SEE SHEET 2 FOR
INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

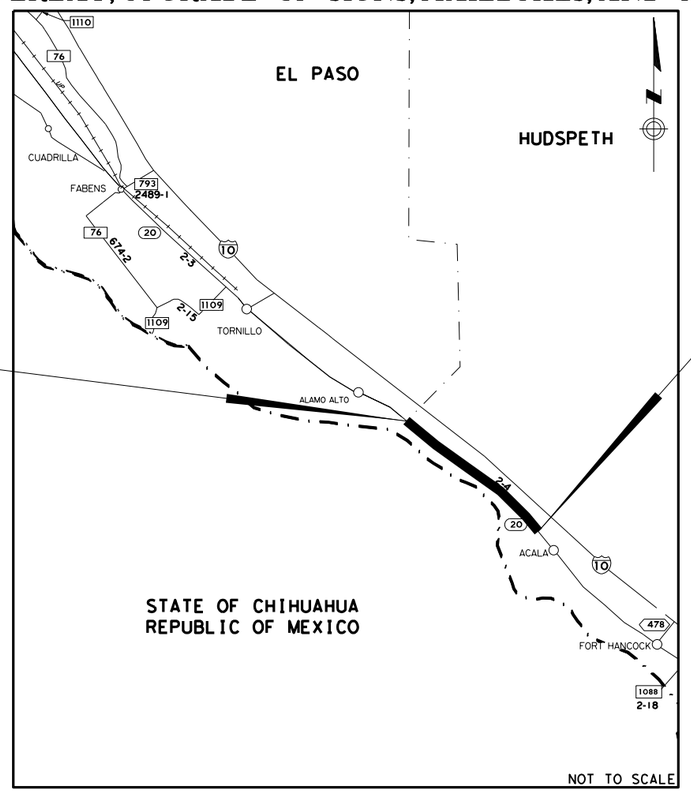
FEDERAL AID PROJECT NO. STP 2022(820)HES

SH 20
HUDSPETH COUNTY

NET LENGTH OF ROADWAY= 28745.00 FT. = 5.444 MI.
NET LENGTH OF PROJECT= 28745.00 FT. = 5.444 MI.

LIMITS: FROM: EL PASO/HUDSPETH COUNTY LINE
TO: 1 MI W OF ACALA RD

CONSTRUCTION OF PAVED SHOULDERS, ROADWAY OVERLAY, UPGRADE OF SIGNS, MAILBOXES, AND MBGF



BEGIN PROJECT
CSJ: 0002-04-033
STA: 100+00.00
RM : 370+0.002
LATITUDE: 31.3910889
LONGITUDE: -105.9928873

END PROJECT
CSJ: 0002-04-033
STA: 387+45.00
RM : 374+1.48
LATITUDE: 31.3434809
LONGITUDE: -105.9229991

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

TDLR INSPECTION NOT REQUIRED

DESIGN SPEED = 60 MPH
A.A.D.T. (2020)=652
A.A.D.T. (2040)=913

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		1

FINAL PLANS

CONTRACTOR: _____
TIME CHARGES BEGAN: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED: _____
DATE WORK WAS ACCEPTED: _____
TOTAL DAYS CHARGED: _____
ORIGINAL CONTRACT AMOUNT: $ _____
AMOUNT OF CONTRACT AMENDMENTS: $ _____
FINAL CONTRACT COST: $ _____

_____ 20 _____

_____
AREA ENGINEER

KEY TO COUNTIES

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

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

REQUIRED SIGNS SHALL BE IN ACCORDANCE WITH BC (1)- 21 THRU BC (12)- 21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

Texas Department of Transportation

RECOMMENDED FOR LETTING: 6/9/2022
DocuSigned by:
Eduardo Perales, P.E.
2778C6D2B5C7482...
SAFETY REVIEW COMMITTEE CHAIRMAN

RECOMMENDED FOR LETTING: 6/9/2022
DocuSigned by:
L. Raul Ortega Jr., P.E.
0F175D5B81604A7...
DISTRICT DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 6/9/2022
DocuSigned by:
7A68C5EA0D94496...
DISTRICT ENGINEER

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7	SUMMARY SHEETS
8	EPIC
	TRAFFIC CONTROL PLAN
9	TYPICAL SECTIONS
10	NARRATIVE
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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

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

NAME

05/27/2022
DATE

SH 20

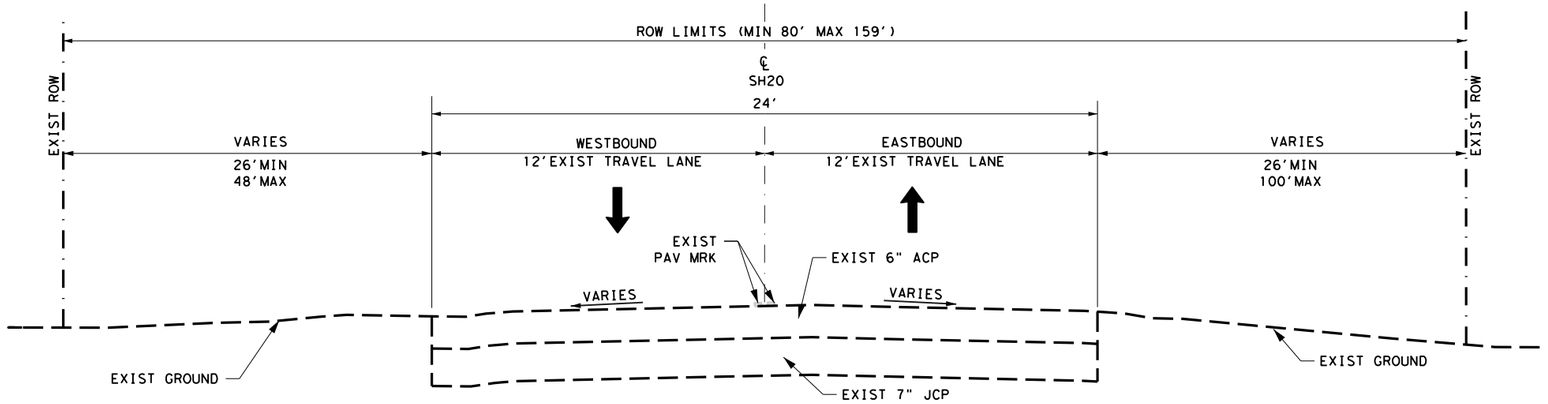
GENERAL

INDEX OF SHEETS

SHEET 1 OF 1

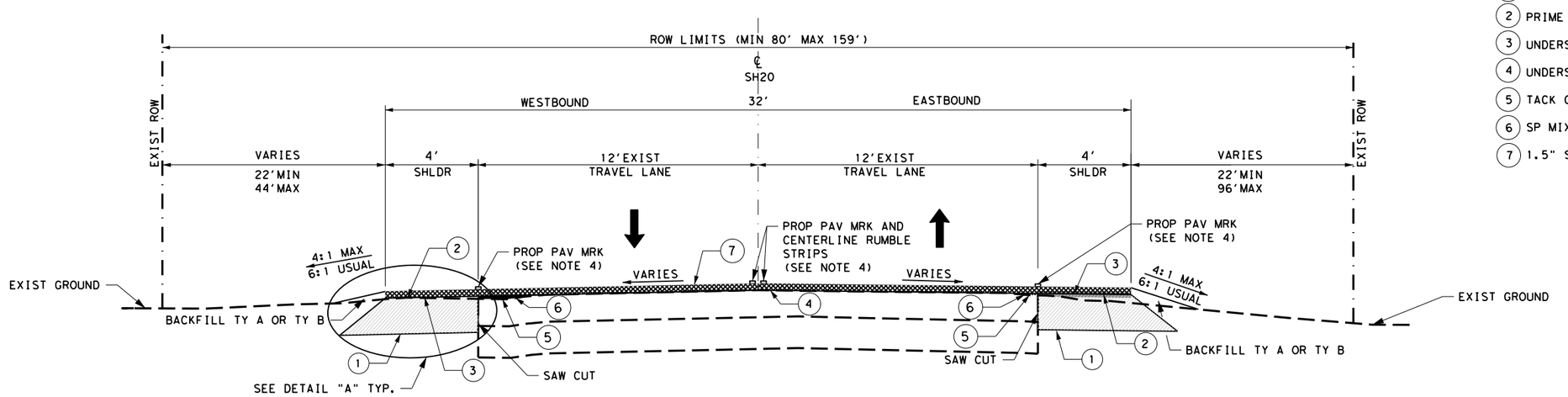
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		2



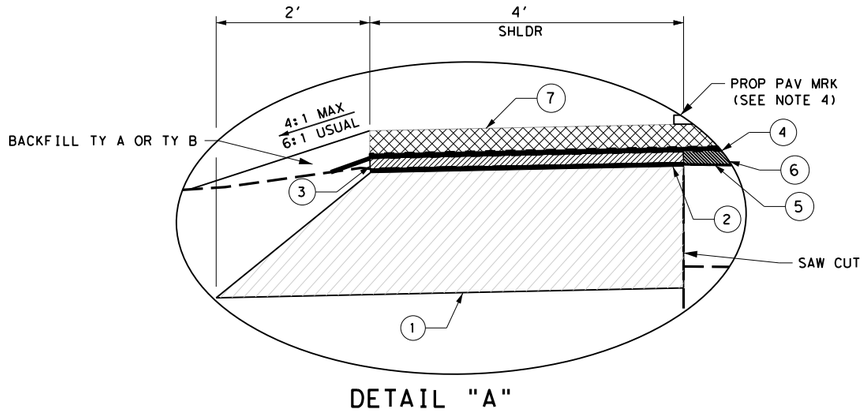
EXISTING TYPICAL SECTION

STA.100+00.00 TO STA.387+45.00



PROPOSED TYPICAL SECTION

STA.100+00.00 TO STA.266+98.50
STA.268+18.50 TO STA.349+65.48
STA.350+68.14 TO STA.382+70.35
STA.383+74.01 TO STA.387+45.00



DETAIL "A"

NOTES:
1. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR QUANTITY CALCULATIONS.
2. CONTRACTOR SHALL MATCH EXISTING ROADWAY CROSS SLOPE UNLESS OTHERWISE DIRECTED.
3. EXISTING EDGE OF PAVEMENT REQUIRES A NEAT SAW-CUT EDGE AT THE PROPOSED WIDENING. CONTRACTOR SHALL PERFORM NEAT SAW-CUTS AT EXISTING PAVEMENT EDGES AS DIRECTED. THIS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. REFER TO SIGNING & PAVEMENT MARKINGS SHEETS FOR PROPOSED PAVEMENT MARKINGS AND CENTERLINE RUMBLE STRIPS.

LEGEND

- TRAFFIC FLOW
- PROPOSED PAVEMENT MARKINGS
- (1) 8" FLEX BASE (TY A)(GR1-2)
- (2) PRIME COAT (SS-1H)
- (3) UNDERSEAL COURSE (SEAL COAT)
- (4) UNDERSEAL COURSE
- (5) TACK COAT
- (6) SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)
- (7) 1.5" SP MIXES SP-D SAC-A PG70-22

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

GENERAL

TYPICAL SECTIONS

NOT TO SCALE

SHEET 1 OF 2

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		3

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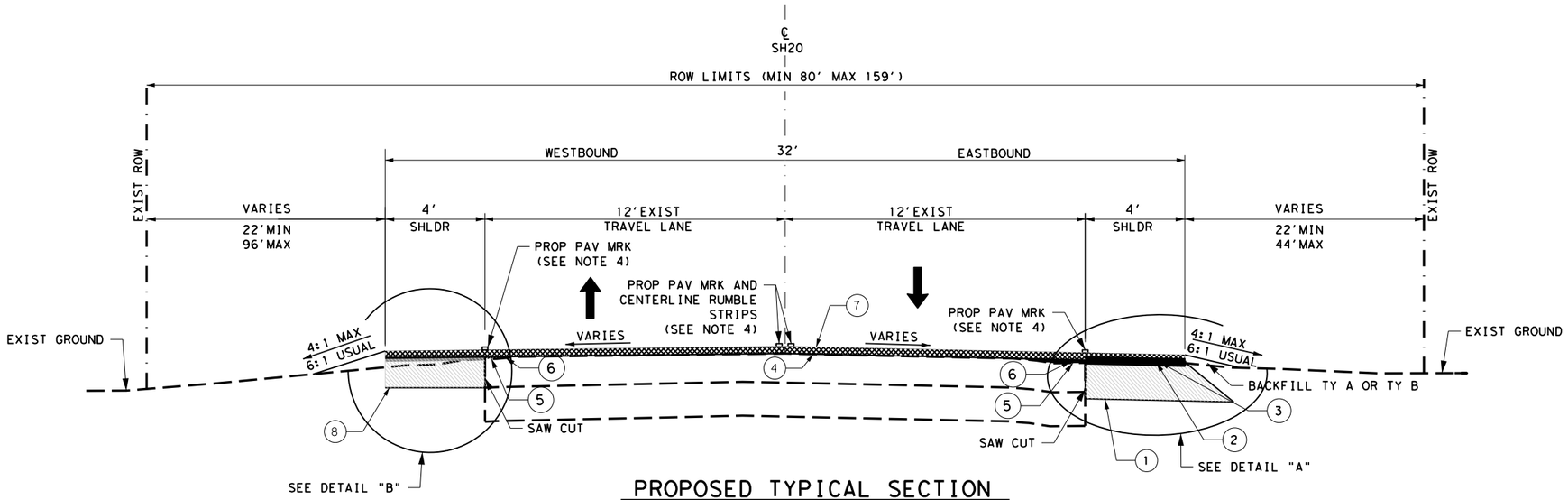
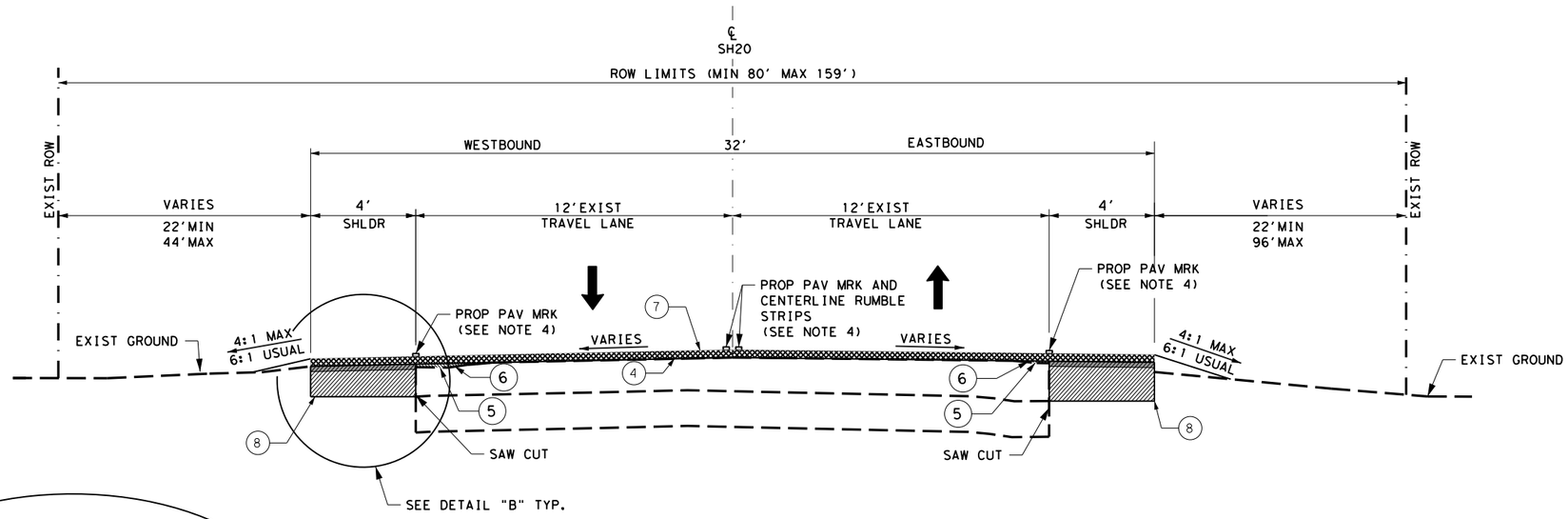


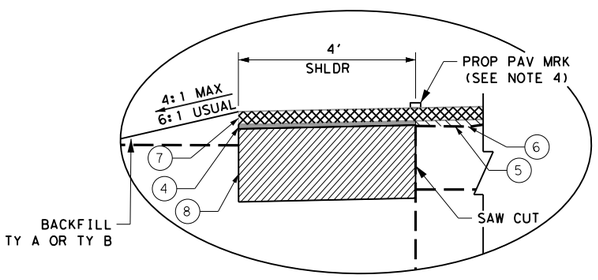
PROPOSED TYPICAL SECTION

STA.266+98.50 TO STA.268+18.50
STA.382+70.35 TO STA.383+74.01



PROPOSED TYPICAL SECTION

STA.349+65.48 TO STA.350+68.14



DETAIL "B"

NOTES:
1. TYPICAL SECTIONS ARE FOR GENERAL INFORMATION ONLY AND SHALL NOT BE USED FOR QUANTITY CALCULATIONS.
2. CONTRACTOR SHALL MATCH EXISTING ROADWAY CROSS SLOPE UNLESS OTHERWISE DIRECTED.
3. EXISTING EDGE OF PAVEMENT REQUIRES A NEAT SAW-CUT EDGE AT THE PROPOSED WIDENING. CONTRACTOR SHALL PERFORM NEAT SAW-CUTS AT EXISTING PAVEMENT EDGES AS DIRECTED. THIS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. REFER TO SIGNING & PAVEMENT MARKINGS SHEETS FOR PROPOSED PAVEMENT MARKINGS AND CENTERLINE RUMBLE STRIPS.
5. SEE MISCELLANEOUS DETAILS SHEET FOR PAVEMENT TRANSITION DETAILS

LEGEND

TRAFFIC FLOW

(1) 8" FLEX BASE (TY A)(GR1-2)
(2) PRIME COAT (SS-1H)
(3) UNDERSEAL COURSE (SEAL COAT)
(4) UNDERSEAL COURSE
(5) TACK COAT
(6) SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)
(7) 1.5" SP MIXES SP-D SAC-A PG70-22
(8) 6" SP MIXES SP-D SAC-A PG70-22

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

GENERAL

TYPICAL SECTIONS

NOT TO SCALE

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		4

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0.GENERAL NOTES:

Tests to be in accordance with the Department's Standard Test Methods.

Table 1
Basis of Estimate for CSJ 0002-04-033[1]

ITEM	DESCRIPTION	RATE
247	FL BS (CMP IN PLC)(TYA GR 1-2)(8")	140 lbs./cf
260	LIME TRT (HYDRATED LIME (SLURRY))	3.3 lb./cu. ft. (3%)
310	PRIME COAT (SS-1H)	0.20 gal./sq. yd.
3085	MEMBRANE UNDERSEAL	0.20 gal./sq. yd.
3077	SP MIXES SP-D SAC-A PG70-22	1.0 in. = 110 lbs./sq. yd. 1.5 in.=165 lbs./sq.yd. 6.0 in.=660 lbs./sq.yd.
3085	UNDERSEAL SEAL COAT: Refer to Item 3085 General Notes for material information	Refer to Item 3085 General Notes for rates.

1. Deviation from the rates shown require approval.

General Requirements

Perform all work for this Contract in accordance with the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (2014) and all applicable State Standards.

At the discretion of the Engineer, failure to comply with contract requirements will be grounds for default as per Item 8.7.1.

Maintain the entire project area in a neat and orderly manner throughout the duration of the work. This work will be subsidiary to the various bid items. Remove all construction litter and undesirable vegetation within the right of way inside the project limits. This work will be subsidiary to the various bid items.

Become familiar with project site prior to submitting bids.

Comply with all Occupational Safety & Health Administration (OSHA) and United States Environmental Protection Agency (EPA) regulations as well as all local and State requirements.

Refer to the various traffic control plan project overview sheets for the proposed sequence of work. Changes will not be permitted, except as approved in writing by the Engineer.

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

Monica Ruiz, P.E.
District Construction Engineer
Monica.Ruiz@txdot.gov

Aldo Madrid, P.E.
Director of Construction
Aldo.Madrid@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Provide vehicular and pedestrian access at all times, including Saturdays, Sundays, and holidays. This access includes, but is not limited to, driveways, streets, parking areas, and walkways. This will be considered subsidiary to the various bid items.

Obtain Engineer approval for all equipment and vehicles prior to use.

Clear and remove from all work sites, surplus and waste materials and leave the site in a neat and aesthetically pleasing condition.

Schedule and perform all work to assure proper drainage during construction operations. All labor, tools, equipment and supervision required, to ensure drainage, removal, and handling of water shall be considered incidental work.

Repair any existing pavement, utilities, structures, etc., damaged by the Contractor's operations, at no additional cost to the Department.

Item 4 – Scope of Work

Provide vehicular and pedestrian access at all times, including Saturday, Sundays and holiday, this access includes, but it is not limited to driveways, streets, parking areas and walkways. This shall be considered subsidiary to the various bid items.

Schedule and perform all work to assure proper drainage during the course of construction operations. All labor, tools, equipment and supervision required, to ensure drainage, removal and handling of water shall be considered incidental work.

Item 5 – Control of Work

The Department will furnish horizontal and vertical reference points. Contractor must verify horizontal and vertical reference points with conventional survey methods before proceeding with construction activities. Verification must be submitted for review and approval to the Department's R.P.L.S. prior to start of construction. Any discrepancies not reported will be at no additional cost to the Department.

Plan datum for this project is NAD 83 for horizontal and NAVD 88 for elevation based.

Electronic earthwork cross sections are available upon request, at bidding Contractor's expense, at the Area Engineer's office.

Keep traveled surfaces used in hauling operations clear and free of dirt or other material.

Existing pavement, utilities, structures, etc. damaged as a result of the operations will be repaired at no additional cost to the Department.

Protect from damage and destruction all areas of the right of way, which are not included in the actual limits of the proposed construction areas. Exercise care to prevent damage to trees, vegetation, and other natural features. Protect trees, shrubs, and other landscape features from abuse, marring, or damage within the actual construction and fenced protection areas designated for preservation.
The engineer has the authority to observe, test, inspect, approve and accept the work, The engineer decides all questions about the quality and acceptability of materials, work performed, work progress, contract interpretation and acceptable contract fulfillment. The engineer has the authority to enforce and make effective decisions.

Restore any area disturbed or damaged to a condition "as good as" or "better than" prior to start of construction operation. This work will be at the Contractor's expense.

Item 7 – Legal Relations and Responsibilities

Comply with all requirements of the Environmental Permits Issues and Commitments (EPIC) Sheet.

Do not discharge any liquid pollutant from vehicles onto the roadside. Immediately clean spills and dispose in compliance with local, state, and federal regulations to the satisfaction of the Engineer at no additional cost to the Department.

Occupational Safety & Health Administration (OSHA) regulations prohibit operations that bring people or equipment within 10 ft. of an energized electrical line. Where workers or equipment may be close to an energized electrical line, notify the electrical power company and make all necessary adjustments to ensure the safety of workers near the energized line.

No significant traffic generator events identified.

Item 8 – Prosecution and Progress

Working days will be calculated in accordance with Section 8.3.1., "Standard Workweek."
Create and maintain a bar chart schedule.

Submit baseline schedule and obtain approval prior to beginning construction. The monthly progress payment will be held if the monthly update is not submitted.

Item 9 – Measurement and Payment

Monthly progress payments will be made for items of work completed by the 27th day of each month. Any work completed after the 27th will be included for payment in the subsequent monthly progress payment.

Submit Material on Hand (MOH) payment requests at least **three (3)** working days before the end of the month for payment consideration on that month's estimate.

Item 134 – Backfilling Pavement Edges

Backfill pavement edges immediately after the surface course has begun unless otherwise directed by the Engineer.
Backfill edges to allow no more than a 1:3 slope from pavement edge to existing ground.

Reclaimed asphalt pavement (RAP) may be used to backfill pavement edges. If insufficient RAP is available, then substitute Flexible Base of a type and grade acceptable by the Engineer to backfill pavement edges at no additional cost to the Department.

If Contractor elects to use RAP material for backfill pavement edges, the RAP material must pass a 2" sieve. All material not passing sieve will be removed and disposed of properly. This shall be considered subsidiary to Item 134.

Apply emulsified asphalt at a 50/50 solution of water to emulsion over the disturbed area with backfill material. The application rate shall achieve a final emulsion rate of 0.15 gal/SY residual asphalt.

Item 247 – Flexible Base

Provide machinery, tools and equipment necessary for proper execution of the work.

When requested, stake with blue tops at 100-foot intervals, the lines, and grade shown in the plans. (For Item 247.4)

Item 260 – Lime Treatment (Road-mixed)

In the event clay is found on subgrade slurry lime treatment should be utilized.
Add lime at the percentage as shown on Table 1 “Basis of Estimate”.

Mix and compact lime, water and subgrade in the roadway. No imported material is necessary.

Item 310 – Prime Coat

Cure prime coat for at least 48 hr. prior to beginning hot-mix asphalt placement operations.

Prime coat (SS-1H) must be worked into the top 1” of the flex base.

Contractor is to place the seal coat or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, Contractor shall reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor’s expense.

Item 316 – Seal Coat

Apply one course surface treatment on shoulders as shown on typical sections. This item will be paid under Item 3085, Underseal Course. Refer to Item 3085 Underseal course in General Notes for application rate.

Protect all existing bridges, curbs, and other exposed concrete surfaces within the limits of the project from asphalt materials by any method that is approved. Remove any excessive asphalt materials deposited on these surfaces at the Contractor’s expense. During the application of the

surface treatment, if existing conditions warrant, the lane widths, transitions, and intersection areas may be varied as directed.

The Engineer will approve asphalt and aggregate rates prior to application.

Prepare the roadway surface prior to placing asphalt to the satisfaction of the Engineer

Use AC-10 or PG 64-22 asphalt for pre-coating aggregate. The stripping characteristics of pre-coated aggregate must not exceed 10% when tested in accordance with Tex-530-C. Add asphalt antistripping agent (Liquid) only to the asphalt pre-coating the aggregate.

Use AC-20-5TR during warm weather placement. Use CRS-1P during cool weather placement or as directed by the Engineer. Do not apply asphalt cement from September 16th to April 30th unless directed by the Engineer.

Item 502 – Barricades, Signs, and Traffic Handling

Prior to beginning construction, the Engineer will approve the routing of traffic and sequence of work.

Additional signs and barricades, placed as directed, will be considered subsidiary to this Item.
In accordance with Section 7.2.6.1, designate, in writing, a Contractor Responsible Person (CRP) and a CRP alternate to take full responsibility for the set-up, maintenance, and necessary corrective measures of the traffic control plan. The CRP or CRP alternate must be present at site and implement the initial set up of every traffic control phase/stage, at each location, and/or each call out, for the entire duration of the project.

At the written request of the Engineer, immediately remove the CRP or CRP alternate from the project if, in the opinion of the Engineer, is not competent, not present at initial TCP set-ups, or does not perform in a proper, skillful, or safe manner. These individuals shall not be reinstated without written consent of the Engineer.

CRP and CRP alternate must be trained using Department approved training. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 2 for Department approved Training.

Table 2
Contractor Responsible Person and Alternate

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCS	Traffic Control Supervisor	2 days	
National Highway Institute	133112 133113	Design and Operation of Work Zone Traffic Control Work Zone Traffic Control for Maintenance Operations	1 day 1 day	Both courses are required to meet minimum required training.
Texas Engineering Extension Services	133112A	Design and Operation of Work Zone Traffic Control	3 days	
University of Texas Arlington Division for Enterprise Development	WKZ421	Traffic Control Supervisor	16 hours	Contact UTA for training needs.

All contractor workers involved with the traffic control implementation and maintenance must participate and complete a Department approved training course. Provide a copy of the certificate of completion to the Engineer for project records. Refer to Table 3 for Department approved training.

Table 3
Other Work Zone Personnel

Provider	Course Number	Course Title	Duration	Notes
American Traffic Safety Services Association	TCT	Traffic Control Technician	1 day	
Texas Engineering Extension Services	HWS002	Work Zone Traffic Control	16 hours	Identical to HWS-410. Counts for 3 year CRP requirement.
National Highway Institute	133116	Maintenance of Traffic for Technicians	5 hours	Web based
National Highway Institute	134109-I	Maintenance Training Series: Basics of Work Zone Traffic Control	1 hour	Free, Web based
University of Texas at Arlington, Division for Enterprise Development	WKZ100	Work Zone Safety: Temporary Traffic Control	4 hours	Note name change. Free, Web based
TxDOT/AGC Joint Development	N/A	Safe Workers Awareness Highway Construction Work Zone Hazards	16 minutes 18 minutes	Videos available through AGC of Texas offices. English & Spanish
AGC America	N/A	Highway Work Zone Safety Training	1 day	
Texas Engineering Extension Service	HWS400	Temporary Traffic Control Worker	4 hours	Contact TEEX, if interested in course
TxDOT/AGC Joint Development	N/A	Work Zone Fundamentals	10 minutes	Videos available through ACT of Texas offices. English & Spanish

Contractor may choose to train workers involved with the traffic control implementation and maintenance with a contractor developed training in lieu of Department approved training. Contractor developed training must be equivalent to the Department approved training shown in Table 3. Provide the Engineer a copy of the course curriculum for pre-approval, prior to conducting the contractor developed training. Provide the Engineer a copy of the log of attendees after training completion for project records.

Existing regulatory signs, route marker auxiliaries, guide signs, and warning signs that must be removed due to widening shall be relocated temporarily and erected on approved supports at locations shown in the plans, or as directed. This work will not be paid for directly, but considered subsidiary to this Item.

Notify the Department officials when major traffic changes are to be made, such as detours. Coordinate with the Department on all traffic changes. Advance notification for the following week's work must be made by 5 P.M. on Wednesdays.

If Law Enforcement Personnel is required by the Engineer, coordinate with local law enforcement as directed or agreed. Complete the weekly tracking form provided by the Department and submit invoices with 5% allowance for Law Enforcement payments by Contractor that agree with the tracking form for payment at the end of each month where approved services were provided.

Provide access to intersecting side roads and driveways at all times, unless otherwise directed.
Any approved change to the sequence of work or TCP, must be signed and sealed by a Contractor's Licensed Professional Engineer assuming full responsibility for any additional barricade signs and devices needed.

Use striping operations to channelize traffic into the newly completed roadway, as directed. Maintain shoulders and median areas in a condition capable of serving as emergency paths, as approved. This work will be subsidiary to this Item.

Use portable changeable message signs (PCMS) to alert public of construction two weeks prior to construction.

Use flaggers when directed. Provide two-way radio communication for all flaggers.

Place and maintain sufficient additional warning signs, beacons, delineators, and barricades to warn and guide the public of all hazards through the construction zone at all times, and as directed.

Use flashing arrow boards on all tapers for each lane closure.

Some signs, barricades, and channelization devices may not be shown at the precise or measured position. Place the barricades, devices, or signs, with approval, in positions to meet field conditions.
Fill any holes left by barricade or sign supports and restore the area to its original condition.
Use Type A flashing warning lights or delineators to mark open excavation, footings, foundations, or other obstructions near lanes that may be open to traffic, as directed.

For additional information pertaining to channelization, signing, spacing details, and flagging procedures required to regulate, warn, and guide traffic through project, refer to the "Barricade and Construction Standards," BC(1)-21 and to the current *Texas Manual on Uniform Traffic Control Devices(TMUTCD).*

Remove or cover signs that do not apply to current conditions at the end of each day's work.
Repair or replace all signs damaged by the public or due to weather events.

Safety Contingency

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

Item 506 – Temporary Erosion, Sedimentation, and Environmental Controls

Place Best Method Practices (BMP's) in locations as designated in the plans or as directed to meet field conditions.

Place a weatherproof bulletin board containing the Texas Commission on Environmental Quality (TCEQ) required information on the project at a site as directed. Post the following documents:

1. TCEQ "TPDES Storm Water Program" Construction Site Notice; Primary Construction Site Notices from both Contractor and Department, completed and signed.
2. TCEQ "Primary Notice of Intents," from both Contractor and Department; and
3. TCEQ "TPDES Permit."

Place rain gauge(s) at locations as directed by the Engineer.

The total disturbed area for this project is **6.27** acres. Establish the authorization requirements for Storm Water Discharges for soil disturbed area in this project, all project locations in the Contract, and Contractor Project Specific Locations (PSLs), within one mile of the project limits. Both the Department and the Contractor shall obtain an authorization to discharge storm water from TCEQ for the construction activities shown on the plans. Obtain required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off right of way. When the total area disturbed for all projects in the Contract and PSLs within one mile of the project limits exceeds five acres, provide a copy of the Contractor Notice of Intent (NOI) PSLs on the right of way to the Engineer (to the appropriate Municipal Separate Storm Sewer System (MS4) Operator when on an Off-system State route).

Best Method Practices (BMP's) may be adjusted to meet field conditions, or as directed. Engineer will verify all locations prior to placement of BMPs. Within the project limits, keep all inlets functional as long as possible to accept storm water as part of the Storm Water Pollution Prevention Plan (SWP3), as directed.

The sedimentation fences will be paid at the time of their initial placement. Any required replacement will be paid by Force Account.

Grading operations will be limited to the catch point of the proposed cross-section.

Preserve any vegetation outside these limits.

Item 540 – Metal Beam Guard Fence

Provide composite blockouts for all Metal Beam Guard Fence (MBGF) posts.

Install guardrails in the direction of traffic flow.

Stake the locations for approval prior to beginning the installation of the proposed MBGF.

Remove all delineators and object markers associated with the MBGF. This work will be subsidiary to the various bid items.

Verify MBGF post lengths and heights prior to ordering materials.

Place reflectors, as per Delineator and Pavement Marker Standard sheet D&OM (1)-20 on the metal beam rail element or as directed. This work will not be paid for directly but will be considered subsidiary to pertinent items.

At the end of each work day, protect all untreated, incomplete, MBGF/Rail blunt ends exposed to traffic flow during construction until the permanent end treatment is in place. All work and incidentals are considered subsidiary to this Item.

MBGF not used will become the property of the Contractor.

Item 544 – Guardrail End Treatments

Provide certifications from the approved manufacturer's online training for all personnel installing end treatments prior to beginning work.

Item 560 – Mailbox Assemblies

Remove existing mailbox assemblies, including mailboxes, as shown on the plans. All removed assemblies, including mailboxes, will become the property of the Contractor.

Proposed mailbox assemblies shall include mailboxes. Furnish all-new material for mailbox assemblies and mailboxes.

Assemblies may include multiple boxes mounted on a single pole/post.

Item 585 – Ride Quality for Pavement Surfaces

Use Surface Test Type B to govern ride quality for finished riding surfaces of travel lanes. Notify the District Laboratory 48 hours prior to conducting Surface Test Type B. Properly mark all starting/ending points, and leave-out sections prior to testing. Deliver test results within 24 hours of testing. Provide all profile measurements in electronic data to ELP-LAB@txdot.gov using the format specified in Tex-1001-S.

"Payment Adjustment, Schedule 2" will be used for the travel lanes.

An IRI > 95 will require corrective action.

Use diamond grinding or equivalent to correct areas of localized roughness. For flexible pavements, use CSS-1H emulsion to fog seal the corrected areas.

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

Item 644 – Small Roadside Sign Assemblies

Stake all sign locations and receive approval prior to sign placement.
The 2-1/2 inch, Schedule 10 post will meet the following requirements:

- 0.120 in. nominal wall thickness
- Seamless or electric-resistance welded steel tubing or pipe
- Steel will be HSLAS Grade 55 per ASTM A1011 or ASTM A1008

Other steel may be used, if it meets the following:

- 55,000 psi minimum yield strength
- 70,000 psi minimum tensile strength
- 20% minimum elongation in 2 in.
- Wall thickness (uncoated) to be within the range of 0.108 in. to 0.132 in. galvanization per ASTM A123 or ASTM A653 G90

For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metalizing with zinc wire per ASTM B833.

Verify all post lengths to ensure the proper sign height. Remove and replace any sign installed incorrectly. This work will be done at no expense to the Department.

Provide Texas Universal Triangular Slip Base Bolt clamp type for all signs as shown on SMD (Slip-1)-08.

As directed, some regulatory and guide signs will be relocated before construction begins. Mark and locate each reference marker perpendicular to the road and along the right of way, or as directed, prior to removal. Re-erect reference markers at their original location upon completion of construction.

All signs removed will become property of the Contractor.

Item 658 – Delineator and Object Marker Assemblies

Verify all locations with the Engineer prior to installation.

Removal and proper disposal of all existing delineators, object markers, and any non-standard hardware assemblies are not paid directly, but will be considered subsidiary to pertinent items for payment.

Item 662 – Work Zone Pavement Markings

In those areas where existing pavement markings are to be covered or removed, field locate and record the existing pavement markings by survey or other approved method by the Engineer as directed. Place final striping on these locations.

Remove and properly dispose of tabs upon completion of the final striping. This work is considered subsidiary to various bid items.

Item 666 – Retroreflectorized Pavement Markings

Use a pilot line for final striping and remove pilot line after all striping is complete. Removal will be in accordance with the methods specified in Item 677, “Eliminating Existing Pavement Markings and Markers,” and will be subsidiary to this Item.

Air blasting is required as pavement surface preparation.

In those areas where existing pavement markings are to be covered or removed, field locate and record the existing pavement markings by survey or other approved method by the Engineer as directed. Place final striping on these locations.

Item 672 – Raised Pavement Markers

Use a pilot line for final striping and remove pilot line after all striping is complete. Removal will be in accordance with the methods specified in Item 677, “Eliminating Existing Pavement Markings and Markers,” and will be subsidiary to this Item.

Air blasting is required for pavement surface preparation.

Furnish adhesives that conform to DMS-6100, “Epoxies and Adhesives,” and DMS-6130, “Bituminous Adhesive for Pavement Markers,” for this Item.

Do not place raised pavement markers when the pavement surface temperature is below 60°F.

Removal of all existing raised pavement markers will be considered subsidiary to the various bid items.

Item 3077 – Superpave Mixtures

Use Surface Aggregate Classification “A” material for all surface mixes.

In place of typical tack materials shown in Table 18 under Item 300, use a tracking resistant asphalt interlayer (TRAIL) material as a tack coat. Approved TRAIL products are found on TxDOT’s Material Producer List under Asphalt Interlayer (Tracking Resistant) through http://www.txdot.gov/business/resources/materials.html.

Hydrated Lime shall be added as an additive as per Item 301 “Asphalt Antistripping Agents” between the rates of 1.0% minimum and 2.0% maximum by weight. If the Hamburg Wheel Test cannot be met within these limits, Liquid Antistripping agents as approved by the Engineer may be used in conjunction with lime.

Supply Warm-Mix Asphalt (WMA) under this Item.

When Reclaimed Asphalt Pavement (RAP) is used in the production of hot-mix asphaltic concrete, use fractionated RAP. Do not exceed 10.0% of Fractionated RAP on surface mixtures.

Use of RAS is not allowed for any mixtures.

Substitute PG Binders (grade dumping) will not be allowed for any mixtures.

Obtain the current version of the templates at http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html. Submit electronically to the Engineer.

Design the mixture at 50 gyrations (Ndesign).

Do not cover with asphaltic material, any existing survey monuments, manholes, or valve covers, etc. Adjustments will be done in coordination with the respective utility owners.

Place a string line or other suitable marking to ensure smooth, neat lines, or as directed. Provide smooth transitions to existing driveways and intersections.

Place longitudinal joints approximately 6 in. from the broken striping, or as directed, to avoid placing under the wheel path. Longitudinal joints will not be allowed to be placed on any outside lanes.

Operate the spreading and finishing machine at a uniform forward speed consistent with the plant production rate, hauling capability, and roller train capacity to result in a continuous operation. The speed will be slow enough, so that stopping between trucks is not ordinarily required. If the Engineer determines non-uniform delivery of material is affecting the HMA placement, the Engineer may require the paving operations to cease until acceptable methods are employed to minimize starting and stopping of the paver.

Item 3085 – UNDERSEAL COURSE

Prepare the roadway surface prior to placing Underseal Course to the satisfaction of the Engineer. Some areas may require more extensive cleaning than other areas. This work will not be paid for directly but will be subsidiary to pertinent items.

Apply one course surface treatment (seal coat) on widen shoulder structure as shown on the typical sections.

Use Spray Applied Underseal Membrane or seal coat as underseal course prior to the placement of ACP(SP-D) along entire width of roadway.

The minimum application rates are listed in Table 4. The engineer may adjust the application rate taking in consideration the existing pavement surface conditions.

Table 4

Material	Minimum Application Rate
AGGR (TY-PB GR-4 SAC-B)(110 SY/CY)	110 SY/CY
ASPH (AC-20-5TR)(Warm Weather)	0.35 GAL/SY
ASPH (AC12-5TR) or RC250)(Cool Weather)	0.35 GAL/SY (AC12-5TR) or 0.47 GAL/SY (RC-250)
OR	
Spray Applied Underseal Membrane	0.20 GAL/SY

Item 6001 – PORTABLE CHANGEABLE MESSAGE SIGN

This item will be used as directed by the Engineer.

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

All TMA Operators must participate in a TMA workshop to be conducted by the El Paso District Safety Office, on the proper use of TMAs, prior to working on Department Right of Way (ROW). A certificate of completion will be issued to TMA Operators that successfully complete the TMA workshop. The certificate of completion must be carried by TMA Operators at all times while working on Department right of way.

Acquire the TCP and TMA Operator's certificates of completion prior to the authorization to begin work. No time suspension will be granted and no traffic control work will be allowed without certificates of completion.

Up to 2 total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

The supporting vehicle for the TMA shall have a minimum gross (i.e., ballasted) vehicular weight of 19,000 pounds.

Table 5
Basis of Estimate for Stationary TMAs

		TMA		
Phase	Standard	Required	Additional	TOTAL
1A	TCP (2-2)-18	1	0	1
1B	TCP (2-2)-18	1	0	1
2	TCP (2-2)-18	1	0	1

Table 6
Basis of Estimate for Mobile TMAs

	TMA		
Standard	Required	Additional	TOTAL
TCP (3-1)-13	2	0	2

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0002-04-033 **DISTRICT** El Paso **COUNTY** Hudspeth
HIGHWAY SH 20

							TOTAL EST.	TOTAL FINAL
			CONTROL SECTION JOB		**0002-04-033**			
			PROJECT ID		**A00177452**			
			COUNTY		**Hudspeth**			
			HIGHWAY		**SH 20**			
ALT	**BID CODE**	**DESCRIPTION**		**UNIT**	EST.	FINAL		
	106-6002	OBLITERATING ABANDONED ROAD		SY	180.000		180.000	
	112-6003	SUBGRADE WIDENING (DENS CONT)		SY	35,134.000		35,134.000	
	134-6004	BACKFILL (TY A OR B)		STA	287.450		287.450	
	247-6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")		SY	31,710.000		31,710.000	
	260-6002	LIME (HYDRATED LIME (SLURRY))		TON	10.000		10.000	
	260-6079	LIME TRT (SUBGRADE)(6")		SY	1,280.000		1,280.000	
	310-6014	PRIME COAT (SS-1H)		GAL	5,102.000		5,102.000	
	500-6001	MOBILIZATION		LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING		MO	11.000		11.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)		LF	29,597.000		29,597.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)		LF	29,597.000		29,597.000	
	510-6002	ONE-WAY TRAF CONT (PILOT CAR)		HR	252.000		252.000	
	533-6004	RUMBLE STRIPS (CENTERLINE) ASPHALT		LF	28,745.000		28,745.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)		LF	600.000		600.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE		LF	450.000		450.000	
	542-6003	REMOVE DOWNSTREAM ANCHOR TERMINAL		EA	1.000		1.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)		EA	4.000		4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)		EA	2.000		2.000	
	560-6004	MAILBOX INSTALL-S (TWG-POST) TY 2		EA	7.000		7.000	
	560-6005	MAILBOX INSTALL-D (TWG-POST) TY 2		EA	2.000		2.000	
	560-6006	MAILBOX INSTALL-M (TWG-POST) TY 2		EA	1.000		1.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)		EA	54.000		54.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)		EA	4.000		4.000	
	644-6076	REMOVE SM RD SN SUP&AM		EA	43.000		43.000	
	658-6047	INSTL OM ASSM (OM-2Y)(WC)GND		EA	13.000		13.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS		EA	24.000		24.000	
	658-6081	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND(BI)		EA	33.000		33.000	
	662-6008	WK ZN PAV MRK NON-REMOV (W)6"(SLD)		LF	28,745.000		28,745.000	
	666-6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)		LF	57,494.000		57,494.000	
	666-6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)		LF	6,311.000		6,311.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)		LF	8,998.000		8,998.000	
	672-6009	REFL PAV MRKR TY II-A-A		EA	434.000		434.000	
	3077-6052	SP MIXESSP-DSAC-A PG70-22		TON	8,494.000		8,494.000	
	3077-6054	SP MIXESSP-DSAC-A PG70-22 (LEVEL-UP)		TON	143.000		143.000	
	3085-6001	UNDERSEAL COURSE		GAL	34,013.000		34,013.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN		DAY	52.000		52.000	
	6185-6002	TMA (STATIONARY)		DAY	108.000		108.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0002-04-033 **DISTRICT** El Paso **COUNTY** Hudspeth
HIGHWAY SH 20

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**0002-04-033**			
		PROJECT ID		**A00177452**			
		COUNTY		**Hudspeth**			
		HIGHWAY		**SH 20**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	6185-6005	TMA (MOBILE OPERATION)	DAY	20.000		20.000	
	18	EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

* ITEM SHALL BE USED AT LOCATIONS IDENTIFIED AND AS DIRECTED BY THE ENGINEER.

SUMMARY OF ROADWAY ITEMS

LOCATION	134 6004 BACKFILL (TY A OR B) STA	106 6002 OBLITERATING ABANDONED ROAD SY	112 6003 SUBGRADE WIDENING (DENS CONT) SY	260 * 6002 LIME (HYDRATED LIME (SLURRY)) TON	260 * 6079 LIME TRT (SUBGRADE) (6") SY	247 6230 FL BS (CMP IN PLACE) (TY A GR 1-2) (8") SY	310 6014 PRIME COAT (SS-1H) GAL	540 6001 MTL W-BEAM GD FEN (TIM POST) LF	542 6001 REMOVE METAL BEAM GUARD FENCE LF	542 6003 REMOVE DOWNSTREAM ANCHOR TERMINAL EA	544 6001 GUARDRAIL END TREATMENT (INSTALL) EA	544 6003 GUARDRAIL END TREATMENT (REMOVE) EA	3077 6052 SP MIXES SP-D SAC-A PG70-22 TON	3077 6054 SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP) TON	3085 6001 UNDERSEAL COURSE GAL
SHEET 1	22	0	2689	0	0	2403	384	0	0	0	0	0	645	6	2710
SHEET 2	22	180	2689	0	0	2444	391	0	0	0	0	0	645	6	2722
SHEET 3	22	0	2689	0	0	2444	391	0	0	0	0	0	645	6	2577
SHEET 4	22	0	2689	0	0	2444	391	0	0	0	0	0	645	6	2580
SHEET 5	22	0	2689	0	0	2444	391	0	0	0	0	0	645	10	2580
SHEET 6	22	0	2689	0	0	2444	391	450	450	1	2	2	645	13	2582
SHEET 7	22	0	2689	0	0	2444	391	0	0	0	0	0	645	11	2575
SHEET 8	22	0	2689	0	0	2393	391	0	0	0	0	0	663	14	2582
SHEET 9	22	0	2689	0	0	2444	391	0	0	0	0	0	645	14	2600
SHEET 10	22	0	2689	0	0	2444	391	0	0	0	0	0	645	15	2603
SHEET 11	22	0	2689	0	0	2444	391	0	0	0	0	0	645	16	2590
SHEET 12	22	0	2689	0	0	2354	391	0	0	0	0	0	675	12	2557
SHEET 13	22	0	2689	0	0	2399	391	150	0	0	2	0	660	14	2584
SHEET 14	1.45	0	177	0	0	161	26	0	0	0	0	0	43	1	171
PROJECT TOTALS	**287.45**	**180**	**35134**	**10**	**1280**	**31710**	**5102**	**600**	**450**	**1**	**4**	**2**	**8494**	**143**	**34013**

SUMMARY OF PAVEMENT MARKING ITEMS

LOCATION	533 6004 RUMBLE STRIPS (CENTERLINE) ASPHALT LF	560 6004 MAILBOX INSTALL-S (TWG-POST) TY 2 EA	560 6005 MAILBOX INSTALL-D (TWG-POST) TY 2 EA	560 6006 MAILBOX INSTALL-M (TWG-POST) TY 2 EA	644 6001 IN SM RD SN SUP&AM TY10BWG(1) SA(P) EA	644 6004 IN SM RD SN SUP&AM TY10BWG(1)SA(T) EA	644 6076 REMOVE SM RD SN SUP&AM EA	658 6047 INSTL OM ASSM (OM-2Y)(WC)GND EA	658 6060 REMOVE DELIN & OBJECT MARKER ASSMS EA	658 6081 INSTL DEL ASSM (D-SW)SZ1(WFLX)GND(BI) EA	666 6318 RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL) LF	666 6321 RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL) LF	666 6285 REF PROF PAV MRK TY I(W)6"(SLD)(090MIL) LF	672 6009 REFL PAV MRKR TY II-A-A EA
SHEET 1	2200	1	0	0	1	2	2	0	0	0	550	0	4402	28
SHEET 2	2200	0	0	0	5	2	3	1	6	25	550	0	4402	28
SHEET 3	2200	0	0	0	2	0	1	2	8	8	550	0	4400	28
SHEET 4	2200	0	0	0	0	0	0	0	0	0	550	0	4400	28
SHEET 5	2200	0	0	0	1	0	2	0	0	0	550	0	4400	28
SHEET 6	2200	0	0	0	12	0	1	1	1	0	550	632	4400	36
SHEET 7	2200	1	1	0	19	0	20	0	0	0	100	4002	4402	55
SHEET 8	2200	0	0	0	12	0	11	3	3	0	125	3910	4400	55
SHEET 9	2200	1	0	0	1	0	2	0	0	0	550	454	4400	34
SHEET 10	2200	1	0	0	1	0	1	0	0	0	550	0	4400	28
SHEET 11	2200	0	0	0	0	0	0	2	2	0	550	0	4400	28
SHEET 12	2200	2	0	1	0	0	0	0	0	0	550	0	4400	28
SHEET 13	2200	1	1	0	0	0	0	4	4	0	550	0	4400	28
SHEET 14	145	0	0	0	0	0	0	0	0	0	36	0	290	2
PROJECT TOTALS	**28745**	**7**	**2**	**1**	**54**	**4**	**43**	**13**	**24**	**33**	**6311**	**8998**	**57496**	**434**

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	500 6001 MOBILIZATION LS	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING MO	506 6038 TEMP SEDMT CONT FENCE (INSTALL) LF	506 6039 TEMP SEDMT CONT FENCE (REMOVE) LF	510 6002 ONE-WAY TRAF CONT (PILOT CAR) HR	662 6008 WK ZN PAV MRK NON-REMOV (W)6"(SLD) LF	6001 6001 PORTABLE CHANGEABLE MESSAGE SIGN DAY	6185 6002 TMA (STATIONARY) DAY	6185 6005 TMA (MOBILE OPERATION) DAY
CSJ 0002-04-033	1	11	29597	29597	252	28745	52	108	20
PROJECT TOTALS	**1**	**11**	**29597**	**29597**	**252**	**28745**	**52**	**108**	**20**

SH 20
GENERAL

SUMMARY SHEETS

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		7

DATE: 5/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040033\4 - Design\Plan Set\13. Standards\ENVIRONMENTAL\ENV_EPIC.dgn

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SWP3 and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SWP3 information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

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

III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

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

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CGP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

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

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

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

Contact the Engineer if any of the following are detected:
* Dead or distressed vegetation (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☒ No

If "No", then no further action is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☒ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

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

☒ No Action Required ☐ Required Action

Action No.

1.

2.

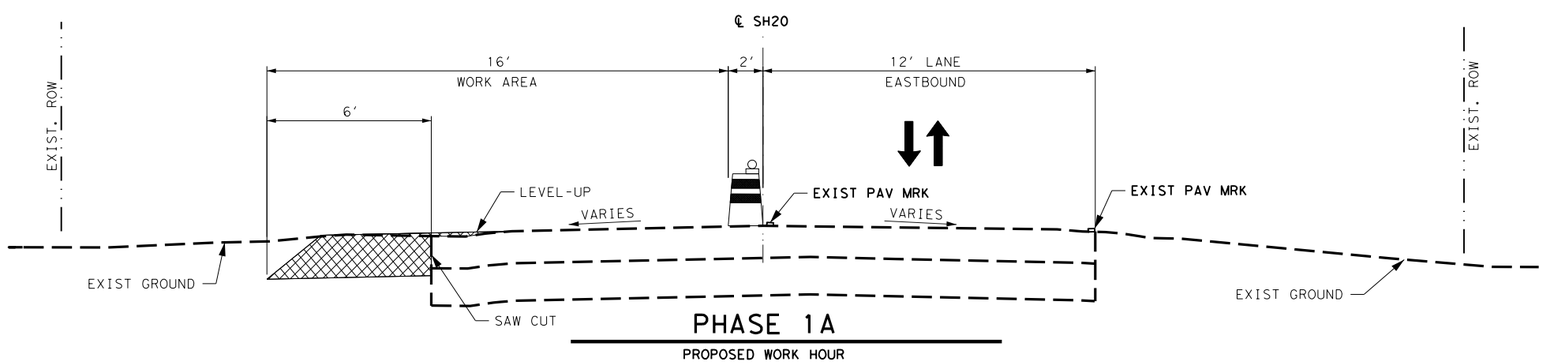
3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

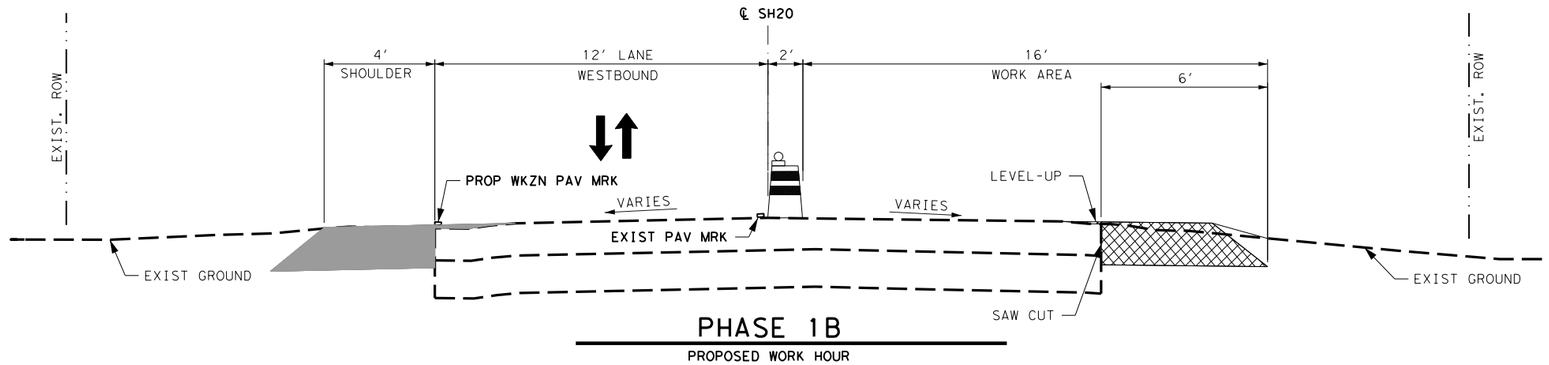
EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR	
	CONT	SECT	JOB	HIGHWAY	
REVISIONS 12-12-2011 (DS) 05-07-14 ADDED NOTE SECTION IV. 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	0002	04	033	SH 20	
	DIST	COUNTY		SHEET NO.	
	ELP	HUDSPETH		8	



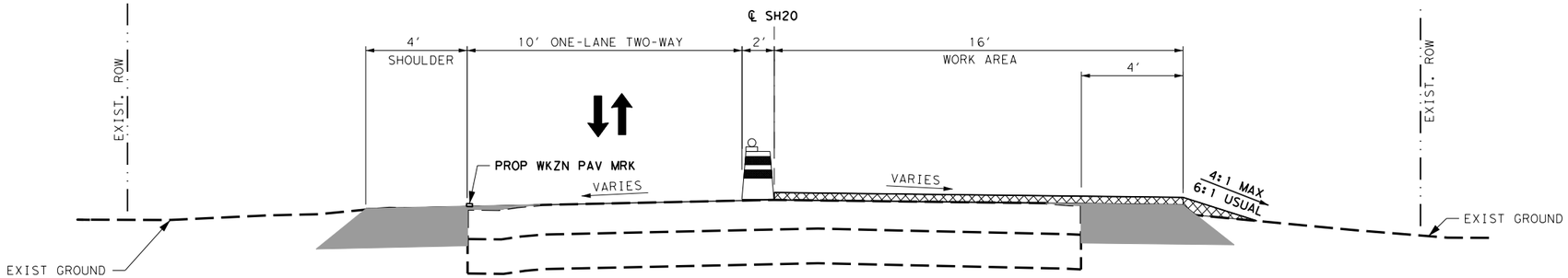
PHASE 1A

PROPOSED WORK HOUR



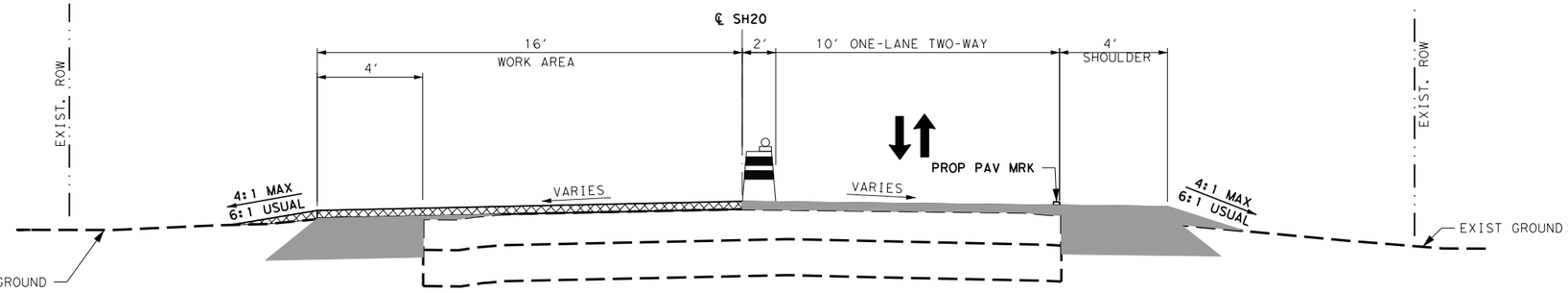
PHASE 1B

PROPOSED WORK HOUR



PHASE 2 - STEP 1A

PROPOSED WORK HOUR



PHASE 2 - STEP 1B

PROPOSED WORK HOUR

LEGEND

- TRAFFIC FLOW
- CONSTRUCTED CURRENT PHASE
- CONSTRUCTED PREVIOUS PHASE
- EXISTING PAVEMENT
- DRUM WITH WARNING REFLECTOR

NOTES:

1. LEVEL-UP EXISTING EDGE CONDITIONS PRIOR TO CONSTRUCTION OF SHOULDER.
2. CONSTRUCT SHOULDERS IN SEGMENTS NO LONGER THAN HALF MILE AT A TIME, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. SAW CUT EXISTING PAVEMENT STRUCTURE TO THE PROPOSED PAVEMENT DEPTH OR AS DIRECTED BY THE ENGINEER.
4. PHASE 2 STEP 1A AND PHASE 2 STEP 1B SHALL BE COMPLETED IN ONE WORKDAY TO ELIMINATE THE CENTERLINE LONGITUDINAL DROP-OFF BETWEEN OPPOSING TRAVEL LANES. LIMIT WORK ZONE LENGTH THAT CAN BE OVERLAID IN ONE WORKDAY.
5. SHIFT TRAFFIC BACK TO ORIGINAL TWO WAY CONFIGURATION PRIOR TO END OF WORK DAY AND TREAT DROP OFF CONDITIONS AT END OF EACH WORKING DAY AS AS SHOWN ON TREATMENT FOR VARIOUS EDGE CONDITIONS SHEET.
6. TRAFFIC DIRECTION WILL BE CONTROLLED BY PILOT CAR AND FLAGGER DURING WORK HOURS.
7. PROVIDE AND MAINTAIN ALL BARRICADES, WARNING SIGNS, AND TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH TXDOT BC AND TCP STANDARDS, AND PART VI OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
8. REFER TO TCP NARRATIVE SHEET AND MOBILE OPERATIONS TCP STANDARDS FOR PHASE 3 TCP.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC CONTROL PLAN

TYPICAL SECTIONS
STA. 100+00.00 TO STA. 387+45.00

NOT TO SCALE SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		9

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DN: | CK: | DW: | CK:

GENERAL NOTES:

1. PRIOR TO START OF THE PROJECT, INSTALL ADVANCED WARNING SIGNS ACCORDING TO THE BC STANDARDS OR AS DIRECTED AND SHALL REMAIN IN PLACE THROUGHOUT THE DURATION OF CONSTRUCTION.
2. PLACE TRAFFIC CONTROL DEVICES AND WORK ZONE PAVEMENT MARKINGS PRIOR TO MOVING TRAFFIC AND BEGINNING CONSTRUCTION. REMOVE ALL EXISTING PAVEMENT MARKINGS AND SIGNS CONFLICTING WITH WORK ZONE PAVEMENT MARKINGS AND TEMPORARY SIGNS.
3. PLACE TEMPORARY SW3P MEASURES ACCORDING TO PROJECT PLANS, OR AS OTHERWISE INSTRUCTED BY ENGINEER, BUT NO SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBANCE OR POTENTIAL POLLUTANT GENERATING ACTIVITIES IN THEIR CONTROL AREA. REMOVE TEMPORARY SW3P EROSION CONTROL MEASURES IN EACH AREA AS DIRECTED BY THE ENGINEER.
4. MAINTAIN POSITIVE DRAINAGE DURING CONSTRUCTION.
5. PROVIDE ACCESS TO PRIVATE PROPERTY AT ALL TIMES. MATERIALS, MAINTENANCE AND LABOR FOR TEMPORARY ACCESS IS SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. MAINTAIN ACCESS TO MAILBOXES AT ALL TIMES. IN THE EVENT THIS IS NOT POSSIBLE, PROVIDE TEMPORARY MAILBOXES AS DIRECTED AND COORDINATE WITH THE UNITED STATES POSTAL SERVICE AND PROPERTY OWNERS. MATERIALS, MAINTENANCE AND LABOR FOR THIS SHALL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.
7. COORDINATE WITH SCHOOL DISTRICTS AND PROVIDE ACCOMMODATIONS FOR TEMPORARY SCHOOL BUS STOPS AS DIRECTED BY THE ENGINEER. THIS SHALL BE SUBISDARY TO THE VARIOUS BID ITEMS.
8. ALL THROUGH LANES WILL BE OPENED TO TRAFFIC AT THE END OF EACH WORKDAY, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

SEQUENCE OF CONSTRUCTION

PHASE 1A:

1. INSTALL ADDITIONAL SIGNAGE,50MPH CONSTRUCTION SPEED ZONE SIGN CHANNELIZING DEVICES, AND WORK ZONE BARRICADES.
2. INSTALL SWP3 DEVICES AS REQUIRED IN THE PLANS AND/OR AS DIRECTED.
3. FOLLOW TCP (2-2b) FOR DAILY LANE CLOSURES USING BOTH FLAGGERS AND PILOT CAR TO CONSTRUCT THE WESTBOUND SHOULDER AS SHOWN IN THE PLANS.
4. LEVEL-UP EDGE CONDITIONS PRIOR TO CONSTRUCTION OF SHOULDER.
5. SAW CUT EXISTING PAVEMENT STRUCTURE TO THE PROPOSED PAVEMENT DEPTH OR AS DIRECTED BY THE ENGINEER.
6. CONSTRUCT IN HALF MILE MAXIMUM WORK ZONE LENGTH OR AS DIRECTED BY THE ENGINEER.
7. PROPOSED CONSTRUCTION TO REMAIN CLOSED TO TRAFFIC DURING WORK HOURS UNTIL ALL WESTBOUND CONSTRUCTION HAS BEEN COMPLETED.
8. SHIFT TRAFFIC BACK TO ORIGINAL TWO WAY CONFIGURATION AND TREAT DROP OFF CONDITIONS PRIOR TO END OF EACH DAY AS SHOWN ON TREATMENT FOR VARIOUS EDGE CONDITIONS SHEET.

PHASE 1B

1. PLACE NON-REMOVABLE WORK ZONE PAVEMENT MARKINGS AS SHOWN IN TRAFFIC CONTROL PLAN TYPICAL SECTIONS SHEET.
2. FOLLOW TCP (2-2b) FOR DAILY LANE CLOSURES USING BOTH FLAGGERS AND PILOT CAR TO CONSTRUCT THE EASTBOUND SHOULDER AS SHOWN IN THE PLANS.
3. LEVEL-UP EDGE CONDITIONS PRIOR TO CONSTRUCTION OF SHOULDER.
4. SAW CUT EXISTING PAVEMENT STRUCTURE TO THE PROPOSED PAVEMENT DEPTH OR AS DIRECTED BY THE ENGINEER.
5. CONSTRUCT IN HALF MILE MAXMUM WORK ZONE LENGTH OR AS DIRECTED BY THE ENGINEER.
6. PROPOSED CONSTRUCTION TO REMAIN CLOSED TO TRAFFIC DURING WORK HOURS UNTIL ALL EASTBOUND CONSTRUCTION HAS BEEN COMPLETED.
7. SHIFT TRAFFIC BACK TO ORIGINAL TWO WAY CONFIGURATION AND TREAT DROP OFF CONDITIONS PRIOR TO END OF EACH DAY AS SHOWN ON TREATMENT FOR VARIOUS EDGE CONDITIONS SHEET.

PHASE 2 STEP 1A AND PHASE 2 STEP 1B

1. FOLLOW TCP (2-2b) FOR DAILY LANE CLOSURES USING BOTH FLAGGERS AND PILOT CAR.
2. PLACE UNDERSEAL AND OVERLAY ON EASTBOUND FOLLOWING OVERLAY AND UNDERSEAL ON WESTBOUND PRIOR TO END OF WORKDAY. THE INTENT IS TO OVERLAY THE FULL ROADWAY BY ELIMINATING THE CENTERLINE LONGITUDINAL DROP-OFF BETWEEN THE OPPOSING TRAVEL LANES PRIOR TO END OF WORKDAY.
3. WORK ZONE LENGTH WILL BE RESTRICTED TO WHAT CAN BE OVERLAID ON FULL ROADWAY WIDTH PRIOR TO END OF WORKDAY OR AS APPROVED BY THE ENGINEER.
4. PROPOSED CONSTRUCTION TO REMAIN CLOSED TO TRAFFIC AND OPENED AT END OF WORKING DAY OR AS DIRECTED BY THE ENGINEER.
5. MAINTAIN ACCESS TO MAILBOXES AND PROVIDE ACCESS TO PRIVATE PROPERTY AT ALL TIMES.

PHASE 3

1. PLACE PROPOSED PAVEMENT MARKNGS AND CENTERLINE RUMBLE STRIPS, METAL BEAM GUARD FENCE AND TERMINALS FOLLOWING TCP (3-3a) and TCP (2-2b).
2. REMOVE ALL TRAFFIC CONTROL DEVICES, TEMPORARY SIGNS, AND SWP3 DEVICES AND INSTALL PERMANENT SMALL SIGNS SIMULTANEOUSLY.

STATE OF TEXAS
ALEJANDRO FRANCO
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LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

TRAFFIC CONTROL PLAN
NARRATIVE

SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		10

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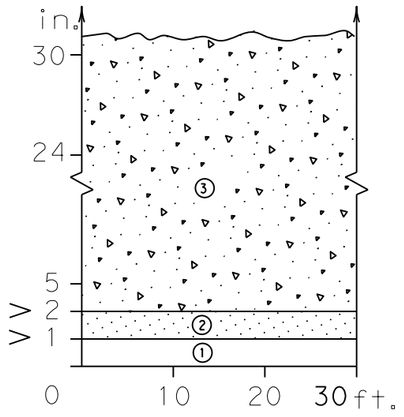
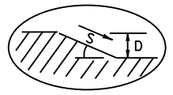
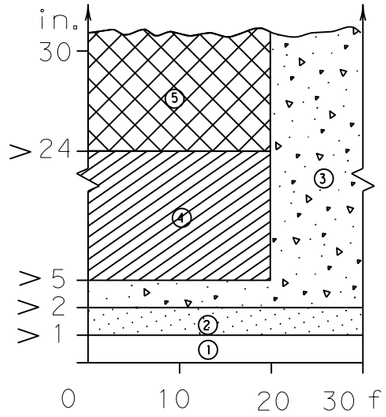
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

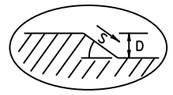


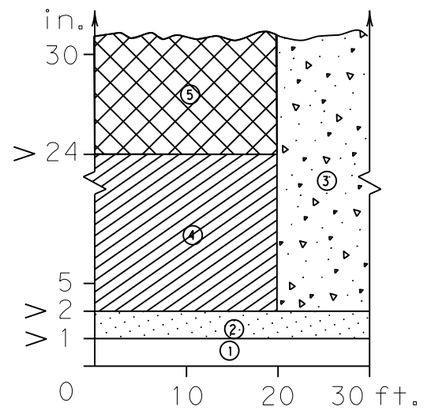
Edge Condition I
S = (3:1) (or flatter)



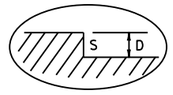


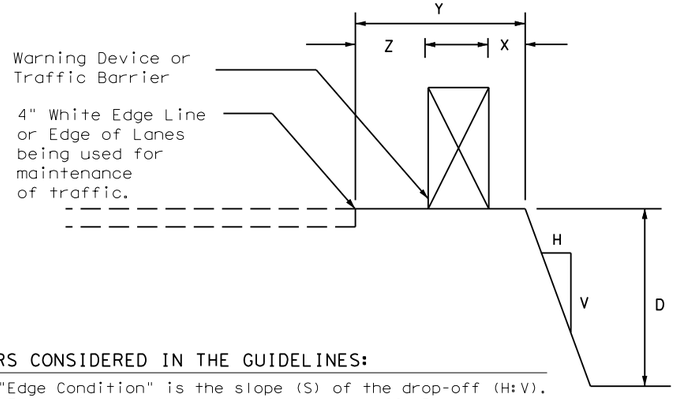
Edge Condition II
S = ((2.99):1) to (1:1)





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





FACTORS CONSIDERED IN THE GUIDELINES:

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

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

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

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

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

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

Edge Condition Notes:

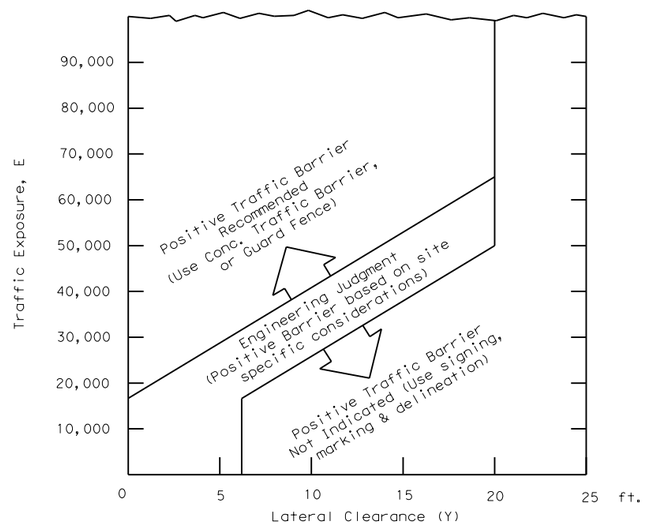
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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

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

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

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



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

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

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

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

Engineer's Seal

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

Date 05/27/2022

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
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	ELP	HUDSPETH		11

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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).

