# STATE OF TEXAS
## DEPARTMENT OF TRANSPORTATION

## PLANS OF PROPOSED
## STATE HIGHWAY IMPROVEMENT

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 1 |

BONHAM STATE PARK
DESIGN SPEED= 20
A.D.T.(2020)= 470 VPD
A.D.T.(2040)= 705 VPD

STATE AID PROJECT NO. C 901-32-83, ETC.

# BONHAM STATE PARK, ETC.
# FANNIN COUNTY, ETC

CSJ: 0901-32-083

NET LENGTH OF ROADWAY= 8297.44 FT.= 1.57 MI.

LIMITS: WITHIN BONHAM STATE PARK
FOR THE REHABILITATION OF EXISTING ROADWAY

CSJ: 0901-19-177

NET LENGTH OF ROADWAY= 2874.41 FT.=0.54 MI.

LIMITS: WITHIN LAKE TEXOMA FISHERIES LAB
FOR THE REHABILITATION OF EXISTING ROADWAY

INDEX OF SHEETS

SEE SHEET 3 FOR INDEX OF SHEETS

FINAL PLANS

LETTING DATE:

DATE CONTRACTOR BEGAN WORK:

DATE WORK WAS COMPLETED:

DATE WORK WAS ACCEPTED:

ORIGINAL CONTRACT WORKING DAYS:

USED OF WORKING DAYS

NO. OF CHANGE ORDERS:

FINAL CONTRACT COST:

PERCENT OVER/UNDER RUN:

CONTRACTOR:

I CERTIFY THAT THIS PROJECT WAS BUILT IN ACCORDANCE WITH PLANS AND SPECIFICATIONS.

AREA ENGINEER DATE

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

SEE SHEET 2 LOCATION MAP FOR PROJECT LIMITS

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, SEPTEMBER 1, 2024 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED SPECIAL LABOR PROVISIONS FOR ALL STATE CONSTRUCTION PROJECTS (000-005)

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE
BRIDGE: NONE





SUBMITTED FOR LETTING: July 12, 2024

Monte R. Peter P.E.
DESIGN ENGINEER

RECOMMENDED FOR LETTING: 7/12/2024

DocuSigned by:
Aaron R Bloom
2F03D019E58F45...
AREA ENGINEER

APPROVED FOR LETTING: 7/12/2024

DocuSigned by:
Hari Paramanantham
AF7AF41AFE6049...
DISTRICT ENGINEER

DATE: 7/11/2024 4:50:50 PM
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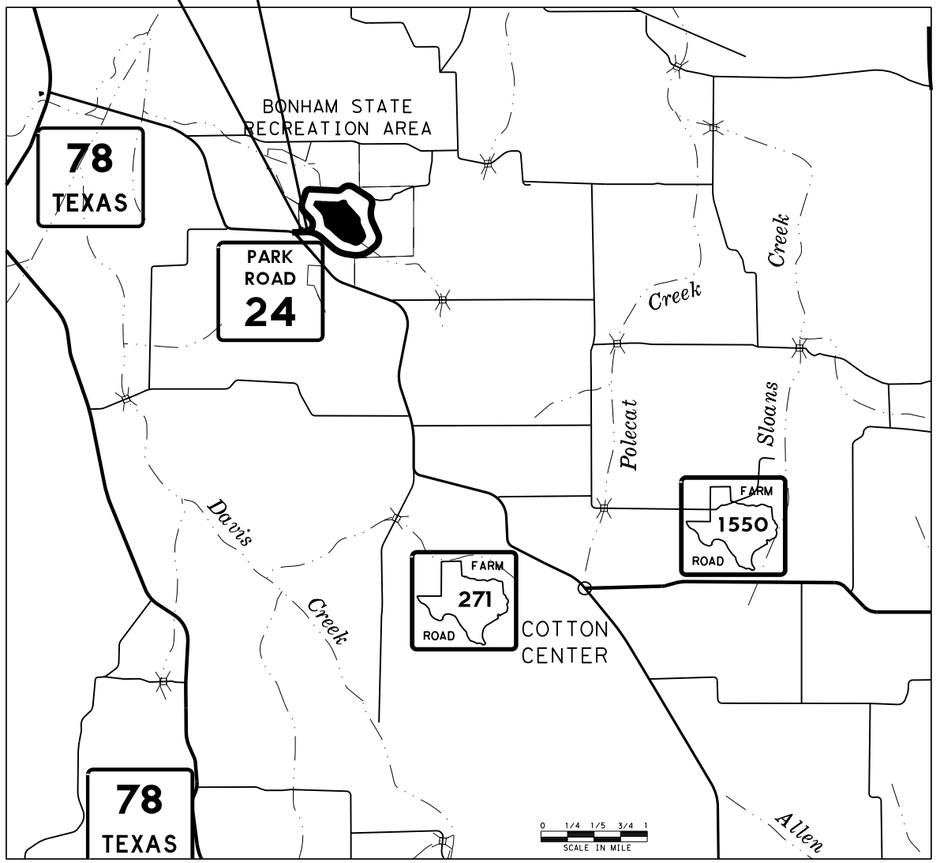
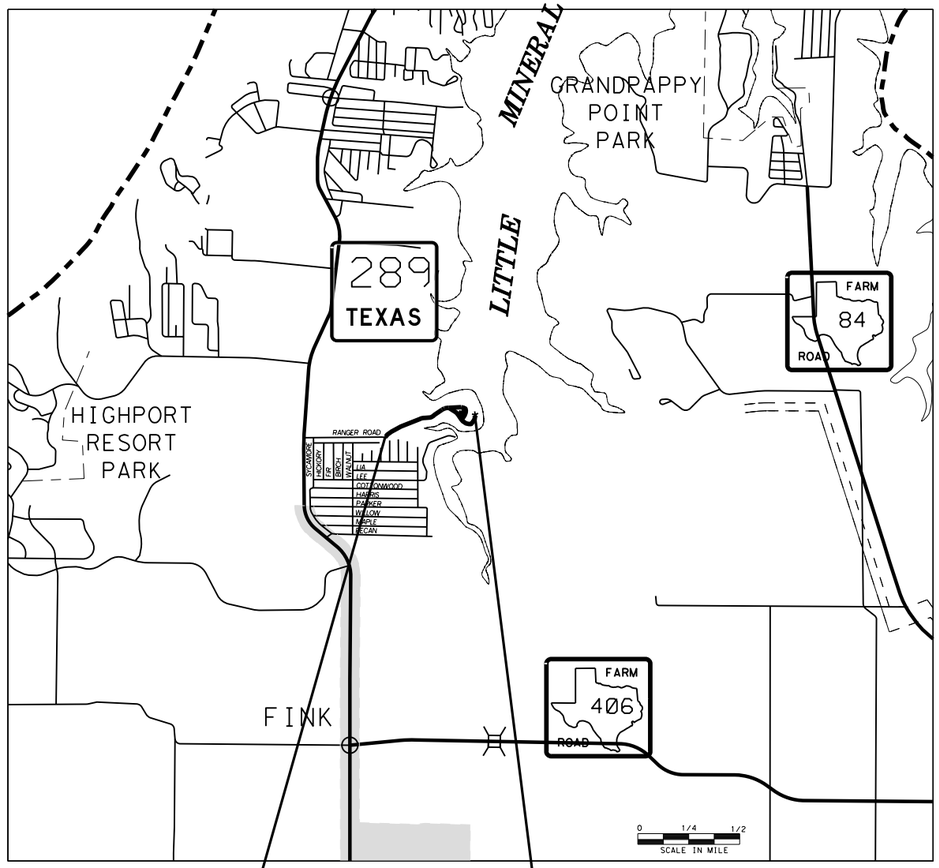
CSJ: 0901-32-083
STA: 0+00

END PROJECT
CSJ: 0901-32-083
STA: 83+17.45




# CSJ: 0901-32-083
# BONHAM STATE PARK
# FANNIN COUNTY

# CSJ: 0901-19-177
# TEXOMA FISHERIES LAB
# GRAYSON COUNTY




BEGIN PROJECT
CSJ: 0901-19-177
STA: 0+00

END PROJECT
CSJ: 0901-19-177
STA: 28+74.41

Texas Department of Transportation

## LOCATION MAP



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 2 |

DATE:
24 01:31PM
NT NAME

# INDEX OF SHEETS



STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH A '▪' HAVE BEEN ISSUED BY ME AND ARE APPLICABLE TO THIS PROJECT.

Monte R. Rater P.E. — NAME

Aug. 7, 2024 — DATE

Texas Department of Transportation

INDEX OF SHEETS



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
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| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 3 |

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05/13/2024 01:30 PM
DOCUMENT NAME

DATE:
FILE:

# CORE DATA

PAVEMENT CORES PROVIDED BY WSB

| | | |
|---|---|---|
| NO. C-01 | BONHAM STATE PARK LOOP RD<br>GPS: 33.544444, -96.148889 | 8" ACP<br>8" BASE |
| NO. C-02 | BONHAM STATE PARK LOOP RD<br>GPS: 33.546314, -96.142968 | 6.25" ACP |
| NO. C-03 | BONHAM STATE PARK LOOP RD<br>GPS: 33.541082, -96.14285 | 3" ACP |

CK | DW | CK | DW

DATE: 7/11/2024 4:51:11 PM
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Texas Department of Transportation

BONHAM STATE PARK
PAVEMENT CORE
DATA



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 4 |

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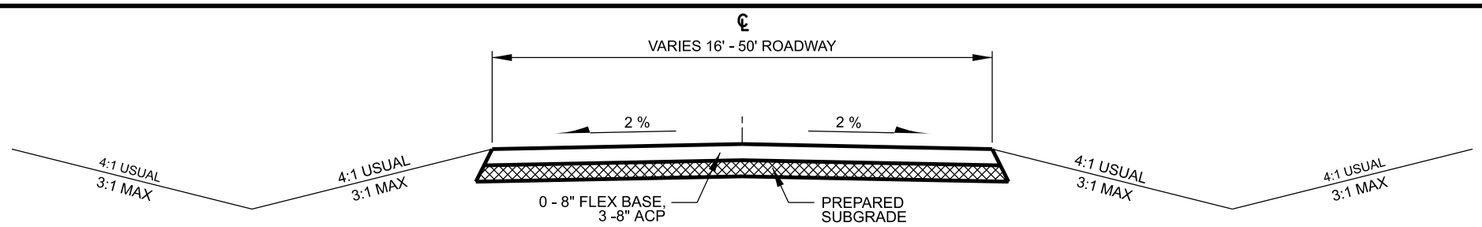


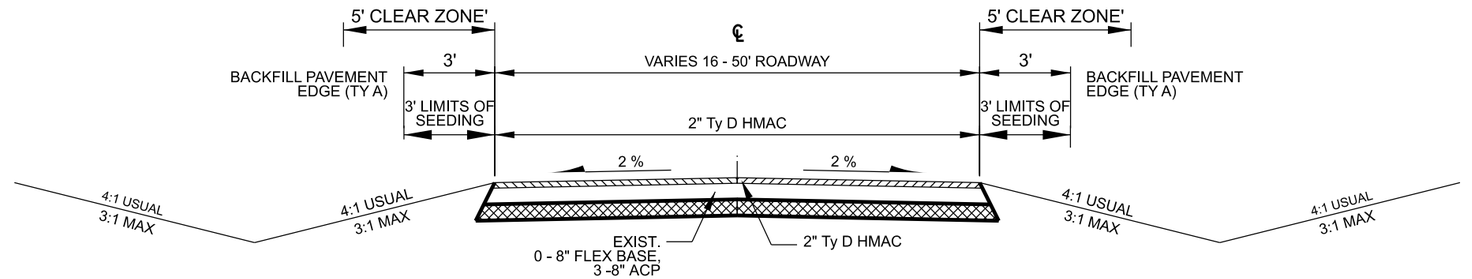

## EXISTING TYPICAL

16' ROADWAY
STA: 0+00 - 41+23
STA: 58+12 - 83+17.45
STA: 200+00 - 203+65.38

20' ROADWAY
STA: 56+21 - 57+74

TRANSITIONS 20' to 16'
STA: 57+74 - 58+12

VARIES 33' - 50' ROADWAY
STA: 51+53 - 56+21




## PROPOSED TYPICAL

16' ROADWAY
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STA: 200+00 - 203+65.38

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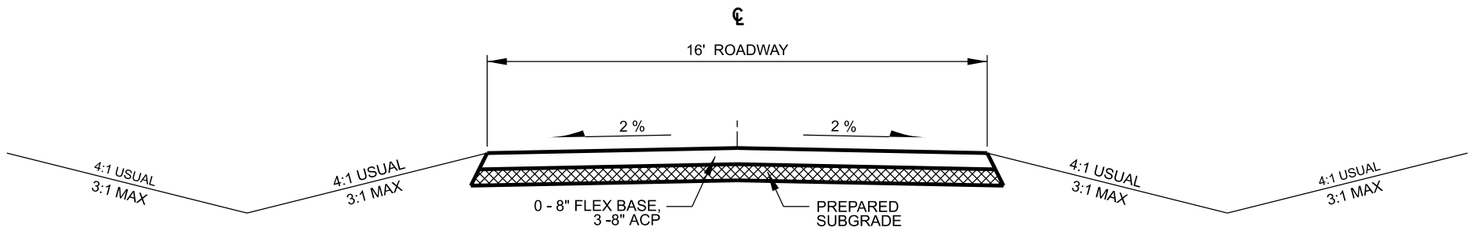
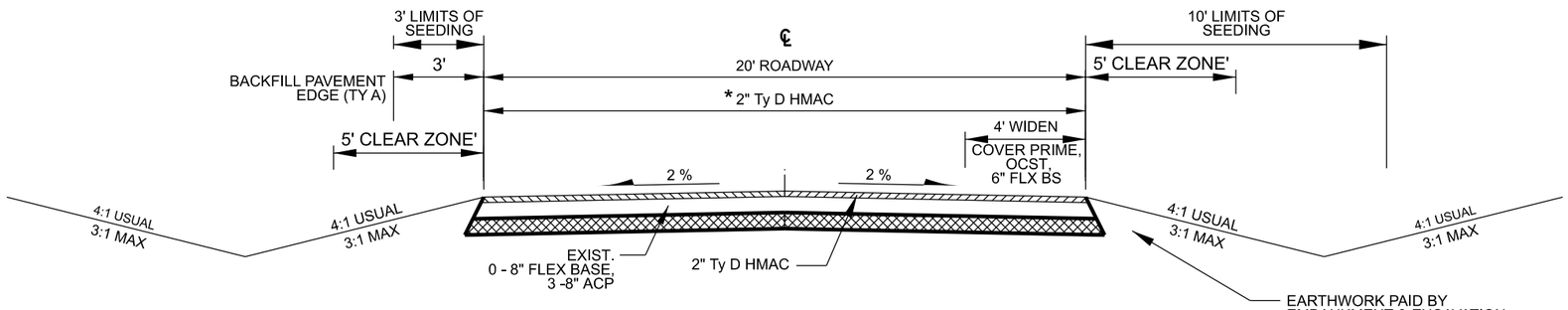
STA: 57+74 - 58+12

VARIES 33' - 50' ROADWAY
STA: 51+53 - 56+21




## EXISTING TYPICAL

STA: 41+23 -51+53




## PROPOSED TYPICAL

TRANSITION 16' to 20'
STA: 41+23 - 42+81

20' ROADWAY
STA: 42+81 - 51+53

* HMAC OVERLAY DEPTH SHALL VARY NEAR CENTERLINE TO CORRECT CROWN LOCATION DUE TO ROADWAY WIDENING

DATE: $DATE$
FILE: $FILE$
$TIME$

STATE OF TEXAS
MONTE L. RATER
95859
PROFESSIONAL ENGINEER

7.12.24

Monte R. Rater P.E.

SCALE (FEET):
0 1 2 5

Texas Department of Transportation

BONHAM STATE PARK

TYPICAL SECTION



SHEET 1 OF 3

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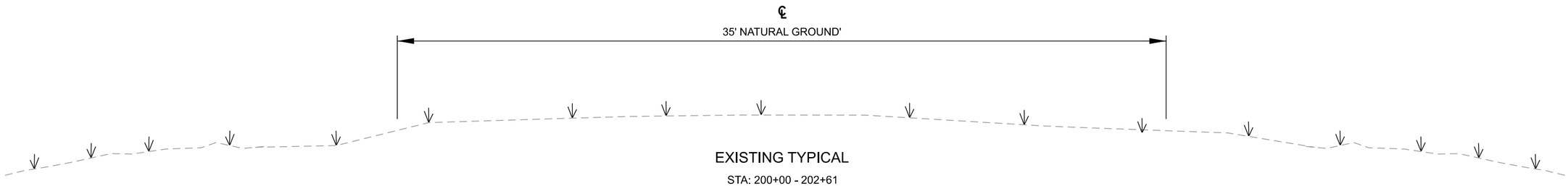
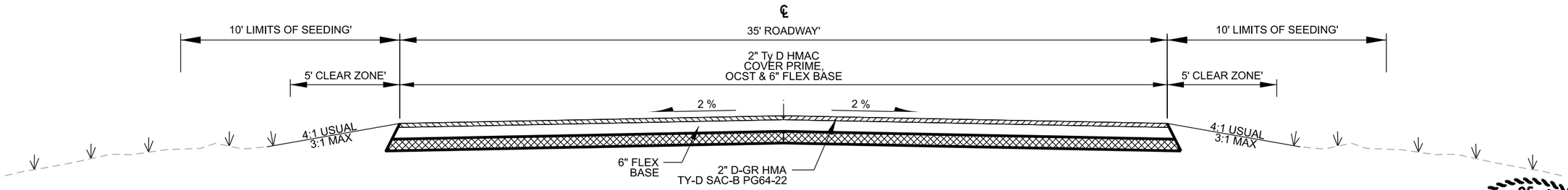



EXISTING TYPICAL

STA: 200+00 - 202+61




PROPOSED TYPICAL

35' ROADWAY

STA: 300+00 - 302+89.92

STATE OF TEXAS
MONTE L. RATER
95859
PROFESSIONAL ENGINEER

7.12.24

Monte R. Rater P.E.

SCALE (FEET):

0 1 2 5

Texas Department of Transportation

BONHAM STATE PARK

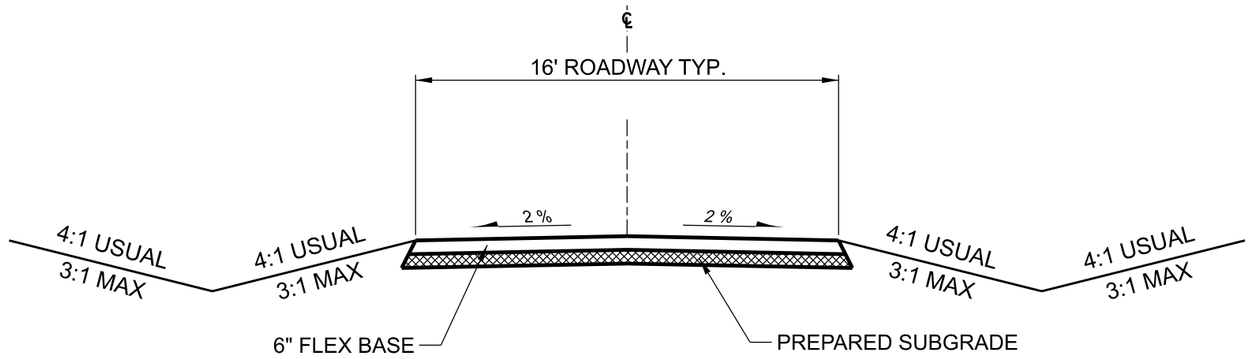
TYPICAL SECTION



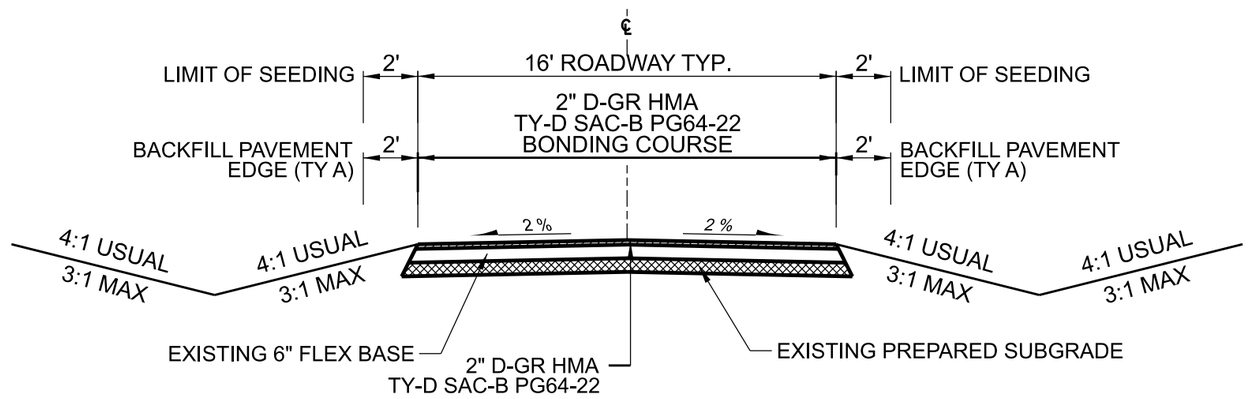
SHEET 2 OF 3

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 6 |

DATE: $DATE$
FILE: $FILE$
$TIME$




EXISTING TYPICAL
STA: 0+00 - 28+74.41




PROPOSED TYPICAL
STA: 0+00 - 28+74.41

STATE OF TEXAS
MONTE L. RATER
95859
PROFESSIONAL ENGINEER

7.12.24

Monte R. Rater P.E.

0 2 4 6 8 10
SCALE IN FEET

TEXOMA FISHERIES LAB

TYPICAL SECTIONS

CSJ: 0901-19-177


SHEET 3 OF 3

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 7 |

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## GENERAL NOTES

### General:

This project contains the following modified standard sheets: CCCG-22 MOD, CH-PW-0 (MOD)

Contractor questions on this project are to be addressed to the following individual(s):
Sherman Area Office
Aaron Bloom, P.E. – Aaron.Bloom@txdot.gov
Melese Norcha, P.E. – Melese.Norcha@txdot.gov

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:
https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

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

On Contractor request, earthwork cross sections and construction timelines will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/
The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Dispose of waste materials at an approved site. Furnish written approval from the property owner before disposal of waste materials.

Locate equipment a minimum of 30 feet from roadway when possible. Place signs and barricades as approved.

Stockpile sites for construction materials must be approved. Give at least 48 hours notification prior to stockpiling material.

**Item 5 Control of the Work:**

The responsibility for the construction surveying on this contract will be in accordance with Section 5.9.1, Method A.

Working days will be computed and charged in accordance with Article 8.3.1.4 Standard Work Week.





Right and left are determined based upon the forward direction of stationing in the specific control section.

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

Per Item 5.11 FINAL CLEANUP, prior to requesting final inspection the Contractor shall leave the work locations in a neat and presentable condition. This may include but is not limited to mowing, trimming and removal litter, debris, objectionable material, temporary structures, excess materials, and equipment from the work locations.

**Item 7 Legal Relations and Responsibilities:**

One significant traffic generator event has been identified. Christmas Light Up the Park event at Bonham State Park requires construction operations to temporarily cease from December 12 through December 15 at Bonham State Park.

**Item 8 Prosecution and Progress:**

Before beginning work on this project submit in writing, for approval, a plan of construction operations outlining in detail a sequence of work to be followed.

Provide a Bar Chart progress schedule for this project.

Adjacent construction operations shall only be allowed on one side of the roadway at a time.

**Item 9 Measurement and Payment:**

Items of work for the Monthly Estimate will be cut off on the 25th of each month. Items of work performed after the 25th will be processed and paid on the following month's estimate. Material On Hand (MOH) will cut off on the 20th of each month. Special circumstances will be considered on a case-by-case basis.

**Item 100 Preparing Right of Way:**

Trim trees only enough to provide clearance for construction operations. Coordinate trimming and removal with Texas Parks and Wildlife personnel before trimming or removing trees. Remove all trimming / removal debris from the project.

Prep ROW includes tree removal necessary for roadway widening from station 42+81to 51+53. Tree removal shall be approved by the Engineer.
Cable – post fence removal (11 posts) shall be included subsidiary to this item.

**Item 105 Removing Treated and Untreated Base and Asphalt Pavement:**

Contractor shall retain waste material.

**Item 110 Excavation:**

Before excavation operations the existing topsoil shall be salvaged in a manner to preserve the vigor of the existing Bermuda grass sod per Item 160.

Rock may be encountered during excavation.

**Item 132 Embankment:**

Test potential embankment sources using Tex-145-E to determine the presence and concentration of sulfates. Do not bring soil with greater than 3000 ppm sulfates into project.

Excavation pits for project embankment made within 250 feet of State Right of Way must be approved.

Embankment must be free from weed and non-native grass seed.

Before embankment operations the existing topsoil shall be salvaged in a manner to preserve the vigor of the existing Bermuda grass sod per Item 160.

**Item 134 Backfilling Pavement Edges:**

Use Type A backfill Material for final backfill consisting of subsoil obtained below topsoil to prevent noxious seed transfer. Provide material free of weed, non-native grass seed, vegetation, and other objectionable materials with a Plasticity Index between 15 and 30.

The backfill material source must be approved by the Engineer.

Place backfill with a road widener.

**Item 164 Seeding for Erosion Control, 166 Fertilizer:**

Apply fertilizer with a ratio of 3-1-2 (N-P-K) over the areas to be seeded. This work will not be paid for directly but will be considered subsidiary.

Seed mixture.
Canada Wildrye (*Elymus canadensis*) at 10 PLS/acre
Little Bluestem (*Schizachyrium scoparium*) at 8 PLS/acre
Green Sprangletop (*Leptochloa dubia*) at 2 PLS/acre
Buffalograss (*Bouteloua dactyloides*) at 8 PLS/acre
Partridge Pea (*Chamaecrista fasciculata*) at 13 PLS/acre





If plantings are done between September and March, add Cereal Rye Grain (*Secale cereale*) at 25 PLS lbs./acre.

Ensure straw/hay mulch is free of weed and grass seed.

**Item 168 Vegetative Watering:**

Use water trucks equipped with a sprinkler system adequate to permit coverage of the entire seeded area from the roadbed. This equipment must be available to perform watering throughout the duration of vegetative establishment.

Water all seeded areas the day seed is applied. Thereafter, maintain the seeded areas in a well-watered condition throughout the duration of vegetative establishment.

**Item 169 Soil Retention Blanket:**

Soil retention blanket must meet Wildlife Friendly Requirements.

**Item 247 Flexible Base:**

Grading requirements
Tests to be in accordance with TxDOT Standard Test Methods

Soil Constants

| Item Desc. | Linear Shrinkage | LL | Wet Ball | WBMV (incr. passing #40 sieve) |
|---|---|---|---|---|
| Item 247 Flex Base | 6.0 max. | 40 max. | 40 max. | 20% max. |

PERCENT RETAINED ON SIEVE:

| 1-3/4” | 7/8” | 3/8” | No. 4 | No. 40 |
|---|---|---|---|---|
| 0 | 10-35 | 30-50 | 45-65 | 70-85 |

Flexible Base will not contain more than 1% by weight of clay balls.

All pavement edge drop-offs, at end of day, shall be backfilled in accordance with Edge Treatment Condition I on the “Treatment for Various Edge Conditions” sheet. Backfill material shall be approved by the Engineer.

**Item 300 Asphalts, Oils, and Emulsions:**

Provide 1L (1qt.) clean and dry screw top or friction-lid sampling cans as directed.

Furnish at least one sample of each type of asphalt used on the project for QA/QC purposes.

**Item 302 Aggregates for Surface Treatments:**

Grade 5 Modified Grading Requirements
CUMULATIVE PERCENT RETAINED ON SIEVE:

| 1/2” | 3/8” | No. 4 | No. 8 | No. 200 |
|---|---|---|---|---|
| 0 | 0-5 | 30-80 | 85-100 | 95-100 |

The decantation requirement for Grade 5 Modified aggregate is 4% maximum.

The requirements for Flakiness Index, Magnesium Sulfate Soundness, and Los Angeles Abrasion are waived for the Grade 5 Modified aggregate.

Utilize SAC B surface treatment aggregates.

Use unmodified AC or PG for pre-coating aggregate. Emulsion pre-coating will not be allowed.

Use liquid antistrip or other approved antistrip agent complying with the requirements of Item 301 Asphalt Antistripping Agents. The aggregate will be evaluated for moisture susceptibility using test method TEX-530-C.

**Item 316 Surface Treatments:**

Unless otherwise permitted by the Engineer in writing, the open season for asphalt placement will be:

May 15- August 31 for AC

Permission to place asphalt outside of the open season may require the contractor to place a fog seal at the contractor’s expense.

***Rates For Construction Projects**

**First Course**

| ITEM | APPLICATION | |
|---|---|---|
| | Cover Prime | 1st Course |
| *Asphalt Type | RC-250 | AC-20-5TR or AC-20XP |
| *Asph. Rate (Gal/SY) | 0.28 | 0.46 |
| Aggregate Type | B | B |
| Aggregate Grade | 5 or Mod 5 | 3 |
| Aggr. Rate (CY/SY) | 1:140 | 1:105 |
| Min. Cure Time | 14 days ** | |

* The information above is intended to provide general guidance and as a basis of estimate. Based on the season and weather conditions at the time, the engineer will determine the asphalt type and rates to be used at the time of application.
** Or as approved by the Engineer





**Second Course**

| ITEM | APPLICATION |
|---|---|
| | 2nd Course |
| *Asphalt Type | AC-20-5TR or AC-20XP |
| *Asph. Rate (Gal/SY) | 0.36 |
| Aggregate Type | PB |
| Aggregate Grade | 4 |
| Aggr. Rate (CY/SY) | 1:120 |

* The information above is intended to provide general guidance and as a basis of estimate. Based on the season and weather conditions at the time, the engineer will determine the asphalt type and rates to be used at the time of application.
** Or as approved by the Engineer

**Item 341 Dense-Graded Hot-Mix Asphalt:**

All surface mixes are to be SAC A.

The use of PG 64-22 asphalt is required.

RAS is not allowed in surface mixes.

Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV’s remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

Specify Hot Mix Asphalt Concrete (HMAC) or Warm Mix Asphalt (WMA) at the time of design submittal. After design submittal, continue producing the chosen design unless otherwise approved.

RAP from contractor owned sources may be used if the RAP is fractionated. The course fraction of contractor owned RAP will not be allowed if it consists primarily of siliceous aggregates.

A tack coat is required for all overlay areas and for all longitudinal joints unless otherwise directed.

Evaluation of the mixture for moisture susceptibility will be performed by using test method TEX 530-C (boil test) and there shall be no evidence of stripping during design verification or at any time during production.

The maximum nighttime paved surface vertical differential will be limited to two inches. Prevent ponding of water on any travel ways that are exposed to traffic.

Perform all sampling for aggregate quality testing on stockpiles at the HMAC plant. Mixture sampling for QC/QA testing will typically be taken from the truck at the plant; however, the Engineer may direct that a sample be taken at any point or location of mixture during production, delivery, or placement.

***Item 341 Dense-Graded Hot-Mix Asphalt (cont.):***

Preparation and construction of permanent / temporary transitions, terminations of mix courses and transitions to driveways and intersecting roadways is subsidiary to Item 341. This includes all labor, machinery, materials, and incidentals to complete the work including planing, removal, hauling and stockpiling of materials and necessary clean-up.

**Item 351 Flexible Pavement Structure Repair:**

Engineer will select pavement repair areas before scheduled work begins.

Perform flexible pavement structure repair before the final HMAC placement.

**Item 354 Planing and Texturing Pavement:**

The planing operation will be followed closely by the hot-mix asphalt (HMA) overlay operation. If inclement weather or other unexpected factors do not allow planed areas to be overlaid, warning signs per Standard Sheet WZ(UL) will be maintained until the hot-mix asphalt overlay operation is completed.

RAP will become the property of the Contractor.

**Item 400 Excavation and Backfill for Structures:**

Excavation and backfill for bridge, culvert and Safety End Treatment construction/installation will be subsidiary to Item 462, 464 and 466.

**Item 420 Concrete Substructures:**

Do not use membrane curing for structural elements.

**Item 432 Riprap:**

The Engineer may adjust placement of riprap in the field.

Filter fabric is required for stone riprap.

ADA vehicle parking area shall utilize 6” concrete riprap and be reinforced longitudinally and transversely with #4 rebar at 12” c-c spacing between the #4 bars. Center rebar vertically in the sidewalk. Use grade 60 rebar.

Riprap Special bid item construction details - Construct riprap as shown in Figure 2 on the Stone Riprap Standard for mortared stone with this exception – do not lap stone as shown in Figure 2. Place stone in pattern selected by TPWD personnel. Excavate and construct to achieve 8 inch depth mortared bed stone riprap. Wet the stones thoroughly before placing mortar. Bed the larger stones in fresh mortar bed as they are being place and shove adjacent stones into contact with one another.





Spread excess mortar forced out during placement of the stones uniformly over them to fill all voids completely. Point up all joints roughly either with flush joints or shallow, smooth-raked joints as directed.

**Item 464 Reinforced Concrete Pipe:**

Required excavation and backfill will be subsidiary to this Item.

Concrete pipe collars shall be subsidiary this item.

**Item 466 Headwalls and Wingwalls:**

Required excavation, backfill and pipe saw cutting will be subsidiary to this Item.

Historic masonry culvert headwalls shall be avoided during construction operations. Contractor damage shall require headwall reconstruction per the specifications mandated by Texas Parks and Wildlife Department historic preservation requirements.

**Item 467 Safety End Treatment:**

Parallel pipe culverts ~ 30" diameter and smaller require precast SET unless directed by the Engineer to use cast-in-place SETs when precast SETs would project over 3" above surrounding ground surface or when otherwise indicated in the plans. Additional work to install cast in place SETs will be subsidiary to this Item.

Repair damage culvert ends prior to SET installation. Straighten CMP ends by straightening or cutting off damaged ends. Paint cut off ends with zinc paint. Repair minor damaged RCP ends with epoxy mortar. This work will be subsidiary to this Item.

When necessary to close connection gaps, grout precast SETs to culvert ends. Materials, labor and equipment will be subsidiary to this item.

Required excavation, backfill and pipe saw cutting will be subsidiary to this Item.

Placement of concrete Riprap between multiple SETs on multiple barrel culverts will be subsidiary to this Item.

During SET installation, unless indicated otherwise in the plans, match SET flow line grade with the culvert flow line grade.

Removal and disposal of existing headwalls for parallel culverts will be subsidiary to this Item.

**Item 496 Removing Structures:**

Carefully remove and salvage existing historic stone headwall stones for reuse as stone façade for proposed CH-PW-0 headwalls. This work shall be subsidiary to this item.

**Item 502 Barricades, Signs and Traffic Handling:**

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

The following items will be required for flagger on this project:

1. Flaggers are required to wear a white hard hat while performing flagging operations.
2. Flaggers will be required at the intersection of all State maintained roadways.
3. Flaggers may be required at other high traffic generating intersections as deemed necessary by the Area Engineer.

The traffic control plan for this contract consists of the installation and maintenance of warning signs and other traffic control devices shown in the plans, specification data which may be included in the general notes, applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD), traffic control plan sheets included in the plans, standard BC sheets and Item 502 of the Standard Specifications.

Do not begin Item 502, Barricades, Signs, and Traffic Handling, on the roadway until both of the following conditions are met:

1. The work schedule is approved.
2. No more than 5 workdays will pass between the beginning of Item 502 and the actual commencement of roadway work bid items.

Correct all deficiencies within the time frame noted on the Traffic Control Device Inspection Form 599. Failure to make corrections within time frame specified may result in no payment for this Item for the month of the noted deficiency.

Provide shadow vehicles equipped with Truck Mounted Attenuators (TMA) as shown on Traffic Control Plan (TCP) standards.

Ensure that all travel lanes are open at night.

Provide pilot car during one lane / two-way traffic operations.

Road closures must be approved by the Engineer.





**Item 503 Portable Changeable Message Sign:**

One (1) portable changeable message board is required for advance warning at Bonham State Park Entrance.

**Item 505 Truck Mounted Attenuators (TMA) and Trailer Attenuator (TA):**

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

**Item 506 Temporary Erosion, Sedimentation & Environmental Controls:**

The Temporary Erosion Control measures for this project will consist of using the following items, as directed:

1. Erosion Control Logs

The final estimate will be withheld until all disturbed areas are covered with at least 70% perennial vegetative cover.

Acquire approval for any change to the location of erosion control logs as shown in the plans, prior to installation. Placement of erosion protection devices may be altered, as directed, to satisfy the requirements of the SWP3.

Refer to the SWP3 sheet for the total disturbed area for the project.

The disturbed area in this project, all project locations in the Contract, and Contractor project specific locations (PSLs) within one mile of the project limits will further establish the authorization requirements for storm water discharges. The Department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. Obtain any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off ROW. 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 Contractors NOI for PSLs on the ROW (to the appropriate MS4 operator when on an off-system route).

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

Reinforcing steel shall be required in all curb/curb and gutter unless otherwise directed by the Engineer.

**Item 531 Sidewalks:**

Five foot wide sidewalk shall be reinforced longitudinally with #4 rebar along sidewalk edges (place 3" from face of sidewalk edge) and #3 rebar at 18" c-c spacing between the #4 bars. Place lateral #3 rebar at 18" c-c spacing. Center rebar vertically in the sidewalk. Use grade 60 rebar.
Joints shall be tooled or saw-cut every 4' to a depth of 1 1/2" unless otherwise directed. All expansion joints shall consist of fiberboard and sealed with a Class 7 silicone sealant according to DMs-6310.

All longitudinal joints adjacent to curb shall have fiberboard and sealed with a Class 7 silicone sealant according to DMS-6310.
The surfaces of sloped areas shall be broomed to provide a slip resistant finish.

ADA Ramps ~ Concrete shall be placed around existing features such as signs, fireplugs, utility poles, and etc. when located within the limits of the new ramp to provide a four foot (4') minimum pathway. Any excavation/embankment necessary for establishing ramps to proper grade shall be considered subsidiary to the various bid items. Ramps shall be added, deleted, and/or changed as directed by the Engineer.

**Item 540 Metal Beam Guard Fence:**

Reinstall removed MBGF and SGT's on the same day.

MBGF delineation shall be installed within ten (10) working days of the completion of each MBGF section. Concrete mow strip is not considered to be a part of this work.

**Item 542 Removing Metal Beam Guard Fence:**

Removed MBGF rail shall be retained by the Contractor.

**Item 585 Ride Quality for Pavement Surfaces:**

Use Surface Test Type A to evaluate ride quality of the final pavement surface on park side roads in accordance with Item 585, "Ride Quality for Pavement Surfaces."

Use Surface Test Type B Pay Adjustment Schedule 3 to evaluate ride quality of the final pavement surface Park Road 24 in accordance with Item 585, "Ride Quality for Pavement Surfaces."





**Item 644 Small Roadside Sign Assemblies:**

Upon removal of sign assemblies, deliver sign faces to TxDOT office at address:
3904 US 75 South, Sherman, TX.

Dispose of foundations, posts, and hardware.

Use the Southern Plains style triangular slip base for all post types.

Stake proposed sign locations & obtain Engineer's approval of locations prior to placing foundations.

**Item 662 Work Zone Pavement Markings:**

Place flexible reflective roadway tabs in accordance with the current WZ (STPM) prior to seal coat operations. Place tabs to indicate the beginning and ending of no passing zones.

Cut, remove, and properly dispose of the upright portions of all work zone tabs prior to acceptance of any roadway. Remove entire tab when located on HMAC or concrete surfaces.

**Item 666 Retroreflectorized Pavement Markings:**

No stripe will be placed unless the inspector is present and at least 24 hours advance notice has been given by the Contractor.

Lay out pilot lines for approval 24 hours prior to all final pavement marking applications.

Use equipment with footage counters capable of measuring the linear footage placed. Calibrate counters prior to the beginning of striping operations.

Reduce truck speed enough to ensure that the beads drop onto the stripe and do not roll in the paint film.

Due to problems in traffic handling, do not place a dash center stripe and edge line at the same time.

Contact the Engineer 7 days before pavement marking placement for re-establishment of no-pass zones.

# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0901-32-083 **DISTRICT** Paris **COUNTY** Fannin, Grayson
**HIGHWAY** Various

| ALT | BID CODE | DESCRIPTION | UNIT | EST. | FINAL |
|---|---|---|---|---|---|
| | 100-7002 | PREPARING ROW | STA | 9.000 | |
| | 105-7002 | RMV (2"-6") TRT/UNTRT BASE & ASPH PAV | SY | 132.000 | |
| | 110-7001 | EXCAV (ROADWAY) | CY | 637.000 | |
| | 132-7003 | EMBANK (FNL)(OC)(TY B) | CY | 314.000 | |
| | 134-7001 | BACKFILL (TY A) | STA | 174.000 | |
| | 164-7006 | BROADCAST SEED (TEMP_COOL) | SY | 12,648.000 | |
| | 164-7026 | STRAW/HAY MLCH SEED(PERM_RURAL_CLAY) | SY | 12,648.000 | |
| | 168-7001 | VEGETATIVE WATERING | TGL | 75.930 | |
| | 169-7009 | SOIL RET BLKT(SL_MOD_CLAY_SHORT_ROLL) | SY | 944.000 | |
| | 216-7001 | PROOF ROLLING | HR | 3.270 | |
| | 247-7046 | FL BS (CMP IN PLC)(TY A GR 4) (6") | SY | 4,858.000 | |
| | 316-7016 | ASPH (RC-250) | GAL | 1,364.000 | |
| | 316-7067 | ASPH (AC-20-5TR OR AC-20XP) | GAL | 2,239.000 | |
| | 316-7171 | AGGR (TY-B, GR-3)(SAC-B) | CY | 50.000 | |
| | 316-7250 | AGGR (TY-B, GR-5) | CY | 40.000 | |
| | 341-7062 | D-GR HMA TY-D SAC-A PG64-22 (EXEMPT) | TON | 3,624.000 | |
| | 351-7005 | FLEXIBLE PAVEMENT STRUCTURE REPAIR(6") | SY | 80.000 | |
| | 354-7032 | PLANE ASPH CONC PAV(0" TO 2") | SY | 297.000 | |
| | 420-7008 | CL A CONC (COLLAR) | EA | 1.000 | |
| | 432-7003 | RIPRAP (CONC)(6 IN) | CY | 26.000 | |
| | 432-7053 | RIPRAP (SPECIAL) | CY | 7.000 | |
| | 464-7003 | RC PIPE (CL III)(18 IN) | LF | 348.000 | |
| | 464-7005 | RC PIPE (CL III)(24 IN) | LF | 12.000 | |
| | 466-7101 | HEADWALL (CH - PW - 0) (DIA= 24 IN) | EA | 1.000 | |
| | 466-7105 | HEADWALL (CH - PW - 0) (DIA= 36 IN) | EA | 1.000 | |
| | 467-7308 | SET (TY II) (18 IN) (RCP) (6: 1) (P) | EA | 5.000 | |
| | 467-7328 | SET (TY II) (24 IN) (RCP) (6: 1) (P) | EA | 1.000 | |
| | 496-7004 | REMOV STR (SET) | EA | 1.000 | |
| | 496-7006 | REMOV STR (HEADWALL) | EA | 2.000 | |
| | 500-7001 | MOBILIZATION | LS | 1.000 | |
| | 502-7001 | BARRICADES, SIGNS AND TRAFFIC HANDLING | MO | 4.000 | |
| | 503-7002 | PORTABLE CHANGEABLE MESSAGE SIGN | EA | 1.000 | |
| | 505-7001 | TMA (STATIONARY) | DAY | 60.000 | |
| | 505-7002 | TMA (MOBILE OPERATION) | HR | 100.000 | |
| | 506-7044 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 700.000 | |
| | 506-7046 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 700.000 | |
| | 529-7009 | CONC CURB & GUTTER (TY II) | LF | 280.000 | |
| | 531-7002 | CONC SIDEWALKS (5") | SY | 3.000 | |
| | 531-7012 | CURB RAMPS (TY 20) | EA | 1.000 | |
| | 540-7002 | MTL W-BEAM GD FEN (STEEL POST) | LF | 1,400.000 | |
| | 542-7001 | REMOVE METAL BEAM GUARD FENCE | LF | 1,500.000 | |

**ESTIMATE & QUANTITY**

# Estimate & Quantity Sheet

**CONTROLLING PROJECT ID** 0901-32-083 **DISTRICT** Paris **COUNTY** Fannin, Grayson
**HIGHWAY** Various

| ALT | BID CODE | DESCRIPTION | UNIT | EST. | FINAL |
|---|---|---|---|---|---|
| | 542-7002 | REMOVE TERMINAL ANCHOR SECTION | EA | 4.000 | |
| | 544-7001 | GUARDRAIL END TREATMENT (INSTALL) | EA | 4.000 | |
| | 644-7001 | IN SM RD SN SUP&AM TY10BWG(1)SA(P) | EA | 16.000 | |
| | 644-7004 | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 1.000 | |
| | 644-7073 | REMOVE SM RD SN SUP&AM | EA | 7.000 | |
| | 658-7019 | INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI) | EA | 16.000 | |
| | 658-7056 | INSTL OM ASSM (OM-2Y)(WC)GND | EA | 18.000 | |
| | 662-7114 | WK ZN PAV MRK SHT TERM (TAB)TY Y-2 | EA | 47.000 | |
| | 666-7117 | REFL PAV MRK TY I (Y)12"(SLD)(100MIL) | LF | 50.000 | |
| | 666-7405 | REFL PAV MRK TY I (W)4"(SLD)(100MIL) | LF | 1,988.000 | |
| | 666-7411 | REFL PAV MRK TY I (W)6"(SLD)(100MIL) | LF | 134.000 | |
| | 666-7423 | REFL PAV MRK TY I (Y)6"(SLD)(100MIL) | LF | 3,746.000 | |
| | 668-7103 | PREFAB PM TY C (W)(WORD) | EA | 3.000 | |
| | 668-7110 | PREFAB PM TY C (W)(18")(YLD TRI) | EA | 10.000 | |
| | 668-7132 | PRE PM TY C (WHT)(ACC PRK)(SYMBL ONLY) | EA | 4.000 | |
| | 672-7004 | REFL PAV MRKR TY II-A-A | EA | 94.000 | |
| | 3007-7001 | BONDING COURSE | GAL | 1,650.000 | |
| | 5012-7001 | STONE MASONRY (FACADE MASONRY) | SF | 227.000 | |
| | 5013-7001 | STONE MASONRY REPAIR | SF | 50.000 | |
| | 08 | EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (NON-PART) | LS | 1.000 | |
| | | SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (NON-PART) | LS | 1.000 | |

| SUMMARY OF ROADWAY ITEMS | | | | | | | | | | | PRIME COURSE | | FIRST COURSE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 100 | 105 | 134 | 341 | 3007 | 110 | 132 | 216 | 247 | 316 | 316 | 316 | 316 | 351 | 354 |
| | | 7002 | 7002 | 7001 | 7062 | 7001 | 7001 | 7003 | 7001 | 7046 | 7016 | 7250 | 7067 | 7171 | 7005 | 7032 |
| 0901-32-083 | AREA (SQ.FT.) | PREPARING ROW | RMV(2"-6") TRT/UNTRT BASE & ASPH PAV | BACKFILL (TY A) | D-GR HMA TY-D SAC-A PG64-22 (EXEMPT) | BONDING COURSE | EXCAV (ROADWAY) | EMBANK (FNL)(OC)(TY B) | PROOF ROLLING | FL BS (CMP IN PLC)(TY A GR 4) (6") | ASPH (RC-250) | AGGR (TY-B, GR-5) | ASPH (AC-20-5TR OR AC-20XP) | AGGR (TY-B, GR-3)(SAC-B) | FLEXIBLE PAVEMENT STRUCTURE REPAIR(6") + | PLANE ASPH CONC PAV (0" TO 2") |
| | | STA | SY | STA | TON | GAL | CY | CY | HR | SY | GAL | CY | GAL | CY | SY | SY |
| PR 24 | 139599 | | 132 | 84 | 1.707 | 776 | | | | | | | | | 60 | |
| WIDENING STA: 42+81 - 51+53 | 3251 | 9 | | | 40 | 19 | 60 | 20 | 0.25 | 362 | 102 | 3 | 167 | 4 | | |
| PARKING LOT A | 10945 | | | | 134 | 61 | 203 | 67 | 0.82 | 1217 | 341 | 9 | 560 | 12 | | |
| BUNK HOUSE ROAD | 17717 | | | 11 | 217 | 99 | | | | | | | | | | |
| PARKING LOT B | 3289 | | | 5 | 41 | 19 | | | | | | | | | | |
| MAINTENANCE ROAD | 12395 | | | 12 | 152 | 69 | | | | | | | | | | |
| DUMP STATION ROAD | 20330 | | | 4 | 249 | 113 | 181 | 60 | 1.51 | 2259 | 633 | 17 | 1040 | 22 | | |
| PARKING LOT C | 4823 | | | 7 | 59 | 27 | | | | | | | | | | 167 |
| PARKING LOT D | 5247 | | | | 65 | 30 | 119 | 39 | 0.39 | 583 | 164 | 5 | 269 | 6 | | |
| PARKING LOT E | 4692 | | | 2 | 58 | 27 | | | | | | | | | | |
| FISHING DOCK ROAD | 5340 | | | 7 | 66 | 30 | | | | | | | | | | |
| PARKING LOT F | 1310 | | | | 17 | 8 | 25 | 8 | 0.1 | 146 | 41 | 2 | 68 | 2 | | |
| PULL OFF 1 | 1567 | | | | 20 | 9 | 29 | 9 | 0.12 | 175 | 49 | 2 | 81 | 2 | | |
| PULL OFF 2 | 520 | | | | 7 | 3 | 10 | 3 | 0.04 | 58 | 17 | 1 | 27 | 1 | | |
| PULL OFF 3 | 520 | | | | 7 | 3 | 10 | 3 | 0.04 | 58 | 17 | 1 | 27 | 1 | | |
| | | | | | | | | | | | | | | | | |
| TOTALS | | 9 | 132 | 132 | 2,839 | 1,293 | 637 | 209 | 3.27 | 4,858 | 1,364 | 40 | 2,239 | 50 | 60 | 167 |

HMA BASED ON 110LBS/SY/IN @ 2"
BONDING COURSE BASED ON 0.05 GAL/SY
PROOF ROLLING BASED ON 5,000 SY/HR FOR FLEX BASE AND SUBGRADE
+LOCATIONS TO BE DETERMINED BY ENGINEER

PRIME COURSE:
ASPH: RC-250 @ 0.28 GAL/SY
AGGR: GR 5 OR MOD 5 B OR L @ 1:140 CY/SY
FIRST COURSE:
ASPH: AC-20-5TR or AC-20XP @ 0.46 GAL/SY
AGGR: GR 3 B OR L @ 1:105 CY/SY

| SUMMARY OF ROADWAY ITEMS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 540 | 542 | 542 | 544 | 658 | 132 |
| | | 7002 | 7001 | 7002 | 7001 | 7019 | 7003 |
| CSJ: 0901-32-083 | LT/RT | MTL W-BEAM GD FEN (STEEL POST) | REMOVE METAL BEAM GUARD FENCE | REMOVE TERMINAL ANCHOR SECTION | GUARDRAIL END TREATMENT (INSTALL) | INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI) | EMBANK (FNL)(OC)(TY B) |
| STATION | | LF | LF | EA | EA | EA | CY |
| STA: 58+28.51 - 65+28.51 | LT | 700 | 750 | 2 | 2 | 8 | 50 |
| STA: 58+24.93 - 65+24.93 | RT | 700 | 750 | 2 | 2 | 8 | 50 |
| | | | | | | | |
| TOTALS | | 1400 | 1500 | 4 | 4 | 16 | 100 |

| SUMMARY OF ROADWAY ITEMS | | | | | | |
|---|---|---|---|---|---|---|
| | 432 | 432 | 529 | 531 | 531 |
| | 7003 | 7053 | 7009 | 7002 | 7012 |
| CSJ: 0901-32-083 | RIPRAP (CONC)(6 IN) | RIPRAP (SPECIAL) | CONC CURB & GUTTER (TY II) | CONC SIDEWALKS (5") | CURB RAMPS (TY 20) |
| | CY | CY | LF | SY | EA |
| **PR 24** | | | | | |
| STA: 23+15.47 - 23+80.47 LT | | | 65 | | |
| STA: 23+16.13 - 23+81.13 RT | | | 65 | | |
| STA: 57+24 - 58+12 RT | | 7 | | | |
| | | | | | |
| **PARK HQ CURB** + | | | | | |
| STA: 51+52.09 - 56+65.43 | | | 150 | 3 | |
| | | | | | |
| **LOT A** | | | | | |
| ADA PARKING | 4 | | | | |
| | | | | | |
| **BATHROOM LOT** | | | | | |
| ADA PARKING | 18 | | | | |
| | | | | | |
| **LOT C** | | | | | |
| ADA PARKING | 4 | | | | 1 |
| | | | | | |
| TOTALS | 26 | 7 | 280 | 3 | 1 |

+REPAIR LOCATIONS TO BE DETERMINED BY ENGINEER

| SUMMARY OF DRAINAGE ITEMS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 132 | 420 | 464 | 464 | 466 | 466 | 467 | 467 | 496 | 496 | 5012 | 5013 | 658 |
| | 7003 | 7008 | 7003 | 7005 | 7101 | 7105 | 7308 | 7328 | 7004 | 7006 | 7001 | 7001 | 7056 |
| CSJ: 0901-32-083 | EMBANK (FNL)(OC)(TY B) | CL A CONC (COLLAR) | RC PIPE (CL III)(18 IN) | RC PIPE (CL III)(24 IN) | HEADWALL (CH - PW - 0) (DIA= 24 IN) | HEADWALL (CH - PW - 0) (DIA= 36 IN) | SET (TY II) (18 IN) (RCP) (6: 1) (P) | SET (TY II) (24 IN) (RCP) (6: 1) (P) | REMOV STR (SET) | REMOV STR (HEADWALL) | STONE MASONRY (FACADE MASONRY) | STONE MASONRY REPAIR | INSTL OM ASSM (OM-2Y)(WC)GND |
| | CY | EA | LF | LF | EA | EA | EA | EA | EA | EA | SF | SF | EA |
| PR 24 CULVERTS * | | | | | | | | | | | | 50 | 18 |
| CULVERT STA: 41+10 LT | | | | | | 1 | | | | 1 | 200 | | |
| CULVERT STA:49+69 RT | 5 | 1 | | 8 | 1 | | | | | 1 | 27 | | |
| DUMP STATION ROAD | | | 28 | | | | 1 | | | | | | |
| BATHROOM LOT | | | | 4 | | | | 1 | 1 | | | | |
| PARKING LOT D DAINAGE | | | 320 | | | | 4 | | | | | | |
| | | | | | | | | | | | | | |
| TOTALS | 5 | 1 | 348 | 12 | 1 | 1 | 5 | 1 | 1 | 2 | 227 | 50 | 18 |

*SEE PLAN LAYOUT SHEETS FOR CULVERT LOCATIONS

| SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS | | | |
|---|---|---|---|
| | 503 | 505 | 505 |
| | 7002 | 7001 | 7002 |
| CSJ: 0901-32-083 | PORTABLE CNANGEABLE MESSAGE SIGN | TMA (STATIONARY) | TMA (MOBILE OPERATION) |
| | EA | DAY | HR |
| TOTALS | 1 | 60 | 100 |

Texas Department of Transportation

# QUANTITY SUMMARIES

## BONHAM STATE PARK





| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 10 |

DATE: $DATE$
FILE: $FILE$
$TIME$

CK:
DW:
CK:
DN:

**SUMMARY OF EROSION CONTROL ITEMS**

| CSJ: 0901-32-083 | LENGTH | WIDTH | | 164 7006 BROADCAST SEED (TEMP_COOL) | 164 7026 STRAW/HAY MLCH SEED(PERM_ RURAL_CLAY) | 168 7001 VEGETATIVE WATERING + | 169 7009 SOIL RET BLKT (SL_MOD_C LAY_ROLL | FERTILIZER 3-1-2 * | 506 7044 BIODEG EROSN CONT LOGS (INSTL)(12") | 506 7046 BIODEG EROSN CONT LOGS (REMOVE) | EROSION LOG INSTALLATION | EROSION LOG REMOVAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LF | LEFT | RIGHT | SY | SY | TGL | SY | LBS | LF | LF | DATE | DATE |
| PR 24 | 7095 | 3 | 3 | 4730 | 4730 | 28.38 | | 466 | 600 | 600 | | |
| WIDENING STA: 42+81 - 51+53 | 872 | 0 | 10 | 969 | 969 | 5.82 | 944 | 96 | | | | |
| PARKING LOT A | 273 | 3 | 3 | 182 | 182 | 1.10 | | 18 | | | | |
| BUNK HOUSE ROAD | 1029 | 3 | 3 | 686 | 686 | 4.12 | | 68 | | | | |
| PARKING LOT B | 456 | 3 | 3 | 304 | 304 | 1.83 | | 30 | | | | |
| MAINTENANCE ROAD | 1160 | 3 | 3 | 774 | 774 | 4.64 | | 77 | | | | |
| DUMP STATION ROAD | 1050 | 3 | 3 | 700 | 700 | 4.20 | | 69 | | | | |
| PARKING LOT C | 659 | 3 | 3 | 440 | 440 | 2.64 | | 44 | | | | |
| PARKING LOT D | 264 | 3 | 3 | 176 | 176 | 1.06 | | 18 | | | | |
| PARKING LOT E | 193 | 3 | 3 | 129 | 129 | 0.78 | | 13 | | | | |
| | | | | | | | | | | | | |
| TOTALS | | | | 9090 | 9090 | 54.57 | 944 | 899 | 600 | 600 | | |

* FOR CONRACTORS INFORMATION ONLY: 2 CYCLES AT 50 LBS. NITROGEN PER ACRE
AT 21-7-14 (NPK) ANALYSIS = 0.0492 LBS/SY/CYCLE
WATERING: BASED ON 2 APPLICATIONS: 0.5" RAINFALL EQUIVALENT = 0.003 TGL/SY/CYCLE

+ LOCATIONS TO BE DETERMINED
BY ENGINEER

**SUMMARY OF SIGNING ITEMS**

| CSJ: 0901-32-083 | 644 7001 IN SM RD SN SUP&AM TY10BWG(1) SA(P) | 644 7004 IN SM RD SN SUP&AM TY10BWG(1) SA(T) | 644 7073 REMOVE SM RD SN SUP&AM |
|---|---|---|---|
| | EA | EA | EA |
| **PR 24** | | | |
| ROADWAY | 12 | 1 | 5 |
| | | | |
| **LOT A** | | | |
| ADA PARKING | 1 | | |
| | | | |
| **BATHROOM LOT** | | | |
| ADA PARKING | 1 | | 1 |
| | | | |
| **LOT C** | | | |
| ADA PARKING | 2 | | 1 |
| | | | |
| TOTALS | 16 | 1 | 7 |

