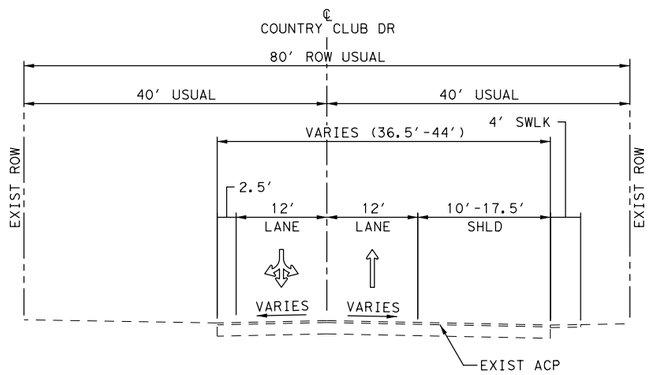
Texas Department of Transportation

COUNTRY CLUB DR
TYPICAL SECTIONS
AT IH 20

SHEET 3 OF 4

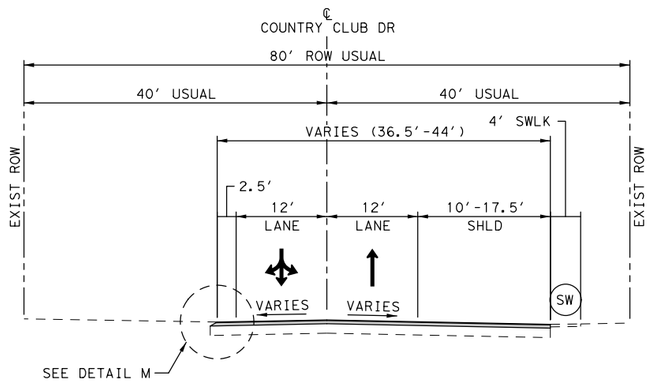
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	8
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\CCD*T



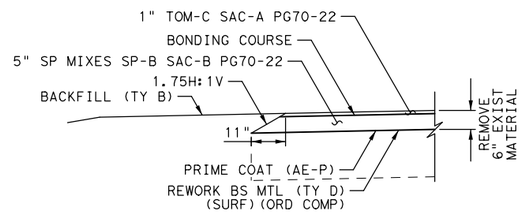
EXIST TYPICAL SECTION

STA 117+59.15 TO STA 119+01.00



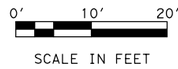
PROP TYPICAL SECTION

STA 117+59.15 TO STA 119+01.00 (1)



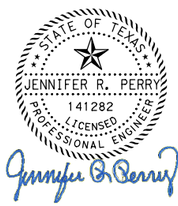
DETAIL M

NOT TO SCALE



(SW) SEE MISCELLANEOUS SIDEWALK DETAILS FOR SIDEWALK LIMITS.

(1) SEE ROADWAY PLAN SHEETS FOR LIMITS OF PAVEMENT CONSTRUCTION.



TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

COUNTRY CLUB DR
TYPICAL SECTIONS
AT IH 20

SHEET 4 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	9
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\CCD*T

Material Specification Information

Grading Requirements

Item	Description	Grading Requirements Percent Retained - Sieves				Soil Constants		Wet Ball Mill
						L.L. Max.	P.I. Max.	Max.
		1-3/4"	7/8"	3/8"	#40			
247	Type A GR 4	0-3	10-35	20-55	65-85	40	12	40

The maximum increase in material passing the number 40 sieve resulting from the wet ball mill test shall not exceed 20%.

Cure the finished section of flex base until the moisture content is at least 3 percentage points below the optimum as or as directed by the engineer before applying the next successive course or prime coat.

There is potential for gypsum in the area and additional time may be necessary to process the subgrade and/or base material.

Contractor questions on this project will be accepted through email at the following address:

- ODA-PreLettingQuestions@txdot.gov

All contractor questions will be reviewed by the Engineer. All questions and/or responses will be posted to TxDOT's Public FTP at the following Address:

https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

General

Clean the existing curb and gutter, curb outlets and curb inlets in accordance with section 427.4.2.1.2 "Blast Cleaning" as part of the final clean up. Surfaces will exhibit a uniform appearance free from stains, marks, and all foreign matter. This work will be subsidiary to the pertinent bid items.

Item 5: Control of the Work

The existing alignment is the control for the Contractor staking. Establish reference points for the control prior to removing the existing surface.

Use Method C for construction surveying.

In the event the finished surface does not conform to the typical sections or does not meet the required IRI, rework the non-conforming area to the limits necessary and employ additional survey control as directed.

County: Reeves **Sheet: 10**
Highway: IH 20 **Control: 0003-07-064, ETC.**

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Item 6: Control of Materials

Restrict storage of equipment and materials to approved areas. The Engineer will not approve storage in any TxDOT yard.

Promptly and properly dispose of any waste generated from servicing equipment on the project.

Item 7: Legal Relations and Responsibilities

If access to the project is required through a new or unapproved driveway (i.e. Material source, stockpile location, field office, etc.), obtain an approved "Permit to Construct Access Driveway Facilities on Highway Right Of Way" (TxDOT Form 1058) before beginning any construction operations.

Utilities (public, private and TxDOT) exist throughout the project. Prior to any excavation, investigate to determine the utility locations within the project right of way. Contact the TxDOT Odessa Traffic Operations shop at 432-498-4690 to investigate and determine the location of any TxDOT utility that may exist within the project right of way. Exercise caution when excavating in areas where investigations have determined that utilities exist. The contractor is responsible for maintaining utility markings.

No significant traffic generator events identified.

As an element of ensuring public safety and convenience under Article 7.2.4, the Contractor is hereby directed to open all closed lanes and shoulder and remove all traffic control devices from any areas where work is not being actively performed unless overnight traffic control is required and approved by the engineer. Removed devices must be stored outside of the clear zones near the right of way line or removed from the right of way line entirely.

At any time during construction that a previously installed crash cushion is damaged by the traveling public and is requested to be repaired by the Engineer, the repair will be paid at the same unit cost as the original installation.

Item 8: Prosecution and Progress

The following portions of the plans may affect the Contractor's planned construction sequencing. The Contractor's attention is directed to the appropriate plan sheet or standard sheet.

-Traffic Control Plan

-Storm Water Pollution Prevention Plan

-Environmental Permit, Issues And Commitments (EPIC)

-Railroad Exhibits and/or Notes

Maintain ingress and egress to side streets and private property at all times, unless otherwise shown on the plans.

Maintain ingress and egress to the frontage roads at all times.

Initiate the installation of Item 628 “Electrical Services” as part of the initial work sequence to allow TxDOT the lead-time necessary for coordination with utility companies to establish and provide for electrical service(s) proposed for this project.

Working day charges will start 09/01/2022.

Start roadway work by 09/01/2022.

Working days will be computed and charged in accordance with Article 8. 3.1.4. “Standard Workweek.”

90 day lead time is needed to allow for sufficient time to obtain and produce materials needed for various bid items in this project.

Item 105: Removing Treated and Untreated Base and Asphalt Pavement

Saw cut and remove existing asphaltic pavement by an approved method.

Item 150: Blading

Use blading to construct and remove side road turnouts, rebuild existing dikes, ditch blocks, and other work as directed.

When directed, fill and grade low areas outside the embankment areas to drain.

Preserve the top 4" of topsoil outside of the work area. Preserve this material in windrows until topsoil can be replaced and seeded to stabilize all exposed terrain.

Item 216: Proof Rolling

Proof rolling will be required on rock embankments where density tests are not practical and at other locations as directed.

Item 247: Flexible Base

The estimated quantity of flexible base shown includes all roadways, intersecting streets and driveways. The measured area for payment will be the crown width only. The side slope tapers are not included in the measurements for the flexible base but are considered subsidiary to this item.

Assume responsibility for the disposal of all boulders not fractured during ordinary rolling methods and those too large to be incorporated into the foundation course as approved.

Maintain moisture during compaction as directed by the Engineer. Determine the moisture content of the material in accordance with Tex-115-E or Tex-103-E as directed by the Engineer.

Item 302: Aggregates for Surface Treatments

Flakiness index for aggregates will not be required on this project.

Coat aggregate with 1.0 percent by weight of residual bitumen.

County: Reeves **Sheet: 10A**
Highway: IH 20 **Control: 0003-07-064, ETC.**

Use an unmodified asphalt with a minimum performance grade of 64-16 (PG 64-16) or better for aggregate pre-coating.

Use a liquid asphalt anti-stripping agent of a type and at a rate approved by the Engineer.

Item 310: Prime Coat

MC-30 will have a minimum 72 hour curing time or as directed by the engineer.

Item 316: Seal Coat

Apply 1 surface treatment(s).

Furnish Class A aggregate for the surface course.

Do not apply asphalt cement between August 31st and May 1st unless authorized in writing.

Place a string line or other suitable marking where needed to assure smooth neat lines or as directed.

Surface treat the existing surfaced intersections, auxiliary lanes, curve widenings and widened dip sections plus any additional areas encountered during construction to conform to the existing surface. The limits are the greater of the end of the curb returns, the right of way line, or the adjacent traffic lane.

Rates are shown in the plans.

Perform rock land and shoot test strips for each day’s work at each location or as directed by the Engineer.

Provide the Engineer with this information prior to the seal coat application. Provide control that is acceptable to the Engineer for yield calculations.

Wet the stockpile of aggregate prior to use.

The use of a variable rate nozzle will be required on this project as determined by the engineer.

Contractor shall provide a list of stockpile locations prior to any material placed on the job site. Contractor shall have the Engineer and Odessa District Environmental Officer approve any and all stockpile locations prior to stockpiling of aggregate or other material. Stockpile locations will not be permitted on or adjacent to landscaped and non-mow areas.

As seal coat operations are completed at each location, clean and level all stockpile locations to the satisfaction of the Engineer.

Clean up paper, asphalt and excess rock after seal coat placement as each reference location is completed. Contractor shall not proceed ahead more than two reference locations before clean-up operations have been accomplished at the previous completed reference locations.

Contractor shall clean and remove asphalt from unauthorized concrete at the expense of the Contractor.

Item 416: Drilled Shaft Foundations

For drilled shaft foundations for roadway illumination assemblies, provide Class C concrete with 6-1/2” slump for dry type placements in accordance with Table 2, Slump Requirements.

Item 420: Concrete Structures

Mass concrete will be paid for by the quantity shown in the plans.

Item 421: Hydraulic Cement Concrete

Furnish a job site curing tank equipped with a recording thermometer with the capability to chart temperatures for 24 hours, 7 days and 30 days. Furnish the Engineer with copies of the temperature records.

Furnish disposable 4” or 6” cylinder molds and caps that meet testing tolerances.

The Engineer will provide strength testing equipment for acceptance testing.

Within seven (7) days after concrete has been placed for foundations for traffic signals, roadway illumination assemblies, or high mast illumination assemblies, provide a rub finish for exposed surfaces in accordance with Item 427, Surface Finishes for Concrete, Article 4.3.3.

Furnish Type II or IP cement.

Furnish Type II or IP cement for cast-in-place concrete.

All plants and trucks may be inspected and approved by the Engineer in lieu of the NRMCA or Non-Department Engineer Sealed Certifications. The criteria and frequency of the Engineer approval of plants and trucks is the same used for NRMCA Certification.

Item 432: Riprap

Use approved expansion joint material and place between the proposed riprap and curb and gutter.

Reinforce all riprap on this project with no. 3 bars spaced 12 inches O.C.B.W. or no. 4 bars spaced at 18 inches O.C.B.W.

Broom finish all riprap on this project unless otherwise directed.

Polypropylene fiber may not be used in lieu of reinforcing steel.

In addition to reinforcing steel, polypropylene fiber is required at a rate of 1.5 lbs. /cy.

Item 479: Adjusting Manholes (Water Meter)

Relocate the water meter to the location as shown on the plans or as directed, matching the finish grading elevation and side slope. Extending the water line is subsidiary to this bid item.

County: Reeves **Sheet: 10B**
Highway: IH 20 **Control: 0003-07-064, ETC.**

Item 502: Barricades, Signs, and Traffic Handling

Stop work immediately if any major traffic control element such as an advanced warning flashing panel or TMA or PCMS is not in good working order or control setup.

Maintain "No Center Line", "Do Not Pass" and "Pass With Care" signs until the permanent lane markings have been placed in accordance with plans.

Place orange fencing around sidewalk, wheelchair ramps and other pedestrian areas that pose a hazard to pedestrian traffic as directed

Use Shoulder Drop-Off (CW8-9A) signs during construction when shoulder drop-off conditions are 3 inches or greater or as directed. Placement shall be in accordance with the “Texas Manual on Uniform Traffic Control Devices”.

Place chevrons, at a minimum, on every other drum used for outsides of curves, merging tapers and shifting tapers.

Vertical panels shall be self-righting.

The Contractor Force Account “Safety Contingency” that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

When construction operations result in a drop-off of more than 2 inches, a 3:1 or flatter slope will be required. The slope must be constructed with a compacted material capable of supporting vehicles as approved by the Engineer. This work shall be done expeditiously during daylight hours. Flaggers and appropriate signing to safely guide traffic through the work area will be required as directed by the Engineer. This shall be considered subsidiary to Item 502.

Item 504: Field Office and Laboratory

Provide a Type D structure (asphalt mix control laboratory) for the asphalt mix control laboratory for the Engineer's exclusive use. In addition to the requirements of Item 504, this structure will have a minimum height of 8 feet and provide a minimum of 400 square feet of gross floor area for permanently located asphalt plants, or 200 square feet for temporary located plants serving one project. The floor area will be partitioned into a minimum of two interconnected rooms, each room furnished with an exterior door and a minimum of two windows. The floor will have sufficient strength to support the testing equipment and have an impervious covering.

Item 506: Temporary Erosion, Sedimentation, and Environmental Controls

In accordance with the Construction General Permit (CGP), erosion control and stabilization measures should be initiated as soon as practicable to include erosion control blankets, biodegradable erosion control logs, and seeding.

The total disturbed area for this project is 8.16 Acres. The disturbed area in this project, all project locations in the contract, and Contractor Project Specific Locations (PSLS), within 1 mile of the project limits, for the contract will further establish the authorization requirements for storm water discharges. The department will obtain an authorization to discharge storm water from the Texas Commission On Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain any required authorization from the TCEQ for any Contractor PSLS for construction support activities on or off the right of way. When the total area disturbed for all projects in the contract and PSLS within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLS on the right of way, to the Engineer (or to the appropriate MS4 operator when on an off-state system route).

Upon acceptance of the project, all SW3P devices will become property of the State and maintenance responsibility is transferred to the State until final stabilization is attained.

When applying cement for emulsion, asphalt treatment, or any other soil stabilization, sprinkle water as needed to control cement from blowing and contaminating adjacent vegetation and waters.

Item 529: Concrete Curb, Gutter, and Combined Curb And Gutter

Use and place approved expansion joint material between the existing curb and the proposed curb and at least every 50 feet in the proposed curb sections.

Use polypropylene fiber reinforcing when required at a rate of 1.5 lbs./cy in lieu of wire reinforcing.

Polypropylene fibers may not be used in lieu of reinforcing steel.

After construction, restore the adjacent surface to a condition approved by the Engineer. Consider this work subsidiary to this bid item.

Item 530: Intersections, Driveways, and Turnouts

Reinforce concrete driveways with no. 3 bars spaced at 12" O.C.B.W. or with #4 bars spaced at 18" O.C.B.W.

Polypropylene fiber may not be used in lieu of reinforcing steel.

In addition to reinforcing steel, polypropylene fiber is required at a rate of 1.5 lbs./cy.

Item 531: Sidewalks

Polypropylene fiber may not be used in lieu of reinforcing steel.

Polypropylene fiber reinforcing is required at a rate of 1.5 lbs./cy in lieu of wire reinforcing.

County: Reeves **Sheet: 10C**
Highway: IH 20 **Control: 0003-07-064, ETC.**

Item 585: Ride Quality for Pavement Surfaces

Use surface test Type A to evaluate ride quality of travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.”

Item 610: Roadway Illumination Assemblies

Changes in the locations of poles, conduit, pull boxes, or other items as shown on the plans may be made in those instances deemed necessary, or when requested by the Contractor and approved.

Item 618: Conduit

Place a single continuous piece of warning tape in accordance with this item along the entire length of each underground conduit installation. Locate warning tape approximately twelve inches above conduit as indication that a buried electrical line exists below the tape. Cement stabilized backfilled conduit is exempt from this requirement. Comply with warning tape requirements for any installation of buried conduit, including portions of conduit located outside of cement stabilized backfill.

When trenched conduit is proposed beneath roadways under construction, install conduit after grading operations have been completed and before any surfacing begins at that location.

When shown on the plans as bored conduit, install conduit by an approved directional boring method.

Maintain a minimum 24” depth from finish grade to top of conduit for conduit proposed beneath pavement.

Use an approved ditching method. Place and backfill conduit proposed beneath existing pavement in accordance with the section shown in the plans. Schedule and complete work so that all lanes open to traffic at night.

For conduit raceways that are intended to remain empty or unused, extend the lower end of conduit from the face of the foundation to a minimum of 1’ beyond the edge of the foundation or the riprap apron, whichever is farthest, and use conduit cap fittings for both ends of conduit. Do not glue caps or use duct tape when capping ends of conduit raceways that are intended to remain empty. Prevent dirt and debris from entering raceways during construction by temporarily capping both ends of open raceways. Other than conduit raceways that are intended to remain unused, fit each exposed end of raceways with a bushing. Where steel raceway is used, install a ground-type bushing and connect the bushing and ground rod with a bonding jumper.

Item 620: Electrical Conductors

Note the requirements of Item 7, Article 18. Electrical Requirements, of the standard specifications.

Do not exceed four hundred and fifty feet (450’) between ground boxes where conduit and conductor is used.

Item 628: Electrical Services

Contractor to complete electric service coordination and identify service location with utility provider prior to starting any work on the project. Before construction or installation of any electrical service(s) on this project, contact TxDOT Odessa Traffic Operations shop at 432-498-4690 to facilitate coordination with the appropriate energy company or companies. Contractor to complete the construction of all electrical services at the earliest possible time to establish power for the proposed electrical service(s).

Physically identify the location for each proposed electrical service on the project and request the physical address for each proposed electrical service identified; the Engineer will provide the physical address for each respective location. Permanently mark the physical address of any proposed electrical service on the respective meter base lid. Use one of two methods for permanent marking. For the preferred method of marking, use an approved die-stamp, with a minimum ½" height of alpha-numeric characters and stamp physical address on meter base lid. After stamping, apply coating of zinc-rich paint to the stamped area. Do not damage meter base. Replace meter base if determined by the Engineer as damaged or unacceptable. No additional compensation will be made for replacement of meter bases in the event an unacceptable determination is made. When approved, use an alternate method of marking by providing a brass or aluminum plate tag with the physical address embossed by a machine-stamp process. Affix this tag to the meter base by a method approved by the Engineer. Provide a sample of a stamped plate tag for approval of this alternate method. The permanent physical address is required to be marked on the meter base prior to initiation of electrical service. Materials, labor, tools, equipment and incidentals necessary to complete this work will be considered as subsidiary to Item 628, "Electrical Services".

Use materials from the Prequalified Material Producer Lists as shown on the Texas Department of Transportation (TxDOT) – Construction Division's (CST) Material Producer List. See TxDOT website (www.TxDOT.gov) - business > resources > material producer list - for list of prequalified manufacturers. Category is "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials found on this list."

For incidental material and parts necessary for construction of electrical services, including the service entrance weather-head, rigid metal conduit (RMC) and PVC conduit, conduit fittings, service conductors, circuit breakers, ground rods and clamps, grounding bushing(s), and mounting hardware including straps and channel brackets for conduit support, furnish products and/or materials that comply with the plans and specifications. Prior to construction of any electrical service, submit to the Engineer respective catalog cut sheets for incidental materials and parts. Electrical services constructed of materials or parts which do not comply with the plans and specifications will be cause for rejection of a portion or all of the work.

Install photocell(s) facing north when practical.

Item 644: Small Roadside Sign Assemblies

All new sign supports for stop and yield signs will have a 12" red strip of Type C High Specific Intensity Reflective tape. Place the top of the tape 4' above the edge of the roadway. This work will not be paid for directly and will be subsidiary to the pertinent bid item.

For standard small sign details and dimensions, refer to the "Standard Highway Sign Designs for Texas (SHSD)"; a supplement to the Texas Manual on Uniform Traffic Control Devices (TMUTCD)".

Locate and mark existing reference marker(s) perpendicular to the road and along the right of way, or as directed, prior to removal. Erect new reference marker(s) at the original location, upon completion of construction.

County: Reeves **Sheet: 10D**
Highway: IH 20 **Control: 0003-07-064, ETC.**

Item 658: Delineator and Object Marker Assemblies

Delineator and object marker assembly posts shall be composed of post-consumer recycled materials. Embedded stub shall be perforated square tubing.

Item 662: Work Zone Pavement Markings

After permanent pavement markings are placed, pull tabs from hot mix surface and/or cut off tabs flush with the pavement on seal coat surface. Remove tabs from the project and dispose of properly.

Materials used for non-removable work zone pavement markings will be paint and beads or other approved materials.

Item 666 Retroreflectorized Pavement Markings

Type I markings shall meet the minimum retroreflectivity values defined by Article 4.4 Retroreflectivity Requirements.

This Contract totals more than 200,000 feet of pavement markings; use a mobile retroreflectometer for retroreflectivity measurements. Portable retroreflectometers may not be used for this Contract.

Place Type I pavement markings with a ribbon-gun application.

Measure thickness for markings in accordance with Tex-854-B using usage rates (Part II).

Item 672: Raised Pavement Markers

Do not place raised pavement markers until the micro-surfacing has cured a minimum of 48 hours.

Item 680: Highway Traffic Signals

Wire signal installations to operate in accordance with the phase diagrams shown in the plans. Set time intervals as directed.

Use aluminum signal heads and components for this project.

Provide an approved technician who is available at all times by an on-call basis for maintenance of any installed signal equipment during the period of time in which installed signals are operating, including the test period for this project.

Provide a minimum length of 24" for each signal cable in each signal pole. All conductors are to be continuous without splices between terminals.

Remove existing foundations which are to be abandoned a minimum of one foot (1') below subgrade or two feet (2') below natural ground. This work is considered subsidiary to Item 680, "Highway Traffic Signals".

When D3-1 signs are required, provide one piece 0.080" (80 mil) thick aluminum alloy sheet sign blank with Type C (high specific intensity) green sign background and Type C (high specific intensity) white letters, border, and/or symbols in accordance with the details shown on the plans.

Initially operate traffic signals at new locations in flash mode until such time as is approved so that phase sequencing may be initiated.

Ensure the safe movement of traffic through any intersection where construction renders an existing traffic signal inoperable. Enlist off-duty law enforcement officers to assist in maintaining safe and efficient traffic movement through a disabled signalized intersection. Give the Engineer 48 hours advance notification prior to disabling any traffic signal and at that time inform the Engineer of the method or methods of ensuring safe movement of traffic through the intersection. Enlistment of off-duty law enforcement will not be paid for directly, but is considered subsidiary to this bid item.

Changes in the locations of poles, conduit, pull boxes, or other items as shown on the plans may be made in those instances deemed necessary, or when requested by the Contractor and approved.

Replace any LEDs that fail during the thirty (30) day test period in a timely manner. Equipment and incidentals necessary for replacement of failed LEDs are considered subsidiary to the various bid items and will not be paid for directly.

Supply a TS-2 Type 1 traffic signal controller assembly with an Intelight X3 Controller. Verify the controller has Ethernet capability, an internal embedded web page (web server), along with internal Power over Ethernet (POE), and 4 port harden internal Ethernet switch. The web browser and controller must have the capability to have separate passwords and both are I.P. addressable. Provide the controller with the latest firmware release. Provide the software and all necessary components for an intelligent detection control system. Provide Cabinet Option 4 as defined by DMS-11170.

Item 682: Vehicle and Pedestrian Signal Heads

Replace any LEDs that fail during the thirty (30) day test period in a timely manner. Equipment and incidentals necessary for replacement of failed LEDs are considered subsidiary to the various bid items and will not be paid for directly.

Use aluminum signal heads and components for this project.

Item 684: Traffic Signal Cables

Attach permanent non-metallic tags to each signal cable in the access compartment of each signal pole and inside the traffic signal controller cabinet. Conductor(s) and/or cable(s) which connects signal heads to the terminal block will be tagged to indicate which specific signal head is being served. Signal cable at the traffic signal controller cabinet will be tagged to identify separate signal phases. Material, labor, tools, equipment, and incidentals are necessary to perform this work are subsidiary to the various bid items.

County: Reeves **Sheet: 10E**
Highway: IH 20 **Control: 0003-07-064, ETC.**

Item 690: Maintenance of Traffic Signals

Salvage signal equipment as determined. Salvaged signal equipment will be delivered to the Odessa District Signal Shop located at:

3901 East Highway 80
Odessa, Texas 79761
(432) 498-4960

Salvage items such as roadside flash beacon assemblies or as directed.

Item 3077: Superpave Mixtures

Binder:

Provide a binder that has a Performance Grade of 70-22 (PG 70-22) for the SP mix.

Aggregate quality:

Furnish Class B aggregate for the Type SP mix.

Furnish aggregates for the shoulders and/or ramps that meet project SAC requirements.

Magnesium sulfate soundness loss will not be greater than 20 percent when Class A aggregate is required.

Mixture design:

Design a mixture with a gradation that has stone on stone contact and passes below the reference zone.

Test method Tex-530-C (Boil Test) will not be required.

Placement:

Semi-trailer type vehicles are prohibited from dumping directly into the finishing machine for the finished surface unless the trailer is equipped with an auger slatted chain or another approved conveyor.

No RAP will be allowed in the surface course.

No more than 10% RAP will be allowed in non-surface courses.

No RAS will be allowed.

Mineral filler will not be allowed.

Lime will not be allowed as an anti-stripping agent.

Field sand will not be allowed.

Item 3081: Thin Overlay Mixtures

Binder:

Provide a binder that has a Performance Grade of 70 -22 (PG 70 -22) for the TOM-C mix.

A minimum of 15, 000 passes at 12.5mm rut depth is required for the Hamburg Wheel Test when a binder grade of PG 70-22 is specified.

No RAP or RAS will be allowed.

Aggregate quality:

Furnish only Class A aggregate. Blending of SAC A and SAC B material will not be allowed for the coarse aggregate.

Mineral filler will not be allowed.

Lime will not be allowed as an anti-stripping agent.

Field sand will not be allowed.

Item 6001: Portable Changeable Message Sign

PCMS shall be placed in operation a minimum of one (1) week prior to construction. Location(s) and duration for PCMS shall be as directed by the Engineer.

Item 6083: Video Imaging and Radar Vehicle Detection System

Supply Iteris Video Imaging and Radar Vehicle Detection (VIRVDS) cameras, edge connect module, color monitor, BNC to RCA cable for color monitor, as well as any component needed to make the system functional.

The Video Imaging and Radar Vehicle Detection System (VIRVDS) is being paid for as one unit in accordance with Item 6083 and includes but not limited to:

*Cameras
1-Processor
1-Color Monitor
*Coaxial Cable
System Set-up

*See plan sheets for camera and coaxial cable quantity.

VIRVDS cameras shall be installed directly to the mast arm in accordance with the details shown in the plans and shall be capable of monitoring all approach lanes of oncoming traffic utilizing detection zones that accommodate the initial 200 feet of approaching traffic. Detection zone sizes will simulate the operation of a 6’ x 6’ and a 6’ x 40’ inductive loop.

County: Reeves **Sheet: 10F**
Highway: IH 20 **Control: 0003-07-064, ETC.**

The VIRVDS will be tested in a typical intersection application.

The contractor shall provide ample personnel, equipment and any necessary incidentals to perform testing for detection accuracy, count and flow rate accuracy, speed accuracy, occupancy accuracy and classification accuracy of the VIRVDS in accordance with this item and as directed by the Engineer.

Disconnecting and reconnecting of video output cable from one output port to another as a method of switching video monitoring will not be allowed. A toggle switch or multiple monitors shall be required to provide an acceptable method of switching video outputs.

Item 6185: Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

General Note 5 of TCP (2-1)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as “required” plus the ‘additional shadow vehicle’ is the quantity that has been estimated for this operation.

General Note 8 of TCP (2-3)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as “required” plus the ‘additional shadow vehicle’ is the quantity that has been estimated for this operation.

General Note 4 of TCP (2-5)-18 provides for additional shadow vehicle(s) with truck mounted attenuator (TMA); one (1) additional shadow vehicle with TMA is included in the basis of estimate for this operation. The shadow vehicle(s) with TMA specified on the traffic control plan as “required” plus the ‘additional shadow vehicle’ is the quantity that has been estimated for this operation.

BASIS OF ESTIMATE – STATIONARY			
STANDARD	REQUIRED	OPTIONAL	TOTAL
TCP (2-1)-18	1	1	2
TCP (2-3)-18	1	1	2
TCP (2-5)-18	1	1	2

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-1)-13; the shadow vehicle(s) with TMA specified on the traffic control plan as “required” is the quantity that has been estimated for this operation.

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-2)-13; the shadow vehicle(s) with TMA specified on the traffic control plan as “required” is the quantity that has been estimated for this operation.

There are no General Notes for additional shadow vehicle(s) with truck mounted attenuator (TMA) on TCP (3-3)-14; the shadow vehicle(s) with TMA specified on the traffic control plan as “required” is the quantity that has been estimated for this operation.

BASIS OF ESTIMATE – STATIONARY			
STANDARD	REQUIRED	OPTIONAL	TOTAL
TCP (3-1)-13	2	0	2
TCP (3-2)-13	2	0	2
TCP (3-3)-14	2	0	2

The Contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0003-07-064 **DISTRICT** Odessa **COUNTY** Reeves
HIGHWAY IH 20

			CONTROL SECTION JOB		**0003-07-064**		**0003-07-065**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00180198**		**A00180200**			
			COUNTY		**Reeves**		**Reeves**			
			HIGHWAY		**IH 20**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL	EST.	FINAL			
	104-6011	REMOVING CONC (MEDIANS)	SY			42.000		42.000		
	104-6017	REMOVING CONC (DRIVEWAYS)	SY			805.000		805.000		
	104-6022	REMOVING CONC (CURB AND GUTTER)	LF	4,408.000		1,570.000		5,978.000		
	104-6028	REMOVING CONC (MISC)	SY	6.000				6.000		
	104-6036	REMOVING CONC (SIDEWALK OR RAMP)	SY	262.000				262.000		
	105-6008	REMOVING STAB BASE AND ASPH PAV (6")	SY	15,005.000		6,820.000		21,825.000		
	105-6074	REMOVING STAB BASE AND ASPH PAV (4")	SY	969.000		1,002.000		1,971.000		
	105-6094	REMOVING STAB BASE & ASPH PAV(12"-27")	SY	917.000		552.000		1,469.000		
	112-6004	SUBGRADE WIDENING (ORD COMP)	SY	7,106.000		3,779.000		10,885.000		
	134-6010	BACKFILL (TY B)	LF	6,807.000		4,768.000		11,575.000		
	150-6002	BLADING	HR	8.000		8.000		16.000		
	164-6005	BROADCAST SEED (PERM) (URBAN) (SANDY)	SY	14,728.000		10,257.000		24,985.000		
	164-6009	BROADCAST SEED (TEMP) (WARM)	SY	7,364.000		5,131.000		12,495.000		
	164-6011	BROADCAST SEED (TEMP) (COOL)	SY	7,364.000		5,131.000		12,495.000		
	169-6002	SOIL RETENTION BLANKETS (CL 1) (TY B)	SY	246.000				246.000		
	216-6001	PROOF ROLLING	HR	8.000		8.000		16.000		
	247-6044	FL BS (CMP IN PLC)(TY A GR 4)(FNAL POS)	CY	995.000		532.000		1,527.000		
	251-6079	REWORK BS MTL (TY D)(SURF)(ORD COMP)	SY	15,123.000		6,823.000		21,946.000		
	310-6005	PRIME COAT (AE-P)	GAL	4,451.000		2,129.000		6,580.000		
	316-6017	ASPH (AC-20-5TR)	GAL			6,905.000		6,905.000		
	316-6126	AGGR(TY-PB GR-4 SAC-A)	CY			157.000		157.000		
	416-6004	DRILL SHAFT (36 IN)	LF	64.000		17.000		81.000		
	416-6006	DRILL SHAFT (48 IN)	LF	72.000		75.000		147.000		
	416-6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF			48.000		48.000		
	420-6002	CL A CONC (MISC)	CY			206.000		206.000		
	432-6001	RIPRAP (CONC)(4 IN)	CY			10.000		10.000		
	479-6008	ADJUSTING MANHOLES (WATER METER)	EA	1.000				1.000		
	496-6082	REMOV STR (WATER VALVE BOX)	EA	2.000				2.000		
	500-6001	MOBILIZATION	LS	1.000				1.000		
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	13.000				13.000		
	506-6040	BIODEG EROSN CONT LOGS (INSTL) (8")	LF	80.000		315.000		395.000		
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	80.000		315.000		395.000		
	529-6008	CONC CURB & GUTTER (TY II)	LF	4,332.000		3,023.000		7,355.000		
	530-6004	DRIVEWAYS (CONC)	SY			867.000		867.000		
	531-6001	CONC SIDEWALKS (4")	SY	110.000				110.000		
	531-6005	CURB RAMPS (TY 2)	EA	6.000				6.000		
	531-6008	CURB RAMPS (TY 5)	EA	2.000				2.000		

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0003-07-064 **DISTRICT** Odessa **COUNTY** Reeves
HIGHWAY IH 20

			CONTROL SECTION JOB		**0003-07-064**		**0003-07-065**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00180198**		**A00180200**			
			COUNTY		**Reeves**		**Reeves**			
			HIGHWAY		**IH 20**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	531-6010	CURB RAMPS (TY 7)		EA	2.000				2.000	
	536-6004	CONC DIRECTIONAL ISLAND		SY			143.000		143.000	
	610-6009	REMOVE RD IL ASM (TRANS-BASE)		EA	2.000		6.000		8.000	
	610-6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED		EA			6.000		6.000	
	618-6023	CONDT (PVC) (SCH 40) (2")		LF			1,350.000		1,350.000	
	618-6024	CONDT (PVC) (SCH 40) (2") (BORE)		LF			425.000		425.000	
	618-6046	CONDT (PVC) (SCH 80) (2")		LF	1,125.000		1,835.000		2,960.000	
	618-6047	CONDT (PVC) (SCH 80) (2") (BORE)		LF	707.000		625.000		1,332.000	
	618-6053	CONDT (PVC) (SCH 80) (3")		LF	724.000		925.000		1,649.000	
	618-6054	CONDT (PVC) (SCH 80) (3") (BORE)		LF	542.000		355.000		897.000	
	620-6009	ELEC CONDR (NO.6) BARE		LF	3,098.000		5,585.000		8,683.000	
	620-6010	ELEC CONDR (NO.6) INSULATED		LF	696.000		6,270.000		6,966.000	
	621-6004	TRAY CABLE (3 CONDR) (8 AWG)		LF	2,490.000		876.000		3,366.000	
	624-6002	GROUND BOX TY A (122311)W/APRON		EA			7.000		7.000	
	624-6010	GROUND BOX TY D (162922)W/APRON		EA	9.000		7.000		16.000	
	624-6028	REMOVE GROUND BOX		EA			2.000		2.000	
	628-6002	REMOVE ELECTRICAL SERVICES		EA	2.000				2.000	
	628-6144	ELC SRV TY D 120/240 060(NS)SS(E)PS(U)		EA	1.000		1.000		2.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)		EA	25.000		16.000		41.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)		EA	17.000		2.000		19.000	
	644-6005	IN SM RD SN SUP&AM TY10BWG(1)SA(T-2EXT)		EA			1.000		1.000	
	644-6007	IN SM RD SN SUP&AM TY10BWG(1)SA(U)		EA	4.000				4.000	
	644-6027	IN SM RD SN SUP&AM TYS80(1)SA(P)		EA			2.000		2.000	
	644-6030	IN SM RD SN SUP&AM TYS80(1)SA(T)		EA	4.000		1.000		5.000	
	644-6033	IN SM RD SN SUP&AM TYS80(1)SA(U)		EA	4.000		2.000		6.000	
	644-6034	IN SM RD SN SUP&AM TYS80(1)SA(U-1EXT)		EA			1.000		1.000	
	644-6036	IN SM RD SN SUP&AM TYS80(1)SA(U-BM)		EA			4.000		4.000	
	644-6076	REMOVE SM RD SN SUP&AM		EA	38.000		20.000		58.000	
	658-6080	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND		EA	10.000				10.000	
	658-6095	INSTL DEL ASSM (D-DY)SZ 1(YFLX)GND		EA	15.000				15.000	
	658-6099	INSTL OM ASSM (OM-2Z)(WFLX)GND		EA	8.000				8.000	
	662-6048	WK ZN PAV MRK REMOV (REFL) TY I-C		EA			27.000		27.000	
	662-6061	WK ZN PAV MRK REMOV (W)4"(DOT)		LF	459.000				459.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)		LF	10,064.000		1,425.000		11,489.000	
	662-6071	WK ZN PAV MRK REMOV (W)8"(SLD)		LF			540.000		540.000	
	662-6075	WK ZN PAV MRK REMOV (W)24"(SLD)		LF	139.000		36.000		175.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)		LF	10,409.000		1,283.000		11,692.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0003-07-064 **DISTRICT** Odessa **COUNTY** Reeves
HIGHWAY IH 20

			CONTROL SECTION JOB		**0003-07-064**		**0003-07-065**		TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00180198**		**A00180200**			
			COUNTY		**Reeves**		**Reeves**			
			HIGHWAY		**IH 20**		**IH 20**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL	EST.	FINAL		
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)		LF	1,812.000		2,739.000		4,551.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)		LF			1,120.000		1,120.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)		LF	9,003.000		6,965.000		15,968.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)		LF	15,632.000		10,390.000		26,022.000	
	668-6076	PREFAB PAV MRK TY C (W) (24") (SLD)		LF	504.000		236.000		740.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)		EA	12.000		13.000		25.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)		EA	12.000		11.000		23.000	
	668-6092	PREFAB PAV MRK TY C (W) (36")(YLD TRI)		EA	24.000		6.000		30.000	
	672-6007	REFL PAV MRKR TY I-C		EA	91.000		130.000		221.000	
	672-6009	REFL PAV MRKR TY II-A-A		EA	196.000		196.000		392.000	
	680-6003	INSTALL HWY TRF SIG (SYSTEM)		EA	1.000		1.000		2.000	
	682-6001	VEH SIG SEC (12")LED(GRN)		EA	16.000		16.000		32.000	
	682-6002	VEH SIG SEC (12")LED(GRN ARW)		EA	6.000		2.000		8.000	
	682-6003	VEH SIG SEC (12")LED(YEL)		EA	16.000		16.000		32.000	
	682-6004	VEH SIG SEC (12")LED(YEL ARW)		EA	12.000		4.000		16.000	
	682-6005	VEH SIG SEC (12")LED(RED)		EA	16.000		16.000		32.000	
	682-6006	VEH SIG SEC (12")LED(RED ARW)		EA	6.000		2.000		8.000	
	682-6018	PED SIG SEC (LED)(COUNTDOWN)		EA	12.000				12.000	
	682-6054	BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM		EA	16.000		16.000		32.000	
	682-6055	BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM		EA	6.000		2.000		8.000	
	684-6003	TRF SIG CBL (TY A)(10 AWG)(4 CONDR)		LF	3,260.000				3,260.000	
	684-6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)		LF	3,517.000				3,517.000	
	684-6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)		LF	1,100.000		884.000		1,984.000	
	684-6038	TRF SIG CBL (TY A)(14 AWG)(12 CONDR)		LF	1,975.000		2,060.000		4,035.000	
	685-6003	REMOVE RDSD FLASH BEACON ASSEMBLY		EA	5.000				5.000	
	686-6039	INS TRF SIG PL AM(S)1 ARM(36')LUM		EA	1.000				1.000	
	686-6047	INS TRF SIG PL AM(S)1 ARM(44')LUM		EA	2.000				2.000	
	686-6051	INS TRF SIG PL AM(S)1 ARM(48')LUM		EA	1.000		1.000		2.000	
	686-6055	INS TRF SIG PL AM(S)1 ARM(50')LUM		EA	1.000				1.000	
	686-6059	INS TRF SIG PL AM(S)1 ARM(55')LUM		EA	1.000		1.000		2.000	
	686-6189	INS TRF SIG PL AM(S)2 ARM(50-40')		EA	1.000				1.000	
	686-6193	INS TRF SIG PL AM(S)2 ARM(50-44')		EA			2.000		2.000	
	687-6001	PED POLE ASSEMBLY		EA	4.000				4.000	
	688-6001	PED DETECT PUSH BUTTON (APS)		EA	12.000				12.000	
	688-6003	PED DETECTOR CONTROLLER UNIT		EA	1.000				1.000	
	690-6055	REPLACE OF CURBS		LF	100.000				100.000	
	752-6005	TREE REMOVAL (4" - 12" DIA)		EA	2.000				2.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0003-07-064 **DISTRICT** Odessa **COUNTY** Reeves
HIGHWAY IH 20

				CONTROL SECTION JOB	0003-07-064		0003-07-065		TOTAL EST.	TOTAL FINAL
				PROJECT ID	A00180198		A00180200			
				COUNTY	Reeves		Reeves			
				HIGHWAY	IH 20		IH 20			
ALT	BID CODE	DESCRIPTION	UNIT		EST.	FINAL	EST.	FINAL		
	752-6006	TREE REMOVAL (12" - 18" DIA)	EA				6.000		6.000	
	760-6001	DITCH CLEANING AND RESHAPING (FOOT)	LF				4,482.000		4,482.000	
	772-6001	POST AND CABLE FENCE (REMOVAL)	LF				397.000		397.000	
	772-6002	POST AND CABLE FENCE (REMV CONC ANCHOR)	EA				2.000		2.000	
	772-6003	POST AND CABLE FENCE (NEW INSTALLATION)	LF				397.000		397.000	
	772-6004	POST AND CABLE FENCE (NEW CONC ANCHOR)	EA				2.000		2.000	
	1005-6001	LOOSE AGGR FOR GROUNDCOVER (TYPE I)	CY		88.000				88.000	
	1005-6002	LOOSE AGGR FOR GROUNDCOVER (TYPE II)	CY		42.000				42.000	
	3077-6007	SP MIXESSP-BSAC-B PG70-22	TON		5,777.000		2,656.000		8,433.000	
	3081-6002	TOM-C SAC-A	TON		1,211.000		563.000		1,774.000	
	3084-6001	BONDING COURSE	GAL		4,202.000		1,936.000		6,138.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA		3.000		3.000		6.000	
	6054-6005	ANTENNA (UNI-DIRECTIONAL)	EA		1.000		1.000		2.000	
	6058-6001	BBU SYSTEM (EXTERNAL BATT CABINET)	EA		1.000		1.000		2.000	
	6083-6001	VIDEO IMAGING AND RAD VEH DETECTION SYS	EA		1.000		1.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY		342.000		180.000		522.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY		28.000		22.000		50.000	
	6306-6007	VIVDS CABLING	LF		2,747.000		3,615.000		6,362.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS		1.000				1.000	
		ELECTRICAL: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS		1.000				1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS		1.000				1.000	

SUMMARY OF TRAFFIC CONTROL ITEMS

LOCATION	662 6048	662 6061	662 6063	662 6071	662 6075	662 6095	6001 6002	6185 6002	6185 6005
	WK ZN PAV MRK REMOV (REFL) TY I-C	WK ZN PAV MRK REMOV (W)4" (DOT)	WK ZN PAV MRK REMOV (W)4" (SLD)	WK ZN PAV MRK REMOV (W)8" (SLD)	WK ZN PAV MRK REMOV (W)24" (SLD)	WK ZN PAV MRK REMOV (Y)4" (SLD)	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	EA	LF	LF	LF	LF	LF	EA	DAY	DAY
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
PHASE 1							3	52	6
PHASE 2	27		1,425	540	36	1,283		68	2
PHASE 3/4								60	14
IH 20 AT SH 17 TOTAL	27	0	1,425	540	36	1,283	3	180	22
IH 20 AT COUNTRY CLUB DR									
PHASE 1			4,382		43	4,462	2	94	6
PHASE 1A		312	1,364		24	1,364	1	10	2
PHASE 1B		147	15		12	15		12	2
PHASE 2			4,303		60	4,568		106	2
PHASE 3/4								120	16
IH 20 AT COUNTRY CLUB DR TOTAL		459	10,064		139	10,409	3	342	28
PROJECT TOTAL	**27**	**459**	**11,489**	**540**	**175**	**11,692**	**6**	**522**	**50**

DATE: 4/22/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\00A*SUM

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

QUANTITY SUMMARY

SHEET 1 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	12
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

SUMMARY OF REMOVAL ITEMS

LOCATION	104 6011	104 6017	104 6022	104 6028	104 6036	105 6008	105 6074	105 6094	479 6008
	REMOVING CONC (MEDIANS)	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB AND GUTTER)	REMOVING CONC (MISC)	REMOVING CONC (SIDEWALK OR RAMP)	REMOVING STAB BASE AND ASPH PAV (6")	REMOVING STAB BASE AND ASPH PAV (4")	REMOVING STAB BASE & ASPH PAV (12"-27")	ADJUSTING MANHOLES (WATER METER)
	SY	SY	LF	SY	SY	SY	SY	SY	EA
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 8			26					5	
SHEET 2 OF 8	42	805	313					3	
SHEET 3 OF 8			735			2,334	595	84	
SHEET 4 OF 8			204			923	205		
SHEET 5 OF 8								240	
SHEET 6 OF 8			292			2,746	202	176	
SHEET 7 OF 8						817			
SHEET 8 OF 8								44	
IH 20 AT SH 17 TOTAL	42	805	1570			6820	1002	552	
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 9			480			1,812		169	
SHEET 2 OF 9			811		154	3,128	475	196	1
SHEET 3 OF 9			499			1,502		128	
SHEET 4 OF 9			354			1,037		133	
SHEET 5 OF 9			252			822		33	
SHEET 6 OF 9			601			1,934		80	
SHEET 7 OF 9			793	6	108	2,752	494	80	
SHEET 8 OF 9			602			1,933		98	
SHEET 9 OF 9			16			85		3	
IH 20 AT COUNTRY CLUB DR TOTAL			4,408	6	262	15,005	969	917	1
PROJECT TOTAL	42	805	5,978	6	262	21,825	1,971	1,469	1

SUMMARY OF REMOVAL ITEMS

LOCATION	496 6082	628 6002	644 6076	685 6003	752 6005	752 6006	772 6001	772 6002
	REMOV STR (WATER VALVE BOX)	REMOVE ELECTRICAL SERVICES	REMOVE SM RD SN SUP&AM	REMOVE RDSD FLASH BEACON ASSEMBLY	TREE REMOVAL (4" - 12" DIA)	TREE REMOVAL (12" - 18" DIA)	POST AND CABLE FENCE (REMOVAL)	POST AND CABLE FENCE (REMV CONC ANCHOR)
	EA	EA	EA	EA	EA	EA	LF	EA
CSJ 0003-07-064, ETC.								
IH 20 AT SH 17								
SHEET 1 OF 8			5					
SHEET 2 OF 8			2					
SHEET 3 OF 8			10			3		
SHEET 4 OF 8						3		
SHEET 5 OF 8			1					
SHEET 6 OF 8			2				266	1
SHEET 7 OF 8							131	1
SHEET 8 OF 8								
IH 20 AT SH 17 TOTAL			20		0	6	397	2
IH 20 AT COUNTRY CLUB DR								
SHEET 1 OF 9			1					
SHEET 2 OF 9	2	1	8	3	2			
SHEET 3 OF 9			2					
SHEET 4 OF 9			7					
SHEET 5 OF 9			8					
SHEET 6 OF 9			3					
SHEET 7 OF 9		1	7	2				
SHEET 8 OF 9			2					
SHEET 9 OF 9								
IH 20 AT COUNTRY CLUB DR TOTAL	2	2	38	5	2			
PROJECT TOTAL	2	2	58	5	2	6	397	2

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

QUANTITY SUMMARY

SHEET 2 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

SHEET NO. 13

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\ODA*SH

SUMMARY OF PAVING ITEMS

LOCATION			LENGTH	PROPOSED PAVEMENT AVERAGE WIDTH	PROPOSED SURFACE PAVEMENT AREA	PROPOSED BASE AREA	DESCRIPTION	112 6004 SUBGRADE WIDENING (ORD COMP)	247 6044 FL BS (CMP IN PLC) (TY A GR 4) (FNAL POS)	251 6079 REWORK BS MTL (TY D) (SURF) (ORD COMP)	310 6005 PRIME COAT (AE-P) (0.20 GAL/SY)	316 6017 ASPH (AC-20-5TR) (0.38 GAL/SY)
BEGIN	END	LT/RT	LF	LF	SY	SY		SY	CY	SY	GAL	GAL
CSJ 0003-07-064, ETC.												
IH 20 NFR AT SH 17												
+30.00	1+34.59	LT	105		696	761	WIDENING/REHAB	460	64	301	153	
1+34.59	6+03.91	LT	469	30	1,566	1,566	WIDENING/REHAB	470	66	1,096	314	
6+03.91	7+04.00	LT	100	25.5	297	315	WIDENING/REHAB	81	12	234	63	
+32.82	2+15.93	RT	183		737	843	WIDENING/REHAB	309	43	534	169	
2+15.93	6+03.91	RT	388	24	1,036	1,144	WIDENING/REHAB	238	34	906	229	
6+03.91	7+04.00	RT	100	21	239	249	WIDENING/REHAB	15	3	234	50	
IH 20 SFR AT SH 17												
+33.86	1+28.16	LT	94		534	582	WIDENING/REHAB	265	37	317	117	
1+28.16	6+00.00	LT	472	32	1,679	1,679	WIDENING/REHAB	525	73	1,154	336	
6+00.00	7+00.00	LT	100	27	301	301	WIDENING/REHAB	56	8	245	61	
+34.32	1+94.23	RT	160		897	921	WIDENING/REHAB	185	26	736	185	
1+94.23	6+30.00	RT	436	22	1,066	1,066	WIDENING/REHAB			1,066	214	
SH 17												
59+74.62	60+36.34	LT	62	2	14	31	WIDENING	31	5		7	
60+36.34	63+11.00	LT	275	4	143	219	WIDENING	219	31		44	
63+11.00	66+58.68	LT	348	6	232	329	WIDENING	329	46		66	
69+94.01	74+82.33	LT	488			136	WIDENING	136	19		28	
77+51.78	79+44.46	LT	193	10	203	203	WIDENING	203	29		41	
67+50.00	76+75.00	RT	925			257	WIDENING	257	36		52	
56+39.03	59+74.62	LT/RT	336	62	2,312		SURFACE TREATMENT					879
59+74.62	63+00.00	LT/RT	325	62	2,235		SURFACE TREATMENT					850
63+00.00	64+00.00	LT/RT	100	64	712		SURFACE TREATMENT					271
64+00.00	66+58.68	LT/RT	259	66	1,897		SURFACE TREATMENT					721
66+58.68	67+50.00	LT/RT	91	66	670		SURFACE TREATMENT					255
67+50.00	67+87.10	LT/RT	37	64	264		SURFACE TREATMENT					101
67+87.10	69+57.10	LT/RT	170	67	1,266		SURFACE TREATMENT					482
69+57.10	69+94.01	LT/RT	37	70	288		SURFACE TREATMENT					110
69+94.01	74+82.33	LT/RT	488	67	3,626		SURFACE TREATMENT					1,378
74+82.33	76+75.00	LT/RT	193	68	1,461		SURFACE TREATMENT					556
76+75.00	77+51.78	LT/RT	77	70	600		SURFACE TREATMENT					228
77+51.78	79+44.46	LT/RT	193	66	1,405		SURFACE TREATMENT					534
79+44.46	81+43.83	LT/RT	199	64	1,421		SURFACE TREATMENT					540
IH 20 AT SH 17 TOTAL								3,779	532	6,823	2,129	6,905
IH 20 NFR AT COUNTRY CLUB DR												
48+10.00	53+05.00	RT	495	41	2,310	606	WIDENING/REHAB	606	85	1,843	490	
53+05.00	56+43.50	RT	339	48	1,806	621	WIDENING/REHAB	621	87	1,279	380	
56+43.50	59+28.42	RT	285	44.5	2,127	774	WIDENING/REHAB	774	108	1,469	449	
59+28.42	62+51.00	RT	323	41	1,469	588	WIDENING/REHAB	588	82	971	312	
62+51.00	67+46.00	RT	495	35.5	1,973	633	WIDENING/REHAB	633	88	1,503	428	
IH 20 SFR AT COUNTRY CLUB DR												
47+45.00	54+05.00	LT	660	37	2,735	771	WIDENING/REHAB	771	108	2,148	584	
54+05.00	55+87.32	LT	182	44	901	355	WIDENING/REHAB	355	50	597	191	
55+87.32	58+62.00	LT	275	48.5	2,067	822	WIDENING/REHAB	822	115	1,346	434	
58+62.00	61+66.00	LT	304	54.5	1,860	988	WIDENING/REHAB	988	138	956	389	
61+66.00	62+66.00	LT	100	50	560	260	WIDENING/REHAB	260	37	328	118	
62+66.00	68+26.00	LT	560	37	2,330	656	WIDENING/REHAB	656	92	1,831	498	
COUNTRY CLUB DR												
114+91.15	116+98.17	LT/RT	207	37	852		REHAB			852	171	
115+54.16	116+46.43	LT/RT	92	39.3	N/A	32	PROP CURB INSTALLATION	32	5		7	
IH 20 AT COUNTRY CLUB DR TOTAL								7,106	995	15,123	4,451	
PROJECT TOTAL								**10,885**	**1,527**	**21,946**	**6,580**	**6,905**

Texas Department of Transportation

TBPE REGISTRATION NO. F-163341

QUANTITY SUMMARY

SHEET 3 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	14
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\ODA*SUM

SUMMARY OF PAVING ITEMS

LOCATION			LENGTH	PROPOSED PAVEMENT AVERAGE WIDTH	PROPOSED SURFACE PAVEMENT AREA	PROPOSED BASE AREA	DESCRIPTION	316 6126 AGGR (TY-PB GR-4 SAC-A) (120 SY/CY)	3077 6007 SP MIXES SP-B SAC-B PG70-22 (550 LBS/SY) 5" DEPTH	3081 6002 TOM-C SAC-A (115 LBS/SY)	3084 6001 BONDING COURSE (0.20 GAL/SY)
BEGIN	END	LT/RT	LF	LF	SY	SY		CY	TON	TON	GAL
CSJ 0003-07-064, ETC.											
IH 20 NFR AT SH 17											
+30.00	1+34.59	LT	105		696	761	WIDENING/REHAB		192	41	140
1+34.59	6+03.91	LT	469	30	1,566	1,566	WIDENING/REHAB		431	91	314
6+03.91	7+04.00	LT	100	25.5	297	315	WIDENING/REHAB		82	18	60
+32.82	2+15.93	RT	183		737	843	WIDENING/REHAB		203	43	148
2+15.93	6+03.91	RT	388	24	1,036	1,144	WIDENING/REHAB		285	60	208
6+03.91	7+04.00	RT	100	21	239	249	WIDENING/REHAB		66	14	48
IH 20 SFR AT SH 17											
+33.86	1+28.16	LT	94		534	582	WIDENING/REHAB		147	31	107
1+28.16	6+00.00	LT	472	32	1,679	1,679	WIDENING/REHAB		462	97	336
6+00.00	7+00.00	LT	100	27	301	301	WIDENING/REHAB		83	18	61
+34.32	1+94.23	RT	160		897	921	WIDENING/REHAB		247	52	180
1+94.23	6+30.00	RT	436	22	1,066	1,066	WIDENING/REHAB		294	62	214
SH 17											
59+74.62	60+36.34	LT	62	2	14	31	WIDENING		4	1	3
60+36.34	63+11.00	LT	275	4	143	219	WIDENING		40	9	29
63+11.00	66+58.68	LT	348	6	232	329	WIDENING		64	14	47
69+94.01	74+82.33	LT	488			136	WIDENING				
77+51.78	79+44.46	LT	193	10	203	203	WIDENING		56	12	41
67+50.00	76+75.00	RT	925			257	WIDENING				
56+39.03	59+74.62	LT/RT	336	62	2,312		SURFACE TREATMENT	20			
59+74.62	63+00.00	LT/RT	325	62	2,235		SURFACE TREATMENT	19			
63+00.00	64+00.00	LT/RT	100	64	712		SURFACE TREATMENT	6			
64+00.00	66+58.68	LT/RT	259	66	1,897		SURFACE TREATMENT	16			
66+58.68	67+50.00	LT/RT	91	66	670		SURFACE TREATMENT	6			
67+50.00	67+87.10	LT/RT	37	64	264		SURFACE TREATMENT	3			
67+87.10	69+57.10	LT/RT	170	67	1,266		SURFACE TREATMENT	11			
69+57.10	69+94.01	LT/RT	37	70	288		SURFACE TREATMENT	3			
69+94.01	74+82.33	LT/RT	488	67	3,626		SURFACE TREATMENT	31			
74+82.33	76+75.00	LT/RT	193	68	1,461		SURFACE TREATMENT	13			
76+75.00	77+51.78	LT/RT	77	70	600		SURFACE TREATMENT	5			
77+51.78	79+44.46	LT/RT	193	66	1,405		SURFACE TREATMENT	12			
79+44.46	81+43.83	LT/RT	199	64	1,421		SURFACE TREATMENT	12			
IH 20 AT SH 17 TOTAL								157	2,656	563	1,936
IH 20 NFR AT COUNTRY CLUB DR											
48+10.00	53+05.00	RT	495	41	2,310	606	WIDENING/REHAB		636	133	462
53+05.00	56+43.50	RT	339	48	1,806	621	WIDENING/REHAB		497	104	362
56+43.50	59+28.42	RT	285	44.5	2,127	774	WIDENING/REHAB		585	123	426
59+28.42	62+51.00	RT	323	41	1,469	588	WIDENING/REHAB		404	85	294
62+51.00	67+46.00	RT	495	35.5	1,973	633	WIDENING/REHAB		543	114	395
IH 20 SFR AT COUNTRY CLUB DR											
47+45.00	54+05.00	LT	660	37	2,735	771	WIDENING/REHAB		753	158	547
54+05.00	55+87.32	LT	182	44	901	355	WIDENING/REHAB		248	52	181
55+87.32	58+62.00	LT	275	48.5	2,067	822	WIDENING/REHAB		569	119	414
58+62.00	61+66.00	LT	304	54.5	1,860	988	WIDENING/REHAB		512	107	372
61+66.00	62+66.00	LT	100	50	560	260	WIDENING/REHAB		154	33	112
62+66.00	68+26.00	LT	560	37	2,330	656	WIDENING/REHAB		641	134	466
COUNTRY CLUB DR											
114+91.15	116+98.17	LT/RT	207	37	852		REHAB		235	49	171
115+54.16	116+46.43	LT/RT	92	39.3	N/A	32	PROP CURB INSTALLATION				
IH 20 AT COUNTRY CLUB DR TOTAL									5,777	1,211	4,202
PROJECT TOTAL								**157**	**8,433**	**1,774**	**6,138**

TBPE REGISTRATION NO. F-163411

Texas Department of Transportation

QUANTITY SUMMARY

SHEET 4 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	15
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\ODA*SH

SUMMARY OF ROADWAY ITEMS

LOCATION	134 6010 BACKFILL (TY B)	150 6002 BLADING	216 6001 PROOF ROLLING	420 6002 CL A CONC (MISC)	432 6001 RIPRAP (CONC) (4 IN)	529 6008 CONC CURB & GUTTER (TY II)	530 6004 DRIVEWAYS (CONC)	531 6001 CONC SIDEWALKS (4")	531 6005 CURB RAMPS (TY 2)	531 6008 CURB RAMPS (TY 5)
	LF	HR	HR	CY	CY	LF	SY	SY	EA	EA
CSJ 0003-07-064, ETC.										
IH 20 AT SH 17										
SHEET 1 OF 8	26					26				
SHEET 2 OF 8	196					196	867			
SHEET 3 OF 8	1,433			95	2	1,229				
SHEET 4 OF 8	408			111		205				
SHEET 5 OF 8	801				8	801				
SHEET 6 OF 8	1,427					566				
SHEET 7 OF 8	331									
SHEET 8 OF 8	146									
IH 20 AT SH 17 TOTAL	4,768	8	8	206	10	3,023	867			
IH 20 AT COUNTRY CLUB DR										
SHEET 1 OF 10	736					491				
SHEET 2 OF 10	771					771		57	4	
SHEET 3 OF 10	663					498				
SHEET 4 OF 10	607					349				
SHEET 5 OF 10										
SHEET 6 OF 10	524					256				
SHEET 7 OF 10	1,083					601				
SHEET 8 OF 10	1,168					736		53	2	2
SHEET 9 OF 10	1,002					504				
SHEET 10 OF 10	253					126				
IH 20 AT COUNTRY CLUB DR TOTAL	6,807	8	8			4,332		110	6	2
PROJECT TOTAL	**11,575**	**16**	**16**	**206**	**10**	**7,355**	**867**	**110**	**6**	**2**

SUMMARY OF ROADWAY ITEMS

LOCATION	531 6010 CURB RAMPS (TY 7)	536 6004 CONC DIRECTIONAL ISLAND	690 6055 REPLACE OF CURBS	760 6001 DITCH CLEANING AND RESHAPING (FOOT)	772 6003 POST AND CABLE FENCE (NEW INSTALLATION)	772 6004 POST AND CABLE FENCE (NEW CONC ANCHOR)
	EA	SY	LF	LF	LF	EA
CSJ 0003-07-064, ETC.						
IH 20 AT SH 17						
SHEET 1 OF 8						
SHEET 2 OF 8		46		13		
SHEET 3 OF 8				1,392		
SHEET 4 OF 8				409		
SHEET 5 OF 8				800		
SHEET 6 OF 8		97		1,389	267	1
SHEET 7 OF 8				332	130	1
SHEET 8 OF 8				147		
IH 20 AT SH 17 TOTAL		143		4,482	397	2
IH 20 AT COUNTRY CLUB DR						
SHEET 1 OF 10			25			
SHEET 2 OF 10	2		40			
SHEET 3 OF 10			35			
SHEET 4 OF 10						
SHEET 5 OF 10						
SHEET 6 OF 10						
SHEET 7 OF 10						
SHEET 8 OF 10						
SHEET 9 OF 10						
SHEET 10 OF 10						
IH 20 AT COUNTRY CLUB DR TOTAL	2		100			
PROJECT TOTAL	**2**	**143**	**100**	**4,482**	**397**	**2**

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

QUANTITY SUMMARY

SHEET 5 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	16
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\00A*SUM.dgn

SUMMARY OF SIGN ASSEMBLIES

LOCATION	644 6001 IN SM RD SN SUP&AM TY10BWG (1)SA (P)	644 6004 IN SM RD SN SUP&AM TY10BWG (1)SA (T)	644 6005 IN SM RD SN SUP&AM TY10BWG (1)SA (T-2EXT)	644 6007 IN SM RD SN SUP&AM TY10BWG (1)SA (U)	644 6027 IN SM RD SN SUP&AM TYS80 (1)SA (P)	644 6030 IN SM RD SN SUP&AM TYS80 (1)SA (T)	644 6033 IN SM RD SN SUP&AM TYS80 (1)SA (U)	644 6034 IN SM RD SN SUP&AM TYS80 (1)SA (U-1EXT)	644 6036 IN SM RD SN SUP&AM TYS80 (1)SA (U-BM)
	EA	EA	EA	EA	EA	EA	EA	EA	EA
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
	16	2	1		2	1	2	1	4
IH 20 AT SH 17 TOTAL	16	2	1		2	1	2	1	4
IH 20 AT COUNTRY CLUB DR									
	25	17		4		4	4		
IH 20 AT COUNTRY CLUB DR TOTAL	25	17		4		4	4		
PROJECT TOTAL	**41**	**19**	**1**	**4**	**2**	**5**	**6**	**1**	**4**

SUMMARY OF STRIPING ITEMS

LOCATION	658 6080 INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND	658 6095 INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND	658 6099 INSTL OM ASSM (OM-2Z) (WFLX)GND	666 6036 REFL PAV MRK TY I (W)8" (SLD) (100MIL)	666 6300 RE PM W/RET REQ TY I (W)4" (BRK) (100MIL)	666 6303 RE PM W/RET REQ TY I (W)4" (SLD) (100MIL)	666 6315 RE PM W/RET REQ TY I (Y)4" (SLD) (100MIL)	668 6076 PREFAB PAV MRK TY C (W) (24") (SLD)	668 6077 PREFAB PAV MRK TY C (W) (ARROW)
	EA	EA	EA	LF	LF	LF	LF	LF	EA
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
				2,739	1,120	6,965	10,390	236	13
IH 20 AT SH 17 TOTAL				2,739	1,120	6,965	10,390	236	13
IH 20 AT COUNTRY CLUB DR									
	10	15	8	1,812		9,003	15,632	504	12
IH 20 AT COUNTRY CLUB DR TOTAL	10	15	8	1,812		9,003	15,632	504	12
PROJECT TOTAL	**10**	**15**	**8**	**4,551**	**1,120**	**15,968**	**26,022**	**740**	**25**

SUMMARY OF STRIPING ITEMS

LOCATION	668 6085 PREFAB PAV MRK TY C (W) (WORD)	668 6092 PREFAB PAV MRK TY C (W) (36") (YLD TRI)	672 6007 REFL PAV MRKR TY I-C	672 6009 REFL PAV MRKR TY II-A-A
	EA	EA	EA	EA
CSJ 0003-07-064, ETC.				
IH 20 AT SH 17				
	11	6	130	196
IH 20 AT SH 17 TOTAL	11	6	130	196
IH 20 AT COUNTRY CLUB DR				
	12	24	91	196
IH 20 AT COUNTRY CLUB DR TOTAL	12	24	91	196
PROJECT TOTAL	**23**	**30**	**221**	**392**

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

QUANTITY SUMMARY

SHEET 6 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

SHEET NO. 17

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\1. General\00A*SUM

SUMMARY OF SIGNAL ITEMS

LOCATION	416 6004	416 6006	618 6046	618 6047	618 6053	618 6054	620 6009	620 6010	621 6004
	DRILL SHAFT (36 IN)	DRILL SHAFT (48 IN)	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (2") (BORE)	CONDT (PVC) (SCH 80) (3")	CONDT (PVC) (SCH 80) (3") (BORE)	ELEC CONDR (NO.6) BARE	ELEC CONDR (NO.6) INSULATED	TRAY CABLE (3 CONDR) (8 AWG)
	LF	LF	LF	LF	LF	LF	LF	LF	LF
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 1	17	75	1,835	625	925	355	3,745	1,060	876
IH 20 AT SH 17 TOTAL	17	75	1835	625	925	355	3745	1060	876
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 1	64	72	1,125	707	724	542	3,098	696	2,490
IH 20 AT COUNTRY CLUB DR TOTAL	64	72	1125	707	724	542	3098	696	2490
PROJECT TOTAL	81	147	2,960	1,332	1,649	897	6,843	1,756	3,366

SUMMARY OF SIGNAL ITEMS

LOCATION	624 6010	628 6144	680 6003	682 6054	682 6055	682 6001	682 6002	682 6003	682 6004
	GROUND BOX TY D (162922) W/APRON	ELC SRV TY D 120/240 060 (NS) SS (E) PS (U)	INSTALL HWY TRF SIG (SYSTEM)	BACKPLATE W/REF BRDR (3 SEC) (VENT) ALUM	BACKPLATE W/REF BRDR (4 SEC) (VENT) ALUM	VEH SIG SEC (12") LED (GRN)	VEH SIG SEC (12") LED (GRN ARW)	VEH SIG SEC (12") LED (YEL)	VEH SIG SEC (12") LED (YEL ARW)
	EA	EA	EA	EA	EA	EA	EA	EA	EA
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 1	7	1	1	16	2	16	2	16	4
IH 20 AT SH 17 TOTAL	7	1	1	16	2	16	2	16	4
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 1	9	1	1	16	6	16	6	16	12
IH 20 AT COUNTRY CLUB DR TOTAL	9	1	1	16	6	16	6	16	12
PROJECT TOTAL	16	2	2	32	8	32	8	32	16

SUMMARY OF SIGNAL ITEMS

LOCATION	682 6005	682 6006	682 6018	684 6003	684 6031	684 6033	684 6038	686 6039	686 6047
	VEH SIG SEC (12") LED (RED)	VEH SIG SEC (12") LED (RED ARW)	PED SIG SEC (LED) (COUNTDOWN)	TRF SIG CBL (TY A) (10 AWG) (4 CONDR)	TRF SIG CBL (TY A) (14 AWG) (5 CONDR)	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	TRF SIG CBL (TY A) (14 AWG) (12 CONDR)	INS TRF SIG PL AM (S) 1 ARM (36') LUM	INS TRF SIG PL AM (S) 1 ARM (44') LUM
	EA	EA	EA	LF	LF	LF	LF	EA	EA
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 1	16	2	0	0	0	884	2,060	0	0
IH 20 AT SH 17 TOTAL	16	2	0	0	0	884	2060	0	0
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 1	16	6	12	3,260	3,517	1,100	1,975	1	2
IH 20 AT COUNTRY CLUB DR TOTAL	16	6	12	3260	3517	1100	1975	1	2
PROJECT TOTAL	32	8	12	3,260	3,517	1,984	4,035	1	2

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

QUANTITY SUMMARY

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	18
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	
CHECK				
WSP				

SUMMARY OF SIGNAL ITEMS

LOCATION	686 6051	686 6055	686 6059	686 6189	686 6193	687 6001	688 6001	688 6003	6306 6007
	INS TRF SIG PL AM (S)1 ARM (48')LUM	INS TRF SIG PL AM (S)1 ARM (50')LUM	INS TRF SIG PL AM (S)1 ARM (55')LUM	INS TRF SIG PL AM (S)2 ARM (50-40')	INS TRF SIG PL AM (S)2 ARM (50-44')	PED POLE ASSEMBLY	PED DETECT PUSH BUTTON (APS)	PED DETECTOR CONTROLLER UNIT	VIVDS CABLING
	EA	EA	EA	EA	EA	EA	EA	EA	LF
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 1	1	0	1	0	2	0	0	0	3,615
IH 20 AT SH 17 TOTAL	1	0	1	0	2	0	0	0	3615
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 1	1	1	1	1	0	4	12	1	2,747
IH 20 AT COUNTRY CLUB DR TOTAL	1	1	1	1	0	4	12	1	2747
PROJECT TOTAL	2	1	2	1	2	4	12	1	6,362

SUMMARY OF SIGNAL ITEMS

LOCATION	6054 6005	6058 6001	6083 6001						
	ANTENNA (UNI-DIRECTIONAL)	BBU SYSTEM (EXTERNAL BATT CABINET)	VIDEO IMAGING AND RAD VEH DETECTION SYS						
	EA	EA	EA						
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 1	1	1	1						
IH 20 AT SH 17 TOTAL	1	1	1						
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 1	1	1	1						
IH 20 AT COUNTRY CLUB DR TOTAL	1	1	1						
PROJECT TOTAL	2	2	2						

+/++ : COAXIAL CABLE IS SUBSIDIARY TO ITEM 6083 6001 AND CAT 5E CABLE IS SUBSIDIARY TO ITEM 6054 6005.

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Dallas, Texas 75207
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Texas Department of Transportation

QUANTITY SUMMARY

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	19
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	
CHECK				
WSP				

SUMMARY OF ILLUMINATION ITEMS

LOCATION	416 6029	610 6009	610 6214	618 6023	618 6024	620 6009	620 6010	624 6002	624 6028
	DRILL SHAFT (RDWY ILL POLE) (30 IN)	REMOVE RD IL ASM (TRANS-BASE)	IN RD IL (TY SA) 40T-8 (250W EQ) LED	CONDT (PVC) (SCH 40) (2")	CONDT (PVC) (SCH 40) (2") (BORE)	ELEC CONDR (NO.6) BARE	ELEC CONDR (NO.6) INSULATED	GROUND BOX TY A (122311)W/APRON	REMOVE GROUND BOX
	LF	EA	EA	LF	LF	LF	LF	EA	EA
CSJ 0003-07-064, ETC.									
IH 20 AT SH 17									
SHEET 1 OF 1	48	6	6	1,350	425	1,840	5,210	7	2
IH 20 AT SH 17 TOTAL	48	6	6	1350	425	1840	5210	7	2
IH 20 AT COUNTRY CLUB DR									
SHEET 1 OF 1	0	2	0	0	0	0	0	0	0
IH 20 AT COUNTRY CLUB DR TOTAL	0	2	0	0	0	0	0	0	0
PROJECT TOTAL	48	8	6	1,350	425	1,840	5,210	7	2

WSP USA Inc.
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Dallas, Texas 75207
TBPE # F-2263

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QUANTITY SUMMARY

SHEET 9 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS WSP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK WSP	TEXAS	ODA	REEVES	20
CHECK WSP	CONTROL 0003	SECTION 07	JOB 064,ETC	

SUMMARY OF ECP ITEMS

LOCATION	164 6005 BROADCAST SEED (PERM) (URBAN) (SANDY) SY	164 6009 BROADCAST SEED (TEMP) (WARM) SY	164 6011 BROADCAST SEED (TEMP) (COOL) SY	169 6002 SOIL RETENTION BLANKETS (CL 1) (TY B) SY	506 6040 BIODEG EROSN CONT LOGS (INSTL) (8") LF	506 6043 BIODEG EROSN CONT LOGS (REMOVE) LF	1005 6001 LOOSE AGGR FOR GROUNDCOVER (TYPE I) 4 INCH DEPTH CY	1005 6002 LOOSE AGGR FOR GROUNDCOVER (TYPE II) 4 INCH DEPTH CY
CSJ 0003-07-064, ETC.								
IH 20 AT SH 17								
SHEET 1 OF 8	53	27	27		20	20		
SHEET 2 OF 8	490	245	245					
SHEET 3 OF 8	2,930	1,465	1,465		110	110		
SHEET 4 OF 8	953	477	477		30	30		
SHEET 5 OF 8	1,679	840	840					
SHEET 6 OF 8	3,134	1,567	1,567		100	100		
SHEET 7 OF 8	871	436	436		40	40		
SHEET 8 OF 8	147	74	74		15	15		
IH 20 AT SH 17 TOTAL	10,257	5,131	5,131		315	315		
IH 20 AT COUNTRY CLUB DR								
SHEET 1 OF 9	2,098	1,049	1,049					
SHEET 2 OF 9	1,120	560	560				54	23
SHEET 3 OF 9	1,390	695	695					
SHEET 4 OF 9	1,926	963	963					
SHEET 5 OF 9	1,634	817	817					
SHEET 6 OF 9	2,462	1,231	1,231					
SHEET 7 OF 9	1,262	631	631	152	80	80	34	19
SHEET 8 OF 9	2,124	1,062	1,062	94				
SHEET 9 OF 9	712	356	356					
IH 20 AT COUNTRY CLUB DR TOTAL	14,728	7,364	7,364	246	80	80	88	42
PROJECT TOTAL	**24,985**	**12,495**	**12,495**	**246**	**395**	**395**	**88**	**42**

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JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

QUANTITY SUMMARY

SHEET 10 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC

SHEET NO. 21

SEQUENCE OF CONSTRUCTION

1. GENERAL NOTES

1. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) PER TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) MUST BE PLACED 7 DAYS IN ADVANCE OF THE BEGINNING OF THE CONSTRUCTION.
2. PLACE AND MAINTAIN ADVANCE WARNING SIGNS, TRAFFIC CONTROL DEVICES, WORK ZONE PAVEMENT MARKINGS AND SIGNS IN ACCORDANCE WITH TRAFFIC CONTROL PLAN, TRAFFIC CONTROL STANDARDS, TMUTCD, AND GENERAL NOTES. SIGNS, TRAFFIC CONTROL AND WARNING DEVICES SHOWN ARE CONSIDERED MINIMUM AND ADDITIONAL SIGNS, TRAFFIC CONTROL, OR WARNING DEVICES, AS DEEMED NECESSARY BY THE ENGINEER OR DICTATED BY FIELD CONDITIONS, MUST BE PROVIDED ACCORDING TO ALL APPLICABLE STANDARDS AND TMUTCD. ADDITIONAL SIGNS OR TRAFFIC CONTROL DEVICES WILL NOT BE PAID DIRECTLY BUT WILL BE SUBSIDIARY TO THE BID ITEM, 502-6001 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
3. THE SEQUENCE OF CONSTRUCTION PROVIDED IS NOT TO BE CONSIDERED RESTRICTIVE. THE CONTRACTOR, WITH WRITTEN APPROVAL OF THE ENGINEER, MAY ALTER THE SEQUENCE OF CONSTRUCTION PROVIDED THE TRAFFIC IS MAINTAINED AND THE CRITERIA ESTABLISHED HEREIN IS FOLLOWED.
4. MAINTAIN ACCESS TO ALL SIDE STREETS AND ADJOINING PROPERTIES AT ALL TIMES. THIS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
5. THE CONTRACTOR MUST PROVIDE POSITIVE DRAINAGE THROUGHOUT THE CONSTRUCTION OF THE PROJECT. THE CONTRACTOR MUST CORRECT DRAINAGE DEFICIENCIES THAT PRESENT A HAZARD TO THE TRAVELING PUBLIC OR PROPERTY. THIS WORK WILL NOT BE PAID DIRECTLY BUT WILL BE SUBSIDIARY TO ITEM 502-6001 "BARRICADES, SIGNS AND TRAFFIC HANDLING".
6. THE CONTRACTOR MUST REMOVE ALL EXISTING SIGNS AND MARKINGS THAT CONFLICT WITH THE CONSTRUCTION SIGNS AND MARKINGS. EXISTING MARKINGS MUST BE REMOVED IN AREAS WHERE TRAFFIC IS DIRECTED TO CROSS THEM. THE SIGNS MUST BE PROPERLY STORED IN A SAFE PLACE UNTIL THE CONSTRUCTION HAS BEEN COMPLETED.
7. NO WORK MUST BE PERFORMED IN THE TRAVELED WAY INCLUDING LOADING AND UNLOADING OF TRUCKS.
8. THE CONTRACTOR MUST ENSURE THAT ALL BARRICADES, SIGNS, CHANNELIZING DEVICES, WARNING LIGHTS, AND TRAFFIC HANDLING DEVICES ARE MAINTAINED IN A CLEAN FUNCTIONAL CONDITION AT ALL TIMES.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE TEMPORARY AND EXISTING PAVEMENT MARKINGS IN A GOOD AND VISIBLE CONDITION THROUGHOUT THE LENGTH OF THE PROJECT.
10. THE CONTRACTOR MUST MAINTAIN BARRICADES AND SAFETY FENCES AT EACH SITE WHERE PEDESTRIAN TRAFFIC IS EVIDENT.
11. CONTRACTOR MUST COVER OPEN EXCAVATIONS WITH STEEL PLATES ANCHORED PROPERLY DURING NON-WORKING HOURS AND OPEN LANES FOR NORMAL TRAFFIC FLOW, AS APPLICABLE.
12. NOTIFY THE ENGINEER, IN WRITING, TWO WEEKS PRIOR TO SHIFTING OF TRAFFIC WITHIN EACH PHASE OF THE TRAFFIC CONTROL PLAN.
13. BARRICADES, SIGNS, AND CHANNELIZING DEVICES, AS SHOWN, MUST BE ADJUSTED TO FIT FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER.
14. REMOVE SIGNS, BARRICADES, AND CONES NOT IN USE FOR THREE WORKING DAYS FROM THE RIGHT-OF-WAY.
15. STORM WATER POLLUTION PREVENTION PLAN (SW3P) DEVICES MUST BE INSTALLED PRIOR TO THE START OF CONSTRUCTION. ALL SW3P DEVICES MUST BE INSTALLED, UPDATED, AND MAINTAINED DURING CONSTRUCTION, AS REQUIRED BY THE PLANS AND/OR AS DIRECTED BY THE ENGINEER.
16. THE CONTRACTOR MUST PLACE A 3:1 SLOPE BETWEEN THE CONSTRUCTION ZONE AND TRAVELED PAVEMENT AS THE END OF EACH DAY IF DROP-OFF EXCEEDS 2 INCHES.
17. PREPARING ROW / REMOVAL OF EXISTING ITEMS TO BE DONE ONLY IN AREAS WHERE WORK IS OCCURING, AS PER THE PHASES NOTED BELOW.

2. SEQUENCE OF WORK

THIS PROJECT WILL BE CONSTRUCTED IN 4 PHASES, WHICH INCLUDES TWO SUBPHASES.
A BRIEF DESCRIPTION OF THESE PHASES ARE AS FOLLOWS:

PHASE 1 - IH 20 AT SH 17 AND COUNTRY CLUB DR CONSTRUCTION

1. INSTALL TRAFFIC CONTROL DEVICES.
2. PRIOR TO ANY CONSTRUCTION, INSTALL SEDIMENT LOGS AND ANY OTHER REQUIRED EROSION/SEDIMENTATION CONTROL DEVICES AS SHOWN ON THE SW3P LAYOUTS AND STANDARDS AS THEY PERTAIN TO THE CONSTRUCTION.
3. INSTALL DETOUR SIGNS. SEE PHASE 1 DETOUR LAYOUT FOR PLACEMENT OF SIGNS.
4. CLOSE APPROPRIATE ROADS WHILE DETOURING TRAFFIC AS SHOWN ON TCP TYPICAL SECTIONS AND PHASE 1 DETOUR LAYOUT.
5. SAWCUT AND REMOVE EXISTING ROADWAY PAVEMENT SECTIONS AS SHOWN.
6. CONSTRUCT PAVEMENT WIDENING AND REHABILITATE EXISTING PAVEMENT TO LIMITS AS SHOWN. CONSTRUCT FULL PAVEMENT STRUCTURE BEFORE MOVING TO NEXT PHASE.
7. INSTALL CURB AND GUTTER TO THE LIMITS AS SHOWN.
8. PLACE TEMPORARY WORK ZONE PAVEMENT MARKINGS AS SHOWN.

PHASE 1A - IH 20 AT COUNTRY CLUB DR CONSTRUCTION

1. INSTALL/ADJUST TRAFFIC CONTROL DEVICES.
2. INSTALL/ADJUST DETOUR SIGNS. SEE PHASE 1A DETOUR LAYOUT FOR PLACEMENT OF SIGNS.
3. REMOVE CONFLICTING PAVEMENT MARKINGS ON IH 20 SFR WEST OF COUNTRY CLUB DR AND ON COUNTRY CLUB DR BETWEEN THE FRONTAGE ROADS AS SHOWN.
4. TRANSITION TRAFFIC ON IH 20 SFR WEST OF COUNTRY CLUB DR AND ON COUNTRY CLUB DR BETWEEN THE FRONTAGE ROADS AS SHOWN.
5. SAWCUT AND REMOVE EXISTING ROADWAY PAVEMENT SECTIONS AS SHOWN.
6. CONSTRUCT PAVEMENT WIDENING AND REHABILITATE EXISTING PAVEMENT TO LIMITS AS SHOWN. CONSTRUCT FULL PAVEMENT STRUCTURE BEFORE MOVING TO NEXT PHASE.
7. PLACE TEMPORARY WORK ZONE PAVEMENT MARKINGS AS SHOWN.

PHASE 1B - IH 20 AT COUNTRY CLUB DR CONSTRUCTION

1. INSTALL/ADJUST TRAFFIC CONTROL DEVICES.
2. INSTALL/ADJUST DETOUR SIGNS. SEE PHASE 1B DETOUR LAYOUT FOR PLACEMENT OF SIGNS.
3. SAWCUT AND REMOVE EXISTING ROADWAY PAVEMENT SECTIONS AS SHOWN.
4. CONSTRUCT PAVEMENT WIDENING AND REHABILITATE EXISTING PAVEMENT TO LIMITS AS SHOWN. CONSTRUCT FULL PAVEMENT STRUCTURE BEFORE MOVING TO NEXT PHASE.
5. PLACE TEMPORARY WORK ZONE PAVEMENT MARKINGS AS SHOWN.

PHASE 2 - IH 20 AT SH 17 AND COUNTRY CLUB DR CONSTRUCTION

1. INSTALL/ADJUST TRAFFIC CONTROL DEVICES.
2. PRIOR TO ANY CONSTRUCTION, INSTALL SEDIMENT LOGS AND ANY OTHER REQUIRED EROSION/SEDIMENTATION CONTROL DEVICES AS SHOWN ON THE SW3P LAYOUTS AND STANDARDS AS THEY PERTAIN TO THE CONSTRUCTION.
3. INSTALL DETOUR SIGNS. SEE PHASE 2 DETOUR LAYOUT FOR PLACEMENT OF SIGNS.
4. REMOVE CONFLICTING PAVEMENT MARKINGS FROM PREVIOUS PHASE.
5. CLOSE APPROPRIATE ROADS WHILE DETOURING TRAFFIC AS SHOWN ON TCP TYPICAL SECTIONS AND PHASE 2 DETOUR LAYOUT.
6. SAWCUT AND REMOVE EXISTING ROADWAY PAVEMENT SECTIONS AS SHOWN.
7. CONSTRUCT PAVEMENT WIDENING AND REHABILITATE EXISTING PAVEMENT TO LIMITS AS SHOWN. CONSTRUCT FULL PAVEMENT STRUCTURE.
8. INSTALL CURB AND GUTTER TO THE LIMITS AS SHOWN.

PHASE 3 - IH 20 AT SH 17 AND COUNTRY CLUB DR CONSTRUCTION

1. INSTALL/ADJUST TRAFFIC CONTROL DEVICES.
2. PRIOR TO ANY CONSTRUCTION, INSTALL SEDIMENT LOGS AND ANY OTHER REQUIRED EROSION/SEDIMENTATION CONTROL DEVICES AS SHOWN ON THE SW3P LAYOUTS AND STANDARDS AS THEY PERTAIN TO THE CONSTRUCTION.
3. INSTALL NEW TRAFFIC SIGNALS.
4. CONSTRUCT SIDEWALK TO LIMITS AS SHOWN ON SIDEWALK DETAILS.

PHASE 4 - FINAL CONFIGURATION

1. REMOVE EXISTING CONFLICTING SIGNING AND MARKINGS.
2. INSTALL PERMANENT PAVEMENT MARKINGS AS SHOWN.
3. SHIFT ALL TRAFFIC TO FINAL CONFIGURATION.
4. PLACE APPROPRIATE PERMANENT LANDSCAPE AS SHOWN.

3. FINAL CLEAN UP

UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISCARDED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN A SMOOTH, NEAT AND SIGHTLY CONDITION.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

TRAFFIC CONTROL PLAN
GENERAL NOTES AND
SEQUENCE OF CONSTRUCTION

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	22
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017X17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*TCP*G

① OBEY WARNING SIGNS STATE LAW
R20-3T
48" X 42"

② STAY ALERT
TALK OR TEXT LATER
G20-10T
60" X 48"

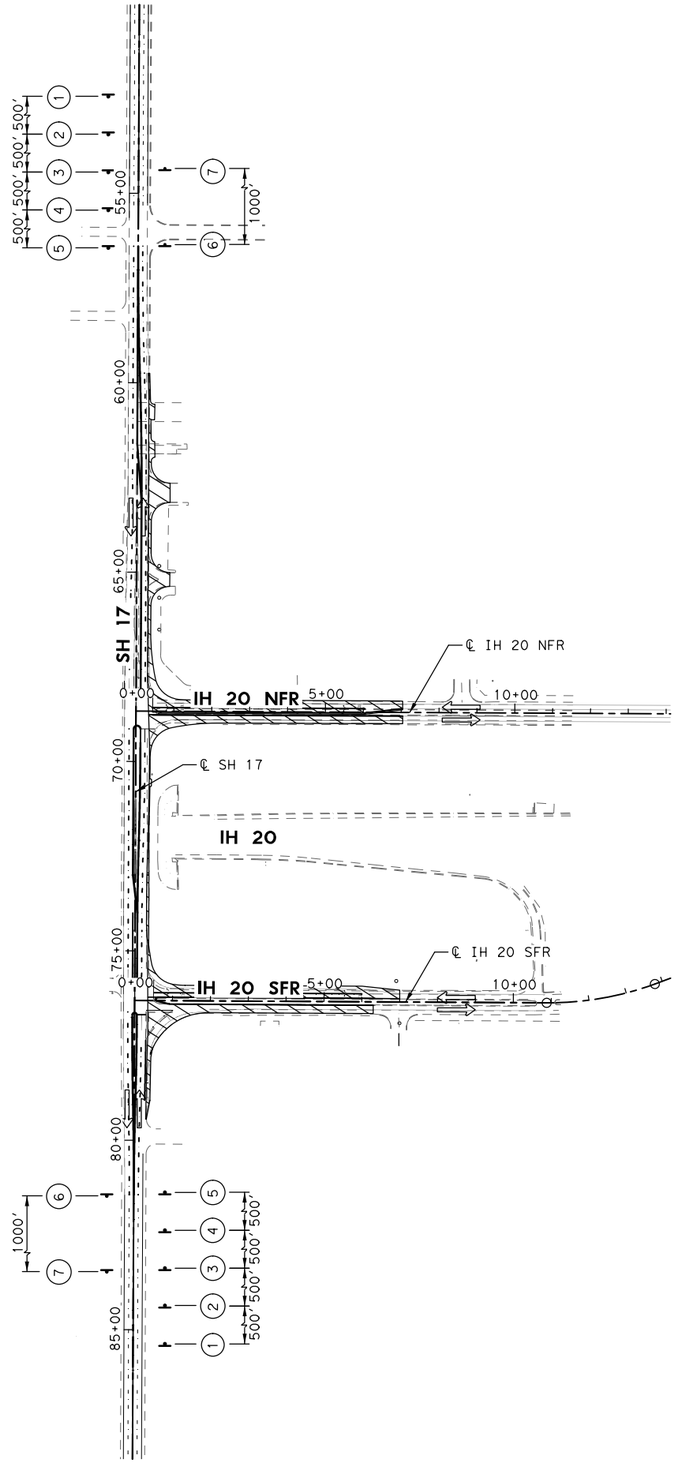
③ BEGIN WORK ZONE — G20-9TP 24" X 24"
TRAFFIC FINES DOUBLE — R20-5T 24" X 30"
WHEN WORKERS ARE PRESENT — R20-5aTP 24" X 12"

④ ROAD WORK AHEAD
CW20-1D
48" X 48"

⑤ BEGIN ROAD WORK NEXT 1 MILE — G20-5T 48" X 24"
NAME
ADDRESS
CITY
STATE
CONTRACTOR — G20-6T 48" X 30"

⑥ END ROAD WORK
G20-2
36" x 18"

⑦ END WORK ZONE
G20-2bT
36" x 18"



0′ 200′ 400′
SCALE IN FEET

LEGEND
- CONSTRUCTION
- TRAFFIC DIRECTION
- SIGN POST

NOTES:
1. REFER TO STANDARDS BC (1) THRU (12) AND TCP STANDARDS FOR LENGTHS, SIGN SPACING, AND OTHER INFORMATION.
2. ADVANCE WARNING SIGNS MUST BE PLACED IN POSITION TO ALLOW ADDITION OF DETOUR ROUTING SIGNAGE NEEDED FOR EACH PHASE.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

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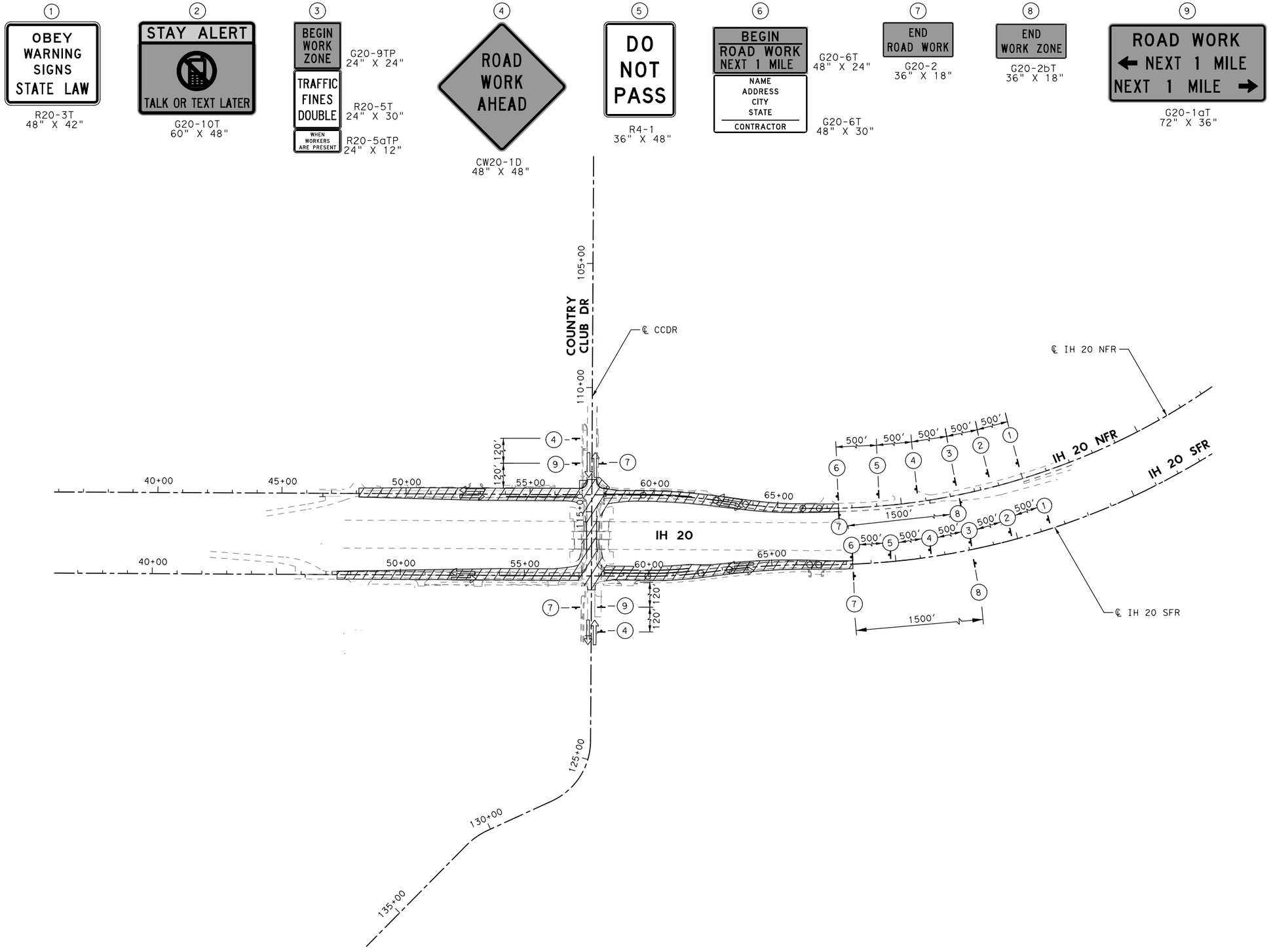
IH 20 AT SH 17
ADVANCED WARNING SIGNS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	23
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	



NOTES:

1. REFER TO STANDARDS BC (1) THRU (12) AND TCP STANDARDS FOR LENGTHS, SIGN SPACING, AND OTHER INFORMATION.
2. ADVANCE WARNING SIGNS MUST BE PLACED IN POSITION TO ALLOW ADDITION OF DETOUR ROUTING SIGNAGE NEEDED FOR EACH PHASE.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER
03/30/2022

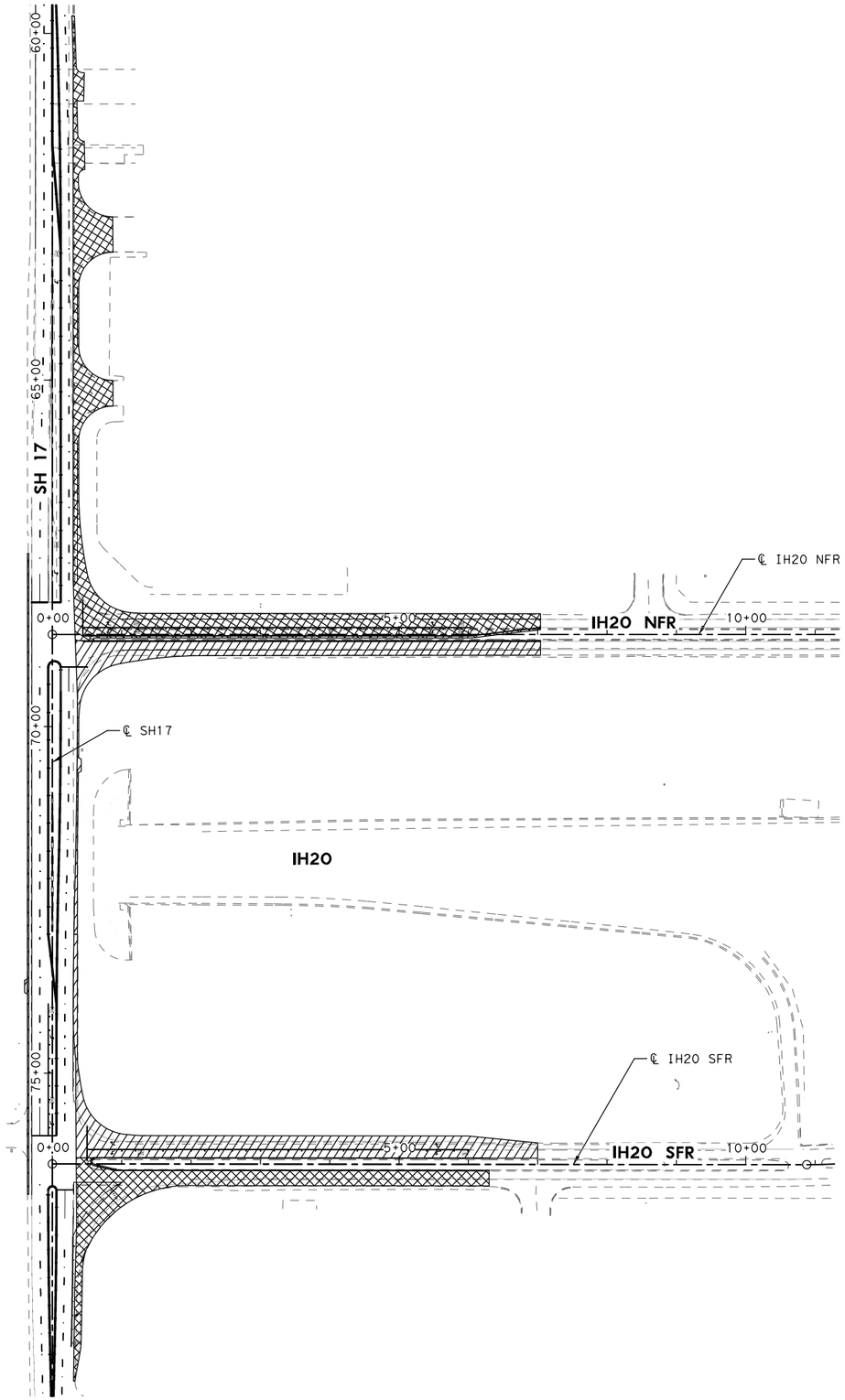
JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
ADVANCED WARNING SIGNS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	24
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - DesignPlan Set\2. TCP\CCD*TCP*A



0′ 100′ 200′

SCALE IN FEET

LEGEND

PHASE 1

PHASE 2

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

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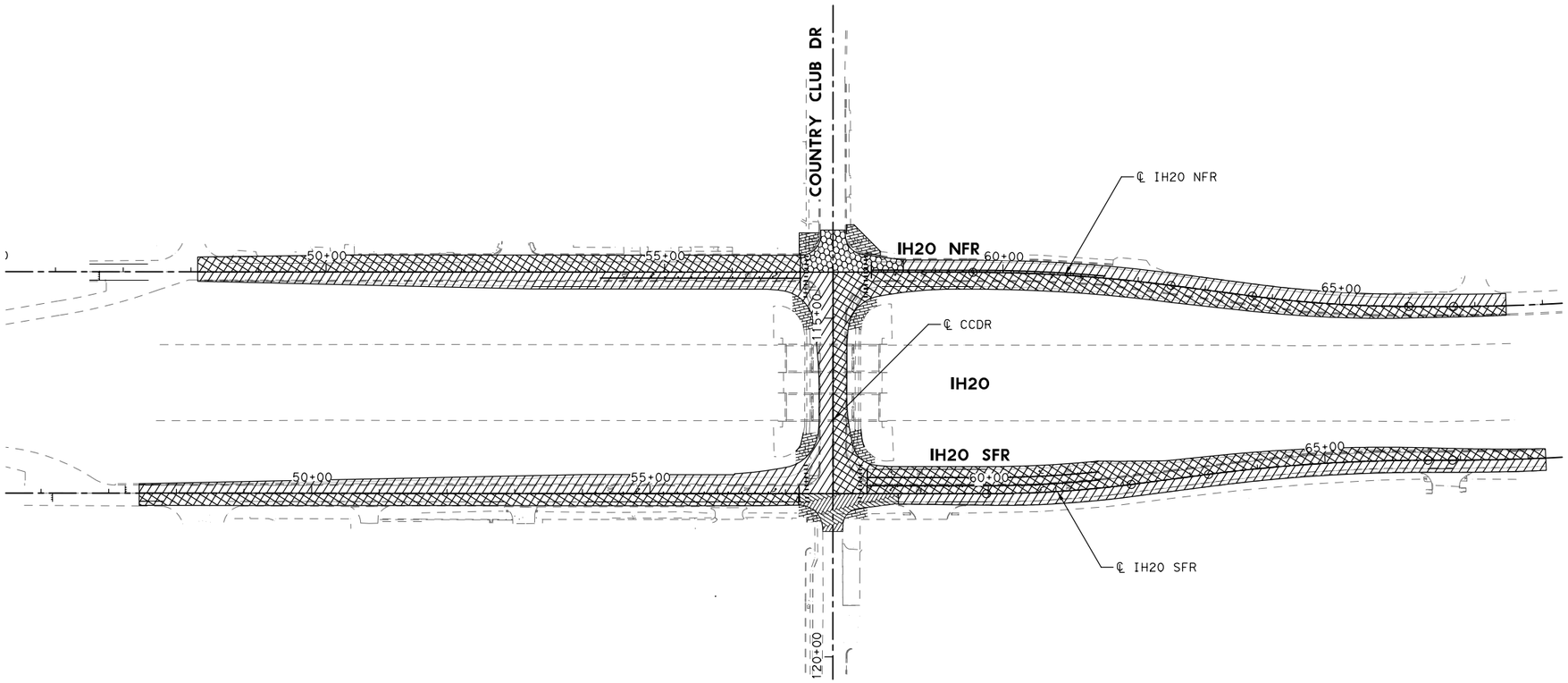
Texas Department of Transportation

IH 20 AT SH 17
OVERALL TCP PHASING

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	25
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\SH17*TCP*



0′ 100′ 200′

SCALE IN FEET

LEGEND

- PHASE 1
- PHASE 1A
- PHASE 1B
- PHASE 2
- PHASE 3

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

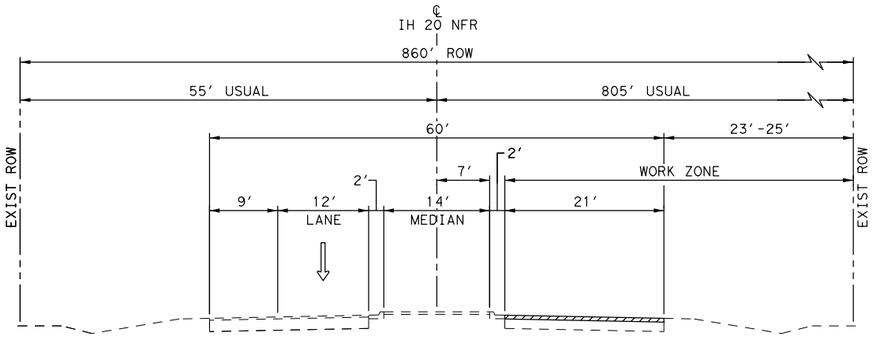
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
OVERALL TCP PHASING

SHEET 1 OF 1

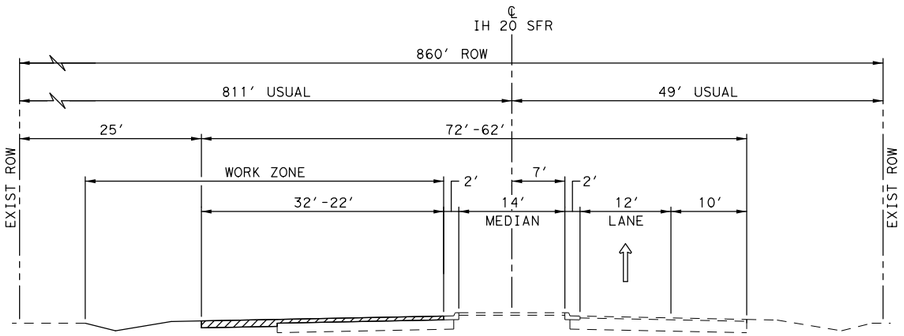
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	26
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*0



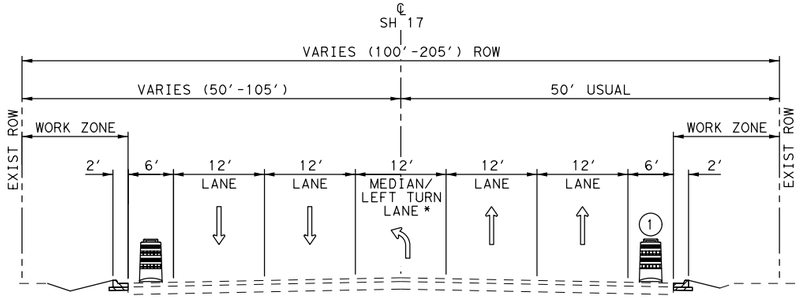
TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 1)

STA 0+00.00 TO STA 7+04.00



TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 1)

STA 0+00.00 TO STA 7+00.00



*LEFT TURN LANE OF SH17 WILL BE CLOSED FROM STA 66+00 TO STA 68+50
LEFT TURN LANE OF SH17 WILL REMAIN OPEN FROM STA 74+00 TO STA 76+00

TRAFFIC CONTROL TYPICAL SECTION-SH 17 (PHASE 1)

STA 67+50.00 TO STA 76+75.00

0′ 10′ 20′

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (Y) 4" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 8" (SLD)

NOTES:

1. REFER TO TCP(2-5) FOR DETAILS ON LONG TERM LANE CLOSURES.
2. EXISTING PAVEMENT MARKINGS TO REMAIN UNLESS OTHERWISE SHOWN.

STATE OF TEXAS
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141282
LICENSED
PROFESSIONAL ENGINEER

04/22/2022

JMT TBPE REGISTRATION NO. F-16341

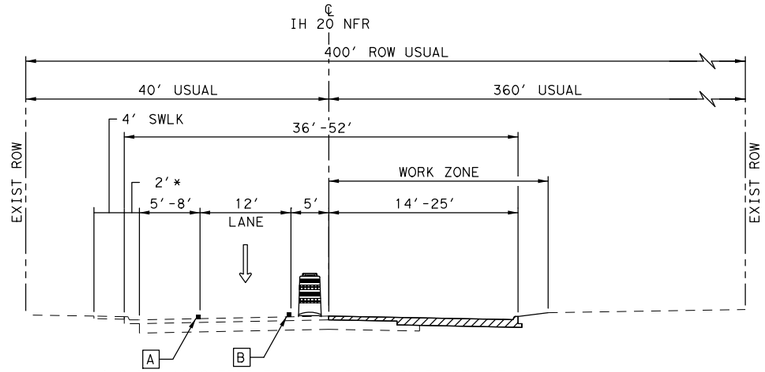
Texas Department of Transportation

IH 20 AT SH 17
TCP TYPICAL SECTIONS
PHASE 1

SHEET 1 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	27
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

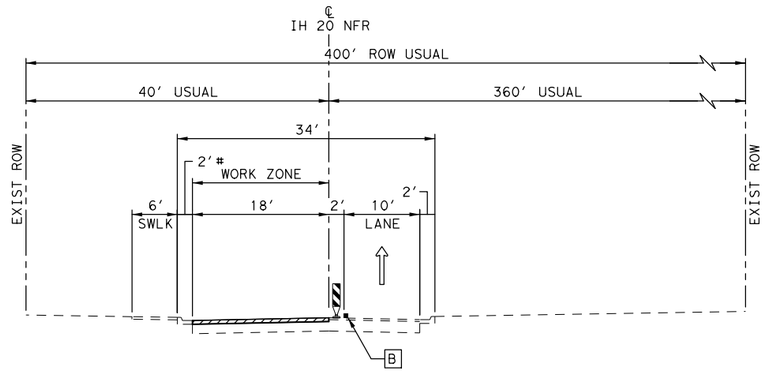
DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\SH17 *TCP



*2' CURB AND GUTTER FROM STA 50+47.86 TO STA 57+48.98

TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 1)

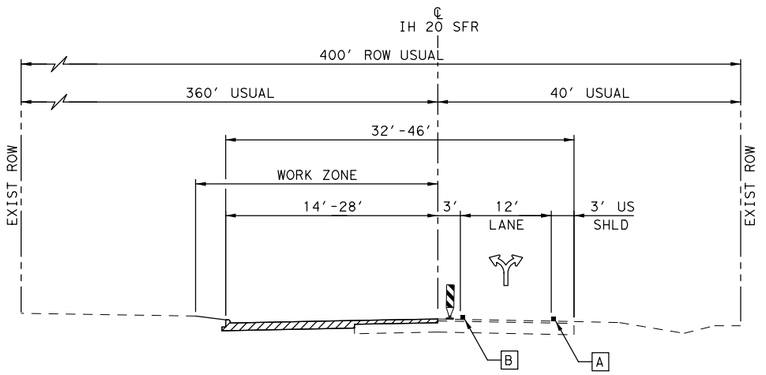
STA 48+10.00 TO STA 57+48.98



#2' CURB AND GUTTER FROM STA 57+48.98 TO STA 61+60.71

TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 1)

STA 57+48.98 TO STA 67+46.00



TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 1)

STA 47+45.00 TO STA 57+70.29

0' 10' 20'

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (Y) 4" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 8" (SLD)

NOTES:

1. EXISTING PAVEMENT MARKINGS TO REMAIN UNLESS OTHERWISE SHOWN.

STATE OF TEXAS
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141282
LICENSED
PROFESSIONAL ENGINEER

04/22/2022

JMT TBPE REGISTRATION NO. F-16341

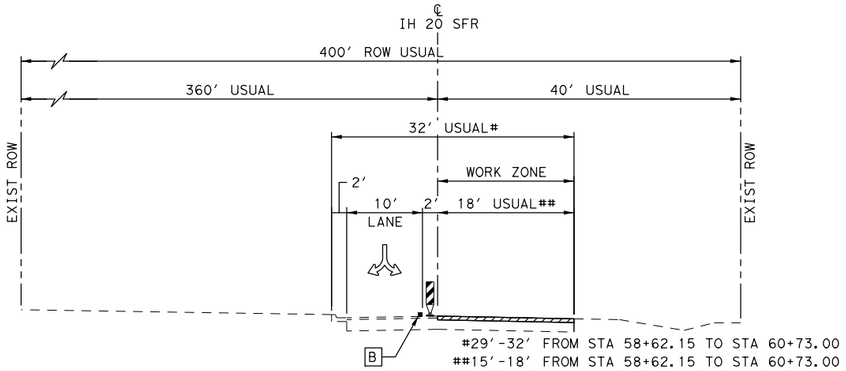
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064,ETC

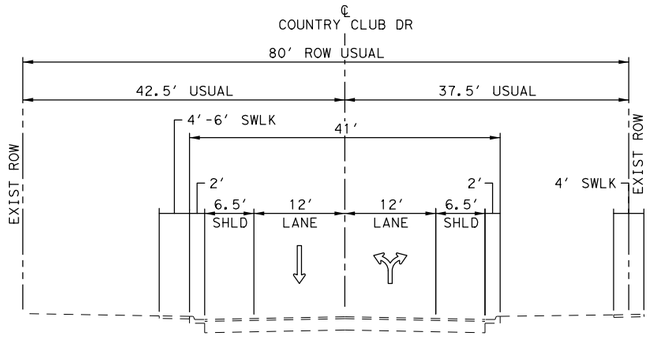
SHEET NO. 28

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



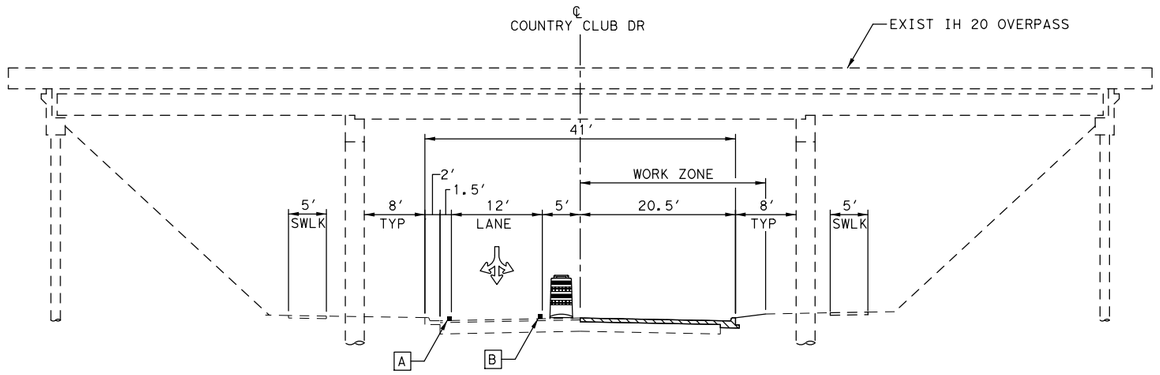
TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 1)

STA 57+70.29 TO STA 68+26.00



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1)

STA 113+70.00 TO STA 114+32.13



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1)

STA 114+32.13 TO STA 117+59.15

0' 10' 20'

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (Y) 4" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 8" (SLD)

NOTES:

1. EXISTING PAVEMENT MARKINGS TO REMAIN UNLESS OTHERWISE SHOWN.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

04/22/2022

JMT TBPE REGISTRATION NO. F-16341

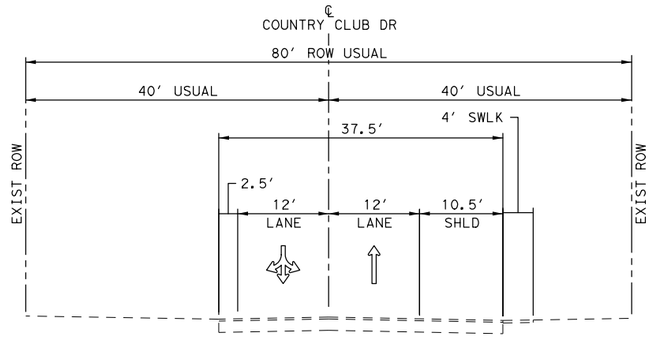
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 1

SHEET 3 OF 7

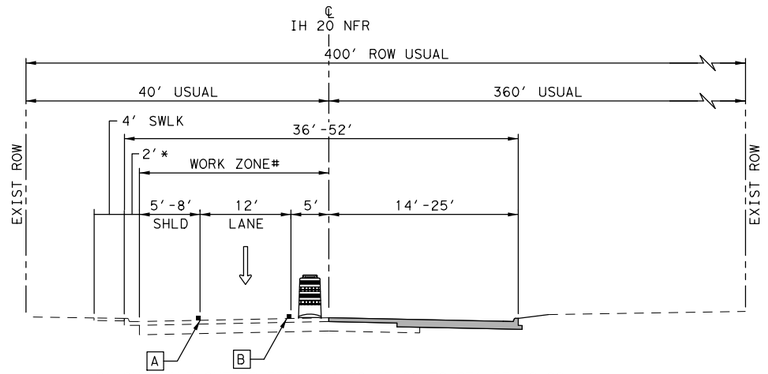
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	29
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064,ETC	

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1/1A)

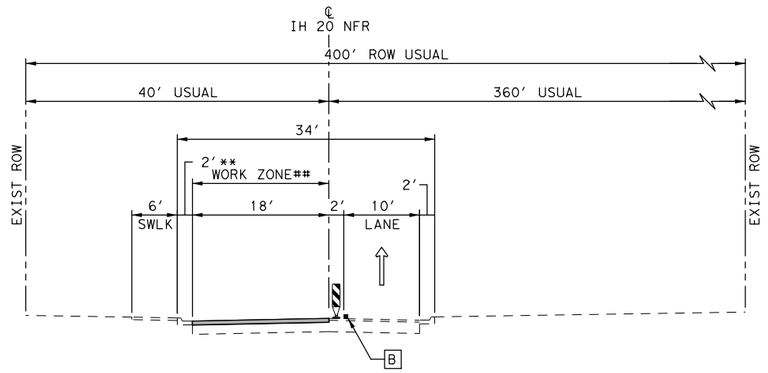
STA 117+59.15 TO STA 118+15.00



*2' CURB AND GUTTER FROM STA 50+47.86 TO STA 57+48.98
#CONSTRUCTION IN PHASE 1A STA 57+01.00 TO STA 57+48.98

TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 1A/1B)

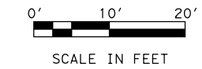
STA 48+10.00 TO STA 57+48.98



**2' CURB AND GUTTER FROM STA 57+48.98 TO STA 61+60.71
##CONSTRUCTION IN PHASE 1A STA 57+48.98 TO STA 58+53.00

TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 1A/1B)

STA 57+48.98 TO STA 67+46.00



SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (Y) 4" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 8" (SLD)

NOTES:

1. EXISTING PAVEMENT MARKINGS TO REMAIN UNLESS OTHERWISE SHOWN.

JMT TBPE REGISTRATION NO. F-16341

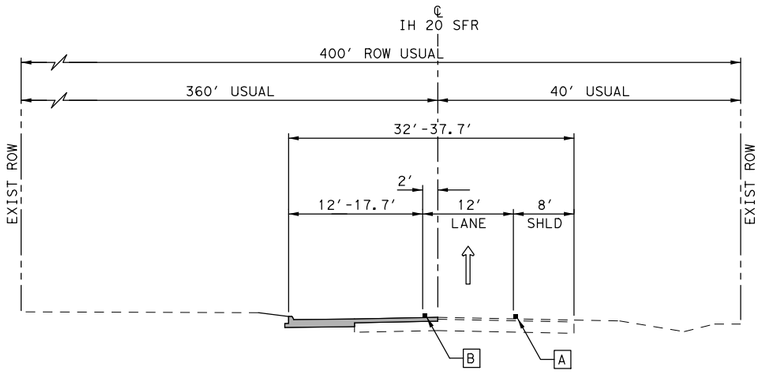
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 1/1A/1B

SHEET 4 OF 7

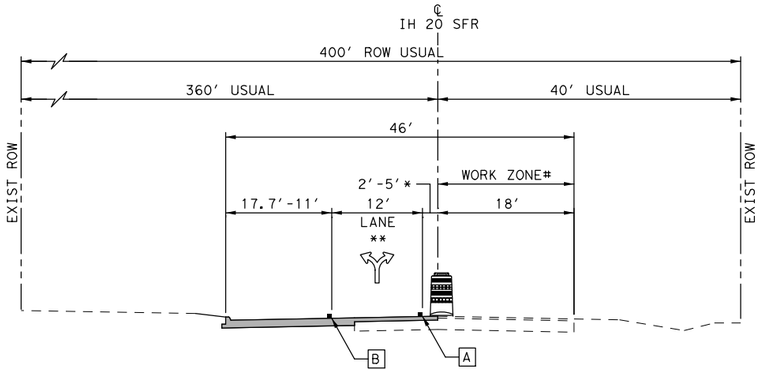
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB / 30
	0003	07	064,ETC

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 1A/1B)

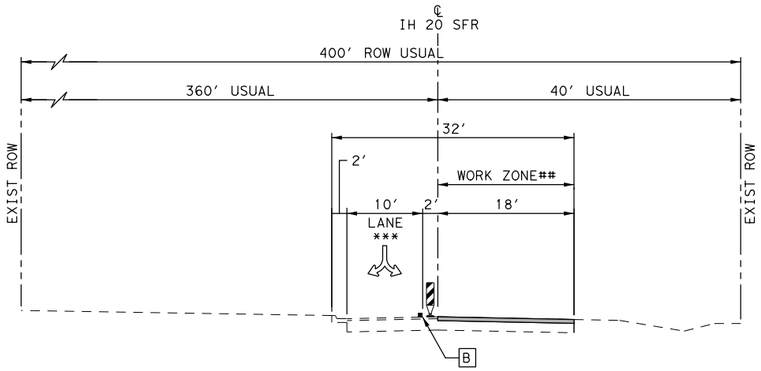
STA 47+45.00 TO STA 50+13.00



*TRAFFIC SHIFT FROM STA 50+13.00 TO STA 54+28.00
**LEFT TURN ONLY IN PHASE 1B
#CONSTRUCTION PHASE 1B STA 57+19.64 TO STA 57+70.29

TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 1A/1B)

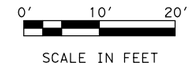
50+13.00 TO STA 57+70.29



##CONSTRUCTION PHASE 1B STA 57+70.29 TO STA 58+67.12
***RIGHT TURN ONLY IN PHASE 1B

TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 1A/1B)

STA 57+70.29 TO STA 68+26.00



SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (Y) 4" (SLD)
- C WK ZN PAV MRK REMOV (W) 8" (SLD)

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

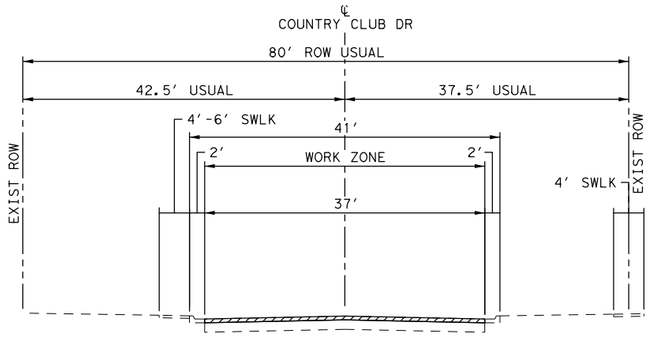
IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 1A/1B

SHEET 5 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

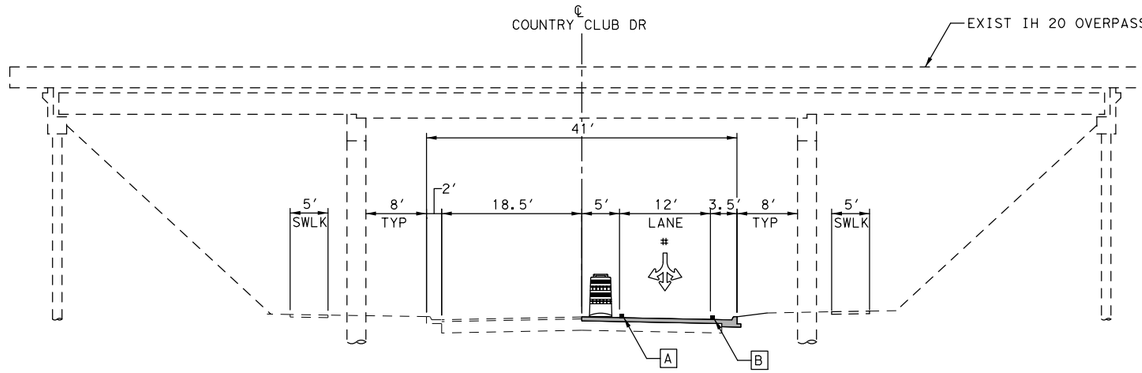
SHEET NO. 31

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1A)

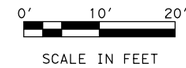
STA 113+70.00 TO STA 114+32.13



#LEFT AND RIGHT TURN ONLY IN PHASE 1A

TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1A/1B)

STA 114+32.13 TO STA 117+59.15



LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (Y) 4" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 8" (SLD)

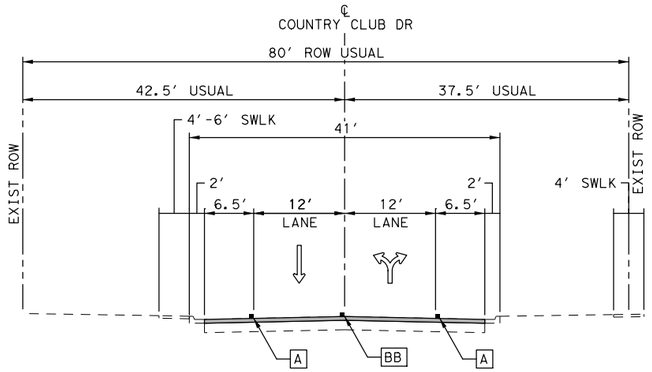
TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 1A/1B

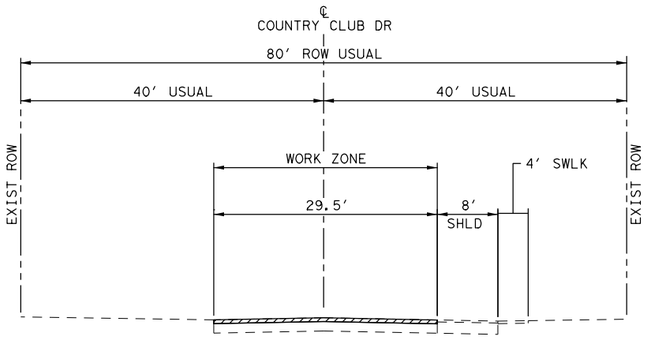
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES / 32
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1B)

STA 113+70.00 TO STA 114+32.13



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 1B)

STA 117+59.15 TO STA 118+15.00

0' 10' 20'

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- [A] WK ZN PAV MRK REMOV (W) 4" (SLD)
- [B] WK ZN PAV MRK REMOV (Y) 4" (SLD)
- [C] WK ZN PAV MRK REMOV (W) 8" (SLD)

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

04/22/2022

Jennifer R. Perry

JMT TBPE REGISTRATION NO. F-16341

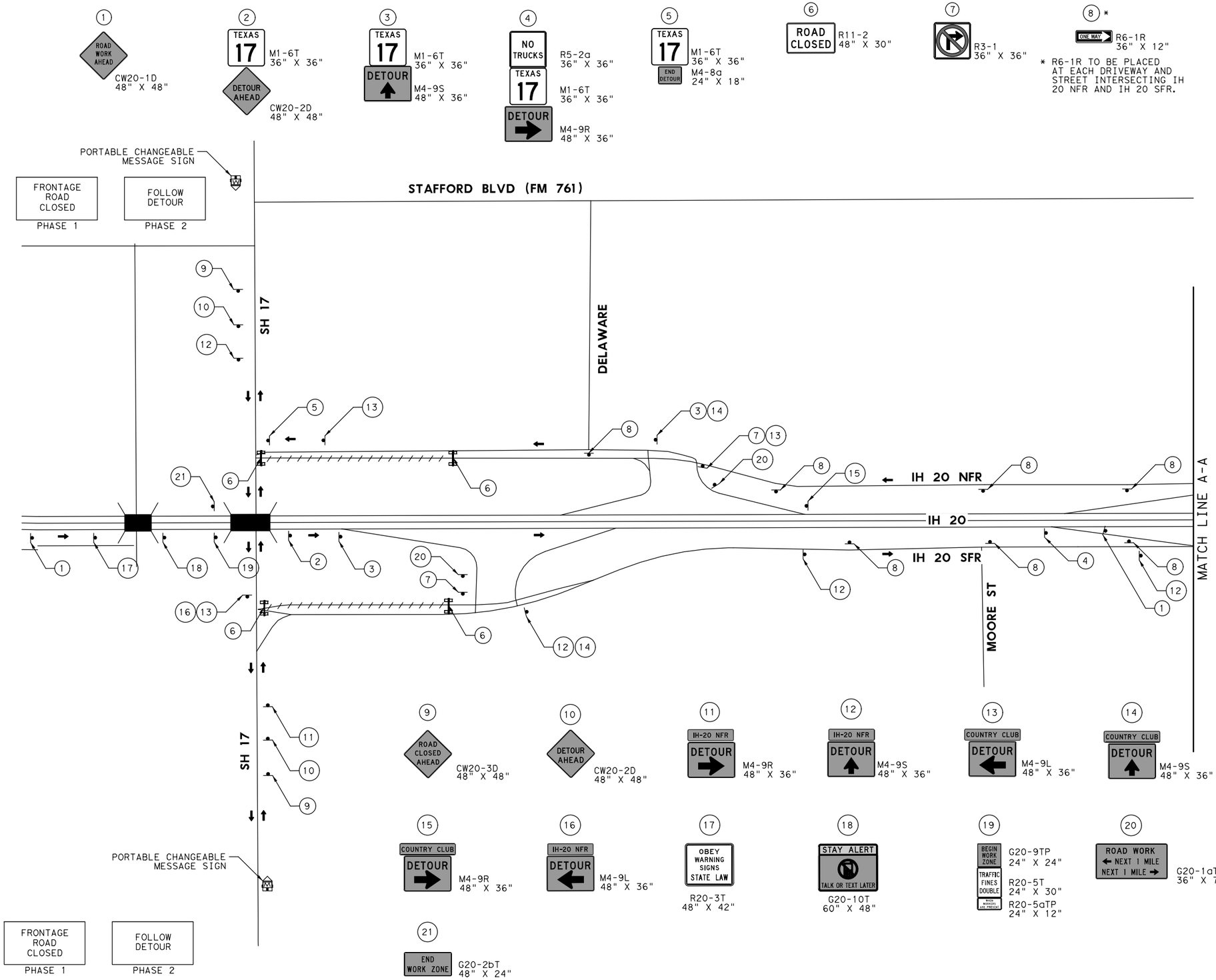
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 1B

SHEET 7 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	33
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



1. ROAD WORK AHEAD — CW20-1D 48" X 48"
2. TEXAS 17 M1-6T 36" X 36"; DETOUR AHEAD CW20-2D 48" X 48"
3. TEXAS 17 M1-6T 36" X 36"; DETOUR M4-9S 48" X 36"
4. NO TRUCKS R5-2a 36" X 36"; TEXAS 17 M1-6T 36" X 36"; DETOUR M4-9R 48" X 36"
5. TEXAS 17 M1-6T 36" X 36"; END DETOUR M4-8a 24" X 18"
6. ROAD CLOSED R11-2 48" X 30"
7. R3-1 36" X 36"
8. * ONE WAY R6-1R 36" X 12"
   * R6-1R TO BE PLACED AT EACH DRIVEWAY AND STREET INTERSECTING IH 20 NFR AND IH 20 SFR.
9. ROAD CLOSED AHEAD CW20-3D 48" X 48"
10. DETOUR AHEAD CW20-2D 48" X 48"
11. IH-20 NFR DETOUR M4-9R 48" X 36"
12. IH-20 NFR DETOUR M4-9S 48" X 36"
13. COUNTRY CLUB DETOUR M4-9L 48" X 36"
14. COUNTRY CLUB DETOUR M4-9S 48" X 36"
15. COUNTRY CLUB DETOUR M4-9R 48" X 36"
16. IH-20 NFR DETOUR M4-9L 48" X 36"
17. OBEY WARNING SIGNS STATE LAW R20-3T 48" X 42"
18. STAY ALERT TALK OR TEXT LATER G20-10T 60" X 48"
19. BEGIN WORK ZONE G20-9TP 24" X 24"; TRAFFIC FINES DOUBLE R20-5T 24" X 30"; WHEN WORKERS ARE PRESENT R20-5aTP 24" X 12"
20. ROAD WORK ← NEXT 1 MILE NEXT 1 MILE → G20-1aT 36" X 72"
21. END WORK ZONE G20-2bT 48" X 24"

0′ 250′ 500′
SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.
4. DRUMS MUST BE PLACED IN PHASE 1 TO BLOCK THE EASTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND WESTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

DETOUR PLAN
PHASE 1

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	34
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*DETOUR PLAN PHASE 1.dgn

(1) ROAD CLOSED AHEAD — CW20-3D, 48" X 48"

(2) DETOUR AHEAD — CW20-2D, 48" X 48"

(3) TEXAS 17 / IH-20 SFR / DETOUR — M1-6T, 36" X 36"; M4-9S, 48" X 36"

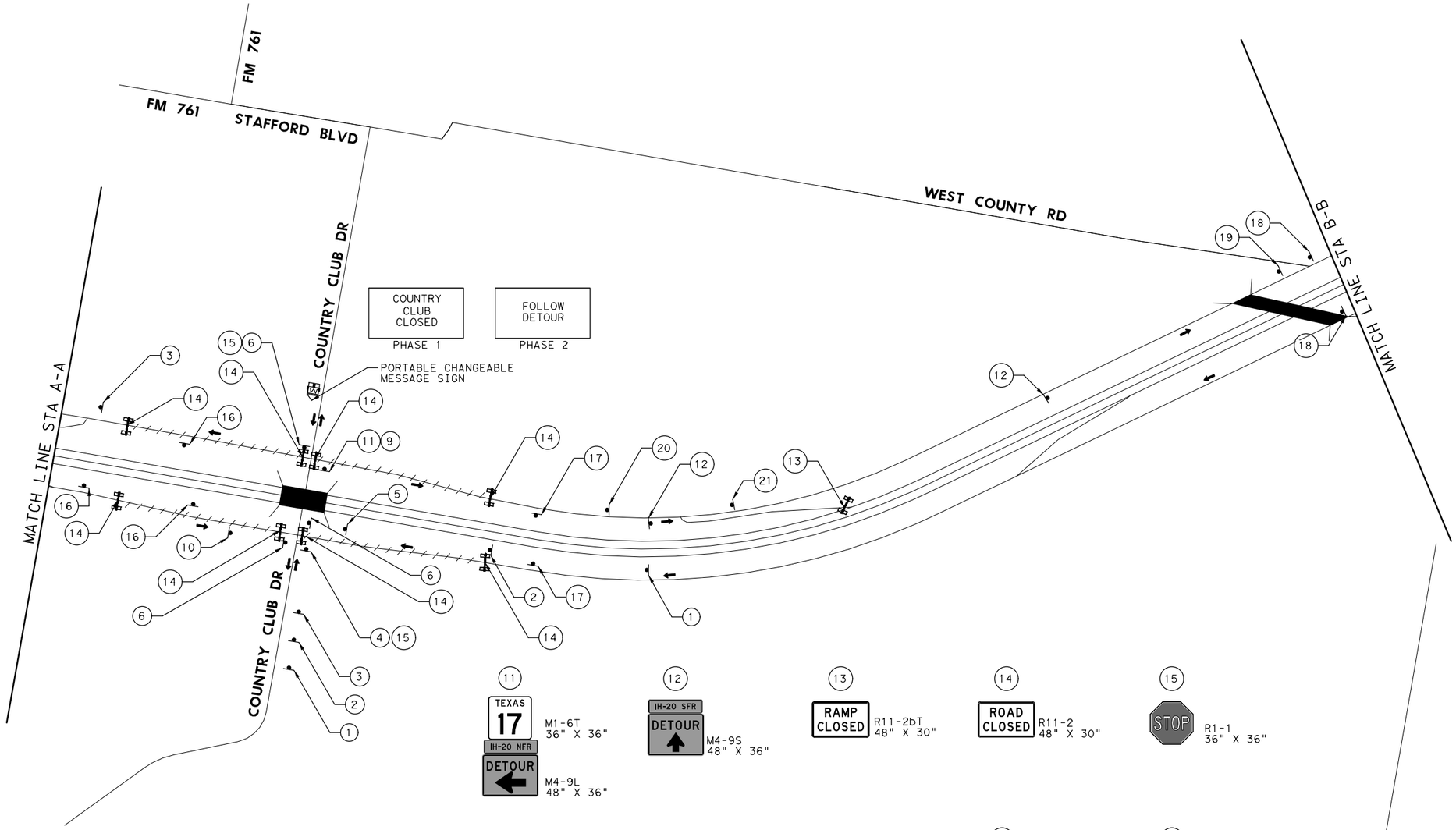
(4) ONLY — R3-5a, 30" X 36"

(5) TEXAS 17 / IH-20 SFR / DETOUR — M1-6T, 36" X 36"; M4-9R, 48" X 36"

(6) R3-8cT, 30" X 30"

(9) IH-20 SFR / DETOUR — M4-9R, 48" X 36"

(10) TEXAS 17 / IH-20 SFR / IH-20 NFR / DETOUR — M1-6T, 36" X 36"; M4-9L, 48" X 36"



(11) TEXAS 17 / IH-20 NFR / DETOUR — M1-6T, 36" X 36"; M4-9L, 48" X 36"

(12) IH-20 SFR / DETOUR — M4-9S, 48" X 36"

(13) RAMP CLOSED — R11-2bT, 48" X 30"

(14) ROAD CLOSED — R11-2, 48" X 30"

(15) STOP — R1-1, 36" X 36"

(16) * ONE WAY — R6-1R, 36" X 12"

* R6-1R TO BE PLACED AT EACH DRIVEWAY AND STREET INTERSECTING IH 20 NFR AND IH 20 SFR WEST OF COUNTRY CLUB DR.

(17) ** ONE WAY — R6-1L, 36" X 12"

** R6-1L TO BE PLACED AT EACH DRIVEWAY AND STREET INTERSECTING IH 20 NFR AND IH 20 SFR EAST OF COUNTRY CLUB DR.

(18) ROAD WORK ½ MILE — CW20-1E, 48" X 48"

(19) ROAD CLOSED TO THRU TRAFFIC — R11-4, 60" X 30"

(20) ROAD CLOSED 500 FT — CW20-3C, 48" X 48"

(21) ROAD CLOSED 1000 FT — CW20-3B, 48" X 48"

0′ 250′ 500′

SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.
4. DRUMS MUST BE PLACED IN PHASE 1 TO BLOCK THE EASTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND WESTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

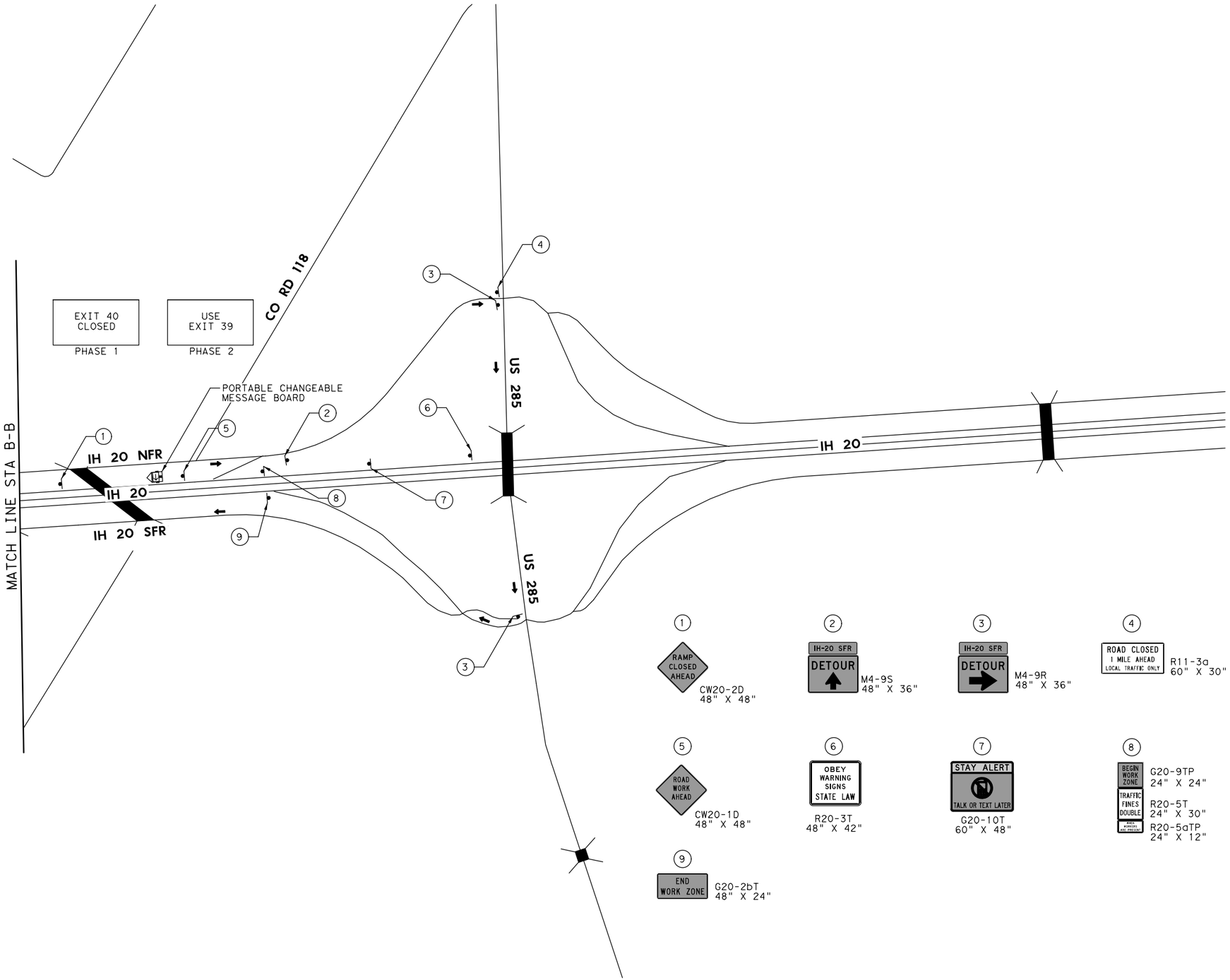
DETOUR PLAN
PHASE 1

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064,ETC

SHEET NO. 35

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*DETOUR PLAN PHASE 1.dgn



0′ 250′ 500′

SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.
4. DRUMS MUST BE PLACED IN PHASE 1 TO BLOCK THE EASTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND WESTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.

