

DIV. NO.	STATE	PROJECT NO.			SHEET NO.
6	TEXAS	F 2023 (685)			1
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
HOU	HARRIS	0114	12	012	US 290

DESIGN SPEED = 50 MPH
 ADT (2023) = 10,800
 ADT (2043) = 15,000

STATE OF TEXAS

DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED

STATE HIGHWAY IMPROVEMENT

PROJECT NO.: F 2023 (685)

CONTROL NO.: 0114-12-012

US 290 FRTG

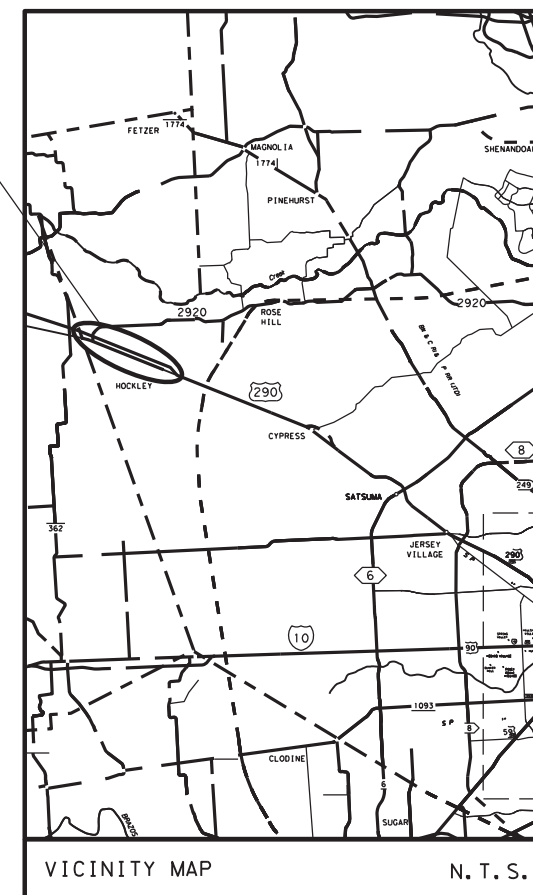
HARRIS COUNTY

LIMITS: FROM WALLER COUNTY LINE
TO EAST OF HEGAR RD

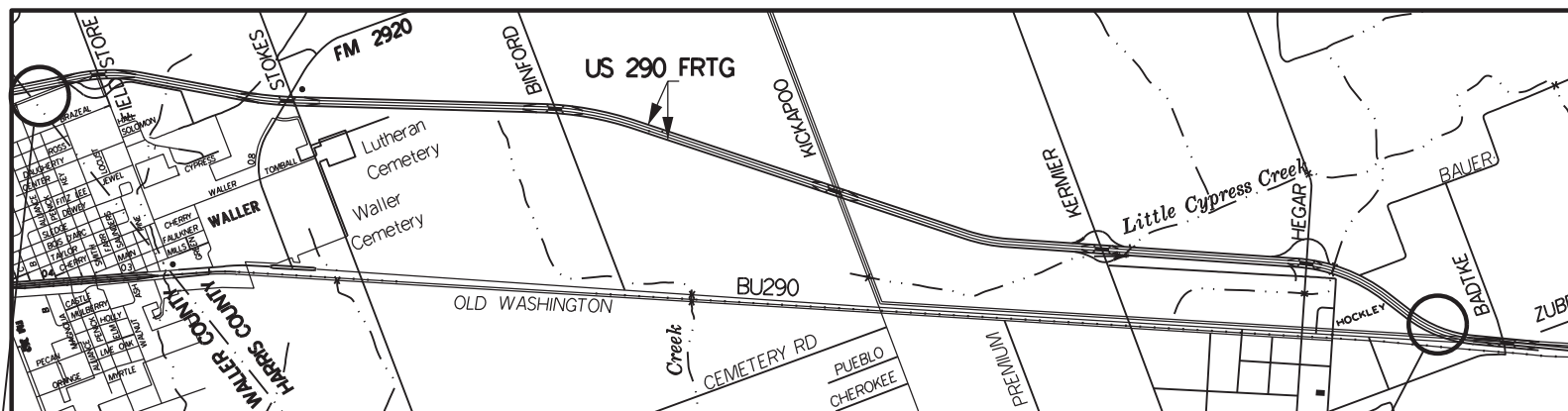
NET LENGTH OF PROJECT = ROADWAY : 33,958.00 FT = 6.431 MI
 BRIDGES : 542.00 FT = 0.103 MI
 TOTAL : 34,500.00 FT = 6.534 MI

INDEX OF SHEETS
SEE SHEET 2

PROJECT LOCATION



FOR THE CONSTRUCTION OF ASPHALTIC CONCRETE PAVEMENT OVERLAY CONSISTING OF PLANING, UNDERSEAL COURSE, ACP OVERLAY, AND PAVEMENT MARKINGS.



BEGIN PROJECT
 CSJ: 0114-12-012
 STA: 0+00.00
 MP = 0.000
 TRM = 704A+1.698

END PROJECT
 CSJ: 0114-12-0112
 STA: 345+00.00
 MP = 6.516
 TRM = 712A+0.242

EXCEPTIONS: PER PLAN LAYOUT
 EQUATIONS: NONE
 RR CROSSINGS: NONE

Texas Department of Transportation
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SUBMITTED FOR LETTING: 1/26/2023

DocuSigned by:

 192FCD8CB4B444D...
 AREA ENGINEER

APPROVED FOR LETTING: 2/2/2023

DocuSigned by:

 FOR DESIGNER/ENGINEER

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND THE SPECIFICATION ITEM LISTED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, JULY 5, 2022).

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COUNTY: HARRIS PROJ. NO. _____
 HWY. NO. US 290 LETTING DATE: APRIL 2, 2023
 DATE ACCEPTED _____

INDEX OF SHEETS

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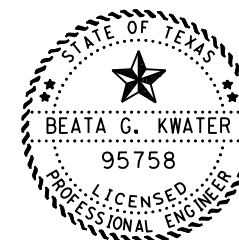
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE (*)
HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE
SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Beata Kwater, P.E., PE

2/2/2023
DATE

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of Transportation

INDEX
OF
SHEETS

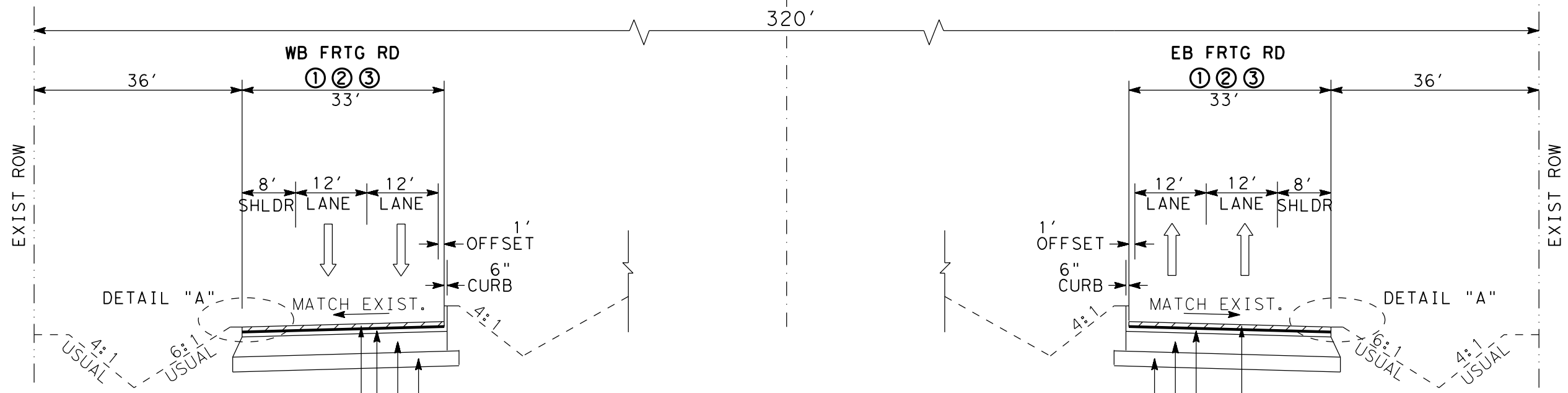
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			2
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

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	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	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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US 290
320'



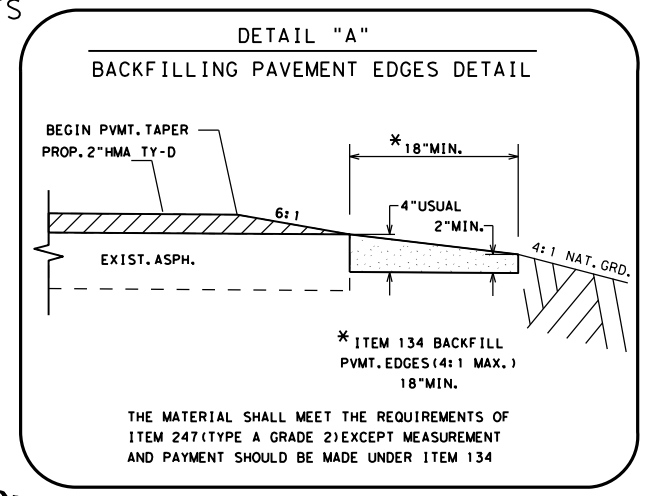
PROP. 2" PLANING, UNDERSEAL COURSE AND 2" ACP OVERLAY TY-D

EXIST 4" ACP
EXIST 8" ASB
EXIST 6" LTS

PROP. 2" PLANING, UNDERSEAL COURSE AND 2" ACP OVERLAY TY-D

EXIST 4" ACP
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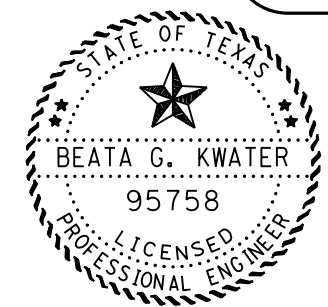
EXISTING AND PROPOSED TYPICAL SECTION
SEE TCP TYPICAL SECTIONS FOR STATIONS LIMITS



- ① PROP. PLANE ASPH CONC PAV (2") ITEM 354
- ② PROP. UNDERSEAL COURSE ITEM 3085
- ③ PROP. 2" ACP OVERLAY TY-D SAC-A PG70-22 ITEM 3076

NOTES:

1. FOR THIS TYPICAL SECTION, FOR ASPHALT CURB AND GUTTER SECTIONS USE SURFACE TEST TYPE B AND PAY ADJUSTMENT SCHEDULE 2 EXCEPT FOR OUTSIDE LANE. USE SURFACE TEST TYPE B AND PAY ADJUSTMENT SCHEDULE 3 FOR THE OUTSIDE LANE.
2. THE LOCATION OF FLEXIBLE STRUCTURE REPAIR AREA VARIES AND WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.



Beata Kwater, P.E.

US 290 FRTG
EXISTING AND
PROPOSED
TYPICAL SECTIONS

N. T. S.

SHEET 1 OF 4

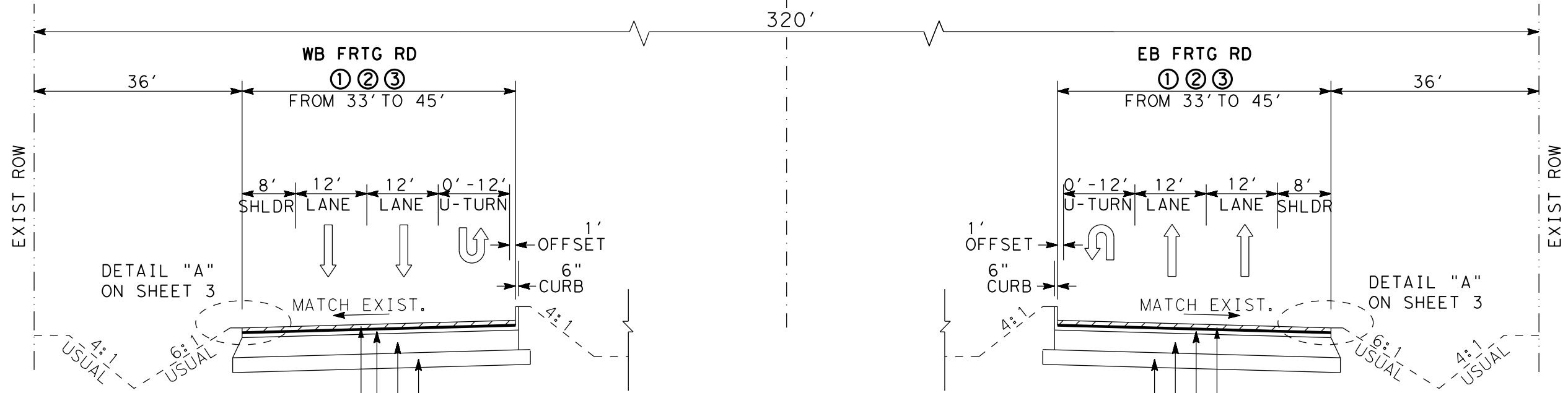
1/20/2023

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		3
STATE	STATE DIST. NO.	COUNTY
TEXAS	12	HARRIS
CONT.	SECT.	JOB
0114	12	012
		HIGHWAY NO.
		US 290

\$ TIME\$
\$ DATE\$
\$ FILE\$
\$ USER\$

US 290

320'



PROP. 2" PLANING, UNDERSEAL COURSE AND 2" ACP OVERLAY TY-D

EXIST 4" ACP
EXIST 8" ASB
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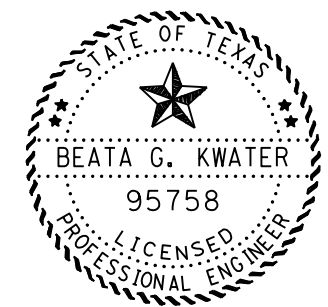
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US 290 FRTG
EXISTING AND
PROPOSED
TYPICAL SECTIONS

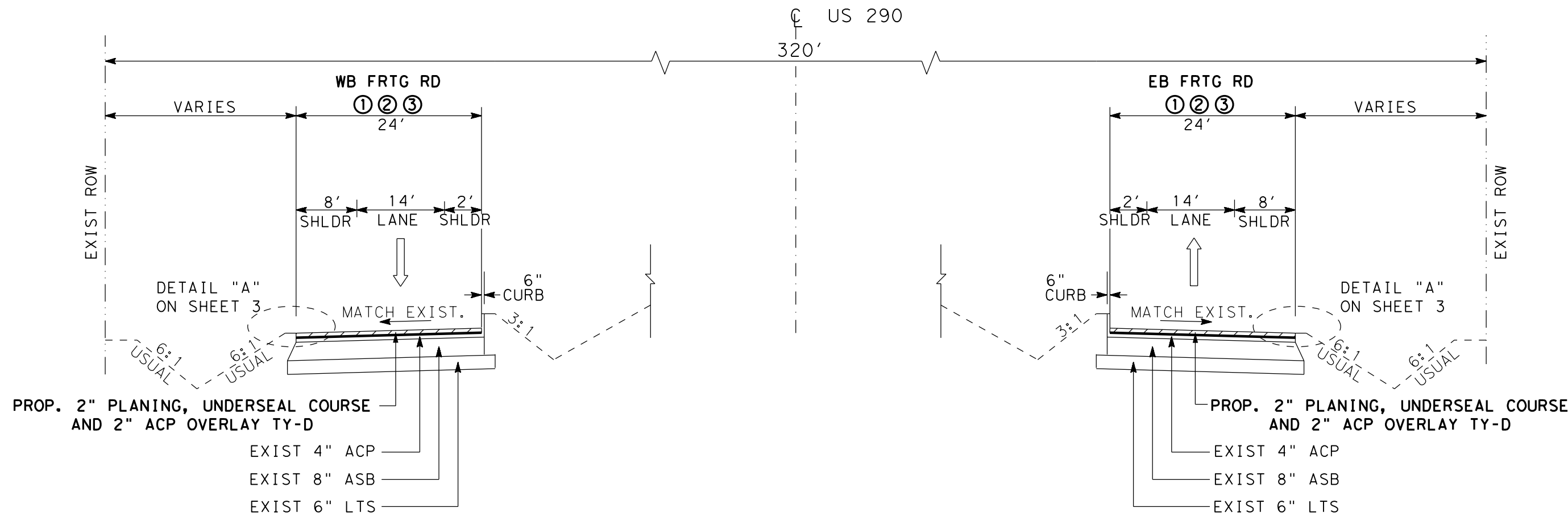
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SHEET 2 OF 4

1/20/2023

\$ TIME\$
\$ DATE\$
\$ FILE\$
\$ USER\$

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			4
STATE	STATE DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290



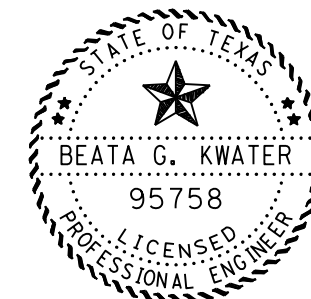
EXISTING AND PROPOSED TYPICAL SECTION
ENTRANCE RAMPS/EXIT RAMPS

SEE TCP TYPICAL SECTIONS FOR STATIONS LIMITS

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US 290 FRTG
EXISTING AND
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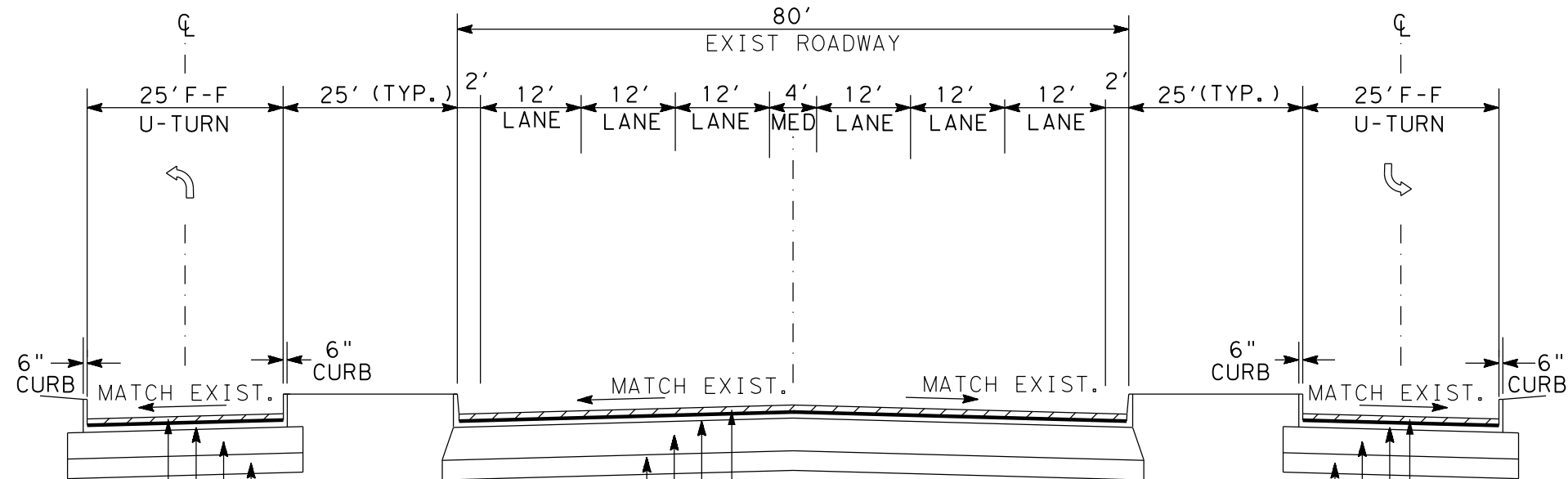
N. T. S.

SHEET 3 OF 4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			5
STATE	STATE DIST. NO.	COUNTY	
TEXAS	12	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

1/20/2023

\$TIME\$
\$DATE\$
\$FILE\$
\$USER\$



PROP. 2" PLANING, UNDERSEAL COURSE
AND 2" ACP OVERLAY TY-D

EXIST 4" ACP
EXIST 8" ASB
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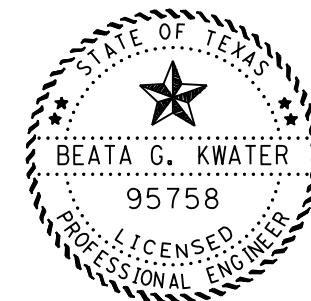
EXISTING AND PROPOSED TYPICAL SECTIONS
AT INTERSECTIONS:

FIELD STORE RD
FM 2920
BINFORD RD
KICKAPOO RD
KERMIER RD
HEGAR RD

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Beata Kwator, P.E.

US 290 FRTG
EXISTING AND
PROPOSED
INTERSECTION
TYPICAL SECTIONS

N. T. S.

SHEET 4 OF 4

1/20/2023

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		6
STATE	STATE DIST. NO.	COUNTY
TEXAS	12	HARRIS
CONT.	SECT.	JOB
0114	12	012
		HIGHWAY NO.
		US 290

\$TIME\$
\$DATE\$
\$FILE\$
\$USER\$

County: Harris

Control: 0114-12-012

Highway: US 290

General Notes:**General:**

Contractor questions on this project are to be addressed to the following individuals:

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.

All relevant project documentation, including Contract Time Determinations and cross-sections will continue to be provided on the following FTP site:

[Index of /pub/txdot-info/Pre-Letting Responses/Houston District \(state.tx.us\)](http://pub.txdot-info/Pre-Letting%20Responses/Houston%20District) 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.

The following standard detail sheets are modified:

Modified Standards

EC (1) -16 (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.

County: Harris

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Highway: US 290

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.

Tolls incurred by the Contractor are incidental 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.

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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

Wayne Series 900
Elgin White Wing
Elgin Pelican

Truck Type - 4 Wheel

M-B Cruiser II
Wayne Model 945
Mobile TE-3
Mobile TE-4
Murphy 4042

General: Traffic Control and Construction

Underseal Course (Item 3085) will be covered with the Hot Mix Asphalt Overlay (Item 3076) prior to reopening to traffic each day. The roadway will not be opened to traffic until the Hot Mix asphalt Overlay and work zone pavement markings are in place.

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

In the case of an emergency, the Engineer may allow traffic on the roadway before the asphalt overlay is in place. The roadway surface will be cleaned by removing all loose matter resulting from the construction operations.

Verify that all conditions under Item 502 are met before beginning work every day that work occurs.

General: Utilities

Consider the locations of underground utilities 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 cause 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.

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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, ftp://ftp.dot.state.tx.us/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.

County: Harris

Control: 0114-12-012

Highway: US 290

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	B	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,	Y	Y	Y	T	SD

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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)
	Etc.)					
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
Brazoria Area Office	HOU-BRZAShpDrwgs@txdot.gov
Fort Bend Area Office	HOU-FBAShpDrwgs@txdot.gov
Galveston Area Office	HOU-GALVAShpDrwgs@txdot.gov
Montgomery Area Office	HOU-MONTAShpDrwgs@txdot.gov
North Harris Area Office	HOU-NHAShpDrwgs@txdot.gov
Southeast Area Office	HOU-SEHAShpDrwgs@txdot.gov
Traffic Systems Construction Office	HOU-TSCShpDrwgs@txdot.gov
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

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T - Traffic Engineer	
Traffic Operations	HOU-TrfShpDrwgs@txdot.gov
TMS – Traffic Management System	
Computerized Traffic Management Systems (CTMS)	HOU-CTMSShpDrwgs@txdot.gov

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

Item 6: Control of Materials

To comply with the latest provisions of the Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

Item 7: Legal Relations and Responsibilities

The total area disturbed for this project is 0.00 acres. This project does not require a U.S. Army Corps of Engineers (USACE) Section 404 Permit before letting, but if a permit is needed during construction, assume responsibility for preparing the permit application. Submit the permit application to the Department’s District Environmental Section for approval. Once the permit application is approved, the Department will submit it to the USACE. Assume responsibility for the requested revisions, in coordination with the Department’s District Environmental Section.

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

No significant traffic generator events identified.

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Item 8: Prosecution and Progress

The Department will not adjust the number of days for the project and milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions, or discrepancies found in the time determination schedule.

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

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 for all lanes on US 290 Frontage Road and all intersecting streets is \$500.00. 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 134: Backfilling Pavement Edges

Quantity by station includes both sides of the roadway.

The Contractor has the option of selecting the type of backfill material consisting of Reclaimable Asphalt Pavement (RAP), Flex Base, or Crushed Concrete provided that it meets the requirements listed below.

If using salvaged asphalt concrete pavement, size it so that all the material, passes the 2-in. sieve. Use RAP that does not contain deleterious material such as clay or organic material.

Flex Base must meet the requirements of Item 247, Type A, Grade 1-2. Department Test Method Tex-117-E will not be required.

Crushed concrete must meet the requirements of Item 247, Grade 1-2. Department Test Methods Tex-116-E and Tex-117-E will not be required.

Place emulsified asphalt (SS-1, CSS-1, or CSS-1H) at an application rate of 0.25 gal/sq. yard.

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Item 247: Flexible Base

Place the flexible base in courses a maximum of 8 in. thick (loose measurement). Mix flexible base that requires 2 or more mixtures of material, in an approved stationary pugmill type mixer. Material passing the No. 40 sieve is known as soil binder.

Tolerances relating to a specified gradation and to a plasticity index under this specification are permitted.

Furnish one type of the base material unless otherwise authorized.

Compact the courses to a minimum density of 95 percent of the maximum density as determined using test method TEX-113-E.

Sandstone aggregate is not permitted.

Item 351: Flexible Pavement Structure Repair

Use asphalt stabilized base for the base material.

For base repair, place the asphalt stabilized base in compacted lifts of 4 in. maximum, unless otherwise directed.

Item 354: Planing and Texturing Pavement

The Reclaimed Asphalt Pavement from the project will become the property of the Contractor for use in the current construction project or in future projects.

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.

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.

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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.

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 US 290 Frontage Roads and Intersections

Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours
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
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

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Day	Daytime Closure Hours	Nighttime Closure Hours	Restricted Hours
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.

Before closing any City of Houston sidewalk, one or more city street lanes, or entire city streets during construction, obtain a permit to do so from the City. Obtain the required permit in person at the City of Houston Permit Office, or apply online at <http://www.gims.houstontx.gov>.

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

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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.

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

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 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.”

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

Item 662: Work Zone Pavement Markings**Item 666: Reflectorized Pavement Markings**

Use Type III glass beads for thermoplastic 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.

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 or work zone 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.

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 678: Pavement Surface Preparation for Markings

Do not blast clean asphalt concrete pavement. Clean asphalt concrete pavement as required under the applicable specifications or as directed.

On new concrete pavement or on existing concrete pavement when placing a new stripe on a new location, remove the curing compounds and contamination from the pavement surface by flail milling or as directed. In addition, air-blast the surface with compressed air just before placing the new stripe.

On existing concrete pavement when placing a new stripe on an existing location, after removing the existing stripe under the Item, "Eliminating Existing Pavement Markings and Markers," air-blast the surface with compressed air just before placing the new stripe.

Do not clean concrete pavement by grinding.

Item 3076: Dense-Graded Hot Mix Asphalt

Taper the asphalt concrete pavement at the beginning and ending points.

Use a maximum 6H:1V slope for the asphalt concrete pavement edge.

Where the 6H:1V ACP edge taper extends over onto the unsurfaced shoulders, blade off the loose existing shoulder material to provide a solid base for the outside taper edge. After placing the ACP overlay, blade this material back against the edge taper. This work is subsidiary to the various bid items.

The stockpile will be the point of sampling of coarse aggregate for test method TEX-217-F (Part II, decantation).

Place the asphalt concrete pavement in courses as shown on the typical sections.

Do not use petroleum-based solvents in the beds of hot mix asphalt delivery vehicles.

Dilution of tack coat is not allowed.

Use SAC A or B with PG70-22 (surface).

Do not use Surface Aggregate Classification (SAC) C for this project.

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For determining the Asphalt Content, only ignition ovens will be allowed.

The tack coat rate shown on the “Basis of Estimate” is an average rate for calculating tack coat quantities. Vary the rate based on the pavement conditions and other factors such as manufacturer’s recommendations and weather.

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.

Basis of Estimate

Item	Description	Limit and Rate	Unit
134	Backfilling Pavement Edges • Asphalt Emulsion	0.25 Gal. / Sq. Yd.	STA
3076	Dense-Graded Hot Mix Asphalt • Asphalt • Aggregate Tack Coat • Applied on new HMA • Applied on Existing HMA • Applied on Milled HMA	110 Lb. / Sq. Yd.-In. 6 % by weight 94 % by weight 0.06 Gal. / Sq. Yd. 0.09 Gal. / Sq. Yd. 0.11 Gal. / Sq. Yd.	TON



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0114-12-012

DISTRICT Houston
HIGHWAY US 290

COUNTY Harris

CONTROL SECTION JOB				0114-12-012		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00129242			
COUNTY				Harris			
HIGHWAY				US 290			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	134-6001	BACKFILL (TY A)	STA	427.000		427.000	
	351-6008	FLEXIBLE PAVEMENT STRUCTURE REPAIR(12")	SY	1,000.000		1,000.000	
	354-6045	PLANE ASPH CONC PAV (2")	SY	218,929.000		218,929.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		3.000	
	662-6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	20,696.000		20,696.000	
	662-6002	WK ZN PAV MRK NON-REMOV (W)4"(DOT)	LF	400.000		400.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	92,704.000		92,704.000	
	662-6012	WK ZN PAV MRK NON-REMOV (W)8"(SLD)	LF	11,440.000		11,440.000	
	662-6014	WK ZN PAV MRK NON-REMOV (W)12"(SLD)	LF	640.000		640.000	
	662-6016	WK ZN PAV MRK NON-REMOV (W)24"(SLD)	LF	4,300.000		4,300.000	
	662-6017	WK ZN PAV MRK NON-REMOV (W)(ARROW)	EA	58.000		58.000	
	662-6018	WK ZN PAV MRK NON-REMOV (W)(DBL ARW)	EA	4.000		4.000	
	662-6019	WK ZN PAV MRK NON-REMOV (W)(ENTR GORE)	EA	10.000		10.000	
	662-6020	WK ZN PAV MRK NON-REMOV (W)(EXIT GORE)	EA	14.000		14.000	
	662-6026	WK ZN PAV MRK NON-REMOV (W)(UTURN ARW)	EA	46.000		46.000	
	662-6029	WK ZN PAV MRK NON-REMOV(W)(WORD)	EA	104.000		104.000	
	662-6031	WK ZN PAV MRK NON-REMOV(W)36"(YLD TRI)	EA	168.000		168.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	24,670.000		24,670.000	
	662-6038	WK ZN PAV MRK NON-REMOV (Y)8"(SLD)	LF	4,000.000		4,000.000	
	662-6039	WK ZN PAV MRK NON-REMOV (Y)12"(SLD)	LF	6,200.000		6,200.000	
	666-6018	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	LF	200.000		200.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	5,720.000		5,720.000	
	666-6042	REFL PAV MRK TY I (W)12"(SLD)(100MIL)	LF	320.000		320.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	2,150.000		2,150.000	
	666-6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	29.000		29.000	
	666-6057	REFL PAV MRK TY I(W)(DBL ARROW)(100MIL)	EA	2.000		2.000	
	666-6063	REFL PAV MRK TY I(W)(UTURN ARW)(100MIL)	EA	23.000		23.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	52.000		52.000	
	666-6081	REFL PAV MRK TY I(W)(ENTR GORE)(100MIL)	EA	5.000		5.000	
	666-6084	REFL PAV MRK TY I(W)(EXIT GORE)(100MIL)	EA	7.000		7.000	
	666-6102	REF PAV MRK TY I(W)36"(YLD TRI)(100MIL)	EA	84.000		84.000	
	666-6138	REFL PAV MRK TY I (Y)8"(SLD)(100MIL)	LF	2,000.000		2,000.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	3,100.000		3,100.000	
	666-6162	RE PV MRK TY I(BLACK)6"(SHADOW)(100MIL)	LF	10,348.000		10,348.000	
	666-6180	REFL PAV MRK TY II (W) 12" (SLD)	LF	2,200.000		2,200.000	
	666-6225	PAVEMENT SEALER 6"	LF	302.000		302.000	



DISTRICT	COUNTY	CCSJ	SHEET
Houston	Harris	0114-12-012	8



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0114-12-012

DISTRICT Houston
HIGHWAY US 290

COUNTY Harris

CONTROL SECTION JOB				0114-12-012		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00129242			
COUNTY				Harris			
HIGHWAY				US 290			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	10,348.000		10,348.000	
	666-6309	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	LF	46,352.000		46,352.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	12,335.000		12,335.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	280.000		280.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	806.000		806.000	
	677-6002	ELIM EXT PAV MRK & MRKS (6")	LF	302.000		302.000	
	3076-6041	D-GR HMA TY-D SAC-A PG70-22	TON	24,082.120		24,082.120	
	3085-6001	UNDERSEAL COURSE	GAL	32,839.300		32,839.300	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	194.000		194.000	
	6185-6002	TMA (STATIONARY)	DAY	80.000		80.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	40.000		40.000	
08		CONTRACTOR FORCE ACCOUNT SAFETY CONTINGENCY (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT EROSION CONTROL MAINTENANCE (NON-PARTICIPATING)	LS	1.000		1.000	
		CONTRACTOR FORCE ACCOUNT LAW ENFORCEMENT (NON-PARTICIPATING)	LS	1.000		1.000	


CSJ 0114-12-012 SUMMARY OF QUANTITIES

ITEM	134	351	354	662	662	662	662	662	662	662	662	662			
DESC. CODE	6001	6008	6045	6001	6002	6004	6012	6014	6016	6017	6018	6019			
SHT NO.	STATION TO STATION			BACKFILL (TY A)	FLEXIBLE PAVEMENT STRUCTURE REPAIR (12")	PLANE ASPH CONC PAV (2")	WRK ZN PAV MRK NON-REMOV (W)4"(BRK)	WRK ZN PAV MRK NON-REMOV (W)4"(DOT)	WRK ZN PAV MRK NON-REMOV (W)4"(SLD)	WRK ZN PAV MRK NON-REMOV (W)8"(SLD)	WRK ZN PAV MRK NON-REMOV (W)12"(SLD)	WRK ZN PAV MRK NON-REMOV (W)24"(SLD)	WRK ZN PAV MRK NON-REMOV (W)(ARROW)	WRK ZN PAV MRK NON-REMOV (W)(DBL ARW)	WRK ZN PAV MRK NON-REMOV (W)(ENTR GORE)
	STA	SY	SY	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA		
US 290 FRTG															
CSJ 0114-12-012															
1	0+00.00	TO	52+00.00	77.00	200.00	37771.70	4200.00		16686.00	1760.00	160.00	600.00	8.00		2.00
2	52+00.00	TO	104+00.00	101.52	200.00	48004.00	5346.00		21144.00	2060.00		900.00	8.00		2.00
3	104+00.00	TO	132+31.00	55.12	100.00	31537.33	2920.00		12224.00	1580.00		600.00	8.00		2.00
4	178+53.00	TO	204+57.00	49.02	100.00	26708.65	1420.00		10890.00	1880.00	160.00	600.00	10.00		
5	242+14.50	TO	290+00.00	62.90	200.00	33509.87	3760.00	400.00	14480.00	2320.00	160.00	900.00	16.00	4.00	2.00
6	290+00.00	TO	344+63.50	80.90	200.00	41396.79	3050.00		17280.00	1840.00	160.00	700.00	8.00		2.00
TOTAL				427.00	1000.00	218928.34	20696.00	400.00	92704.00	11440.00	640.00	4300.00	58.00	4.00	10.00

ITEM	662	662	662	662	662	662	662	662	666	666	666	666	666	666		
DESC. CODE	6020	6026	6029	6031	6034	6038	6039	6018	6036	6042	6048	6054	6057			
SHT NO.	STATION TO STATION			WRK ZN PAV MRK NON-REMOV(W) (EXIT GORE)	WRK ZN PAV MRK NON-REMOV(W) (UTURN ARW)	WRK ZN PAV MRK NON-REMOV(W) (WORD)	WRK ZN PAV MRK NON-REMOV(W) 36"(YLD TRI)	WRK ZN PAV MRK NON-REMOV(Y)4"(SLD)	WRK ZN PAV MRK NON-REMOV(Y)8"(SLD)	WRK ZN PAV MRK NON-REMOV(Y)12"(SLD)	REFL PAV MRK TY I (W)6"(DOT) (100 MIL)	REFL PAV MRK TY I (W)8"(SLD) (100 MIL)	REFL PAV MRK TY I (W)12"(SLD) (100MIL)	REFL PAV MRK TY I (W)24"(SLD) (100MIL)	REFL PAV MRK TY I (W)(ARROW) (100MIL)	REFL PAV MRK TY I (W)(DBL ARROW) (100MIL)
	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA
US 290 FRTG																
CSJ 0114-12-012																
1	713+10.00	TO	721+00.00	2.00	8.00	16.00	28.00	3800.00	1000.00	1200.00		880.00	80.00	300.00	4.00	
2	721+00.00	TO	734+00.00	6.00	8.00	16.00	28.00	3800.00	1000.00	1200.00		1030.00		450.00	4.00	
3	734+00.00	TO	747+00.00	2.00	6.00	14.00	28.00	3840.00		700.00		790.00		300.00	4.00	
4	747+00.00	TO	760+00.00		8.00	18.00	28.00	5200.00		700.00		940.00	80.00	300.00	5.00	
5	760+00.00	TO	773+00.00		8.00	24.00	28.00	5530.00	1000.00	1200.00	200.00	1160.00	80.00	450.00	8.00	2.00
6	773+00.00	TO	786+00.00	4.00	8.00	16.00	28.00	2500.00	1000.00	1200.00		920.00	80.00	350.00	4.00	
TOTAL				14.00	46.00	104.00	168.00	24670.00	4000.00	6200.00	200.00	5720.00	320.00	2150.00	29.00	2.00

0114-12-012 SUMMARY OF QUANTITIES

SHEET 1 OF 2

 <p>© TxDOT 2022</p>	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	6			10
	STATE	STATE DIST. NO.	COUNTY	
	TEXAS	HOU	HARRIS	
	CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290	

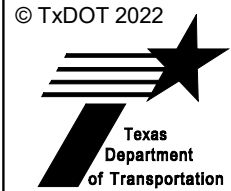
CSJ 0114-12-012 SUMMARY OF QUANTITIES

ITEM		666	666	666	666	666	666	666	666	666	666	666	666	666	666
DESC. CODE		6063	6078	6081	6084	6102	6138	6141	6162	6180	6225	6306	6309	6321	
SHT NO.	STATION TO STATION	REFL PAV MRK TY I (W)(UTURN ARW) (100MIL)	REFL PAV MRK TY I (W)(WORD) (100MIL)	REFL PAV MRK TY I (W)(ENTR GORE) (100MIL)	REFL PAV MRK TY I (W)(EXIT GORE) (100MIL)	REFL PAV MRK TY I (W)36"(YLD TRI) (100MIL)	REFL PAV MRK TY I (Y)8"(SLD) (100MIL)	REFL PAV MRK TY I (Y)12"(SLD) (100MIL)	REFL PAV MRK TY I (BLACK)6" (SHADOW) (100MIL)	REFL PAV MRK TY II (W)12"(SLD)	PAVEMENT SEALER 6"	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)	
		EA	EA	EA	EA	EA	LF	LF	LF	LF	LF	LF	LF	LF	
US 290 FRTG															
CSJ 0114-12-012															
1	0+00.00 TO 52+00.00	4.00	8.00	1.00	1.00	14.00	500.00	600.00	2100.00	350.00		2100.00	8343.00	1900.00	
2	52+00.00 TO 104+00.00	4.00	8.00	1.00	3.00	14.00	500.00	600.00	2673.00	450.00		2673.00	10572.00	1900.00	
3	104+00.00 TO 132+31.00	3.00	7.00	1.00	1.00	14.00		350.00	1460.00	250.00		1460.00	6112.00	1920.00	
4	178+53.00 TO 204+57.00	4.00	9.00			14.00		350.00	710.00	600.00		710.00	5445.00	2600.00	
5	242+14.50 TO 290+00.00	4.00	12.00	1.00		14.00	500.00	600.00	1880.00	300.00	302.00	1880.00	7240.00	2765.00	
6	290+00.00 TO 344+63.50	4.00	8.00	1.00	2.00	14.00	500.00	600.00	1525.00	250.00		1525.00	8640.00	1250.00	
TOTAL		23.00	52.00	5.00	7.00	84.00	2000.00	3100.00	10348.00	2200.00	302.00	10348.00	46352.00	12335.00	

ITEM		672	672	677	3076	3085
DESC. CODE		6009	6010	6002	6041	6001
SHT NO.	STATION TO STATION	REFL PAV MRKR TY II-A-A	REFL PAV MRKR TY II-C-R	ELIM EXT PAV MRK & MRKS (6")	D-GR HMA TY-D SAC-A PG70-22	UNDERSEAL COURSE
		EA	EA	LF	TON	GAL
US 290 FRTG						
CSJ 0114-12-012						
1	0+00.00 TO 52+00.00	55.00	149.00		4154.89	5665.80
2	52+00.00 TO 104+00.00	55.00	186.00		5280.44	7200.60
3	104+00.00 TO 132+31.00	30.00	113.00		3469.11	4730.60
4	178+53.00 TO 204+57.00	30.00	83.00		2937.95	4006.30
5	242+14.50 TO 290+00.00	55.00	152.00	302.00	3686.08	5026.48
6	290+00.00 TO 344+63.50	55.00	123.00		4553.65	6209.52
TOTAL		280.00	806.00	302.00	24082.12	32839.30

**0114-12-012
SUMMARY OF QUANTITIES**

SHEET 2 OF 2

	FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
	6			11
	STATE	STATE DIST. NO.	COUNTY	
	TEXAS	HOU	HARRIS	
	CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290	

Y	C	HIGHWAY	D	REFERENCE MARKERS							E	TEST	DIST	IRI(IN/MI)			COMMENTS
				BEGIN	END	LEN	MM/DD/YYYY	TRAV	LEFT	RIGHT				SI			
2022	08	US0290	A1	706A	+	0.600	706A	+	0.700	0.1	05	10/28/2021		82	69	4.1	
2022	08	US0290	A1	706A	+	1.500	706A	+	1.523	0.1	05	10/28/2021		271	236	1.7	
2022	08	US0290	A1	710A	+	1.164	710A	+	1.264	0.1	05	10/28/2021		293	310	1.2	
2022	08	US0290	X1	704A	+	0.783	704A	+	0.883	0.1	05	10/28/2021		133	83	3.5	
2022	08	US0290	X1	706A	+	0.283	706A	+	0.383	0.1	05	10/28/2021		112	111	3.5	
2022	08	US0290	X1	706A	+	0.983	706A	+	1.083	0.1	05	10/28/2021		97	107	3.6	
2022	08	US0290	X1	710A	+	0.009	710A	+	0.109	0.1	05	10/28/2021		131	121	3.2	

Pavement Types

Description

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
Combination)	

IRI DATA

FED RD. DIV. NO.	State	Project Number			Sheet
6	Texas				12
DIST	COUNTY	CONT.	SECT.	JOB	Highwy
HOU	HARRIS	0114	12	012	US 290

SEQUENCE OF CONSTRUCTION NARRATIVE

PRELIMINARY PHASE: (MUST BE COMPLETED PRIOR TO PHASE 1)

1. INSTALL ADVANCE WARNING DEVICES.
- US 290 WB & EB FRONTAGE ROAD FROM WALLER C/L TO EAST OF HEGAR RD.

PHASE 1

1. INSTALL ADVANCE SIGNAGE FOR WB & EB OUTSIDE ONE LANE CLOSURE -US 290 FRONTAGE ROAD.
2. REMOVE EXISTING FRONTAGE ROAD PAVEMENT OUTSIDE LANE(S) PHASE 1 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
3. PLACE ASPHALT OVERLAY FRONTAGE ROAD OUTSIDE LANE(S) PHASE 1 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
4. INSTALL WORK ZONE PAVEMENT STRIPING BEFORE OPENING TO TRAFFIC.

PHASE 2

1. INSTALL ADVANCE SIGNAGE FOR WB & EB LANES(S) CLOSURE AND DETOUR FOR EXIT RAMPS CLOSURE -US 290 FRONTAGE ROAD.
2. INSTALL WORK ZONE PAVEMENT STRIPING.
3. REMOVE EXISTING FRONTAGE ROAD PAVEMENT INSIDE LANE(S) AND RAMPS PHASE 2 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
4. PLACE ASPHALT OVERLAY FRONTAGE ROAD INSIDE LANE(S) AND RAMPS PHASE 2 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
5. INSTALL WORK ZONE PAVEMENT STRIPING BEFORE OPENING TO TRAFFIC.
6. REMOVE EXIT RAMP CLOSURE ADVANCE DEVICES AND OPEN EXIT RAMPS TO TRAFFIC.

PHASE 3

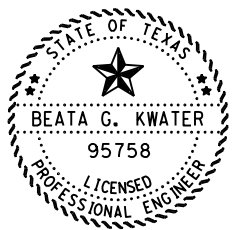
1. INSTALL ADVANCE SIGNAGE DETOUR FOR EXIT RAMPS CLOSURE & EB US 290 FRONTAGE ROAD (SEE PLAN SHEETS).
2. REMOVE EXISTING FRONTAGE ROAD PAVEMENT TO SPECIFIED LIMITS (SEE PLAN SHEETS).
3. PLACE ASPHALT OVERLAY FRONTAGE ROAD AND RAMPS PHASE 3 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
4. INSTALL WORK ZONE PAVEMENT STRIPING BEFORE OPENING TO TRAFFIC.
5. REMOVE EXIT RAMP CLOSURE ADVANCE DEVICES AND OPEN EXIT RAMPS TO TRAFFIC.

PHASE 4

1. INSTALL ADVANCE SIGNAGE DETOUR FOR ENTRANCE RAMPS CLOSURE-WB & EB US 290 FRONTAGE ROAD (SEE PLAN SHEETS).
2. REMOVE EXISTING FRONTAGE ROAD PAVEMENT TO SPECIFIED LIMITS (SEE PLAN SHEETS).
3. PLACE ASPHALT OVERLAY FRONTAGE ROAD AND RAMPS PHASE 4 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
4. INSTALL WORK ZONE PAVEMENT STRIPING BEFORE OPENING TO TRAFFIC.
5. REMOVE ENTRANCE RAMP CLOSURE ADVANCE DEVICES AND OPEN ENTRANCE RAMPS TO TRAFFIC.

PHASE 5 (STEP A TO STEP D)

1. INSTALL ADVANCE SIGNAGE FOR INTERSECTIONS OF US 290 FRONTAGE ROAD (SEE PLAN SHEETS).
2. REMOVE EXISTING INTERSECTIONS ROAD PAVEMENT TO SPECIFIED LIMITS (SEE PLAN SHEETS).
3. PLACE ASPHALT OVERLAY AT INTERSECTIONS PHASE 5 TO SPECIFIED LIMITS (SEE PLAN SHEETS).
4. INSTALL WORK ZONE PAVEMENT STRIPING BEFORE OPENING TO TRAFFIC.



Beata Kwator, P.E.

1/20/2023

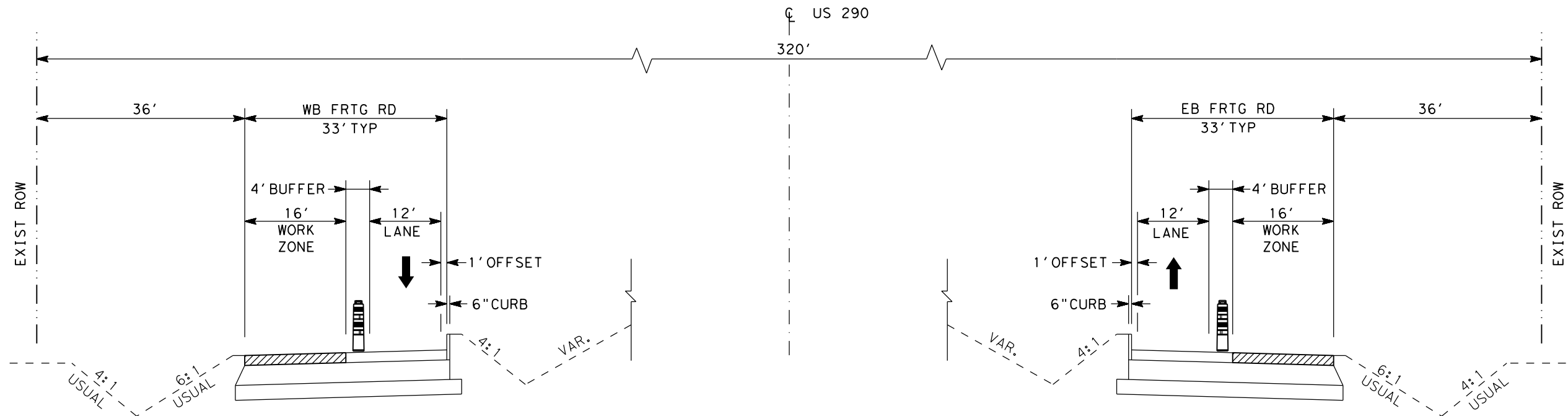
TRAFFIC CONTROL
PLAN

SEQUENCE OF
CONSTRUCTION
NARRATIVE



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		13

Ckt
Dm
Ckt
Dm

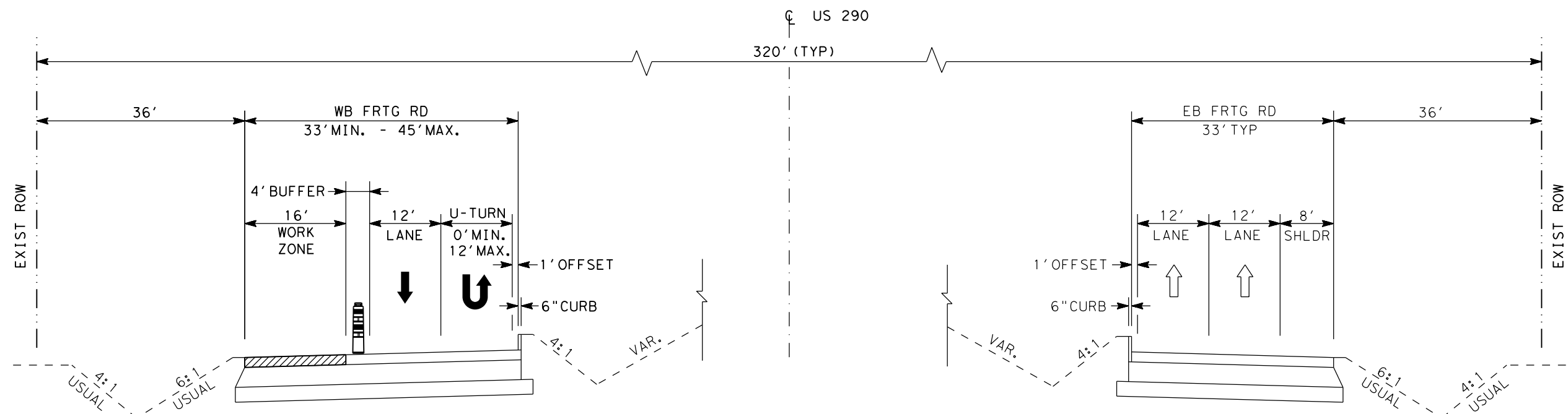


STA. 0+00.00 (ML) TO STA. 6+90.50 (ML)
 STA. 24+76.40 (ML) TO STA. 28+16.80 (ML)
 STA. 61+81.70 (ML) TO STA. 62+70.60 (ML)
 STA. 77+34.80 (ML) TO STA. 115+02.80 (ML)
 STA. 264+09.30 (ML) TO STA. 274+56.30 (ML)
 STA. 295+11.20 (ML) TO STA. 300+90.00 (ML)
 STA. 315+35.10 (ML) TO STA. 340+98.90 (ML)

STA. 15+91.00 (ML) TO STA. 18+27.50 (ML)
 STA. 31+42.00 (ML) TO STA. 54+13.50 (ML)
 STA. 72+10.10 (ML) TO STA. 73+87.60 (ML)
 STA. 120+31.50 (ML) TO STA. 122+54.80 (ML)
 STA. 276+81.60 (ML) TO STA. 290+55.00 (ML)
 STA. 307+86.50 (ML) TO STA. 308+40.80 (ML)

STA. 66+88.90 (ML) TO STA. 74+13.50 (ML)
 STA. 78+92.00 (ML) TO STA. 116+05.90 (ML)

Beata Kwater, P.E.

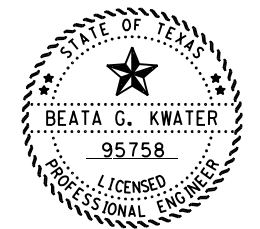


STA. 21+19.20 (ML) TO STA. 24+76.40 (ML)
 STA. 68+74.80 (ML) TO STA. 72+10.10 (ML)

LEGEND:



1/20/2023



TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD TYPICAL SECTIONS

PHASE 1

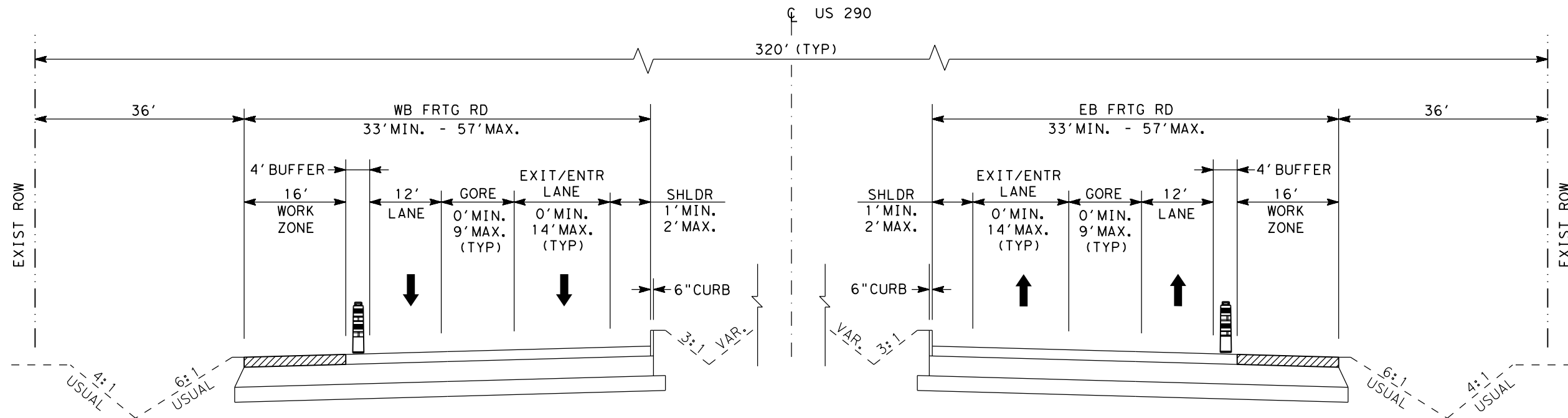
NOT TO SCALE

SHEET 1 OF 2

<p>TEXAS DEPARTMENT OF TRANSPORTATION © 2022 ALL RIGHTS RESERVED</p>			
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	14	

DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILES\$

Ckt
Dm
Ckt
Dm



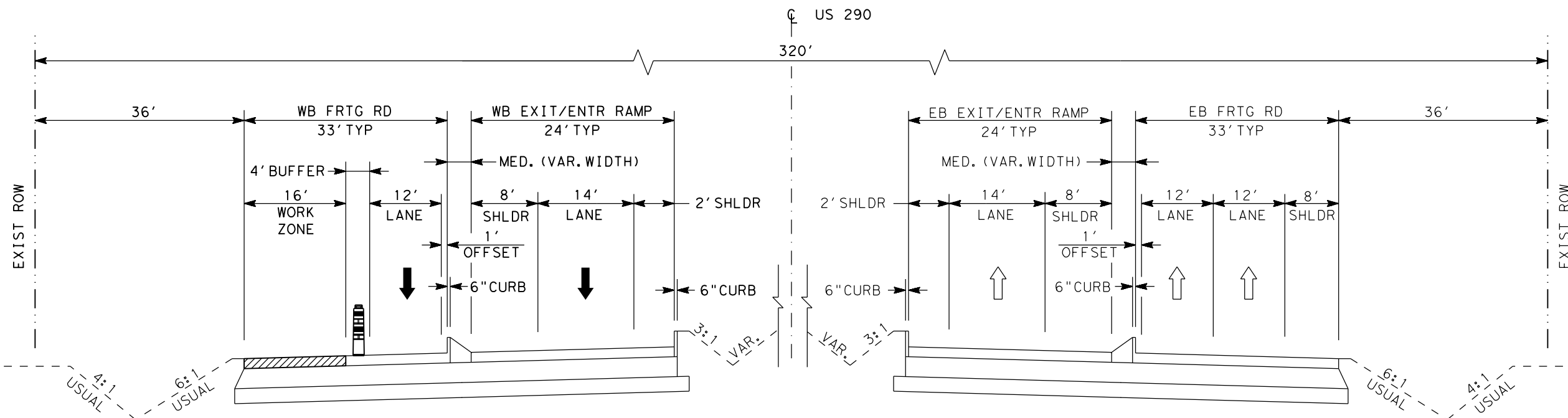
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STA. 55+49.00 (ML) TO STA. 61+81.70 (ML)
STA. 116+54.90 (ML) TO STA. 120+31.50 (ML)
STA. 290+95.00 (ML) TO STA. 295+11.20 (ML)
STA. 343+66.40 (ML) TO STA. 344+70.00 (ML)

STA. 28+16.80 (ML) TO STA. 31+42.00 (ML)
STA. 73+87.60 (ML) TO STA. 77+34.80 (ML)
STA. 260+64.50 (ML) TO STA. 264+09.30 (ML)
STA. 308+40.80 (ML) TO STA. 315+35.10 (ML)

STA. STA. 74+13.50 (ML) TO STA. 78+92.00 (ML)
STA. 116+05.90 (ML) TO STA. STA. 121+95.90 (ML)

Beata Kwater, P.E.

1/20/2023



STA. 6+90.50 (ML) TO STA. 10+32.80 (ML)
STA. 54+13.50 (ML) TO STA. 55+49.00 (ML)
STA. 115+02.80 (ML) TO STA. 116+54.90 (ML)
STA. 290+55.00 (ML) TO STA. 290+95.00 (ML)
STA. 340+98.90 (ML) TO STA. 343+66.40 (ML)

LEGEND:



TRAFFIC BARREL/DRUM

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED PROFESSIONAL ENGINEER

TRAFFIC CONTROL PLAN

US 290
FRONTAGE ROAD
TYPICAL SECTIONS

PHASE 1
NOT TO SCALE

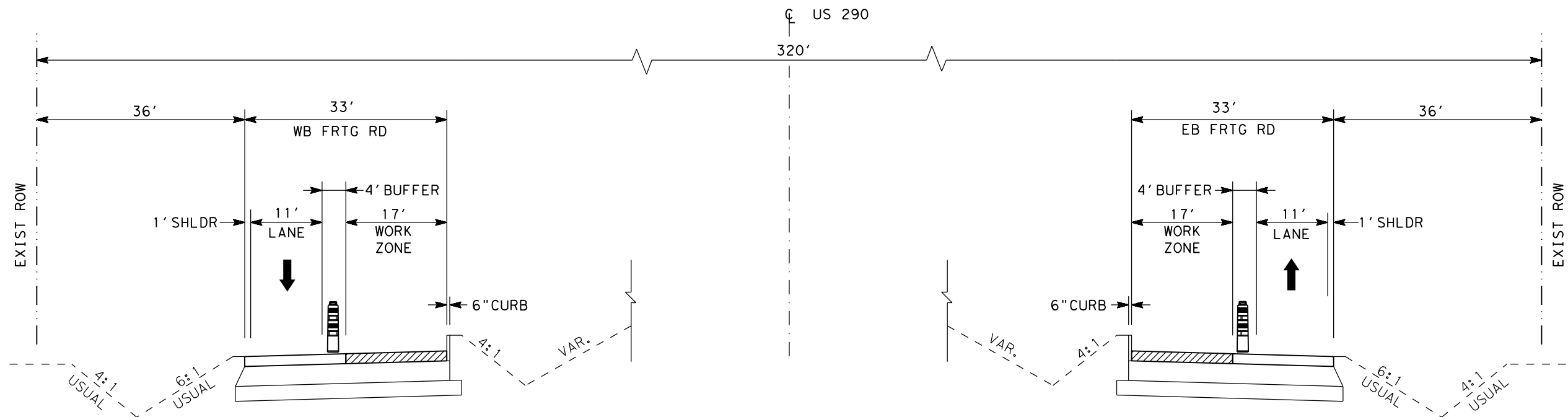
SHEET 2 OF 2

TEXAS DEPARTMENT OF TRANSPORTATION
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CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	15	

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PEN TABLE: \$PEN\$
FILE: \$FILES

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Ckt
Dm



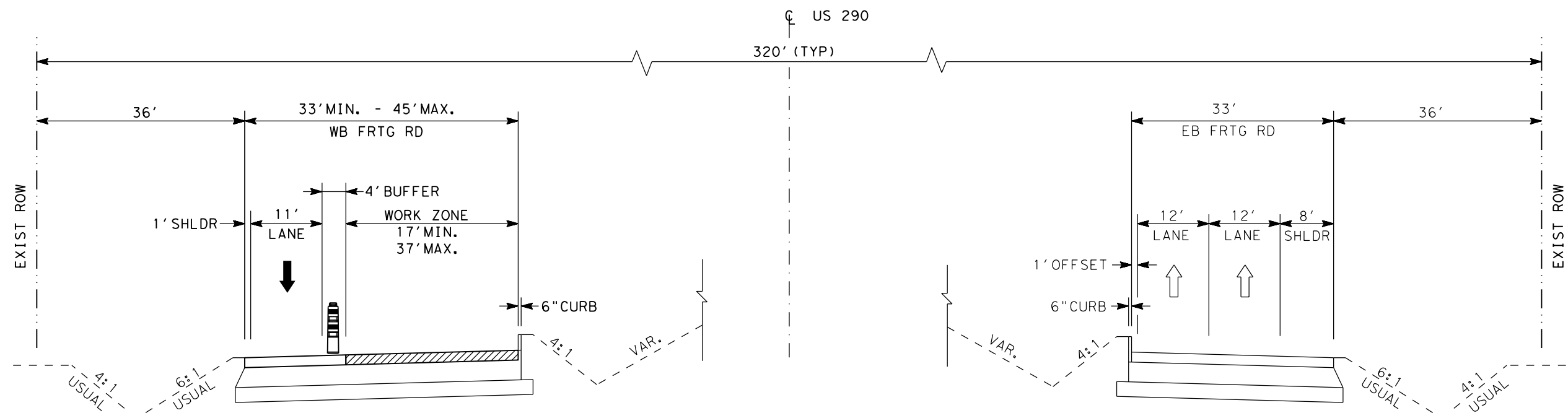
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 STA. 295+11.20 (ML) TO STA. 300+90.00 (ML)
 STA. 315+35.10 (ML) TO STA. 340+98.90 (ML)

STA. 15+91.00 (ML) TO STA. 18+27.50 (ML)
 STA. 31+42.00 (ML) TO STA. 54+13.50 (ML)
 STA. 72+10.10 (ML) TO STA. 73+87.60 (ML)
 STA. 120+31.50 (ML) TO STA. 122+54.80 (ML)
 STA. 276+59.90 (ML) TO STA. 290+55.00 (ML)
 STA. 307+86.50 (ML) TO STA. 308+40.80 (ML)

STA. 66+88.90 (ML) TO STA. 74+13.50 (ML)
 STA. 78+92.00 (ML) TO STA. 116+05.90 (ML)

Beata Kwater, P.E.

1/20/2023



STA. 21+19.20 (ML) TO STA. 24+76.40 (ML)
 STA. 68+74.80 (ML) TO STA. 72+10.10 (ML)

LEGEND:



STATE OF TEXAS
 BEATA G. KWATER
 95758
 LICENSED PROFESSIONAL ENGINEER

TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD TYPICAL SECTIONS

PHASE 2 NOT TO SCALE

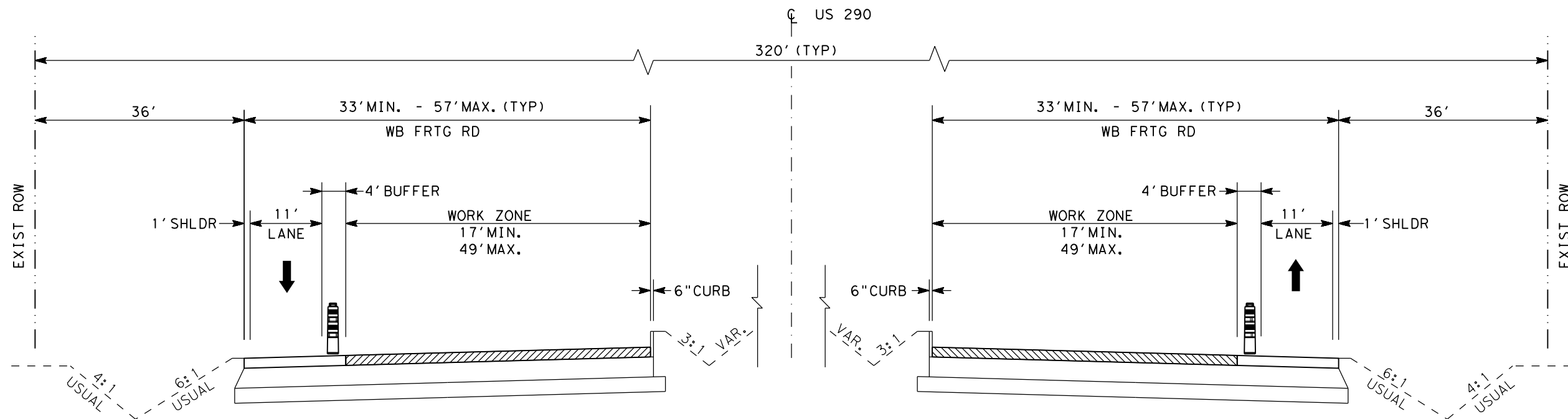
SHEET 1 OF 2

TEXAS DEPARTMENT OF TRANSPORTATION
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CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	16	

DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILE\$

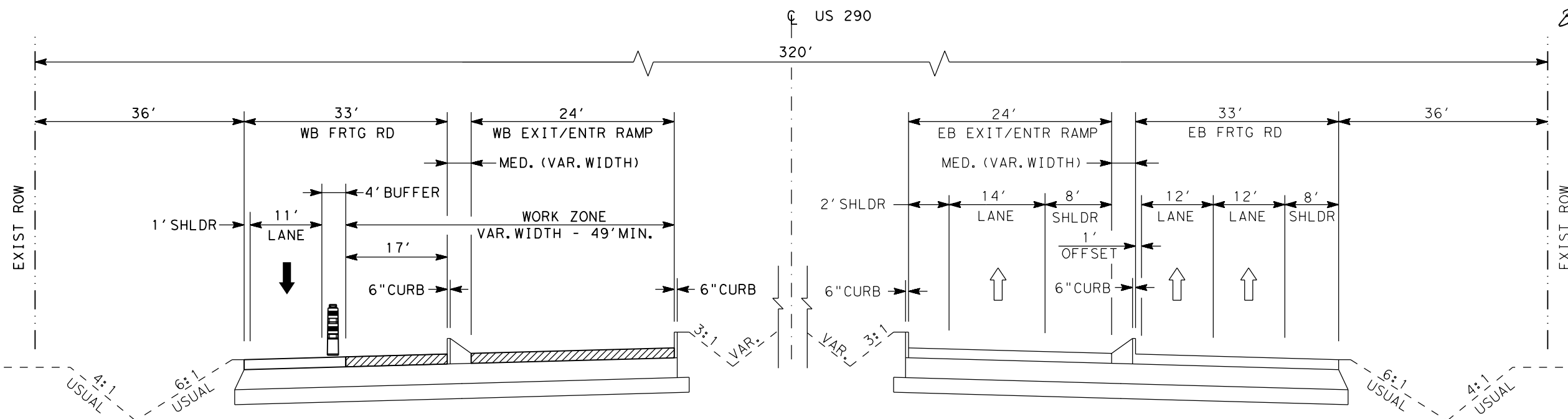
Ckt
Dm
Ckt
Dm



STA. 10+32.80 (ML) TO STA. 15+91.00 (ML)
 STA. 55+49.00 (ML) TO STA. 61+81.70 (ML)
 STA. 116+54.90 (ML) TO STA. 120+31.50 (ML)
 STA. 290+95.00 (ML) TO STA. 295+11.20 (ML)
 STA. 343+66.40 (ML) TO STA. 344+70.00 (ML)

STA. 28+16.80 (ML) TO STA. 31+42.00 (ML)
 STA. 73+87.60 (ML) TO STA. 77+34.80 (ML)
 STA. 260+64.50 (ML) TO STA. 264+09.30 (ML)
 STA. 308+40.80 (ML) TO STA. 315+35.10 (ML)

STA. STA. 74+13.50 (ML) TO STA. 78+92.00 (ML)
 STA. 116+05.90 (ML) TO STA. STA. 121+95.90 (ML)



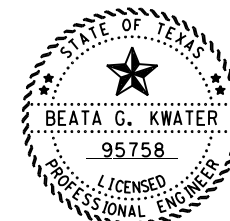
STA. 6+90.50 (ML) TO STA. 10+32.80 (ML)
 STA. 54+13.50 (ML) TO STA. 55+49.00 (ML)
 STA. 115+02.80 (ML) TO STA. 116+54.90 (ML)
 STA. 290+55.00 (ML) TO STA. 290+95.00 (ML)
 STA. 340+98.90 (ML) TO STA. 343+66.40 (ML)

LEGEND:



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1/20/2023



TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD TYPICAL SECTIONS

PHASE 2

NOT TO SCALE

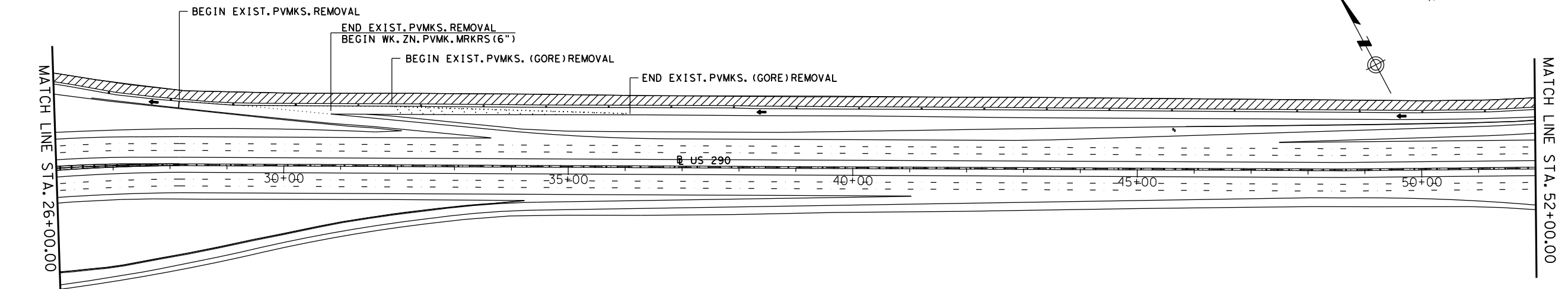
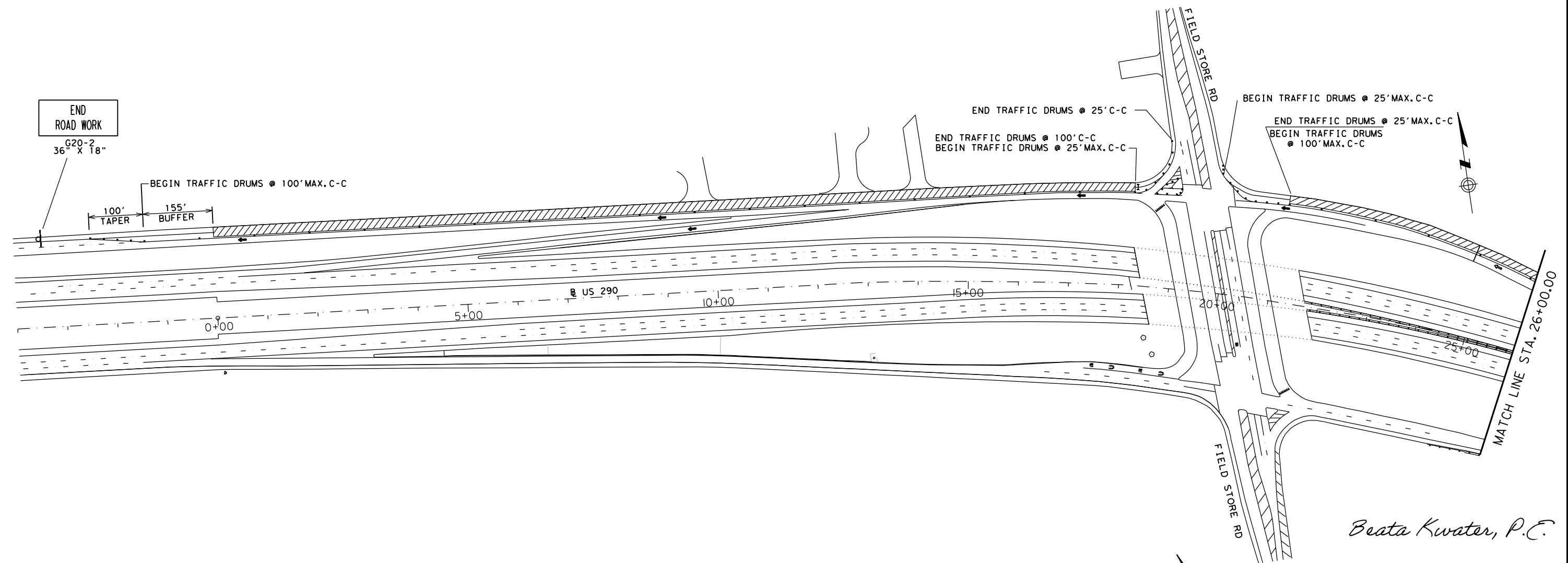
SHEET 2 OF 2



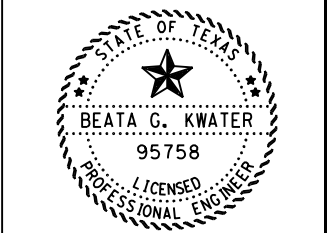
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	17	

DATE: \$DATES
 PEN TABLE: \$PENS
 FILE: \$FILES

CKT
DWF
CKT
DWF



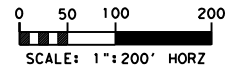
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND AND EASTBOUND FRONTAGE ROAD

PHASE 1



SHEET 1 OF 6

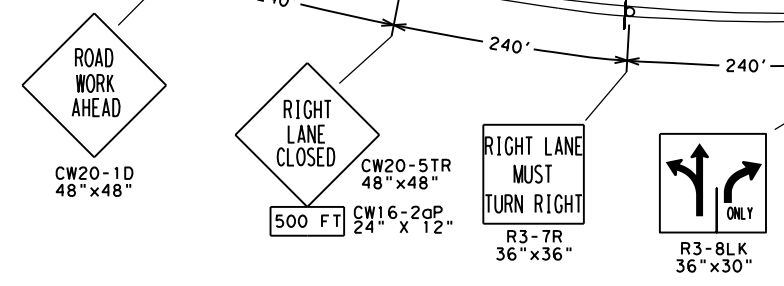
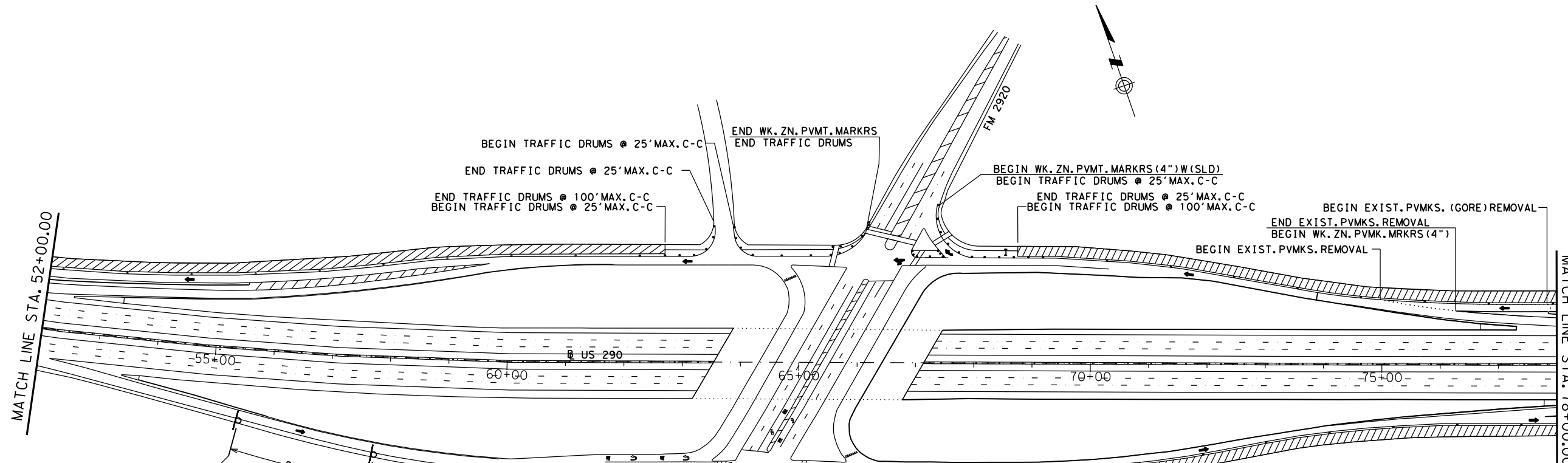


