FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	C 27-13-238		1
STATE	STATE DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

PROJECT NO.: C 27-13-238
CONTROL: 0027-13-238
IH 69 FRTG
HARRIS COUNTY

LIMITS: FROM 0.924 MI SOUTH OF BISSONNET TO 0.127 MI NORTH OF CHIMNEY ROCK RD.

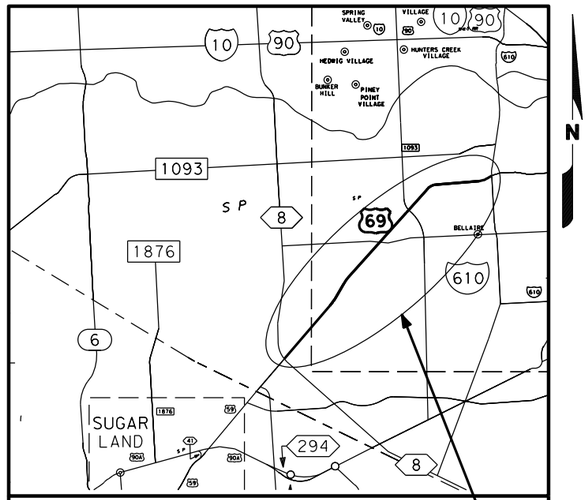
NET LENGTH OF PROJECT= ROADWAY : 34,393.67 FT=6.514 MI
BRIDGES : 244.00 FT=0.046 MI
TOTAL : 34,637.67 FT=6.560 MI

FOR THE CONSTRUCTION OF 1.5" MILLING AND OVERLAY
CONSISTING OF A SEAL COAT AND 2"THIN OVERLAY.

DESIGN SPEED = 45 MPH
ADT (2024) = 42,300
ADT (2044) = 58,200

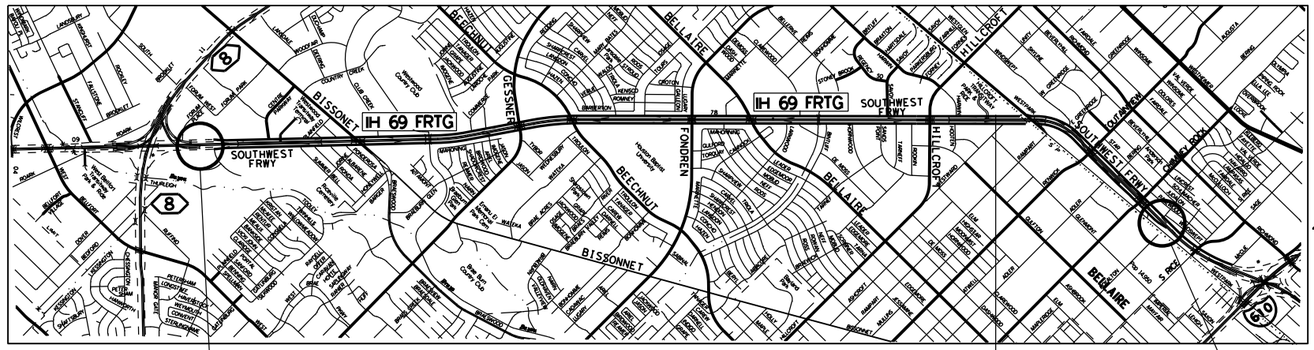
INDEX OF SHEETS

SEE SHEET NO. 2



VICINITY MAP N.T.S.

PROJECT LOCATION



BEGIN PROJECT
CSJ: 0027-13-238
STA. 286+90.00
MP=1.645
REF. MRKR=116+0.337

PROJECT LOCATION MAP
N.T.S.

END PROJECT
CSJ: 0027-13-238
STA. 129+00.00
MP=8.205
REF. MRKR=122+0.902

EQUATIONS:
STA.563+83.31 BK = STA.59+55.64 FWD

SUBMITTED FOR LETTING: 10/25/2023

DocuSigned by:
Hamoon Bahrami
192FCD8CB3B34D...
AREA ENGINEER

APPROVED FOR LETTING: 11/21/2023

DocuSigned by:
James Koch , P.E.
E843ACFA45624C6...
FOR DISTRICT ENGINEER

1. SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE SPECIFICATION ITEM LISTED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED LABOR PROVISION FOR STATE PROJECTS: SP000---008
2. FOR BARRICADES AND SIGNING AT INDIVIDUAL HIGHWAY SECTION, REFER TO BARRICADE AND CONSTRUCTION STANDARD SHEETS: BC(1)-21 THRU BC(12)-21.
3. FOR TRAFFIC CONTROL AT INDIVIDUAL HIGHWAY SECTION, REFER TO TRAFFIC CONTROL PLAN STANDARD SHEETS: TCP(5-1)-18, TCP(6-4)-12, TCP(6-8)-14, AND TCP(6-9)14.

R.R. CROSSINGS: NONE

EQUATIONS: STA.563+83.31 BK = STA.59+55.64 FWD

EXCEPTIONS: NONE

COUNTY HARRIS PROJ. NO. 0027-13-238
HWY. NO. IH 69 LETTING DATE FEB. 2024
DATE ACCEPTED

INDEX OF SHEETS

REF FILES ATT.

LEVELS DISPLAYED

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
33	34	35	39	40	41	42	43	44	45	46	47	48				
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED
PROFESSIONAL ENGINEER

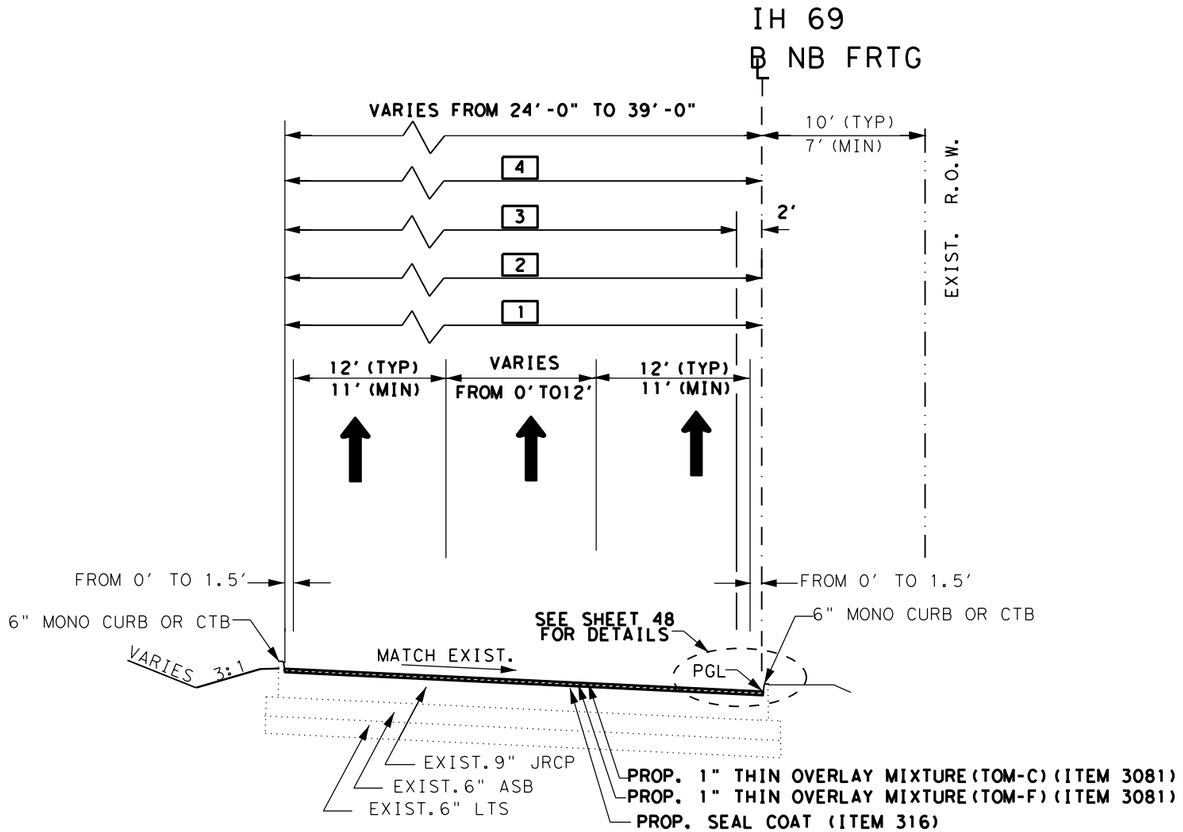
THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE (*) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

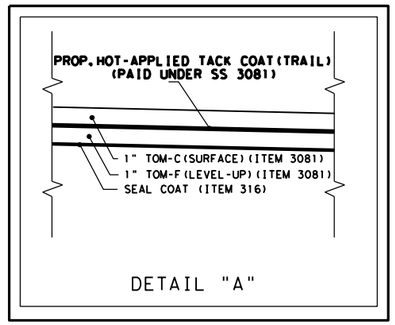
Beata Kwater, P.E., PE

10/25/2023
DATE

INDEX OF SHEETS

FED.RD. DIV.NO.	PROJECT NO		SHEET NO.
6			2
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG





DETAIL "A"

TYPICAL SECTION IH 69 NB FRTG RD

STA. 286+90.00 TO 129+00.00

EQUATION: STA.563+83.31 BK= STA.59+55.64 FWD

PAVEMENT MARKINGS ONLY:

STA. 334+00.00 TO STA. 339+20.00 = 520 FT
STA. 359+35.70.00 TO STA. 361+79.70.00 = 244 (BRIDGE) FT
STA. 391+20.00 TO STA. 394+20.00= 300 FT
STA. 410+00.00 TO STA. 413+60.00= 360 FT
STA. 452+10.00 TO STA. 454+90.00= 280 FT
STA. 473+00.00 TO STA. 476+60.00= 360 FT
STA. 536+10.00 TO STA. 539+00.00= 290 FT
STA. 66+10.00 TO STA. 72+80.00= 670 FT
STA. 92+40.00 TO STA. 95+20.00= 280 FT
STA. 116+90.00 TO STA. 119+40.00= 250 FT

LEGEND:

1. LIMIT OF 1.5" ASPHALT MILLING (ITEM 354)
2. LIMIT OF FULL DEPTH REPAIR (ITEM 361)
3. LIMIT OF PROPOSED SEAL COAT (ITEM 316) AND 1" THIN OVERLAY MIXTURE(TOM-F)(LEVEL-UP) AND 1" THIN OVERLAY MIXTURE(TOM-C)(SURFACE) PG 76-22, SAC A (ITEM 3081)
4. LIMIT OF PROPOSED SEAL COAT (ITEM 316) AND 1" THIN OVERLAY MIXTURE(TOM-C)(SURFACE) PG 76-22, SAC A (ITEM 3081)

NOTES:

1. FOR THIS TYPICAL SECTION, SURFACE TEST TYPE B AND PAY ADJUSTMENT SCHEDULE 2 EXCEPT FOR THE OUTSIDE LANE AND SURFACE TEST TYPE B AND PAY ADJUSTMENT SCHEDULE 3 FOR THE OUTSIDE LANE WILL BE USED FOR ITEM "RIDE QUALITY FOR PAVEMENT SURFACE".
2. THE ASPHALT BINDER MAY NOT BE SUBSTITUTED FOR THIS PROJECT.
3. WORK ON BRIDGES IS LIMITED TO PAVEMENT MARKING ONLY (FOR STATIONS SEE PLAN LAYOUT SHEETS).
4. THE SEAL COAT (ITEM 316) WILL BE COVERED WITH THIN OVERALY MIXTURE (TOM-F)(ITEM 3081) PRIOR TO REOPENING TO TRAFFIC EACH DAY. THE ROADWAY WILL NOT BE OPENED TO TRAFFIC UNTIL THE TOM AND WORK ZONE PAVEMENT MARKINGS ARE IN PLACE.
5. A HOT-APPLIED TACK COAT (TRAIL) WILL BE APPLIED ON TOM-F PRIOR PLACING TOM-C SURFACE WITH APPLICATION RATE 0.06 GAL/SY.
6. FOR LIMITS OF THIN OVERLAY MIXTURE (TOM-F) FOR THE NB & SB OUTSIDE LANES SEE SHEET 48.
7. FOR PAVEMENT MARKINGS SEE PAVEMENT MARKINGS LAYOUT AND STANDARD SHEETS.

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

10/25/2023

TEXAS DEPARTMENT OF TRANSPORTATION

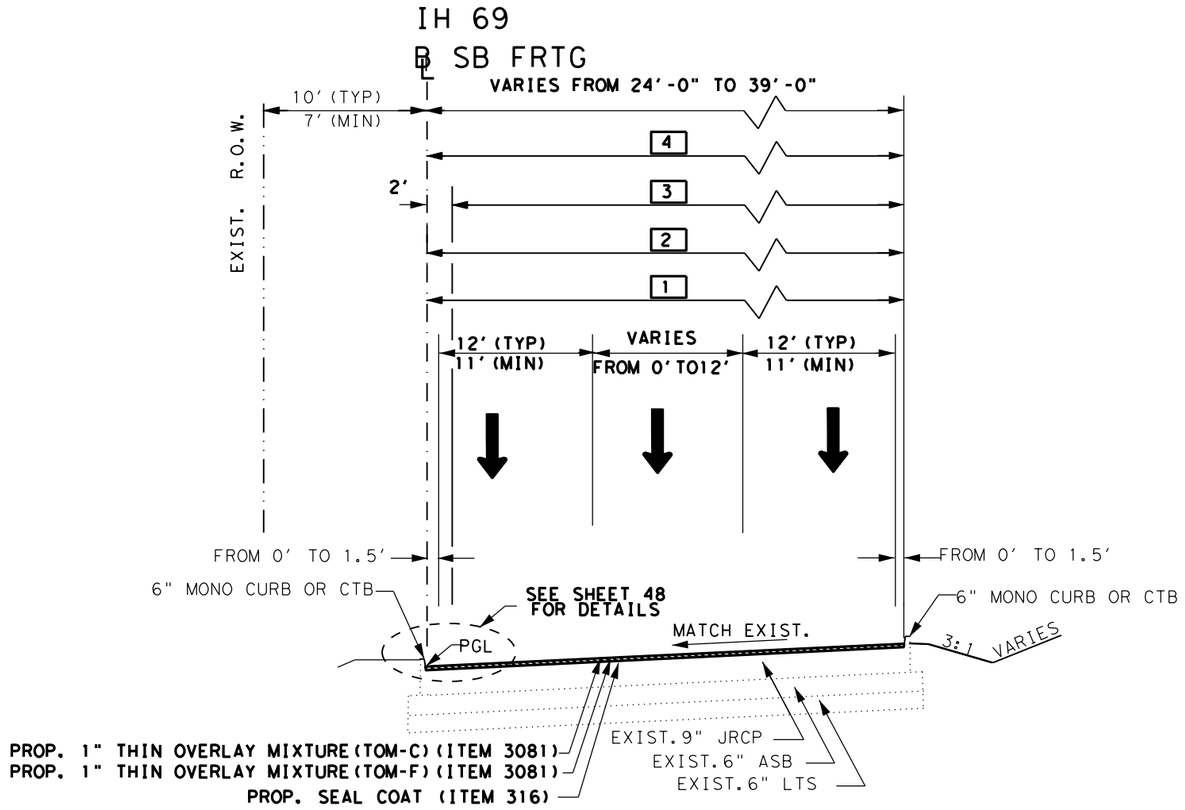
IH 69 FRTG RD EXISTING & PROPOSED TYPICAL SECTION

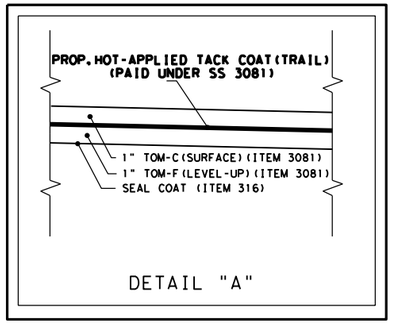
N. T. S.

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			3
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

H:/CDA/0050060817/GENERAL/PROPOSED TYPICAL SECTIONS.dgn REV:01/24/2013





TYPICAL SECTION IH 69 SB FRTG RD

STA. 291+20.00 TO 125+15.00

EQUATION: STA. 563+83.31 BK = STA. 59+55.64 FWD

PAVEMENT MARKINGS ONLY:

STA. 332+50.00 TO STA. 337+50.00 = 500 FT
STA. 359+11.30 TO STA. 361+55.30 = 244 FT (BRIDGE)
STA. 391+50.00 TO STA. 394+20.00 = 270 FT
STA. 408+20.00 TO STA 413+90.00 = 570 FT
STA. 452+10.00 TO STA. 454+90.00 = 280 FT
STA. 472+20.00 TO STA. 475+80.00 = 360 FT
STA. 536+20.00 TO STA. 539+00.00 = 280 FT
STA. 64+80.00 TO STA. 70+20.00 = 540 FT
STA. 92+20.00 TO STA. 95+20.00 = 300 FT
STA. 117+00.00 TO STA. 119+60.00 = 260 FT

LEGEND:

1 LIMIT OF 1.5" ASPHALT MILLING (ITEM 354)

2 LIMIT OF FULL DEPTH REPAIR (ITEM 361)

3 LIMIT OF PROPOSED SEAL COAT (ITEM 316) AND
1" THIN OVERLAY MIXTURE(TOM-F)(LEVEL-UP) AND
1" THIN OVERLAY MIXTURE(TOM-C)(SURFACE) PG 76-22, SAC A
(ITEM 3081)

4 LIMIT OF PROPOSED SEAL COAT (ITEM 316) AND
1" THIN OVERLAY MIXTURE(TOM-C)(SURFACE) PG 76-22, SAC A
(ITEM 3081)

NOTES:

1. FOR THIS TYPICAL SECTION, SURFACE TEST TYPE B AND PAY ADJUSTMENT SCHEDULE 2 EXCEPT FOR THE OUTSIDE LANE AND SURFACE TEST TYPE B AND PAY ADJUSTMENT SCHEDULE 3 FOR THE OUTSIDE LANE WILL BE USED FOR ITEM "RIDE QUALITY FOR PAVEMENT SURFACE".
2. THE ASPHALT BINDER MAY NOT BE SUBSTITUTED FOR THIS PROJECT.
3. WORK ON BRIDGES IS LIMITED TO PAVEMENT MARKING ONLY (FOR STATIONS SEE PLAN LAYOUT SHEETS).
4. THE SEAL COAT (ITEM 316) WILL BE COVERED WITH THIN OVERALY MIXTURE (TOM-F)(ITEM 3081) PRIOR TO REOPENING TO TRAFFIC EACH DAY. THE ROADWAY WILL NOT BE OPENED TO TRAFFIC UNTIL THE TOM AND WORK ZONE PAVEMENT MARKINGS ARE IN PLACE.
5. A HOT-APPLIED TACK COAT (TRAIL) WILL BE APPLIED ON TOM-F PRIOR PLACING TOM-C SURFACE WITH APPLICATION RATE 0.06 GAL/SY.
6. FOR LIMITS OF THIN OVERLAY MIXTURE (TOM-F) FOR THE NB & SB OUTSIDE LANES SEE SHEET 48.
7. FOR PAVEMENT MARKINGS SEE PAVEMENT MARKINGS LAYOUT AND STANDARD SHEETS.

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.
10/25/2023

TEXAS DEPARTMENT OF TRANSPORTATION

IH 69 FRTG RD EXISTING & PROPOSED TYPICAL SECTION

N.T.S.

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			4
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

H:/CDA/0050060817/GENERAL/PROPOSED TYPICAL SECTIONS.dgn REV:01/24/2013

General Notes:

General:

Area Engineer contact information for this project follows:

Area Engineer :Hamoon Bahrami, P.E. e-mail: Hamoon.Bahrami@txdot.gov
Assistant Area Engineer:Brett McLeod, P.E. e-mail: Brett.McLeod@txdot.gov

Submit any questions about this project via the Letting Pre-Bid Q&A web page, located at:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

The Letting Pre-Bid Q&A web page for each project can be accessed by scrolling or filtering the dashboard using the controls on the left side to navigate to the project. Hover over the blue hyperlink of the project to view the Q&A and click on the link in the window that pops up.

Large files with relevant project documentation, such as Geotech reports and As-Built plans will continue to be provided on the following FTP site:

Index of /pub/txdot-info/Pre-Letting Responses/Houston District (state.tx.us) or

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

Unless otherwise shown on the plans, RAP generated by this project will become the property of the Contractor for use in the current construction project or in future projects.

If fixed features require, the governing slopes shown may vary between the limits shown and to the extent determined by the Engineer.

Superelevate the curves to match the existing surface.

Notify the Engineer immediately if discrepancies are discovered in the horizontal control or the benchmark data.

The following standard detail sheets are modified:

Modified Standards

EC(1)-16 (MOD)
ECL-12 HOU DIST (MOD)

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

The cost for materials, labor, and incidentals to provide for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.2.4 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Grade street intersections and median openings for surface drainage.

Tolls incurred by the Contractor are subsidiary to the various bid items.

Procure permits and licenses, which are to be issued by the City, County, or Municipal Utility District.

General: Roadway Illumination and Electrical

For roadway illumination and electrical items, use materials from pre-qualified producers as shown on the Construction Division (CST) of the Department's material producers list. Check the latest link on the Department's website for this list. The category/item is "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials found on this list.

Perform electrical work in conformance with the National Electrical Code (NEC) and the Department's standard sheets.

General: Traffic Signals

For traffic signal items, use materials from the Pre-Qualified Producers List (located at http://www.dot.state.tx.us/GSD/purchasing/supps.htm) and the materials pre-qualified for illumination and electrical items (located at http://ftp.dot.state.tx.us/pub/txdot-info/cmd/mpl/riaes.pdf) as shown on the Department's Material Producers List and the Roadway Illumination and Electrical Supplies List. Check the latest links on the Department's website for these lists. No substitutions will be allowed for materials found on these lists.

General: Site Management

Mark stations every 100 ft. and maintain the markings for the project duration. Remove the station markings at the completion of the project. This work is subsidiary to the various bid items.

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission will be granted to store materials on surfaces if no damage or discoloration will result.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the District Engineer.

Control the dust caused by construction operations. For sweeping the base material in preparation for laying asphalt and for sweeping the finished concrete pavement, use one of the following types of sweepers or approved equal:

Tricycle Type	**Truck Type - 4 Wheel**
Wayne Series 900	M-B Cruiser II
Elgin White Wing	Wayne Model 945
Elgin Pelican	Mobile TE-3
	Mobile TE-4
	Murphy 4042

General: Traffic Control and Construction

Full depth concrete repair (Item 361) will be performed after the milling of the existing asphalt and prior the installation of the proposed seal coat and asphalt overlay.

The seal coat (Item 316) will be covered with the Thin Overlay Mixture (TOM-F) (Item 3081) level-up prior to reopening to traffic each day. The roadway will not be opened to traffic until the TOM and work zone pavement markings are in place.

Schedule construction operations such that preparing individual items of work follows in close sequence to constructing storm drains in order to provide as little inconvenience as practical to the businesses and residents along the project.

Schedule work so that the base placement operations follow the subgrade work as closely as practical to reduce the hazard to the traveling public and to prevent undue delay caused by wet weather.

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of

planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or causes damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

Be aware that an operational Computerized Transportation Management System (CTMS) exists within the limits of this project and that the system must remain operational throughout construction. If the Contractor damages or causes damage to this system, repair such damage within 8 hours of occurrence at no cost to the Department. In the event of system damage, notify the Director of Traffic Management Systems at 713-881-3283 within one hour of occurrence. Failure of the Contractor to repair damage to the main fiber optic cable and CCTV cable trunk lines, which convey all corridor information to TranStar, will result in the Contractor being billed for the full cost of emergency repairs.

At least 72 hours before starting work, make arrangements for locating existing Department-owned above ground and underground fiber optic, communications, power, illumination, and traffic signal cabling and conduit. Do this by calling the Department's Houston District Traffic Signal Operations Office at 713-802-5662, or by e-mailing the Department's Houston District Traffic Signal Operations Office at: HOU-LocateRequest@txdot.gov, to schedule marking of underground lines on the ground. Use caution if working in these areas to avoid damaging or interfering with existing facilities.

Notify the Engineer at least 48 hours before constructing junction boxes at storm drain and utility intersections.

Install or remove poles and luminaires located near overhead or underground electrical lines using established industry and utility safety practices. Consult the appropriate utility company before beginning such work.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to the Department.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Perform electrical work in conformance with the National Electrical Code (NEC) and Department's standard sheets.

Before beginning any underground work, notify the City of Houston's Chief Inspector, Public Works and Engineering, to establish the locations of any existing electrical systems for lighting facilities within the limits of this project.

Item 5: Control of Work

Submit shop drawings electronically for the fabrication of items as documented in Table 1 below. Information and requirements for electronic submittals can be viewed in the "Guide to Electronic Shop Drawing Submittal" which can be accessed through the following web link, "Guide to Electronic Shop Drawing Submittal" to read , https://ftp.txdot.gov/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf
References to 11 in. x 17 in. sheets in individual specifications for structural items imply electronic CAD sheets.

Table 1

2014 Construction Specification Required Shop/Working Drawing Submittals - TxDOT Generated Plans

Spec Item No.'s	Product	Submittal Required	Approval Required (Y/N)	Contractor/ Fabricator P.E. Seal Required	Reviewing Party	Shop or Working Drawing (Note 1)
7.16.1&.2	Construction Load Analyses	Y	Y	Y	B	WD
400	Excavation and Backfill for Structures (cofferdams)	Y	N	Y	A	WD
403	Temporary Special Shoring	Y	N	Y	C	WD
420	Formwork/Falsework	Y	N	Y	A	WD
423	Retaining Walls, (calcs req'd.)	Y	Y	Y	C	SD
425	Optional Design Calculations (Prstrs Bms)	Y	Y	Y	B	SD
425	Prestr Concr Sheet Piling	Y	Y	N	B	SD
425	Prestr Concr Beams	Y	Y	N	B	SD
425	Prestr Concr Bent	Y	Y	N	B	SD
426	Post Tension Details	Y	Y	N	B	SD
434	Elastomeric Bearing Pads (All)	Y	Y	N	B	SD
441	Bridge Protective Assembly	Y	Y	N	B	SD
441	Misc Steel (various steel assemblies)	Y	Y	N	B	SD
441	Steel Pedestals (bridge raising)	Y	Y	N	B	SD
441	Steel Bearings	Y	Y	N	B	SD
441	Steel Bent	Y	Y	N	B	SD
441	Steel Diaphragms	Y	Y	N	B	SD
441	Steel Finger Joint	Y	Y	N	B	SD
441	Steel Plate Girder	Y	Y	N	B	SD
441	Steel Tub-Girders	Y	Y	N	B	SD
441	Erection Plans, including Falsework	Y	N	Y	A	WD
449	Sign Structure Anchor Bolts	Y	Y	N	T	SD
450	Railing	Y	Y	N	A	SD
462	Concrete Box Culvert	Y	Y	N	C	SD
462	Concrete Box Culvert (Alternate Designs Only,calcs reqd.)	Y	Y	Y	B	SD
464	Reinforced Concrete Pipe (Jack and Bore only; ONLY when requested)	Y	Y	Y	A	SD
465	Pre-cast Junction Boxes, Grates, and Inlets	Y	Y	N	A	SD
465	Pre-cast Junction Boxes, Grates, and Inlets (Alternate Designs Only, calcs req'd.)	Y	Y	Y	A	SD
466	Pre-cast Headwalls and Wingwalls	Y	Y	N	A	SD
467	Pre-cast Safety End Treatments	Y	Y	N	A	SD
495	Raising Existing Structure (calcs reqd.)	Y	Y	Y	B	SD
610	Roadway Illumination Supports (Non-Standard only, calcs reqd.)	Y	Y	Y	BRG	SD
613	High Mast Illumination Poles (Non-standard only, calcs reqd.)	Y	Y	Y	BRG	SD
627	Treated Timber Poles	Y	Y	N	T	SD
644	Special Non-Standard Supports (Bridge Mounts, Barrier Mounts, Etc.)	Y	Y	Y	T	SD
647	Large Roadside Sign Supports	Y	Y	Y	T	SD
650	Cantilever Sign Structure Supports - Alternate Design Calcs.	Y	Y	Y	T	SD
650	Sign Structures	Y	Y	N	T	SD
680	Installation of Highway Traffic Signals	Y	Y	N	T	SD
682	Vehicle and Pedestrian Signal Heads	Y	Y	N	T	SD
684	Traffic Signal Cables	Y	Y	N	T	SD
685	Roadside Flashing Beacon Assemblies	Y	Y	N	T	SD
686	Traffic Signal Pole Assemblies (Steel) (Non-Standard only)	Y	Y	Y	T	SD
687	Pedestal Pole Assemblies	Y	Y	N	T	SD
688	Detectors	Y	Y	N	A	SD
784	Repairing Steel Bridge Members	Y	Y	Y	B	WD
SS	Prestr Concr Crown Span	Y	Y	N	B	SD
SS	Sound Barrier Walls	Y	Y	Y	A	SD
SS	Camera Poles	Y	Y	Y	TMS	SD
SS	Pedestrian Bridge (Calcs req'd.)	Y	Y	Y	B	SD
SS	Screw-In Type Anchor Foundations	Y	Y	N	T	SD
SS	Fiber Optic/Communication Cable	Y	Y	N	TMS	SD
SS	Spread Spectrum Radios for Signals	Y	Y	N	T	SD
SS	VIVDS System for Signals	Y	Y	N	T	SD
SS	CTMS Equipment	Y	Y	N	TMS	SD

Notes:

1. Document flow for Working Drawings differs from Shop Drawings in that Working Drawings must be submitted to the Engineer rather than the Engineer of Record and they are for the information of the Engineer only; an approval stamp and distribution to all project offices is not required.

Key to Reviewing Party

A - Area Office	
Area Office	**Email Address**
West/Central Harris Area Office	HOU-WWCHAOShpDrwgs@txdot.gov
B - Houston Bridge Engineer	
Bridge Design (Houston TxDOT)	HOU-BrgShpDrwgs@txdot.gov
BRG - Austin Bridge Division	
Bridge Design (Austin TxDOT)	BRG_ShopPlanReview@txdot.gov
C - Construction Office	
Construction	HOU-ConstrShpDrwgs@txdot.gov
Laboratory	HOU-LabShpDrwgs@txdot.gov
T - Traffic Engineer	
Traffic Operations	HOU-TrfShpDrwgs@txdot.gov
TMS – Traffic Management System	
Computerized Traffic Management Systems (CTMS)	HOU-CTMSShpDrwgs@txdot.gov

Item 7: Legal Relations and Responsibilities

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

No significant traffic generator events have been identified.

Item 8: Prosecution and Progress

Working days will be computed and charged based on a 5-day workweek in accordance with Section 8.3.1.6, with nighttime work.

The maximum number of days the time charges on this contract may be suspended due to contractor mobilization, and material fabrication/accumulation or processing delays is 60 days. The Engineer and the Contractor may mutually agree, in writing, to decrease this maximum number of days.

A working day will be charged Monday through Friday, excluding national holidays, if the weather or other conditions permit the performance of the principal unit of work underway, as determined by the Engineer, regardless of material availability. Nighttime work that extends past midnight will be charged to the following day. Work on national holidays will not be permitted without written permission of the Engineer. If work requiring an Inspector to be present is performed on a national holiday, and weather and other conditions permit the performance of work for 8 hours between 9:00 p.m. and 5:00 a.m., a working day will be charged.

The Lane Closure Assessment Fee is $1,000.00 for IH 69 frontage road, and entrance and exit ramps. This fee applies to the Contractor for closures or obstructions that overlap into restricted

hour traffic for each hour or portion thereof, per lane, regardless of the length of lane closure or obstruction. For Restricted Hours subject to Lane Assessment Fee refer to the Item, “Barricades, Signs, and Traffic Handling.” The time increment for the Lane Closure Assessment fee for this project is one hour.

Item 104: Removing Concrete

Removing concrete curb is paid as a separate bid item if the existing pavement on which it rests is not removed at the same time.

Item 305: Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement

Unless otherwise shown on the plans, RAP generated by this project will become the property of the Contractor for use in the current construction project or in future projects.

Item 316: Seal Coat

Place seal coats only from May 1 to September 15, inclusive, unless written approval is obtained to extend the placement period if weather conditions warrant an extension.

The asphalt application rate shown on the “Basis of Estimate” is an average rate for calculating asphalt quantities. Vary the rate based on the pavement conditions and other factors such as the type and grade of aggregate used, weather, and traffic.
The Department will furnish the material under this Item at locations shown on the plans.

Allowable Asphalt Cements based on Average Daily Traffic (ADT) are shown below:

For ADT greater than 5000	ADT 1000 to 5000	ADT less than 1000
AC-20 XP	AC-15P	AC-10-2TR
AC-20-5TR	AC-20-5TR	AC-10 w/2% SBR
	AC-20-XP	AC-15P
	AC-10-2TR	

Item 354: Planing and Texturing Pavement

Unless otherwise shown on the plans, RAP generated by this project will become the property of the Contractor for use in the current construction project or in future projects.

Item 361: Repair of Concrete Pavement

For full depth repair, remove only the quantity of pavement replaceable during the daily allowable work schedule.

Remove loose sub-base material and replace it with concrete. Use a bondbreaker, such as a polyethylene sheet, at the interface between the replaced sub-base material and the new concrete pavement.

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Supply polyethylene fabric on the job site sufficient to cover the area of repair.

Do not place concrete if impending weather may result in rainfall or low temperatures that may impair the quality of the finished work.

Repair portions of the concrete pavement surfaces that are damaged while in a plastic state before those areas receive permanent pavement markings and open to traffic. Perform repairs that are structurally equivalent to and cosmetically uniform with adjacent undamaged areas. Do not repair by grouting onto the surface.

Ready mix concrete will be permitted if the equipment and construction methods can produce the desired results. Hand finishing will be permitted.

Perform saw cutting as shown on the plans in accordance with Section 360.4.10, "Sawing Joints." This saw cutting is subsidiary to this bid Item.

Item 465: Junction Boxes, Manholes, and Inlets

Manholes must be adjusted within tree (3) days of ACP overlay.

Saw cutting that is necessary for the performance of this item is subsidiary.

If required on the plans, build manholes and inlets to stage 1 construction, cover with temporary pavement, and complete in a later phase of construction. This temporary covering and pavement are subsidiary to the various bid items.

Construct manholes and inlets in graded areas, first to an elevation at least 4 in. above the top of the highest entering pipe and cover with a wooden cover. Complete the construction of such manholes and inlets to the finished elevation when completing the grading work for such manholes and inlets. Adjust the final elevation, if required, since this elevation is approximate.

Construct manholes and inlets in paved areas to an elevation so their temporary wooden covers are flush with the surface of the base material.

Do not leave excavations or trenches open overnight.

Item 502: Barricades, Signs, and Traffic Handling

Use a traffic control plan for handling traffic through the various phases of construction. Follow the phasing sequence unless otherwise agreed upon by the Area Engineer and the Project Manager. Ensure this plan conforms to the latest "Texas Manual on Uniform Traffic Control Devices" and the latest Barricade and Construction (BC) Standard Sheets. The latest versions of Work Zone Standard Sheets WZ (BTS-1) and WZ (BTS-2) are the traffic control plan for the signal installations.

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Submit changes to the traffic control plan to the Area Engineer. Provide a layout showing the construction phasing, signs, striping, and signalizations for changes to the original traffic control plan.

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning signs in accordance with the latest "Texas Manual on Uniform Traffic Control Devices" for typical construction layouts.

Cover work zone signs when work related to the signs is not in progress, or when any hazard related to the signs no longer exists.

Keep the delineation devices, signs, and pavement markings clean. This work is subsidiary to the Item, "Barricades, Signs, and Traffic Handling."

Erect temporary signs when exit ramps are closed or moved to new locations during construction.

If a section is not complete before the end of the workday, pull back the base material to the existing pavement edge on a 6H: 1V slope. Edge drop-offs during the hours of darkness are not permitted.

Before detouring traffic onto the mainlane shoulders, remove dirt, debris, vegetation, and other deleterious material from the surface of the shoulders. Appropriately sign the detour in an approved manner. This work is subsidiary to the various bid items.

Coordinate and schedule the work with the appropriate Metro representative if requiring access to the High Occupancy Vehicle lanes.

Cover or remove the permanent signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase.

Replace the overhead signs, informational signs, and exit signs to be removed, with temporary signs providing the correct information to the traveling public. Size the replacement signs and include them in the traffic control plan.

Do not mount signs on drums or barricades, except those listed in the latest Barricades and Construction standard sheets.

Use traffic cones for daytime work only. Replace the cones with plastic drums during nighttime hours.

Place positive barriers to protect drop-off conditions greater than 2 ft. within the clear zone that remain overnight.

Do not reduce the existing number of lanes open to traffic except as shown on the following time schedule:

One and Two Lane Closures on IH 69 Frontage Roads and Intersections

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Tuesday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Wednesday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00PM
Thursday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Friday	N/A	N/A	5:00AM – 9:00 PM
Saturday	N/A	N/A	N/A
Sunday	N/A	9:00 PM- 5:00 AM	N/A

Full Closure (Entrance and Exit Ramps)

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Monday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Tuesday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Wednesday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Thursday	N/A	9:00 PM- 5:00 AM	5:00AM – 9:00 PM
Friday	N/A	N/A	5:00AM – 9:00 PM
Saturday	N/A	N/A	N/A
Sunday	N/A	9:00 PM- 5:00 AM	N/A

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours Subject to Lane Assessment Fee
Friday	N/A	N/A	5:00AM – 9:00 PM
Saturday	N/A	N/A	N/A
Sunday	N/A	9:00 PM- 5:00 AM	N/A

The above times are approved for the traffic control conditions listed. The Area Engineer may approve other closure times if traffic counts warrant. The Area Engineer may reduce the above times for special events.

Law enforcement assistance will be required for this project and is expected to be required for major traffic control changes and lane closures. Coordinate with local law enforcement and arrange for law enforcement as directed or agreed by the Engineer. Before payment will be made, complete the "Daily Report on Law Enforcement Force Account Work" (Form 318),

provided by the Department and submit daily invoices that agree with this form for any day during the month in which approved services were provided.

Provide full-time, off-duty, uniformed, certified peace officers, as part of traffic control operations. The peace officers must be able to show proof of certification by the Texas Commission on Law Enforcement Officers Standards. The cost of the officers is paid for on a force account basis.

A minimum of 7 days in advance of any total closure, notify the Houston District Public Information Office of which roadways, ramps, intersections, or lanes will be closed, the dates they will remain closed, and when they will be opened again to traffic.

A minimum of 7 days in advance of any total closure, place a portable changeable message (PCM) sign at the location of each total closure which informs the traveling public of the details of the closure. Alternately, if the Traffic Control Plan provides a positive barrier at the location, a non-trailer mounted static message board sign behind the positive barrier may be used in place of a PCM.

Use Uneven Lane Signs (CW 8-11) during resurfacing operations for elevation differences between adjacent lanes of greater than 1 in.

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.

Item 506: Temporary Erosion, Sedimentation and Environmental Controls

The use of hay bales is not permitted as Storm Water Pollution Prevention Plan (SWP3) measures.

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. Since the disturbed area is less than 5 acres, a "Notice of Intent" (NOI) is not required.

Use appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. Remove and dispose of materials in compliance with State and Federal laws.

Before starting construction, review with the Engineer the SWP3 used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SWP3.

Schedule the seeding or sodding work as soon as possible. The project schedule provides for a vegetation management plan.

After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control.

Implement temporary and permanent erosion control measures to comply with the National Pollution Discharge Elimination System (NPDES) general permit under the Clean Water Act.

Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

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

An air-entraining admixture is not required.

For concrete curbs, use Grade 7 aggregate conforming to Section 421.2.6 of the Item, "Hydraulic Cement Concrete."

Item 585: Ride Quality for Pavement Surfaces

To eliminate the need for corrective action due to excessive deviations in the final surface layers, exercise caution to ensure satisfactory profile results in the intermediate paving layers (mixture).

Milling will not be allowed as a corrective action for excessive deviations in the final surface layer of hot-mix asphalt.

For concrete or asphalt curb and gutter sections or frontage roads, use Surface Test Type B and Pay Adjustment Schedule 2 except for the outside lane. Use Surface Test Type B and Pay Adjustment Schedule 3 for the outside lane.

Item 618: Conduit

When backfilling bore pits, ensure that the conduit is not damaged during installation or due to settling backfill material. Compact select backfill in 3 equal lifts to the bottom of the conduit; or if using sand, place it 2 in. above the conduit. Ensure backfill density is equal to that of the existing soil. Prevent material from entering the conduit.

Construct bore pits a minimum of 5 ft. from the edge of the base or pavement. Close the bore pit holes overnight.

Unless otherwise shown on the plans, install underground conduit a minimum of 24 in. deep. Install the conduit in accordance with the latest National Electrical Code (NEC) and applicable

Department standard sheets. Place conduit under driveways or roadways a minimum of 24 in. below the pavement surface.

If using casing to place bored conduit, the casing is subsidiary to the conduit.

If placing the conduit under existing pavement to reach the service poles, bore the conduit in place and extend it a minimum distance of 5 ft. beyond the edge of shoulder or the back of curb.

Where PVC, duct cable, and HDPE conduit 1 in. and larger is allowed and installed per Department standards, provide a PVC elbow in place of the galvanized rigid metal elbow required by the Electrical Details standards. Ensure the PVC elbow is of the same schedule rating as the conduit to which it is connected. Use only a flat, high tensile strength polyester fiber pull tape to pull conductors through the PVC conduit system.

Remove conductor and conduit to be abandoned to 1 ft. below the ground level. This work is subsidiary to the various bid items.

Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes as shown on standard sheet ED(4)-14. Mount the junction boxes flush (+ 0 in., - 1/2 in.) with the concrete surface of the concrete barrier.

Locate the underground utilities within the project limits. Provide the equipment necessary for locating these utilities, locate, and mark them before starting any excavation work in the area. This work is subsidiary to the various bid items. If the Contractor damages or cause damage to any existing underground utilities, repair such damage at no cost to the Department.

Ensure the interconnection of new equipment to the existing system does not interfere with the operation of the remaining system components. Ensure the system remains completely operational between the hours of 6:00 a.m. Monday and 12:00 a.m. (midnight) Saturday.

Do not interrupt system operation without coordinating with the Department's operations personnel at Houston Transtar at (713) 881-3285.

Perform work to be done on cables during weekends only.

Provide Liquid-Tight Flexible Metal (LTFM) conduit if the plans refer to flexible metal conduit. Do not use flexible metal conduit.

Unless otherwise shown on the plans, place conduit runs behind curbs at locations where curbs exist.

Use schedule 80 PVC conduit to house conductor runs under paved riprap, roadway, or driveways, unless otherwise shown on the plans.

Use Rigid Metal Conduit (RMC) for exposed conduit.

Before backfilling conduit trenches, place a detectable underground metalized mylar marking tape above the conduit and concrete encasement. Imprint the marking tape with, “TxDOT CONDUIT AND FIBER OPTIC CABLE SYSTEM. CALL (713) 802-5909 BEFORE PROCEEDING” every 18 in. Supplying and installing the marking tapes is subsidiary to the various bid items.

Conduit elbows and rigid metal extensions required when installing PVC conduit systems are subsidiary to the various bid items.

Install a continuous bare or green insulated copper wire No. 8 AWG or larger in every conduit throughout the electrical system in accordance with the Electrical Detail Standard Sheets, and the latest edition of the NEC.

Item 620: Electrical Conductors

Test each wire of each cable or conductor after installation. Incomplete circuits or damage to the wire or the cable are cause for immediate rejection of the entire cable being tested. Remove and replace the entire cable at no expense to the Department. Also test the replacement cable after installation.

When pulling cables or conductors through the conduit, do not exceed the manufacturer’s recommended pulling tensions. Lubricate the cables or conductors with a lubricant recommended by the cable manufacturer.

For both transformer and shoe-base type illumination poles, provide double-pole breakaway fuse holders as shown on the Department’s Construction Division (CST) material producers list. Check the latest link on the Department’s website for this list. The category is “Roadway Illumination and Electrical Supplies.” The fuse holder is shown on the list under Items 610 and 620. Provide 10 Amp time delay fuses.

Ensure that circuits test clear of faults, grounds, and open circuits.

Split bolt connectors are allowed only for splices on the grounding conductors.

For Roadside Flashing Beacon Assemblies (Item 685) and Pedestal Pole Assemblies (Item 687) within the project, provide single-pole breakaway disconnects as shown on the Construction Division (CST) material producers list. Check the latest link on the Department’s website for this list. The category is “Roadway Illumination and Electrical Supplies.” The fuse holder is shown on the list under Item 685. For underground (hot) conductors, install a breakaway connector with a dummy fuse (slug). Provide dummy fuse (slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).

For electrical licensing and electrical certification requirements for this project, see Item 7 of the Standard Specifications and any applicable special provisions to Item 7.

Item 624: Ground Boxes

The ground box locations are approximate. Alternate ground box locations may be used as directed, to avoid placing in sidewalks or driveways.

Ground metal ground box covers. Bond the ground box cover and ground conductors to a ground rod located in the ground box and to the system ground.

Ground the existing metal ground box covers as shown on the latest standard sheet ED (4)-14.

During construction and until project completion, provide personnel and equipment necessary to remove ground box lids for inspection. Provide this assistance within 24 hours of notification.

Construct concrete aprons in accordance with the latest standard sheet ED (4)-14. Make the depth of the concrete apron the same as the depth of the ground box, except for Type 1 and Type 2 ground boxes. For Type 1 or Type 2 ground boxes, construct the concrete apron in accordance with details shown on the “Ground Box Details Installations” standard.

Item 628: Electrical Services

Verify and coordinate the electrical service location with the engineering section of the appropriate utility district or company.

Identify the electrical service pole with an address number assigned by the Utility Service Provider. Provide 2-in. numerals visible from the highway. Provide numbers cut out aluminum figures nailed to wood poles or painted figures on steel poles or service cabinets.

Item 662: Work Zone Pavement Markings

At the end of each workday, mark roadways that remain open to traffic during construction operations with standard pavement markings, in accordance with the latest “Texas Manual on Uniform Traffic Control Devices.”

Do not use raised pavement markers as optional work zone pavement markings on final asphalt surfaces.

For transition lane lines and detour lane lines, use raised pavement markers as shown for solid lines on the latest Barricade and Construction standard sheet for “Work Zone Pavement Marking Details.”

Item 662: Work Zone Pavement Markings
Item 666: Reflectorized Pavement Markings
Item 668: Prefabricated Pavement Markings

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Use Type III glass beads for thermoplastic and multipolymer pavement markings.

Use a 0.100 in. (100 mil) thickness for thermoplastic pavement markings, measured to the top of the thermoplastic, not including the exposed glass beads.

Use a 0.022 in. (22 mil) thickness for multipolymer pavement markings, measured to the top of the multipolymer, not including the exposed glass beads.

For roadways with asphalt surfaces to be striped with work zone or permanent thermoplastic markings, the Contractor has the option to apply paint and beads markings for a maximum 30-day period until placing the thermoplastic markings, or until starting the succeeding phase of work on the striped area. Maintain the paint and beads markings, at no expense to the Department, until placing the thermoplastic markings or starting the succeeding phase of work on the striped area. The work zone markings, whether paint and beads or thermoplastic, are paid under the Item, "Work Zone Pavement Markings" and the markings are paid for only once for the given phase of construction.

If using paint and bead markings as described above, purchase the traffic paint from the open market.

If the Type II markings become dirty and require cleaning by washing, brushing, compressed air, or other approved methods before applying the Type I thermoplastic markings, this additional cleaning is subsidiary to the Item, "Reflectorized Pavement Markings."

Establish the alignment and layout for work zone striping and permanent striping.

Stripe all roadways before opening them to traffic.

Place pavement markings under these items in accordance with details shown on the plans, the latest "Texas Manual on Uniform Traffic Control Devices," or as directed.

When design details are not shown on the plans, provide pavement markings for arrows, words, and symbols conforming to the latest "Standard Highway Sign Designs for Texas" manual.

Place the pedestrian crosswalk pavement markings only after the pedestrian signals and push buttons are installed and operating.

Item 672: Raised Pavement Markers

If other operations are complete on the project and if the curing time period is not yet elapsed, the contract time will be suspended until the curing is done.

Before placing the raised pavement markers on concrete pavement, blast clean the surface using an abrasive-blasting medium. This work is subsidiary to the Item, "Raised Pavement Markers."

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Provide epoxy adhesive that is machine-mixed or nozzle-mixed and dispensed. Equip the machine or nozzle with a mechanism to ensure positive mix measurement control.

Item 677: Eliminating Existing Pavement Markings and Markers

Remove existing pavement markings on concrete or asphalt surfaces by flail milling or as directed.

Item 688: Vehicle Loop detectors

Provide a black tube loop detector wire as specified in the "International Municipal Signal Association, Inc." (IMSA) Specifications.

If the loop sealant supplied by the Contractor is not on the Department's pre-qualified product list, before applying the sealant provide a 5-gal.container of loop sealant for testing.

Item 3081: Thin Overlay Mixtures (TOM)

Place mixtures only when the air temperature is above 70°F.

Provide an asphalt binder PG 76-22. Substation of PG binder is not allowed.

Place mixture as the compacted lift thickness of one inch for TOM-F and one inch for TOM-C.

A hot-applied tack coat (TRAIL) will be applied prior to placing TOM-C surface, which is paid under Item 3081 (Tack Coat).

Provide 100% SAC-A aggregate for TOM-C surface. Blending is not allowed.

Do not use RAP or RAS in the mixture.

A Pave-IR system or Thermal camera system is mandatory for this project. The contractor must demonstrate that the mixture is being placed with minimum thermal segregation.

Provide a mixture which exceeds a minimum of 500 cycles in the Overlay Tester, Tex-248-F.

For breakdown rolling use two steel wheel rollers working in tandem without excessive breakage of aggregate and provide a smooth surface and uniform texture. Keep the rollers as close as possible to the lay down machine. Do not use pneumatic tire rollers. Use a steel wheel as the finish roller.

Water flow measurements as per test Method Tex-246-F is mandatory for setting rolling patterns. For TOM-C the water flow should be at least 4 minutes, adjust the rolling patterns if less than 4 minutes. The water flow shall not exceed 10 minutes to avoid excessive compaction.

WMA (Warm Mix Asphalt) is required when the plant to job haul distance is greater than 40 miles.

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When WMA is required no reduction in temperature for the PG grade of binder will be permitted (the WMA is a compaction aide).

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

A shadow vehicle with Truck Mounted Attenuators (TMAs) or Trailer Attenuators (TAs) is required as shown on the appropriate Traffic Control Plan (TCP) sheets. TMAs/TAs must meet the requirements of the Compliant Work Zone Traffic Control Device List.

Level 3 Compliant TMAs/TAs are required for this project.

A total of one (1) shadow vehicle with a TMA/TA is required for the work with the exception of Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

A total of three (3) shadow vehicles with a TMA/TA are required for Pavement Marking Operations. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

In addition to the shadow vehicles with TMAs/TAs that are specified as being required on the TCP layout sheets for this project, provide additional shadow vehicles with TMAs/TAs as shown on the TCP Standard sheets. The Contractor is responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs/TAs needed on the project.