(1) RAMP CLOSED AHEAD — CW20-2D, 48" X 48"

(2) IH-20 SFR / DETOUR — M4-9S, 48" X 36"

(3) IH-20 SFR / DETOUR — M4-9R, 48" X 36"

(4) ROAD CLOSED 1 MILE AHEAD LOCAL TRAFFIC ONLY — R11-3a, 60" X 30"

(5) ROAD WORK AHEAD — CW20-1D, 48" X 48"

(6) OBEY WARNING SIGNS STATE LAW — R20-3T, 48" X 42"

(7) STAY ALERT / TALK OR TEXT LATER — G20-10T, 60" X 48"

(8) BEGIN WORK ZONE — G20-9TP, 24" X 24"
TRAFFIC FINES DOUBLE — R20-5T, 24" X 30"
WHEN WORKERS ARE PRESENT — R20-5aTP, 24" X 12"

(9) END WORK ZONE — G20-2bT, 48" X 24"

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

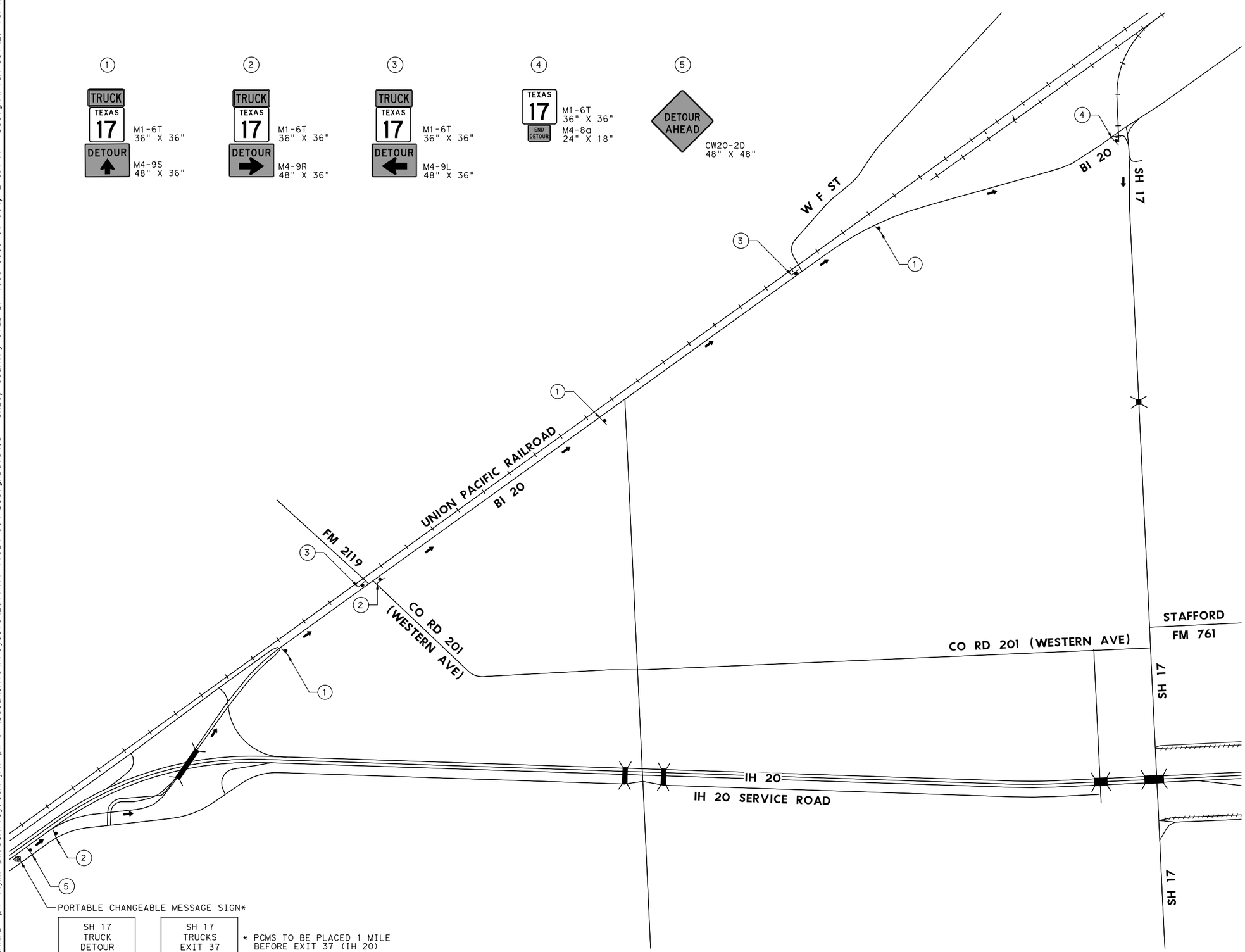
Texas Department of Transportation

DETOUR PLAN
PHASE 1

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.	
JMT	6	(SEE TITLE SHEET)		IH20	
GRAPHICS JMT	STATE	DISTRICT	COUNTY		SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES		36
CHECK JMT	CONTROL	SECTION	JOB		
	0003	07	064, ETC		

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*DETOUR



0′ 500′ 1000′

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- TRAFFIC SIGN
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

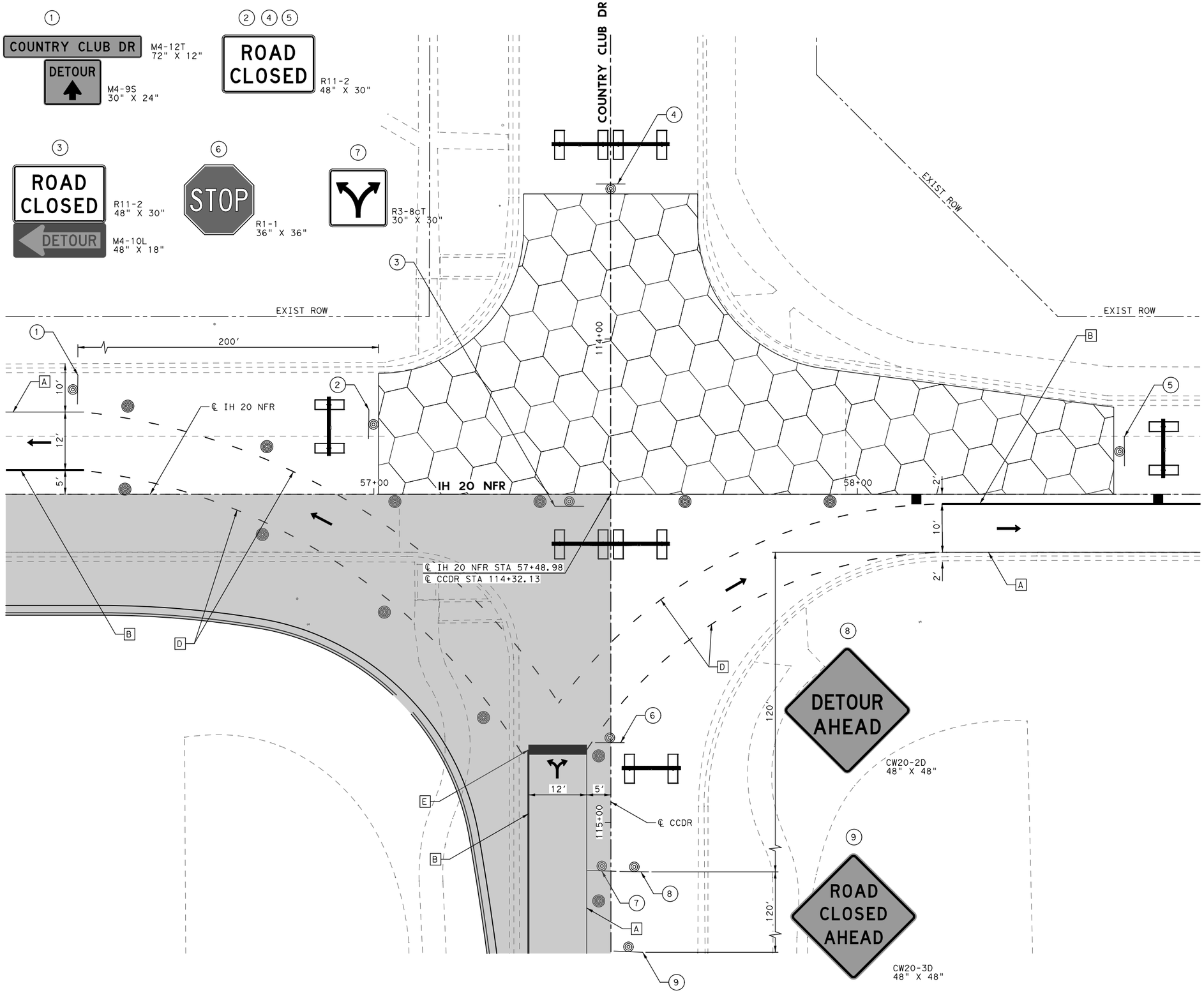
JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

TRUCK DETOUR
PHASE 1

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	37
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				



STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
04/22/2022

JMT TBPE REGISTRATION NO. F-16341

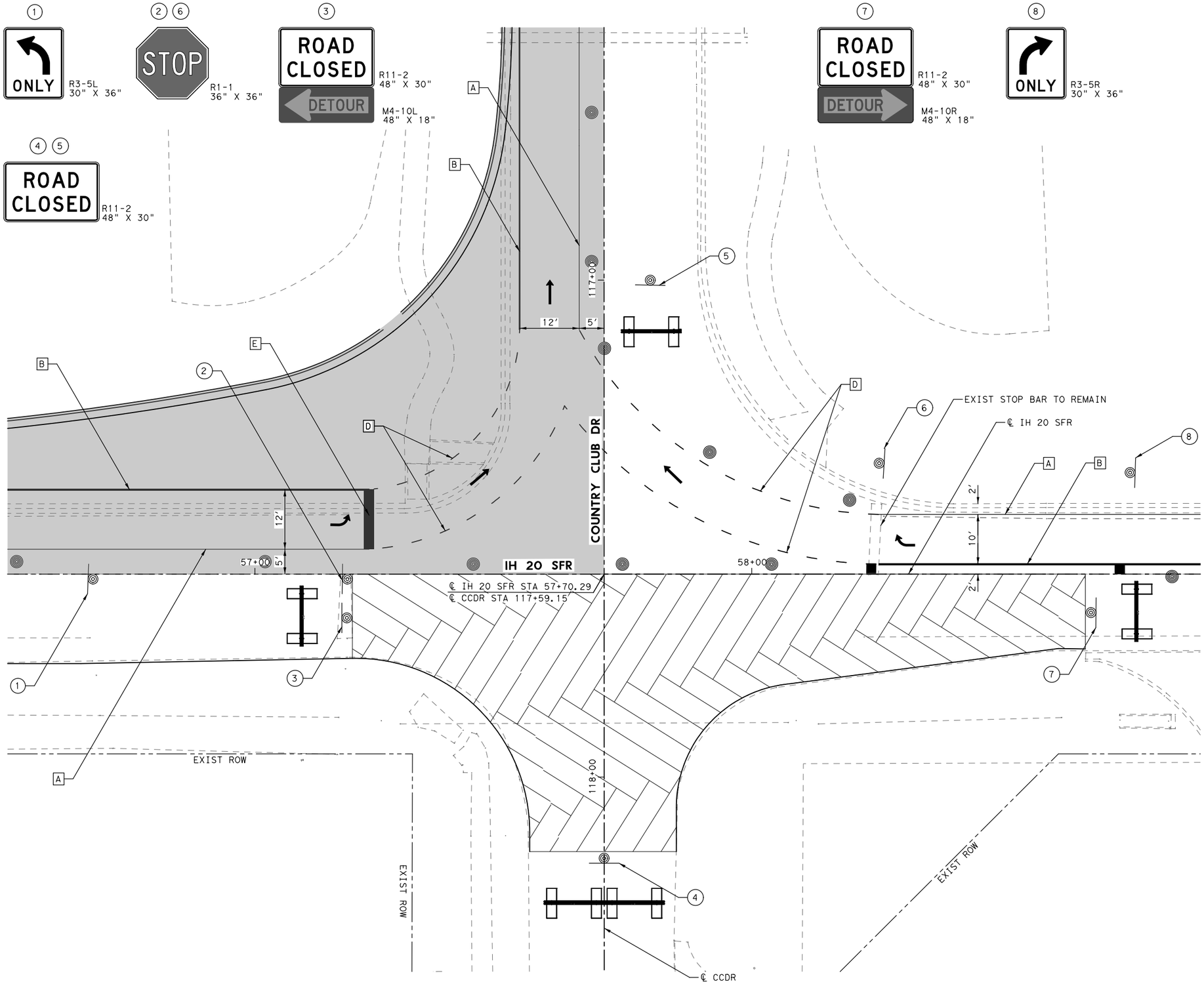
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP PHASING DETAIL
PHASE 1A

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	38
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*P



0′ 10′ 20′

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- TYPE III BARRICADE
- SIGN POST
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (Y) 4" (SLD)
- C WK ZN PAV MRK REMOV (W) 8" (SLD)
- D WK ZN PAV MRK REMOV (W) 4" (DOT)
- E WK ZN PAV MRK REMOV (W) 24" (SLD)

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

04/22/2022

JMT TBPE REGISTRATION NO. F-16341

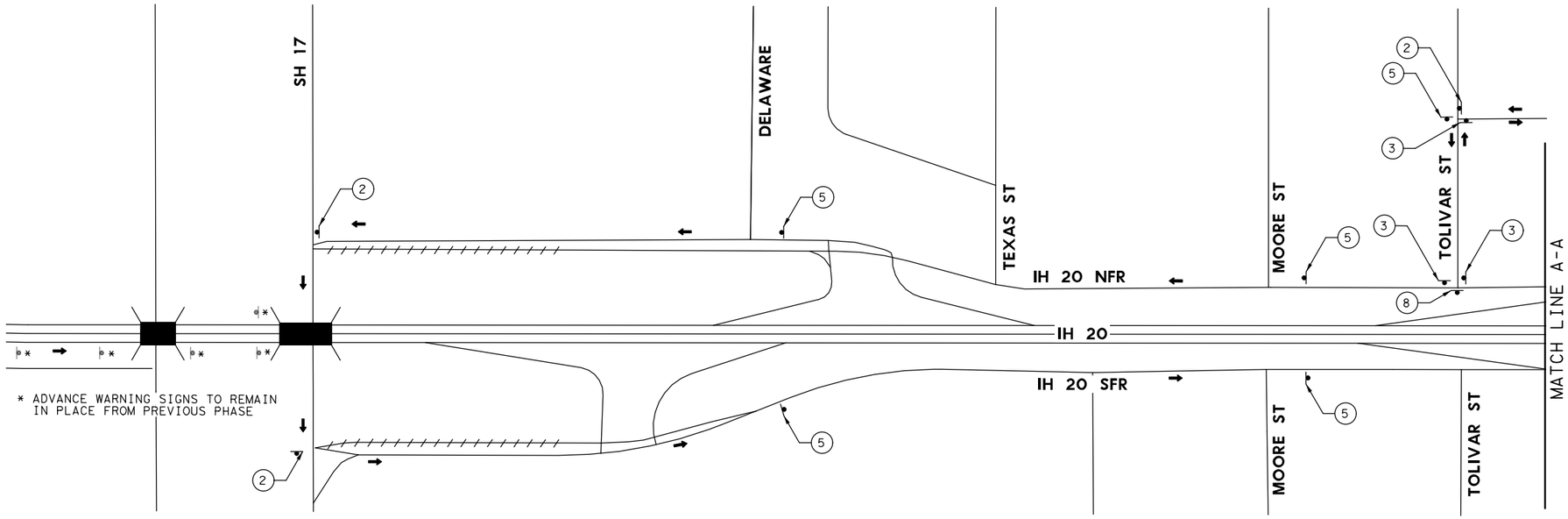
Texas Department of Transportation

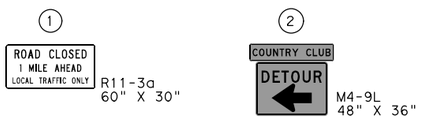
IH 20 AT COUNTRY CLUB DR
TCP PHASING DETAIL
PHASE 1B

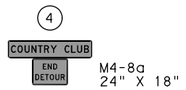
SHEET 1 OF 1

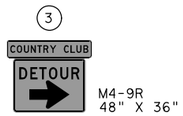
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	39
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

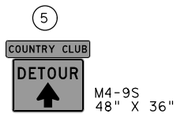
DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*P

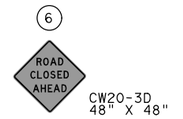


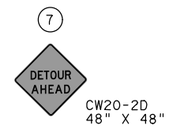


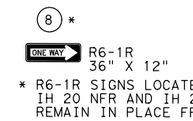




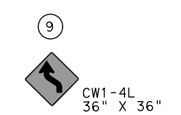


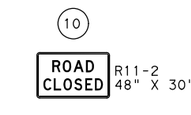


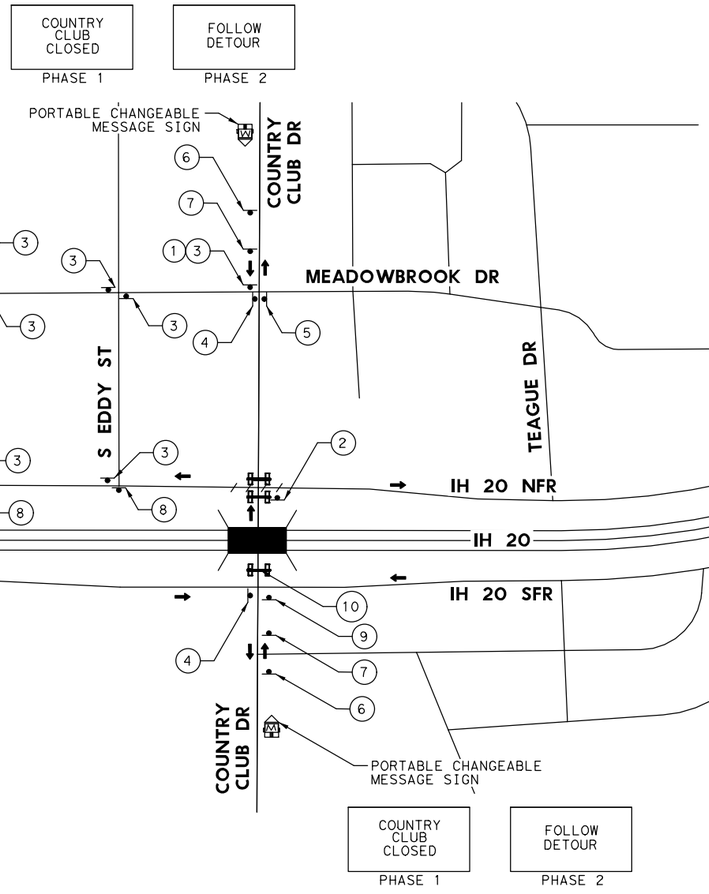




* R6-1R SIGNS LOCATED ON IH 20 NFR AND IH 20 SFR TO REMAIN IN PLACE FROM PHASE 1







LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500' IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
4. DRUMS MUST BE PLACED IN PHASE 1A TO BLOCK THE EASTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND WESTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.
5. PHASE 1 IH 20 SFR AND NFR DETOUR SIGNS AND PCMS TO REMAIN IN PLACE FOR PHASE 1A.

JMT TBPE REGISTRATION NO. F-16341

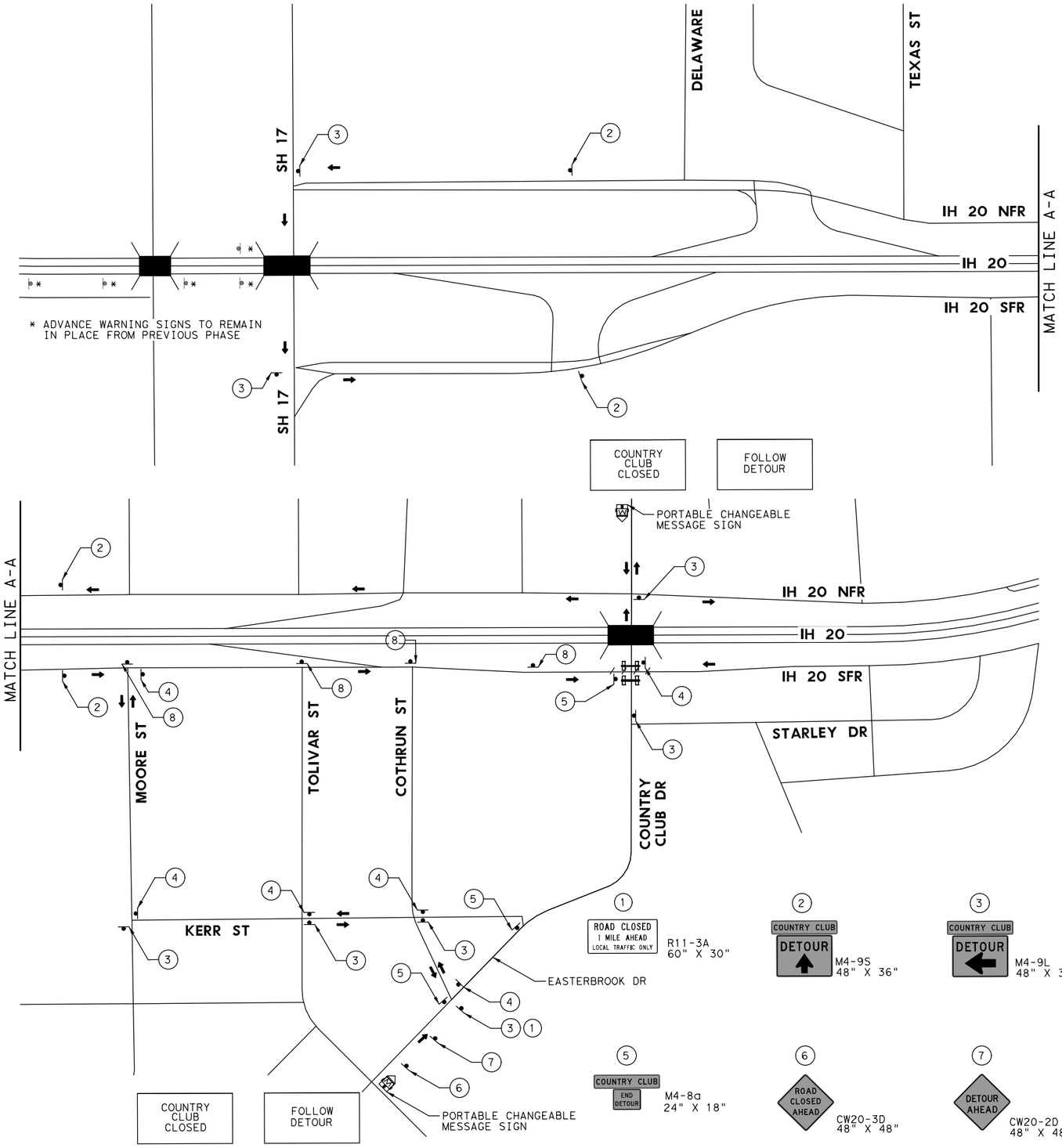
Texas Department of Transportation

DETOUR PLAN
PHASE 1A

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	40
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*DETOUR



0′ 250′ 500′

SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.
4. DRUMS MUST BE PLACED IN PHASE 1B TO BLOCK THE EASTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND WESTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.
5. PHASE 1 IH 20 SFR AND NFR DETOUR SIGNS AND PCMS TO REMAIN IN PLACE FOR PHASE 1B.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER
03/30/2022

1. ROAD CLOSED 1 MILE AHEAD LOCAL TRAFFIC ONLY — R11-3A 60" X 30"
2. COUNTRY CLUB DETOUR — M4-9S 48" X 36"
3. COUNTRY CLUB DETOUR — M4-9L 48" X 36"
4. COUNTRY CLUB DETOUR — M4-9R 48" X 36"
5. COUNTRY CLUB END DETOUR — M4-8a 24" X 18"
6. ROAD CLOSED AHEAD — CW20-3D 48" X 48"
7. DETOUR AHEAD — CW20-2D 48" X 48"
8. ONE WAY — R6-1R 36" X 12"

* R6-1R SIGNS LOCATED ON IH 20 NFR AND IH 20 SFR TO REMAIN IN PLACE FROM PHASE 1

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

DETOUR PLAN
PHASE 1B

SHEET 1 OF 1

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS	STATE	DISTRICT	COUNTY
JMT	TEXAS	ODA	REEVES
CHECK	CONTROL	SECTION	JOB
JMT	0003	07	064,ETC
CHECK			
JMT			

SHEET NO. 41

DATE: 3/30/2022
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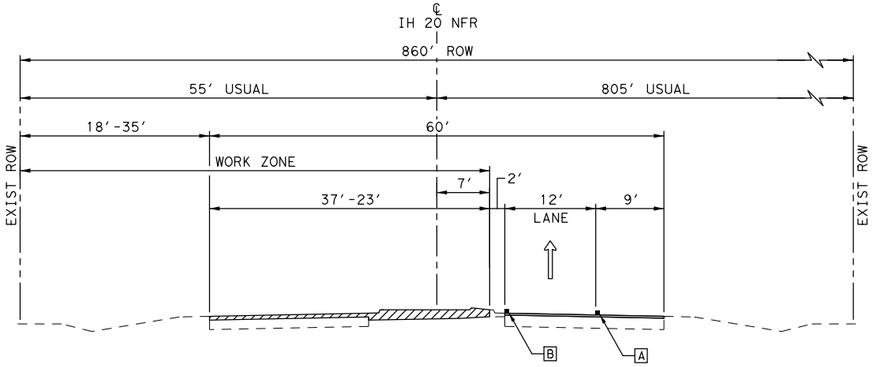
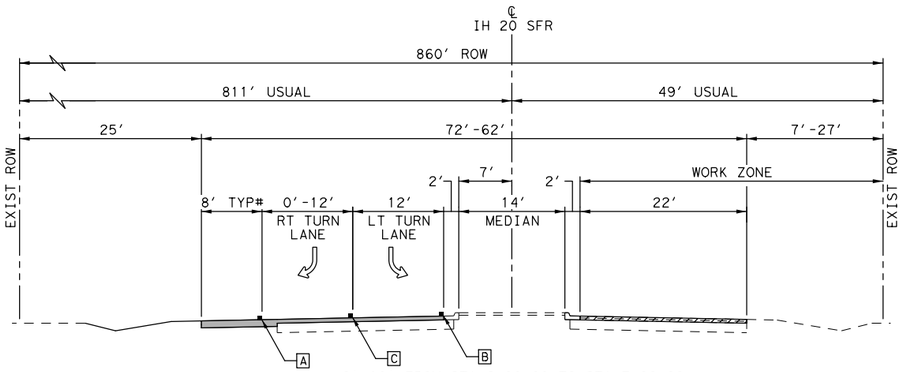


TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 2)

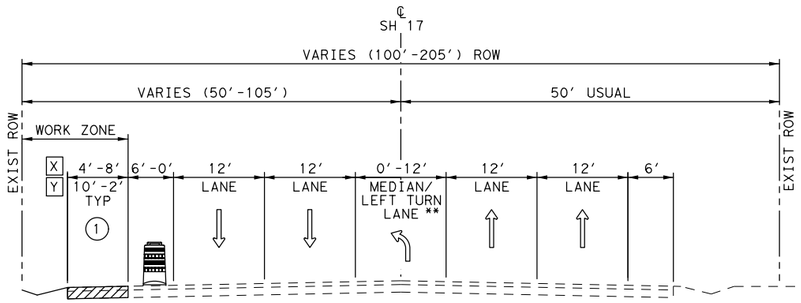
STA 0+00.00 TO STA 7+04.00



#8′-10′ FROM STA 6+00.00 TO STA 7+00.00

TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 2)

STA 0+00.00 TO STA 7+00.00



**LEFT TURN LANE OF SH17 WILL BE CLOSED FROM STA 74+00 TO STA 76+00
LEFT TURN LANE OF SH17 WILL REMAIN OPEN FROM STA 66+00 TO STA 68+50

TRAFFIC CONTROL TYPICAL SECTION-SH 17 (PHASE 2)

X STA 59+74.56 TO STA 67+50.00
Y STA 76+75.00 TO STA 79+44.47

0′ 10′ 20′

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (Y) 4" (SLD)
- C WK ZN PAV MRK REMOV (W) 8" (SLD)

NOTES:

1. REFER TO TCP(2-5) FOR DETAILS ON LONG TERM LANE CLOSURES.
2. EXISTING PAVEMENT MARKINGS TO REMAIN UNLESS OTHERWISE SHOWN.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER

04/22/2022

JMT TBPE REGISTRATION NO. F-16341

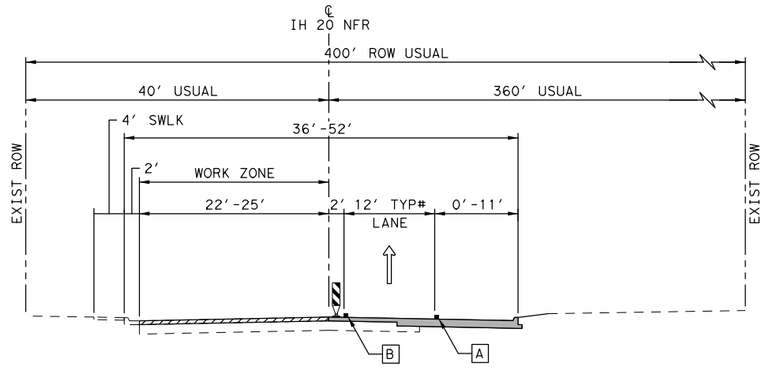
Texas Department of Transportation

IH 20 AT SH 17
TCP TYPICAL SECTIONS
PHASE 2

SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	42
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

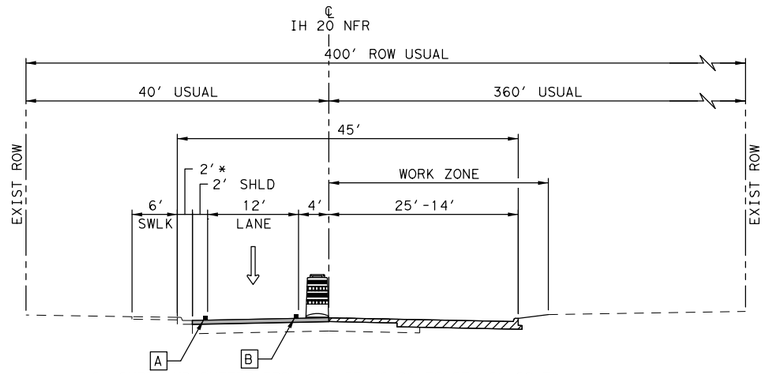
DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\SH17 *TCP



#10'-12' DOWNSTREAM TAPER FROM STA 48+10.00 TO STA 49+10.00

TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 2)

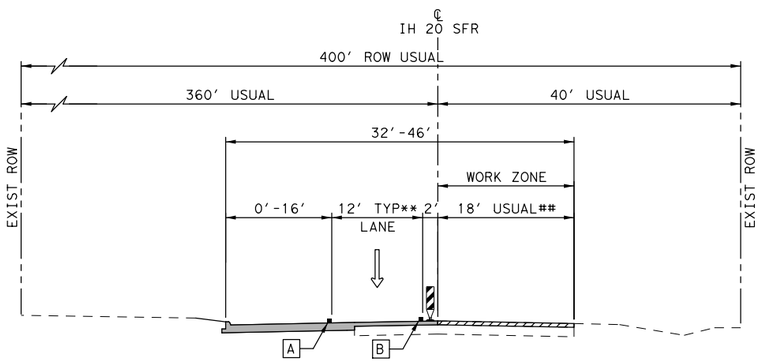
STA 48+10.00 TO STA 57+48.98



*2' CURB AND GUTTER FROM STA 57+48.98 TO STA 61+60.71

TRAFFIC CONTROL TYPICAL SECTION-IH 20 NFR (PHASE 2)

STA 57+48.98 TO STA 67+46.00



**10'-12' DOWNSTREAM TAPER FROM STA 47+45.00 TO STA 48+45.00
##18'-17' FROM STA 56+65.00 TO STA 57+19.64

TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 2)

STA 47+45.00 TO STA 57+70.29

0' 10' 20'

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (Y) 4" (SLD)
- C WK ZN PAV MRK REMOV (W) 8" (SLD)

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
04/22/2022

JMT TBPE REGISTRATION NO. F-16341

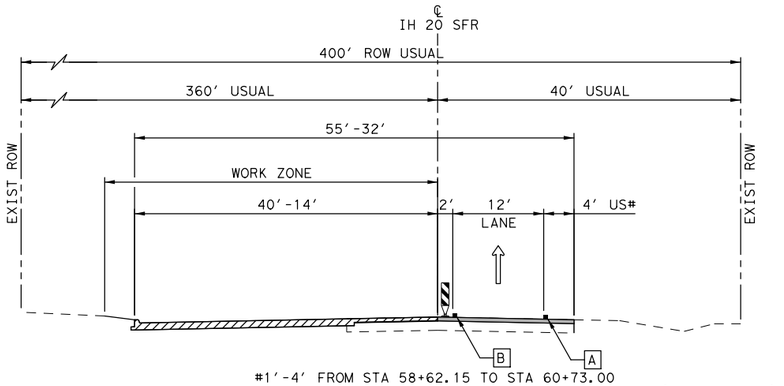
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 2

SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	
CHECK JMT	CONTROL	SECTION	JOB	43
	0003	07	064,ETC	

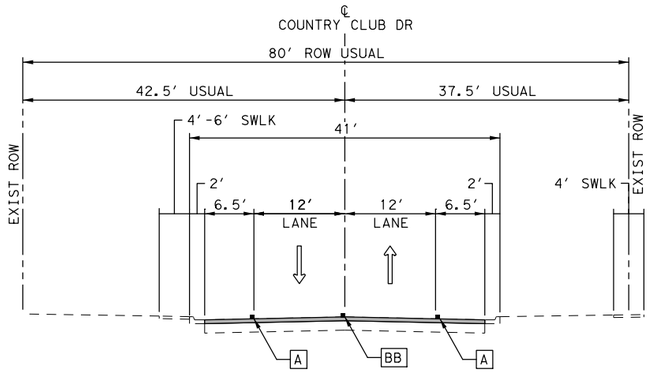
DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



#1'-4' FROM STA 58+62.15 TO STA 60+73.00

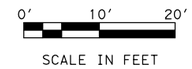
TRAFFIC CONTROL TYPICAL SECTION-IH 20 SFR (PHASE 2)

STA 58+60.49 TO STA 68+26.00



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 2)

STA 113+70.00 TO STA 114+32.13



LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (Y) 4" (SLD)
- C WK ZN PAV MRK REMOV (W) 8" (SLD)

JMT TBPE REGISTRATION NO. F-16341

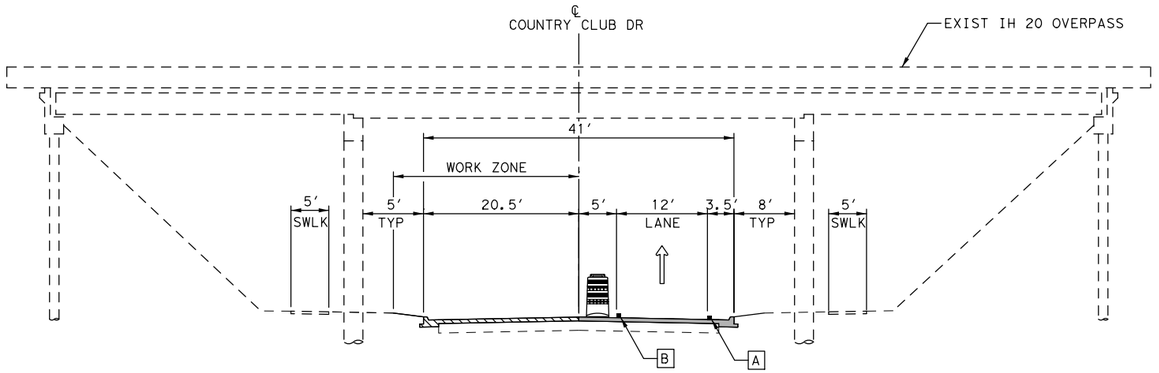
Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 2

SHEET 3 OF 4

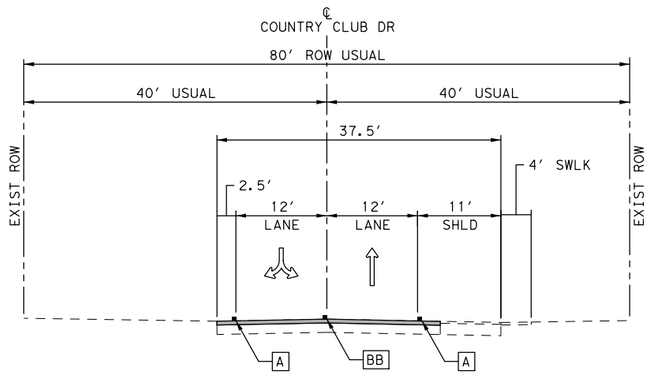
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	44
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 4/20/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\CCD*TCP*T



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 2)

STA 114+32.13 TO STA 117+59.15



TRAFFIC CONTROL TYPICAL SECTION-COUNTRY CLUB DR (PHASE 2)

STA 117+59.15 TO STA 118+15.00

0' 10' 20'

SCALE IN FEET

LEGEND

- TRAFFIC DIRECTION
- DRUM
- VERTICAL PANEL
- CONSTRUCT THIS PHASE/STEP
- CONSTRUCTED PREVIOUS PHASE(S)/STEP(S)
- A WK ZN PAV MRK REMOV (W) 4" (SLD)
- B WK ZN PAV MRK REMOV (Y) 4" (SLD)
- C WK ZN PAV MRK REMOV (W) 8" (SLD)

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
04/22/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 AT COUNTRY CLUB DR
TCP TYPICAL SECTIONS
PHASE 2

SHEET 4 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	45
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

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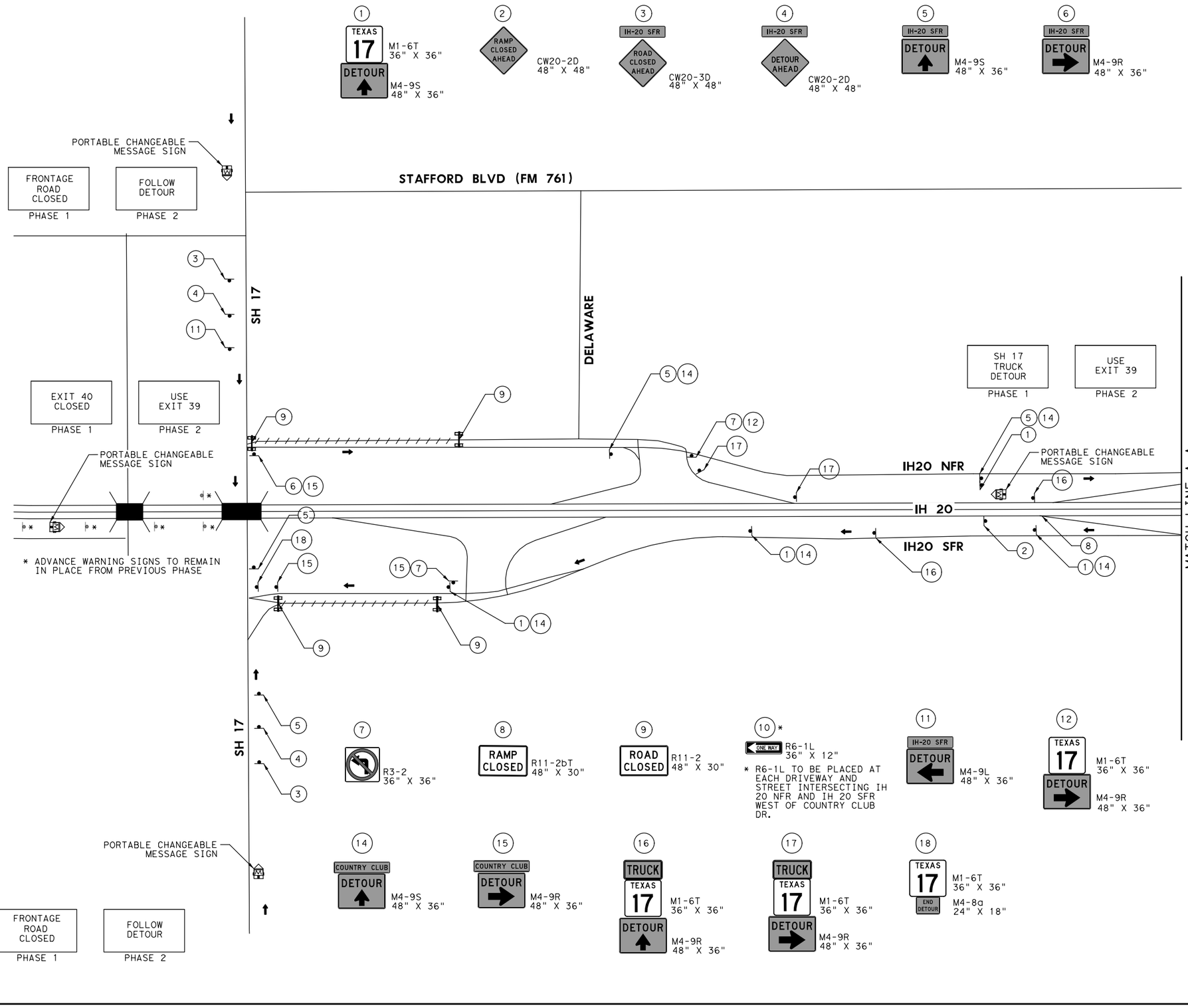


1. TEXAS 17 DETOUR — M1-6T 36" X 36", M4-9S 48" X 36"
2. RAMP CLOSED AHEAD — CW20-2D 48" X 48"
3. IH-20 SFR ROAD CLOSED AHEAD — CW20-3D 48" X 48"
4. IH-20 SFR DETOUR AHEAD — CW20-2D 48" X 48"
5. IH-20 SFR DETOUR — M4-9S 48" X 36"
6. IH-20 SFR DETOUR — M4-9R 48" X 36"
7. R3-2 36" X 36"
8. RAMP CLOSED — R11-2bT 48" X 30"
9. ROAD CLOSED — R11-2 48" X 30"
10. * ONE WAY — R6-1L 36" X 12"
    * R6-1L TO BE PLACED AT EACH DRIVEWAY AND STREET INTERSECTING IH 20 NFR AND IH 20 SFR WEST OF COUNTRY CLUB DR.
11. IH-20 SFR DETOUR — M4-9L 48" X 36"
12. TEXAS 17 DETOUR — M1-6T 36" X 36", M4-9R 48" X 36"
14. COUNTRY CLUB DETOUR — M4-9S 48" X 36"
15. COUNTRY CLUB DETOUR — M4-9R 48" X 36"
16. TRUCK TEXAS 17 DETOUR — M1-6T 36" X 36", M4-9R 48" X 36"
17. TRUCK TEXAS 17 DETOUR — M1-6T 36" X 36", M4-9R 48" X 36"
18. TEXAS 17 END DETOUR — M1-6T 36" X 36", M4-8a 24" X 18"

0′ 250′ 500′
SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.
4. DRUMS MUST BE PLACED IN PHASE 2 TO BLOCK THE WESTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND EASTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022
Jennifer R Perry

JMT TBPE REGISTRATION NO. F-16341

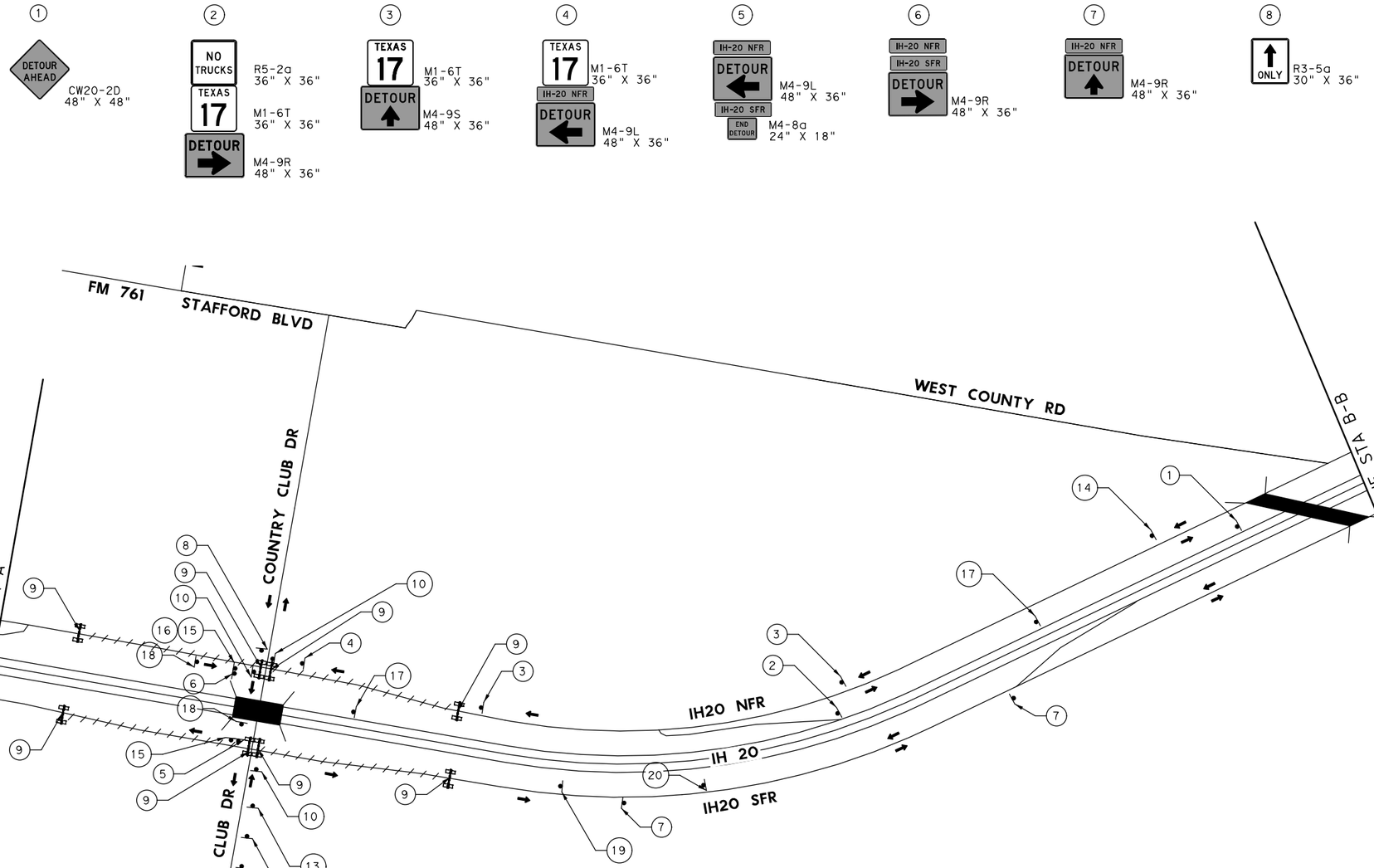
Texas Department of Transportation

DETOUR PLAN
PHASE 2

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	46
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*DETOUR PLAN PHASE 2.dgn



1. DETOUR AHEAD — CW20-2D, 48" X 48"
2. NO TRUCKS — R5-2a, 36" X 36"; TEXAS 17 — M1-6T, 36" X 36"; DETOUR — M4-9R, 48" X 36"
3. TEXAS 17 — M1-6T, 36" X 36"; DETOUR — M4-9S, 48" X 36"
4. TEXAS 17 — M1-6T, 36" X 36"; IH-20 NFR; DETOUR — M4-9L, 48" X 36"
5. IH-20 NFR; DETOUR — M4-9L, 48" X 36"; IH-20 SFR; END DETOUR — M4-8a, 24" X 18"
6. IH-20 NFR; IH-20 SFR; DETOUR — M4-9R, 48" X 36"
7. IH-20 NFR; DETOUR — M4-9R, 48" X 36"
8. ONLY — R3-5a, 30" X 36"
9. ROAD CLOSED — R11-2, 48" X 30"
10. R3-8cT, 30" X 30"
11. ROAD CLOSED AHEAD — CW20-3D, 48" X 48"
12. DETOUR AHEAD — CW20-2D, 48" X 48"
13. COUNTRY CLUB; DETOUR — M4-9L, 48" X 36"
14. IH-20 SFR; DETOUR — M4-9R, 48" X 36"
15. TEXAS 17 — M1-6T, 36" X 36"; DETOUR — M4-9R, 48" X 36"
16. COUNTRY CLUB; END DETOUR — M4-8a, 24" X 18"
17. TRUCK; TEXAS 17 — M1-6T, 36" X 36"; DETOUR — M4-9R, 48" X 36"
18. TRUCK; TEXAS 17 — M1-6T, 36" X 36"; DETOUR — M4-9R, 48" X 36"
19. ROAD CLOSED 500 FT — CW20-3C, 48" X 48"
20. ROAD CLOSED 1000 FT — CW20-3B, 48" X 48"

0′ 250′ 500′
SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.
4. DRUMS MUST BE PLACED IN PHASE 2 TO BLOCK THE WESTBOUND LANE OF IH 20 NORTH FRONTAGE ROAD AND EASTBOUND LANE OF IH 20 SOUTH FRONTAGE ROAD FROM SH 17 TO COUNTRY CLUB DR.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

DETOUR PLAN
PHASE 2

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

SHEET NO. 47

DATE: 3/30/2022
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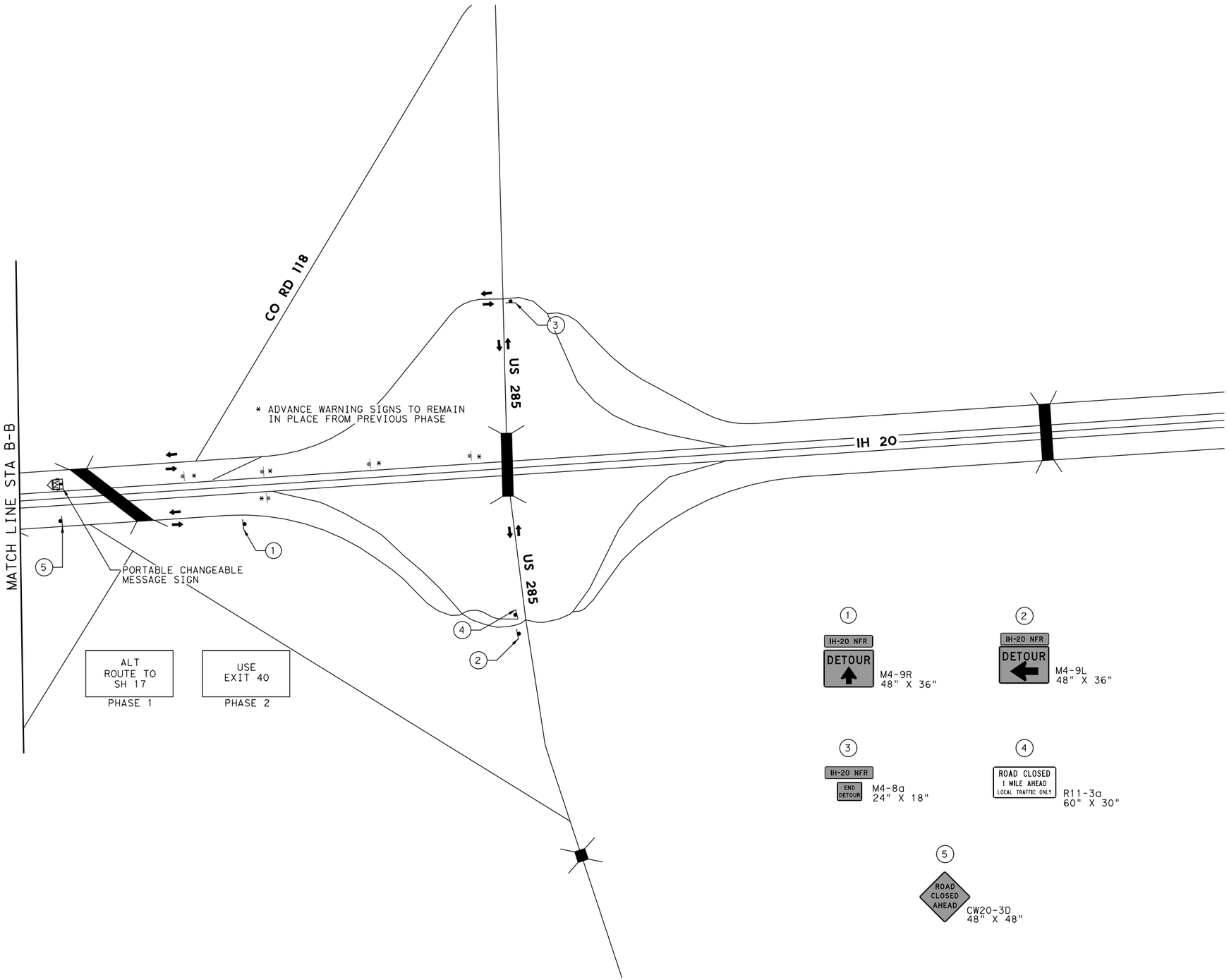


0′ 250′ 500′

SCALE IN FEET

LEGEND

- CONSTRUCTION
- TRAFFIC DIRECTION
- TRAFFIC SIGN THIS PHASE
- TRAFFIC SIGN PREVIOUS PHASE
- TYPE III BARRICADE

NOTES:

1. SIGN SPACING TO MEET REQUIREMENTS AS SHOWN ON BC SHEETS.
2. PORTABLE CHANGEABLE MESSAGE SIGNS ARE TO BE PLACED 500′ IN ADVANCE OF CLOSED SIDESTREET/RAMP IN BOTH DIRECTIONS A MINIMUM OF 7 DAYS IN ADVANCE OF CLOSURE OR AS DIRECTED. ALL MESSAGES MUST BE APPROVED.
3. SIGNS NOT TO SCALE.

1. IH-20 NFR / DETOUR — M4-9R 48" X 36"
2. IH-20 NFR / DETOUR — M4-9L 48" X 36"
3. IH-20 NFR / END DETOUR — M4-8a 24" X 18"
4. ROAD CLOSED I MILE AHEAD LOCAL TRAFFIC ONLY — R11-3a 60" X 30"
5. ROAD CLOSED AHEAD — CW20-3D 48" X 48"

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

DETOUR PLAN
PHASE 2

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	48
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

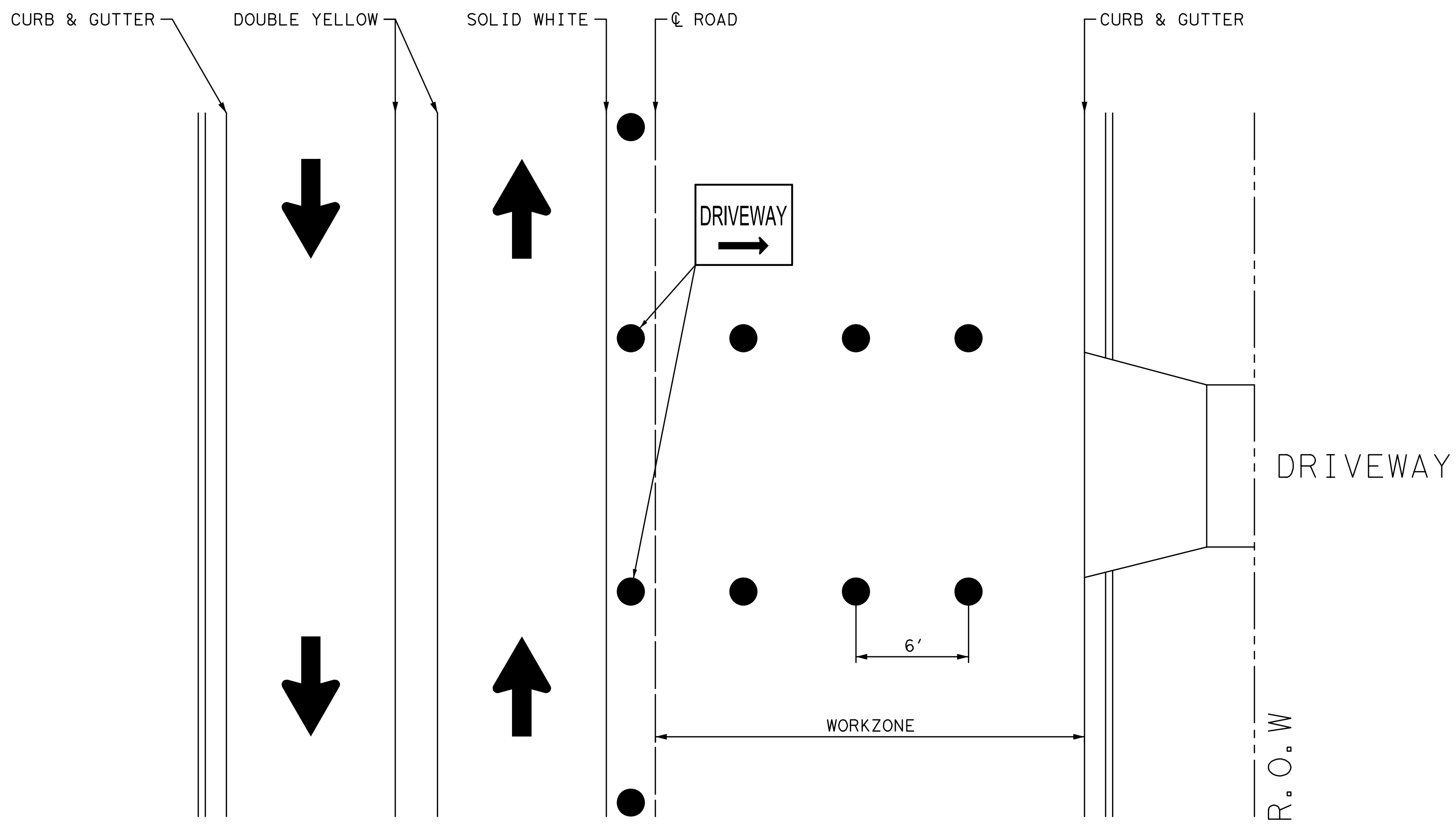
DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\ODA*DETOUR

FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des

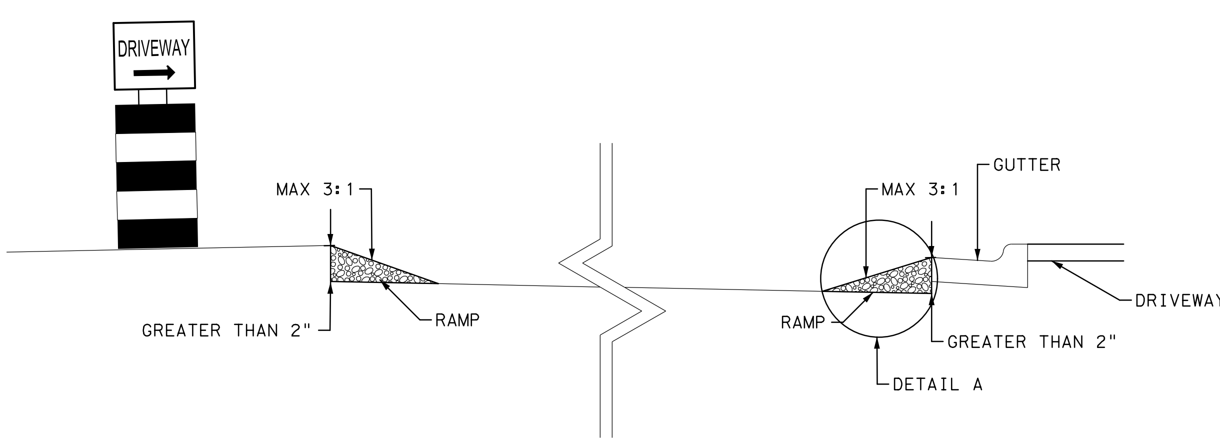
DATE: 3/30/2022

LEGEND

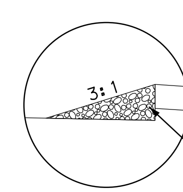
● PLASTIC DRUMS - SEE STANDARD BC(8) - 14



PLAN VIEW



CROSS-SECTION VIEW



BACKFILL EDGE WITH RAP AFTER PLANING, REMOVE RAP PRIOR TO HOTMIX PLACEMENT. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO ITEM 502-6001 "BARRICADES, SIGNS AND TRAFFIC HANDLING."

DETAIL A

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

06/24/2021

infraTECH Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

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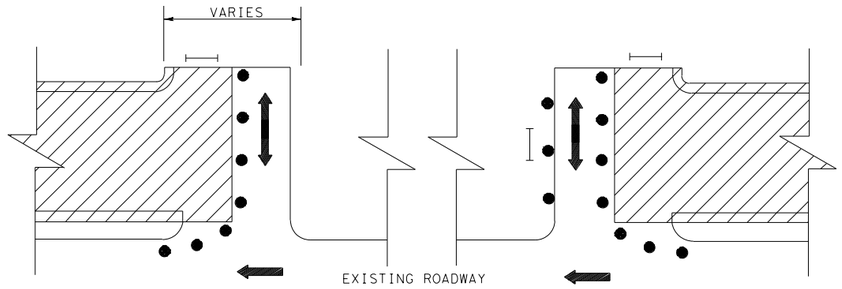
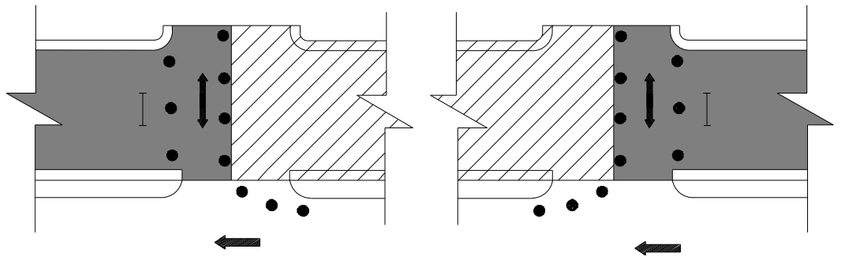
TRAFFIC CONTROL PLAN
DRIVEWAY CONSTRUCTION DETAIL

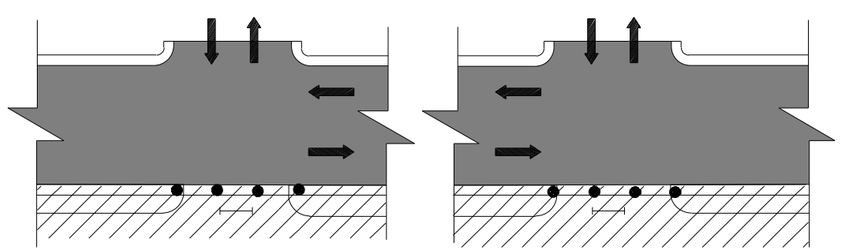
DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	ODA	REEVES	49
CHECK	CONTROL	SECTION	JOB	
IEI	0003	07	064,ETC	



1. WITH TRAFFIC ON EXISTING BUILD ONE-HALF OF DRIVEWAY.



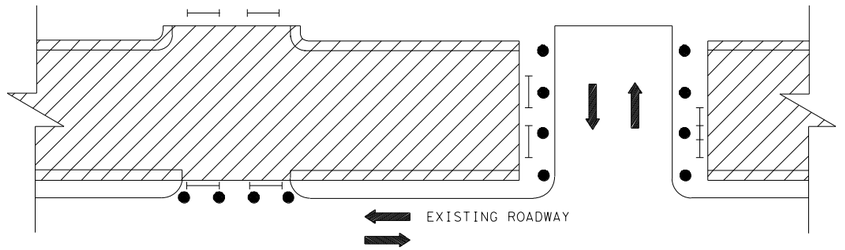
2. BUILD OTHER HALF OF DRIVEWAY.



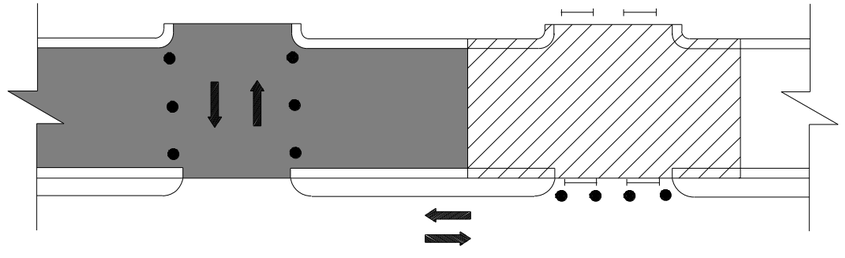
3. OPEN DRIVEWAY.

4. AFTER TRAFFIC MOVES TO NEW ROADWAY, BUILD REMAINING CURB.

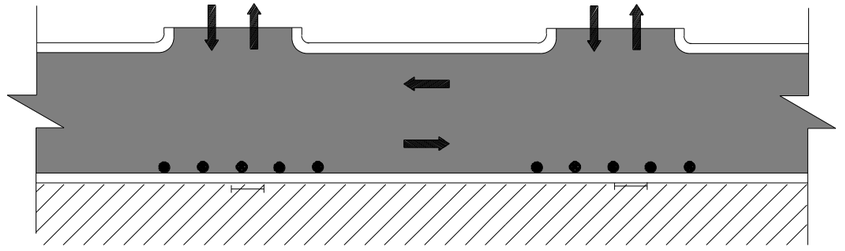
SINGLE ACCESS DRIVEWAY



1. WITH TRAFFIC ON EXISTING, BUILD ONE DRIVE.



2. OPEN COMPLETED DRIVEWAY AND BUILD NEXT DRIVEWAY.



3. AFTER TRAFFIC MOVES TO NEW ROADWAY BUILD REMAINING CURBS.

MULTIPLE ACCESS DRIVES

CONSTRUCTION SEQUENCE OF MISCELLANEOUS DRIVEWAYS

LEGEND

- CONSTRUCTION PHASE
- COMPLETED PHASE
- DIRECTION OF TRAFFIC
- CHANNELIZING DEVICE
- TYPE III BARRICADE

NOTES

1. CONTRACTOR TO MAINTAIN ACCESS TO RESIDENTS AND BUSINESSES AT ALL TIMES. CONSTRUCT PAVEMENT ALONG DRIVEWAYS IN CONJUNCTION WITH WORK PROGRESS.

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula

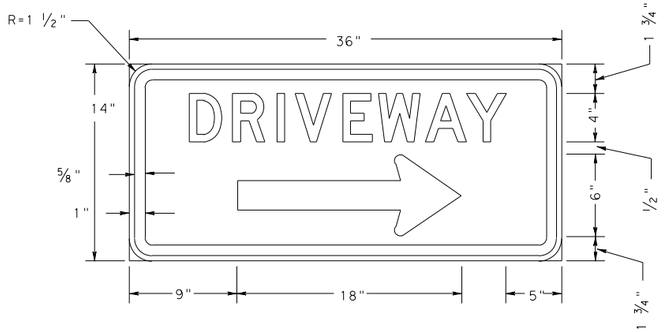
06/24/2021

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

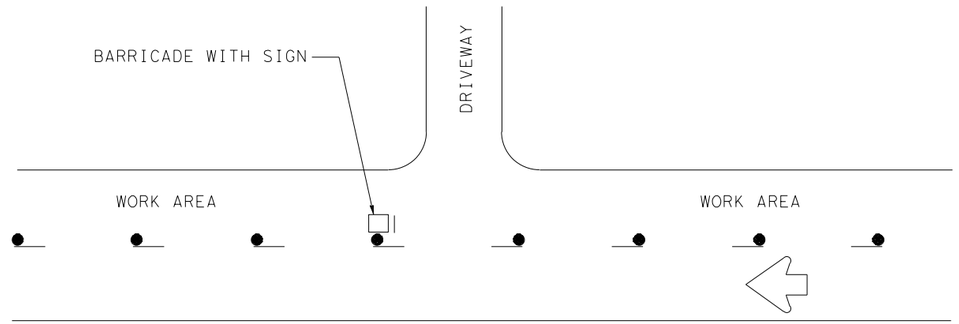
Texas Department of Transportation

TRAFFIC CONTROL PLAN
DRIVEWAYS CONSTRUCTION SEQUENCE

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	(SEE TITLE SHEET)		IH20
GRAPHICS IEI	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK IEI	TEXAS	ODA	REEVES	50
CHECK IEI	CONTROL	SECTION	JOB	
	0003	07	064,ETC	



LETTERS: WHITE
BORDER: WHITE
BACKGROUND: BLUE



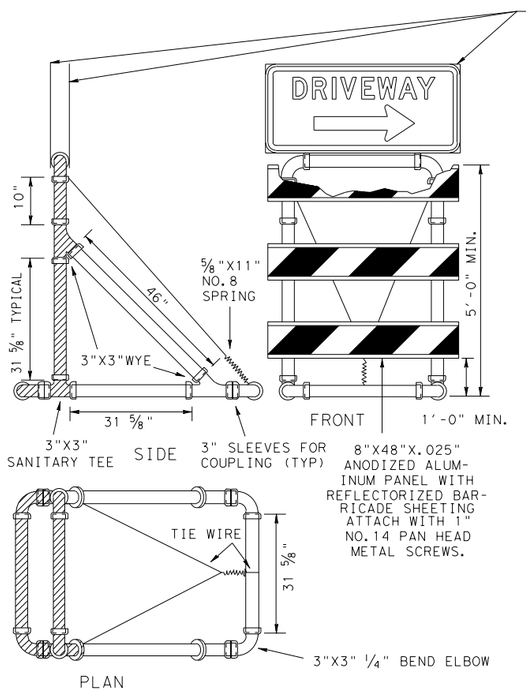
TYPICAL LOCATION OF DRIVEWAY SIGN

TYPE III PVC BARRICADES TYPICAL DESIGN DETAILS

MAY BE USED AT THE OPTION OF THE CONTRACTOR.

NOTES:

1. ALL PIPE SHALL BE POLYVINYL CHLORIDE (PVC) PRESSURE RATED PIPE SDR 21 OR SDR 26 ASTM D2241.
2. JOINT FITTINGS MAY BE PVC-ASTM D2665 OR ACRYLONITRILE BUTADLENE STYRENE (ABS) ASTM D2661 (DRAINAGE WASTE AND VENT).
3. ALL PIPE AND FITTINGS SHALL BE WHITE.
4. ALL JOINTS SHALL BE FREE TO SEPARATE UPON VEHICLE IMPACT.
5. CROSS HATCHED CONDUIT TO BE TIED TOGETHER WITH ROPE THREADED INTO PIPE INTERIOR. USE ⅜" NO. 6 SOLID BRAIDED NYLON OR EQUIVALENT.
6. A FIXED FRANGIBLE PAVEMENT CONNECTION IS PREFERRED. SAND BAGS MAY BE SUBSTITUTED.



CONSTRUCTION SIGN NOTES

MATERIALS

CONSTRUCTION SIGNS SHALL BE MADE FROM APPROVED FIBERGLASS OR HIGH IMPACT PLASTIC AS PRIMARY MATERIALS.

SIGN SHEETING

REFLECTORIZED SIGN SHALL BE CONSTRUCTED OF RETRO REFLECTIVE SHEETING MEETING THE COLOR AND REFLECTIVITY REQUIREMENTS OF MATERIAL SPECIFICATIONS, D-9-8300.

TYPE C SHEETING SHALL BE USED FOR THIS APPLICATION.

SIGN LETTERS

ALL SIGNS LETTERING SHALL BE CLEAR, OPEN ROUNDED TYPE CAPITAL LETTERS AS APPROVED BY AND AS PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION. SIGNS AND LETTERING SHALL BE OF FIRST CLASS WORKMANSHIP EQUIVALENT TO THAT OF THE DEPARTMENT'S STANDARD SIGNS.

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER
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06/24/2021

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TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

TRAFFIC CONTROL PLAN
DRIVEWAY SIGNING

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
IEI	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
IEI	TEXAS	ODA	REEVES	51
CHECK	CONTROL	SECTION	JOB	
IEI	0003	07	064, ETC	
CHECK				
IEI				

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

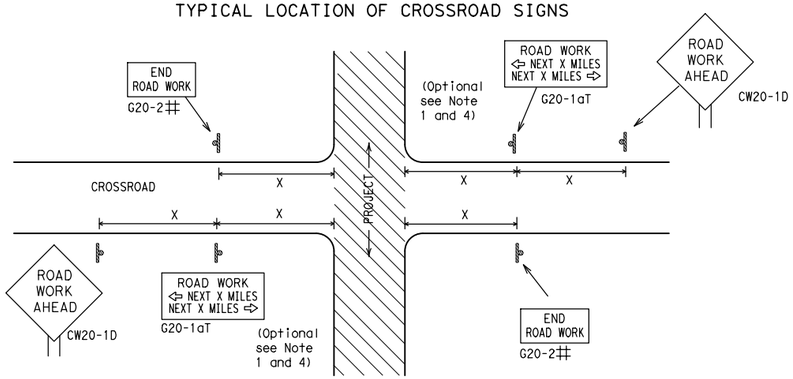
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		52

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\bc-21.dgn

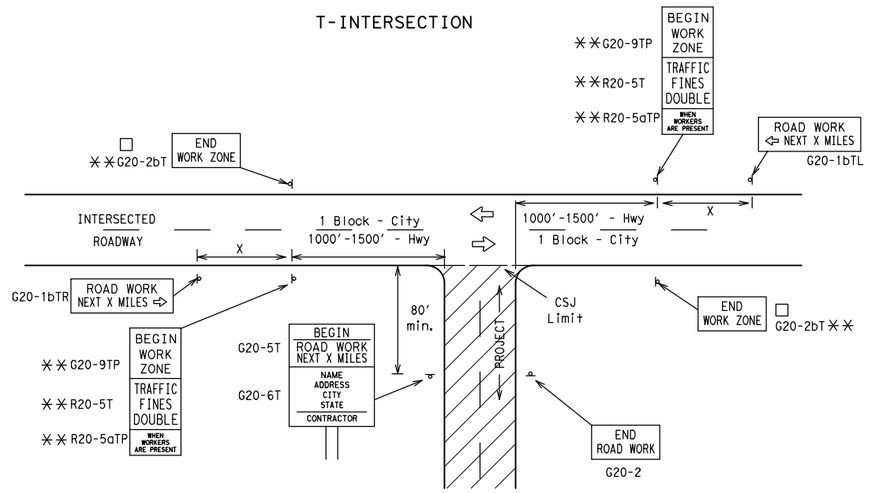
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

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

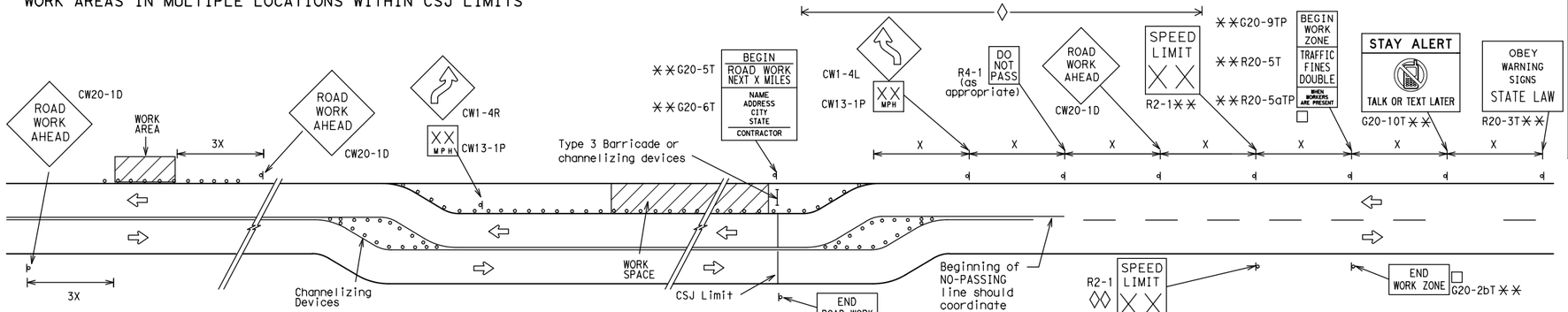
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

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

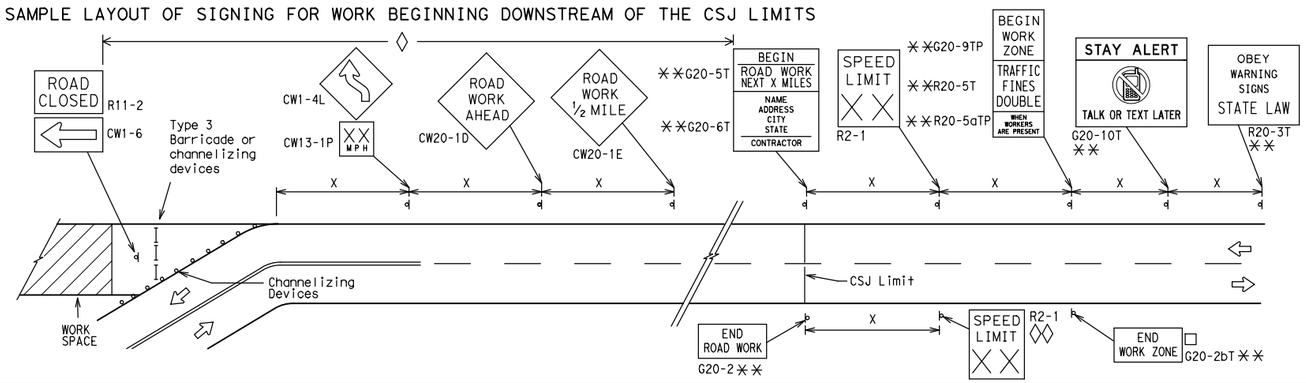
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



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

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	REEVES.		53

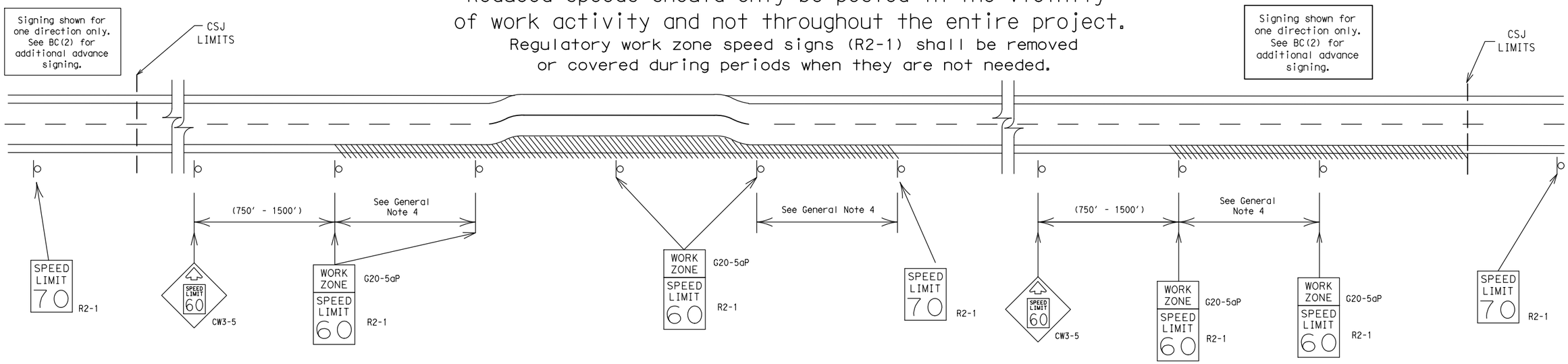
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\bc-21.dgn

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

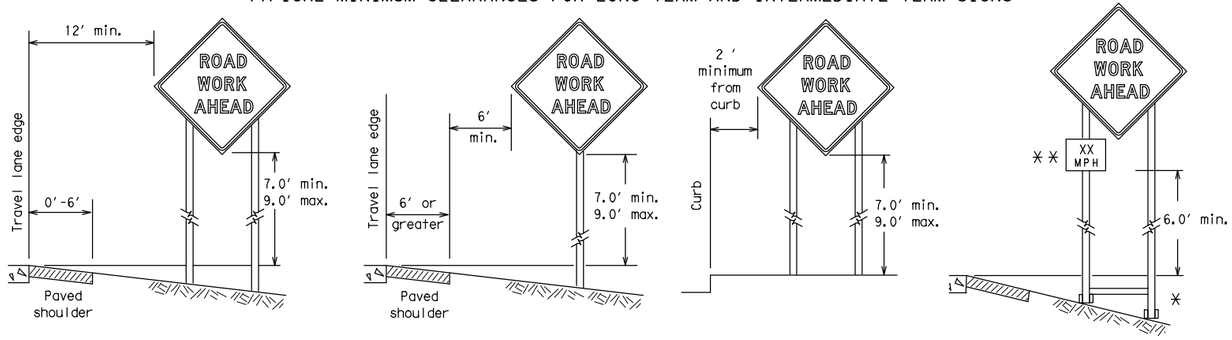
BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		54

97

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\bc-21.dgn

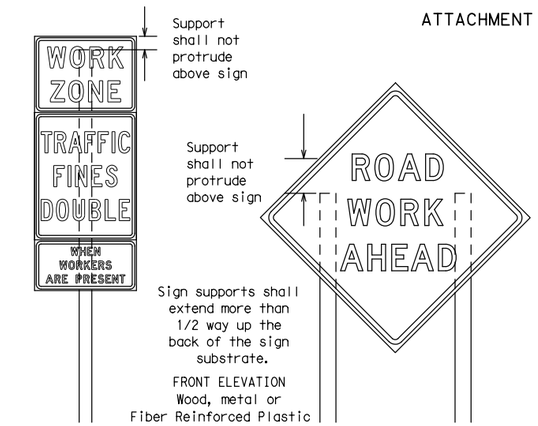
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

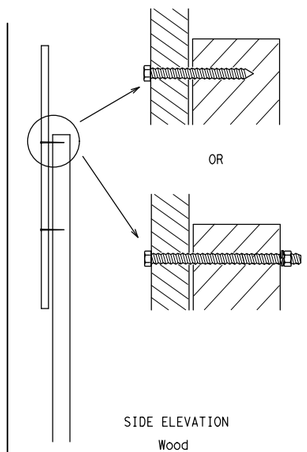


⁎ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





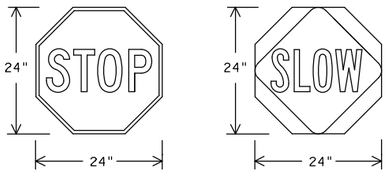
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

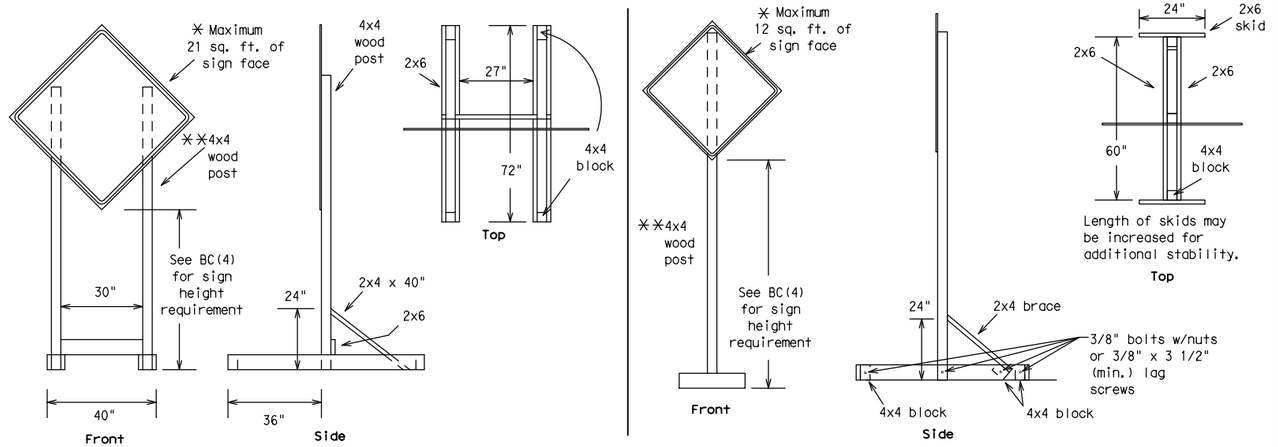
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

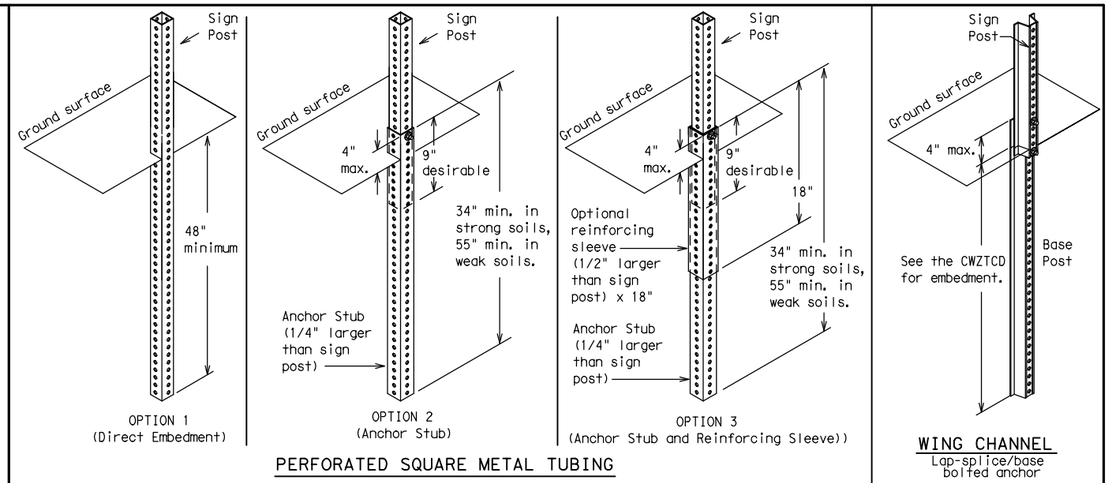
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	REEVES.		55

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards



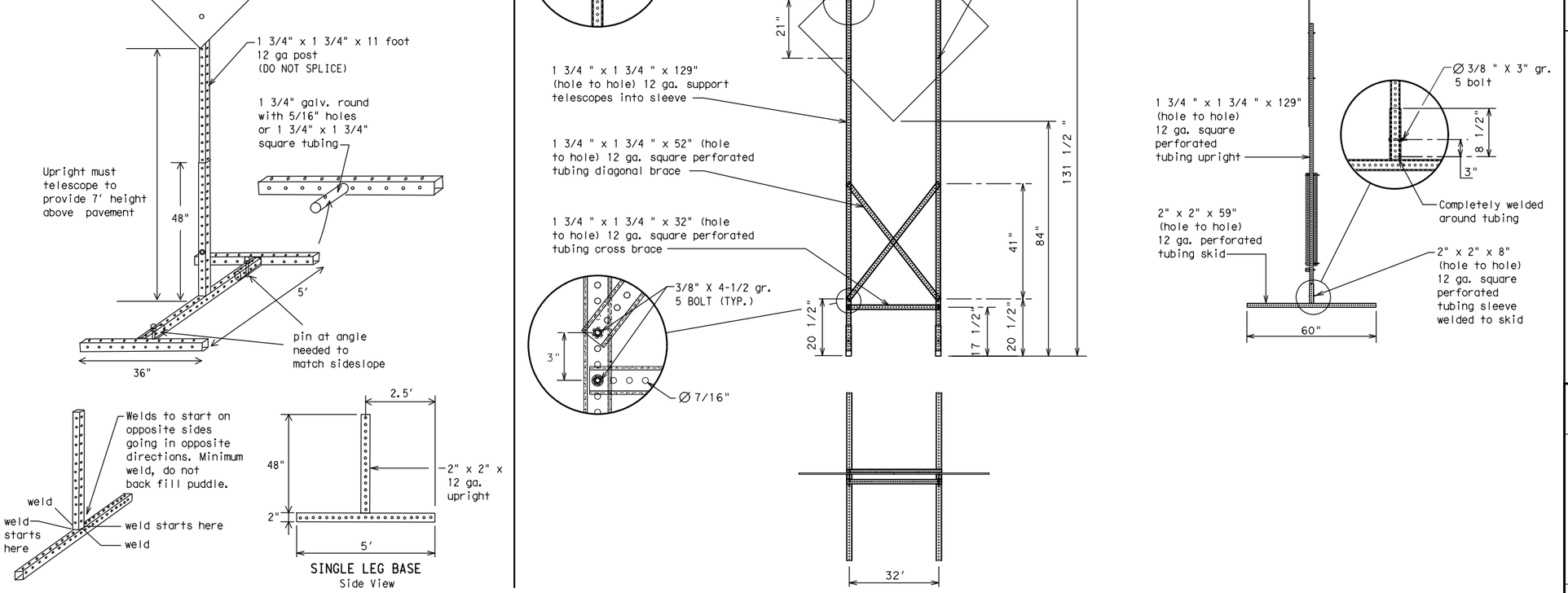
SKID MOUNTED WOOD SIGN SUPPORTS

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



GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	REEVES.		56

DATE: 3/30/2022 $TIME$
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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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

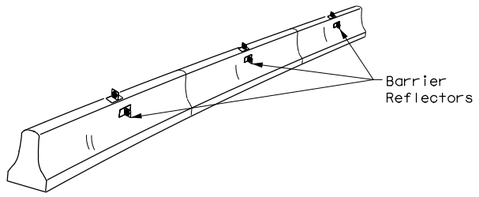
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	REEVES.		57

100

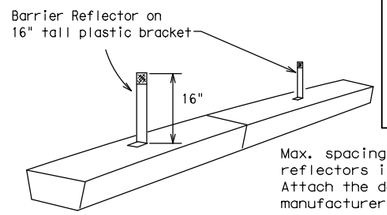
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\

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



CONCRETE TRAFFIC BARRIER (CTB)

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

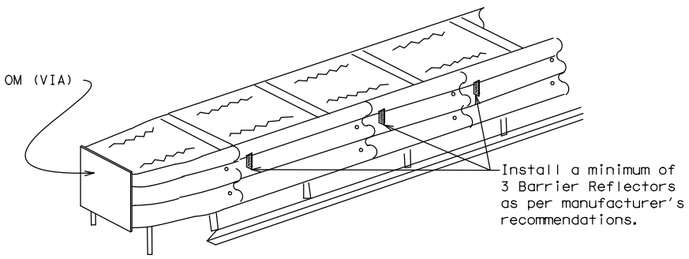


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

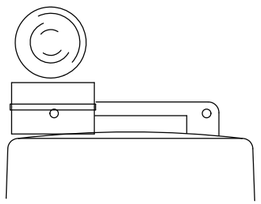


DELINEATION OF END TREATMENTS

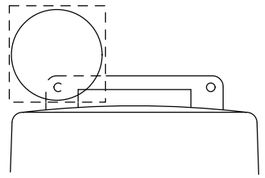
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

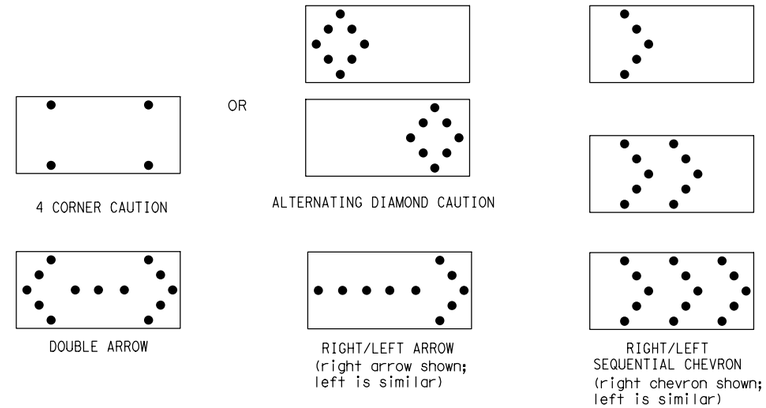
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	REEVES.		58

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DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\bc-21.dgn

GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

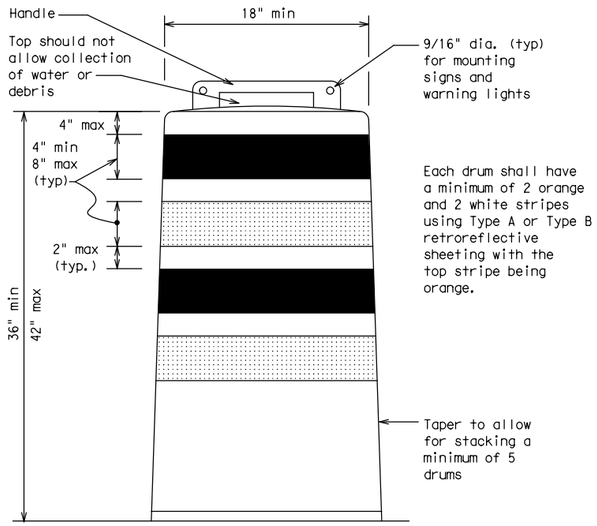
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

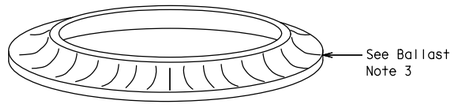
RETROREFLECTIVE SHEETING

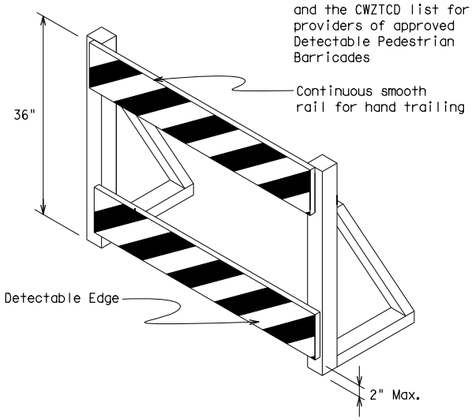
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

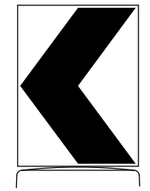




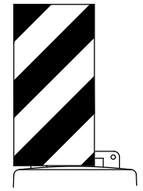


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	ODA	REEVES.		59
7-13				

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DATE: 3/30/2022 $TIME$
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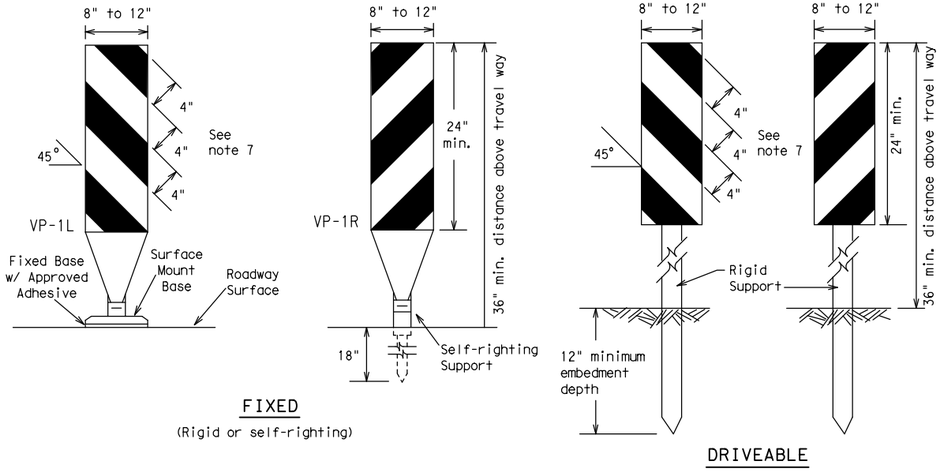
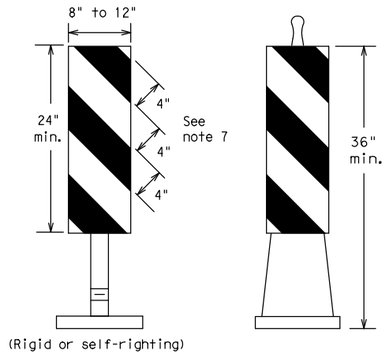


FIXED
(Rigid or self-righting)

DRIVEABLE

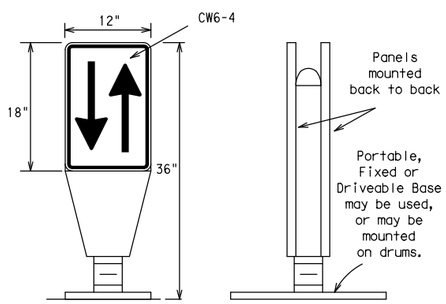


(Rigid or self-righting)

PORTABLE

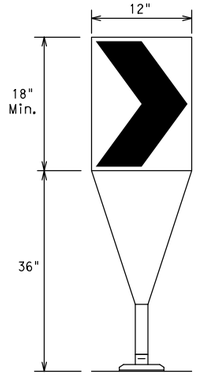
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



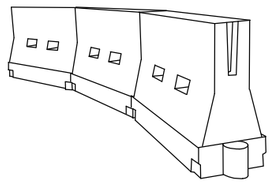
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ODA	REEVES.		60

DATE: 3/30/2022 $TIME$
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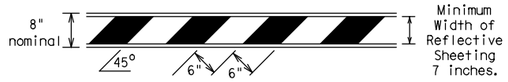
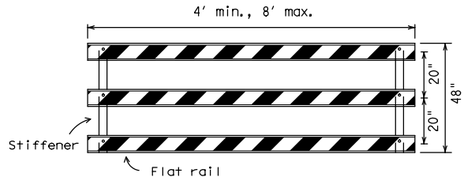
TYPE 3 BARRICADES

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 or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



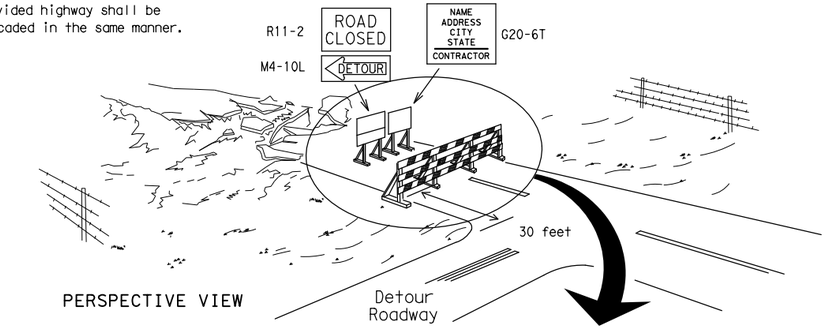
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

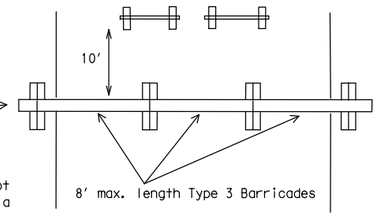
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

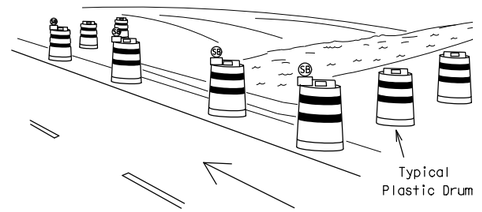
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

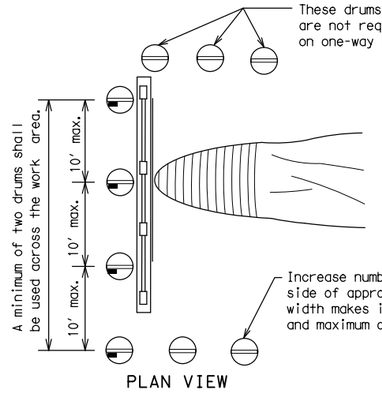
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

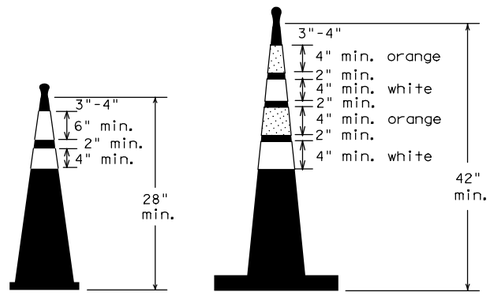
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



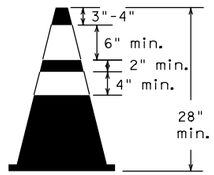
PLAN VIEW

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

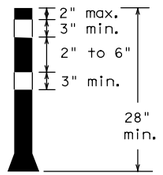
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

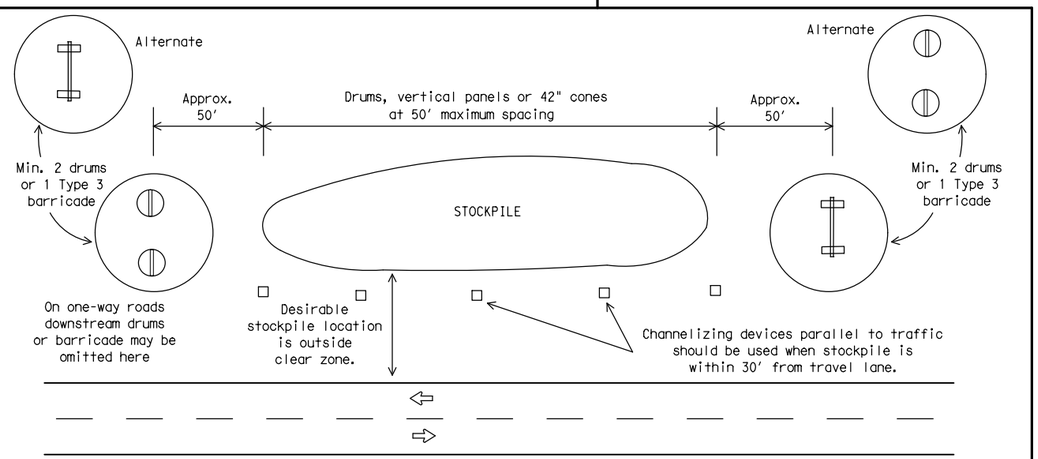


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13 5-21	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		61

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\bc-21.dgn

WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

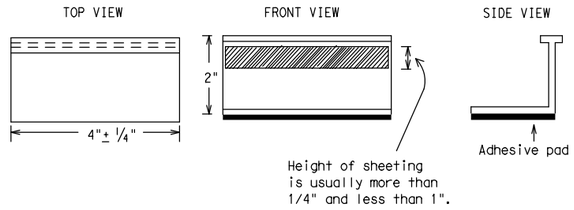
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	ODA	REEVES.		62
11-02 8-14				

DATE: 3/30/2022 $TIME$
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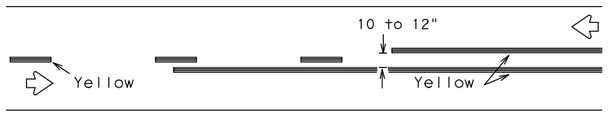
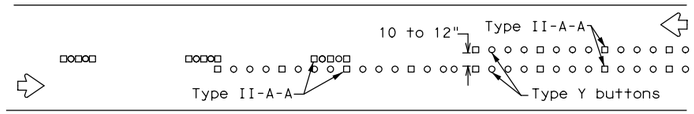
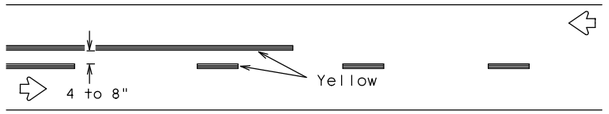
PAVEMENT MARKING PATTERNS



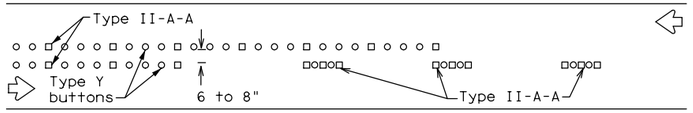
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



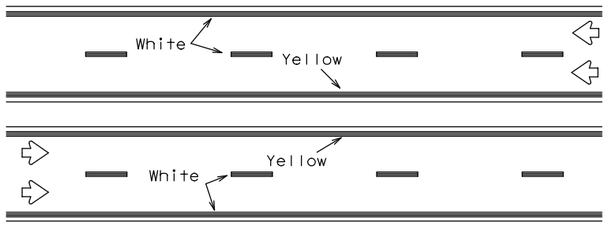
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



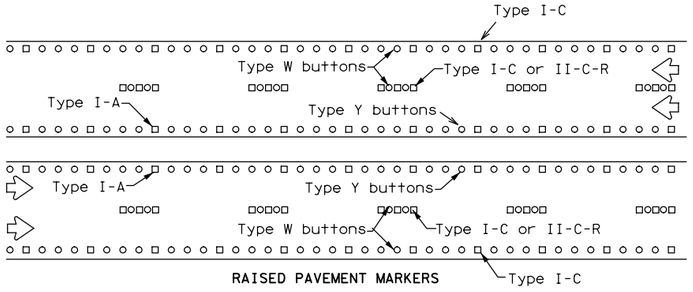
RAISED PAVEMENT MARKERS - PATTERN B

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



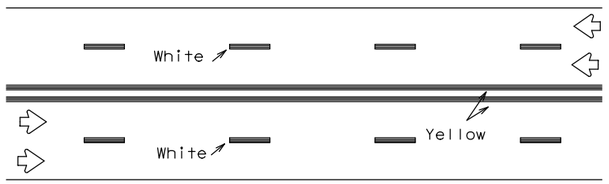
REFLECTORIZED PAVEMENT MARKINGS



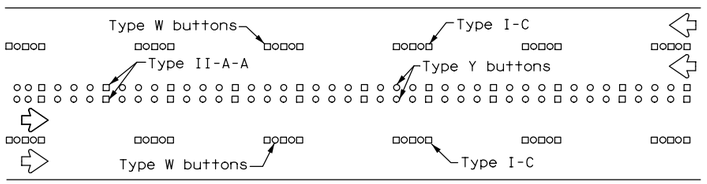
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



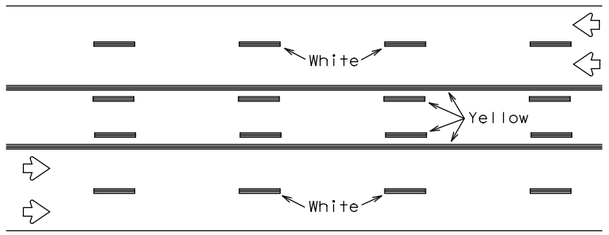
REFLECTORIZED PAVEMENT MARKINGS



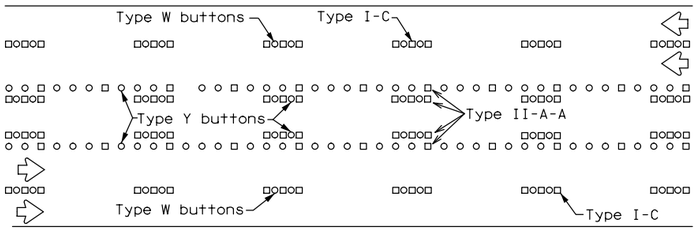
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



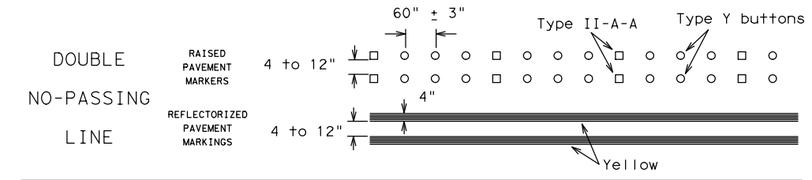
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

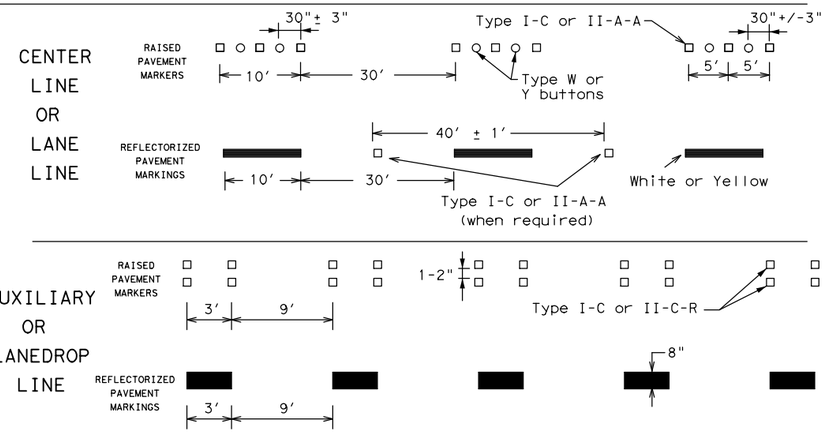
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

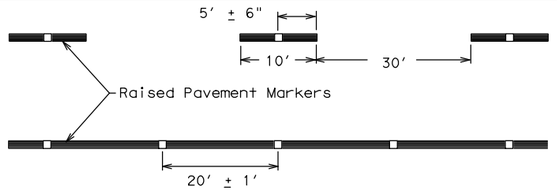


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		63

DATE: 3/30/2022 $TIME$
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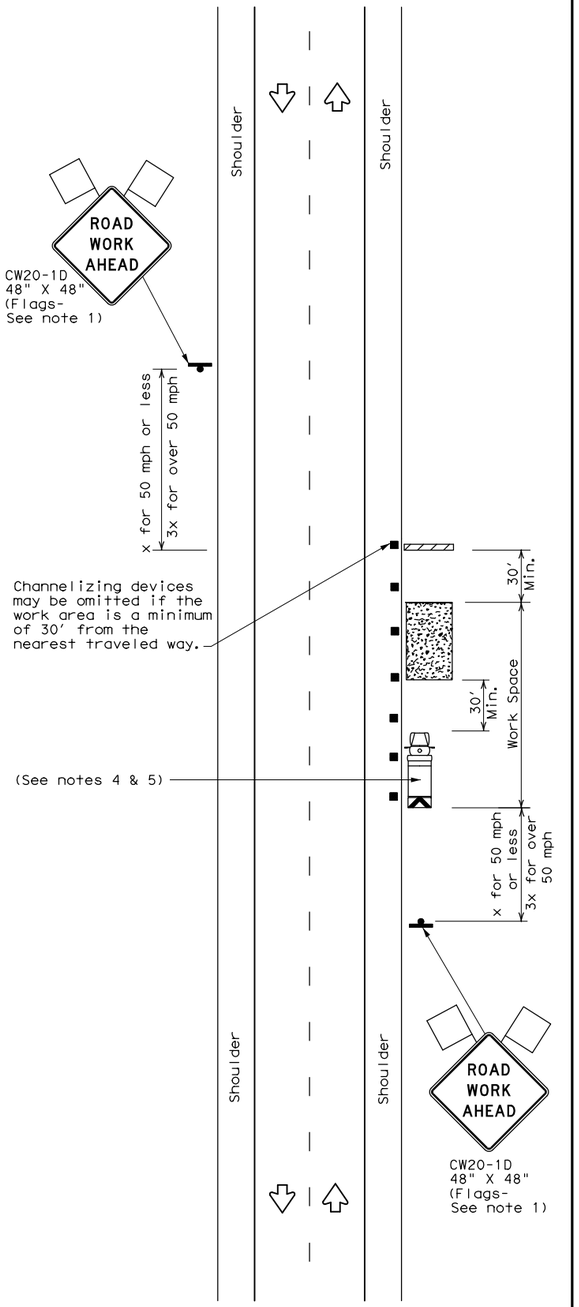
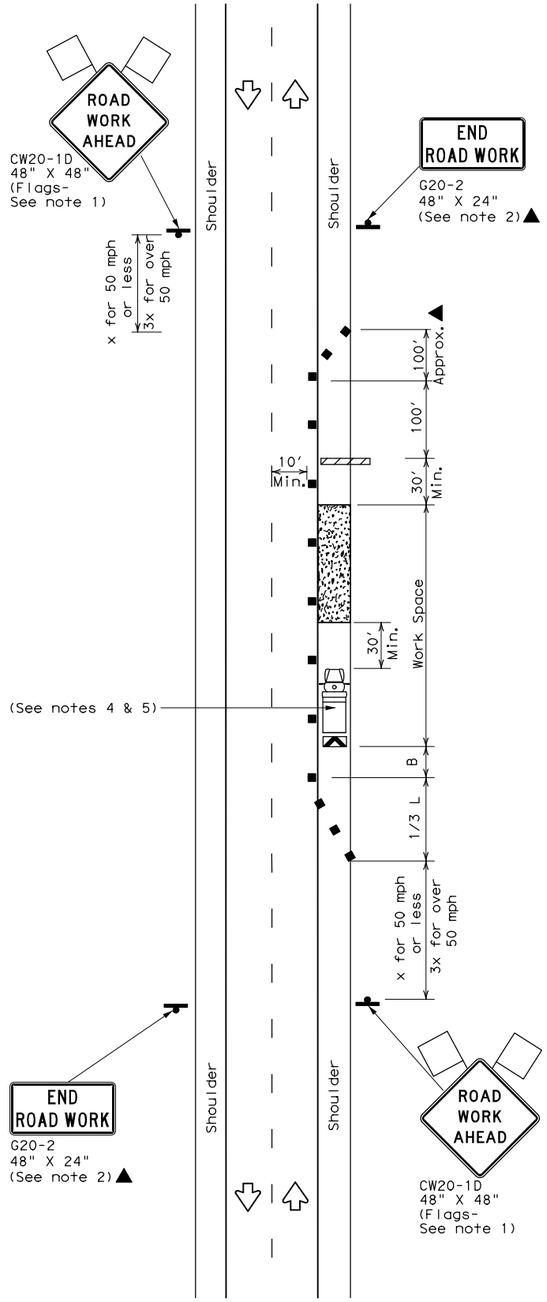


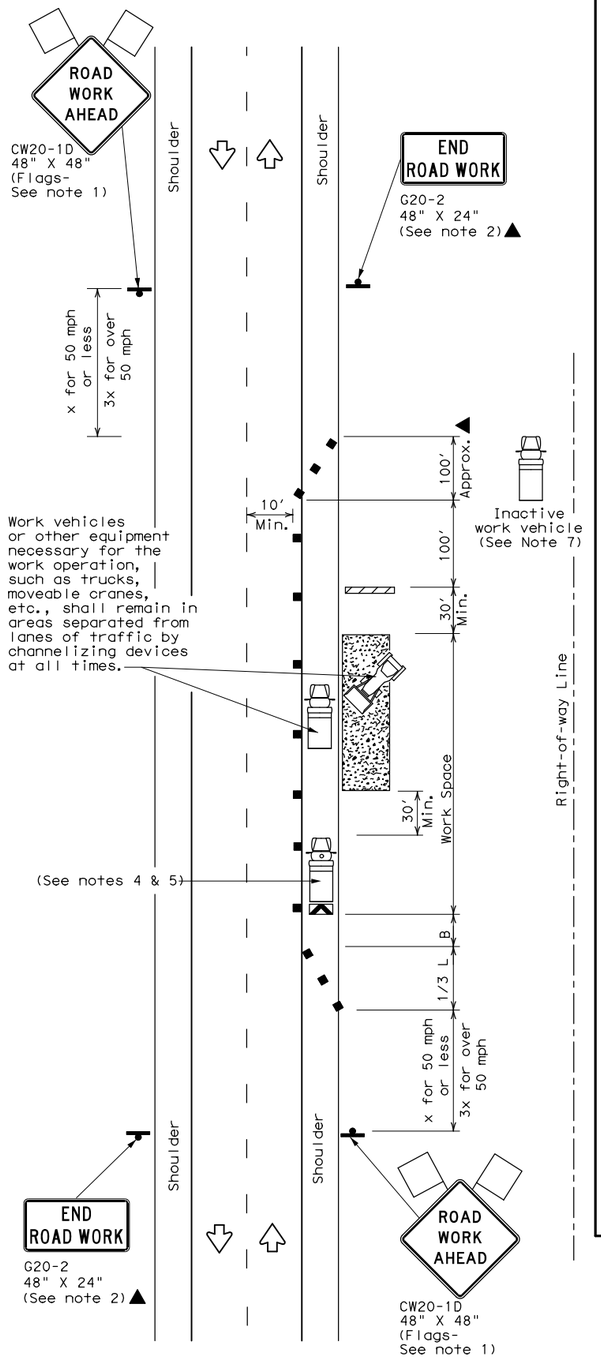
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

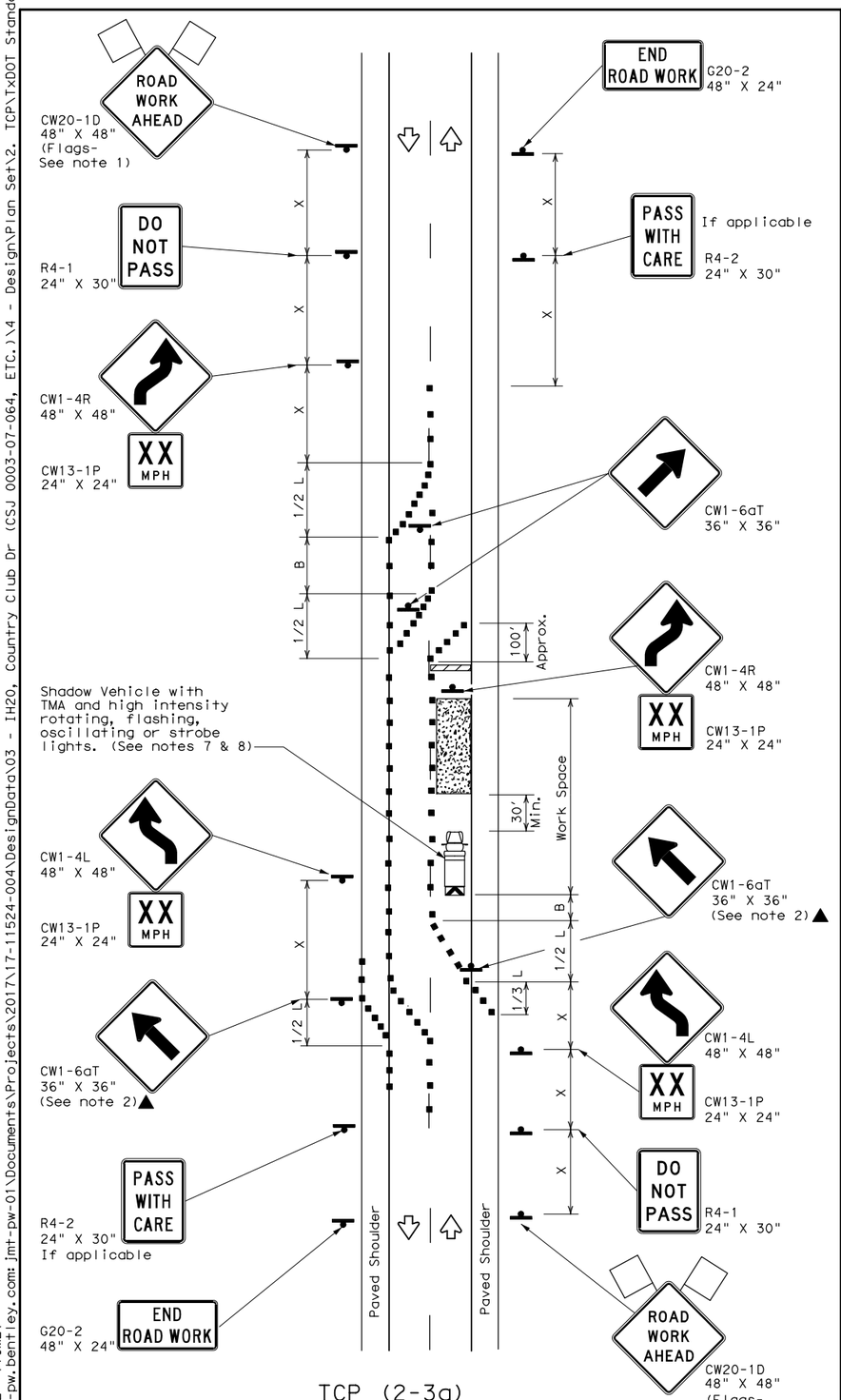
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	ODA	REEVES.		64
1-97 2-18				

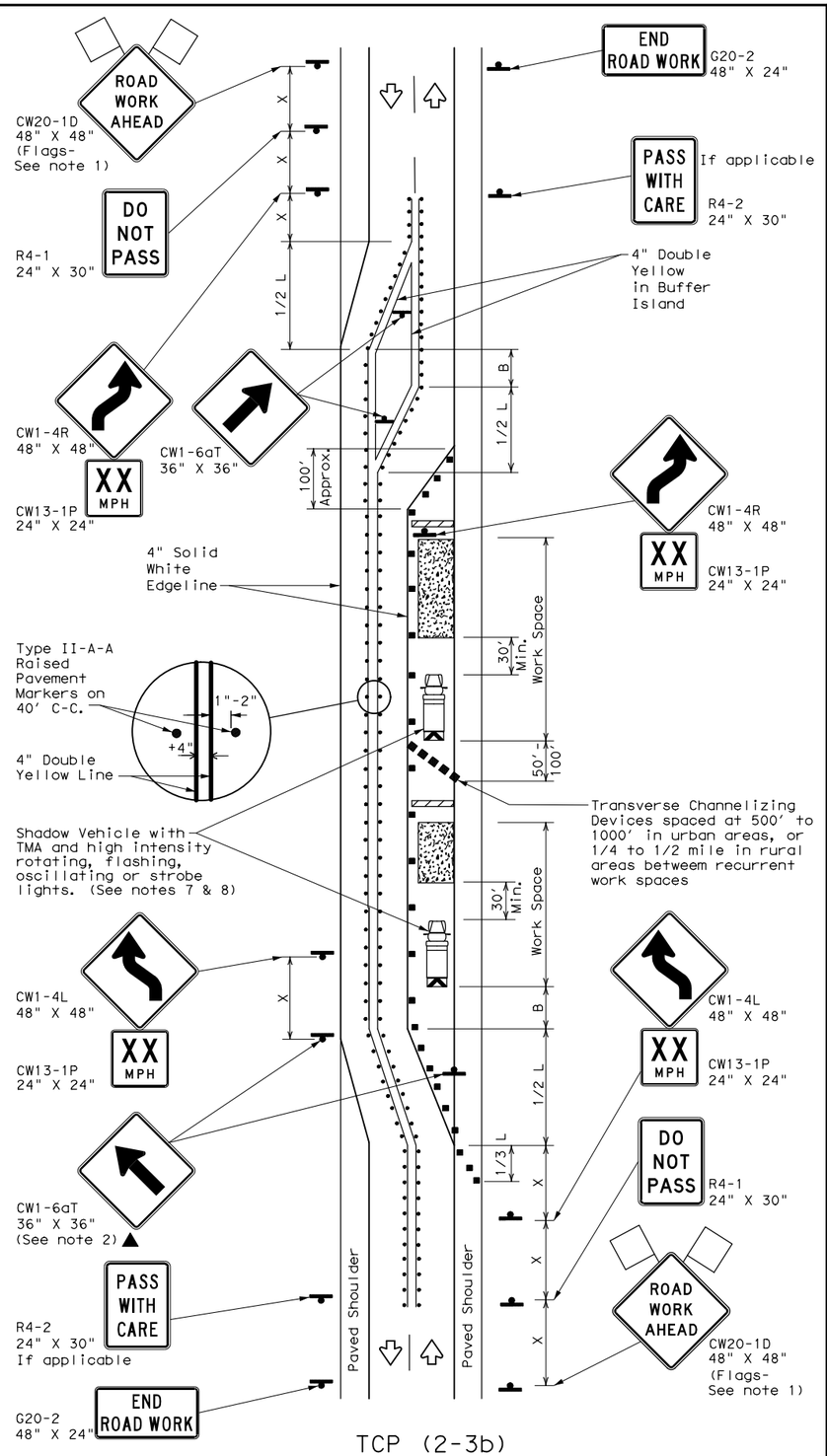
161

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\tcp(2-3)-18.dgn



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

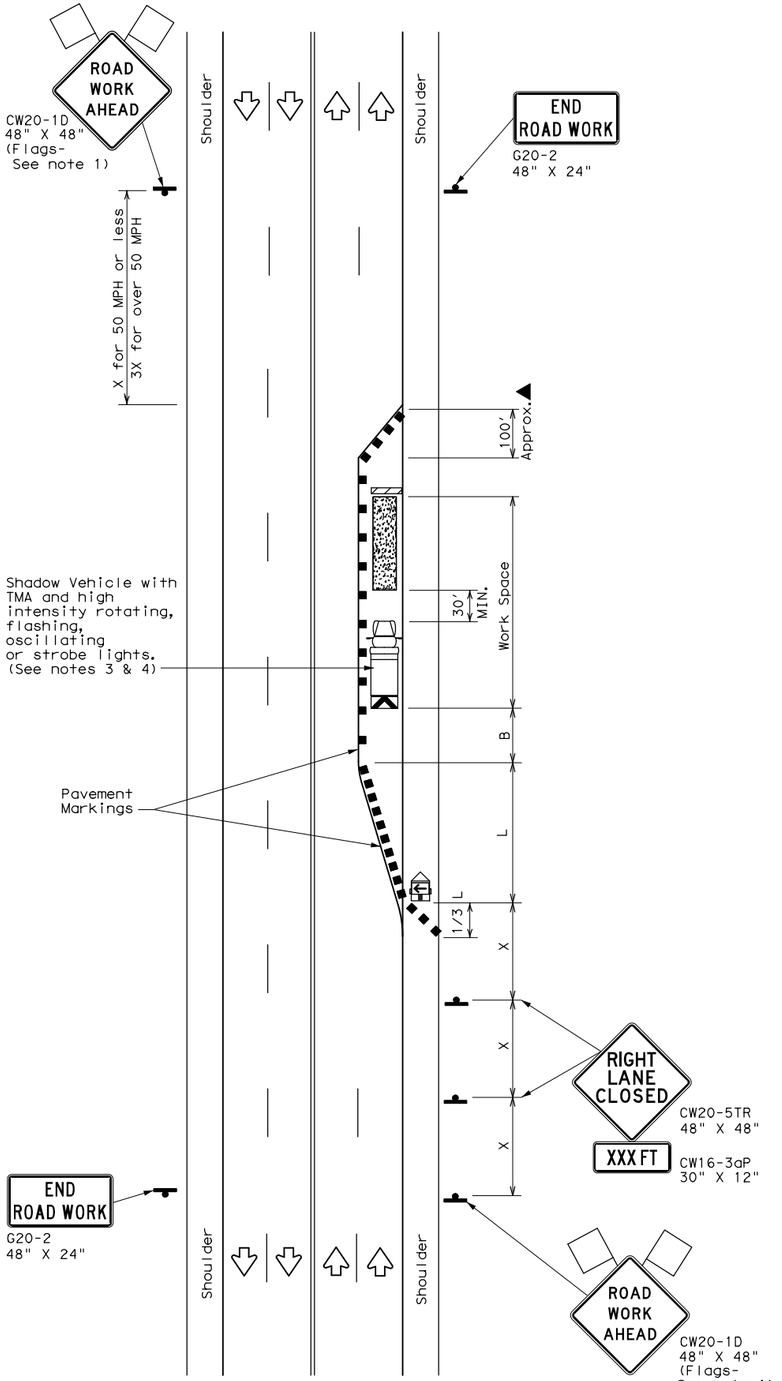
TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

FILE: tcp(2-3)-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	ODA	REEVES.		65
4-98 2-18				

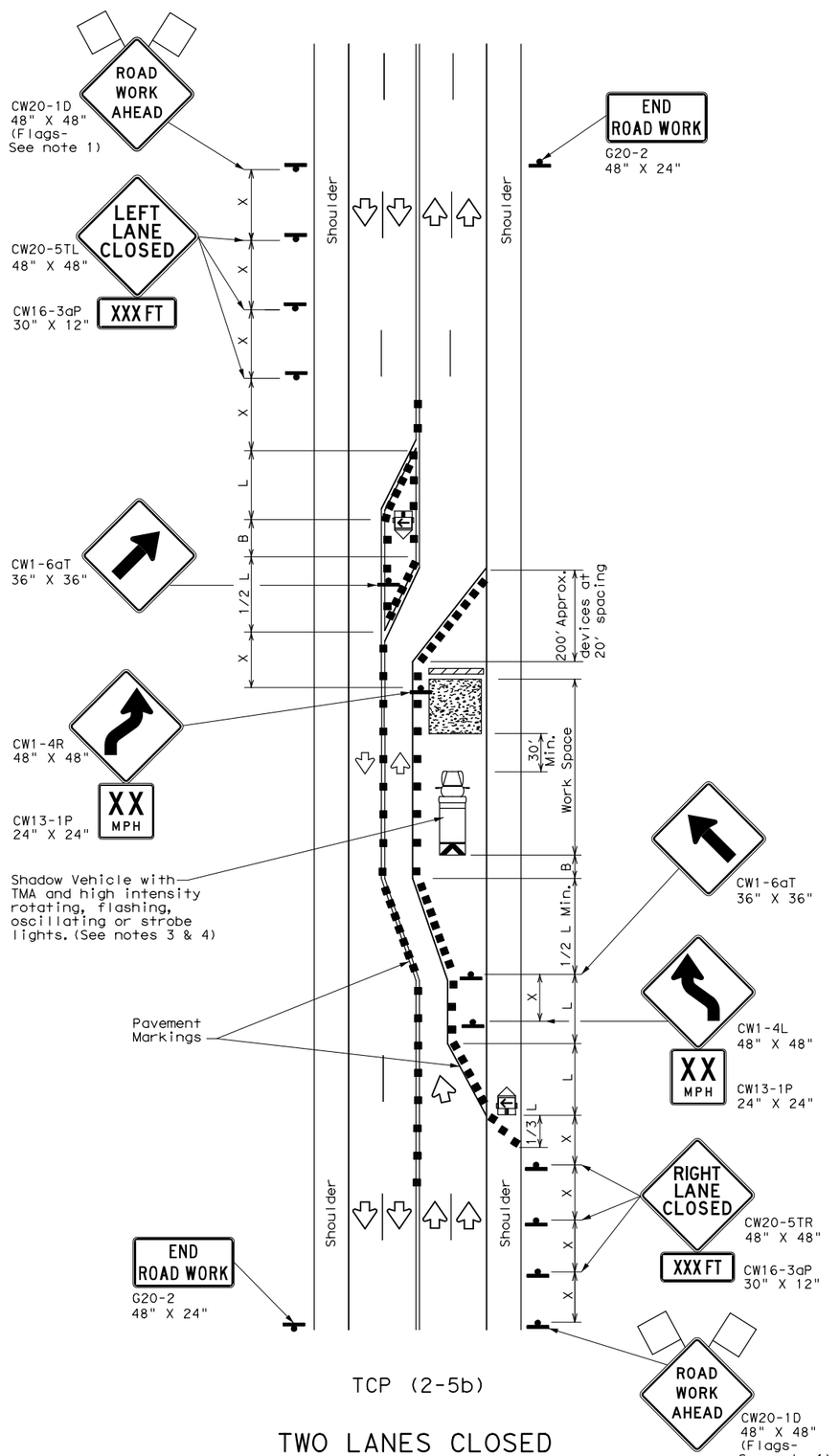
163

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\2. TCP\TxDOT Standards\tcp2-5-18.dgn



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. 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.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12	0003	07	064,ETC	IH20
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	ODA	REEVES.		66

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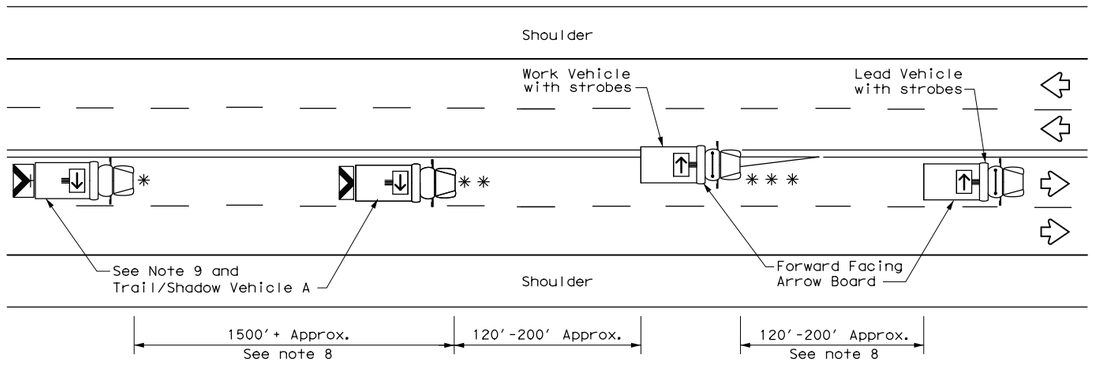
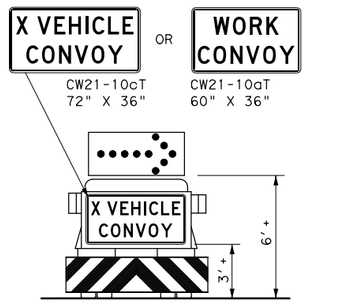


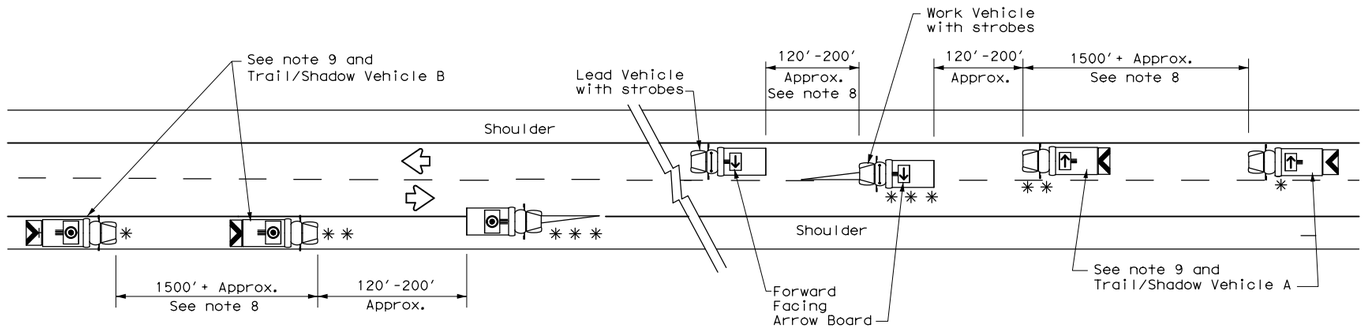
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

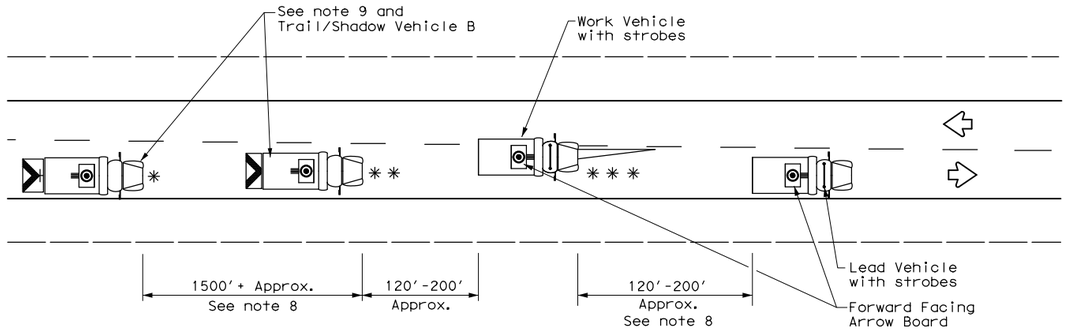


WORK ON SHOULDER

WORK ON TRAVEL LANE

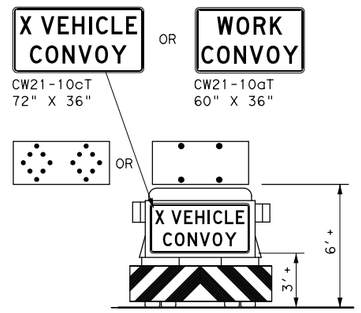
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

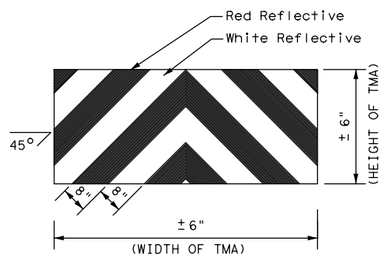
with Flashing Arrow Board in CAUTION display

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
REVISIONS 2-94 4-98 8-95 7-13 1-97	0003	07	064,ETC	IH20
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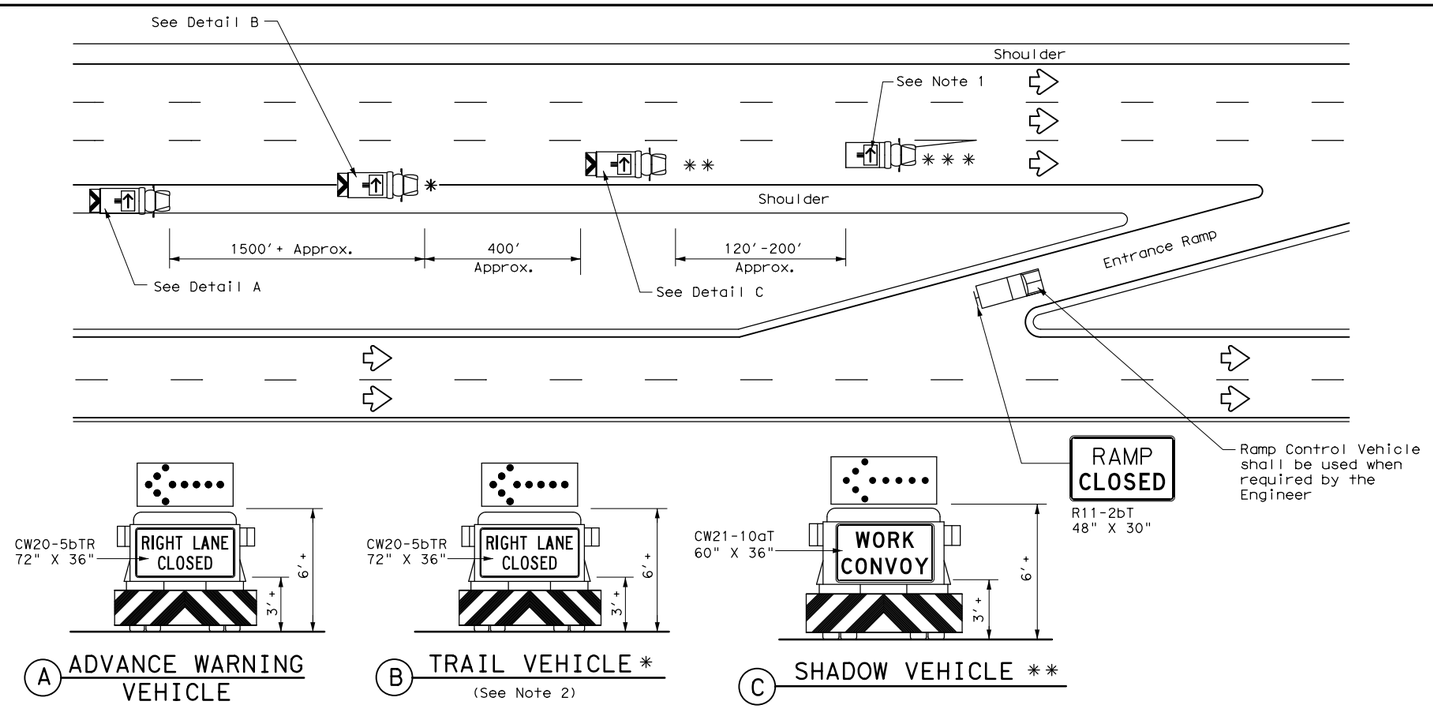
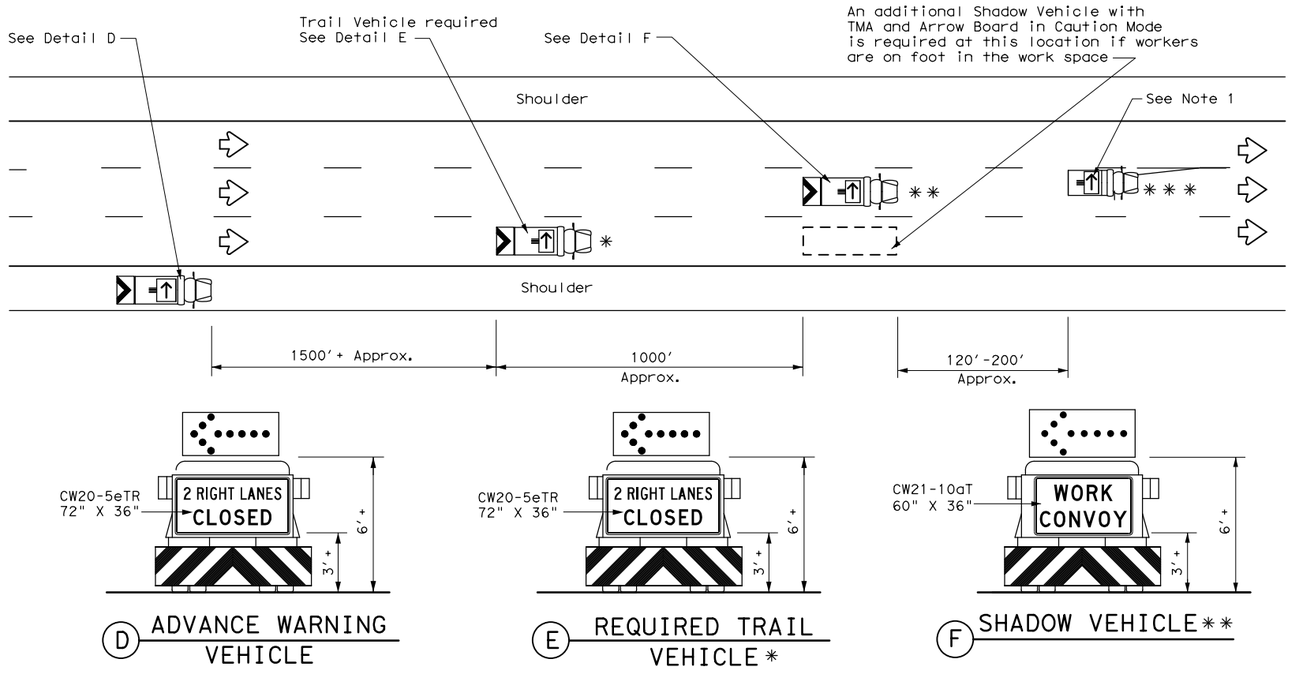


RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



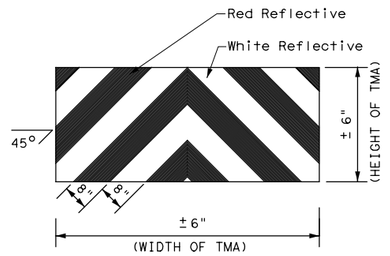
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

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©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	ODA	REEVES.		68
1-97				

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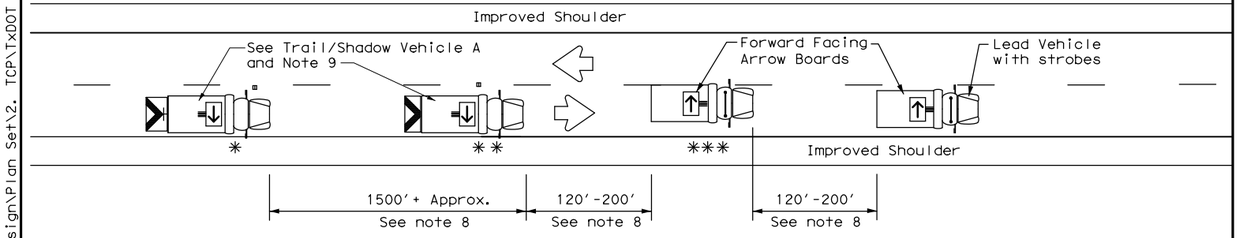
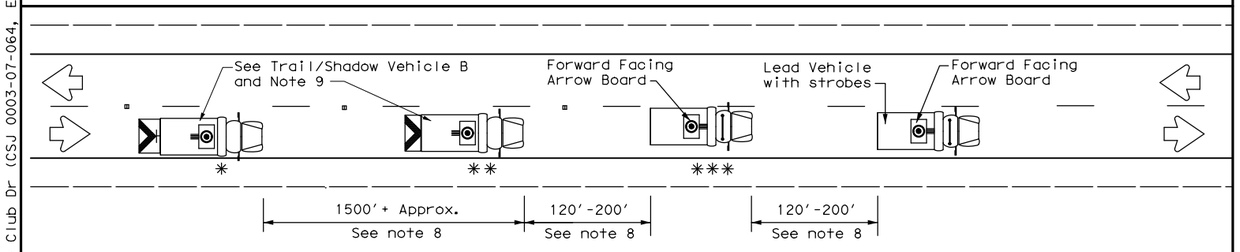


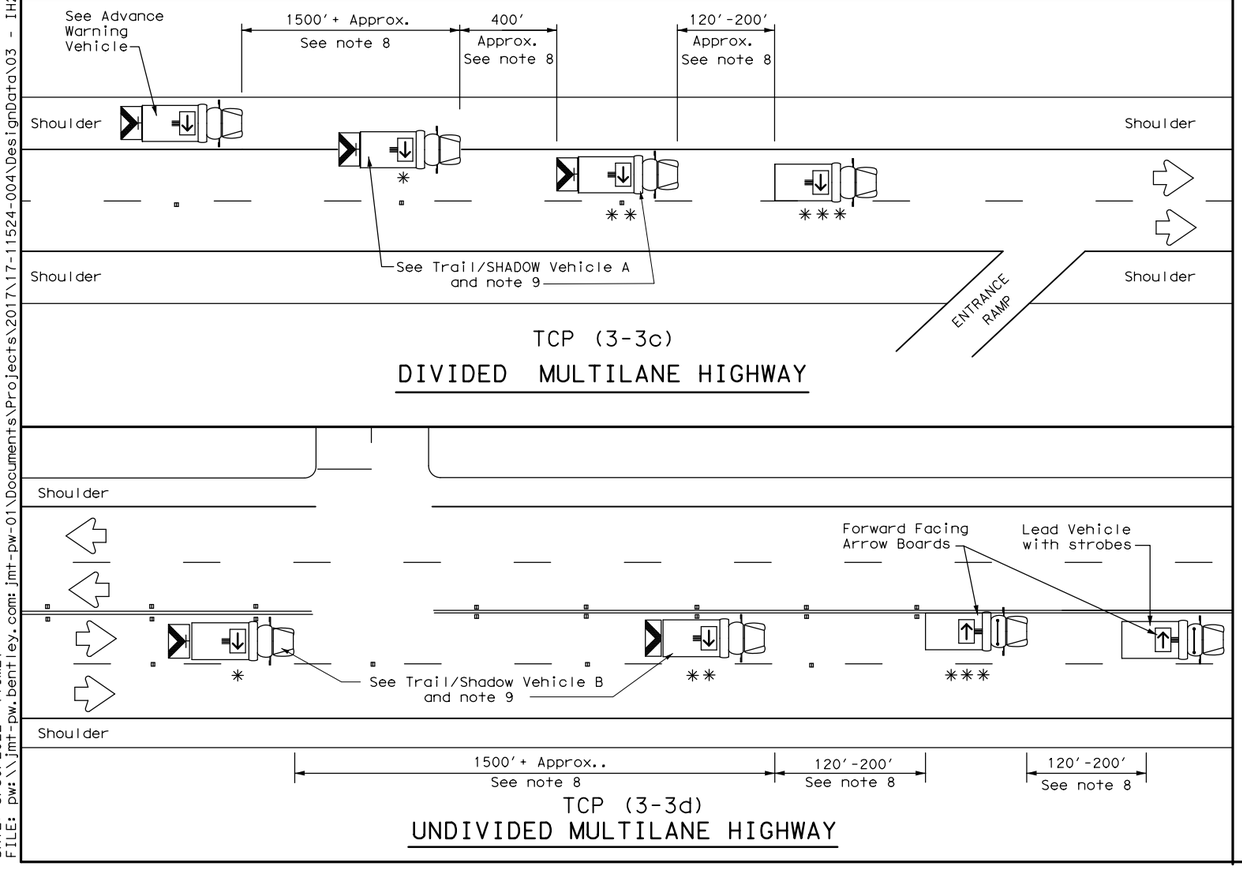
TCP (3-3a)

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



TCP (3-3b)

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

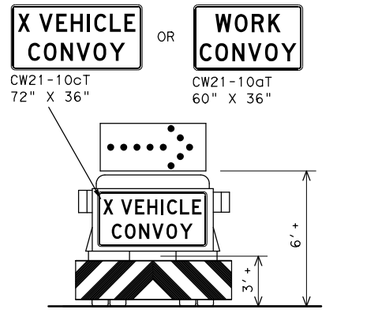


TCP (3-3c)

DIVIDED MULTILANE HIGHWAY

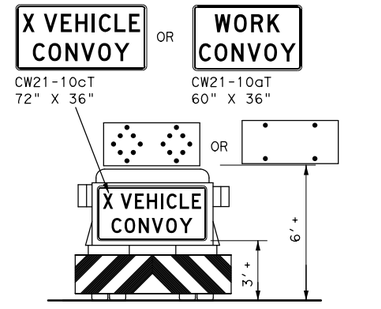
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



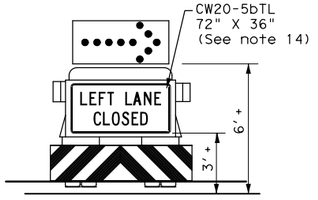
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

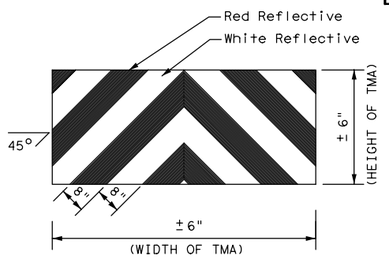


TRAIL/SHADOW VEHICLE B

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

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©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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8-95 7-13				
1-97 7-14	ODA	REEVES.		69

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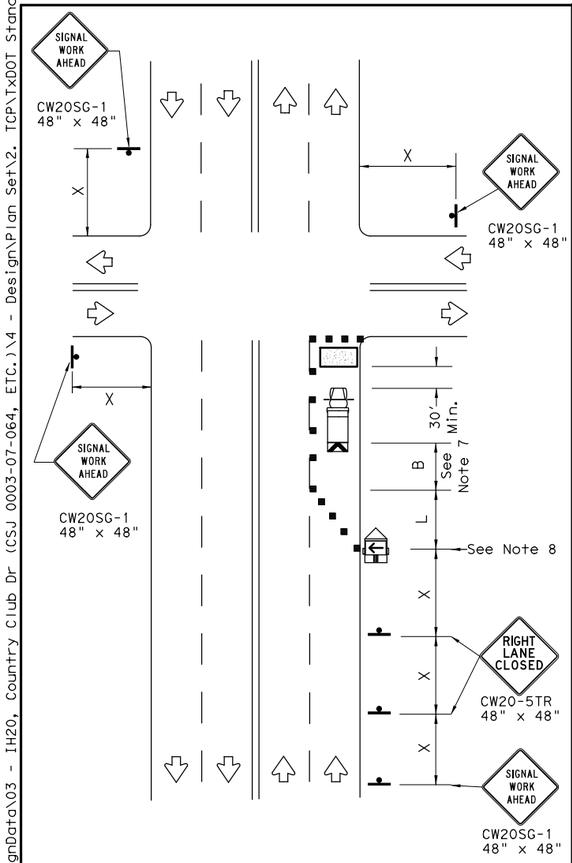
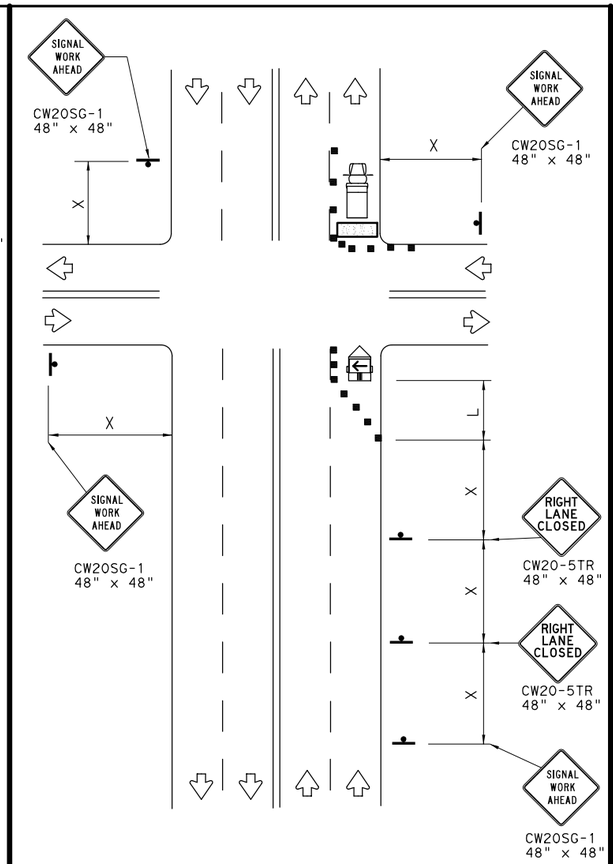


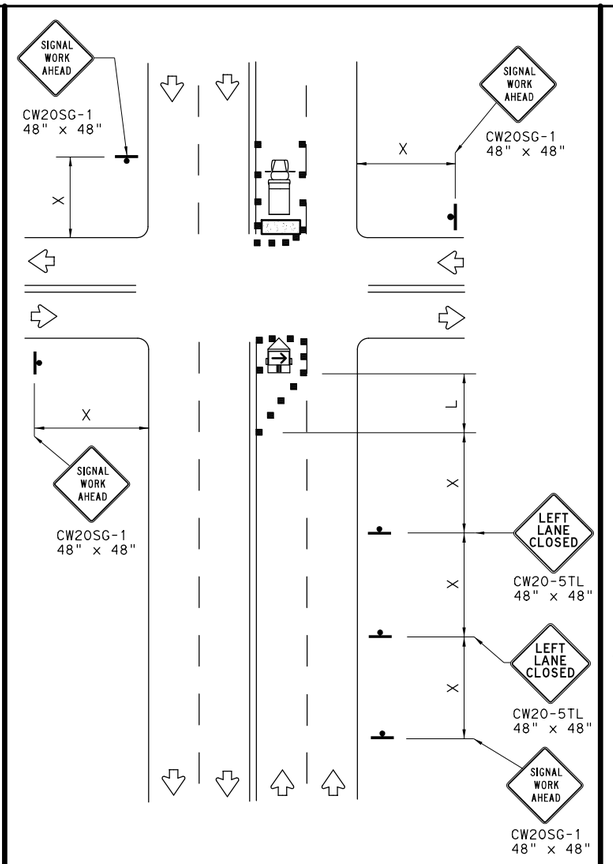
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



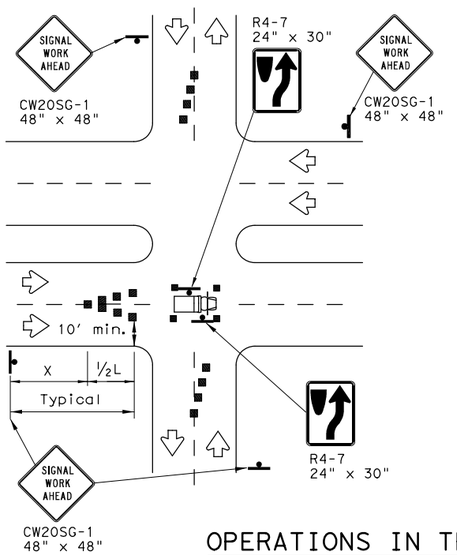
FAR SIDE RIGHT LANE CLOSURE

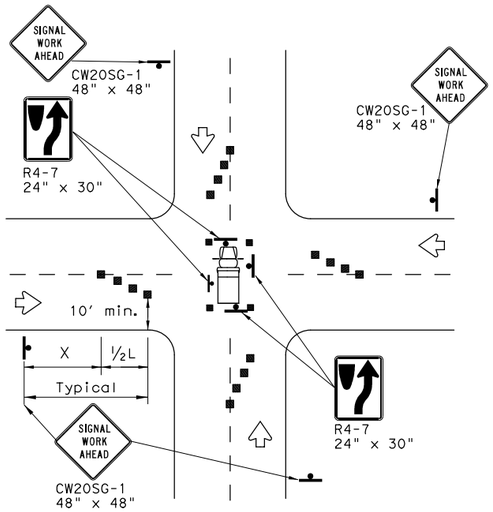
SHORT DURATION OR SHORT TERM STATIONARY



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	ODA	REEVES.		70

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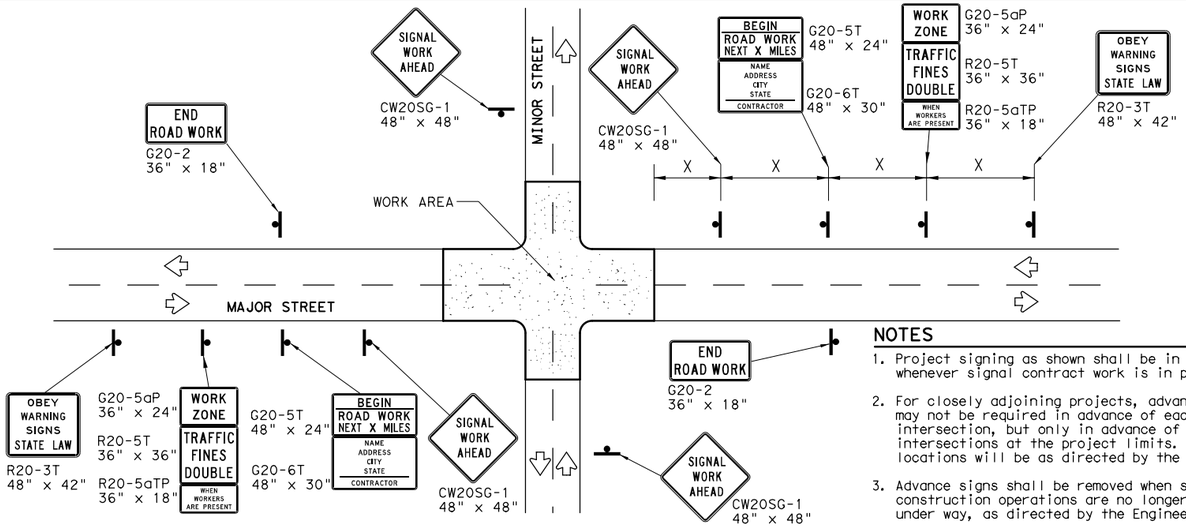


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

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

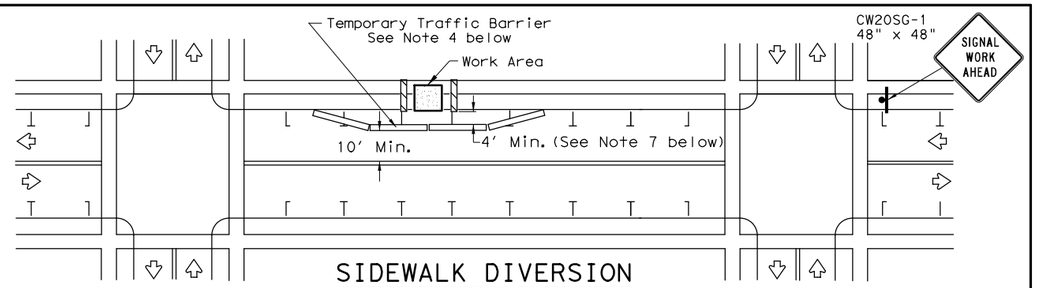
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

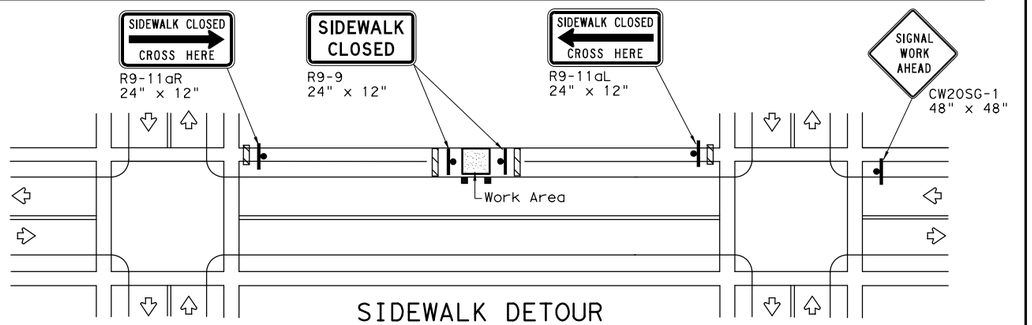
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

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

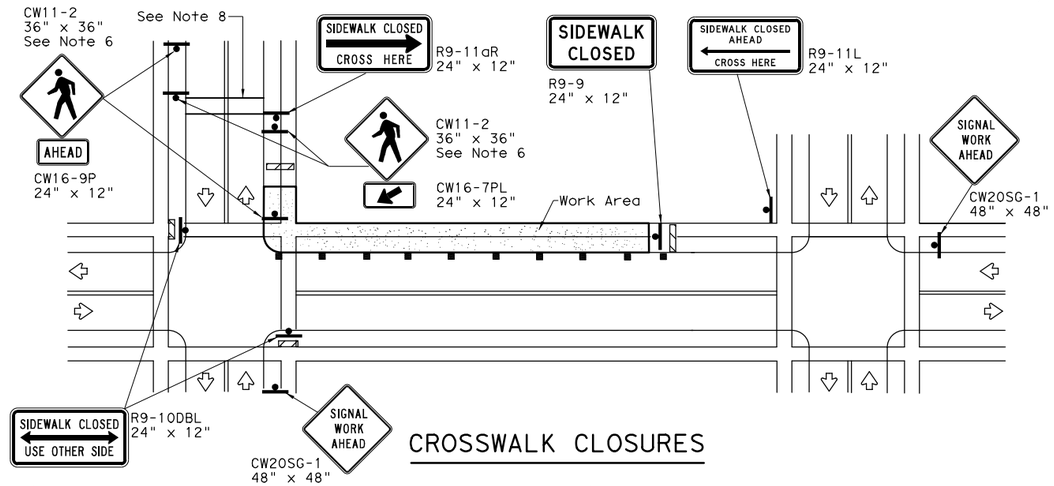
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



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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©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
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4-98 3-03	ODA	REEVES.		71

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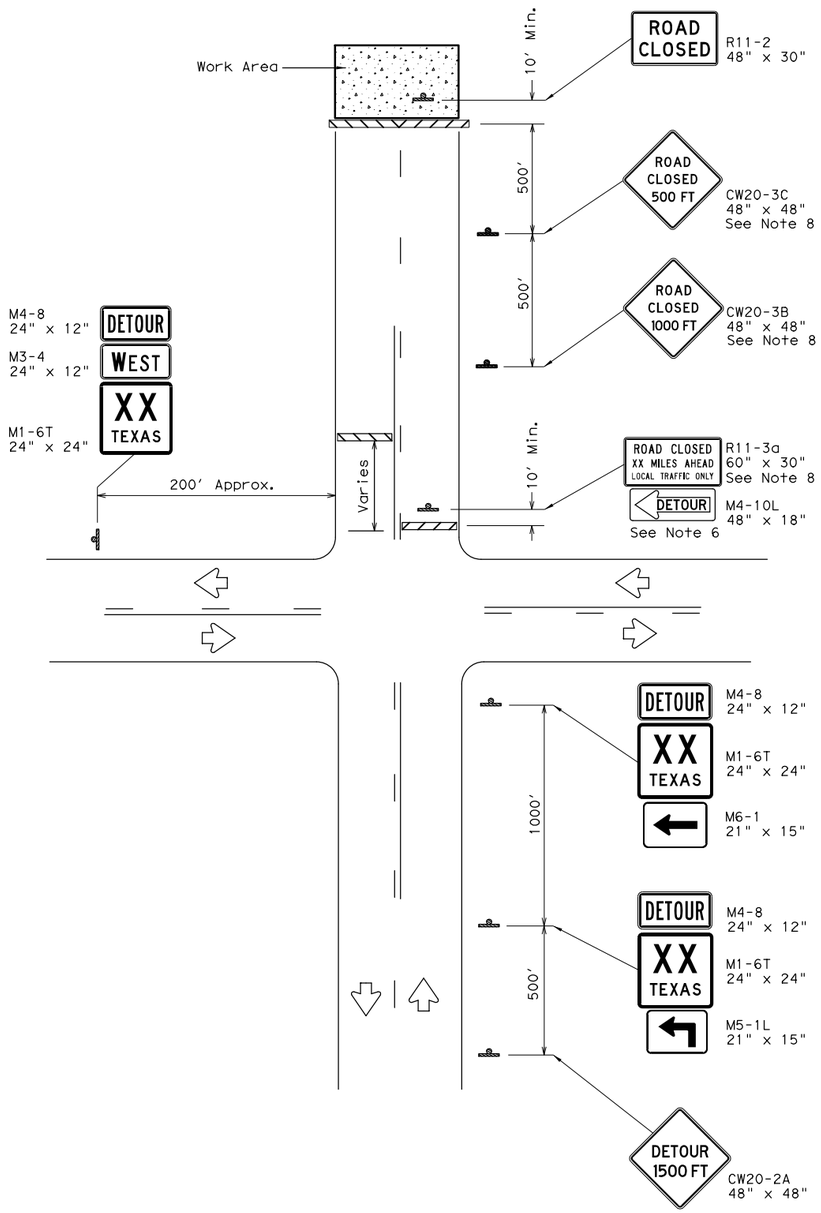
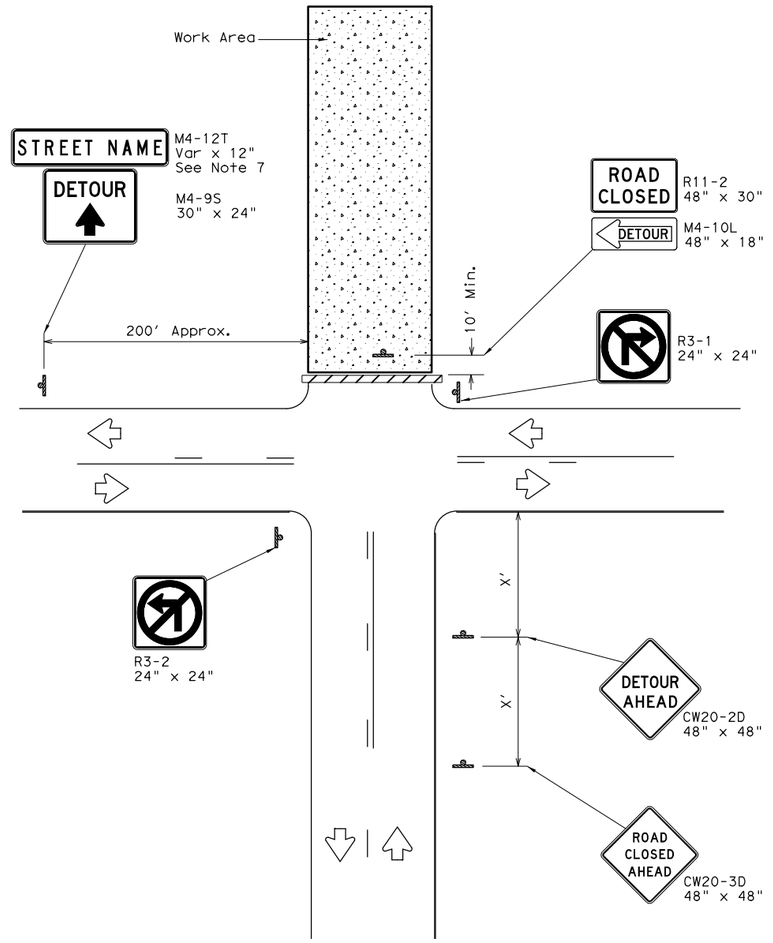


ROAD CLOSURE BEYOND THE INTERSECTION

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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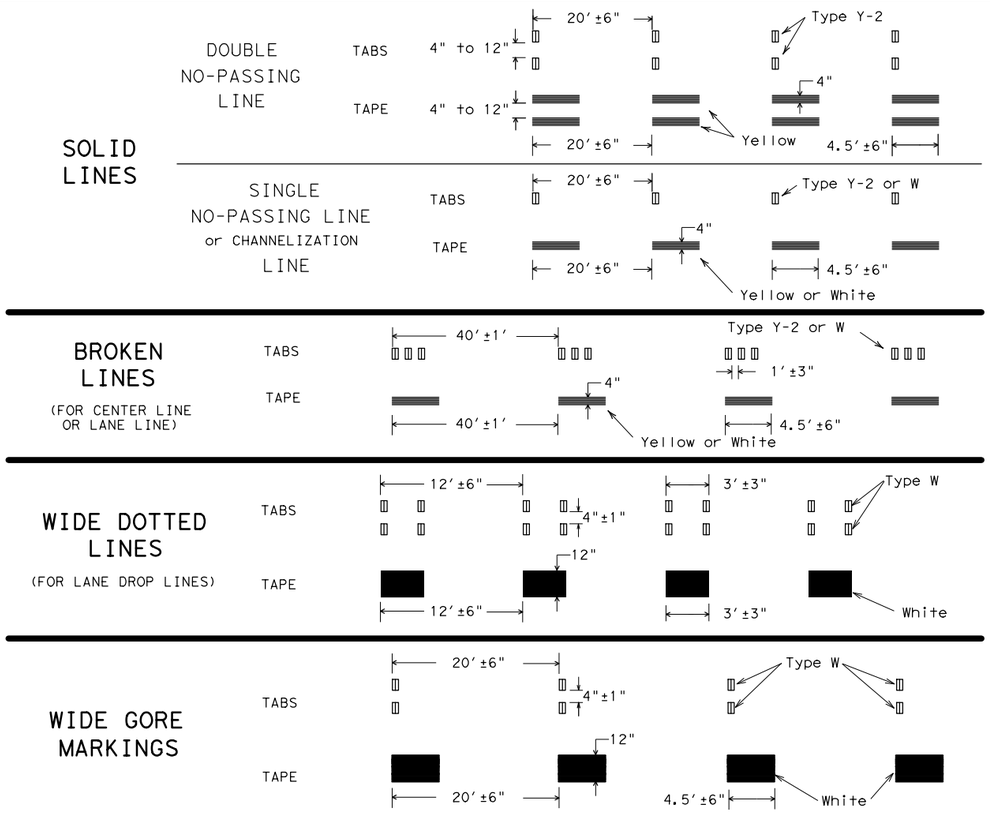
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



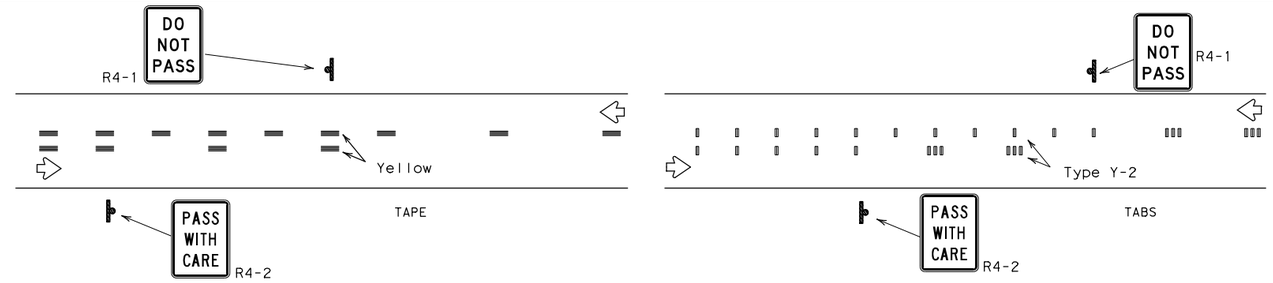
NOTES:

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.