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	18	

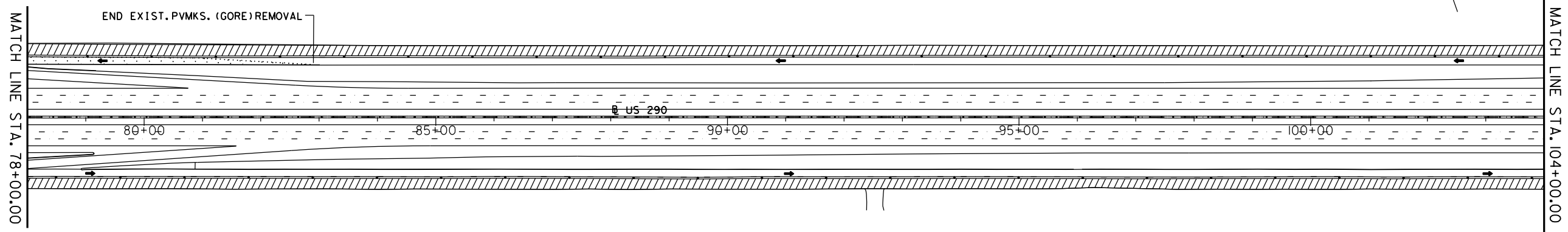
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PENS\$
FILE: \$FILES\$

Ckt
 Dm
 Ckt
 Dm

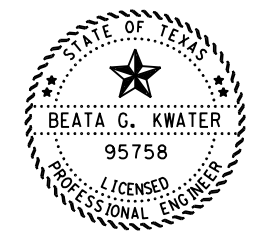


BEGIN TRAFFIC DRUMS @ 100' MAX. C-C
 BEGIN WK. ZN. PVMT. MARKRS (4") W (SLD)
 BEGIN TRAFFIC DRUMS @ 25' MAX. C-C



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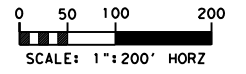
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND AND EASTBOUND FRONTAGE ROAD

PHASE 1



SHEET 2 OF 6

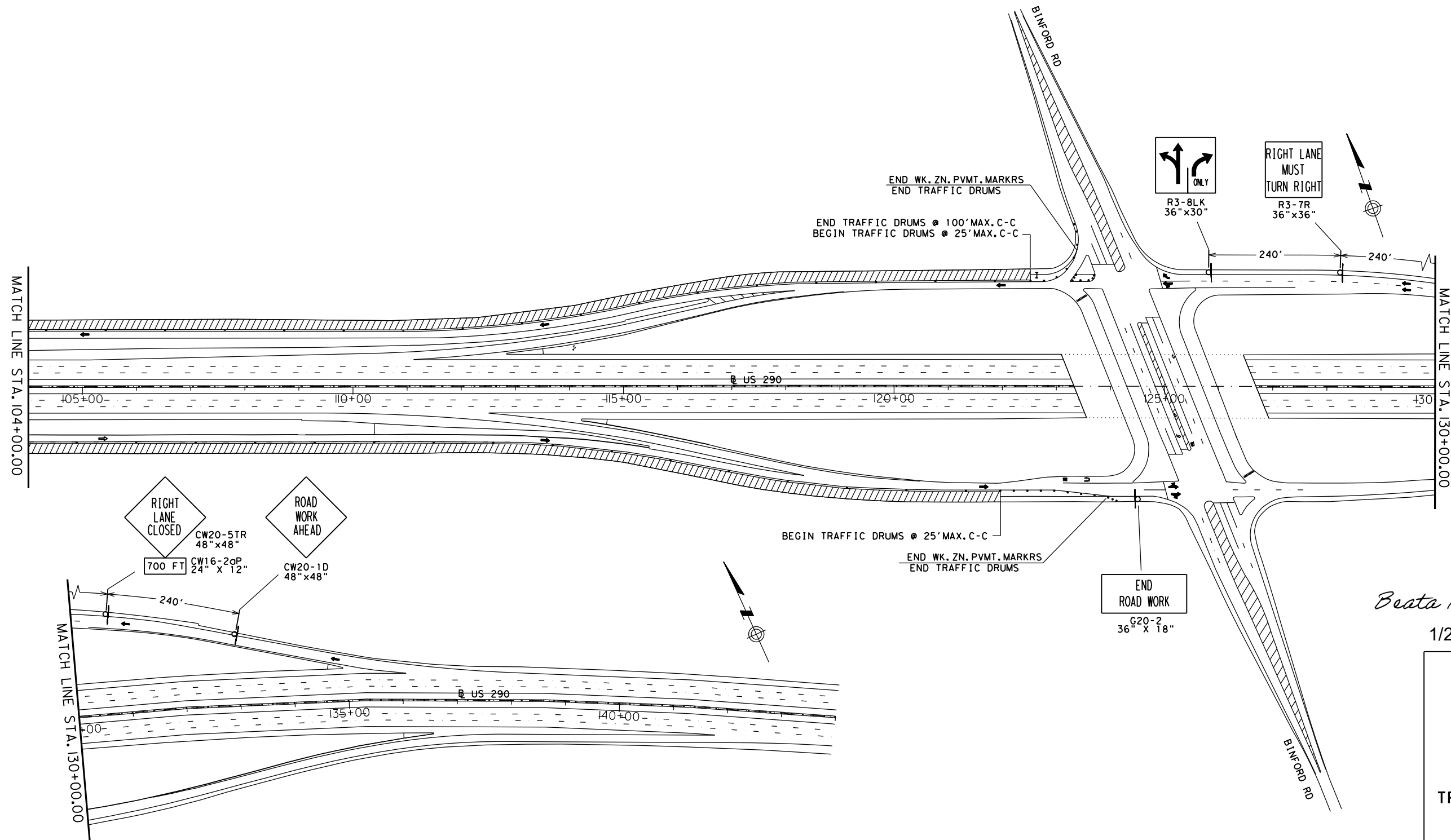


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	19	

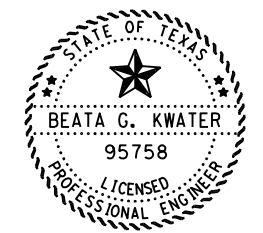
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILE\$

Ckt
Dnr
Ckt
Dnr



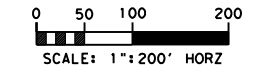
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND AND EASTBOUND FRONTAGE ROAD

PHASE 1



SHEET 3 OF 6

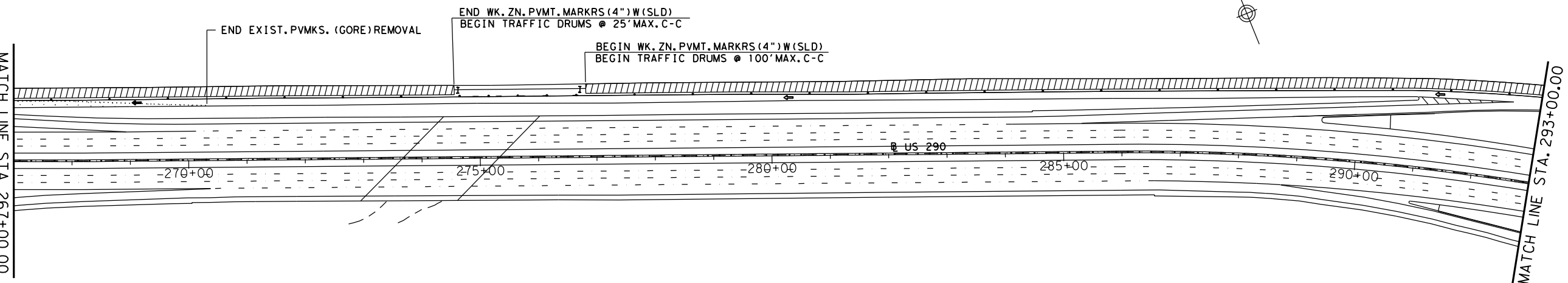
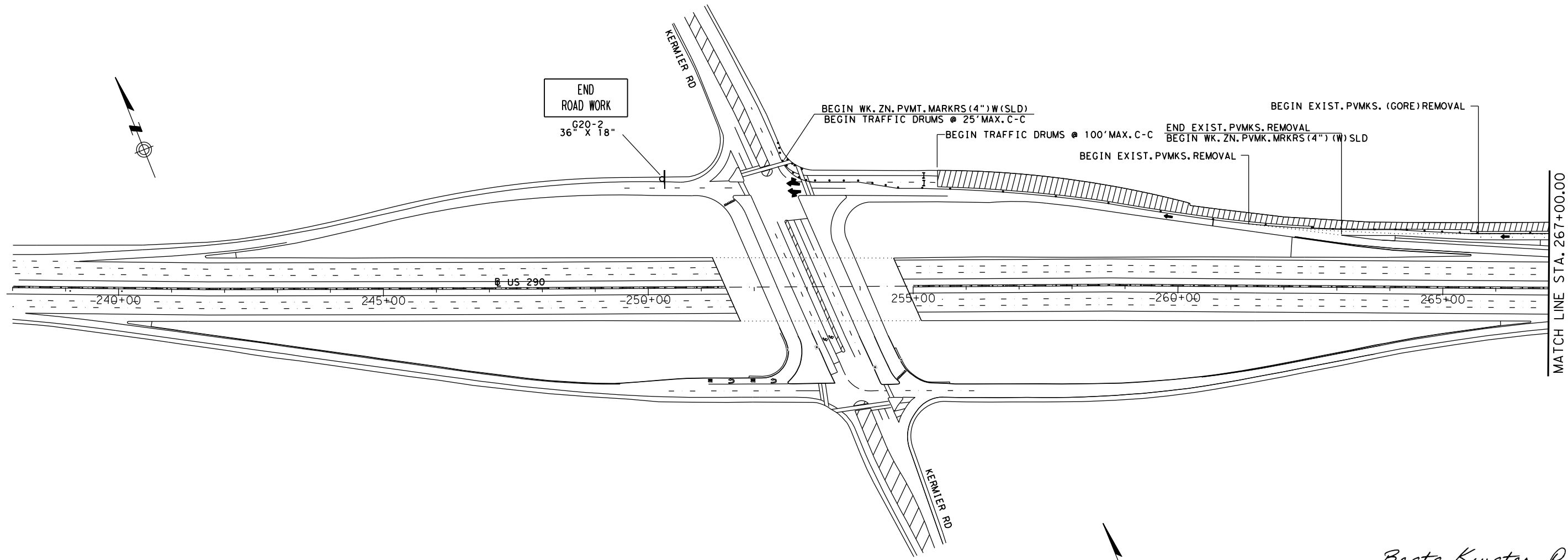


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	20	

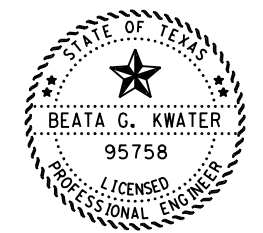
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
			PORTABLE CHANGEABLE MESSAGE SIGN
			PORTABLE FLASHING ARROW BOARD
			TEMP. GROUND MOUNTED SIGNS
			TY 3 BARRICADE
			TRAFFIC BARREL/DRUM

DATE: \$TIMES\$
PEN TABLE: \$SPENS\$
FILE: \$FILES\$

Ckt
 Dm
 Ckt
 Dm



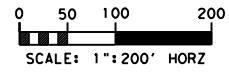
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TRAFFIC CONTROL PLAN

US 290 WESTBOUND AND EASTBOUND FRONTAGE ROAD

PHASE 1



SHEET 4 OF 6

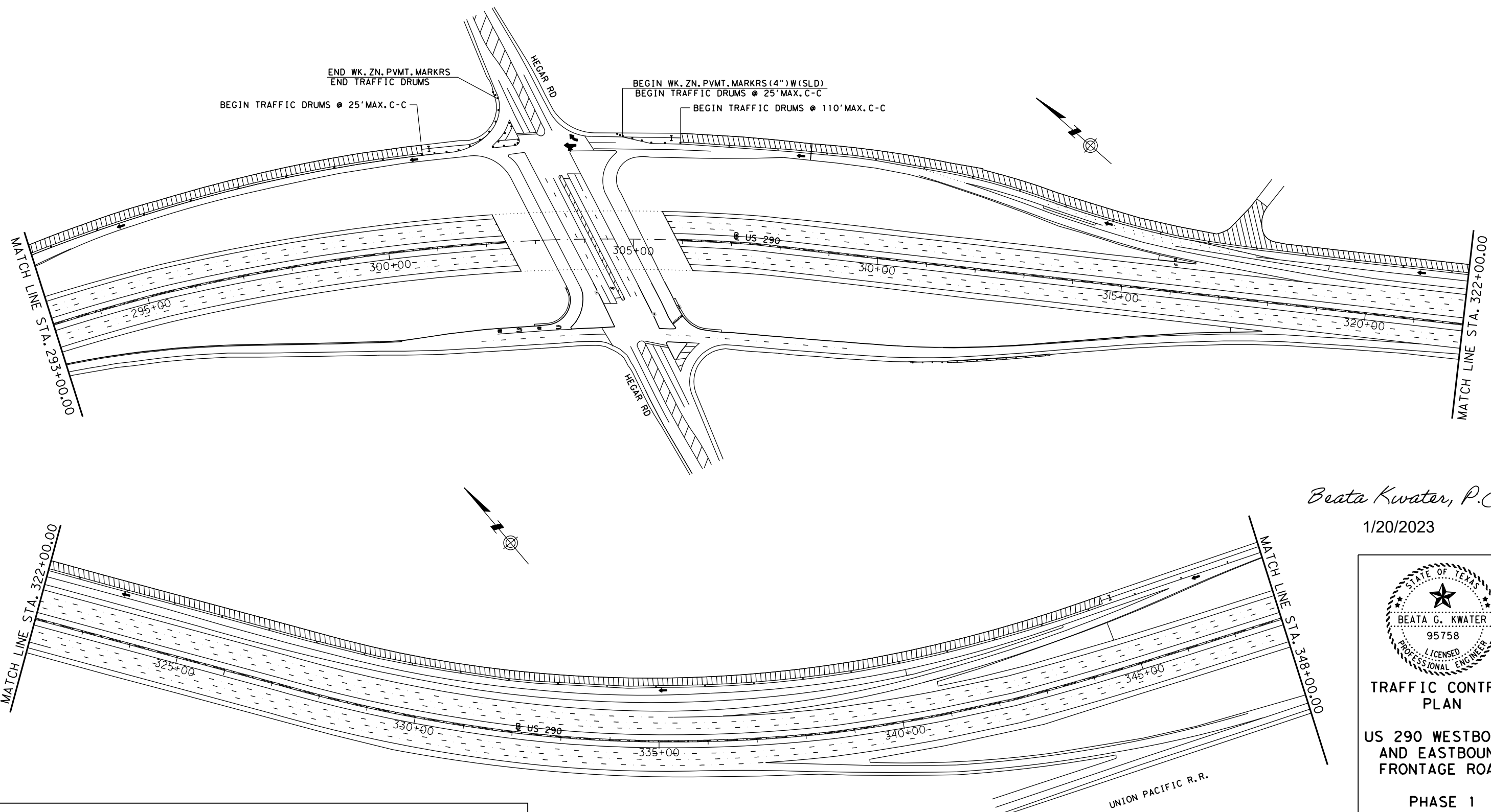


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	21	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

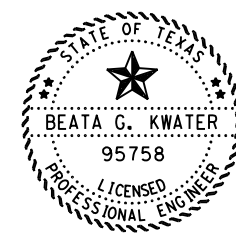
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 FILE: \$FILE\$

CKT
DWT
CKT
DWT



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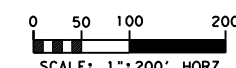
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND AND EASTBOUND FRONTAGE ROAD

PHASE 1



SHEET 5 OF 6

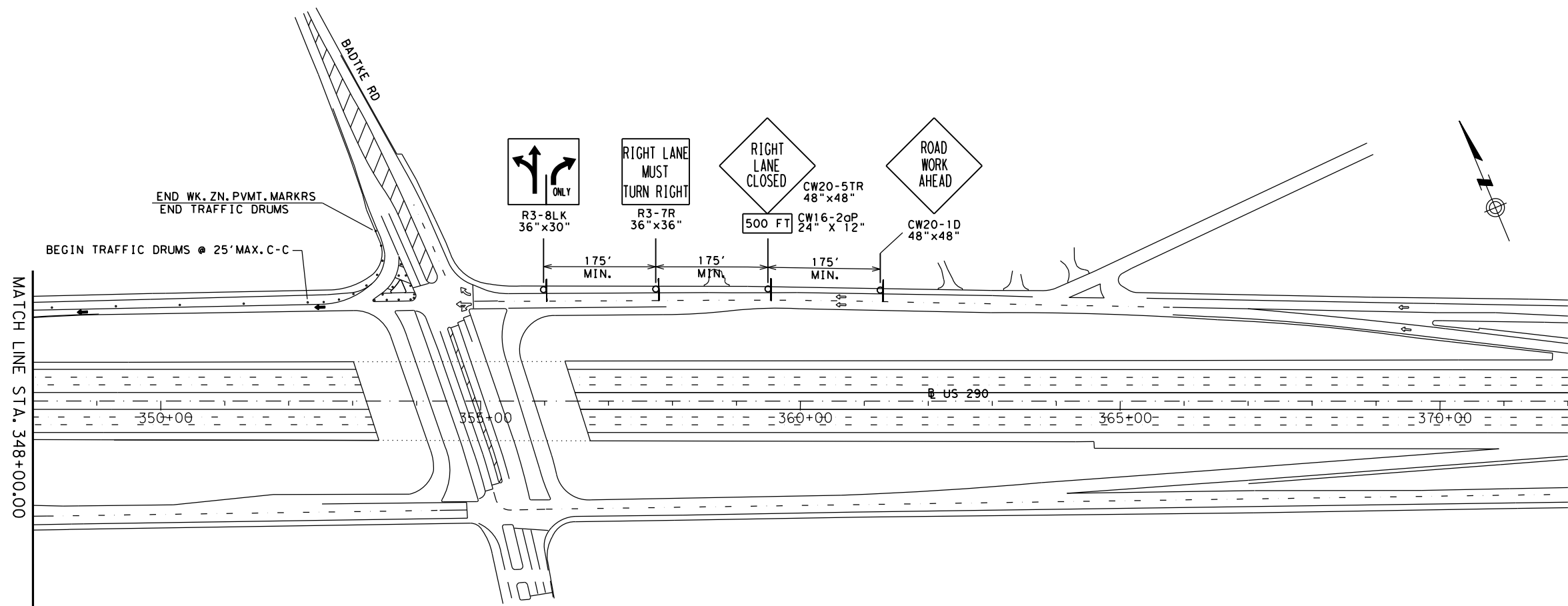


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	22	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATES
PEN TABLE: \$PEN\$
FILE: \$FILES

CKT
DWT
CKT
DWT



END WK. ZN. PVMT. MARKRS
END TRAFFIC DRUMS

BEGIN TRAFFIC DRUMS @ 25' MAX. C-C

MATCH LINE STA. 348+00.00

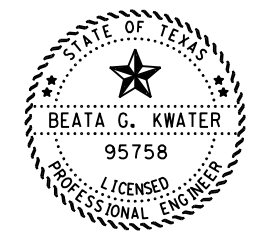
350+00 355+00 360+00 365+00 370+00

US 290

R3-8LK 36"x30"
R3-7R 36"x36"
500 FT
CW20-5TR 48"x48"
CW16-2OP 24" X 12"
CW20-1D 48"x48"

175' MIN. 175' MIN. 175' MIN.

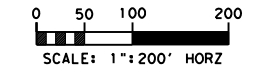
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TRAFFIC CONTROL PLAN

US 290 WESTBOUND AND EASTBOUND FRONTAGE ROAD

PHASE 1



SCALE: 1"=200' HORZ

SHEET 6 OF 6

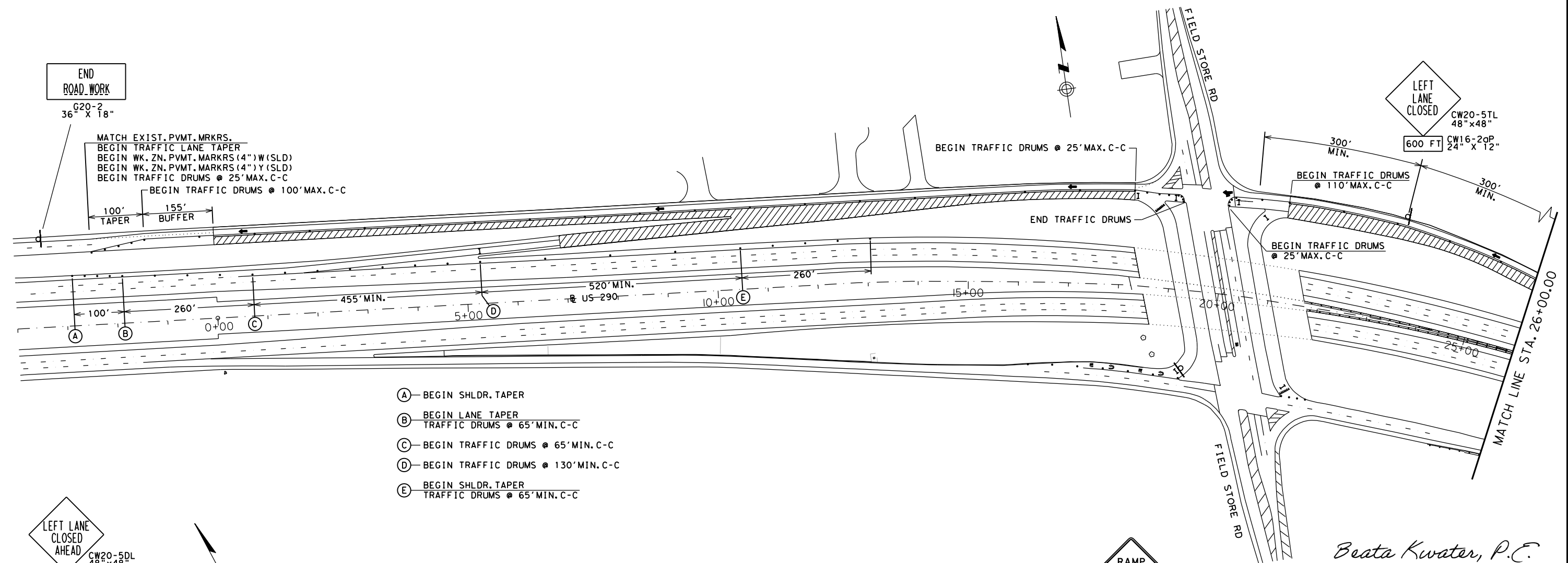


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		23

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		PORTABLE FLASHING ARROW BOARD
	TEMP. GROUND MOUNTED SIGNS		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

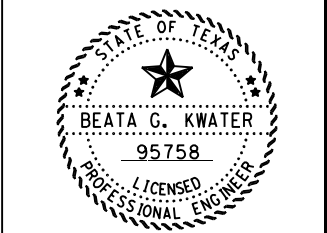
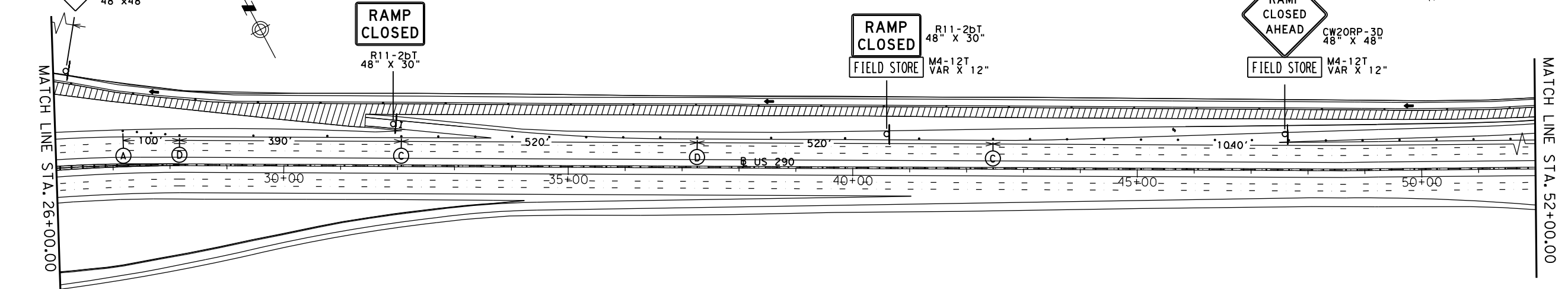
DATE: \$DATES
PEN TABLE: \$PENS
FILE: \$FILES

CKT
DWF
CKT
DWF



- (A) - BEGIN SHLDR. TAPER
- (B) - BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) - BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) - BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) - BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C

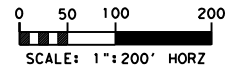
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1/20/2023



TRAFFIC CONTROL PLAN

**US 290 WESTBOUND
EXIT RAMP AT
FIELD STORE ROAD**

PHASE 2



SHEET 1 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	24	

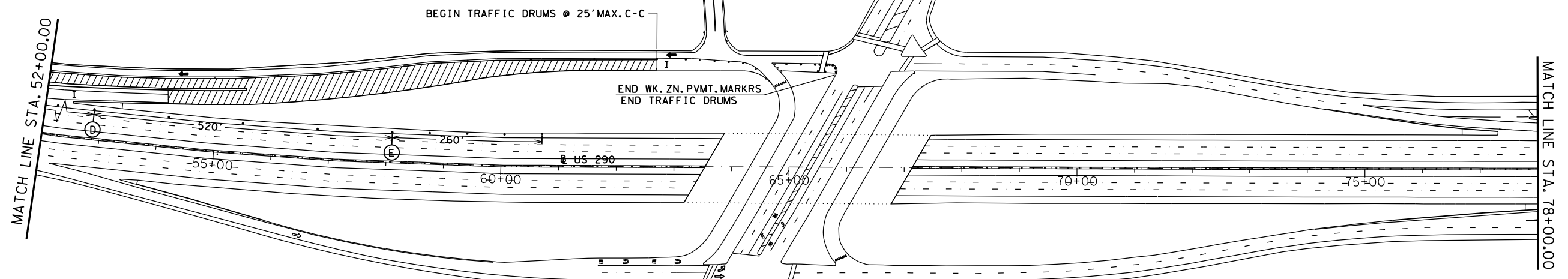
LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

DATE: \$DATES
PEN TABLE: \$PENS
FILE: \$FILES

CKT
DWF
CKT
DWF

- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



FIELD	USE
STOR EXT	FM 2920
CLOSED	EXIT

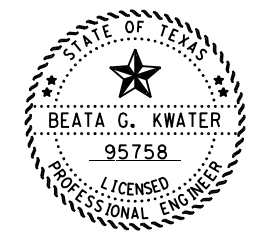
Or, as an option when exits are numbered

EXIT XX	USE
CLOSED	EXIT XY

Place 1 mile (approx.) in advance of closed ramp.

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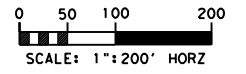
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT FIELD STORE ROAD

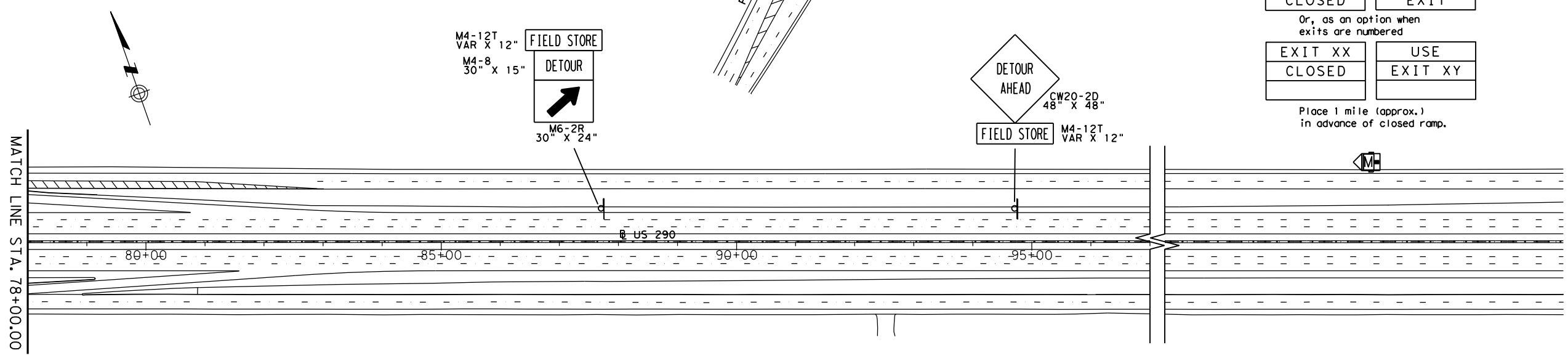
PHASE 2



SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	25	



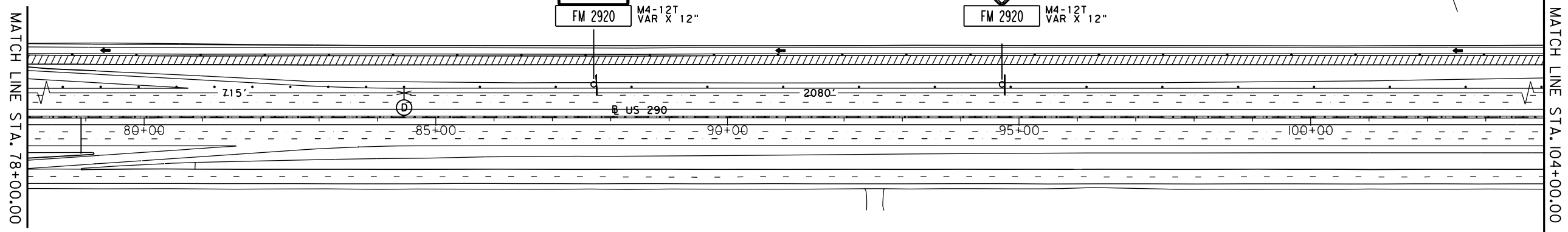
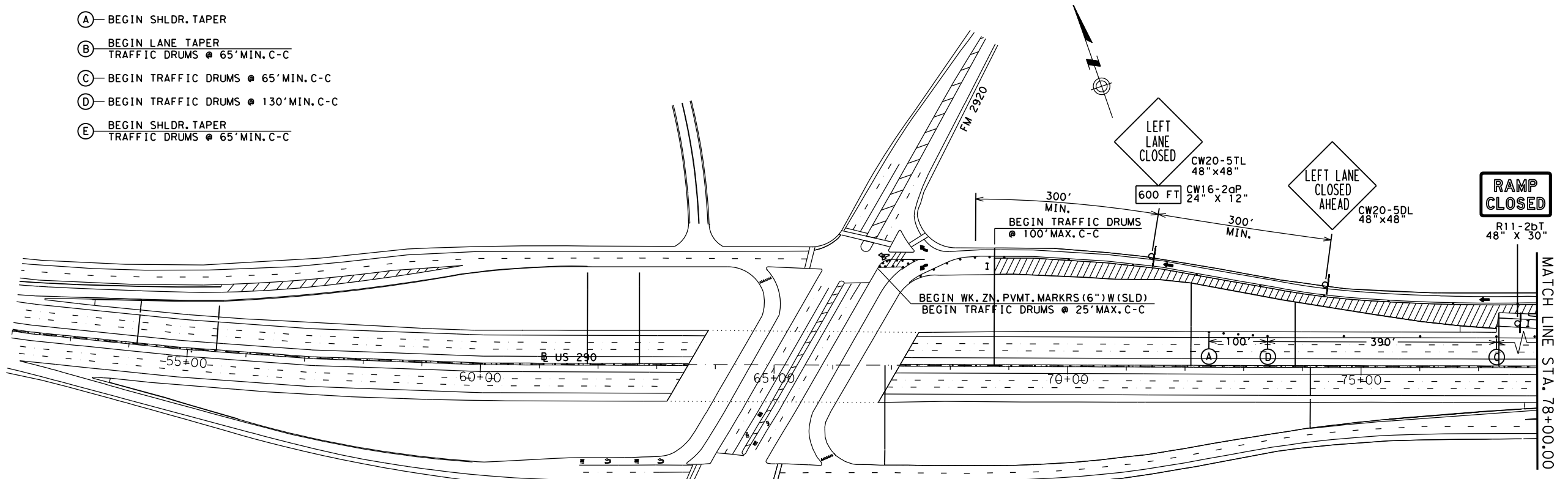
LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

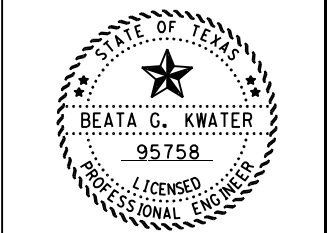
DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF

- (A) — BEGIN SHLDR. TAPER
- (B) — BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) — BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) — BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) — BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



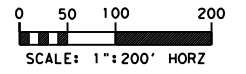
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT FM 2920

PHASE 2



SHEET 1 OF 2



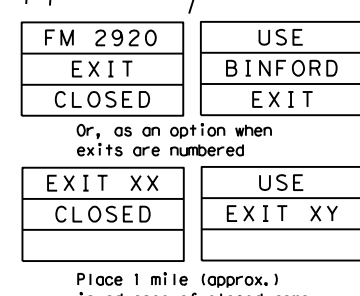
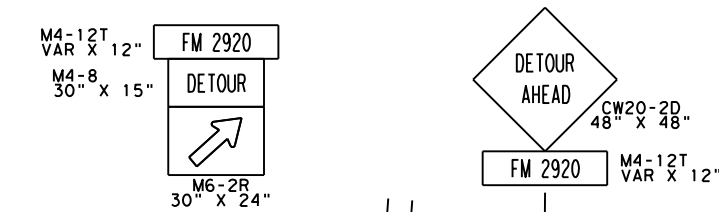
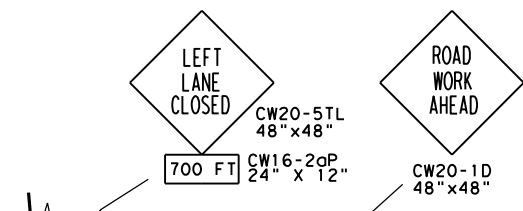
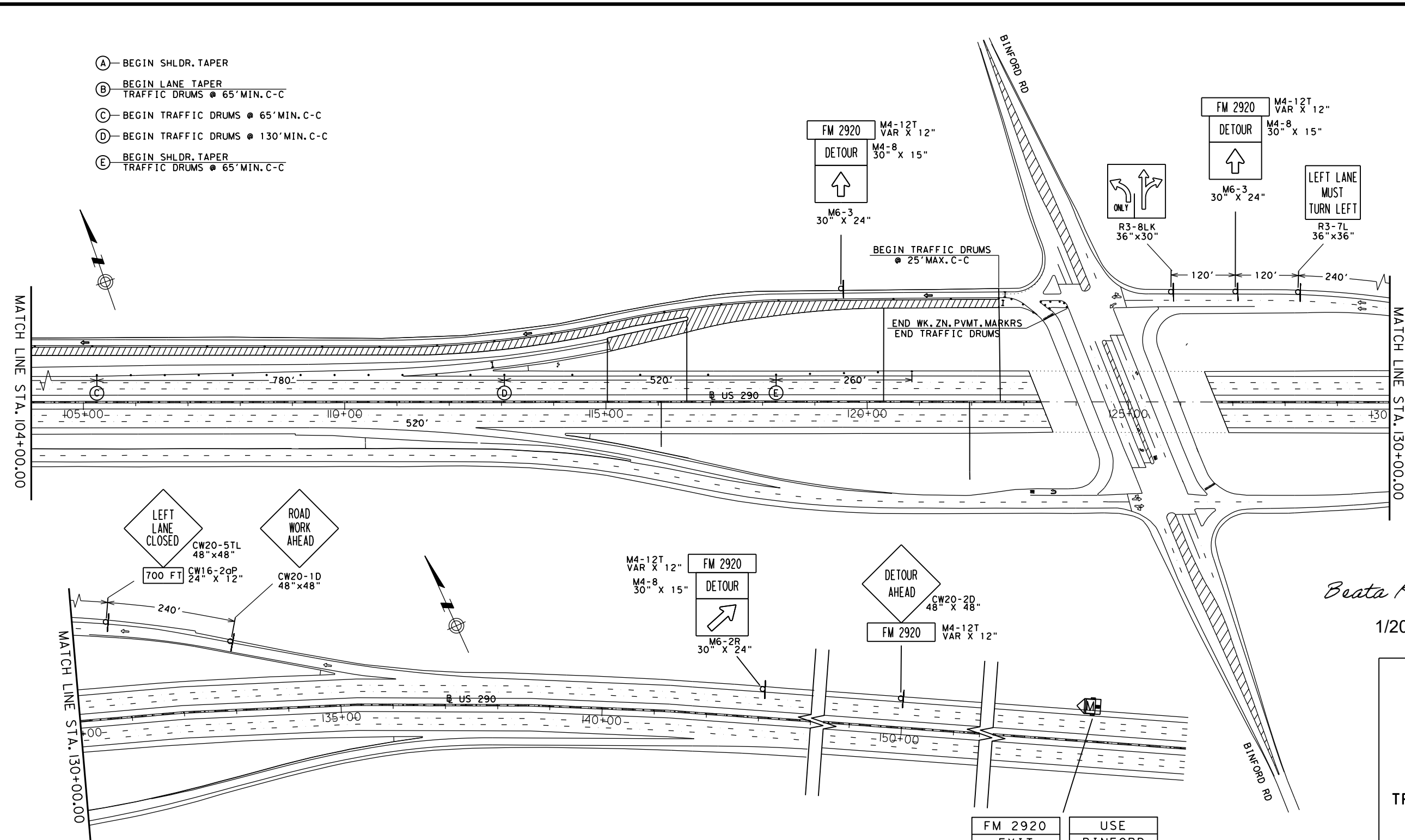
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	26	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

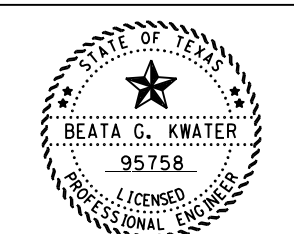
DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF

- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



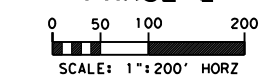
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND
EXIT RAMP AT
FM 290

PHASE 2



SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	27	

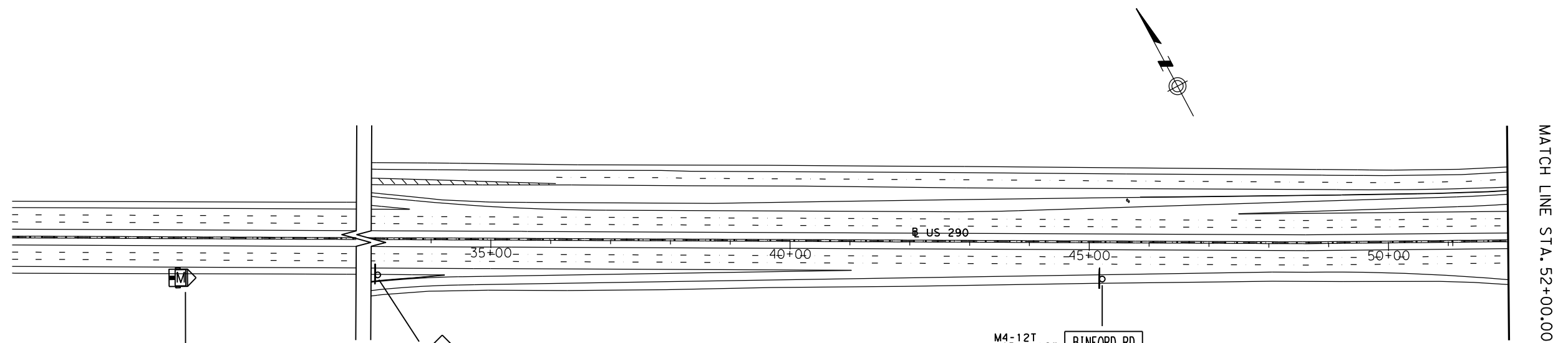
DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

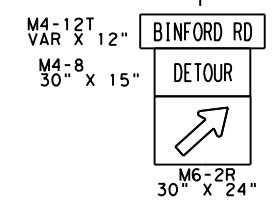
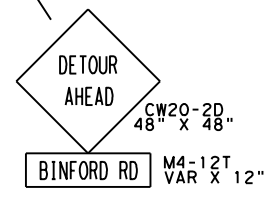
CKT
DIN
CKT
DIN

- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



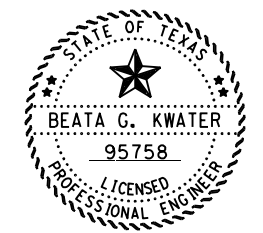
BINFORD RD EXIT CLOSED	USE FM 2920 EXIT
Or, as an option when exits are numbered	
EXIT XX CLOSED	USE EXIT XY

Place 1 mile (approx.) in advance of closed ramp.



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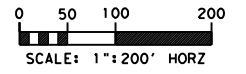
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT BINFORD ROAD

PHASE 2



SHEET 1 OF 3



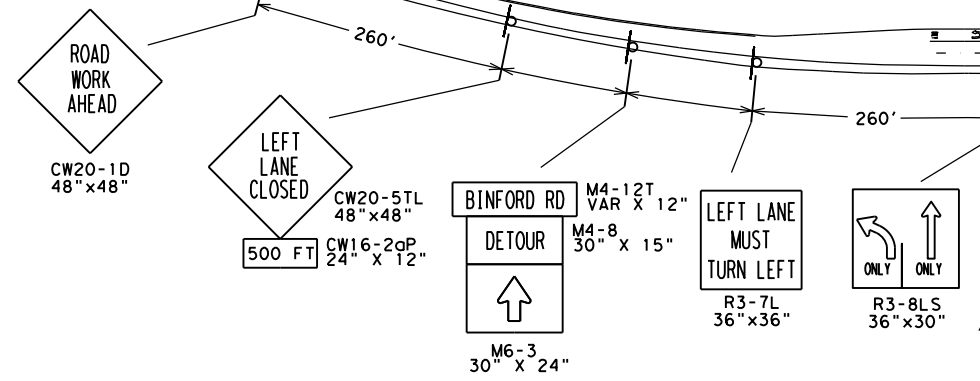
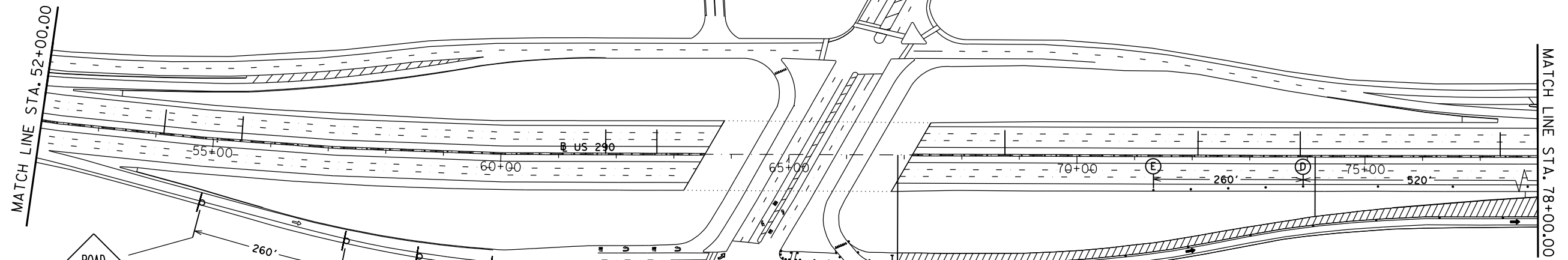
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	28	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PENS\$
FILE: \$FILES\$

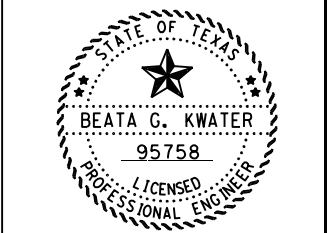
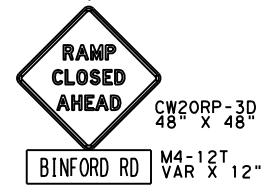
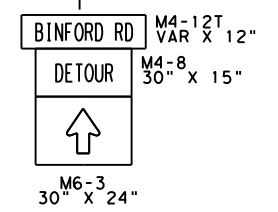
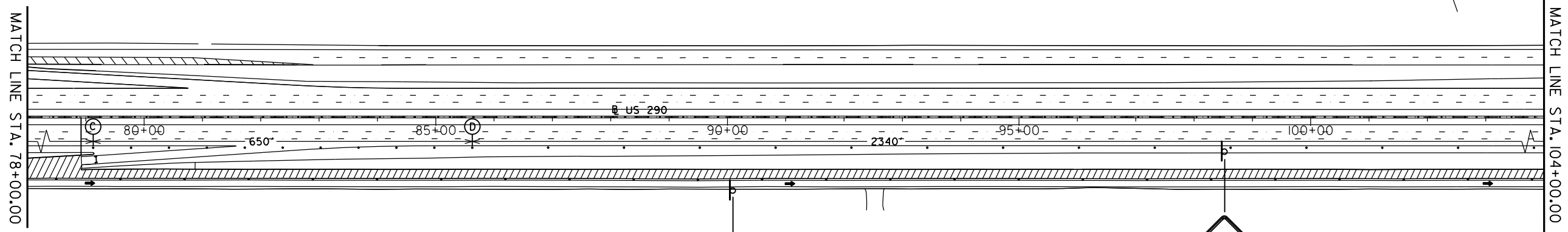
Ckt
 Dm
 Ckt
 Dm

- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



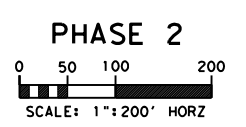
BEGIN TRAFFIC DRUMS @ 100' MAX. C-C
 BEGIN WK. ZN. PVMT. MARKRS (4\"/>

Beata Kwater, P.E.
 1/20/2023



TRAFFIC CONTROL PLAN
US 290 EASTBOUND
EXIT RAMP AT
BINFORD ROAD

PHASE 2
 SCALE: 1"=200' HORZ



SHEET 2 OF 3



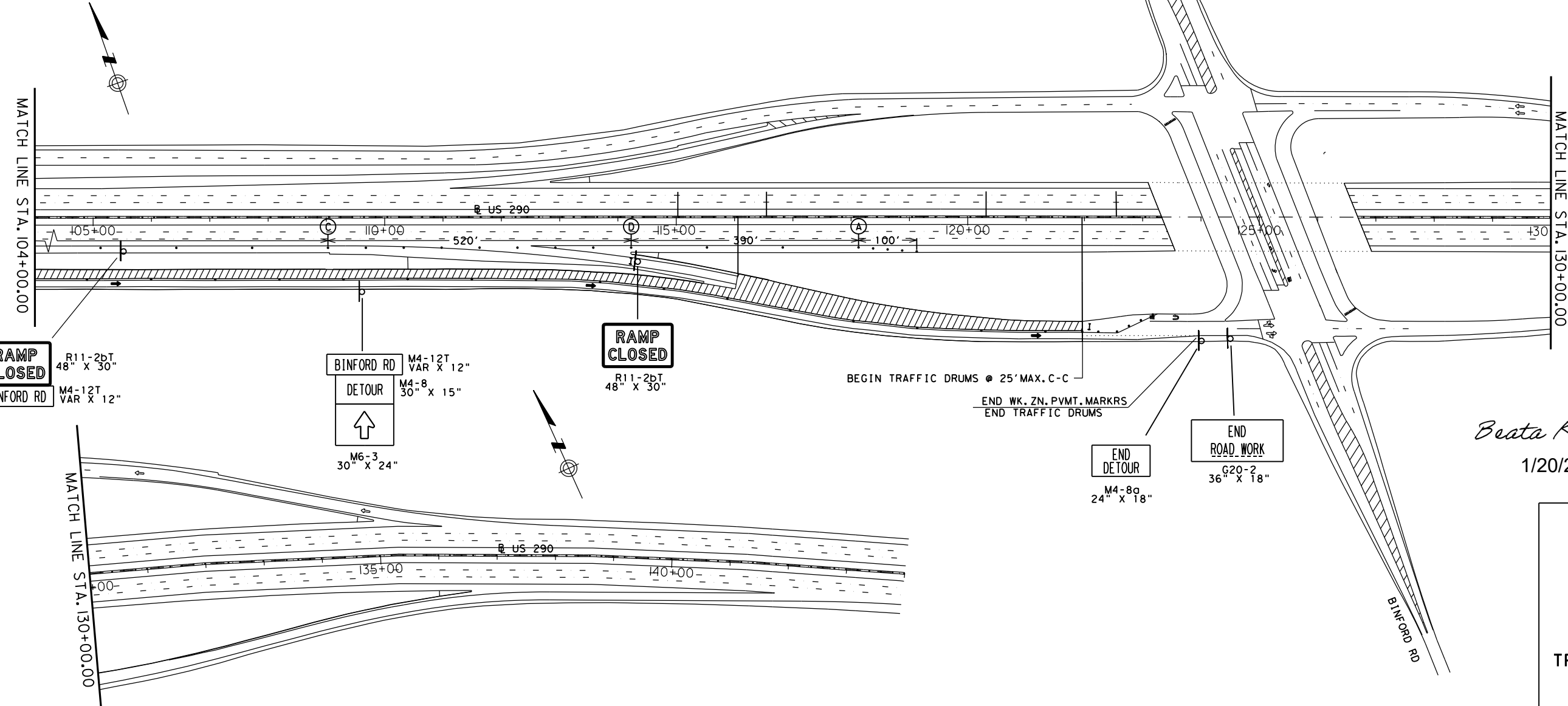
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	29	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	TRAFFIC BARREL/DRUM		PORTABLE FLASHING ARROW BOARD
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		

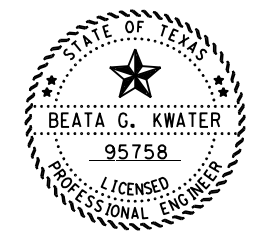
DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILES\$

CKT
DWT
CKT
DWT

- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



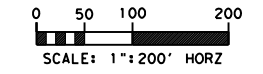
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND
EXIT RAMP AT
BINFORD ROAD

PHASE 2



SHEET 3 OF 3



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	30	

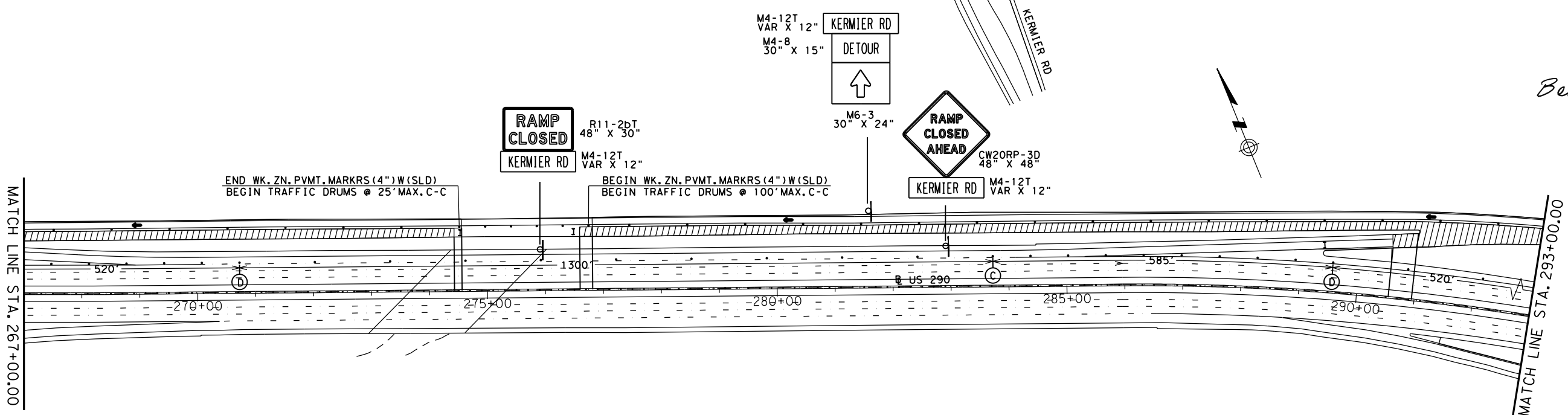
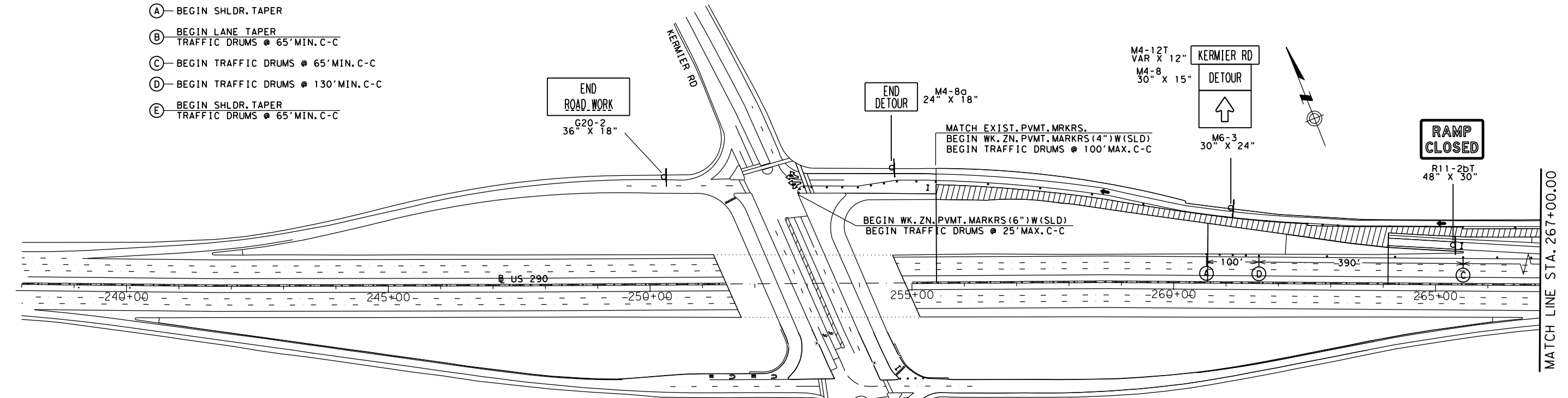
LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

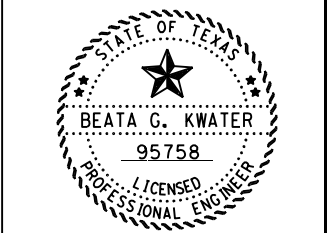
DATE: \$DATE\$
PEN TABLE: \$PENS\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF

- (A) — BEGIN SHLDR. TAPER
- (B) — BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) — BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) — BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) — BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



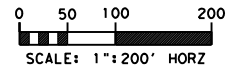
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND
EXIT RAMP AT
KERRIER ROAD

PHASE 2



SHEET 1 OF 2



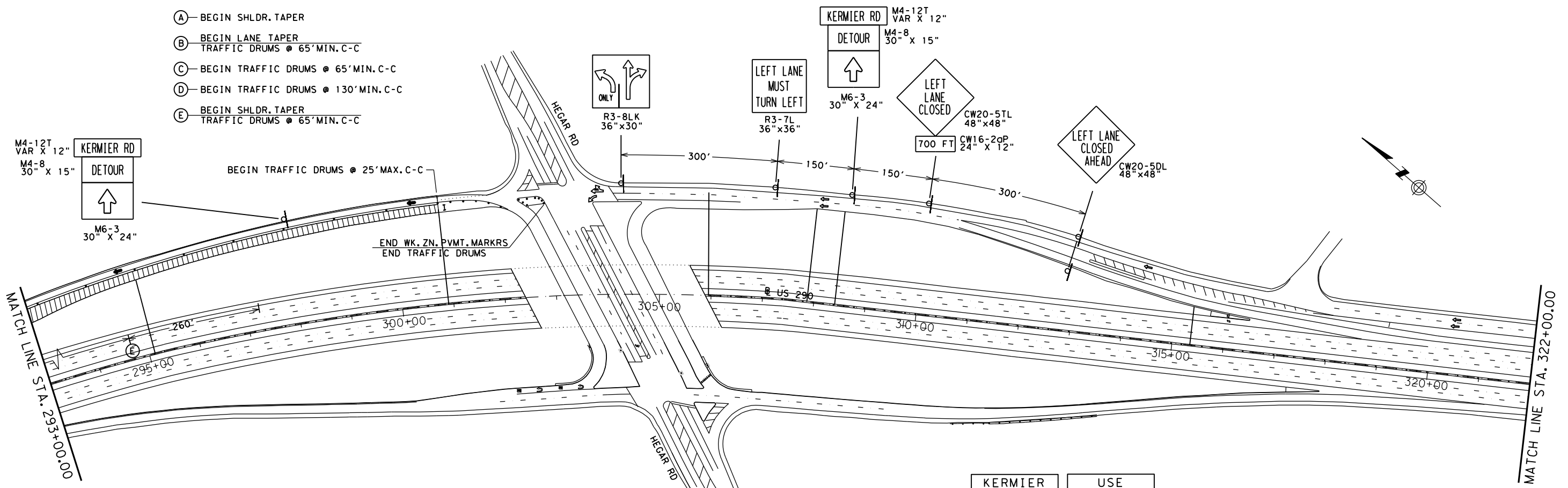
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	31	

LEGEND					
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

DATE: \$DATES\$
PEN TABLE: \$PENS\$
FILE: \$FILES\$

CKT
 DMF
 CKT
 DMF

- (A) — BEGIN SHLDR. TAPER
- (B) — BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) — BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) — BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) — BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C

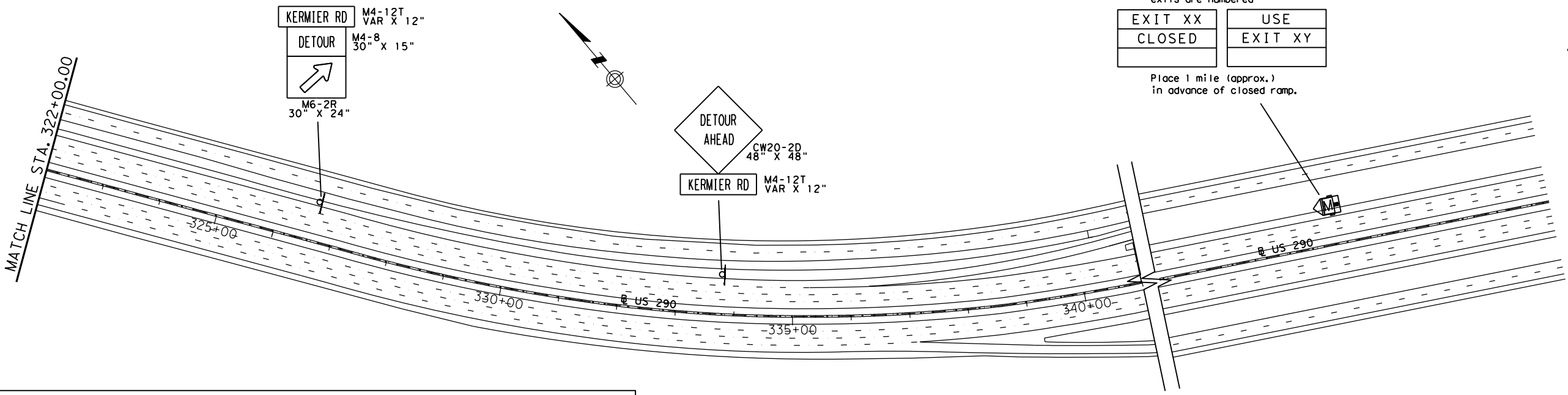


KERMIER RD EXIT CLOSED	USE HEGAR RD EXIT
------------------------	-------------------

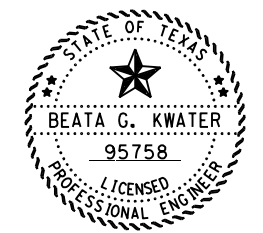
Or, as an option when exits are numbered

EXIT XX CLOSED	USE EXIT XY
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Place 1 mile (approx.) in advance of closed ramp.



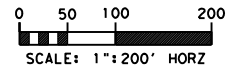
Beata Kwator, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT KERMIER ROAD

PHASE 2



SHEET 2 OF 2



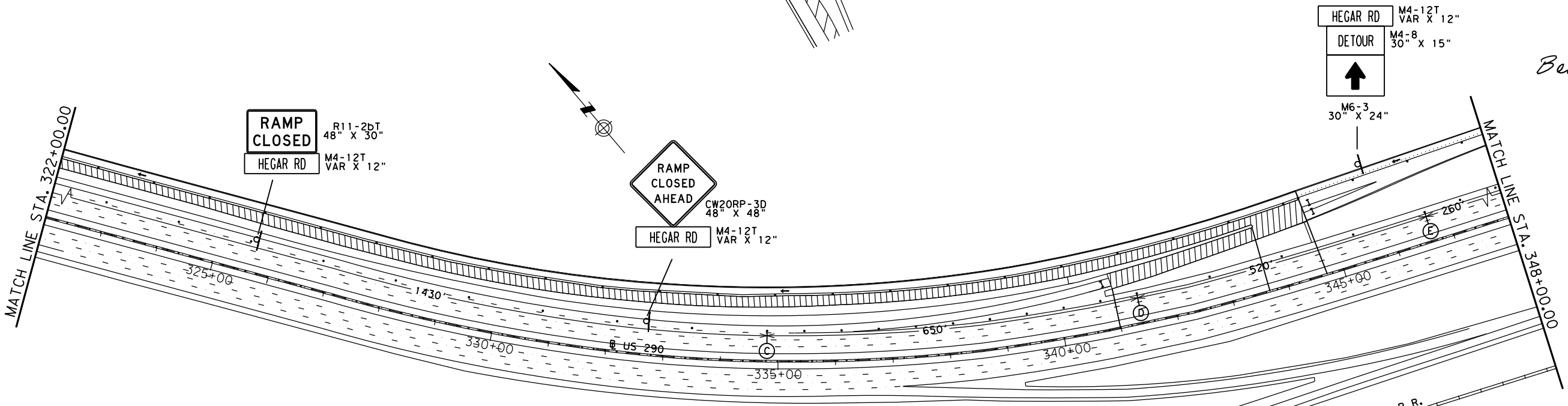
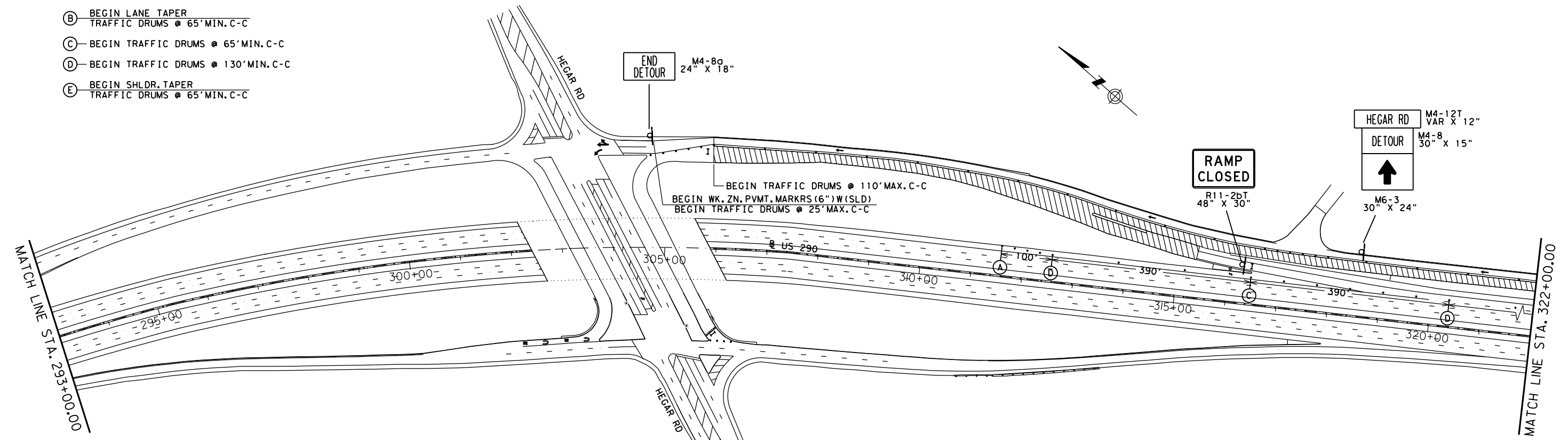
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	32	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

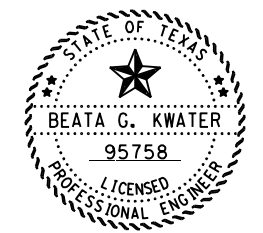
DATE: \$DATE\$
 PEN TABLE: \$PENS\$
 FILE: \$FILES\$

CKT
DWF
CKT
DWF

- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



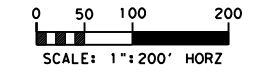
Beata Kwator, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT HEGAR ROAD

PHASE 2



SHEET 1 OF 2

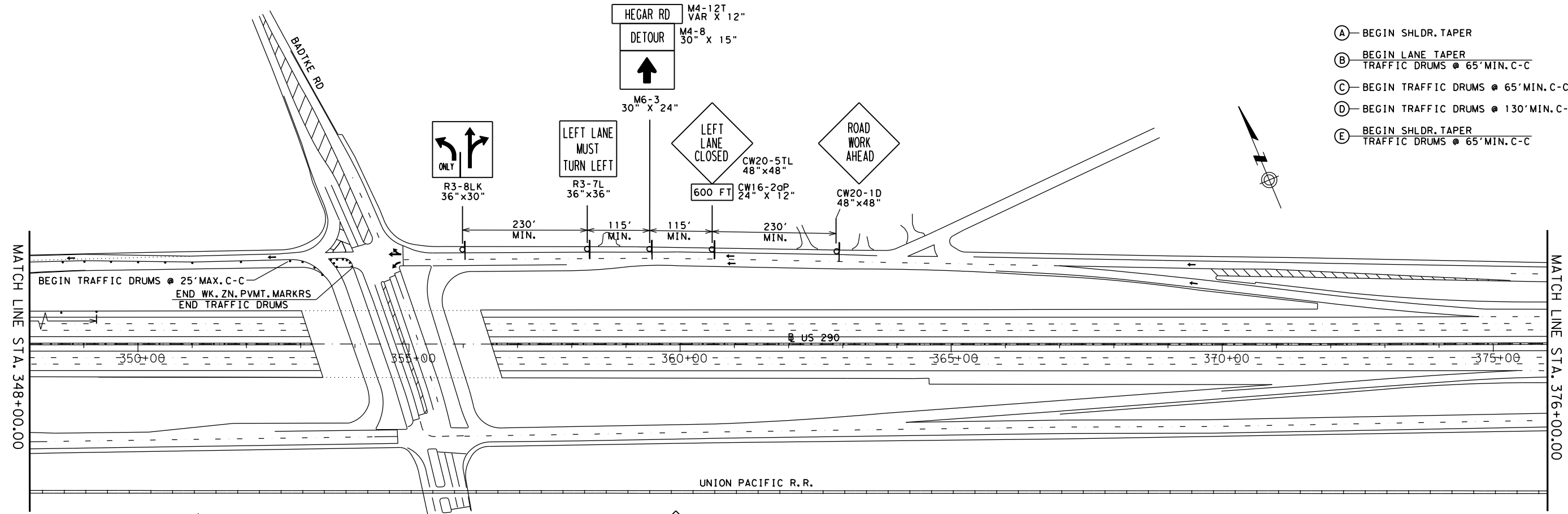


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	33	

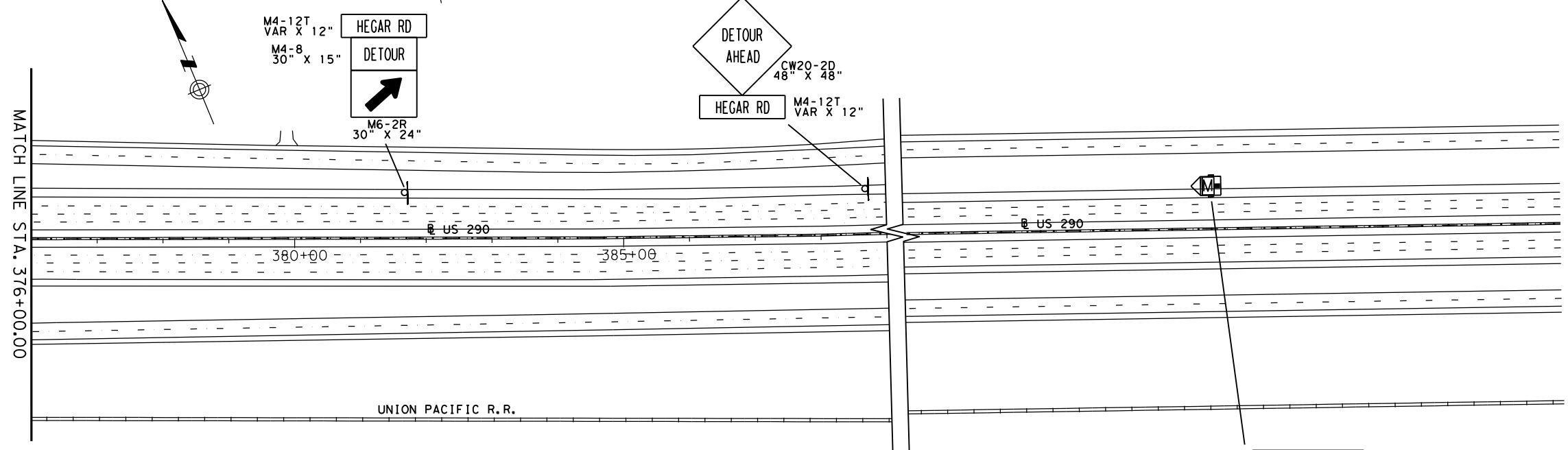
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PENS\$
FILE: \$FILES\$

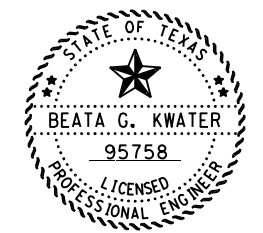
CKT
DIN
CKT
DIN



- (A) BEGIN SHLDR. TAPER
- (B) BEGIN LANE TAPER
TRAFFIC DRUMS @ 65' MIN. C-C
- (C) BEGIN TRAFFIC DRUMS @ 65' MIN. C-C
- (D) BEGIN TRAFFIC DRUMS @ 130' MIN. C-C
- (E) BEGIN SHLDR. TAPER
TRAFFIC DRUMS @ 65' MIN. C-C



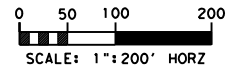
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT HEGAR ROAD

PHASE 2



SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	34	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TEMP. GROUND MOUNTED SIGNS		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

HEGAR RD	USE
EXIT	BADTKE
CLOSED	RD EXIT

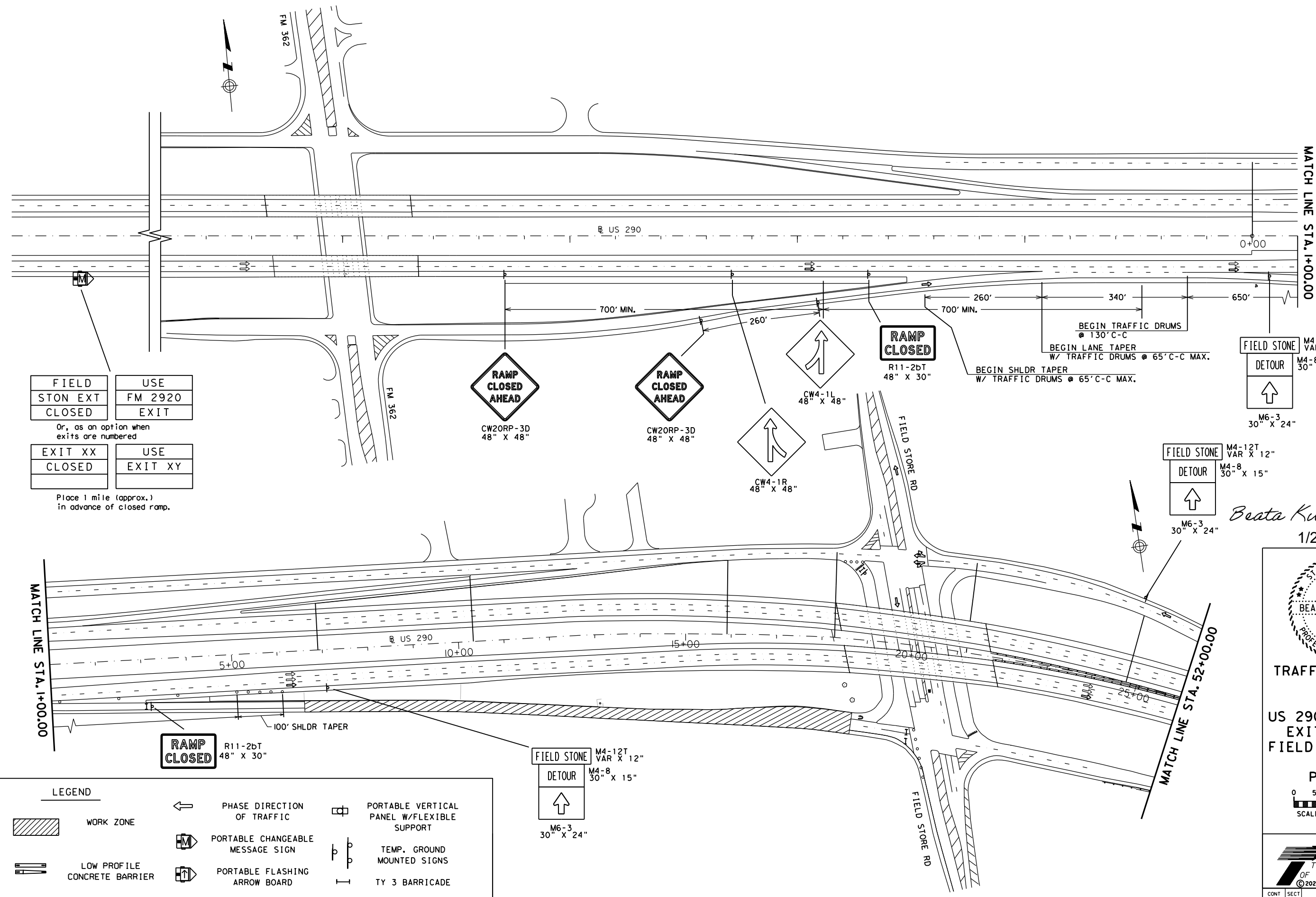
Or, as an option when exits are numbered

EXIT XX	USE
CLOSED	EXIT XY

Place 1 mile (approx.) in advance of closed ramp.

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DIN
CKT
DIN



FIELD STON EXT CLOSED	USE FM 2920 EXIT
Or, as an option when exits are numbered	
EXIT XX CLOSED	USE EXIT XY
Place 1 mile (approx.) in advance of closed ramp.	