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	ELP	HUDSPETH		12
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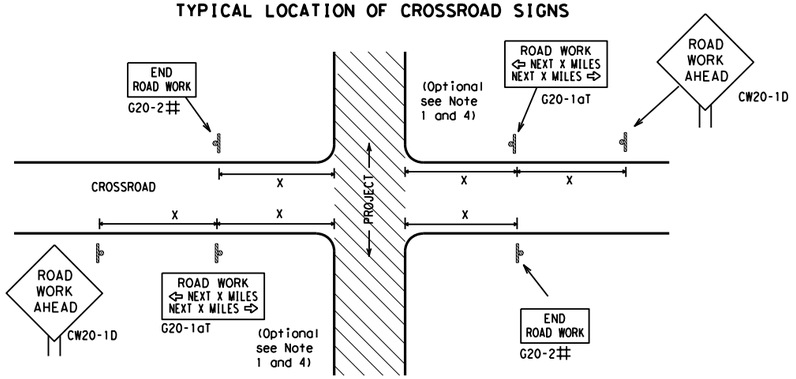
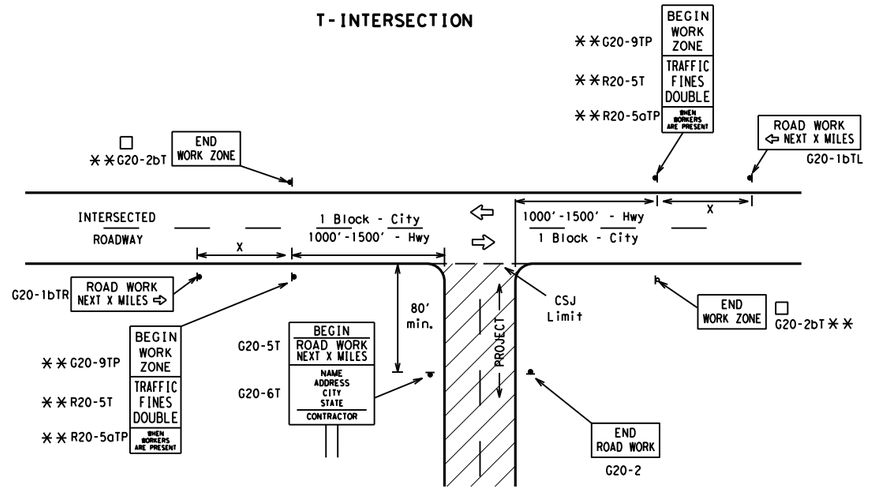
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

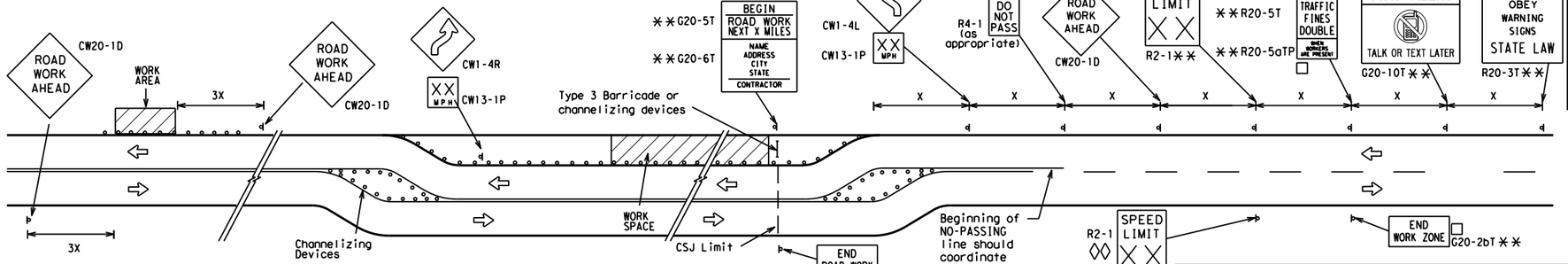
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

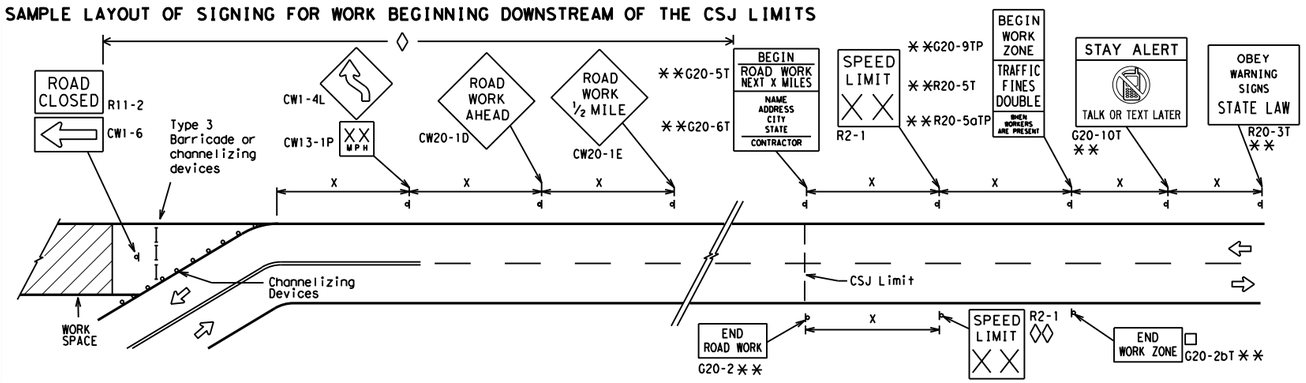
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

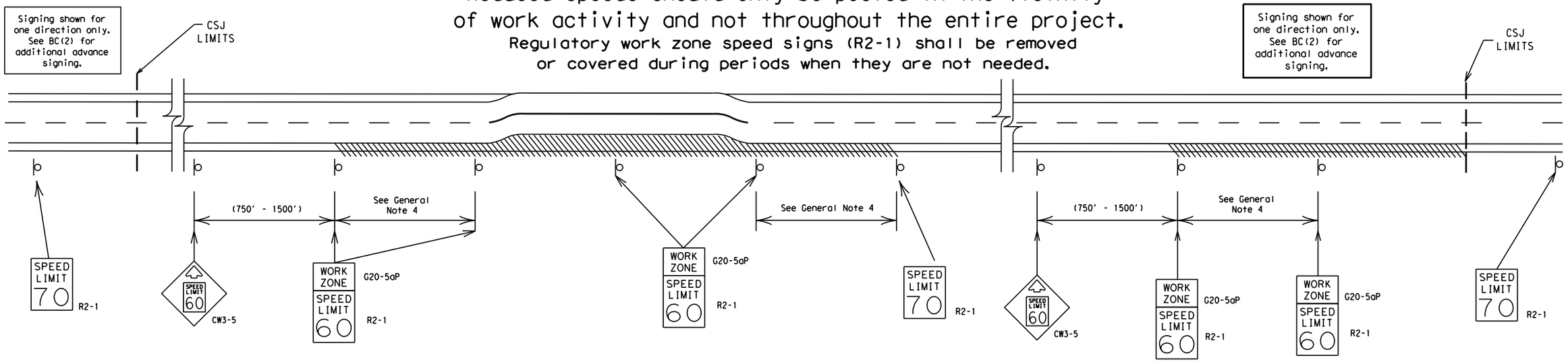
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	HUDSPETH		13

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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7-13 5-21	ELP	HUDSPETH		14

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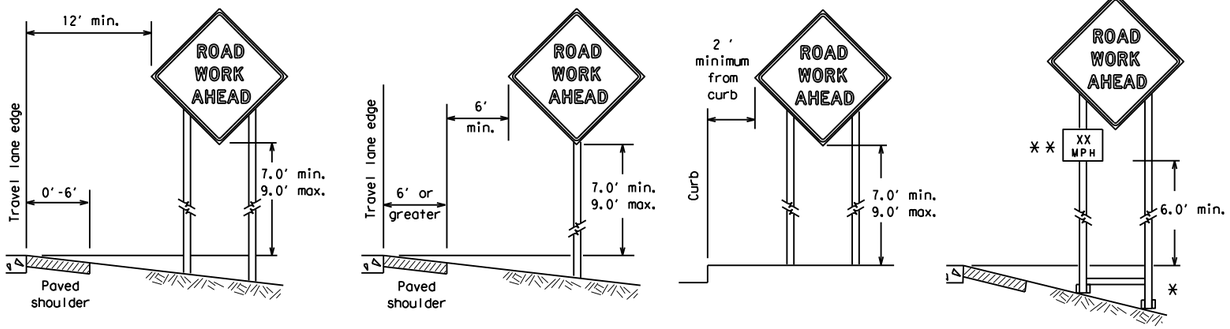
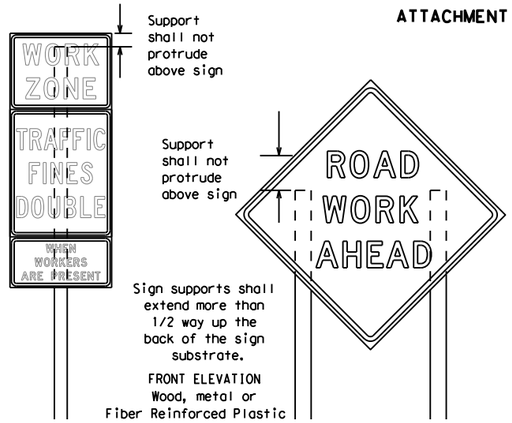
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

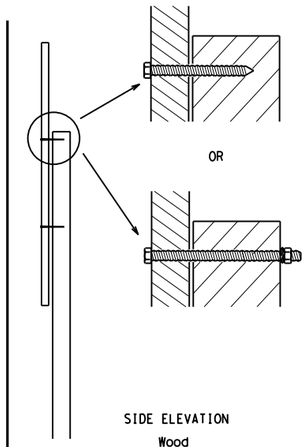


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





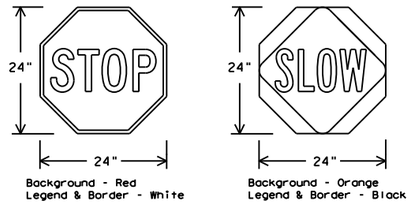
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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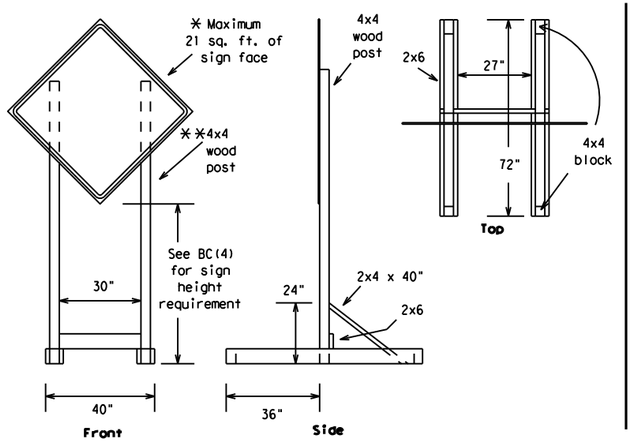
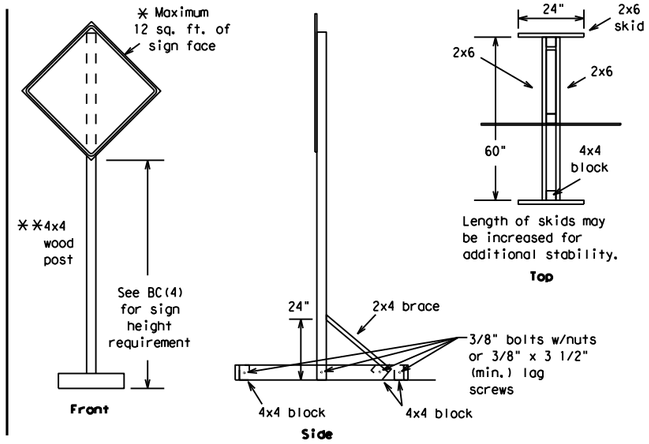
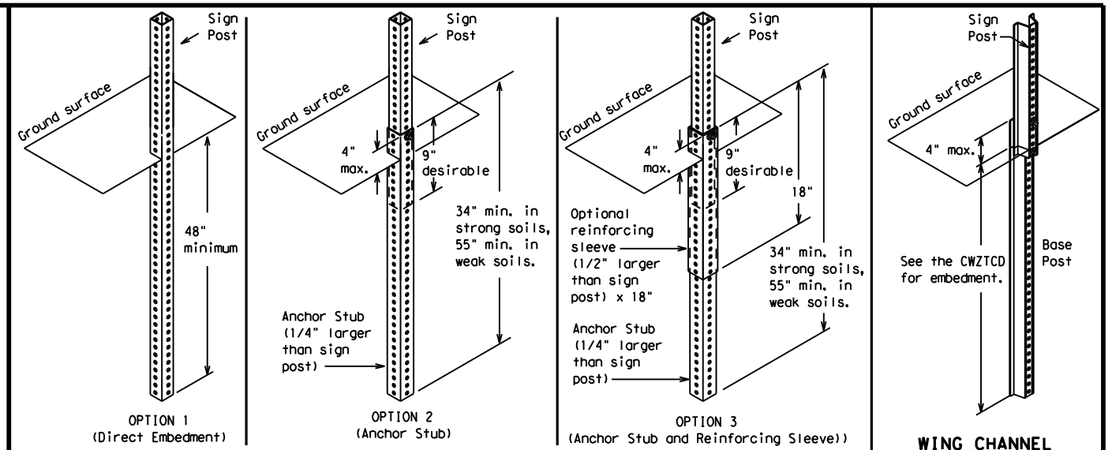




SKID MOUNTED WOOD SIGN SUPPORTS

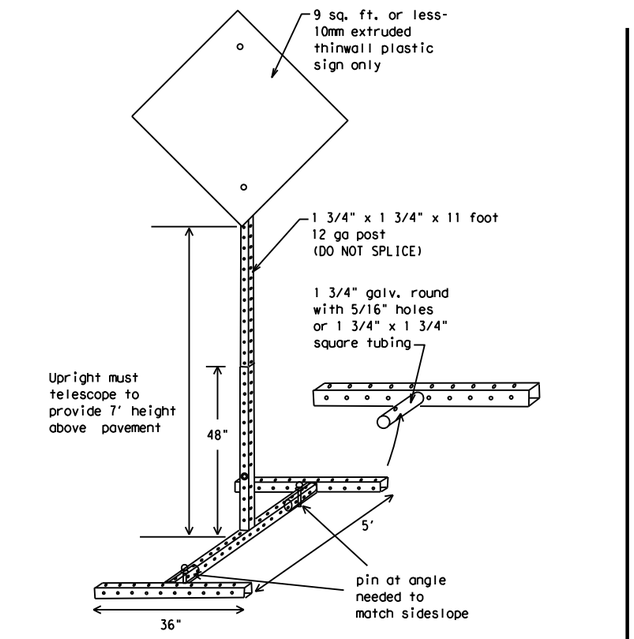
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

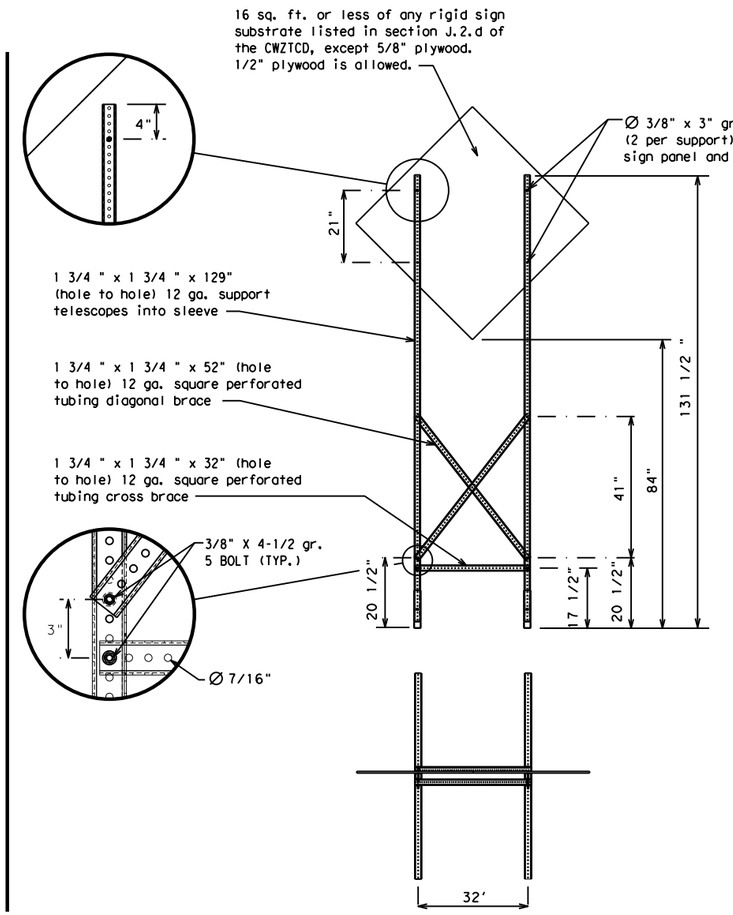


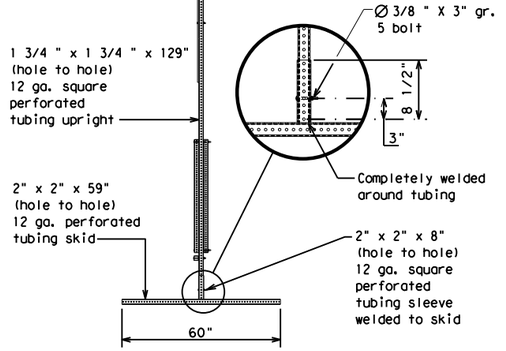
PERFORATED SQUARE METAL TUBING

GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	HUDSPETH		16

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* 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		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0002	04	033	SH 20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	HUDSPETH		17

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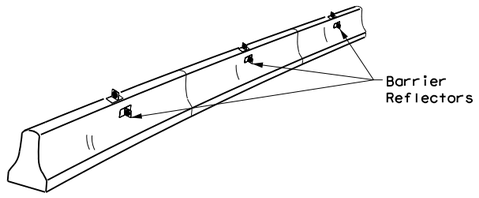
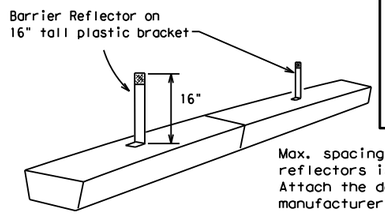
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

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

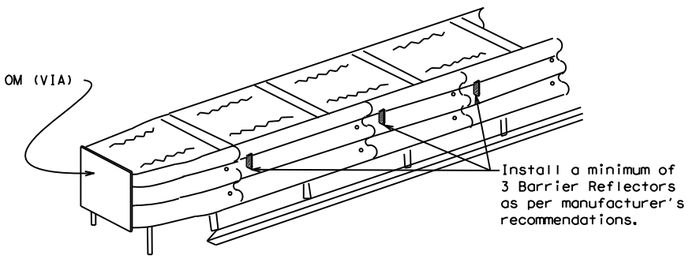


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

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.

LOW PROFILE CONCRETE BARRIER (LPCB)

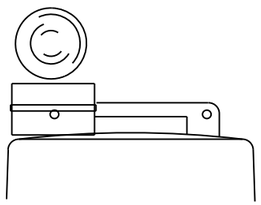


DELINEATION OF END TREATMENTS

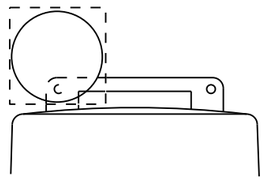
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

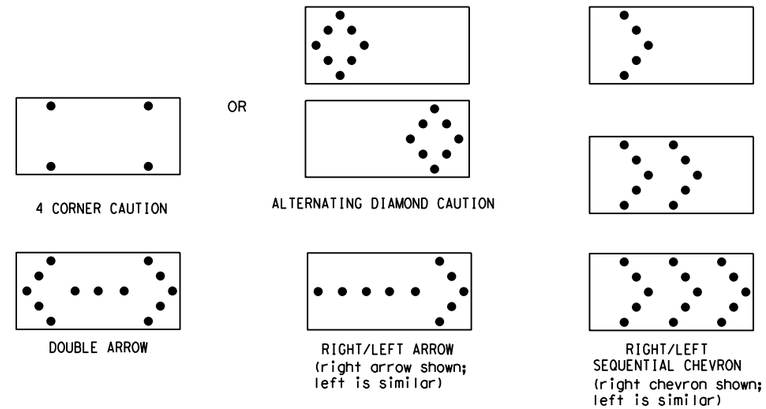
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	ELP	HUDSPETH		18

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

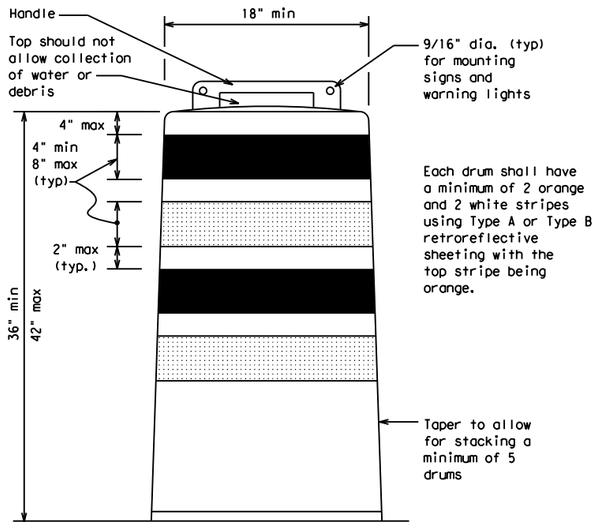
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

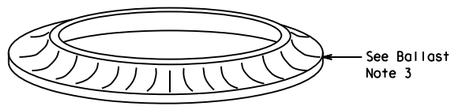
RETROREFLECTIVE SHEETING

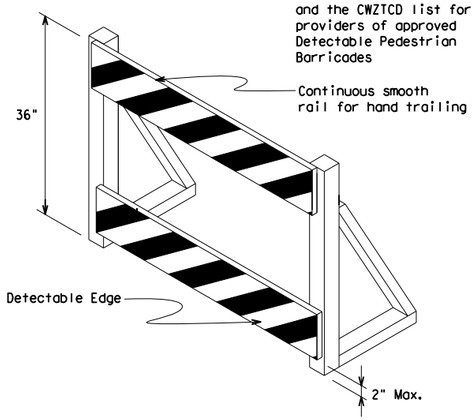
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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

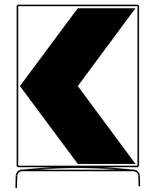




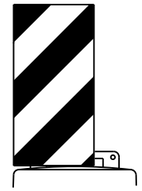


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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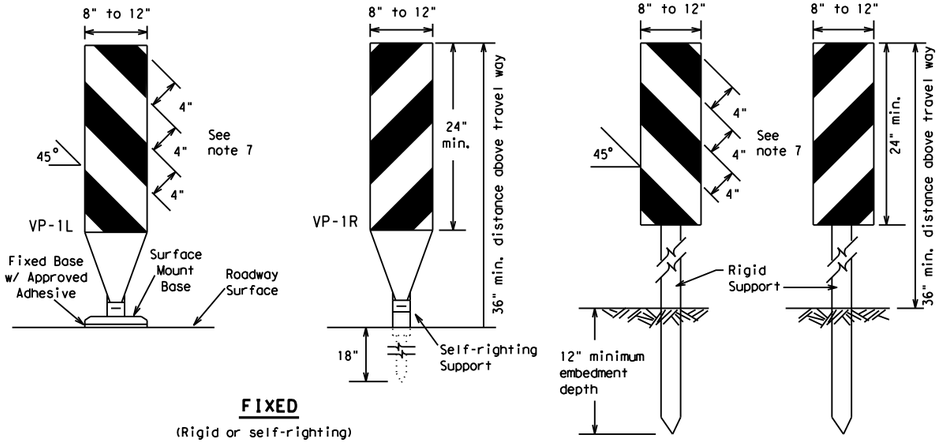
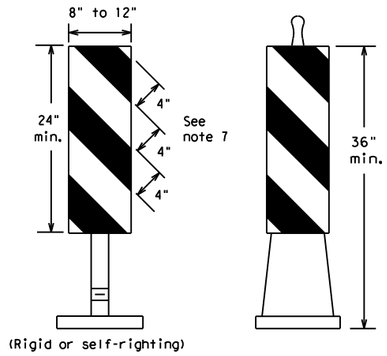


FIXED
(Rigid or self-righting)

DRIVEABLE

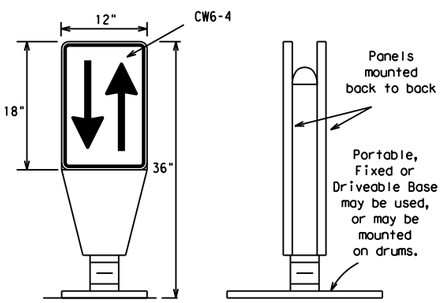


(Rigid or self-righting)

PORTABLE

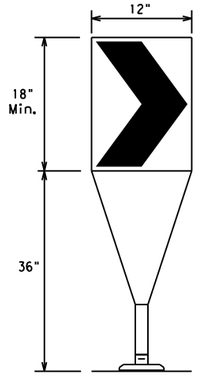
VERTICAL PANELS (VPs)

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



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



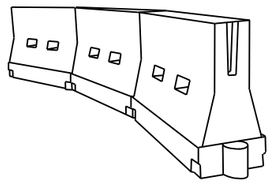
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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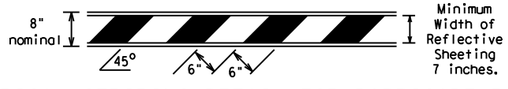
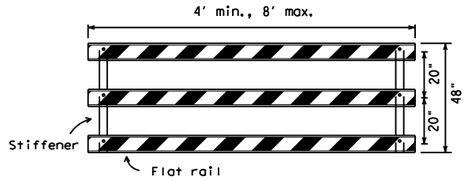
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



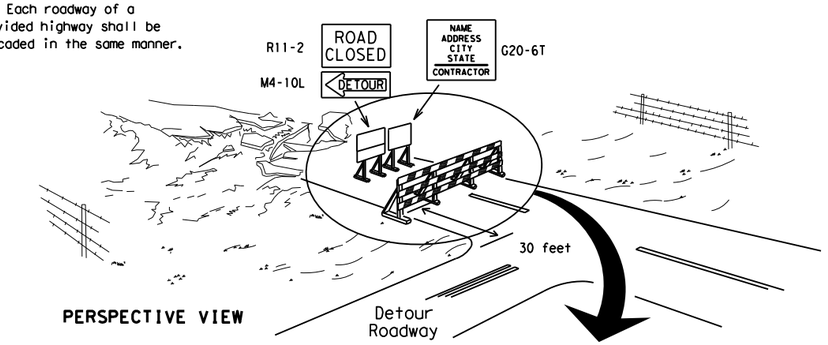
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

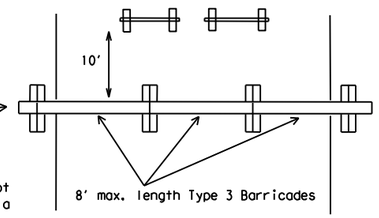
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

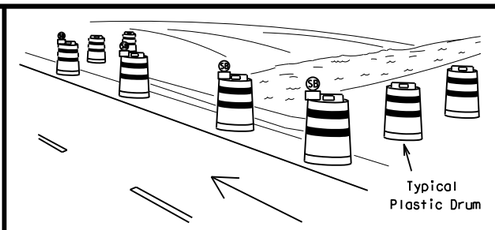
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

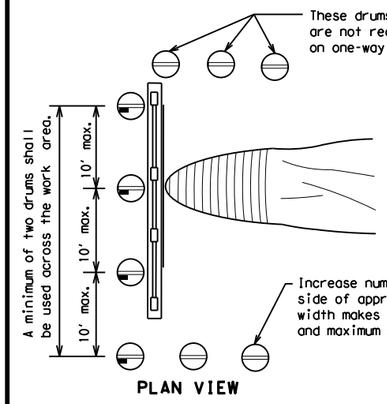
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

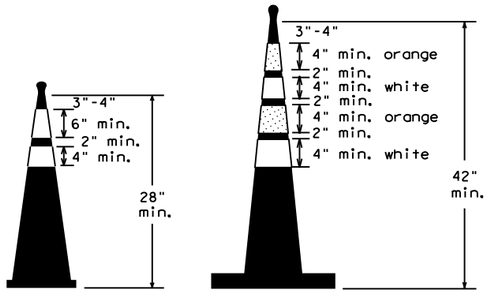
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

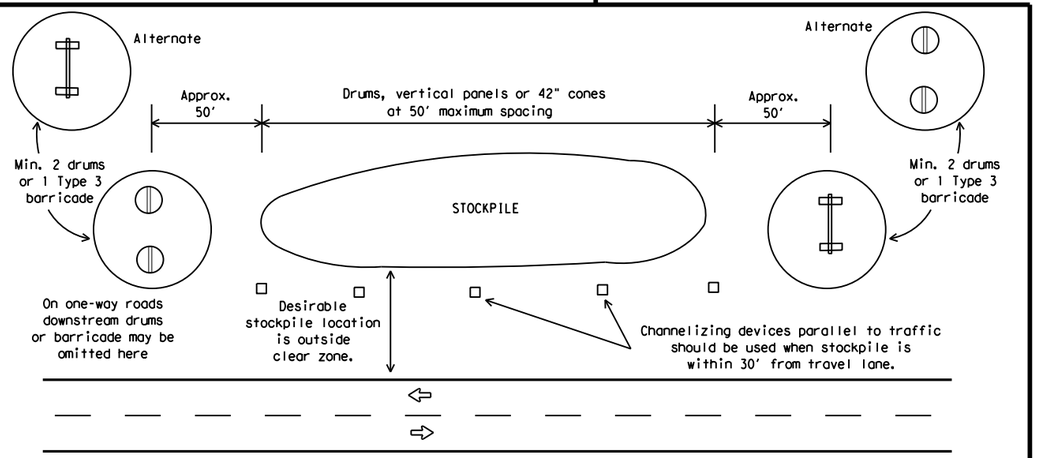


Two-Piece cones | One-Piece cones | Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

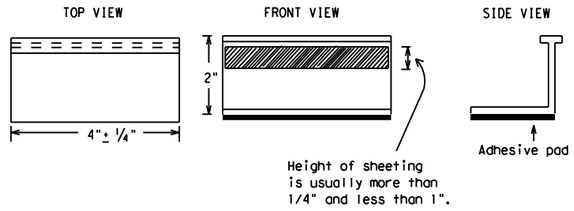
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
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1-02 7-13	ELP	HUDSPETH		22
11-02 8-14				

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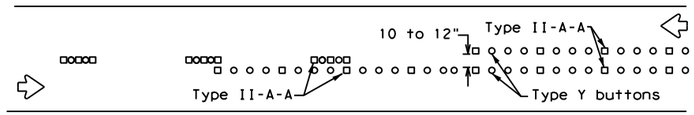
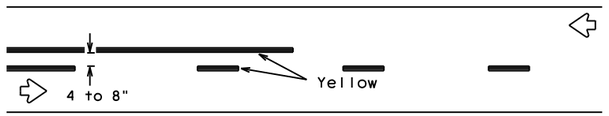
PAVEMENT MARKING PATTERNS

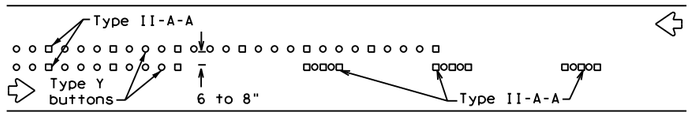
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



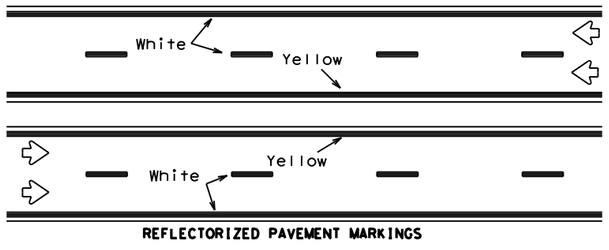
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



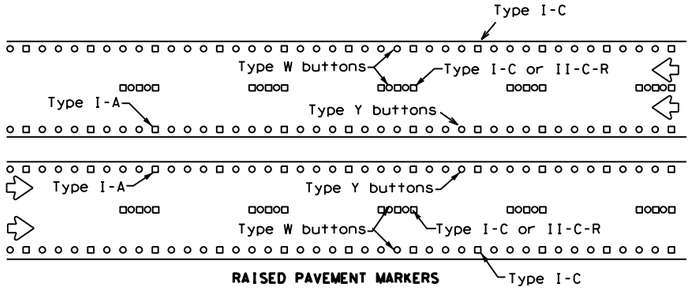
RAISED PAVEMENT MARKERS - PATTERN B

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

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



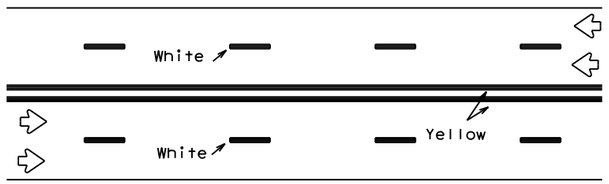
REFLECTORIZED PAVEMENT MARKINGS



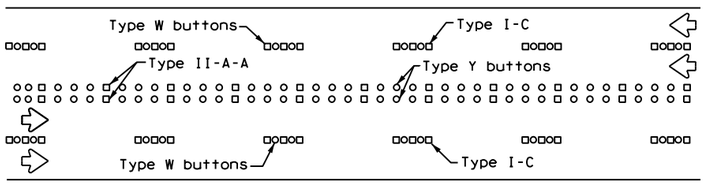
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



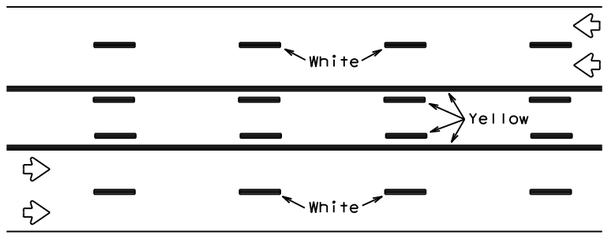
REFLECTORIZED PAVEMENT MARKINGS



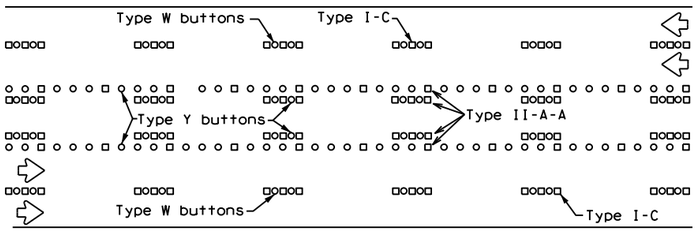
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

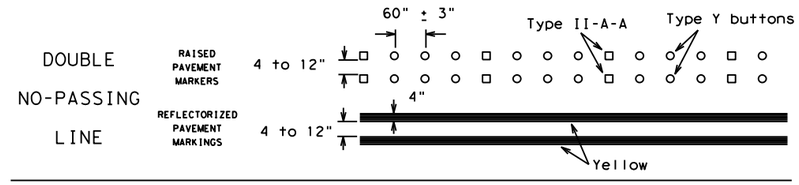
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

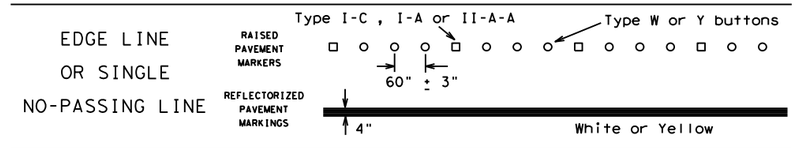
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

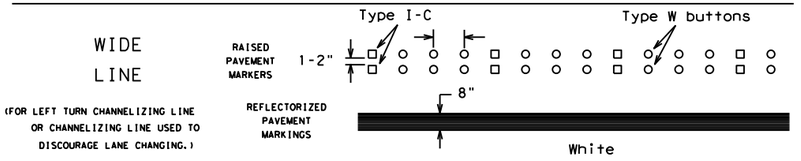


EDGE LINE OR SINGLE NO-PASSING LINE



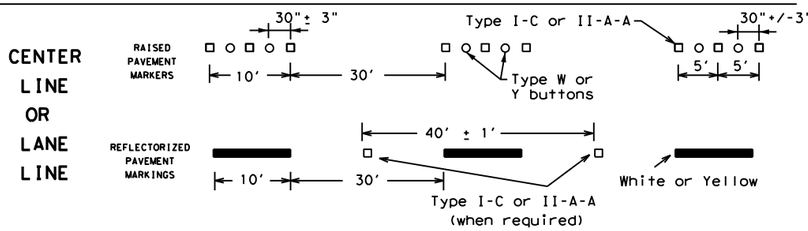
WIDE LINE

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

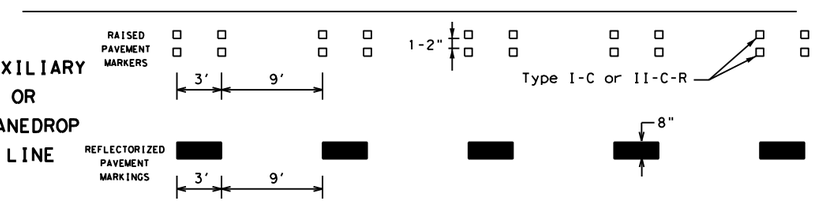


BROKEN LINES

CENTER LINE OR LANE LINE

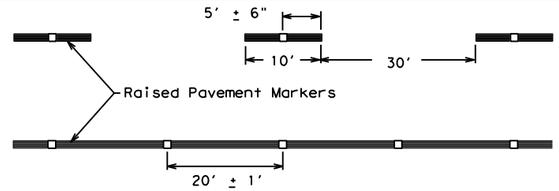


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

SHEET 12 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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2-98 7-13	ELP	HUDSPETH		23
11-02 8-14				

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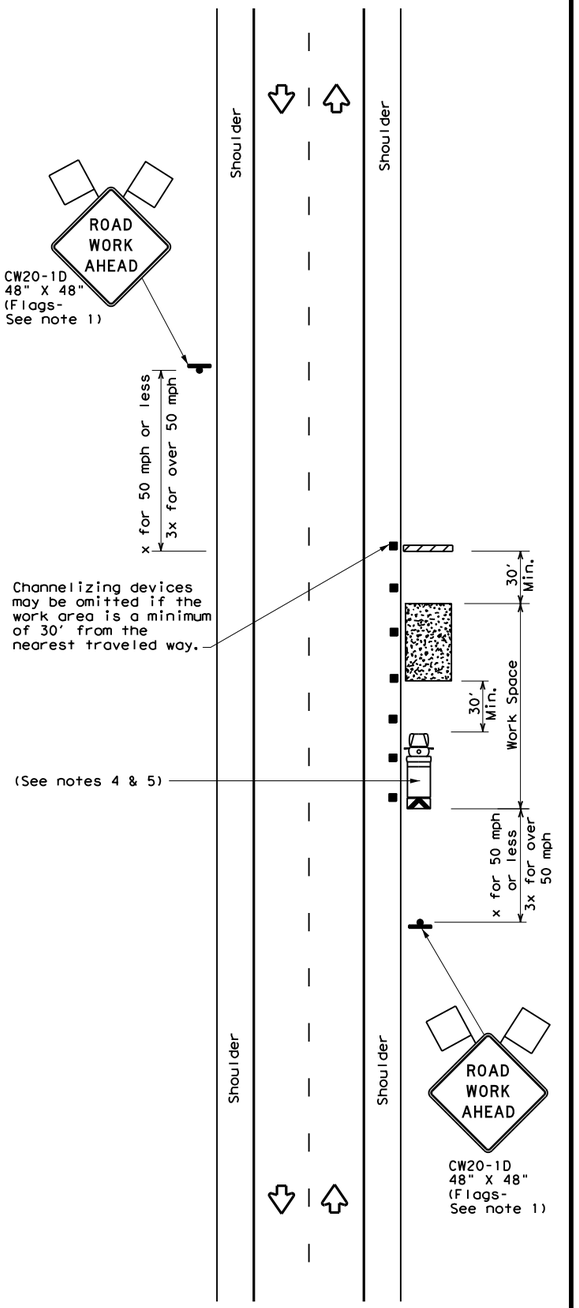
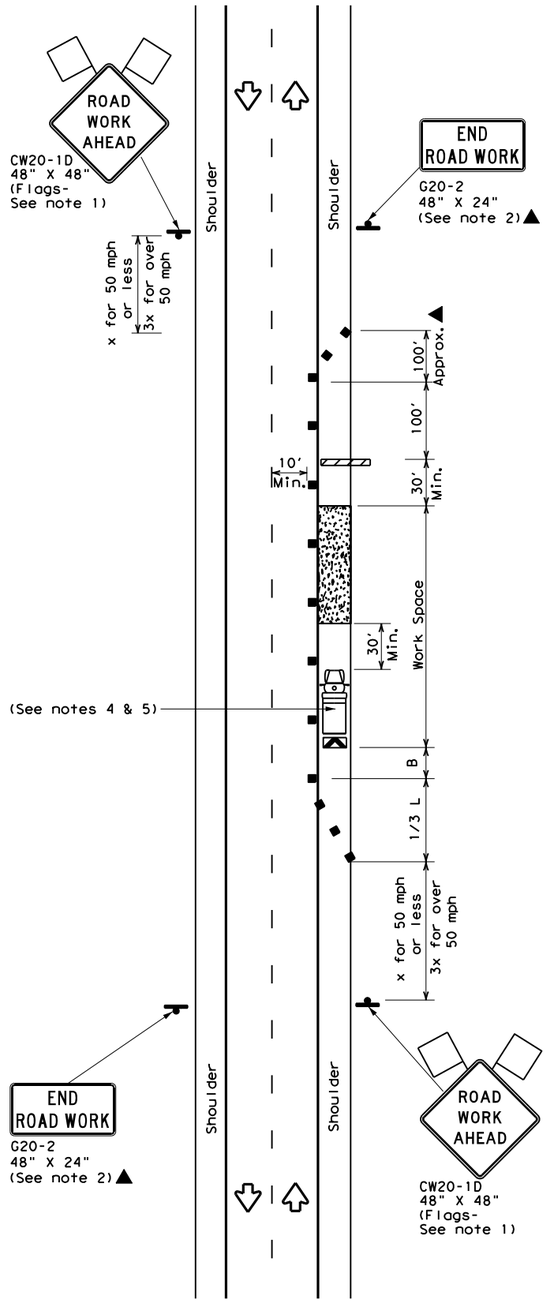


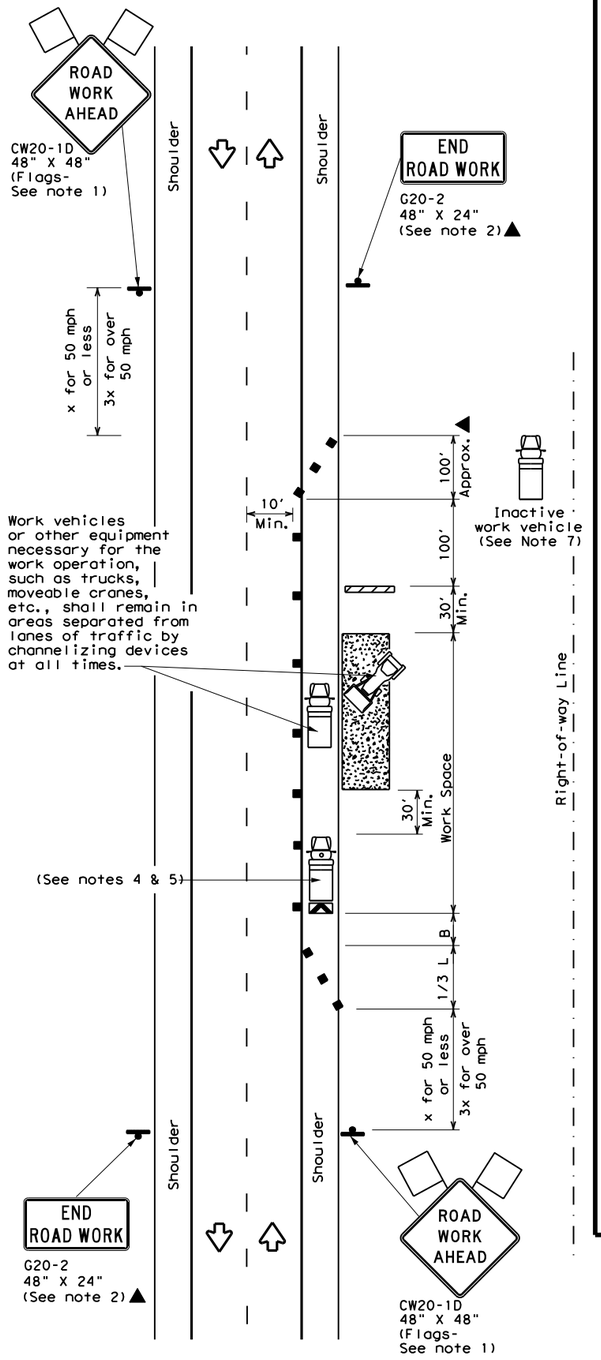
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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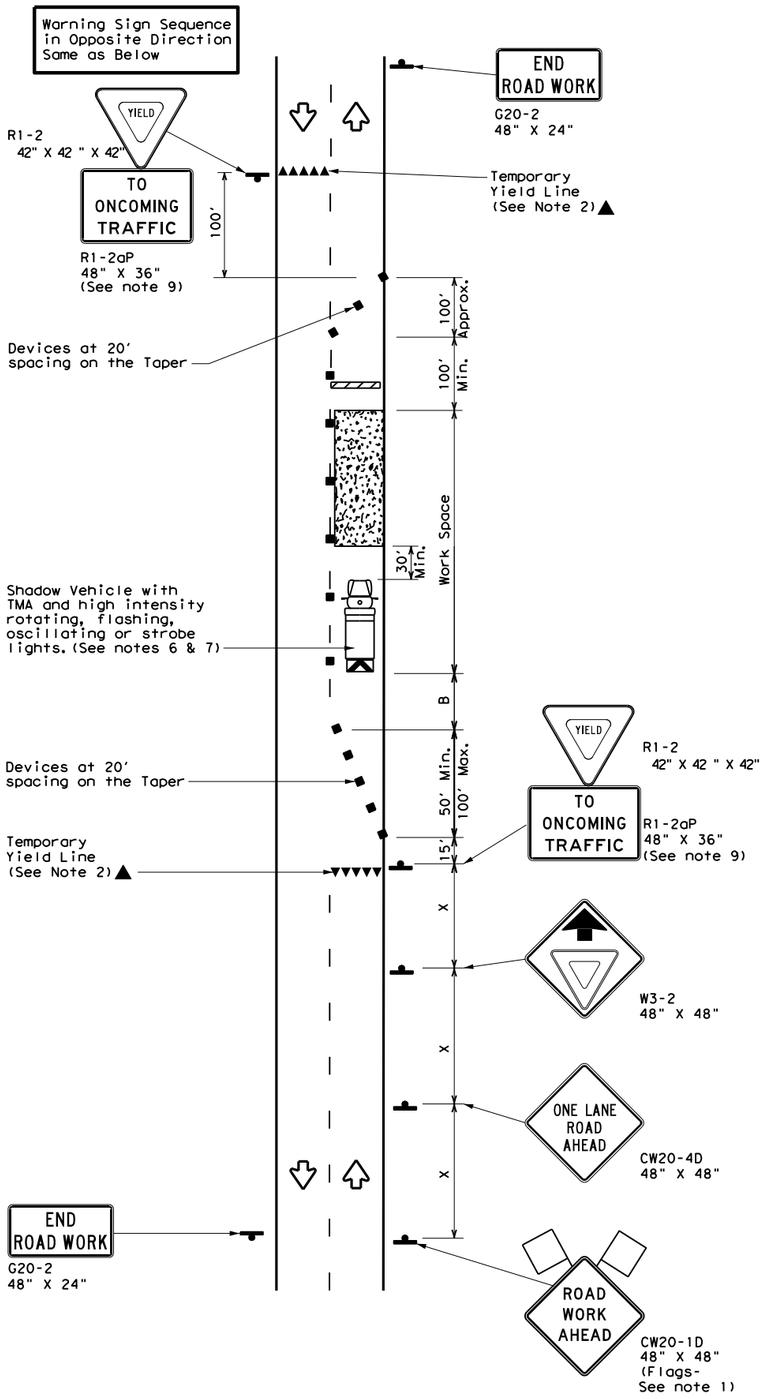
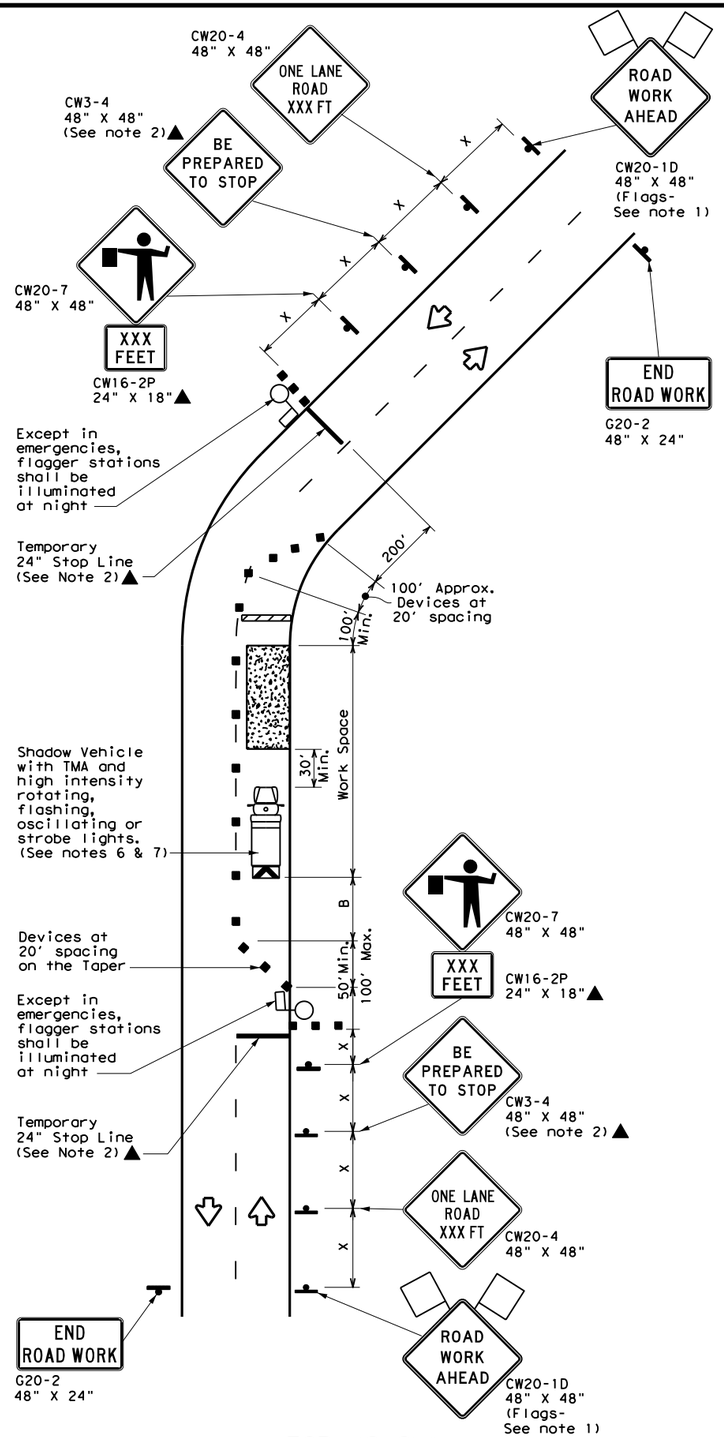


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND

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

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

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

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

GENERAL NOTES

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

TCP (2-2a)

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

TCP (2-2b)

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

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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	ELP	HUDSPETH		25

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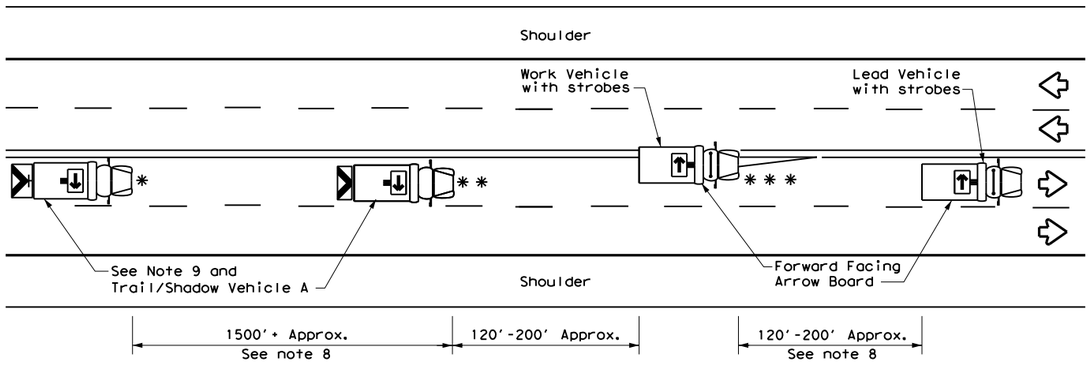
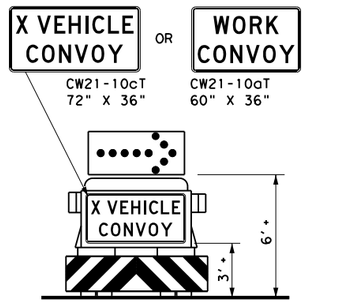


TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

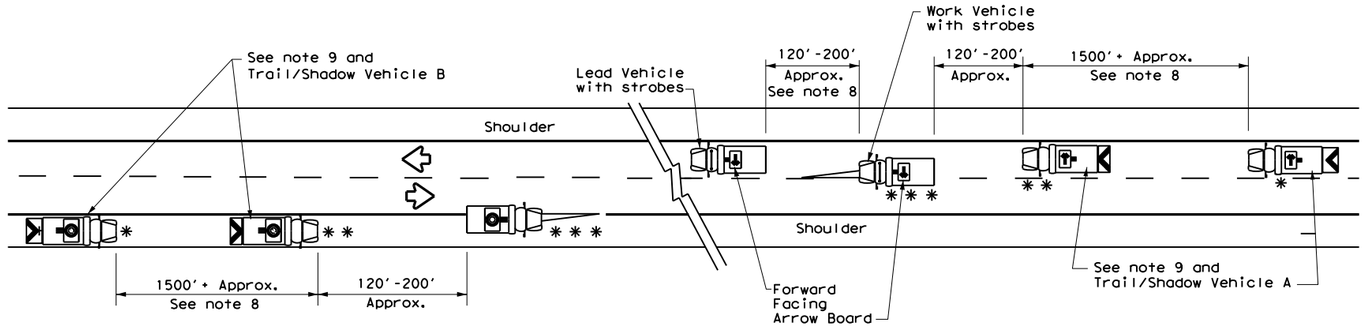
with RIGHT Directional display Flashing Arrow Board

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

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

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.

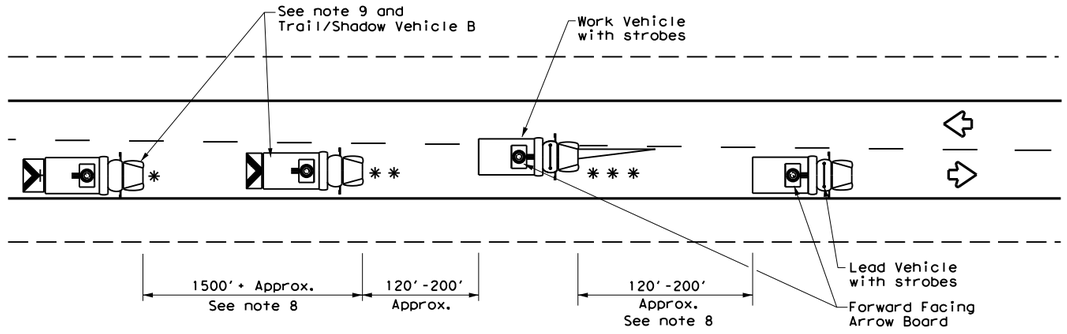


WORK ON SHOULDER

WORK ON TRAVEL LANE

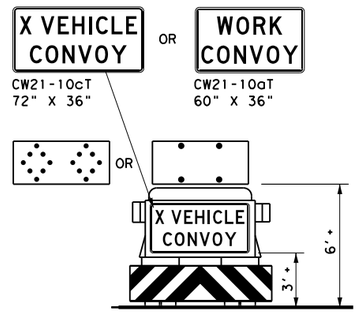
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



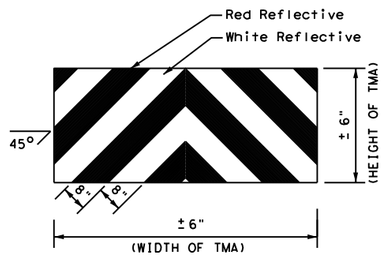
TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board in CAUTION display



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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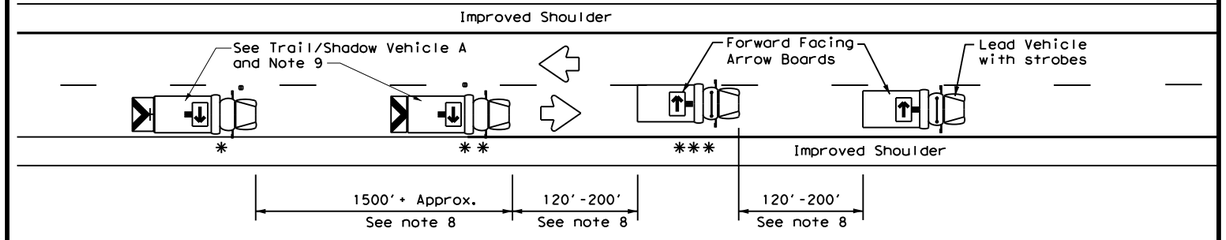
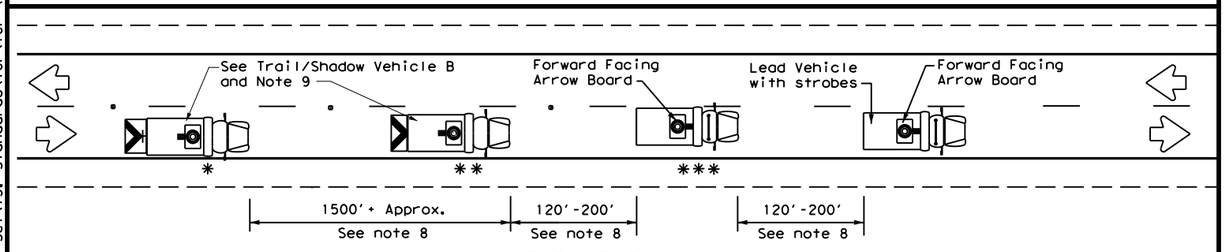


TCP (3-3a)

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



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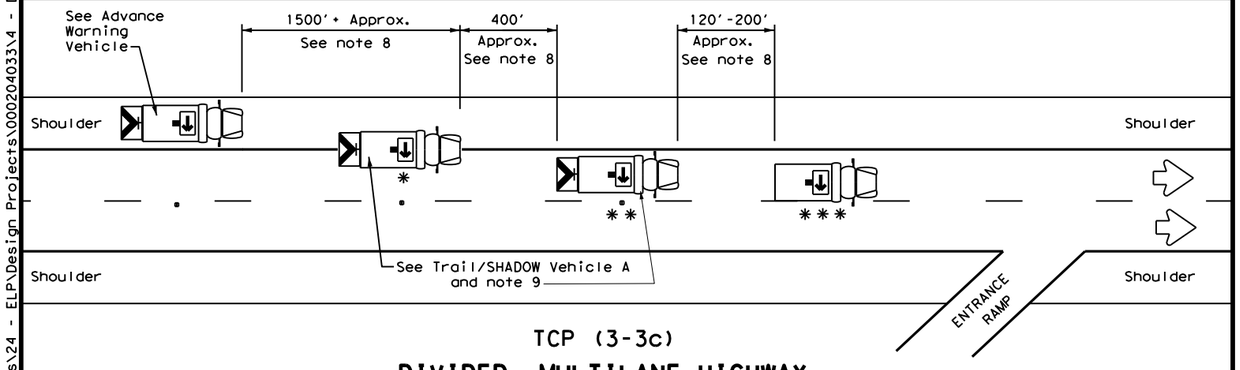
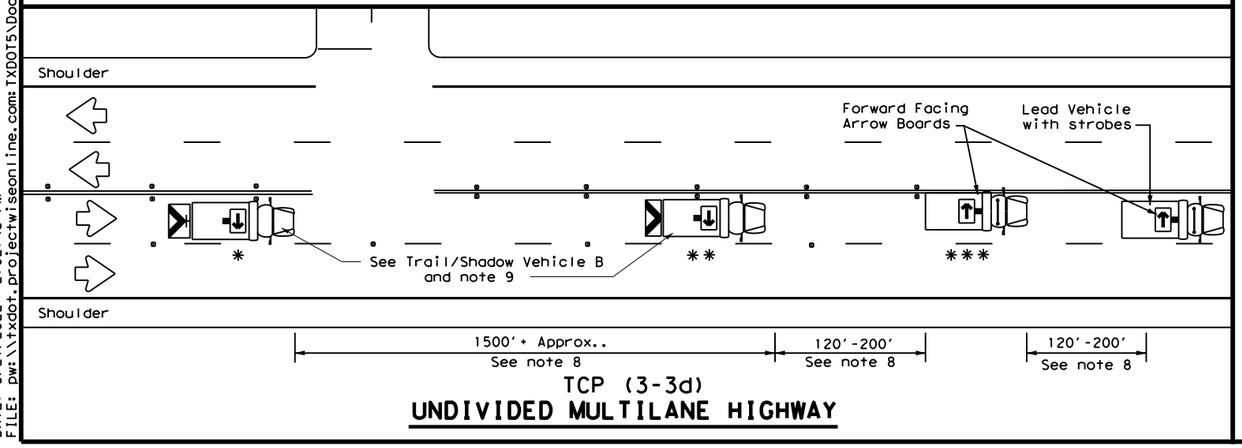
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS (WORK ON TRAVEL LANE)



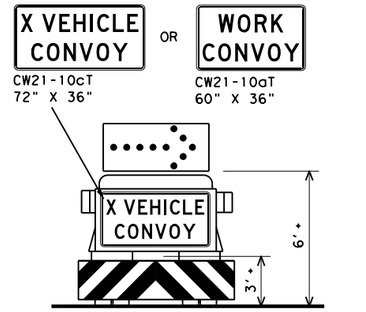
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



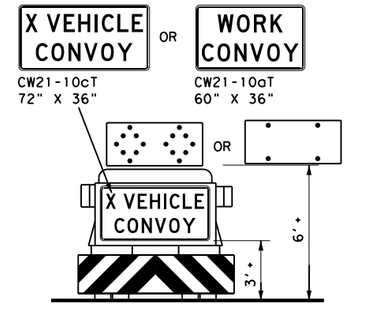
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



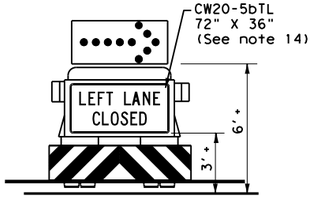
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

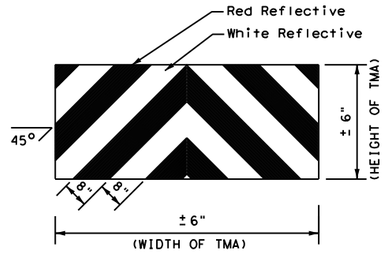


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

TCP(3-3)-14

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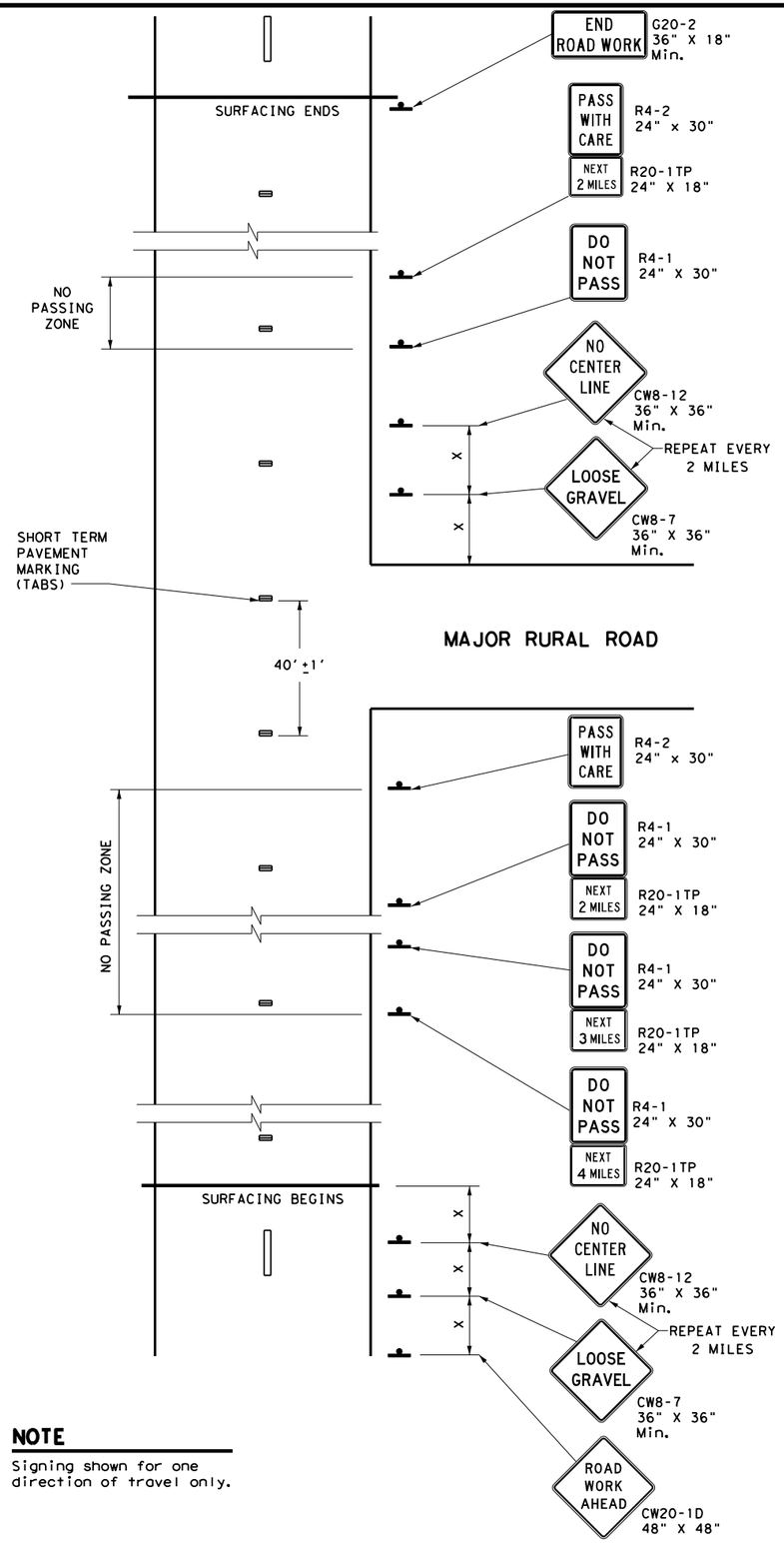
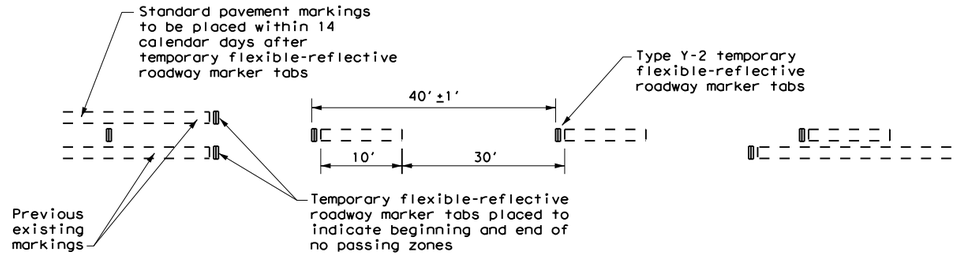


NOTE

Signing shown for one direction of travel only.

NO PASSING ZONES ON TWO-LANE TWO-WAY ROADS



TABS ON CENTERLINES OF TWO-LANE TWO-WAY ROADS

For seal coat, micro-surface or similar operations

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

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

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

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

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

"NO CENTER LINE" SIGN (CW8-12)

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

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

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

"LOOSE GRAVEL" SIGN (CW8-7)

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

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

PAVEMENT MARKINGS

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

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

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

COORDINATION OF SIGN LOCATIONS

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

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

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

* Conventional Roads Only

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

GENERAL NOTES

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

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL DETAILS FOR SURFACING OPERATIONS

TCP(7-1)-13

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© TxDOT March 1991	CONT	SECT	JOB	HIGHWAY
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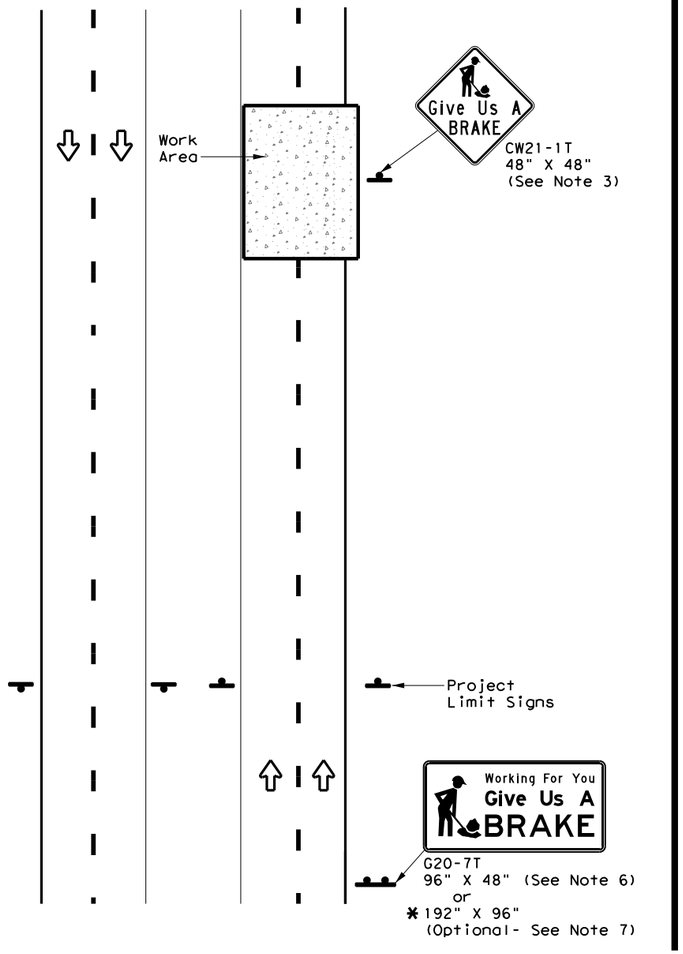
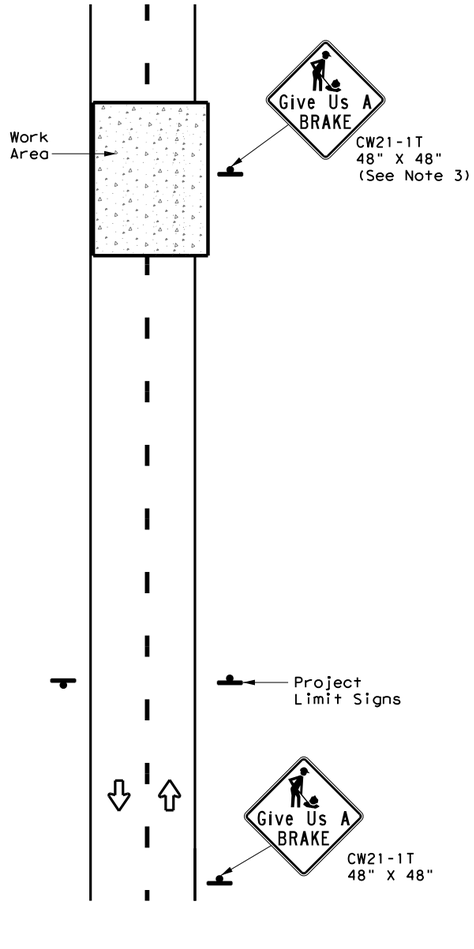


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

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

SUMMARY OF LARGE SIGNS

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

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

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©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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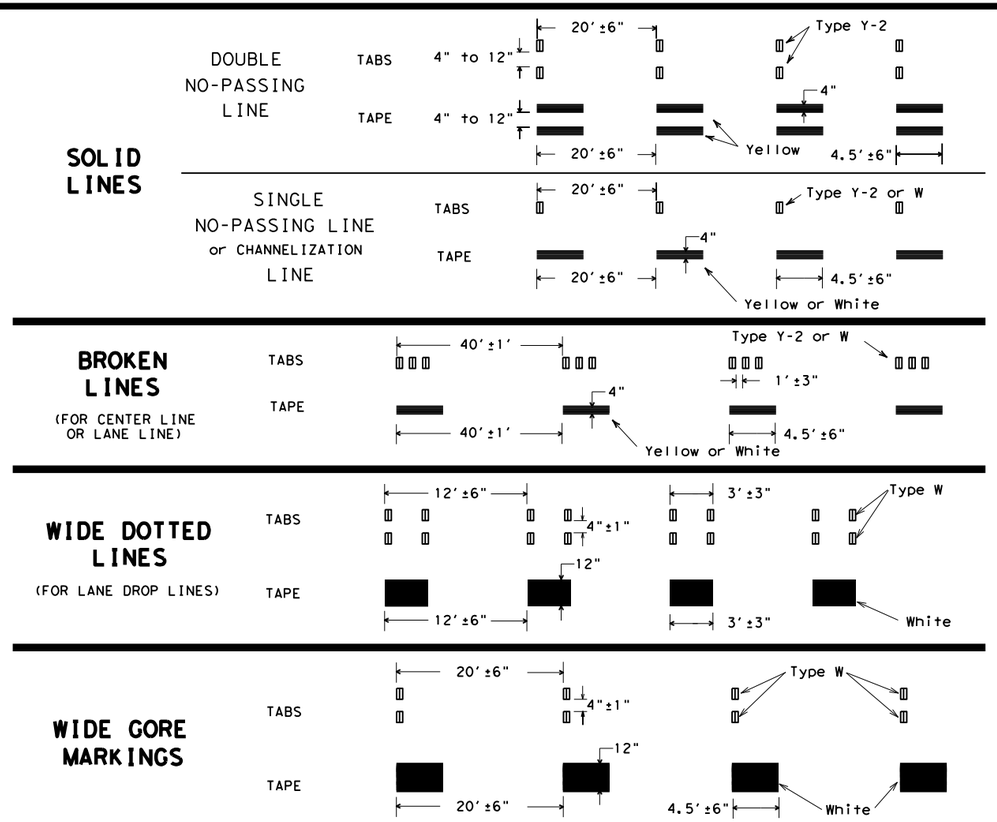
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



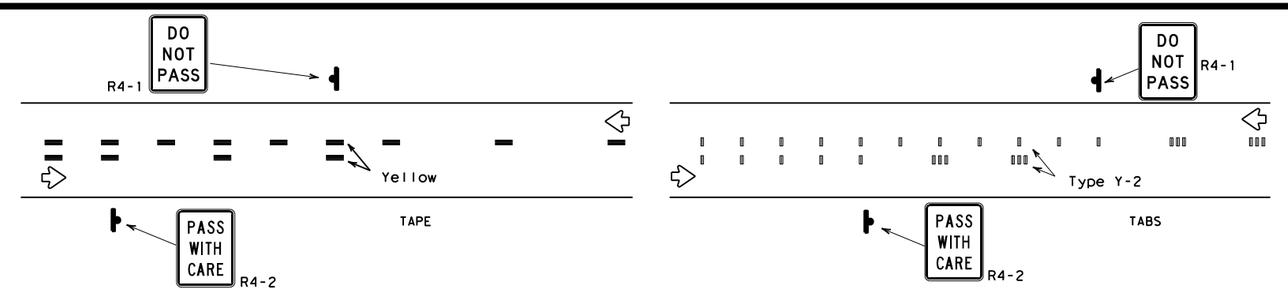
NOTES:

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

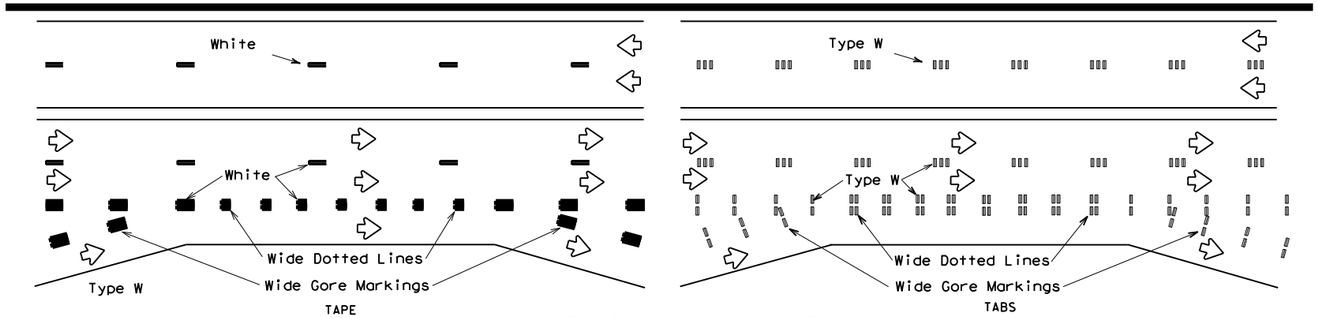
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

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

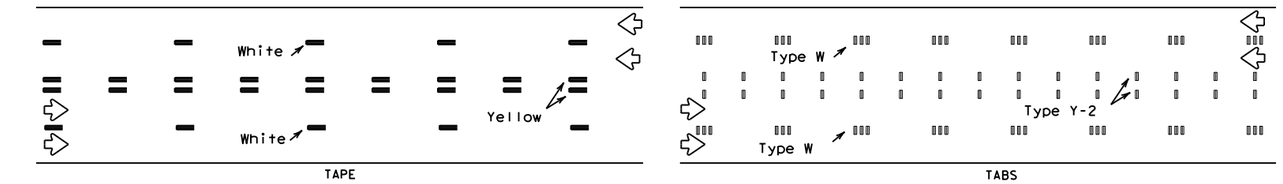
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



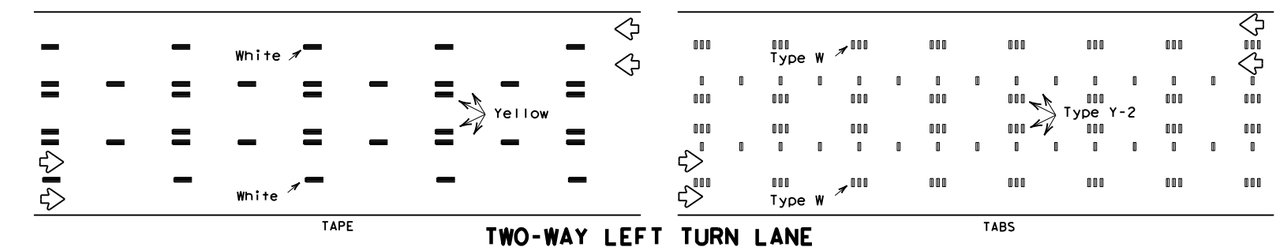
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



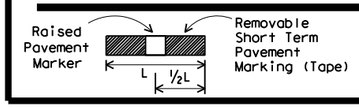
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



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

PREFABRICATED PAVEMENT MARKINGS

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

RAISED PAVEMENT MARKERS

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

FILE:	wzstpm-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS		0002	04	033	SH 20
1-97		DIST	COUNTY		SHEET NO.
3-03		ELP	HUDSPETH		30
7-13					

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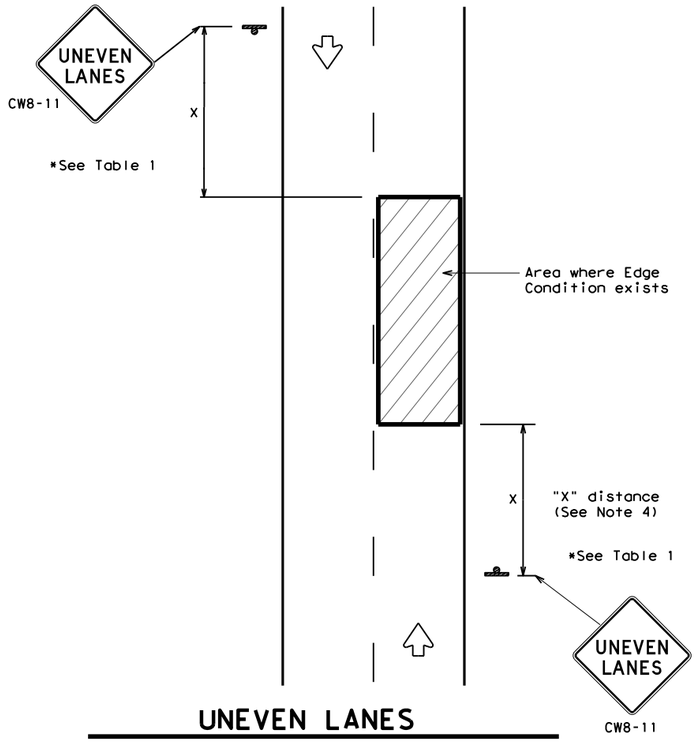
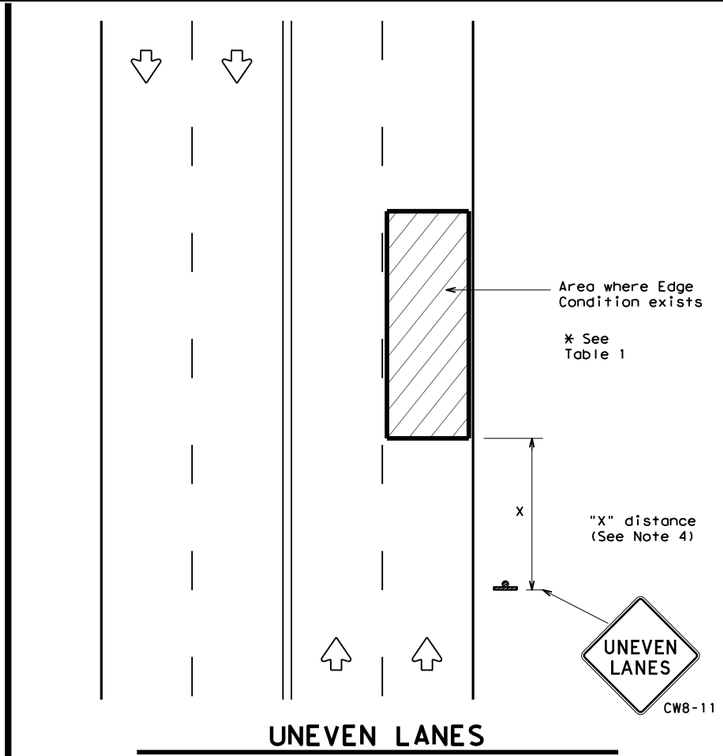
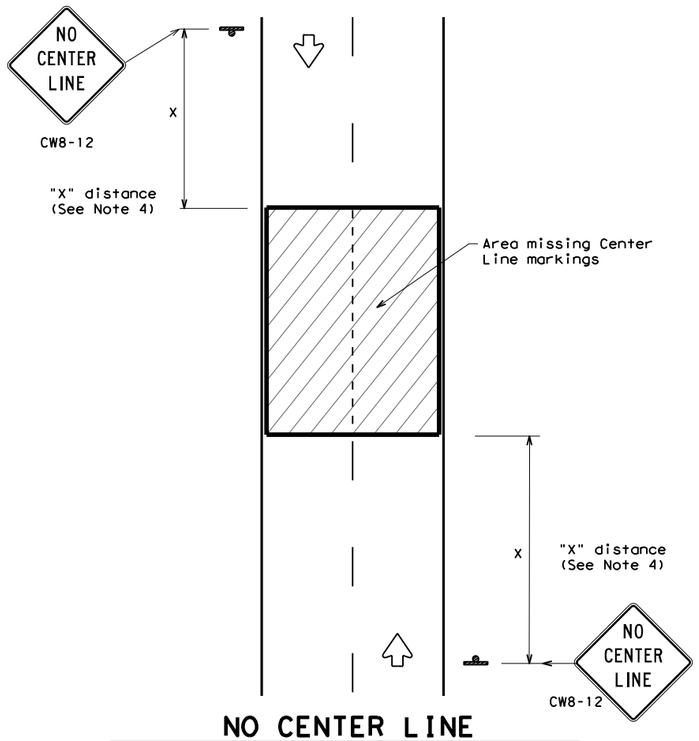


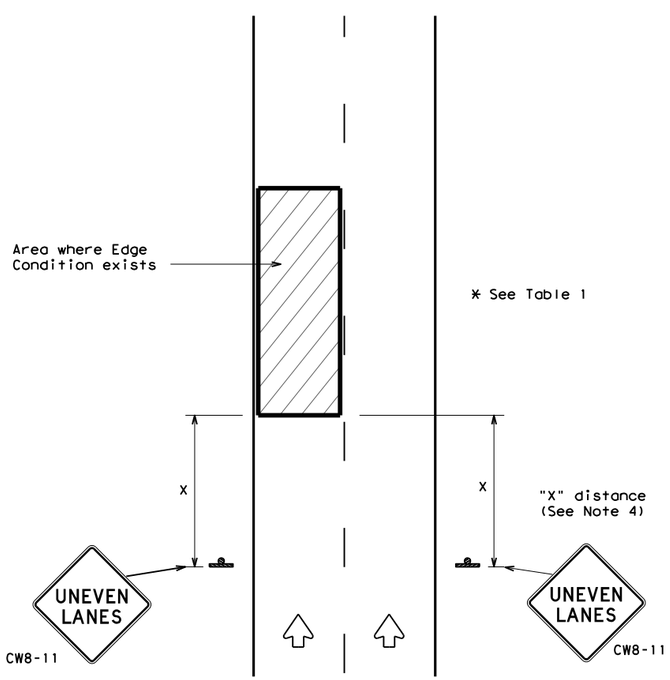
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

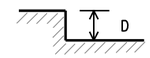
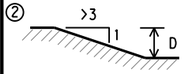
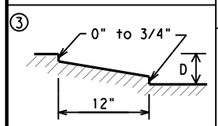
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

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

GENERAL NOTES

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

TABLE 1

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

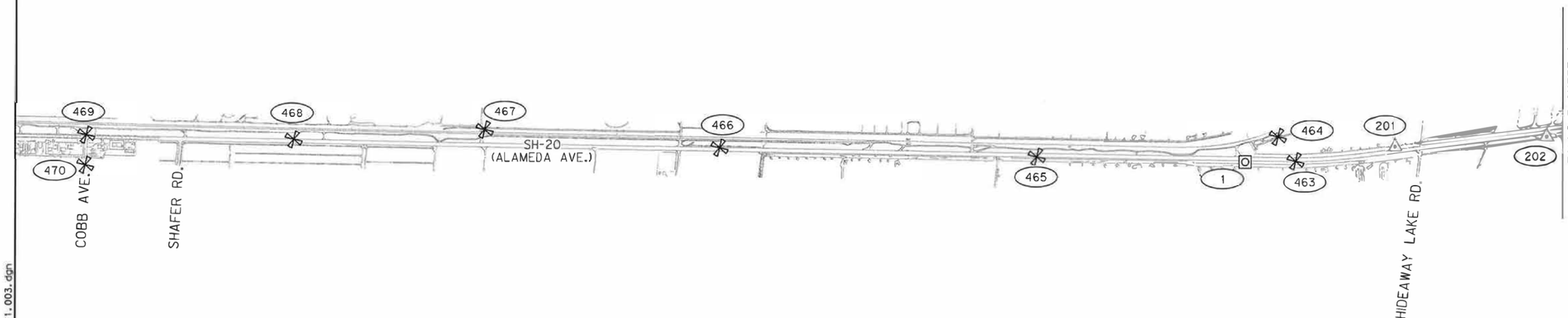
WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	ELP	HUDSPETH		31

HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	10529168.61	512528.88	3574.38	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
201	10528278.89	513757.85	3571.71	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
202	10527338.59	514956.77	3569.85	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
463	10528834.90	512911.77	3576.42	PK NAIL
464	10529134.69	512942.32	3574.86	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
465	10530605.49	511005.50	3578.14	PK NAIL
466	10532800.24	508690.07	3580.07	PK NAIL
467	10534511.58	507051.43	3579.25	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
468	10535716.33	505558.71	3584.01	PK NAIL
469	10537133.94	504036.85	3584.72	PK NAIL
470	10536917.57	503829.42	3583.53	PK NAIL

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.
2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.
3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

Coleen M. Johnson Nov. 8, 2018
COLEEN M. JOHNSON DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
TEXAS REGISTRATION NO. 4871

STATE OF TEXAS REGISTERED COLEEN MARIE JOHNSON 4871 PROFESSIONAL LAND SURVEYOR

0 500 1000 1500 2000
SCALE: 1"=1000'

Texas Department of Transportation

HALFF
9500 AMBERGLEN BLVD.
BUILDING F, SUITE 125
AUSTIN, TEXAS 78729
TEL (512) 777-4600
FAX (512) 252-8141
TBPLS FIRM NO. 10029607

2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		1 OF 10

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HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 1 OF 10

Texas Department of Transportation

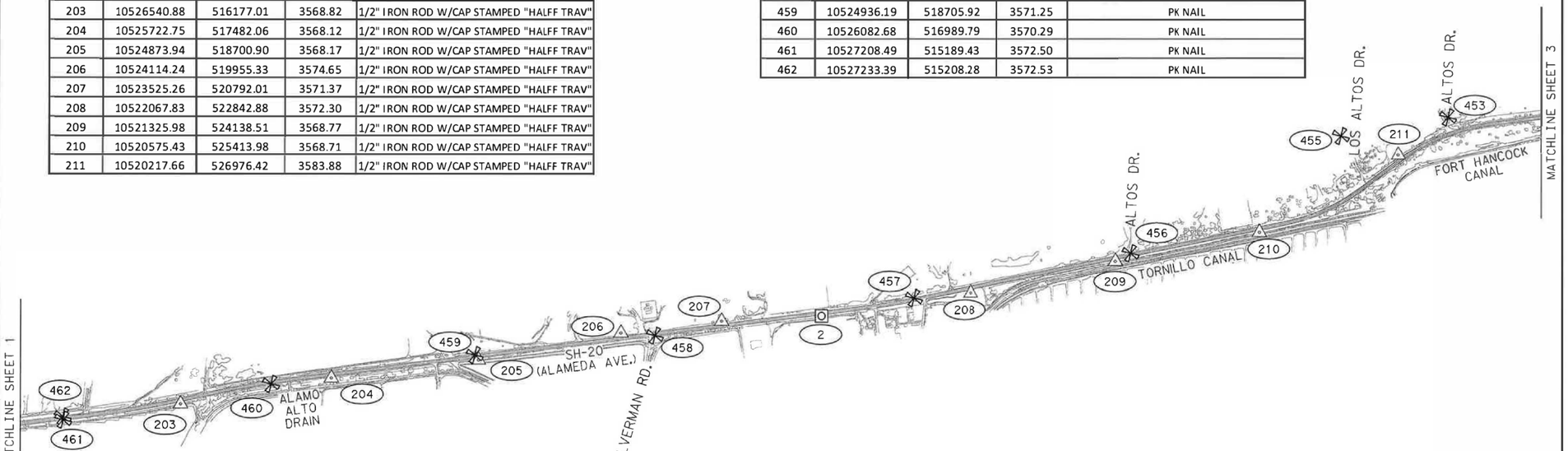
CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		32

HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
2	10522897.49	521570.33	3568.93	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
203	10526540.88	516177.01	3568.82	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
204	10525722.75	517482.06	3568.12	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
205	10524873.94	518700.90	3568.17	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
206	10524114.24	519955.33	3574.65	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
207	10523525.26	520792.01	3571.37	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
208	10522067.83	522842.88	3572.30	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
209	10521325.98	524138.51	3568.77	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
210	10520575.43	525413.98	3568.71	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
211	10520217.66	526976.42	3583.88	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"

AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
453	10520167.07	527601.82	3589.74	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
455	10520749.49	526669.61	3591.19	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
456	10521284.58	524306.84	3568.83	PK NAIL
457	10522411.36	522382.98	3570.77	PK NAIL
458	10523867.50	520193.98	3575.04	PK NAIL
459	10524936.19	518705.92	3571.25	PK NAIL
460	10526082.68	516989.79	3570.29	PK NAIL
461	10527208.49	515189.43	3572.50	PK NAIL
462	10527233.39	515208.28	3572.53	PK NAIL



LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.