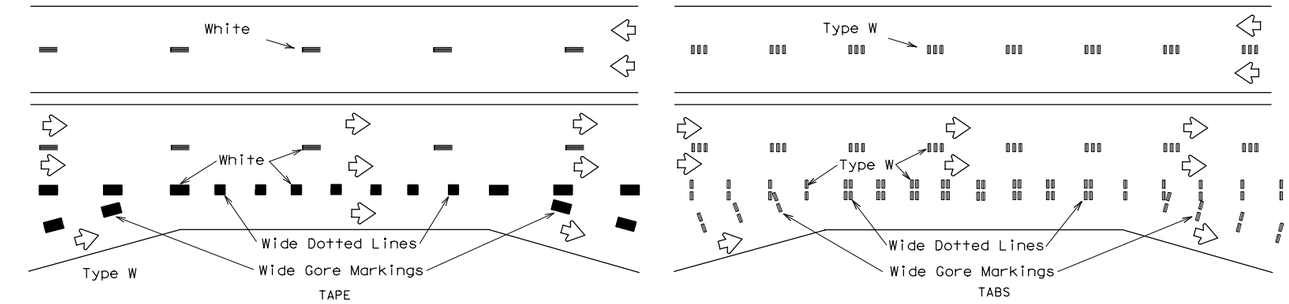
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

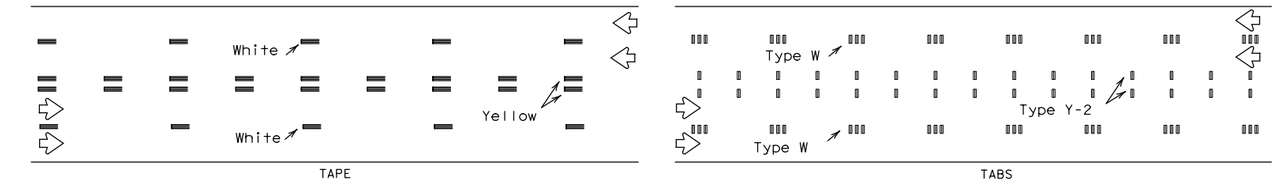
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



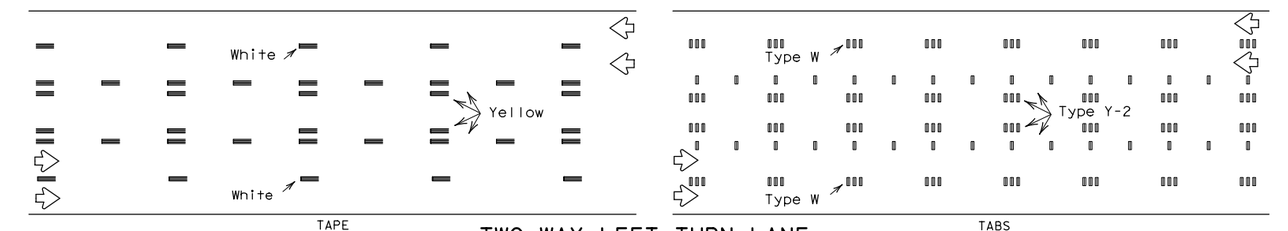
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



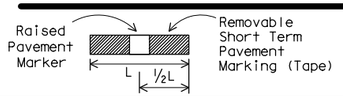
LANE LINES FOR DIVIDED HIGHWAY



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

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0003	07	064,ETC	IH20
1-97		DIST	COUNTY		SHEET NO.
3-03		ODA	REEVES.		73
7-13					

111

CONTROL POINTS (SURFACE COORDINATES)							
POINT	NORTH	EAST	ELEVATION	(BASELINE) STATION	OFFSET	LT/RT	DESCRIPTION
CP10	10,488,331.827	1,302,156.894	2,610.874'	(SH 17) 79+46.98	84.25'	LT	CHISELED "X" CUT IN CONCRETE SET
CP11	10,489,659.178	1,302,431.500	2,609.500'	(SH 17) 65+91.79	57.23'	LT	5/8-INCH IRON ROD SET
CP12	10,488,377.928	1,303,555.371	2,605.724'	(IH20SFR) 14+35.97	32.21'	RT	5/8-INCH IRON ROD SET

100′ 0′ 50′ 100′ 200′

GRAPHIC SCALE
1" = 200' (11"x17")
MIDLAND COUNTY, TEXAS

NOTES:

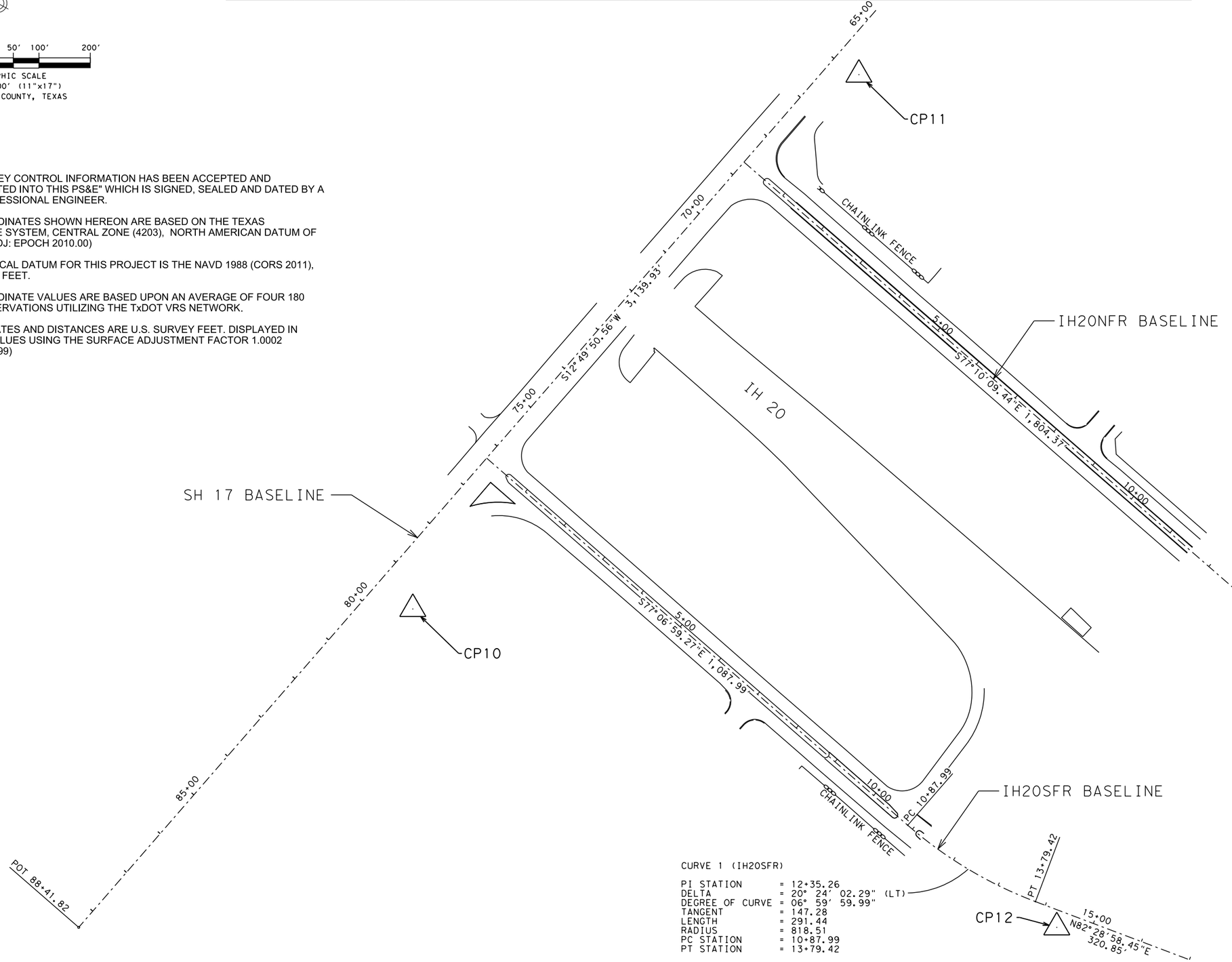
1. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E" WHICH IS SIGNED, SEALED AND DATED BY A TEXAS PROFESSIONAL ENGINEER.

2. ALL COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (2011 ADJ: EPOCH 2010.00)

3. THE VERTICAL DATUM FOR THIS PROJECT IS THE NAVD 1988 (CORS 2011), U.S. SURVEY FEET.

4. ALL COORDINATE VALUES ARE BASED UPON AN AVERAGE OF FOUR 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK.

5. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET. DISPLAYED IN SURFACE VALUES USING THE SURFACE ADJUSTMENT FACTOR 1.0002 (0.99980003999)



CURVE 1 (IH20SFR)

PI STATION = 12+35.26
DELTA = 20° 24' 02.29" (LT)
DEGREE OF CURVE = 06° 59' 59.99"
TANGENT = 147.28
LENGTH = 291.44
RADIUS = 818.51
PC STATION = 10+87.99
PT STATION = 13+79.42

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON MARCH, 2020 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

07/31/20
Eric A. Kreiner
RPLS No. 5320
Date

CONTROL POINT LEGEND

DENOTES PRIMARY CONTROL POINT AS NOTED (3 1/2" ALUMINUM DISK IN CONCRETE)

SAM SURVEYING · AERIAL MAPPING · ENGINEERING
Surveying and Mapping, LLC. (SAM)
1341 W. Mockingbird Lane, Suite 400W
Dallas, Tx 75247 - (214) 631-7888
FIRM REGISTRATION NO. F-1937
TBPLS REGISTRATION NO. 10064301

Texas Department of Transportation

SURVEY CONTROL INDEX SHEET

REEVES COUNTY, TEXAS

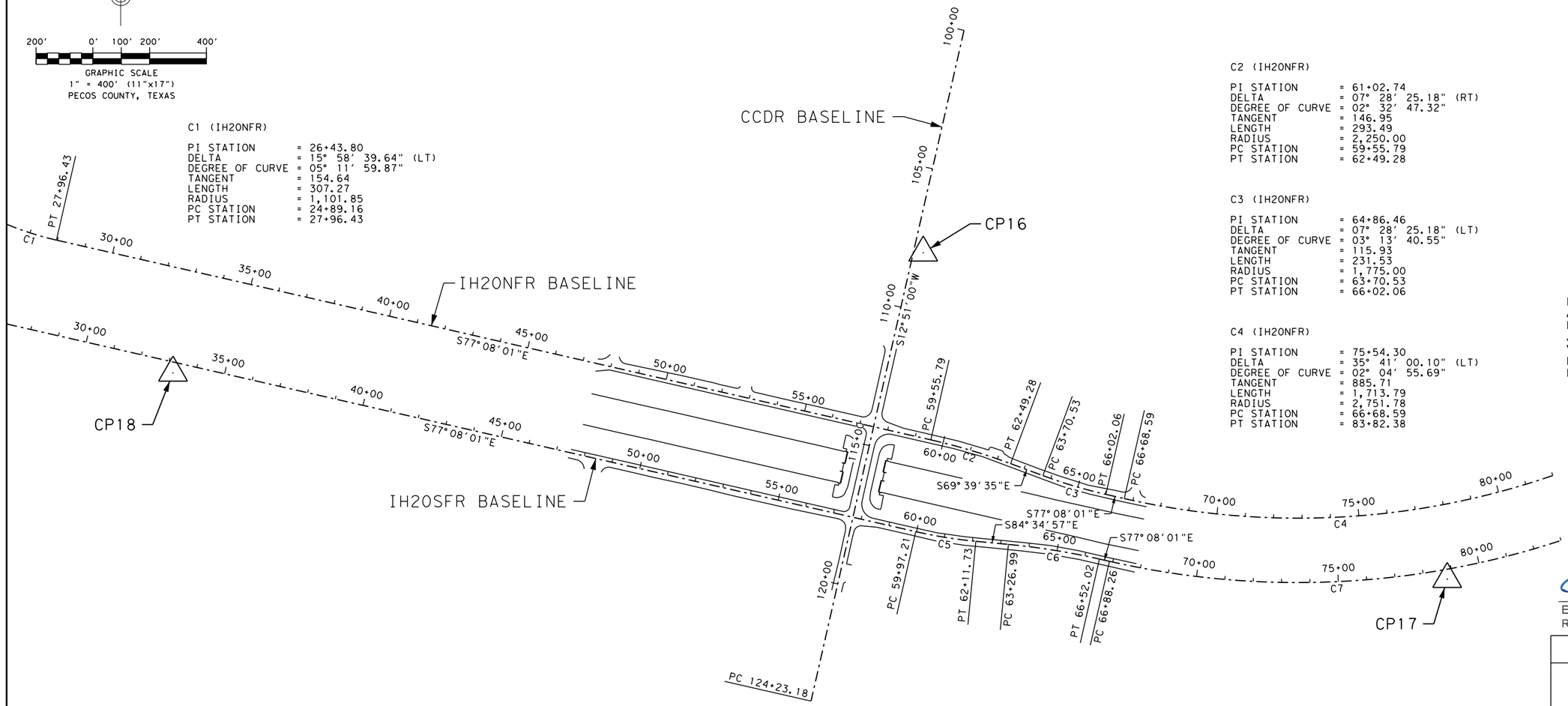
SH 17 AT IH 20

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		74
STATE	STATE DIST.	COUNTY	
TEXAS	ODA	REEVES	
CONT.	SECT.	JOB	HIGHWAY NO.
0003	07	064, ETC	IH 20

CONTROL POINTS (SURFACE COORDINATES)							
POINT	NORTH	EAST	ELEVATION	(BASELINE) STATION	OFFSET	LT/RT	DESCRIPTION
CP16	10,488,576.389	1,308,036.724	2,594.91'	(CCDR) 112+04.40	34.11'	RT	"X" CUT SET
CP17	10,487,426.588	1,309,882.411	2,591.91'	(IH20SFR) 78+80.16	34.43'	RT	5/8-INCH IRON ROD W/RED "SAM" CAP SET
CP18	10,488,153.382	1,305,394.168	2,600.57'	(IH20SFR) 33+22.11	37.27'	RT	"X" CUT SET

200' 0' 100' 200' 400'

GRAPHIC SCALE
1" = 400' (11"x17")
PECOS COUNTY, TEXAS



C1 (IH20NFR)

PI STATION = 26+43.80
DELTA = 15° 58' 39.64" (LT)
DEGREE OF CURVE = 05° 11' 59.87"
TANGENT = 154.64
LENGTH = 307.27
RADIUS = 1,101.85
PC STATION = 24+89.16
PT STATION = 27+96.43

C2 (IH20NFR)

PI STATION = 61+02.74
DELTA = 07° 28' 25.18" (RT)
DEGREE OF CURVE = 02° 32' 47.32"
TANGENT = 146.95
LENGTH = 293.49
RADIUS = 2,250.00
PC STATION = 59+55.79
PT STATION = 62+49.28

C3 (IH20NFR)

PI STATION = 64+86.46
DELTA = 07° 28' 25.18" (LT)
DEGREE OF CURVE = 03° 13' 40.55"
TANGENT = 115.93
LENGTH = 231.53
RADIUS = 1,775.00
PC STATION = 63+70.53
PT STATION = 66+02.06

C4 (IH20NFR)

PI STATION = 75+54.30
DELTA = 35° 41' 00.10" (LT)
DEGREE OF CURVE = 02° 04' 55.69"
TANGENT = 885.71
LENGTH = 1,713.79
RADIUS = 2,751.78
PC STATION = 66+68.59
PT STATION = 83+82.38

C5 (IH20SFR)

PI STATION = 61+04.62
DELTA = 07° 26' 56.39" (LT)
DEGREE OF CURVE = 03° 28' 20.90"
TANGENT = 107.41
LENGTH = 214.52
RADIUS = 1,650.00
PC STATION = 59+97.21
PT STATION = 62+11.73

C6 (IH20SFR)

PI STATION = 64+89.73
DELTA = 07° 26' 56.39" (RT)
DEGREE OF CURVE = 02° 17' 30.59"
TANGENT = 162.74
LENGTH = 325.02
RADIUS = 2,500.00
PC STATION = 63+26.99
PT STATION = 66+52.02

C7 (IH20SFR)

PI STATION = 76+46.71
DELTA = 35° 41' 00.10" (LT)
DEGREE OF CURVE = 01° 55' 26.80"
TANGENT = 958.45
LENGTH = 1,854.54
RADIUS = 2,977.78
PC STATION = 66+88.26
PT STATION = 85+42.80

NOTES:

1. THE SURVEY CONTROL INFORMATION HAS BEEN ACCEPTED AND INCORPORATED INTO THIS PS&E" WHICH IS SIGNED, SEALED AND DATED BY A TEXAS PROFESSIONAL ENGINEER.

2. ALL COORDINATES SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE (4203), NORTH AMERICAN DATUM OF 1983 (CORS 2011)

3. THE VERTICAL DATUM FOR THIS PROJECT IS THE NAVD 1988 (CORS 2011), U.S. SURVEY FEET.

4. ALL COORDINATE VALUES ARE BASED UPON AN AVERAGE OF FOUR 180 EPOCH OBSERVATIONS UTILIZING THE TxDOT VRS NETWORK.

5. COORDINATES AND DISTANCES ARE U.S. SURVEY FEET. DISPLAYED IN SURFACE VALUES USING THE SURFACE ADJUSTMENT FACTOR 1.0002 (0.99980003999)

I HEREBY CERTIFY THAT THE HORIZONTAL AND VERTICAL DATA SHOWN HEREON WAS DETERMINED BY A FIELD SURVEY ON JANUARY, 2022 UTILIZING THE TxDOT VIRTUAL REFERENCE SYSTEM RTK NETWORK AND IS CORRECTLY SHOWN HEREON.

STATE OF TEXAS
REGISTERED
ERIC A. KREINER
5320
PROFESSIONAL
LAND SURVEYOR

03/29/22

Eric A. Kreiner
RPLS No. 5320

Date

CONTROL POINT LEGEND

△ DENOTES PRIMARY CONTROL POINT AS NOTED

SAM™
Surveying and Mapping, LLC. (SAM)
1341 W. Mockingbird Lane, Suite 400W
Dallas, Tx 75247 - (214) 631-7888
FIRM REGISTRATION NO. F-1937
TBPLS REGISTRATION NO. 10064301

Texas Department of Transportation

SURVEY CONTROL INDEX SHEET

PECOS COUNTY, TEXAS
COUNTRY CLUB ROAD
@ IH-20

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	SEE TITLE SHEET		75
STATE	STATE DIST.	COUNTY	
TEXAS	ODA	PECOS	
CONT.	SECT.	JOB	HIGHWAY NO.
0003	07	064	IH 20

SH 17

Chain SH17 contains:
SH171 SH173 SH174

Beginning chain SH17 description
Feature: Geom_Centerline

Point SH171 N 10,491,222.0919 E 1,302,728.7722 Sta 50+01.88

Course from SH171 to SH173 S 12° 49′ 50.56" W Dist 700.0000

Point SH173 N 10,490,539.5706 E 1,302,573.3224 Sta 57+01.88

Course from SH173 to SH174 S 12° 49′ 50.56" W Dist 3,139.9323

Point SH174 N 10,487,478.0410 E 1,301,876.0340 Sta 88+41.82

Ending chain SH17 description

SH 17 NBBL

Chain SH17NBBL contains:
589 CUR SH17NBBL_3 CUR SH17NBBL_4 CUR SH17NBBL_7 CUR SH17NBBL_8 CUR SH17NBBL_1-1 CUR SH17NBBL_12 590

Beginning chain SH17NBBL description
Feature: Geom_Centerline

Point 589 N 10,490,598.1908 E 1,302,598.9809 Sta 256+39.03

Course from 589 to PC SH17NBBL_3 S 12° 49′ 47.74" W Dist 0.0057

Curve Data

Curve SH17NBBL_3						
P.I. Station	258+06.87	N	10,490,434.5455	E	1,302,561.7094	
Delta =	2° 02′ 46.21"	(LT)				
Degree =	0° 36′ 34.77"					
Tangent =	167.8303					
Length =	335.6250					
Radius =	9,398.0000					
External =	1.4984					
Long Chord =	335.6072					
Mid. Ord. =	1.4982					
P.C. Station	256+39.04	N	10,490,598.1852	E	1,302,598.9797	
P.T. Station	259+74.66	N	10,490,269.6794	E	1,302,530.3056	
C.C.		N	10,488,511.1604	E	1,311,762.3159	

Back = S 12° 49′ 50.56" W
Ahead = S 10° 47′ 04.35" W
Chord Bear = S 11° 48′ 27.46" W

Curve Data

Curve SH17NBBL_4						
P.I. Station	261+42.92	N	10,490,104.3923	E	1,302,498.8216	
Delta =	2° 02′ 46.21"	(RT)				
Degree =	0° 36′ 29.18"					
Tangent =	168.2589					
Length =	336.4821					
Radius =	9,422.0000					
External =	1.5023					
Long Chord =	336.4642					
Mid. Ord. =	1.5020					
P.C. Station	259+74.66	N	10,490,269.6794	E	1,302,530.3056	
P.T. Station	263+11.14	N	10,489,940.3347	E	1,302,461.4561	
C.C.		N	10,492,032.6893	E	1,293,274.7192	

Back = S 10° 47′ 04.35" W
Ahead = S 12° 49′ 50.56" W
Chord Bear = S 11° 48′ 27.46" W

Course from PT SH17NBBL_4 to PC SH17NBBL_7 S 12° 49′ 50.56" W Dist 659.6930

Curve Data

Curve SH17NBBL_7						
P.I. Station	270+89.80	N	10,489,181.1170	E	1,302,288.5381	
Delta =	1° 26′ 48.56"	(RT)				
Degree =	0° 36′ 29.18"					
Tangent =	118.9675					
Length =	237.9224					
Radius =	9,422.0000					
External =	0.7510					
Long Chord =	237.9161					
Mid. Ord. =	0.7510					
P.C. Station	269+70.84	N	10,489,297.1139	E	1,302,314.9573	
P.T. Station	272+08.76	N	10,489,065.8240	E	1,302,259.1984	
C.C.		N	10,491,389.4685	E	1,293,128.2204	

Back = S 12° 49′ 50.56" W
Ahead = S 14° 16′ 39.12" W
Chord Bear = S 13° 33′ 14.84" W

Curve Data

Curve SH17NBBL_8						
P.I. Station	273+27.42	N	10,488,950.8248	E	1,302,229.9335	
Delta =	1° 26′ 48.56"	(LT)				
Degree =	0° 36′ 34.77"					
Tangent =	118.6645					
Length =	237.3164					
Radius =	9,398.0000					
External =	0.7491					
Long Chord =	237.3101					
Mid. Ord. =	0.7491					
P.C. Station	272+08.76	N	10,489,065.8240	E	1,302,259.1984	
P.T. Station	274+46.07	N	10,488,835.1233	E	1,302,203.5815	
C.C.		N	10,486,748.0984	E	1,311,366.9178	

Back = S 14° 16′ 39.12" W
Ahead = S 12° 49′ 50.56" W
Chord Bear = S 13° 33′ 14.84" W

Course from PT SH17NBBL_8 to PC SH17NBBL_11 S 12° 49′ 50.56" W Dist 222.7527

Curve Data

Curve SH17NBBL_11						
P.I. Station	277+87.49	N	10,488,502.2311	E	1,302,127.7626	
Delta =	1° 26′ 48.56"	(RT)				
Degree =	0° 36′ 34.77"					
Tangent =	118.6646					
Length =	237.3165					
Radius =	9,398.0000					
External =	0.7491					
Long Chord =	237.3102					
Mid. Ord. =	0.7491					
P.C. Station	276+68.83	N	10,488,617.9326	E	1,302,154.1146	
P.T. Station	279+06.14	N	10,488,387.2318	E	1,302,098.4977	
C.C.		N	10,490,704.9575	E	1,292,990.7783	

Back = S 12° 49′ 50.56" W
Ahead = S 14° 16′ 39.12" W
Chord Bear = S 13° 33′ 14.84" W

Curve Data

Curve SH17NBBL_12						
P.I. Station	280+25.11	N	10,488,271.9388	E	1,302,069.1580	
Delta =	1° 26′ 48.56"	(LT)				
Degree =	0° 36′ 29.18"					
Tangent =	118.9675					
Length =	237.9224					
Radius =	9,422.0000					
External =	0.7510					
Long Chord =	237.9161					
Mid. Ord. =	0.7510					
P.C. Station	279+06.14	N	10,488,387.2317	E	1,302,098.4977	
P.T. Station	281+44.07	N	10,488,155.9419	E	1,302,042.7387	
C.C.		N	10,486,063.5872	E	1,311,229.4757	

Back = S 14° 16′ 39.12" W
Ahead = S 12° 49′ 50.57" W
Chord Bear = S 13° 33′ 14.84" W

Course from PT SH17NBBL_12 to 590 S 12° 49′ 48.20" W Dist 0.0076

Point 590 N 10,488,155.9345 E 1,302,042.7371 Sta 281+44.07

Ending chain SH17NBBL description

SH 17 SBBL

Chain SH17SBBL contains:
586 587 CUR SH17SBBL_5 CUR SH17SBBL_6 CUR SH17SBBL_9 CUR SH17SBBL_10 588

Beginning chain SH17SBBL description
Feature: Geom_Centerline

Point 586 N 10,490,603.5149 E 1,302,575.5789 Sta 156+39.04

Course from 586 to 587 S 12° 49′ 50.56" W Dist 62.8488

Point 587 N 10,490,542.2354 E 1,302,561.6220 Sta 157+01.88

Course from 587 to PC SH17SBBL_5 S 12° 49′ 50.56" W Dist 609.1155

Curve Data

Curve SH17SBBL_5						
P.I. Station	164+29.66	N	10,489,832.6277	E	1,302,400.0031	
Delta =	1° 26′ 48.56"	(RT)				
Degree =	0° 36′ 34.77"					
Tangent =	118.6645					
Length =	237.3164					
Radius =	9,398.0000					
External =	0.7491					
Long Chord =	237.3101					
Mid. Ord. =	0.7491					
P.C. Station	163+11.00	N	10,489,948.3293	E	1,302,426.3550	
P.T. Station	165+48.32	N	10,489,717.6285	E	1,302,370.7381	
C.C.		N	10,492,035.3541	E	1,293,263.0188	

Back = S 12° 49′ 50.56" W
Ahead = S 14° 16′ 39.12" W
Chord Bear = S 13° 33′ 14.84" W

NOTES:

1. ALIGNMENTS WERE RECREATED FROM SURVEY DATA AND ARE BEST FIT TO EXISTING ROADWAYS FOR PROJECT REFERENCE.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

IH 20 AT SH 17

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064,ETC

SHEET NO. 76

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*ALIGN.dgn

SH 17 SBBL

		Curve Data		
Curve SH17SBBL_6				
P.I. Station	166+67.28	N 10,489,602.3355	E	1,302,341.3985
Delta =	1° 26′ 48.56" (LT)			
Degree =	0° 36′ 29.18"			
Tangent =	118.9676			
Length =	237.9225			
Radius =	9,422.0000			
External =	0.7510			
Long Chord =	237.9161			
Mid. Ord. =	0.7510			
P.C. Station	165+48.32	N 10,489,717.6285	E	1,302,370.7381
P.T. Station	167+86.24	N 10,489,486.3385	E	1,302,314.9792
C.C.		N 10,487,393.9840	E	1,311,501.7162
Back = S	14° 16′ 39.12" W			
Ahead = S	12° 49′ 50.56" W			
Chord Bear = S	13° 33′ 14.84" W			

Course from PT SH17SBBL_6 to PC SH17SBBL_9 S 12° 49′ 50.56" W Dist 882.4456

		Curve Data		
Curve SH17SBBL_9				
P.I. Station	177+87.35	N 10,488,510.2257	E	1,302,092.6615
Delta =	1° 26′ 48.56" (LT)			
Degree =	0° 36′ 34.77"			
Tangent =	118.6645			
Length =	237.3164			
Radius =	9,398.0000			
External =	0.7491			
Long Chord =	237.3101			
Mid. Ord. =	0.7491			
P.C. Station	176+68.68	N 10,488,625.9272	E	1,302,119.0135
P.T. Station	179+06.00	N 10,488,393.8957	E	1,302,069.2393
C.C.		N 10,486,538.9023	E	1,311,282.3497
Back = S	12° 49′ 50.56" W			
Ahead = S	11° 23′ 02.01" W			
Chord Bear = S	12° 06′ 26.28" W			

		Curve Data		
Curve SH17SBBL_10				
P.I. Station	180+24.97	N 10,488,277.2684	E	1,302,045.7572
Delta =	1° 26′ 48.57" (RT)			
Degree =	0° 36′ 29.18"			
Tangent =	118.9677			
Length =	237.9228			
Radius =	9,422.0000			
External =	0.7510			
Long Chord =	237.9165			
Mid. Ord. =	0.7510			
P.C. Station	179+06.00	N 10,488,393.8957	E	1,302,069.2393
P.T. Station	181+43.92	N 10,488,161.2713	E	1,302,019.3379
C.C.		N 10,490,253.6262	E	1,292,832.6010
Back = S	11° 23′ 02.01" W			
Ahead = S	12° 49′ 50.57" W			
Chord Bear = S	12° 06′ 26.29" W			

Course from PT SH17SBBL_10 to 588 S 12° 49′ 56.30" W Dist 0.0073

Point 588 N 10,488,161.2642 E 1,302,019.3363 Sta 181+43.93

==========

Ending chain SH17SBBL description

CCDR

Chain CCDR contains:
CCDR1 CUR CCDR_3 CUR CCDR_6 CCDR8

Beginning chain CCDR description
Feature: Geom_Centerline

==========

Point CCDR1 N 10,489,359.6489 E 1,308,180.4083 Sta 100+00.00

Course from CCDR1 to PC CCDR_3 S 12° 51′ 00.00" W Dist 2,423.1846

		Curve Data		
Curve CCDR_3				
P.I. Station	125+95.26	N 10,486,829.3853	E	1,307,603.2240
Delta =	65° 09′ 56.59" (RT)			
Degree =	21° 16′ 48.71"			
Tangent =	172.0756			
Length =	306.2271			
Radius =	269.2446			
External =	50.2905			
Long Chord =	289.9865			
Mid. Ord. =	42.3755			
P.C. Station	124+23.18	N 10,486,997.1515	E	1,307,641.4935
P.T. Station	127+29.41	N 10,486,793.6550	E	1,307,434.8988
C.C.		N 10,487,057.0313	E	1,307,378.9920
Back = S	12° 51′ 00.00" W			
Ahead = S	78° 00′ 56.59" W			
Chord Bear = S	45° 25′ 58.29" W			

Course from PT CCDR_3 to PC CCDR_6 S 78° 00′ 56.59" W Dist 280.1107

		Curve Data		
Curve CCDR_6				
P.I. Station	130+65.19	N 10,486,723.9335	E	1,307,106.4417
Delta =	20° 48′ 13.01" (LT)			
Degree =	18° 53′ 40.41"			
Tangent =	55.6648			
Length =	110.1037			
Radius =	303.2396			
External =	5.0668			
Long Chord =	109.4999			
Mid. Ord. =	4.9835			
P.C. Station	130+09.52	N 10,486,735.4919	E	1,307,160.8933
P.T. Station	131+19.63	N 10,486,693.7893	E	1,307,059.6454
C.C.		N 10,486,438.8615	E	1,307,223.8589
Back = S	78° 00′ 56.59" W			
Ahead = S	57° 12′ 43.58" W			
Chord Bear = S	67° 36′ 50.08" W			

Course from PT CCDR_6 to CCDR8 S 57° 12′ 43.58" W Dist 1,574.0090

Point CCDR8 N 10,485,841.4152 E 1,305,736.4059 Sta 146+93.64

==========

Ending chain CCDR description

IH 20 NFR

Chain IH20NFR contains:
NFRIH20001 NFRIH20002

Beginning chain IH20NFR description
Feature: Geom_Centerline

==========

Point NFRIH20001 N 10,489,403.4499 E 1,302,314.5616 Sta 0+00.00

Course from NFRIH20001 to NFRIH20002 S 77° 10′ 09.44" E Dist 1,804.3705

Point NFRIH20002 N 10,489,002.7513 E 1,304,073.8778 Sta 18+04.37

==========

Chain IH20NFR contains:
53 CUR IH20NFR_3 CUR IH20NFR_6 CUR IH20NFR_9 CUR IH20NFR_12 CUR IH20NFR_15 54

Feature: Geom_Centerline

==========

Point 53 N 10,489,002.7513 E 1,304,073.8778 Sta 18+04.37

Course from 53 to PC IH20NFR_3 S 77° 10′ 09.44" E Dist 101.8920

		Curve Data		
Curve IH20NFR_3				
P.I. Station	20+28.21	N 10,488,953.0432	E	1,304,292.1272
Delta =	16° 00′ 48.47" (RT)			
Degree =	6° 36′ 31.85"			
Tangent =	121.9466			
Length =	242.3034			
Radius =	866.9556			
External =	8.5345			
Long Chord =	241.5156			
Mid. Ord. =	8.4513			
P.C. Station	19+06.26	N 10,488,980.1240	E	1,304,173.2256
P.T. Station	21+48.57	N 10,488,894.2126	E	1,304,398.9444
C.C.		N 10,488,134.8158	E	1,303,980.6997
Back = S	77° 10′ 09.44" E			
Ahead = S	61° 09′ 20.96" E			
Chord Bear = S	69° 09′ 45.20" E			

Course from PT IH20NFR_3 to PC IH20NFR_6 S 61° 09′ 20.96" E Dist 340.5956

		Curve Data		
Curve IH20NFR_6				
P.I. Station	26+43.80	N 10,488,655.2984	E	1,304,832.7351
Delta =	15° 58′ 39.64" (LT)			
Degree =	5° 11′ 59.87"			
Tangent =	154.6360			
Length =	307.2651			
Radius =	1,101.8496			
External =	10.7981			
Long Chord =	306.2705			
Mid. Ord. =	10.6933			
P.C. Station	24+89.16	N 10,488,729.8993	E	1,304,697.2840
P.T. Station	27+96.43	N 10,488,620.8641	E	1,304,983.4884
C.C.		N 10,489,695.0479	E	1,305,228.8484
Back = S	61° 09′ 20.96" E			
Ahead = S	77° 08′ 00.60" E			
Chord Bear = S	69° 08′ 40.78" E			

Course from PT IH20NFR_6 to PC IH20NFR_9 S 77° 08′ 00.60" E Dist 3,159.3625

NOTES:

1. ALIGNMENTS WERE RECREATED FROM SURVEY DATA AND ARE BEST FIT TO EXISTING ROADWAYS FOR PROJECT REFERENCE.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER
03/30/2022
IH 20 AT COUNTRY CLUB DR

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED PROFESSIONAL ENGINEER
03/30/2022
IH 20 AT SH 17

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES / 77
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*ALIGN.dgn

IH 20 NFR

Curve Data

Curve IH20NFR_9					
P.I. Station	61+02.74	N	10,487,884.6131	E	1,308,206.7879
Delta =	7° 28′ 25.18" (RT)				
Degree =	2° 32′ 47.32"				
Tangent =	146.9534				
Length =	293.4900				
Radius =	2,250.0000				
External =	4.7938				
Long Chord =	293.2820				
Mid. Ord. =	4.7837				
P.C. Station	59+55.79	N	10,487,917.3368	E	1,308,063.5243
P.T. Station	62+49.28	N	10,487,833.5332	E	1,308,344.5781
C.C.		N	10,485,723.8307	E	1,307,562.4939
Back = S	77° 08′ 00.60" E				
Ahead = S	69° 39′ 35.42" E				
Chord Bear = S	73° 23′ 48.01" E				

Course from PT IH20NFR_9 to PC IH20NFR_12 S 69° 39′ 35.42" E Dist 121.2493

Curve Data

Curve IH20NFR_12					
P.I. Station	64+86.46	N	10,487,751.0913	E	1,308,566.9681
Delta =	7° 28′ 25.18" (LT)				
Degree =	3° 13′ 40.55"				
Tangent =	115.9299				
Length =	231.5310				
Radius =	1,775.0000				
External =	3.7818				
Long Chord =	231.3669				
Mid. Ord. =	3.7738				
P.C. Station	63+70.53	N	10,487,791.3878	E	1,308,458.2670
P.T. Station	66+02.06	N	10,487,725.2761	E	1,308,679.9872
C.C.		N	10,489,455.7086	E	1,309,075.2445
Back = S	69° 39′ 35.42" E				
Ahead = S	77° 08′ 00.60" E				
Chord Bear = S	73° 23′ 48.01" E				

Course from PT IH20NFR_12 to PC IH20NFR_15 S 77° 08′ 00.60" E Dist 66.5330

Curve Data

Curve IH20NFR_15					
P.I. Station	75+54.30	N	10,487,513.2309	E	1,309,608.3189
Delta =	35° 41′ 00.10" (LT)				
Degree =	2° 04′ 55.69"				
Tangent =	885.7080				
Length =	1,713.7857				
Radius =	2,751.7780				
External =	139.0282				
Long Chord =	1,686.2228				
Mid. Ord. =	132.3419				
P.C. Station	66+68.59	N	10,487,710.4605	E	1,308,744.8497
P.T. Station	83+82.38	N	10,487,856.6968	E	1,310,424.7194
C.C.		N	10,490,393.1456	E	1,309,357.6160
Back = S	77° 08′ 00.60" E				
Ahead = N	67° 10′ 59.30" E				
Chord Bear = N	85° 01′ 29.35" E				

Course from PT IH20NFR_15 to 54 N 67° 10′ 59.30" E Dist 143.1092

Point 54 N 10,487,912.1927 E 1,310,556.6301 Sta 85+25.49

Ending chain IH20NFR description

IH 20 SFR

Chain IH20SFR contains:
SFRIH20001 CUR IH20SFR_1 SFRIH20002

Beginning chain IH20SFR description
Feature: Geom_Centerline

Point SFRIH20001 N 10,488,658.6242 E 1,302,144.9215 Sta 0+00.00

Course from SFRIH20001 to PC IH20SFR_1 S 77° 06′ 59.27" E Dist 1,087.9867

Curve Data

Curve IH20SFR_1					
P.I. Station	12+35.26	N	10,488,383.1972	E	1,303,349.0889
Delta =	20° 24′ 02.29" (LT)				
Degree =	6° 59′ 59.99"				
Tangent =	147.2781				
Length =	291.4377				
Radius =	818.5114				
External =	13.1446				
Long Chord =	289.9007				
Mid. Ord. =	12.9369				
P.C. Station	10+87.99	N	10,488,416.0358	E	1,303,205.5184
P.T. Station	13+79.42	N	10,488,402.4644	E	1,303,495.1013
C.C.		N	10,489,213.9414	E	1,303,388.0219
Back = S	77° 06′ 59.27" E				
Ahead = N	82° 28′ 58.45" E				
Chord Bear = S	87° 19′ 00.41" E				

Course from PT IH20SFR_1 to SFRIH20002 N 82° 28′ 58.45" E Dist 320.8473

Point SFRIH20002 N 10,488,444.4383 E 1,303,813.1912 Sta 17+00.27

IH 20 SFR

Chain IH20SFR contains:
49 CUR IH20SFR_3 CUR IH20SFR_6 CUR IH20SFR_9 CUR IH20SFR_12 50

Feature: Geom_Centerline

Point 49 N 10,488,444.4383 E 1,303,813.1912 Sta 17+00.27

Course from 49 to PC IH20SFR_3 N 82° 28′ 58.45" E Dist 150.2852

Curve Data

Curve IH20SFR_3					
P.I. Station	20+03.37	N	10,488,484.0903	E	1,304,113.6851
Delta =	20° 23′ 00.95" (RT)				
Degree =	6° 44′ 26.45"				
Tangent =	152.8135				
Length =	302.3968				
Radius =	850.0000				
External =	13.6272				
Long Chord =	300.8046				
Mid. Ord. =	13.4122				
P.C. Station	18+50.56	N	10,488,464.0989	E	1,303,962.1849
P.T. Station	21+52.95	N	10,488,450.0618	E	1,304,262.6617
C.C.		N	10,487,621.4039	E	1,304,073.3836
Back = N	82° 28′ 58.45" E				
Ahead = S	77° 08′ 00.60" E				
Chord Bear = S	87° 19′ 31.08" E				

Course from PT IH20SFR_3 to PC IH20SFR_6 S 77° 08′ 00.60" E Dist 3,844.2570

Curve Data

Curve IH20SFR_6					
P.I. Station	61+04.62	N	10,487,570.1041	E	1,308,115.1077
Delta =	7° 26′ 56.39" (LT)				
Degree =	3° 28′ 20.90"				
Tangent =	107.4092				
Length =	214.5157				
Radius =	1,650.0000				
External =	3.4923				
Long Chord =	214.3647				
Mid. Ord. =	3.4849				
P.C. Station	59+97.21	N	10,487,594.0220	E	1,308,010.3954
P.T. Station	62+11.73	N	10,487,559.9634	E	1,308,222.0372
C.C.		N	10,489,202.5931	E	1,308,377.8177
Back = S	77° 08′ 00.60" E				
Ahead = S	84° 34′ 56.99" E				
Chord Bear = S	80° 51′ 28.80" E				

Course from PT IH20SFR_6 to PC IH20SFR_9 S 84° 34′ 56.99" E Dist 115.2664

Curve Data

Curve IH20SFR_9					
P.I. Station	64+89.73	N	10,487,533.7160	E	1,308,498.8030
Delta =	7° 26′ 56.39" (RT)				
Degree =	2° 17′ 30.59"				
Tangent =	162.7412				
Length =	325.0238				
Radius =	2,500.0000				
External =	5.2913				
Long Chord =	324.7950				
Mid. Ord. =	5.2802				
P.C. Station	63+26.99	N	10,487,549.0808	E	1,308,336.7887
P.T. Station	66+52.02	N	10,487,497.4768	E	1,308,657.4580
C.C.		N	10,485,060.2479	E	1,308,100.7576
Back = S	84° 34′ 56.99" E				
Ahead = S	77° 08′ 00.60" E				
Chord Bear = S	80° 51′ 28.80" E				

Course from PT IH20SFR_9 to PC IH20SFR_12 S 77° 08′ 00.60" E Dist 36.2434

Curve Data

Curve IH20SFR_12					
P.I. Station	76+46.71	N	10,487,275.9783	E	1,309,627.1762
Delta =	35° 41′ 00.10" (LT)				
Degree =	1° 55′ 26.80"				
Tangent =	958.4500				
Length =	1,854.5368				
Radius =	2,977.7780				
External =	150.4465				
Long Chord =	1,824.7101				
Mid. Ord. =	143.2110				
P.C. Station	66+88.26	N	10,487,489.4061	E	1,308,692.7914
P.T. Station	85+42.80	N	10,487,647.6526	E	1,310,510.6267
C.C.		N	10,490,392.4167	E	1,309,355.8835
Back = S	77° 08′ 00.60" E				
Ahead = N	67° 10′ 59.30" E				
Chord Bear = N	85° 01′ 29.35" E				

Course from PT IH20SFR_12 to 50 N 67° 10′ 59.30" E Dist 144.9888

Point 50 N 10,487,703.8774 E 1,310,644.2700 Sta 86+87.79

Ending chain IH20SFR description

NOTES:

1. ALIGNMENTS WERE RECREATED FROM SURVEY DATA AND ARE BEST FIT TO EXISTING ROADWAYS FOR PROJECT REFERENCE.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022
IH 20 AT COUNTRY CLUB DR

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER
03/30/2022
IH 20 AT SH 17

JMT TBPE REGISTRATION NO. F-16341

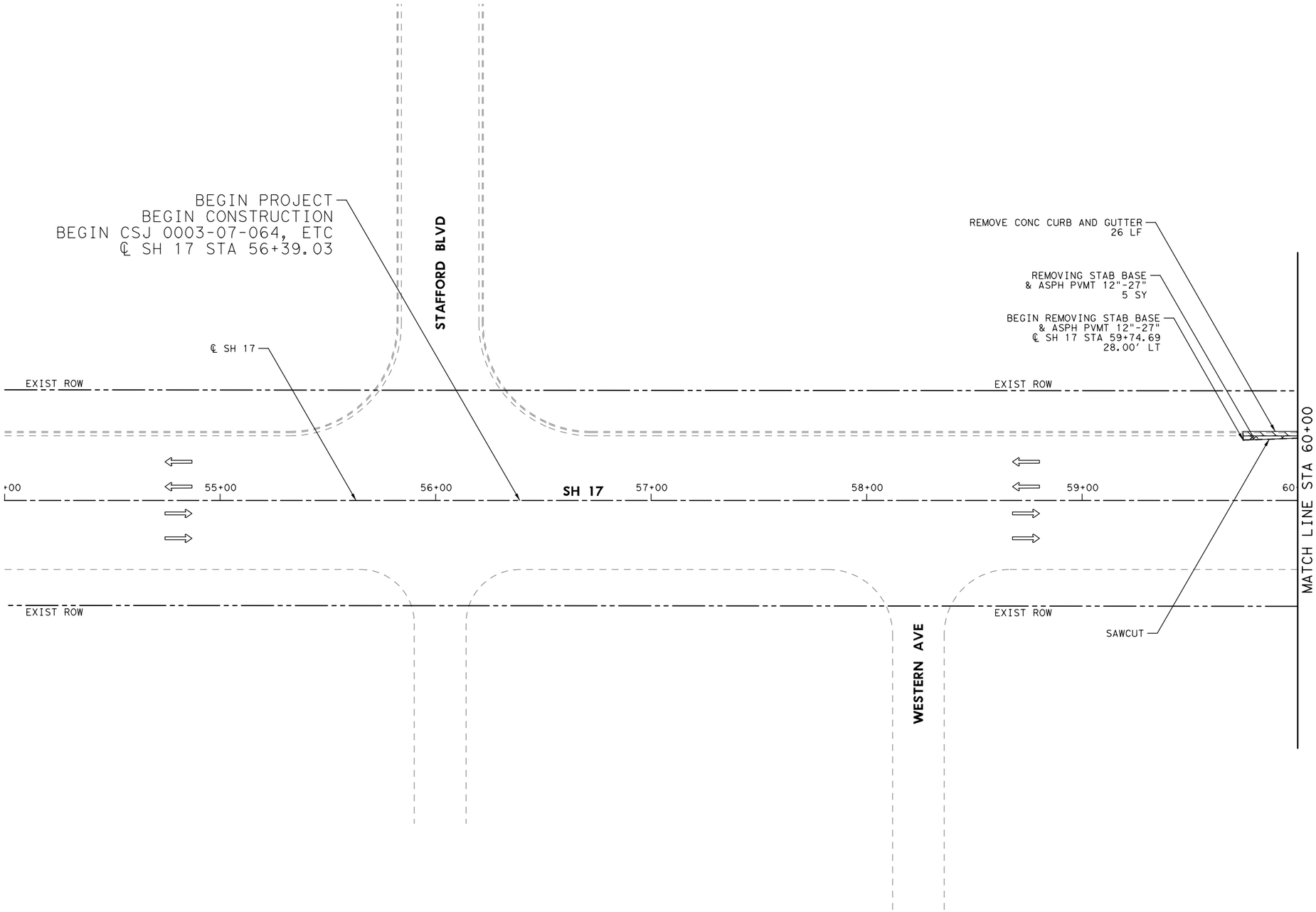
Texas Department of Transportation

HORIZONTAL ALIGNMENT DATA

SHEET 3 OF 3

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB / 78
	0003	07	064,ETC

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*ALIGN.dgn



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

NOTES:

1. REFER TO THE TRAFFIC SIGNAL LAYOUT SHEETS AND ILLUMINATION PLAN SHEETS FOR SIGNAL AND ILLUMINATION REMOVAL ITEMS.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

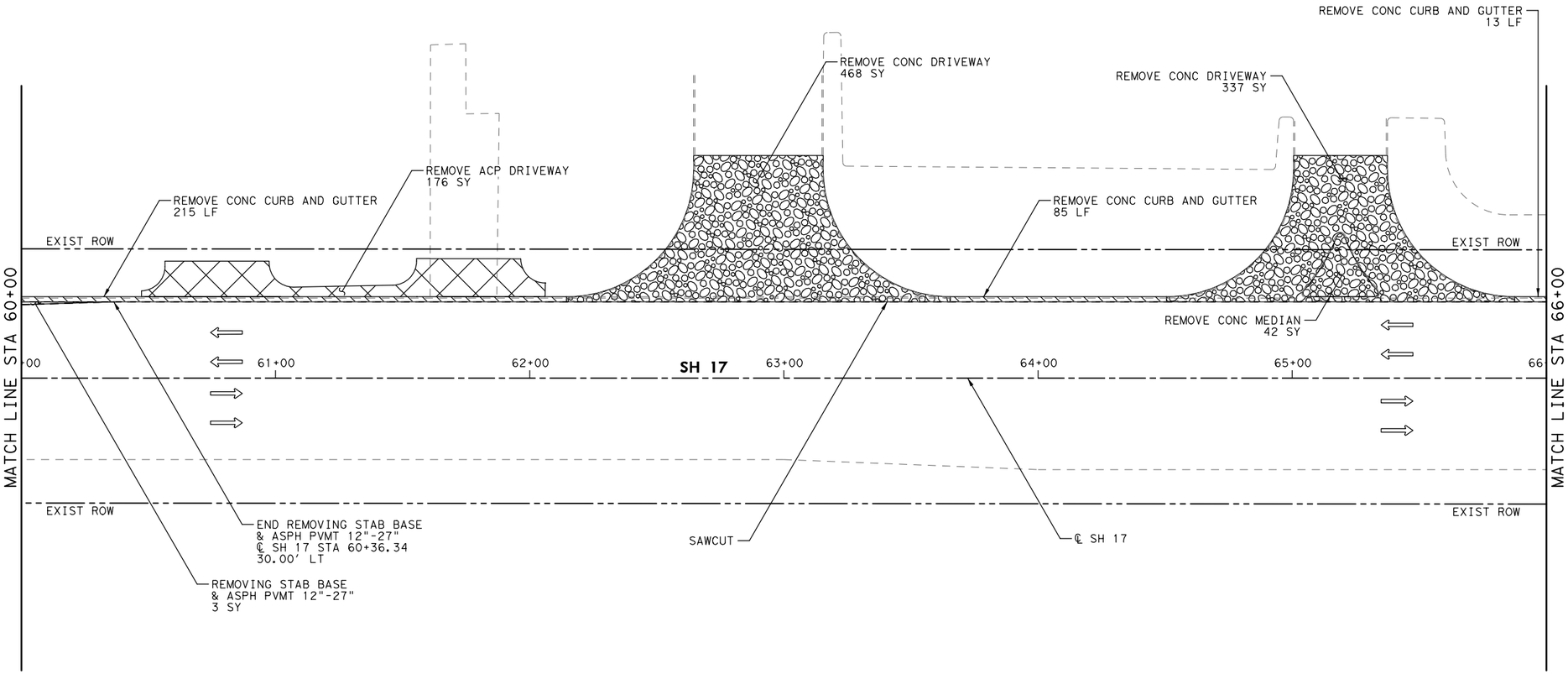
Texas Department of Transportation

SH 17
REMOVAL PLAN
AT IH 20

SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	79
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

NOTES:

1. REFER TO THE TRAFFIC SIGNAL LAYOUT SHEETS AND ILLUMINATION PLAN SHEETS FOR SIGNAL AND ILLUMINATION REMOVAL ITEMS.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

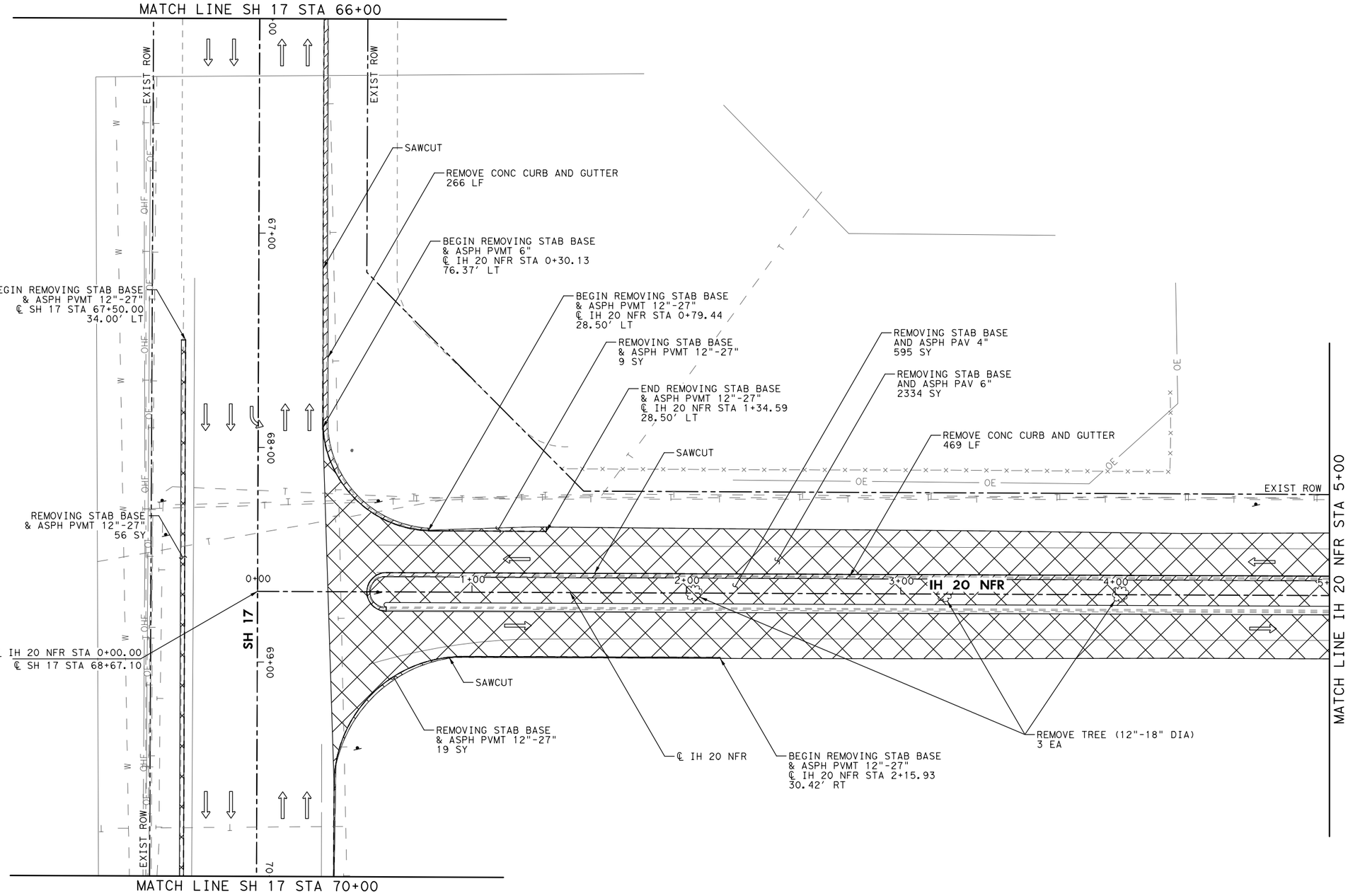
Texas Department of Transportation

SH 17
REMOVAL PLAN
AT IH 20

SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	80
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

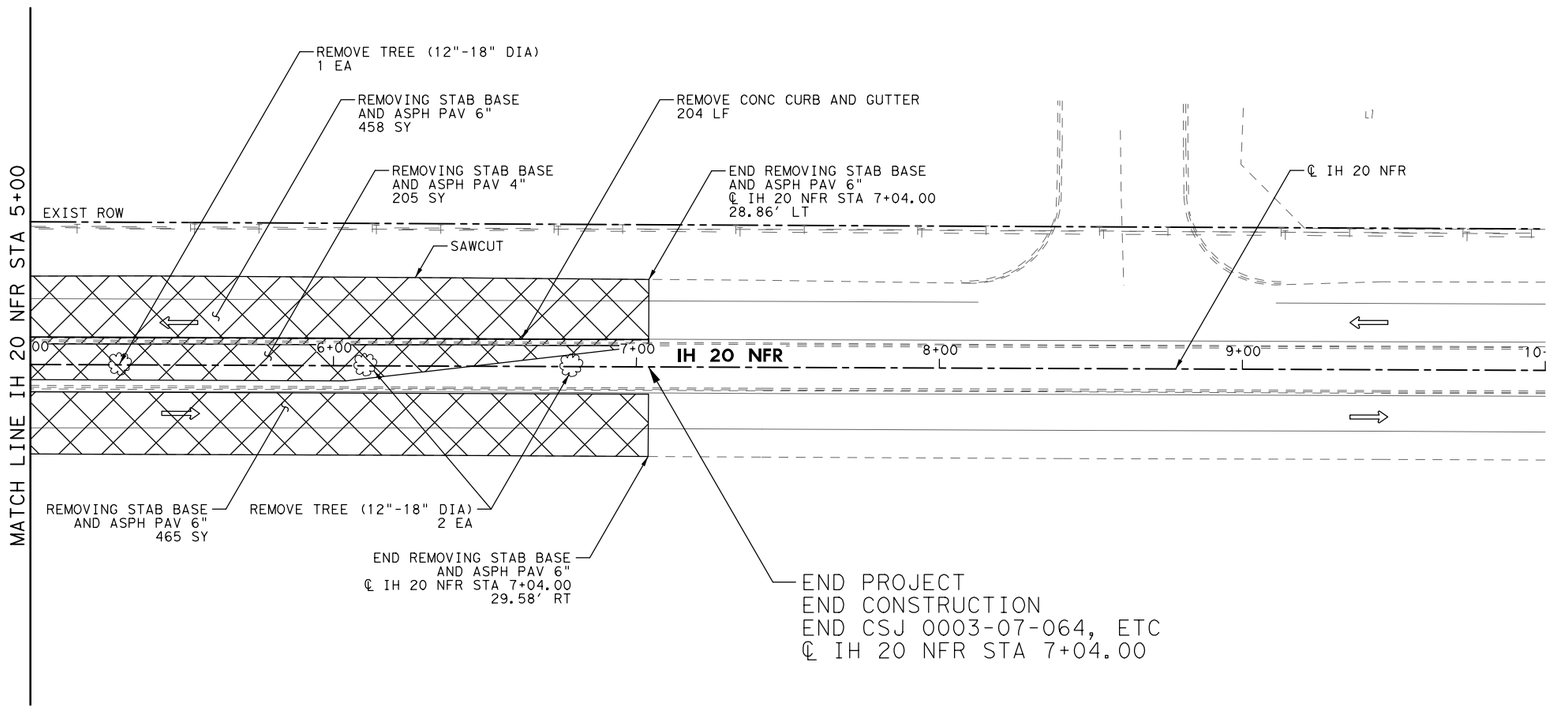
Texas Department of Transportation

IH 20 NFR
REMOVAL PLAN
AT SH 17

SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	81
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
REMOVAL PLAN
AT SH 17

SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	82
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
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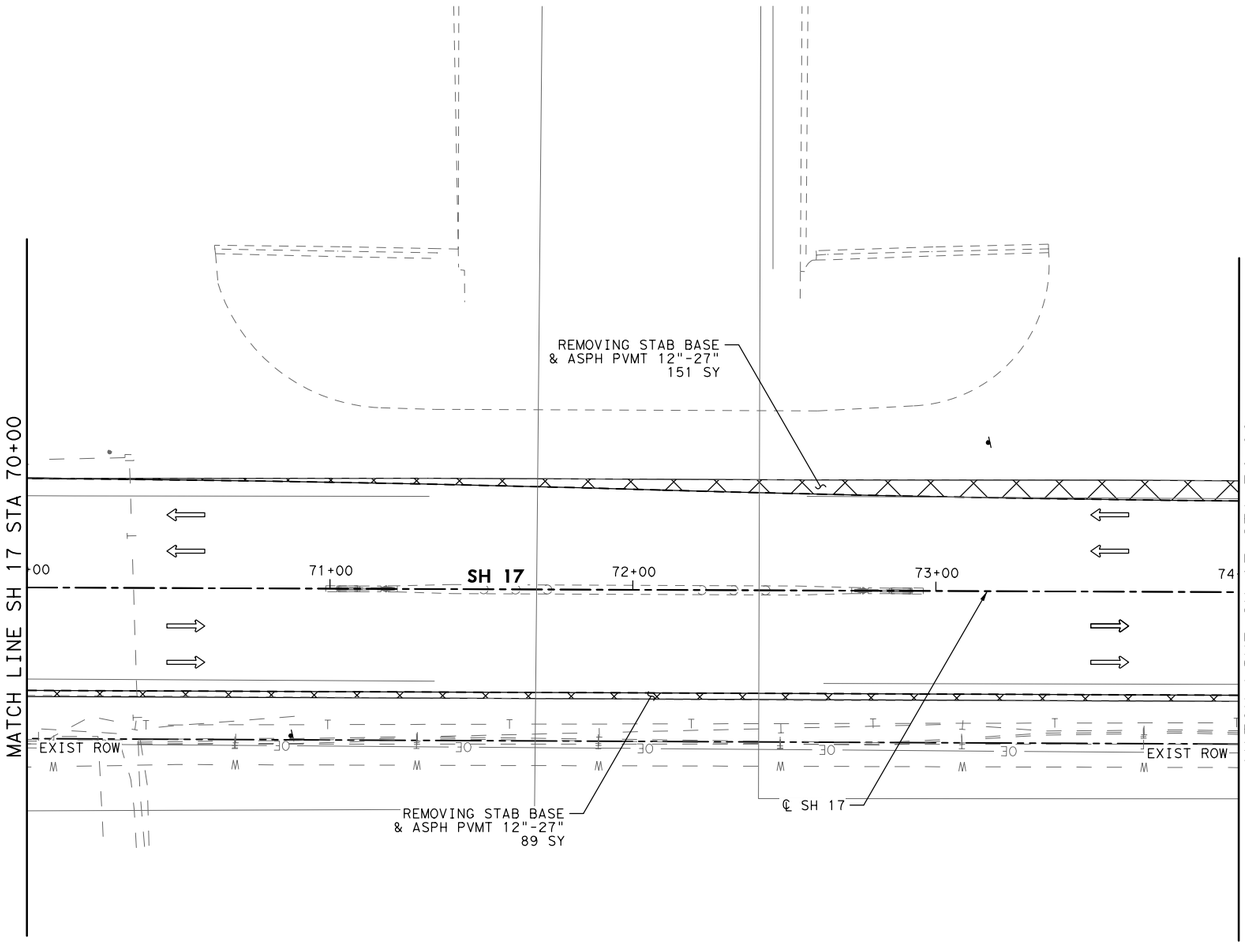

0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SH 17
REMOVAL PLAN
AT IH 20 FR

SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	83
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
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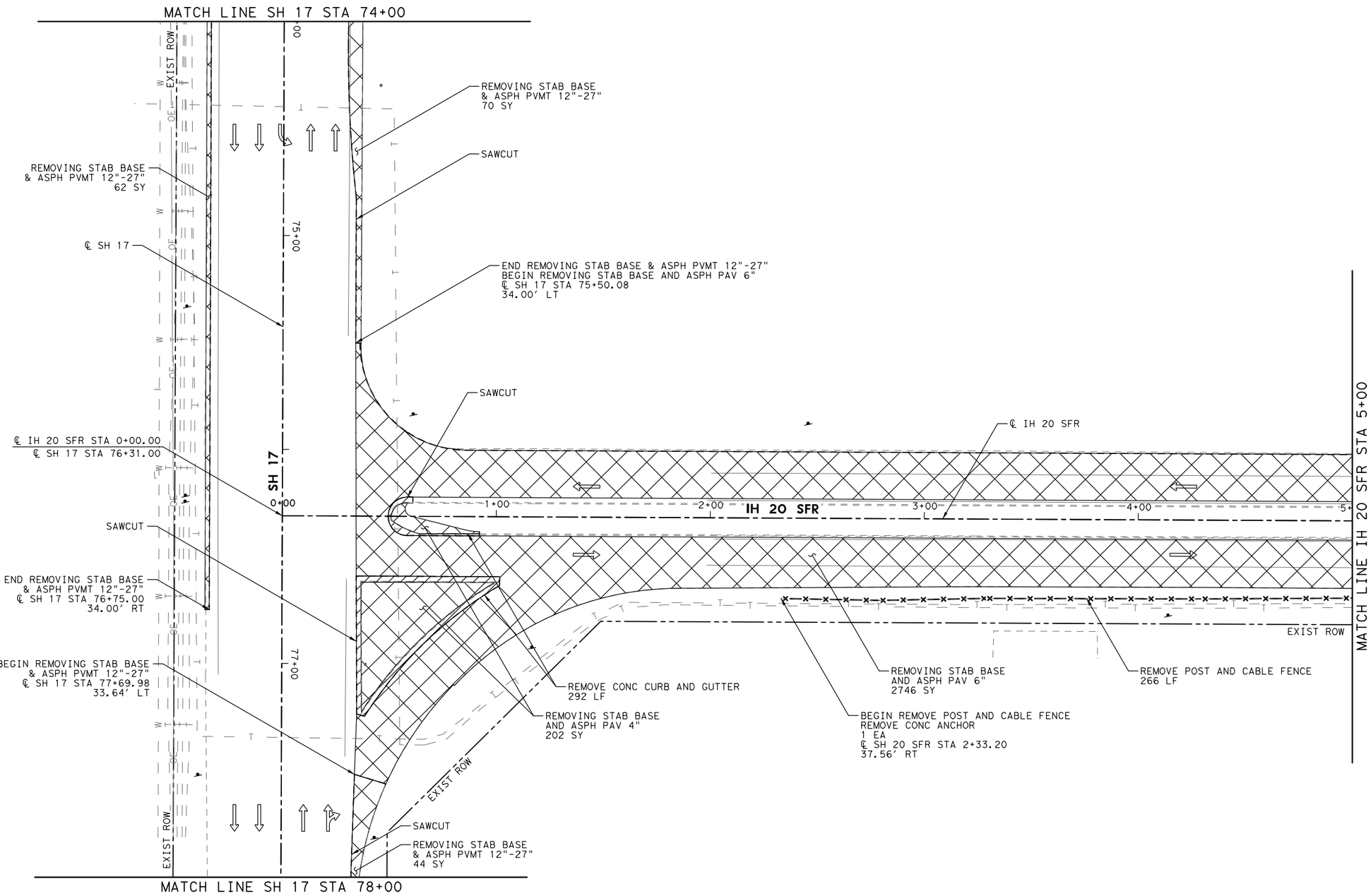

0' 25' 50'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
REMOVAL PLAN
AT SH 17

SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	84
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC	

DATE: 3/30/2022
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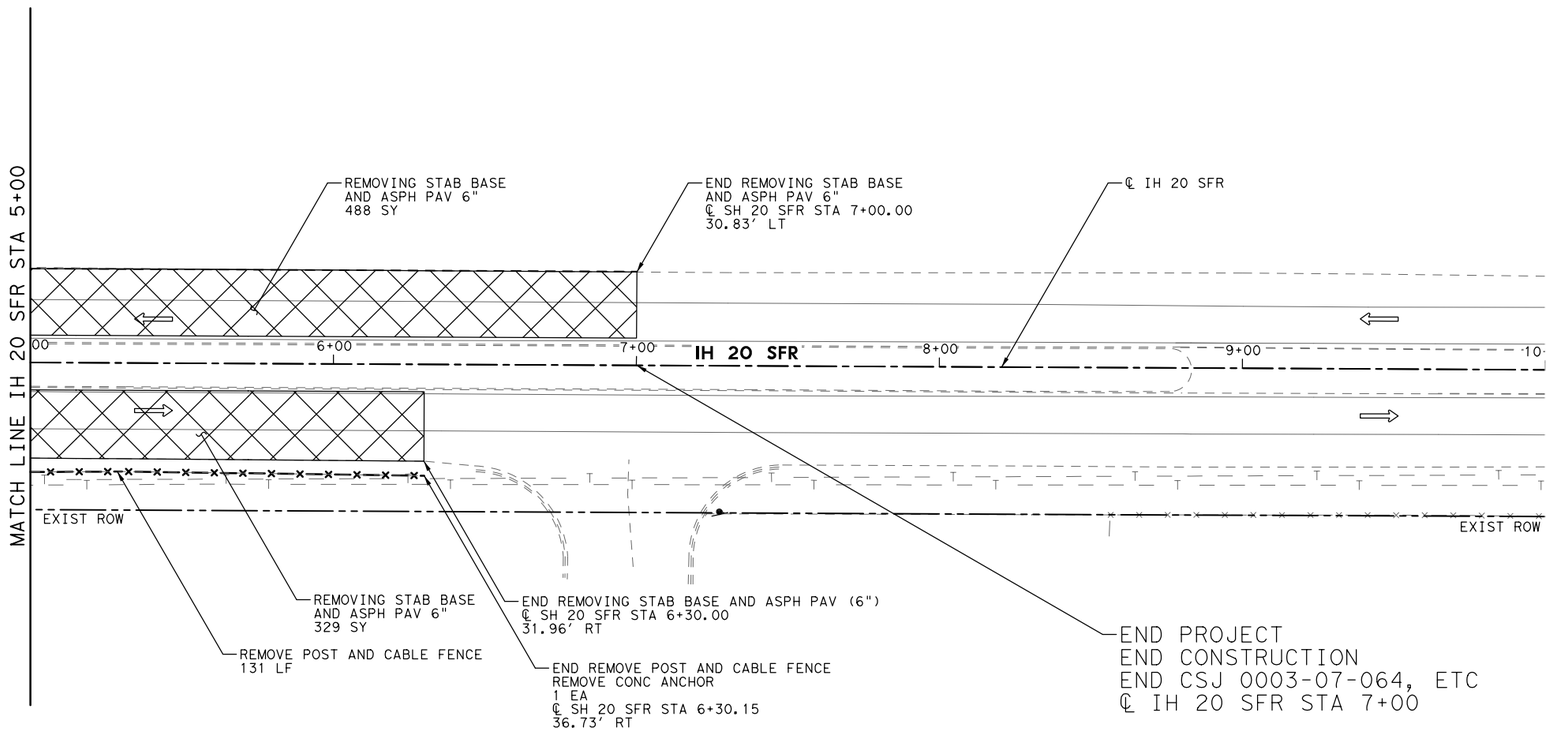


0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

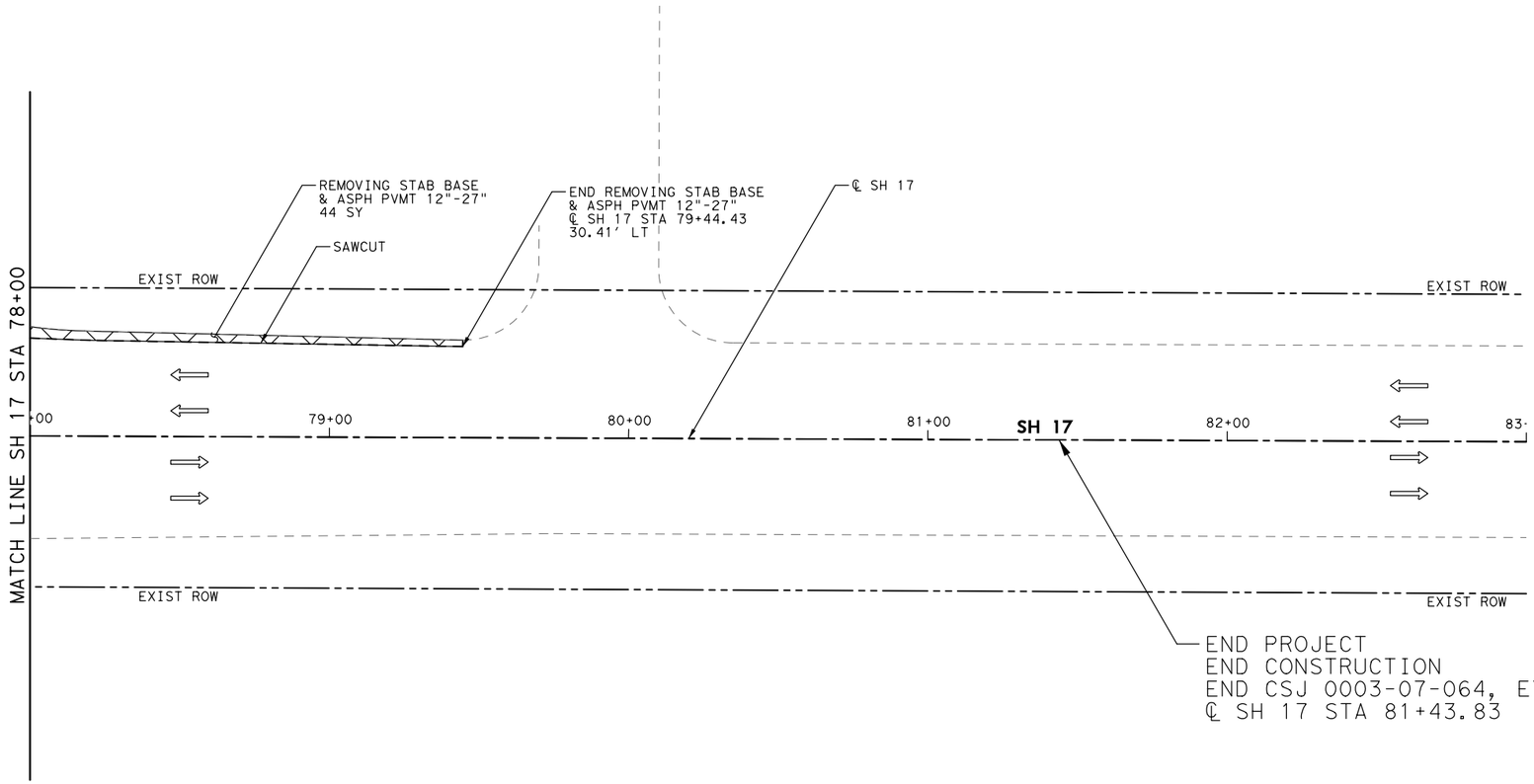
Texas Department of Transportation

IH 20 SFR
REMOVAL PLAN
AT SH 17

SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	85
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- STAB BASE AND ASPH PVMT REMOVAL
- CURB AND GUTTER REMOVAL
- CONC REMOVAL
- SIDEWALK REMOVAL

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

TBPE REGISTRATION NO. F-16341

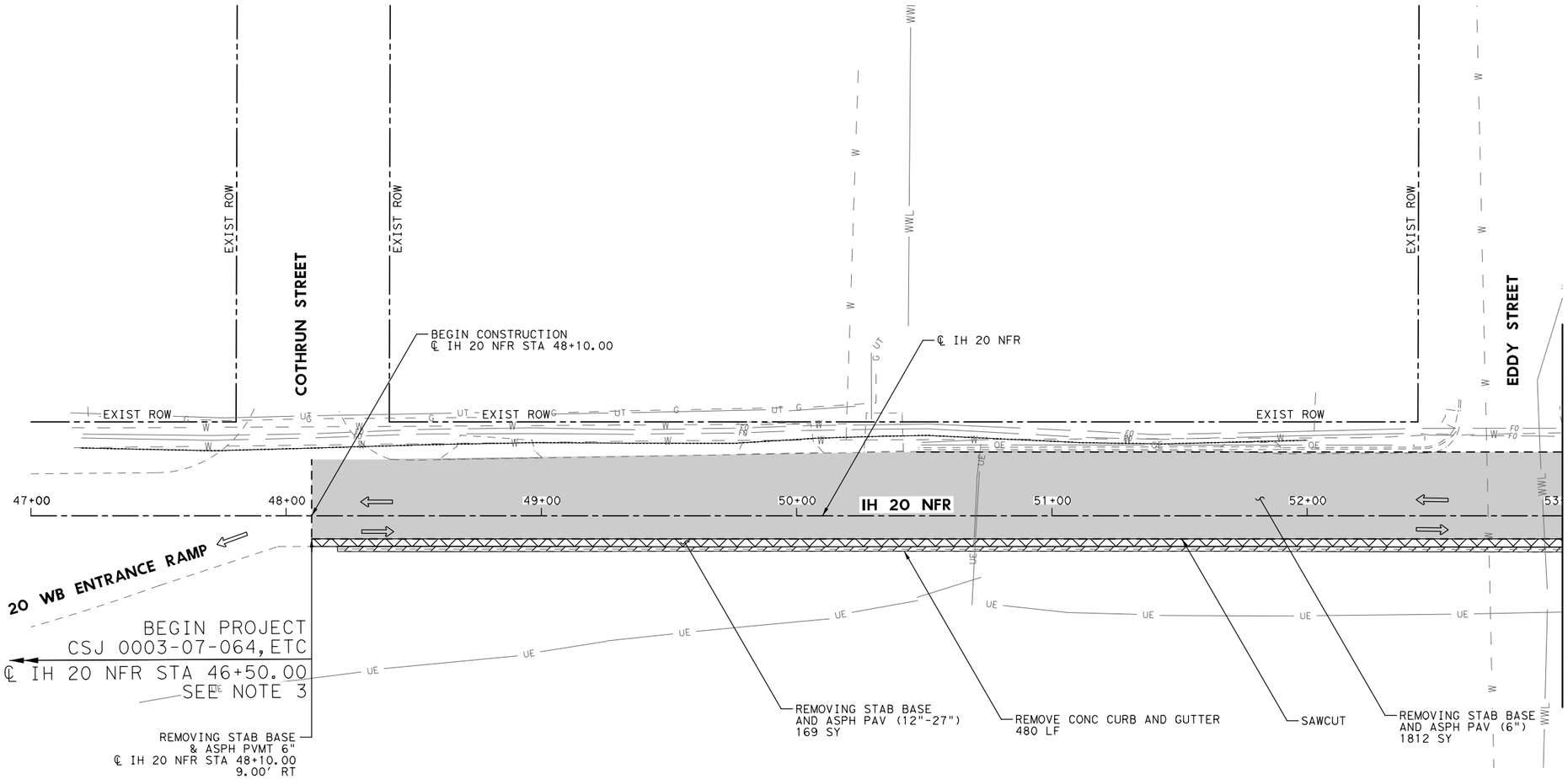
Texas Department of Transportation

SH 17
REMOVAL PLAN
AT IH 20 FR

SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	86
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
- REMOVING STAB BASE AND ASPH PAV (12"-27")
- REMOVING CONC (CURB AND GUTTER)
- REMOVING CONC (MISC)
- REMOVING CONC (SDWLK OR RAMP)

NOTES:

1. REFER TO THE TRAFFIC SIGNAL LAYOUT SHEETS FOR SIGNAL AND ILLUMINATION REMOVAL ITEMS.
2. REFER TO THE SIGNING AND PAVEMENT MARKING PLAN SHEETS FOR SIGN AND STRIPING REMOVAL ITEMS.
3. LIMITS OF SIGNING AND PAVEMENT MARKINGS EXTEND BEYOND THE LIMITS OF CONSTRUCTION. SEE SIGNING & PAVEMENT MARKING PLAN SHEETS FOR PROJECT LIMITS.
4. ADJUST WATER METER AND EXTEND WATER LINE AS APPROVED. MOVING WATER METER AND EXTENDING WATER LINE WILL BE SUBSIDIARY TO ITEM 479.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

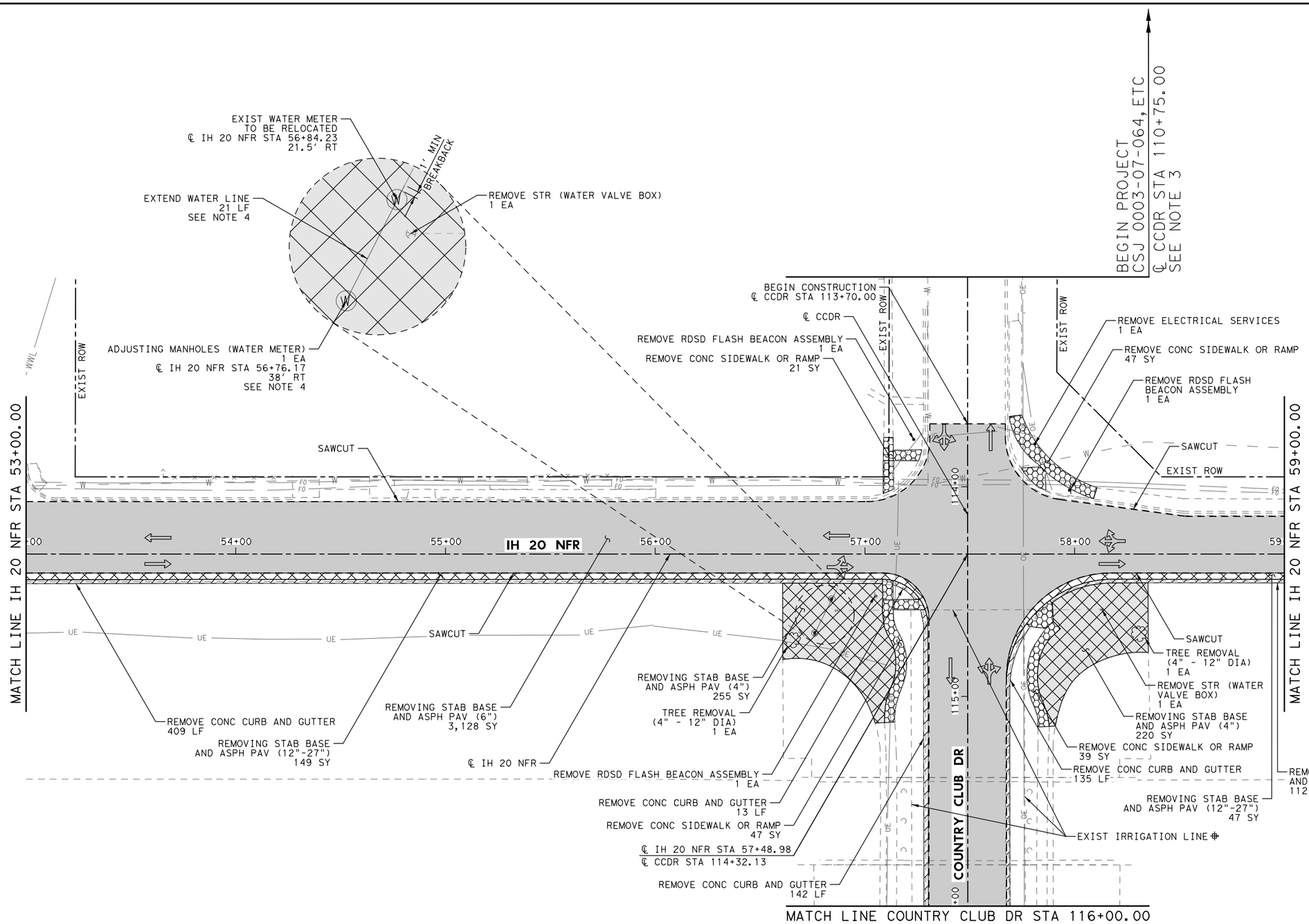
Texas Department of Transportation

IH 20 NFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 1 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	87
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*R



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
- REMOVING STAB BASE AND ASPH PAV (12"-27")
- REMOVING CONC (CURB AND GUTTER)
- REMOVING CONC (MISC)
- REMOVING CONC (SDWLK OR RAMP)

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⌖ LOCATION IS APPROXIMATE. EXIST IRRIGATION LINE TO BE ABANDONED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

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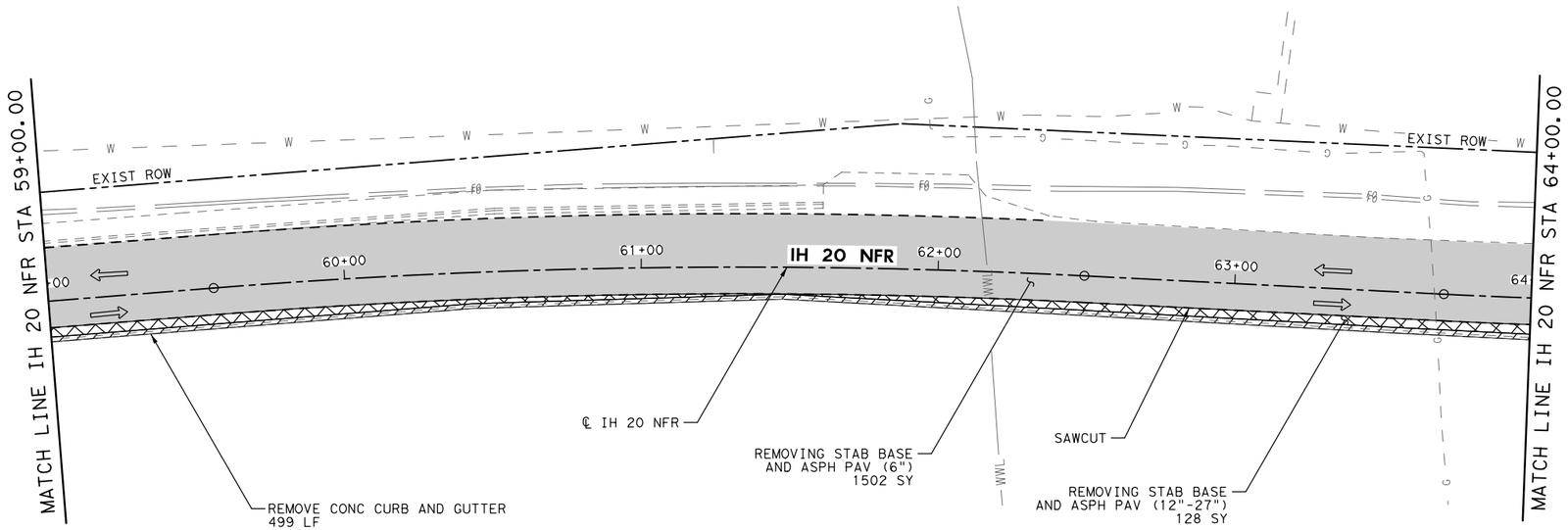
IH 20 NFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 2 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064, ETC

SHEET NO. 88

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*R



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
- REMOVING STAB BASE AND ASPH PAV (12"-27")
- REMOVING CONC (CURB AND GUTTER)
- REMOVING CONC (MISC)
- REMOVING CONC (SDWLK OR RAMP)

NOTES:

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STATE OF TEXAS
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03/30/2022

Jennifer R Perry

JMT TBPE REGISTRATION NO. F-16341

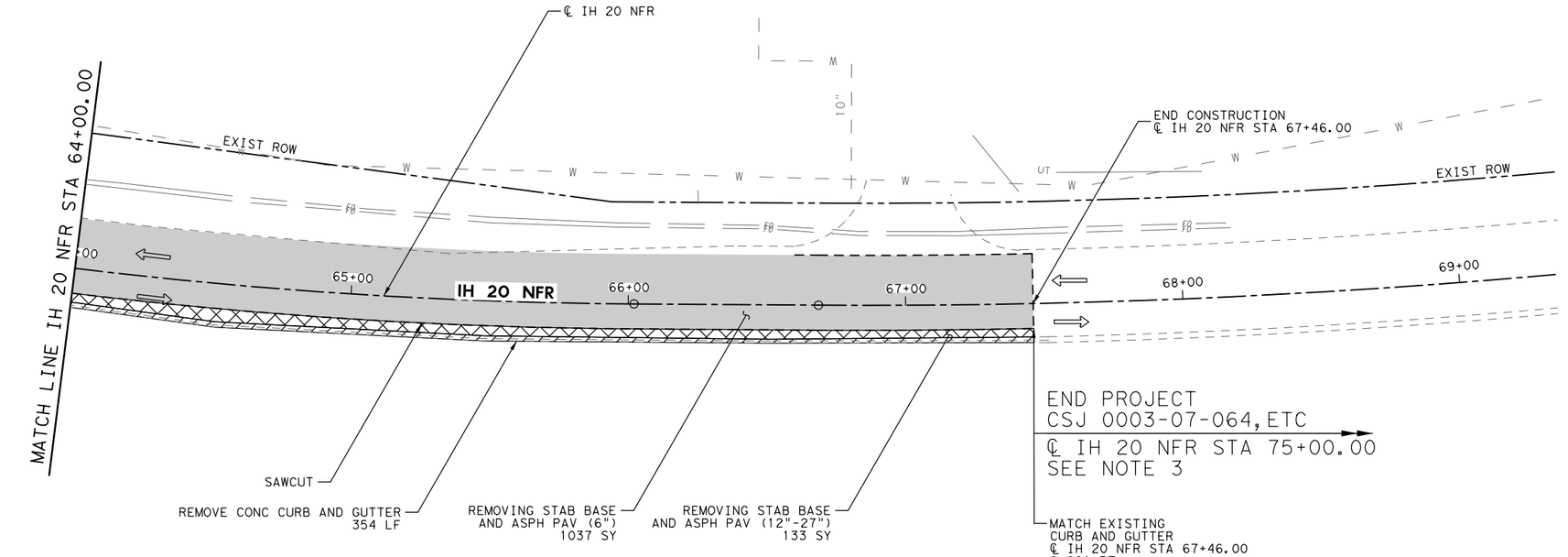
Texas Department of Transportation

IH 20 NFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 3 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	89
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*R



0' 25' 50'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
- REMOVING STAB BASE AND ASPH PAV (12"-27")
- REMOVING CONC (CURB AND GUTTER)
- REMOVING CONC (MISC)
- REMOVING CONC (SDWLK OR RAMP)

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STATE OF TEXAS
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Texas Department of Transportation

IH 20 NFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 4 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	90
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
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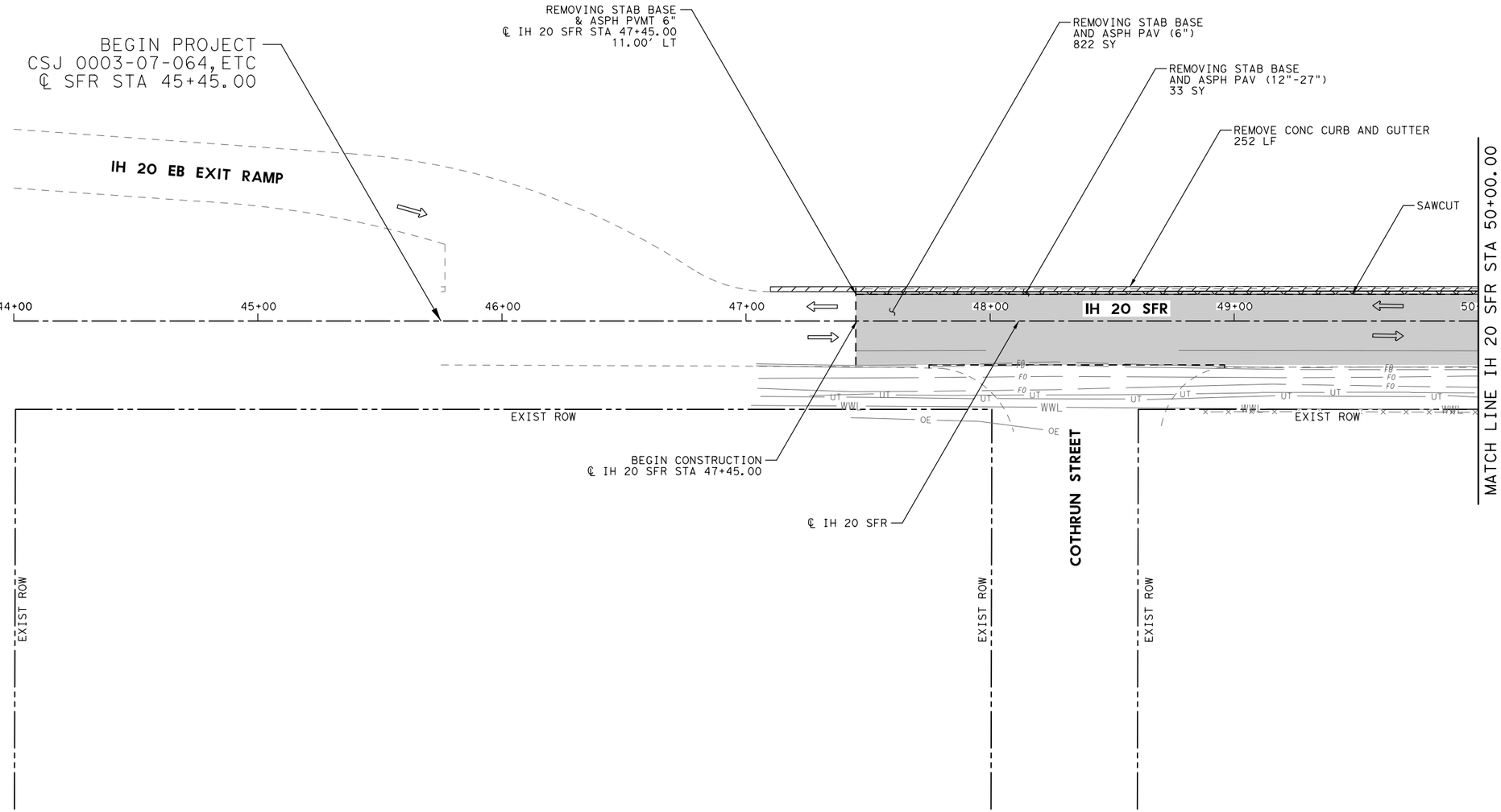

0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
- REMOVING STAB BASE AND ASPH PAV (12"-27")
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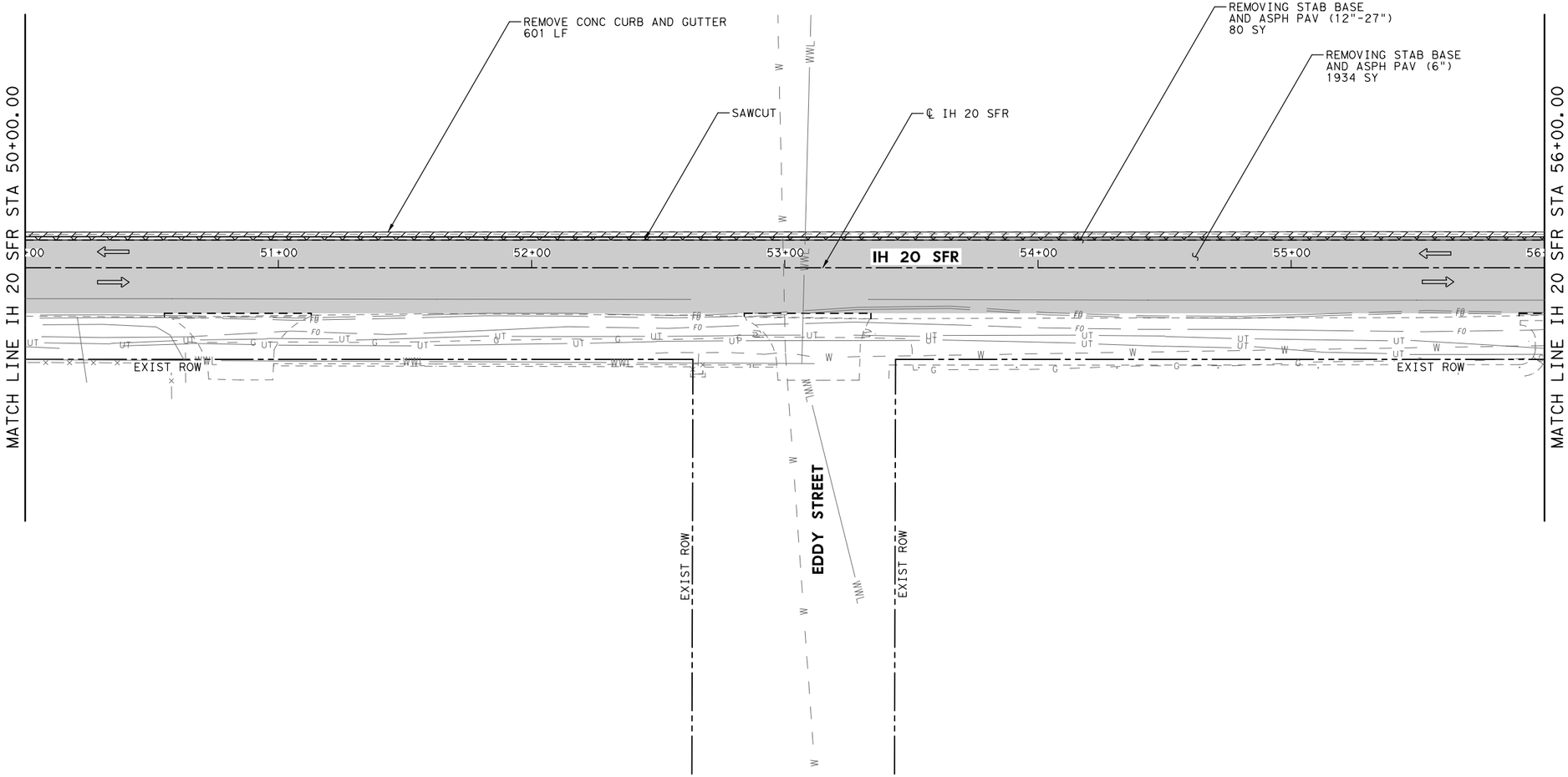
Texas Department of Transportation

IH 20 SFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 5 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	91
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*R



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
- REMOVING STAB BASE AND ASPH PAV (12"-27")
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03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 6 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	92
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
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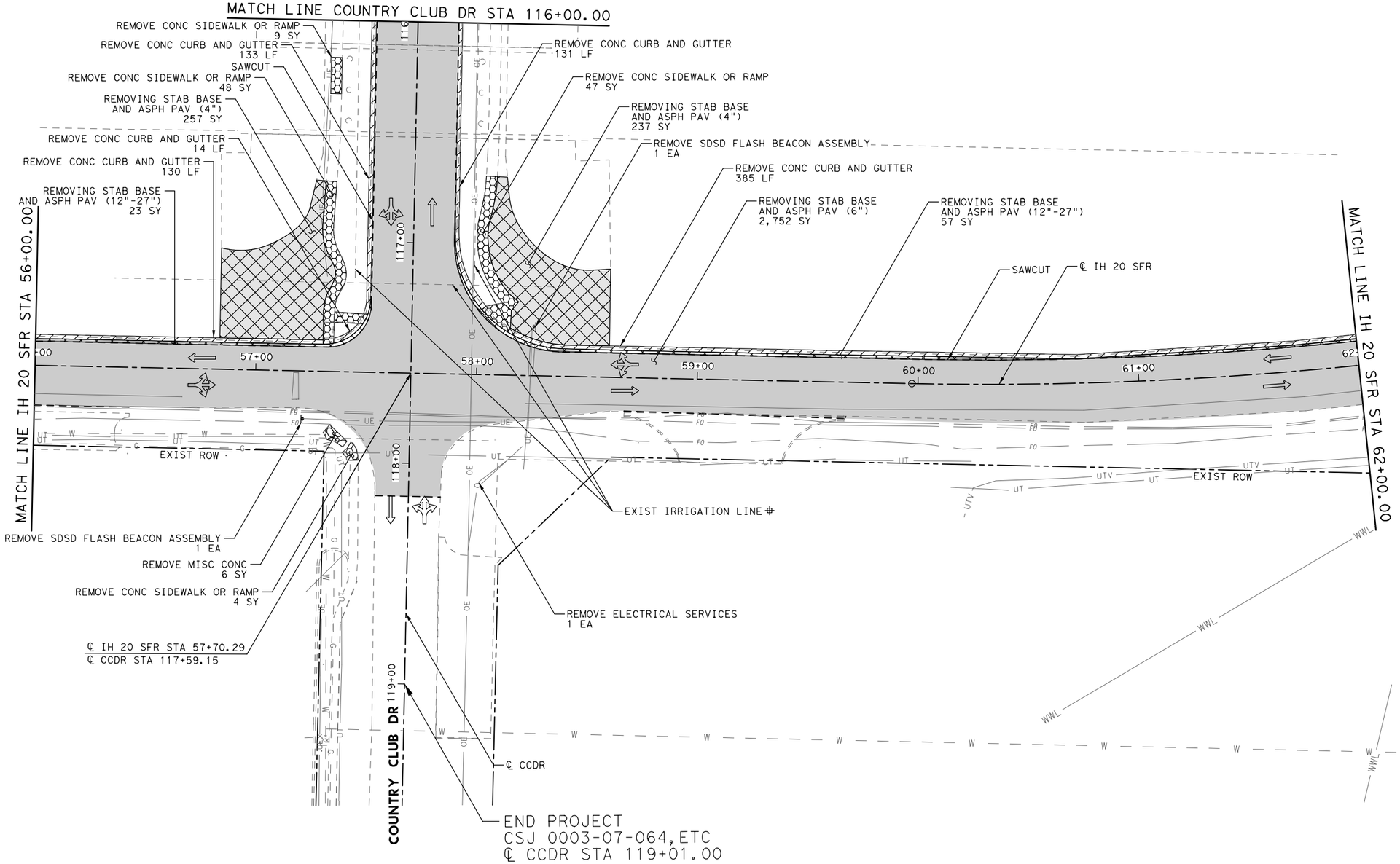

0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
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STATE OF TEXAS
JENNIFER R. PERRY
141282
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PROFESSIONAL ENGINEER

03/30/2022

Jennifer R. Perry

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 7 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	93
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
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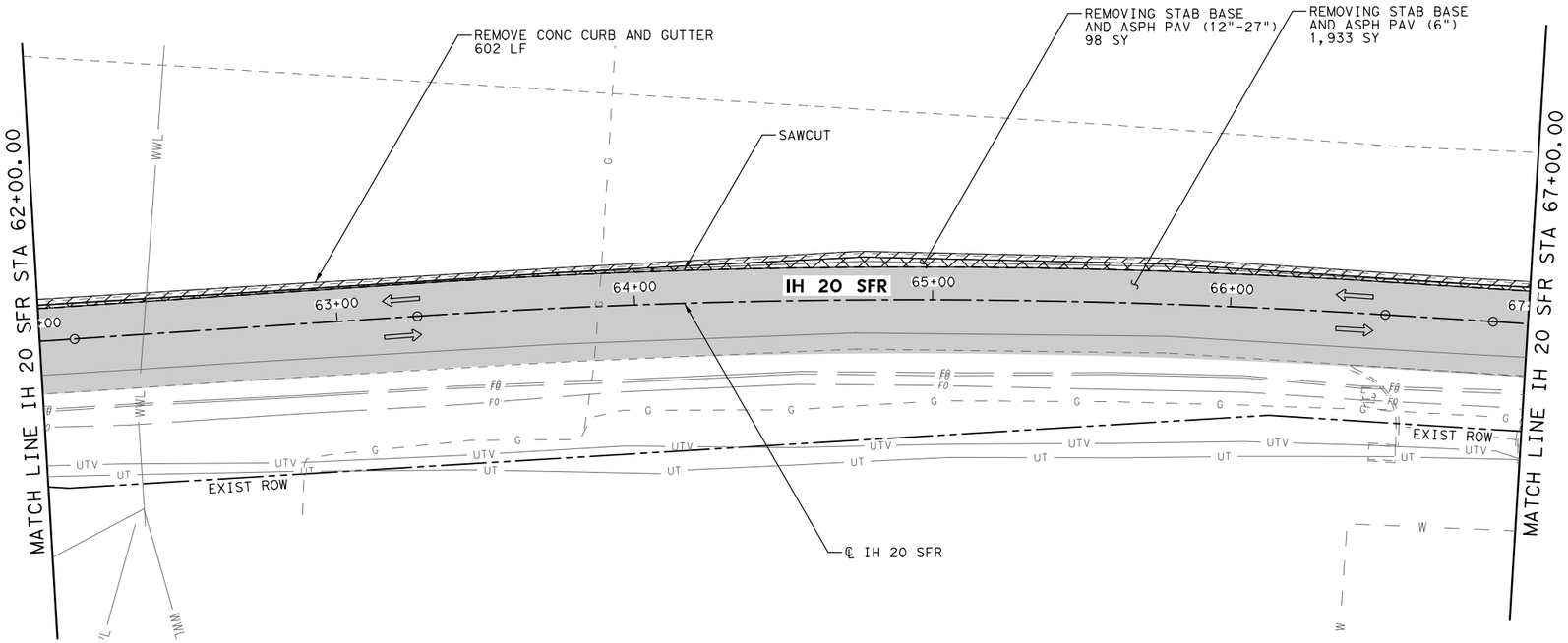

0′ 25′ 50′

SCALE IN FEET

LEGEND

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- REMOVING STAB BASE AND ASPH PAV (6")
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IH 20 SFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 8 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	94
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	

DATE: 3/30/2022
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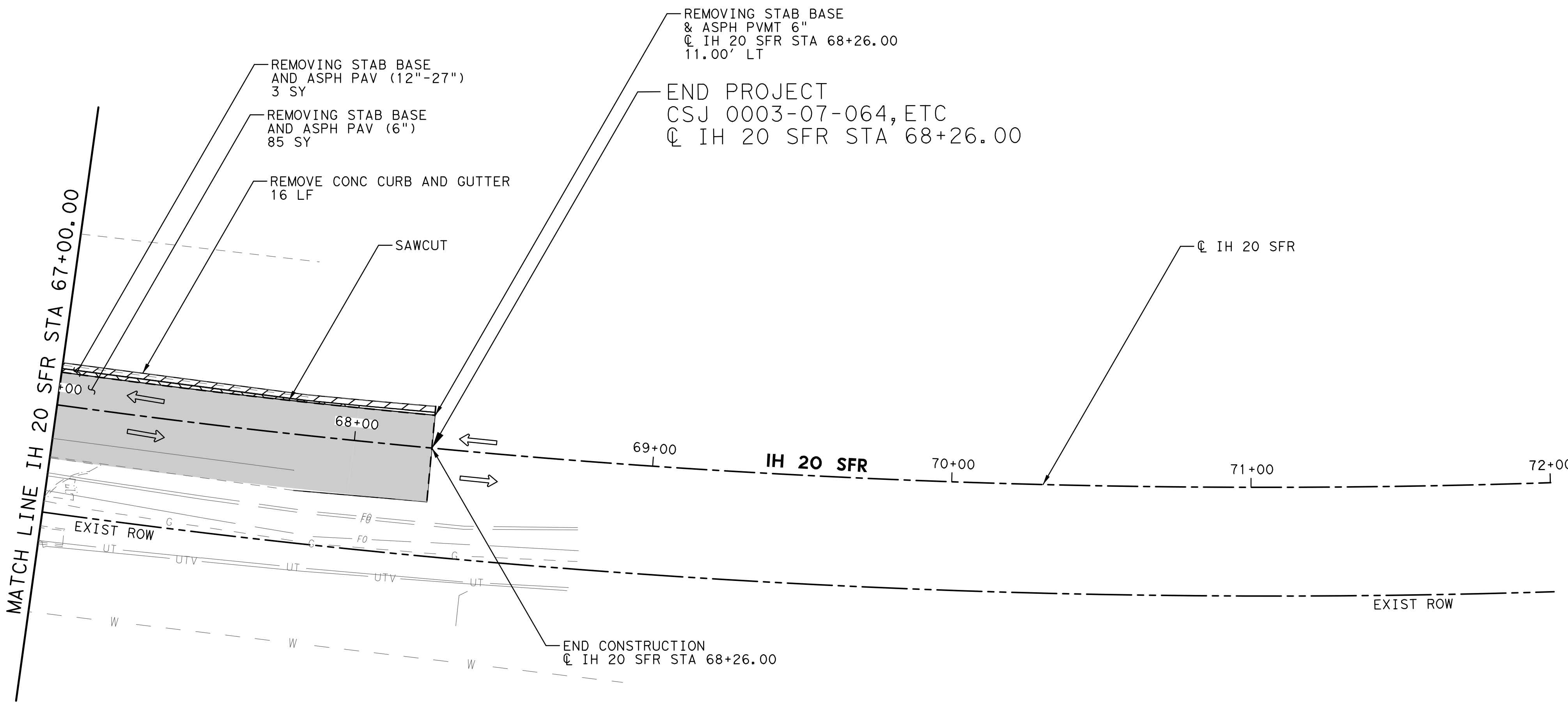

N

0' 25' 50'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- REMOVING STAB BASE AND ASPH PAV (6")
- REMOVING STAB BASE AND ASPH PAV (4")
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03/30/2022

JMT® TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

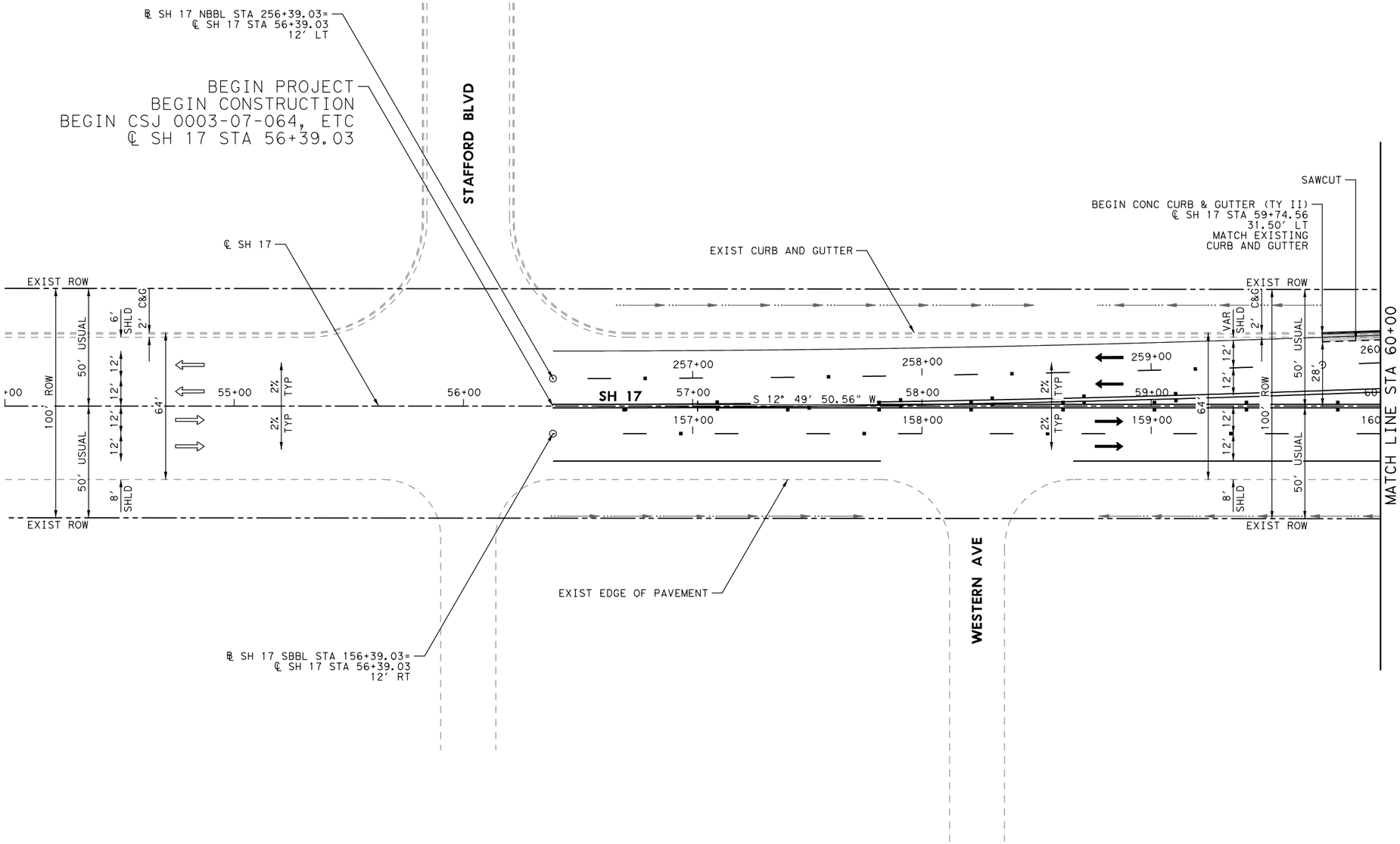
IH 20 SFR
REMOVAL PLAN
AT COUNTRY CLUB DR

SHEET 9 OF 9

DESIGN JMT	FED.RD. DIV.NO. 6	FEDERAL AID PROJECT NO. (SEE TITLE SHEET)		HIGHWAY NO. IH20	
GRAPHICS JMT	STATE	DISTRICT	COUNTY		SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES		95
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064,ETC		

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*R

CAUTION
VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0' 25' 50'
SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)
- PROP SAWTOOTH CURB & GUTTER WITH RIPRAP (4")
- PROP FENCE
- EXIST FLOW LINE
- PROP FLOW LINE
- G — EXIST GAS LINE
- P — EXIST PIPELINE
- W — EXIST WATER LINE
- WW — EXIST WASTEWATER LINE
- T — EXIST TELECOMMUNICATION LINE
- OE — EXIST OVERHEAD ELECTRIC LINE
- OHF — EXIST OVERHEAD FIBER LINE

NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY UTILITIES PRIOR TO CONSTRUCTION.
2. PROPOSED PAVEMENT TO MATCH EXISTING PROFILE AND CROSS-SLOPES.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER
03/30/2022
Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

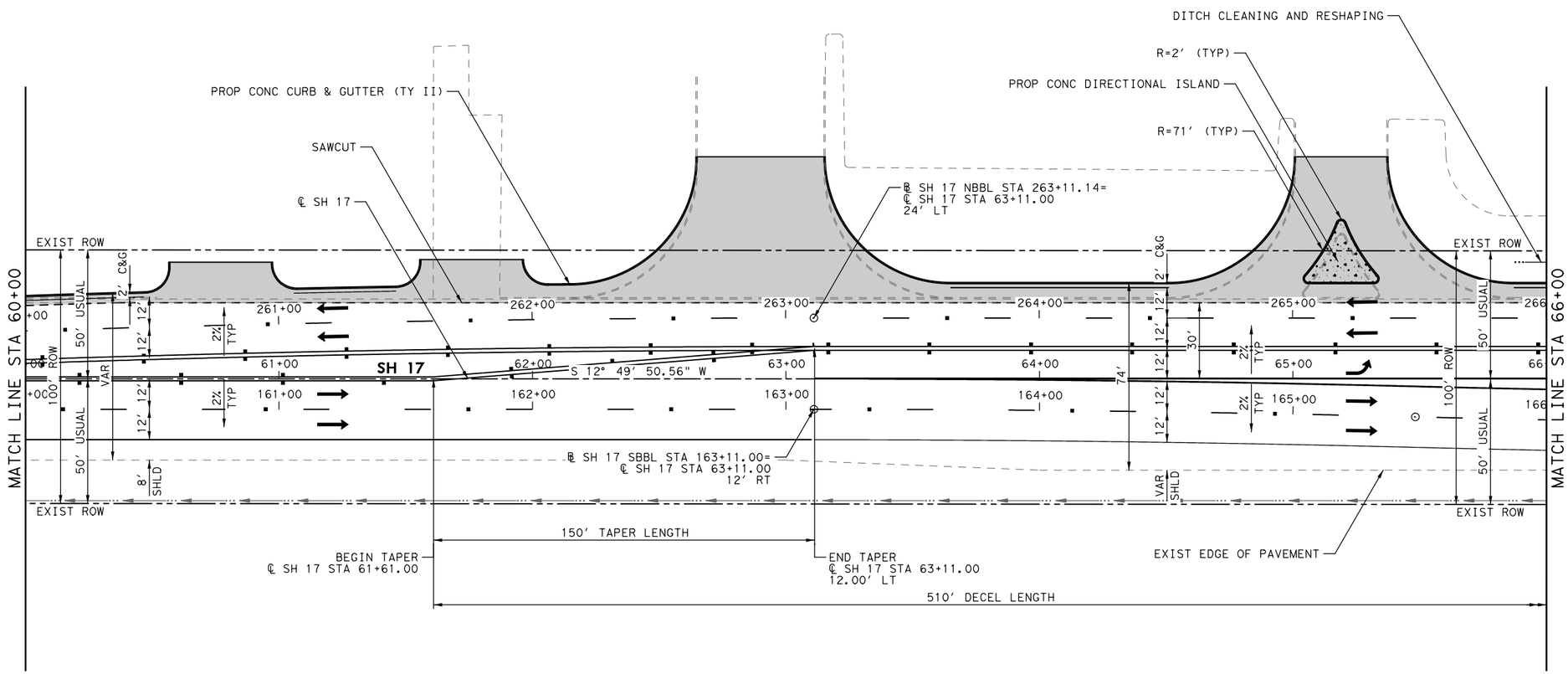
SH 17
ROADWAY PLAN
AT IH 20

SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	96
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

CAUTION

VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0' 25' 50'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)
- PROP SAWTOOTH CURB & GUTTER WITH RIPRAP (4")
- PROP FENCE
- EXIST FLOW LINE
- PROP FLOW LINE
- G — EXIST GAS LINE
- P — EXIST PIPELINE
- W — EXIST WATER LINE
- WW — EXIST WASTEWATER LINE
- T — EXIST TELECOMMUNICATION LINE
- OE — EXIST OVERHEAD ELECTRIC LINE
- OHF — EXIST OVERHEAD FIBER LINE

NOTES:

1. THE CONTRACTOR SHALL FIELD VERIFY UTILITIES PRIOR TO CONSTRUCTION.
2. PROPOSED PAVEMENT TO MATCH EXISTING PROFILE AND CROSS-SLOPES.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

TBPE REGISTRATION NO. F-16341

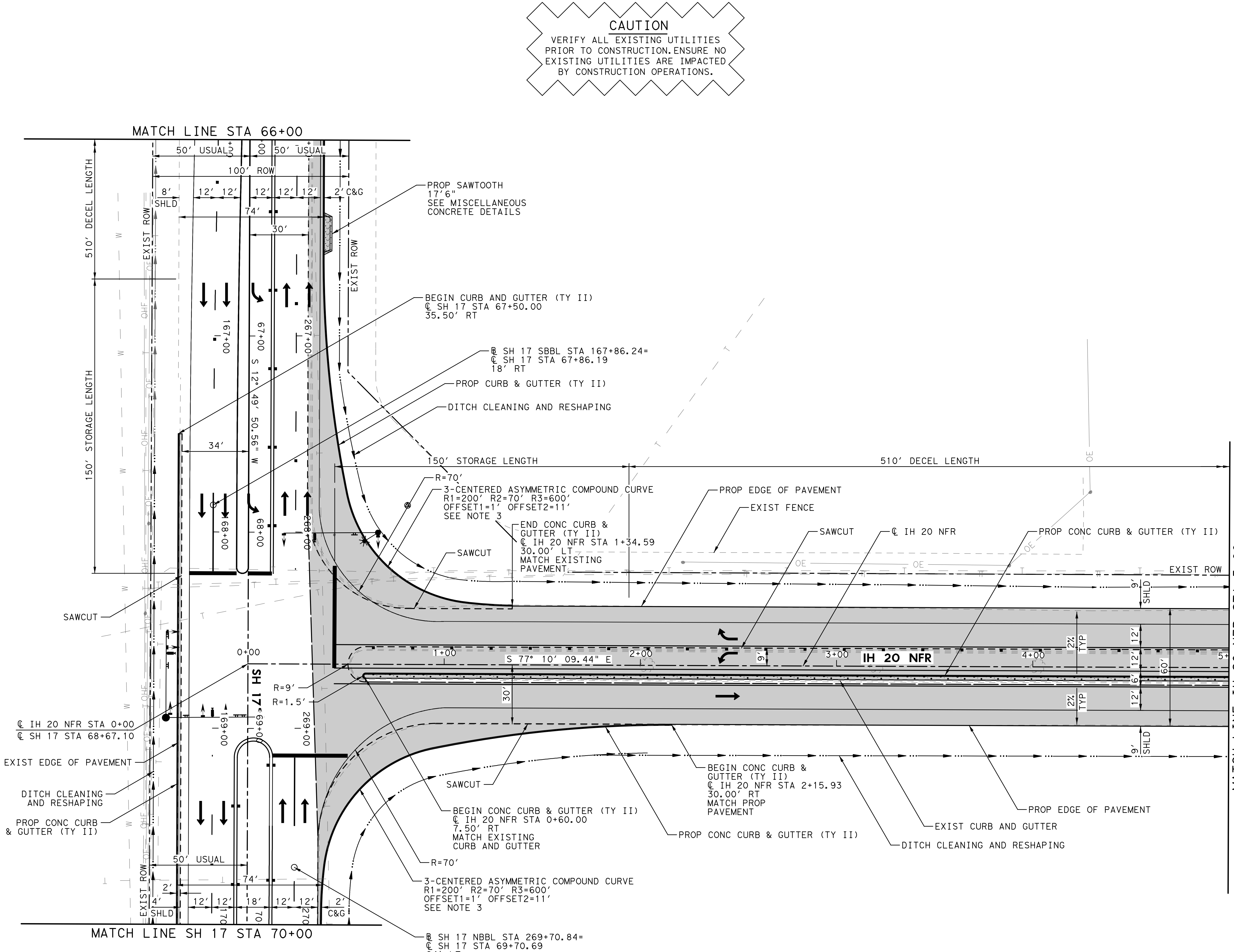
Texas Department of Transportation

SH 17
ROADWAY PLAN
AT IH 20

SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	97
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)
- PROP SAWTOOTH CURB & GUTTER WITH RIPRAP (4")
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NOTES:

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2. PROPOSED PAVEMENT TO MATCH EXISTING PROFILE AND CROSS-SLOPES.
3. SEE INTERSECTION DETAILS FOR MORE INFORMATION.