**SUMMARY OF PAVEMENT MARKING ITEMS**

| CSJ: 0901-32-083 | 662 7114 WK ZN PAV MRK SHT TERM (TAB)TY Y-2 | 666 7405 REFL PAV MRK TY I (W)4"(SLD)(100MIL) | 666 7411 REFL PAV MRK TY I (W)6"(SLD)(100MIL) | 666 7423 REFL PAV MRK TY I (Y)6"(SLD)(100MIL) | 668 7103 PREFAB PM TY C (W)(WORD) | 668 7110 PREFAB PM TY C (W)(18")(YLD TRI) | 668 7132 PRE PM TY C (WHT)(ACC PRK)(SYMBL ONLY) | 672 7004 REFL PAV MRKR TY II-A-A | 666 7117 REFL PAV MRK TY I (Y)12"(SLD)(100MIL) |
|---|---|---|---|---|---|---|---|---|---|
| | EA | LF | LF | LF | EA | EA | EA | EA | LF |
| PR 24: 0+00 - 2+22 | 6 | | | 444 | | | | 11 | 25 |
| PR 24: 41+23 - 57+74 | 41 | | | 3302 | | | | 83 | 25 |
| PR 24: 74+60 - 75+30 | | | 104 | | | 10 | | | |
| PARKING LOT A | | 522 | | | 1 | | 1 | | |
| DUMP STATION ROAD | | | | | | | | | |
| PARKING LOT C | | 346 | | | 1 | | 2 | | |
| PARKING LOT D | | 546 | | | | | | | |
| PARKING LOT E | | 286 | | | | | | | |
| BATHROOM LOT | | 288 | | | 1 | | 1 | | |
| | | | | | | | | | |
| TOTALS | 47 | 1988 | 104 | 3746 | 3 | 10 | 4 | 94 | 50 |

DATE: $DATE$ $TIME$
FILE: $FILE$

Texas Department of Transportation

QUANTITY SUMMARIES

BONHAM STATE PARK





| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 11 |

CK:
DW:
CK:
DN:

**SUMMARY OF ROADWAY ITEMS**

| CSJ: 0901-19-177 | AREA (SQ.FT.) | 134 7001 BACKFILL (TY A) | 354 7032 PLANE ASPH CONC PAV(0" TO 2") o | 341 7062 D-GR HMA TY-D SAC-A PG64-22 (EXEMPT) | 3007 7001 BONDING COURSE | 351 7005 FLEXIBLE PAVEMENT STRUCTURE REPAIR(6") |
|---|---|---|---|---|---|---|
| | | STA | SY | TON | GAL | SY |
| RANGER ROAD | 45989 | 29 | | 563 | 256 | |
| MAINTENANCE ROAD | 10372 | 7 | | 127 | 58 | |
| PARKING LOT A | 3869 | 3 | 130 | 48 | 22 | 10 |
| PARKING LOT B | 3776 | 3 | | 47 | 21 | 10 |
| | | | | | | |
| TOTALS | | 42 | 130 | 785 | 357 | 20 |

**HMA BASED ON 110LBS/SY/IN @ 2"**
BONDING COURSE BASED ON 0.05GAL/SY
oPLANING TO BE DONE AROUND
MAINTENANCE BUILDING TO
BLEND PAVEMENT TO SIDEWALK
HEIGHT

**SUMMARY OF EROSION CONTROL ITEMS**

| CSJ: 0901-19-177 | LENGTH | WIDTH | | 164 7006 BROADCAST SEED (TEMP_COOL) | 164 7026 STRAW/HAY MLCH SEED(PERM_RURAL_CLAY) | 168 7001 VEGETATIVE WATERING | FERTILIZER 3-1-2 • | 506 7044 BIODEG EROSN CONT LOGS (INSTL) (12") | 506 7046 BIODEG EROSN CONT LOGS (REMOVE) | EROSION LOG INSTALLATION + | EROSION LOG REMOVAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LF | LEFT | RIGHT | SY | SY | TGL | LBS | LF | LF | DATE | DATE |
| RANGER ROAD | 2874 | 4 | 4 | 2555 | 2555 | 15.33 | 252 | 100 | 100 | | |
| MAINTENANCE ROAD | 649 | 4 | 4 | 577 | 577 | 3.47 | 57 | | | | |
| PARKING LOT A | 242 | 4 | 4 | 216 | 216 | 1.30 | 22 | | | | |
| PARKING LOT B | 236 | 4 | 4 | 210 | 210 | 1.26 | 21 | | | | |
| | | | | | | | | | | | |
| TOTALS | | | | 3558 | 3558 | 21.36 | 352 | 100 | 100 | | |

• FOR CONRACTORS INFORMATION ONLY: 2 CYCLES AT 50 LBS. NITROGEN PER ACRE
AT 21-7-14 (NPK) ANALYSIS = 0.0492 LBS/SY/CYCLE
WATERING: BASED ON 2 APPLICATIONS: 0.5" RAINFALL EQUIVALENT = 0.003 TGL/SY/CYCLE

+LOCATIONS TO BE DETERMINED
BY ENGINEER

DATE: $DATE$ $TIME$
FILE: $FILE$

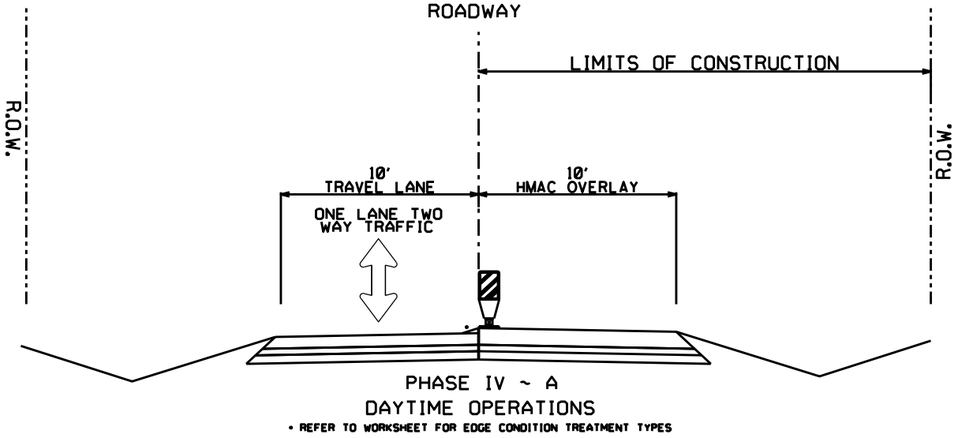
Texas Department of Transportation

# QUANTITY SUMMARIES

## TEXOMA FISHERIES LAB

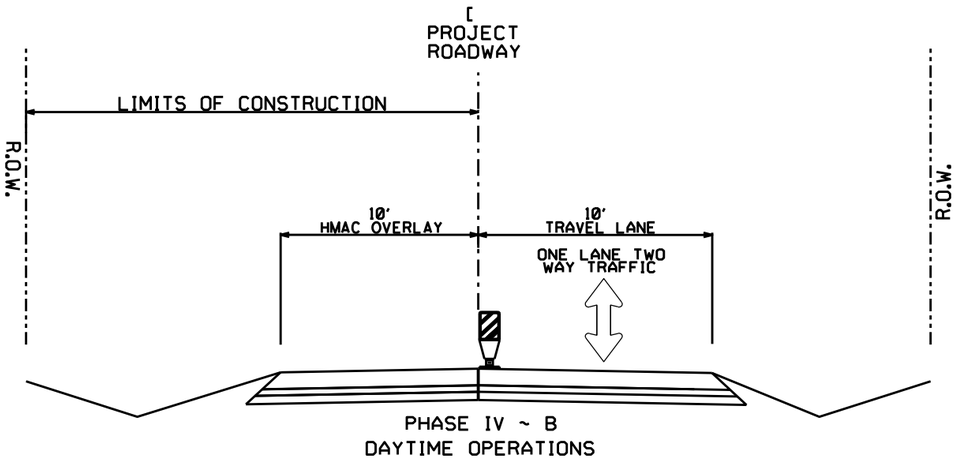



| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 12 |

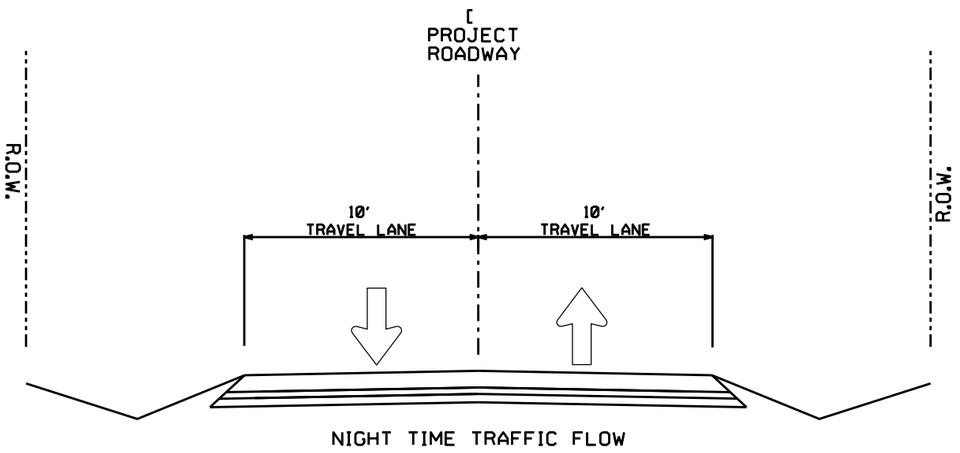



PHASE IV ~ A
DAYTIME OPERATIONS

• REFER TO WORKSHEET FOR EDGE CONDITION TREATMENT TYPES




PHASE IV ~ B
DAYTIME OPERATIONS




NIGHT TIME TRAFFIC FLOW

TRAFFIC FLOW TYPICAL SECTIONS

**Phase I ~ Initial Traffic Control**

Install project limit traffic control devices (TCD) per the BC standard sheets. Utilize the applicable TCP (1-1)-18 or TCP (1-2)-18 layout for TCD installation.

**Phase II ~ Erosion Control**

Install erosion control devices utilizing the applicable TCP (1-1)-18 layout or TCP (1-2)-18.

**Phase III ~ Spot Pavement Repair**

Refer to the Traffic Flow Typical Sections for construction work area and traffic flow.

Utilize TCP (1-2)-18 as appropriate for construction operations.

**Phase IV ~ Road Widening Construction**

Refer to the Traffic Flow Typical Sections for construction work area and traffic flow.

Utilize TCP (2-2)-18 as appropriate for road widening.

Prior to advancement to the next section, all backfilling and temporary striping must be completed and the section must be approved by the engineer.

**Phase V ~ Parking Lot Construction**

Utilize TCP (2-1)-18 or TCP (2-2)-18 as appropriate.

**Phase VI ~ MBGF Work**

Remove and install proposed MBGF by closinf road section crossing dam utilizing WZ (RCD)-13.

**Phase VII ~ HMAC Overlay - Park Side Roads and Park Road 24**

Refer to the Traffic Flow Typical Sections for construction work area and traffic flow.

Utilize TCP (1-2)-18 as appropriate for HMAC overlay operations.

When roadway width is less than 20 feet - close park road in half loop sections utilizing WZ (RCD)-13 and with additional traffic control signs, devices and markings appropriate for traffic flow and road width.

Complete HMAC overlay operations on the park side roads first and then Park Road 24.

Complete work operations to open travel lanes at night.

**Phase VIII ~ Backfill and Seeding Operations**

Perform pavement backfill operations, sign installation and seeding, utilizing the appropriate TCP standard.

**Phase IX ~ Install Road Signs and Final Pavement Markings**

Install road signs for new traffic flow configuration and cover signs.

Install final pavement markings using TCP(3-1)-13 and TCP(3-3)-14.

Remove road sign covers.

**Phase X ~ Project Clean Up**

Remove erosion control devices, construction debris and waste material, utilizing the appropriate TCP standard.

**Notes:** Prior to a specific construction operation, the traffic control standard specified for the construction phase in this narrative must be evaluated thoroughly for appropriateness. All traffic control operations must adhere to the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and the applicable Traffic Control Standards. Construction phase order may be varied when approved by the Engineer. Submit a Work and Traffic Control Sequence plan to the Engineer for approval. Ensure that both travel lanes are open at night. Provide pilot car during one lane/two way traffic operations. Road closures must be approved by the Engineer.

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED PROFESSIONAL ENGINEER

7.15.24

Monte R. Rater P.E.

Texas Department of Transportation

SEQUENCE OF WORK



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 13 |

DATE: $DATE$
FILE: $FILE$
$TIME$

## 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 |

DATE:
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Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

# BC(1)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21 | 0901 | 32 | 083, ETC | VAR |
| | DIST | COUNTY | | SHEET NO. |
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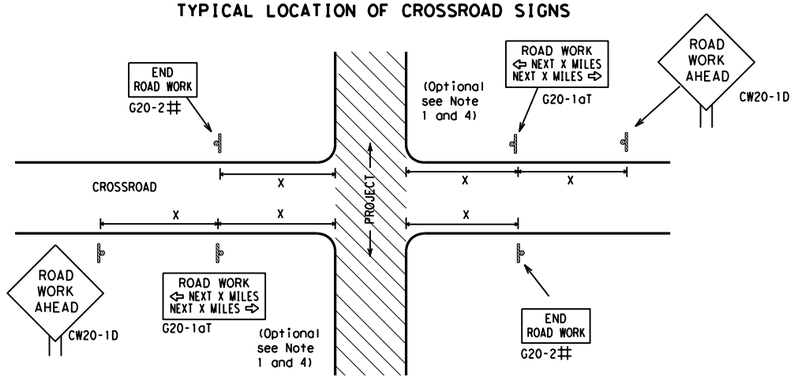
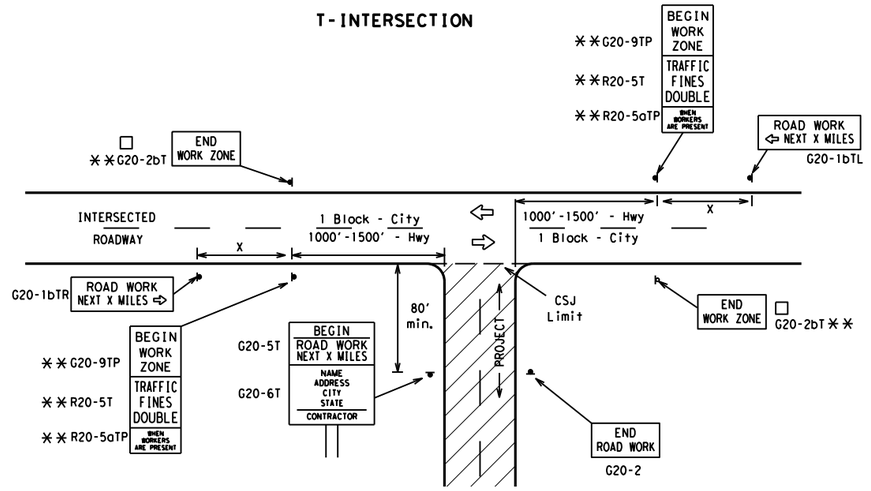
## TYPICAL LOCATION OF CROSSROAD SIGNS




# 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] |

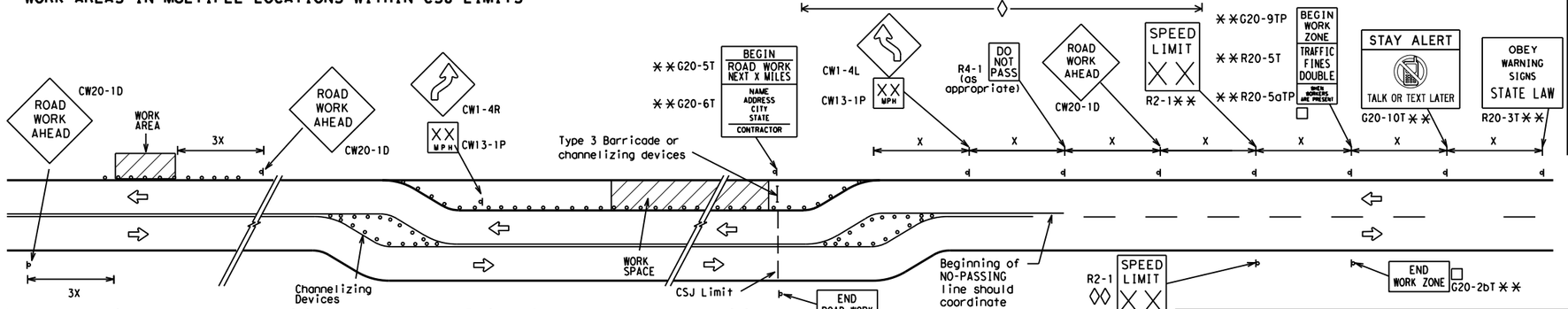
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

## GENERAL NOTES

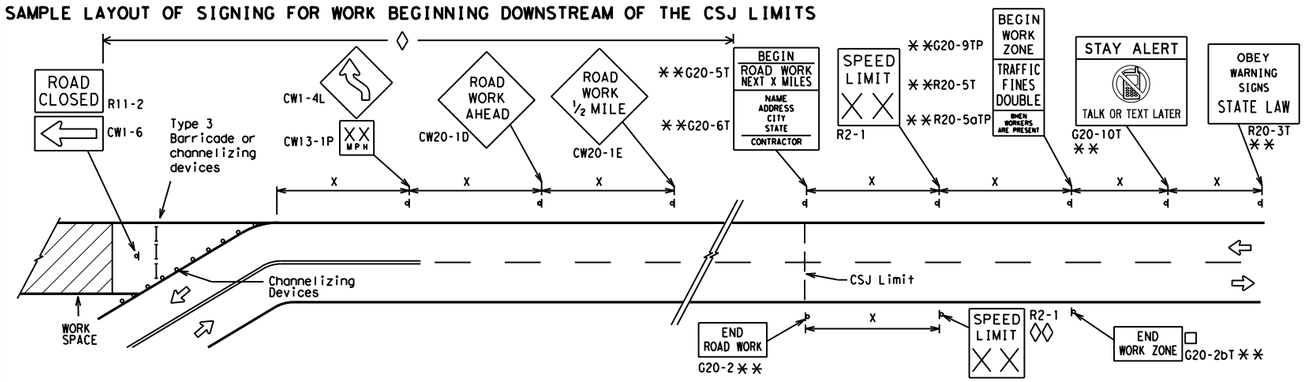
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 DOWNSTREAM OF THE CSJ LIMITS




## SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

## NOTES

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

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

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

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

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

## LEGEND

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



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 | 0901 | 32 | 083, ETC | VAR |
| 9-07 8-14 | DIST | COUNTY | | SHEET NO. |
| 7-13 5-21 | PAR | FANNIN, ETC. | | 15 |

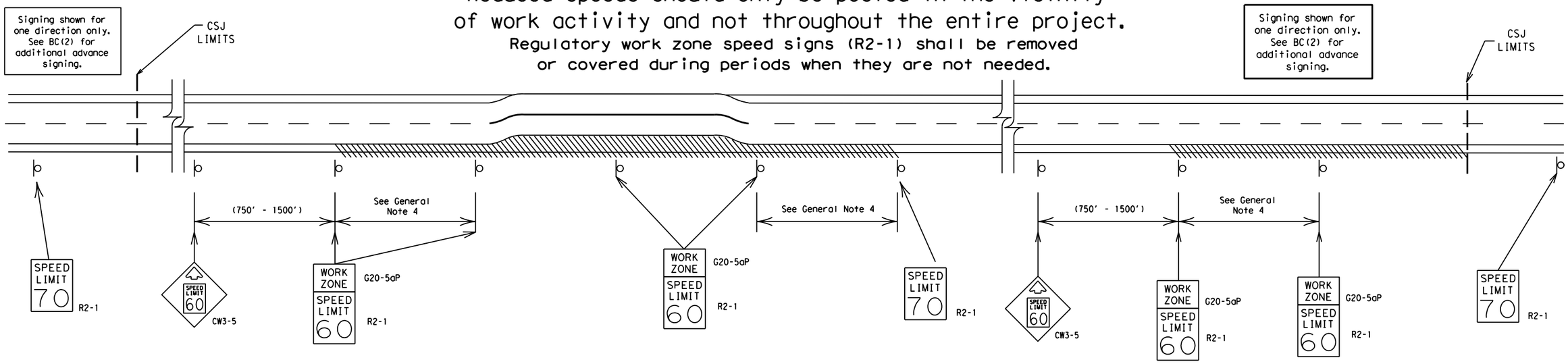
DATE:
FILE:

# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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




## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

### GENERAL NOTES

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



Texas Department of Transportation

Traffic Safety Division Standard

## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

## BC(3)-21

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|---|---|---|---|---|
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| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 9-07 8-14 | DIST | COUNTY | | SHEET NO. |
| 7-13 5-21 | PAR | FANNIN, ETC. | | 16 |

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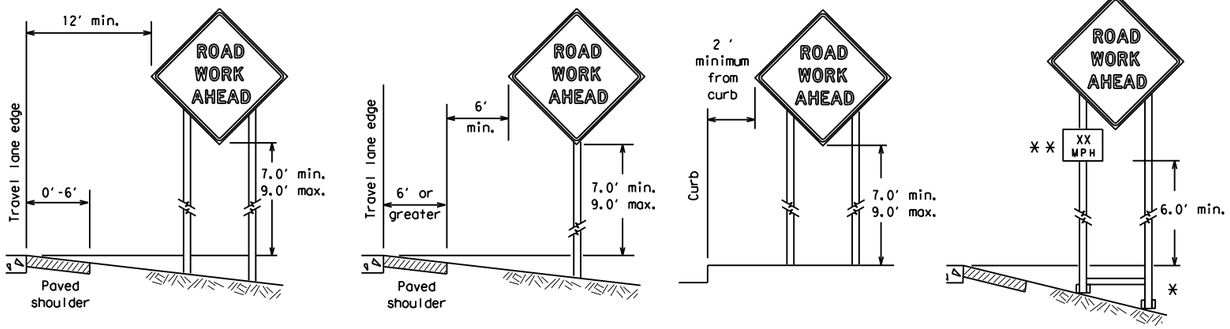
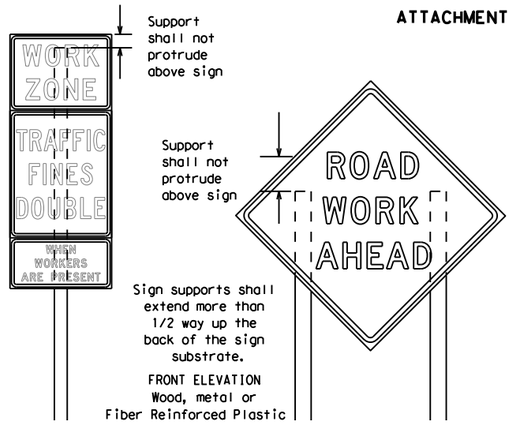
## TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

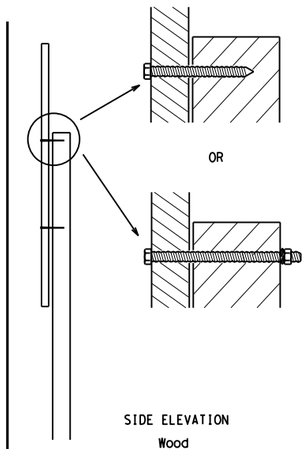



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

* * 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



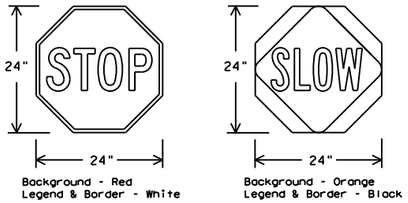

Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

**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.



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

# BC(4)-21

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|---|---|---|---|---|
| ©TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
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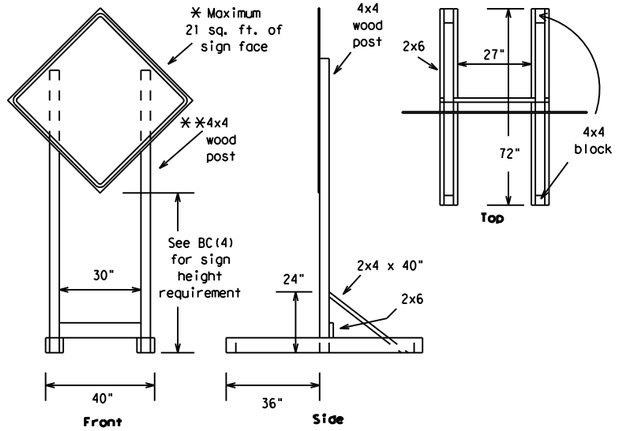
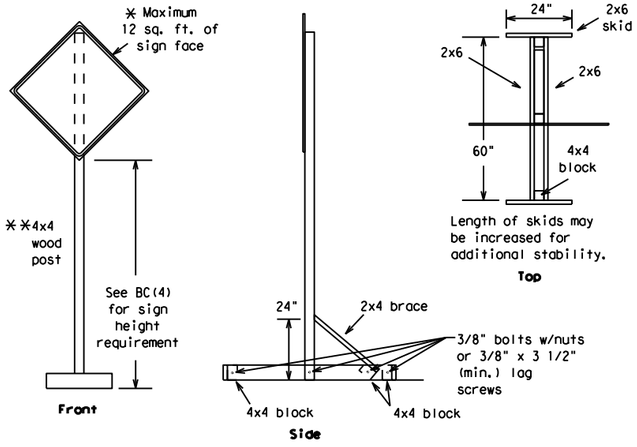
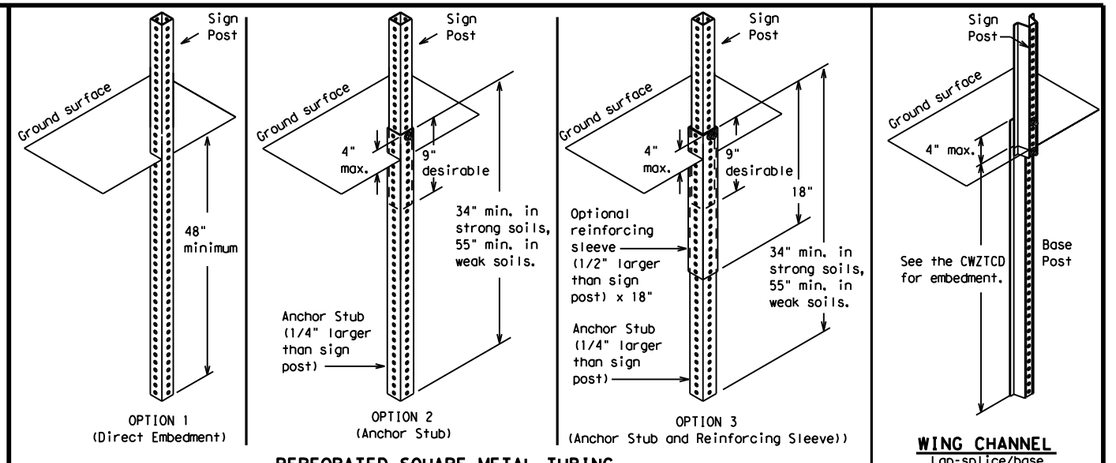



# SKID MOUNTED WOOD SIGN SUPPORTS

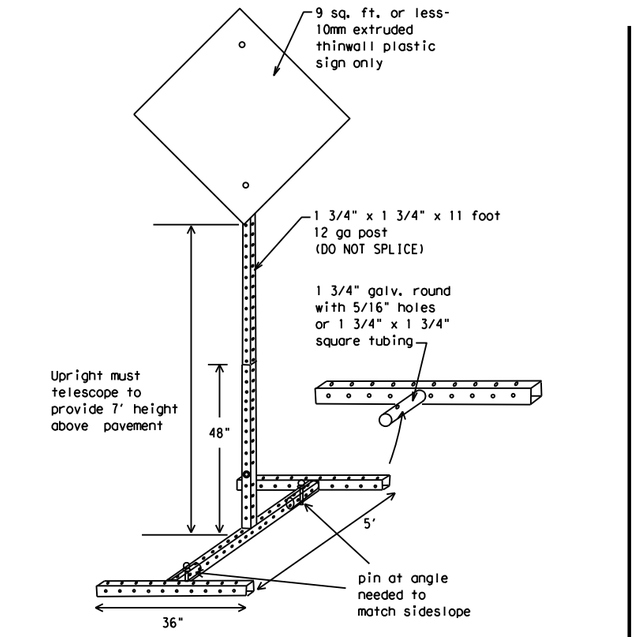
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

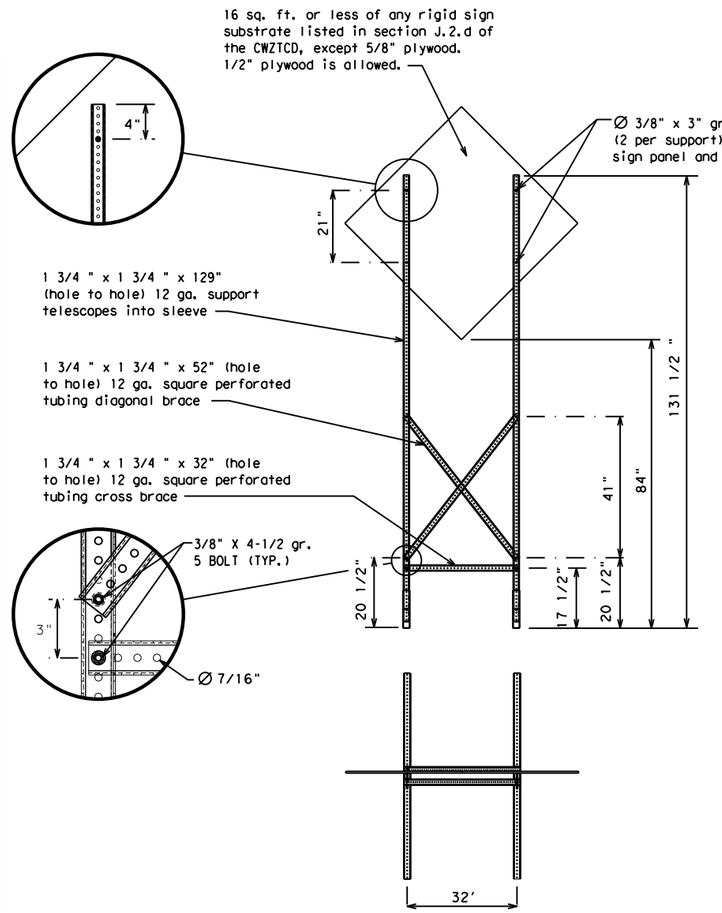


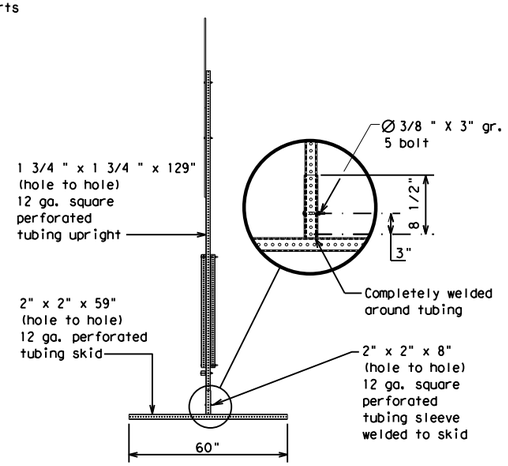

PERFORATED SQUARE METAL TUBING

# 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.



Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

# BC(5)-21

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

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

### Other Condition List

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

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

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

### Location List

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

### Warning List

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

### ** Advance Notice List

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

** 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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| ©TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
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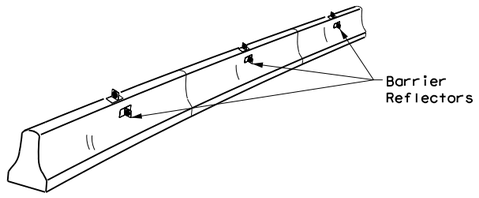
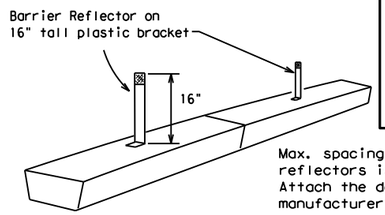
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



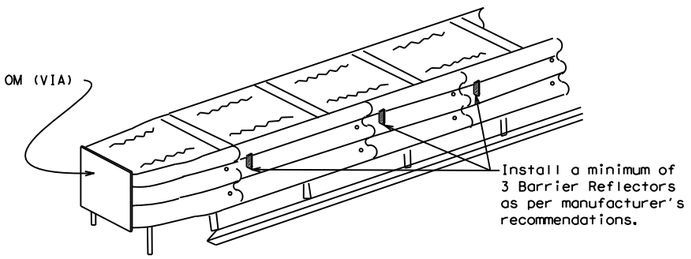

## CONCRETE TRAFFIC BARRIER (CTB)

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)




## DELINEATION OF END TREATMENTS

**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**

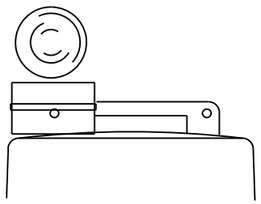
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

**END TREATMENTS FOR CTB'S USED IN WORK ZONES**

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

# BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

## WARNING LIGHTS

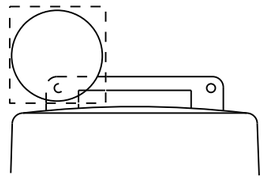


Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

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.



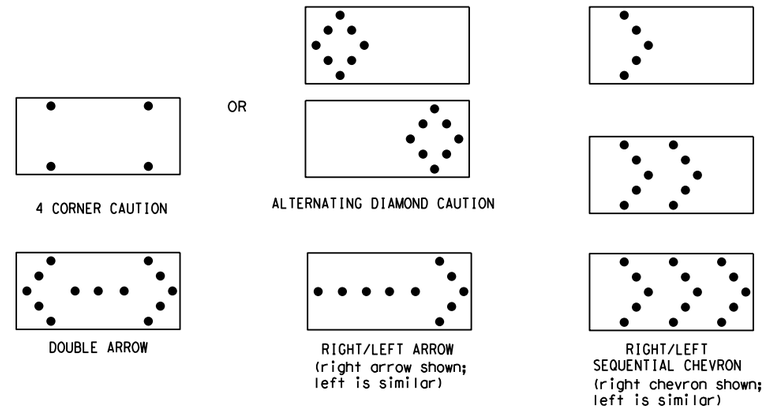
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

## 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

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|---|---|---|---|---|
| © TxDOT November 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 9-07 8-14 | DIST | COUNTY | | SHEET NO. |
| 7-13 5-21 | PAR | FANNIN, ETC. | | 20 |

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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:

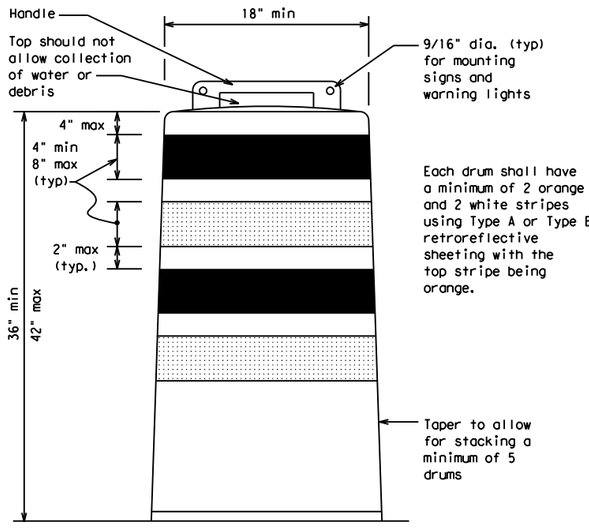
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

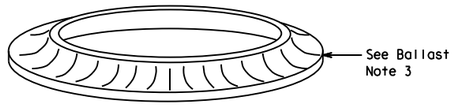
## RETROREFLECTIVE SHEETING

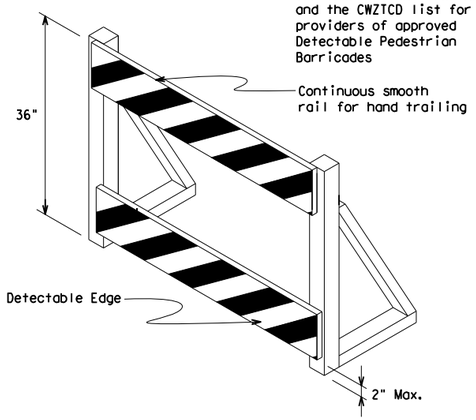
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

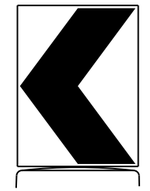


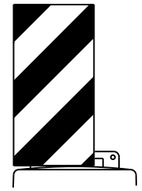




## DETECTABLE PEDESTRIAN BARRICADES

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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| 4-03 8-14 | DIST | COUNTY | | SHEET NO. |
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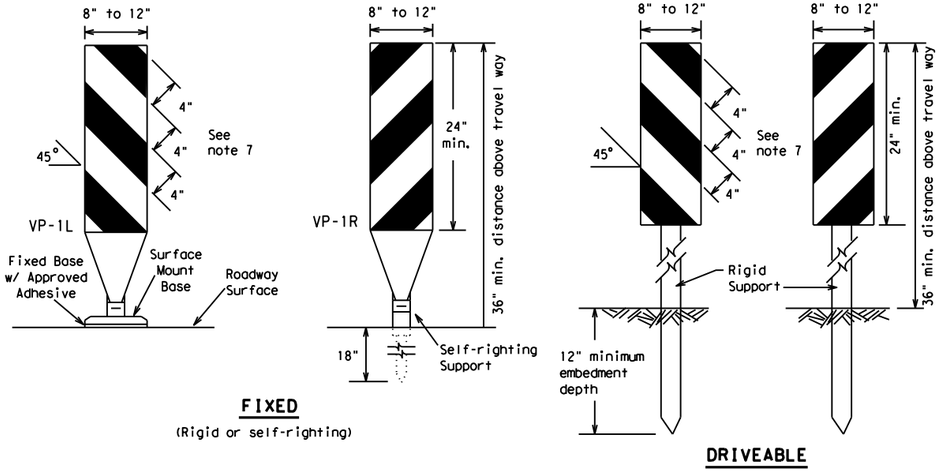
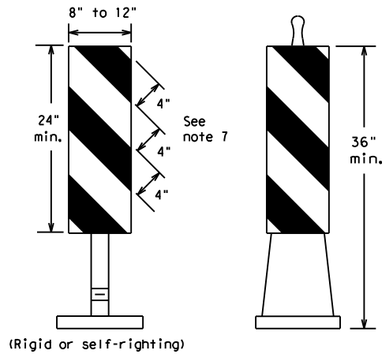



**FIXED**
(Rigid or self-righting)

**DRIVEABLE**

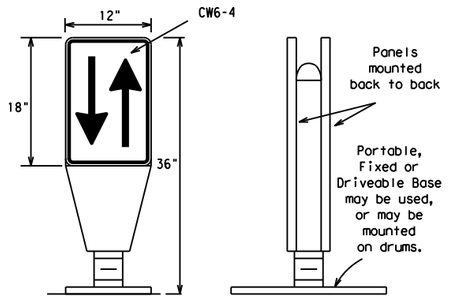



(Rigid or self-righting)

**PORTABLE**

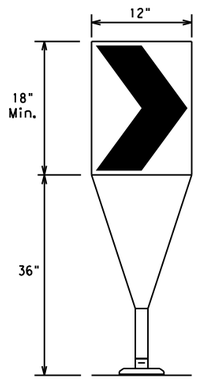
## VERTICAL PANELS (VPs)

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)



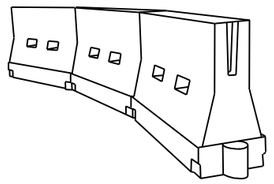

Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

Texas Department of Transportation | Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

# BC(9)-21

| FILE: bc-21.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
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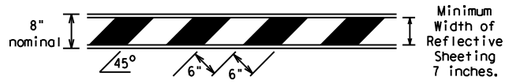
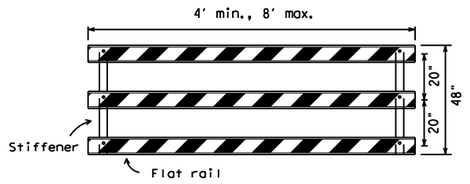
## TYPE 3 BARRICADES

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.



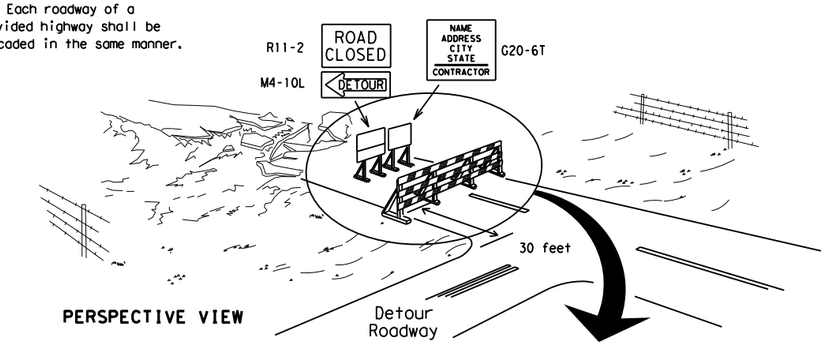

### TYPICAL STRIPING DETAIL FOR BARRICADE RAIL




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

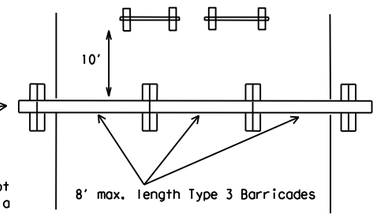
### TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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




PERSPECTIVE VIEW

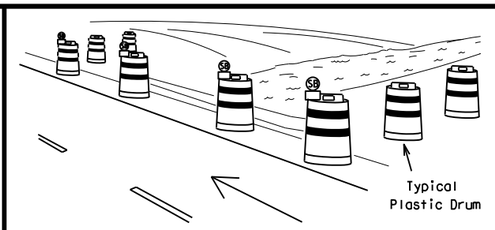
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.




PLAN VIEW

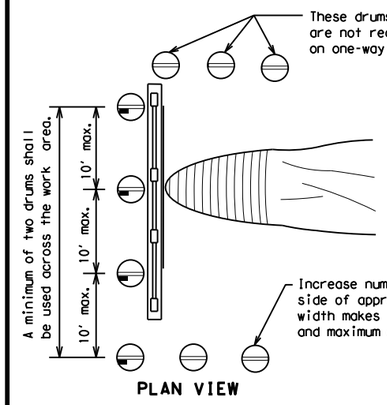
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

### TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION




PERSPECTIVE VIEW

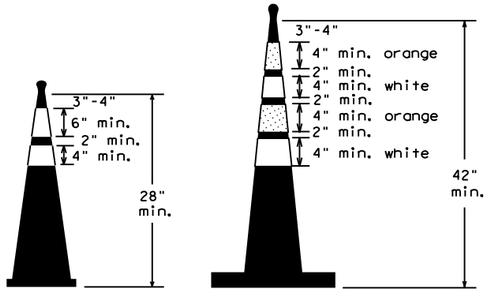
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



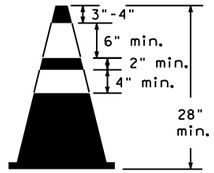

| LEGEND | |
|---|---|
| | Plastic drum |
| | Plastic drum with steady burn light or yellow warning reflector |
| SB | Steady burn warning light or yellow warning reflector |

PLAN VIEW

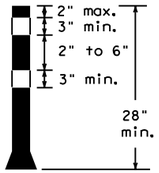
### CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS




Two-Piece cones




One-Piece cones

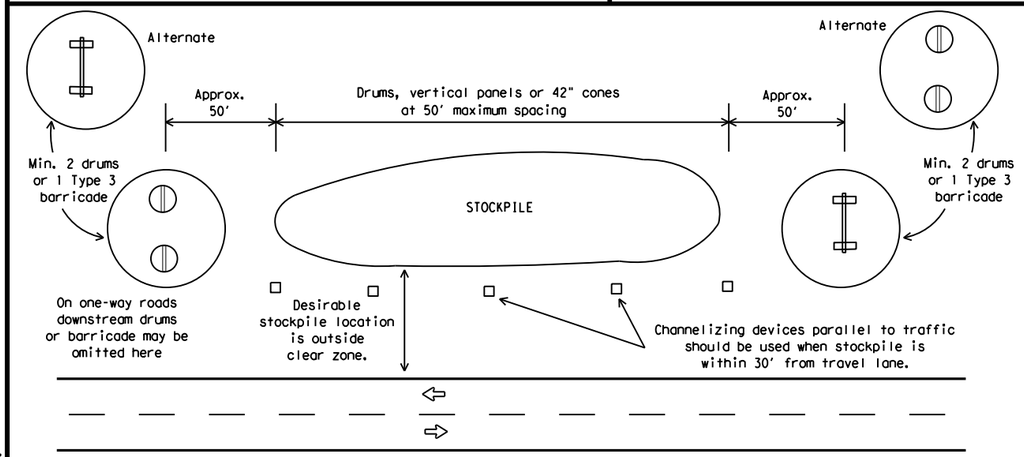



Tubular Marker

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

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SHEET 10 OF 12

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.

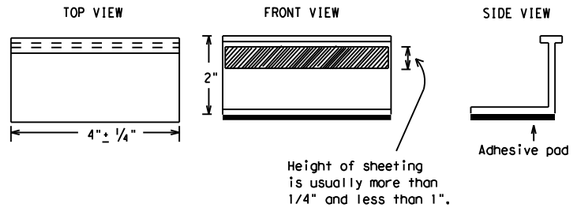
## MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

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| 11-02 8-14 | | | | |

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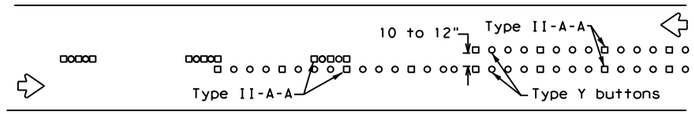
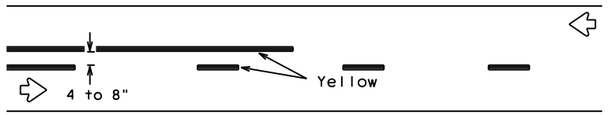
# PAVEMENT MARKING PATTERNS

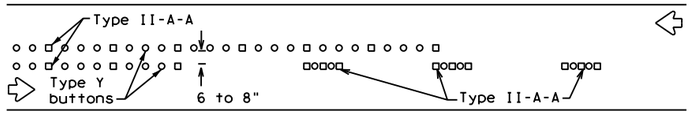

REFLECTORIZED PAVEMENT MARKINGS - PATTERN A




RAISED PAVEMENT MARKERS - PATTERN A



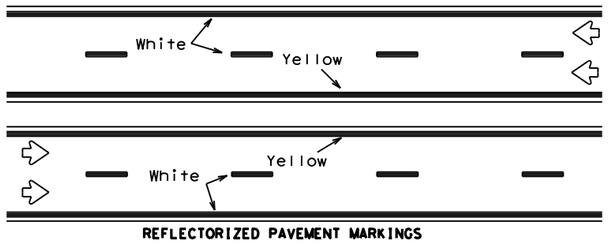

REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



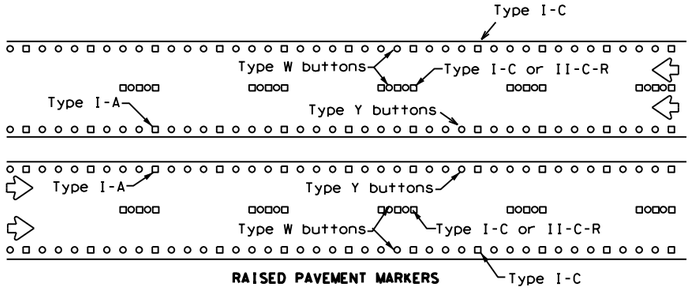

RAISED PAVEMENT MARKERS - PATTERN B

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



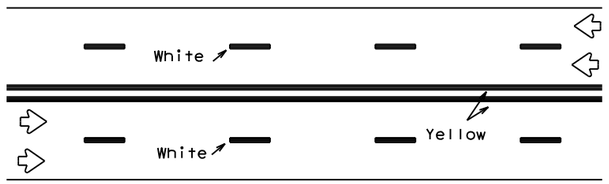

REFLECTORIZED PAVEMENT MARKINGS



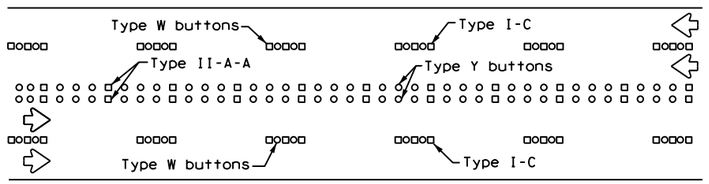

RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

## EDGE & LANE LINES FOR DIVIDED HIGHWAY



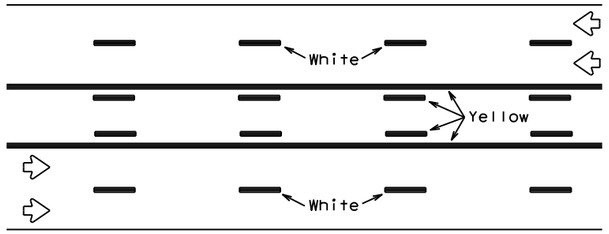

REFLECTORIZED PAVEMENT MARKINGS



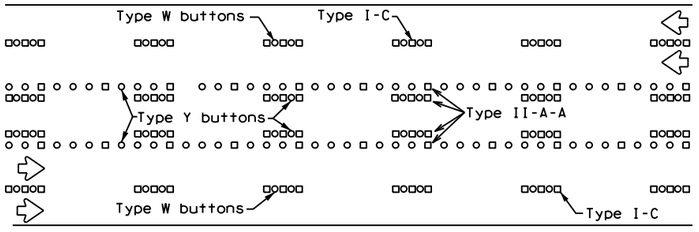

RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS




REFLECTORIZED PAVEMENT MARKINGS




RAISED PAVEMENT MARKERS

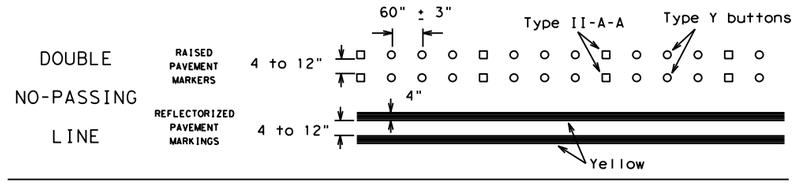
Prefabricated markings may be substituted for reflectorized pavement markings.

## TWO-WAY LEFT TURN LANE

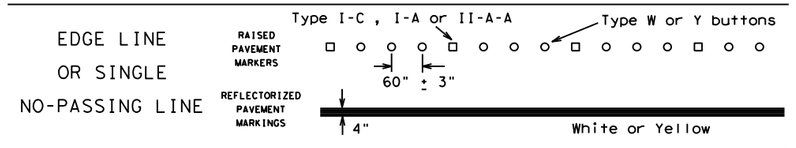
# STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

## SOLID LINES

DOUBLE NO-PASSING LINE

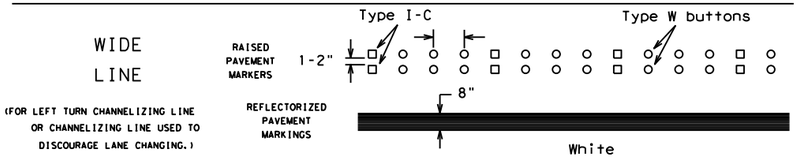



EDGE LINE OR SINGLE NO-PASSING LINE



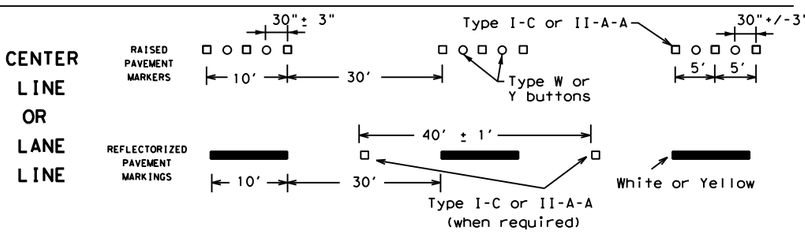

WIDE LINE

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

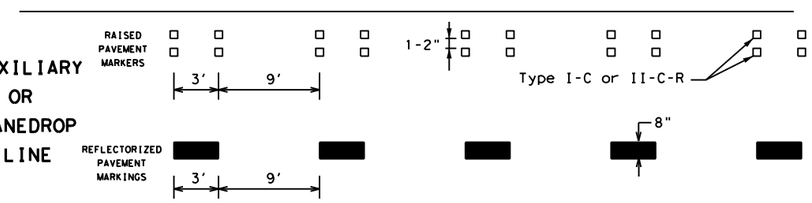



## BROKEN LINES

CENTER LINE OR LANE LINE

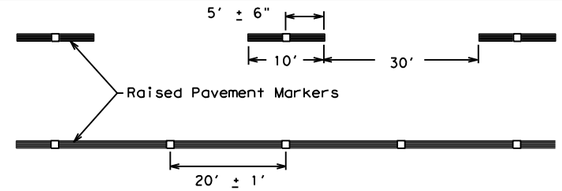



AUXILIARY OR LANEDROP LINE




### 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."



Texas Department of Transportation

Traffic Safety Division Standard

# BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

## BC(12)-21

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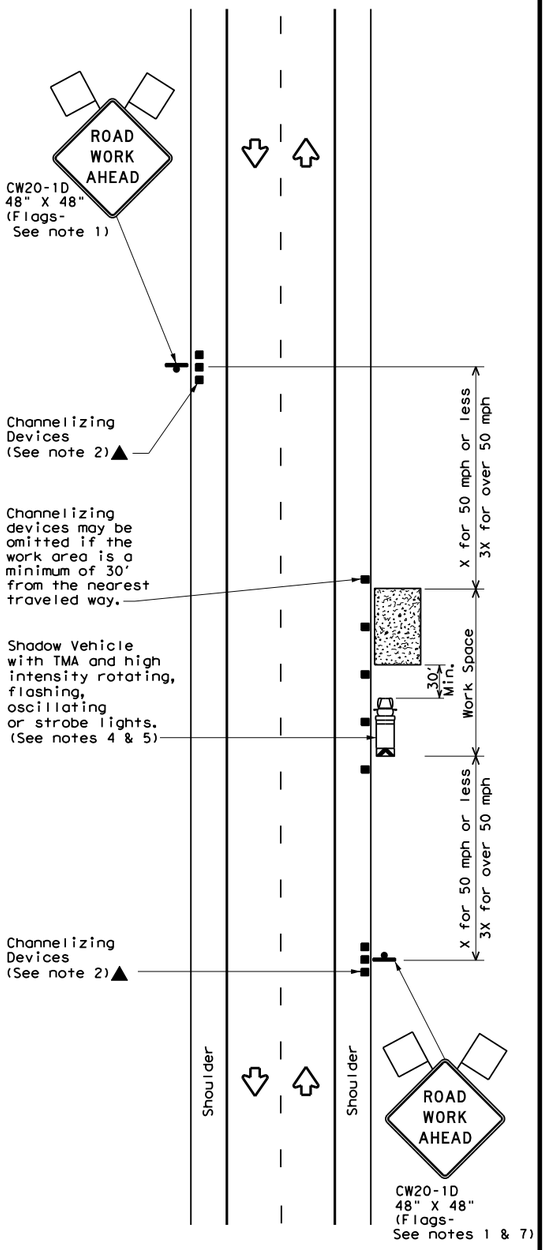
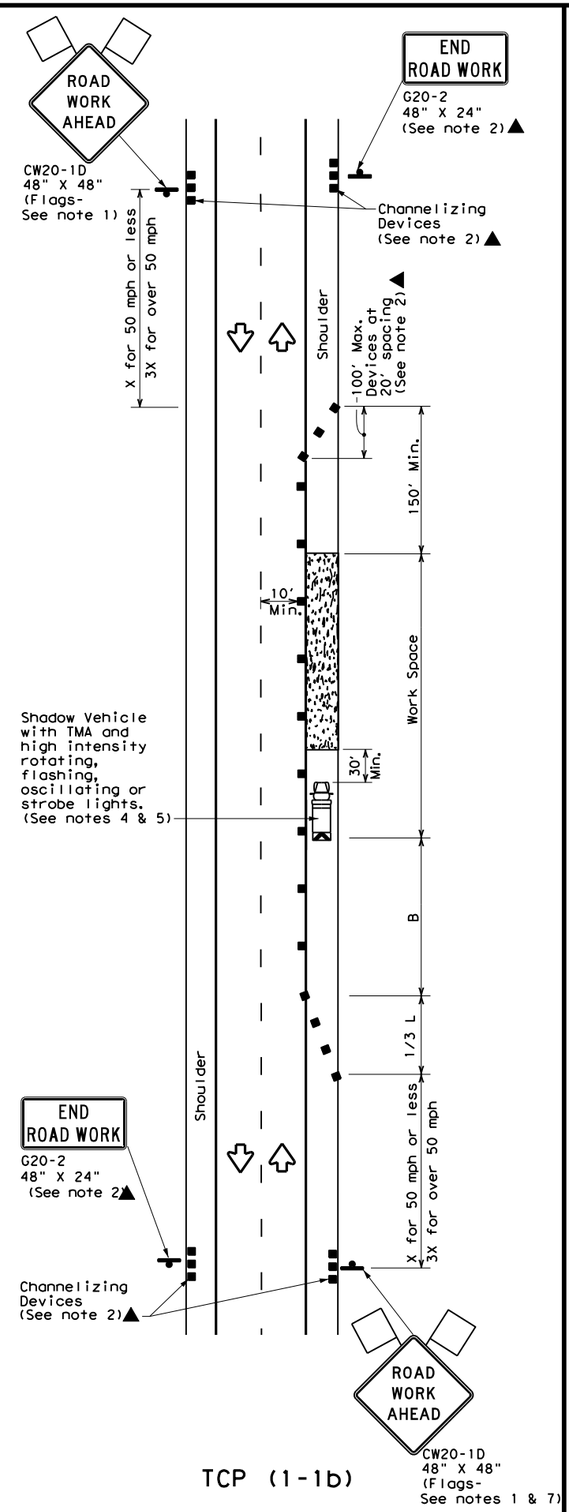