Basis of Estimate

Item	Description	Limit and Rate	Unit
316	Seal Coat • Asphalt • Aggregate (Gr 4)	 0.32 Gal. / Sq. Yd. 1/130 Cu. Yd. / Sq. Yd.	 GAL CY

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0027-13-238 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY IH 69

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0027-13-238**			
		PROJECT ID		**A00130703**			
		COUNTY		**Harris**			
		HIGHWAY		**IH 69**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6021	REMOVING CONC (CURB)	LF	1,000.000		1,000.000	
	316-6017	ASPH (AC-20-5TR)	GAL	81,427.500		81,427.500	
	316-6434	AGGR (TY-PB GR-4 OR TY-PL GR-4 (SAC-B)	CY	1,957.300		1,957.300	
	354-6041	PLANE ASPH CONC PAV (1.5")	SY	254,461.000		254,461.000	
	361-6003	FULL - DEPTH REPAIR CRCP (9")	SY	800.000		800.000	
	438-6001	CLEANING AND SEALING EXISTING JOINTS	LF	10,000.000		10,000.000	
	465-6263	INLET (STG II)(TY C)	EA	7.000		7.000	
	479-6001	ADJUSTING MANHOLES	EA	30.000		30.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000		5.000	
	529-6022	CONC CURB (DOWEL) (TY II)	LF	1,000.000		1,000.000	
	662-6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	53,420.000		53,420.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	33,076.000		33,076.000	
	662-6005	WK ZN PAV MRK NON-REMOV (W)6"(BRK)	LF	26,710.000		26,710.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)	LF	16,538.000		16,538.000	
	662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	2,810.000		2,810.000	
	662-6017	WK ZN PAV MRK NON-REMOV (W)(ARROW)	EA	153.000		153.000	
	662-6018	WK ZN PAV MRK NON-REMOV (W)(DBL ARW)	EA	107.000		107.000	
	662-6019	WK ZN PAV MRK NON-REMOV (W)(ENTR GORE)	EA	36.000		36.000	
	662-6020	WK ZN PAV MRK NON-REMOV (W)(EXIT GORE)	EA	36.000		36.000	
	662-6026	WK ZN PAV MRK NON-REMOV (W)(UTURN ARW)	EA	3.000		3.000	
	662-6027	WK ZN PAV MRK NON-REMOV (W)(U-L ARR)	EA	23.000		23.000	
	662-6029	WK ZN PAV MRK NON-REMOV(W)(WORD)	EA	155.000		155.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	18,366.000		18,366.000	
	662-6037	WK ZN PAV MRK NON-REMOV (Y)6"(SLD)	LF	9,183.000		9,183.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	4,327.000		4,327.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	11,240.000		11,240.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	7,440.000		7,440.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	102.000		102.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA	71.000		71.000	
	666-6063	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL)	EA	4.000		4.000	
	666-6066	REFL PAV MRK TY I(W)(U-LT ARW)(100 MIL)	EA	15.000		15.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	103.000		103.000	
	666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	12.000		12.000	
	666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	12.000		12.000	
	666-6162	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	LF	1,634.000		1,634.000	
	666-6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	31,285.000		31,285.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0027-13-238 **DISTRICT** Houston **COUNTY** Harris
HIGHWAY IH 69

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0027-13-238**			
		PROJECT ID		**A00130703**			
		COUNTY		**Harris**			
		HIGHWAY		**IH 69**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6212	REFL PAV MRK TY II (Y) 12" (SLD)	LF	425.000		425.000	
	666-6217	REFL PAV MRK TY II (Y) (MED NOSE)	EA	52.000		52.000	
	666-6225	PAVEMENT SEALER 6"	LF	17,632.000		17,632.000	
	666-6226	PAVEMENT SEALER 8"	LF	11,240.000		11,240.000	
	666-6230	PAVEMENT SEALER 24"	LF	7,440.000		7,440.000	
	666-6231	PAVEMENT SEALER (ARROW)	EA	102.000		102.000	
	666-6232	PAVEMENT SEALER (WORD)	EA	103.000		103.000	
	666-6234	PAVEMENT SEALER (DBL ARROW)	EA	71.000		71.000	
	666-6236	PAVEMENT SEALER (UTURN ARROW)	EA	3.000		3.000	
	666-6238	PAVEMENT SEALER (U-L ARROW)	EA	15.000		15.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	31,285.000		31,285.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	20,693.000		20,693.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	9,183.000		9,183.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	2,128.000		2,128.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	17,632.000		17,632.000	
	677-6003	ELIM EXT PAV MRK & MRKS (8")	LF	11,240.000		11,240.000	
	677-6005	ELIM EXT PAV MRK & MRKS (12")	LF	8,419.000		8,419.000	
	677-6007	ELIM EXT PAV MRK & MRKS (24")	LF	3,180.000		3,180.000	
	677-6008	ELIM EXT PAV MRK & MRKS (ARROW)	EA	106.000		106.000	
	677-6009	ELIM EXT PAV MRK & MRKS (DBL ARROW)	EA	86.000		86.000	
	677-6012	ELIM EXT PAV MRK & MRKS (WORD)	EA	103.000		103.000	
	677-6036	ELIM EXT PAV MRK & MRKS (UTURN ARROW)	EA	3.000		3.000	
	688-6004	VEH LP DETECT (SAWCUT)	LF	1,176.000		1,176.000	
	3081-6007	TOM-C PG76-22 SAC-A	TON	13,995.200		13,995.200	
	3081-6010	TOM-F PG76-22 SAC-B	TON	12,595.800		12,595.800	
	3081-6015	TACK COAT	GAL	13,740.900		13,740.900	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	212.000		212.000	
	6185-6002	TMA (STATIONARY)	DAY	140.000		140.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	156.000		156.000	
	08	CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	

SUMMARY OF ROADWAYS QUANTITIES

LOCATION	104 6021	316 6017	316 6434	354 6041	361 6003	438 6001	465 6263	479 6001	529 6022	688 6004	3081 6007	3081 6010	3081 6015	6001 6001	6185 6002	6185 6005
	REMOVING CONC (CURB)	ASPH (AC-20-5TR)	AGGR (TY-PB GR-4 OR TY-PL GR-4 (SAC-B)	PLANE ASPH CONC PAV (1.5")	FULL-DEPTH REPAIR CRCP(9")	CLEANING AND SEALING EXISTING JOINTS	INLET (STG II) (TY C)	ADJUSTING MANHOLES	CONC CURB (DOWEL) (TY II)	VEH LP DETECT (SAWCUT)	TOM-C PG76-22 SAC-A	TOM-F PG76-22 SAC-B	TACK COAT	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LF	GAL	CY	SY	SY	LF	EA	EA	LF	LF	TON	TON	GAL	DAY	DAY	DAY
SHEET 1	200	9575.70	230.20	29924	100	1000	1	6	100		1645.80	1481.20	1615.90	106	10	12
SHEET 2	100	11739.50	282.20	36686	100	1500	1	4	150	147	2017.70	1816.00	1981.00		20	22
SHEET 3	100	11129.30	267.50	34779	100	1250	1	4	125	147	1912.80	1721.60	1878.10		20	22
SHEET 4	100	10792.30	259.40	33726	100	1250	1	3	125	147	1854.90	1669.40	1821.20		20	22
SHEET 5	100	14636.20	351.80	45738	100	1250	1	1	125	147	2515.60	2264.00	2469.90		20	22
SHEET 6	200	10125.40	243.40	31642	100	1250	1	2	125	147	1740.30	1566.30	1708.70		20	22
SHEET 7	100	11318.70	272.10	35371	100	1500	1	10	150	294	1945.40	1750.90	1910.00		20	22
SHEET 8	100	2110.40	50.70	6595	100	1000			100	147	362.70	326.50	361.10	106	10	12
PROJECT TOTALS	1000	81427.50	1957.30	254461	800	10000	7	30	1000	1176	13995.20	12595.80	13740.90	212	140	156

SUMMARY OF QUANTITIES

TEXAS DEPARTMENT OF TRANSPORTATION

CONT	SECT	JOB	HIGHWAY
0027	13	238	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS		8

SUMMARY OF PAVEMENT MARKING QUANTITIES

LOCATION	662 6001	662 6004	662 6005	662 6008	662 6012	662 6017	662 6018	662 6019	662 6020	662 6026	662 6027	662 6029	662 6034	662 6037	666 6018	666 6036
	WK ZN PAV MRK NON-REMOV (W)4" (BRK)	WK ZN PAV MRK NON-REMOV (W)4" (SLD)	WK ZN PAV MRK NON-REMOV (W)6" (BRK)	WK ZN PAV MRK NON-REMOV (W)6" (SLD)	WK ZN PAV MRK NON-REMOV (W)8" (SLD)	WK ZN PAV MRK NON-REMOV (W) (ARROW)	WK ZN PAV MRK NON-REMOV (W) (DBL ARW)	WK ZN PAV MRK NON-REMOV (W) (ENTR GORE)	WK ZN PAV MRK NON-REMOV (W) (EXIT GORE)	WK ZN PAV MRK NON-REMOV (W) (UTURN ARW)	WK ZN PAV MRK NON-REMOV (W) (U-L ARR)	WK ZN PAV MRK NON-REMOV (W) (WORD)	WK ZN PAV MRK NON-REMOV (Y)4" (SLD)	WK ZN PAV MRK NON-REMOV (Y)6" (SLD)	REFL PAV MRK TY I (W)6" (DOT) (100MIL)	REFL PAV MRK TY I (W)8" (SLD) (100MIL)
	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF
SHEET 1	5154	4216	2577	2108				6	6				3400	1700		
SHEET 2	7390	5970	3695	2985				6	6				3556	1778		
SHEET 3	7240	5220	3620	2610				3	3				1500	750		
SHEET 4	7040	4730	3520	2365				3	3				1610	805		
SHEET 5	11980	4260	5990	2130				6	6				3200	1600		
SHEET 6	6940	3510	3470	1755				3	3				1690	845		
SHEET 7	7160	5070	3580	2535				6	6				1980	990		
SHEET 8	516	100	258	50				3	3				1430	715		
INTERSECTION					2810	153	107			3	23	155			4327	11240
PROJECT TOTALS	53420	33076	26710	16538	2810	153	107	36	36	3	23	155	18366	9183	4327	11240

LOCATION	666 6048	666 6054	666 6057	666 6063	666 6066	666 6078	666 6081	666 6084	666 6180	666 6162	666 6217	666 6212	666 6225	666 6226	666 6230	666 6231
	REFL PAV MRK TY I (W)24" (SLD) (100MIL)	REFL PAV MRK TY I (W) (ARROW) (100MIL)	REFL PAV MRK TY I(W) (DBL ARROW) (100MIL)	REFL PAV MRK TY I(W) (UTURN ARW) (100MIL)	REFL PAV MRK TY I(W) (U-LT ARW) (100 MIL)	REFL PAV MRK TY I (W) (WORD) (100MIL)	REFL PAV MRK TY I(W) (ENTR GORE) (100 MIL)	REFL PAV MRK TY I(W) (EXIT GORE) (100 MIL)	REFL PAV MRK TY II (W) 12" (SLD)	RE PV MRK TY I (BLACK)6" (SHADOW) (100MIL)	REFL PAV MRK TY II (Y) (MED NOSE)	REFL PAV MRK TY II (Y) 12" (SLD)	PAVEMENT SEALER 6"	PAVEMENT SEALER 8"	PAVEMENT SEALER 24"	PAVEMENT SEALER (ARROW)
	LF	EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	LF	LF	LF	LF	EA
SHEET 1										2577						
SHEET 2										3695						
SHEET 3										3620						
SHEET 4										3520						
SHEET 5										5990						
SHEET 6										3470						
SHEET 7										3580						
SHEET 8										258						
INTERSECTION	7440	102	71	4	15	103	12	12	1634	4575	52	425	17632	11240	7440	102
PROJECT TOTALS	7440	102	71	4	15	103	12	12	1634	31285	52	425	17632	11240	7440	102

LOCATION	666 6232	666 6234	666 6236	666 6238	666 6306	666 6309	666 6321	672 6010	677 6002	677 6003	677 6005	677 6007	677 6008	677 6009	677 6012	677 6036
	PAVEMENT SEALER (WORD)	PAVEMENT SEALER (DBL ARROW)	PAVEMENT SEALER (UTURN ARROW)	PAVEMENT SEALER (U-L ARROW)	RE PM W/RET REQ TY I (W)6" (BRK) (100MIL)	RE PM W/RET REQ TY I (W)6" (SLD) (100MIL)	RE PM W/RET REQ TY I (Y)6" (SLD) (100MIL)	REFL PAV MRKR TY II-C-R	ELIM EXT PAV MRK & MRKS (6")	ELIM EXT PAV MRK & MRKS (8")	ELIM EXT PAV MRK & MRKS (12")	ELIM EXT PAV MRK & MRKS (24")	ELIM EXT PAV MRK & MRKS (ARROW)	ELIM EXT PAV MRK & MRKS (DBL ARROW)	ELIM EXT PAV MRK & MRKS (WORD)	ELIM EXT PAV MRK & MRKS (UTURN ARROW)
	EA	EA	EA	EA	LF	LF	LF	EA	LF	LF	LF	LF	EA	EA	EA	EA
SHEET 1					2577	2108	1700	129								
SHEET 2					3695	2985	1778	185								
SHEET 3					3620	2610	750	181								
SHEET 4					3520	2365	805	176								
SHEET 5					5990	2130	1600	300								
SHEET 6					3470	1755	845	174								
SHEET 7					3580	2535	990	179								
SHEET 8					258	50	715	13								
INTERSECTION	103	71	3	15	4575	4155		791	17632	11240	8419	3180	106	86	103	3
PROJECT TOTALS	103	71	3	15	31285	20693	9183	2128	17632	11240	8419	3180	106	86	103	3

SUMMARY OF QUANTITIES

SHEET 2 OF 2

TEXAS DEPARTMENT OF TRANSPORTATION

CONT	SECT	JOB	HIGHWAY
0027	13	238	IH 69
DIST	COUNTY		SHEET NO.
HOU	HARRIS		9

FY	MSEC	HIGHWAY	RDBD	REFERENCE MARKERS BEGIN			REFERENCE MARKERS END			LEN	PTYPE	TEST MM/DD/YYYY	DIST TRAV	IRI(IN/MI) LEFT	IRI(IN/MI) RIGHT	IRI(IN/MI) SI
2023	08	IH0069	A1	0116	+	0.334	0116	+	0.434	0.1	07	9/12/2022		143	123	3.1
2023	08	IH0069	A1	0116	+	0.434	0116	+	0.534	0.1	07	9/12/2022		104	124	3.4
2023	08	IH0069	A1	0116	+	0.534	0116	+	0.634	0.1	07	9/12/2022		117	143	3.2
2023	08	IH0069	A1	0116	+	0.634	0116	+	0.734	0.1	07	9/12/2022		67	86	4.1
2023	08	IH0069	A1	0116	+	0.734	0116	+	0.834	0.1	07	9/12/2022		61	117	3.9
2023	08	IH0069	A1	0116	+	0.834	0116	+	0.934	0.1	07	9/12/2022		77	132	3.6
2023	08	IH0069	A1	0116	+	0.934	0117	+	0.048	0.1	07	9/12/2022		88	112	3.7
2023	08	IH0069	A1	0117	+	0.048	0117	+	0.148	0.1	07	9/12/2022		81	138	3.5
2023	08	IH0069	A1	0117	+	0.148	0117	+	0.248	0.1	07	9/12/2022		88	119	3.6
2023	08	IH0069	A1	0117	+	0.248	0117	+	0.348	0.1	07	9/12/2022		165	198	2.5
2023	08	IH0069	A1	0117	+	0.348	0117	+	0.448	0.1	07	9/12/2022		125	154	3.0
2023	08	IH0069	A1	0117	+	0.448	0117	+	0.548	0.1	07	9/12/2022		94	123	3.5
2023	08	IH0069	A1	0117	+	0.548	0117	+	0.648	0.1	07	9/12/2022		98	146	3.3
2023	08	IH0069	A1	0117	+	0.648	0117	+	0.748	0.1	07	9/12/2022		137	202	2.6
2023	08	IH0069	A1	0117	+	0.748	0117	+	0.848	0.1	07	9/12/2022		144	175	2.7
2023	08	IH0069	A1	0117	+	0.848	0117	+	0.948	0.1	07	9/12/2022		114	156	3.1
2023	08	IH0069	A1	0117	+	0.948	0118	+	0.043	0.1	07	9/12/2022		86	109	3.7
2023	08	IH0069	A1	0118	+	0.043	0118	+	0.143	0.1	07	9/12/2022		103	118	3.5
2023	08	IH0069	A1	0118	+	0.143	0118	+	0.243	0.1	07	9/12/2022		66	77	4.2
2023	08	IH0069	A1	0118	+	0.243	0118	+	0.343	0.1	07	9/12/2022		84	99	3.8
2023	08	IH0069	A1	0118	+	0.343	0118	+	0.443	0.1	07	9/12/2022		192	199	2.3
2023	08	IH0069	A1	0118	+	0.443	0118	+	0.543	0.1	07	9/12/2022		74	98	3.9
2023	08	IH0069	A1	0118	+	0.543	0118	+	0.643	0.1	07	9/12/2022		86	136	3.5
2023	08	IH0069	A1	0118	+	0.643	0118	+	0.743	0.1	07	9/12/2022		106	166	3.1
2023	08	IH0069	A1	0118	+	0.743	0118	+	0.843	0.1	07	9/12/2022		173	185	2.5
2023	08	IH0069	A1	0118	+	0.843	0118	+	0.943	0.1	07	9/12/2022		110	110	3.5
2023	08	IH0069	A1	0118	+	0.943	0119	+	0.039	0.1	07	9/12/2022		110	123	3.4
2023	08	IH0069	A1	0119	+	0.039	0119	+	0.139	0.1	07	9/12/2022		117	170	3.0
2023	08	IH0069	A1	0119	+	0.139	0119	+	0.239	0.1	07	9/12/2022		82	128	3.6
2023	08	IH0069	A1	0119	+	0.239	0119	+	0.339	0.1	07	9/12/2022		138	166	2.8
2023	08	IH0069	A1	0119	+	0.339	0119	+	0.439	0.1	07	9/12/2022		124	152	3.0
2023	08	IH0069	A1	0119	+	0.439	0119	+	0.539	0.1	07	9/12/2022		233	243	1.8
2023	08	IH0069	A1	0119	+	0.539	0119	+	0.639	0.1	07	9/12/2022		117	145	3.1
2023	08	IH0069	A1	0119	+	0.639	0119	+	0.739	0.1	07	9/12/2022		93	135	3.4
2023	08	IH0069	A1	0119	+	0.739	0119	+	0.839	0.1	07	9/12/2022		110	120	3.4
2023	08	IH0069	A1	0119	+	0.839	0119	+	0.939	0.1	07	9/12/2022		123	182	2.8
2023	08	IH0069	A1	0119	+	0.939	0120	+	0.033	0.1	07	9/12/2022		143	149	2.9

Pavement Types

Codes	Description
01	Continuously Reinforced Concrete Pavement
02	Jointed Reinforced Concrete Pavement
03	Jointed Plain Concrete Pavement
04	Thick Asphaltic Concrete Pavement (greater than 5-1/2”)
05	Intermediate Thickness Asphaltic Concrete Pavement (2-1/2” to 5-1/2”)
06	Thin Surfaced Flexible Base Pavement (less than 2-1/2”)
07	Asphalt Surfacing with Heavily Stabilized Base
08	Overlaid and/or Widened Old Concrete Pavement
09	Overlaid and/or Widened Old Flexible Pavement
10	Thin Surfaced Flexible Base Pavement (Surface Treatment-Seal Coat

IRI DATA

FED RD. DIV. NO.	State	Project Number			Sheet
6	Texas				10
DIST	**COUNTY**	**CONT.**	**SECT.**	**JOB**	**Highwy**
HOU	HARRIS	0027	13	238	IH 69 FRTG

2023	08	IH0069	A1	0120	+	0.033	0120	+	0.133	0.1	07	9/12/2022	103	125	3.4
2023	08	IH0069	A1	0120	+	0.133	0120	+	0.233	0.1	07	9/12/2022	97	146	3.3
2023	08	IH0069	A1	0120	+	0.233	0120	+	0.333	0.1	07	9/12/2022	128	165	2.9
2023	08	IH0069	A1	0120	+	0.333	0120	+	0.433	0.1	07	9/12/2022	123	178	2.9
2023	08	IH0069	A1	0120	+	0.433	0120	+	0.533	0.1	07	9/12/2022	113	164	3.0
2023	08	IH0069	A1	0120	+	0.533	0120	+	0.633	0.1	07	9/12/2022	108	141	3.2
2023	08	IH0069	A1	0120	+	0.633	0120	+	0.733	0.1	07	9/12/2022	106	157	3.1
2023	08	IH0069	A1	0120	+	0.733	0120	+	0.833	0.1	07	9/12/2022	82	120	3.6
2023	08	IH0069	A1	0120	+	0.833	0120	+	0.933	0.1	07	9/12/2022	107	138	3.3
2023	08	IH0069	A1	0120	+	0.933	0121	+	0.034	0.1	07	9/12/2022	93	137	3.4
2023	08	IH0069	A1	0121	+	0.034	0121	+	0.134	0.1	07	9/12/2022	185	213	2.2
2023	08	IH0069	A1	0121	+	0.134	0121	+	0.234	0.1	07	9/12/2022	140	189	2.7
2023	08	IH0069	A1	0121	+	0.234	0121	+	0.334	0.1	07	9/12/2022	130	177	2.8
2023	08	IH0069	A1	0121	+	0.334	0121	+	0.434	0.1	07	9/12/2022	104	115	3.5
2023	08	IH0069	A1	0121	+	0.434	0121	+	0.534	0.1	07	9/12/2022	108	121	3.4
2023	08	IH0069	A1	0121	+	0.534	0121	+	0.634	0.1	07	9/12/2022	114	143	3.2
2023	08	IH0069	A1	0121	+	0.634	0121	+	0.734	0.1	07	9/12/2022	121	161	3.0
2023	08	IH0069	A1	0121	+	0.734	0121	+	0.834	0.1	07	9/12/2022	279	222	1.7
2023	08	IH0069	A1	0121	+	0.834	0121	+	0.934	0.1	07	9/12/2022	192	188	2.4
2023	08	IH0069	A1	0121	+	0.934	0122	+	0.038	0.1	07	9/12/2022	114	116	3.4
2023	08	IH0069	A1	0122	+	0.038	0122	+	0.138	0.1	07	9/12/2022	140	143	3.0
2023	08	IH0069	A1	0122	+	0.138	0122	+	0.238	0.1	07	9/12/2022	97	129	3.4
2023	08	IH0069	A1	0122	+	0.238	0122	+	0.338	0.1	07	9/12/2022	129	156	3.0
2023	08	IH0069	A1	0122	+	0.338	0122	+	0.438	0.1	07	9/12/2022	105	128	3.4
2023	08	IH0069	A1	0122	+	0.438	0122	+	0.538	0.1	07	9/12/2022	108	125	3.4
2023	08	IH0069	A1	0122	+	0.538	0122	+	0.638	0.1	07	9/12/2022	136	132	3.1
2023	08	IH0069	A1	0122	+	0.638	0122	+	0.738	0.1	07	9/12/2022	207	194	2.2
2023	08	IH0069	A1	0122	+	0.738	0122	+	0.824	0.1	07	9/12/2022	128	167	2.9
2023	08	IH0069	X1	0116	+	0.265	0116	+	0.365	0.1	07	10/2/2022	174	159	2.6
2023	08	IH0069	X1	0116	+	0.365	0116	+	0.465	0.1	07	10/2/2022	90	116	3.6
2023	08	IH0069	X1	0116	+	0.465	0116	+	0.565	0.1	07	10/2/2022	127	120	3.3
2023	08	IH0069	X1	0116	+	0.565	0116	+	0.665	0.1	07	10/2/2022	85	104	3.8
2023	08	IH0069	X1	0116	+	0.665	0116	+	0.765	0.1	07	10/2/2022	95	108	3.6
2023	08	IH0069	X1	0116	+	0.765	0116	+	0.865	0.1	07	10/2/2022	74	79	4.1
2023	08	IH0069	X1	0116	+	0.865	0116	+	0.965	0.1	07	10/2/2022	111	116	3.4
2023	08	IH0069	X1	0116	+	0.965	0117	+	0.079	0.1	07	10/2/2022	80	93	3.9
2023	08	IH0069	X1	0117	+	0.079	0117	+	0.179	0.1	07	10/2/2022	96	100	3.7
2023	08	IH0069	X1	0117	+	0.179	0117	+	0.279	0.1	07	10/2/2022	155	201	2.5
2023	08	IH0069	X1	0117	+	0.279	0117	+	0.379	0.1	07	10/2/2022	137	219	2.5
2023	08	IH0069	X1	0117	+	0.379	0117	+	0.479	0.1	07	10/2/2022	97	166	3.1
2023	08	IH0069	X1	0117	+	0.479	0117	+	0.579	0.1	07	10/2/2022	116	183	2.9
2023	08	IH0069	X1	0117	+	0.579	0117	+	0.679	0.1	07	10/2/2022	127	187	2.8
2023	08	IH0069	X1	0117	+	0.679	0117	+	0.779	0.1	07	10/2/2022	129	170	2.9
2023	08	IH0069	X1	0117	+	0.779	0117	+	0.879	0.1	07	10/2/2022	87	151	3.3
2023	08	IH0069	X1	0117	+	0.879	0117	+	0.979	0.1	07	10/2/2022	101	113	3.5
2023	08	IH0069	X1	0117	+	0.979	0118	+	0.074	0.1	07	10/2/2022	81	103	3.8

IRI DATA

FED RD. DIV. NO.	State	Project Number			Sheet
6	Texas				11
DIST	**COUNTY**	**CONT.**	**SECT.**	**JOB**	**Highwy**
HOU	HARRIS	0027	13	238	IH 69 FRTG

2023	08	IH0069	X1	0118	+	0.074	0118	+	0.174	0.1	07	10/2/2022	71	99	3.9
2023	08	IH0069	X1	0118	+	0.174	0118	+	0.274	0.1	07	10/2/2022	73	108	3.8
2023	08	IH0069	X1	0118	+	0.274	0118	+	0.374	0.1	07	10/2/2022	163	206	2.4
2023	08	IH0069	X1	0118	+	0.374	0118	+	0.474	0.1	07	10/2/2022	81	107	3.8
2023	08	IH0069	X1	0118	+	0.474	0118	+	0.574	0.1	07	10/2/2022	120	85	3.6
2023	08	IH0069	X1	0118	+	0.574	0118	+	0.674	0.1	07	10/2/2022	137	181	2.7
2023	08	IH0069	X1	0118	+	0.674	0118	+	0.774	0.1	07	10/2/2022	133	150	3.0
2023	08	IH0069	X1	0118	+	0.774	0118	+	0.874	0.1	07	10/2/2022	104	139	3.3
2023	08	IH0069	X1	0118	+	0.874	0118	+	0.974	0.1	07	10/2/2022	114	152	3.1
2023	08	IH0069	X1	0118	+	0.974	0119	+	0.070	0.1	07	10/2/2022	125	132	3.2
2023	08	IH0069	X1	0119	+	0.070	0119	+	0.170	0.1	07	10/2/2022	128	141	3.1
2023	08	IH0069	X1	0119	+	0.170	0119	+	0.270	0.1	07	10/2/2022	126	130	3.2
2023	08	IH0069	X1	0119	+	0.270	0119	+	0.370	0.1	07	10/2/2022	82	104	3.8
2023	08	IH0069	X1	0119	+	0.370	0119	+	0.470	0.1	07	10/2/2022	111	125	3.4
2023	08	IH0069	X1	0119	+	0.470	0119	+	0.570	0.1	07	10/2/2022	158	217	2.4
2023	08	IH0069	X1	0119	+	0.570	0119	+	0.670	0.1	07	10/2/2022	90	93	3.8
2023	08	IH0069	X1	0119	+	0.670	0119	+	0.770	0.1	07	10/2/2022	91	113	3.6
2023	08	IH0069	X1	0119	+	0.770	0119	+	0.870	0.1	07	10/2/2022	160	197	2.5
2023	08	IH0069	X1	0119	+	0.870	0119	+	0.970	0.1	07	10/2/2022	137	159	2.9
2023	08	IH0069	X1	0119	+	0.970	0120	+	0.064	0.1	07	10/2/2022	103	103	3.6
2023	08	IH0069	X1	0120	+	0.064	0120	+	0.164	0.1	07	10/2/2022	87	88	3.9
2023	08	IH0069	X1	0120	+	0.164	0120	+	0.264	0.1	07	10/2/2022	78	122	3.7
2023	08	IH0069	X1	0120	+	0.264	0120	+	0.364	0.1	07	10/2/2022	100	119	3.5
2023	08	IH0069	X1	0120	+	0.364	0120	+	0.464	0.1	07	10/2/2022	105	166	3.1
2023	08	IH0069	X1	0120	+	0.464	0120	+	0.564	0.1	07	10/2/2022	103	116	3.5
2023	08	IH0069	X1	0120	+	0.564	0120	+	0.664	0.1	07	10/2/2022	100	110	3.6
2023	08	IH0069	X1	0120	+	0.664	0120	+	0.764	0.1	07	10/2/2022	107	116	3.5
2023	08	IH0069	X1	0120	+	0.764	0120	+	0.864	0.1	07	10/2/2022	97	139	3.4
2023	08	IH0069	X1	0120	+	0.864	0120	+	0.964	0.1	07	10/2/2022	98	167	3.1
2023	08	IH0069	X1	0120	+	0.964	0121	+	0.065	0.1	07	10/2/2022	132	159	2.9
2023	08	IH0069	X1	0121	+	0.065	0121	+	0.165	0.1	07	10/2/2022	119	116	3.4
2023	08	IH0069	X1	0121	+	0.165	0121	+	0.265	0.1	07	10/2/2022	91	133	3.5
2023	08	IH0069	X1	0121	+	0.265	0121	+	0.365	0.1	07	10/2/2022	75	92	4.0
2023	08	IH0069	X1	0121	+	0.365	0121	+	0.465	0.1	07	10/2/2022	103	89	3.7
2023	08	IH0069	X1	0121	+	0.465	0121	+	0.565	0.1	07	10/2/2022	95	120	3.5
2023	08	IH0069	X1	0121	+	0.565	0121	+	0.665	0.1	07	10/2/2022	98	108	3.6
2023	08	IH0069	X1	0121	+	0.665	0121	+	0.765	0.1	07	10/2/2022	329	357	0.9
2023	08	IH0069	X1	0121	+	0.765	0121	+	0.865	0.1	07	10/2/2022	100	121	3.5
2023	08	IH0069	X1	0121	+	0.865	0121	+	0.965	0.1	07	10/2/2022	60	101	4.0
2023	08	IH0069	X1	0121	+	0.965	0122	+	0.069	0.1	07	10/2/2022	89	147	3.4

IRI DATA

FED RD. DIV. NO.	State	Project Number			Sheet
6	Texas				12
DIST	**COUNTY**	**CONT.**	**SECT.**	**JOB**	**Highwy**
HOU	HARRIS	0027	13	238	IH 69 FRTG

2023	08	IH0069	X1	0122	+	0.069	0122	+	0.169	0.1	07	10/2/2022	82	132	3.5
2023	08	IH0069	X1	0122	+	0.169	0122	+	0.269	0.1	07	10/2/2022	182	224	2.2
2023	08	IH0069	X1	0122	+	0.269	0122	+	0.369	0.1	07	10/2/2022	106	144	3.2
2023	08	IH0069	X1	0122	+	0.369	0122	+	0.469	0.1	07	10/2/2022	113	164	3.0
2023	08	IH0069	X1	0122	+	0.469	0122	+	0.569	0.1	07	10/2/2022	118	191	2.8
2023	08	IH0069	X1	0122	+	0.569	0122	+	0.669	0.1	07	10/2/2022	91	153	3.3
2023	08	IH0069	X1	0122	+	0.669	0122	+	0.769	0.1	07	10/2/2022	205	208	2.2
2023	08	IH0069	X1	0122	+	0.769	0122	+	0.869	0.1	07	10/2/2022	250	220	1.9
2023	08	IH0069	X1	0122	+	0.869	0122	+	0.969	0.1	07	10/2/2022	204	139	2.6

IRI DATA

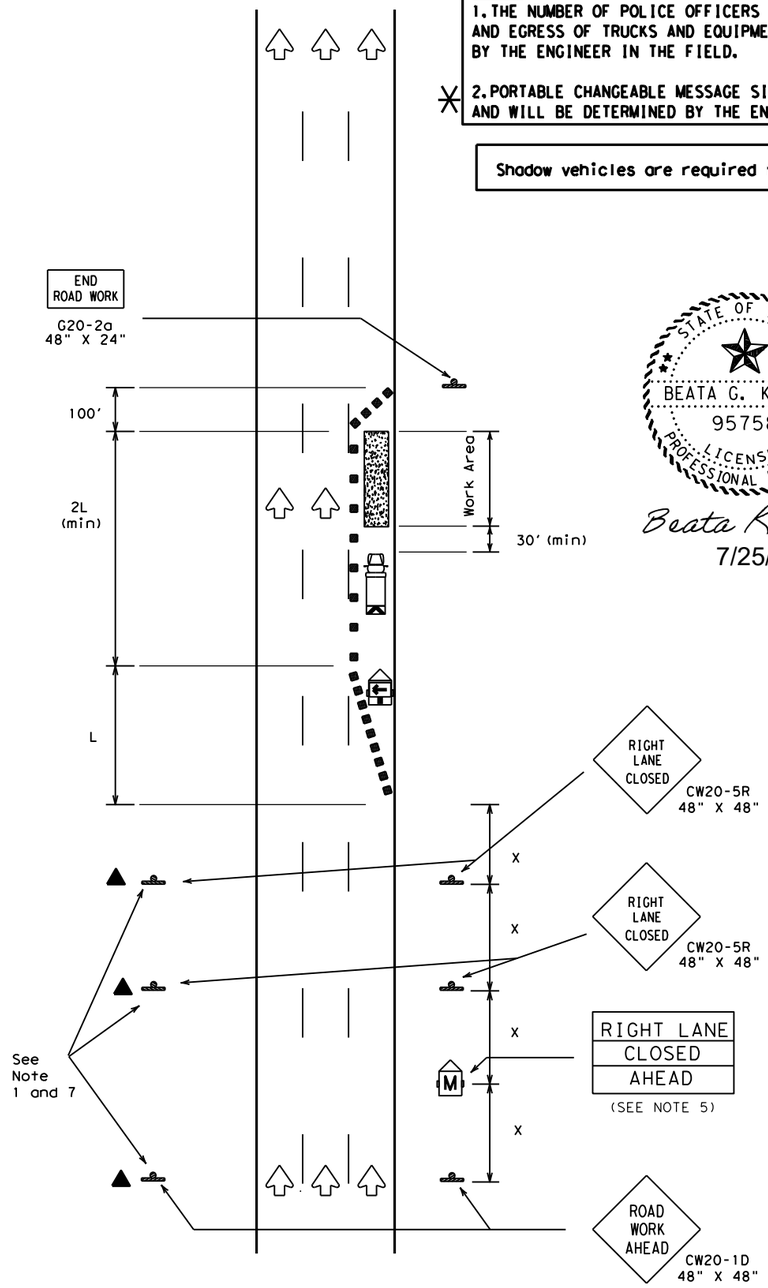
FED RD. DIV. NO.	State	Project Number			Sheet
6	Texas				13
DIST	**COUNTY**	**CONT.**	**SECT.**	**JOB**	**Highwy**
HOU	HARRIS	0027	13	238	IH 69 FRTG

NOTES:

1. THE NUMBER OF POLICE OFFICERS TO ASSIST WITH INGRESS AND EGRESS OF TRUCKS AND EQUIPMENT WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.

✳ 2. PORTABLE CHANGEABLE MESSAGE SIGN IS OPTIONAL AND WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.

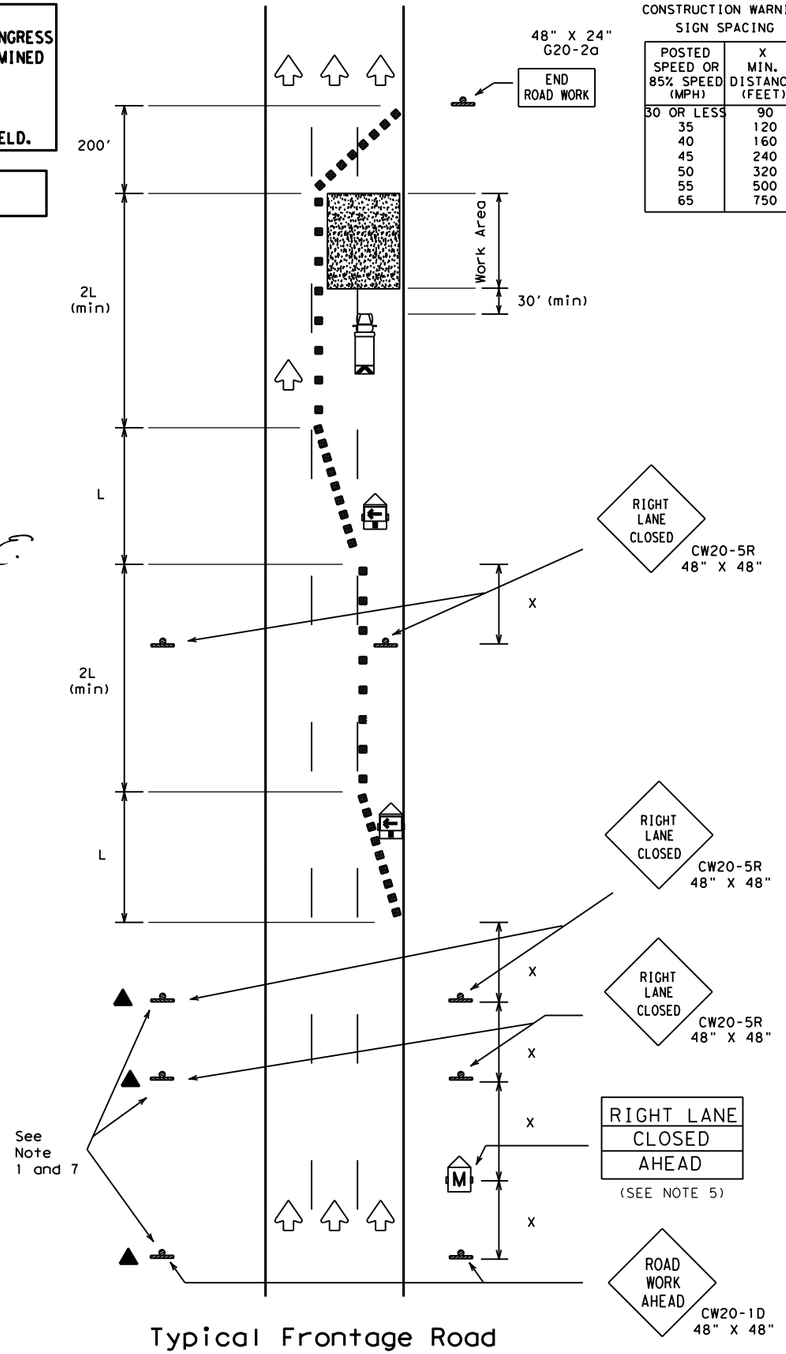
Shadow vehicles are required for lane closure.



Typical Frontage Road
One Lane Closure

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.
7/25/2023



Typical Frontage Road
Two Lane Closure

Typical Frontage Road

CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator
Trailer Mounted Flashing Arrow Panel (M) Portable Changeable Message Sign
Flagger Sign Post

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70		700'	770'	840'	70'	140'-115'

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

GENERAL NOTES:

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

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

TEXAS DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL PLAN
FRONTAGE ROAD LANE CLOSURE

DN: LR	CK: CW	DW: DN	CK: MT	MEG NO.:

REVISIONS

STATE DISTRICT	FEDERAL REGION	PROJECT NO.	SHEET
HOU	6		14

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
HARRIS	0027	13	238	IH 69 FRTG

SEE TABLE (B)
FOR CHANNELIZING
DEVICE SPACING

Truck Mounted Attenuator (TMA)

Heavy Work Vehicle

Trailer Mounted Flashing Arrow Panel

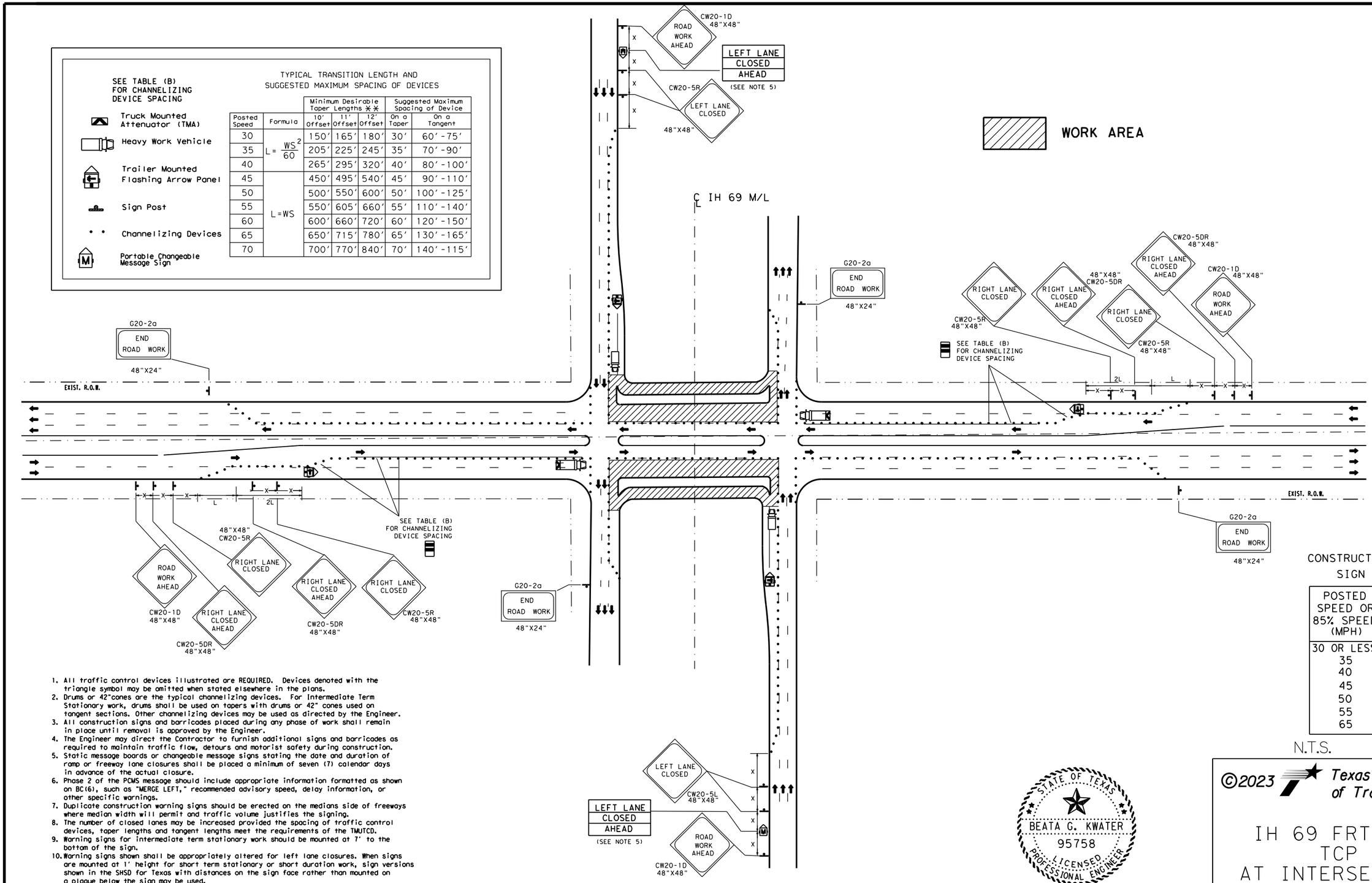
Sign Post

Channelizing Devices

Portable Changeable Message Sign

TYPICAL TRANSITION LENGTH AND
SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70		700'	770'	840'	70'	140'-115'



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CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

N.T.S.

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

11/28/2023

IH 69 FRTG RD TCP AT INTERSECTION

SHEET 1 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			15
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

SEE TABLE (B)
FOR CHANNELIZING
DEVICE SPACING

Truck Mounted Attenuator (TMA)

Heavy Work Vehicle

Trailer Mounted Flashing Arrow Panel

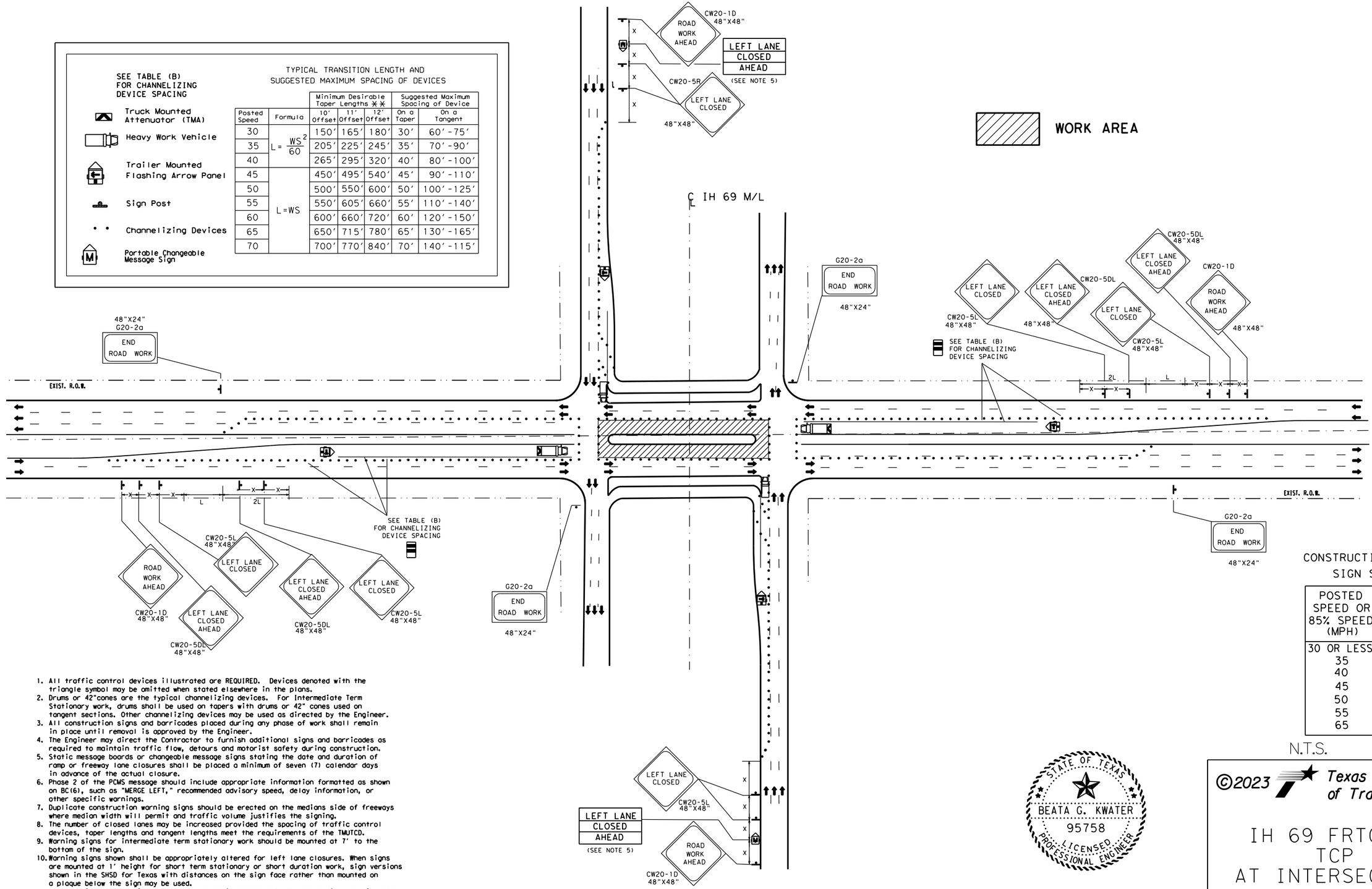
Sign Post

Channelizing Devices

Portable Changeable Message Sign

TYPICAL TRANSITION LENGTH AND
SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths * * 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70		700'	770'	840'	70'	140'-115'



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POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

N.T.S.

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED PROFESSIONAL ENGINEER

Beata Kwater, P.E.
11/28/2023

IH 69 FRTG RD TCP AT INTERSECTION

SHEET 2 OF 4

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			16
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

SEE TABLE (B)
FOR CHANNELIZING
DEVICE SPACING

Truck Mounted Attenuator (TMA)

Heavy Work Vehicle

Trailer Mounted Flashing Arrow Panel

Sign Post

Channelizing Devices

Portable Changeable Message Sign

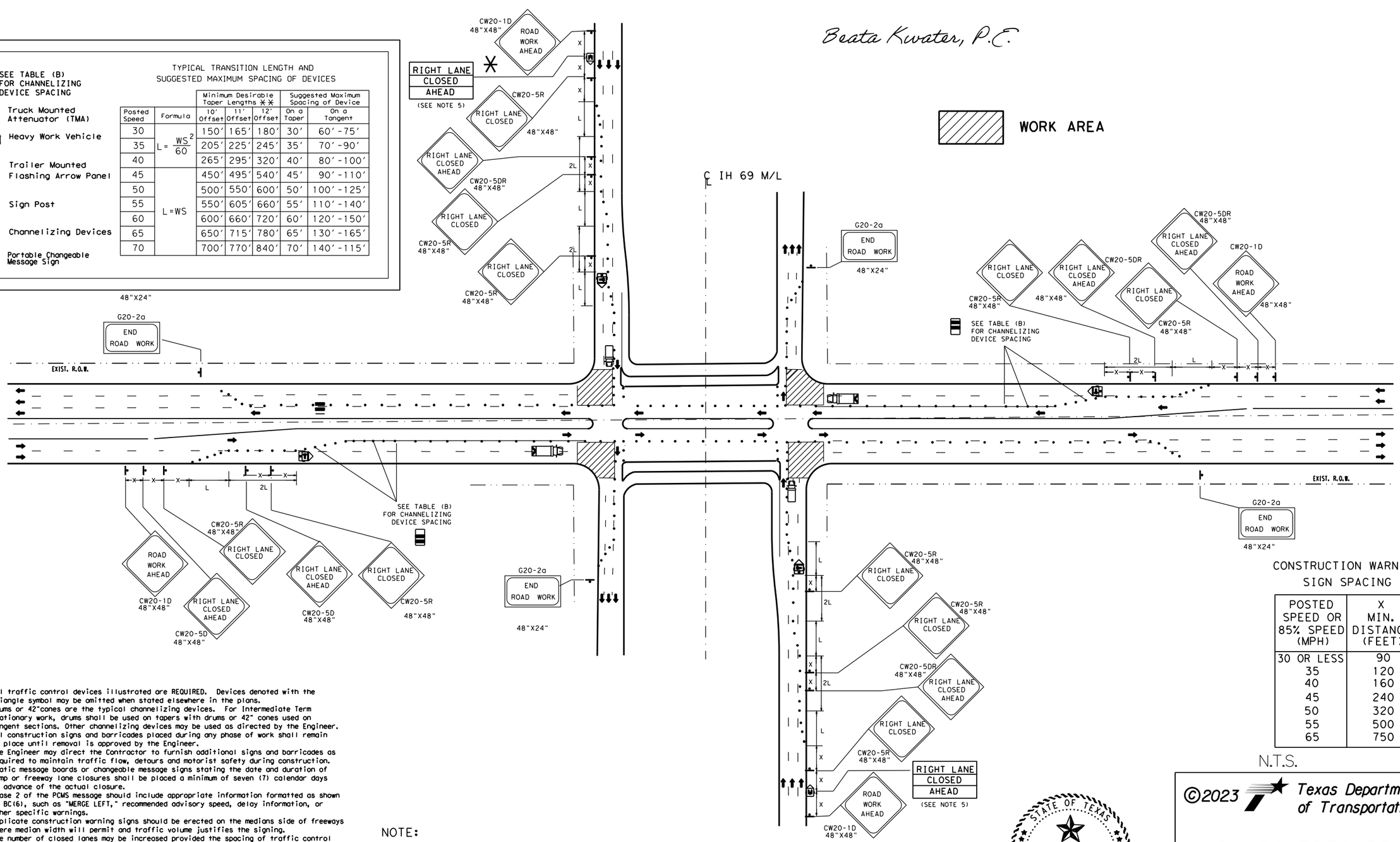
TYPICAL TRANSITION LENGTH AND
SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70		700'	770'	840'	70'	140'-115'

Beata Kwater, P.E.

WORK AREA

℄ IH 69 M/L



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7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

NOTE:

POLICE OFFICERS ARE REQUIRED TO DIRECT TRAFFIC THRU THE INTERSECTION.

✳ PORTABLE CHANGEABLE MESSAGE SIGN IS OPTIONAL AND WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.

FOR MORE DETAILS, SEE TYPICAL TRAFFIC CONTROL SHEETS.

CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

N.T.S.

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.

11/28/2023

IH 69 FRTG RD TCP AT INTERSECTION

SHEET 3 OF 4

FED.RD. DIV.NO.	PROJECT NO.	SHEET NO.
6		17

STATE	DIST.	COUNTY
TEXAS	12	HARRIS

CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

SEE TABLE (B)
FOR CHANNELIZING
DEVICE SPACING

Truck Mounted Attenuator (TMA)

Heavy Work Vehicle

Trailer Mounted Flashing Arrow Panel

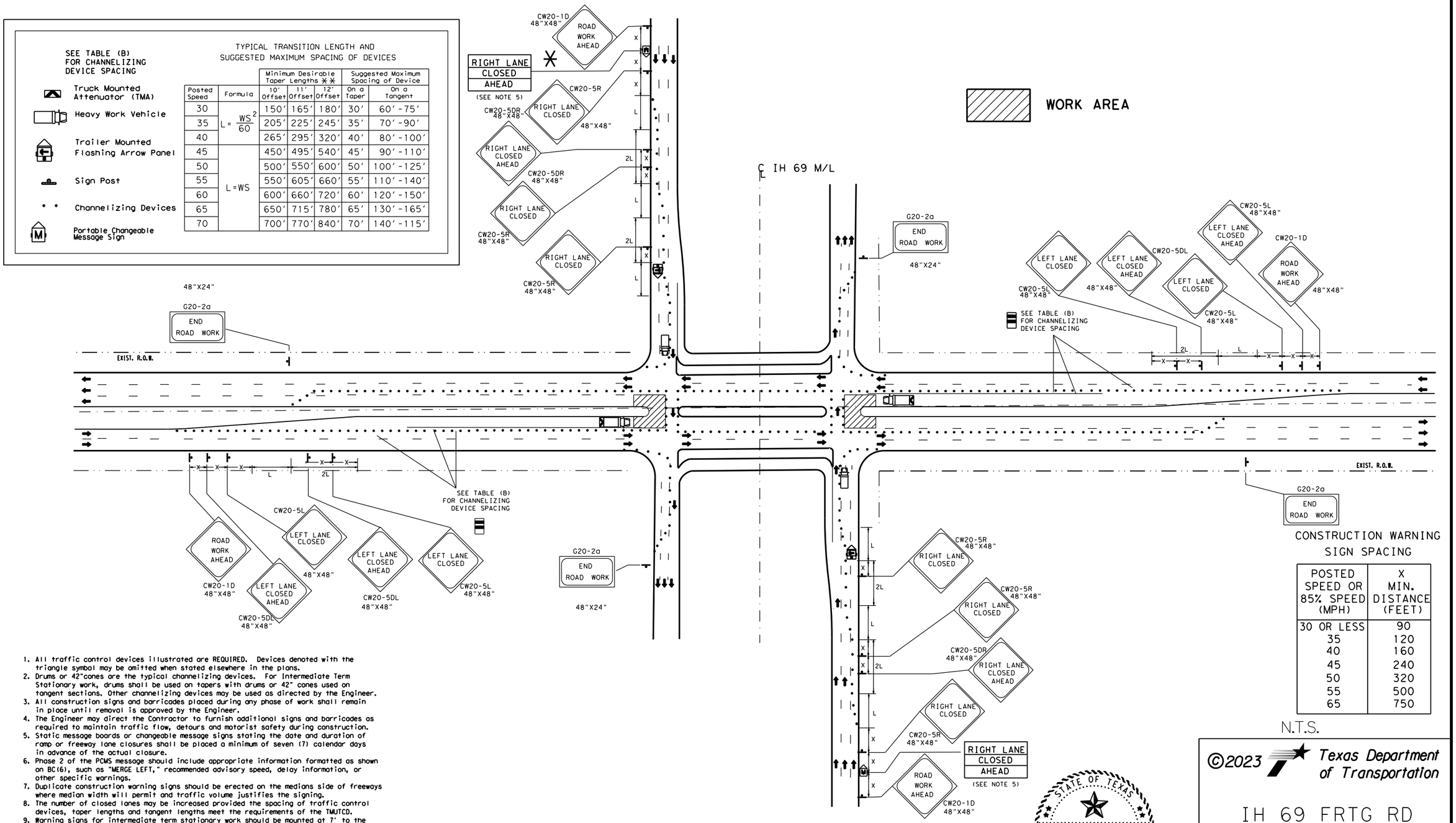
Sign Post

Channelizing Devices

Portable Changeable Message Sign

TYPICAL TRANSITION LENGTH AND
SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70		700'	770'	840'	70'	140'-115'



CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

N.T.S.

1. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

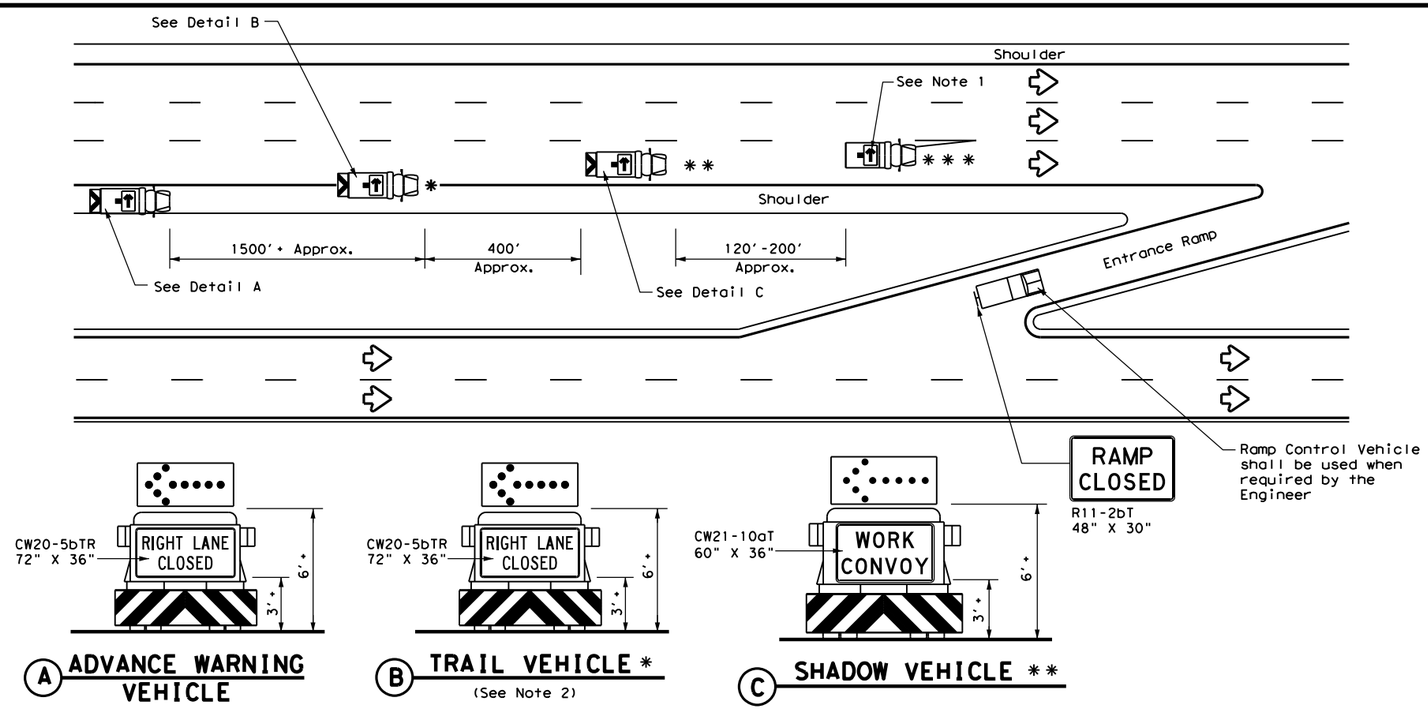
11/28/2023

IH 69 FRTG RD TCP AT INTERSECTION

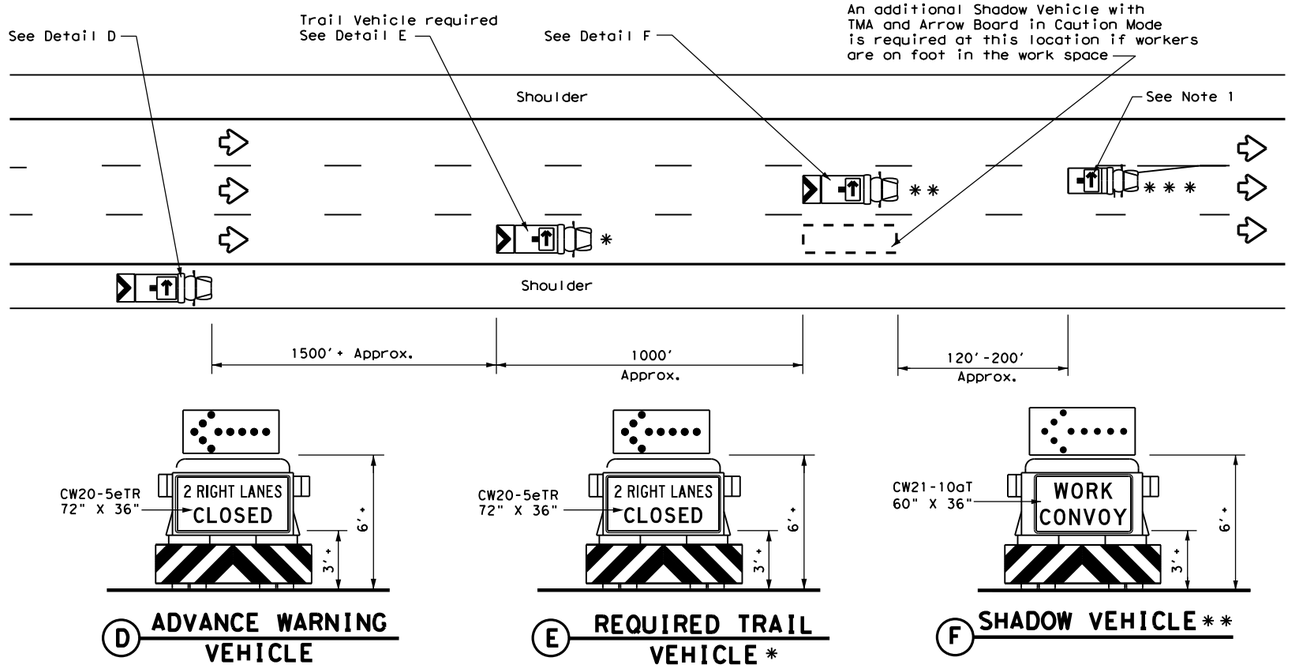
SHEET 4 OF 4

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			18
STATE	DIST.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

DATE:
FILE:



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



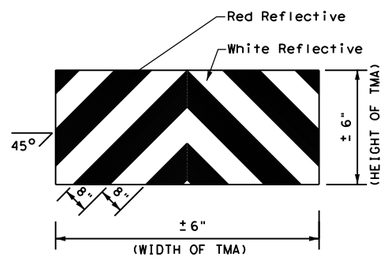
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

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



STRIPING FOR TMA

Texas Department of Transportation

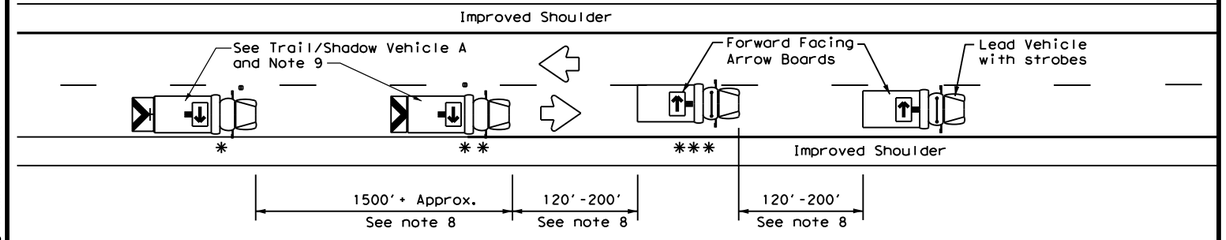
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

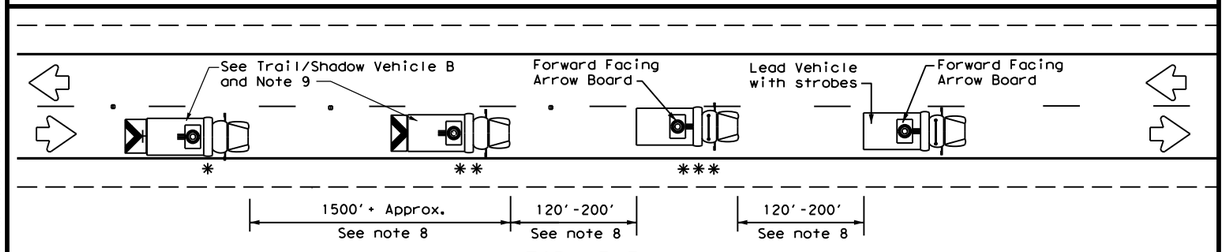
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		19

176



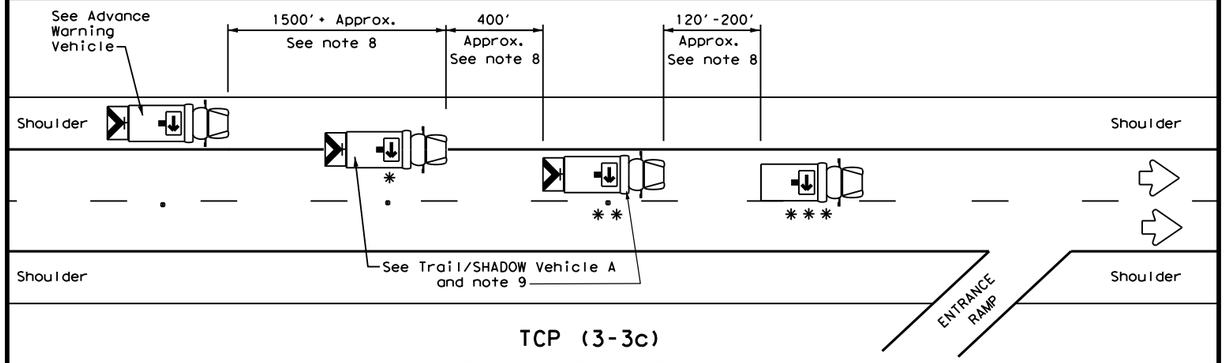
TCP (3-3a)

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



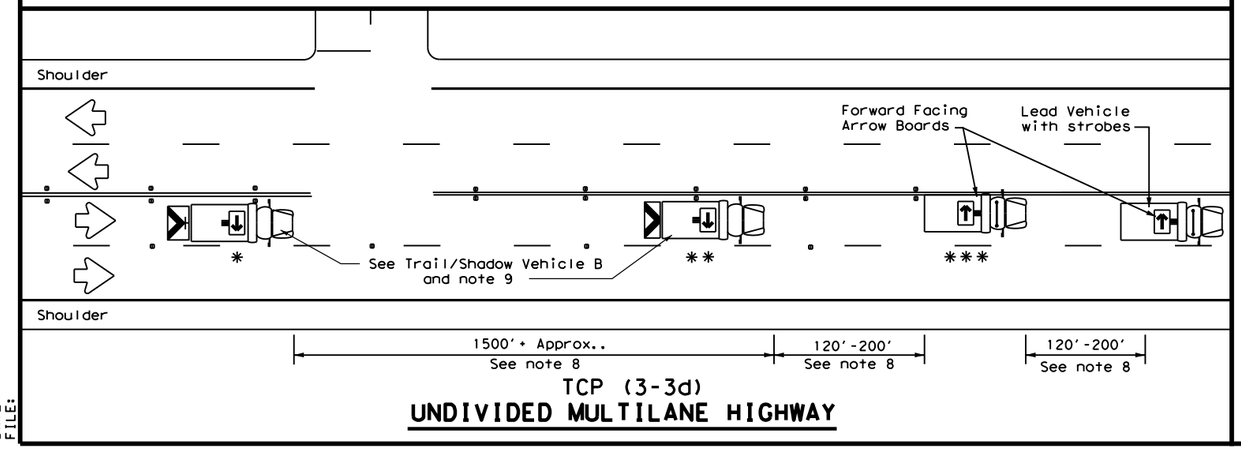
TCP (3-3b)

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



TCP (3-3c)

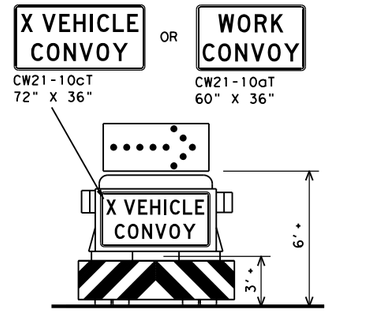
DIVIDED MULTILANE HIGHWAY



TCP (3-3d)

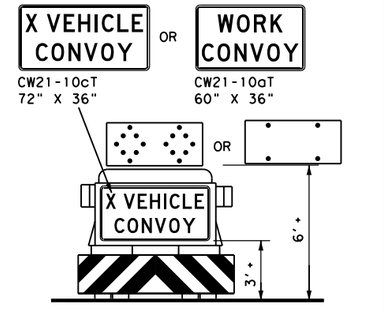
UNDIVIDED MULTILANE HIGHWAY

DATE:
FILE:



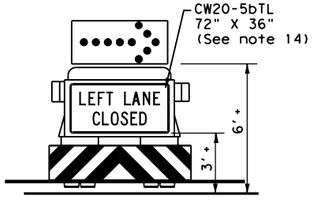
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

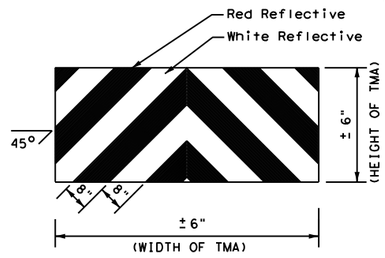


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

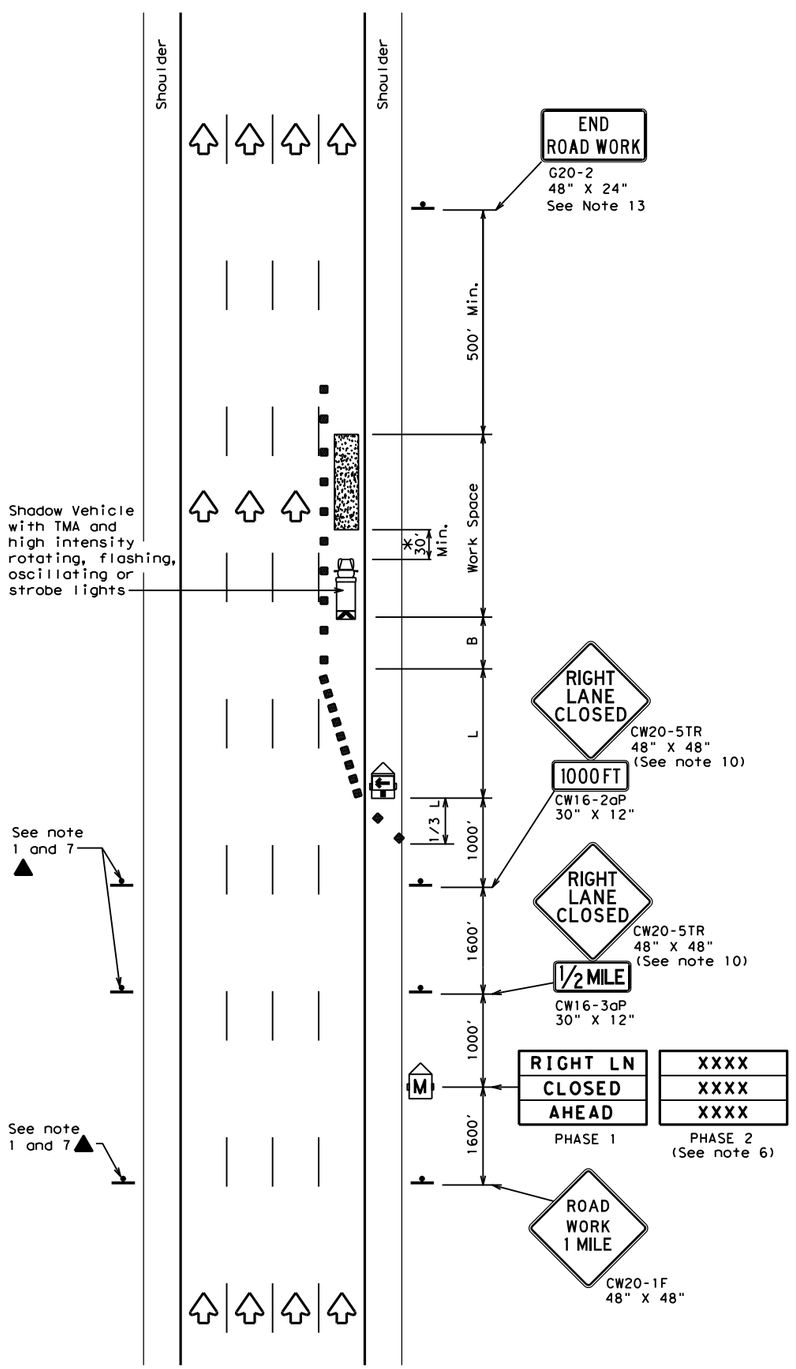
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 7-13	HOU	HARRIS		20
1-97 7-14				

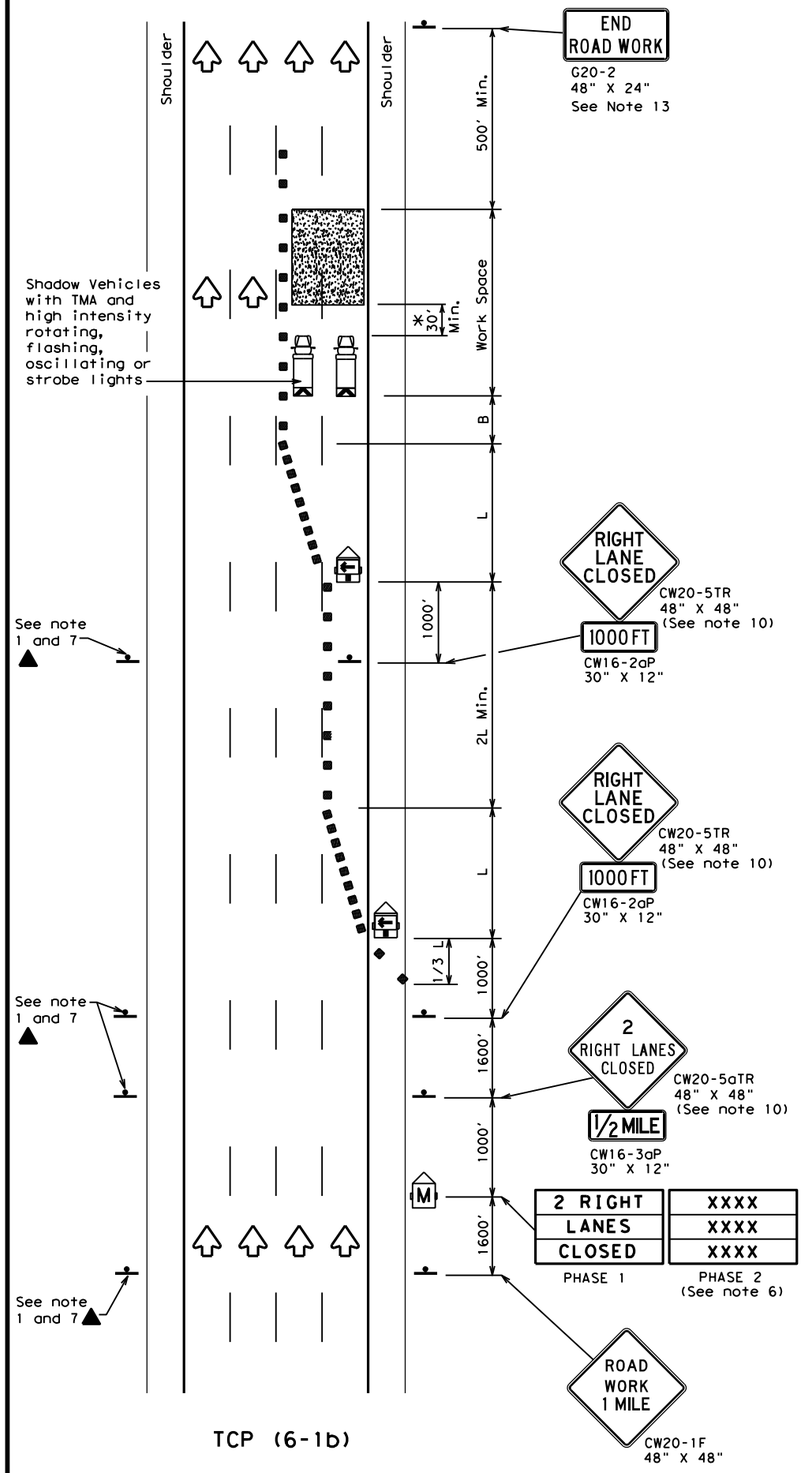
177

DATE:
FILE:



TCP (6-1a)

TYPICAL FREEWAY ONE LANE CLOSURE



TCP (6-1b)

TYPICAL FREEWAY TWO LANE CLOSURE

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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. Drums or 42"cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
3. All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
4. The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
5. Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
6. Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
7. Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
8. The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the TMUTCD.
9. Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
10. Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
11. When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
12. For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
13. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

* A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

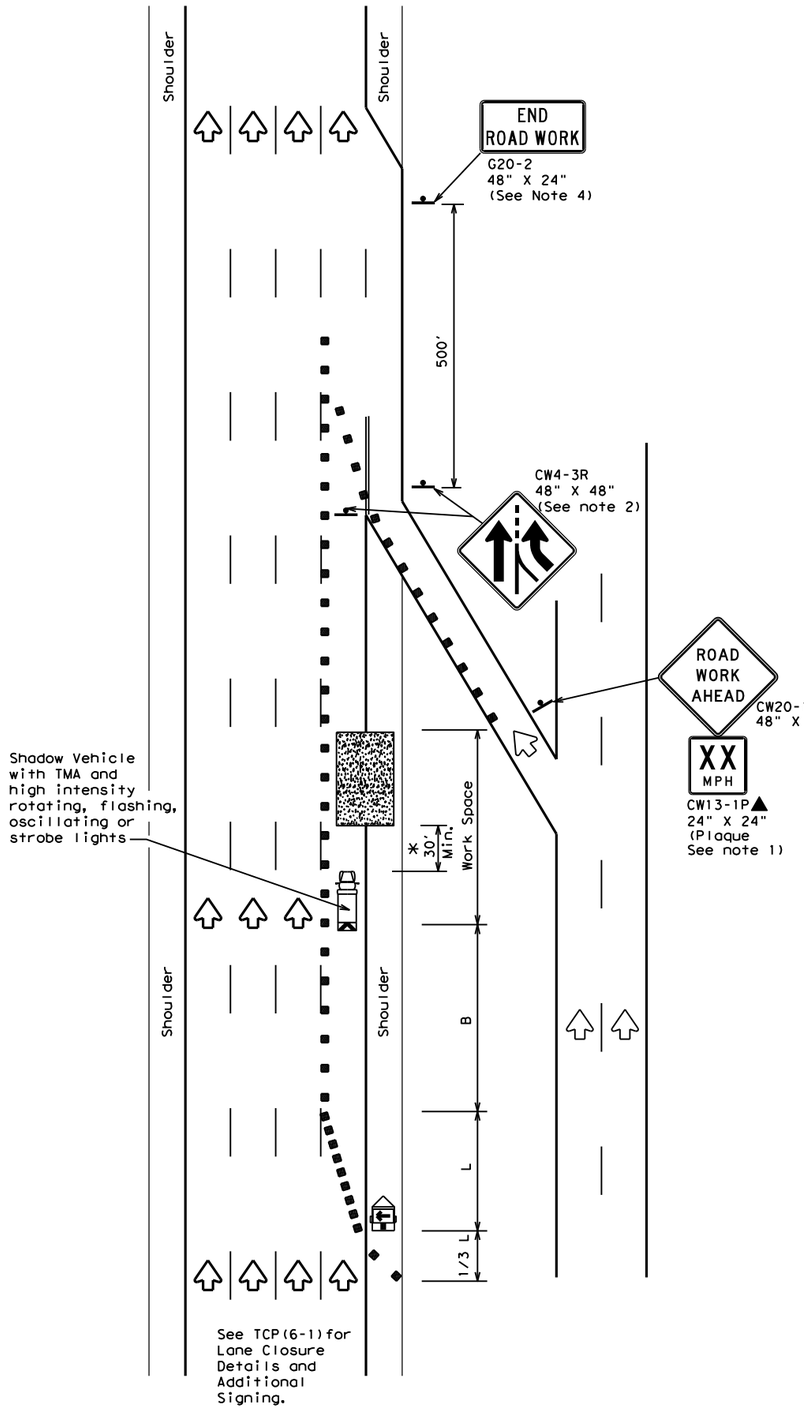
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP(6-1)-12

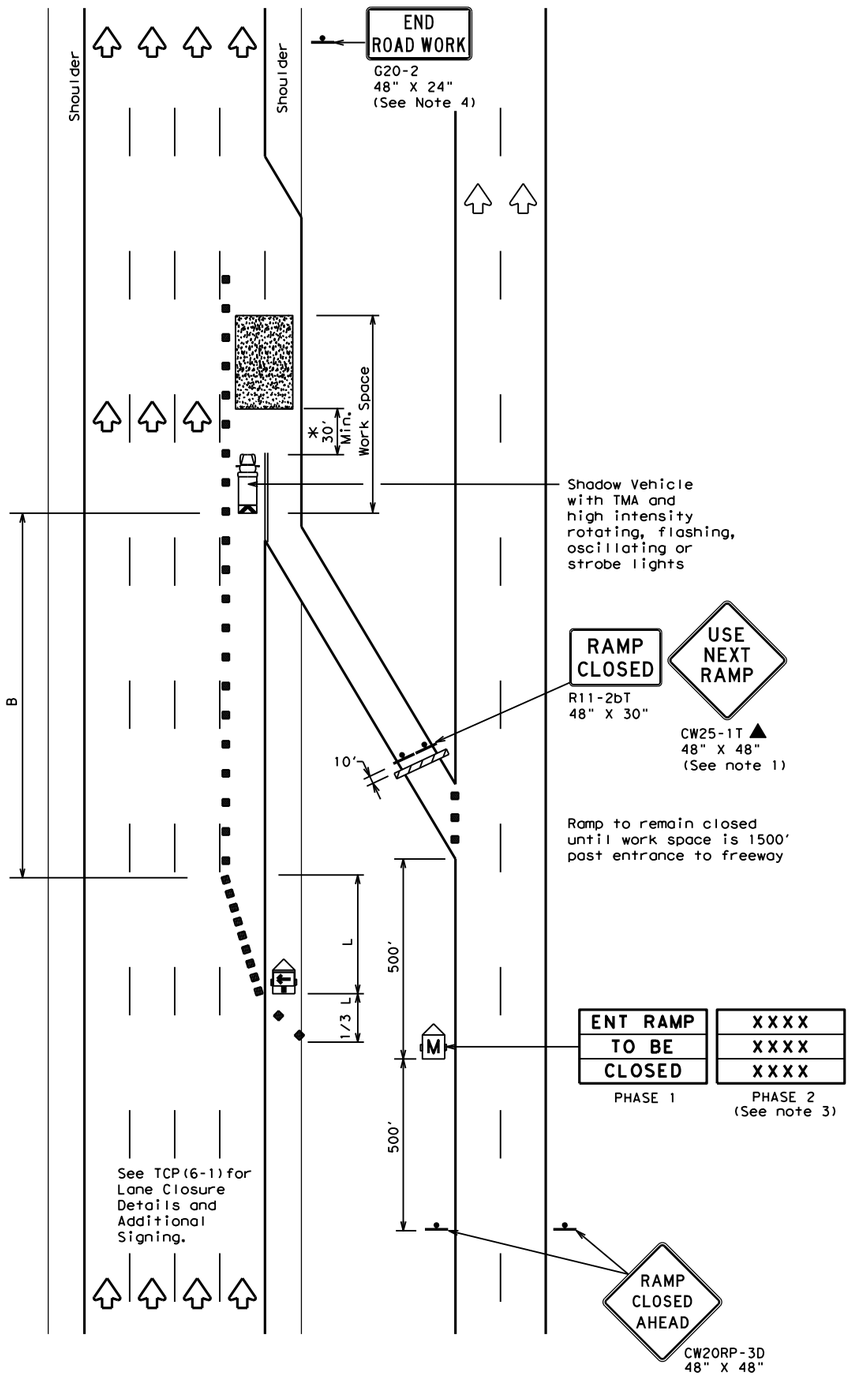
FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
8-12	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		21

DATE:
FILE:



TCP (6-2a)

ENTRANCE RAMP OPEN
WORK WITHIN 500' OF RAMP



TCP (6-2b)

ENTRANCE RAMP 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 "L" **			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. ADDED LANE Symbol (CW4-3) sign may be omitted when sign between ramp and mainlane can be seen from both roadways.
3. See "Advance Notice List" on BC(6) for recommended date and time formatting options for PCMS Phase 2 message.
4. The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

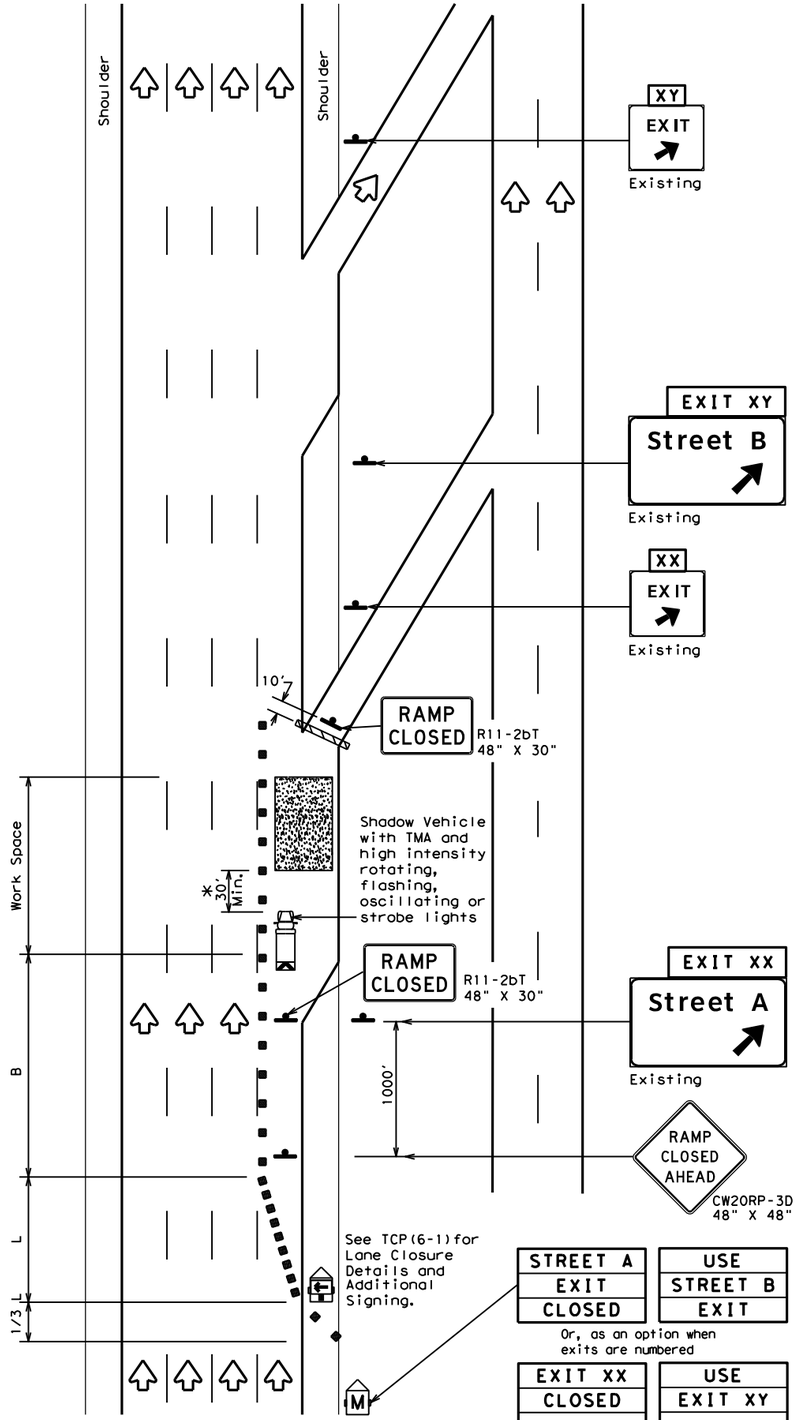
Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP(6-2)-12

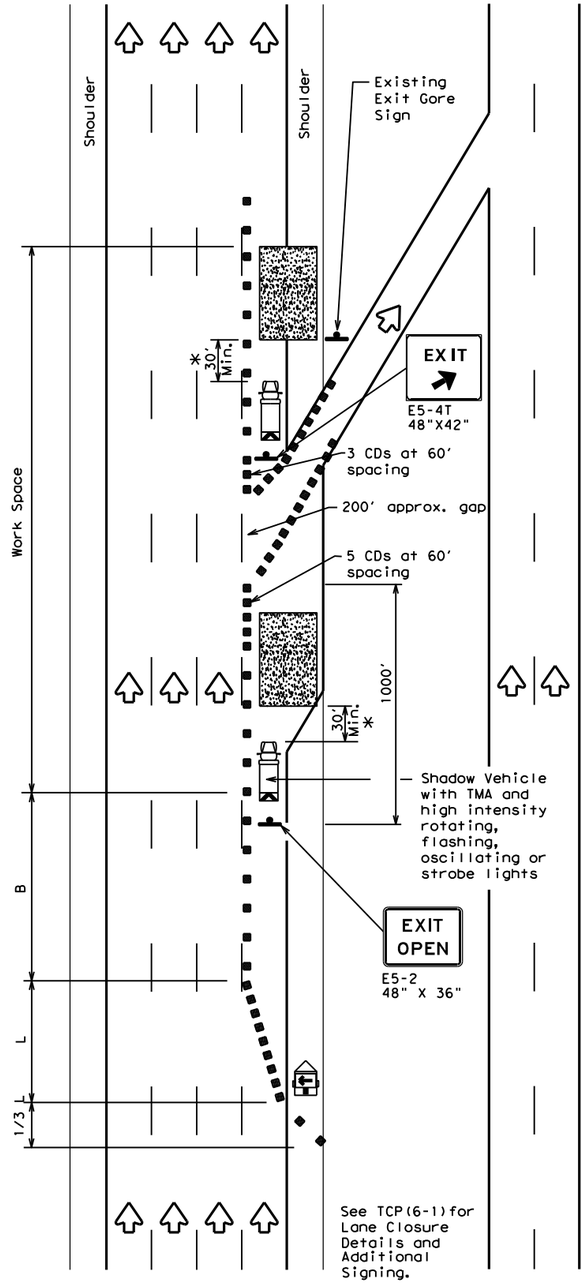
FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
1-97 8-98	DIST	COUNTY		SHEET NO.
4-98 8-12	HOU	HARRIS		22

202



TCP (6-4a)

EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)

EXIT RAMP OPEN

LEGEND

	Type 3 Barricade		Channelizing Devices (CDs)
	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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
2. See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP(6-4)-12

FILE: tcp6-4.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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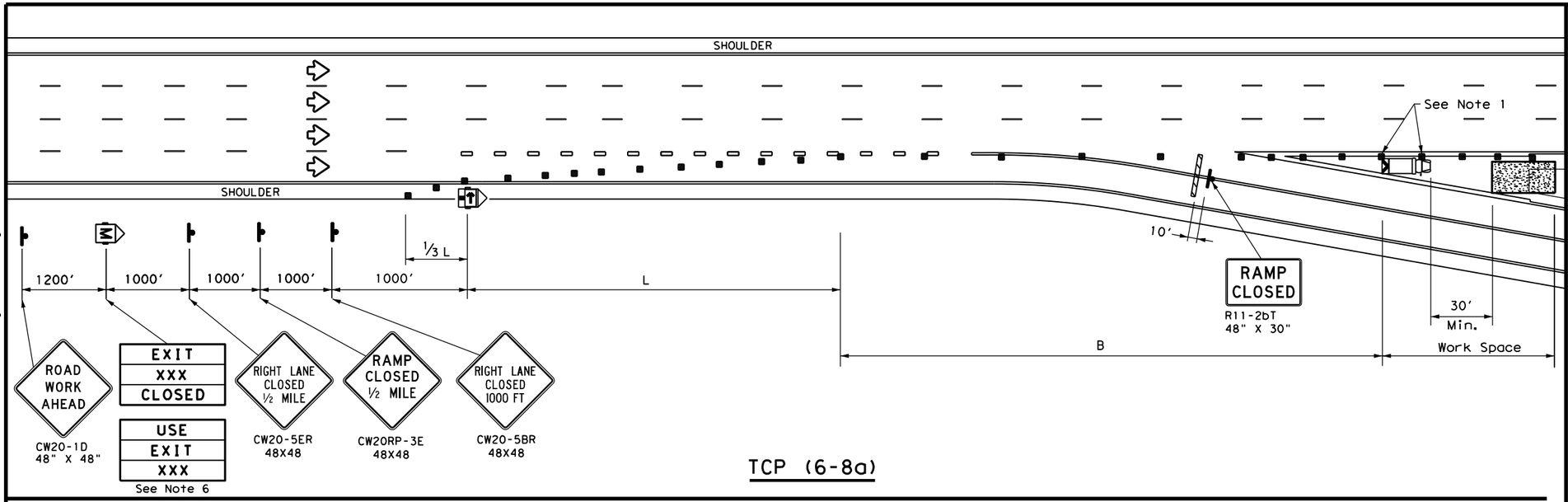
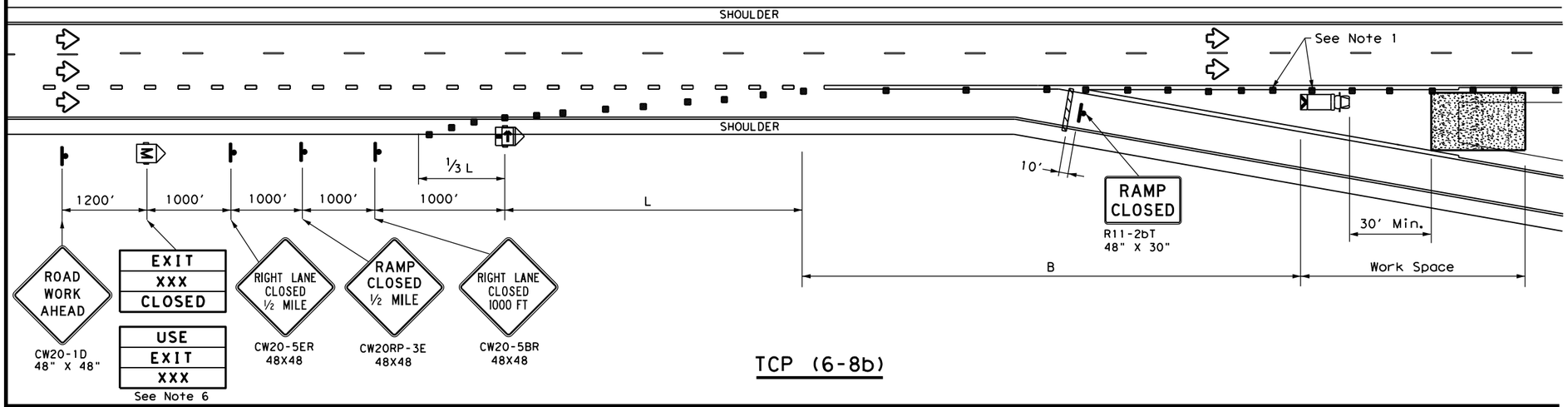
4-98 8-12	HOU	HARRIS		23

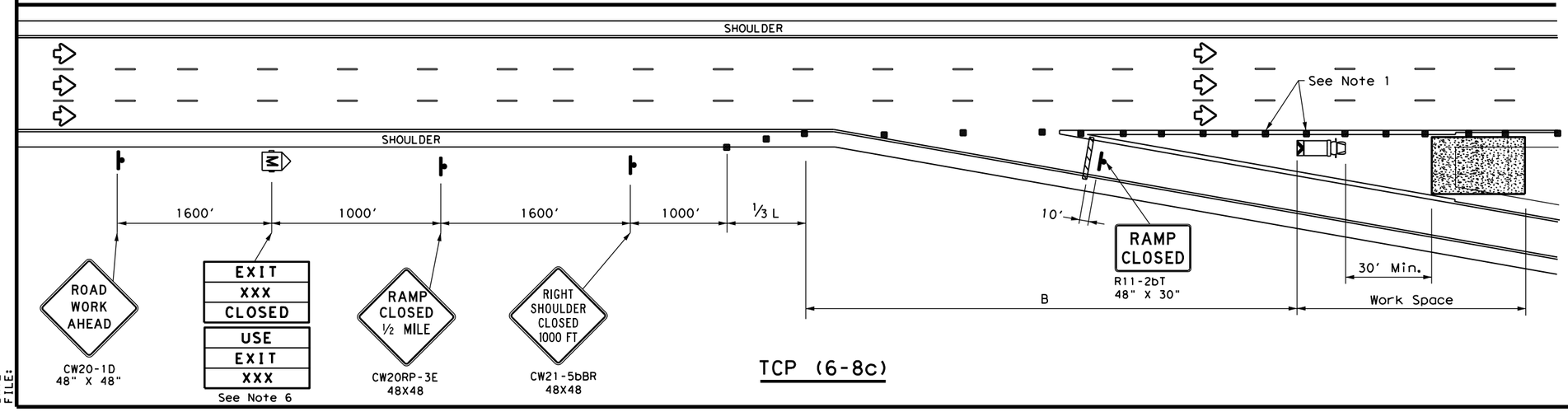
DATE:
FILE:



TCP (6-8a)



TCP (6-8b)



TCP (6-8c)

DATE:
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LEGEND

	Type 3 Barricade	▪▪	Channelizing Devices (CDs)
	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 "L" ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Suggested Longitudinal Buffer Space "B"
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

** 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. Place channelizing devices in the gore at 20' spacing.
2. See the Standard Highway Sign Design for Texas (SHSD) for sign details.
3. The PCMS may be omitted when a permanent DMS sign is available in an appropriate location to display a similar message as called for on the PCMS.
4. When it is determined that a through lane should be closed in addition to the exit ramp, refer to TCP(6-4) for traffic control details.
5. Truck mounted attenuator is required.
6. The PCMS may be omitted if replaced with a "RAMP CLOSED" AHEAD (CW20RP-3D) Sign.
7. Roadway ADT should be greater than 10,000.

Texas Department of Transportation

Traffic Operations Division Standard

WORK IN EXIT GORE FOR ADT GREATER THAN 10,000

TCP(6-8)-14

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REVISIONS	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
		HARRIS		23A

DATE:
FILE:

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

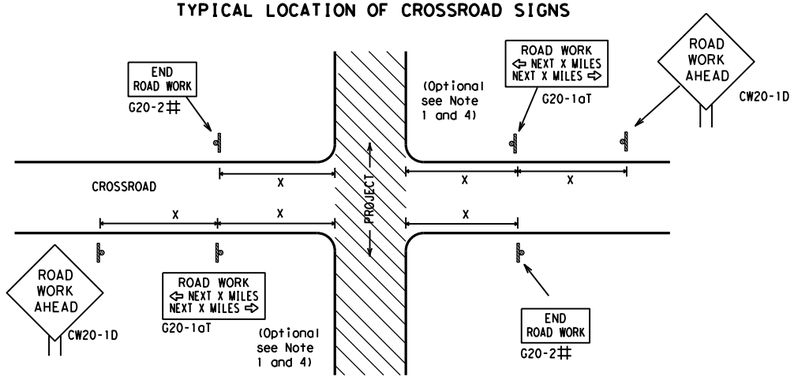
Traffic Safety Division Standard

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	0027	13	238	IH 69
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		24

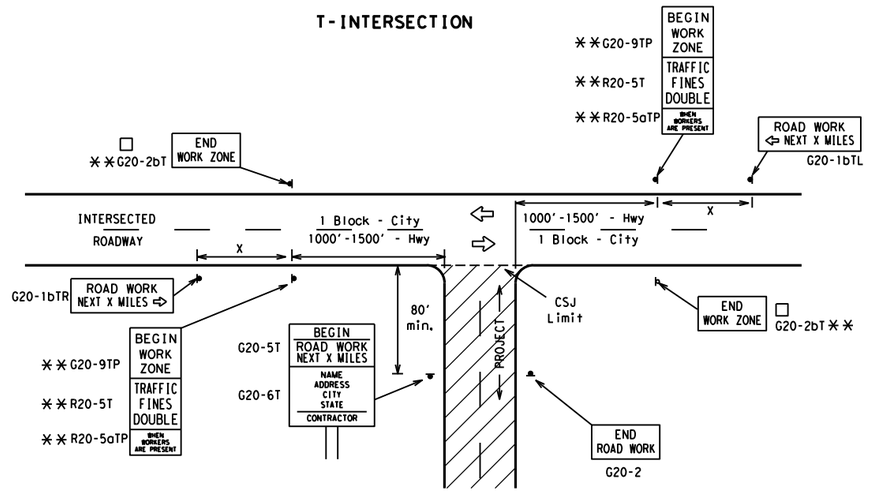
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

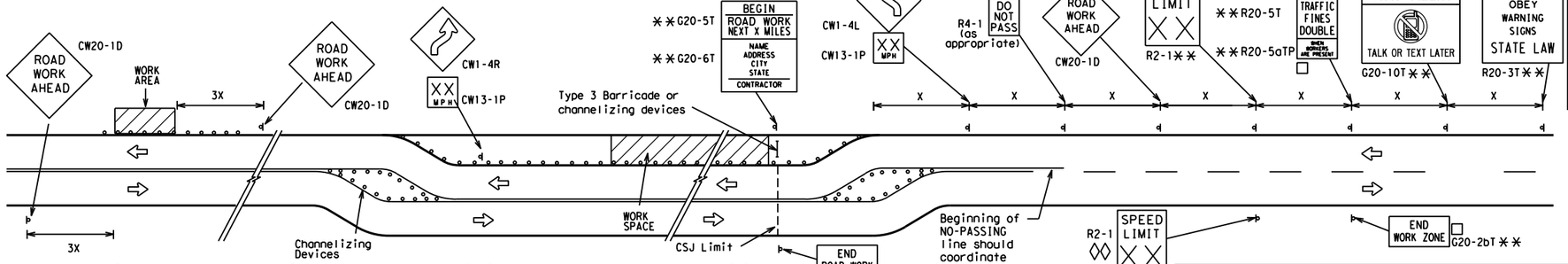
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

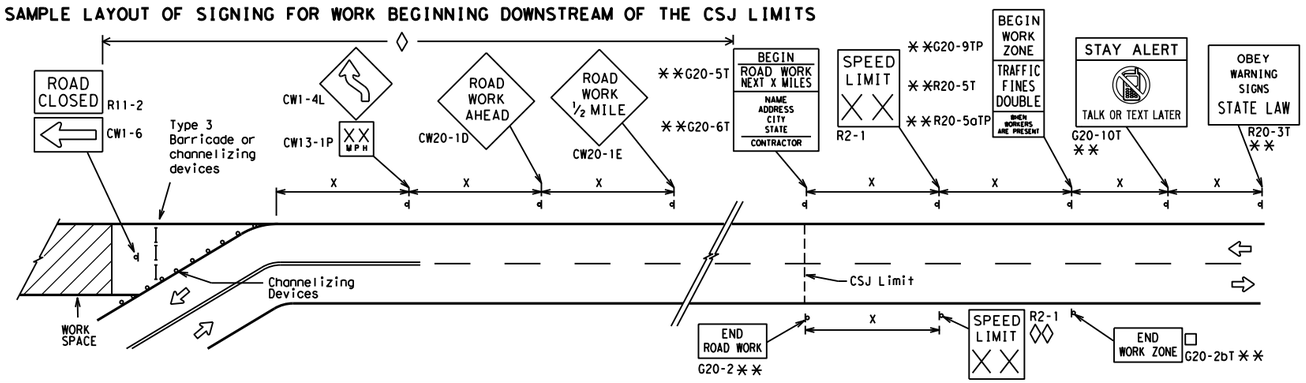
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0027	13	238	IH 69
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7-13 5-21	HOU	HARRIS		25

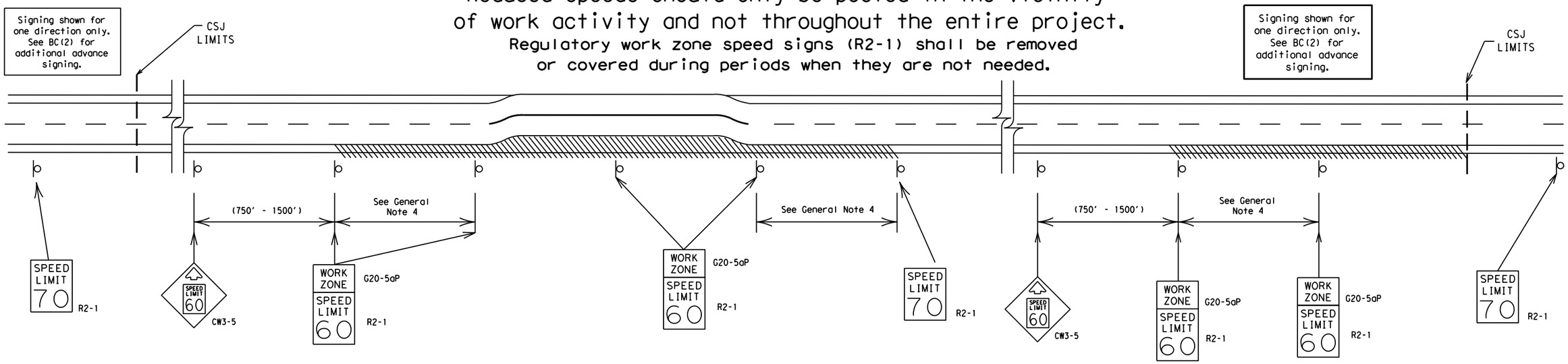
DATE:
FILE:

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.

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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0027	13	238	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		26

DATE:
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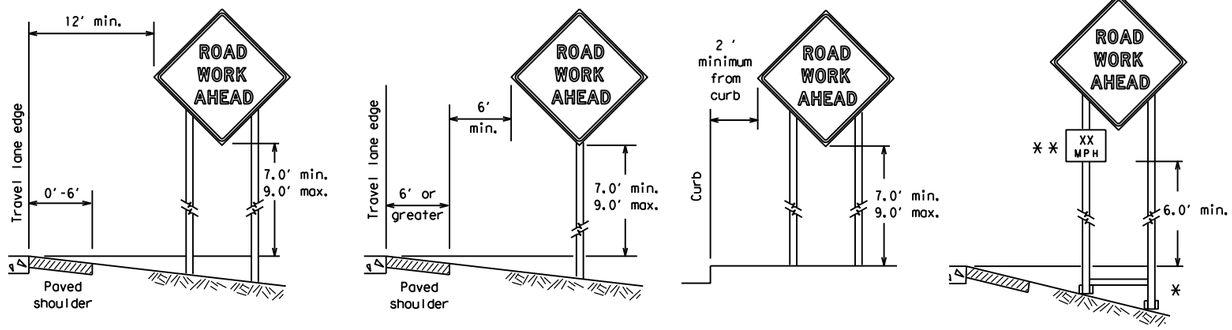
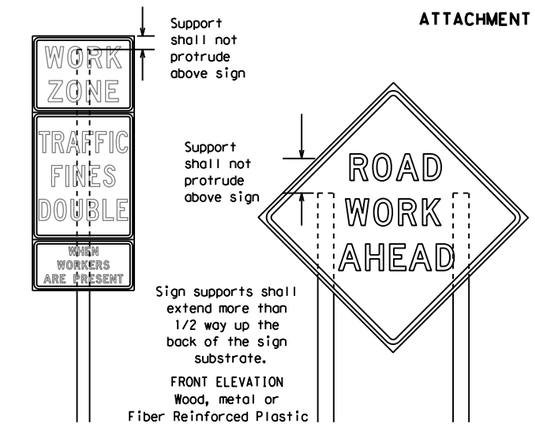
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

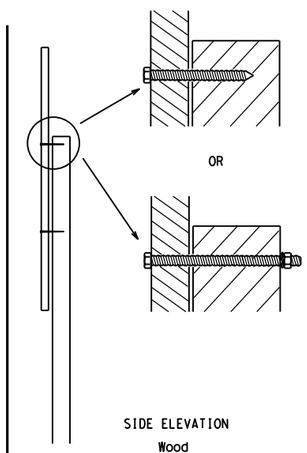


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





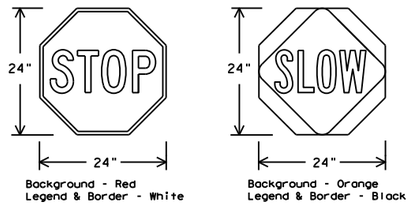
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
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.

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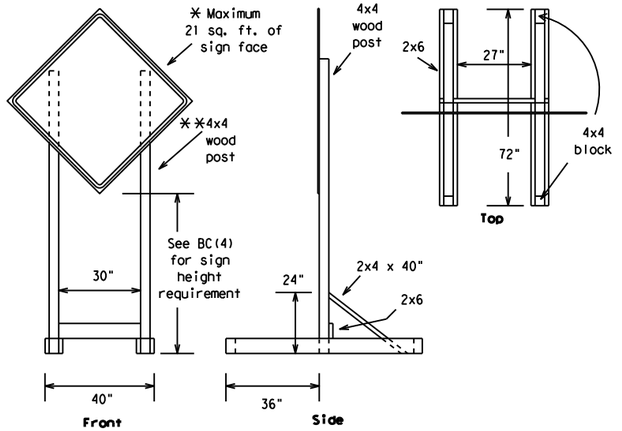
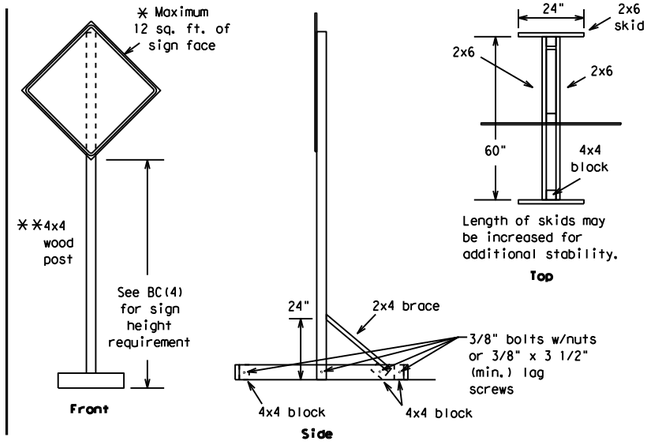
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

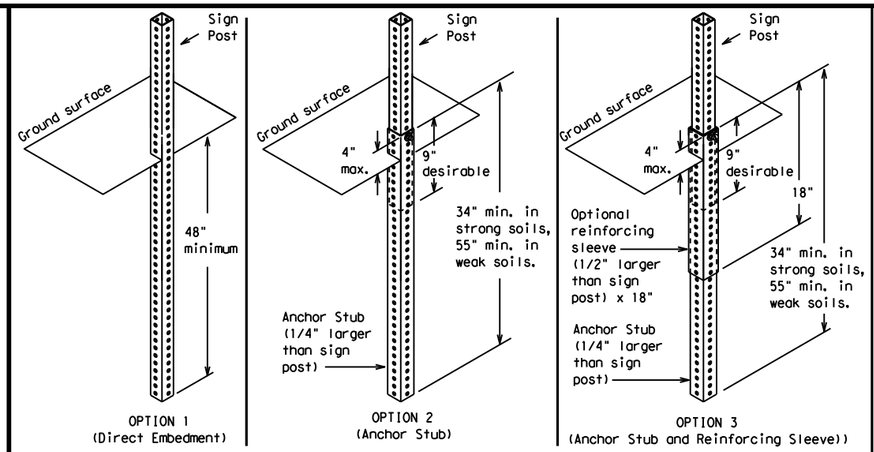
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		27





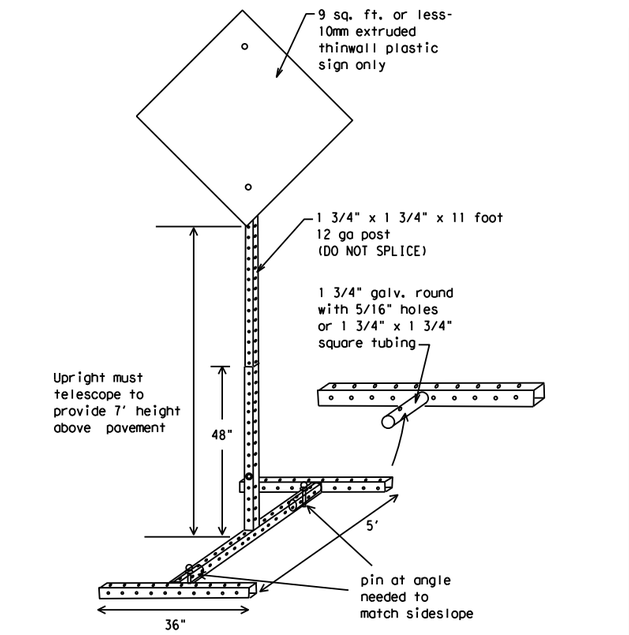
SKID MOUNTED WOOD SIGN SUPPORTS

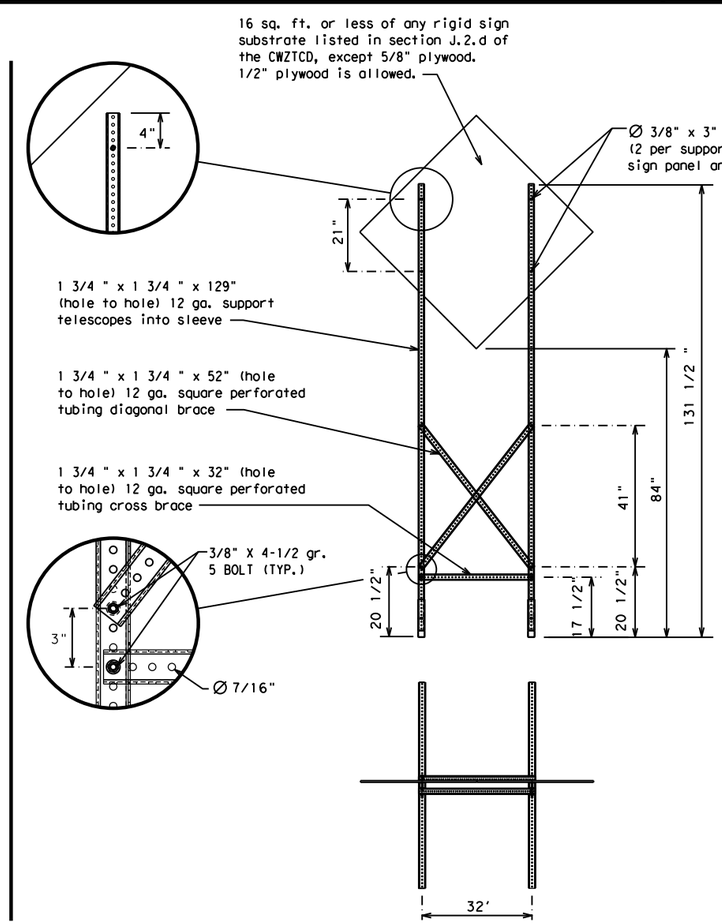
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

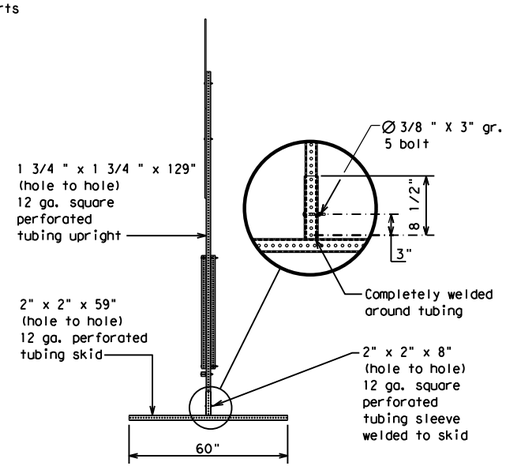


GROUND MOUNTED SIGN SUPPORTS

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	0027	13	238	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		28

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

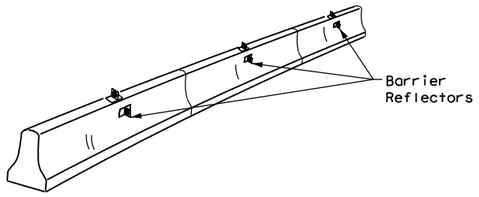
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		29

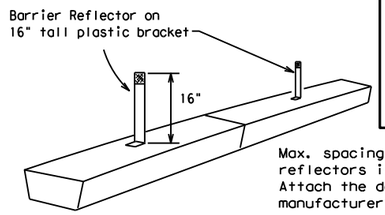
DATE:
FILE:

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.