STATE OF TEXAS CHRISTOPHER J. STRUNK 138599 LICENSED PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

IH 20 NFR ROADWAY PLAN AT SH 17

SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	98
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*

CAUTION

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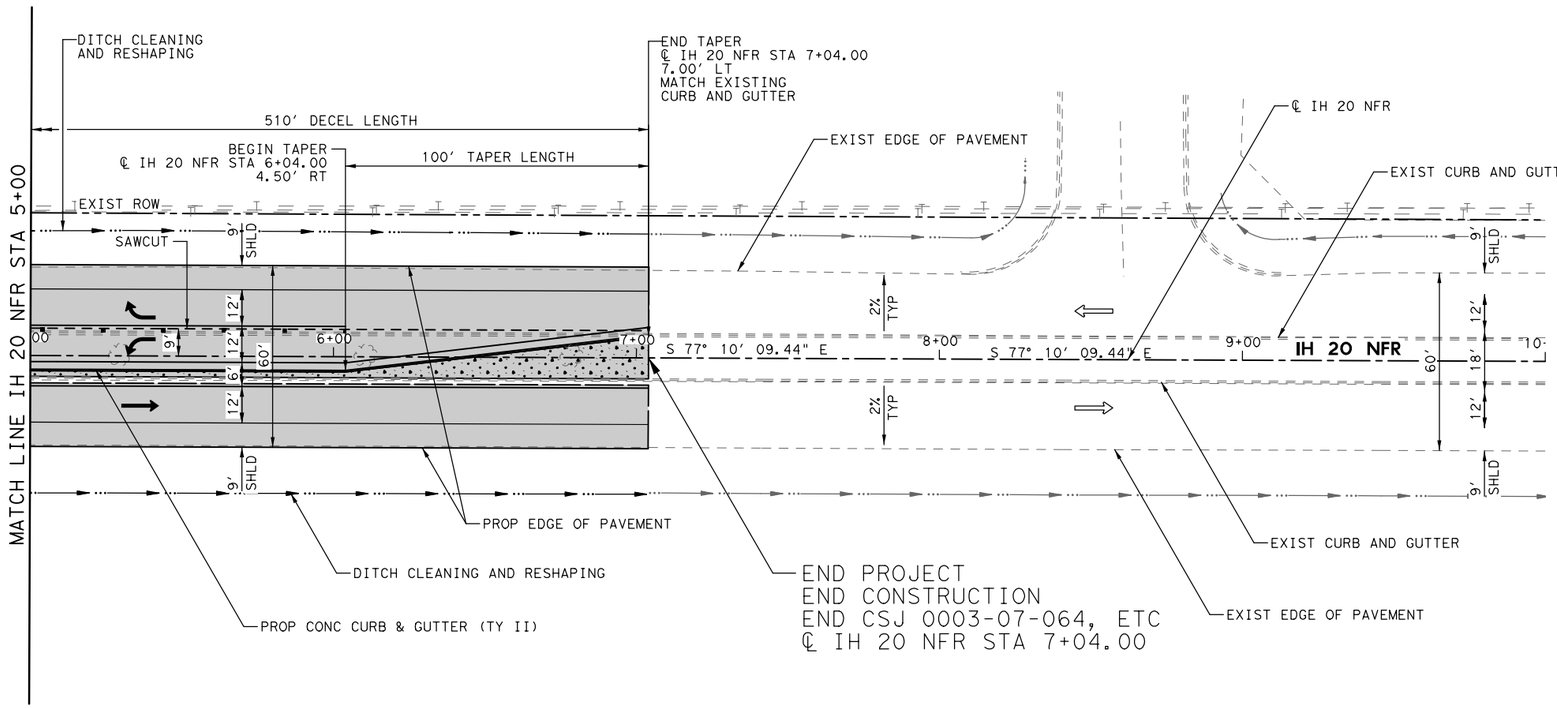

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)
- PROP SAWTOOTH CURB & GUTTER WITH RIPRAP (4")
- PROP FENCE
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NOTES:

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2. PROPOSED PAVEMENT TO MATCH EXISTING PROFILE AND CROSS-SLOPES.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
ROADWAY PLAN
AT SH 17

SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	99
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

CAUTION

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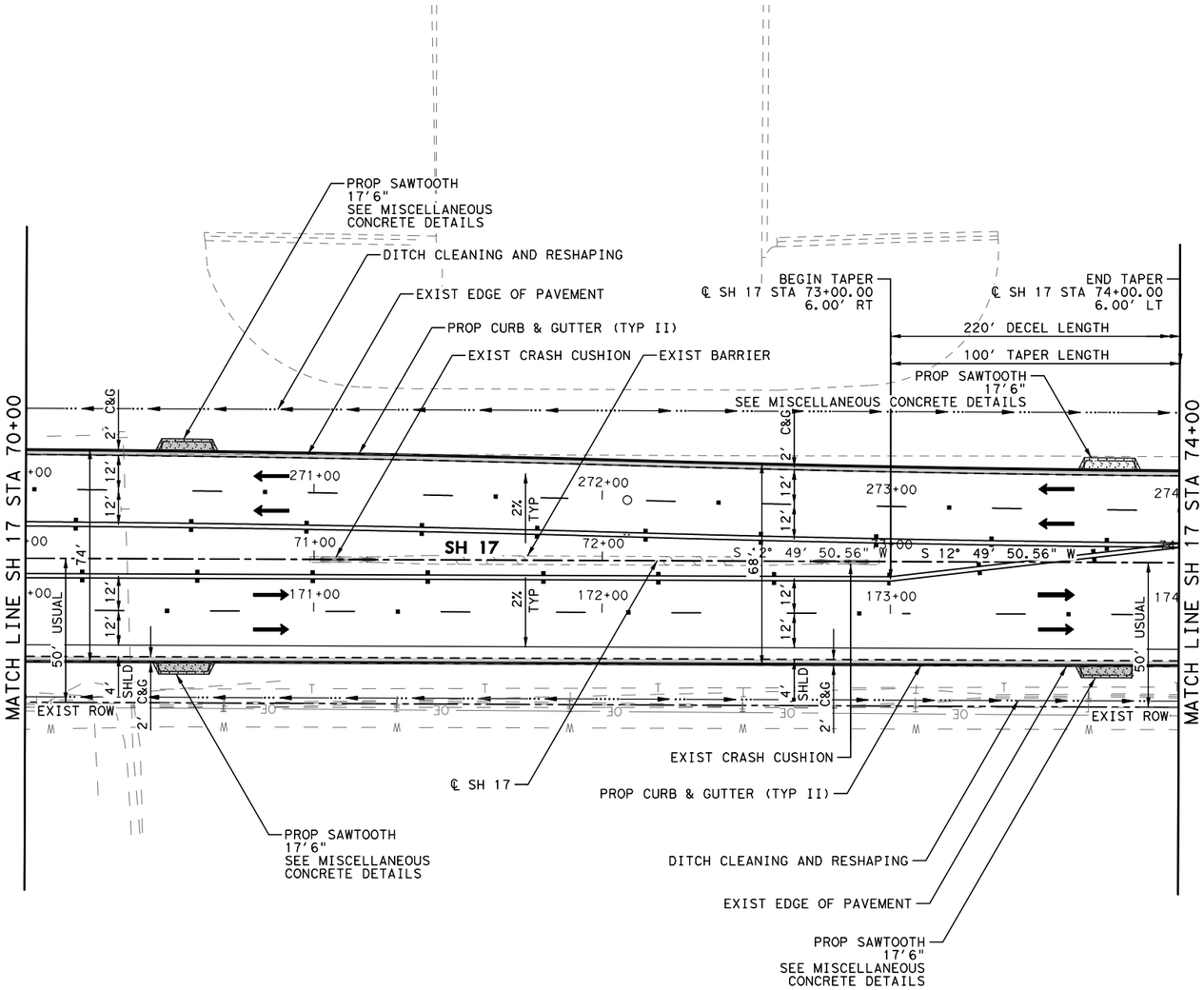

0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
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- EXIST WASTEWATER LINE
- EXIST TELECOMMUNICATION LINE
- EXIST OVERHEAD ELECTRIC LINE
- EXIST OVERHEAD FIBER LINE

NOTES:

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STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

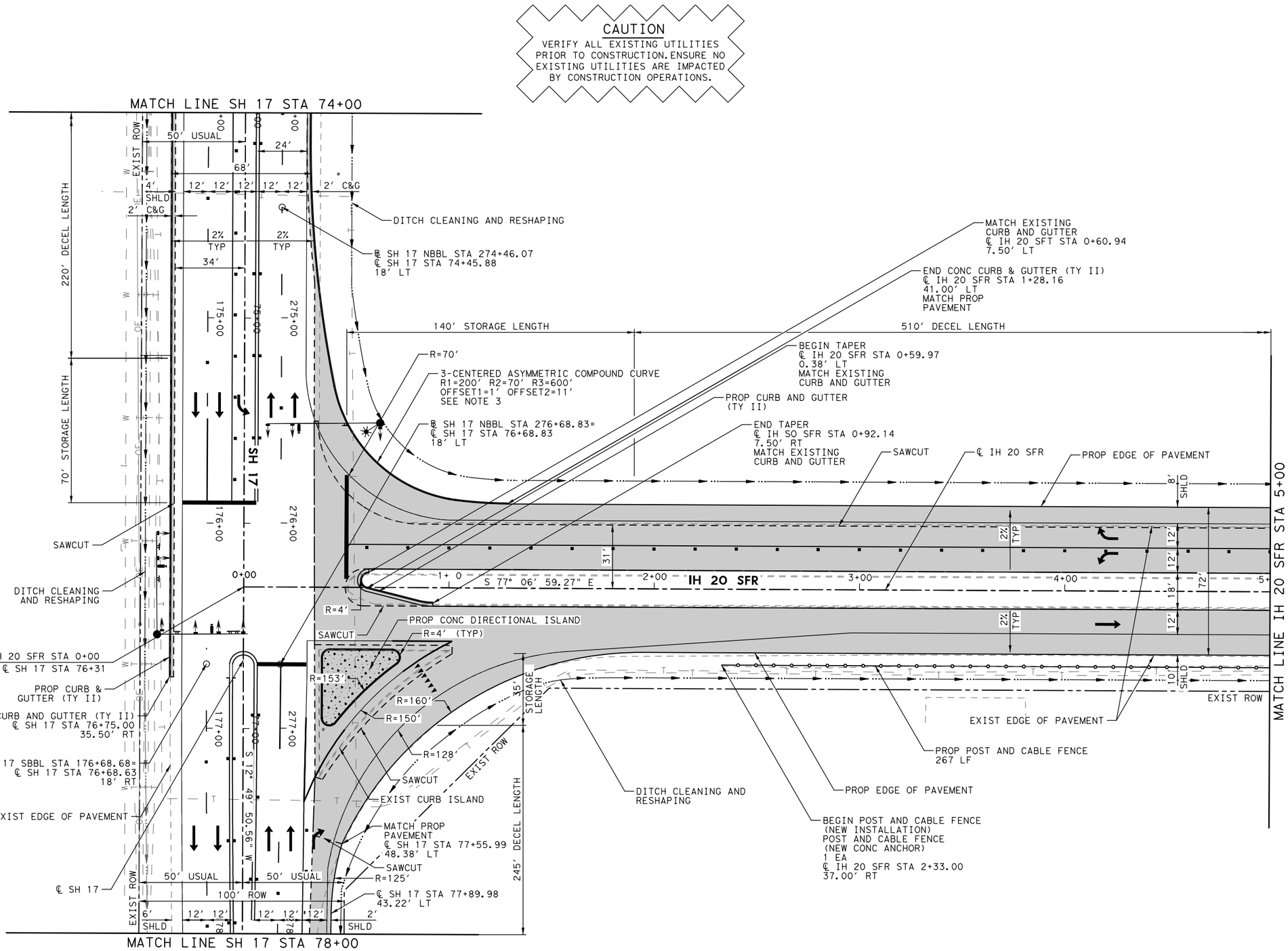
Texas Department of Transportation

SH 17
ROADWAY PLAN
AT IH 20

SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	100
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



0' 25' 50'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)
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STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT SH 17

SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	101
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*

CAUTION

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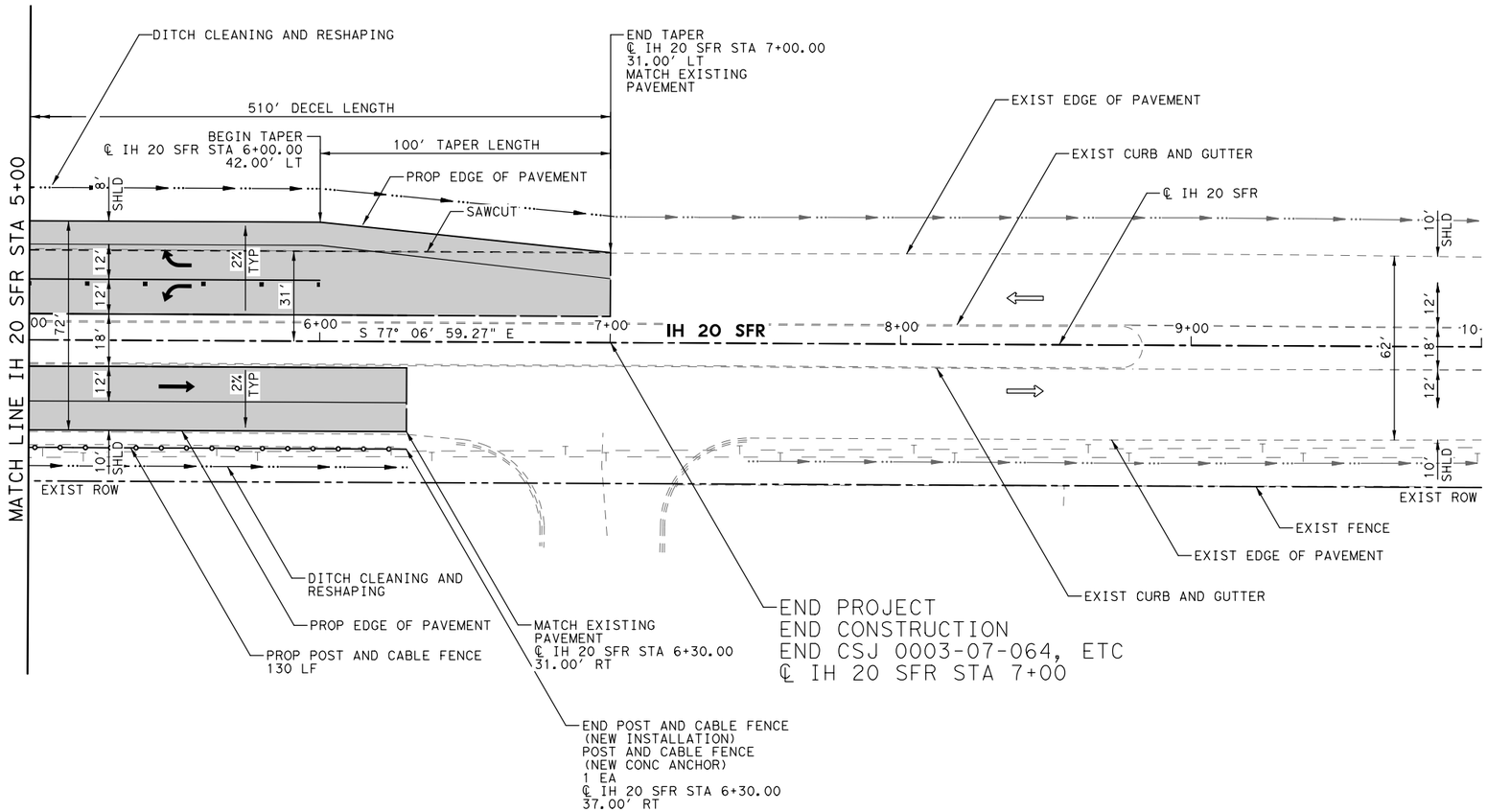

0′ 25′ 50′

SCALE IN FEET

LEGEND

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- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
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STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER
03/30/2022
Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT SH 17

SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	102
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

CAUTION

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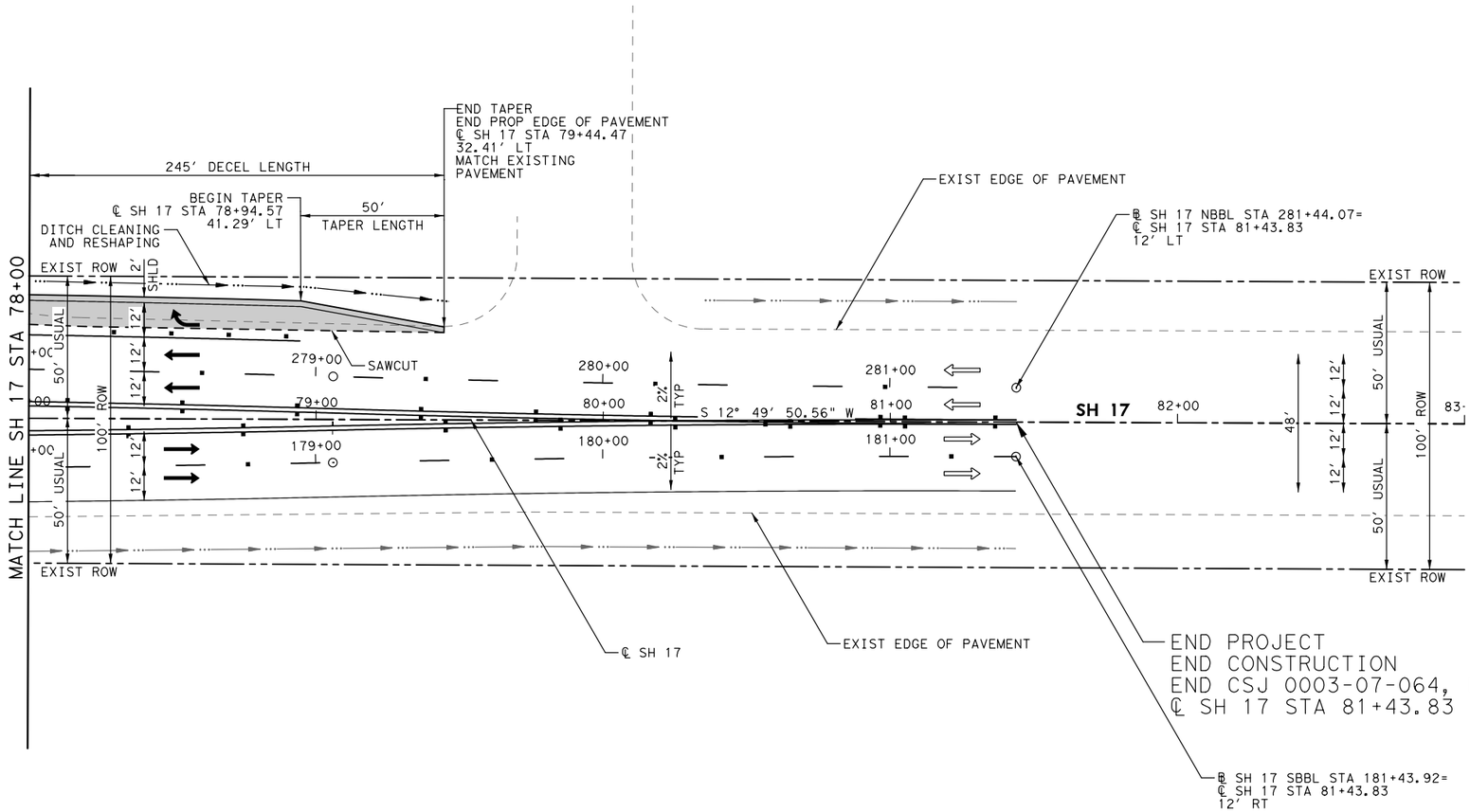

0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)
- PROP SAWTOOTH CURB & GUTTER WITH RIPRAP (4")
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STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SH 17
ROADWAY PLAN
AT IH 20

SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	103
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*

CAUTION

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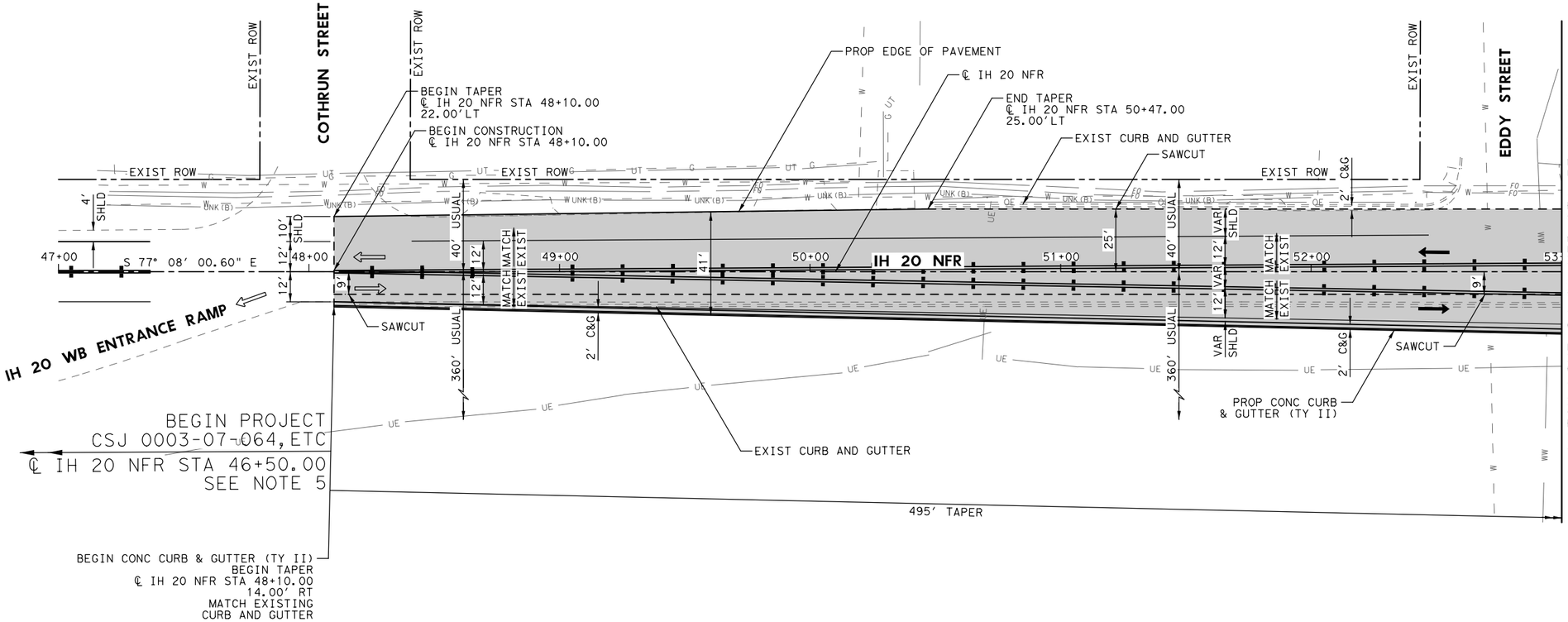

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
- G — EXIST GAS LINE
- W — EXIST WATER LINE
- WW — EXIST WASTEWATER LINE
- UT — EXIST TELEPHONE LINE
- UE — EXIST ELECTRIC LINE
- OE — EXIST OVERHEAD ELECTRIC LINE
- UTV — EXIST UNDERGROUND TV LINE
- UNK (B) — UNKOWN UTILITY LINE

NOTES:

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2. WHERE PROPOSED PAVEMENT MEETS OR ABUTS EXISTING PAVEMENT OR CURB AND GUTTER AS SHOWN, SAWCUT TO STRAIGHT AND CLEAN EDGES.
3. SEE INTERSECTION DETAILS FOR MORE INFORMATION.
4. SEE SIDEWALK DETAILS FOR MORE INFORMATION.
5. LIMITS OF SIGNING AND PAVEMENT MARKINGS EXTEND BEYOND THE LIMITS OF CONSTRUCTION. SEE SIGNING & PAVEMENT MARKING PLAN SHEETS FOR PROJECT LIMITS.
6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
ROADWAY PLAN
AT COUNTRY CLUB DR

SHEET 1 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	104
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

CAUTION

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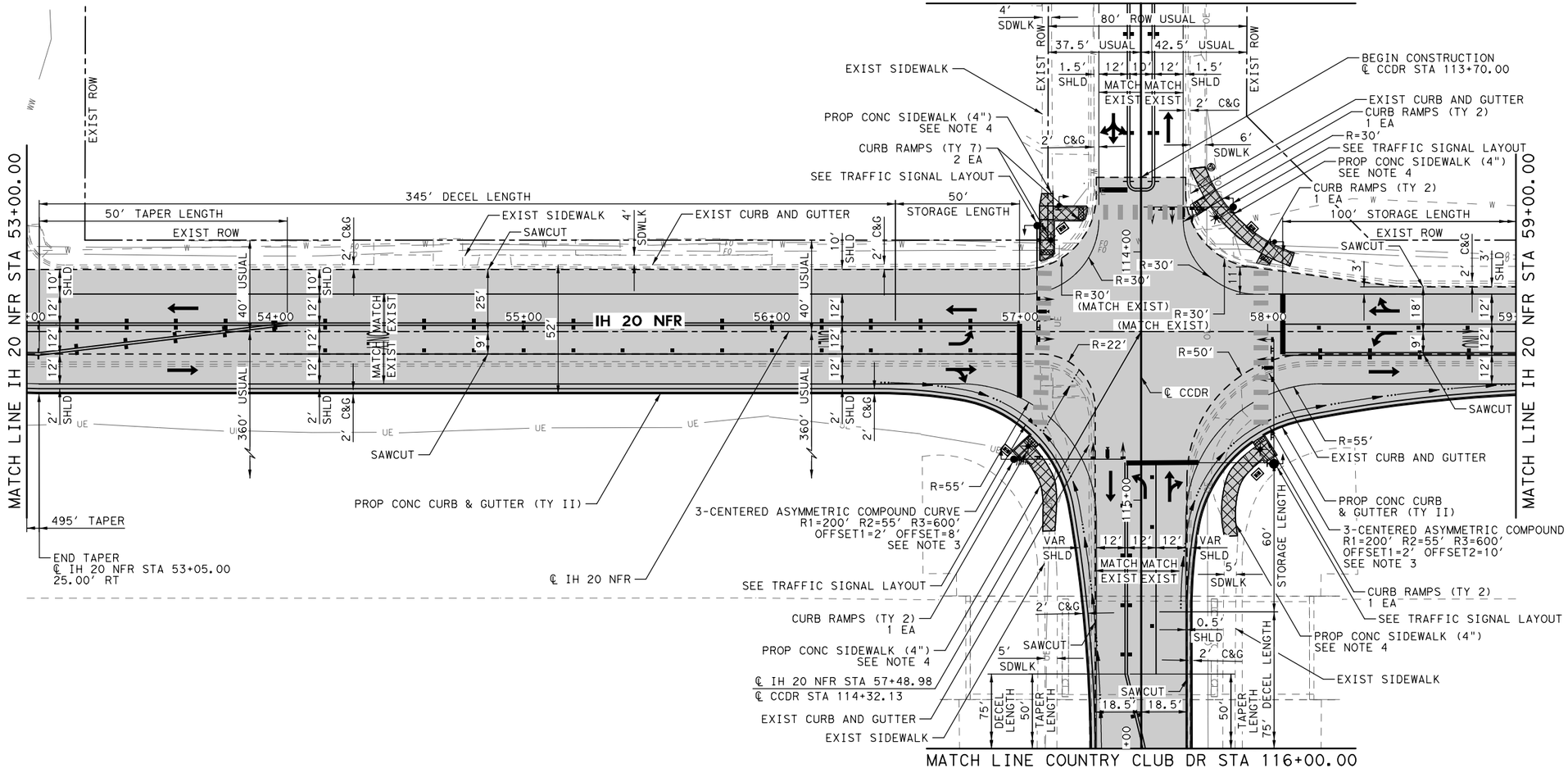

0' 25' 50'

SCALE IN FEET

LEGEND

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- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
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7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
ROADWAY PLAN
AT COUNTRY CLUB DR

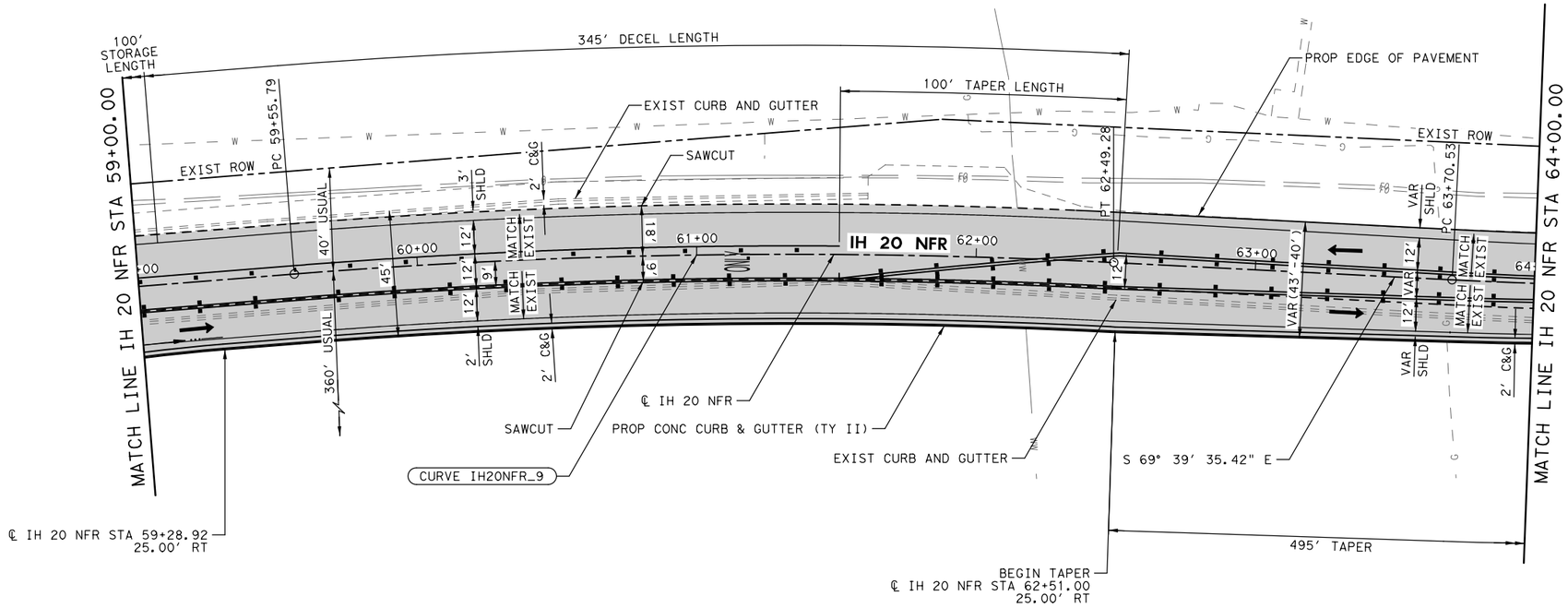
SHEET 2 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	105
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CURVE IH20NFR_9
PI STATION = 61+02.74
DELTA = 7° 28' 25.18" (RT)
DEGREE OF CURVE = 2° 32' 47.32"
TANGENT = 146.95
LENGTH = 293.49
RADIUS = 2,250.00
PC STATION = 59+55.79
PT STATION = 62+49.28

CAUTION
VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0' 25' 50'
SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
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NOTES:

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6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
ROADWAY PLAN
AT COUNTRY CLUB DR

SHEET 3 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	106
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CURVE IH20NFR_12		CURVE IH20NFR_15	
PI STATION	= 64+86.46	PI STATION	= 75+54.30
DELTA	= 7° 28′ 25.18" (LT)	DELTA	= 35° 41′ 00.10" (LT)
DEGREE OF CURVE	= 3° 13′ 40.55"	DEGREE OF CURVE	= 2° 04′ 55.69"
TANGENT	= 115.93	TANGENT	= 885.71
LENGTH	= 231.53	LENGTH	= 1,713.79
RADIUS	= 1,775.00	RADIUS	= 2,751.78
PC STATION	= 63+70.53	PC STATION	= 66+68.59
PT STATION	= 66+02.06	PT STATION	= 83+82.38

CAUTION

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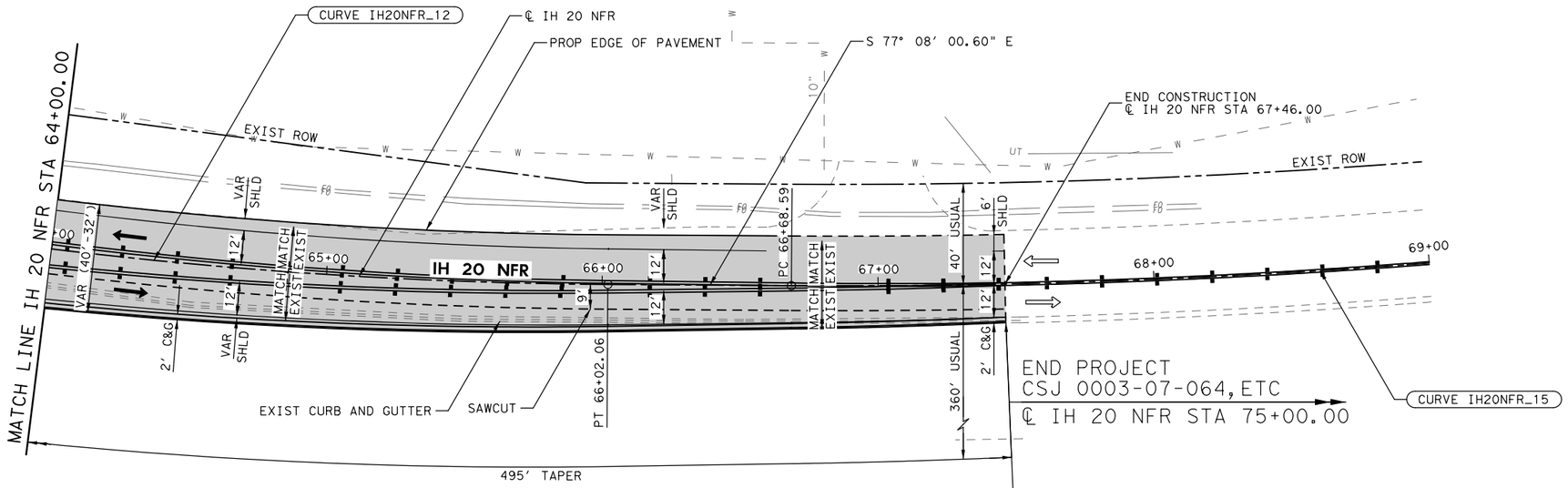

0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
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3. SEE INTERSECTION DETAILS FOR MORE INFORMATION.
4. SEE SIDEWALK DETAILS FOR MORE INFORMATION.
5. LIMITS OF SIGNING AND PAVEMENT MARKINGS EXTEND BEYOND THE LIMITS OF CONSTRUCTION. SEE SIGNING & PAVEMENT MARKING PLAN SHEETS FOR PROJECT LIMITS.
6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
ROADWAY PLAN
AT COUNTRY CLUB DR

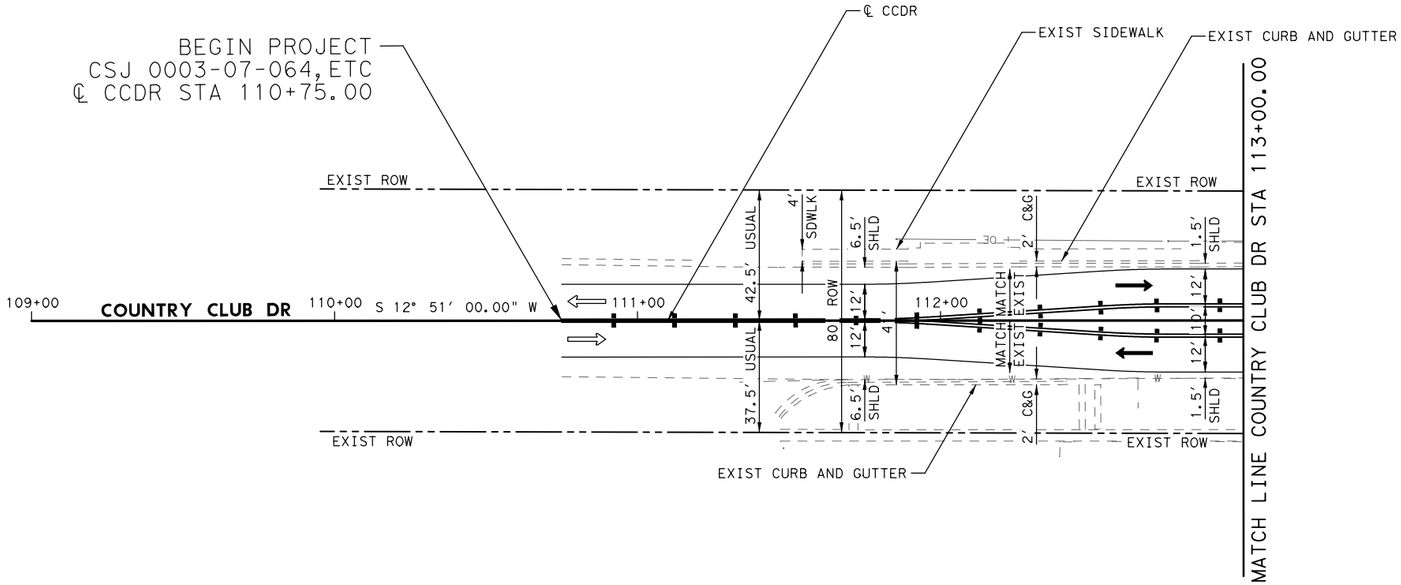
SHEET 4 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	107
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CAUTION

VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
- G — EXIST GAS LINE
- W — EXIST WATER LINE
- WW — EXIST WASTEWATER LINE
- UT — EXIST TELEPHONE LINE
- UE — EXIST ELECTRIC LINE
- OE — EXIST OVERHEAD ELECTRIC LINE
- UTV — EXIST UNDERGROUND TV LINE
- UNK (B) — UNKOWN UTILITY LINE

NOTES:

1. THE CONTRACTOR MUST FIELD VERIFY UTILITIES PRIOR TO CONSTRUCTION.
2. WHERE PROPOSED PAVEMENT MEETS OR ABUTS EXISTING PAVEMENT OR CURB AND GUTTER AS SHOWN, SAWCUT TO STRAIGHT AND CLEAN EDGES.
3. SEE INTERSECTION DETAILS FOR MORE INFORMATION.
4. SEE SIDEWALK DETAILS FOR MORE INFORMATION.
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7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

COUNTRY CLUB DR
ROADWAY PLAN
IH 20 NFR

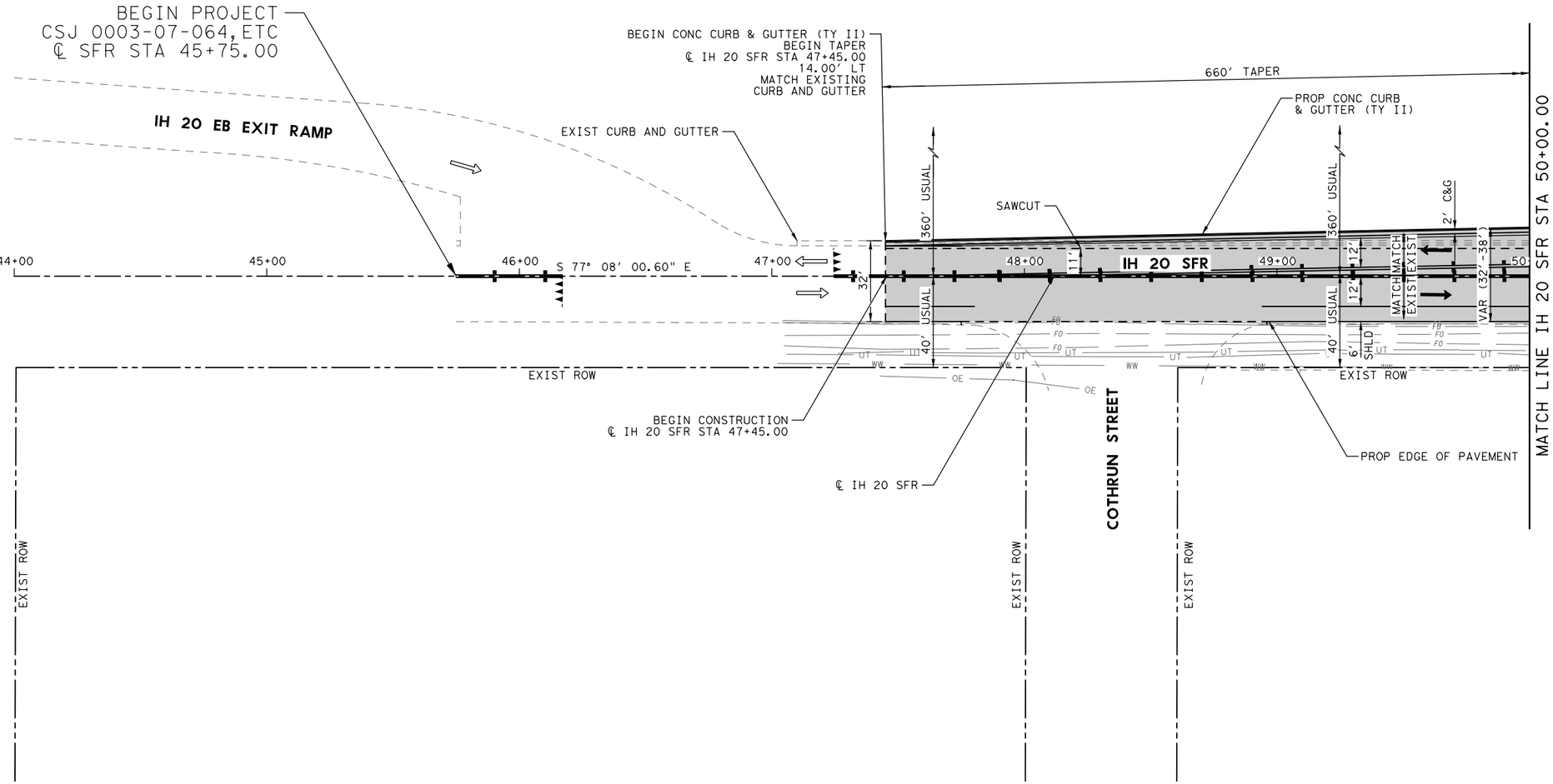
SHEET 5 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	108
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CAUTION

VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
- G — EXIST GAS LINE
- W — EXIST WATER LINE
- WW — EXIST WASTEWATER LINE
- UT — EXIST TELEPHONE LINE
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NOTES:

1. THE CONTRACTOR MUST FIELD VERIFY UTILITIES PRIOR TO CONSTRUCTION.
2. WHERE PROPOSED PAVEMENT MEETS OR ABUTS EXISTING PAVEMENT OR CURB AND GUTTER AS SHOWN, SAWCUT TO STRAIGHT AND CLEAN EDGES.
3. SEE INTERSECTION DETAILS FOR MORE INFORMATION.
4. SEE SIDEWALK DETAILS FOR MORE INFORMATION.
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6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT COUNTRY CLUB DR

SHEET 6 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	109
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

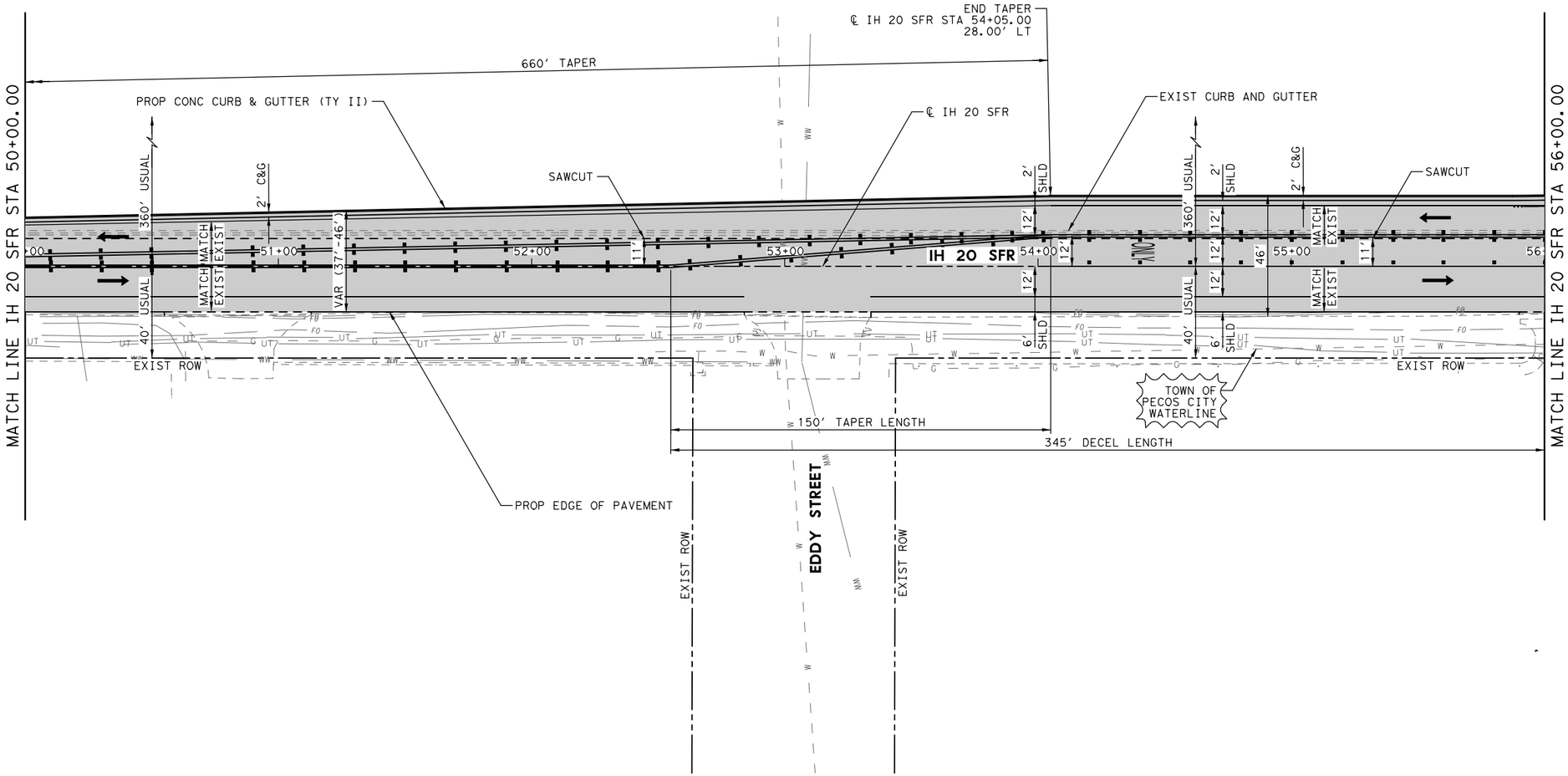
DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CAUTION

VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.

CAUTION

TOWN OF PECOS CITY WATERLINE REQUIRES EXTREME CAUTION. AVOID IMPACTS WITH ALL CONSTRUCTION ACTIVITIES.



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
- G — EXIST GAS LINE
- W — EXIST WATER LINE
- WW — EXIST WASTEWATER LINE
- UT — EXIST TELEPHONE LINE
- UE — EXIST ELECTRIC LINE
- OE — EXIST OVERHEAD ELECTRIC LINE
- UTV — EXIST UNDERGROUND TV LINE
- UNK (B) — UNKOWN UTILITY LINE

NOTES:

1. THE CONTRACTOR MUST FIELD VERIFY UTILITIES PRIOR TO CONSTRUCTION.
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4. SEE SIDEWALK DETAILS FOR MORE INFORMATION.
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6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

04/22/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT COUNTRY CLUB DR

SHEET 7 OF 10

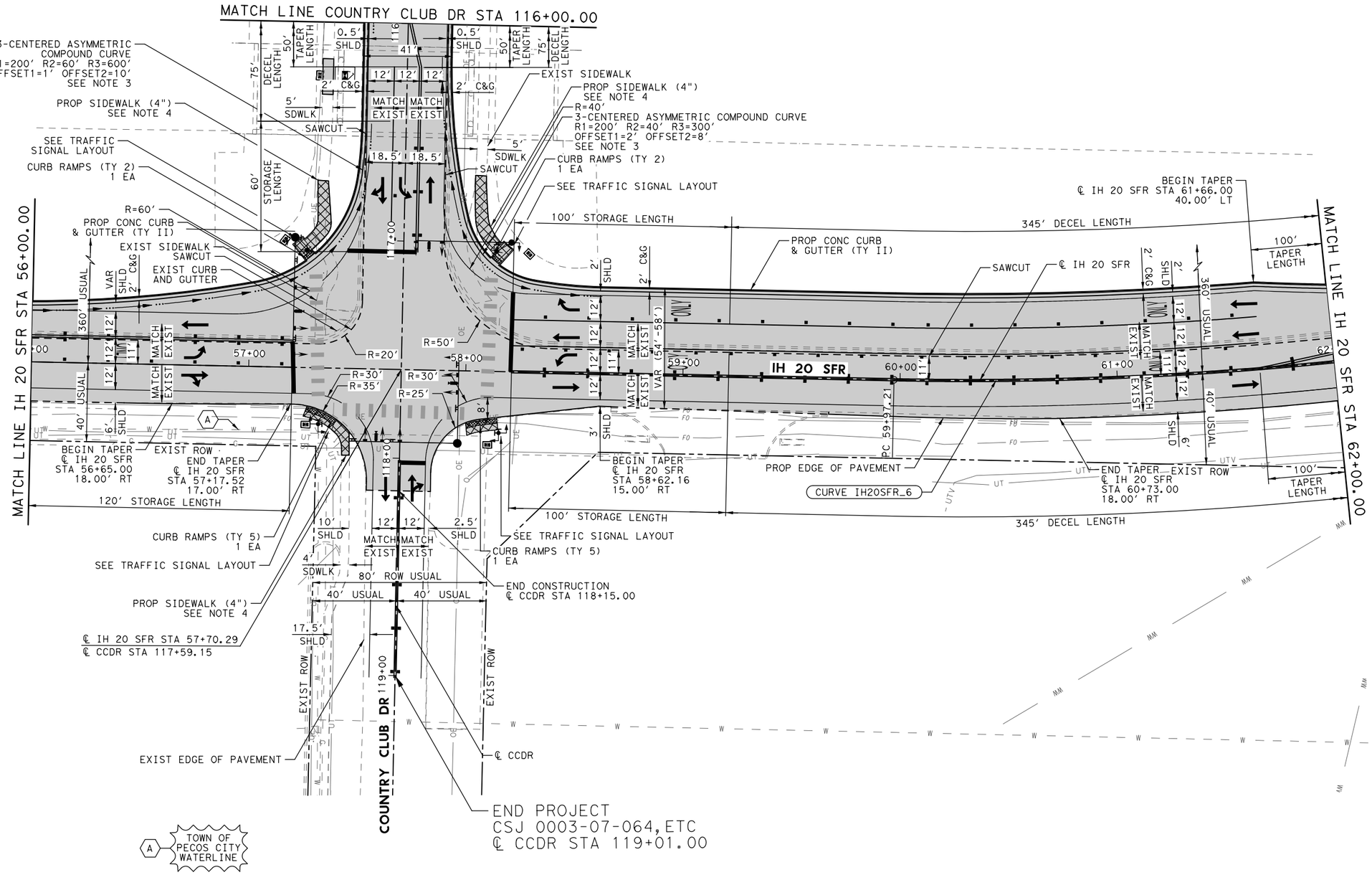
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	110
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 4/22/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CURVE IH20SFR_6
PI STATION = 61+04.62
DELTA = 7° 26' 56.39" (LT)
DEGREE OF CURVE = 3° 28' 20.90"
TANGENT = 107.41
LENGTH = 214.52
RADIUS = 1,650.00
PC STATION = 59+97.21
PT STATION = 62+11.73

CAUTION
VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.

CAUTION
TOWN OF PECOS CITY WATERLINE REQUIRES EXTREME CAUTION. AVOID IMPACTS WITH ALL CONSTRUCTION ACTIVITIES.



0' 25' 50'
SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO EXIST FIBER OPTIC
- G EXIST GAS LINE
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- UE EXIST ELECTRIC LINE
- OE EXIST OVERHEAD ELECTRIC LINE
- UTV EXIST UNDERGROUND TV LINE
- UNK (B) UNKOWN UTILITY LINE

NOTES:

1. THE CONTRACTOR MUST FIELD VERIFY UTILITIES PRIOR TO CONSTRUCTION.
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6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER
04/22/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT COUNTRY CLUB DR

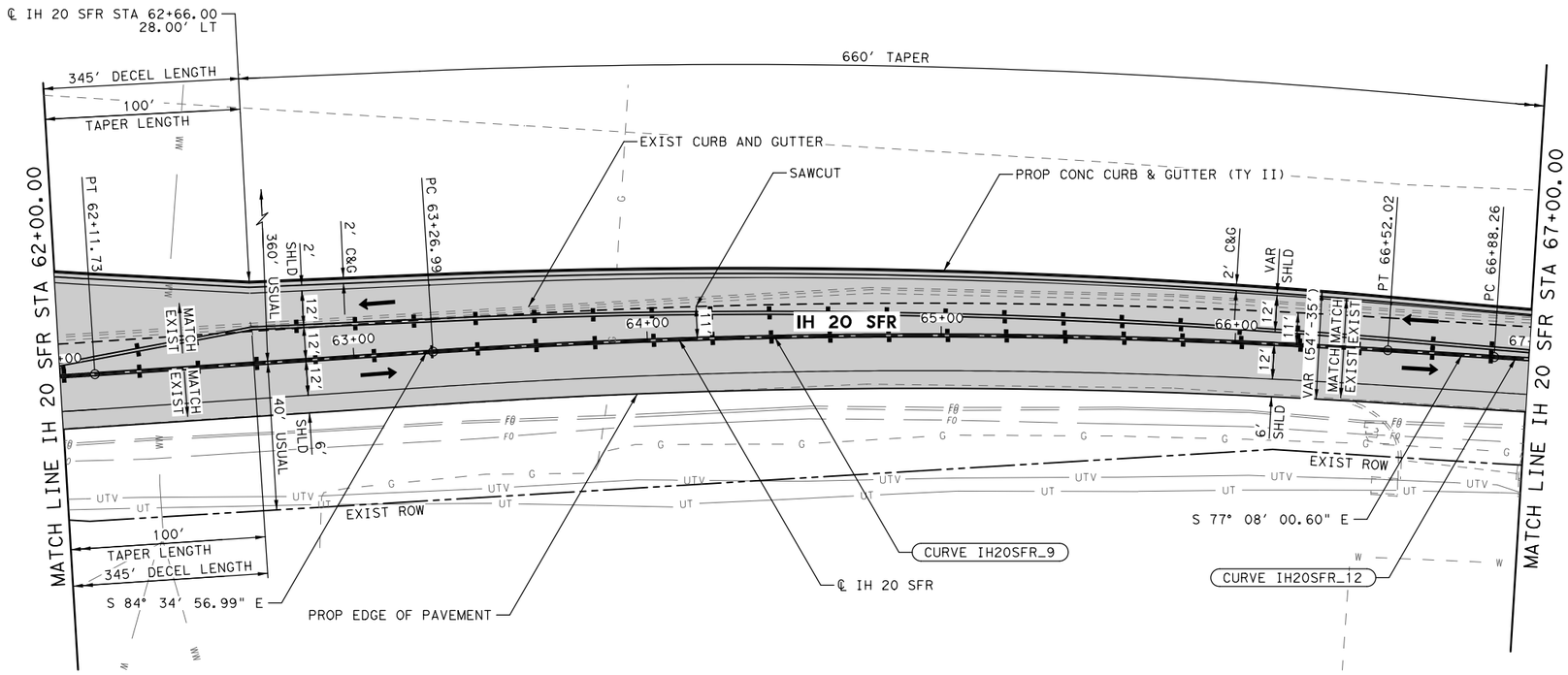
SHEET 8 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	111
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

CURVE IH20SFR_9		CURVE IH20SFR_12	
PI STATION	= 64+89.73	PI STATION	= 76+46.71
DELTA	= 7° 26′ 56.39" (RT)	DELTA	= 35° 41′ 00.10" (LT)
DEGREE OF CURVE	= 2° 17′ 30.59"	DEGREE OF CURVE	= 1° 55′ 26.80"
TANGENT	= 162.74	TANGENT	= 958.45
LENGTH	= 325.02	LENGTH	= 1,854.54
RADIUS	= 2,500.00	RADIUS	= 2,977.78
PC STATION	= 63+26.99	PC STATION	= 66+88.26
PT STATION	= 66+52.02	PT STATION	= 85+42.80

CAUTION

VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0′ 25′ 50′

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
- G — EXIST GAS LINE
- W — EXIST WATER LINE
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- UTV — EXIST UNDERGROUND TV LINE
- UNK (B) — UNKOWN UTILITY LINE

NOTES:

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2. WHERE PROPOSED PAVEMENT MEETS OR ABUTS EXISTING PAVEMENT OR CURB AND GUTTER AS SHOWN, SAWCUT TO STRAIGHT AND CLEAN EDGES.
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6. OFFSETS AND DIMENSIONS MEASURED TO BACK OF CURB UNLESS OTHERWISE NOTED.
7. INSTALL CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT COUNTRY CLUB DR

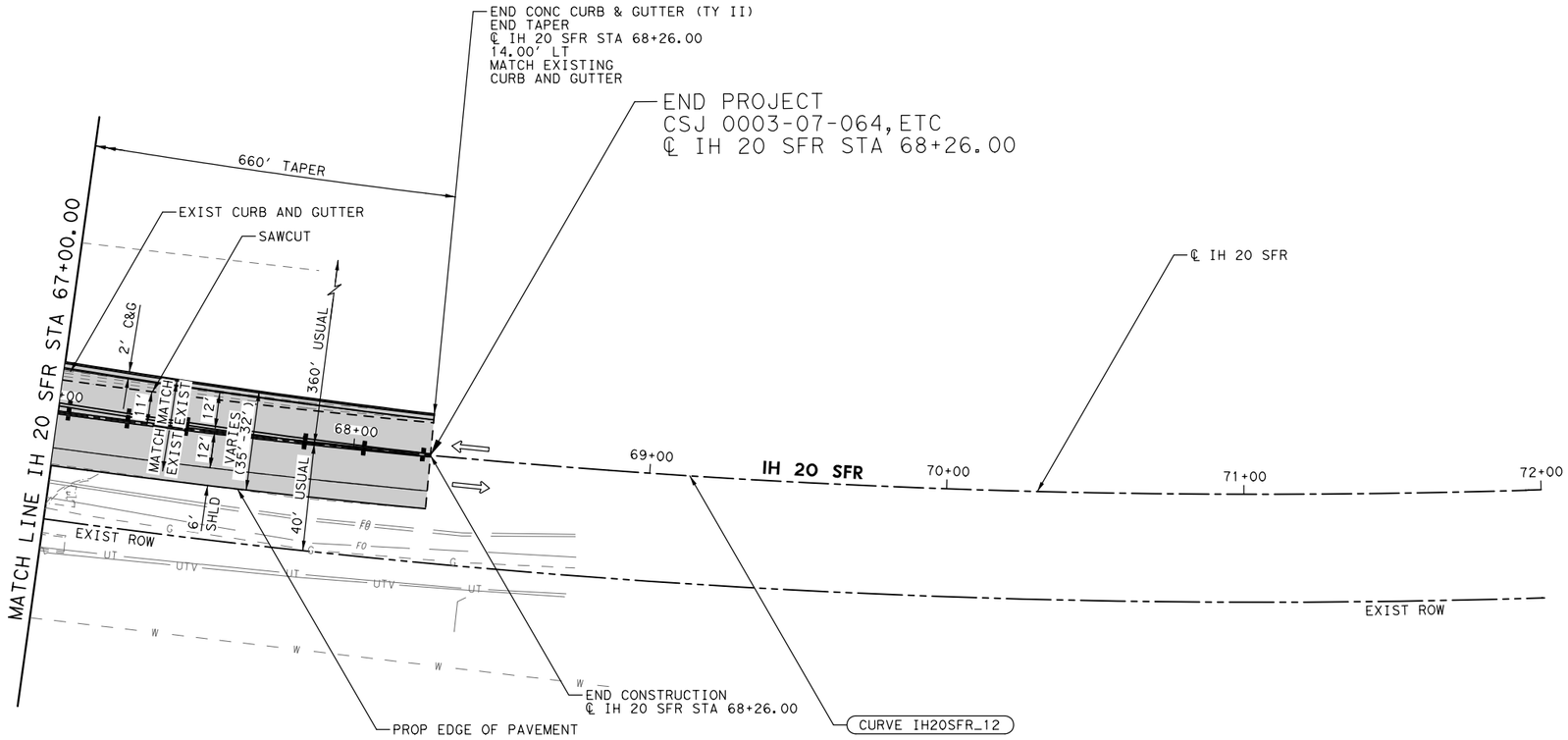
SHEET 9 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	112
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P

CURVE IH20SFR_12
PI STATION = 76+46.71
DELTA = 35° 41′ 00.10" (LT)
DEGREE OF CURVE = 1° 55′ 26.80"
TANGENT = 958.45
LENGTH = 1,854.54
RADIUS = 2,977.78
PC STATION = 66+88.26
PT STATION = 85+42.80

CAUTION
VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ENSURE NO EXISTING UTILITIES ARE IMPACTED BY CONSTRUCTION OPERATIONS.



0′ 25′ 50′
SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 7
- FO — EXIST FIBER OPTIC
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- UNK (B) — UNKOWN UTILITY LINE

NOTES:

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4. SEE SIDEWALK DETAILS FOR MORE INFORMATION.
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8. REPLACE CURBS AS DIRECTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

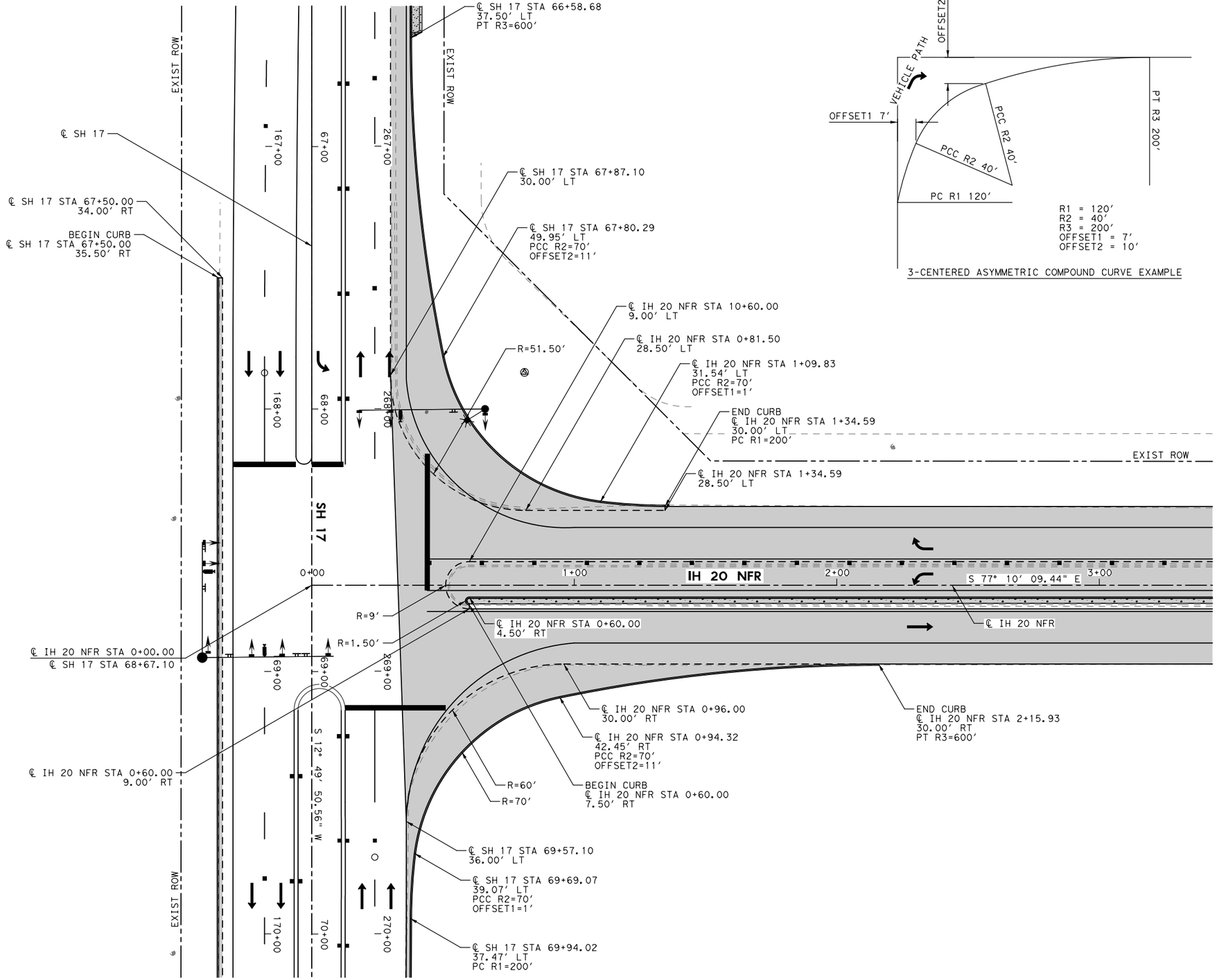
Texas Department of Transportation

IH 20 SFR
ROADWAY PLAN
AT COUNTRY CLUB DR

SHEET 10 OF 10

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	113
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*P



3-CENTERED ASYMMETRIC COMPOUND CURVE EXAMPLE

0' 10' 20' 40'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CL A CONC (MISC)

NOTES:

1. PROPOSED PAVEMENT TO MATCH SAWCUT LINES AND MATCH EXISTING CROSS-SLOPES.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

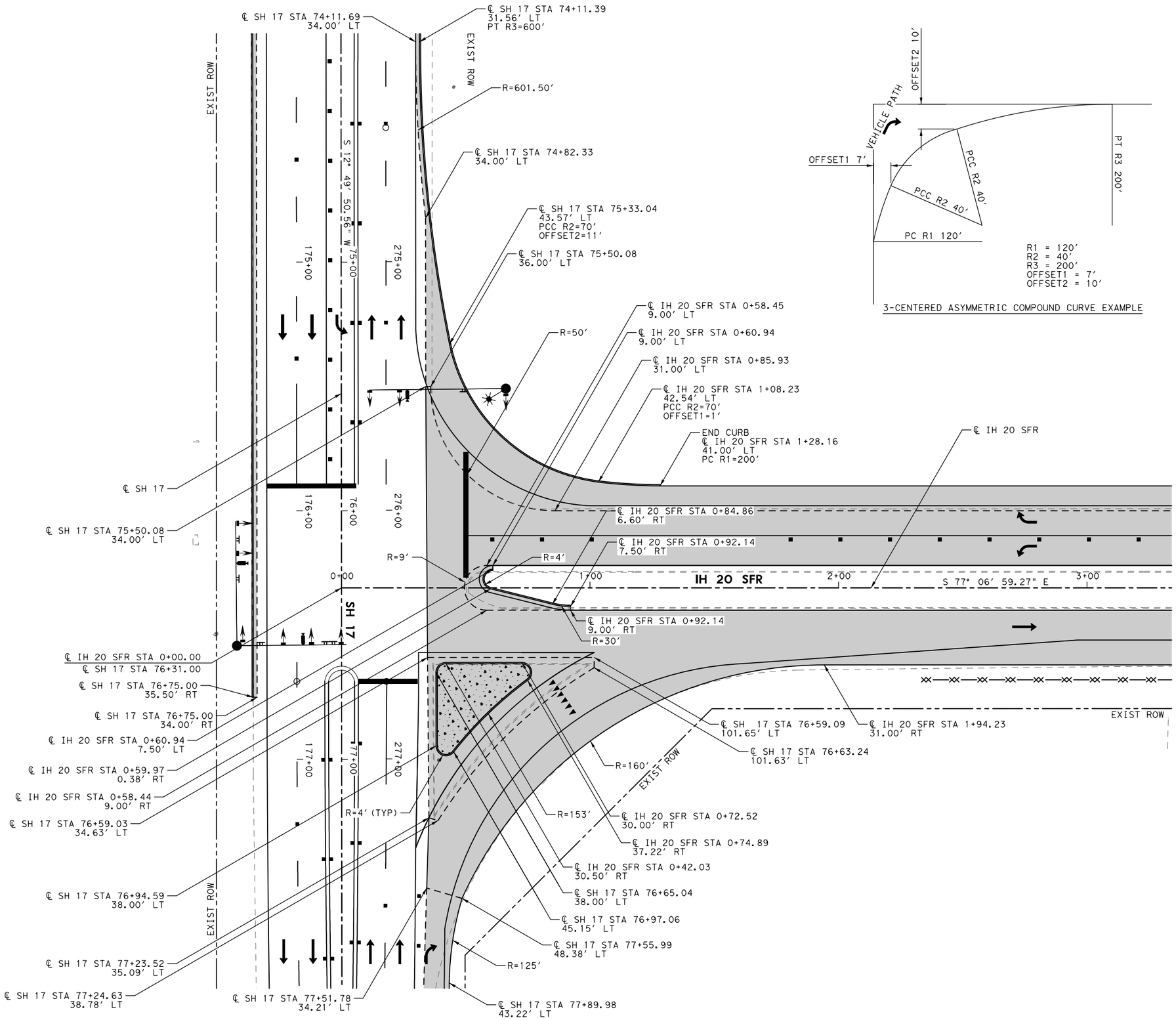
Texas Department of Transportation

IH 20 NFR
INTERSECTION DETAILS
AT SH 17

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	114
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



3-CENTERED ASYMMETRIC COMPOUND CURVE EXAMPLE

0' 10' 20' 40'

SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
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NOTES:

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STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

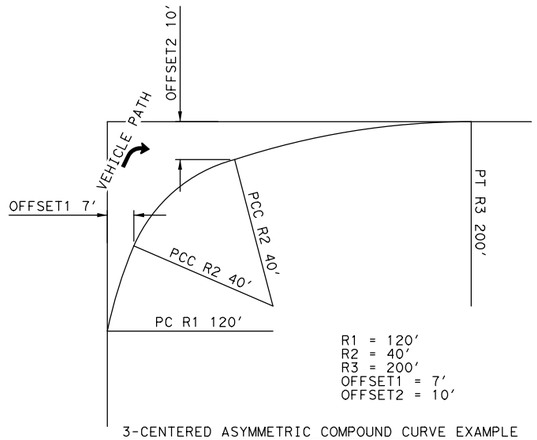
Texas Department of Transportation

IH 20 SFR
INTERSECTION DETAILS
AT SH 17

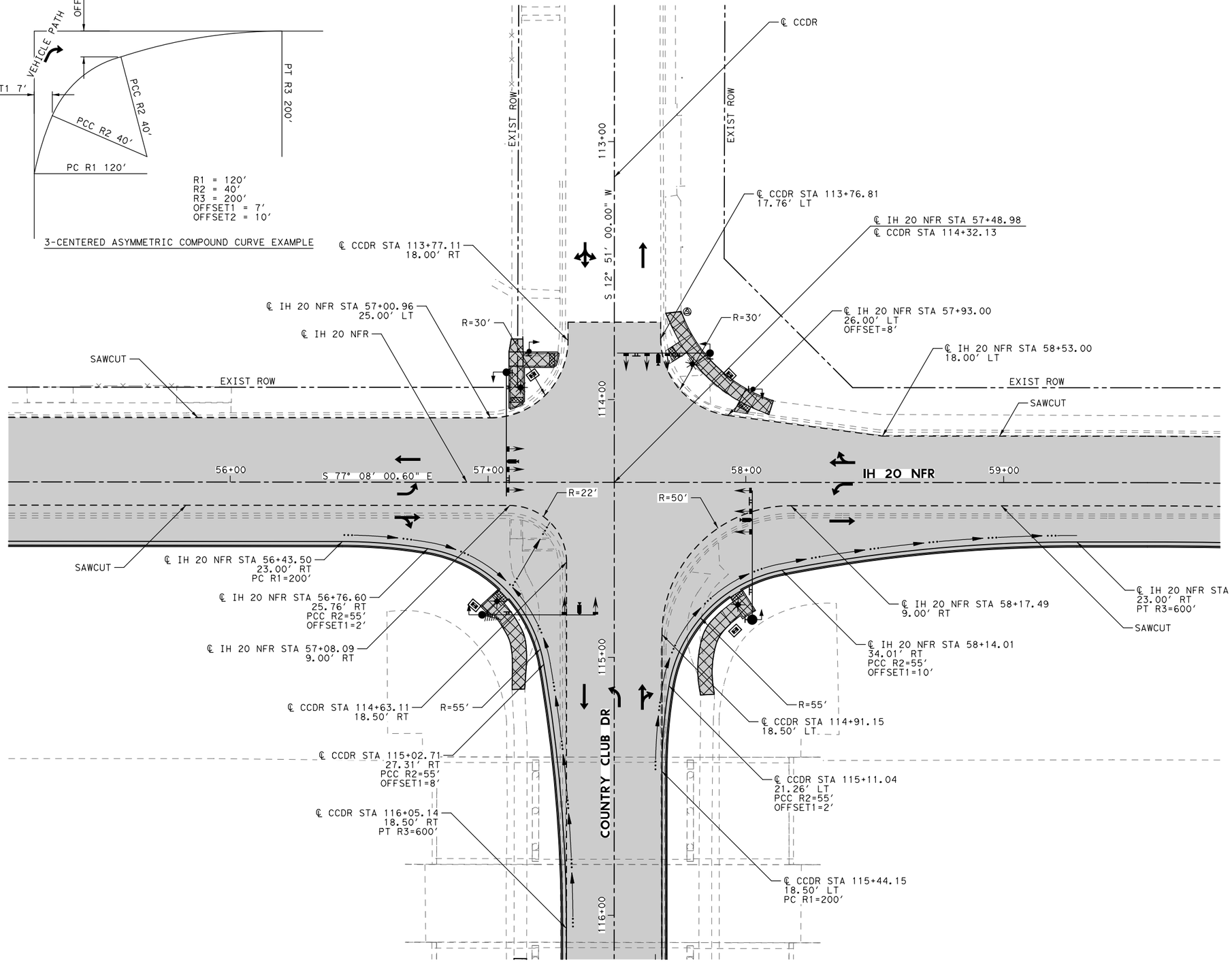
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	115
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\IH20*



3-CENTERED ASYMMETRIC COMPOUND CURVE EXAMPLE



LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 2

NOTES:

1. WHERE PROPOSED PAVEMENT MEETS OR ABUTS EXISTING PAVEMENT OR CURB AND GUTTER AS SHOWN, SAWCUT TO STRAIGHT AND CLEAN EDGES.
2. PLACE CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
3. OFFSETS MEASURED TO THE LIP OF GUTTER UNLESS OTHERWISE NOTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
INTERSECTION DETAILS
AT COUNTRY CLUB DR

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	116
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
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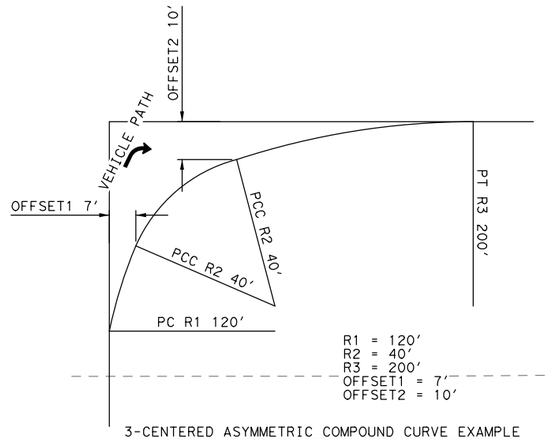
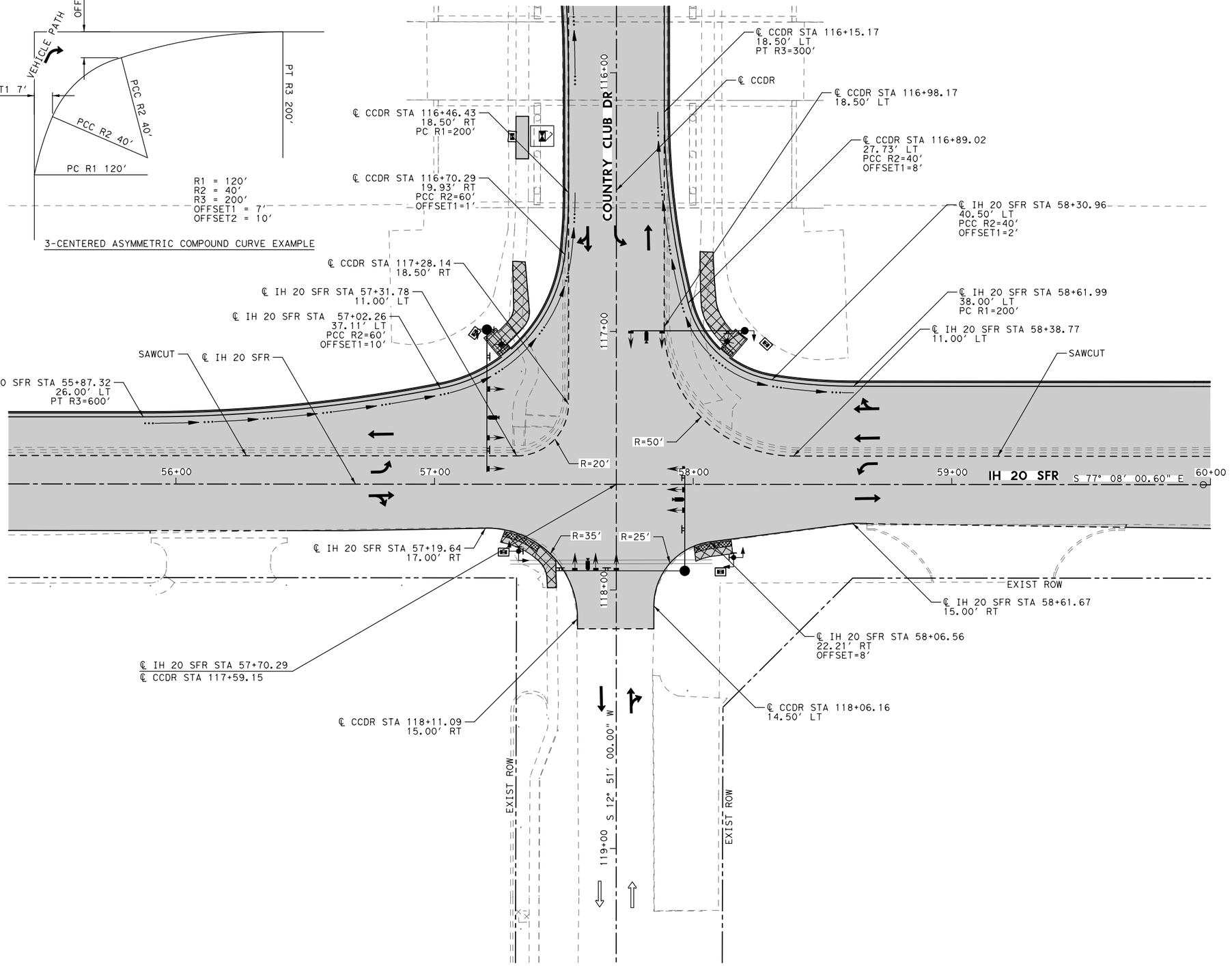


3-CENTERED ASYMMETRIC COMPOUND CURVE EXAMPLE



LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP PAVEMENT/DRIVEWAYS/ CURB & GUTTER
- CONC SIDEWALKS (4")
- ℄ GUTTERLINE AT PROP CURB RADII SEE NOTE 2

NOTES:

1. WHERE PROPOSED PAVEMENT MEETS OR ABUTS EXISTING PAVEMENT OR CURB AND GUTTER AS SHOWN, SAWCUT TO STRAIGHT AND CLEAN EDGES.
2. PLACE CURB AND GUTTERS AT CURB RADII TO PROVIDE FLOW AS SHOWN ON THE LAYOUT.
3. OFFSETS MEASURED TO THE LIP OF GUTTER UNLESS OTHERWISE NOTED.

JMT TBPE REGISTRATION NO. F-16341

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IH 20 SFR
INTERSECTION DETAILS
AT COUNTRY CLUB DR

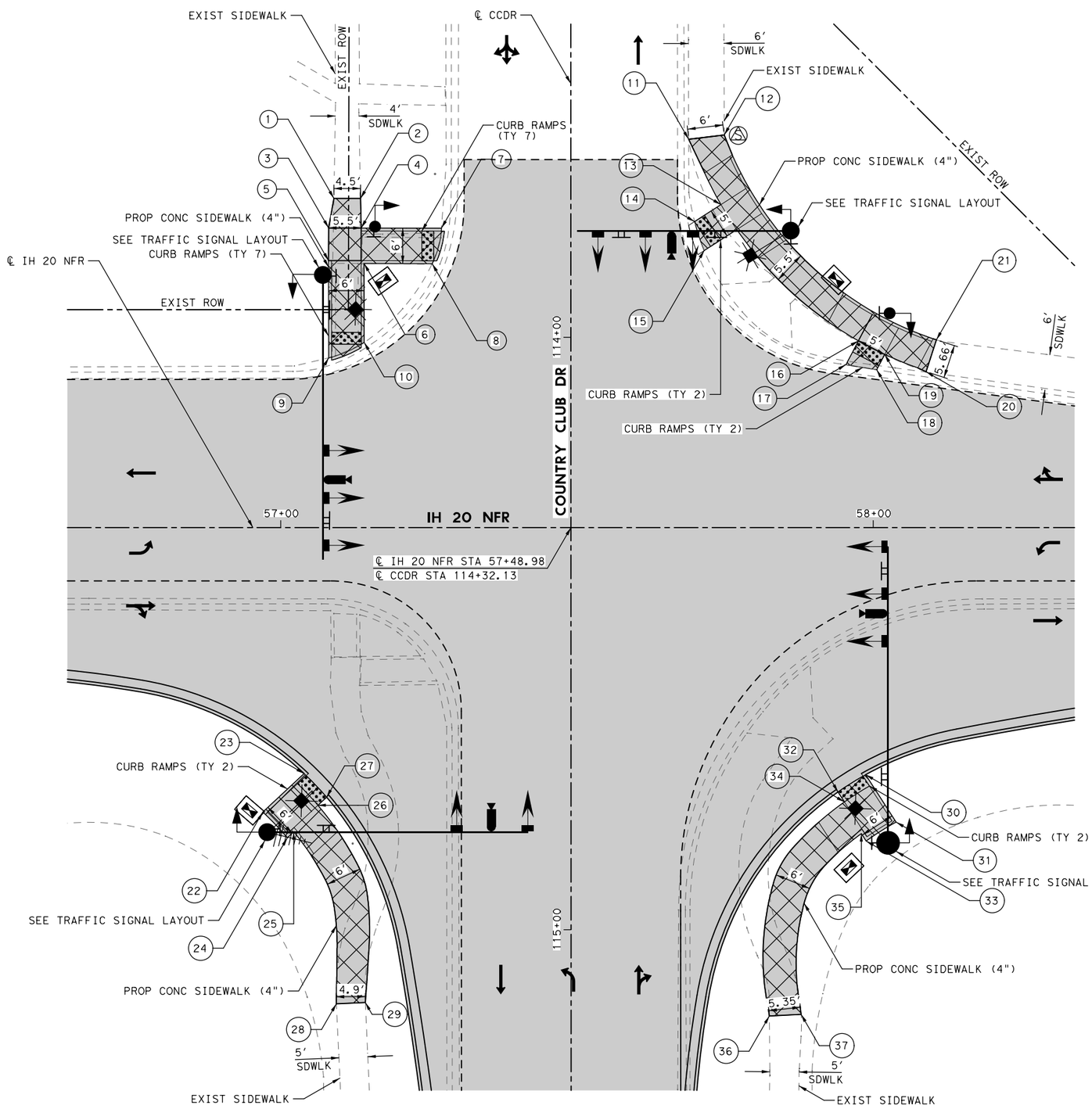
SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	117
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*I

SIDEWALK LOCATION DATA

POINT	STATION	OFFSET (NOTE 1)
1	STA 57+08.97	55.56′ LT
2	STA 57+13.47	55.57′ LT
3	STA 57+08.08	50.57′ LT
4	STA 57+13.56	50.57′ LT
5	STA 57+08.06	45.06′ LT
6	STA 57+14.07	44.57′ LT
7	STA 57+27.14	50.54′ LT
8	STA 57+25.56	44.55′ LT
9	STA 57+08.09	28.64′ LT
10	STA 57+14.09	31.27′ LT
11	STA 57+68.85	65.56′ LT
12	STA 57+74.85	66.28′ LT
13	STA 57+74.30	54.53′ LT
14	STA 57+69.84	51.66′ LT
15	STA 57+71.46	46.76′ LT
16	STA 57+97.52	31.52′ LT
17	STA 57+95.40	27.51′ LT
18	STA 58+00.57	26.62′ LT
19	STA 58+01.95	29.24′ LT
20	STA 58+08.92	26.32′ LT
21	STA 58+10.66	31.71′ LT
22	STA 56+96.97	48.01′ RT
23	STA 57+03.94	41.52′ RT
24	STA 57+01.09	52.37′ RT
25	STA 57+02.19	51.34′ RT
26	STA 57+06.27	46.87′ RT
27	STA 57+07.73	45.50′ RT
28	STA 57+09.37	80.39′ RT
29	STA 57+14.27	80.15′ RT
30	STA 57+98.72	41.69′ RT
31	STA 58+03.87	49.70′ RT
32	STA 57+94.05	44.62′ RT
33	STA 57+98.80	52.91′ RT
34	STA 57+95.13	46.30′ RT
35	STA 57+97.91	51.50′ RT
36	STA 57+82.47	82.44′ RT
37	STA 57+87.83	82.17′ RT



0′ 10′ 20′

SCALE IN FEET

LEGEND

- PROP DIRECTIONAL ARROW
- CONC SIDEWALKS (4")

NOTES:

1. ALL OFFSETS ARE MEASURED FROM THE FRONTAGE ROADS CENTERLINES UNLESS OTHERWISE NOTED.
2. INSTALL PEDESTRIAN RAMPS TO MEET REQUIREMENTS ON PED-18.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
SIDEWALK DETAILS
AT COUNTRY CLUB DR

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064,ETC

SHEET NO. 118

DATE: 3/30/2022
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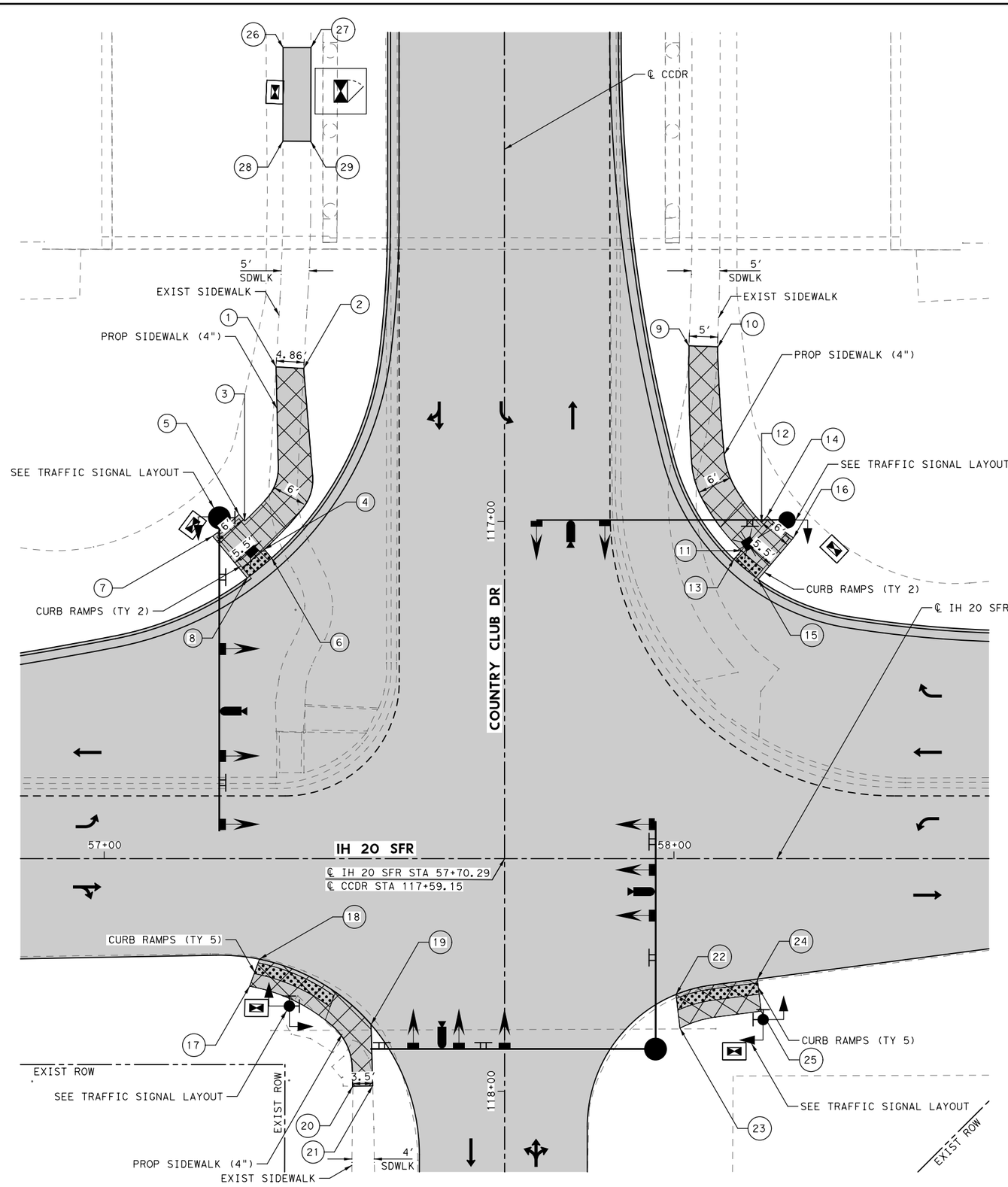
SIDEWALK LOCATION DATA

POINT	STATION	OFFSET (NOTE 1)
1	STA 57+30.16	86.29' LT
2	STA 57+35.01	86.01' LT
3	STA 57+24.64	59.23' LT
4	STA 57+28.10	54.27' LT
5	STA 57+23.46	60.65' LT
6	STA 57+29.38	52.72' LT
7	STA 57+19.03	56.59' LT
8	STA 57+25.11	49.26' LT
9	STA 58+02.64	89.99' LT
10	STA 58+07.64	89.82' LT
11	STA 58+11.83	54.04' LT
12	STA 58+15.38	58.96' LT
13	STA 58+10.53	52.51' LT
14	STA 58+16.36	60.11' LT
15	STA 58+14.77	49.01' LT
16	STA 58+20.97	56.28' LT
17	STA 57+25.53	22.71' RT
18	STA 57+27.26	17.65' RT
19	STA 57+46.85	29.15' RT
20	STA 57+43.64	40.00' RT
21	STA 57+47.11	40.00' RT
22	STA 58+00.37	23.85' RT
23	STA 58+01.04	29.76' RT
24	STA 58+14.65	21.15' RT
25	STA 58+15.30	26.78' RT
26	STA 57+31.39	142.31' LT
27	STA 57+36.28	142.31' LT
28	STA 57+31.37	125.90' LT
29	STA 57+36.25	125.90' LT



0' 10' 20'

SCALE IN FEET

LEGEND

- PROP DIRECTIONAL ARROW
- CONC SIDEWALKS (4")

NOTES:

1. ALL OFFSETS ARE MEASURED FROM THE FRONTAGE ROADS CENTERLINES UNLESS OTHERWISE NOTED.
2. INSTALL PEDESTRIAN RAMPS TO MEET REQUIREMENTS ON PED-18.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

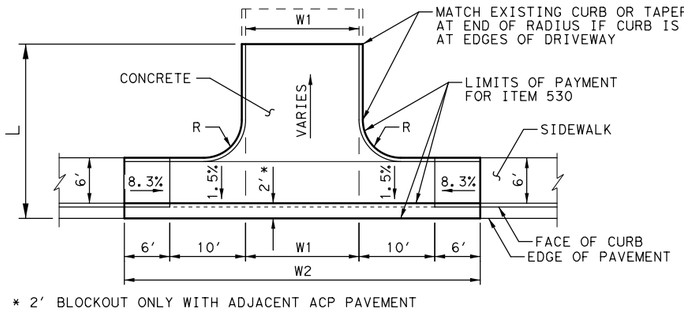
Texas Department of Transportation

IH 20 SFR
SIDEWALK DETAILS
AT COUNTRY CLUB DR

SHEET 2 OF 2

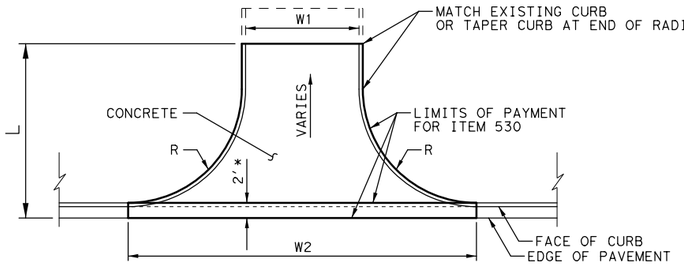
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	119
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\CCD*MAIN*



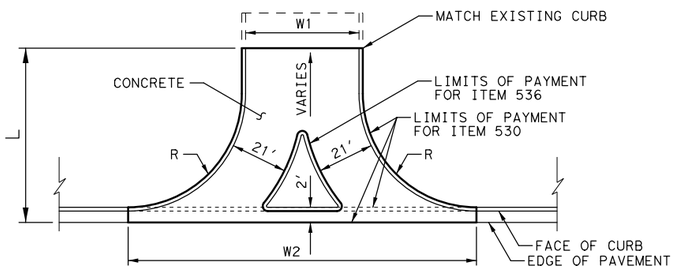
* 2' BLOCKOUT ONLY WITH ADJACENT ACP PAVEMENT

TYPICAL DRIVEWAY DETAIL "A"
WITH CURB AND GUTTER AND SIDEWALK
NTS

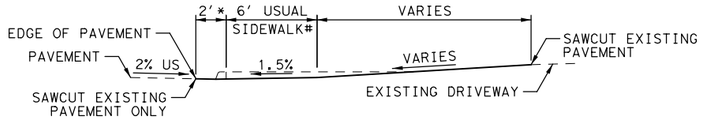


* 2' BLOCKOUT ONLY WITH ADJACENT ACP PAVEMENT

TYPICAL DRIVEWAY DETAIL "B"
WITH CURB AND GUTTER
NTS

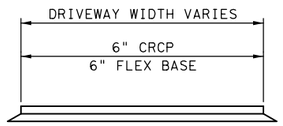


TYPICAL DRIVEWAY DETAIL "C"
WITH CURB AND GUTTER
AND CONCRETE DIRECTIONAL ISLAND
NTS



\# SEE ROADWAY PLAN FOR ADDITIONAL INFORMATION
* 2' BLOCKOUT ONLY WITH ADJACENT ACP PAVEMENT

TYPICAL DRIVEWAY PROFILE DETAIL "AA"
WITH CURB AND GUTTER
NTS



CONCRETE DRIVEWAY TYPICAL SECTION
NTS

DRIVEWAY GENERAL NOTES:

1. ALL DRIVEWAYS CONSTRUCTED ON THIS PROJECT SHALL BE IN CONFORMANCE WITH EXISTING GOVERNING REGULATIONS AS SET FORTH BY THE TEXAS DEPARTMENT OF TRANSPORTATION.
2. THE CONTRACTOR SHALL OBTAIN PERMISSION FROM THE RESPECTIVE PROPERY OWNERS PRIOR TO CONSTRUCTING PROPOSED DRIVEWAYS BEYOND EXISTING ROW LIMITS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF HE ENCOUNTERS DIFFICULTY IN OBTAINING PERMISSION FROM ANY PROPERTY OWNERS.
3. DRIVEWAYS(CONC): 6" FLEX BASE TY A GR 4 AND 6" CLASS C CRCP FOR CONCRETE DRIVEWAYS. IF EXISTING CONCRETE DRIVEWAY HAS A GREATER THICKNESS, MATCH EXISTING CONDITION OR AS DIRECTED. MATCH EXISTING CONCRETE REINFORCEMENT OR USE W2.9 X W2.9 WELDED WIRE REINFORCING. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 530.
4. ON CONCRETE DRIVEWAYS, SAW CONTRACTION JOINTS AT APPROVED LOCATIONS.
5. REMOVE PORTIONS OF EXISTING CONCRETE OR ACP DRIVEWAY BY SAW CUTTING TO NEAT LINES UNLESS OTHERWISE DIRECTED.
6. REMOVAL AND DISPOSAL OF EXISTING DRIVEWAY MATERIALS OTHER THAN CONCRETE AND ALL OTHER WORK AND MATERIALS NECESSARY TO CONSTRUCT DRIVEWAY WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 530. CONSTRUCT AND TIE DRIVEWAY TO THE EXISTING OR PROPOSED EDGE OF PAVEMENT AND EXISTING DRIVEWAY AS APPROVED.
7. MAX DRIVEWAY GRADES NOT TO EXCEED:
   8% SLOPE FOR COMMERCIAL DRIVEWAYS
   12% SLOPE FOR RESIDENTIAL DRIVEWAYS
   2% SLOPE ACROSS PROPOSED SIDEWALKS
8. OMIT PAYMENT FOR CURB WITHIN LIMITS OF DRIVEWAY. CURBS ON DRIVEWAYS SHALL BE CONSIDERED SUBSIDIARY TO THE PRICE BID PER SQUARE YARD FOR DRIVEWAYS AND WILL NOT BE PAID FOR DIRECTLY.
9. PROVIDE CURB CUTS AS DIRECTED ALONG CURBED DRIVEWAYS THROUGH DITCH SECTIONS TO MAINTAIN EXISTING DRAINAGE PATTERN.
10. SEE DRIVEWAY SUMMARY SHEET FOR ADDITIONAL INFORMATION.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022
Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

DRIVEWAY DETAILS

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	120
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*D

SUMMARY OF DRIVEWAY ITEMS

LOCATION	LT/RT	EXISTING SURFACE	PLAN DETAIL	PROFILE DETAIL	(FT)				DRIVEWAYS				REMARKS
									104 6011	104 6017	530 6004	536 6004	
					W1	W2	L	R	REMOVING CONC (MEDIANS)	REMOVING CONC (DRIVEWAYS)	DRIVEWAYS (CONC)	CONC DIRECTIONAL ISLAND	
									SY	SY	SY	SY	
SH 17													
CSJ													
60+77	LT	GRAVEL	B	AA	40	60	14	10			68		COMMERCIAL
61+76	LT	ACP	B	AA	40	60	13	10			63		COMMERCIAL
62+90	LT	CONC	B	AA	50	150	52	50		468	430		COMMERCIAL
65+19	LT	CONC	C	AA	36	136	52	50	42	337	306	46	COMMERCIAL
								TOTAL	42	805	867	46	

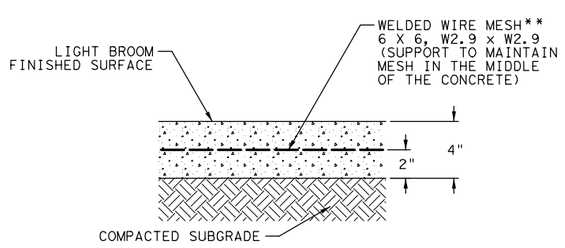
TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

DRIVEWAY SUMMARY

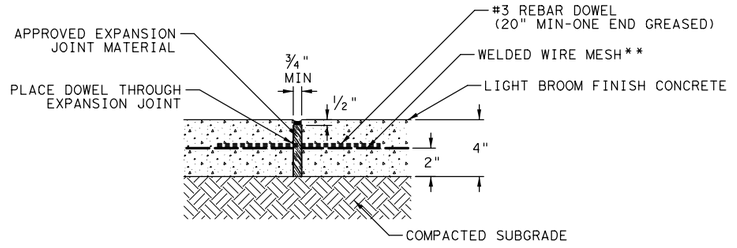
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	121
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*DW



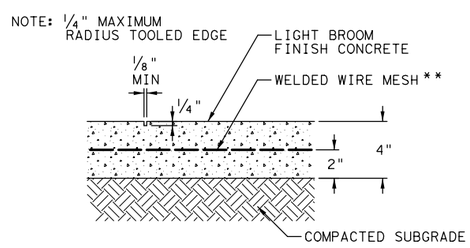
TYPICAL CL A CONC (MISC)

NTS



HORIZONTAL EXPANSION JOINT

NTS



TOOLED CONTROL JOINT

NTS

NOTES:

**POLYPROPYLENE FIBER REINFORCING AT A RATE OF 1.5 LBS/CY MAY BE USED IN LIEU OF WIRE REINFORCING.

TBPE REGISTRATION NO. F-16341

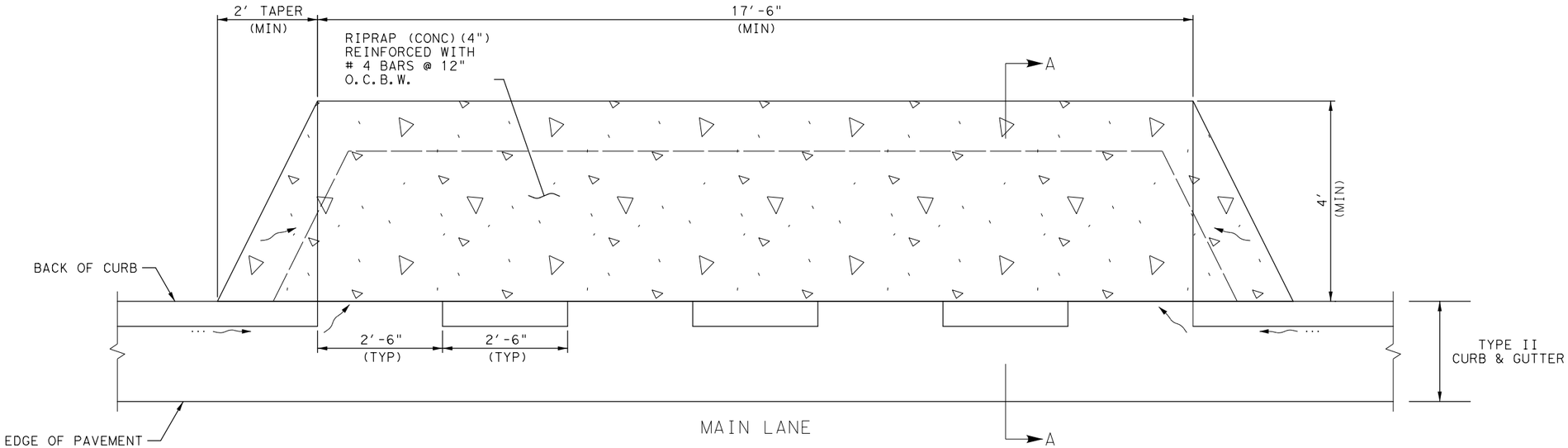
Texas Department of Transportation

MISCELLANEOUS MEDIAN DETAILS

SCALE: NTS

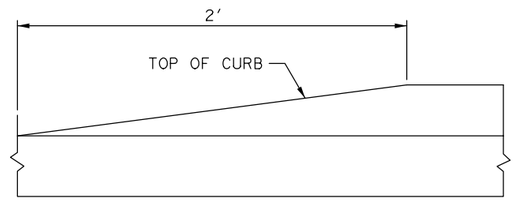
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	122
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064, ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*R



SAWTOOTH CURB & GUTTER TYPE (II)

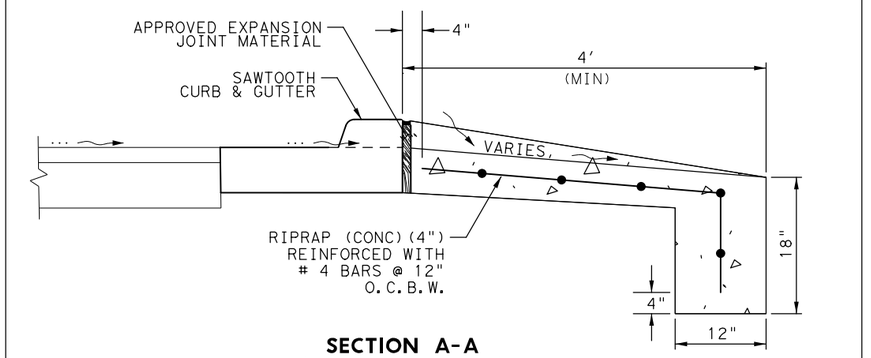
NTS



LAYDOWN CURB TRANSITION

NOTE: TO BE PAID FOR AS TYPE II CURB AND GUTTER

NTS



SECTION A-A

NTS

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Christopher J. Strunk

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

MISCELLANEOUS CONCRETE DETAILS

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	123
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\ODA*R

DATE: 3/31/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards\sctable.dgn

SEAL COAT MATERIAL SELECTION TABLE

TIER I: HEAVY USE - USE ONLY THE SELECTED MATERIALS.

TYPE	ASPHALT RUBBER (A-R)	ASPHALT CEMENT (AC)
	☐ A-R ONLY	☒ AC ONLY
ASPHALT	☐ A-R TY II ☐ A-R TY III ☐ SP 300-	☒ AC-20-5TR ☐ AC-20XP ☐ AC-15P ☐ SP 300-

TIER II: MODERATE USE - USE THESE MATERIALS OR ANY SELECTED TIER I MATERIAL COMBINATIONS OF THE ALLOWED TYPES.

TYPE	ASPHALT CEMENT (AC)	ASPHALT EMULSION
	☐ AC ONLY	☐ EMULSION ONLY
ASPHALT	☐ AC-10-2TR ☐ AC-15P ☐ AC-20XP ☐ AC-10 W/2%SBR ☐ AC-5 W/2%SBR ☐ SP 300-	☐ CHFRS-2P ☐ HFRS-2P ☐ CRS-2P ☐ SP 300-

TIER III: LIGHT USE - USE THESE MATERIALS OR ANY SELECTED TIER I OR TIER II MATERIAL COMBINATIONS OF THE ALLOWED TYPES.

TYPE	ASPHALT CEMENT (AC)	ASPHALT EMULSION
	☐ AC ONLY	☐ EMULSION ONLY
ASPHALT	☐ AC-10 ☐ AC-5 ☐ SP 300-	☐ CRS-2 ☐ CRS-2H ☐ HFRS-2 ☐ SP 300-

DISTRICTWIDE SEAL COAT PROJECT SEASONS: REFER TO ITEM 316 FOR TEMPERATURE AND WEATHER RESTRICTIONS.

SEASON 1: AMA, CHS, LBB	MAY 15 TO AUG 31
SEASON 2: ABL, ATL, BWD, DAL, FTW, LFK, ODA, PAR, SJT, TYL, WAC, WFS	MAY 1 TO AUG 31
SEASON 3: AUS, BMT, BRY, ELP, HOU, SAT, YKM	MAY 1 TO SEP 15
SEASON 4: CRP, LRD, PHR	APR 1 TO SEPT 30

NOTE: SEAL COATS ON ROUTINE MAINTENANCE CONTRACTS MUST BE COMPLETED BY AUGUST 31 UNLESS OTHERWISE SHOWN ON THE PLANS.

INSTRUCTIONS TO THE CONTRACTOR:

1. PROVIDE MATERIALS ACCORDING TO THE ALTERNATES SELECTED FOR THE ROADWAY TIER DESIGNATIONS SPECIFIED AT VARIOUS ROADWAY LOCATIONS SHOWN ON THE PLANS;
2. ALTERNATELY, SUPPLY SELECTED BINDERS FROM A HIGHER TIER, BUT ONLY IF THE TYPE OF MATERIAL IS ALLOWED FOR THE DESIGNATED TIER; PAYMENT WILL ONLY BE MADE FOR THE TIER DESIGNATED FOR THE PAVEMENT;
3. SUPPLY THE AGGREGATE TYPE, GRADE AND SURFACE AGGREGATE CLASS SHOWN ON THE PLANS; AND
4. ADHERE TO THE APPLICATION SEASON SELECTED.

THERE ARE 245 WORKING DAYS ALLOWED FOR THIS PROJECT.
THE LATEST ROADWAY START WORK DATE IS 05/25/2023, OR AS APPROVED.

STATE OF TEXAS
CHRISTOPHER J. STRUNK
138599
LICENSED
PROFESSIONAL ENGINEER

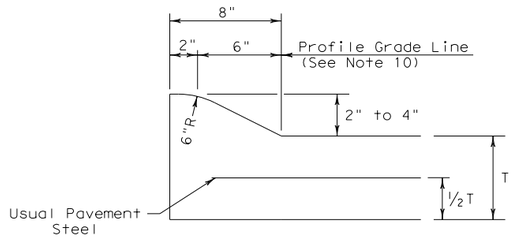
Christopher J. Strunk 03/30/2022

SEAL COAT MATERIAL SELECTION TABLE

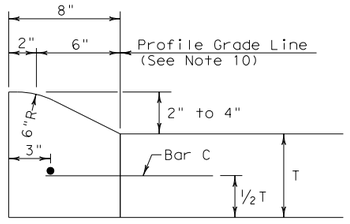
SCTABLE

FILE: sctable.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		124

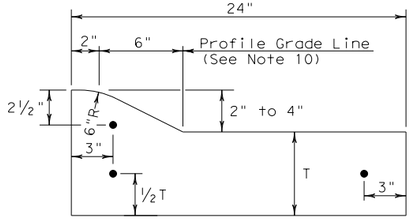
DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards



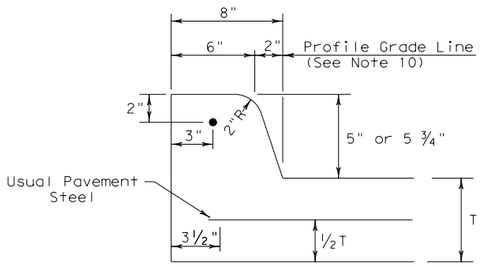
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



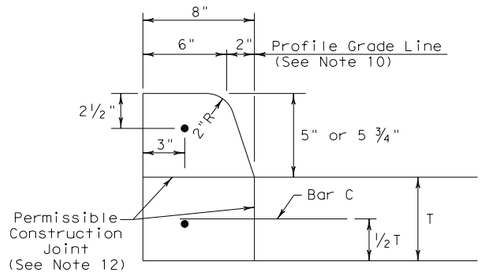
TYPE I CURB
2" - 4" HEIGHT



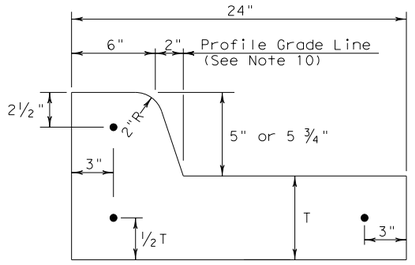
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



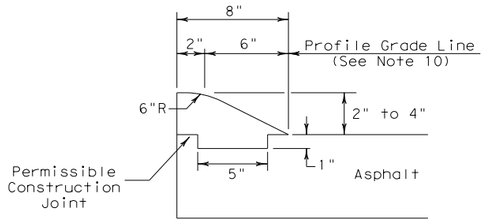
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



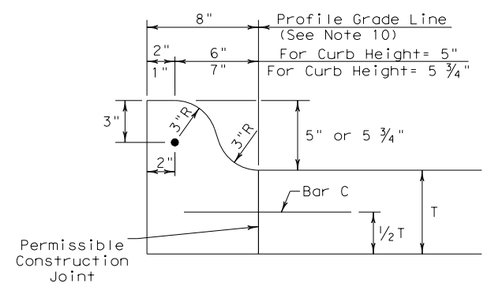
TYPE II CURB
5" - 5 ¾" HEIGHT



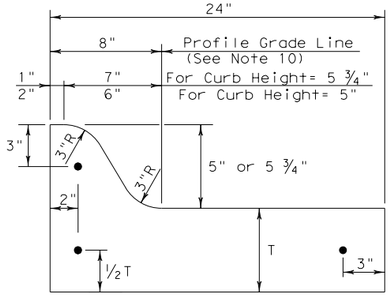
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



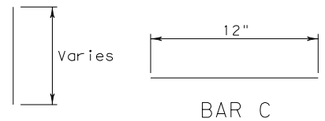
TYPE III CURB (KEYED)
2" - 4" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

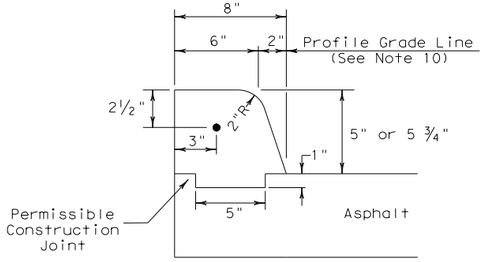


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

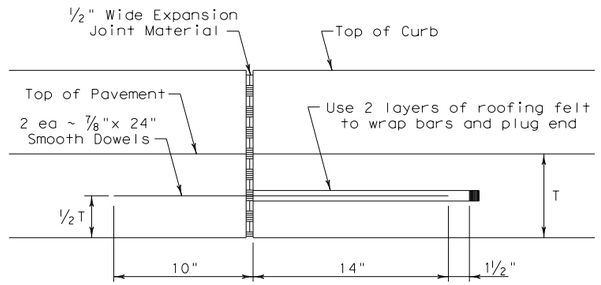


BAR B

BAR C

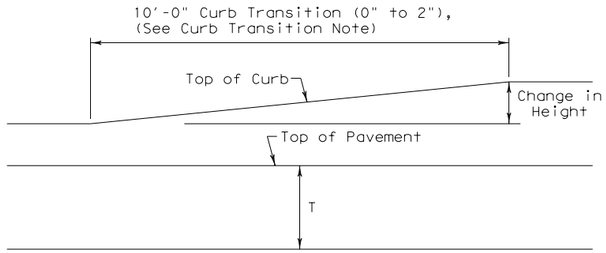


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

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



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B used as needed to support curb reinforcing steel during concrete placement.

Texas Department of Transportation

Design Division Standard

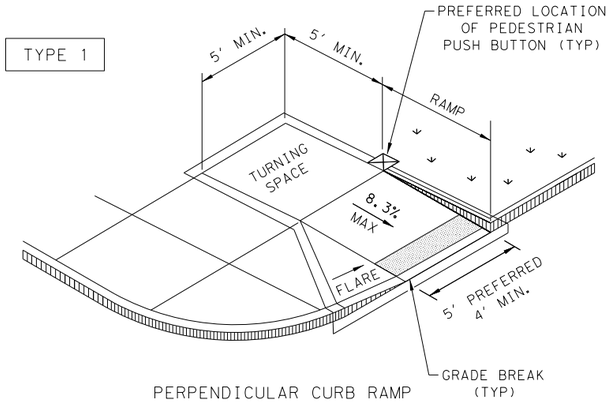
CONCRETE CURB AND CURB AND GUTTER

CCCG-21

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: SS	CK: KM
©TxDOT: FEBRUARY 2021 REVISIONS	CONT	SECT	JOB	HIGHWAY
	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		125

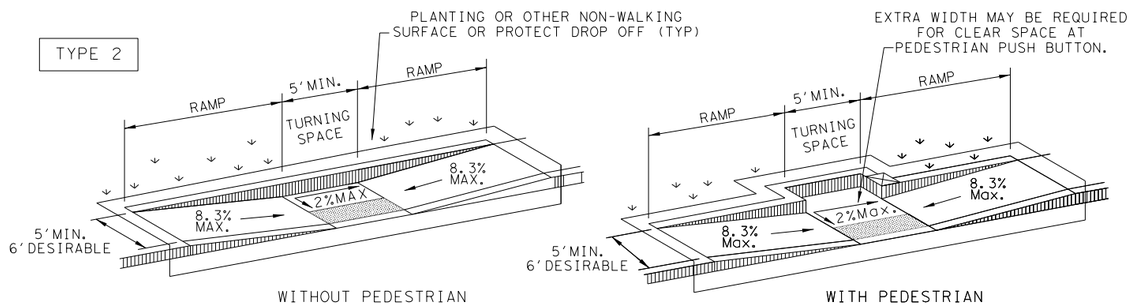
DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards

TYPE 1



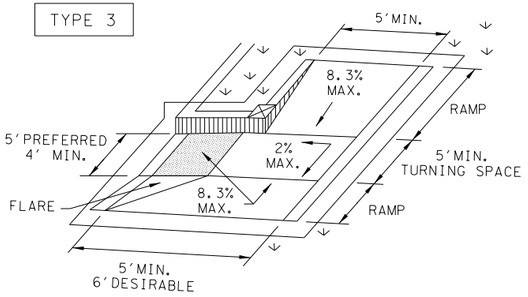
PERPENDICULAR CURB RAMP

TYPE 2

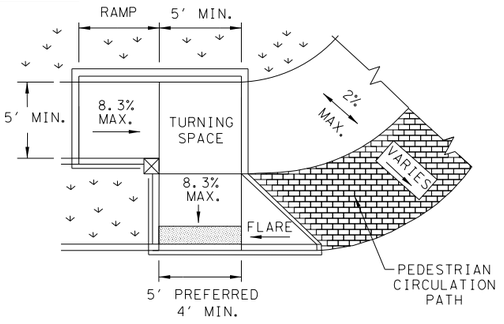


PARALLEL CURB RAMP

TYPE 3

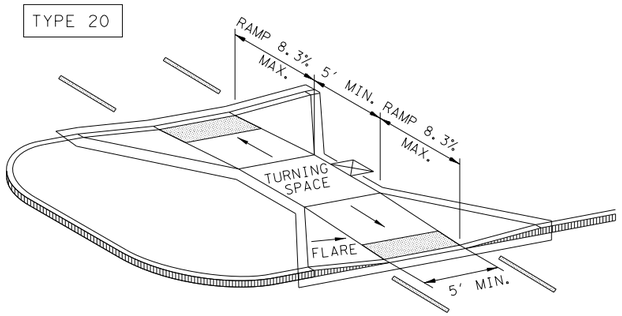


TYPE 6



COMBINATION CURB RAMPS

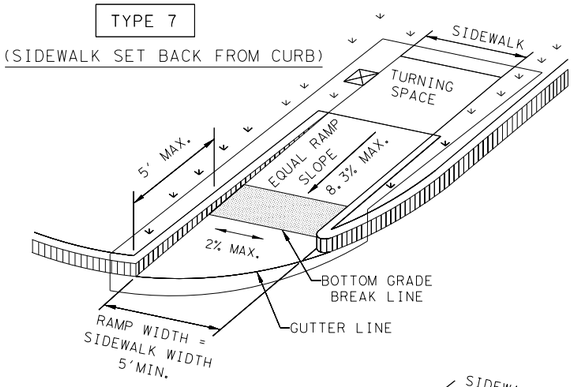
TYPE 20



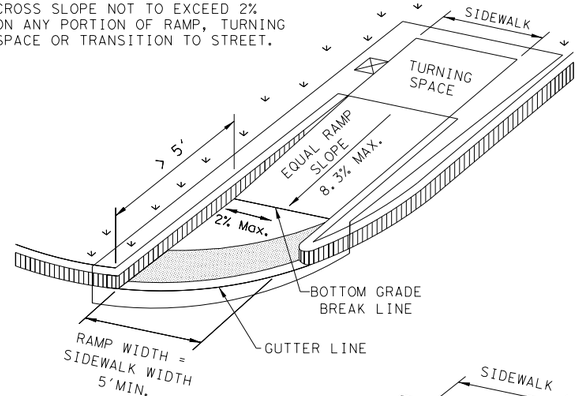
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

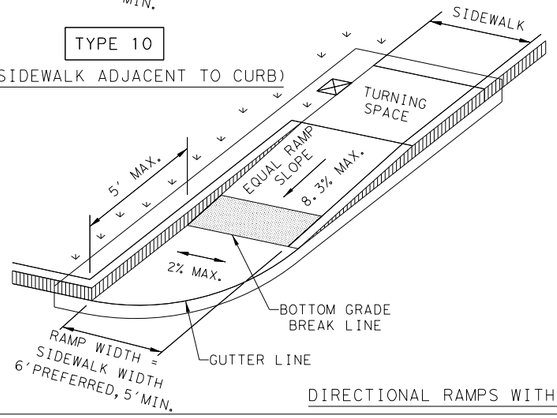


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

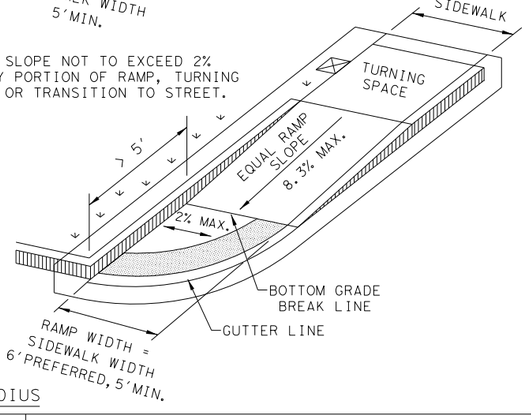


TYPE 10

(SIDEWALK ADJACENT TO CURB)

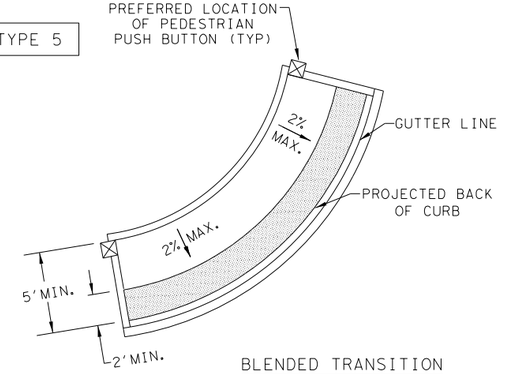


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



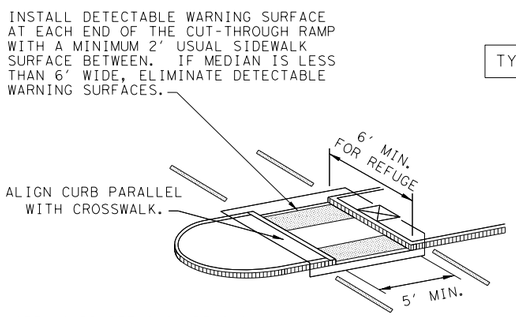
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 5



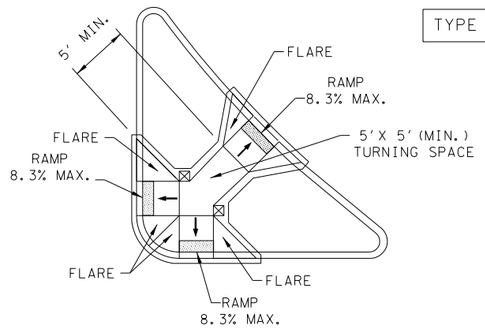
BLENDED TRANSITION
(FLUSH LANDING)

TYPE 21

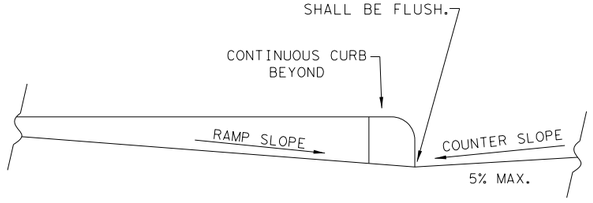


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

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	0003	07	064, ETC	IH20
REVISED 08,2005	DIST	COUNTY		SHEET NO.
REVISED 06,2012	ODA	REEVES.		126
REVISED 01,2018				

DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Stand

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5′. Where the sidewalk is adjacent to the back of curb, a 6′ sidewalk width is desirable. Where a 5′ sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4′ for short distances. 5′x 5′ passing areas at intervals not to exceed 200′ are required.
5. Turning Spaces shall be 5′x 5′ minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4′x 4′ wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6′ wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5′x 5′ landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

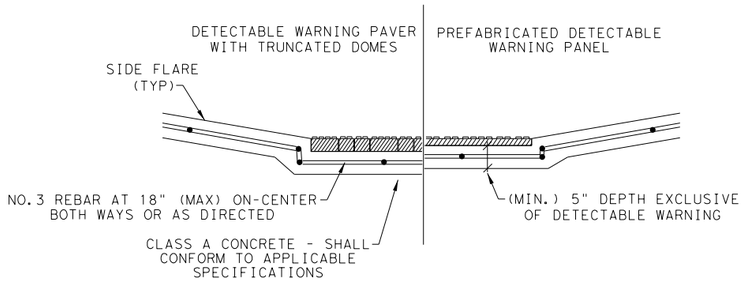
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

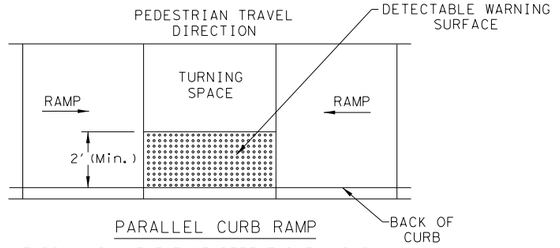
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

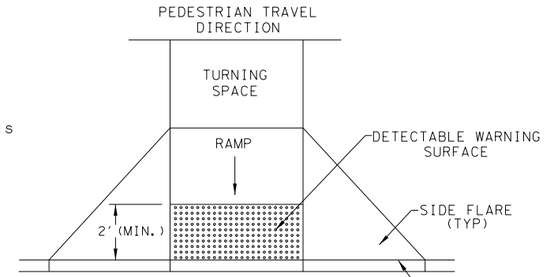


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

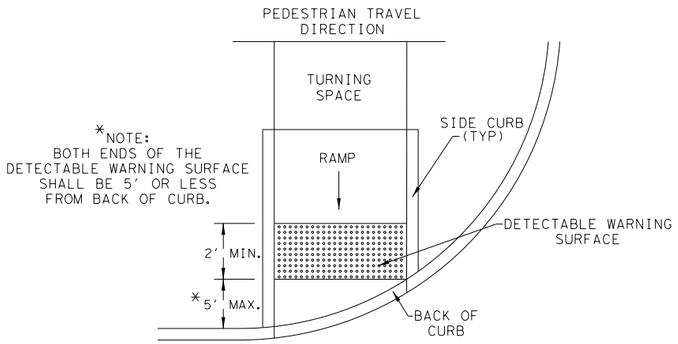
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

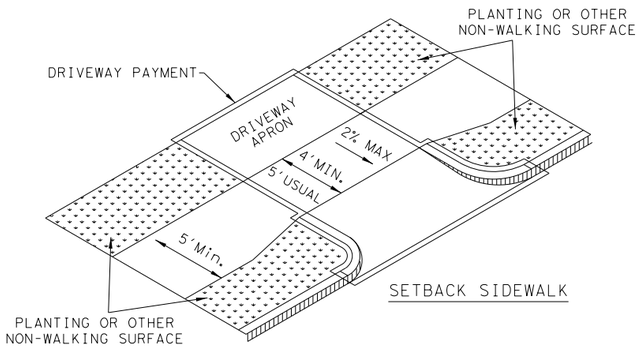
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

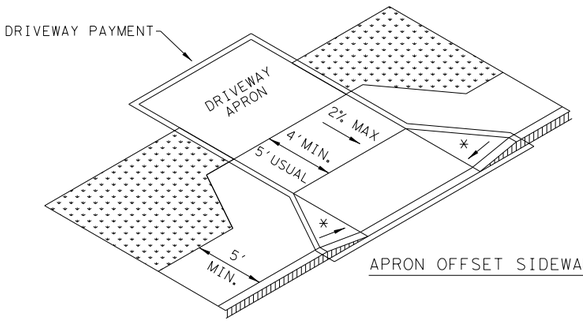
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		127

DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards\ped18.dgn

SIDEWALK TREATMENT AT DRIVEWAYS

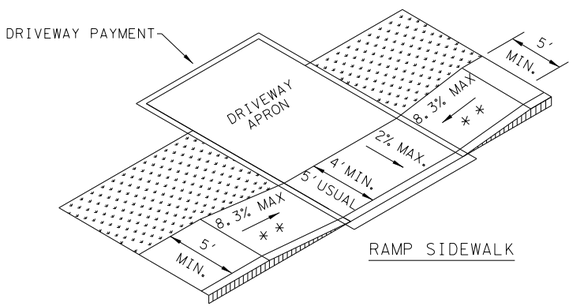


SETBACK SIDEWALK



APRON OFFSET SIDEWALK

WIDE SIDEWALK

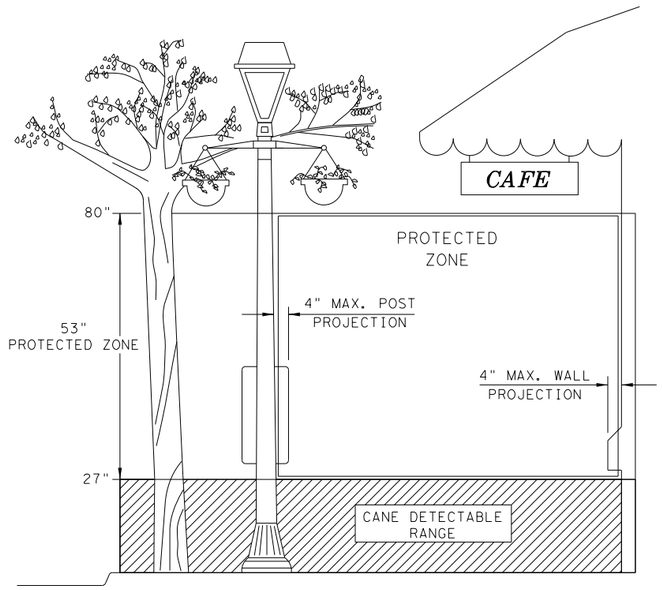


RAMP SIDEWALK

NOTES:

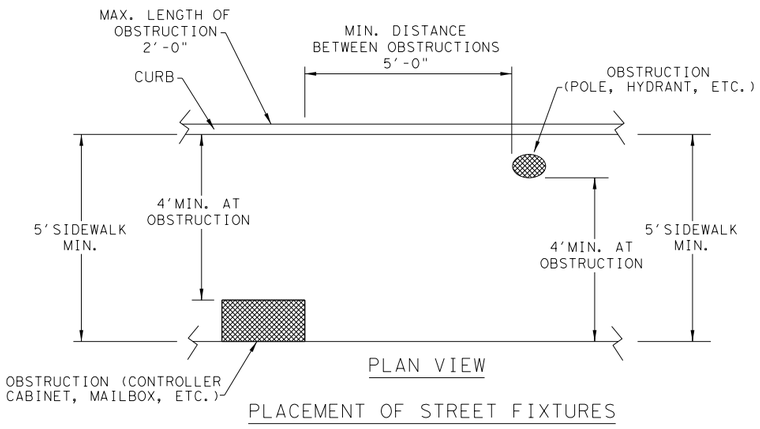
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * 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

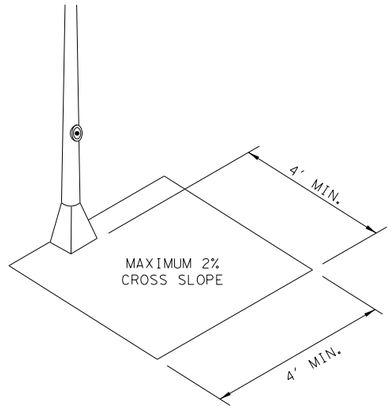
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



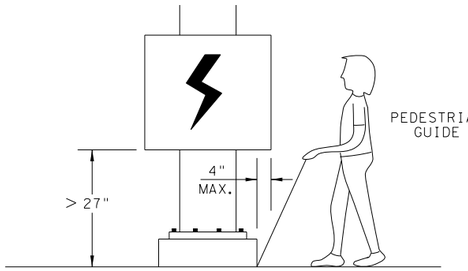
PLAN VIEW

PLACEMENT OF STREET FIXTURES

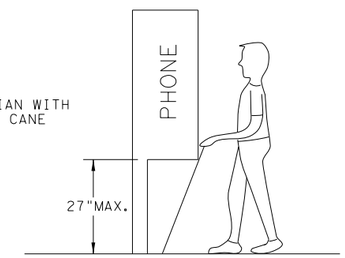
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



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

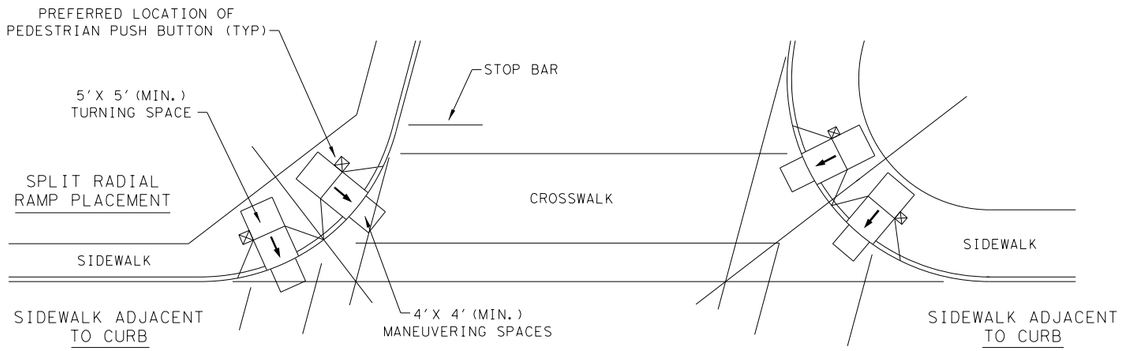
PED-18

FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0003	07	064, ETC		IH20
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY			SHEET NO.
	ODA	REEVES.			128

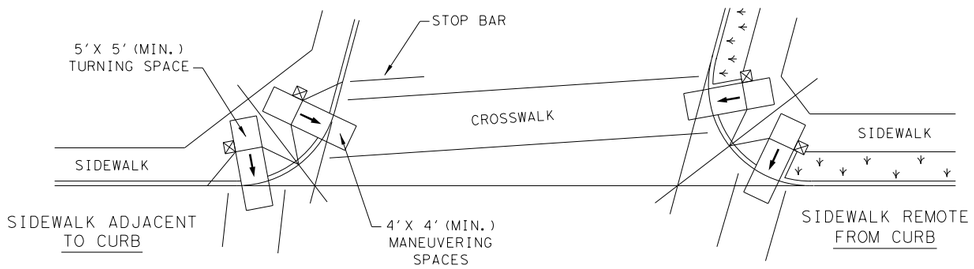
DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards\ped18.dgn

TYPICAL CROSSING LAYOUTS

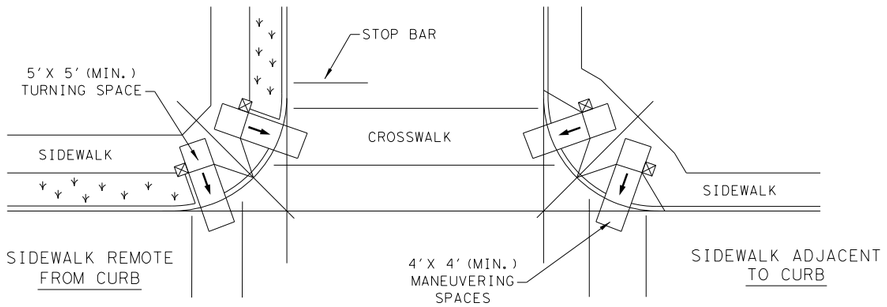
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



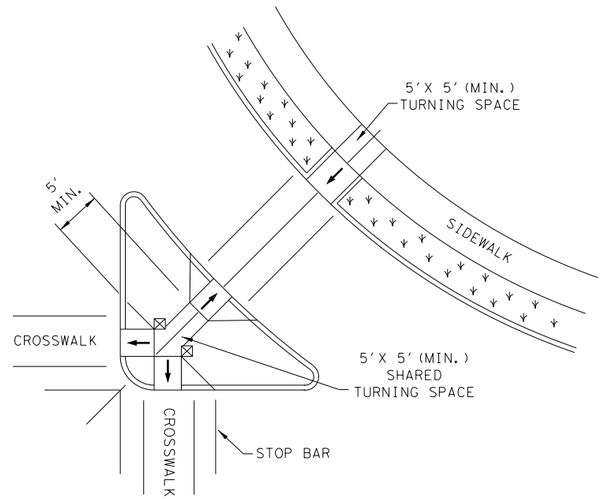
SKEWED INTERSECTION WITH "LARGE" RADIUS



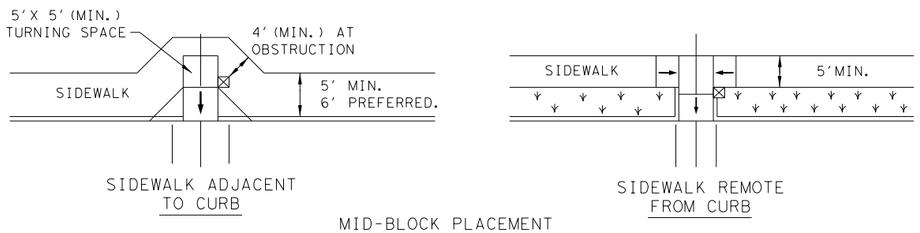
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

SHEET 4 OF 4

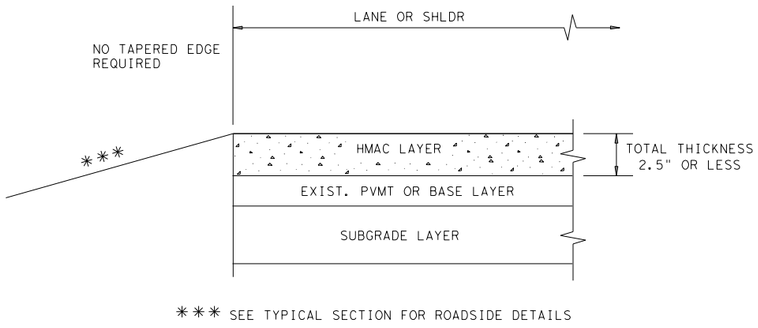
Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

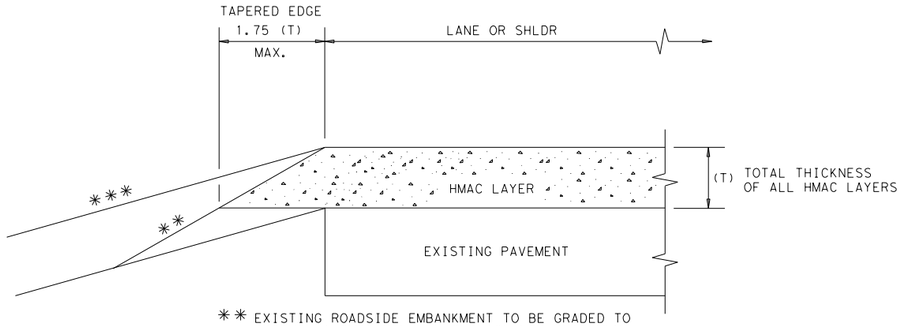
FILE: ped18	DN: TxDOT		DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS	0003	07	064, ETC		IH20
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY			SHEET NO.
	ODA	REEVES.			129

DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards\tehmac11.dgn



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

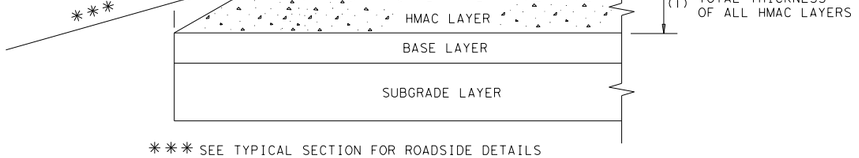
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

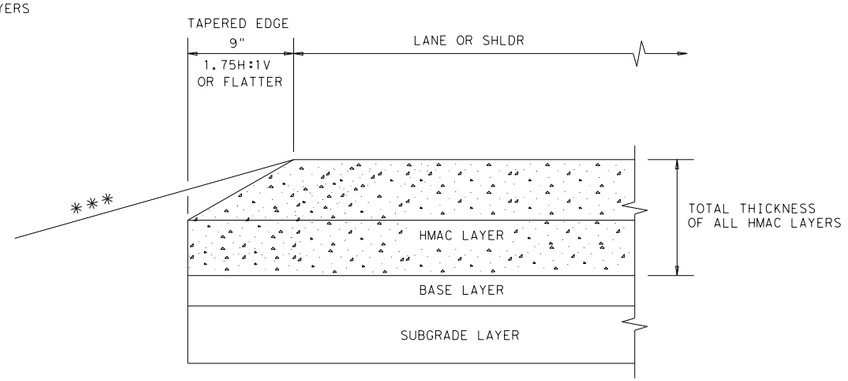
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation

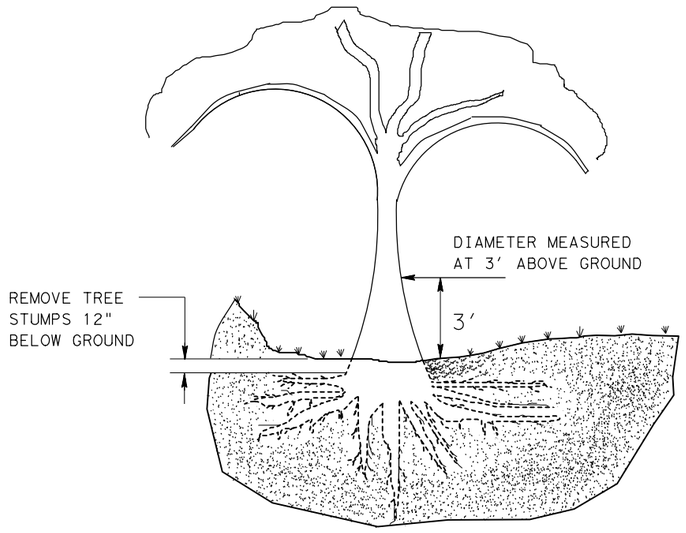
Design Division Standard

TAPERED EDGE DETAILS
HMAC PAVEMENT

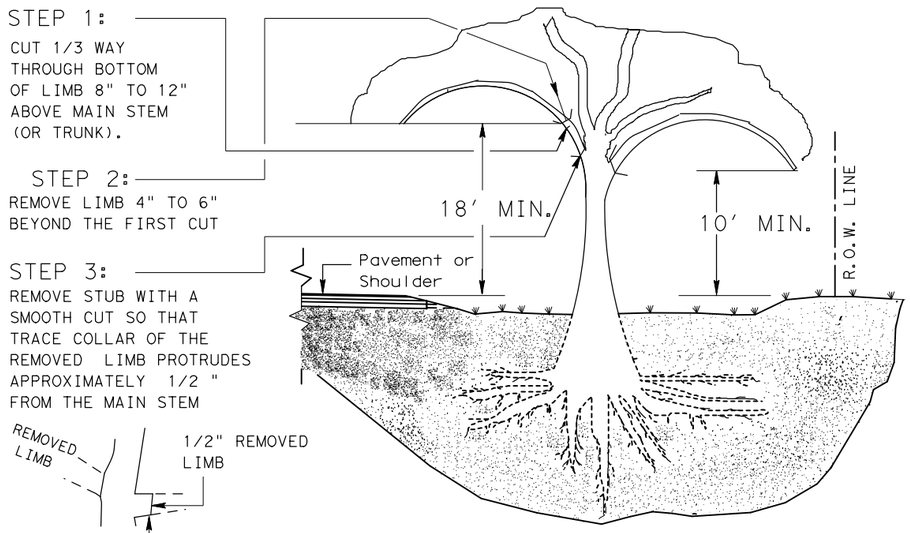
TE(HMAC)-11

FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		130

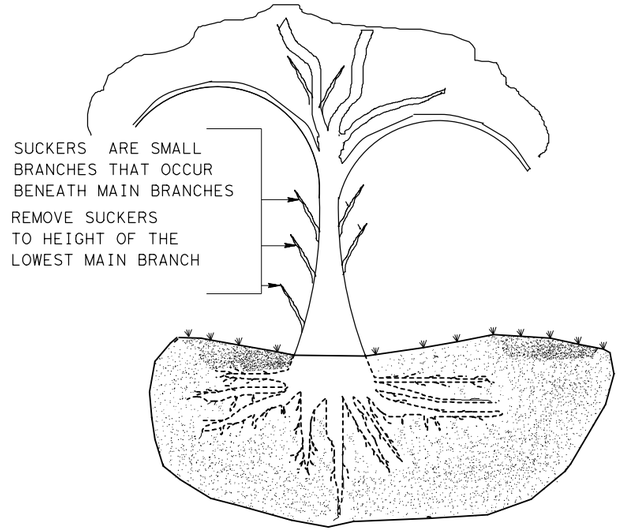
3/30/2022 $TIME$
pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\3. Roadway\TxDOT Standards\TRB-15(1).dgn



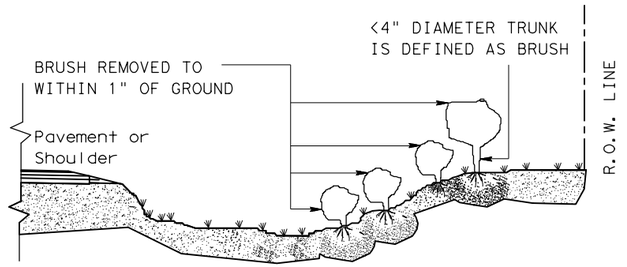
TREE REMOVAL



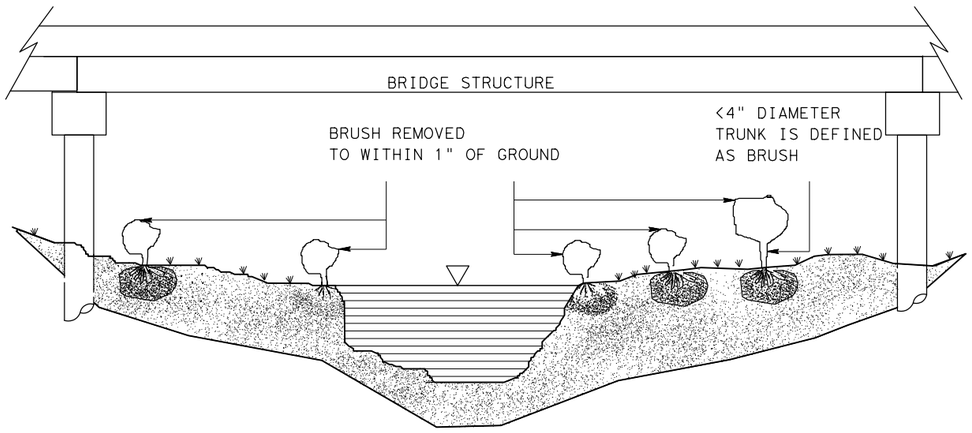
TREE TRIMMING



STEPS 1,2 AND 3 APPLY WHEN REMOVING LIMBS 2" IN DIAMETER OR LARGER.



BRUSH REMOVAL



BRUSH REMOVAL UNDER BRIDGE AND IN CHANNEL

GENERAL NOTES:

TREE TRIMMING

1. TRIM AND REMOVE ALL TREE LIMBS ON THE PAVEMENT SIDE OF THE TRUNK 18' ABOVE THE PAVEMENT OR BRIDGE DECK ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

2. TRIM AND REMOVE ALL TREE LIMBS BETWEEN THE TRUNK AND R.O.W. LINE 10' ABOVE NATURAL GROUND, TERRAIN OR OTHER STRUCTURE ELEVATION, UNLESS OTHERWISE SHOWN ON THE PLANS.

TREE REMOVAL

3. FOR TREES MARKED FOR REMOVAL, THE DIAMETER OF TREES ARE DETERMINED BY MEASUREMENT OF THE TRUNK CIRCUMFERENCE 3' ABOVE THE GROUND. TREES WITH TRUNKS OF LESS THAN 4" DIAMETER ARE CONSIDERED TO BE BRUSH. TREES WITH MULTIPLE TRUNKS AT THE POINT OF MEASUREMENT ARE MEASURED AND PAID FOR SEPARATELY.

4. MEASUREMENTS FOR PAYMENT OF TREE DIAMETERS ARE DIVIDED INTO THE RANGES SHOWN IN TABLE 1.

TABLE 1
TREE TRUNK SIZE FOR TREE REMOVAL PAYMENT

PAY ITEM	RANGE FOR PAY ITEMS: TRUNK DIAMETER * LOWER LIMIT IS GREATER THAN	TRUNK DIAMETER * UPPER LIMIT IS LESS THAN OR EQUAL TO	TRUNK CIRCUMFERENCE LOWER LIMIT IS GREATER THAN	TRUNK CIRCUMFERENCE UPPER LIMIT IS LESS THAN OR EQUAL TO
752 6005	4	12	12 1/2	37 1/2
752 6006	12	18	37 1/2	56 1/2
752 6007	18	24	56 1/2	75 1/2
752 6008	24	30	75 1/2	94
752 6009	30	36	94	113
752 6010	36	42	113	132
752 6011	42	48	132	151
752 6012	48	60	151	188 1/2
752 6013	60	72	188 1/2	226
752 6019	72	84	226	264
	84	GREATER THAN 84	264	NOT APPLICABLE

*SEE GENERAL NOTE #3.

Texas Department of Transportation — Maintenance Division Standard

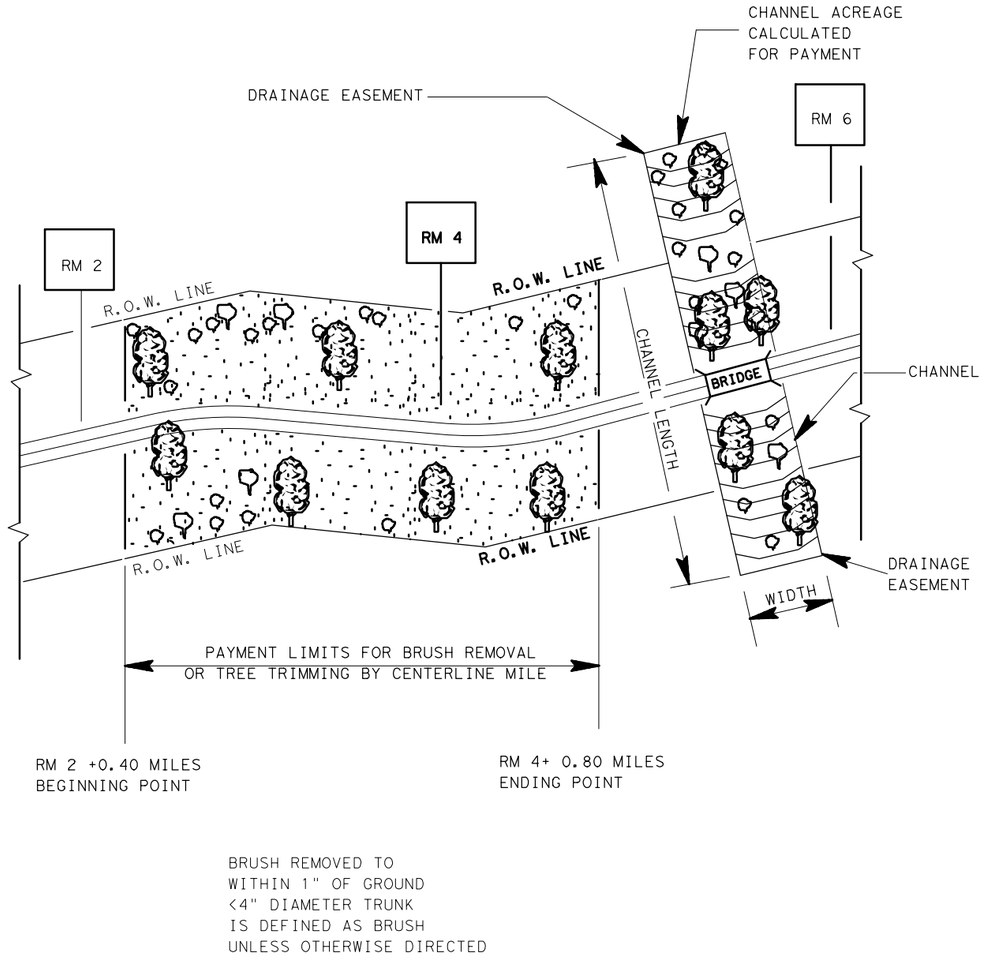
TREE AND BRUSH REMOVAL

TRB-15(1)

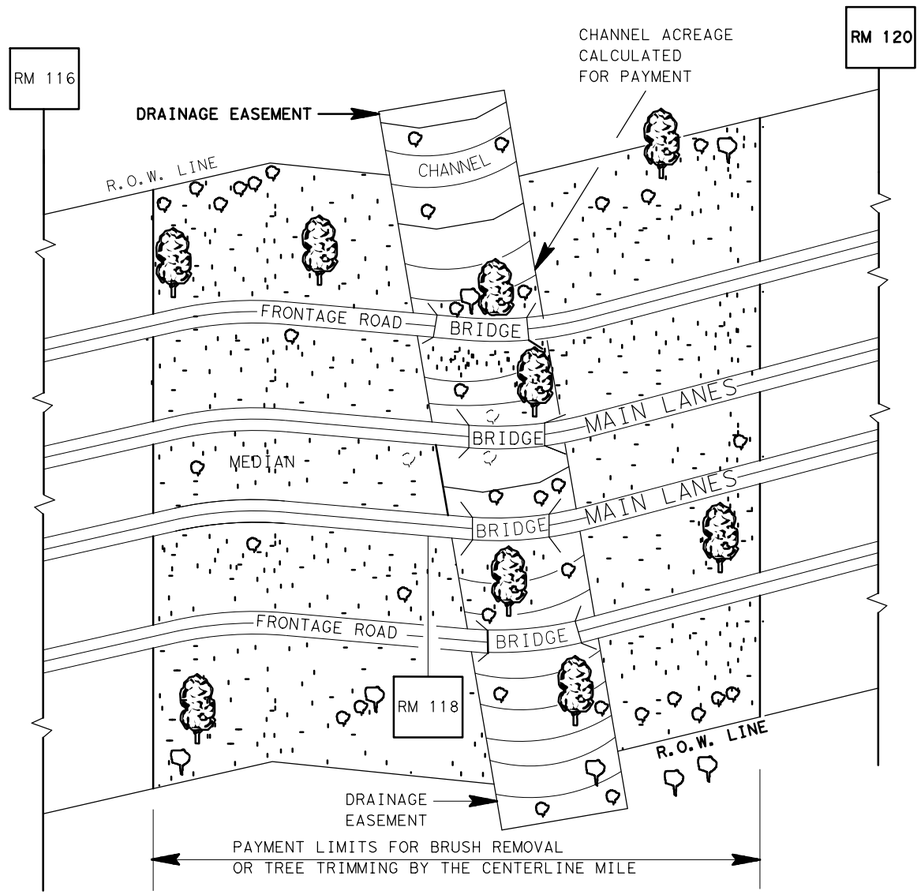
SHEET 1 OF 2

FILE:	DN: JEO	CK: LJB	DW: JEO	CK:
© TxDOT MARCH 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
Revised table 1 to 2014 Specification	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		131

LEVELS DISPLAYED
1



EXAMPLE: UNDIVIDED HIGHWAY



EXAMPLE: DIVIDED HIGHWAY WITH FRONTAGE ROADS

GENERAL NOTES:

TREE TRIMMING AND BRUSH REMOVAL

1. PAYMENT BY THE CENTERLINE MILE IS MADE TO THE NEAREST 1/100 (0.01) MILE.
2. LIMITS OF WORK ARE SHOWN AS DISTANCES FROM REFERENCE MARKERS (RM).
3. PAY ITEMS BY THE CENTERLINE MILE INCLUDE ALL TREE TRIMMING OR BRUSH REMOVAL IN THE RIGHT OF WAY ON BOTH SIDES OF THE HIGHWAY. FOR DIVIDED HIGHWAYS, THE MEDIAN IS INCLUDED. FOR HIGHWAYS WITH FRONTAGE ROADS, THE AREAS BETWEEN THE FRONTAGE ROADS AND MAIN LANES, AND THE AREAS OUTSIDE OF THE FRONTAGE ROADS ARE INCLUDED.
4. BRUSH REMOVAL AND TREE TRIMMING UNDER BRIDGES, IN AND ALONG CHANNELS AND EASEMENTS ARE PAID FOR BY THE ACRE FOR AREAS DESIGNATED ON THE PLANS.

Texas Department of Transportation
Maintenance Division
Standard Plans

TREE AND BRUSH REMOVAL

TRB-15(2)

SHEET 2 OF 2

FILE: TRB-15(2).DGN	DRAWN: JEO MODIFIED:		CHECKED: DW: LJB	DW: -	CK: -	NEG NO.:		
© TxDOT APRIL 2015		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #				SHEET
REVISED: 5/13/2004	LJB	ODA		ODA				132
REVISED: 9/24/2004	LJB	COUNTY			CONTROL	SECTION	JOB	HIGHWAY
REVISED: APRIL 2015	JEO	REEVES			0003	07064,	ETC	IH20

NOTES:

1. TRAFFIC SIGNALS SHALL BE DESIGNED ACCORDING TO CURRENT TxDOT STATEWIDE STANDARDS AND SPECIFICATIONS.

2. CONTRACTOR SHALL ENSURE CONTINUOUS COMMUNICATION OF PERMANENT TRAFFIC SIGNALS USING EXISTING WIRELESS RADIO TO THE APPLICABLE TXDOT/CITY TRAFFIC MANAGEMENT CENTER.

3. CONTRACTOR SHALL CALL TEXAS 811 21 BUSINESS DAYS BEFORE CONSTRUCTION WORK TO LOCATE UNDERGROUND UTILITY LINES. THE CONTRACTOR SHALL COORDINATE UP FRONT WITH ELECTRIC SERVICE PROVIDER FOR POWER SOURCE LOCATION BEFORE STARTING ANY PROJECT WORK. THE CONTRACTOR WILL MAKE ALL ARRANGEMENTS FOR ELECTRICAL SERVICE. NOTIFY THE ELECTRICAL PROVIDER, IN WRITING, ONCE PROJECT NTP IS RECEIVED OF THE NEED FOR ELECTRICAL SERVICE .DESIGNATED UTILITY COMPANY WILL INSTALL THE METER IN THE SERVICE PEDESTAL CABINET .CONTRACTOR TO OBTAIN ALL METERING EQUIPMENT REQUIREMENTS FROM UTILITY COMPANY PRIOR TO STARTING ELECTRIC SERVICE WORK.

4. ALL HEIGHTS AND LOCATIONS OF SIGNAL RELATED ITEMS ARE DIAGRAMMATIC ONLY AND MAY BE ADJUSTED IN THE FIELD TO ACCOMMODATE ACTUAL FIELD CONDITIONS AND TO AVOID UTILITY CONFLICTS AS DIRECTED BY THE TXDOT'S DESIGNATED ENGINEER. CONTRACTOR TO VERIFY SIGNAL POLE LOCATIONS WITH THE DESIGNATED TXDOT ENGINEER BEFORE DRILLING FOR SIGNAL FOUNDATIONS.

5. CONTRACTOR SHALL SALVAGE THE EXISTING TRAFFIC EQUIPMENT AS DIRECTED BY TXDOT AND AS SHOWN IN THE PLANS. EQUIPMENT REQUESTED BY TXDOT IS TO BE STOCKPILED AT THE TXDOT YARD AT 3901 EAST HIGHWAY 90,ODESSA,TEXAS - 79761. ALL OTHER MATERIAL NOT REQUESTED BY TXDOT BECOMES THE PROPERTY OF THE CONTRACTOR. DISPOSE OF MATERIAL OFF THE RIGHT OF WAY IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. MAINTAIN THE OPERATION OF THE EXISTING TRAFFIC SIGNAL UNTIL DIRECTED TO REMOVE IT.

6. INSTALLATION AND/OR REMOVAL OF ANY STRUCTURE, FOUNDATION, OR UNDERGROUND CABLE/CONDUIT LOCATED NEAR ANY OVERHEAD OR UNDERGROUND ELECTRICAL LINES SHALL BE ACCOMPLISHED USING ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES. THE CONTRACTOR SHALL CONSULT WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING SUCH WORK.

7. ALL LUMINAIRES INSTALLED ON SIGNAL POLES SHALL BE 250 WATT EQ. LED LUMINAIRES. LUMINAIRES ARE SHOWN GRAPHICALLY AT 15 DEGREES TO THE SIGNAL POLE FOR CLARITY ONLY. THE LUMINAIRE IS TO BE PLACED PERPENDICULAR TO THE ROADWAY IT IS INTENDED TO LIGHT.

8. PERMANENT SIGNAL HEADS MOUNTED ON THE SIGNAL ARM SHALL BE HORIZONTAL.

9. THE TRAFFIC SIGNAL AND PEDESTRIAN HEAD SHALL BE ALUMINUM. THE TRAFFIC SIGNAL SHALL HAVE ALUMINUM VENTED BACK PLATES WITH REFLECTIVE BORDER TAPE PER TXDOT STD DRAWING TS-BP-20.

10. TRAFFIC SIGNAL POLE SHALL BE PLACED A MINIMUM OF FOUR (4) FEET CLEAR FROM THE FACE OF CURB.

11. THE PRESENCE DETECTION EQUIPMENT SHALL MEET THE TXDOT ODESSA DISTRICT STANDARDS FOR VIDEO IMAGING AND RADAR VEHICLE DETECTION SYSTEM (VIRVDS).

12. PROJECT TRAFFIC SIGNAL COORDINATION CONTACT INFORMATION
TxDOT SIGNAL OFFICE: KELLI WILLIAMS, 432-498-4752.

13. CONTRACTOR TO INSTALL SIGNAL FOUNDATION APPROXIMATELY 2.5 FEET ABOVE GROUND TO MEET 20 FEET CLEAR TO THE PAVEMENT. REFER TO INTERSECTION PLANS AND CROSS SECTIONS FOR ADDITIONAL DETAILS.

14. POSITION THE BACK OF THE CONTROLLER CABINET TOWARDS THE INTERSECTION, TO ENSURE SIGNAL TECH HAS VISIBILITY OF THE INTERSECTION WHILE WORKING WITHIN THE CABINET.