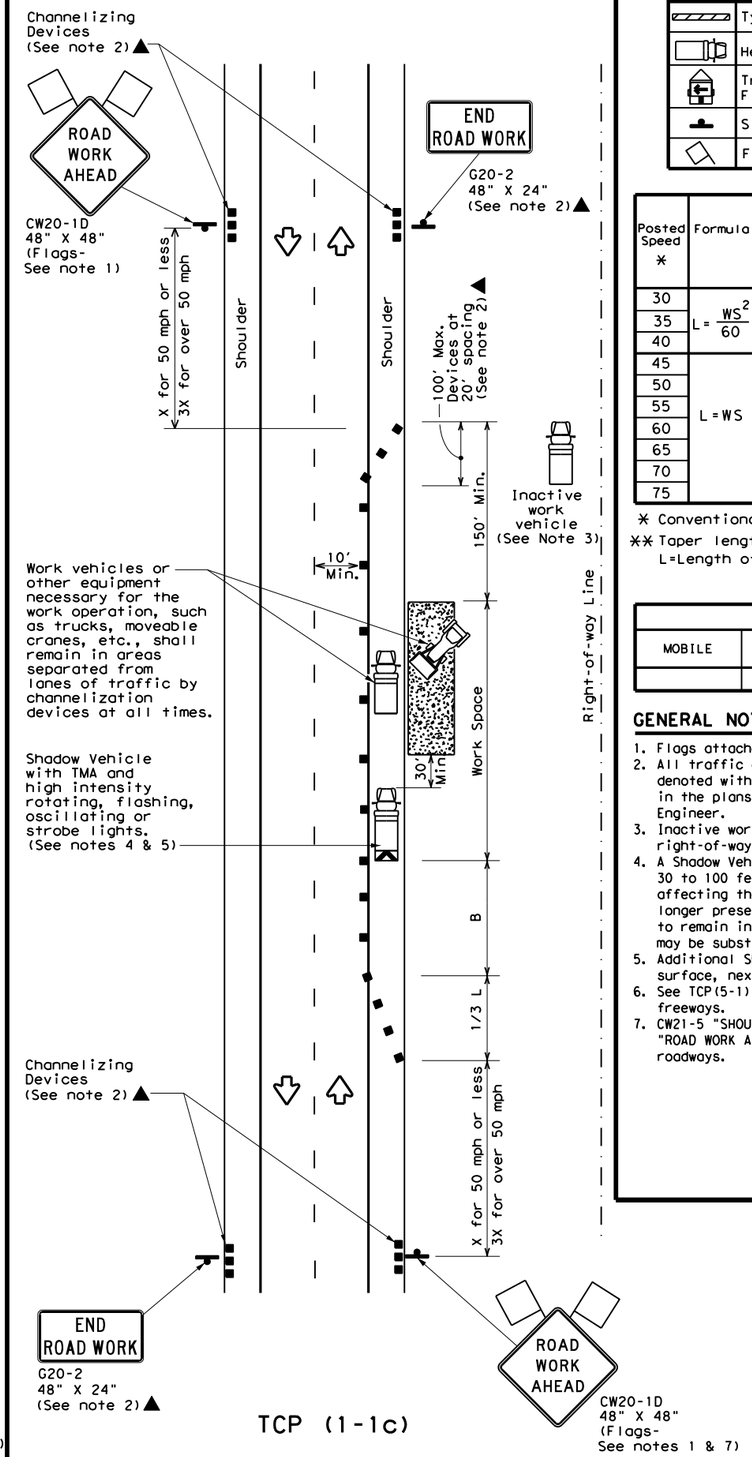

TCP (1-1a)

## WORK SPACE NEAR SHOULDER
Conventional Roads




TCP (1-1b)

## WORK SPACE ON SHOULDER
Conventional Roads




TCP (1-1c)

## 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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. 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 wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. 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

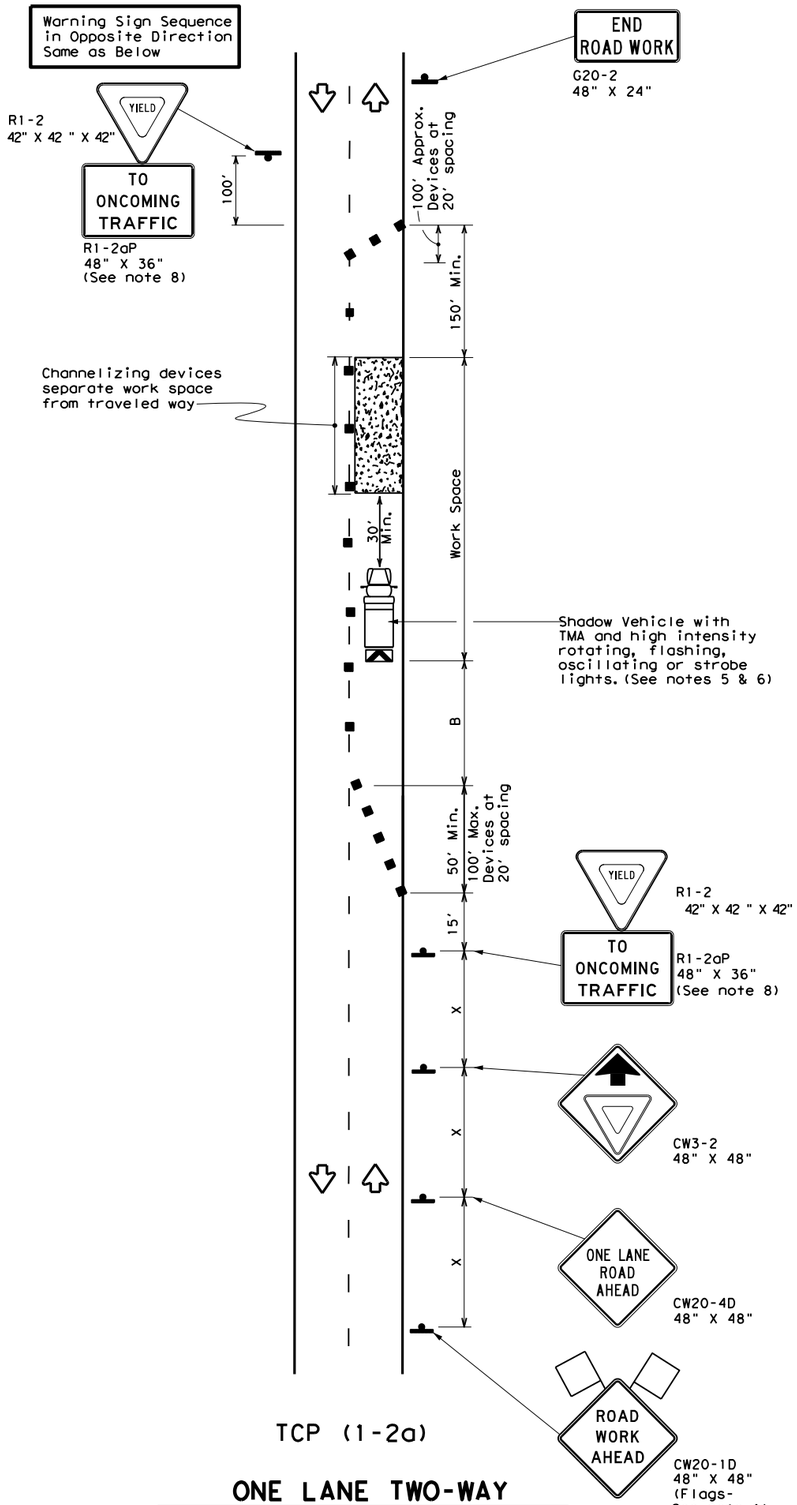
Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

# TCP(1-1)-18

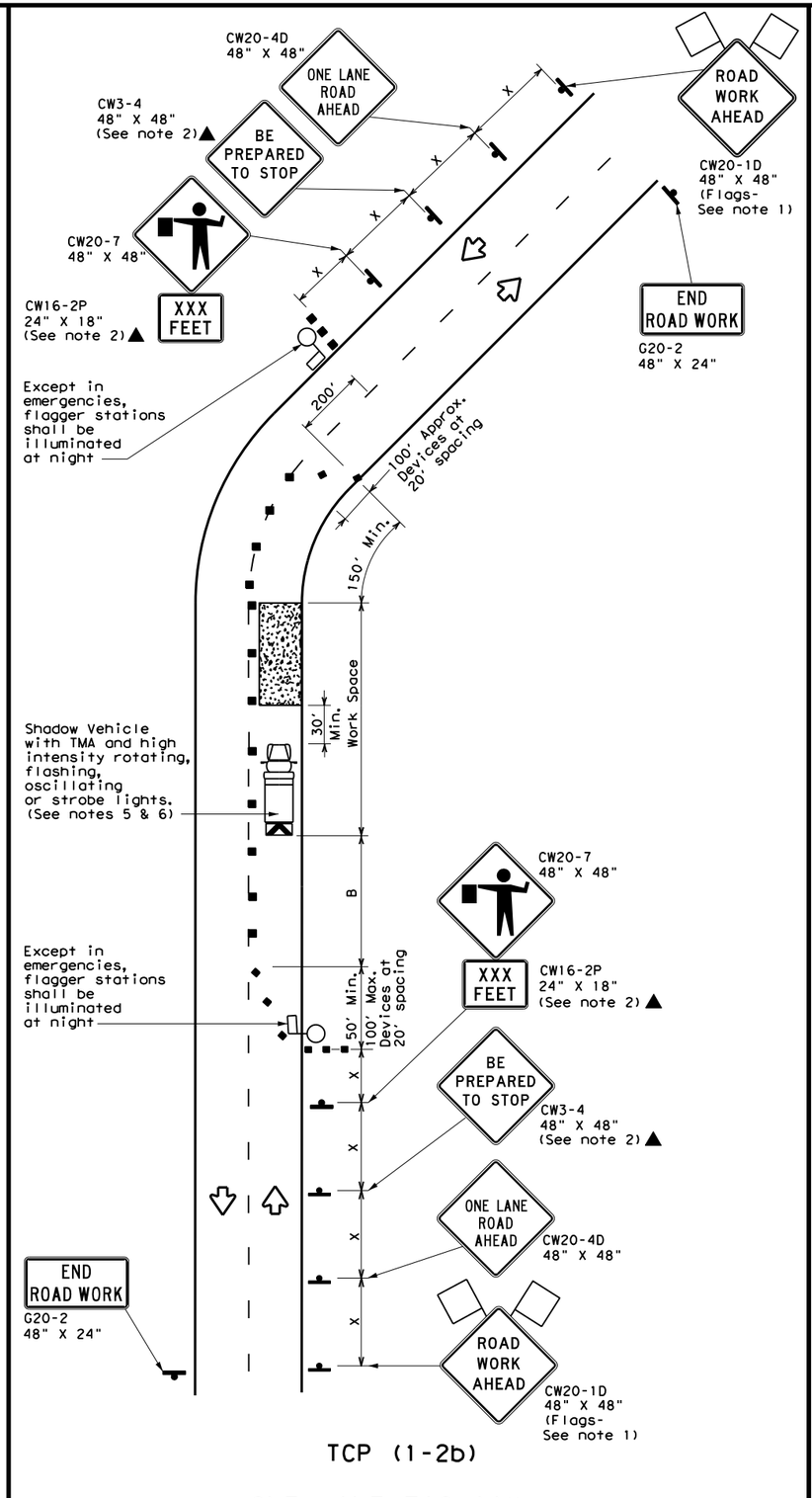
| FILE: tcp1-1-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18 | 0901 | 32 | 083, ETC | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 26 |

DATE:
FILE:




TCP (1-2a)

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




TCP (1-2b)

## ONE LANE TWO-WAY
## CONTROL WITH FLAGGERS

### LEGEND

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

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

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

### TYPICAL USAGE

| MOBILE | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
|---|---|---|---|---|
| | ✓ | ✓ | | |

### GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

### TCP (1-2a)

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

### TCP (1-2b)

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

Texas Department of Transportation

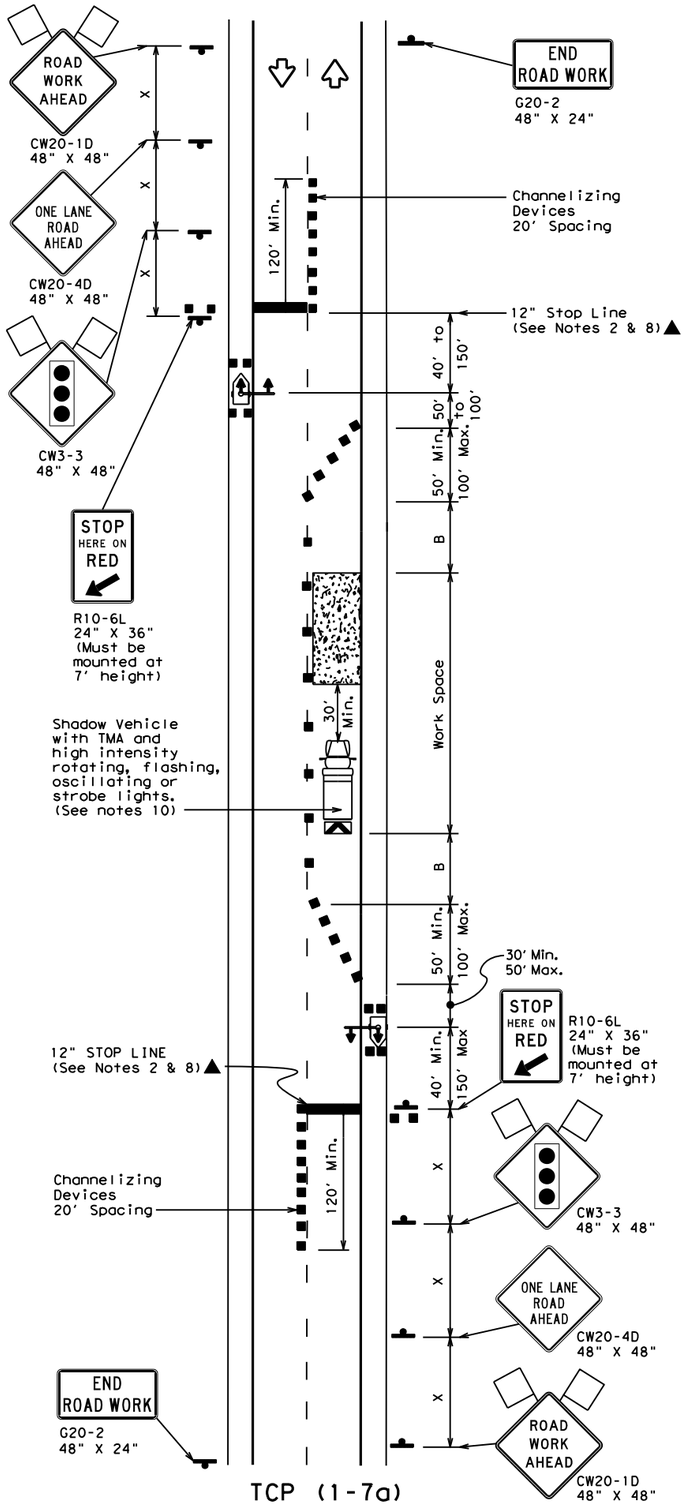
Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN
# ONE-LANE TWO-WAY
# TRAFFIC CONTROL

## TCP(1-2)-18

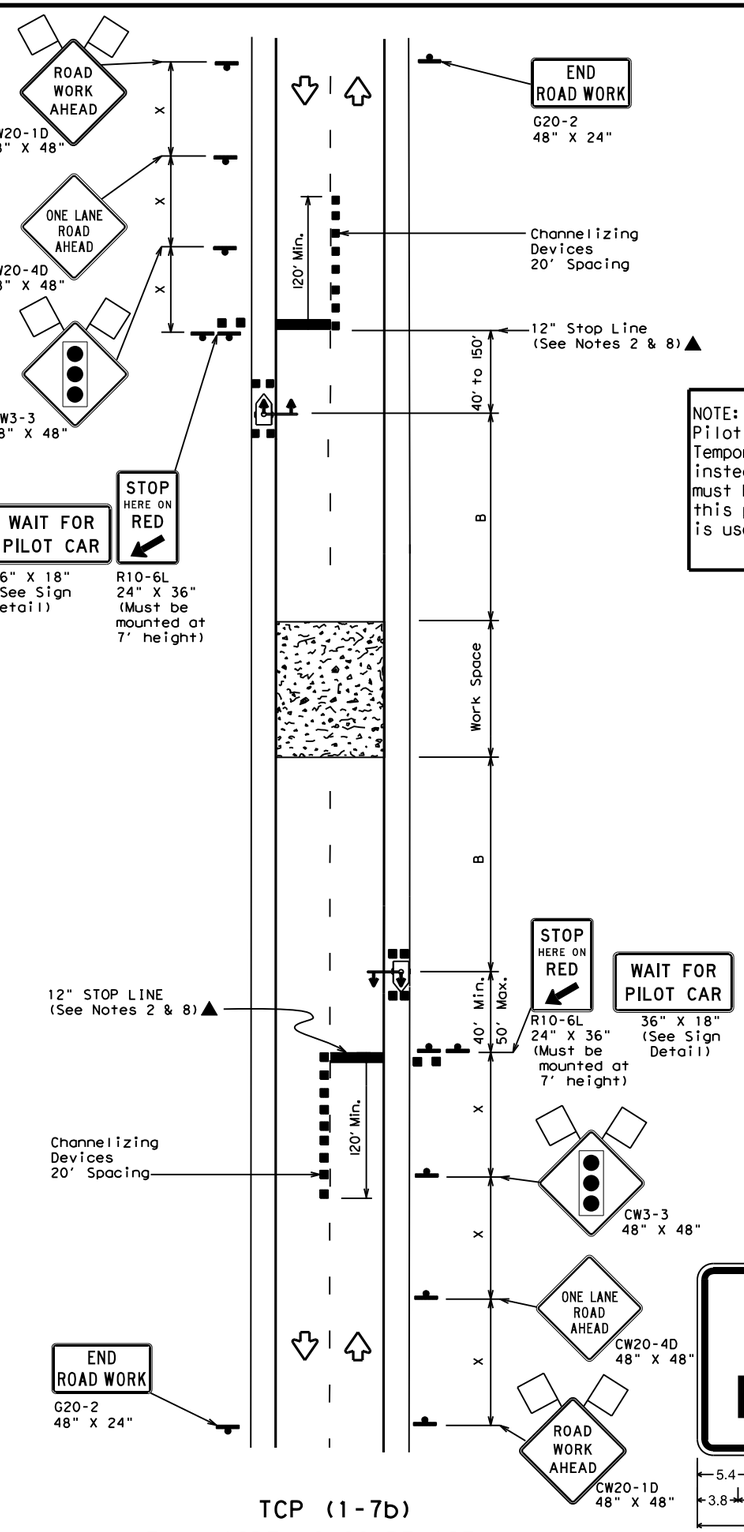
| FILE: tcp1-2-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 4-90 4-98 | DIST | COUNTY | | SHEET NO. |
| 2-94 2-12 | PAR | FANNIN, ETC. | | 27 |
| 1-97 2-18 | | | | |

DATE: 7/11/2024 4:52:43 PM
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\P-PTHC0001.dgn




TCP (1-7a)

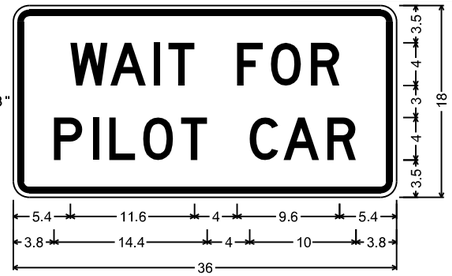
**ONE LANE TWO-WAY TRAFFIC CONTROL WITH TRAFFIC SIGNALS**




TCP (1-7b)

**FULL WIDTH CLOSURE WITH TRAFFIC SIGNALS AND PILOT CAR**

NOTE: FORM 6(09)-19(E) - Pilot Vehicles using Temporary Traffic Signals instead of Flaggers - TxDOT, must be filled out each day this preliminary standard is used.




1.5" Radius, 0.625" Border, 0.375" Indent, Black on White; [WAIT FOR] D; [PILOT CAR] D; (Must be mounted at 7' height)

| LEGEND | | | |
|---|---|---|---|
| | Sign | | Channelizing Devices |
| | Heavy Work Vehicle | | Truck Mounted Attenuator (TMA) |
| | Temporary or Portable Traffic Signal | M | Portable Changeable Message Sign (PCMS) |
| | Flag | | Traffic Flow |

| 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. Unless otherwise stated in the plans, flags attached to signs 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 BE PREPARED TO STOP sign may be installed after the ONE LANE ROAD AHEAD sign, but proper sign spacing shall be maintained.
4. ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
5. If pilot car is used to guide vehicles through traffic control zone, vehicle shall have an identification name displayed and "PILOT CAR, FOLLOW ME" (G20-4) sign or message board mounted in a conspicuous position on rear.
6. Channelizing devices are recommended for all applications. Devices may be offset as needed for Maintenance operations.
7. See "Recommended Work Zone Settings" chart in the control box for preset programming.
8. A temporary STOP line may be used in conjunction with "Stop here on Red" (R10-6).
9. Proper alignment of overhead signal with on-coming lane should be ensured.
10. A Shadow Vehicle with TMA should be used anytime it can be positioned approximately 30 to 100' in advance of workers exposed to traffic 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 remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.

Texas Department of Transportation

*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN SHORT TERM TEMPORARY SIGNALS PRELIMINARY STANDARD

## TCP(1-7)-11

| FILE: tcp1-7.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 28 |

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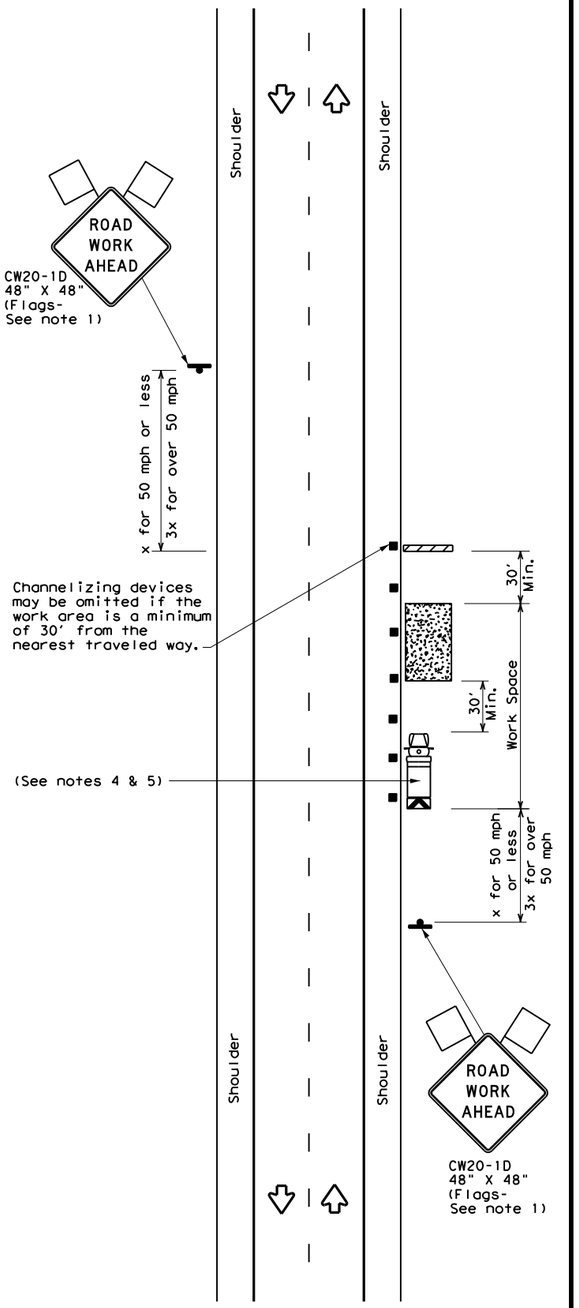
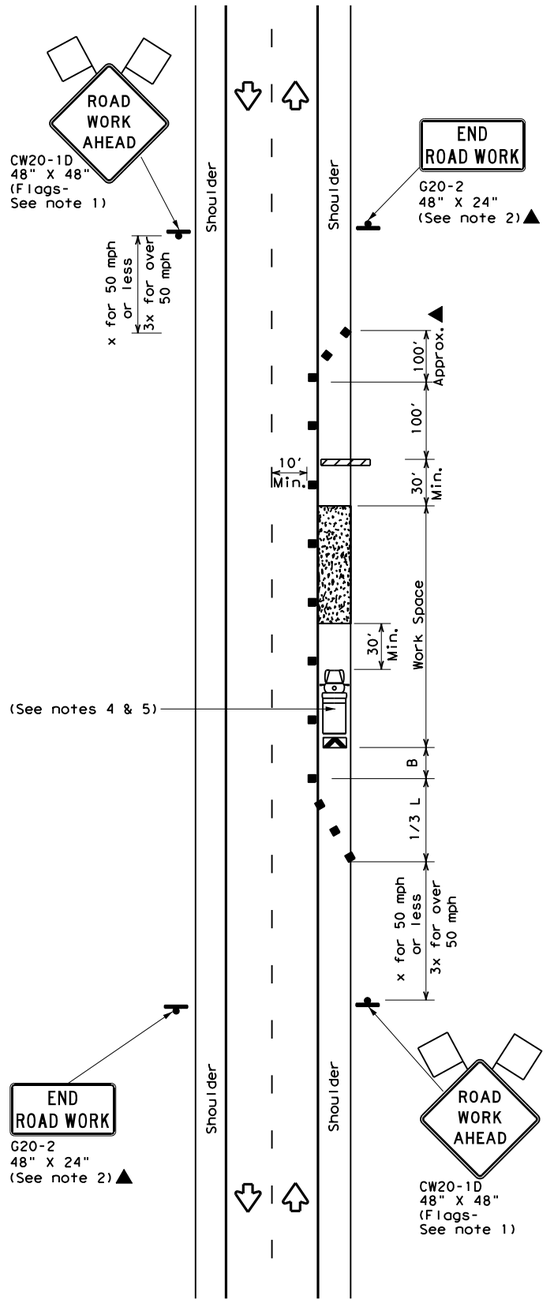
DATE:
FILE:



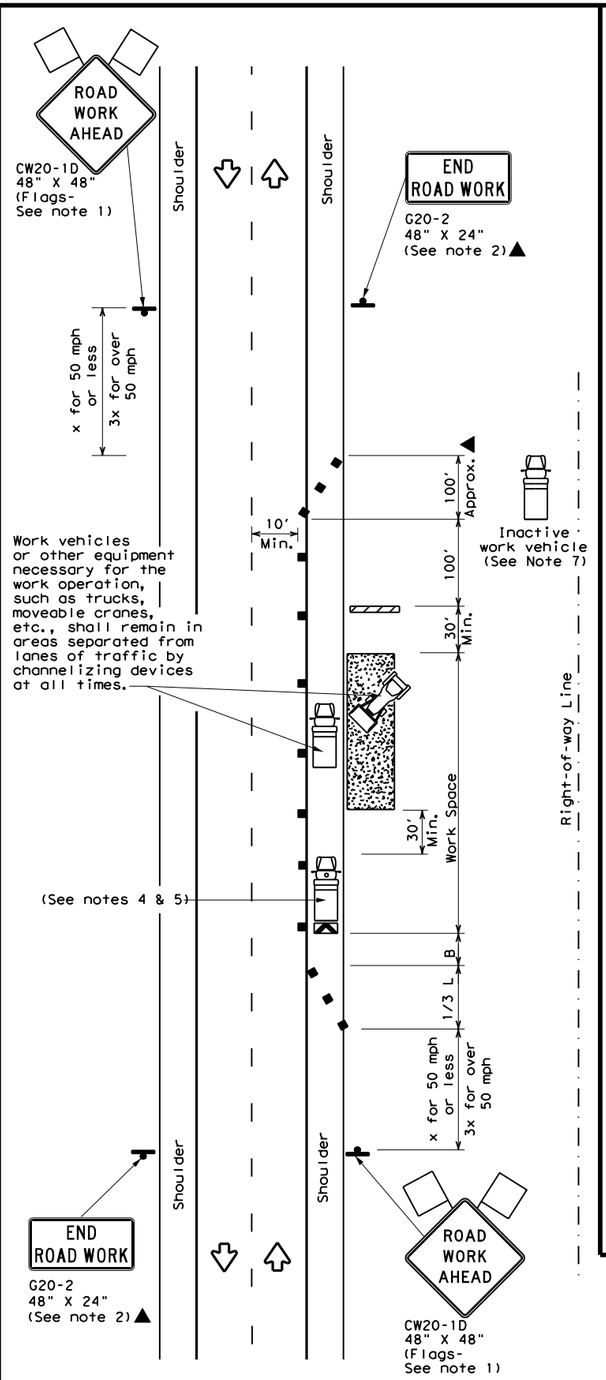

TCP (2-1a)

## WORK SPACE NEAR SHOULDER
Conventional Roads




TCP (2-1b)

## WORK SPACE ON SHOULDER
Conventional Roads




TCP (2-1c)

## WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

## GENERAL NOTES

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

Texas Department of Transportation

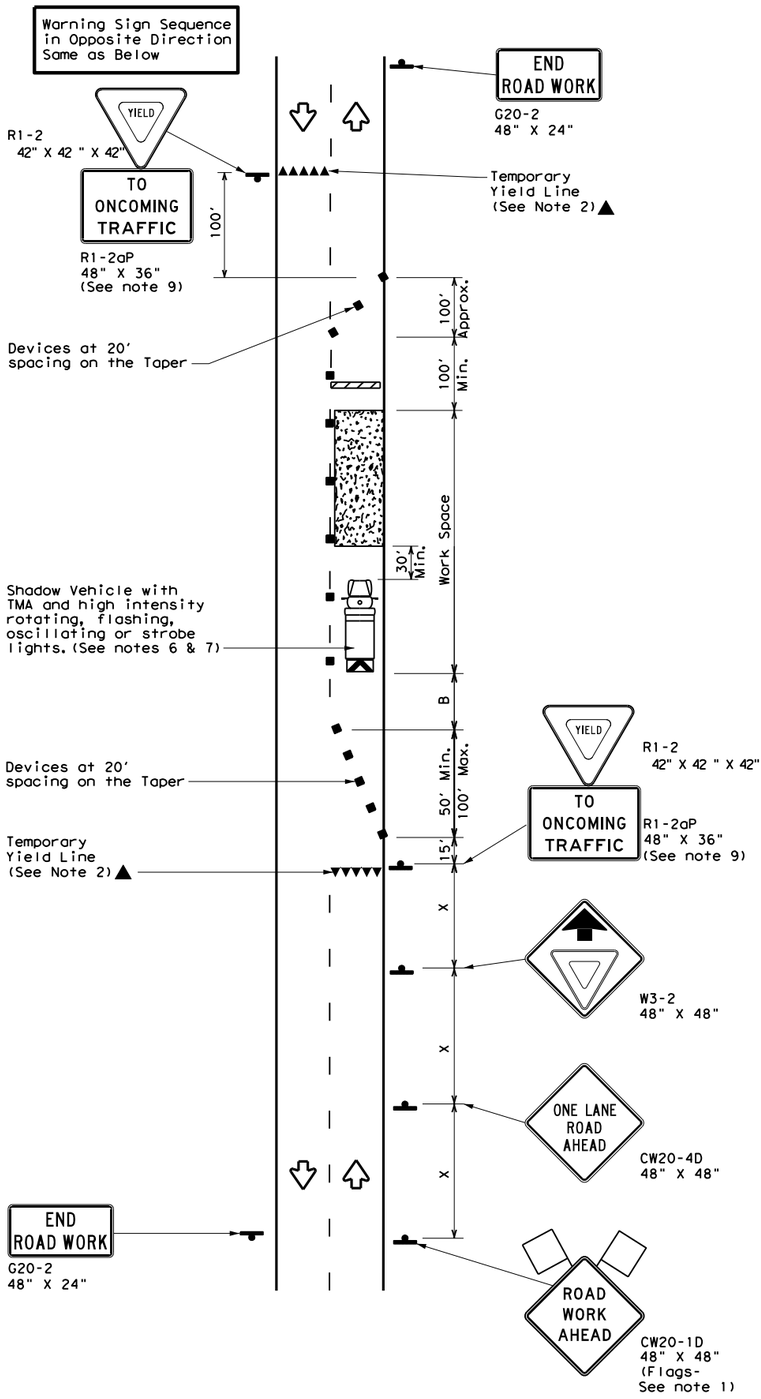
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

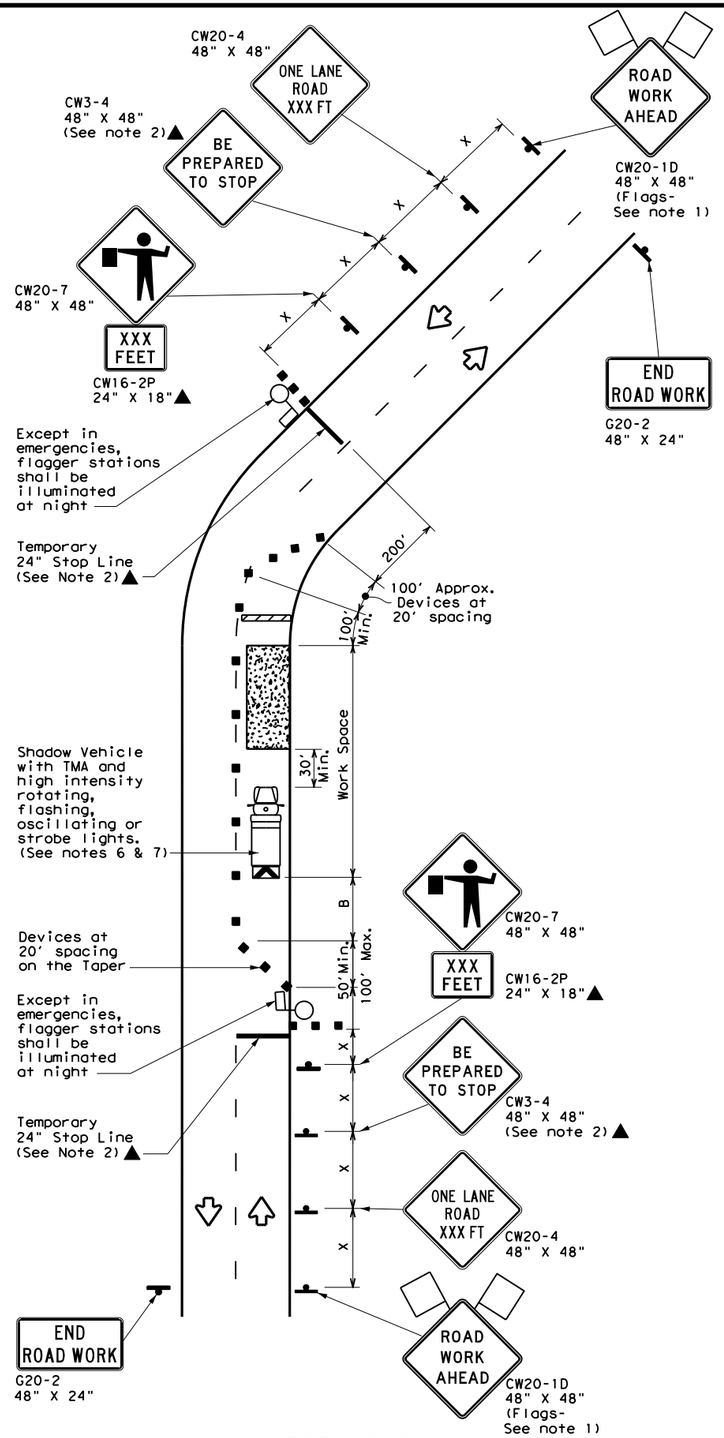
# TCP(2-1)-18

| FILE: tcp2-1-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 2-94 4-98 | DIST | COUNTY | | SHEET NO. |
| 8-95 2-12 | PAR | FANNIN, ETC. | | 29 |
| 1-97 2-18 | | | | |

DATE:
FILE:




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




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

## LEGEND

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

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

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

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

## GENERAL NOTES

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

### TCP (2-2a)

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

### TCP (2-2b)

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

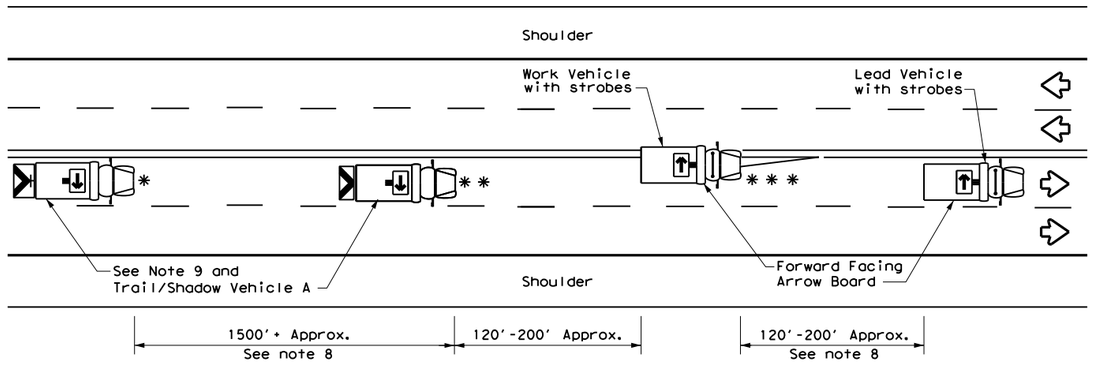
Texas Department of Transportation
*Traffic Operations Division Standard*

# TRAFFIC CONTROL PLAN
# ONE-LANE TWO-WAY
# TRAFFIC CONTROL

## TCP(2-2)-18

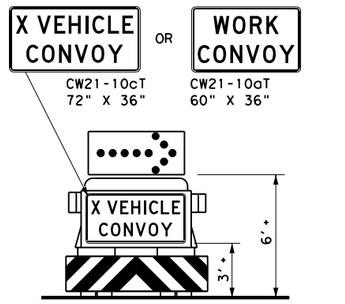
| FILE: tcp2-2-18.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18 | 0901 | 32 | 083, ETC | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 30 |

DATE:
FILE:



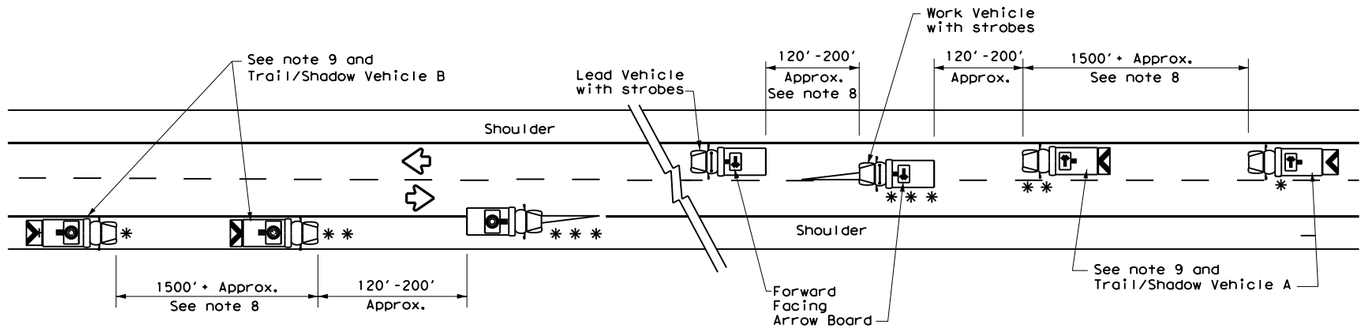

TCP (3-1a)

## UNDIVIDED MULTILANE ROADWAY




## TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

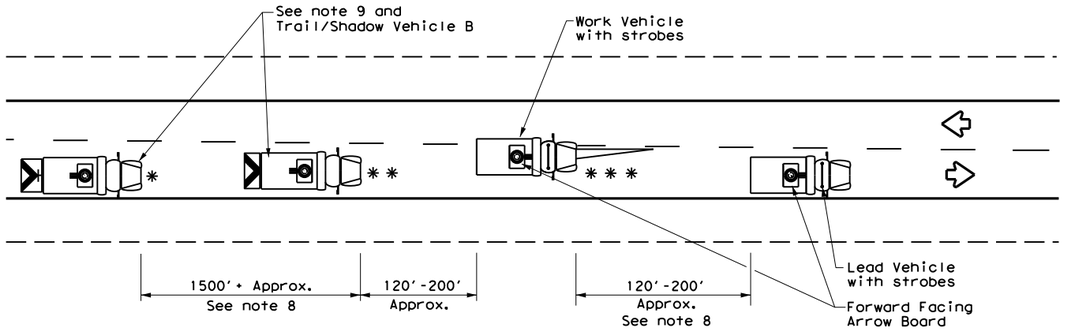



WORK ON SHOULDER

WORK ON TRAVEL LANE

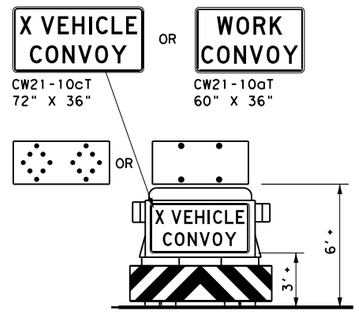
TCP (3-1b)

## TWO-WAY ROADWAY WITH PAVED SHOULDERS




TCP (3-1c)

## TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS




## TRAIL/SHADOW VEHICLE B

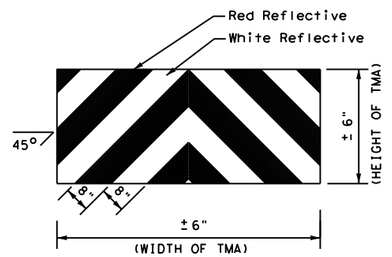
with Flashing Arrow Board in CAUTION display

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

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

## GENERAL NOTES

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




## STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

# TCP(3-1)-13

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| © TxDOT December 1985 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-94 4-98 8-95 7-13 1-97 | 0901 | 32 | 083, ETC | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 31 |

DATE: 7/11/2024 4:52:58 PM
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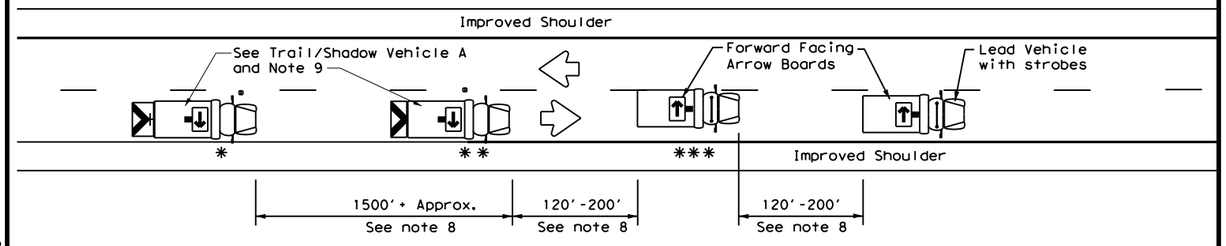
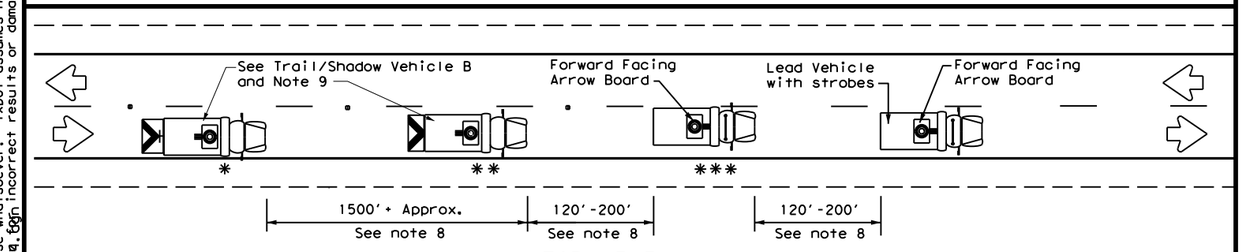


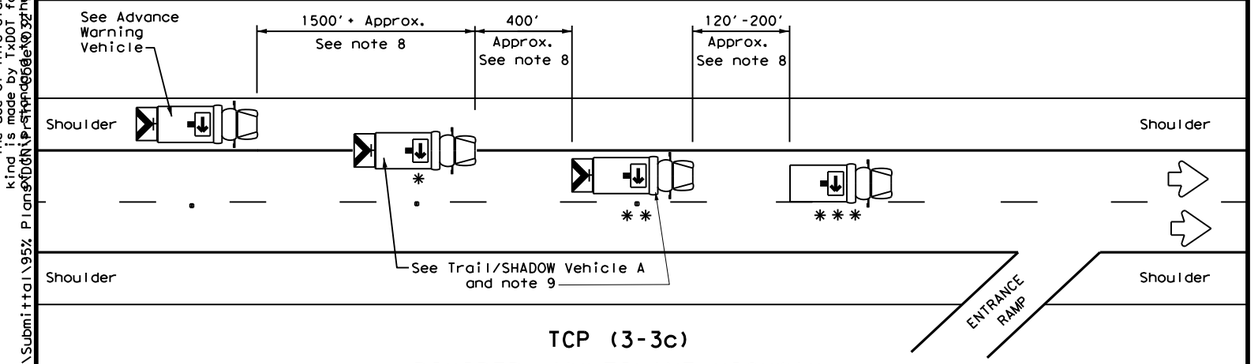

TCP (3-3a)

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



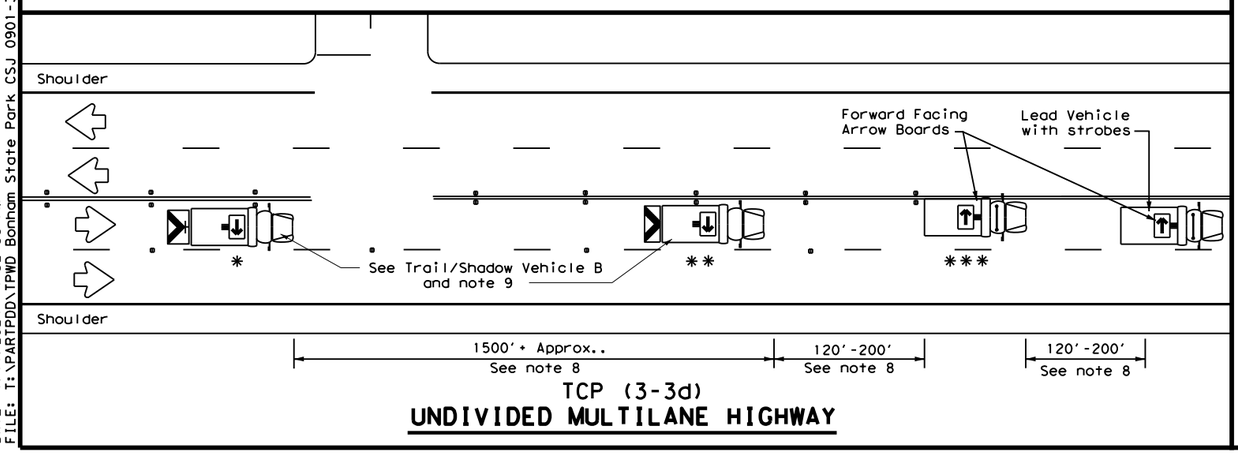

TCP (3-3b)

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



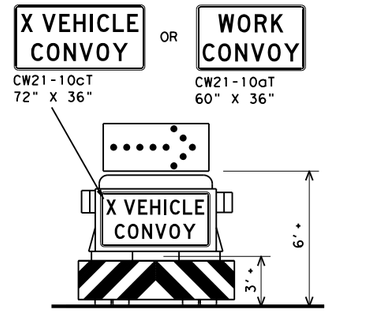

TCP (3-3c)

## DIVIDED MULTILANE HIGHWAY



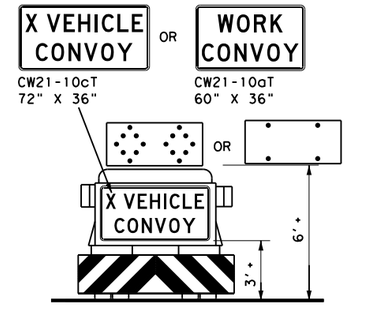

TCP (3-3d)

## UNDIVIDED MULTILANE HIGHWAY



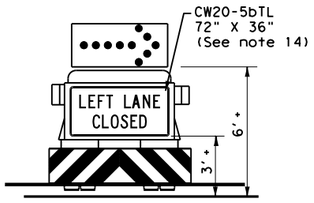

## TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

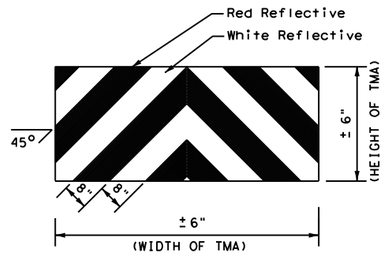



## TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode




## ADVANCE WARNING VEHICLE




## STRIPING FOR TMA

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

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

## GENERAL NOTES

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

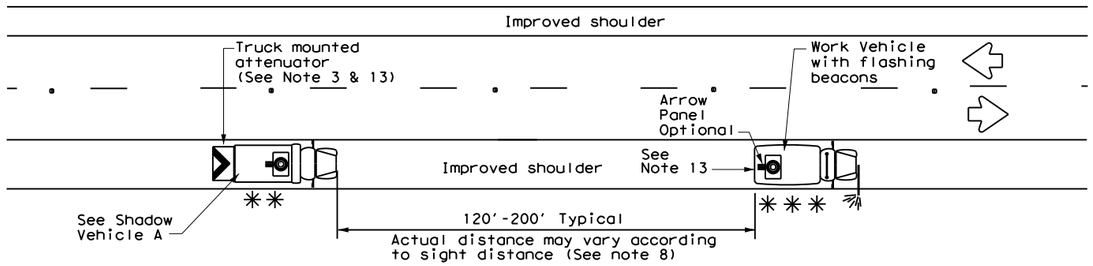
Texas Department of Transportation

Traffic Operations Division Standard

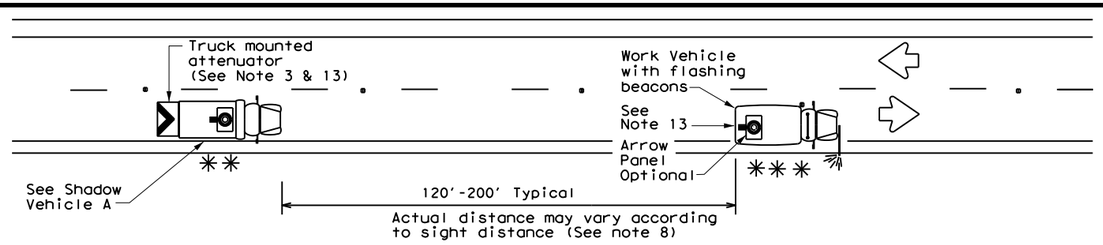
# TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL

# TCP(3-3)-14

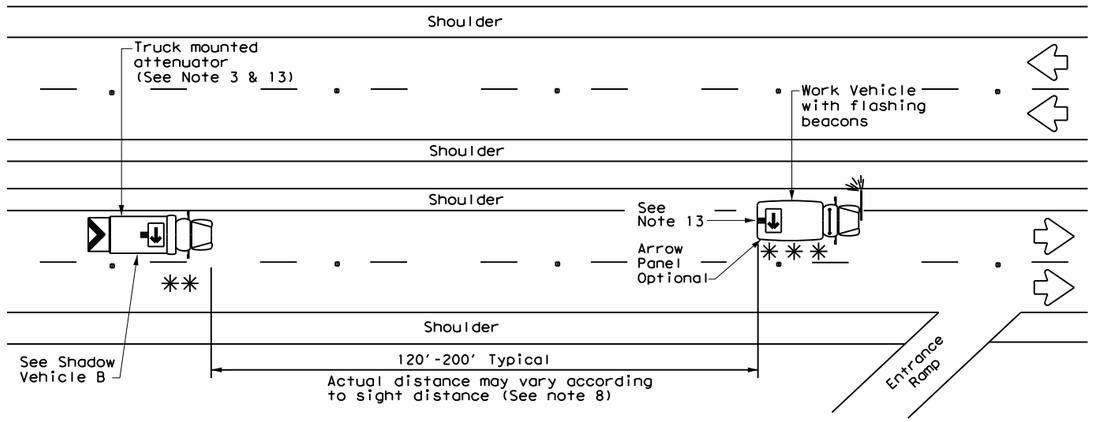
| FILE: tcp3-3.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT September 1987 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 2-94 4-98 | DIST | COUNTY | | SHEET NO. |
| 8-95 7-13 | PAR | FANNIN, ETC. | | 32 |
| 1-97 7-14 | | | | |



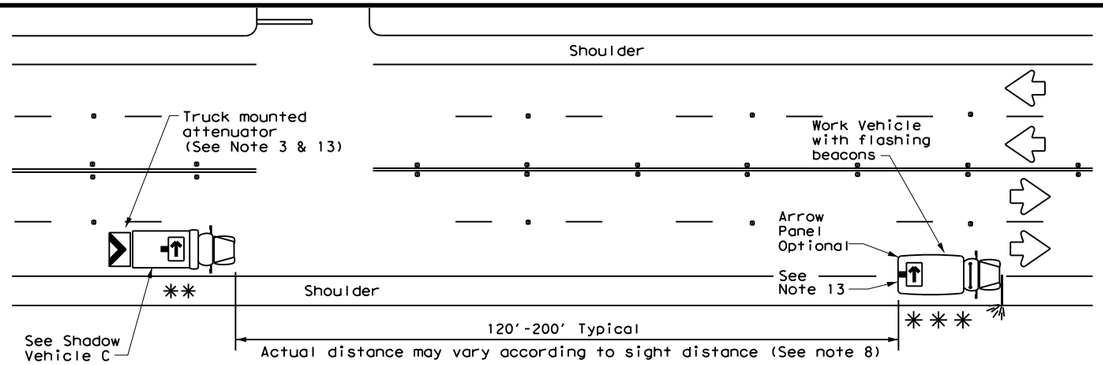

## TWO LANE HIGHWAY WITH PAVED SHOULDERS MINIMUM 8'



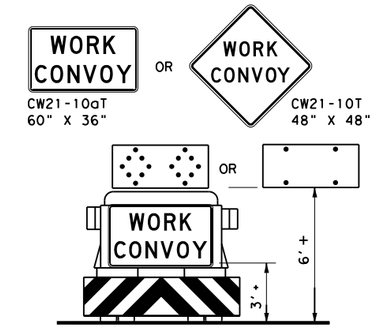

## TWO LANE HIGHWAY WITH NO SHOULDER OR NARROW SHOULDER




## MULTILANE HIGHWAY

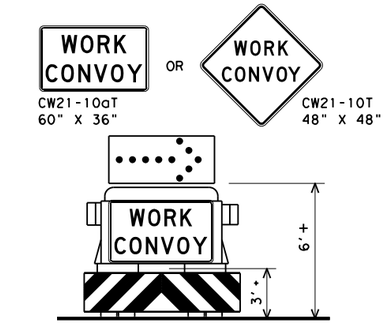



## MULTILANE HIGHWAY



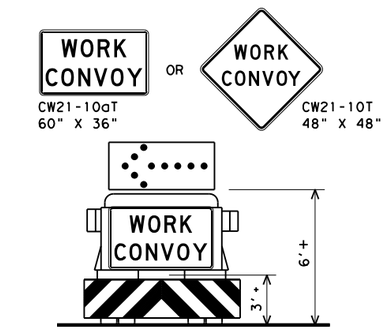

## SHADOW VEHICLE A

with Flashing Arrow Board in Caution Mode



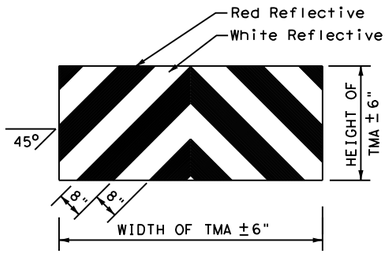

## TYPICAL SHADOW VEHICLE B

with RIGHT Directional display Flashing Arrow Board




## TYPICAL SHADOW VEHICLE C

with LEFT Directional display Flashing Arrow Board




## STRIPING FOR TMA

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

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

## GENERAL NOTES

1. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
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 is required.
4. Striping on the back panel of all TMAs shall be 8" red reflective sheeting with white background, placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS-8300, TYPE A.
5. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When the work convoy must change lanes, the Shadow Vehicle should change lanes first to protect the Work Vehicle.
8. Spacing between Shadow and Work Vehicle will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the Shadow Vehicle in time to slow down and/or change lanes as they approach the Work Convoy.
9. Use of an arrow panel on the Work Vehicle is optional except as provided in note 13, but may be required by the Engineer. If an arrow panel is not used, dual flashing beacons, mounted as high and as widely separated as practicable at the rear of the Work Vehicle shall be required.
10. On two-lane two-way roadways, the Work and Shadow Vehicles should pull over periodically to allow motor vehicle traffic to pass.
11. Work and Shadow Vehicles should stay on the shoulder of highways having 8' or wider shoulders when possible.
12. A Trail Vehicle may be added to the operation when approved by the Engineer. See TCP(3) series standards.
13. The shadow vehicle may be omitted on conventional roadways when a TMA or TA and arrow panel is mounted to the herbicide vehicle. A separate shadow vehicle will be required on expressways and Freeways.