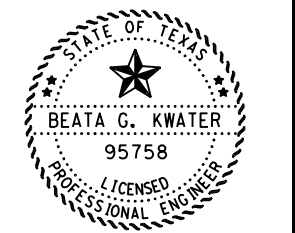
LEGEND					
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

MATCH LINE STA. 1+00.00

FIELD STONE M4-12T VAR X 12"
DETOUR M4-8 30" X 15"
M6-3 30" X 24"

FIELD STONE M4-12T VAR X 12"
DETOUR M4-8 30" X 15"
M6-3 30" X 24"

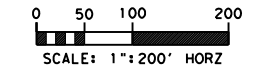
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT FIELD STORE ROAD

PHASE 3



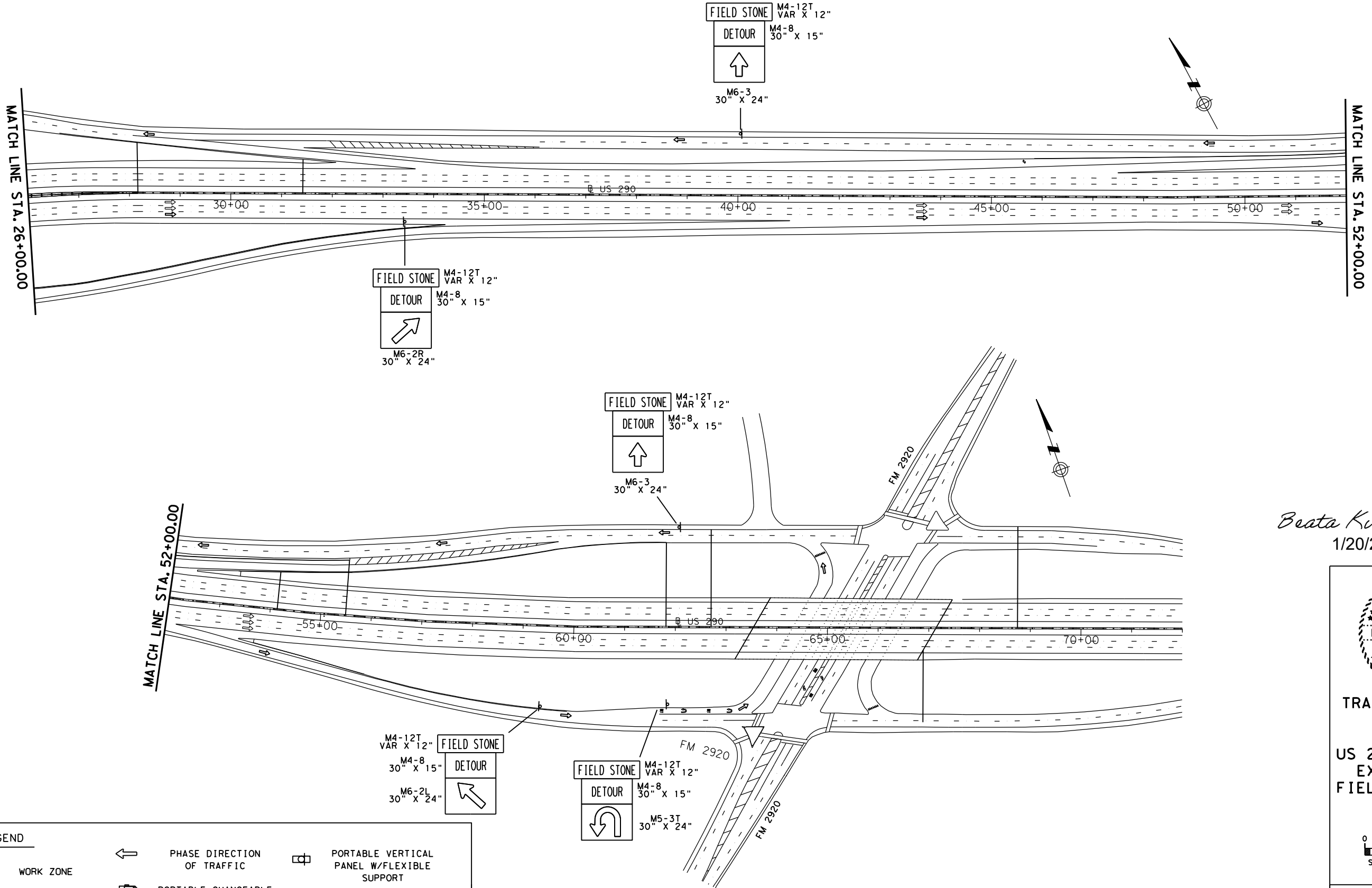
SHEET 1 OF 2



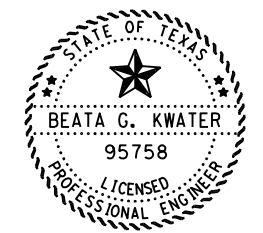
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	35	

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DIN
CKT
DIN



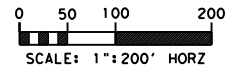
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT FIELD STORE ROAD

PHASE 3



SHEET 2 OF 2

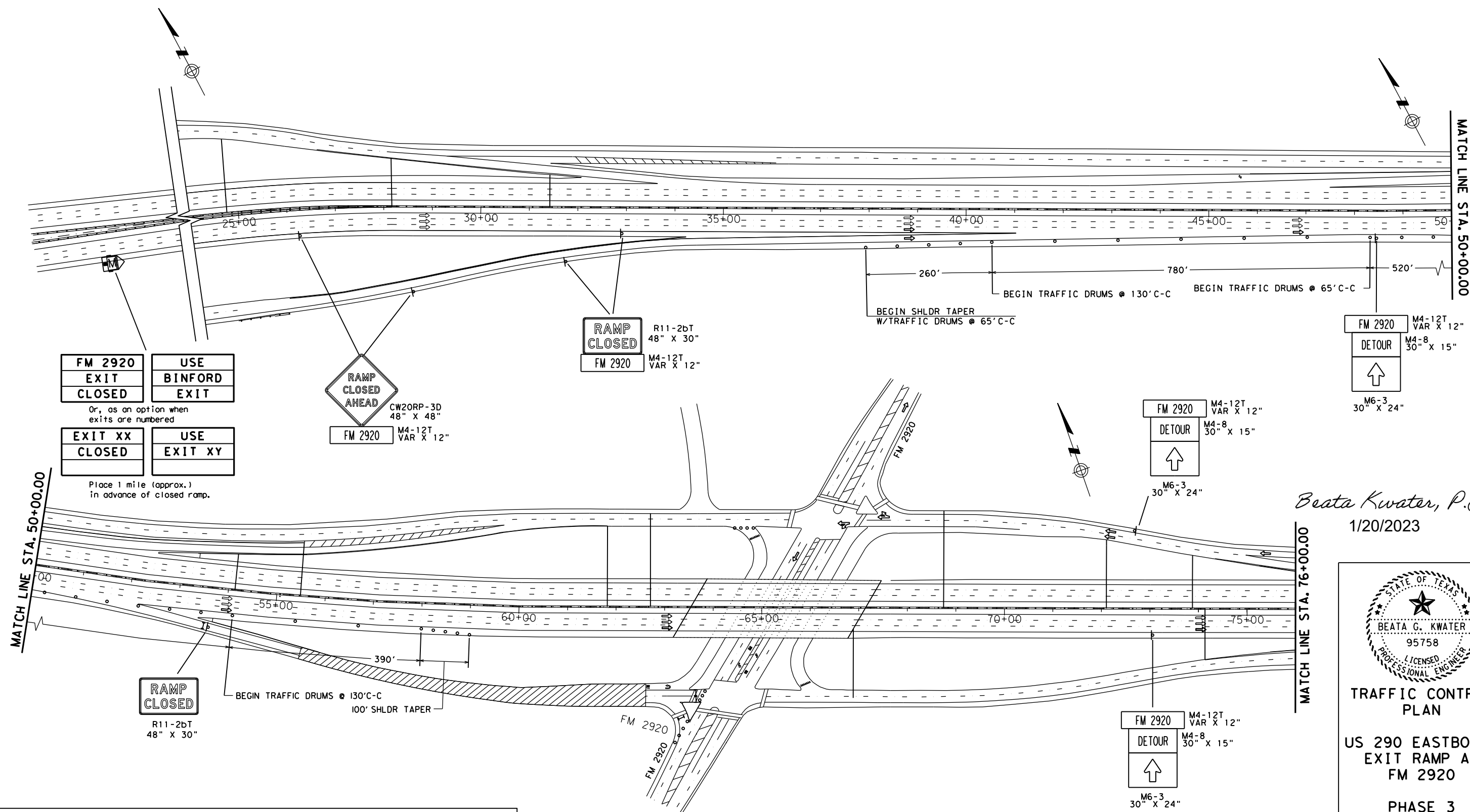


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	36	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

Ckt
 Dm
 Ckt
 Dm



FM 2920
EXIT
CLOSED
USE
BINFORD
EXIT

Or, as an option when exits are numbered

EXIT XX
CLOSED
USE
EXIT XY

Place 1 mile (approx.) in advance of closed ramp.

RAMP
CLOSED
AHEAD
 CW2ORP-3D
 48" X 48"
FM 2920 M4-12T
 VAR X 12"

RAMP
CLOSED
FM 2920 R11-2bT
 48" X 30"
 M4-12T
 VAR X 12"

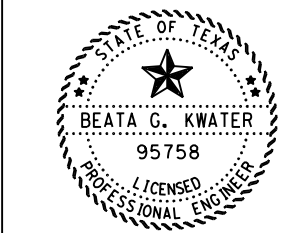
FM 2920 M4-12T
 VAR X 12"
DETOUR M4-8
 30" X 15"
 M6-3
 30" X 24"

FM 2920 M4-12T
 VAR X 12"
DETOUR M4-8
 30" X 15"
 M6-3
 30" X 24"

FM 2920 M4-12T
 VAR X 12"
DETOUR M4-8
 30" X 15"
 M6-3
 30" X 24"

RAMP
CLOSED
 R11-2bT
 48" X 30"

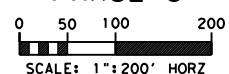
Beata Kwater, P.E.
 1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT FM 2920

PHASE 3



SHEET 1 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	37	

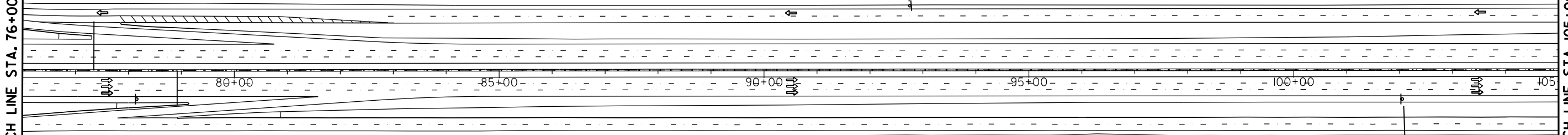
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILES\$

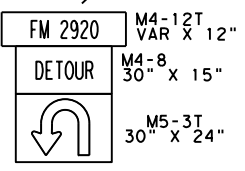
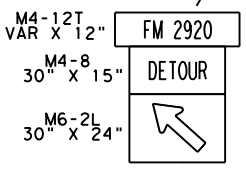
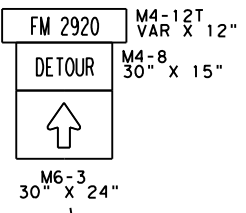
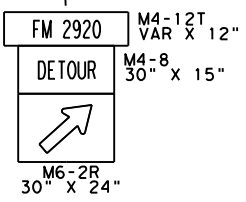
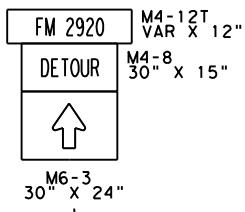
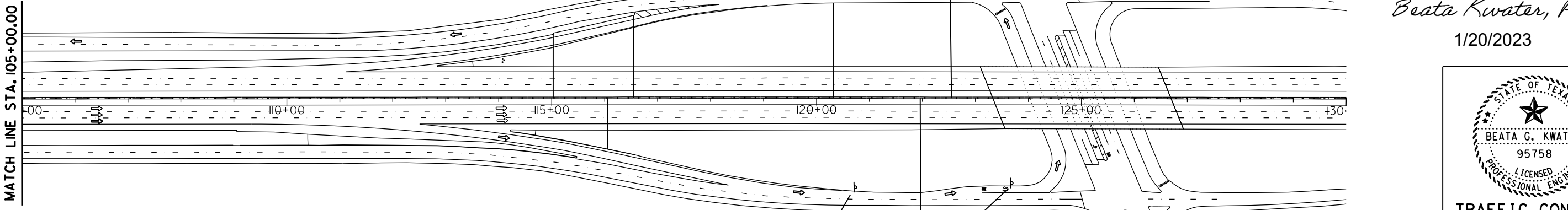
Ckt
 Dm
 Ckt
 Dm

MATCH LINE STA. 76+00.00

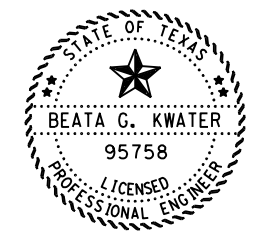
MATCH LINE STA. 105+00.00



MATCH LINE STA. 105+00.00



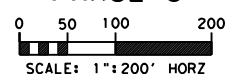
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT FM 290

PHASE 3



SHEET 2 OF 2



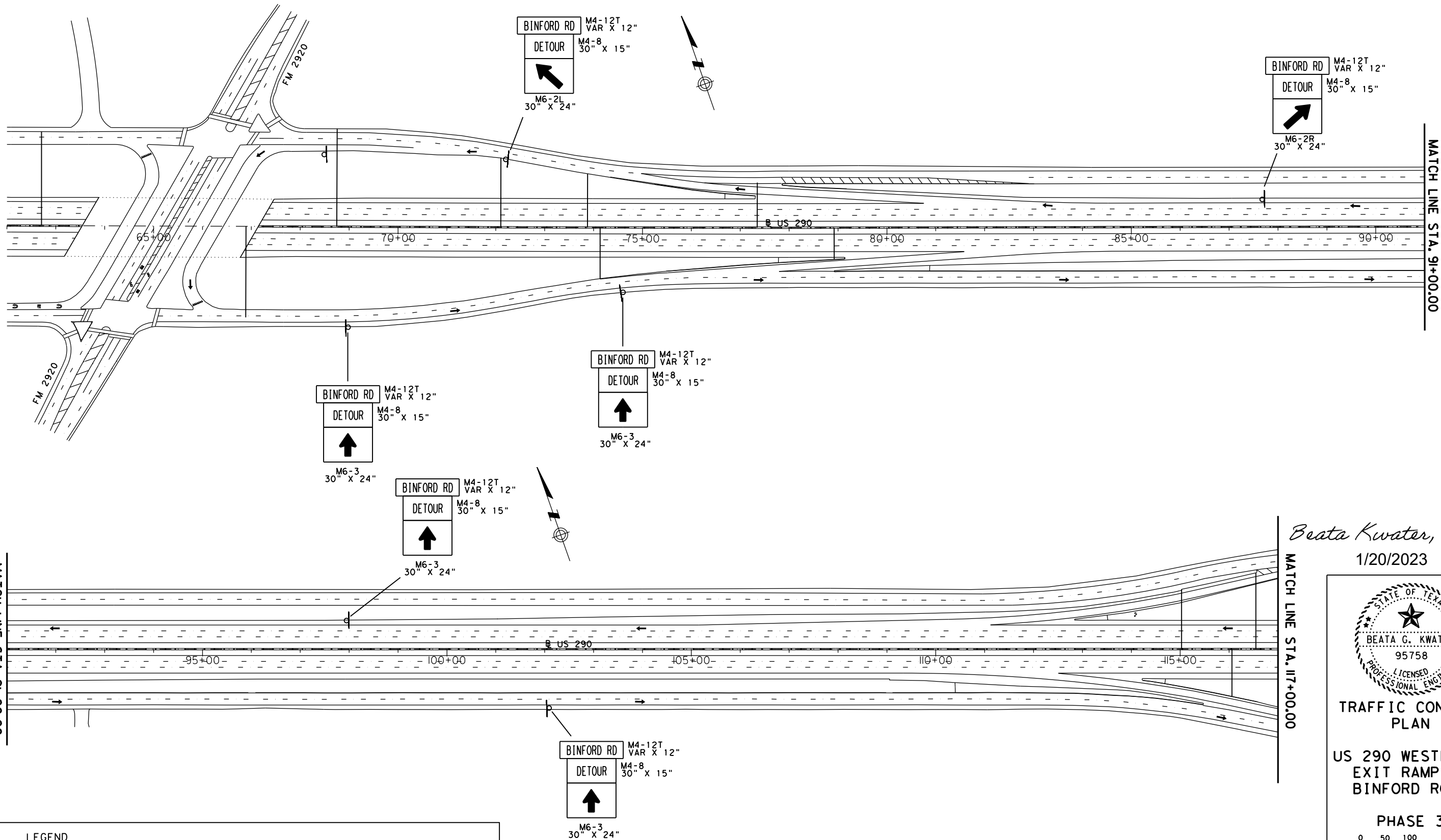
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	38	

LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

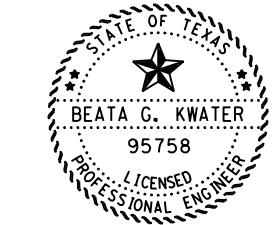
DATE: \$TIMES\$
 PEN TABLE: \$PEN\$
 FILE: \$FILES\$

Ckt
Dwg
Ckt
Dwg



Beata Kwator, P.E.
1/20/2023

MATCH LINE STA. 117+00.00



TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT BINFORD ROAD

PHASE 3



SHEET 1 OF 2

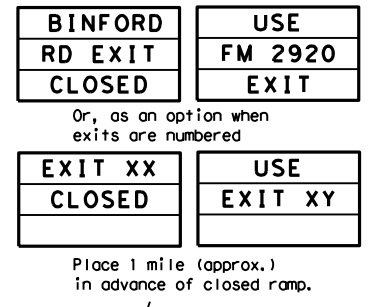
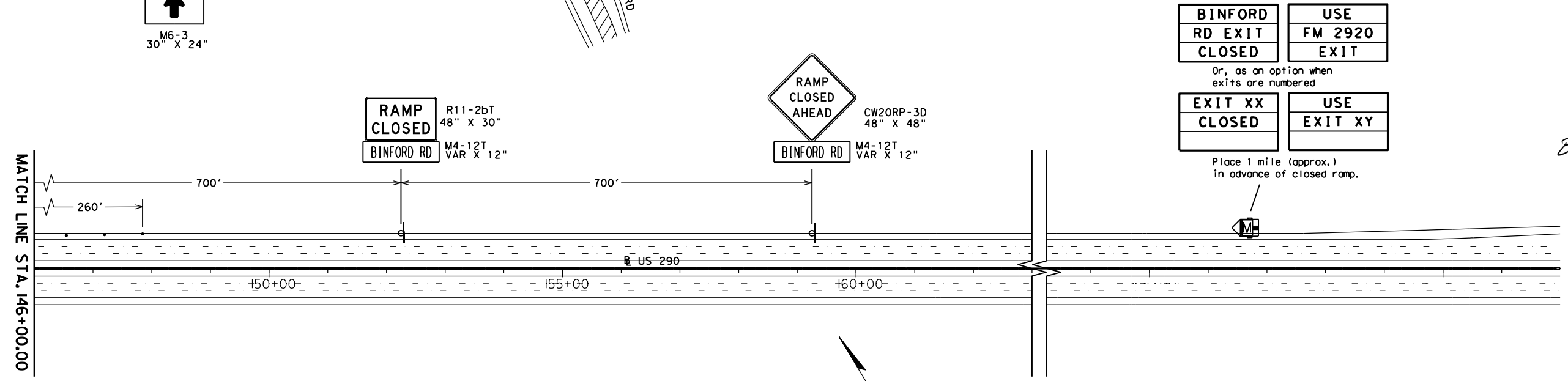
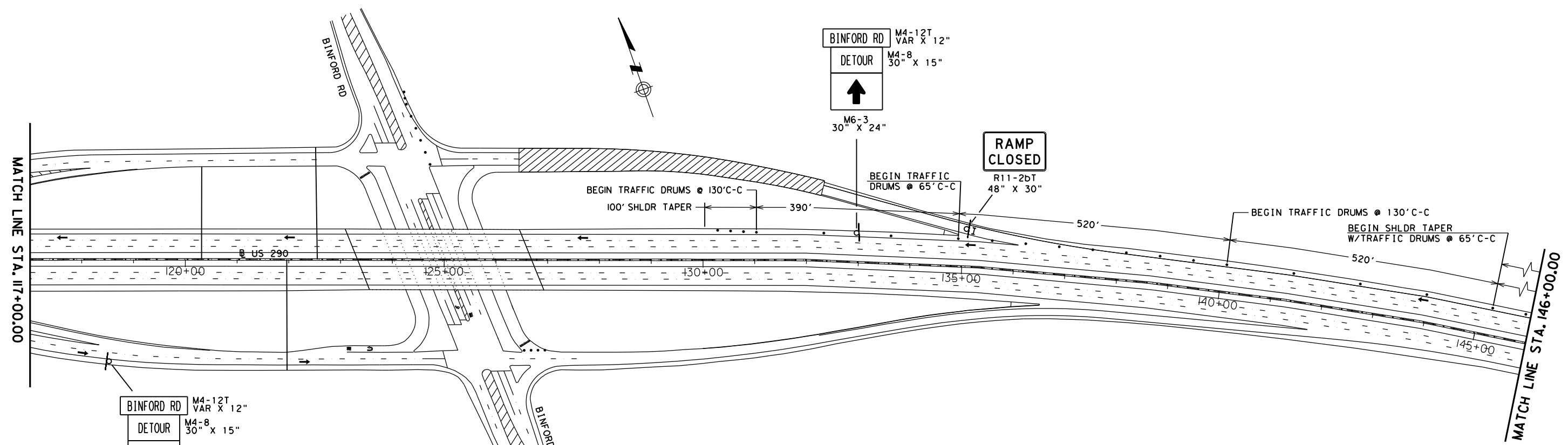


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	39	

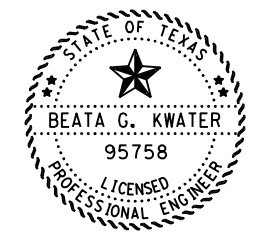
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TEMP. GROUND MOUNTED SIGNS		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PENS\$
FILE: \$FILES\$

CKT
 DWT
 CKT
 DWT



Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

**US 290 WESTBOUND
EXIT RAMP AT
BINFORD ROAD**

PHASE 3

NOT TO SCALE

SHEET 2 OF 2

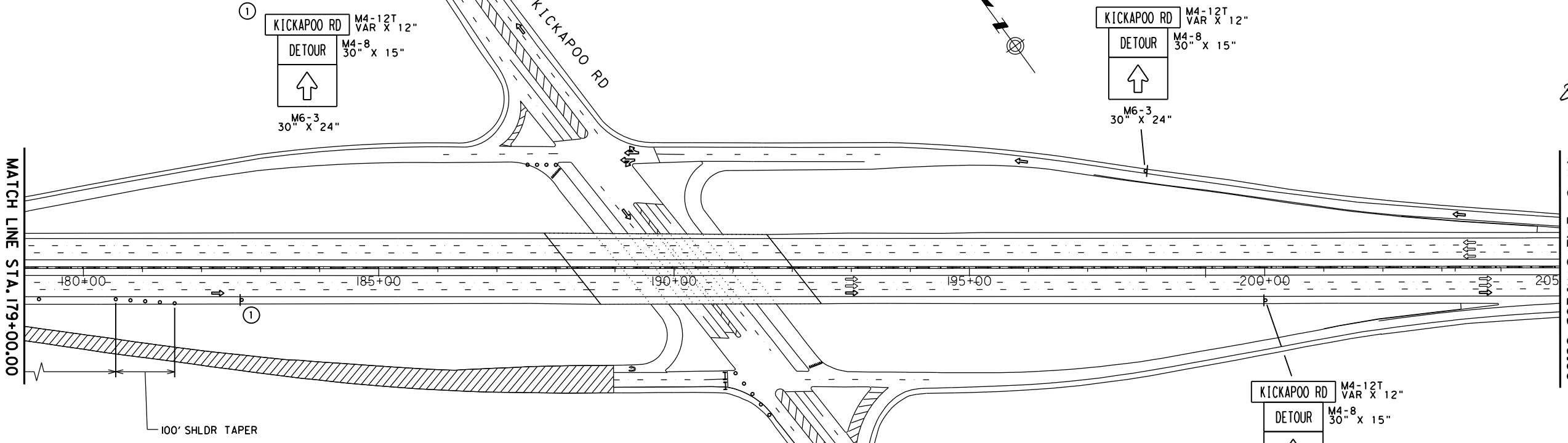
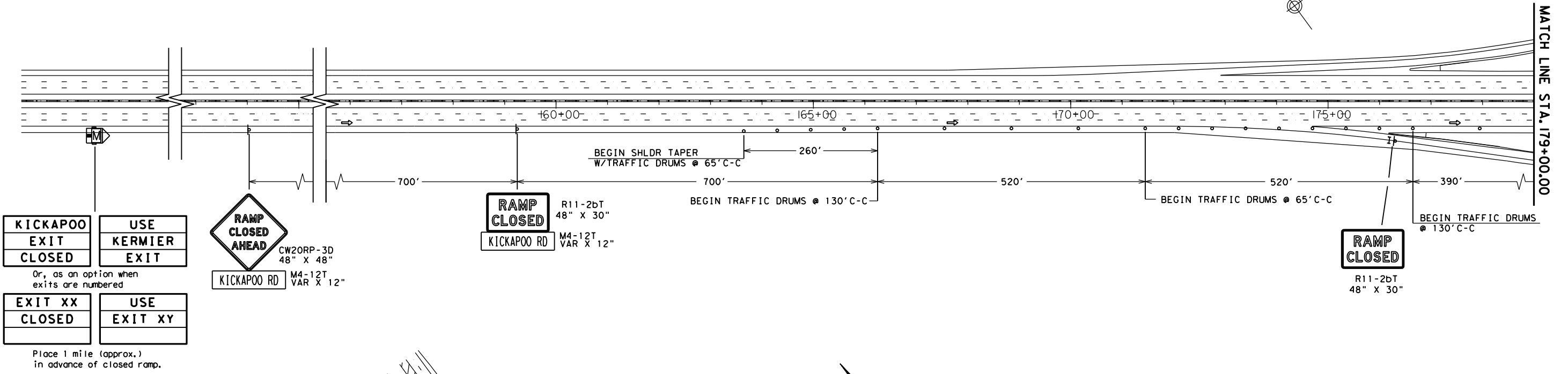


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	40	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

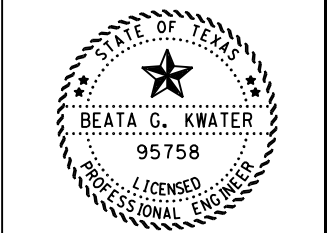
DATE: \$DATE\$
 PEN TABLE: \$PENS\$
 FILE: \$FILES\$

CKT
DIN
CKT
DIN



LEGEND					
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

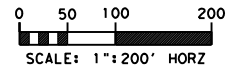
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TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT KICKAPOO ROAD

PHASE 3



SHEET 1 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	41	

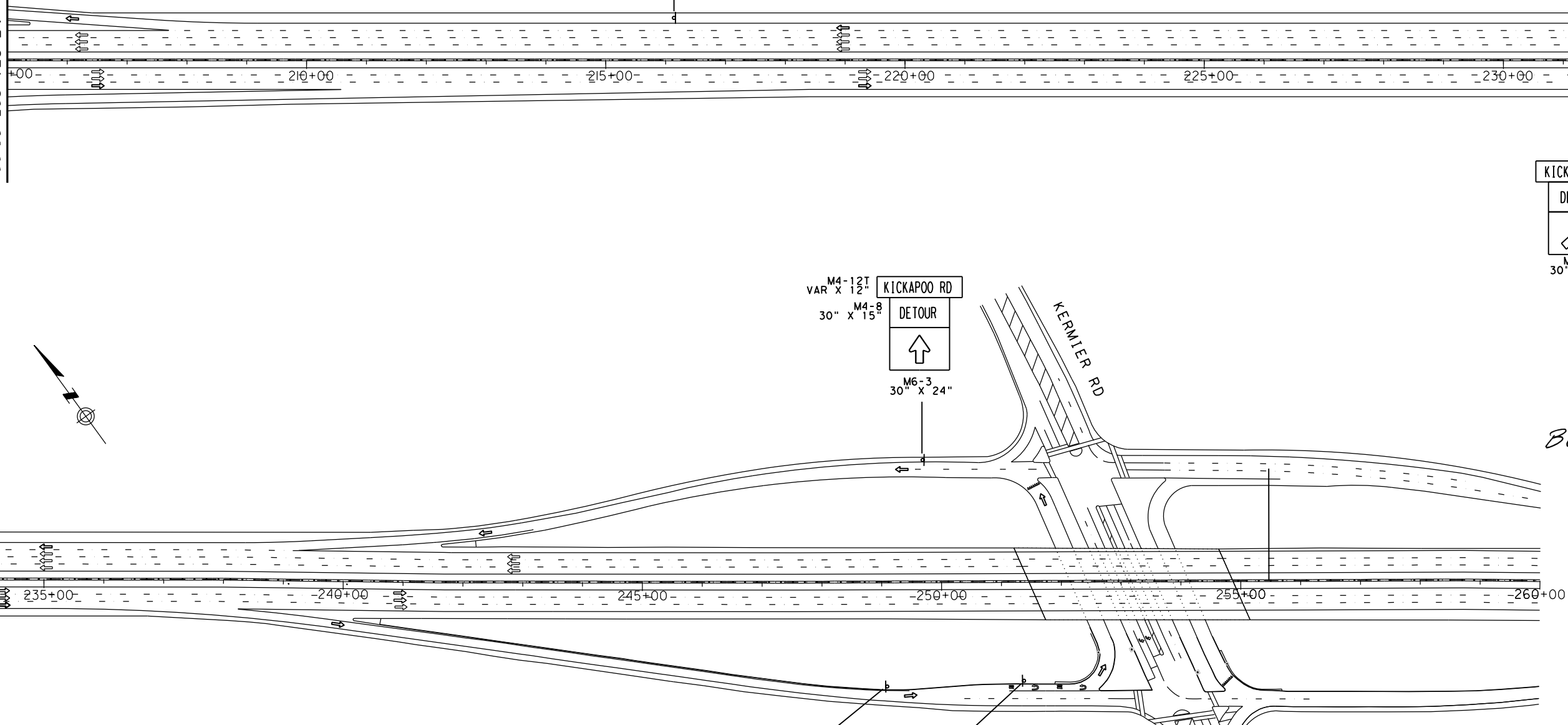
DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILE\$

CKT
DIN
CKT
DIN

MATCH LINE STA. 205+00.00

MATCH LINE STA. 234+00.00

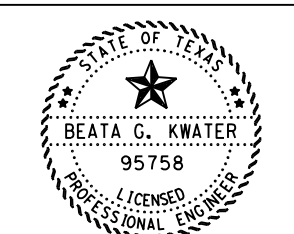
MATCH LINE STA. 234+00.00



LEGEND					
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

DATE: \$TIMES\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

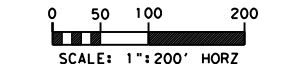
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TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT KICKAPOO ROAD

PHASE 3

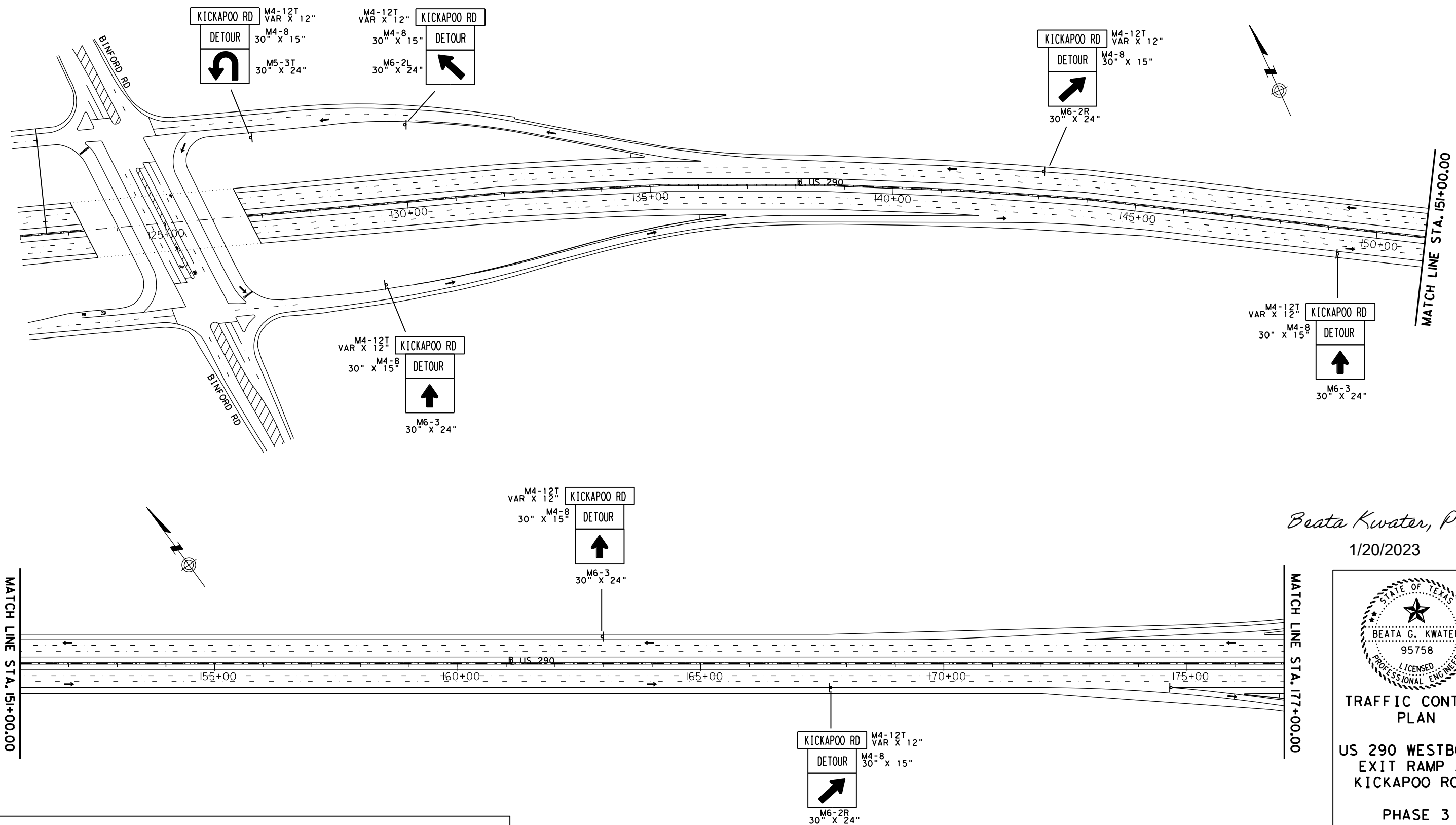


SHEET 2 OF 2

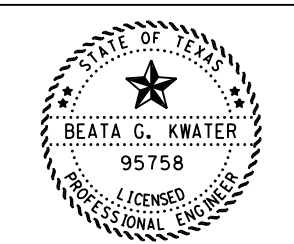


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	42	

CKT
DWF
CKT
DWF



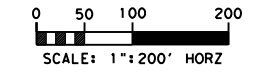
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TRAFFIC CONTROL PLAN

US 290 WESTBOUND EXIT RAMP AT KICKAPOO ROAD

PHASE 3



SHEET 1 OF 2

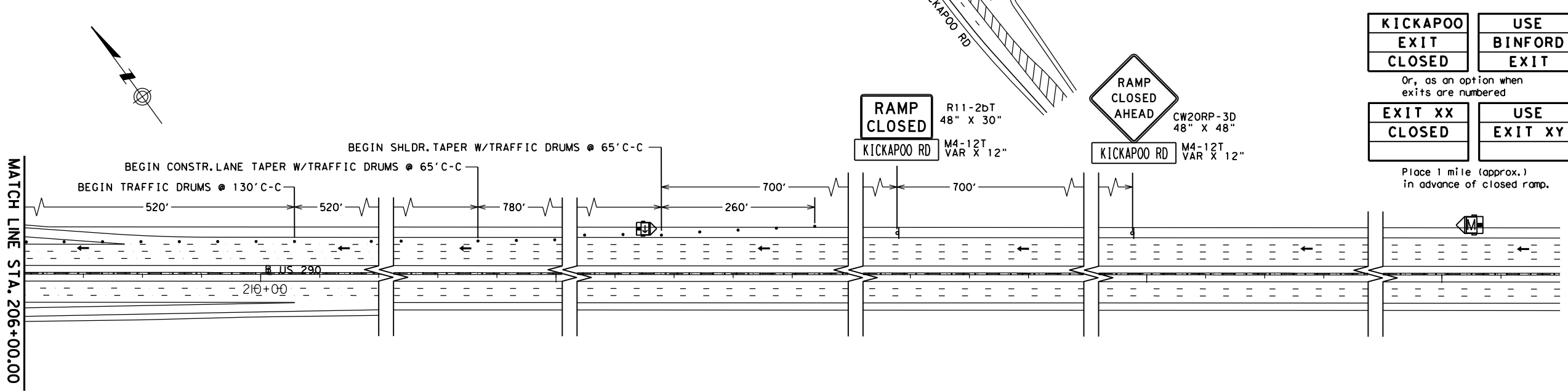
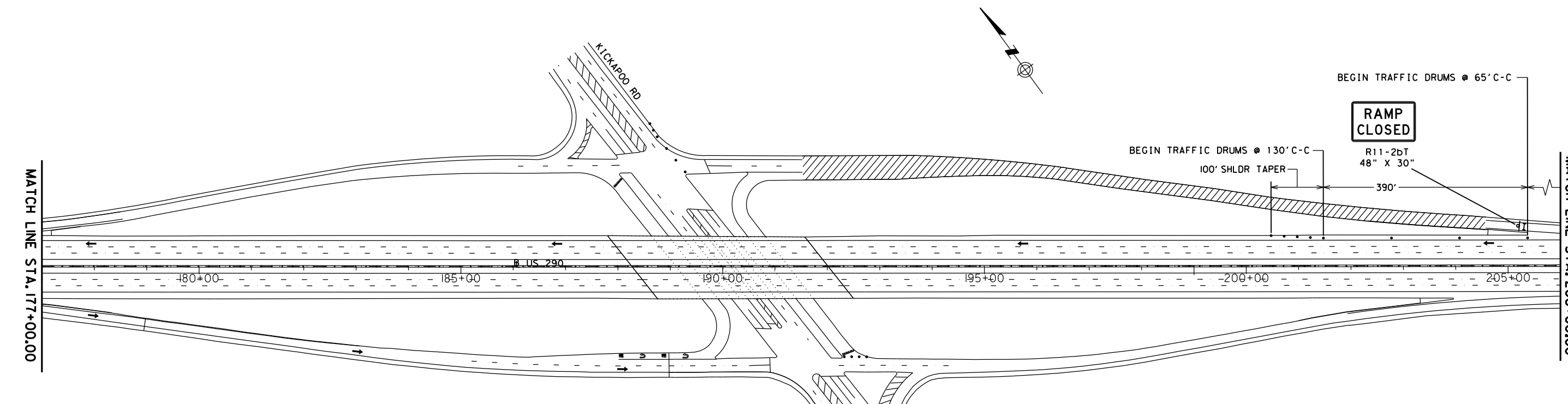


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	43	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
			PORTABLE FLASHING ARROW BOARD
			TEMP. GROUND MOUNTED SIGNS
			TY 3 BARRICADE
			TRAFFIC BARREL/DRUM
			PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT

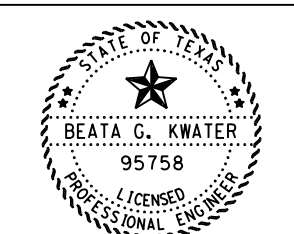
DATE: \$TIMES\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

Ckt
 Dm
 Ckt
 Dm



KICKAPOO EXIT CLOSED	USE BINFORD EXIT
Or, as an option when exits are numbered	
EXIT XX CLOSED	USE EXIT XY
Place 1 mile (approx.) in advance of closed ramp.	

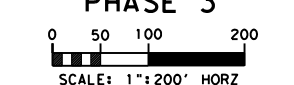
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1/20/2023



TRAFFIC CONTROL PLAN

**US 290 WESTBOUND
EXIT RAMP AT
KICKAPOO ROAD**

PHASE 3



SHEET 2 OF 2



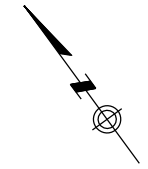
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	44	

LEGEND

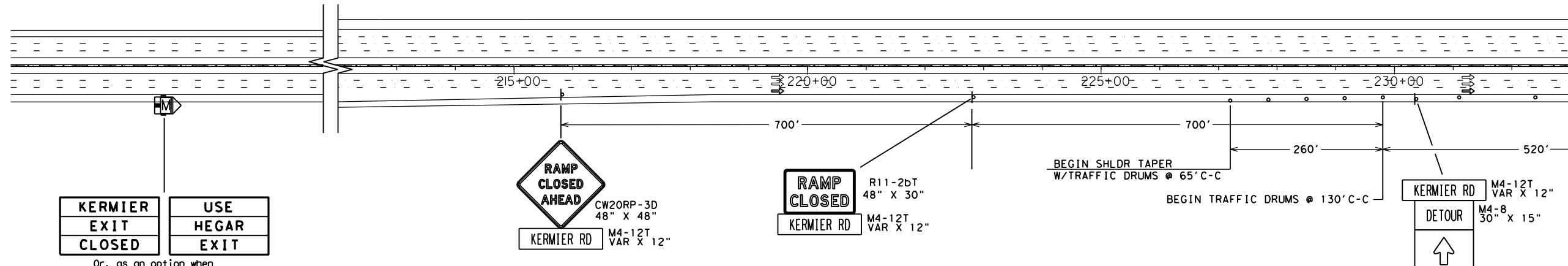
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
 PEN TABLE: \$PENS\$
 FILE: \$FILES\$

Dm
 Ckt
 Dm
 Ckt
 Dm
 Ckt



MATCH LINE STA. 234+00.00



KERMIER EXIT CLOSED **USE HEGAR EXIT**
 Or, as an option when exits are numbered
EXIT XX CLOSED **USE EXIT XY**
 Place 1 mile (approx.) in advance of closed ramp.

RAMP CLOSED AHEAD
 CW20RP-3D
 48" X 48"
 KERMIER RD M4-12T VAR X 12"

RAMP CLOSED
 R11-2bT
 48" X 30"
 KERMIER RD M4-12T VAR X 12"

KERMIER RD M4-12T VAR X 12"
DETOUR M4-8 30" X 15"
 M6-3 30" X 24"

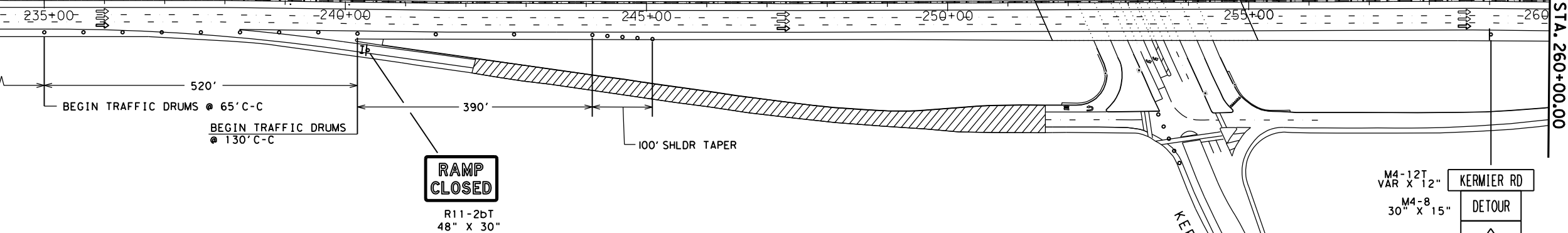
KERMIER RD M4-12T VAR X 12"
DETOUR M4-8 30" X 15"
 M6-3 30" X 24"

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1/20/2023

MATCH LINE STA. 234+00.00

MATCH LINE STA. 260+00.00



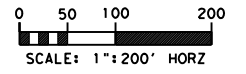
RAMP CLOSED
 R11-2bT
 48" X 30"

M4-12T VAR X 12"
DETOUR M4-8 30" X 15"
 M6-3 30" X 24"

TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT KERMIER ROAD

PHASE 3



SHEET 1 OF 2

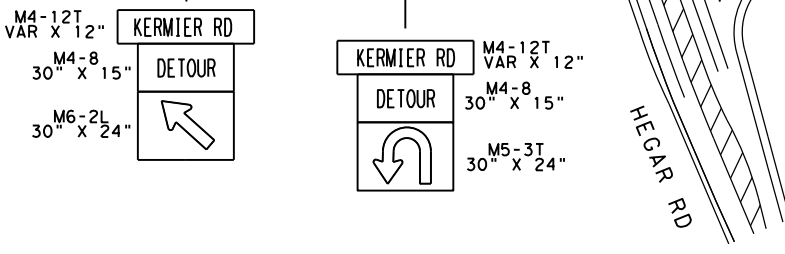
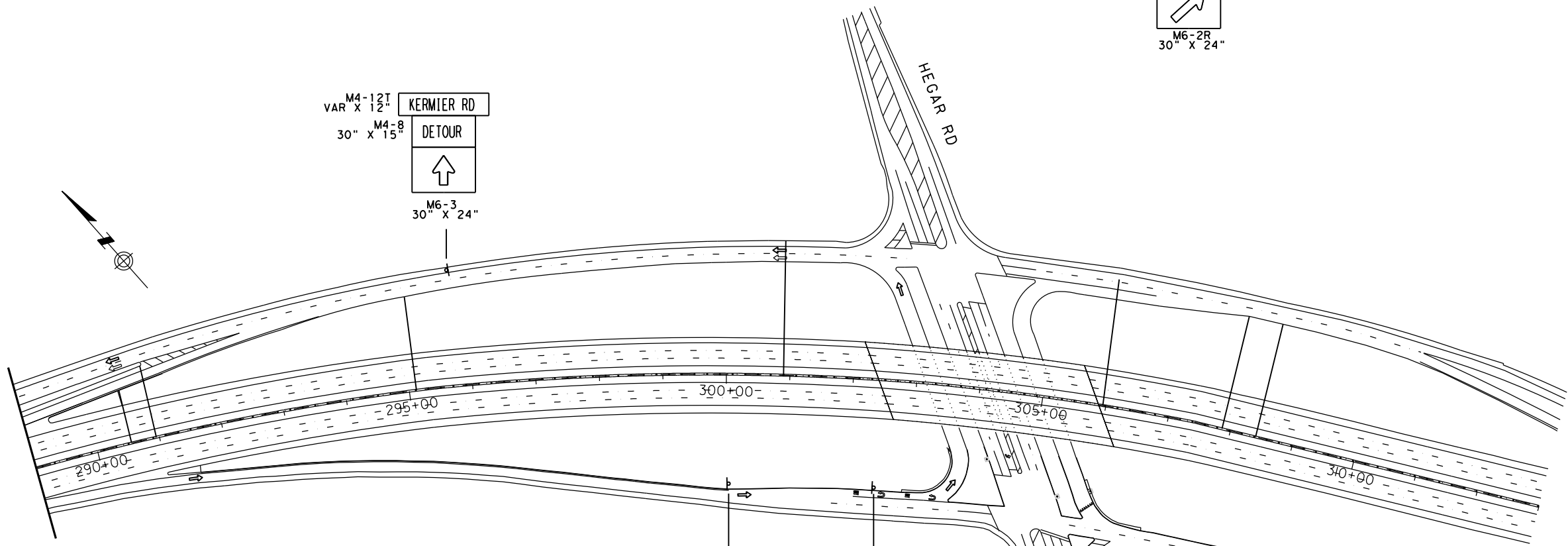
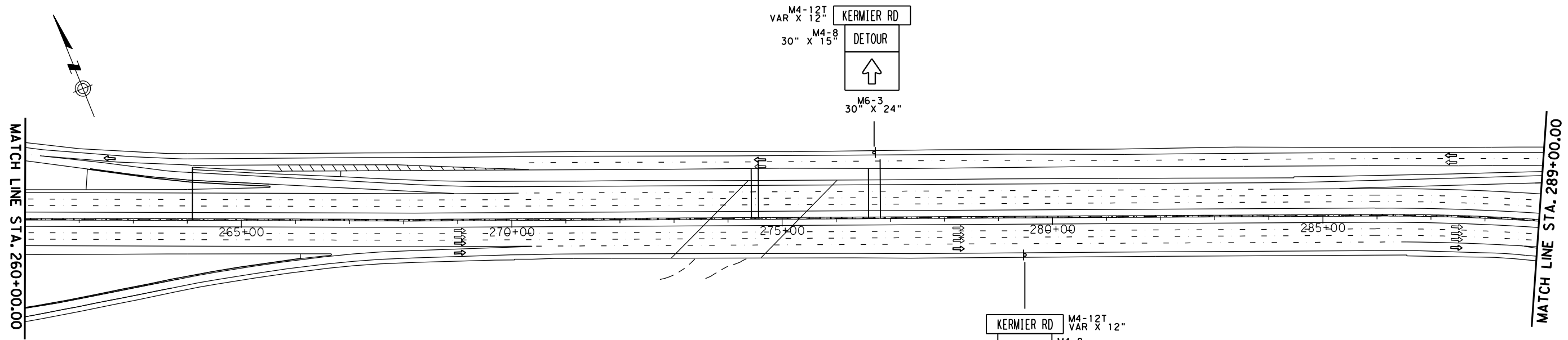


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	45	

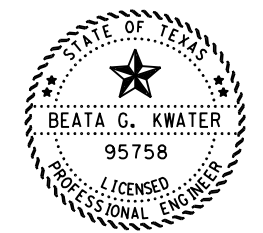
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		TRAFFIC BARREL/DRUM
	PORTABLE FLASHING ARROW BOARD		

DATE: \$DATE\$
 PEN TABLE: \$PENS\$
 FILE: \$FILES\$

CKT
DWT
CKT
DWT



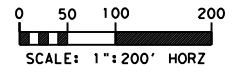
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT KERMIER ROAD

PHASE 3



SHEET 2 OF 2

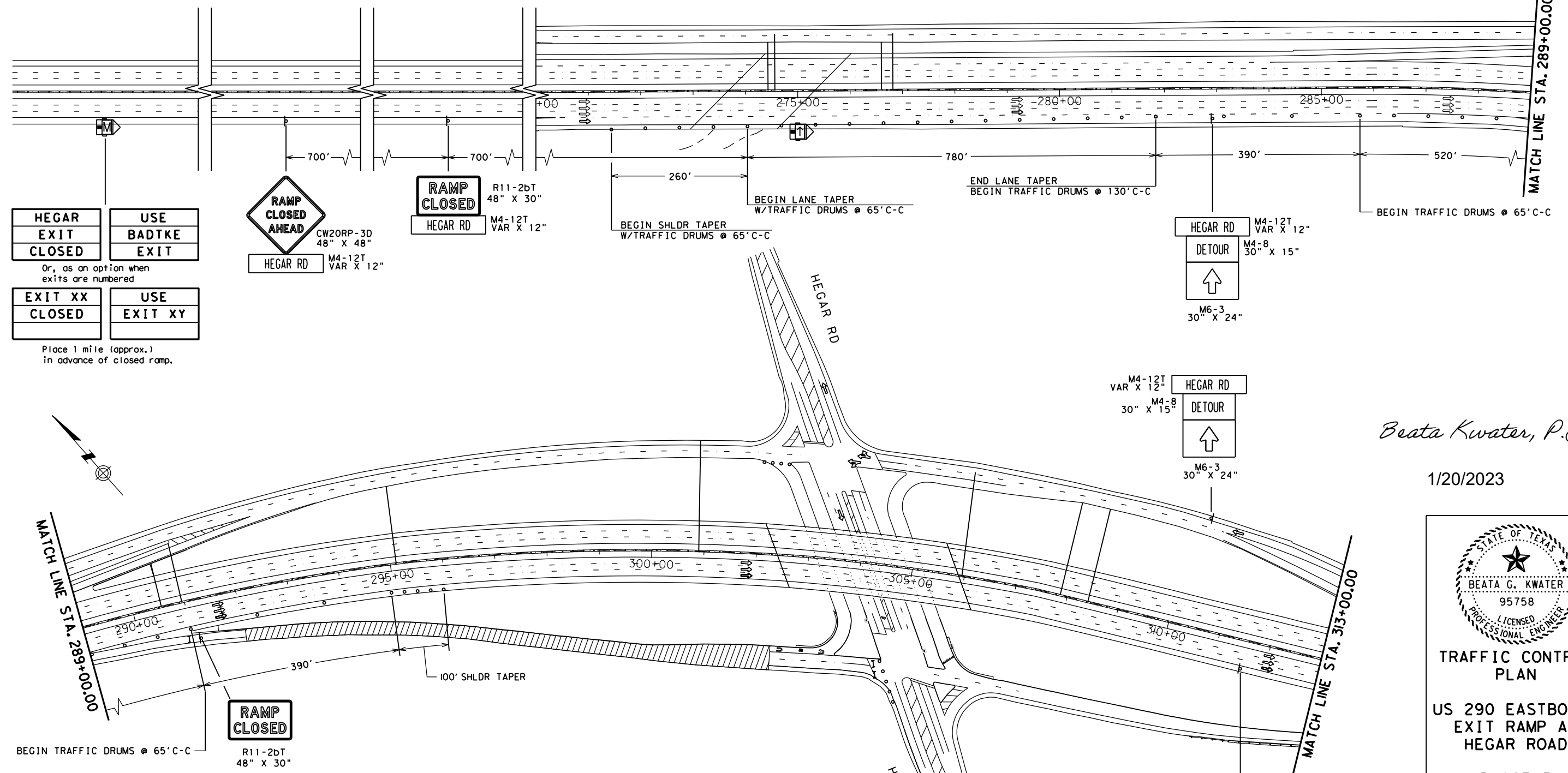
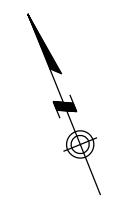


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	46	

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		PORTABLE FLASHING ARROW BOARD
	TRAFFIC BARREL/DRUM		

DATE: \$DATES
PEN TABLE: \$PEN\$
FILE: \$FILES

Dn
Ckt
Dn
Ckt
Dn
Ckt



HEGAR EXIT CLOSED **USE BADTKE EXIT**
 Or, as an option when exits are numbered
EXIT XX CLOSED **USE EXIT XY**
 Place 1 mile (approx.) in advance of closed ramp.

LEGEND					
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

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 1/20/2023

TRAFFIC CONTROL PLAN

US 290 EASTBOUND EXIT RAMP AT HEGAR ROAD

PHASE 3

0 50 100 200
SCALE: 1"=200' HORZ

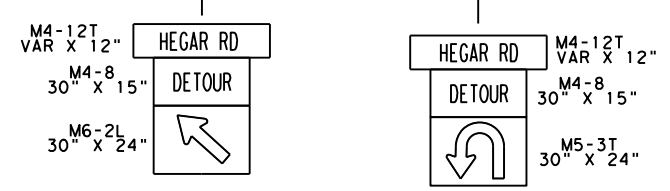
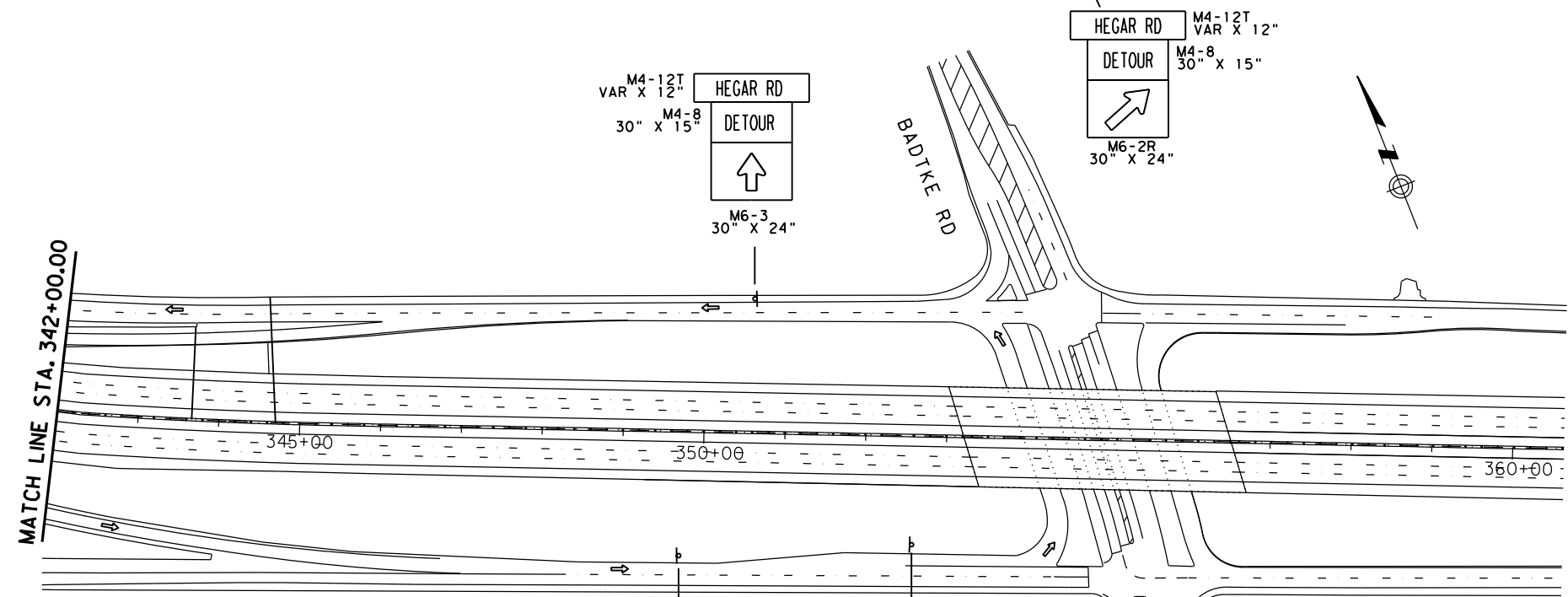
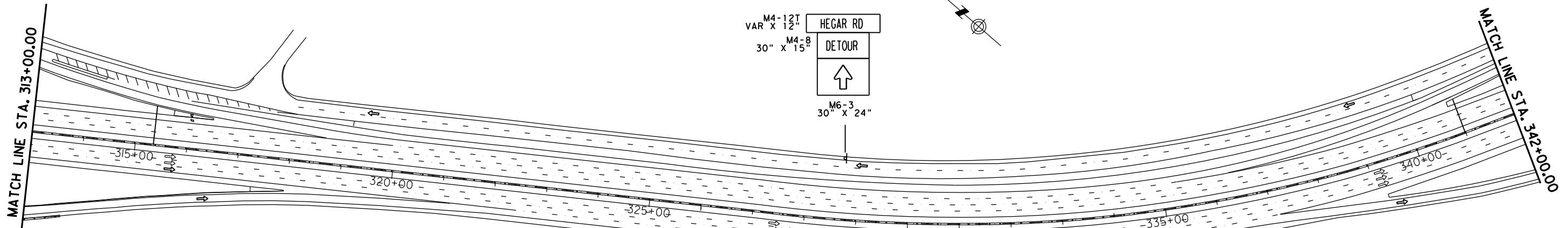
SHEET 1 OF 2

TEXAS DEPARTMENT OF TRANSPORTATION
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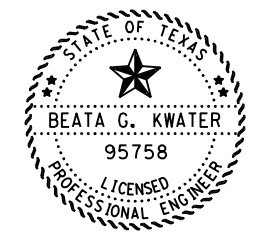
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	47	

DATE: \$DATES\$
 PEN TABLE: \$SPENS\$
 FILE: \$FILES\$

CKT
DIN
CKT
DIN



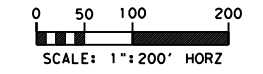
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND
EXIT RAMP AT
HEGAR ROAD

PHASE 3



SHEET 2 OF 2

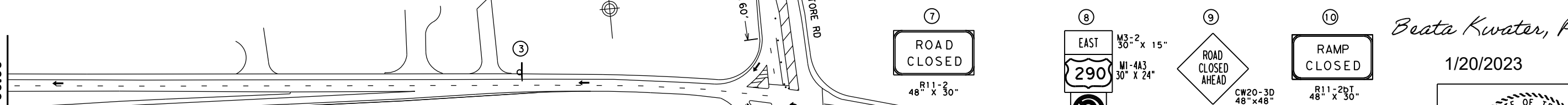
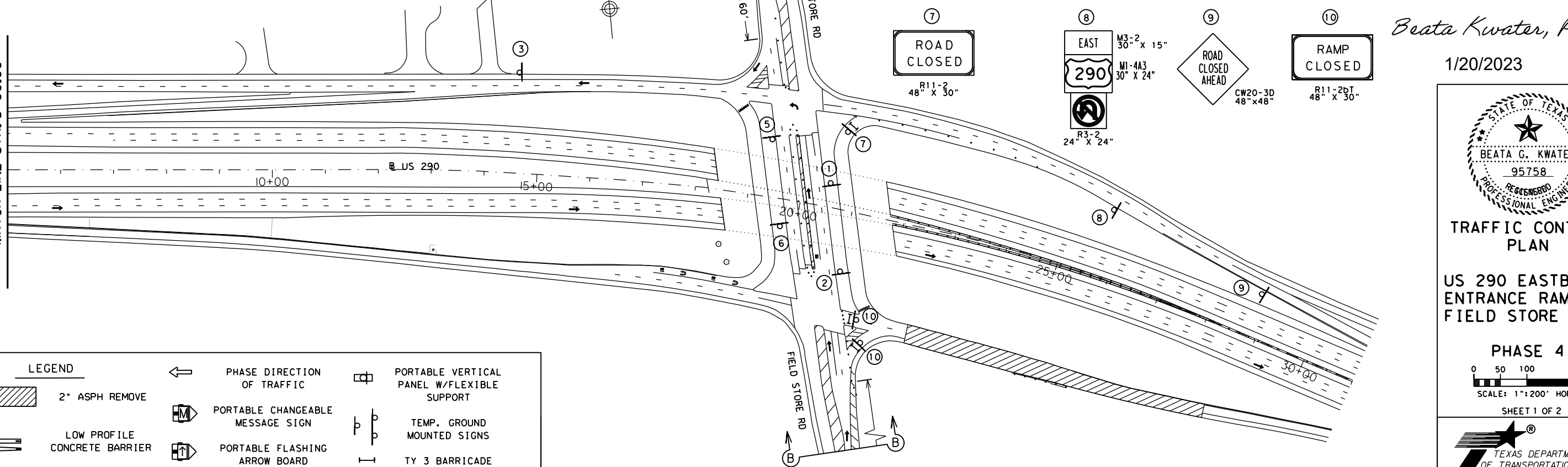
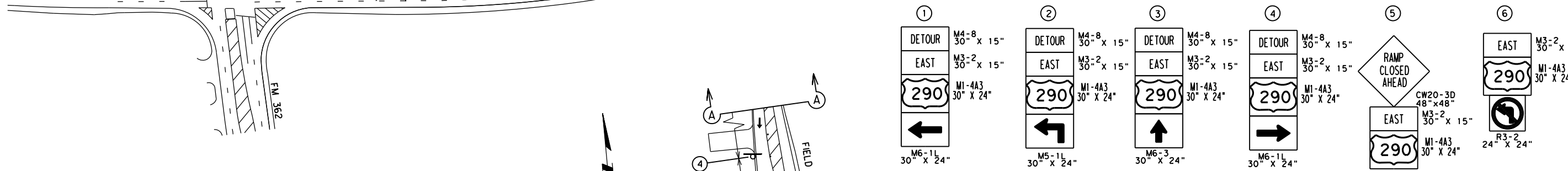
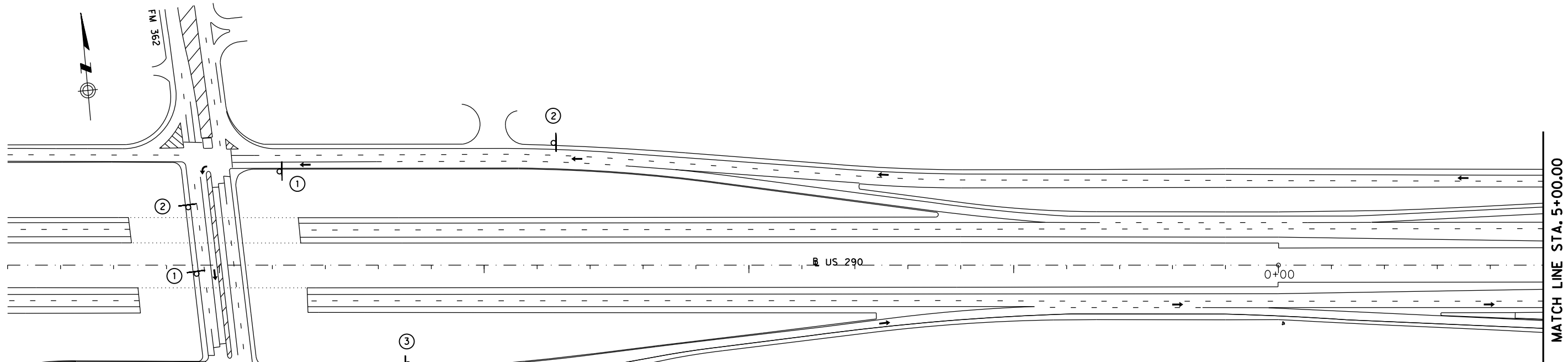


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	48	

LEGEND	
	WORK ZONE
	PHASE DIRECTION OF TRAFFIC
	PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE
	TRAFFIC BARREL/DRUM
	LOW PROFILE CONCRETE BARRIER

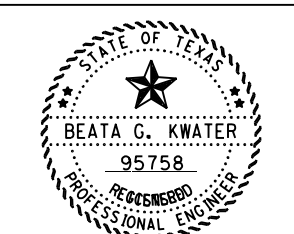
DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF



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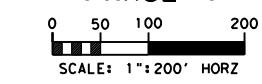
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT FIELD STORE ROAD

PHASE 4



SHEET 1 OF 2

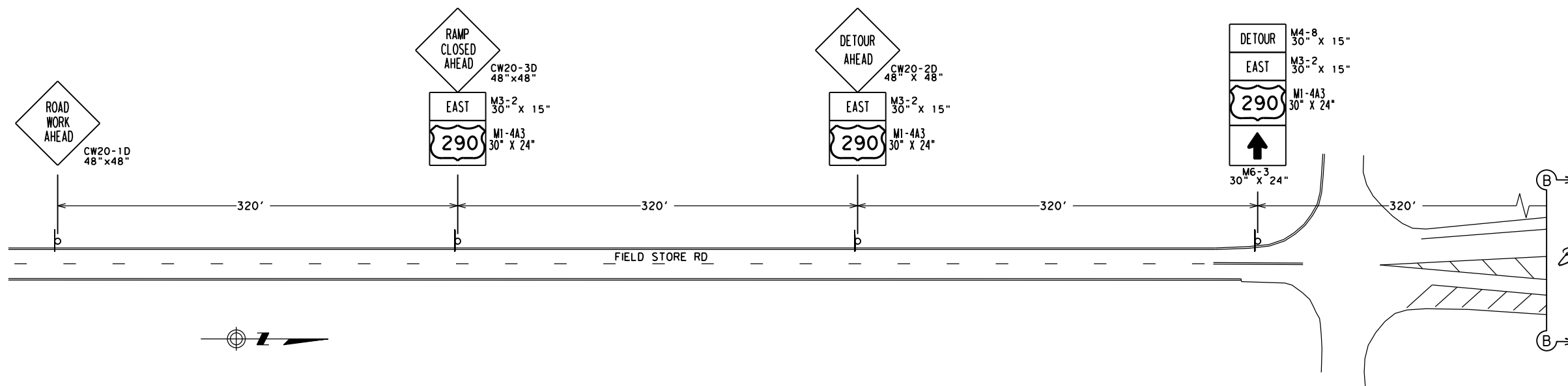
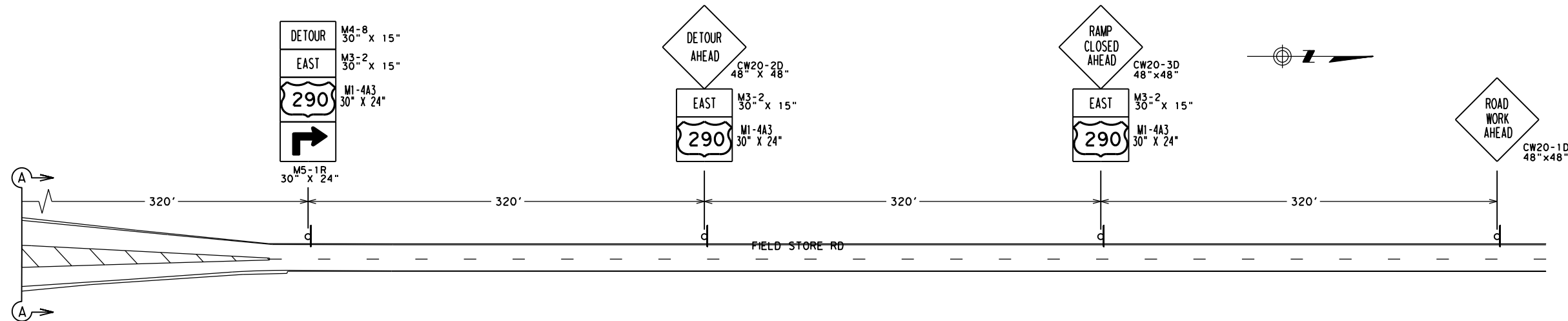


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	49	

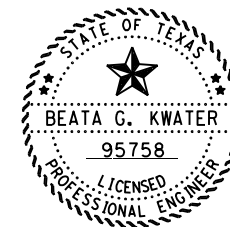
LEGEND					
	2" ASPH REMOVE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			PORTABLE CHEVRON W/FLEXIBLE SUPPORT		TRAFFIC BARREL/DRUM

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWH
CKT
DWH



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1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND
ENTRANCE RAMP AT
FIELD STORE ROAD

PHASE 4

NOT TO SCALE

SHEET 2 OF 2

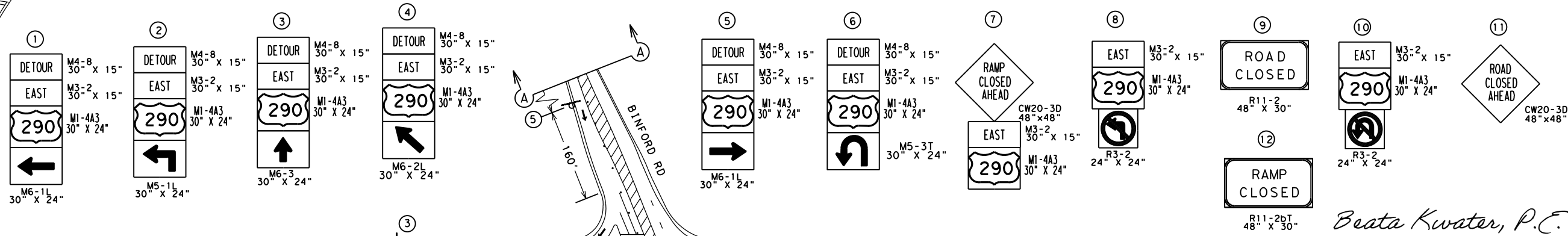
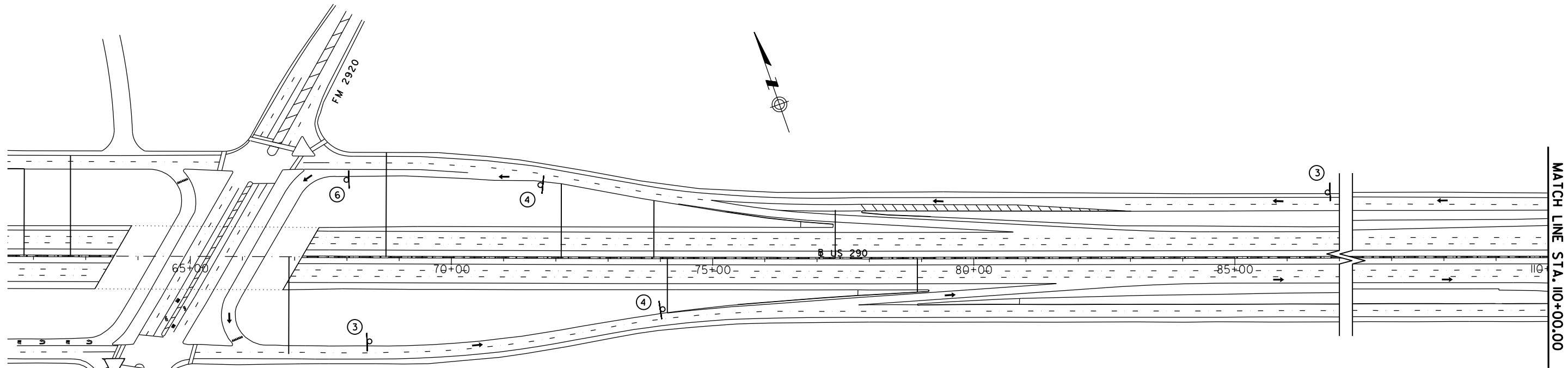


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	50	

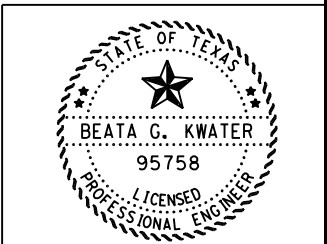
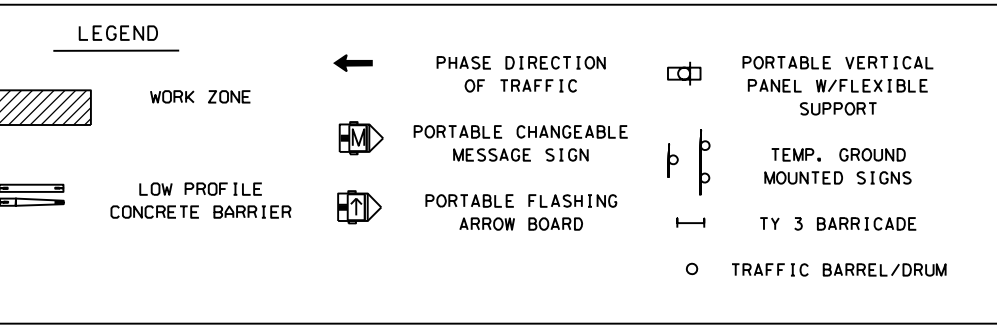
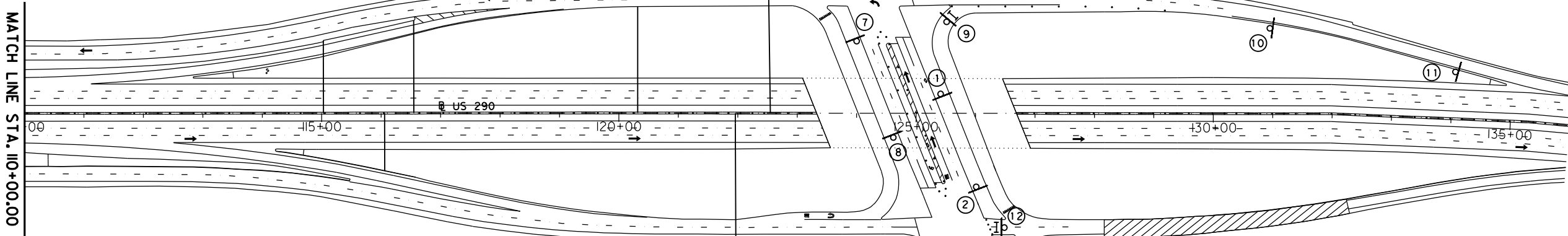
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TRAFFIC BARREL/DRUM		

DATE: \$TIMES\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF



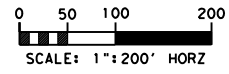
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT BINFORD ROAD

PHASE 4



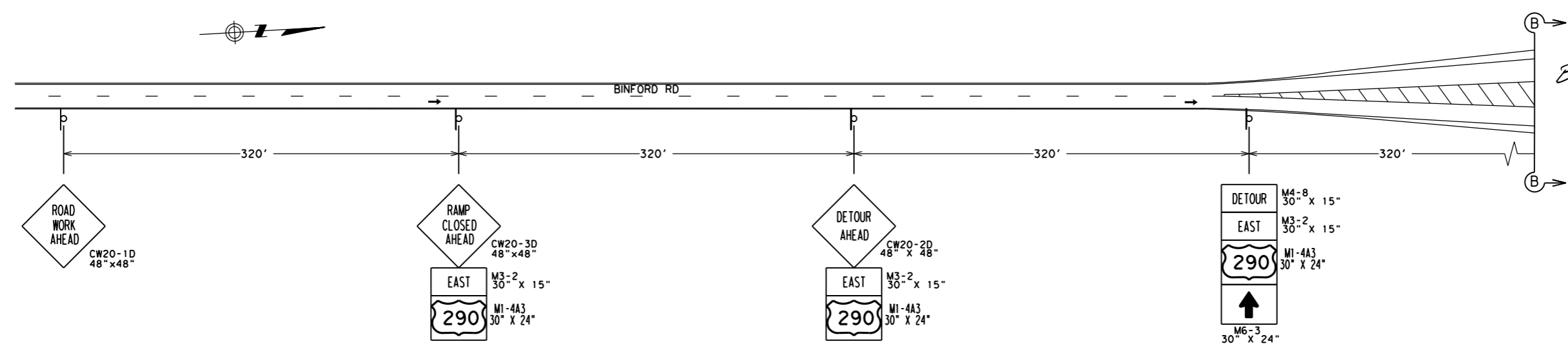
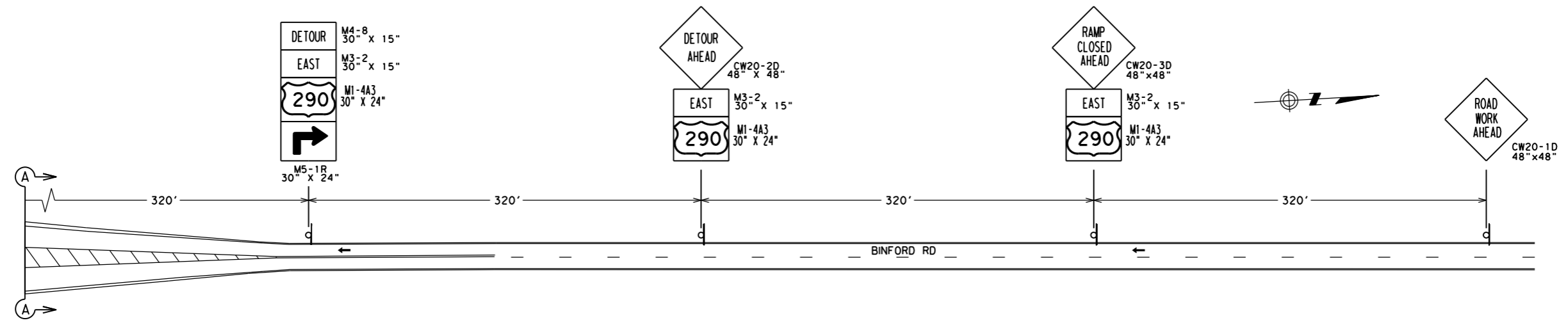
SHEET 1 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	51	

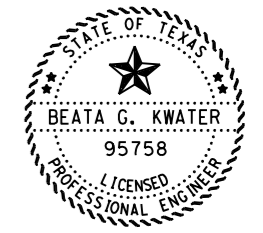
DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CK: _____
 DW: _____
 CK: _____
 DN: _____



Beata Kwater, P.E.