2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.

3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

0 500 1000 1500 2000

SCALE: 1"=1000'

Texas Department of Transportation
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2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		2 OF 10

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HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 2 OF 10

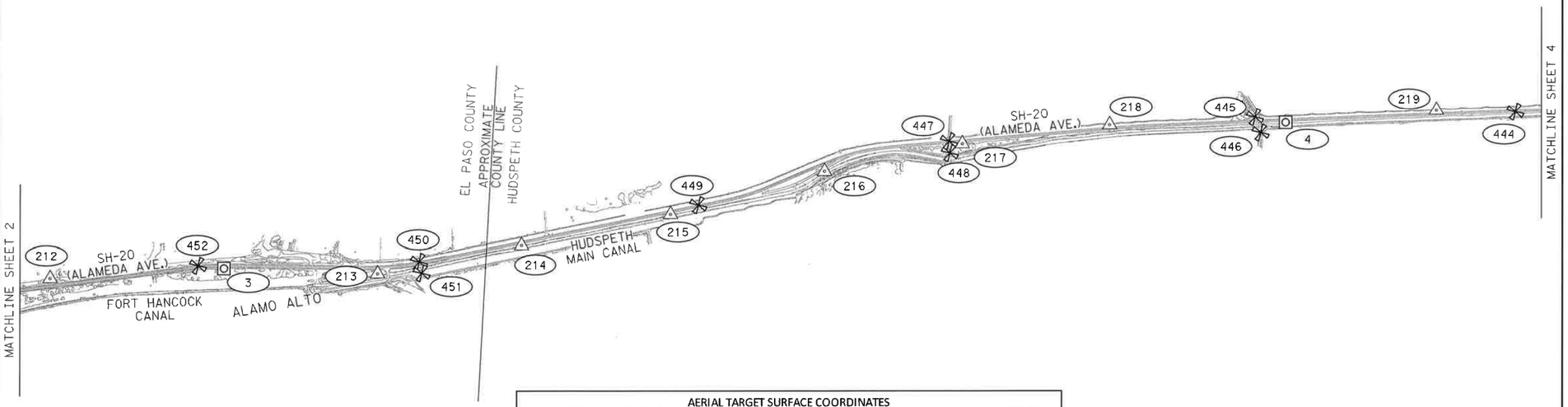
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		33

HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
3	10518418.89	529856.51	3584.25	CONCRETE MON. W/ALUMINUM DISK
4	10512372.56	538786.54	3556.18	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
212	10519506.36	528488.91	3582.85	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
213	10517350.08	530970.74	3562.53	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
214	10516594.68	532235.08	3560.49	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
215	10515819.85	533563.54	3560.45	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
216	10515109.70	535001.76	3558.86	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
217	10514392.92	536214.12	3556.72	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
218	10513539.82	537448.54	3554.75	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
219	10511448.76	540001.39	3554.05	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
444	10510909.80	540579.91	3556.64	PK NAIL
445	10512617.46	538593.23	3555.50	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
446	10512462.08	538532.12	3554.97	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
447	10514500.04	536131.85	3558.05	PK NAIL
448	10514406.78	536059.15	3559.23	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
449	10515703.22	533832.42	3560.64	PK NAIL
450	10517160.96	531358.73	3560.73	PK NAIL
451	10517059.31	531302.58	3561.99	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
452	10518611.77	529682.34	3587.54	PK NAIL

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.

2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.

3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

0 500 1000 1500 2000

SCALE: 1"=1000'

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2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		3 OF 10

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HORIZONTAL & VERTICAL
CONTROL SHEET

SCALE: NTS SHEET 3 OF 10

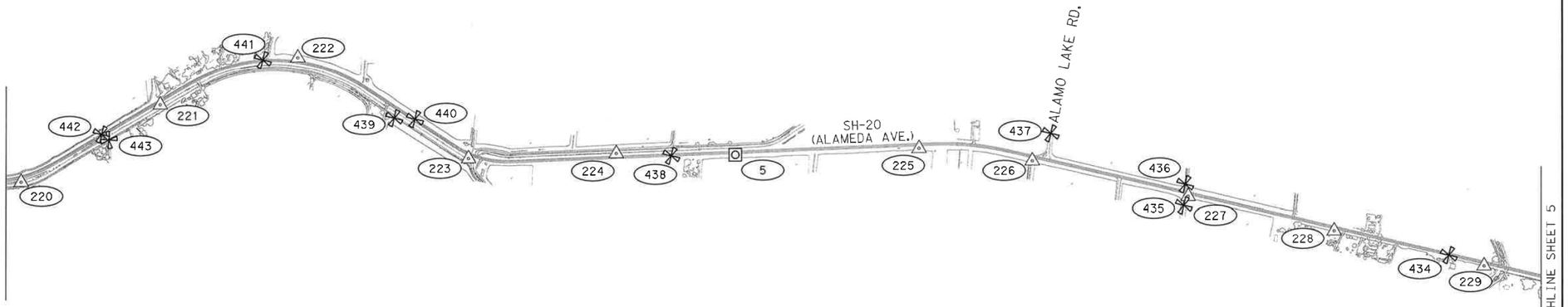
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		34

HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
5	10505878.50	546629.06	3548.54	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
220	10510426.55	541150.26	3555.18	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
221	10510076.88	542694.20	3555.02	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
222	10509514.81	544025.68	3550.81	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
223	10507631.60	544620.49	3554.07	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
224	10506678.33	545757.07	3551.66	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
225	10504704.12	548030.65	3547.65	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
226	10503853.48	548790.27	3547.28	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
227	10502547.96	549714.22	3546.94	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
228	10501325.49	550565.65	3547.05	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
229	10500065.02	551448.62	3543.63	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
434	10500377.84	551259.34	3545.89	PK NAIL
435	10502511.28	549622.86	3547.87	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
436	10502657.24	549772.63	3547.71	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
437	10503932.27	549109.18	3547.91	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
438	10506296.92	546147.76	3551.68	PK NAIL
439	10508423.58	544339.59	3550.10	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
440	10508278.79	544487.24	3553.16	PK NAIL
441	10509730.08	543751.89	3553.91	PK NAIL
442	10510247.58	542059.90	3555.35	PK NAIL
443	10510156.55	542080.46	3555.65	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.

2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.

3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

0 500 1000 1500 2000

SCALE: 1"=1000'

Texas Department of Transportation

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BUILDING F, SUITE 125
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TBPLS FIRM NO. 10029607

2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		4 OF 10

HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 4 OF 10

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		35

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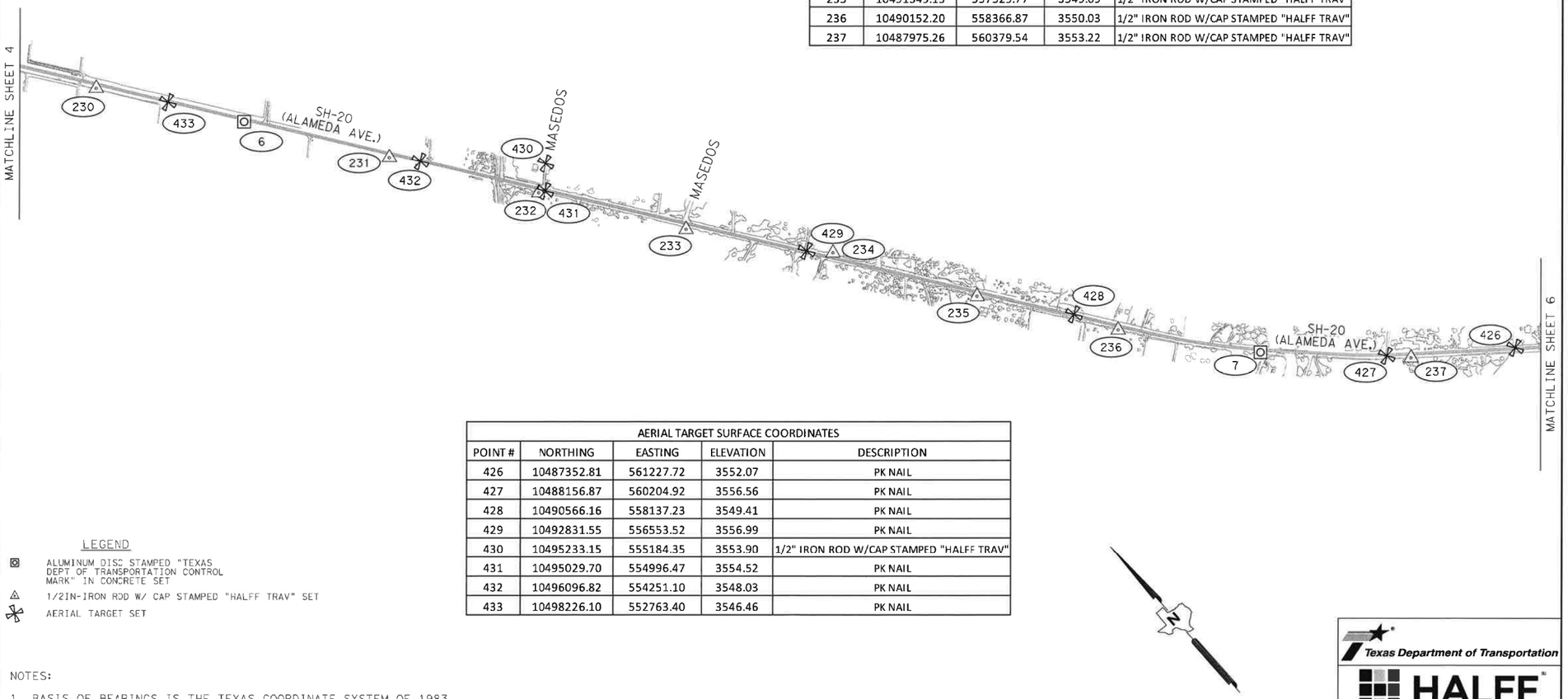
HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
6	10497571.35	553200.88	3544.86	CONCRETE MON. W/ALUMINUM DISK
7	10489029.79	559284.60	3558.35	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
230	10498814.16	552312.86	3544.44	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
231	10496330.31	554046.95	3544.30	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
232	10495063.50	554932.51	3552.21	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
233	10493799.36	555795.45	3555.36	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
234	10492641.34	556737.03	3554.48	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
235	10491349.15	557529.77	3549.69	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
236	10490152.20	558366.87	3550.03	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
237	10487975.26	560379.54	3553.22	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
426	10487352.81	561227.72	3552.07	PK NAIL
427	10488156.87	560204.92	3556.56	PK NAIL
428	10490566.16	558137.23	3549.41	PK NAIL
429	10492831.55	556553.52	3556.99	PK NAIL
430	10495233.15	555184.35	3553.90	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
431	10495029.70	554996.47	3554.52	PK NAIL
432	10496096.82	554251.10	3548.03	PK NAIL
433	10498226.10	552763.40	3546.46	PK NAIL

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.
2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.
3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

0 500 1000 1500 2000

SCALE: 1"=1000'

Texas Department of Transportation

HALFF

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TBPLS FIRM NO. 10029607

2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		5 OF 10

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HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 5 OF 10

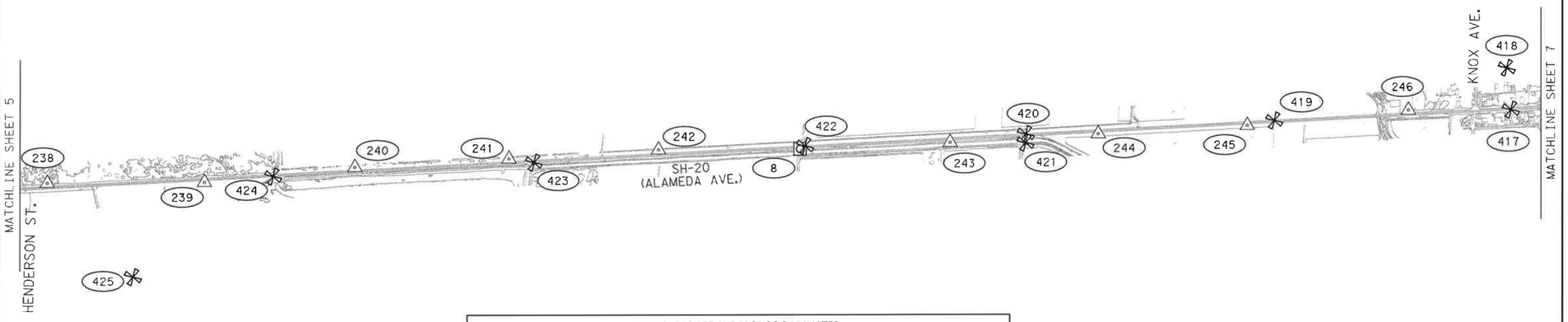
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		36

HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
8	10482284.75	567473.93	3530.01	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
238	10487088.20	561612.14	3547.68	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
239	10486041.64	562794.04	3539.19	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
240	10485143.27	564017.59	3534.36	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
241	10484170.83	565226.78	3532.11	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
242	10483228.63	566411.45	3530.82	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
243	10481325.71	568640.33	3529.56	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
244	10480388.25	569810.15	3527.84	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
245	10479446.07	570985.31	3527.26	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
246	10478474.49	572295.73	3525.73	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
417	10477788.82	573065.60	3528.12	PK NAIL
418	10478130.83	573316.40	3539.67	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
419	10479301.32	571218.82	3529.49	PK NAIL
420	10480875.72	569265.05	3530.56	PK NAIL
421	10480812.03	569205.09	3530.86	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
422	10482272.73	567531.20	3530.57	PK NAIL
423	10483976.26	565389.63	3532.98	PK NAIL
424	10485622.89	563347.54	3538.74	PK NAIL
425	10485813.68	561632.97	3541.05	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.
2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.
3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

0 500 1000 1500 2000

SCALE: 1"=1000'

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2018	CONT	SECT	JOB	HIGHWAY
	C001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		6 OF 10

HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 6 OF 10

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		37

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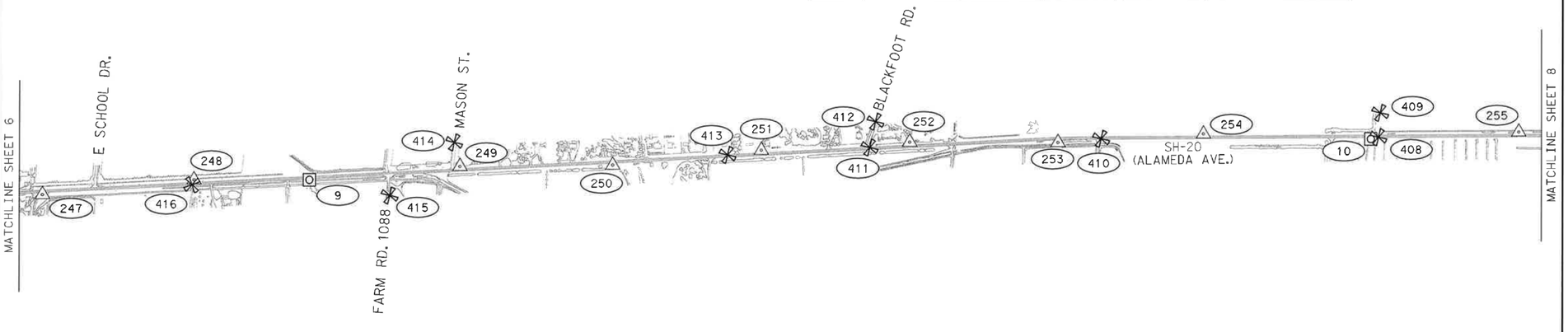
HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
9	10475805.00	575509.20	3525.71	CONCRETE MON. W/ALUMINUM DISK
10	10468981.41	583734.10	3517.99	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
247	10477477.97	573415.77	3527.55	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
248	10476574.86	574648.61	3524.47	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
249	10474896.50	576724.31	3527.18	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
250	10473873.94	577885.22	3533.30	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
251	10472992.75	579091.03	3528.52	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
252	10472058.92	580254.25	3527.50	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
253	10471057.58	581364.74	3521.51	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
254	10470142.08	582516.14	3518.04	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
255	10468040.36	584891.45	3518.08	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
408	10468943.26	583804.18	3519.73	PK NAIL
409	10469113.67	583979.65	3518.62	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
410	10470794.93	581713.31	3521.66	PK NAIL
411	10472286.98	579918.65	3528.42	PK NAIL
412	10472441.14	580135.21	3529.66	PK NAIL
413	10473184.26	578806.68	3531.65	PK NAIL
414	10475113.75	576841.96	3528.18	PK NAIL
415	10475150.01	576004.70	3523.70	PK NAIL
416	10476551.60	574600.56	3526.67	PK NAIL

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- AERIAL TARGET SET

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.

2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.

3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

0 500 1000 1500 2000

SCALE: 1"=1000'

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2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		7 OF 10

HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 7 OF 10

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		38

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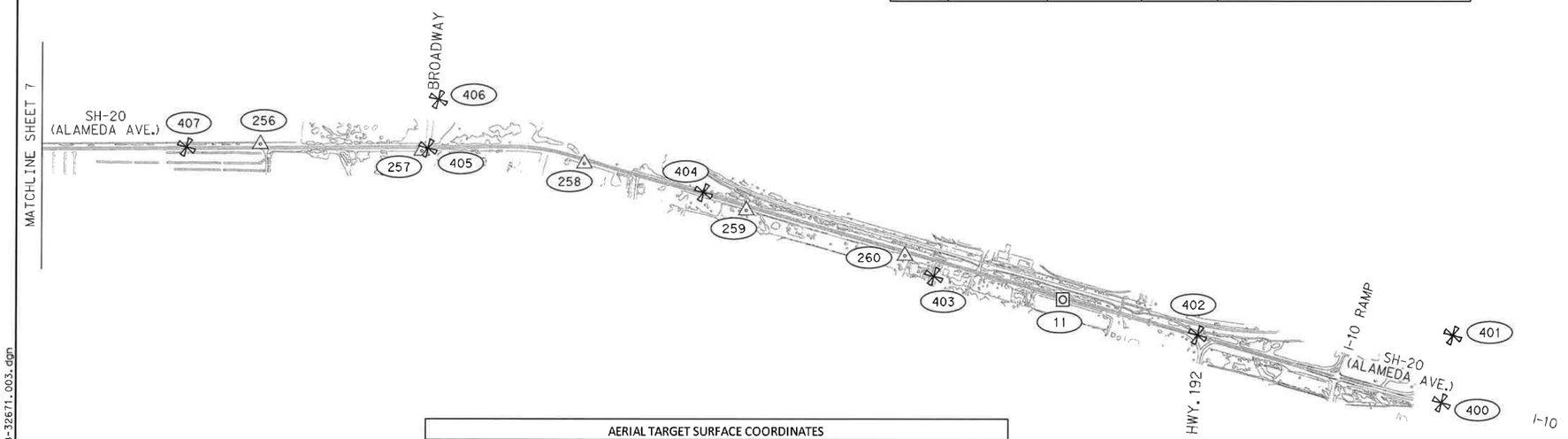
HORIZONTAL AND VERTICAL CONTROL SHEETS

PRIMARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
11	10460942.25	590660.96	3575.58	CONCRETE MON. W/ALUMINUM DISK

SECONDARY CONTROL POINT SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
256	10467039.91	586021.47	3518.38	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
257	10465983.55	587108.01	3532.37	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
258	10464884.69	588161.56	3547.69	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
259	10463540.82	589002.77	3559.91	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
260	10462234.60	589828.43	3568.86	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"



AERIAL TARGET SURFACE COORDINATES				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
400	10457860.18	592670.86	3560.32	PK NAIL
401	10458254.41	593168.23	3582.01	PK NAIL
402	10459855.15	591383.39	3574.47	PK NAIL
403	10461913.09	589900.86	3571.67	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
404	10463929.36	588818.77	3559.51	PK NAIL
405	10465964.68	587168.73	3535.13	PK NAIL
406	10466237.75	587541.93	3538.70	1/2" IRON ROD W/CAP STAMPED "HALFF TRAV"
407	10467476.40	585489.18	3519.37	PK NAIL

LEGEND

- ◎ ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" IN CONCRETE SET
- △ 1/2IN-IRON ROD W/ CAP STAMPED "HALFF TRAV" SET
- ✱ AERIAL TARGET SET

NOTES:

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2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.
3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

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SCALE: 1"=1000'

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2018	CONT	SECT	JOB	HIGHWAY
	0001	03	057	S.H. 20
	DIST	COUNTY		SHEET NO.
	24	EL PASO/HUDSPETH		8 OF 10

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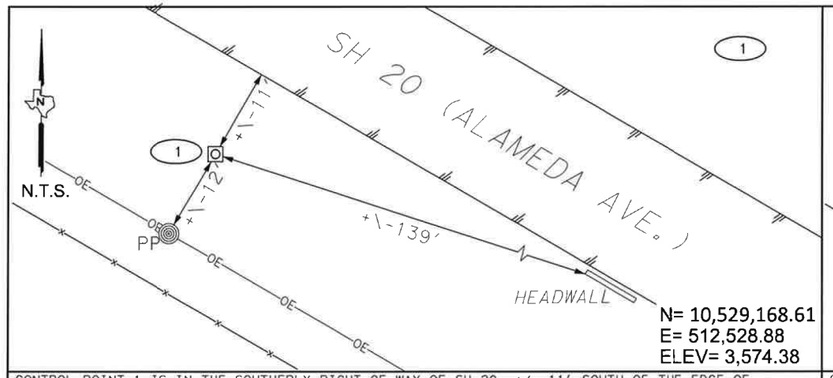
HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 8 OF 10

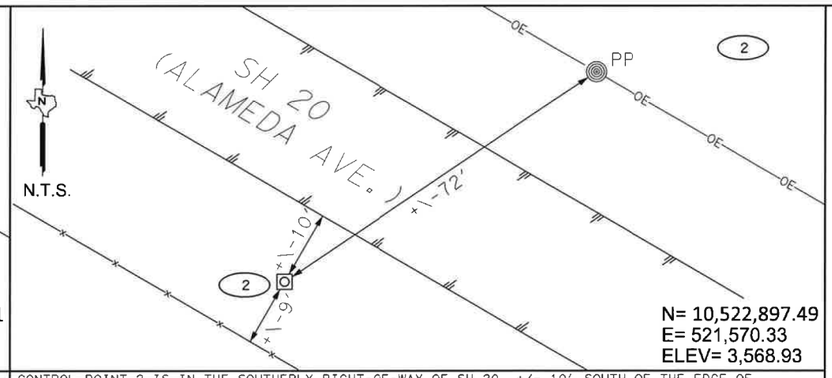
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		39



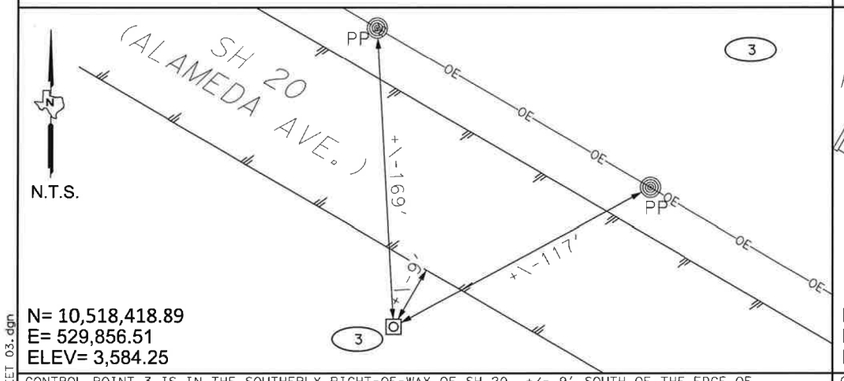
N= 10,529,168.61
E= 512,528.88
ELEV= 3,574.38

CONTROL POINT 1 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 11' SOUTH OF THE EDGE OF PAVEMENT, +/- 12' NORTH OF A POWER POLE AND +/- 139' WEST OF A HEADWALL, APPROXIMATELY 4.2 MILES EAST OF FM 3380.



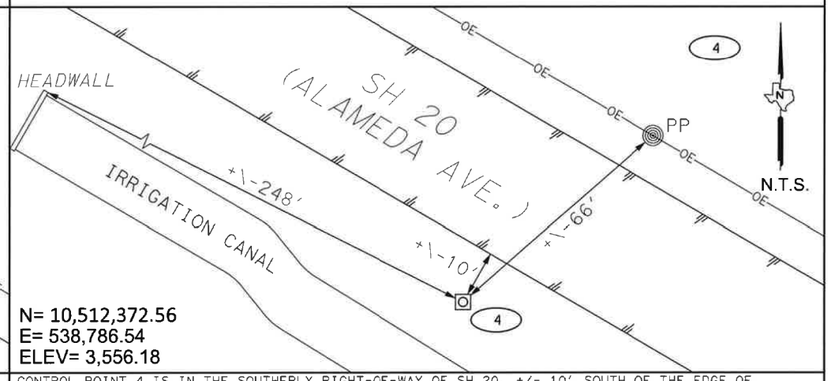
N= 10,522,897.49
E= 521,570.33
ELEV= 3,568.93

CONTROL POINT 2 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 10' SOUTH OF THE EDGE OF PAVEMENT, +/- 72' SOUTHWESTERLY OF A POWER POLE AND +/- 9' NORTH OF A WIRE FENCE , APPROXIMATELY 6.2 MILES EAST OF FM 3380.



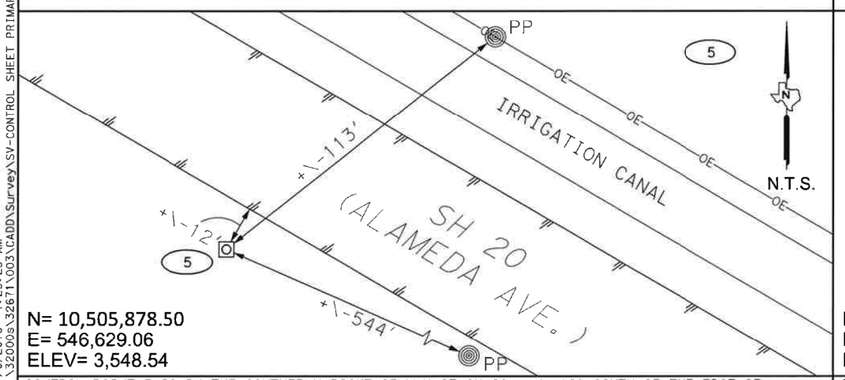
N= 10,518,418.89
E= 529,856.51
ELEV= 3,584.25

CONTROL POINT 3 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 9' SOUTH OF THE EDGE OF PAVEMENT, +/- 169' SOUTHEASTERLY OF A POWER POLE AND +/- 117' SOUTHWESTERLY OF A POWER POLE, APPROXIMATELY 8.0 MILES EAST OF FM 3380.



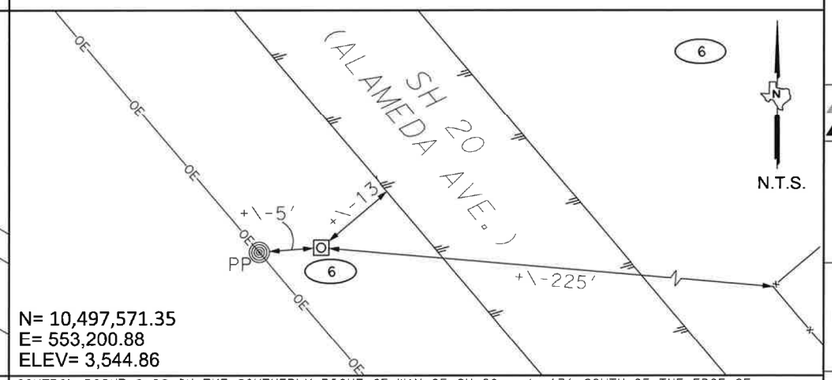
N= 10,512,372.56
E= 538,786.54
ELEV= 3,556.18

CONTROL POINT 4 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 10' SOUTH OF THE EDGE OF PAVEMENT, +/- 248' NORTHWESTERLY OF A HEADWALL AND +/- 66' SOUTHWESTERLY OF A POWER POLE, APPROXIMATELY 10.1 MILES EAST OF FM 3380.



N= 10,505,878.50
E= 546,629.06
ELEV= 3,548.54

CONTROL POINT 5 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 12' SOUTH OF THE EDGE OF PAVEMENT, +/- 113' NORTHWESTERLY OF A POWER POLE AND +/- 544' SOUTHWESTERLY OF A POWER POLE, APPROXIMATELY 12.1 MILES EAST OF FM 3380.



N= 10,497,571.35
E= 553,200.88
ELEV= 3,544.86

CONTROL POINT 6 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 13' SOUTH OF THE EDGE OF PAVEMENT, +/- 5' WEST OF A POWER POLE AND +/- 225' EAST OF A WIRE FENCE CORNER, APPROXIMATELY 11.1 MILES NORTHWEST OF IH 10.

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" SET IN CONCRETE
- POWER POLE
- SIGN
- EDGE OF PAVMENT
- OE — OVERHEAD ELECTRIC
- WIRE FENCE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100. UNITS: U.S. SURVEY FEET.
2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.
3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

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PRIMARY CONTROL SHEET

CONT	SECT	JOB	HIGHWAY
0001	03	057	S.H. 20
DIST	COUNTY		SHEET NO.
24	EL PASO / HUDSPETH		9 OF 10

DATE: 11/8/2018 7:25:25 AM
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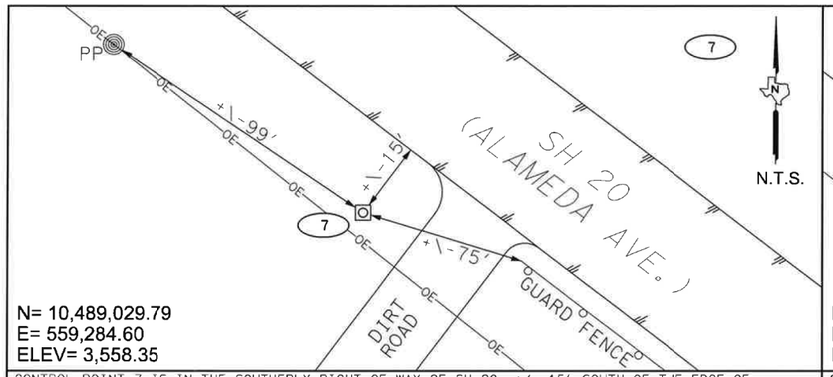
HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 9 OF 10

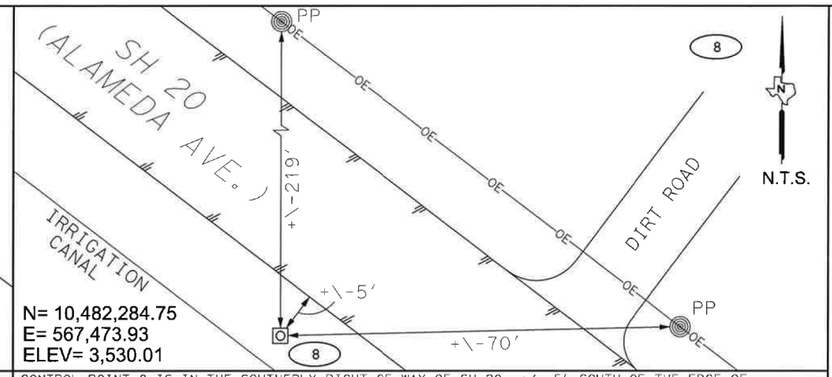
Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		40



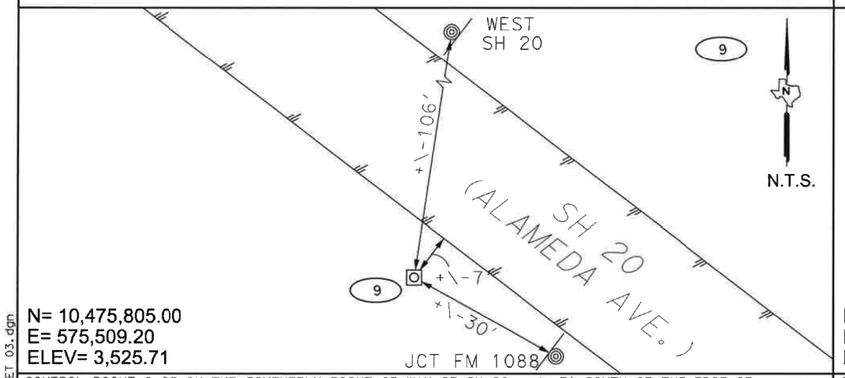
N= 10,489,029.79
E= 559,284.60
ELEV= 3,558.35

CONTROL POINT 7 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 15' SOUTH OF THE EDGE OF PAVEMENT, +/-99' SOUTHEAST OF A POWER POLE AND +/- 75' EAST OF A GUARD FENCE, APPROXIMATELY 9.1 MILES NORTHWEST OF IH 10.



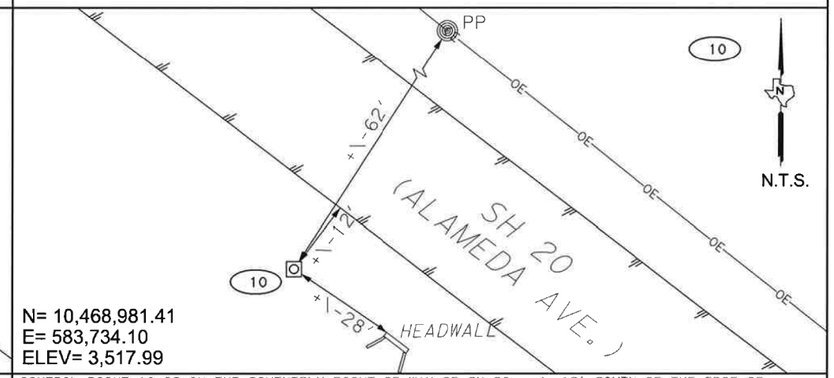
N= 10,482,284.75
E= 567,473.93
ELEV= 3,530.01

CONTROL POINT 8 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 5' SOUTH OF THE EDGE OF PAVEMENT, +/- 70' EAST OF A POWER POLE AND +/- 219' NORTH OF A POWER POLE, APPROXIMATELY 7.1 MILES NORTHWEST OF IH 10.



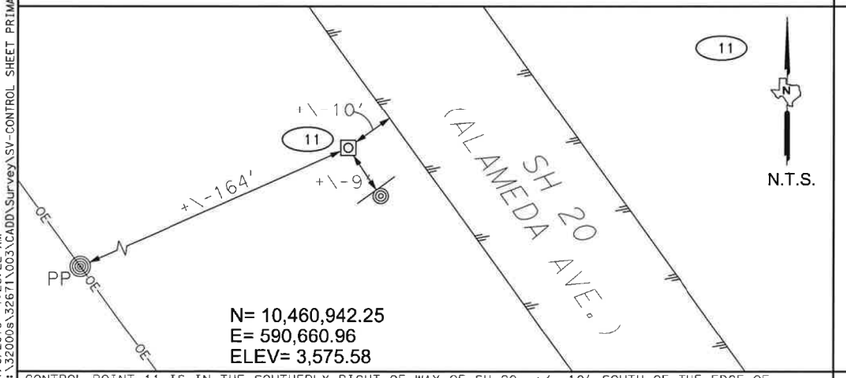
N= 10,475,805.00
E= 575,509.20
ELEV= 3,525.71

CONTROL POINT 9 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 7' SOUTH OF THE EDGE OF PAVEMENT, +/- 106' SOUTH OF A SIGN AND +/- 30' WEST OF A SIGN, APPROXIMATELY 5.2 MILES NORTHWEST OF IH 10.



N= 10,468,981.41
E= 583,734.10
ELEV= 3,517.99

CONTROL POINT 10 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 12' SOUTH OF THE EDGE OF PAVEMENT, +/- 62' SOUTH OF A POWER POLE AND +/- 28' NORTHWEST OF A HEADWALL, APPROXIMATELY 3.1 MILES NORTHWEST OF IH 10.



N= 10,460,942.25
E= 590,660.96
ELEV= 3,575.58

CONTROL POINT 11 IS IN THE SOUTHERLY RIGHT-OF-WAY OF SH 20, +/- 10' SOUTH OF THE EDGE OF PAVEMENT, +/- 9' WEST OF A SIGN AND +/- 164' NORTHEAST OF A POWER POLE, APPROXIMATELY 1.1 MILES NORTHWEST OF IH 10.

LEGEND

- ALUMINUM DISC STAMPED "TEXAS DEPT OF TRANSPORTATION CONTROL MARK" SET IN CONCRETE
- PP — POWER POLE
- SIGN
- EDGE OF PAVMENT
- —OE— OVERHEAD ELECTRIC
- —X— WIRE FENCE

NOTES:

1. BASIS OF BEARINGS IS THE TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE 4203 (NAD 83/2011). ALL COORDINATES AND DISTANCES SHOWN HEREON ARE SURFACE AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR 1.00023100.
UNITS: U.S. SURVEY FEET.

2. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED USING THE TXDOT RTK NETWORK, NAVD 88, GEOID 12B.

3. FIELD SURVEYS WERE CONDUCTED JULY THROUGH OCTOBER - 2018.

Texas Department of Transportation

HALFF
9500 AMBERGLEN BLVD.
BUILDING F, SUITE 125
AUSTIN, TEXAS 78729
TEL (512) 777-4600
FAX (512) 252-8141
TBPLS FIRM NO. 10029607

PRIMARY CONTROL SHEET

CONT	SECT	JOB	HIGHWAY
0001	03	057	S.H. 20
DIST	COUNTY		SHEET NO.
24	EL PASO / HUDSPETH		10 OF 10

DATE: 11/8/2018 7:26:22 AM
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DATE: 5/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040334 - Design\Plan Set\3. Roadway\Horizontal and Vertical Control Sheets.dgn

HORIZONTAL & VERTICAL CONTROL SHEET

SCALE: NTS SHEET 10 OF 10

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		41

Chain SH20_NEW contains:
93 CUR SH20_NEW_3 CUR SH20_NEW_4 SPI SH20_NEW_7 CUR SH20_NEW_8 CUR SH20_NEW_9 - CUR SH20_NEW_12 SPI SH20_NEW_15 CUR SH20_NEW_16 SPI SH20_NEW_17 CUR SH20_NEW_20- CUR SH20_NEW_23 CUR SH20_NEW_26 94

Beginning chain SH20_NEW description
Feature: Road_Centerline

Point 93 X 531,580.48 Y 10,517,011.03 Sta 100+00.00

Course from 93 to PC SH20_NEW_3 S 59° 40′ 18" E Dist 2,855.56

Curve Data

Curve SH20_NEW_3

P.I. Station		130+33.25	X	534,198.62	Y	10,515,479.37
Delta	=	8° 14′ 58" (LT)				
Degree	=	2° 19′ 31"				
Tangent	=	177.70				
Length	=	354.78				
Radius	=	2,464.12				
External	=	6.40				
Long Chord	=	354.47				
Mid. Ord.	=	6.38				
P.C. Station		128+55.56	X	534,045.24	Y	10,515,569.10
P.T. Station		132+10.33	X	534,363.29	Y	10,515,412.58
C.C.			X	535,289.51	Y	10,517,695.99
Back	= S 59° 40′ 18" E					
Ahead	= S 67° 55′ 15" E					
Chord Bear	= S 63° 47′ 47" E					

Curve Data

Curve SH20_NEW_4

P.I. Station		132+74.86	X	534,423.08	Y	10,515,388.32
Delta	=	3° 00′ 00" (LT)				
Degree	=	2° 19′ 31"				
Tangent	=	64.53				
Length	=	129.02				
Radius	=	2,464.12				
External	=	0.84				
Long Chord	=	129.01				
Mid. Ord.	=	0.84				
P.C. Station		132+10.33	X	534,363.29	Y	10,515,412.58
P.T. Station		133+39.36	X	534,484.06	Y	10,515,367.23
C.C.			X	535,289.51	Y	10,517,695.99
Back	= S 67° 55′ 15" E					
Ahead	= S 70° 55′ 15" E					
Chord Bear	= S 69° 25′ 15" E					

Course from PT SH20_NEW_4 to TS SH20_NEW_7 S 70° 55′ 15" E Dist 484.61

Spiral SH20_NEW_7 Type 1 Spiral Element

Angle	2° 42′ 44" (RT)	P	0.85	BK S	70° 55′ 15" E
LS	215.00	K	107.49	AH S	68° 12′ 32" E
R	2,270.96	LT	143.35	CB S	70° 01′ 01" E
YS	3.39	ST	71.68	Defl	0° 54′ 15"
XS	214.95	LC	214.98	Deg	2° 31′ 23"

Spiral Coordinates

Point	X	Y	Station
TS	534,942.05	10,515,208.83	138+23.96
PI	535,077.52	10,515,161.97	139+67.31
SC	535,144.08	10,515,135.36	140+38.96
CC	534,301.04	10,513,026.68	

Curve Data

Curve SH20_NEW_8

P.I. Station		142+53.82	X	535,343.59	Y	10,515,055.60
Delta	=	10° 48′ 35" (RT)				
Degree	=	2° 31′ 23"				
Tangent	=	214.86				
Length	=	428.45				
Radius	=	2,270.96				
External	=	10.14				
Long Chord	=	427.81				
Mid. Ord.	=	10.10				
P.C. Station		140+38.96	X	535,144.08	Y	10,515,135.36
P.T. Station		144+67.41	X	535,524.60	Y	10,514,939.84
C.C.			X	534,301.04	Y	10,513,026.68
Back	= S 68° 12′ 32" E					
Ahead	= S 57° 23′ 57" E					
Chord Bear	= S 62° 48′ 14" E					

Curve Data

Curve SH20_NEW_9

P.I. Station		145+56.64	X	535,599.77	Y	10,514,891.76
Delta	=	4° 30′ 00" (RT)				
Degree	=	2° 31′ 23"				
Tangent	=	89.23				
Length	=	178.36				
Radius	=	2,270.96				
External	=	1.75				
Long Chord	=	178.32				
Mid. Ord.	=	1.75				
P.C. Station		144+67.41	X	535,524.60	Y	10,514,939.84
P.T. Station		146+45.77	X	535,670.93	Y	10,514,837.94
C.C.			X	534,301.04	Y	10,513,026.68
Back	= S 57° 23′ 57" E					
Ahead	= S 52° 53′ 57" E					
Chord Bear	= S 55° 08′ 57" E					

Course from PT SH20_NEW_9 to PC SH20_NEW_12 S 52° 53′ 57" E Dist 2,216.95

NOTES:
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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20 ROADWAY

HORIZONTAL ALIGNMENT DATA

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		42

DATE: 5/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040334 - DesignPlan Set\3. Roadway\SH20_ALING DATA.dgn

Curve Data

Curve SH20_NEW_12

P.I. Station		171+40.01	X	537,660.27	Y	10,513,333.37
Delta	=	2° 27′ 23" (RT)				
Degree	=	0° 26′ 35"				
Tangent	=	277.29				
Length	=	554.49				
Radius	=	12,933.85				
External	=	2.97				
Long Chord	=	554.45				
Mid. Ord.	=	2.97				
P.C. Station		168+62.72	X	537,439.11	Y	10,513,500.63
P.T. Station		174+17.21	X	537,874.06	Y	10,513,156.78
C.C.			X	529,637.16	Y	10,503,184.92
Back	= S	52° 53′ 57" E				
Ahead	= S	50° 26′ 34" E				
Chord Bear	= S	51° 40′ 16" E				

Course from PT SH20_NEW_12 to TS SH20_NEW_15 S 50° 26′ 34" E Dist 3,829.10

Spiral SH20_NEW_15 Type 1 Spiral Element

Angle	8° 00′ 00" (LT)	P	3.98	BK S	50° 26′ 34" E
LS	342.27	K	171.02	AH S	58° 26′ 34" E
R	1,225.65	LT	228.41	CB S	53° 06′ 33" E
YS	15.91	ST	114.30	Defl	2° 39′ 58"
XS	341.60	LC	341.97	Deg	4° 40′ 29"

Spiral Coordinates

Point	X	Y	Station
TS	540,826.25	10,510,718.22	212+46.31
PI	541,002.36	10,510,572.76	214+74.72
SC	541,099.76	10,510,512.94	215+88.58
CC	541,741.20	10,511,557.34	

Curve Data

Curve SH20_NEW_16

P.I. Station		217+19.25	X	541,211.11	Y	10,510,444.55
Delta	=	12° 10′ 17" (LT)				
Degree	=	4° 40′ 29"				
Tangent	=	130.67				
Length	=	260.36				
Radius	=	1,225.65				
External	=	6.95				
Long Chord	=	259.88				
Mid. Ord.	=	6.91				
P.C. Station		215+88.58	X	541,099.76	Y	10,510,512.94
P.T. Station		218+48.94	X	541,334.37	Y	10,510,401.17
C.C.			X	541,741.20	Y	10,511,557.34
Back	= S	58° 26′ 34" E				
Ahead	= S	70° 36′ 51" E				
Chord Bear	= S	64° 31′ 42" E				

Spiral SH20_NEW_17 Type 2 Spiral Element

Angle	8° 00′ 00" (LT)	P	3.98	BK S	70° 36′ 51" E
LS	342.27	K	171.02	AH S	78° 36′ 51" E
R	1,225.65	LT	228.41	CB S	75° 56′ 52" E
YS	15.91	ST	114.30	Defl	2° 39′ 58"
XS	341.60	LC	341.97	Deg	4° 40′ 29"

Spiral Coordinates

Point	X	Y	Station
CS	541,334.37	10,510,401.17	218+48.94
PI	541,442.19	10,510,363.23	219+63.24
ST	541,666.11	10,510,318.14	221+91.21
CC	541,741.20	10,511,557.34	

Course from ST SH20_NEW_17 to PC SH20_NEW_20 S 78° 36′ 51" E Dist 1,424.67

Curve Data

Curve SH20_NEW_20

P.I. Station		246+36.32	X	544,063.10	Y	10,509,835.44
Delta	=	63° 39′ 58" (RT)				
Degree	=	3° 29′ 09"				
Tangent	=	1,020.44				
Length	=	1,826.44				
Radius	=	1,643.68				
External	=	291.00				
Long Chord	=	1,733.91				
Mid. Ord.	=	247.23				
P.C. Station		236+15.88	X	543,062.74	Y	10,510,036.89
P.T. Station		254+42.31	X	544,326.31	Y	10,508,849.53
C.C.			X	542,738.25	Y	10,508,425.55
Back	= S	78° 36′ 51" E				
Ahead	= S	14° 56′ 53" E				
Chord Bear	= S	46° 46′ 52" E				

Course from PT SH20_NEW_20 to PC SH20_NEW_23 S 14° 56′ 53" E Dist 1,070.68

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
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PROFESSIONAL ENGINEER

05/27/2022

SH 20 ROADWAY

HORIZONTAL ALIGNMENT DATA

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		43

DATE: 5/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040333\4 - Design\Plan Set\3. Roadway\SH20_ALING DATA.dgn

Curve Data

Curve SH20_NEW_23

P.I.	Station	268+17.19	X	544,680.95	Y	10,507,521.18
Delta	=	35° 28′ 35" (LT)				
Degree	=	6° 01′ 30"				
Tangent	=	304.19				
Length	=	588.82				
Radius	=	950.97				
External	=	47.47				
Long Chord	=	579.46				
Mid. Ord.	=	45.21				
P.C.	Station	265+13.00	X	544,602.48	Y	10,507,815.07
P.T.	Station	271+01.82	X	544,915.42	Y	10,507,327.38
C.C.			X	545,521.27	Y	10,508,060.37

Back = S 14° 56′ 53" E
Ahead = S 50° 25′ 28" E
Chord Bear = S 32° 41′ 10" E

Course from PT SH20_NEW_23 to PC SH20_NEW_26 S 50° 25′ 28" E Dist 4,210.71

Curve Data

Curve SH20_NEW_26

P.I.	Station	317+10.38	X	548,467.62	Y	10,504,391.29
Delta	=	15° 29′ 04" (RT)				
Degree	=	1° 57′ 29"				
Tangent	=	397.85				
Length	=	790.84				
Radius	=	2,926.32				
External	=	26.92				
Long Chord	=	788.44				
Mid. Ord.	=	26.68				
P.C.	Station	313+12.53	X	548,160.97	Y	10,504,644.75
P.T.	Station	321+03.38	X	548,695.48	Y	10,504,065.15
C.C.			X	546,296.63	Y	10,502,389.19

Back = S 50° 25′ 28" E
Ahead = S 34° 56′ 25" E
Chord Bear = S 42° 40′ 56" E

Course from PT SH20_NEW_26 to 94 S 34° 56′ 25" E Dist 7,463.10

Point 94 X 552,969.75 Y 10,497,947.27 Sta 395+66.47

==========

Ending chain SH20_NEW description

NOTES:

1. HORIZONTAL ALIGNMENT DATA IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

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05/27/2022

SH 20
ROADWAY

HORIZONTAL ALIGNMENT DATA

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		44

DATE: 5/27/2022
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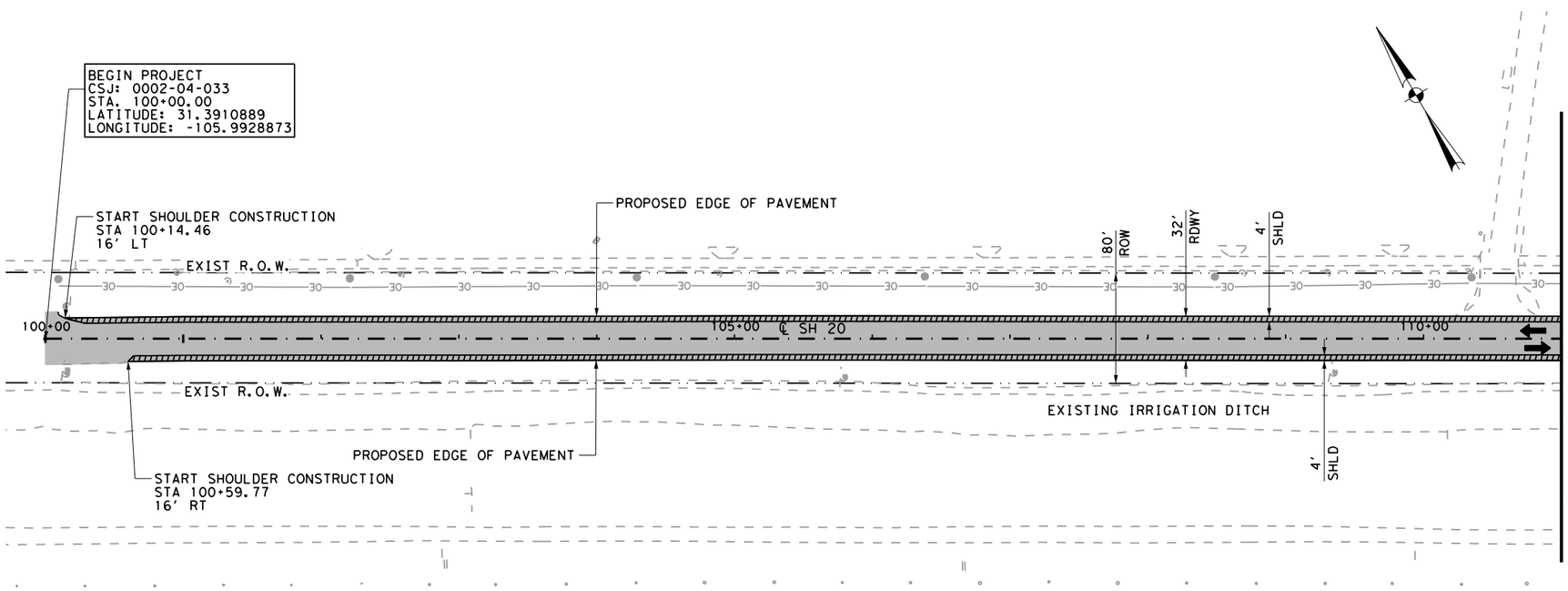
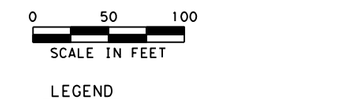




LEGEND

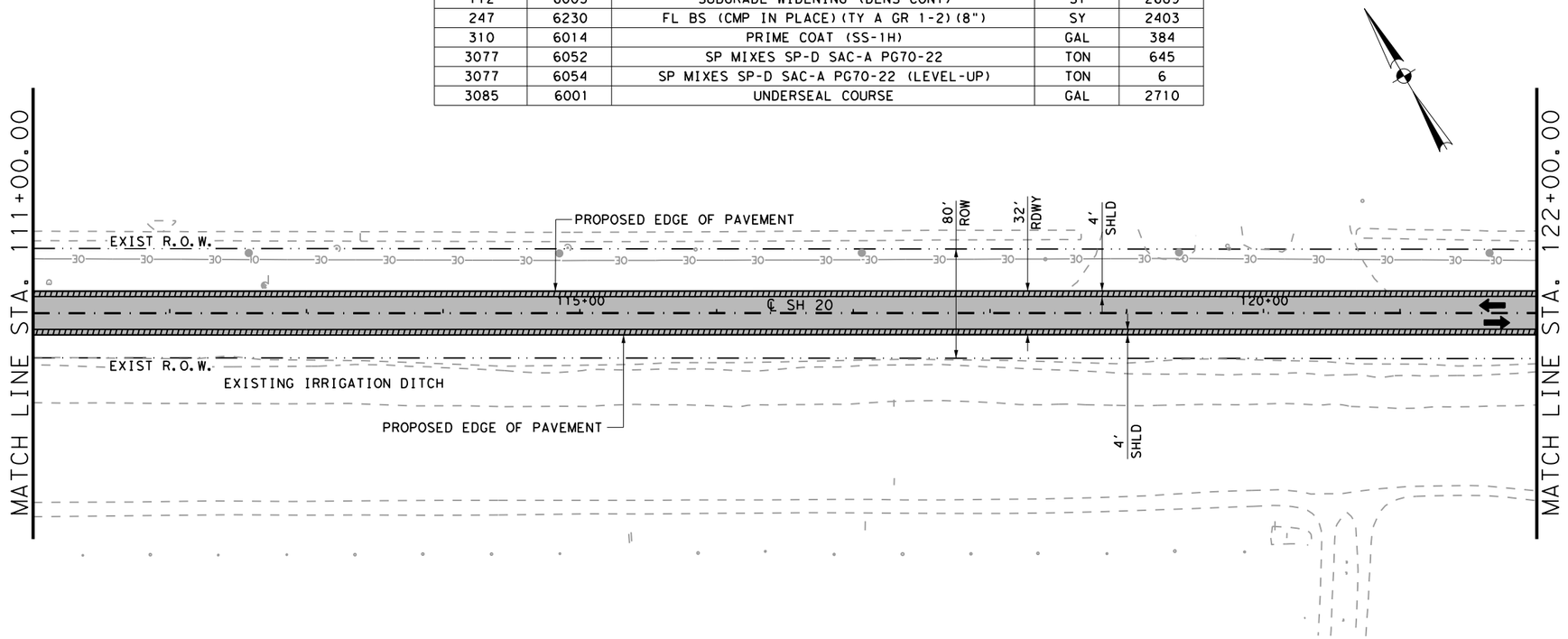
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. UTILITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY. CONTRACTOR SHALL IDENTIFY & LOCATE ALL UTILITIES WITHIN PROJECT LIMITS PRIOR TO PERFORMING ANY WORK.
2. EXISTING IRRIGATION STRUCTURES TO REMAIN AND ARE NOT TO BE DISTURBED.
3. HORIZONTAL ALIGNMENT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

ROADWAY ESTIMATE (SHEET 1 OF 14)

ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2403
310	6014	PRIME COAT (SS-1H)	GAL	384
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	6
3085	6001	UNDERSEAL COURSE	GAL	2710



STATE OF TEXAS
ALEJANDRO FRANCO
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05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

BEGIN STA. 100+00 TO STA. 122+00.00

SHEET 1 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		45

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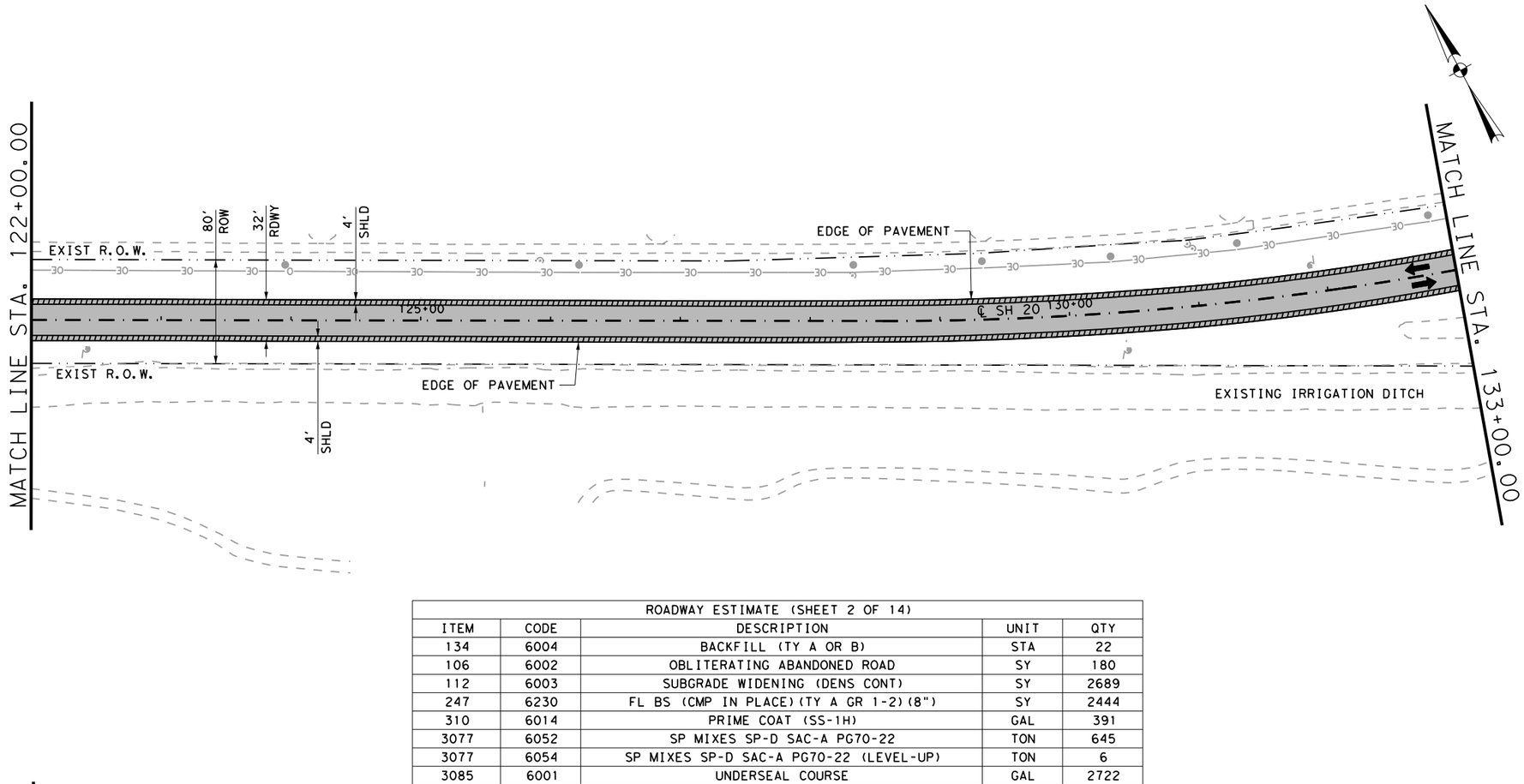

ROADWAY ESTIMATE (SHEET 2 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
106	6002	OBLITERATING ABANDONED ROAD	SY	180
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	6
3085	6001	UNDERSEAL COURSE	GAL	2722

0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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2. EXISTING IRRIGATION STRUCTURES TO REMAIN AND ARE NOT TO BE DISTURBED.