Texas Department of Transportation

Traffic Operations Division Standard

# TRAFFIC CONTROL PLAN MOBILE OPERATIONS HERBICIDE TRUCK OPERATIONS

# TCP(3-5)-18

| FILE: tcp3-5.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT July 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 4-18 | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 33 |

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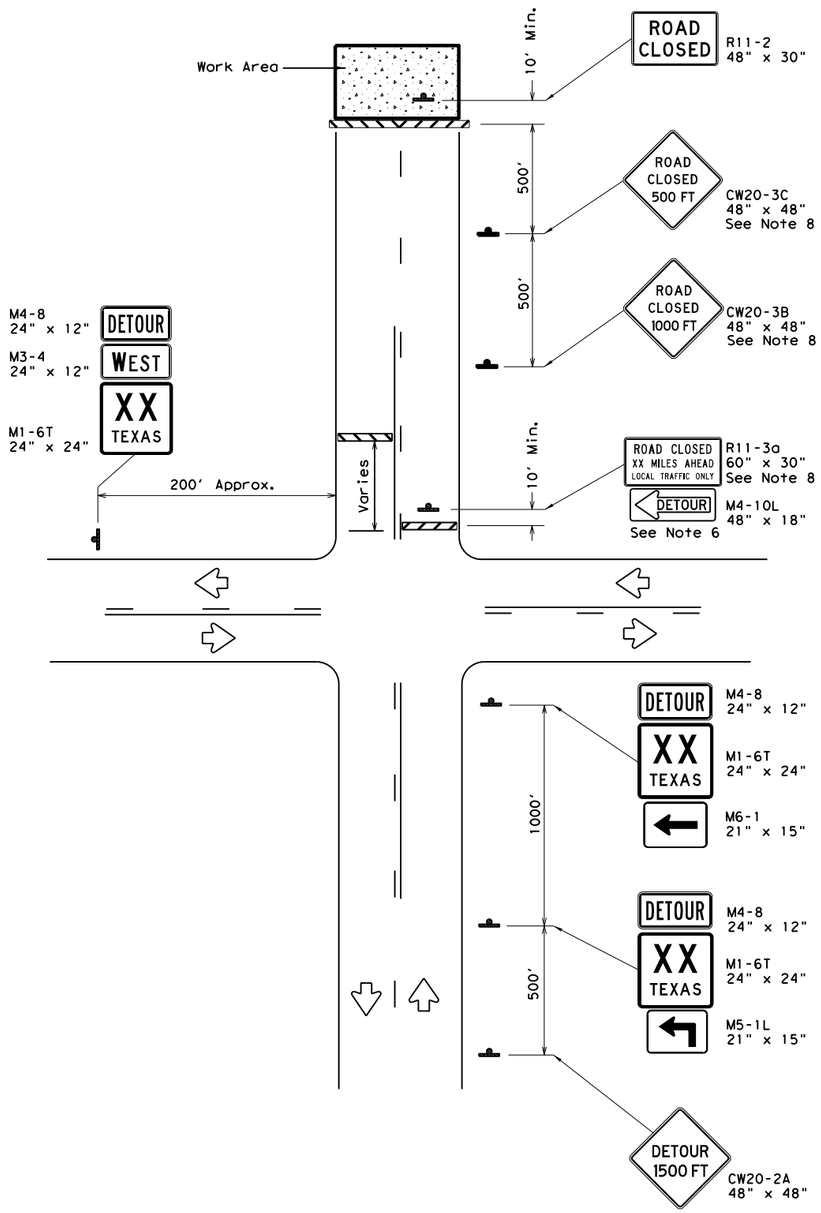
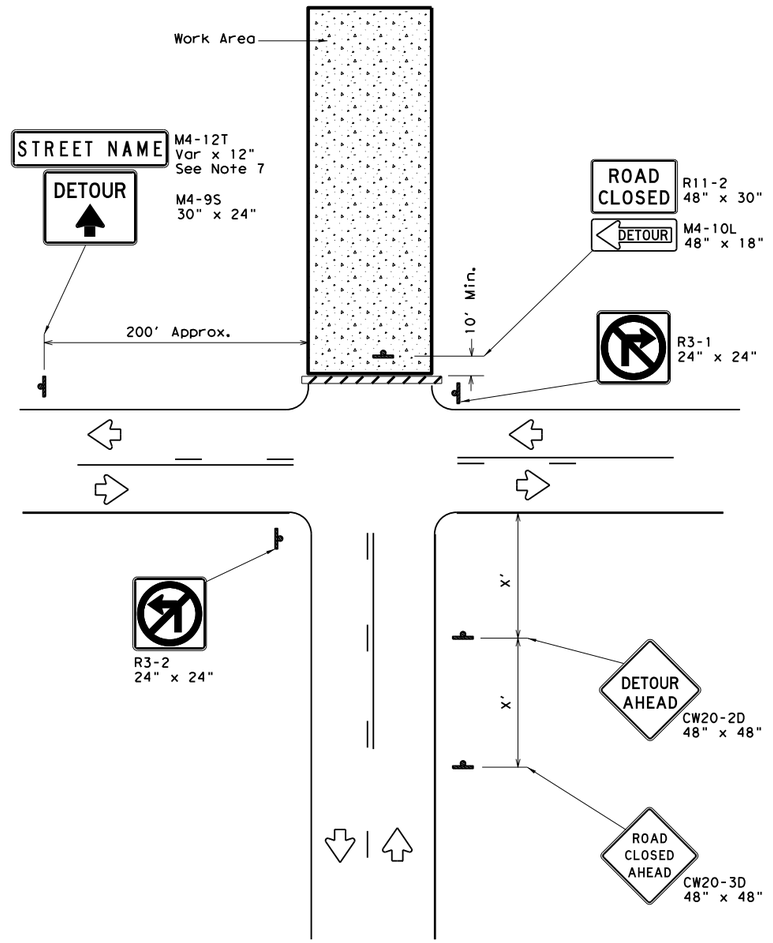



## ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour




## ROAD CLOSURE AT THE INTERSECTION

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

| LEGEND | |
|---|---|
| | Type 3 Barricade |
| | Sign |

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

* Conventional Roads Only

## GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

# WORK ZONE ROAD CLOSURE DETAILS

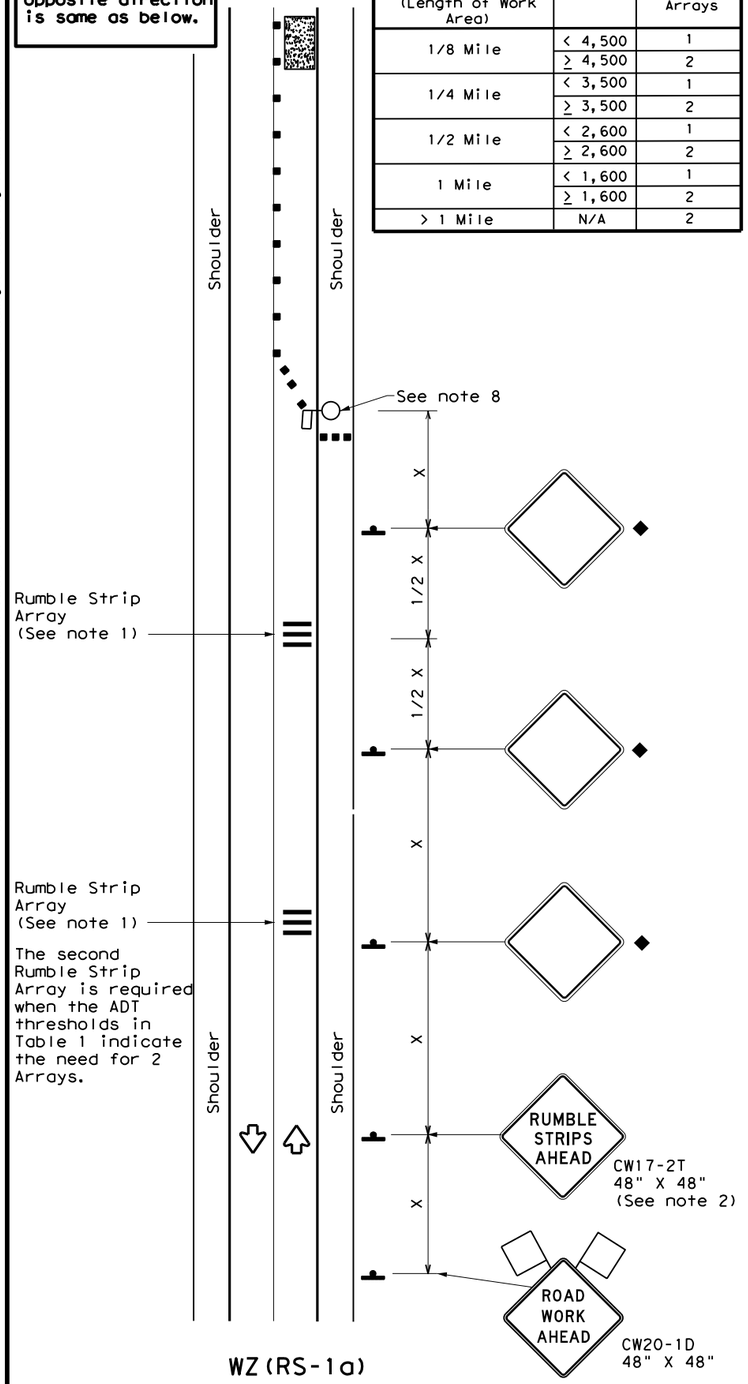
# WZ(RCD)-13

| FILE: wzrcd-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT August 1995 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 1-97 4-98 7-13 | DIST | COUNTY | | SHEET NO. |
| 2-98 3-03 | PAR | FANNIN, ETC. | | 34 |

DATE:
FILE:

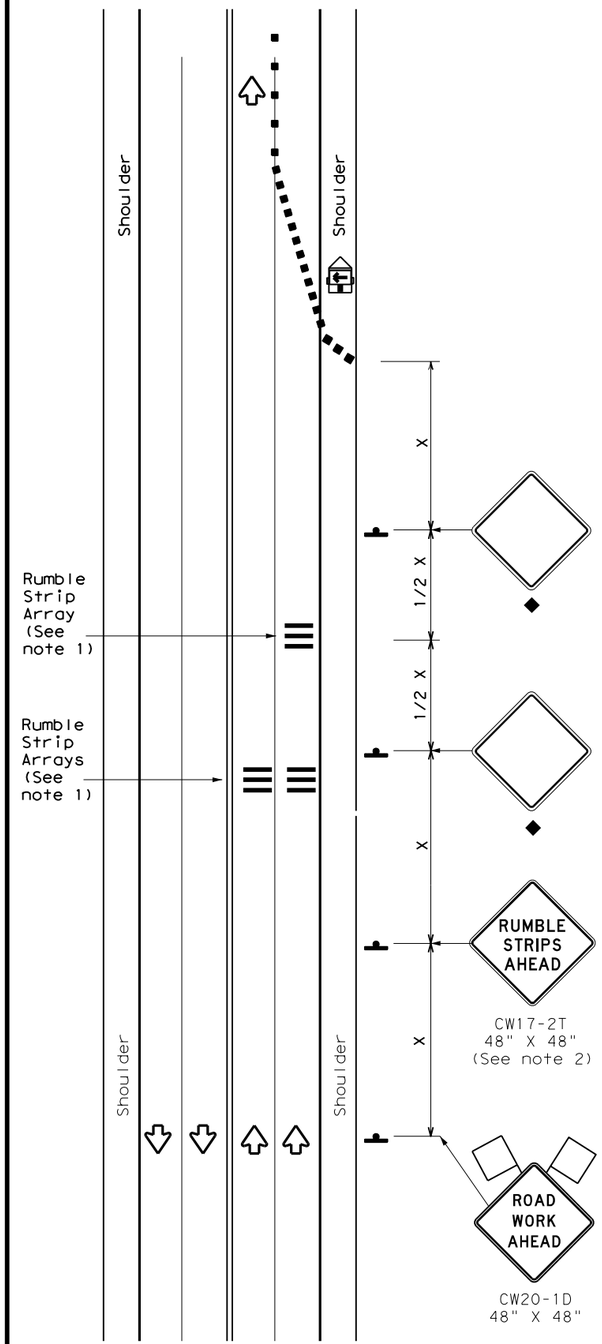
**Warning sign and rumble strip sequence in opposite direction is same as below.**

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




WZ(RS-1a)

## RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION




WZ(RS-1b)

## RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

## GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

| TABLE 2 | |
|---|---|
| Speed | Approximate distance between strips in an array |
| ≤ 40 MPH | 10' |
| > 40 MPH & ≤ 55 MPH | 15' |
| = 60 MPH | 20' |
| ≥ 65 MPH | * 35' + |

Texas Department of Transportation

Traffic Safety Division Standard

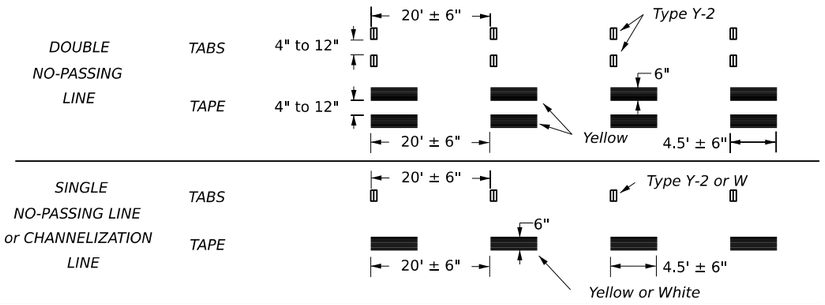
# TEMPORARY RUMBLE STRIPS

## WZ(RS)-22

| FILE: wzrs22.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT November 2012 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 2-14 1-22 4-16 | 0901 | 32 | 083, ETC | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 35 |

117

# WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



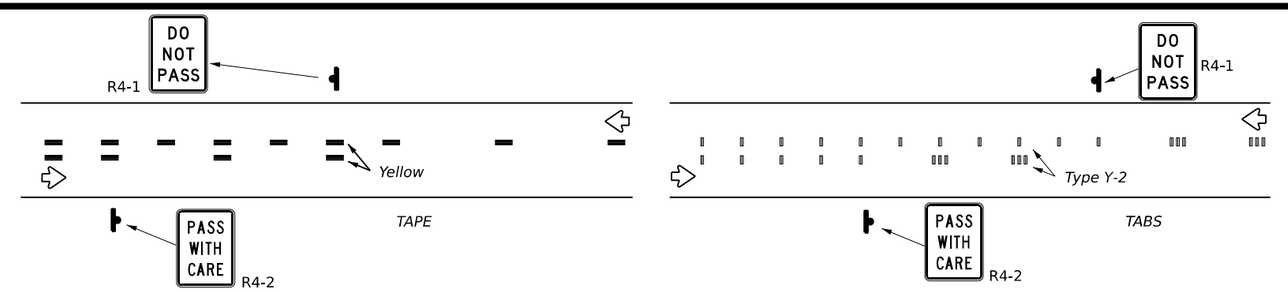

**NOTES:**

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

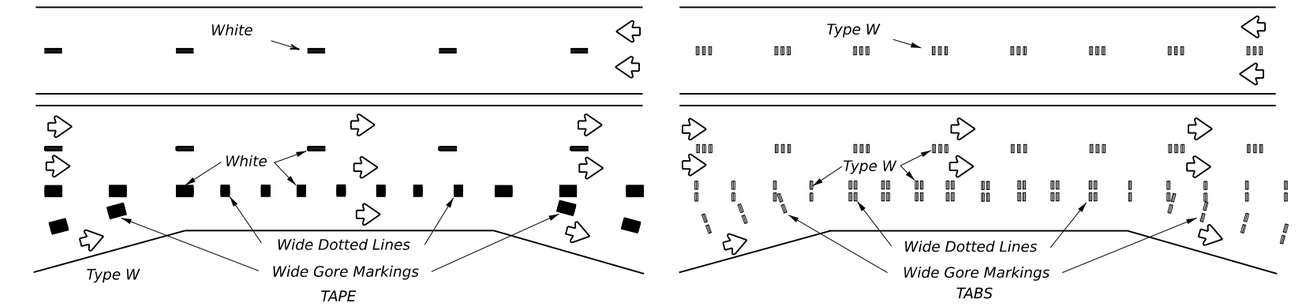
**TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)**

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

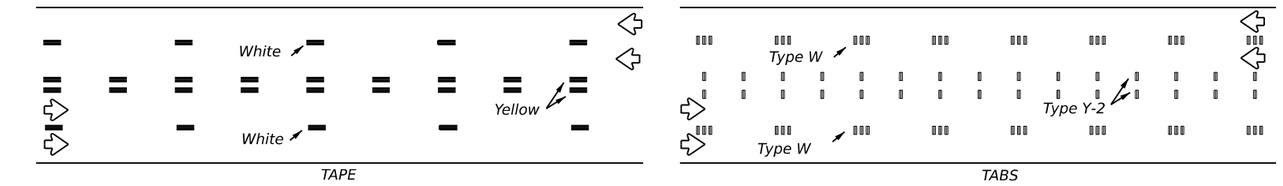
# WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



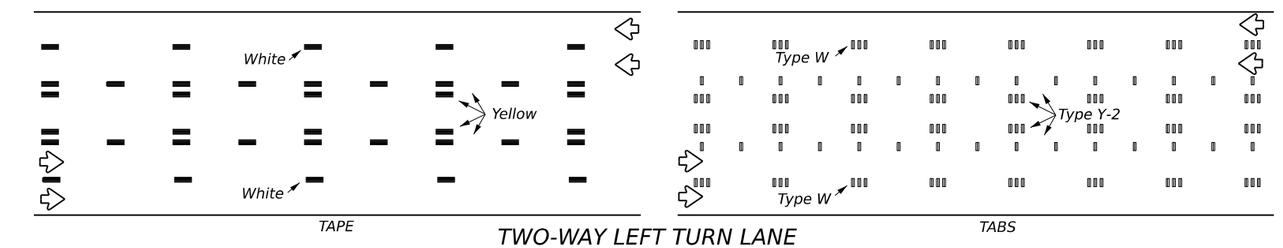

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



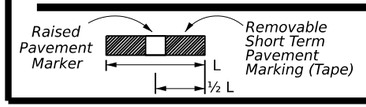

LANE LINES FOR DIVIDED HIGHWAY




LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS




TWO-WAY LEFT TURN LANE




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

**PREFABRICATED PAVEMENT MARKINGS**

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

**RAISED PAVEMENT MARKERS**

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

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

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:

http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Safety Division Standard

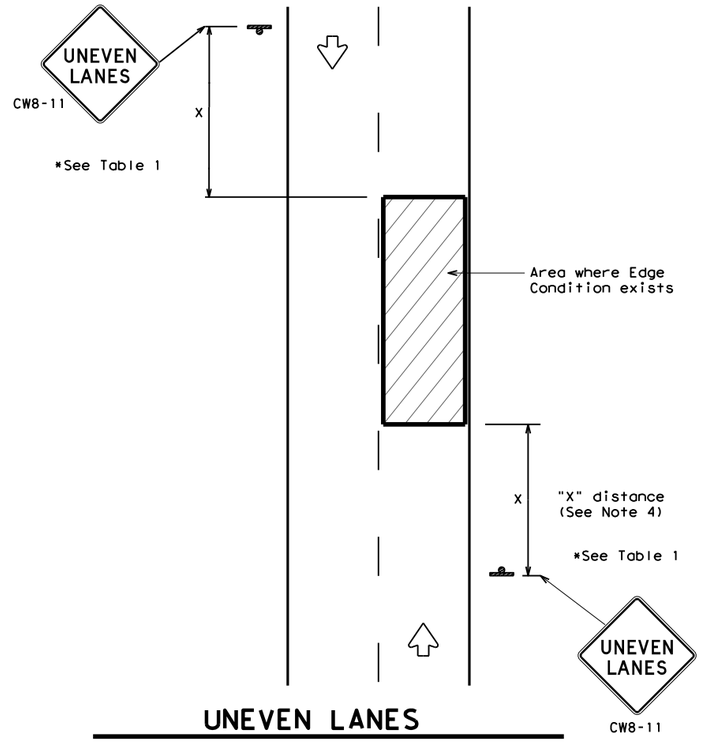
# WORK ZONE SHORT TERM PAVEMENT MARKINGS

## WZ(STPM)-23

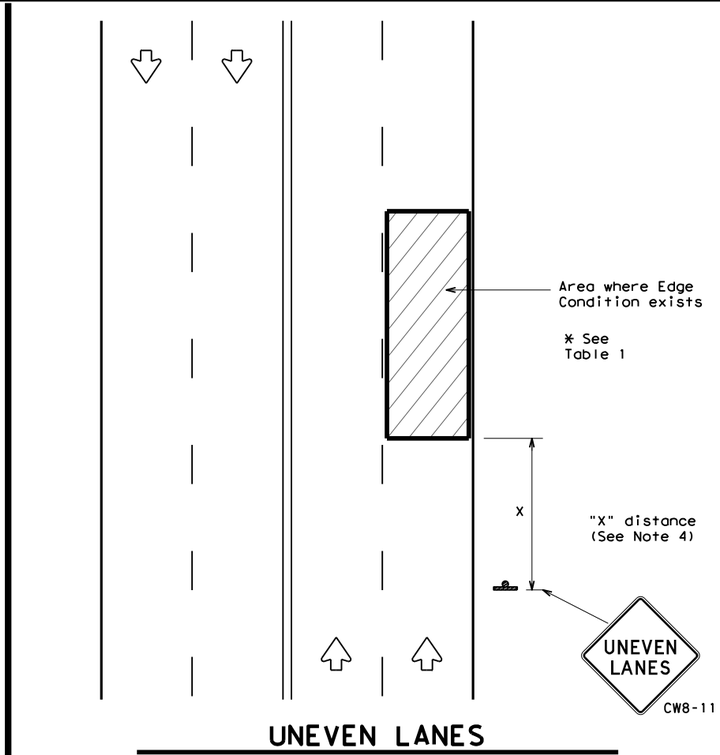
| FILE: wzstpm-23.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| ©TxDOT February 2023 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 4-92 7-13 | DIST | COUNTY | | SHEET NO. |
| 1-97 2-23 | DST | FANNIN, ETC. | | 36 |
| 3-03 | | | | |

DATE: DATE TIME
FILE: DOCUMENT NAME

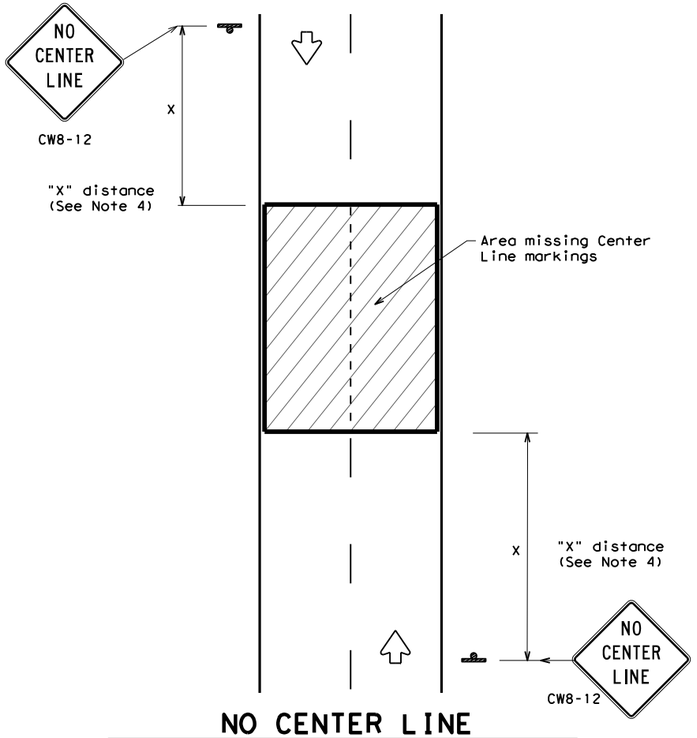
DATE:
FILE:



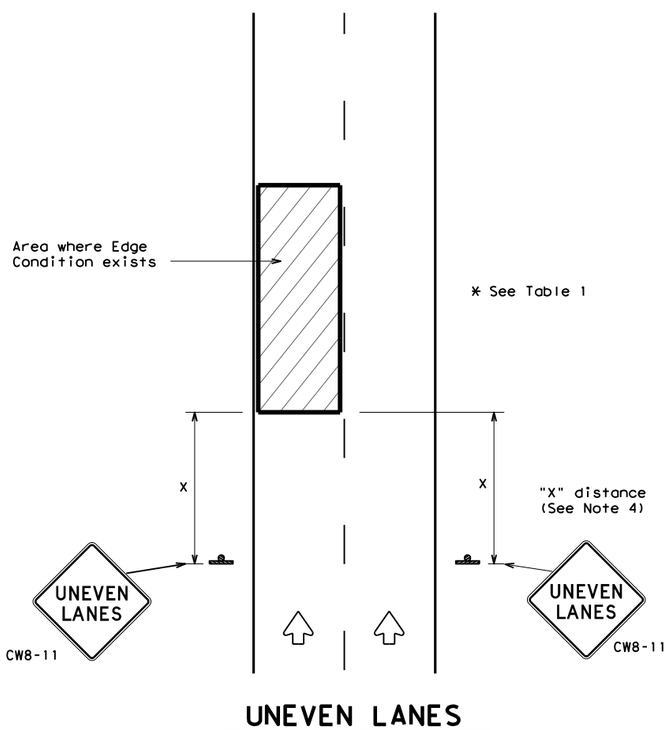

## UNEVEN LANES
## TWO LANE CONVENTIONAL ROAD




## UNEVEN LANES
## FOUR LANE CONVENTIONAL ROAD




## NO CENTER LINE
## TWO LANE CONVENTIONAL ROAD




## UNEVEN LANES
## DIVIDED ROADWAY

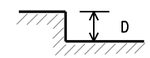
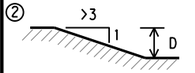
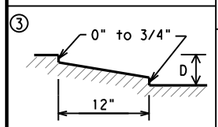
| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|---|---|
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |
| TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS | DMS-8241 |
| SIGN FACE MATERIALS | DMS-8300 |

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

## GENERAL NOTES

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

**TABLE 1**

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

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

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

Texas Department of Transportation

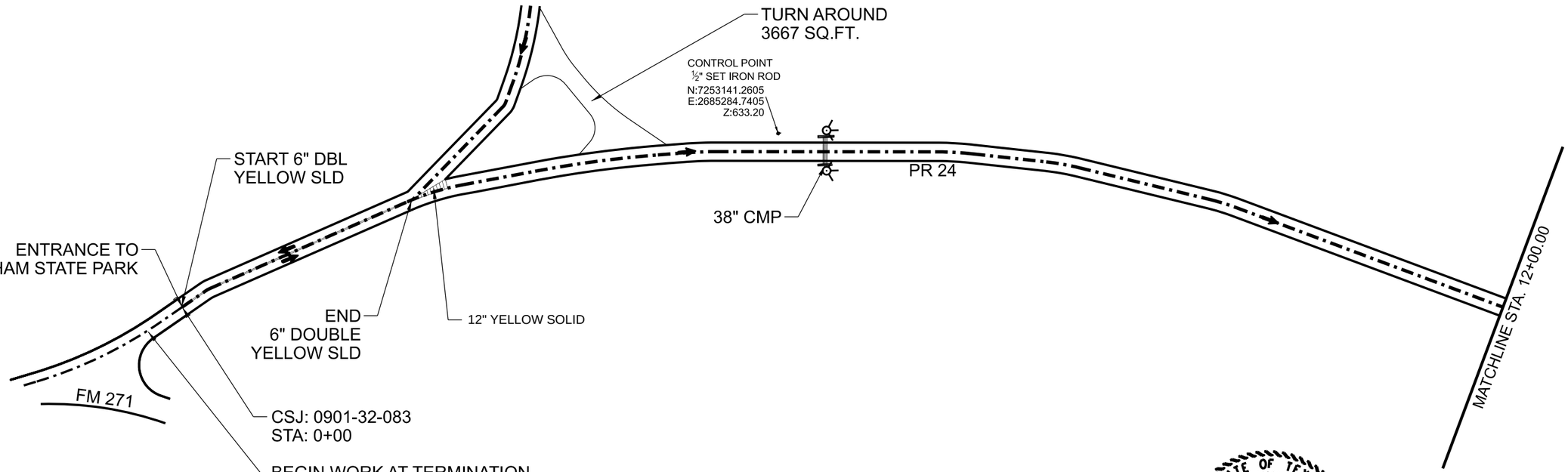
*Traffic Operations Division Standard*

# SIGNING FOR UNEVEN LANES

# WZ(UL)-13

| FILE: wzul-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT April 1992 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC | VAR |
| 8-95 2-98 7-13 | DIST | COUNTY | | SHEET NO. |
| 1-97 3-03 | PAR | FANNIN, ETC. | | 37 |

DK
DW
CK
DN




CONSTRUCT HMAC OVERLAY OVER ALL EXSITING HMAC SURFACES.

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

8.07.24

Monte R. Rater P.E.

**LEGEND**

TRAFFIC DIRECTION ARROWS

OBJ MARKER
OM-2Y(WC)(GND)

1" = 100'

Texas Department of Transportation

BONHAM STATE PARK
PLAN LAYOUT



SHEET 1 OF 7

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 38 |

DATE: $DATE$
FILE: $FILE$
$TIME$

DK
DW
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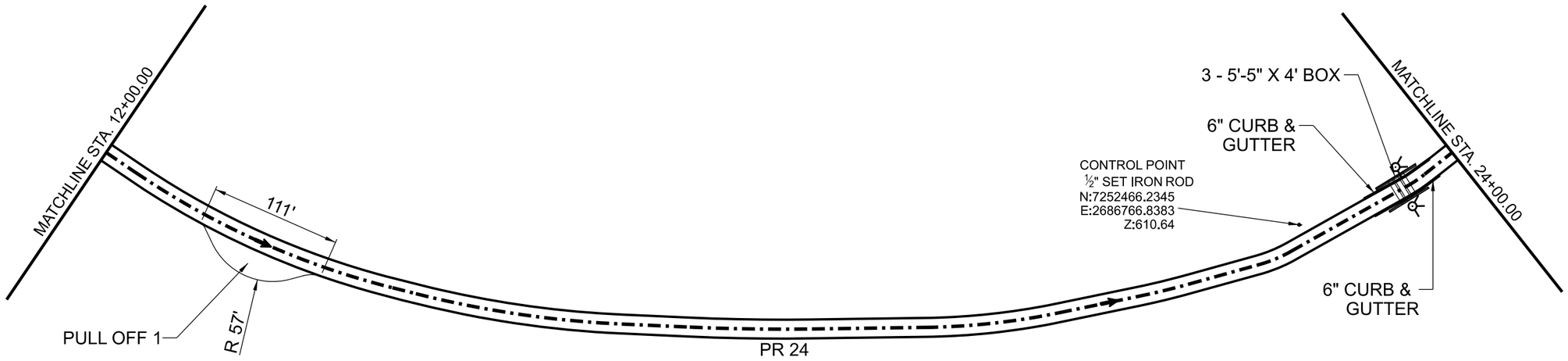
DN




CONSTRUCT HMAC OVERLAY OVER ALL EXSITING HMAC SURFACES.

SEE MISCELLANEOUS DETAILS
FOR CURB & GUTTER DETAILS

**LEGEND**

TRAFFIC DIRECTION ARROWS

OBJ MARKER
OM-2Y(WC)(GND)

STATE OF TEXAS
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8.07.24

Monte R. Rater P.E.

1" = 100'

Texas Department of Transportation

BONHAM STATE PARK

PLAN LAYOUT



SHEET 2 OF 7

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 39 |

DATE: $DATE$ $TIME$
FILE: $FILE$

DK
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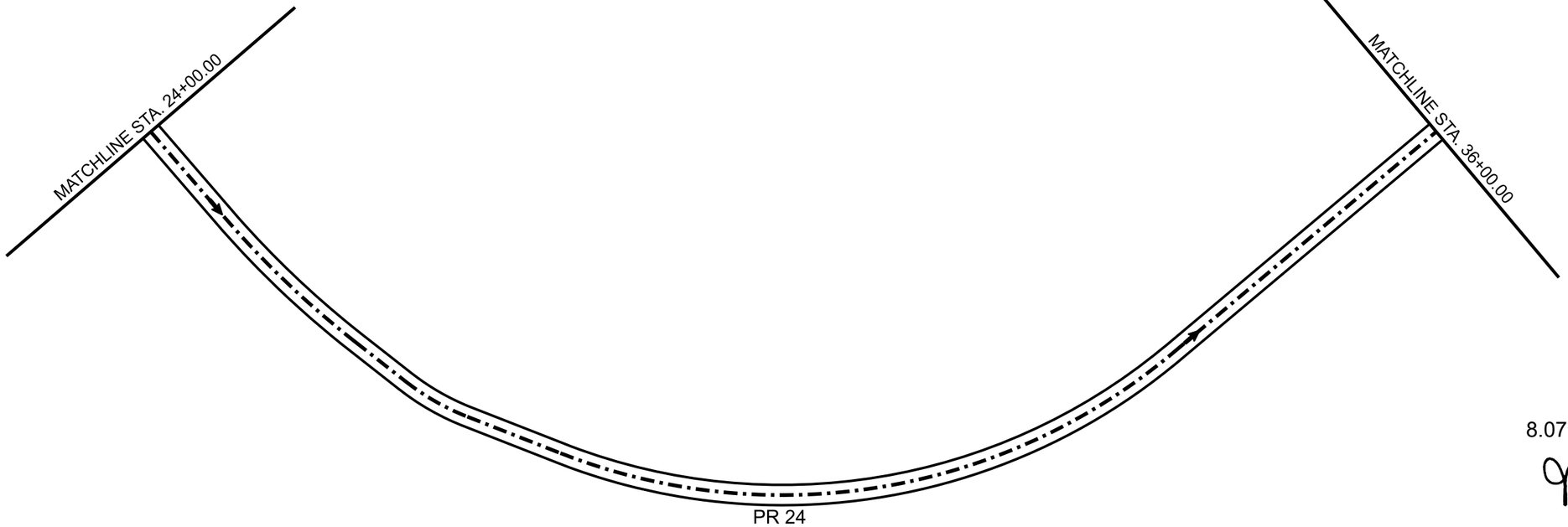


CONSTRUCT HMAC OVERLAY OVER ALL EXSITING HMAC SURFACES.

LEGEND

TRAFFIC DIRECTION ARROWS

OBJ MARKER
OM-2Y(WC)(GND)

STATE OF TEXAS
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1" = 100'

Texas Department of Transportation

# BONHAM STATE PARK
# PLAN LAYOUT



SHEET 3 OF 7

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 40 |

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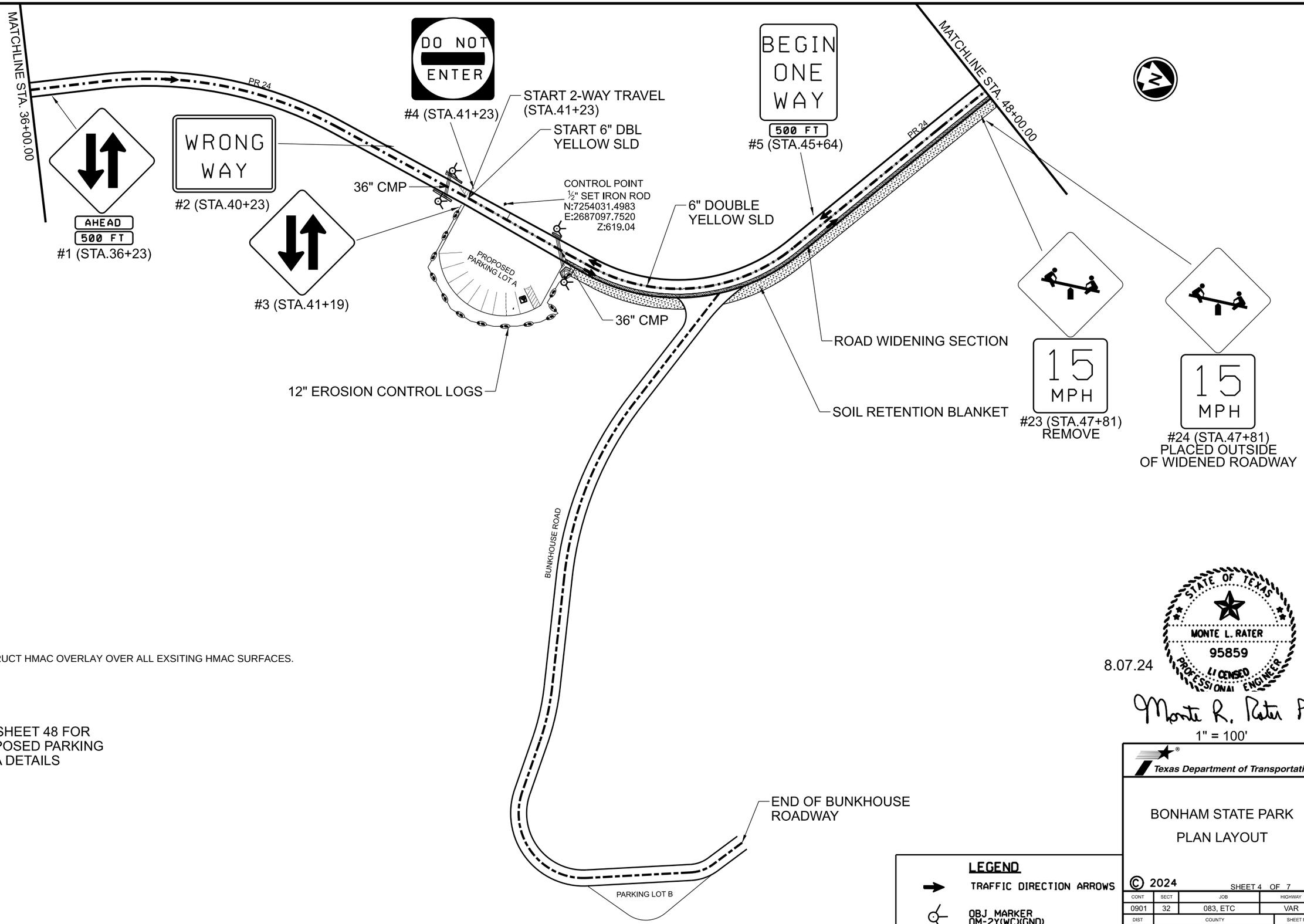
FILE: $FILE$




CONSTRUCT HMAC OVERLAY OVER ALL EXSITING HMAC SURFACES.

SEE SHEET 48 FOR PROPOSED PARKING LOT A DETAILS

**LEGEND**

TRAFFIC DIRECTION ARROWS

OBJ MARKER OM-2Y(WC)(GND)

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED PROFESSIONAL ENGINEER

8.07.24

Monte R. Rater P.E.

1" = 100'

Texas Department of Transportation

BONHAM STATE PARK

PLAN LAYOUT





| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 41 |

DATE: $DATE$ $TIME$
FILE: $FILE$

CONCRETE CURB REPAIR SECTIONS TO BE DETERMINED BY AREA ENGINEER

4" WH SLD, 10' SPACING, 26' LENGTH

END 2-WAY TRAVEL (STA.57+74)

END 6" DBL YELLOW SLD

BEGIN ONE WAY
500 FT
#7 (STA.52+74)

RESERVED PARKING
VAN ACCESSIBLE
VIOLATORS SUBJECT TO FINE AND TOWING
#8 (STA.53+03)
#10 (STA. 53+29)

ACC PARKING 8' X 26' CONCRETE

4" WH SLD, 10' SPACING, 26' LENGTH

15 MPH
#6 (STA.56+48)

PROPOSED PARKING LOT F

FISHING DOCK

15 MPH
#11 (STA.58+35)
REMOVE

MATCHLINE STA. 48+00.00

24" CMP

CONTROL POINT
½" SET IRON ROD
N:7254535.0928
E:2686715.8502
Z:628.94

6" DOUBLE YELLOW SLD

PROPOSED MBGF

MATCHLINE STA. 60+00.00

OVERLAY ALL SURFACES

SEE SHEET 49 FOR PROPOSED PARKING LOT D DETAILS

SEE SHEET 50 FOR DUMP STATION DETAILS

NOTE 1: SEE SHEET 53 FOR RAMP DETAILS

NOTE 2: PLANING TO BE DONE AROUND CURB TO MAINTAIN EXISTING HEIGHT

REMOVE ASPHALT

PARK HQ

Control Point
½ Set Iron Rod
N:7254676.2077
E:2686510.0185
Z:629.80

SEE NOTE 2

8 FT

7 FT

PROPOSED MBGF

8" ROCK RIPRAP (SPECIAL)

PARKING LOT E

PROPOSED PARKING LOT D

4" WH SLD, 10' SPACING, 26' LENGTH

15 MPH
EXISTING SIGN TO REMAIN

SEE NOTE 1

PARKING LOT G

ROADWAY WIDENING SECTION

STA: 49+69
4' X 24" CULVERT EXTENSION

BATHROOM LOT

REGRADE DITCH FOR FLOW

PROPOSED 2 - 160' X 18" RCP
&
PARALLEL S.E.T.S.

4" WH SLD, 10' SPACING, 26' LENGTH

4" WH SLD, 10' SPACING, 18' LENGTH

12" EROSION CONTROL LOGS

ACC PARKING 8' X 26'

ELECTRIC POLE TO BE RELOCATED BY OTHERS

ONE LANE BRIDGE

WATER VAVLES

SOIL RETENTION BLANKET

PROPOSED 18" CULVERT EXT.
&
PARALLEL S.E.T.

752 SQ.FT. HMAC

DUMP STATION ROAD

15 MPH
EXISTING SIGN TO REMAIN

PROPOSED 24" CULVERT EXT.
&
PARALLEL S.E.T.

DUMP STATION

RESERVED PARKING
VAN ACCESSIBLE
VIOLATORS SUBJECT TO FINE AND TOWING
#9 (STA.53+37)

MAINTENANCE ROAD

END OVERLAY AT GATE

END OVERLAY AT START OF EXISTING PARKING LOT

Monte R. Rater P.E.

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

8.07.24

1" = 100'

**LEGEND**

TRAFFIC DIRECTION ARROWS

OBJ MARKER
OM-2Y(WC)(GND)

Texas Department of Transportation

BONHAM STATE PARK
PLAN LAYOUT



SHEET 5 OF 7

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 42 |

DATE: $DATE$
FILE: $FILE$
$TIME$

DK:
DK:
DW:
CK:

MATCHLINE STA. 60+00.00

PROPOSED MBGF

PROPOSED MBGF

ONE LANE BRIDGE

15 MPH

#12 (STA.68+55)
REMOVE

2 - 18" CMP

STATE LAW
YIELD
TO
WITHIN CROSSWALK

#13 (STA.70+00)

15 MPH

#14 (STA.71+10)
REMOVE

MATCHLINE STA. 72+00.00

CONTROL POINT
½" SET IRON ROD
N:7254297.8673
E:2684850.7024
Z:608.50

CONSTRUCT HMAC OVERLAY OVER ALL EXSITING HMAC SURFACES.

**LEGEND**

TRAFFIC DIRECTION ARROWS

OBJ MARKER
OM-2Y(WC)(GND)

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

8.07.24

Monte R. Rater P.E.

1" = 100'

Texas Department of Transportation

BONHAM STATE PARK

PLAN LAYOUT





| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
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| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 43 |

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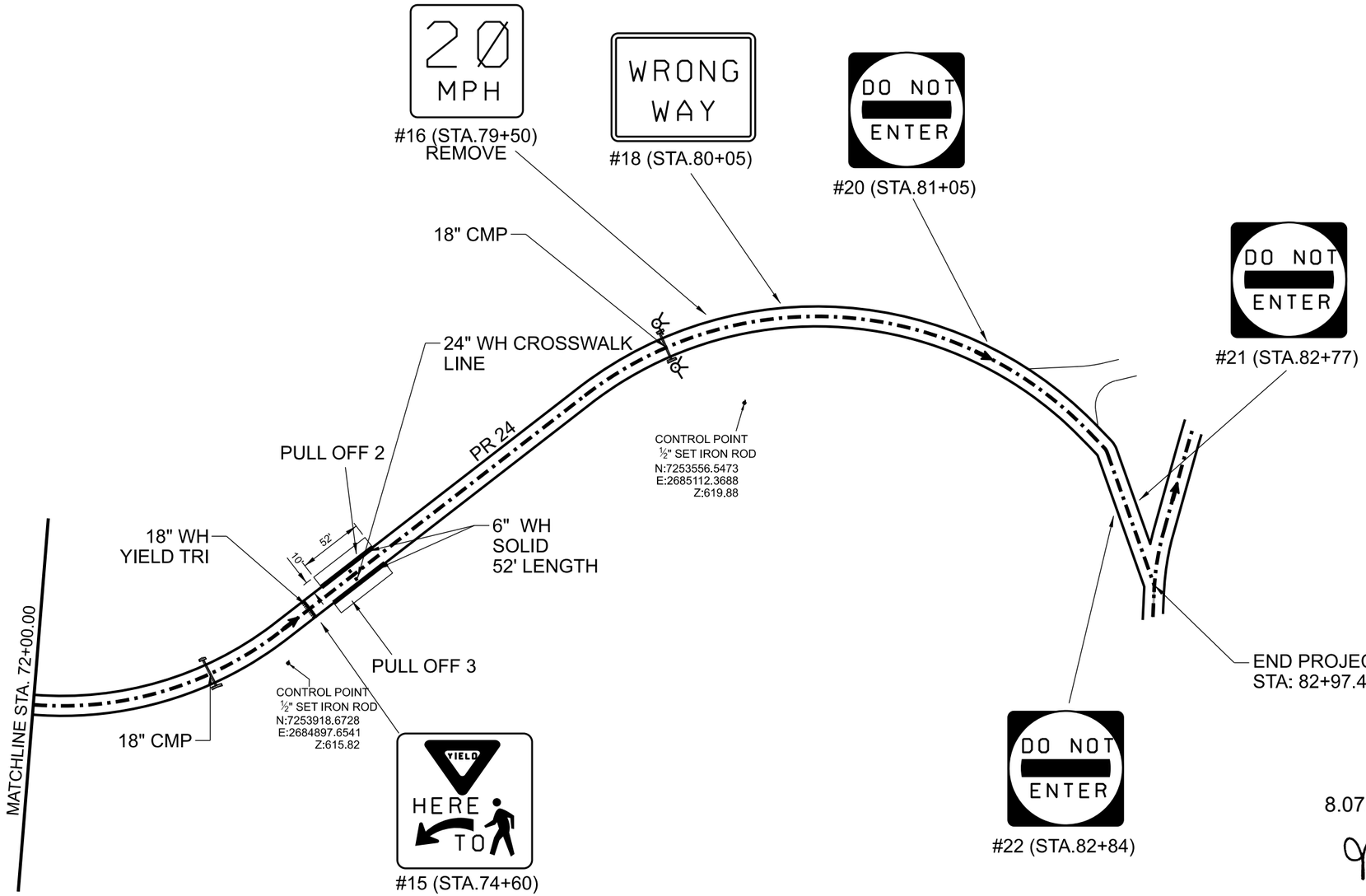


CONSTRUCT HMAC OVERLAY OVER ALL EXSITING HMAC SURFACES.

**LEGEND**

- TRAFFIC DIRECTION ARROWS
- OBJ MARKER OM-2Y(WC)(GND)

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

8.07.24

Monte R. Rater P.E.

1" = 100'

Texas Department of Transportation

# BONHAM STATE PARK
# PLAN LAYOUT



SHEET 7 OF 7

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 44 |

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DK DW CK DN

CK:
DW:
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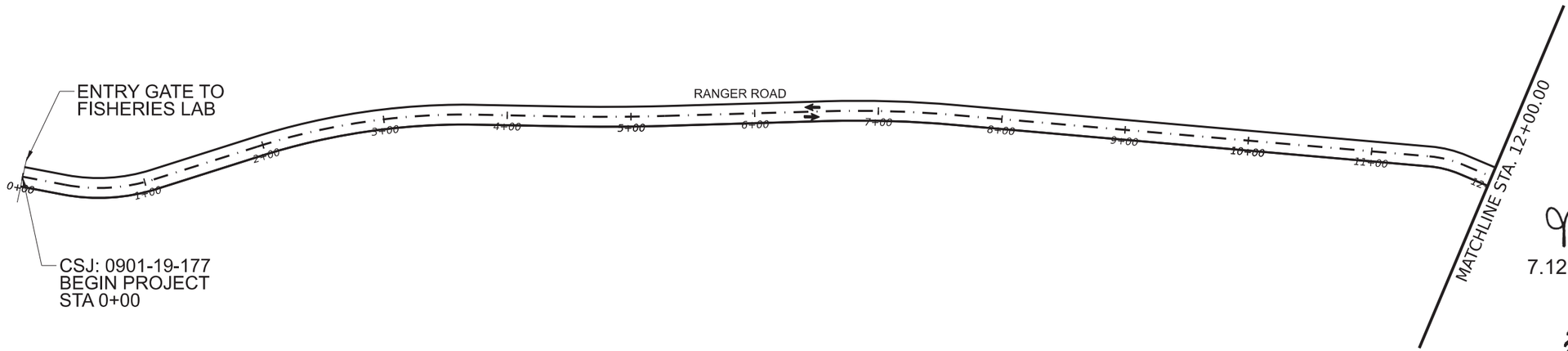
DW:




OVERLAY ALL
SURFACES

Monte R. Rater P.E.
7.12.24

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

1" = 100'

LEGEND

TRAFFIC DIRECTION ARROWS

Texas Department of Transportation

# TEXOMA FISHERIES LAB

## PLAN LAYOUT



SHEET 1 OF 3

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
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| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 45 |

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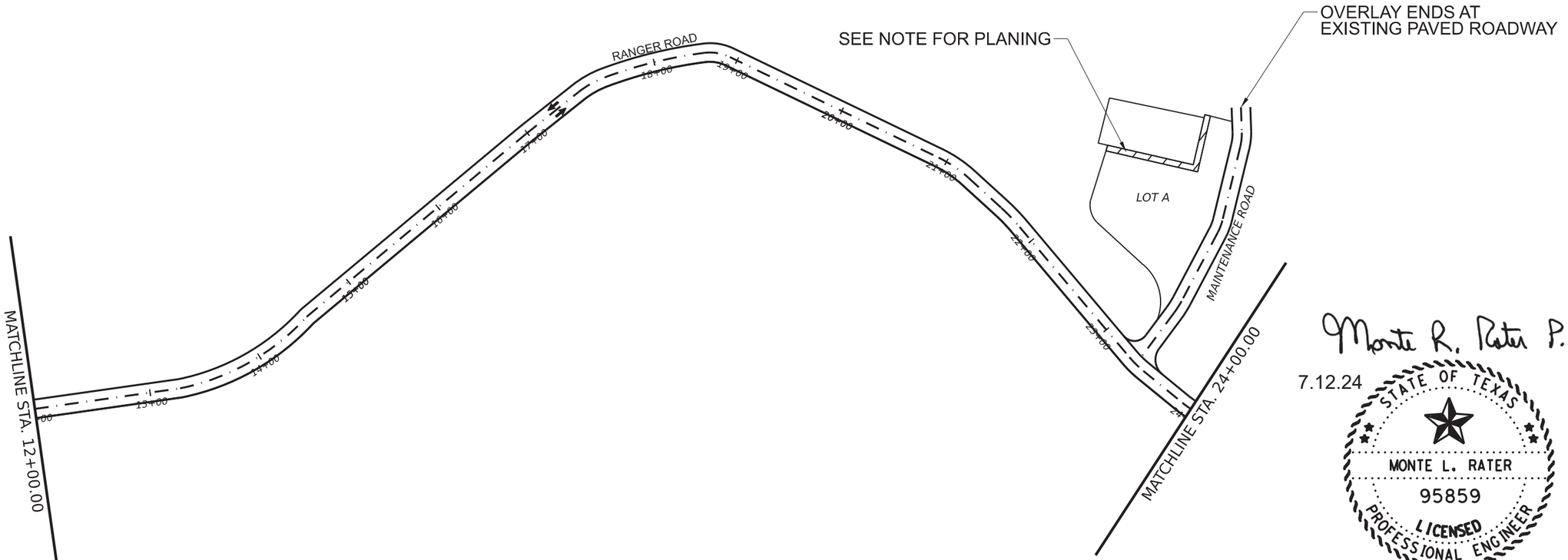


OVERLAY ALL SURFACES

NOTE:
PLANING TO BE DONE AROUND MAINTENANCE BUILDING TO BLEND PAVEMENT TO EXISTING SIDEWALK HEIGHT

Monte R. Rater P.E.

7.12.24

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

1" = 100'

LEGEND

→ TRAFFIC DIRECTION ARROWS

Texas Department of Transportation

# TEXOMA FISHERIES LAB

## PLAN LAYOUT



SHEET 2 OF 3

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
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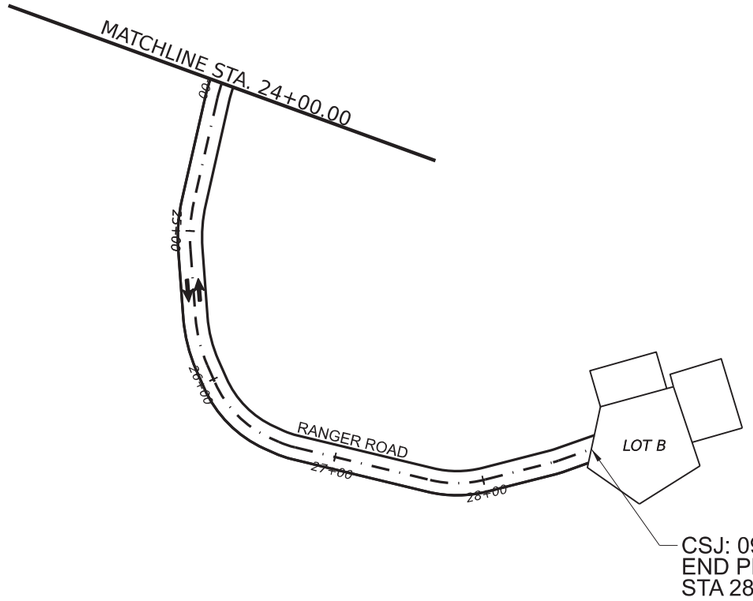


OVERLAY ALL SURFACES

Monte R. Rater P.E.

7.12.24

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

1" = 100'

Texas Department of Transportation

**TEXOMA FISHERIES LAB**

**PLAN LAYOUT**



SHEET 3 OF 3

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 47 |

LEGEND

→ TRAFFIC DIRECTION ARROWS

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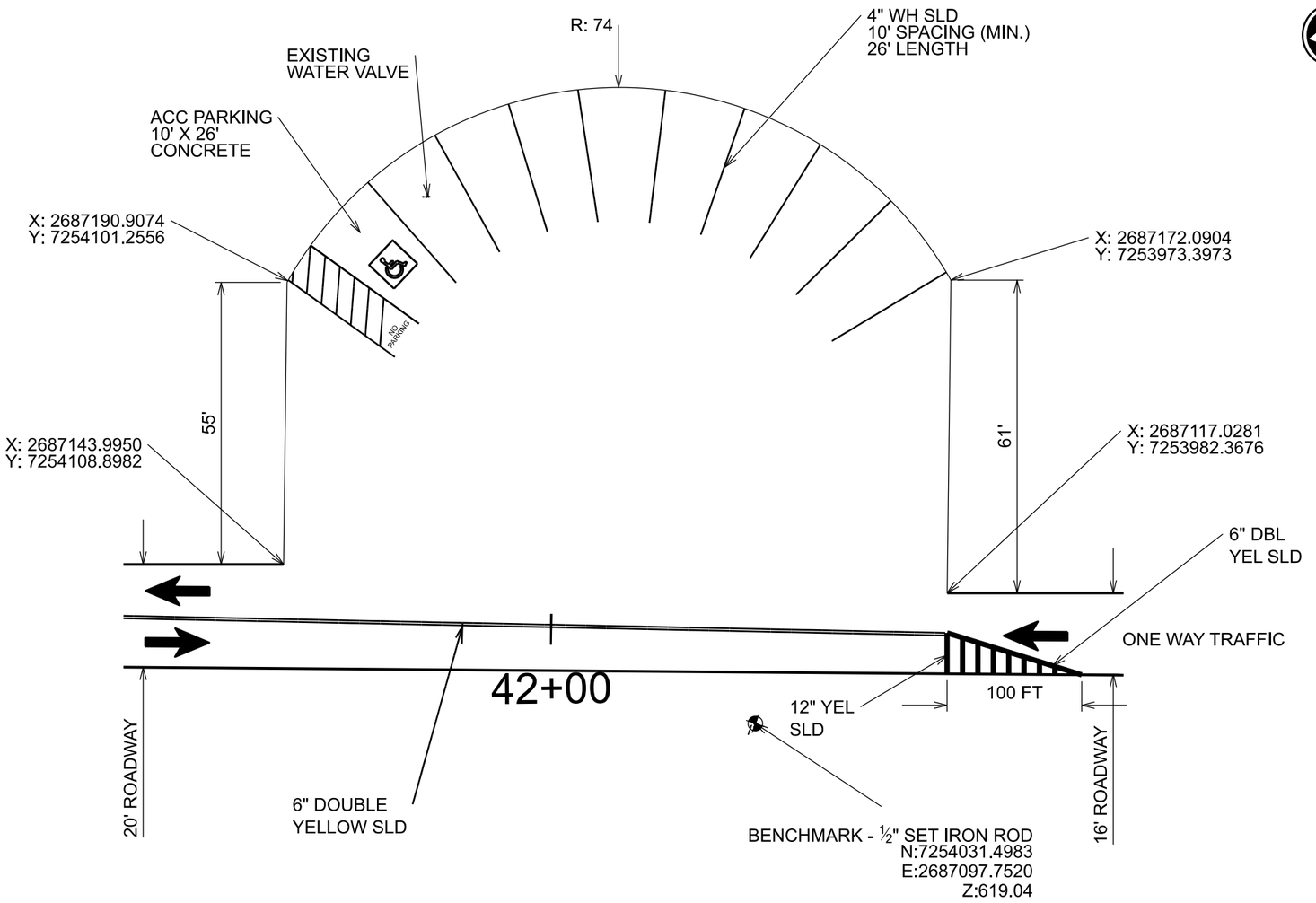


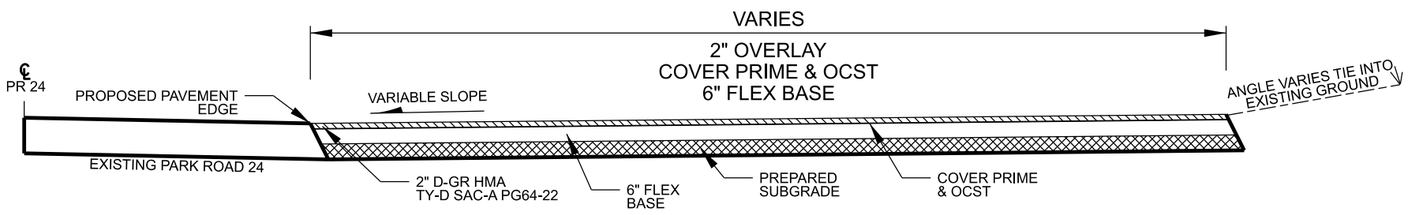


PROPOSED PARKING LOT TYPICAL

PARKING LOT A
STA: 41+23 - 42+53

Monte R. Rater P.E.
7.15.24

STATE OF TEXAS
MONTE L. RATER
95859
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0 5 10 15 20 25
SCALE IN FEET

Texas Department of Transportation

# BONHAM STATE PARK

## PROPOSED PARKING LOT A



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
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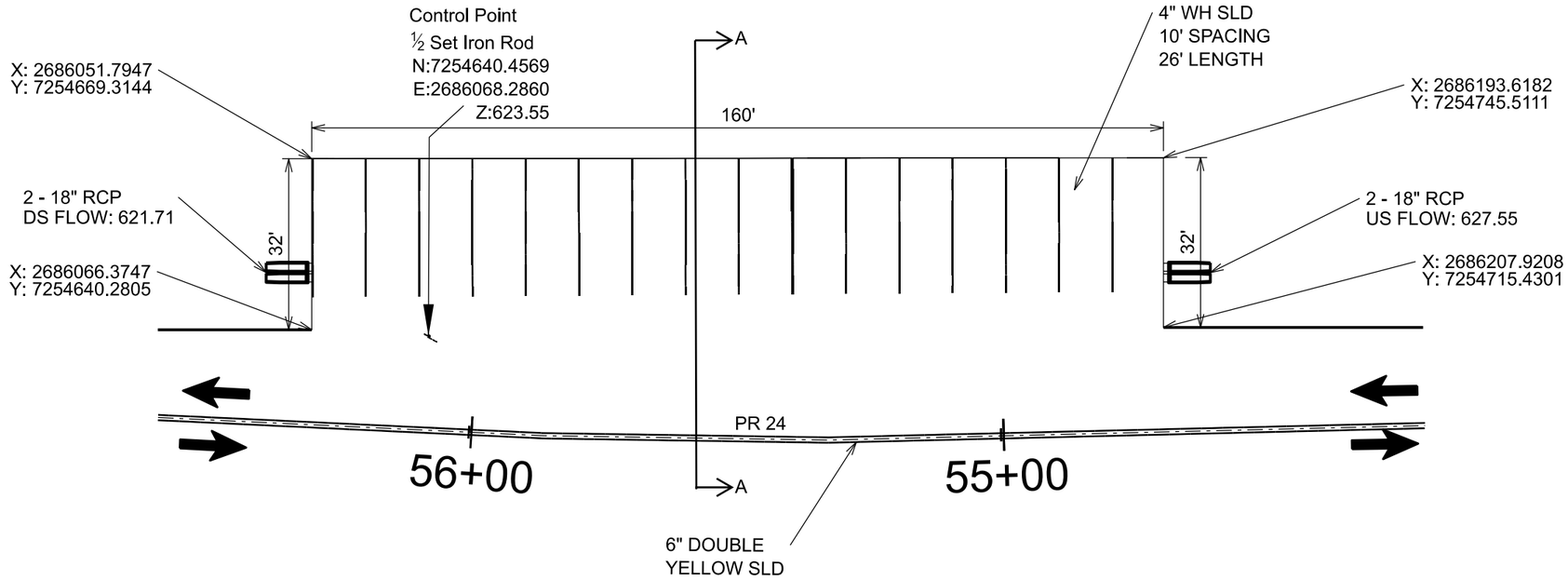


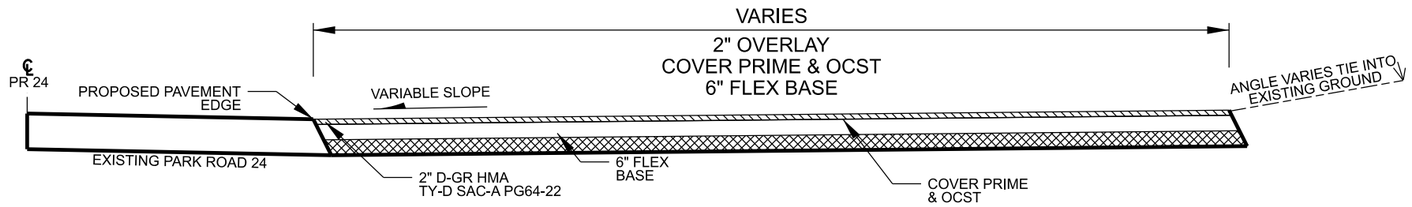


PROPOSED PARKING LOT TYPICAL

SECTION A-A
STA: 54+70 - 56+30

Monte R. Rater P.E.
8.07.24

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MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

0 5 10 15 20 25
SCALE IN FEET

Texas Department of Transportation

BONHAM STATE PARK

PROPOSED PARKING
LOT D



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 49 |

DATE: 05/13/2024 01:30 PM
FILE: DOCUMENT NAME

DK:
DW:
CK:
DN:

PI 300+80.42
Δ 42°15'49.0" (RT)
D 76°23'39.7"
T 28.99'
L 55.32'
R 75.00'
PC 300+51.44
PT 301+06.76

PI 302+17.23
Δ 46°28'40.6" (RT)
D 98°47'09.0"
T 24.91'
L 47.05'
R 58.00'
PC 301+92.32
PT 302+39.37

X 2686373.9884
Y 7254849.4814

X 2686346.1265
Y 7254930.3789

X 2686349.5063
Y 7254976.0237

PR 24

TELCO

POT 300+00.00

R 14

N61°16'04.3"W
51.44

PC 300+51.44

X 2686408.8469
Y 7254808.1385

301+00

N19°00'15.2"W
85.56

35'

302+00

R 13'

PT 301+06.76

PC 301+92.32

85.56'

R 13'

PT 302+39.37

N27°28'25.4"E
49.69

END ROAD CONSTRUCTION
STA: 302+89.06

R 20

POT 302+89.06

300+00

BEGIN ROAD CONSTRUCTION
STA: 300+00

X: 2686453.9496
Y: 7254783.4123

MAINTENANCE ROAD

X: 2686372.4294
Y: 7255020.1078

8'

33'

87'

33'

## LEGEND

- SEWER CLEANOUT
- WOODEN POSTS
- SIGN
- OE — OVERHEAD ELECTRIC
- ROAD CENTERLINE

VPI 300+00.00
EL 636.15

PROPOSED PROFILE

+2.206%

VPI 302+88.90
EL 642.52

EXISTING PROFILE

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 299+80 | 300+00 | 300+20 | 300+40 | 300+60 | 300+80 | 301+00 | 301+20 | 301+40 | 301+60 | 301+80 | 302+00 | 302+20 | 302+40 | 302+60 | 302+80 |
| | 636.15 PROP | 636.59 | 637.03 | 637.47 | 637.92 | 638.36 | 638.80 | 639.24 | 639.68 | 640.12 | 640.56 | 641.00 | 641.44 | 641.89 | 642.33 PROP |
| | 636.15 EXIST | 635.87 | 635.23 | 635.92 | 637.03 | 638.65 | 639.20 | 639.57 | 639.91 | 640.22 | 640.45 | 640.70 | 641.18 | 641.81 | 642.41 EXIST |

690 680 670 660 650 640 630 620 610 600 590 580 570

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STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

8.07.24

Monte R. Rater P.E.