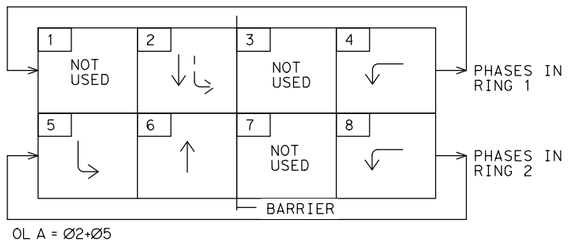
WSP USA Inc. TBPE #F-2263
STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

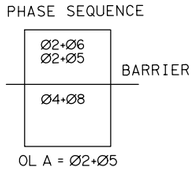
WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

TRAFFIC SIGNAL GENERAL NOTES

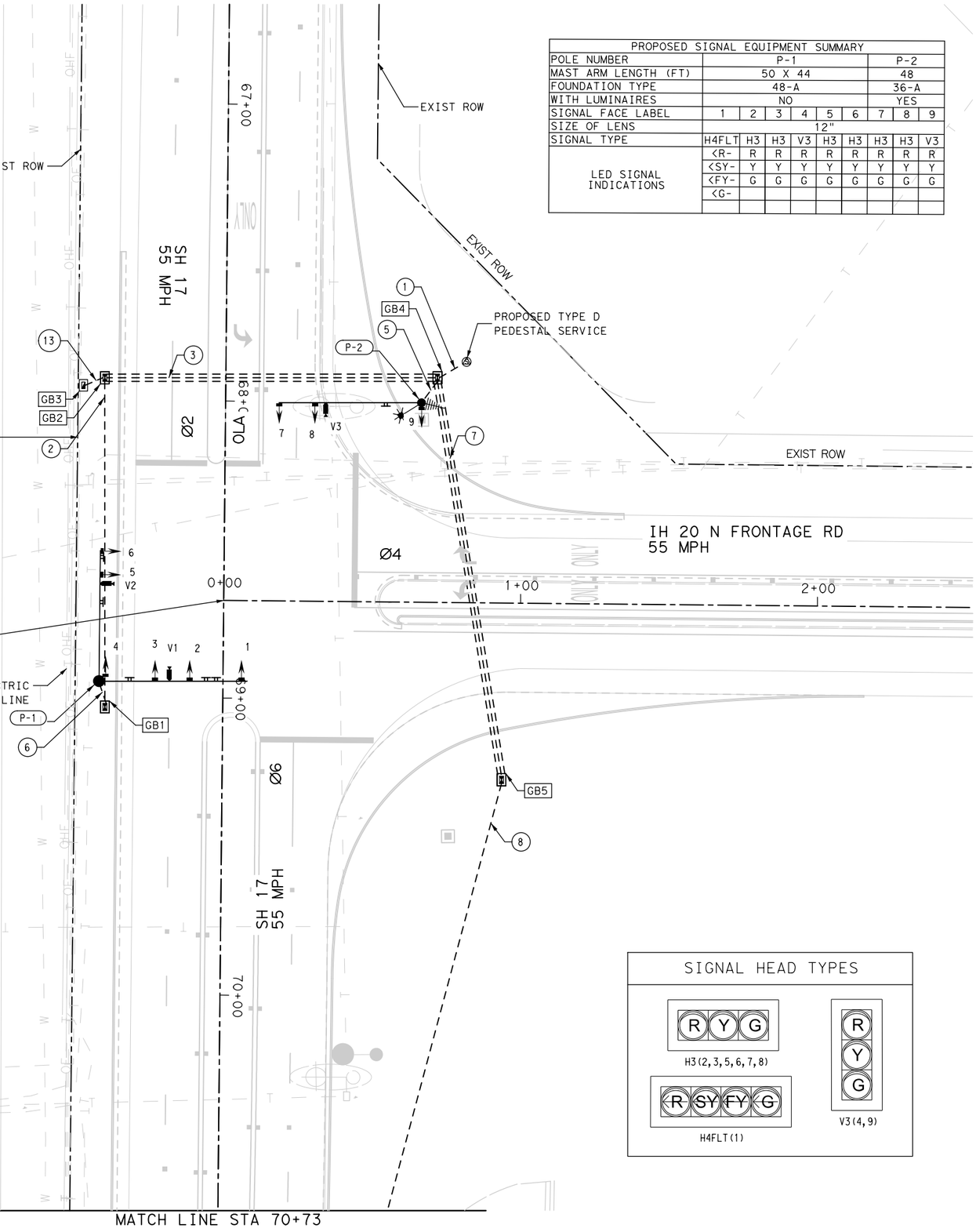
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	133
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				

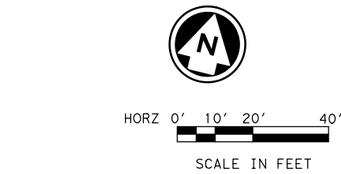




POLE LOCATION			
POLE	BASELINE	STATION	OFFSET (FT)
P-1	SH17	68+94.35	41.75 RT
P-2	SH17	68+00.01	66.00 LT

PROPOSED SIGNAL EQUIPMENT SUMMARY									
POLE NUMBER	P-1						P-2		
MAST ARM LENGTH (FT)	50 X 44						48		
FOUNDATION TYPE	48-A						36-A		
WITH LUMINAIRES	NO						YES		
SIGNAL FACE LABEL	1	2	3	4	5	6	7	8	9
SIZE OF LENS	12"								
SIGNAL TYPE	H4FLT	H3	H3	V3	H3	H3	H3	H3	V3
LED SIGNAL INDICATIONS	<R-	R	R	R	R	R	R	R	R
	<SY-	Y	Y	Y	Y	Y	Y	Y	Y
	<FY-	G	G	G	G	G	G	G	G
	<G-								





SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8' ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
- VIDEO PRESENCE DETECTOR
- ANTENNA/ETHERNET SYSTEM
- POLE MOUNTED SIGN
- MAST ARM MOUNTED SIGN
- SERVICE METER
- TYPE D GROUND BOX W/APRON
- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR MAKING HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
2. INSTALLATION AND/OR REMOVAL OF ANY STRUCTURE, FOUNDATION OR UNDERGROUND CABLE/CONDUIT LOCATED NEAR ANY OVERHEAD OF UNDERGROUND DISTRIBUTION LINES SHALL BE ACCOMPLISHED USING ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES. THE CONTRACTOR SHALL CONSULT WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING SUCH WORK.
3. THE VIDEO IMAGING AND RADAR VEHICLE DETECTIONS SYSTEM (VIRVDS) IS BEING PAID FOR AS ONE UNIT IN ACCORDANCE WITH ITEM 6083 AND INCLUDES BUT NOT LIMITED TO.
   6-CAMERAS
   1-PROCESSOR
   1-COLOR MONITOR
   COAXIAL CABLE
   SYSTEM SETUP
4. CONTRACTOR TO COORDINATE WITH TNMP, JONATHAN LOZANO, (915) 667-6146, Francisco.Lozano@tnmp.com FOR SERVICE AND CONSTRUCTION REQUIREMENTS.

SIGNAL HEAD TYPES

WSP USA Inc. TBPE #F-2263
PRASHANT PACHORE
121302
LICENSED PROFESSIONAL ENGINEER
03/30/2022
WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

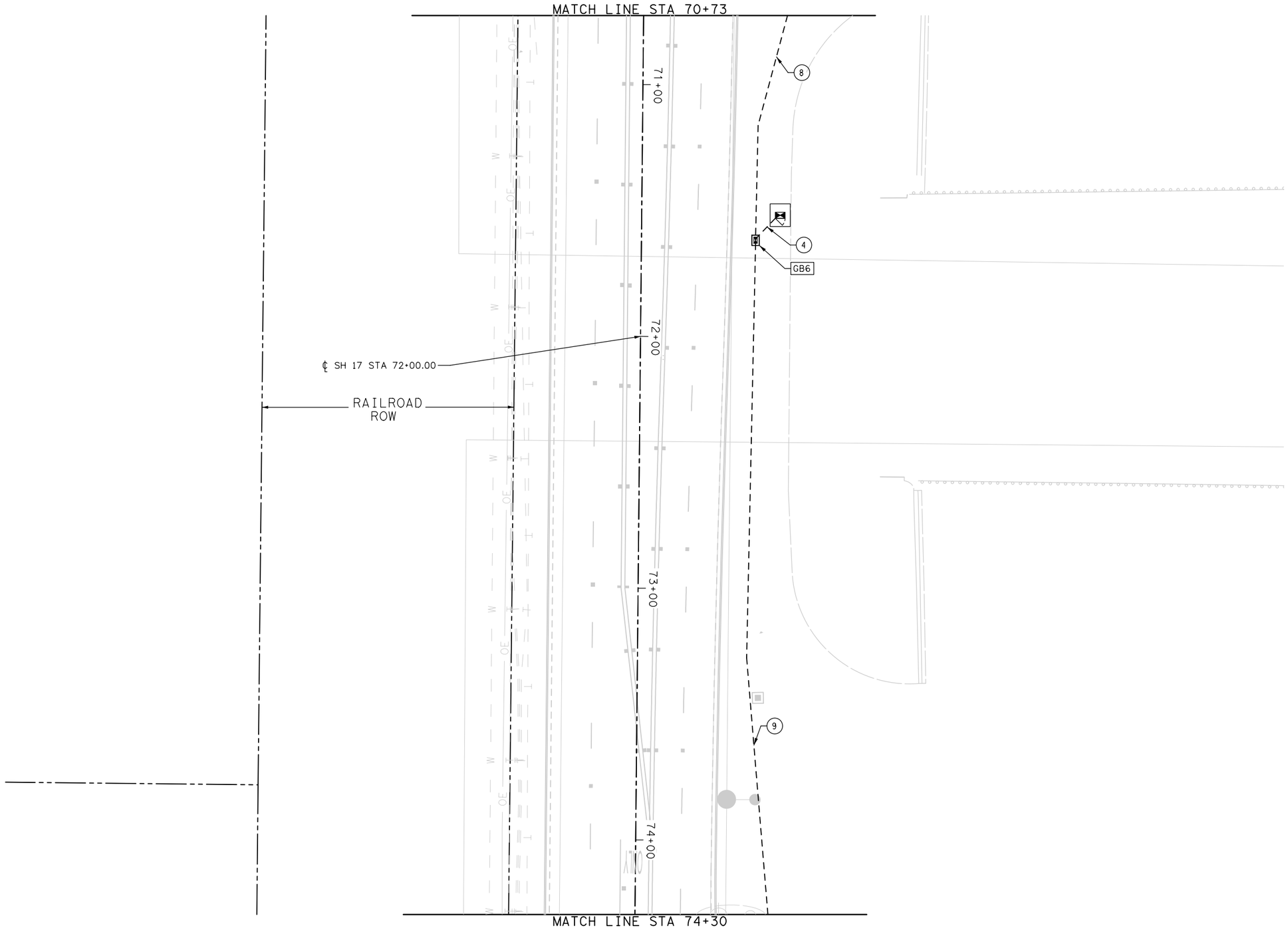
TRAFFIC SIGNAL PLAN

SH 17 AT IH 20 N FRONTAGE RD

SCALE: 1" = 40' SHEET 1 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)	IH20
GRAPHICS WSP	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK WSP	TEXAS	ODA	REEVES / 134
CHECK WSP	CONTROL	SECTION	JOB
	0003	07	064,ETC

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Sig



HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
- VIDEO PRESENCE DETECTOR
- ANTENNA/ETHERNET SYSTEM
- POLE MOUNTED SIGN
- MAST ARM MOUNTED SIGN
- SERVICE METER
- TYPE D GROUND BOX W/APRON
- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

WSP USA Inc. TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

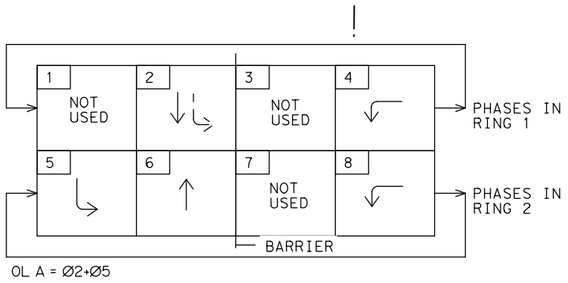
Texas Department of Transportation

TRAFFIC SIGNAL PLAN

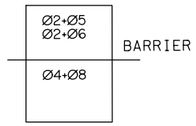
SH 17 STA 70+73 TO STA 74+30

SCALE: 1" = 40′ SHEET 2 OF 7

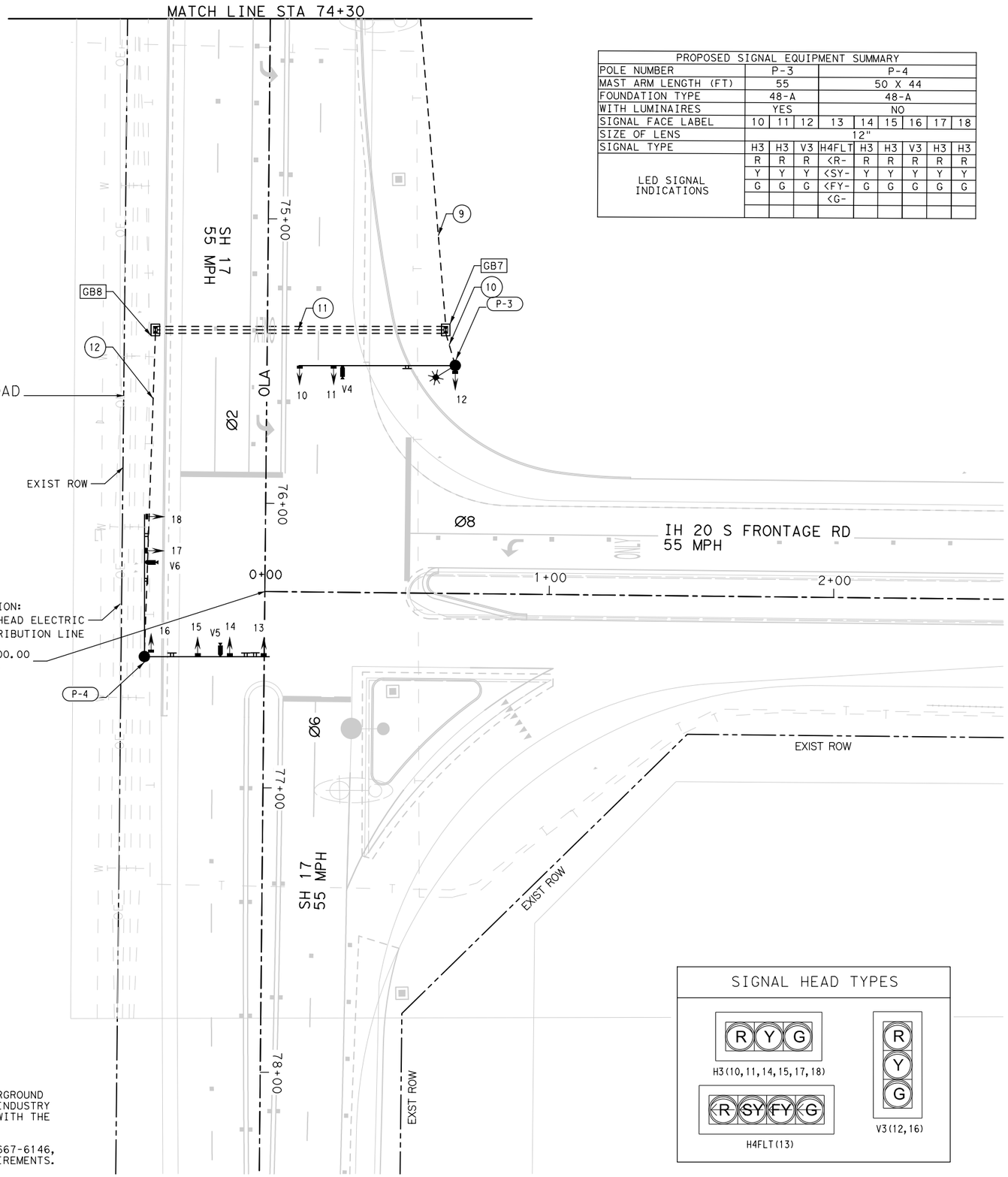
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS WSP	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK WSP	TEXAS	ODA	REEVES	135
CHECK WSP	CONTROL	SECTION	JOB	
	0003	07	064, ETC	



PHASE SEQUENCE



POLE LOCATION			
POLE	BASELINE	STATION	OFFSET (FT)
P-3	SH17	75+50.91	66.19 LT
P-4	SH17	76+54.26	42.10 RT



PROPOSED SIGNAL EQUIPMENT SUMMARY									
POLE NUMBER	P-3			P-4					
MAST ARM LENGTH (FT)	55			50 X 44					
FOUNDATION TYPE	48-A			48-A					
WITH LUMINAIRES	YES			NO					
SIGNAL FACE LABEL	10	11	12	13	14	15	16	17	18
SIZE OF LENS	12"								
SIGNAL TYPE	H3	H3	V3	H4FLT	H3	H3	V3	H3	H3
LED SIGNAL INDICATIONS	R	R	R	<R-	R	R	R	R	R
	Y	Y	Y	<SY-	Y	Y	Y	Y	Y
	G	G	G	<FY-	G	G	G	G	G
				<G-					

HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
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- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

SIGNAL HEAD TYPES

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR MAKING HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
2. INSTALLATION AND/OR REMOVAL OF ANY STRUCTURE, FOUNDATION OR UNDERGROUND CABLE/CONDUIT LOCATED NEAR ANY OVERHEAD OF UNDERGROUND DISTRIBUTION LINES SHALL BE ACCOMPLISHED USING ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES. THE CONTRACTOR SHALL CONSULT WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING SUCH WORK.
3. CONTRACTOR TO COORDINATE WITH TNMP, JONATHAN LOZANO, (915) 667-6146, Francisco.Lozano@tnmp.com FOR SERVICE AND CONSTRUCTION REQUIREMENTS.

WSP USA Inc. TBPE #F-2263
PRASHANT PACHORE 121392 LICENSED PROFESSIONAL ENGINEER 03/30/2022
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TBPE # F-2263

Texas Department of Transportation

TRAFFIC SIGNAL PLAN

SH 17 AT IH 20 S FRONTAGE RD

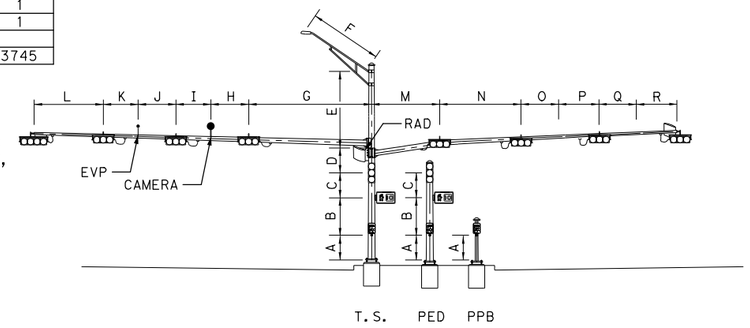
SCALE: 1" = 40′ SHEET 3 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	136
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Sig

ELECTRICAL SCHEDULE																
RUN NO.	CONDUIT (SCH 80)				LENGTH (FT)	GROUND	POWER	SIGNAL	PED SIGNAL	APS	ILL	DETECTION	ANTENNA	PULL STRING
	2"		3"			#6	1C#6	12C#14	5C#14	4C#10	3C#8 XHHW	VIRVDS	CABLE	
	T	B	T	B		BARE	AWG	AWG	AWG	AWG	TRAY			
1	1				10	1	2				1			1
2			1		110	1		1						1
	1				110	1						2		1
3				1	115	1	2	1						1
		1			115	1						2		1
4			1		15	1		1						1
			1		15	1		1						1
			1		15	1		2						1
	1				15	1	2							1
	1				15	1						6	1	1
5			1		15	1		1						1
	1				15	1					1			1
	1				15	1						1	1	1
6			1		5	1		1						1
	1				5	1						2		1
7				1	135	1		2						1
		1			135	1					1			1
		1			135	1	2							1
		1			135	1						3	1	1
8			1		245	1		2						1
	1				245	1					1			1
	1				245	1	2							1
	1				245	1						3	1	1
9			1		380	1		2						1
	1				380	1					1			1
	1				380	1						3		1
10			1		15	1		1						1
	1				15	1					1			1
	1				15	1						1		1
11				1	105	1		1						1
		1			105	1						2		1
12			1		115	1		1						1
	1				115	1						2		1
13	1				10	1	2							1
TOTALS(LF)	1835	625	930	355		3745	1060	2060			800	3300	410	3745

NOTES:
1. "T" = TRENCHED; "B" = BORED
2. TOTALS DO NOT INCLUDE QUANTITIES INSIDE THE SIGNAL POLE.
3. FOR QUANTITIES INSIDE SIGNAL POLE, SEE SIGNAL POLE/ARM CONDUCTOR QUANTITIES TABLE.
4. TRAFFIC SIGNAL CABLES INSIDE SIGNAL HEADS AND CONTROLLERS OR COILS IN GROUND BOXES AND POLE BASES ARE NOT PAID FOR DIRECTLY, BUT ARE SUBSIDIARY TO PERTINENT ITEMS. THIS IS IN ACCORDANCE WITH ITEM 684 TRAFFIC SIGNAL CABLES, SECTION 684.5 PAYMENT.
5. * TWO ADDITIONAL 3" CONDUITS INSTALLED FOR FUTURE USE



SIGNAL POLE/ARM CONDUCTOR QUANTITIES(LF)																				SIGNAL HEADS	PED HEADS	APS	VIRVDS	ILL
POLE	TYPE	LENGTH (FT)																						3C#8
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	7C#14	5C#14	4C#10	CABLE	TRAY
P-1	5044-80	4	6	4	4			20	5	7	18			32	4	8				308			93	
P-2	48L-80	4	6	4	4	12	8	32	4	12										138			50	38
P-3	55L-80	4	6	4	4	12	8	40	3	12										152			76	38
P-4	5044-80	4	6	4	4			34	4	12				18	8	4	12			286			96	
																		TOTALS (LF)		884			315	76

ELECTRICAL SERVICE DATA											
Elec. Service ID	Plan Sheet	Electrical Service Description	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amp	Two-Pole Contactor Amps	Panel bd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
TS4 (SH 17)	1	ELC SRV TY D 120/240 060(NS)SS(E)PS(U)	2"	3/#2	N/A	2P/60	2P/ 30	100	Signal	1P/50	40	9.6
									Lighting	2P/30	20	

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TBPE # F-2263

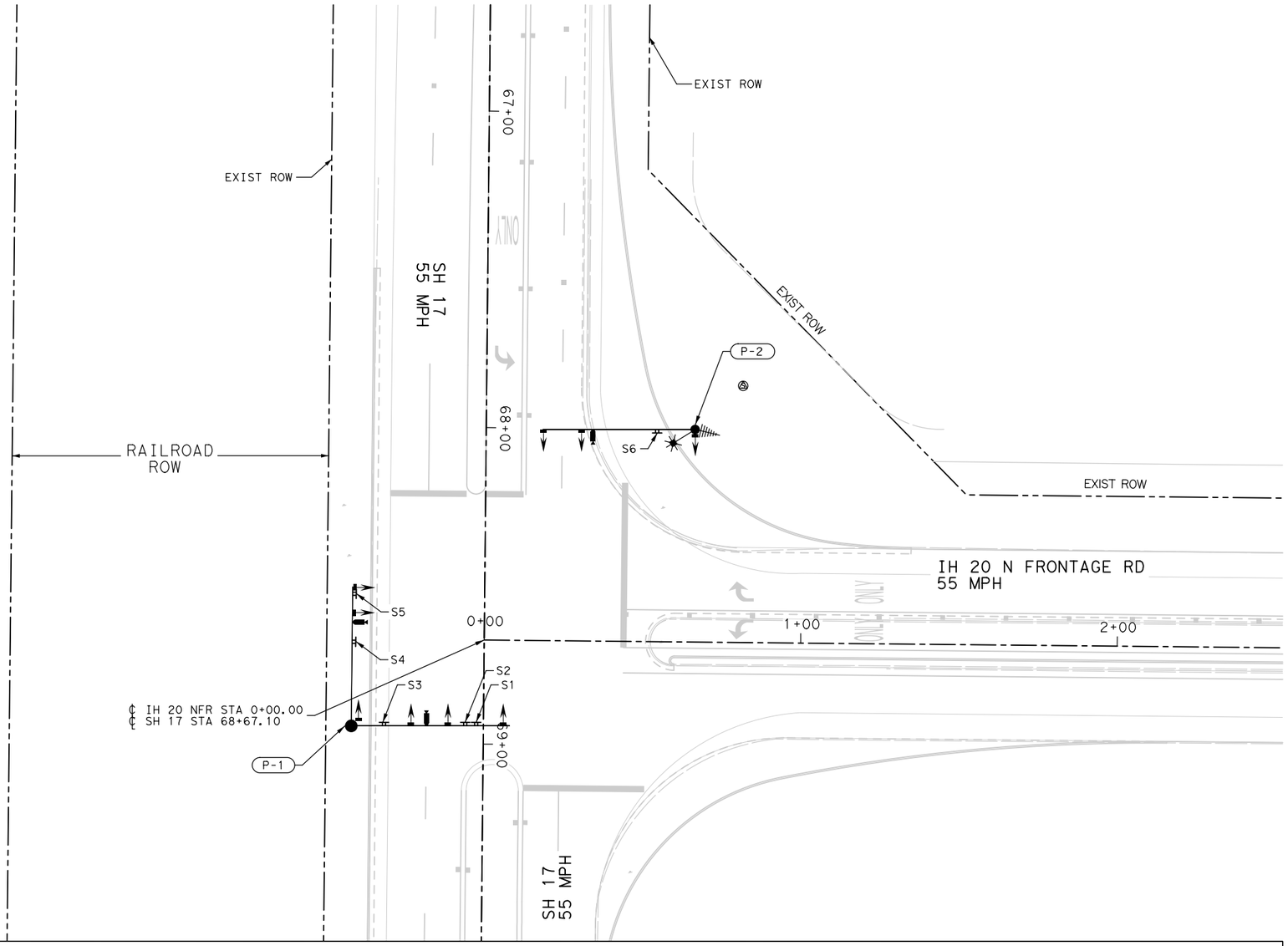
Texas Department of Transportation

TRAFFIC SIGNAL SUMMARY

SH 17 AT IH 20 FRONTAGE RD

SHEET 4 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	137
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				



HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
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- TYPE D GROUND BOX
- TYPE A GROUND BOX
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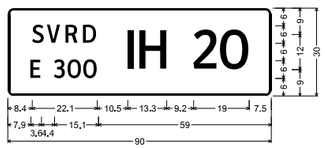
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

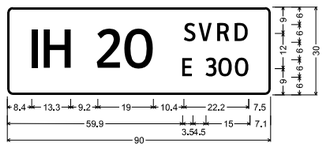
PROPOSED SMALL SIGNS (CONTRACTOR SUPPLIED)

S3



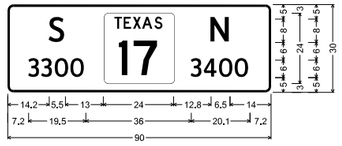
1.9" Radius, 0.8" Border, White on, Green;
"SVRD", ClearviewHwy-3-W;
"E 300", ClearviewHwy-3-W 50% spacing;
"IH 20", ClearviewHwy-3-W 50% spacing;

S6



1.9" Radius, 0.8" Border, White on, Green;
"IH 20", ClearviewHwy-3-W 50% spacing;
"SVRD", ClearviewHwy-3-W;
"E 300", ClearviewHwy-3-W 50% spacing;

S4



1.9" Radius, 0.8" Border, White on, Green;
"S", ClearviewHwy-3-W;
"3300", ClearviewHwy-3-W 50% spacing;
State Highway 17 M1-6T2: "N", ClearviewHwy-3-W;
"3400", ClearviewHwy-3-W 50% spacing;

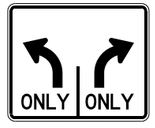
S1

R10-17T
30"X36"

S2

R3-5L
30"x36"

S5



R3-8LR
36"x30"

NOTE: CONTRACTOR TO VERIFY BLOCK NUMBERS WITH TXDOT PRIOR TO FABRICATION OF SIGN PANELS

WSP USA Inc. TBPE #F-2263

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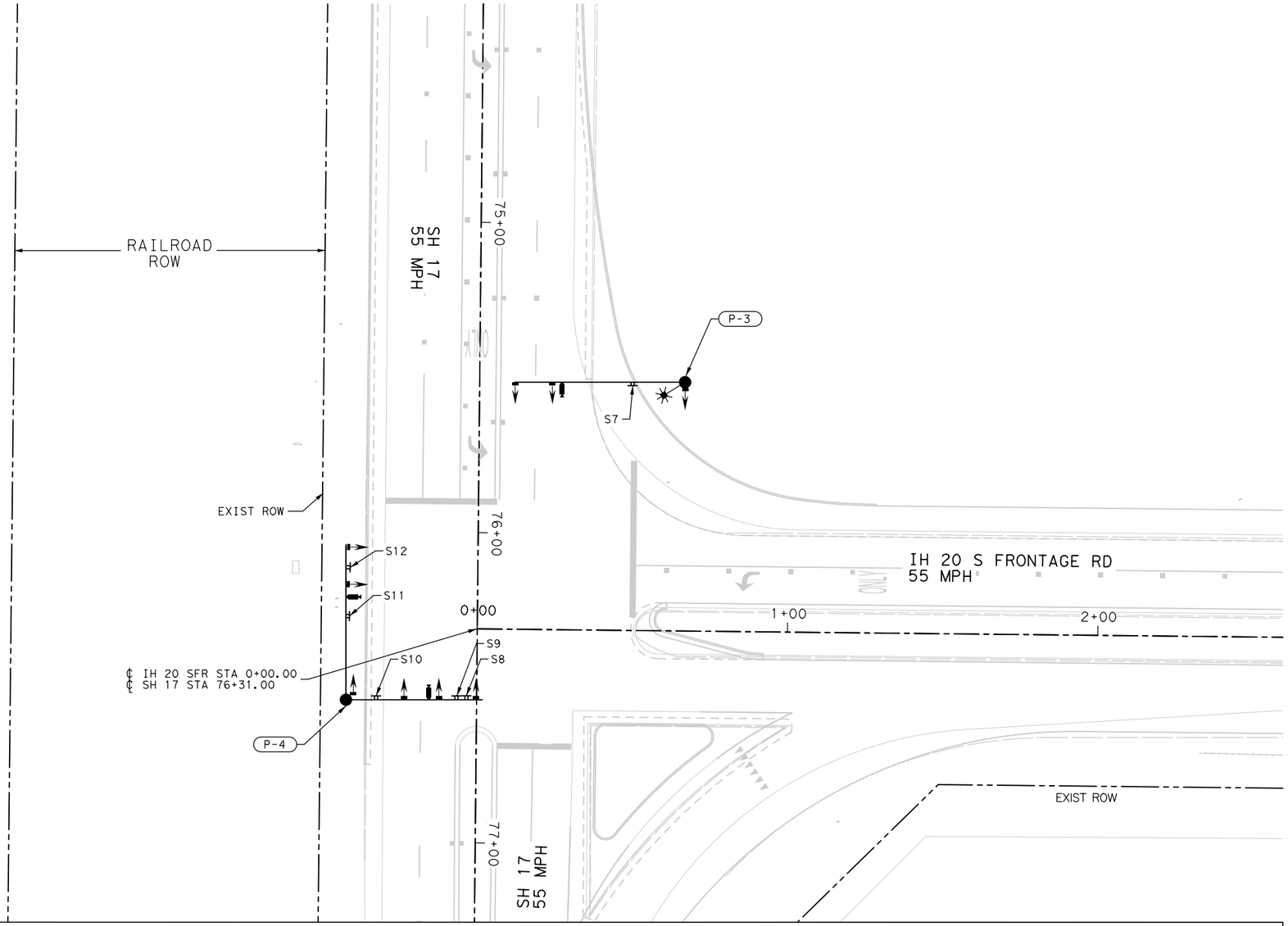
Texas Department of Transportation

SIGNAL POLE/ MAST ARM SIGNS

SH 17 AT IH 20 N FRONTAGE RD

SCALE: 1" = 40′ SHEET 5 OF 7

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	138
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	
CHECK				



HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
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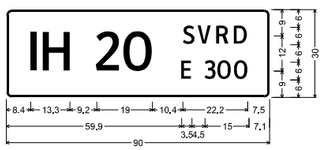
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

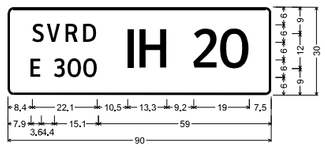
PROPOSED SMALL SIGNS (CONTRACTOR SUPPLIED)

S7



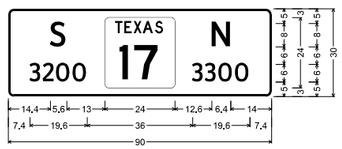
1,9" Radius, 0,8" Border, White on, Green;
"IH 20", ClearviewHwy-3-W 50% spacing;
"SVRD", ClearviewHwy-3-W;
"E 300", ClearviewHwy-3-W 50% spacing;

S10



1,9" Radius, 0,8" Border, White on, Green;
"SVRD", ClearviewHwy-3-W;
"E 300", ClearviewHwy-3-W 50% spacing;
"IH 20", ClearviewHwy-3-W 50% spacing;

S11



1,9" Radius, 0,8" Border, White on, Green;
"S", ClearviewHwy-3-W;
"3200", ClearviewHwy-3-W 50% spacing;
State Highway 17 M1-6T2: "N", ClearviewHwy-3-W;
"3300", ClearviewHwy-3-W 50% spacing;

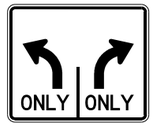
S8

R10-17T
30"X36"

S9

R3-5L
30"x36"

S12



R3-8LR
36"x30"

NOTE: CONTRACTOR TO VERIFY BLOCK NUMBERS WITH TXDOT PRIOR TO FABRICATION OF SIGN PANELS

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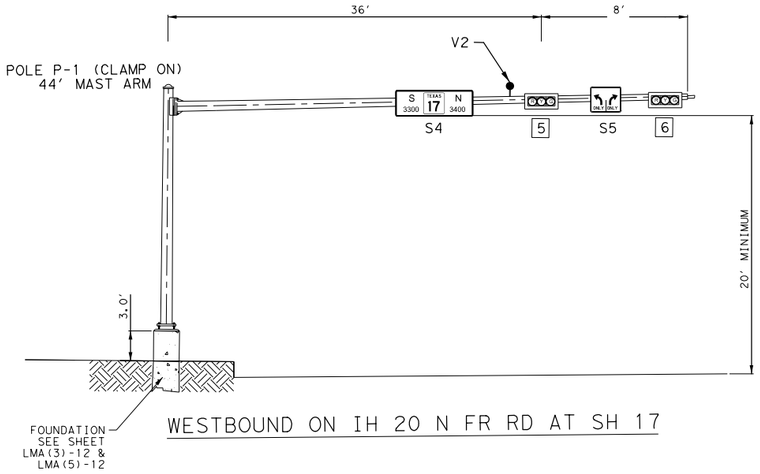
SIGNAL POLE/ MAST ARM SIGNS

SH 17 AT IH 20 S FRONTAGE RD

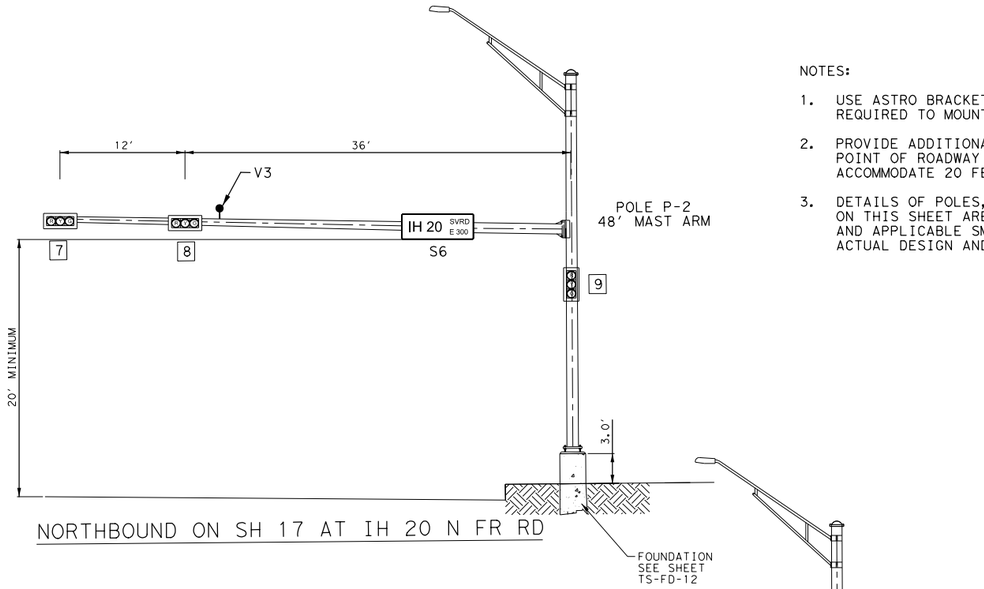
SCALE: 1" = 40′ SHEET 6 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)	IH20
GRAPHICS	STATE	DISTRICT	COUNTY
WSP	TEXAS	ODA	REEVES
CHECK	CONTROL	SECTION	JOB
WSP	0003	07	064,ETC
CHECK			SHEET NO.
WSP			139

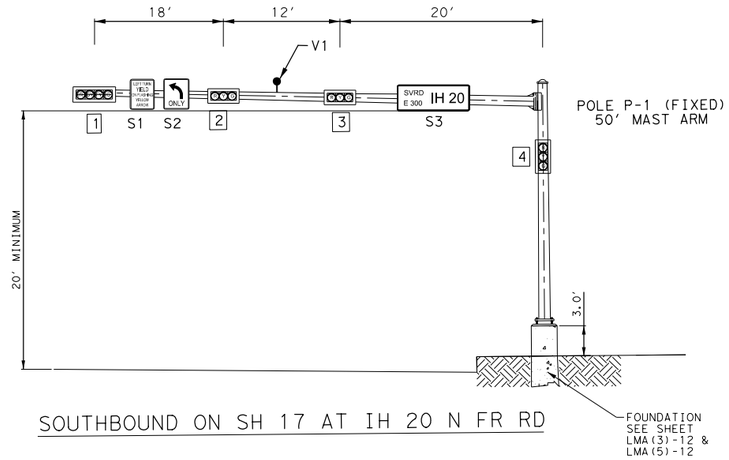
DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017X17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Sign



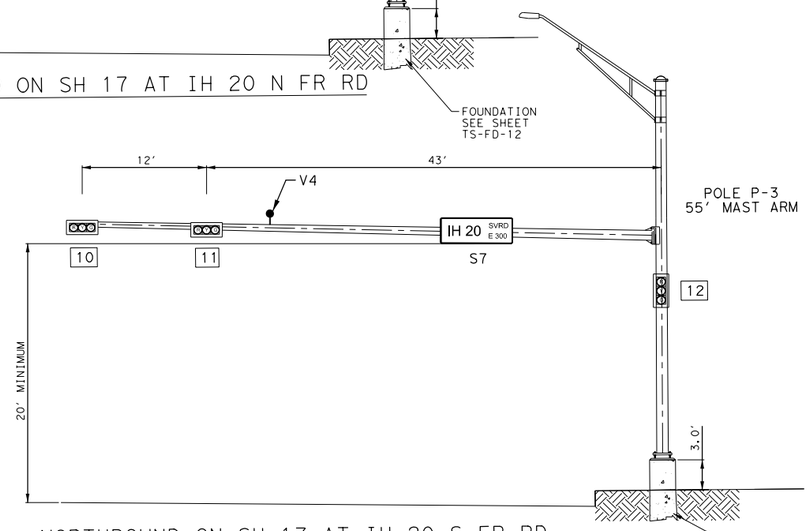
WESTBOUND ON IH 20 N FR RD AT SH 17



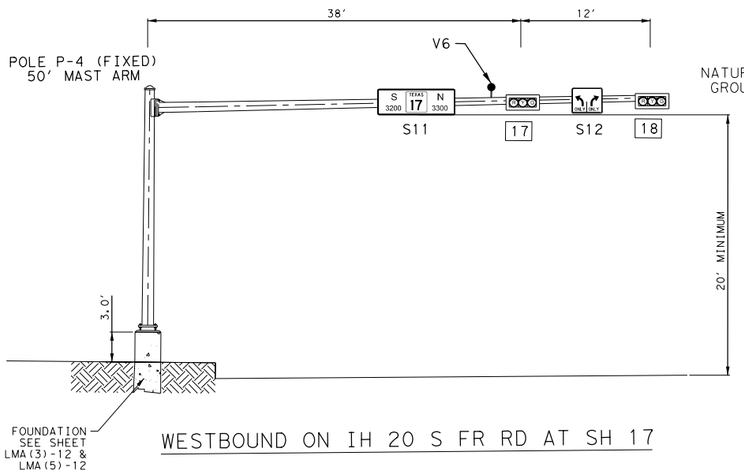
NORTHBOUND ON SH 17 AT IH 20 N FR RD



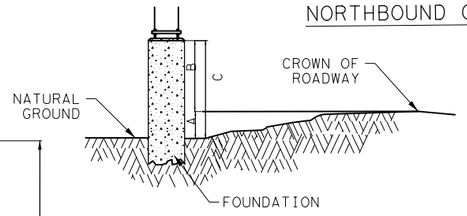
SOUTHBOUND ON SH 17 AT IH 20 N FR RD



NORTHBOUND ON SH 17 AT IH 20 S FR RD



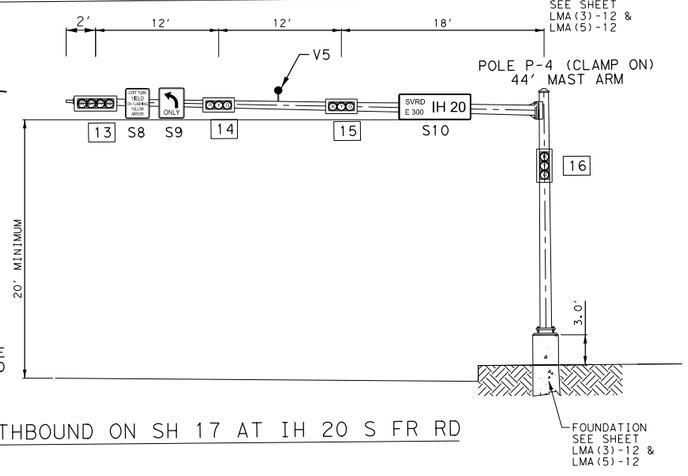
WESTBOUND ON IH 20 S FR RD AT SH 17



TRAFFIC SIGNAL POLE FOUNDATION DETAIL

	A	B	C (*)
POLE P-1	0.5	2.5	3.0
POLE P-2	0.5	2.5	3.0
POLE P-3	0.5	2.5	3.0
POLE P-4	0.5	2.5	3.0

(*) - CONTRACTOR TO ADJUST FOUNDATION ABOVE GROUND BASED ON FIELD CONDITIONS TO MEET 20 FEET CLERANCE REQUIREMENT



SOUTHBOUND ON SH 17 AT IH 20 S FR RD

NOTES:

1. USE ASTRO BRACKET ASSEMBLY OR APPROVED EQUAL SHALL BE REQUIRED TO MOUNT SIGNS AND SIGNAL HEADS.
2. PROVIDE ADDITIONAL REQUIRED DRILLED SHAFT ABOVE THE HIGHEST POINT OF ROADWAY UNDERNEATH THE SIGNAL MAST ARM TO ACCOMMODATE 20 FEET OF VERTICAL CLEARANCE.
3. DETAILS OF POLES, SIGNAL HEADS AND MOUNTING BRACKETS SHOWN ON THIS SHEET ARE EXAMPLES ONLY. SEE SIGNAL LAYOUT SHEET(S) AND APPLICABLE SMA-80, LMA-80, MA-C OR MA-D STANDARDS FOR THE ACTUAL DESIGN AND CONSTRUCTION OF MAST ARM POLES.

WSP USA Inc. TBPE #F-2263
STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

SIGNAL POLE DETAIL

SH 17 AT IH 20 FRONTAGE RD

SHEET 7 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	140
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				

OL A = Ø2, OL B = Ø6

PHASE SEQUENCE

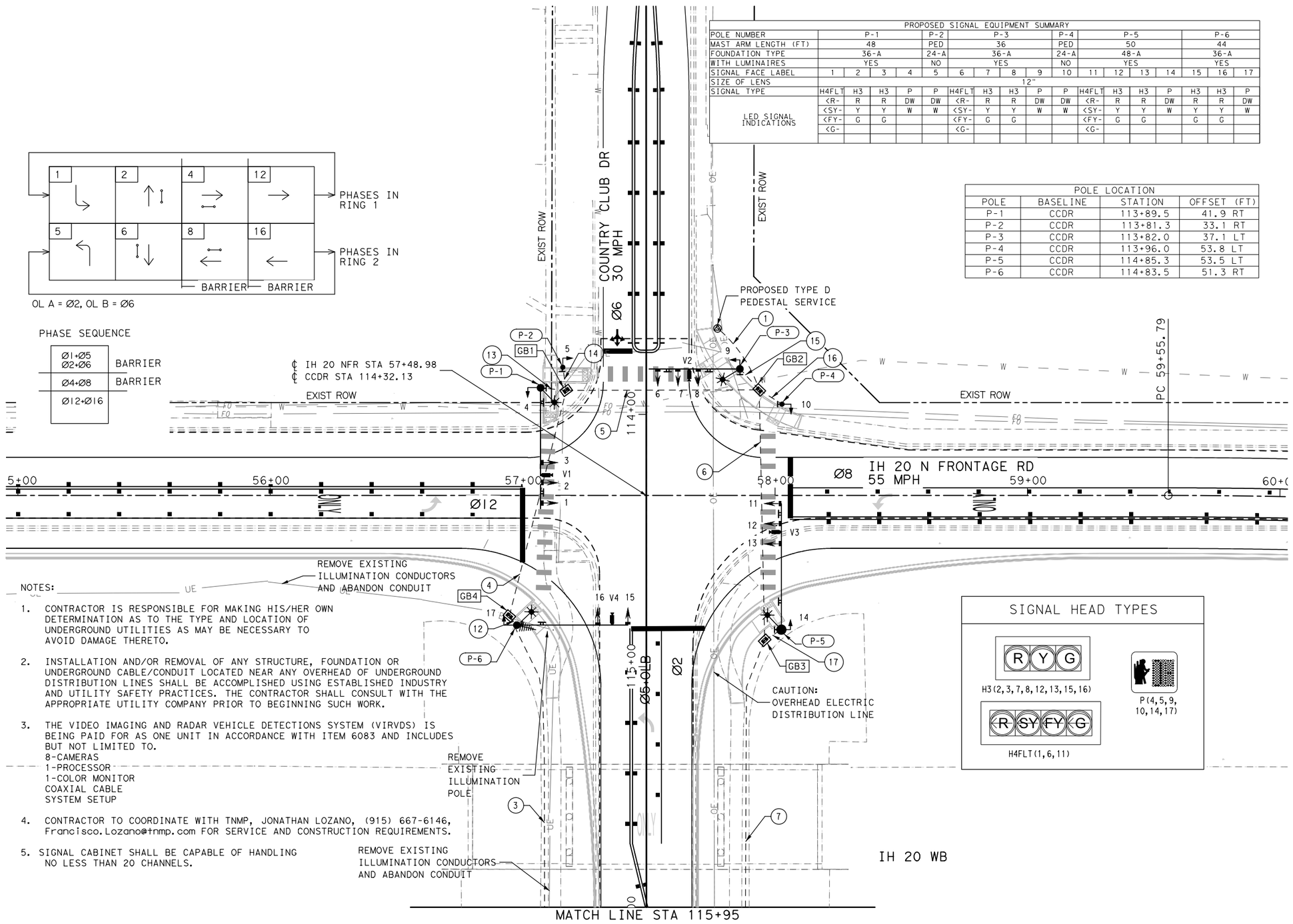
Ø1+Ø5 Ø2+Ø6	BARRIER
Ø4+Ø8	BARRIER
Ø12+Ø16	

PROPOSED SIGNAL EQUIPMENT SUMMARY

POLE NUMBER	P-1				P-2	P-3				P-4	P-5				P-6		
MAST ARM LENGTH (FT)	48				PED	36				PED	50				44		
FOUNDATION TYPE	36-A				24-A	36-A				24-A	48-A				36-A		
WITH LUMINAIRES	YES				NO	YES				NO	YES				YES		
SIGNAL FACE LABEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SIZE OF LENS	12"																
SIGNAL TYPE	H4FLT	H3	H3	P	P	H4FLT	H3	H3	P	P	H4FLT	H3	H3	P	H3	H3	P
LED SIGNAL INDICATIONS	<R-	R	R	DW	DW	<R-	R	R	DW	DW	<R-	R	R	DW	R	R	DW
	<SY-	Y	Y	W	W	<SY-	Y	Y	W	W	<SY-	Y	Y	W	Y	Y	W
	<FY-	G	G			<FY-	G	G			<FY-	G	G		G	G	
	<G-					<G-					<G-						

POLE LOCATION

POLE	BASELINE	STATION	OFFSET (FT)
P-1	CCDR	113+89.5	41.9 RT
P-2	CCDR	113+81.3	33.1 RT
P-3	CCDR	113+82.0	37.1 LT
P-4	CCDR	113+96.0	53.8 LT
P-5	CCDR	114+85.3	53.5 LT
P-6	CCDR	114+83.5	51.3 RT



NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR MAKING HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
2. INSTALLATION AND/OR REMOVAL OF ANY STRUCTURE, FOUNDATION OR UNDERGROUND CABLE/CONDUIT LOCATED NEAR ANY OVERHEAD OF UNDERGROUND DISTRIBUTION LINES SHALL BE ACCOMPLISHED USING ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES. THE CONTRACTOR SHALL CONSULT WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING SUCH WORK.
3. THE VIDEO IMAGING AND RADAR VEHICLE DETECTIONS SYSTEM (VIRVDS) IS BEING PAID FOR AS ONE UNIT IN ACCORDANCE WITH ITEM 6083 AND INCLUDES BUT NOT LIMITED TO.
   8-CAMERAS
   1-PROCESSOR
   1-COLOR MONITOR
   COAXIAL CABLE
   SYSTEM SETUP
4. CONTRACTOR TO COORDINATE WITH TNMP, JONATHAN LOZANO, (915) 667-6146, Francisco.Lozano@tnmp.com FOR SERVICE AND CONSTRUCTION REQUIREMENTS.
5. SIGNAL CABINET SHALL BE CAPABLE OF HANDLING NO LESS THAN 20 CHANNELS.

SIGNAL HEAD TYPES

HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
- VIDEO PRESENCE DETECTOR
- ANTENNA/ETHERNET SYSTEM
- POLE MOUNTED SIGN
- MAST ARM MOUNTED SIGN
- SERVICE METER
- TYPE D GROUND BOX W/APRON
- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

WSP USA Inc. TBPE #F-2263
PRASHANT PACHORE 121392 LICENSED PROFESSIONAL ENGINEER 06/30/2022
WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

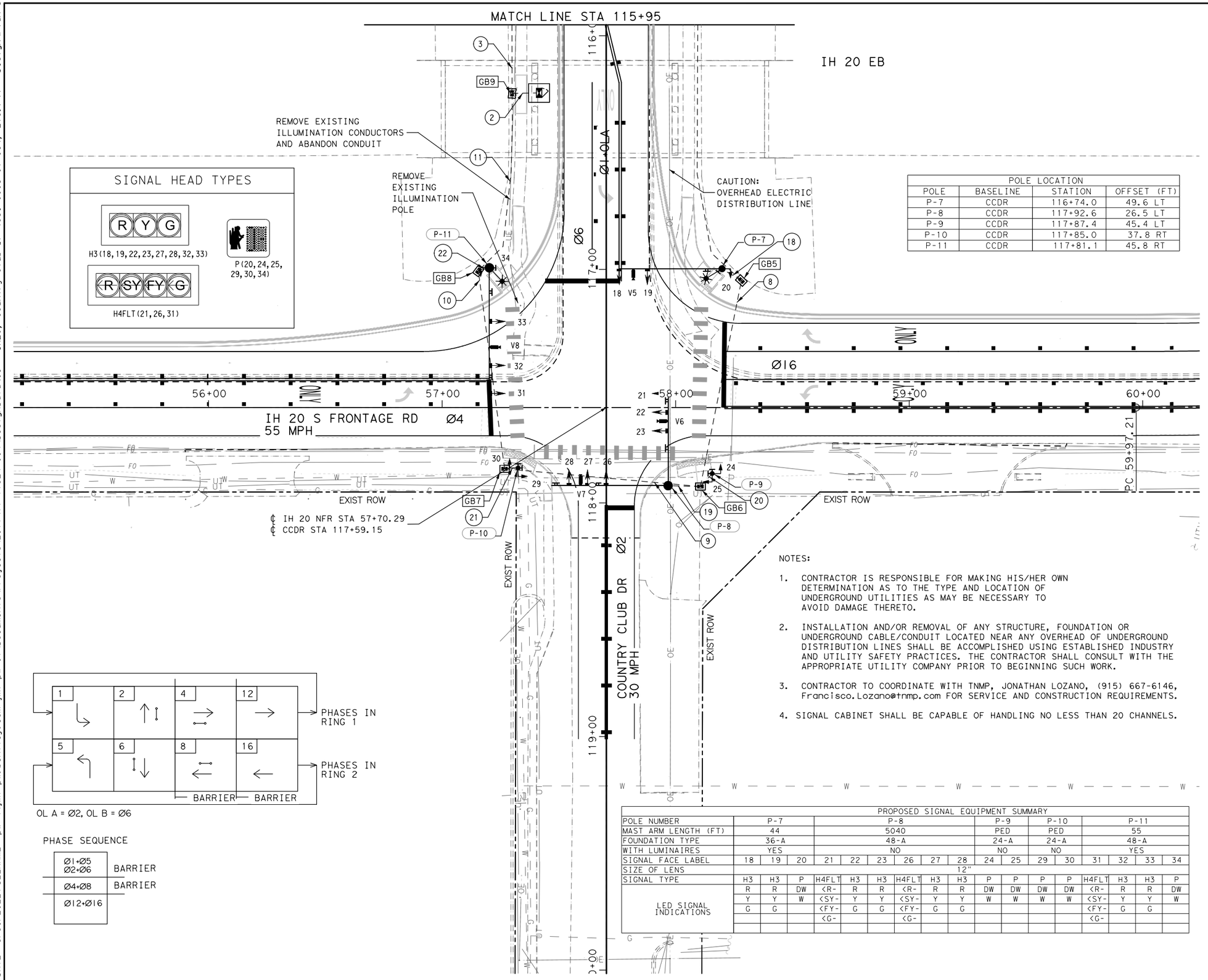
TRAFFIC SIGNAL PLAN

COUNTRY CLUB DR AT IH 20 N FRONTAGE RD

SCALE: 1" = 40′ SHEET 1 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	141
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	
CHECK				
WSP				

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8



POLE LOCATION			
POLE	BASELINE	STATION	OFFSET (FT)
P-7	CCDR	116+74.0	49.6 LT
P-8	CCDR	117+92.6	26.5 LT
P-9	CCDR	117+87.4	45.4 LT
P-10	CCDR	117+85.0	37.8 RT
P-11	CCDR	117+81.1	45.8 RT

HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
- VIDEO PRESENCE DETECTOR
- ANTENNA/ETHERNET SYSTEM
- POLE MOUNTED SIGN
- MAST ARM MOUNTED SIGN
- SERVICE METER
- TYPE D GROUND BOX W/APRON
- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR MAKING HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.
2. INSTALLATION AND/OR REMOVAL OF ANY STRUCTURE, FOUNDATION OR UNDERGROUND CABLE/CONDUIT LOCATED NEAR ANY OVERHEAD OF UNDERGROUND DISTRIBUTION LINES SHALL BE ACCOMPLISHED USING ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES. THE CONTRACTOR SHALL CONSULT WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING SUCH WORK.
3. CONTRACTOR TO COORDINATE WITH TNMP, JONATHAN LOZANO, (915) 667-6146, Francisco.Lozano@tnmp.com FOR SERVICE AND CONSTRUCTION REQUIREMENTS.
4. SIGNAL CABINET SHALL BE CAPABLE OF HANDLING NO LESS THAN 20 CHANNELS.

Ø1 A = Ø2, Ø1 B = Ø6

PHASE SEQUENCE

Ø1+Ø5 Ø2+Ø6	BARRIER
Ø4+Ø8	BARRIER
Ø12+Ø16	

PROPOSED SIGNAL EQUIPMENT SUMMARY																		
POLE NUMBER	P-7			P-8						P-9		P-10		P-11				
MAST ARM LENGTH (FT)	44			5040						PED		PED		55				
FOUNDATION TYPE	36-A			48-A						24-A		24-A		48-A				
WITH LUMINAIRES	YES			NO						NO		NO		YES				
SIGNAL FACE LABEL	18	19	20	21	22	23	26	27	28	24	25	29	30	31	32	33	34	
SIZE OF LENS	12"																	
SIGNAL TYPE	H3	H3	P	H4FLT	H3	H3	H4FLT	H3	H3	P	P	P	P	H4FLT	H3	H3	P	
LED SIGNAL INDICATIONS	R	R	DW	<R-	R	R	<R-	R	R	DW	DW	DW	DW	<R-	R	R	DW	
	Y	Y	W	<SY-	Y	Y	<SY-	Y	Y	W	W	W	W	<SY-	Y	Y	W	
	G	G		<FY-	G	G	<FY-	G	G					<FY-	G	G		
				<G-			<G-							<G-				

WSP USA Inc. TBPE #F-2263
PRASHANT PACHORE 121392 LICENSED PROFESSIONAL ENGINEER 03/30/2022
WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

TRAFFIC SIGNAL PLAN

COUNTRY CLUB DR AT IH 20 S FRONTAGE RD

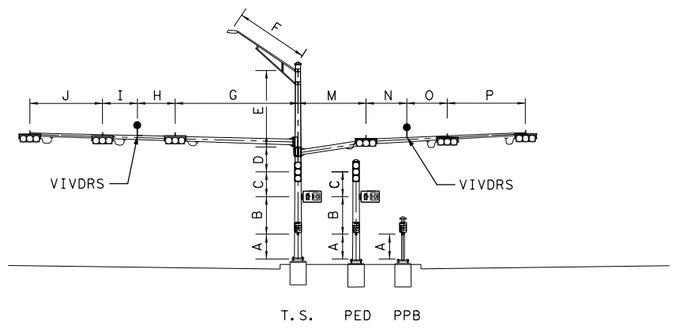
SCALE: 1" = 40′ SHEET 2 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)	IH20
GRAPHICS	STATE	DISTRICT	COUNTY
WSP	TEXAS	ODA	REEVES
CHECK	CONTROL	SECTION	JOB
WSP	0003	07	064,ETC
CHECK			SHEET NO.
WSP			142

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8

ELECTRICAL SCHEDULE																
RUN NO.	CONDUIT (SCH 80)				LENGTH (FT)	GROUND	POWER	SIGNAL	PED SIGNAL	APS	ILL	DETECTION	ANTENNA	PULL STRING
	2"		3"			#6	1C#6	12C#14	5C#14	4C#10	3C#8 XHHW	VIRVDS	CABLE	
	T	B	T	B		BARE	AWG	AWG	AWG	AWG	TRAY			
1	1				24	1					8			1
			1		24	1	2							1
2*	1				12	1	2							1
			1		12	1		8						1
			1		12	1			12					1
			1		12	1				12		8	1	1
3	1				147	1	2							1
			1		147	1		4	6					1
			1		147	1				6		4	1	1
4		1			92	1	2							1
		1			92	1				5		3		1
	1				92	1					1			1
				1	92	1		3	5					1
5		1			73	1	2							1
		1			73	1				3				1
	1				73	1					2			1
				1	73	1		2	3			2		1
6		1			102	1			1	1		1		1
	1				102	1					5			1
				1	102	1		1	1					1
7	1				221	1					4			1
			1		221	1								1
8		1			95	1			1	1		1		1
	1				95	1					3			1
				1	95	1		1	1					1
9		1			90	1				3		3		1
	1				90	1					2			1
				1	90	1		2	3					1
10		1			90	1				5		3		1
	1				90	1					1			1
				1	90	1		2	5					1
11	1				79	1				6		4		1
			1		79	1		3	6					1
12	1				10	1					1			1
			1		10	1		1	1	1		1	1	1
13	1				10	1					1			1
			1		10	1		1	1	1		1		1
14	1				10	1			1	1				1
15	1				10	1					1			1
			1		10	1		1	1	1		1		1
16	1				14	1			1	1				1
17	1				10	1					1			1
			1		10	1		1	1	1		1		1
18	1				10	1					1			1
			1		10	1		1	1	1		1		1
19	1				15	1					1			1
	1				15	1		1				2		1
20			1		10	1			2	2				1
21	1				10	1			2	2				1
22	1				10	1					1			1
			1		10	1		1	1	1		1		1
TOTALS(LF)	1125	707	724	542		3098	696	1975	3417	3220	2262	2249	169	3098

NOTES:
1. "T" = TRENCHED; "B" = BORED
2. TOTALS DO NOT INCLUDE QUANTITIES INSIDE THE SIGNAL POLE.
3. FOR QUANTITIES INSIDE SIGNAL POLE, SEE SIGNAL POLE/ARM CONDUCTOR QUANTITIES TABLE.
4. TRAFFIC SIGNAL CABLES INSIDE SIGNAL HEADS AND CONTROLLERS OR COILS IN GROUND BOXES AND POLE BASES ARE NOT PAID FOR DIRECTLY, BUT ARE SUBSIDIARY TO PERTINENT ITEMS. THIS IS IN ACCORDANCE WITH ITEM 684 TRAFFIC SIGNAL CABLES, SECTION 684.5 PAYMENT.
5. * TWO ADDITIONAL 3" CONDUITS INSTALLED FOR FUTURE USE



SIGNAL POLE/ARM CONDUCTOR QUANTITIES(LF)																							
POLE	TYPE	LENGTH (FT)																		SIGNAL HEADS	PED HEADS	APS	ANTENNA	VIRVDS	ILL
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	7C#14	5C#14	4C#10	CABLE	CABLE	3C#8 TRAY
P-1	48L-80	4	6	4	4	12	8	30	4	4	8									186	10	4		72	38
P-2	PED	4	6																		10	4			
P-3	36L-80	4	6	4	4	12	8	17	4	4	8									129	10	4		59	38
P-4	PED	4	6																		10	4			
P-5	50L-80	4	6	4	4	12	8	34	4	4	8									198	10	4		76	38
P-6	44L-80	4	6	4	4	12	8	32	6	6										112	10	4	18	76	38
P-7	44L-80	4	6	4	4	12	8	32	6	6										148	10	4		76	38
P-8	5040-80	4	6	4	4	12	8	26	4	4	8			23	4	4	8			135				61	38
P-9	PED	4	6																		10	4			
P-10	PED	4	6																		10	4		60	38
P-11	55L-80	4	6	4	4	12	8	23	10	8	12									171	10	4		71	38
																		TOTALS (LF)		1100	100	40	18	498	228

ELECTRICAL SERVICE DATA												
Elec. Service ID	Plan Sheet	Electrical Service Description	Service Conduit Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contactor Amps	Panel bd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
TS1 (CCDR)	1	ELC SRV TY D 120/240 060 (NS)SS(E)SP(U)	2"	3/#6	N/A	2P/60	2P/ 30	100	SIGNAL	1P/50	40	9.6
									LIGHTING	2P/30	20	

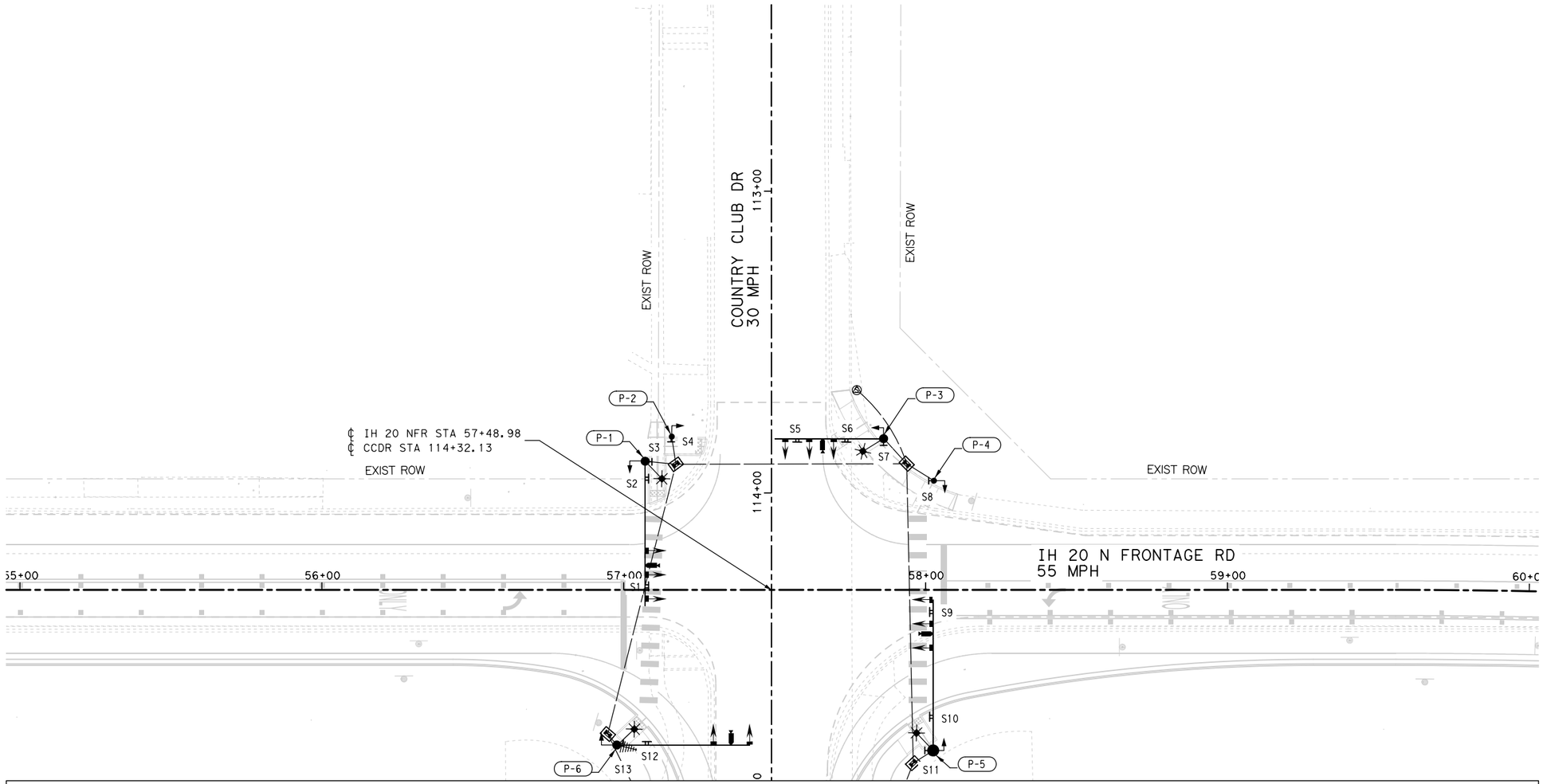
WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

TRAFFIC SIGNAL SUMMARY

SHEET 3 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	143
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				



HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

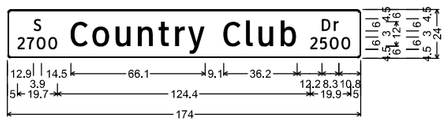
SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
- VIDEO PRESENCE DETECTOR
- ANTENNA/ETHERNET SYSTEM
- POLE MOUNTED SIGN
- MAST ARM MOUNTED SIGN
- SERVICE METER
- TYPE D GROUND BOX W/APRON
- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

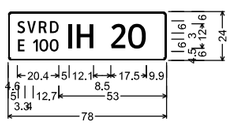
PROPOSED SMALL SIGNS (CONTRACTOR SUPPLIED)

S2



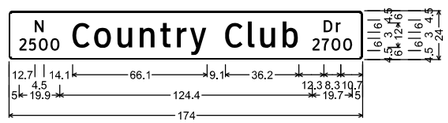
D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"S", ClearviewHwy-3-W; "2700", ClearviewHwy-3-W;
"Country Club", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;
"2500", ClearviewHwy-3-W;

S6



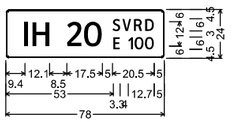
D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"SVRD", ClearviewHwy-3-W;
"E 100", ClearviewHwy-3-W 50% spacing;
"IH 20", ClearviewHwy-3-W 50% spacing;

S10



D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"N", ClearviewHwy-3-W; "2500", ClearviewHwy-3-W;
"Country Club", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;
"2700", ClearviewHwy-3-W;

S12



D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"IH 20", ClearviewHwy-3-W 50% spacing;
"SVRD", ClearviewHwy-3-W;
"E 100", ClearviewHwy-3-W 50% spacing;

S1, S5, S9

R10-17T
30"X36"

S3, S7, S11

R10-3eL
(9x15)

S4, S8, S13

R10-3eR
(9x15)

NOTE: CONTRACTOR TO VERIFY BLOCK NUMBERS WITH TXDOT PRIOR TO FABRICATION OF SIGN PANELS.

WSP USA Inc. TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED
PROFESSIONAL ENGINEER
05/30/2022

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

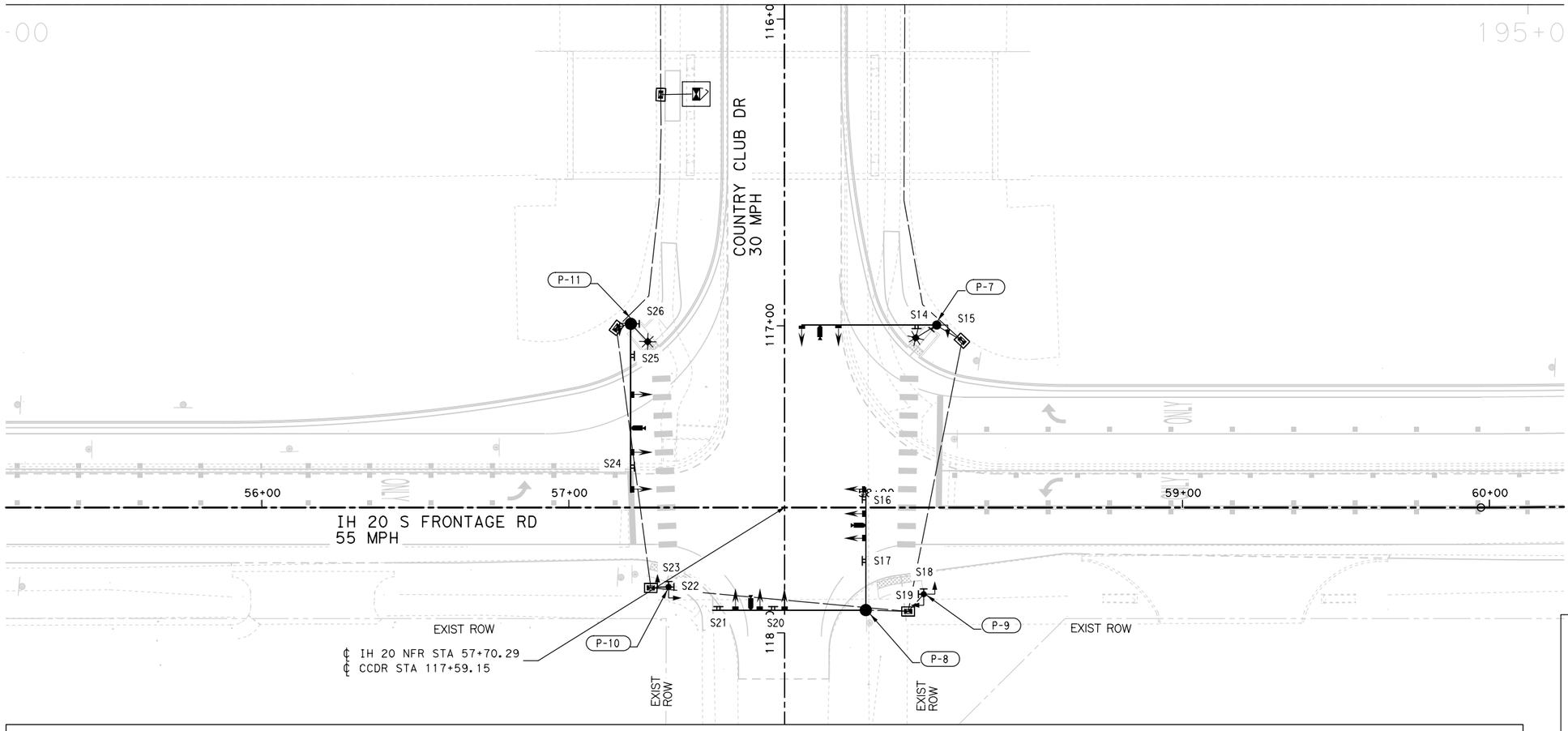
Texas Department of Transportation

SIGNAL POLE/ MAST ARM SIGNS

COUNTRY CLUB DR AT IH 20 N FRONTAGE RD

SCALE: 1" = 40′ SHEET 4 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	144
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	



HORZ 0′ 10′ 20′ 40′

SCALE IN FEET

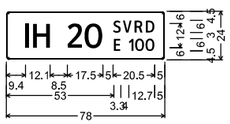
SIGNAL LEGEND

PROPOSED EQUIPMENT

- POLE AND MAST ARM
- PEDESTAL POLE
- 8′ ARM WITH LED LUMINAIRE
- LED PEDESTRIAN SIGNAL HEAD
- 12" LED SIGNAL HEAD (HOR)
- 12" LED SIGNAL HEAD (VER)
- VIDEO PRESENCE DETECTOR
- ANTENNA/ETHERNET SYSTEM
- POLE MOUNTED SIGN
- MAST ARM MOUNTED SIGN
- SERVICE METER
- TYPE D GROUND BOX W/APRON
- TYPE D GROUND BOX
- TYPE A GROUND BOX
- CONDUIT (TRENCH)
- CONDUIT (BORED)
- CONTROLLER AND CABINET W/PAD
- (1) CONDUIT RUN NUMBER
- Ø1 PHASE NUMBER

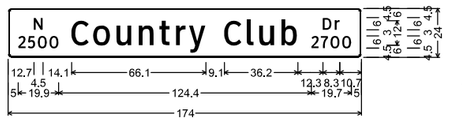
PROPOSED SMALL SIGNS (CONTRACTOR SUPPLIED)

S14



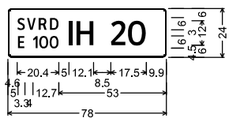
D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"IH 20", ClearviewHwy-3-W 50% spacing;
"SVRD", ClearviewHwy-3-W;
"E 100", ClearviewHwy-3-W 50% spacing;

S17



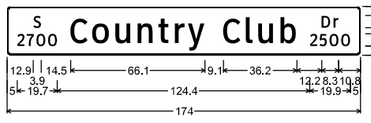
D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"N", ClearviewHwy-3-W; "2500", ClearviewHwy-3-W;
"Country Club", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;
"2700", ClearviewHwy-3-W;

S21



D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"SVRD", ClearviewHwy-3-W;
"E 100", ClearviewHwy-3-W 50% spacing;
"IH 20", ClearviewHwy-3-W 50% spacing;

S25



D3-1G(6) 12in;
1.5" Radius, 0.8" Border, White on Green;
"S", ClearviewHwy-3-W; "2700", ClearviewHwy-3-W;
"Country Club", ClearviewHwy-3-W; "Dr", ClearviewHwy-3-W;
"2500", ClearviewHwy-3-W;

S16, S20, S24

R10-17T
30"X36"

S18, S23, S26

R10-3eL
(9x15)

S15, S19, S22

R10-3eR
(9x15)

NOTE: CONTRACTOR TO VERIFY BLOCK NUMBERS WITH TXDOT PRIOR TO FABRICATION OF SIGN PANELS.

WSP USA Inc. TBPE #F-2263
PRASHANT PACHORE
121392
LICENSED
PROFESSIONAL ENGINEER
3/30/2022

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

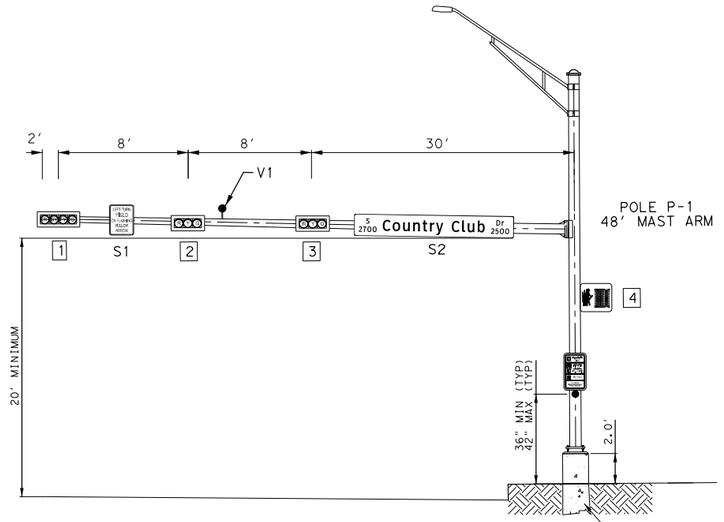
Texas Department of Transportation

SIGNAL POLE/ MAST ARM SIGNS

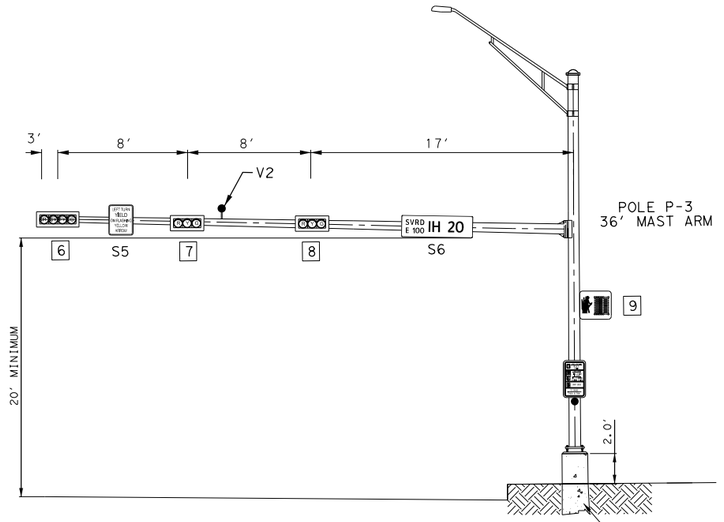
COUNTRY CLUB DR AT IH 20 S FRONTAGE RD

SCALE: 1" = 40′ SHEET 5 OF 7

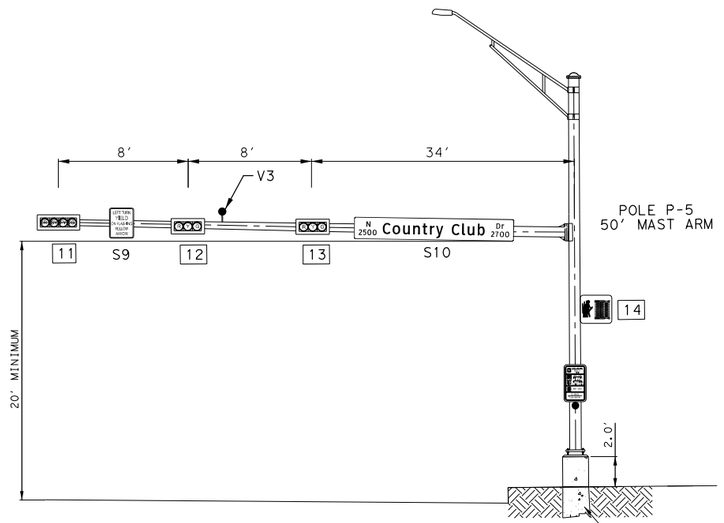
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	145
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	
CHECK				



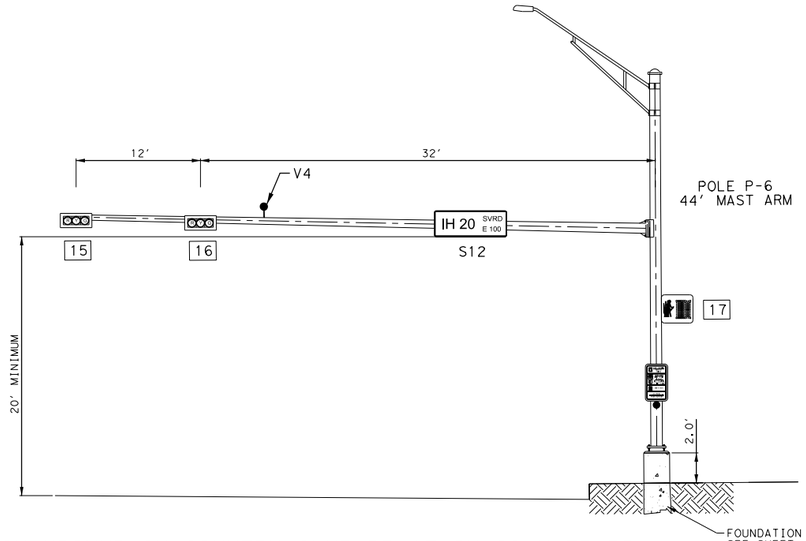
WESTBOUND ON IH 20 N FR RD AT COUNTRY CLUB DR



NORTHBOUND ON COUNTRY CLUB DR AT IH 20 N FR RD



EASTBOUND ON IH 20 N FR RD AT COUNTRY CLUB DR



SOUTHBOUND ON COUNTRY CLUB DR AT IH 20 N FR RD

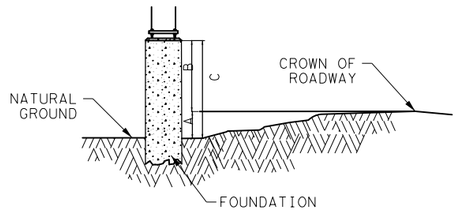
NOTES:

1. USE ASTRO BRACKET ASSEMBLY OR APPROVED EQUAL SHALL BE REQUIRED TO MOUNT SIGNS AND SIGNAL HEADS.
2. PROVIDE ADDITIONAL REQUIRED DRILLED SHAFT ABOVE THE HIGHEST POINT OF ROADWAY UNDERNEATH THE SIGNAL MAST ARM TO ACCOMMODATE 20 FEET OF VERTICAL CLEARANCE.
3. DETAILS OF POLES, SIGNAL HEADS AND MOUNTING BRACKETS SHOWN ON THIS SHEET ARE EXAMPLES ONLY. SEE SIGNAL LAYOUT SHEET(S) AND APPLICABLE SMA-80, LMA-80, MA-C OR MA-D STANDARDS FOR THE ACTUAL DESIGN AND CONSTRUCTION OF MAST ARM POLES.

TRAFFIC SIGNAL POLE FOUNDATION DETAIL

	A	B	C (*)
POLE P-1	0	2	2.0
POLE P-3	0	2	2.0
POLE P-5	0	2	2.0
POLE P-6	0	2	2.0

(*) - CONTRACTOR TO ADJUST FOUNDATION ABOVE GROUND BASED ON FIELD CONDITIONS TO MEET 20 FEET CLERANCE REQUIREMENT



WSP USA Inc. TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED
PROFESSIONAL ENGINEER
03-30-2022

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

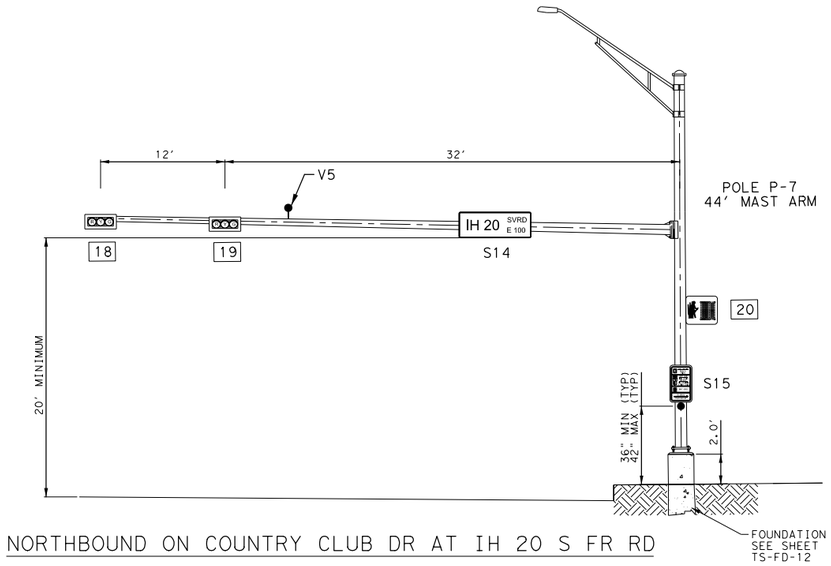
SIGNAL POLE DETAIL

COUNTRY CLUB DR AT IH 20 N FRONTAGE RD

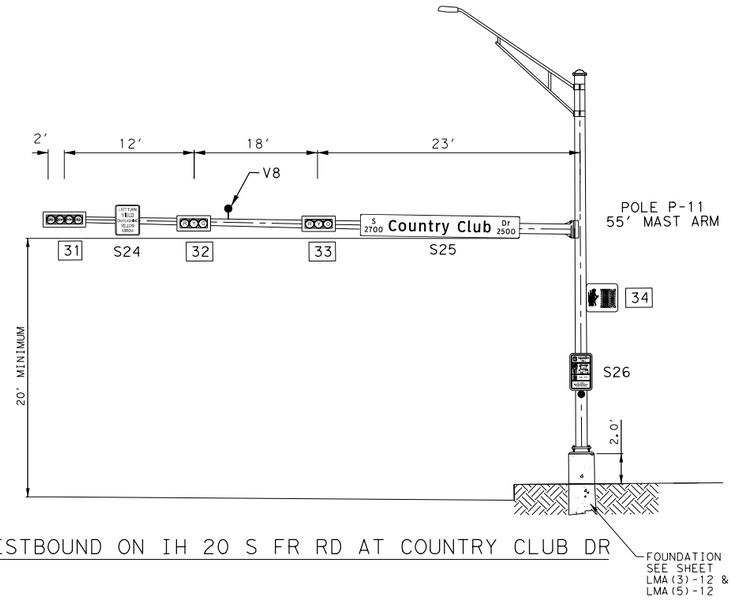
SHEET 6 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	146
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064, ETC	
CHECK				
WSP				

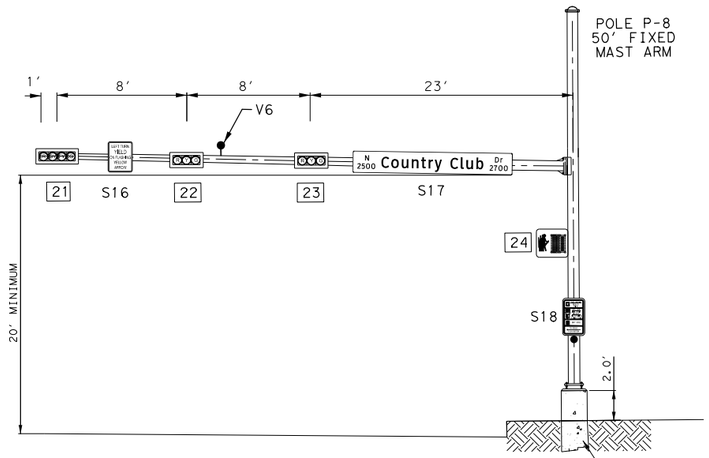
DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8



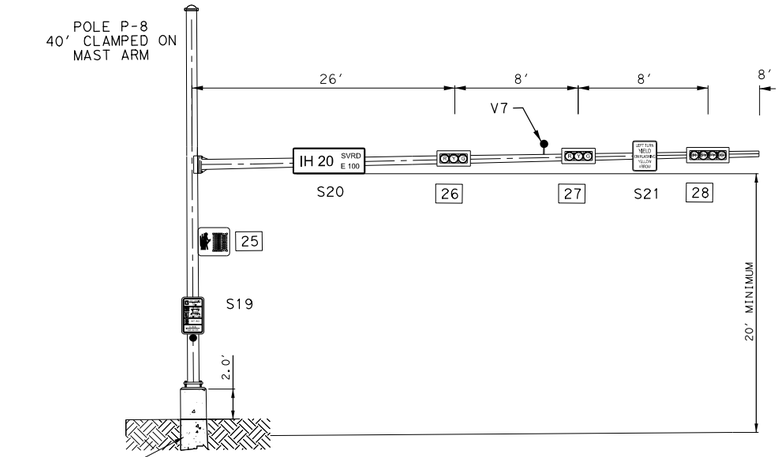
NORTHBOUND ON COUNTRY CLUB DR AT IH 20 S FR RD



WESTBOUND ON IH 20 S FR RD AT COUNTRY CLUB DR



EASTBOUND ON IH 20 S FR RD AT COUNTRY CLUB DR



SOUTHBOUND ON COUNTRY CLUB DR AT IH 20 S FR RD

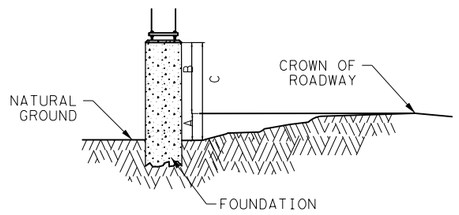
NOTES:

1. USE ASTRO BRACKET ASSEMBLY OR APPROVED EQUAL SHALL BE REQUIRED TO MOUNT SIGNS AND SIGNAL HEADS.
2. PROVIDE ADDITIONAL REQUIRED DRILLED SHAFT ABOVE THE HIGHEST POINT OF ROADWAY UNDERNEATH THE SIGNAL MAST ARM TO ACCOMMODATE 20 FEET OF VERTICAL CLEARANCE.
3. DETAILS OF POLES, SIGNAL HEADS AND MOUNTING BRACKETS SHOWN ON THIS SHEET ARE EXAMPLES ONLY. SEE SIGNAL LAYOUT SHEET(S) AND APPLICABLE SMA-80, LMA-80, MA-C OR MA-D STANDARDS FOR THE ACTUAL DESIGN AND CONSTRUCTION OF MAST ARM POLES.

TRAFFIC SIGNAL POLE FOUNDATION DETAIL

	A	B	C (*)
POLE P-7	0	2	2.0
POLE P-8	0	2	2.0
POLE P-11	0	2	2.0

(*) - CONTRACTOR TO ADJUST FOUNDATION ABOVE GROUND BASED ON FIELD CONDITIONS TO MEET 20 FEET CLERANCE REQUIREMENT



WSP USA Inc. TBPE #F-2263
STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

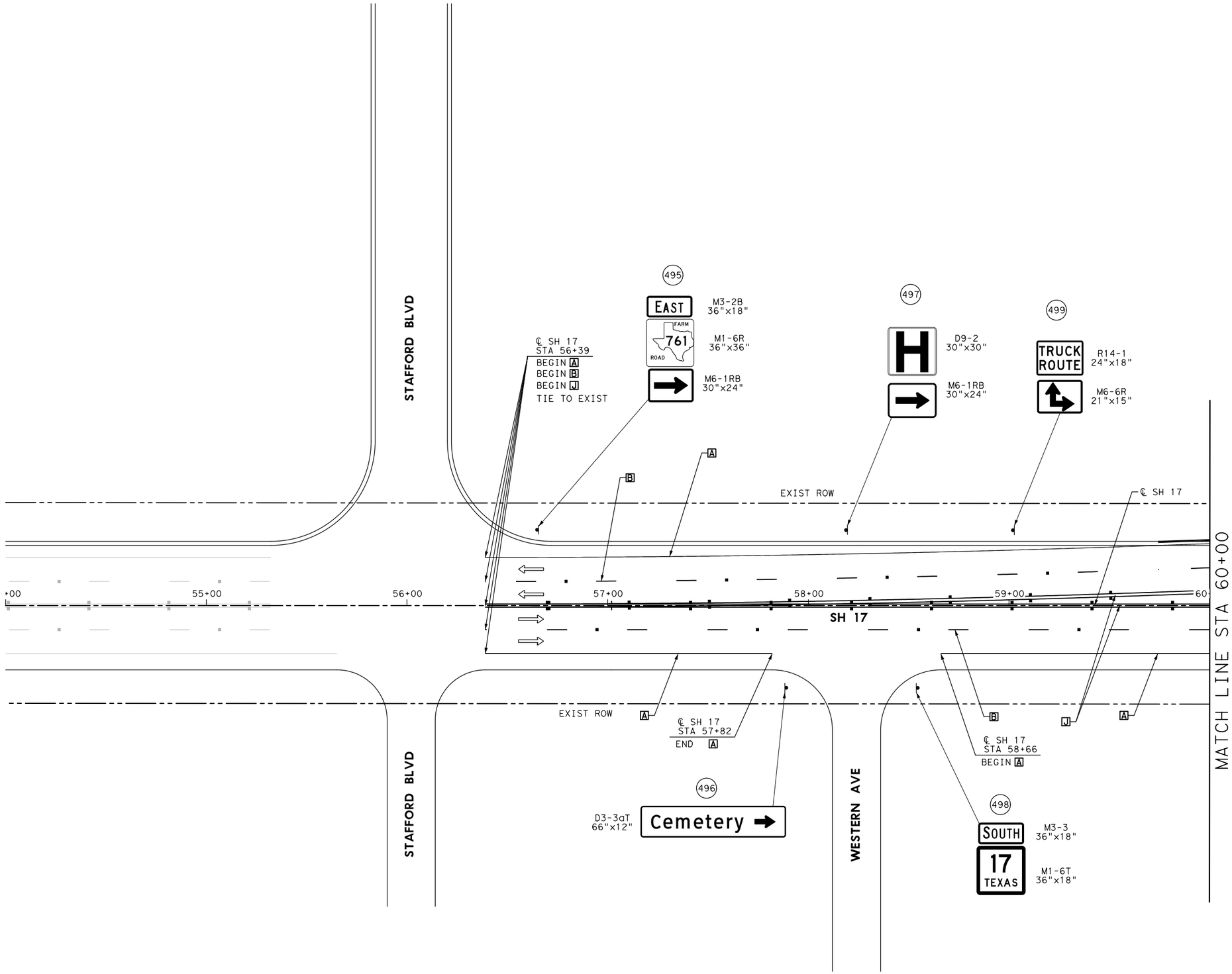
SIGNAL POLE DETAIL

COUNTRY CLUB DR AT IH 20 S FRONTAGE RD

SHEET 7 OF 7

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	147
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8



0′ 25′ 50′

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80′ C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20′ C/C
E	REFL PAV MRK TY I (W)8"(DOT)
F	PREFAB PAV MRK TY C (W)12"(SLD)
G	PREFAB PAV MRK TY C(W)24"(SLD)
H	RE PM W/RET REQ TY I (Y)4"(SLD)
I	REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40′ C/C
J	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40′ C/C
K	REFL PAV MRK TY I (W)36"(YLD TRI)
L	PREFAB PAV MRK TY C (W)(ARROW)
M	PREFAB PAV MRK TY C (W)(WORD)
N	REFL PAV MRK TY I (W)8"(LNDP)
O	PREFAB PAV MRK TY C (W)(LNDP ARROW)
P	REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20′ C/C
	DEL ASSM (D-SW) SZ1 (FLX) GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
3. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT MARKING REMOVAL. THIS COST WILL BE INCIDENTAL TO THE INSTALLATION OF PAVEMENT MARKINGS.

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula

03/30/2022

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

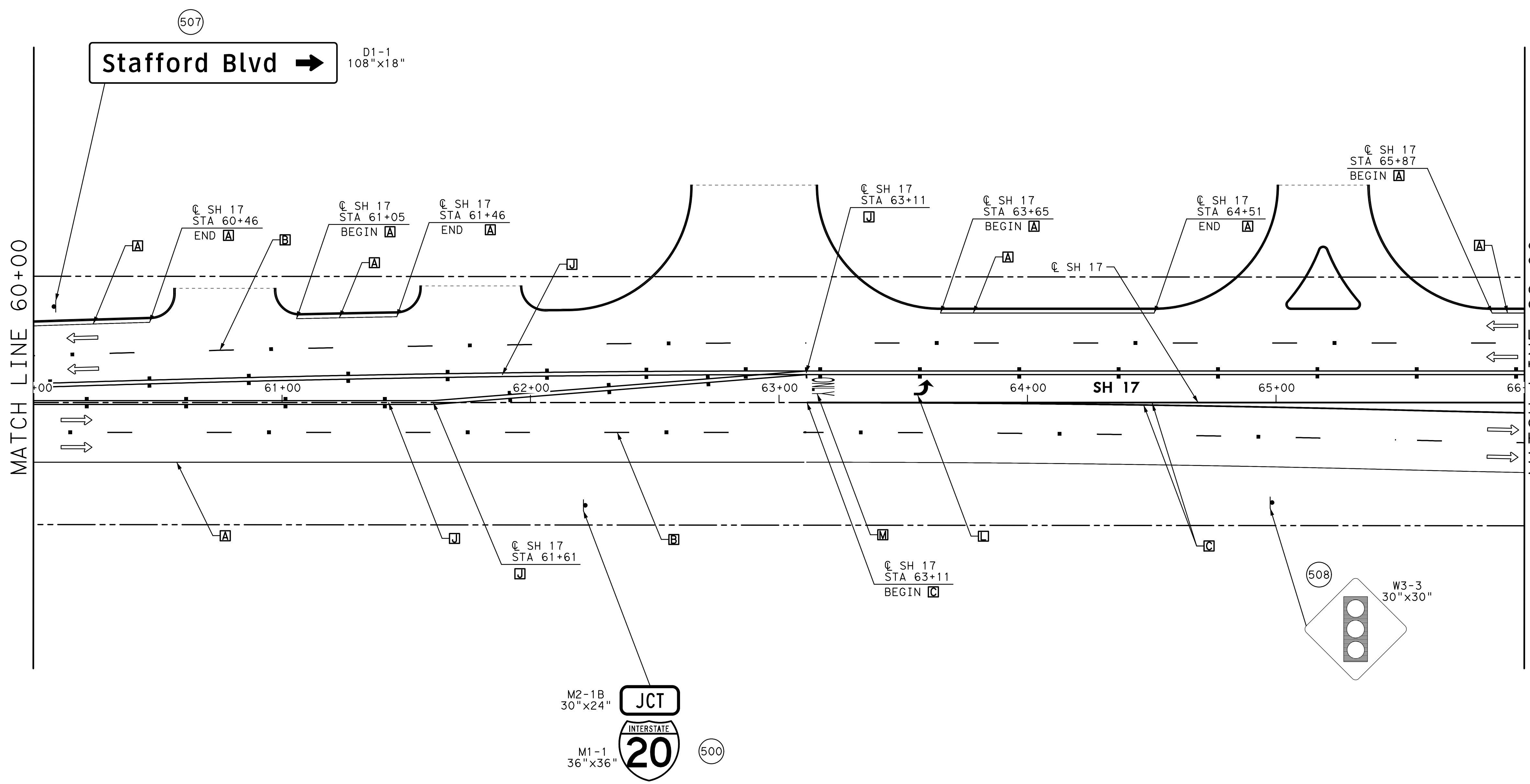
Texas Department of Transportation

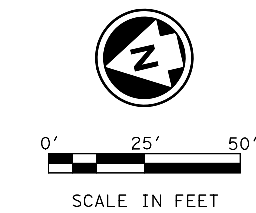
SH 17 AT IH 20
SIGNING & PAVEMENT MARKING PLAN

SCALE: 1" = 50′ SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS AH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA	REEVES	148
CHECK ZS	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des





LEGEND

- A RE PM W/RET REQ TY I (W)4"(SLD)
- B RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
- C REFL PAV MRK TY I (W)8"(SLD)
- D REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
- E REFL PAV MRK TY I (W)8"(DOT)
- F PREFAB PAV MRK TY C (W)12"(SLD)
- G PREFAB PAV MRK TY C(W)24"(SLD)
- H RE PM W/RET REQ TY I (Y)4"(SLD)
- I REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40' C/C
- J REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
- K REFL PAV MRK TY I (W)36"(YLD TRI)
- L PREFAB PAV MRK TY C (W)(ARROW)
- M PREFAB PAV MRK TY C (W)(WORD)
- N REFL PAV MRK TY I (W)8"(LNDP)
- O PREFAB PAV MRK TY C (W)(LNDP ARROW)
- P REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20' C/C
- DEL ASSM (D-SW) SZ1 (FLX) GND
- TRAFFIC DIRECTION
- PROP SIGN ASSEMBLY
- (XXX) PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
3. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT MARKING REMOVAL. THIS COST WILL BE INCIDENTAL TO THE INSTALLATION OF PAVEMENT MARKINGS.

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula
03/30/2022

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

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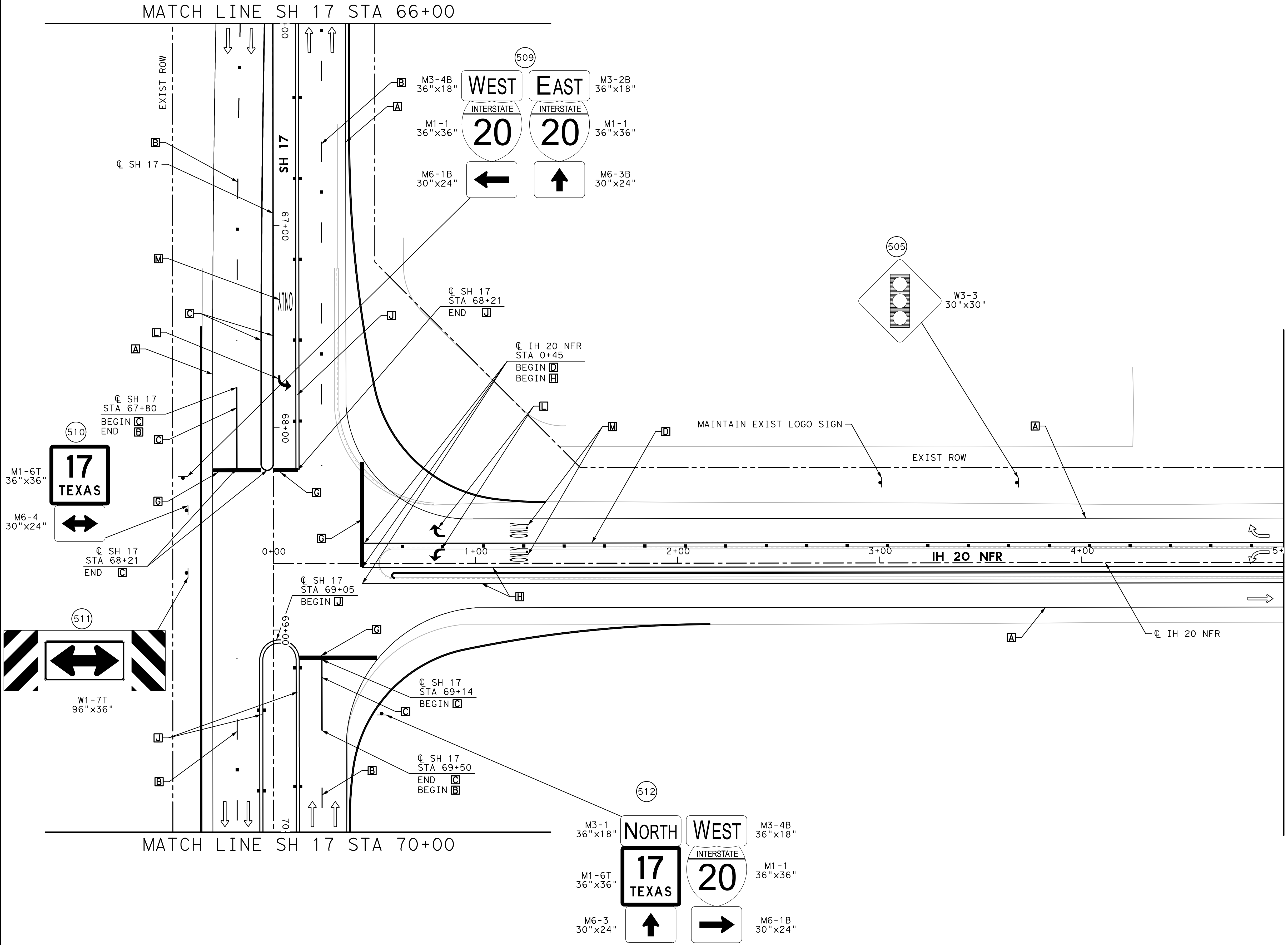
Texas Department of Transportation

SH 17 AT IH 20

SIGNING & PAVEMENT MARKING PLAN

SCALE: 1" = 50'
SHEET 2 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
AH	6	(SEE TITLE SHEET)	IH20	
GRAPHICS AH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA	REEVES	149
CHECK ZS	CONTROL 0003	SECTION 07	JOB 064, ETC	



0' 25' 50'
SCALE IN FEET

LEGEND

- A RE PM W/RET REQ TY I (W)4"(SLD)
- B RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
- C REFL PAV MRK TY I (W)8"(SLD)
- D REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
- E REFL PAV MRK TY I (W)8"(DOT)
- F PREFAB PAV MRK TY C (W)12"(SLD)
- G PREFAB PAV MRK TY C(W)24"(SLD)
- H RE PM W/RET REQ TY I (Y)4"(SLD)
- I REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40' C/C
- J REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
- K REFL PAV MRK TY I (W)36"(YLD TRI)
- L PREFAB PAV MRK TY C (W)(ARROW)
- M PREFAB PAV MRK TY C (W)(WORD)
- N REFL PAV MRK TY I (W)8"(LNDP)
- O PREFAB PAV MRK TY C (W)(LNDP ARROW)
- P REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20' C/C
- DEL ASSM (D-SW) SZ1 (FLX) GND
- TRAFFIC DIRECTION
- PROP SIGN ASSEMBLY
- (XXX) PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
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STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED PROFESSIONAL ENGINEER
Mohammed S Ula
03/30/2022

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

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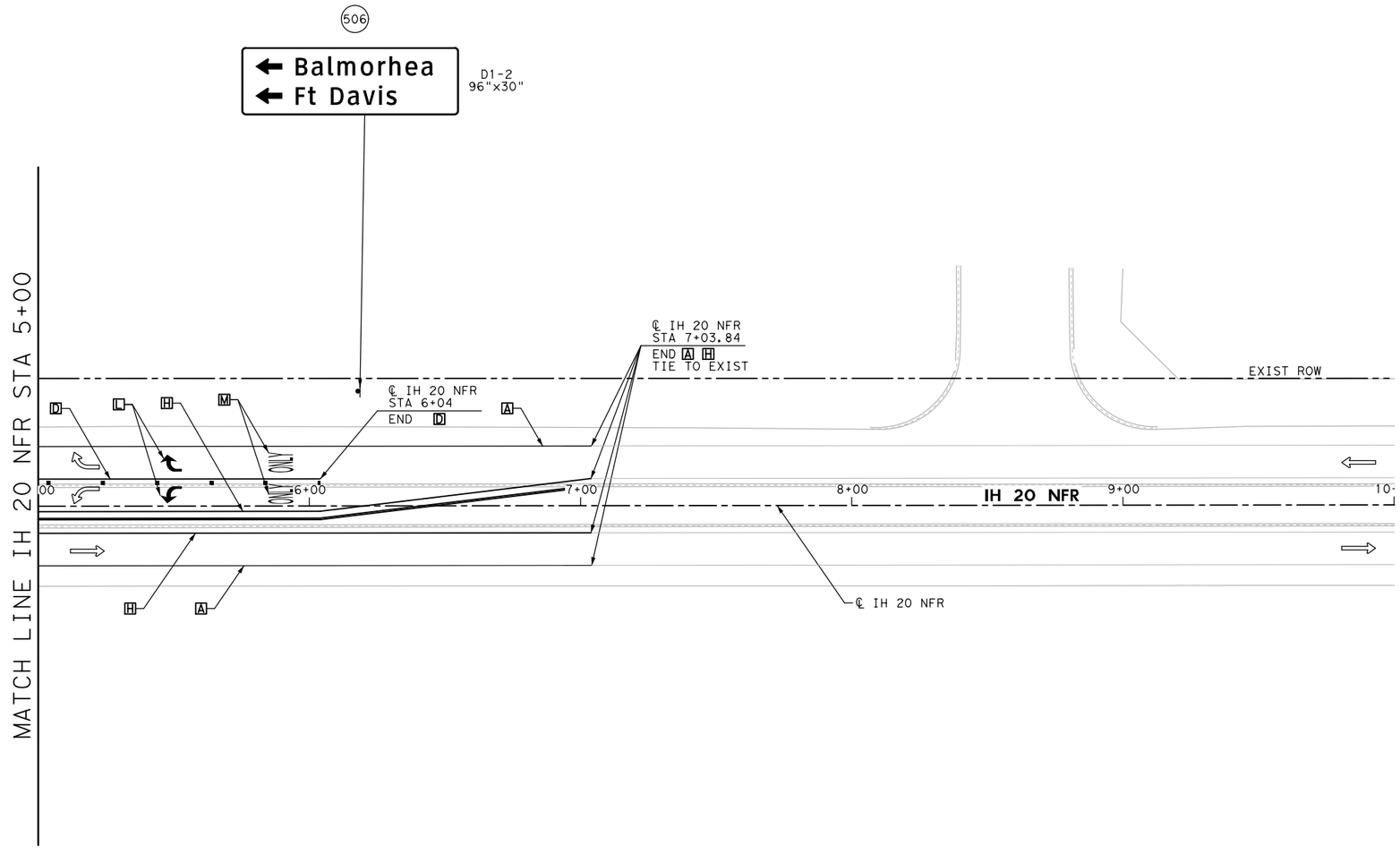
IH 20 NFR AT SH 17

SIGNING & PAVEMENT MARKING PLAN

SCALE: 1" = 50'
SHEET 3 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AH	TEXAS	ODA	REEVES	150
CHECK SU	CONTROL	SECTION	JOB	
CHECK ZS	0003	07	064, ETC	



0′ 25′ 50′

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80′ C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20′ C/C
E	REFL PAV MRK TY I (W)8"(DOT)
F	PREFAB PAV MRK TY C (W)12"(SLD)
G	PREFAB PAV MRK TY C(W)24"(SLD)
H	RE PM W/RET REQ TY I (Y)4"(SLD)
I	REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40′ C/C
J	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40′ C/C
K	REFL PAV MRK TY I (W)36"(YLD TRI)
L	PREFAB PAV MRK TY C (W)(ARROW)
M	PREFAB PAV MRK TY C (W)(WORD)
N	REFL PAV MRK TY I (W)8"(LNDP)
O	PREFAB PAV MRK TY C (W)(LNDP ARROW)
P	REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20′ C/C
	DEL ASSM (D-SW) SZ1 (FLX) GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
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STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula

06/24/2021

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

IH 20 NFR AT SH 17
SIGNING & PAVEMENT MARKING PLAN

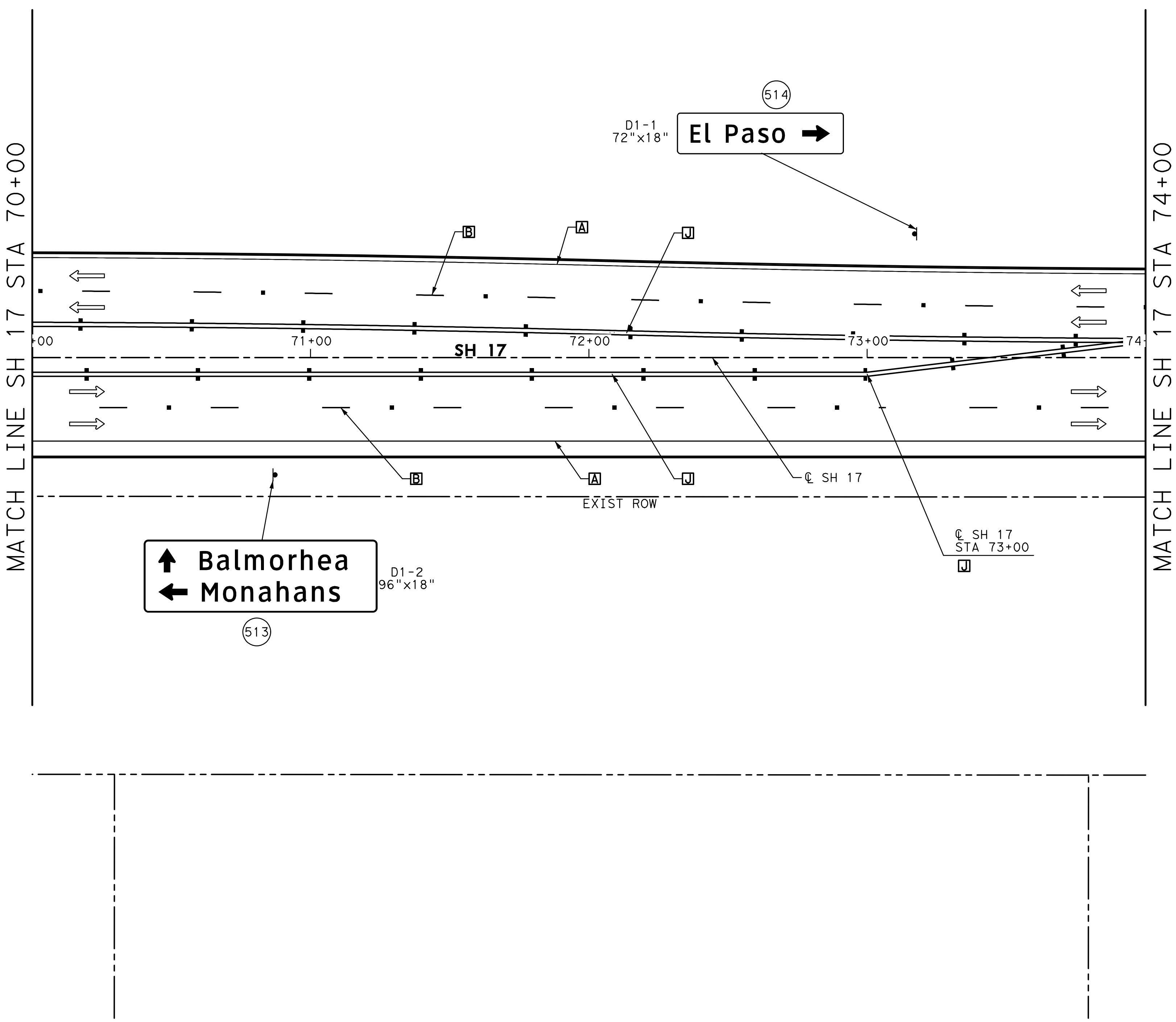
SCALE: 1" = 50′ SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS AH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA	REEVES	151
CHECK ZS	CONTROL 0003	SECTION 07	JOB 064,ETC	

FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des
DATE: 3/30/2022

FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des

DATE: 3/30/2022



0' 25' 50'

SCALE IN FEET

LEGEND

- A RE PM W/RET REQ TY I (W)4"(SLD)
- B RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
- C REFL PAV MRK TY I (W)8"(SLD)
- D REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
- E REFL PAV MRK TY I (W)8"(DOT)
- F PREFAB PAV MRK TY C (W)12"(SLD)
- G PREFAB PAV MRK TY C(W)24"(SLD)
- H RE PM W/RET REQ TY I (Y)4"(SLD)
- I REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40' C/C
- J REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
- K REFL PAV MRK TY I (W)36"(YLD TRI)
- L PREFAB PAV MRK TY C (W)(ARROW)
- M PREFAB PAV MRK TY C (W)(WORD)
- N REFL PAV MRK TY I (W)8"(LNDP)
- O PREFAB PAV MRK TY C (W)(LNDP ARROW)
- P REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20' C/C
- DEL ASSM (D-SW) SZ1 (FLX) GND
- TRAFFIC DIRECTION
- PROP SIGN ASSEMBLY
- XXX PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
3. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT MARKING REMOVAL. THIS COST WILL BE INCIDENTAL TO THE INSTALLATION OF PAVEMENT MARKINGS.

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula

06/24/2021

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

SH 17 AT IH 20

SIGNING & PAVEMENT MARKING PLAN

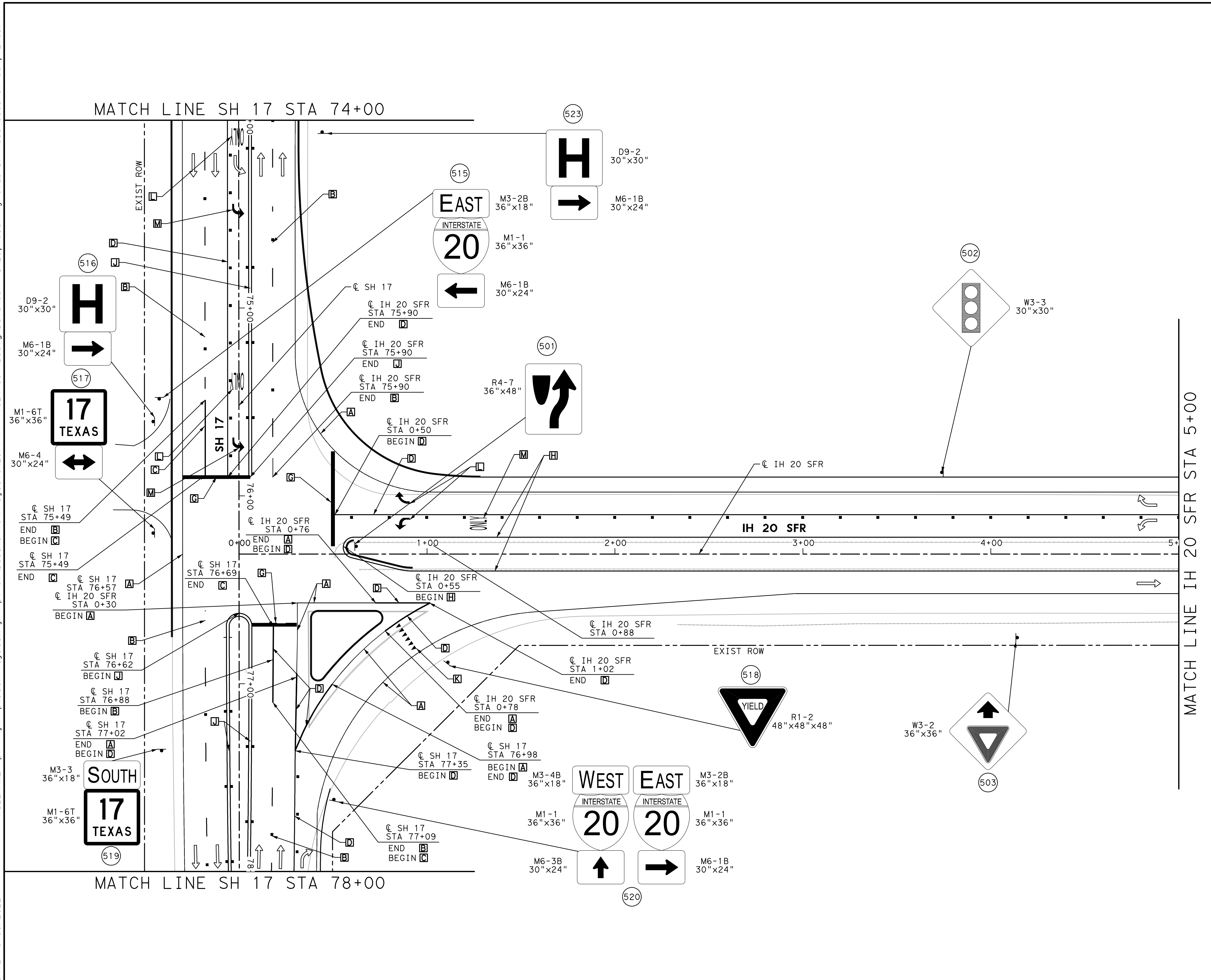
SCALE: 1" = 50'

SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AH	TEXAS	ODA	REEVES	152
CHECK	CONTROL	SECTION	JOB	
SU / ZS	0003	07	064, ETC	

FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des

DATE: 3/30/2022



0' 25' 50'
SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	REFL PAV MRK TY I (W)8"(DOT)
F	PREFAB PAV MRK TY C (W)12"(SLD)
G	PREFAB PAV MRK TY C(W)24"(SLD)
H	RE PM W/RET REQ TY I (Y)4"(SLD)
I	REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40' C/C
J	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
K	REFL PAV MRK TY I (W)36"(YLD TRI)
L	PREFAB PAV MRK TY C (W)(ARROW)
M	PREFAB PAV MRK TY C (W)(WORD)
N	REFL PAV MRK TY I (W)8"(LNDP)
O	PREFAB PAV MRK TY C (W)(LNDP ARROW)
P	REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20' C/C
	DEL ASSM (D-SW) SZ1 (FLX) GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

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STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER
Mohammed S Ula
03/30/2022

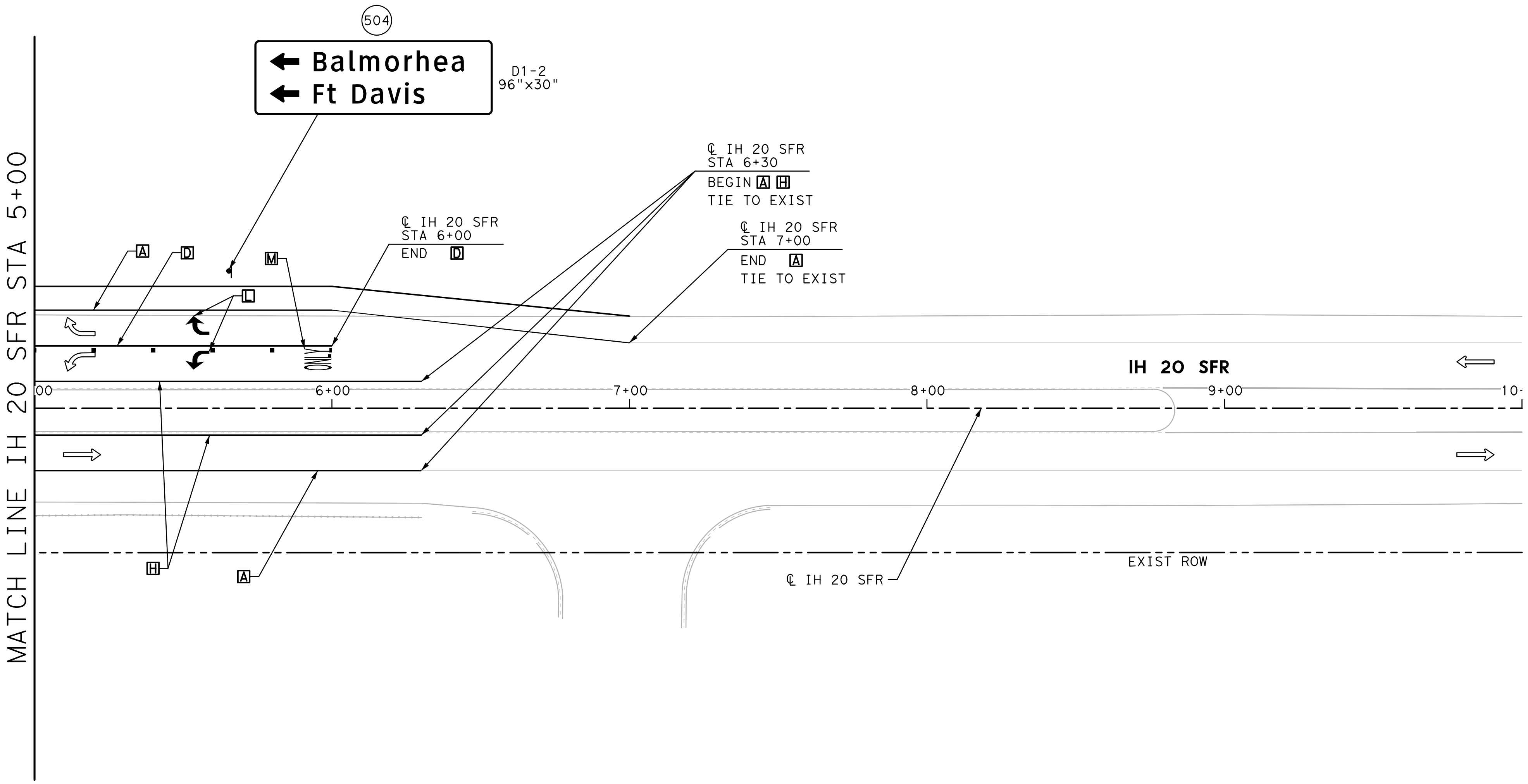
infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

IH 20 SFR AT SH 17
SIGNING & PAVEMENT MARKING PLAN

SCALE: 1" = 50'
SHEET 6 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
AH	TEXAS	ODA	REEVES	153
CHECK	CONTROL	SECTION	JOB	
SU	0003	07	064, ETC	
CHECK				
ZS				



0' 25' 50'

SCALE IN FEET

LEGEND

- A RE PM W/RET REQ TY I (W)4"(SLD)
- B RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
- C REFL PAV MRK TY I (W)8"(SLD)
- D REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
- E REFL PAV MRK TY I (W)8"(DOT)
- F PREFAB PAV MRK TY C (W)12"(SLD)
- G PREFAB PAV MRK TY C(W)24"(SLD)
- H RE PM W/RET REQ TY I (Y)4"(SLD)
- I REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40' C/C
- J REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
- K REFL PAV MRK TY I (W)36"(YLD TRI)
- L PREFAB PAV MRK TY C (W)(ARROW)
- M PREFAB PAV MRK TY C (W)(WORD)
- N REFL PAV MRK TY I (W)8"(LNDP)
- O PREFAB PAV MRK TY C (W)(LNDP ARROW)
- P REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20' C/C
- DEL ASSM (D-SW) SZ1 (FLX) GND
- TRAFFIC DIRECTION
- PROP SIGN ASSEMBLY
- (XXX) PROP SIGN NUMBER

NOTES:

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STATE OF TEXAS
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06/24/2021

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Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

IH 20 SFR AT SH 17

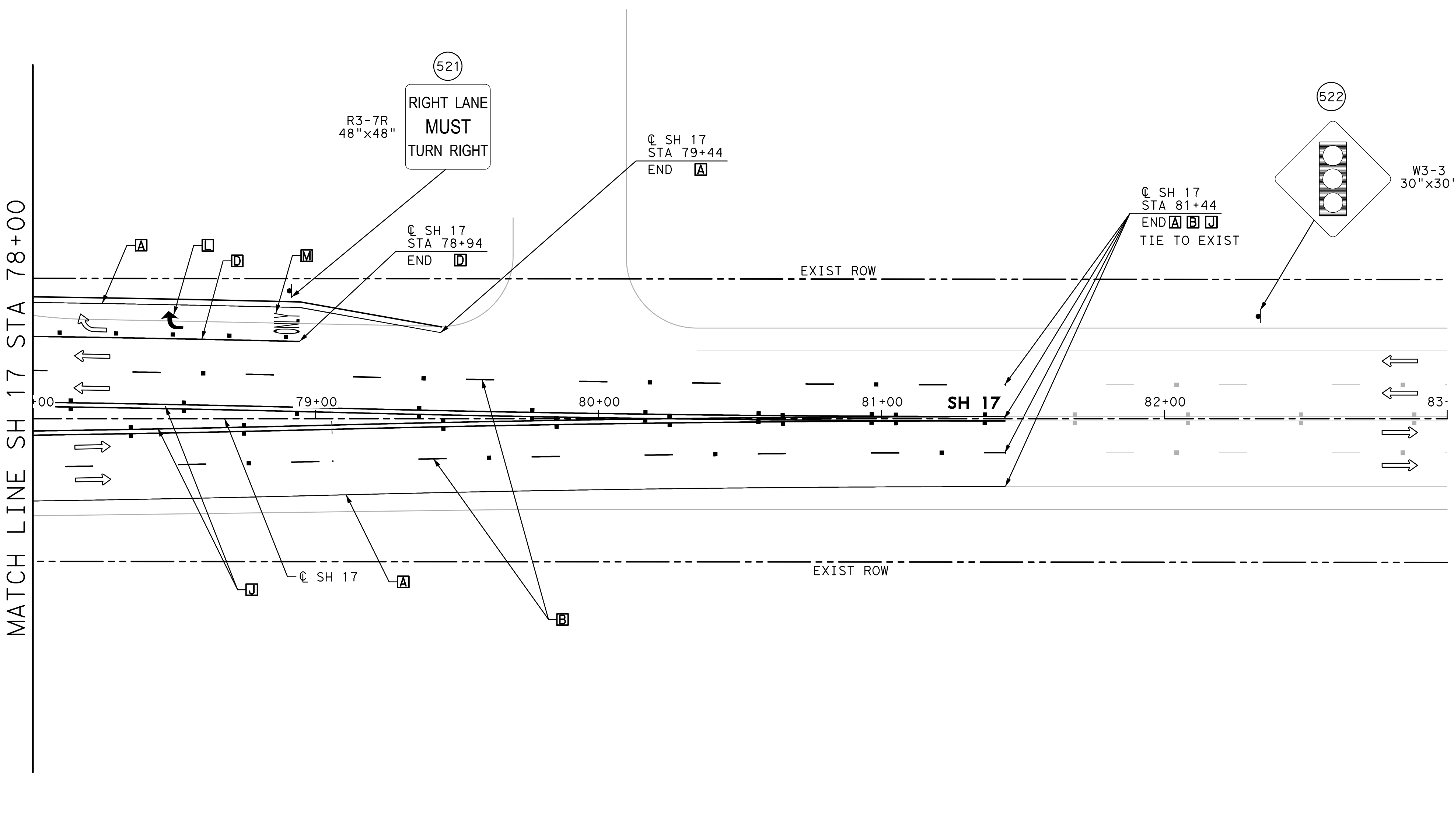
SIGNING & PAVEMENT MARKING PLAN

SCALE: 1" = 50'   SHEET 7 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS AH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA	REEVES	154
CHECK ZS	CONTROL 0003	SECTION 07	JOB 064,ETC	

FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des

DATE: 3/30/2022



0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	REFL PAV MRK TY I (W)8"(DOT)
F	PREFAB PAV MRK TY C (W)12"(SLD)
G	PREFAB PAV MRK TY C(W)24"(SLD)
H	RE PM W/RET REQ TY I (Y)4"(SLD)
I	REFL PAV MRK TY I (Y)4"(BRK) W/TYPE II-A-A @ 40' C/C
J	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
K	REFL PAV MRK TY I (W)36"(YLD TRI)
L	PREFAB PAV MRK TY C (W)(ARROW)
M	PREFAB PAV MRK TY C (W)(WORD)
N	REFL PAV MRK TY I (W)8"(LNDP)
O	PREFAB PAV MRK TY C (W)(LNDP ARROW)
P	REFL PAV MRK TY I Y 4" (DBL) W/TYPE II-A-A @ 20' C/C
	DEL ASSM (D-SW) SZ1 (FLX) GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

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STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED PROFESSIONAL ENGINEER

Mohammed S Ula
06/24/2021

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

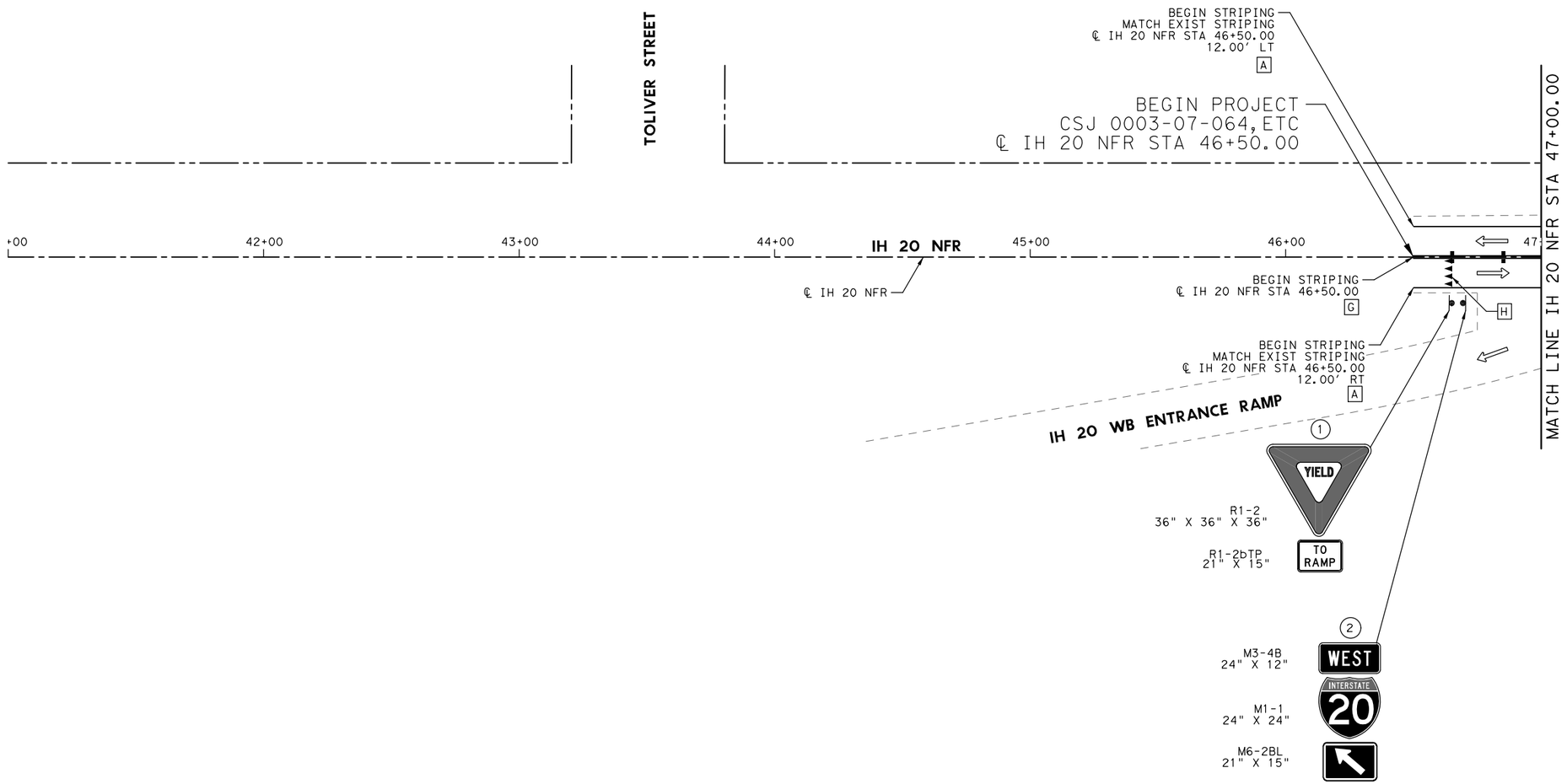
SH 17 AT IH 20

SIGNING & PAVEMENT MARKING PLAN

SCALE: 1" = 50'

SHEET 8 OF 8

DESIGN	FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS AH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA	REEVES	155
	CONTROL	SECTION	JOB	
CHECK ZS	0003	07	064, ETC	



0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R Perry

JMT TBPE REGISTRATION NO. F-163341

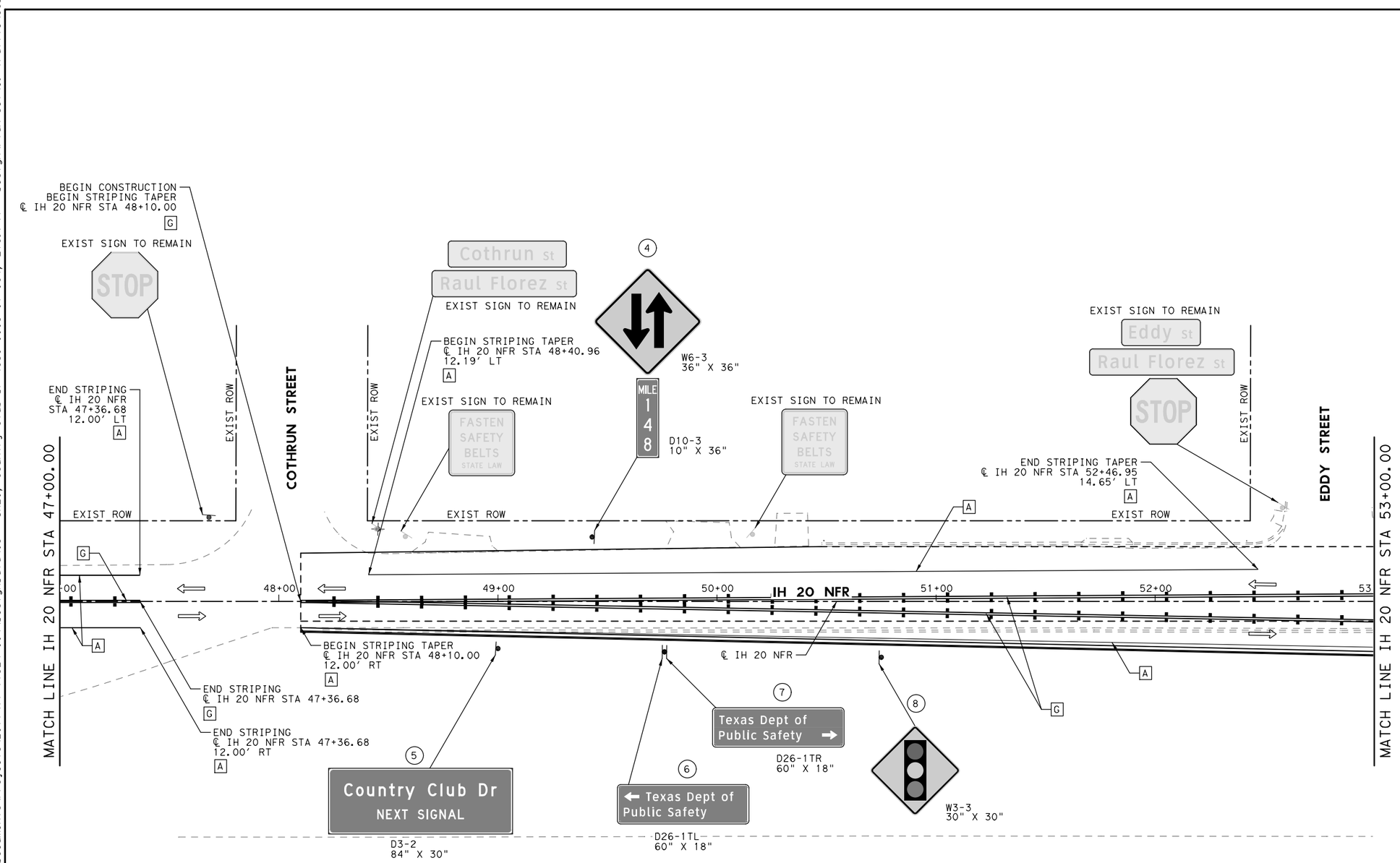
Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 1 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	156
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*SIGN.dgn



0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R Perry

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 2 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	157
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
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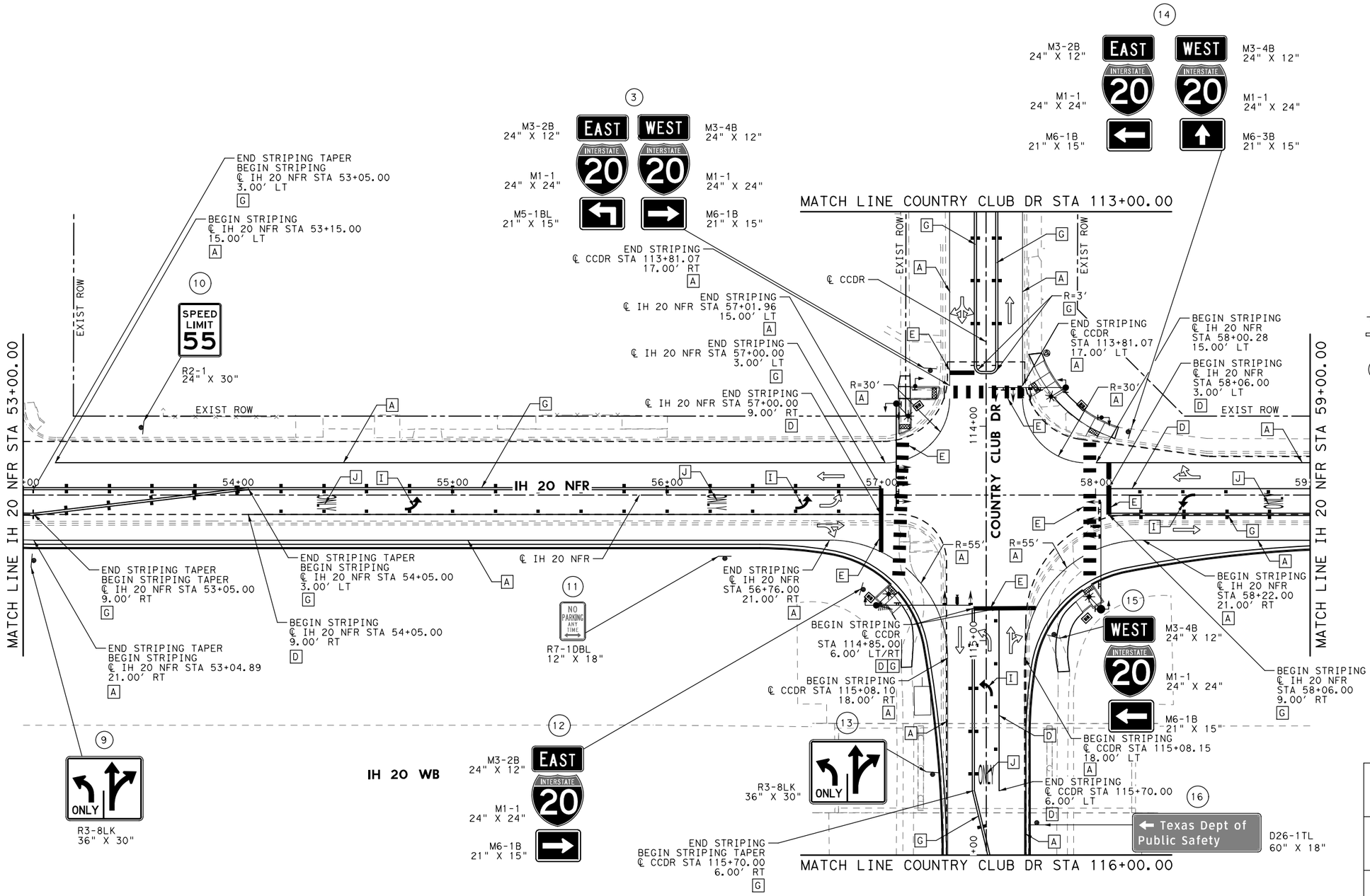

0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 3 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	158
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064, ETC	

DATE: 3/30/2022
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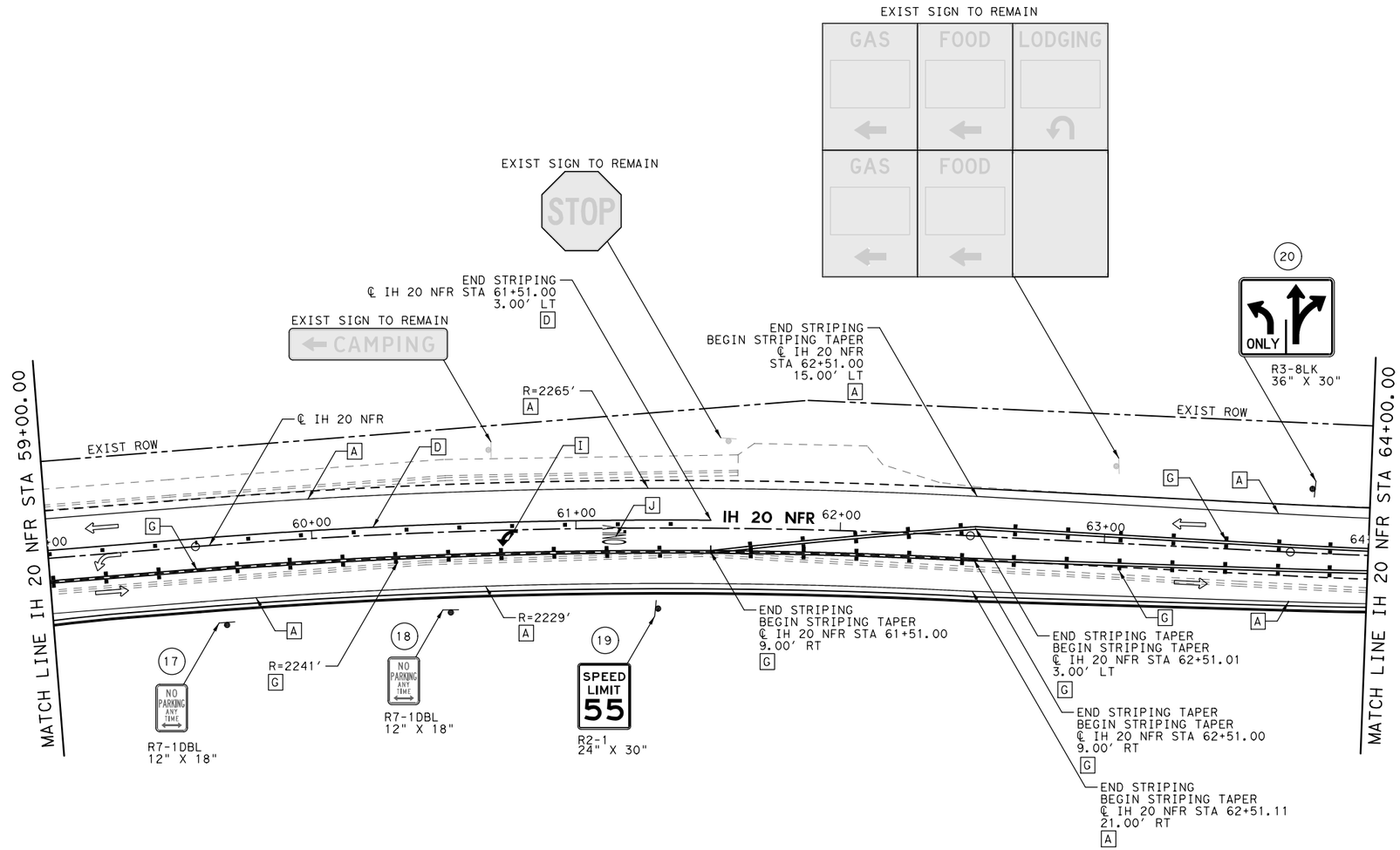

0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
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I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

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JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 4 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	159
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

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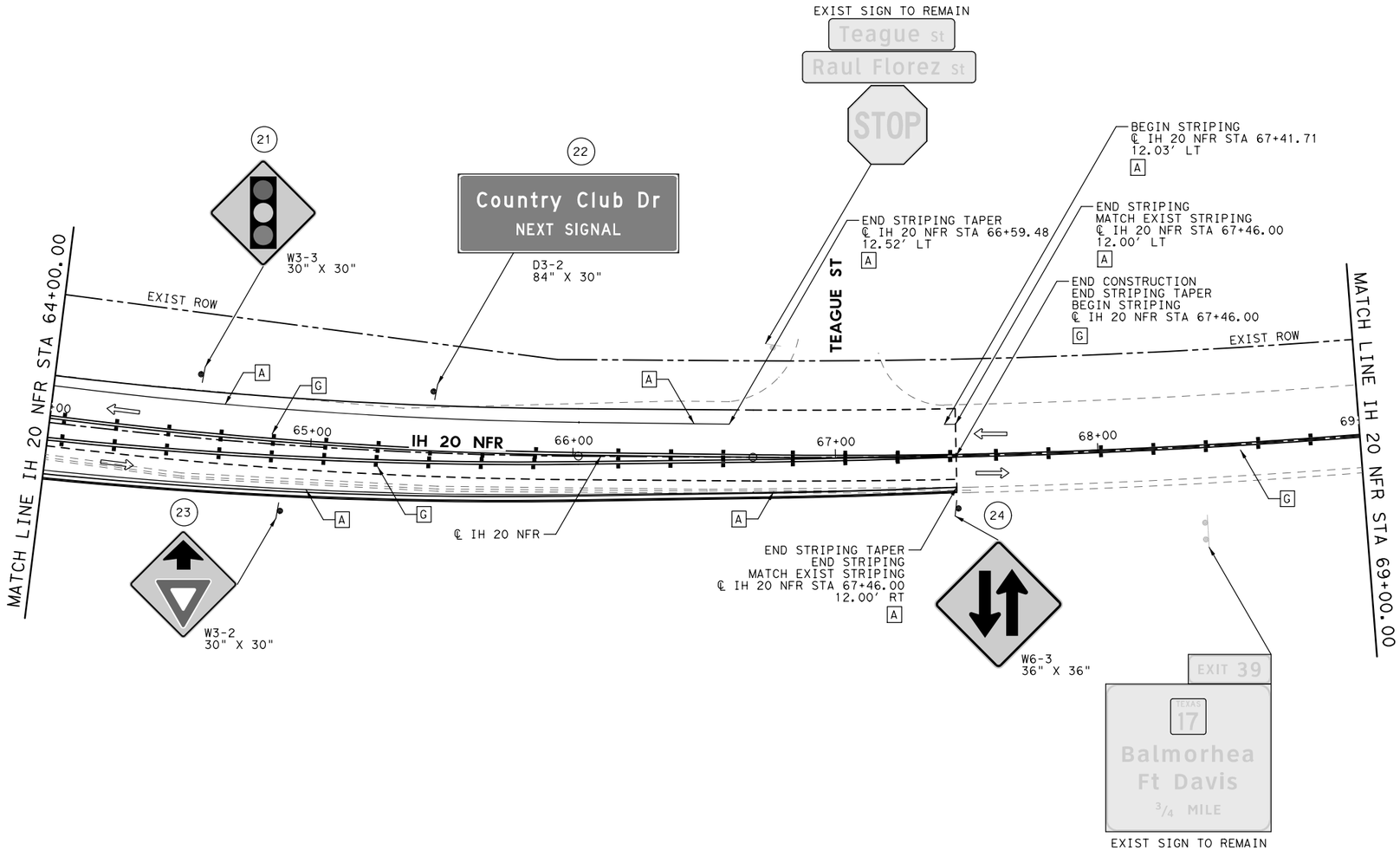