1/20/2023



TRAFFIC CONTROL PLAN

**US 290 EASTBOUND
 ENTRANCE RAMP AT
 BINFORD ROAD**

PHASE 4

NOT TO SCALE

SHEET 2 OF 2

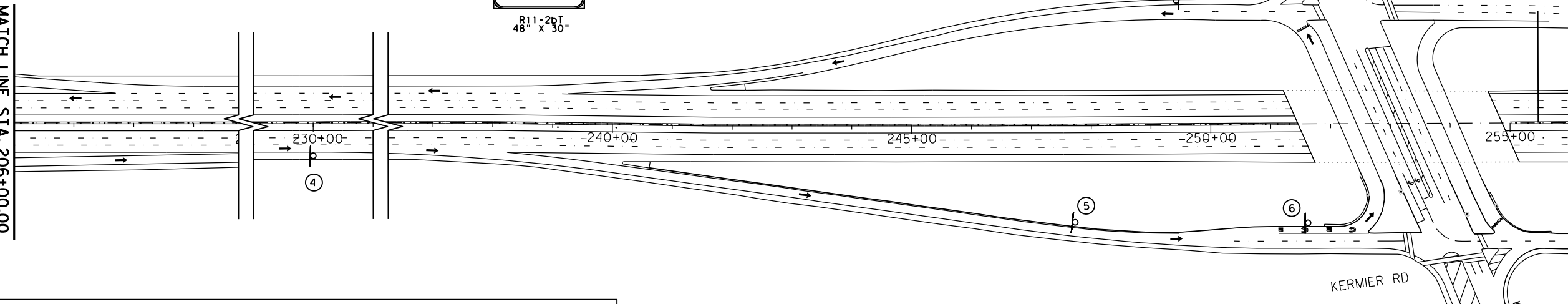
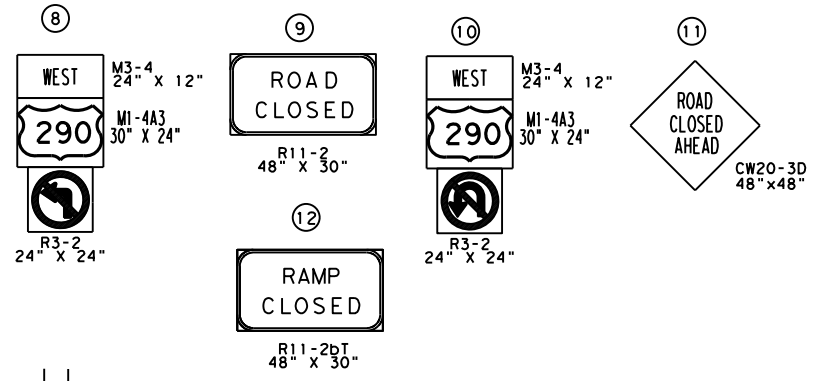
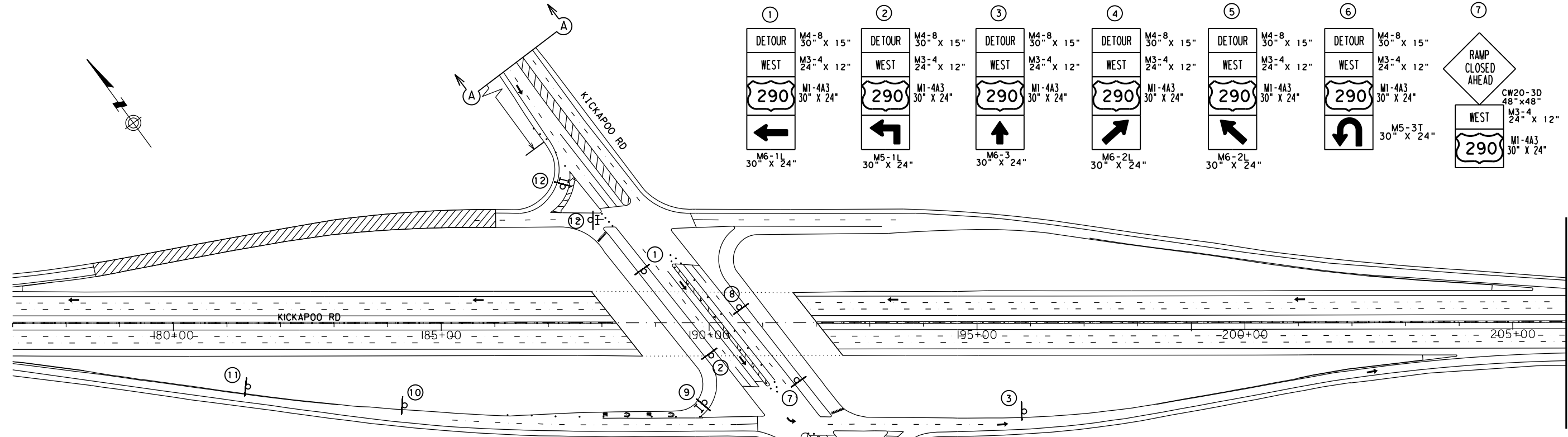
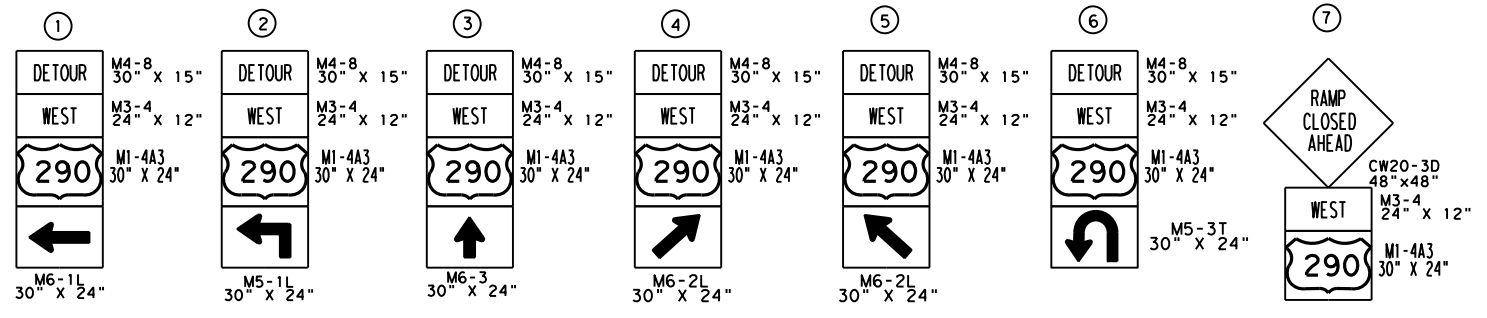
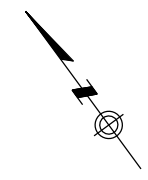


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		52

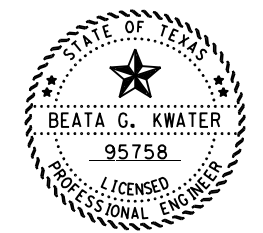
LEGEND		
	WORK ZONE	
	LOW PROFILE CONCRETE BARRIER	
	PHASE DIRECTION OF TRAFFIC	
	PORTABLE CHANGEABLE MESSAGE SIGN	
	PORTABLE FLASHING ARROW BOARD	
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT	
	TEMP. GROUND MOUNTED SIGNS	
	TY 3 BARRICADE	
	TRAFFIC BARREL/DRUM	

DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILE\$

CKT
DIN
CKT
DIN



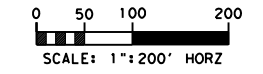
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND ENTRANCE RAMP AT KICKAPOO ROAD

PHASE 4



SHEET 1 OF 2

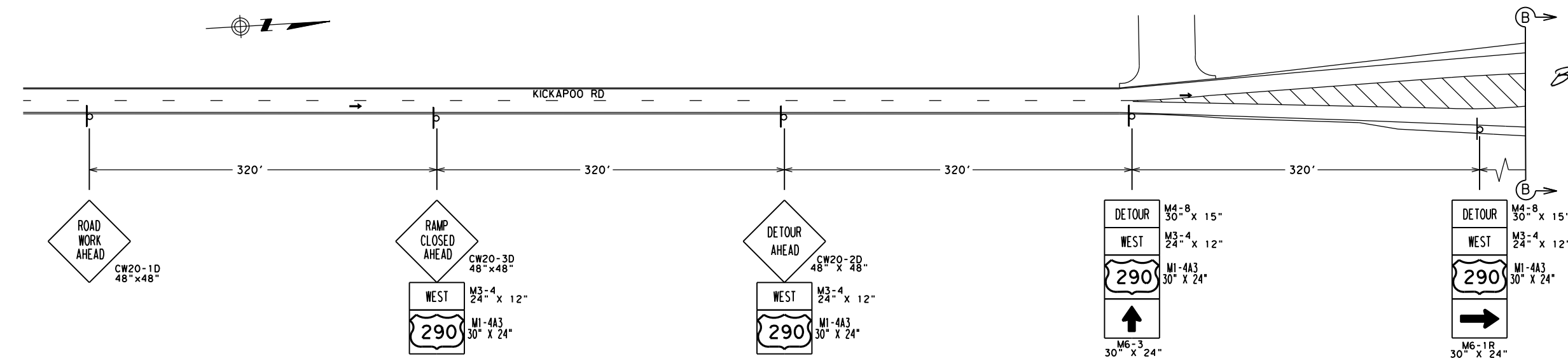
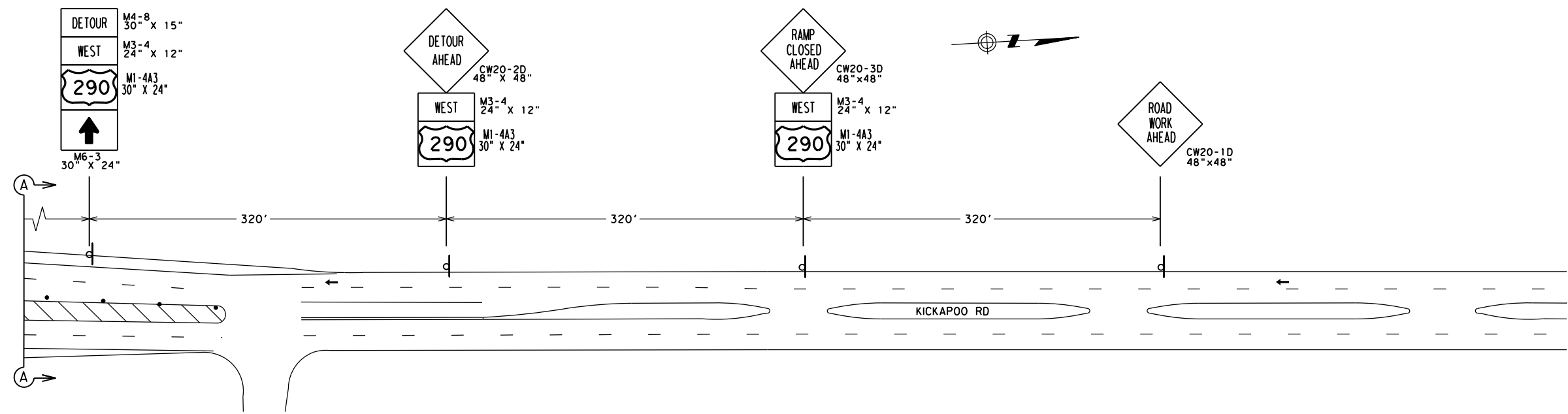


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	53	

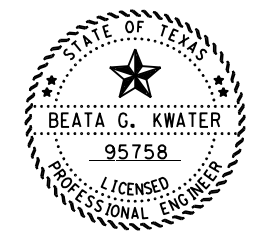
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DIN
CKT
DIN



Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND ENTRANCE RAMP AT KICKAPOO ROAD

PHASE 4

NOT TO SCALE

SHEET 2 OF 2



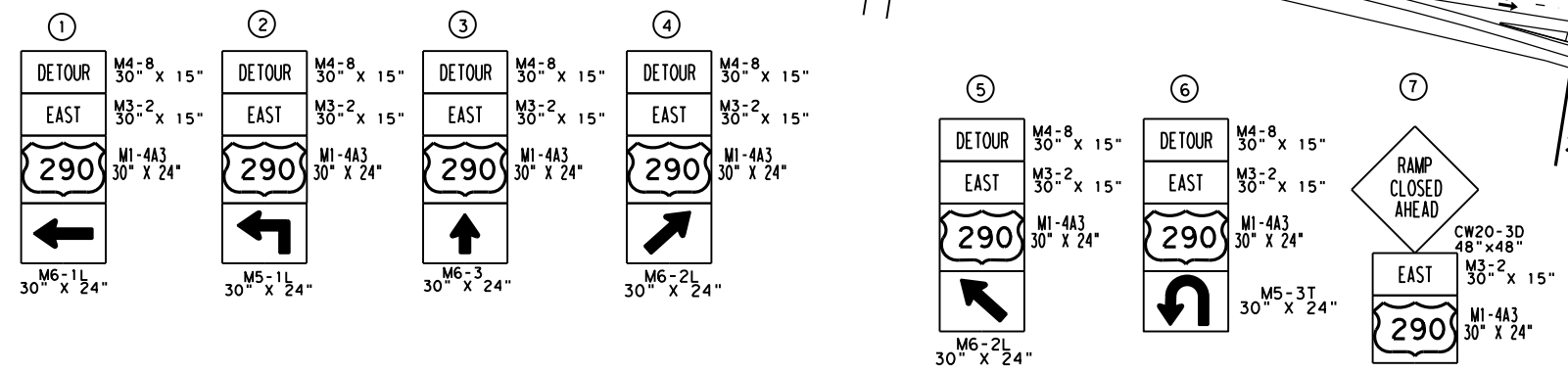
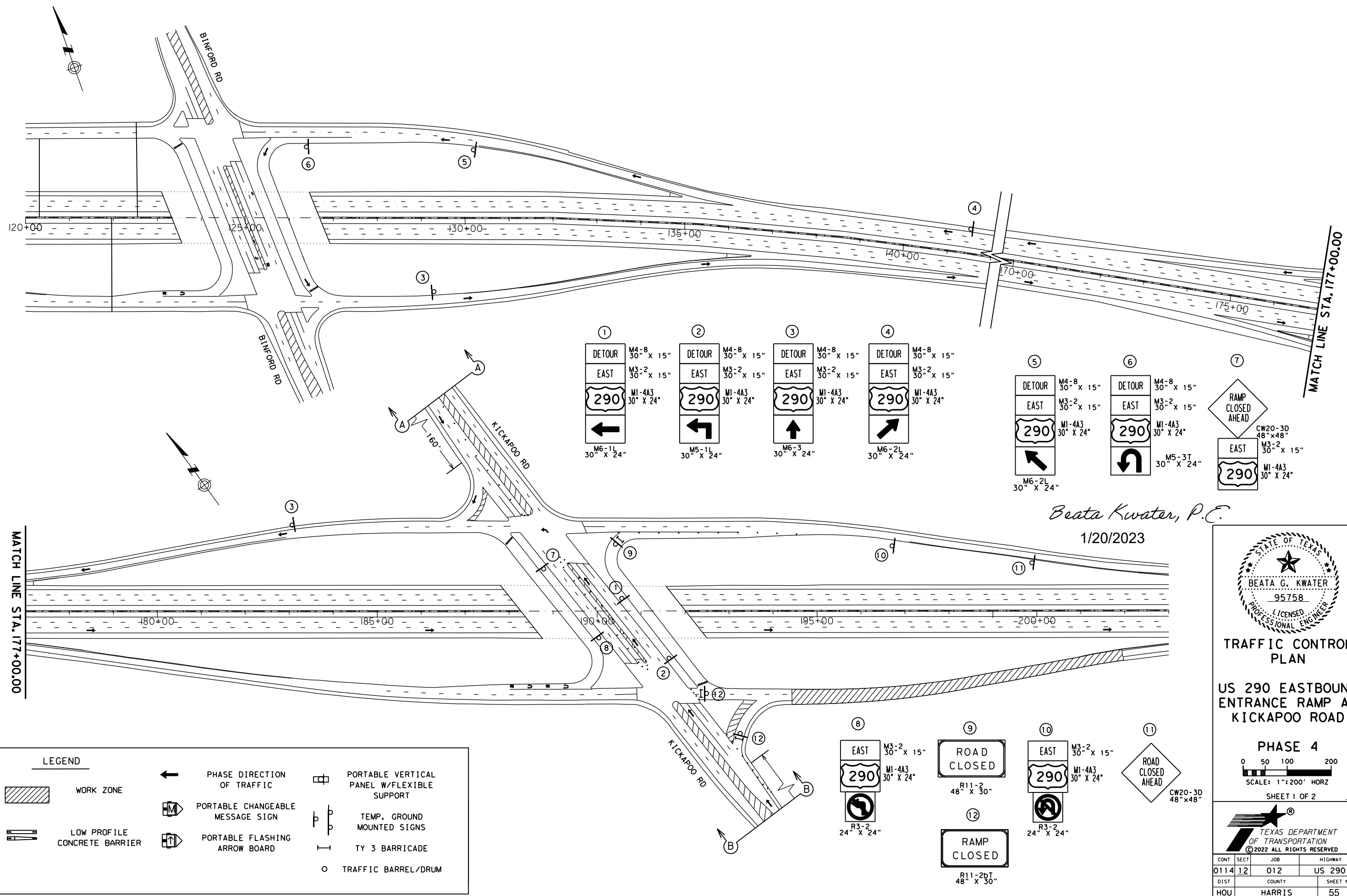
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		54

LEGEND

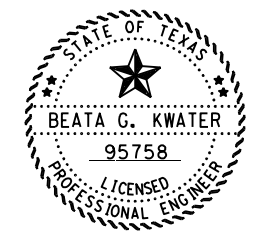
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	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF



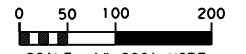
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT KICKAPOO ROAD

PHASE 4



SCALE: 1"=200' HORZ

SHEET 1 OF 2

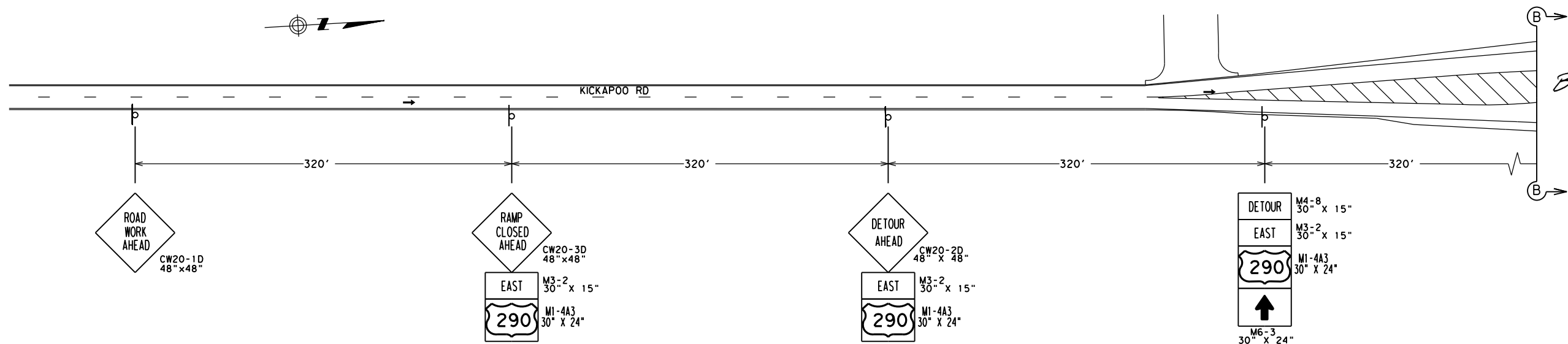
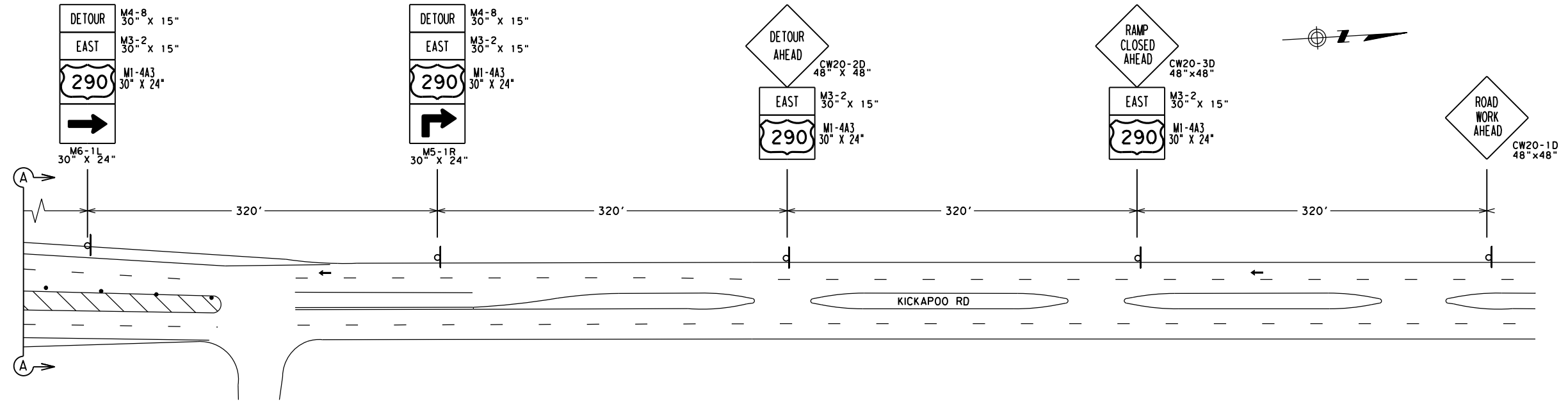


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	55	

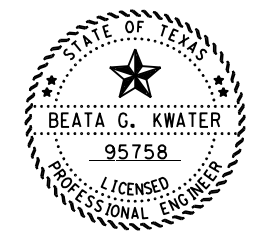
LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DIN
CKT
DIN



Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT KICKAPOO ROAD

PHASE 4

NOT TO SCALE

SHEET 2 OF 2



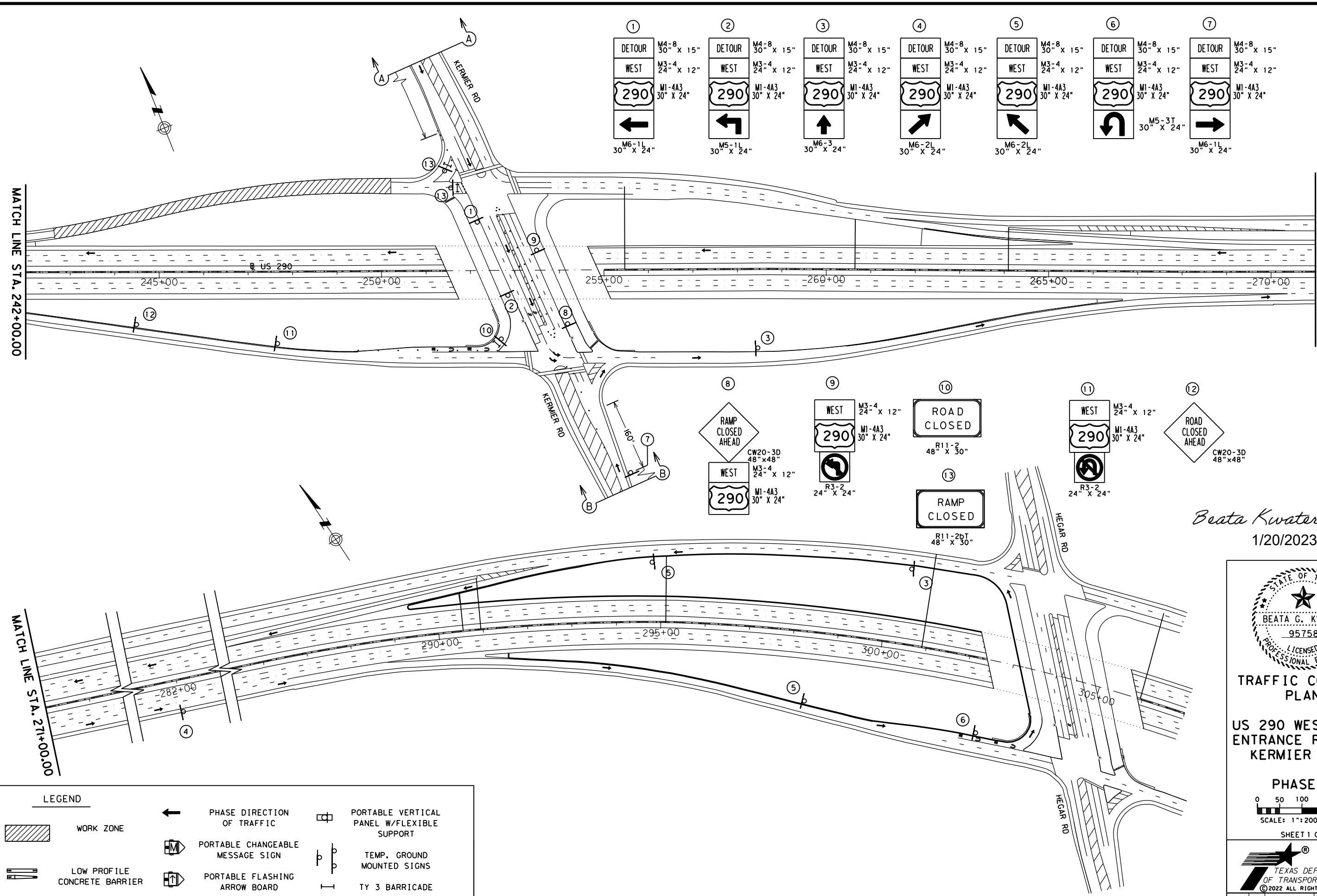
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		56

LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

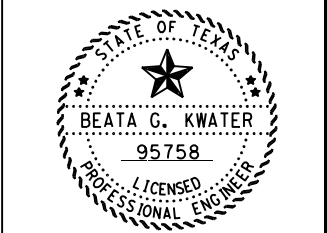
CKT
 DWF
 CKT
 DWF



① DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ← M6-1L 30" X 24"	② DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↙ M5-1L 30" X 24"	③ DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↑ M6-3 30" X 24"	④ DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↗ M6-2L 30" X 24"	⑤ DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↖ M6-2L 30" X 24"	⑥ DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↻ M5-3T 30" X 24"	⑦ DETOUR M4-8 30" X 15" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" → M6-1L 30" X 24"
--	--	---	--	--	--	--

⑧ RAMP CLOSED AHEAD CW20-3D 48" X 48" WEST M3-4 24" X 12" 290 M1-4A3 30" X 24"	⑨ WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↻ R3-2 24" X 24"	⑩ ROAD CLOSED R11-2 48" X 30"	⑪ WEST M3-4 24" X 12" 290 M1-4A3 30" X 24" ↻ R3-2 24" X 24"	⑫ ROAD CLOSED AHEAD CW20-3D 48" X 48"
⑬ RAMP CLOSED R11-2bT 48" X 30"				

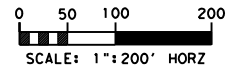
Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND ENTRANCE RAMP AT KERMIER ROAD

PHASE 4



SHEET 1 OF 2

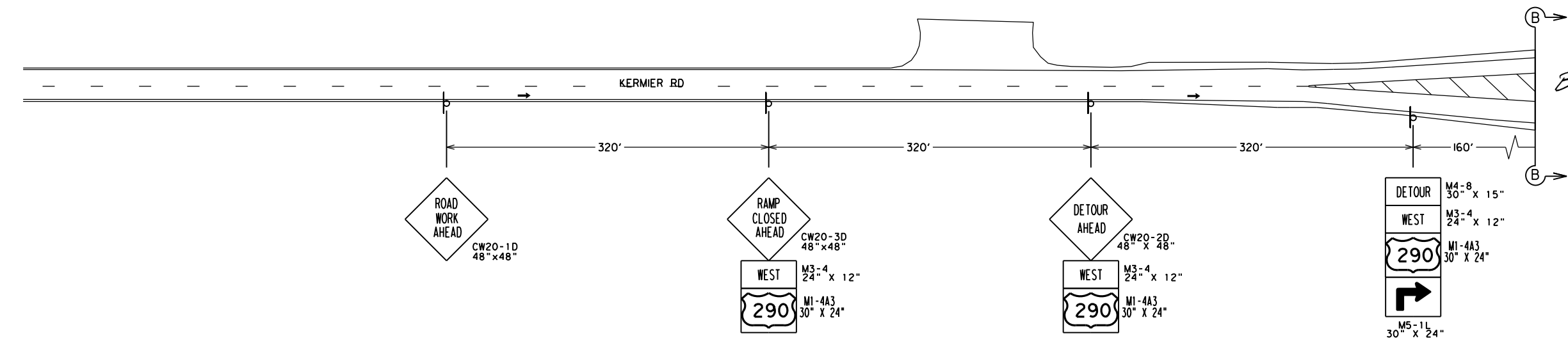
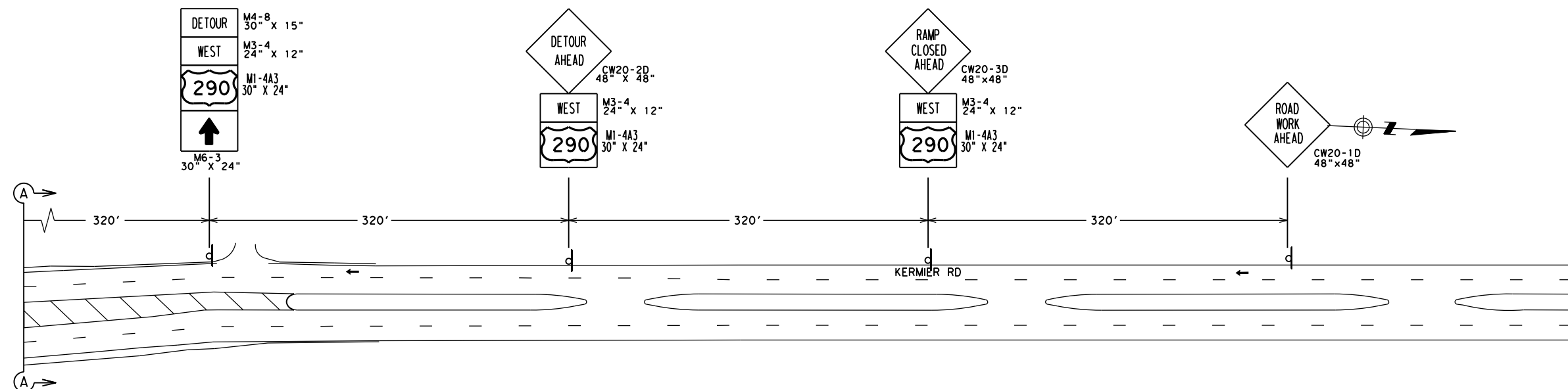


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	57	

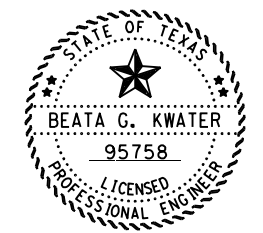
LEGEND			
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	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TEMP. GROUND MOUNTED SIGNS		TY 3 BARRICADE
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
 PEN TABLE: \$PENS\$
 FILE: \$FILES\$

CKT
DWH
CKT
DWH



Beata Kwater, P.C.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 WESTBOUND ENTRANCE RAMP AT KERMIER ROAD

PHASE 4
NOT TO SCALE

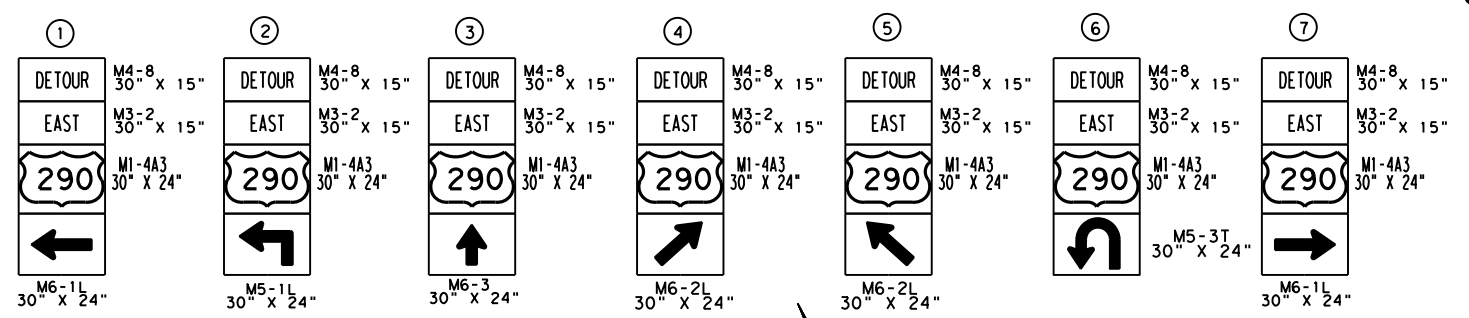
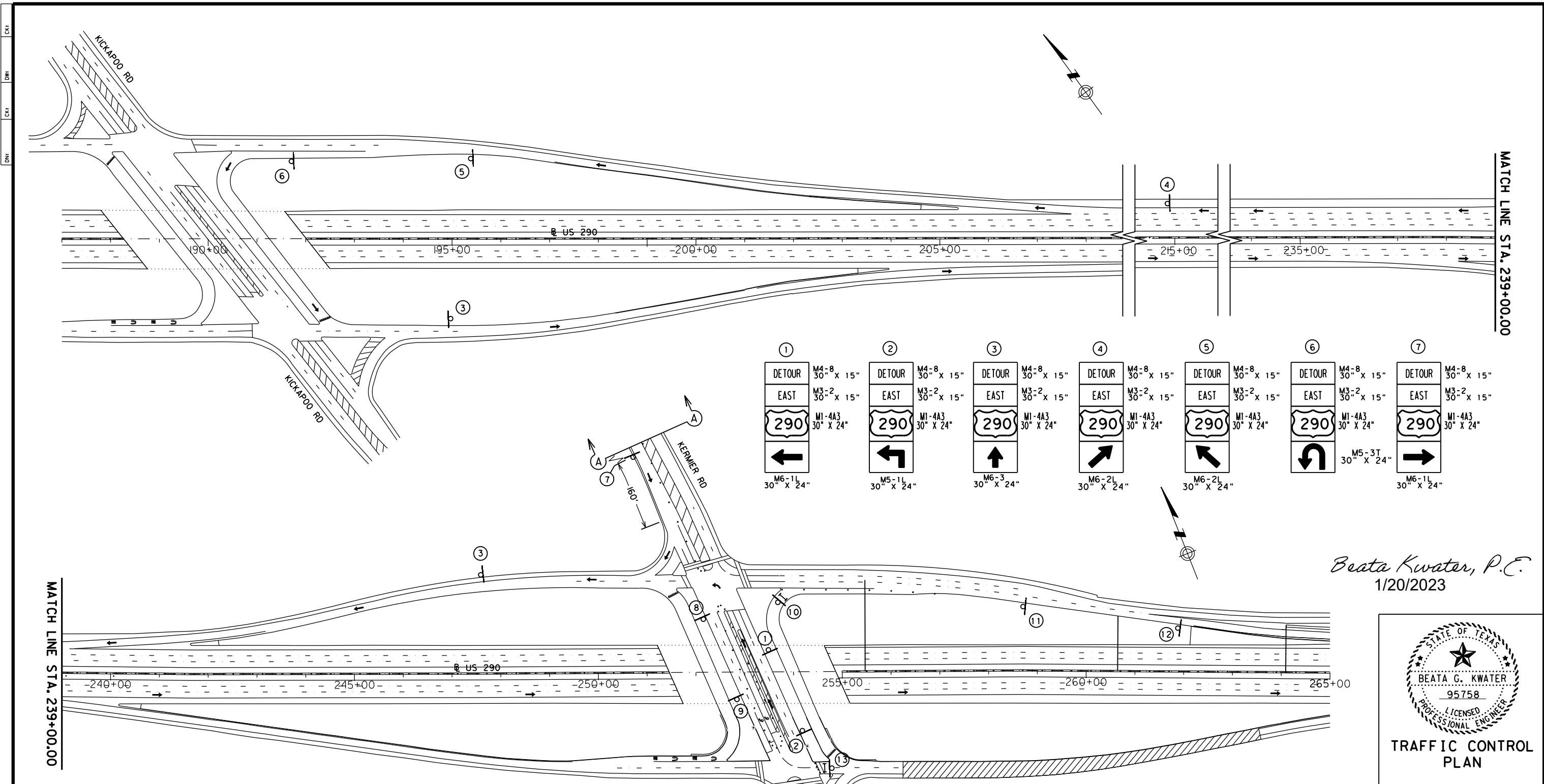
SHEET 2 OF 2



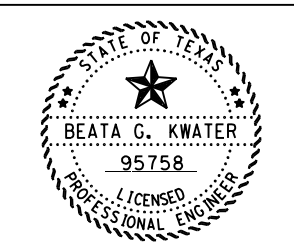
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		58

LEGEND			
	WORK ZONE		PHASE DIRECTION OF TRAFFIC
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN
	PORTABLE FLASHING ARROW BOARD		TEMP. GROUND MOUNTED SIGNS
	TY 3 BARRICADE		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$



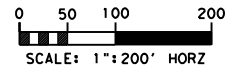
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT KERRIER ROAD

PHASE 4



SHEET 1 OF 2



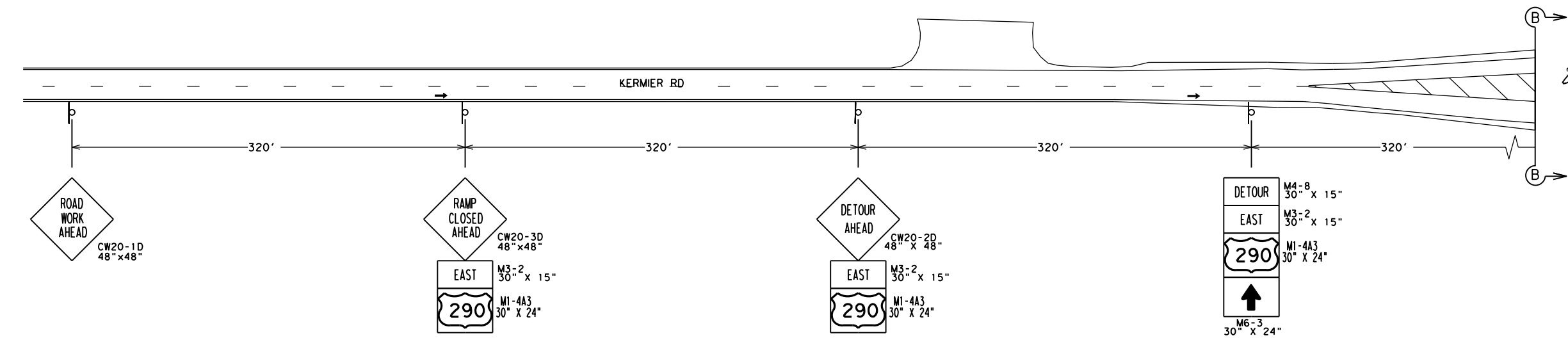
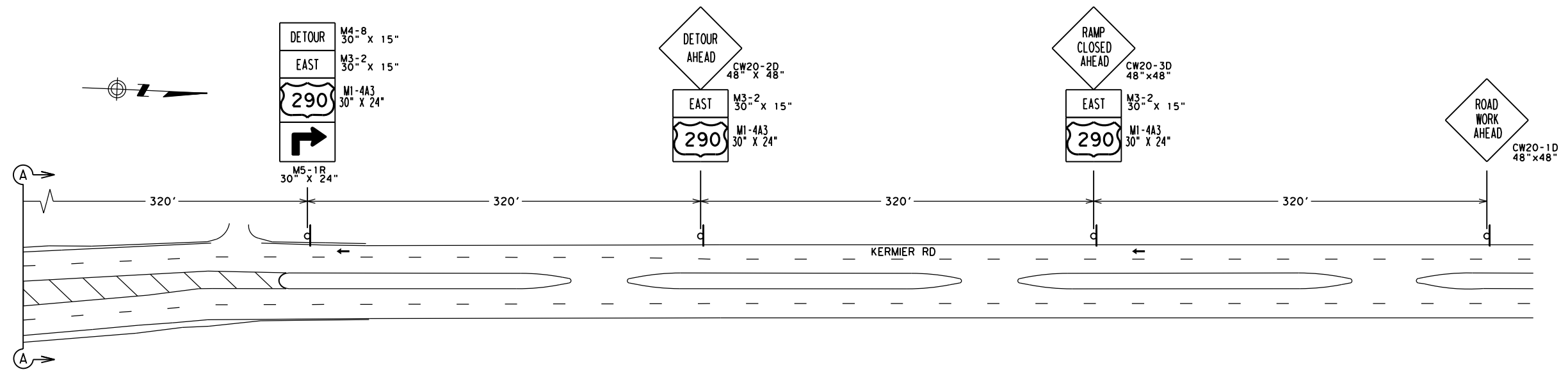
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	59	

LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
					TRAFFIC BARREL/DRUM

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWT
CKT
DWT



Beata Kwater, P.E.
1/20/2023

STATE OF TEXAS
BEATA G. KWATER
95758
LICENSED PROFESSIONAL ENGINEER

TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT KERMIER ROAD

PHASE 4
NOT TO SCALE

SHEET 2 OF 2



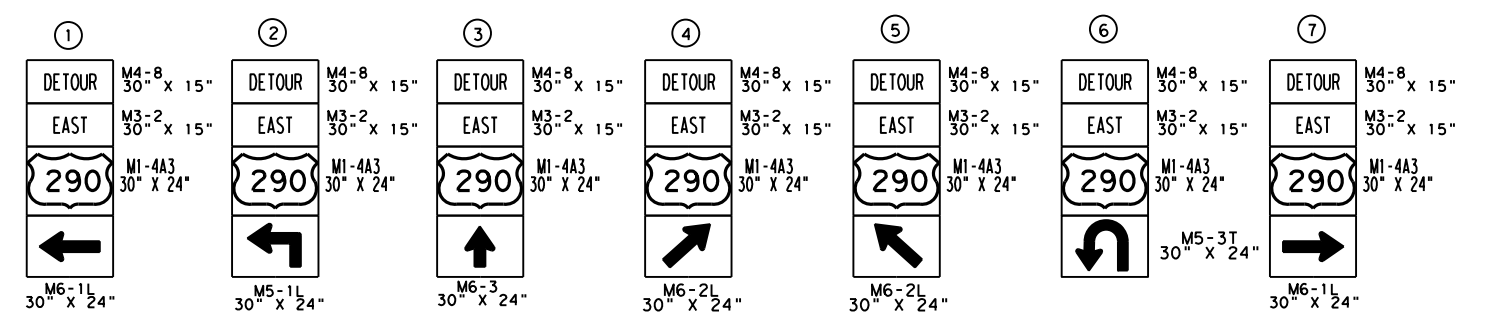
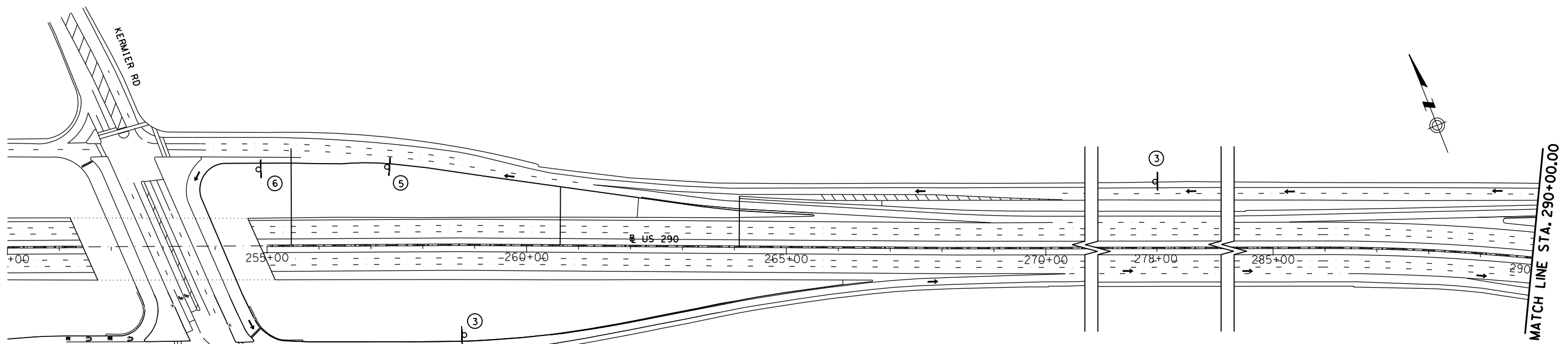
CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		60

LEGEND

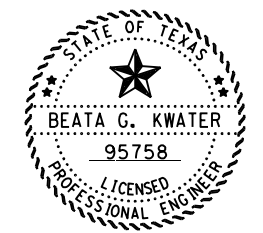
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWF
CKT
DWF



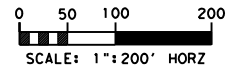
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1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT HEGAR ROAD

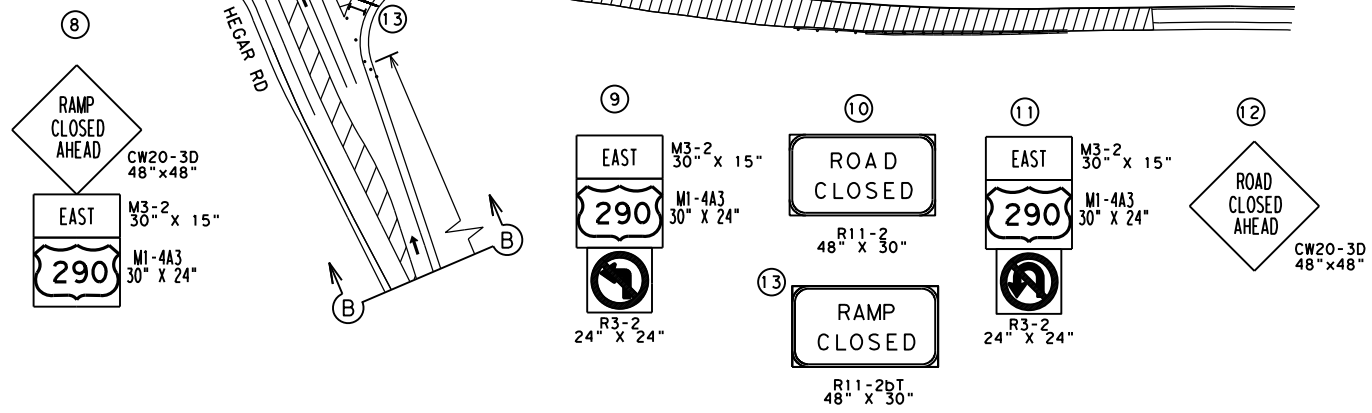
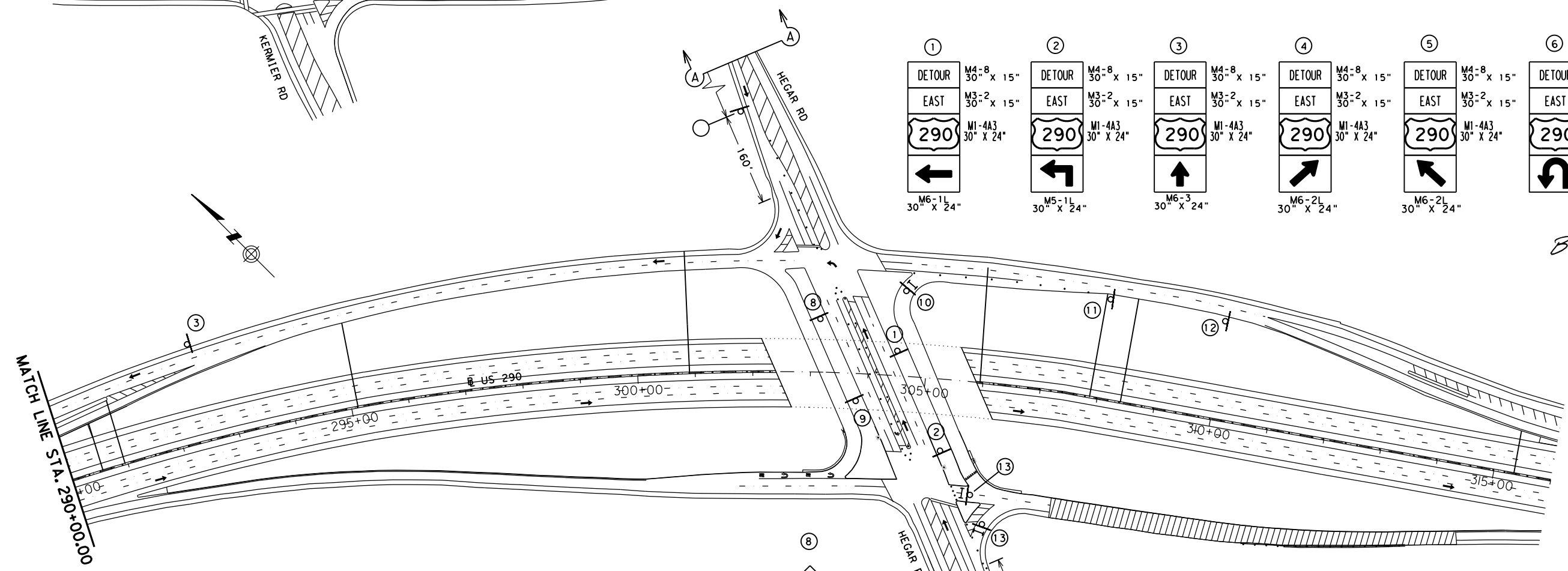
PHASE 4



SHEET 1 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	61	

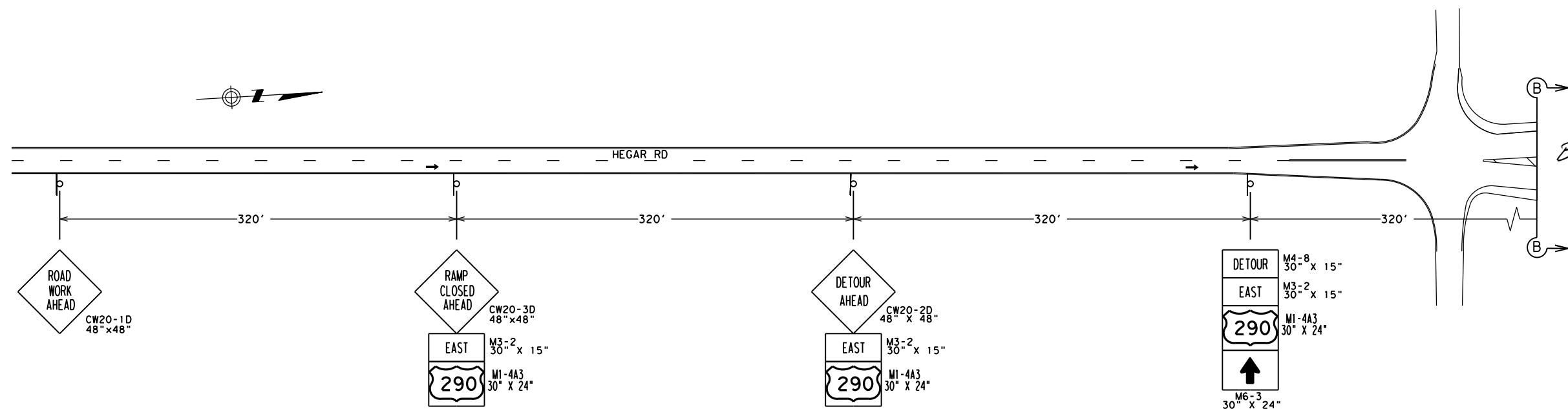
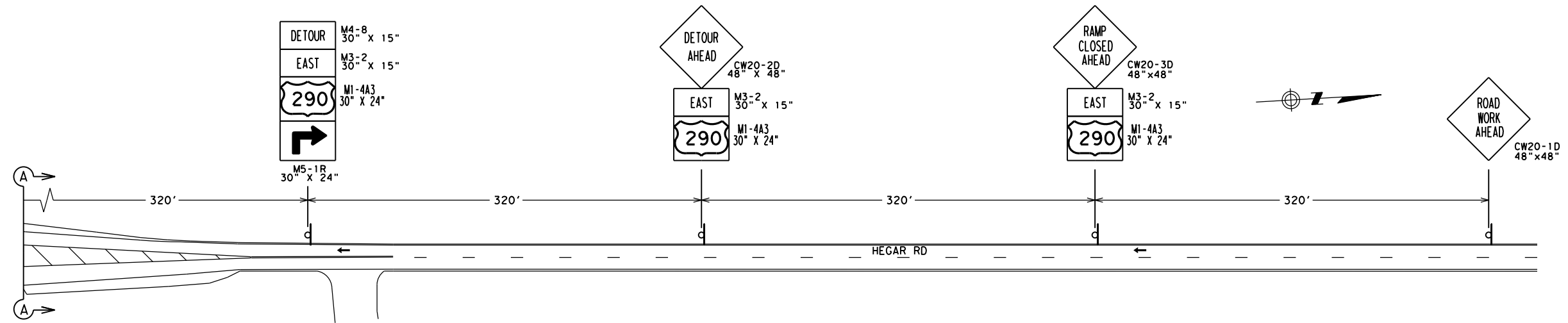


LEGEND

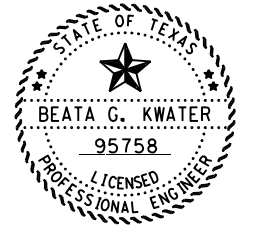
	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

DATE: \$DATE\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

CKT
DWH
CKT
DWH



Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 EASTBOUND ENTRANCE RAMP AT HEGAR ROAD

PHASE 4

NOT TO SCALE

SHEET 2 OF 2



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY		SHEET NO.
HOU	HARRIS		62

LEGEND

	WORK ZONE		PHASE DIRECTION OF TRAFFIC		PORTABLE VERTICAL PANEL W/FLEXIBLE SUPPORT
	LOW PROFILE CONCRETE BARRIER		PORTABLE CHANGEABLE MESSAGE SIGN		TEMP. GROUND MOUNTED SIGNS
			PORTABLE FLASHING ARROW BOARD		TY 3 BARRICADE
			TRAFFIC BARREL/DRUM		

DATE: \$TIMES\$
PEN TABLE: \$PEN\$
FILE: \$FILES\$

Ckt
 Dm
 Ckt
 Dm

CONSTRUCTION WARNING SIGN SPACING

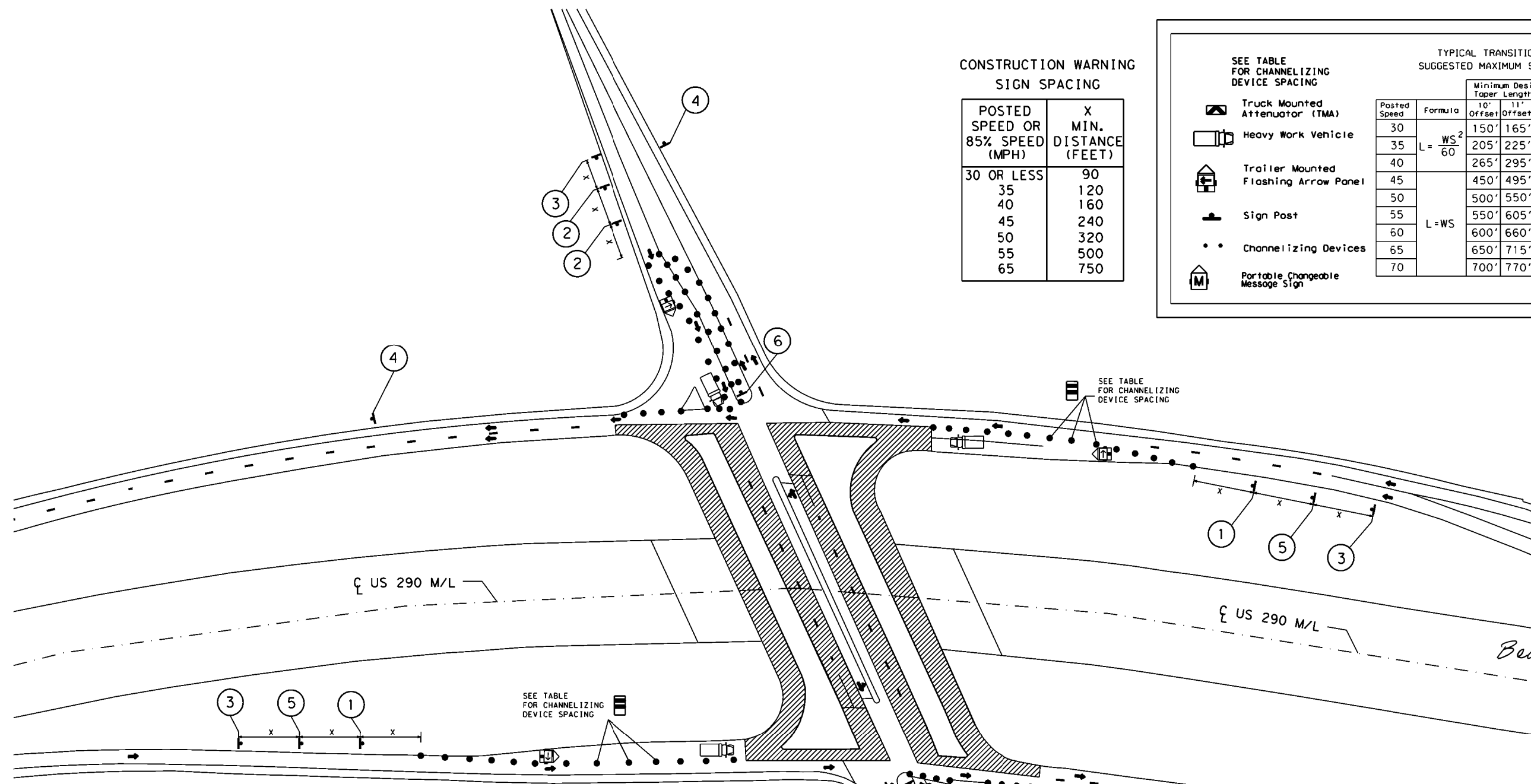
POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

SEE TABLE FOR CHANNELIZING DEVICE SPACING

TYPICAL TRANSITION LENGTH AND SUGGESTED MAXIMUM SPACING OF DEVICES

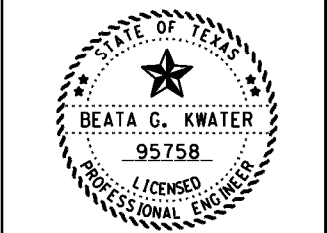
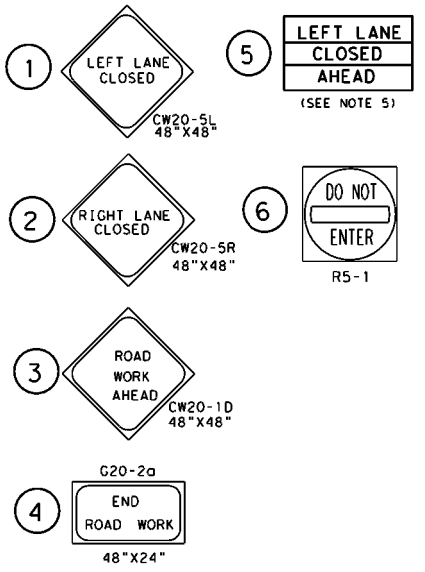
Posted Speed	Formula	Minimum Desirable Taper Lengths * * *			Suggested Maximum Spacing of Device	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40		265'	295'	320'	40'	80' - 100'
45	L=WS	450'	495'	540'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

Legend:
 [TMA] Truck Mounted Attenuator (TMA)
 [HWV] Heavy Work Vehicle
 [FAP] Trailer Mounted Flashing Arrow Panel
 [SP] Sign Post
 [CD] Channelizing Devices
 [M] Portable Changeable Message Sign



Beata Kwater, P.E.
1/20/2023

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 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.
- 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.
- 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.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.



TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD INTERSECTIONS

PHASE 5 - STEP A

NOT TO SCALE

SHEET 1 OF 4



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	63	

DATE: \$DATE\$
 PEN TABLE: \$PEN\$
 FILE: \$FILE\$

CRT
 DM
 CK
 DM

CONSTRUCTION WARNING SIGN SPACING

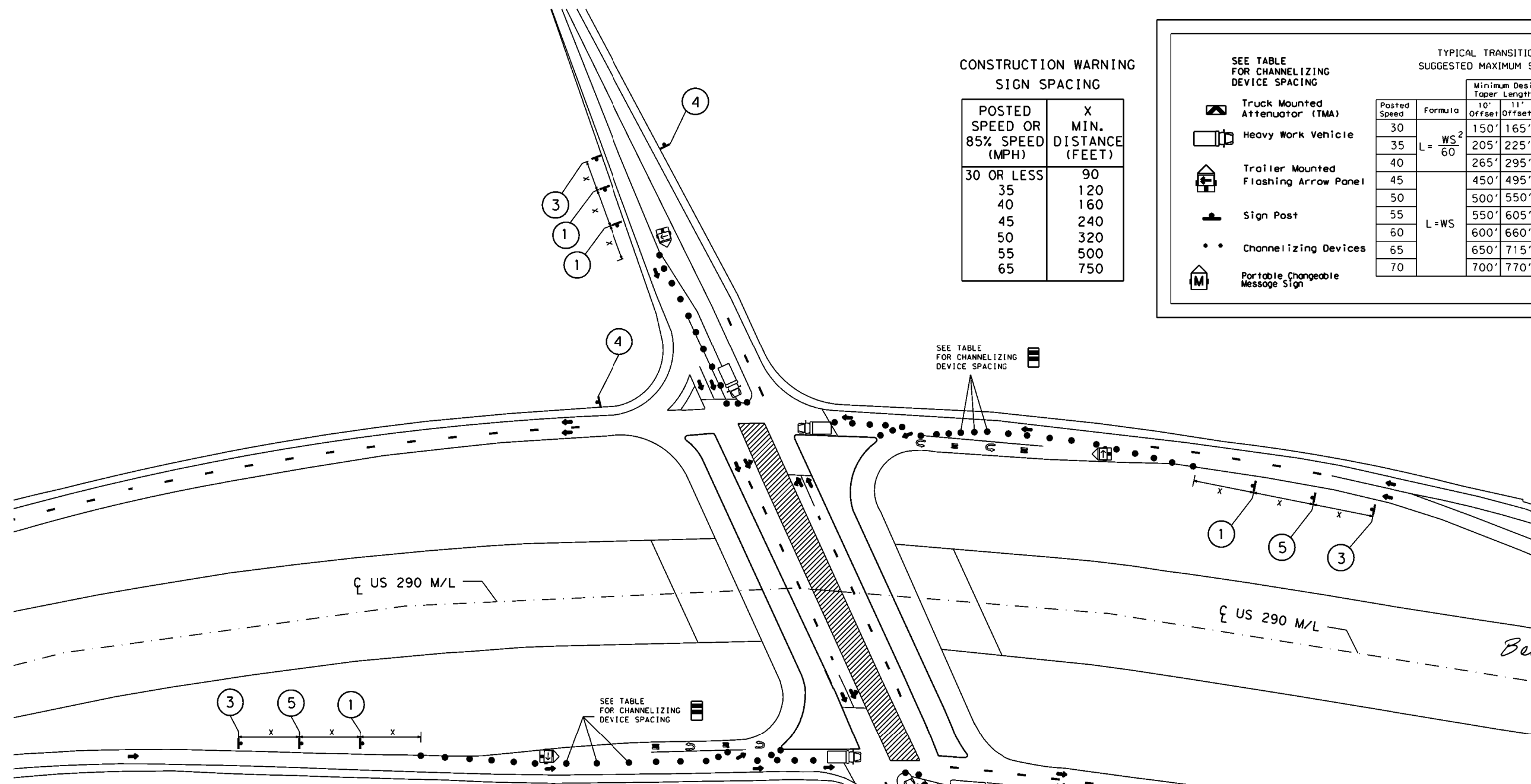
POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

SEE TABLE FOR CHANNELIZING DEVICE SPACING

TYPICAL TRANSITION LENGTH AND SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Device	
		10' Offset	11' Offset	12' Offset	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		600'	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'

Legend:
 Truck Mounted Attenuator (TMA)
 Heavy Work Vehicle
 Trailer Mounted Flashing Arrow Panel
 Sign Post
 Channelizing Devices
 Portable Changeable Message Sign

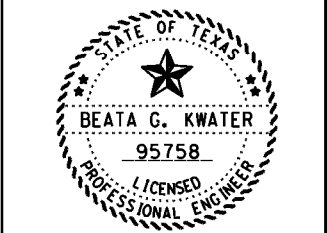


- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- Drums or 42" cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- Warning signs 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.
- 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.
- 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.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

Legend for signs:

- 1. LEFT LANE CLOSED (CW20-5L 48"x48")
- 2. RIGHT LANE CLOSED (CW20-5R 48"x48")
- 3. ROAD WORK AHEAD (CW20-1D 48"x48")
- 4. END ROAD WORK (G20-2a 48"x24")
- 5. LEFT LANE CLOSED AHEAD (SEE NOTE 5)
- 6. DO NOT ENTER (R5-1)

Beata Kwater, P.E.
 1/20/2023



TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD INTERSECTIONS

PHASE 5 - STEP B

NOT TO SCALE

SHEET 2 OF 4



CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	64	

DATE: #DATES
 PEN TABLE: #PENS
 FILE: #FILES

Ckt
 Dm
 Ckt
 Dm

CONSTRUCTION WARNING SIGN SPACING

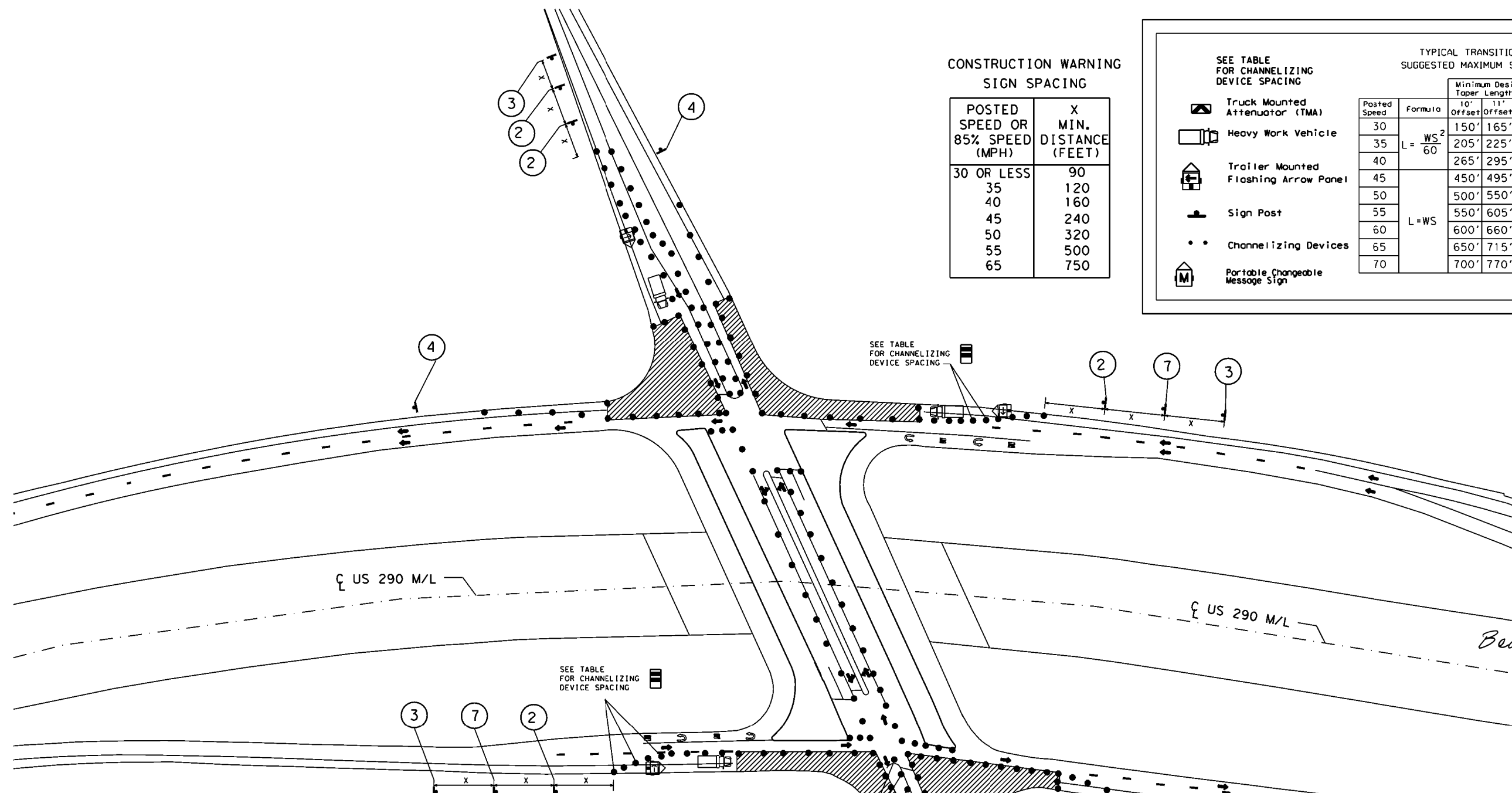
POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

SEE TABLE FOR CHANNELIZING DEVICE SPACING

TYPICAL TRANSITION LENGTH AND SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths * * *			Suggested Maximum Spacing of Device	
		10' Offset	11' Offset	12' Offset	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'

Legend:
 [TMA] Truck Mounted Attenuator (TMA)
 [HWV] Heavy Work Vehicle
 [FAP] Trailer Mounted Flashing Arrow Panel
 [SP] Sign Post
 [CD] Channelizing Devices
 [M] Portable Changeable Message Sign



- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the median side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 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.
- 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.
- 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.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

Legend for signs:

- 1. LEFT LANE CLOSED (CW20-5L 48"x48")
- 2. RIGHT LANE CLOSED (CW20-5R 48"x48")
- 3. ROAD WORK AHEAD (CW20-1D 48"x48")
- 4. END ROAD WORK (G20-2a 48"x24")
- 5. LEFT LANE CLOSED AHEAD (SEE NOTE 5)
- 6. DO NOT ENTER (R5-1)
- 7. RIGHT LANE CLOSED AHEAD (SEE NOTE 5)

Beata Kwater, P.C.
1/20/2023

STATE OF TEXAS
 BEATA G. KWATER
 95758
 LICENSED PROFESSIONAL ENGINEER

TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD INTERSECTIONS

PHASE 5 - STEP C

NOT TO SCALE

SHEET 3 OF 4

TEXAS DEPARTMENT OF TRANSPORTATION
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CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	65	

DATE: #DAYS
 PEN TABLE: #PENS
 FILE: #FILES

Ckt
 Dm
 Ckt
 Dm

CONSTRUCTION WARNING SIGN SPACING

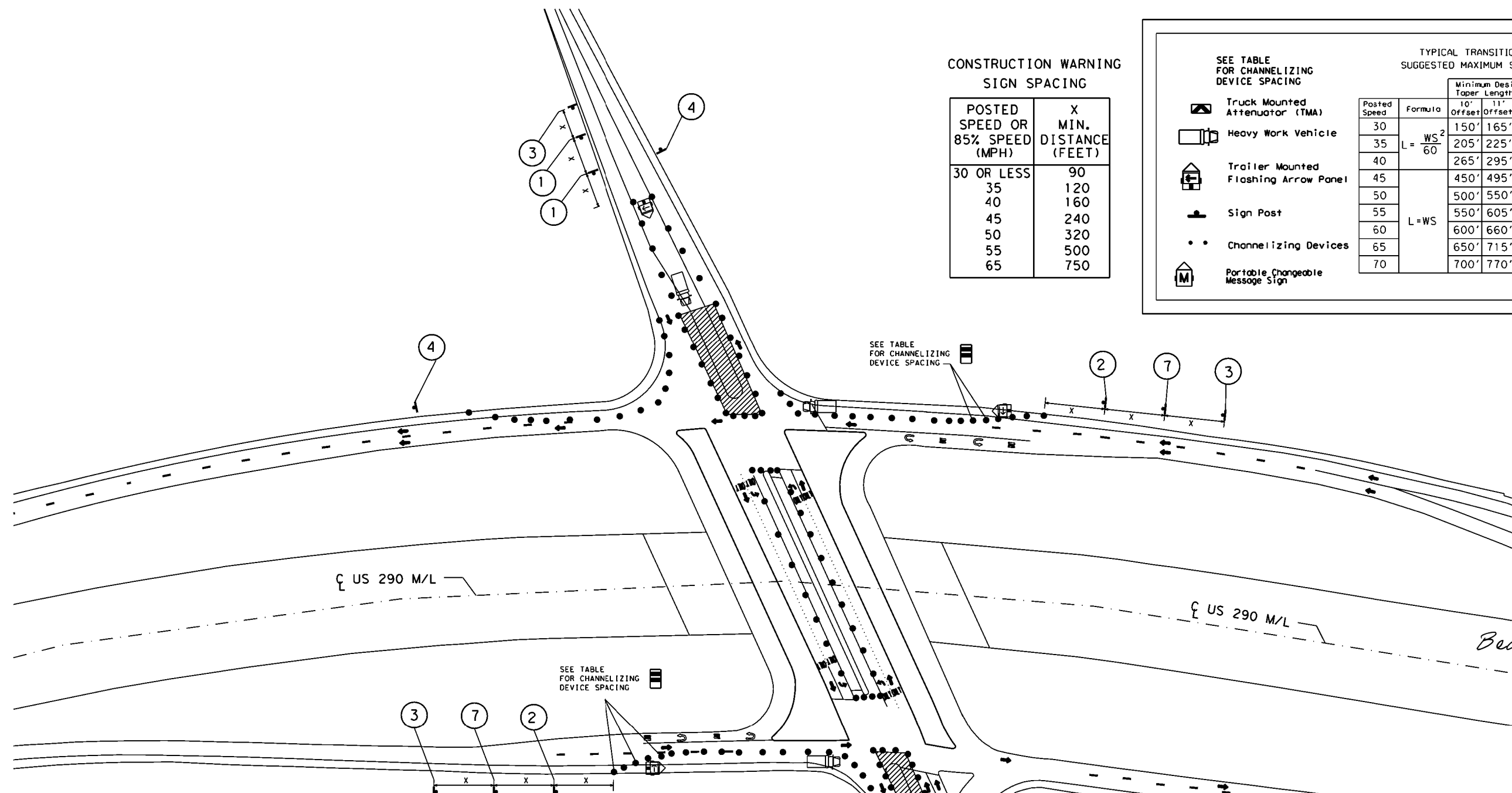
POSTED SPEED OR 85% SPEED (MPH)	X MIN. DISTANCE (FEET)
30 OR LESS	90
35	120
40	160
45	240
50	320
55	500
65	750