3. HORIZONTAL ALIGNMENT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

STATE OF TEXAS
ALEJANDRO FRANCO
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05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 122+00.00 TO STA. 144+00.00

SHEET 2 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		46

DATE: 5/27/2022 2:05:51 PM
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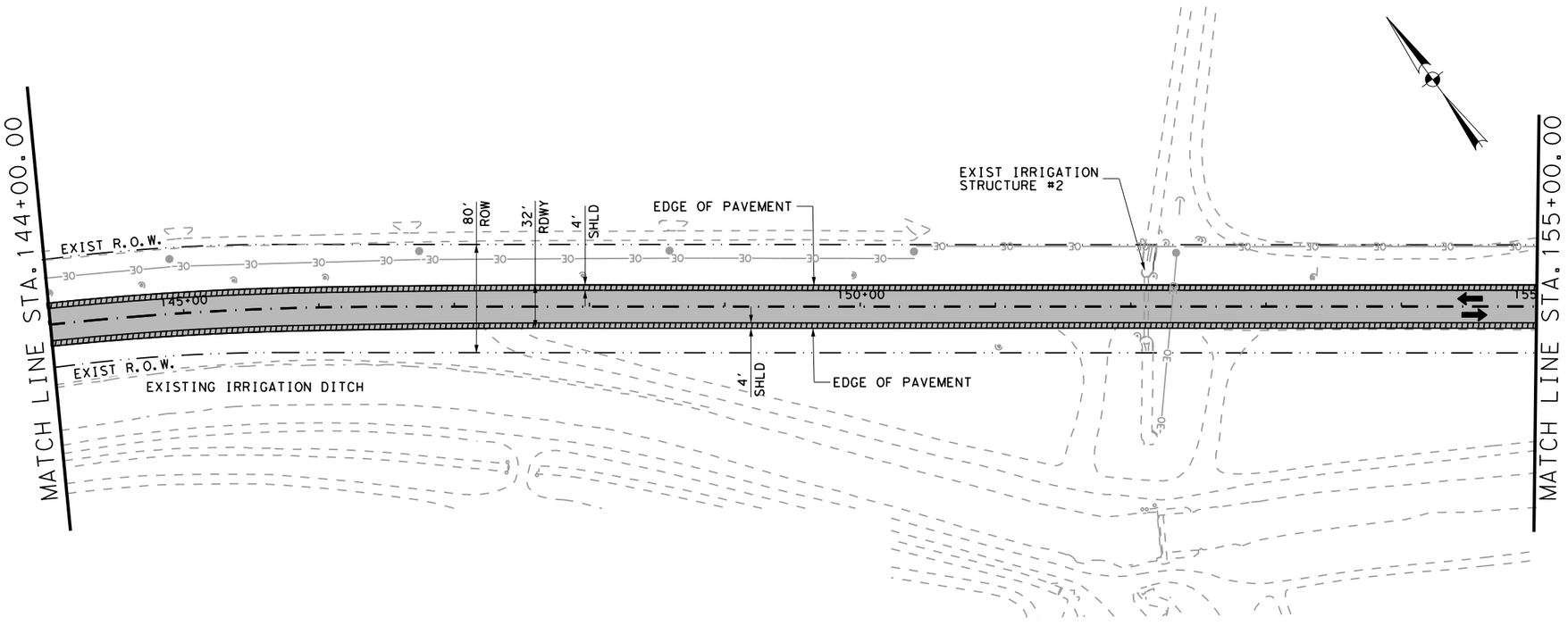
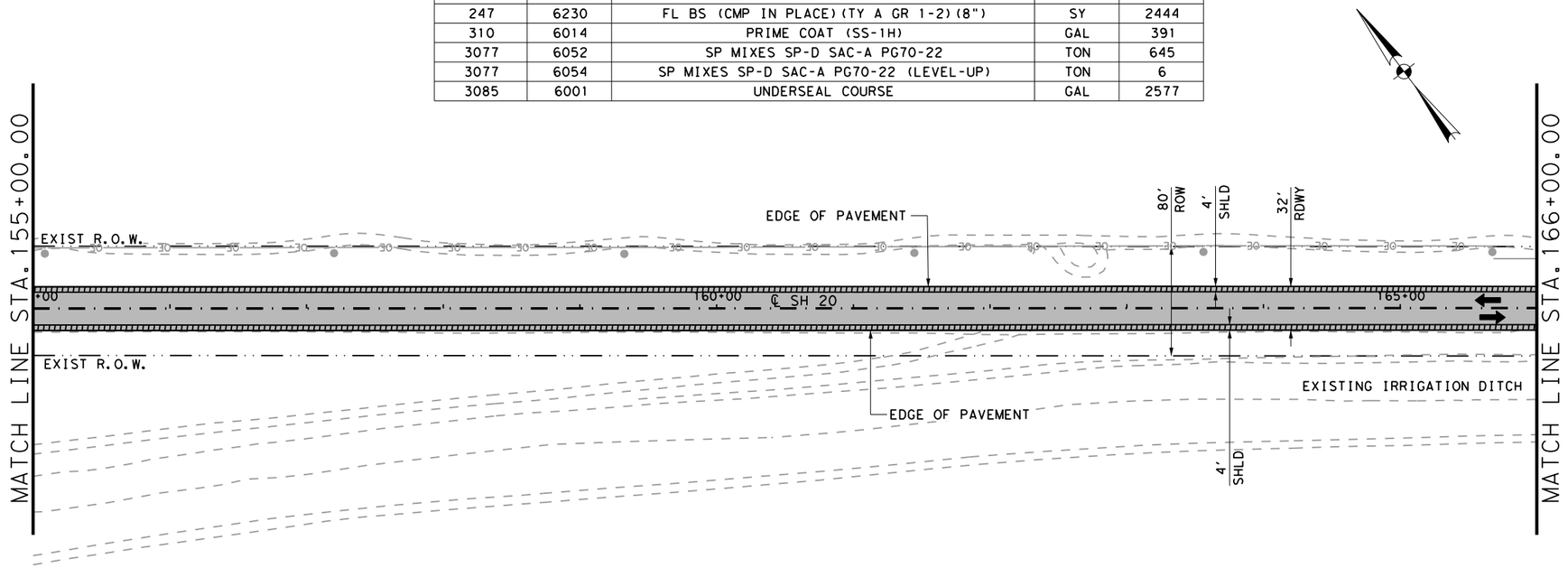


ROADWAY ESTIMATE (SHEET 3 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	6
3085	6001	UNDERSEAL COURSE	GAL	2577



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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3. HORIZONTAL ALIGNMENT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 144+00.00 TO STA. 166+00.00

SHEET 3 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		47

DATE: 5/27/2022 2:06:06 PM
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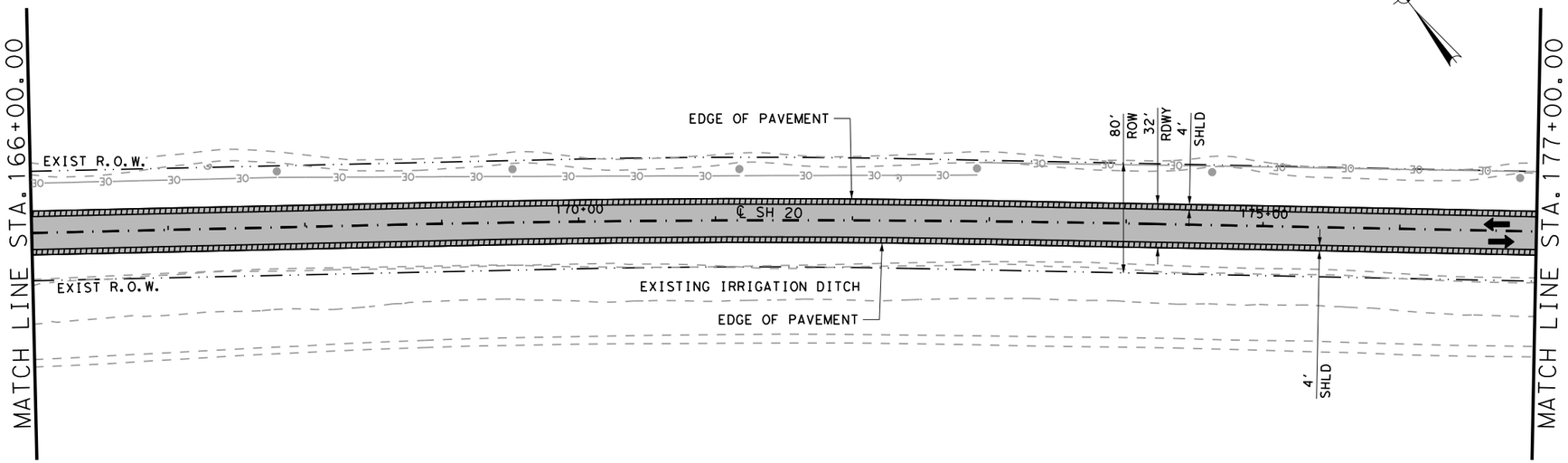
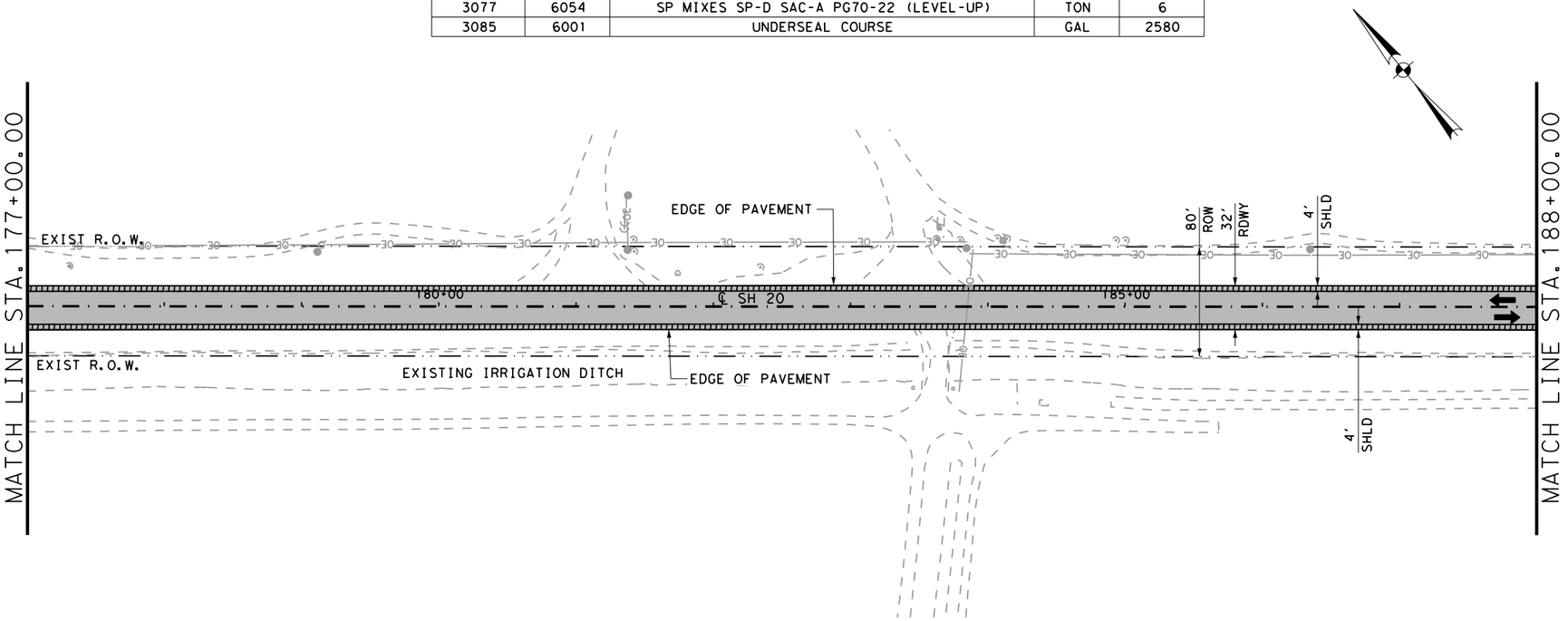


ROADWAY ESTIMATE (SHEET 4 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	6
3085	6001	UNDERSEAL COURSE	GAL	2580



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 166+00.00 TO STA. 188+00.00

SHEET 4 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		48

DATE: 5/27/2022 2:06:21 PM
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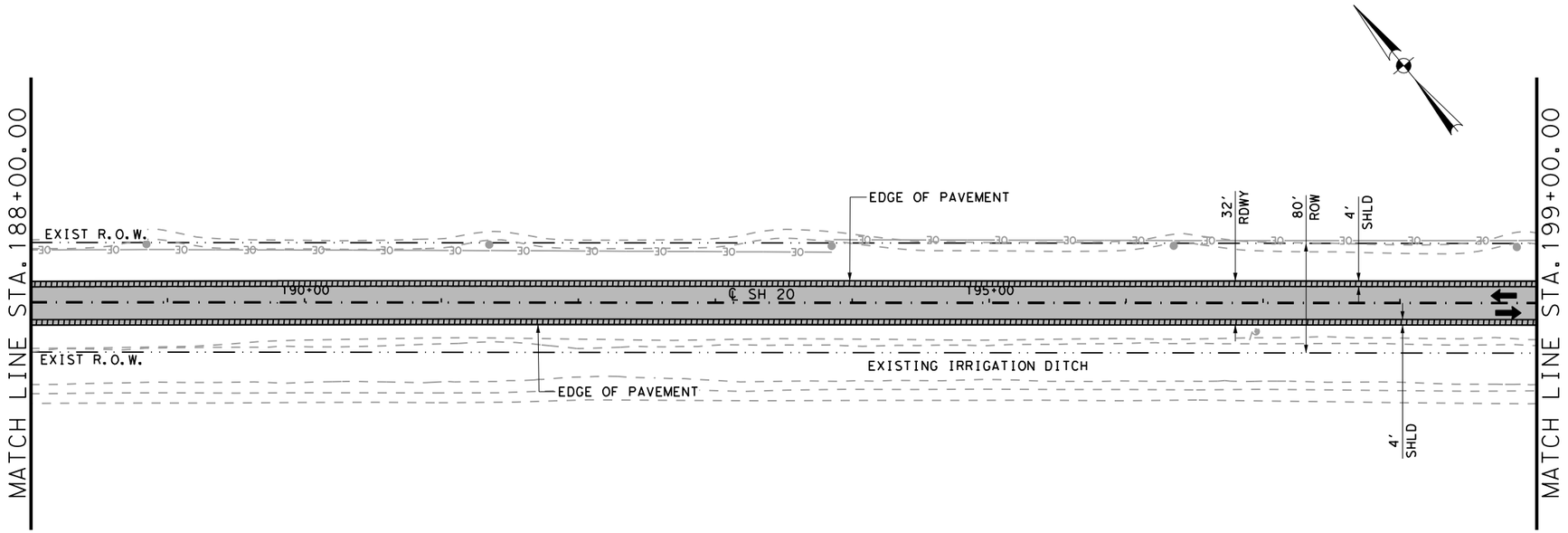

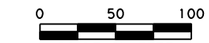

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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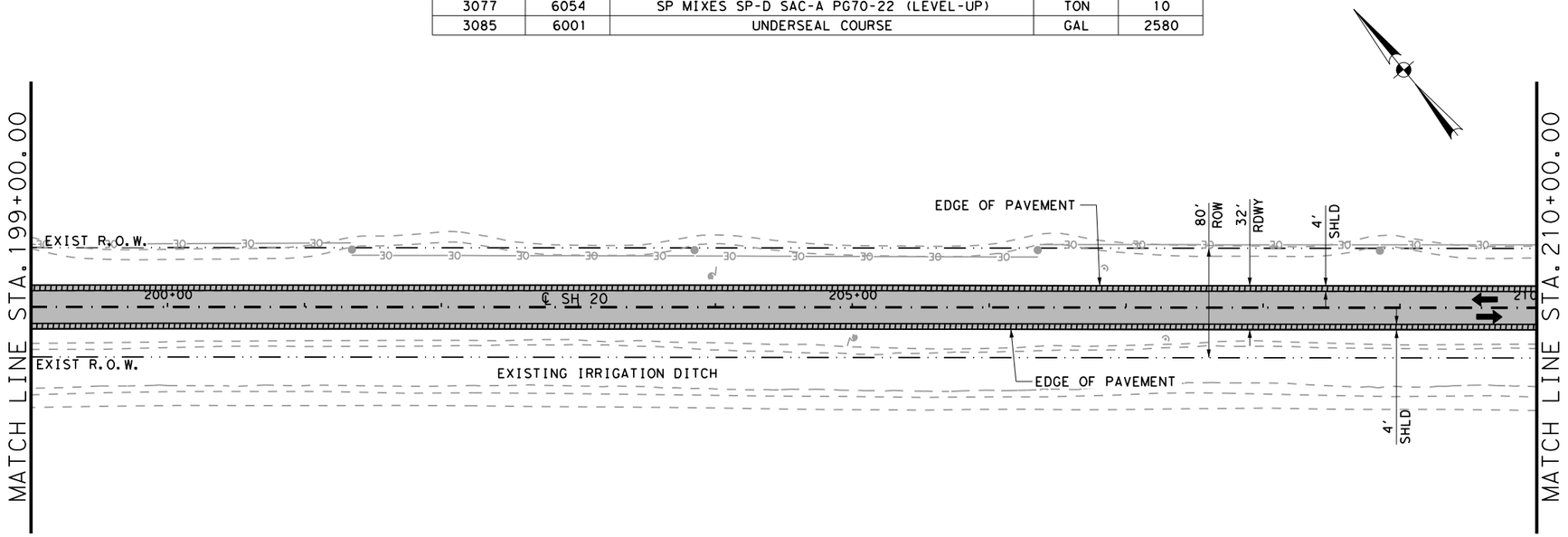
ROADWAY ESTIMATE (SHEET 5 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	10
3085	6001	UNDERSEAL COURSE	GAL	2580



STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 188+00.00 TO STA. 210+00.00

SHEET 5 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		49

DATE: 5/27/2022 2:06:36 PM
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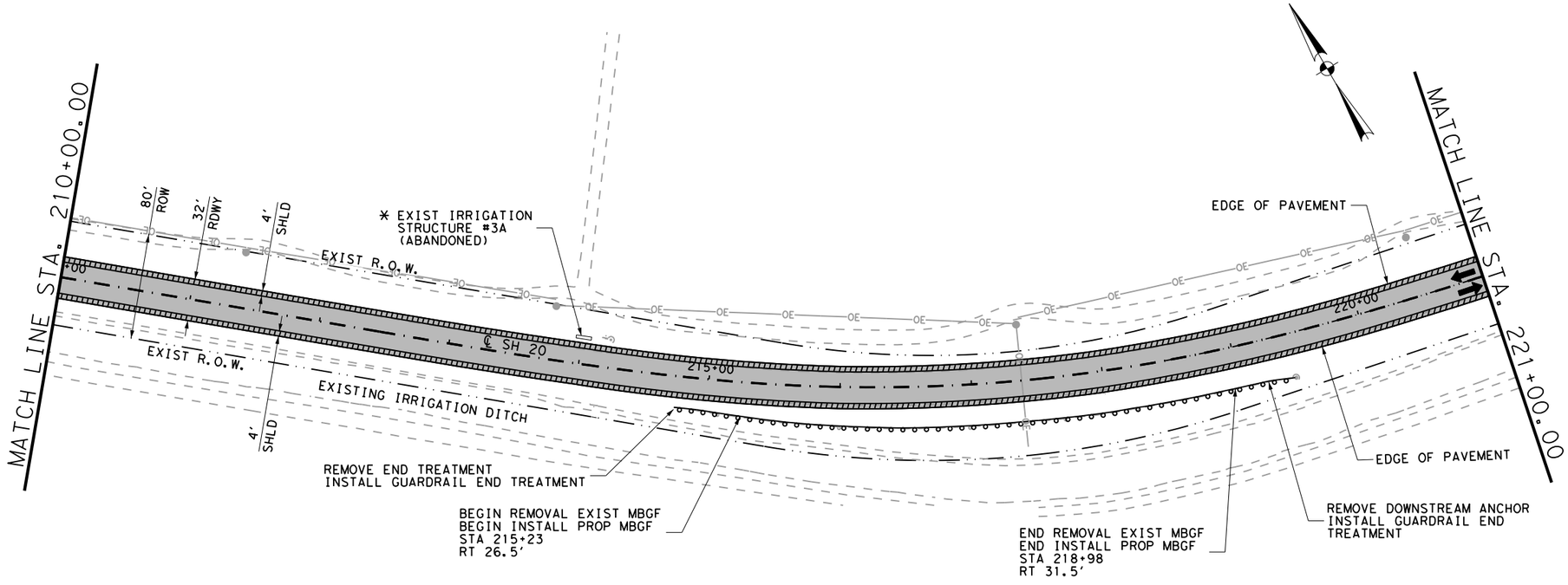
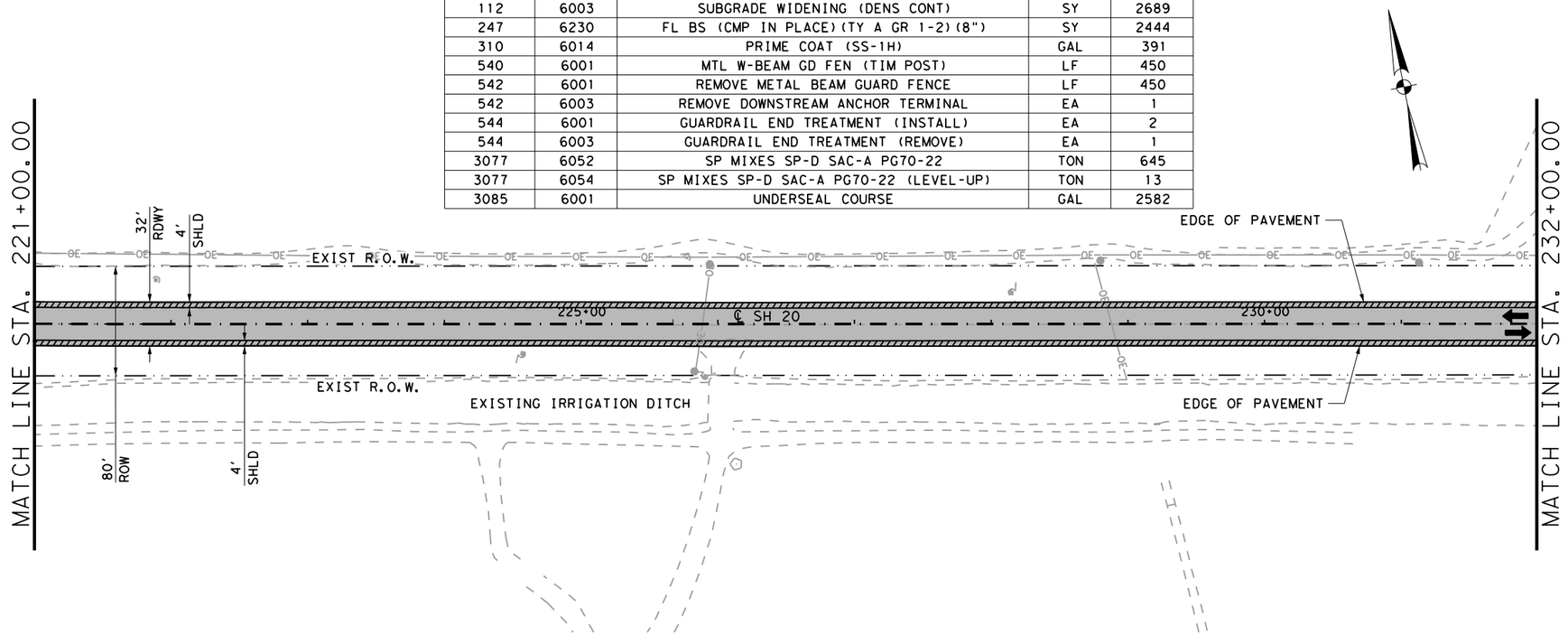


ROADWAY ESTIMATE (SHEET 6 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
540	6001	MTL W-BEAM GD FEN (TIM POST)	LF	450
542	6001	REMOVE METAL BEAM GUARD FENCE	LF	450
542	6003	REMOVE DOWNSTREAM ANCHOR TERMINAL	EA	1
544	6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
544	6003	GUARDRAIL END TREATMENT (REMOVE)	EA	1
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	13
3085	6001	UNDERSEAL COURSE	GAL	2582



0 50 100
SCALE IN FEET

LEGEND

- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW
- MBGF
- * SEE MISCELLANEOUS DETAILS FOR MORE INFORMATION

NOTES:

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 210+00.00 TO STA. 232+00.00

SHEET 6 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		50

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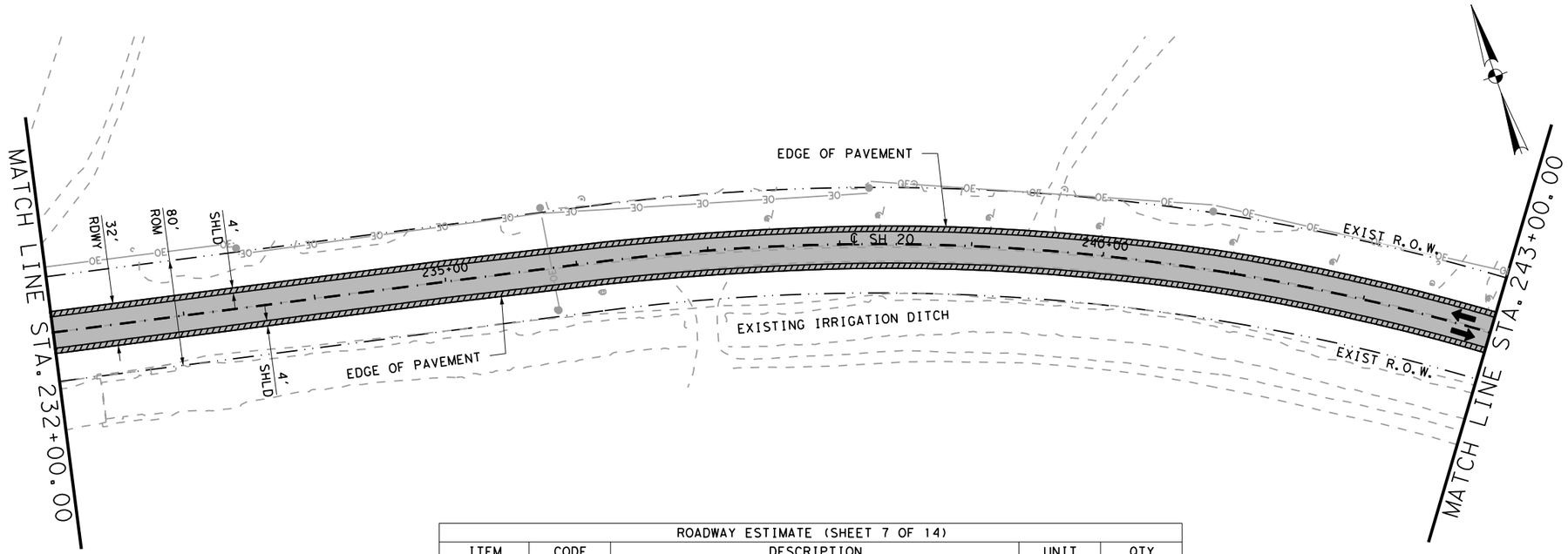

ROADWAY ESTIMATE (SHEET 7 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	11
3085	6001	UNDERSEAL COURSE	GAL	2575

NOTES:

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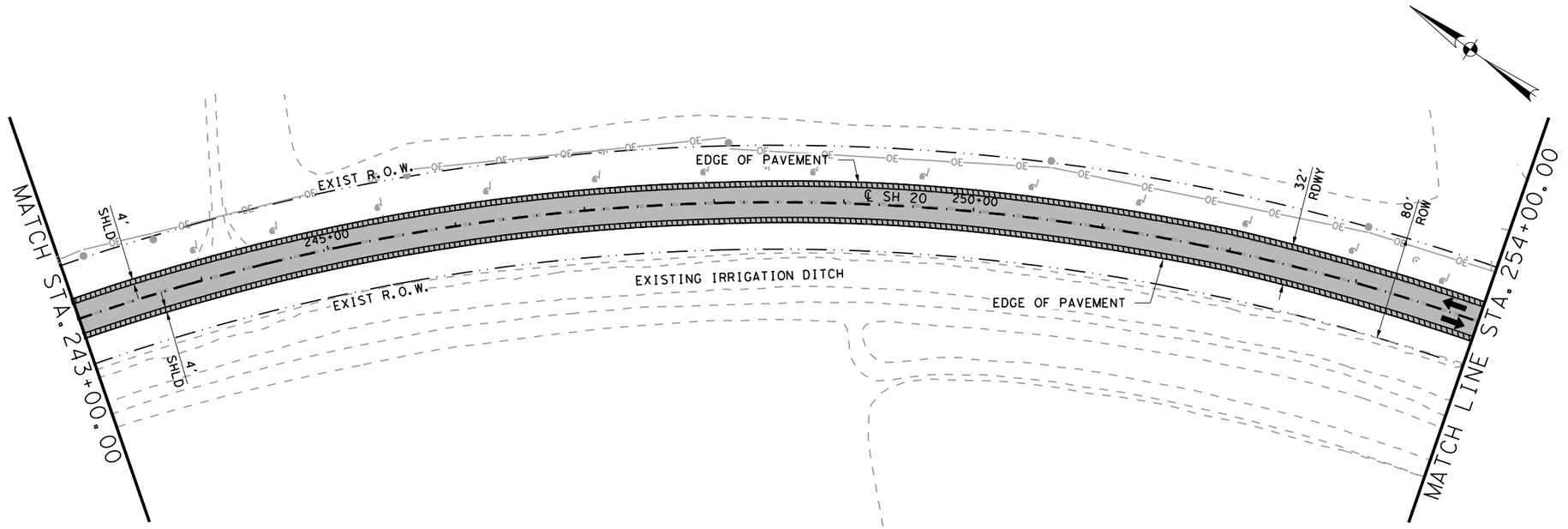

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 232+00.00 TO STA. 254+00.00

SHEET 7 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		51

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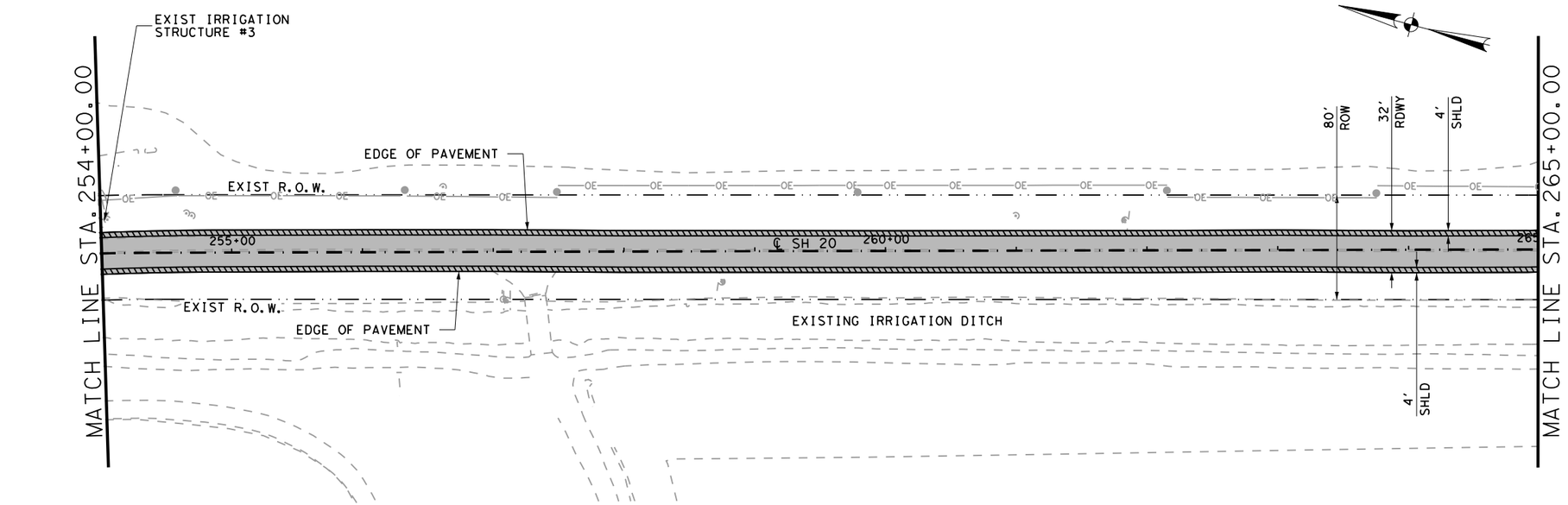
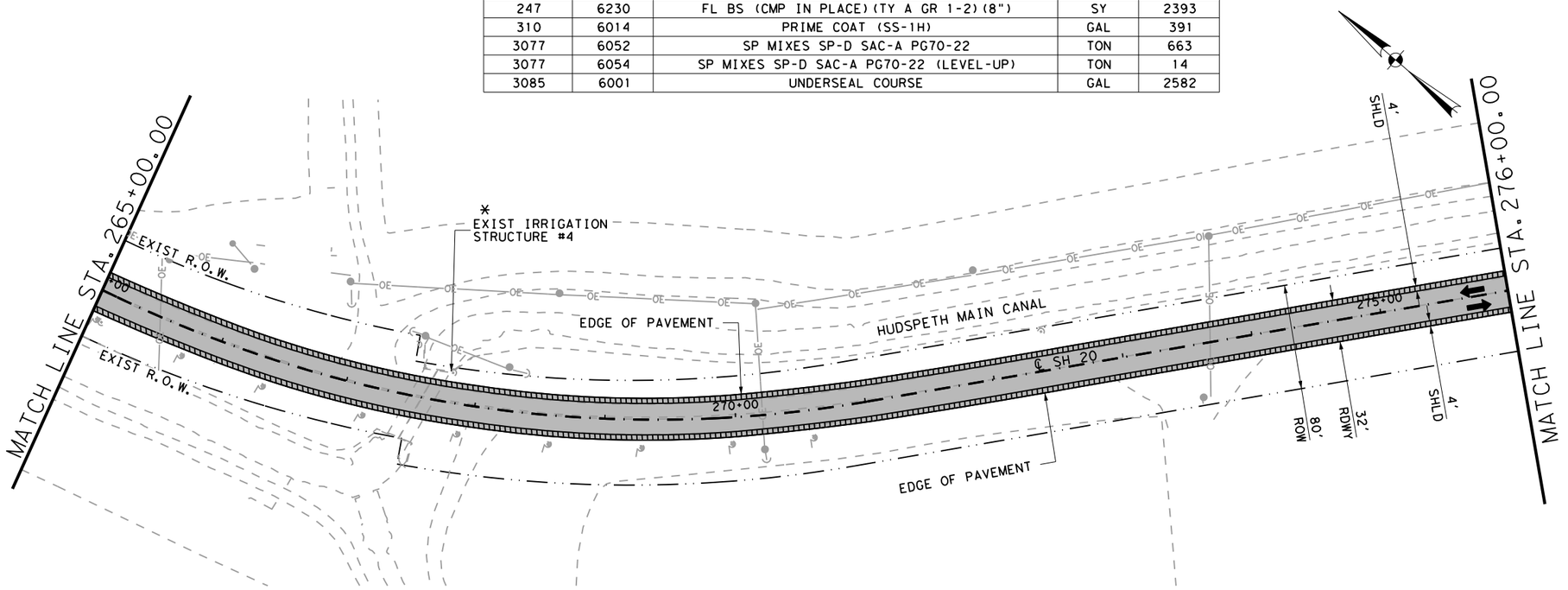


ROADWAY ESTIMATE (SHEET 8 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2393
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	663
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	14
3085	6001	UNDERSEAL COURSE	GAL	2582



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

* SEE MISCELLANEOUS DETAILS FOR MORE INFORMATION

NOTES:

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 254+00.00 TO STA. 276+00.00

SHEET 8 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		52

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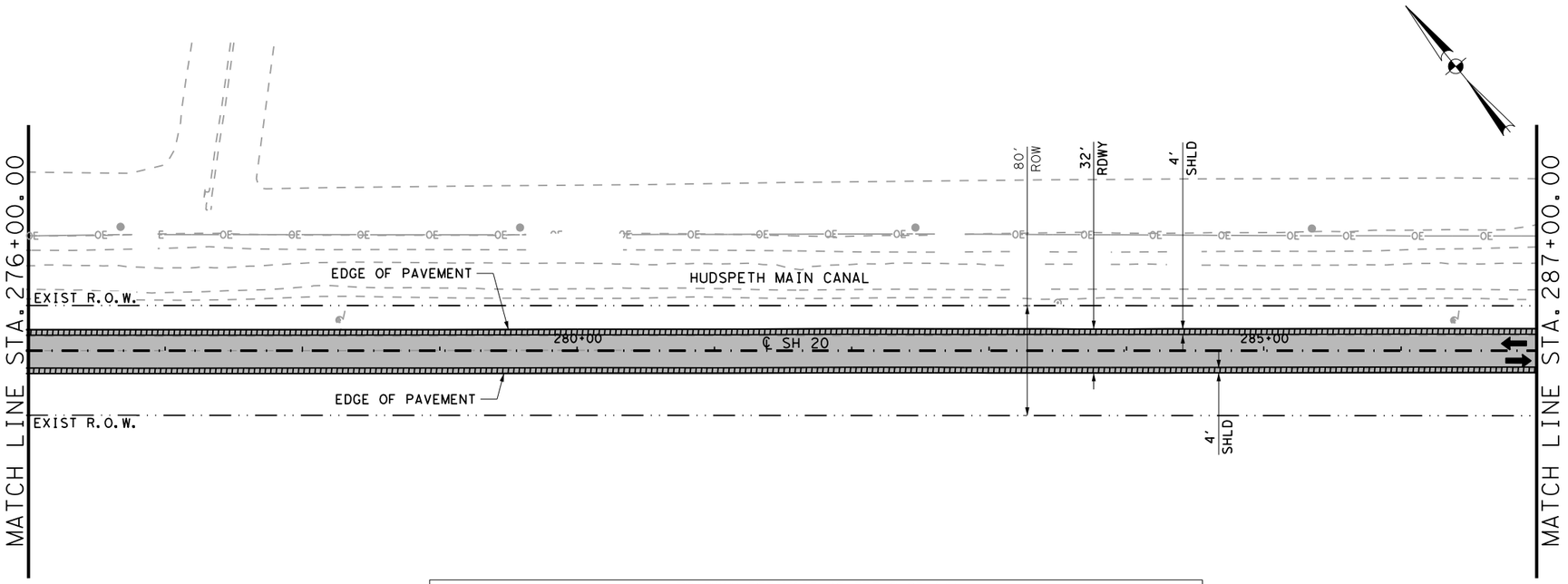
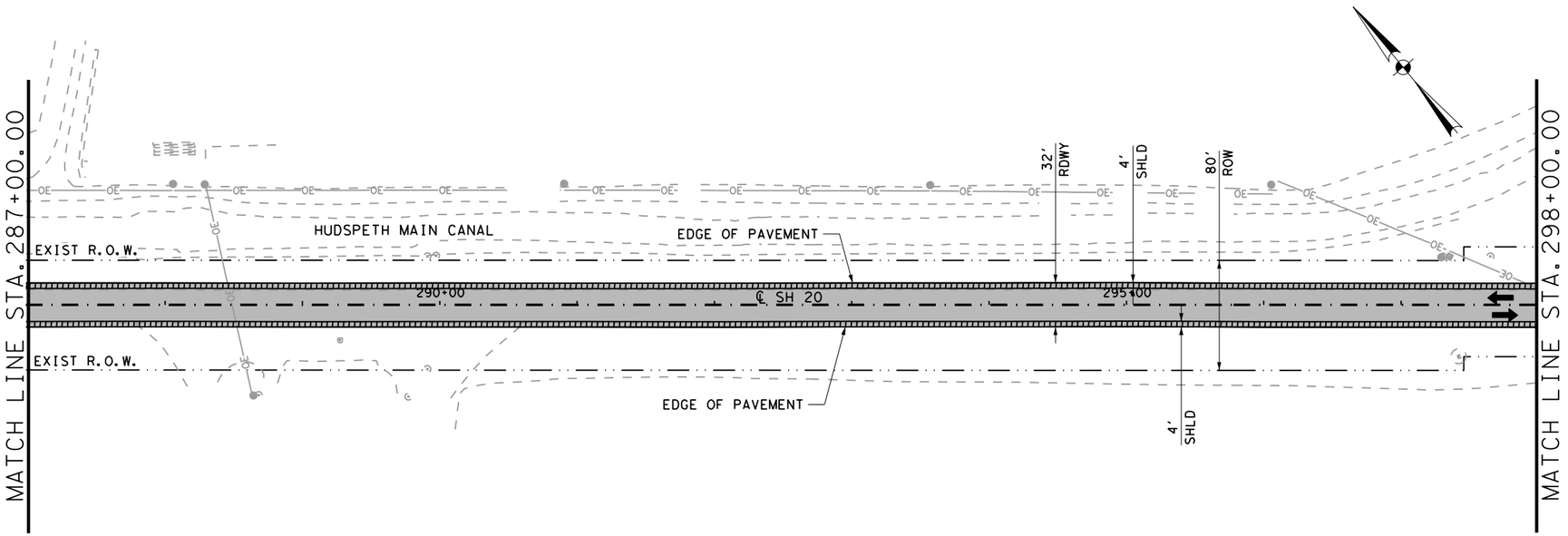


ROADWAY ESTIMATE (SHEET 9 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	14
3085	6001	UNDERSEAL COURSE	GAL	2600



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 276+00.00 TO STA. 298+00.00

SHEET 9 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		53

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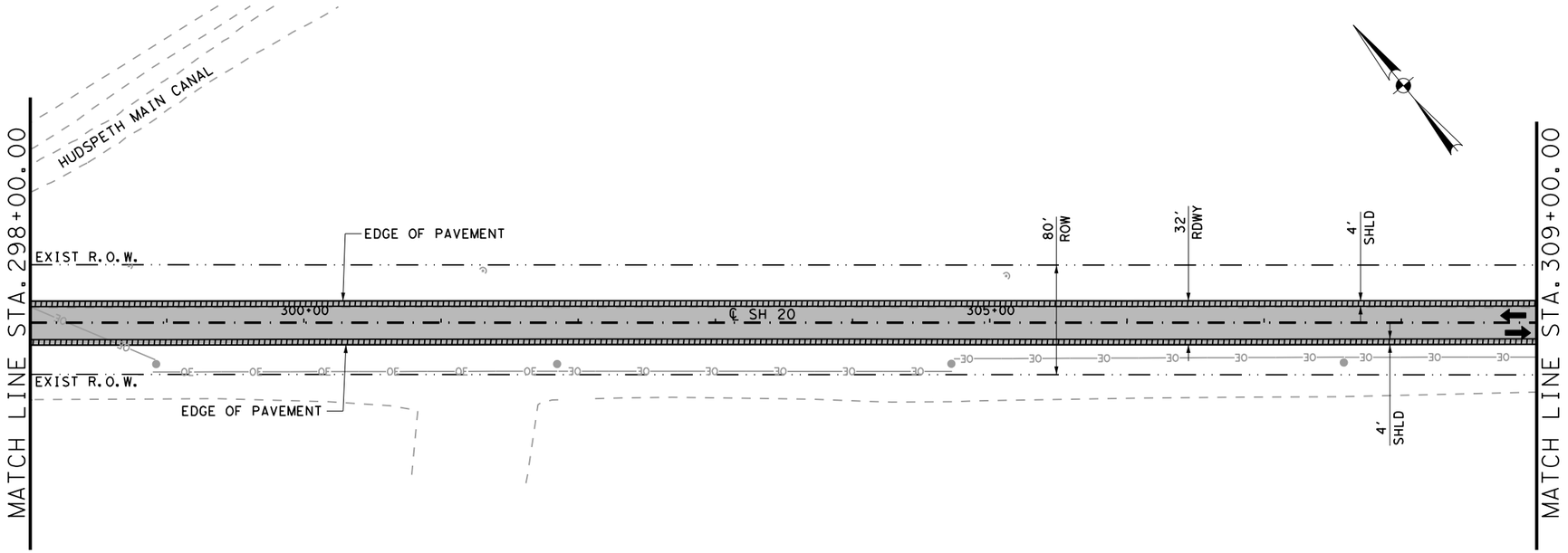
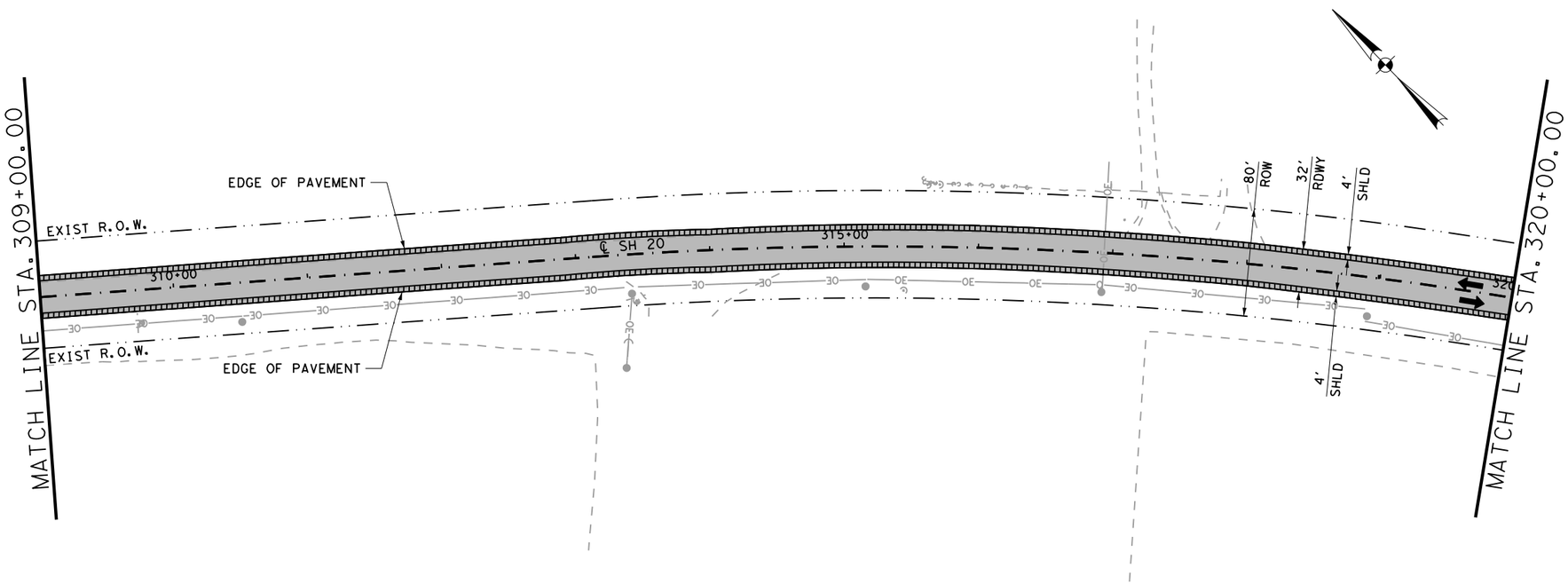


ROADWAY ESTIMATE (SHEET 10 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	15
3085	6001	UNDERSEAL COURSE	GAL	2603



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
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140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 298+00.00 TO STA. 320+00.00

SHEET 10 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		54

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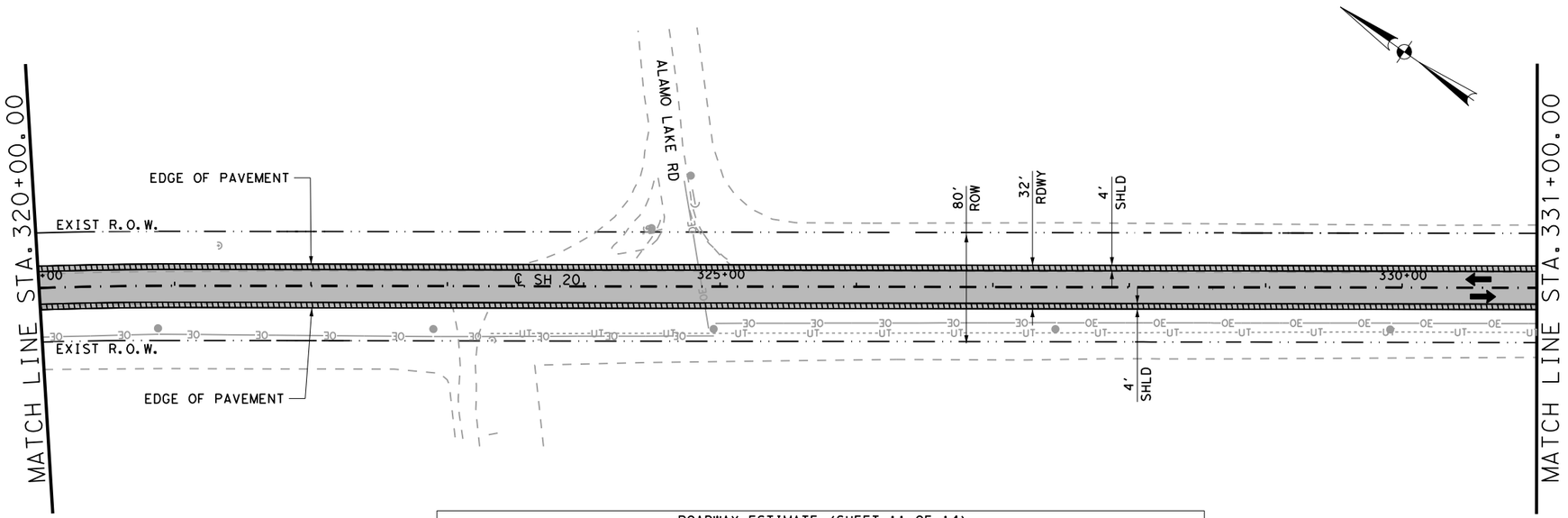
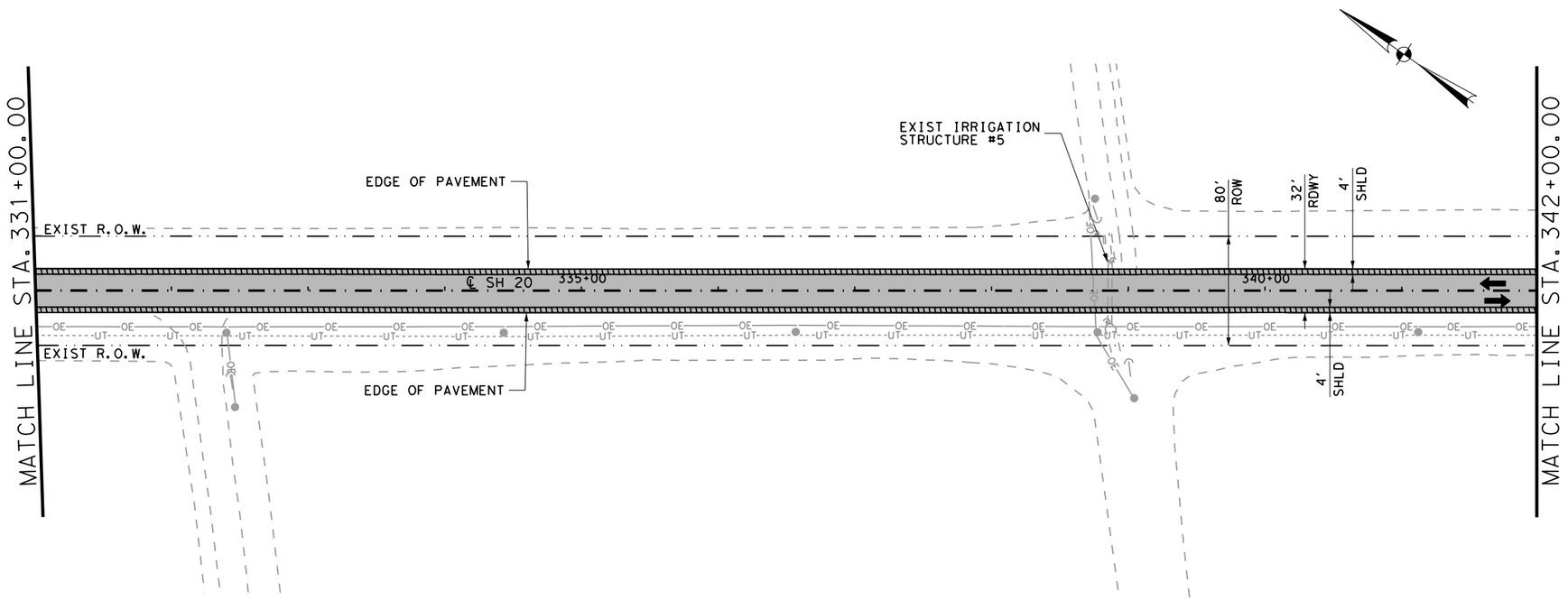


ROADWAY ESTIMATE (SHEET 11 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2444
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	645
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	16
3085	6001	UNDERSEAL COURSE	GAL	2590



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 320+00.00 TO STA. 342+00.00

SHEET 11 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		55

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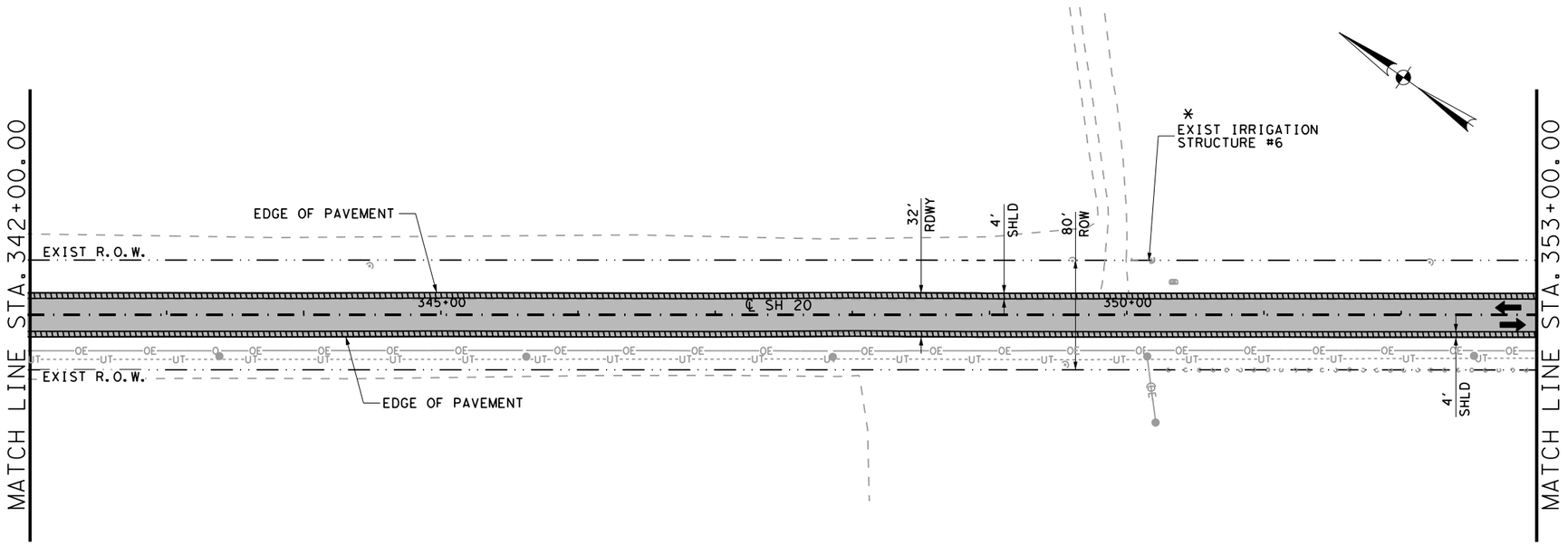
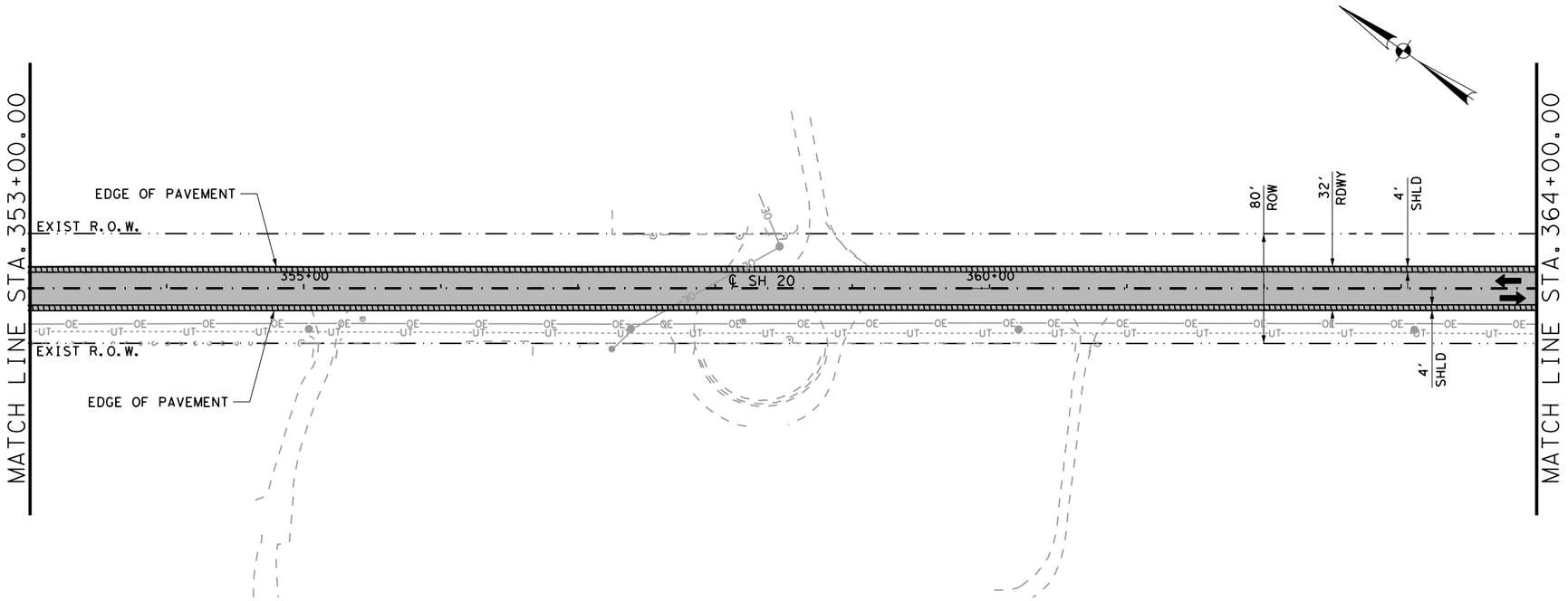


ROADWAY ESTIMATE (SHEET 12 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2354
310	6014	PRIME COAT (SS-1H)	GAL	391
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	675
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	12
3085	6001	UNDERSEAL COURSE	GAL	2557



0 50 100
SCALE IN FEET

LEGEND

PROPOSED FULL-WIDTH 1.5" OVERLAY

PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY

TRAFFIC FLOW

* SEE MISCELLANEOUS DETAILS FOR MORE INFORMATION

NOTES:

1. UTILITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY. CONTRACTOR SHALL IDENTIFY & LOCATE ALL UTILITIES WITHIN PROJECT LIMITS PRIOR TO PERFORMING ANY WORK.
2. EXISTING IRRIGATION STRUCTURES TO REMAIN AND ARE NOT TO BE DISTURBED.
3. HORIZONTAL ALIGNMENT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 342+00.00 TO STA. 364+00.00

SHEET 12 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		56

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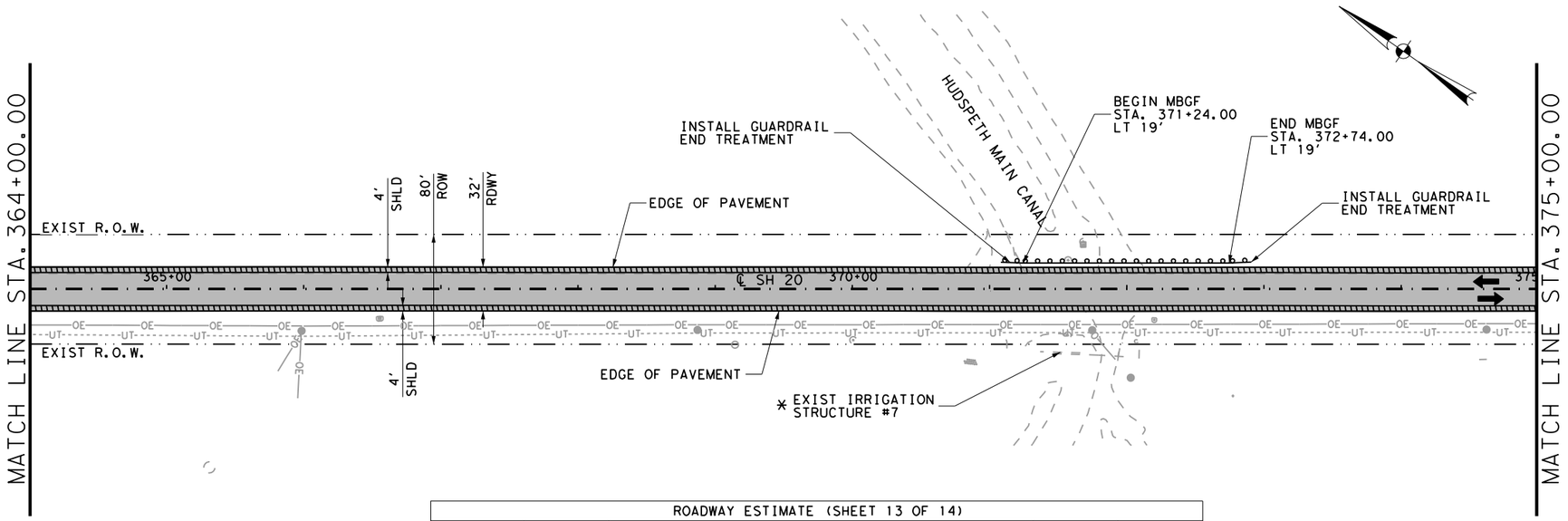

LEGEND

- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW
- MBGF
- * SEE MISCELLANEOUS DETAILS FOR MORE INFORMATION

ROADWAY ESTIMATE (SHEET 13 OF 14)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	22
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	2689
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	2399
310	6014	PRIME COAT (SS-1H)	GAL	391
540	6001	MTL W-BEAM GD FEN (TIM POST)	LF	150
544	6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	660
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	14
3085	6001	UNDERSEAL COURSE	GAL	2584

NOTES:

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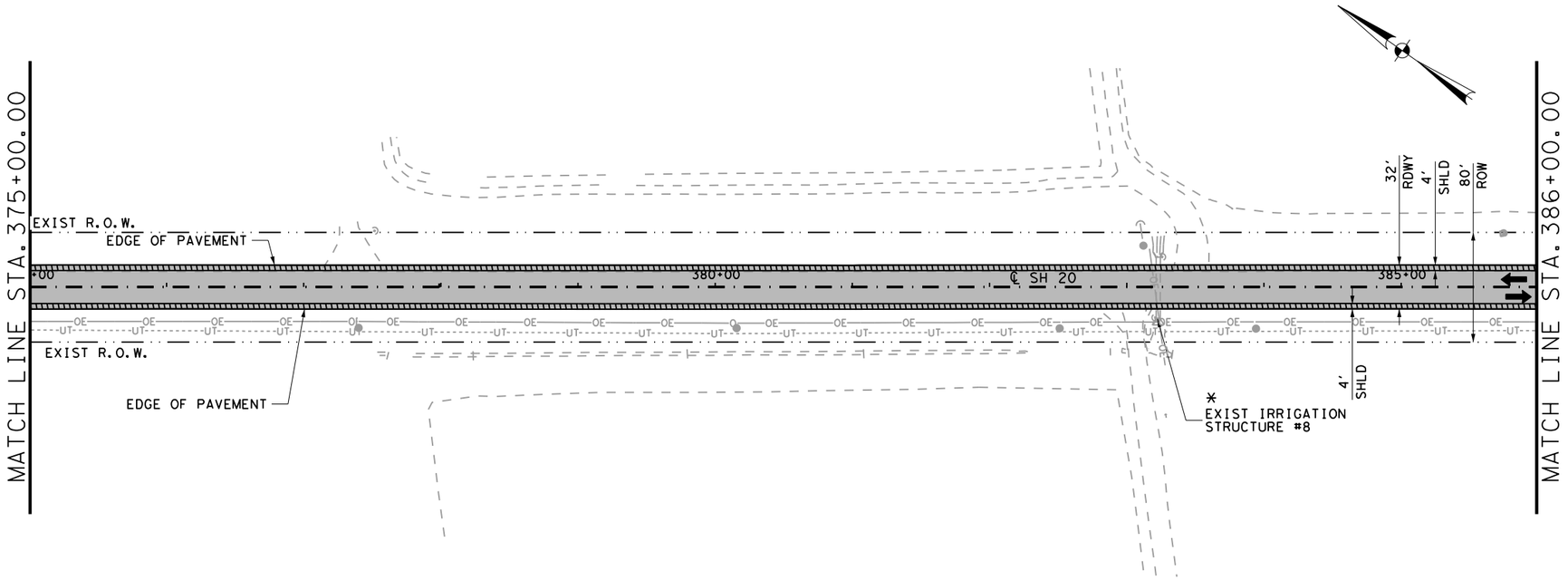
3. HORIZONTAL ALIGNMENT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.



05/27/2022

SH 20
ROADWAY

ROADWAY LAYOUT

STA. 364+00.00 TO STA. 386+00.00

SHEET 13 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		57

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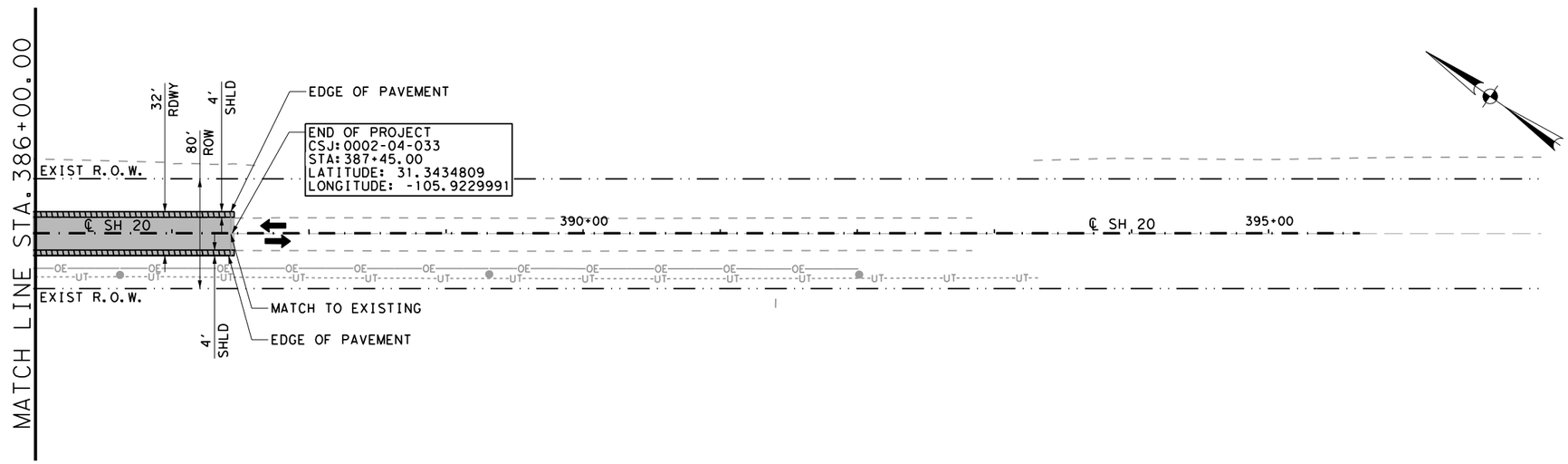

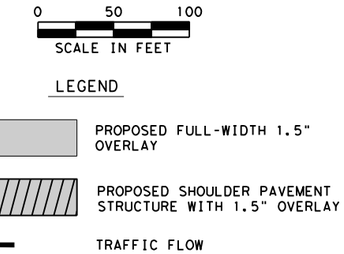

NOTES:

1. UTILITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY. CONTRACTOR SHALL IDENTIFY & LOCATE ALL UTILITIES WITHIN PROJECT LIMITS PRIOR TO PERFORMING ANY WORK.

2. EXISTING IRRIGATION STRUCTURES TO REMAIN AND ARE NOT TO BE DISTURBED.

3. HORIZONTAL ALIGNMENT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

ROADWAY ESTIMATE (SHEET 14 OF 14)

ITEM	CODE	DESCRIPTION	UNIT	QTY
134	6004	BACKFILL (TY A OR B)	STA	1.45
112	6003	SUBGRADE WIDENING (DENS CONT)	SY	177
247	6230	FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	SY	161
310	6014	PRIME COAT (SS-1H)	GAL	26
3077	6052	SP MIXES SP-D SAC-A PG70-22	TON	43
3077	6054	SP MIXES SP-D SAC-A PG70-22 (LEVEL-UP)	TON	1
3085	6001	UNDERSEAL COURSE	GAL	171

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SH 20
ROADWAY

ROADWAY LAYOUT

STA.386+00.00 TO STA.387+45.00

SHEET 14 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		58

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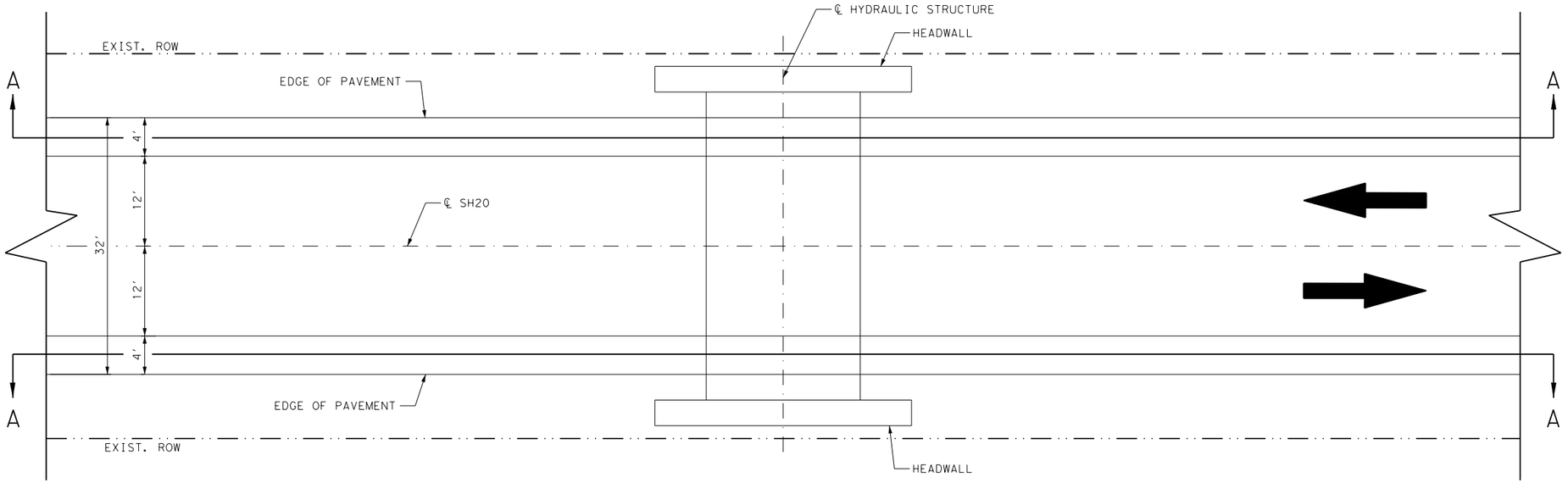


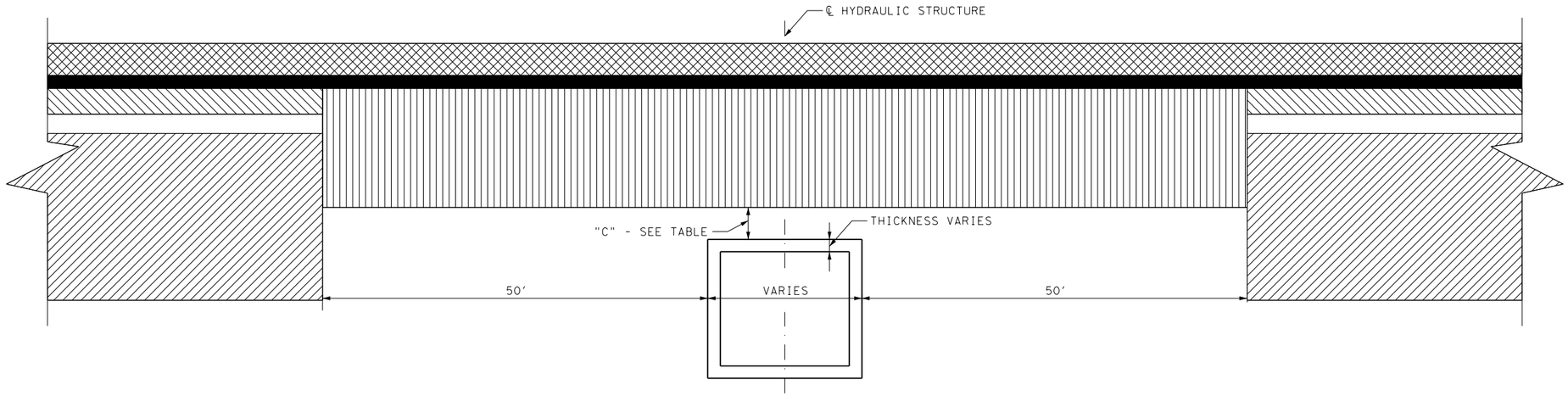
PLAN VIEW
N.T.S.

NOTES

1. FIELD VERIFY STRUCTURE LOCATION AND DIMENSIONS.
2. CARE SHALL BE TAKEN DURING EXCAVATING AS NOT TO DAMAGE EXISTING HYDRAULIC STRUCTURES.
3. SEE ROADWAY SHEETS FOR METAL BEAM GUARD FENCE LOCATIONS.
4. SEE TYPICAL SECTION SHEETS FOR SHOULDER STRUCTURE

LEGEND

- TRAFFIC FLOW
- 8" FLEX BASE (TY A)(GR1-2)
- PRIME COAT (SS-1H)
- UNDERSEAL COURSE (SEAL COAT)
- UNDERSEAL COURSE
- 1.5" SP MIXES SP-D SAC-A PG70-22
- 6" SP MIXES SP-D SAC-A PG70-22



SECTION A-A
N.T.S.

STRUCTURE NO.	EB/WB	STA.	STRUCTURE	EOP TO HEADWALL	"C" Clearance
4	WB	267+58.50	9'X5'	7'	0.3'
6	EB	350+16.81	24"	21'	0.6'
6	WB	350+16.81	24"	21'	0.3'
8	WB	383+22.18	3'X2'	5'	0.9'

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SH 20 ROADWAY

MISCELLANEOUS DETAILS

NOT TO SCALE SHEET 1 OF 1

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		59

DATE: 5/27/2022
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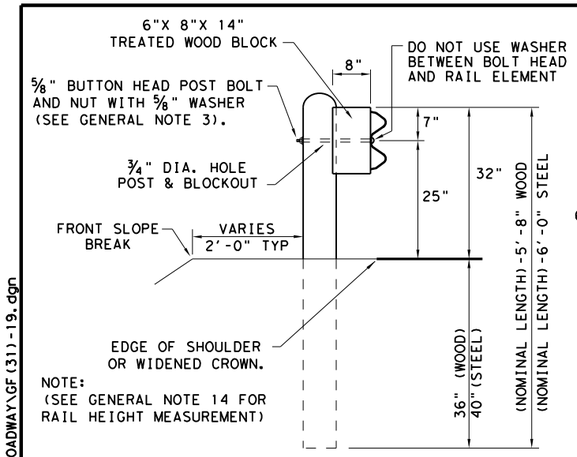
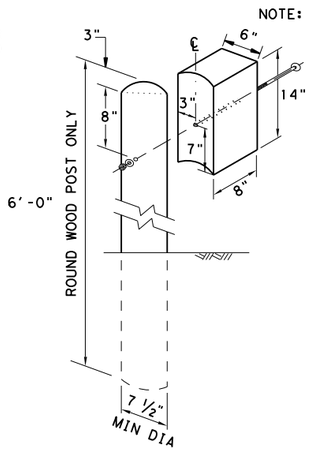


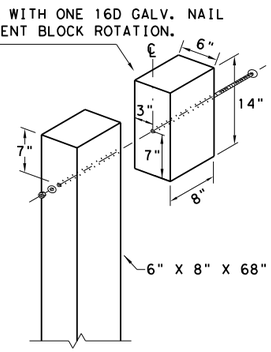
NOTE:
(SEE GENERAL NOTE 14 FOR
RAIL HEIGHT MEASUREMENT)

TYPICAL POST PLACEMENT

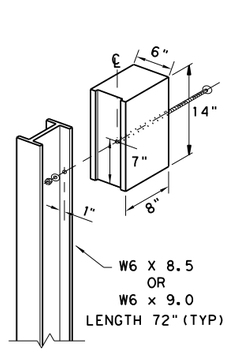


**WOOD BLOCK TO
ROUND WOOD POST**

NOTE: TOENAIL WITH ONE 16D GALV. NAIL
TO PREVENT BLOCK ROTATION.

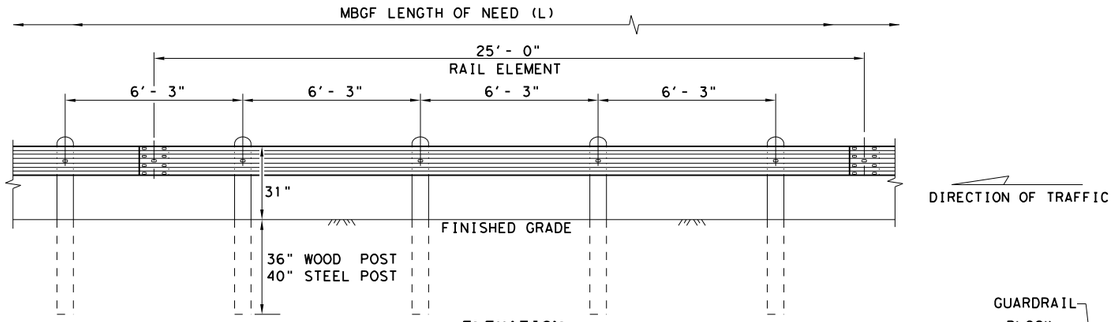


**WOOD BLOCK TO
RECTANGULAR WOOD POST**



**ROUTED WOOD BLOCK
TO I-BEAM STEEL POST**

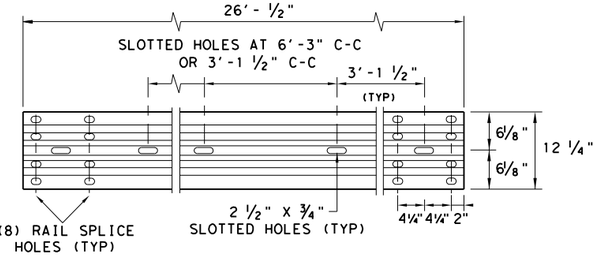
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



DIRECTION OF TRAFFIC

**ELEVATION
MID-SPAN RAIL SPLICE**

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



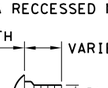
ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

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

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL
BOLTS COME WITH A RECCESSED NUT.

SPLICE BOLT LENGTH → VARIES

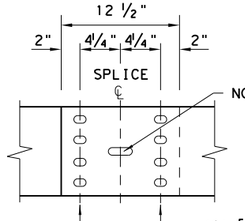
FBB01 = 1 ¼"
FBB02 = 2"



POST & BLOCK LENGTH
FBB03 = 10"
FBB04 = 18"

BUTTON HEAD BOLT

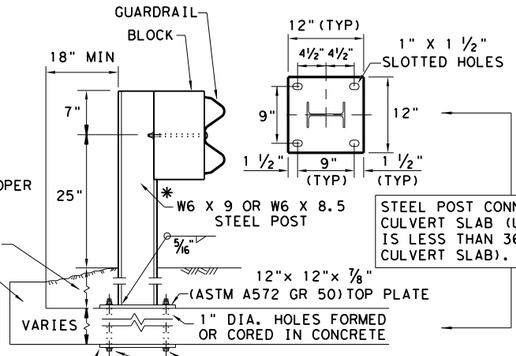
NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



DIRECTION OF TRAFFIC

**MID-SPAN
RAIL SPLICE DETAIL**

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



* POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

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

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

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

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

GENERAL NOTES

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

Texas Department of Transportation

Design Division Standard

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

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		60

DATE: 5/27/2022
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040334 - Design\Plan Set\13. Standards\ROADWAY\SGT(10S)31-16.dgn

NOTE: STEEL I-BEAM POST W6 X 8.5 (6'-0") PN: 533G
STANDARD WOOD BLOCKOUTS (6"X8"X14") PN: 4076B
AT (POSTS 2 THRU 8)

⅝" X 10" HGR BOLT PN: 3500G
⅝" HGR NUT PN: 3340G

LINE AT THE BACK OF POST #2 THRU #8

FROM THE CENTERLINE OF POST(1) & POST(0)

ANCHOR PADDLE PN: 15204A

ANGLE STRUT PN: 15202G

16"

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3)

DO NOT BOLT ANCHOR RAIL TO - POST (2)

SEE DETAIL 1

POST(1)

POST(0)

TRAFFIC FLOW

PLAN VIEW

MASH TEST LEVEL 3 (TL-3) LENGTH OF SoftStop TERMINAL (50'-9 ½")

BEGIN LENGTH OF NEED

50'-9 ½" STANDARD INSTALLATION LENGTH (MASH TL-3 SoftStop)

BEGIN STANDARD MBGF

END PAYMENT FOR SGT

6¼" 3'-1 ½" 6'-3" 6'-3"

ANCHOR RAIL WITH SLOTS - (THREADED THRU HEAD)
SEE SoftStop MANUAL FOR COMPLETE DETAILS

MIDDLE SLOT CUTOUT (1) 1 ¾" X 6'-10 ¼"

OUTSIDE SLOTS CUTOUT (2)1½" X 6'-9 ⅝"

MBGF LAPPED IN DIRECTION OF TRAFFIC FLOW

25'-0" DOWNSTREAM W-BEAM GUARDRAIL PN: 61G

SoftStop ANCHOR RAIL (12GA) PN: 15215G

SoftStop FACE SEE GN(3) & NOTE: B

3'-1 ½"(+/-) 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 6'-3" 5'-8" 4'-7"

ANCHOR PADDLE PN: 15204A

END OF ANCHOR RAIL PN: 15215G

SEE NOTE: C

SEE NOTE: A

POST 32" HEIGHT

31"

RAIL HEIGHT

RAIL 25'-0" PN: 61G

RAIL 25'-0" PN: 15215G

DO NOT BOLT ANCHOR RAIL TO POST(2)

SEE DETAIL 2

13/16" DIA. YIELDING HOLES

SEE DETAIL 3

6'-1⅜"

(8) ⅝"× 1-¼" GR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST 40" DEPTH (TYP 1-8)

(8) ⅝"× 1-¼" HGR BOLTS PN: 3360G
⅝" HEX NUTS PN: 3340G

POST(8) POST(7) POST(6) POST(5) POST(4) POST(3)

POST(2) 6'-0" (SYTP) PN: 15000G

POST(1) 4'-9 ½" SYTP PN: 15203G

POST(0) 6'-5 ⅜" PN: 15205A

ELEVATION VIEW

HARDWARE FOR POST(2) THRU POST(8)
(1) ⅝"× 10" HGR BOLT PN: 3500G
(1) ⅝" HGR HEX NUT PN: 3340G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

(1) ⅝" x 1 ¾" HEX HD BOLT PN 3391G

ANGLE STRUT PN: 15202G

(2) ⅝" WASHERS PN 4372G

(1) ⅝" HGR HEX NUT PN 3340G

DETAIL 1

SHOWN AT POST(1) NEAR GROUND

(1) ⅝" HEX NUT

(1) ⅝" x 1-½" HEX HD BOLT-GR-5 PN: 105286

(2) ⅝" ROUND WASHERS PN: 3240G

DETAIL 2

SHOWN AT POST(1)

ANCHOR KEEPER PLATE (24 GA) PN: 15207G

ANCHOR PLATE WASHER ½" THICK PN: 15206G

1" ROUND WASHER F463 PN: 4902G

(2) ⅝" x 2 ½" HEX HD BOLT GR-5 PN: 105285G

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

(2) ⅝" ROUND WASHER (WIDE) PN: 3240G

1" NUT PN: 3908G SHALL BE SECURELY TIGHTENED AFTER FINAL ASSEMBLY, BUT NOT DEFORMING THE KEEPER PLATE.

ANCHOR PADDLE PN: 15204A

(2) ⅝" HEX NUT A563 GR.DH PN: 3245G

W-BEAM FLATTENED (4 PLIES)

ANGLE STRUT PN: 15202G

SEE NOTE: A

(2) ¾" x 2 ½" HEX BOLT (TYP) PN: 3717G

(4) ¾" FLAT WASHER (TYP) PN: 3701G

(2) ¾" HEX NUT (TYP) PN: 3704G

6'-1 ⅜" POST DEPTH

(2) ANCHOR POST ANGLE PN: 15201G

DETAIL 3
AT POST(0)

6'-5 ⅜" (W6 X 15)
I-BEAM POST PN: 15205A

TRAFFIC FLOW

ALTERNATE BLOCKOUT SEE GENERAL NOTE: 6

4" X 7 ½" X 14" BLOCKOUT COMPOSITE PN: 6777B

6" X 8" X 14" BLOCKOUT WOOD PN: 4076B

NOTE: DO NOT BOLT ANCHOR RAIL TO POST(2)

8" 6" 14"

⅝" HGR NUT PN: 3340G

⅝" X 10" HGR POST BOLT PN: 3500G

13/16" DIAMETER YIELDING HOLES LOCATED IN FLANGES

FINISHED GRADE

(HOLES APROXIMATELY CENTERED AT FINISHED GRADE)

ISOMETRIC VIEW POST(1 & 2)

W6 X 8.5 I-BEAM POST SHOWING STANDARD WOOD BLOCKOUT

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

FINISHED GRADE

LINE POST (3, 4, 5, 6, 7 & 8)

SECTION VIEW B-B

6'-0" (W6 X 8.5)
I-BEAM POST PN: 533G

W-BEAM RAIL 25'-0"

6" X 8" X 14" BLOCKOUT WOOD

⅝" X 10" HGR POST BOLT PN: 3500G

⅝" HGR NUT PN: 3340G

POST HEIGHT 32"

31" RAIL HEIGHT

40"

FINISHED GRADE

POST(2)

SECTION VIEW A-A

6'-0" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15000G

NOTE: DO NOT BOLT ANCHOR RAIL PANEL TO POST(2)

POST 17"- ½" HEIGHT

4'-9 ½"

13/16" DIA. YIELDING HOLES

40"

POST(1)

FRONT VIEW POST(1)

4'-9 ½" (W6 X 8.5)
(SYTP) I-BEAM POST PN: 15203G

NOTE: NO BLOCKOUT INSTALLED AT POST(1)

APPROX 5'-10"

5'-0"

50' APPROACH GRADING

2'-0"

STANDARD MBGF

EDGE OF PAVEMENT

NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

2'-0" MAX. RAIL OFFSET

APPROACH GRADING (1V:10H OR FLATTER) SEE PRODUCT ASSEMBLY MANUAL FOR ADDITIONAL GUIDANCE.