0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

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03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN
AT COUNTRY CLUB DR

SHEET 5 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.	
JMT	6	(SEE TITLE SHEET)	IH20	
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	160
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
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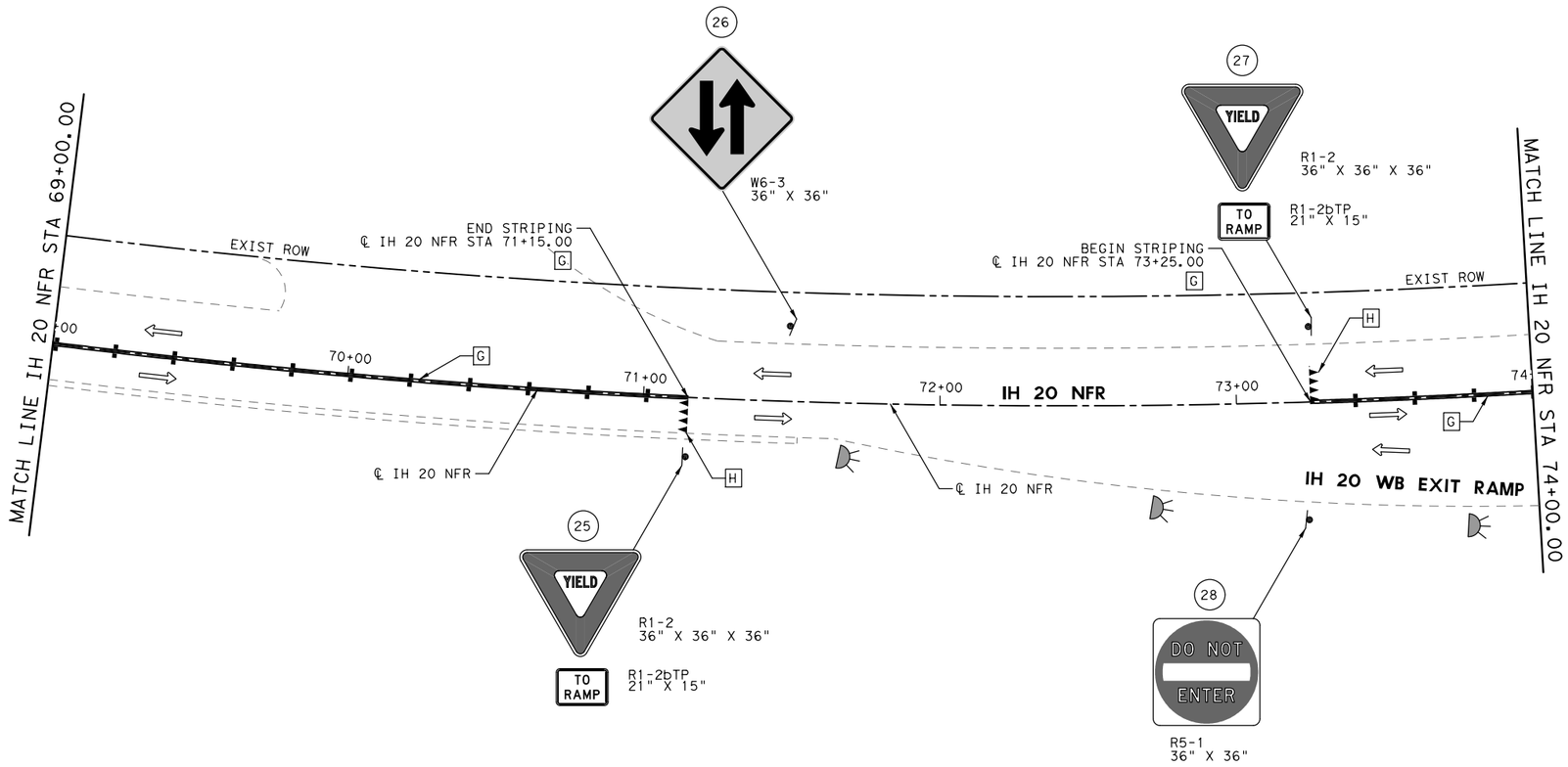


0′ 25′ 50′

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80′ C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20′ C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40′ C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
3. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT MARKING REMOVAL. THIS COST WILL BE INCIDENTAL TO THE INSTALLATION OF PAVEMENT MARKINGS.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

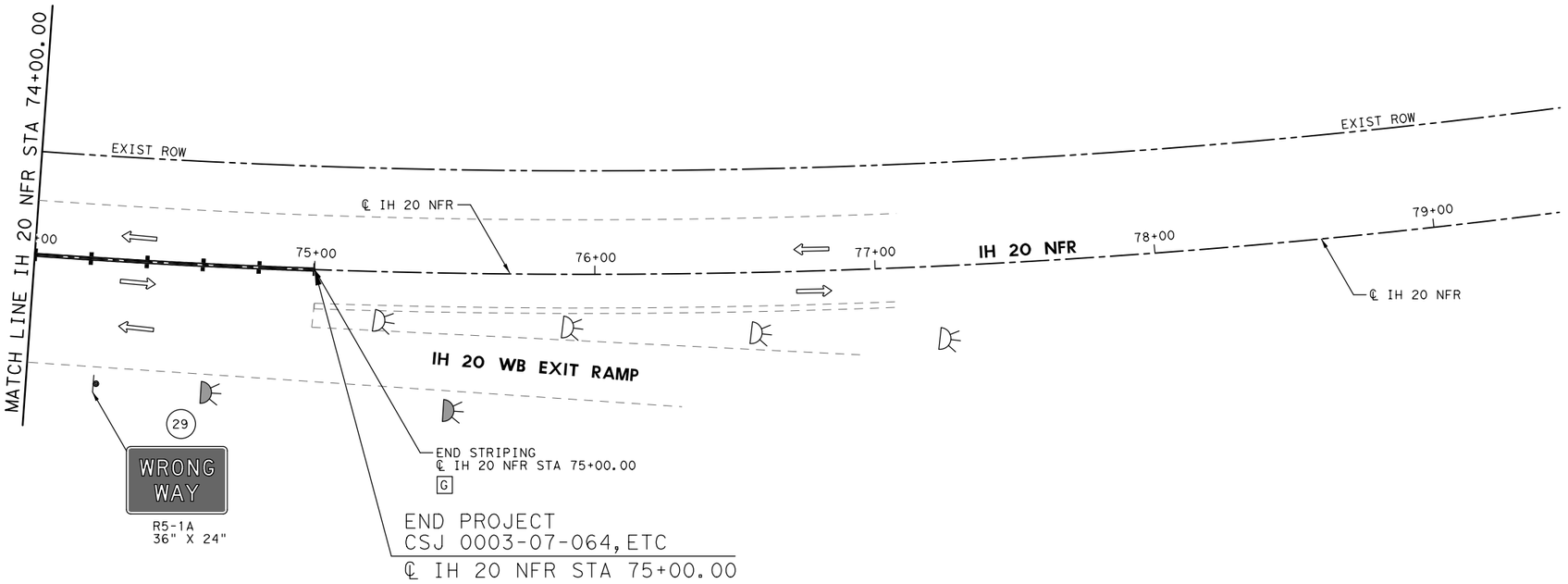
Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 6 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	161
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*SPM.dgn



0′ 25′ 50′

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80′ C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20′ C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40′ C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
3. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT MARKING REMOVAL. THIS COST WILL BE INCIDENTAL TO THE INSTALLATION OF PAVEMENT MARKINGS.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R Perry

TBPE REGISTRATION NO. F-163341

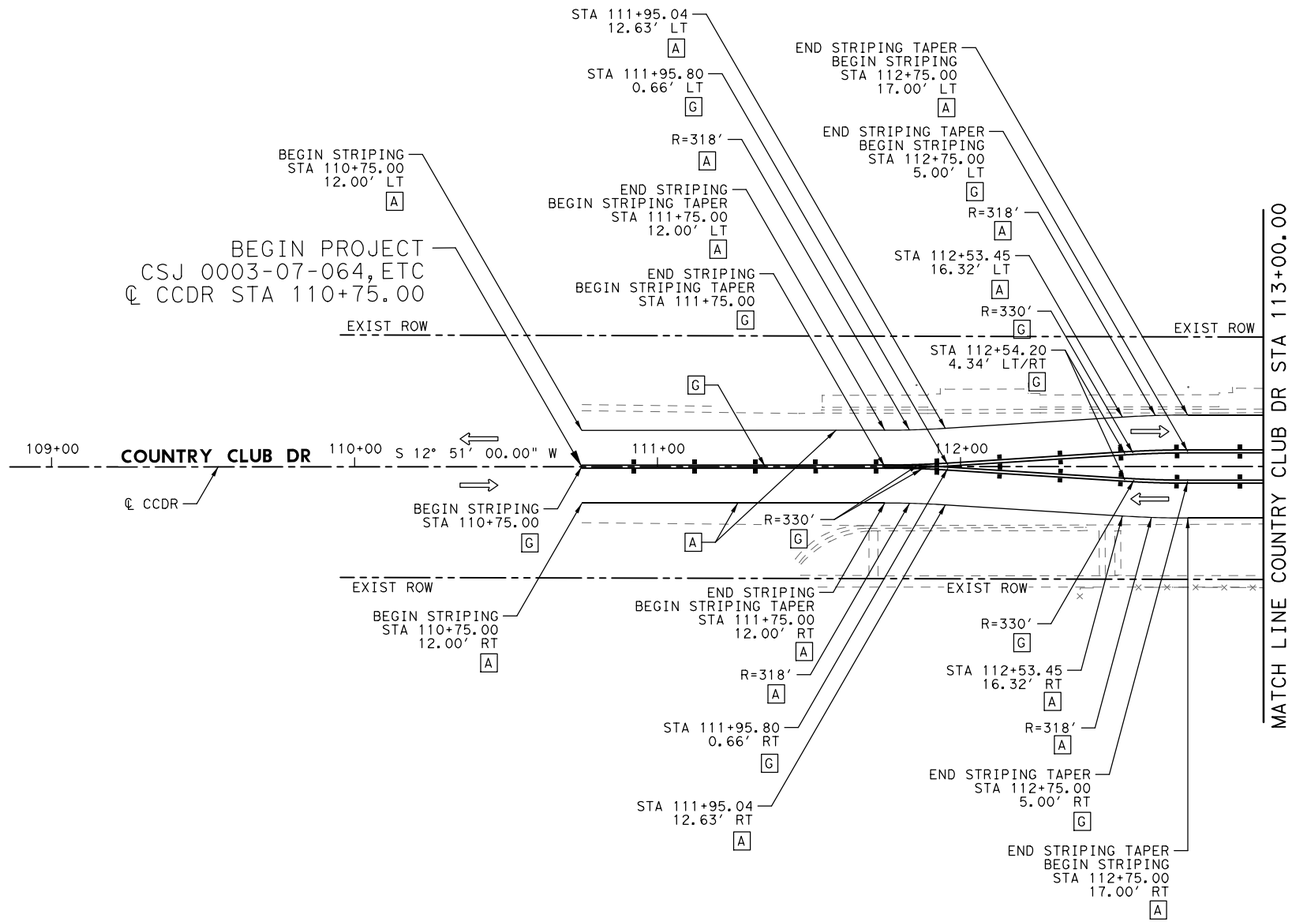
Texas Department of Transportation

IH 20 NFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 7 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	162
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*SMP7.dgn



0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
3. NO SEPARATE PAYMENT WILL BE MADE FOR PAVEMENT MARKING REMOVAL. THIS COST WILL BE INCIDENTAL TO THE INSTALLATION OF PAVEMENT MARKINGS.
4. ALL STATIONS AND OFFSETS ARE MEASURED FROM COUNTRY CLUB DR CENTERLINE UNLESS OTHERWISE NOTED.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

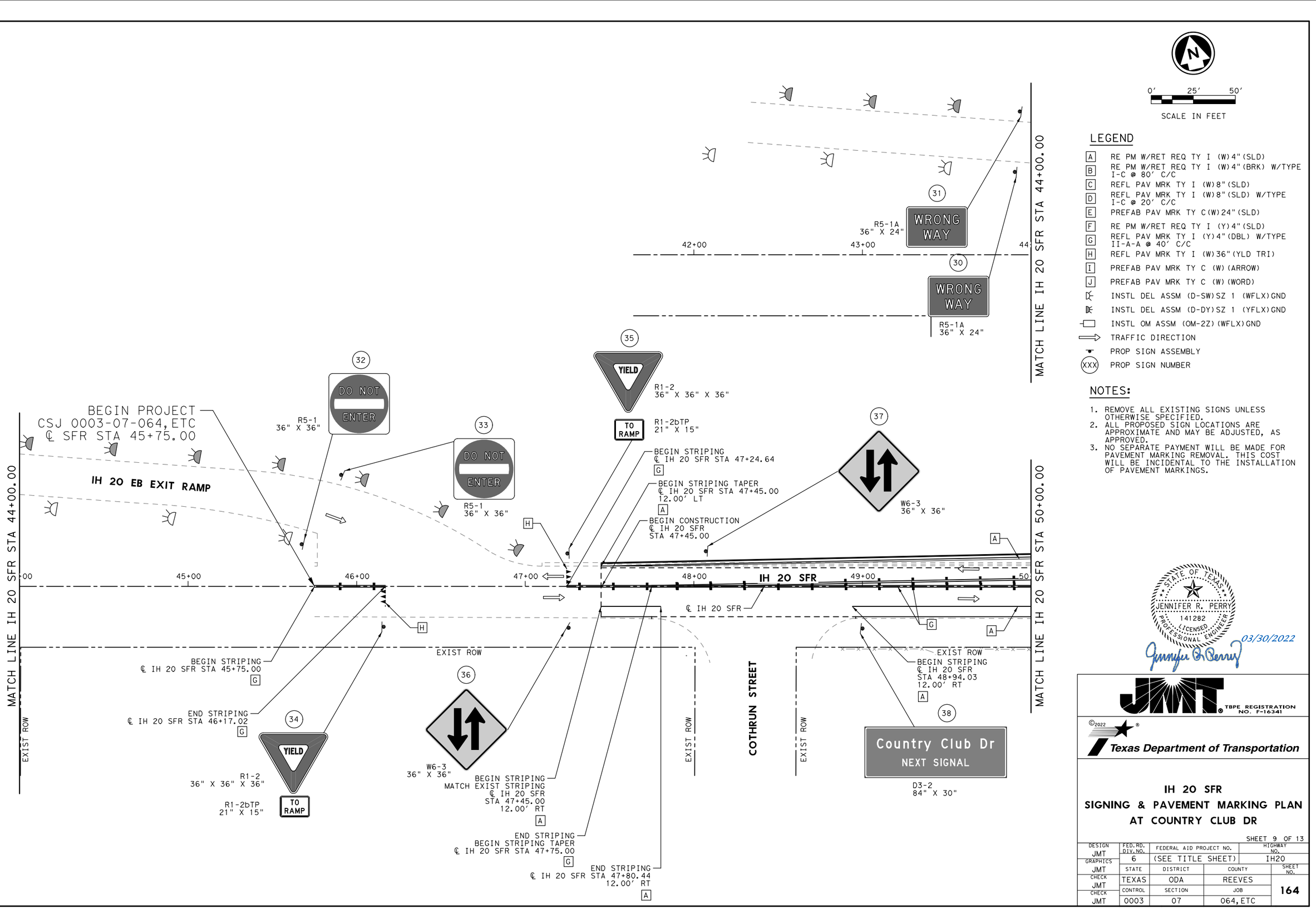
Texas Department of Transportation

COUNTRY CLUB DR
SIGNING & PAVEMENT MARKING PLAN
IH 20 NFR

SHEET 8 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA / REEVES	163
CHECK JMT	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*S



LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
2. ALL PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED, AS APPROVED.
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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

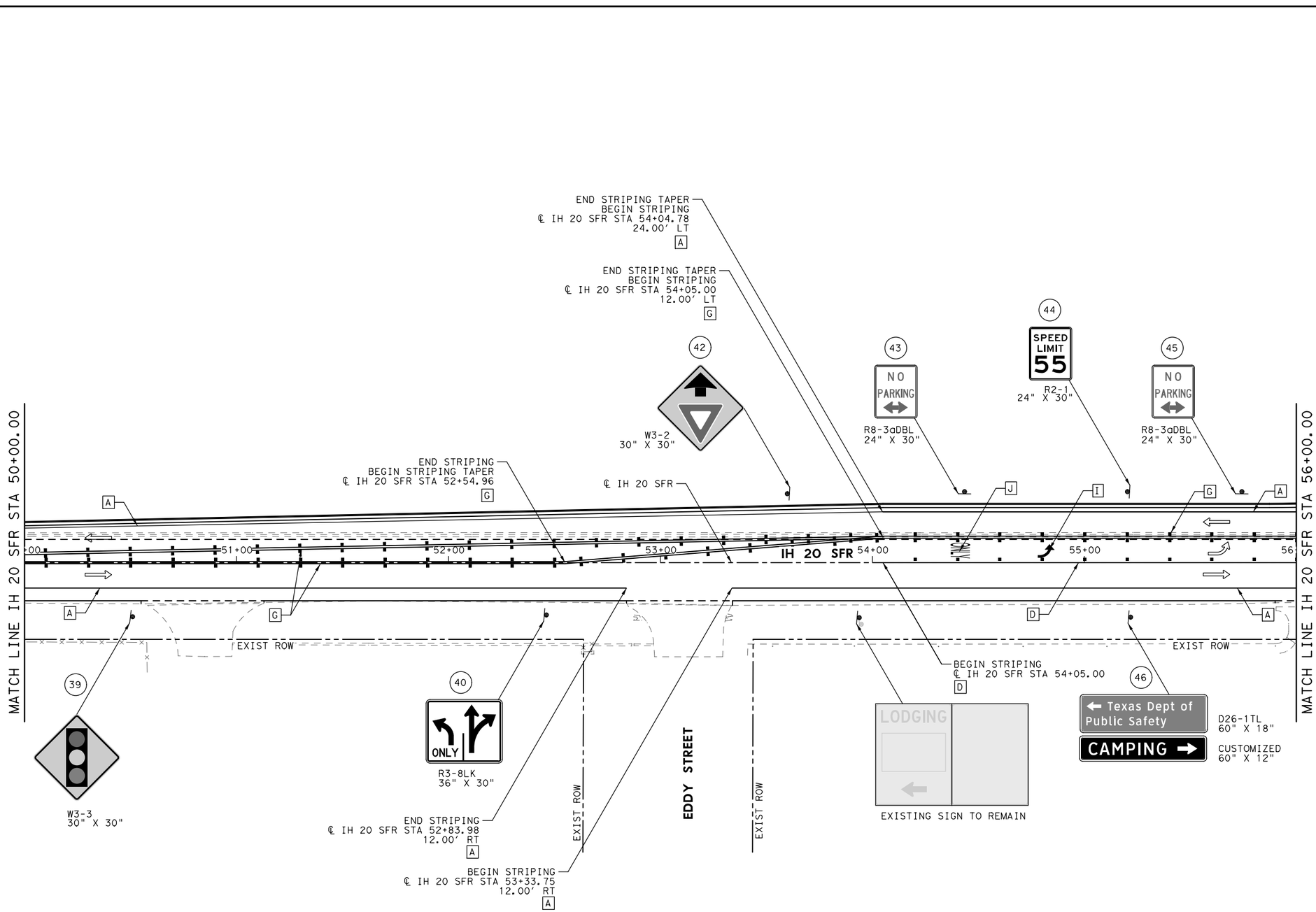
Texas Department of Transportation

IH 20 SFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 9 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS	STATE	DISTRICT	COUNTY
JMT	TEXAS	ODA	REEVES
CHECK	CONTROL	SECTION	JOB
JMT	0003	07	064, ETC
CHECK			SHEET NO.
JMT			164

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*SIGN.dgn



0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
SIGNING & PAVEMENT MARKING PLAN
AT COUNTRY CLUB DR

SHEET 10 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	165
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
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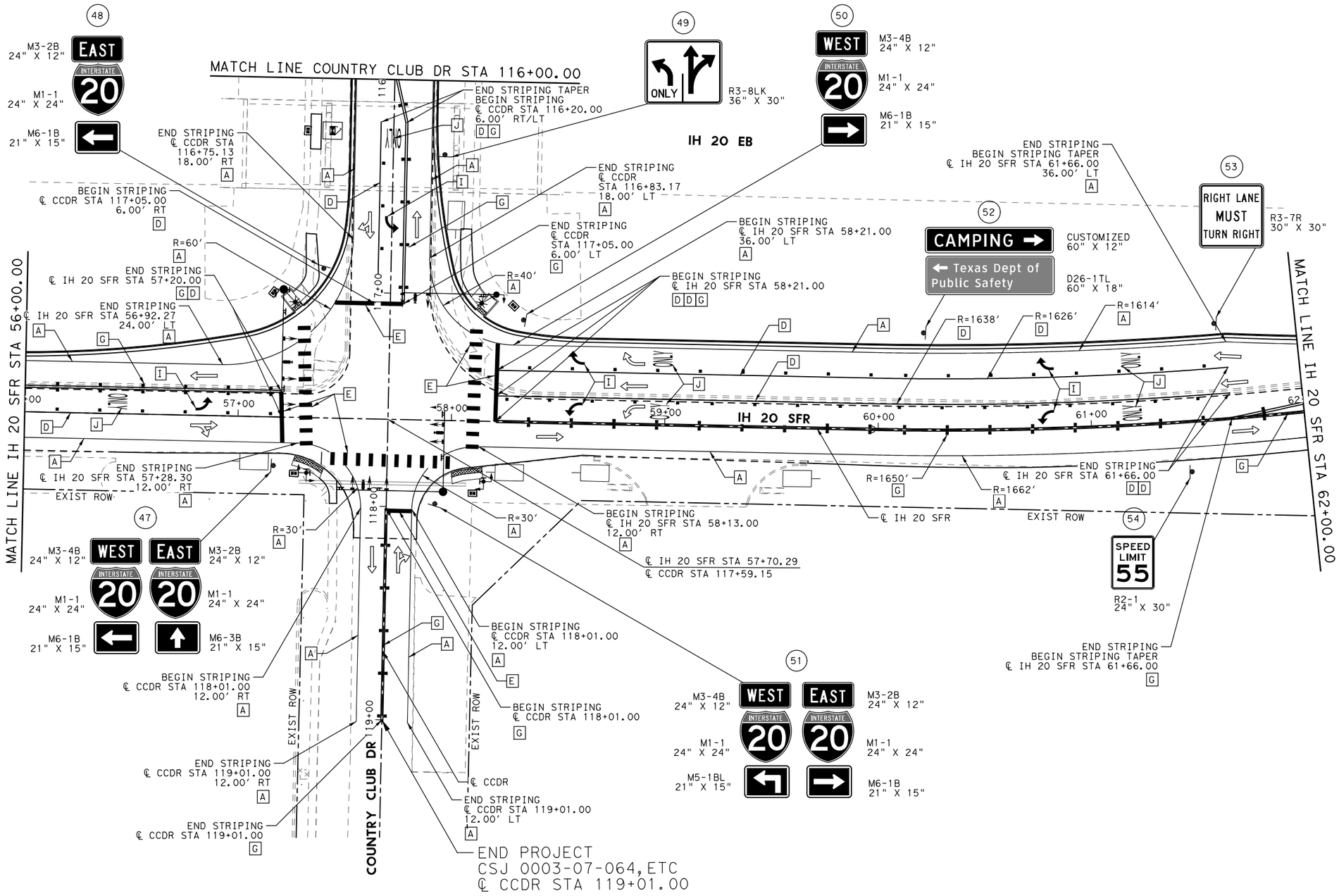

0′ 25′ 50′

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80′ C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20′ C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40′ C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 11 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS	STATE	DISTRICT	COUNTY
JMT	TEXAS	ODA	REEVES
CHECK	CONTROL	SECTION	JOB
JMT	0003	07	064,ETC

SHEET NO. 166

DATE: 3/30/2022
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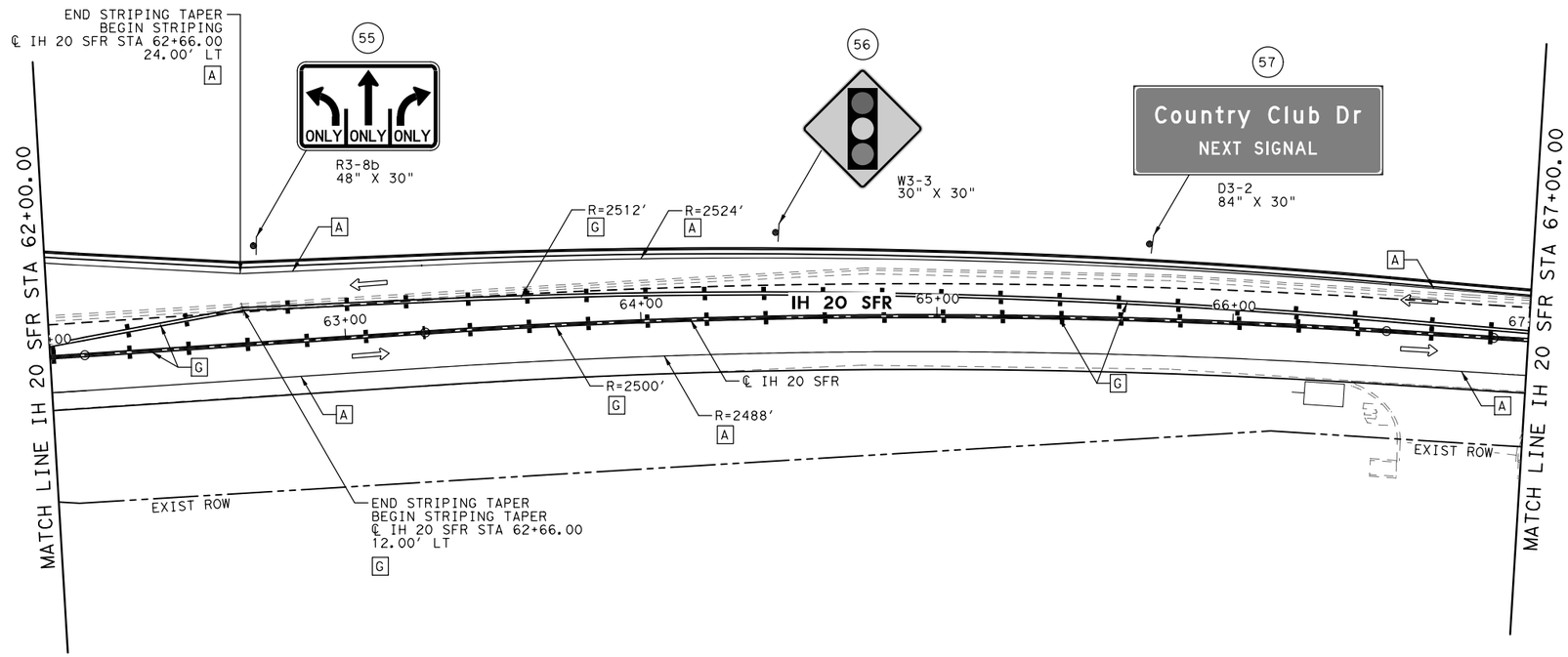

0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R Perry

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
SIGNING & PAVEMENT MARKING PLAN AT COUNTRY CLUB DR

SHEET 12 OF 13

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	167
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
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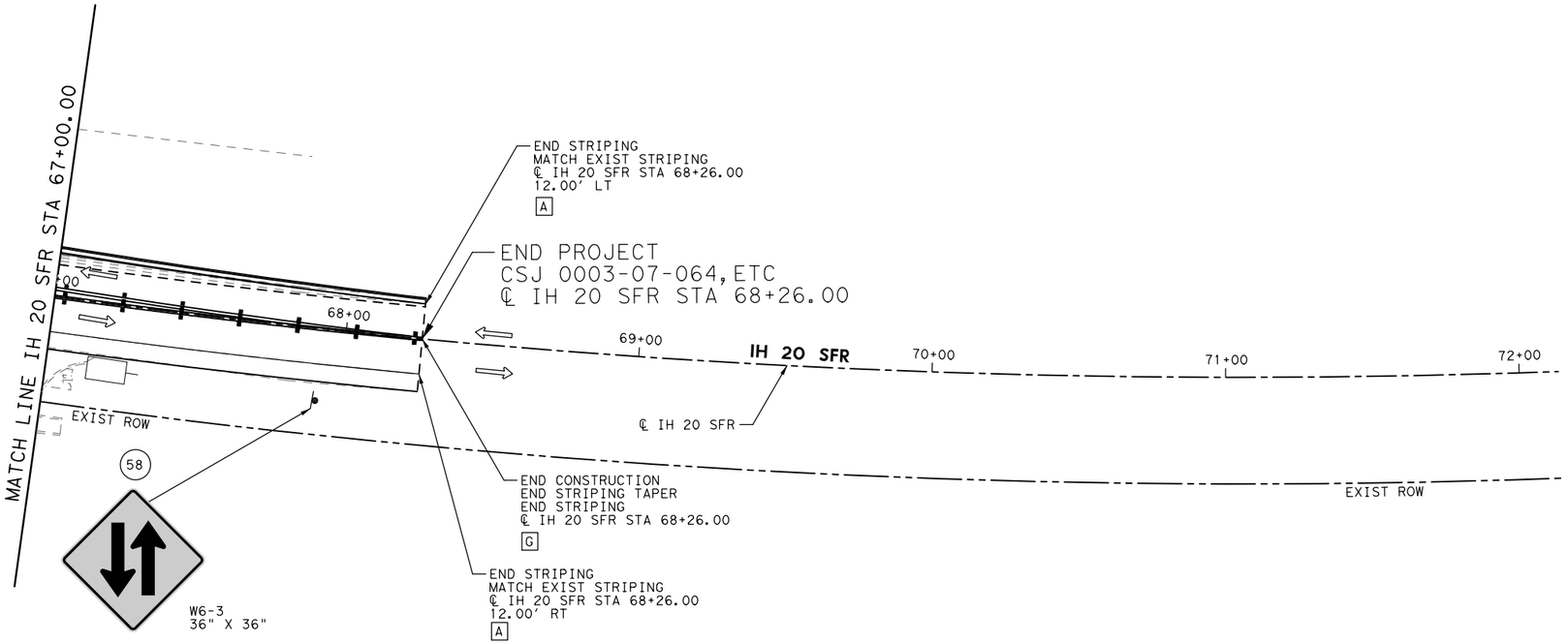

0' 25' 50'

SCALE IN FEET

LEGEND

A	RE PM W/RET REQ TY I (W)4"(SLD)
B	RE PM W/RET REQ TY I (W)4"(BRK) W/TYPE I-C @ 80' C/C
C	REFL PAV MRK TY I (W)8"(SLD)
D	REFL PAV MRK TY I (W)8"(SLD) W/TYPE I-C @ 20' C/C
E	PREFAB PAV MRK TY C(W)24"(SLD)
F	RE PM W/RET REQ TY I (Y)4"(SLD)
G	REFL PAV MRK TY I (Y)4"(DBL) W/TYPE II-A-A @ 40' C/C
H	REFL PAV MRK TY I (W)36"(YLD TRI)
I	PREFAB PAV MRK TY C (W)(ARROW)
J	PREFAB PAV MRK TY C (W)(WORD)
	INSTL DEL ASSM (D-SW)SZ 1 (WFLX)GND
	INSTL DEL ASSM (D-DY)SZ 1 (YFLX)GND
	INSTL OM ASSM (OM-2Z)(WFLX)GND
	TRAFFIC DIRECTION
	PROP SIGN ASSEMBLY
XXX	PROP SIGN NUMBER

NOTES:

1. REMOVE ALL EXISTING SIGNS UNLESS OTHERWISE SPECIFIED.
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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R. Perry

JMT TBPE REGISTRATION NO. F-16341

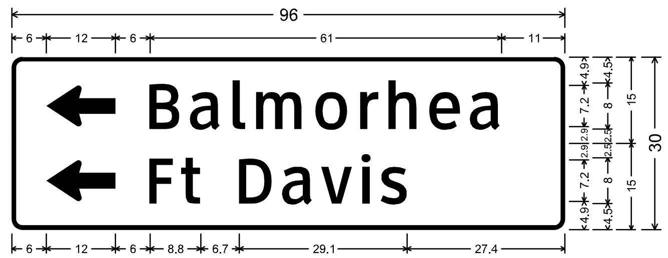
Texas Department of Transportation

IH 20 SFR
SIGNING & PAVEMENT MARKING PLAN
AT COUNTRY CLUB DR

SHEET 13 OF 13

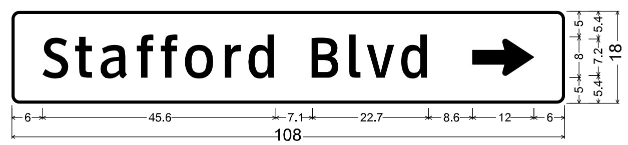
DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	168
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*SIGN.dgn



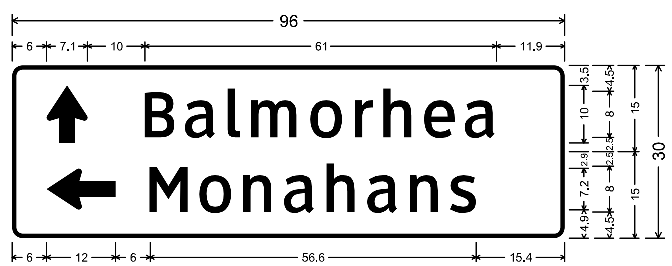
SIGN NO. 504, 506

D1-2 8in LT-LT;
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0: X 7.1: 180'; "BALMORHEA" ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1 " 180'; "FT DAVIS" Clearview Hwy-3-W;



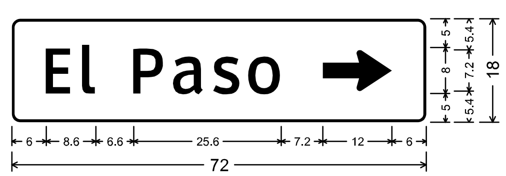
SIGN NO. 507

D1-1 8in RT;
1.5" Radius, 0.5" Border, White on, Green;
"Stafford Blvd" ClearviewHwy-3-W; Standard Arrow Custom 12.0" X 7.1" 0';



SIGN NO. 513

D1-2 8in UP-LT;
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 10.0" X 7.1" 90'; "Balmorhea" ClearviewHwy-3-W;
1.9" Radius, 0.8" Border, White on, Green;
Standard Arrow Custom 12.0" X 7.1" 180'; "Monahans" ClearviewHwy-3-W;



SIGN NO. 514

D1-1 8in RT;
1.5" Radius, 0.5" Border, White on, Green;
"El Paso" ClearviewHwy-3-W; Standard Arrow Clustom 12.0" X 7.1" 0';

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER
Mohammed S Ula
06/24/2021

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

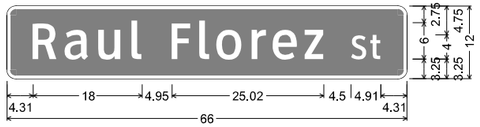
SIGN DETAILS

SCALE: NTS

DESIGN AH	FED. RD. DIV. NO. 6	FEDERAL AID PROJECT NO. (SEE TITLE SHEET)		HIGHWAY NO. IH20
GRAPHICS AH	STATE TEXAS	DISTRICT ODA	COUNTY REEVES	SHEET NO. 169
CHECK SU	CONTROL 0003	SECTION 07	JOB 064, ETC	
CHECK ZS				

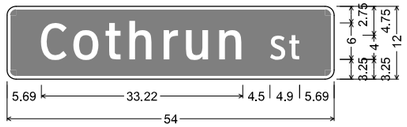
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des

DATE: 3/30/2022



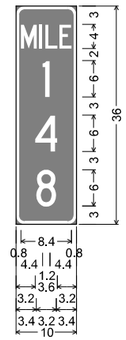
D3-1G(3) 6In (Principal legend with descending strokes);
1.50" Radius, 0.50" Border, White on, Green;
"Raul Florez", ClearviewHwy-3-W; "St", ClearviewHwy-3-W;
Table of letter and object lefts

R 4.31	a 9.57	u 15.13	l 20.62	F 27.26	l 31.81	o 34.62	r 40.35	e 43.91	z 49.09
S 56.78	t 59.97								



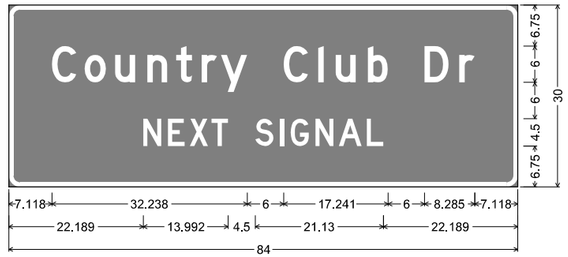
D3-1G(3) 6in (Principal legend with descending strokes);
1.50" Radius, 0.50" Border, White on, Green;
"Cothrun", ClearviewHwy-3-W;
"St", ClearviewHwy-3-W;
Table of letter and object lefts

C 5.69	o 11.04	t 16.26	h 20.30	r 25.82	u 29.62	n 35.11
S 43.41	t 46.59					



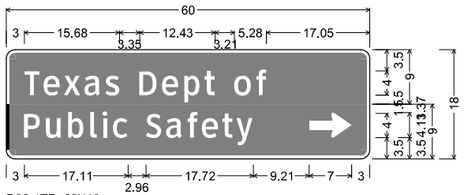
MILE SIGN;
1.5" Radius, 0.5" Border, White on, Green;
"MILE", C 50% spacing;
"1", C;
"4", C;
"8", C;
Table of letter and object lefts

M 0.8	I 3.8	L 4.8	E 7.2
I 4.4			
4 3.2			
8 3.4			



D3-2;
1.875" Radius, 0.750" Border, White on, Green;
"Country Club Dr", D; "NEXT SIGNAL", D;
Table of letter and object lefts

C 7.118	o 12.502	u 17.544	n 22.844	t 27.618	r 31.828	y 35.010	
C 45.356	I 51.060	u 53.953	b 59.252	D 68.597	r 74.340		
N 22.189	E 26.267	X 29.853	T 33.439	S 40.681	I 44.760	G 46.518	N 50.596	A 54.464	L 59.069

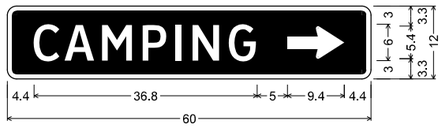


D26-1TR_60X18;

1.50" Radius, 0.50" Border, White on, Green;
"Texas Dept of", ClearviewHwy-3-W;

1.50" Radius, 0.50" Border, White on, Green;
"Public Safety", ClearviewHwy-3-W;
Standard Arrow Custom 7.00" X 4.13" 0';
Table of letter and object lefts

T 3.00	e 6.21	x 9.53	a 12.94	s 16.38	D 22.03	e 25.76	p 29.44	t 32.74
o 37.67	f 41.26							
P 3.00	u 6.62	b 10.28	l 13.92	l 15.88	c 17.67			
S 23.07	a 26.44	f 29.92	e 32.33	t 35.68	y 38.01	→ 50.00		



CUSTOMIZED, 60" x 12"
1.5" Radius, 0.8" Border, White on, Blue;
"CAMPING", ClearviewHwy-3-W;
Standard Arrow Custom 9.4" X 5.4" 0';
Table of letter and object lefts

C 4.4	A 9.5	M 15.7	P 22.4	I 27.8	N 30.6	G 36.6	→ 46.2

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SIGN DETAILS

SCALE: NTS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	170
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*S

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	NOTE
IH 20-SH 17 SHEET 6 OF 8	501	R4-7	KEEP RIGHT	36"x48"	X		10 BWG	1	SA	P		
	502	W3-3	SIGNAL AHEAD	30"x30"	X		10 BWG	1	SA	P		
	503	W3-2	YIELD AHEAD	36"x36"	X		10 BWG	1	SA	P		
	515	M3-2B	EAST	36"x18"	X		S80	1	SA	P		
		M1-1	INTERSTATE 20	36"x36"	X							
		M6-1LB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
	516	D9-2	HOSPITAL	30"x30"	X		10 BWG	1	SA	P		
		M6-1RB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
	517	M1-6T	17 TEXAS	36"x36"	X		10 BWG	1	SA	P		
		M6-4	DIRECTIONAL ARROW (BOTH)	30"x24"	X							
	518	R1-2	YIELD	48"x48"x48"	X		10 BWG	1	SA	T		
	519	M3-3	SOUTH	36"x18"	X		10 BWG	1	SA	P		
		M1-6T	17 TEXAS	36"x36"	X							
	520	M3-4B	WEST	36"x18"	X		S80	1	SA	U		
		M1-1	INTERSTATE 20	36"x36"	X							
		M6-3B	DIRECTIONAL ARROW (UP)	30"x24"	X							
		M3-2B	EAST	36"x18"	X							
		M1-1	INTERSTATE 20	36"x36"	X							
		M6-1RB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
	523	D9-2	HOSPITAL	30"x30"	X		10 BWG	1	SA	P		
		M6-1RB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
IH 20 -SH 17 SHEET 7 OF 8	504	D1-2	BALMORHEA FT DAVIS	96"x30"	X		S80	1	SA	U	BM	
IH 20-SH 17 SHEET 1 OF 8	499	R14-1	TRUCK ROUTE	24"x18"	X		10 BWG	1	SA	P		
		M6-6R	DIRECTIONAL ARROW (UP AND HORIZONTAL)	21"x15"	X							
	498	M3-3	SOUTH	36"x18"	X		10 BWG	1	SA	P		
		M1-6T	17 TEXAS	36"x36"	X							
	497	M3-3	HOSPITAL	30"x30"	X		10 BWG	1	SA	P		
		M6-1RB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
	496	D3-3aT	CEMETERY	66"X12"	X		10 BWG	1	SA	T		
	495	M3-2B	EAST	36"x18"	X		S80	1	SA	P		
		M1-6R	FARM TO MARKET ROAD 761	36"x36"	X							
		M6-1RB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							

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

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

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

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula

03/30/2022

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

SUMMARY OF SMALL SIGNS

SHEET 1 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
AH	6	(SEE TITLE SHEET)	IH20
GRAPHICS AH	STATE	DISTRICT	COUNTY
CHECK SU	TEXAS	ODA	REEVES
CHECK ZS	CONTROL	SECTION	JOB
	0003	07	064, ETC

SHEET NO. 171

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing\SUMMARY OF SMALL SIGNS.dgn

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION PREFABRICATED	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext	NOTE
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	
IH 20-SH 17 SHEET 3 OF 8	505	W3-3	SIGNAL AHEAD	30"x30"	X		10 BWG	1	SA	P		
	509	M3-4B	WEST	36"x18"	X		S80	1	SA	U		
		M1-1	INTERSTATE 20	36"x36"	X							
		M6-1LB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
		M3-2B	EAST	36"x18"	X							
		M1-1	INTERSTATE 20	36"x36"	X							
		M6-3	DIRECTIONAL ARROW (UP)	30"x24"	X							
	510	M1-6T	17 TEXAS	36"x36"	X		10 BWG	1	SA	P		
		M6-4	DIRECTIONAL ARROW (BOTH)	30"x24"	X							
	511	W1-7T	LARGE ARROW, TWO HEADED	96"x36"	X		S80	1	SA	U	BM	
	512	M3-1	NORTH	36"x18"	X		S80	1	SA	U	1EXT	
		M1-6T	17 TEXAS	36"x36"	X							
		M6-3	DIRECTIONAL ARROW (UP)	30"x24"	X							
		M3-4B	WEST	36"x18"	X							
		M1-1	INTERSTATE 20	36"x36"	X							
		M6-1RB	DIRECTIONAL ARROW (HORIZONTAL)	30"x24"	X							
IH 20 -SH 17 SHEET 4 OF 8	506	D1-2	BALMORHEA FT DAVIS	96"x30"	X		S80	1	SA	U	BM	
IH 20 -SH 17 SHEET 5 OF 8	513	D1-2	BALMORHEA MONAHANS	96"x30"	X		S80	1	SA	U	BM	
IH 20 -SH 17 SHEET 8 OF 8	514	D1-1	EL PASO	72"x18"	X		S80	1	SA	T		
	521	R3-7R	RIGHT LANE MUST TURN RIGHT	48"x48"	X		10 BWG	1	SA	P		
	522	W3-3	SIGNAL AHEAD	30"x30"	X		10 BWG	1	SA	P		
IH 20 -SH 17 SHEET 2 OF 8	507	D1-1	STAFFORD BLVD.	108"X18"	X		10 BWG	1	SA	T	2EXT	
	508	W3-3	SIGNAL AHEAD	30"x30"	X		10 BWG	1	SA	P		
	500	M2-1B	JCT	30"X24"	X		10 BWG	1	SA	P		
		M1-1	INTERSTATE 20	36"x36"	X							

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

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

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER

Mohammed S Ula

03/30/2022

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

SUMMARY OF SMALL SIGNS

SHEET 2 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
AH	6	(SEE TITLE SHEET)	IH20
GRAPHICS AH	STATE	DISTRICT / COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA / REEVES	172
CHECK ZS	CONTROL	SECTION / JOB	
	0003	07 / 064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	FLAT ALUMINUM (TYPE G)	SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass TWT = Thin-wall 10BWG = 10 BWG S80 = Sched 80	SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POSTS: 1 or 2	SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX) ANCHOR TYPE: UA = Universal Conc UB = Universal Bolt SA = Slipbase-Conc SB = Slipbase-Bolt WS = Wedge Steel WP = Wedge Pistic	SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX) MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX) MOUNTING DESIGNATION: 1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL = Extruded Alum. Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY= TYPE TY N TY S
IH 20 - CCDR SHEET 1 OF 13	1	R1-2	YIELD	36" x 36" x 36"	x		10BWG	1	SA	T		
		R1-2bTP	TO RAMP	21" x 15"	x							
	2	M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x		10BWG	1	SA	P		
		M1-1	IH 20	24" x 24"	x							
		M6-2BL	ARROW - STRGT TO THE NORTH WEST (AUX. SIGN)	21" x 15"	x							
IH 20 - CCDR SHEET 2 OF 13	4	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	x		10BWG	1	SA	T		
		D10-3	3 DIGIT MILE MARKER	10" x 36"	x							
	5	D3-2	DESTINATION - 2 LINES	84" x 30"	x		S80	1	SA	T		
	6	D26-1TL	TEXAS DEPT OF PUBLIC SAFETY TO THE LEFT	60" x 18"	x		10BWG	1	SA	U		
	7	D26-1TR	TEXAS DEPT OF PUBLIC SAFETY TO THE RIGHT	60" x 18"	x		10BWG	1	SA	U		
	8	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	30" x 30"	x		10BWG	1	SA	P		
IH 20 - CCDR SHEET 3 OF 13	3	M3-2B	EAST CARDINAL DIRECTION	24" x 12"	x		S80	1	SA	U		
		M1-1	IH 20	24" x 24"	x							
		M5-1BL	ARROW - VERTICAL STRGHT THEN TO THE LEFT (AUX. SIGN)	21" x 15"	x							
		M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x							
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE RIGHT (AUX. SIGN)	21" x 15"	x							
	9	R3-8LK	ADVANCED INTERSECTION LANE CONTROL	36 " x 30"	x		10BWG	1	SA	T		
	10	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	x		10BWG	1	SA	P		
	11	R7-1DBL	NO PARKING ANY TIME	12" x 18"	x		10BWG	1	SA	P		
	12	M3-2B	EAST CARDINAL DIRECTION	24" x 12"	x		10BWG	1	SA	P		
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE RIGHT (AUX. SIGN)	21" x 15"	x							
	13	R3-8LK	ADVANCED INTERSECTION LANE CONTROL	36 " x 30"	x		10BWG	1	SA	T		
	14	M3-2B	EAST CARDINAL DIRECTION	24" x 12"	x		S80	1	SA	U		
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE LEFT (AUX. SIGN)	21" x 15"	x							
		M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x							
		M1-1	IH 20	24" x 24"	x							
		M6-3B	ARROW - VERTICAL STRGHT (AUX. SIGN)	21" x 15"	x							
	15	M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x		10BWG	1	SA	P		
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE LEFT (AUX. SIGN)	21" x 15"	x							
	16	D26-1TL	TEXAS DEPT OF PUBLIC SAFETY TO THE LEFT	60" x 18"	x		10BWG	1	SA	T		
IH 20 - CCDR SHEET 4 OF 13	17 & 18	R7-1DBL	NO PARKING ANY TIME	12" x 18"	x		10BWG	1	SA	P		
	19	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	x		10BWG	1	SA	P		
	20	R3-8LK	ADVANCED INTERSECTION LANE CONTROL	36 " x 30"	x		10BWG	1	SA	T		
IH 20 - CCDR SHEET 5 OF 13	21	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	30" x 30"	x		10BWG	1	SA	P		
	22	D3-2	DESTINATION - 2 LINES	84" x 30"	x		S80	1	SA	T		
	23	W3-2	SYMBOL - YIELD AHEAD	30" x 30"	x		10BWG	1	SA	P		
	24	W6-3	SYMBOL - TWO WAY TRAFFIC	36' x 36"	x		10BWG	1	SA	T		
IH 20 - CCDR SHEET 6 OF 13	25 & 27	R1-2	YIELD	36" x 36" x 36"	x		10BWG	1	SA	T		
		R1-2bTP	TO RAMP	21" x 15"	x							
	26	W6-3	SYMBOL - TWO WAY TRAFFIC	36' x 36"	x		10BWG	1	SA	T		
	28	R5-1	DO NOT ENTER	36" x 36"	x		10BWG	1	SA	T		
IH 20 - CCDR SHEET 7 OF 13	29	R5-1A	WRONG WAY	36" x 24"	x		10BWG	1	SA	P		

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

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STATE OF TEXAS
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03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SUMMARY OF SMALL SIGNS

SHEET 3 OF 4

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064,ETC

SHEET NO. 173

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*SS*

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	FLAT ALUMINUM (TYPE G)	SMA RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE: FRP = Fiberglass TWT = Thin-wall 10BWG = 10 BWG S80 = Sched 80	POSTS: 1 or 2	ANCHOR TYPE: UA = Universal Conc UB = Universal Bolt SA = Slipbase-Conc SB = Slipbase-Bolt WS = Wedge Steel WP = Wedge Plstic	MOUNTING DESIGNATION: PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext. BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL = Extruded Alum. Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY= TYPE TY N TY S
IH 20 - CCDR SHEET 9 OF 13	30	R5-1A	WRONG WAY	36" x 24"	x		10BWG	1	SA	P		
	31	R5-1A	WRONG WAY	36" x 24"	x		10BWG	1	SA	P		
	32	R5-1	DO NOT ENTER	36" x 36"	x		10BWG	1	SA	T		
	33	R5-1	DO NOT ENTER	36" x 36"	x		10BWG	1	SA	T		
	34	R1-2	YIELD	36" x 36" x 36"	x		10BWG	1	SA	T		
		R1-2bTP	TO RAMP	21" x 15"	x							
	35	R1-2	YIELD	36" x 36" x 36"	x		10BWG	1	SA	T		
		R1-2bTP	TO RAMP	21" x 15"	x							
	36	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	x		10BWG	1	SA	T		
	37	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	x		10BWG	1	SA	T		
	38	D3-2	DESTINATION - 2 LINES	84" x 30"	x		S80	1	SA	T		
IH 20 - CCDR SHEET 10 OF 13	39	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	30" x 30"	x		10BWG	1	SA	P		
	40	R3-8LK	ADVANCED INTERSECTION LANE CONTROL	36 " x 30"	x		10BWG	1	SA	P		
	42	W3-2	SYMBOL - YIELD AHEAD	30" x 30"	x		10BWG	1	SA	P		
	43	R8-3aDBL	NO PARKING	24" x 30"	x		10BWG	1	SA	P		
	44	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	x		10BWG	1	SA	P		
	45	R8-3aDBL	NO PARKING	24" x 30"	x		10BWG	1	SA	P		
	46	D26-1TL	TEXAS DEPT OF PUBLIC SAFETY TO THE LEFT	60" x 18"	x		10BWG	1	SA	U		
		CUSTOMIZED	CAMPING (TO THE RIGHT)	60" x 12"	x							
IH 20 - CCDR SHEET 11 OF 13	47	M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x		S80	1	SA	U		
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE LEFT (AUX. SIGN)	21" x 15"	x							
		M3-2B	EAST CARDINAL DIRECTION	24" x 12"	x							
		M1-1	IH 20	24" x 24"	x							
		M6-3B	ARROW - VERTICAL STRGHT (AUX. SIGN)	21" x 15"	x							
	48	M3-2B	EAST CARDINAL DIRECTION	24" x 12"	x		10BWG	1	SA	P		
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE LEFT (AUX. SIGN)	21" x 15"	x							
	49	R3-8LK	ADVANCED INTERSECTION LANE CONTROL	36 " x 30"	x		10BWG	1	SA	P		
	50	M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x		10BWG	1	SA	P		
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE RIGHT (AUX. SIGN)	21" x 15"	x							
	51	M3-4B	WEST CARDINAL DIRECTION	24" x 12"	x		S80	1	SA	U		
		M1-1	IH 20	24" x 24"	x							
		M5-1BL	ARROW - VERTICAL STRGHT THEN TO THE LEFT (AUX. SIGN)	21" x 15"	x							
		M3-2B	EAST CARDINAL DIRECTION	24" x 12"	x							
		M1-1	IH 20	24" x 24"	x							
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE RIGHT (AUX. SIGN)	21" x 15"	x							
	52	CUSTOMIZED	CAMPING (TO THE LEFT)	60" x 12"	x		10BWG	1	SA	U		
		D26-1TR	TEXAS DEPT OF PUBLIC SAFETY TO THE RIGHT	60" x 18"	x							
	53	R3-7R	RIGHT LANE MUST TURN RIGHT	30" x 30"	x		10BWG	1	SA	P		
	54	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	x		10BWG	1	SA	P		
IH 20 - CCDR SHEET 12 OF 13	55	R3-8b	ADVANCED INTERSECTION LANE CONTROL	48 " x 30"	x		10BWG	1	SA	T		
	56	W3-3	SYMBOL - SIGNALIZED INTERSECTION AHEAD	30" x 30"	x		10BWG	1	SA	P		
	57	D3-2	DESTINATION- 2 LINES	84" x 30"	x		S80	1	SA	T		
IH 20 - CCDR SHEET 13 OF 13	58	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	x		10BWG	1	SA	T		

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

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

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SUMMARY OF SMALL SIGNS

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)	IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY / SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES
CHECK JMT	CONTROL	SECTION	JOB
	0003	07	064,ETC

174

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*S

REF. MRK	LOC.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	0644-6076 REMOVE SM RD SN SUP & AM
IH 20 - SH 17 INTERSECTION					EA.
0+55	NORTH	R4-7	KEEP RIGHT OF MEDIAN	36X48	1
0+56	NORTH	R1-1	KEEP RIGHT OF MEDIAN	36X36	1
0+60	NORTH	R1-1	STOP	36X36	1
1+16	SOUTH	R1-2	YIELD	48X48X48	1
2+45	NORTH	D1-2	← BALMORHEA, ← FT DAVIS	96X30	1
4+14	SOUTH	W3-2	YIELD AHEAD	36X36	1
4+65	NORTH	D1-2	← BALMORHEA, ← FT DAVIS	96X30	1
56+65	EAST	M3-2B	EAST	36X18	1
		M1-6R	FARM TO MARKET ROAD 761	36X36	
		M6-1RB	DIRECTIONAL ARROW	30X24	
57+89	WEST	D3-3aT	CEMETERY →	66X12	1
58+19	EAST	D9-2	HOSPITAL	30X30	1
		M6-1RB	DIRECTIONAL ARROW	30X24	
58+55	WEST	M3-3	SOUTH	36X18	1
		M1-6T	17 TEXAS	36X18	
59+02	EAST	R14-1	TRUCK ROUTE	24X18	1
		M6-6R	DIRECTIONAL ARROW	21X15	
60+08	EAST	D1-1	STAFFORD BLVD. →	114X18	1
62+22	WEST	M2-1B	JCT	30X24	1
		M1-1	INTERSTATE 20	36X36	
68+24	WEST	M3-4B	WEST	36X18	1
		M1-1	INTERSTATE 20	36X36	
		M6-1B	DIRECTIONAL ARROW	30X18	
		M3-2B	EAST	36X18	
		M1-1	INTERSTATE 20	36X36	
		M6-3B	DIRECTIONAL ARROW	30X18	
68+40	WEST	M1-6T	17 TEXAS	36X36	1
		M6-4	DIRECTIONAL ARROW	30X18	
69+39	SOUTH	M3-1	NORTH	36X18	1
		M1-6T	17 TEXAS	36X36	
		M6-3	DIRECTIONAL ARROW	30X18	
		M3-4B	WEST	36X18	
		M1-1	INTERSTATE 20	36X36	
		D9-2	HOSPITAL	36X36	
		M6-1B	DIRECTIONAL ARROW	30X18	
73+20	EAST	D1-1	EL PASO →	72X18	1
76+21	EAST	D9-2	HOSPITAL	36X36	1
		M6-1B	DIRECTIONAL ARROW	30X18	
76+25	EAST	M6-1B	17 TEXAS	36X36	1
		M6-4	DIRECTIONAL ARROW	30X18	
				SUBTOTAL:	20

SIGN ASSEMBLIES TO BE REMOVED AND NOT REPLACED

STATE OF TEXAS
MOHAMMED S ULA
131559
LICENSED
PROFESSIONAL ENGINEER
Mohammed S Ula
03/30/2022

infraTECH
Engineers & Innovators, LLC
TBPE REGISTRATION NO. F-18368

Texas Department of Transportation

SIGNING REMOVAL SUMMARY

SHEET 1 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
AH	6	(SEE TITLE SHEET)		IH20
GRAPHICS AH	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK SU	TEXAS	ODA	REEVES	175
CHECK ZS	CONTROL 0003	SECTION 07	JOB 064,ETC	

FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Des

DATE: 3/30/2022

REF. MRK	LOC.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	0644-6076 REMOVE SM RD SN SUP&AM
IH 20 NFR					
46+61	16′ RT	R1-2	YIELD	36" x 36" x 36"	1
49+43	27′ LT	M3 - 4B	WEST CARDINAL DIRECTION	24" x 12"	1
		M1-1	IH 20	24" x 24"	
		M6-2BL	ARROW - STRGH TO THE NORTH WEST (AUX. SIGN)	21" x 15"	
49+43	26′ LT	D10-3	3 DIGIT MILE MARKER	10" x 36"	1
49+77	22′ RT	D26-1TL	TEXAS DEPT OF PUBLIC SAFETY TO THE RIGHT	60" x 18"	1
		D26-1TR	TEXAS DEPT OF PUBLIC SAFETY TO THE LEFT	60" x 18"	
52+47	18′ RT	W3-1	SYMBOL - STOP AHEAD	36" x 36′	1
53+54	30′ LT	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	1
56+48	31′ LT	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	1
56+32	18′ RT	R7-1DBL	NO PARKING ANY TIME	12" x 18"	1
57+05	20′ RT	R1-1	STOP	36" x 36"	1
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36" x 18"	
			SEE REMOVAL LAYOUTS FOR MORE INFORMATION		
58+65	19′ RT	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	1
59+40	17′ RT	R7-1DBL	NO PARKING ANY TIME	12" x 18"	1
60+03	18′ RT	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	1
64+99	24 ′ RT	W3-2	SYMBOL- YIELD AHEAD	30" x 30"	1
65+02	29′ LT	W3-1	SYMBOL - STOP AHEAD	36" x 36′	1
69+60	29′ LT	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	1
70+74	21′ RT	R1-2	YIELD	36" x 36" x 36"	1
73+15	26′ LT	R1-2	YIELD	36" x 36" x 36"	1
73+23	38′ RT	R5-1	DO NOT ENTER	36" x 36"	1
74+25	43′ RT	R5-1a	WRONG WAY	36" x 24"	1
				SUBTOTAL :	19

REF. MRK	LOC.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	0644-6076 REMOVE SM RD SN SUP&AM
IH 20 SFR					
43+86	86′ LT	R5-1a	WRONG WAY	36" x 24"	1
43+90	49′ LT	R5-1a	WRONG WAY	36" x 24"	1
45+67	25′ LT	R5-1	DO NOT ENTER	36" x 36"	1
45+91	66′ LT	R5-1	DO NOT ENTER	36" x 36"	1
45+86	24′ RT	R1-2	YIELD	36" x 36" x 36"	1
47+17	18′ LT	R1-2	YIELD	36" x 36" x 36"	1
47+61	30′ RT	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	1
49+33	29′ RT	W3-1	SYMBOL - STOP AHEAD	36" x 36′	1
53+40	19′ LT	W3-2	SYMBOL- YIELD AHEAD	30" x 30"	1
54+40	19′ LT	R7-1DBL	NO PARKING ANY TIME	12" x 18"	1
55+44	19′ LT	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	1
56+01	19′ LT	R8-3aDBL	NO PARKING	24" x 30"	1
56+76	20′ LT	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	1
57+22	22′ RT	R1-1	STOP	36" x 36"	1
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36" x 18"	
			SEE REMOVAL LAYOUTS FOR MORE INFORMATION		
57+98	38′ RT	D26-1TL	TEXAS DEPT OF PUBLIC SAFETY TO THE RIGHT	60" x 18"	1
		CUSTOMIZED	CAMPING	60" x 12"	
58+26	22′ LT	R1-1	STOP	36" x 36"	1
		W4-4P	CROSS TRAFFIC DOES NOT STOP	36" x 18"	
			SEE REMOVAL LAYOUTS FOR MORE INFORMATION		
61+02	32′ RT	R2-1	SPEED LIMIT (55 MPH)	24" x 30"	1
62+39	32′ RT	W6-3	SYMBOL - TWO WAY TRAFFIC	36" x 36"	1
66+50	20′ LT	W3-1	SYMBOL - STOP AHEAD	36" x 36′	1
				SUBTOTAL :	19

REF. MRK	LOC.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	0644-6076 REMOVE SM RD SN SUP&AM
COUNTRY CLUB DR					
113+74	26′ RT	M3-2B	EAST CARDINAL DIRECTION	24" x 12"	1
		M1-1	IH 20	24" x 24"	
		M6-1B	ARROW - VERTICAL STRGHT (AUX. SIGN)	21" x 15"	
		M3-4B	WEST CARDINAL DIRECTION	24" x 12"	
		M1-1	IH 20	24" x 24"	
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE RIGHT (AUX. SIGN)	21" x 15"	
114+86	26′ LT	M3-4B	WEST CARDINAL DIRECTION	24" x 12"	1
		M1-1	IH 20	24" x 24"	
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE LEFT (AUX. SIGN)	21" x 15"	
115+25	26′ LT	D26-1TL	TEXAS DEPT OF PUBLIC SAFETY TO THE LEFT	60" x 18"	1
117+20	26′ LT	M3-2B	EAST CARDINAL DIRECTION	24" x 12"	1
		M1-1	IH 20	24" x 24"	
		M6-1B	ARROW - HORIZONTAL STRGHT TO THE LEFT (AUX. SIGN)	21" x 15"	
				SUBTOTAL :	4

NOTES:
1. SIGN ASSEMBLIES TO BE REMOVED AND NOT REPLACED.
2. ALL EXISTING SIGN DIMENSIONS SHOWN ARE APPROXIMATE AND FOR CONTRACTOR'S REFERENCE ONLY.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SIGNING REMOVAL SUMMARY

SHEET 2 OF 2

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	176
CHECK JMT	CONTROL 0003	SECTION 07	JOB 064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\CCD*R

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

DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\

NOTE: Structures north of ice line to be designed for ice.

ZONE 2
(90 MPH WIND)

ZONE 3
(80 MPH WIND)

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 4
(70 MPH WIND)

ICE LINE

ZONE 3
(80 MPH WIND)

ZONE 1
(100 MPH WIND)

LEGEND

ZONE 1 - = (100 MPH WIND)
ZONE 2 - = (90 MPH WIND)
ZONE 3 - = (80 MPH WIND)
ZONE 4 - = (70 MPH WIND)
= (ICE LINE)
= (DISTRICT LINES)

APPLICABLE STANDARDS SHEETS

OVERHEAD SIGN BRIDGE STANDARDS:

OSB-SE
OSB-Z#
OSB-Z#1
HOSB-Z#
HOSB-Z1L
HOSB-Z#1
OSBT
OSBC
OSBC-SC-Z#
OSBS-SC
OSB-FD
OSB-FD-SC

CANTILEVER OVERHEAD SIGN SUPPORT STANDARDS:

COSS-SE
COSS-Z#-10
HCOSS-Z#-10
COSS-Z21-10
COSS-Z#&Z#1-10
COSSD
COSSF
COSS-FD

Note: # = Wind Zone number 1, 2, 3 or 4

HIGH MAST ILLUMINATION POLE STANDARDS:

HMIP-98
HMIF-98

WALKWAYS AND BRACKETS STANDARDS:

SWW
SB(SWL-1)

TRAFFIC SIGNAL POLE STANDARDS:

SP-80
SP-100
SMA-80
SMA-100
DMA-80
DMA-100
MA-C
MAC(ILSN)
MAD-D
TS-FD
LUM-A
CFA
LMA
TS-C
MA-DPD

FOR HARRIS CO. ONLY
Zone line is just North of US 90, around on the North, West and South sides of IH 610 and down the West side of SH 288.

FOR JACKSON CO. ONLY
Zone line is just North of SH 616.

WIND VELOCITY & ICE ZONES FOR APPLICABLE OVERHEAD SIGN SUPPORTS, HIGH MAST POLES, AND TRAFFIC SIGNAL POLES

Based on 50 Year Mean Recurrence Interval of Fastest Mile Wind Velocity at 33 feet height.

THIS SHEET TO BE INCLUDED IN ALL P.S.&E. PACKAGES CONTAINING ONE OR MORE OF THE APPLICABLE STANDARD SHEETS LISTED HEREON

Texas Department of Transportation

Traffic Operations Division Standard

WIND VELOCITY AND ICE ZONES

WV & IZ-14

FILE: windice.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1996	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-14-Added list of applicable standards, restricting use to structures designed for Fastest Mile wind speeds.	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		177

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\Traffic Signals\TxDOT Standards\ed1-14.dgn

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS		0003	07	064,ETC	IH20
		DIST	COUNTY		SHEET NO.
		ODA	REEVES		178

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\Traffic Signals\TxDOT Standards\ed3-14.dgn

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

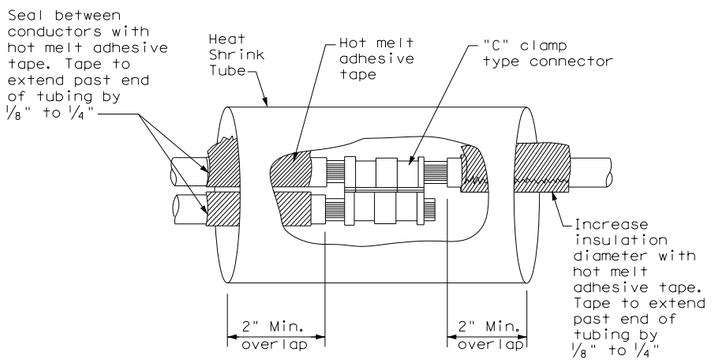
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

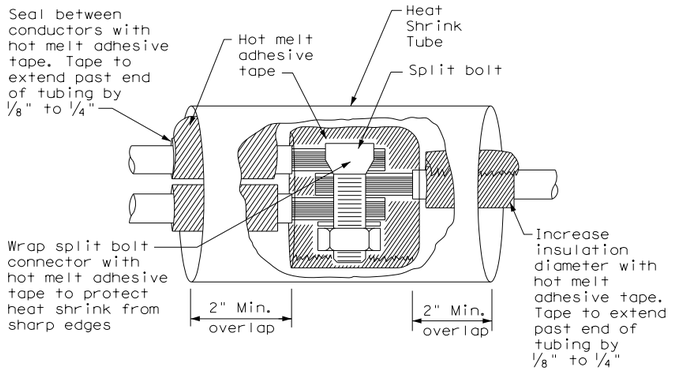
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

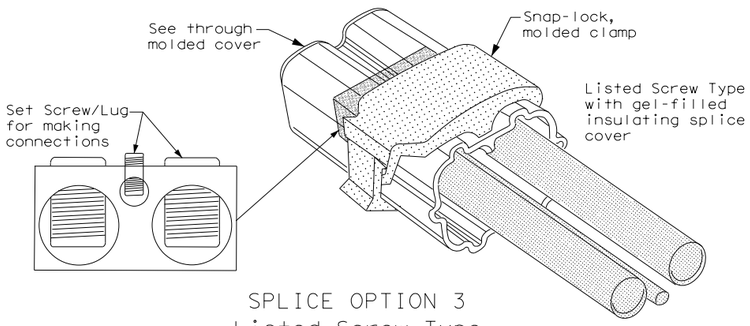
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

FILE: ed3-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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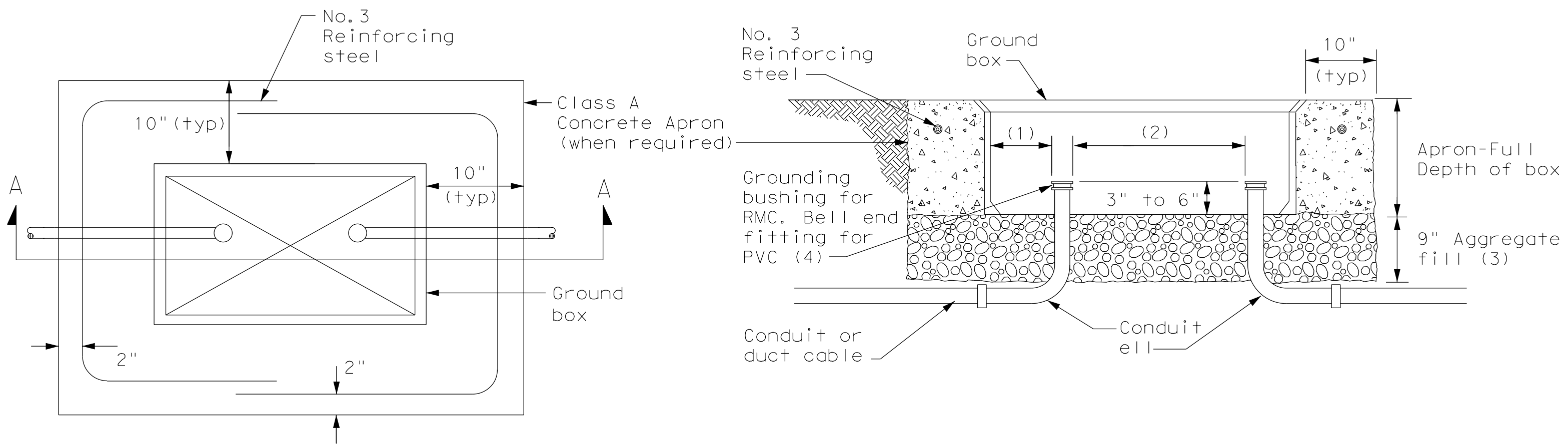
	ODA	REEVES		179

71C



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 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

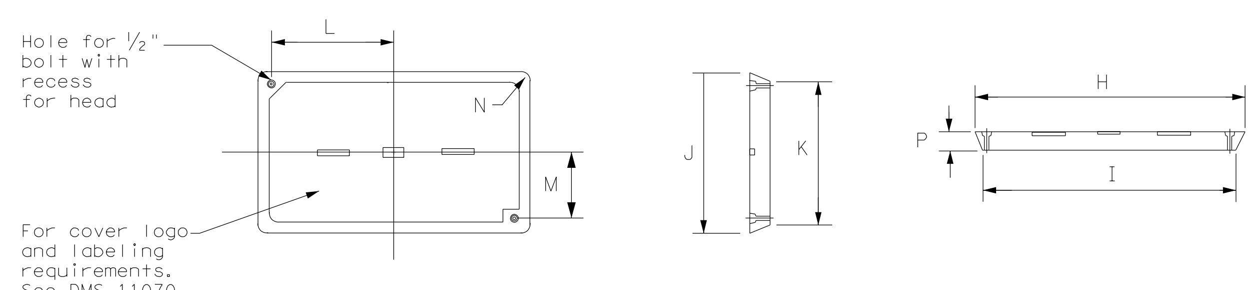
1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the 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.

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

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

FILE: ed4-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2014	CONT	SECT	JOB	HIGHWAY
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	ODA		REEVES	180

71D

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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

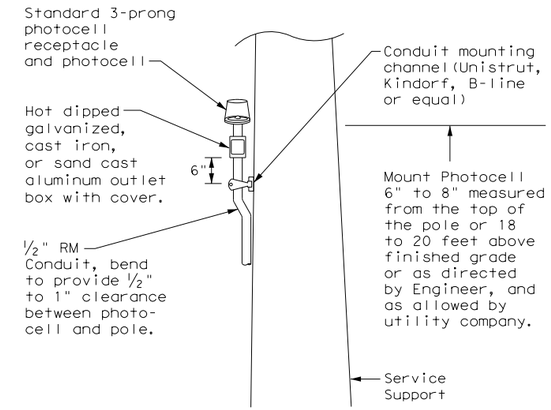
(SS)= Safety Switch Ahead of Meter-Check with Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

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

FILE: ed5-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		181

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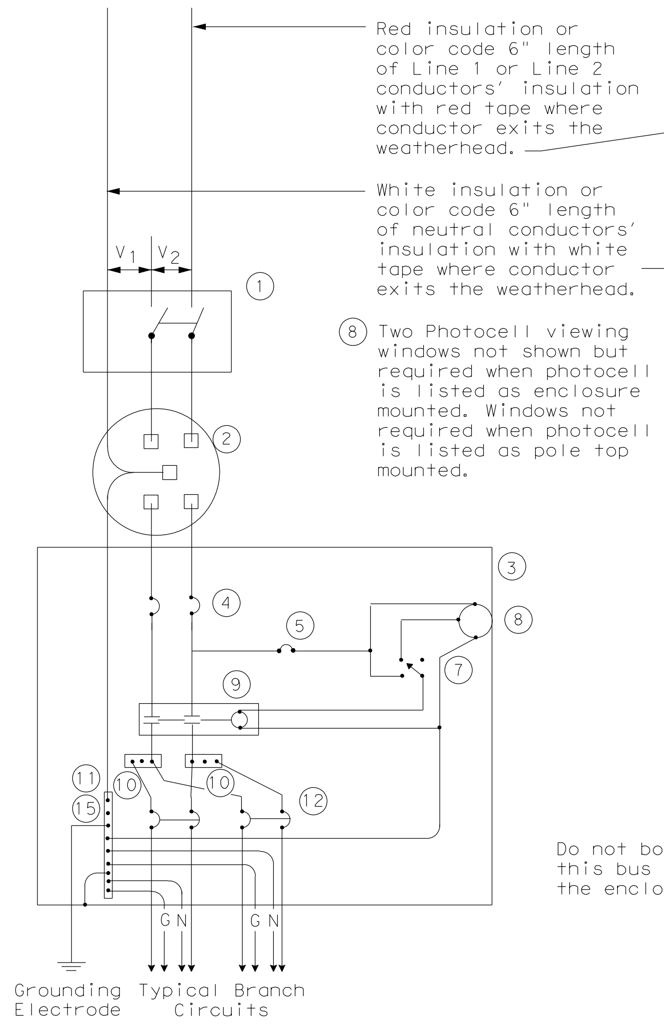
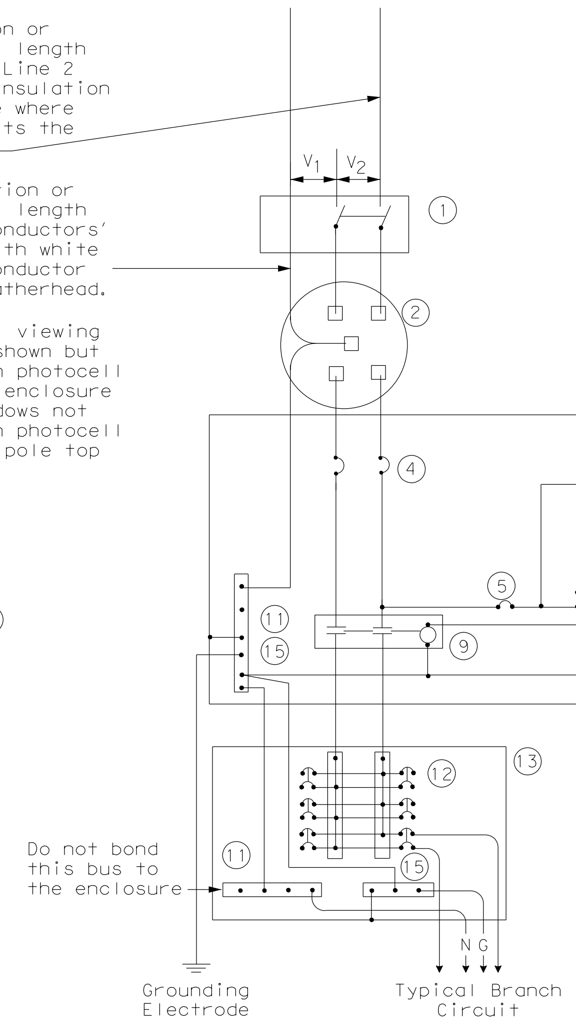
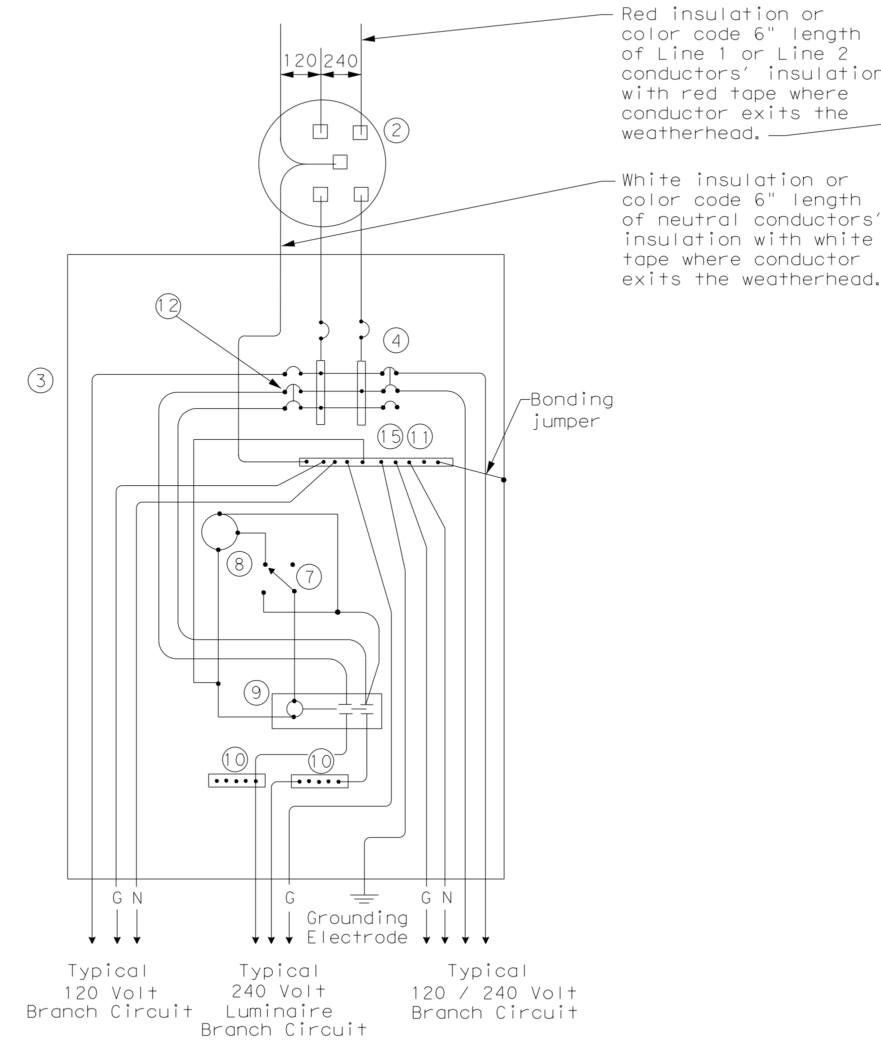
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\...\TxDOT Standards\



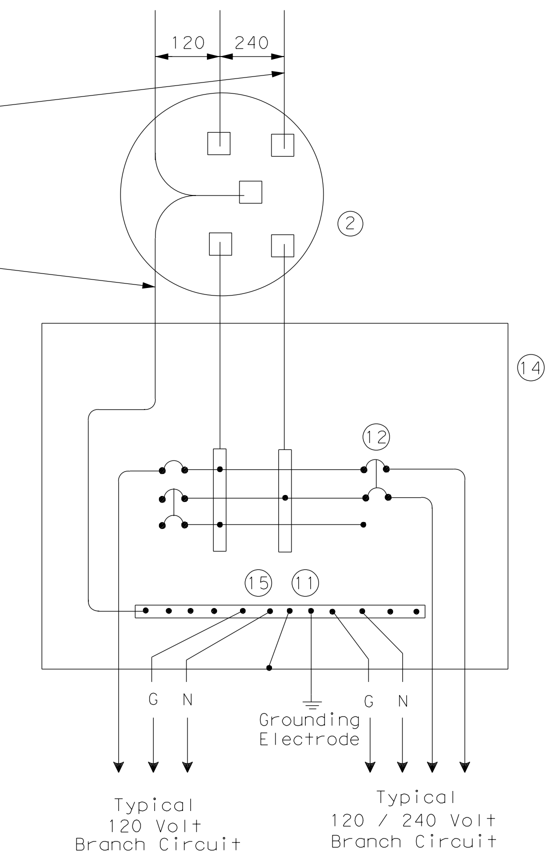
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T

120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
——	Power Wiring
——	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation — Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0003	07	064,ETC	IH20
	DIST		COUNTY	SHEET NO.
	ODA		REEVES	182

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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.

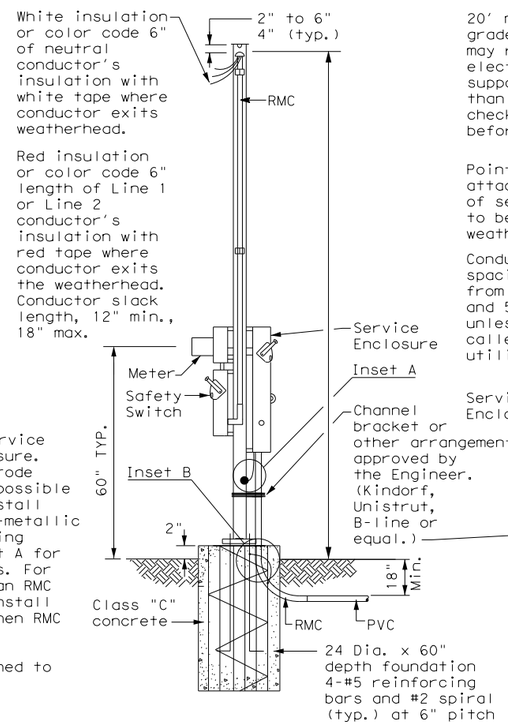
7. Drill and tap steel poles and frames for ½ in. X 13 UNC tank ground fitting. For steel pole service supports, provide and install tank ground fitting 4 in. to 6 in. below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode 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.

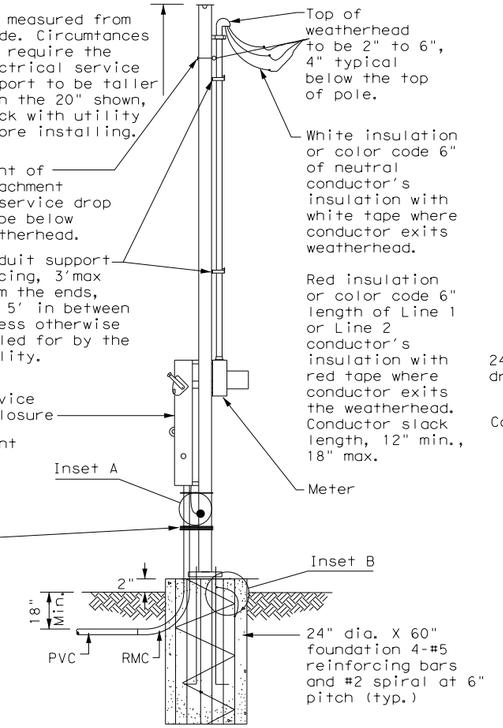
9. Provide ¼" - 20 machine screws for bonding. Do not use sheet metal screws. Remove all non-conductive material at contact points. Terminate bonding jumpers with listed devices. Install minimum size 6 AWG stranded copper bonding jumpers. Make up all threaded bonding connections wrench tight.

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.

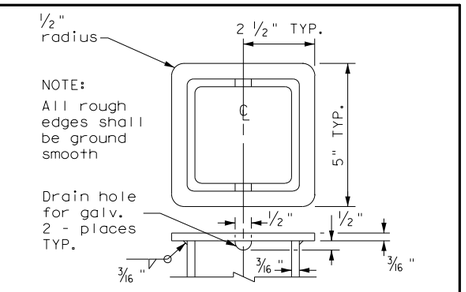


WITH SAFETY SWITCH

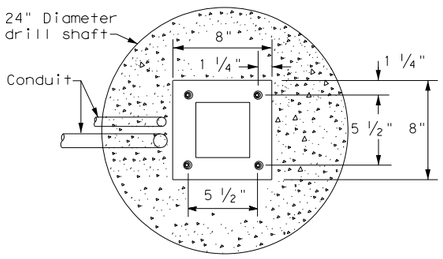


WITHOUT SAFETY SWITCH

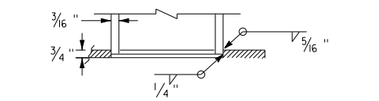
SERVICE SUPPORT TYPE SP (O) - OVERHEAD SERVICE



POLE TOP PLATE

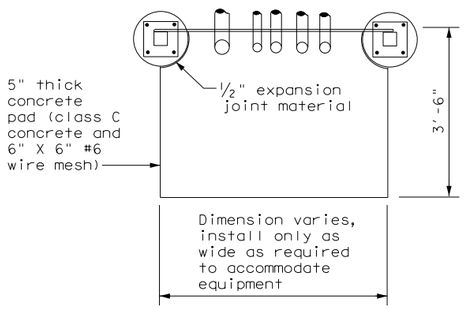


BASE PLATE DETAIL



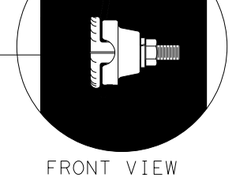
BOTTOM OF POLE

SERVICE SUPPORT TYPE SF & SP



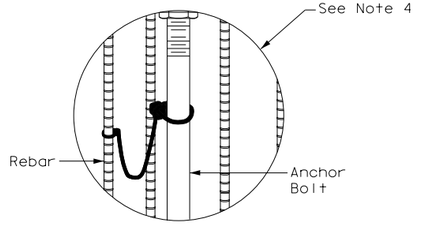
TOP VIEW

SERVICE SUPPORT TY SF (O) & SF (U)

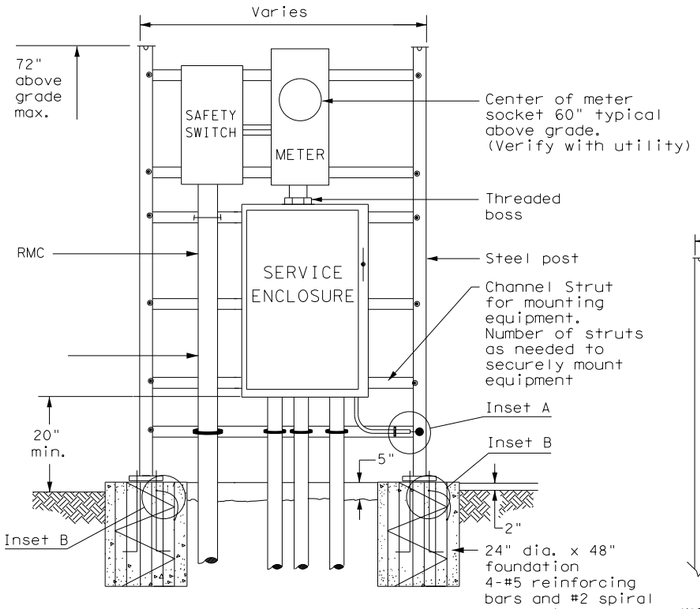


FRONT VIEW

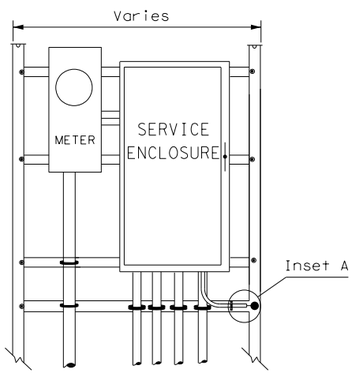
INSET A



INSET B

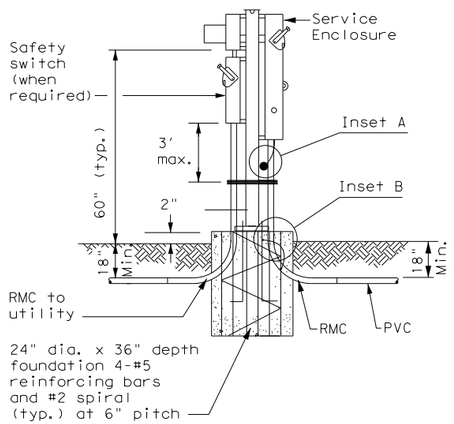


WITH SAFETY SWITCH
FRONT VIEW

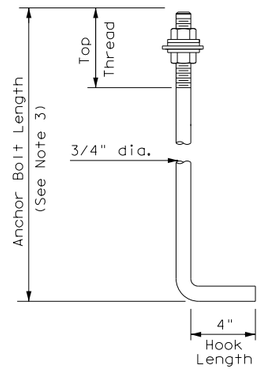


WITHOUT SAFETY SWITCH

SERVICE SUPPORT TYPE SF(U) - UNDERGROUND SERVICE



WITH SAFETY SWITCH



HOOKED ANCHOR DETAIL

SERVICE SUPPORT TYPE SP(U) - UNDERGROUND SERVICE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES SF & SP

ED(7)-14

FILE: ed7-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		183

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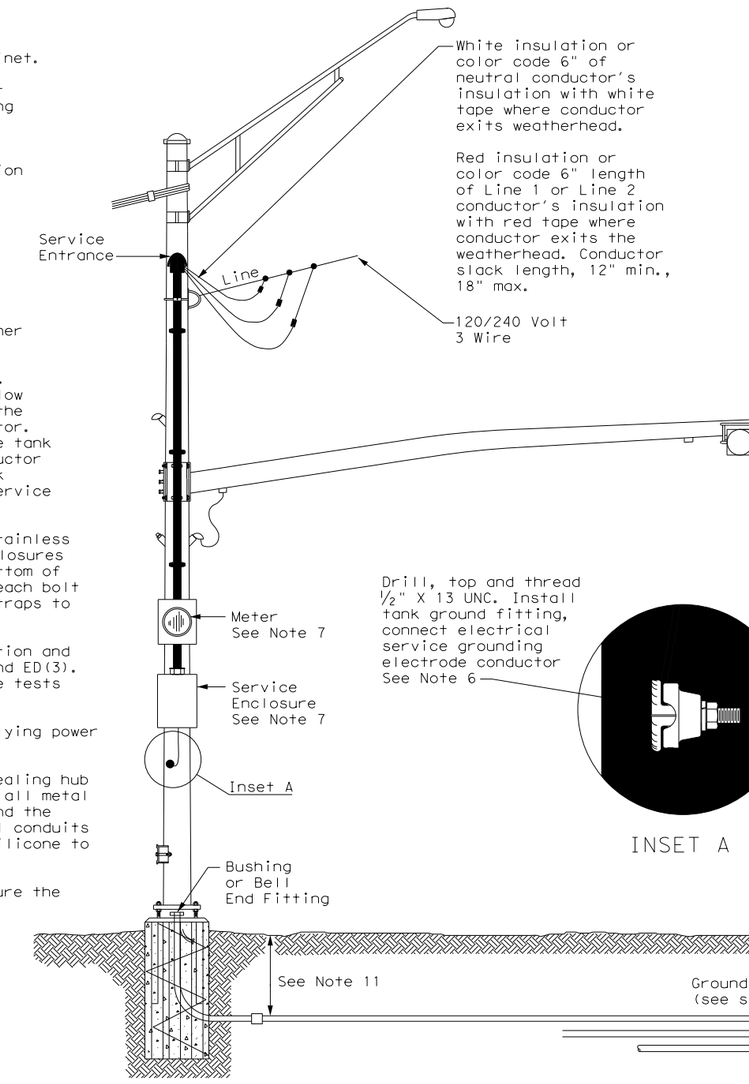
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\Traffic Signals\TxDOT Standards\ed8-14.dgn

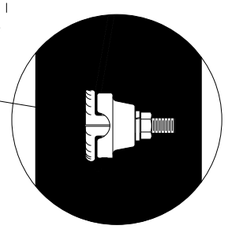
TRAFFIC SIGNAL NOTES

1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".

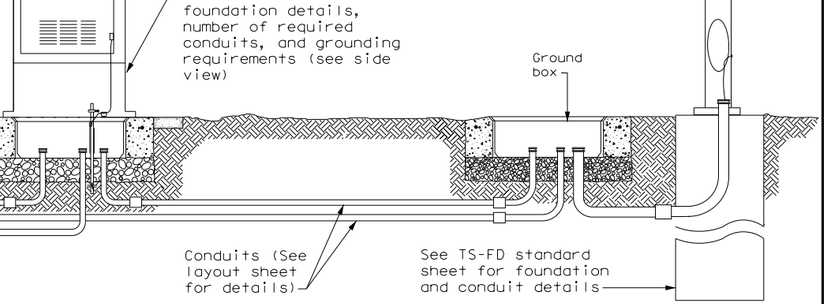


SIGNAL POLE WITH SERVICE

Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

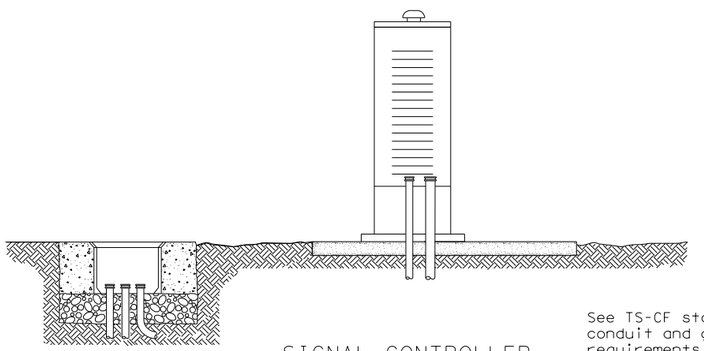


INSET A



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

FILE: ed8-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		184

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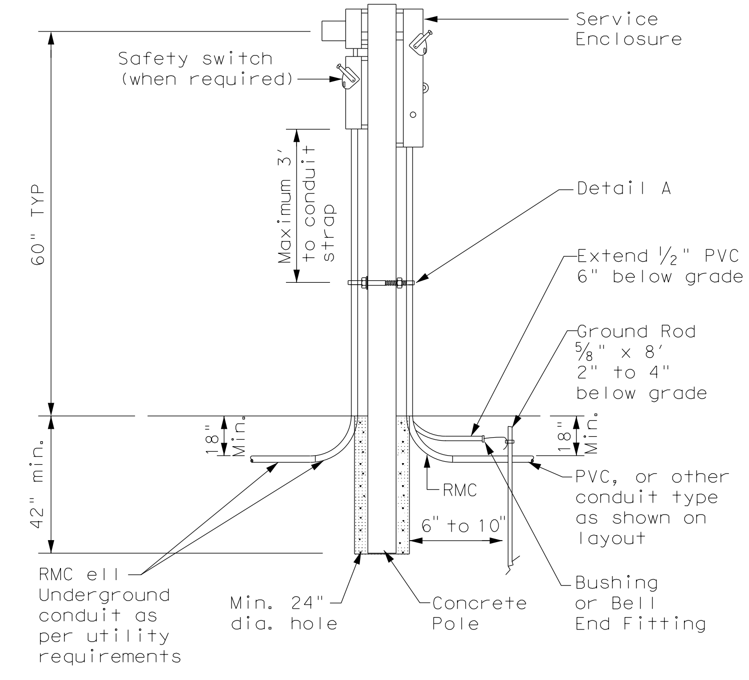
TIMBER POLE (TP) SERVICE SUPPORT NOTES

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 electrical 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 ⅝ in. max. depth and 1 ⅞ 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 ¾ in. maximum depth, and 1½ in. to 1⅝ 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, ¼ in. minimum diameter by 1½ 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.

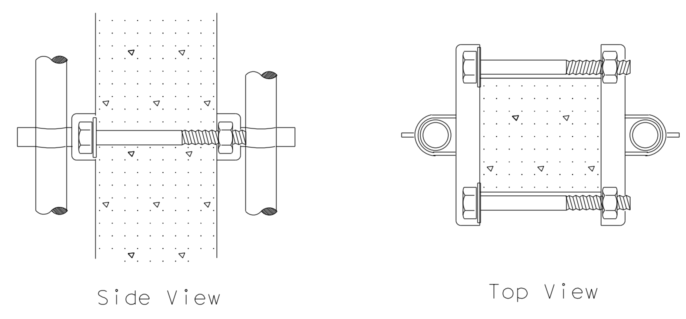
GRANITE CONCRETE (GC) & OTHER CONCRETE (OC) NOTES

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 ½ in. or 1 ⅝ in. wide by 1 in. up to 3 ¾ 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.



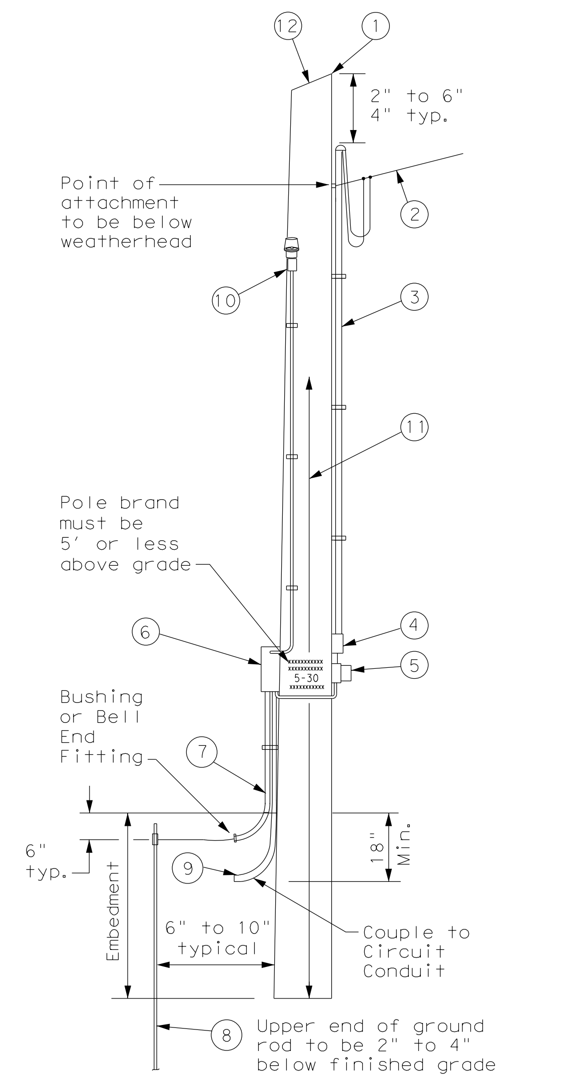
CONCRETE SERVICE SUPPORT
Underground (U)



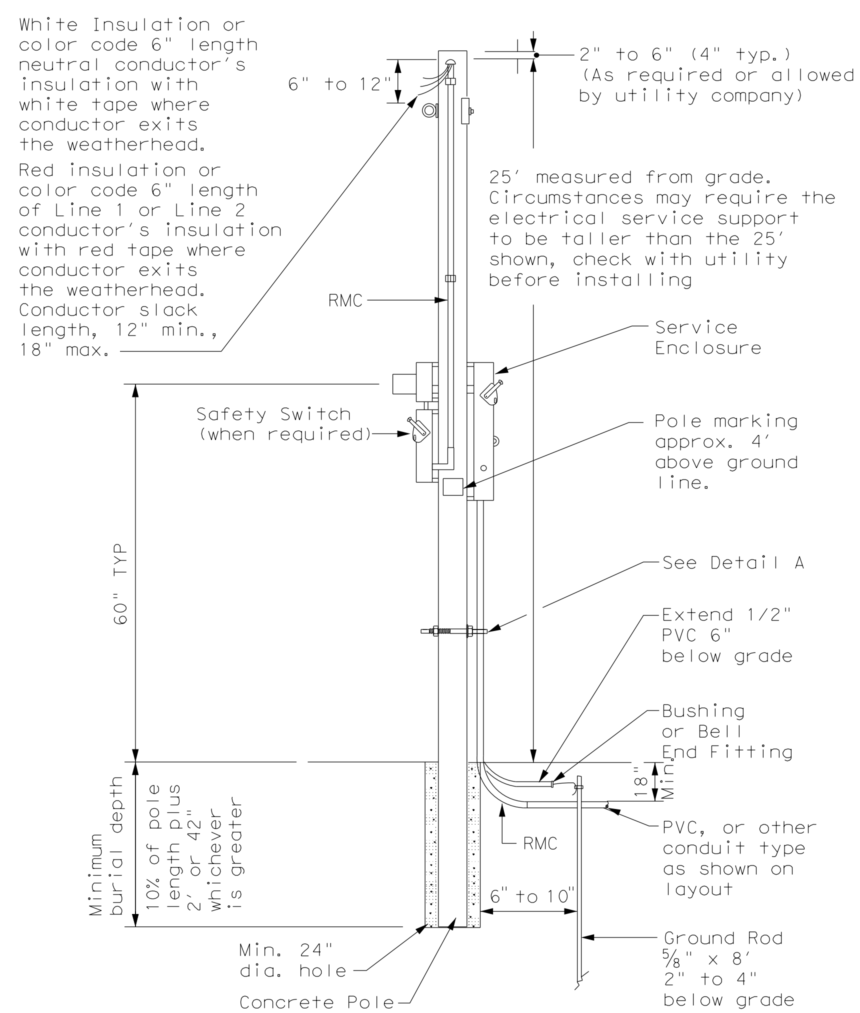
DETAIL A

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.

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 ½ in. PVC to ground rod - extend ½ in. PVC 6 in. underground.
8. ⅝ 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)



CONCRETE SERVICE SUPPORT
Overhead (O)

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0003	07	064, ETC	IH20
	DIST		COUNTY	SHEET NO.
	ODA		REEVES	185

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DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\

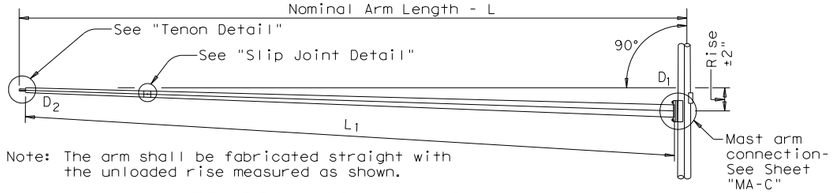
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

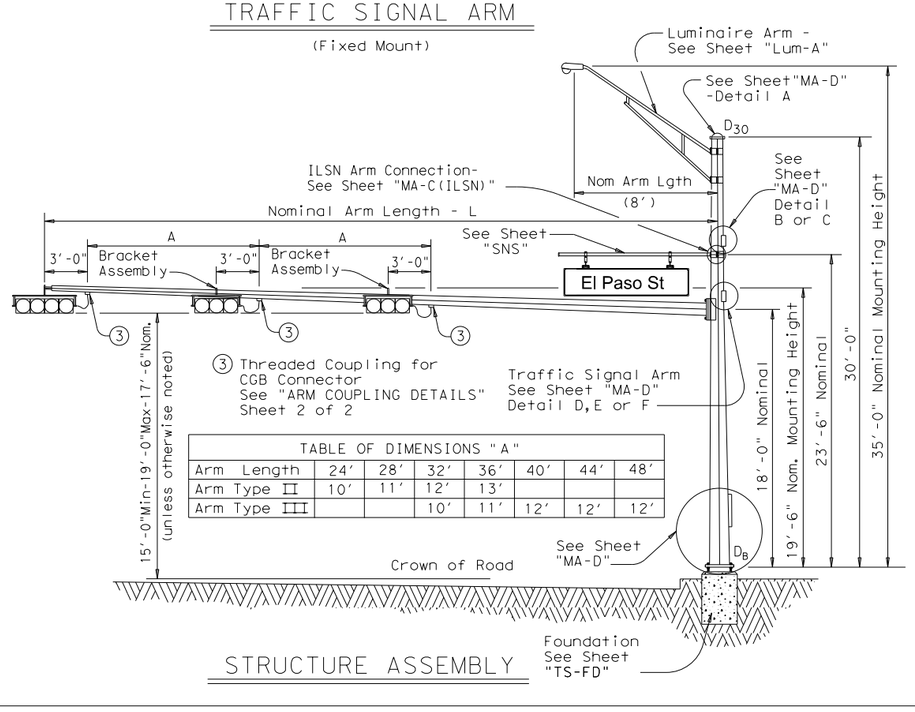


TABLE OF DIMENSIONS "A"							
Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80	1	48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	
48					48III-80	1

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
¾"	1′-6"	
1 ½"	3′-4"	
1 ¾"	3′-10"	1

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SH 17 AT IH 20 FRONTAGE RD SHEET 1 OF 2

WSP USA Inc TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)

SMA-80(1)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064,ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		186

122A

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

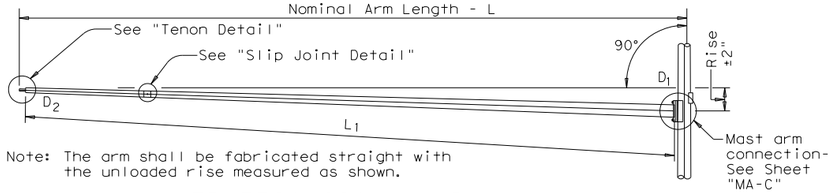
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

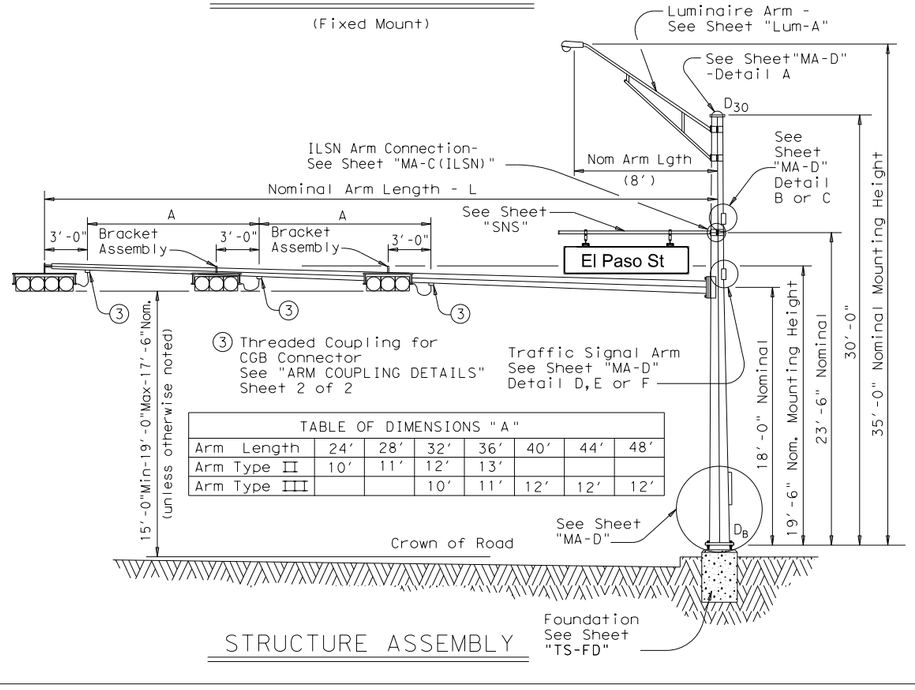


TABLE OF DIMENSIONS "A"							
Arm Length	24′	28′	32′	36′	40′	44′	48′
Arm Type II	10′	11′	12′	13′			
Arm Type III			10′	11′	12′	12′	12′

STRUCTURE ASSEMBLY

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80	1	36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80	2	44S-80		44-80	
48	48L-80	1	48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	1
40					40III-80	
44					44III-80	2
48					48III-80	1

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	4

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
¾"	1′-6"	4
1 ½"	3′-4"	
1 ¾"	3′-10"	4

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

COUNTRY CLUB DR AT IH 20 FRONTAGE RD

WSP USA Inc TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)

SMA-80(1)-12

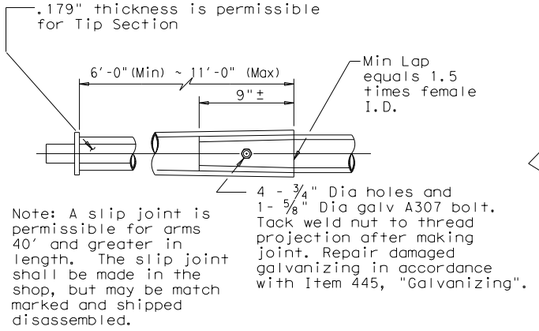
DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
11-99
1-12

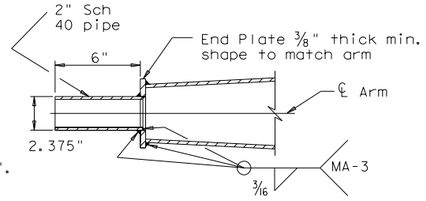
CONT	SECT	JOB	HIGHWAY
0003	07	064,ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		187

122A

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\



SLIP JOINT DETAIL



TENON DETAIL

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

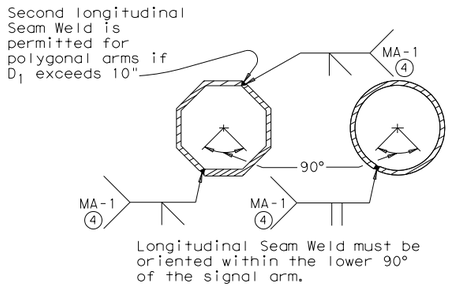
If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

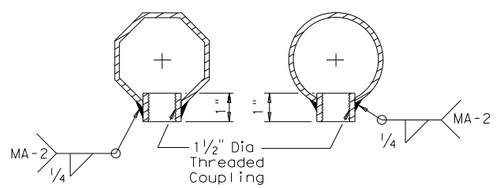
This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL



ARM COUPLING DETAILS

④ 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

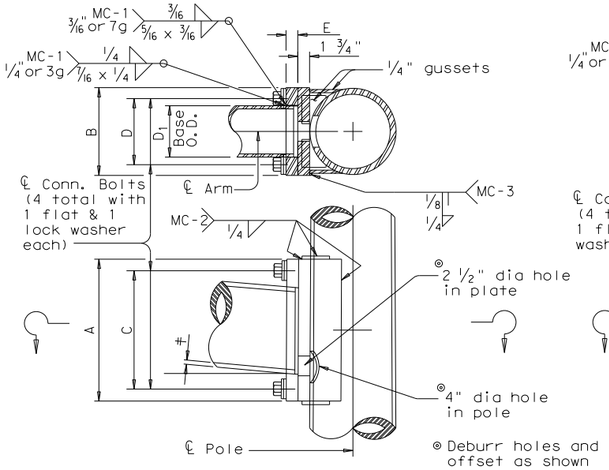
REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064,ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		188

122B

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017X17-11524-004\DesignData\02 - Traffic\Signals\TxDOT Standards\Sta02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\MA-C-12.dgn

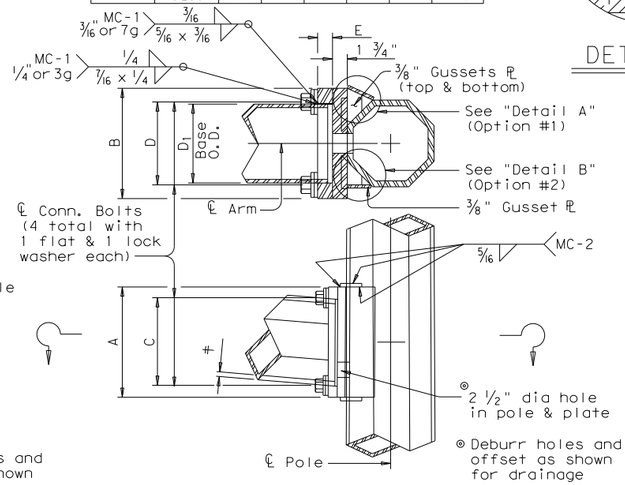
ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



FIXED MOUNT DETAIL 1

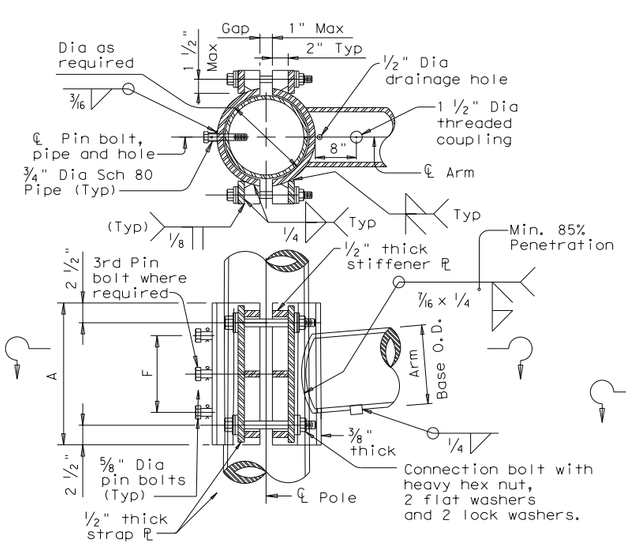
ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8

ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	B in.	C in.	D in.	E in.	CONN BOLT DIA in.
7.0	.179	11	11	8	8	1 ¾	1 ¼
7.5	.179	11	11	8	8	1 ¾	1 ¼
8.0	.179	11	11	8	8	2	1 ¼
9.0	.179	13	13	10	10	2	1 ¼
10.0	.179	13	13	10	10	2	1 ¼
9.5	.239	13	13	10	10	2	1 ¼
10.0	.239	14	14	11	11	2	1 ½
11.0	.239	14	14	11	11	3	1 ½
11.5	.239	14	14	11	11	3	1 ½

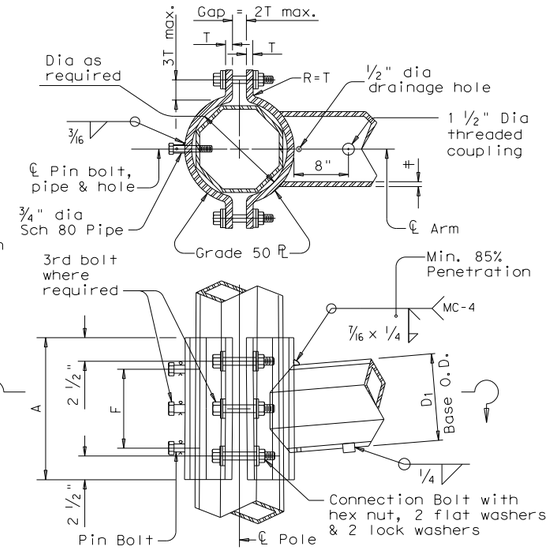


FIXED MOUNT DETAIL 2

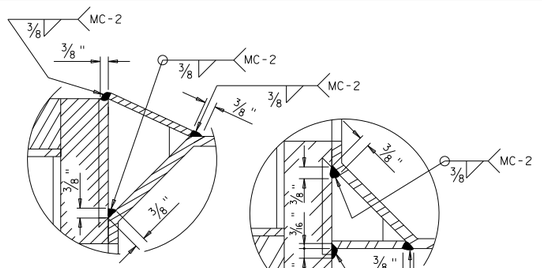
ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	F in.	T in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
7.0	.179	12	6	¾	4	¾	2	5/8
7.5	.179	14	8	¾	4	¾	2	5/8
8.0	.179	14	8	¾	4	¾	2	5/8
9.0	.179	16	10	⅞	4	1	2	5/8
10.0	.179	18	10	⅞	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8



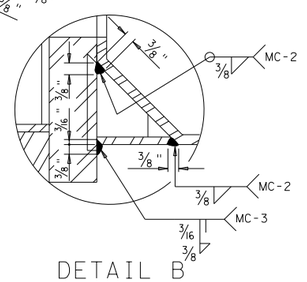
CLAMP-ON DETAIL 1



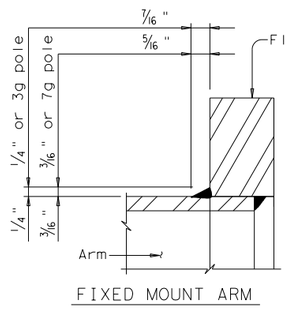
CLAMP-ON DETAIL 2



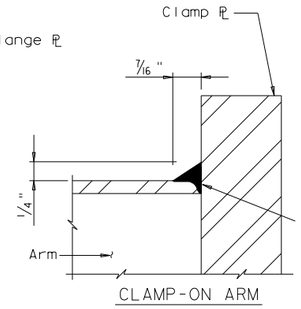
DETAIL A



DETAIL B



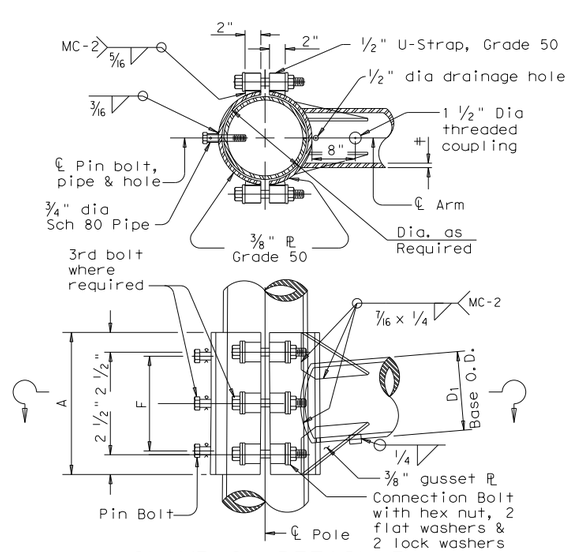
FIXED MOUNT ARM



CLAMP-ON ARM

ARM BASE WELD DETAILS

ARM SIZE D_1 in.	ARM SIZE ∓ in.	A in.	F in.	CONN. BOLTS No. ea.	CONN. BOLTS Dia in.	PIN BOLTS No. ea.	PIN BOLTS Dia in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 3/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
5-09
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		189

126A

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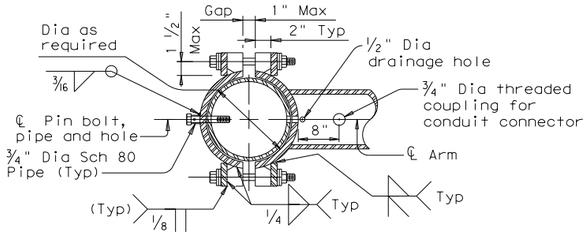
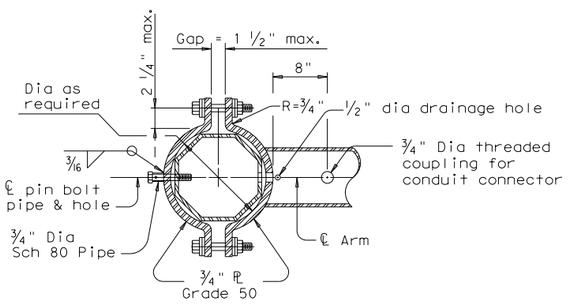
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - DesignPlan Set\8. Traffic\Signals\TxDOT Standards\

TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1, 2 and 3						
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
3 in. dia Schedule 40 Pipe	in.	in.	ea.	in.	ea.	in.
	10	4	4	¾	2	⅝



SECTION A-A



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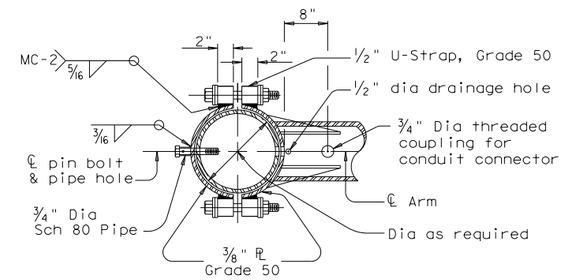

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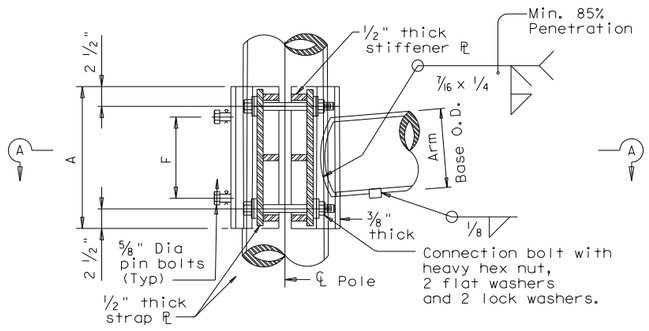
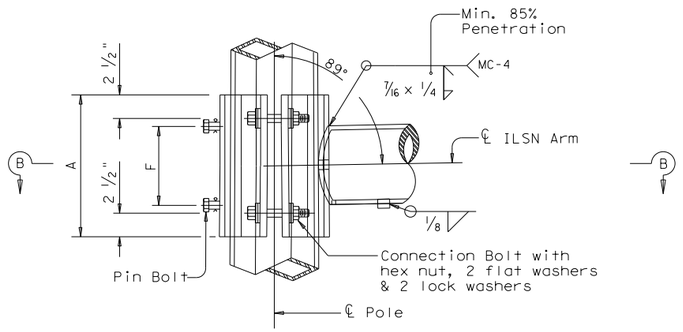
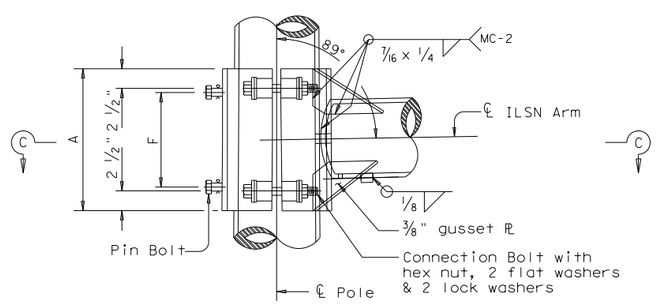


ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:

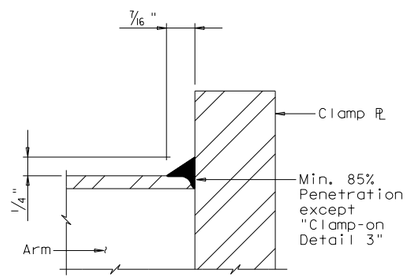
Clamp-on details shall be used for ILSN support arm assemblies. A 1 ½" inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the details.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

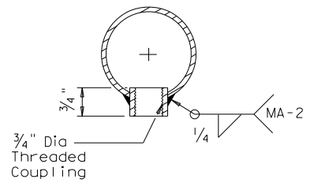
NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 9/16" dia holes for a ⅛" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON ARM

ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST-ARM CONNECTIONS

MA-C(ILSN)-12

DN: MS	CK: JSY	DW: MWF	CK: JSY

REVISIONS
5-96
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CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES	190

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DATE: 3/30/2022 $TIME$
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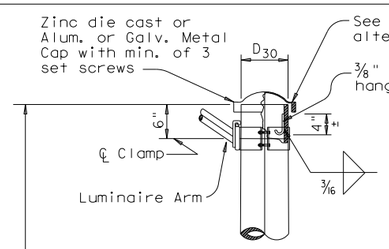
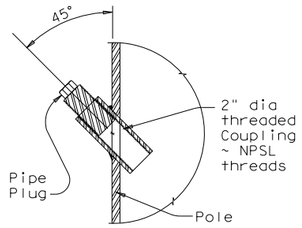
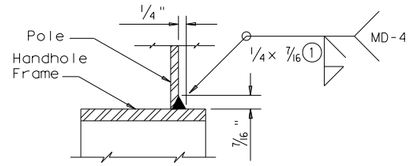


DETAIL A

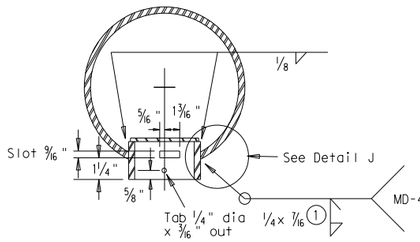
(for pole with luminaire)



POLE COUPLING DETAIL



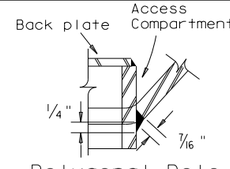
DETAIL G



SECTION X-X

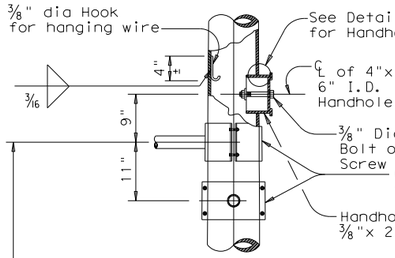
Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

Round Pole

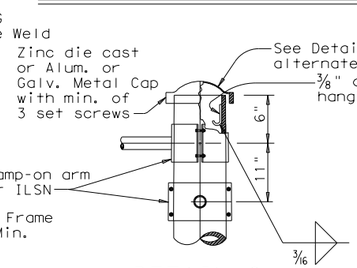


Polygonal Pole

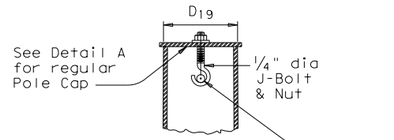
DETAIL J



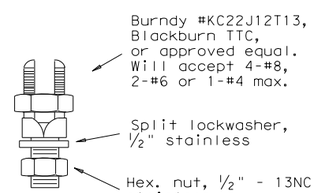
DETAIL B



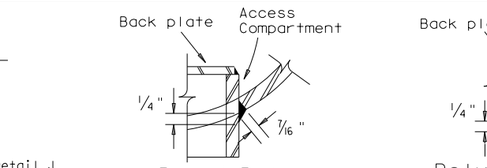
DETAIL C



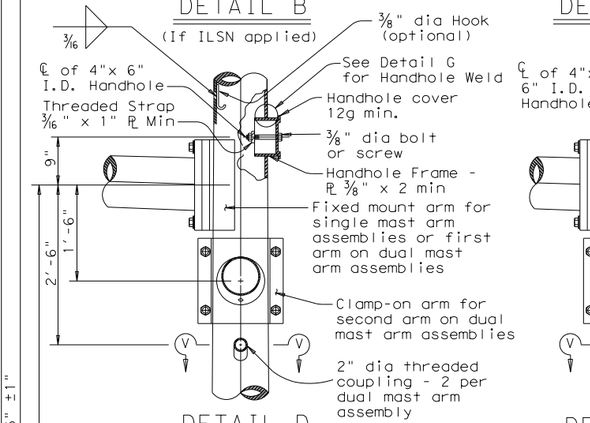
SECTION Y-Y



COPPER GROUND CONNECTOR

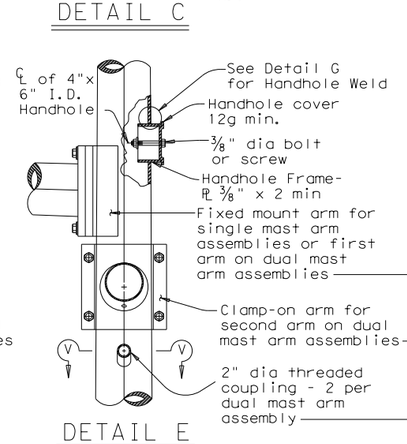


ACCESS COMPARTMENT



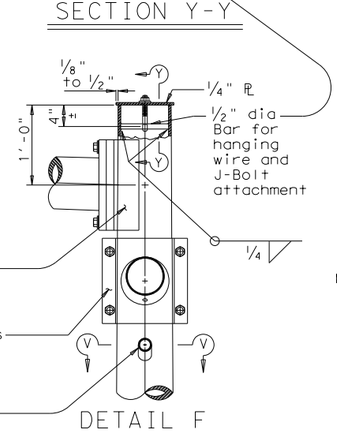
DETAIL D

(for 30' pole with luminaire and ILSN sign)



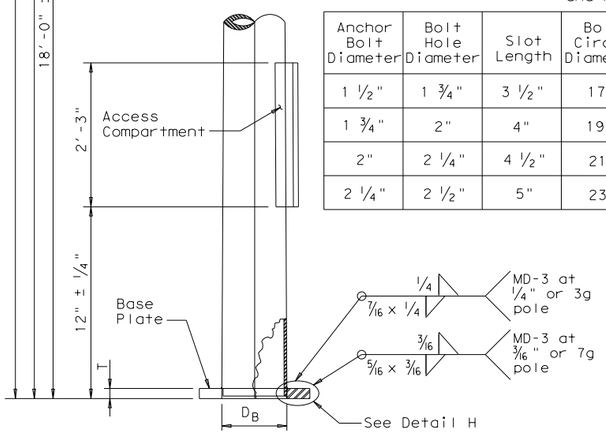
DETAIL E

(for 24' pole with ILSN sign and no luminaire)



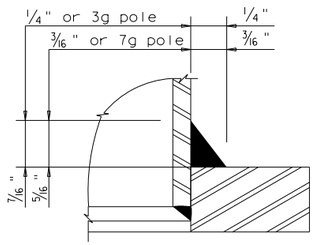
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

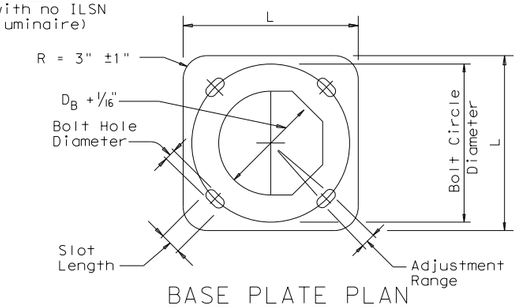


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.

2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.

3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.

4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS
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CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES	191

DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)				FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	11- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

1

NOTES:

(1) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(2) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(3) Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

(4) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(5) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(6) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
				24-A	30-A	36-A	36-B	42-A
P-2	10	36-A	1			17*		
TOTAL DRILLED SHAFT LENGTHS						17*		

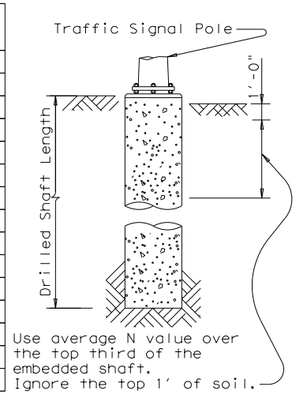
* INCLUDES DRILLED SHAFT PER FOUNDATION DESIGN TABLE PLUS ADDITIONAL DRILLED SHAFT ABOVE GRADE TO ACCOMODATE VERTICAL CLEARANCE. SEE SIGNAL POLE DETAIL SH 17 AND IH 20 FRONTAGE RD SHEET 7 OF 7 FOR MORE DETAILS.

MODIFICATIONS:

1 PER WINCORE AND LPILE ANALYSIS/CALCULATIONS

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

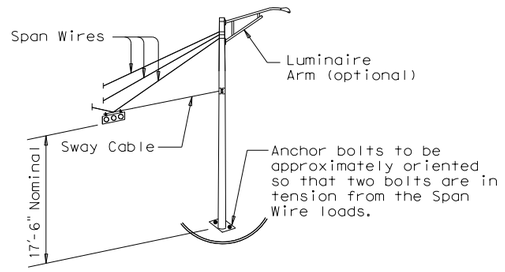


ANCHOR BOLT & TEMPLATE SIZES

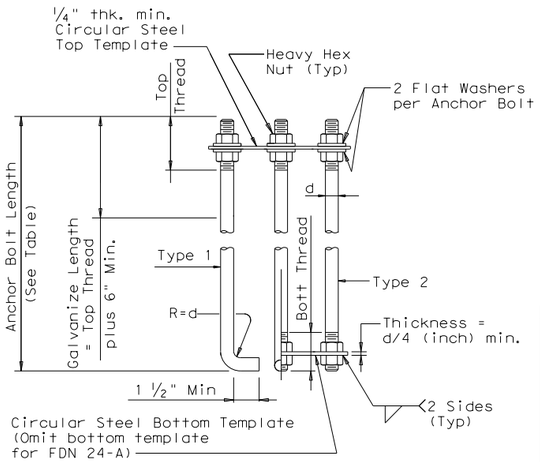
BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

(7) Min dimensions given, longer bolts are acceptable.

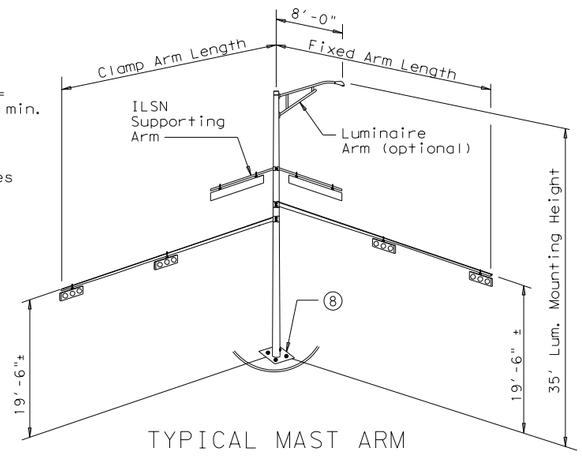
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



TYPICAL STRAIN POLE ASSEMBLY



ANCHOR BOLT ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

SH 17 AT IH 20 FRONTAGE RD

WSP USA Inc TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

Prashant Pachore

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS: 5-96, 11-98, 1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		192

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FOUNDATION DESIGN TABLE

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		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
1 36-A	36"	11- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

(1) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(2) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(3) Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

(4) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(5) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(6) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

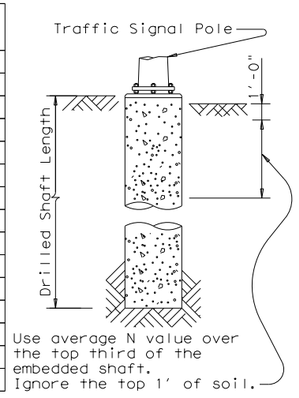
FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
				24-A	30-A	36-A	36-B	42-A
P-1	10	36-A	1			16*		
P-2	10	24-A	1	6				
P-3	10	36-A	1			16*		
P-4	10	24-A	1	6				
P-6	10	36-A	1			16*		
P-7	10	36-A	1			16*		
P-9	10	24-A	1	6				
P-10	10	24-A	1	6				
TOTAL DRILLED SHAFT LENGTHS				24		64*		

* INCLUDES DRILLED SHAFT PER FOUNDATION DESIGN TABLE PLUS ADDITIONAL DRILLED SHAFT ABOVE GRADE TO ACCOMODATE 20 FT VERTICAL CLEARANCE.

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'



ANCHOR BOLT & TEMPLATE SIZES

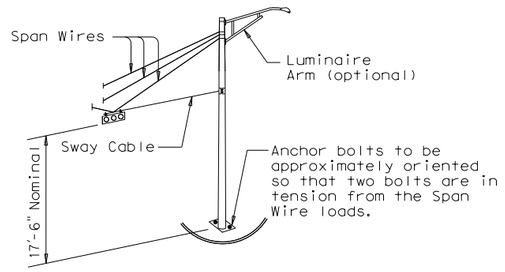
BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

(7) Min dimensions given, longer bolts are acceptable.

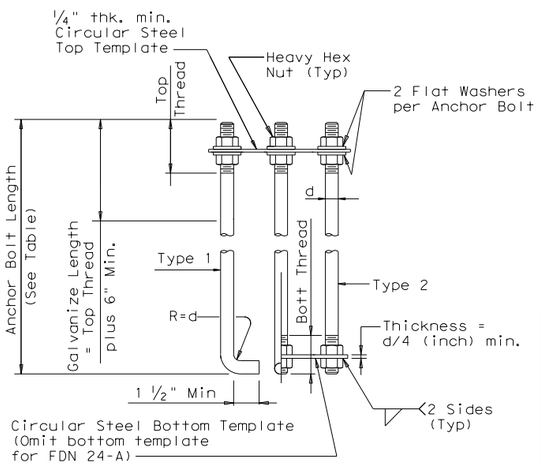
MODIFICATIONS:

1 PER WINCORE AND LPILE ANALYSIS/CALCULATIONS

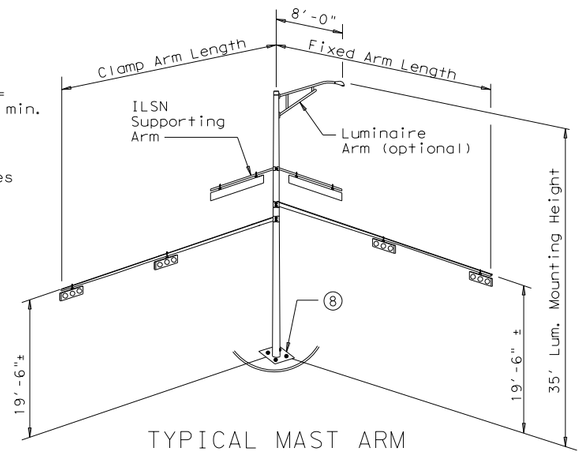
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



TYPICAL STRAIN POLE ASSEMBLY



ANCHOR BOLT ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

COUNTRY CLUB DR AT IH 20 FRONTAGE RD

WSP USA Inc TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED
PROFESSIONAL ENGINEER
03/30/2022

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-96 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		193

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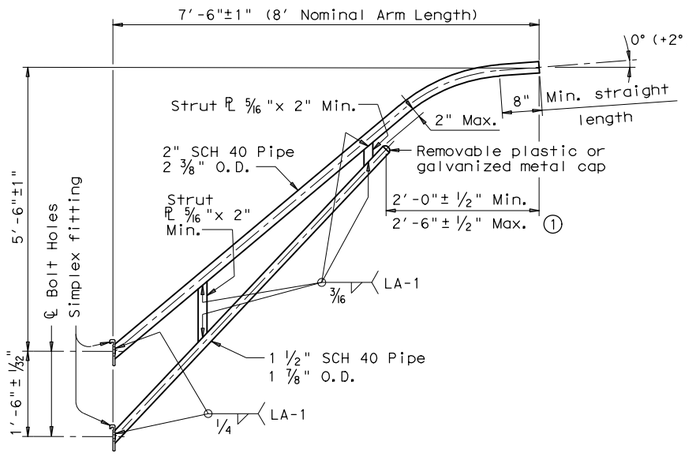
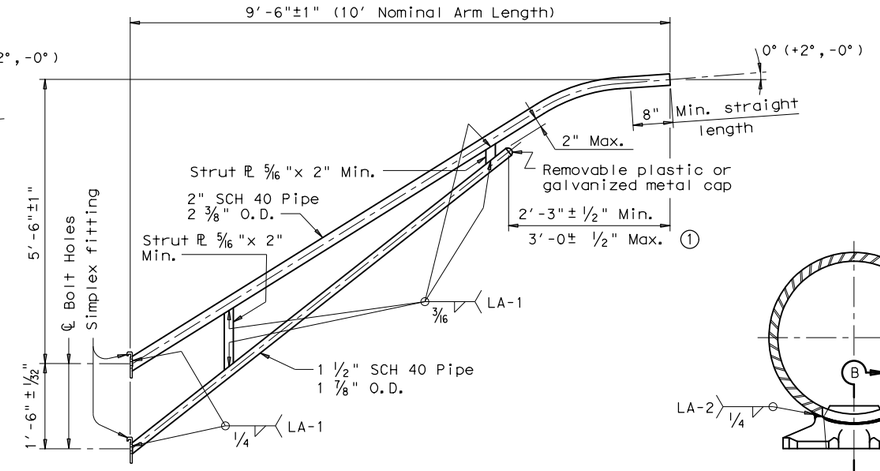
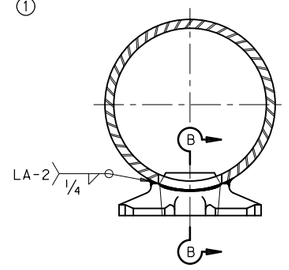
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\



8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

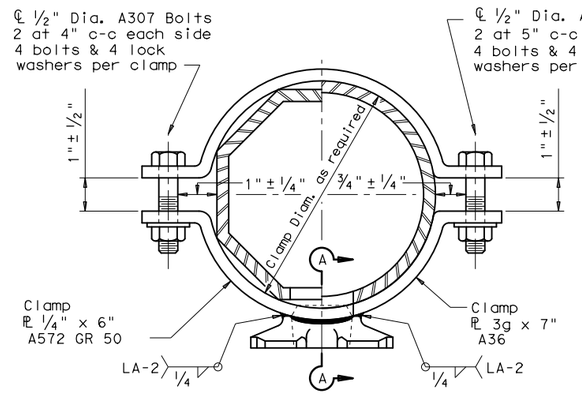
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

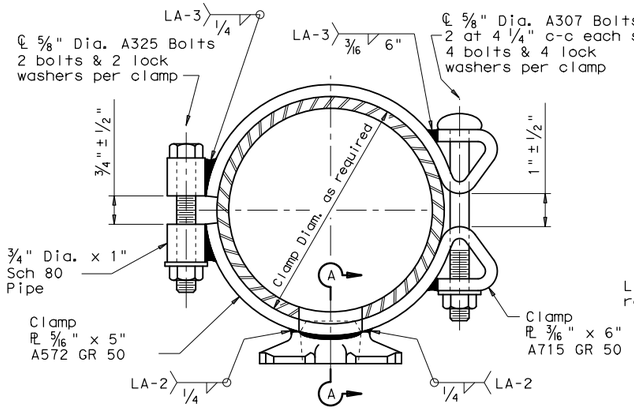
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



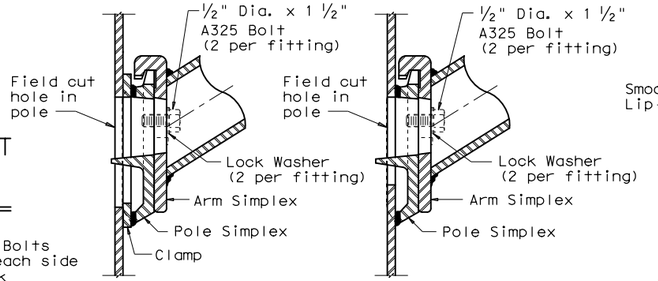
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



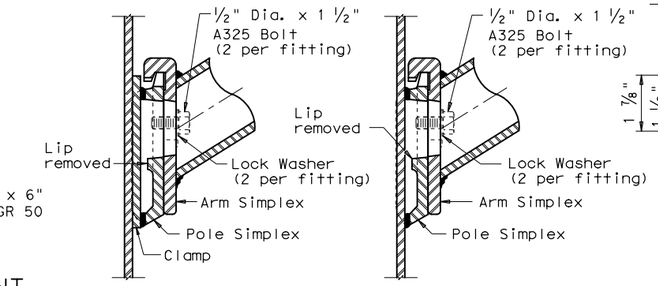
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING

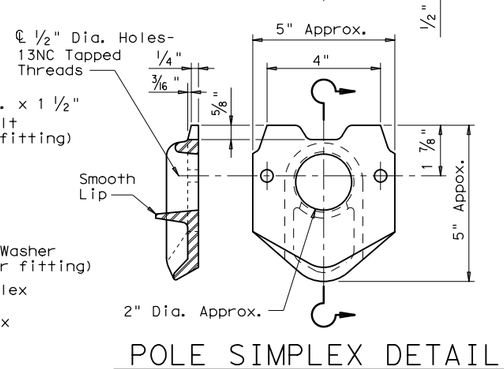


LOWER SIMPLEX FITTING

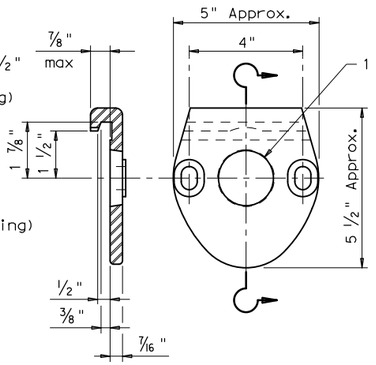
LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



POLE SIMPLEX DETAIL



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96	0003	07	064,ETC	IH20
1-99	DIST	COUNTY		SHEET NO.
1-12	ODA	REEVES		194

DATE: 3/30/2022 $TIME$
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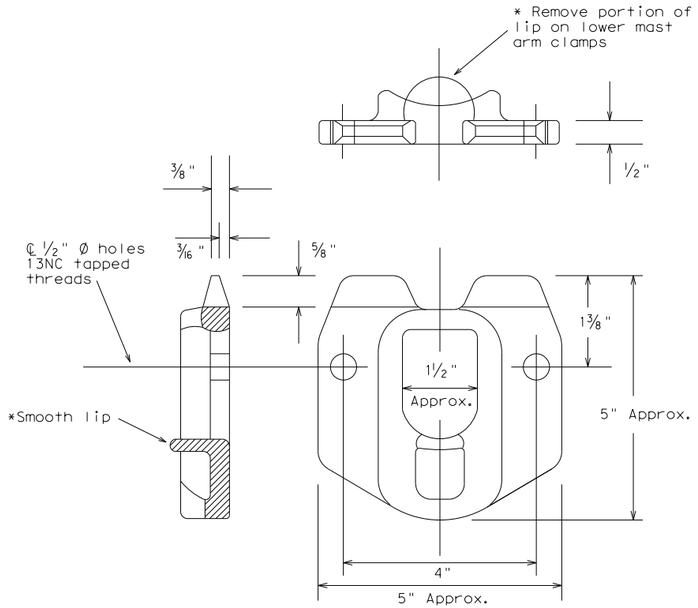
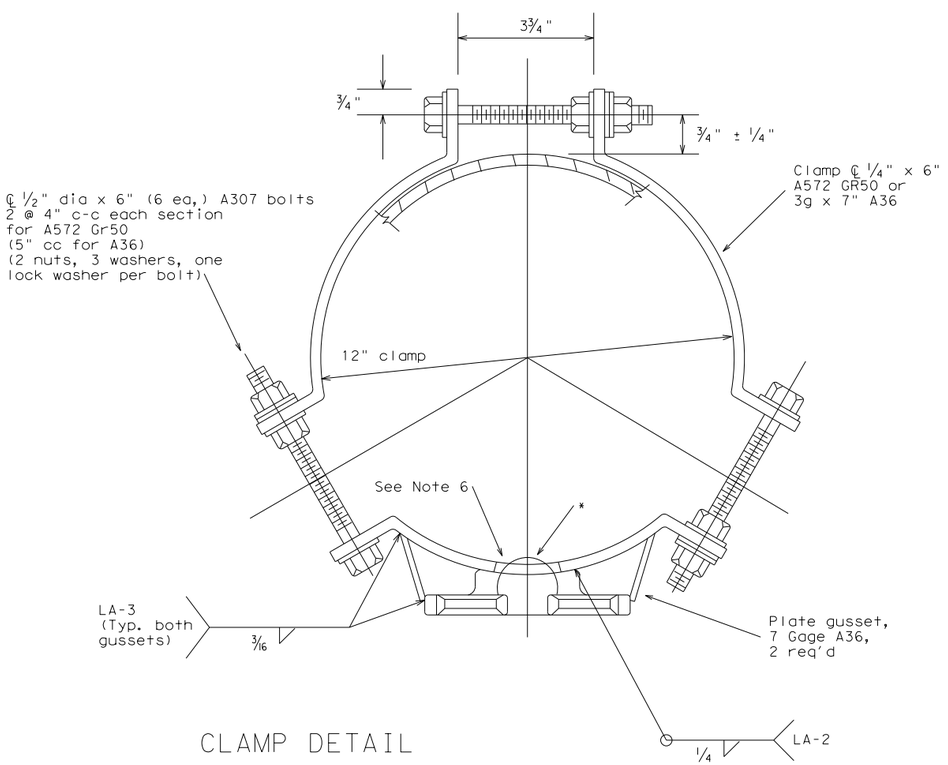
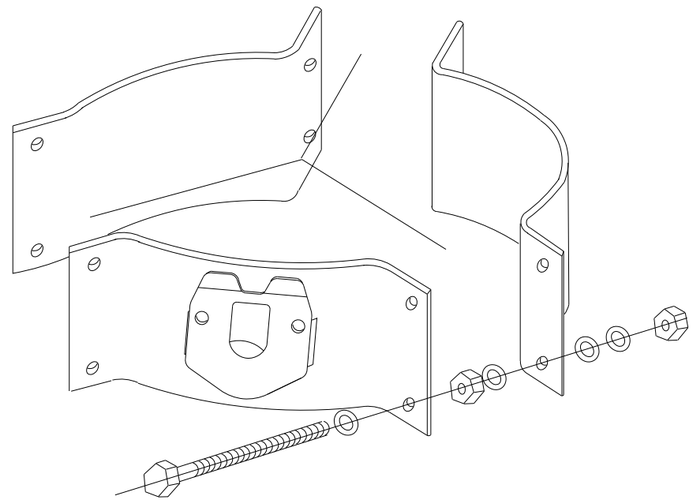


POLE SIMPLEX DETAILS



CLAMP DETAIL



PROJECTION

OTHER MATERIALS:

1. Pole simplex shall be ASTM A27 GR65-35 or A148 GR80-50 or A576 GR1021. ASTM A576 must be suitable for forging and also meet minimum tensile of 65ksi, minimum yield of 35ksi, and a minimum elongation of 22 percent in 2 inches.
2. Welded tabs and backplates shall be ASTM A-36 steel or better.
3. Nylon insert locknuts shall conform to ASTM A563.