1" = 30'

Texas Department of Transportation

# BONHAM STATE PARK

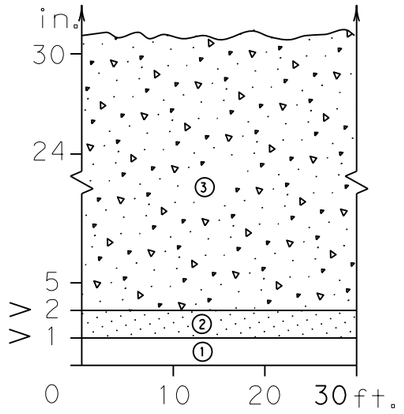
## DUMP STATION PLAN & PROFILE

SHEET 1 OF 1

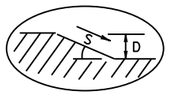
| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 901 | 32 | 83 | CA |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN | | 50 |

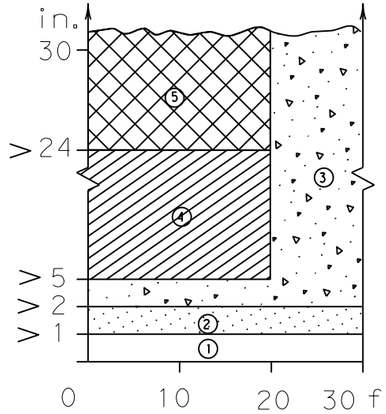
# DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

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

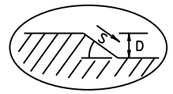


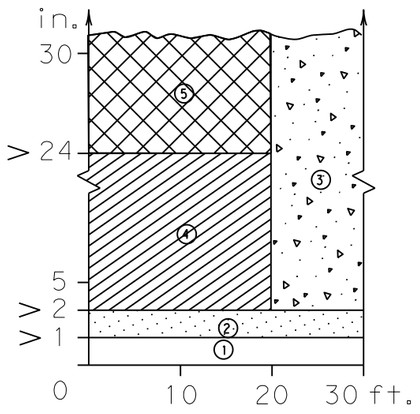

Edge Condition I
S = (3:1) (or flatter)



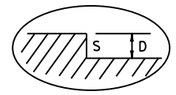



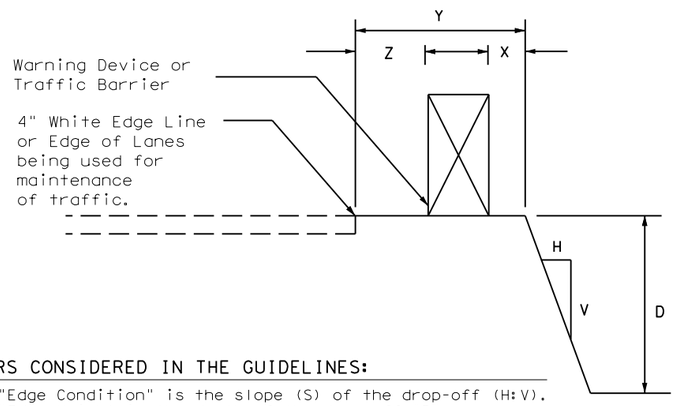

Edge Condition II
S = ((2.99):1) to (1:1)




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:

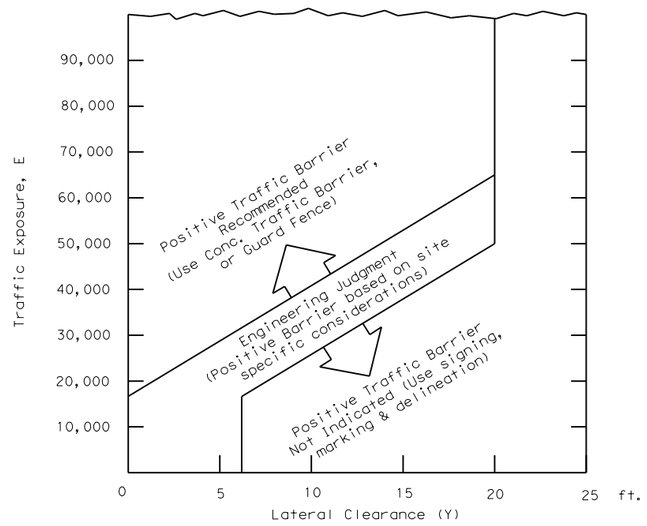
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

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
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

7.12.24

Monte R. Rater P.E.

Texas Department of Transportation

Traffic Safety Division Standard

# TREATMENT FOR VARIOUS EDGE CONDITIONS

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|---|---|---|---|---|---|
| © TxDOT | August 2000 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | | 0901 | 32 | 083, ETC | VAR |
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| | | PAR | FANNIN, ETC. | | 51 |

DATE:
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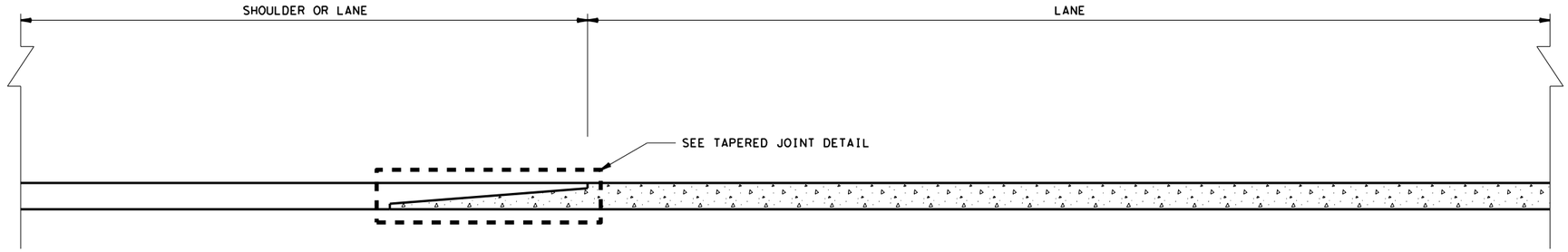
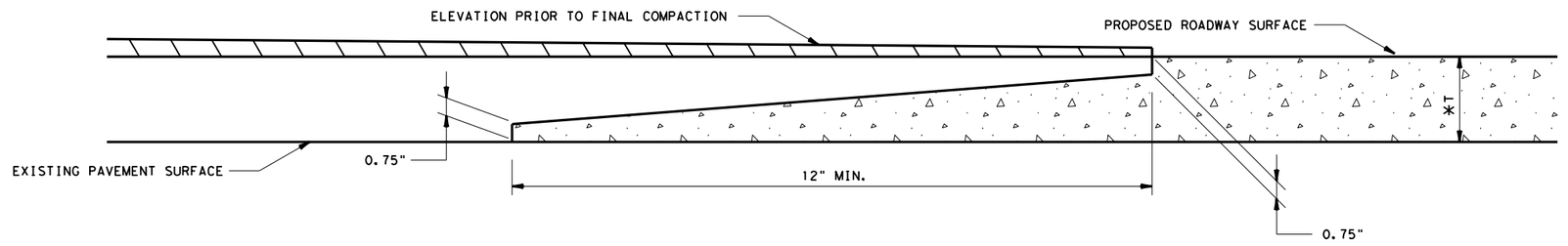



**CROSS-SECTIONAL VIEW OF LONGITUDINAL JOINT**

* T = THICKNESS OF PREVIOUSLY PLACED, COMPACTED HMA MAT.




SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA

**TAPERED JOINT DETAIL**

NOTES:

EXTEND THE TAPERED PORTION OF THE MAT BEYOND THE NORMAL LANE WIDTH.

CONSTRUCT THE TAPERED PORTION OF THE MAT USING AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED.

APPLY TACK COAT TO THE IN-PLACE TAPER BEFORE THE ADJACENT MAT IS PLACED.

FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL NOT CHANGE.

COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED TO BE AS NEAR TO FINAL DENSITY AS POSSIBLE.

Monte R. Rater P.E.

7.12.24

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

Texas Department of Transportation

HOTMIX LONGITUDINAL JOINT DETAIL



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, etc | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 52 |

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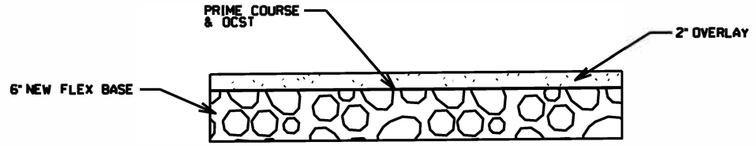
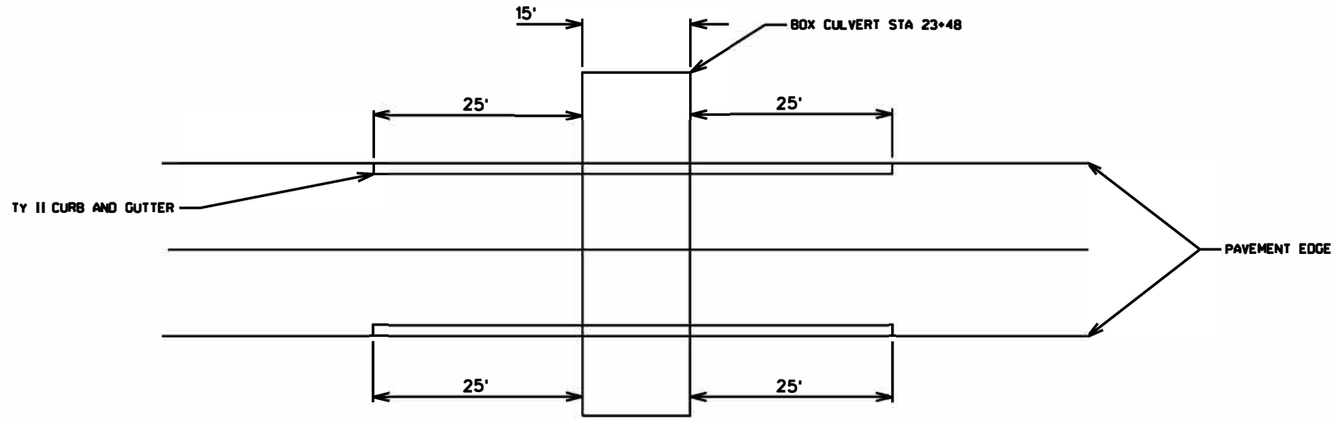


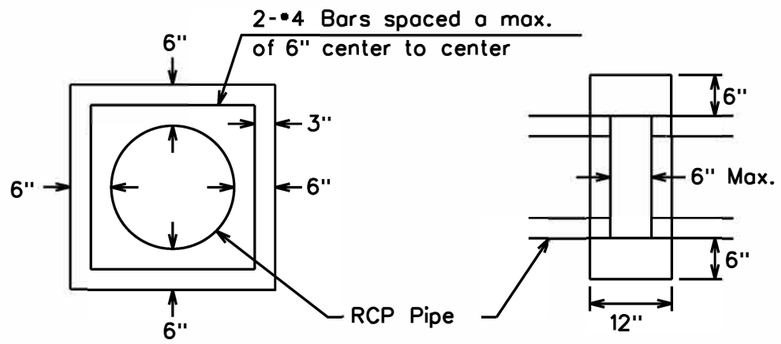

## PR 24 PULL OFFS & PARKING LOTS

SECTIONAL VIEW
NOT TO SCALE



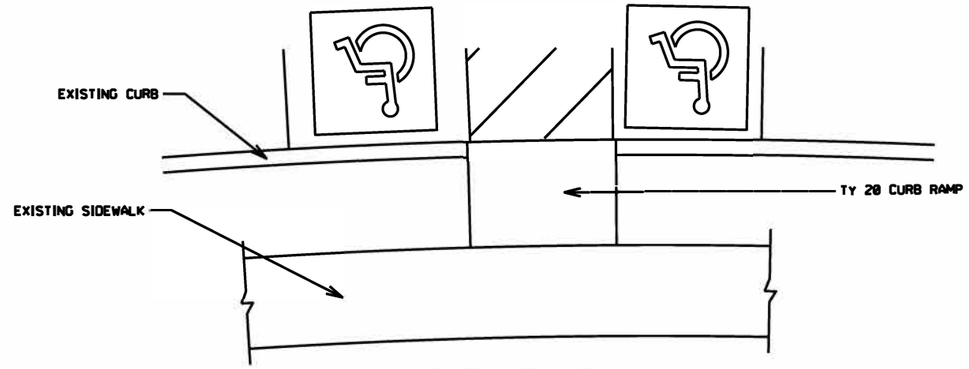

## CURB AND GUTTER PLACEMENT STA. 23+48

NOT TO SCALE



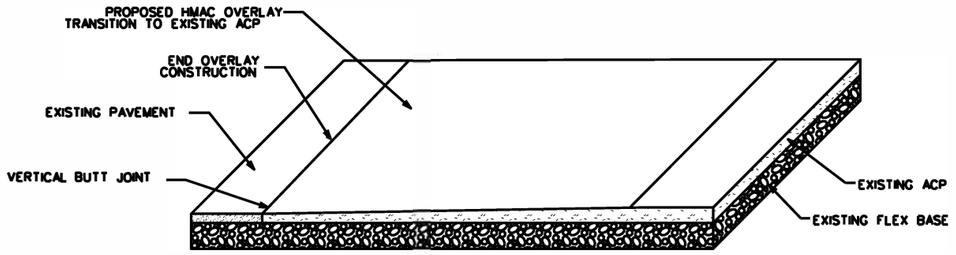

## CONCRETE PIPE COLLAR DETAIL

Concrete for collar shall be Class A
Pipe collars will be subsidiary to Item 464
NOT TO SCALE



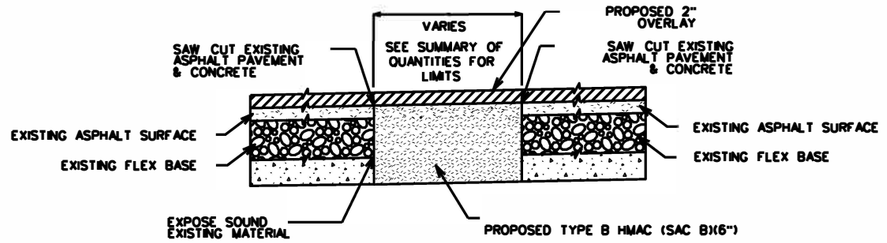

## CURB RAMP

NOT TO SCALE




## PAVEMENT TERMINATION TRANSITION DETAIL

ISOMETRIC VIEW
NOT TO SCALE




## FLEXIBLE PAVEMENT REPAIR DETAILS

SECTIONAL VIEW
NOT TO SCALE

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

8.07.24

Monte R. Rater P.E.

Texas Department of Transportation

0901-32-083, ETC.

MISCELLANEOUS DETAILS



SHEET 1 OF 1

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 53 |

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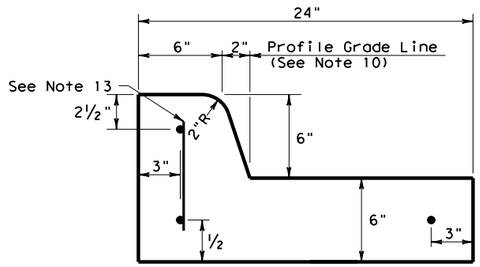
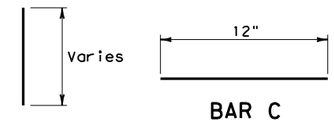
FILE: $FILES
$TIMES




TYPE II CURB AND GUTTER
6" HEIGHT

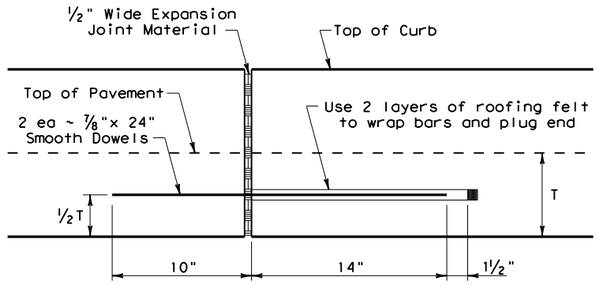



BAR B

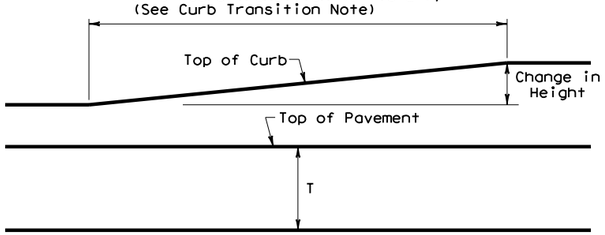



BAR C

CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.




EXPANSION JOINT DETAIL




CURB TRANSITION
Note: To be paid for as Highest Curb

## GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.

Texas Department of Transportation

Design Division Standard

# CONCRETE CURB AND CURB AND GUTTER

## CCCG-22

| FILE: cccg21.dgn | DN: TXDOT | CK: AN | DW: CS | CK: KM |
|---|---|---|---|---|
| ©TxDOT: JUNE 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 54 |

DATE: $DATE$
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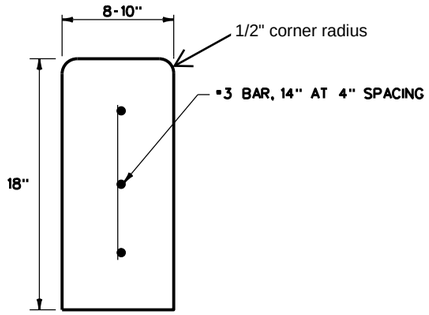
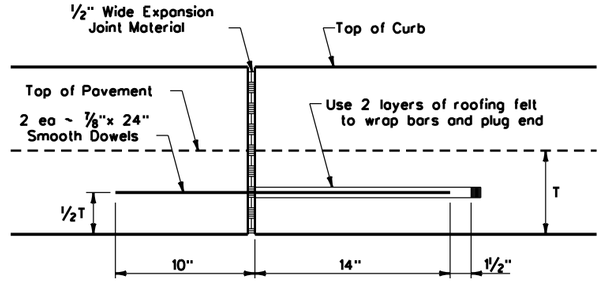
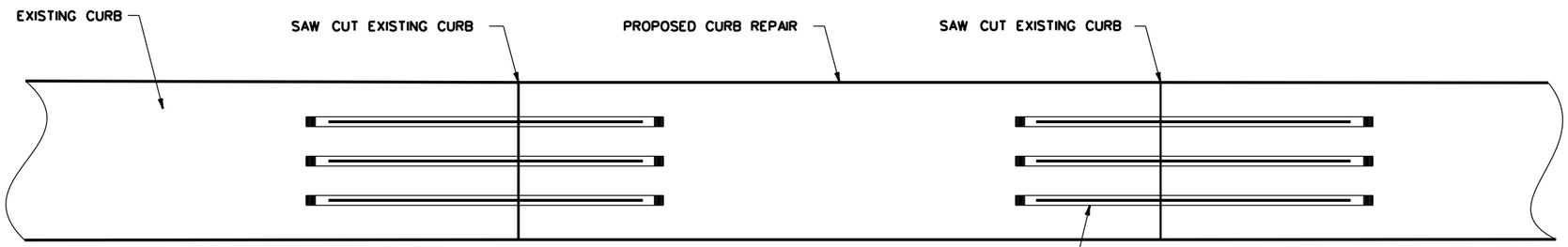



EXPANSION JOINT DETAIL




Extend dowels 12" into existing and proposed curb.

## GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.

Monte R. Rater P.E.

7.15.24

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

Texas Department of Transportation

Design Division Standard

# CONCRETE CURB AND CURB AND GUTTER

## BONHAM PARK HQ CURB

## CCCG-22 MOD

| FILE: cccg21.dgn | DN: TXDOT | CK: AN | DW: CS | CK: KM |
|---|---|---|---|---|
| © TxDOT: JUNE 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 55 |

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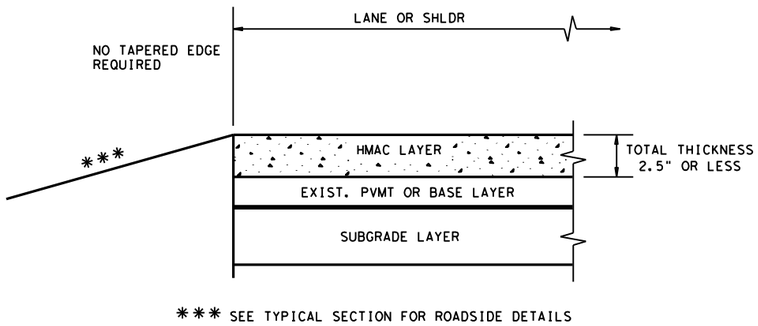
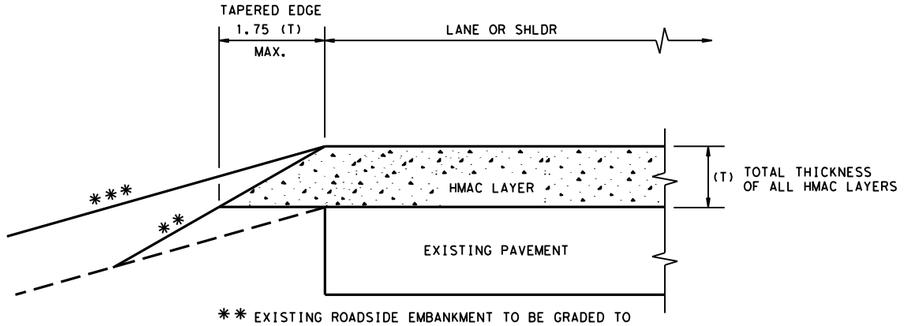



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

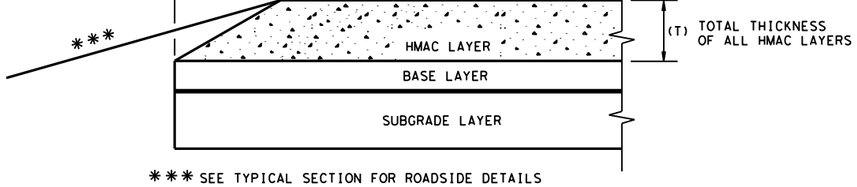
## CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY WITH THICKNESS OF 2.5" OR LESS




** 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.

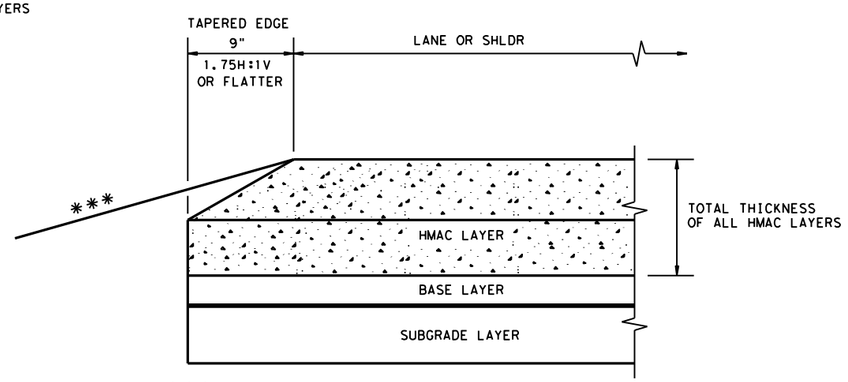
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

## 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

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|---|---|---|---|---|---|---|
| FILE: tehmac11.dgn | DN: TxDOT | CK: RL | DW: KB | CK: | | |
| © TxDOT January 2011 REVISIONS | CONT | SECT | JOB | HIGHWAY | | |
| | 0901 | 32 | 083, ETC | VAR | | |
| | DIST | COUNTY | | SHEET NO. | | |
| | PAR | FANNIN, ETC. | | 56 | | |

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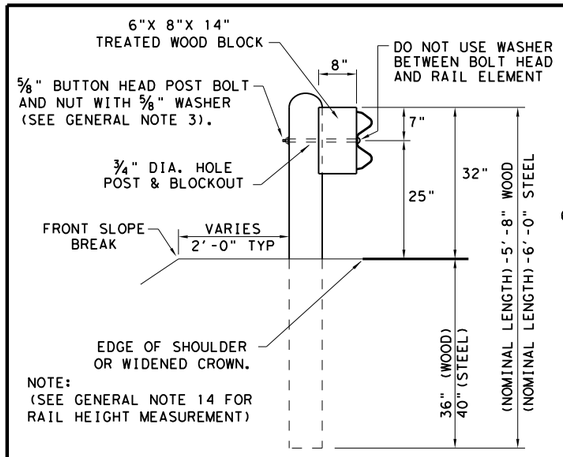
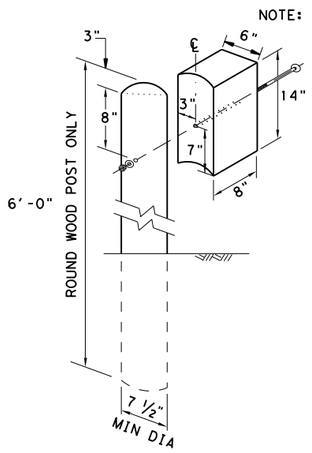
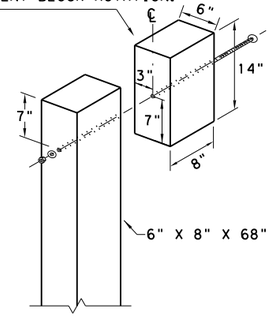



**TYPICAL POST PLACEMENT**

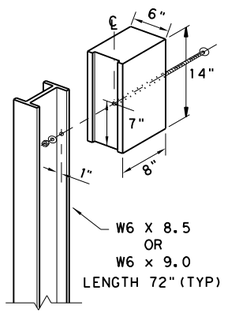



**WOOD BLOCK TO ROUND WOOD POST**

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

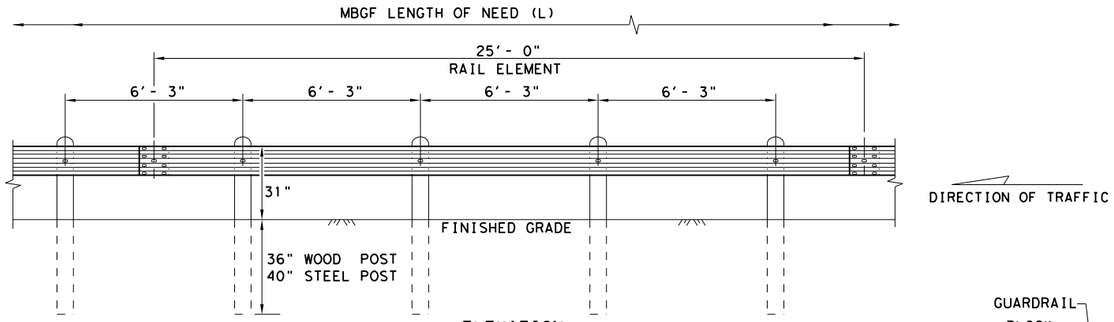



**WOOD BLOCK TO RECTANGULAR WOOD POST**



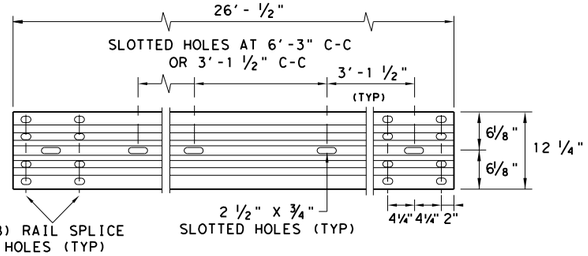

**ROUTED WOOD BLOCK TO I-BEAM STEEL POST**

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




**ELEVATION**
**MID-SPAN RAIL SPLICE**

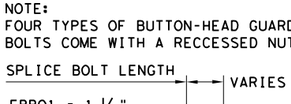
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)




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

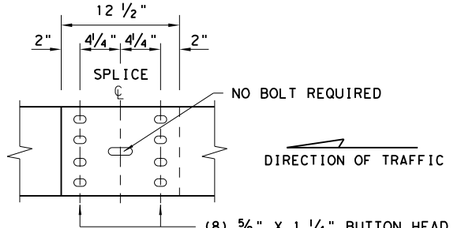
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

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



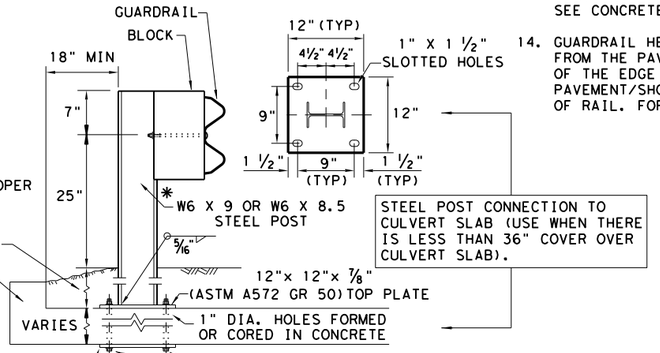

**BUTTON HEAD BOLT**

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




**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 | 0901 | 32 | 083,ETC | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 57 |

DATE: 7/11/2024
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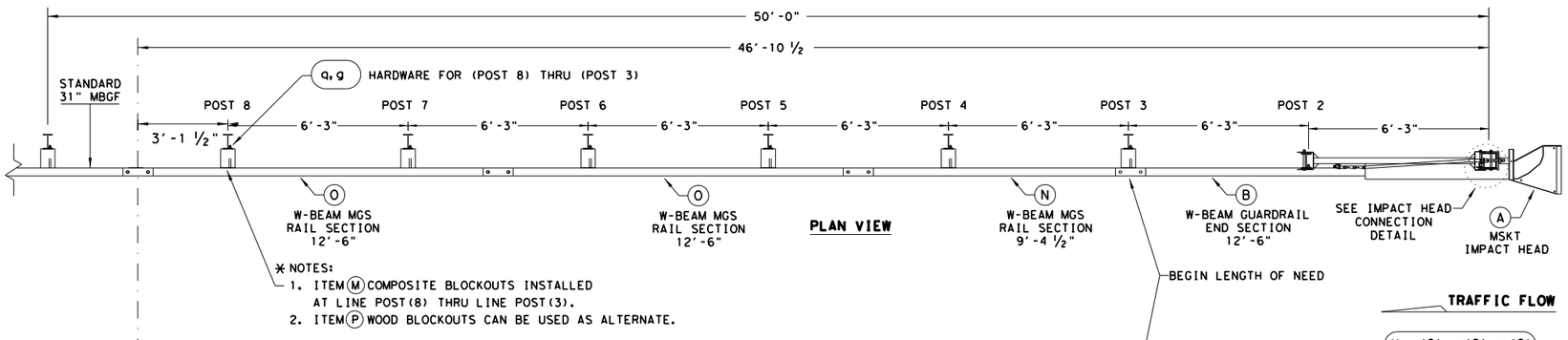
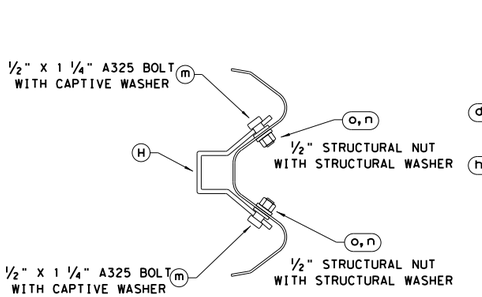
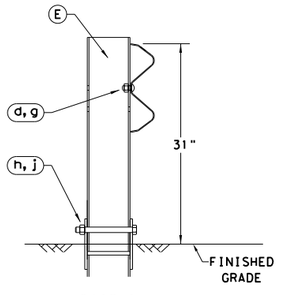


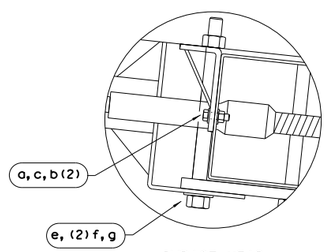

NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.




SECTION B-B
ANCHOR BRACKET




POST 2
SECTION A-A

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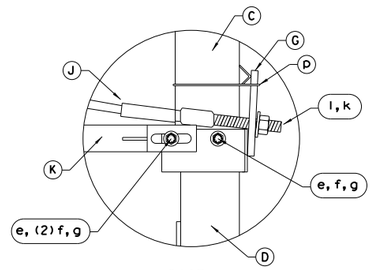
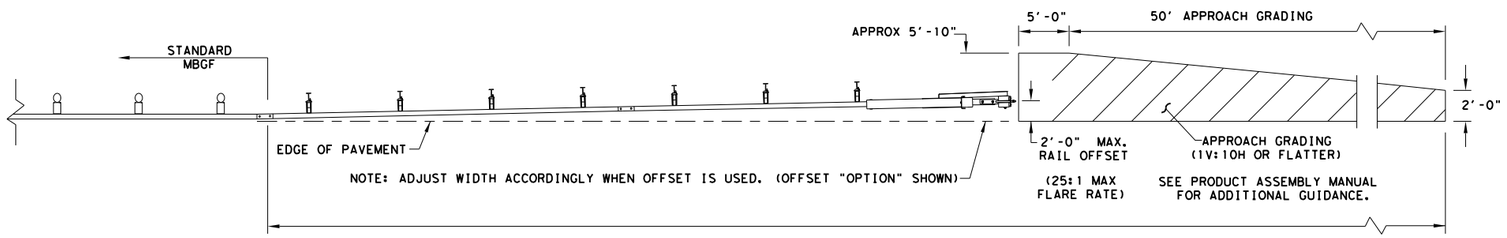



POST 1
CONNECTION DETAIL




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 ⅛" 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 ½") | 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 | ⅝" x 1" HEX BOLT (GRD 5) | B5160104A |
| b | 4 | ⅝" WASHER | W0516 |
| c | 2 | ⅝" HEX NUT | N0516 |
| d | 25 | ⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2) | B580122 |
| e | 2 | ⅝" Dia. x 9" HEX BOLT (GRD A449) | B580904A |
| f | 3 | ⅝" WASHER | W050 |
| g | 33 | ⅝" Dia. H.G.R NUT | N050 |
| h | 1 | ¾" Dia. x 8 ½" HEX BOLT (GRD A449) | B340854A |
| j | 1 | ¾" Dia. HEX NUT | N030 |
| k | 2 | 1 ANCHOR CABLE HEX NUT | N100 |
| l | 2 | 1 ANCHOR CABLE WASHER | W100 |
| m | 8 | ½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER | SB12A |
| n | 8 | ½" STRUCTURAL NUTS | N012A |
| o | 8 | 1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS | W012A |
| p | 1 | BEARING PLATE RETAINER TIE | CT-100ST |
| q | 6 | ⅝" x 10" H.G.R. BOLT | B581002 |
| r | 1 | OBJECT MARKER 18" X 18" | E3151 |

SEE NOTES: * — M, N, O, P, Q

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

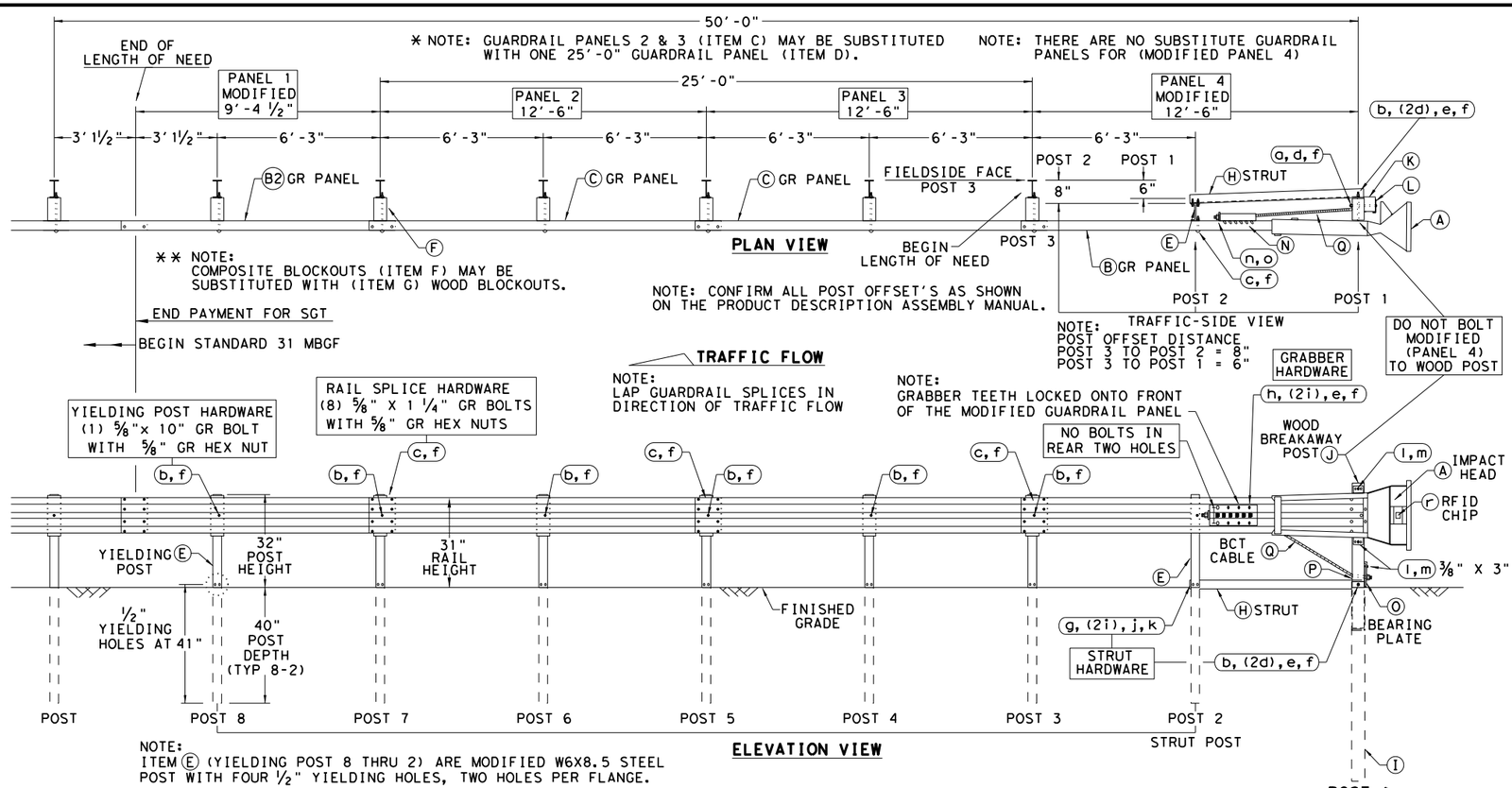
Texas Department of Transportation

Design Division Standard

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

| FILE: sgt12s3118.dgn | DN: TxDOT | CK: KM | DW: VP | CK: CL |
|---|---|---|---|---|
| © TxDOT: APRIL 2018 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 58 |

DATE: 7/11/2024
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\Print Code\059 SGT (15) 31-20.dgn

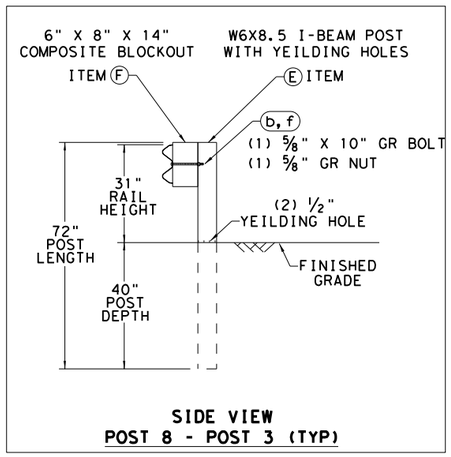



## GENERAL NOTES

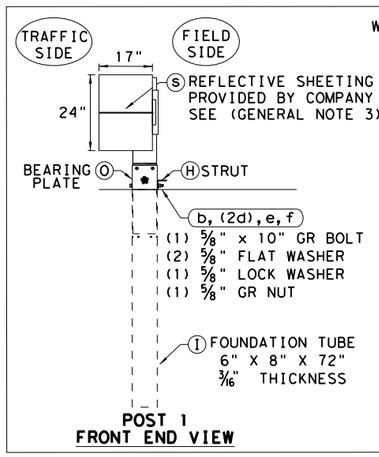
1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: SPIG INDUSTRY, INC. AT 1(267) 644-9510. 14675 INDUSTRIAL PARK RD; BRISTOL, VA 24202
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE MANUFACTURER'S; SGET END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL.
3. MANUFACTURER WILL APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" TO THE FACE PLATE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. THE OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. THE NOMINAL HEIGHT OF THE GUARDRAIL BEAM IS 31 INCHES WITH A TOLERANCE OF +/- ONE INCH.
5. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
6. (POST 2 THROUGH POST 8) ARE MODIFIED STEEL-YIELDING POSTS WITH YIELDING HOLES AT GROUND LEVEL. THERE ARE NO SUBSTITUTE POSTS.
7. POSTS SHALL NOT BE SET IN CONCRETE.
8. IF SOLID ROCK IS ENCOUNTERED FOR ANY OF THE POSTS IN THE SYSTEM, CONTACT THE MANUFACTURER FOR SPECIFIC INSTALLATION GUIDANCE.
9. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
10. A COMPOSITE MATERIAL BLOCKOUT THAT MEETS DMS-7210 REQUIREMENTS MAY BE SUBSTITUTED FOR AN APPROVED WOOD BLOCKOUT. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
11. THE ENTIRE SYSTEM MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY CURVE. HOWEVER, THE SYSTEM CAN BE OFFSET BY TWO FEET AS SHOWN ON THE APPROACH GRADING DETAIL TO HELP OFF-SET THE IMPACT HEAD FROM SHOULDER OF THE ROAD.

| ITEM | QTY | MAIN SYSTEM COMPONENTS | ITEM # |
|---|---|---|---|
| A | 1 | SGET IMPACT HEAD | SIH1A |
| B | 1 | MODIFIED GUARDRAIL PANEL 12'-6" 12GA | 126SPZGP |
| B2 | 1 | MODIFIED GUARDRAIL PANEL 9'-4 1/2" 12GA | GP94 |
| C | 2 | STANDARD GUARDRAIL PANEL 12'-6" 12GA | GP126 |
| D * | 1 | STANDARD GUARDRAIL PANEL 25'-0" 12GA | GP25 |
| E | 7 | MODIFIED YIELDING I-BEAM POST W6x8.5 | YP6MOD |
| F | 6 | COMPOSITE BLOCKOUT 6" X 8" X 14" | CBO8 |
| G ** | 6 | WOOD BLOCKOUT 6" X 8" X 14" | WBO8 |
| H | 1 | STRUT 3" X 3" X 80" x 1/4" A36 ANGLE | STR80 |
| I | 1 | FOUNDATION TUBE 6" X 8" X 72" x 3/16" | FNDT6 |
| J | 1 | WOOD BREAKAWAY POST 5 1/2" x 7 1/2" x 50" | WBRK50 |
| K | 1 | WOOD STRIKE BLOCK | WSBLK14 |
| L | 1 | STRIKE PLATE 1/4" A36 BENT PLATE | SPLT8 |
| M | 1 | REINFORCEMENT PLATE 12 GA. GR55 | REPLT17 |
| N | 1 | GUARDRAIL GRABBER 2 1/2" X 2 1/2" X 16 1/2" | GGR17 |
| O | 1 | BEARING PLATE 8" X 8 5/8" X 5/8" A36 | BPLT8 |
| P | 1 | PIPE SLEEVE 4 1/4" X 2 3/8" O.D. (2 1/8" I.D.) | PSLV4 |
| Q | 1 | BCT CABLE 3/4" X 81" LENGTH | CBL81 |
| **SMALL HARDWARE** | | | |
| a | 1 | 5/8" X 12" GUARDRAIL BOLT 307A HDG | 12GRBLT |
| b | 7 | 5/8" X 10" GUARDRAIL BOLT 307A HDG | 10GRBLT |
| c | 33 | 5/8" X 1 1/4" GR SPLICE BOLTS 307A HDG | 1GRBLT |
| d | 3 | 5/8" FLAT WASHER F436 A325 HDG | 58FW436 |
| e | 1 | 5/8" LOCK WASHER HDG | 58LW |
| f | 39 | 5/8" GUARDRAIL HEX NUT HDG | 58HN563 |
| g | 2 | 1/2" X 2" STRUT BOLT A325 HDG | 2BLT |
| h | 6 | 1/2" X 1 1/4" PLATE BOLT A325 HDG | 125BLT |
| i | 16 | 1/2" FLAT WASHER F436 A325 HDG | 12FWF436 |
| j | 8 | 1/2" LOCK WASHER HDG | 12LW |
| k | 8 | 1/2" HEX NUT A563 HDG | 12HN563 |
| l | 4 | 3/8" X 3" HEX LAG SCREW GR5 HDG | 38LS |
| m | 4 | 3/8" FLAT WASHER F436 A325 HDG | 38FW844 |
| n | 2 | 1" FLAT WASHER F436 A325 HDG | 1FWF436 |
| o | 2 | 1" HEX NUT A563DH HDG | 1HN563 |
| p | 1 | 18" TO 24" LONG ZIP TIE RATED 175-200LB | ZPT18 |
| q | 1 | 1 1/2" X 4" SCH-40 PVC PIPE | PSPCR4 |
| r | 1 | RFID CHIP RATED MIL-STD-810F | RFID810F |
| s | 1 | IMPACT HEAD REFLECTIVE SHEETING | RS30M |

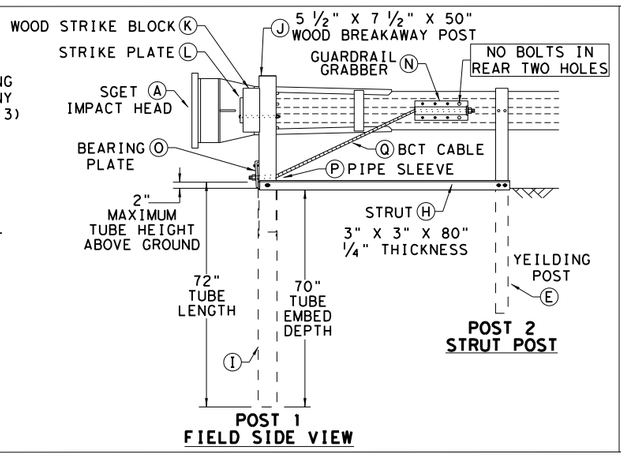
* ALTERNATIVE ITEMS
** NOTE: SEE PLAN VIEW




SIDE VIEW
POST 8 - POST 3 (TYP)

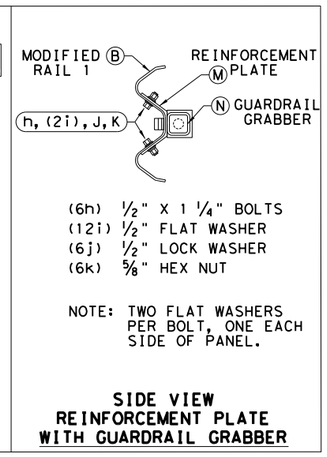



POST 1
FRONT END VIEW

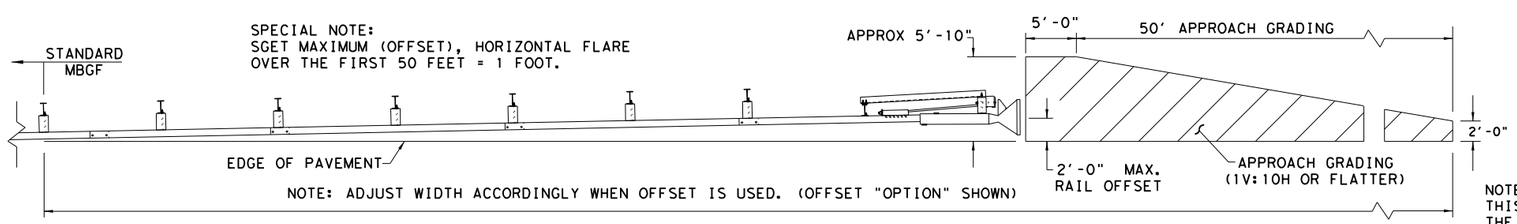



POST 1
FIELD SIDE VIEW

POST 2
STRUT POST




SIDE VIEW
REINFORCEMENT PLATE
WITH GUARDRAIL GRABBER




APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE:
THIS STANDARD IS A BASIC REPRESENTATION OF THE SGET TERMINAL SYSTEM AND IS NOT INTENDED TO REPLACE THE MANUFACTURER'S ASSEMBLY MANUAL.

Texas Department of Transportation
Design Division Standard

# SPIG INDUSTRY, LLC
# SINGLE GUARDRAIL TERMINAL
# SGET - TL-3 - MASH
# SGT(15)31-20

| FILE: sgt153120.dgn | DN: TxDOT | CK: KM | DW: VP | CK: VP |
|---|---|---|---|---|
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| | DIST | COUNTY | | SHEET NO. |
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DATE:
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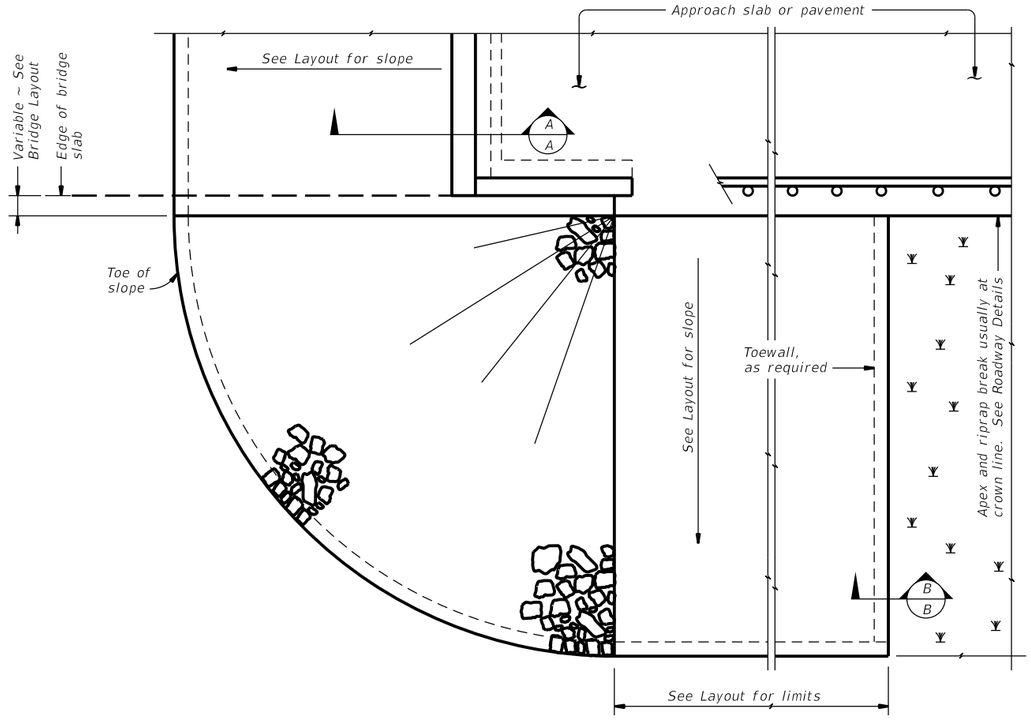
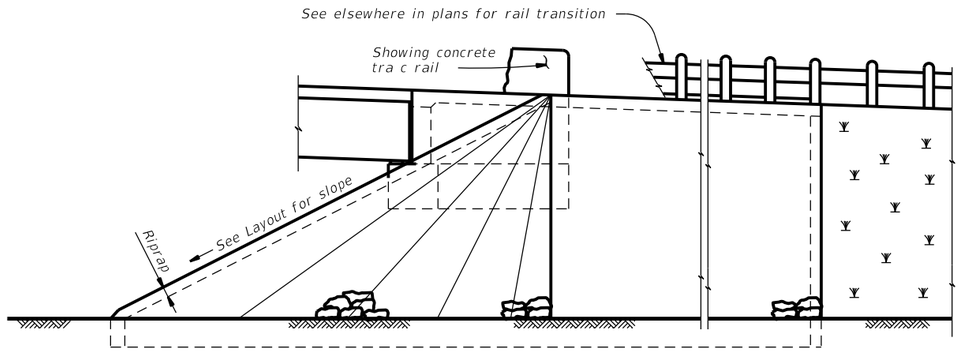
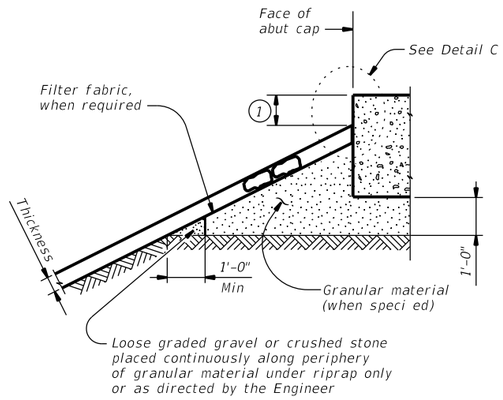


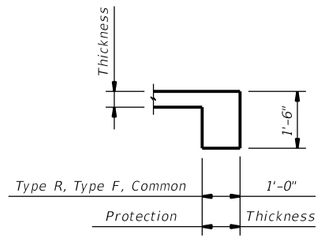

PLAN




ELEVATION

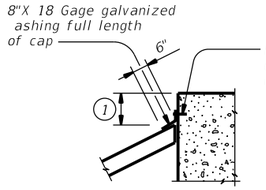



SECTION A-A AT CAP

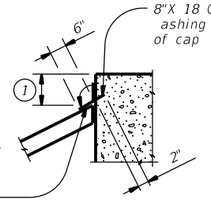



SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".




CAP OPTION A




CAP OPTION B

DETAIL C

1 Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap speci ed.
See elsewhere in plans for locations and details of shoulder drains.