SEE TABLE FOR CHANNELIZING DEVICE SPACING

TYPICAL TRANSITION LENGTH AND SUGGESTED MAXIMUM SPACING OF DEVICES

Posted Speed	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Device	
		10' Offset	11' Offset	12' Offset	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		600'	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'

Legend:
 [TMA] Truck Mounted Attenuator (TMA)
 [HWV] Heavy Work Vehicle
 [FAP] Trailer Mounted Flashing Arrow Panel
 [SP] Sign Post
 [CD] Channelizing Devices
 [M] Portable Changeable Message Sign

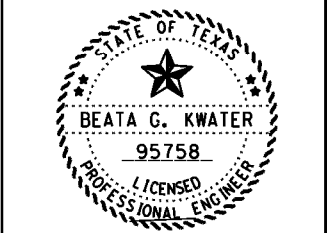


- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- Drums or 42" cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 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.
- 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.
- 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.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

Legend for signs and devices:

- 1. LEFT LANE CLOSED (CW20-5L 48"x48")
- 2. RIGHT LANE CLOSED (CW20-5R 48"x48")
- 3. ROAD WORK AHEAD (CW20-1D 48"x48")
- 4. END ROAD WORK (G20-2a 48"x24")
- 5. LEFT LANE CLOSED AHEAD (SEE NOTE 5)
- 6. DO NOT ENTER (R5-1)
- 7. RIGHT LANE CLOSED AHEAD (SEE NOTE 5)

Beata Kwater, P.E.
1/20/2023



TRAFFIC CONTROL PLAN

US 290 FRONTAGE ROAD INTERSECTIONS

PHASE 5 - STEP D

NOT TO SCALE

SHEET 4 OF 4

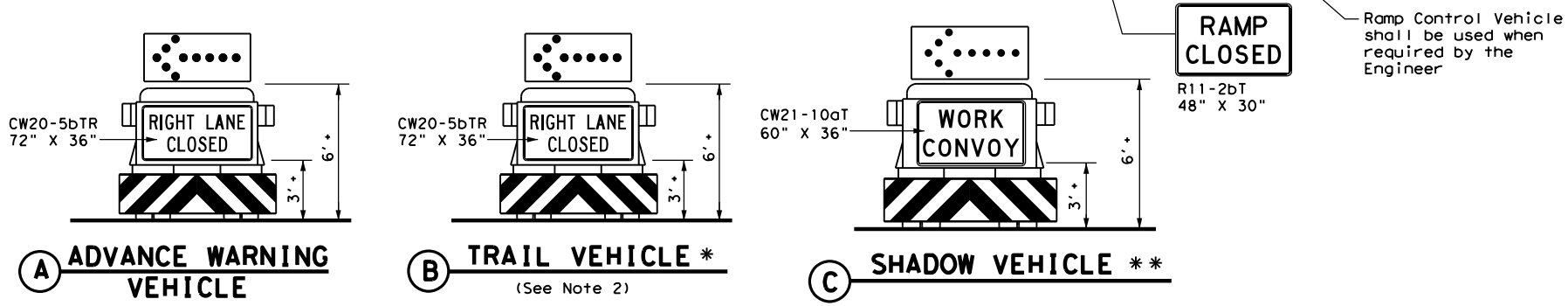
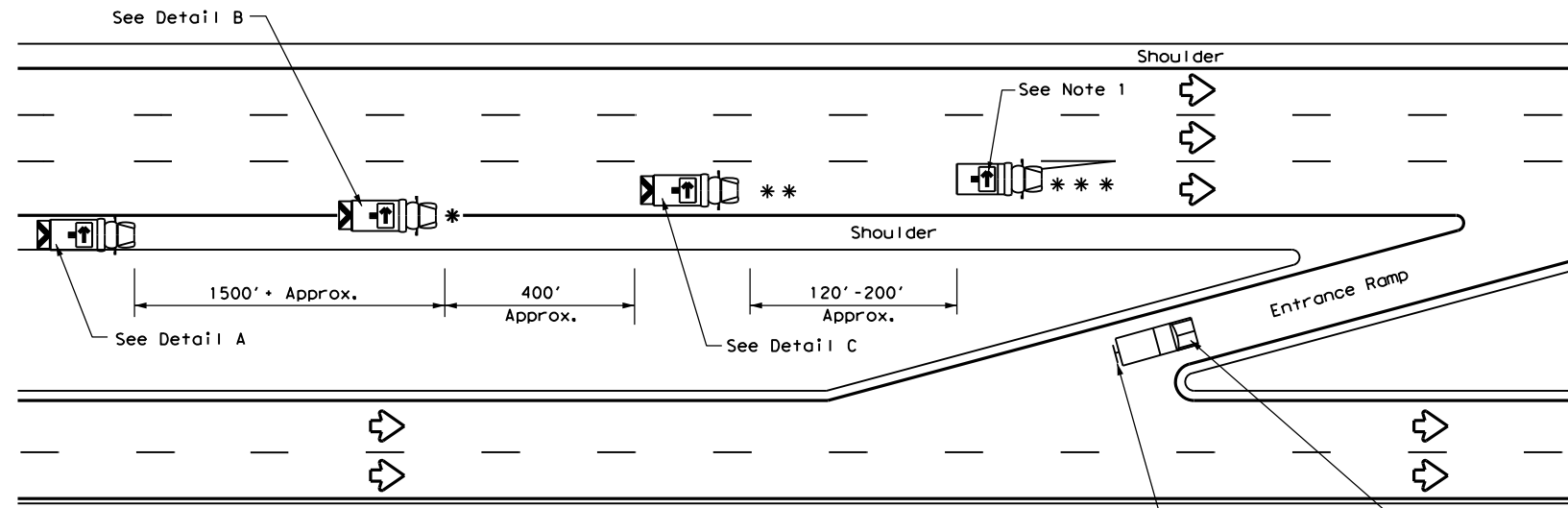


CONT	SECT	JOB	HIGHWAY
0114	12	012	US 290
DIST	COUNTY	SHEET NO.	
HOU	HARRIS	66	

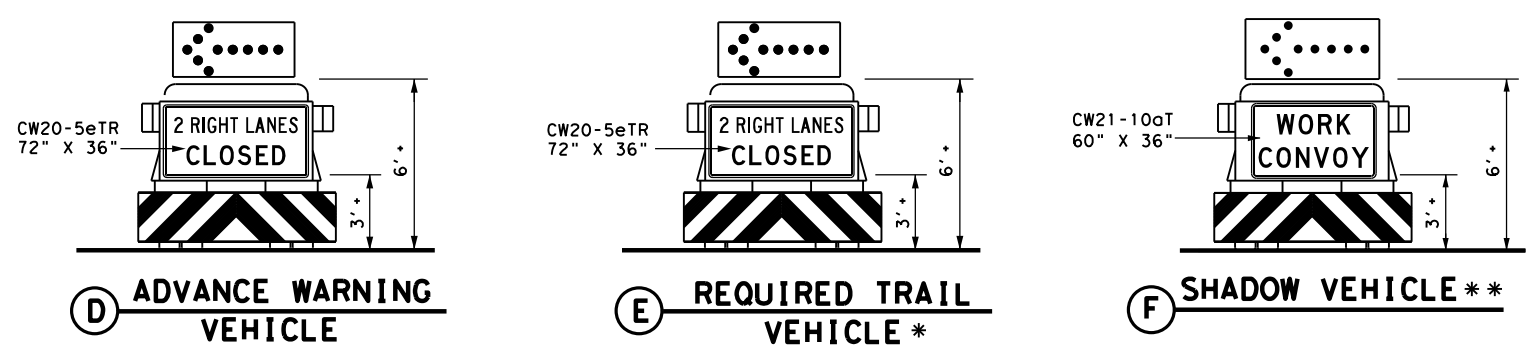
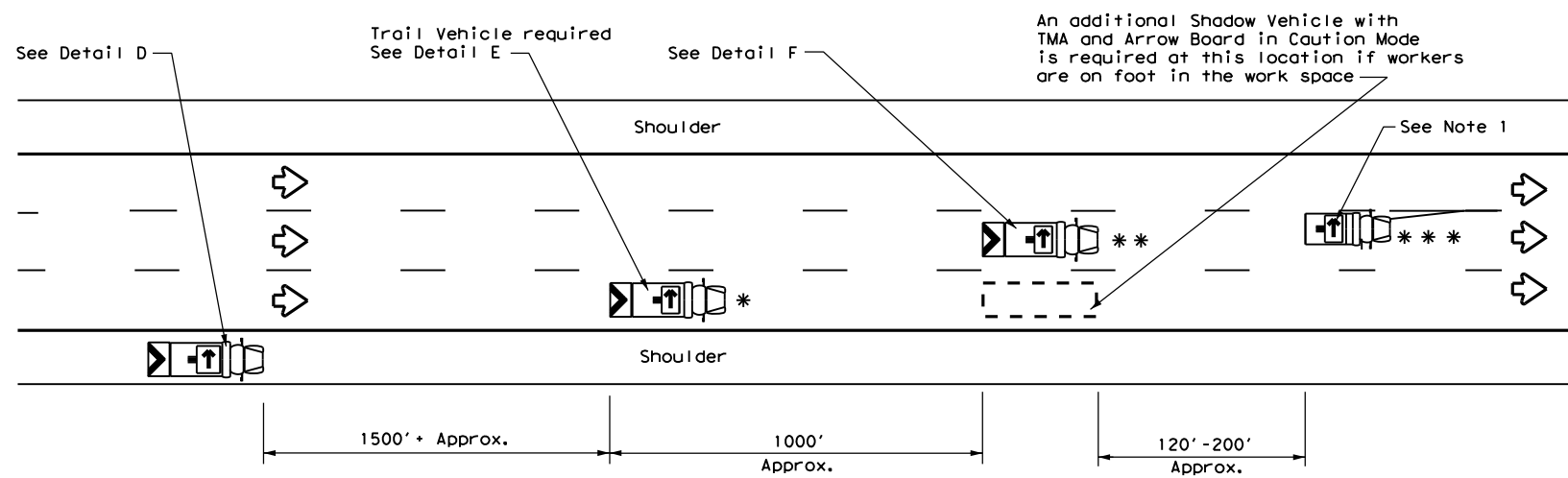
DATE: #DATES
 PEN TABLE: #PENS
 FILE: #FILES

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DATE: FILE:



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



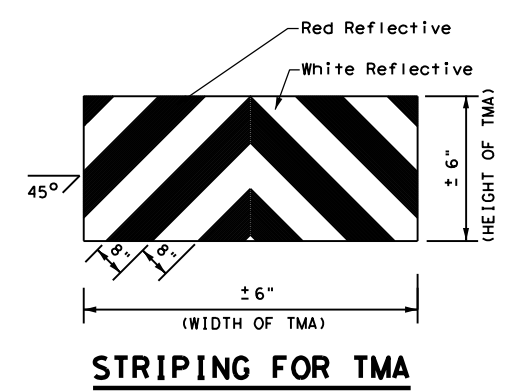
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTES

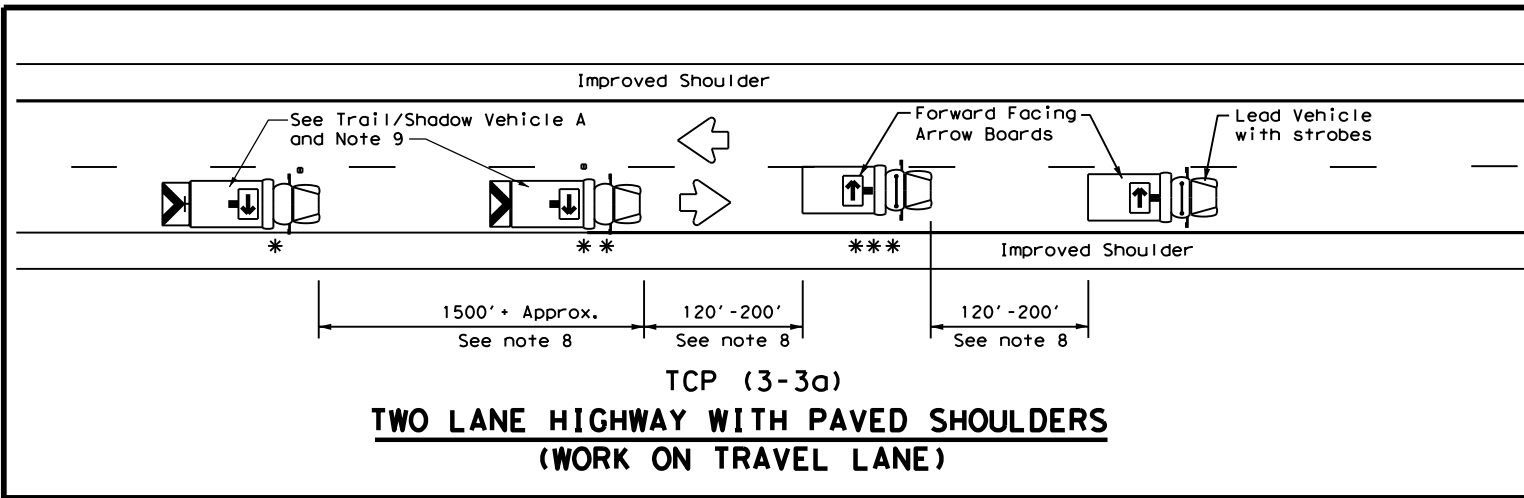
- ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
- 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.
- 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.
- The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- 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.
- Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
- 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.
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- 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.
- Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
- The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



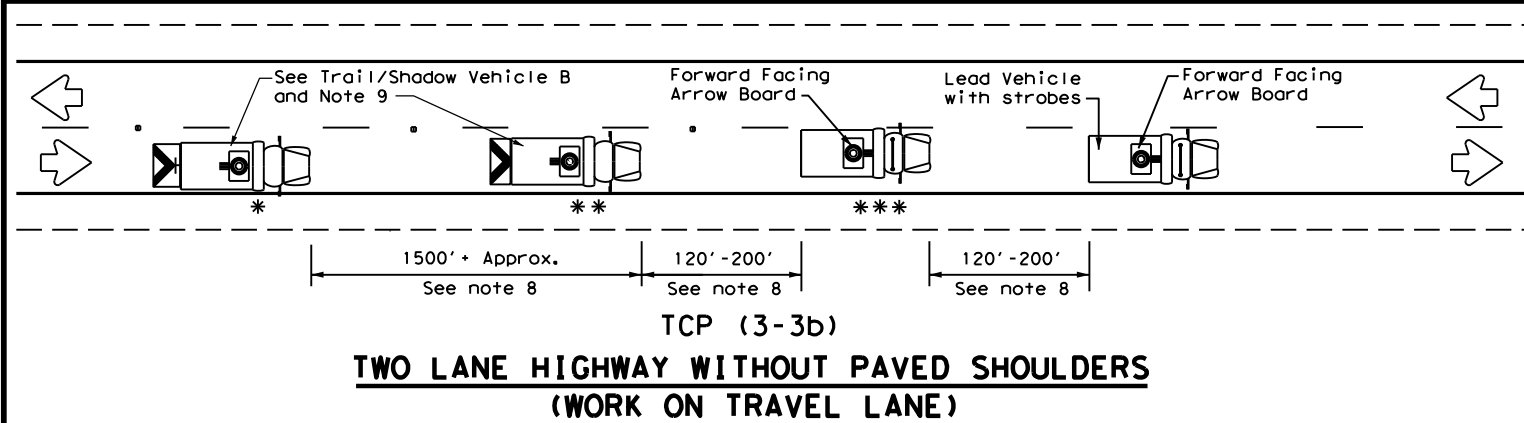
STRIPING FOR TMA

		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
© TxDOT December 1985	CONT	SECT	JOB
REVISIONS	0114	12	012
2-94 4-98	DIST	COUNTY	US 290
8-95 7-13	HOU	HARRIS	SHEET NO.
1-97			67

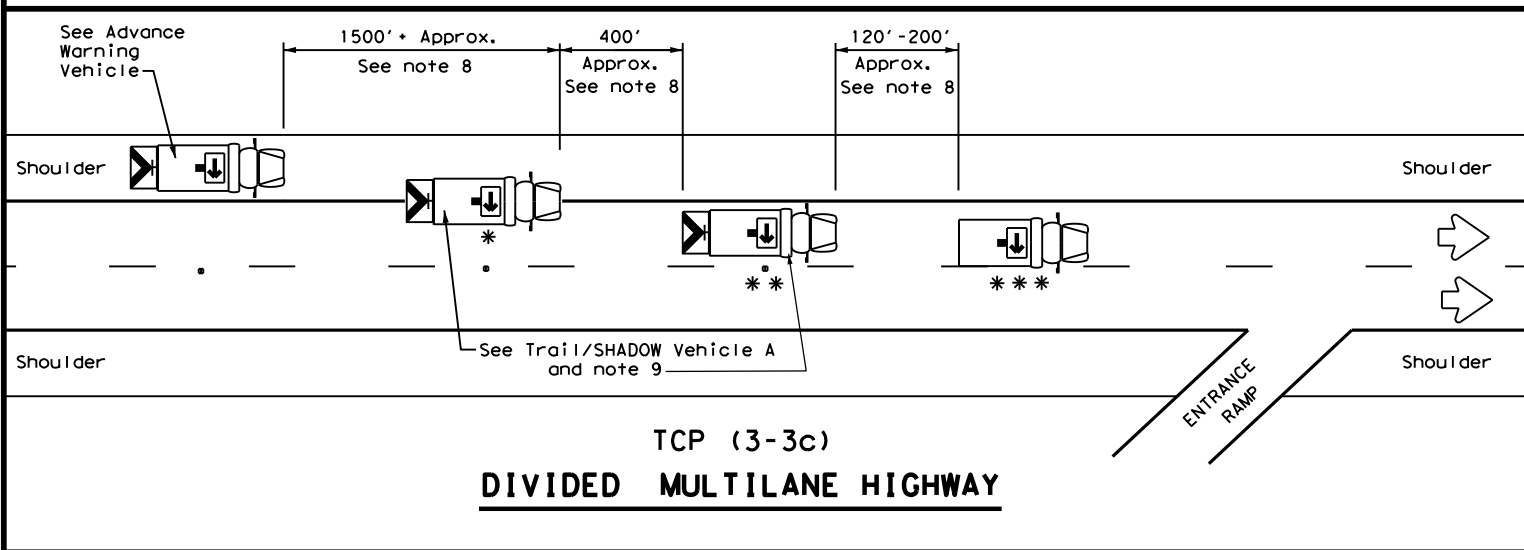
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



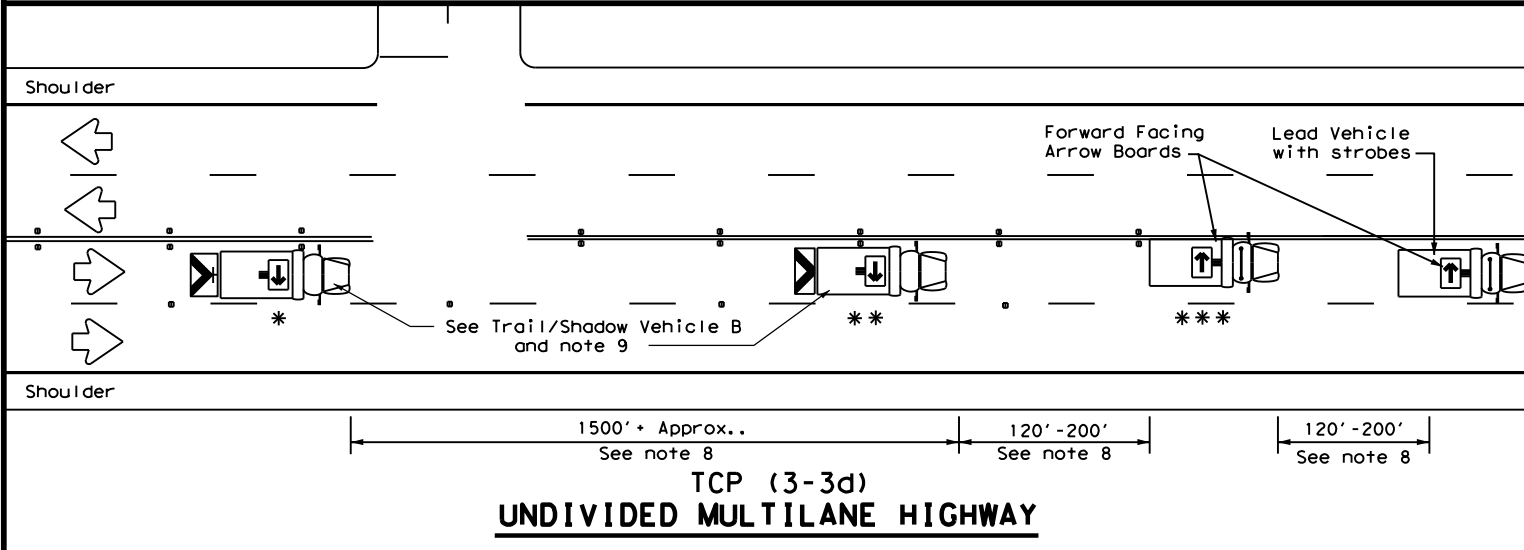
TCP (3-3a)
TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



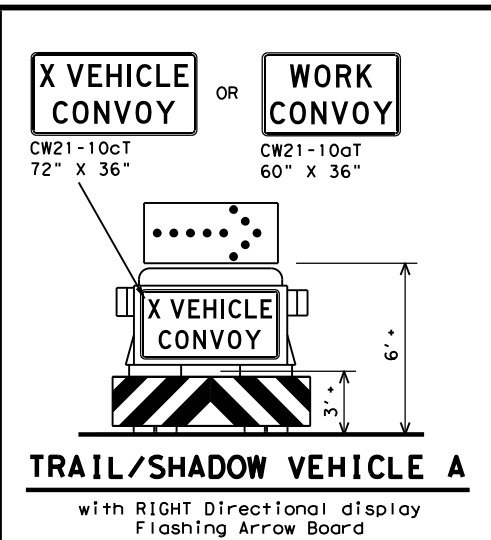
TCP (3-3b)
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



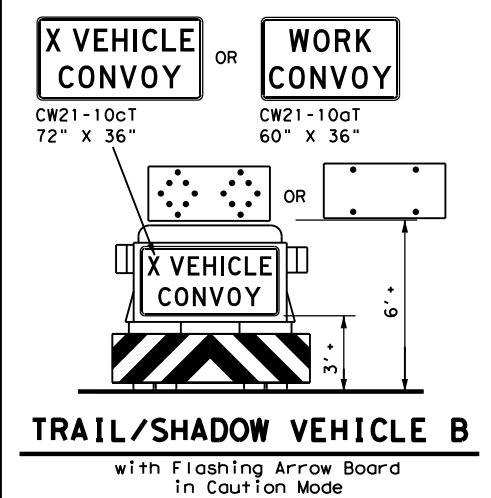
TCP (3-3c)
DIVIDED MULTILANE HIGHWAY



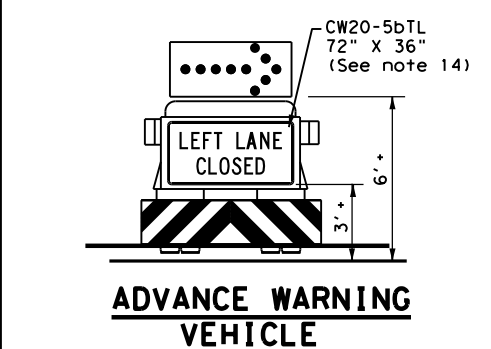
TCP (3-3d)
UNDIVIDED MULTILANE HIGHWAY



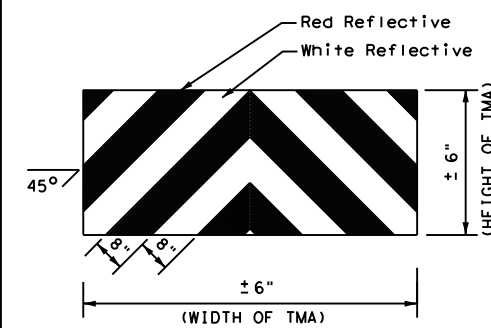
TRAIL/SHADOW VEHICLE A
 with RIGHT Directional display
 Flashing Arrow Board



TRAIL/SHADOW VEHICLE B
 with Flashing Arrow Board
 in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
* Trail Vehicle		ARROW BOARD DISPLAY	
** Shadow Vehicle			
*** Work Vehicle		RIGHT	Directional
		LEFT	Directional
		DOUBLE	Arrow
		CAUTION (Alternating Diamond or 4 Corner Flash)	

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

GENERAL NOTES

- 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.
- 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.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
- 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.
- 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.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- 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.
- 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.
- 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.
- A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
- For divided highways with three or four lanes in each direction, use TCP(3-2).
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
- 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.

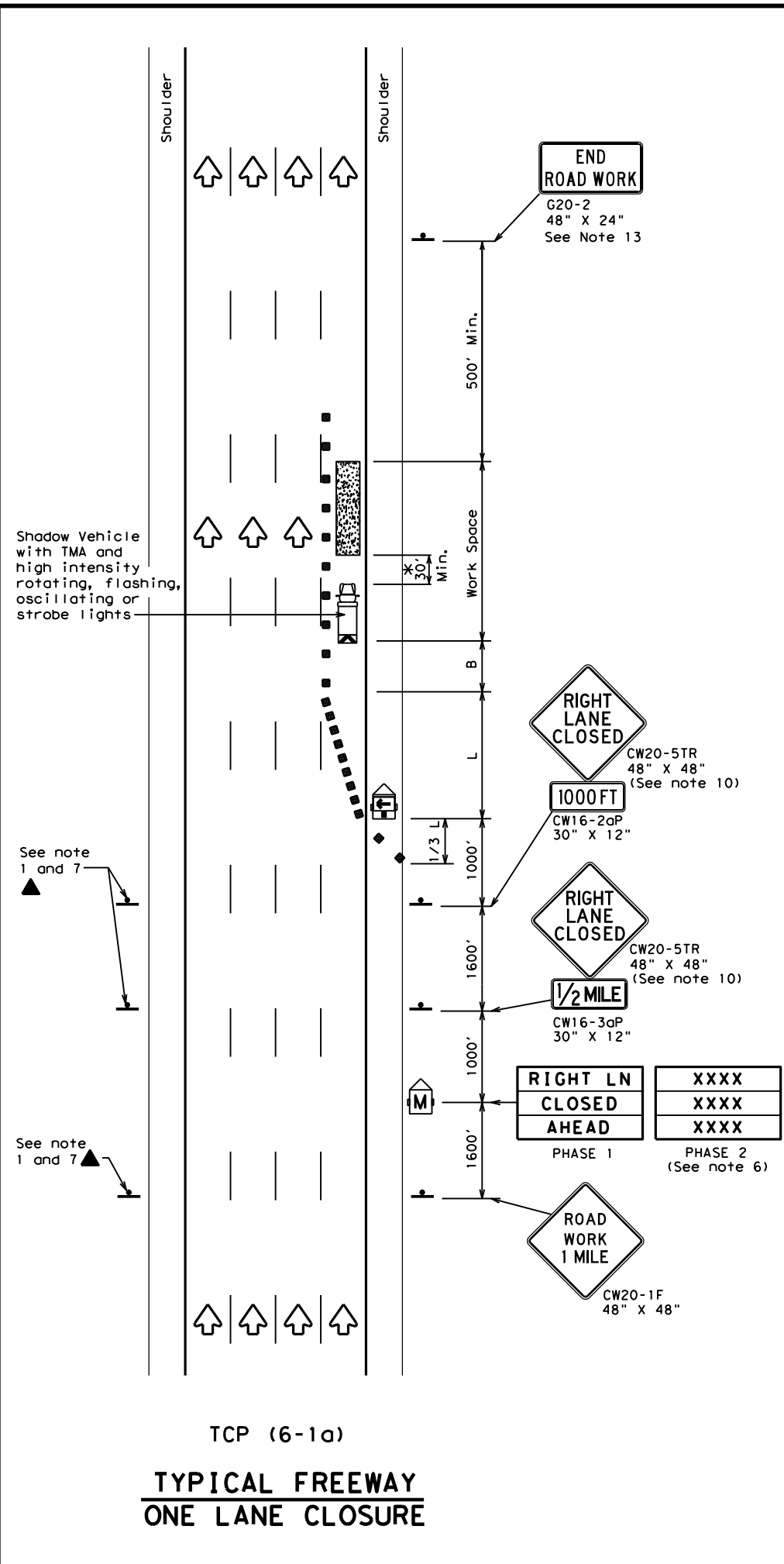


TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT
MARKER INSTALLATION/
REMOVAL
TCP (3-3) - 14

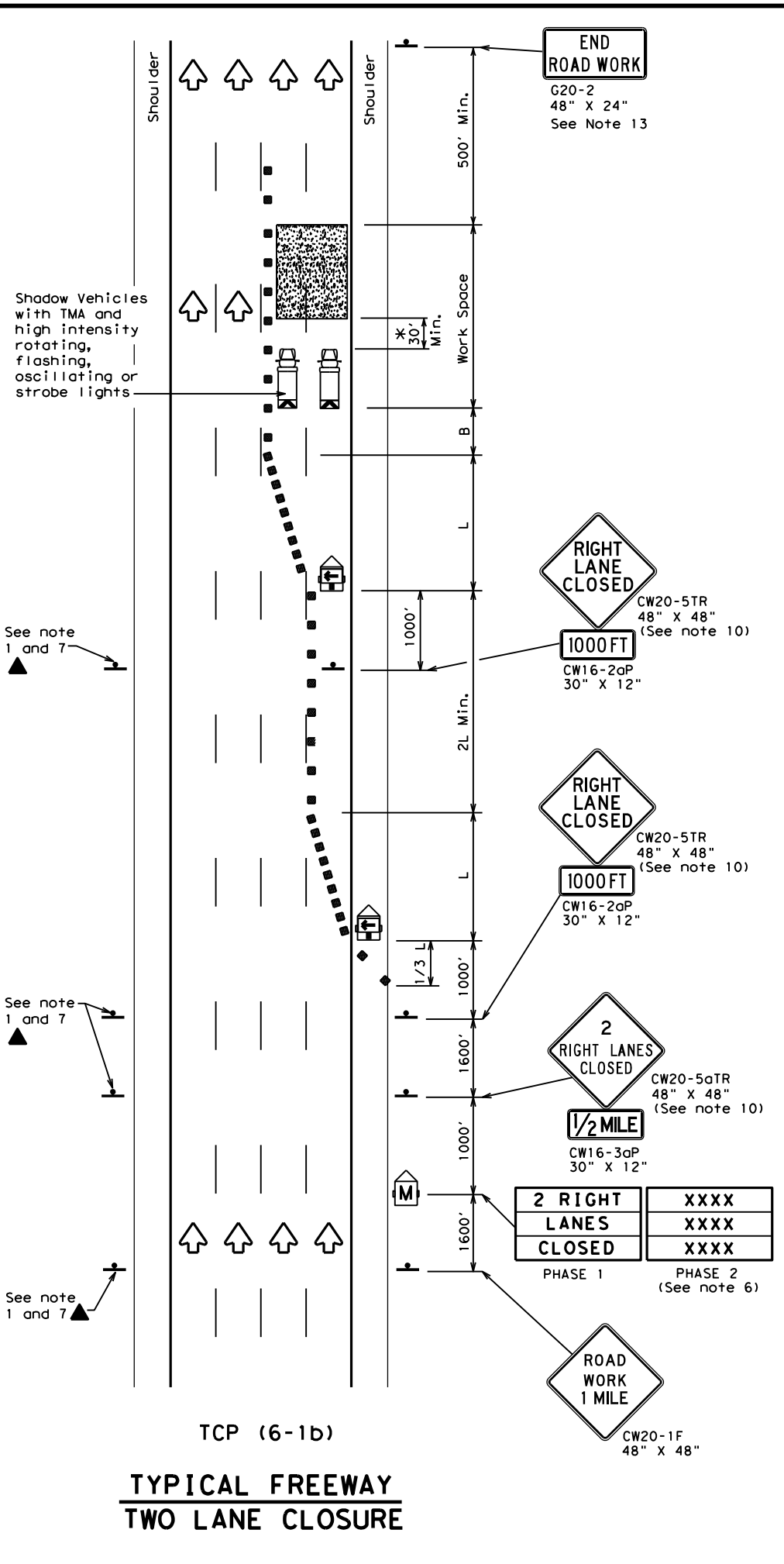
FILE:	tcp3-3.dgn	DN:	TxDOT	CK:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	September 1987	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0114	12	012	US 290				
2-94	4-98	DIST		COUNTY	SHEET NO.				
8-95	7-13	HOU		HARRIS	68				
1-97	7-14								

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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		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

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- 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.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- 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.
- 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.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- 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.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- 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 in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- 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.
- 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.
- 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

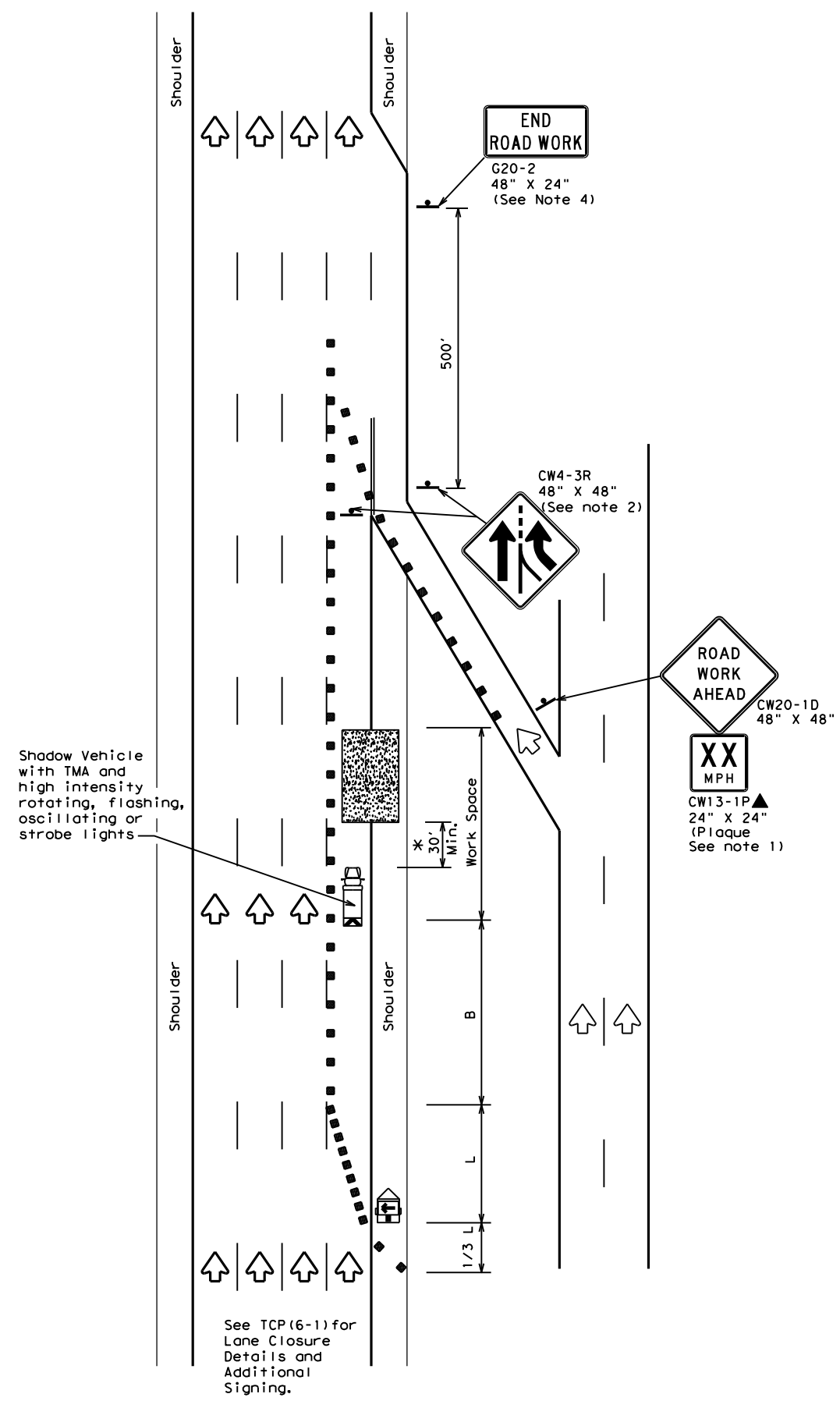
TRAFFIC CONTROL PLAN FREEWAY LANE CLOSURES

TCP (6-1) - 12

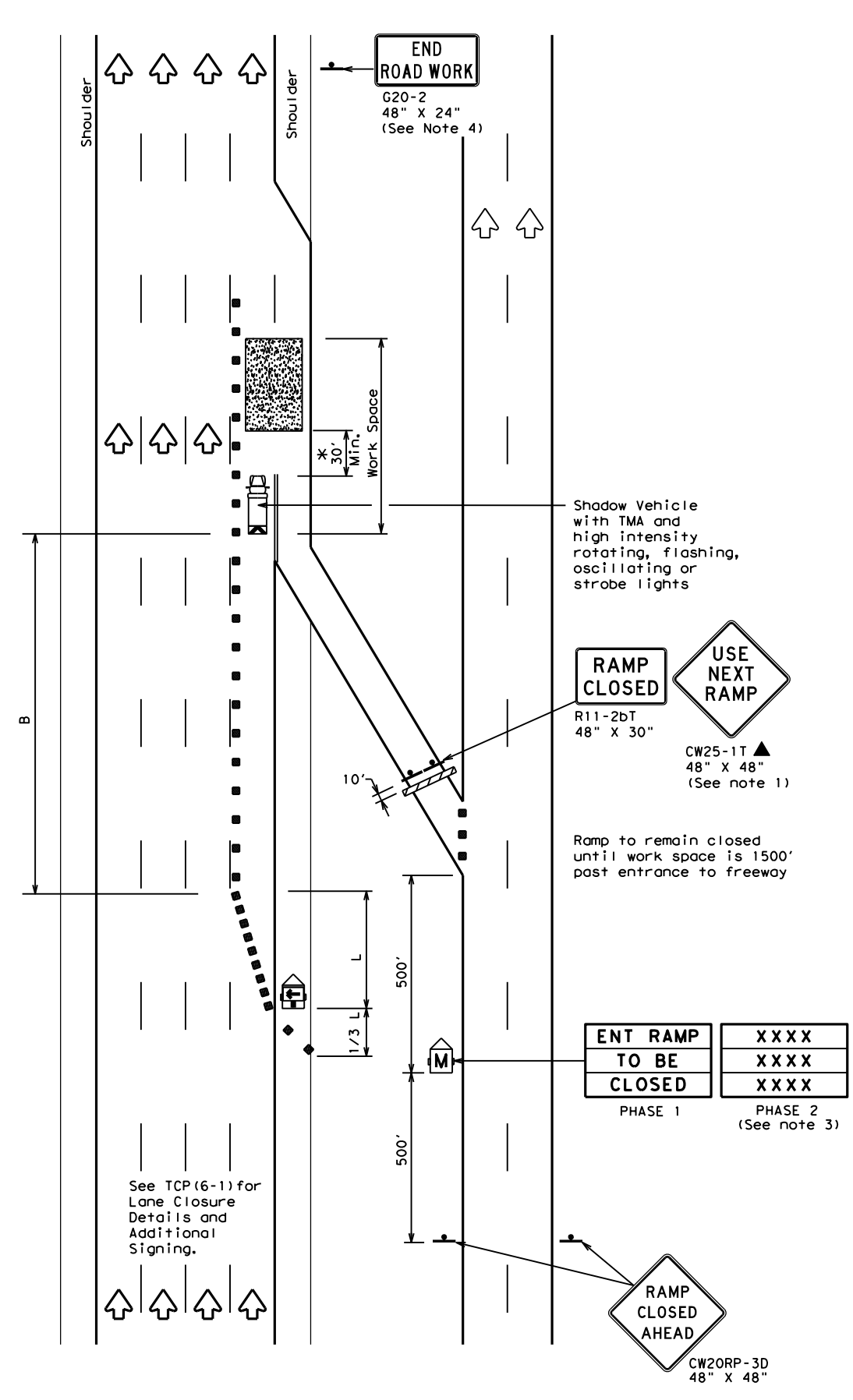
FILE: tcp6-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
8-12	REVISIONS	0114 12	012	US 290
	DIST	COUNTY	SHEET NO.	
	HOU	HARRIS	69	

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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		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

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

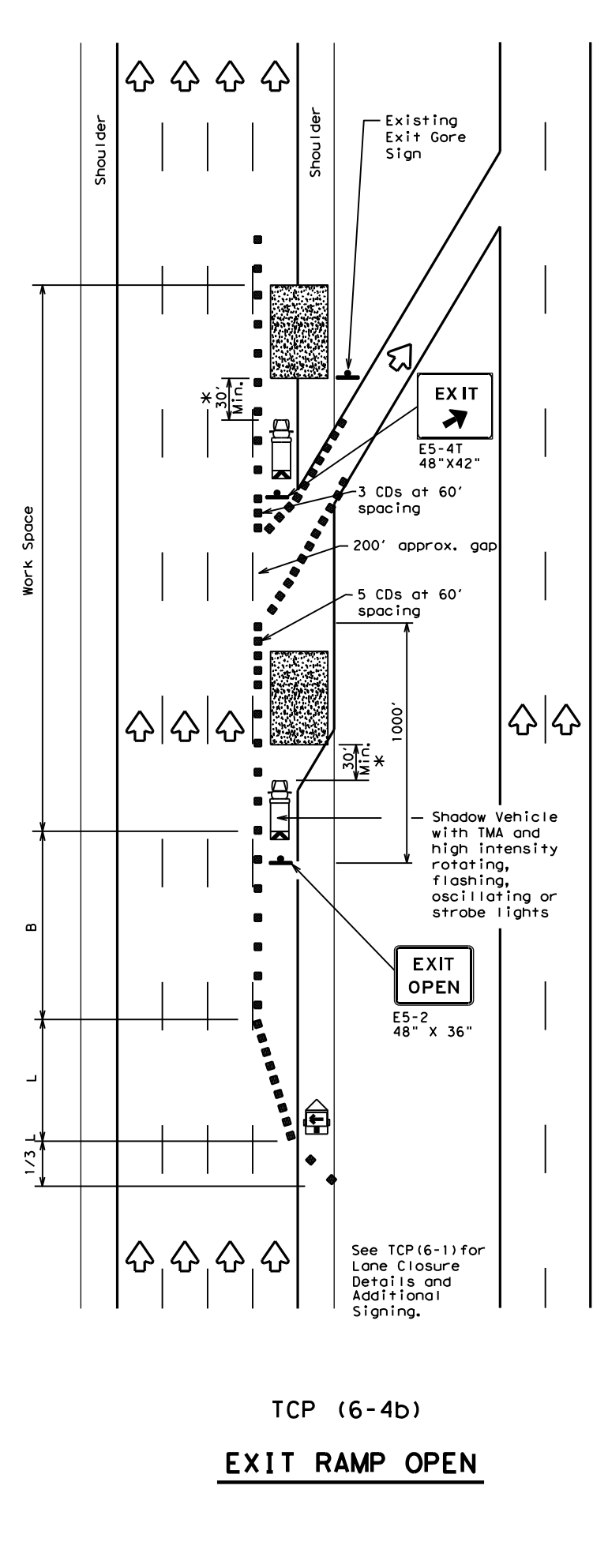
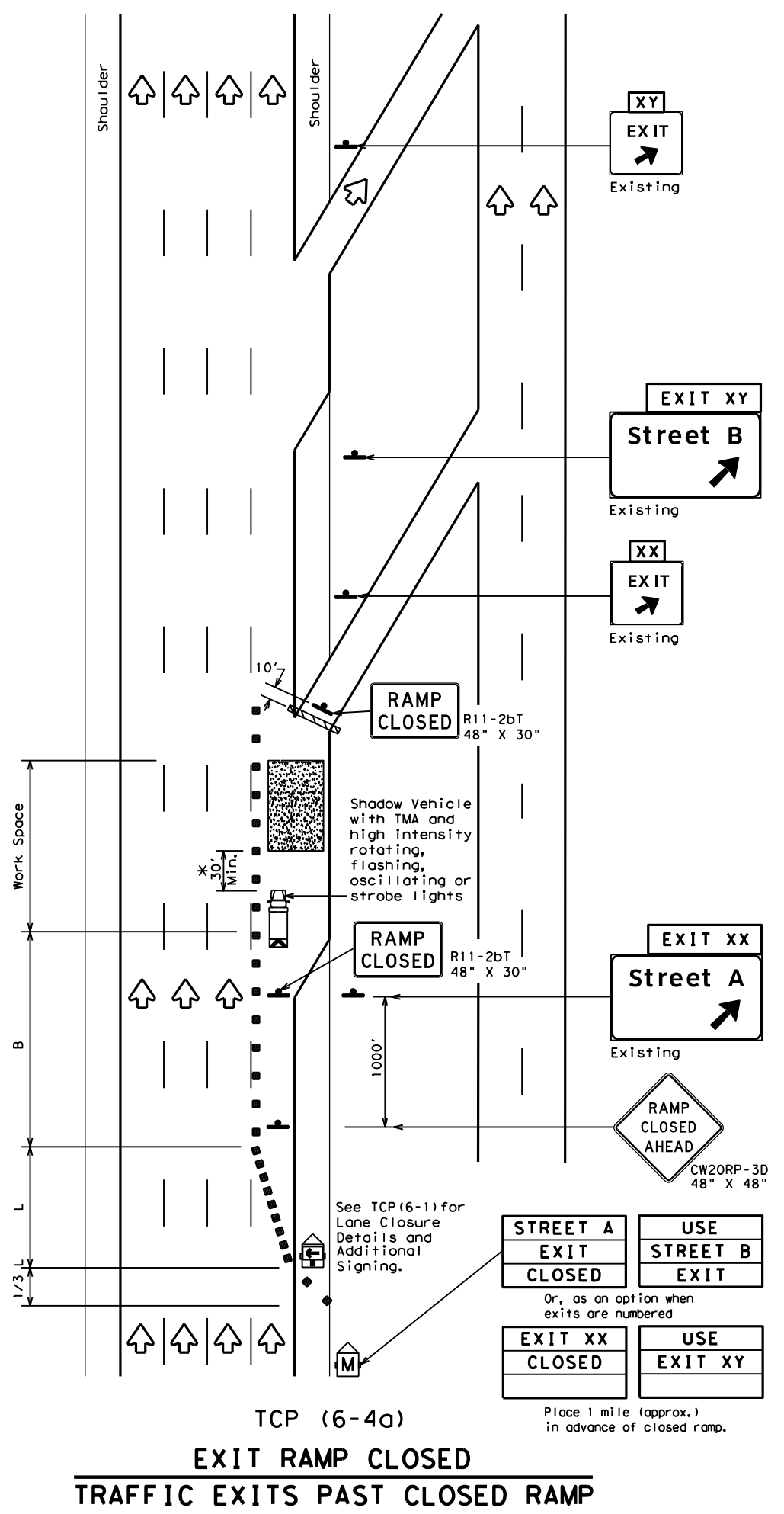
TRAFFIC CONTROL PLAN
WORK AREA NEAR RAMP

TCP (6-2) - 12

FILE: tcp6-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		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**
- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
 - 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	CR: TxDOT
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4-98 8-12	HOU	HARRIS	71	

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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).

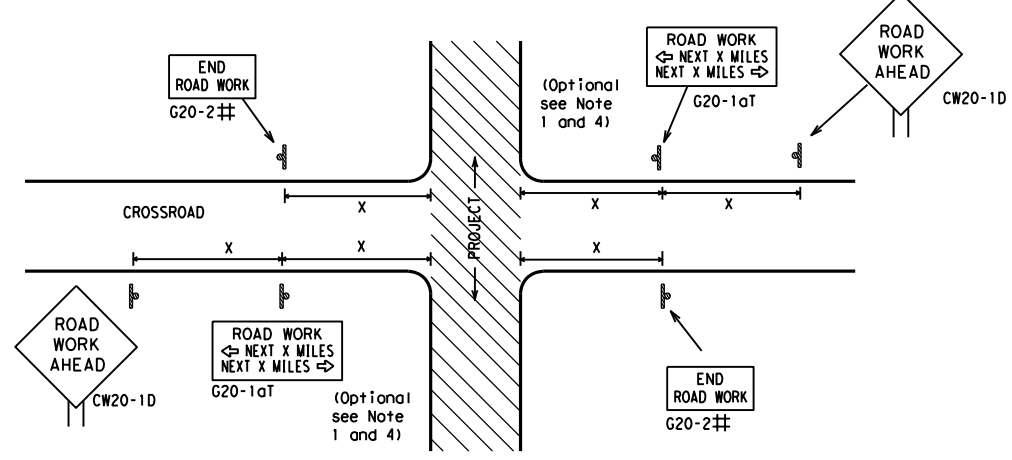
<p>THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov</p>
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)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

SHEET 1 OF 12

Texas Department of Transportation		Traffic Safety Division Standard	
<p>BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS</p> <p>BC (1) - 21</p>			
FILE:	bc-21.dgn	DN:	TxDOT
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REVISIONS	CONT	SECT	JOB
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5-10 5-21	HOU	HARRIS	
SHEET NO.	72		

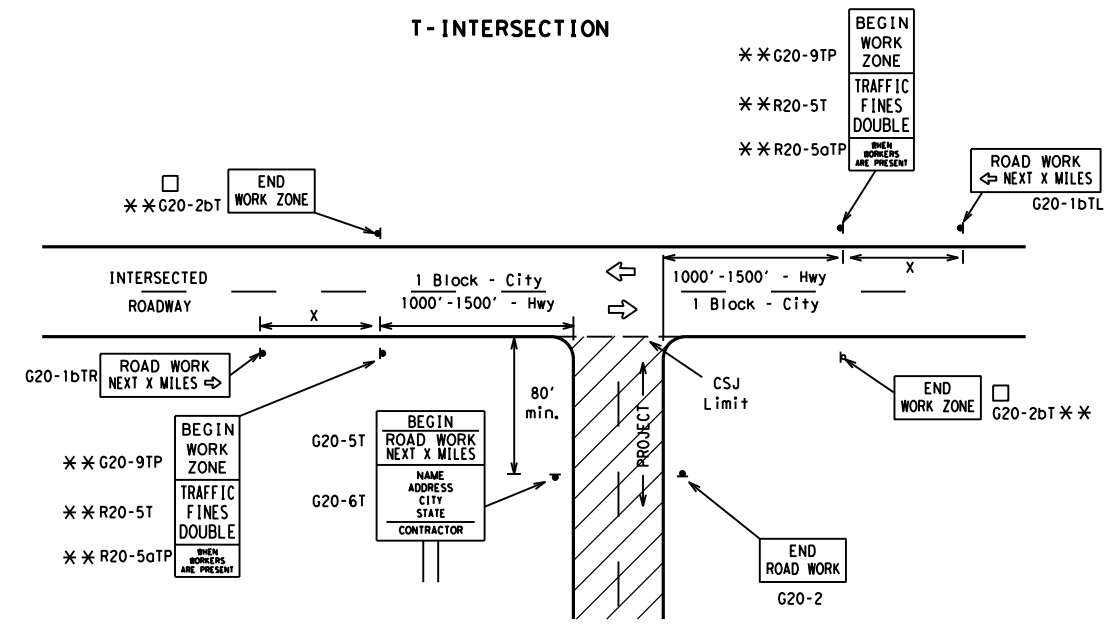
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TYPICAL LOCATION OF CROSSROAD SIGNS



- ## May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)
- 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.
 - 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.
 - 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.
 - 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.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - 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

- 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.
- 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}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

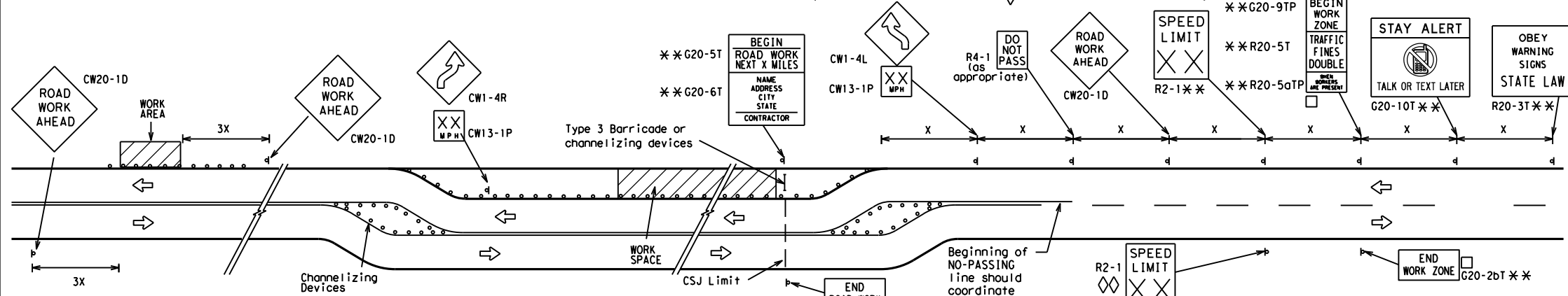
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

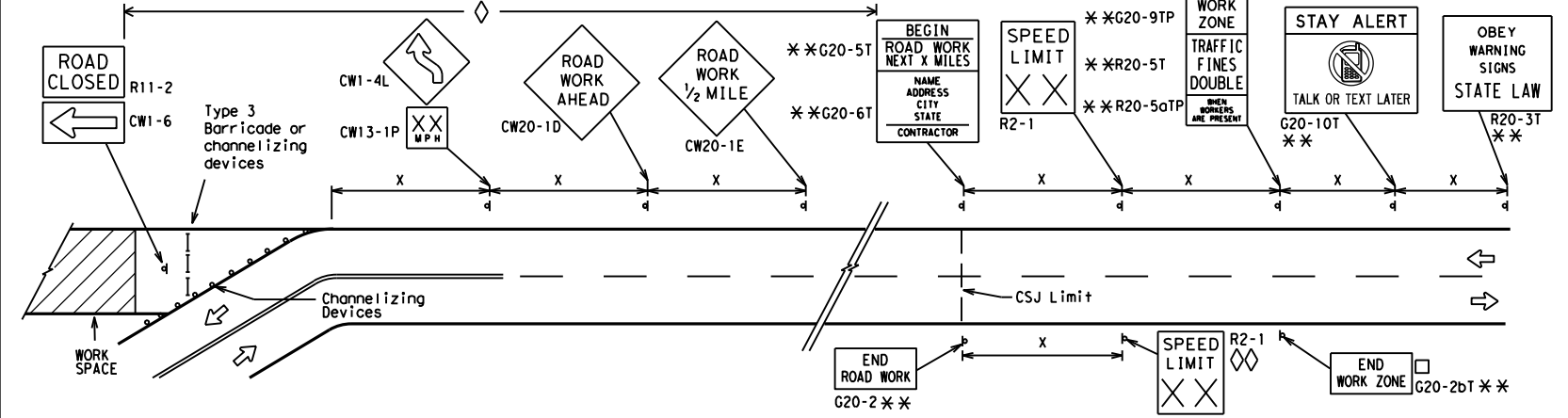
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be 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".
- Only diamond shaped warning sign sizes are indicated.
- 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

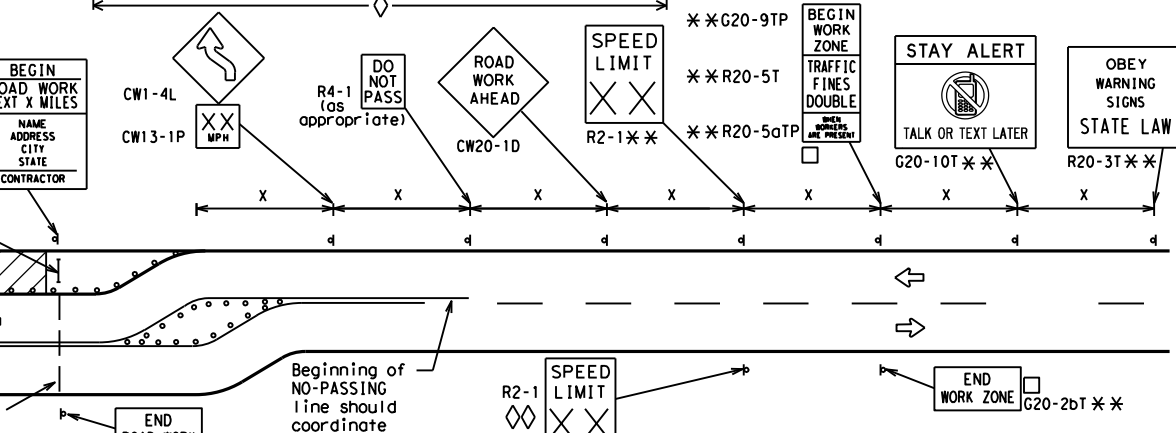


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT 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.

SHEET 2 OF 12

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	0114	12	012	US 290
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	HOU	HARRIS	73	

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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- 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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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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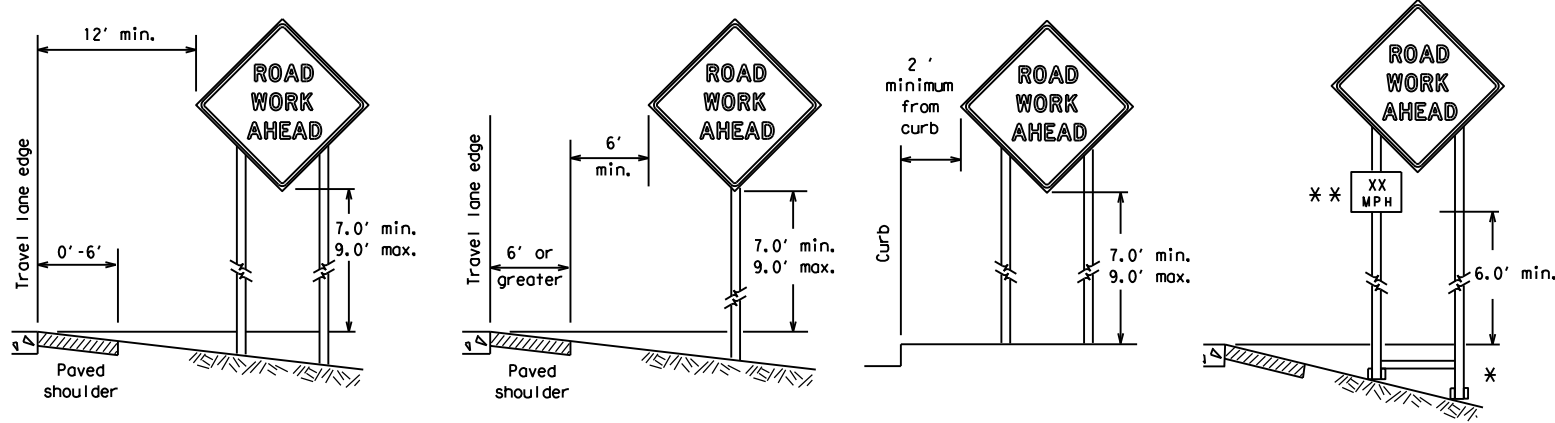
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SHEET 3 OF 12

		Traffic Safety Division Standard	
<h2>BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT</h2>			
<h3>BC (3) - 21</h3>			
FILE:	bc-21.dgn	DW:	TxDOT
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		SECT:	12
		JOB:	012
		HIGHWAY:	US 290
REVISIONS		DIST:	COUNTY
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7-13	5-21	HOU:	HARRIS
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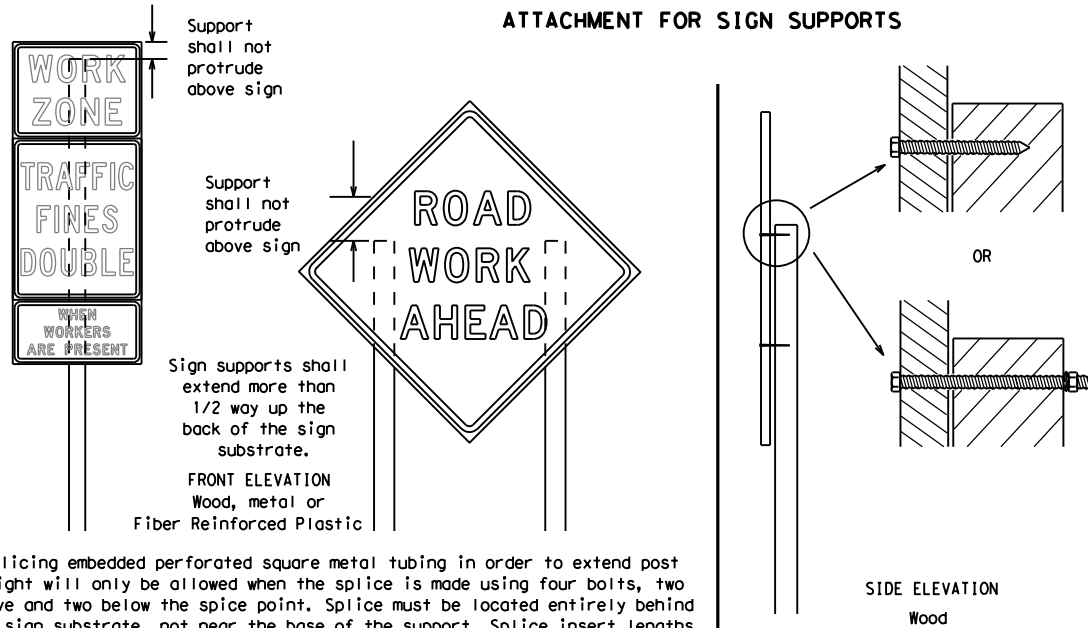
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* 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



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 splice 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.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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)

- 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.
 - Long-term stationary - work that occupies a location more than 3 days.
 - 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.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- 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.
- 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.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- 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.
- 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

- 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

- 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.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- 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

- 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).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- 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

- 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

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- 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.
- 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.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

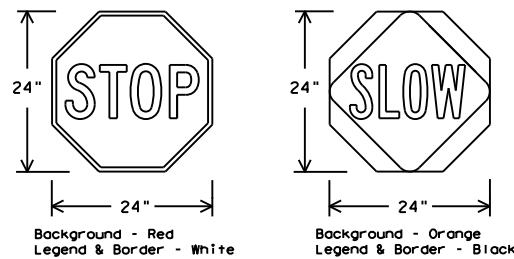
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- 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.
- 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.
- 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.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- 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.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflectORIZED when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- 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

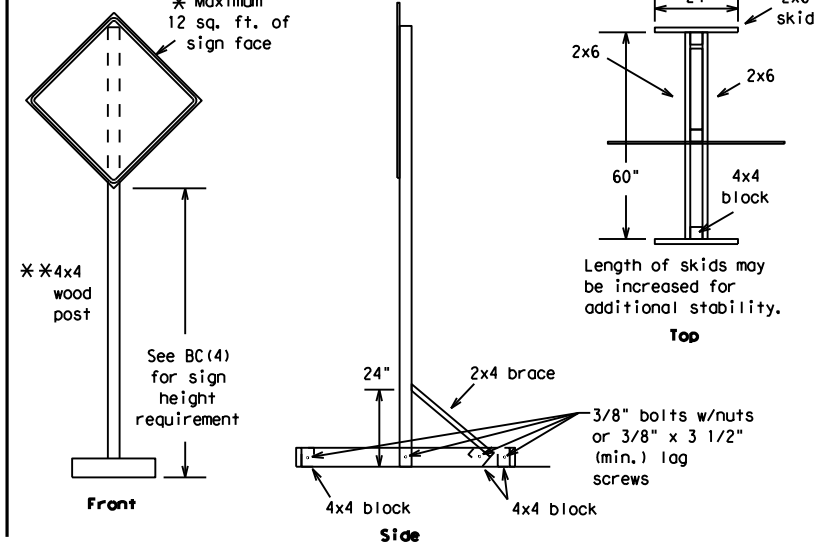
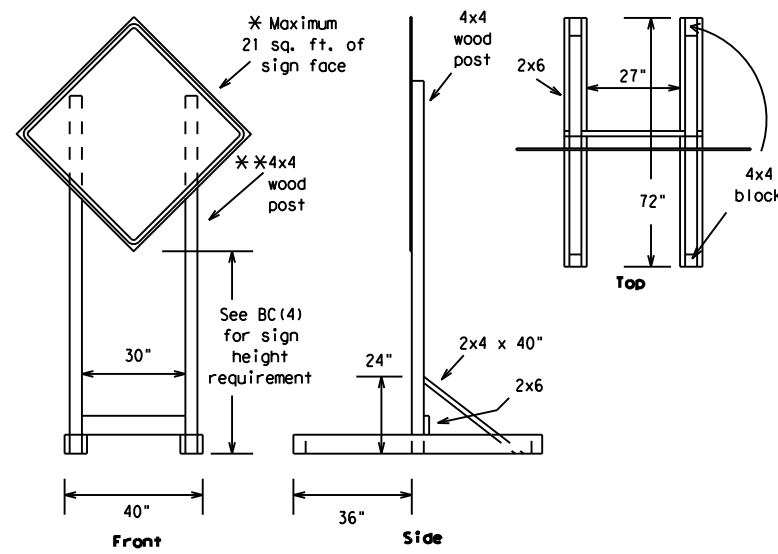
- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (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.
- 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.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- 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.
- 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.
- 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.

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

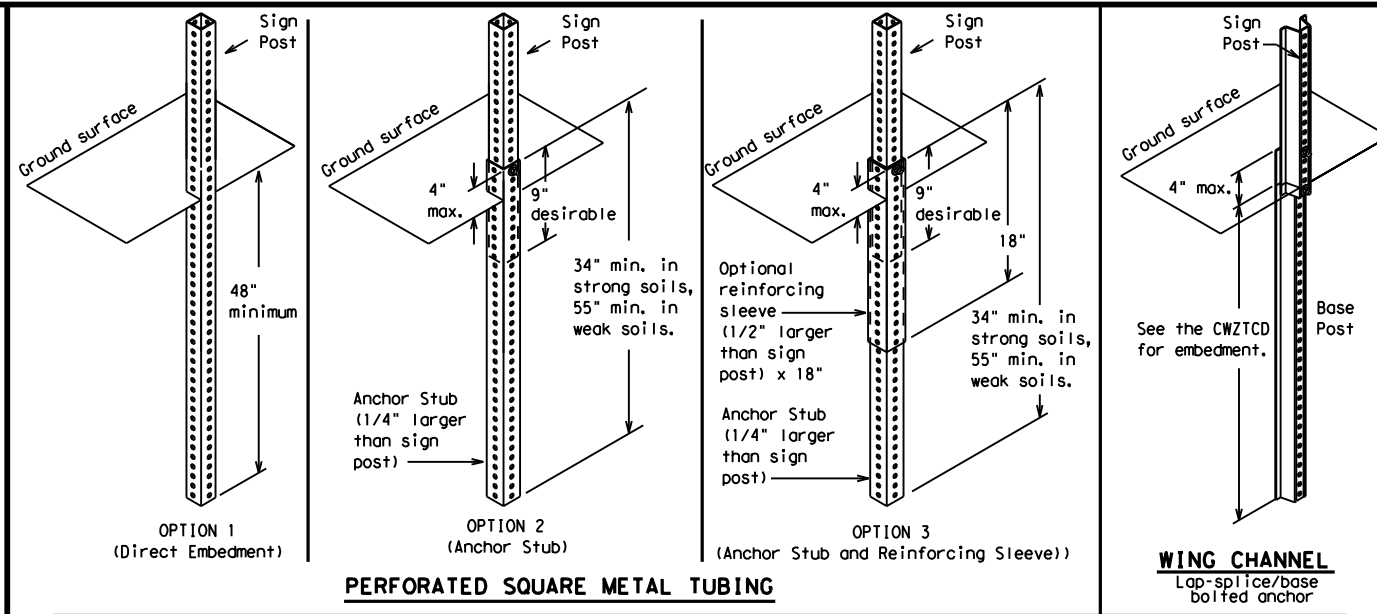
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© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0114	12	012	US 290
9-07 8-14	DIST	COUNTY	SHEET NO.	
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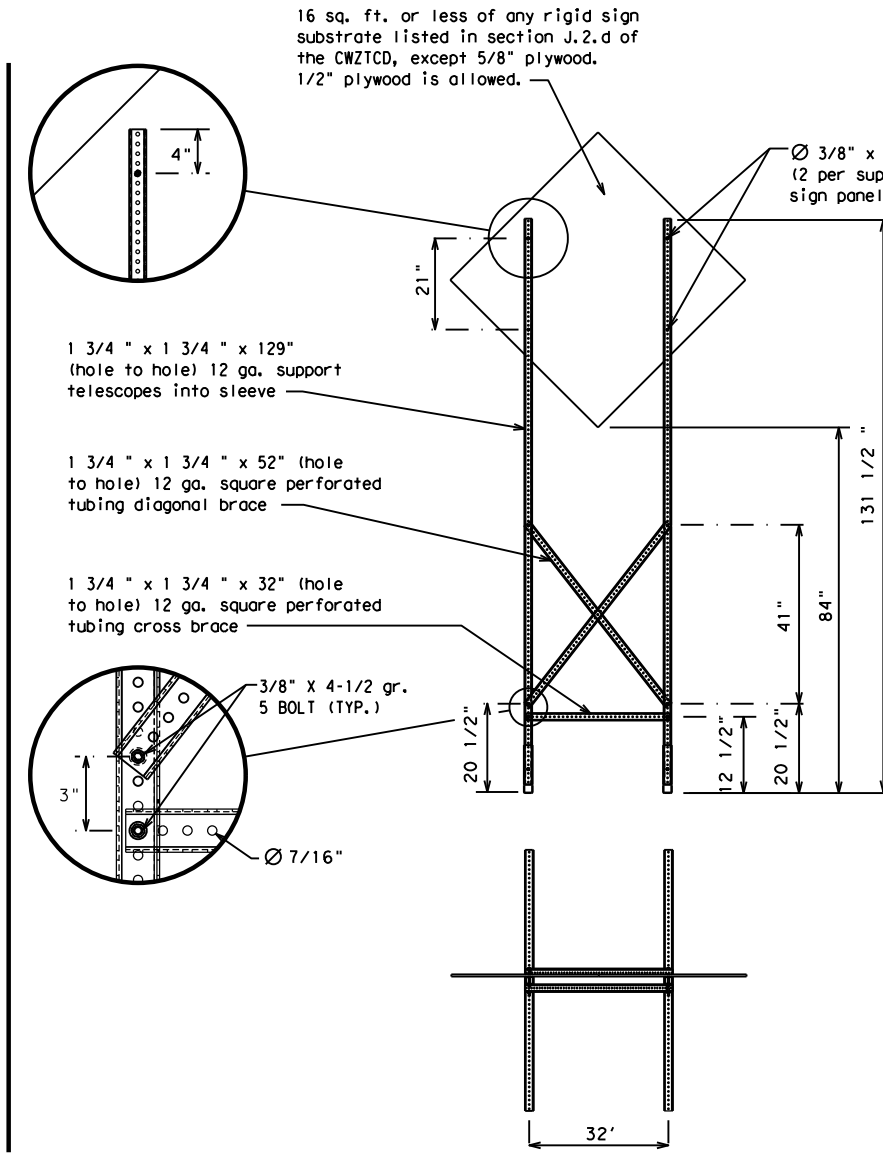
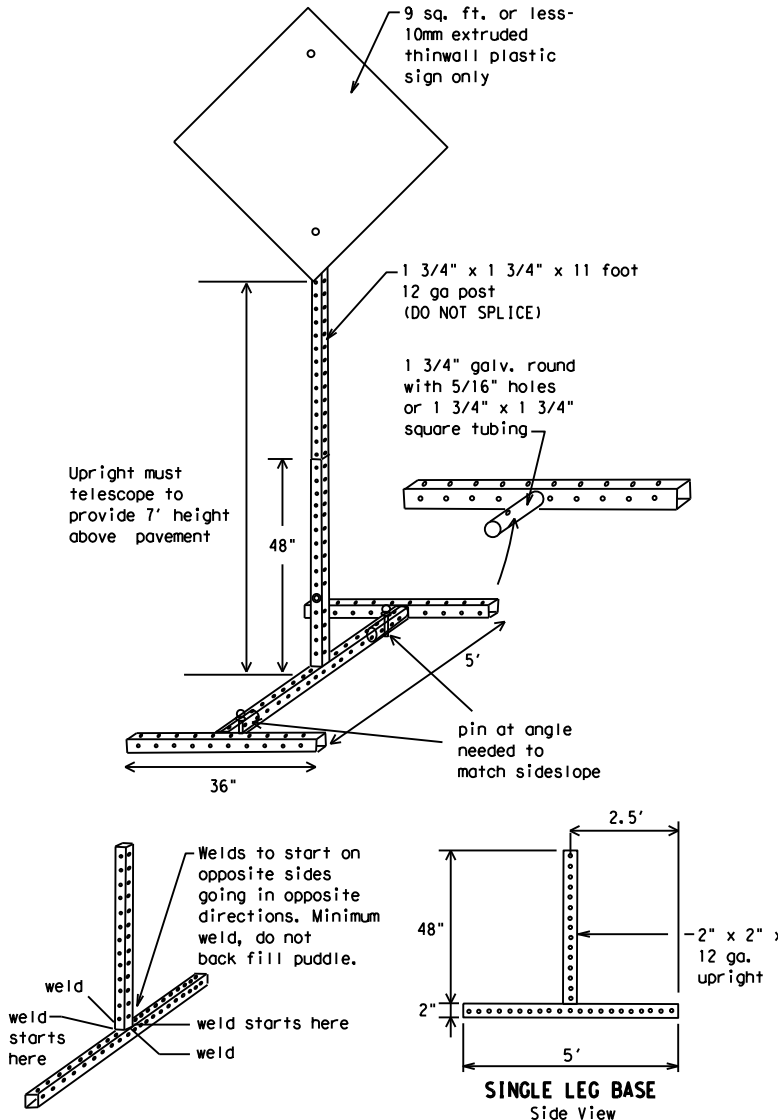
SKID MOUNTED WOOD SIGN SUPPORTS

* 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

- 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.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- 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.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

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7-13	5-21	HOU	HARRIS	76					

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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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

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WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	Hwy	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT
ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
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
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *
FORM X LINES RIGHT
USE XXXXX RD EXIT
USE EXIT I-XX NORTH
USE I-XX E TO I-XX N
WATCH FOR TRUCKS
EXPECT DELAYS
END SHOULDER USE
WATCH FOR WORKERS

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

SHEET 6 OF 12



BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

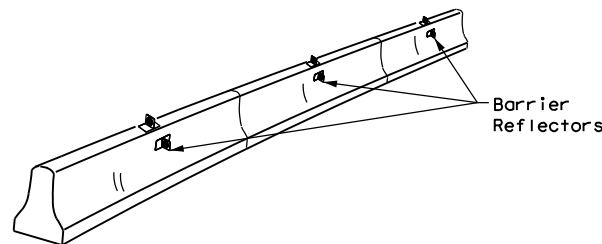
BC (6) - 21

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© TxDOT	November 2002	CONT:	SECT:	JOB:	REVISIONS:	0114	12	012	US 290
9-07	8-14	DIST:	COUNTY:	SHEET NO.:					
7-13	5-21	HOU:	HARRIS						77

DATE: FILE:

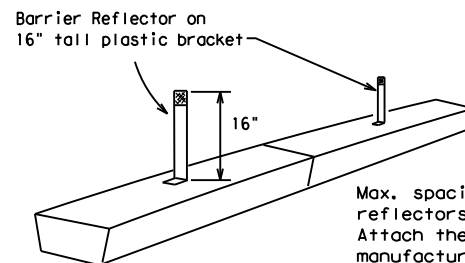
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



CONCRETE TRAFFIC BARRIER (CTB)

- 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.