APPROACH GRADING AT GUARDRAIL END TREATMENTS

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: TRINITY HIGHWAY AT 1(888)323-6374. 2525 N. STEMMONS FREEWAY, DALLAS, TX 75207
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; SoftStop END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL. PN: 620237B
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
7. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL AND REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
8. POSTS SHALL NOT BE SET IN CONCRETE.
9. IT IS ACCEPTABLE TO INSTALL THE SoftStop IMPACT HEAD PARALLEL TO THE GRADE LINE OR WITH AN UPWARD TILT.
10. DO NOT ATTACH THE SoftStop SYSTEM DIRECTLY TO A RIGID BARRIER.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE SoftStop SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.

NOTE: A	THE INSTALLATION HEIGHT OF FULLY ASSEMBLED ANCHOR POST WILL VARY FROM 3-¾" MIN. TO 4" MAX. ABOVE FINISHED GRADE.
NOTE: B	PART PN: 5852B RIGHT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING) PART PN: 5851B LEFT-SIDE (HIGH INTENSITY REFLECTIVE SHEETING)
NOTE: C	W-BEAM SPLICE LOCATED BETWEEN LINE POST(4) AND LINE POST(5) GUARDRAIL PANEL 25'-0" PN: 61G ANCHOR RAIL 25'-0" PN: 15215G LAP GUARDRAIL IN DIRECTION OF TRAFFIC FLOW.

PART	QTY	MAIN SYSTEM COMPONENTS
620237B	1	PRODUCT DESCRIPTION ASSEMBLY MANUAL (LATEST REV.)
15208A	1	SoftStop HEAD (SEE MANUAL FOR RIGHT-LEFT APPROACH)
15215G	1	SoftStop ANCHOR RAIL (12GA) WITH CUTOUT SLOTS
61G	1	SoftStop DOWNSTREAM W-BEAM RAIL (12GA) (25'- 0")
15205A	1	POST #0 - ANCHOR POST (6'- 5 ⅞")
15203G	1	POST #1 - (SYTP) (4'- 9 ½")
15000G	1	POST #2 - (SYTP) (6'- 0")
533G	6	POST #3 THRU #8 - I-BEAM (W6 x 8.5) (6'- 0")
4076B	7	BLOCKOUT - WOOD (ROUTED) (6" x 8" x 14")
6777B	7	BLOCKOUT - COMPOSITE (4" x 7 ½" x 14")
15204A	1	ANCHOR PADDLE
15207G	1	ANCHOR KEEPER PLATE (24 GA)
15206G	1	ANCHOR PLATE WASHER (½" THICK)
15201G	2	ANCHOR POST ANGLE (10" LONG)
15202G	1	ANGLE STRUT
		HARDWARE
4902G	1	1" ROUND WASHER F436
3908G	1	1" HEAVY HEX NUT A563 GR.DH
3717G	2	¾" x 2 ½" HEX BOLT A325
3701G	4	¾" ROUND WASHER F436
3704G	2	¾" HEAVY HEX NUT A563 GR.DH
3360G	16	⅝" x 1 ¼" W-BEAM RAIL SPLICE BOLTS HGR
3340G	25	⅝" W-BEAM RAIL SPLICE NUTS HGR
3500G	7	⅝" x 10" HGR POST BOLT A307
3391G	1	⅝" x 1 ¾" HEX HD BOLT A325
4489G	1	⅝" x 9" HEX HD BOLT A325
4372G	4	⅝" WASHER F436
105285G	2	⅝" x 2 ½" HEX HD BOLT GR-5
105286G	1	⅝" x 1 ½" HEX HD BOLT GR-5
3240G	6	⅝" ROUND WASHER (WIDE)
3245G	3	⅝" HEX NUT A563 GR.DH
5852B	1	HIGH INTENSITY REFLECTIVE SHEETING - SEE NOTE: B

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

Texas Department of Transportation

Design Division Standard

TRINITY HIGHWAY
SOFTSTOP END TERMINAL
MASH - TL-3
SGT(10S)31-16

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©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
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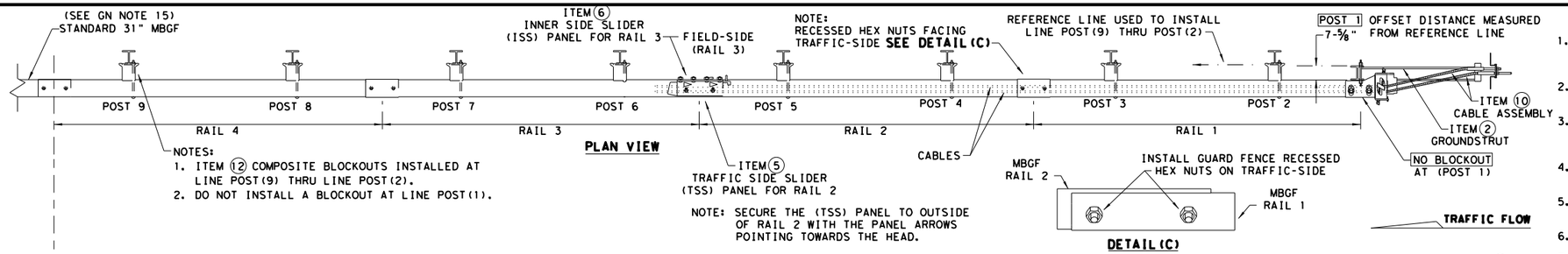

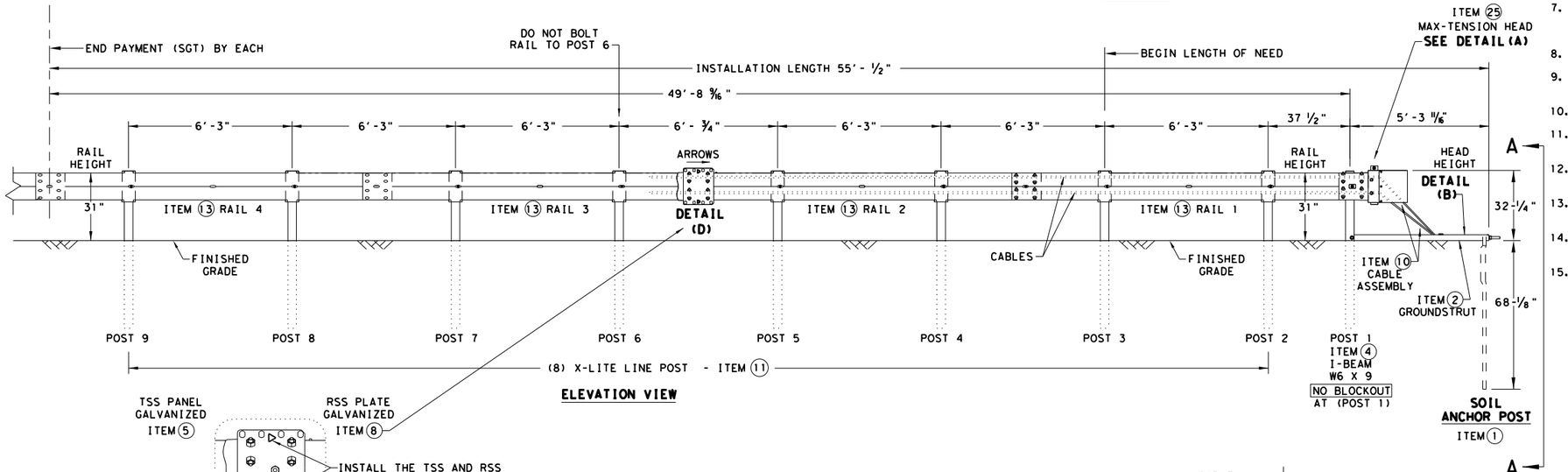

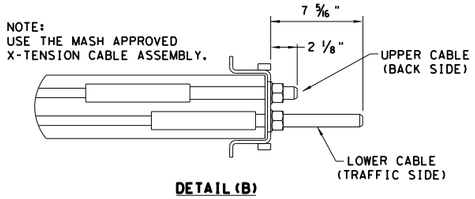

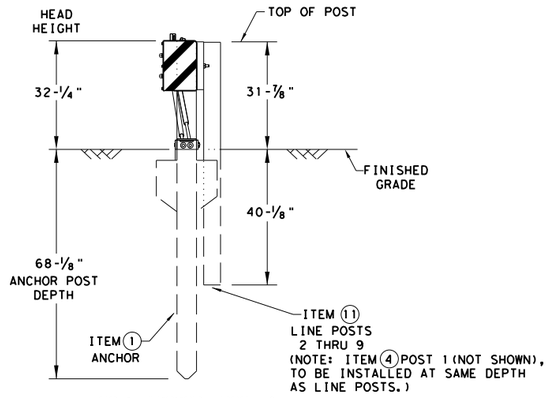

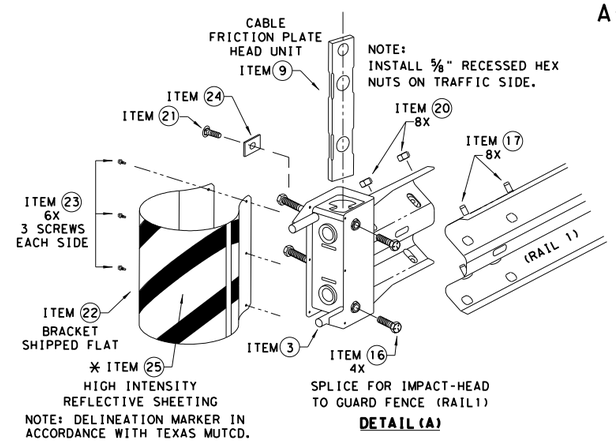

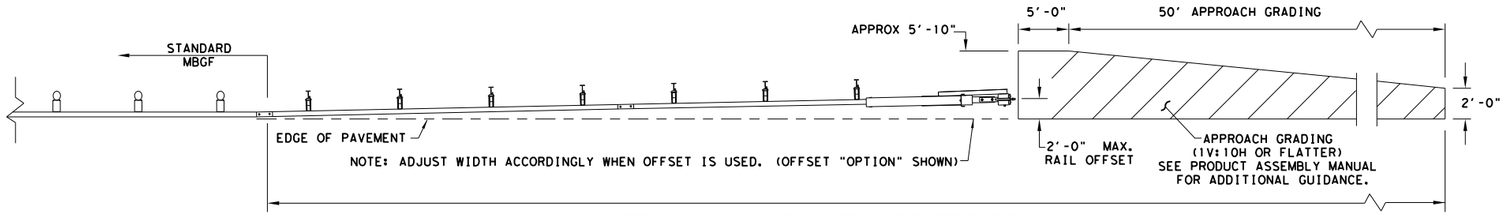

GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: LINDSAY TRANSPORTATION SOLUTIONS (LTS) - BARRIER SYSTEMS, INC. AT (707) 374-6800
2. FOR INSTALLATION, REPAIR, & MAINTENANCE REFER TO THE; MAX-TENSION INSTALLATION INSTRUCTION MANUAL. P/N MANMAX REV D (ECN 3516).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURE'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. ALL STEEL COMPONENTS ARE GALVANIZED PER ASTM A123 OR EQUIVALENT UNLESS OTHERWISE STATED.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POST WITH COMPOSITE BLOCKOUTS.
7. COMPOSITE MATERIAL BLOCKOUT THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST(MPL)FOR CERTIFIED PRODUCERS.
8. REFER TO INSTALLATION MANUAL FOR SPECIFIC PANEL LAPPING GUIDANCE.
9. IF SOLID ROCK IS ENCOUNTERED SEE THE MANUFACTURER'S INSTALLATION MANUAL FOR INSTALLATION GUIDANCE.
10. POSTS SHALL NOT BE SET IN CONCRETE.
11. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POST TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST.
12. MAX-TENSION SYSTEM SHALL NEVER BE INSTALLED WITHIN A CURVED SECTION OF GUARDRAIL.
13. IF A DELINEATION MARKER IS REQUIRED, MARKER SHALL BE IN ACCORDANCE WITH TEXAS MUTCD.
14. THE SYSTEM IS SHOWN WITH 12'-6" MBGF PANELS, 25'-0" MBGF PANELS ARE ALSO ALLOWED.
15. A MINIMUM OF 12'-6" OF 12GA. MBGF IS REQUIRED IMMEDIATELY DOWNSTREAM OF THE MAX-TENSION SYSTEM.

ITEM #	PART NUMBER	DESCRIPTION	QTY
1	BSI-1610060-00	SOIL ANCHOR - GALVANIZED	1
2	BSI-1610061-00	GROUND STRUT - GALVANIZED	1
3	BSI-1610062-00	MAX-TENSION IMPACT HEAD	1
4	BSI-1610063-00	W6x9 I-BEAM POST 6FT.-GALVANIZED	1
5	BSI-1610064-00	TSS PANEL - TRAFFIC SIDE SLIDER	1
6	BSI-1610065-00	ISS PANEL - INNER SIDE SLIDER	1
7	BSI-1610066-00	TOOTH - GEOMET	1
8	BSI-1610067-00	RSS PLATE - REAR SIDE SLIDER	1
9	B061058	CABLE FRICTION PLATE - HEAD UNIT	1
10	BSI-1610069-00	CABLE ASSEMBLY - MASH X-TENSION	2
11	BSI-1012078-00	X-LITE LINE POST-GALVANIZED	8
12	B090534	8" W-BEAM COMPOSITE-BLOCKOUT XT110	8
13	BSI-4004386	12'-6" W-BEAM GUARD FENCE PANELS 12GA.	4
14	BSI-1102027-00	X-LITE SQUARE WASHER	1
15	BSI-2001886	5/8" X 7" THREAD BOLT HH (GR.5)GEOMET	1
16	BSI-2001885	3/4" X 3" ALL-THREAD BOLT HH (GR.5)GEOMET	4
17	4001115	5/8" X 1 1/4" GUARD FENCE BOLTS (GR.2)MGAL	48
18	2001840	5/8" X 10" GUARD FENCE BOLTS MGAL	8
19	2001636	5/8" WASHER F436 STRUCTURAL MGAL	2
20	4001116	5/8" RECESSED GUARD FENCE NUT (GR.2)MGAL	59
21	BSI-2001888	5/8" X 2" ALL THREAD BOLT (GR.5)GEOMET	1
22	BSI-1701063-00	DELINEATION MOUNTING (BRACKET)	1
23	BSI-2001887	1/4" X 3/4" SCREW SD HH 410SS	7
24	4002051	GUARDRAIL WASHER RECT AASHTO FWR03	1
* 25	SEE NOTE BELOW	HIGH INTENSITY REFLECTIVE SHEETING	1
** 26	4002337	8" W-BEAM TIMBER-BLOCKOUT, PDB01B	8
** 27	BSI-4004431	25' W-BEAM GUARDRAIL PANEL,8-SPACE,12GA.	2
28	MANMAX Rev-(D)	MAX-TENSION INSTALLATION INSTRUCTIONS	1

* TO BE PROVIDED BY DISTRIBUTOR OR CONTRACTOR.

** ALTERNATIVE ITEMS NOT SHOWN.
ITEM(26) 8" WOOD-BLOCKOUTS
ITEM(27) 25'GUARD FENCE PANELS

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

Texas Department of Transportation

Design Division Standard

MAX-TENSION END TERMINAL MASH - TL-3

SGT(11S)31-18

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© TxDOT: FEBRUARY 2018	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		62

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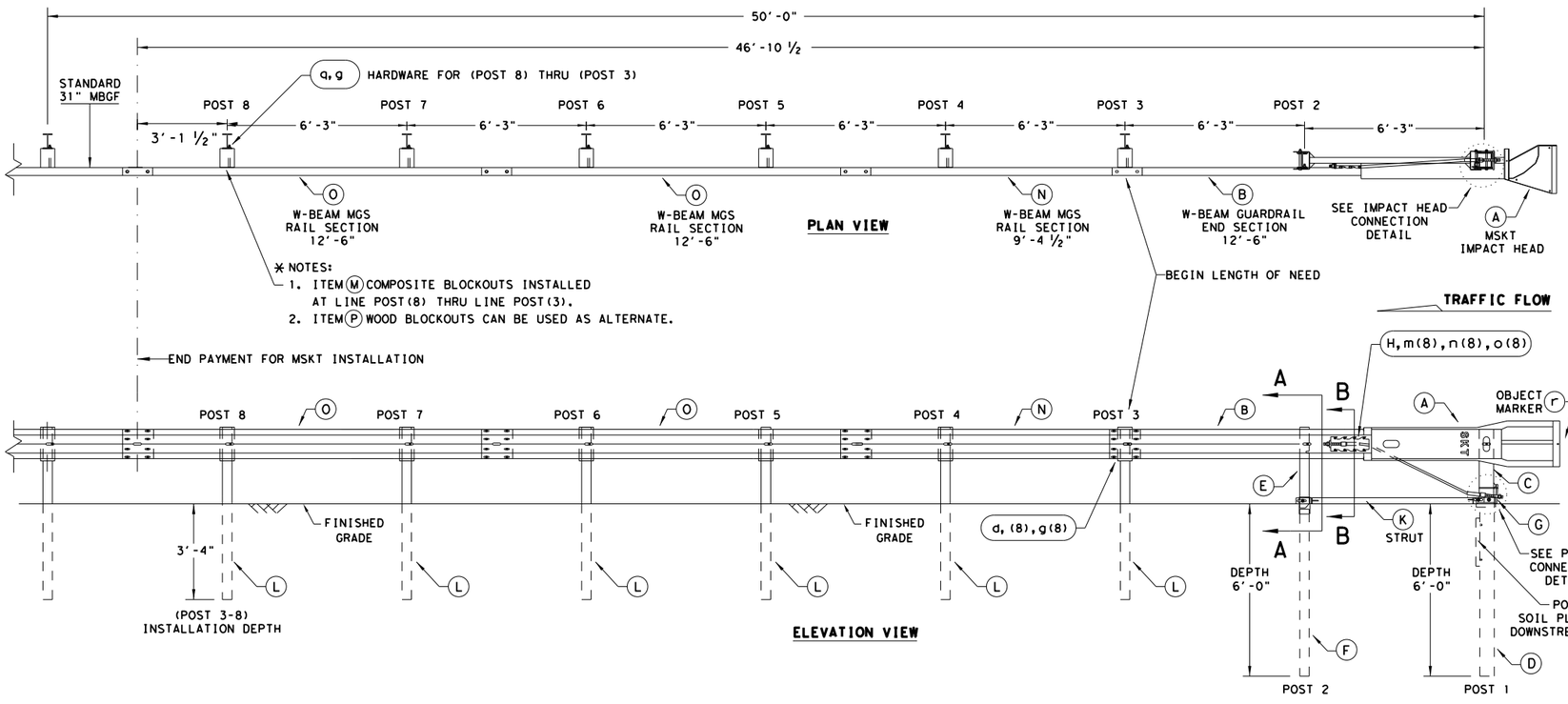
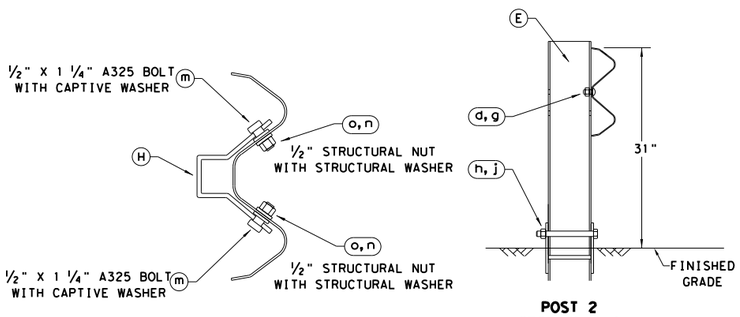
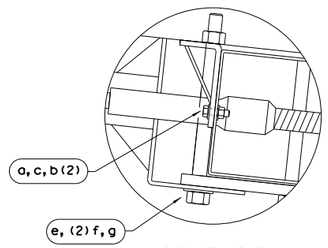
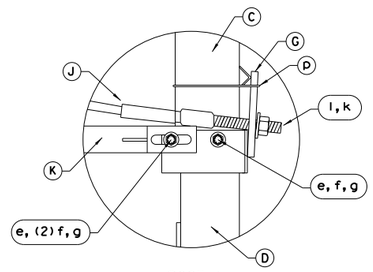
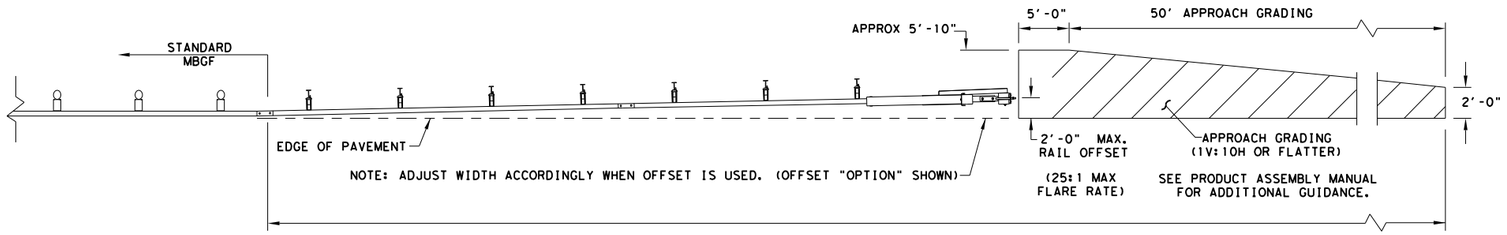


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.









NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

APPROACH GRADING AT GUARDRAIL END TREATMENTS

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

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

GENERAL NOTES

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

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

SEE NOTES: *

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

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

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	ELP	HUDSPETH		63	

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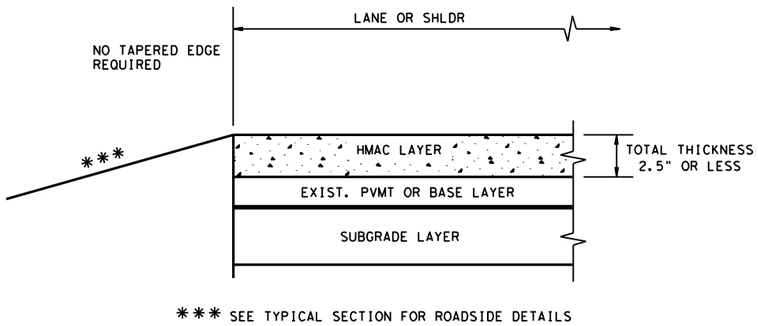
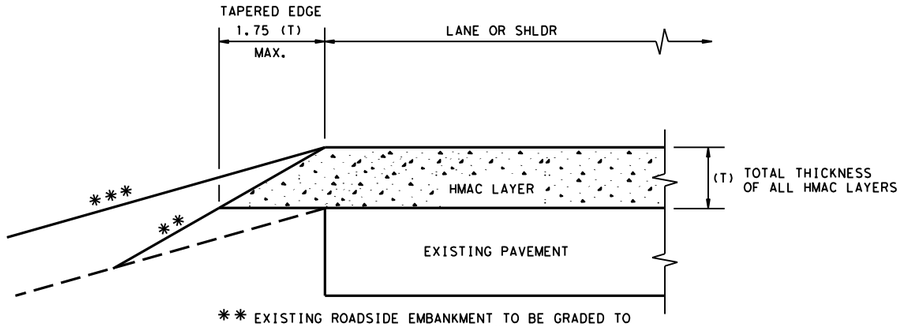


*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

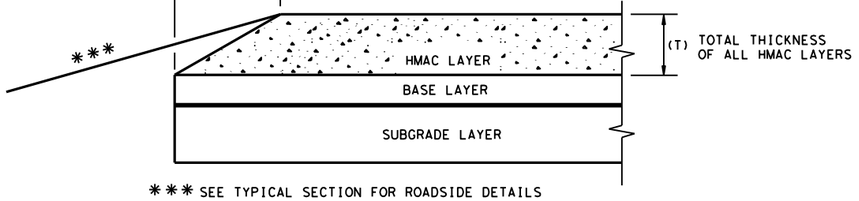
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

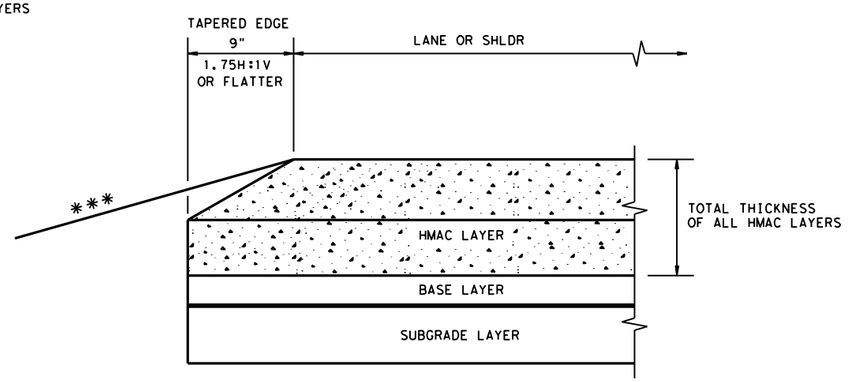
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT HMAC THICKNESS 5" OR GREATER

(NOT TO SCALE)

GENERAL NOTES

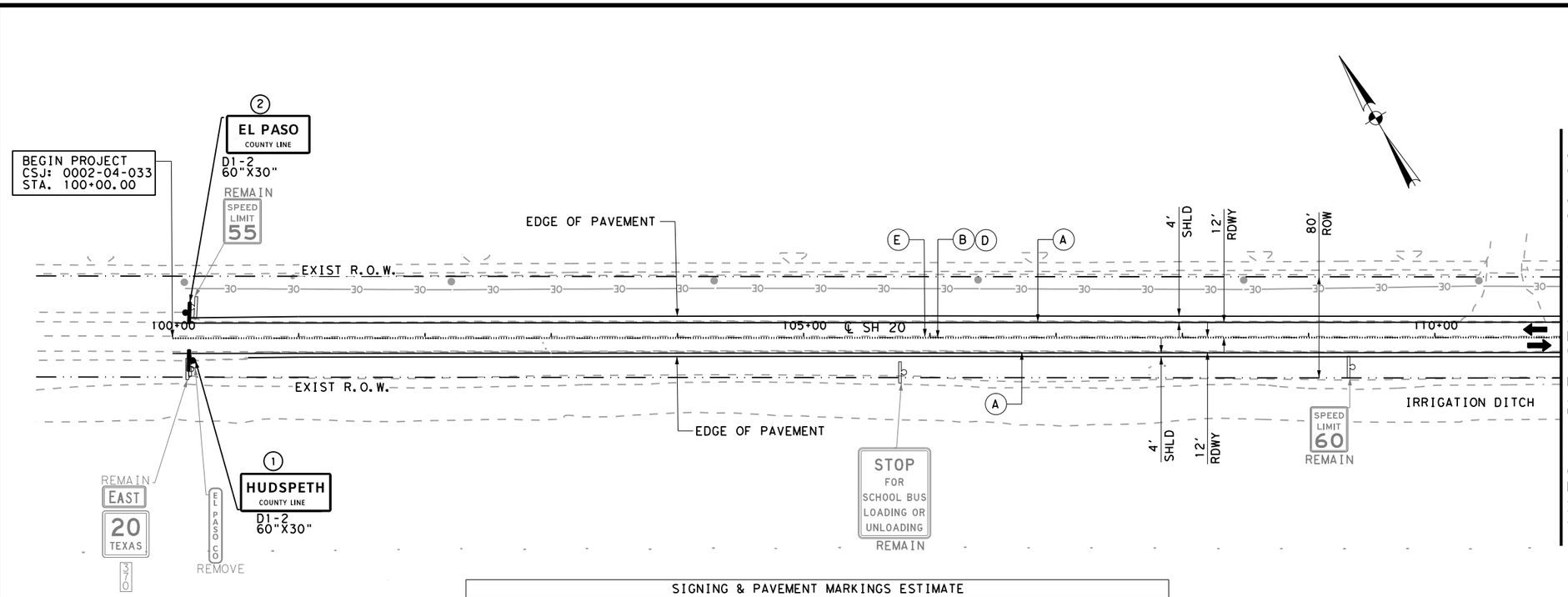
1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

Texas Department of Transportation | Design Division Standard

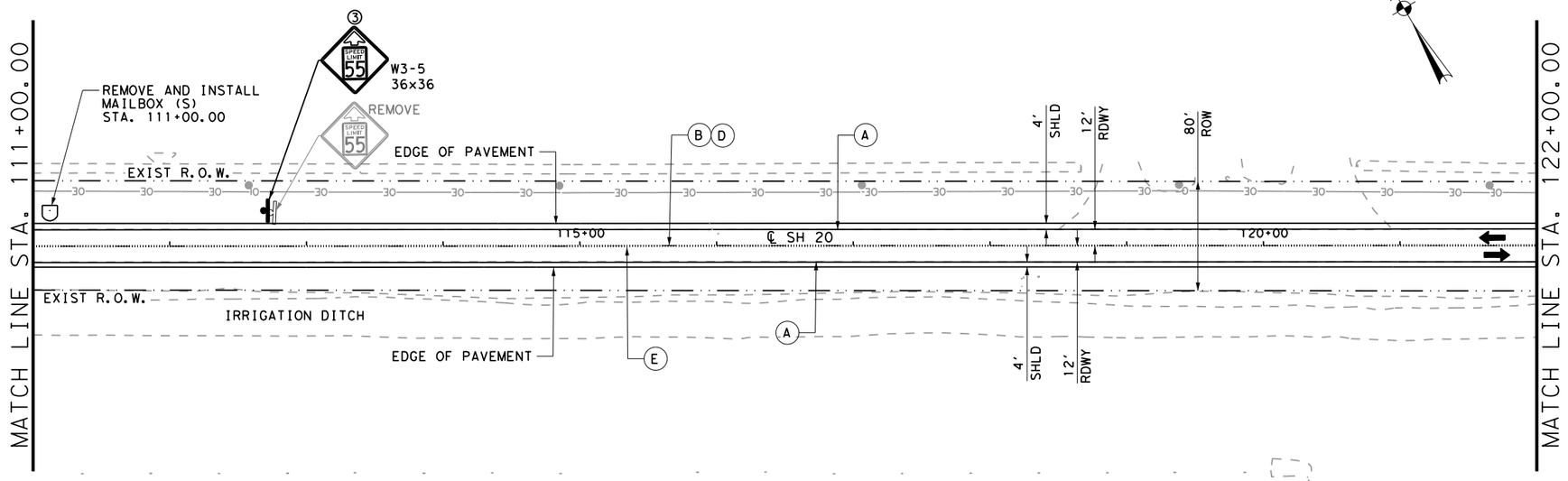
TAPERED EDGE DETAILS
HMAC PAVEMENT

TE(HMAC)-11

FILE: tehmac11.dgn		DN: TxDOT		CK: RL	DW: KB		CK:
©TxDOT January 2011		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0002	04	033		SH 20	
		DIST		COUNTY			SHEET NO.
		ELP		HUDSPETH			64



SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
560	6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
644	6076	REMOVE SM RD SN SUP&AM	EA	2
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4402
672	6009	REFL PAV MRKR TY II-A-A	EA	28



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SCALE IN FEET

NOTES:

1. MATCH TO EXISTING STRIPING ON BOTH ENDS OF THE PROJECT. REFER TO PM STANDARDS FOR FURTHER DETAILS.
2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20 TRAFFIC

SIGNING & PAVEMENT MARKINGS

BEGIN STA. 100+00 TO STA. 122+00.00

SHEET 1 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST.	COUNTY		SHEET NO.
ELP	HUDSPETH		65

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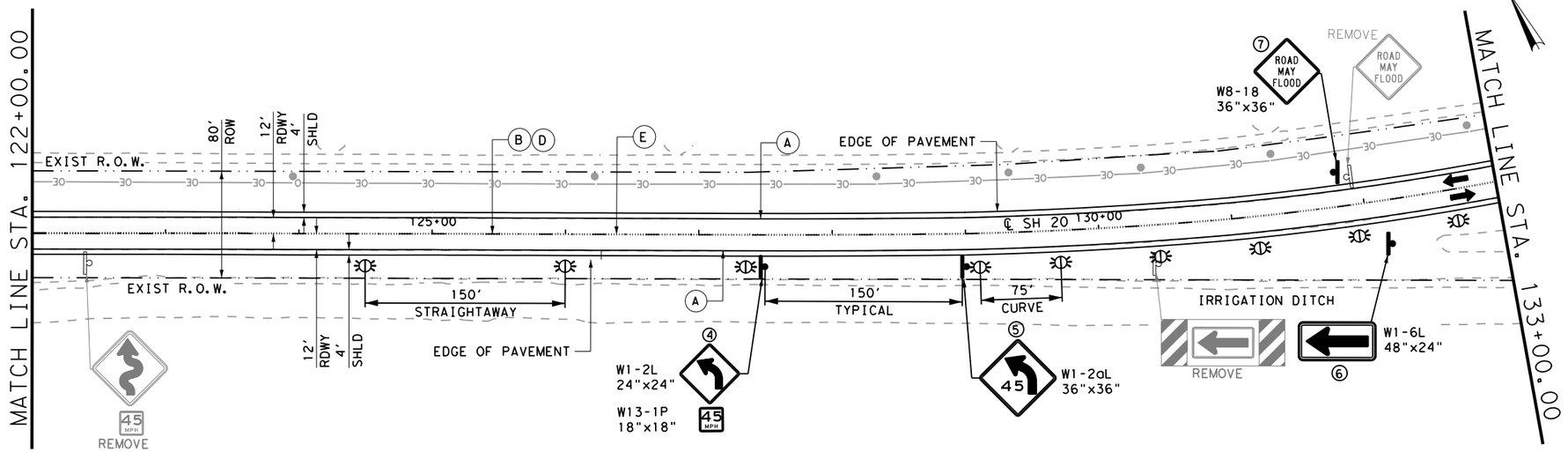
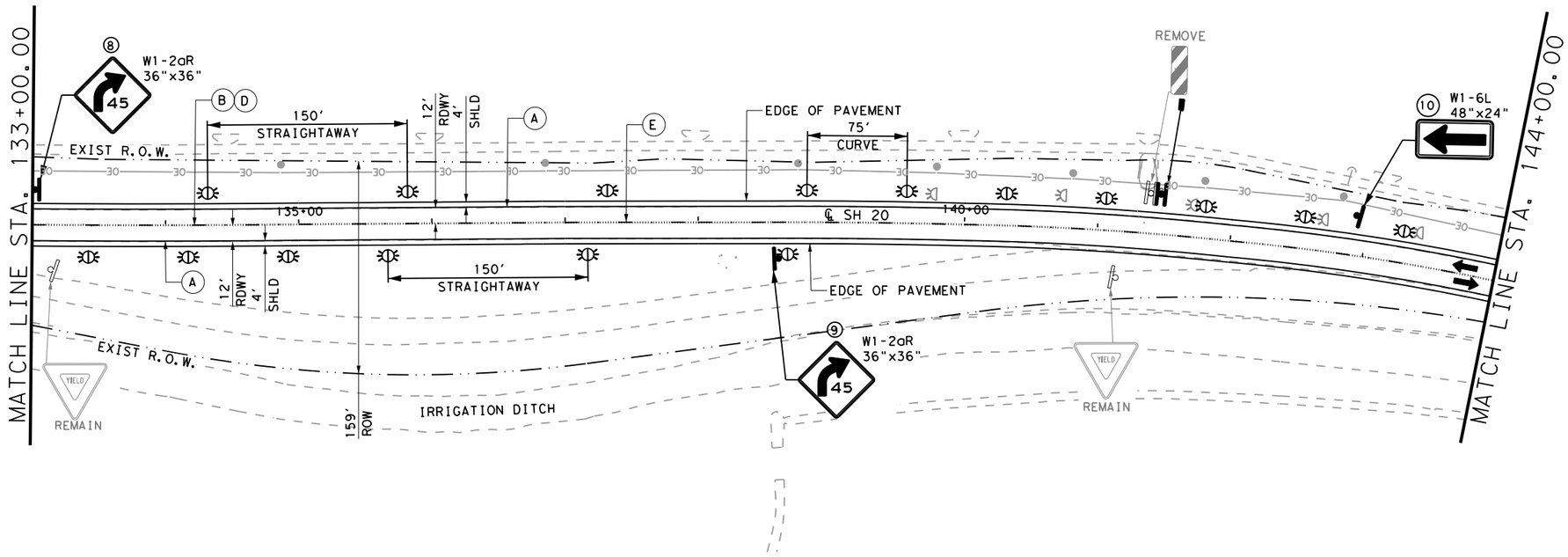


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	5
644	6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2
644	6076	REMOVE SM RD SN SUP&AM	EA	3
658	6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	1
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	6
658	6081	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND(BI)	EA	25
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4402
672	6009	REFL PAV MRKR TY II-A-A	EA	28



0 50 100
SCALE IN FEET

NOTES:

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2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
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LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20 TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 122+00.00 TO STA. 144+00.00

SHEET 2 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		66

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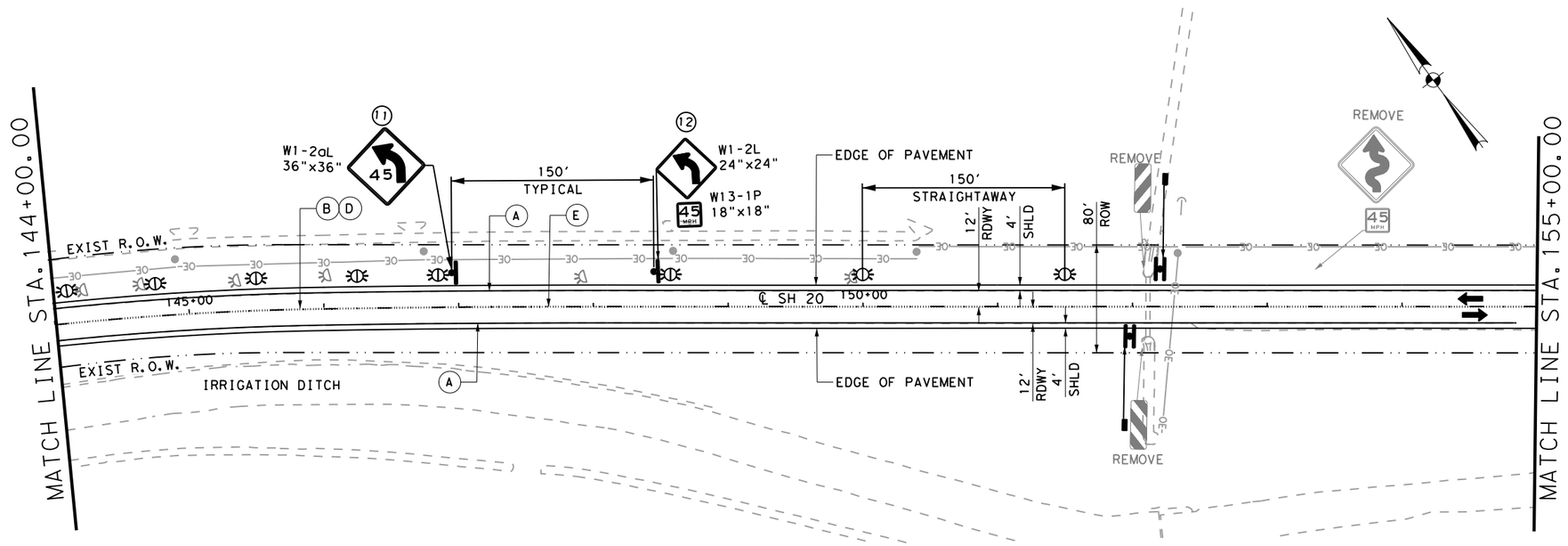
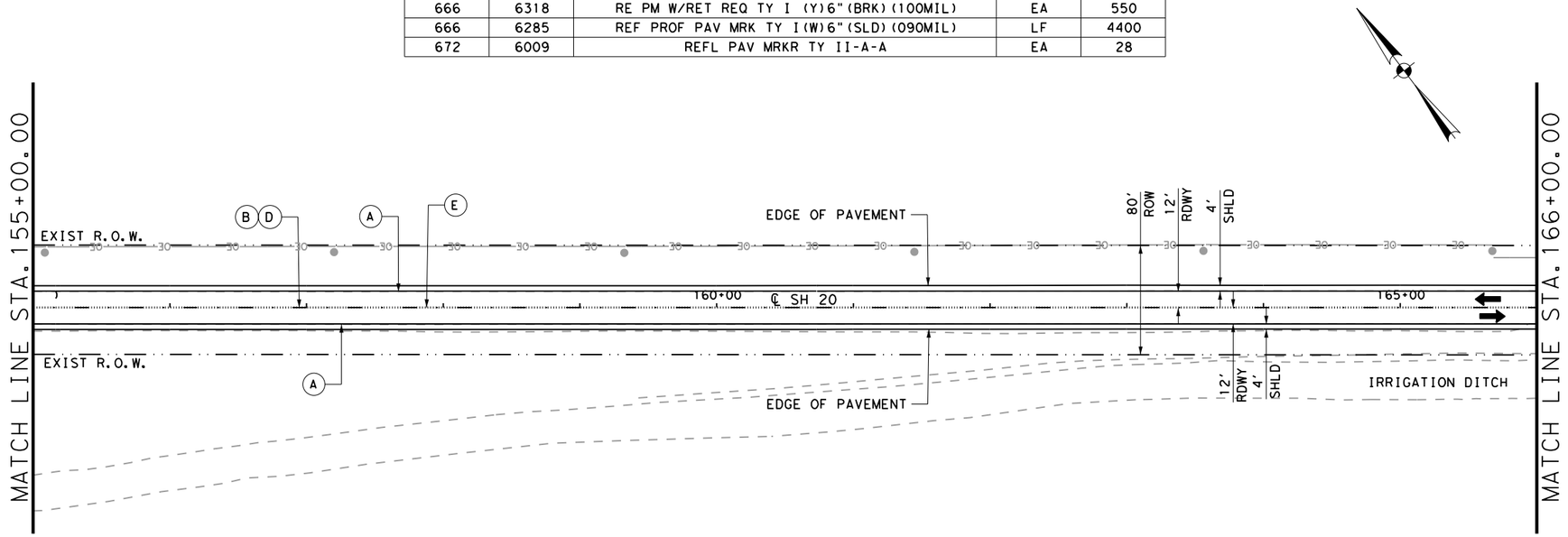


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	2
644	6076	REMOVE SM RD SN SUP&AM	EA	1
658	6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	2
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	8
658	6081	INSTL DEL ASSM (D-SW)SZ 1(WFLX)GND(BI)	EA	8
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	EA	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



0 50 100
SCALE IN FEET

NOTES:

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LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 144+00.00 TO STA. 166+00.00

SHEET 3 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		67

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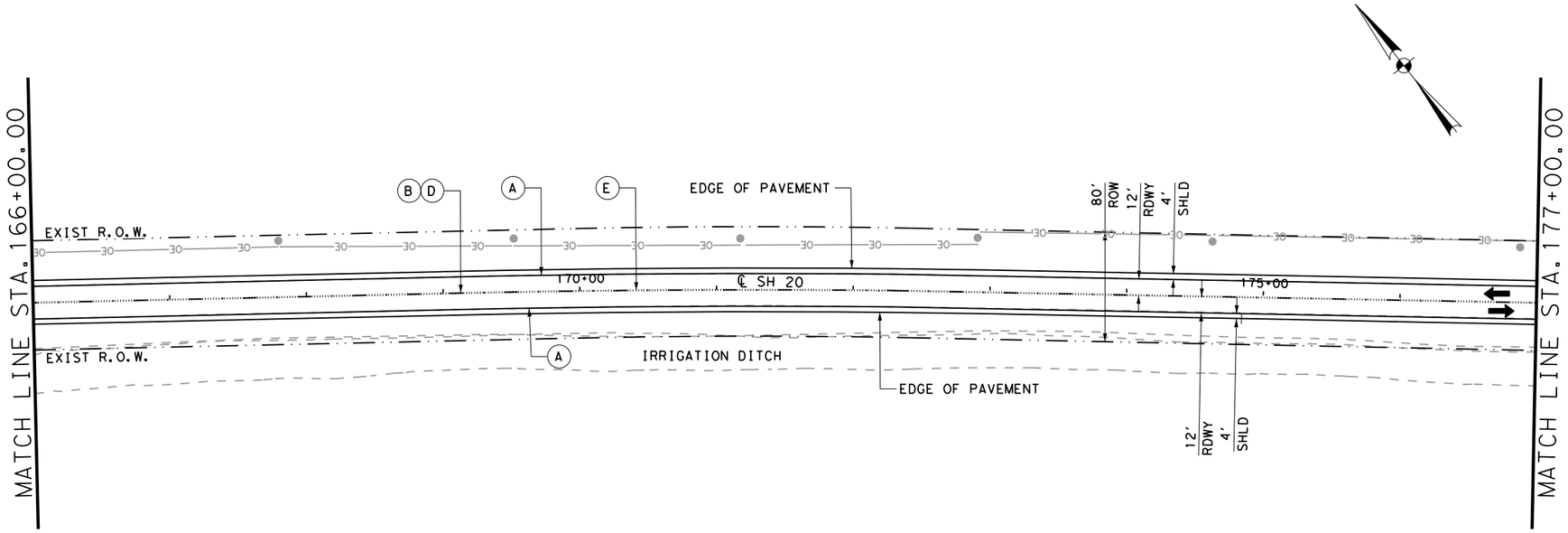
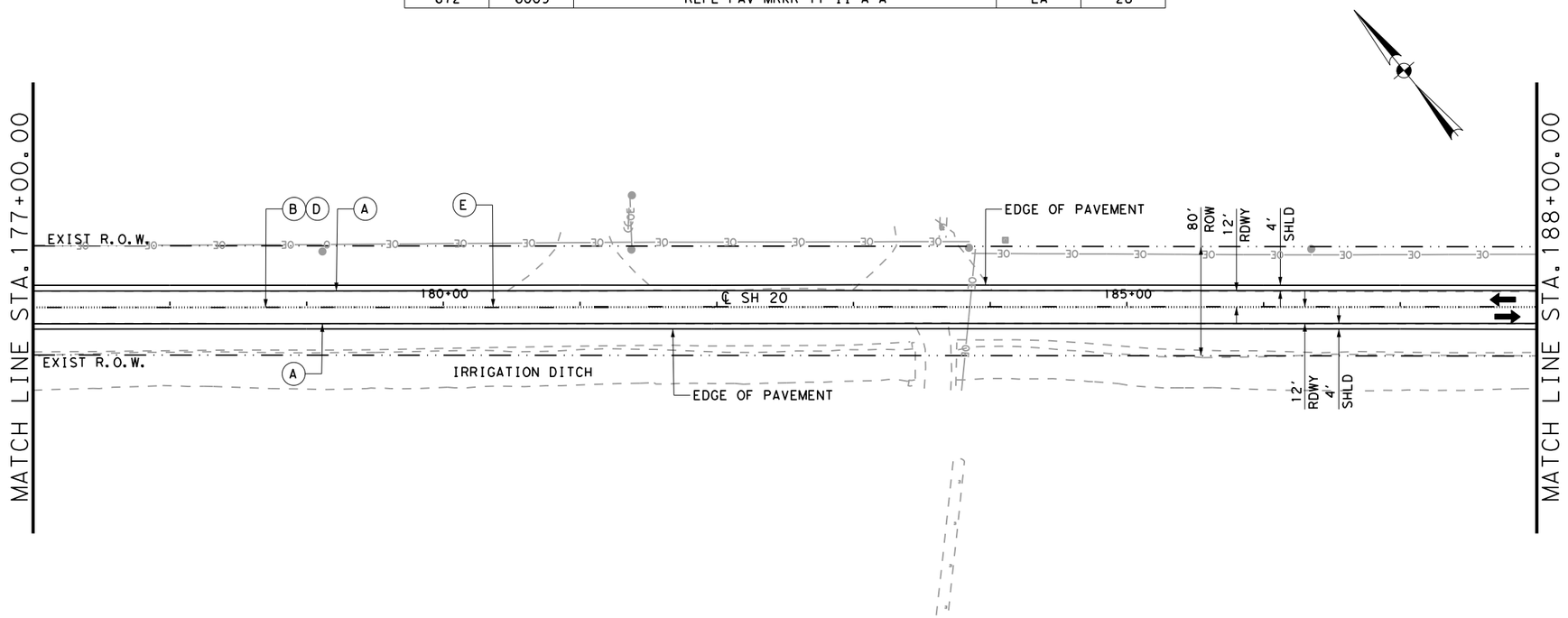


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	EA	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



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SCALE IN FEET

NOTES:

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LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
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05/27/2022

SH 20 TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 166+00.00 TO STA. 188+00.00

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		68

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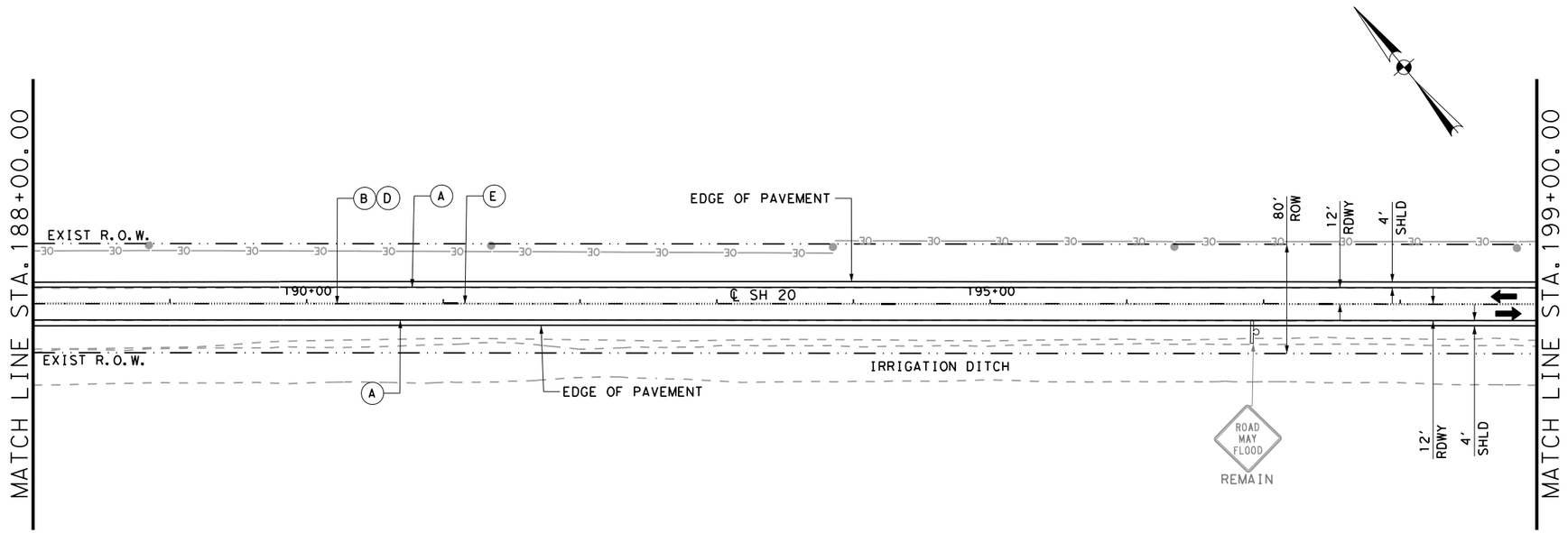
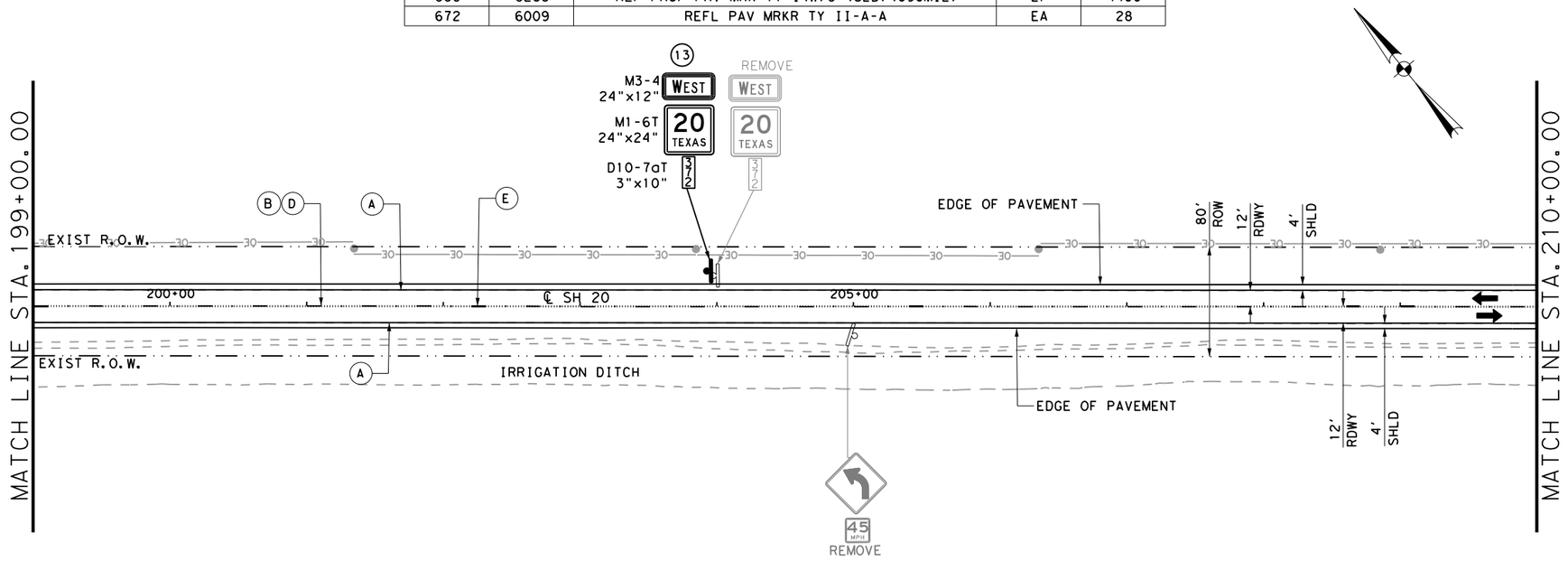


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6076	REMOVE SM RD SN SUP&AM	EA	2
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	EA	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



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SCALE IN FEET

NOTES:

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3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
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PROFESSIONAL ENGINEER

05/27/2022

SH 20 TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 188+00.00 TO STA. 210+00.00

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		69

DATE: 5/27/2022 2:10:56 PM
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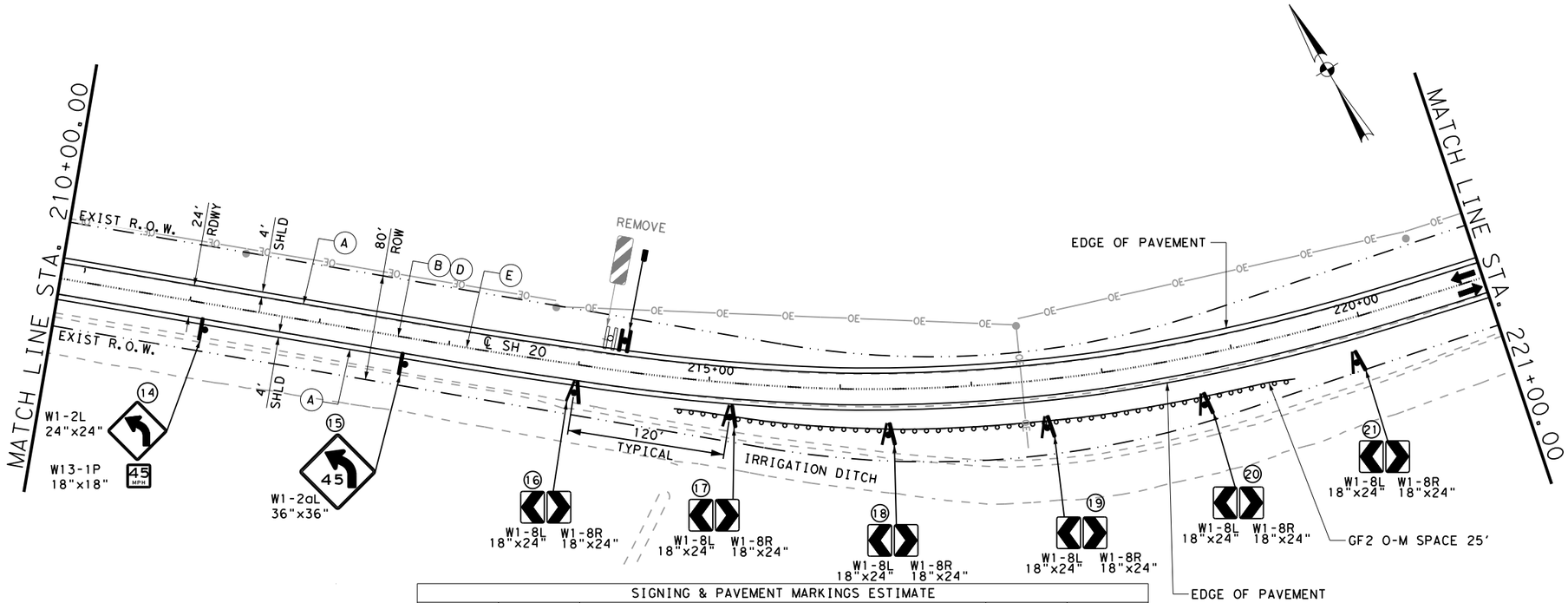
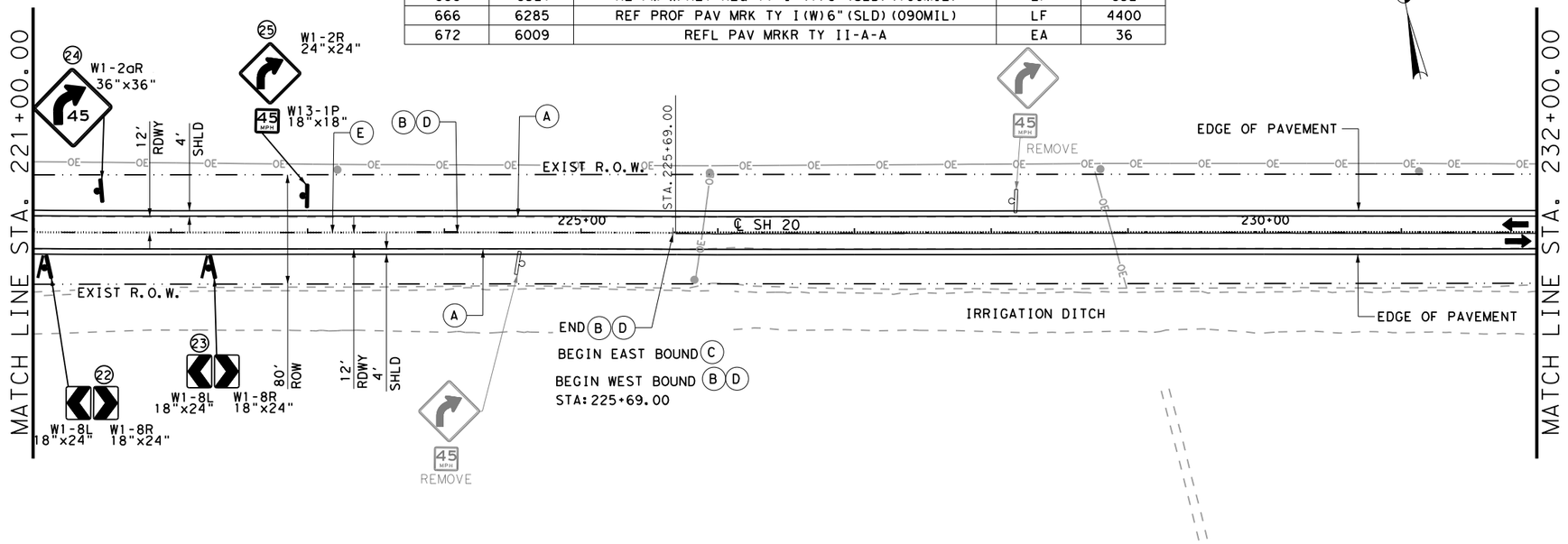


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	12
644	6076	REMOVE SM RD SN SUP&AM	EA	1
658	6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	1
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	1
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	632
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	36



0 50 100
SCALE IN FEET

NOTES:

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2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
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LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20 TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 210+00.00 TO STA. 232+00.00

SHEET 6 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		70

DATE: 5/27/2022 2:11:09 PM
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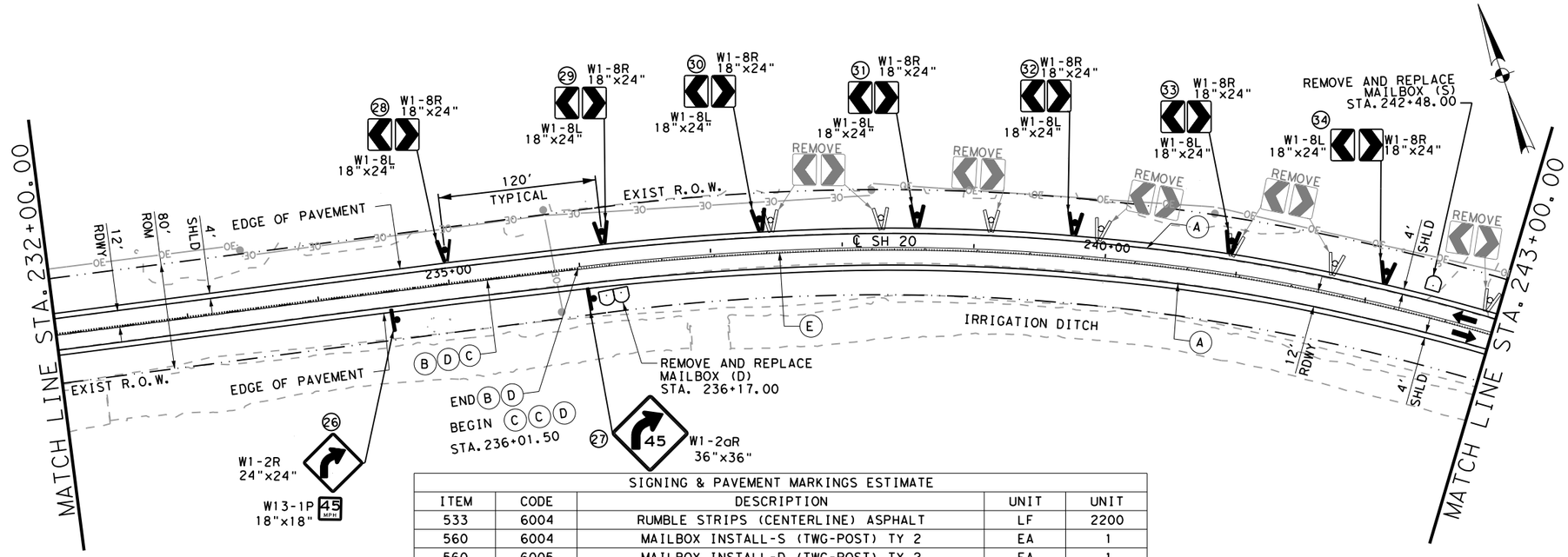
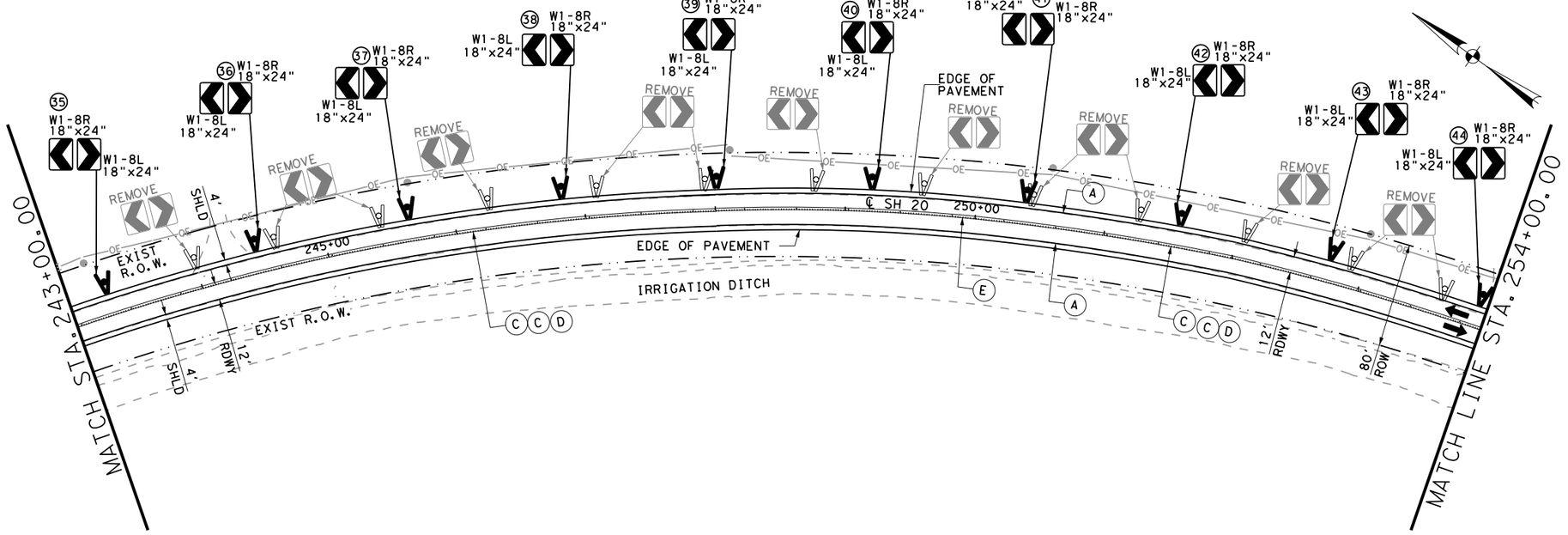


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
560	6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1
560	6005	MAILBOX INSTALL-D (TWG-POST) TY 2	EA	1
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	19
644	6076	REMOVE SM RD SN SUP&AM	EA	20
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	100
666	6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	4002
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4402
672	6009	REFL PAV MRKR TY II-A-A	EA	55



0 50 100
SCALE IN FEET

NOTES:

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2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
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LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 232+00.00 TO STA. 254+00.00

SHEET 7 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		71

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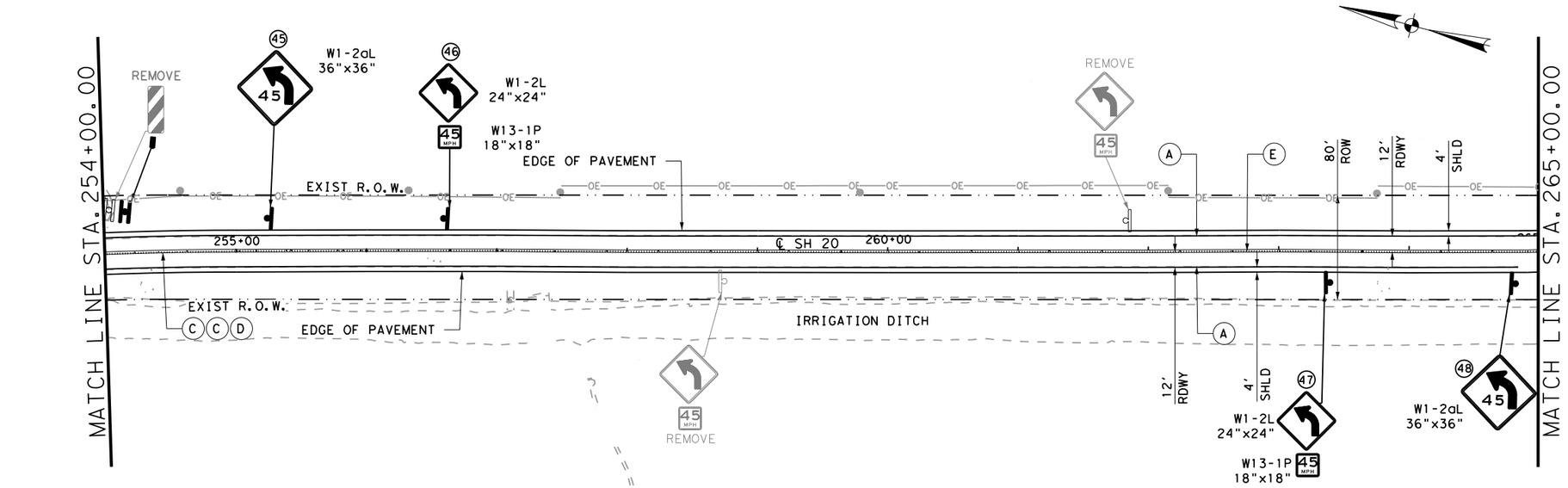
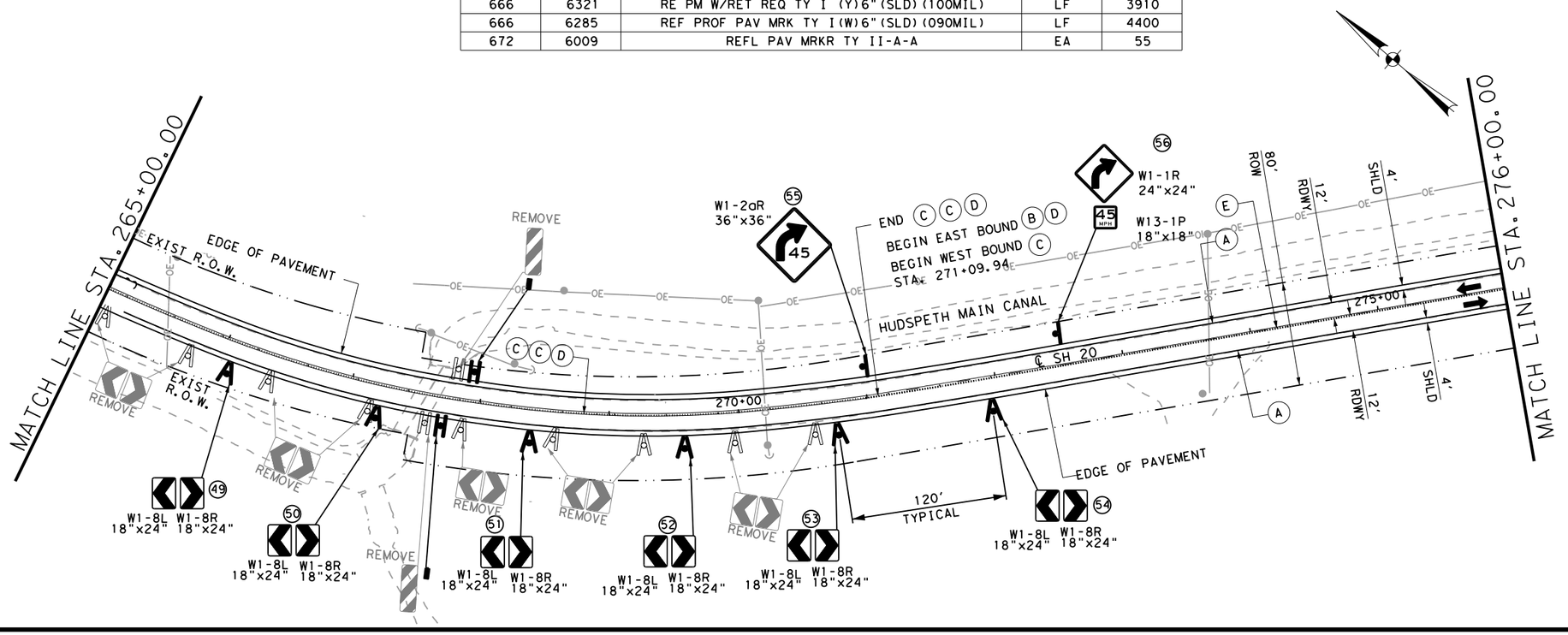


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	12
644	6076	REMOVE SM RD SN SUP&AM	EA	11
658	6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	3
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	3
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	125
666	6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	3910
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	55



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SCALE IN FEET

NOTES:

1. MATCH TO EXISTING STRIPING ON BOTH ENDS OF THE PROJECT. REFER TO PM STANDARDS FOR FURTHER DETAILS.
2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 254+00.00 TO STA. 265+00.00

SHEET 8 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		72

DATE: 5/27/2022 2:11:36 PM
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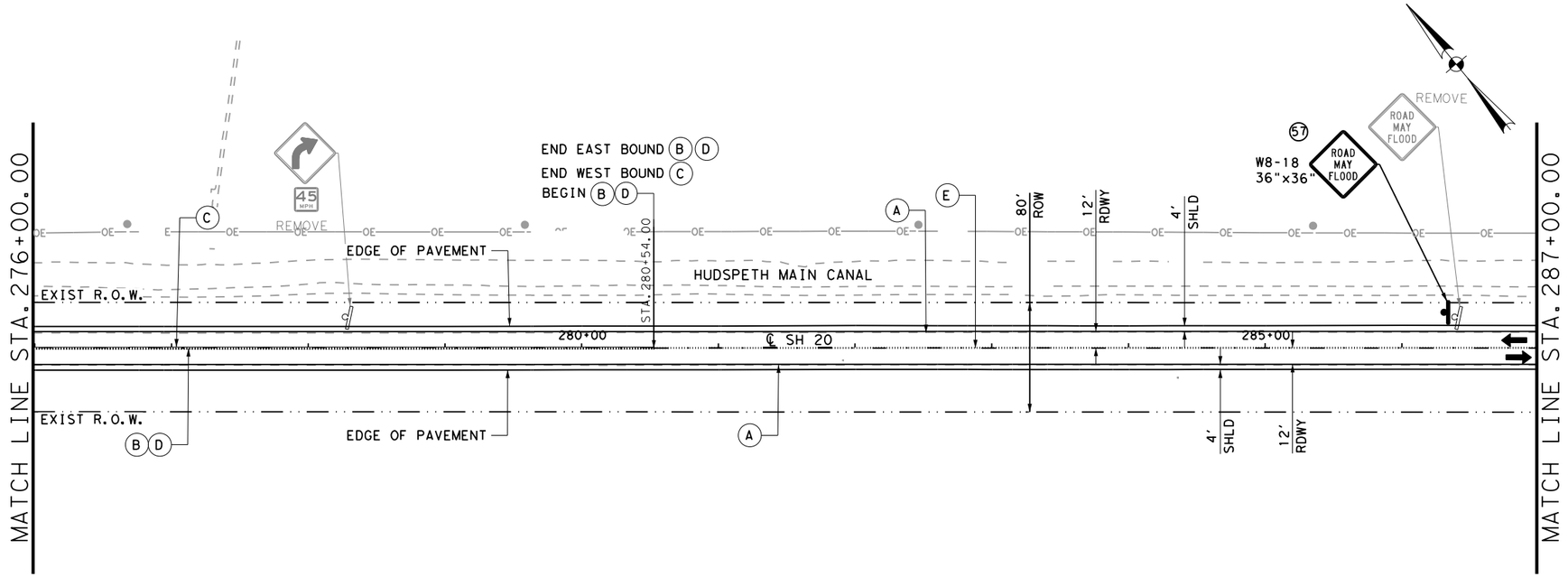
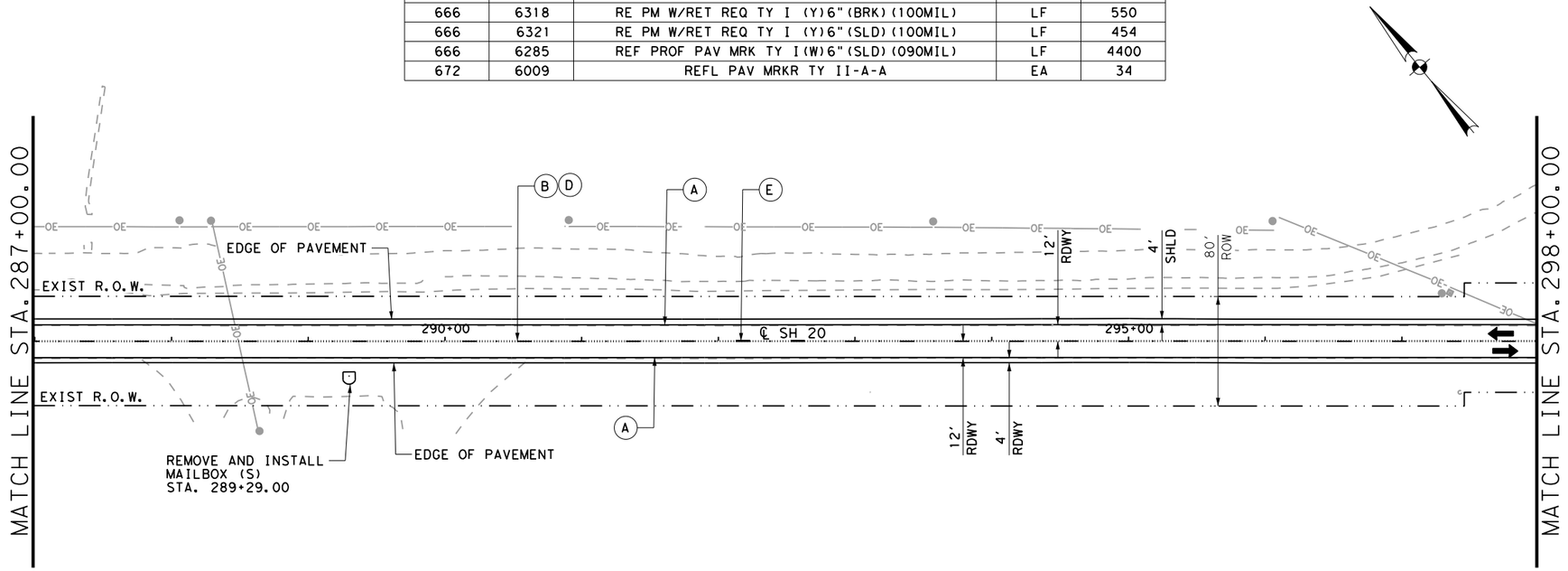