Texas Department of Transportation

Bridge Division Standard

# STONE RIPRAP

SRR

| FILE: | DN: AES | CK: JGD | DW: BWH | CK: AES |
|---|---|---|---|---|
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| REVISIONS | 0901 | 32 | 083, ETC. | VAR. |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 59A |

DATE:
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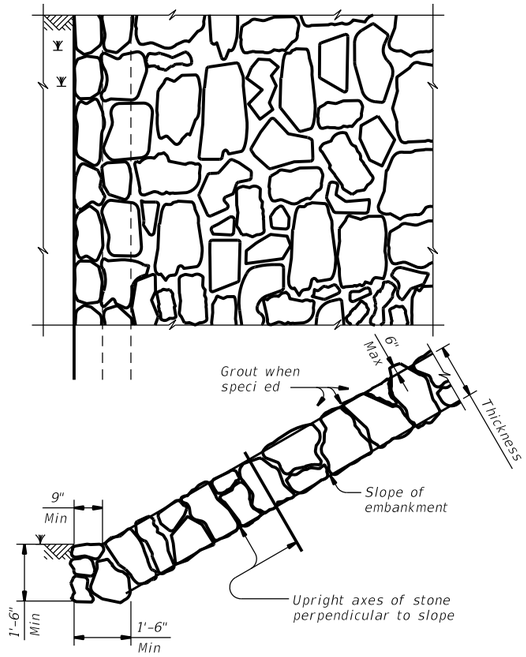



FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

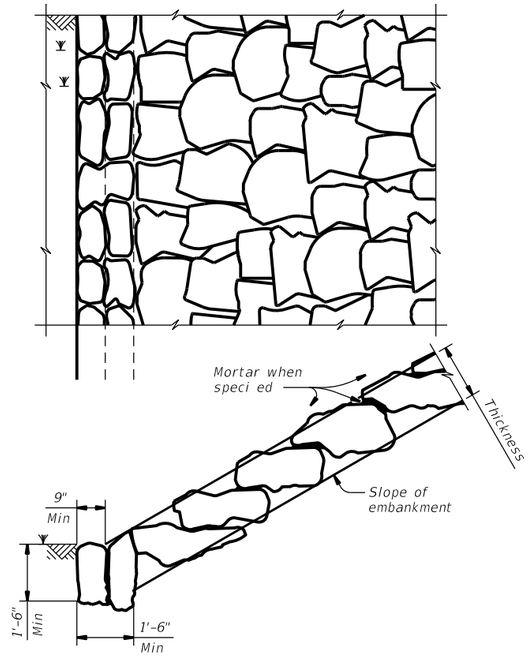



FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

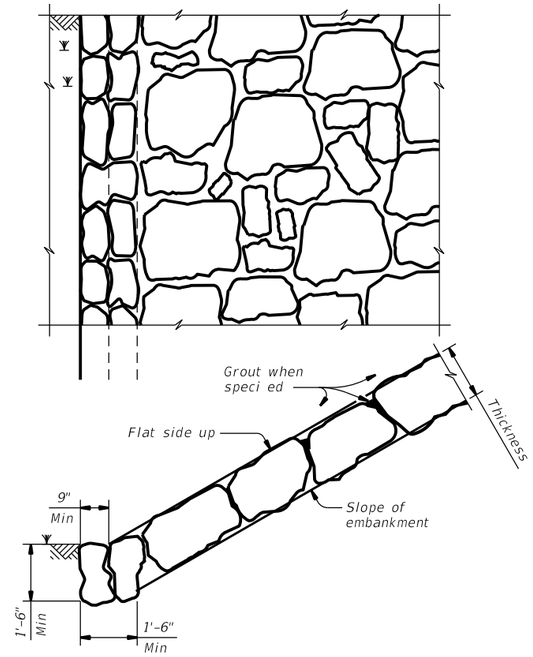



FIGURE 3 ~ TYPE F STONE RIPRAP

grouted

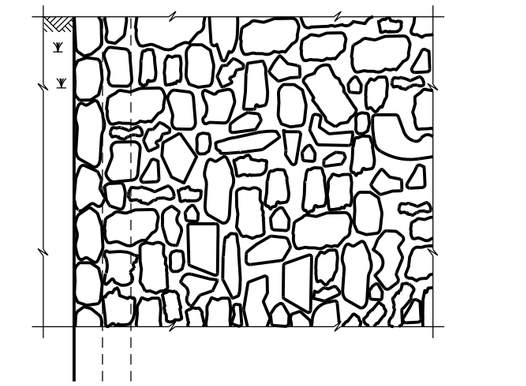



FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

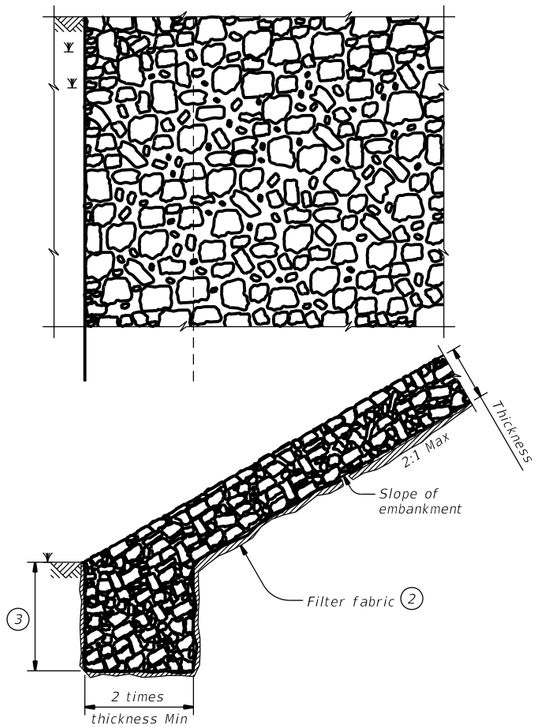


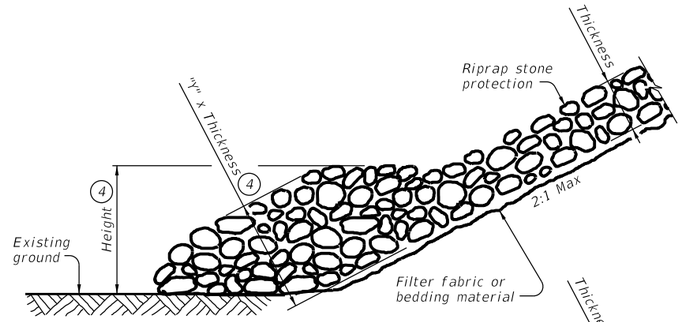

FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of lter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

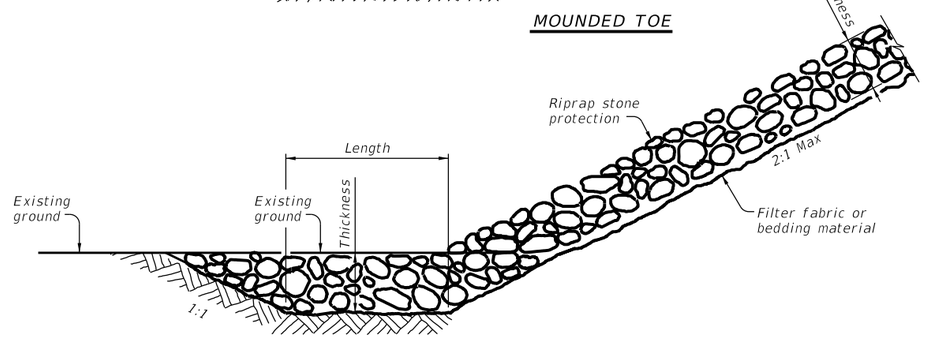
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be de ned. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.




MOUNDED TOE




EXTENDED ROCK FILLED TRENCH

## PROTECTION STONE RIPRAP TOE OPTIONS (5)



Texas Department of Transportation

Bridge Division Standard

# STONE RIPRAP

SRR

| FILE: | DN: AES | CK: JGD | DW: BWH | CK: AES |
|---|---|---|---|---|
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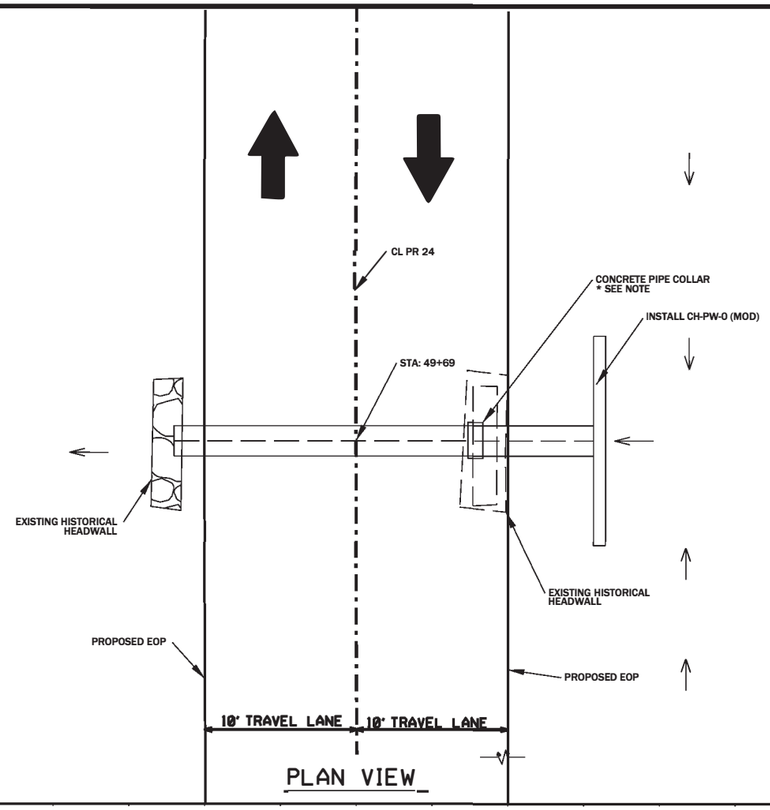
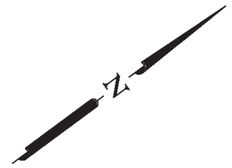



PLAN VIEW



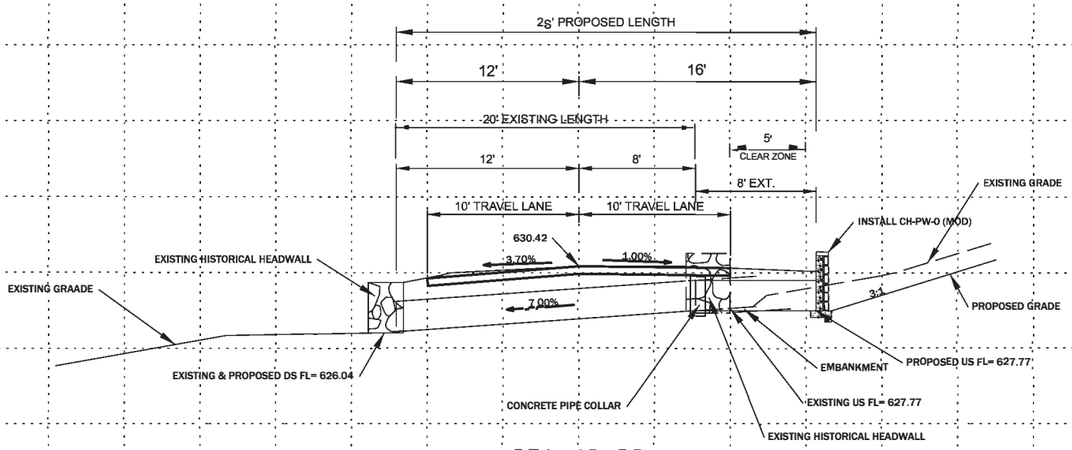

* NOTE: SEE MISCELLANEOUS SHEET FOR DETAILS

ESTIMATED QUANTITIES

| | |
|---|---|
| 0132 7003 EMBANKMENT (FNL)(OC)(TY B) | 5 CY |
| 0420 7008 CL A CONC (COLLAR) | 1 EA |
| 0464 7005 RC PIPE (CL III)(24 IN) | 8 LF |
| 0466 7101 HEADWALL (CH-PW-0)(D)(A=24 IN) | 1 EA |
| 0496 7006 REMOV STR (HEADWALL) | 1 EA |
| 5050 6001 STONE MASONRY (FACADE MASONRY) | 27 SF |

SUBJECT CULVERT HAS NO HISTORY OF OVERTOPPING ROADWAY

STANDARDS: CH-PW-0(MOD)




STA. 49+69

EXISTING ~ 1 - 24" x 20' CMP

PROPOSED ~ 1 - 24" X 20' CMP WITH 8' RCP EXT. US

FLOW

640
635
630
625
620

65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65

CP 1/2" SET IRON ROD
N: 7254535.0928
E: 2686715.8502
Z: 628.94

SCALE
HORIZONTAL: 1"=10'
VERTICAL: 1"=10'

STATE OF TEXAS
MONTE RATER
95859
LICENSED
PROFESSIONAL ENGINEER

7.15.24

Monte R. Rater P.E.

PR 24
CULVERT LAYOUT
STA. 49+69


SHEET 1 OF 1

Texas Department of Transportation

| CONT | SECT | JOB | HIGHWAY |
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| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 60 |

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FILE: $FILE$

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DW:
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DN:

# CROSS CULVERT HYDROLOGIC AND HYDRAULIC DATA (RATIONAL METHOD)

| STRUCTURE INLET STA. | DRAINAGE AREA IDENTIFIER | AREA (AC) | CHANNEL SLOPE (FT/FT) | CHANNEL n | CHANNEL TYPE | HYDRAULIC CONDITION | STRUCTURE DESCRIPTION | STRUCTURE MANNINGS n | STRUCTURE SLOPE (FT/FT) | ENTRANCE / EXIT TYPE | RUNOFF COEFFICIENT | Tc (MIN) | FLOOD FREQUENCY | FLOW (Q) (CFS) | HEADWATER ELEV (FT) | TAILWATER ELEV (FT) | TAILWATER VELOCITY | DEPTH OVER ROADWAY (FT) | ROADWAY ELEV OVERTOP (FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PARK LOT D CULVERT | 1 | 3 | 0.0365 | 0.300 | TRAPEZOIDAL | EXISTING | NO EXISTING CULVERT | 0.012 | 0.0365 | **LEFT** N/A<br>**RIGHT** N/A | 0.54 | 10 | **10 YEAR** | 14.0 | 628.93 | N/A | 0.83 | 0.00 | 630.16 |
| | | | | | | | | | | | | | **100 YEAR** | 20.0 | 629.17 | N/A | 0.91 | 0.00 | |
| | | | | | | PROPOSED | 2-18" x160' RCP<br>W/ SET US & DS | 0.012 | 0.0365 | **LEFT** SET<br>**RIGHT** SET | 0.54 | 10 | **10 YEAR** | 14.0 | 629.09 | 660.95 | 5.39 | 4.47 | 630.16 |
| | | | | | | | | | | | | | **100 YEAR** | 20.0 | 630.16 | 661.67 | 5.66 | 4.94 | |

DESIGN OF DRAINAGE FACILITIES BASED UPON THE TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019.
PEAK FLOWS WERE DETERMINED USING THE RATIONAL METHOD.
CULVERTS ANALYZED FOR NO PONDING ON ROADWAY PAVEMENT DURING A 5 OR 10 YEAR FLOOD EVENT.
SOFTWARE EMPLOYED FOR HYDROLOGIC ANALYSIS: HY-8 (VER.7.50 FHWA).
PER CUSTOMARY TXDOT ENGINEERING PROCEDURE, CULVERTS EXTENDED LESS THAN TEN PERCENT ARE
NOT ANALYZED WHEN CULVERT HISTORY INDICATES ADEQUATE STORM FLOW CAPACITY AND FLOOD RISKS HAVE NOT CHANGED.

PROJ = PROJECTING END
FW = FLARED WING
SW = STRAIGHT WINGS
PW = PARALLEL WING
JB = JUNCTION BOX


N

**Park Lot D culvert Drain Area**

| Rational Method | | |
|---|---|---|
| | C Coefficient = | 0.54 |
| | A (acres) = | 4 |
| | Tc (min) = | 10 |
| **Recurrence** | **Intensity (in/hr)** | Flow (cfs) |
| **2 year** | 4.52 | 9.8 |
| **5 year** | 5.65 | 12.2 |
| **10 year** | 6.50 | 14.0 |
| **25 year** | 7.62 | 16.5 |
| **100 year** | 9.28 | 20.0 |

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8.07.24

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MONTE L. RATER
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NOTES:

DESIGN OF DRAINAGE FACILITIES BASED ON THE TXDOT HYDRAULIC DESIGN MANUAL, SEPTEMBER 2019.

DRAINAGE AREAS DETERMINED BY SURVEY DATA, USGS TOPOGRAPHIC MAPS, DIGITAL ELEVATION MODELS, AS-BUILT PLANS AND FIELD OBSERVATIONS. THE RATIONAL METHOD WAS USED FOR HYDROLOGIC ANALYSIS OF DRAINAGE AREAS.

Texas Department of Transportation

BONHAM STATE PARK

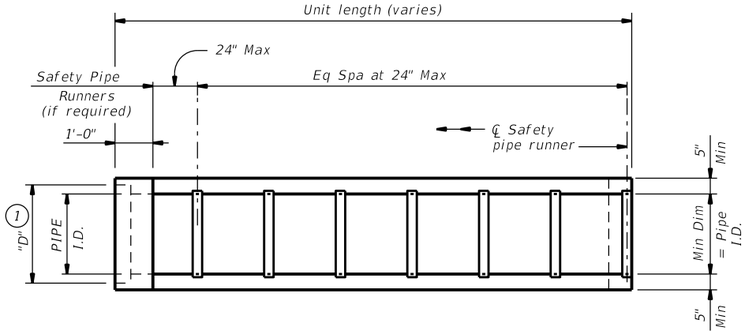
HYDRAULIC DATA



SHEET 1 OF 1

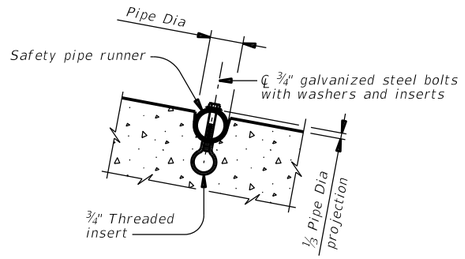
| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 61 |

DATE: $DATE$ $TIME$
FILE: $FILE$



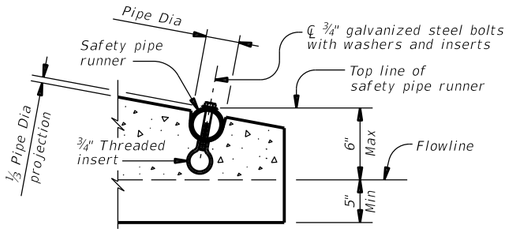

## PLAN

(Showing bell end connection.)

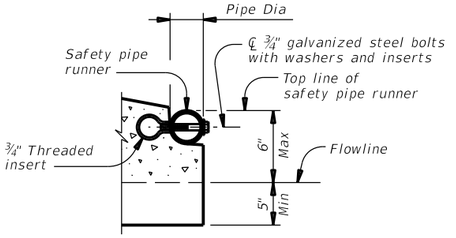



## INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



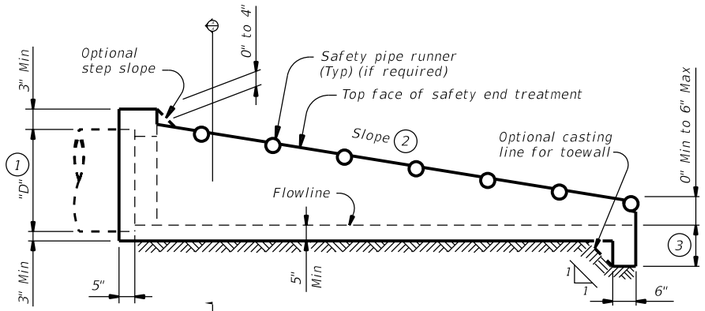

OPTION A




OPTION B

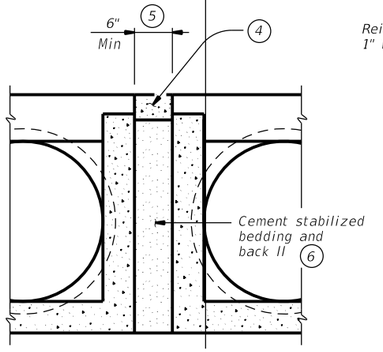
## END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)

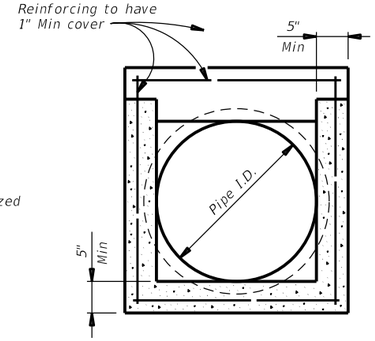



## LONGITUDINAL ELEVATION

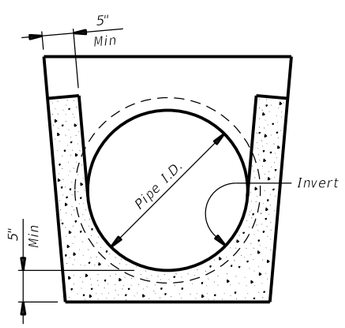
(Showing bell end connection.)




MULTIPLE PIPE INSTALLATION

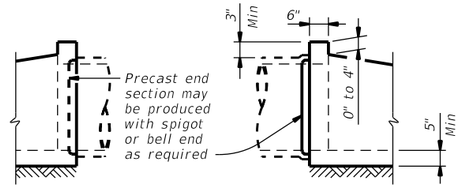



OPTION WITH SQUARE BOTTOM




OPTION WITH INVERT BOTTOM

## SECTION A-A




## OPTIONAL JOINT FOR RCP

(Showing joint between RCP and precast safety end treatment.)

## REQUIREMENTS FOR CULVERT PIPES AND SAFETY PIPE RUNNERS

| Pipe I.D. | RCP Wall "B" Thickness | TP Wall Thickness (7) | "D" (1) | Slope | Min Length | Pipe Runners Required | | Required Pipe Runner Size | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Single Pipe | Multiple Pipe | Nominal Dia. | O.D. | I.D. |
| 12" | 2" | 1.15" | 17.00" | 6:1 | 4' – 9" | No | Yes, for > 2 pipes | 3" STD | 3.500" | 3.068" |
| 15" | 2 ¼" | 1.30" | 20.50" | 6:1 | 6' – 5" | No | Yes, for > 2 pipes | 3" STD | 3.500" | 3.068" |
| 18" | 2 ½" | 1.60" | 24.00" | 6:1 | 8' – 0" | No | Yes, for > 2 pipes | 3" STD | 3.500" | 3.068" |
| 24" | 3" | 1.95" | 31.00" | 6:1 | 11' – 3" | No | Yes, for > 2 pipes | 3" STD | 3.500" | 3.068" |
| 30" | 3 ½" | 2.65" | 38.50" | 6:1 | 14' – 8" | No | Yes | 4" STD | 4.500" | 4.026" |
| 36" | 4" | 2.75" | 45.50" | 6:1 | 17' – 11" | Yes | Yes | 4" STD | 4.500" | 4.026" |
| 42" | 4 ½" | 2.7" | 52.50" | 6:1 | 21' – 2" | Yes | Yes | 4" STD | 4.500" | 4.026" |

(1) Dimension "D" is based on reinforced concrete pipe (RCP) meeting the requirements of ASTM C–76, Class III, (RCP Wall "B" thickness). Adjust "D" for any other wall thickness used. For thermoplastic pipe (TP) take into account the annular space requirements for grouted connections.

(2) Slope as shown elsewhere in the plans. Slope of 6:1 or atter is required for vehicle safety.

(3) Toewall to be used only when dimension is shown elsewhere in the plans.

(4) Fill the top 4" of void between precast end treatments with concrete riprap. Concrete riprap is considered subsidiary to the Item 467, "Safety End Treatment."

(5) Adjust clear distance between pipes to provide for the minimum distance between safety end treatments.

(6) Provide cement stabilized bedding and back II in accordance with the Item 400, "Excavation and Back II for Structures." Bedding and back II is considered subsidiary to the Item 467, "Safety End Treatment." When concrete riprap is speci ed around the safety end treatment, back II as directed by Engineer.

(7) Thermoplastic pipe wall thickness may vary. Adjust accordingly. Thermoplastic pipe requires the safety end treatments to have a bell end for grouted connections.

### GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe (RCP), and thermoplastic pipe (TP) may be used for TYPE II end treatment as speci ed in Item "Safety End Treatment."

When precast safety end treatment is used as a Contractor's alternate to mitered RCP, riprap will not be required unless noted otherwise on the plans.

Synthetic bers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture this product in accordance with Item 467, "Safety End Treatment" except as noted below :

A. Provide minimum reinforcing of #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6"x6" – D12 x D12 or 5"x5" – D10 x D10 welded wire reinforcement (WWR).

B. For precast (steel formed) sections, provide Class "C" concrete (f'c = 3,600 psi).

At the option and expense of the Contractor the next larger size of safety end treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280–2F, "Safety Treatment of Roadside Parallel–Drainage Structures", Texas Transportation Institute, March 1981.

Provide pipe runners meeting the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Galvanize all steel components except reinforcing steel after fabrication. Repair galvanizing damaged during transport or construction in accordance with the speci cations.

Connect RCP using the Optional Joint for RCP detail shown or in accordance with Item 464, "Reinforced Concrete Pipe." Connect TP by grouting. See Pipe and Box Grouted Connections (PBGC) standard for grouted connections with TP and precast safety end treatment.

Texas Department of Transportation

Bridge Division Standard

# PRECAST SAFETY END TREATMENT

## TYPE II ~ PARALLEL DRAINAGE

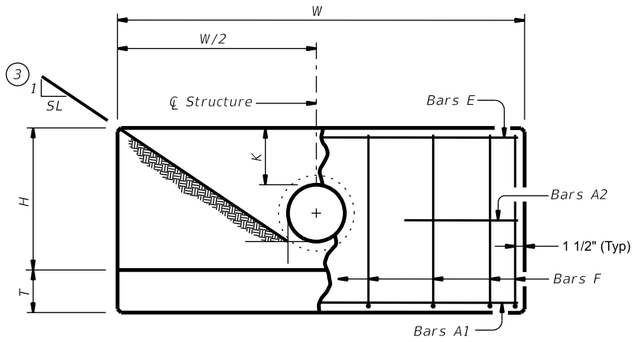
## PSET-SP

| FILE: | DN: RLW | CK: KLR | DW: JTR | CK: GAF |
|---|---|---|---|---|
| ©TxDOT February 2020 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 12-21: Added 42" TP | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 62 |

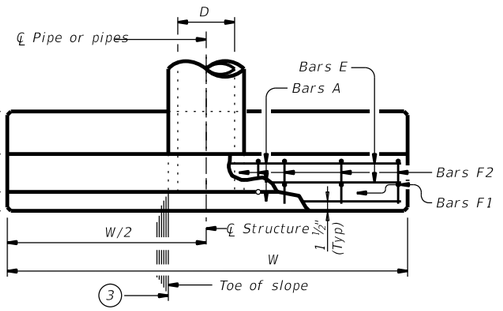
DATE: $DATE$ $TIME$
FILE: $FILE$

## TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

| Slope | Dia of Pipe (D) | Values for One Pipe | | | Values To Be Added for Each Addt'l Pipe | | |
|---|---|---|---|---|---|---|---|
| | | W | Reinf (Lbs) (1) | Conc (CY) (2) | W | Reinf (Lbs) (1) | Conc (CY) (2) |
| 2:1 | 12" | 9' – 0" | 122 | 1.1 | 1' – 9" | 15 | 0.2 |
| | 15" | 10' – 3" | 136 | 1.3 | 2' – 2" | 16 | 0.2 |
| | 18" | 11' – 6" | 163 | 1.5 | 2' – 8" | 19 | 0.3 |
| | 21" | 12' – 9" | 200 | 1.8 | 3' – 1" | 31 | 0.4 |
| | 24" | 14' – 0" | 217 | 2.1 | 3' – 7" | 34 | 0.4 |
| | 27" | 15' – 3" | 254 | 2.4 | 3' – 11" | 37 | 0.5 |
| | 30" | 16' – 6" | 272 | 2.7 | 4' – 4" | 40 | 0.6 |
| | 33" | 17' – 9" | 314 | 3.1 | 4' – 8" | 43 | 0.6 |
| | 36" | 19' – 0" | 371 | 3.9 | 5' – 1" | 46 | 0.8 |
| | 42" | 21' – 6" | 442 | 4.9 | 5' – 10" | 52 | 1.0 |
| | 48" | 25' – 0" | 569 | 6.4 | 6' – 7" | 59 | 1.3 |
| | 54" | 27' – 6" | 701 | 7.5 | 7' – 6" | 82 | 1.6 |
| | 60" | 30' – 0" | 794 | 8.8 | 8' – 3" | 90 | 1.8 |
| | 66" | 32' – 6" | 894 | 10.2 | 8' – 9" | 96 | 2.0 |
| | 72" | 35' – 0" | 1,055 | 11.7 | 9' – 4" | 103 | 2.3 |




ELEVATION




PLAN




BARS F2

(1) Total quantities include one 3'–1" lap for bars over 60' in length.

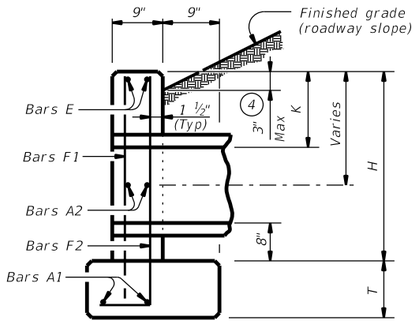
(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above nished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Determine K value to provide 3" maximum headwall protrusion above surrounding ground and pavement surface. Dimensions shown are maximum.

(6) Quantities shown are for one structure end only (one headwall).




SECTION AT CENTER OF PIPE

## TABLE OF CONSTANT DIMENSIONS

| Dia of Pipe (D) | G | K (5) | H | T | E |
|---|---|---|---|---|---|
| 12" | 0' – 9" | 1' – 0" | 2' – 8" | 0' – 9" | 2' – 9" |
| 15" | 0' – 11" | 1' – 0" | 2' – 11" | 0' – 9" | 2' – 9" |
| 18" | 1' – 2" | 1' – 0" | 3' – 2" | 0' – 9" | 2' – 9" |
| 21" | 1' – 4" | 1' – 0" | 3' – 5" | 0' – 9" | 2' – 9" |
| 24" | 1' – 7" | 1' – 0" | 3' – 8" | 0' – 9" | 2' – 9" |
| 27" | 1' – 8" | 1' – 0" | 3' – 11" | 0' – 9" | 2' – 9" |
| 30" | 1' – 10" | 1' – 0" | 4' – 2" | 0' – 9" | 2' – 9" |
| 33" | 1' – 11" | 1' – 0" | 4' – 5" | 0' – 9" | 2' – 9" |
| 36" | 2' – 1" | 1' – 0" | 4' – 8" | 1' – 0" | 2' – 9" |
| 42" | 2' – 4" | 1' – 0" | 5' – 2" | 1' – 0" | 3' – 0" |
| 48" | 2' – 7" | 1' – 3" | 5' – 11" | 1' – 0" | 3' – 3" |
| 54" | 3' – 0" | 1' – 3" | 6' – 5" | 1' – 0" | 3' – 6" |
| 60" | 3' – 3" | 1' – 3" | 6' – 11" | 1' – 0" | 3' – 9" |
| 66" | 3' – 3" | 1' – 3" | 7' – 5" | 1' – 0" | 4' – 0" |
| 72" | 3' – 4" | 1' – 3" | 7' – 11" | 1' – 0" | 4' – 3" |

## TABLE OF REINFORCING STEEL (6)

| Bar | Size | Spa | No. |
|---|---|---|---|
| A1 | #5 | ~ | 2 |
| A2 | #5 | 1' – 6" | ~ |
| E | #5 | ~ | 2 |
| F | #5 | 1' – 0" | ~ |

**MATERIAL NOTES:**
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

**GENERAL NOTES:**
Designed according to AASHTO LRFD Bridge Design Speci cations.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.
This detail may be used for pipes up to 15 degree skew. Headwall shall be placed parallel to pavement edge.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

NOT TO SCALE

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# PARK ROAD 24

## CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

## CH-PW-0 (MOD)

SHEET 1 OF 2

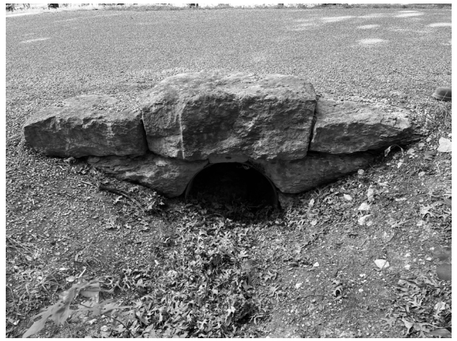


Texas Department of Transportation

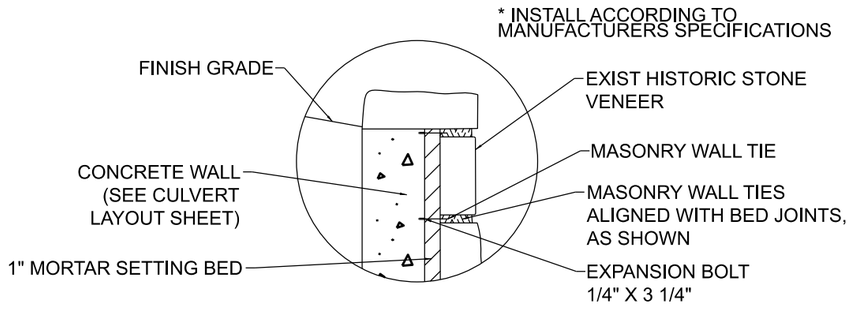
| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 63 |

DATE:
FILE:

EXISTING CONDITIONS IMAGE. STA. 41+10
36" x 24' CMP



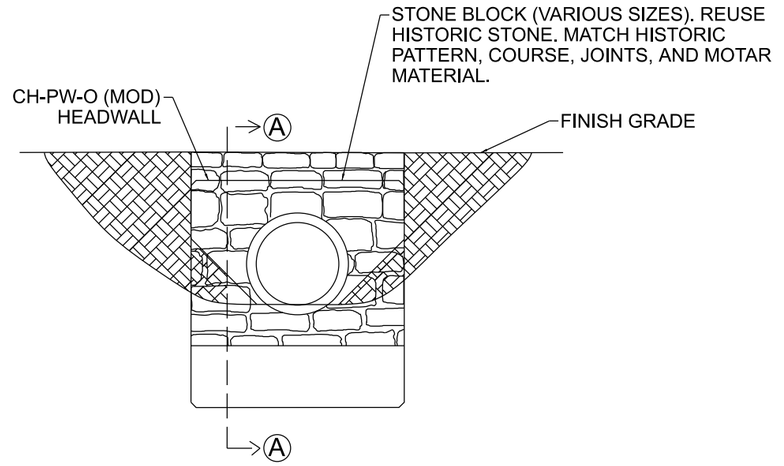
EXISTING CONDITIONS IMAGE. STA. 49+69
24" x 20' CMP



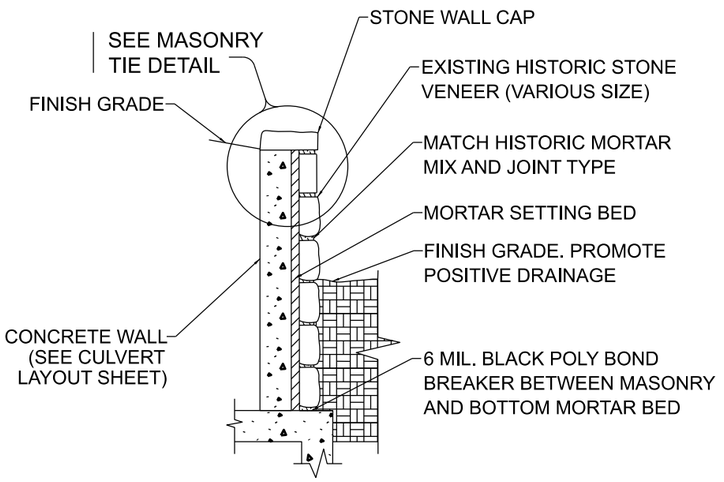

MASONRY TIE DETAIL

| SCHEDULE OF MATERIALS AND FINISHED FOR NATURAL STONE VENEER | | | |
|---|---|---|---|
| ITEM | DESCRIPTION | SPEC or FINISH | EXAMPLE |
| Subsidiary to Pertinent Items | WALL TIES | 22 GAUGE GALV. WALL TIE | SIMPSON STRONG OR APPROVED EQUAL |
| Subsidiary to Pertinent Items | MORTAR JOINT (RAKED) | (1) part lime to (6) parts sand, then (6) parts of mud to (1) part of cement. Color mixed in with cement in proportion to lime (1) part for every (4) parts of lime used. | Information from Arthur Fehr's Day Book, dated Feb. 1, 1934 (TPWD) approved mix) |
| 0420-6074 | CLASS C CONC. (MISC.) | | |

NOTES:
1. CONTRACTOR TO SALVAGE HISTORIC STONE, CATALOGUE AND NUMBER EXISTING STONE, STORE, AND REPLICATE EXISTING HISTORIC STONE AT SAME ORIGINAL WALL LOCATION. MOTAR MATERIAL AND JOINT TYPE ARE TO REPLICATE THE EXISTING HISTORIC HEADWALL. RELOCATED STONE HEADWALL TO VISUALLY MATCH GENERAL CONDITIONS OF EXISTING HISTORIC HEADWALL THAT WILL REMAIN IN PLACE. IF NEW WALL MATERIAL IS REQUIRED, MATCH EXISTING STONE MATERIAL, COLOR, AND SIZE.
2. EXISTING STONES MAY BE MODIFIED ONLY IF NECESSARY BY CUTTING AND HAMMERING EDGES. KEEP MODIFICATIONS TO EXISTING STONE TO A MINIMUM.
3. FOR CULVERT WINGWALLS, KEEP EXISTING STONE VISIBLE ABOVE FINISH GRADE. NEW CONCRETE HEADWALL NOT TO BE VISIBLE. NEW HEADWALL TO BE COVERED WITH SALVAGED STONE FROM SITE.
4. REINFORCING STEEL IS CONSIDERED SUBSIDIARY TO STONE MASONRY AND WILL NOT BE PAID FOR SEPARATELY.
5. PROVIDE 3/4" BED JOINTS ON FACE OF MASONRY WALL. MATCH HISTORIC MORTAR AND JOINT TYPE AT STONE WALL JOINTS.
6. WALL TIES SHALL BE 22 GAUGE, GALV. CORRUGATED STEEL, SECURED WITH HILTI EXPANSION ANCHOR BOLT KB 3 1/4 X 3 1/4 SS 304, OR APPROVED EQUAL INSTALLED ACCORDING TO MANUFACTURE'S SPECIFICATIONS. PLACE WALL TIES AT EVERY SECOND HORIZONTAL BED JOINT, IN THE CENTER OF THE WALL FACE, AS SHOWN.
7. ADJUST HEIGHT OF MASONRY TO ENSURE THAT THE TOP OF WALL MASONRY IS IN HORIZONTAL ALIGNMENT.
8. PLACE BLACK POLY SHEETING (6 MIL) AS A BOND BREAKER AT BOTTOM CORNERS OF MASONRY. PLACE SHEETING BETWEEN MASONRY LEDGE AND THE BOTTOM MORTAR BED, EXTENDING 12" FROM CORNERS.
9. REFER TO THE CONC. LEDGE DETAIL SHEET FOR PLACEMENT, DIMENSIONS, AND SIZES OF REINFORCING STEEL.
10. MORTAR, GROUT, REINFORCING STEEL, AND TIES ARE CONSIDERED SUBSIDIARY TO STONE MASONRY AND WILL NOT BE PAID FOR SEPARATELY.
11. APPROVED EQUAL MASONRY SECURING DEVICES OR SYSTEMS MUST BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION.




CIRCULAR PIPE CULVERT ELEVATION




SECTION FOR Ⓐ-Ⓐ

NOT TO SCALE

Monte R. Rater P.E.
7.15.24

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# PARK ROAD 24

## CONCRETE HEADWALL CH-PW-O (MOD)

SHEET 2 OF 2

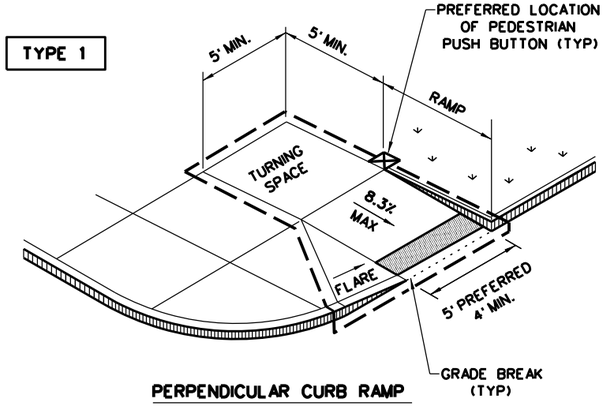


Texas Department of Transportation

| CONT | SECT | JOB | HIGHWAY |
|---|---|---|---|
| 0901 | 32 | 083, ETC. | VAR |
| DIST | COUNTY | | SHEET NO. |
| PAR | FANNIN, ETC. | | 64 |

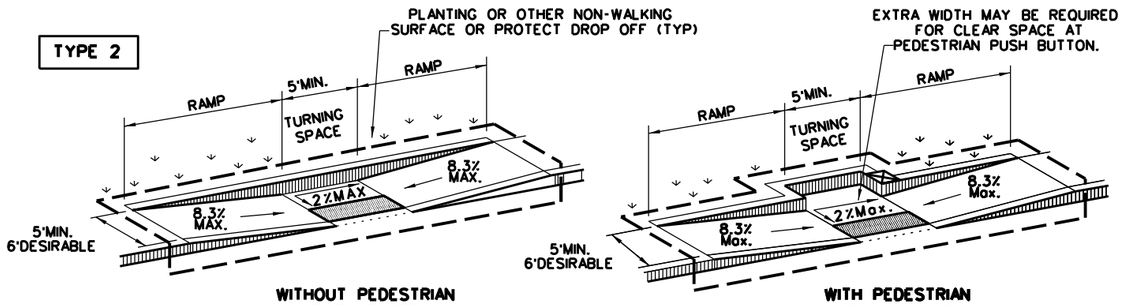
DATE:
FILE:

## TYPE 1



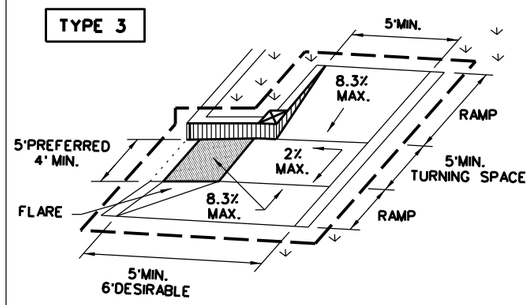

PERPENDICULAR CURB RAMP

## TYPE 2

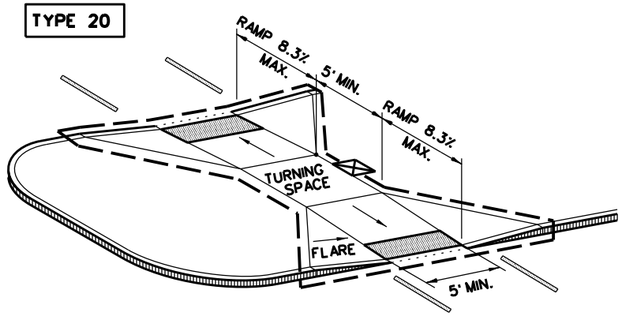



PARALLEL CURB RAMP

## TYPE 3



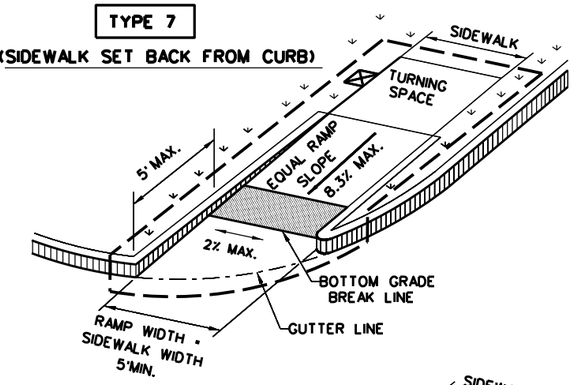

## TYPE 20



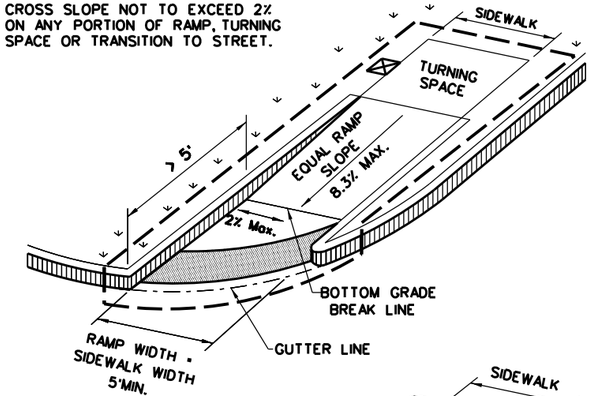

CURB RAMPS AT MEDIAN ISLANDS

## TYPE 7

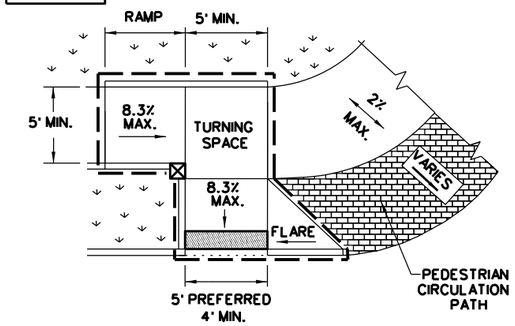
(SIDEWALK SET BACK FROM CURB)




CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



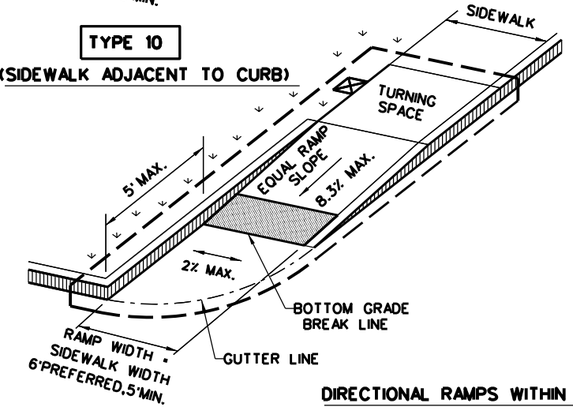

## TYPE 6



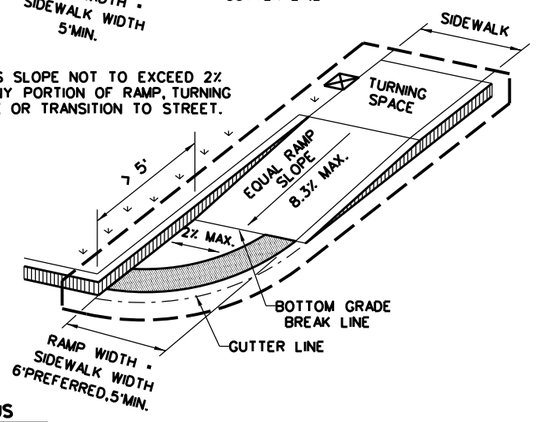

COMBINATION CURB RAMPS

## TYPE 10

(SIDEWALK ADJACENT TO CURB)

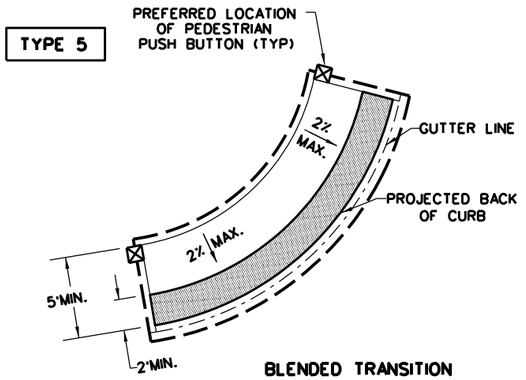



CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.




DIRECTIONAL RAMPS WITHIN RADIUS

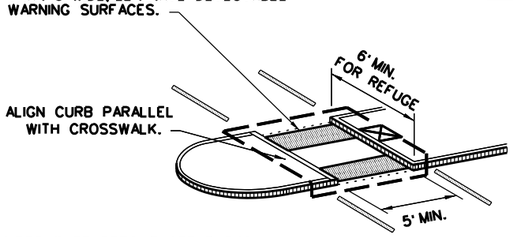
## TYPE 5




BLENDED TRANSITION
(FLUSH LANDING)

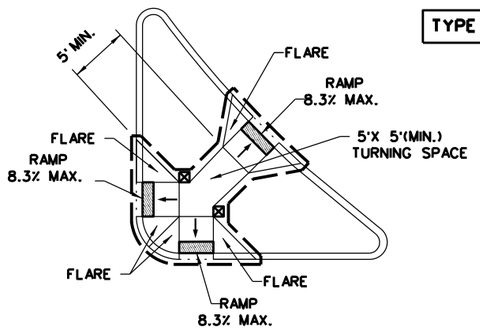
## TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



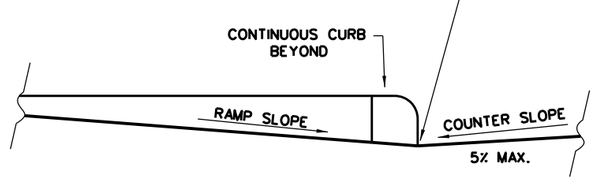

NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

## TYPE 22




COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.




TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

### NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

- DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.
- DETECTABLE WARNING SURFACE
- DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.
- GUTTER LINE — · —
- GRADE BREAK · · · · · ·
- RAMP LIMITS OF PAYMENT — —

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

# PEDESTRIAN FACILITIES CURB RAMPS

# PED-18

| FILE: ped18 | DN: TxDOT | DW: VP | CK: KM | CK: PK & JG |
|---|---|---|---|---|
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| REVISED 08,2005<br>REVISED 06,2012<br>REVISED 01,2018 | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 64A |

DATE:
FILE:

# GENERAL NOTES

## CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.

2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.

3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.

4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.

5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.

6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.

7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.

8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).

9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.

10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.

11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.

12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.

13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".

14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.

15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.

16. Provide a smooth transition where the curb ramps connect to the street.

17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.

18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

## DETECTABLE WARNING MATERIAL

19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.

20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.

21. Detectable warning surfaces must be firm, stable and slip resistant.

22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.

23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.

24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

## DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.

26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

## SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.

28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.

29. Street grades and cross slopes shall be as shown elsewhere in the plans.

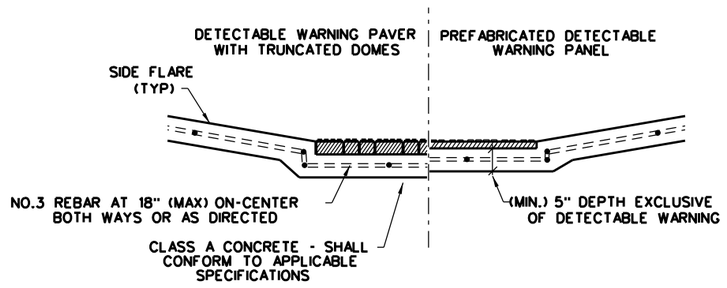
30. Changes in level greater than 1/4 inch are not permitted.

31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.

32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.

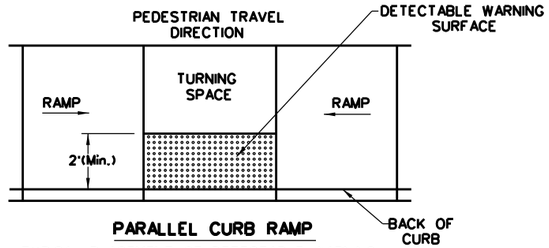
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".

34. Sidewalk details are shown elsewhere in the plans.

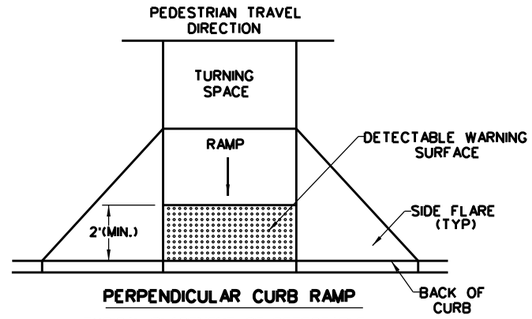



SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

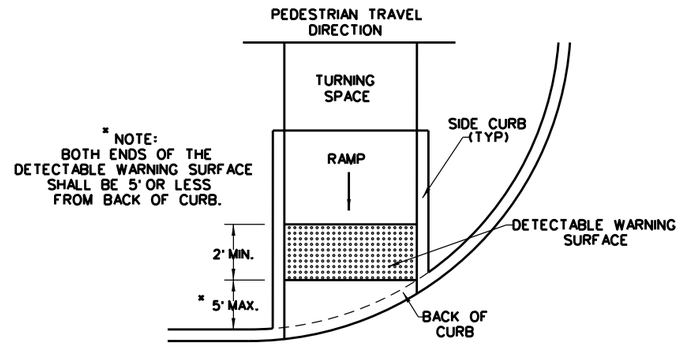
# DETECTABLE WARNING SURFACE DETAILS




PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.




PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.




DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



Texas Department of Transportation

Design Division Standard

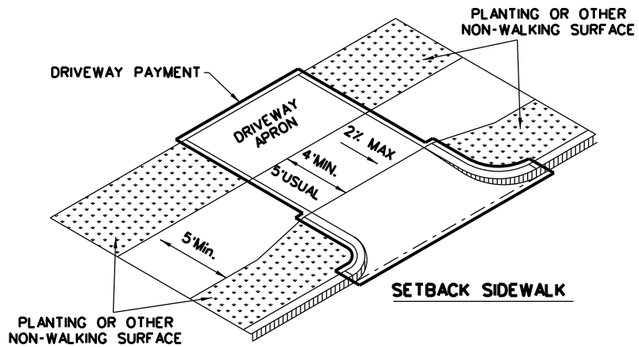
# PEDESTRIAN FACILITIES CURB RAMPS

# PED-18

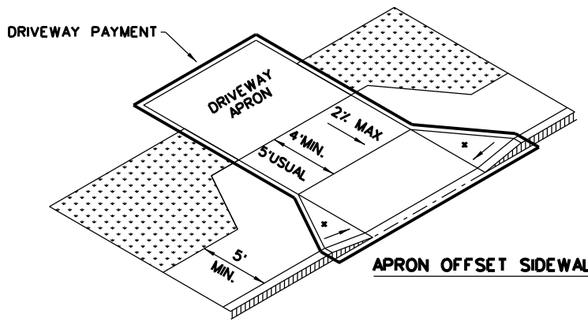
| | | | | | |
|---|---|---|---|---|---|
| FILE: ped18 | DN: TxDOT | | DW: VP | CK: KM | CK: PK & JG |
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | | VAR |
| REVISED 08,2005<br>REVISED 06,2012<br>REVISED 01,2018 | DIST | COUNTY | | | SHEET NO. |
| | PAR | FANNIN, ETC. | | | 64B |

DATE:
FILE:

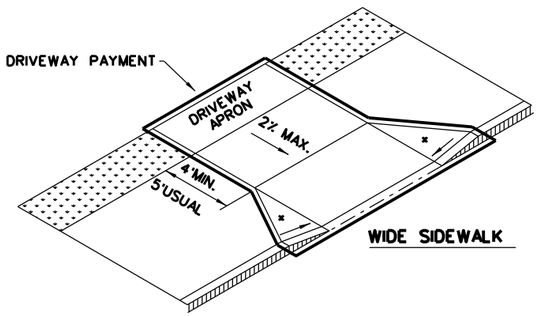
## SIDEWALK TREATMENT AT DRIVEWAYS



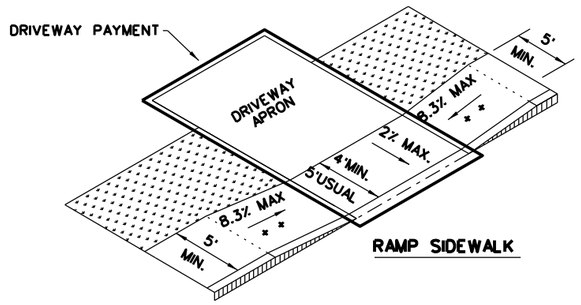

SETBACK SIDEWALK




APRON OFFSET SIDEWALK



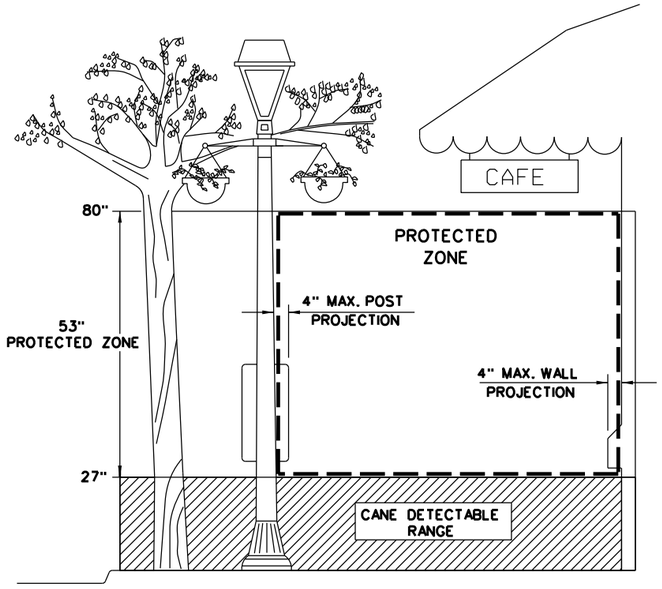

WIDE SIDEWALK




RAMP SIDEWALK

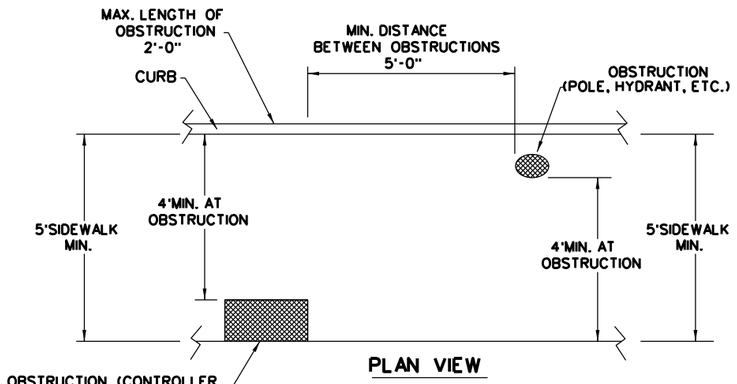
NOTES:

- * WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
- * * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.




PROTECTED ZONE

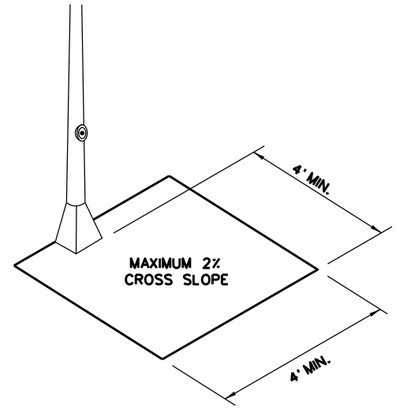
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



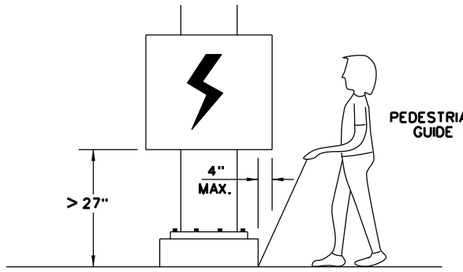

PLAN VIEW

PLACEMENT OF STREET FIXTURES

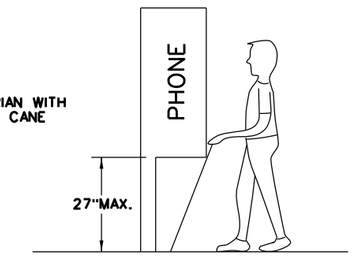
NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.




CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON




WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.




PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE <80"



Texas Department of Transportation

Design Division Standard

# PEDESTRIAN FACILITIES CURB RAMPS

# PED-18

| | | | | | |
|---|---|---|---|---|---|
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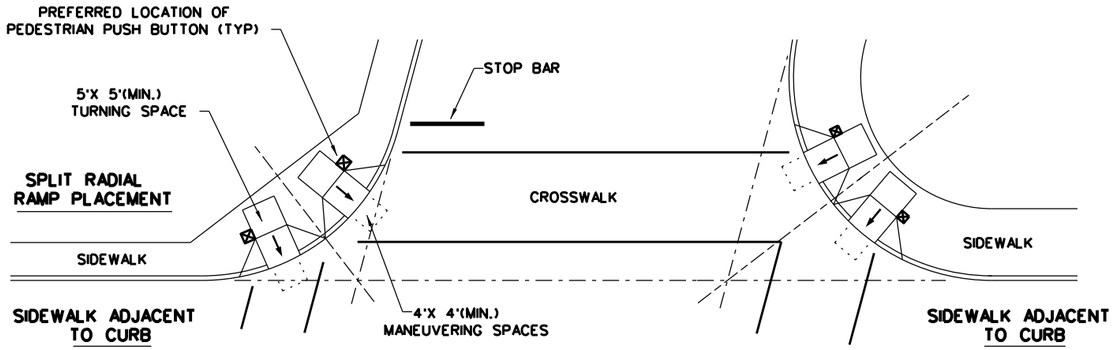
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | | VAR |
| REVISED 08,2005<br>REVISED 06,2012<br>REVISED 01,2018 | DIST | COUNTY | | | SHEET NO. |
| | PAR | FANNIN, ETC. | | | 64C |

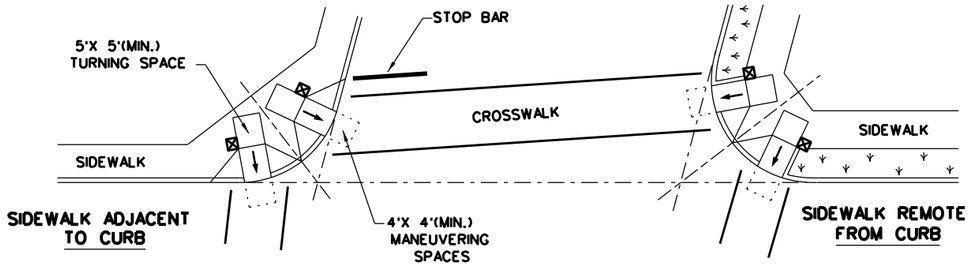
DATE:
FILE:

# TYPICAL CROSSING LAYOUTS

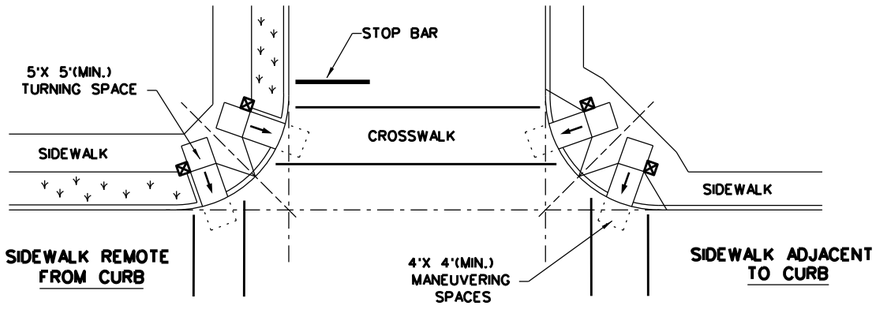
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



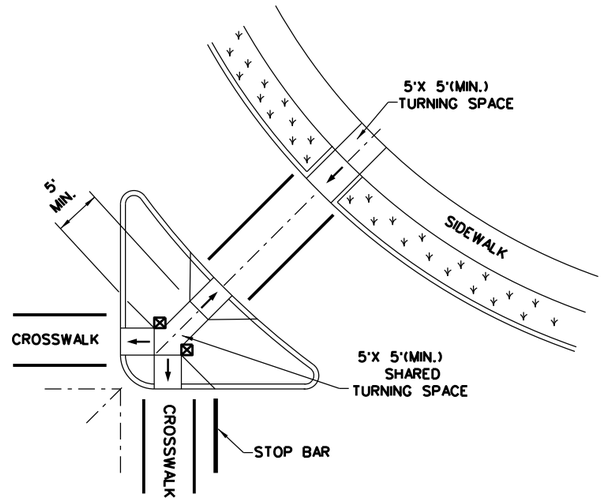

SKEWED INTERSECTION WITH "LARGE" RADIUS



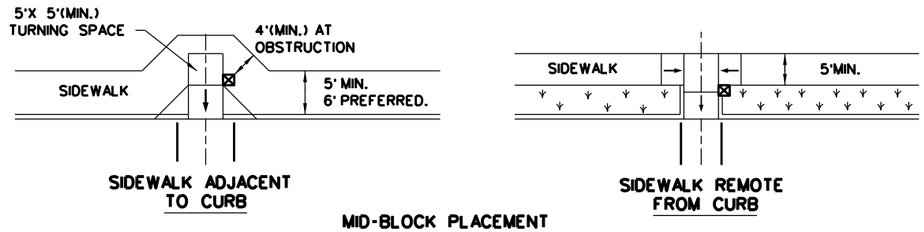

SKEWED INTERSECTION WITH "SMALL" RADIUS




NORMAL INTERSECTION WITH "SMALL" RADIUS




AT INTERSECTION
W/FREE RIGHT TURN & ISLAND




MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.



Texas Department of Transportation

Design Division Standard

# PEDESTRIAN FACILITIES CURB RAMPS

# PED-18

| | | | | | |
|---|---|---|---|---|---|
| FILE: ped18 | DN: TxDOT | | DW: VP | CK: KM | CK: PK & JG |
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | | VAR |
| REVISED 08,2005<br>REVISED 06,2012<br>REVISED 01,2018 | DIST | COUNTY | | | SHEET NO. |
| | PAR | FANNIN, ETC. | | | 64D |

# SUMMARY OF SMALL SIGNS

| STATION | SIGN NO. | SIGN NOMENCLATURE | SIGN | DIMENSIONS | FLAT ALUMINUM (TYPE A) | EXAL ALUMINUM (TYPE G) | SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE | POSTS | ANCHOR TYPE | MOUNTING DESIGNATION PREFABRICATED | MOUNTING DESIGNATION 1EXT or 2EXT | BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | FRP = Fiberglass<br>TWT = Thin-Wall<br>10BWG = 10 BWG<br>S80 = Sch 80 | 1 or 2 | UA=Universal Conc<br>UB=Universal Bolt<br>SA=Slipbase-Conc<br>SB=Slipbase-Bolt<br>WS=Wedge Steel<br>WP=Wedge Plastic | P = "Plain"<br>T = "T"<br>U = "U" | BM = Extruded Wind Beam<br>WC = 1.12 #/ft Wing Channel<br>EXAL= Extruded Alum Sign Panels | TY = TYPE<br>TY N<br>TY S |
| 36+23 RT | 1 | W6-3 | SYMBOL - TWO WAY TRAFFIC | 36 x 36 | X | | 10BWG | 1 | SA | P | | |
| | | R3-5hTP | 500 FT (DISTANCE PLAQUE) | 24 x 8 | | | | | | | | |
| | | R3-17AP | AHEAD <PLAQUE> | 24 x 8 | | | | | | | | |
| 40+23 LT | 2 | R5-1A | WRONG WAY | 42 x 30 | X | | 10BWG | 1 | SA | P | | |
| 41+19 RT | 3 | W6-3 | SYMBOL - TWO WAY TRAFFIC | 36 x 36 | X | | 10BWG | 1 | SA | P | | |
| 41+23 LT | 4 | R5-1 | DO NOT ENTER | 36 x 36 | X | | 10BWG | 1 | SA | P | | |
| 45+64 LT | 5 | R6-6 | BEGIN ONE WAY | 30 x 36 | X | | 10BWG | 1 | SA | P | | |
| | | R3-5hTP | 500 FT (DISTANCE PLAQUE) | 24 x 8 | | | | | | | | |
| 56+48 LT | 6 | W15-1 | PLAYGROUND | 24 x 24 | X | | 10BWG | 1 | SA | P | | |
| | | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | 18 x 18 | | | | | | | | |
| 52+74 RT | 7 | R6-6 | BEGIN ONE WAY | 30 x 36 | X | | 10BWG | 1 | SA | P | | |
| | | R3-5hTP | 500 FT (DISTANCE PLAQUE) | 24 x 8 | | | | | | | | |
| 53+03 LT | 8 | R7-8T | RESERVED PARKING <SYMBOL - HANDICAP> | 12 x 18 | X | | 10BWG | 1 | SA | P | | |
| | | R7-8P | VAN ACCESSIBLE | 18 x 9 | | | | | | | | |
| | | R7-8aPT | VIOLATORS SUBJECT TO FINE AND TOWING | 18 x 9 | | | | | | | | |
| 53+29 LT | 9 | R7-8T | RESERVED PARKING <SYMBOL - HANDICAP> | 12 x 18 | X | | 10BWG | 1 | SA | P | | |
| | | R7-8P | VAN ACCESSIBLE | 18 x 9 | | | | | | | | |
| | | R7-8aPT | VIOLATORS SUBJECT TO FINE AND TOWING | 18 x 9 | | | | | | | | |
| 53+37 RT | 10 | R7-8T | RESERVED PARKING <SYMBOL - HANDICAP> | 12 x 18 | X | | 10BWG | 1 | SA | P | | |
| | | R7-8P | VAN ACCESSIBLE | 18 x 9 | | | | | | | | |
| | | R7-8aPT | VIOLATORS SUBJECT TO FINE AND TOWING | 18 x 9 | | | | | | | | |
| 58+35 LT | 11 | W15-1 | PLAYGROUND | REMOVE | | | | | | | | |
| | | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | REMOVE | | | | | | | | |
| 68+55 LT | 12 | W5-3 | ONE LANE BRIDGE | REMOVE | | | | | | | | |
| | | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | REMOVE | | | | | | | | |
| 70+00 RT | 13 | R1-6 | STATE LAW YIELD TO <PED> W/IN CROSSWALK | 12 x 36 | X | | 10BWG | 1 | SA | P | | |
| 71+10 LT | 14 | W1-1R | SYMBOL - HORIZ ALN TURN RIGHT | REMOVE | | | | | | | | |
| | | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | REMOVE | | | | | | | | |
| 74+60 RT | 15 | R1-5AL | YIELD HERE TO PEDESTRIANS <ARROW LT> | 36 x 48 | X | | 10BWG | 1 | SA | T | | |
| 79+50 LT | 16 | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | REMOVE | | | | | | | | |
| | 17 | | OMIT | | | | | | | | | |
| 80+05 LT | 18 | R5-1A | WRONG WAY | 42 x 30 | X | | 10BWG | 1 | SA | P | | |
| | 19 | | OMIT | | | | | | | | | |
| 81+05 LT | 20 | R5-1 | DO NOT ENTER | 36 x 36 | X | | 10BWG | 1 | SA | P | | |
| 82+77 LT | 21 | R5-1 | DO NOT ENTER | 36 x 36 | X | | 10BWG | 1 | SA | P | | |
| 82+84 RT | 22 | R5-1 | DO NOT ENTER | 36 x 36 | X | | 10BWG | 1 | SA | P | | |

| 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 | 0901 | 32 | 083, ETC. | VAR |
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DATE: $DATE$
FILE: $FILE$
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# SUMMARY OF SMALL SIGNS

| STATION | SIGN NO. | SIGN NOMENCLATURE | SIGN | DIMENSIONS | FLAT ALUMINUM (TYPE A) | EXAL ALUMINUM (TYPE G) | SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX) POST TYPE | POSTS | ANCHOR TYPE | MOUNTING DESIGNATION PREFABRICATED | MOUNTING DESIGNATION 1EXT or 2EXT - # of Ext | BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TY - TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | FRP - Fiberglass<br>TWT - Thin-Wall<br>10BWG - 10 BWG<br>S80 - Sch 80 | 1 or 2 | UA-Universal Conc<br>UB-Universal Bolt<br>SA-Slipbase-Conc<br>SB-Slipbase-Bolt<br>WS-Wedge Steel<br>WP-Wedge Plastic | P - "Plain"<br>T - "T"<br>U - "U" | BM - Extruded Wind Beam<br>WC - 1.12 #/ft Wing Channel<br>EXAL- Extruded Alum Sign Panels | TY N<br>TY S |
| 56+48 LT | 23 | W15-1 | PLAYGROUND | REMOVE | | | | | | | | |
| | | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | | | | | | | | | |
| 56+48 LT | 24 | W15-1 | PLAYGROUND | 24 x 24 | X | | 10BWG | 1 | SA | P | | |
| | | W13-1P | (SPEED) MPH <ADVISORY SPEED PLAQUE> | 18 x 18 | | | | | | | | |

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

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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).



DATE: $DATE$ $TIME$
FILE: $FILE$

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<br>8-16 | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 65A |

# 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)**

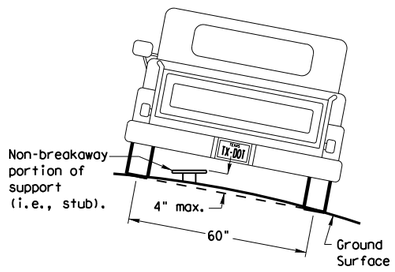
**Anchor Type**

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-1) to (SLIP-3))

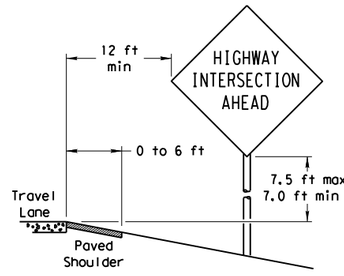
# REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT




To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

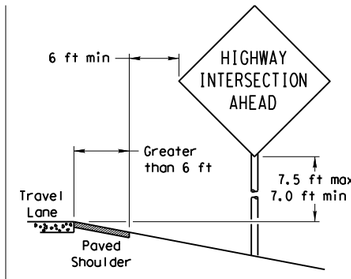
# SIGN LOCATION

## PAVED SHOULDERS




**LESS THAN 6 FT. WIDE**

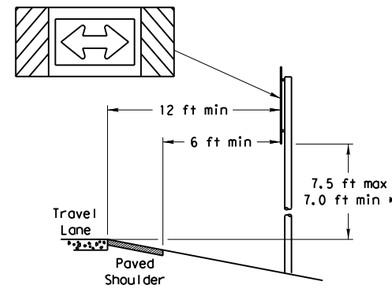
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



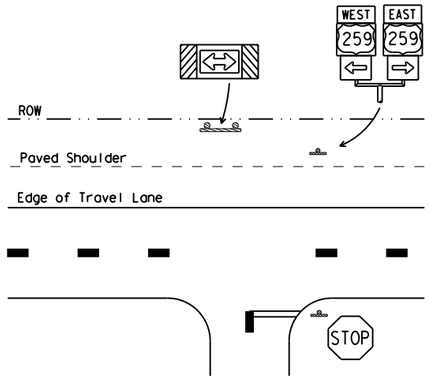

**GREATER THAN 6 FT. WIDE**

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

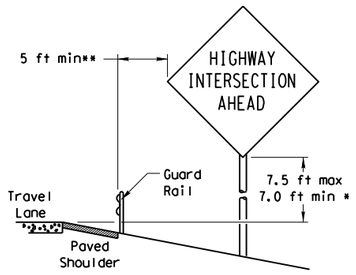
## T-INTERSECTION



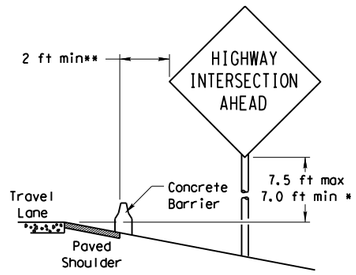

When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.




## BEHIND BARRIER



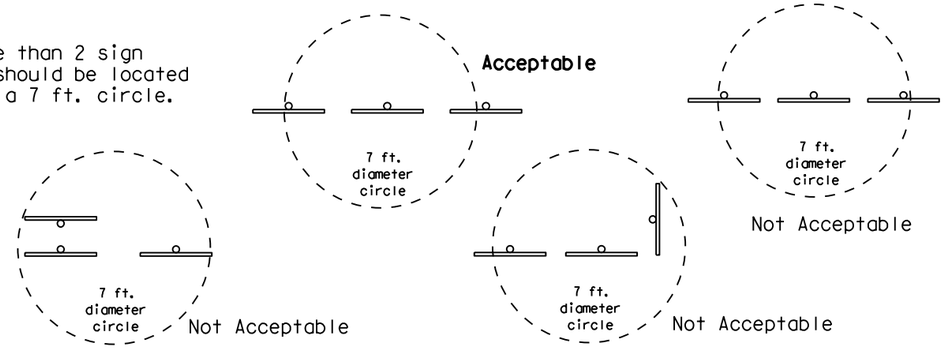

**BEHIND GUARDRAIL**



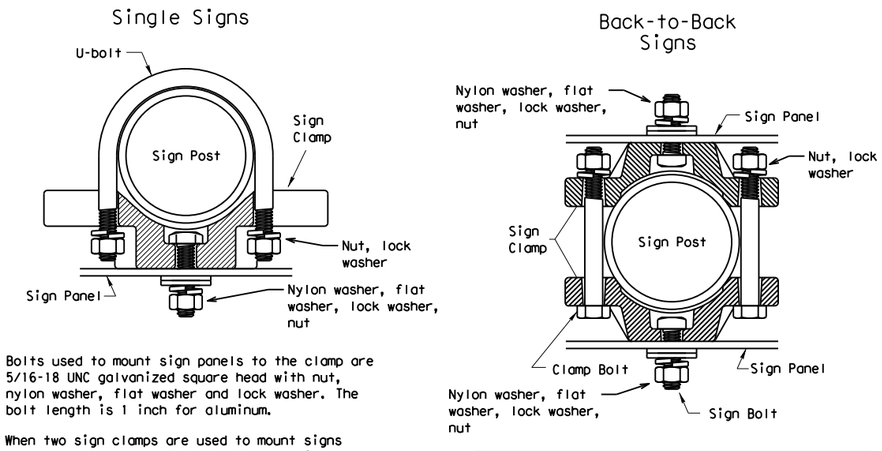

**BEHIND CONCRETE BARRIER**

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.




# TYPICAL SIGN ATTACHMENT DETAIL



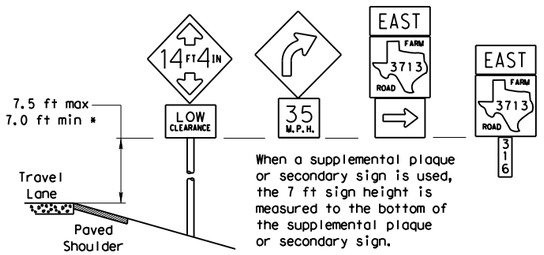

Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

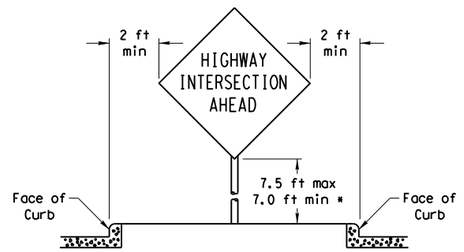
| Pipe Diameter | Approximate Bolt Length | |
|---|---|---|
| | Specific Clamp | Universal Clamp |
| 2" nominal | 3" | 3 or 3 1/2" |
| 2 1/2" nominal | 3 or 3 1/2" | 3 1/2 or 4" |
| 3" nominal | 3 1/2 or 4" | 4 1/2" |

## SIGNS WITH PLAQUES



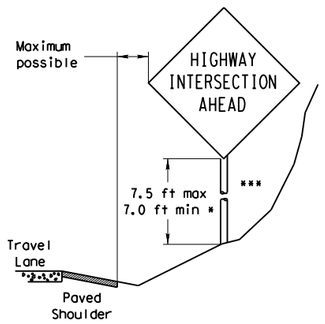

When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

## CURB & GUTTER OR RAISED ISLAND




## RESTRICTED RIGHT-OF-WAY

**(When 6 ft min. is not possible.)**




Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* 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

*Texas Department of Transportation*
*Traffic Operations Division*

# SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

## SMD(GEN)-08



9-08 REVISIONS

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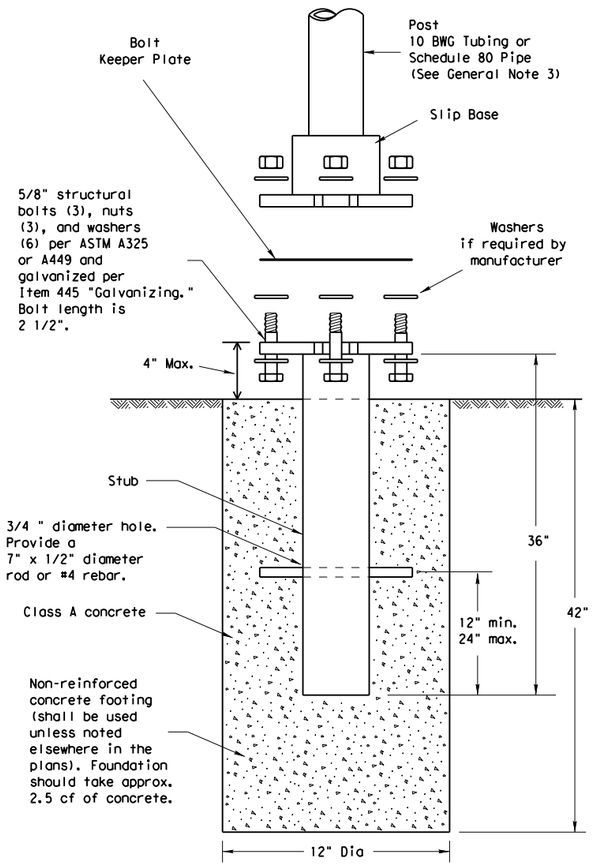
# TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS




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.

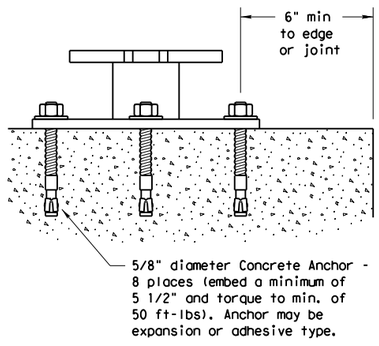
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum 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



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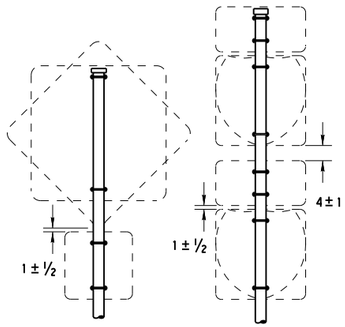
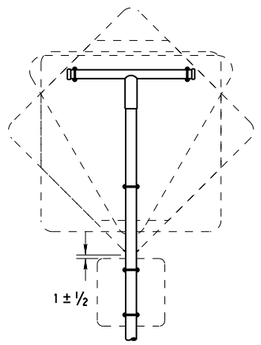



SM RD SGN ASSM TY XXXXX(1)XX(P)

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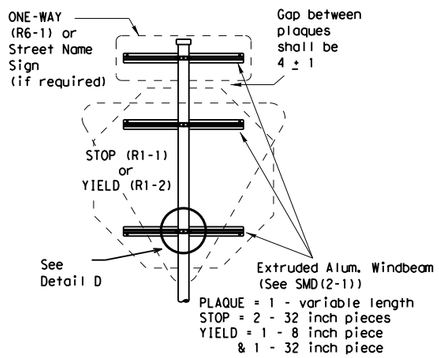
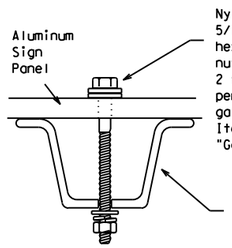
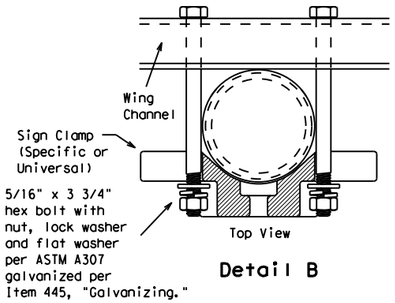


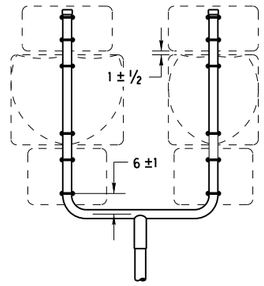

SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



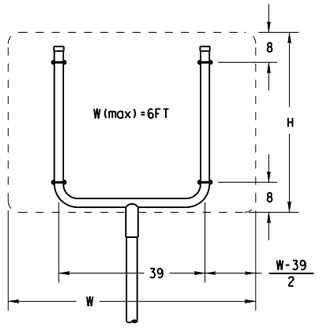

**Detail A**




**Detail B**




SM RD SGN ASSM TY XXXXX(1)XX(U)

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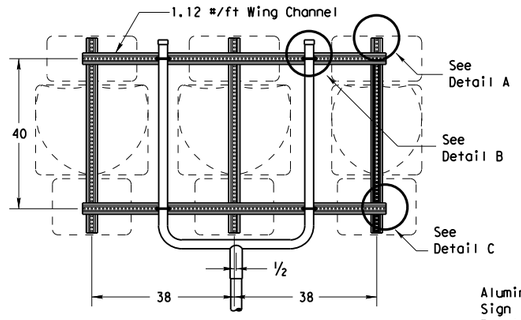
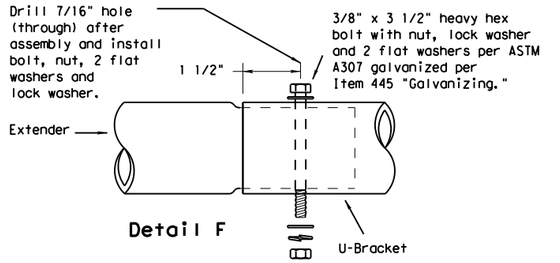
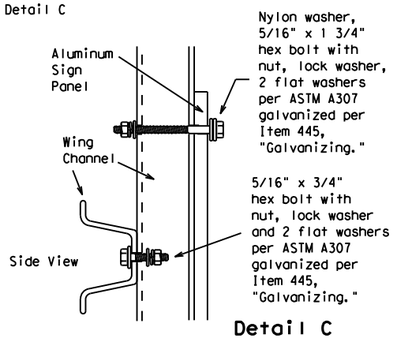



SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

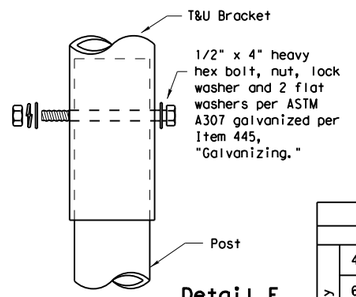



**Detail F**

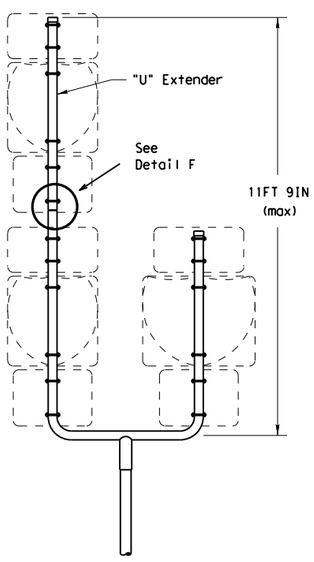
Splices shall only be allowed behind the sign substrate.



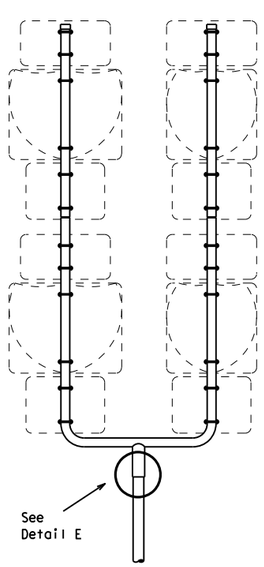

**Detail C**



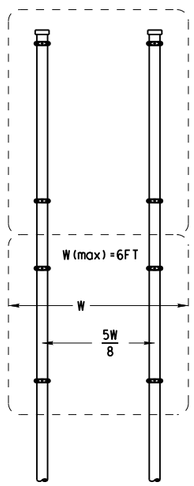

**Detail E**




SM RD SGN ASSM TY S80(1)XX(U-1EXT)

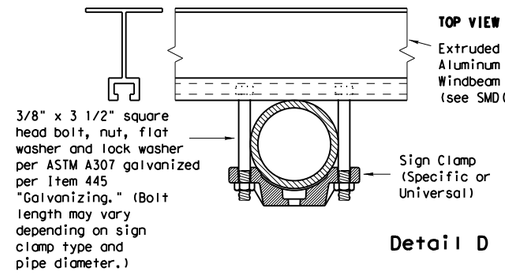


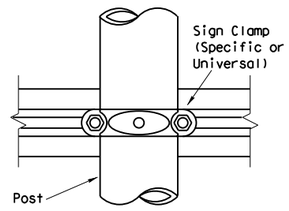

SM RD SGN ASSM TY S80(1)XX(U-2EXT)




SM RD SGN ASSYM TY XXXXX(2)XX(P)

**SIDE VIEW**



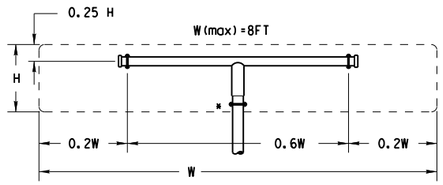




**Detail D**

**GENERAL NOTES:**

1. | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
   |---|---|---|
   | 10 BWG | 1 | 16 SF |
   | 10 BWG | 2 | 32 SF |
   | Sch 80 | 1 | 32 SF |
   | Sch 80 | 2 | 64 SF |
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

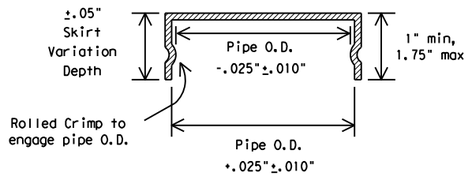
| REQUIRED SUPPORT | | |
|---|---|---|
| | SIGN DESCRIPTION | SUPPORT |
| Regulatory | 48-inch STOP sign (R1-1) | TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM) |
| | 60-inch YIELD sign (R1-2) | TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM) |
| | 48x16-inch ONE-WAY sign (R6-1) | TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM) |
| | 36x48, 48x36, and 48x48-inch signs | TY 10BWG(1)XX(T) |
| | 48x60-inch signs | TY S80(1)XX(T) |
| Warning | 48x48-inch signs (diamond or square) | TY 10BWG(1)XX(T) |
| | 48x60-inch signs | TY S80(1)XX(T) |
| | 48-inch Advance School X-ing sign (S1-1) | TY 10BWG(1)XX(T) |
| | 48-inch School X-ing sign (S2-1) | TY 10BWG(1)XX(T) |
| | Large Arrow sign (W1-6 & W1-7) | TY 10BWG(1)XX(T) |




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.

*Texas Department of Transportation*
*Traffic Operations Division*

# SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

## SMD(SLIP-2)-08

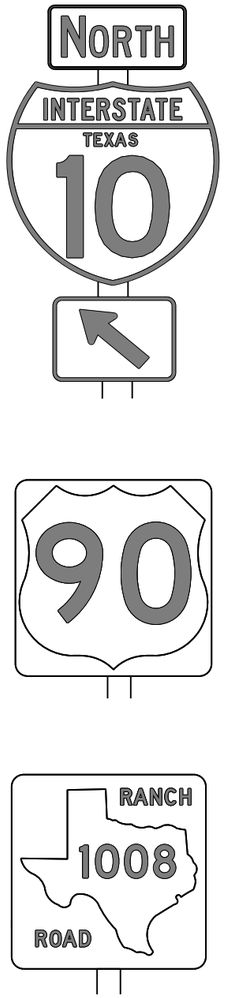


| REVISIONS | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| 9-08 | CONT | SECT | JOB | HIGHWAY |
| | 0901 | 32 | 083,ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 68 |

DATE:
FILE:

## REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

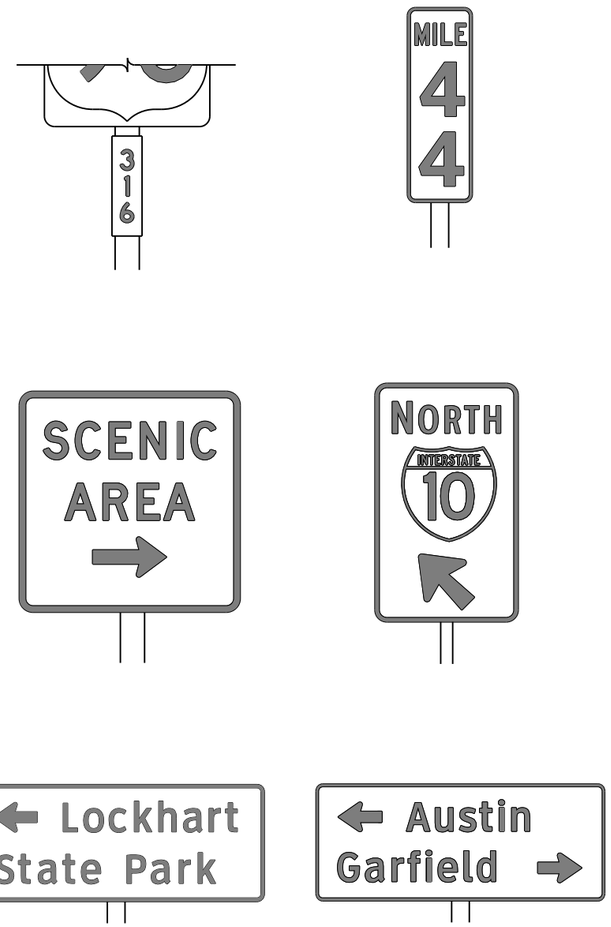
| SHEETING REQUIREMENTS | | |
|---|---|---|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | WHITE | TYPE A SHEETING |
| BACKGROUND | ALL OTHERS | TYPE B OR C SHEETING |
| LEGEND & BORDERS | WHITE | TYPE A SHEETING |
| LEGEND & BORDERS | BLACK | ACRYLIC NON-REFLECTIVE FILM |
| LEGEND & BORDERS |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




TYPICAL EXAMPLES

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

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




TYPICAL EXAMPLES

## GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

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

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

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

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

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

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

# TYPICAL SIGN REQUIREMENTS

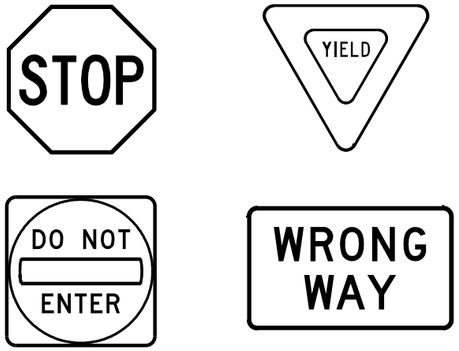
# TSR(3)-13

| FILE: tsr3-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT October 2003 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 12-03 7-13 | DIST | COUNTY | | SHEET NO. |
| 9-08 | PAR | FANNIN, ETC. | | 69 |

3

## 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 |

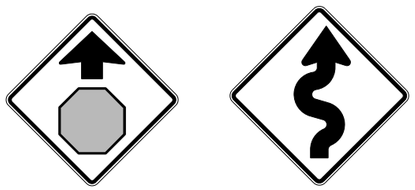
## REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

**(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

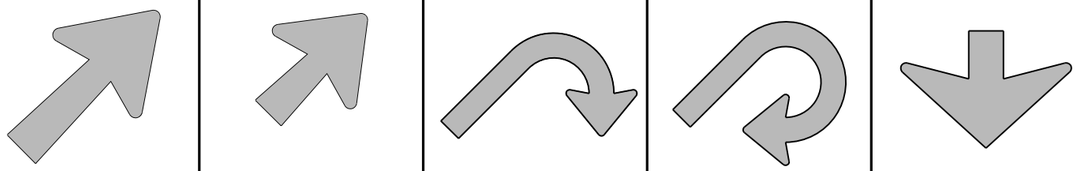
| FILE: tsr4-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT October 2003 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 12-03 7-13 | DIST | COUNTY | | SHEET NO. |
| 9-08 | PAR | FANNIN, ETC. | | 70 |

DATE:
FILE:

DATE:
FILE:

# ARROW DETAILS

for Large Ground-Mounted and Overhead Guide Signs




| TYPE | LETTER SIZE | USE |
|---|---|---|
| A-1 | 10.67" U/L and 10" Caps | Single Lane Exits |
| A-2 | 13.33" U/L and 12" Caps | |
| A-3 | 16" & 20" U/L | |
| B-1 | 10.67" U/L and 10" Caps | Multiple Lane Exits |
| B-2 | 13.33" U/L and 12" Caps | |
| B-3 | 16" & 20" U/L | |

| CODE | USED ON SIGN NO. |
|---|---|
| E-3 | E5-1aT |
| E-4 | E5-1bT |

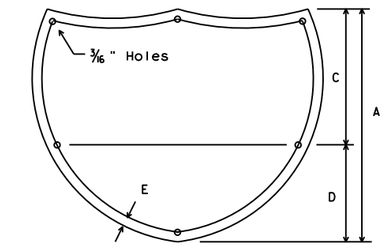
**NOTE**

Arrow dimensions are shown in the "Standard Highway Sign Designs for Texas" manual.

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

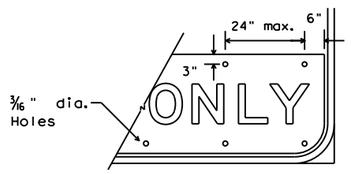
http://www.txdot.gov/

# SIGN BLANK PUNCHING DETAILS FOR ATTACHMENTS WHEN SPECIFIED TO BE TYPE A ALUMINUM SIGNS (FOR MOUNTING TO GUIDE SIGN FACE)

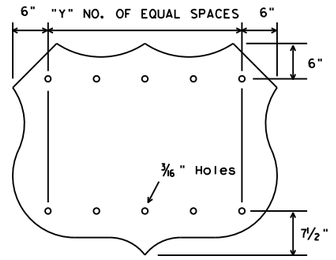



INTERSTATE ROUTE MARKERS

| A | C | D | E |
|---|---|---|---|
| 36 | 21 | 15 | 1 1/2 |
| 48 | 28 | 20 | 1 3/4 |

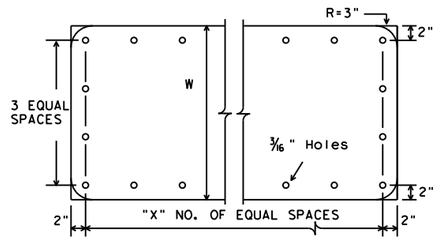



EXIT ONLY PANEL




U.S. ROUTE MARKERS

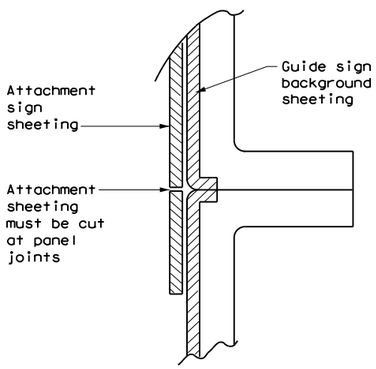
| Sign Size | "Y" |
|---|---|
| 24x24 | 2 |
| 30x24 | 3 |
| 36x36 | 3 |
| 45x36 | 4 |
| 48x48 | 4 |
| 60x48 | 5 |




STATE ROUTE MARKERS

| No. of Digits | W | X |
|---|---|---|
| 4 | 24 | 4 |
| 4 | 36 | 5 |
| 4 | 48 | 6 |
| 3 | 24 | 3 |
| 3 | 36 | 4 |
| 3 | 48 | 5 |

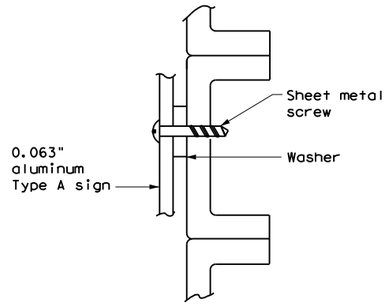
# MOUNTING DETAILS OF ATTACHMENTS TO GUIDE SIGN FACE ("EXIT ONLY" AND "LEFT EXIT" PANELS, ROUTE MARKERS AND OTHER ATTACHMENTS)



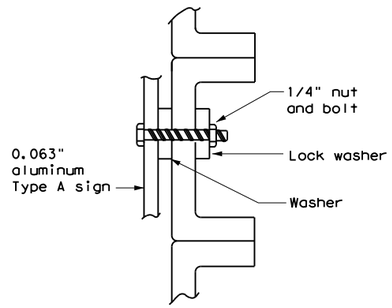

DIRECT APPLIED ATTACHMENT

**NOTE:**

1. Sheeting for legend, symbols, and borders must be cut at panel joints.
2. Direct applied attachment signs will be subsidiary to "Aluminum Signs" or "Fiberglass Signs".




SCREW ATTACHMENT



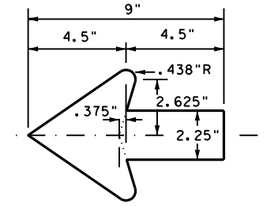

NUT/BOLT ATTACHMENT

**NOTE:**

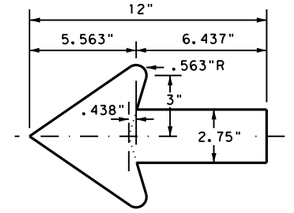
Furnish Type A aluminum sign attachments only when specified in the plans. These signs will be paid for under "Aluminum Signs".

# ARROW DETAILS

for Destination Signs (Type D)




Standard arrow to be used with 6 inch letters.




Standard arrow to be used with 8 inch letters.

Texas Department of Transportation

*Traffic Operations Division Standard*

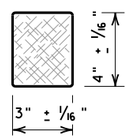
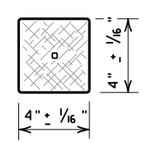
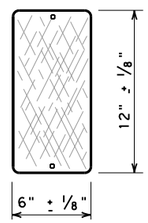
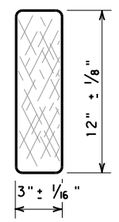
# TYPICAL SIGN REQUIREMENTS

## TSR(5)-13

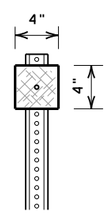
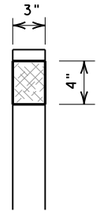
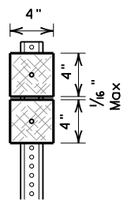
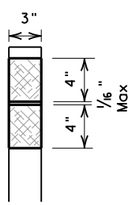
| FILE: tsr5-13.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT October 2003 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 12-03 7-13 | DIST | COUNTY | | SHEET NO. |
| 9-08 | PAR | FANNIN, ETC. | | 71 |

DATE: 7/11/2024 4:55:38 PM
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\PAR_dom1-20.dgn

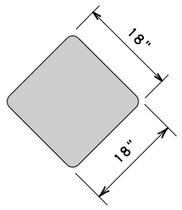
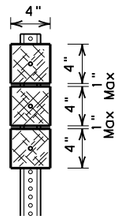
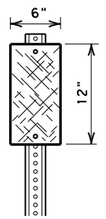
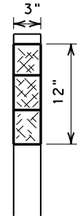
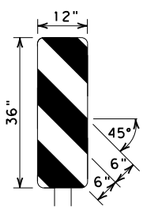
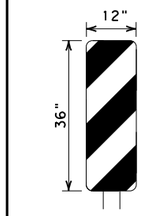
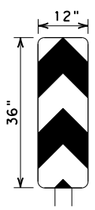
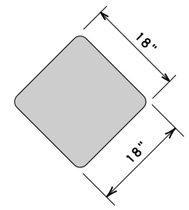
## REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

| | 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).<br>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. | | | |

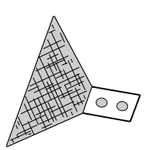
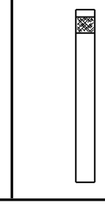
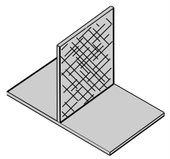
## DELINEATORS

| | 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 |

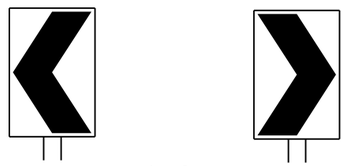
## OBJECT MARKERS

| | Type 1 (OM-1) | Type 2 (OM-2) | | | Type 3 (OM-3) | | | Type 4 (OM-4) |
|---|---|---|---|---|---|---|---|---|
| | OM-1 | OM-2X | OM-2Y | OM-2Z | OM-3L | OM-3R | OM-3C | OM-4 |
| DEVICE |   |   3-Size 2 reflector units |   1-Size 3 reflector unit |   3-Size 1 reflector units or 1-Size 4 reflector unit |   |   |   |   |
| SHEETING | Yellow-Type $B_{FL}$ or $C_{FL}$ Sheeting | Yellow - Type B or C Sheeting | | | Alternating acrylic black and retroflective yellow - Type $B_{FL}$ or $C_{FL}$ Sheeting | | | Red -Type $B_{FL}$ or $C_{FL}$ Sheeting |
| POST TYPE | TWT | WC | WC | WFLX | TWT | | | TWT |
| MOUNT TYPE | WAS, WAP | GND | GND | GND, SRF | WAS, WAP | | | WAS, WAP |

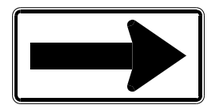
## BARRIER REFLECTORS (BRF)

| | GF1 | GF2 | CTB |
|---|---|---|---|
| DEVICE |  |  |  |
| NOTE | 1. Barrier reflectors shall meet the requirements of DMS 8600.<br>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).<br>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" | |

## 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

| 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: dom1-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| ©TxDOT August 2004 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083,ETC. | VAR |
| 10-09 3-15 | DIST | COUNTY | | SHEET NO. |
| 4-10 7-20 | PAR | FANNIN, ETC. | | 72 |

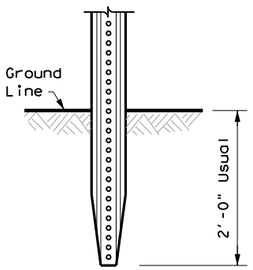
20A

DATE: 7/11/2024 4:55:42 PM
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\P-STANDARDS\dom2-20.dgn

# POST TYPE AND SUPPORT FOUNDATION DETAILS

## WING CHANNEL (WC)

### GND

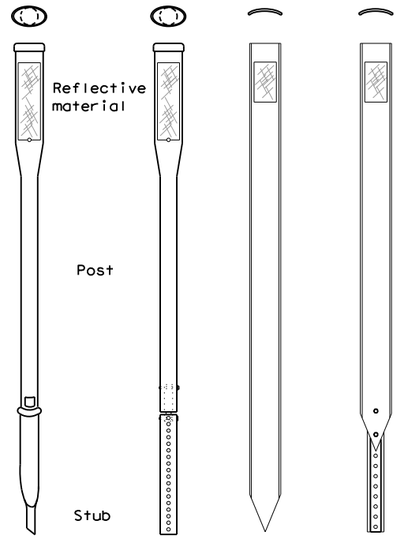



**NOTES**

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.

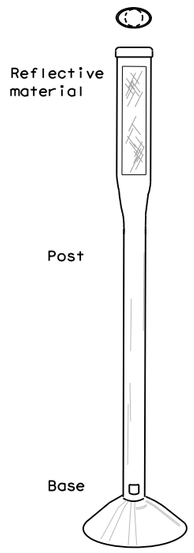
## FLEXIBLE POSTS (YFLX, WFLX)

### GND




EMBEDDED

### SRF



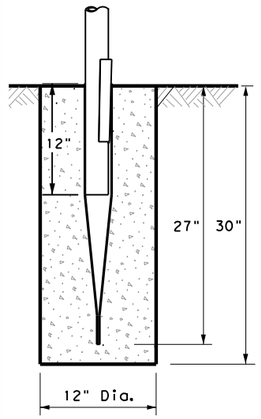

SURFACE MOUNT

**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.

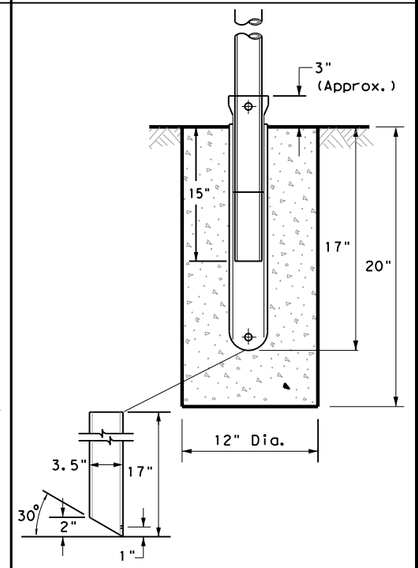
## WEDGE ANCHOR SYSTEMS

### WAS




STEEL

### WAP




PLASTIC

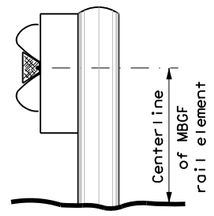
**NOTE**

1. Install per manufacturer's recommendations.

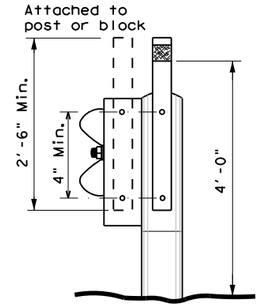
# TYPE OF BARRIER MOUNTS

## GUARD FENCE ATTACHMENT

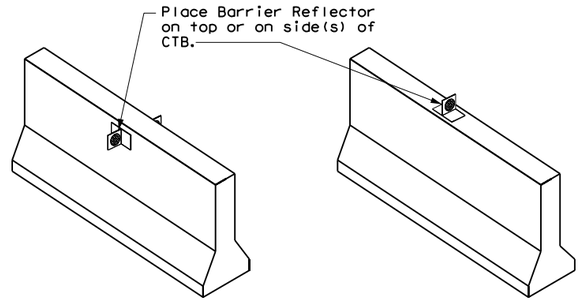
### GF1




### GF2



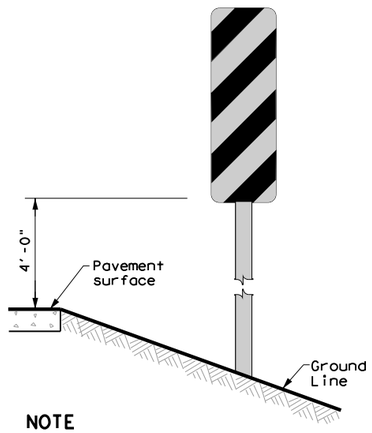

## CONCRETE TRAFFIC BARRIER (CTB)




**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.

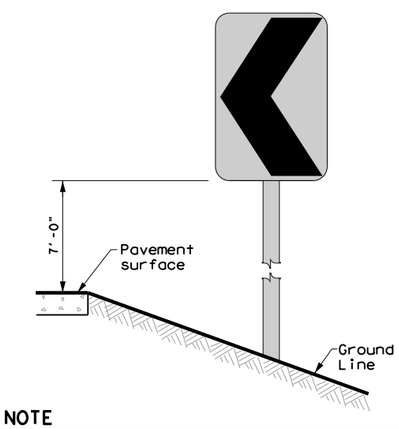
## TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS




**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)

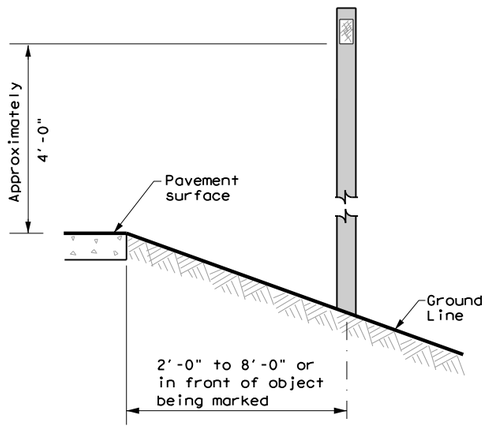
## CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN




**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*

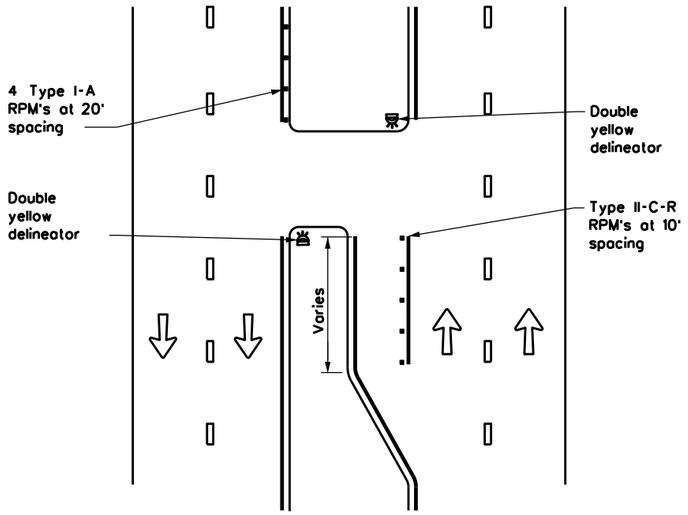
# DELINEATOR & OBJECT MARKER INSTALLATION

# D & OM(2)-20

| FILE: dom2-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| © TxDOT August 2004 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 10-09 3-15 | DIST | COUNTY | | SHEET NO. |
| 4-10 7-20 | PAR | FANNIN, ETC. | | 73 |

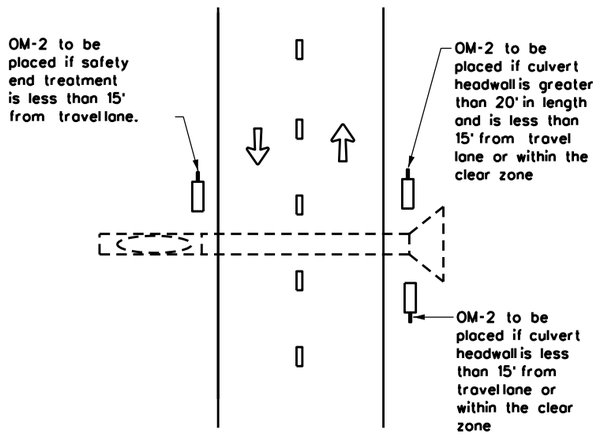
20B

## CROSSOVERS



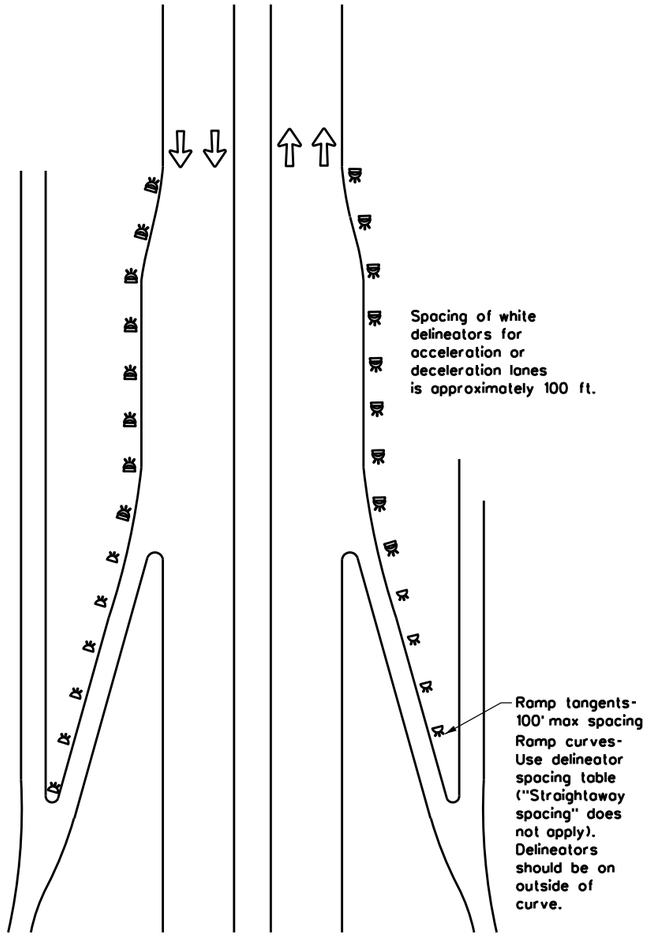

DETAIL 1

## FOR CULVERTS WITHOUT MBGF



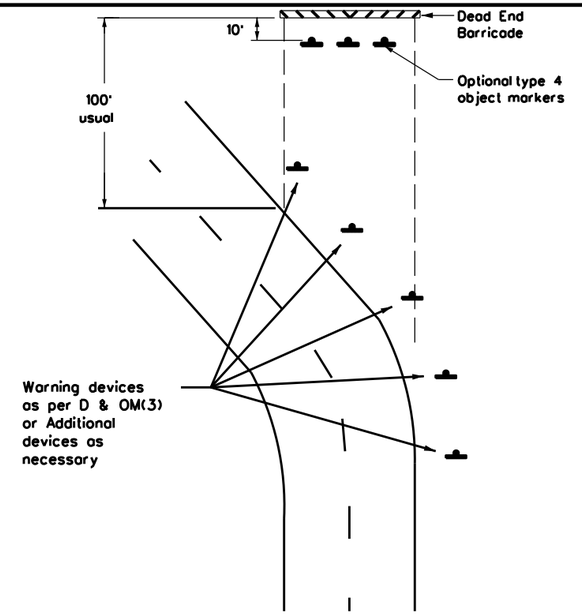

DETAIL 2

## FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



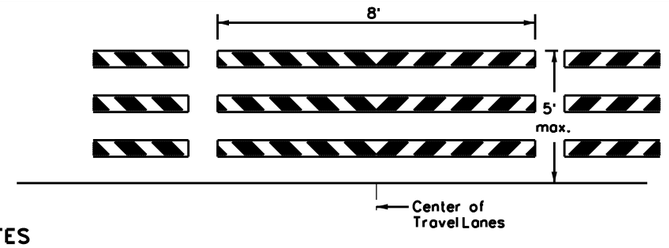

DETAIL 3

## TYPICAL APPLICATION OF DEAD END BARRICADE




DETAIL 4

## TYPICAL DEAD END BARRICADE INSTALLATION




### NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

## LEGEND

| | |
|---|---|
| | Bidirectional Delineator |
| | Delineator |
| | OM-3 |
| | Barricade |
| | Sign |
| | OM-2 |
| | Double Delineator |

Texas Department of Transportation

Traffic Safety Division Standard

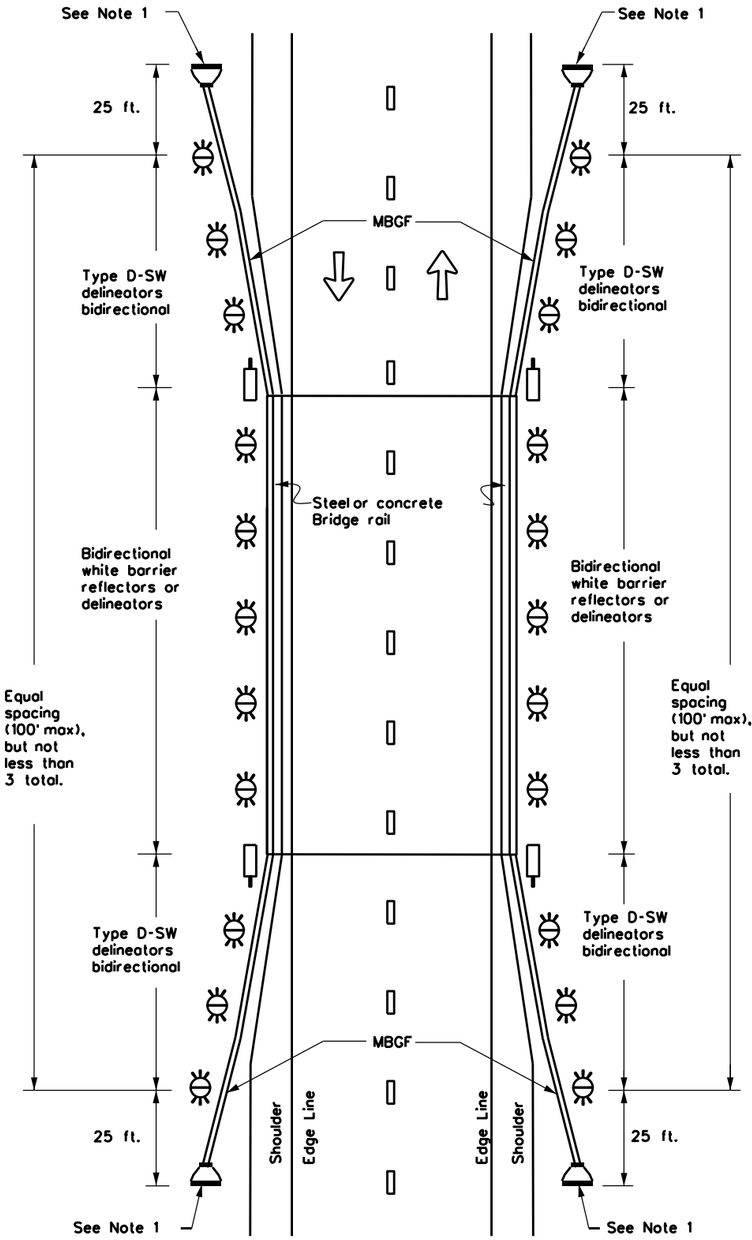
# DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

# D & OM(4)-20

| FILE: dom4-20.dgn | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
|---|---|---|---|---|
| © TxDOT August 2004 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083,ETC. | VAR |
| 3-15 7-20 | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 74 |

DATE: $DATE$ $TIME$
FILE: $FILE$

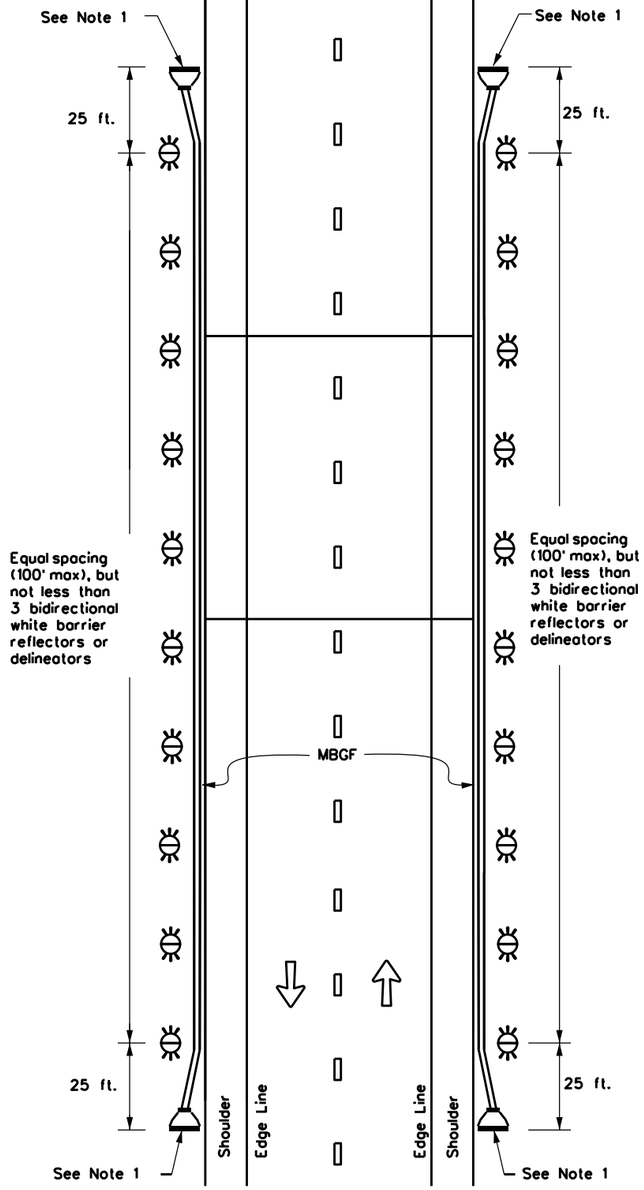
## TWO-WAY, TWO LANE ROADWAY WITH REDUCED WIDTH APPROACH RAIL




NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

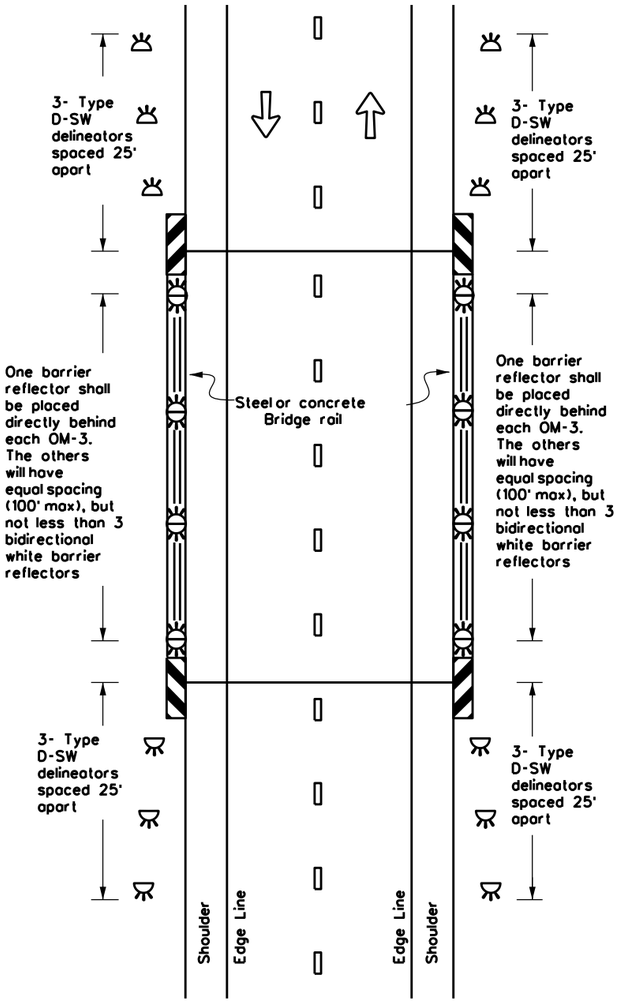
## TWO-WAY, TWO LANE ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)




NOTE:

1. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end.