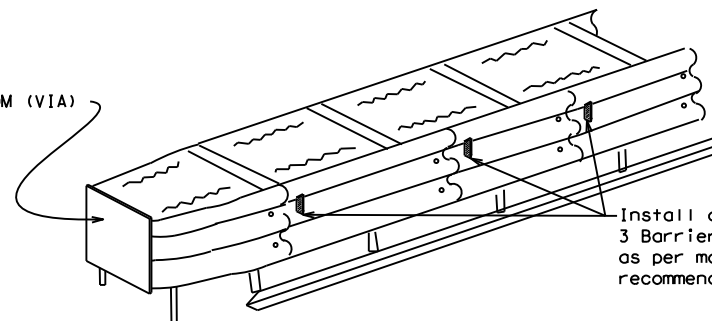


LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

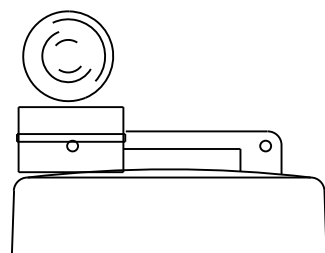
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

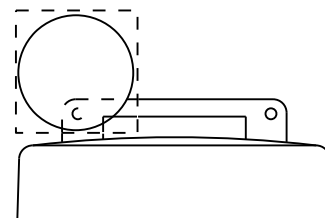
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- 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

- 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.
- 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.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



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

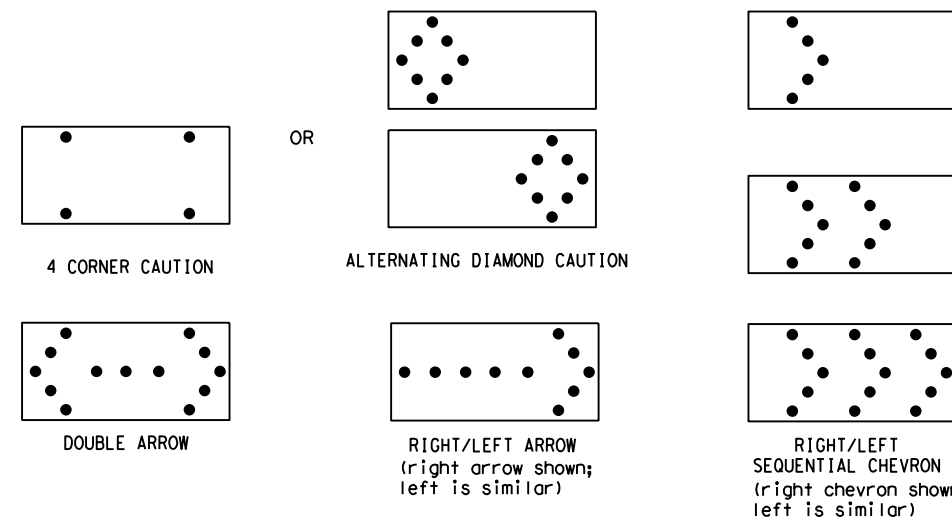


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

DATE: FILE:

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.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- 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.
- 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

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- 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.



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

BC (7) - 21

FILE: bc-21.dgn	DW: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS		0114	12	012
9-07	8-14	DIST	COUNTY	SHEET NO.
7-13	5-21	HOU	HARRIS	78

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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:

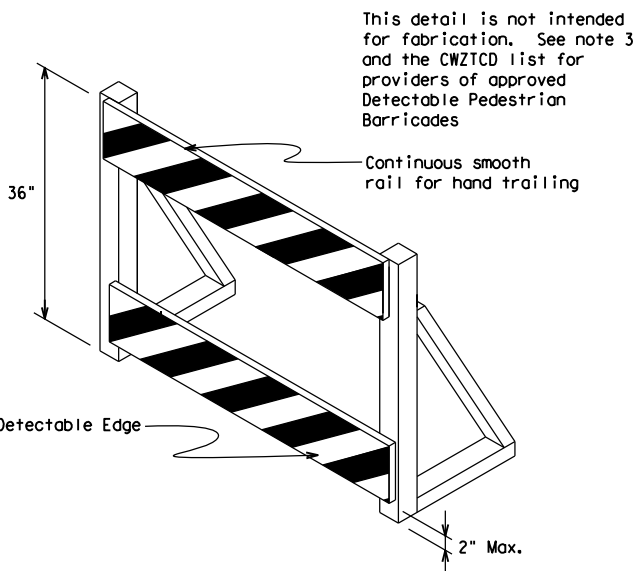
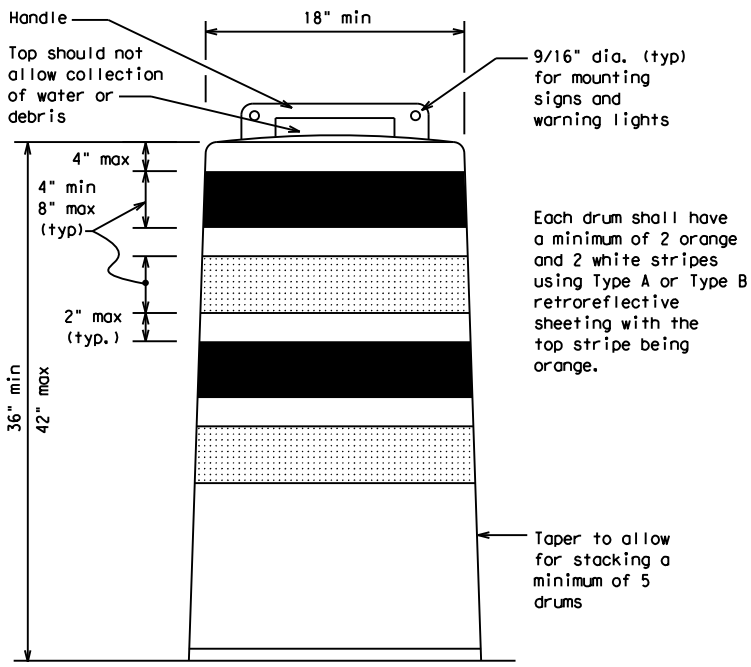
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- 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.
- 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.
- 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.
- 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.
- 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- 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.
- 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.

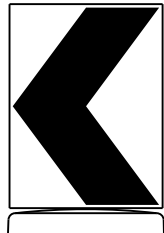
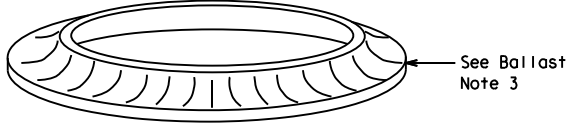
BALLAST

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.

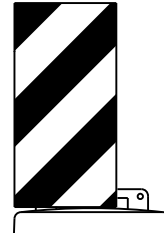


DETECTABLE PEDESTRIAN BARRICADES

- 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.
- 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.
- 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.
- 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.
- Warning lights shall not be attached to detectable pedestrian barricades.
- 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

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- 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.
- 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.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12

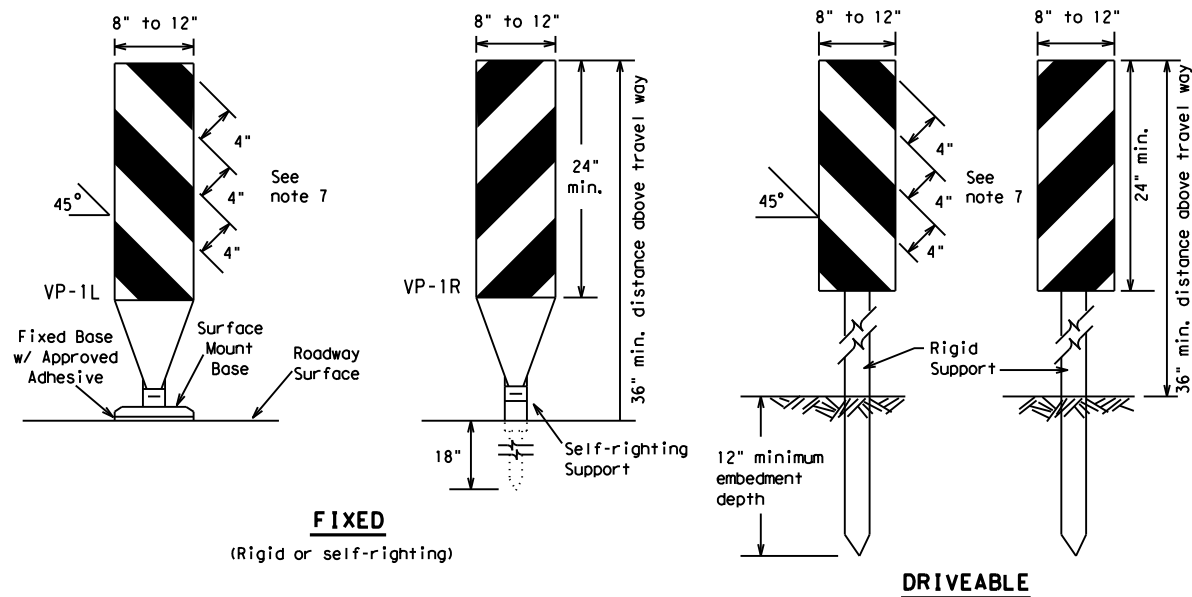


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

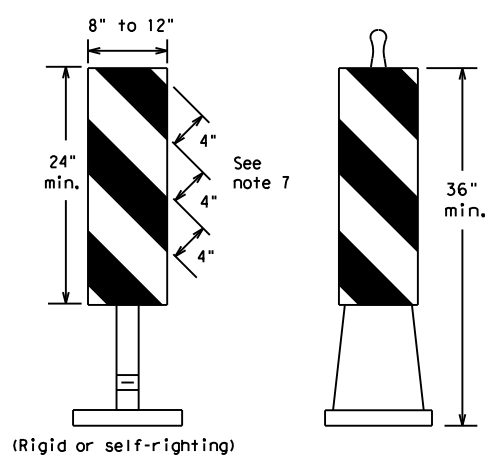
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REVISIONS		0114	12	012	US 290				
4-03	8-14	DIST	COUNTY	SHEET NO.					
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FIXED
(Rigid or self-righting)

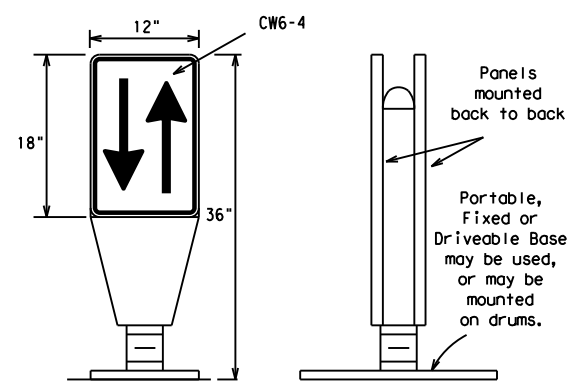
DRIVEABLE



PORTABLE

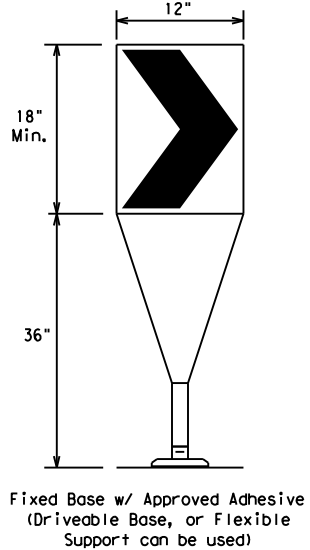
VERTICAL PANELS (VPs)

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 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.
- 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.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



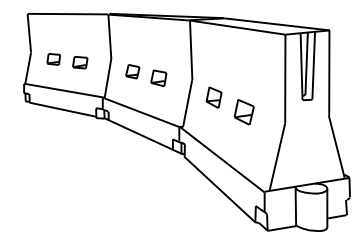
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- 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.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- 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.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- 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.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- 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

- 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.
- 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.
- 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.
- 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.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

GENERAL NOTES

- 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).
- 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.
- 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).
- 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.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed	Formula	Minimum Desirable Taper Lengths			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = 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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

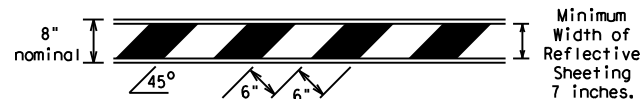
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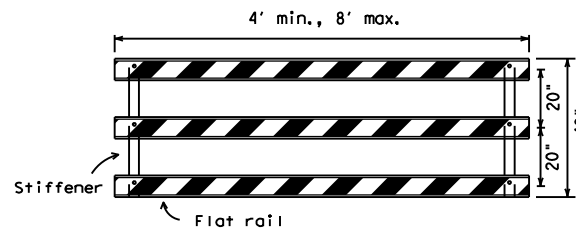
TYPE 3 BARRICADES

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.

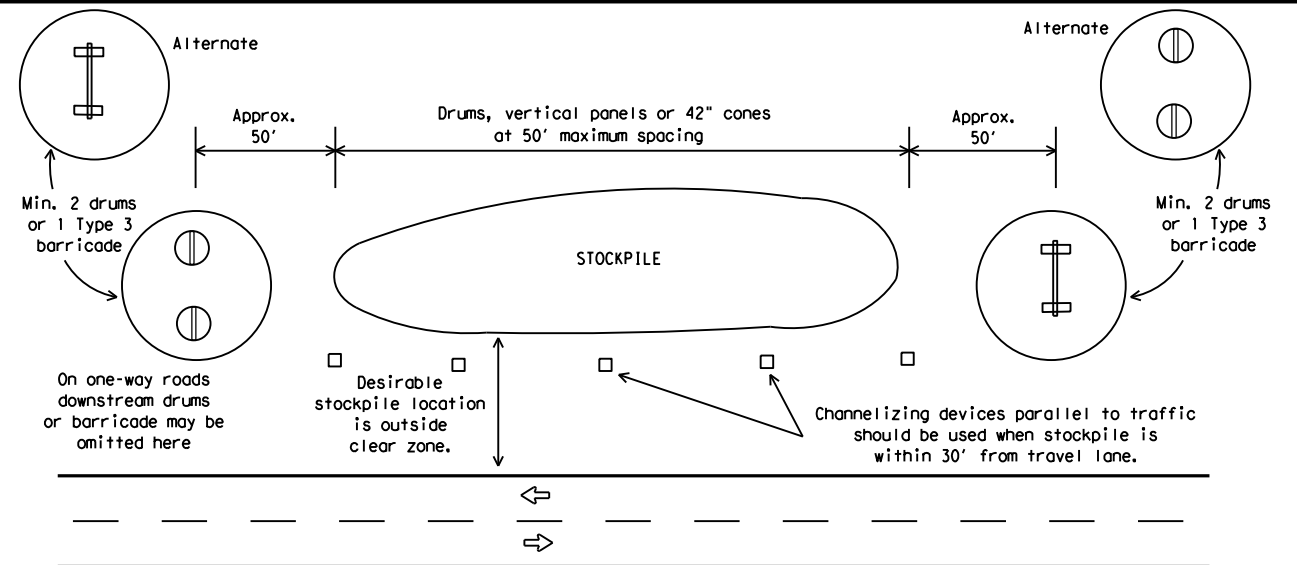


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



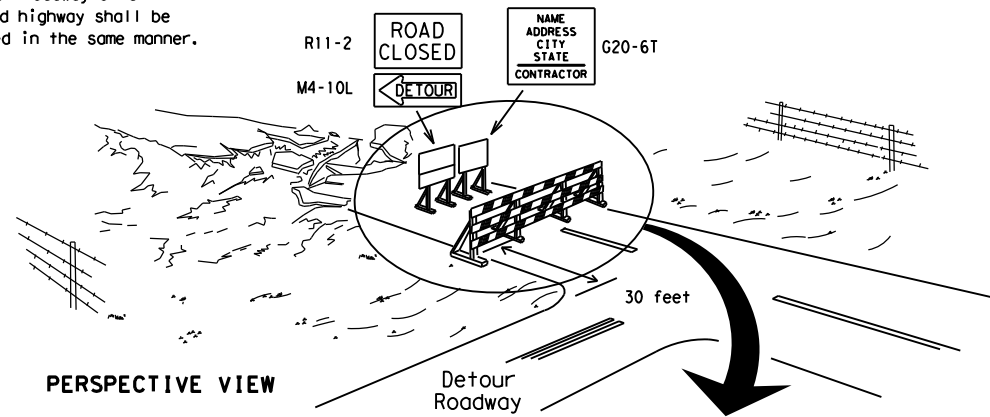
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

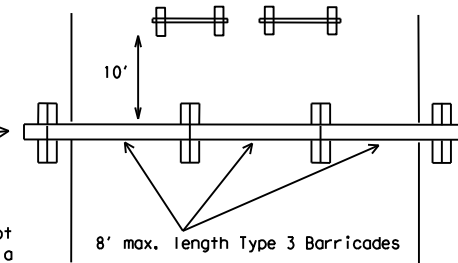
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

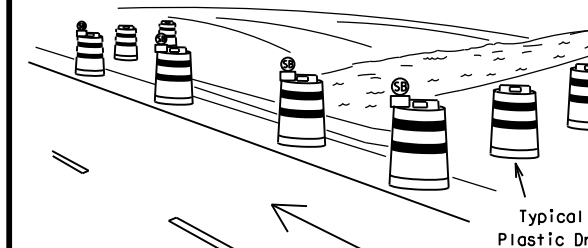
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.

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.



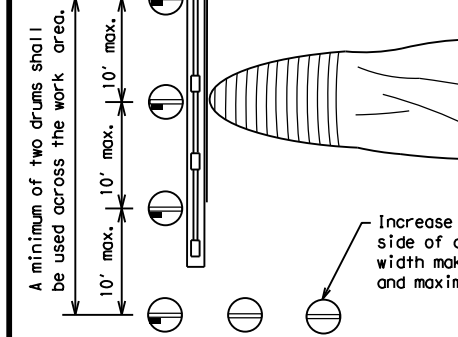
PLAN VIEW

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

These drums are not required on one-way roadway



PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

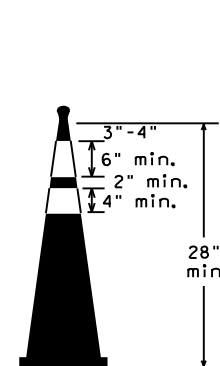
1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

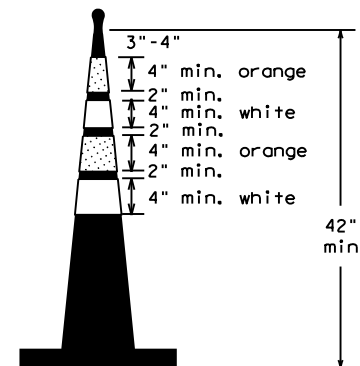
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

A minimum of two drums shall be used across the work area. Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

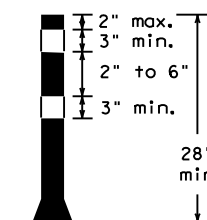
CONES



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.



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0114	12	012	US 290
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	HOU	HARRIS	81	

WORK ZONE PAVEMENT MARKINGS

GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- 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

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

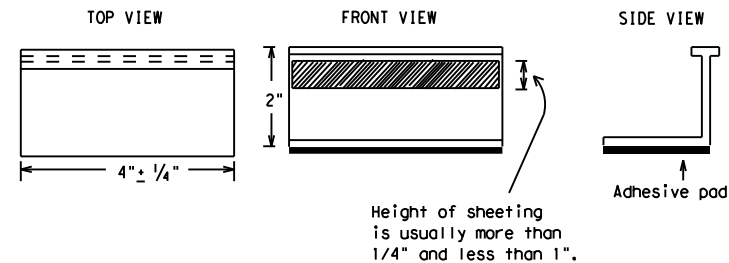
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
 - 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.
 - 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.
- Small design variances may be noted between tab manufacturers.
- 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
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2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	HOU	HARRIS	82	
11-02 8-14				

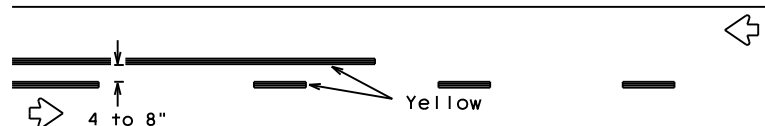
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PAVEMENT MARKING PATTERNS

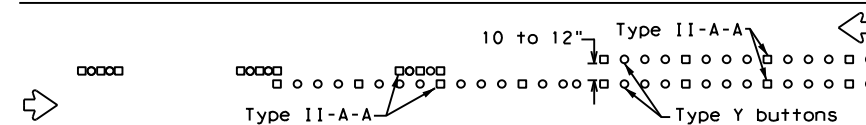


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

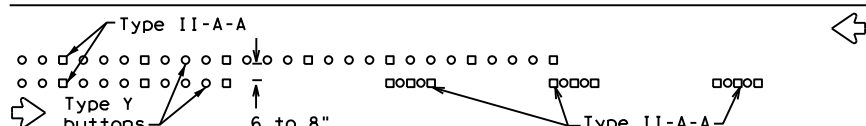


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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.



RAISED PAVEMENT MARKERS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN B

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



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



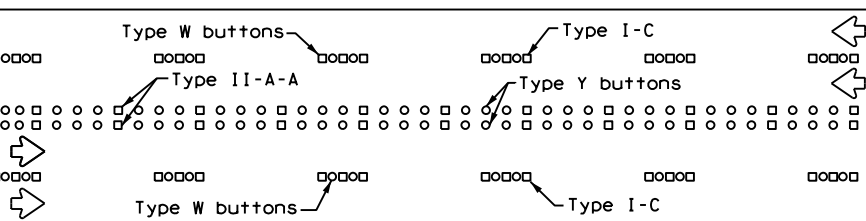
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



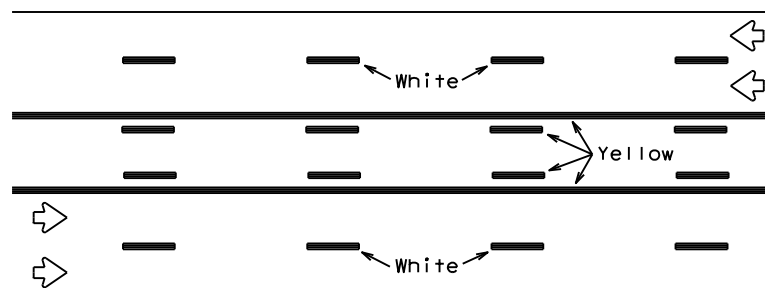
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



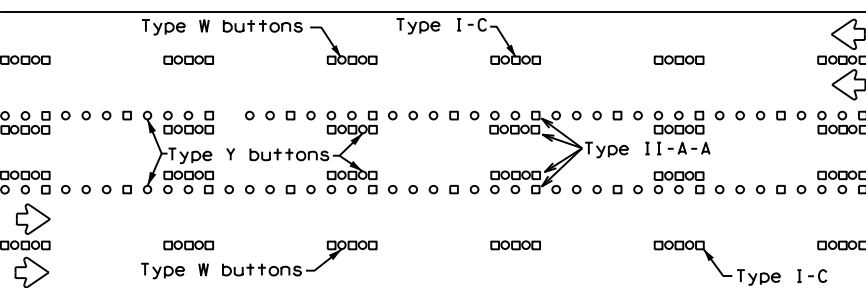
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



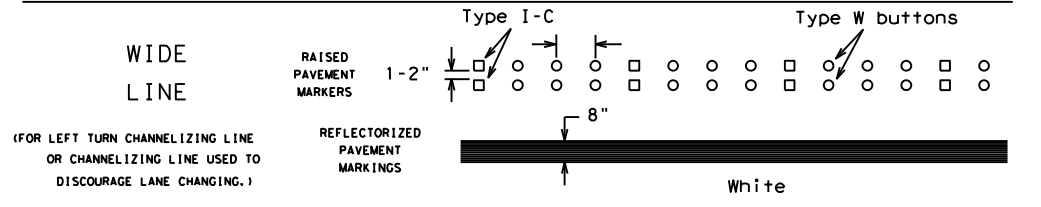
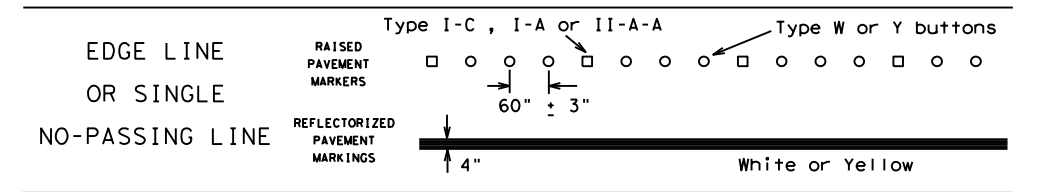
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

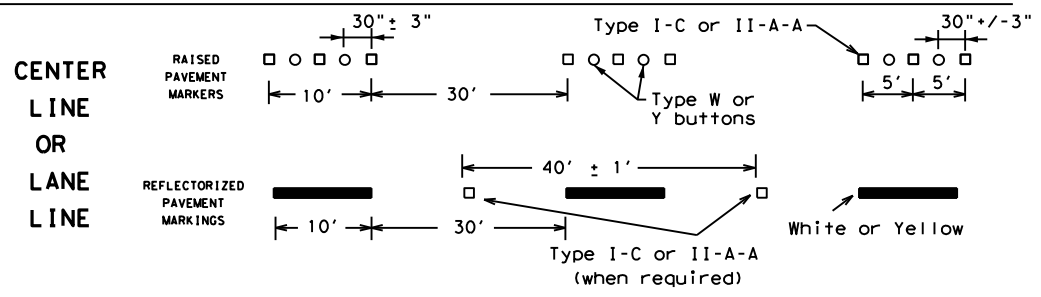
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



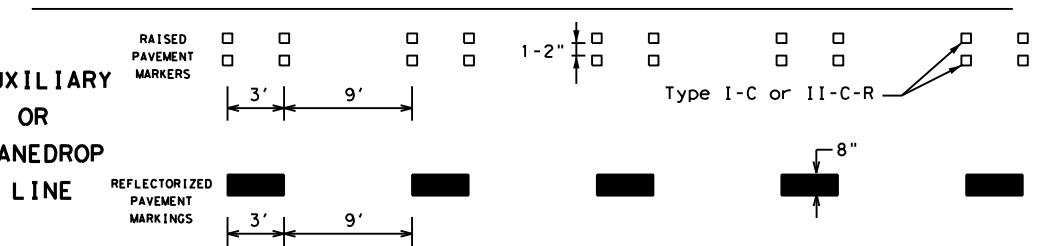
SOLID LINES



BROKEN LINES

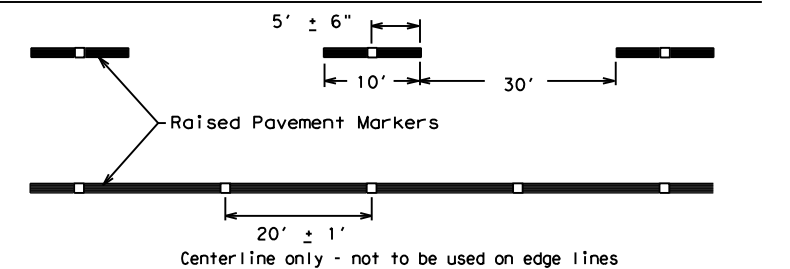


AUXILIARY OR LANEDROP LINE



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.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

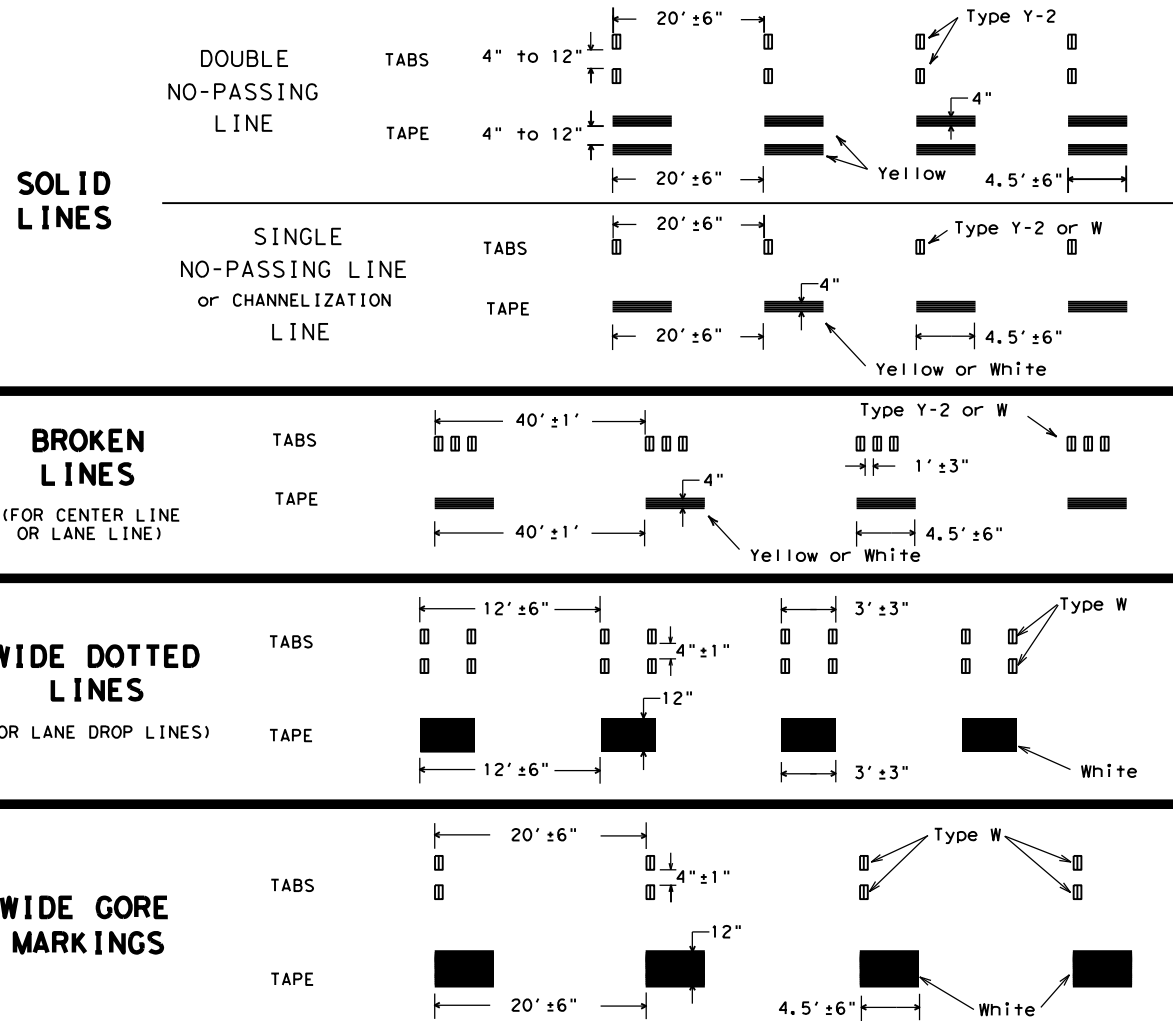
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0114	12	012	US 290
1-97 9-07 5-21	DIST	COUNTY	SHEET NO.	
2-98 7-13	HOU	HARRIS	83	
11-02 8-14				

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



NOTES:

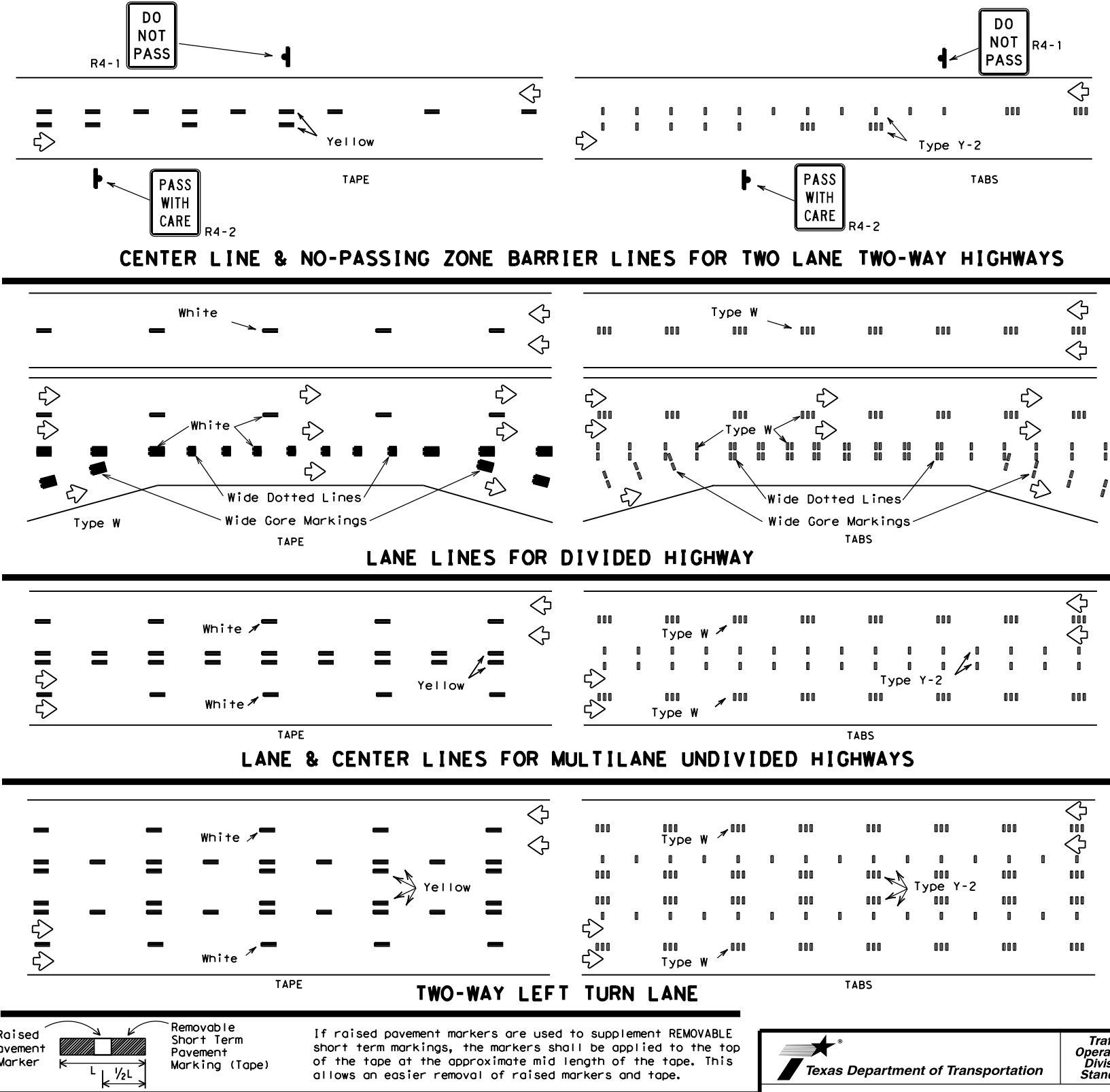
- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical 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.
- 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.
- 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.
- 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.
- 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).
- 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)

- 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).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- 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.
- 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.

DATE:
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WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

- 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)

- 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



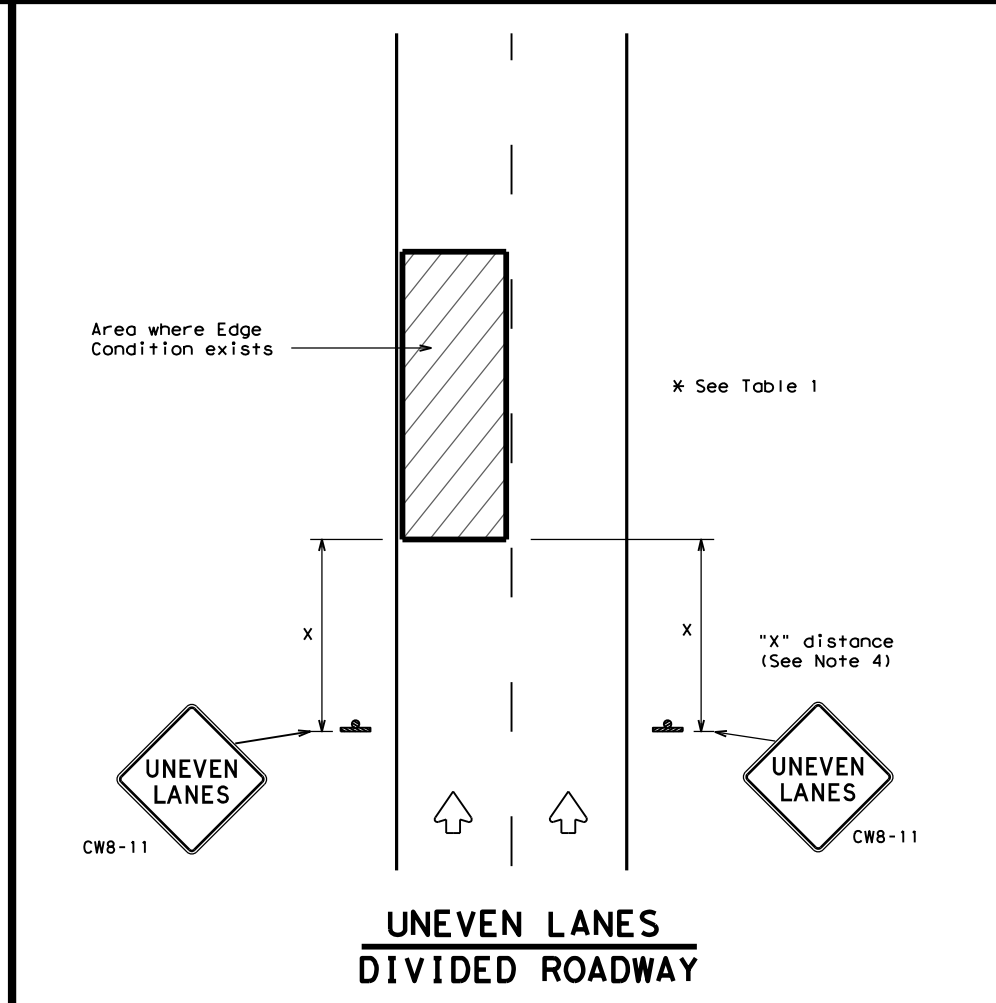
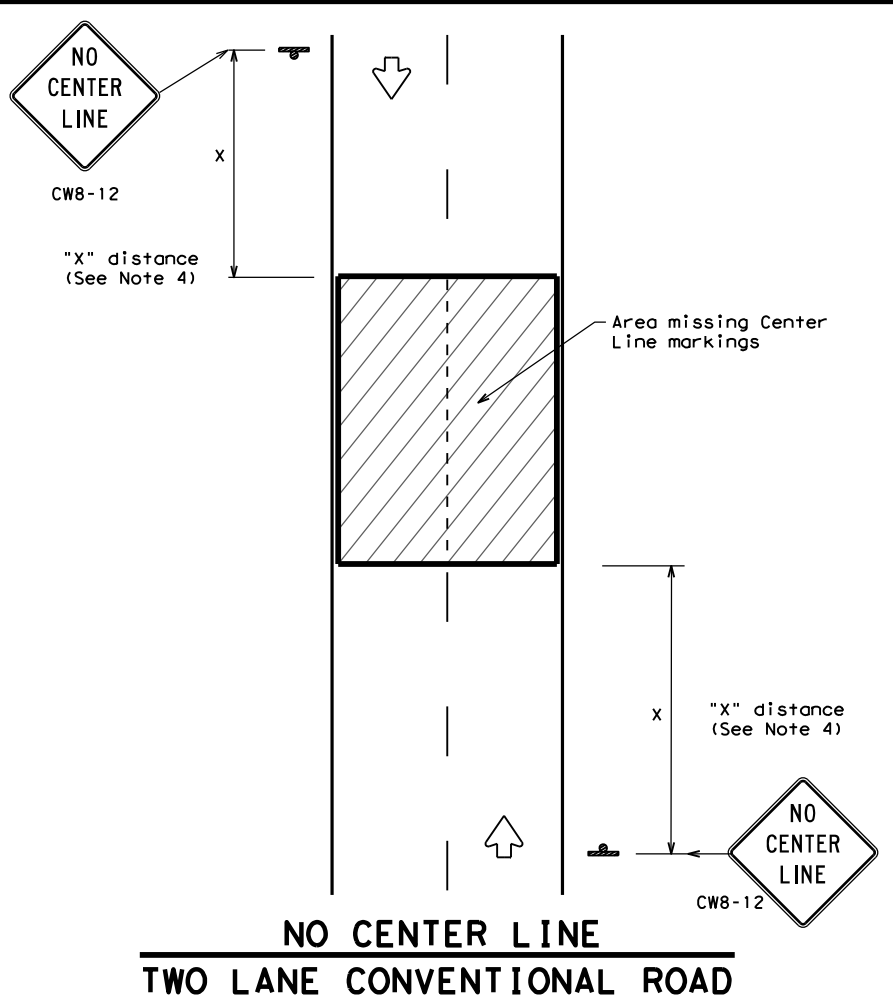
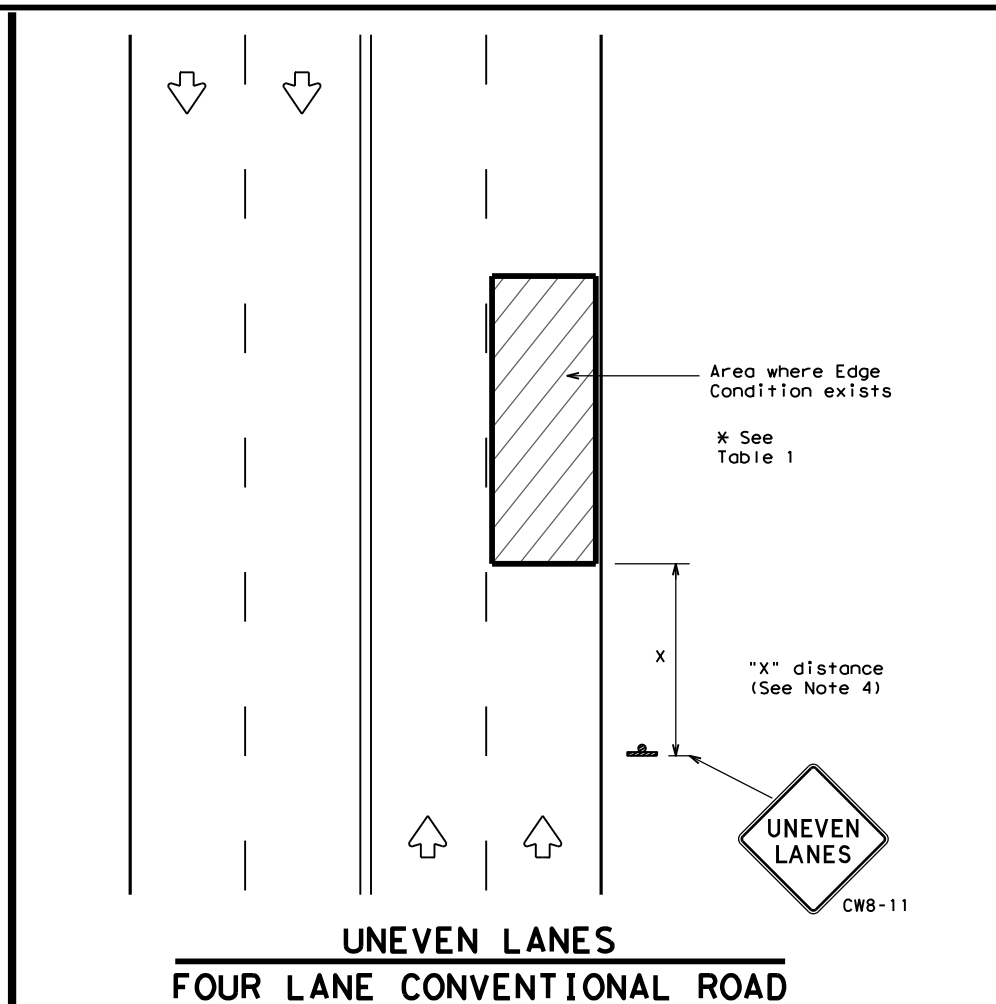
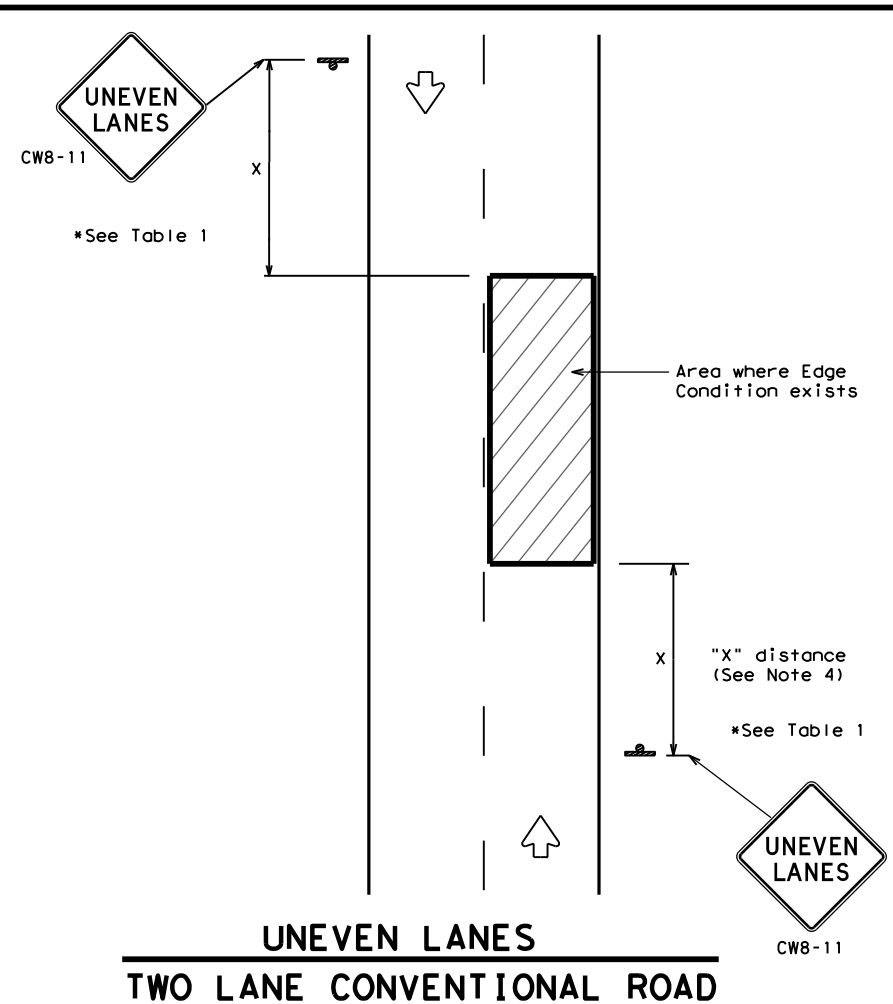
WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ (STPM) - 13

FILE:	wzstpm-13.dgn	DN:	TxDOT	CK:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	April 1992	CONT:	0114	SECT:	12	JOB:	012	HIGHWAY:	US 290
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3-03									
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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.

Edge Condition	Edge Height (D)	* Warning Devices
①	Less than or equal to: 1/4" (maximum-planing) 1/2" (typical-overlay)	Sign: CW8-11
②	Less than or equal to 3"	Sign: CW8-11
③	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"



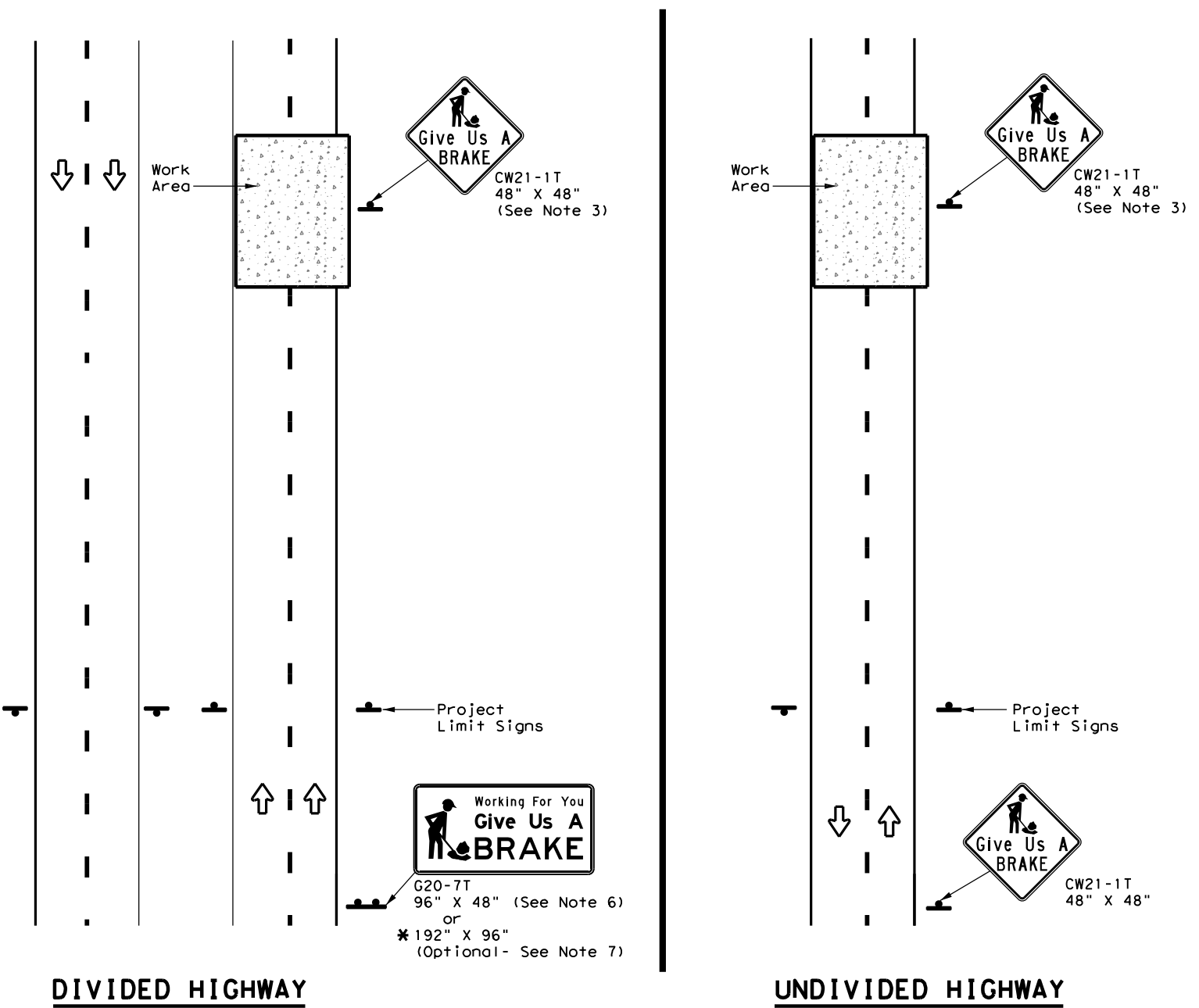
SIGNING FOR UNEVEN LANES

WZ (UL) - 13

FILE: WZUL-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
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8-95 2-98 7-13	DIST	COUNTY	SHEET NO.	
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SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL		DRILLED SHAFT
						Size	(LF)	
							① ②	24" DIA. (LF)
Orange	G20-7T		96" X 48"	Type B _{FL} or C _{FL}	32	▲	▲ ▲	▲
Orange	G20-7T		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

- See BC and SMD sheets for additional sign support details.
- Sign locations shall be approved by the Engineer.
- 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.
- 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.
- Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
- 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.
- 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
- 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.

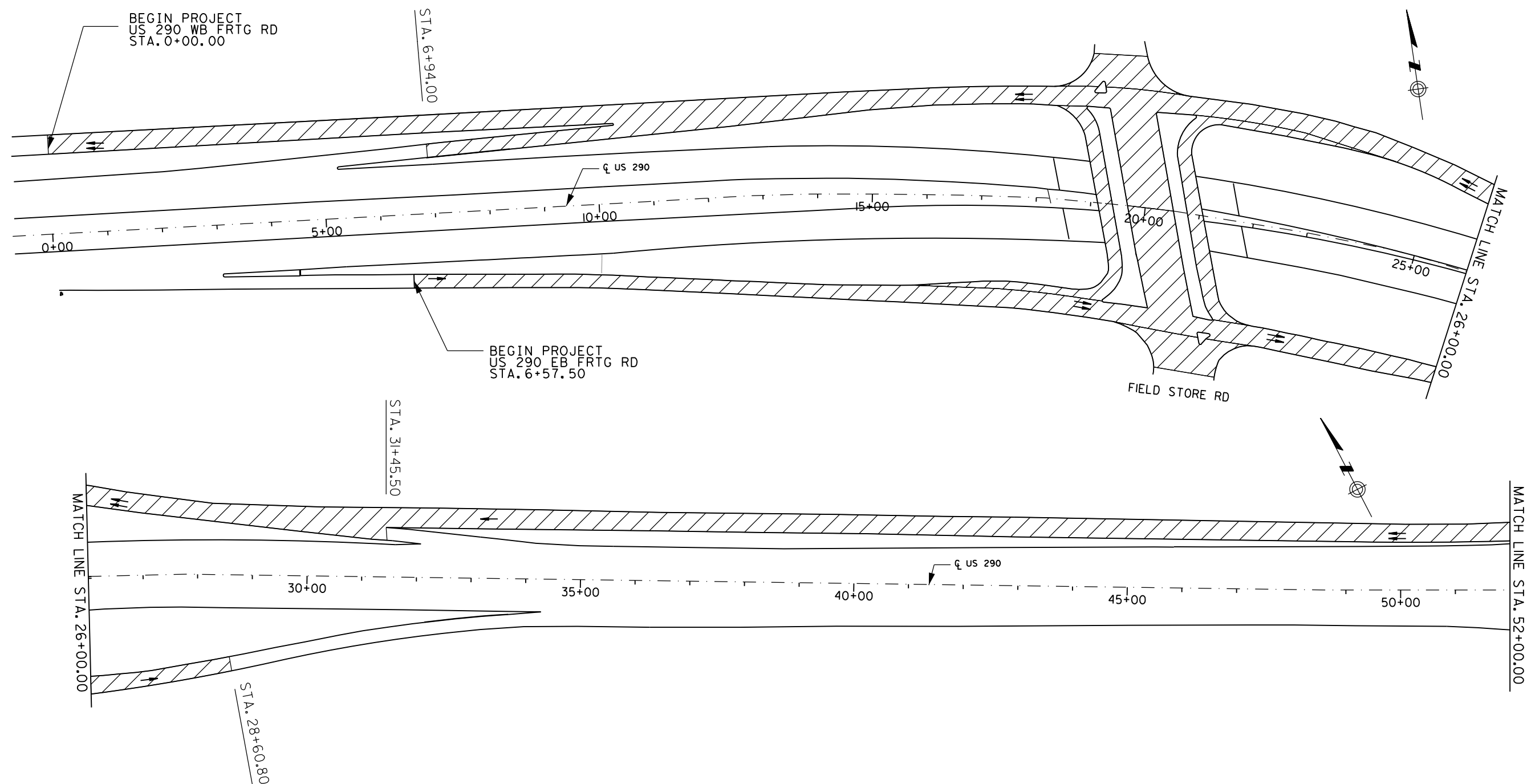
Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ (BRK) - 13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	0114	12	0112	US 290
6-96 5-98 7-13	DIST	COUNTY	SHEET NO.	
8-96 3-03	HOU	HARRIS	86	

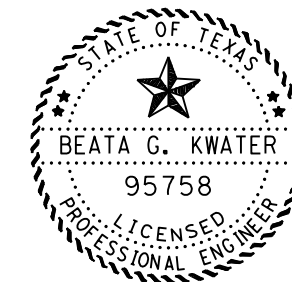


NOTES:

1. THE UNDERSEAL COURSE WILL BE COVERED WITH THE HMA OVERLAY (ITEM 3076) PRIOR TO REOPENING TO TRAFFIC EACH DAY. THE ROADWAY WILL NOT BE OPENED TO TRAFFIC UNTIL THE HMA AND WORK ZONE PAVEMENT MARKINGS ARE IN PLACE.
2. MILLING OPERATIONS MUST BE PERFORMED BEGINNING WITH THE OUTSIDE LANE AND WORKING INWARDS IN EACH ADJOINING LANE. 3. FOR LIMITS OF ACP OVERLAY AT DRIVEWAYS AND ROADWAYS SEE "ACP OVERLAY DETAILS".
4. FOR PAVEMENT MARKINGS SEE "PAVEMENT MARKINGS LAYOUT" AND STANDARD SHEETS. ELIMINATING RAISED PAVEMENT MARKERS IS SUBSIDIARY TO THE VARIOUS BID ITEMS.
5. THE LOCATION OF BASE REPAIR AREA VARIES AND WILL BE DIRECTED BY THE ENGINEER IN THE FIELD.
6. REMOVE DIRT, DUST, OR OTHER LOOSE MATERIAL BEFORE PLACING UNDERSEAL COURSE, NO ADDITIONAL PAYMENT WILL BE MADE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

LEGEND:

	PROP. 2" PLANE ASPH CONC PAV, ITEM 354 PROP. UNDERSEAL COURSE, ITEM 3085 PROP. 2" ACP OVERLAY TY-D SAC-A PG76-22, ITEM 3076
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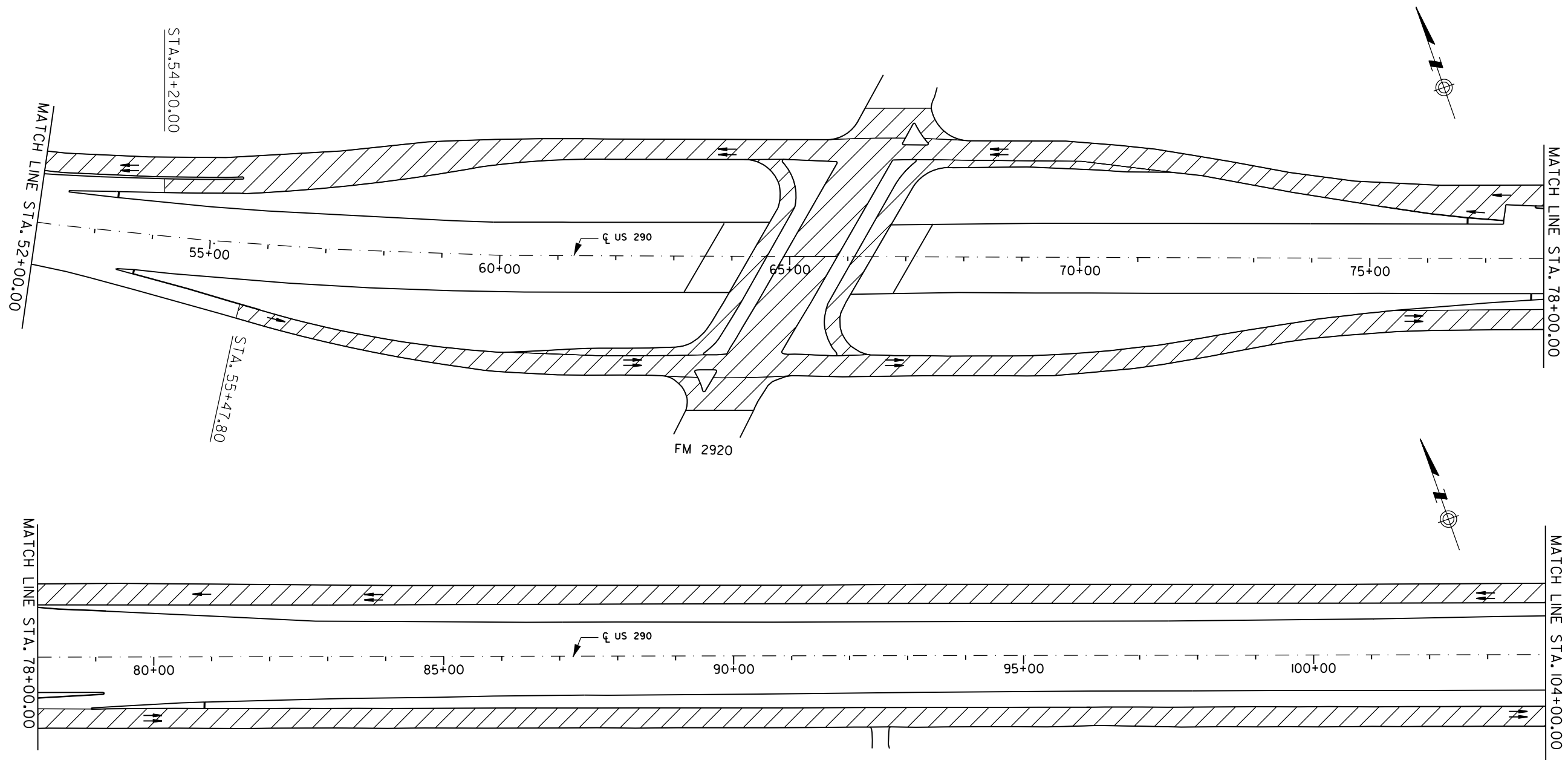
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1/20/2023

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US 290 FRTG RD
PLAN LAYOUT

PROJECT NO.		SHEET NO.	
6		87	
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

SHEET 1 OF 6

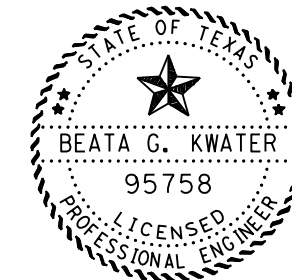


NOTES:

1. THE UNDERSEAL COURSE WILL BE COVERED WITH THE HMA OVERLAY (ITEM 3076) PRIOR TO REOPENING TO TRAFFIC EACH DAY. THE ROADWAY WILL NOT BE OPENED TO TRAFFIC UNTIL THE HMA AND WORK ZONE PAVEMENT MARKINGS ARE IN PLACE.
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	PROP. 2" PLANE ASPH CONC PAV, ITEM 354 PROP. UNDERSEAL COURSE, ITEM 3085 PROP. 2" ACP OVERLAY TY-D SAC-A PG76-22, ITEM 3076
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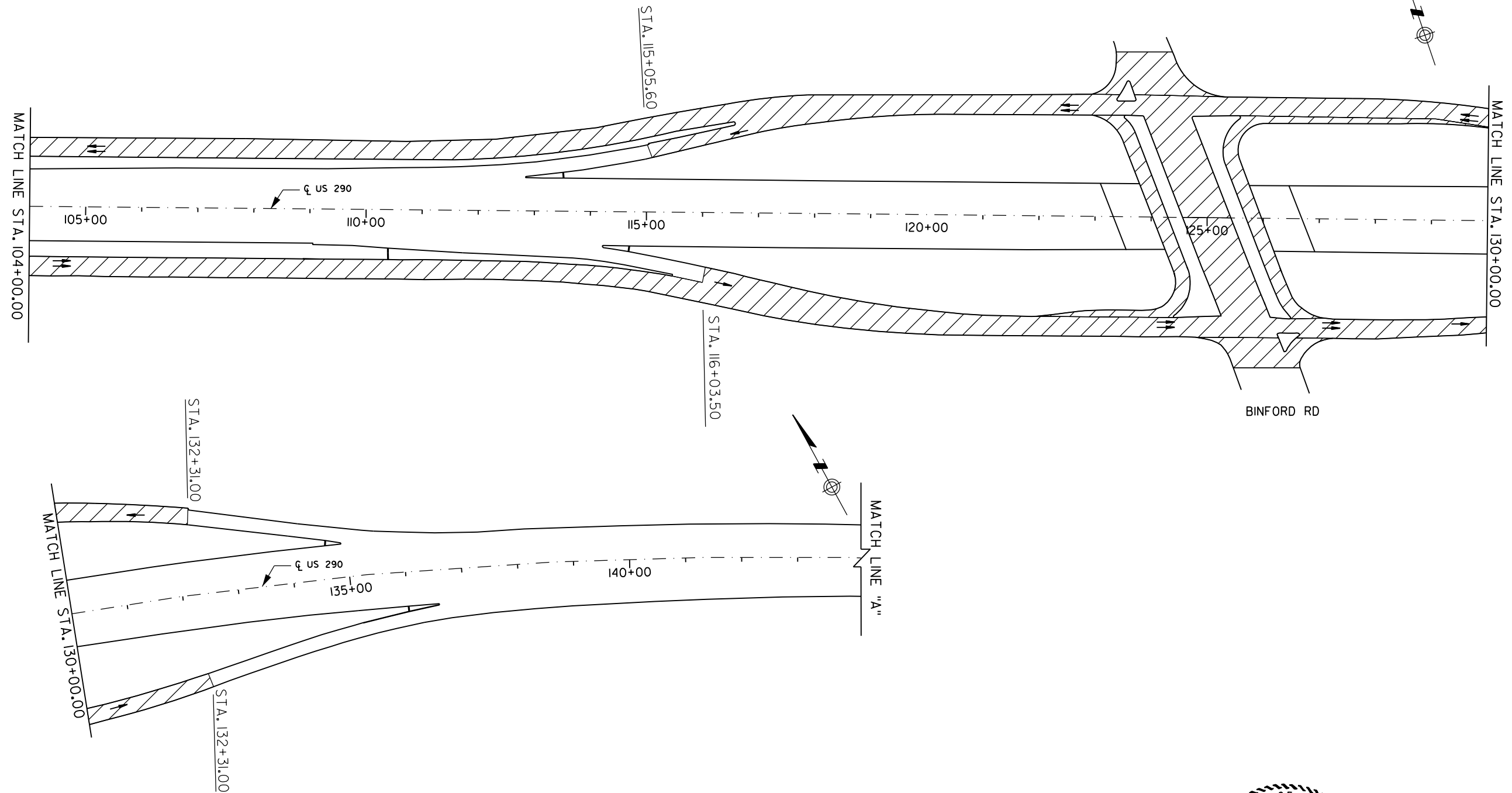
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1/20/2023

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US 290 FRTG RD
PLAN LAYOUT

FED. RD. DIV. NO.		PROJECT NO.		SHEET NO.	
6				88	
STATE	DIST.	COUNTY			
TEXAS	HOU.	HARRIS			
CONT.	SECT.	JOB	HIGHWAY NO.		
0114	12	012	US 290		

\$DATE\$ \$TIME\$

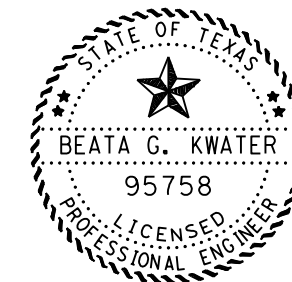


NOTES:

1. THE UNDERSEAL COURSE WILL BE COVERED WITH THE HMA OVERLAY (ITEM 3076) PRIOR TO REOPENING TO TRAFFIC EACH DAY. THE ROADWAY WILL NOT BE OPENED TO TRAFFIC UNTIL THE HMA AND WORK ZONE PAVEMENT MARKINGS ARE IN PLACE.
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LEGEND:

	PROP. 2" PLANE ASPH CONC PAV, ITEM 354
	PROP. UNDERSEAL COURSE, ITEM 3085
	PROP. 2" ACP OVERLAY TY-D SAC-A PG76-22, ITEM 3076



Beata Kwater, P.E.
1/20/2023

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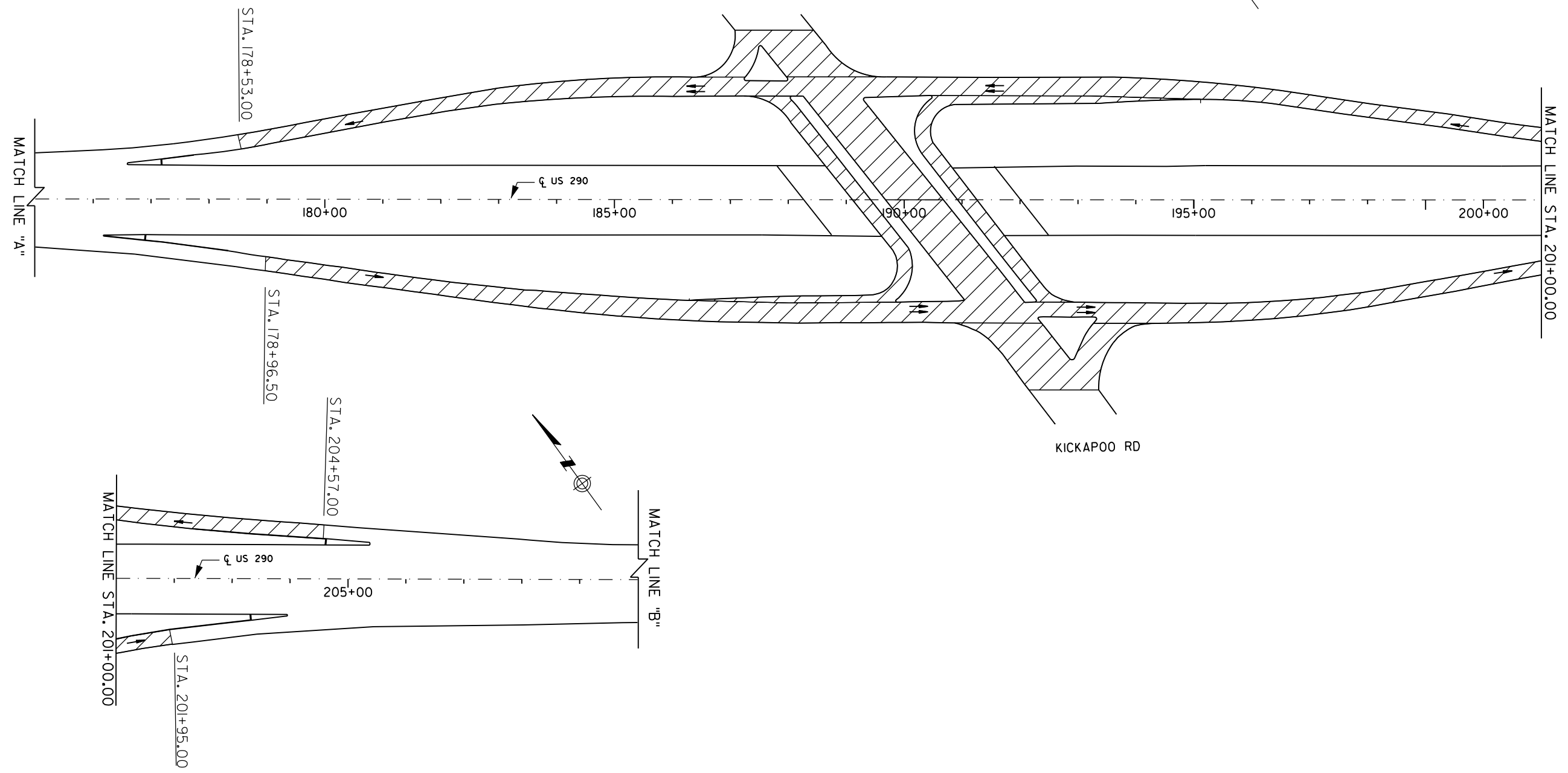
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US 290 FRTG RD
PLAN LAYOUT

SHEET 3 OF 6

FED. RD. DIV. NO.	6	PROJECT NO.	SHEET NO.
STATE	DIST.	COUNTY	
TEXAS	HOU.	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

\$DATE\$ \$TIME\$

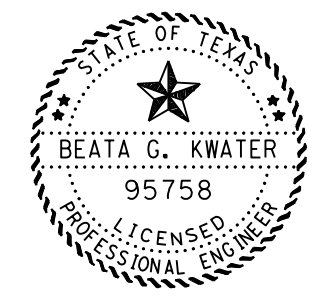


NOTES:

1. THE UNDERSEAL COURSE WILL BE COVERED WITH THE HMA OVERLAY (ITEM 3076) PRIOR TO REOPENING TO TRAFFIC EACH DAY. THE ROADWAY WILL NOT BE OPENED TO TRAFFIC UNTIL THE HMA AND WORK ZONE PAVEMENT MARKINGS ARE IN PLACE.
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LEGEND:

	PROP. 2" PLANE ASPH CONC PAV, ITEM 354
	PROP. UNDERSEAL COURSE, ITEM 3085
	PROP. 2" ACP OVERLAY TY-D SAC-A PG76-22, ITEM 3076



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1/20/2023

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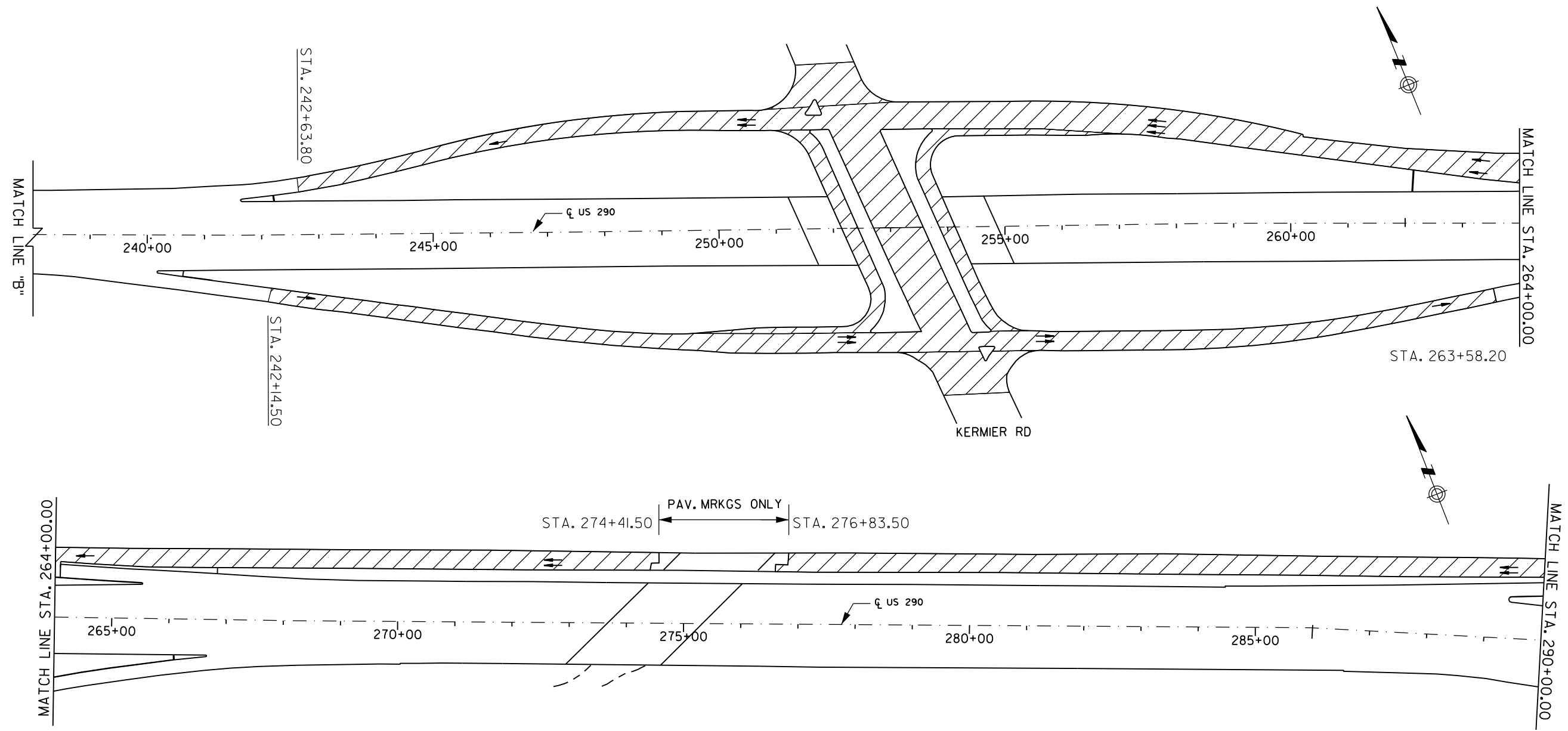
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US 290 FRTG RD
PLAN LAYOUT

SHEET 4 OF 6

FED. RD. DIV. NO.	6	PROJECT NO.	SHEET NO.
STATE	DIST.	COUNTY	
TEXAS	HOU.	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

\$DATE\$ \$TIME\$

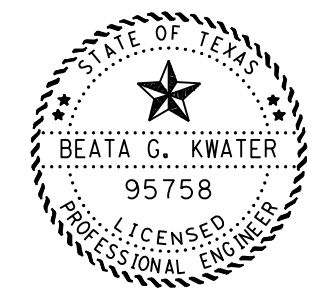


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LEGEND:

	PROP. 2" PLANE ASPH CONC PAV, ITEM 354
	PROP. UNDERSEAL COURSE, ITEM 3085
	PROP. 2" ACP OVERLAY TY-D SAC-A PG76-22, ITEM 3076



Beata Kwater, P.E.
1/20/2023

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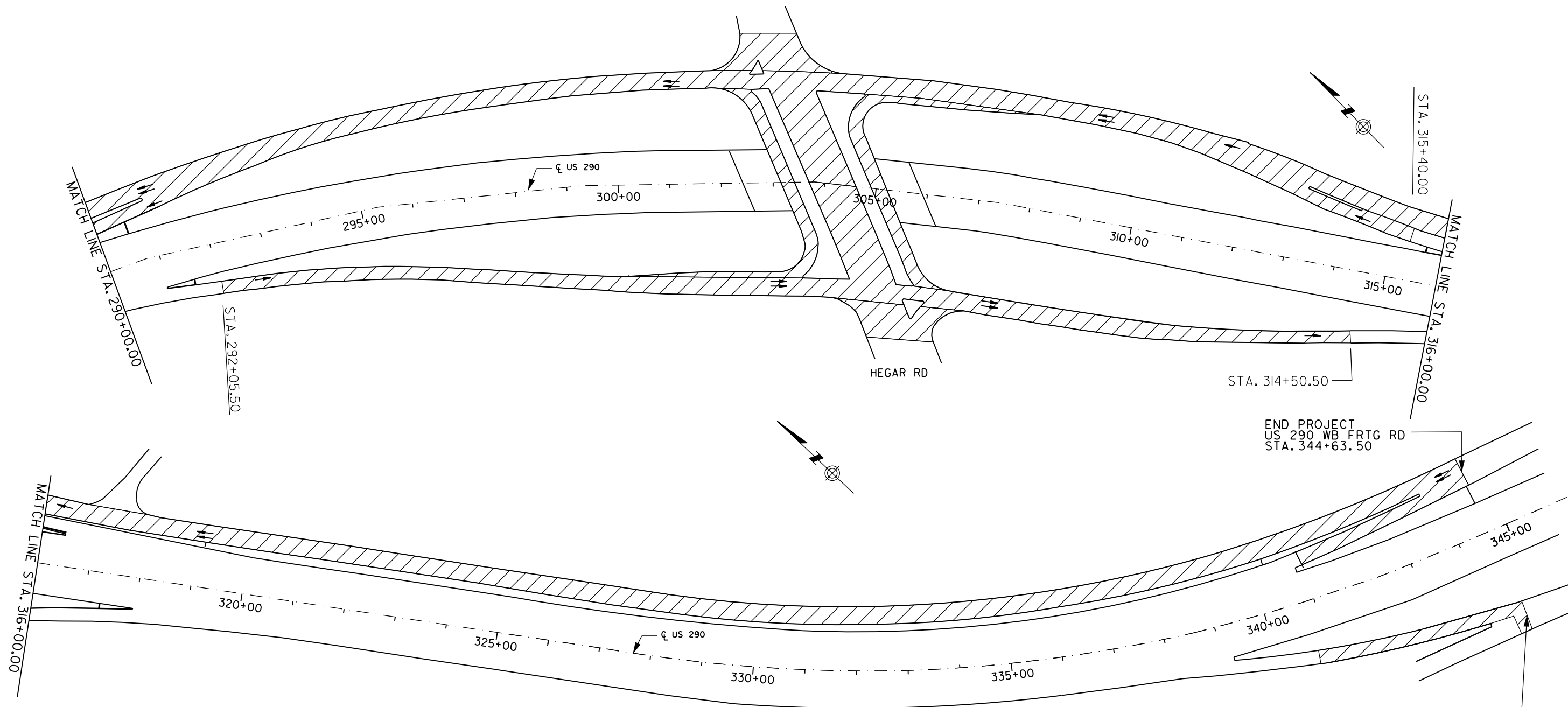
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US 290 FRTG RD
PLAN LAYOUT

SHEET 5 OF 6

FED. RD. DIV. NO.	6	PROJECT NO.	SHEET NO.
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

\$DATE\$ \$TIME\$

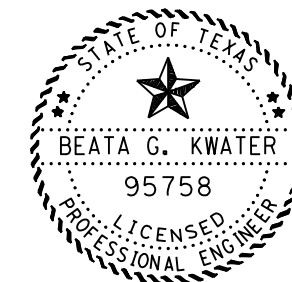


NOTES:

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LEGEND:

	PROP. 2" PLANE ASPH CONC PAV, ITEM 354
	PROP. UNDERSEAL COURSE, ITEM 3085
	PROP. 2" ACP OVERLAY TY-D SAC-A PG76-22, ITEM 3076



Beata Kwator, P.E.