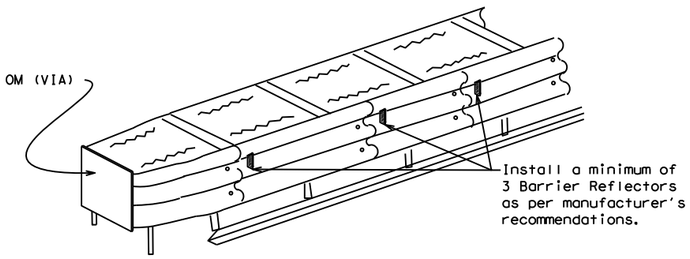
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

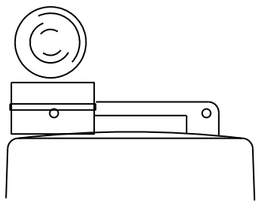
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

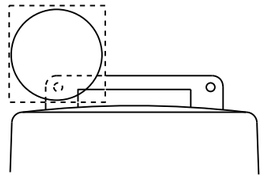
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

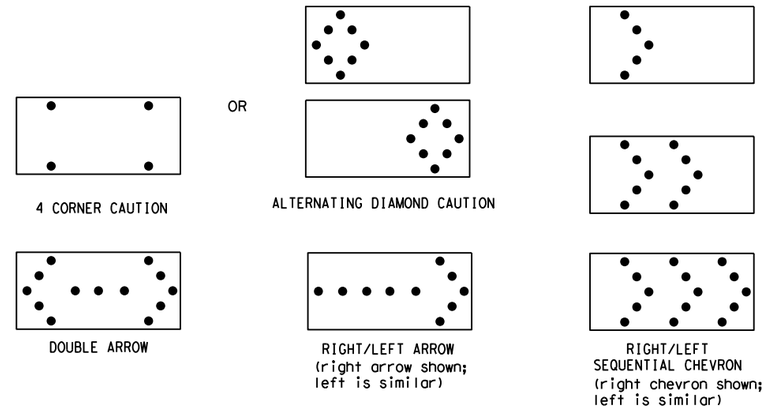
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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
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REVISIONS	0027	13	238	IH 69
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

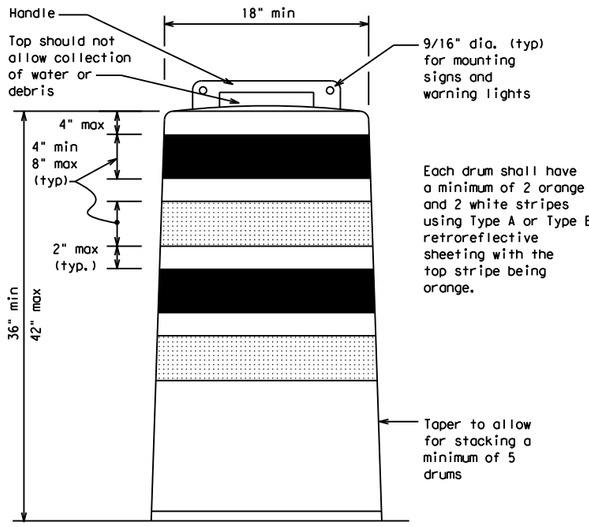
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

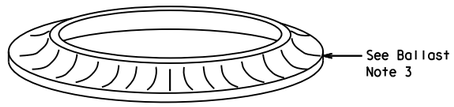
RETROREFLECTIVE SHEETING

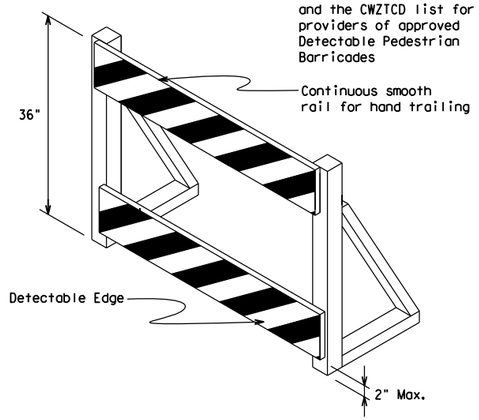
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

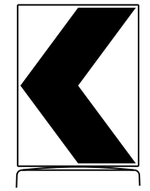




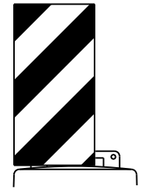


DETECTABLE PEDESTRIAN BARRICADES

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
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REVISIONS	0027	13	238	IH 69
4-03 8-14	DIST	COUNTY		SHEET NO.
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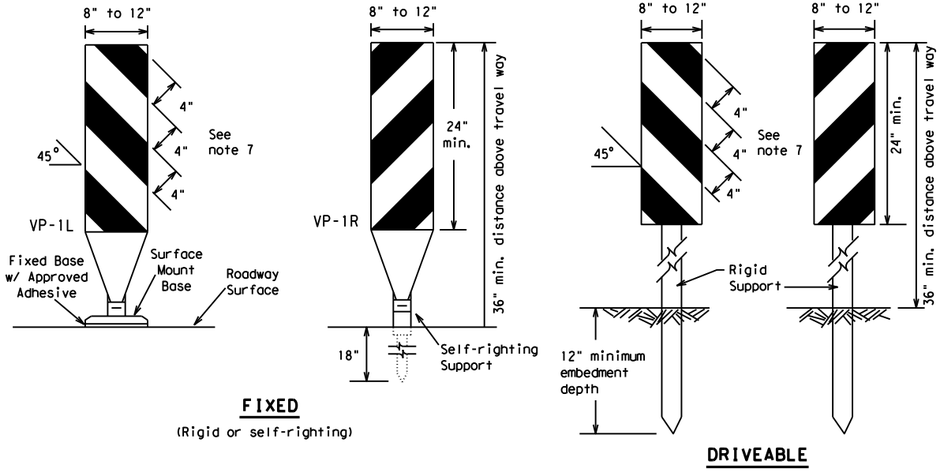


FIXED
(Rigid or self-righting)

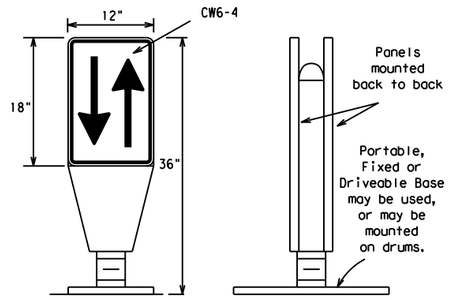
DRIVEABLE

(Rigid or self-righting)

PORTABLE

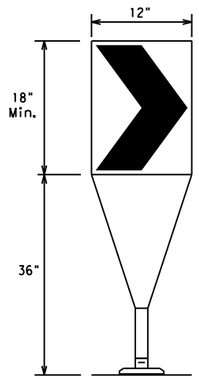
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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



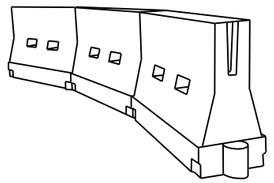
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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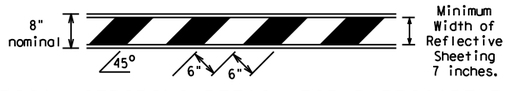
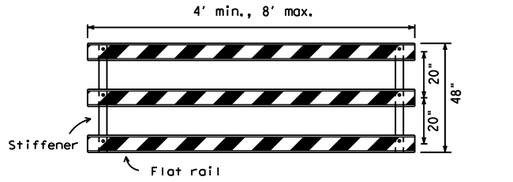
TYPE 3 BARRICADES

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.



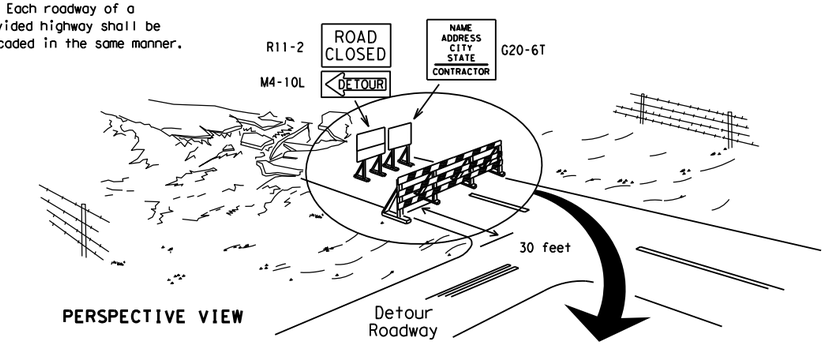
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

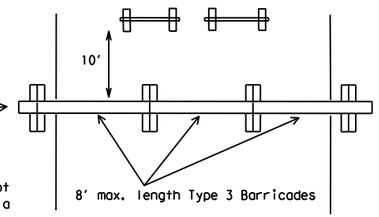
Each roadway of a divided highway shall be barricaded in the same manner.



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.

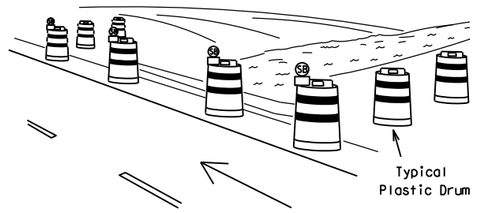
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

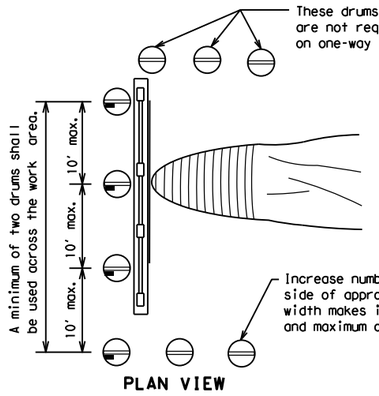
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

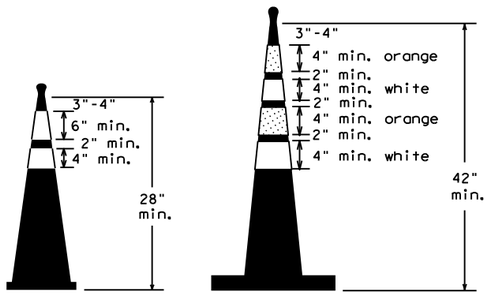
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



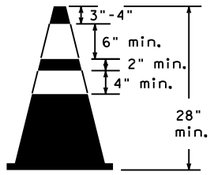
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

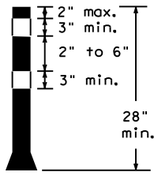
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

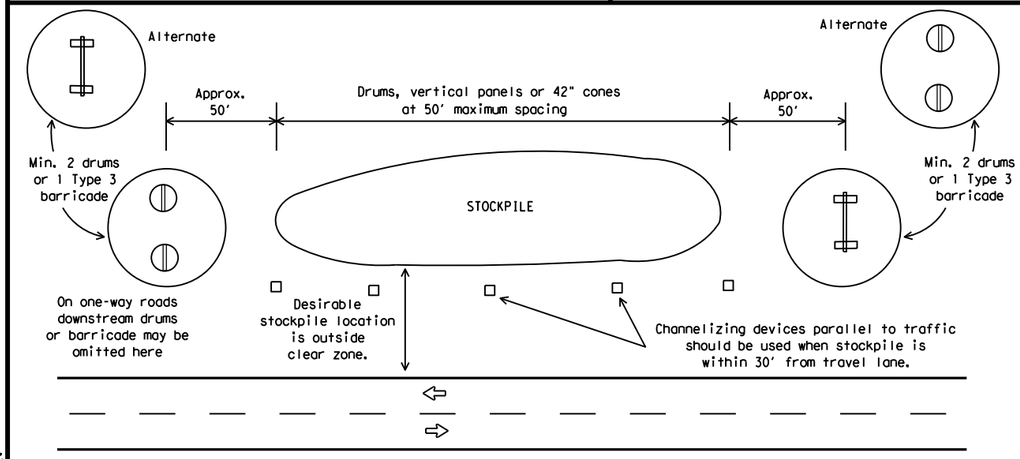


Tubular Marker

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

DATE:
FILE:

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	0027	13	238	IH 69
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	HOU	HARRIS		33

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

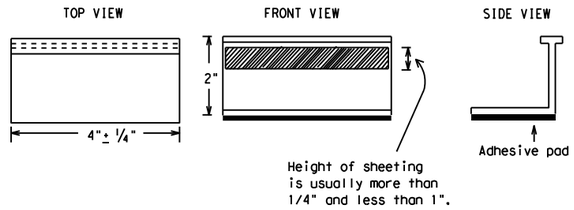
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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	0027	13	238	IH 69
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	HOU	HARRIS		34
11-02 8-14				

DATE:
FILE:

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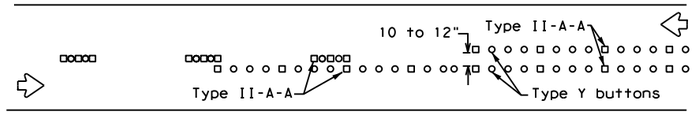
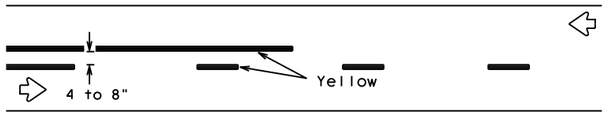
DATE:
FILE:

PAVEMENT MARKING PATTERNS

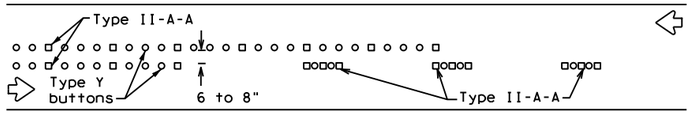
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



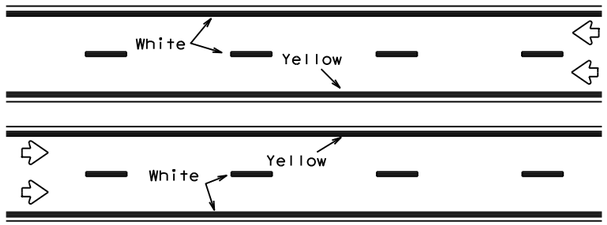
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



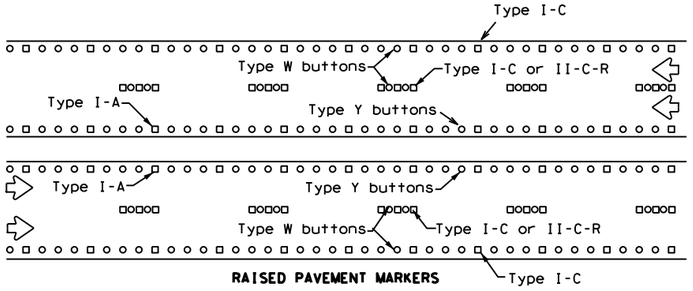
RAISED PAVEMENT MARKERS - PATTERN B

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

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



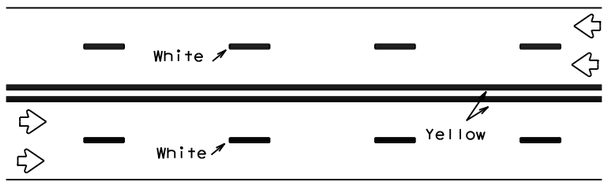
REFLECTORIZED PAVEMENT MARKINGS



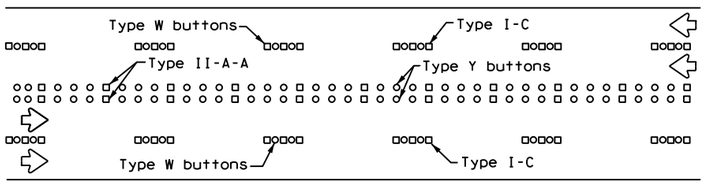
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



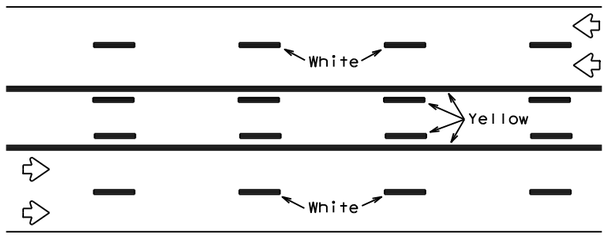
REFLECTORIZED PAVEMENT MARKINGS



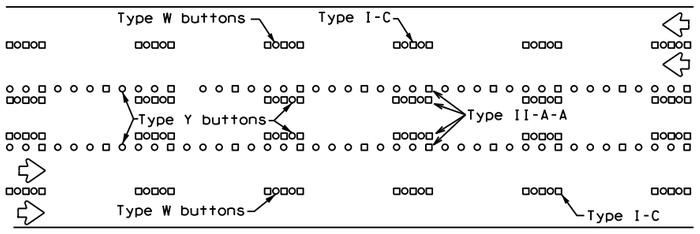
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

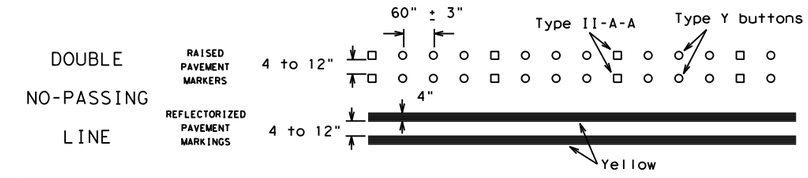
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

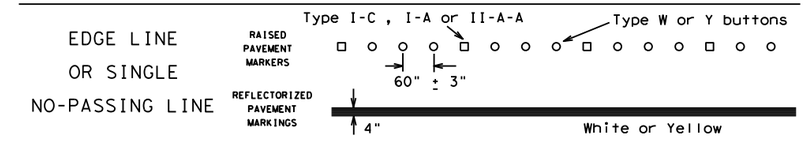
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

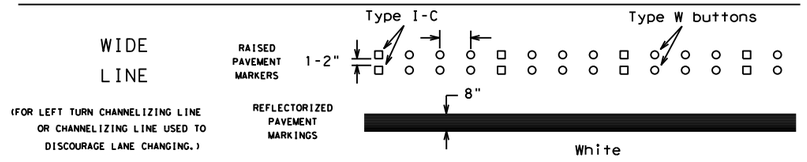


EDGE LINE OR SINGLE NO-PASSING LINE



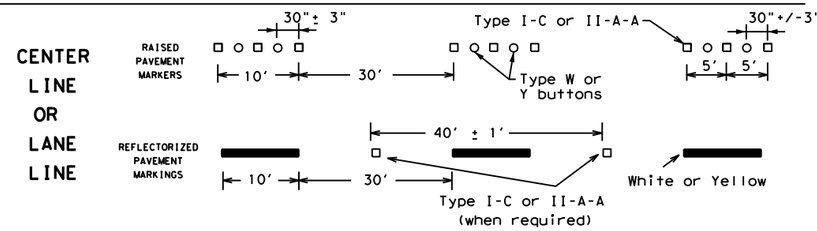
WIDE LINE

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

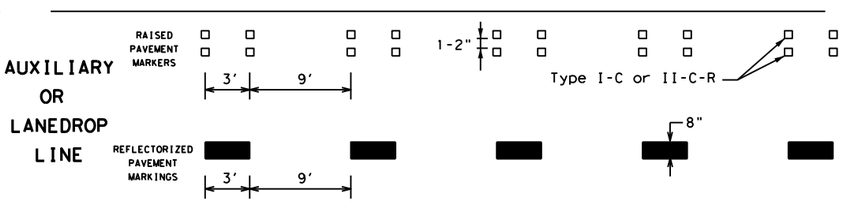


BROKEN LINES

CENTER LINE OR LANE LINE

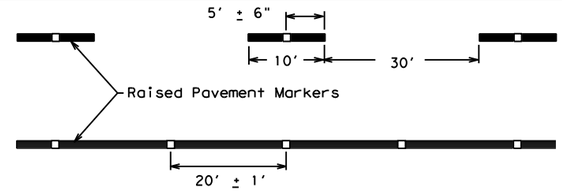


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

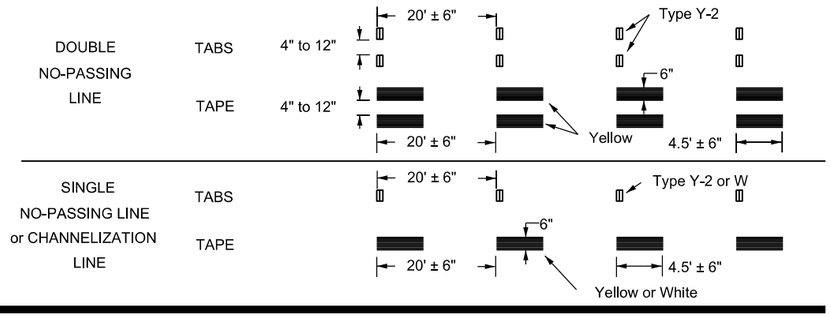
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	0027	13	238	IH 69
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		35

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



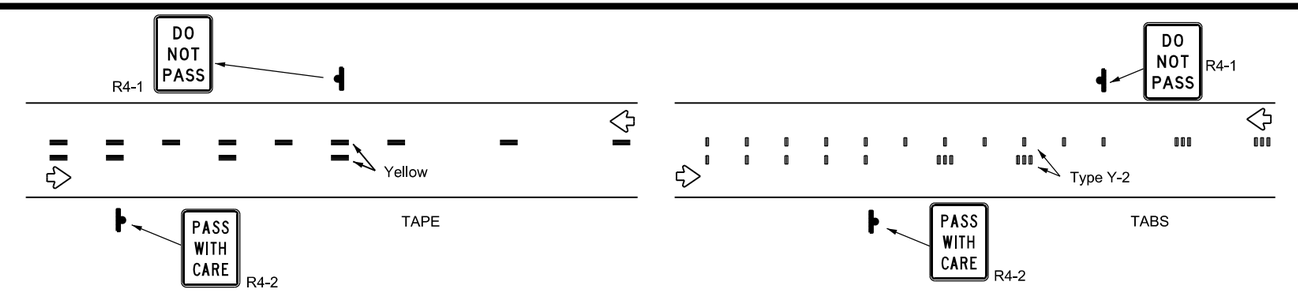
NOTES:

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.

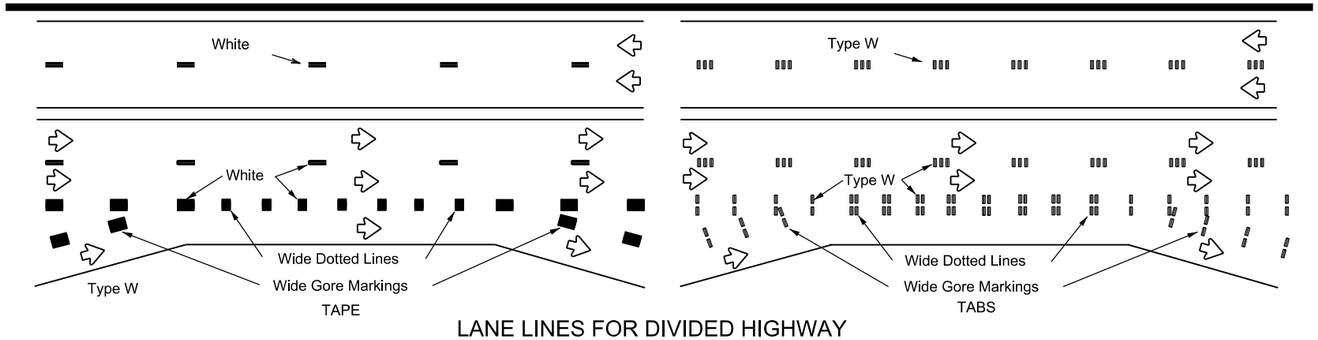
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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.

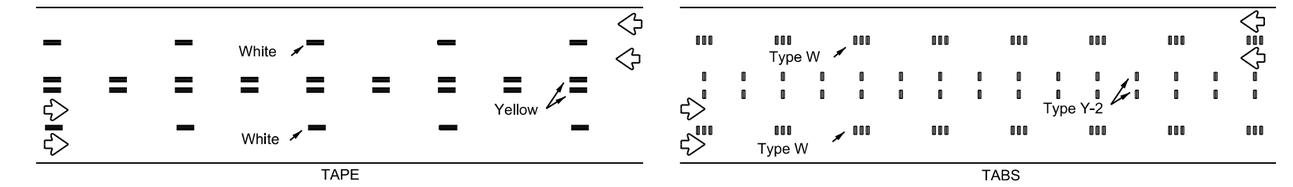
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



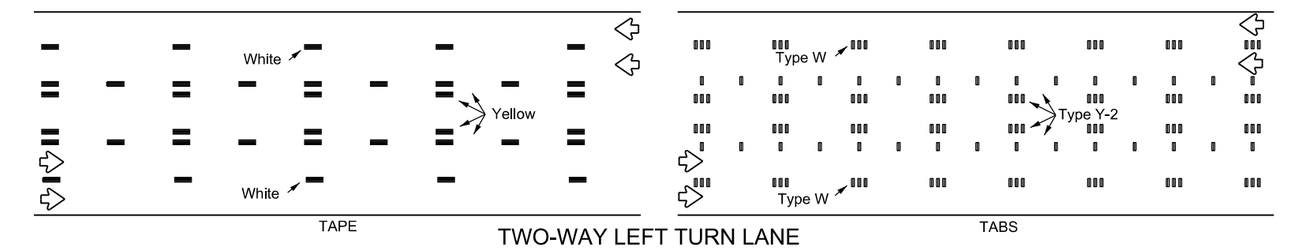
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



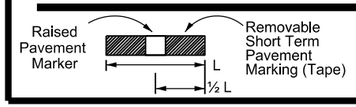
LANE LINES FOR DIVIDED HIGHWAY



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 Safety Division Standard

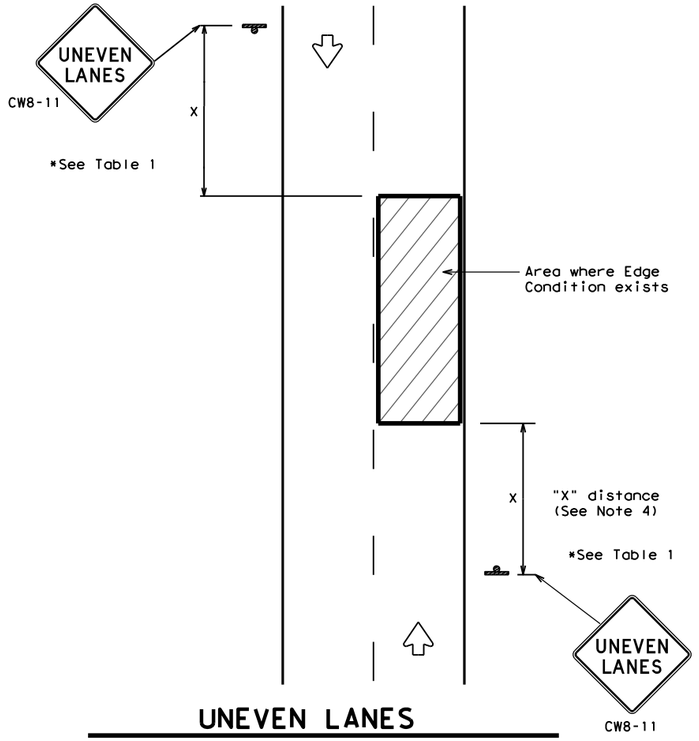
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-23

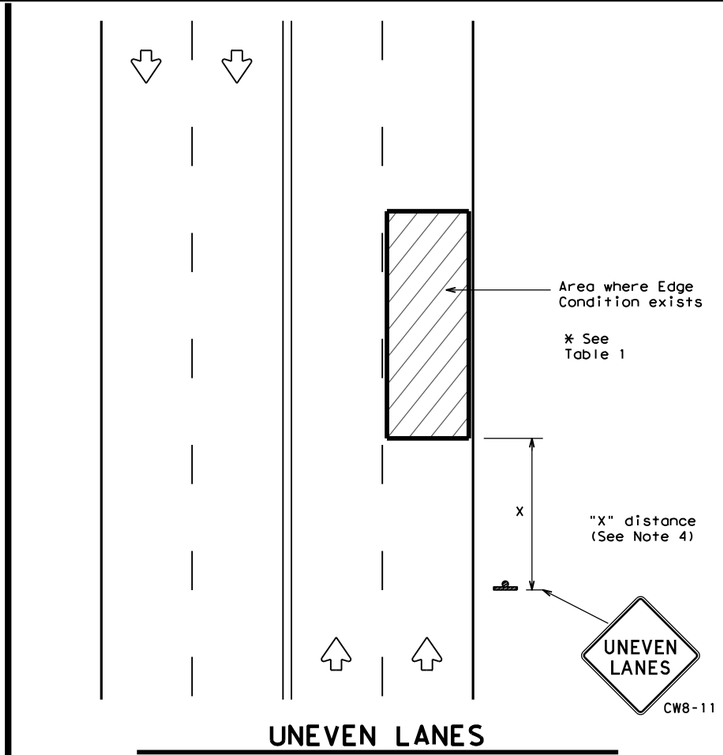
FILE: wzstpm-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
4-92 7-13	DIST	COUNTY		SHEET NO.
1-97 2-23	HOU	HARRIS		36
3-03				

DATE:
FILE:

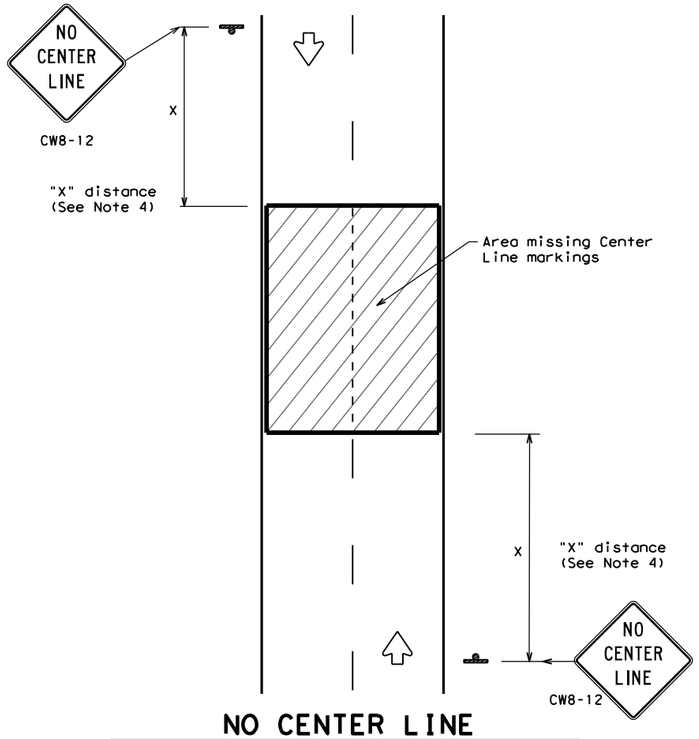
DATE:
FILE:



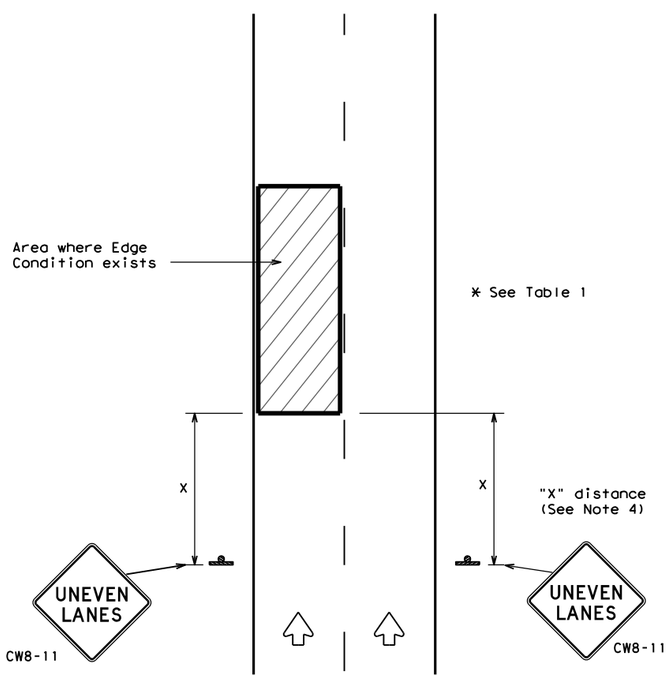
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

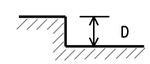
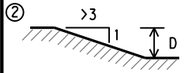
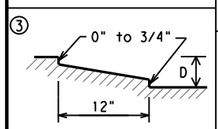
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	HOU	HARRIS		37

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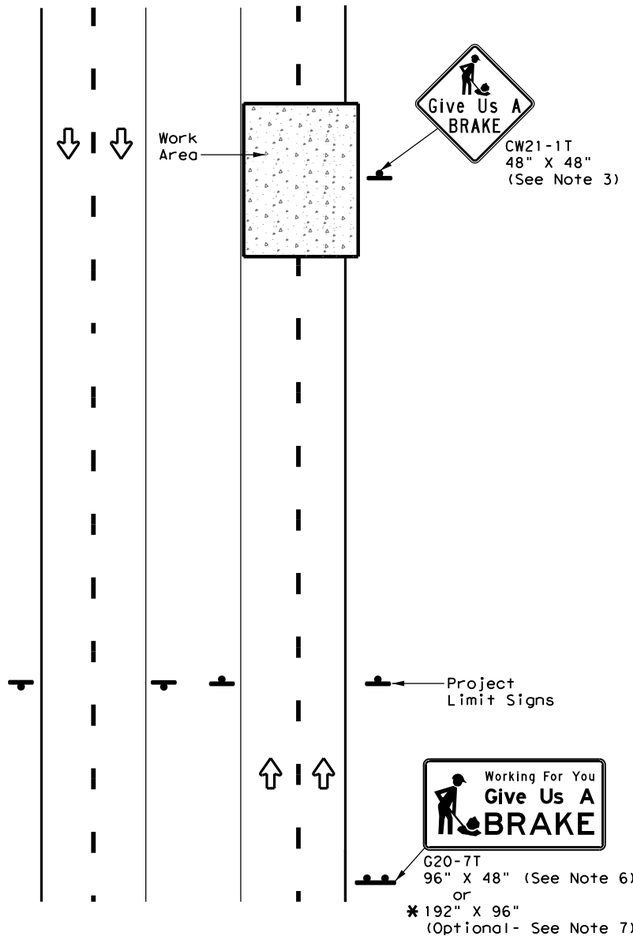
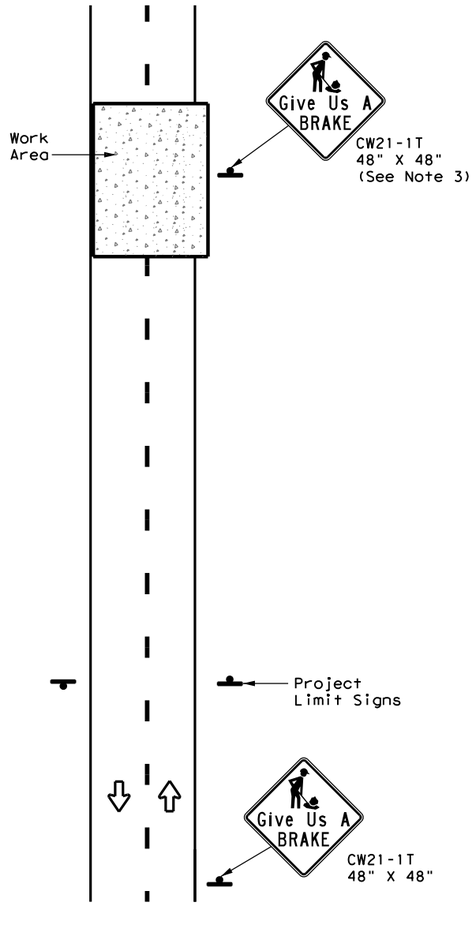


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

DATE:
FILE:

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

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

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

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

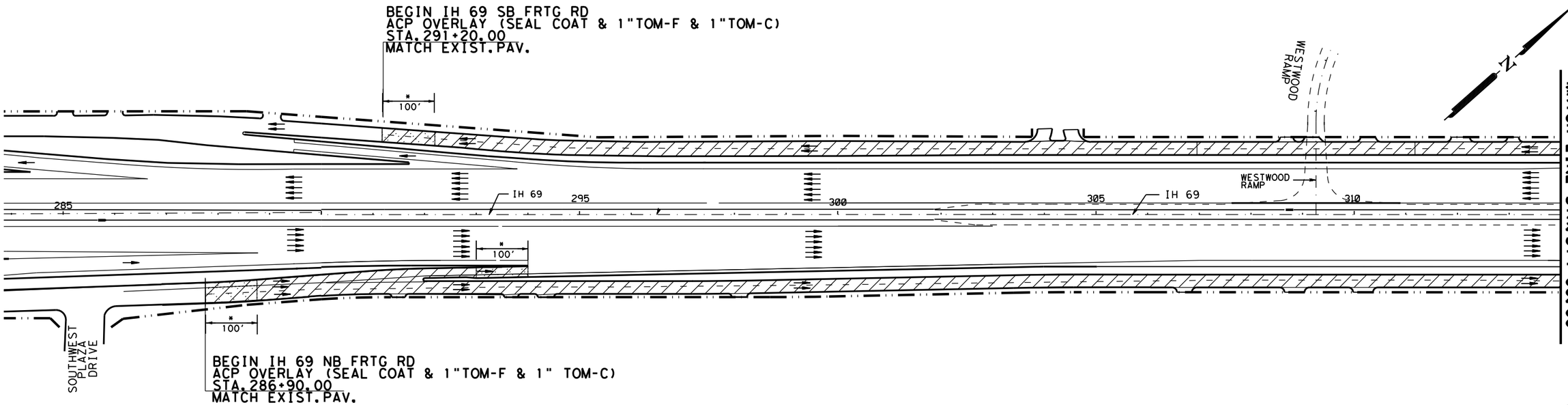
WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	HOU	HARRIS		38

116

BEGIN IH 69 SB FRTG RD
ACP OVERLAY (SEAL COAT & 1"TOM-F & 1"TOM-C)
STA. 291+20.00
MATCH EXIST. PAV.



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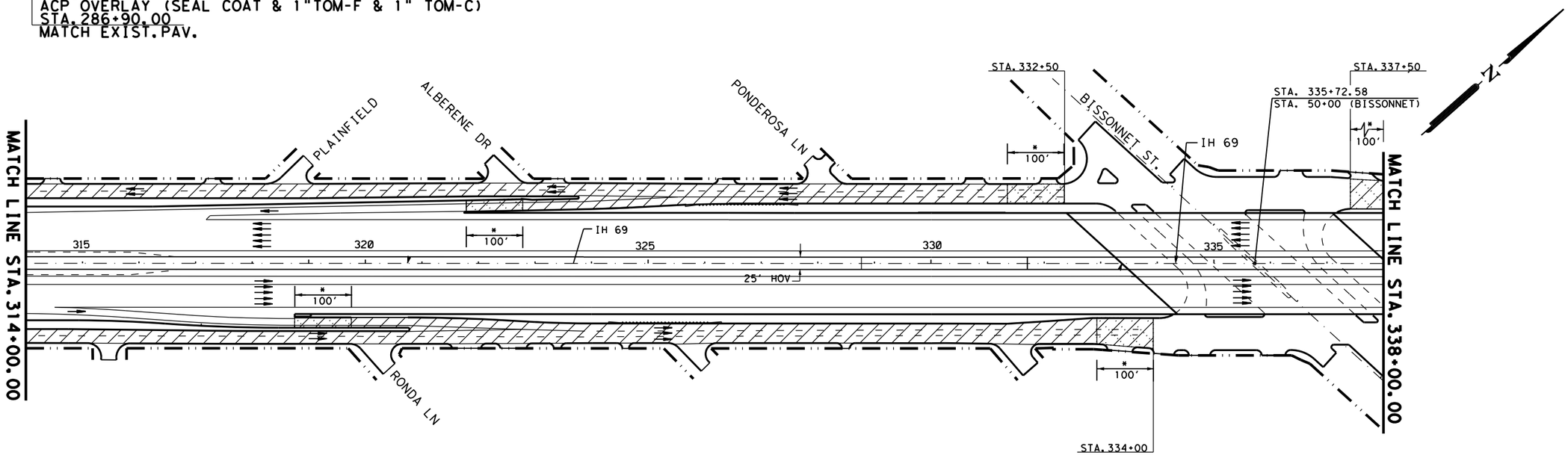
STA. 286+90.00
MATCH EXIST. PAV.



LEGEND:

PROP. 1.5" ASPH. MILLING (354), SEAL COAT (ITEM 316) AND 2" THIN OVERLAY MIXTURE (1"TOM-F LEVEL-UP) & (1"TOM-C SURFACE) (ITEM 3081)

* SEE DETAIL "B", SHEET 47

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.
7/27/2023

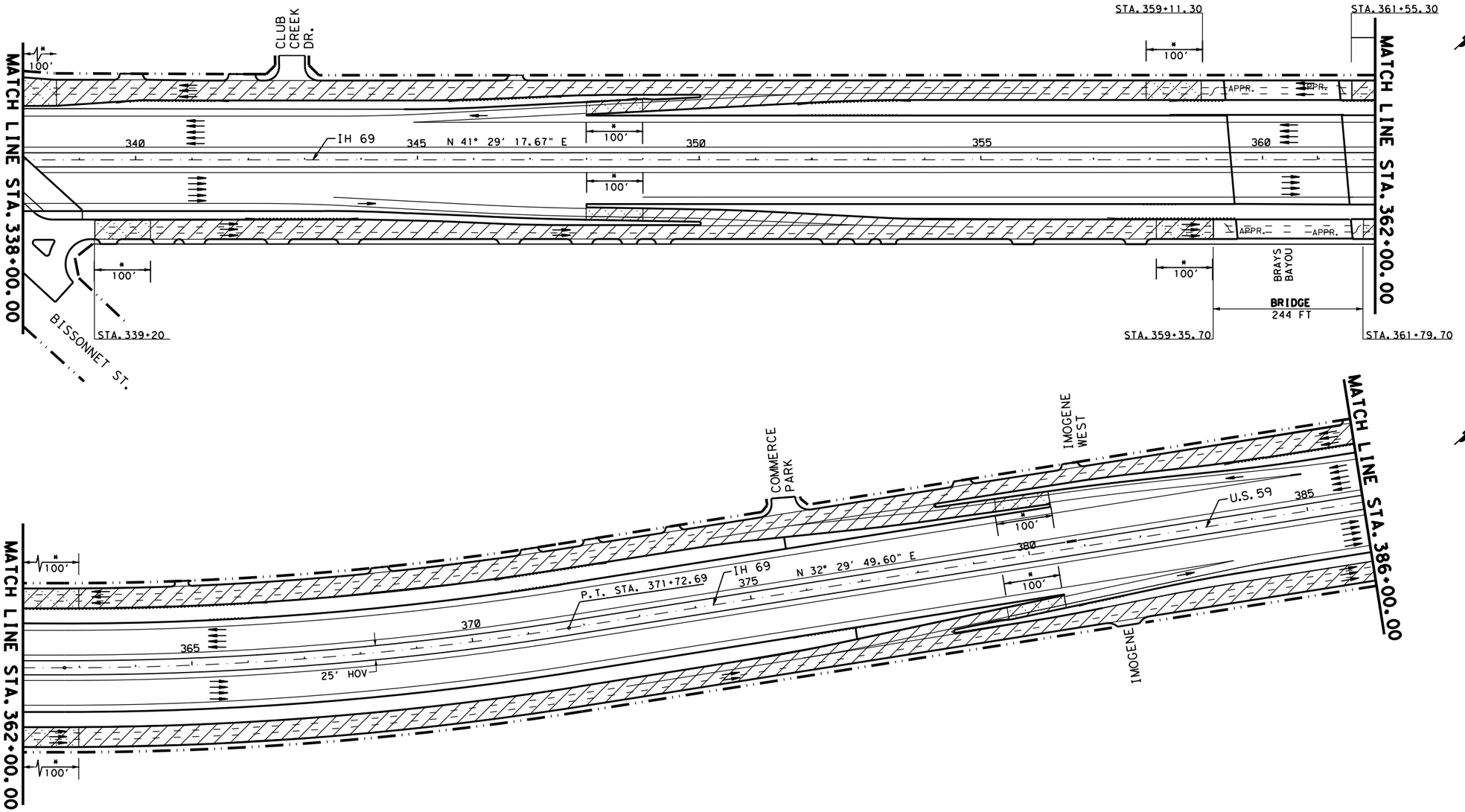
N.T.S.

IH 69 FRTG PLAN LAYOUT

SHEET 1 OF 8

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			39
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$



LEGEND:

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STATE OF TEXAS
BEATA G. KWATER
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Beata Kwater, P.E.

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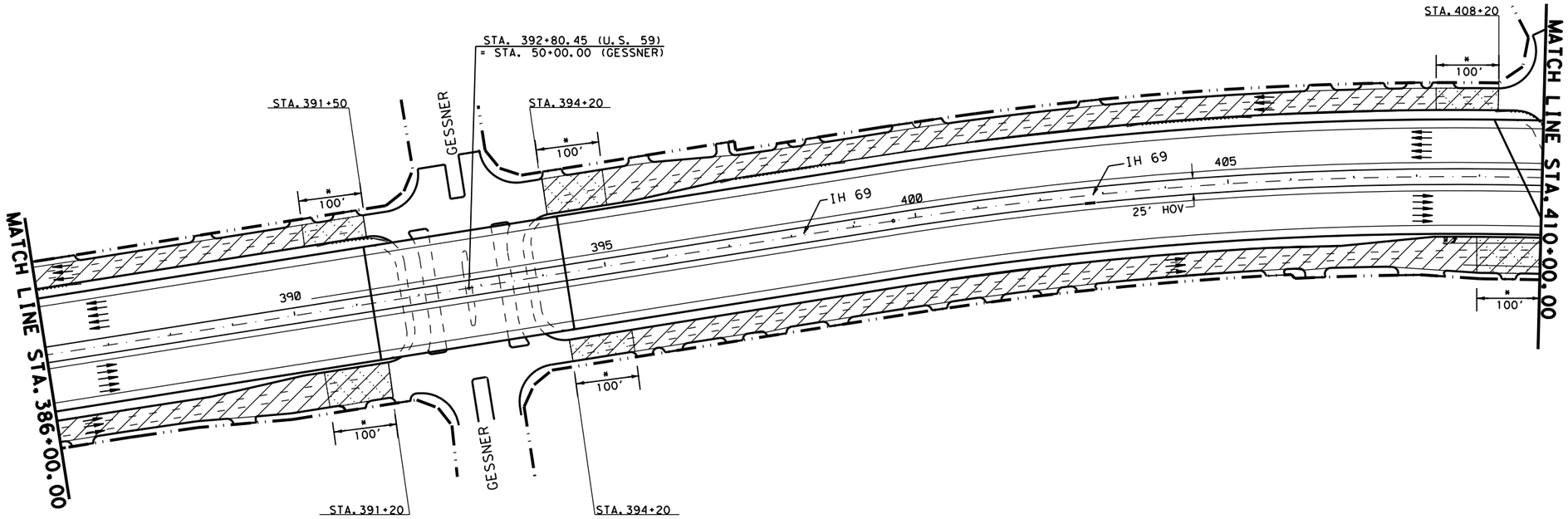
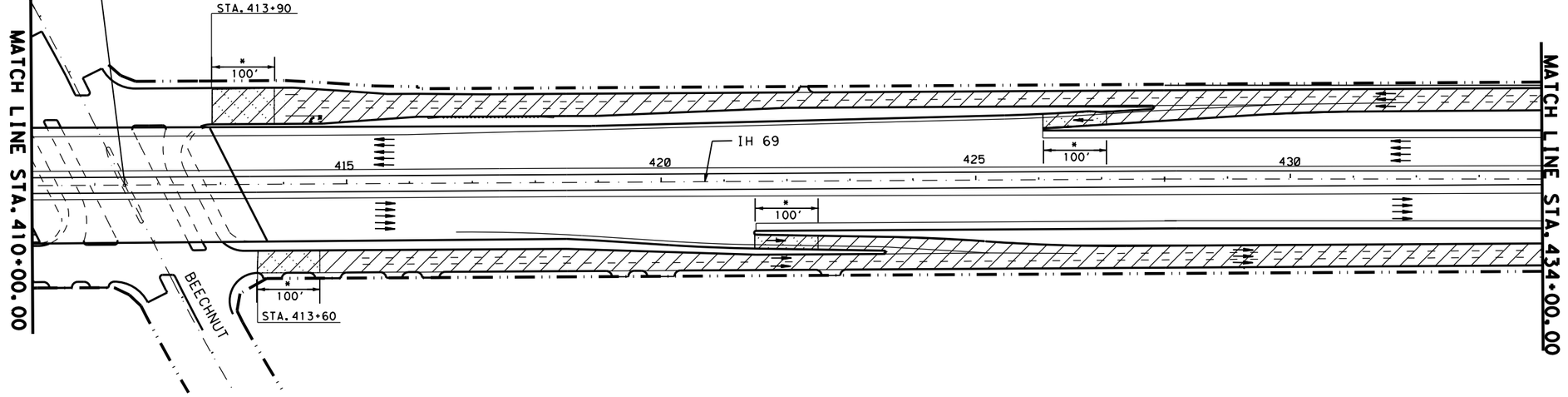
IH 69 FRTG PLAN LAYOUT

SHEET 2 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			40
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$





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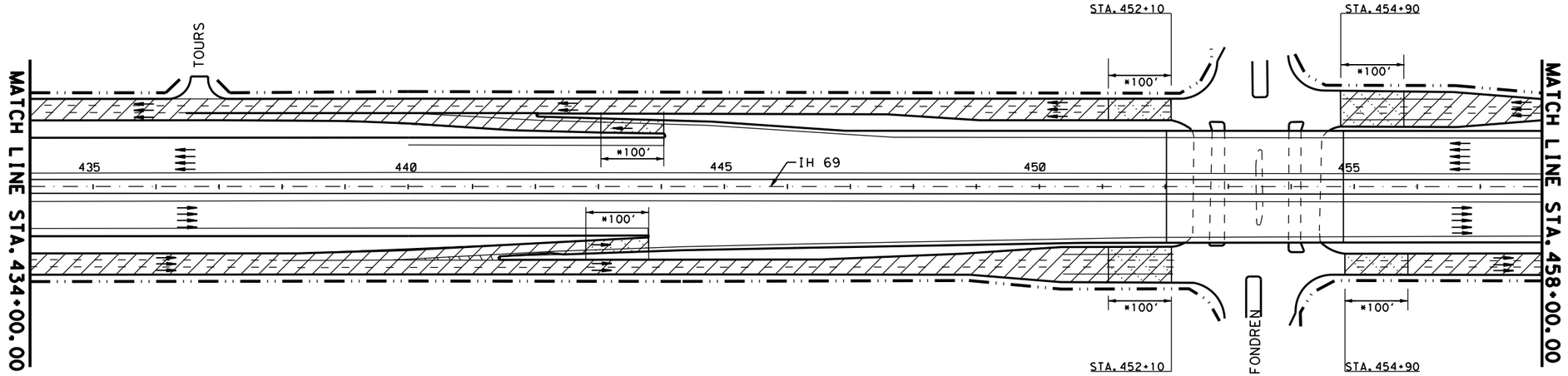
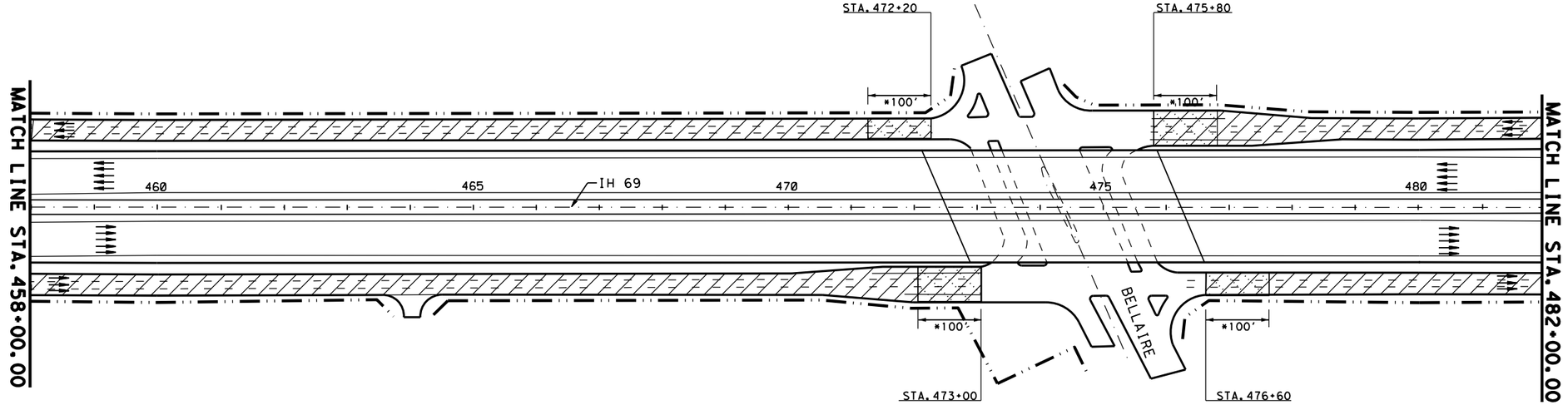
IH 69 FRTG PLAN LAYOUT

SHEET 3 OF 8

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			41
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$





LEGEND:

PROP. 1.5" ASPH. MILLING (354), SEAL COAT (ITEM 316) AND 2" THIN OVERLAY MIXTURE(1"TOM-F LEVEL-UP)& (1"TOM-C SURFACE)(ITEM 3081)

* SEE DETAIL "B", SHEET 47

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7/27/2023

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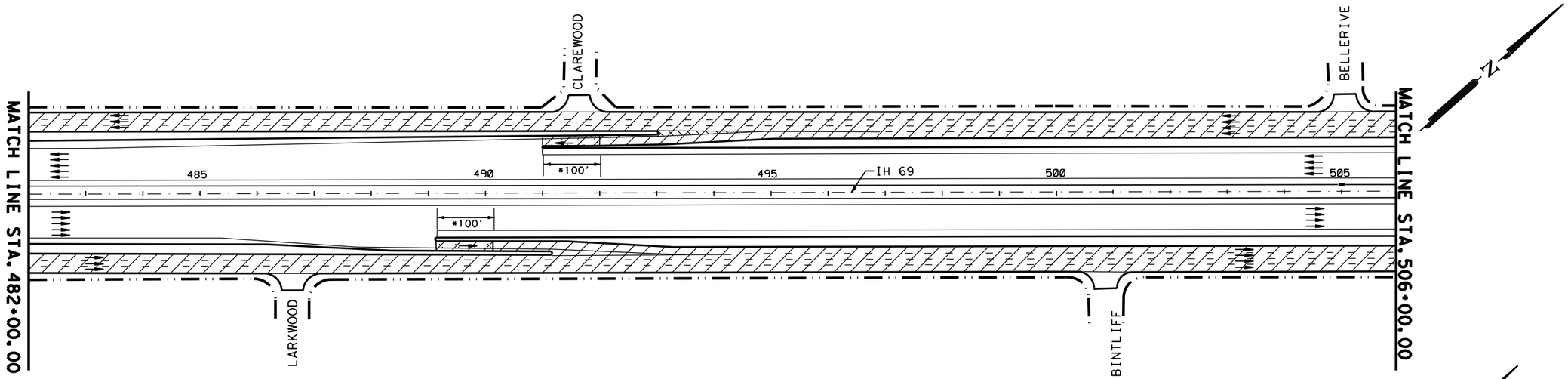
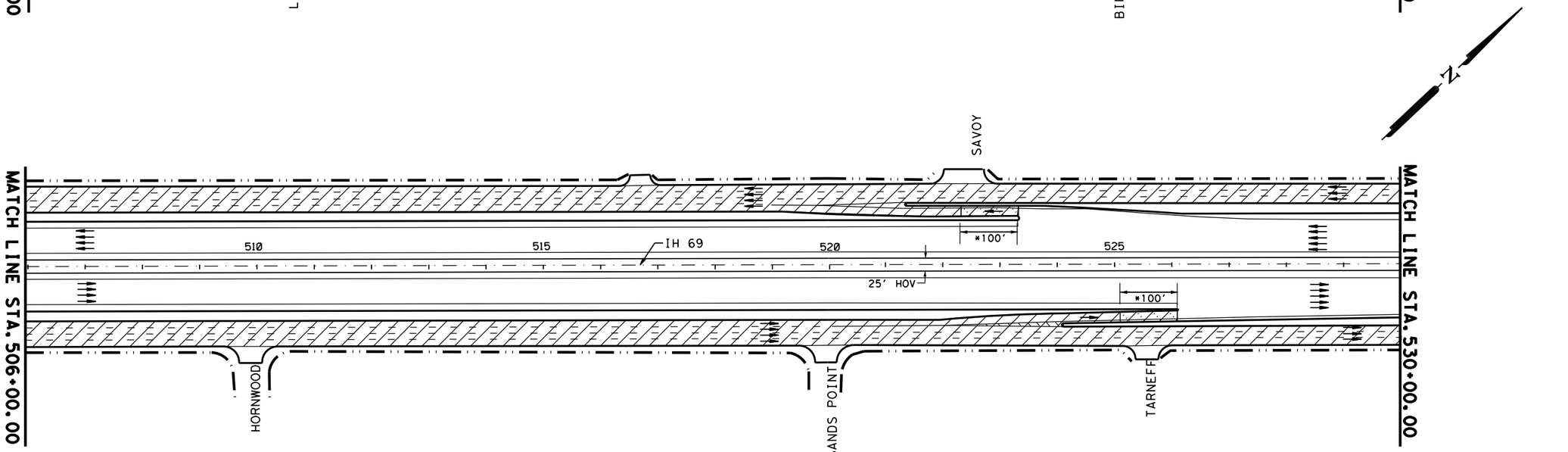
IH 69 FRTG PLAN LAYOUT

SHEET 4 OF 8

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			42
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$





LEGEND:

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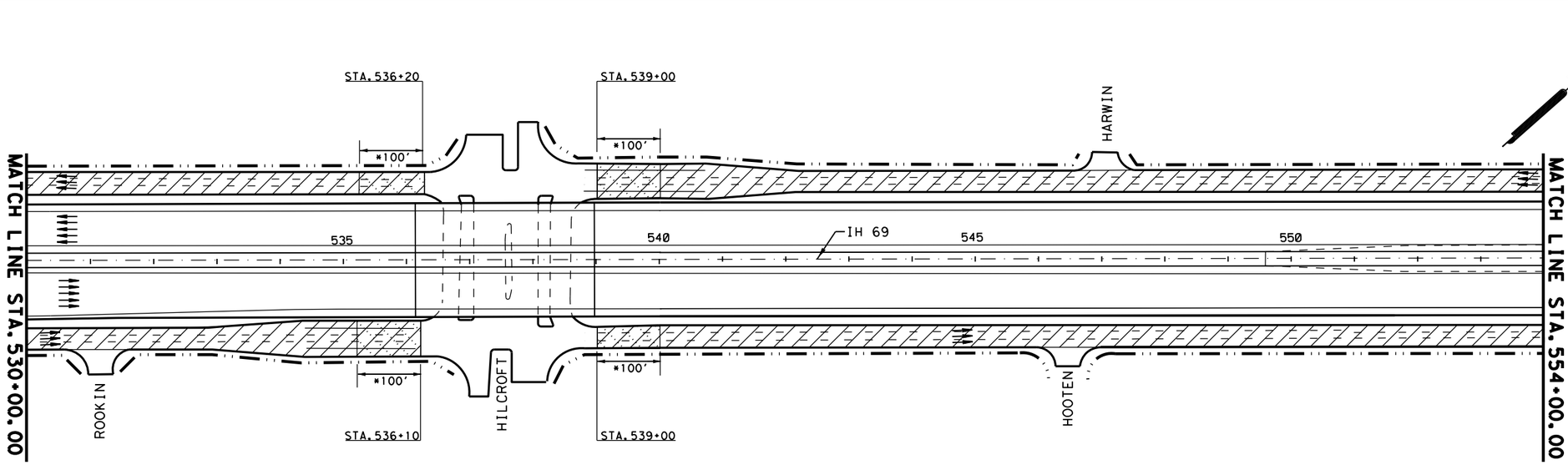
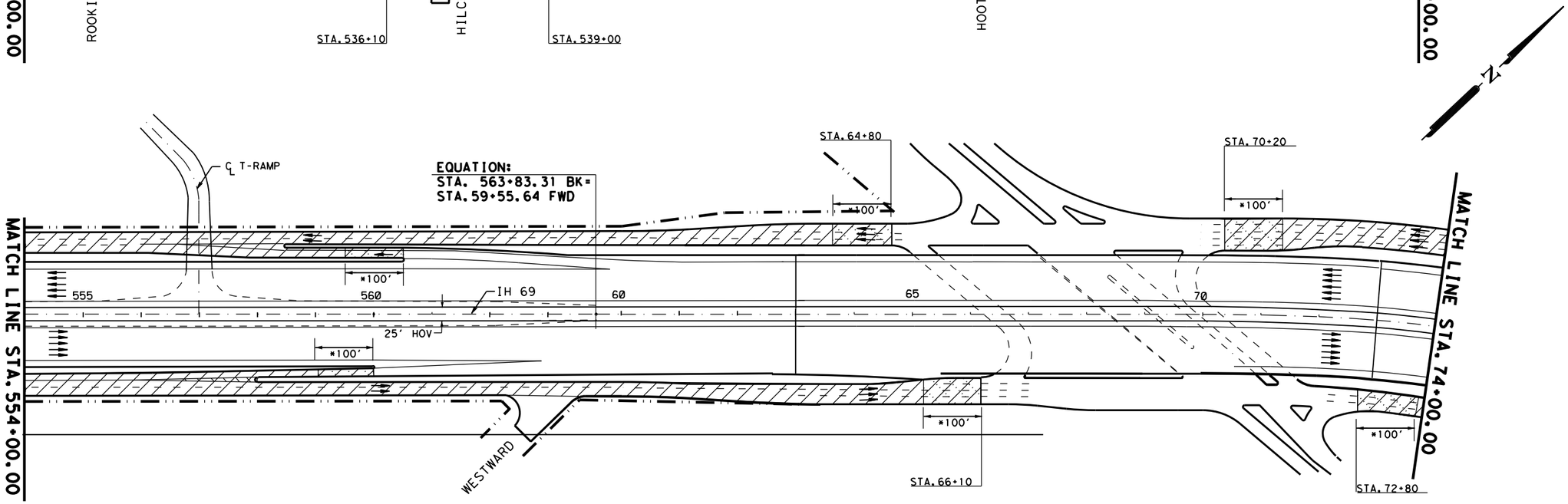
IH 69 FRTG PLAN LAYOUT

SHEET 5 OF 8

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			43
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$





WESTPARK DR.