## TWO-WAY, TWO LANE ROADWAY BRIDGE WITH NO APPROACH RAIL




## LEGEND

| | |
|---|---|
| | Bidirectional Delineator |
| | Delineator |
| | OM-3 |
| | OM-2 |
| | Terminal End |
| | Traffic Flow |

Texas Department of Transportation

Traffic Safety Division Standard

# DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

# D & OM(5)-20

| FILE: dom5-20.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| © TxDOT August 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 7-20 | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 75 |

20E

DATE: $DATE$ $TIME$
FILE: $FILE$

DATE: 7/11/2024 4:55:56 PM
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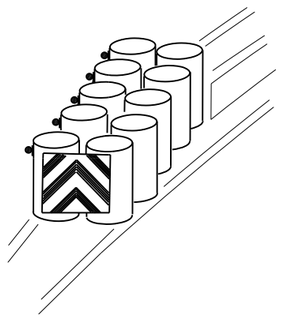
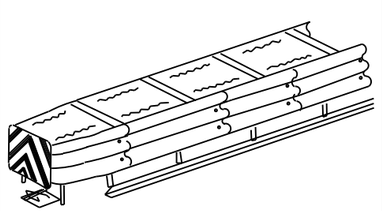
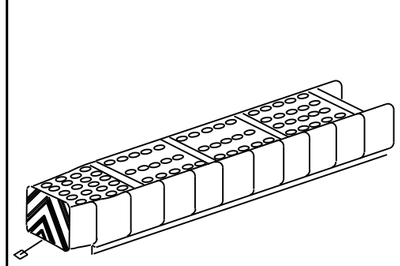
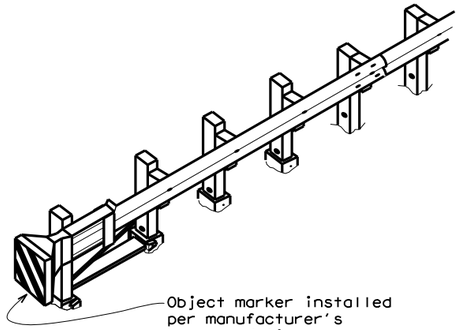
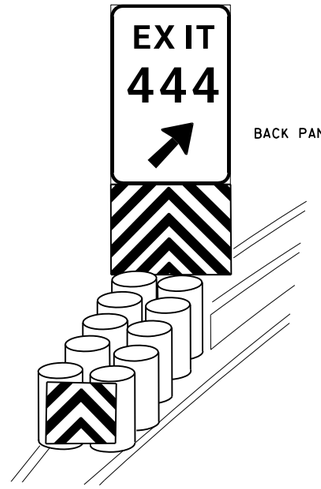
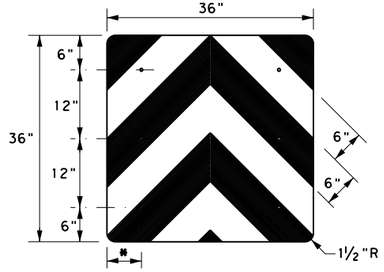


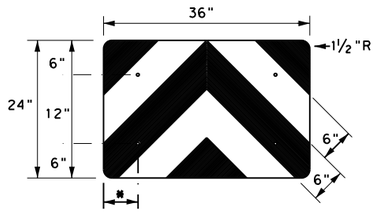




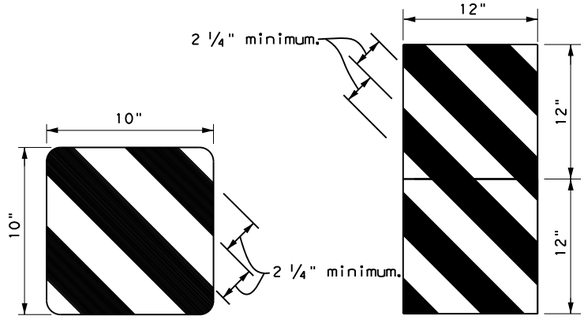


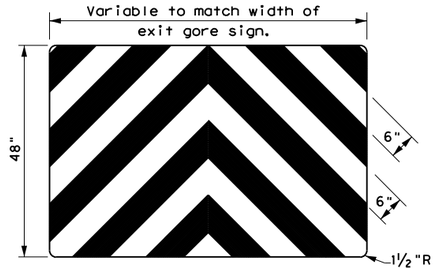



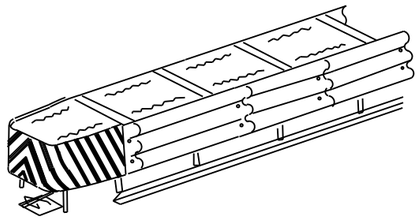



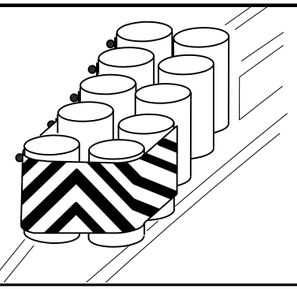

* Adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer

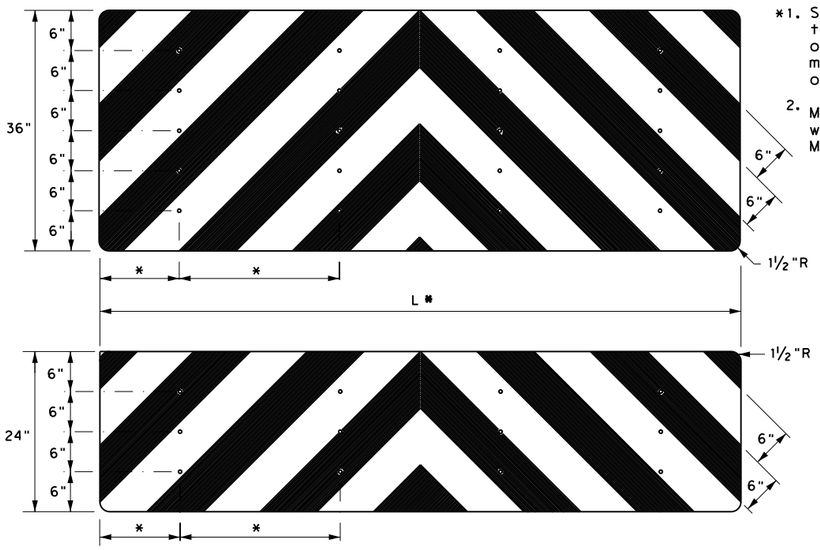



OBJECT MARKERS SMALLER THAN 3 FT$^2$








## 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 |
| REVISIONS | 0901 | 32 | 083,ETC. | VAR |
| 4-92 8-04 | DIST | COUNTY | | SHEET NO. |
| 8-95 3-15 | PAR | FANNIN, ETC. | | 76 |
| 4-98 7-20 | | | | |

20G

DATE: 7/11/2024 4:56:05 PM
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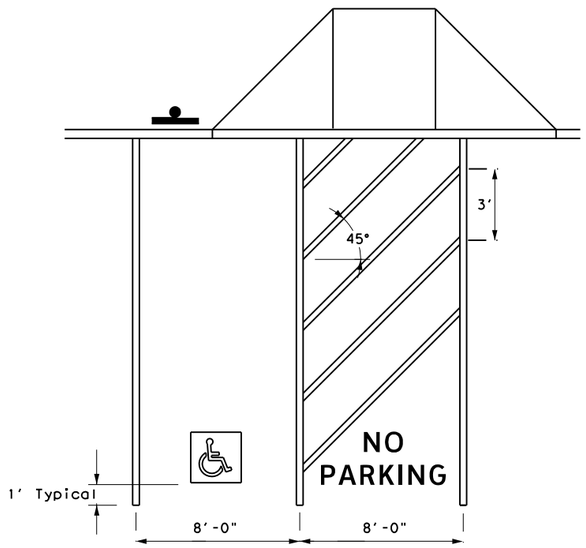
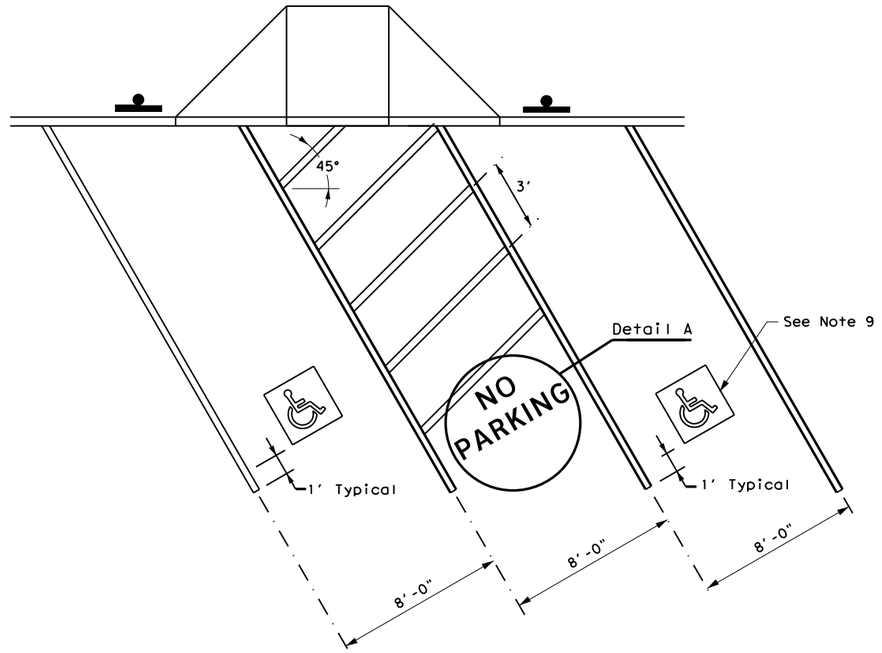
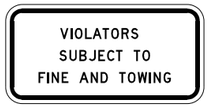



# PERPENDICULAR OR ANGLED ACCESSIBLE PARKING SPACE DIMENSIONS


R7-8T


R7-8P




R7-8aPT

## ACCESSIBLE PARKING SIGNS


Detail A

| 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 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS | DMS-8240 |
| SIGN FACE MATERIALS | DMS-8300 |

## GENERAL NOTES:

1. All paved accessible parking space limit lines shall be 4" solid white lines.

2. Paved accessible parking spaces must include a white International Symbol of Accessibility applied conspicuously on the surface in a color that contrasts the pavement. A blue background with white border may supplement the symbol for additional contrast.

3. The words "NO PARKING" must be applied on any access aisle adjacent to the parking space. The words must be white, applied:

   a) in all capital letters.

   b) centered within each access aisle adjacent to the parking space.

4. RESERVED PARKING (R7-8T) sign including the International Symbol of Accessibility.

   a) shall be REQUIRED for each accessible parking space.

   b) shall NOT be placed between two accessible parking spaces.

   c) shall NOT be placed in a location that restricts movement of wheelchairs within the adjacent sidewalk.

   d) shall have a mounting height of 7 feet to the bottom of the sign.

5. A sign identifying the consequences of parking illegally in a paved accessible parking space. Must:

   a) at a minimum state "VIOLATORS SUBJECT TO FINE AND TOWING" (Plaque)(R7-8aPT).

   b) be mounted on a pole, post, wall or freestanding board.

   c) be no more than eight inches (8") below sign R7-8T a sign required by the Texas Accessibility Standards, 502.6.

   d) be installed so that the bottom edge of the sign is no lower than 48 inches and no higher than 80 inches above the ground level.

6. Signs identifying van parking spaces shall contain the designation "VAN ACCESSIBLE" (R7-8P) Signs shall be 60 inches minimum above the ground level measured to the bottom of the sign.

7. Perpendicular or angled parking spaces shall be 8 feet wide minimum with an access aisle 8 feet minimum wide (van accessible). Two parking spaces are permitted to share a common access aisle.

8. Access aisles shall be at street level, extend the full length of the parking space they serve, follow ADA surface requirements, and marked to discourage parking in the access aisle. Curb ramps shall connect the access aisle to the adjacent pedestrian access route. Curb ramps shall not be located within the access aisle.

9. International Symbol of Accessibility Parking Space Marking and sign details can be found in The Standard Highway Sign Designs for Texas (SHSD) at the following website. http://www.txdot.gov/

Texas Department of Transportation

Traffic Safety Division Standard

# PAVEMENT MARKINGS AND SIGNING FOR ACCESSIBLE PARKING

## PM(AP)-21

| FILE: pm(ap)-21 | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
|---|---|---|---|---|
| ©TxDOT July 2021 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 77 |

22F

DATE: DATE/TIME 4:56:10 PM
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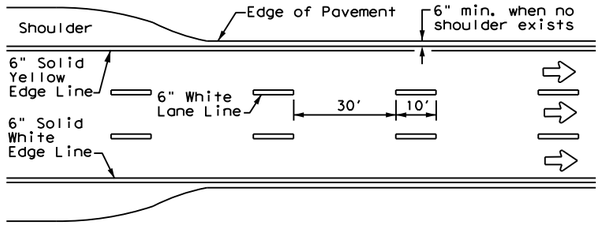
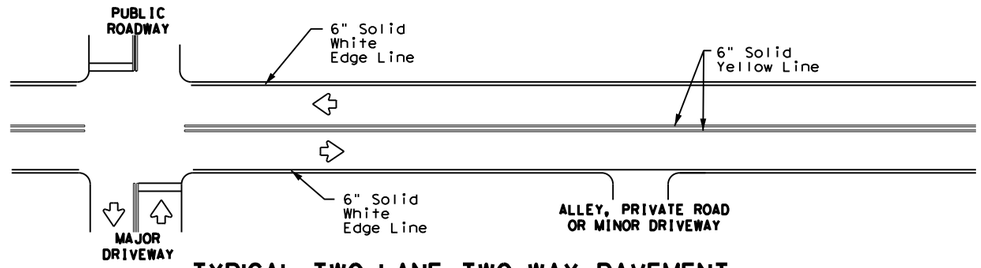
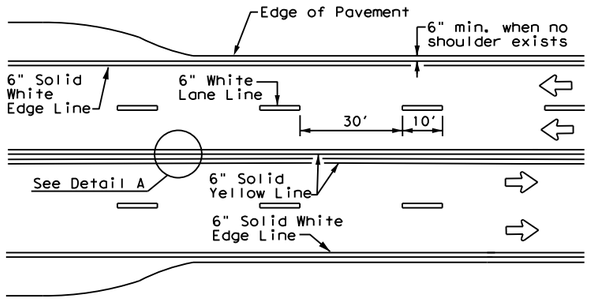
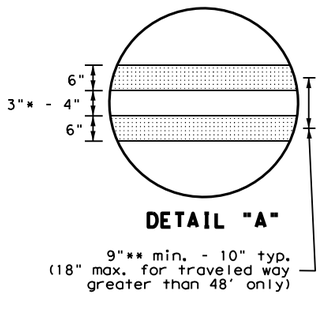



## EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS




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



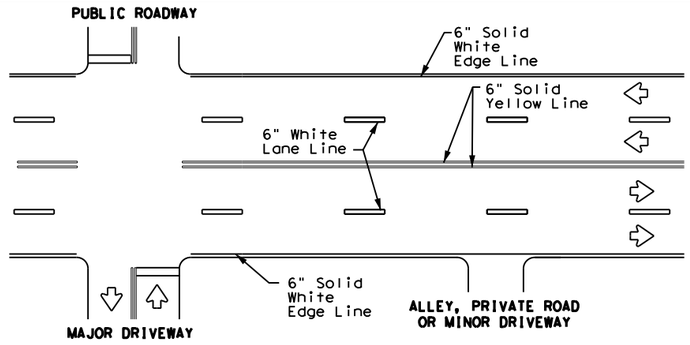

DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

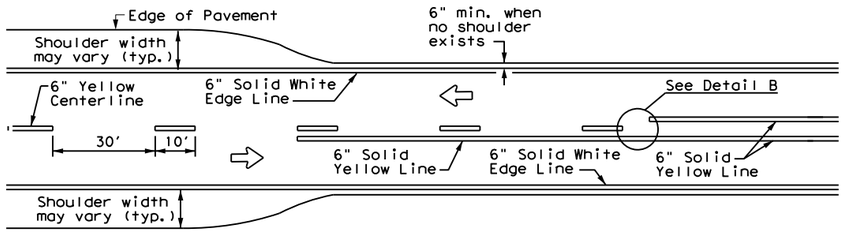
## CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

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

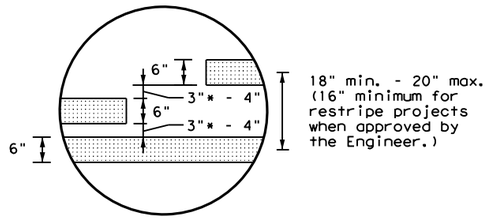
** 8" minimum for restripe projects when approved by the Engineer.




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

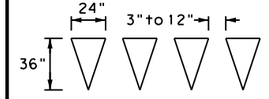



## TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



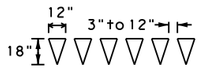

DETAIL "B"

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

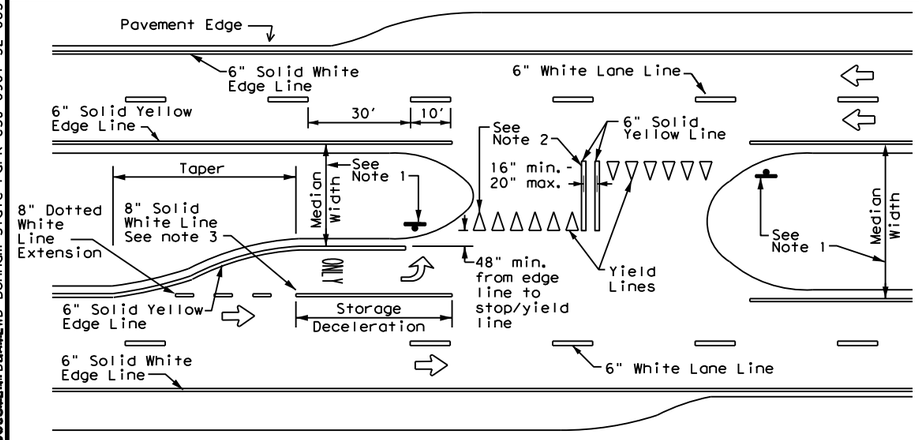



For posted speed on road being marked equal to or greater than 45 MPH.

## YIELD LINES




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




## FOUR LANE DIVIDED ROADWAY CROSSOVERS

## NOTES

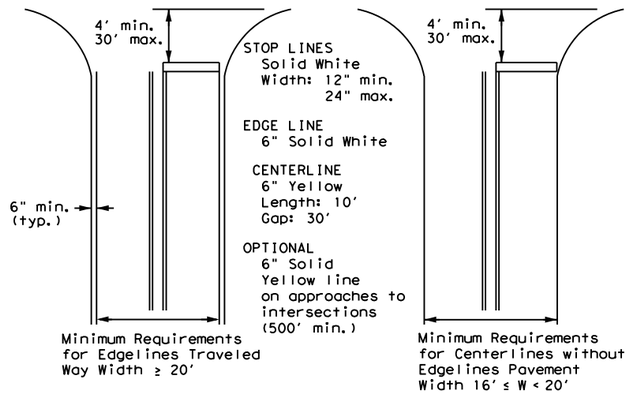
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling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

## GENERAL NOTES

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

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

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




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

## GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

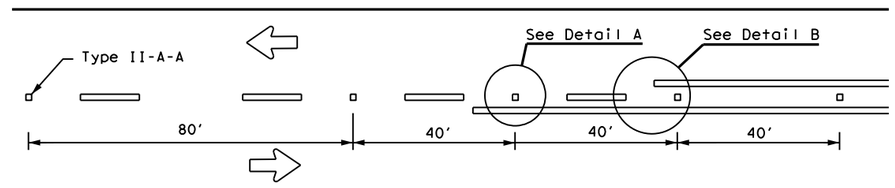
# TYPICAL STANDARD PAVEMENT MARKINGS

# PM(1)-22

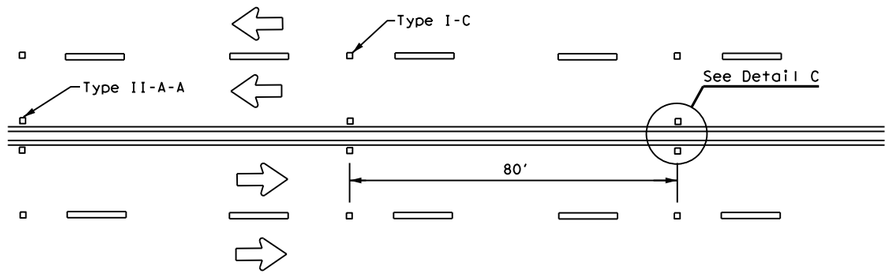
| FILE: pm1-22.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 11-78 8-00 6-20 8-95 3-03 12-22 5-00 2-12 | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 78 |

22A

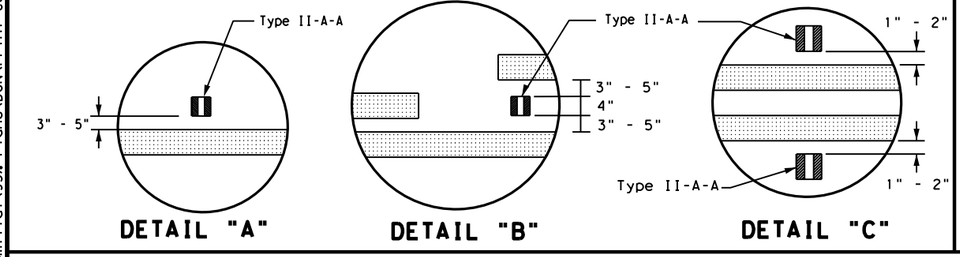
# REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

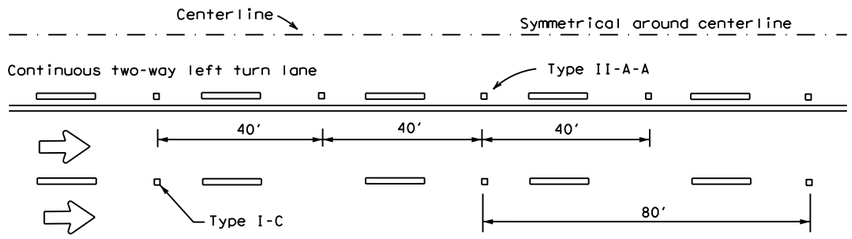



## CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

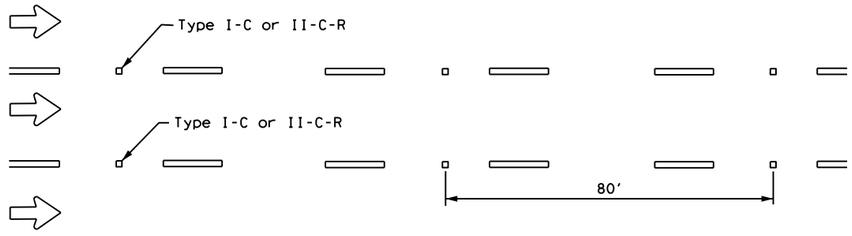



## CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS




## CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



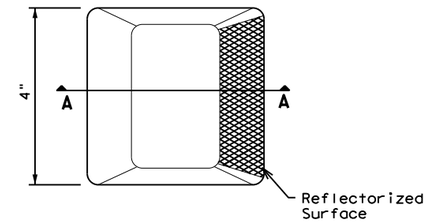

## LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

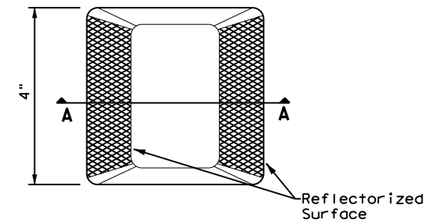
See Note 3.

| 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 |

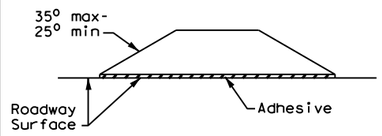
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.




Type I (Top View)

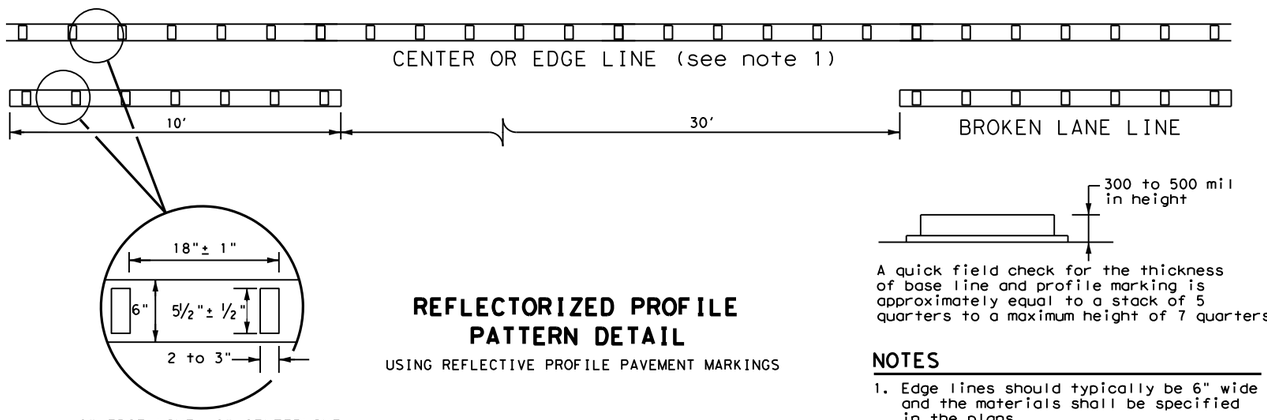



Type II (Top View)




SECTION A

## RAISED PAVEMENT MARKERS




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

## 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.

### NOTES

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

### GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

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

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|---|---|---|---|---|
| © TxDOT December 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12 | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 79 |

22B



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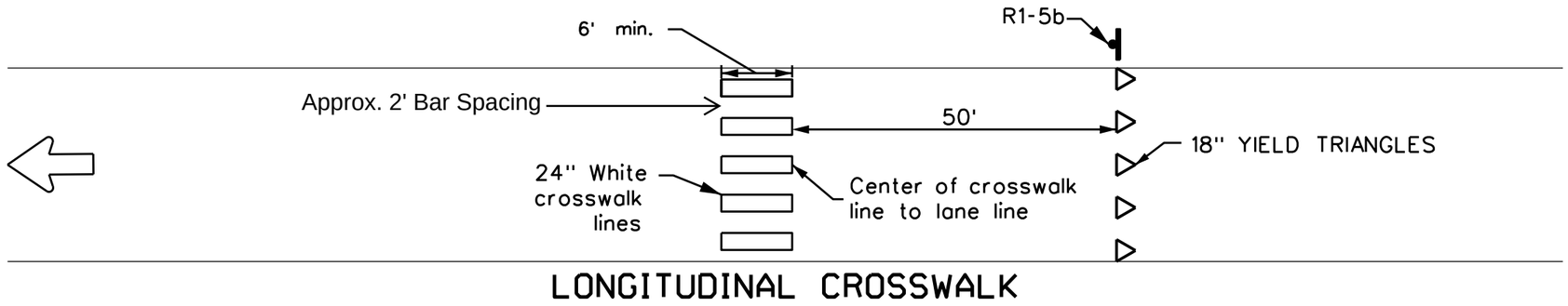


LONGITUDINAL CROSSWALK

NOT TO SCALE

## GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
4. Each crosswalk shall be a minimum of 6' wide.
5. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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

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

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

7.12.24

Monte R. Rater P.E.

Texas Department of Transportation

Traffic Safety Division Standard

# CROSSWALK PAVEMENT MARKINGS

| FILE: pm4-22a.dgn | DN: | CK: | DW: | CK: |
|---|---|---|---|---|
| © TxDOT December 2022 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| 6-20 | DIST | COUNTY | | SHEET NO. |
| 6-22 | PAR | FANNIN, ETC. | | 80 |
| 12-22 | | | | |

22D

DATE: $DATE$ $TIME$
FILE: $FILE$

## STORMWATER POLLUTION PREVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with the TPDES Construction General Permit TXR150000 (CGP). The Texas Department of Transportation (TxDOT) ensures that project specifications include adequate best management practices (BMPs) for this project.

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

This SWP3 is consistent with requirements specified in applicable stormwater plans and the projects environmental permits, issues, and commitments (EPICs). A copy of the CGP is included in Attachment 2.12 of the SWP3 binder.

### 1.0 SITE/PROJECT DESCRIPTION

**1.1 PROJECT CONTROL SECTION JOB (CSJ):**
0901-32-083, ETC

**1.2 PROJECT LIMITS:**
From: WITHIN BONHAM STATE PARK, ETC.

To:

**1.3 PROJECT COORDINATES:**
BEGIN: (Lat) 33.543107 ,(Long) -96.150051

END: (Lat) 33.543107 ,(Long) -96.150051

**1.4 TOTAL PROJECT AREA (Acres):** 6.98

**1.5 TOTAL AREA TO BE DISTURBED (Acres):** 2.61

**1.6 NATURE OF CONSTRUCTION ACTIVITY:**
REHABILITATE PARK ROADS, PARKING LOTS AND CAMPSITE PULLOUTS

**1.7 MAJOR SOIL TYPES:**

| Soil Type | Description |
|---|---|
| FERRIS CLAY, 5 TO 12% SLOPES, ERODED | 100% CLAY, WELL DRAINED, VERY HIGH RATE OF RUNOFF, AND VERY LOW TO MODERATELY LOW EROSION POTENTIAL |
| HEIDEN-FERRIS COMPLEX, 2 TO 6% SLOPES, ERODED | 100% CLAY, WELL DRAINED, VERY HIGH RATE OF RUNOFF, AND VERY LOW TO MODERATELY LOW EROSION POTENTIAL |
| HOWE-WHIGHTWRIGHT COMPLEX, 3 TO 5% SLOPES, ERODED | 50% HOWE SOIL, 30% WHITEWRIGHT SOIL, 20% MINOR COMPONENTS, WELL DRAINED, LOW RATE OF RUNOFF, AND MODERATELY LOW TO HIGH EROSION POTENTIAL |
| WHIGHTWRIGHT-HOWE- COMPLEX, 5 TO 12% SLOPES, ERODED | 60% WHITEWRIGHT SOIL, 20% HOWE SOIL, 20% MINOR COMPONENTS, WELL DRAINED, MEDIUM RATE OF RUNOFF, AND MODERATELY LOW TO TO HIGH EROSION POTENTIAL |
| | |
| | |
| | |

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

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

| Type | Sheet #s |
|---|---|
| | |
| | |
| | |
| | |
| | |

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

**1.9 CONSTRUCTION ACTIVITIES:**
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.5.)

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

**1.10 POTENTIAL POLLUTANTS AND SOURCES:**

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

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

| Tributaries | Classified Waterbody |
|---|---|
| BOIS D' ARC TRIBUTARY | BOIS D' ARC CREEK (202A) |
| | |
| | |
| | |
| | |
| | |

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

**1.12 ROLES AND RESPONSIBILITIES: TxDOT**

☒ Development of plans and specifications
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Perform SWP3 inspections
☒ Maintain SWP3 records and update to reflect daily operations
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other:
☐ Other:
☐ Other:

**1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR**

☒ Day To Day Operational Control
☒ Submit Notice of Intent (NOI) to TCEQ (≥5 acres)
☒ Post Construction Site Notice
☐ Submit NOI/CSN to local MS4
☒ Maintain schedule of major construction activities
☒ Install, maintain and modify BMPs
☒ Complete and submit Notice of Termination to TCEQ
☒ Maintain SWP3 records for 3 years
☐ Other:
☐ Other:
☐ Other:

**1.14 LOCAL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) OPERATOR COORDINATION:**

| MS4 Entity |
|---|
| |
| |
| |
| |
| |

Monte R. Rater P.E.
7.15.24

STATE OF TEXAS
MONTE L. RATER
95859
LICENSED
PROFESSIONAL ENGINEER

## STORMWATER POLLUTION PREVENTION PLAN (SWP3)





Texas Department of Transportation

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| | | | 81 |
| STATE | STATE DIST. | COUNTY | |
| TEXAS | PAR | FANNIN, ETC. | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0901 | 32 | 083, ETC. | VAR |

## STORMWATER POLLUTION PREVENTION PLAN (SWP3):

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

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

### 2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

**T / P**

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

### 2.2 SEDIMENT CONTROL BMPs:

**T / P**

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

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

Sediment control BMPs requiring design capacity calculations (See SWP3 Attachment 1.3.):

**T / P**

- ☐ ☐ Sediment Trap
  - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
  - ☐ 3,600 cubic feet of storage per acre drained
- ☐ ☐ Sedimentation Basin
  - ☐ Not required (<10 acres disturbed)
  - ☐ Required (>10 acres) and implemented.
    - ☐ Calculated volume runoff from 2-year, 24-hour storm for each acre of disturbed area
    - ☐ 3,600 cubic feet of storage per acre drained
  - ☐ Required (>10 acres), but not feasible due to:
    - ☐ Available area/Site geometry
    - ☐ Site slope/Drainage patterns
    - ☐ Site soils/Geotechnical factors
    - ☐ Public safety
    - ☐ Other: _____

### 2.3 PERMANENT CONTROLS:

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

BMPs To Be Left In Place Post Construction:

| Type | Stationing | |
|---|---|---|
| | From | To |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

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

### 2.4 OFFSITE VEHICLE TRACKING CONTROLS:

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

### 2.5 POLLUTION PREVENTION MEASURES:

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

### 2.6 VEGETATED BUFFER ZONES:

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

| Type | Stationing | |
|---|---|---|
| | From | To |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

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

### 2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

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

### 2.8 DEWATERING:

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

### 2.9 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

When dewatering activities are present, a daily inspection will be conducted once per day during those activities and documented in accordance with CGP and TxDOT requirements.

### 2.10 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.5 of this SWP3.

Monte R. Rater P.E. 7.15.24

STATE OF TEXAS
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PROFESSIONAL ENGINEER

**STORMWATER POLLUTION PREVENTION PLAN (SWP3)**



July 2023 Sheet 2 of 2

*Texas Department of Transportation*

| FED. RD. DIV. NO. | PROJECT NO. | | SHEET NO. |
|---|---|---|---|
| | | | 82 |
| STATE | STATE DIST. | COUNTY | |
| TEXAS | PAR | FANNIN, ETC. | |
| CONT. | SECT. | JOB | HIGHWAY NO. |
| 0901 | 32 | 083, ETC. | VAR |

DATE: $DATE$ $TIME$
FILE: $FILE$

## 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 SW3P and revise when necessary to control pollution or required by the Engineer.

3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

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

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

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

☐ No Permit Required

☒ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)

☐ Individual 404 Permit Required

☐ Other Nationwide Permit Required: NWP# _____

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

1.

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 Compost | ☐ Mulch Filter Berm and Socks |
| ☐ Mulch Filter Berm and Socks | ☐ Mulch Filter Berm and Socks | ☐ Compost Filter Berm and Socks |
| ☒ Compost Filter Berm and Socks | ☒ Compost Filter Berm and Socks | ☐ Vegetation Lined Ditches |
| | ☐ Stone Outlet Sediment Traps | ☐ Sand Filter Systems |
| | ☐ Sediment Basins | ☐ Grassy Swales |

## III. CULTURAL RESOURCES

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

☒ No Action Required ☐ Required Action

Action No.

1.

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

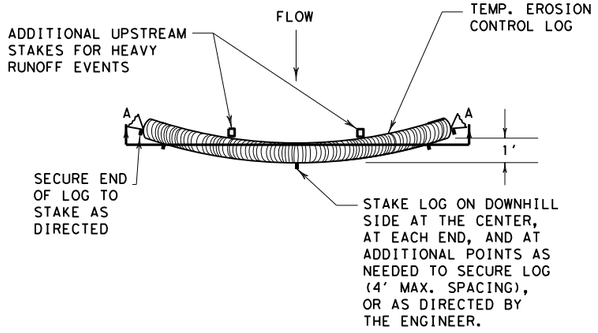
Design Division Standard

# ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

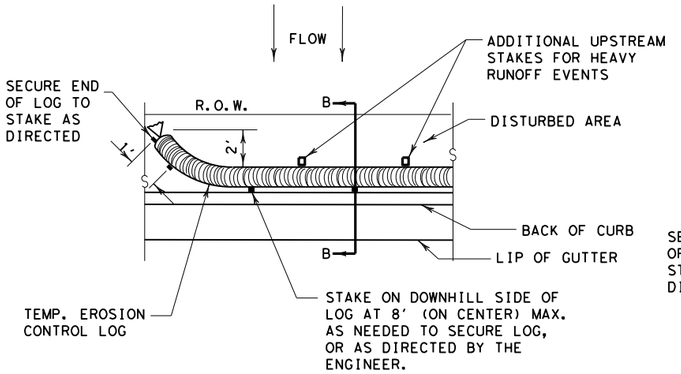
# EPIC

| | | | | | |
|---|---|---|---|---|---|
| FILE: epic.dgn | DN: TxDOT | CK: RG | DW: VP | CK: AR | |
| ©TxDOT: February 2015 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR | |
| 12-12-2011 (DS) | DIST | COUNTY | | SHEET NO. | |
| 05-07-14 ADDED NOTE SECTION IV. | PAR | FANNIN, ETC. | | 83 | |
| 01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES. | | | | | |

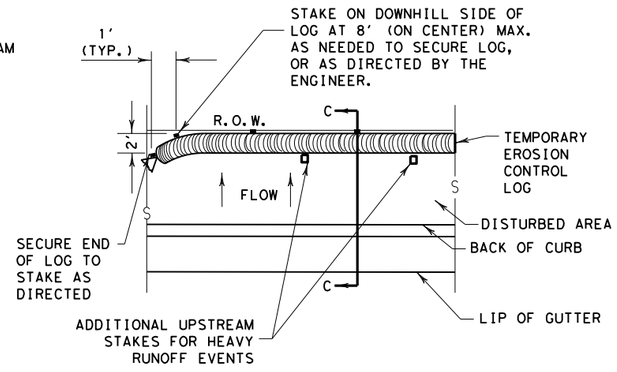
DATE: 7/11/2024
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\Print Code\084 EC (9)-16.dgn



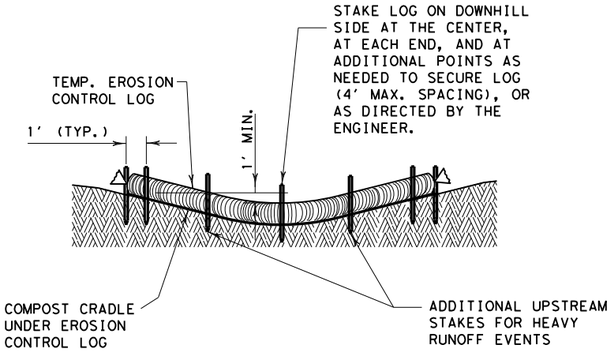

PLAN VIEW




PLAN VIEW



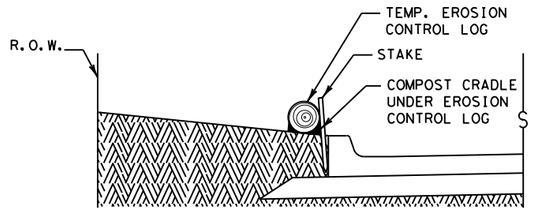

PLAN VIEW




SECTION A-A

EROSION CONTROL LOG DAM

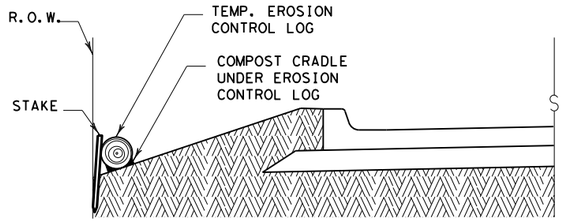
CL-D




SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

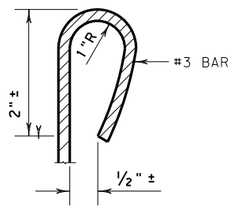
CL-BOC




SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



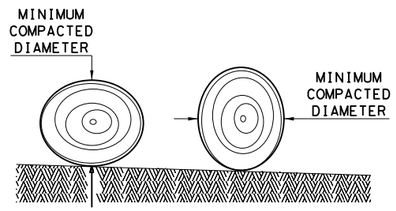

REBAR STAKE DETAIL

## LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

## GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.




DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

## SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



Texas Department of Transportation

Design Division Standard

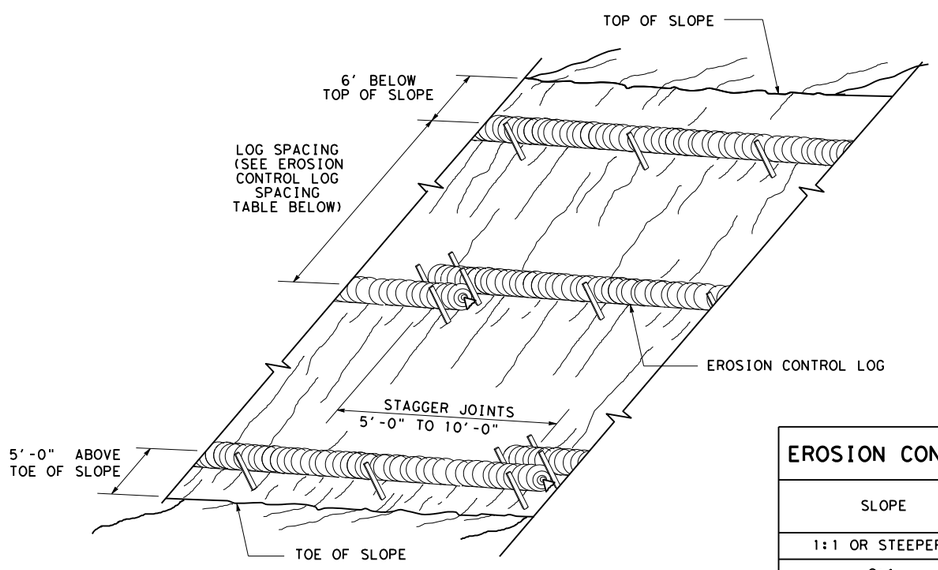
# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

## EROSION CONTROL LOG

## EC(9)-16

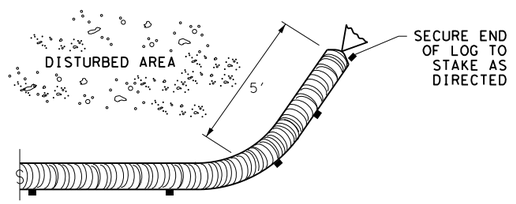
| FILE: ec916 | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS |
|---|---|---|---|---|
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 84 |

DATE: 7/11/2024
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\Print Code\085 EC (9)-16.dgn




## EROSION CONTROL LOGS ON SLOPES
## STAKE AND TRENCHING ANCHORING

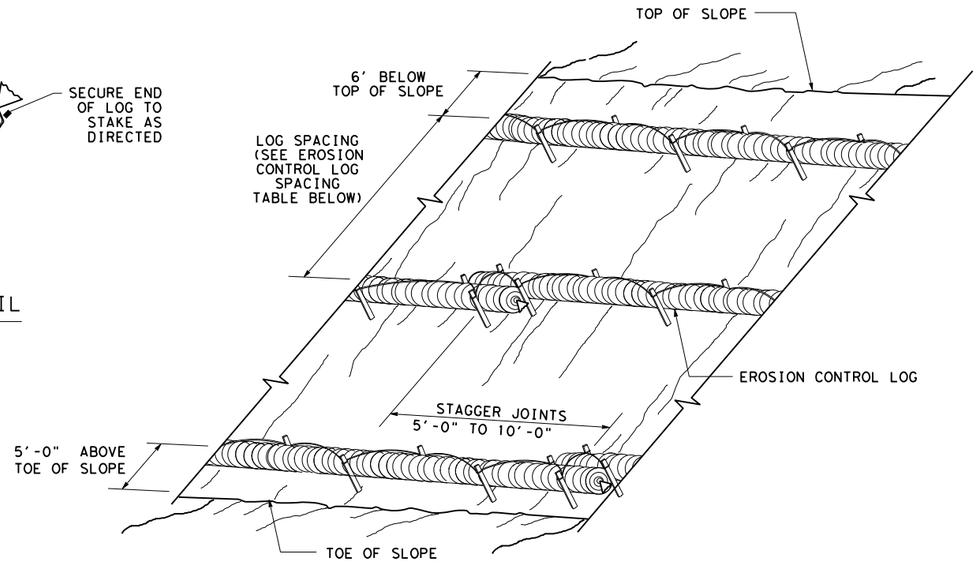
CL-SST




END SECTION RAP DETAIL

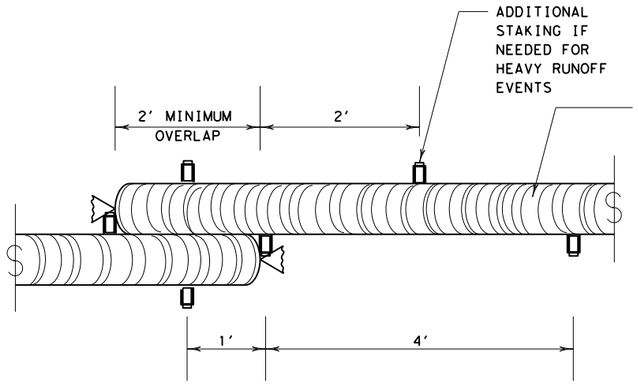
| EROSION CONTROL LOG SPACING TABLE | | | | |
|---|---|---|---|---|
| SLOPE | LOG DIAMETER | | | |
| | 6" | 8" | 12" | 18" |
| 1:1 OR STEEPER | 5' | 10' | 15' | 20' |
| 2:1 | 10' | 20' | 30' | 40' |
| 3:1 | 15' | 30' | 45' | 60' |
| 4:1 OR FLATTER | 20' | 40' | 60' | 80' |

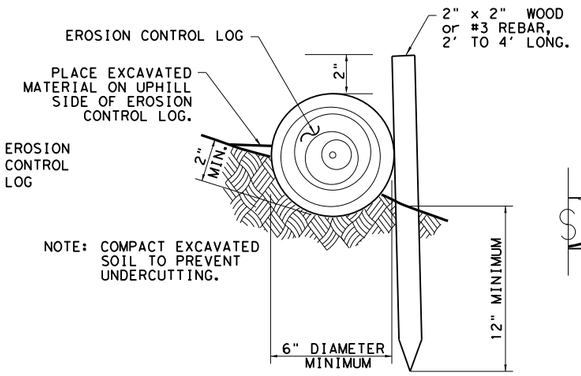
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART




## EROSION CONTROL LOGS ON SLOPES
## STAKE AND LASHING ANCHORING

CL-SSL

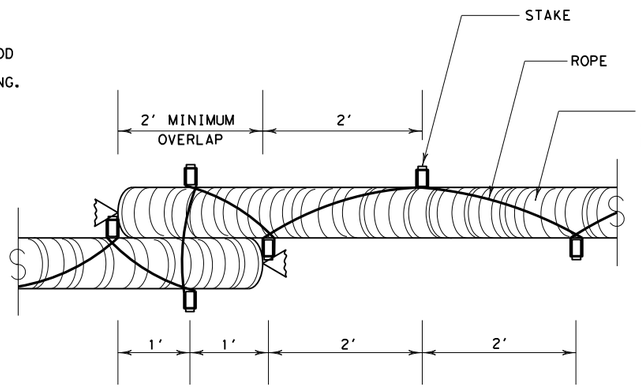


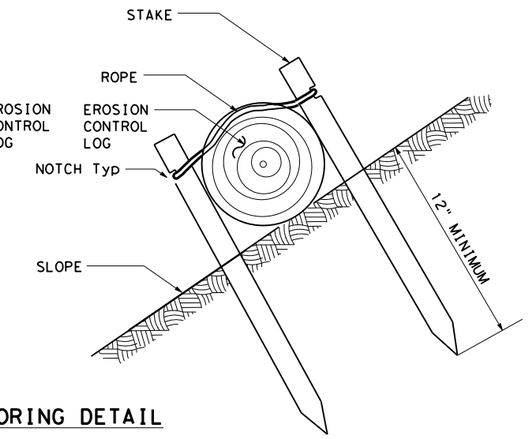




## STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

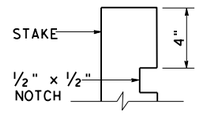
| TRENCH DEPTH TABLE | |
|---|---|
| LOG DIAMETER | DEPTH |
| 6" | 2" |
| 8" | 3" |
| 12" | 4" |
| 18" | 5" |




## STAKE AND LASHING ANCHORING DETAIL

CL-SSL




## STAKE NOTCH DETAIL

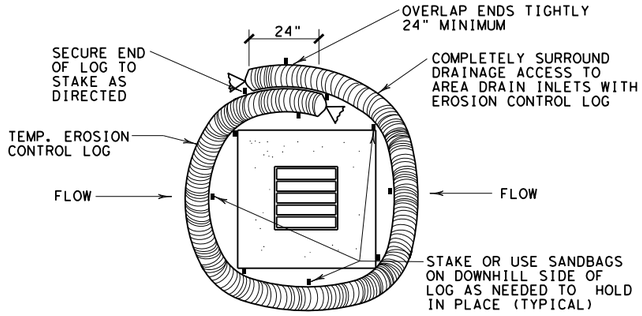


Texas Department of Transportation — Design Division Standard

# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
## EROSION CONTROL LOG
## EC(9)-16

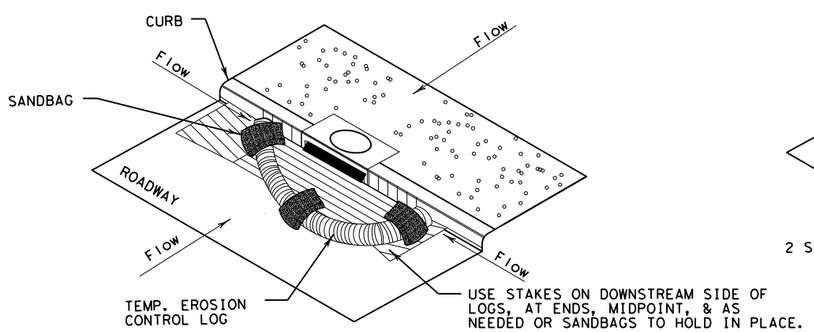
| | | | | | |
|---|---|---|---|---|---|
| FILE: ec116 | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS | |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR | |
| | DIST | COUNTY | | SHEET NO. | |
| | PAR | FANNIN, ETC. | | 85 | |

DATE: 7/11/2024
FILE: T:\PARTPDD\TPWD Bonham State Park CSJ 0901-32-083\Submittal\95% Plans\DGN\Print Code\086 EC (9)-16.dgn



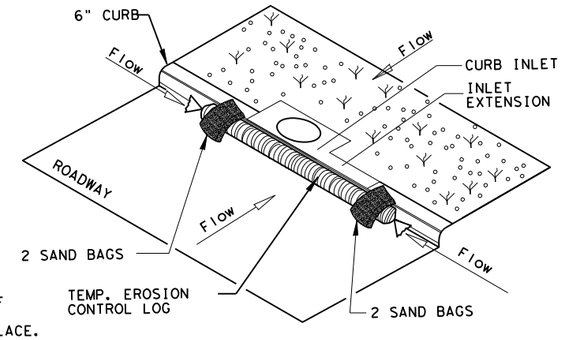

## EROSION CONTROL LOG AT DROP INLET

CL-DI




## EROSION CONTROL LOG AT CURB INLET

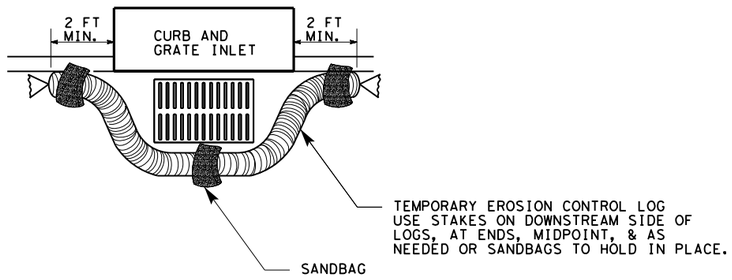
CL-CI




## EROSION CONTROL LOG AT CURB INLET

CL-CI

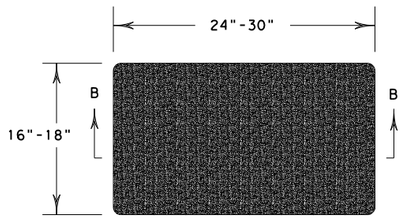
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.




## EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI


SECTION B-B




SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

# TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

## EROSION CONTROL LOG

## EC(9)-16

| FILE: ec916 | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS |
|---|---|---|---|---|
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 0901 | 32 | 083, ETC. | VAR |
| | DIST | COUNTY | | SHEET NO. |
| | PAR | FANNIN, ETC. | | 86 |