GENERAL NOTES:

1. Materials and fabrication shall be in accordance with Standard Sheet "MA-C" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified fabrication tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.
2. All parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing". The throat of the Simplex shall be made free of all rough or sharp edges resulting from the galvanizing process.
3. Each simplex fitting shall be supplied with 2 ASTM A325 bolts, 1/2in. X 1 1/2in. and 2 lock washers. The bolts and lock washers shall be secured to the clamp with the other hardware items. The Fabricator shall ship clamp assembly together in a single package, including all bolts, nuts, and washers required for the clamp and simplex fitting.
4. Design conforms to 1994 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" and interim revisions thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor. Clamps are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq.ft.,12 ft. maximum arm length.
5. Each assembly shall consist of one upper piece simplex fitting having a smooth lip and one lower piece simplex fitting with the lip removed.
6. Approximately 2 in. diameter hole in upper mast arm clamp.

For 8.9 - 12 inch diameter Signal Poles
(Two req'd for each mast arm)

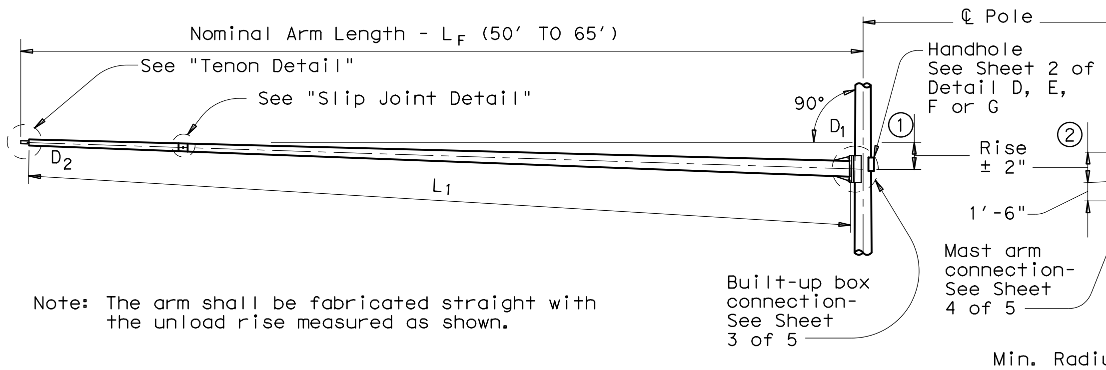
Texas Department of Transportation
Traffic Operations Division

CLAMP ON FITTING ASSEMBLY FOR LUMINAIRE MAST ARM

CFA-12

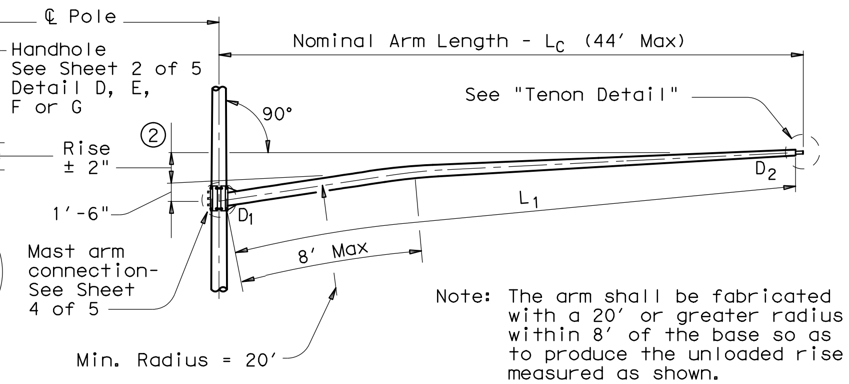
© TxDOT	DN: KAB	CK: RES	DW: FDN	CK: CAL
REVISIONS	CONT	SECT	JOB	HIGHWAY
11-99 1-12	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		195

130



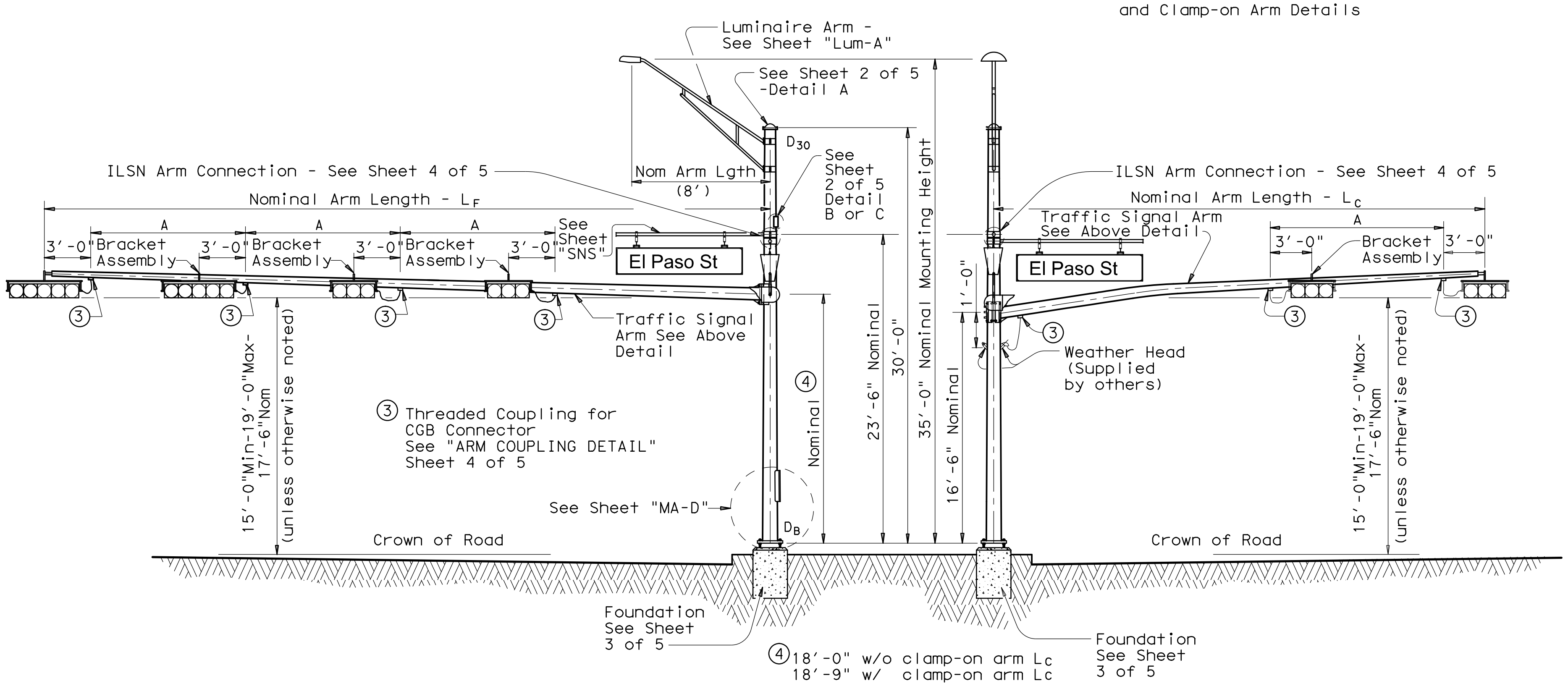
FIXED MOUNT TRAFFIC SIGNAL ARM

(1) See Sheet 3 of 5 for Arm Rise



CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

(2) See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



ELEVATION

(Showing fixed mount arm)

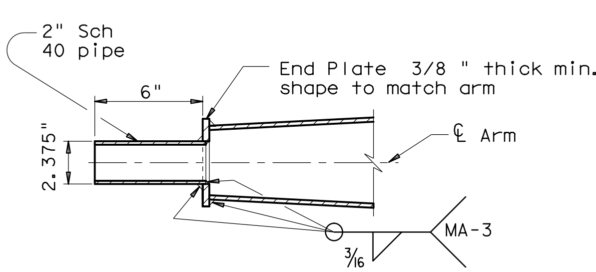
STRUCTURE ASSEMBLY

ELEVATION

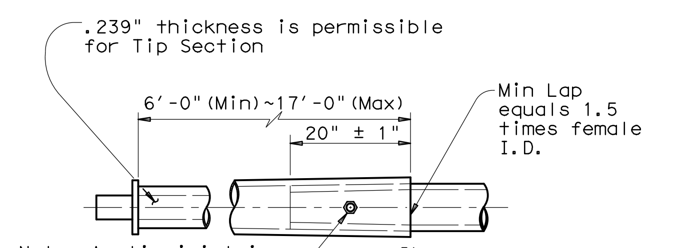
(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"

Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



Note: A slip joint is permissible for arms 50' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

4 - 3/4" Dia holes and 1- 5/8" Dia galv A307 bolt. Tack weld nut to thread projection after making joint. Repair damaged galvanizing in accordance with Item 445, "Galvanizing".

SLIP JOINT DETAIL (FIXED MOUNT ARM)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL (5)	WL EPA (5)(6)
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

(5) Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

(6) Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)
LMA(1)-12

Sheet 1 of 5

©TxDOT July 2000	DN: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS 4-20-01 1-12	CONT 0003	SECT 07	JOB 064, ETC	HIGHWAY IH20
	DIST ODA		COUNTY REEVES	SHEET NO. 196

131A

DATE: 3/30/2022 $TIME$
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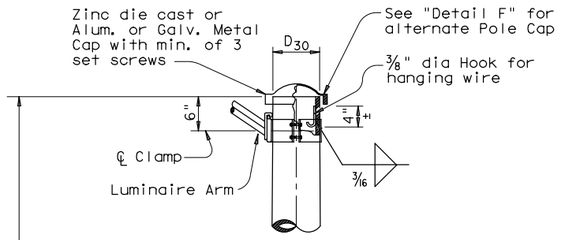
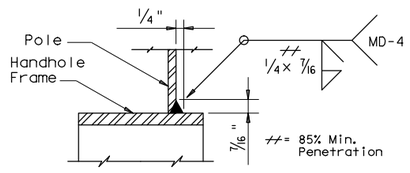
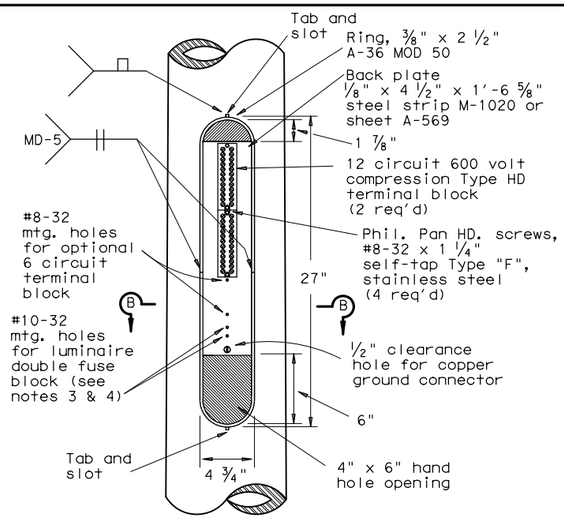


DETAIL A

(for pole with luminaire)



DETAIL H

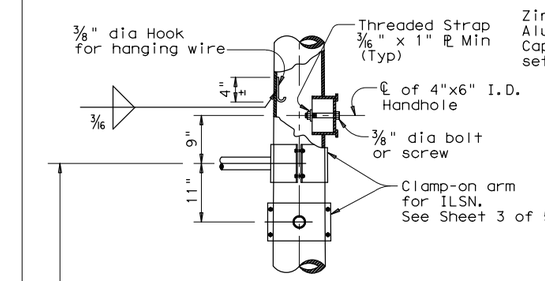


ACCESS COMPARTMENT

MATERIALS	
Round Shafts or Polygonal Shafts (7)	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 (8)
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

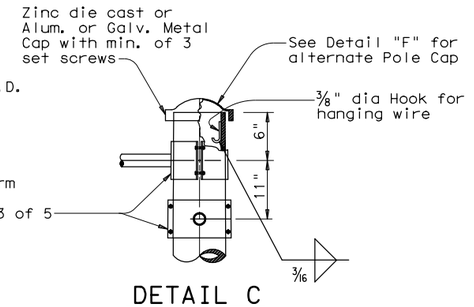
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

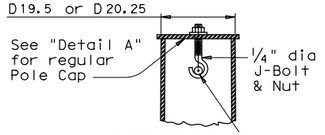


DETAIL B

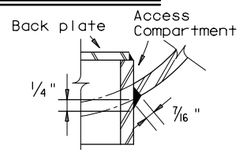
(If ILSN applied)



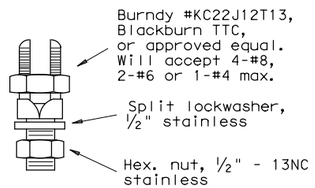
DETAIL C



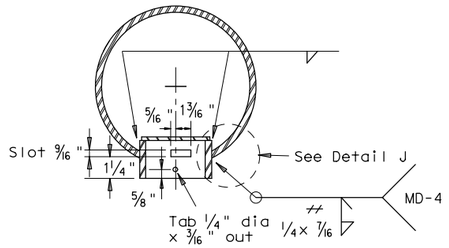
SECTION Y-Y



DETAIL J



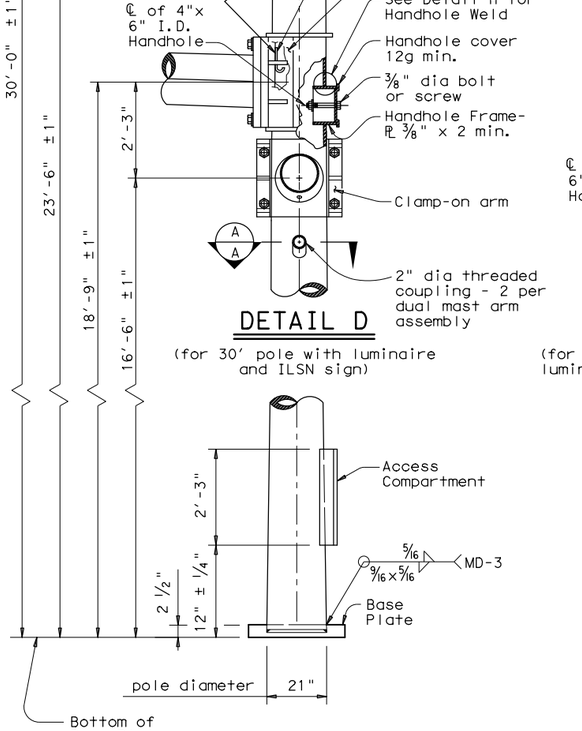
COPPER GROUND CONNECTOR



SECTION B-B

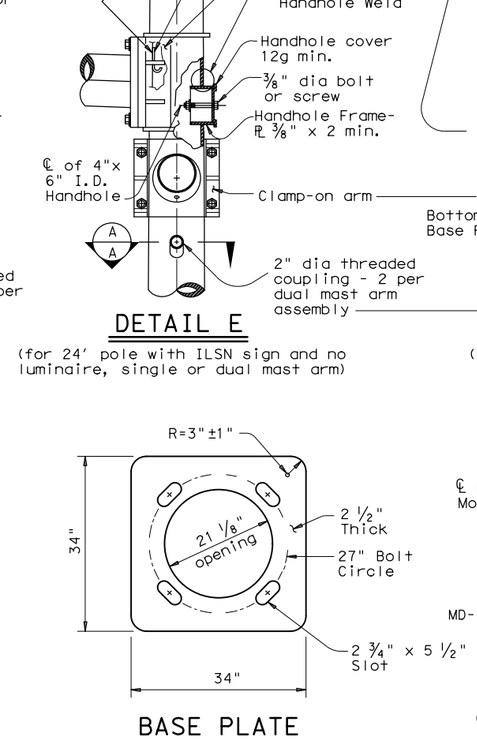
// = 85% Min. Penetration

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



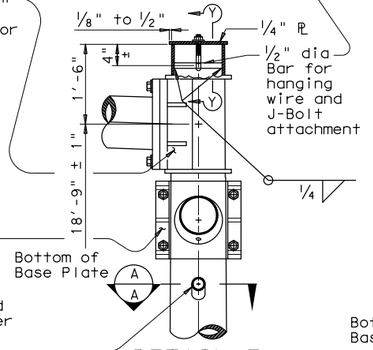
DETAIL D

(for 30' pole with luminaire and ILSN sign)



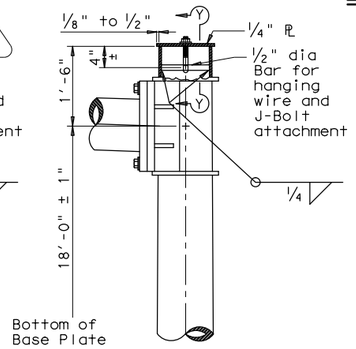
DETAIL E

(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



DETAIL F

(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)

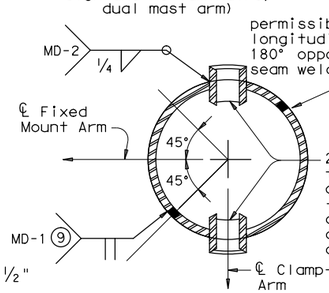


DETAIL G

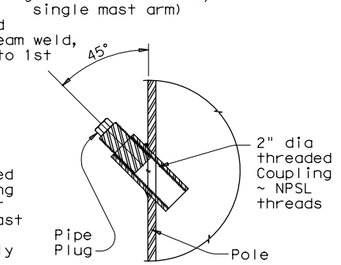
(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

POLE ELEVATION

BASE PLATE



SECTION A-A



POLE COUPLING DETAIL

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

ACCESS COMPARTMENT NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 2 of 5

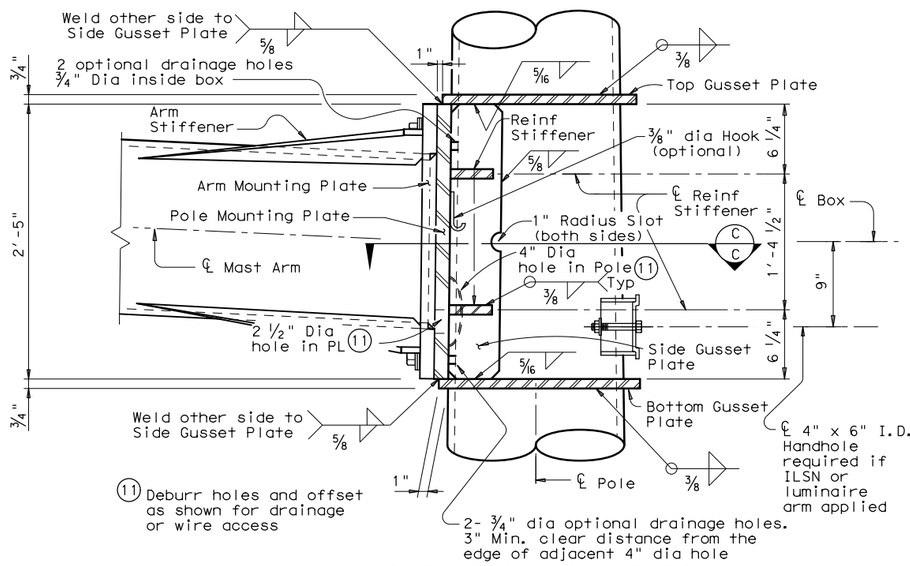
LMA(2)-12

DN: JSY	CK: ARC	DW: TGG	CK: JSY

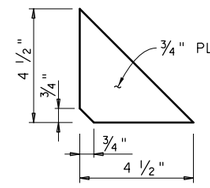
REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		197

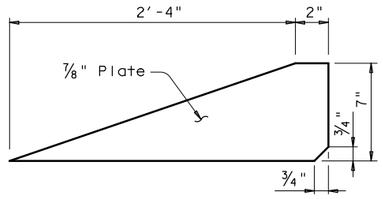
131B



BUILT-UP BOX CONNECTION

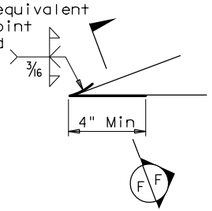


REINFORCING STIFFENER



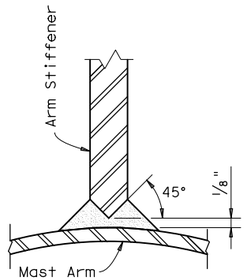
ARM STIFFENER
(Cut to match arm inclination and taper)

Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.



Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

DETAIL "K"



SECTION F-F

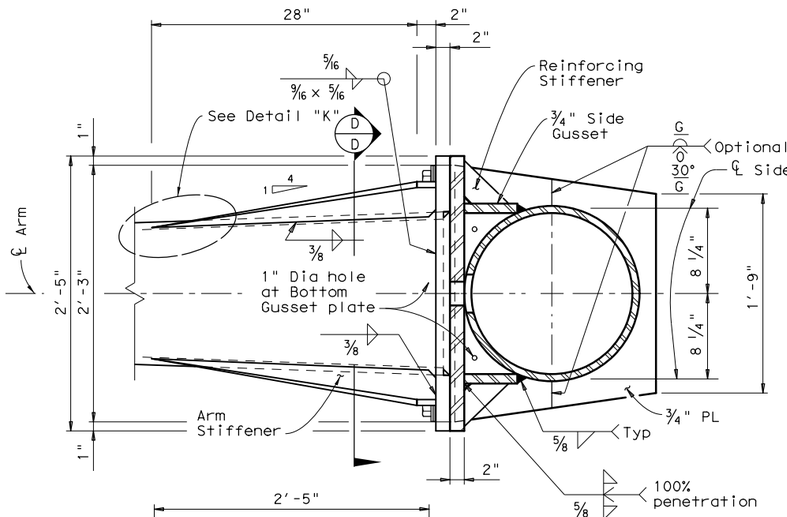
Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

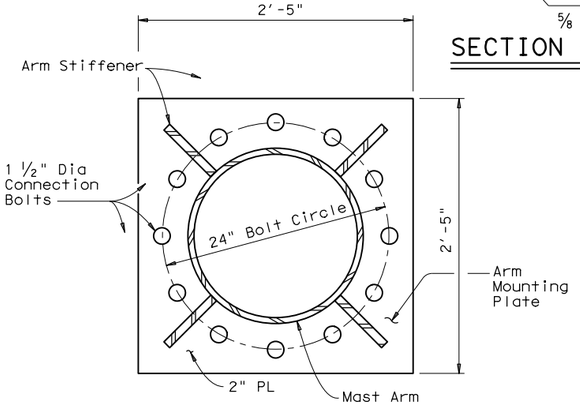
D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

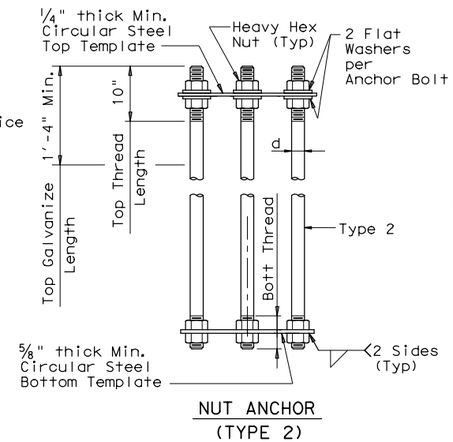
(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.



SECTION C-C

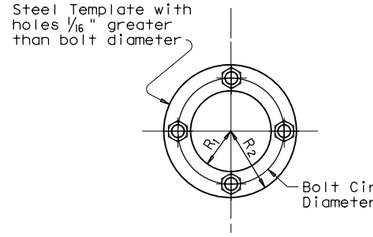


SECTION D-D



NUT ANCHOR
(TYPE 2)

ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length ‡	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

‡ Min dimension given, longer bolts are acceptable.

FOUNDATION DESIGN TABLE

	FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		TYPICAL APPLICATION
			VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
					10	15	40							
1	48-A	48"	26 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

(14) Anchor bolt design develops the foundation capacity given under Foundation Design Laods.

(15) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(17) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

MODIFICATIONS:

1 PER WINCORE AND LPILE ANALYSIS/CALCULATIONS

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

WSP USA Inc. TBPE #F-2263
STATE OF TEXAS
PRASHANT PACHORE
121392
LICENSED PROFESSIONAL ENGINEER
03/30/2022

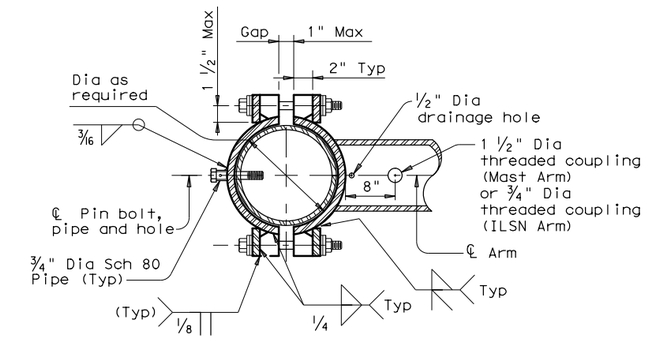
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

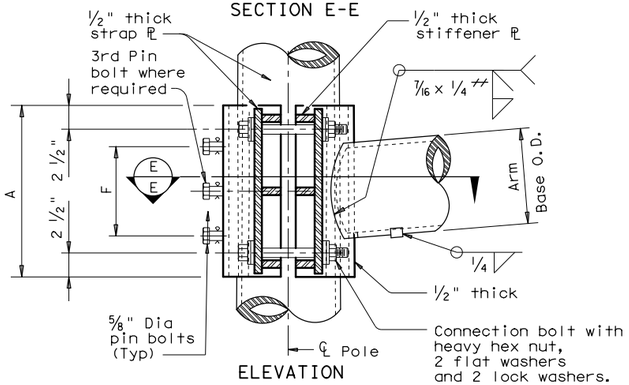
Sheet 3 of 5 LMA(3)-12

REVISIONS	DN: JSY	CK: ARC	DW: TGG	CK: JSY
4-20-01 1-12	CONT	SECT	JOB	HIGHWAY
	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		198

131C



SECTION E-E



ELEVATION
(Mast Arm or ILSN Arm to pole)

†† = 85% Min. Penetration

CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

100 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

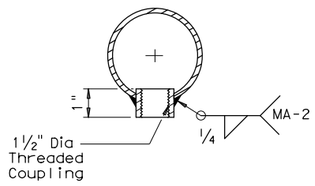
D1 = Arm Base O.D.
D2 = Arm End O.D.
L1 = Shaft Length
Lc = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

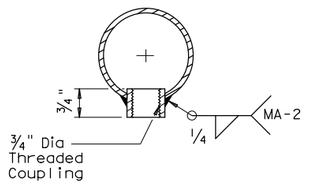
CLAMP-ON ARM CONNECTION

ILSN Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Sch 40 pipe Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	¾	2

Mast Arm Size		A	F	4 Conn. Bolts	5/8" Dia. Pin Bolts
Base Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3



ARM COUPLING DETAIL



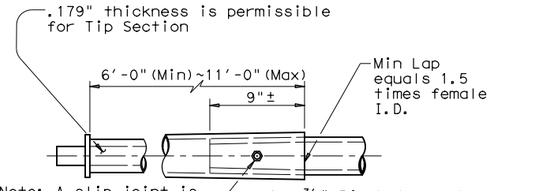
ILSN ARM COUPLING DETAIL

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have 3/16" diameter holes for a ⅛" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An 11/16" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

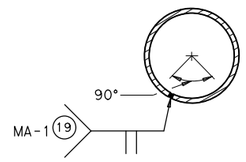


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.
60% Min penetration
100% penetration within 6" of circumferential base welds.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 4 of 5 — LMA(4)-12

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES	199

131D

DATE: 3/30/2022 $TIME$
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Shipping Parts List

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers, and any additional hardware listed in the table.

Nominal Arm Length	30' Poles with Luminaire: See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		24' Poles with ILSN: See note above plus one small hand hole		19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN: See note above	
Single Mast Arm						
Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L		50S		50	
55	55L	1	55S		55	
60	60L		60S		60	
65	65L		65S		65	
Dual Mast Arm						
Lf ft. / Lc ft.						
50 / 20	5020L		5020S		5020	
50 / 24	5024L		5024S		5024	
50 / 28	5028L		5028S		5028	
50 / 32	5032L		5032S		5032	
50 / 36	5036L		5036S		5036	
50 / 40	5040L		5040S		5040	
50 / 44	5044L		5044S		5044	2
55 / 20	5520L		5520S		5520	
55 / 24	5524L		5524S		5524	
55 / 28	5528L		5528S		5528	
55 / 32	5532L		5532S		5532	
55 / 36	5536L		5536S		5536	
55 / 40	5540L		5540S		5540	
55 / 44	5544L		5544S		5544	
60 / 20	6020L		6020S		6020	
60 / 24	6024L		6024S		6024	
60 / 28	6028L		6028S		6028	
60 / 32	6032L		6032S		6032	
60 / 36	6036L		6036S		6036	
60 / 40	6040L		6040S		6040	
60 / 44	6044L		6044S		6044	
65 / 20	6520L		6520S		6520	
65 / 24	6524L		6524S		6524	
65 / 28	6528L		6528S		6528	
65 / 32	6532L		6532S		6532	
65 / 36	6536L		6536S		6536	
65 / 40	6540L		6540S		6540	
65 / 44	6544L		6544S		6544	

Shipping Parts List

Traffic Signal Arms (Fixed Mount) (1 per pole)
Ship each arm with listed equipment attached

Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	2
55	55IV	1
60	60IV	
65	65IV	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	1

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	2

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	3

Each anchor bolt assembly consists of the following: Top and bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers and 4 nut anchor devices (type 2) per Standard Drawing "TS-FD". Templates may be removed for shipment.

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet)
			48-A
P-1	10	1	25#
P-3	10	1	25#
P-4	10	1	25#
Total Drill Shaft Length			75#

Notes

** Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

*** Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

INCLUDES DRILLED SHAFT PER FOUNDATION DESIGN TABLE PLUS ADDITIONAL DRILLED SHAFT ABOVE GRADE TO ACCOMODATE VERTICAL CLEARANCE. SEE SIGNAL POLE DETAIL SH 17 AND IH 20 FRONTAGE RD SHEET 7 OF 7 FOR MORE DETAILS.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

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STATE OF TEXAS
PRASHANT PACHORE
121392
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03/30/2022

SH 17 AT IH 20 FRONTAGE RD

Texas Department of Transportation
Traffic Operations Division

LONG MAST ARM ASSEMBLY PARTS LIST

LMA(5)-12

Sheet 5 of 5

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES	200

131E

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - Data\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

Shipping Parts List

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers, and any additional hardware listed in the table.

Nominal Arm Length	30' Poles with Luminaire: See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex		24' Poles with ILSN: See note above plus one small hand hole		19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN: See note above	
Single Mast Arm						
Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L	1	50S		50	
55	55L	1	55S		55	
60	60L		60S		60	
65	65L		65S		65	
Dual Mast Arm						
Lf ft. / Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50 / 20	5020L		5020S		5020	
50 / 24	5024L		5024S		5024	
50 / 28	5028L		5028S		5028	
50 / 32	5032L		5032S		5032	
50 / 36	5036L		5036S		5036	
50 / 40	5040L		5040S		5040	1
50 / 44	5044L		5044S		5044	
55 / 20	5520L		5520S		5520	
55 / 24	5524L		5524S		5524	
55 / 28	5528L		5528S		5528	
55 / 32	5532L		5532S		5532	
55 / 36	5536L		5536S		5536	
55 / 40	5540L		5540S		5540	
55 / 44	5544L		5544S		5544	
60 / 20	6020L		6020S		6020	
60 / 24	6024L		6024S		6024	
60 / 28	6028L		6028S		6028	
60 / 32	6032L		6032S		6032	
60 / 36	6036L		6036S		6036	
60 / 40	6040L		6040S		6040	
60 / 44	6044L		6044S		6044	
65 / 20	6520L		6520S		6520	
65 / 24	6524L		6524S		6524	
65 / 28	6528L		6528S		6528	
65 / 32	6532L		6532S		6532	
65 / 36	6536L		6536S		6536	
65 / 40	6540L		6540S		6540	
65 / 44	6544L		6544S		6544	

Shipping Parts List

Traffic Signal Arms (Fixed Mount) (1 per pole)
Ship each arm with listed equipment attached

Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	2
55	55IV	1
60	60IV	
65	65IV	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	2

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	1
44					44III-80	

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	3

Each anchor bolt assembly consists of the following: Top and bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers and 4 nut anchor devices (type 2) per Standard Drawing "TS-FD". Templates may be removed for shipment.

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet)
			48-A
P-5	10	1	24#
P-8	10	1	24#
P-11	10	1	24#
Total Drill Shaft Length			72#

Notes

** Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

*** Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

INCLUDES DRILLED SHAFT PER FOUNDATION DESIGN TABLE PLUS ADDITIONAL DRILLED SHAFT ABOVE GRADE TO ACCOMODATE 20 FT VERTICAL CLEARANCE.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

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03/30/2022

COUNTRY CLUB DR AT IH 20 FRONTAGE RD

Texas Department of Transportation
Traffic Operations Division

LONG MAST ARM ASSEMBLY PARTS LIST

LMA(5)-12

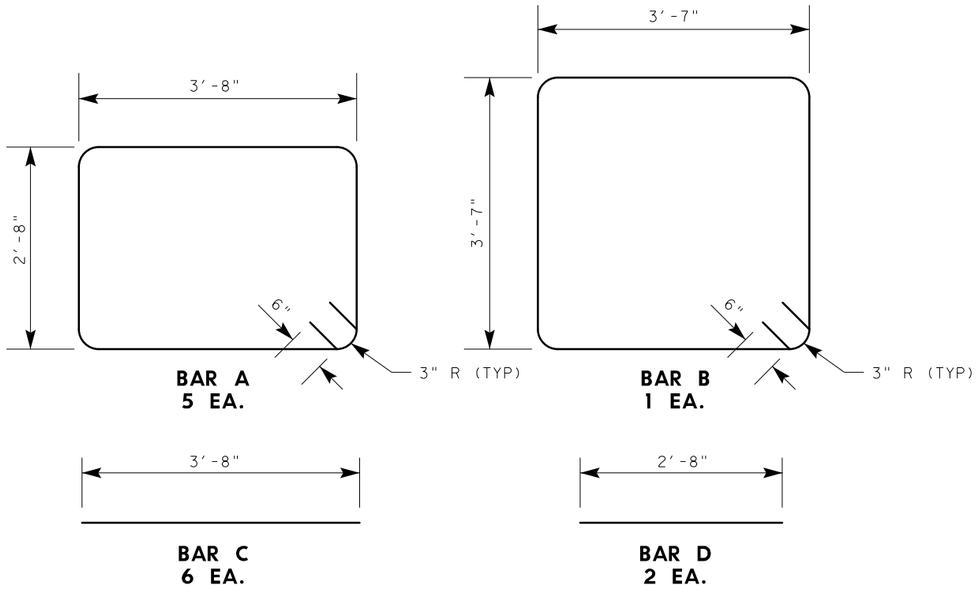
Sheet 5 of 5

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20
DIST	COUNTY		SHEET NO.
ODA	REEVES		201

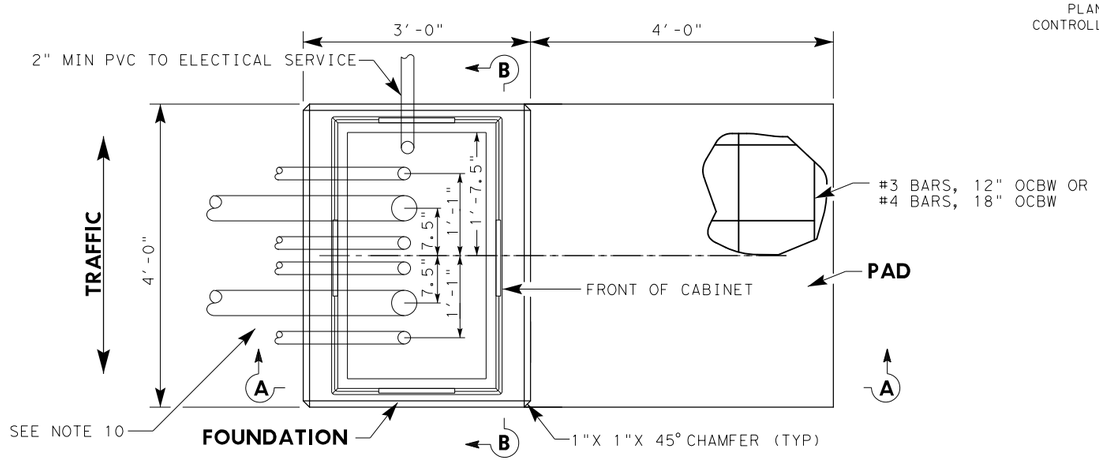
131E

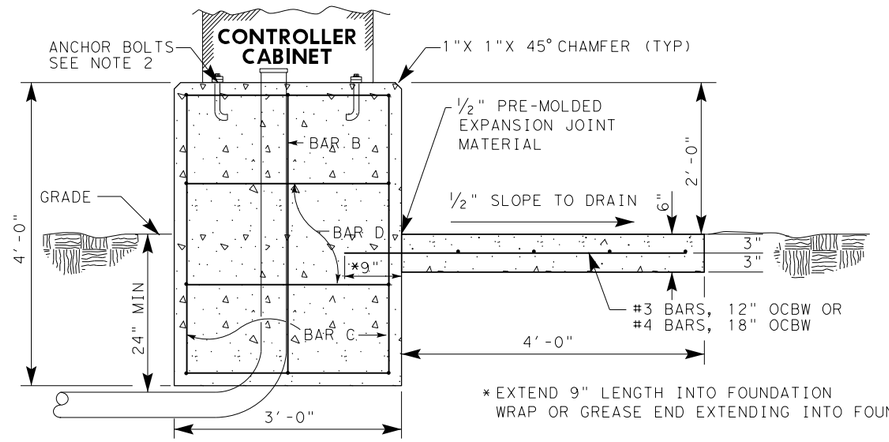


CONTROLLER CABINET FOUNDATION
1/2" DIA. REINF. BARS

NOTES:

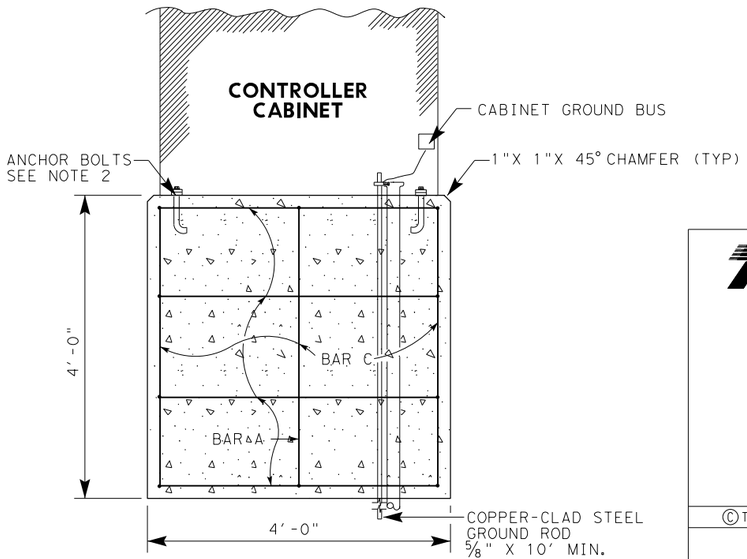
1. SPECIFICATION FOR CONTROLLER CABINET SHOWN IN THE SPECIFICATION AND ELSEWHERE IN THE PLANS.
2. FURNISH AND INSTALL ½" X 12" GALVANIZED BOLTS WITH THE TOP 4" THREADED. FURNISH AND INSTALL GALVANIZED HEXAGON NUTS AND WASHERS. CABINET MANUFACTURER TO PROVIDE DETAILS OF ANCHOR BOLT LOCATIONS.
3. MODIFY DIMENSIONS FOR CONCRETE BASE TO FIT EQUIPMENT FURNISHED, IF NECESSARY.
4. FURNISH CLASS "C" CONCRETE IN ACCORDANCE WITH ITEM 421. CONSTRUCT THE PAD IN ACCORDANCE WITH ITEM 531.
5. SET CONTROLLER FOUNDATION LEVEL WITH THE PAVEMENT SURFACE OR AS APPROVED BY THE ENGINEER.
6. FURNISH, AT NO COST TO THE DEPARTMENT, ANY ADDITIONAL CONCRETE WHICH MAY BE NECESSARY TO STABILIZE THE FOUNDATION AT UNUSUAL LOCATIONS.
7. PLACE REINFORCING BARS AS SHOWN AND IN ACCORDANCE WITH ITEM 440.
8. BOND AN #8 AWG COPPER GROUND WIRE AND A 10' GROUND ROD BONDED TO THE REINFORCING BARS BY A SUITABLE UL LISTED CLAMP AND TERMINATED TO THE CABINET GROUNDING BUS FOR THE PURPOSE OF PROVIDING A LOCAL GROUND FOR THE ELECTRICAL GROUNDING CONDUCTOR. THE ELECTRICAL GROUNDING CONDUCTOR SPECIFIED IN ITEM 680-3.1.1.4 IS REQUIRED AND MUST BE TERMINATED TO THE CABINET GROUND BUS.
9. INSTALL A PVC SLEEVE TO PREVENT THE GROUND ROD FROM DIRECT EMBEDMENT IN THE CONCRETE.
10. STUB UP AND RUN 2 INCH AND 4 INCH CONDUITS THROUGH THE FOUNDATION TO THE VARIOUS TRAFFIC SIGNAL POLES AND GROUND BOXES AS SHOWN ON THE LAYOUTS. INSTALL THE NUMBER OF CONDUITS AS SHOWN ON LAYOUTS, PLUS TWO ADDITIONAL 2 INCH CONDUITS FOR FUTURE USE. TERMINATE THE CONDUITS WITH A BUSHING BETWEEN 2 AND 4 INCHES ABOVE THE FOUNDATION.
11. EXTEND CONDUITS FOR FUTURE USE AT LEAST 18-INCHES FROM THE EDGE OF THE PAD, TERMINATE UNDERGROUND WITH A COUPLING, AND CAP AND SEAL SO THAT THE SEAL CAN BE REMOVED WITHOUT DAMAGING THE COUPLING. THIS MUST ALSO APPLY TO UNUSED TELEPHONE CONDUIT.
12. STUB UP A SEPARATE CONDUIT THROUGH THE FOUNDATION FROM THE ELECTRICAL SERVICE. RUN THE CONDUIT FOR THE ELECTICAL FEED DIRECTLY TO THE ELECTRICAL SERVICE ENCLOSURE. TERMINATE ELECTRICAL CONDUIT ABOVE THE FOUNDATION WITH A COUPLING.
13. FASTEN THE CABINET TO THE CONCRETE FOUNDATION PER MANUFACTURER'S INSTRUCTIONS AND SEAL WITH A SILICONE CAULK BEAD.
14. THE SILICONE CAULK BEAD SPECIFIED IN ITEM 680-3.1.2 MUST BE RTV 133.
15. ALL WORK AND MATERIALS NECESSARY TO CONSTRUCT TRAFFIC SIGNAL CONTROLLER CABINET FOUNDATION AND PAD SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 680. (APPROX. 2.1 CY CONCRETE FOR CONTRACTOR'S INFORMATION ONLY)





* EXTEND 9" LENGTH INTO FOUNDATION
WRAP OR GREASE END EXTENDING INTO FOUNDATION

SECTION A-A



SECTION B-B

WSP USA Inc TBPE #F-2263
STATE OF TEXAS
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03/30/2022

Texas Department of Transportation
Traffic Operations Division

CONTROLLER FOUNDATION DETAILS

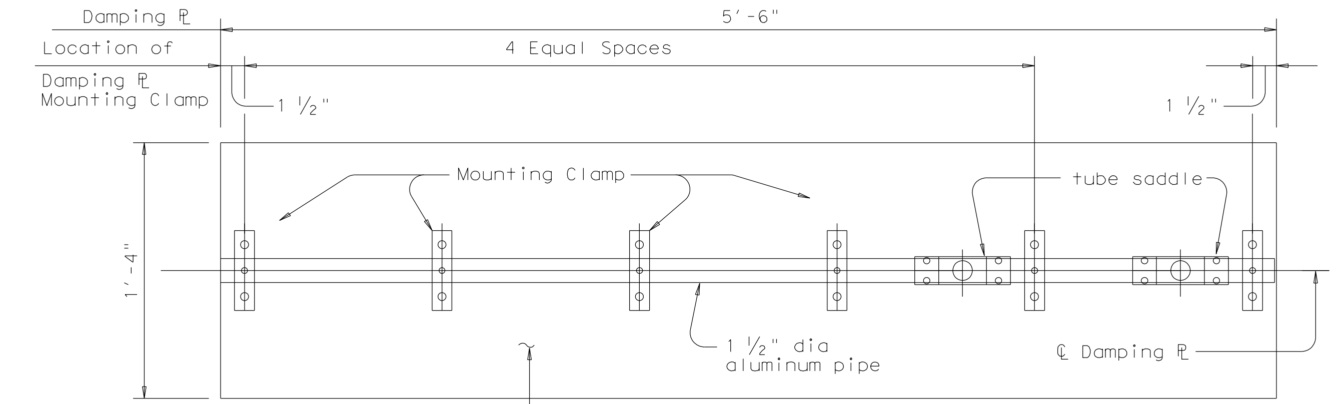
REVISIONS

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

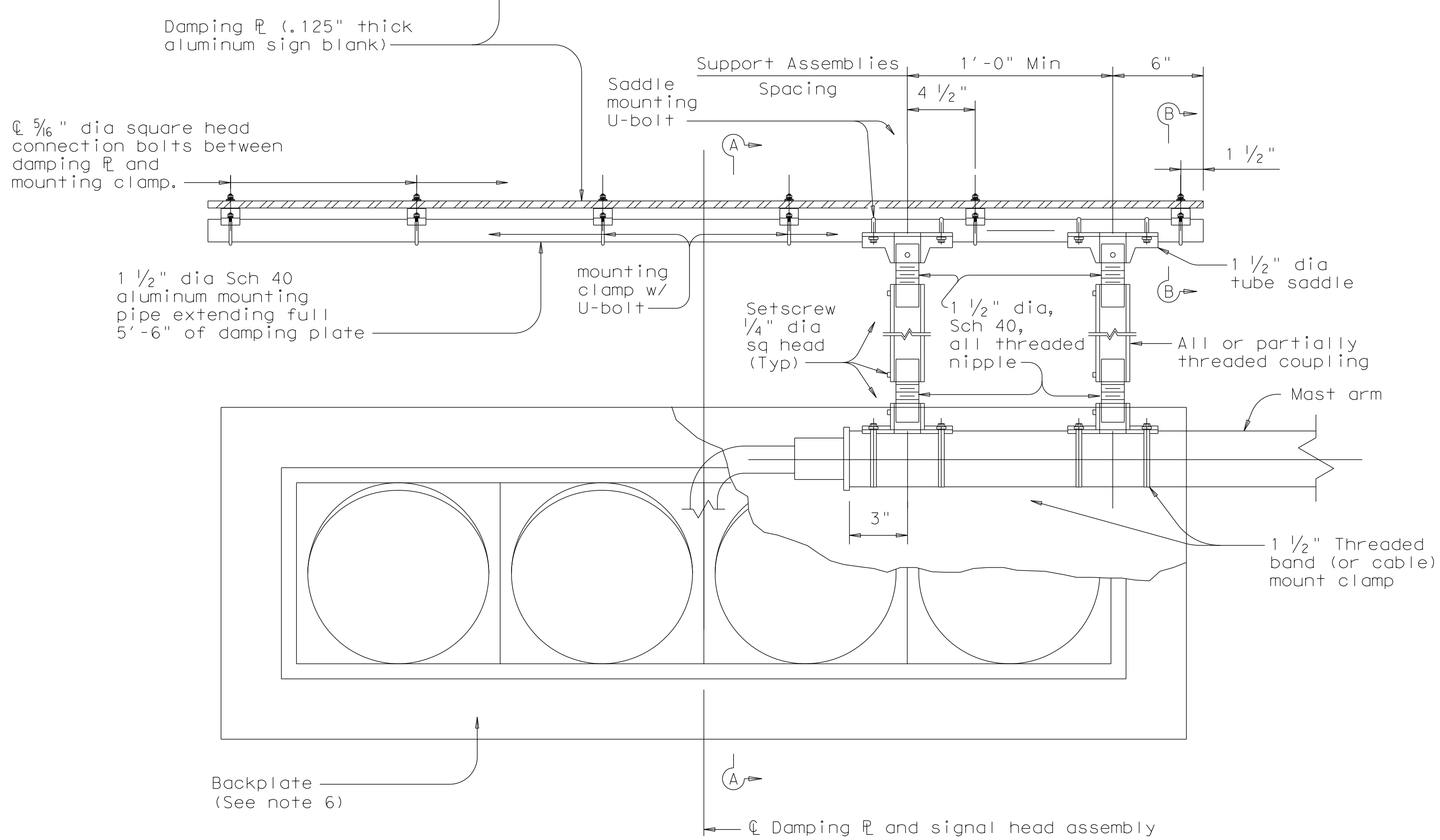
CONT	SECT	JOB	HIGHWAY
0003	07	064,ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES.	202

DATE: 3/30/2022
FILE: pw:\\jmf-pw.bentley.com:jmf-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standards\



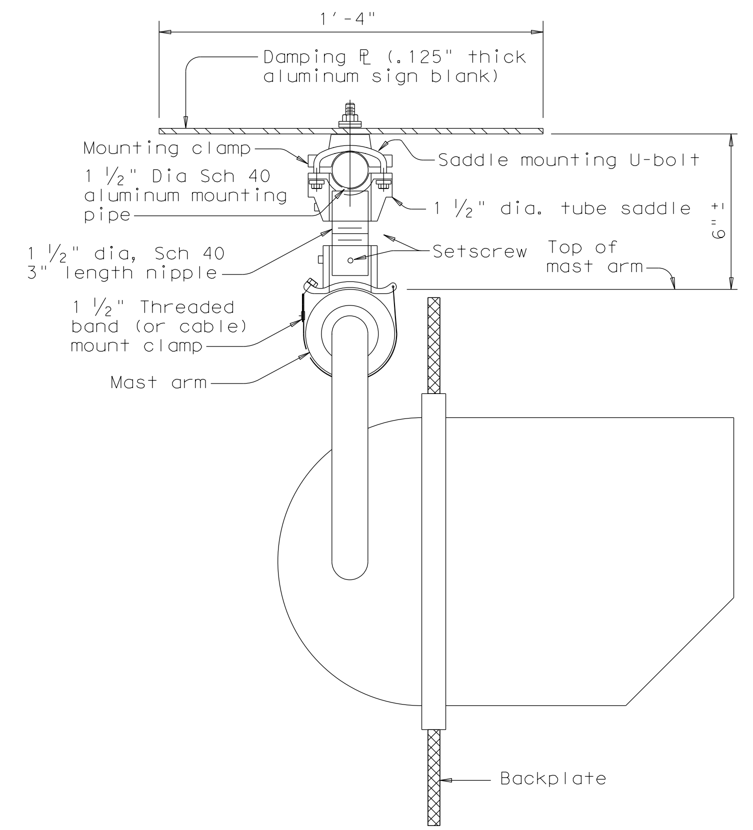
PLAN



ELEVATION

DAMPING PLATE MOUNTING DETAILS

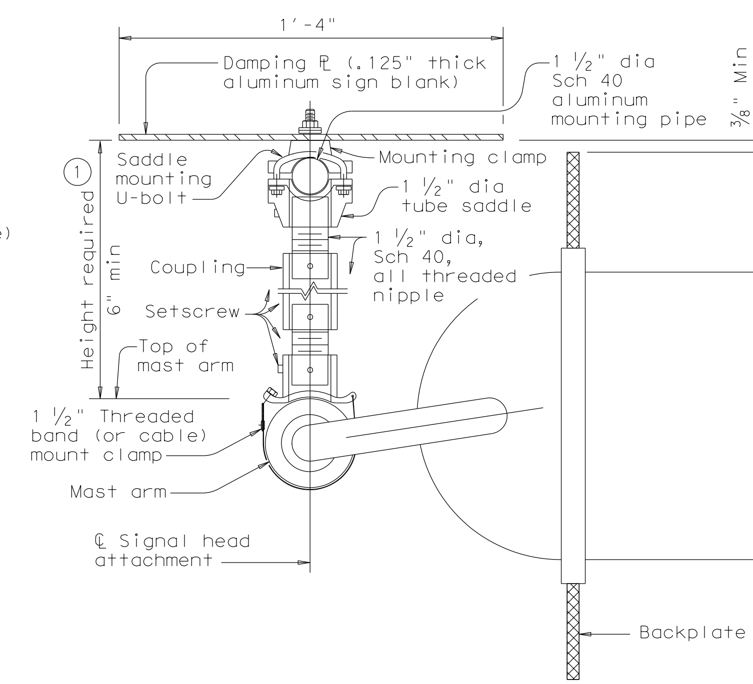
(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

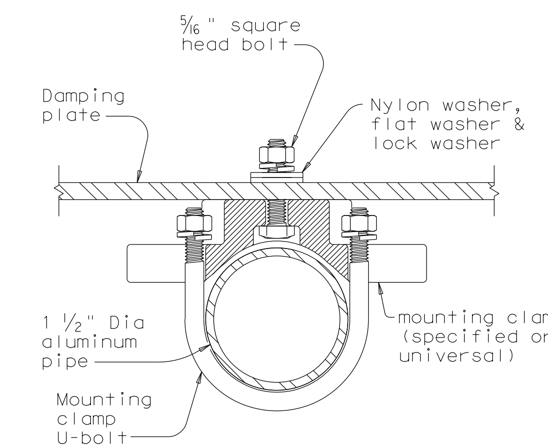
(Showing alternate placement of signal head)

(Mounting clamp U-bolt is not shown for clarity)

① Recommended supporting assemblies to achieve required height for horizontal section heads			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"

GENERAL NOTES:

1. In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.
2. Aluminum sign blank for damping plate will conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle will be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling will be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies will conform to Standard sheet SMD(GEN). U-bolts for saddle mounting will have a minimum yield strength of 36 ksi.
3. Damping plate will be mounted horizontally. Position centerline of damping plate to align with centerline of mast arm or horizontal signal head assembly. Vertical clearance between signal head (with or without backing plate)and bottom of damping plate will be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.
4. Unless stipulated by the manufacturers, all steel parts will be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".
5. Contractor will verify applicable field dimensions before the installation.
6. Backplates are optional for traffic signals. When backplates are used, Backplates will have a 2-inch fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 "Sign Face Materials." See Sheet TS-BP-20 for backplate details.



SECTION B-B

(Showing damping plate attachment)

Texas Department of Transportation

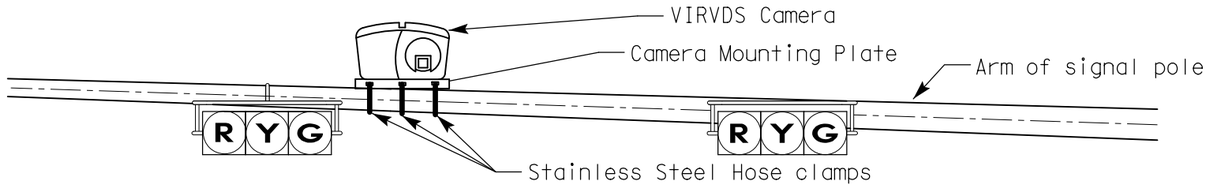
Traffic Safety Division Standard

MAST ARM DAMPING PLATE DETAILS

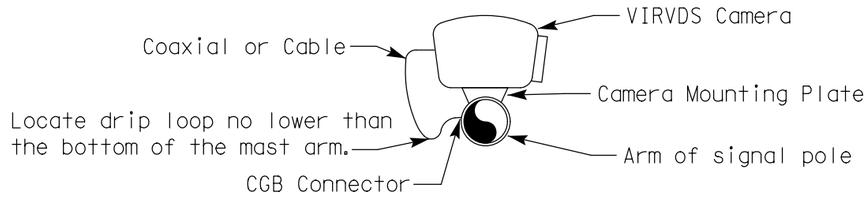
MA-DPD-20

FILE: ma-dpd-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-20 6-20	0003	07	064, ETC	IH20
	DIST		COUNTY	SHEET NO.
	ODA		REEVES.	203

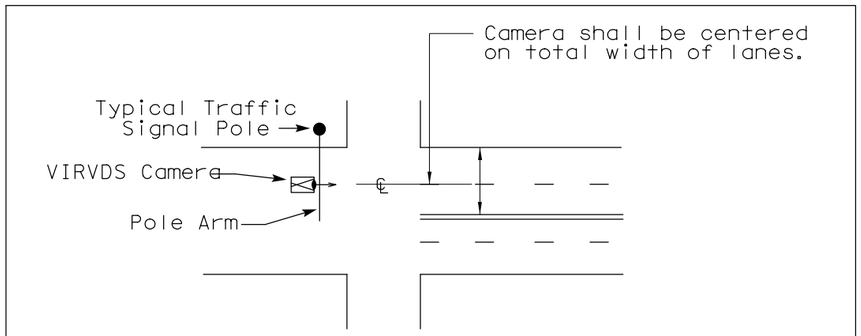
134



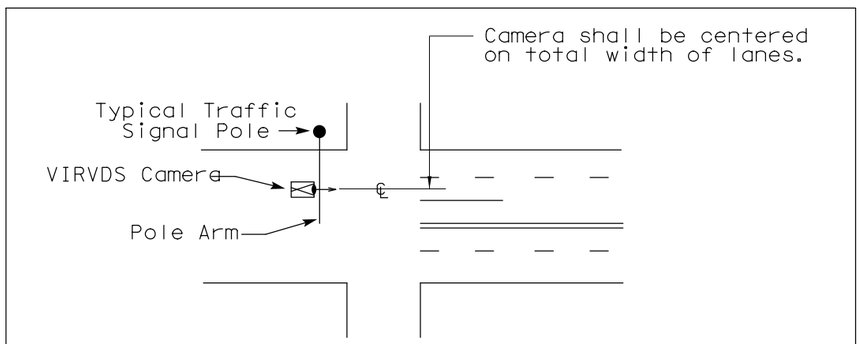
Elevation View



Side View



**Typical VIRVDS Camera:
Lane Placement Detail**



**Typical VIRVDS Camera:
Left Turn Lane Placement Detail**

Notes:

1. INSTALL VIDEO DETECTION PROCESSOR UNIT(S) INSIDE THE CONTROLLER CABINET.
2. USE STAINLESS STEEL HOSE CLAMPS TO INSTALL CAMERA MOUNTS OR METHOD APPROVED BY ENGINEER.
3. AIM THE CAMERA SO THAT THE HORIZON IS NOT VISIBLE IN THE FIELD OF VIEW.
4. INSURE WATER TIGHT CABLE ENTRY AND EXIT POINTS ARE IN THE MAST ARM.
5. FOR THE VIRVDS CAMERAS, A 10 AMP SINGLE POLE (1P) BREAKER (BLADE TYPE FUSES WILL NOT BE ALLOWED) SHALL BE MOUNTED ON A PANEL AND INSTALLED INSIDE THE CONTROLLER CABINET. FABRICATION OF PANEL AND IT'S INSTALLATION SHALL BE AS APPROVED BY THE ENGINEER AND SHALL BE SUBSIDIARY TO PERTINENT BID ITEMS.

VIDEO IMAGING AND RADAR VEHICLE DETECTION SYSTEM (VIRVDS)

WSP USA Inc TBPE #F-2263

STATE OF TEXAS
PRASHANT PACHORE
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03/30/2022

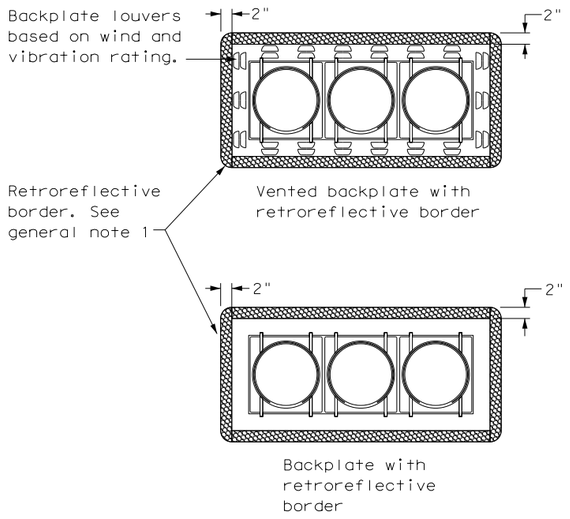
Texas Department of Transportation
Traffic Operations Division

TYPICAL VIRVDS CAMERA MOUNTING DETAILS

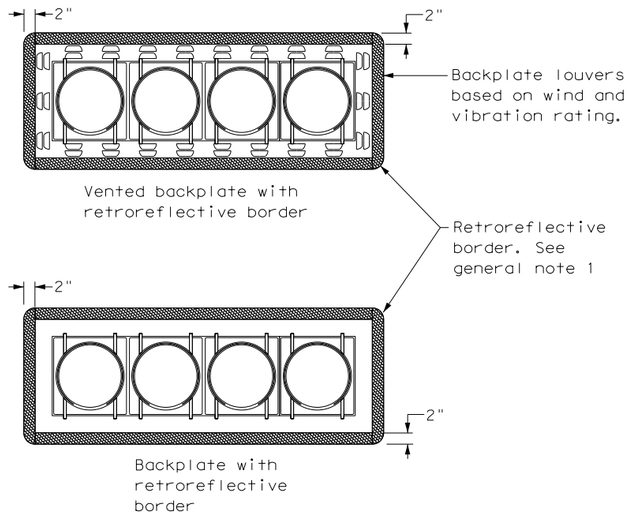
© TxDOT	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		204

TYP RADAR VIRVDS CAMERA MOUNTING.dgn

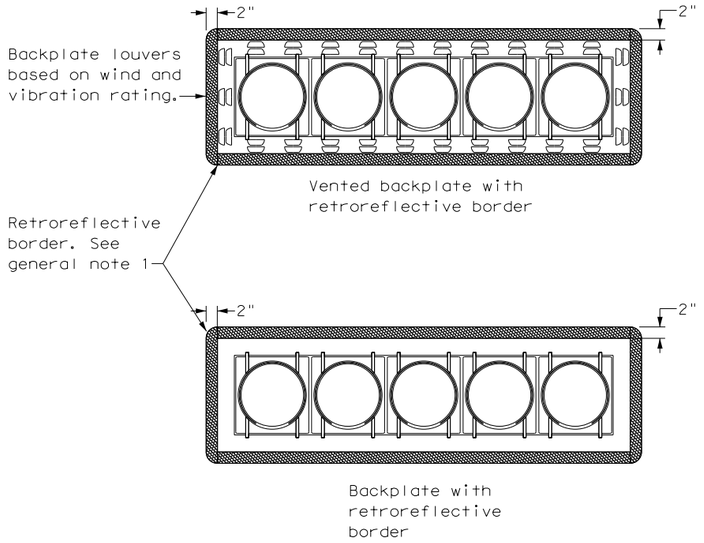
DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signals\TxDOT Standar



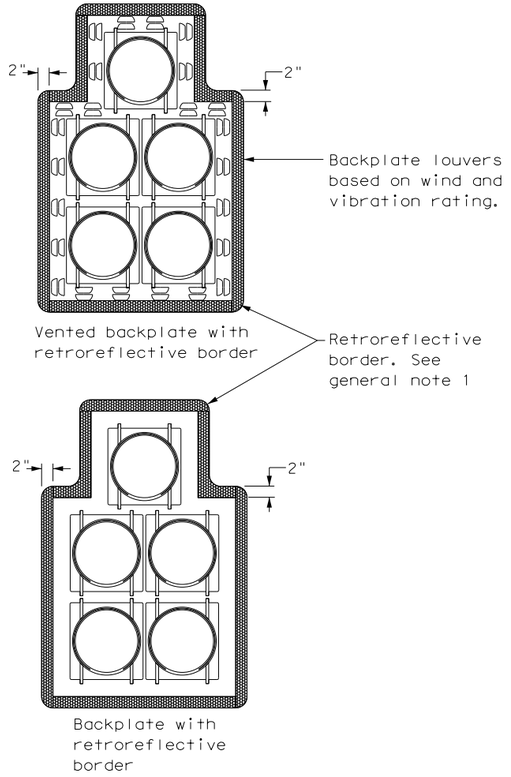
THREE-SECTION HEAD
HORIZONTAL OR VERTICAL



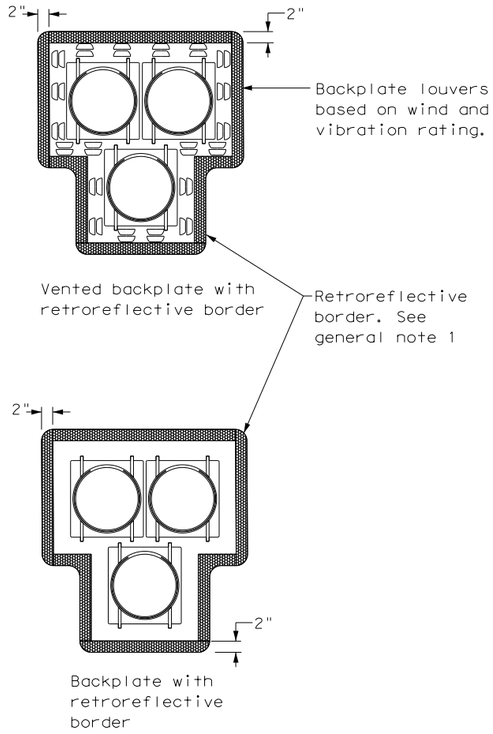
FOUR-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
HORIZONTAL OR VERTICAL



FIVE-SECTION HEAD
CLUSTER



PEDESTRIAN HYBRID
BEACON

GENERAL NOTES:

1. Backplates are optional for traffic signals and pedestrian hybrid beacons. When backplates are used, a 2-inch wide fluorescent yellow AASHTO Type B_{FL} or C_{FL} retroreflective border conforming to TxDOT DMS-8300 is required. Place on all approaches when used.
2. Signal head and backplate compatability must be verified by the contractor prior to installation.
3. When using backplates on signal heads, venting is preferred to reduce cyclic vibration stress.
4. When a vented backplate is used, the retroreflective border must not be placed over the louvers.
5. This standard sheet applies to all signal heads with backplates, including but not limited to:
   - Pole mounted
   - Overhead mounted
   - Span wire mounted
   - Mast arm mounted
   - Vertical signal heads
   - Horizontal signal heads
   - Clustered signal heads
   - Pedestrian hybrid beacons

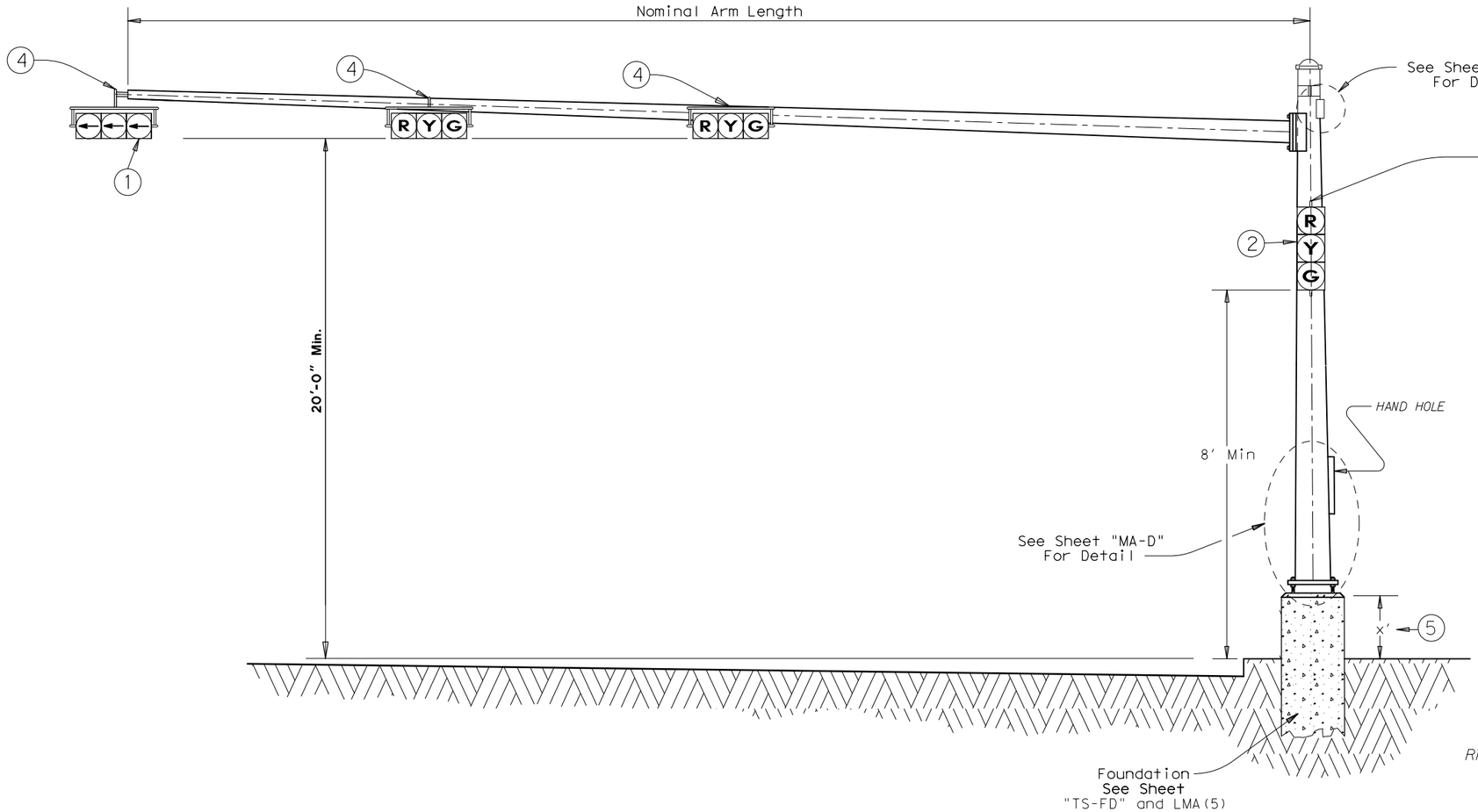
Texas Department of Transportation

Traffic Safety Division Standard

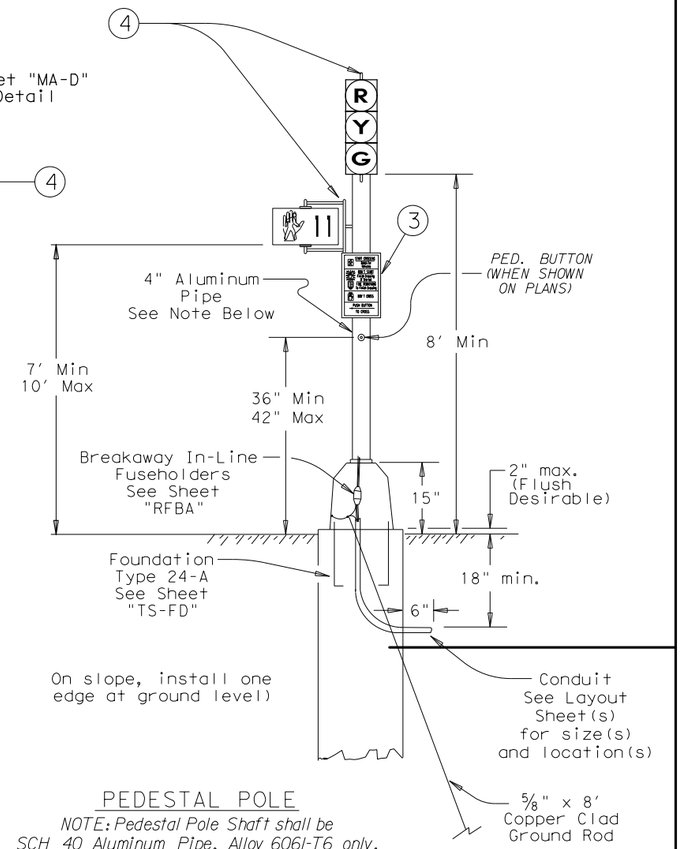
TRAFFIC SIGNAL HEAD WITH BACKPLATE

TS-BP-20

FILE: ts-bp-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		205



MAST ARM POLE



PEDESTAL POLE

NOTE: Pedestal Pole Shaft shall be SCH 40 Aluminum Pipe, Alloy 6061-T6 only. Rigid Metal or Aluminum Conduit will not be allowed.

NOTES :

1. *RED, RED, YELLOW, AND GREEN ARROW INDICATIONS TO BE USED AS SHOWN ON PROPOSED SIGNAL LAYOUT SHEET.*
2. *VERTICALLY MOUNTED HEADS (TYPE V3) WILL BE REQUIRED WHEN SHOWN ON PLANS.*
3. *SIGN R10-3eR or R10-3eL SIGNS REQUIRED WHEN PED. BUTTONS ARE USED. 0.080"(MIN) AL SIGN BLANK:*

R10-3eL (R)

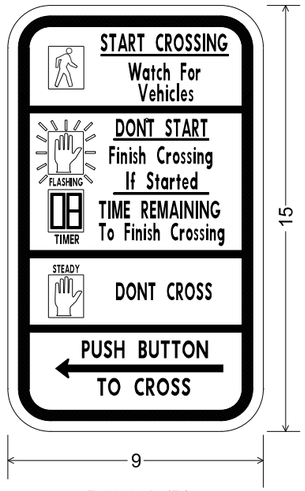
4. *ASTRO BRACKET ASSEMBLY OR APPROVED EQUAL SHALL BE REQUIRED.*
5. *PROVIDE ADDITIONAL DRILLED SHAFT ABOVE GRADE TO ACCOMODATE VERTICAL CLEARANCE. SEE TSFD AND LMA(5) FOR QUANTITIES FOR EACH POLE.*

GENERAL NOTES :

DETAILS OF POLES, HEADS, AND MOUNTING BRACKETS SHOWN ON THIS SHEET ARE EXAMPLES ONLY. SEE SIGNAL LAYOUT SHEET(S) AND APPLICABLE SMA-80, DMA-80, MA-C, OR MA-D STANDARDS FOR THE ACTUAL DESIGN AND CONSTRUCTION OF MAST ARM POLES.

FACES WITH TUNNEL VISORS ON SIGNAL SECTIONS, AND FURNISH PEDESTRIAN SIGNAL SECTIONS WITH A THREE SIDED VISOR SHIELDING THE TOP AND SIDES.

FURNISH PEDESTRIAN COUNTDOWN SIGNALS WITH A SOLID HAND AND A SOLID MAN SYMBOL INDICATIONS IN ONE SECTION AND THE COUNTDOWN IN THE OTHER SECTION. BOTH SECTIONS SHALL BE HOUSED IN ONE UNIT.



R10-3eL (R)

Texas Department of Transportation
Traffic Operations Division

SIGNAL HEAD & SIGNAL POLE DETAIL SHEET

REVISIONS

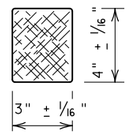
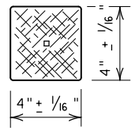
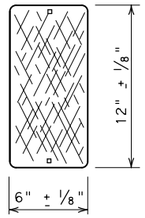
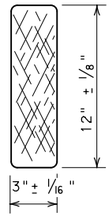
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0003	07	064,ETC	IH20

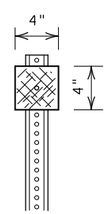
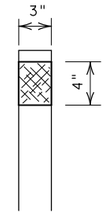
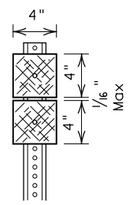
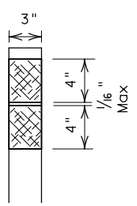
DIST	COUNTY	SHEET NO.
ODA	REEVES	206

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
- S = Single
- D = Double

COLOR OF REFLECTORS
- W = White
- Y = Yellow
- R = Red

REFLECTOR UNIT SIZE
- 1 or 2

TYPE OF POST OR DELINEATOR
- WC = Wing Channel Post
- YFLX = Yellow Flexible Post
- WFLX = White Flexible Post
- BRF = Barrier Reflector

TYPE OF MOUNT
- GND = Embedded (drivable or set in concrete)
- CTB = Concrete Barrier Mount
- GF1 or GF2 = Guard Fence Attachment
- SRF = Surface Mount

DIRECTION
If Required
- BI = Bi-Directional
- BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
- 1, 2, 3, or 4

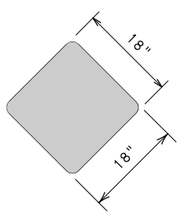
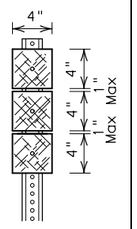
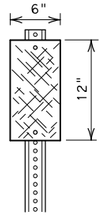
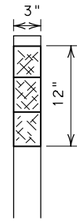
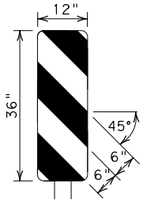
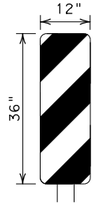
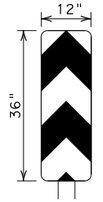
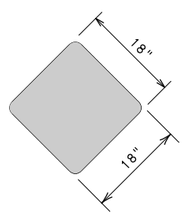
NUMBER OF REFLECTORS OR DIRECTION
- X = 3-Size 2 reflector units (Type 2 only)
- Y = 1-Size 3 reflector unit (Type 2 only)
- Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
- L = Left Side (Type 3 Object Marker only)
- R = Right Side (Type 3 Object Marker only)
- C = Center (Type 3 Object Marker only)

TYPE OF POST
- WC = Wing Channel Post
- WFLX = White Flexible Post
- TWT = Thin Walled Tubing

TYPE OF MOUNT
- GND = Embedded (drivable)
- SRF = Surface Mount
- WAS = Wedge Anchor Steel
- WAP = Wedge Anchor Plastic

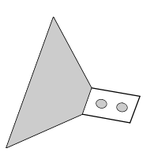
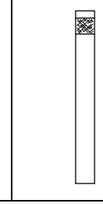
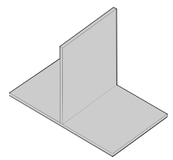
DIRECTION
If Required
- BI = Bi-Directional

OBJECT MARKERS

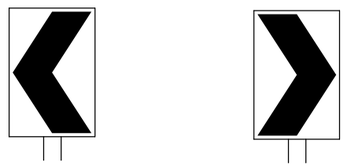
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

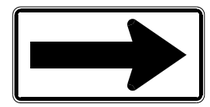
BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE	 W1-8			
SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	
NOTE	1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).			

ONE DIRECTION LARGE ARROW

DEVICE	 W1-6	
SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ODA	REEVES.		207

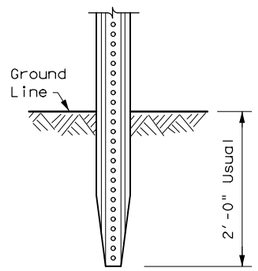
20A

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

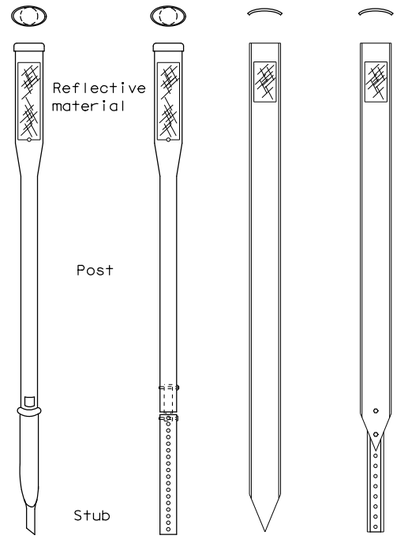


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

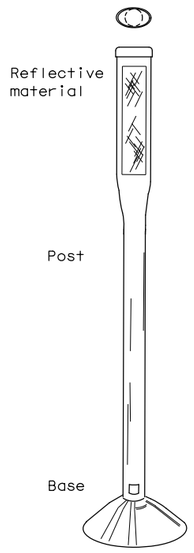
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



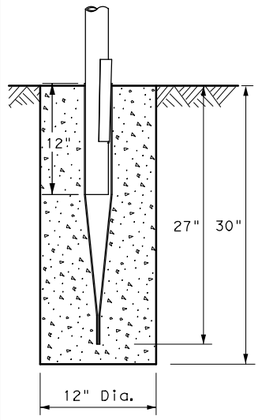
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

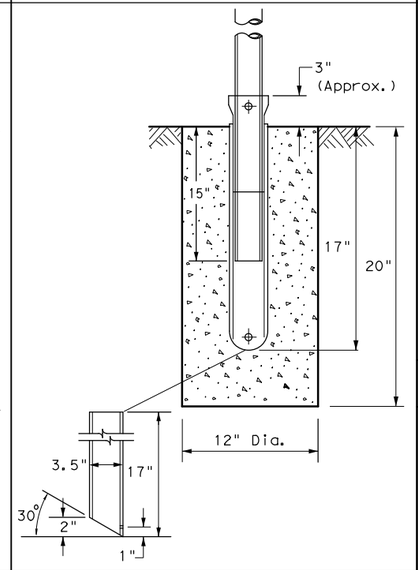
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

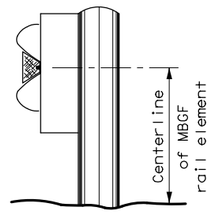
NOTE

1. Install per manufacturer's recommendations.

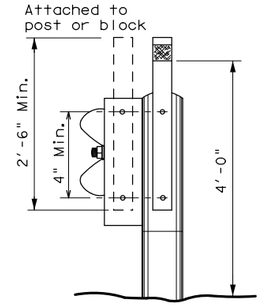
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

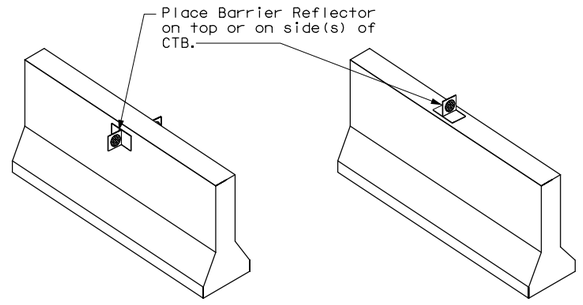
GF1



GF2



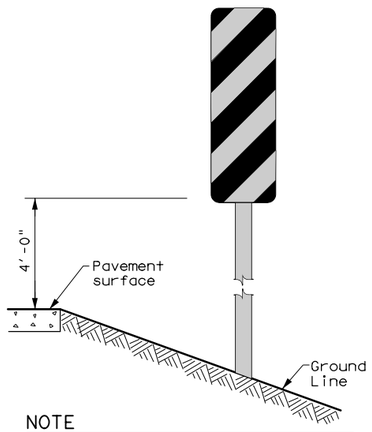
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

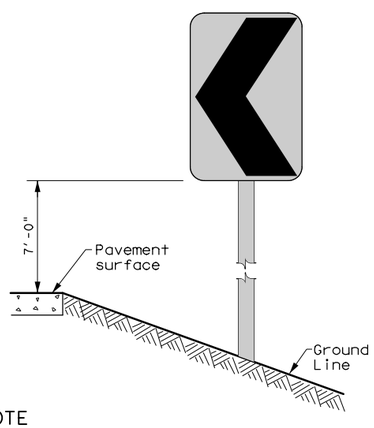
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

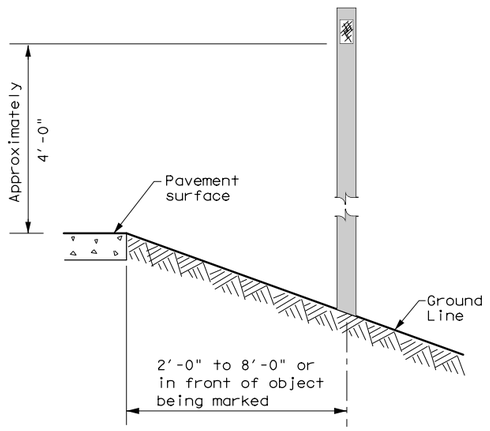
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ODA	REEVES.		208

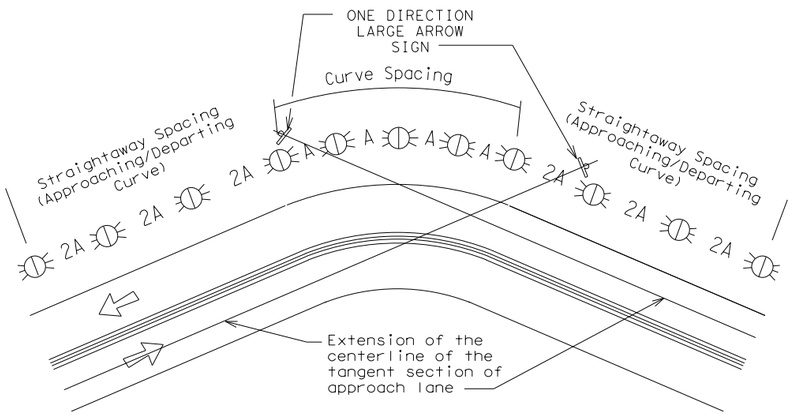
20B

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

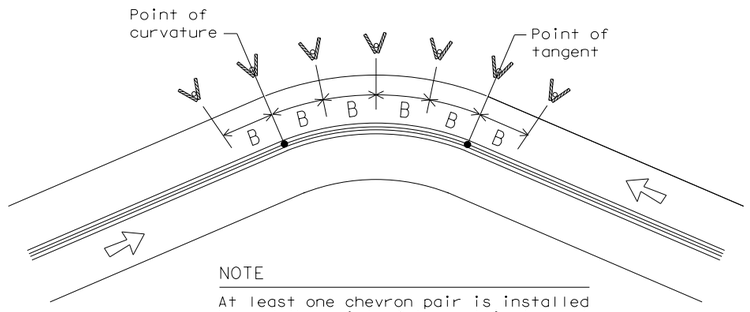
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

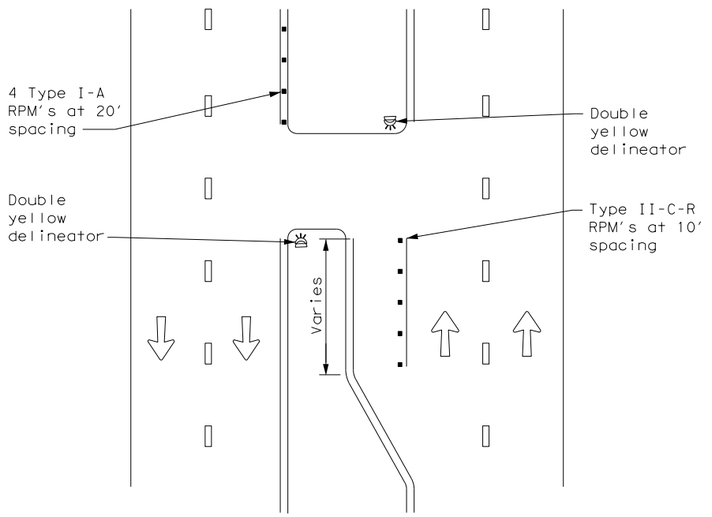
D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
3-15 8-15	DIST	COUNTY		SHEET NO.
8-15 7-20	ODA	REEVES.		209

20C

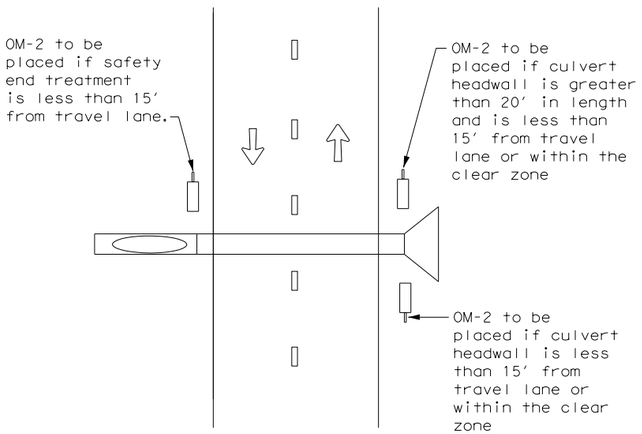
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

CROSSOVERS



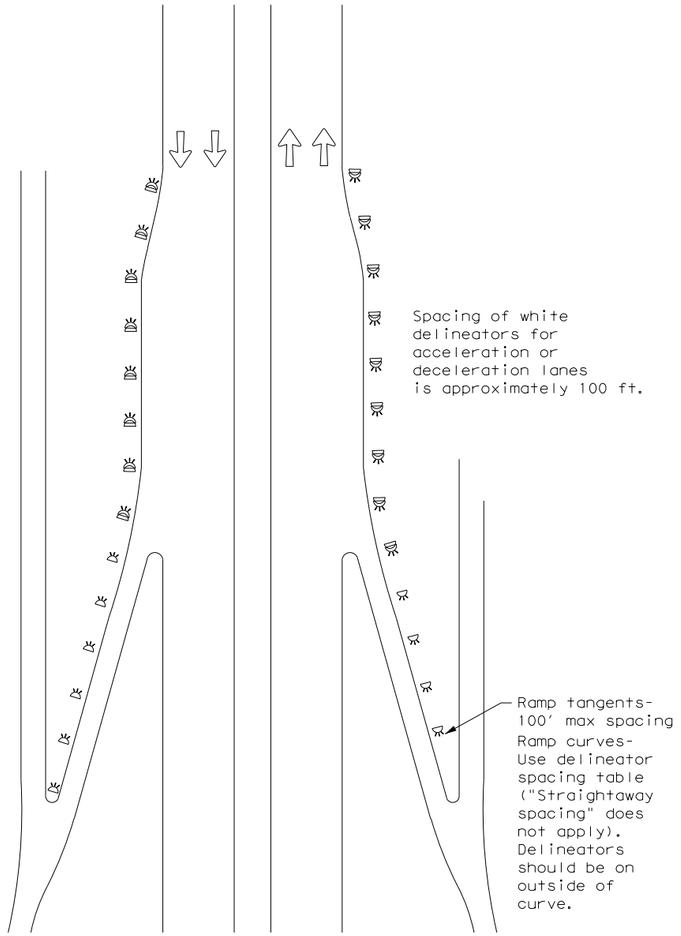
DETAIL 1

FOR CULVERTS WITHOUT MBGF



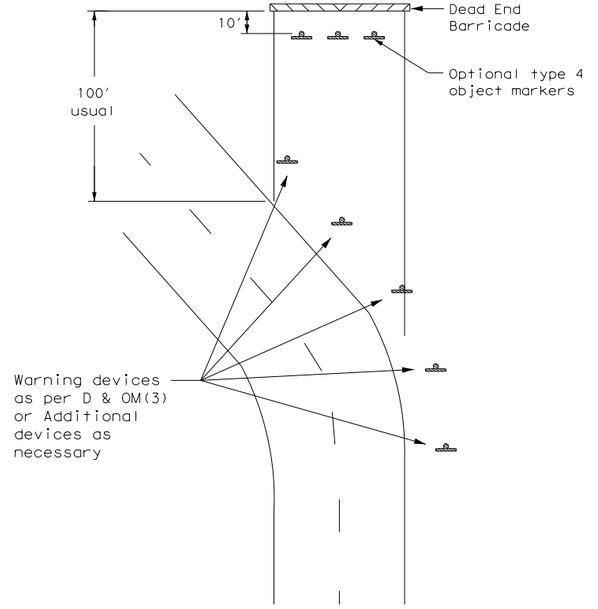
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



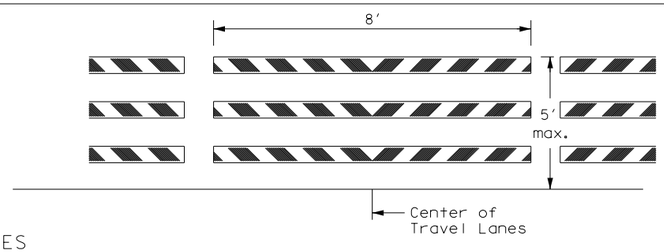
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

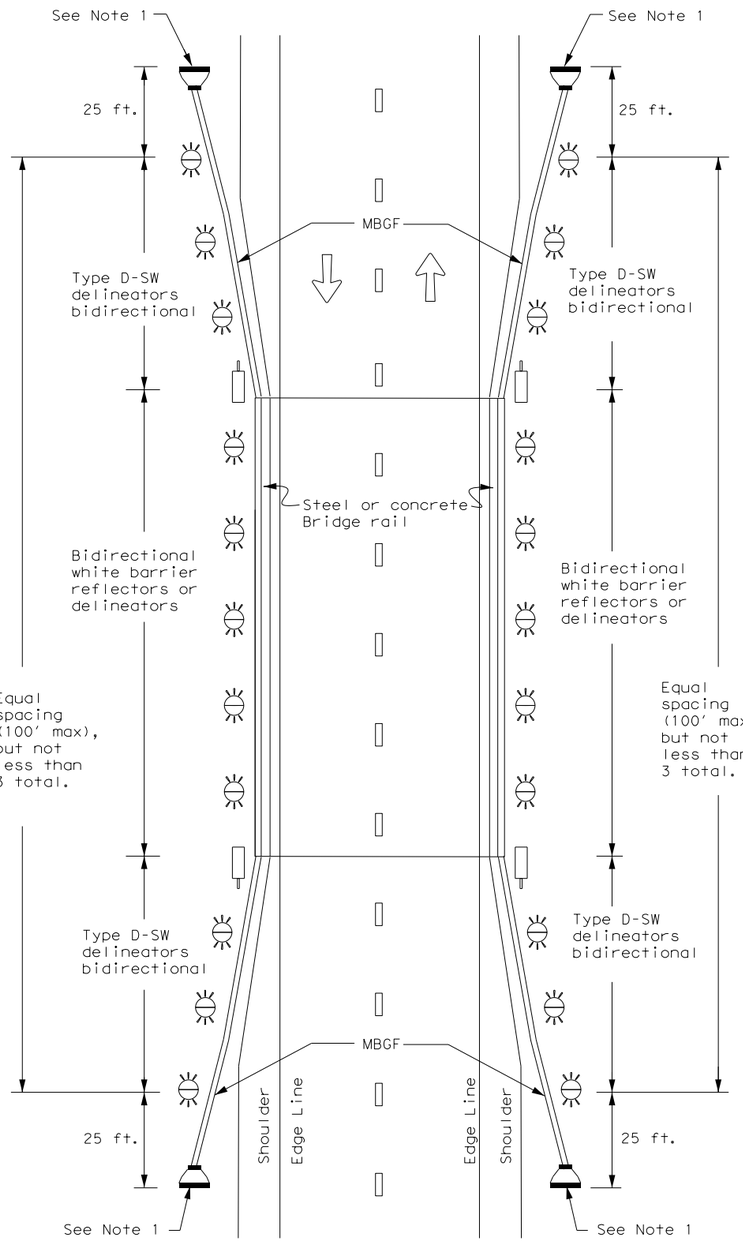
D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
3-15	DIST	COUNTY		SHEET NO.
7-20	ODA	REEVES.		210

20D

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

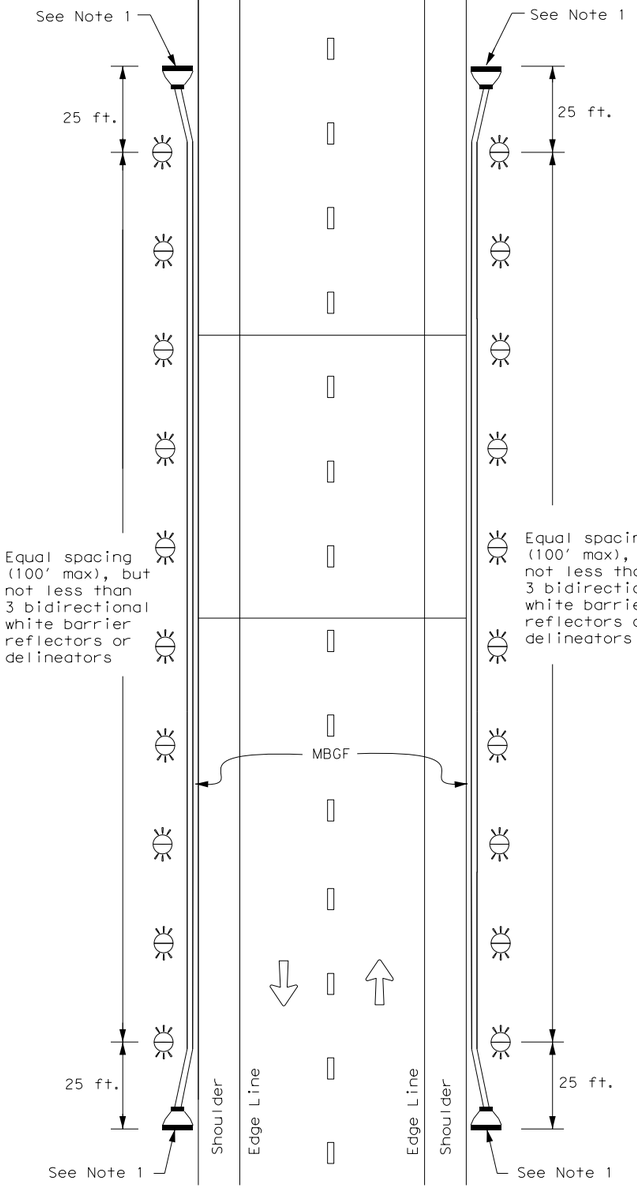
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

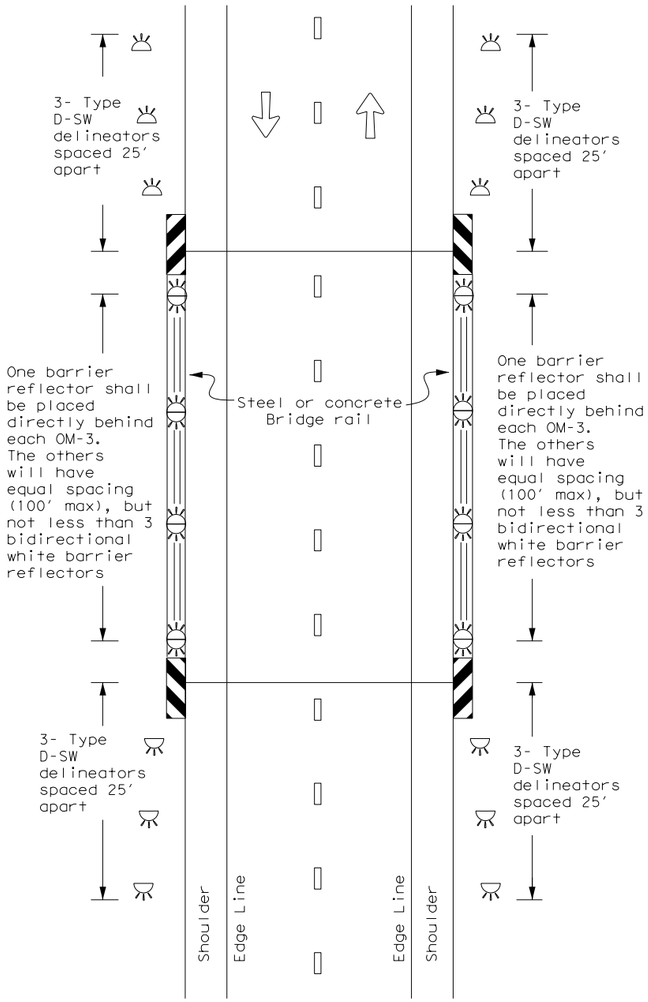
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

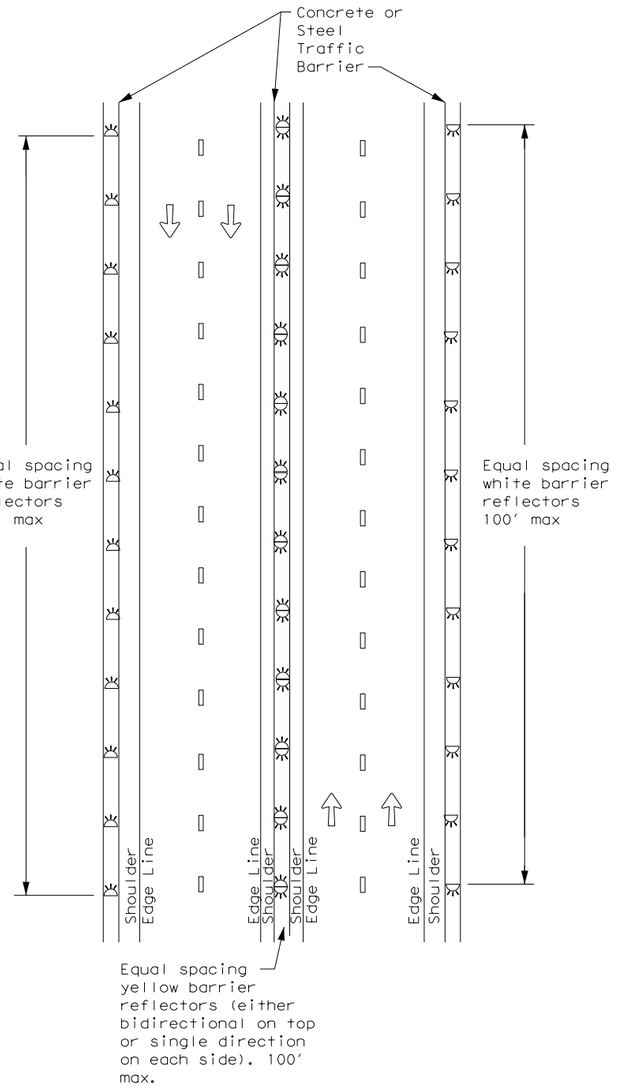
D & OM(5)-20

FILE: dom5-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
7-20	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		211

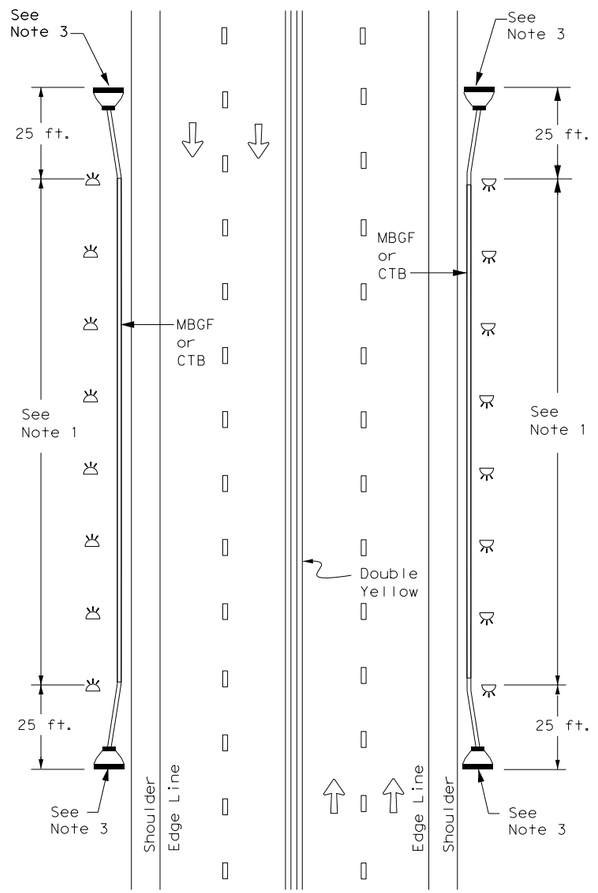
20E

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

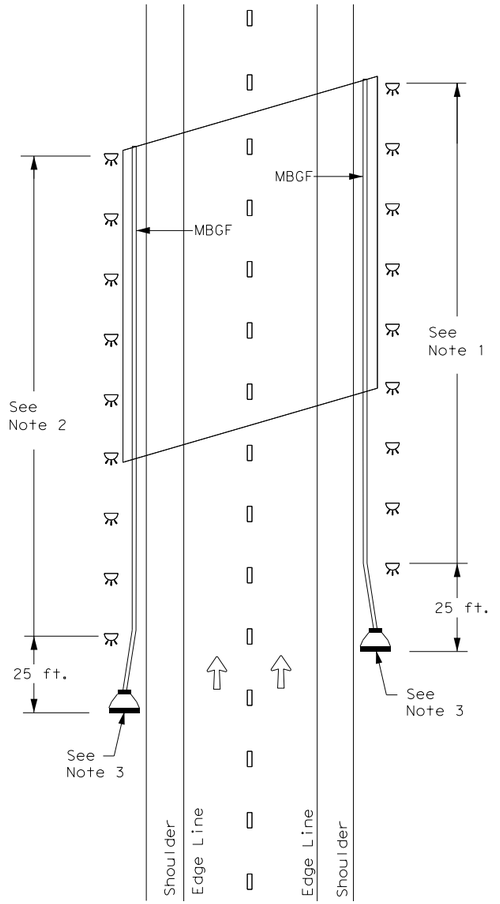
CONTINUOUS CONCRETE OR STEEL BARRIER



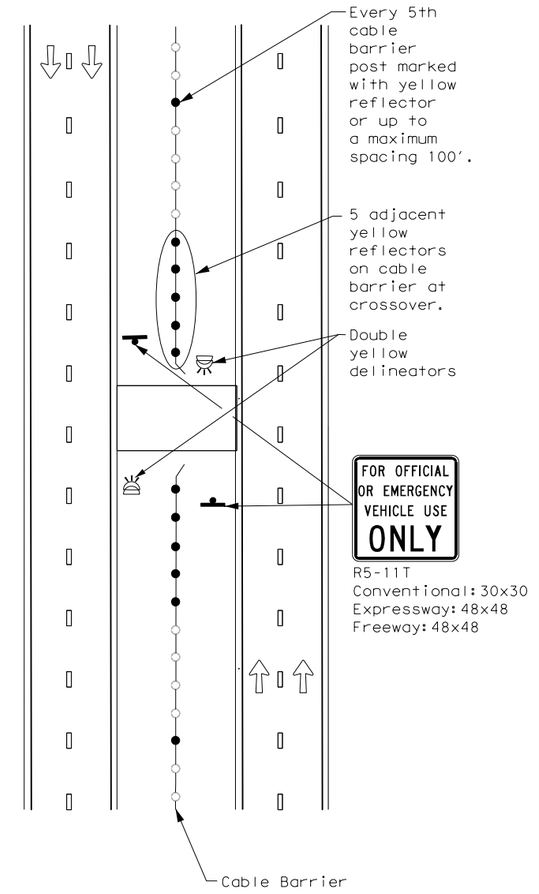
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100′ max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100′ max.)
2. Equal spacing (100′ max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

FILE: dom6-20.dgn			DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT	
©TxDOT August 2015		CONT	SECT	JOB		HIGHWAY	
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7-20		DIST	COUNTY			SHEET NO.	
		ODA	REEVES.			212	

DATE: 3/30/2022 $TIME$
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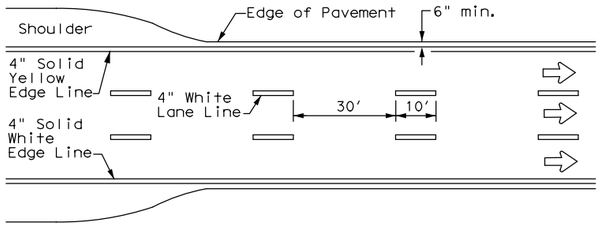
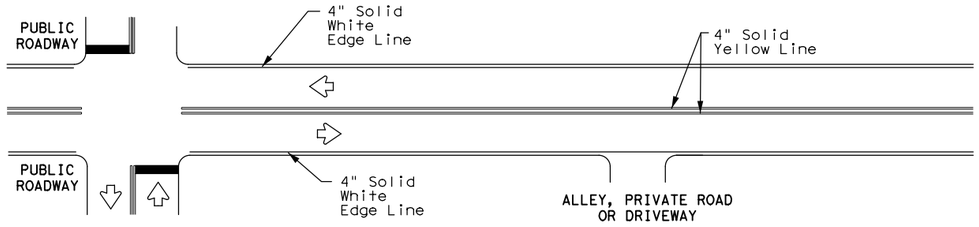
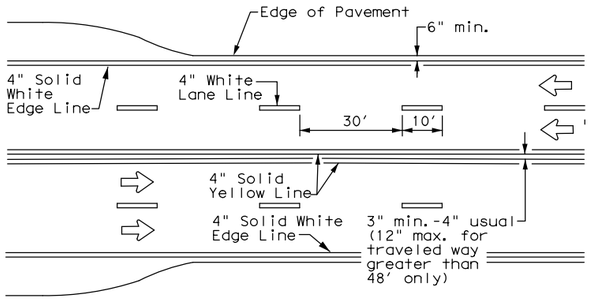


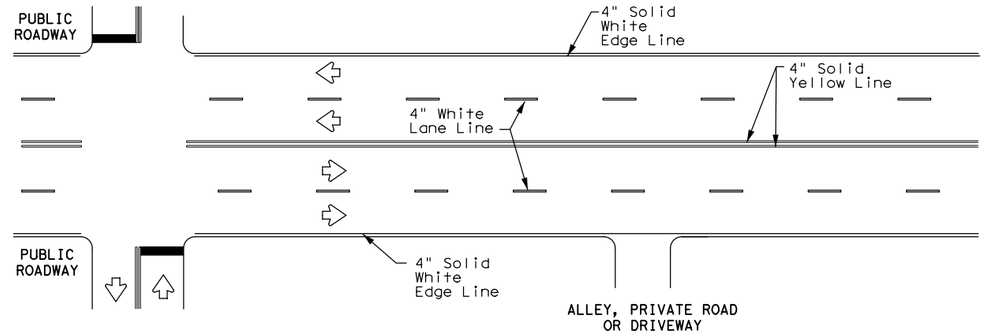
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



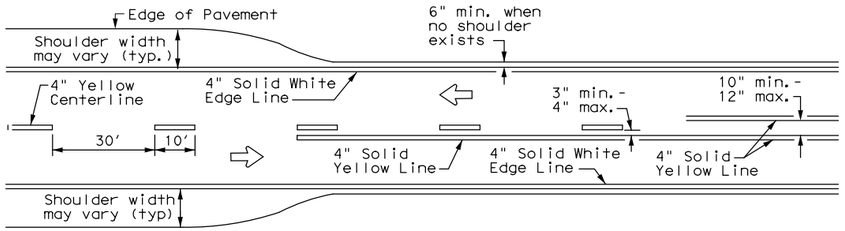
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



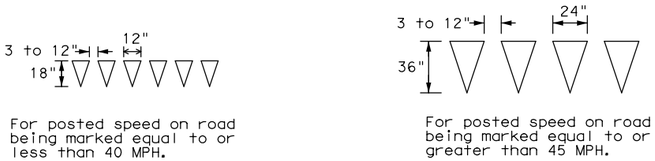
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



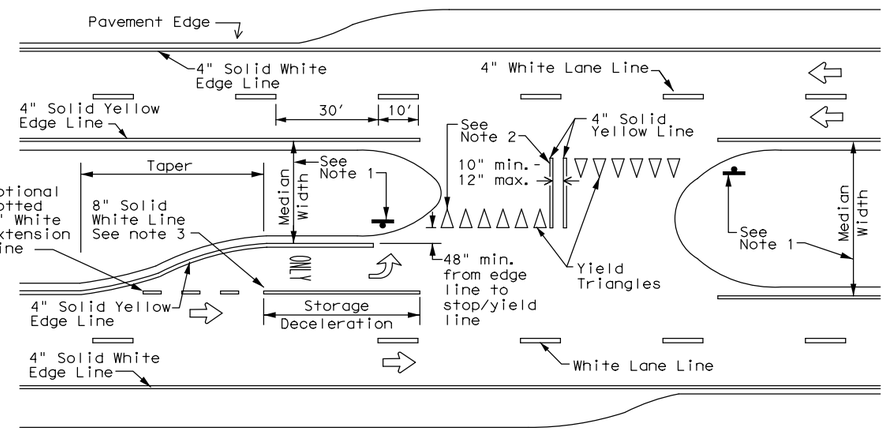
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

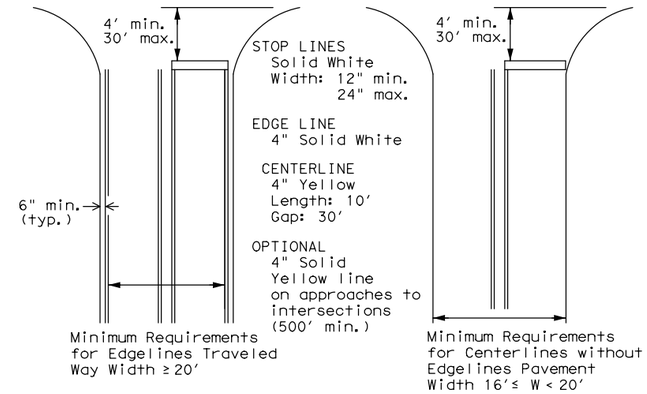
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

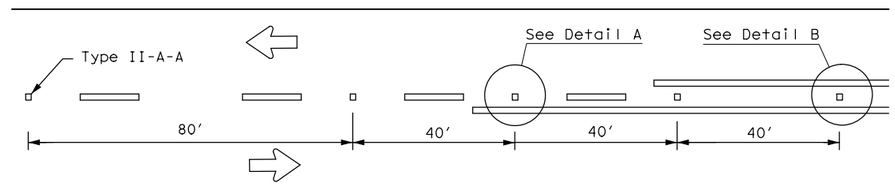
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

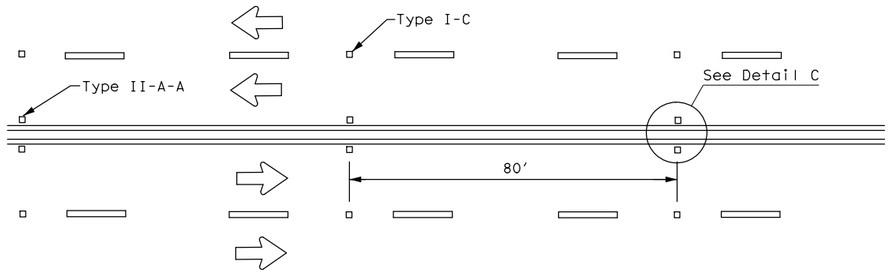
FILE: pm1-20.dgn	DN:	CK:	DW:	CK:
© TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0003	07	064, ETC	IH20
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	ODA	REEVES.		213

22B

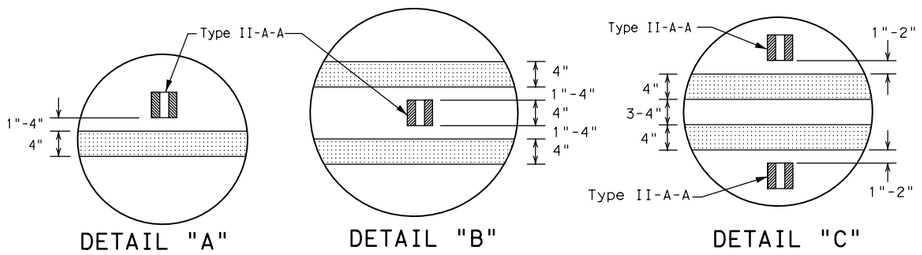
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



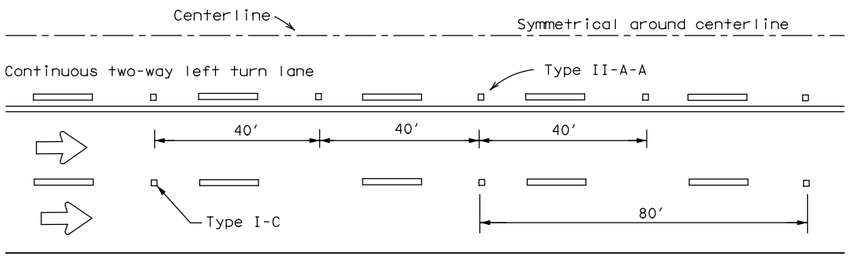
CENTERLINE FOR ALL TWO LANE ROADWAYS



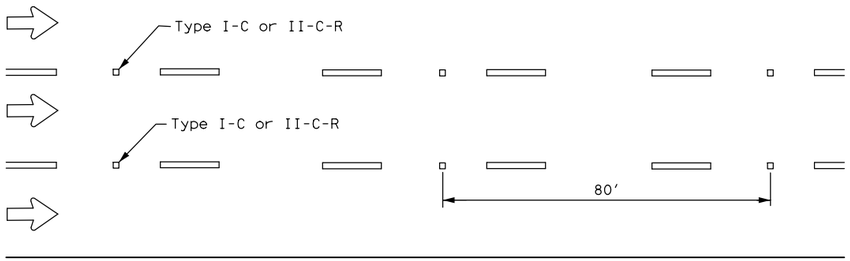
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" DETAIL "B" DETAIL "C"

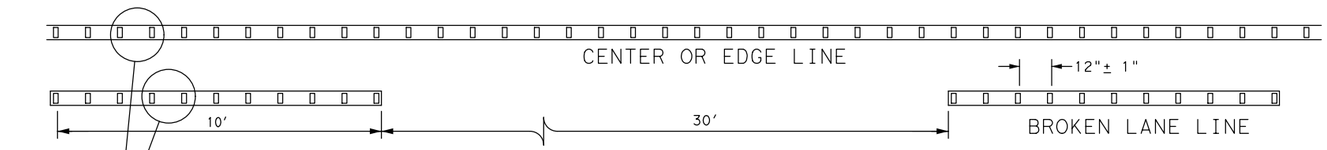


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



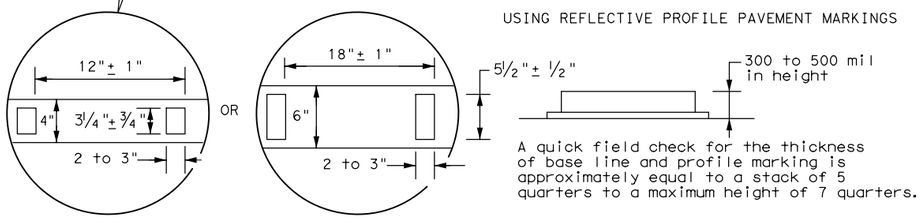
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE

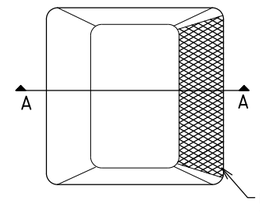
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

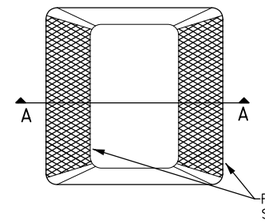
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

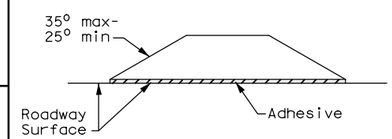
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

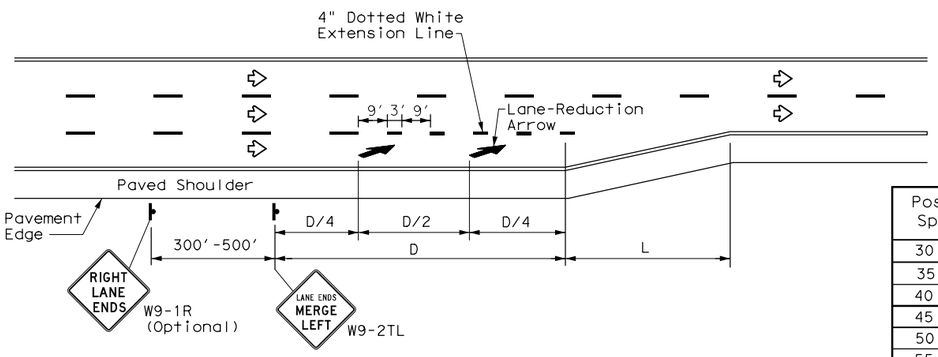
POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		214

22B

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\xxxx-xxx-xxxx.dgn

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing & Pavement Markings\pm3-20.dgn

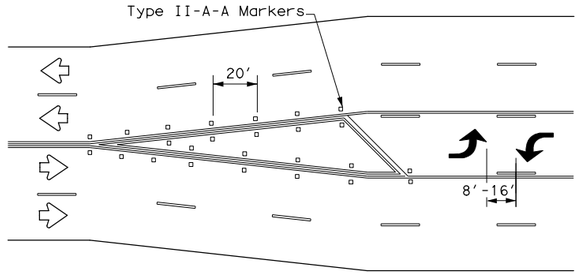


LANE REDUCTION

Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional W9-1R "RIGHT LANE ENDS" sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

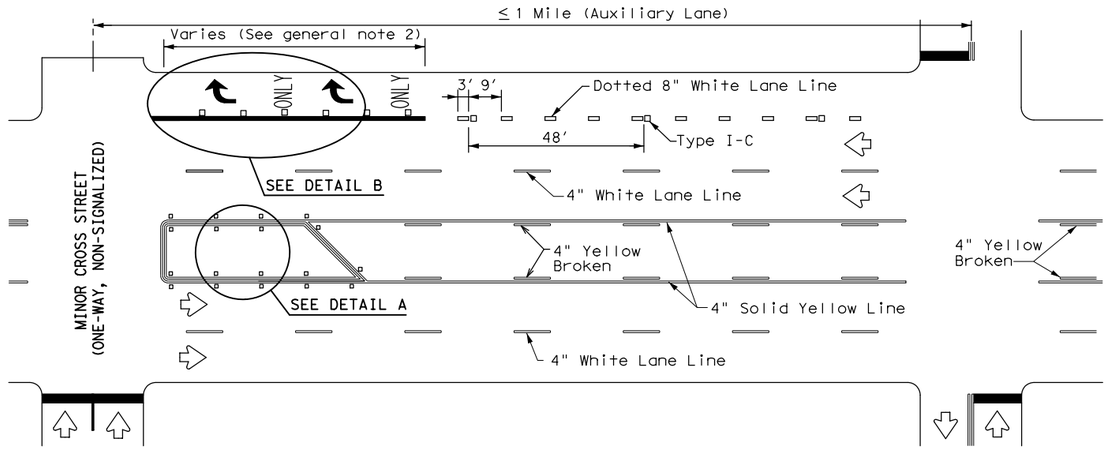
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

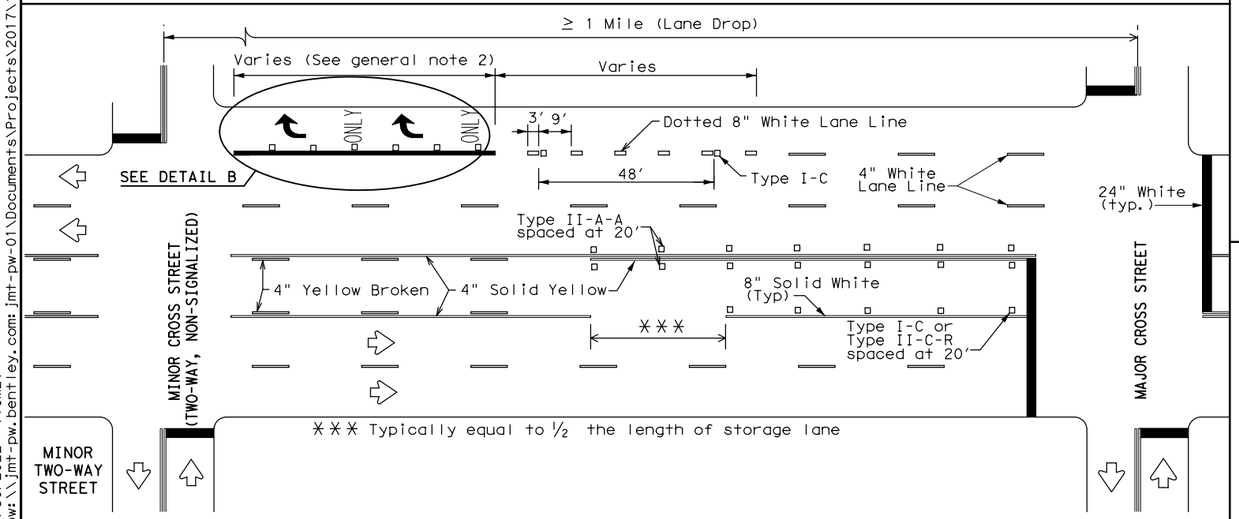
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

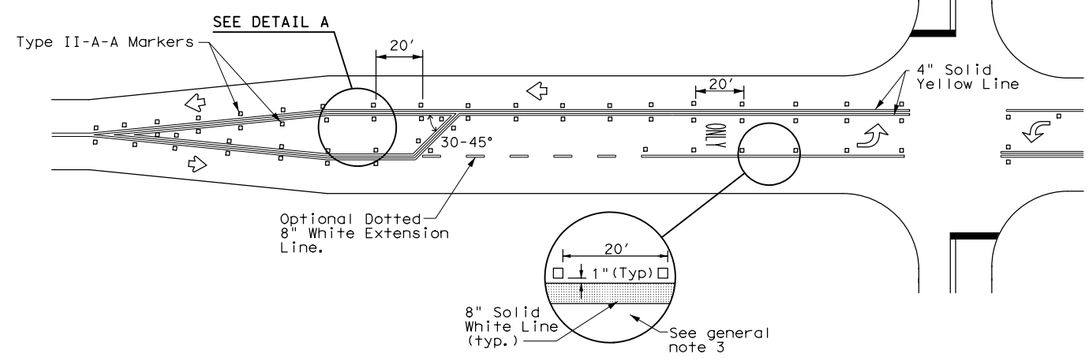
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



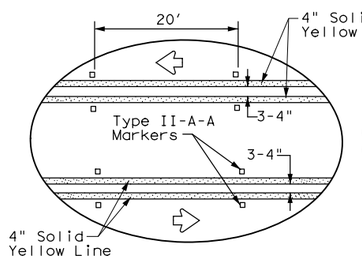
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



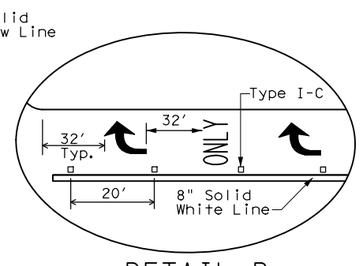
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

Texas Department of Transportation

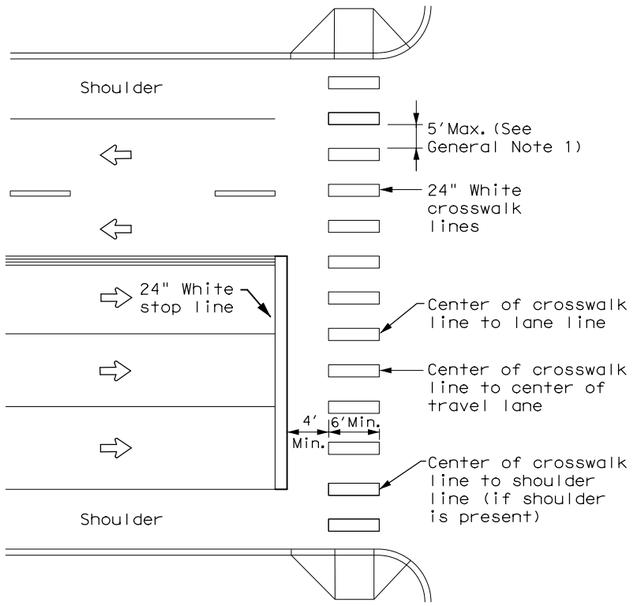
Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN:	CK:	DW:	CK:
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	ODA	REEVES.		215
3-03 6-20				

22D

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing &



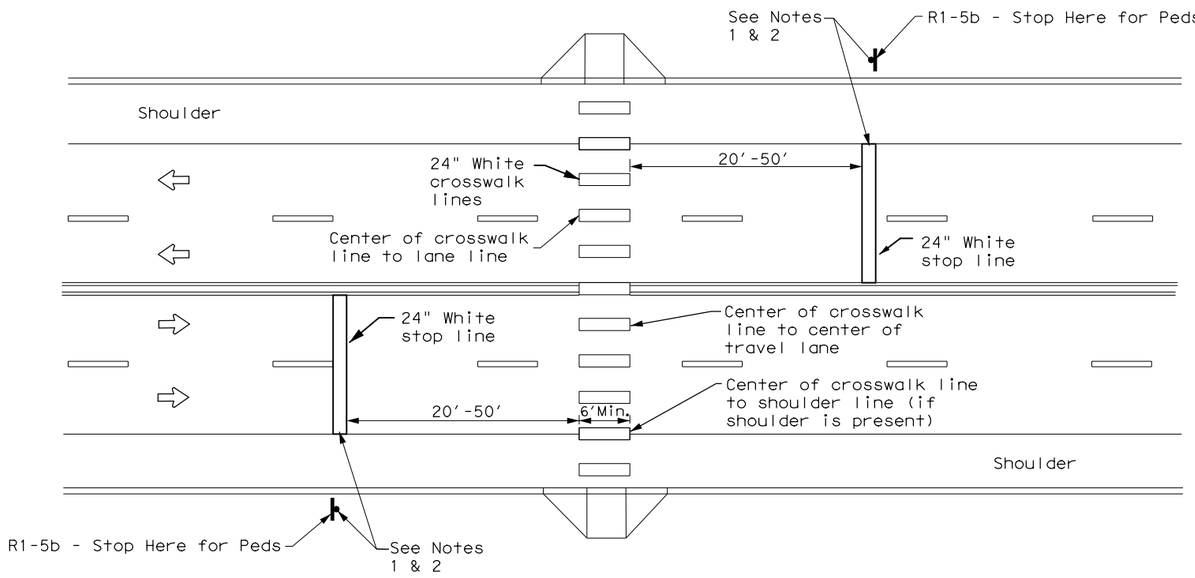
HIGH-VISIBILITY LONGITUDINAL CROSSWALK
AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY
LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with "Stop Here for Pedestrians" signs at unsignalized mid block cross walks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22

FILE: pm4-22.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS 3-22	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		216

22D

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing &

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))

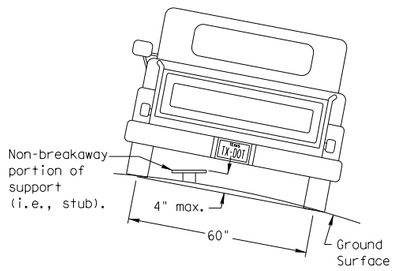
Number of Posts (1 or 2)

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))

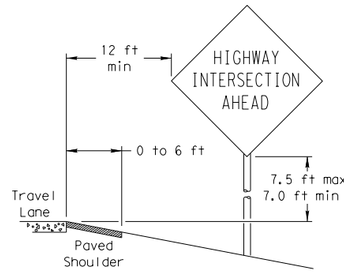
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

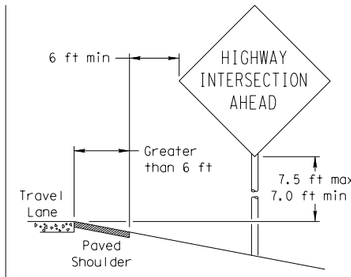
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

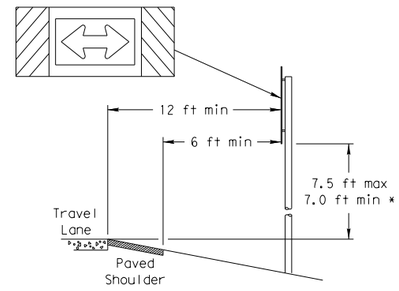
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



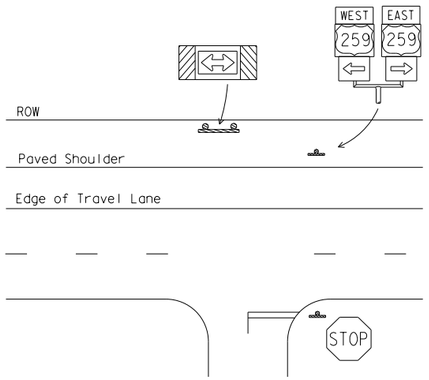
GREATER THAN 6 FT. WIDE

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.

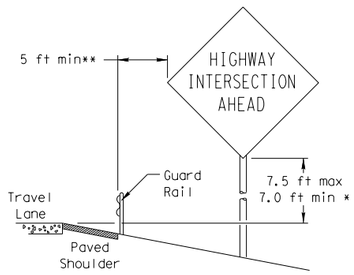
T-INTERSECTION



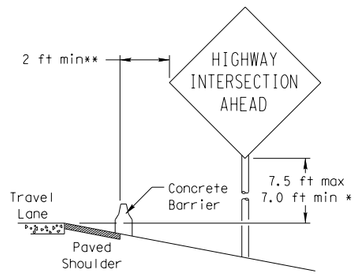
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

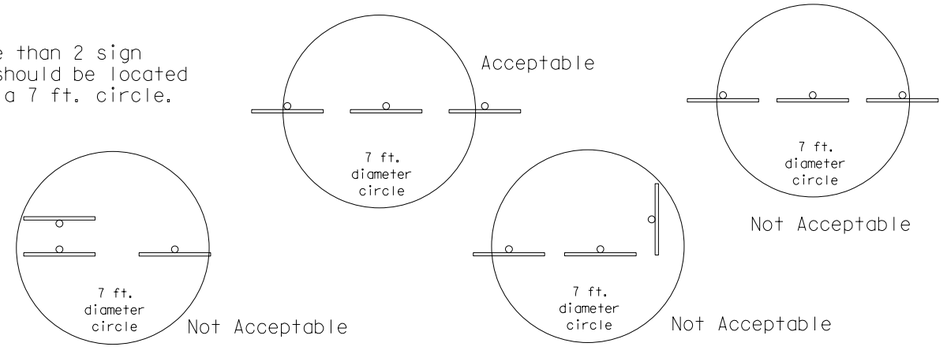
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

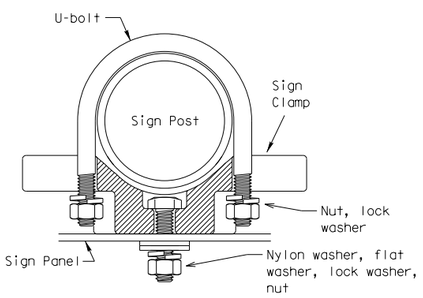
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

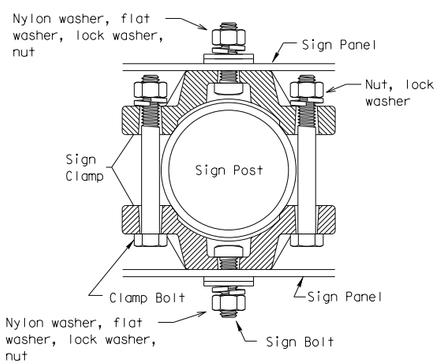


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

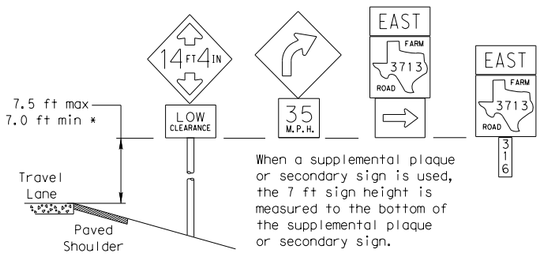
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



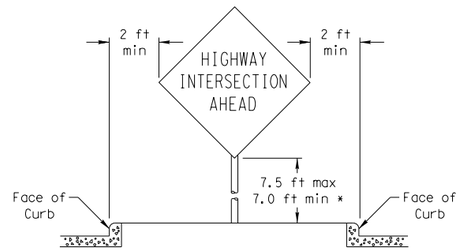
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



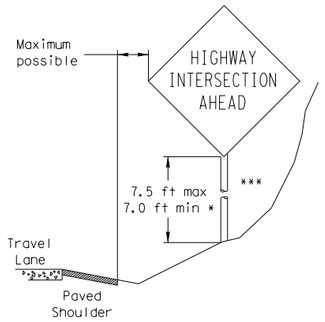
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS
9-08

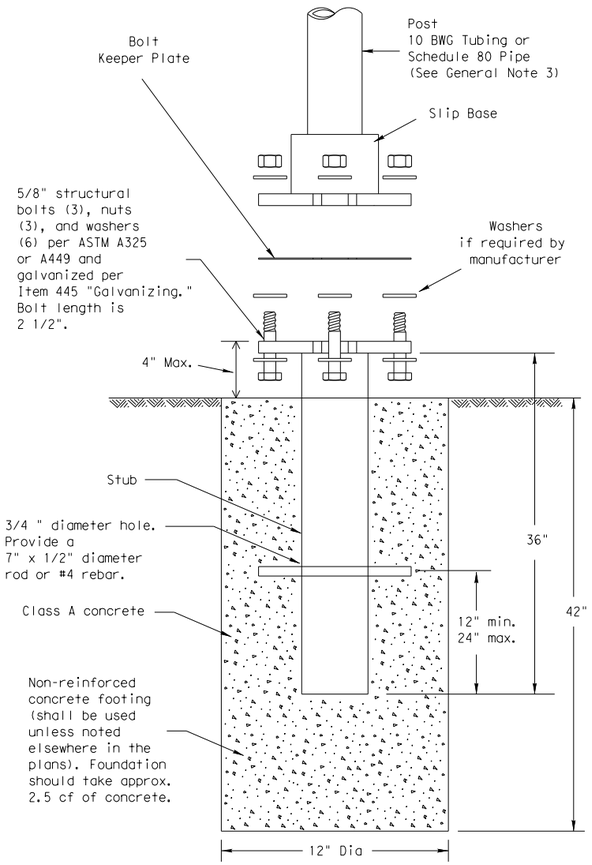
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES.	217

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signing & Pavement Marking

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.

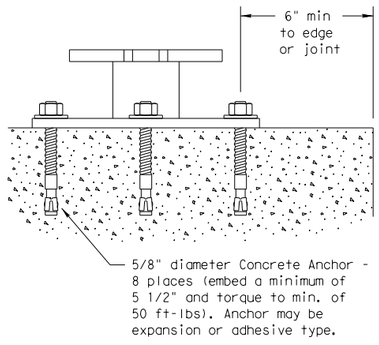
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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.

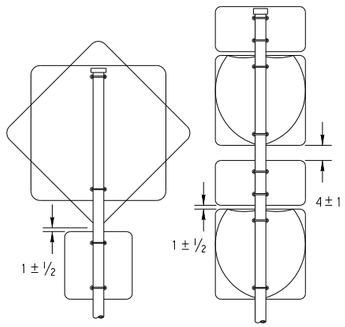
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

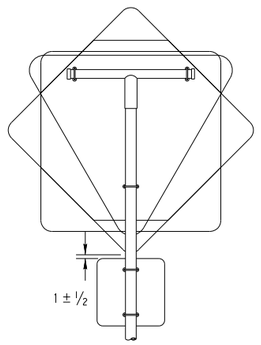
SMD(SLIP-1)-08

©TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		218

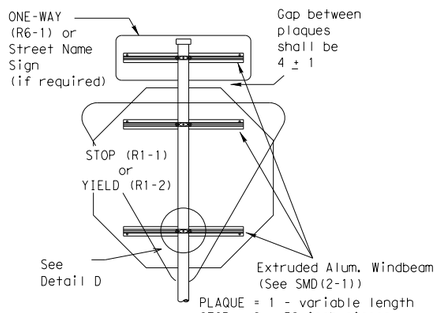
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Signing & Pavement Marking\



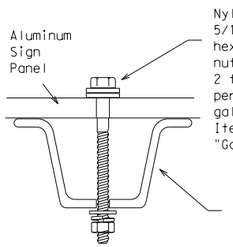
SM RD SGN ASSM TY XXXXX(1)XX(P)



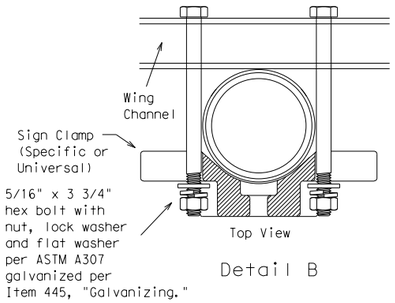
SM RD SGN ASSM TY XXXXX(1)XX(T)



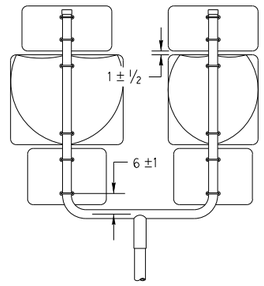
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Detail A



Detail B



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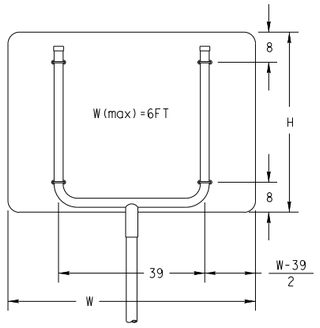
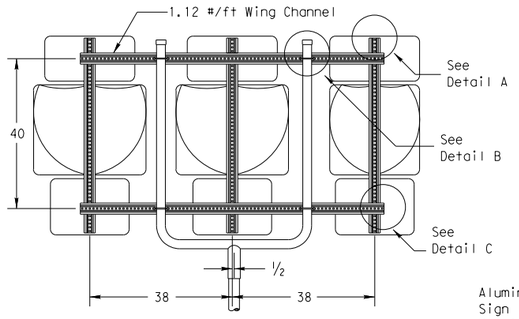
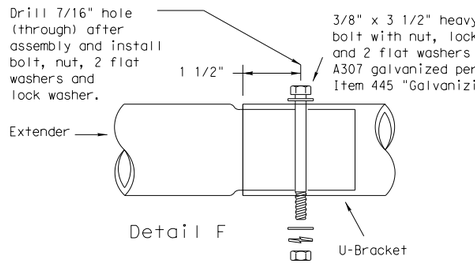


SM RD SGN ASSM TY XXXXX(1)XX(U)

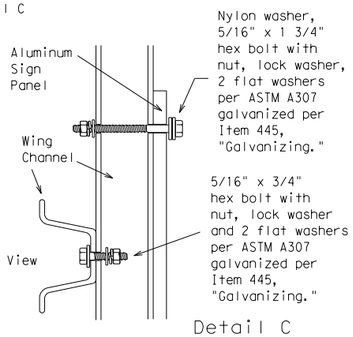


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

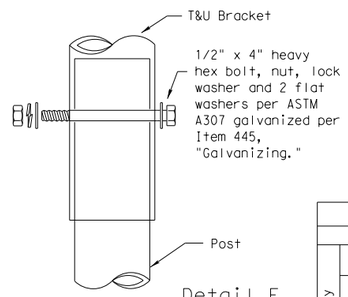


Detail F

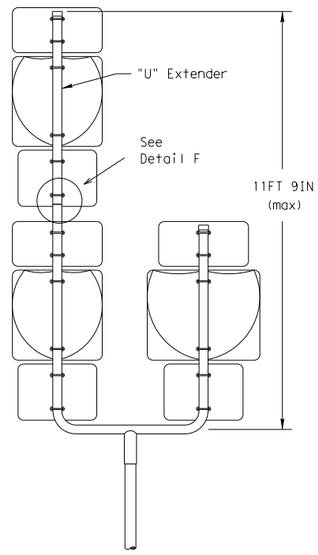
Splices shall only be allowed behind the sign substrate.



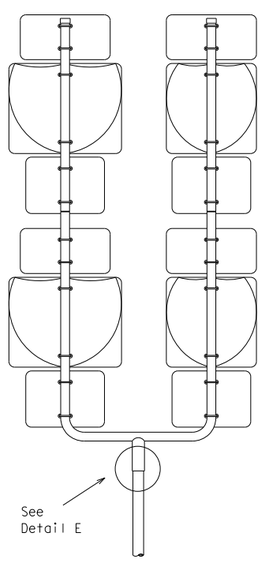
Detail C



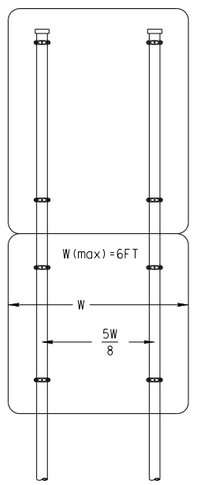
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

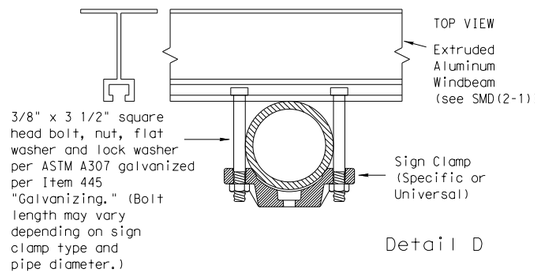


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

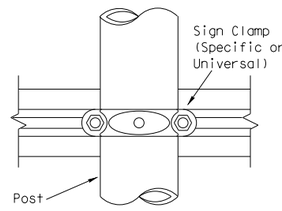


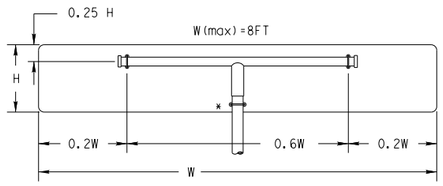
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

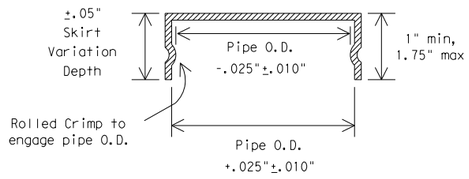




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		219

26C

DATE: 3/30/2022 $TIME$
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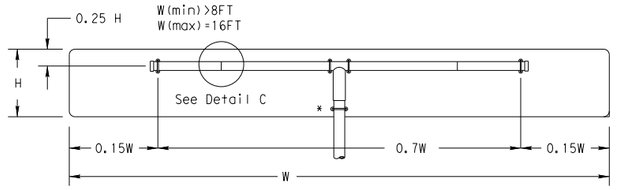
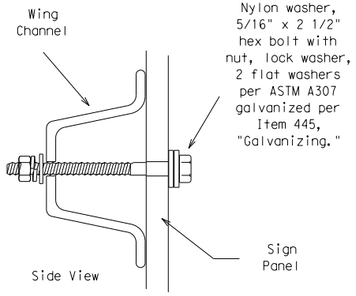
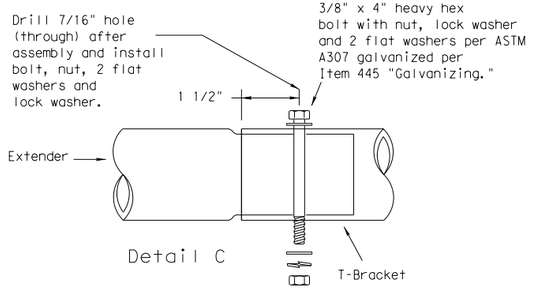


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)

(* - See Note 12)

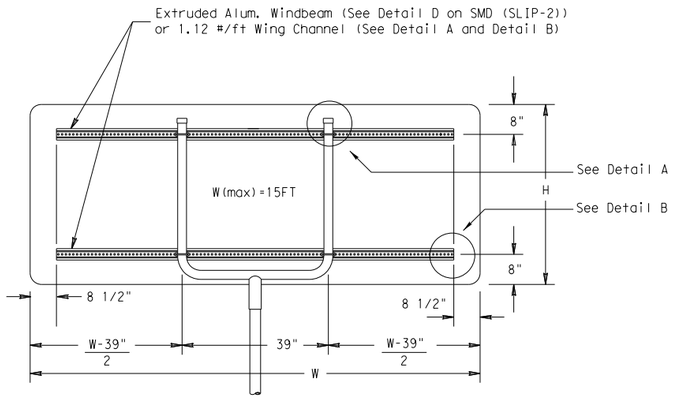


Detail B

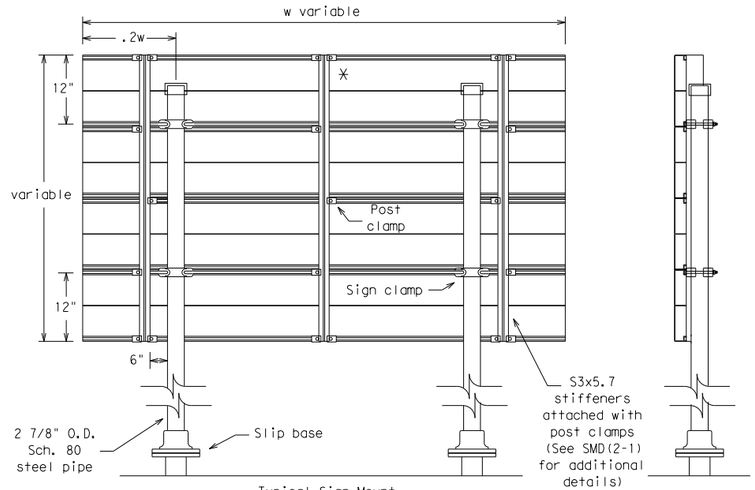


Detail C

Splices shall only be allowed behind the sign substrate.