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
560	6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6076	REMOVE SM RD SN SUP&AM	EA	2
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	454
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	34



0 50 100
SCALE IN FEET

NOTES:

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4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
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LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20 TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 276+00.00 TO STA. 298+00.00

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		73

DATE: 5/27/2022 2:11:50 PM
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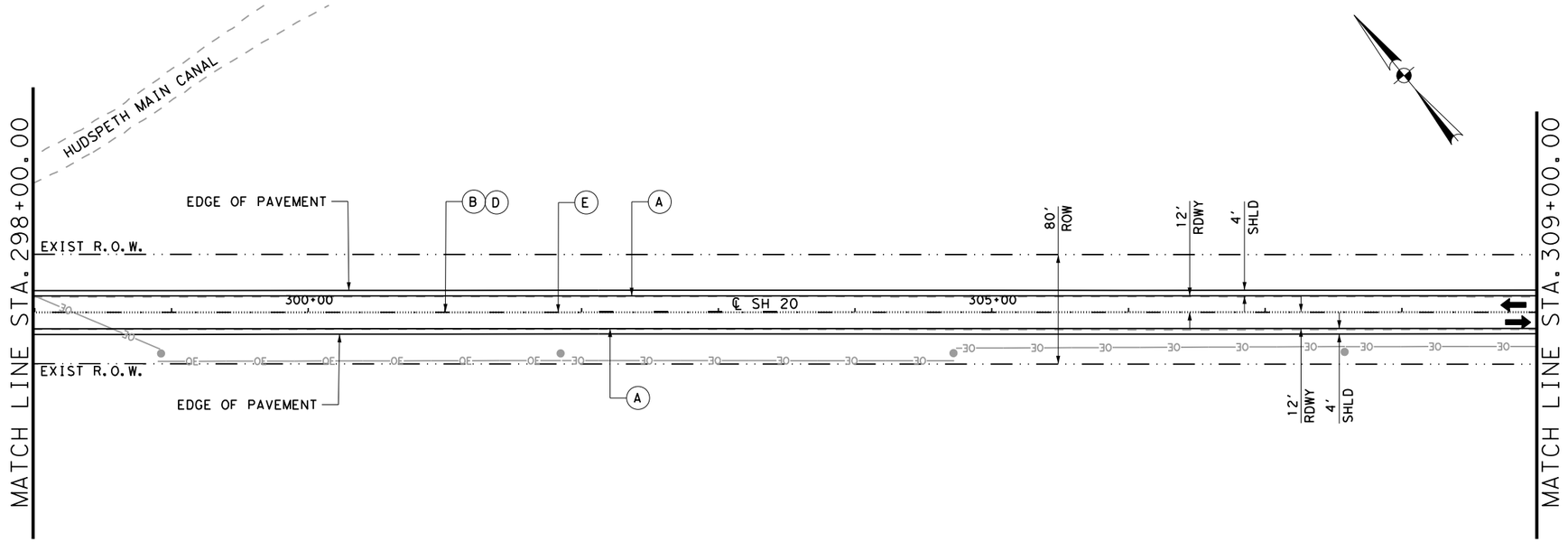
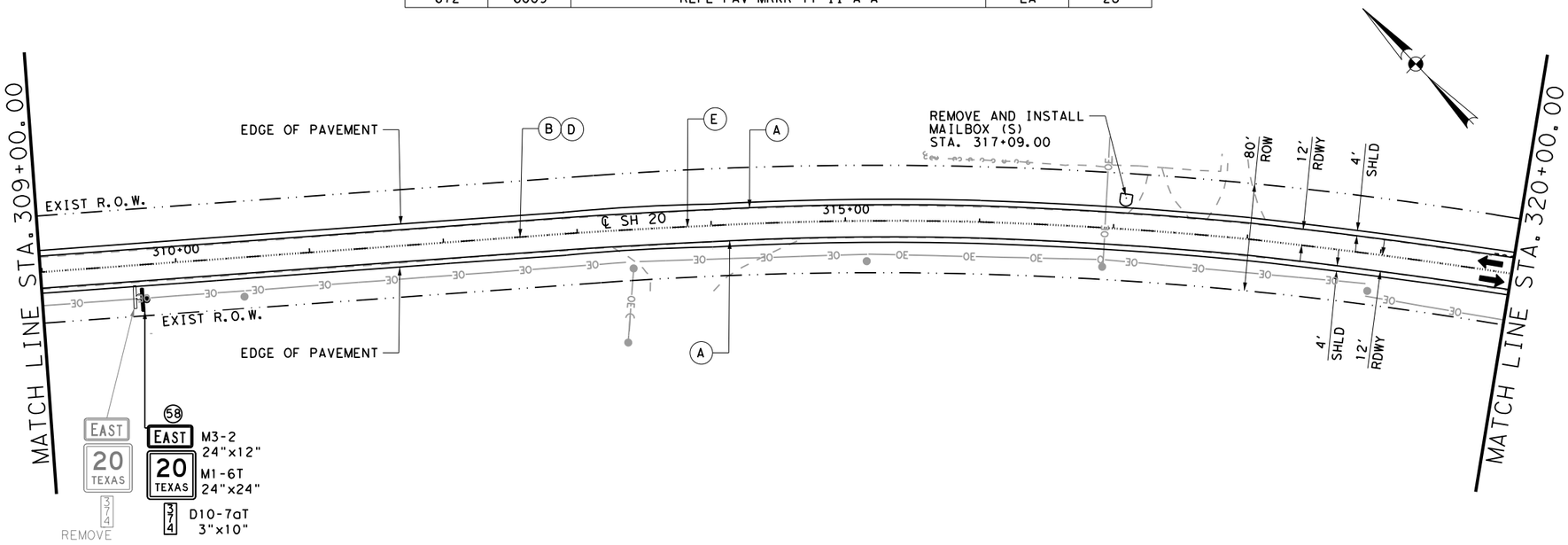


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
560	6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1
644	6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	1
644	6076	REMOVE SM RD SN SUP&AM	EA	1
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



0 50 100
SCALE IN FEET

NOTES:

1. MATCH TO EXISTING STRIPING ON BOTH ENDS OF THE PROJECT. REFER TO PM STANDARDS FOR FURTHER DETAILS.
2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 298+00.00 TO STA. 320+00.00

SHEET 10 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		74

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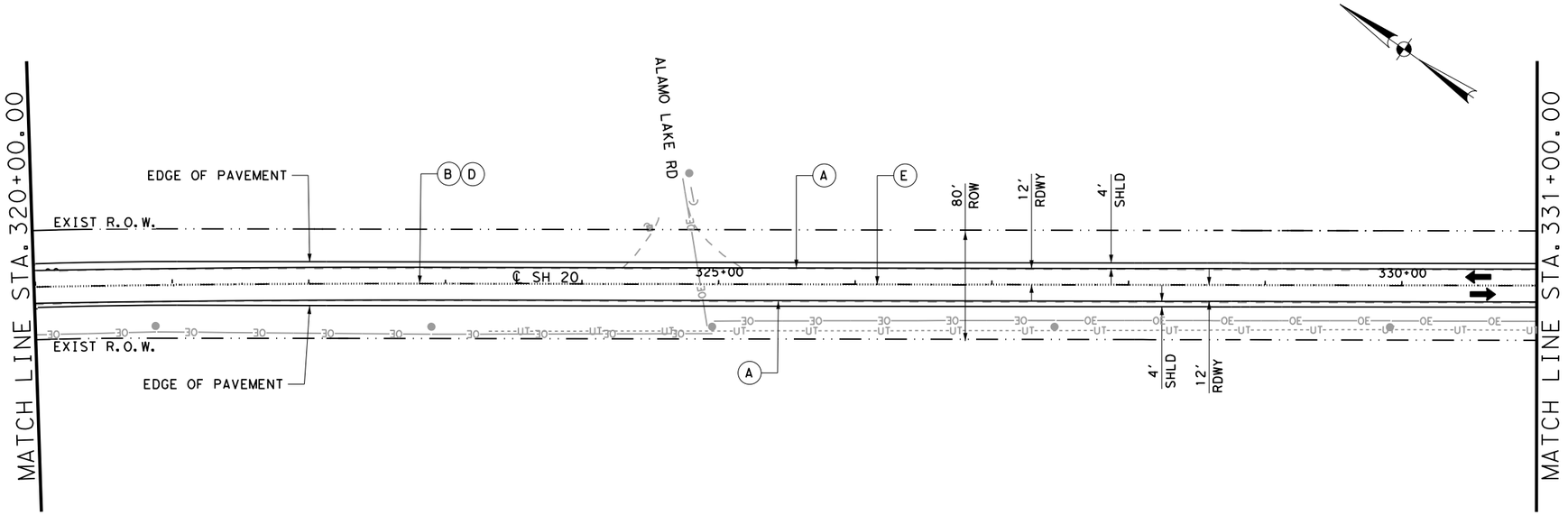
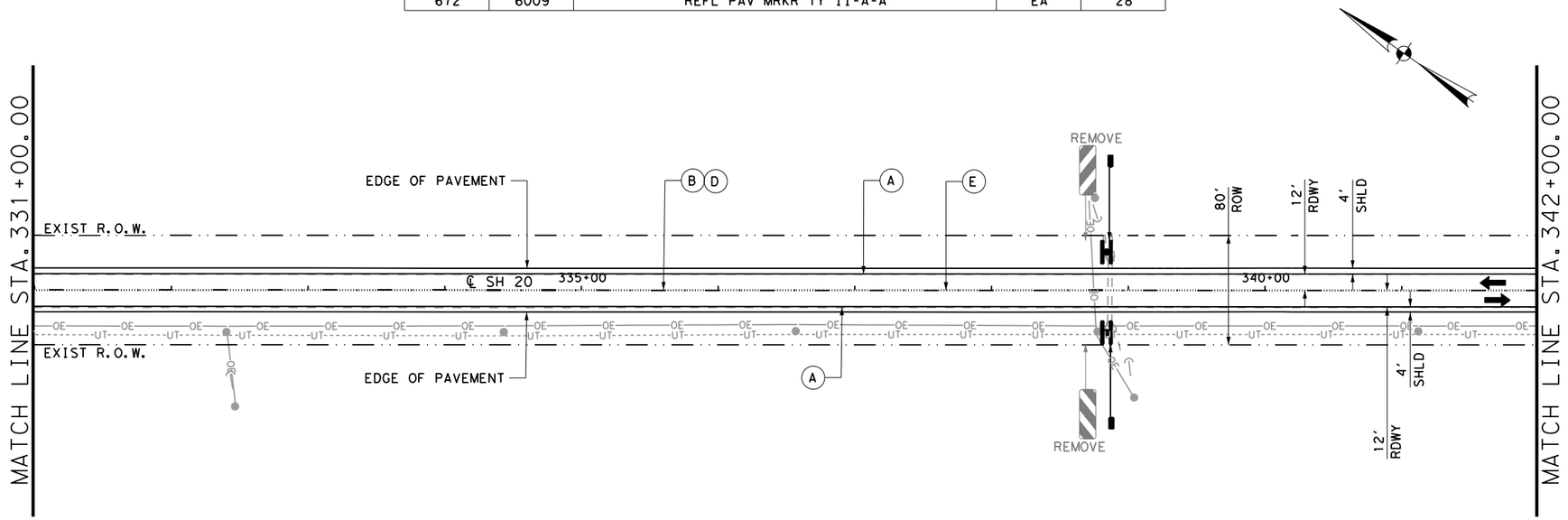


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
658	6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	2
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	2
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



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SCALE IN FEET

NOTES:

1. MATCH TO EXISTING STRIPING ON BOTH ENDS OF THE PROJECT. REFER TO PM STANDARDS FOR FURTHER DETAILS.
2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
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PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 320+00.00 TO STA. 342+00.00

SHEET 11 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		75

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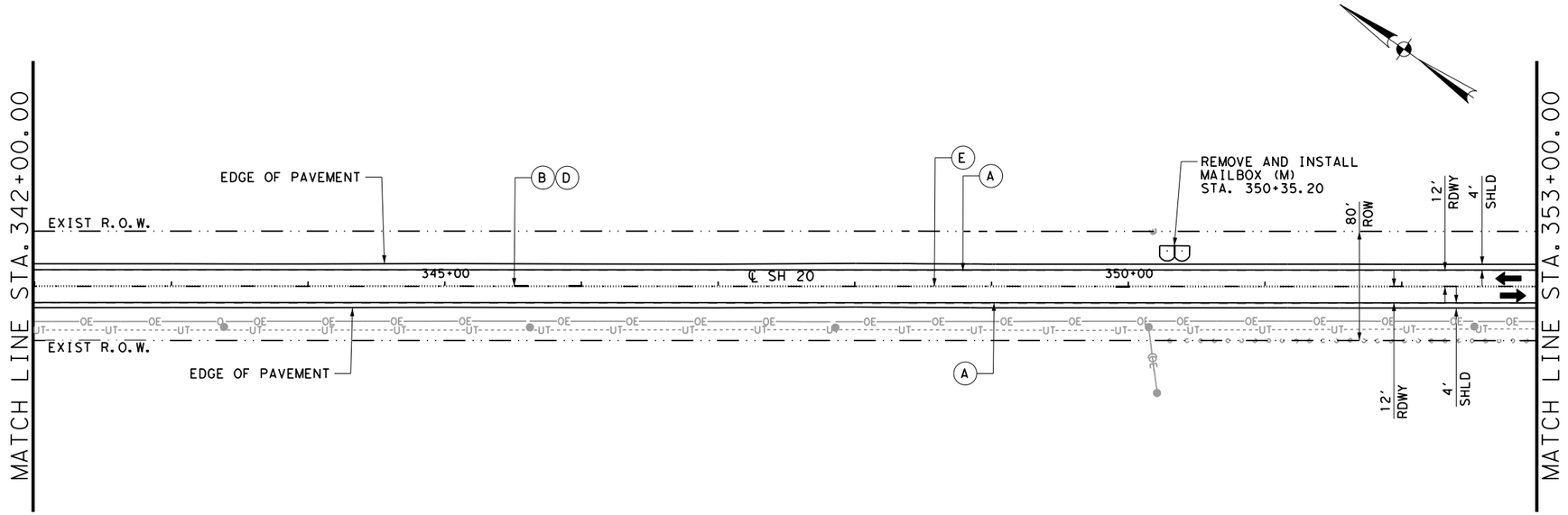
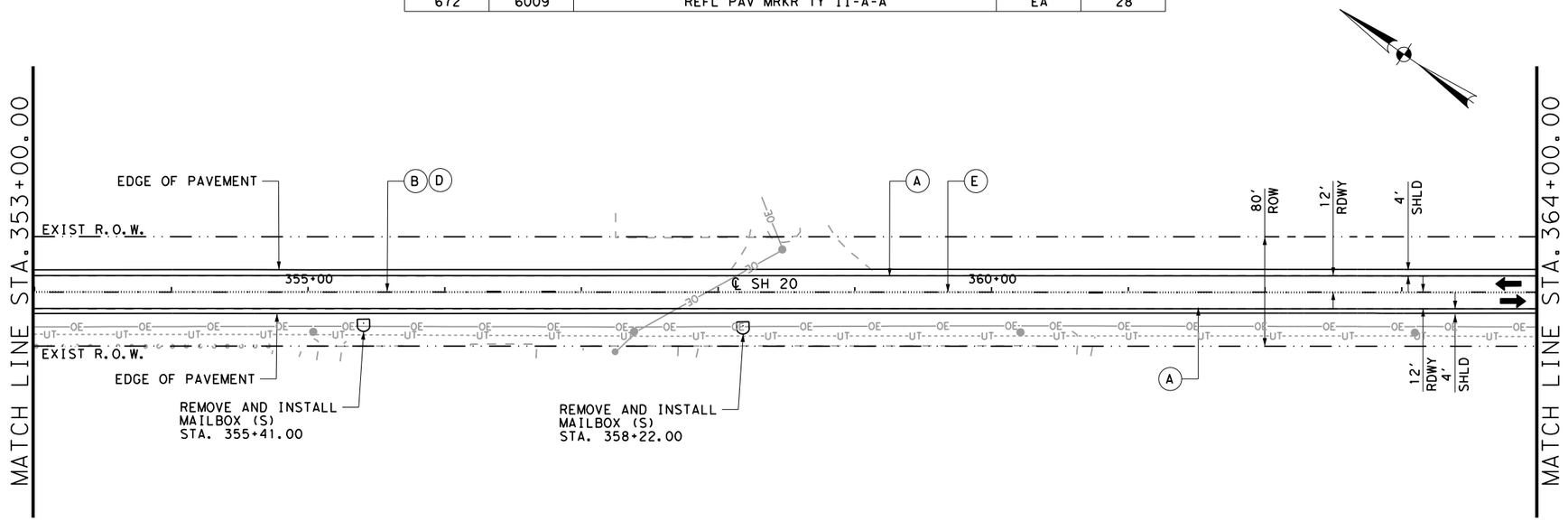


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
560	6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	2
560	6006	MAILBOX INSTALL-M (TWG-POST) TY 2	EA	1
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



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SCALE IN FEET

NOTES:

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2. PLACE PROPOSED SIGNS IN APPROPRIATE LOCATION TO EXISTING SIGN UNLESS OTHERWISE INDICATED ON PLANS OR AS DIRECTED.
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4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
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PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 342+00.00 TO STA. 364+00.00

SHEET 12 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		76

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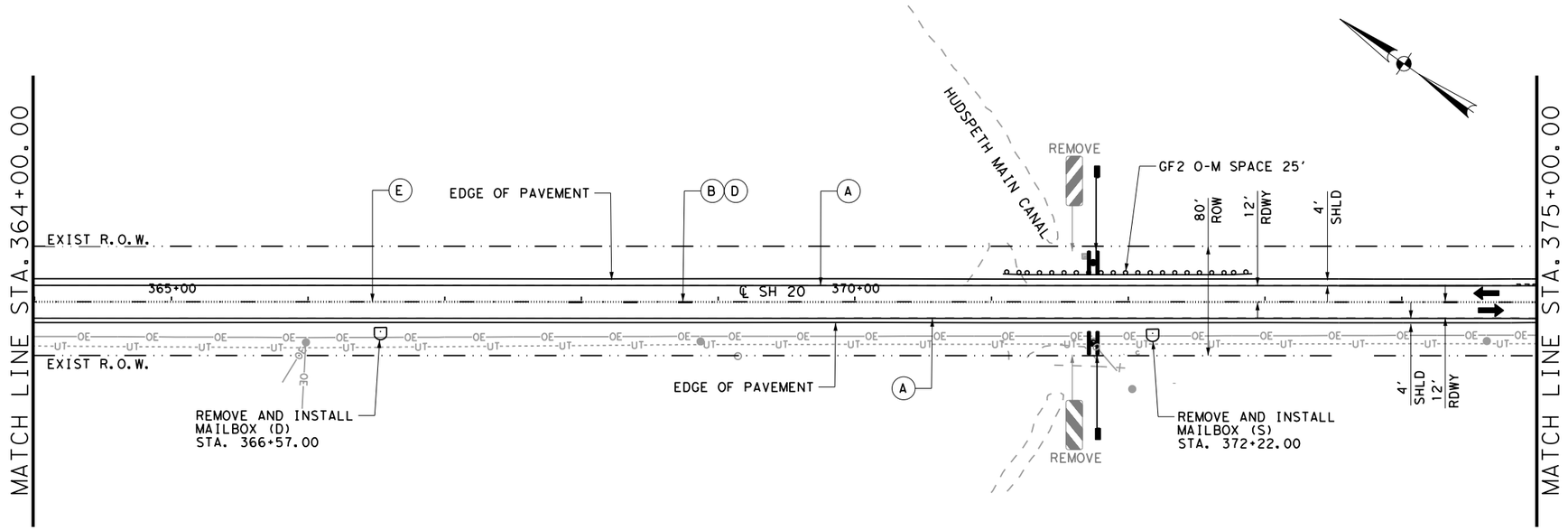
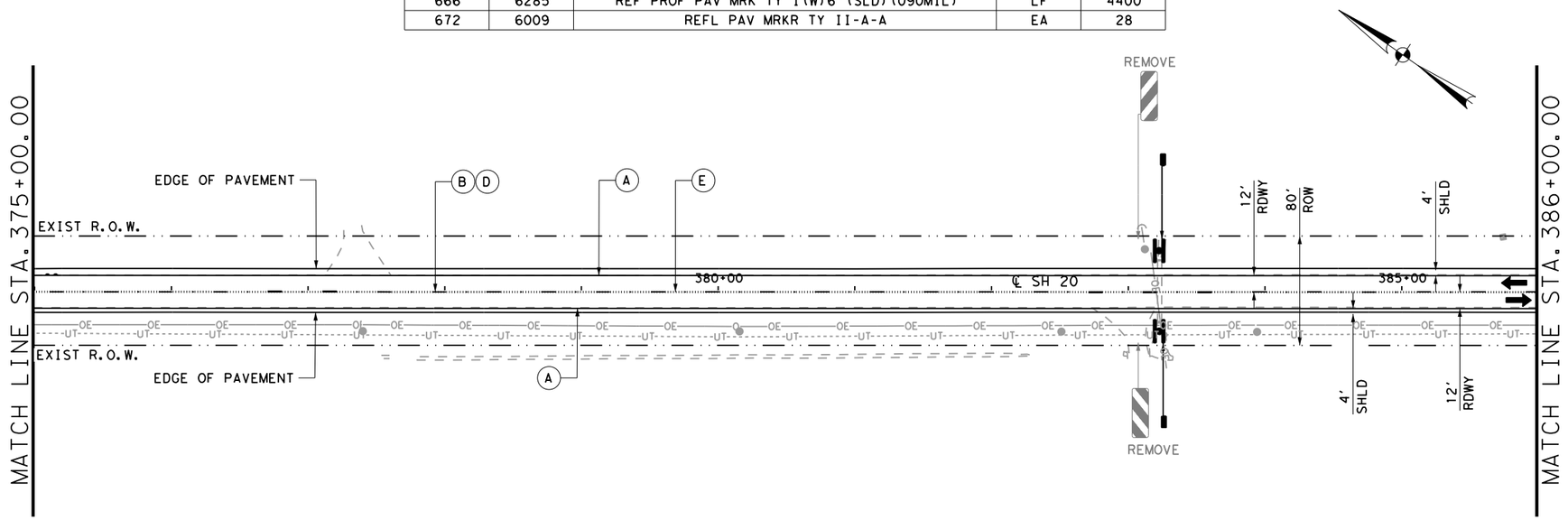


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2200
560	6004	MAILBOX INSTALL-S (TWG-POST) TY 2	EA	1
560	6005	MAILBOX INSTALL-D (TWG-POST) TY 2	EA	1
658	6047	INSTL OM ASSM (OM-2Y)(WC)GND	EA	4
658	6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	4
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	550
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	4400
672	6009	REFL PAV MRKR TY II-A-A	EA	28



0 50 100
SCALE IN FEET

NOTES:

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3. EXISTING MAILBOXES TO BE REMOVED AND REPLACED.
4. HORIZONTAL ALIGNEMNT IS GENERATED FROM BEST FIT OF EXISTING GROUND LINE AT THE CENTERLINE AND IS PROVIDED FOR INFORMATION ONLY.

LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
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PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 364+00.00 TO STA. 3386+00.00

SHEET 13 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		77

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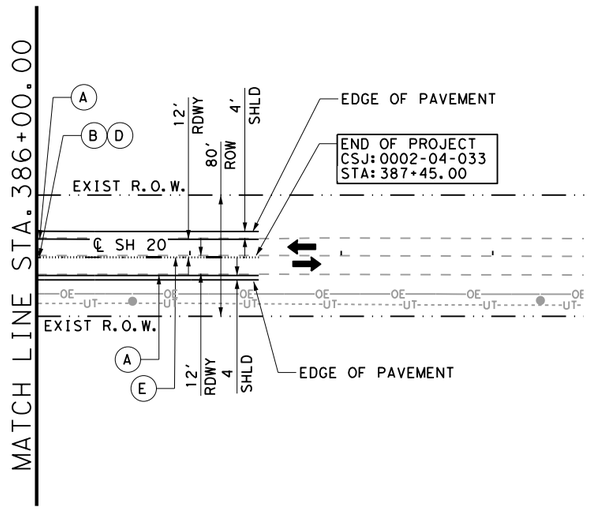
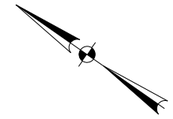


SIGNING & PAVEMENT MARKINGS ESTIMATE				
ITEM	CODE	DESCRIPTION	UNIT	UNIT
533	6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	145
666	6318	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	LF	36
666	6285	REF PROF PAV MRK TY I(W)6"(SLD)(090MIL)	LF	290
672	6009	REFL PAV MRKR TY II-A-A	EA	2



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SCALE IN FEET

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LEGEND

- (A) REF PROF PAV MRK TY I (W) 6"(SLD)(090MIL)
- (B) RE PM W/RET REQ TY I (Y) 6" (BRK)(100MIL)
- (C) RE PM W/RET REQ TY I (Y) 6" (SLD)(100MIL)
- (D) REFL PAV MARKR TY II A-A
- (E) CENTERLINE RUMBLE STRIPS
- (#) SIGN NUMBER
- PROPOSED SIGNS
- EXISTING SIGNS
- TRAFFIC FLOW
- REMOVE EXISTING DELINIATOR
- PROPOSED DELINIATOR
- PROPOSED MAILBOX
- PROPOSED OM-2Y

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20
TRAFFIC

SIGNING & PAVEMENT MARKINGS

STA. 386+00.00 TO STA. 387+45.00

SHEET 14 OF 14

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		78

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
65	1	D1-2	HUDSPETH COUNTY LINE	60"x30"	✓		10BWG	1	SA	T		
65	2	D1-2	EL PASO COUNTY LINE	60"x30"	✓		10BWG	1	SA	T		
65	3	W3-5	SPEED LIMIT 55	36"x36"	✓		10BWG	1	SA	P		
66	4	W1-2L		24"x24"	✓		10BWG	1	SA	P		
		W13-1P	45 MPH	18"x18"	✓							
66	5	W1-2aL	45	36"x36"	✓		10BWG	1	SA	P		
66	6	W1-6L		48"x24"	✓		10BWG	1	SA	T		
66	7	W8-18	ROAD MAY FLOOD	36"x36"	✓		10BWG	1	SA	P		
66	8	W1-2aR	45	36"x36"	✓		10BWG	1	SA	P		
66	9	W1-2aR	45	36"x36"	✓		10BWG	1	SA	P		
66	10	W1-6L		48"x24"	✓		10BWG	1	SA	T		

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

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Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0002	04	033	SH 20
4-16		DIST	COUNTY		SHEET NO.
8-16		ELP	HUDSPETH		79

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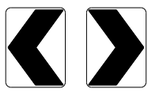
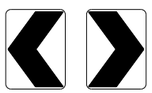
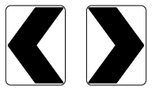
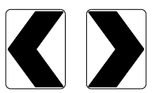
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
67	11	W1-2aL		36"x36"	✓		10BWG	1	SA	P		
67	12	W1-2L		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							
69	13	M3-4		24"x12"	✓		10BWG	1	SA	P		
		M1-6T		24"x24"	✓							
		D10-7aT		3"X10"	✓							
70	14	W1-2L		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							
70	15	W1-2aL		36"x36"	✓		10BWG	1	SA	P		
70	16	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	17	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	18	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	19	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							

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ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

05/27/2022

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Traffic Operations Division Standard

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REVISIONS		0002	04	033	SH 20
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8-16		ELP	HUDSPETH		80

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

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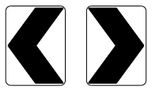
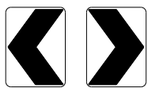
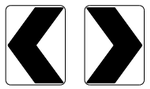
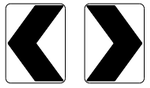
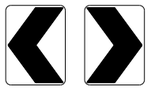
70	20	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	21	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	22	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	23	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
70	24	W1-2aR		36"x36"	✓		10BWG	1	SA	P		
70	25	W1-2R		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							
71	26	W1-2R		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							
71	27	W1-2aR		36"x36"	✓		10BWG	1	SA	P		
71	28	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SHEET 3 OF 7

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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4-16		DIST	COUNTY		SHEET NO.
8-16		ELP	HUDSPETH		81

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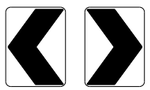
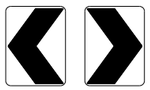
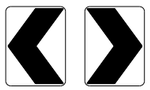
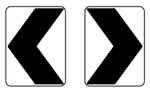
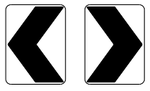
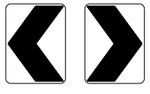
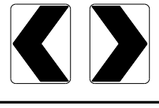
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
71	29	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	30	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	31	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	32	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	33	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	34	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	35	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	36	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	37	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	38	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
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Texas Department of Transportation

Traffic Operations Division Standard

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SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0002	04	033	SH 20
4-16		DIST	COUNTY		SHEET NO.
8-16		ELP	HUDSPETH		82

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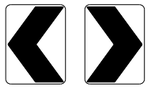
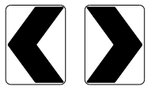
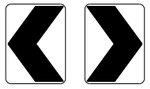
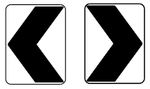
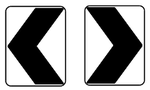
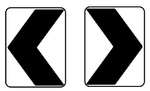
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
71	39	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	40	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	41	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	42	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	43	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
71	44	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
72	45	W1-2aL		36"x36"	✓		10BWG	1	SA	P		
72	46	W1-2L		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							
72	47	W1-2L		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							

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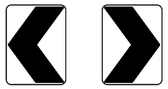
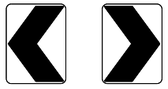
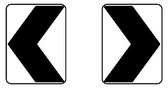
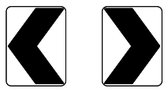
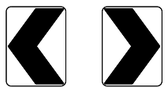
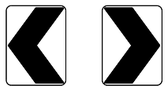
SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
72	48	W1-2aL		36"x36"	✓		10BWG	1	SA	P		
72	49	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
72	50	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
72	51	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
72	52	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
72	53	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
72	54	W1-8L		18"x24"	✓		10BWG	1	SA	P		
		W1-8R		18"x24"	✓							
								1				
72	55	W1-2aR		36"x36"	✓		10BWG	1	SA	P		
72	56	W1-2R		24"x24"	✓		10BWG	1	SA	P		
		W13-1P		18"x18"	✓							
73	57	W8-18		36"x36"	✓		10BWG	1	SA	P		

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FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\000204033\4 - Design\Plan Set\8. Traffic\SH20_TRF_SUM_SMSGN.dgn

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT	May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS		0002	04	033	SH 20
4-16		DIST	COUNTY		SHEET NO.
8-16		ELP	HUDSPETH		84

18

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY = TYPE TY N TY S
74	58	M3-2	EAST	24"x12"	✓		10BWG	1	SA	P		
		M1-6T	20 TEXAS	24"x24"	✓							
		D10-7aT	3 7/4	3"x10"	✓							

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

FILE:	sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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8-16		ELP	HUDSPETH		85

18

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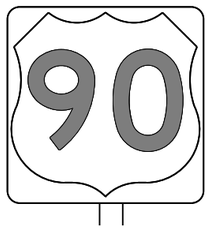
REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

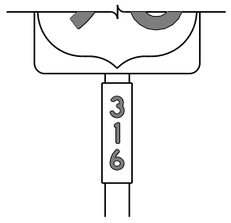
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING

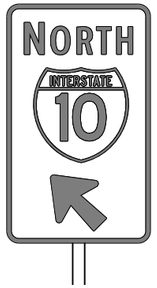


TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING





TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).
4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.
6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

FILE: tsr3-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0002	04	033	SH 20
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ELP	HUDSPETH		86

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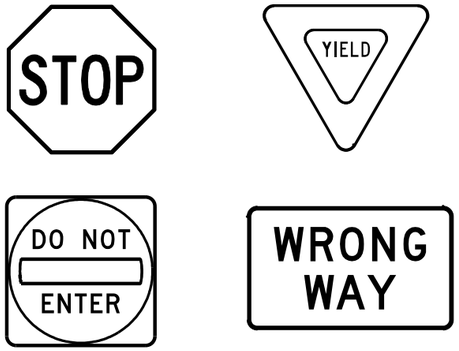
REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

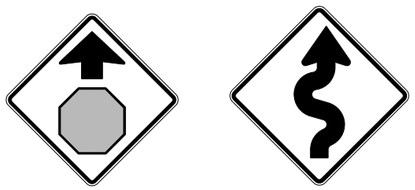
REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS

TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

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

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

FILE: tsr4-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		87

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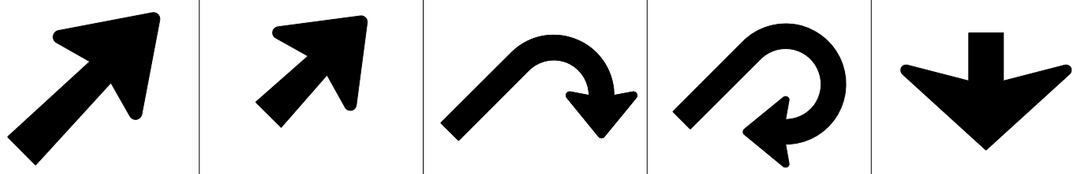
ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs



TYPE	LETTER SIZE	USE
A-1	10.67" U/L and 10" Caps	Single Lane Exits
A-2	13.33" U/L and 12" Caps	
A-3	16" & 20" U/L	
B-1	10.67" U/L and 10" Caps	Multiple Lane Exits
B-2	13.33" U/L and 12" Caps	
B-3	16" & 20" U/L	

CODE	USED ON SIGN NO.
E-3	E5-1aT
E-4	E5-1bT

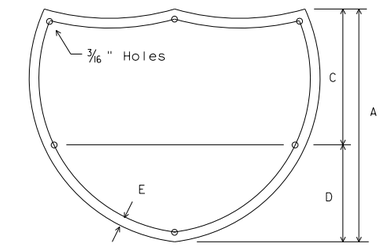
NOTE

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

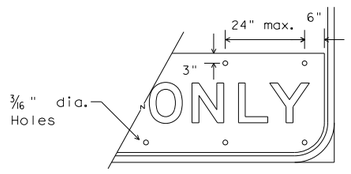
http://www.txdot.gov/

SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

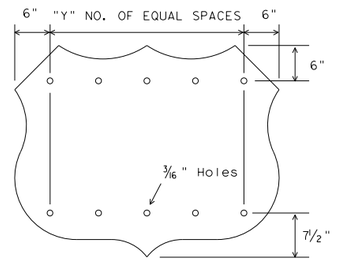


INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	11/2
48	28	20	13/4

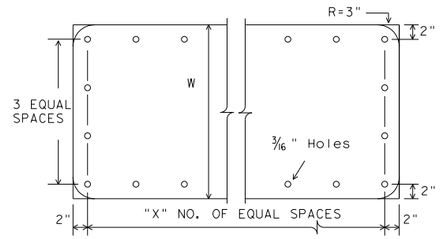


EXIT ONLY PANEL



U.S. ROUTE MARKERS

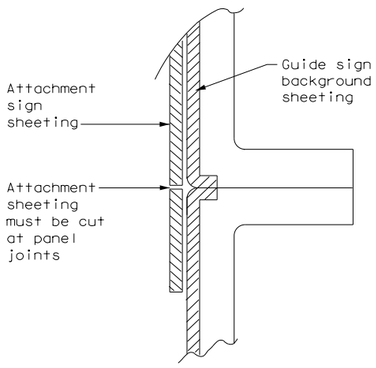
Sign Size	"Y"
24x24	2
30x24	3
36x36	3
45x36	4
48x48	4
60x48	5



STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

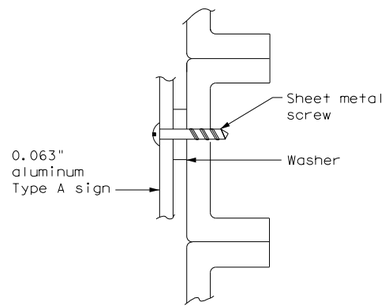
MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



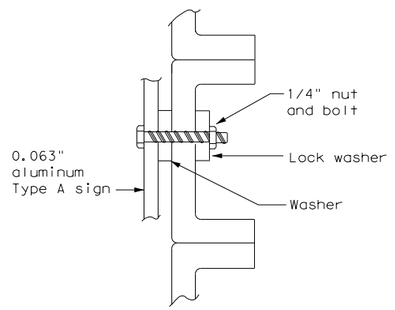
DIRECT APPLIED ATTACHMENT

NOTE:

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".



SCREW ATTACHMENT



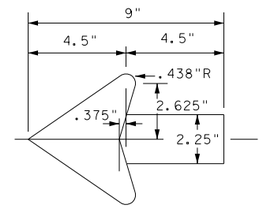
NUT/BOLT ATTACHMENT

NOTE:

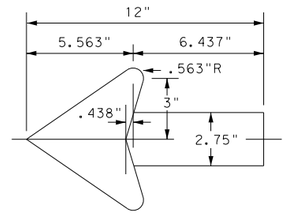
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

ARROW DETAILS

for Destination Signs (Type D)



Standard arrow to be used with 6 inch letters.



Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(5)-13

FILE: tsr5-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	ELP	HUDSPETH		88

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

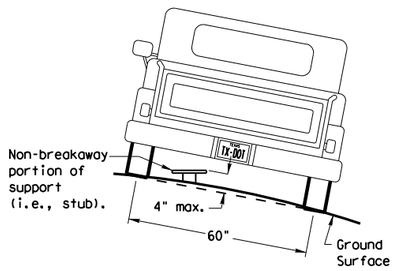
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

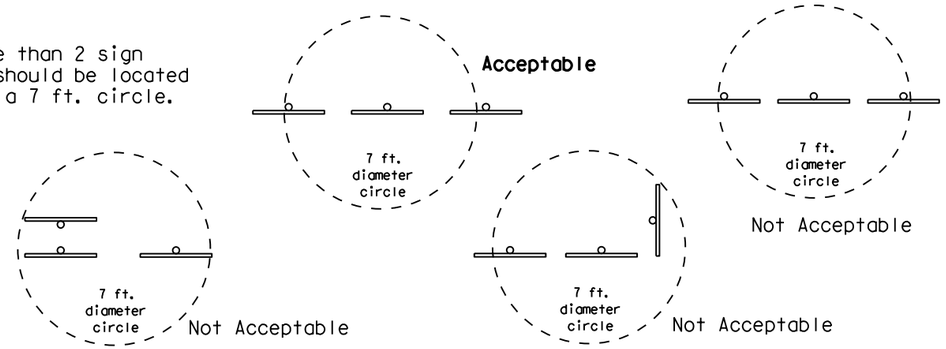
P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



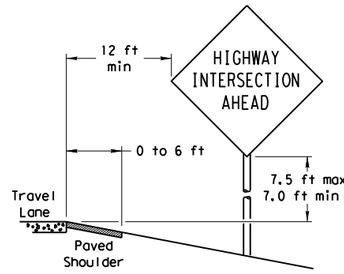
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



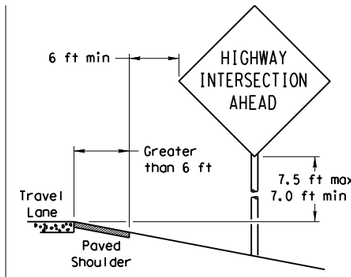
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

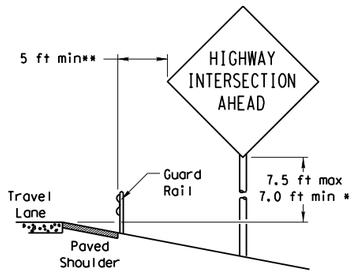
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



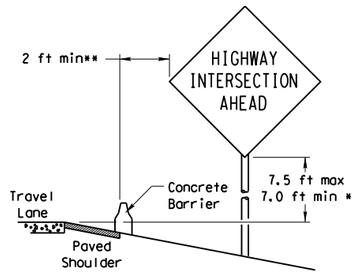
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



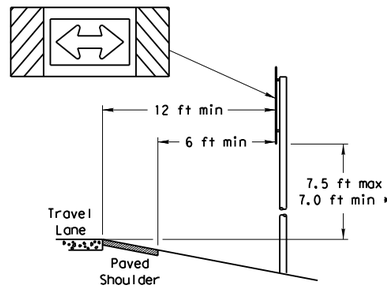
BEHIND GUARDRAIL



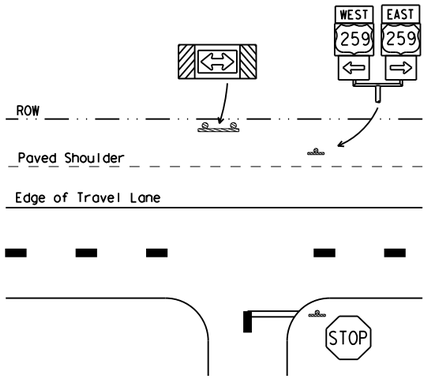
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

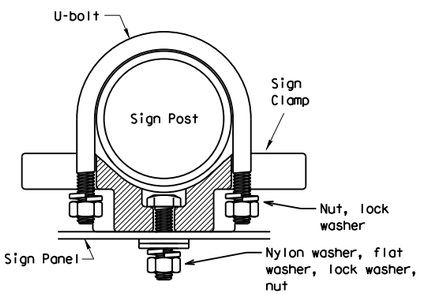
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

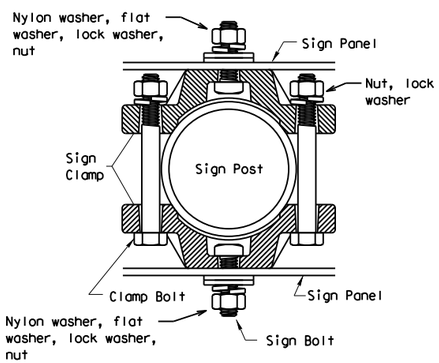


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

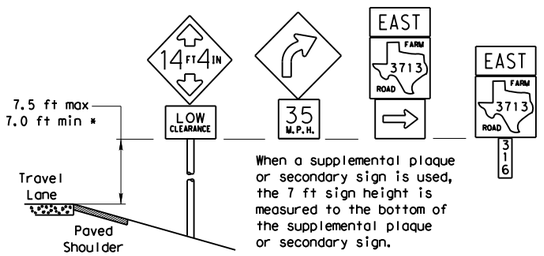
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



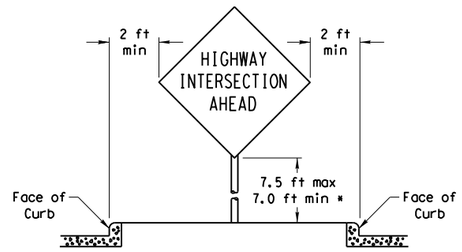
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



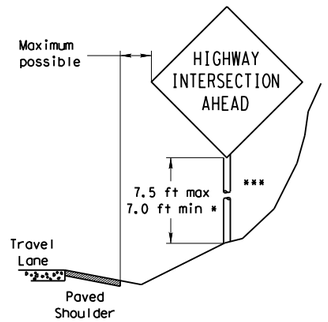
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

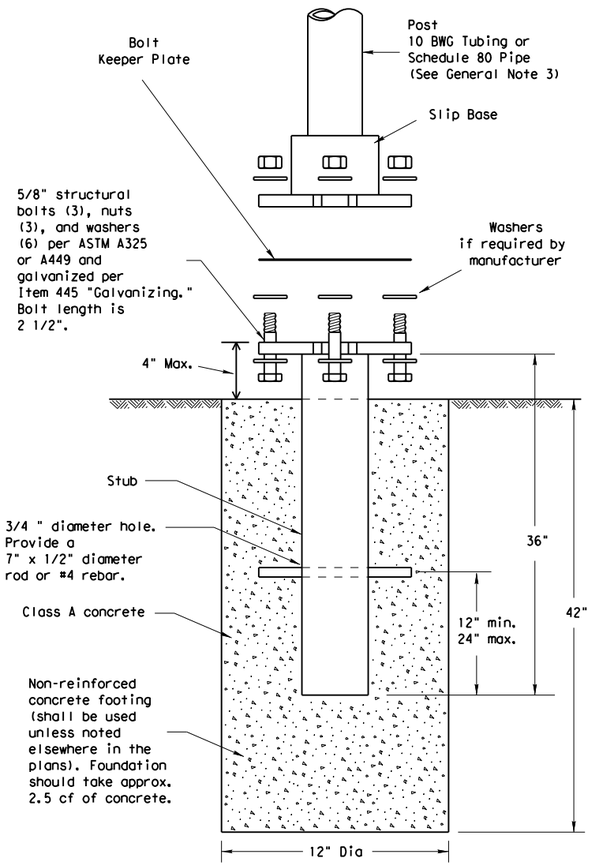
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		89

DATE: 5/27/2022 2:13:45 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040334 - Design\Plan Set\13. Standards\PAVEMENT MARKINGS-DELINEATION\SMD (SLIP-1)-08.dgn

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

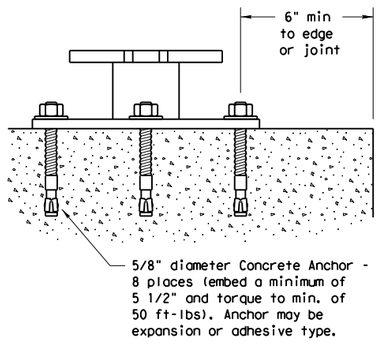
1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   0.134" nominal wall thickness
   Seamless or electric-resistance welded steel tubing or pipe
   Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   Other steels may be used if they meet the following:
   55,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   Schedule 80 Pipe (2.875" outside diameter)
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
   46,000 PSI minimum yield strength
   62,000 PSI minimum tensile strength
   21% minimum elongation in 2"
   Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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

9-08 REVISIONS

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20

DIST	COUNTY	SHEET NO.
ELP	HUDSPETH	90

DATE: 5/27/2022 2:13:51 PM
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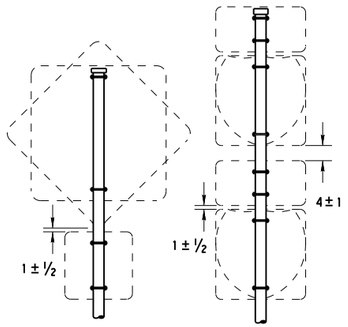
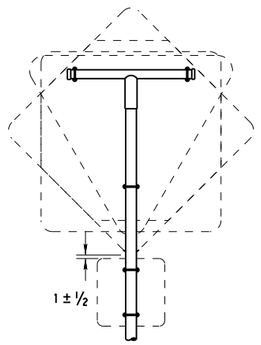
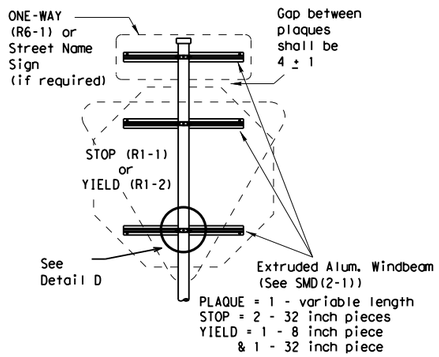


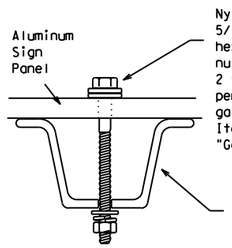
SM RD SGN ASSM TY XXXXX(1)XX(P)



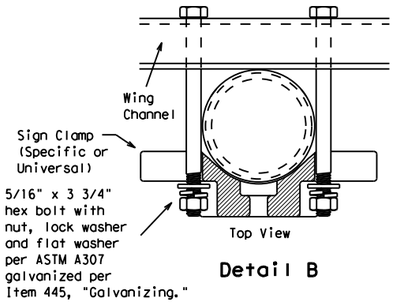
SM RD SGN ASSM TY XXXXX(1)XX(T)



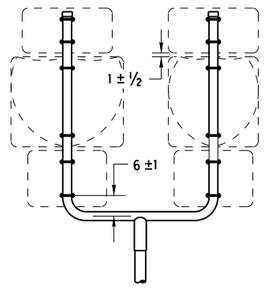
SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



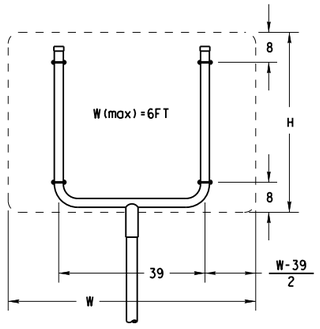
Detail A



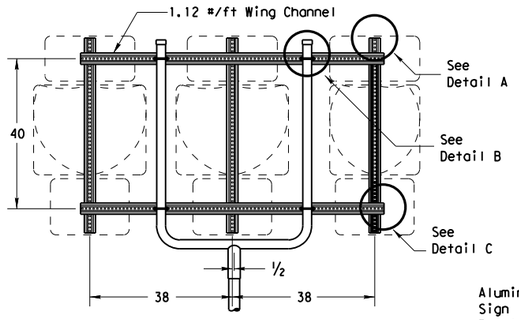
Detail B



SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U)



SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

Drill 7/16" hole (through) after assembly and install bolt, nut, 2 flat washers and lock washer.

3/8" x 3 1/2" heavy hex bolt with nut, lock washer and 2 flat washers per ASTM A307 galvanized per Item 445 "Galvanizing."

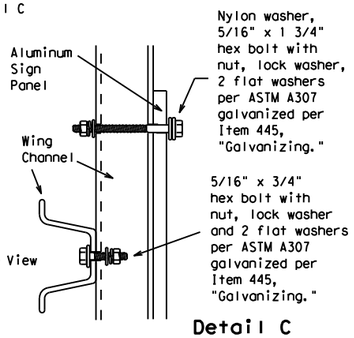
1 1/2"

Extender

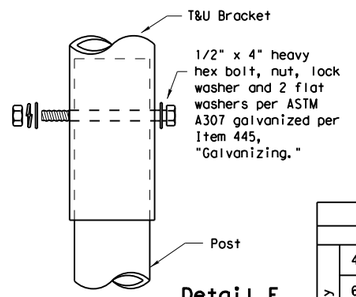
U-Bracket

Detail F

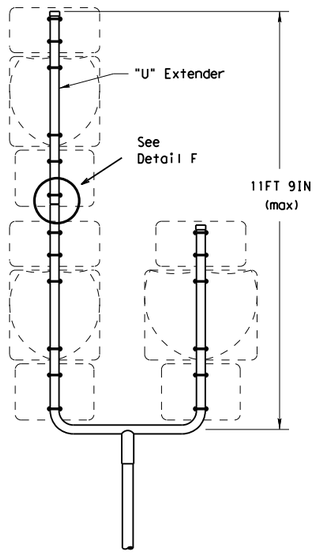
Splices shall only be allowed behind the sign substrate.



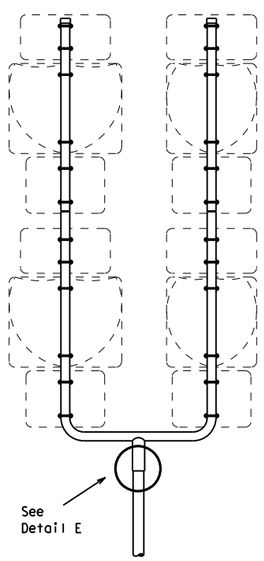
Detail C



Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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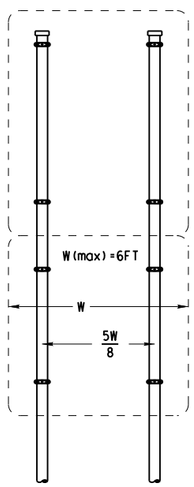
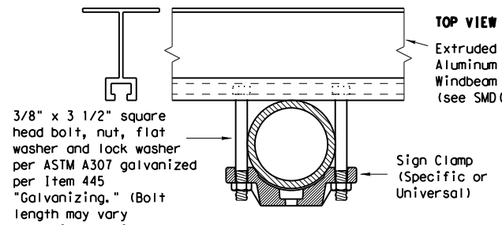
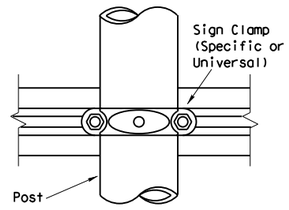


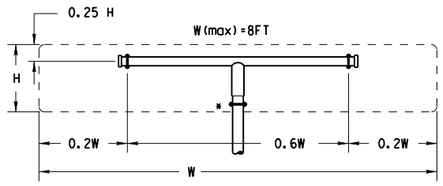
SM RD SGN ASSYM TY XXXXX(2)XX(P)

SIDE VIEW



Detail D

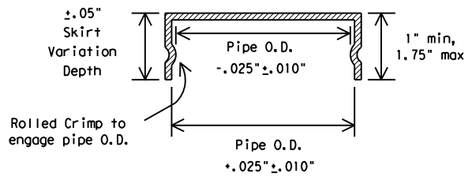




SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. See table above.
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20

DIST	COUNTY	SHEET NO.
ELP	HUDSPETH	91

9-08 REVISIONS

DATE: 5/27/2022 2:13:56 PM
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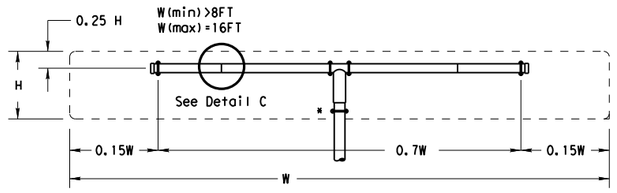
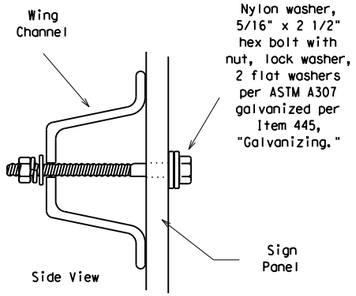
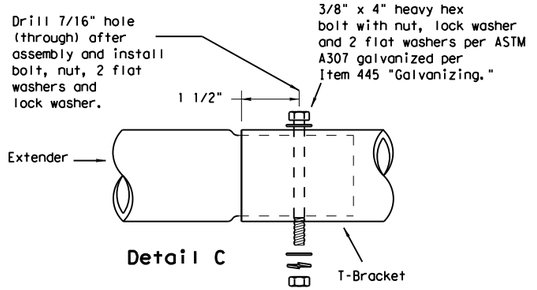


SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



Detail B



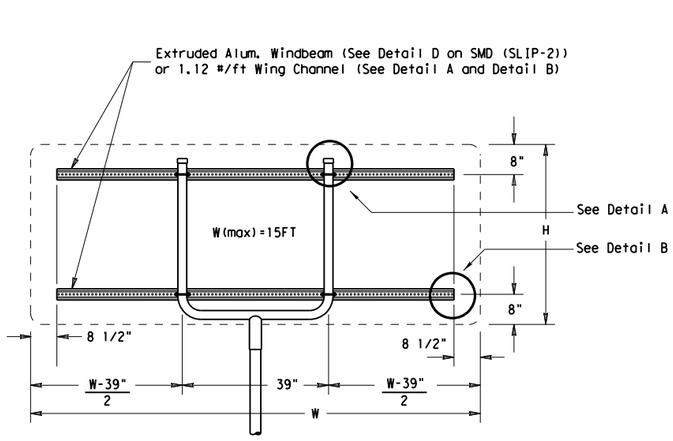
Detail C

Splices shall only be allowed behind the sign substrate.

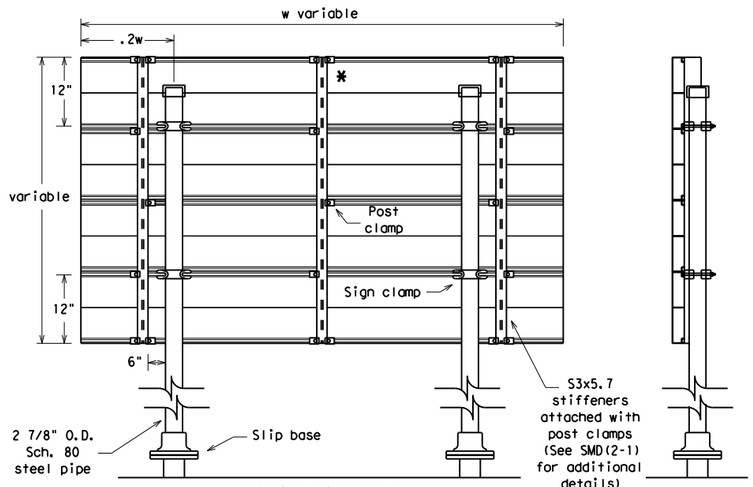
GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.



SM RD SGN ASSM TY XXXXX(1)XX(U-XX)

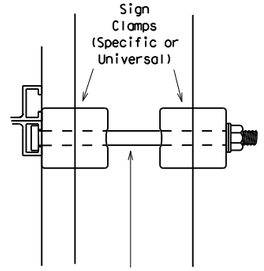


Typical Sign Mount

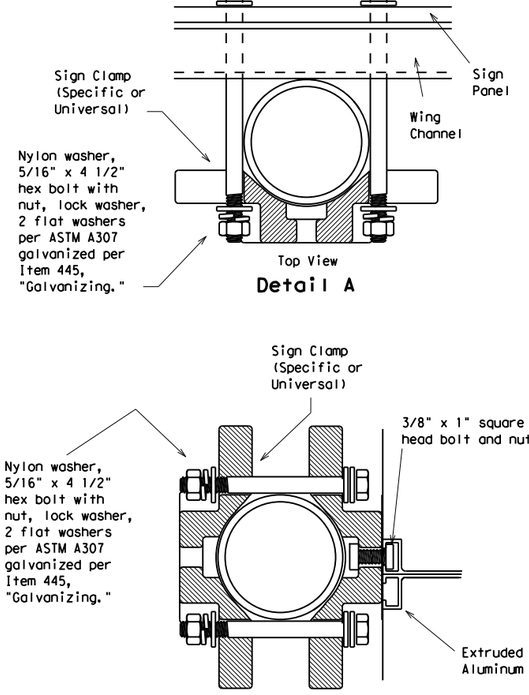
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

See Detail E
for clamp installation

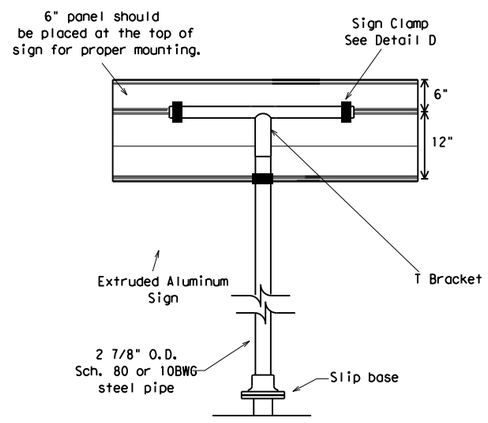


Detail E

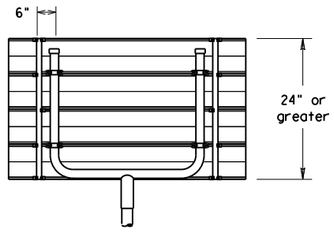


Detail A

Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		92

DATE: 5/27/2022 2:14:04 PM
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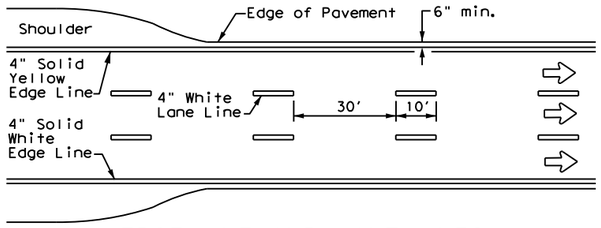
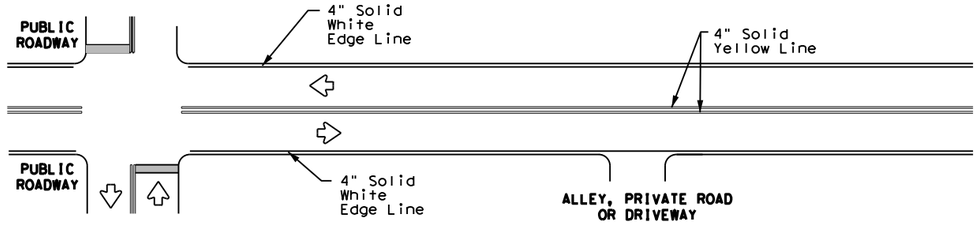
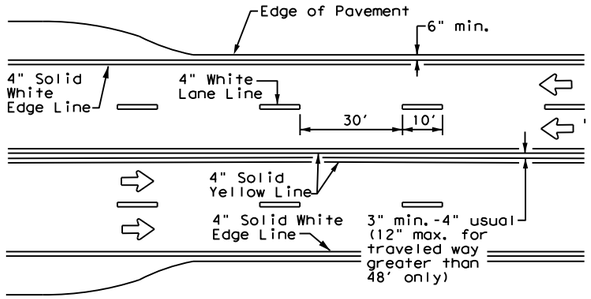


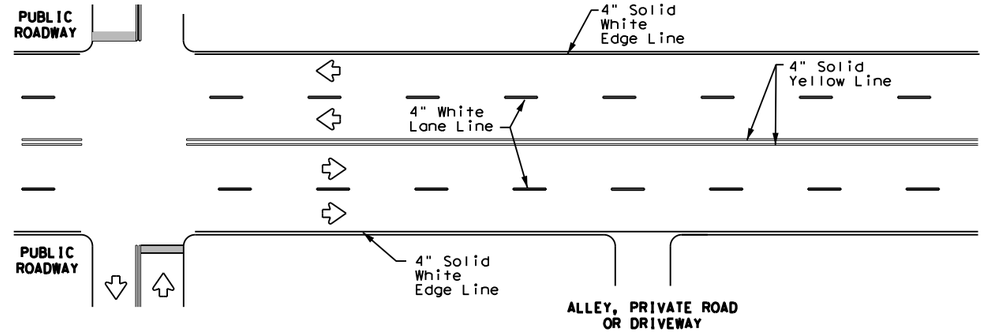
EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



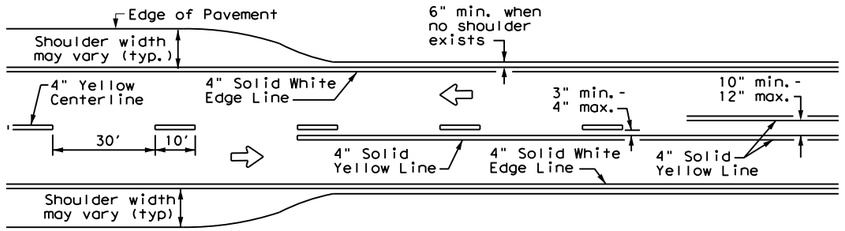
TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



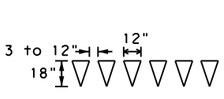
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



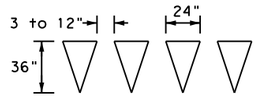
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

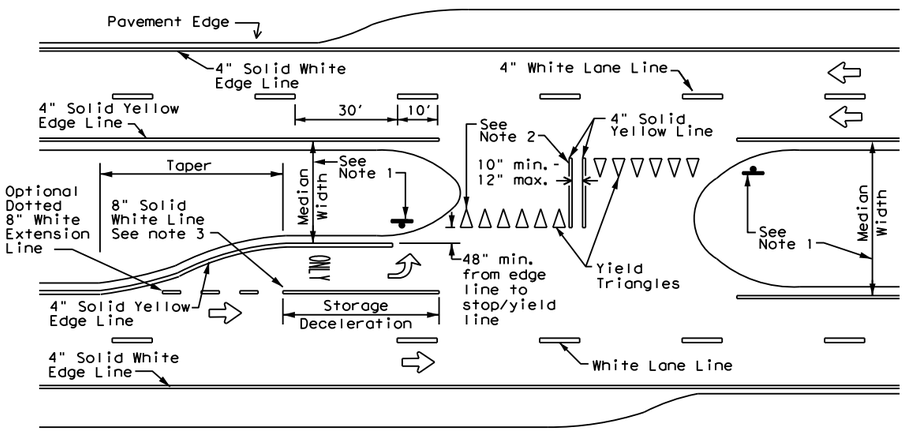


For posted speed on road being marked equal to or less than 40 MPH.



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

YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.

2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.

3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

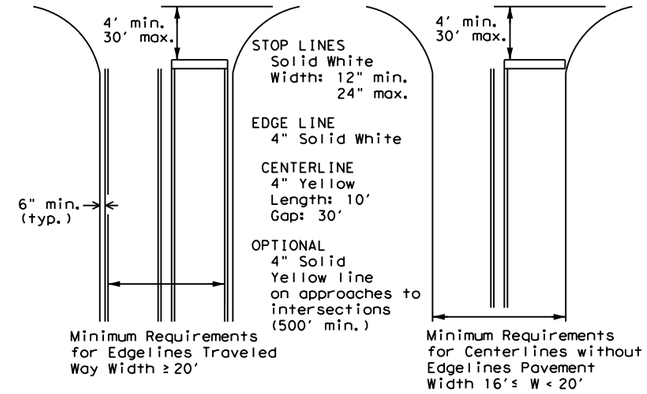
GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.

2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

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

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



GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways

Texas Department of Transportation

Traffic Safety Division Standard

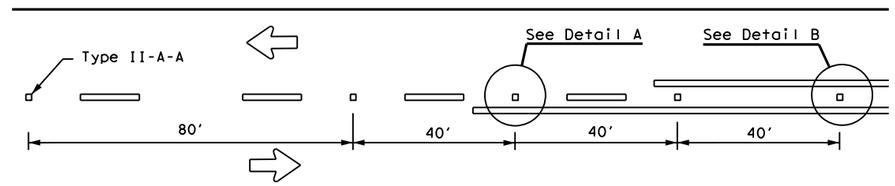
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-20

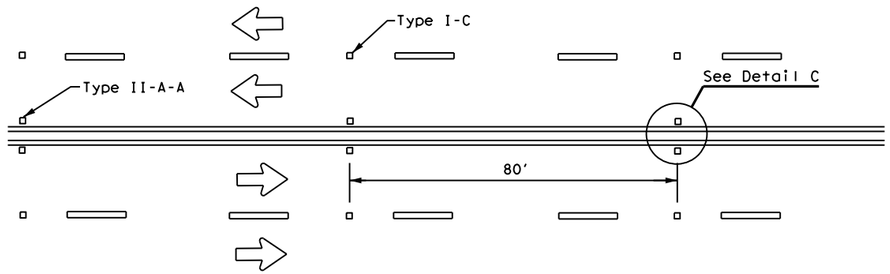
FILE: pm1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT November 1978	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0002	04	033	SH 20
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	ELP	HUDSPETH		93

22A

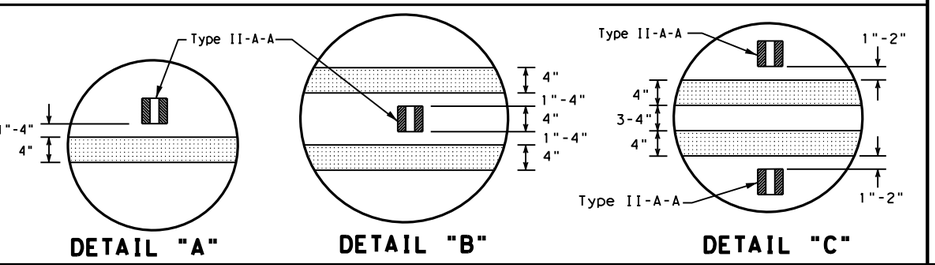
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



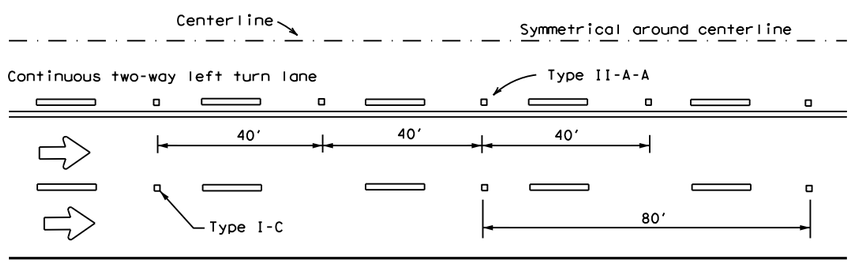
CENTERLINE FOR ALL TWO LANE ROADWAYS



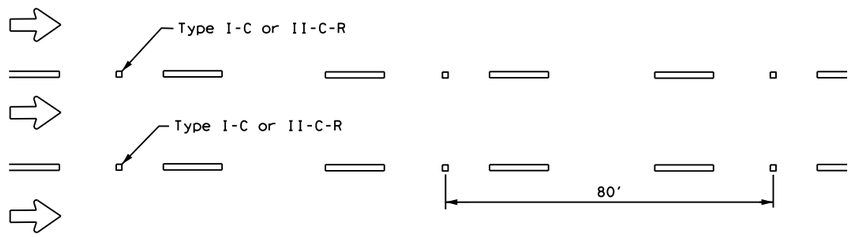
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**

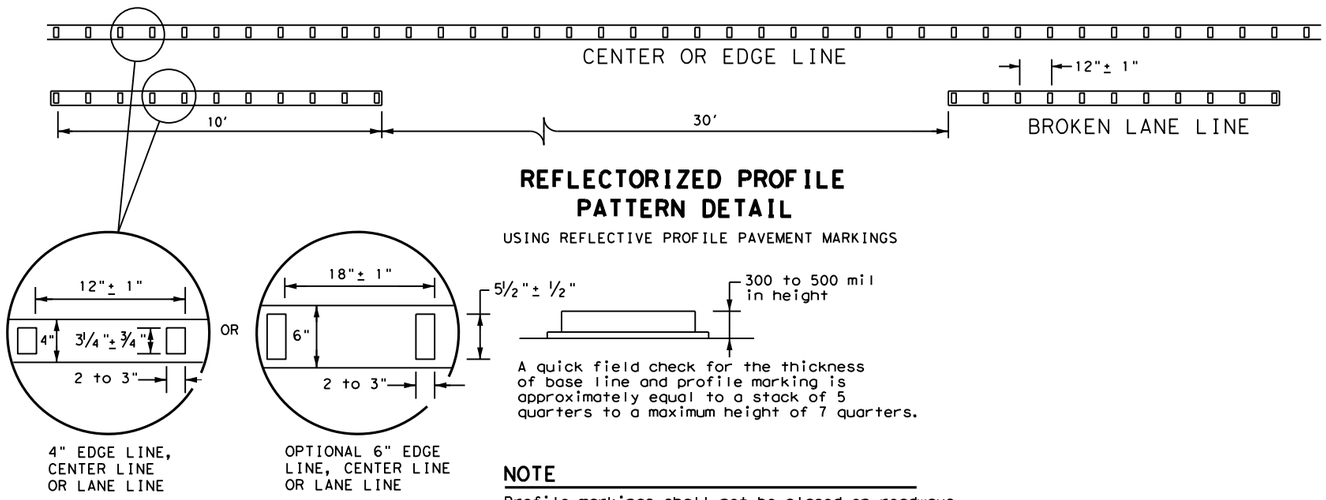


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



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

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



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

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

4" EDGE LINE, CENTER LINE OR LANE LINE

OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

NOTE

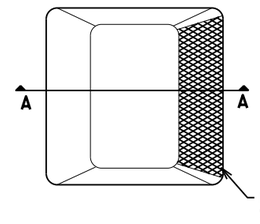
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

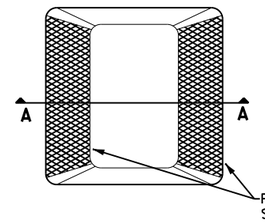
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

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

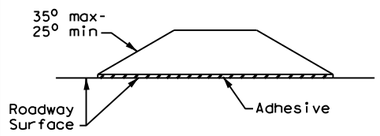
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-20

FILE: pm2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-92 2-10 5-00 2-12 8-00 6-20	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		94

22B

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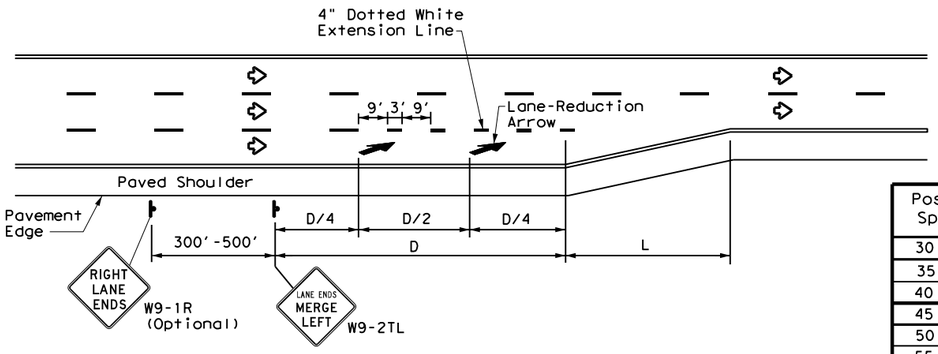
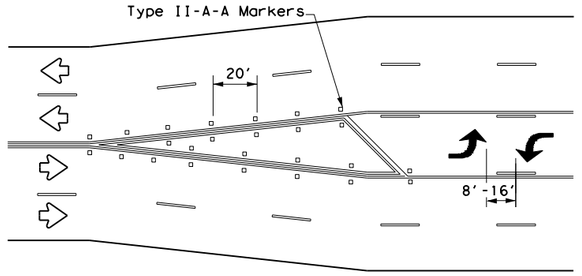


LANE REDUCTION

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

NOTES

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



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

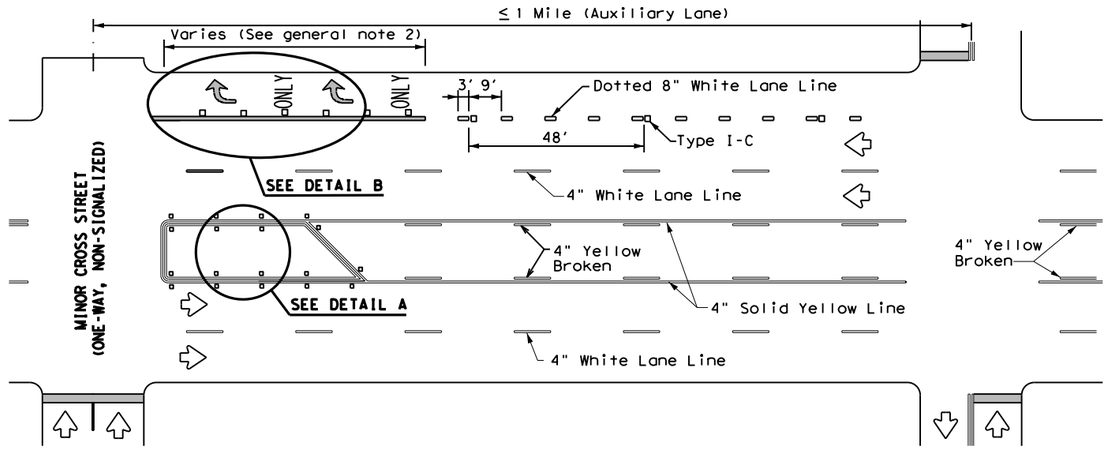
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

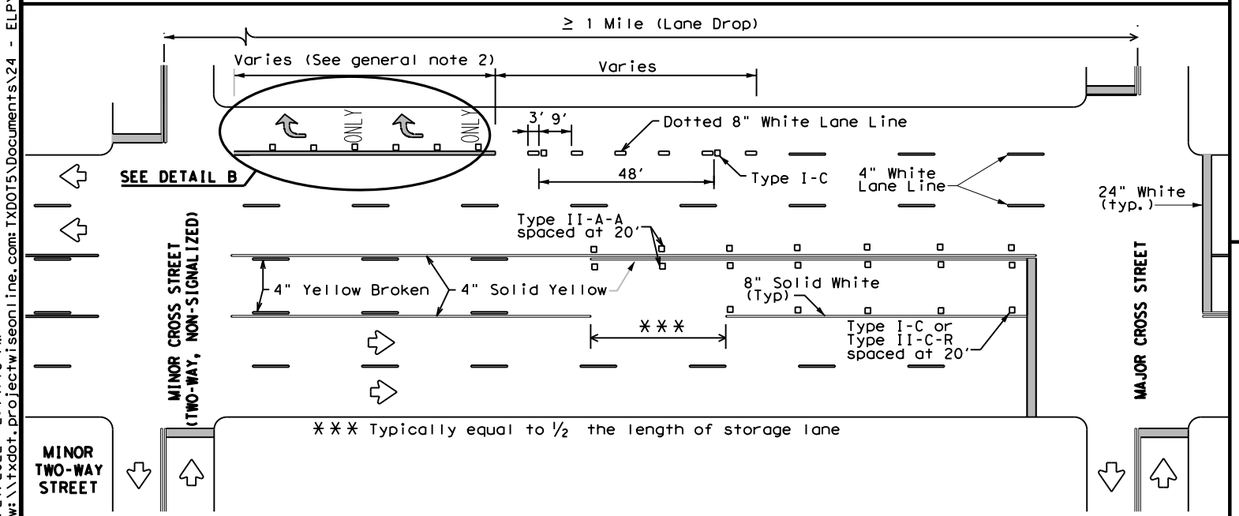
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn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