N.T.S.

LEGEND:

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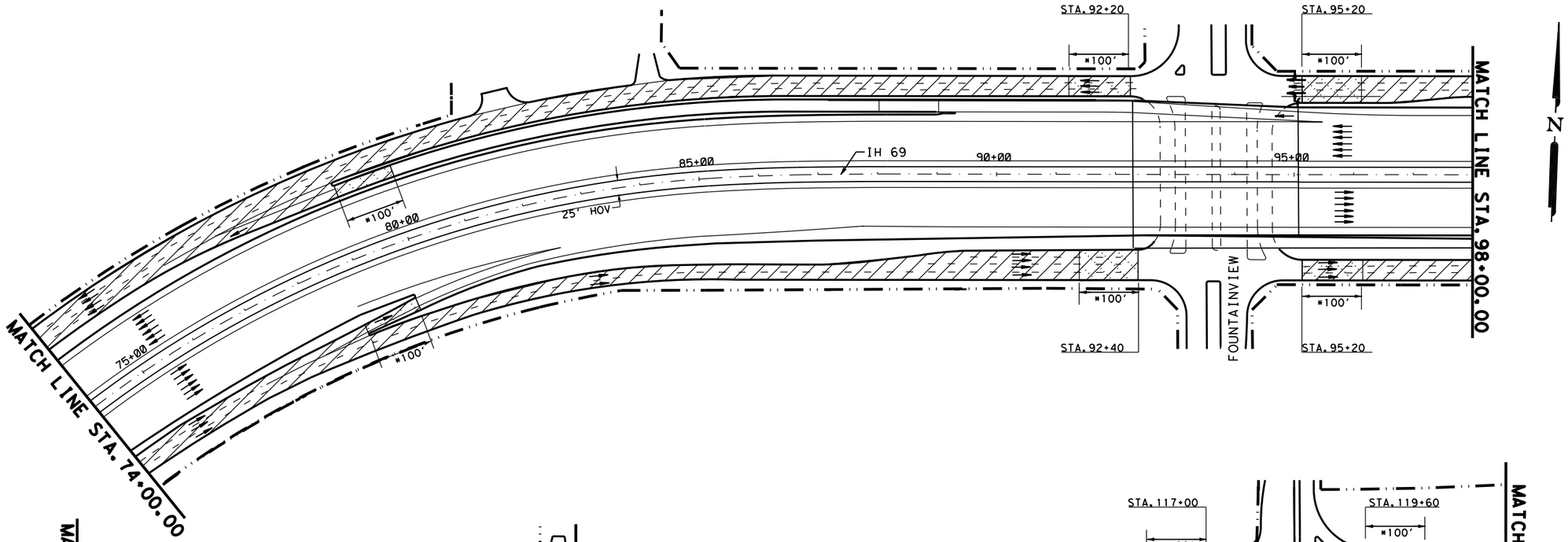
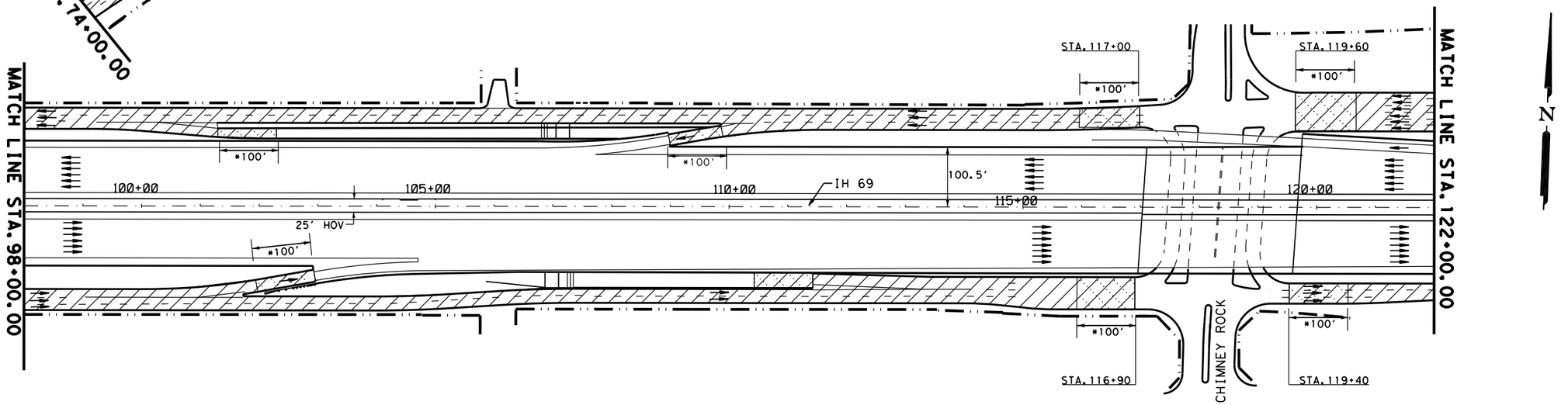
IH 69 FRTG PLAN LAYOUT

SHEET 6 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			44
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$





LEGEND:

PROP. 1.5" ASPH. MILLING (354), SEAL COAT (ITEM 316) AND 2" THIN OVERLAY MIXTURE(1"TOM-F LEVEL-UP)& (1"TOM-C SURFACE)(ITEM 3081)

* SEE DETAIL "B", SHEET 47

STATE OF TEXAS
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7/27/2023

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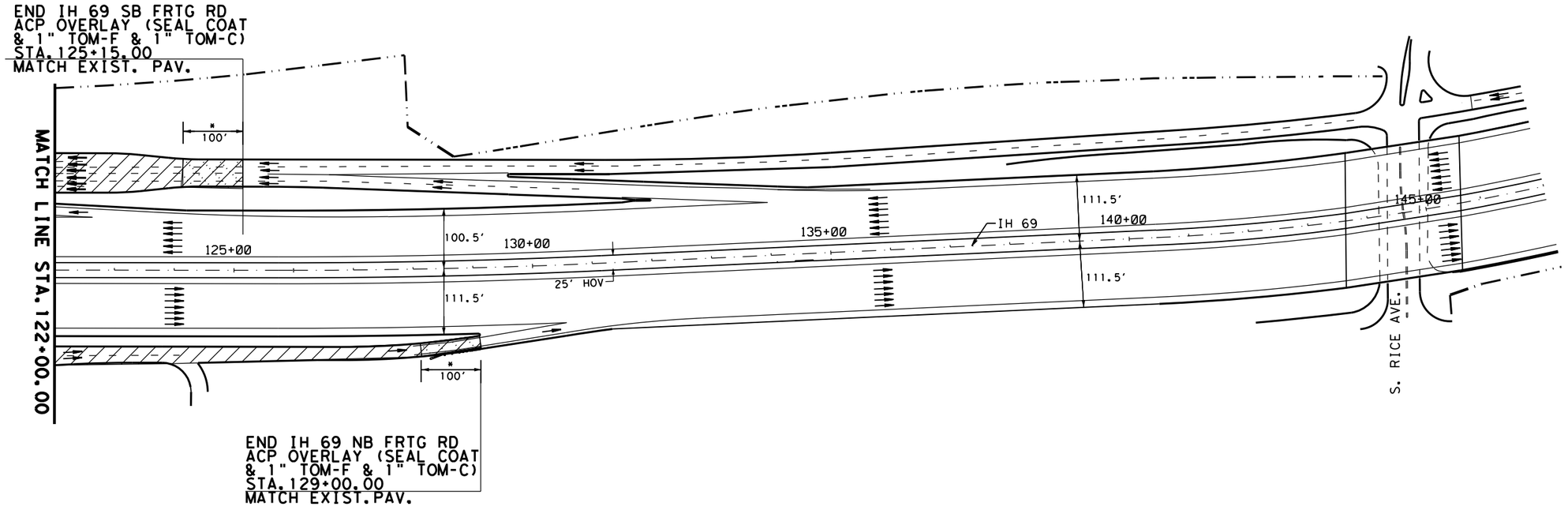
IH 69 FRTG PLAN LAYOUT

SHEET 7 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			45
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

$DATE$ $TIME$ $FILE$



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LEGEND:

PROP. 1.5" ASPH. MILLING (354), SEAL COAT (ITEM 316) AND 2" THIN OVERLAY MIXTURE (1" TOM-F LEVEL-UP) & (1" TOM-C SURFACE) (ITEM 3081)

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7/27/2023

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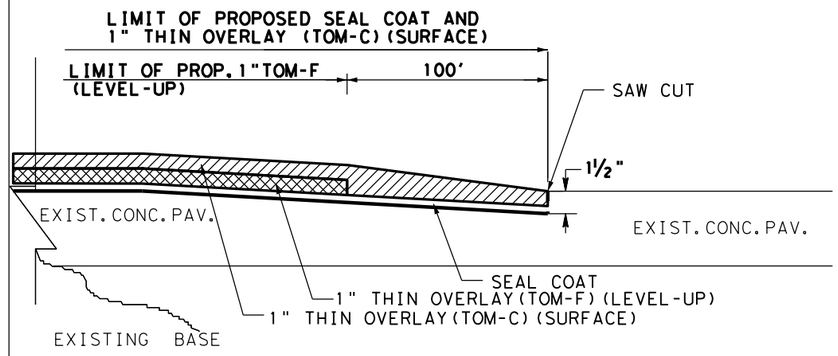
IH 69 FRTG PLAN LAYOUT

SHEET 8 OF 8

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			46
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG RD

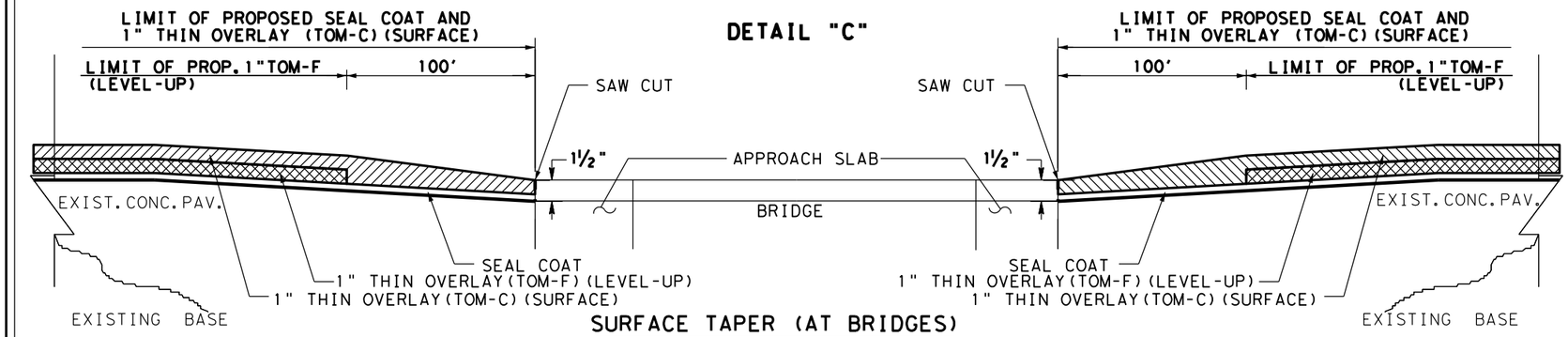
$DATE$ $TIME$ $FILE$

DETAIL "B"



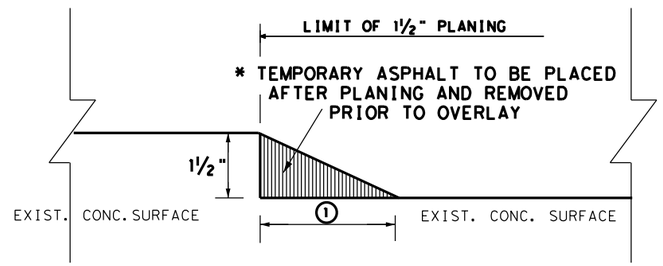
SURFACE TAPER (BEG & END)

DETAIL "C"



SURFACE TAPER (AT BRIDGES)

DETAIL "D"



① FOR APPROACH AND DEPARTURE TRAFFIC
USE 180:1 TAPER.
FOR PARALLEL TRAFFIC USE 6:1 TAPER.

* THIS WORK WILL NOT BE PAID FOR
DIRECTLY BUT WILL BE SUBSIDIARY
TO THE PLANING BID ITEMS.

TEMPORARY ASPHALT DETAIL

LEVELS DISPLAYED
1 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16
17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32
33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48
49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63

ACC: PROJECT/027114224/

FILE: acpdetails.dgn

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.

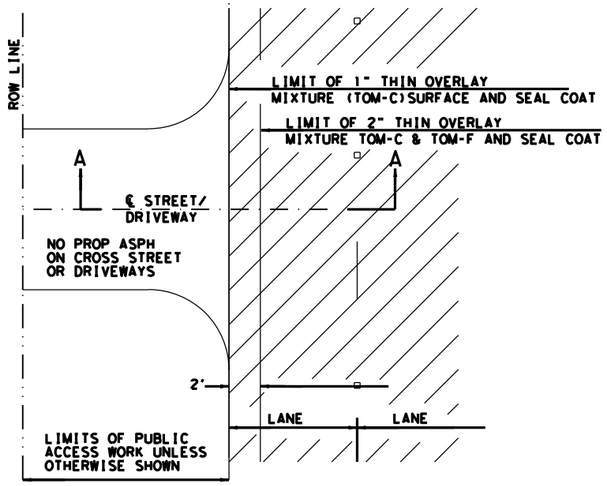
7/2/2023

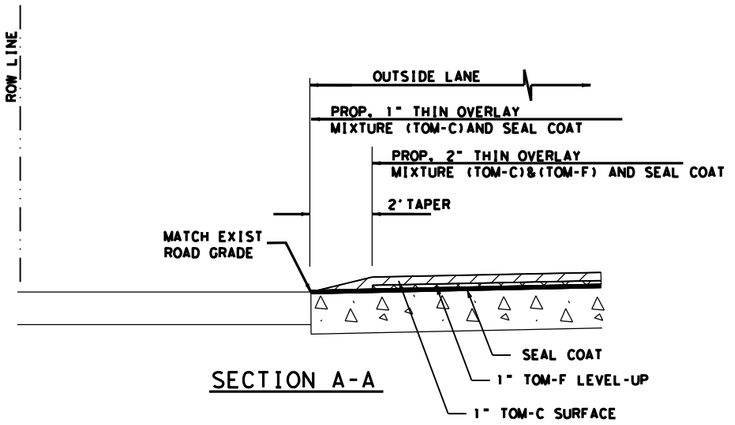
SCALE: NTS

TYPICAL TAPER DETAILS

FED. RD. DIV. NO.	PROJECT		SHEET NO.
6			47
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

DETAIL "C"

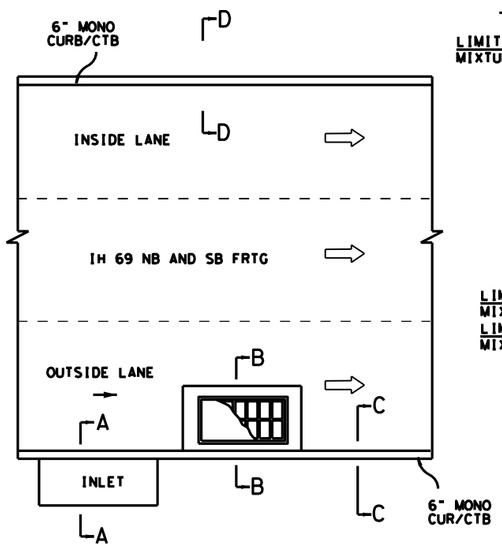


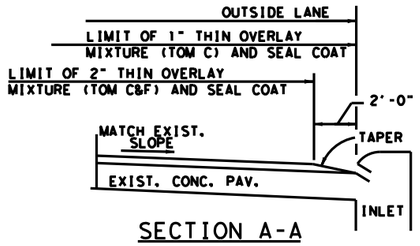


SECTION A-A

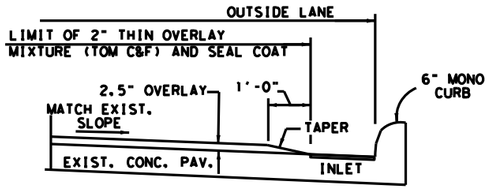
INTERSECTING CROSS STREETS/DRIVEWAYS DETAILS

DETAIL "D"

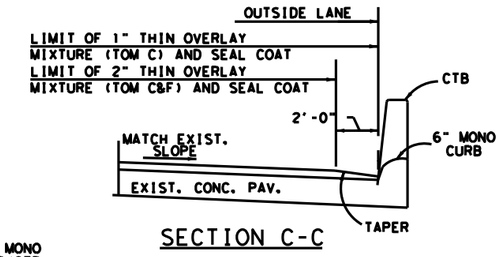




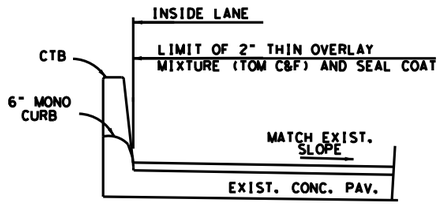
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

NOTE:

1. HAND FINISH OVERLAY AROUND INLET DRAIN OPENINGS

STATE OF TEXAS
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Beata Kwater, P.E.

7/27/2023

SHEET 2 OF 2

NTS

ACP OVERLAY DETAILS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			48
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

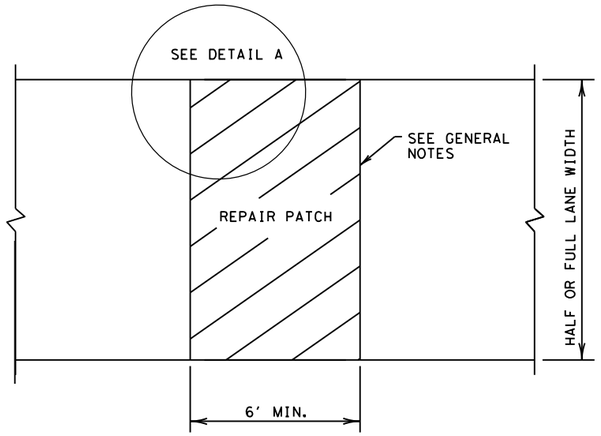
DATE:
FILE:

TABLE NO.1 STEEL BAR SIZE AND SPACING						
TYPE PAVEMENT	SLAB THICKNESS AND BAR SIZE		LONGITUDINAL*		TRANSVERSE*	
			REGULAR BARS	TIEBARS	BARS	TIEBARS
	T (IN.)	BAR SIZE	SPACING (IN.)	SPACING (IN.)	SPACING (IN.)	SPACING (IN.)
CRCP	6.0	#5	7.5	7.5	24	24
	6.5		7.0	7.0		
	7.0		6.5	6.5		
	7.5		6.0	6.0		
	8.0	#6	9.0	9.0	24	24
	8.5		8.5	8.5		
	9.0		8.0	8.0		
	9.5		7.5	7.5		
	10.0		7.0	7.0		
	10.5		6.75	6.75		
	11.0		6.5	6.5		
	11.5		6.25	6.25		
	≥12.0		6.0	6.0		
JRCP	<8.0	#5	24.0	12.0	24	24
	≥8.0	#6	24.0	12.0	24	24
CPCD	<8.0	#5	NONE	12.0	NONE	24
	≥8.0	#6	NONE	12.0	NONE	24

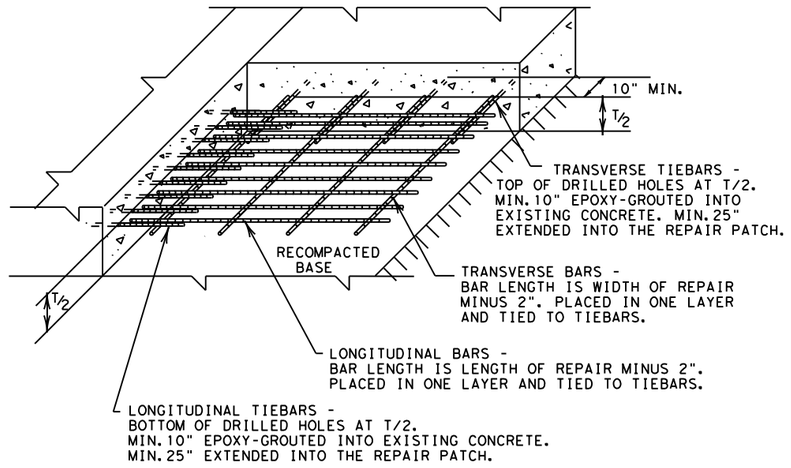
* USE 12" SPACING AS FIRST AND LAST SPACING AT END OR SIDE FOR ALL BARS.

GENERAL NOTES

1. ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
2. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.
3. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
4. AT LEAST ONE LONGITUDINAL FULL DEPTH SAW CUT SHALL BE AT AN EXISTING LONGITUDINAL JOINT.
5. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
6. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
7. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



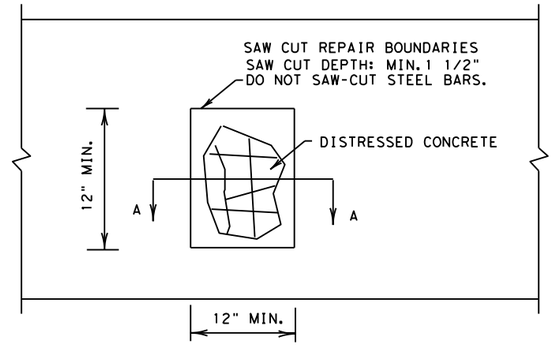
PLAN VIEW



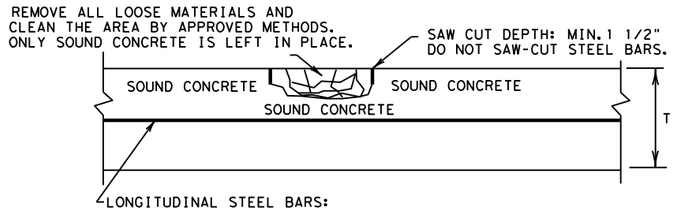
DETAIL A
GROUTED TIEBARS & REINFORCEMENT

GENERAL NOTES

1. ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
2. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
3. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



PLAN VIEW



LONGITUDINAL STEEL BARS:

*REPAIR AREAS MAY BE ADJUSTED AFTER REMOVING DISTRESSED CONCRETE. SWITCH THE HALF-DEPTH REPAIR TO FULL-DEPTH REPAIR IF EXPOSED EXISTING LONGITUDINAL BARS ARE DEFICIENT, AS APPROVED. COMPENSATION WILL BE MADE FOR UNEXPECTED VOLUMES OF REPAIR AREAS OR CHANGES IN SCOPE OF WORK.

*INCREASE THE REPAIR AREA AND PERFORM A FULL-DEPTH REPAIR AS DIRECTED IF LONGITUDINAL STEEL BARS WERE DAMAGED BY THE REMOVAL OPERATIONS. NO ADDITIONAL COMPENSATION WILL BE MADE.

SECTION A-A

HALF-DEPTH REPAIR

FULL-DEPTH REPAIR OF CRCP, JRCP, AND CPCD

Texas Department of Transportation

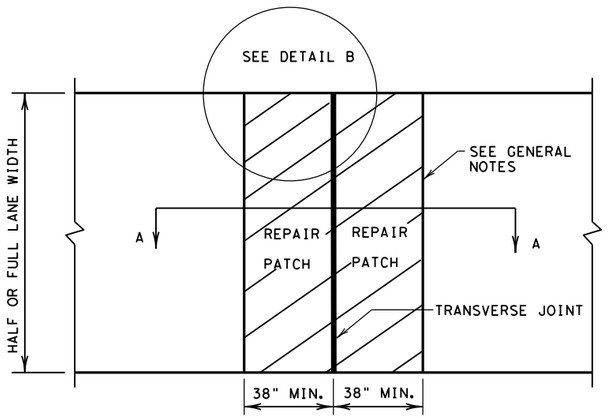
Design Division Standard

REPAIR OF CONCRETE PAVEMENT

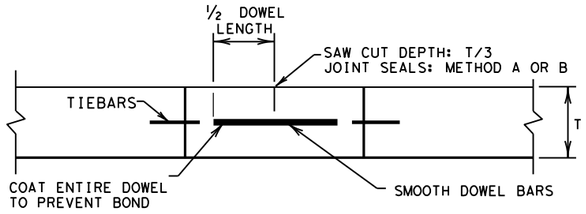
REPCP-14

FILE: repcp14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		49

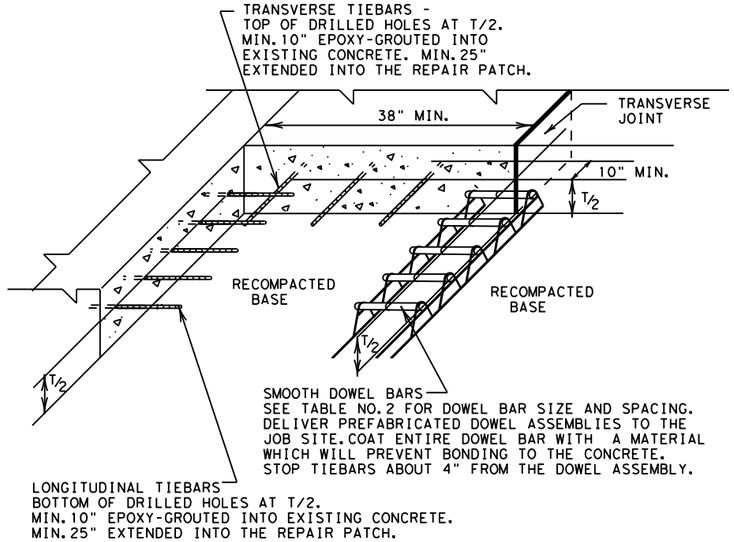
DATE:
FILE:



PLAN VIEW



SECTION A-A



DETAIL B
GROUTED TIEBARS & DOWELS

GENERAL NOTES

1. ITEM 361, "REPAIR OF CONCRETE PAVEMENT" SHALL GOVERN FOR THIS WORK.
2. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.
3. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
4. AT LEAST ONE LONGITUDINAL FULL DEPTH SAW CUT SHALL BE AT AN EXISTING LONGITUDINAL JOINT.
5. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
6. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A CEMENTITIOUS GROUT APPROVED BY THE ENGINEER.
7. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."
8. DOWEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1/4 IN. HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED. WHERE DOWEL BAR BASKETS ARE USED, REMOVE THE SHIPPING WIRES.

TABLE NO. 2 DOWELS (SMOOTH BARS)

PAVEMENT THICKNESS (INCHES)	SIZE AND DIA.	LENGTH (IN.)	SPACING (IN.)
<10	#8 (1 IN.)	18.0	12.0
≥10	#10 (1 1/4 IN.)		

REPAIR OF TRANSVERSE JOINT OF CPCD

Texas Department of Transportation

Design Division Standard

REPAIR OF CONCRETE PAVEMENT

REPCP-14

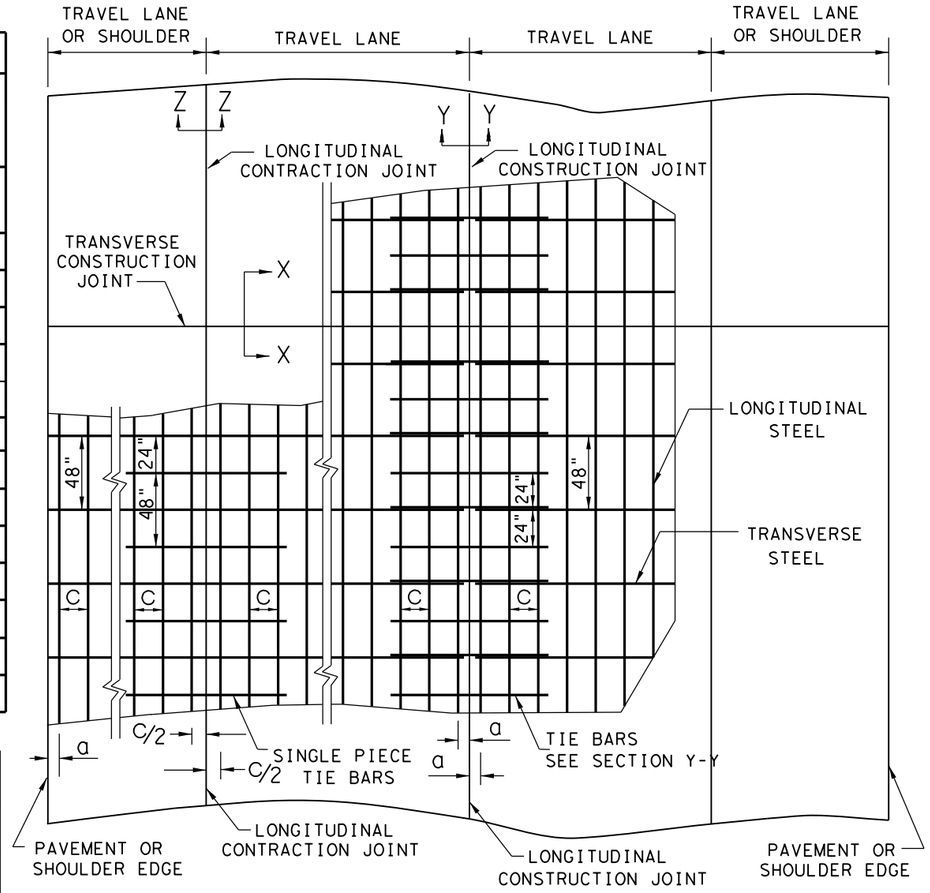
FILE: repcp14.dgn	DN: TxDOT	DN: HC	DW: HC	CK: AN
© TxDOT: DECEMBER 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		50

DATE:
FILE:

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

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

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

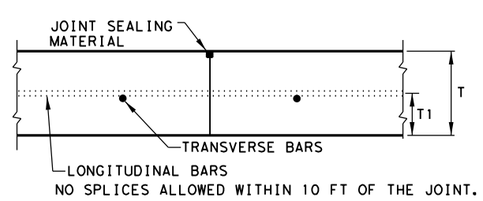


TYPICAL PAVEMENT LAYOUT

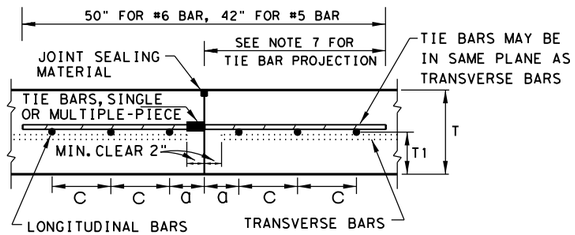
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

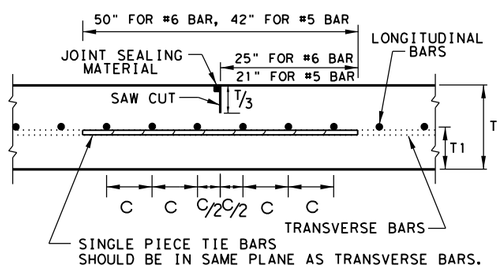
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. FOR PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT, ADDITIONAL DETAIL MAY BE SHOWN ELSEWHERE IN THE PLANS.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO. 1 AND TABLE NO. 2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS) SHALL CONFORM TO TABLE NO. 1.
5. ADJUST REINFORCING STEEL VERTICALLY USING SHIMS OR OTHER METHODS, AS APPROVED, TO MEET VERTICAL TOLERANCES PRIOR TO CONCRETE PLACEMENT.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE MINIMUM PROJECTION OF TIE BARS INTO THE ADJACENT PLACEMENT IS 22.5 IN. for #6 BARS AND 18.5 IN. FOR #5 BARS.
8. SEE STANDARD SHEET "CONCRETE CURB AND CURB AND GUTTER," FOR DETAILS WHEN TYING CONCRETE CURB OR CURB GUTTER AT A LONGITUDINAL JOINT.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN. 10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation

Design Division Standard

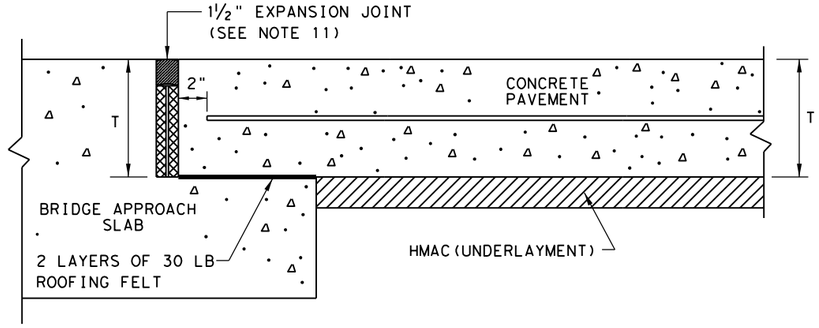
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES

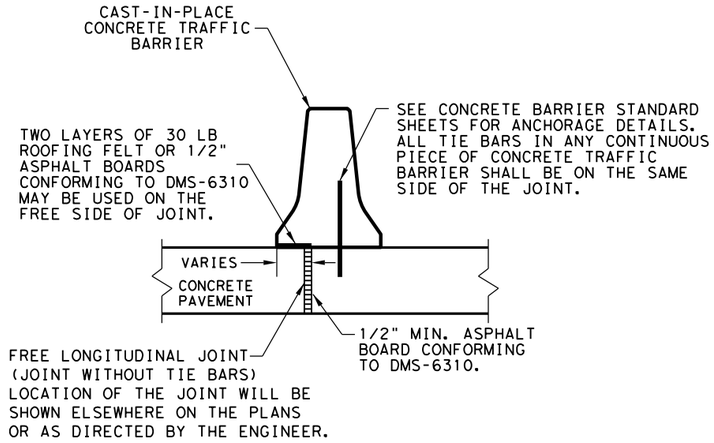
CRCP(1)-23

FILE: crcp123.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
©TxDOT: APRIL 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
APRIL 2023: REVISED LONG. STEEL VERTICAL LOCATION REMOVED ADDITIONAL TIEBAR AT TRANSVERSE CONSTRUCTION JOINTS	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		51

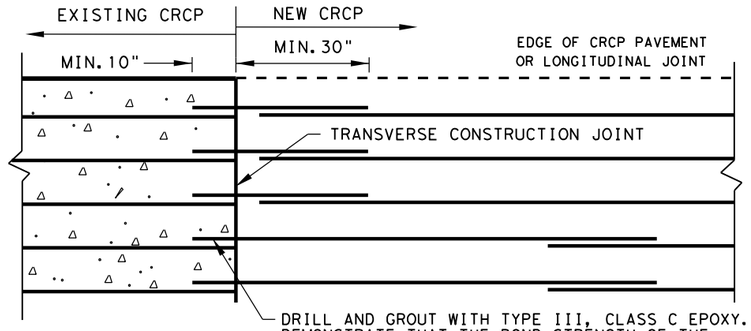
DATE:
FILE:



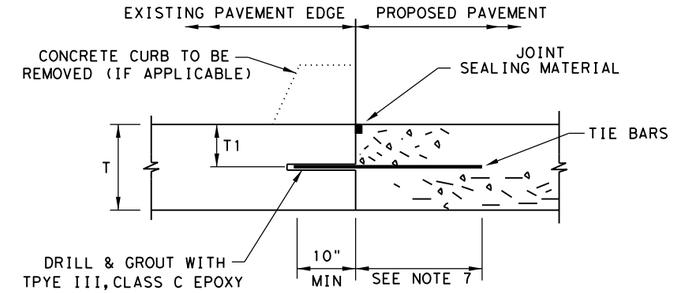
TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH



CENTERLINE FREE LONGITUDINAL JOINT DETAIL

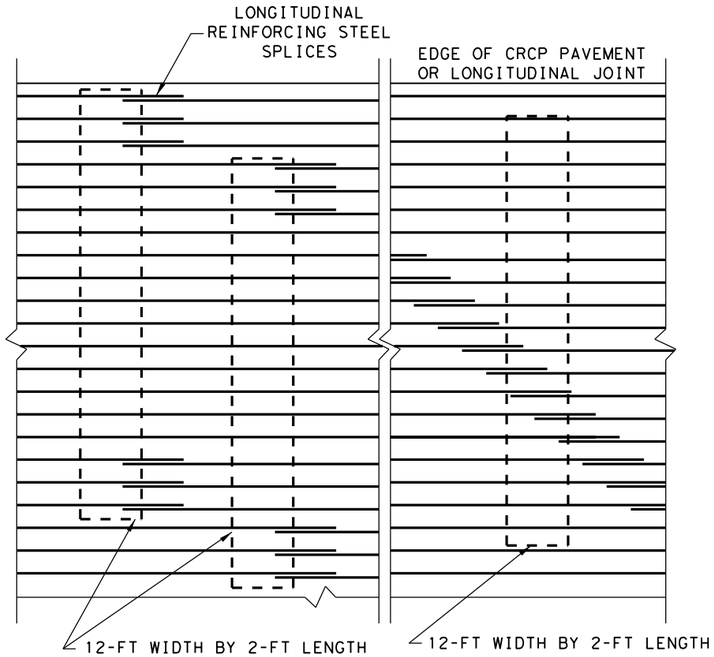


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



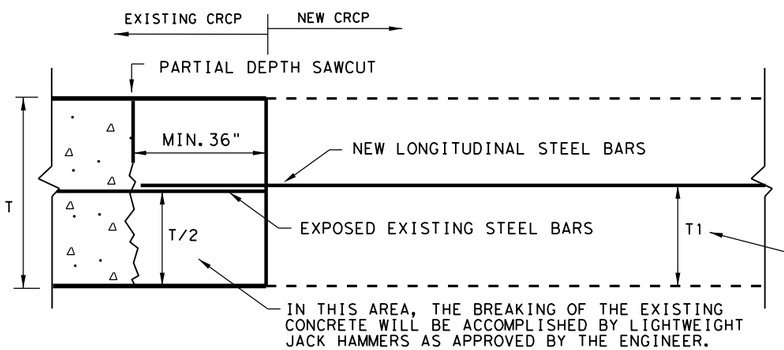
1. BEFORE CONCRETE PLACEMENT, PERFORM PULL-OUT TESTS ON EPOXY-GROUTED TIE BARS IN ACCORDANCE WITH ITEM 360.
2. SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER PAVEMENTS, USE #5 TIE BARS FOR LESS THAN 8" THICK PAVEMENTS.

LONGITUDINAL WIDENING JOINT DETAIL



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

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES

CRCP(1)-23

FILE: crcp123.dgn	DN: TxDOT	CK: KM	DW: CES	CK:	
©TxDOT: APRIL 2023	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0027	13	238	IH 69 FRTG	
APRIL 2023: MODIFIED EXPANSION JOINT DETAIL AT BRIDGE APPROACH SLAB	DIST	COUNTY		SHEET NO.	
	HOU	HARRIS		52	

DATE:
FILE:

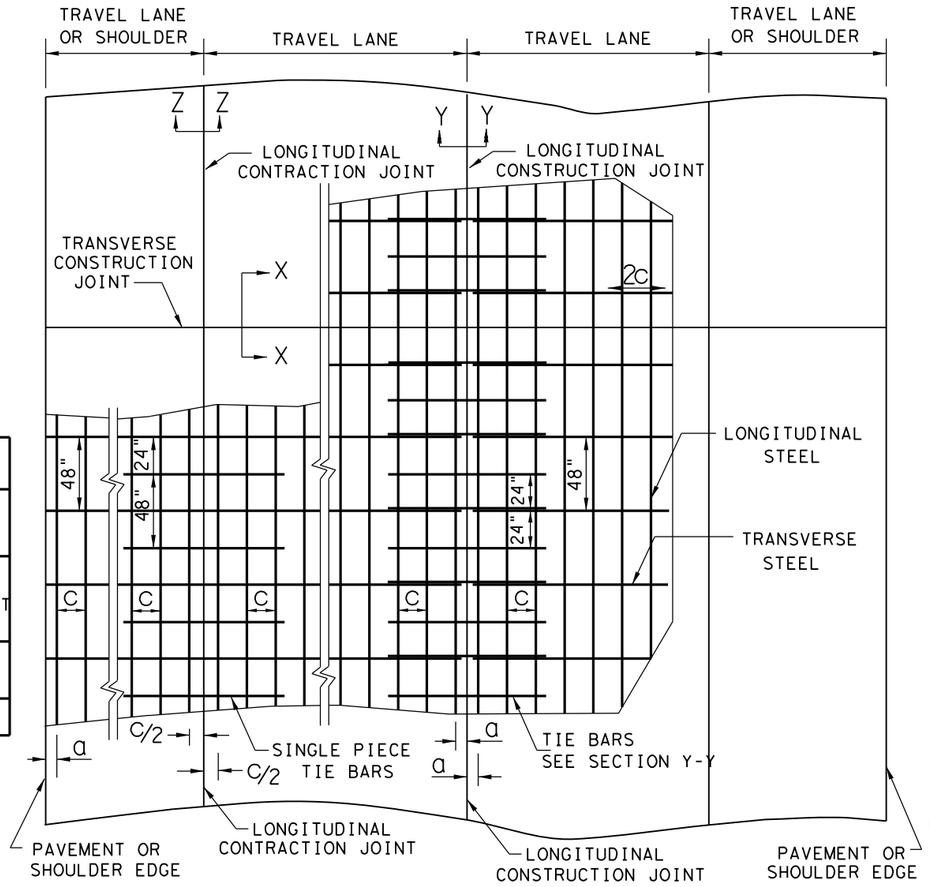
TABLE NO. 1 LONGITUDINAL STEEL

SLAB THICKNESS AND BAR SIZE		FOR BOTH STEEL MATS		LOWER STEEL MAT HEIGHT	TOP STEEL MAT HEIGHT
		LONGITUDINAL STEEL BARS	FIRST SPACING AT EDGE OR JOINT		
T (IN.)	BAR SIZE	SPACING c (IN.)	SPACING a (IN.)	T1 (IN.)	T2 (IN.)
14	#6	9.5	3 TO 4	4.5	8.0
15	#6	8.5	3 TO 4	5.0	8.5

TABLE NO. 2 TRANSVERSE STEEL AND TIE BARS

SLAB THICKNESS T (IN.)	FOR BOTH STEEL MATS		FOR LOWER STEEL MAT ONLY		FOR BOTH STEEL MATS	
	TRANSVERSE STEEL		TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z)		TIE BARS AT LONGITUDINAL CONSTRUCTION JOINT (SECTION Y-Y)	
	BAR SIZE*	SPACING (IN.)	BAR SIZE	SPACING (IN.)	BAR SIZE	SPACING (IN.)
14 - 15	#5	48	#6	48	#6	24

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

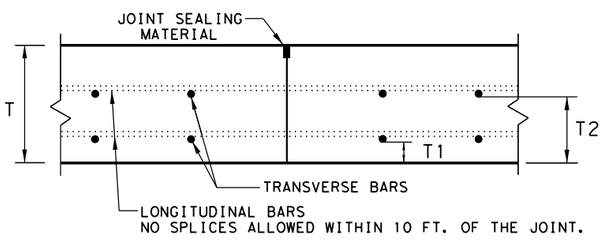


TYPICAL PAVEMENT LAYOUT

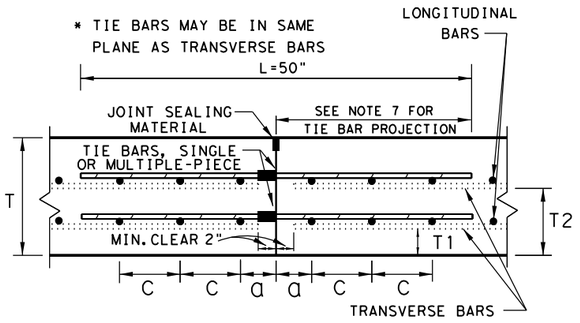
PLAN VIEW (NOT TO SCALE)

GENERAL NOTES

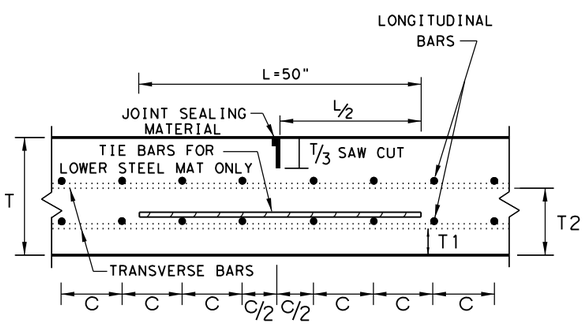
1. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS AND THE CROWN CROSS-SLOPE SHALL BE SHOWN ELSEWHERE IN THE PLANS. FOR PAVEMENTS WIDER THAN 100 FT. WITHOUT A FREE LONGITUDINAL JOINT, ADDITIONAL DETAIL MAY BE SHOWN ELSEWHERE IN THE PLANS.
2. USE COARSE AGGREGATES WITH A RATED COEFFICIENT OF THERMAL EXPANSION (CoTE) OF NOT MORE THAN 5.5 X 10^{-6} IN/IN/ °F AS LISTED IN THE CONCRETE RATED SOURCE QUALITY CATALOG (CRSQC).
3. ALL THE REINFORCING STEEL AND TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60) OR ABOVE. STEEL BAR SIZES AND SPACINGS SHALL CONFORM TO TABLE NO. 1 AND TABLE NO. 2.
4. STEEL BAR PLACEMENT TOLERANCE SHALL BE +/- 1 IN. HORIZONTALLY AND +/- 0.5 IN. VERTICALLY. CALCULATED AVERAGE BAR SPACING (CONCRETE PLACEMENT WIDTH / NUMBER OF LONGITUDINAL BARS IN A SINGLE LAYER) SHALL CONFORM TO TABLE NO. 1.
5. ADJUST REINFORCING STEEL VERTICALLY USING SHIMS OR OTHER METHODS, AS APPROVED, TO MEET VERTICAL TOLERANCES PRIOR TO CONCRETE PLACEMENT.
6. PAVEMENT WIDTHS OF MORE THAN 15 FT. SHALL HAVE A LONGITUDINAL JOINT (SECTION Z-Z OR SECTION Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6 IN. OF THE LANE LINE UNLESS THE JOINT LOCATION IS SHOWN ELSEWHERE ON THE PLANS.
7. THE MINIMUM PROJECTION OF TIE BARS INTO THE ADJACENT PLACEMENT IS 22.5 IN. for #6 BARS AND 18.5 IN. FOR #5 BARS.
8. SEE STANDARD SHEET "CONCRETE CURB AND CURB AND GUTTER," FOR DETAILS WHEN TYING CONCRETE CURB OR CURB GUTTER AT A LONGITUDINAL JOINT.
9. REPLACE MISSING OR DAMAGED TIE BARS WITHOUT ADDITIONAL COMPENSATION BY DRILLING MIN. 10 IN. DEEP AND GROUTING TIE BARS WITH TYPE III, CLASS C EPOXY. MEET THE PULL-OUT TEST REQUIREMENTS IN ITEM 361.
10. OMIT TIE BARS LOCATED WITHIN 18-IN. OF THE TRANSVERSE CONSTRUCTION JOINTS (SECTION X-X). USE HAND-OPERATED IMMERSION VIBRATORS TO CONSOLIDATE THE CONCRETE ADJACENT TO ALL FORMED JOINTS.
11. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR IS SHOWN ON STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONSTRUCTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

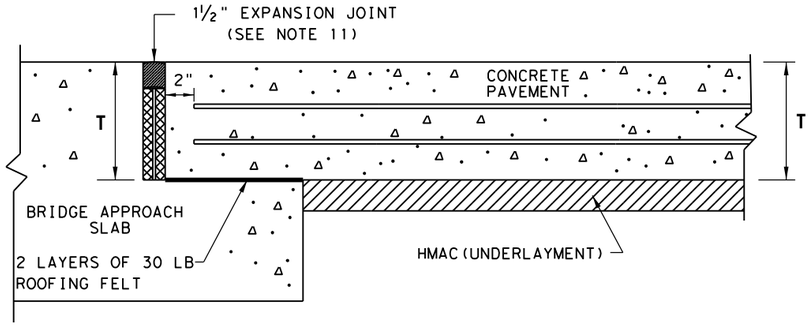
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

TWO LAYER STEEL BAR PLACEMENT T - 14 & 15 INCHES

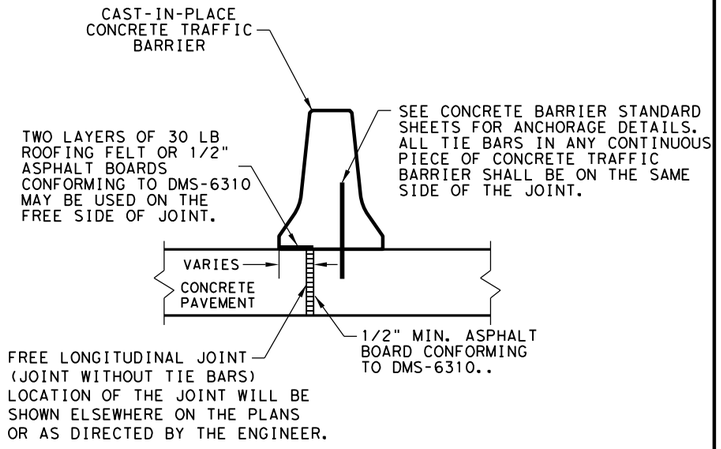
CRCP(2)-23

FILE: crcp223.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
© TxDOT: APRIL 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
APRIL 2023: REMOVED ADDITIONAL TIEBAR AT TRANSVERSE CONSTRUCTION JOINTS.	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		53

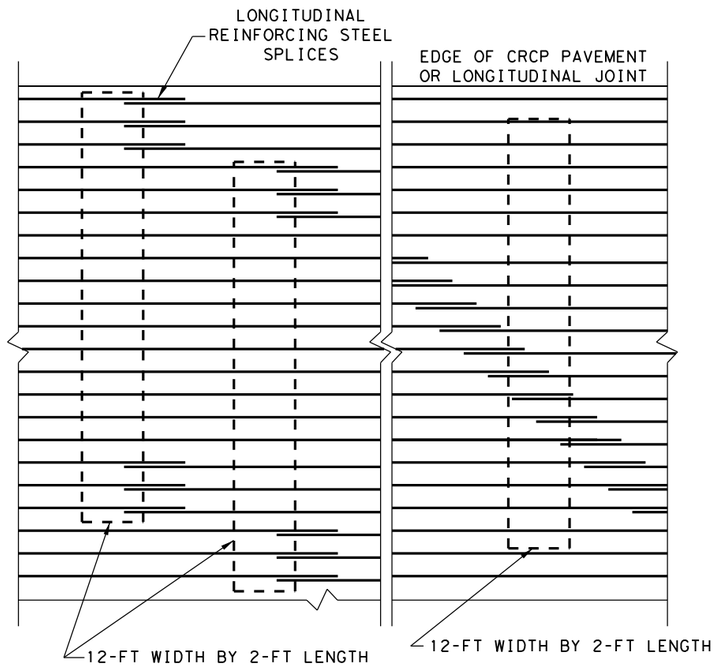
DATE:
FILE:



TRANSVERSE EXPANSION JOINT DETAIL
AT BRIDGE APPROACH

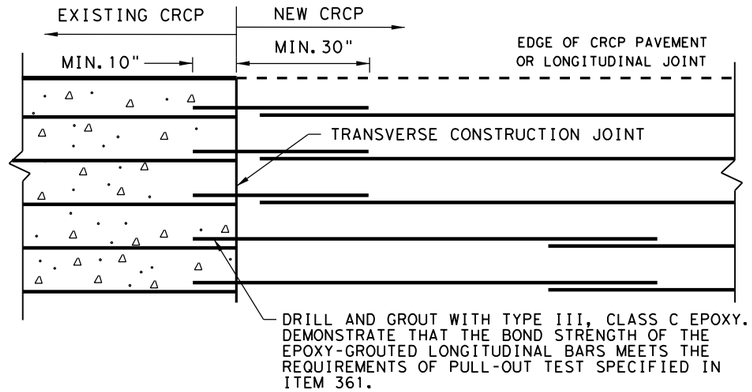


CENTERLINE FREE LONGITUDINAL JOINT DETAIL

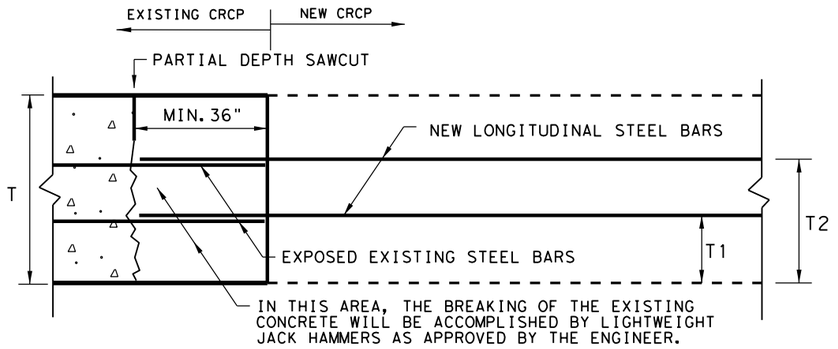


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

EXAMPLES OF LAP CONFIGURATION
PLAN VIEW (NOT TO SCALE)

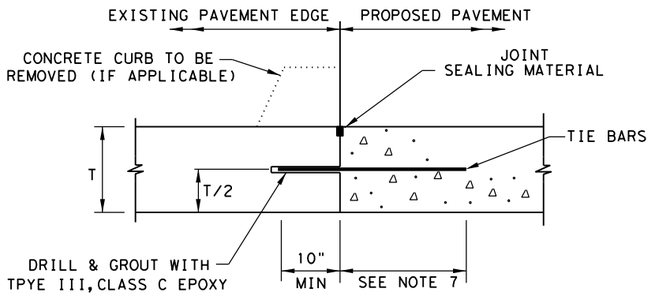


OPTION A: DRILL AND EPOXY
PLAN VIEW (NOT TO SCALE)



OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL
NEW CRCP TO EXISTING CRCP



1. BEFORE CONCRETE PLACEMENT, PERFORM PULL-OUT TESTS ON EPOXY-GROUTED TIE BARS IN ACCORDANCE WITH ITEM 360.
2. SPACE TIE BARS AT 24" SPACING.