1/20/2023

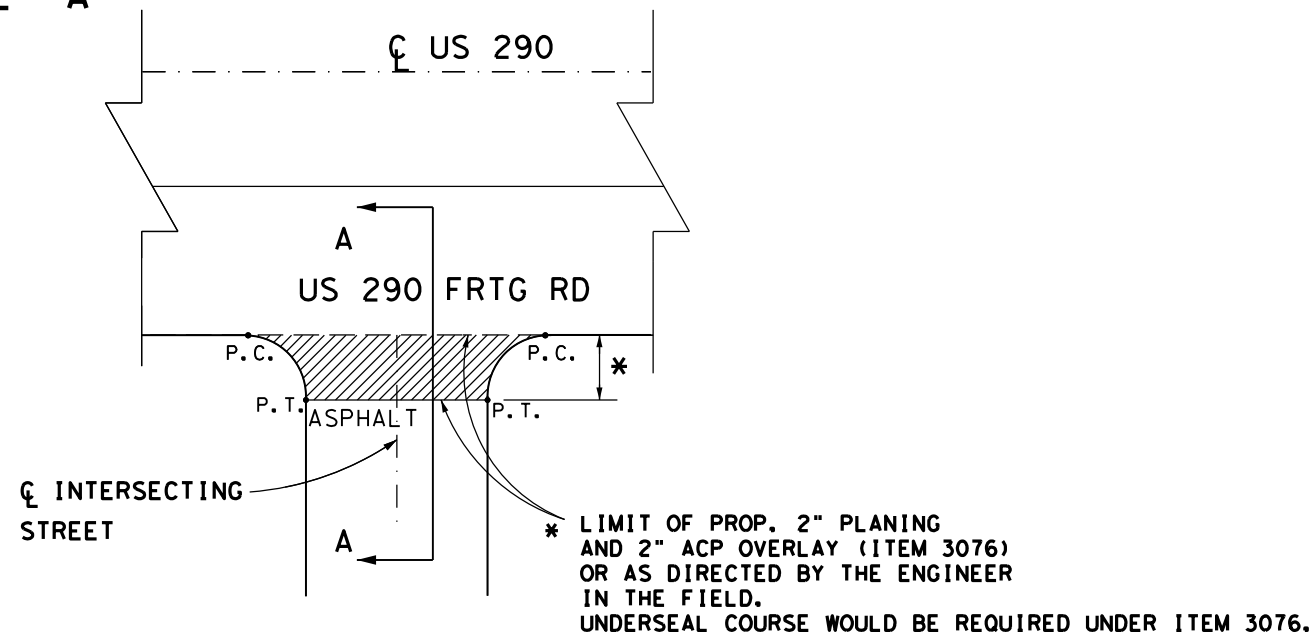
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US 290 FRTG RD
 PLAN LAYOUT

FED. RD. DIST. NO.		PROJECT NO.		SHEET NO.	
6				92	
STATE	DIST.	COUNTY			
TEXAS	HOU.	HARRIS			
CONT.	SECT.	JOB	HIGHWAY NO.		
0114	12	012	US 290		

\$DATE\$ \$TIME\$

DETAIL "A"

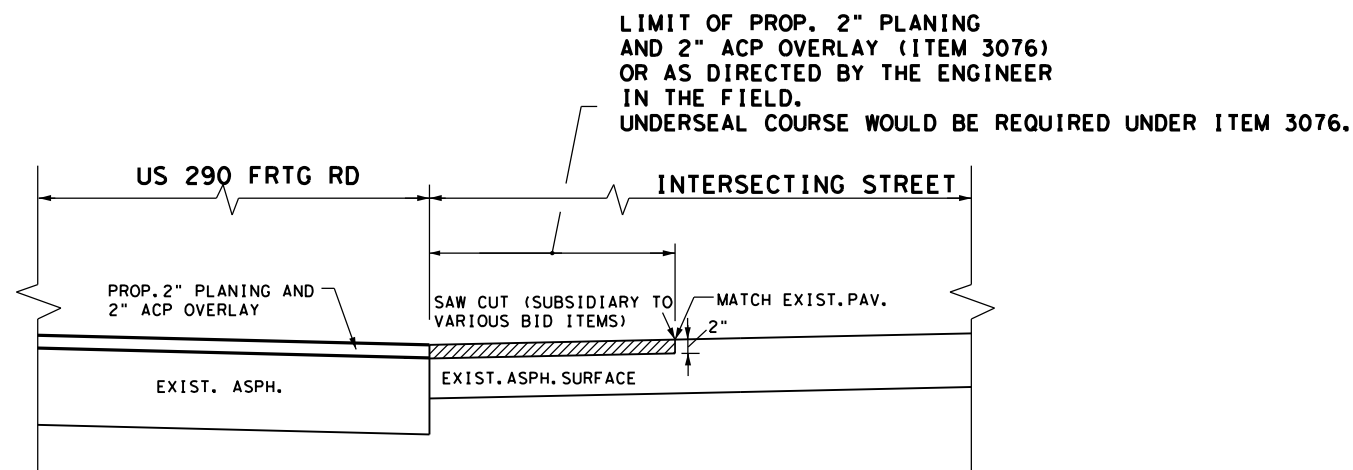


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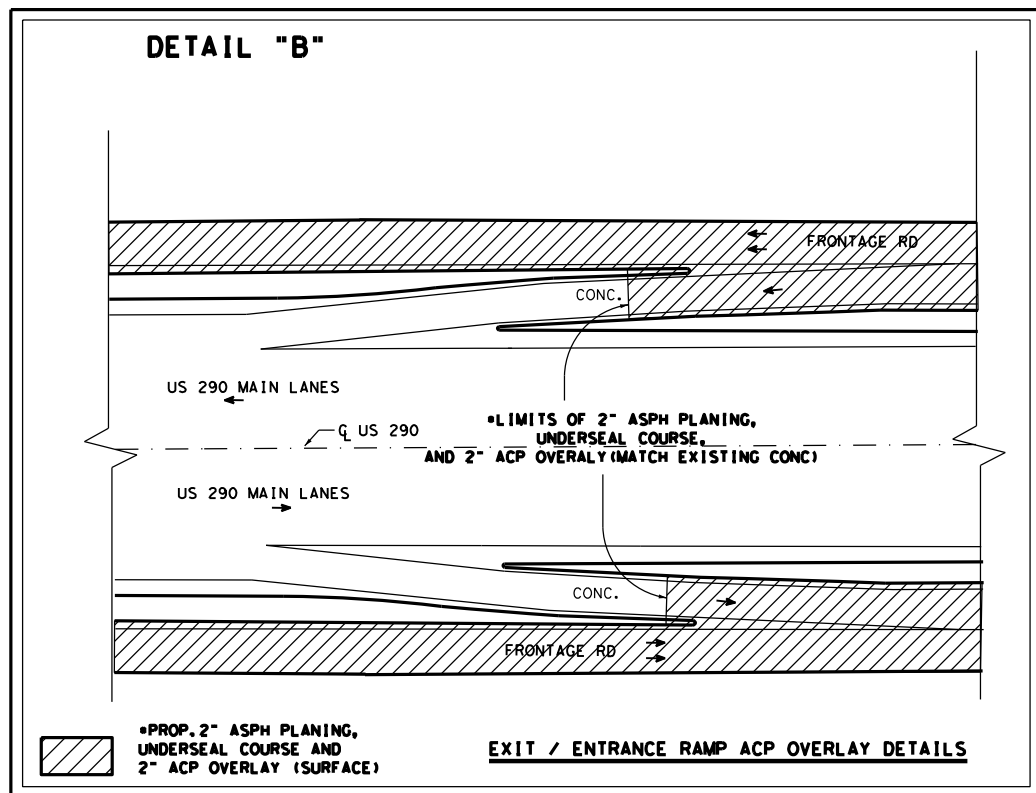


LIMIT OF PROP. 2" PLANING AND 2" ACP OVERLAY (ITEM 3076) OR AS DIRECTED BY THE ENGINEER IN THE FIELD. UNDERSEAL COURSE WOULD BE REQUIRED UNDER ITEM 3076.

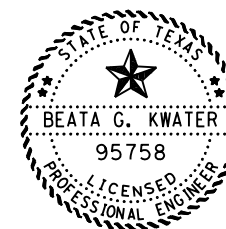
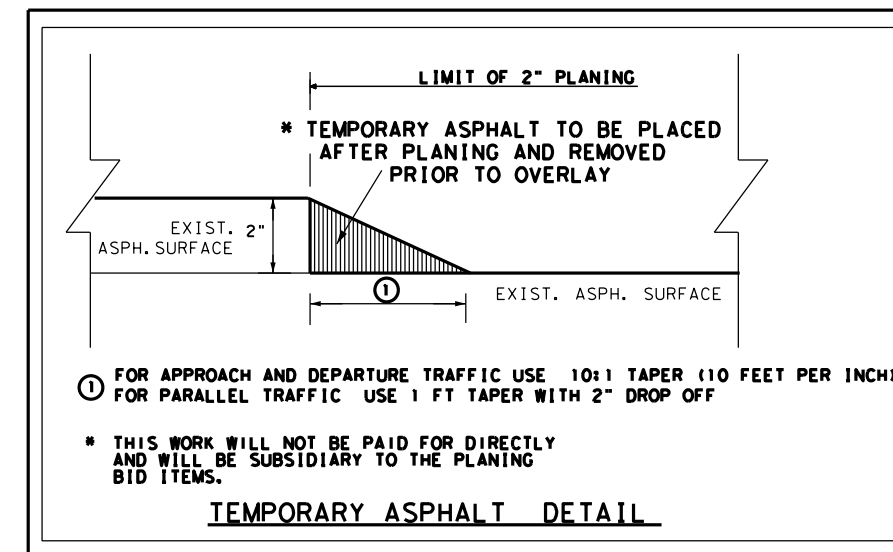
LIMIT OF PLANING AND ACP OVERLAY AT ASPHALT INTERSECTING STREETS (MAJOR AND MINOR)



SECTION "A - A"



LIMIT OF PLANING AND ACP OVERLAY AT EXIT/ENTRANCE RAMP



Beata Kwater, P.E.

1/20/2023

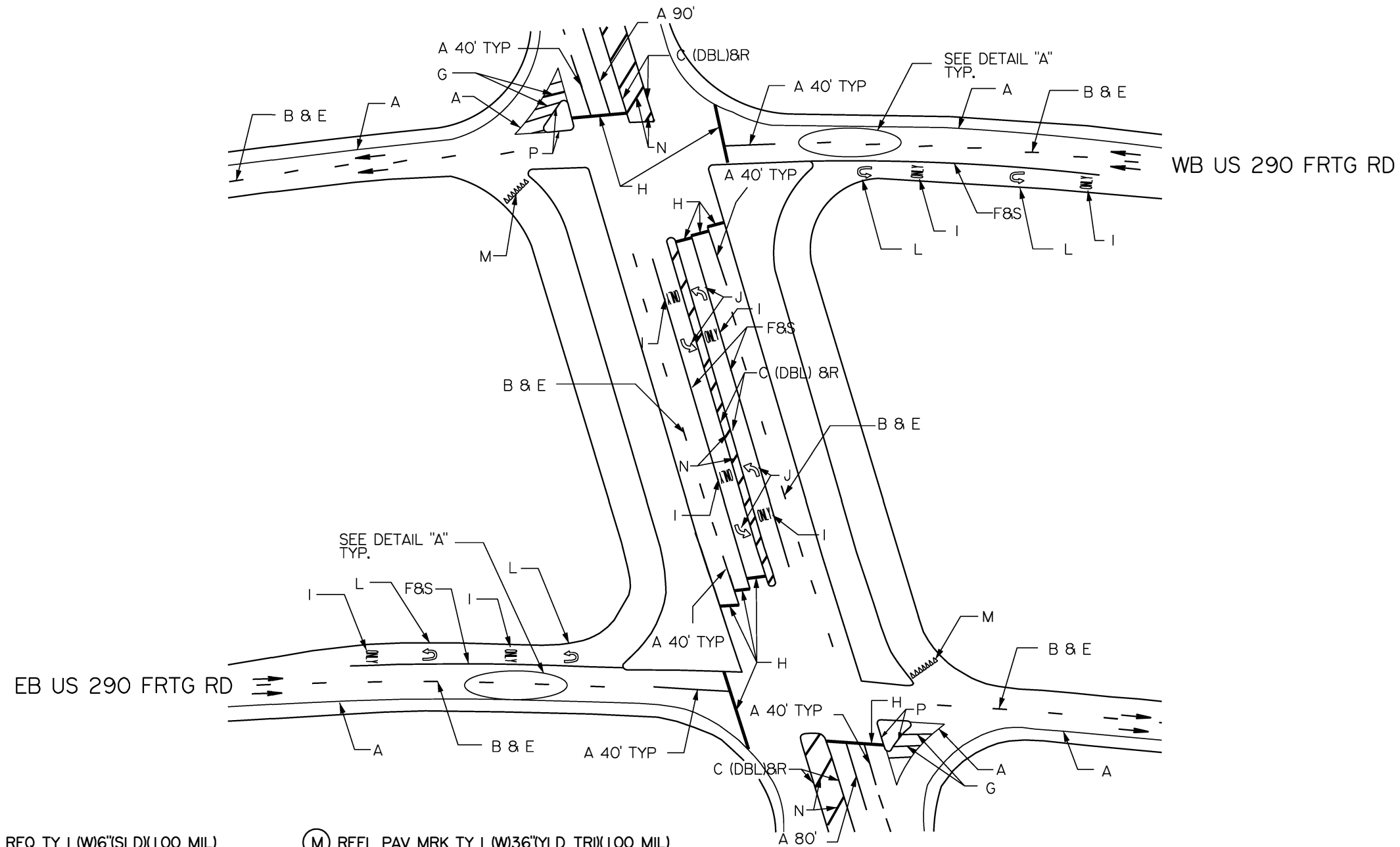


ACP OVERLAY DETAILS

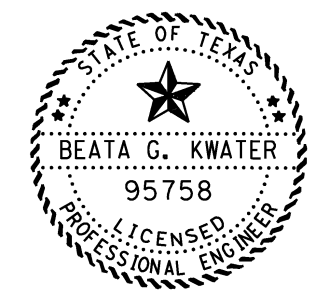
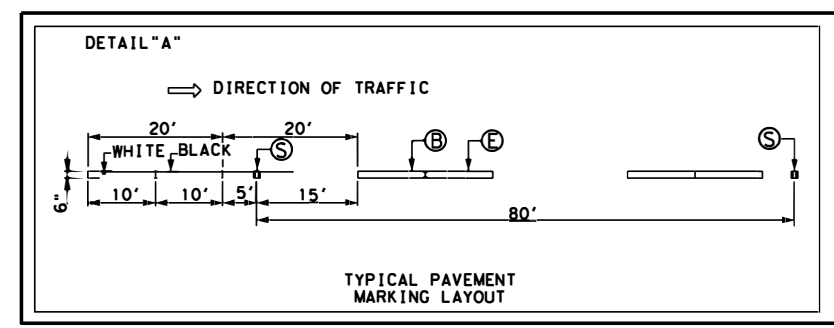
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			93
STATE	DIST.	COUNTY	
TEXAS	HOU	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

NTS

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- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL)
- (D) REFL PAV MRK TY I (W)6"(DOT)(100 MIL)
- (E) REFL PAV MRK TY I (BLACK)6"(SHADOW)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100 MIL)
- (G) REFL PAV MRK TY I (W)12"(SLD)(100 MIL)
- (H) REFL PAV MRK TY I (W)24"(SLD)(100 MIL)
- (I) REFL PAV MRK TY I (W)(WORD)
- (J) REFL PAV MRK TY I (W)(ARROW)
- (K) REFL PAV MRK TY I (W)(DBL ARROW)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW)
- (M) REFL PAV MRK TY I (W)36"(YLD TRI)(100 MIL)
- (N) REFL PAV MRK TY I (Y)12"(SLD)(100 MIL)
- (P) REFL PAV MRK TY II (W)12"(SLD)
- (R) REFL PAV MRKR TY II A-A
- (S) REFL PAV MRKR TY II C-R



Beata Kwater, P.E.
1/20/2023

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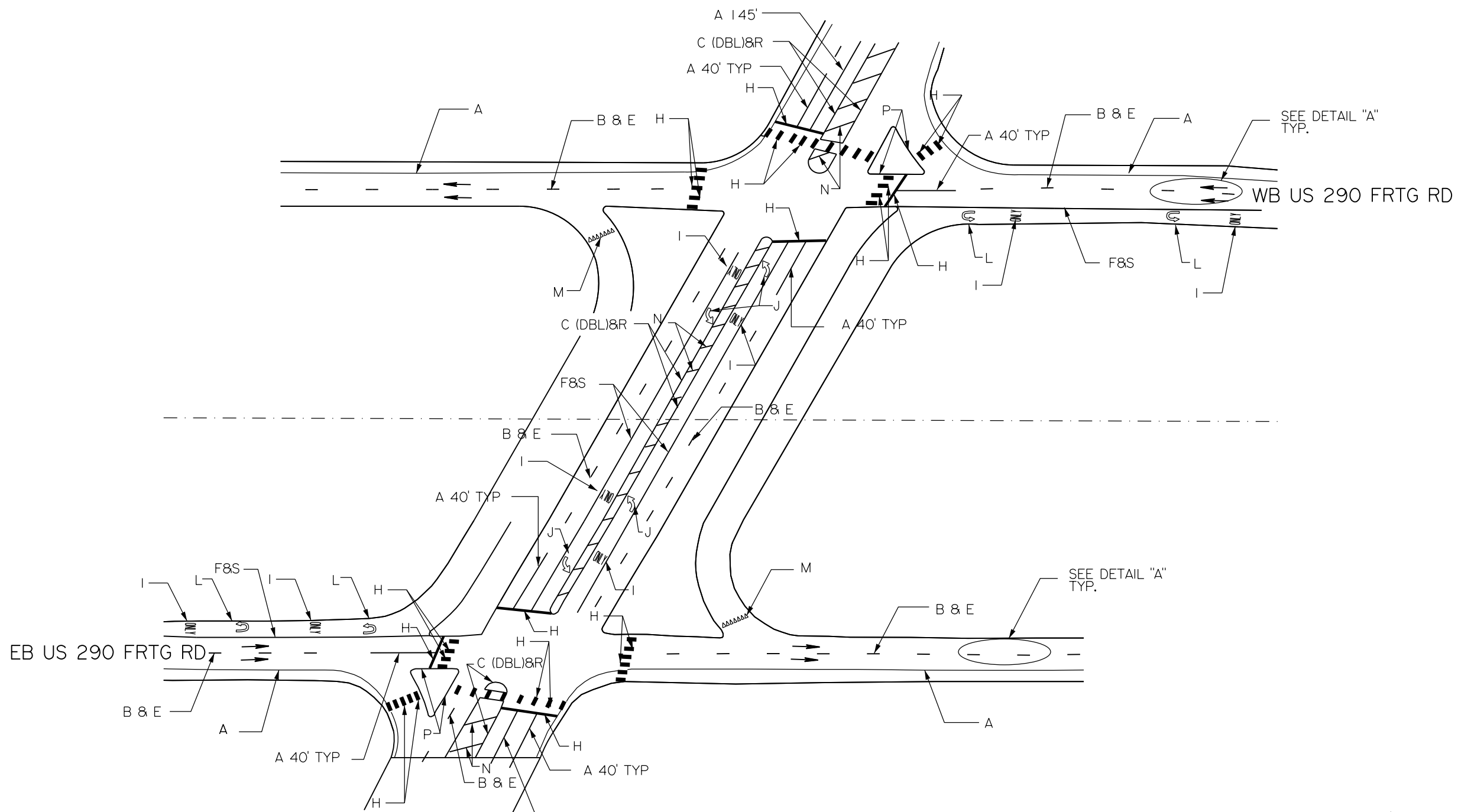
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FIELD STORE RD
PAVEMENT MARKING
LAYOUT

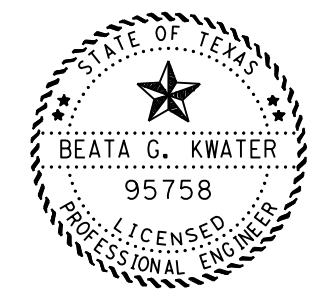
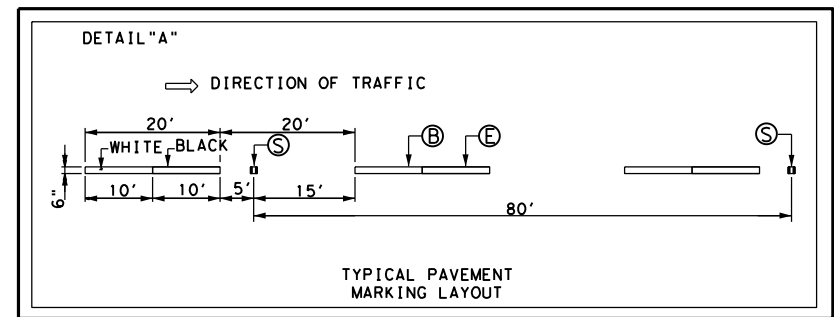
SHEET 1 OF 6

FED. RD. DIST. NO. 6		PROJECT NO.		SHEET NO. 94	
STATE TEXAS	DIST. HOU.	COUNTY HARRIS			
CONT. 0114	SECT. 12	JOB 012	HIGHWAY NO. US 290		

\$DATE\$ \$TIME\$



- FM 2920**
- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)
 - (B) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL)
 - (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL)
 - (D) REFL PAV MRK TY I (W)6"(DOT)(100 MIL)
 - (E) REFL PAV MRK TY I (BLACK)6"(SHADOW)(100 MIL)
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 - (R) REFL PAV MRKR TY II A-A
 - (S) REFL PAV MRKR TY II C-R



Beata Kwater, P.E.
 1/20/2023

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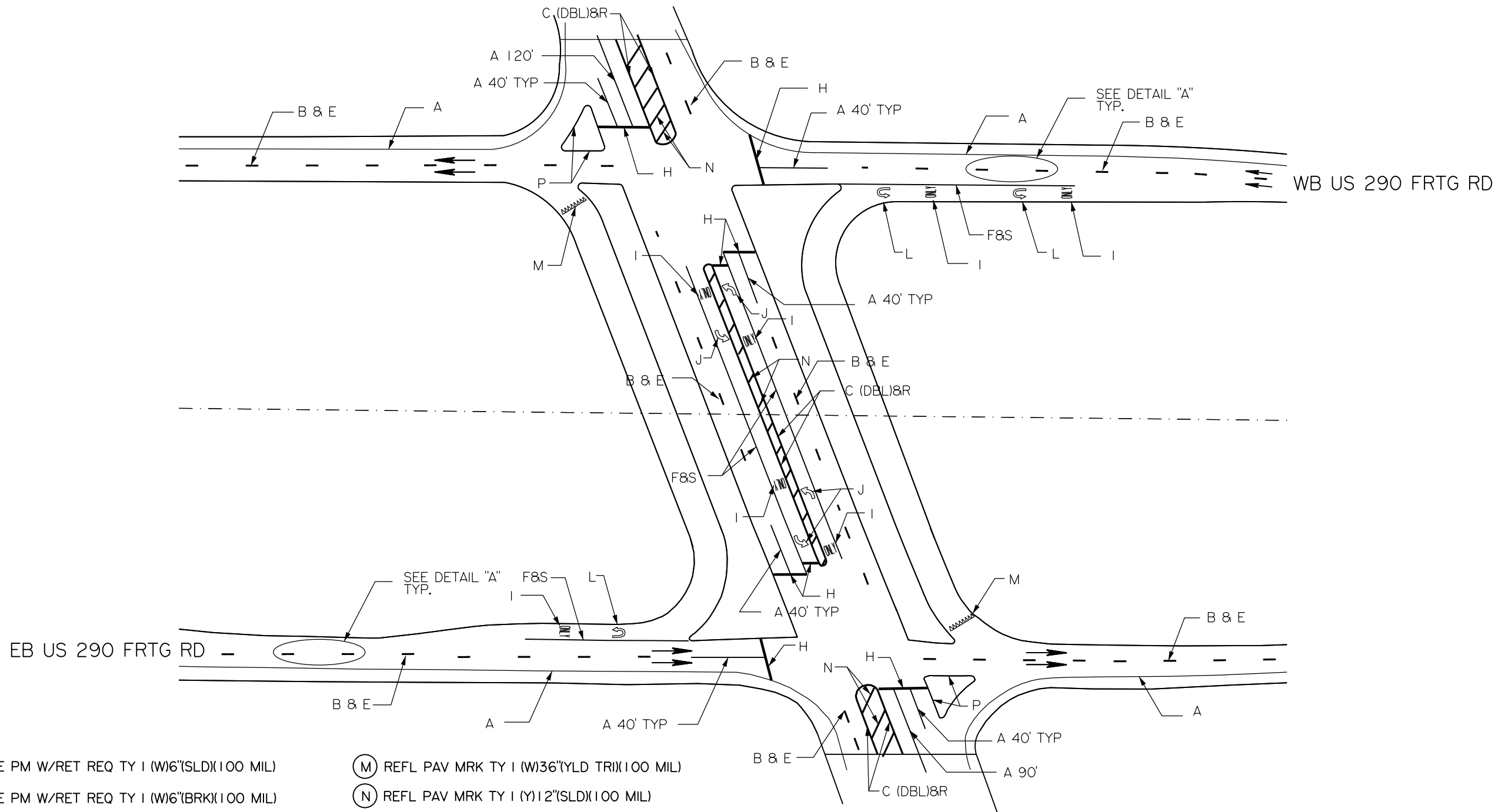
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FM 2920
 PAVEMENT MARKING LAYOUT

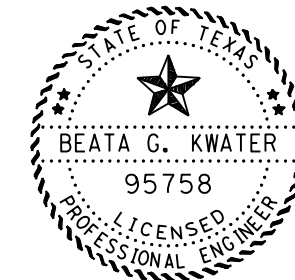
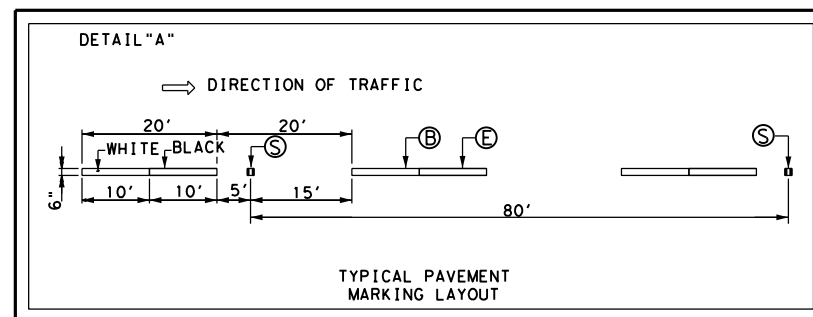
SHEET 2 OF 6

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.	
6		95	
STATE	DIST.	COUNTY	
TEXAS	HOU.	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

\$DATE\$ \$TIME\$



- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)
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- (R) REFL PAV MRKR TY II A-A
- (S) REFL PAV MRKR TY II C-R



Beata Kwater, P.E.

1/20/2023

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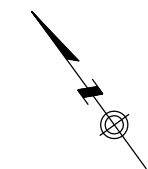
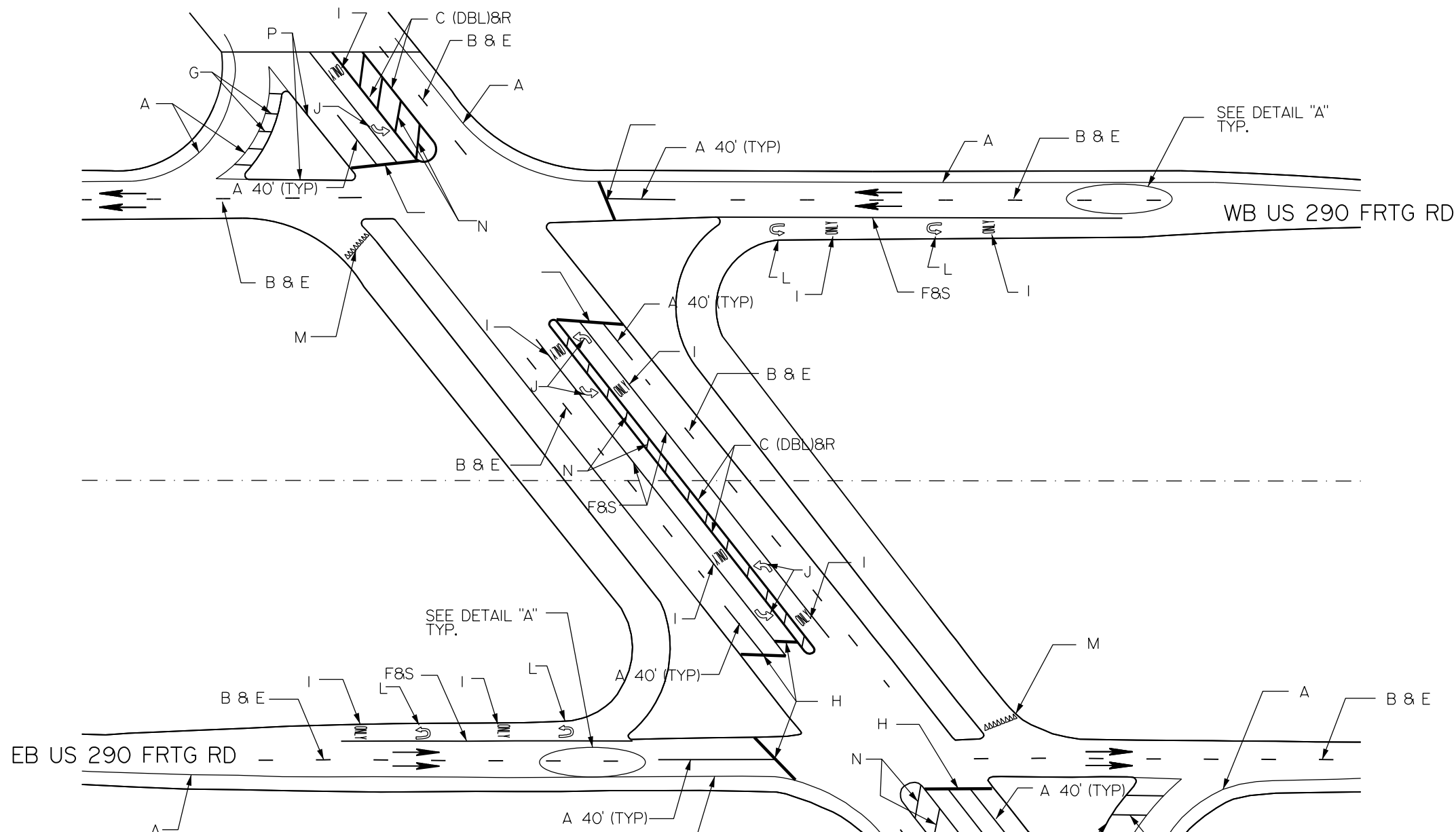
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BINFORD RD
PAVEMENT MARKING
LAYOUT

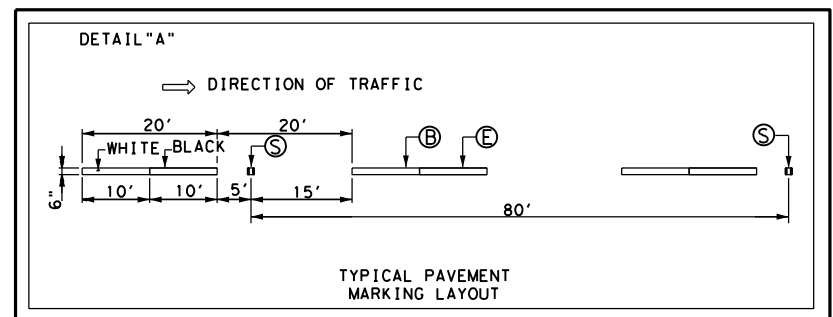
SHEET 3 OF 6

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.	96
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STATE	DIST.	COUNTY	
TEXAS	HOU.	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

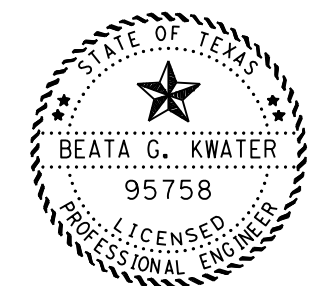
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- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL)
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- (R) REFL PAV MRKR TY II A-A
- (S) REFL PAV MRKR TY II C-R



KICKAPOO RD



Beata Kwater, P.E.

1/20/2023

N.T.S.

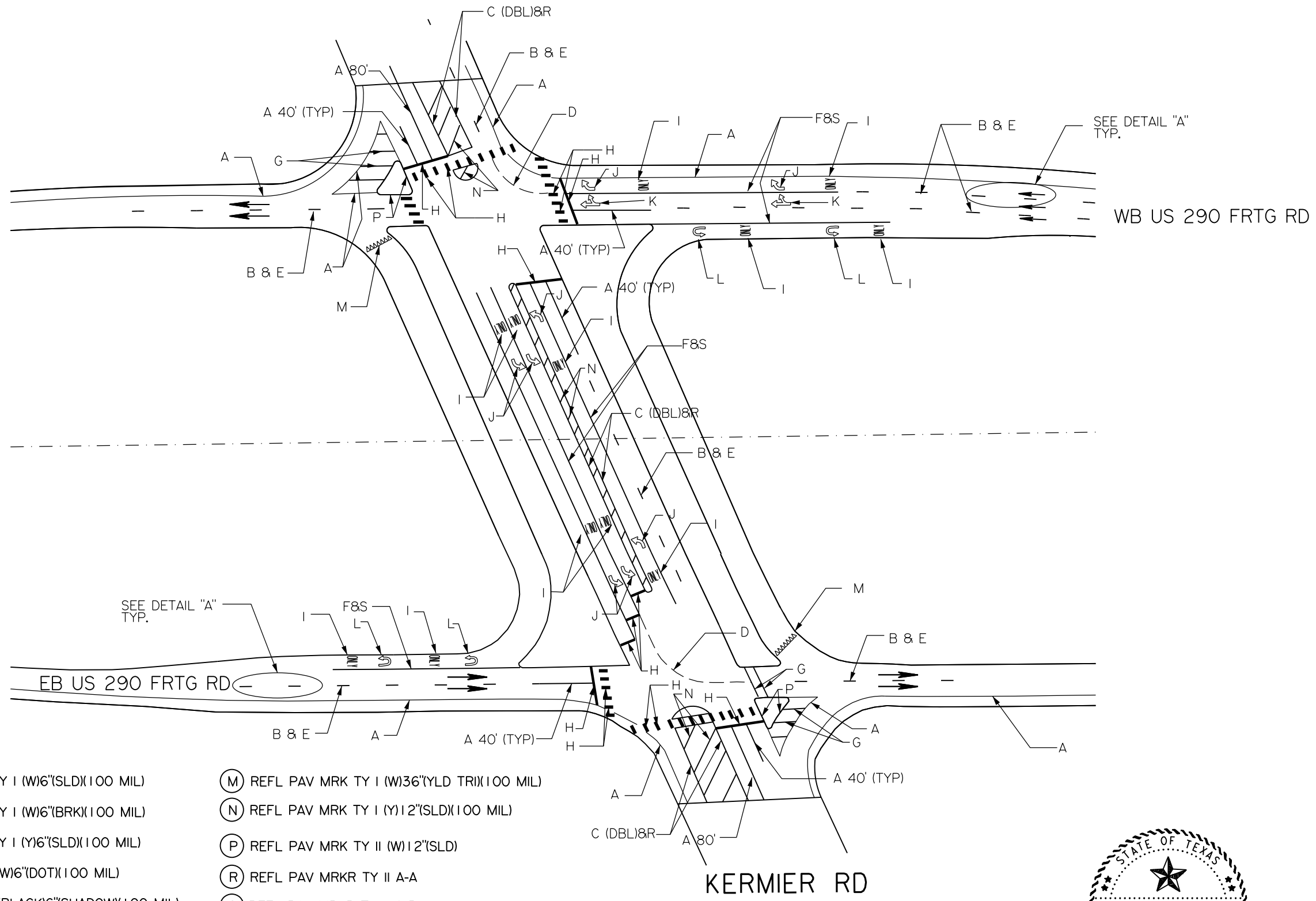
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KICKAPOO RD
PAVEMENT MARKING LAYOUT

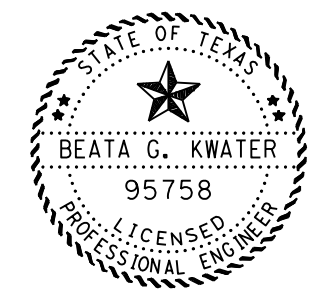
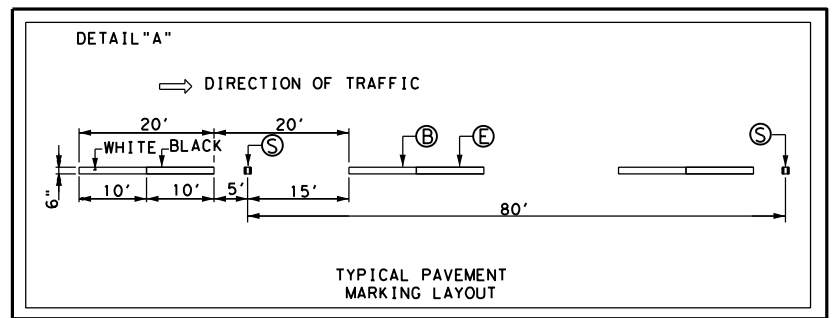
SHEET 4 OF 6

FED. RD. DIV. NO. 6		PROJECT NO.		SHEET NO. 97	
STATE TEXAS	DIST. HOU.	COUNTY HARRIS			
CONT. 0114	SECT. 12	JOB 012	HIGHWAY NO. US 290		

\$DATE\$ \$TIME\$



- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL)
- (D) REFL PAV MRK TY I (W)6"(DOT)(100 MIL)
- (E) REFL PAV MRK TY I (BLACK)6"(SHADOW)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100 MIL)
- (G) REFL PAV MRK TY I (W)12"(SLD)(100 MIL)
- (H) REFL PAV MRK TY I (W)24"(SLD)(100 MIL)
- (I) REFL PAV MRK TY I (W)(WORD)
- (J) REFL PAV MRK TY I (W)(ARROW)
- (K) REFL PAV MRK TY I (W)(DBL ARROW)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW)
- (M) REFL PAV MRK TY I (W)36"(YLD TRI)(100 MIL)
- (N) REFL PAV MRK TY I (Y)12"(SLD)(100 MIL)
- (P) REFL PAV MRK TY II (W)12"(SLD)
- (R) REFL PAV MRKR TY II A-A
- (S) REFL PAV MRKR TY II C-R



Beata Kwater, P.E.

1/20/2023

N.T.S.

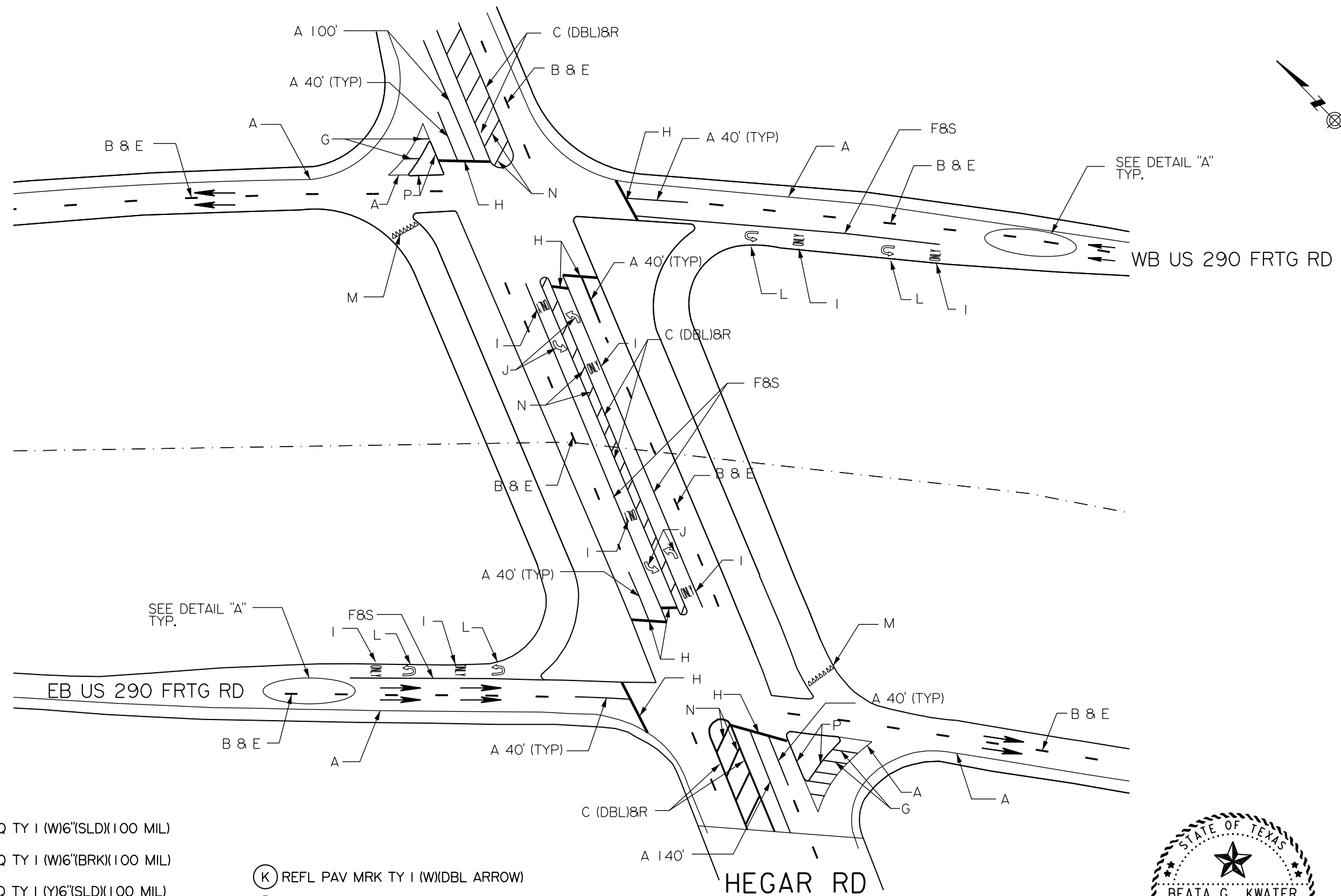
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KERMIER RD
PAVEMENT MARKING LAYOUT

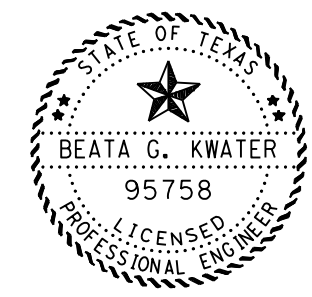
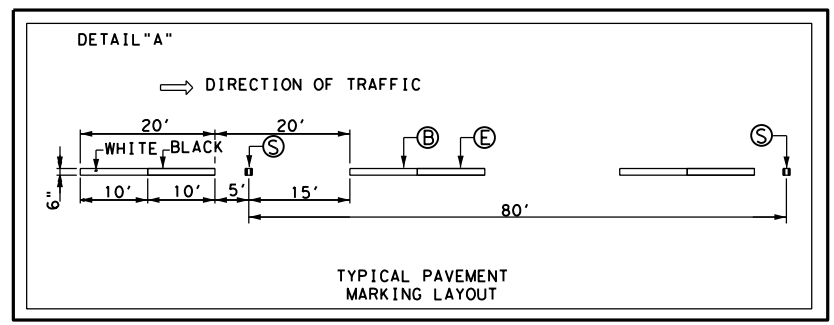
SHEET 5 OF 6

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			98
STATE	DIST.	COUNTY	
TEXAS	HOU.	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290

\$DATE\$ \$TIME\$



- (A) RE PM W/RET REQ TY I (W)6"(SLD)(100 MIL)
- (B) RE PM W/RET REQ TY I (W)6"(BRK)(100 MIL)
- (C) RE PM W/RET REQ TY I (Y)6"(SLD)(100 MIL)
- (D) REFL PAV MRK TY I (W)6"(DOT)(100 MIL)
- (E) REFL PAV MRK TY I (BLACK)6"(SHADOW)(100 MIL)
- (F) REFL PAV MRK TY I (W)8"(SLD)(100 MIL)
- (G) REFL PAV MRK TY I (W)12"(SLD)(100 MIL)
- (H) REFL PAV MRK TY I (W)24"(SLD)(100 MIL)
- (I) REFL PAV MRK TY I (W)(WORD)
- (J) REFL PAV MRK TY I (W)(ARROW)
- (K) REFL PAV MRK TY I (W)(DBL ARROW)
- (L) REFL PAV MRK TY I (W)(UTURN ARROW)
- (M) REFL PAV MRK TY I (W)36"(YLD TRI)(100 MIL)
- (N) REFL PAV MRK TY I (Y)12"(SLD)(100 MIL)
- (P) REFL PAV MRK TY II (W)12"(SLD)
- (R) REFL PAV MRKR TY II A-A
- (S) REFL PAV MRKR TY II C-R



Beata Kwator, P.E.
1/20/2023

N.T.S.

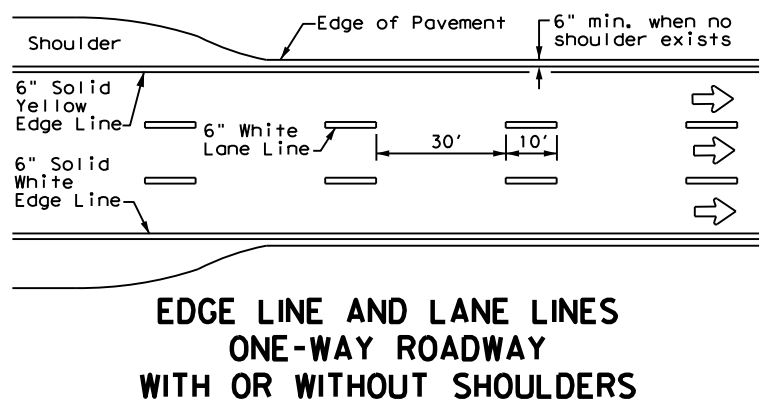
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HEGAR RD
PAVEMENT MARKING LAYOUT

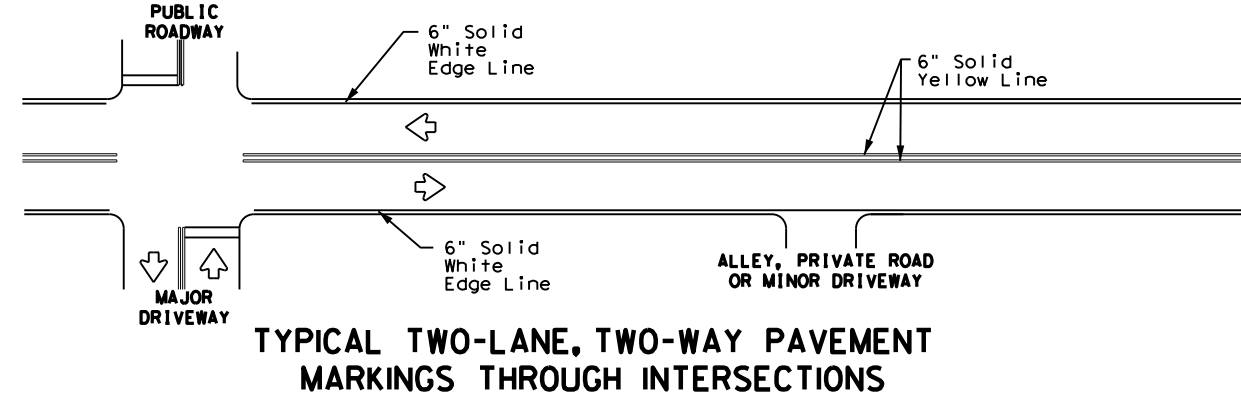
SHEET 6 OF 6

FED. RD. DIST. NO.	PROJECT NO.		SHEET NO.
6			99
STATE	DIST.	COUNTY	
TEXAS	HOU.	HARRIS	
CONT.	SECT.	JOB	HIGHWAY NO.
0114	12	012	US 290
\$DATE\$		\$TIME\$	

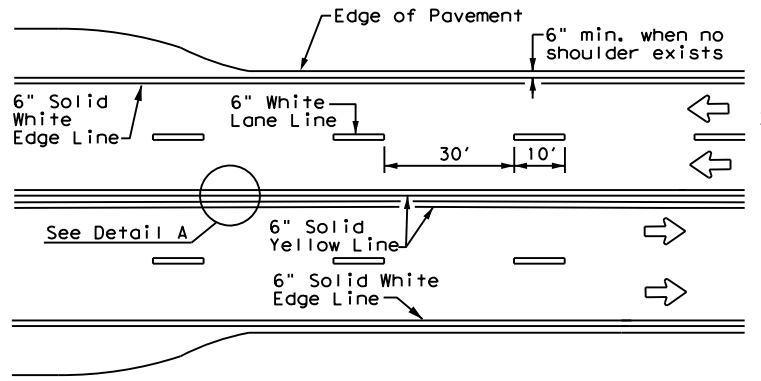
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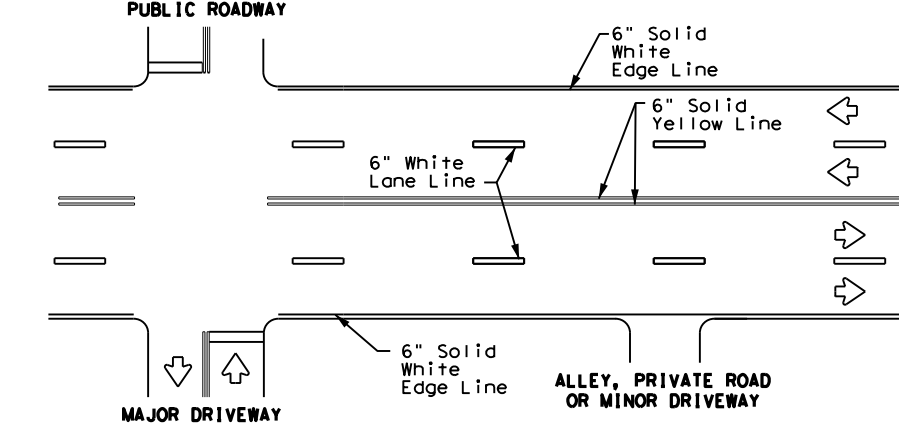
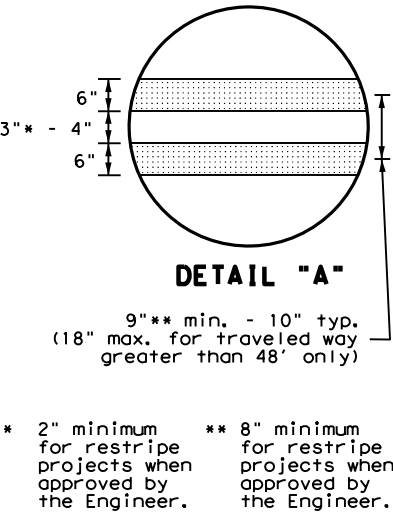
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



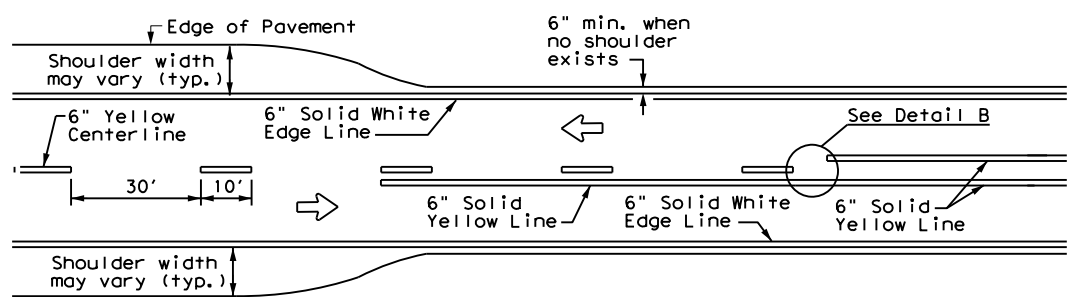
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



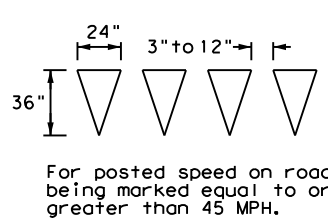
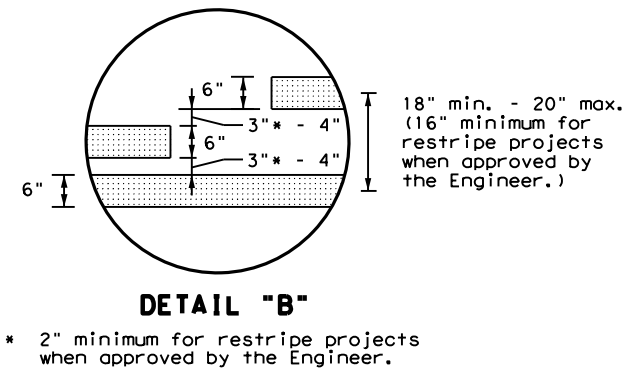
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



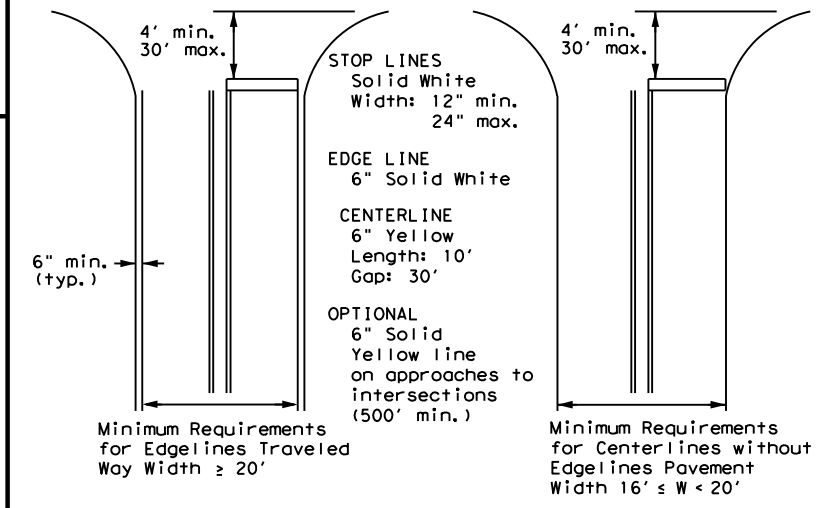
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

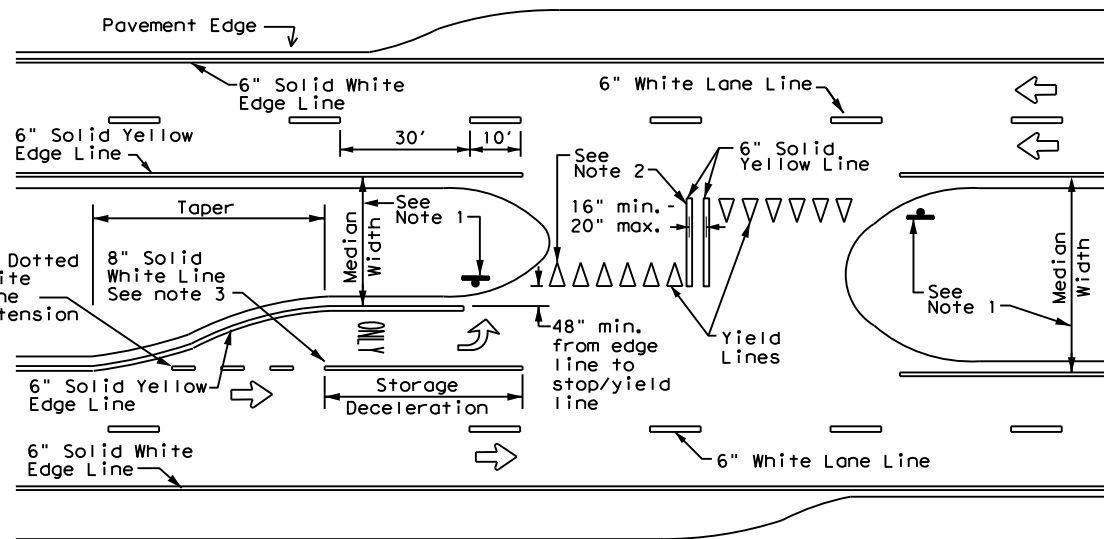


YIELD LINES



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



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

- 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.
- 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.
- 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

- 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.
- 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.



**TYPICAL STANDARD
PAVEMENT MARKINGS**

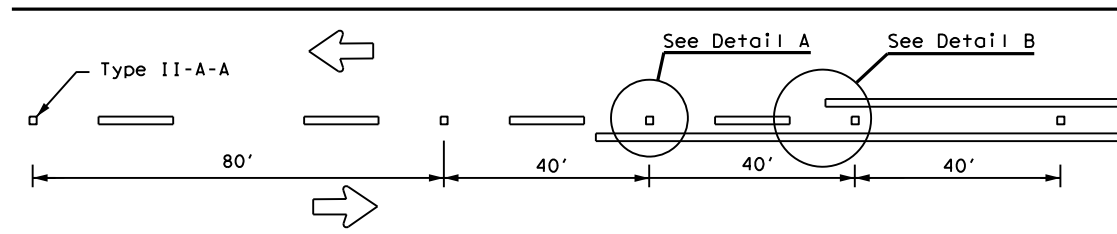
PM(1)-22

FILE:	pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
11-78	8-00 6-20	0114	12	012	US 290
8-95	3-03 12-22	DIST	COUNTY	SHEET NO.	
5-00	2-12	HOU	HARRIS	100	

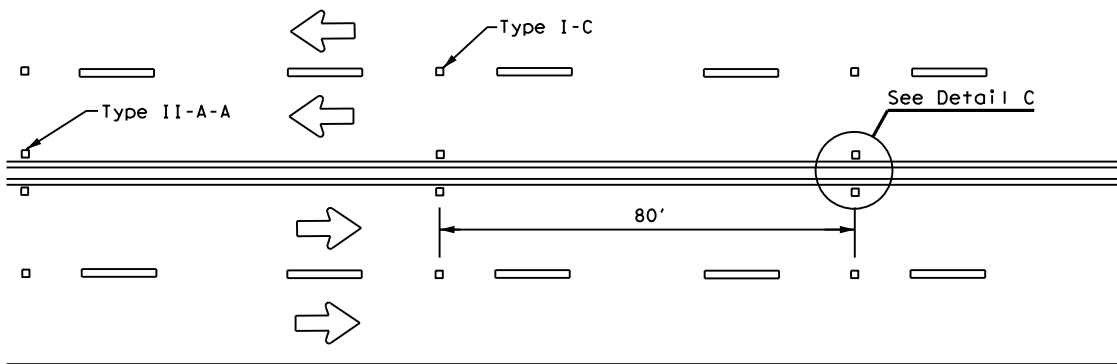
DATE:
FILE:

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

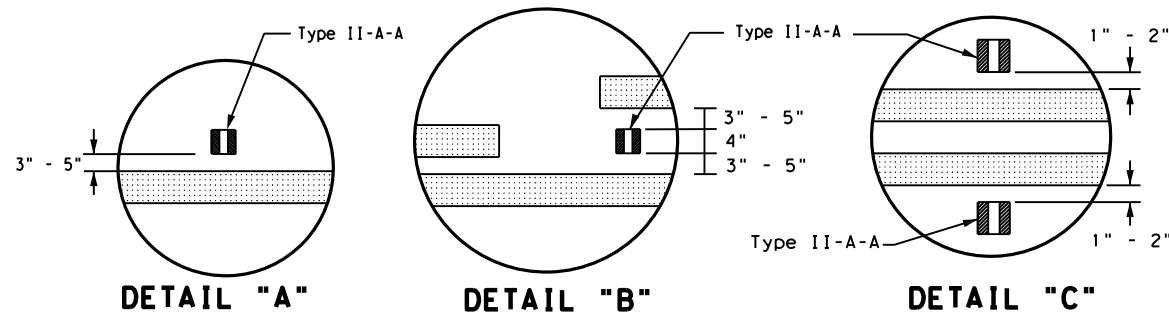
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CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



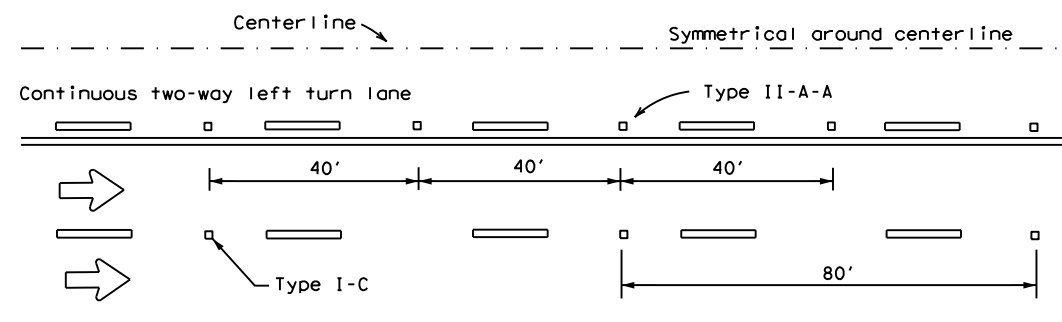
**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY ROADWAYS**



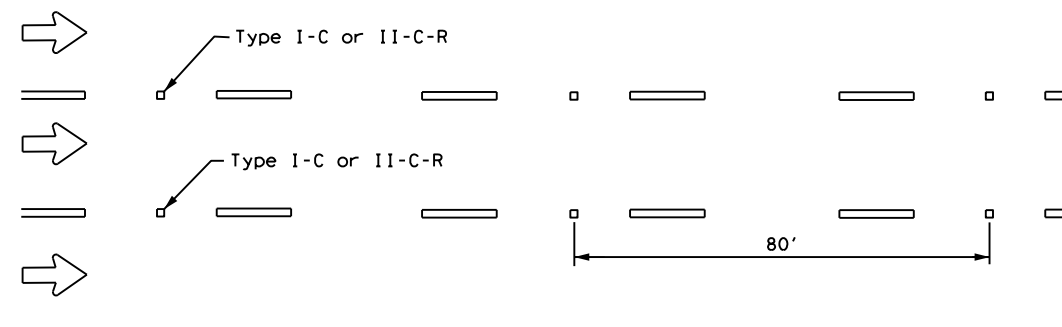
DETAIL "A"

DETAIL "B"

DETAIL "C"

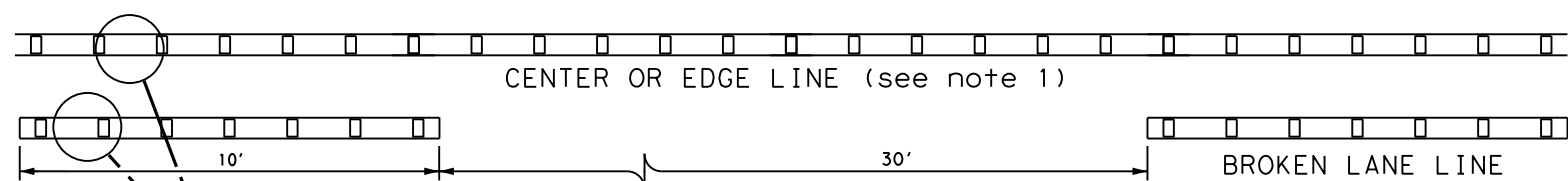


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



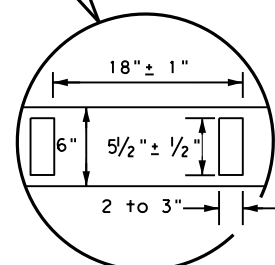
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.
See Note 3.



CENTER OR EDGE LINE (see note 1)

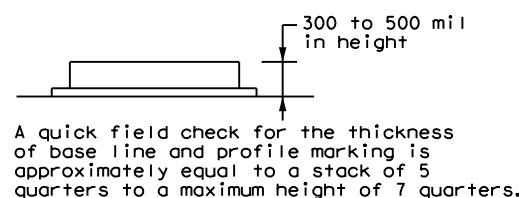
BROKEN LANE LINE



**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

6" EDGE LINE, 6" CENTERLINE
OR 6" LANE LINE



A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

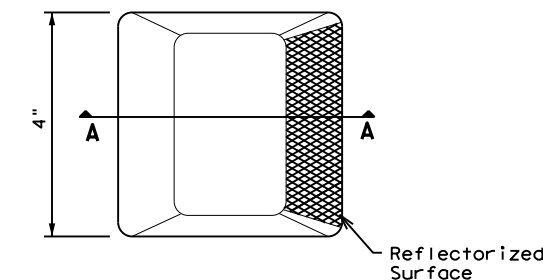
1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

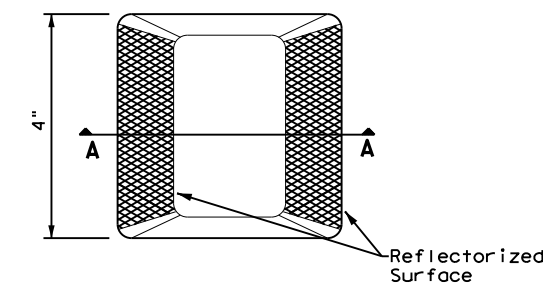
1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians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

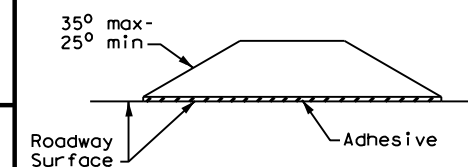
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



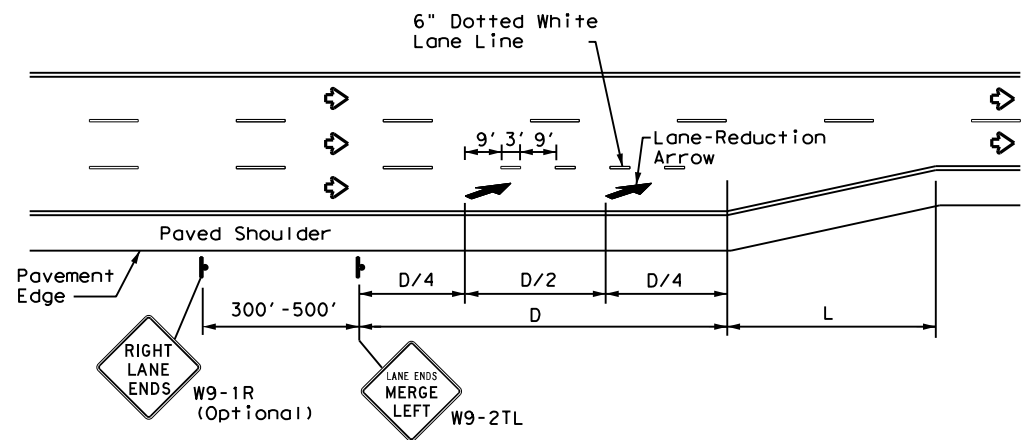
**POSITION GUIDANCE USING
RAISED MARKERS
REFLECTORIZED PROFILE
MARKINGS
PM(2) - 22**

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
	0114	12	012	US 290
4-77 8-00 6-20	DIST	COUNTY	SHEET NO.	
4-92 2-10 12-22	HOU	HARRIS	101	
5-00 2-12				

DATE:
FILE:

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DATE: FILE:



LANE REDUCTION

NOTES

- 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.
- 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.
- 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.
- For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

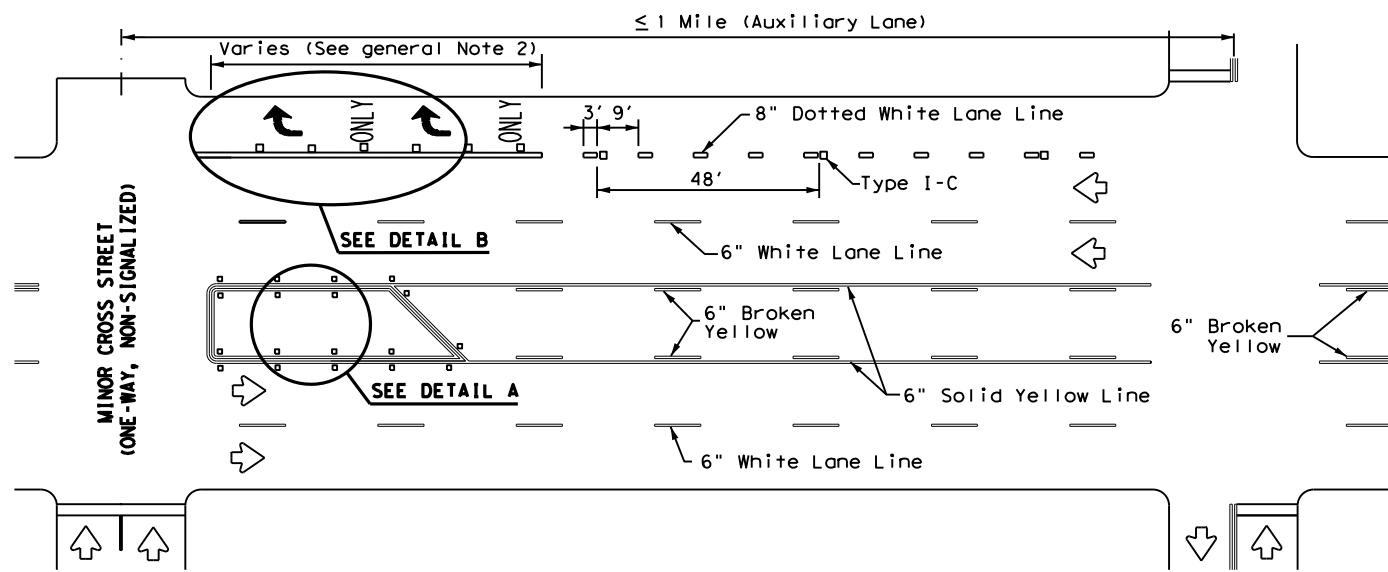
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L = \frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

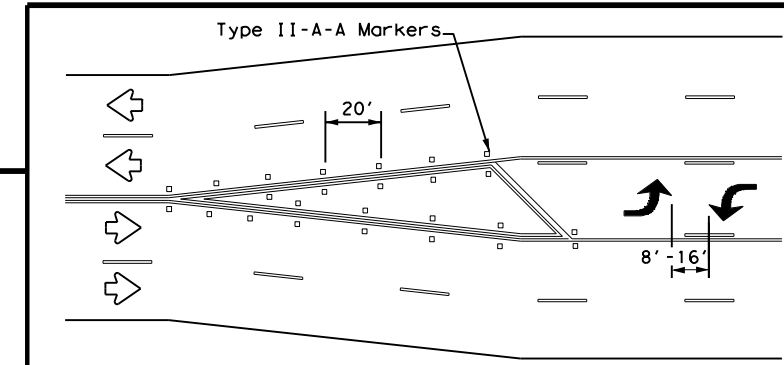
- Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
- 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.
- 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.
- 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.