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

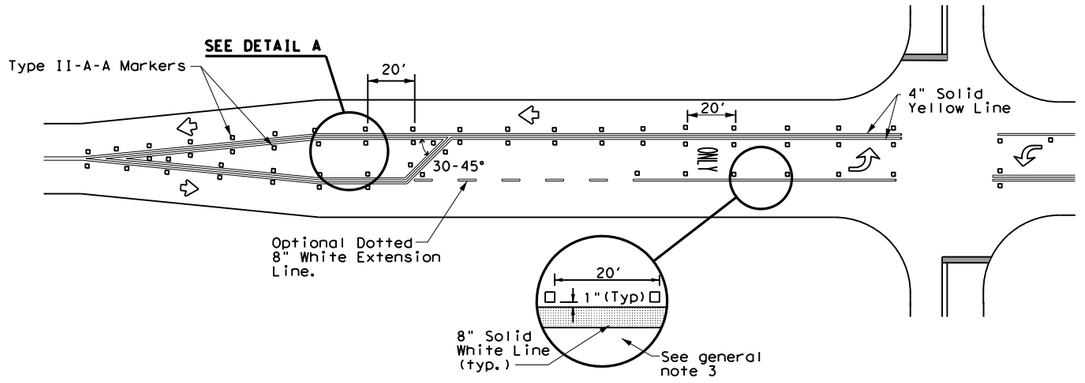
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



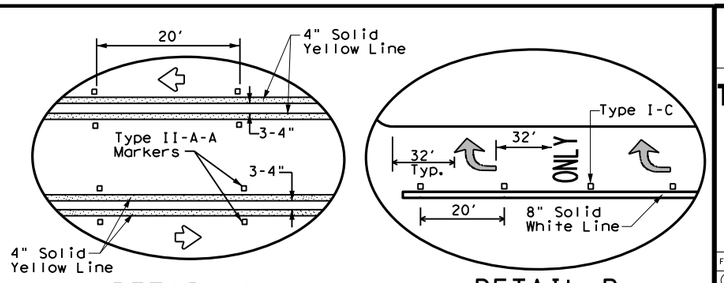
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



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



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A DETAIL B

Texas Department of Transportation — Traffic Safety Division Standard

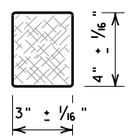
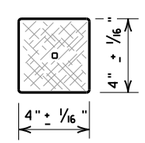
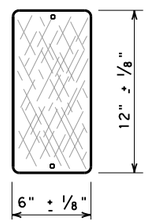
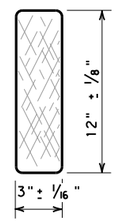
TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-20

FILE: pm3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT April 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
5-00 2-10	DIST	COUNTY		SHEET NO.
8-00 2-12	ELP	HUDSPETH		95
3-03 6-20				

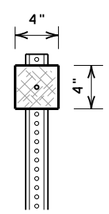
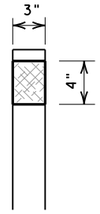
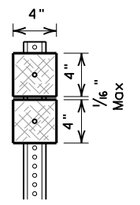
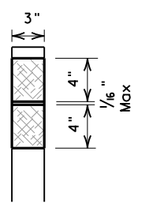
220

DATE: 5/27/2022 2:14:22 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040033\4 - Design\Plan Set\13. Standards\PAVEMENT MARKINGS-DELINEATION\dam1-20.dgn

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

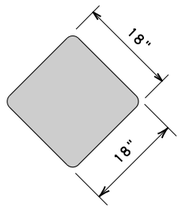
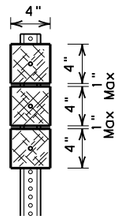
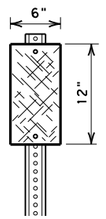
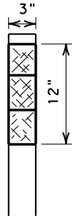
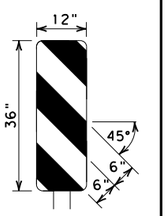
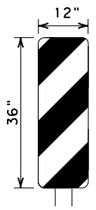
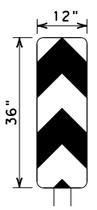
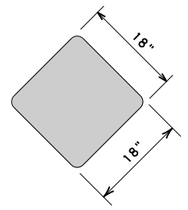
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s)(Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

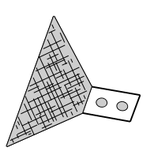
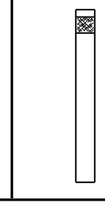
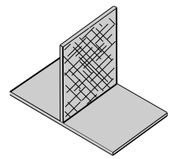
TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

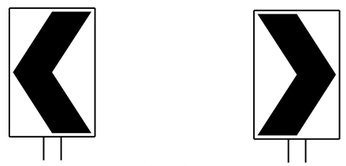
	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



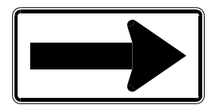
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dam1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ELP	HUDSPETH		96

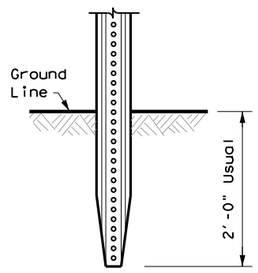
20A

DATE: 5/27/2022 2:14:27 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040334 - Design\Plan Set\13. Standards\PAVEMENT MARKINGS-DELINEATION\dom2-20.dgn

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

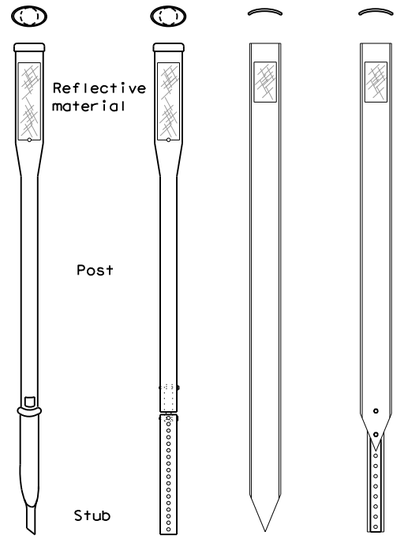


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

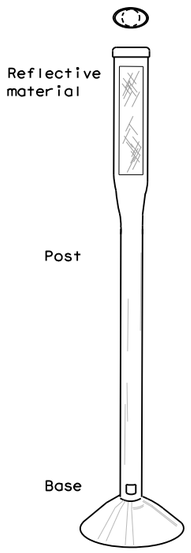
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



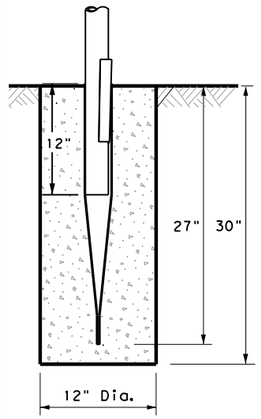
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

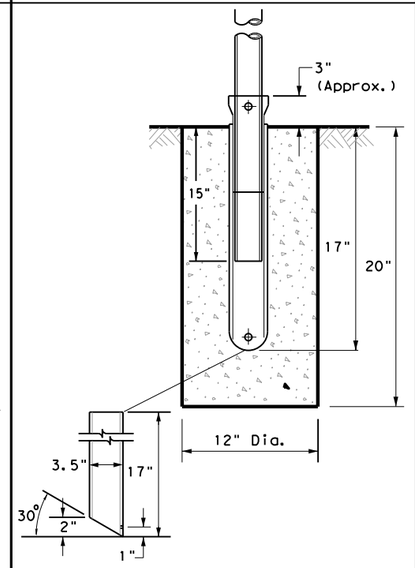
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

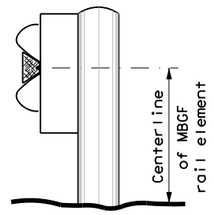
NOTE

1. Install per manufacturer's recommendations.

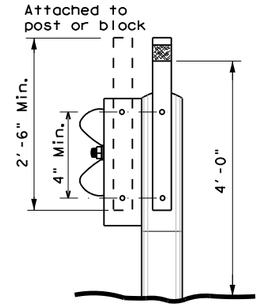
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

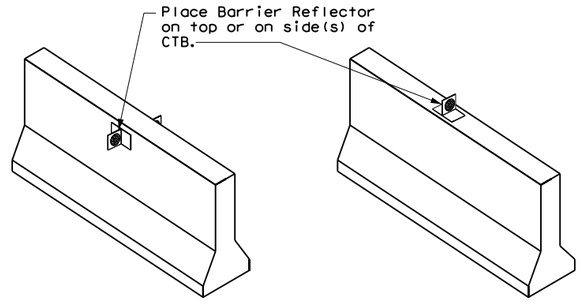
GF1



GF2



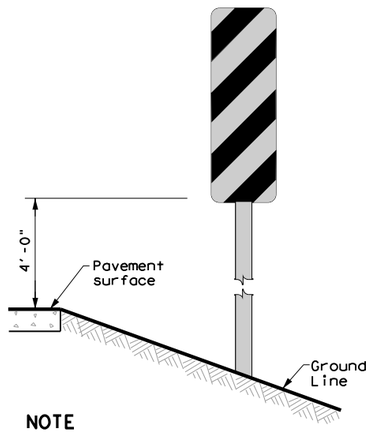
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

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

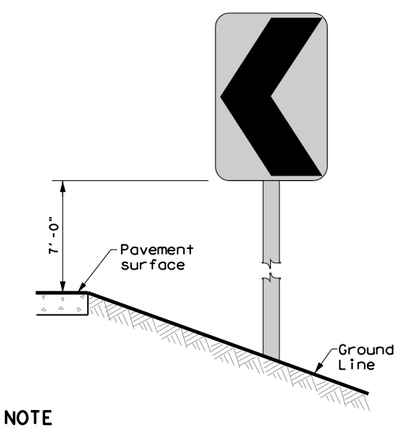
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

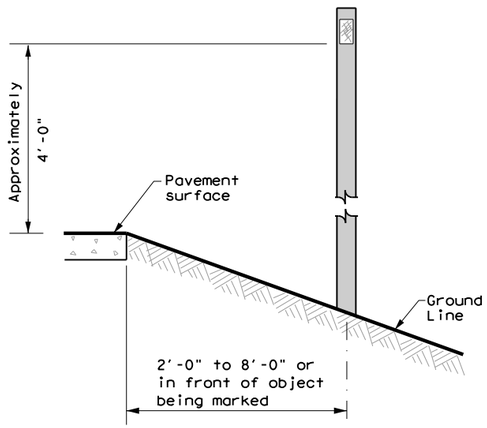
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	ELP	HUDSPETH		97

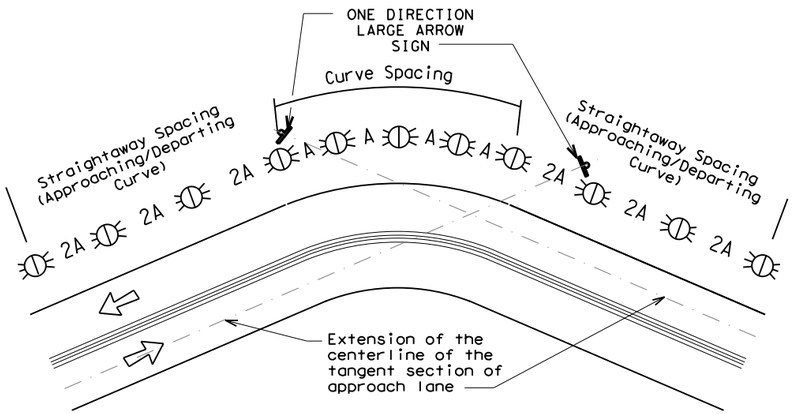
20B

DATE: 5/27/2022 2:14:33 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040033\4 - Design\Plan Set\13. Standards\PAVEMENT MARKINGS-DELINEATION\dom3-20.dgn

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

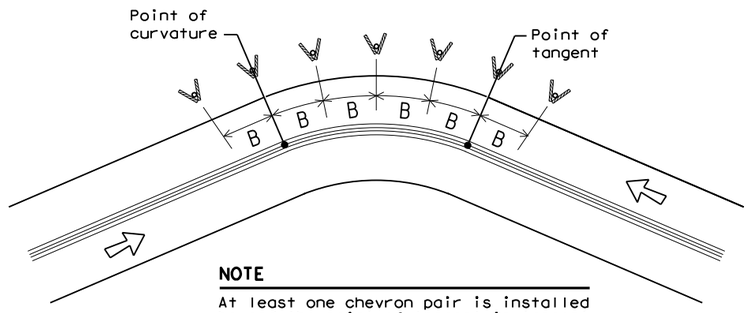
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0002	04	033	SH 20
3-15 8-15 8-15 7-20	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		98

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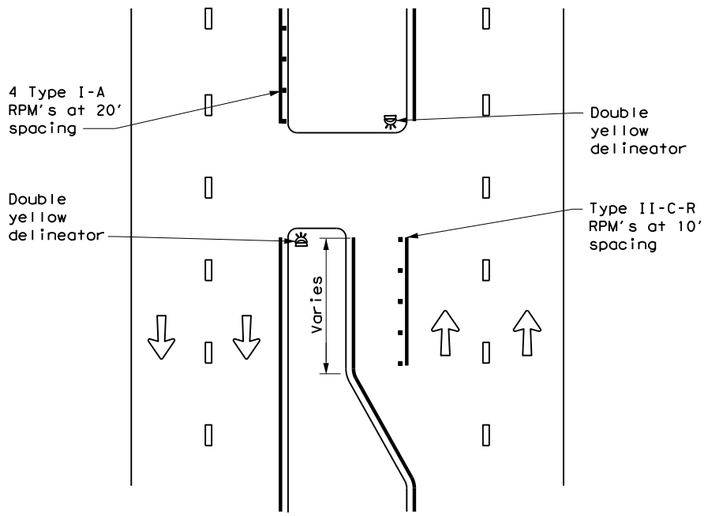
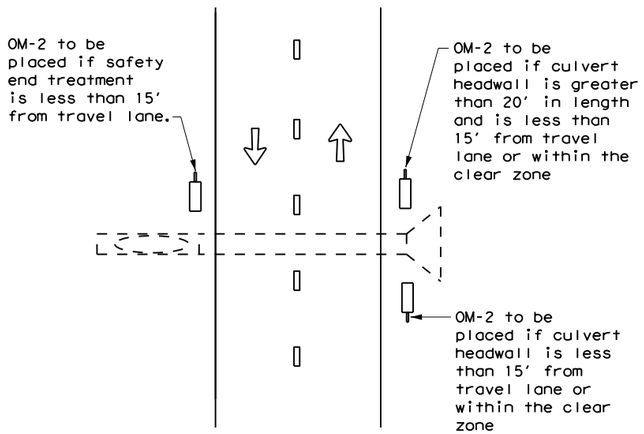
CROSSOVERS



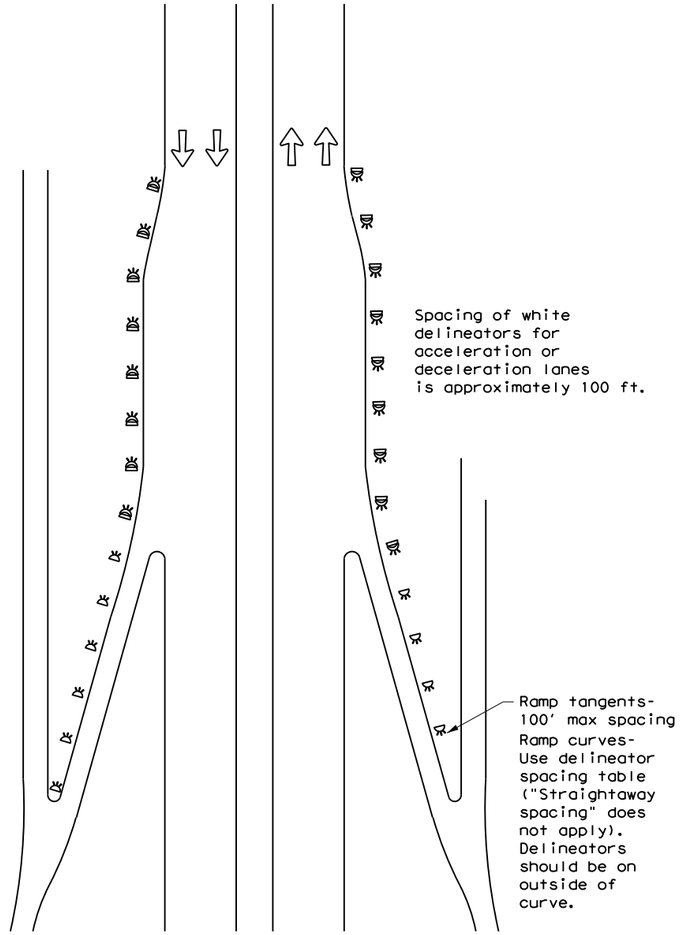
DETAIL 1

FOR CULVERTS WITHOUT MBGF



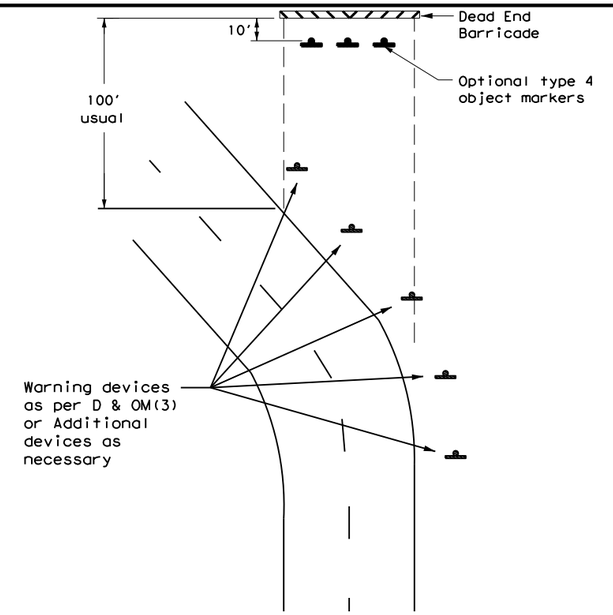
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



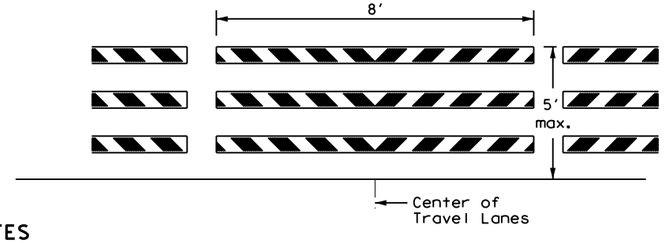
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4)-20

FILE: dom4-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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7-20	ELP	HUDSPETH		99

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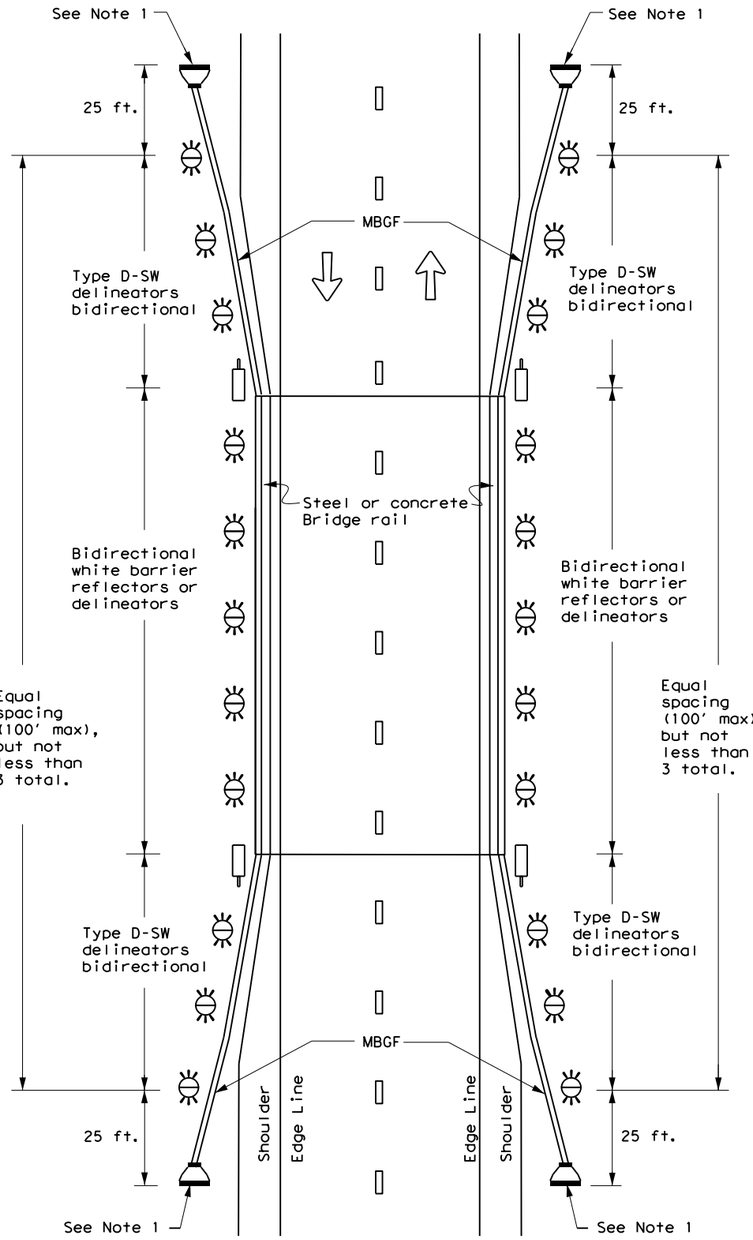
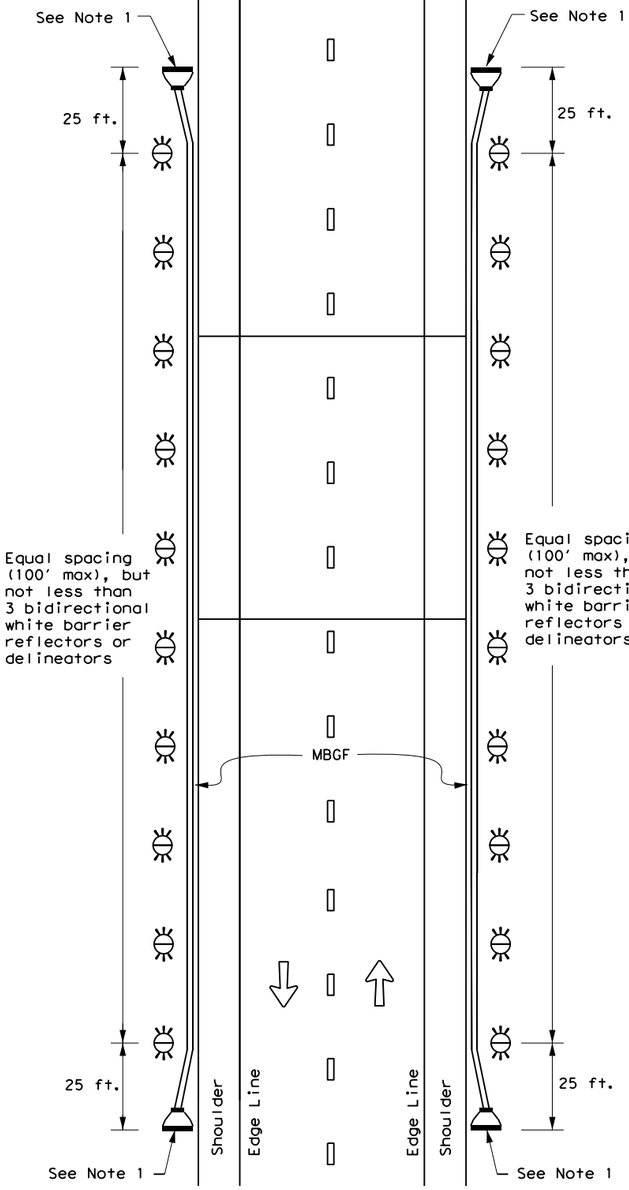
TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

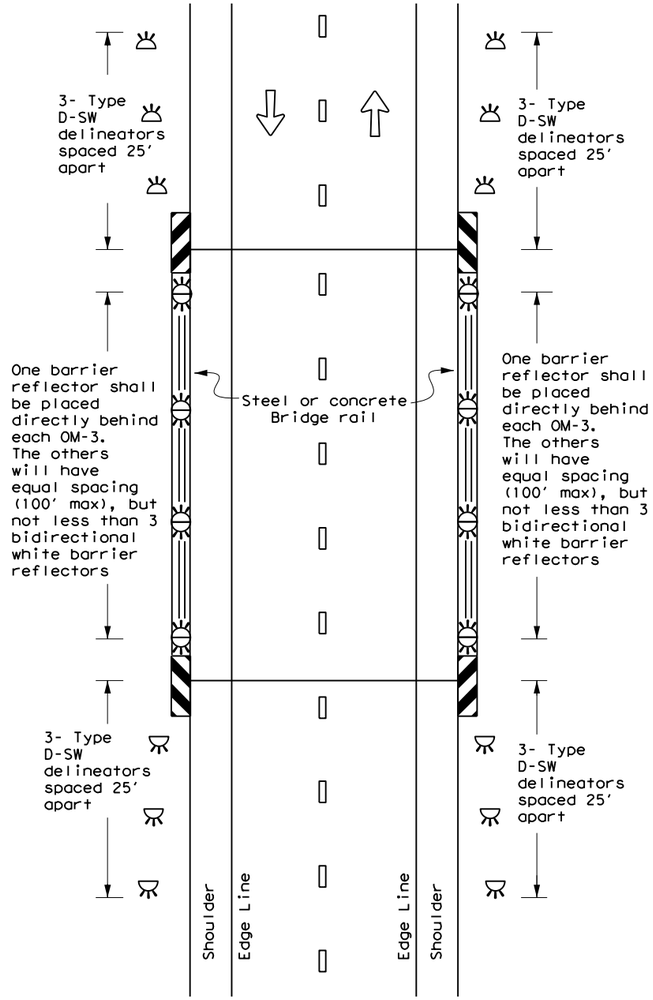
TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL



LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(5)-20

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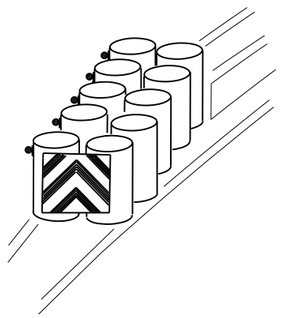
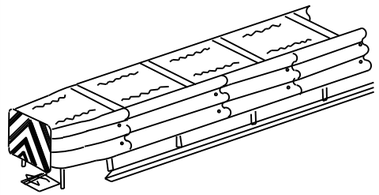
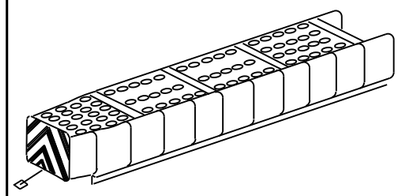
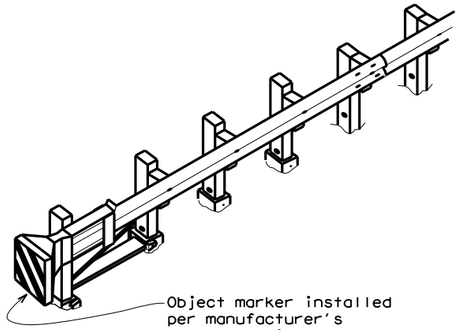
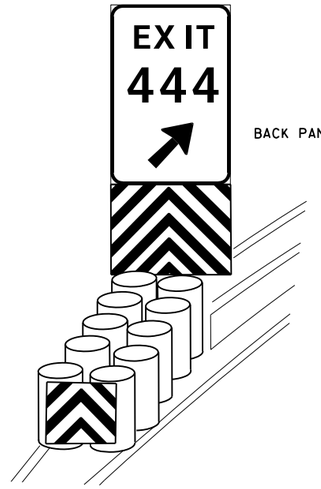
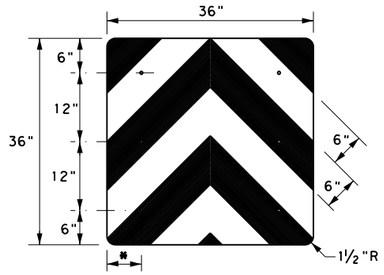


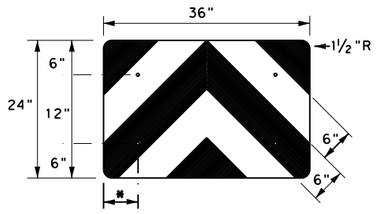




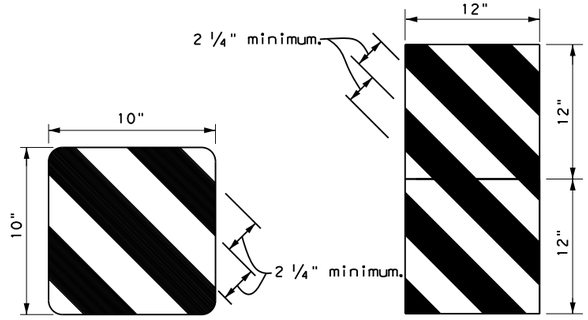




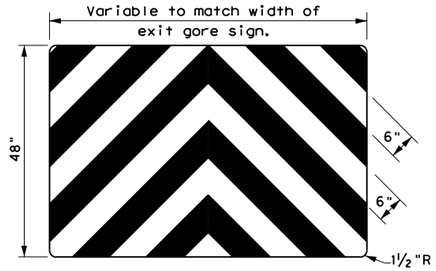


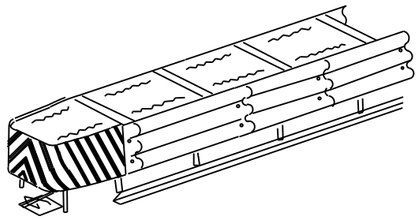


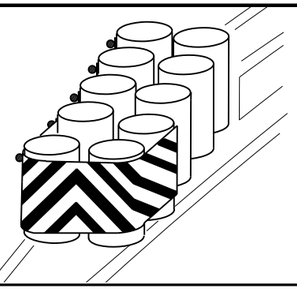
* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

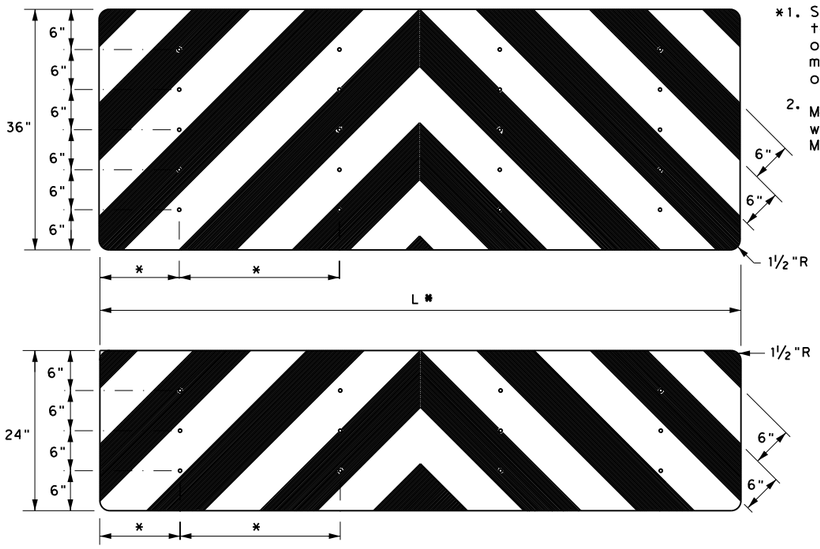


OBJECT MARKERS SMALLER THAN 3 FT^2









NOTES

*1. Spacing should be adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

2. Mounting should be flush with top of attenuator. Minimum size 96" x 24".

NOTES

1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification DMS 8300. Background shall be yellow reflective sheeting (Type B or C) and Chevron shall be black.

2. Object Markers may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears. A radius at the corners is not required for direct applied sheeting.

3. Object Marker size may be reduced to fit smaller devices. Width of alternating black and yellow stripes are typically 6". Object Markers smaller than 3ft may have reduced width stripes of a minimum of 2 ¼".

4. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.

5. Object Marker at nose of attenuator is subsidiary to the attenuator.

6. See D & OM (1-4) for required barrier reflectors.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER FOR VEHICLE IMPACT ATTENUATORS

D & OM(VIA)-20

FILE: domvia20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT December 1989	CONT	SECT	JOB	HIGHWAY
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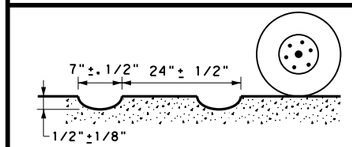
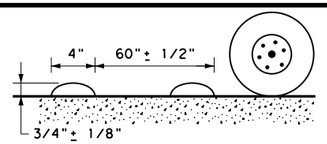
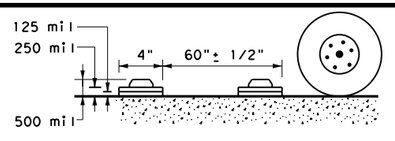
CENTERLINE RUMBLE STRIPS



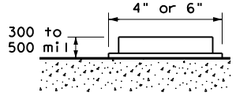
MILLED RUMBLE STRIPS



RAISED TRAFFIC BUTTONS

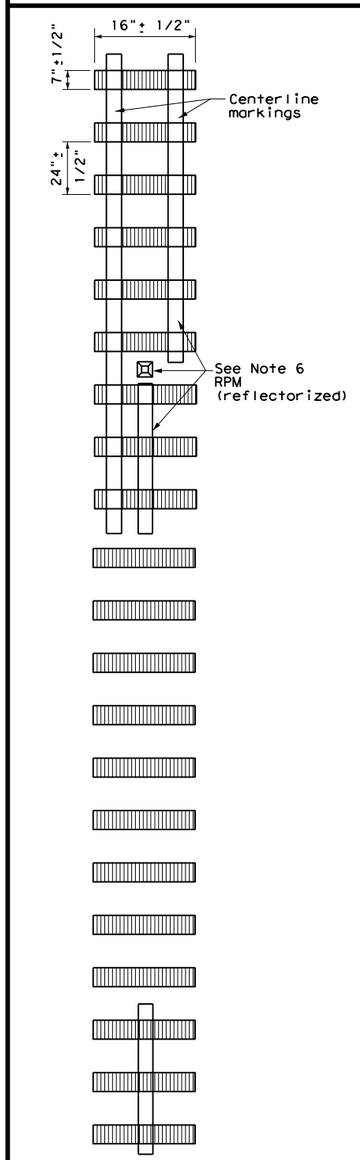


PREFORMED THERMOPLASTIC STRIPS



PROFILE MARKINGS

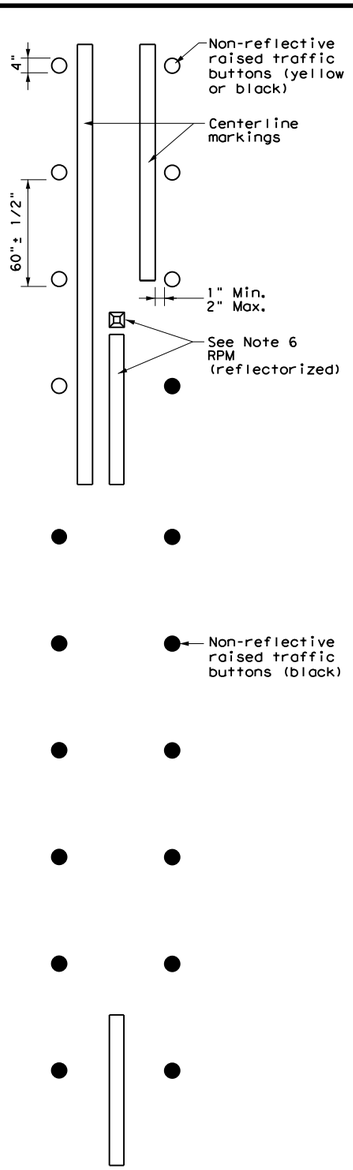
PROFILE VIEW



PLAN VIEW
OPTION 1

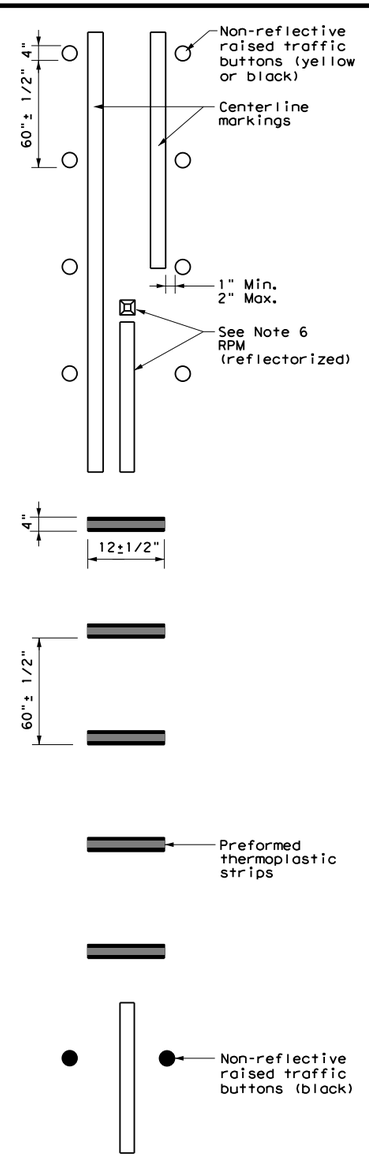
TWO LANE TWO-WAY ROADWAYS

MILLED CENTERLINE RUMBLE STRIPS



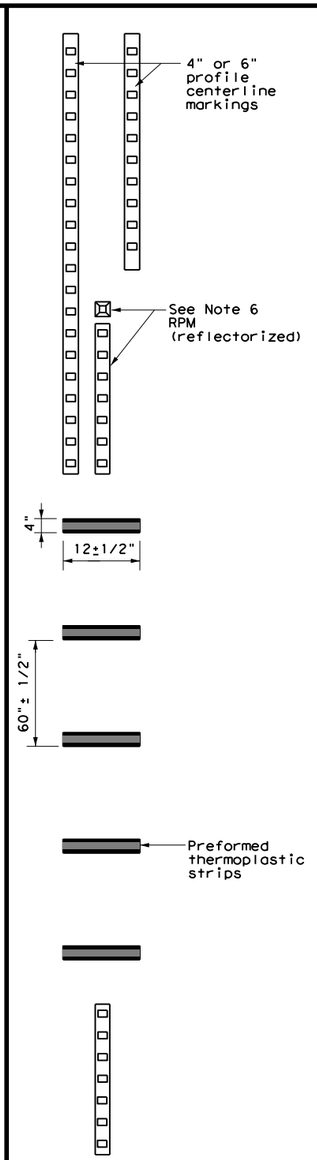
PLAN VIEW
OPTION 2

RAISED CENTERLINE RUMBLE STRIPS



PLAN VIEW
OPTION 3

RAISED CENTERLINE RUMBLE STRIPS AND PREFORMED THERMOPLASTIC STRIPS



PLAN VIEW
OPTION 4

PROFILE CENTERLINE MARKINGS AND PREFORMED THERMOPLASTIC STRIPS

GENERAL NOTES

1. This standard sheet provides guidelines for installing centerline rumble strips on two-lane highways with or without shoulders.
2. Centerline and edgeline rumble strips or profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
3. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
4. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
5. Breaks in milled centerline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks.
6. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, and dimensions pavement markings and profile markings.
7. Consideration should be given to noise levels when centerline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inch depth of milled rumble strip may be considered in these areas.
8. Pavement markings must be applied over milled centerline rumble strips.

WHEN INSTALLING CENTERLINE RUMBLE STRIPS:

9. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per manufacturer's recommendations.
10. When using non-reflective raised traffic buttons as a centerline rumble strip, the button shall be placed adjacent to the pavement marking delineating the centerline. The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
11. The color of the button should be yellow for a continuous no passing roadway. Black buttons should be used in areas where passing is allowed.

WHEN INSTALLING EDGELINE RUMBLE STRIPS WITH OR WITHOUT CENTERLINE RUMBLE STRIPS ON UNDIVIDED HIGHWAYS:

12. See standard sheet RS(4).

Texas Department of Transportation®
Traffic Operations Division Standard

CENTERLINE RUMBLE STRIPS ON TWO LANE TWO-WAY HIGHWAYS

RS(3)-13

FILE: rs(3)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT October 2013	CONT	SECT	JOB	HIGHWAY
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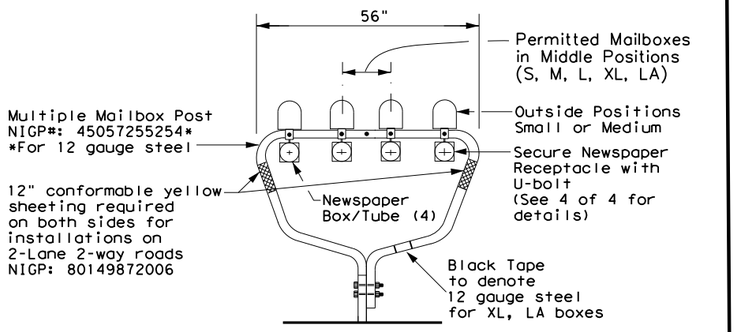

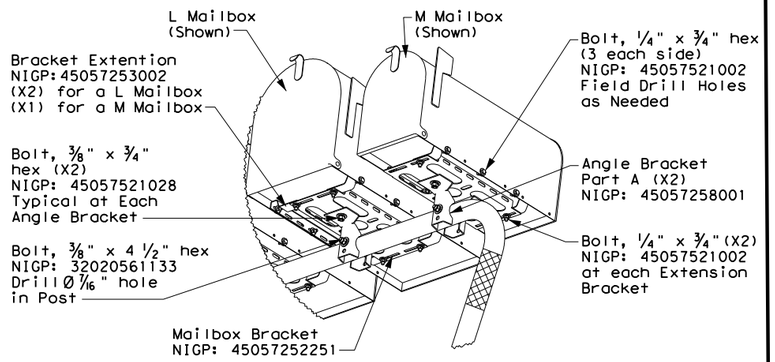

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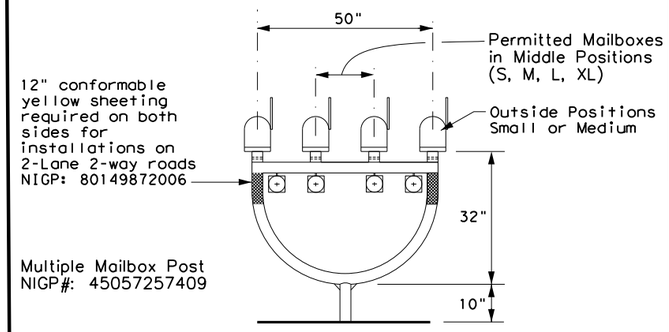
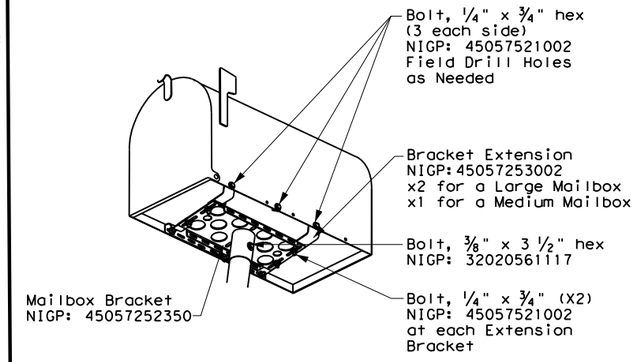




MAILBOX SIZES

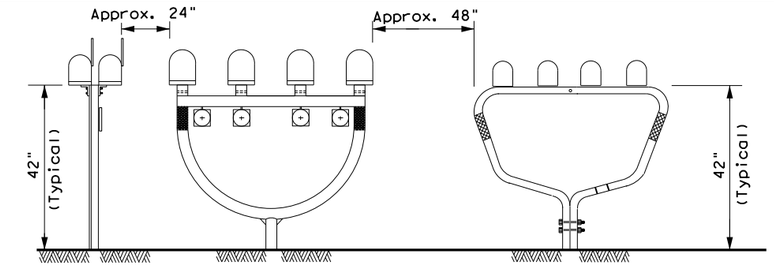
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

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

GENERAL NOTES:

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

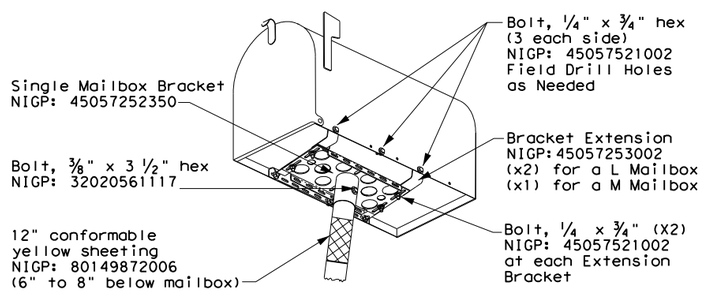
TYPICAL INSTALLATION MEASUREMENTS

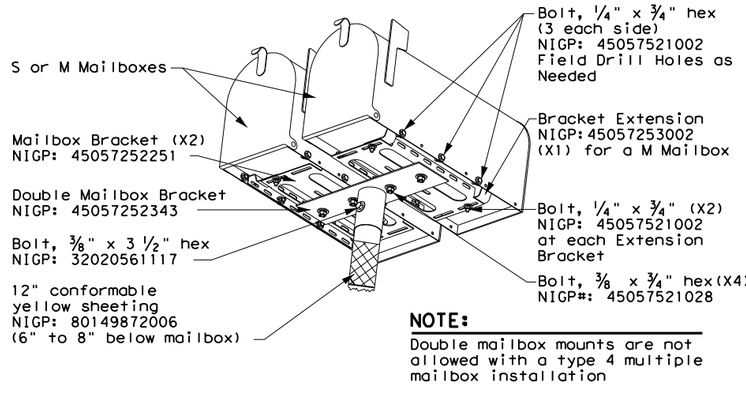


NOTE:

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

TYPE 2 and 4 - SINGLE/DOUBLE

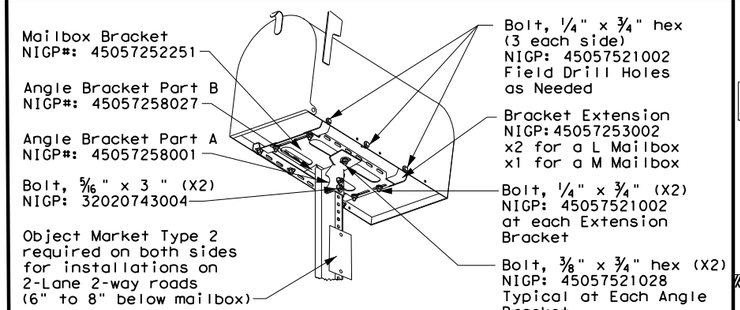


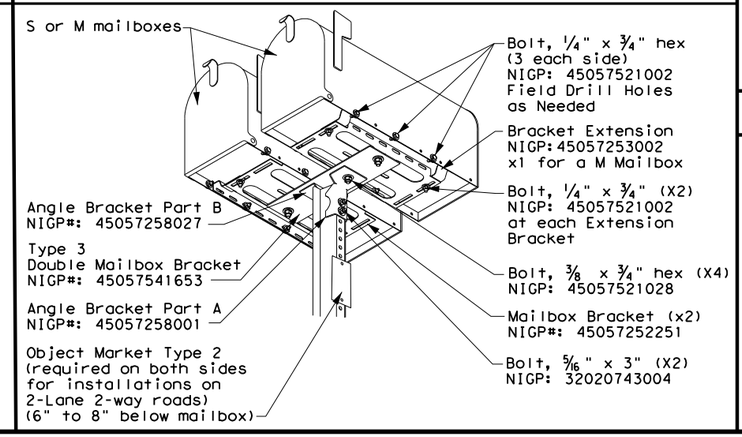


NOTE:

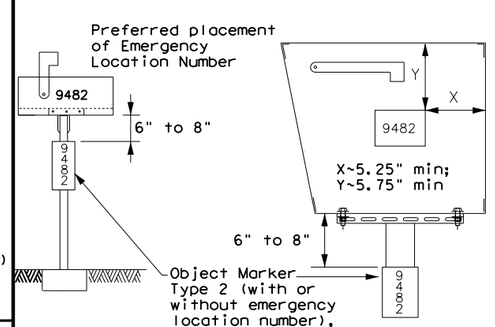
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

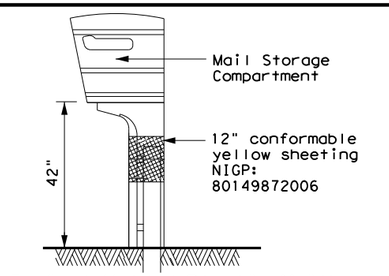


NOTES:

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

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation — Maintenance Division Standard

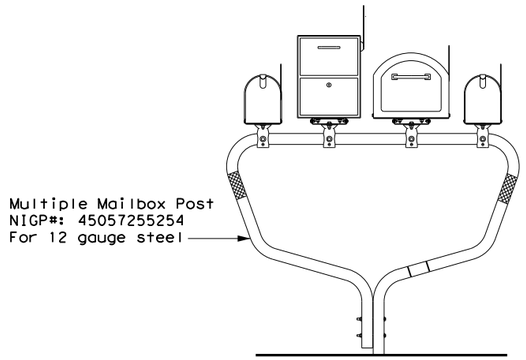
MAILBOX MOUNTING AND ASSEMBLY

MB(1)-21

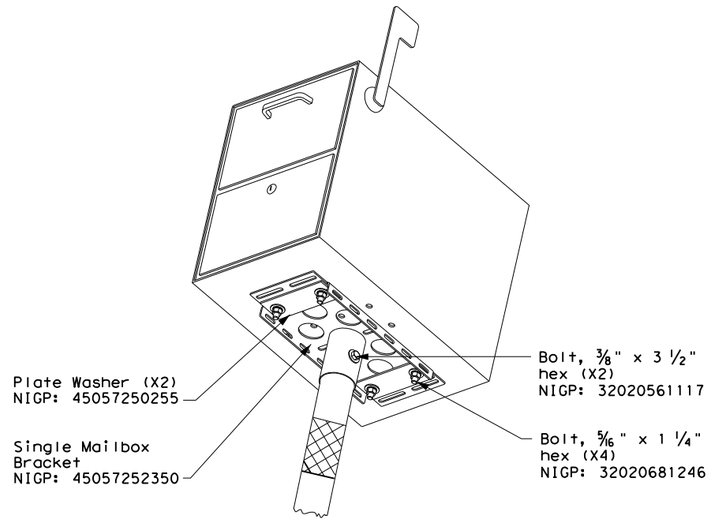
FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		103

DATE: 5/27/2022 2:15:15 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\000204033\24 - Design\Plan Set\13. Standards\ROADWAY\MB-21(1).dgn

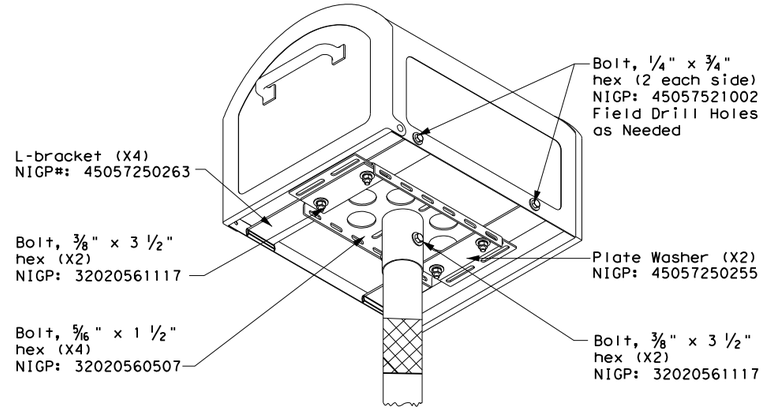
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

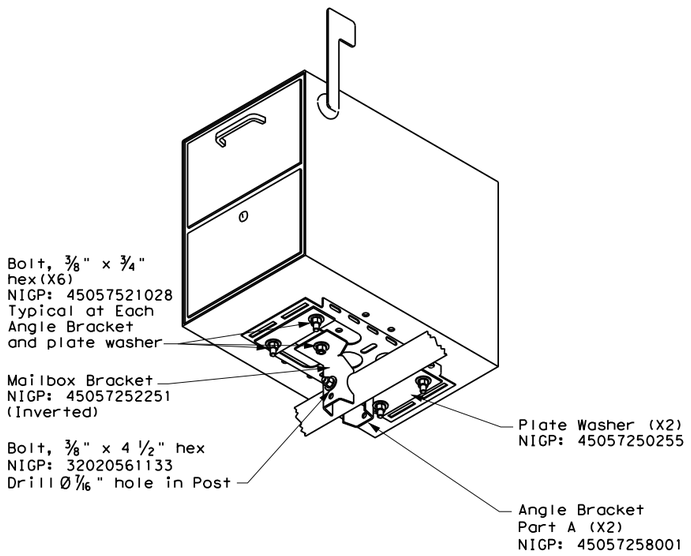


TYPE 2/4 - SINGLE XL MAILBOX

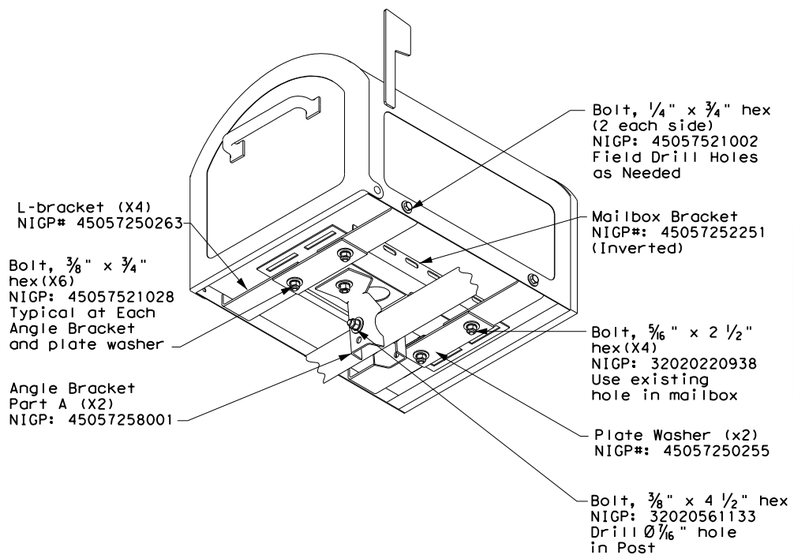


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

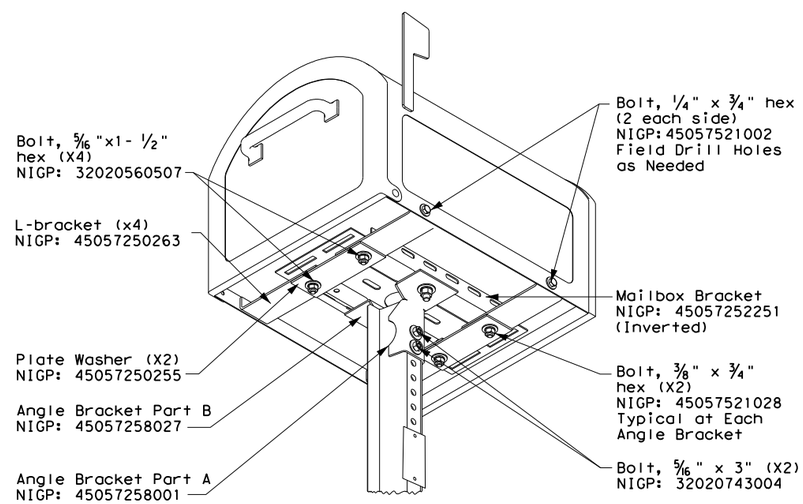
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation | Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

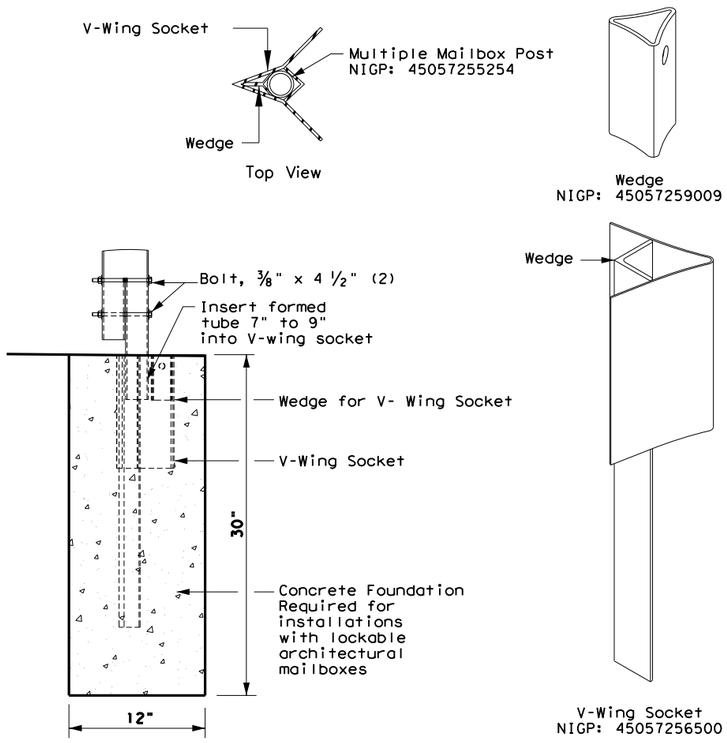
MB(2)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		104

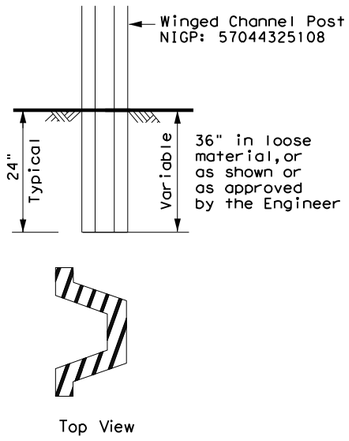
DATE: 5/27/2022 2:15:16 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\0002040334 - Design\Plan Set\13. Standards\ROADWAY\MB-21(1).dgn

TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



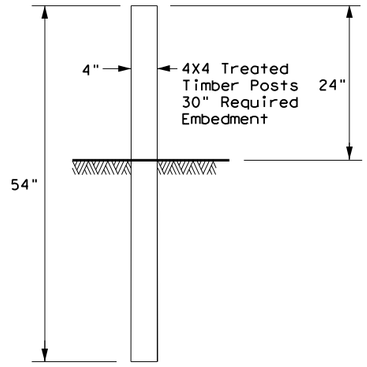
TYPE 3 - SUPPORT/FOUNDATION



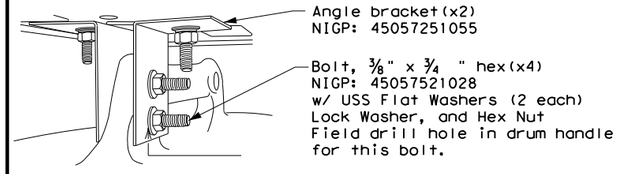
NOTES:

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

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

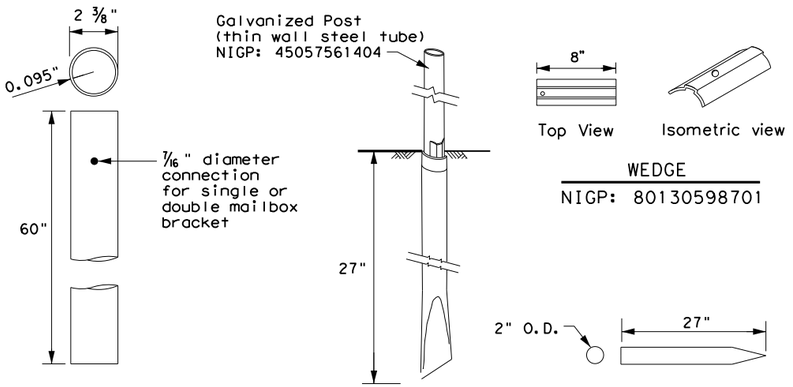
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:

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

TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System

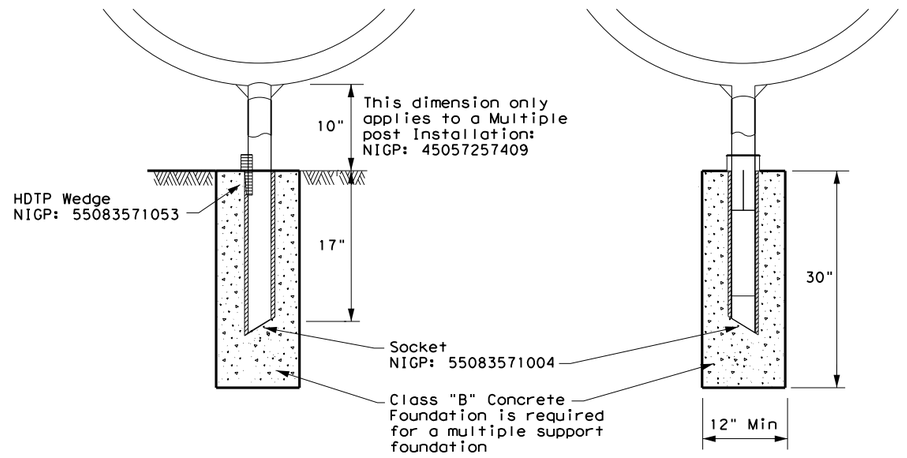


MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

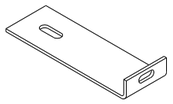
Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

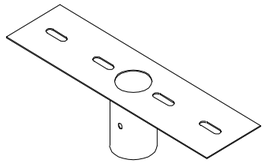
MB(3)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		105

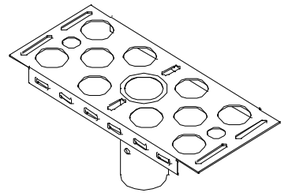
TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: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



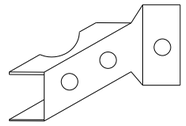
NIGP: 45057250263
L-Bracket x4 for
XL sized mailboxes



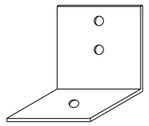
NIGP: 45057252343
Double Mailbox Bracket
For Type 2 and Type 4
double mount



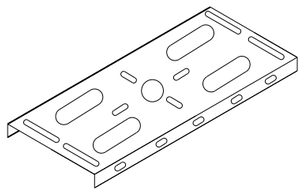
NIGP: 45057252350
Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



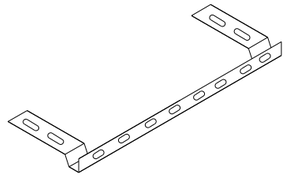
NIGP: 45057258001
Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



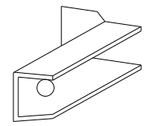
NIGP: 45057251055
Type 6 Angle Bracket
(2 per mailbox)



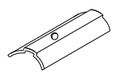
NIGP: 45057252251
Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



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



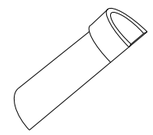
NIGP: 45057258027
Part "B" Angle Bracket
For Type 3 single
and double



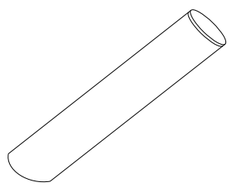
NIGP: 80130598701
Wedge for Type 2

NIGP: 45057250255
Plate Washer for Architecural
and XL Mailboxes

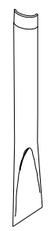
NIGP: 45057541653
Type 3 double mailbox bracket



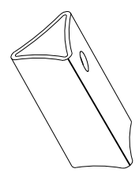
NIGP: 55083571053
Type 4 Mailbox Wedge



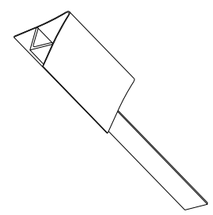
NIGP: 55083571004
Type 4 Mailbox Socket



NIGP: 80130238407
Type 2 Wedge Anchor



NIGP: 45057259009
Wedge for Type 1 V-wing Socket



NIGP: 45057256500
V-wing Socket for
Type 1 Foundation

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

NOTES:

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

BID CODES FOR CONTRACTS

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

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

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

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

Texas Department of Transportation

Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

MB(4)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	0002	04	033	SH 20
	DIST	COUNTY		SHEET NO.
	ELP	HUDSPETH		106

DATE: 5/27/2022 2:15:17 PM
FILE: pw:\\txdot.projectwiseonline.com:TXDOT5\Documents\24 - ELP\Design Projects\000204033\4 - Design\Plan Set\13. Standards\ROADWAY\MB-21(1).dgn

STORM WATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TPDES General Permit TXR150000. The operator, The Texas Department of Transportation ensures that: Project specifications provide that adequate BMPs have been developed for this project. The contractor shall be the party responsible for implementing the BMPs described herein. The contractor shall implement changes approved by the Project Engineer to the SWP3 within the times specified in the SWP3 or the TPDES General Permit. Operators affected by modifications to specifications will be notified in a timely manner.

1. SITE OR PROJECT DESCRIPTION:

NATURE OF THE CONSTRUCTION ACTIVITY: SEE TITLE SHEET

POTENTIAL POLLUTANTS AND	**SOURCES:**
Sediment laden storm water	*Storm water conveyance over disturbed areas*
Fuels, oils, and lubricants	*Construction vehicles and storage areas*
Construction debris and waste	*Various construction activities*
Trash	*Construction Site and Receptacles*
Restroom Facility	*Construction Silt Fence*
Sanitary Waste	

SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:

1. *Installation of silt fence*
2. *Roadway widening*
3. *Construction of Shoulders*
4. *Backfilling pavement edges*
5. *Removing existing signs and installing proposed signs*
6. *Remove silt fence*
7. *Clean up project*

AREAS:

TOTAL AREA OF PROJECT: 21.119 ACRES

TOTAL AREA OF SOIL DISTURBANCE: 15.78 ACRES

TOTAL AREA OFF-SITE: 0.00

WEIGHTED RUNOFF COEFFICIENT (BEFORE AND AFTER CONSTRUCTION): *N/A*

GENERAL LOCATION MAP: *SEE TITLE SHEET*

DETAILED SITE MAP: *SEE ROADWAY LAYOUT SHEETS*

THE LOCATION AND DESCRIPTION OF CONCRETE AND ASPHALT PLANTS:

Supporting Asphalt Plant Facilities will be located off site.

Supporting Concrete Plant Facilities will be located off site.

NAME OF RECEIVING WATERS: *N/A*

A COPY OF TPDES CGP TXR150000 IS INCLUDED IN THE SWP3 FILE.

401 WATER QUALITY CERTIFICATION: YES____ NO__X__

2. BEST MANAGEMENT PRACTICES (BMPs):

EROSION AND SEDIMENT CONTROLS: Erosion and sediment controls have been designed to retain sediment on-site. Controls shall be utilized to reduce off site transport of suspended sediments and pollutants if it is necessary to pump water from the site. Control measures shall be installed per specifications or as directed. Sediment must be removed from controls per the plan requirements or manufacturers recommendations, but no later than the time that design capacity has been reduced by 50%. If sediment escapes the site, accumulations will be removed to minimize further negative effects. Controls will be developed to limit the off site transportation of litter, construction debris, and construction materials.

INTERIM(INT), PERMANENT(PER), AND 401 CERTIFICATION BMP'S:

EROSION CONTROLS:	401	INT	PER
☐ *Compaction & Tracking of slopes*	__	__	__
☐ *Diversion Dike*	__	__	__
☐ *Preserve Existing Vegetation*	__	__	__
☐ *Soil Stabilization*	__	__	__
☐ *Permanent Vegetation*	__	__	__
☒ *No Erosion Controls are Required.*			

SEDIMENT CONTROLS:	401	INT	PER
☒ *Silt Fence*	__	X	__
☐ *Rock Berm*	__	__	__
☐ *Erosion Control Logs*	__	__	__
☐ *Vegetative Filter Strips*	__	__	__
☐ *Ditch Block*	__	__	__
☐ *No Sediment Controls are Required.*			

POST CONSTRUCTION TSS CONTROL (401 CERTIFICATION ONLY):

- ☐ *Vegetation Lined Drainage Ditch*
- ☐ *Retention/Irrigation*
- ☐ *Erosion Control Compost*
- ☐ *Grassy Swales*
- ☐ *Vegetative Filter Strips*
- ☒ *No Post Construction TSS Control Required.*

SEQUENCE OR SCHEDULE OF IMPLEMENTATION:

1. *Implement best management practices that include sediment control measures as shown on plans.*
2. *Maintain sediment control measures througout project.*
3. *Remove erosion control measures.*
4.
5.
6.

The El Paso District of the Texas Department of Transportation uses Site-Manager, a computer based construction record-keeping system. Documentation describing major grading activities, temporary or permanent cessation of construction, and stabilization measures is a part of this system and is incorporated by reference into this SWPPP.

Stabilization measures must be initiated within 14 days when practicable in portions of the site where construction has temporarily or permanently ceased, if earth disturbing activities will not be resumed within 21 days.

3. STRUCTURAL CONTROL PRACTICES:

Structural control practices for this project are listed elsewhere herein.

4. PERMANENT STORM WATER CONTROLS:

Structural control practices installed during construction will be maintained and inspected after construction has ceased on the site and until final stabilization is attained. Unless specified in the plans, after project acceptance TxDOT will assume maintenance responsibilities for the controls and measures. Other permanent controls include existing and proposed; riprap at culvert inlets and outlets, diversion dikes, swales, retaining walls, and other similar devices.

5. OTHER CONTROLS:

OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST: The off site vehicle tracking of sediments shall be minimized by removal of excess dirt from the road and at entrances to the work site. The generation of dust will be minimized as directed by the Project Engineer by dampening haul roads and covering haul trucks with a tarpaulin.

CONSTRUCTION AND WASTE MATERIALS: The contractor will maintain a clean, orderly construction site. Construction waste including trash, rubble, scrap and vegetation shall be disposed of in lidded dumpsters or in a manner approved by the Project Engineer. Disposal methods must meet Federal, State, and Local waste management guidelines. No construction waste will be buried or burned on site. Spoils disposal, material storage, and materials resulting from the destruction of existing roads and structures shall be stored in areas designated by the Project Engineer and protected from run-off. All waterways shall be cleared of temporary embankment, temporary bridges, matting, false work, piling, debris, or other obstructions placed during construction operations, that are not part of the finished work, as soon as practicable. All excess soil generated by the construction will be collected and disposed of by the contractor. Disposal areas, stockpiles, and haul roads shall be constructed in a manner that will minimize and control the amount of sediment that may enter receiving waters. Disposal areas shall not be located in any wetland, water body, or stream bed.

POLLUTANT SOURCES FROM AREAS OTHER THAN CONSTRUCTION: Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants. If potential pollutant sources are identified after the start of construction, controls and measures shall be implemented as directed by the Project Engineer.

5. OTHER CONTROLS (CONT):

DEDICATED ASPHALT PLANTS: Asphalt or asphaltic material for this project will be produced off site. If the project requires a dedicated asphalt plant and the plant within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer.

DEDICATED CONCRETE PLANTS: Cement or Concrete material for this project will be produced off site. If the project requires a dedicated concrete plant and the plant is within 1 mile of the project limits it will be considered an off site PSL. Consideration shall be given to on site plant and storage facilities and measures implemented as directed by the Project Engineer. Concrete trucks shall be wasted or washed out in locations designated by the Project Engineer. The locations shall be protected by a berm sufficient to contain all waste and wash water. Wash water shall not be allowed to enter any storm drainage system or waterway. The residual material and contaminated soil shall be collected and disposed of in accordance with Federal, State, and Local guidelines. Staging areas and vehicle maintenance areas shall be located and constructed in a manner to minimize the runoff of pollutants.

HAZARDOUS MATERIALS AND SPILL REPORTING: The contractor shall take appropriate measures to prevent, minimize, and control the spillage or leakage of hazardous materials and any associated wastes on site and in maintenance and staging areas. hazardous materials shall include but are not limited to paints, acids, solvents, asphalt products, chemical additives, curing compounds, oils, fuels, and lubricants. Hazardous materials shall not be stored, accumulated, or transported in open containers subject to precipitation or spillage, but shall be stored, accumulated, or transported in closed containers of the type recommended by the manufacturer. In the event of a spill the Project Engineer should be contacted immediately. All spills shall be immediately cleaned and any contaminated soil removed and disposed of in accordance with Local, State, and Federal laws. Fuel tanks shall be protected by a secondary containment, such as a lined berm, capable of containing 1.5 times the capacity of the tank, or as approved by the Project Engineer.

OFF SITE PSLs: All off site project specific locations including dedicated asphalt plants, concrete plants, or utility installations, required by the contractor, are the contractor's responsibility. The contractor shall secure all permits required by local, state, or federal laws for off site PSLs. The contractor shall provide diagrams and areas of disturbance for all PSL's within 1 mile of the project.

SANITARY FACILITIES: All sanitary or septic wastes that are generated onsite shall be treated and disposed of in accordance with state and local regulations. Raw sewage or septage shall not be discharged or buried on site. Precaution shall be taken to prevent illicit discharges to storm water. Licensed waste management contractors shall be required to dispose of sanitary waste. Porta johns will be required for the construction site or as directed by the Project Engineer.

VELOCITY DISSIPATION DEVICES: Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as shown in the plans or as directed by the Project Engineer to provide a non-erosive flow velocity from the structure to a watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

6. APPROVED STATE AND LOCAL PLANS:

This SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or permits approved by federal, state, or local officials.

7. MAINTENANCE:

Control measures shall be properly installed according to specifications. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must replace or modify the control as soon as practicable after discovery. Control measures shall be maintained in effective operating condition. If inspections determine that BMPs are not operating effectively maintenance will be performed as necessary to continue the effectiveness of the controls. Maintenance must be accomplished as soon as practicable. Controls adjacent to creeks, culverts, bridges, and water crossings shall have priority. Controls that have been disabled, run over, removed, or otherwise rendered ineffective must be corrected immediately upon discovery.

8. INSPECTION OF CONTROLS:

A TxDOT inspector will inspect disturbed areas of the site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion controls measures identified in the SWP3 will be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking. Inspections will be conducted every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. The SWP3 will be modified based on the result of these inspections. Revisions will be completed within 7 Calendar days following the inspection. Revised implementation schedules will be described in the SWP3 and implemented as soon as practicable. Rain gages will be maintained on site for the duration of the project. Reports summarizing the scope of the inspections are included in the SWP3 file.

9. NON-STORM WATER COMPONENTS:

The contractor shall be required to implement appropriate pollution prevention controls and measures for all eligible non-storm water components of the discharge as approved and directed by the Project Engineer.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

REV: 07-2014

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SWP3)

Texas Department of Transportation

FED. RD. DIV. NO.			SHEET NO.
6			107
STATE	STATE DIST.	COUNTY	
TEXAS	ELP	HUDSPETH	
CONT.	SECT.	JOB	HIGHWAY NO.
0002	04	033	SH 20

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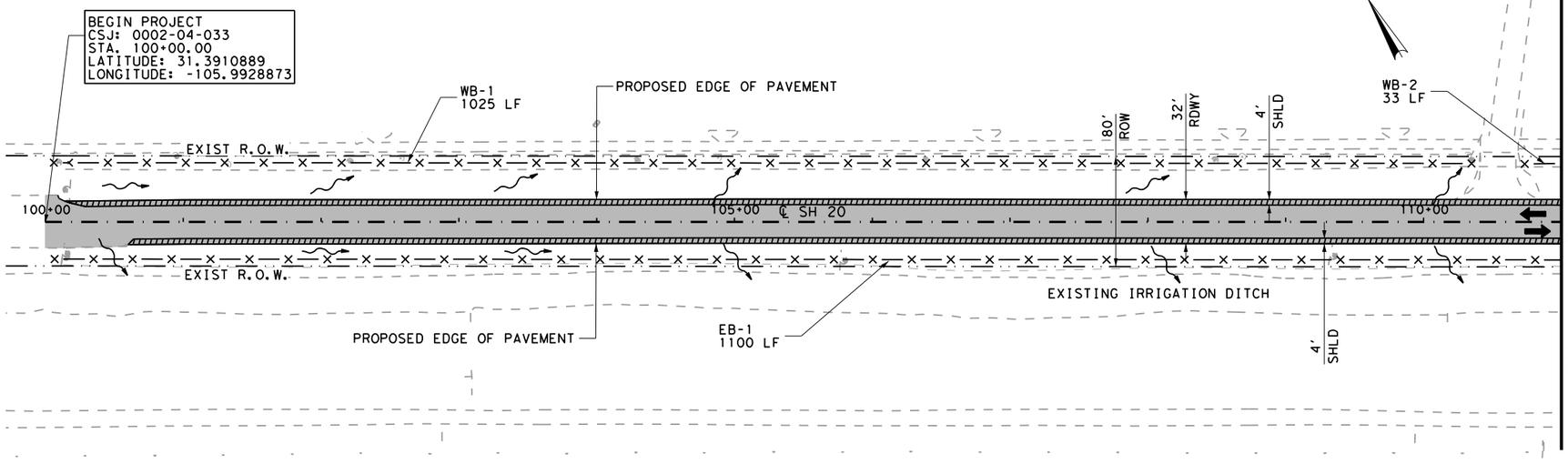


0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

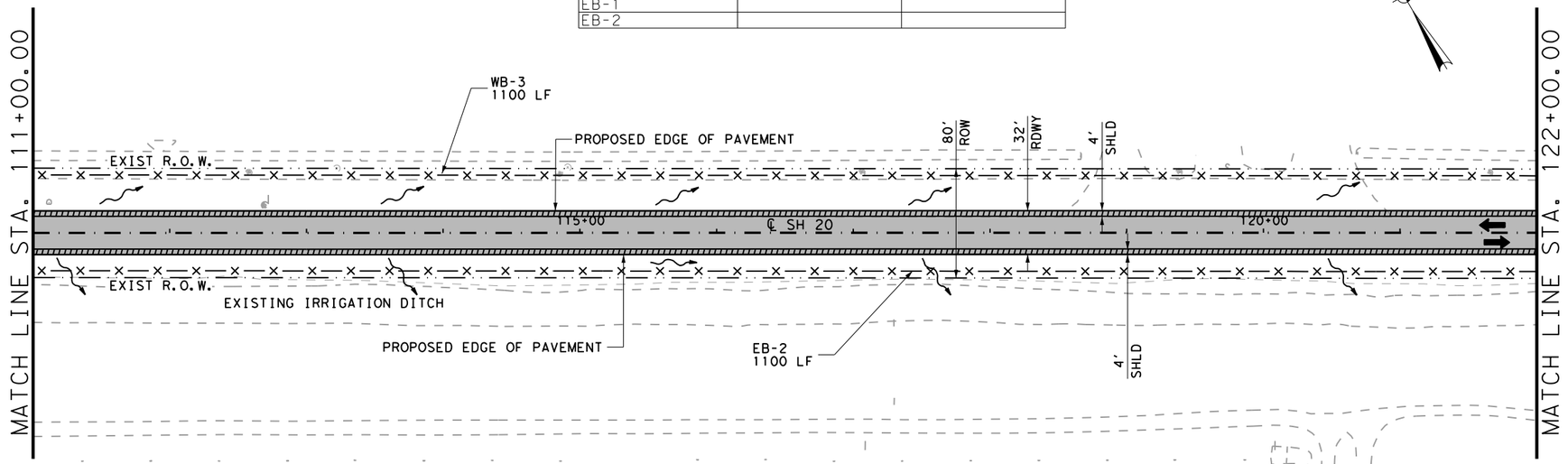
2. MINIMIZE DISTURBANCE OF EXISTING VEGETATION WITHIN THE CONSTRUCTION SITE.

3. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY ENGINEER.

4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

SWP3 ESTIMATE (SHEET 1 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	4358
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	4358

SEDIMENT CONTROL FENCE		
BMP ID	DATE INSTALLED	DATE REMOVED
WB-1		
WB-2		
WB-3		
EB-1		
EB-2		



STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

BEGIN STA. 100+00 TO STA. 122+00.00

SHEET 1 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		108

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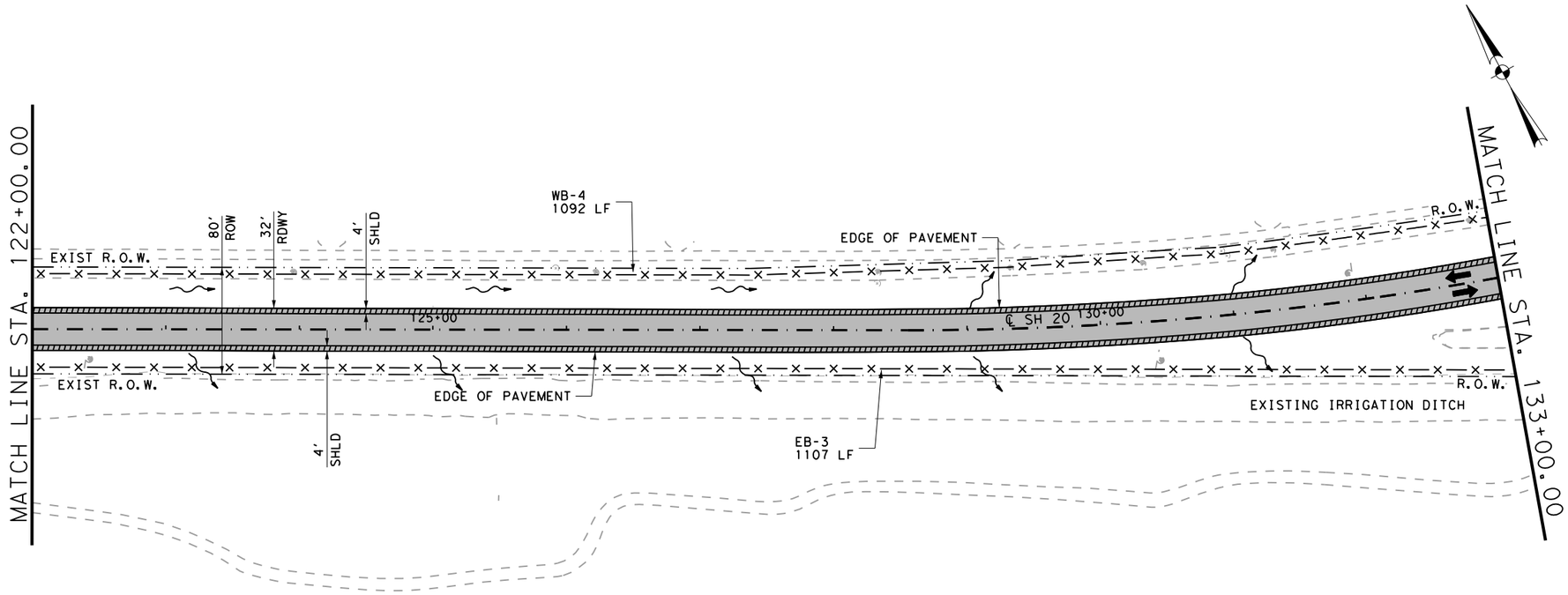
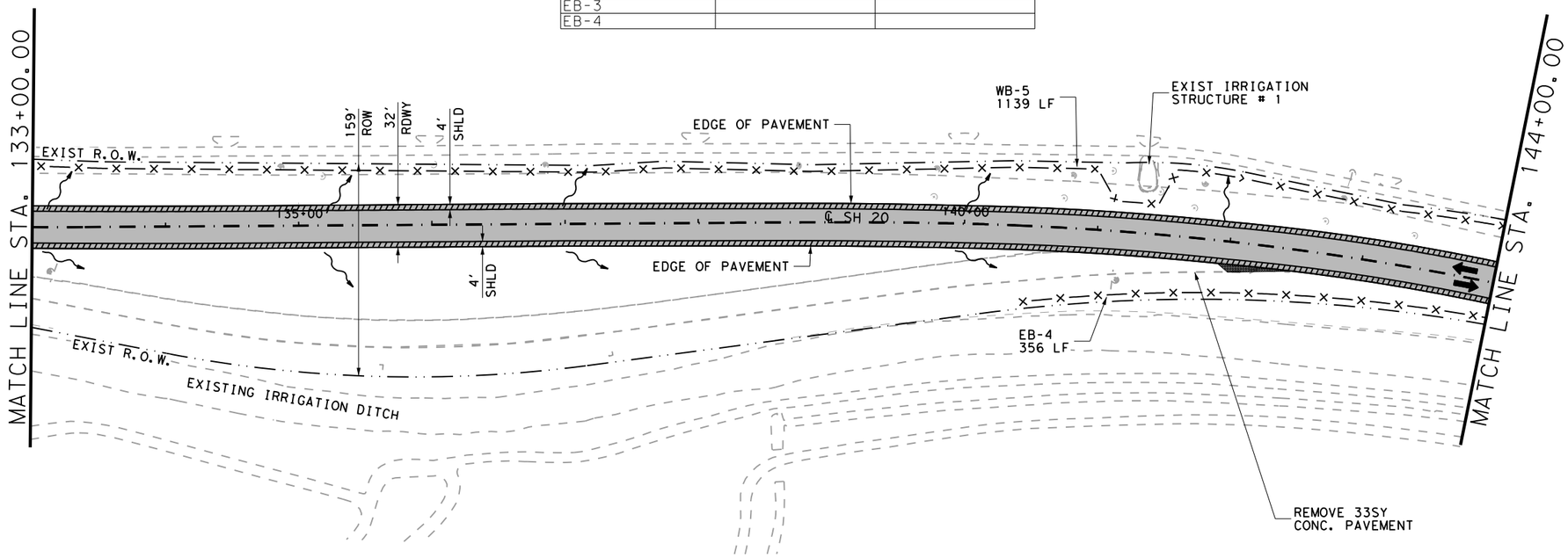
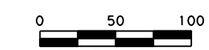


SWP3 ESTIMATE (SHEET 2 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	3694
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	3694

SEDIMENT CONTROL FENCE		
BMP ID	DATE INSTALLED	DATE REMOVED
WB-4		
WB-5		
EB-3		
EB-4		





LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

2. MINIMIZE DISTURBANCE OF EXISTING VEGETATION WITHIN THE CONSTRUCTION SITE.

3. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY ENGINEER.

4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

STATE OF TEXAS
ALEJANDRO FRANCO
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LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 122+00.00 TO STA. 144+00.00

SHEET 2 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		109

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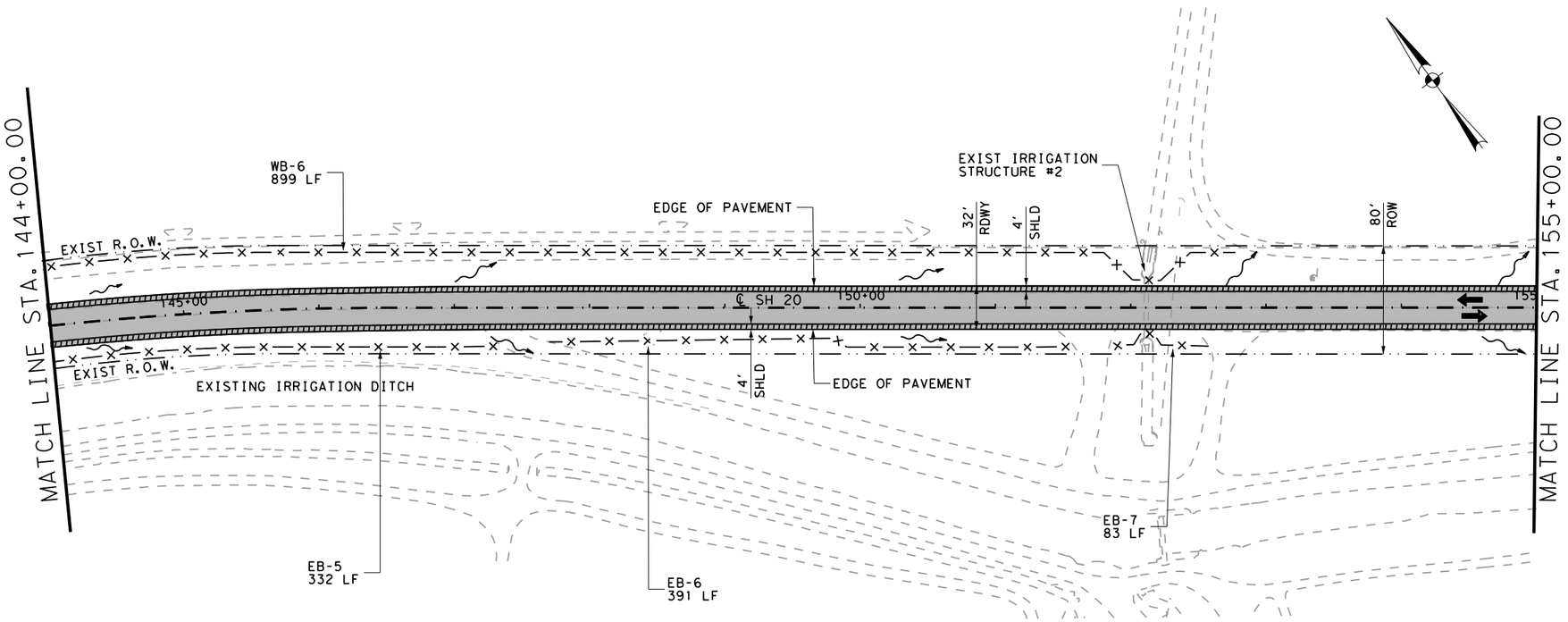

SWP3 ESTIMATE (SHEET 3 OF 13)				
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506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2130

SEDIMENT CONTROL FENCE		
BMP ID	DATE INSTALLED	DATE REMOVED
WB-6		
EB-5		
EB-6		
EB-7		
EB-8		

0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

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3. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY ENGINEER.

4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

STATE OF TEXAS
ALEJANDRO FRANCO
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05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 144+00.00 TO STA. 166+00.00

SHEET 3 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		110

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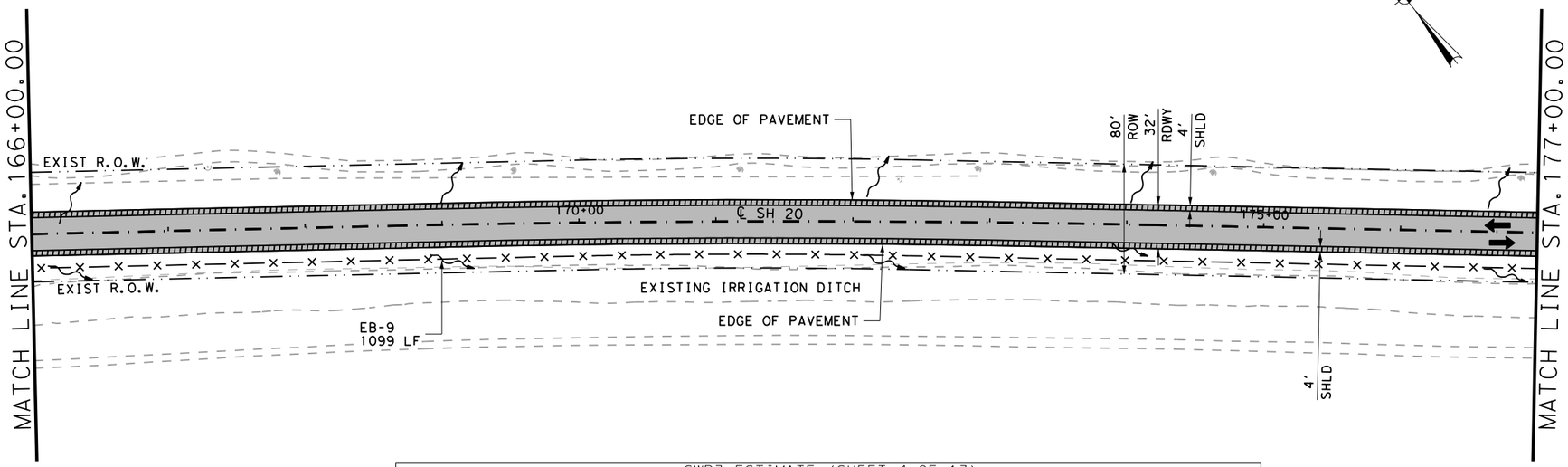

SWP3 ESTIMATE (SHEET 4 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2186
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2186

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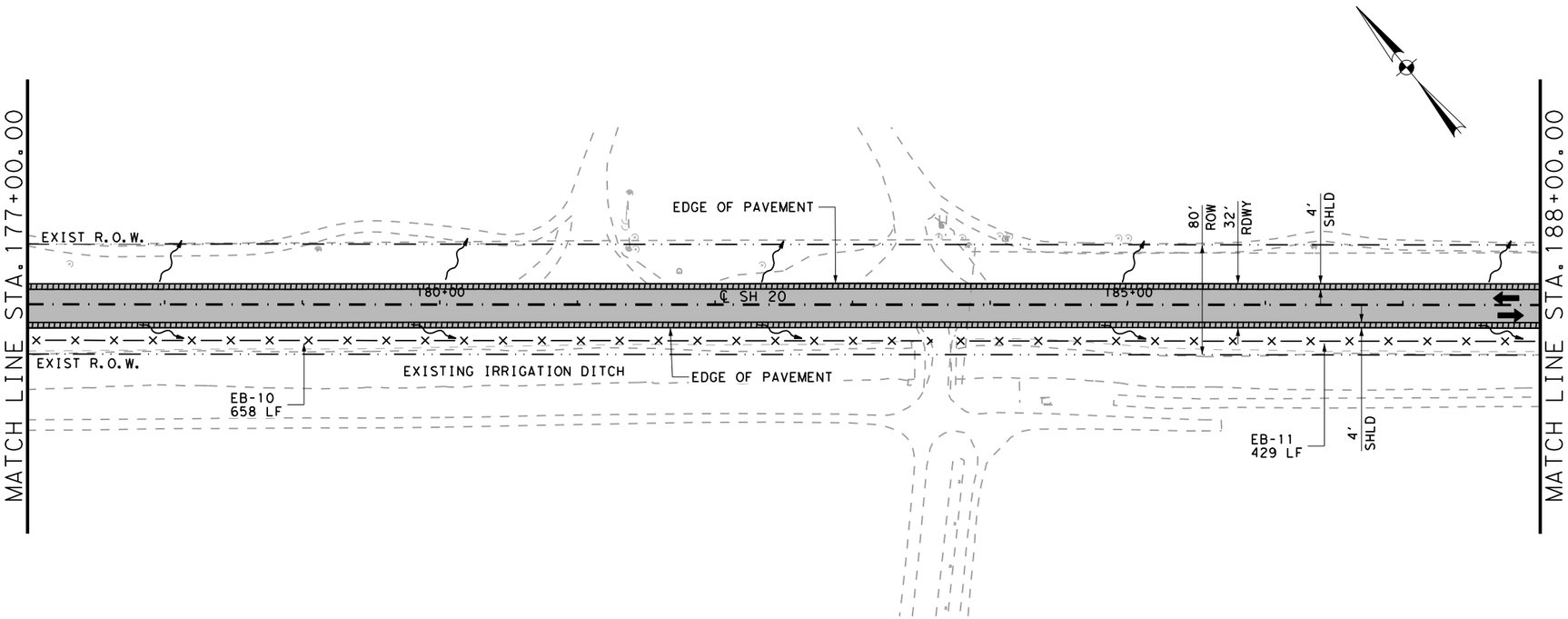
BMP ID	DATE INSTALLED	DATE REMOVED
EB-9		
EB-10		
EB-11		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

2. MINIMIZE DISTURBANCE OF EXISTING VEGETATION WITHIN THE CONSTRUCTION SITE.

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4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

STATE OF TEXAS
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SH 20

SWP3 LAYOUT SHEET

STA. 166+00.00 TO STA. 188+00.00

SHEET 4 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		111

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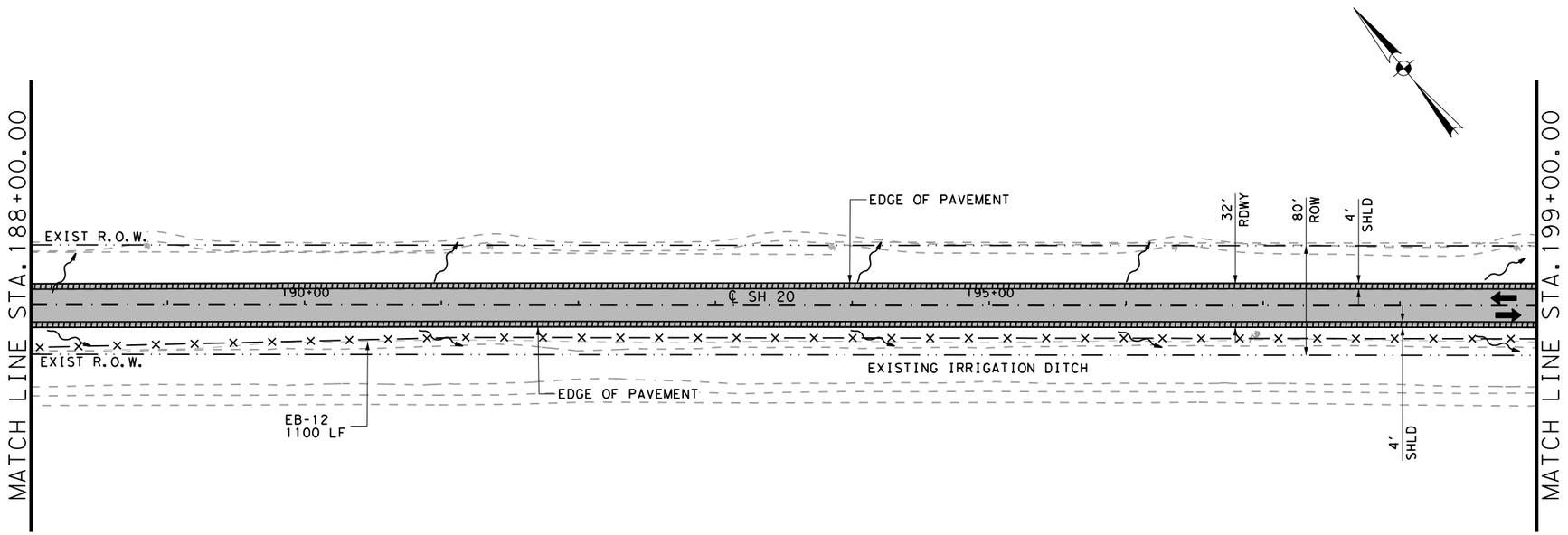

SWP3 ESTIMATE (SHEET 5 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2200
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2200

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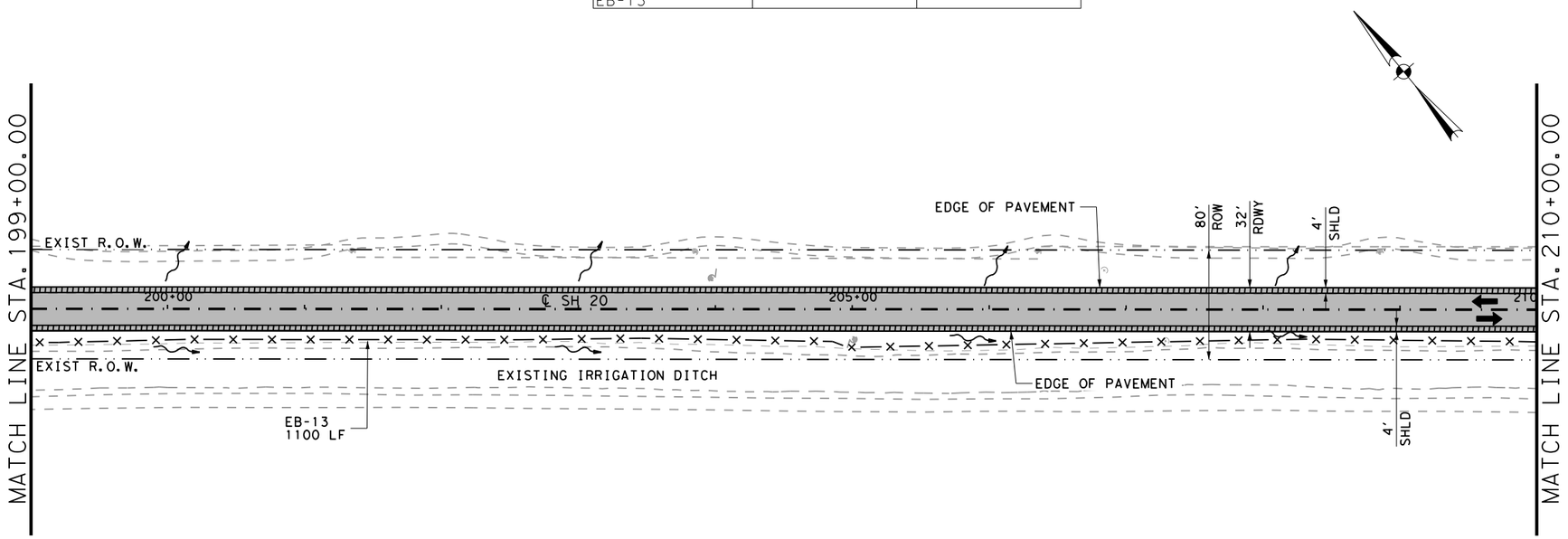
BMP ID	DATE INSTALLED	DATE REMOVED
EB-12		
EB-13		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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2. MINIMIZE DISTURBANCE OF EXISTING VEGETATION WITHIN THE CONSTRUCTION SITE.

3. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY ENGINEER.

4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
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PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 188+00.00 TO STA. 210+00.00

SHEET 5 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		112

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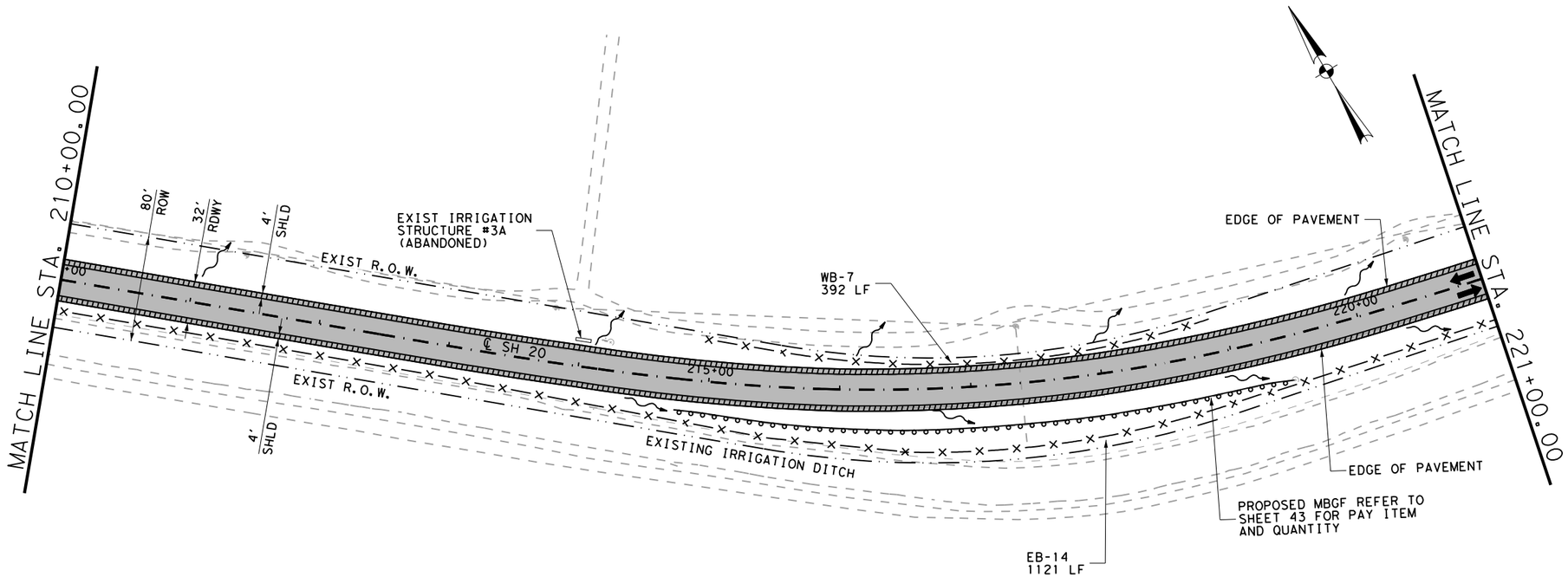

0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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2. MINIMIZE DISTURBANCE OF EXISTING VEGETATION WITHIN THE CONSTRUCTION SITE.

3. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY ENGINEER.

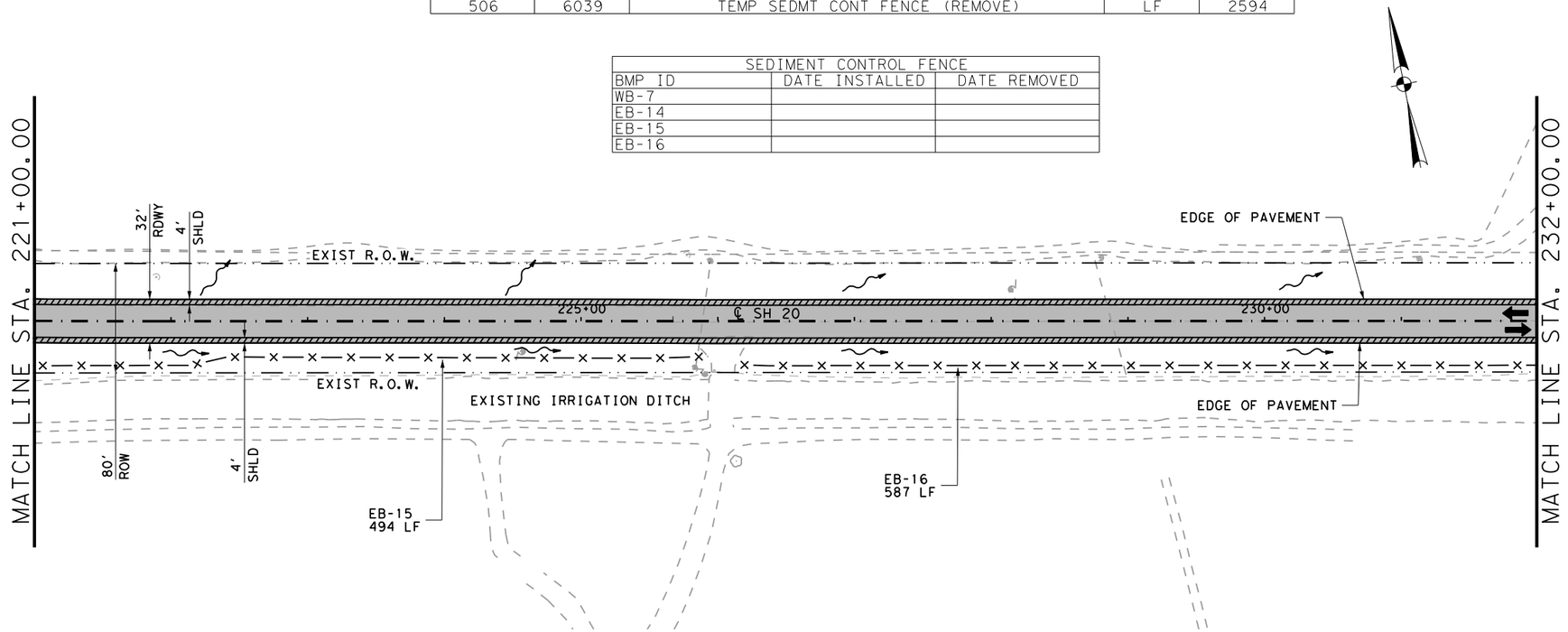
4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

SWP3 ESTIMATE (SHEET 6 OF 13)

ITEM	CODE	DESCRIPTION	UNIT	QTY
506	6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	2594
506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2594

SEDIMENT CONTROL FENCE

BMP ID	DATE INSTALLED	DATE REMOVED
WB-7		
EB-14		
EB-15		
EB-16		



STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 210+00.00 TO STA. 232+00.00

SHEET 6 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		113

DATE: 5/27/2022 4:59:12 PM
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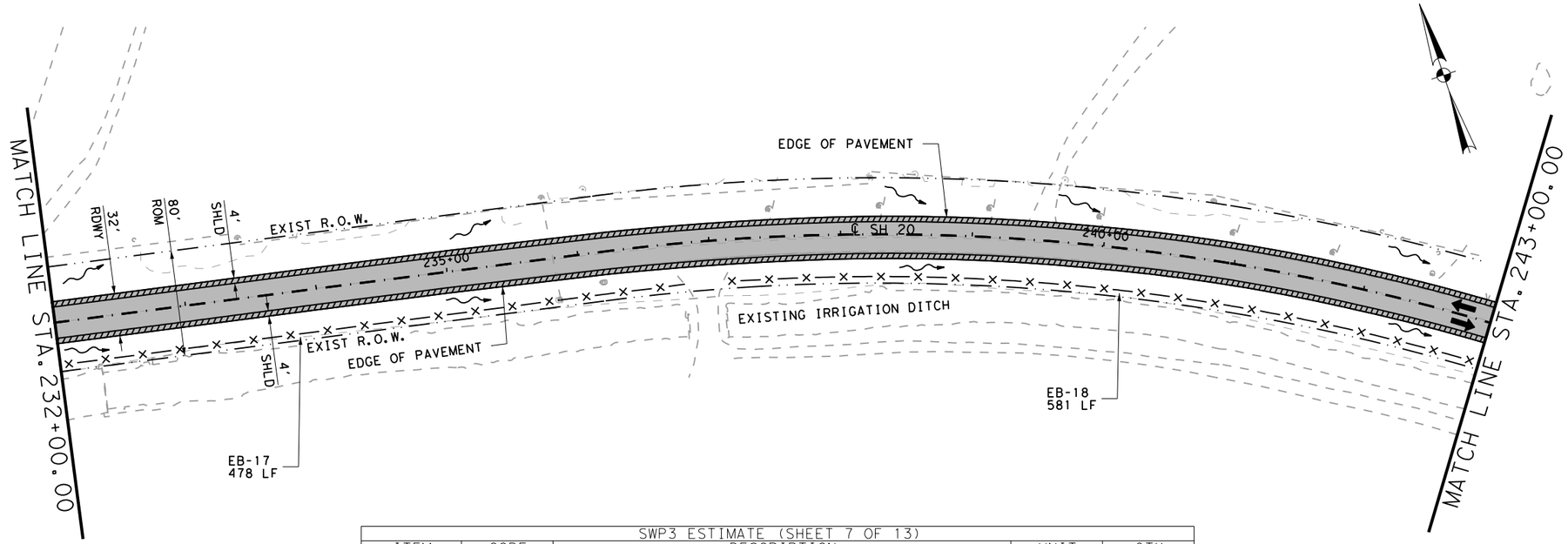

SWP3 ESTIMATE (SHEET 7 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
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506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2221

SEDIMENT CONTROL FENCE		
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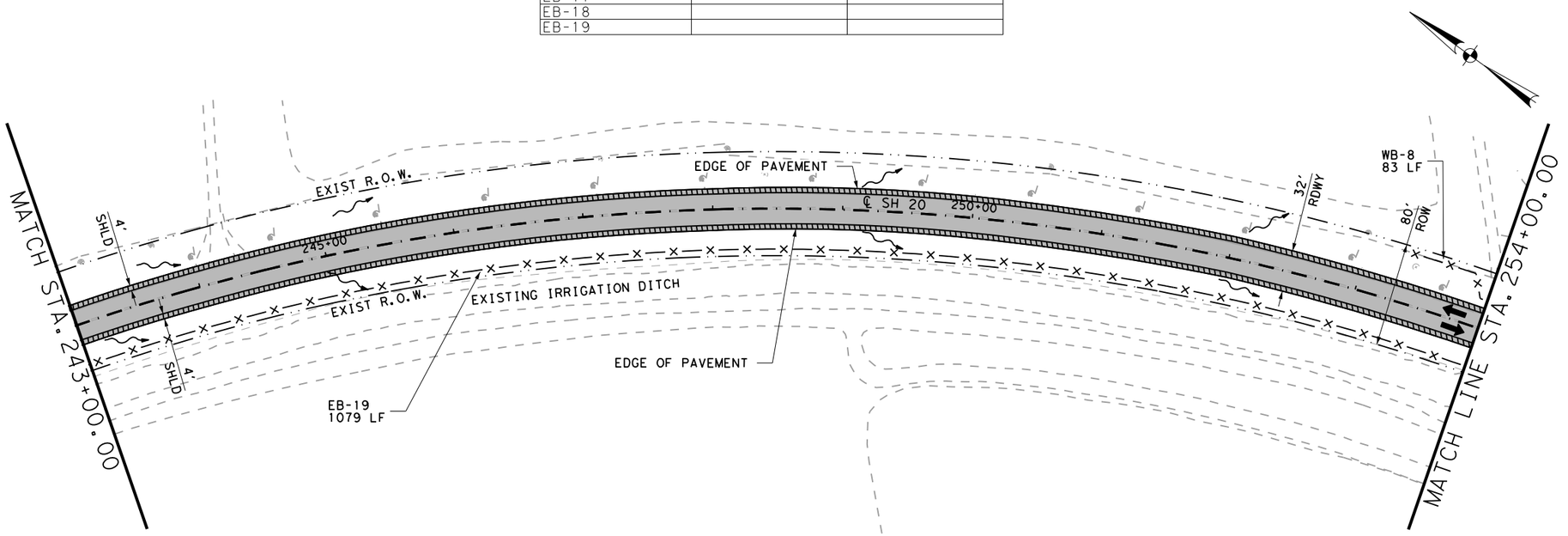
EB-17		
EB-18		
EB-19		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

2. MINIMIZE DISTURBANCE OF EXISTING VEGETATION WITHIN THE CONSTRUCTION SITE.

3. MAINTAIN SWP3 DEVICES FROM PREVIOUS PHASES THAT DO NOT CONFLICT WITH CURRENT WORK OR AS OTHERWISE DIRECTED BY ENGINEER.

4. SEE TYPICAL SECTION SHEETS FOR TYPE AND LIMITS OF SOIL DISTURBANCE AND STABILIZATION.

STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 232+00.00 TO STA. 254+00.00

SHEET 7 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		114

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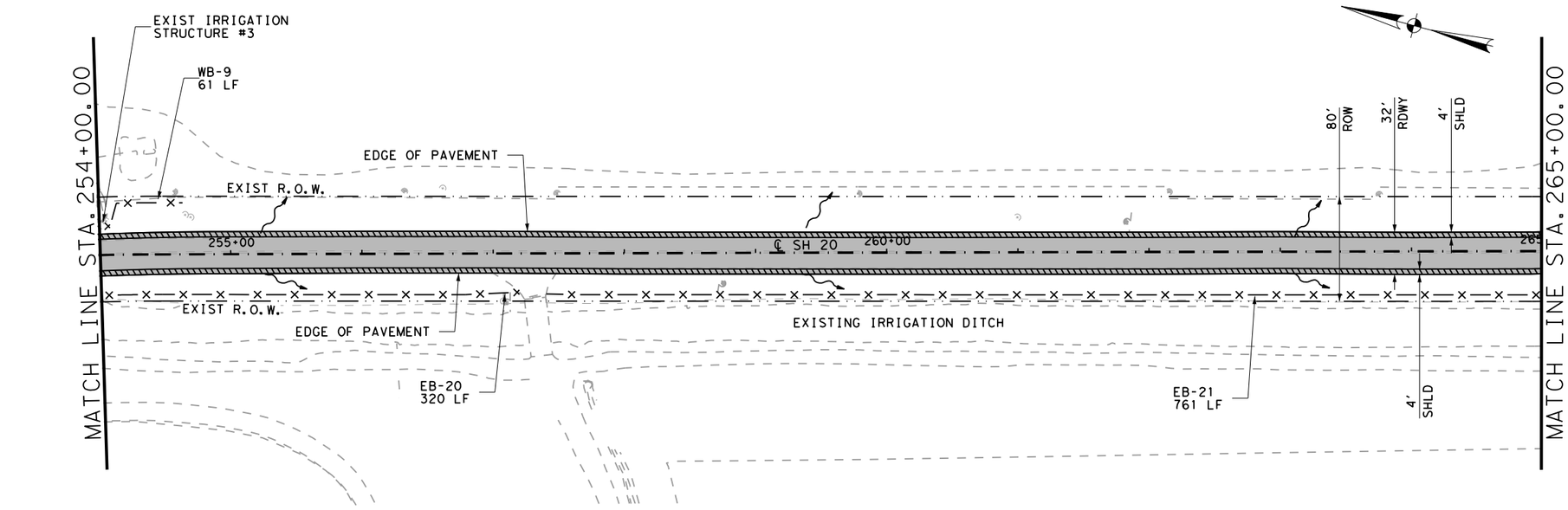

SWP3 ESTIMATE (SHEET 8 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
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506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2397

SEDIMENT CONTROL FENCE		
BMP ID	DATE INSTALLED	DATE REMOVED
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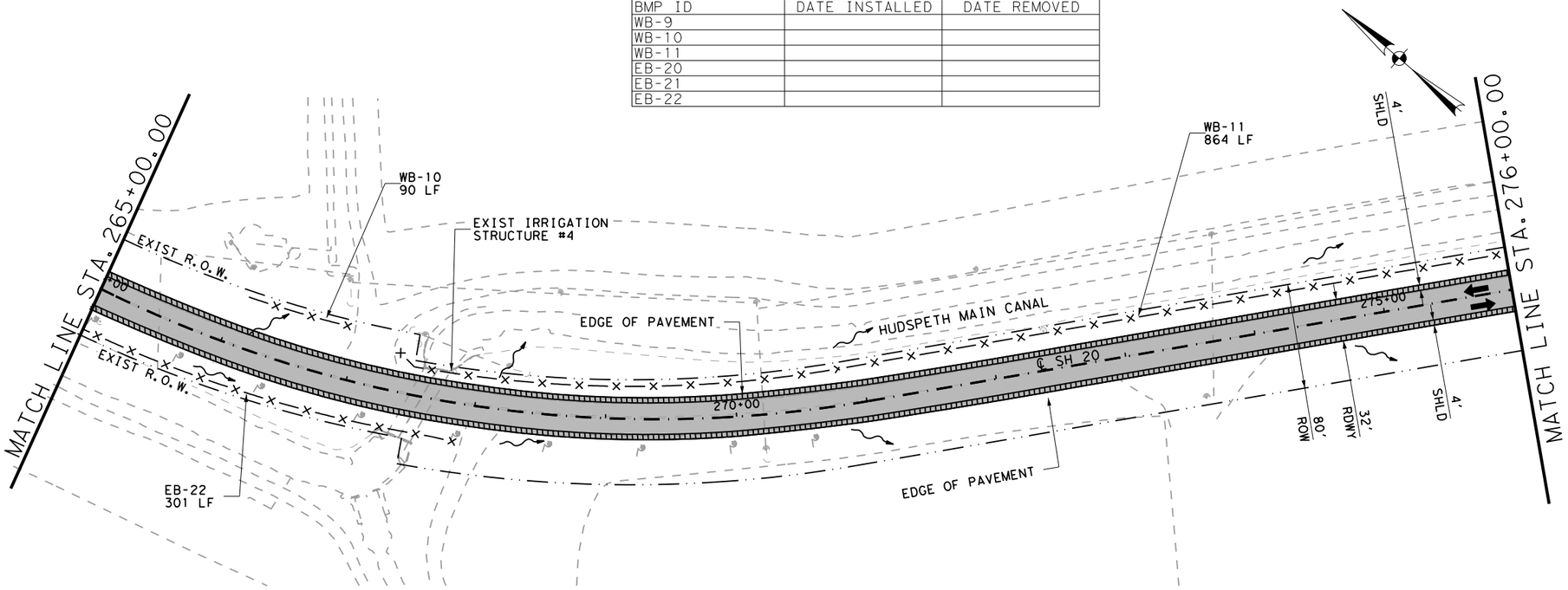
WB-10		
WB-11		
EB-20		
EB-21		
EB-22		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

1. BMPS SHALL NOT BE INSTALLED ANY SOONER THAN TWO WEEKS PRIOR TO SOIL DISTURBING ACTIVITIES IN THEIR CONTROL AREA.

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05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 254+00.00 TO STA. 276+00.00

SHEET 8 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		115

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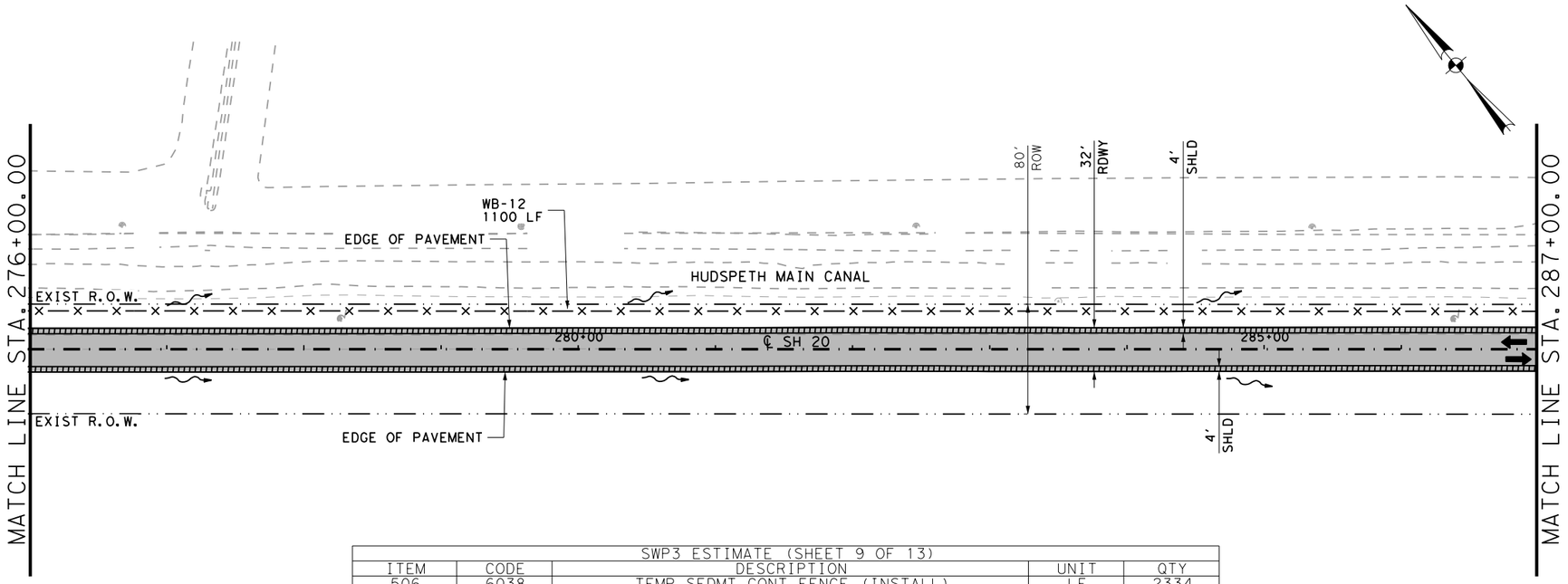

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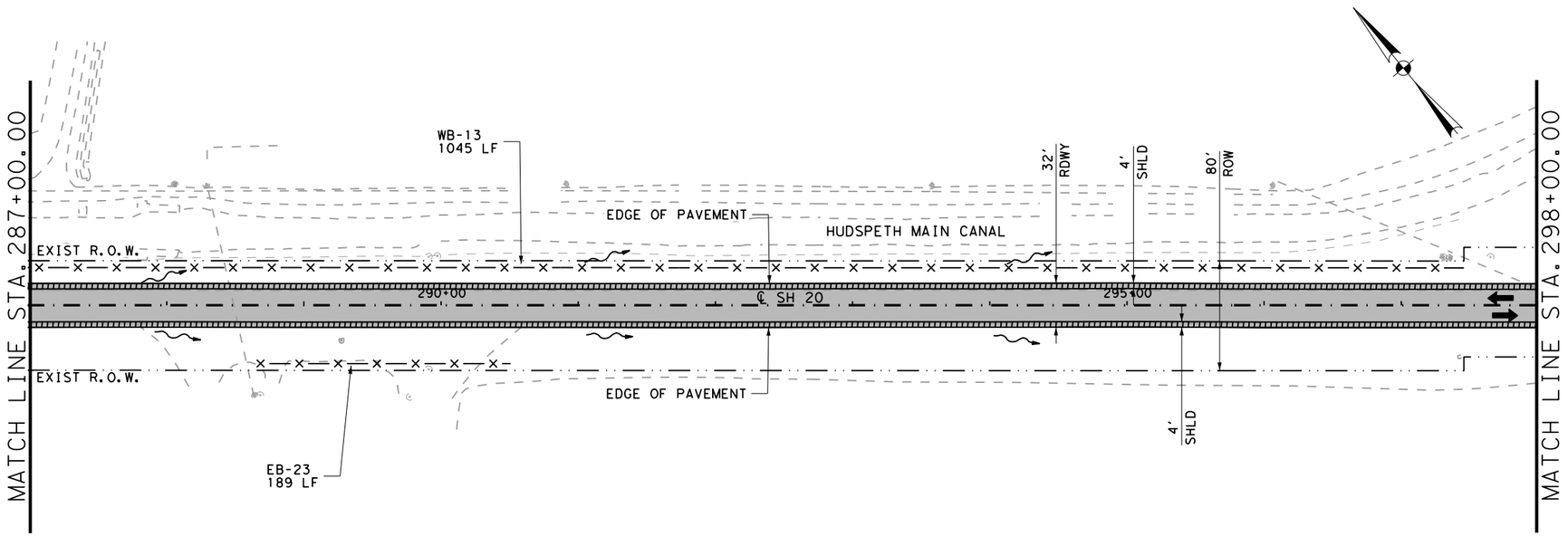
WB-13		
EB-23		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
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PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 276+00.00 TO STA. 298+00.00

SHEET 9 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		116

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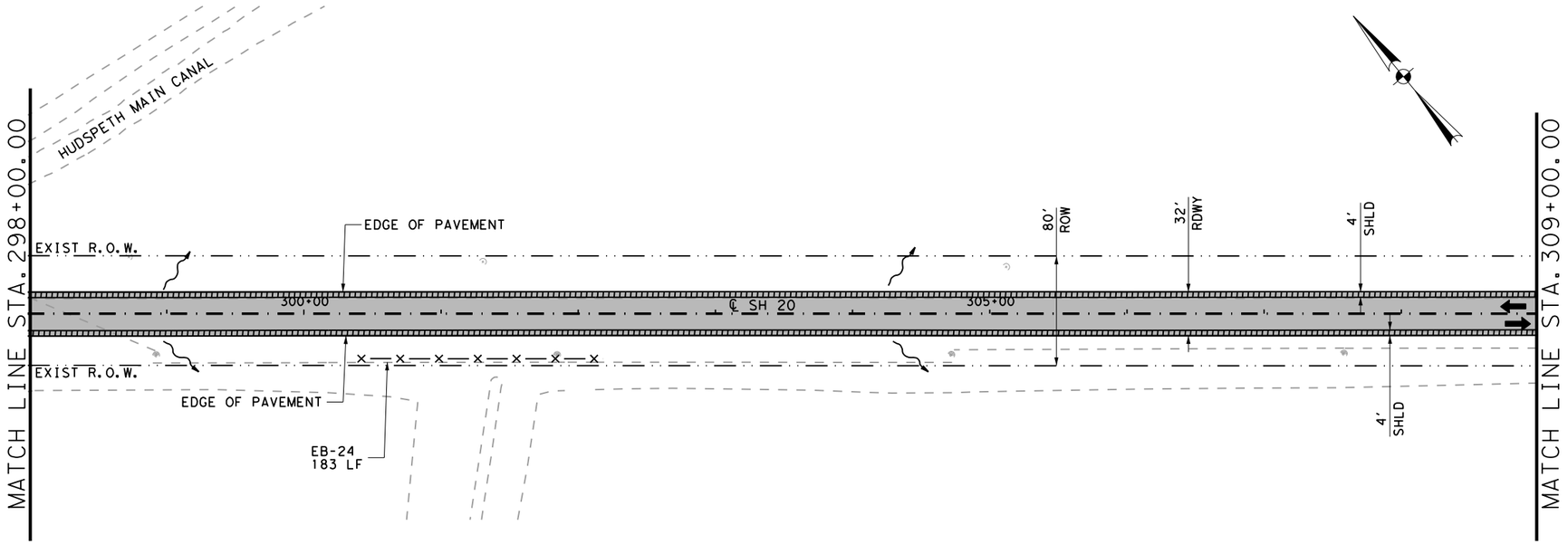

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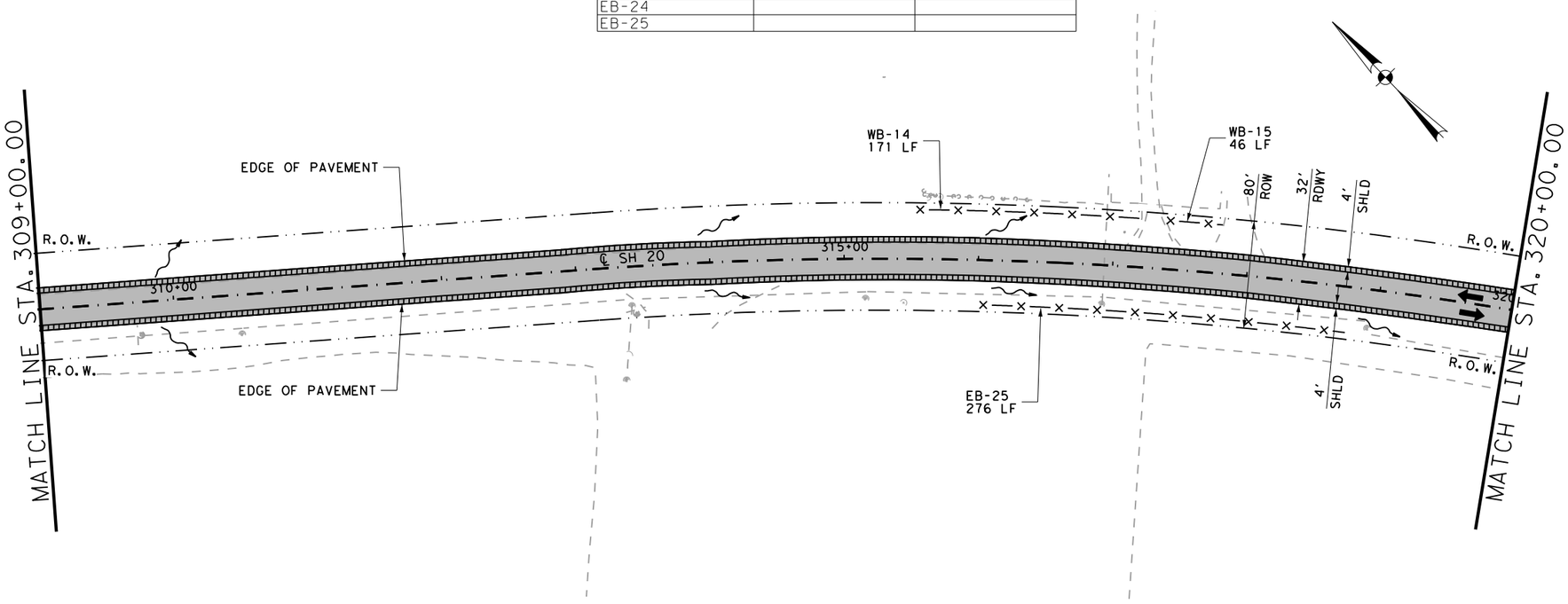
WB-15		
EB-24		
EB-25		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
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05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 298+00.00 TO STA. 320+00.00

SHEET 10 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		117

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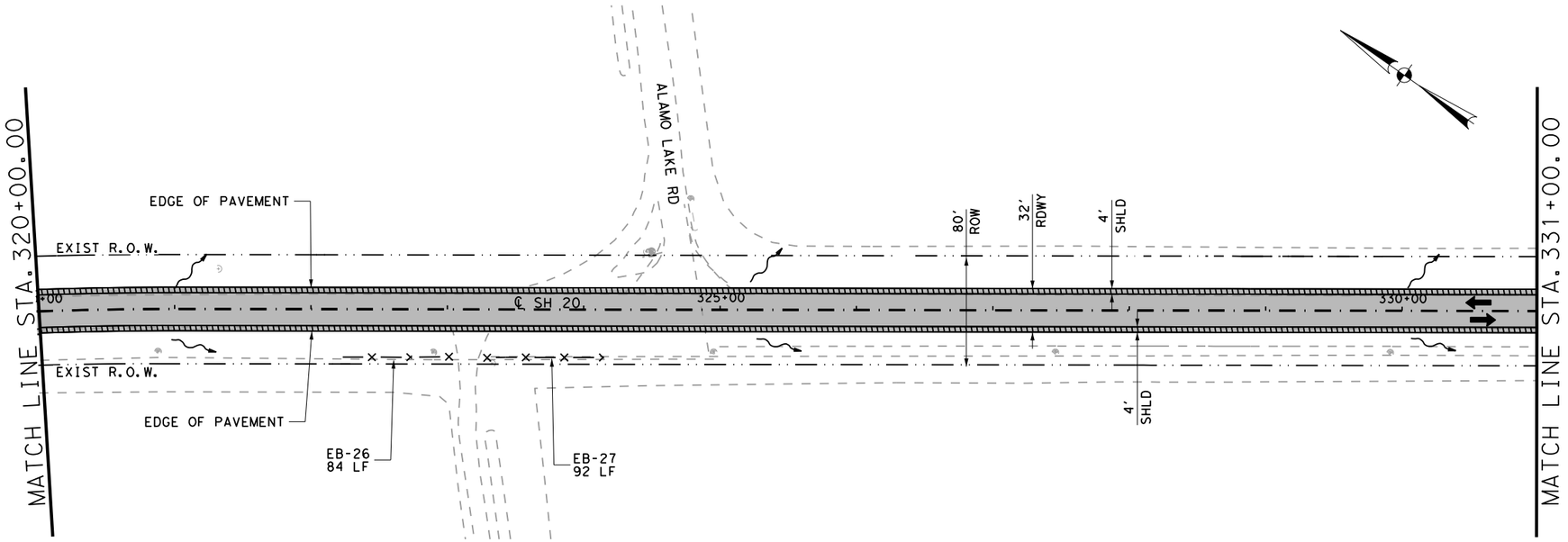

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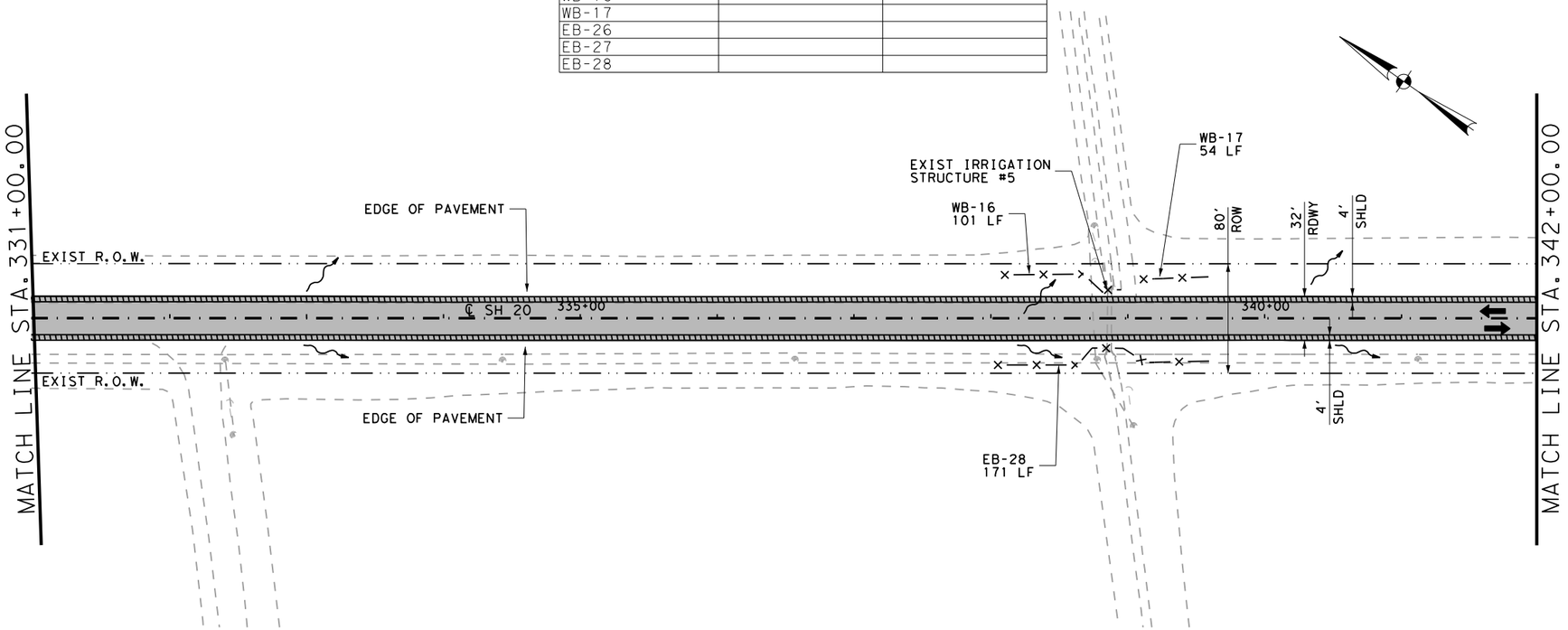
WB-17		
EB-26		
EB-27		
EB-28		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
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05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 320+00.00 TO STA. 342+00.00

SHEET 11 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		118

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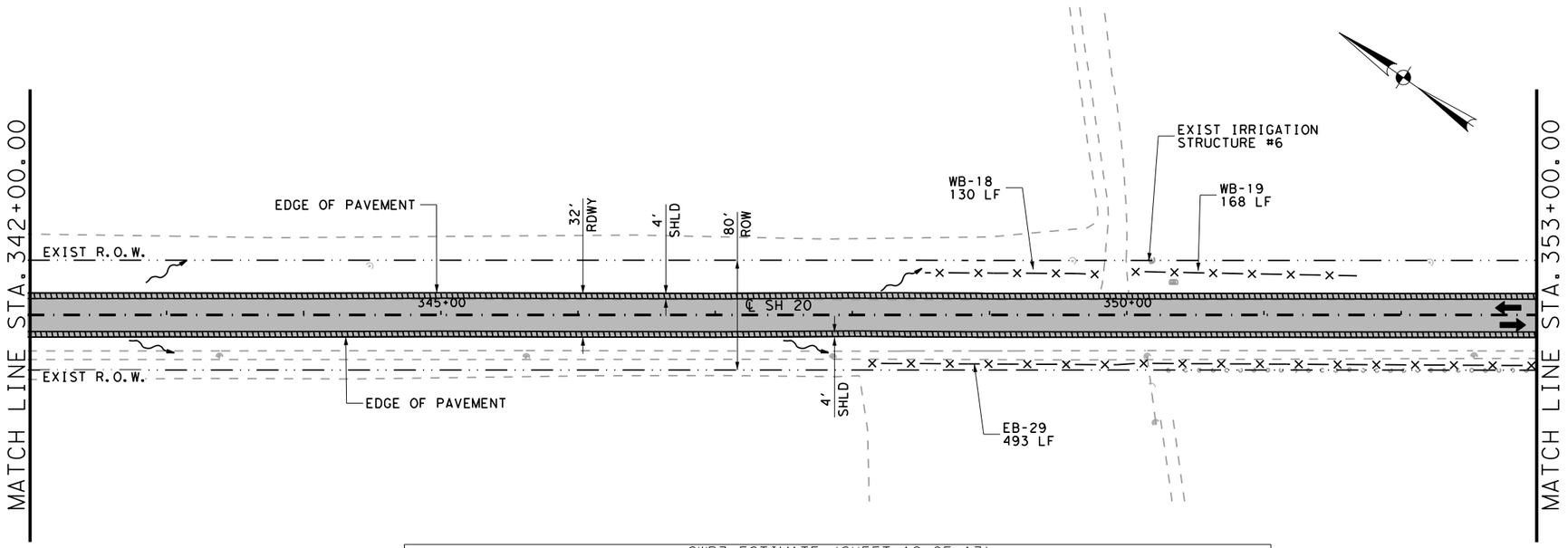

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SEDIMENT CONTROL FENCE		
BMP ID	DATE INSTALLED	DATE REMOVED
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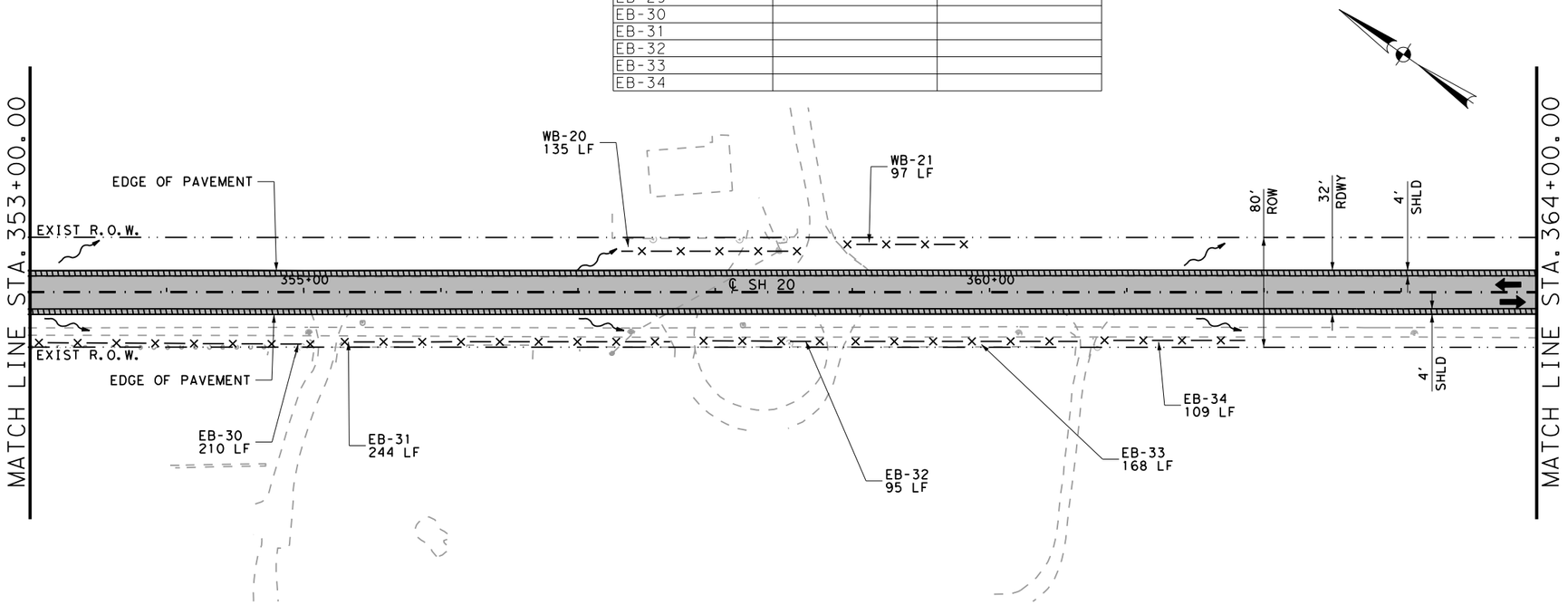
WB-19		
WB-20		
WB-21		
EB-29		
EB-30		
EB-31		
EB-32		
EB-33		
EB-34		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
ALEJANDRO FRANCO
140697
LICENSED PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 342+00.00 TO STA. 364+00.00

SHEET 12 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		119

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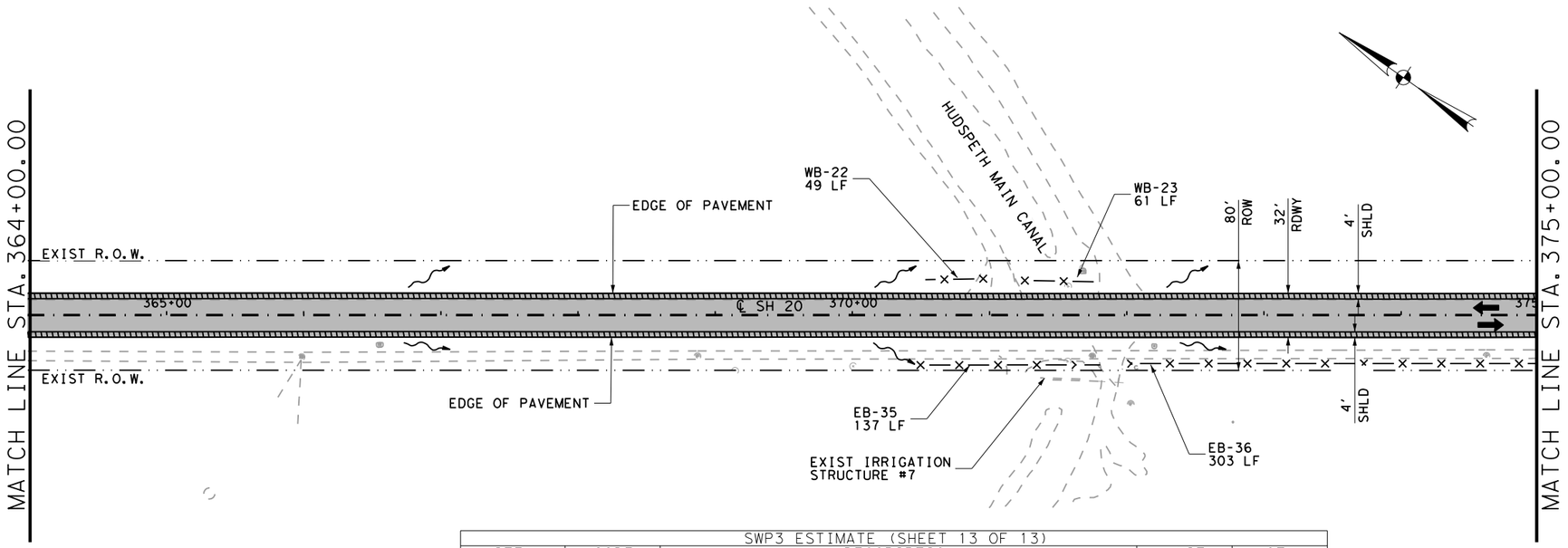

SWP3 ESTIMATE (SHEET 13 OF 13)				
ITEM	CODE	DESCRIPTION	UNIT	QTY
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506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	2456

SEDIMENT CONTROL FENCE		
BMP ID	DATE INSTALLED	DATE REMOVED
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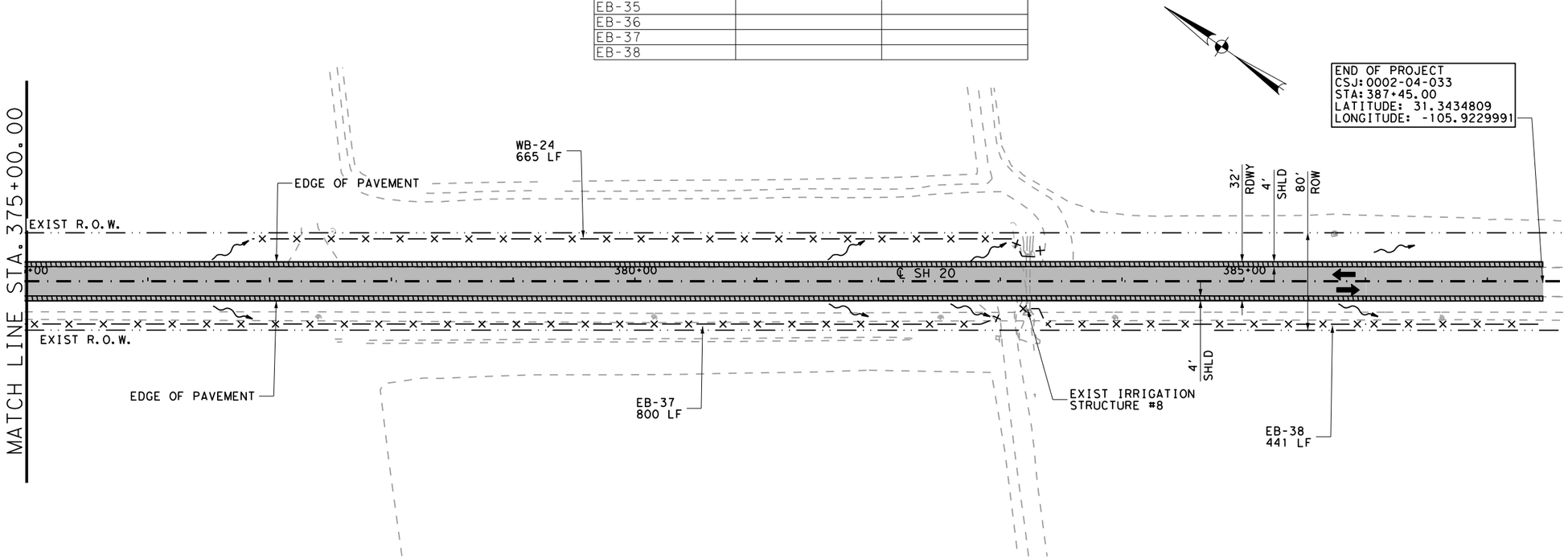
WB-23		
WB-24		
EB-35		
EB-36		
EB-37		
EB-38		



0 50 100
SCALE IN FEET

LEGEND

- SEDIMENT CONTROL FENCE
- DIRECTION OF FLOW
- PROPOSED FULL-WIDTH 1.5" OVERLAY
- PROPOSED SHOULDER PAVEMENT STRUCTURE WITH 1.5" OVERLAY
- TRAFFIC FLOW

NOTES:

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STATE OF TEXAS
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140697
LICENSED
PROFESSIONAL ENGINEER

05/27/2022

SH 20

SWP3 LAYOUT SHEET

STA. 364+00.00 TO STA. 387+45.00

SHEET 13 OF 13

Texas Department of Transportation

CONT	SECT	JOB	HIGHWAY
0002	04	033	SH 20
DIST	COUNTY		SHEET NO.
ELP	HUDSPETH		120

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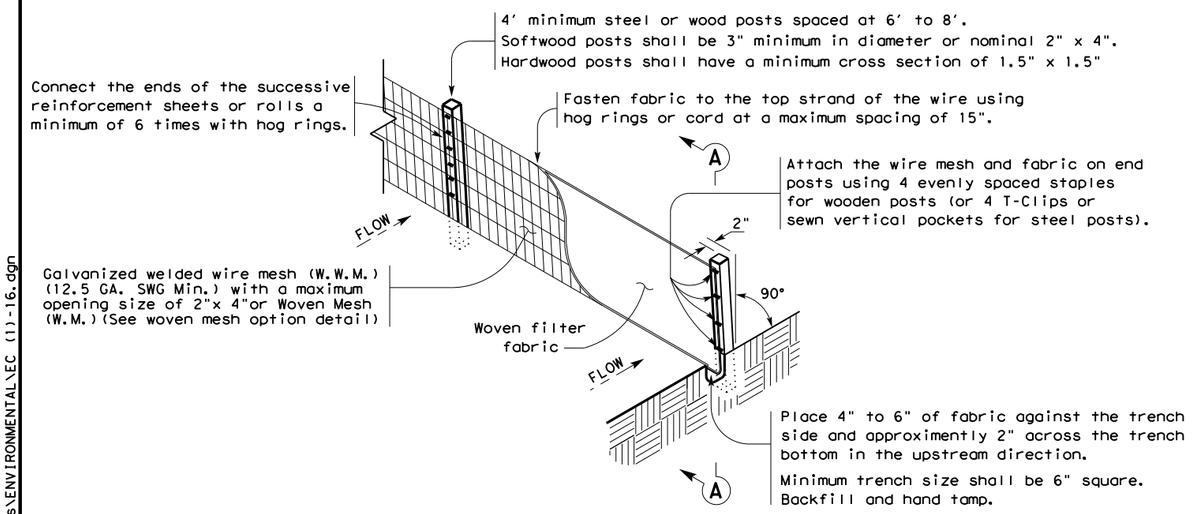
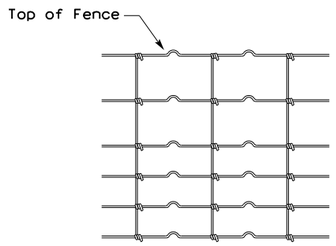
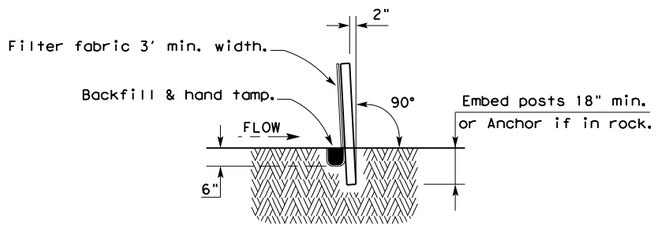


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

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

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

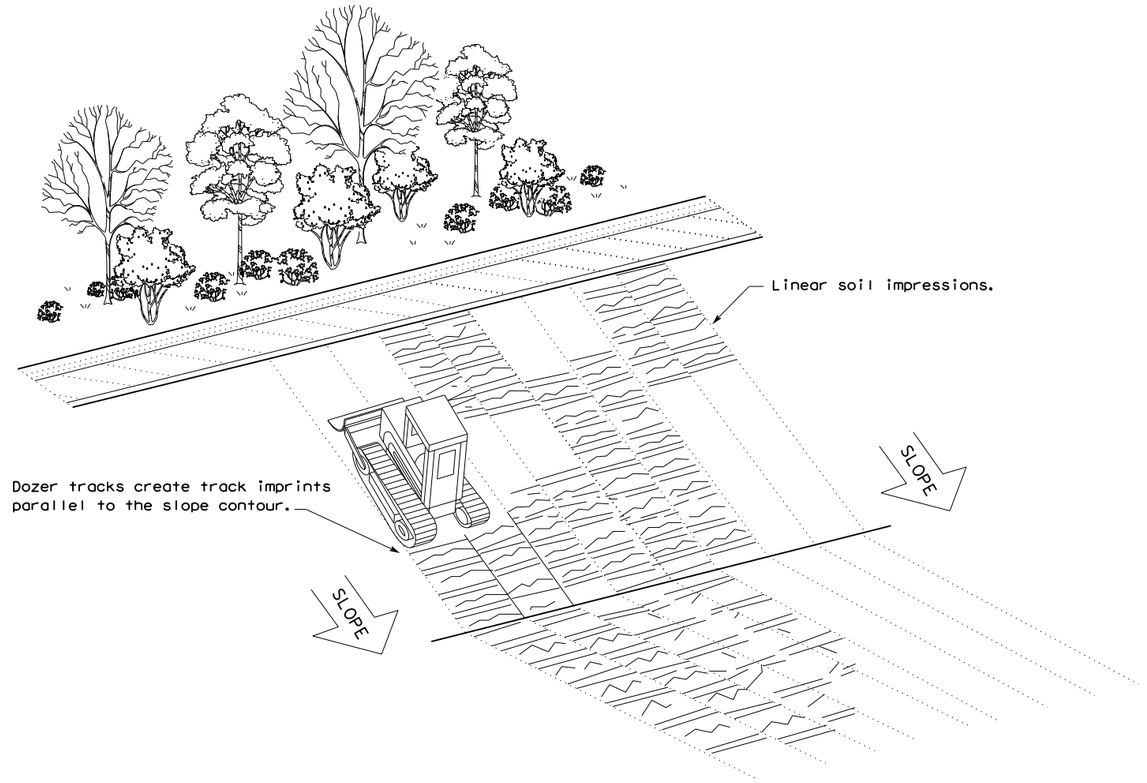
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

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



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

FILE: ec116	DN: TxDOT		CK: KM		DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0002	04	033		SH 20	
	DIST	COUNTY			SHEET NO.	
	ELP	HUDSPETH			121	

5/27/2022
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