LONGITUDINAL WIDENING JOINT DETAIL

SHEET 2 OF 2

Texas Department of Transportation

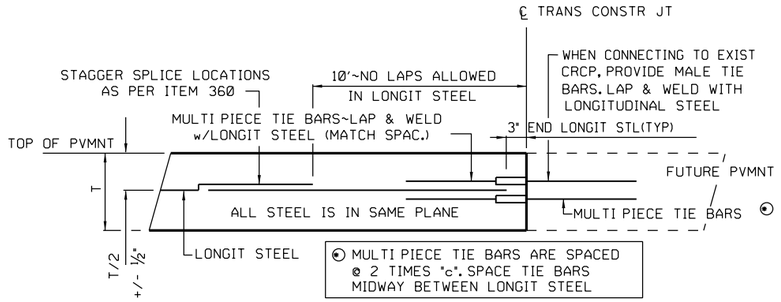
Design Division Standard

CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

TWO LAYER STEEL BAR PLACEMENT
T - 14 & 15 INCHES

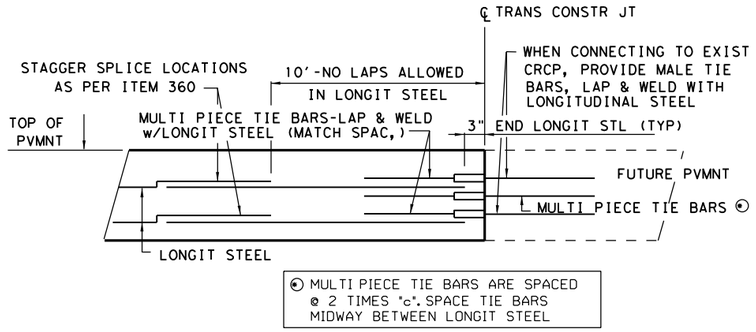
CRCP(2)-23

FILE: crcp223.dgn	DN: TxDOT	CK: KM	DW: CES	CK:
©TxDOT: APRIL 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
APRIL 2023: MODIFIED EXPANSION JOINT DETAIL AT BRIDGE APPROACH SLAB	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		54



SECTION - SINGLE STEEL MAT

AT END OF PROJECT OR TEMPORARY END OF PAVEMENT



SECTION - DOUBLE STEEL MAT

AT END OF PROJECT OR TEMPORARY END OF PAVEMENT

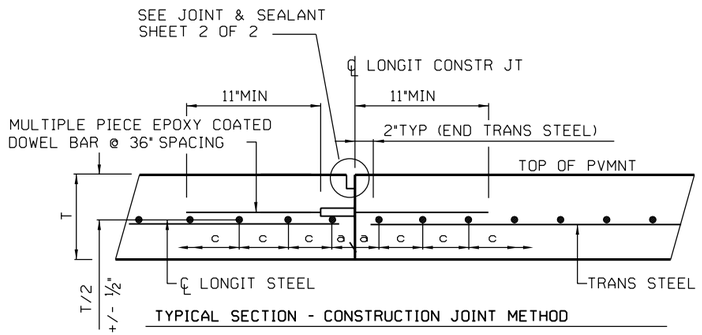
GENERAL NOTES

1. DETAILS FOR 7.0 IN. TO 13.0 IN. THICK CONCRETE PAVEMENT ARE SHOWN ON STANDARD CRCP(1)-17. DETAILS FOR 14 IN. TO 15 IN. THICK CONCRETE PAVEMENT ARE SHOWN ON STANDARD CRCP(2)-17.
2. DOWELS AND TIE BARS - DOWELS ARE ONE INCH MINIMUM DIAMETER. ENSURE DOWELS ARE FREE OF GREASE AND ARE EPOXY COATED. DO NOT SHEAR CUT DOWELS DURING FABRICATION. PROVIDE TIE BARS PER ITEM 360. FURNISH MULTI PIECE TIE BARS AND DOWELS WITH STOP COUPLINGS AND WITH THREADS ON THE BARS.
3. USE CHAIRS OF SUFFICIENT STRUCTURAL QUALITY AND NUMBER TO SUPPORT THE MAT TO THE VERTICAL TOLERANCES. CHAIRS WILL BE APPROVED BY THE ENGINEER AND DO NOT REQUIRE GALVANIZING.
4. MECHANICALLY PLACING REINFORCING STEEL IS NOT ALLOWED. NO BARS, DOWELS OR TIE BARS MAY BE VIBRATED INTO POSITION.
5. WHERE DIFFERENT THICKNESS PAVEMENTS MEET, TRANSITION THE THINNER SECTION TO THE THICKER SECTION OVER A DISTANCE OF 20 FT. PLACE REINFORCING STEEL WITHIN THE TRANSITION THE SAME AS IN THE THICKER PAVEMENT.
6. PERFORM WELDING PER ITEM 448. FURNISH WELDABLE REBAR PER ITEM 440.

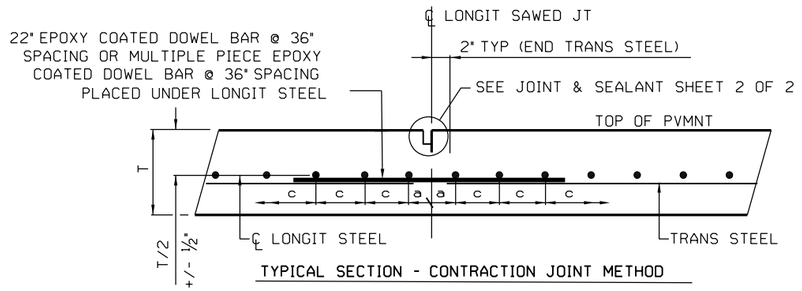
LONGITUDINAL DOWEL JOINT DETAILS

LOCATE WHERE SHOWN IN THE PLANS OR AS APPROVED. CONTRACTOR MAY USE EITHER METHOD

SINGLE STEEL MAT

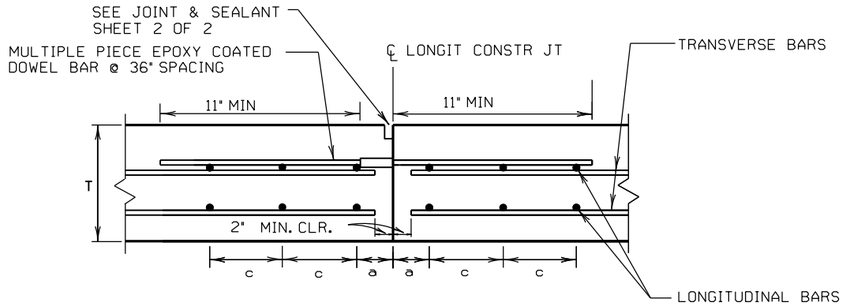


TYPICAL SECTION - CONSTRUCTION JOINT METHOD

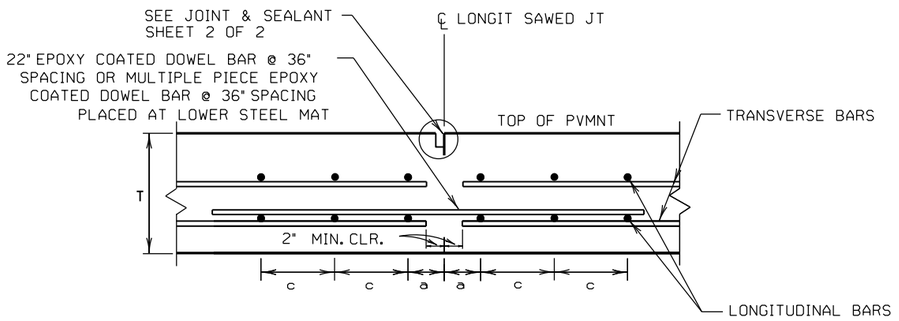


TYPICAL SECTION - CONTRACTION JOINT METHOD

DOUBLE STEEL MAT



TYPICAL SECTION - CONSTRUCTION JOINT METHOD



TYPICAL SECTION - CONTRACTION JOINT METHOD

Texas Department of Transportation
Houston District

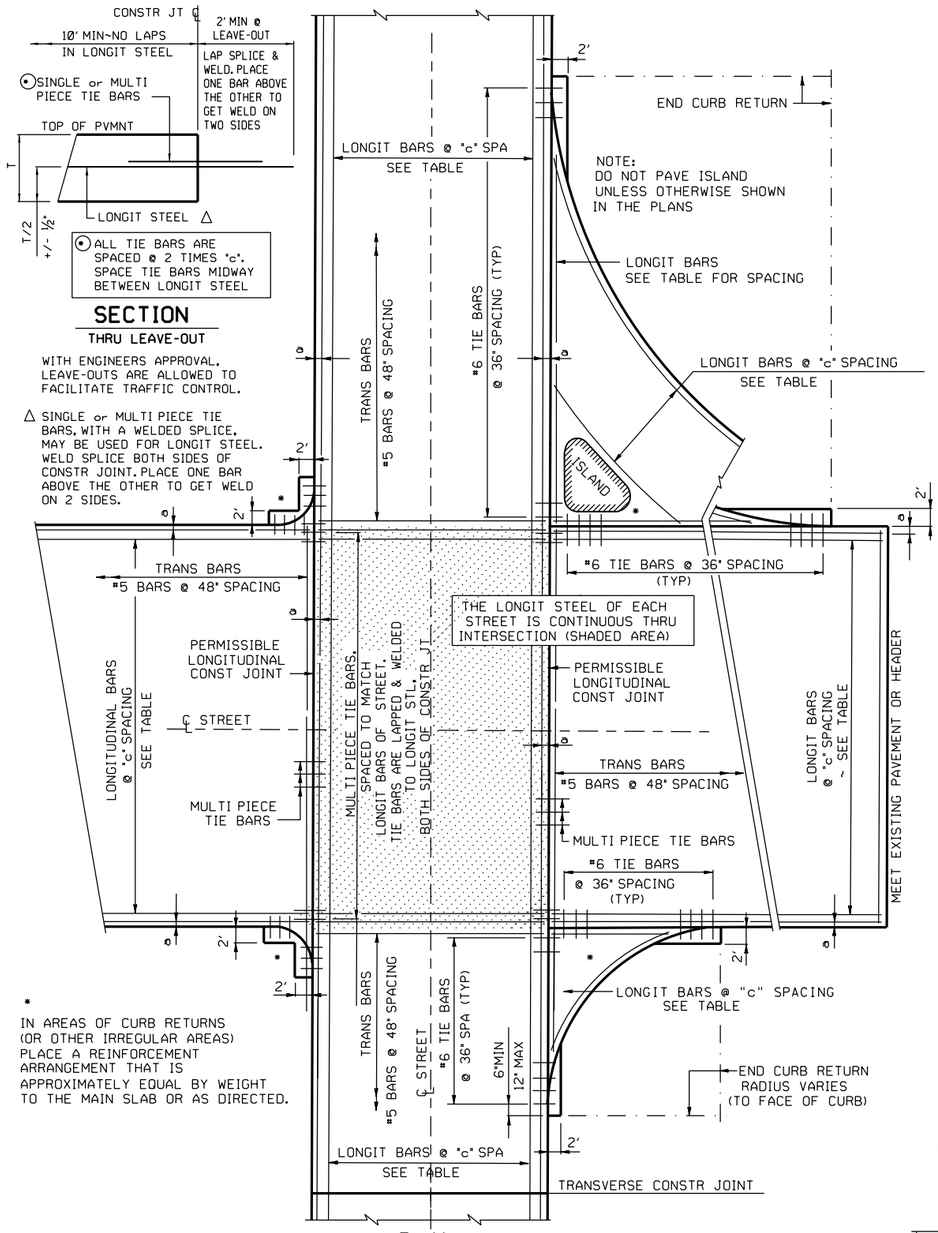
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT HOUSTON SUPPLEMENT CRCP-HS

DN: - CK: - DW: - CK: -

REVISIONS
4/12 CHANGED CTE FROM 6.0 TO 5.0
8/14 UPDATE TO REFERENCE CRCP-13 STND.
2/15 REVISED GENERAL NOTES, MINOR CORRECTIONS.
4/17 REVISED NOTE #3 OF GENERAL NOTES, MINOR CORRECTIONS.

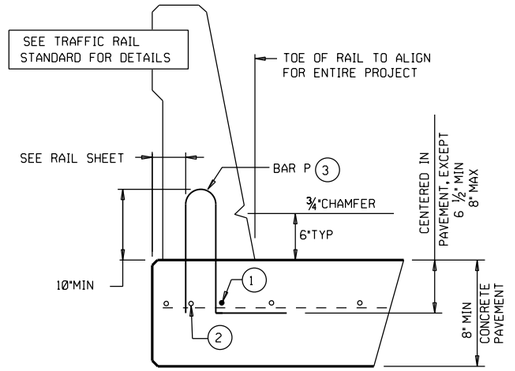
DISTRICT	PROJECT NO.			SHEET
HOU				55
COUNTY	CONTROL	SECTION	JOB	HIGHWAY
HARRIS	0027	13	238	IH 69 FRTG

STD-B1A



PLAN

SHOWING TYPICAL CONCRETE PAVEMENT INTERSECTION



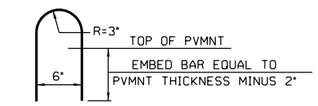
RAIL DETAIL

FOR ADDITIONAL DETAILS, SEE RAIL STANDARD SHEET.
THE MINIMUM LENGTH OF A CONCRETE RAILING PANEL IS FIVE FEET.

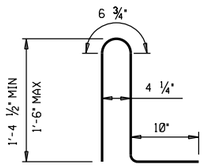
(1) AS AN AID IN SUPPORTING REINFORCEMENT, ADDITIONAL LONGITUDINAL BARS MAY BE USED IN THE SLAB WITH THE APPROVAL OF THE ENGINEER. FURNISH SUCH BARS AT NO EXPENSE TO THE DEPARTMENT.

(2) LONGITUDINAL SLAB BAR MAY BE ADJUSTED LATERALLY 3" +/- TO TIE REINFORCING.

(3) ANCHORAGE BAR SHOWN IS FOR AN SSTR OR T551 RAIL. SEE RAILING DETAIL SHEET FOR SPACING OF BAR P. FOR OTHER RAIL TYPES SEE RAILING DETAIL SHEET.

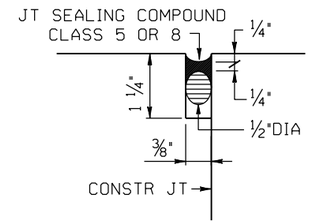


BAR A (#3)

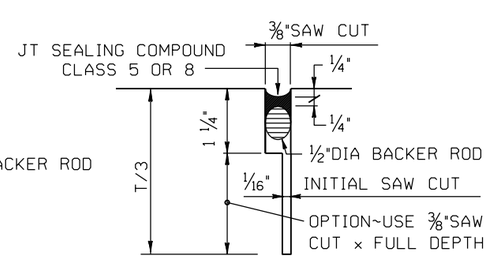


BAR P (#5)

RAIL ANCHOR INSTALLED IN PAVEMENT (3)

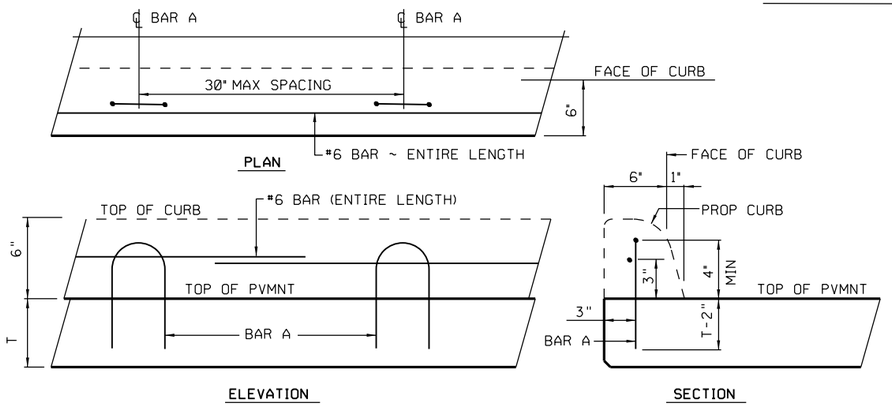


DETAIL 1 ~ CONSTR JOINT



DETAIL 2 ~ SAWED JOINT

JOINT AND SEALANT DETAILS



CURB DETAIL

SEE CC & DID STANDARD

SHEET 2 OF 2

Texas Department of Transportation
Houston District

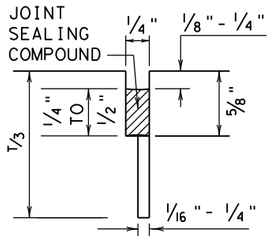
CONTINUOUSLY REINFORCED CONCRETE PAVEMENT HOUSTON SUPPLEMENT CRCP-HS

DN: -	CK: -	DW: -	CK: -	
REVISIONS 4/12 CHANGED CTE FROM 6.0 TO 5.0 (ON SHEET 1) 2/15 MINOR CORRECTIONS.	DISTRICT	PROJECT NO.		SHEET
	HOU			56
	COUNTY	CONTROL	SECTION	JOB	HIGHWAY
	HARRIS	0027	13	238	IH 69 FRTG

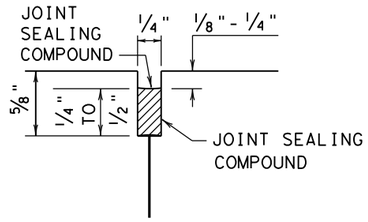
STD-B1B

DATE:
FILE:

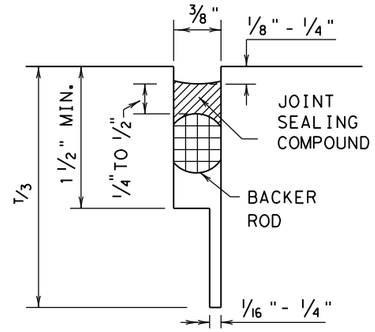
METHOD B: JOINT SEALING COMPOUND



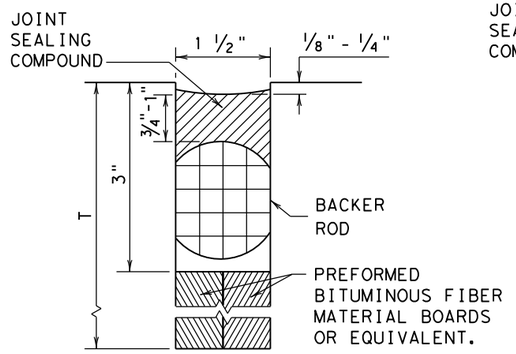
LONGITUDINAL SAWED
CONTRACTION JOINT



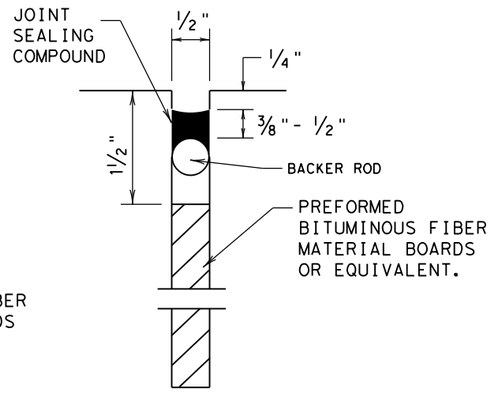
LONGITUDINAL OR TRANSVERSE
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT

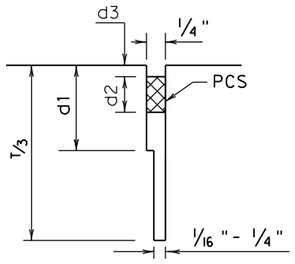


TRANSVERSE FORMED
EXPANSION JOINT

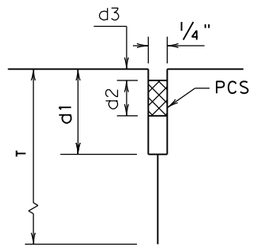


FORMED
ISOLATION JOINT

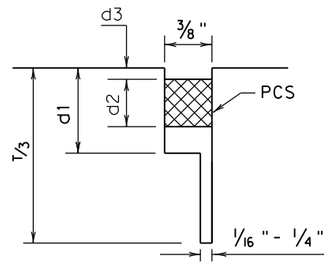
METHOD A: PREFORMED COMPRESSION SEALS (PCS) (DMS-6310 CLASS 6)



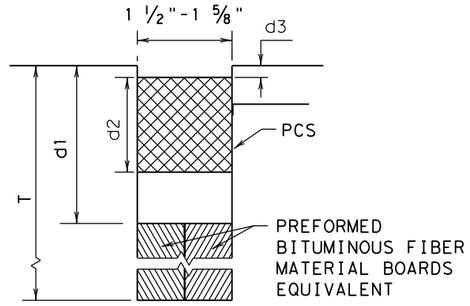
LONGITUDINAL SAWED
CONTRACTION JOINT



LONGITUDINAL
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT



TRANSVERSE FORMED
EXPANSION JOINT

GENERAL NOTES

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

Texas Department of Transportation | Design Division Standard

CONCRETE PAVING DETAILS

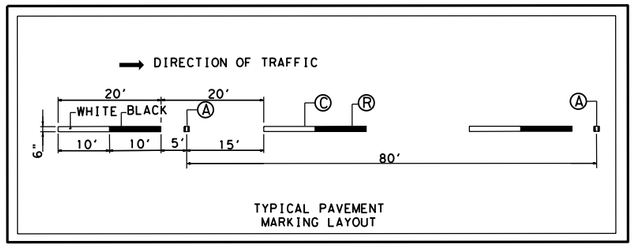
JOINT SEALS

JS-14

FILE: js14.dgn	DN: TxDOT		DN: HC	DW: HC		CK: AN
©TxDOT: DECEMBER 2014	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0027	13	238		IH 69 FRTG	
	DIST	COUNTY				SHEET NO.
	HOU	HARRIS				57

LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



TYPICAL PAVEMENT MARKING LAYOUT

DETAIL "A"

N. T. S.

BISSONNET
INTERSECTION PAVEMENT MARKING LAYOUT

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

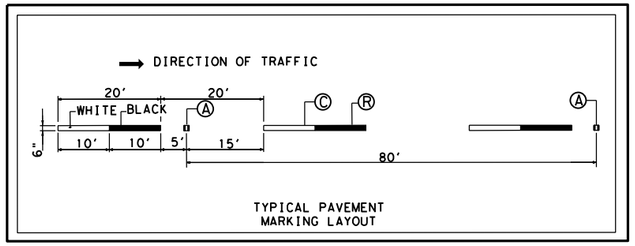
Beata Kwater, P.E.

9/14/2023

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			58
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

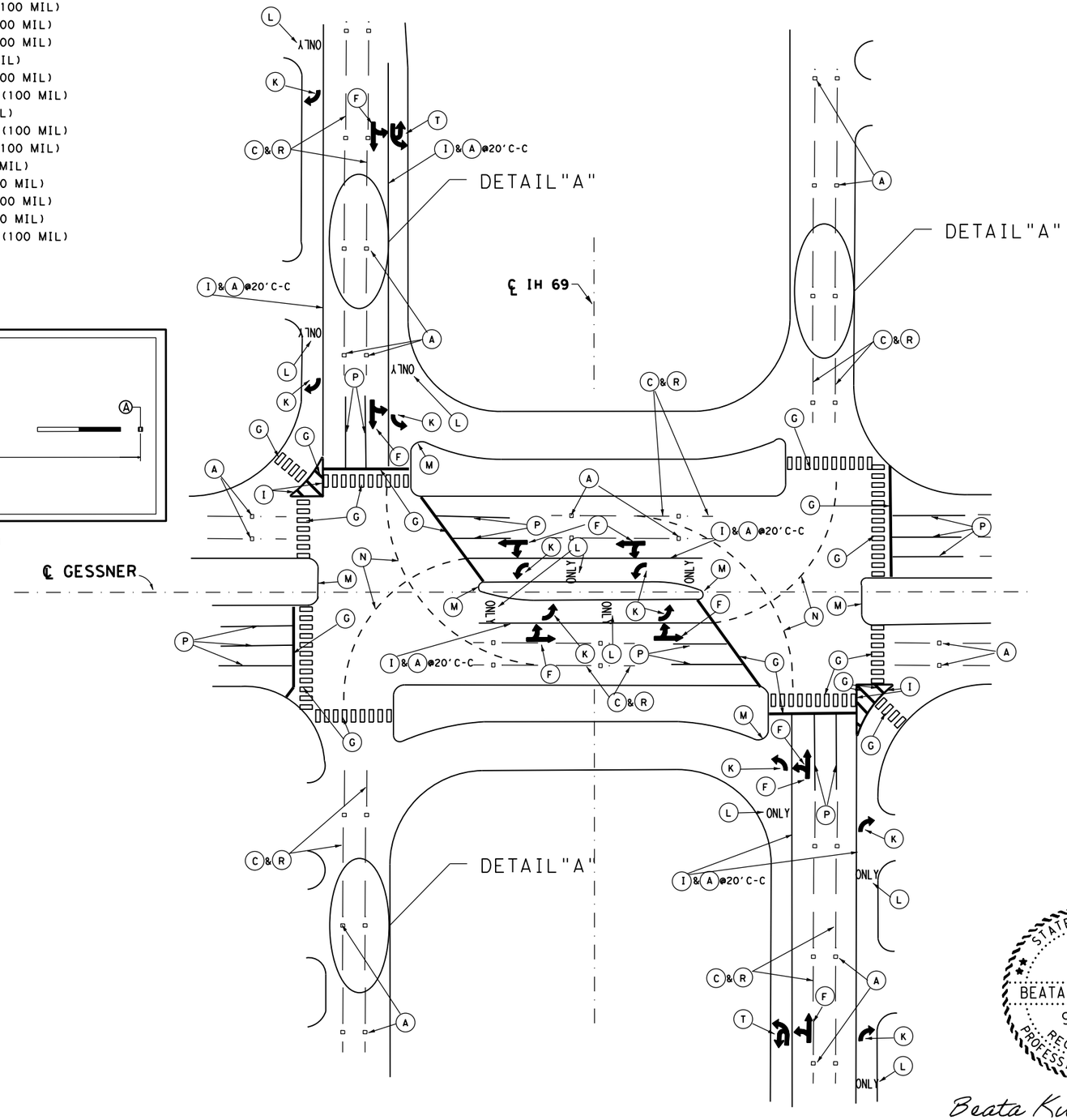
LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



TYPICAL PAVEMENT MARKING LAYOUT

DETAIL"A"



N.T.S.

GESSNER
INTERSECTION PAVEMENT MARKING LAYOUT

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

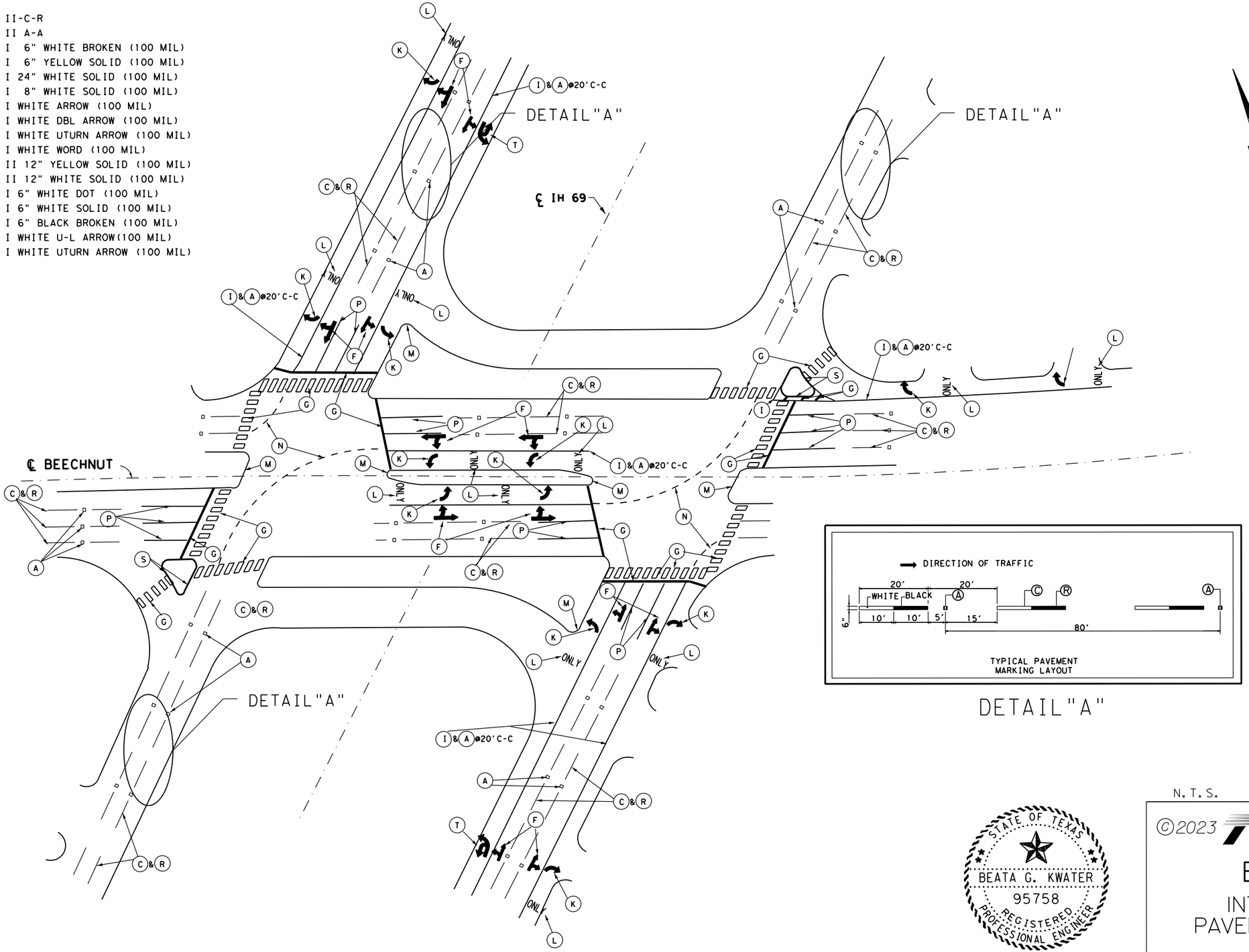
Beata Kwater, P.E.

9/14/2023

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			59
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



DETAIL"A"

N.T.S.

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

9/14/2023

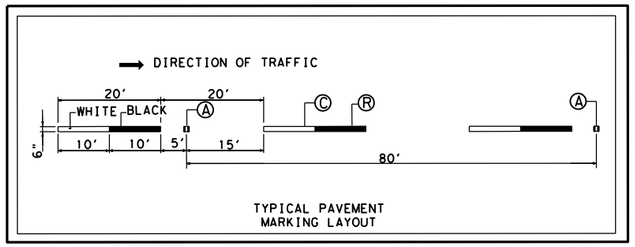
BEECHNUT

INTERSECTION PAVEMENT MARKING LAYOUT

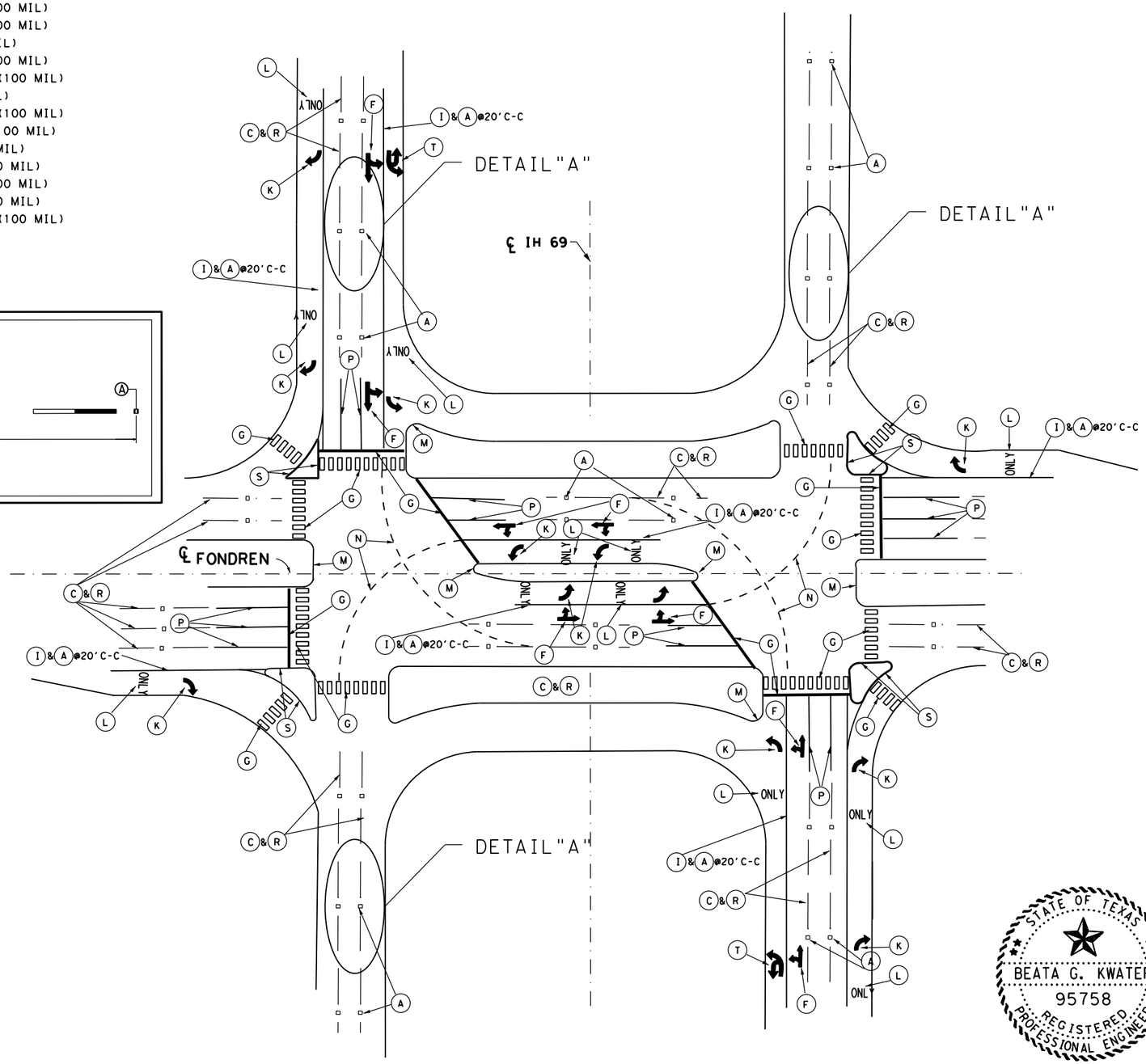
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			60
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



DETAIL"A"



N. T. S.

FONDREN
INTERSECTION PAVEMENT MARKING LAYOUT

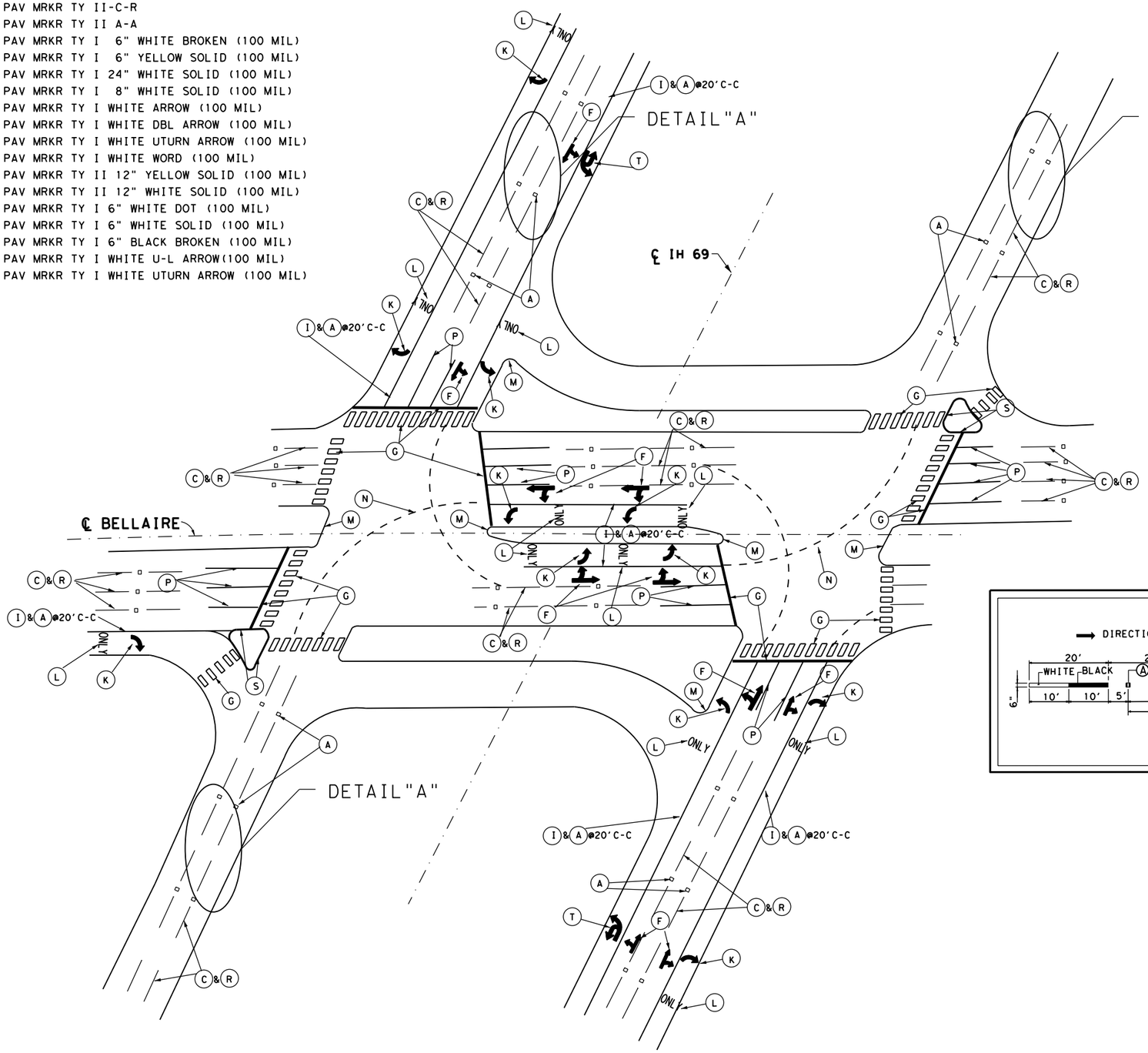
STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

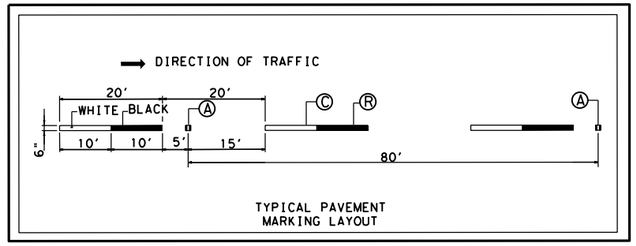
Beata Kwater, P.E.
9/14/2023

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			61
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)





DETAIL"A"

N.T.S.

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.
9/14/2023

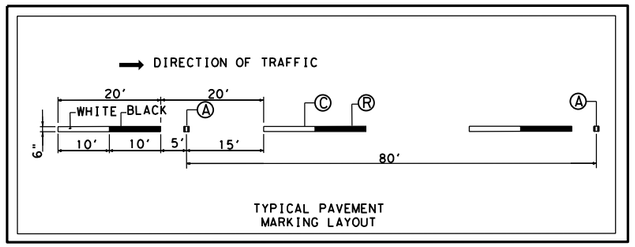
BELLAIRE

INTERSECTION PAVEMENT MARKING LAYOUT

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			62
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

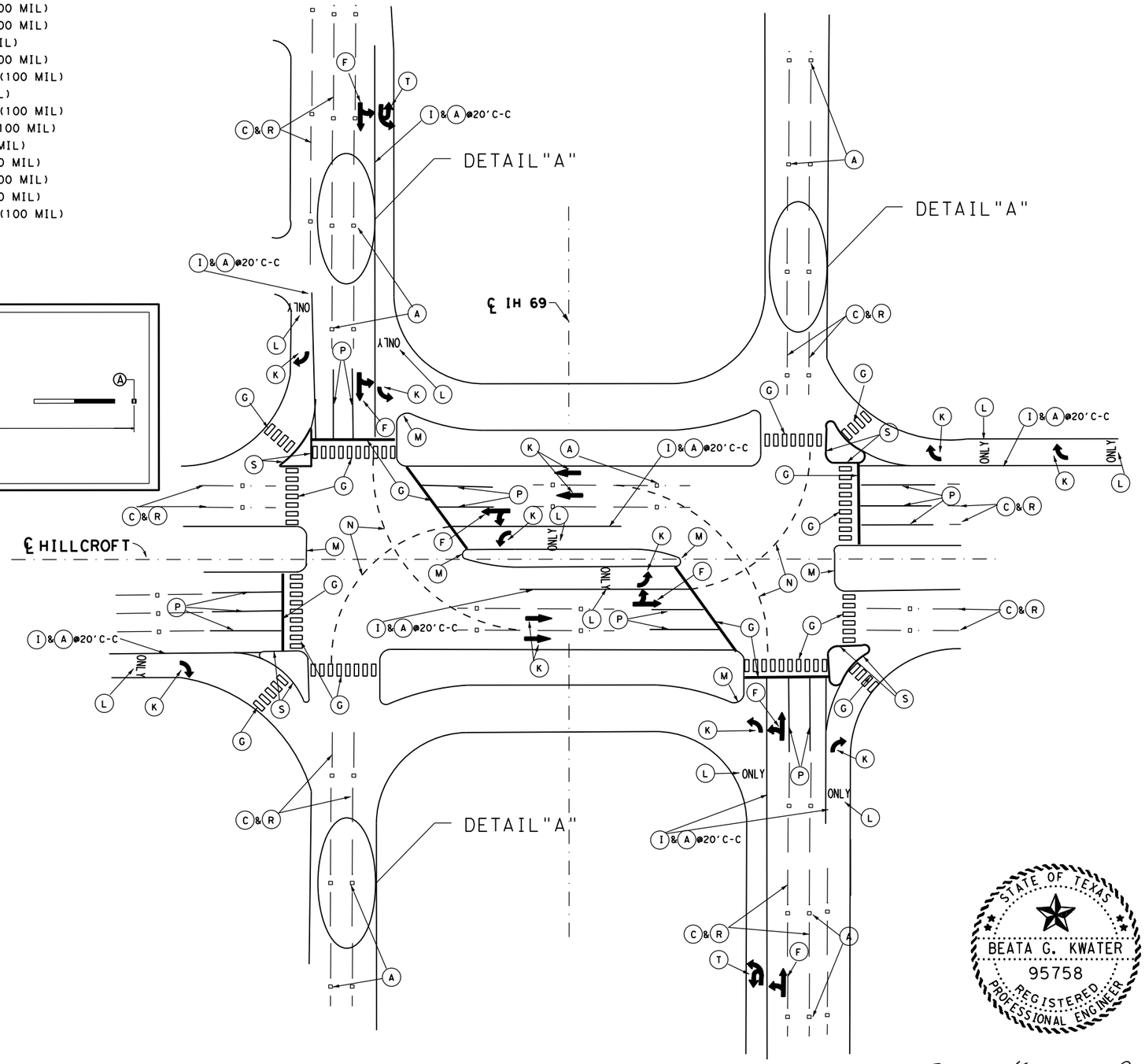
LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



TYPICAL PAVEMENT MARKING LAYOUT

DETAIL"A"



N. T. S.

HILLCROFT

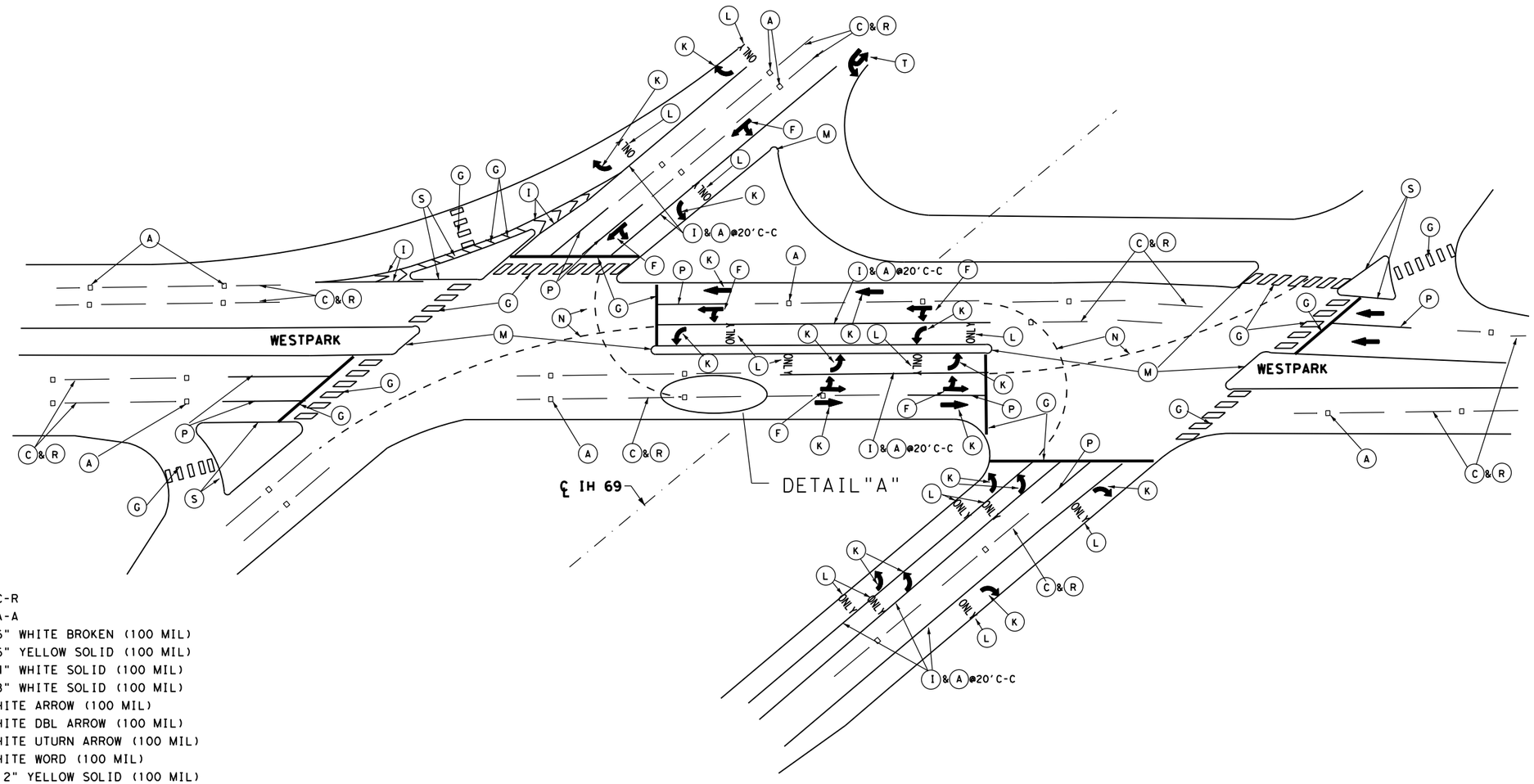
INTERSECTION PAVEMENT MARKING LAYOUT

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

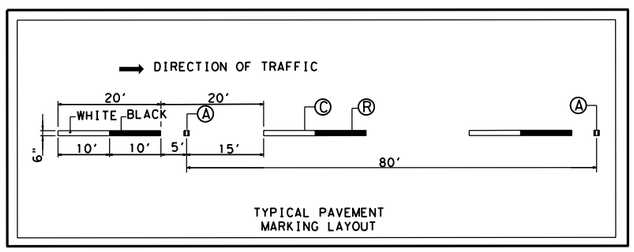
9/14/2023

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			63
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG



LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



DETAIL "A"

N. T. S.

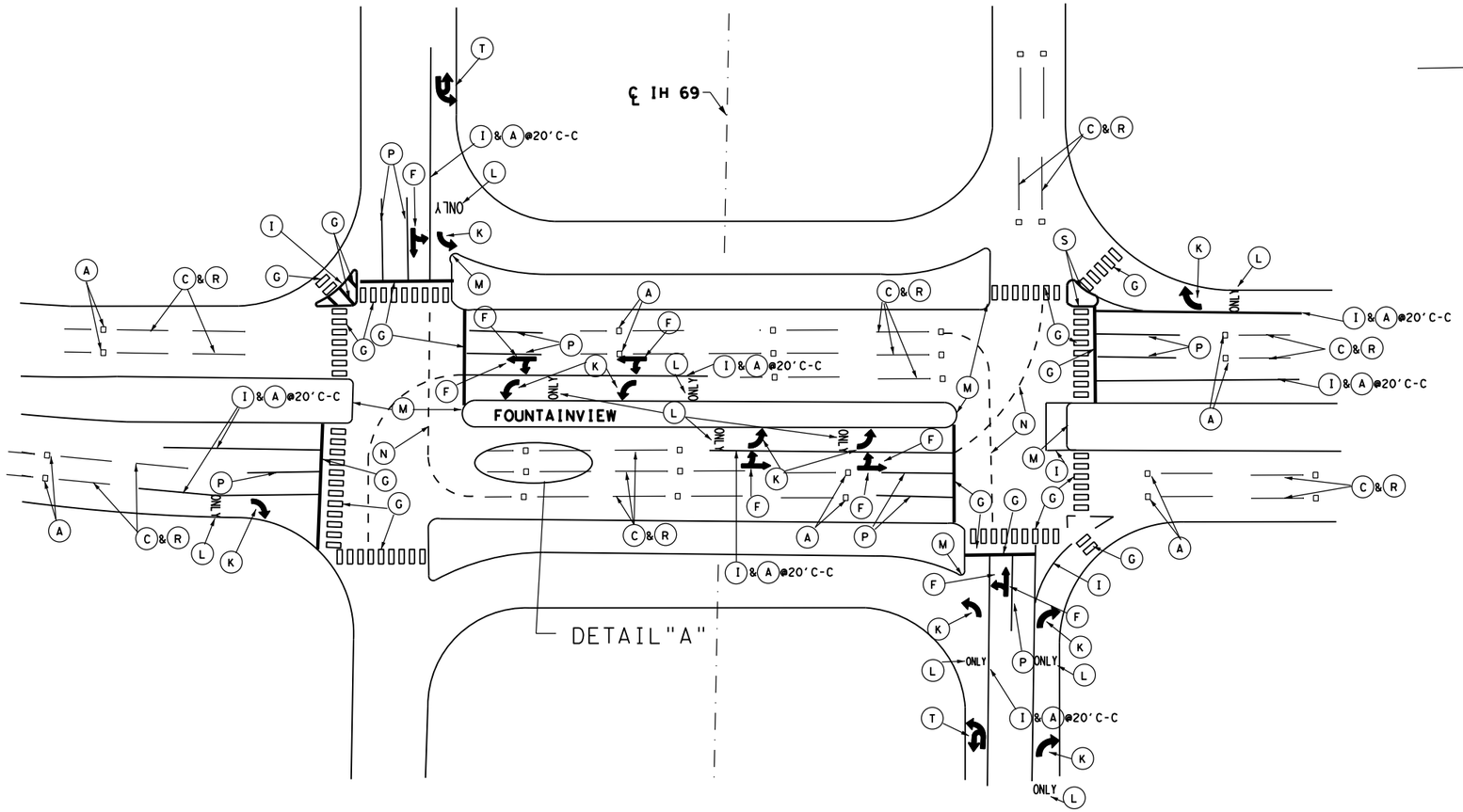
WESTPARK
INTERSECTION PAVEMENT MARKING LAYOUT

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

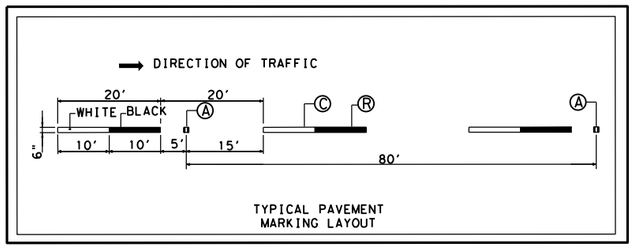
9/14/2023

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			64
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG



LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



DETAIL"A"

N. T. S.

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.

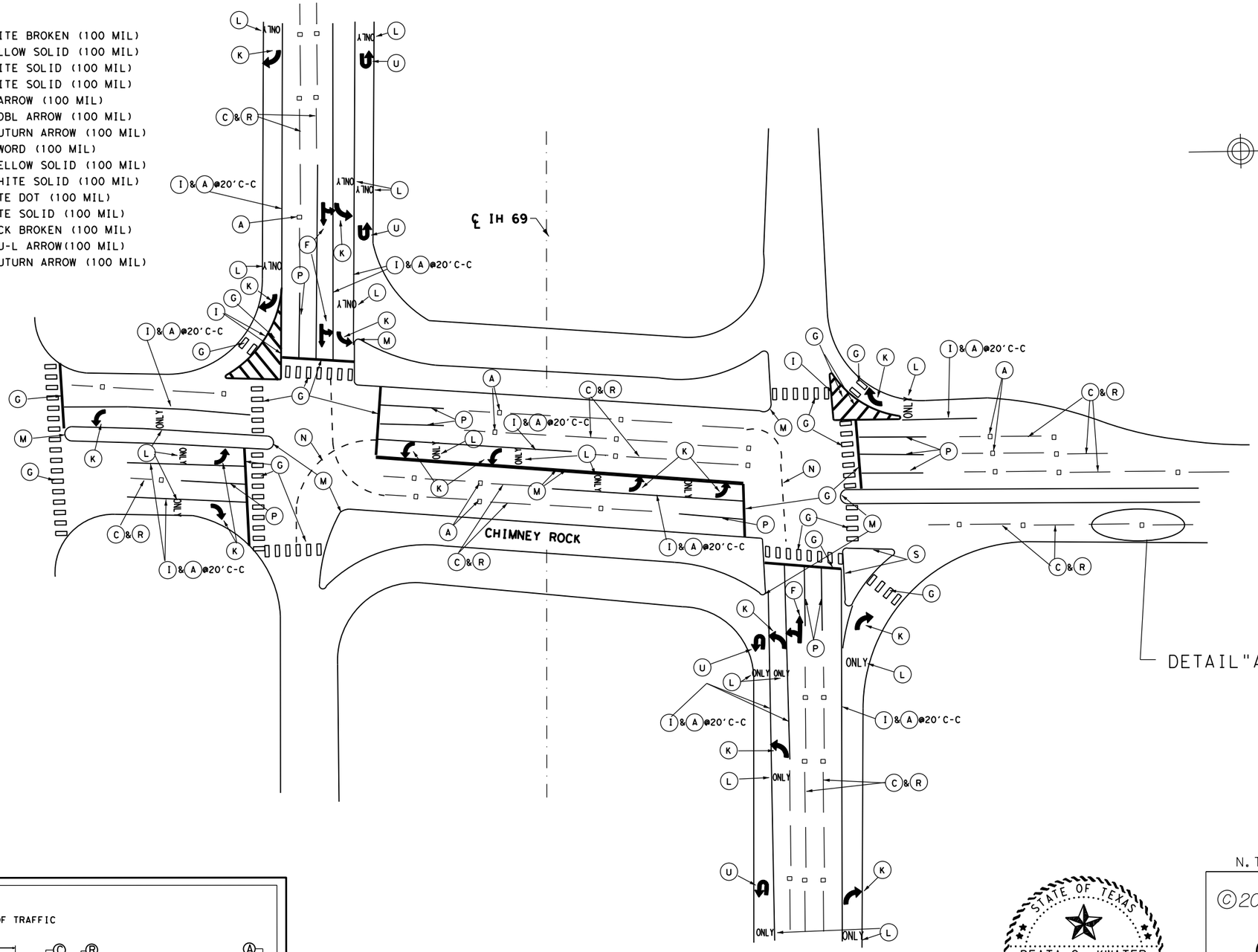
9/14/2023

FOUNTAINVIEW
INTERSECTION PAVEMENT MARKING LAYOUT

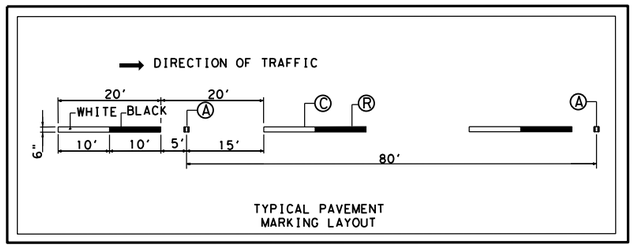
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			65
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

LEGEND:

A - REFL PAV MRKR TY II-C-R
B - REFL PAV MRKR TY II A-A
C - REFL PAV MRKR TY I 6" WHITE BROKEN (100 MIL)
E - REFL PAV MRKR TY I 6" YELLOW SOLID (100 MIL)
G - REFL PAV MRKR TY I 24" WHITE SOLID (100 MIL)
I - REFL PAV MRKR TY I 8" WHITE SOLID (100 MIL)
K - REFL PAV MRKR TY I WHITE ARROW (100 MIL)
F - REFL PAV MRKR TY I WHITE DBL ARROW (100 MIL)
X - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)
L - REFL PAV MRKR TY I WHITE WORD (100 MIL)
M - REFL PAV MRKR TY II 12" YELLOW SOLID (100 MIL)
S - REFL PAV MRKR TY II 12" WHITE SOLID (100 MIL)
N - REFL PAV MRKR TY I 6" WHITE DOT (100 MIL)
P - REFL PAV MRKR TY I 6" WHITE SOLID (100 MIL)
R - REFL PAV MRKR TY I 6" BLACK BROKEN (100 MIL)
T - REFL PAV MRKR TY I WHITE U-L ARROW(100 MIL)
U - REFL PAV MRKR TY I WHITE UTURN ARROW (100 MIL)



DETAIL"A"



DETAIL"A"

N. T. S.

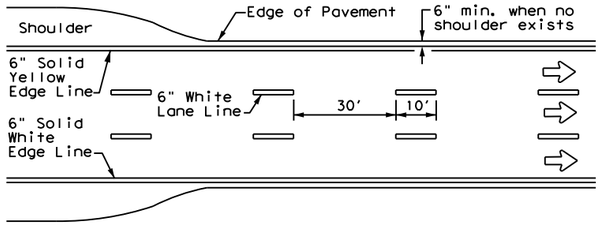
CHIMNEY ROCK
INTERSECTION PAVEMENT MARKING LAYOUT

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

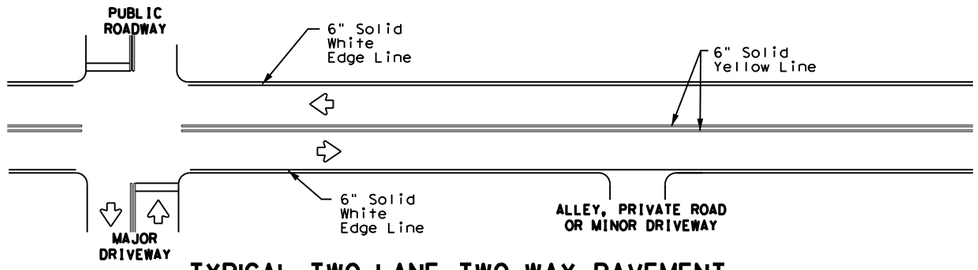
Beata Kwater, P.E.