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

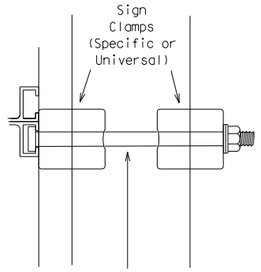


Typical Sign Mount

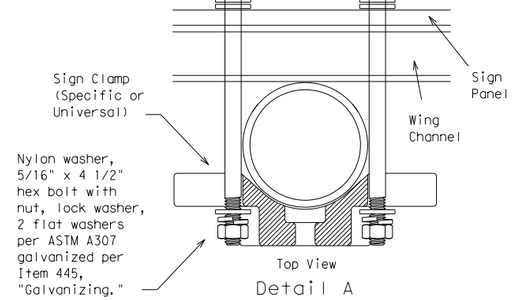
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

See Detail E for clamp installation

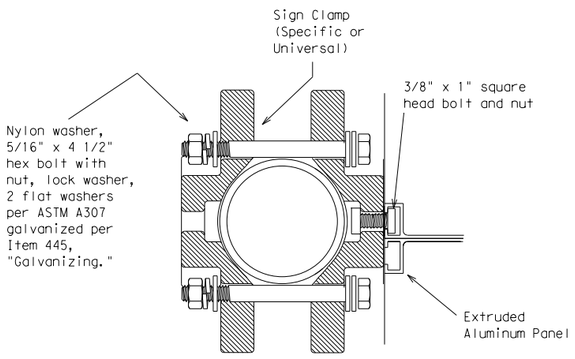


Detail E

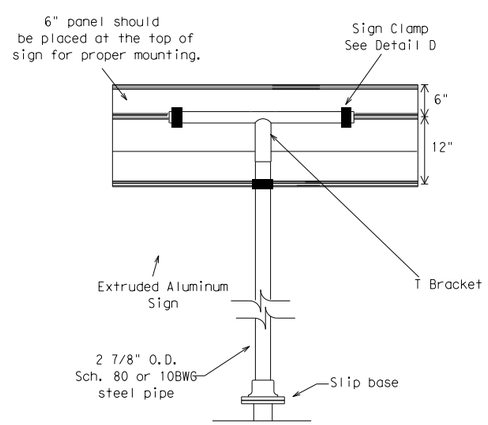


Top View

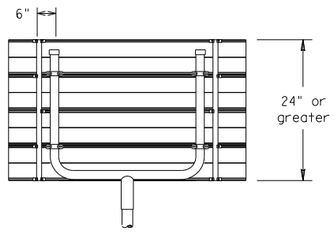
Detail A



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

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.
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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

REVISIONS
9-08

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

CONT	SECT	JOB	HIGHWAY
0003	07	064, ETC	IH20

DIST	COUNTY	SHEET NO.
ODA	REEVES.	220

26D

DATE: 3/30/2022 $TIME$
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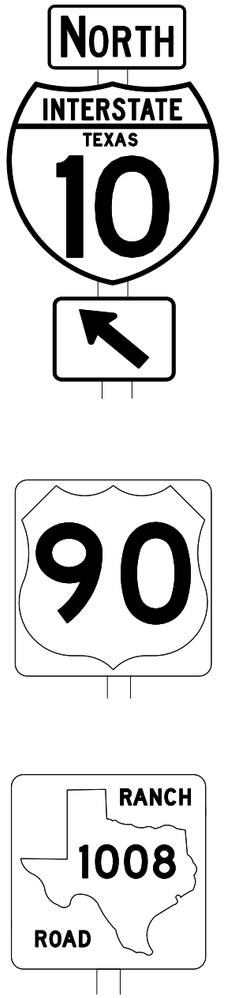
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

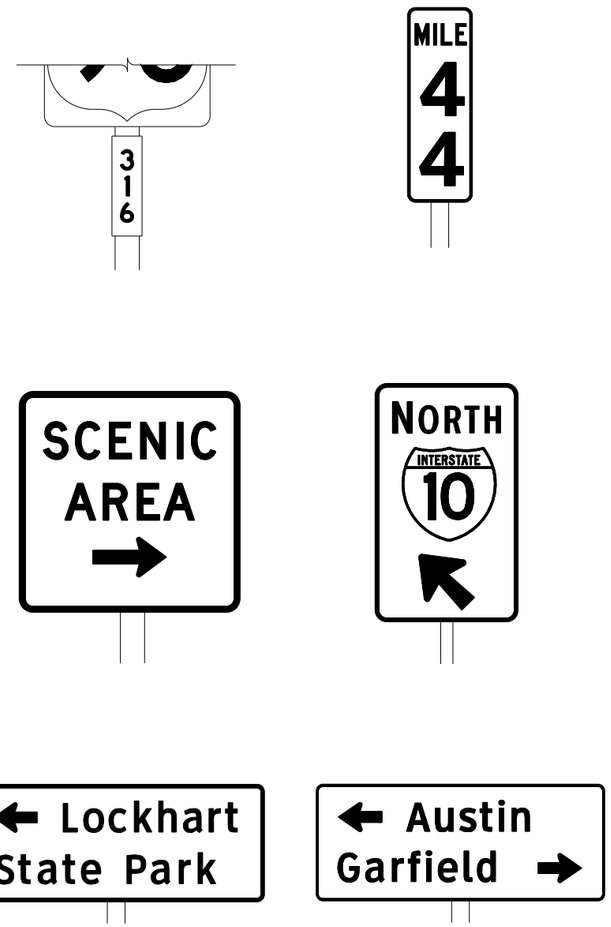
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

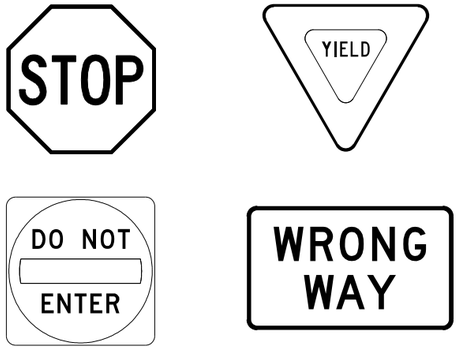
FILE:	tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS		0003	07	064,ETC	IH20
12-03 7-13		DIST	COUNTY		SHEET NO.
9-08		ODA	REEVES.		221

3

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing & P

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

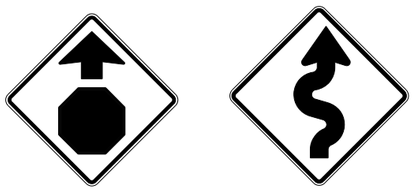
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

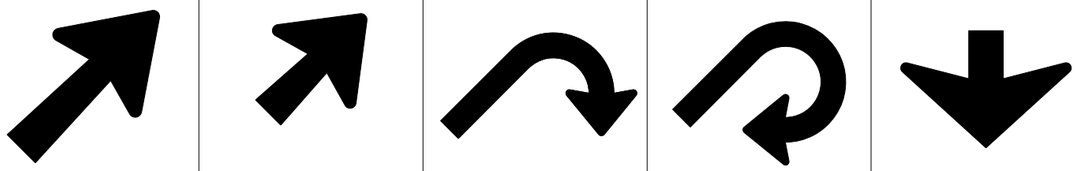
TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		222

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signing & M

ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

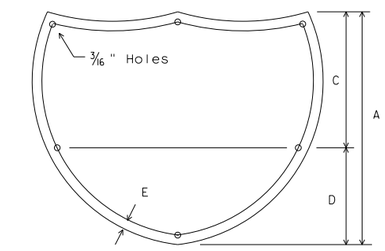
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

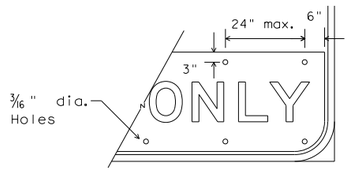
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

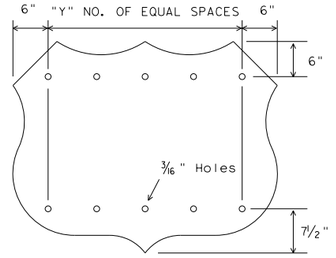


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4

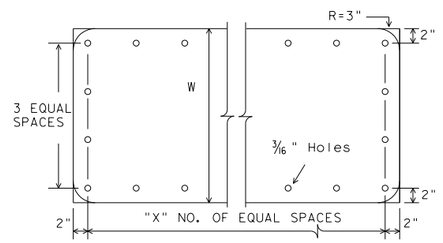


EXIT ONLY PANEL



U.S. ROUTE MARKERS

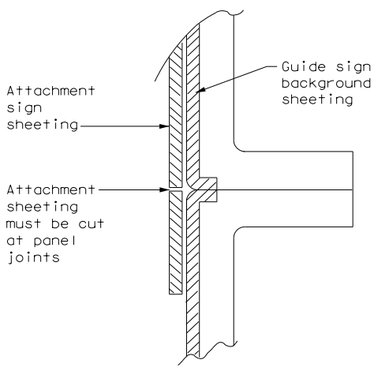
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

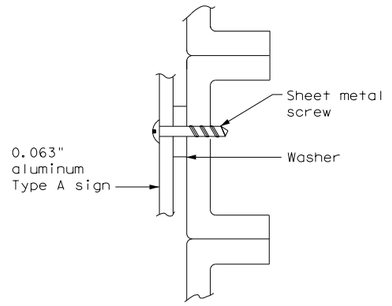
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



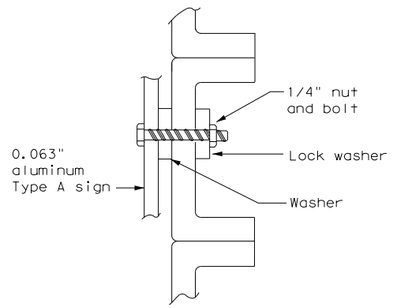
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



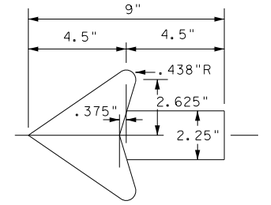
NUT/BOLT ATTACHMENT

NOTE:

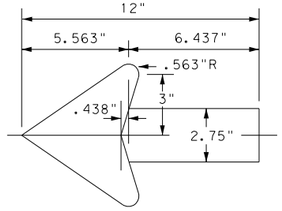
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ODA	REEVES.		223

5

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\rfba13.dgn

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. 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.

7. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."

8. 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.

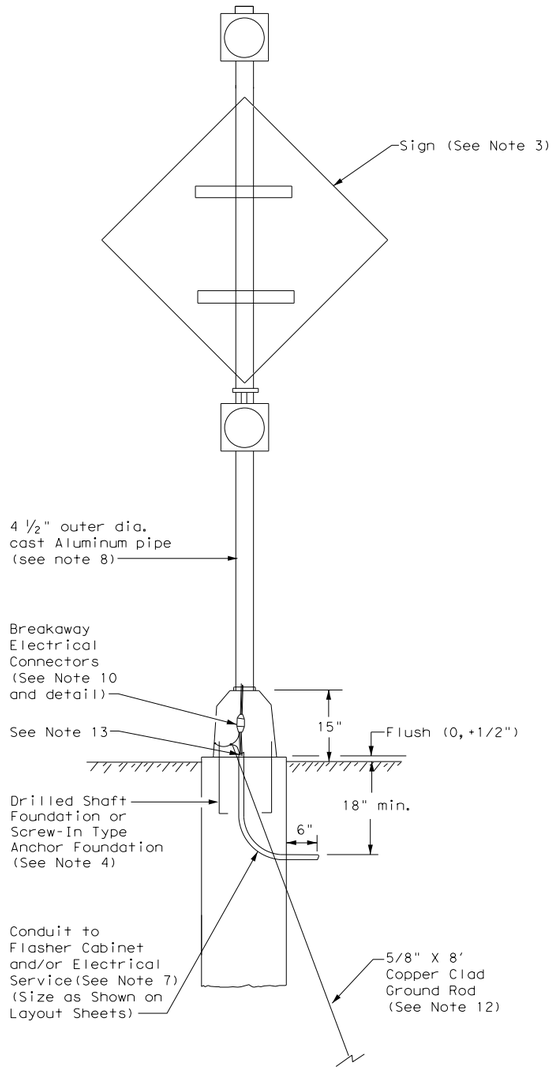
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening of connection.

10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

11. 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.

12. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

13. Ensure height of conduit and ground rod is below top of anchor bolts.



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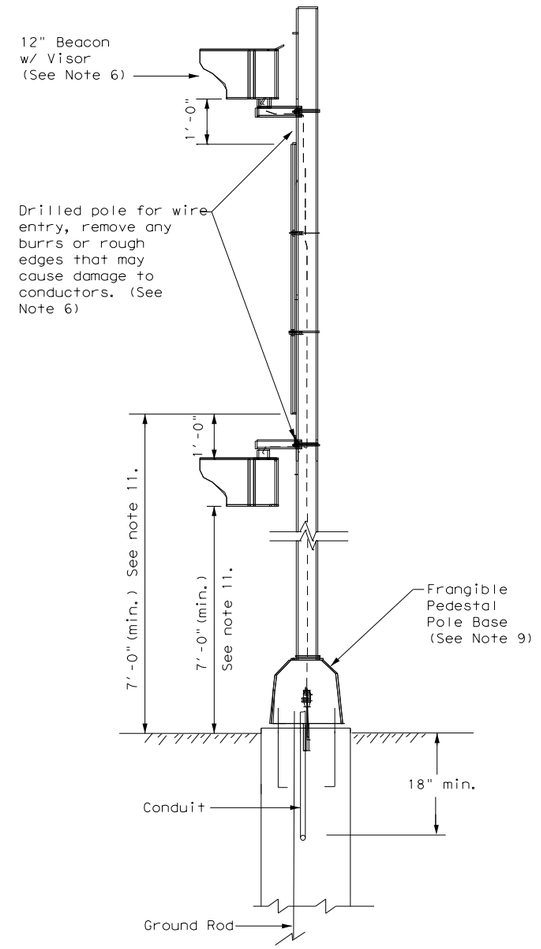
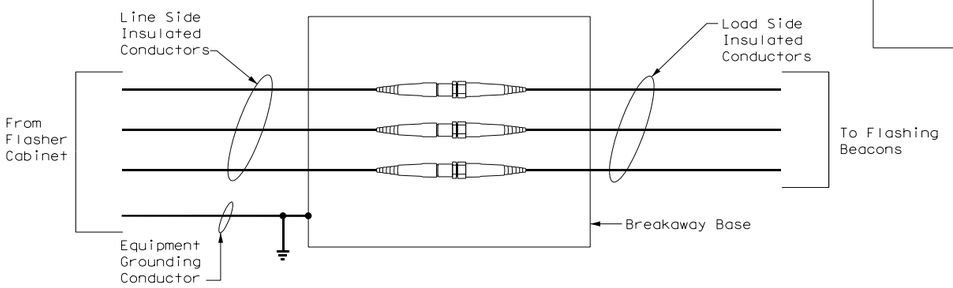
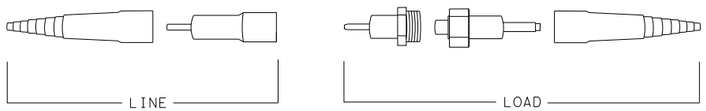


SIDE



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

ROADSIDE FLASHING BEACON ASSEMBLY

RFBA-13

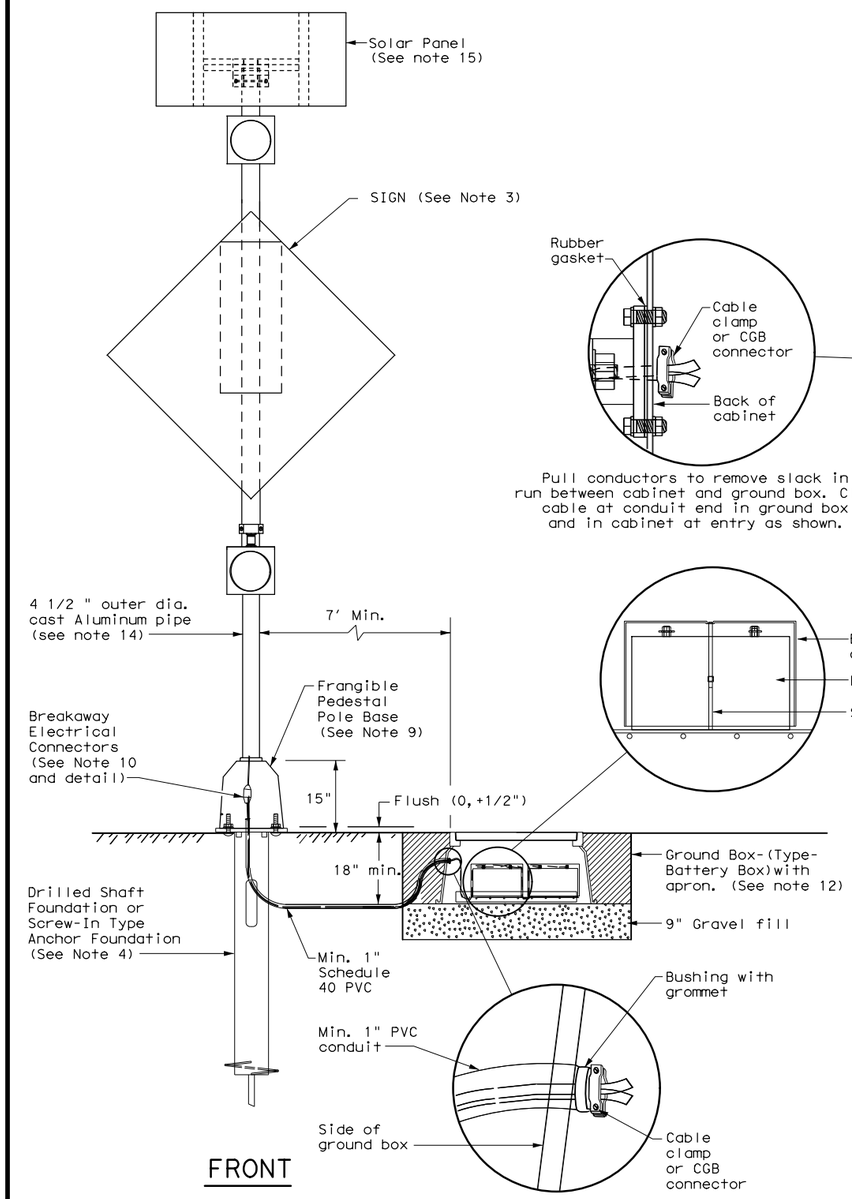
FILE: rfba-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT January 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS 5-93 12-04 10-93 3-13 4-98	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		224

74

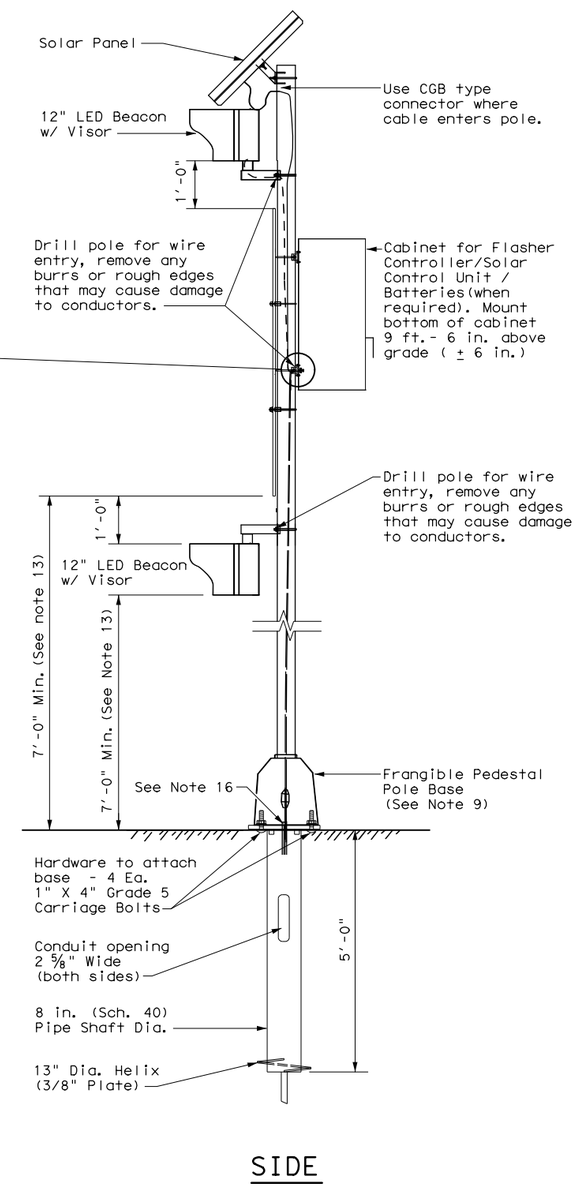
DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\Traffic Signing & Pavement Marking\spb1-13.dgn

GENERAL NOTES:

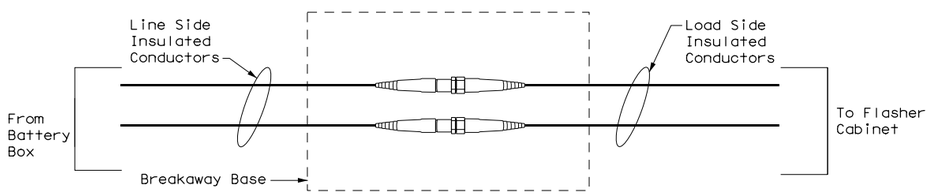
1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
7. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
8. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
11. Install the batteries in a battery box. Place the batteries on a 3/16" thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16" plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
12. See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
13. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
14. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
15. Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
16. Ensure height of conduit is below top of anchor bolts.



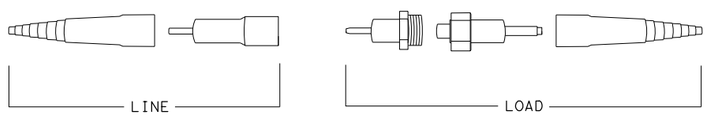
FRONT



SIDE



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

SOLAR POWERED ROADSIDE FLASHING BEACON ASSEMBLY DETAILS

SPRFBA(1)-13

FILE: spb1-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT May 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
12-04 3-13	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		225

75A

GENERAL NOTES :

1. PERFORM ALL ELECTRICAL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, AND TEXAS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS.
2. THE LOCATION OF CONDUCTORS, CONDUITS AND GROUND BOXES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
3. USE ESTABLISHED INDUSTRY AND UTILITY SAFETY PRACTICES TO ERECT POLES AND LUMINARIES NEAR ANY OVERHEAD OR UNDERGROUND UTILITY. CONSULT WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO BEGINNING SUCH WORK.
4. LOCATE ALL UTILITIES, BOTH UNDERGROUND AND ABOVE GROUND, IN THE PROJECT AREA PRIOR TO BEGINNING WORK SO THAT CONFLICTS ARE AVOIDED. CONTACT UTILITY COMPANY REGARDING THEIR SPECIFIC REQUIRED WORKING CLEARANCE REQUIREMENTS. MEET UTILITY COMPANY CLEARANCE REQUIREMENTS AND DO NOT PLACE ANY LUMINAIRE POLE WITHIN 10 FEET OF UTILITY POWER LINES.
5. UNDERGROUND UTILITIES OWNED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ARE PRESENT WITHIN THE RIGHT-OF-WAY ON THIS PROJECT. CONTRACTOR SHALL CALL TEXAS 811 21 DAYS BEFORE CONSTRUCTION WORK TO LOCATE UNDERGROUND UTILITIES. FOR ILLUMINATION AND COMMUNICATIONS & CONTROL MAINTAINED BY TXDOT, CALL THE TXDOT TRAFFIC SIGNAL OFFICE FOR LOCATES A MINIMUM OF 48 HOURS IN ADVANCE OF EXCAVATION. FOR CITY OWNED UTILITY FACILITIES, CALL THE APPROPRIATE DEPARTMENT A MINIMUM OF 48 HOURS IN ADVANCE OF EXCAVATION. THE CONTRACTOR IS LIABLE FOR ALL DAMAGES INCURRED TO THE UTILITIES WHEN WORKING WITHOUT HAVING THE UTILITIES LOCATED PRIOR TO EXCAVATION.
6. CONSULT WITH ELECTRIC COMPANY REPRESENTATIVE TO COORDINATE ELECTRICAL SERVICE INSTALLATIONS.
7. CONTRACTOR TO REMOVE AND SALVAGE FOR ALL EXISTING STREET LIGHTS SPECIFIED FOR REMOVAL.
8. REMOVE ALL OLD ILLUMINATION RELATED CABLE/CONDUCTORS FROM ABANDONED CONDUIT.
9. FOLLOW ALL MANUFACTURER INSTALLATION INSTRUCTIONS.
10. ALL SPLICES AND TAPS SHALL BE WATERPROOF.
11. CONTRACTOR SHALL DEMONSTRATE CLEANLINESS BY PULLING A TEMPLATE (MOUSE) THROUGH THE CONDUIT. CONTRACTOR SHALL CLEAN THE CONDUITS IF NECESSARY. ALL CONDUITS INSTALLED WITHOUT CONDUCTORS SHALL BE CAPPED IMMEDIATELY AFTER PLACEMENT.
12. ALL METAL ENCLOSURES AND BOXES SHALL BE SOLIDLY BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
13. DE-BURR ALL CONDUIT ENDS PRIOR TO INSTALLING BUSHINGS, CONNECTORS, OR COUPLINGS.
14. INSTALL BELL ENDS OR CONNECTORS WITH BUSHINGS ON ALL PVC CONDUIT TERMINATIONS.

WSP USA Inc TBPE #F-2263

STATE OF TEXAS
HYOMIN KIM
137128
REGISTERED PROFESSIONAL ENGINEER
Hyomin Kim 03-30-22

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

ILLUMINATION
GENERAL NOTES

SCALE: 1" = 100'

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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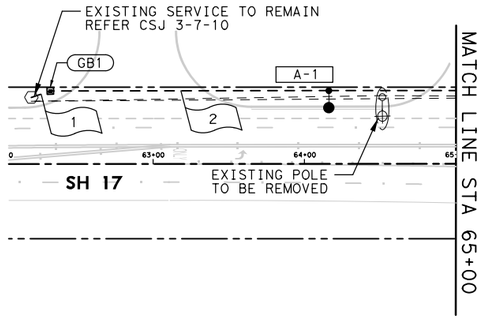
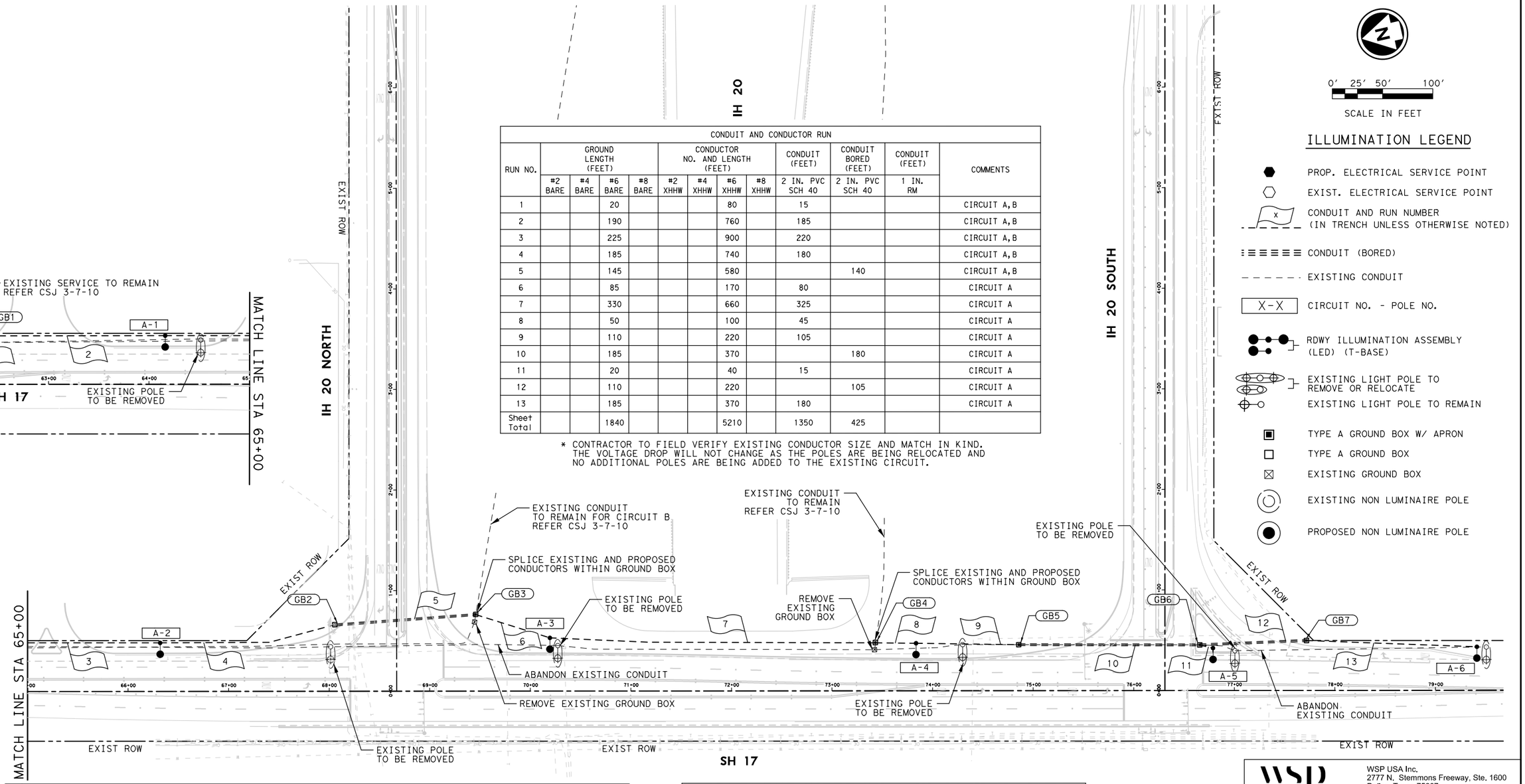
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				





CONDUIT AND CONDUCTOR RUN												
RUN NO.	GROUND LENGTH (FEET)				CONDUCTOR NO. AND LENGTH (FEET)				CONDUIT (FEET)	CONDUIT BORED (FEET)	CONDUIT (FEET)	COMMENTS
	#2 BARE	#4 BARE	#6 BARE	#8 BARE	#2 XHHW	#4 XHHW	#6 XHHW	#8 XHHW	2 IN. PVC SCH 40	2 IN. PVC SCH 40	1 IN. RM	
1			20				80		15			CIRCUIT A,B
2			190				760		185			CIRCUIT A,B
3			225				900		220			CIRCUIT A,B
4			185				740		180			CIRCUIT A,B
5			145				580			140		CIRCUIT A,B
6			85				170		80			CIRCUIT A
7			330				660		325			CIRCUIT A
8			50				100		45			CIRCUIT A
9			110				220		105			CIRCUIT A
10			185				370			180		CIRCUIT A
11			20				40		15			CIRCUIT A
12			110				220			105		CIRCUIT A
13			185				370		180			CIRCUIT A
Sheet Total			1840				5210		1350	425		

* CONTRACTOR TO FIELD VERIFY EXISTING CONDUCTOR SIZE AND MATCH IN KIND. THE VOLTAGE DROP WILL NOT CHANGE AS THE POLES ARE BEING RELOCATED AND NO ADDITIONAL POLES ARE BEING ADDED TO THE EXISTING CIRCUIT.

0′ 25′ 50′ 100′

SCALE IN FEET

ILLUMINATION LEGEND

- PROP. ELECTRICAL SERVICE POINT
- EXIST. ELECTRICAL SERVICE POINT
- CONDUIT AND RUN NUMBER (IN TRENCH UNLESS OTHERWISE NOTED)
- CONDUIT (BORED)
- EXISTING CONDUIT
- X-X CIRCUIT NO. - POLE NO.
- RDWY ILLUMINATION ASSEMBLY (LED) (T-BASE)
- EXISTING LIGHT POLE TO REMOVE OR RELOCATE
- EXISTING LIGHT POLE TO REMAIN
- TYPE A GROUND BOX W/ APRON
- TYPE A GROUND BOX
- EXISTING GROUND BOX
- EXISTING NON LUMINAIRE POLE
- PROPOSED NON LUMINAIRE POLE

SCHEDULE OF ROADWAY ILLUMINATION ASSEMBLIES						
DESCRIPTION	POLE NUMBER	STATION	OFFSET (FEET)	MOUNTING TYPE	DRILL SHAFT DIAMETER LENGTH	NOTES
IN RD IL (TY SA) 40T-8 (250W EQ) LED	A-1	64+16.09	48.33 LT	G	30"/8′	SH 17 ;
IN RD IL (TY SA) 40T-8 (250W EQ) LED	A-2	66+31.99	48.17 LT	G	30"/8′	SH 17 ;
IN RD IL (TY SA) 40T-8 (250W EQ) LED	A-3	70+19.51	52.87 LT	G	30"/8′	SH 17 ;
IN RD IL (TY SA) 40T-8 (250W EQ) LED	A-4	73+83.54	47.21 LT	G	30"/8′	SH 17 ;
IN RD IL (TY SA) 40T-8 (250W EQ) LED	A-5	76+78.86	42.13 LT	G	30"/8′	SH 17 ;
IN RD IL (TY SA) 40T-8 (250W EQ) LED	A-6	79+41.21	43.26 LT	G	30"/8′	SH 17 ;
Notes: G = GROUND MOUNTED						

SHEET SUMMARY OF ESTIMATED QUANTITIES			
ITEM #	DESCRIPTION	UNIT	QTY
0416 6029	DRILL SHAFT (RDWY ILL POLE) (30 IN)	LF	48
0610 6009	REMOVE RD IL ASM (TRANS-BASE)	EA	6
0610 6214	IN RD IL (TY SA) 40T-8 (250W EQ) LED	EA	6
0618 6023	CONDT (PVC) (SCH 40) (2")	LF	1350
0618 6024	CONDT (PVC) (SCH 40) (2") (BORE)	LF	425
0620 6009	ELEC CONDR (NO.6) BARE	LF	1840
0620 6010	ELEC CONDR (NO.6) INSULATED	LF	5210
0624 6002	GROUND BOX TY A (122311)W/APRON	EA	7
0624 6028	REMOVE GROUND BOX	EA	2

WSP USA Inc

TBPE #F-2263

STATE OF TEXAS
HYOMIN KIM
137128
REGISTERED
PROFESSIONAL ENGINEER
Hyomin Kim 03-30-22

WSP USA Inc.
2777 N. Stemmons Freeway, Ste. 1600
Dallas, Texas 75207
TBPE # F-2263

Texas Department of Transportation

ILLUMINATION PLAN

SH 17 AT IH 20

SCALE: 1" = 100′

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
WSP	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
WSP	TEXAS	ODA	REEVES	227
CHECK	CONTROL	SECTION	JOB	
WSP	0003	07	064,ETC	
CHECK				
WSP				

DATE: 3/30/2022 FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\02 - SH 302, IH 20 (CSJ XXXX-XX-XXX)\4 - Design\Plan Set\8. Traffic\Illumination\

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\8. Traffic\Signals\Tx

ROADWAY ILLUMINATION ASSEMBLY NOTES

1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.

2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.

3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC),TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA),and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.

4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.

5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.

   a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.

   b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25′ above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 6th Edition (2013) of the AASHTO Design Specifications. For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25′ above the surrounding terrain, provide poles meeting the following requirements:

      i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).

      ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.

6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.

7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.

8. Install T-Base with following procedure:

   a. Anchor Bolt Tightening.

      i. Coat the threads of the anchor bolts with electrically conductive lubricant.

      ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.

      iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.

      iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.

      v. Check top of T-base for level. If not level then foundation must be leveled.

   b. Top Bolt Procedure

      i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

      ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."

      iii. Tighten each nut to 150 ft-lb. using a torque wrench.

   c. Level and Plumb

      i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.

9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).

10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.

11. Mount luminaires on arms level as shown by the luminaire level indicator.

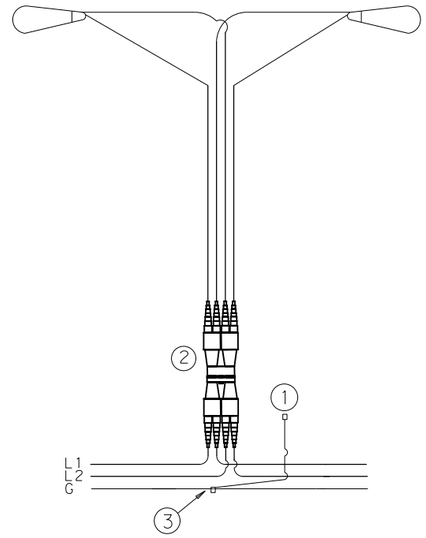
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.

Wiring Diagram Notes:

(1) Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.

(2) Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.

(3) Split Bolt or other connector.



L1,L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

Decorative LED Lighting Notes:

1. LED Drivers in Remote Outdoor enclosures (for drivers that do not include an enclosure as part of a factory assembly):

   a. Provide NEMA 3R outdoor enclosure or as approved.

   b. Install enclosure at least 12" above ground or other horizontal surface. Mount vertically or on ceiling, and avoid direct sun where possible.

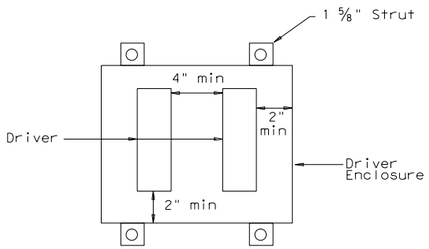
   c. Install drivers with at least 2 inches of space from enclosure walls.

   d. For multiple drivers in an enclosure, provide at least 4 inches side to side and 1 inch end to end from other drivers or electronic equipment

   e. For drivers mounted on back wall of enclosure, mount enclosure on 1 5/8" strut or other standoff to dissipate heat, or mount driver to side of the enclosure or to the metal cover.

   f. Provide remote drivers with a maximum of 100 watts

   g. Provide drivers with documentation of 100,000 hr lifetime at Tcase of 65C or higher.



Driver Spacing In Remote Enclosure

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS

RID(1)-20

FILE: rid1-20.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
7-17	DIST	COUNTY		SHEET NO.
12-20	ODA	REEVES.		228

72A

DATE: 3/30/2022 $TIME$
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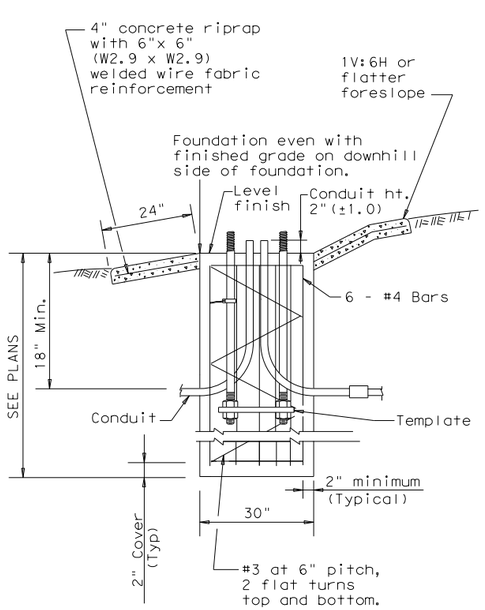
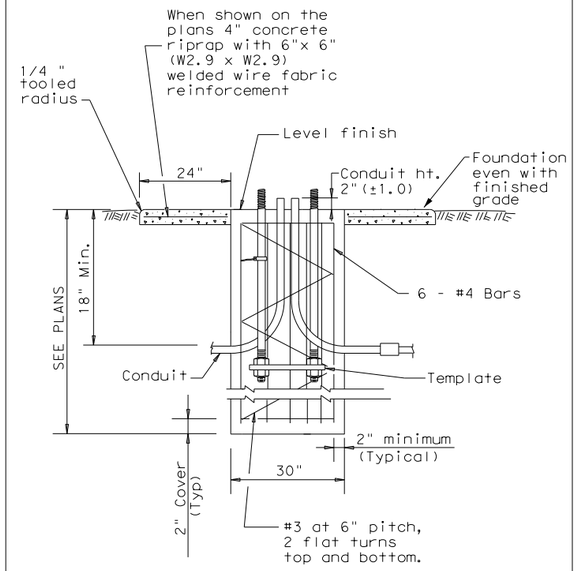


SECTION A-A
SHOWING SLOPED GRADE



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. Grade earthwork around T-base foundations even with the finished grade as shown in Section A-A to ensure proper function of the breakaway device. Use riprap on T-base foundations that are located on sloped grades, and as shown on the plans for level grades.

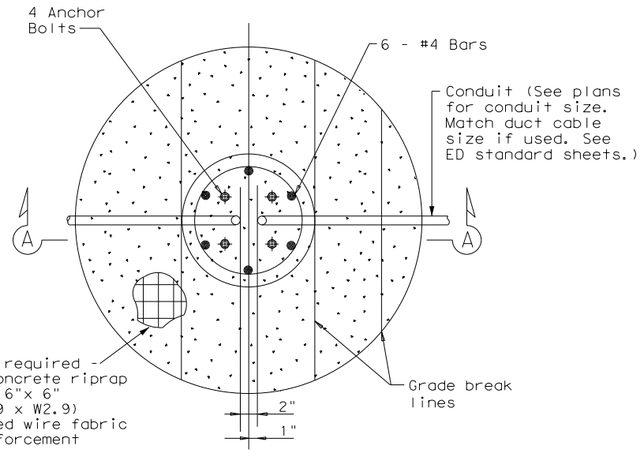
TABLE 4

BREAKAWAY POLE PLACEMENT (See note 6)

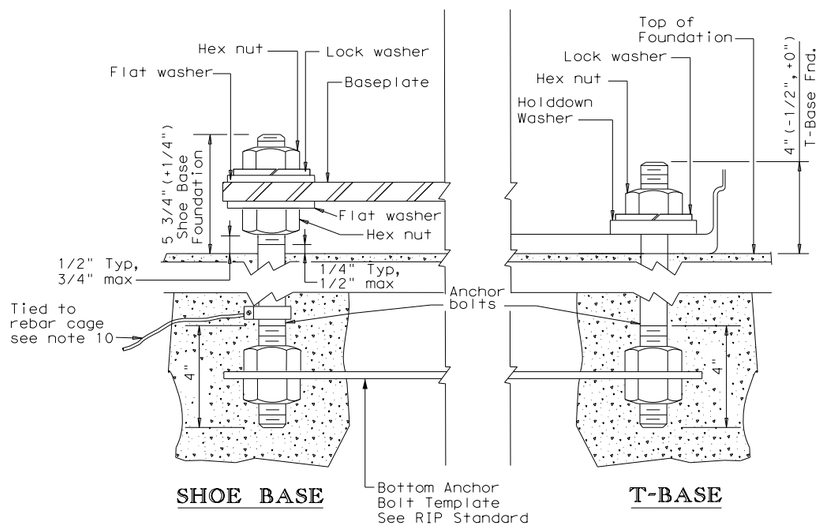
ROADWAY FUNCTIONAL CLASSIFICATION	** POLE OFFSET (DISTANCE TO FACE OF TRANSFORMER BASE)
Freeway Mainlanes (roadway with full control of access)	15 ft. (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft. minimum (15 ft. desirable) from curb face
All others	10 ft. minimum*(15 ft. desirable) from lane edge

* or as close to ROW line as is practical

** provide 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on the other travel lanes. See design guidelines.



FOUNDATION DETAIL



ANCHOR BOLT DETAIL

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION DETAILS
(RDWY ILLUM FOUNDATIONS)

RID(2)-20

FILE: rid2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064,ETC	IH20
1-11	DIST	COUNTY		SHEET NO.
7-17	ODA	REEVES.		229
12-20				

72B

DATE: 3/30/2022 $TIME$
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\RIP(1)-19.rip.dgn

SHIPPING PARTS LIST - POLES AND LUMINAIRE ARMS

Nominal Mounting Ht. (ft)	Shoe Base Designation				Shoe Base Quantity	T-Base Designation				T-Base Quantity	CSB/SSCB Mounted Designation				CSB/SSCB Mounted 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	6	(Type SP 38 S - 8)			(250W EQ) LED	
	(Type SA 40 S - 8 - 8)			(250W EQ) LED		(Type SA 40 T - 8 - 8)			(250W EQ) LED		(Type SP 38 S - 8 - 8)			(250W EQ) LED	
	(Type SA 40 S - 10)			(250W EQ) LED		(Type SA 40 T - 10)			(250W EQ) LED		(Type SP 38 S - 10)			(250W EQ) LED	
	(Type SA 40 S - 10 - 10)			(250W EQ) LED		(Type SA 40 T - 10 - 10)			(250W EQ) LED		(Type SP 38 S - 10 - 10)			(250W EQ) LED	
	(Type SA 40 S - 12)			(250W EQ) LED		(Type SA 40 T - 12)			(250W EQ) LED		(Type SP 38 S - 12)			(250W EQ) LED	
	(Type SA 40 S - 12 - 12)			(250W EQ) LED		(Type SA 40 T - 12 - 12)			(250W EQ) LED		(Type SP 38 S - 12 - 12)			(250W EQ) LED	
50	(Type SA 50 S - 4)			(400W EQ) LED		(Type SA 50 T - 4)			(400W EQ) LED		(Type SP 48 S - 4)			(400W EQ) LED	
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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 - 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)

AT SH 17 AND IH 20

WSP USA Inc TBPE #F-2283

STATE OF TEXAS
HYOMIN KIM
137128
REGISTERED PROFESSIONAL ENGINEER
Hyomin Kim 03-30-22

SHEET 1 OF 4

Texas Department of Transportation — Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(1)-19

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	ODA	REEVES		230

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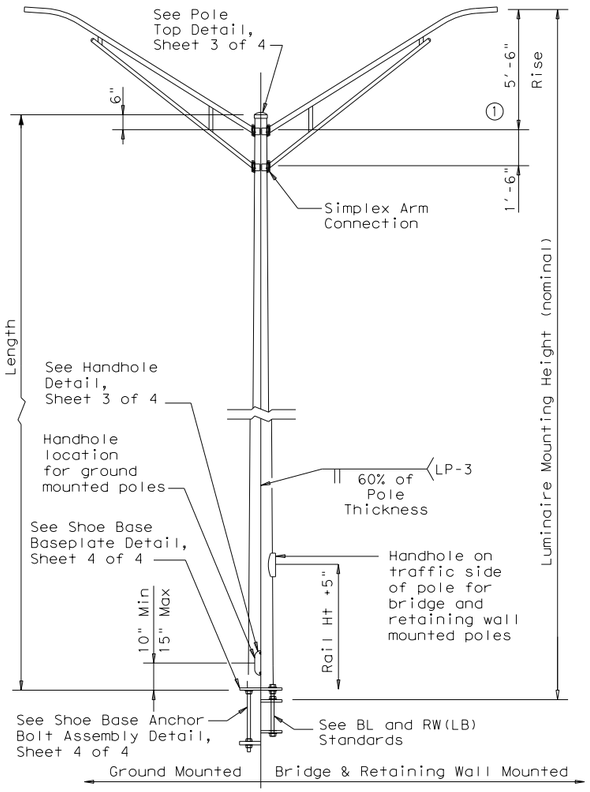
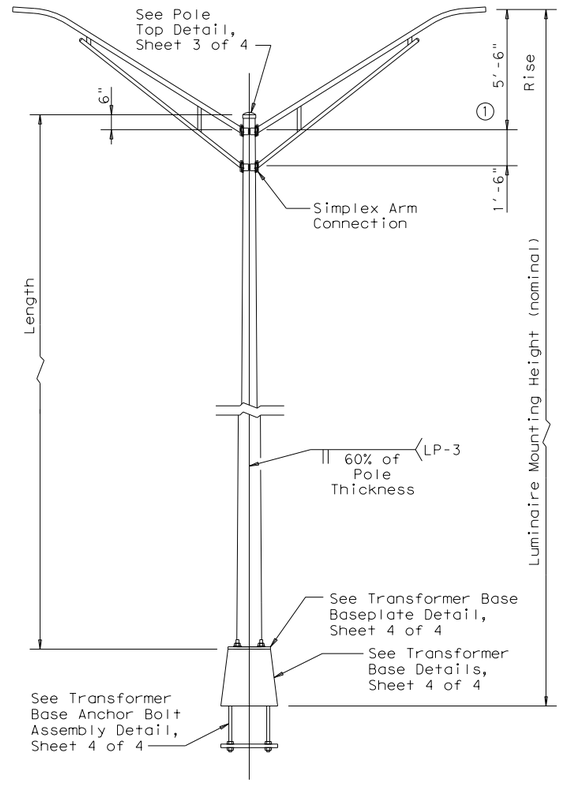


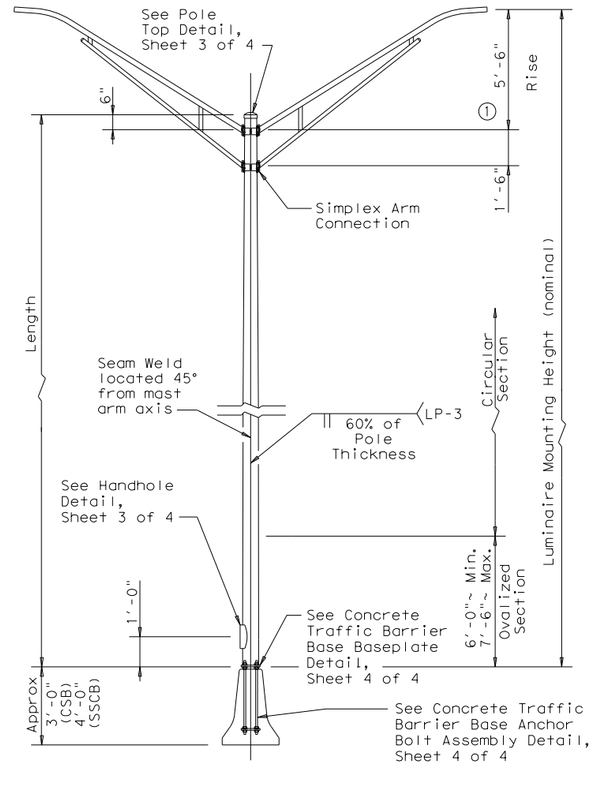
SHOE BASE POLE

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).

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(2)-19

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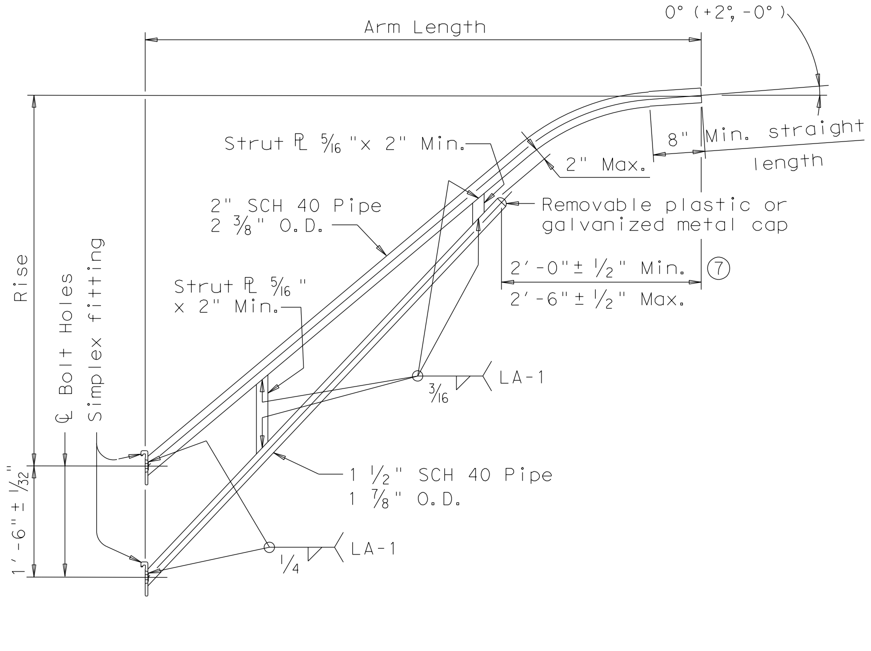
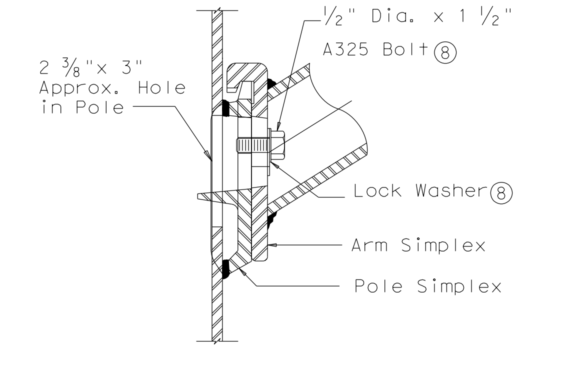
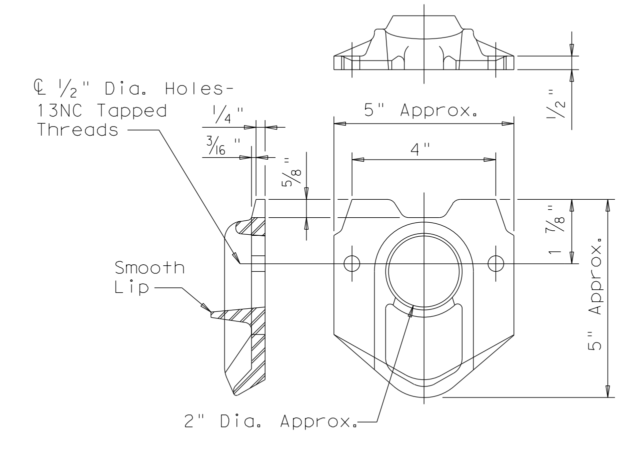


LUMINAIRE ARM

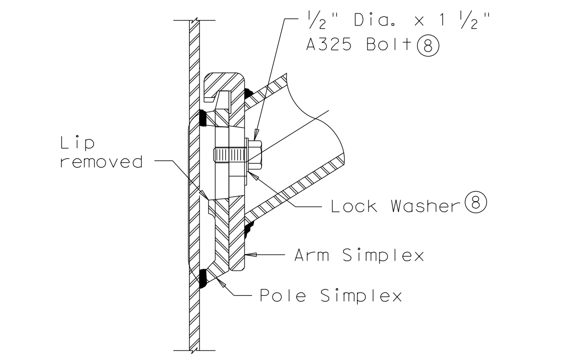


UPPER SIMPLEX FITTING

(Gusset not shown for clarity)

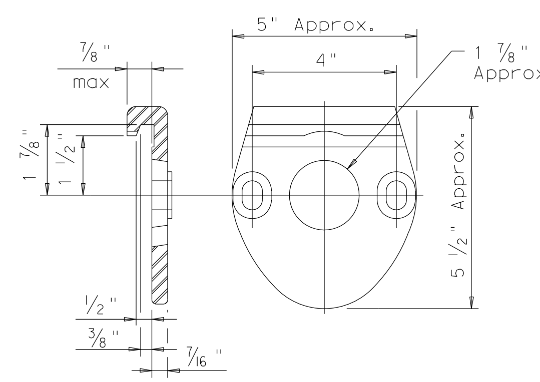


POLE SIMPLEX DETAIL 9



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.

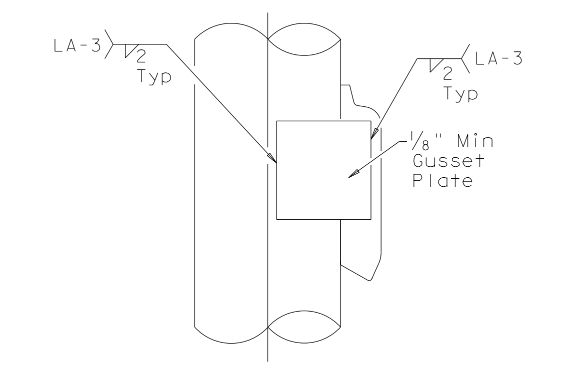
9 Proposed deviations in arm simplex dimensions or materials must be submitted to the Department for approval.

10 A welded handhole frame is permissible. Maximum of two (2) CJP weld splices is allowed.

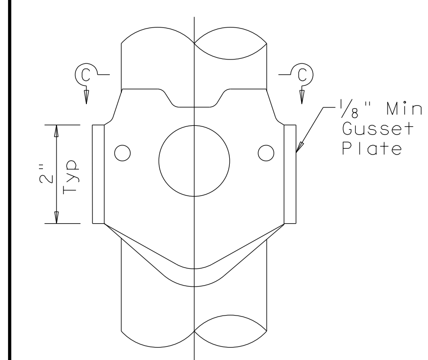
MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr 65-35 or Gr 70-36, A148 Gr 80-50, A576 Gr 1021 5, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr A or B, A500 Gr B, A501, A 1008 HSLAS-F Gr 50 6, or A1011 HSLAS-F Gr 50 6
Arm Struts and Gusset Plates 4	ASTM A36, A572 Gr 50 6, or A588
Misc.	ASTM designations as noted

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"

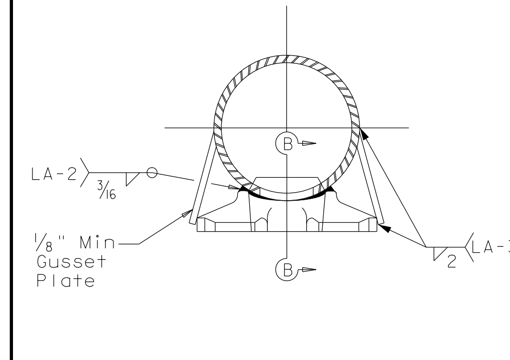
ARM ASSEMBLY FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Arm Length	±1"
Arm Rise	±1"
Deviation from flat	1/8" in 12"
Spacing between holes	±1/32"



SIDE

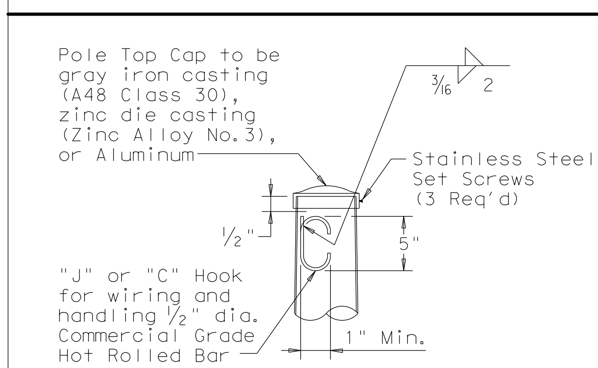


ELEVATION

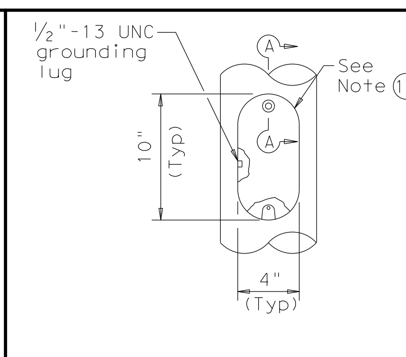


SECTION C-C

SIMPLEX ATTACHMENT DETAIL



POLE TOP



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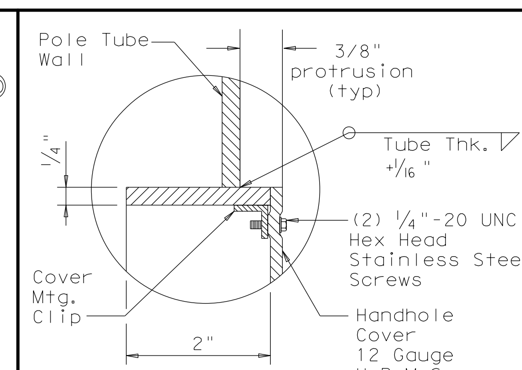

SECTION A-A

HANDHOLE

SHEET 3 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

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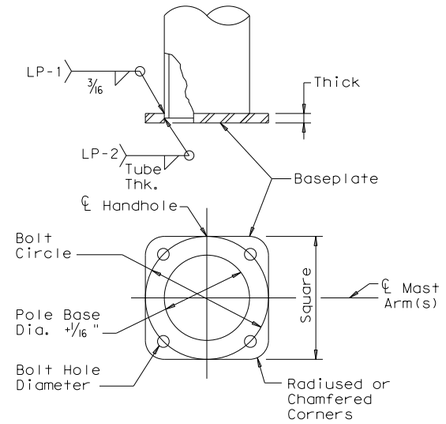
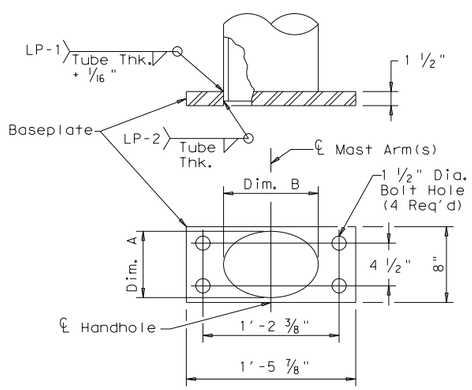


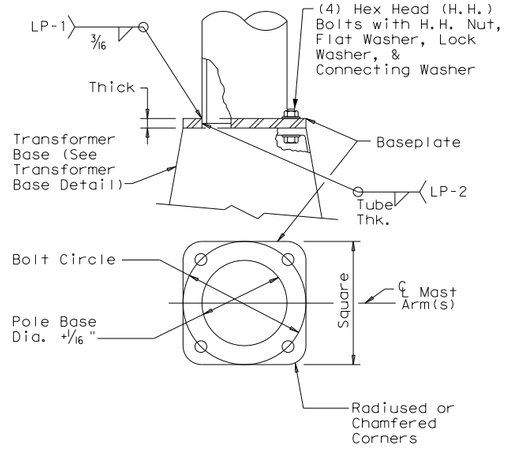
SHOE BASE BASEPLATE

SHOE BASE BASEPLATE TABLE				
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	BOLT HOLE DIAMETER
20′ - 39′	13"	13"	1 1/4"	1 1/4"
40′	15"	15"	1 1/4"	1 1/2"
50′	15"	15"	1 1/2"	1 1/2"



CONCRETE TRAFFIC BARRIER BASE BASEPLATE

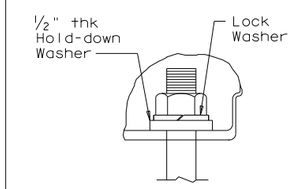
CONCRETE TRAFFIC BARRIER BASE BASEPLATE TABLE			
MOUNTING HEIGHTS (nominal)	POLE DIA.(12)	DIM. A	DIM. B
28′ - 38′	9"	7" ± 1/4"	10" ± 1/4"
48′	10 1/2"	7" ± 1/4"	13" ± 1/4"



TRANSFORMER BASE BASEPLATE

TRANSFORMER BASE BASEPLATE TABLE						
MOUNTING HEIGHTS (nominal)	BOLT CIRCLE	SQUARE	THICK	CONNECTING BOLT DIA.	BOLT HOLE DIAMETER	TRANSFOMER BASE TYPE
20′ - 39′	13"	13"	1 1/4"	1"	1 1/4"	A
40′	15"	15"	1 1/4"	1 1/4"	1 1/2"	B
50′	15"	15"	1 1/2"	1 1/4"	1 1/2"	B

TRANSFORMER BASE TABLE		
TYPE	TOP B.C.	BTM. B.C.
A	13"	14"
B	15"	17 1/4"



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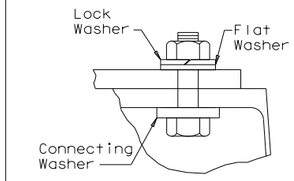

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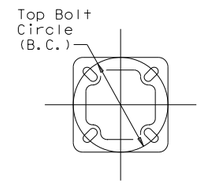
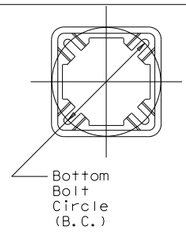
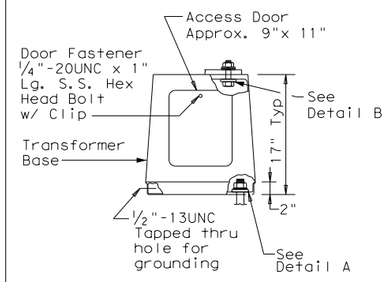


TOP PLAN



BOTTOM PLAN



ELEVATION

TRANSFORMER BASE DETAILS

GENERAL NOTES:

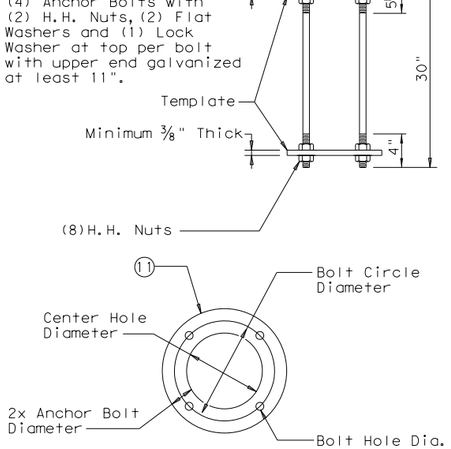
1. For mounting heights between those shown in the table, use the values in the table for the larger mounting height.
2. All breakaway bases shall meet the breakaway requirements of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition (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.

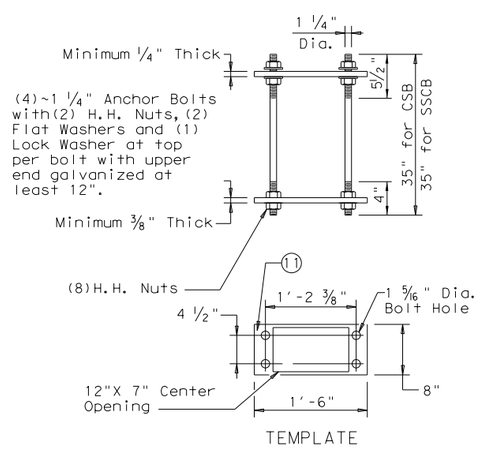
(12) Pole diameter before ovalized.

ANCHOR BOLT FABRICATION TOLERANCES TABLE	
DIMENSION	TOLERANCE
Length	± 1/2"
Threaded length	± 1/2"
Galvanized length (if required)	- 1/4"



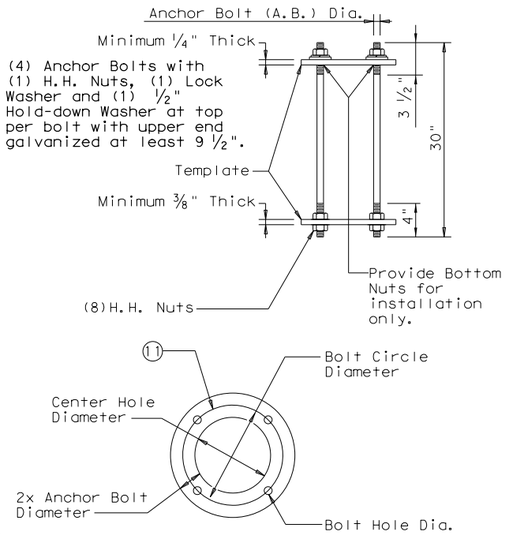
SHOE BASE ANCHOR BOLT ASSEMBLY

SHOE BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′-39′	1"	13"	11"	1 1/16"
40′-50′	1 1/4"	15"	12 1/2"	1 5/16"



CONCRETE TRAFFIC BARRIER BASE ANCHOR BOLT ASSEMBLY

TRANSFORMER BASE ANCHOR BOLT ASSEMBLY TABLE				
MOUNTING HEIGHTS (nominal)	A.B. Dia.	BOLT CIRCLE DIAMETER	CTR. HOLE DIAMETER	BOLT HOLE DIAMETER
20′- 39′	1"	14"	12"	1 1/16"
40′- 50′	1 1/4"	17 1/4"	14 3/4"	1 5/16"



TRANSFORMER BASE ANCHOR BOLT ASSEMBLY

SHEET 4 OF 4

Texas Department of Transportation

Traffic Safety Division Standard

ROADWAY ILLUMINATION POLES

RIP(4)-19

FILE: rip-19.dgn	DN:	CK:	DW:	CK:
©TxDOT January 2007	CONT	SECT	JOB	HIGHWAY
REVISIONS 7-17 12-19	0003	07	064,ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES.		233

73D

STORM WATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TPDES General Permit TXR150000. The operator, The Texas Department of Transportation ensures that: Project specifications provide that adequate BMPs have been developed for this project. The contractor shall be the party responsible for implementing the BMPs described herein. The contractor shall implement changes approved by the Project Engineer to the SWP3 within the times specified in the SWP3 or the TPDES General Permit. Operators affected by modifications to specifications will be notified in a timely manner.

1. SITE OR PROJECT DESCRIPTION:

NATURE OF THE CONSTRUCTION ACTIVITY: SEE TITLE SHEET

POTENTIAL POLLUTANTS AND SOURCES:	
Sediment laden storm water	*Storm water conveyance over disturbed areas*
Fuels, oils, and lubricants	*Construction vehicles and storage areas*
Transported soil	*Off site vehicle tracking*
Construction debris and waste	*Various construction activities*
Sanitary waste	*Restroom facilities*
Trash	*Construction site and Receptacles*

SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:

1. *Blade existing topsoil into windrows, prep ROW, clear and grub*
2. *Grading operations, excavation, and embankment*
3. *Rework slopes, grade ditches (as shown on plans)*
4. *Blade windrowed material back across slopes*
5. *Existing pavement removal/disposal*
6.
7.
8.

AREAS:

TOTAL AREA OF PROJECT: 17.73 ACRES (IH 20 AT SH 17)

TOTAL AREA OF SOIL DISTURBANCE: 3.45 ACRES (IH 20 AT SH 17)

TOTAL AREA OFF-SITE:

AREAS:

TOTAL AREA OF PROJECT: 9.05 ACRES (IH 20 AT COUNTRY CLUB DR)

TOTAL AREA OF SOIL DISTURBANCE: 4.71 ACRES (IH 20 AT COUNTRY CLUB DR)

TOTAL AREA OFF-SITE:

DATA DESCRIBING THE SOIL: SOILS WITHIN PROJECT LIMITS ARE PRIMARILY AMARILLO FINE SANDY LOAM (0 TO 3 PERCENT SLOPES), KIMBROUGH LOAM (0 TO 3 PERFECT SLOPES), AND KIMBROUGH-SLAUGHTER COMPLEX (0 TO 3 PERCENT SLOPES). ALL ARE WELL DRAINED.

GENERAL LOCATION MAP: SEE TITLE SHEET

DETAILED SITE MAP: SEE SWP3 SITE MAP/S SHEET/S

THE LOCATION AND DESCRIPTION OF CONCRETE AND ASPHALT PLANTS:
Supporting Concrete Plant Facilities must be located off site. See note DEDICATED CONCRETE PLANTS.

Supporting Asphalt Plant Facilities must be located off site. See note DEDICATED ASPHALT PLANTS.

NAME OF RECEIVING WATERS:
Storm water from all project sites will eventually flow into The Upper Pecos River which is segment no. 2311 of the Rio Grande Basin.

A COPY OF TPDES CGP TXR150000 IS INCLUDED IN THE SWP3 FILE.

REMARKS: *N/A*

401 WATER QUALITY CERTIFICATION: YES____ NO__X__

2. BEST MANAGEMENT PRACTICES (BMPs):

EROSION AND SEDIMENT CONTROLS: Erosion and sediment controls have been designed to retain sediment on-site. Controls shall be utilized to reduce off site transport of suspended sediments and pollutants if it is necessary to pump water from the site. Control measures shall be installed per specifications or as directed. Sediment must be removed from controls per the plan requirements or manufacturers recommendations, but no later than the time that design capacity has been reduced by 50%. If sediment escapes the site, accumulations will be removed to minimize further negative effects. Controls will be developed to limit the off site transportation of litter, construction debris, and construction materials.

INTERIM(INT), PERMANENT(PER), AND 401 CERTIFICATION BMP'S:

EROSION CONTROLS:	401	INT	PER
☒ *Blankets and Matting*	__	X	__
☐ *Sod*	__	__	__
☒ *Preserve Existing Vegetation*	__	__	X
☐ *Soil Stabilization*	__	__	__
☒ *Permanent Vegetation*	__	__	X
☐ *No Erosion Controls are Required.*			

SEDIMENT CONTROLS:	401	INT	PER
☐ *Silt Fence*	__	__	__
☐ *Rock Berm*	__	__	__
☐ *Buffer Zones*	__	__	__
☐ *Vegetative Filter Strips*	__	__	__
☒ *Biodegradable Erosion Cont Logs*	__	X	__
☐ *No Sediment Controls are Required.*			

POST CONSTRUCTION TSS CONTROL (401 CERTIFICATION ONLY):

- ☐ *Vegetation Lined Drainage Ditch*
- ☐ *Retention/Irrigation*
- ☐ *Erosion Control Compost*
- ☐ *Grassy Swales*
- ☐ *Vegetative Filter Strips*
- ☒ *No Post Construction TSS Control Required.*

SEQUENCE OR SCHEDULE OF IMPLEMENTATION:

1. *Install biodegradable erosion control logs and soil retention blankets*
2. *Windrow topsoil to preserve seed bank*
3. *Windrow topsoil back*
4. *Maintain biodegradable erosion control logs and soil retention blankets*
5. *Inspect until 70% vegetative cover is attained*
6.
7.
8.

The dates of major grading activities, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization practices are initiated, are available in the project diary or SWP3. Stabilization measures must be initiated as soon as practicable in portions of the site where construction has temporarily or permanently ceased. The Odessa District is located in a semi-arid area and the 14 and 21 day requirements are not applicable except, as directed by the Engineer.

3. STRUCTURAL CONTROL PRACTICES:

Structural control practices for this project are listed elsewhere herein.

4. PERMANENT STORM WATER CONTROLS:

Structural control practices installed during construction will be maintained and inspected after construction has ceased on the site and until final stabilization is attained. Unless specified in the plans, after project acceptance TxDOT will assume maintenance responsibilities for the controls and measures. Other permanent controls include existing and proposed; riprap at culvert inlets and outlets, diversion dikes, swales, retaining walls, and other similar devices.

5. OTHER CONTROLS:

OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST: The off site vehicle tracking of sediments shall be minimized by removal of excess dirt from the road and at entrances to the work site. Stabilized Construction Entrances and Exits shall be constructed per the plans or as directed by the Project Engineer. The generation of dust will be minimized as directed by the Project Engineer by dampening haul roads and covering haul trucks with a tarpaulin.

CONSTRUCTION AND WASTE MATERIALS: The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and materials resulting from the destruction of existing roads and structures shall be stored in areas designated by the Project Engineer and protected from run-off. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work, piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants. If potential pollutant sources are identified after the start of construction, controls and measures shall be implemented as directed by the Project Engineer.

5. OTHER CONTROLS (CONT):

DEDICATED ASPHALT PLANTS: Asphalt or asphaltic material for this project will be produced off site. If the project requires a dedicated asphalt plant and the plant within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer.

DEDICATED CONCRETE PLANTS: Cement or Concrete material for this project will be produced off site. If the project requires a dedicated concrete plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer. Concrete trucks shall be wasted or washed out in locations designated by the Project Engineer. The locations shall be protected by a berm sufficient to contain all waste and wash water. Wash water shall not be allowed to enter any storm drainage system or waterway. The residual material and contaminated soil shall be collected and disposed of in accordance with Federal, State, and Local guidelines. Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants.

HAZARDOUS MATERIALS AND SPILL REPORTING: The contractor shall take appropriate measures to prevent, minimize, and control the spillage or leakage of hazardous materials and any associated wastes on site and in maintenance and staging areas. hazardous materials shall include but are not limited to paints, acids, solvents, asphalt products, chemical additives, curing compounds, oils, fuels, and lubricants. Hazardous materials shall not be stored, accumulated, or transported in open containers subject to precipitation or spillage, but shall be stored, accumulated, or transported in closed containers of the type recommended by the manufacturer. In the event of a spill the Project Engineer should be contacted immediately. All spills shall be immediately cleaned and any contaminated soil removed and disposed of in accordance with Local, State, and Federal laws. Fuel tanks shall be protected by a secondary containment, such as a lined berm, capable of containing 1.5 times the capacity of the tank, or as approved by the Project Engineer.

OFF SITE PSLs: All off site project specific locations including dedicated asphalt plants, concrete plants, or utility installations, required by the contractor, are the contractor's responsibility. The contractor shall secure all permits required by local, state, or federal laws for off site PSLs. The contractor shall provide diagrams and areas of disturbance for all PSL's within 1 mile of the project.

SANITARY FACILITIES: All sanitary or septic wastes that are generated onsite shall be treated and disposed of in accordance with state and local regulations. Raw sewage or septage shall not be discharged or buried on site. Precaution shall be taken to prevent illicit discharges to storm water. Licensed waste management contractors shall be required to dispose of sanitary waste. Porta johns will be required for the laboratory and construction site or as directed by the Project Engineer.

VELOCITY DISSIPATION DEVICES: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as shown in the plans or as directed by the Project Engineer to provide a non-erosive flow velocity from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

6. APPROVED STATE AND LOCAL PLANS:

This SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or permits approved by federal, state, or local officials.

7. MAINTENANCE:

Control measures shall be properly installed according to specifications. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must replace or modify the control as soon as practicable after discovery. Control measures shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively maintenance will be performed as necessary to continue the effectiveness of the controls. Maintenance must be accomplished as soon as practicable. Controls adjacent to creeks, culverts, bridges, and water crossings shall have priority. Controls that have been disabled, run over, removed, or otherwise rendered ineffective must be corrected immediately upon discovery.

8. INSPECTION OF CONTROLS:

A TxDOT inspector will inspect disturbed areas of the site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion controls measures identified in the SWP3 will be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking. Inspections will be conducted every month and within 24 hours after the end of a storm event of 0.5 inches or greater. The SWP3 will be modified based on the result of these inspections. Revisions will be completed within 7 Calendar days following the inspection. Revised implementation schedules will be described in the SWP3 and implemented as soon as practicable. Rain gages will be maintained on site for the duration of the project. Reports summarizing the scope of the inspections are included in the SWP3 file.

9. NON-STORM WATER COMPONENTS:

The contractor shall be required to implement appropriate pollution prevention controls and measures for all eligible non-storm water components of the discharge as approved and directed by the Project Engineer.

STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

Jennifer R Perry 03/30/2022

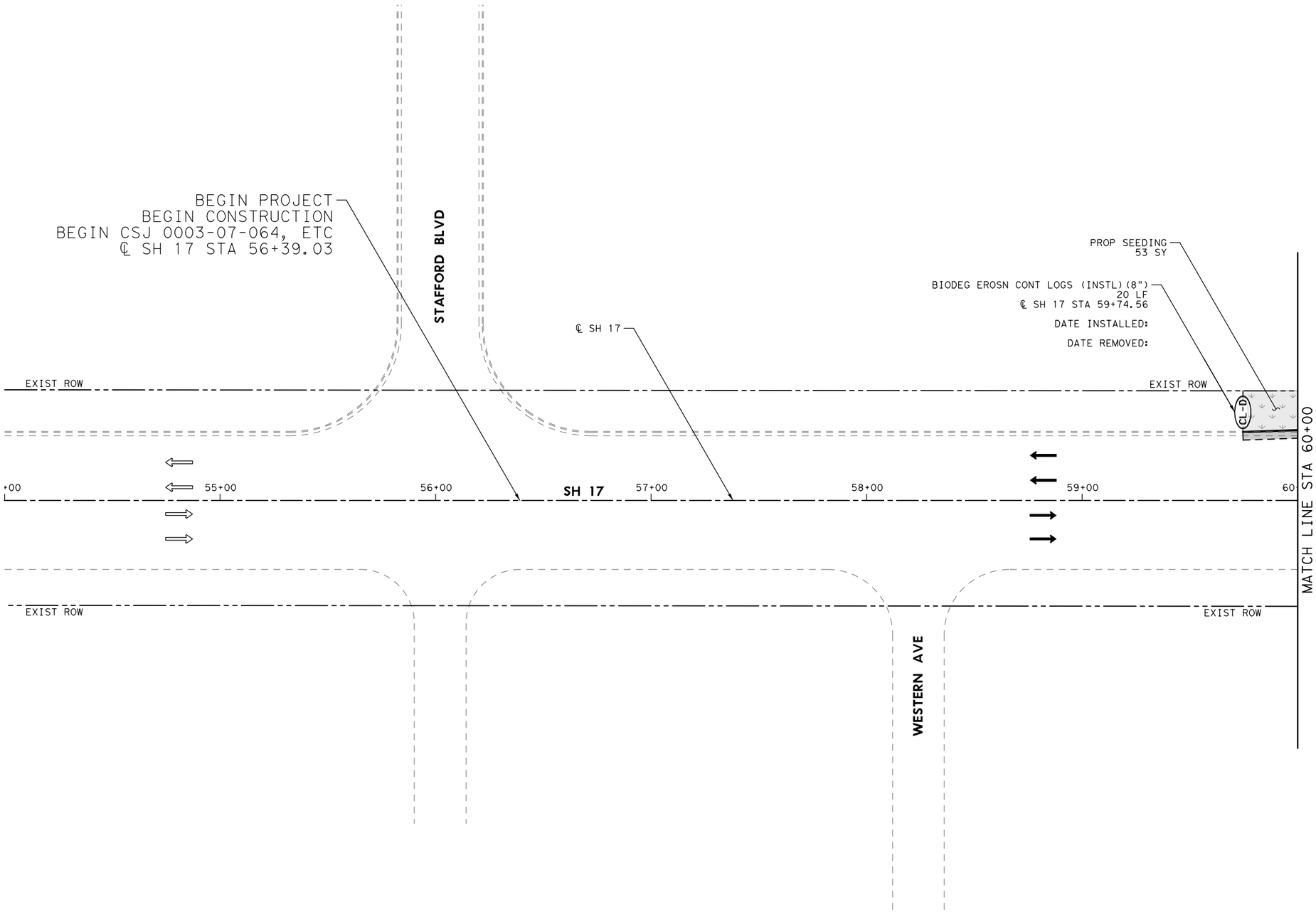
SWP3 NOTES

Texas Department of Transportation

REV: 10-25-16

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6	(SEE TITLE SHEET)	234

STATE	STATE DIST.	COUNTY	
TEXAS	ODA	REEVES	
CONT.	SECT.	JOB	HIGHWAY NO.
0003	07	064,ETC	IH20



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SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP SEEDING
- (CL-D) EROSION CONTROL LOG DAM
- EXIST FLOW LINE
- PROP FLOW LINE

STATE OF TEXAS
CLIFFORD R. MOUSER
56606
REGISTERED PROFESSIONAL ENGINEER

Clifford R. Mouser

6/24/2021

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SH 17
SW3P
AT IH 20

SHEET 1 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
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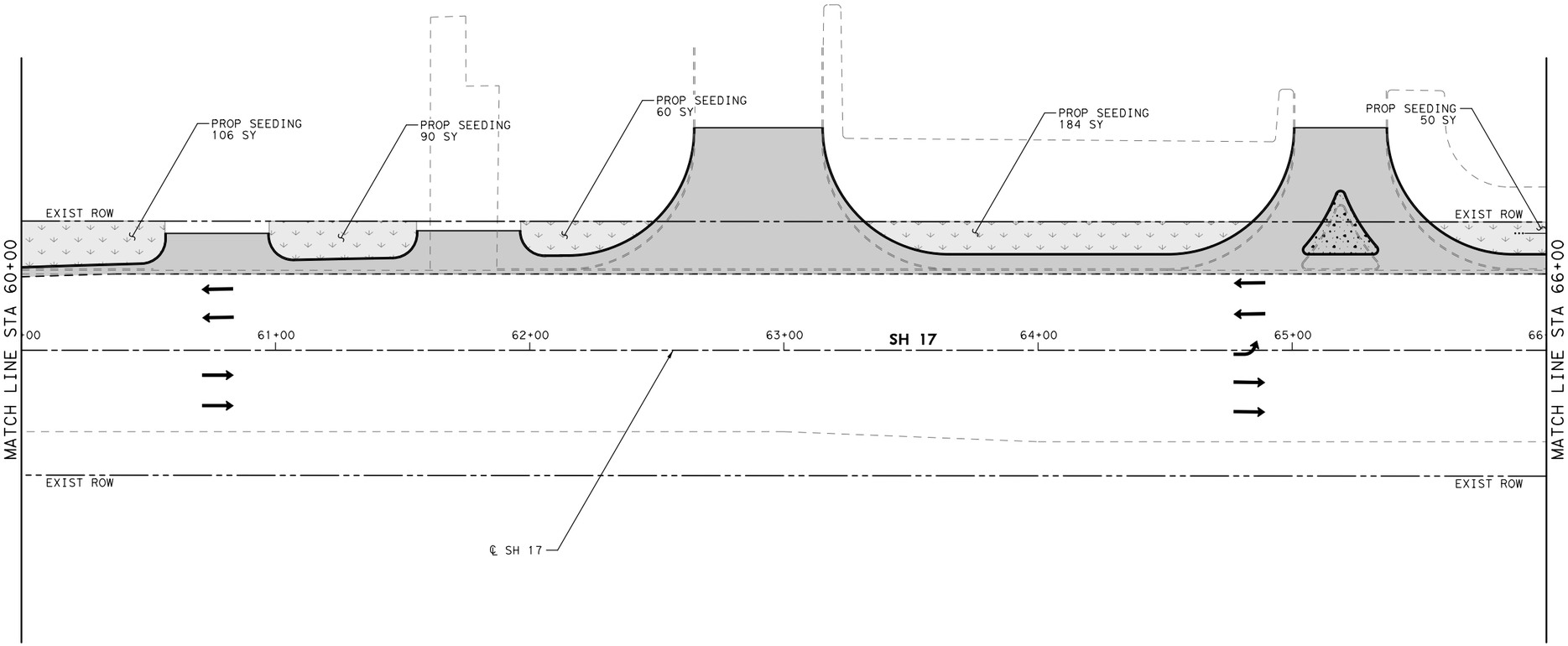

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STATE OF TEXAS
CLIFFORD R. MOUSER
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REGISTERED
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Clifford R. Mouser

6/24/2021

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JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

SH 17
SW3P
AT IH 20

SHEET 2 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
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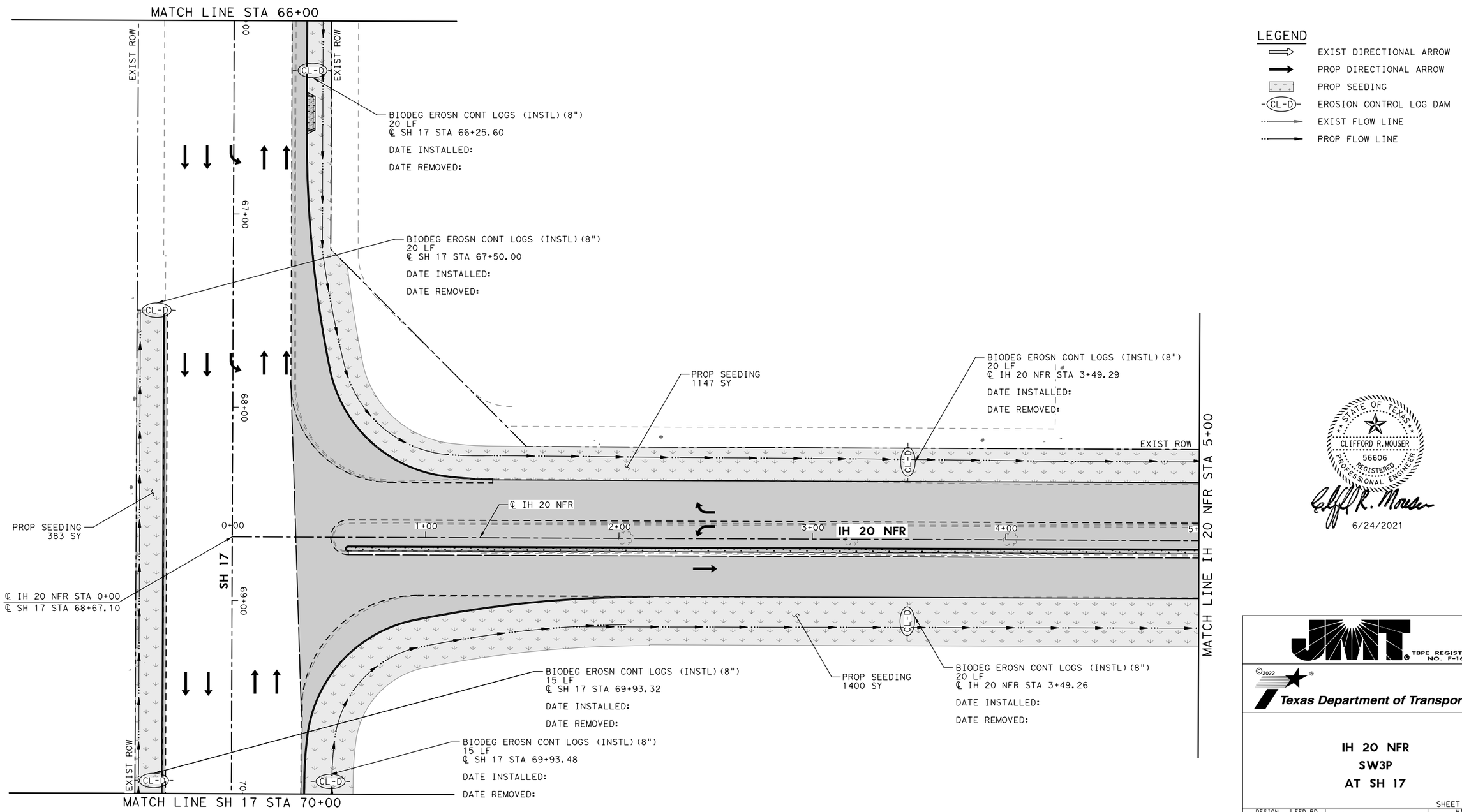

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SCALE IN FEET

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JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 NFR
SW3P
AT SH 17

SHEET 3 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
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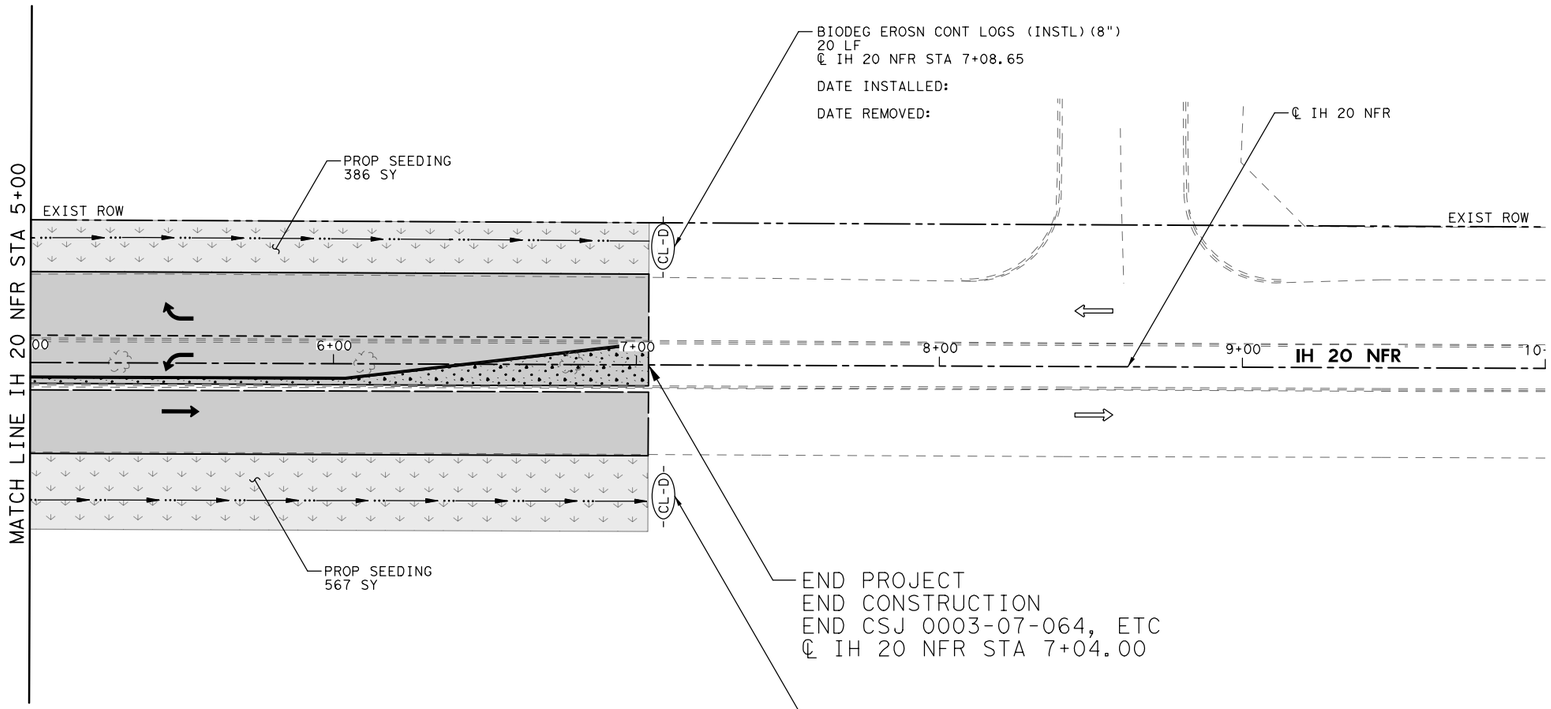

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6/24/2021

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Texas Department of Transportation

IH 20 NFR
SW3P
AT SH 17

SHEET 4 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
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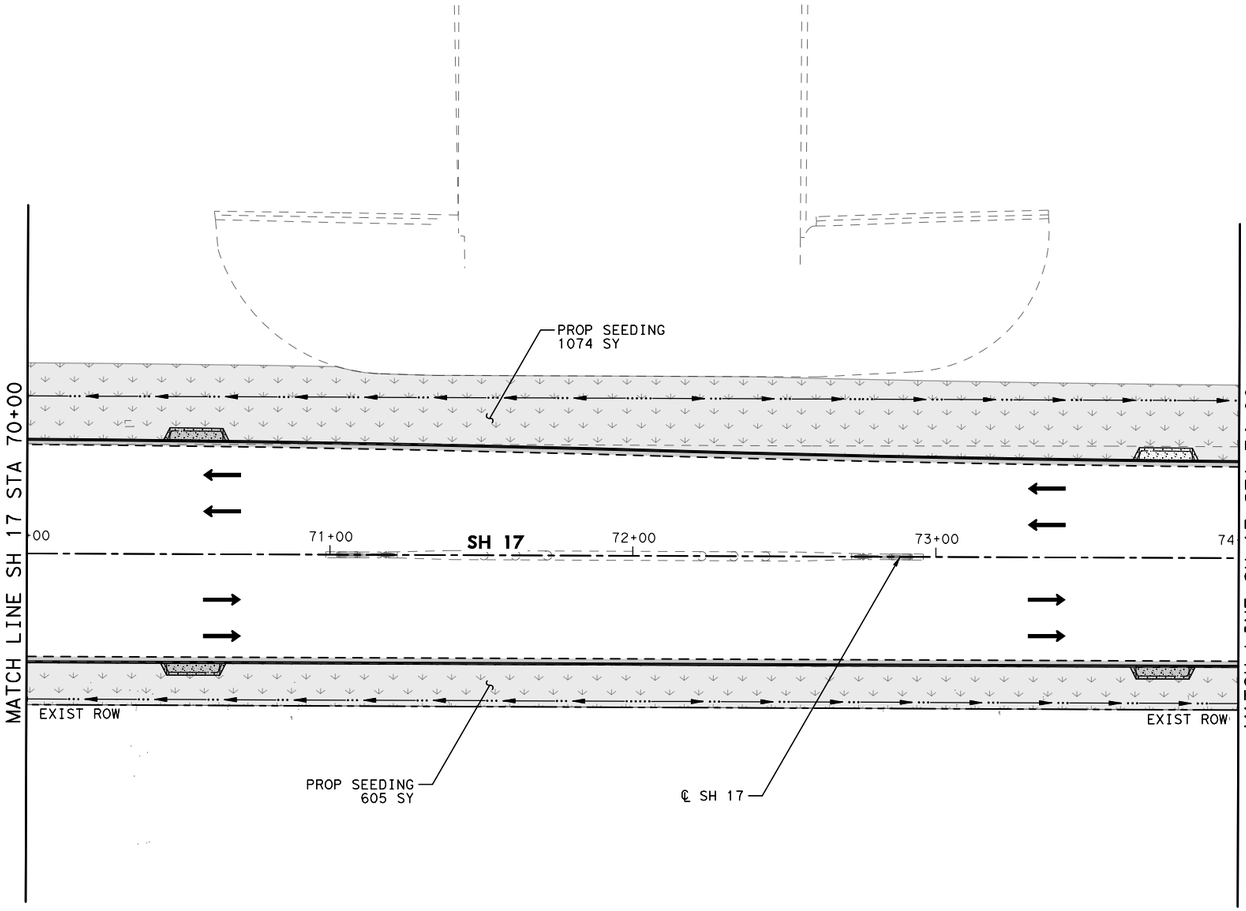

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STATE OF TEXAS
CLIFFORD R. MOUSER
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Texas Department of Transportation

SH 17
SW3P
AT IH 20 FR

SHEET 5 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
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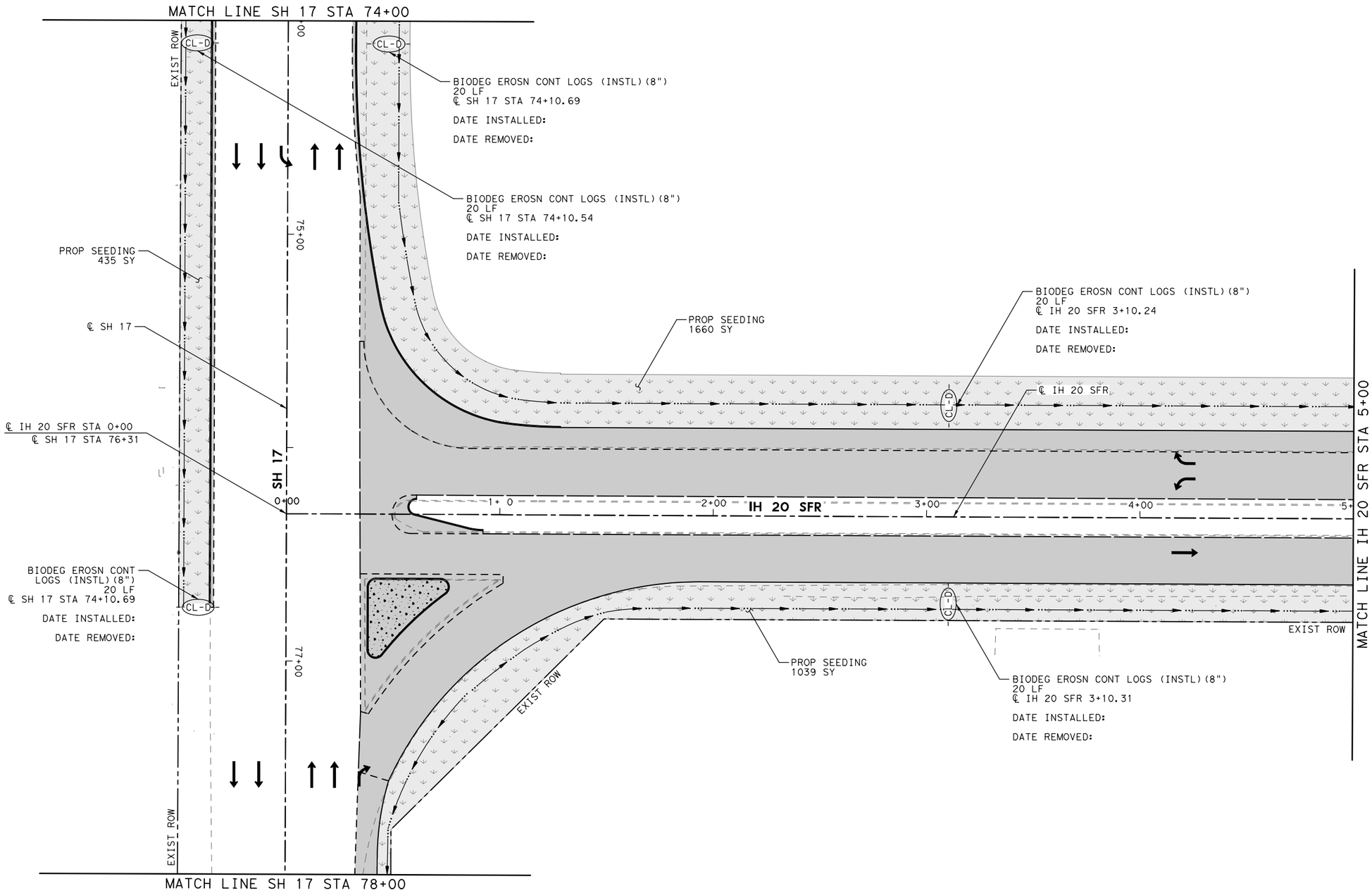

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STATE OF TEXAS
CLIFFORD R. MOUSER
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JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
SW3P
AT SH 17

SHEET 6 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
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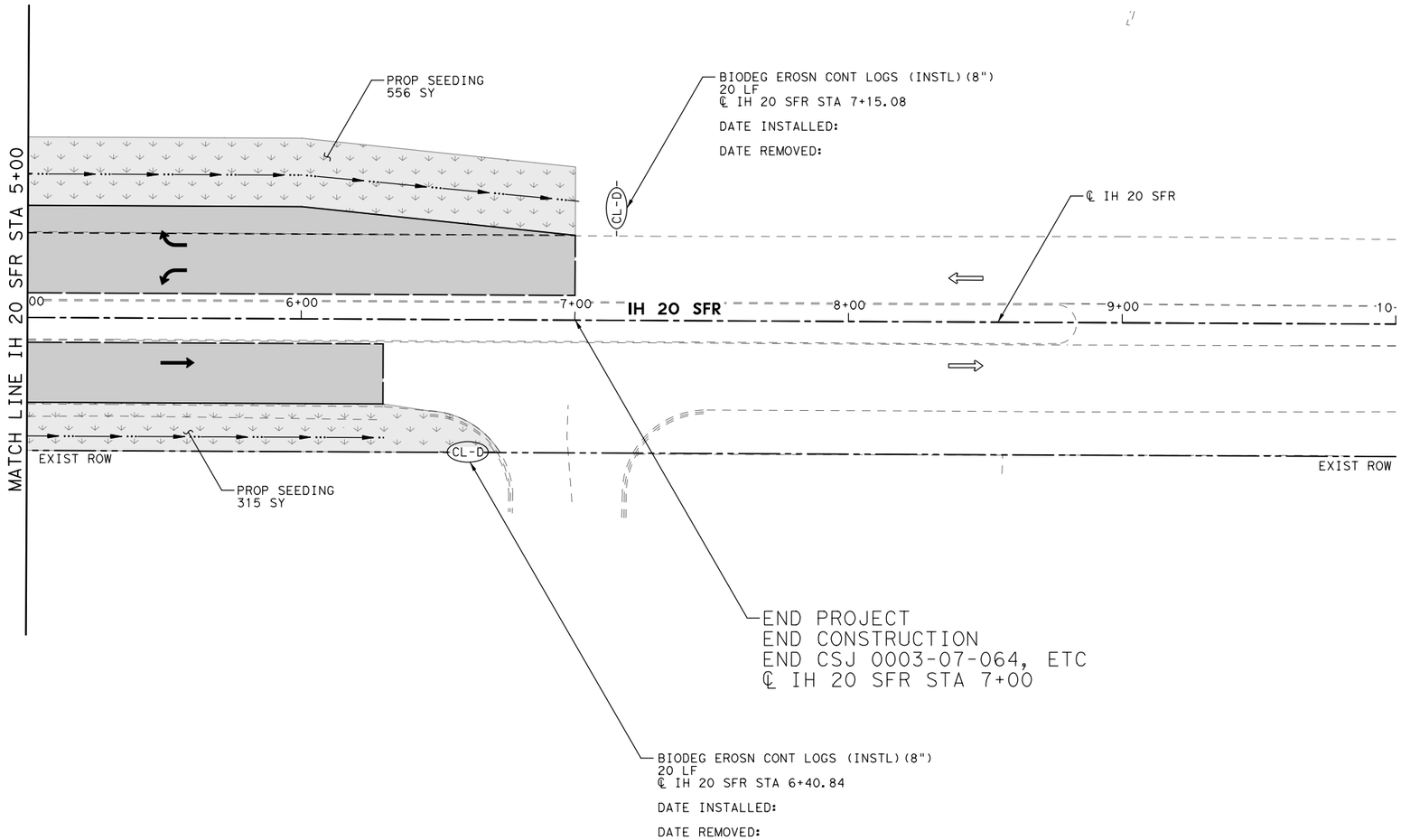

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- PROP SEEDING
- CL-D — EROSION CONTROL LOG DAM
- EXIST FLOW LINE
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STATE OF TEXAS
CLIFFORD R. MOUSER
56606
REGISTERED
PROFESSIONAL ENGINEER

6/24/2021

JMT TBPE REGISTRATION NO. F-16341

Texas Department of Transportation

IH 20 SFR
SW3P
AT SH 17

SHEET 7 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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JMT				

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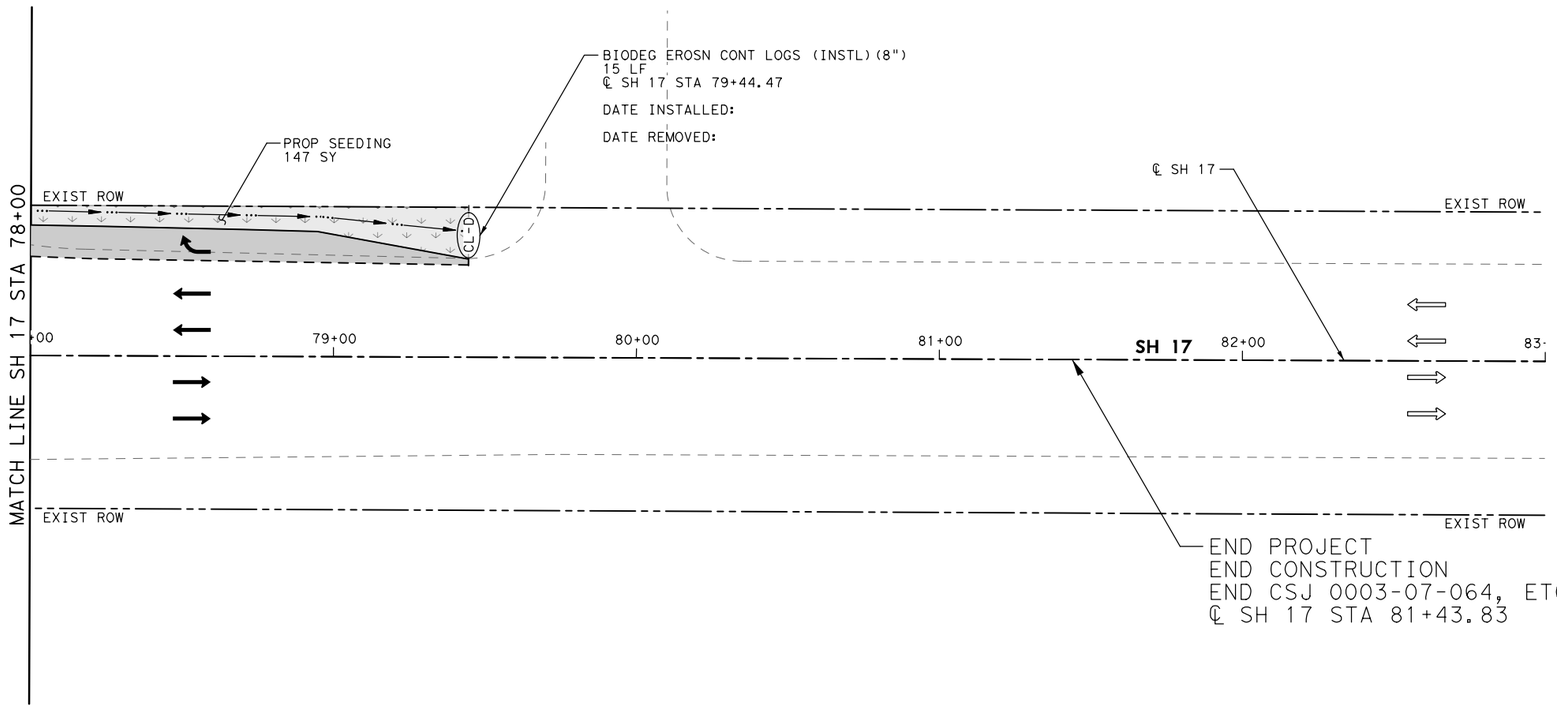

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Texas Department of Transportation

SH 17
SW3P
AT IH 20 FR

SHEET 8 OF 8

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
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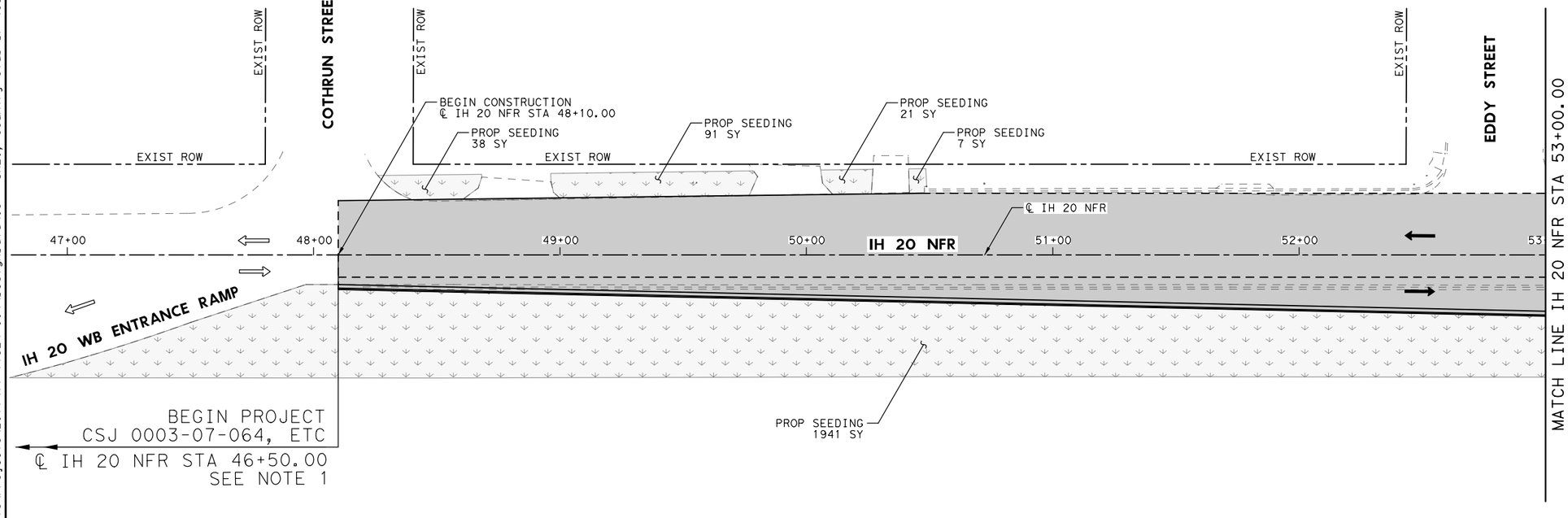
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental



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SCALE IN FEET

LEGEND

- EXIST DIRECTIONAL ARROW
- PROP DIRECTIONAL ARROW
- PROP SEEDING
- SOIL RETENTION BLANKET
- (CL-D) EROSION CONTROL LOG DAM
- EXIST FLOW LINE
- PROP FLOW LINE
- (2) LANDSCAPING RIVER ROCK
- (3) LANDSCAPING GRAVEL

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STATE OF TEXAS
JENNIFER R. PERRY
141282
LICENSED
PROFESSIONAL ENGINEER

03/30/2022

Jennifer R Perry

TBPE REGISTRATION NO. F-16341

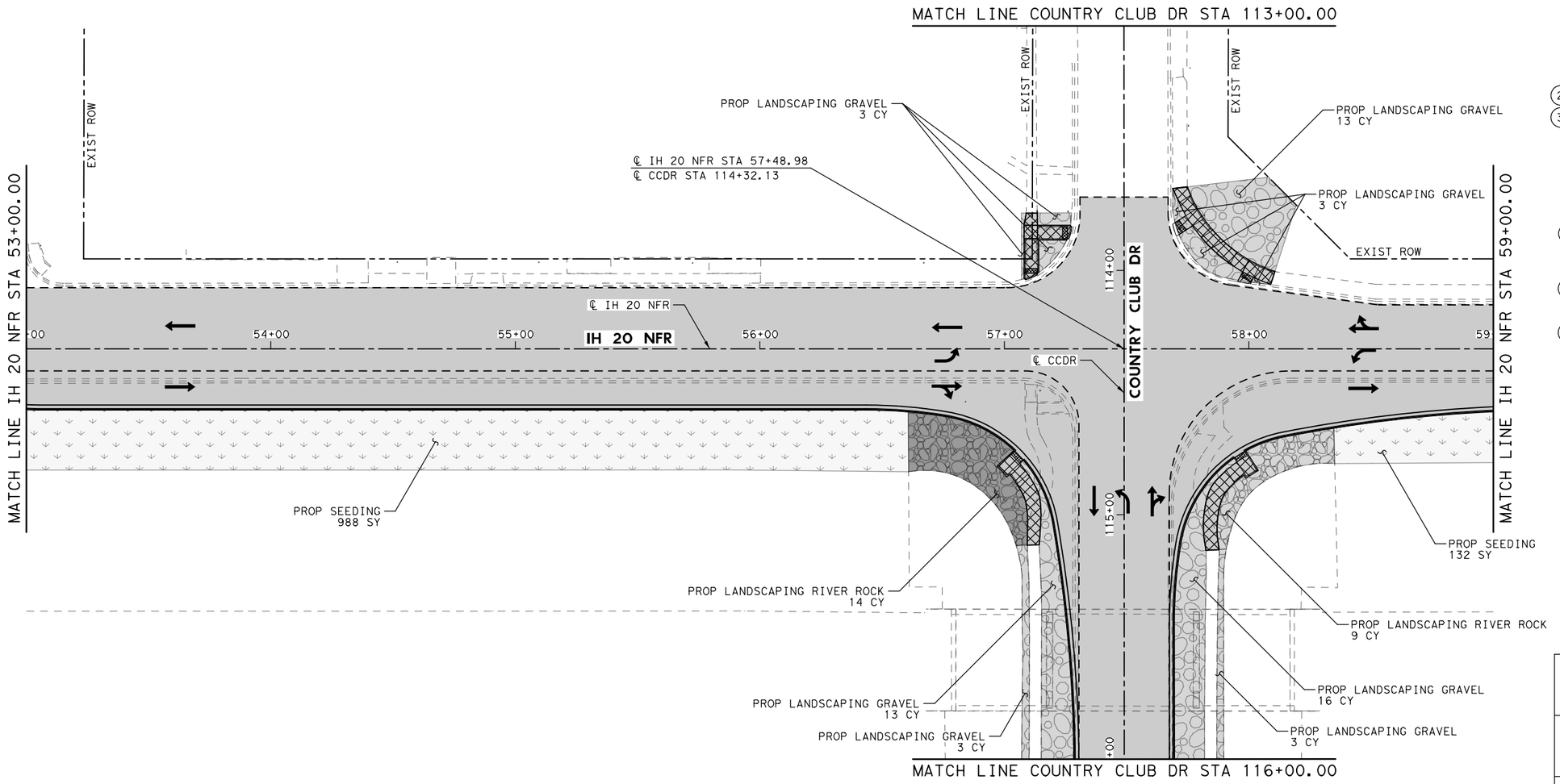
Texas Department of Transportation

IH 20 NFR
SW3P
AT COUNTRY CLUB DR

SHEET 1 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	243
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\Plan Set\9. Environmental\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - DesignPlan Set\9. Environmental



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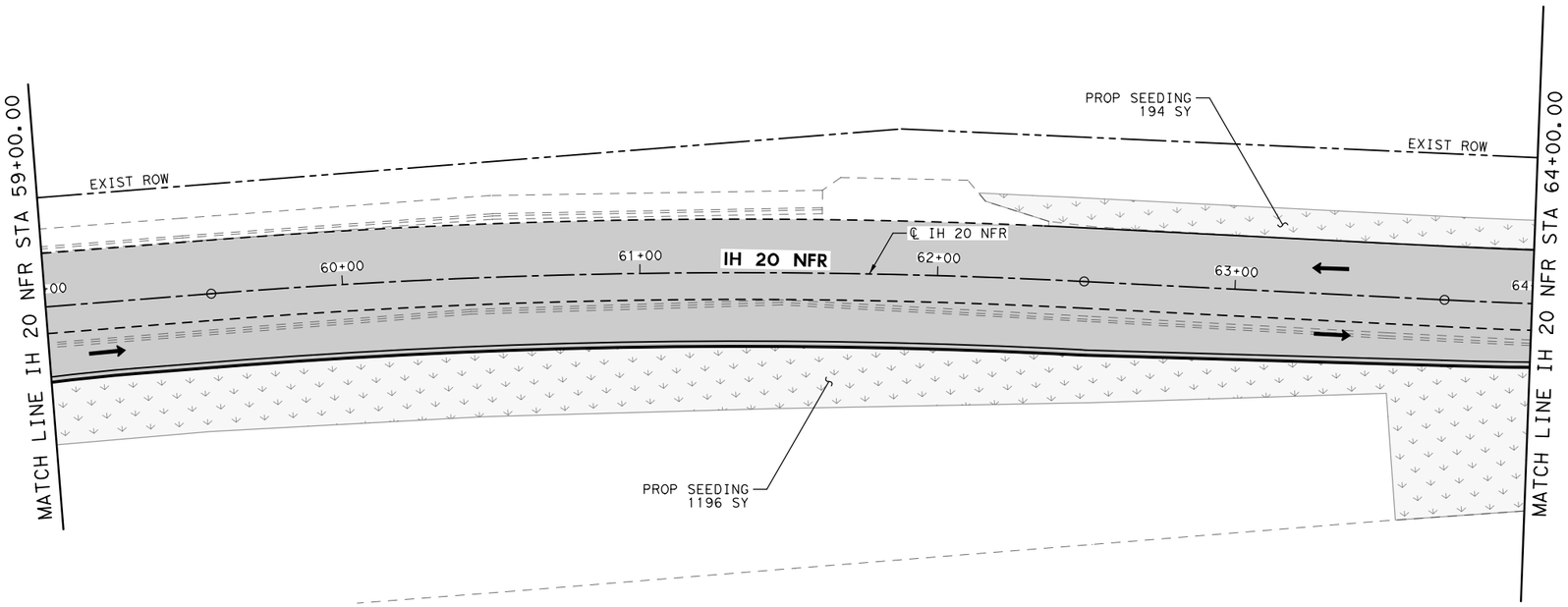
SHEET 2 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	244
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\Design\Plan Set\9. Environmental\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental



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AT COUNTRY CLUB DR

SHEET 3 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	245
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
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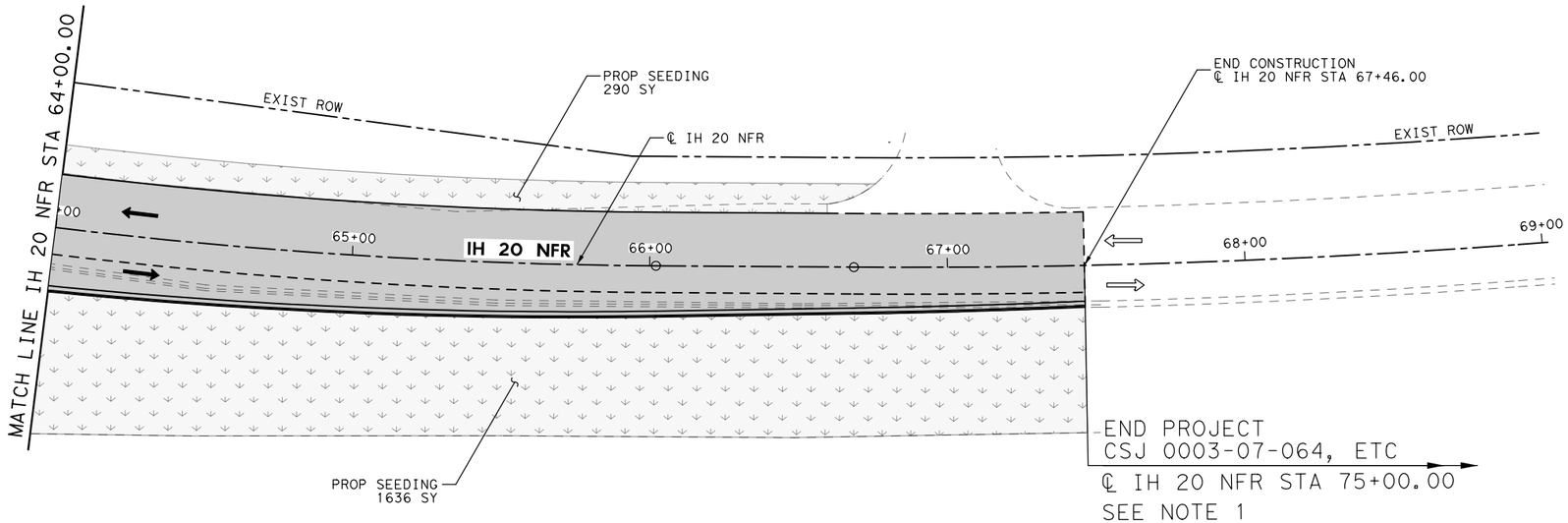

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SW3P
AT COUNTRY CLUB DR

SHEET 4 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	246
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

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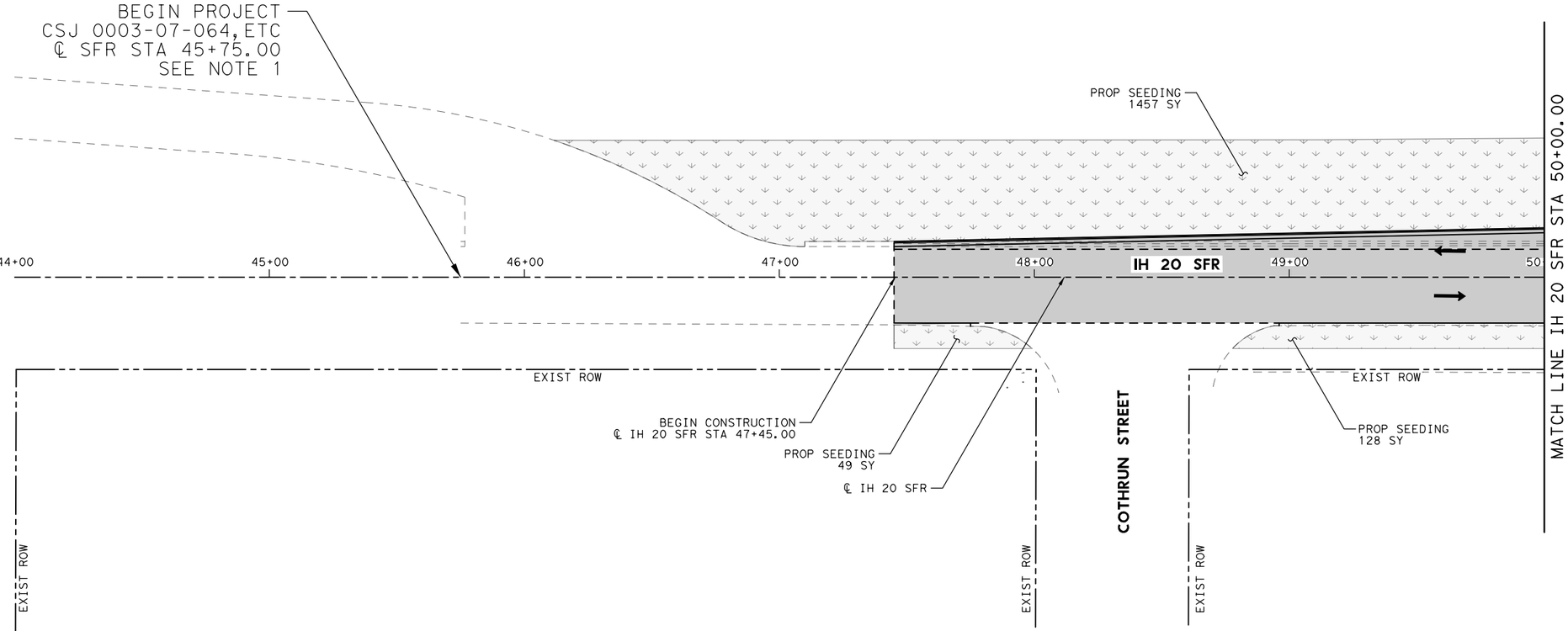

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Texas Department of Transportation

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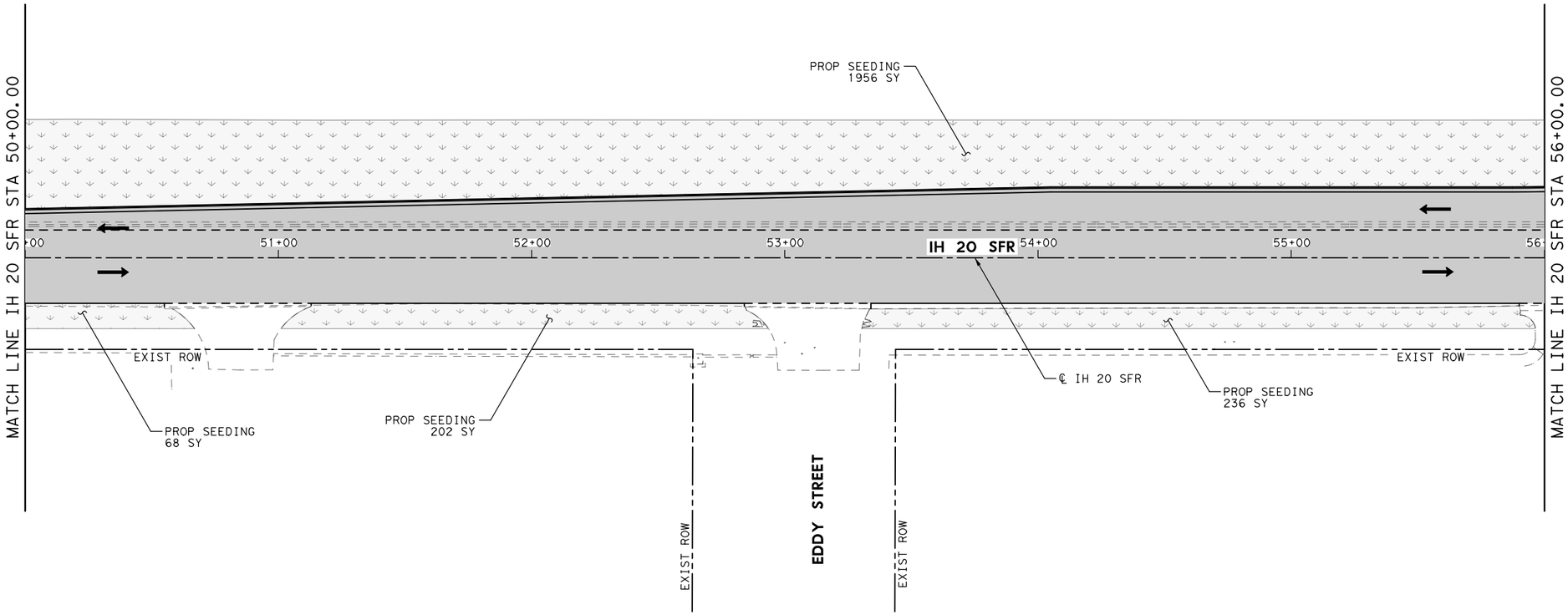
SW3P
AT COUNTRY CLUB DR

SHEET 5 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
JMT	TEXAS	ODA	REEVES	247
CHECK	CONTROL	SECTION	JOB	
JMT	0003	07	064,ETC	
CHECK				
JMT				

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental



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SHEET 6 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	248
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

DATE: 3/30/2022
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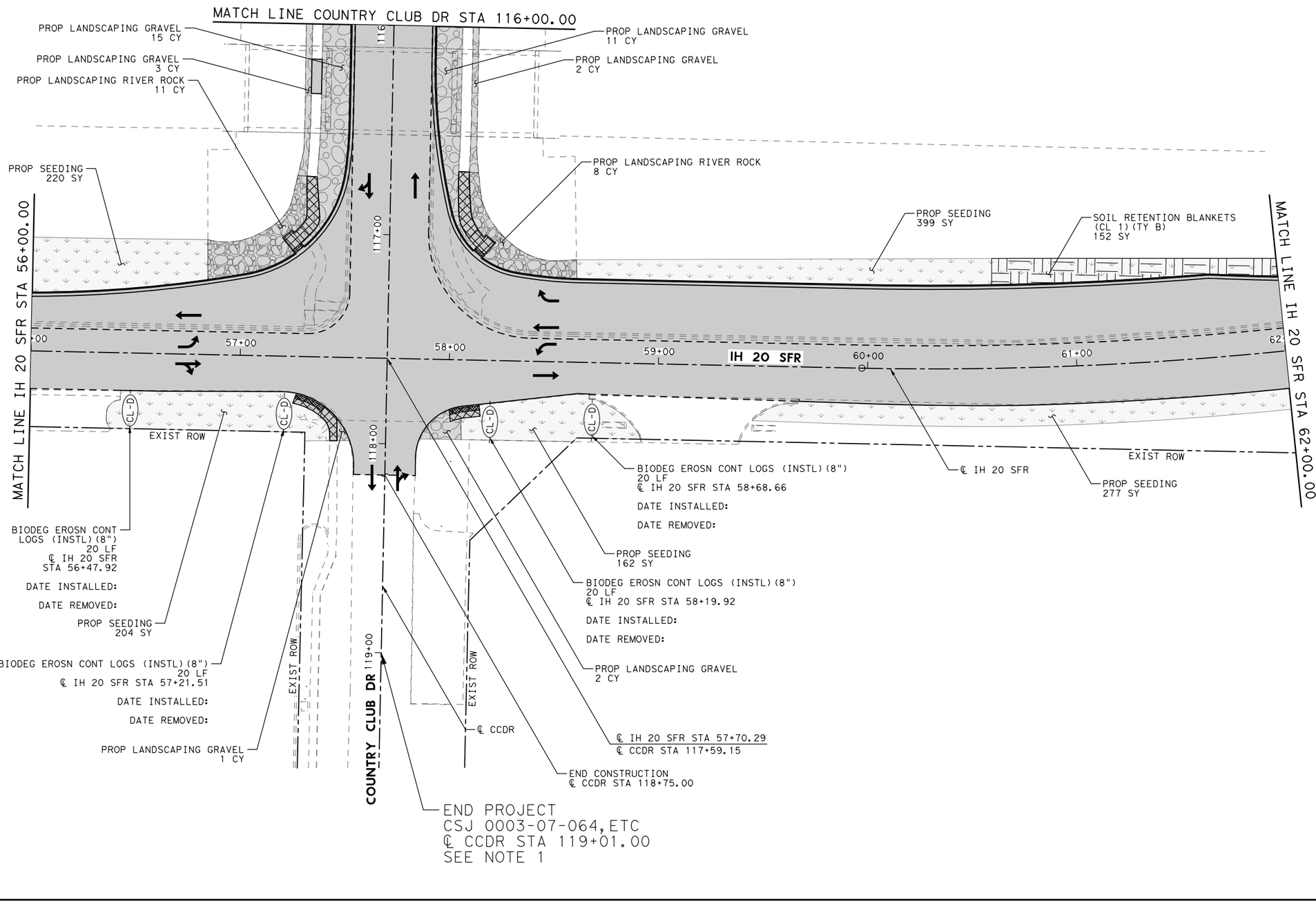

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SHEET 7 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	249
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

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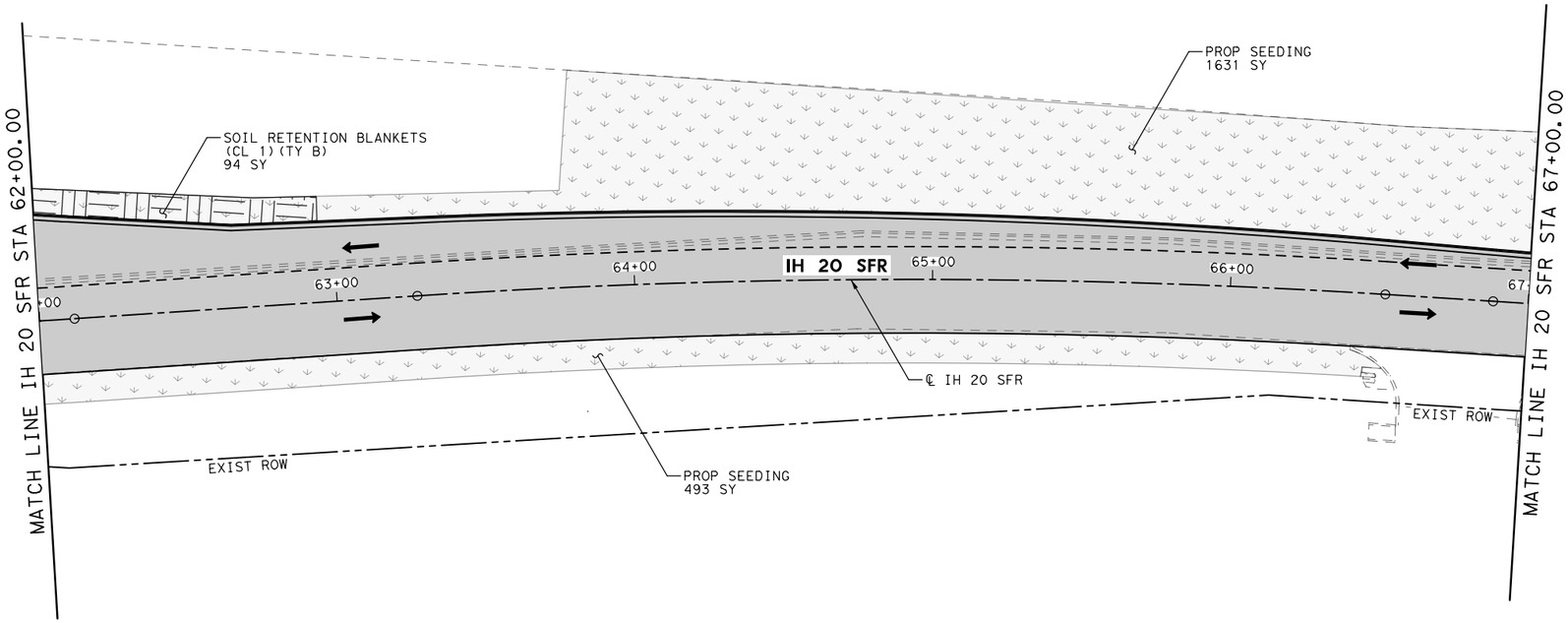
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental



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IH 20 SFR
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AT COUNTRY CLUB DR

SHEET 8 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	250
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064,ETC	

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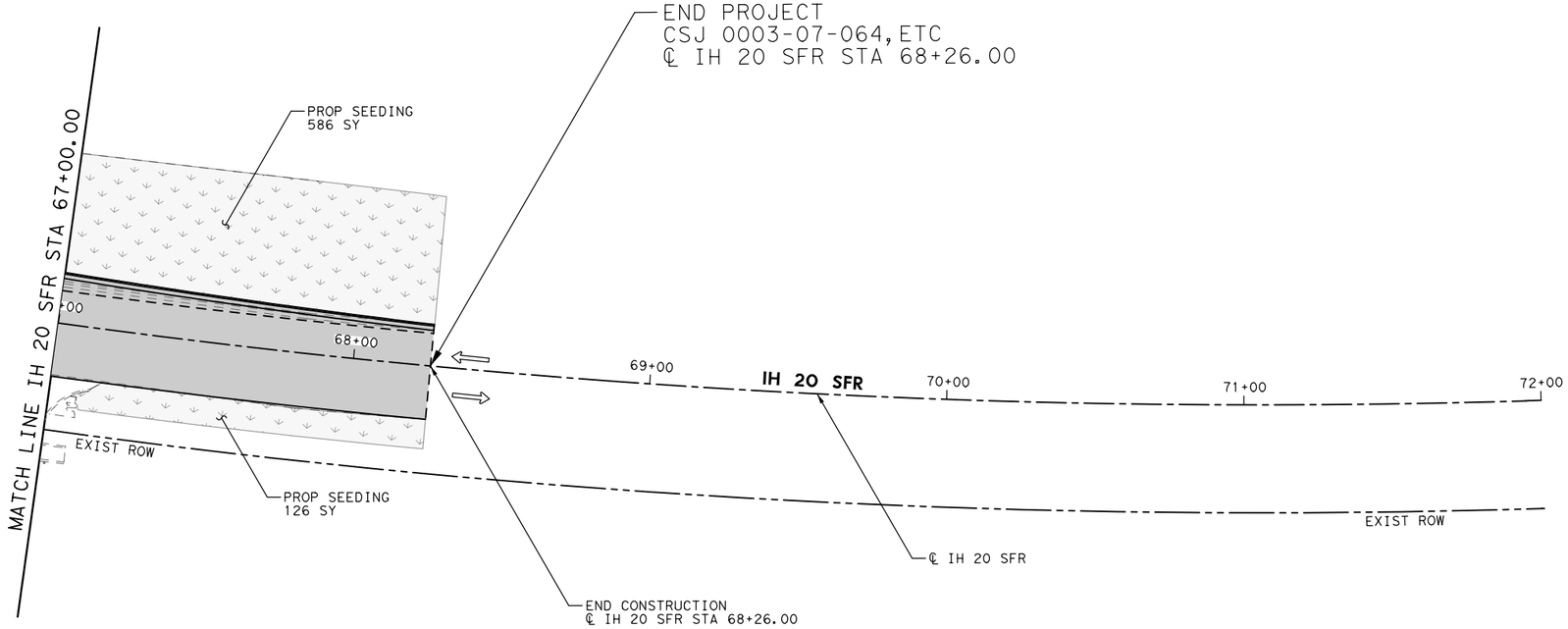
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental



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SHEET 9 OF 9

DESIGN	FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
JMT	6	(SEE TITLE SHEET)		IH20
GRAPHICS JMT	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK JMT	TEXAS	ODA	REEVES	251
CHECK JMT	CONTROL	SECTION	JOB	
	0003	07	064, ETC	

DATE: 3/30/2022
FILENAME: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental

DATE:4/19/2022
FILE:H:\Projects\Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental\ODA*EPIC01.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. PECOS
2.
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☐ No Action Required ☒ Required Action

Action No.

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

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.
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The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.
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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.

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. AVOID HARM TO MIGRATORY BIRDS, EGGS, AND ACTIVE NESTS;
   - DO NOT DISTURB, DESTROY, OR REMOVE ACTICE NESTS, INCLUDING GROUND NESTING BIRDS, DURING THE NESTING SEASON;
   - INACTIVE NESTS AND/OR VEGETATION SUSPECTED TO CONTAIN NESTS SHOULD BE REMOVED OUTSIDE OF NESTING SEASON (NESTING SEASON IS TYPICALLY MARCH 15 TO SEPTEMBER 15).

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

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

Texas Department of Transportation

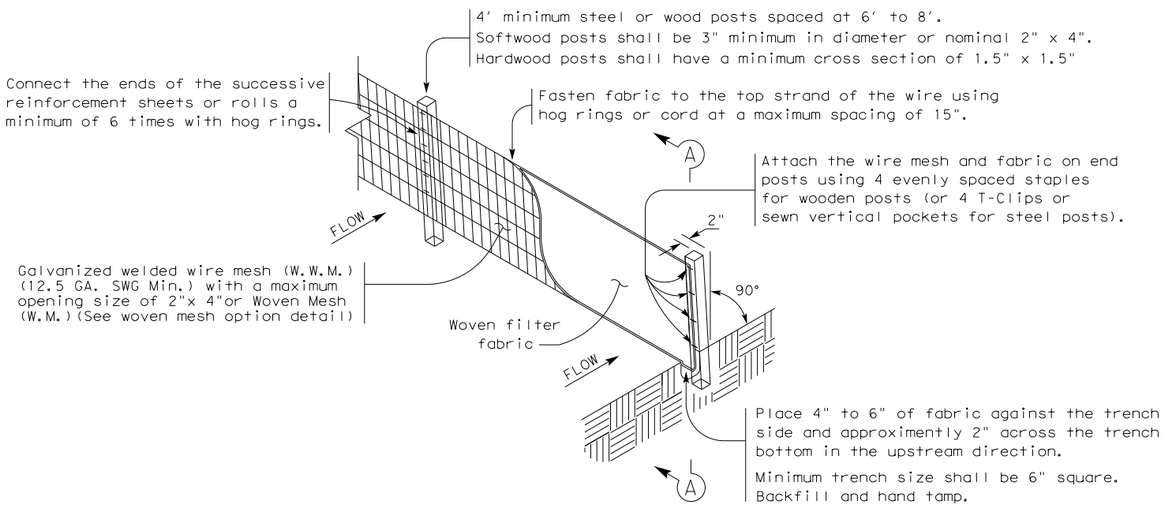
Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

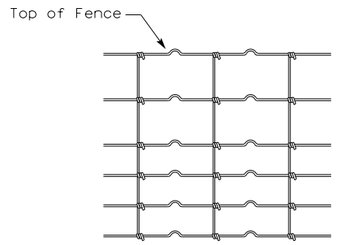
FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		252

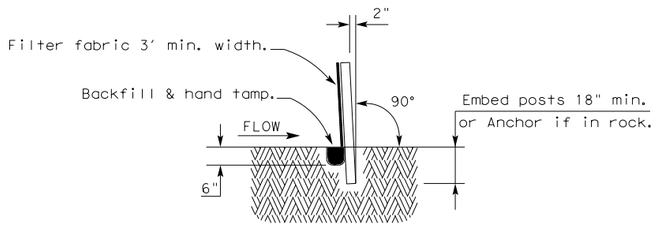
DATE 3/30/2022
FILE pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental\TxDOT



TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

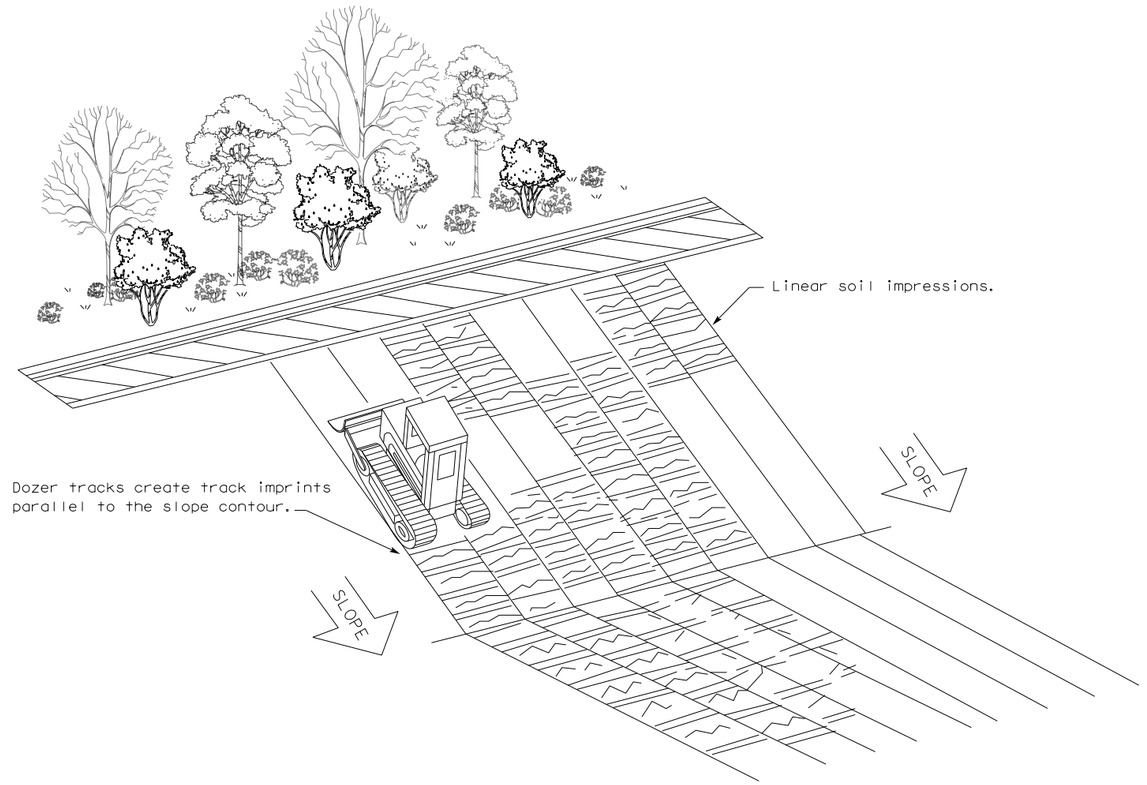
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

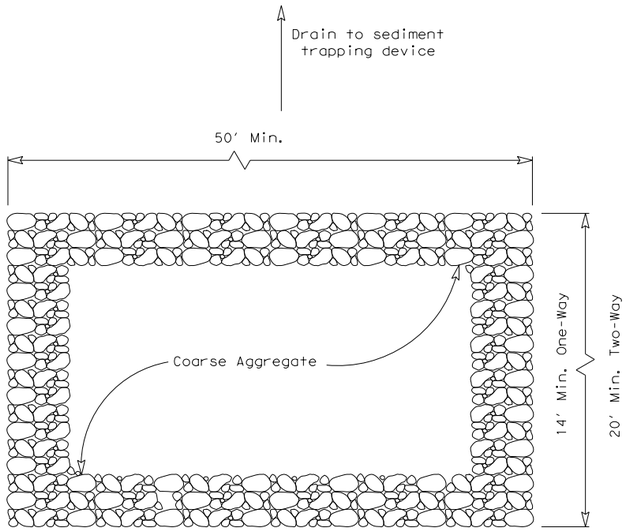
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

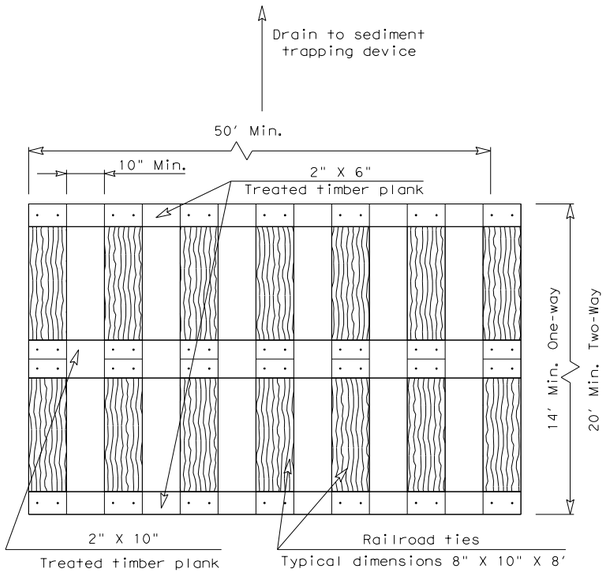
EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY
REVISIONS	0003	07	064,ETC		IH20
	DIST	COUNTY			SHEET NO.
	ODA	REEVES.			253

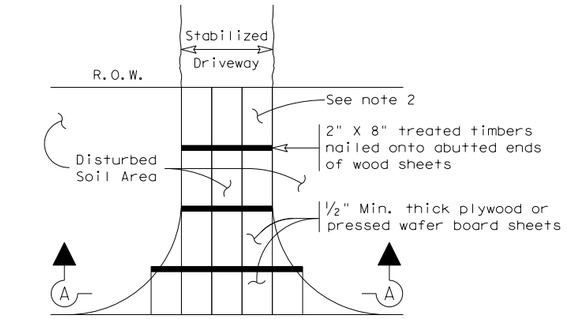
DATE: 3/30/2022
FILE: pw:\\jmt-pw.bentley.com:jmt-pw-01\Documents\Projects\2017\17-11524-004\DesignData\03 - IH20, Country Club Dr (CSJ 0003-07-064, ETC.)\4 - Design\Plan Set\9. Environmental\TxDOT



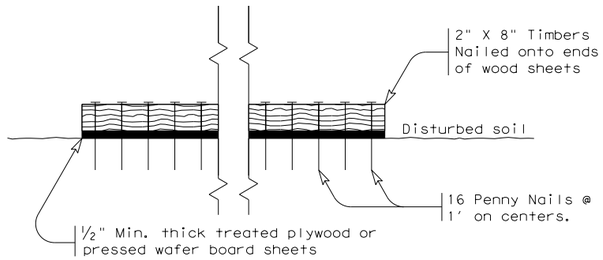
PLAN VIEW



PLAN VIEW



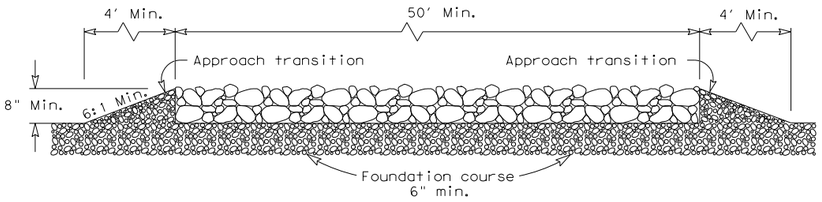
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM



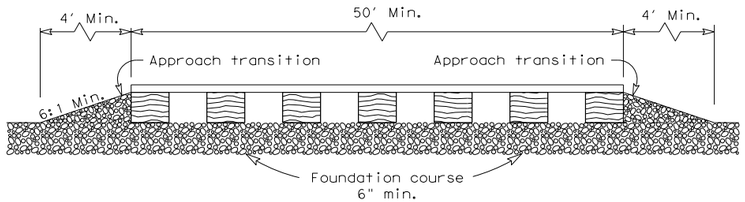
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

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

GENERAL NOTES (TYPE 3)

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

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0003	07	064, ETC	IH20
	DIST	COUNTY		SHEET NO.
	ODA	REEVES		254