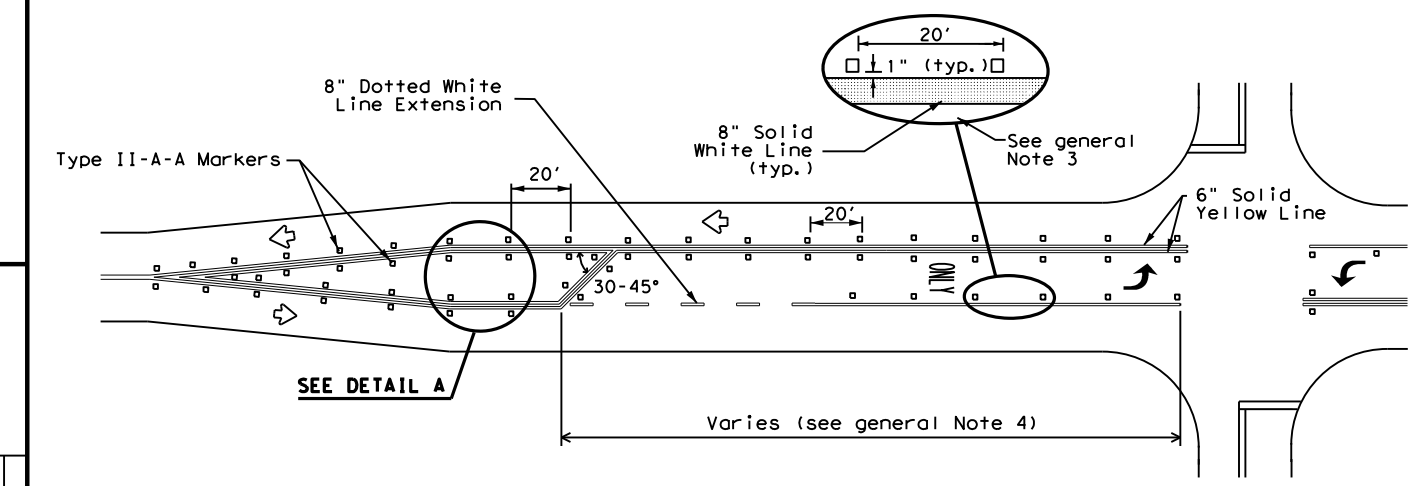


TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE

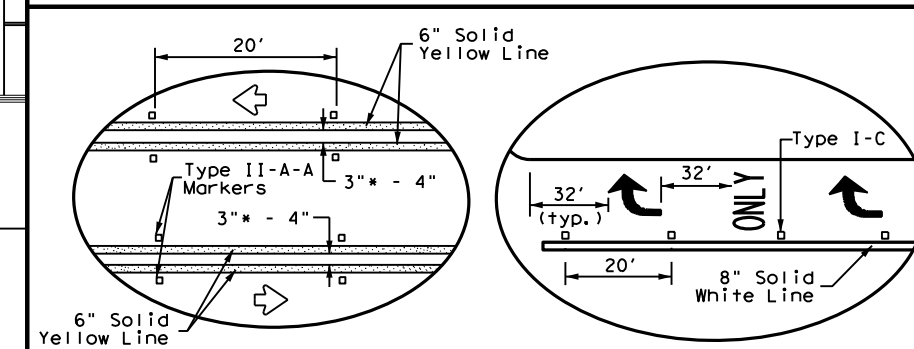


A two-way left-turn (TWLTL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



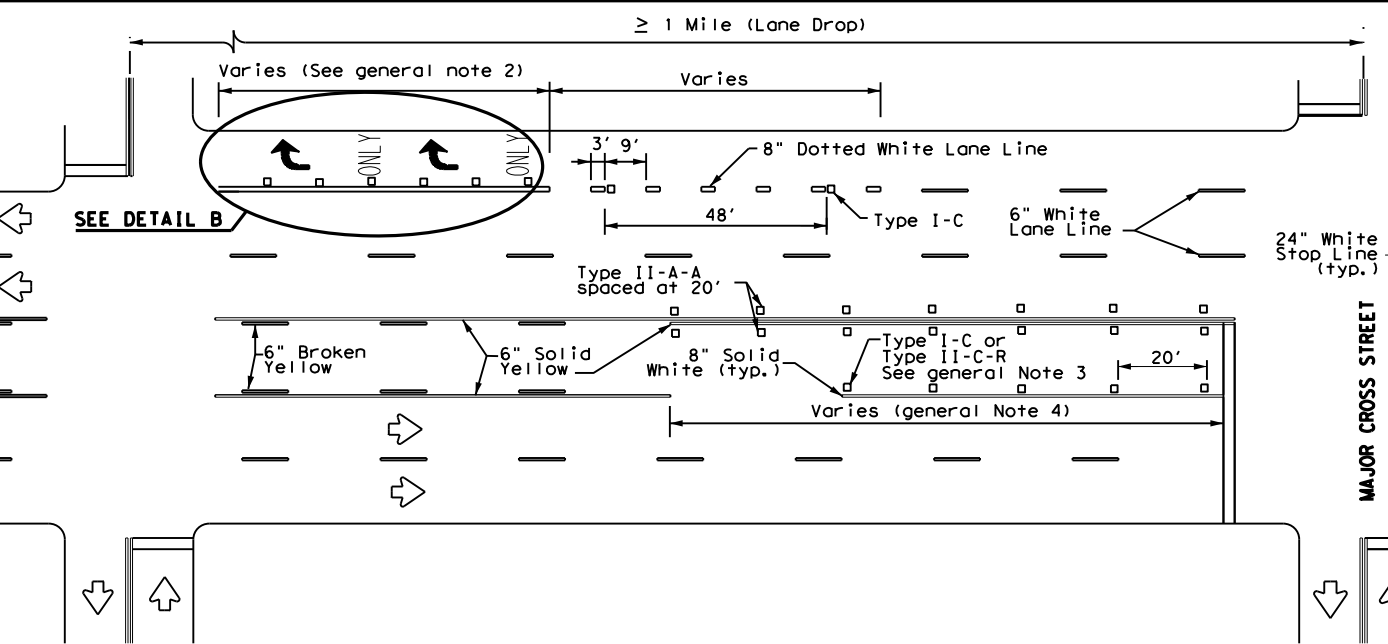
TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A

DETAIL B

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



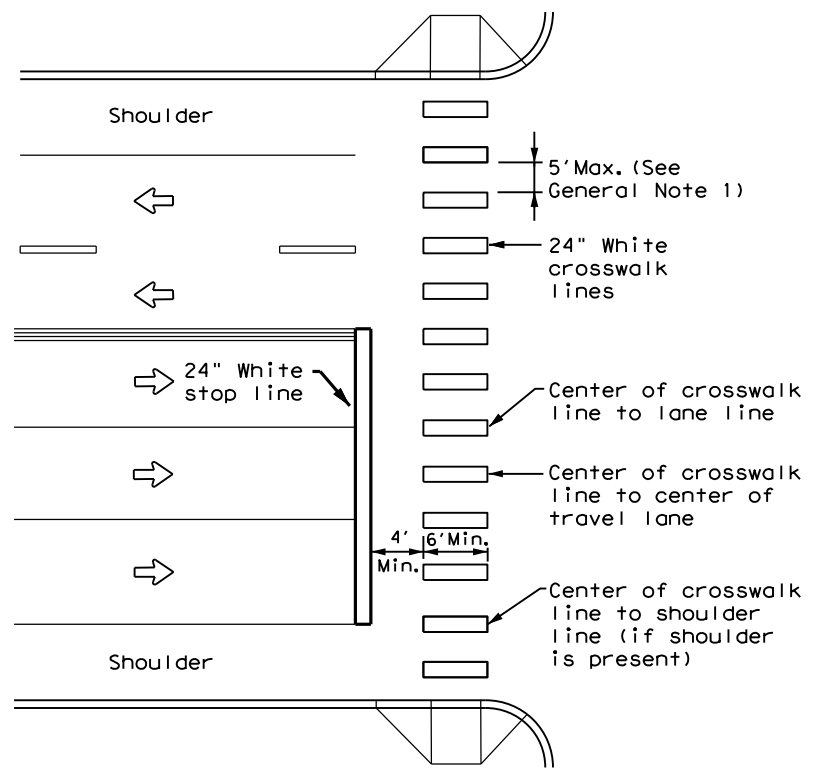
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP

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	0114	12	012	US 290
4-98 3-03 6-20	DIST	COUNTY	SHEET NO.	
5-00 2-10 12-22	HOU	HARRIS	102	
8-00 2-12				

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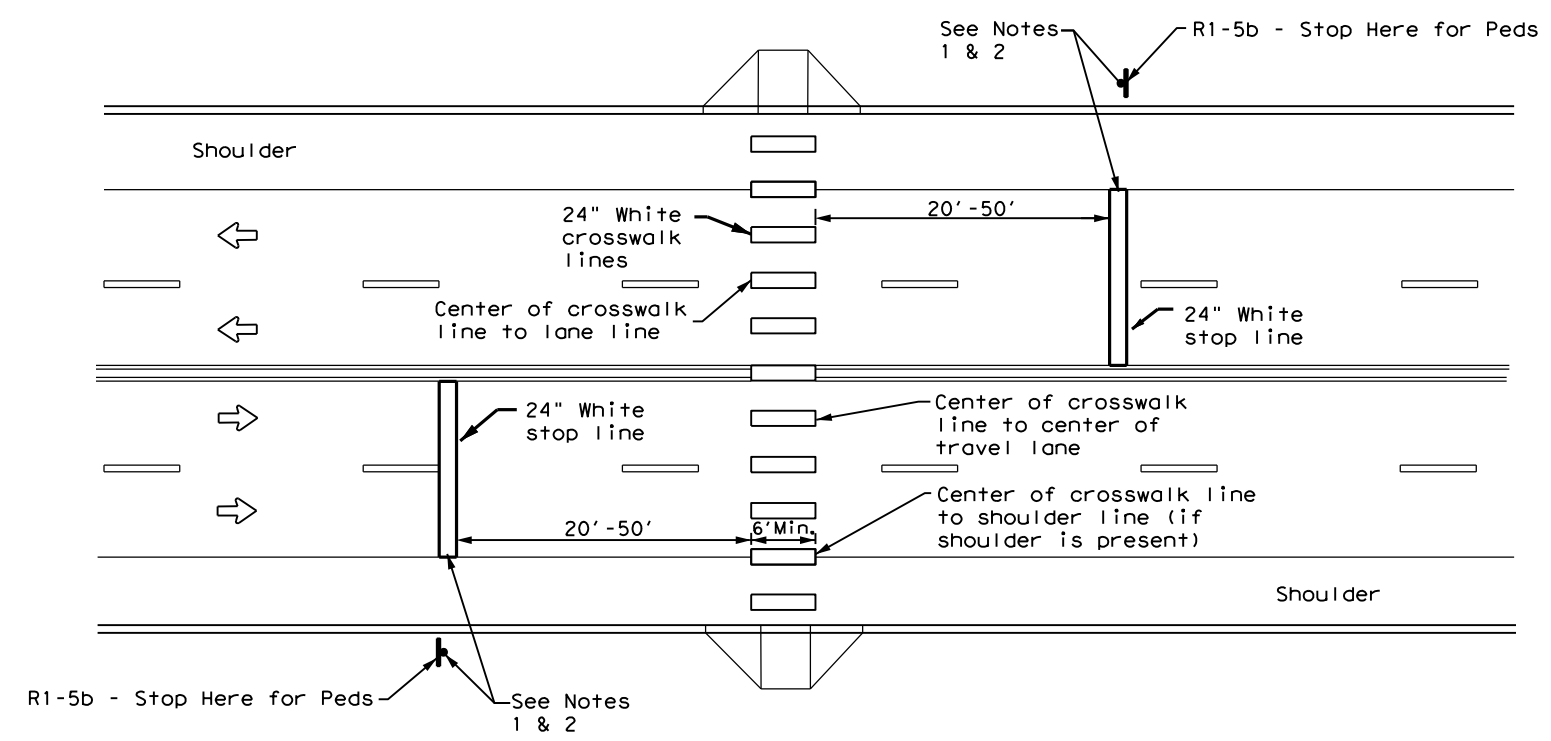
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

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

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

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



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with "Stop Here for Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

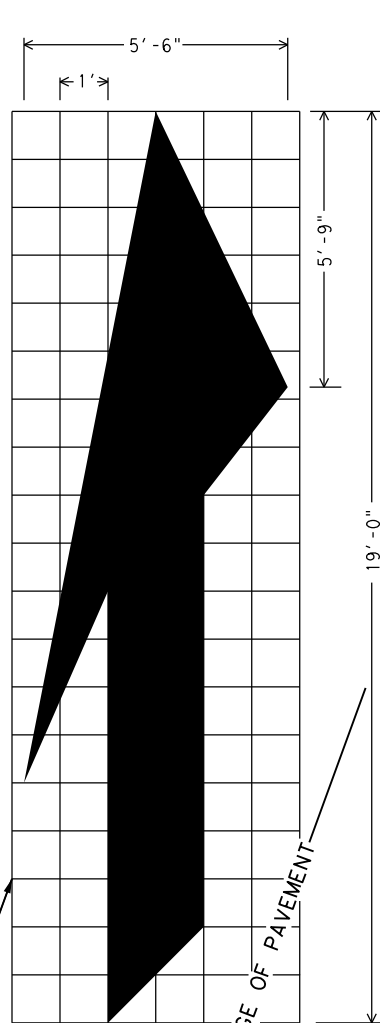
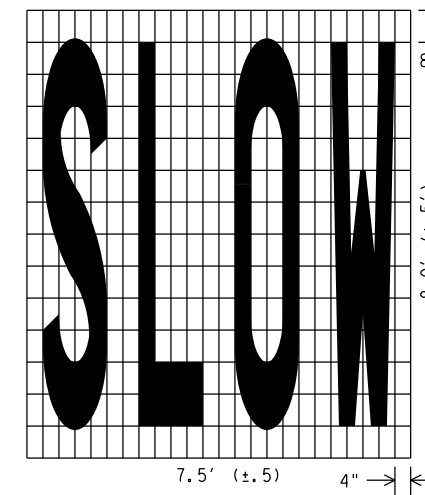
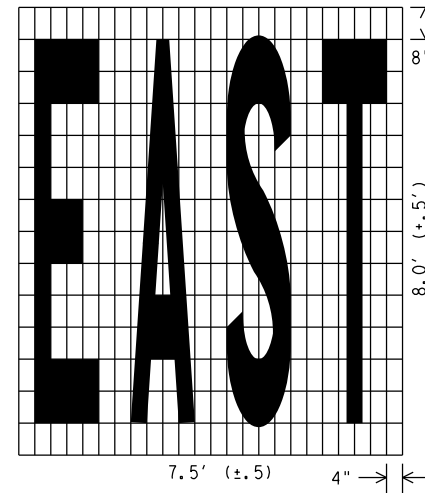
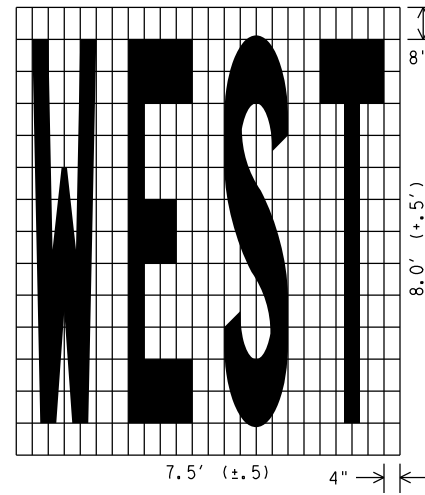
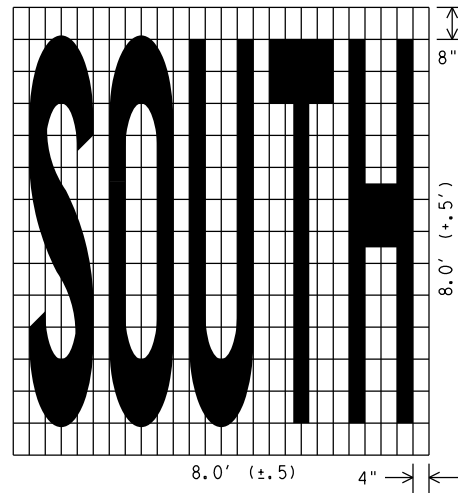
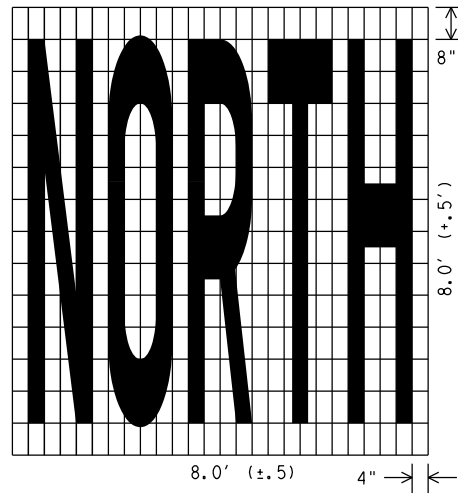
Texas Department of Transportation
Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4) - 22

FILE: pm4-22.dgn	DN:	CK:	DW:	CK:
© TxDOT June 2020	CONT	SECT	JOB	HIGHWAY
3-22 REVISIONS	0114	12	012	US 290
	DIST	COUNTY		SHEET NO.
	HOU	HARRIS		103

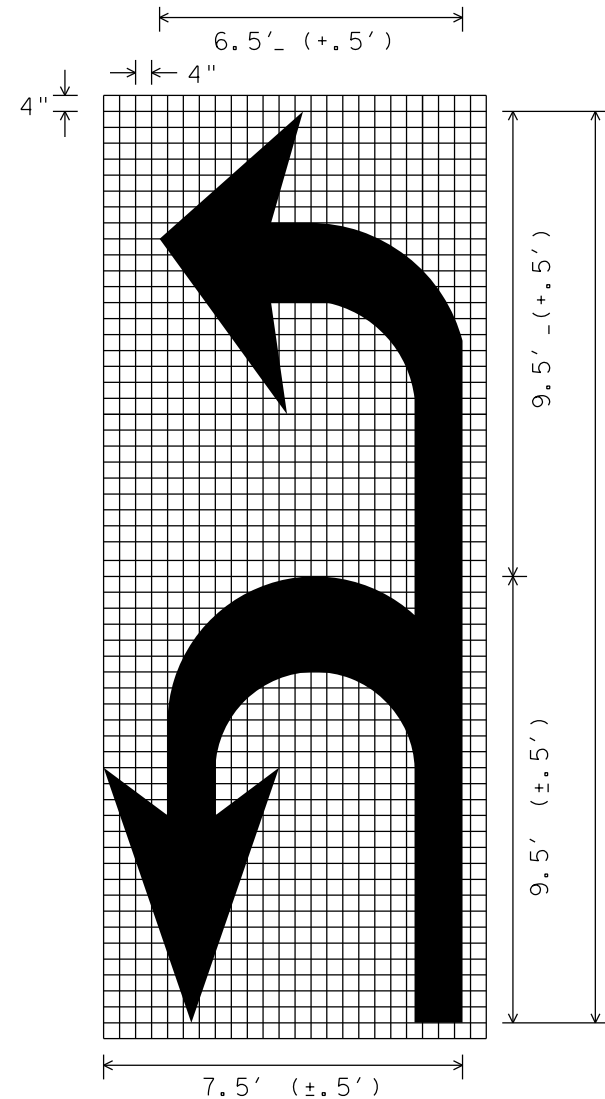
DATE:
FILE:



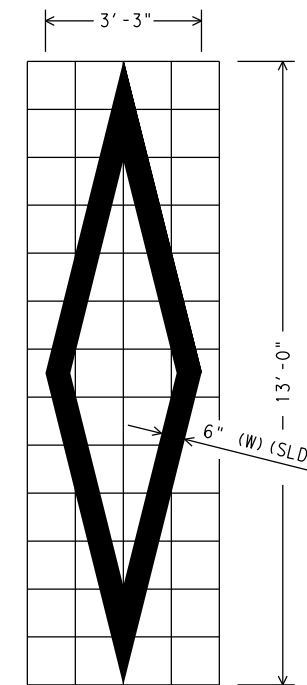
DIRECTION OF VIEW

ISOMETRIC ARROW

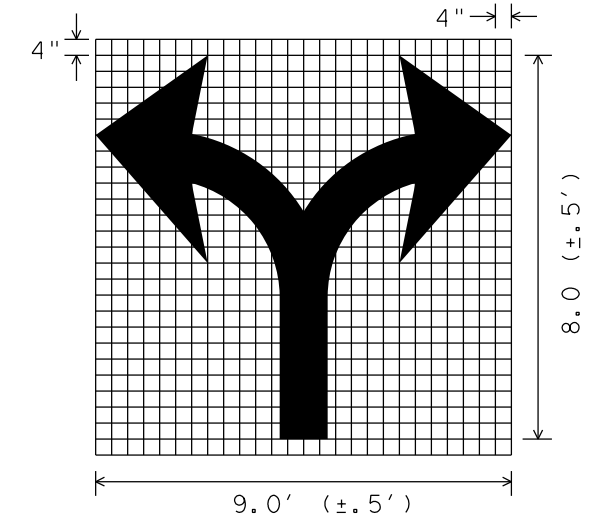
12 INCH GRID
 AREA = 42 SQ. FT.
 RIGHT LANE DROP ARROW
 (FOR LEFT LANE, USE MIRROR IMAGE)



U-L ARROW

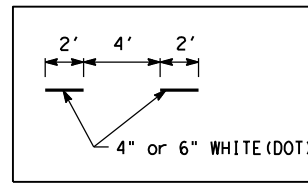


DIAMOND SYMBOL

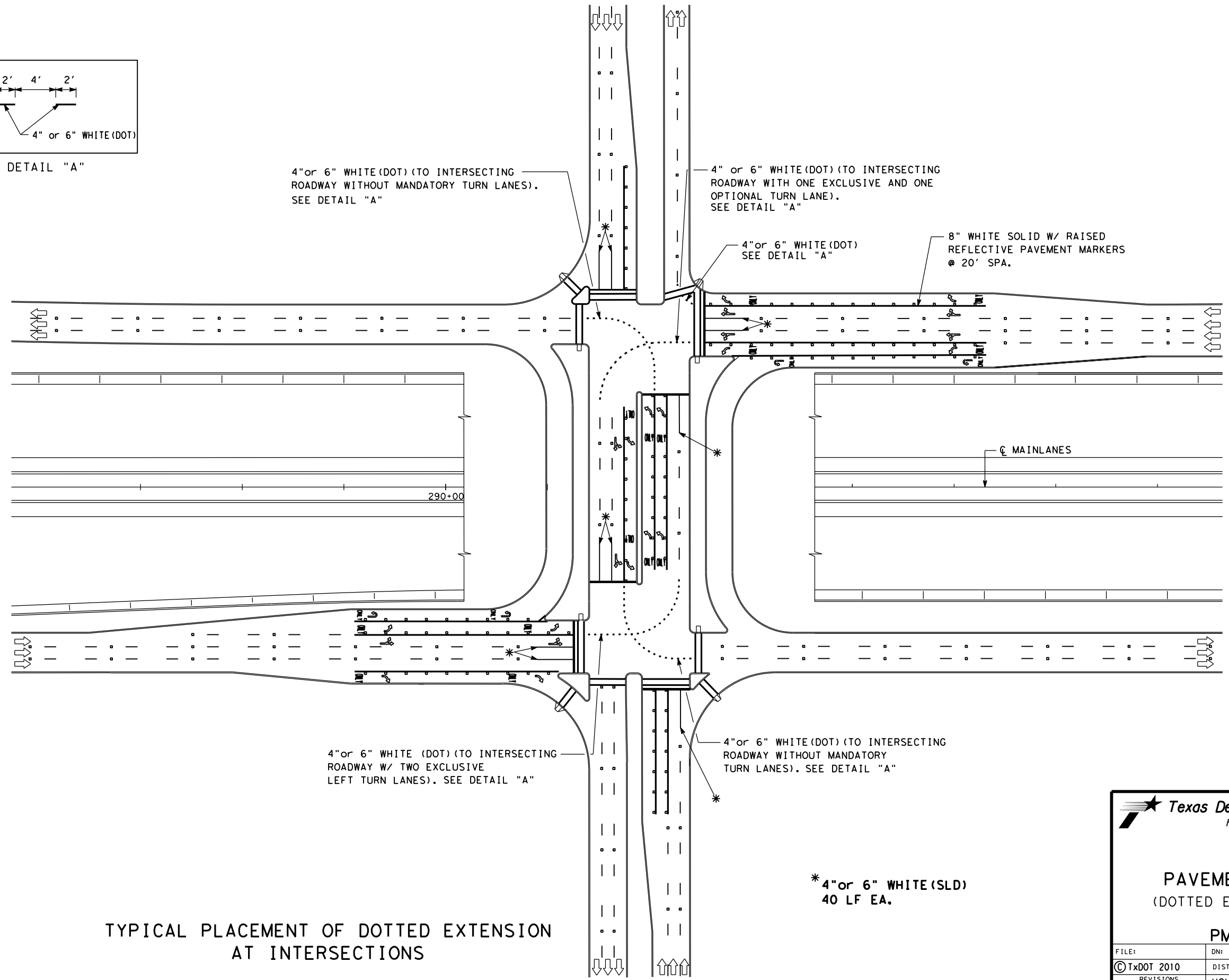


SCALE 1/4" = 1'

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			104				
COUNTY		CONTROL	SECT	JOB	HIGHWAY				
HARRIS		0114	12	012	US 290				



DETAIL "A"



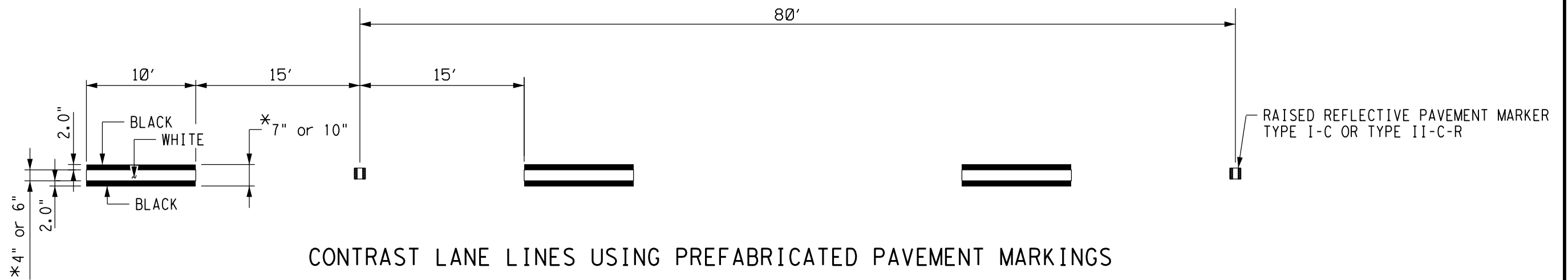
TYPICAL PLACEMENT OF DOTTED EXTENSION AT INTERSECTIONS



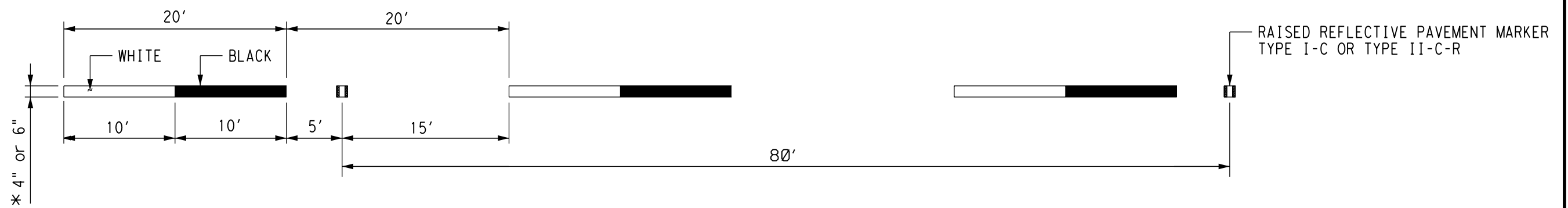
PAVEMENT MARKINGS
(DOTTED EXTENSION DETAILS)

PM(DOT) - 11

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2010	DIST	FED REG	PROJECT NO.	SHEET
4/2010	HOU	6		105
4/2011	COUNTY	CONTROL	SECT	JOB
	HARRIS	0114	12	012
				HIGHWAY
				US 290



➔ DIRECTION OF TRAFFIC

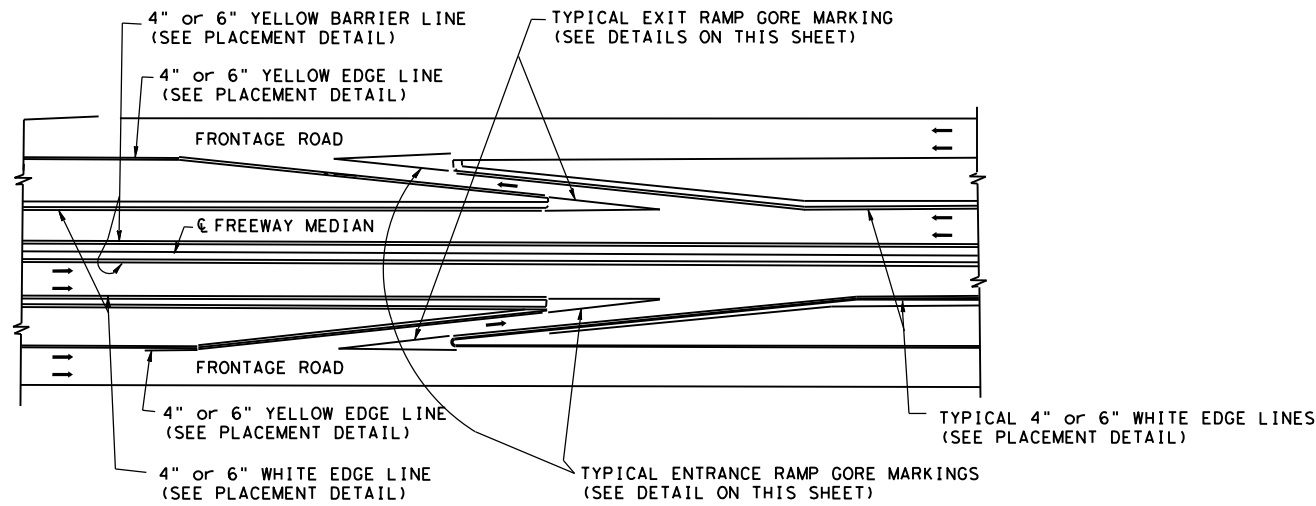


* AS SHOWN ON THE PLANS.

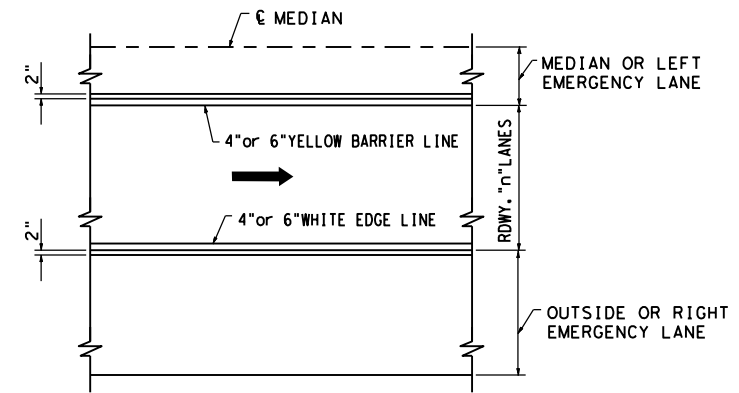
PAVEMENT MARKINGS
(CONTRAST LANE LINES)

PM (CLL) - 14

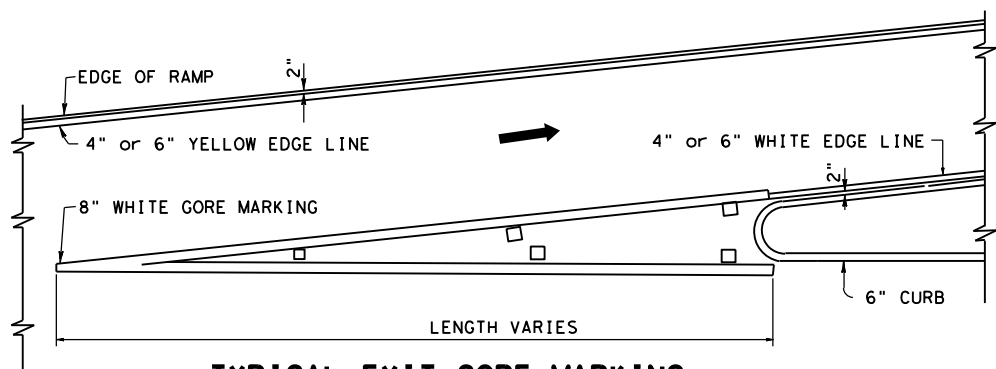
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© TxDOT 2003	DIST	FED REG	PROJECT NO.	SHEET
01-19-08 02-19-08 10-2019 9" to 10"	HOU	6		106
	COUNTY	CONTROL	SECT	JOB
	HARRIS	0114	12	012
				HIGHWAY
				US 290



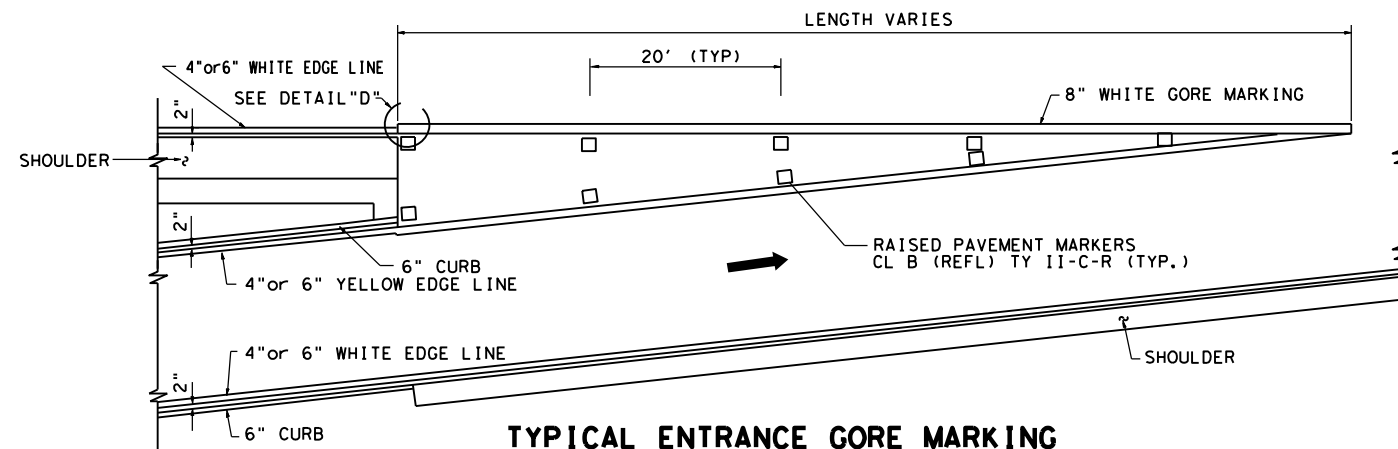
TYPICAL LAYOUT



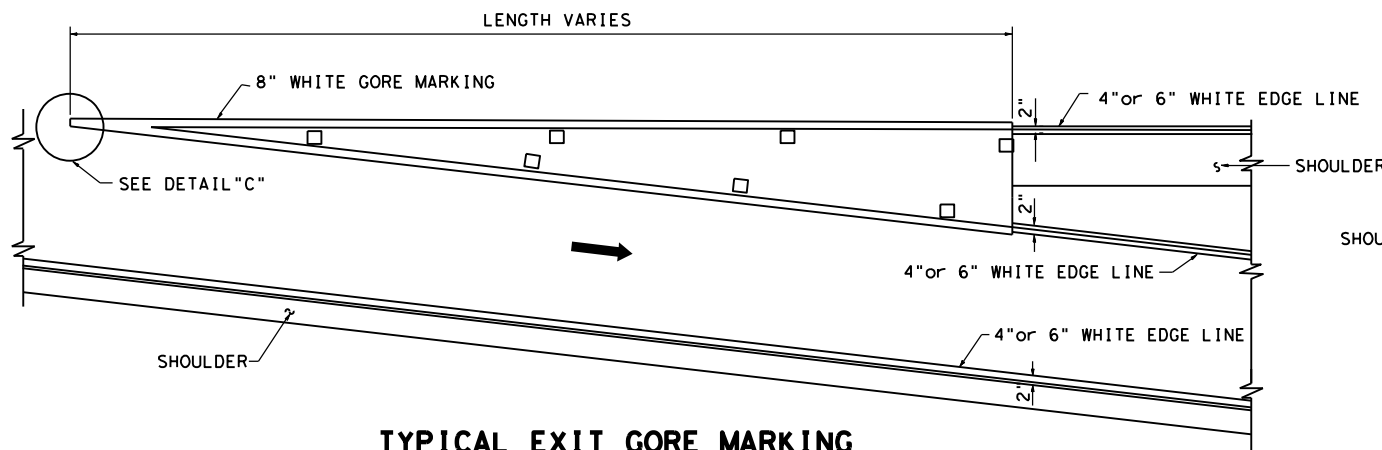
TYPICAL PLACEMENT FOR BARRIER AND EDGE LINES



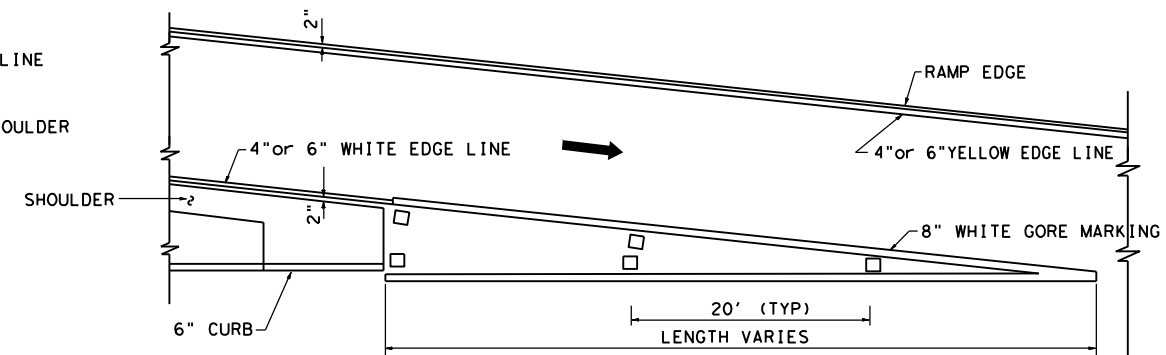
TYPICAL EXIT GORE MARKING AT FRONTAGE ROAD



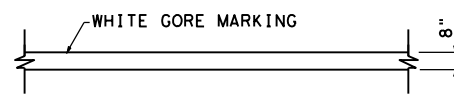
TYPICAL ENTRANCE GORE MARKING AT MAIN TRAFFIC LANES



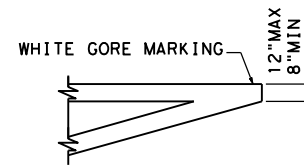
TYPICAL EXIT GORE MARKING AT MAIN TRAFFIC LANES



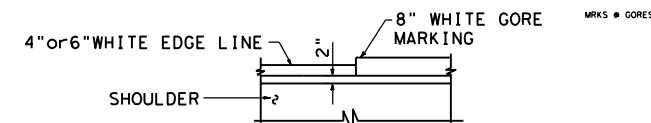
TYPICAL ENTRANCE GORE MARKING AT FRONTAGE ROAD



DETAIL "A"



DETAIL "C"



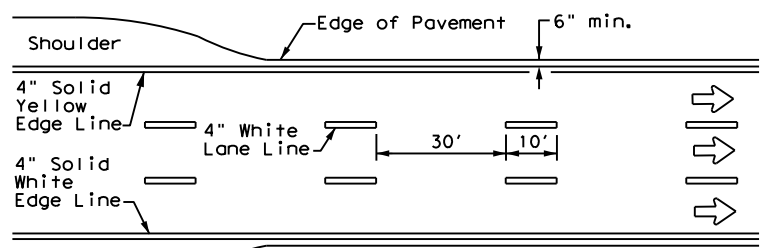
DETAIL "D"

PAVEMENT MARKINGS
(RAMP AND GORE DETAILS)

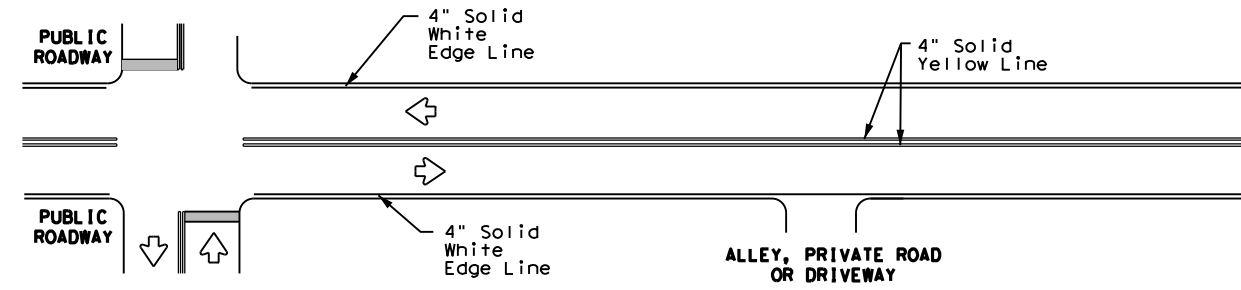
PM (R&G) - 10

FILE:	DN:	CK:	DW:	CK:
© TxDOT 2010	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS	HOU	6		107
4/2010	COUNTY	CONTROL	SECT	JOB
	HARRIS	0114	12	012
				HIGHWAY
				US 290

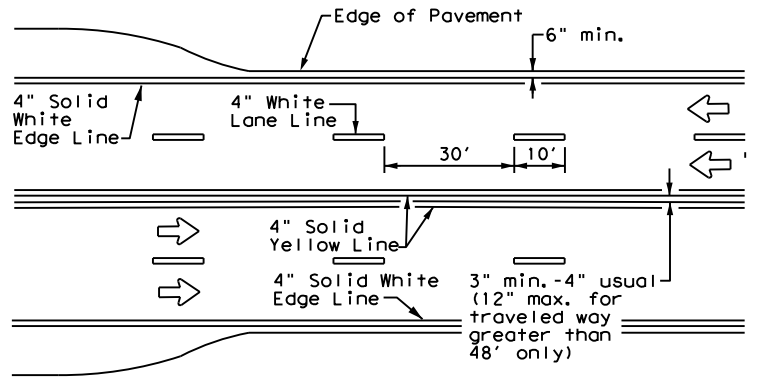
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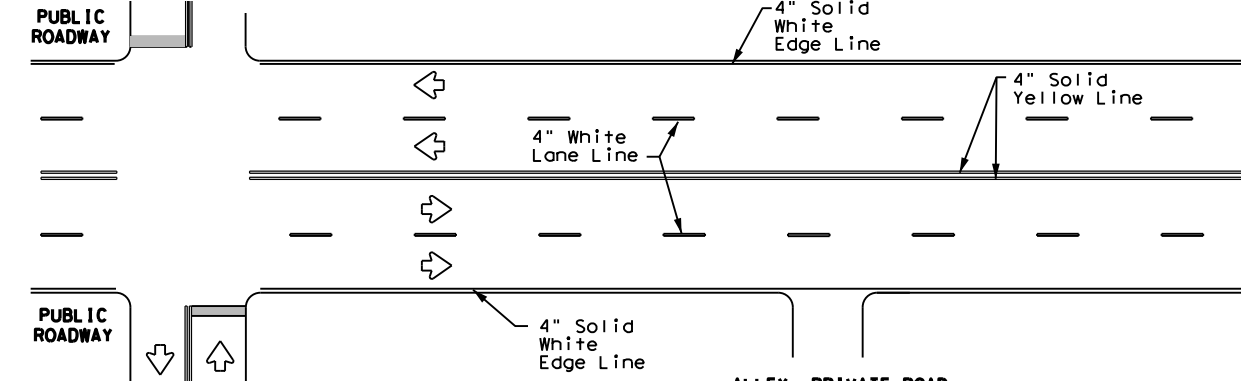
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



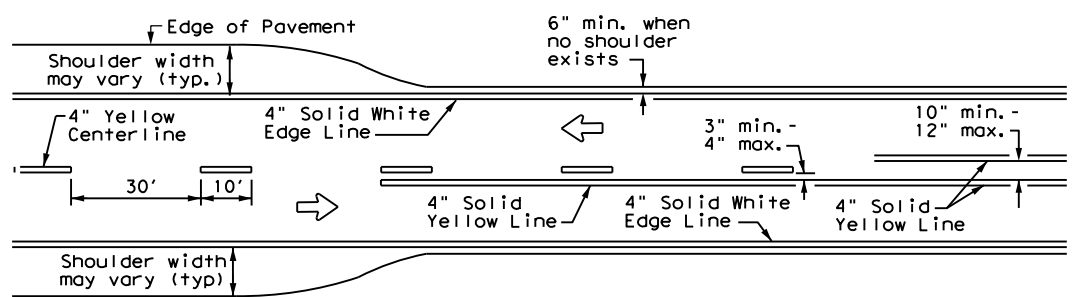
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



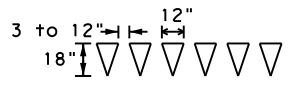
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



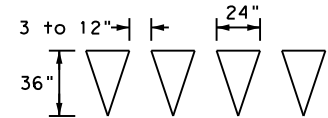
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



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.

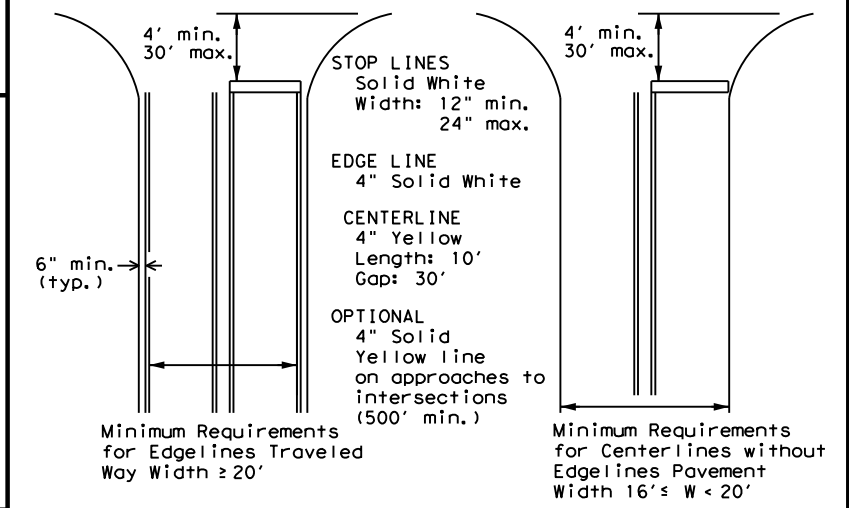
YIELD LINES

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 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.



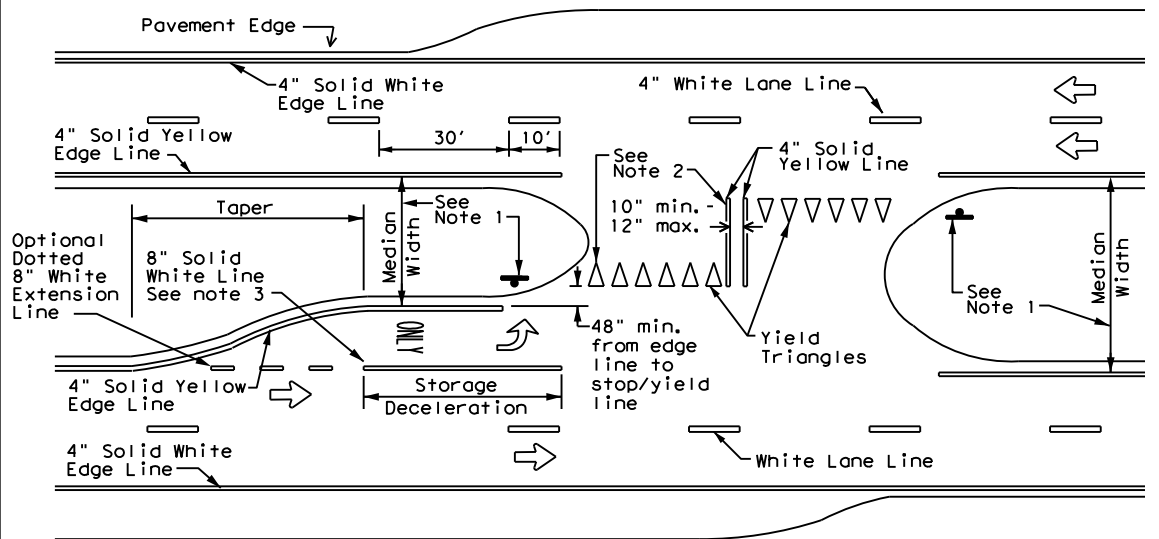
**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**
Based on Traveled Way and Pavement Widths
for Undivided Highways

NOTE:

1. Irrespective of shoulder, use 6 in 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 triangles 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.



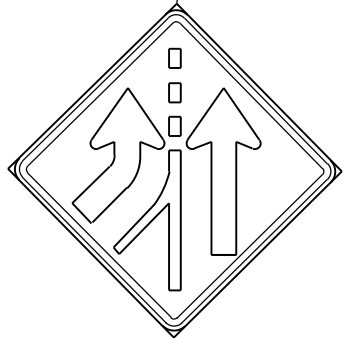
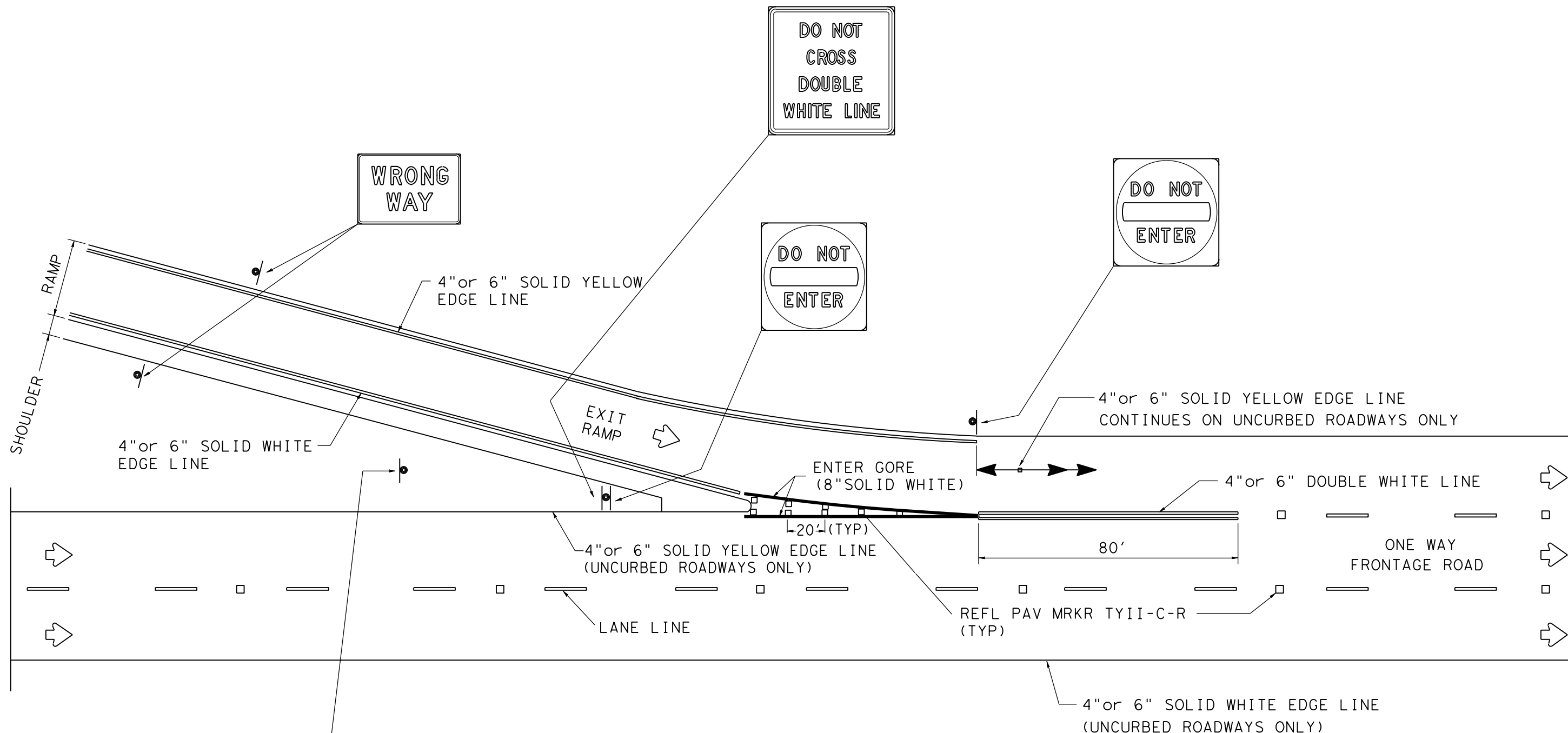
FOUR LANE DIVIDED ROADWAY CROSSOVERS



**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM-20

© TxDOT NOVEMBER 1978		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS					
8-95	2-12	CONT	SECT	JOB	HIGHWAY
5-00	8-16	0114	12	012	US 290
8-00	7-20	DIST	COUNTY	SHEET NO.	
3-03		HOU	HARRIS	108	



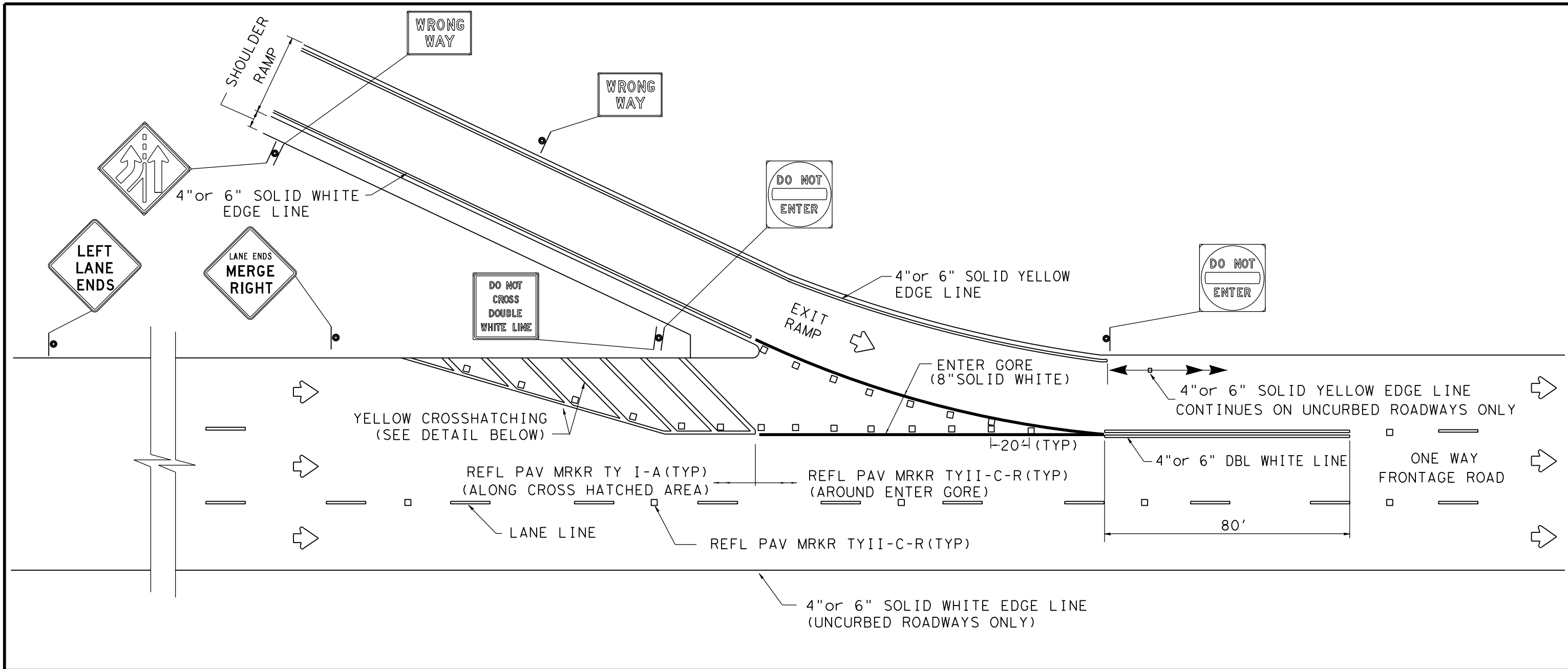
DRAWING SCALE: NONE

Texas Department of Transportation
Houston District

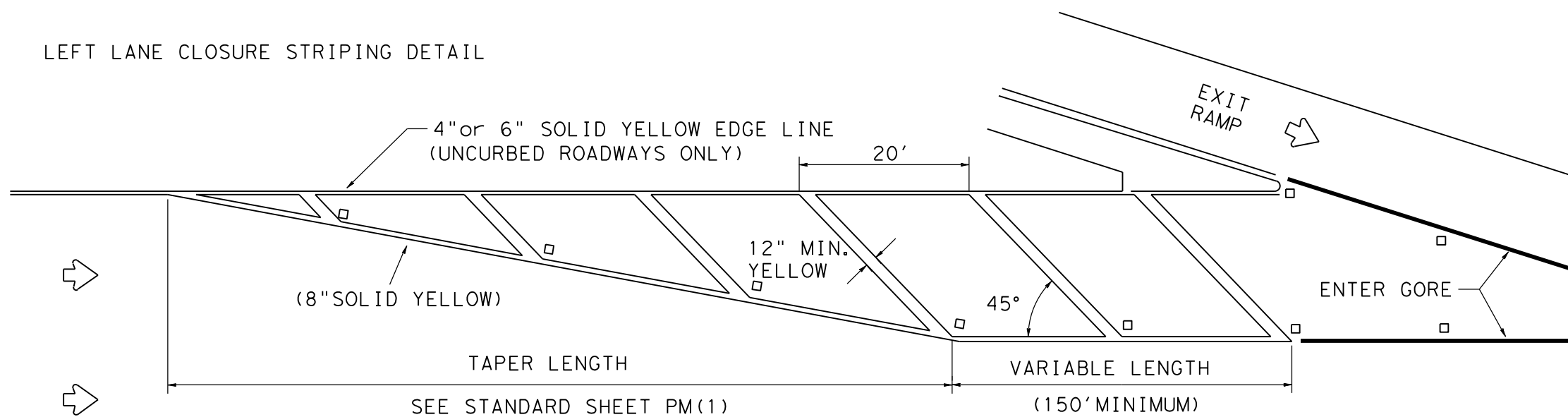
SIGNING AND PAVEMENT MARKING DETAILS
EXIT RAMPS-FRONTAGE ROAD

ER-FR(1)-09

FILE:	DN:	CK:	DW:	CK:
© TxDOT 1998	DIST	FED REG	PROJECT NO.	SHEET
REVISIONS FEB., 2008 DEC., 2009	HOU	6		109
COUNTY	CONTROL	SECT	JOB	HIGHWAY
HARRIS	0114	12	012	US 290



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		110
	COUNTY	CONTROL	SECT	JOB
	HARRIS	0114	12	012
				HIGHWAY
				US 290

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DATE: FILE:

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS					DELINEATORS				D & OM DESCRIPTIVE CODES			
DEVICE	SIZE 1	SIZE 2	SIZE 3	SIZE 4	DEVICE	SINGLE		DOUBLE		INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX (XX)		
											NUMBER OF REFLECTORS S = Single D = Double COLOR OF REFLECTORS W = White Y = Yellow R = Red REFLECTOR UNIT SIZE 1 or 2 TYPE OF POST OR DELINEATOR WC = Wing Channel Post YFLX = Yellow Flexible Post WFLX = White Flexible Post BRF = Barrier Reflector TYPE OF MOUNT GND = Embedded (drivable or set in concrete) CTB = Concrete Barrier Mount GF1 or GF2 = Guard Fence Attachment SRF = Surface Mount DIRECTION If Required BI = Bi-Directional BR = Bi-Directional with red on back	
SHEETING Yellow, White or Red Type B or C reflective sheeting					SHEETING Yellow, White or Red Type B or C Reflective Sheeting							
NOTE 1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (fix). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.					POST TYPE WC YFLX, WFLX		POST TYPE WC YFLX, WFLX		MOUNT TYPE GND GND, SRF		MOUNT TYPE GND GND, SRF	

OBJECT MARKERS										D & OM DESCRIPTIVE CODES		
DEVICE	Type 1 (OM-1)		Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)		INSTL OM ASSM (OM-XX) (XXXX)XXX (XX) TYPE OF OBJECT MARKER 1, 2, 3, or 4 NUMBER OF REFLECTORS OR DIRECTION X = 3-Size 2 reflector unit (Type 2 only) Y = 1-Size 3 reflector unit (Type 2 only) Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only) L = Left Side (Type 3 Object Marker only) R = Right Side (Type 3 Object Marker only) C = Center (Type 3 Object Marker only) TYPE OF POST WC = Wing Channel Post WFLX = White Flexible Post TWT = Thin Walled Tubing TYPE OF MOUNT GND = Embedded (drivable) SRF = Surface Mount WAS = Wedge Anchor Steel WAP = Wedge Anchor Plastic DIRECTION If Required BI = Bi-Directional	
		OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4	DEPARTMENTAL MATERIAL SPECIFICATIONS FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES) DMS-4400 SIGN FACE MATERIALS DMS-8300 DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS DMS-8600		
								SHEETING Yellow-Type B or C Sheeting		SHEETING Alternating acrylic black and retroreflective yellow - Type B _{FL} or C _{FL} Sheeting		
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4	POST TYPE TWT TWT TWT TWT TWT TWT TWT TWT		MOUNT TYPE WAS, WAP GND GND GND, SRF WAS, WAP WAS, WAP	

BARRIER REFLECTORS (BRF)			CHEVRONS				ONE DIRECTION LARGE ARROW		NOTE: Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-290 Alloy 6061-T6 or approved alternative.	
DEVICE	GF1	GF2	CTB	 W1-8				 W1-6		
SHEETING Yellow, White, Red			SIZE (W x L) 18" x 24" (Conventional) 24" x 30" (Conventional Oversize) 30" x 36" (Expressway) 36" x 48" (Freeway)				SIZE (W x L) 48" x 24" (Conventional) 60" x 30" (Expressway & Freeway)		1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.	
NOTE 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.			MOUNTING HEIGHT 4'-0" or 7'-0"				MOUNTING HEIGHT 7'-0"			
NOTE 1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.			NOTE 1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies). 2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).							

Texas Department of Transportation
Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0114	12	012	US 290
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	HOU	HARRIS		111

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POST TYPE AND SUPPORT FOUNDATION DETAILS				TYPE OF BARRIER MOUNTS	
WING CHANNEL (WC)	FLEXIBLE POSTS (YFLX, WFLX)		WEDGE ANCHOR SYSTEMS		GUARD FENCE ATTACHMENT
GND	GND	SRF	WAS	WAP	GF 1
<p>Ground Line</p> <p>2'-0" Usual</p>	<p>Reflective material</p> <p>Post</p> <p>Stub</p>	<p>Reflective material</p> <p>Post</p> <p>Base</p>	<p>12" Dia.</p> <p>12" 27" 30"</p>	<p>3" (Approx.)</p> <p>15" 17" 20"</p> <p>12" Dia.</p> <p>3.5" 17" 1" 2" 30°</p>	<p>Centerline of MBCF rail element</p>
	EMBEDDED		SURFACE MOUNT	STEEL	PLASTIC
NOTES 1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only. 2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.	NOTES 1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices. 2. Install per manufacturer's recommendations. 3. Post length may vary to meet field conditions. 4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.		NOTE 1. Install per manufacturer's recommendations.		

TYPE OF BARRIER MOUNTS	
GUARD FENCE ATTACHMENT	
GF 1	GF 2
<p>Centerline of MBCF rail element</p>	<p>Attached to post or block</p> <p>2'-6" Min.</p> <p>4" Min.</p> <p>4'-0"</p>

CONCRETE TRAFFIC BARRIER (CTB)	
<p>Place Barrier Reflector on top or on side(s) of CTB.</p>	

GENERAL NOTES
1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

TYPES 1,3, AND 4 OBJECT MARKERS AND CHEVRONS
<p>4'-0"</p> <p>Pavement surface</p> <p>Ground Line</p>
NOTE Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN
<p>7'-0"</p> <p>Pavement surface</p> <p>Ground Line</p>
NOTE Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS
<p>Approximately 4'-0"</p> <p>Pavement surface</p> <p>Ground Line</p> <p>2'-0" to 8'-0" or in front of object being marked</p>
NOTE See general notes 1, 2 and 3.

Texas Department of Transportation
 Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0114	12	012	US 290
10-09 3-15	DIST	COUNTY	SHEET NO.	
4-10 7-20	HOU	HARRIS	112	

DATE: FILE:

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 Storm Water Pollution Prevention Plan (SWP3) Houston District standard plan.
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:



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	0114	12	012	US 290
UPDATED section V, text and added definition (10/17)	DIST	COUNTY	SHEET NO.	
ADDED USCG and USACE notes in Section VII (04/18)	HOU	Harris	113	

STORMWATER POLLUTION PREVENTION 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 all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

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):**
0114-12-012**1.2 PROJECT LIMITS:**From: WALLER C/LTo: EAST OF HEGAR RD**1.3 PROJECT COORDINATES:**BEGIN: (Lat) 30.0696003, (Long) -95.9267343END: (Lat) 30.0311972, (Long) -95.8422824**1.4 TOTAL PROJECT AREA (Acres):** 45.25 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% SLOPES	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:

- PSLs determined during preconstruction meeting
 PSLs determined during construction
 No PSLs planned for construction

Type	Sheet #s

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

1.9 CONSTRUCTION ACTIVITIES:

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

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

 Other: _____ Other: _____**1.10 POTENTIAL POLLUTANTS AND SOURCES:**

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

1.11 RECEIVING WATERS:

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

Tributaries	Classified Waterbody
BUFFALO BAYOU	CYPRESS CREEK SEGMENT NO.1009

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

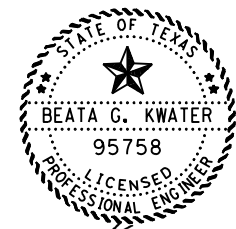
1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

SWP3 will be paid by Force Account



Beata Kwater, P.E.
1/20/2023

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



Sheet 1 of 2

FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				114
STATE	STATE DIST.	COUNTY		
TEXAS	HOU	HARRIS		
CONT.	SECT.	JOB	HIGHWAY NO.	
0114	12	012	US 290	

STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

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

2.2 SEDIMENT CONTROL BMPs:

T / P

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

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

2.3 PERMANENT CONTROLS: 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:

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

- Other: _____
- Other: _____
- Other: _____

2.5 POLLUTION PREVENTION MEASURES:

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

2.6 VEGETATED BUFFER ZONES: 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:

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

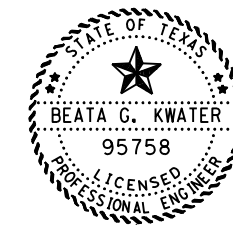
2.8 INSPECTIONS:

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 .

2.9 MAINTENANCE:

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

SWP3 will be paid by Force Account



Beata Kwater, P.E.

1/20/2023

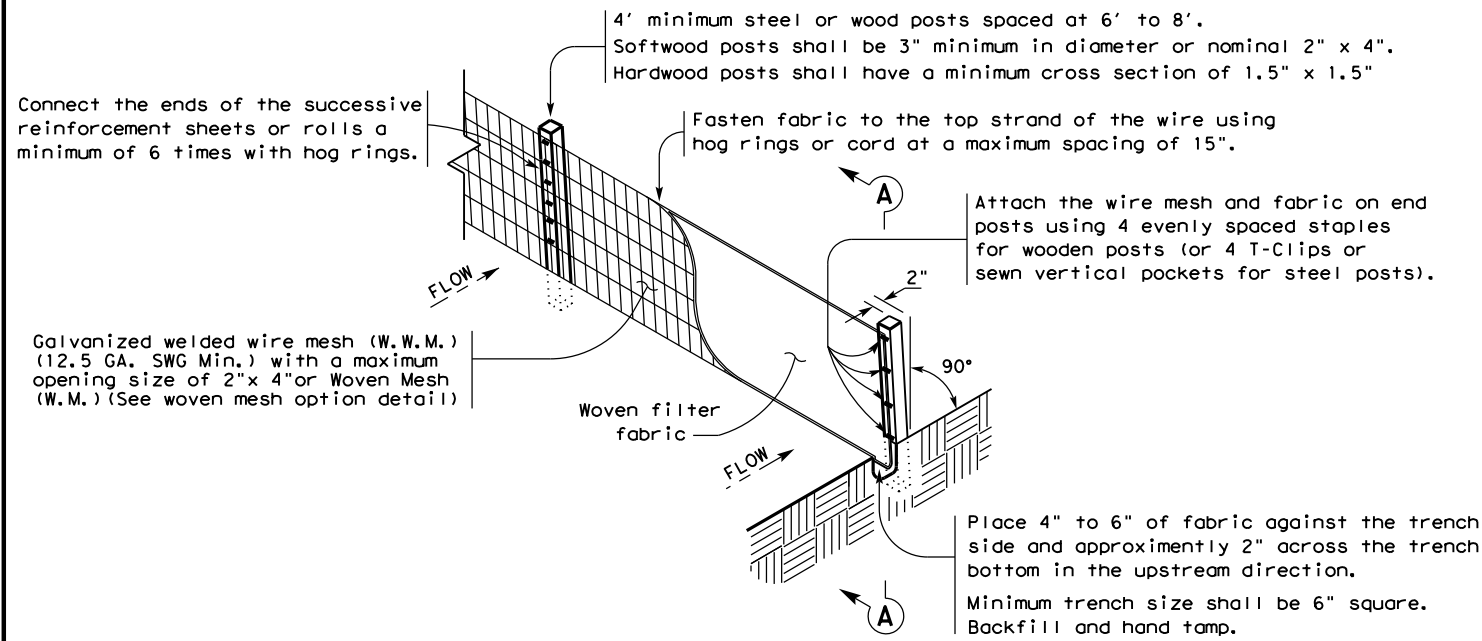
STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)



Sheet 2 of 2

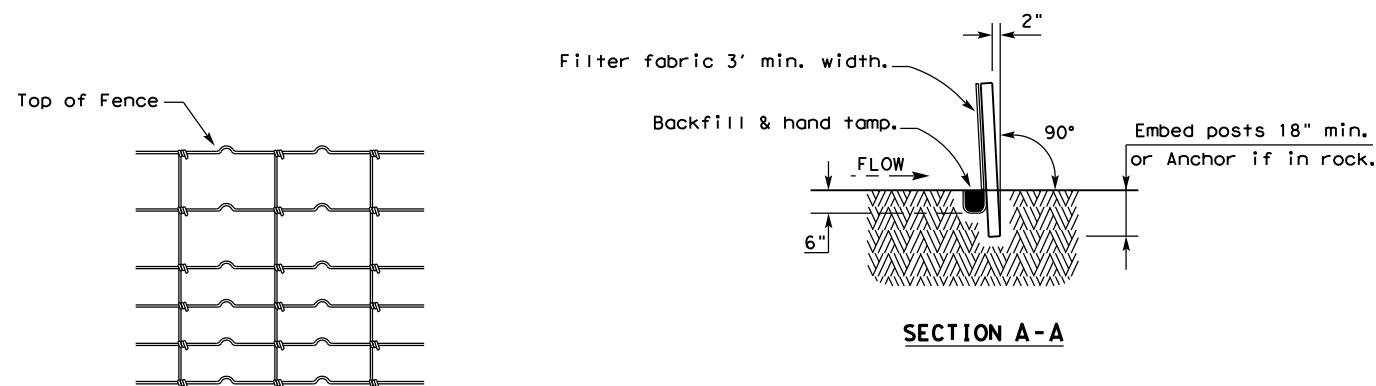
FED. RD. DIV. NO.	PROJECT NO.			SHEET NO.
				115
STATE	STATE DIST.	COUNTY		
TEXAS	HOU	HARRIS		
CONT.	SECT.	JOB	HIGHWAY NO.	
0114	12	012	US 290	

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TEMPORARY SEDIMENT CONTROL FENCE

SCF



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/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

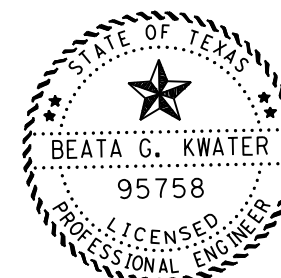
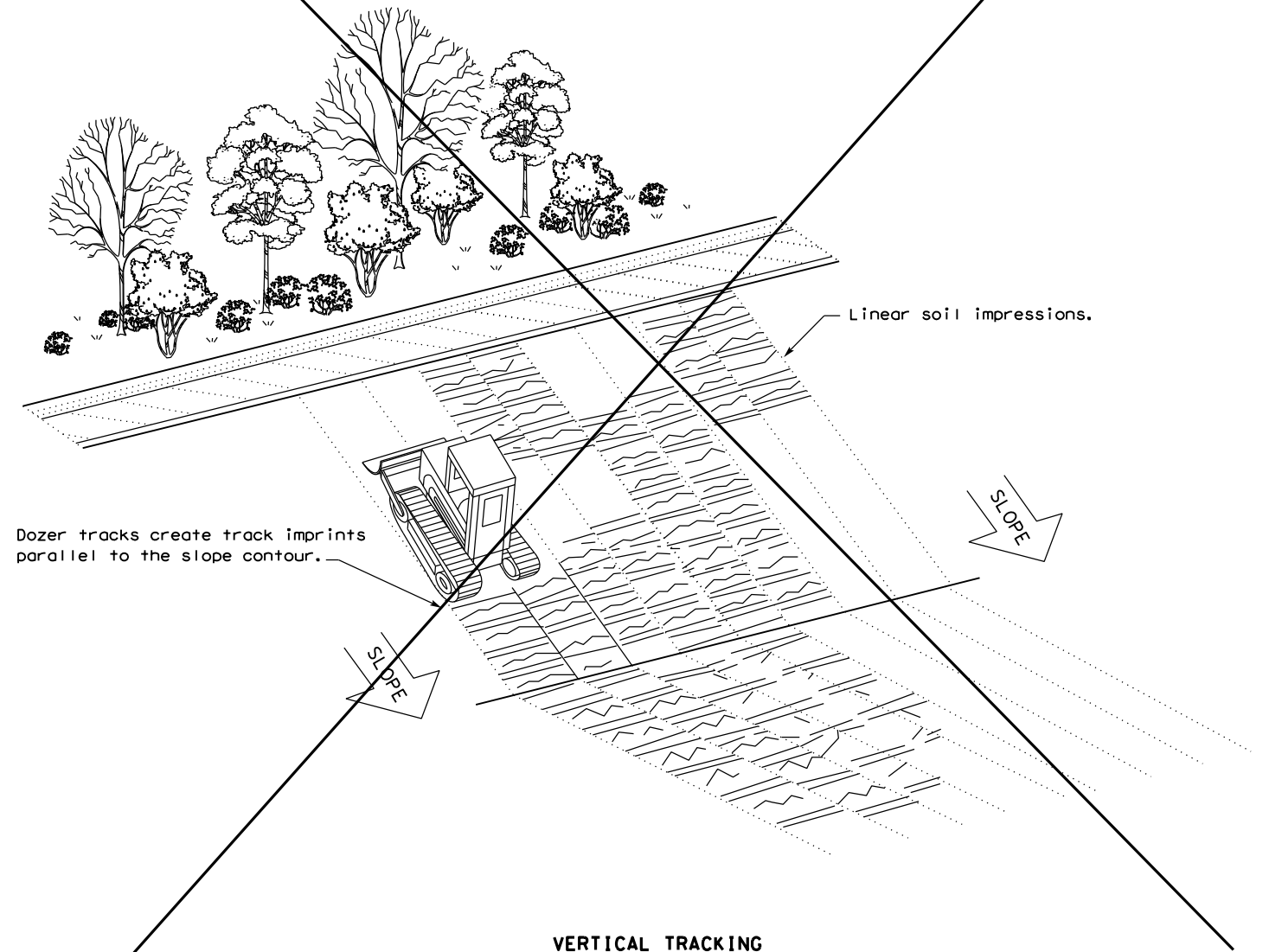
LEGEND

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 continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



Beata Kwater, P.E.

1/20/2023



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	0114	12	012	US 290
	DIST	COUNTY	SHEET NO.	
	12	HARRIS	116	