9/14/2023

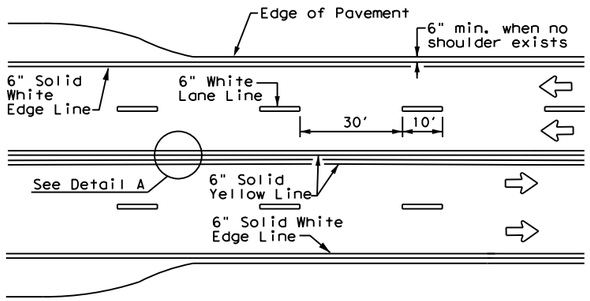
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			66
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

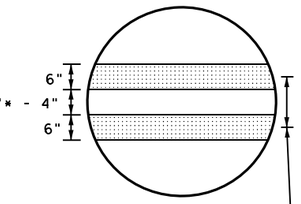


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

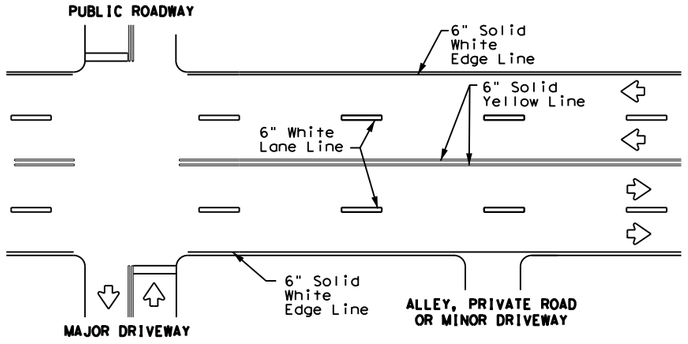




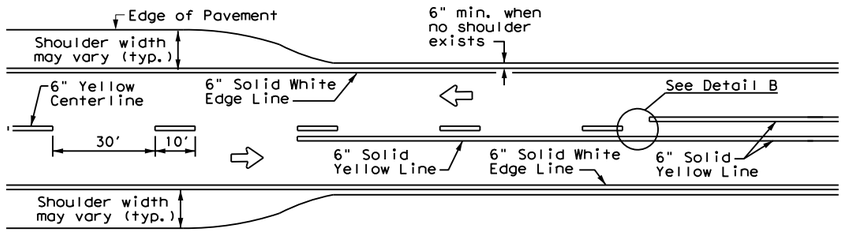
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

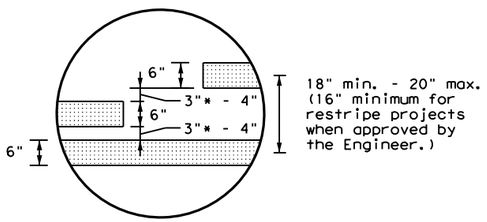
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

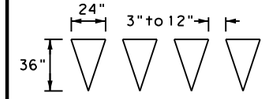


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



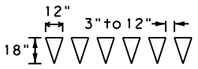
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

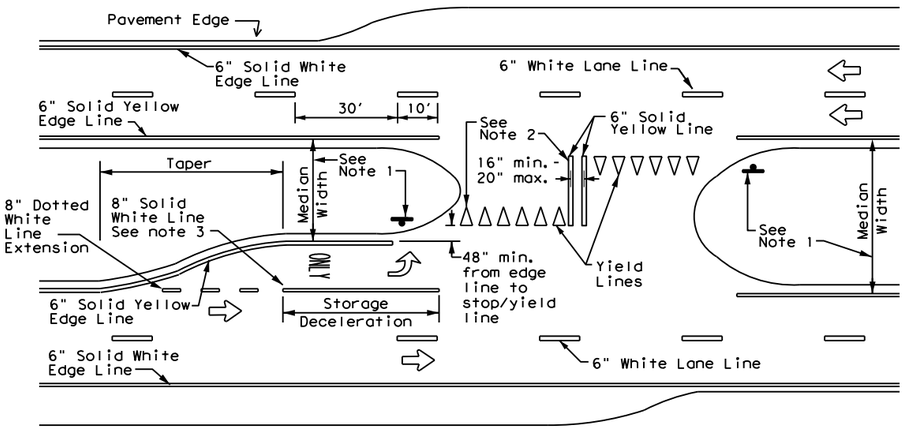


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

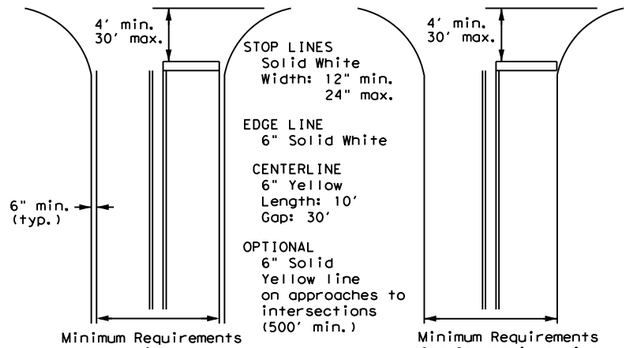
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

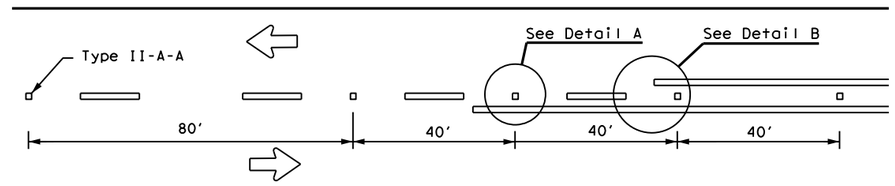
PM(1)-22

FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	0027	13	238	IH 69 FRTG
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	HOU	HARRIS		67

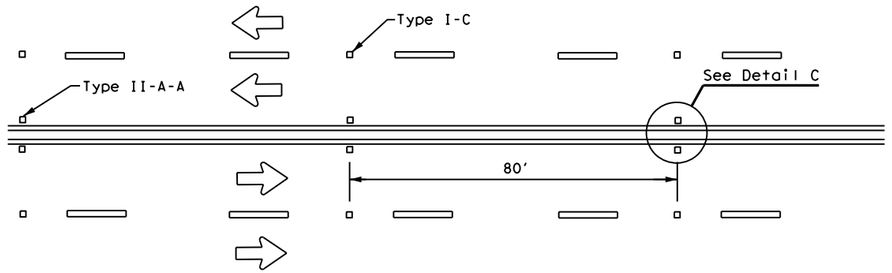
22A

DATE:
FILE:

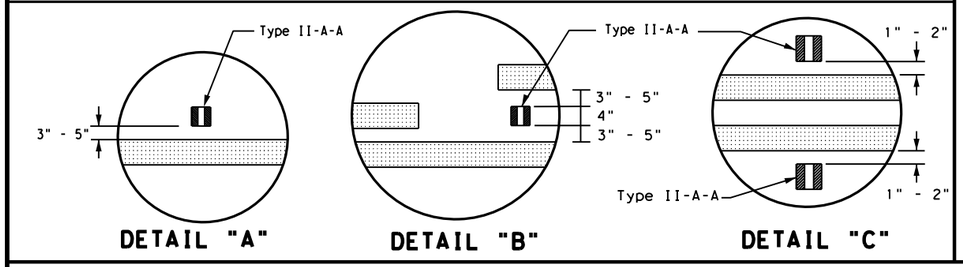
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

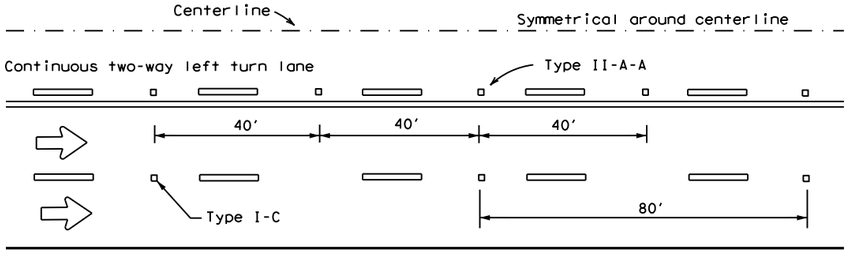


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

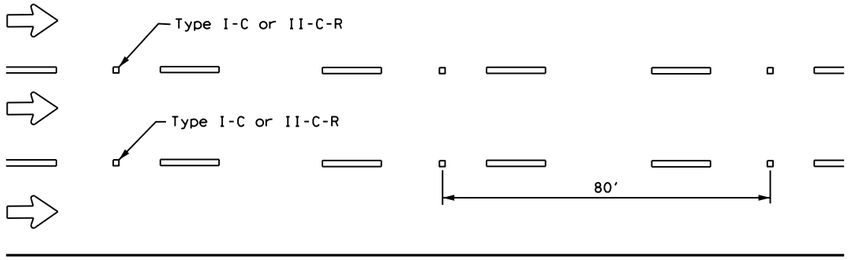


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





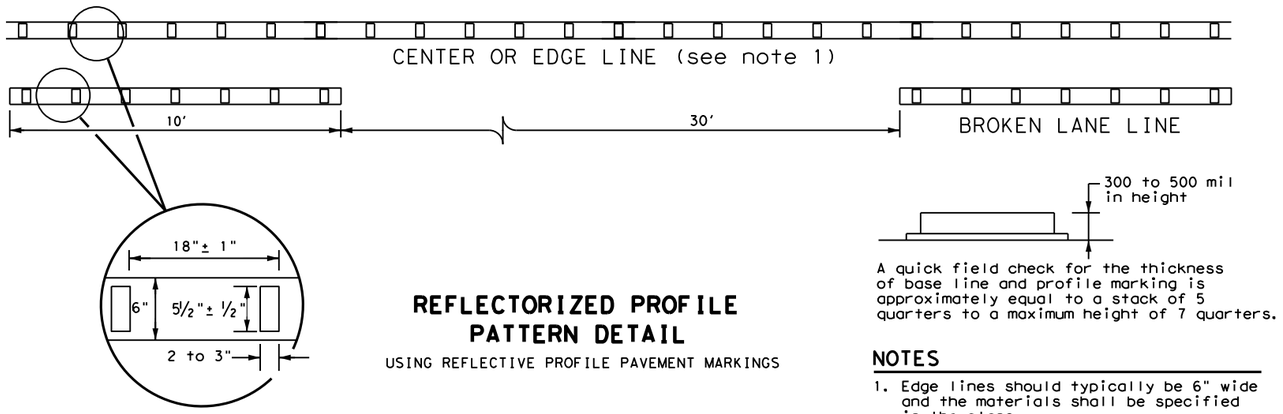
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

See Note 3.



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

NOTES

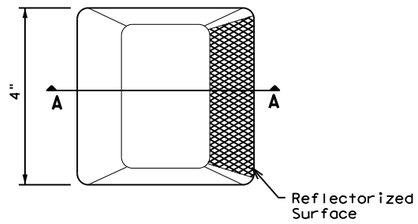
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

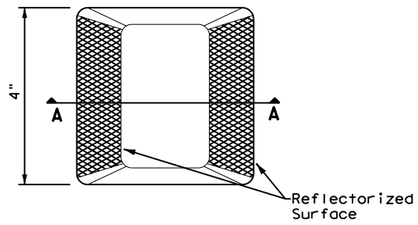
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

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

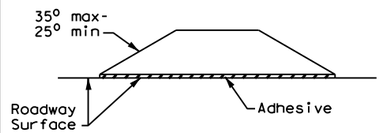
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

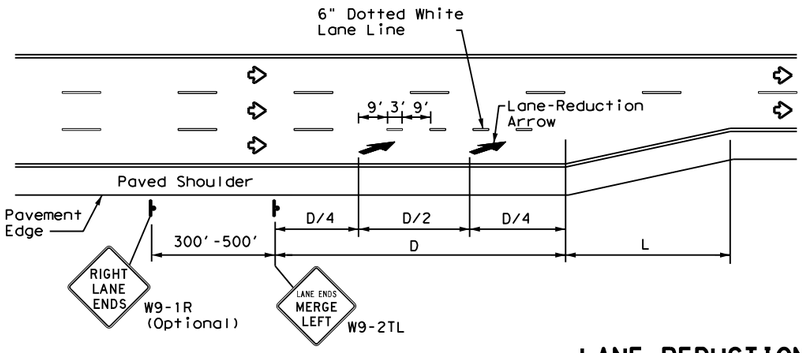
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		68

22B

DATE:
FILE:

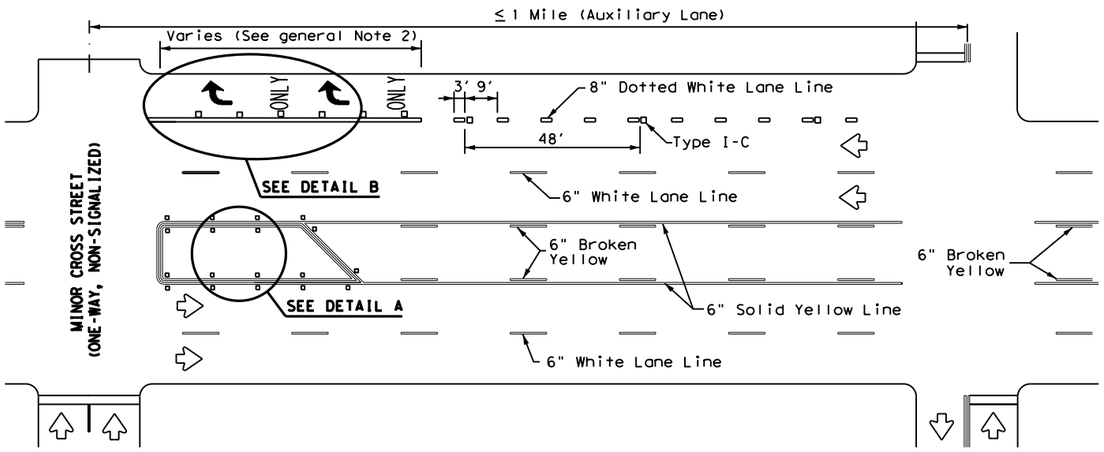


LANE REDUCTION

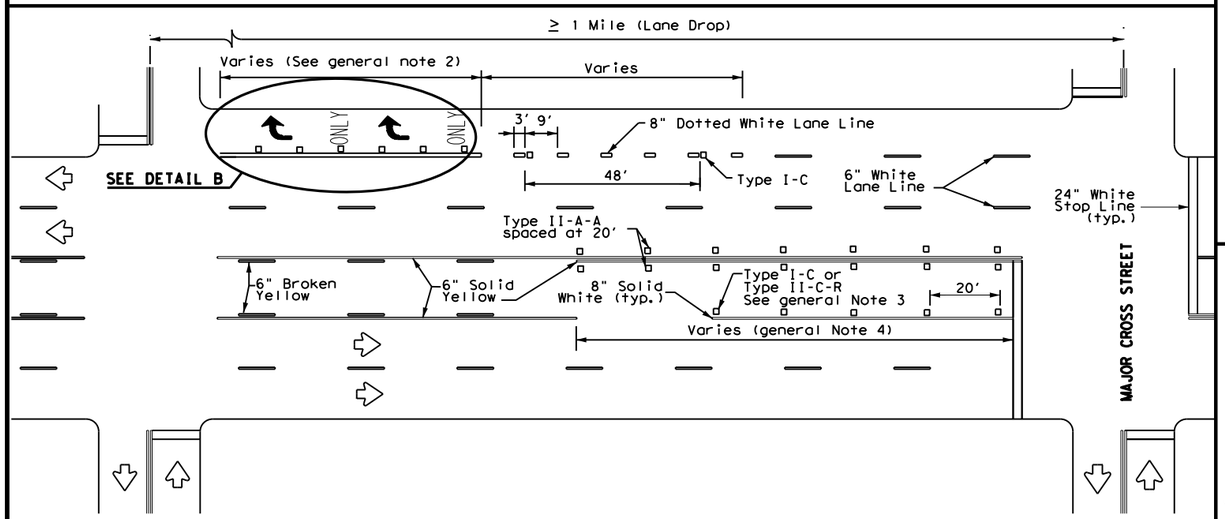
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

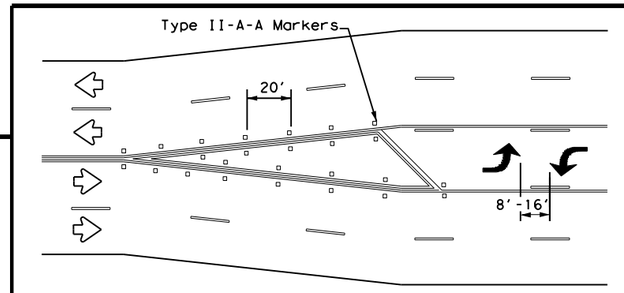
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE

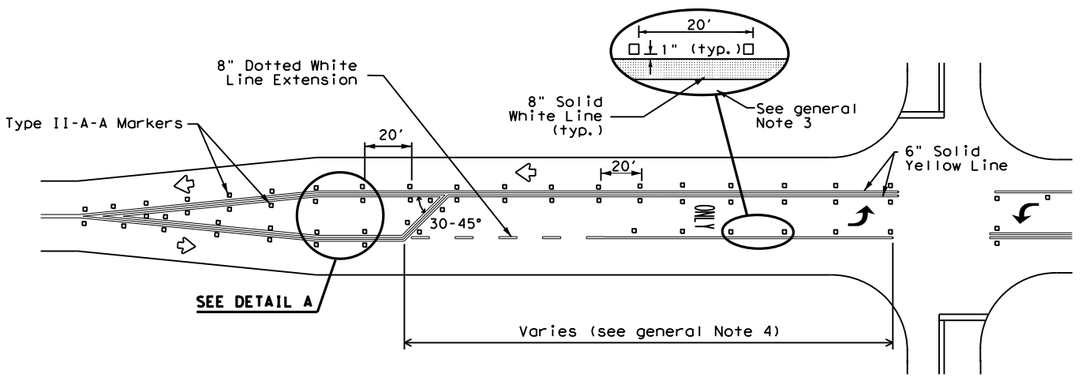


TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP

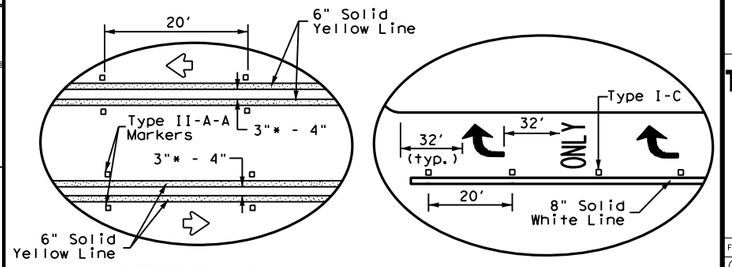


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation

Traffic Safety Division Standard

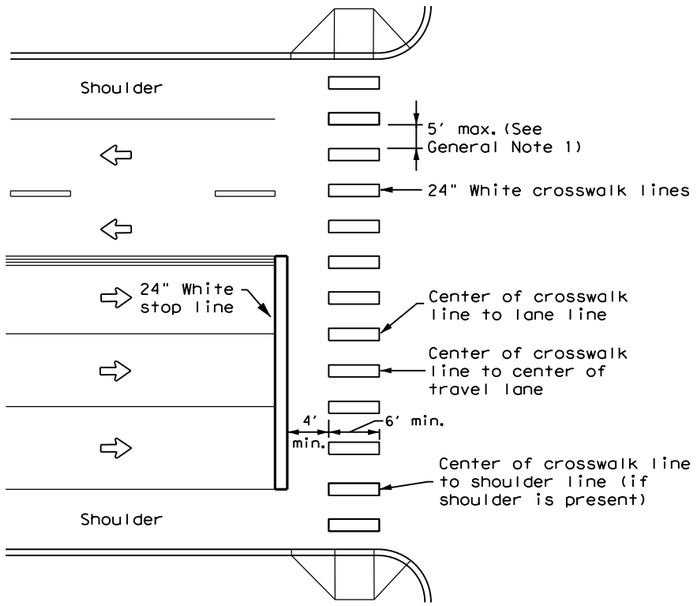
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		69

22C

DATE:
FILE:



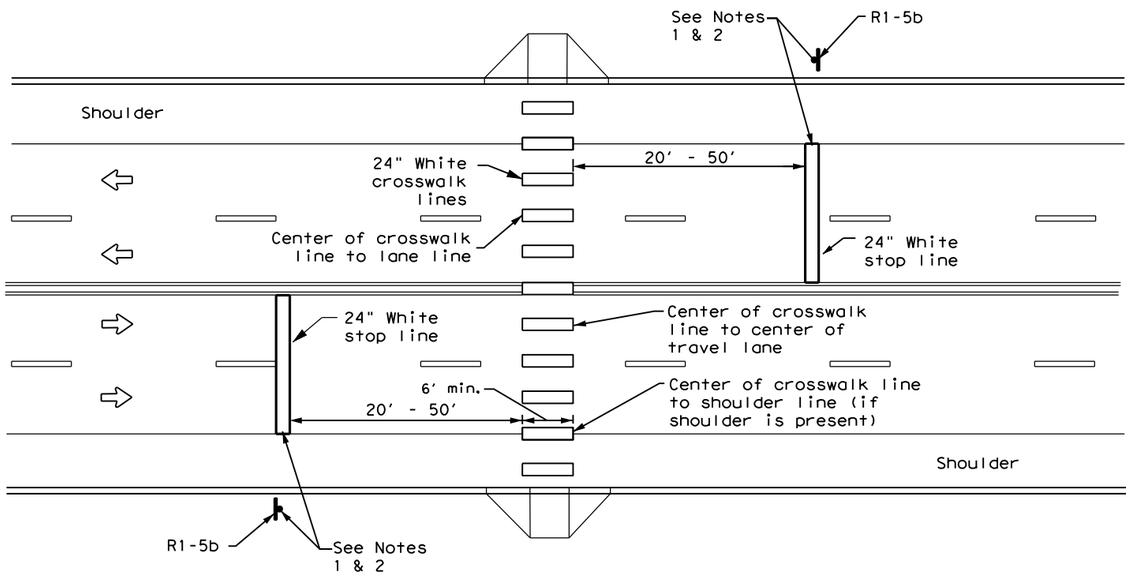
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

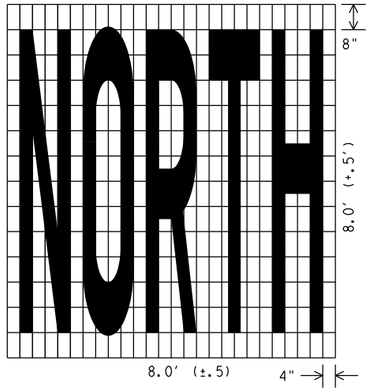
CROSSWALK PAVEMENT MARKINGS

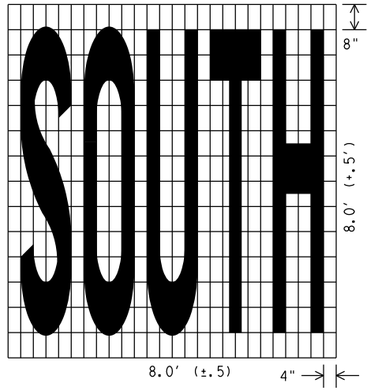
PM(4)-22A

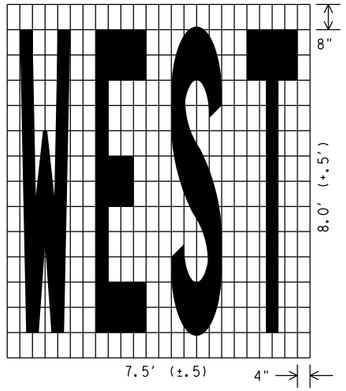
FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
6-20	DIST	COUNTY		SHEET NO.
6-22	HOU	HARRIS		70
12-22				

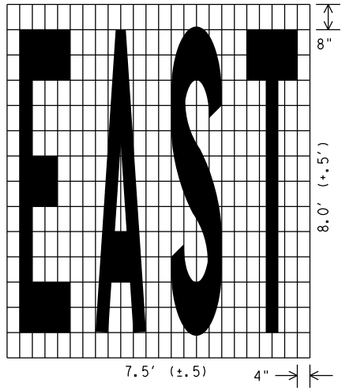
220

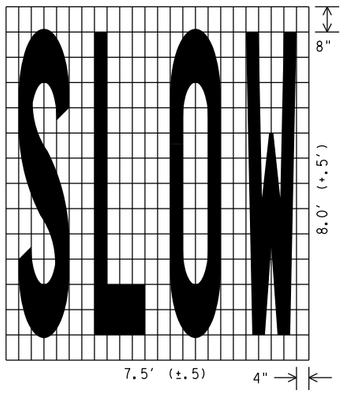
DATE:
FILE:

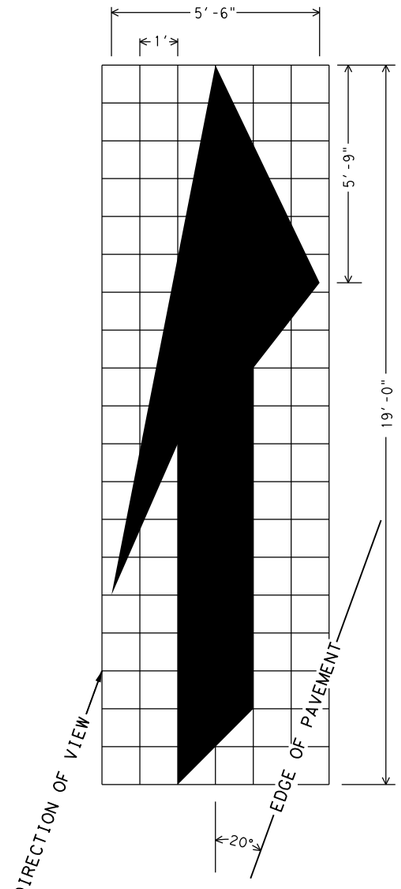






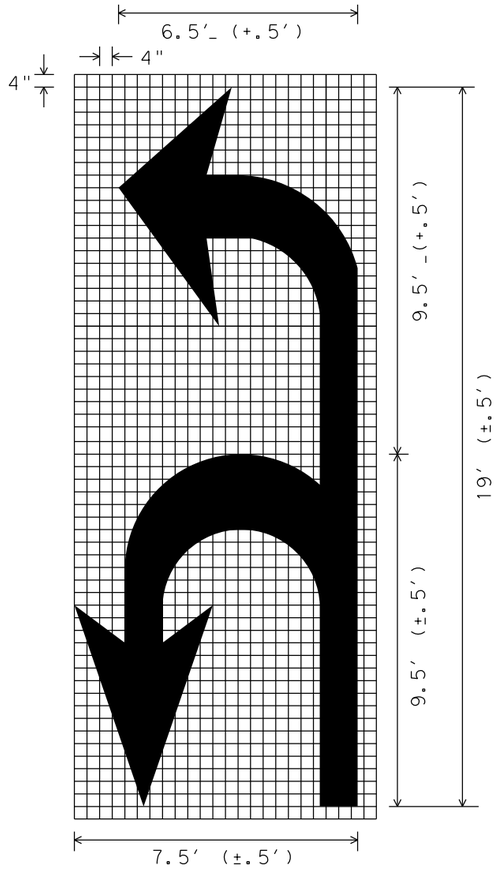




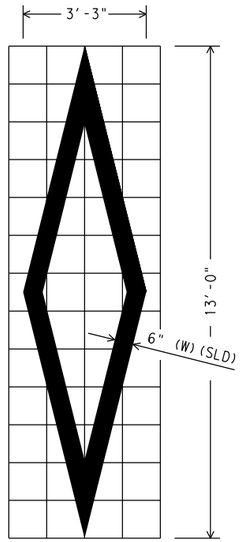


ISOMETRIC ARROW

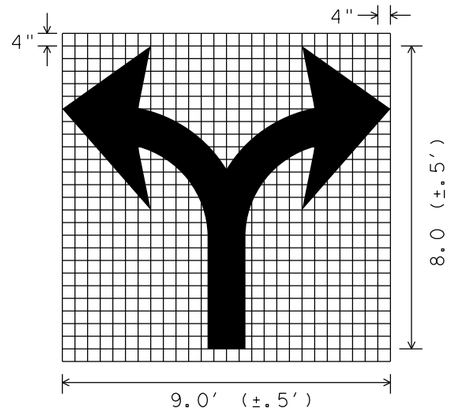
12 INCH GRID
AREA = 42 SQ. FT.
RIGHT LANE DROP ARROW
(FOR LEFT LANE, USE MIRROR IMAGE)



U-L ARROW



DIAMOND SYMBOL



SCALE 1/4" = 1′

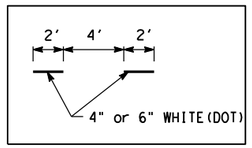
Texas Department of Transportation
Houston District

PAVEMENT MARKINGS (WORDS, ARROWS & SYMBOLS)

PM(WAS)-07

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2007	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 03-19-07	HOU	6		71
	COUNTY	CONTROL	SECT JOB	HIGHWAY
	HARRIS	0027	13 238	IH 69 FRTG

STD-N31



DETAIL "A"

*4"or 6" WHITE(SLD) 40 LF EA.

TYPICAL PLACEMENT OF DOTTED EXTENSION AT INTERSECTIONS

Texas Department of Transportation
Houston District

PAVEMENT MARKINGS
(DOTTED EXTENSION DETAILS)

PM(DOT)-11

FILE:	DN:	CK:	DW:	CK:	
© TxDOT 2010	DIST	FED REG	PROJECT NO.		SHEET
REVISIONS 4/2010 4/2011	HOU	6			72
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HARRIS		0027	13	238	IH 69 FRTG

STD N-28

DATE:
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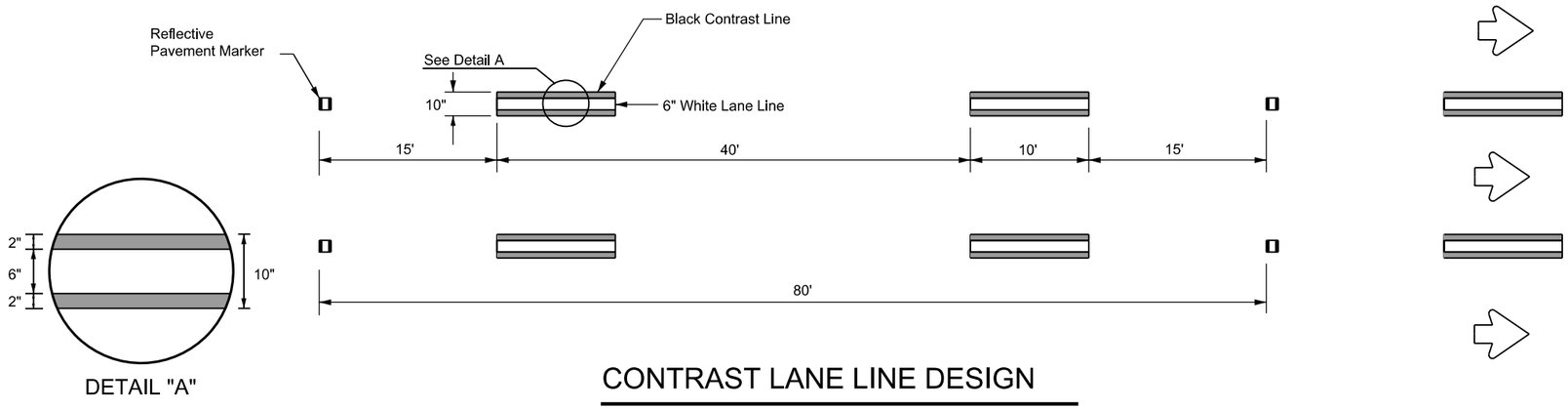
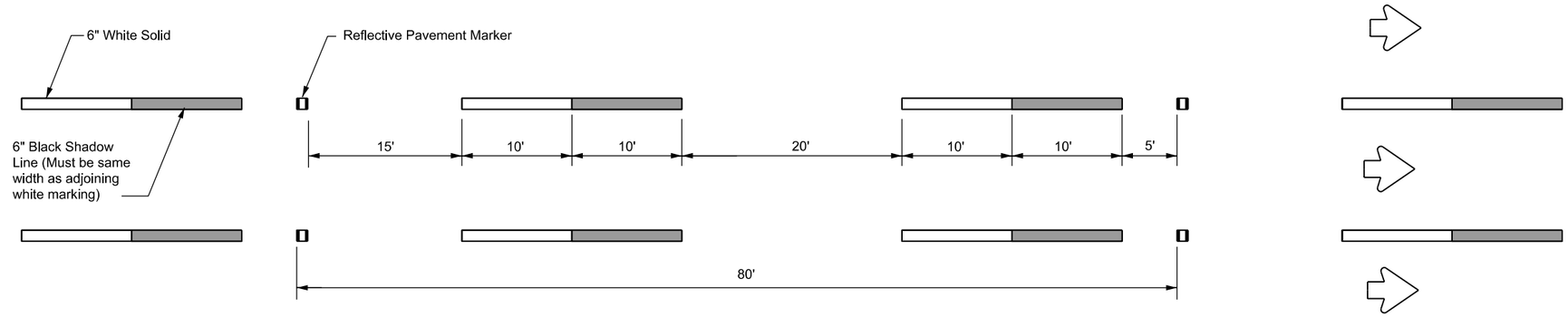
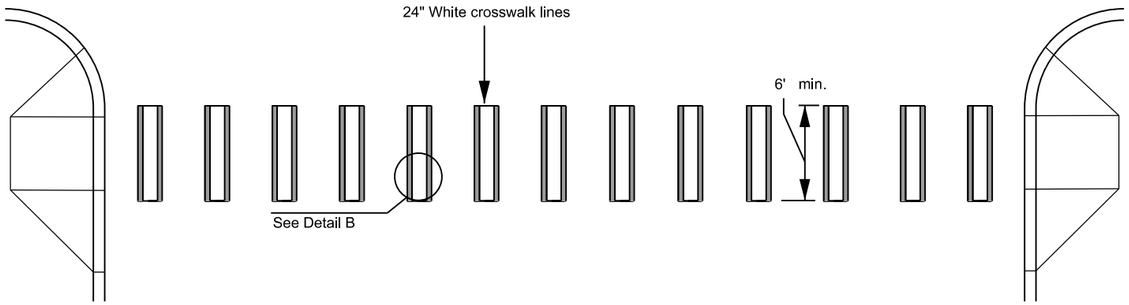


DETAIL "A"

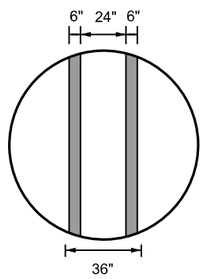
CONTRAST LANE LINE DESIGN



SHADOW LANE LINE DESIGN



CONTRAST CROSSWALK DESIGN



DETAIL "B"

(See PM(4) for crosswalk line placement details)

GENERAL NOTES

1. Contrast and Shadow markings may only be used on concrete pavements.
2. Contrast and Shadow markings shall not be used on edge lines.
3. Contrast lane lines shall be permanent prefabricated pavement markings meeting DMS 8240.
4. Shadow lane line designs shall be a liquid markings system approved by TxDOT.
5. All raised reflective pavement markers placed in broken lines shall be placed in line with and midway between the white stripes.
6. See PM(2) for raised reflective pavement markings installation details.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation

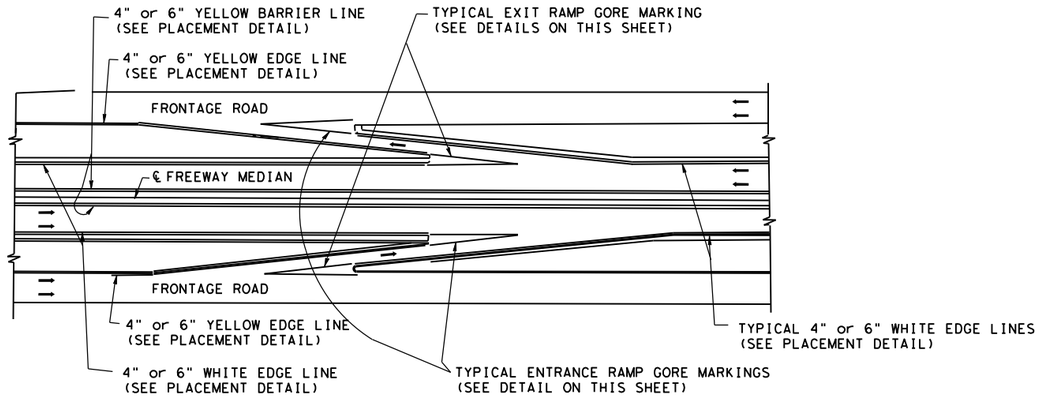
Traffic Safety Division Standard

CONTRAST AND SHADOW PAVEMENT MARKINGS

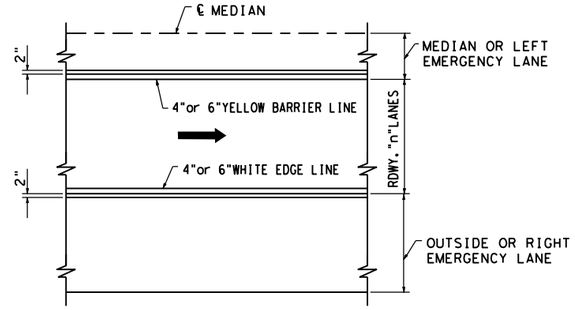
CPM(1)-23

FILE: CPM(1)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT February 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
5-14 2-23	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		73

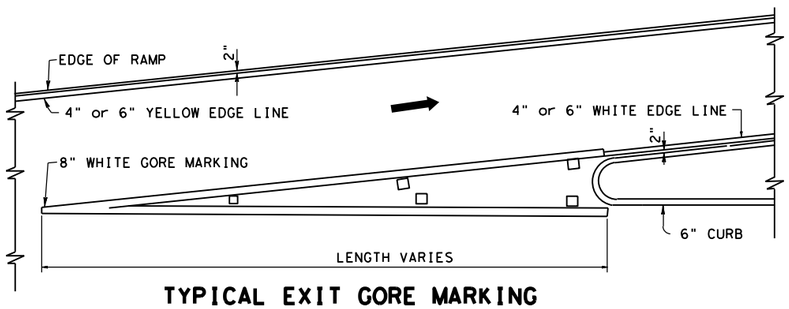
22N



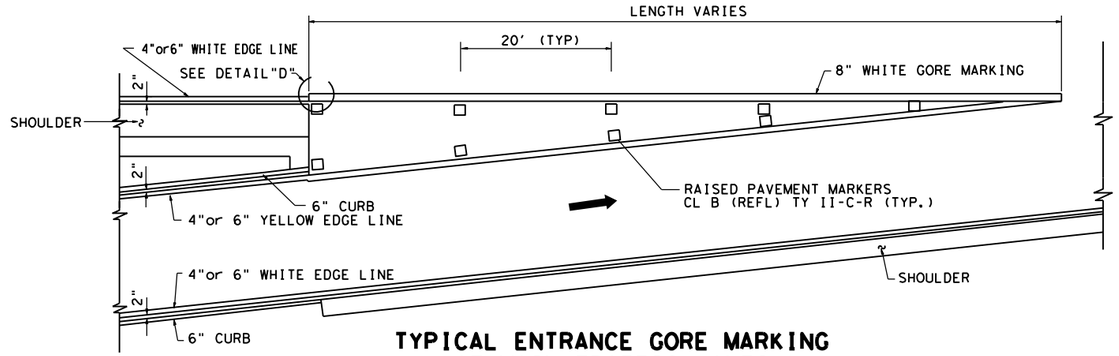
TYPICAL LAYOUT



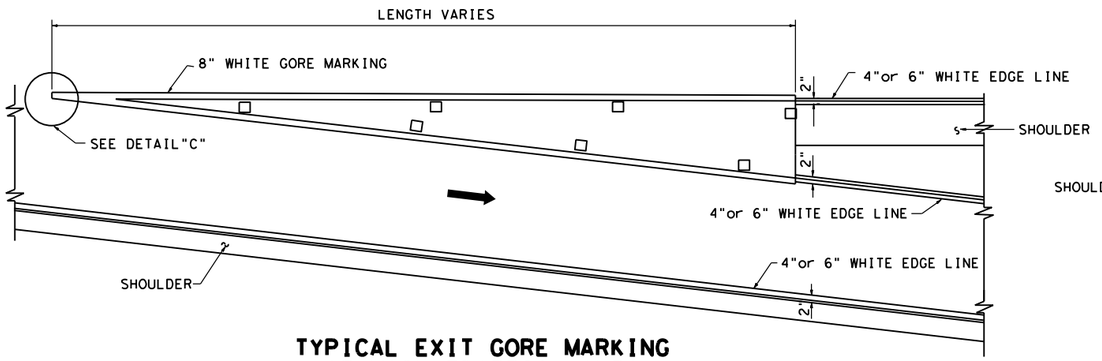
TYPICAL PLACEMENT FOR BARRIER AND EDGE LINES



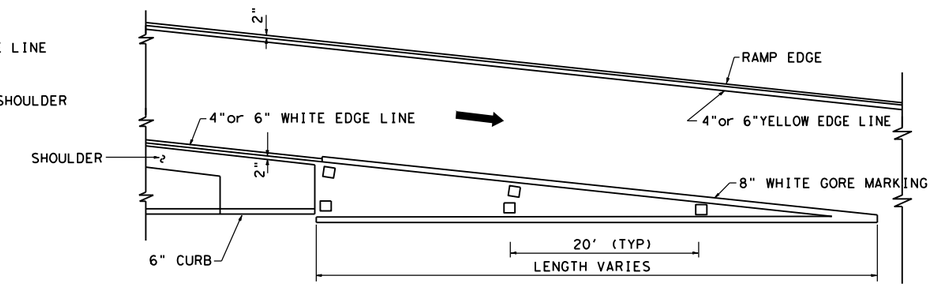
TYPICAL EXIT GORE MARKING AT FRONTAGE ROAD



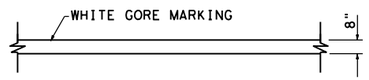
TYPICAL ENTRANCE GORE MARKING AT MAIN TRAFFIC LANES



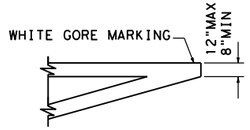
TYPICAL EXIT GORE MARKING AT MAIN TRAFFIC LANES



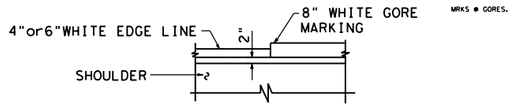
TYPICAL ENTRANCE GORE MARKING AT FRONTAGE ROAD



DETAIL "A"



DETAIL "C"



DETAIL "D "

MRKS • GORES.

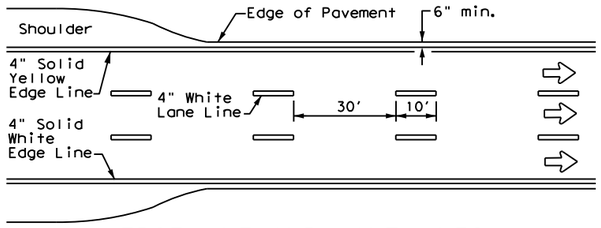
Texas Department of Transportation
Houston District

PAVEMENT MARKINGS
(RAMP AND GORE DETAILS)

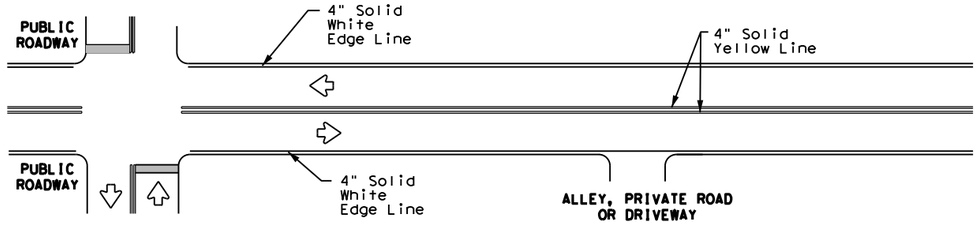
PM(R&G)-10

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS 4/2010	HOU	6		74
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	0027	13	238	IH 69 FRTG

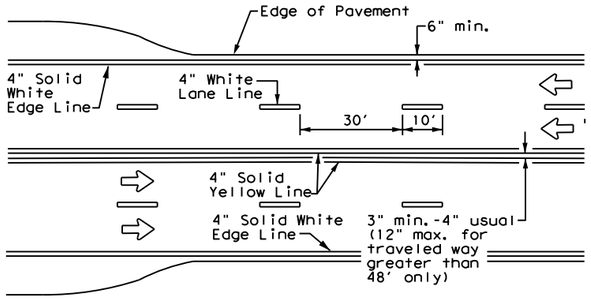
STD N-5



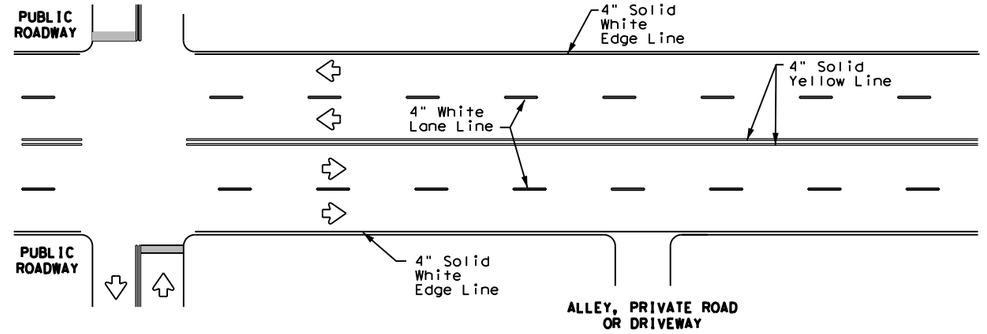
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



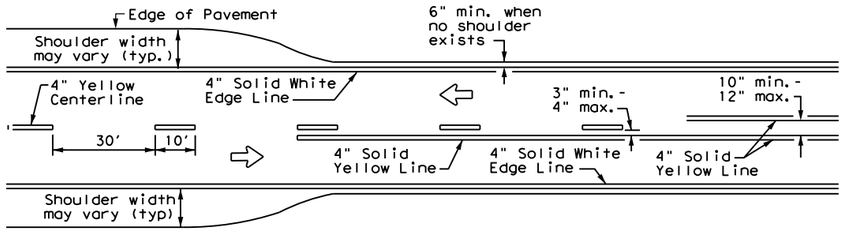
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



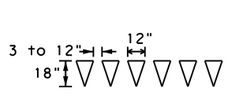
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



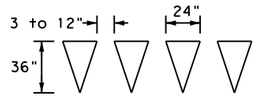
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

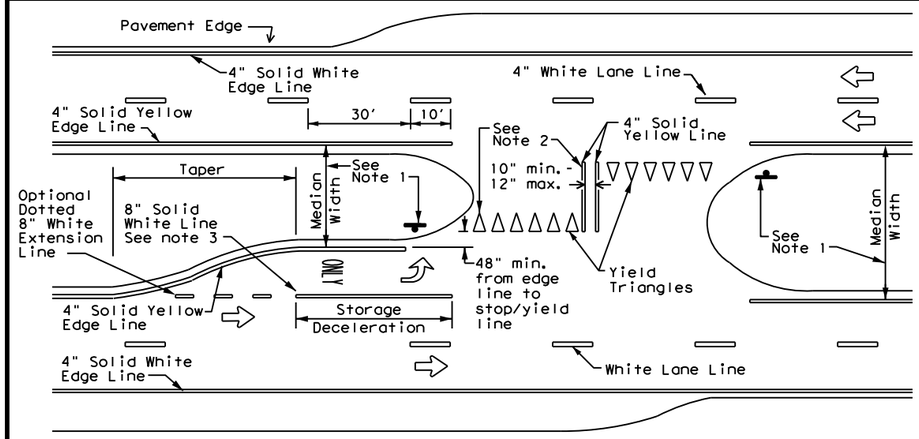


For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTE:

1. Irrespective of shoulder, use 6in width lines (edge lines).
2. Use 4 in. width lines (edge and lane lines) when lane width is 10 ft. or less; and 6 in. width lines when lane width is greater than 10 ft.

NOTES

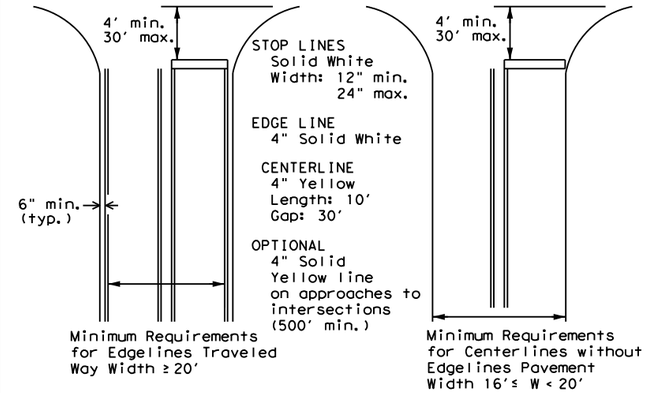
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling 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
HOUSTON DISTRICT STANDARD

TYPICAL STANDARD PAVEMENT MARKINGS

PM-20

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

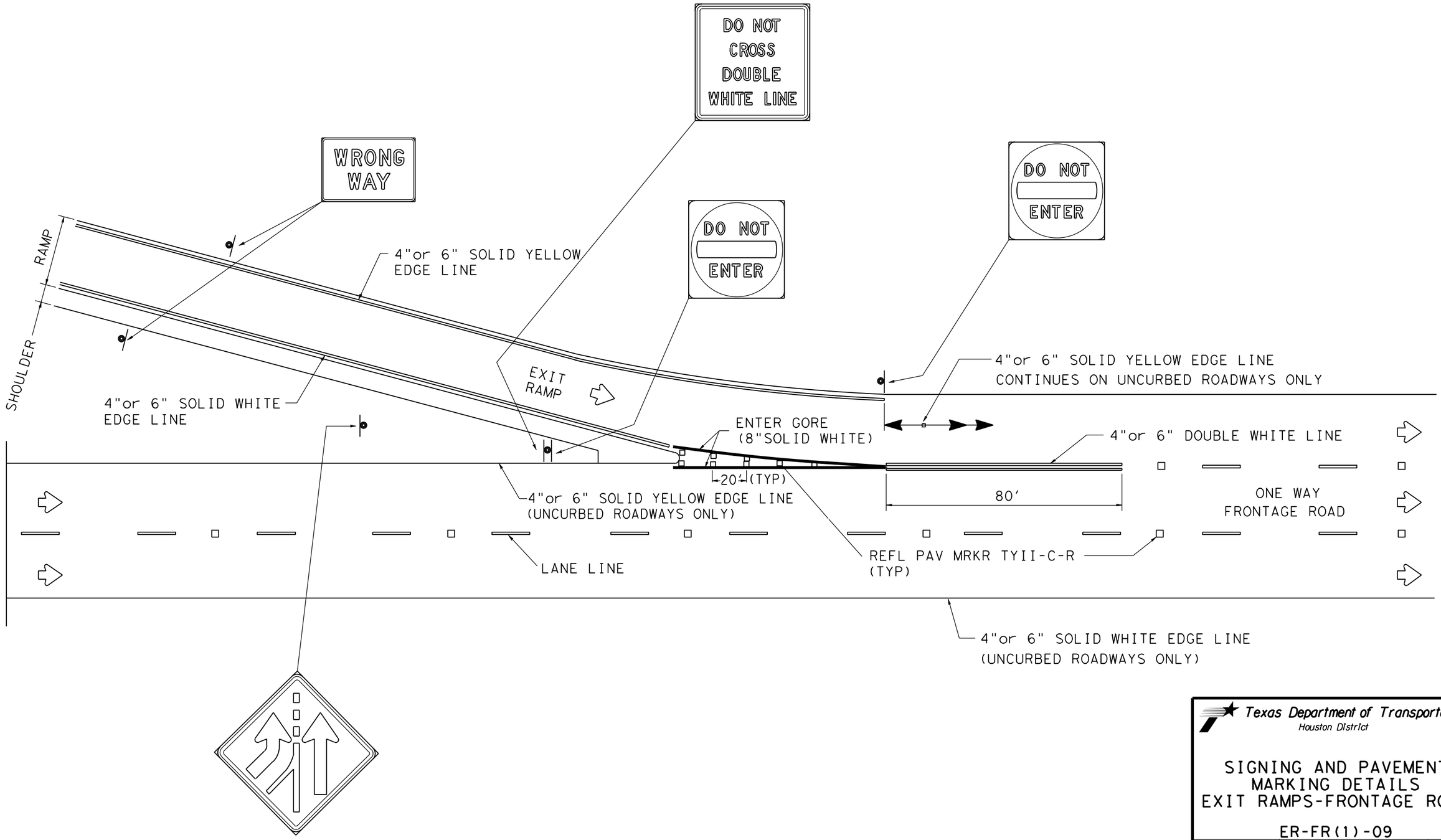
REVISIONS
8-95 2-12
5-00 8-16
8-00 7-20
3-03

CONT	SECT	JOB	HIGHWAY
0027	13	238	IH 69 FRTG

DIST	COUNTY	SHEET NO.
HOU	HARRIS	75

DATE:
FILE:

STD N-5a



DRAWING SCALE: NONE

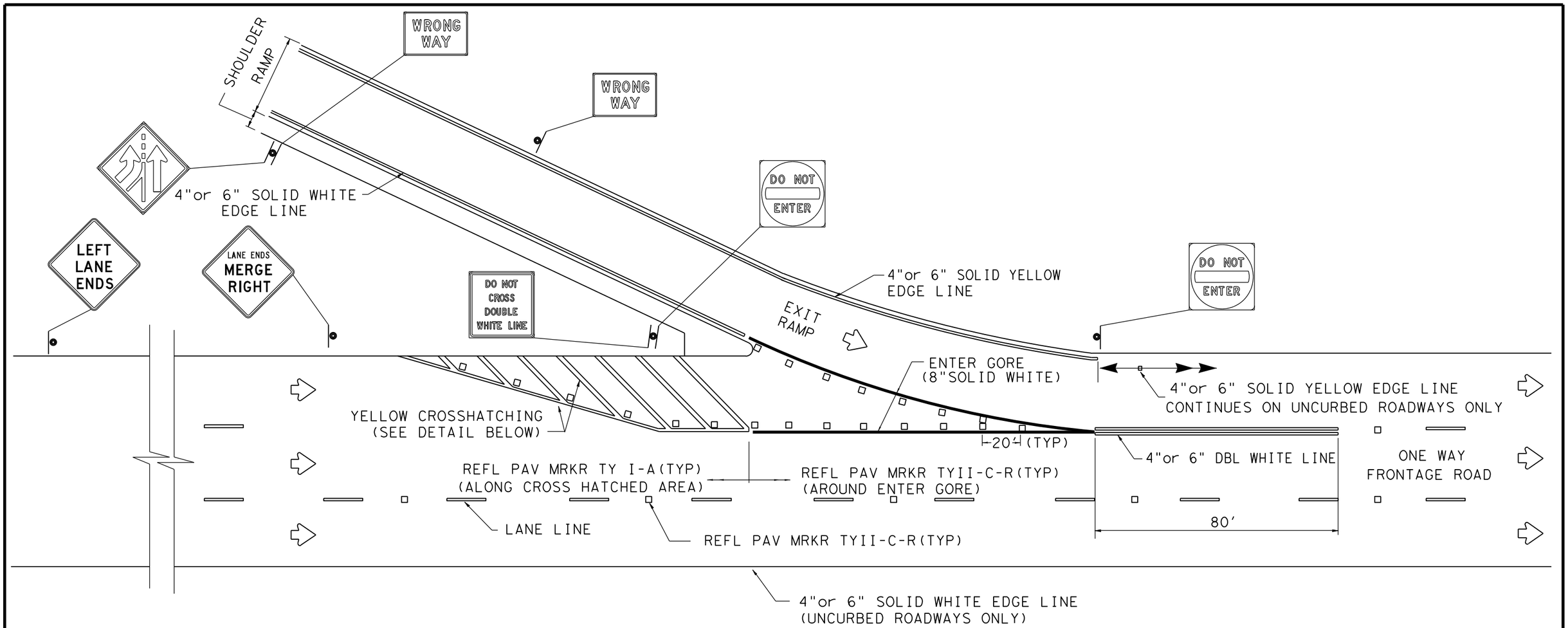
Texas Department of Transportation
Houston District

SIGNING AND PAVEMENT MARKING DETAILS EXIT RAMPS-FRONTAGE ROAD

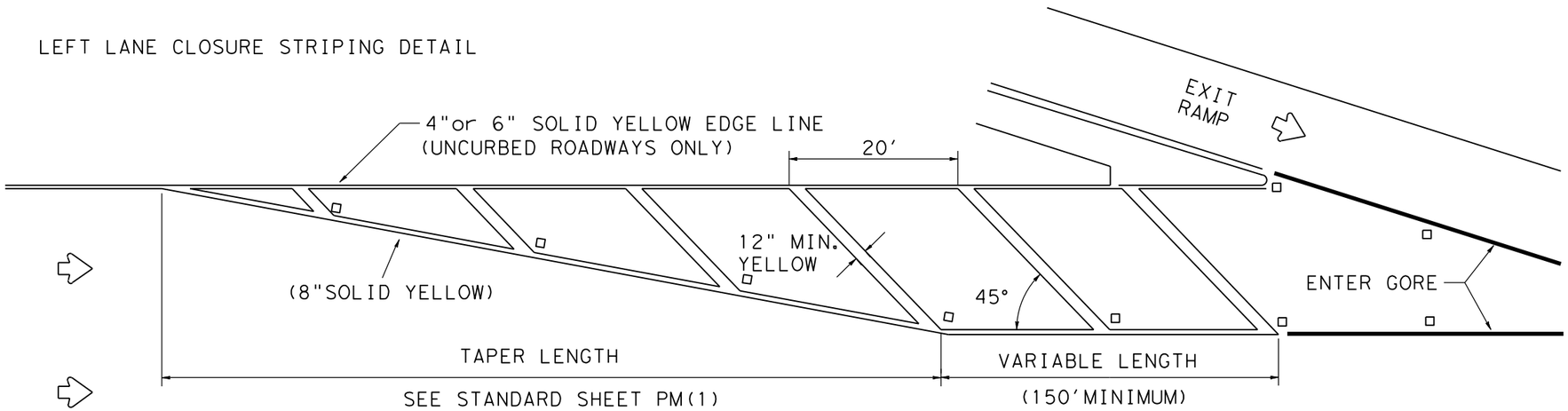
ER-FR(1)-09

FILE:	DN:	CK:	DW:	CK:
© TxDOT 1998	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS FEB., 2008 DEC., 2009	HOU	6		76
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	0027	13	238	IH 69 FRTG

STD N-25



LEFT LANE CLOSURE STRIPING DETAIL



DRAWING SCALE: NONE

Texas Department of Transportation
Houston District

SIGNING AND PAVEMENT MARKING DETAILS EXIT RAMPS-FRONTAGE ROAD

ER-FR(2)-09

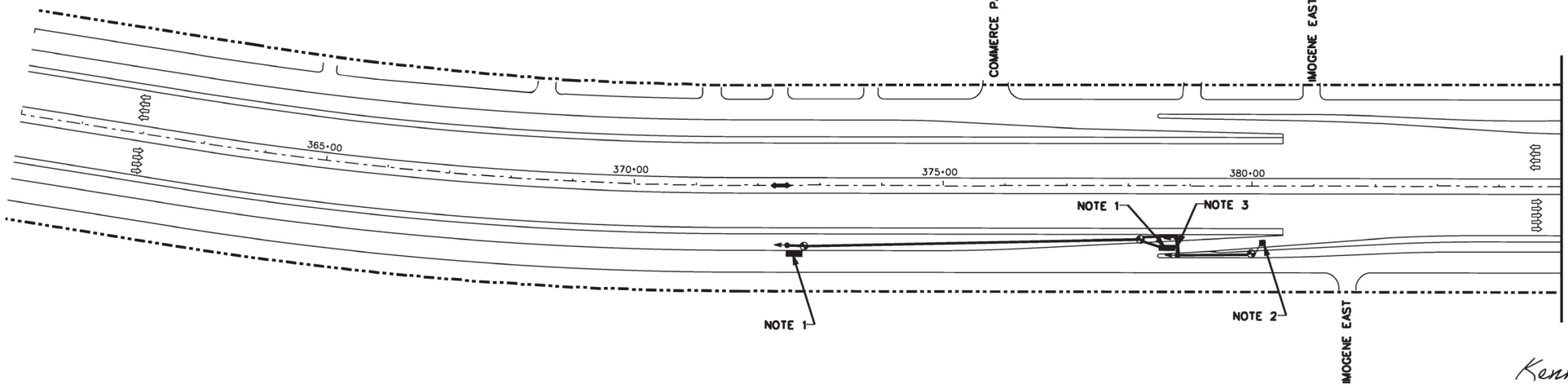
FILE:	DN:	CK:	DW:	CK:
© TxDOT 1998	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS FEB., 2008 DEC., 2009	HOU	6		77
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	0027	13	238	IH 69 FRTG

STD N-26

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOP

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
~~PREFAB~~ PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TY I(W) 24"(SLD)(100MIL)



STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Kenneth Paradowski P.E. 97040, on

October 25 , 2023

Kenneth Paradowski, P.E.

SCALE 1" = 200'

LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

FILE NAME: IH69S-238-01.DGN

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

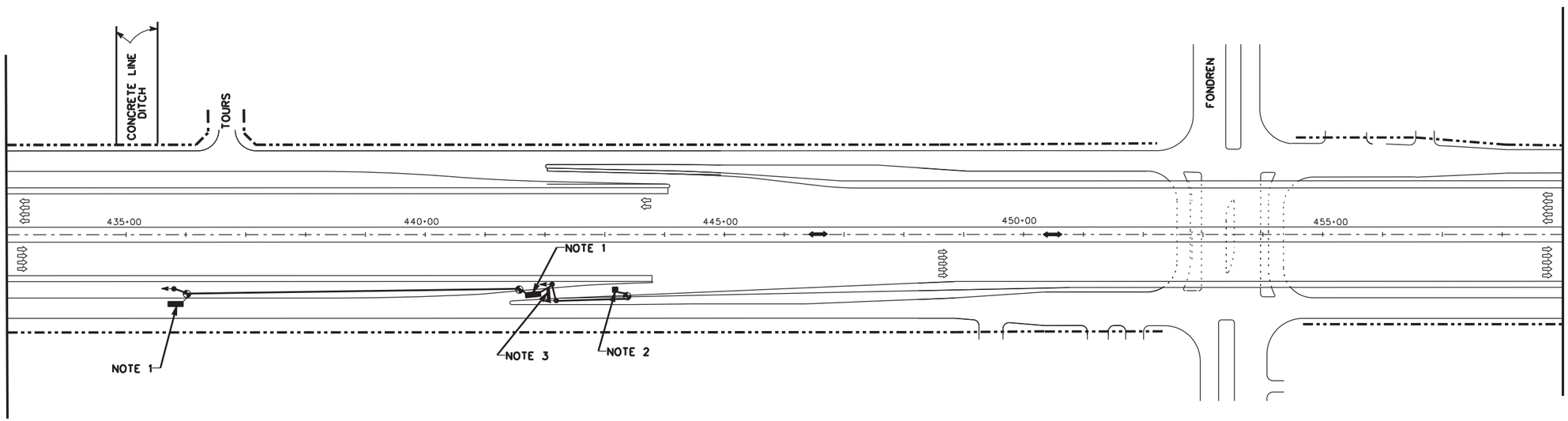
SHEET 1 OF 7

DN: GP	DRAWING	DATE	FED. RD. DIV. RD.	STATE	PROJECT NO.				HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS					H 69
DW: GP									
CK DW: RFB			STATE DIST. NO.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
TR:									
CK TR:			HOUSTON	HARRIS		0027	13	238	78

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOP

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
PREFAB PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TYI(W) 24"(SLD)(100MIL)



STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED PROFESSIONAL ENGINEER

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October 25 , 2023

Kenneth Paradowski, P.E.

LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

SCALE 1" = 200'

FILE NAME: IH69S-238-02.DGN

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

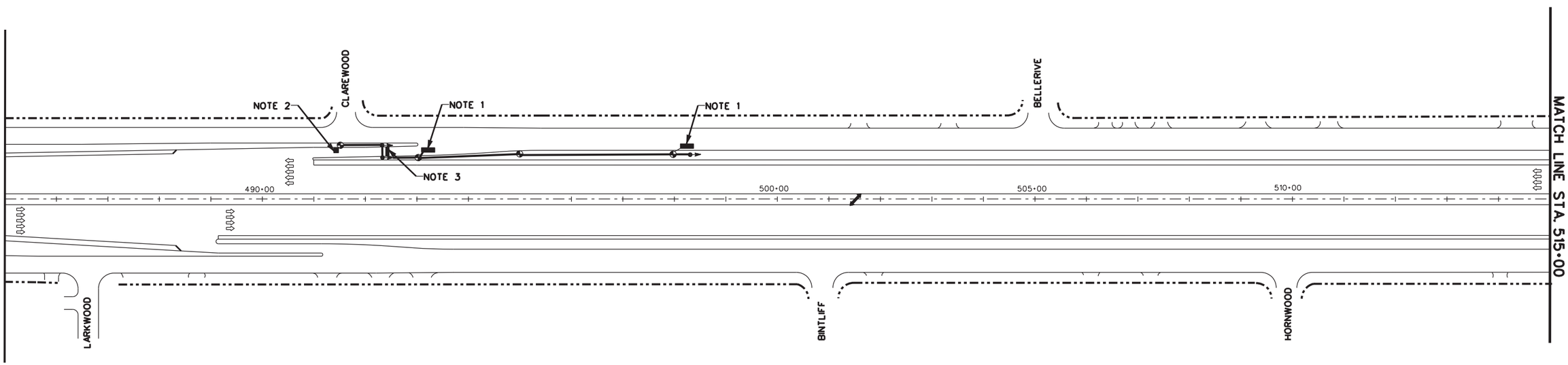
SHEET 2 OF 7

DN:	CBRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CK DN:	KBRIGINAL	APR 12	6	TEXAS					IH 69
DW:	SP								
CK DW:	RFB								
TR:			STATE DIST. NO.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK TR:			HOUSTON	HARRIS		0027	13	238	79

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOP

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
PREFAB PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TYI(W) 24"(SLD)(100MIL)



LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED
PROFESSIONAL ENGINEER

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October 25 , 2023

Kenneth Paradowski, P.E.

SCALE 1" = 200'

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

SHEET 3 OF 7

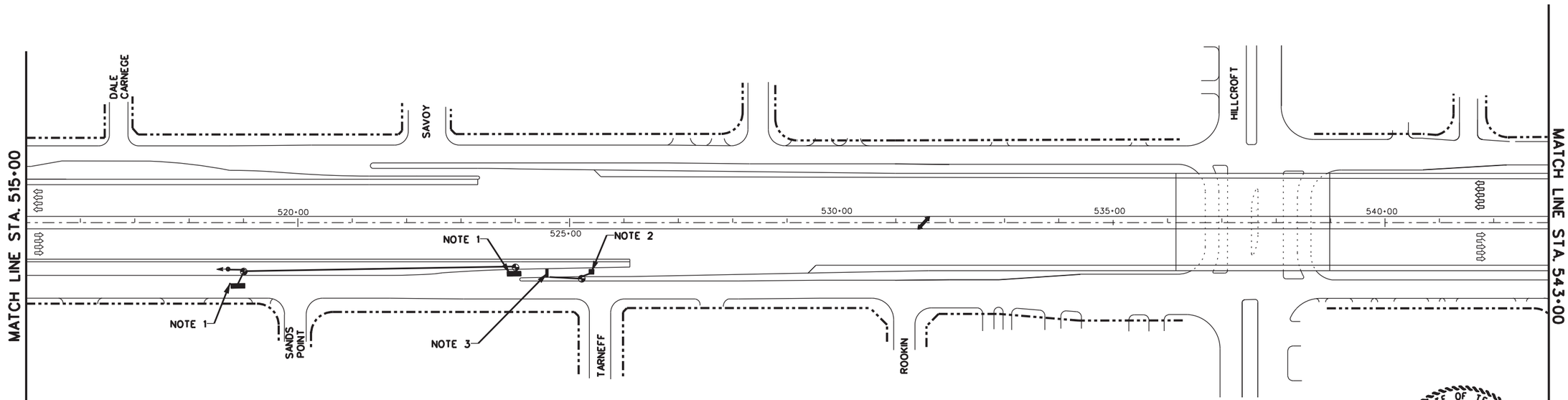
DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS		IH 69
DW: GP						
CK DW: RFB			STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	SHEET NO.
TR:			HOUSTON	HARRIS	0027 / 13 / 238	80
CK TR:						

FILE NAME: IH69S-238-03.DGN

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOP

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
PREFAB PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TYI(W) 24"(SLD)(100MIL)



LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED PROFESSIONAL ENGINEER

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SCALE 1" = 200'

FILE NAME: IH69S-238-04.DGN

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

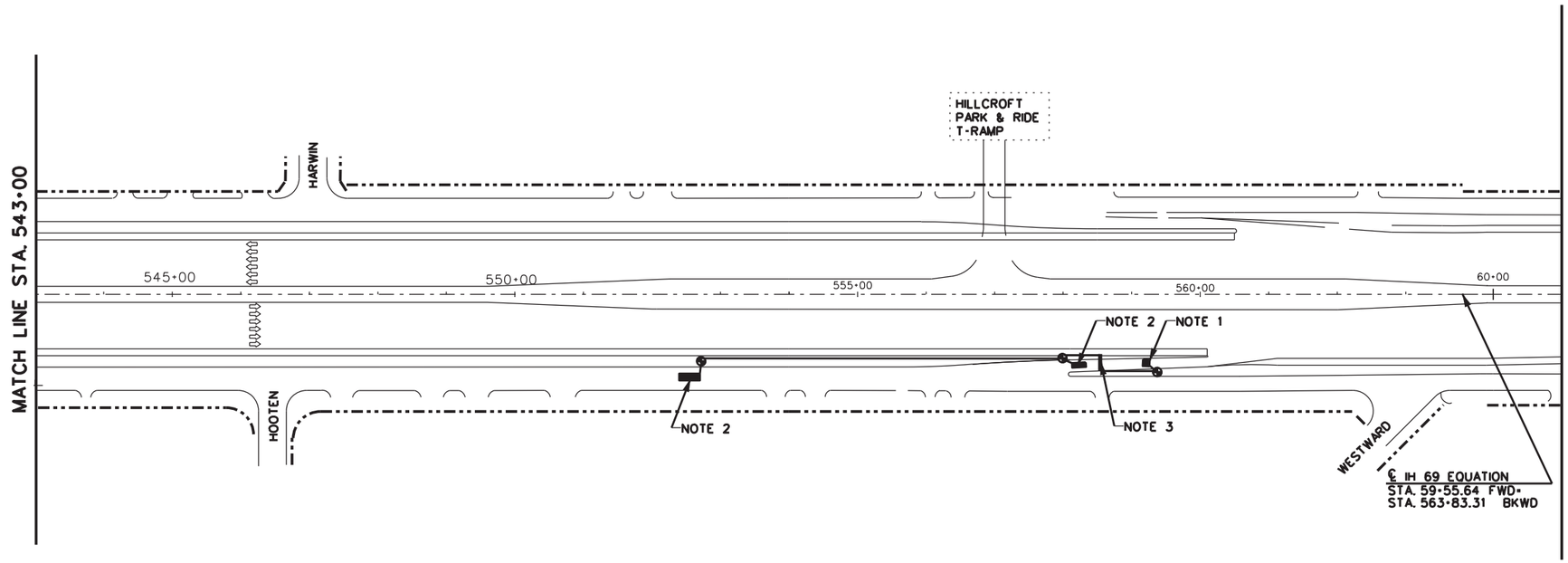
SHEET 4 OF 7

DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS					IH 69
DW: GP			STATE DIST. NO.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
CK DW: RFB			HOUSTON	HARRIS		0027	13	238	81
TR:									
CK TR:									

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOPS

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
PREFAB PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TYI(W) 24"(SLD)(100MIL)



LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED PROFESSIONAL ENGINEER

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October 25 , 2023

Kenneth Paradowski, P.E.

SCALE 1" = 200'

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

SHEET 5 OF 7

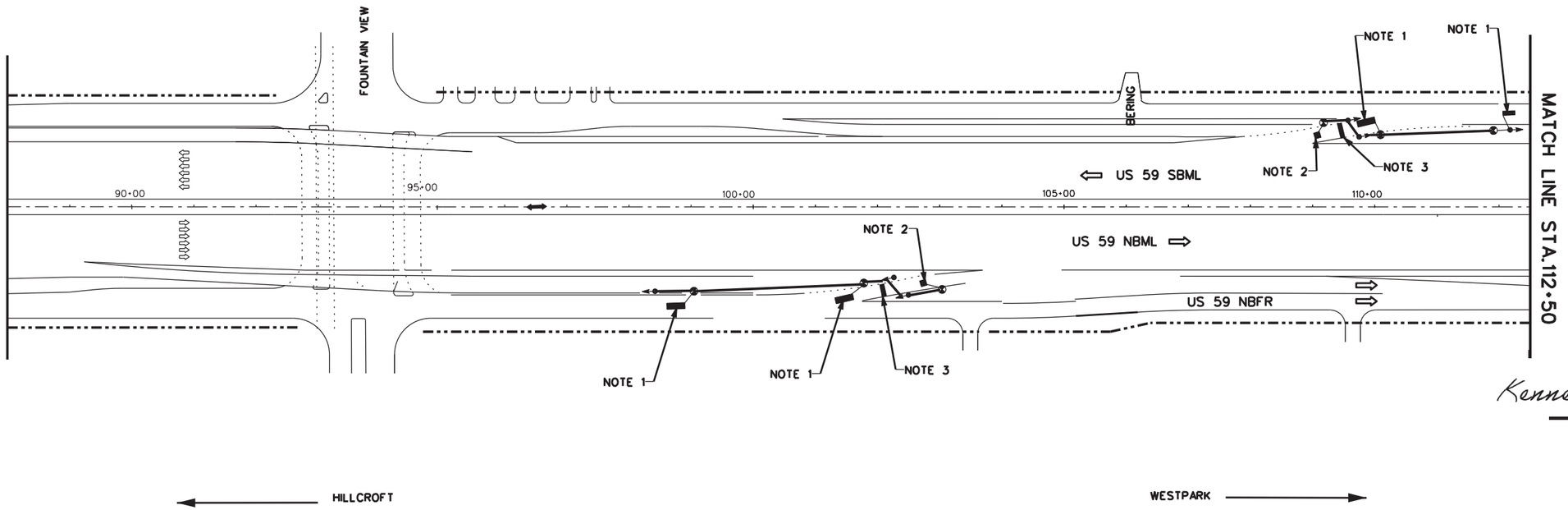
DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.	HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS		IH 69
DW: GP			STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	SHEET NO.
CK DW: RFB			HOUSTON	HARRIS	0027 / 13 / 238	82
TR:						
CK TR:						

FILE NAME: IH-69S-238-05.dgn

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOP

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
PREFAB PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TYI(W) 24"(SLD)(100MIL)



LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED PROFESSIONAL ENGINEER

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October 25 , 2023

Kenneth Paradowski, P.E.

SCALE 1" = 200'

FILE NAME: IH69S-238-06.dgn

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

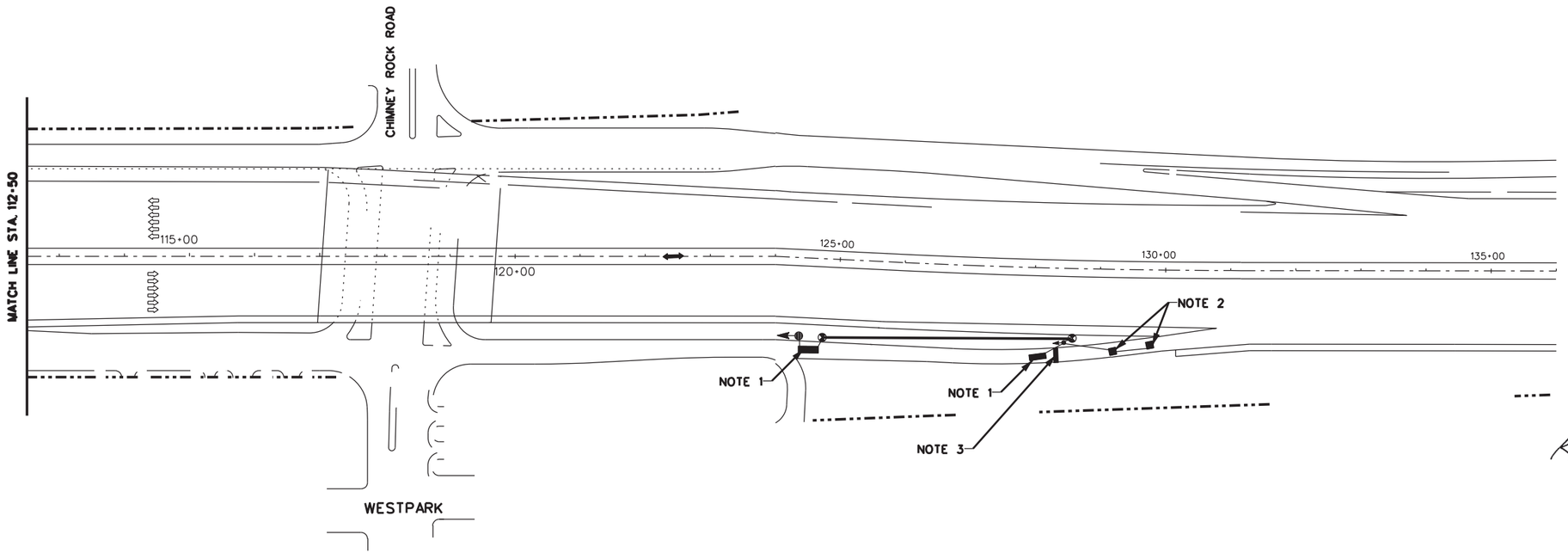
SHEET 6 OF 7

DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.					HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS						IH 69
DW: GP										
CK DW: RFB										
TR:			STATE DIST. NO.	COUNTY		CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
CK TR:			HOUSTON	HARRIS		0027	13	238	83	

1 EXISTING
1 TYPE 3 LOOP
INSTALL
1 TYPE 3 LOOP

2 EXISTING
1 TYPE 1 LOOP
INSTALL
1 TYPE 1 LOOP

3 EXISTING
PREFAB PAV MARK TY "I" (W)(24")(SLD)
INSTALL
REFL PAV MRK TY1(W) 24"(SLD)(100MIL)



LEGEND

- RIGHT OF WAY
- EXISTING GROUND BOX: TYPE 1
- EXISTING GROUND BOX: TYPE 2
- EXISTING DETECTOR LOOP: TYPE 1
- EXISTING DETECTOR LOOP TYPE 3
- EXISTING RAMP METER

STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Kenneth Paradowski P.E. 97040, on

October 25 , 2023

Kenneth Paradowski, P.E.

SCALE 1" = 200'

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM LAYOUT

SHEET 7 OF 7

DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS					IH 69
DW: GP			STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
CK DW: RFB			HOUSTON	HARRIS	0027	13	238	84	
TR:									
CK TR:									

FILE NAME: IH69S-238-07.dgn

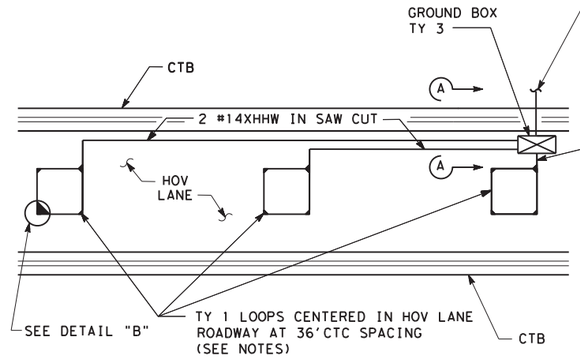
CSJ 0027-13-238

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
688	6004	VEH LP DETECT (SAWCUT)	LF	1176.00

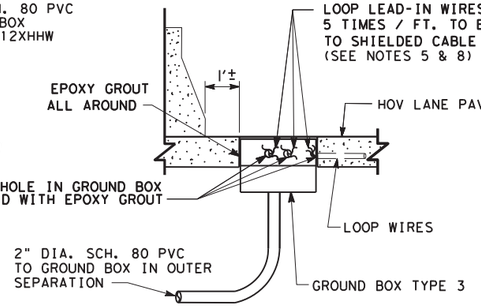
TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 FRTG RD

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM QUANTITIES

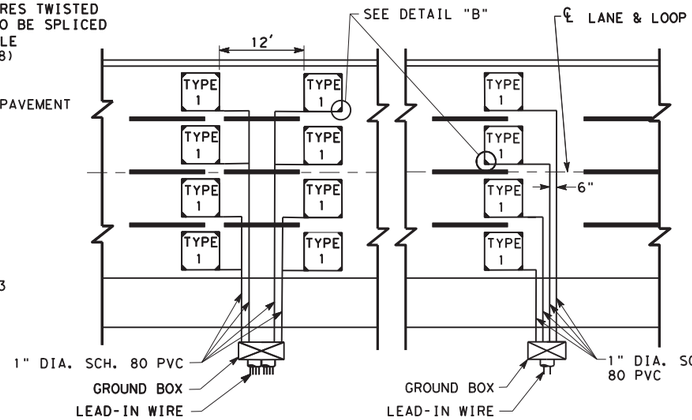
DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.					HIGHWAY NO.
CK DN: KBP	ORIGINAL	APR 12	6	TEXAS						IH 69
DW: GP										
CK DW: RFB			STATE DIST. NO.	COUNTY		CONTROL NO.	SECTION NO.		JOB NO.	SHEET NO.
TR:										
CK TR:			HOUSTON	HARRIS		0027	13		238	85



HOV LANE LOOP INSTALLATION LAYOUT



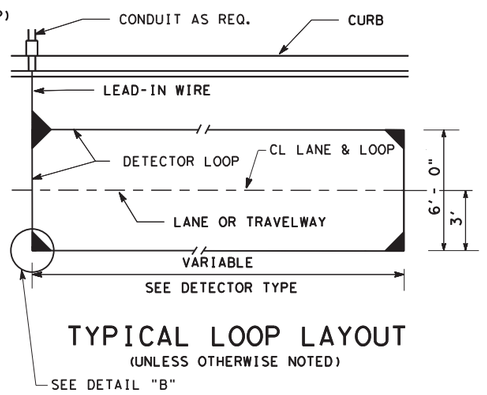
SECTION A-A



NOTE: SEE LAYOUT FOR LOCATION OF GROUND BOX, PLACEMENT MAY BE ON ROADWAY SHOULDER OR OUTSIDE OF SHOULDER.

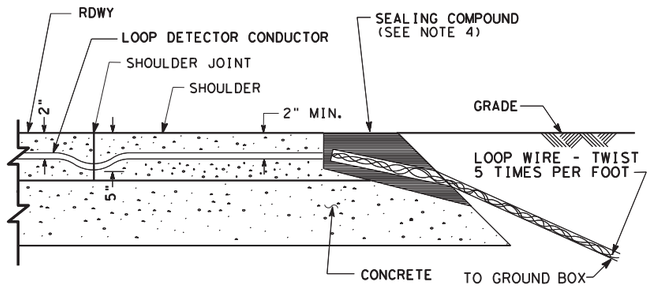
TRAP LOOPS NON-TRAP LOOPS

TYPICAL LOOP DETECTOR LAYOUT

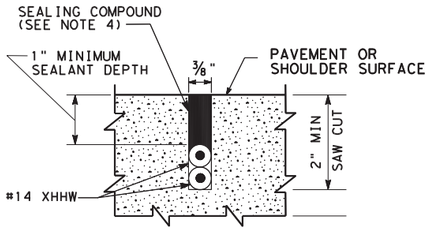


TYPICAL LOOP LAYOUT

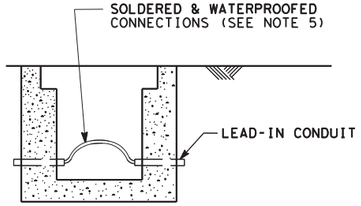
(UNLESS OTHERWISE NOTED)



TYPICAL SECTION OF PAVEMENT CUT FOR LOOP DETECTORS (WITHOUT CURB)



TYPICAL SECTION OF PAVEMENT CUT FOR LOOP DETECTORS



GROUND BOX CONNECTION (TYPICAL DETAIL)

GENERAL NOTES:

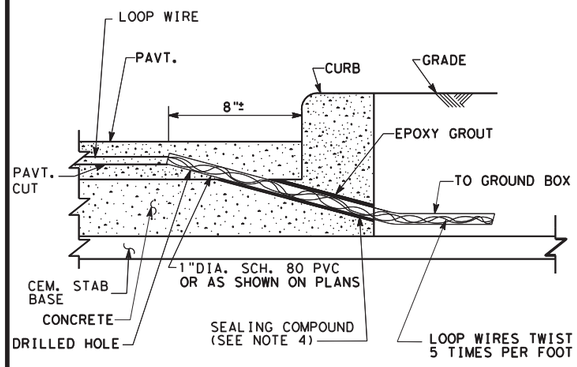
1. ENSURE WIRE FOR LOOPS IS #14XHHW STRANDED AS DESCRIBED IN THE NATIONAL ELECTRICAL CODE.
2. HOLD THE LOOP WIRE IN PLACE EVERY TWO FEET WITH SHORT STRIPS OF RUBBER OR NEOPRENE FLEXIBLE TUBING OR POLYETHYLENE FOAM SEALANT BACKER APPROXIMATELY ONE INCH IN LENGTH. FILL THE SLOT WITH LOOP SEALER WHEN STRIPS ARE LEFT IN PLACE.
3. PAYMENT FOR LOOP DETECTORS INCLUDES LOOP CONDUCTOR WIRE FROM EDGE OF ROADWAY TO SPLICE IN GROUND BOX.
4. ENSURE SPLICE BETWEEN LEAD-IN CONDUCTORS AND THE LOOP WIRE IS MADE IN A GROUND BOX BY SOLDERING. ENSURE THE SPLICE IS COMPLETELY WATERPROOF AND ENCAPUSLATED WITHIN A SCOTCHCAST 82-A OR SCOTCHCAST 82-A1 SPLICE ENCLOSURE.
5. ENSURE DETECTOR LEAD-IN CABLE IS SHIELDED, STRANDED, XHHW, SIZE 12 AWG
6. MAKE THE PAVEMENT CUT WITH A CONCRETE SAW TO NEAT LINES AND LOOSE MATERIAL REMOVED. PLACE THE SEALING COMPOUND WHEN THE CUT IS CLEAN AND DRY.
7. THREE (3) FEET MIN. OF LOOP WIRE IS TO BE COILED IN THE PULL BOX IN HOV ROADWAY TO ALLOW FOR SPLICING TO SHIELDED CABLE.
8. THE LOOP WIRE IS IN A BLACK FLEXIBLE VINYL OR POLYETHYLENE TUBING OF .184 INCH MINIMUM I.D., .031 INCH MINIMUM WALL THICKNESS AND .26 MINIMUM O.D., HAVING A SMOOTH BORE. ENSURE THE TUBING IS NOT ADHERE TO THE LOOP WIRE IN ANY WAY AND RESIST DETERIORATION FROM OILS, SOLVENTS, AND TEMPERATURES UP TO 100° C. ENSURE THE TUBING IS HIGHLY ABRASION RESISTANT AND REMAIN FLEXIBLE FROM -30°C TO 100°C.
9. CONDUIT FROM EDGE OF ROADWAY TO GROUND BOX IS CONSIDERED INCIDENTAL TO THE ITEM DETECTOR LOOP OF THE VARIOUS TYPES.
10. LONGER LOOP LEAD-IN LENGTH REQUIRES USE OF MORE TURNS IN LOOP. (SEE LOOP LEAD-IN LENGTH CHART).

LEAD-IN LENGTH CHART

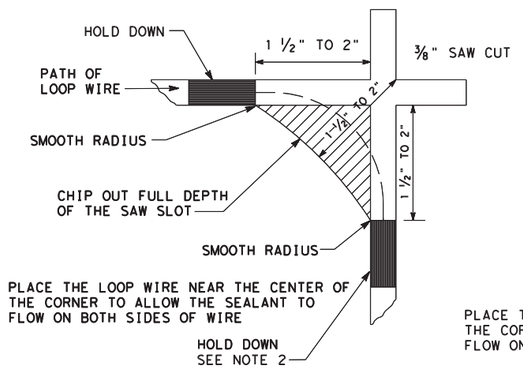
LEAD-IN CABLE LENGTH (FEET)	NUMBER OF TURNS REQUIRED IN LOOP
1-400	3
401-800	4
801-1200	5
1201-1500	6

LOOP SIZE

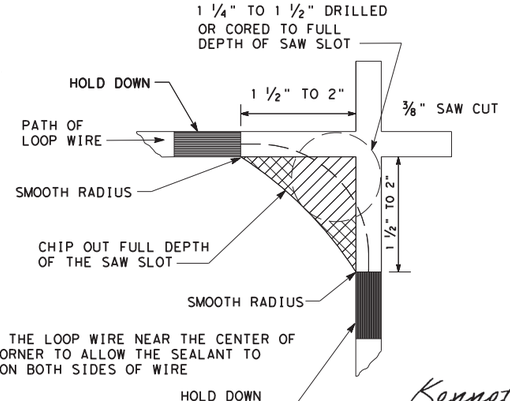
TYPE 1 - 6' X 6'
TYPE 11 - 6' X 12'
TYPE 111 - 6'X 24'
TYPE 1V - 6' X 40'



TYPICAL INSTALLATION OF LOOP DETECTORS (WITH CURB)



CHIPPED OUT CORNER



CORE CORNER

DETAIL B - CORNER DETAILS

STATE OF TEXAS
KENNETH PARADOWSKI
97040
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Kenneth Paradowski P.E. 97040, on

October 25 , 2023

Kenneth Paradowski, P.E.

TEXAS DEPARTMENT OF TRANSPORTATION
IH 69 (SOUTHWEST FREEWAY)

COMPUTERIZED TRANSPORTATION MANAGEMENT SYSTEM INSTALLATION DETAILS

(LOOP DETECTOR) SHEET 1 OF 1

DN: GP	DRAWING	DATE	FED. RD. DIV. NO.	STATE	PROJECT NO.				HIGHWAY NO.
CK DN: KBP	ORIGINAL	JAN 12	6	TEXAS					IH 69
DW: GP									
CK DW: RFB			STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.	
TR:									
CK TR:			HOUSTON	HARRIS	0027	13	238	86	

FILE NAME: CTMSLD.DGN

NAME:

AD-76-0

I. STORMWATER POLLUTION PREVENTION

Texas Pollutant Discharge Elimination System (TPDES) TXR 150000: Stormwater Discharge Permit or Construction General Permit is 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. Refer to the TxDOT SWP3 Summary Sheets, SWP3 Binder Template, and Form 2118.

No Additional Comments

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS

United States Army Corps of Engineers (USACE) Permit is required for filling, dredging, excavating or other work in water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and general conditions associated with the following permit(s). If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Army Corps (USACE) Permit Required

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) without a Pre-Construction Notification (PCN). Project specific permit was not issued by USACE, therefore is not in the plan set. The USACE general conditions are in the "General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Nationwide Permit (NWP) with a Pre-Construction Notification (PCN). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set. The USACE general conditions are in the "General Notes."

☐ Work is authorized by the United States Army Corps of Engineers (USACE) under a Individual Permit (IP). The project specific permit issued by the United States Army Corps of Engineers (USACE) is included in the plan set.

☐ Work would be authorized by the United States Army Corps of Engineers (USACE) permit. The project specific permit issued by the USACE will be provided to the contractor.

United States Coast Guard (USCG) Permit is required for projects that involve the construction or modification (including changes to lighting) of a bridge or causeway across a water body determined to be navigable by the United States Coast Guard (USCG) under Section 9 of the Rivers and Harbors Act. If additional work not represented in the plans is required, contact the Engineer immediately.

☒ No United States Coast Guard (USCG) Coordination Required

☐ United States Coast Guard (USCG) Permit

☐ United States Coast Guard (USCG) Exemption

No Additional Comments

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 area and contact the Engineer immediately.

No Additional Comments

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Refer to TxDOT Standard Specifications in order to comply with requirements for invasive species, beneficial landscaping and tree/brush removal.

No Additional Comments

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

If any of the listed species below are observed, cease work in the area, do not disturb species or habitat and contact the Engineer immediately.

The work may not remove active nests (from bridges, structures, or vegetation adjacent to the roadway, etc.) during nesting season (February 15 to October 1). If removal of structures or vegetation is necessary during the nesting season, the Contractor shall conduct a bird survey no more than 3 days in advance of the clearing/demolish start date. All bird surveys shall be conducted by a Field Biologist and adhere to the guidance document "Avoiding Migratory Birds and Handling Potential Violations" found in the TxDOT Environmental Compliance Toolkits at the time of the survey. (See below for Field Biologist and Ornithologist qualifications)

No Additional Comments

Field Biologist, Ornithologist – a field biologist is defined as an individual qualified to perform field investigations, presence/absence surveys and habitat surveys for protected avian species or species of concern. A mandatory bachelor's degree in biology or a related science is required. At a minimum, the Field Biologist, Ornithologist, shall have completed and reported a minimum of three presence/absence and habitat surveys for protected avian species in the past five years. A minimum of three projects must have been conducted in Texas. Surveys shall have been performed for documentation of species in accordance with a protocol approved by USFWS or TPWD, or following generally accepted methodologies.

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

Refer to TxDOT Standard Specifications in the event potentially contaminated materials are observed, such as dead or distressed vegetation, trash disposal areas, drums, canisters, barrels, leaching or seepage of substances, unusual smells or odors, or stained soil, cease work in the area and contact the Engineer immediately.

No Additional Comments

VII. OTHER ENVIRONMENTAL ISSUES

Comments:

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.

8/10/2023

Texas Department of Transportation

TxDOT Houston District

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: EPIC Sheet.dgn	DN:	CK:	DW:	CK:
© TxDOT: March 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69
UPDATED section V. text and added definition (10 17) ADDED USCG and USACE notes in Section VII (04 18)	DIST	COUNTY		SHEET NO.
	HOU	Harris		87

Version 2.2

DATE: Jun 20, 2023
FILE:

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For projects with less than one acre of soil disturbing activity and that have Environmental, Permits, Issues, and Commitments (EPICs) dependent on stormwater controls and water quality measures TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office, Area Office, or electronically.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION ASPHALT OVERLAY

1.1 PROJECT CONTROL SECTION JOB (CSJ):
0027-13-238

1.2 PROJECT LIMITS:
From: S. OF BISSONNET

To: N. OF CHIMNEY ROCK RD.

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 29.6658170 ,(Long) -95.552128

END: (Lat) 29.725558 ,(Long) -95.473000

1.4 TOTAL PROJECT AREA (Acres): 52.57 AC

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.00 AC

1.6 NATURE OF CONSTRUCTION ACTIVITY:
PLANING, ASPHALT OVERLAY AND PAV.MRKGS

1.7 MAJOR SOIL TYPES:

Soil Type	Description
AFLISOLS, 2-4% SLOPS	NATIVE SOIL WITH CLAY SUBSOIL COVERED WITH 90% OF VARIOUS GRASSES, MODERATE WELL DRAINED

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):

PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

X PSLs determined during preconstruction meeting
☐ PSLs determined during construction
☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:

(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

X Mobilization
X Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
X Remove existing pavement
☐ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
X Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ Install mow strip, MBGF, bridge rail
☐ Place flex base
☐ Rework slopes, grade ditches
☐ Blade windrowed material back across slopes
☐ Revegetation of unpaved areas
X Achieve site stabilization and remove sediment and erosion control measures
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

☐ Sediment laden stormwater from stormwater conveyance over disturbed area
☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
☐ Solvents, paints, adhesives, etc. from various construction activities
☐ Transported soils from offsite vehicle tracking
X Construction debris and waste from various construction activities
☐ Contaminated water from excavation or dewatering pump-out water
☐ Sanitary waste from onsite restroom facilities
☐ Trash from various construction activities/receptacles
☐ Long-term stockpiles of material and waste
☐ Discharges from concrete washout activities, runoff from concrete cutting activities, and other concrete related activities
☐ Other: _____
☐ Other: _____
☐ Other: _____

1.11 RECEIVING WATERS:

Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
BUFFALO BAYOU	SEGMENT NO.1014

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

X Development of plans and specifications
X Perform SWP3 inspections
X Maintain SWP3 records and update to reflect daily operations
☐ Other: _____
☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

X Day To Day Operational Control
X Maintain schedule of major construction activities
X Install, maintain and modify BMPs
☐ Other: _____
☐ Other: _____
☐ Other: _____

SWP3 WILL BE PAID BY FORCE ACCOUNT

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

8/10/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			88
STATE	STATE DIST.	COUNTY	
TEXAS		HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- [X] [ ] Protection of Existing Vegetation
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Soil Retention Blankets
- [ ] [ ] Geotextiles
- [ ] [ ] Mulching/ Hydromulching
- [ ] [ ] Soil Surface Treatments
- [ ] [ ] Temporary Seeding
- [ ] [ ] Permanent Planting, Sodding or Seeding
- [ ] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Vertical Tracking
- [ ] [ ] Interceptor Swale
- [ ] [ ] Riprap
- [ ] [ ] Diversion Dike
- [ ] [ ] Temporary Pipe Slope Drain
- [ ] [ ] Embankment for Erosion Control
- [ ] [ ] Paved Flumes
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- [X] [ ] Biodegradable Erosion Control Logs
- [ ] [ ] Dewatering Controls
- [X] [ ] Inlet Protection
- [ ] [ ] Rock Filter Dams/ Rock Check Dams
- [ ] [ ] Sandbag Berms
- [X] [ ] Sediment Control Fence
- [ ] [ ] Stabilized Construction Exit
- [ ] [ ] Floating Turbidity Barrier
- [ ] [ ] Vegetated Buffer Zones
- [ ] [ ] Vegetated Filter Strips
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____
- [ ] [ ] Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS: N/A

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- [X] Excess dirt/mud on road removed daily
- [X] Haul roads dampened for dust control
- [X] Loaded haul trucks to be covered with tarpaulin
- [ ] Stabilized construction exit
- [X] Daily street sweeping
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- [ ] Chemical Management
- [ ] Concrete and Materials Waste Management
- [X] Debris and Trash Management
- [X] Dust Control
- [ ] Sanitary Facilities
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

2.6 VEGETATED BUFFER ZONES: N/A

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- [X] Fire hydrant flushings
- [X] Irrigation drainage
- [X] Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- [X] Potable water sources
- [X] Springs
- [X] Uncontaminated groundwater
- [X] Water used to wash vehicles or control dust
- [X] Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 DEWATERING:

Dewatering discharges of accumulated stormwater, groundwater, and surface water including discharges from dewatering of trenches, excavations, foundations, vaults, and other points of accumulation are prohibited unless managed by appropriate controls to prevent and minimize the offsite discharge of sediment and other pollutants.

2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STATE OF TEXAS
BEATA G. KWATER
95758
REGISTERED PROFESSIONAL ENGINEER

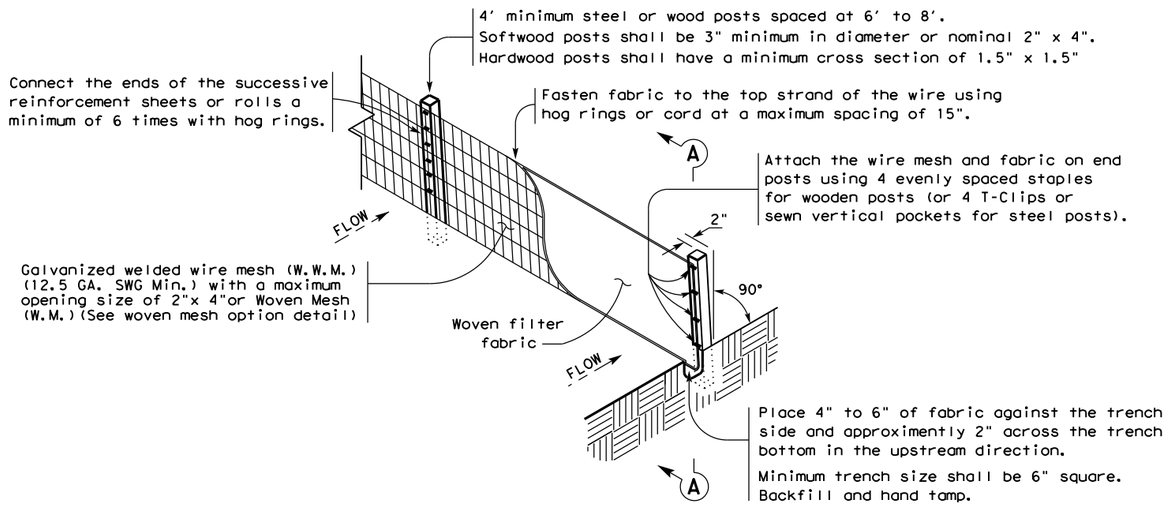
Beata Kwater, P.E.

8/10/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

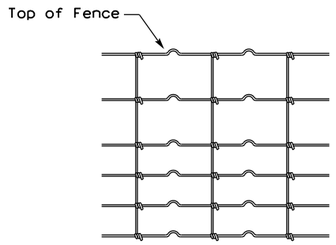
Texas Department of Transportation

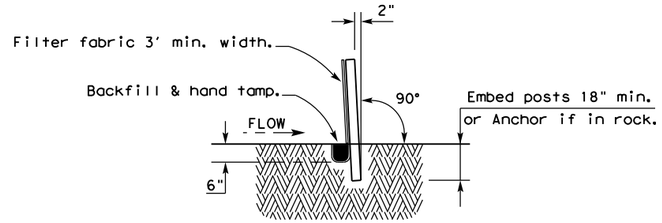
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			89
STATE	STATE DIST.	COUNTY	
TEXAS		HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0027	13	238	IH 69 FRTG



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.

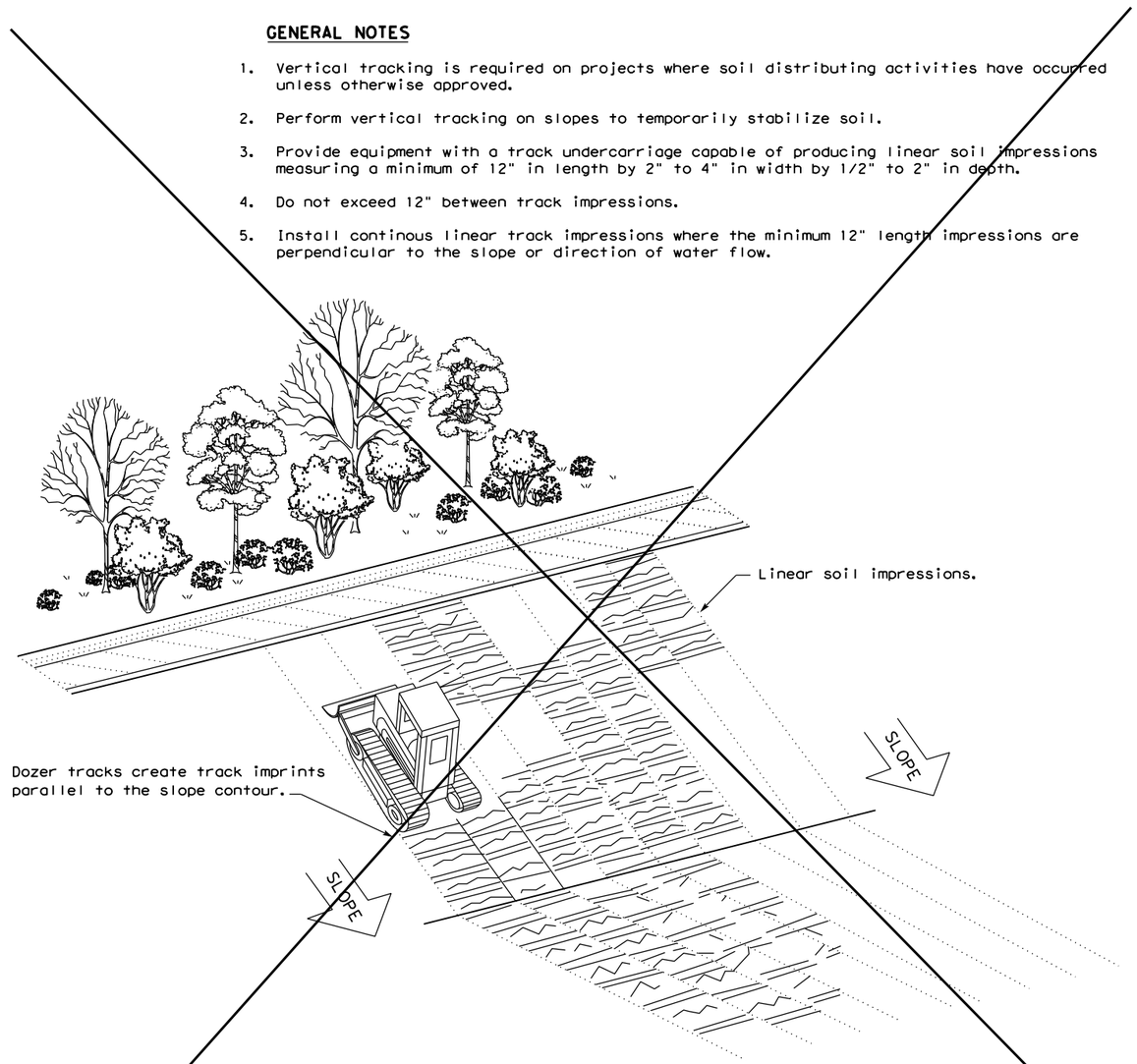
LEGEND

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

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED
PROFESSIONAL ENGINEER

Beata Kwater, P.E.

8/10/2023

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

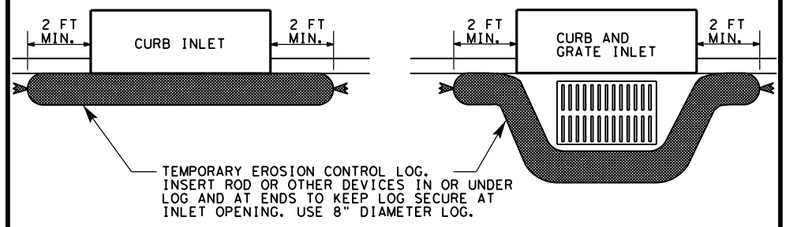
FENCE & VERTICAL TRACKING

EC(1)-16 (MOD)

FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0027	13	238	IH 69 FRTG
	DIST	COUNTY		SHEET NO.
	12	HARRIS		90

CURB INLETS
8" DIAMETER LOGS

ITEM 506-6040 BIODEG EROSN CONT LOGS (INSTL) (8")



MATERIAL REQUIREMENTS

FILL:

Use 100% shredded mulch or other non-compost biodegradable material as fill for logs. No compost or fines.

DO NOT USE MATERIAL WHICH PROHIBITS WATER INFILTRATION.

LOG MESH:
Use mesh with 1/4" openings or larger. Mesh must allow water infiltration but also hold fill material in place.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

A sediment trap (erosion control log) may be used to filter sediment out of runoff draining from an unstabilized area.

Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

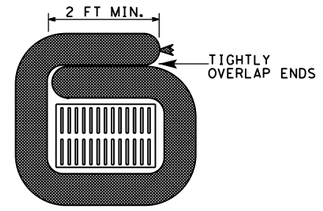
Sediment traps should be placed in the following locations:
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

The trap should be cleaned when the capacity has been reduced by 1/2 or the sediment has accumulated to a depth of 1', whichever is less.

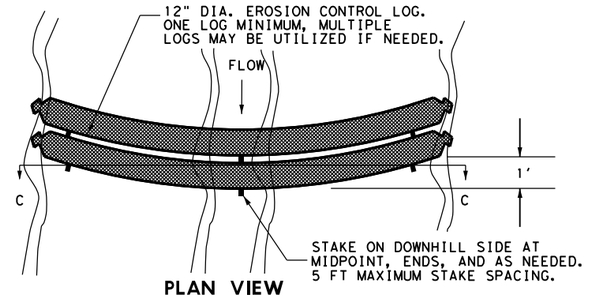
NOTE:
THE USE OF EROSION CONTROL LOGS WILL BE DETERMINED BY THE ENGINEER IN THE FIELD. THIS WORK WILL BE PAID, IF NEEDED AS EXTRA WORK OM A FORCE ACCOUNT BASIS.

DROP INLETS AND OTHER LOCATIONS
12" DIAMETER LOGS

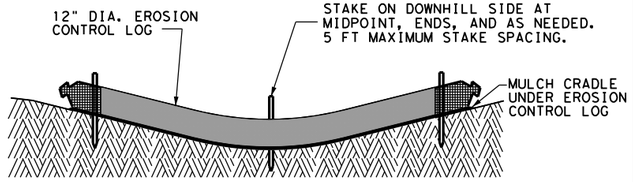
ITEM 506-6041 BIODEG EROSN CONT LOGS (INSTL)(12")



DROP INLETS

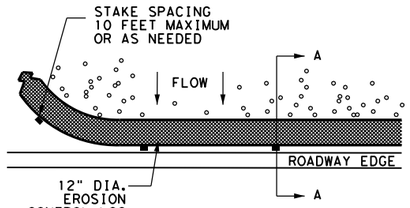


PLAN VIEW

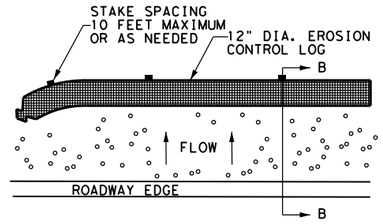


SECTION C-C

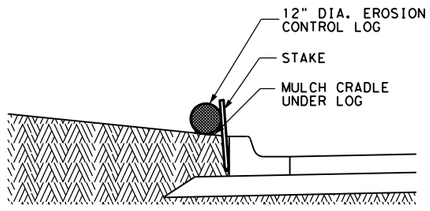
DRAINAGE SWALE OR DITCH



PLAN VIEW

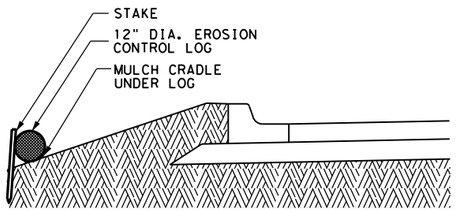


PLAN VIEW



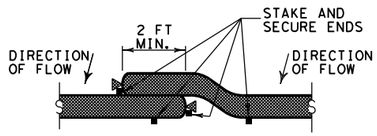
SECTION A-A

SLOPE TO ROADWAY EDGE



SECTION B-B

SLOPE AWAY FROM ROADWAY EDGE

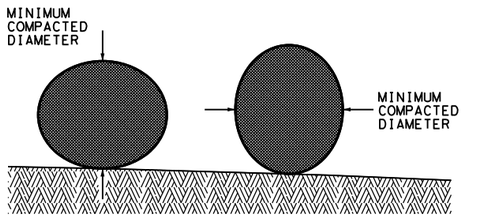


END OF LOG OVERLAP

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED PROFESSIONAL ENGINEER

Beata Kwater, P.E.

8/10/2023



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation
Houston District

EROSION CONTROL LOG

ECL-12 (MOD)

FILE: STDG4a.DGN	DN: TxDot	CK: TxDot	DW: TxDot	CK: TxDot
© TxDOT 2014	DISTRICT	FED REG	PROJECT NUMBER	SHEET
REVISIONS 3/15 MINOR CORRECTIONS	HOU	6		91
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HARRIS	0027	13	238	IH 69 FRTG

STD G-4A