

INDEX OF SHEETS

| SHEET NO. | DESCRIPTION     |
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STATE OF TEXAS  
DEPARTMENT OF TRANSPORTATION  
**PLANS OF PROPOSED  
STATE HIGHWAY IMPROVEMENT**

FEDERAL AID PROJECT NUMBER: STP 2024(118)HESG  
CONTROL-SECTION-JOB: 0909-22-190

| PROJECT ID         |          |          |         |
|--------------------|----------|----------|---------|
| STP 2024(118) HESG |          |          |         |
| FED/DIV #          | HWY #    |          |         |
| 6                  | VARIOUS  |          |         |
| STATE              | DISTRICT | COUNTY   | SHEET # |
| TEXAS              | WACO     | MCLENNAN | 1       |
| CONTROL            | SECTION  | JOB      |         |
| 0909               | 22       | 190      |         |

DESIGN SPEED: A.D.T.  
MAIN LANES: 30 MPH      2020: 1,524 VPD  
2041: 2,134 VPD

MCLENNAN COUNTY  
FROM S 12TH ST TO BUS 77

| CSJ          | ROADWAY LENGTH |              | BRIDGE LENGTH |             | TOTAL LENGTH   |              |
|--------------|----------------|--------------|---------------|-------------|----------------|--------------|
|              | (FT)           | (MI)         | (FT)          | (MI)        | (FT)           | (MI)         |
| 0909-22-190  | 6388.80        | 1.210        | 0.00          | 0.00        | 6388.80        | 1.210        |
| <b>TOTAL</b> | <b>6388.80</b> | <b>1.210</b> | <b>0.00</b>   | <b>0.00</b> | <b>6388.80</b> | <b>1.210</b> |

FOR THE CONSTRUCTION OF  
HAZARD ELIMINATION & SAFETY CONSISTING OF  
SAFETY TREAT FIXED OBJECTS



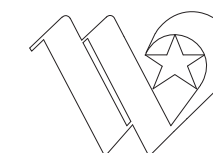
LOCATION MAP 1IN=2MI

EXCEPTIONS: NONE  
EQUATIONS: NONE  
RAILROAD CROSSINGS: NONE

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



PUBLIC WORKS



CITY OF WACO  
TRAFFIC ENGINEERING  
401 FANKILIN AVE  
WACO, TX 76701  
PHONE 254-750-6639

SUBMITTED FOR LETTING: **June 1, 2023**

DocuSigned by:

*Amy Burdley-Hyland*

57D61D2944F1488...

PUBLIC WORKS DIRECTOR  
CITY OF WACO

RECOMMENDED FOR LETTING: **7/26/2023**

DocuSigned by:

*Cheryl P.E.*

6D9791C615CF49B...

AREA ENGINEER

RECOMMENDED FOR LETTING: **7/26/2023**

DocuSigned by:

*Victor Habel, P.E.*

9AD8C743F95E4E3...

DIRECTOR OF TRANSPORTATION  
PLANNING & DEVELOPMENT

APPROVED FOR LETTING: **7/26/2023**

DocuSigned by:

*Stanley Swiatek*

B69BD796DD564C9...

DISTRICT ENGINEER

SHEET DESCRIPTION

I. GENERAL

1 TITLE SHEET  
 2 INDEX OF SHEETS  
 3, 3A-3B GENERAL NOTES  
 4 ESTIMATE AND QUANTITY  
 5 SUMMARY OF QUANTITIES

II. TRAFFIC CONTROL

6 SEQUENCE OF CONSTRUCTION  
 7 TRAFFIC CONTROL PLAN  
 8-19 \* BC(1)-21 THRU BC(12)-21  
 20 \* TCP (2-1)-18

III. PRIMROSE DR

21 REMOVALS  
 22-27 LAYOUTS  
 28 TYPICAL SECTION

IV. STANDARD SHEETS

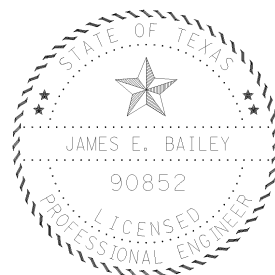
29 \* LPCB-13 (MOD)  
 30 \* LPCB-13

V. ENVIRONMENTAL

31 EPIC  
 32-33 SW3P

VI. ENVIRONMENTAL STANDARDS

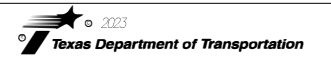
34-43 \* TA-BMP (WACO DISTRICT)  
 44 \* EC(1)-16  
 45 \* EC(2)-16  
 46-48 \* EC(9)-16



THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THIS SHEET WITH A "\*" HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

*James E. Bailey*  
 JAMES E. BAILEY, P.E.

8-1-2023  
 DATE



INDEX OF SHEETS

SHEET 1 OF 1

| CHANGE ORDER | FED. RD. DIV. NO. | CONT | SECT   | JOB       | HIGHWAY |
|--------------|-------------------|------|--------|-----------|---------|
|              | 6                 | 0909 | 22     | 190       | CS      |
|              | STATE             | DIST | COUNTY | SHEET NO. |         |
|              | TEXAS             | WAC  | MBLENW | 2         |         |

**GENERAL**

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is < 1 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 "Project-Specific Locations", provides a listing of regulatory agencies that may need to be contacted regarding this project.

Contractor questions on this project are to be emailed to the Waco District at the following address:

Bill Compton - [Wacoprebid@txdot.gov](mailto:Wacoprebid@txdot.gov), 254-867-2707, 100 S. Loop Dr., Waco, TX  
Carmen Chau - [Wacoprebid@txdot.gov](mailto:Wacoprebid@txdot.gov), 254-867-2794, 100 S. Loop Dr., Waco, TX

Or Via phone or in person to the following individual(s):

Area Engineer's: Clayton Zacha 254-772-2890, 7479 Bagby Ave, Waco, TX  
Assistant Area Engineer's: Clayton Zacha 254-772-2890, 7479 Bagby Ave, Waco, TX

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

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense and at copying companies. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project(s).

**GENERAL NOTES**

The following standard detail sheets have been modified:  
LPCB-13 (MOD)

**ITEM 5: CONTROL OF THE WORK**

Where a precast or cast-in-place concrete element is shown in the plans, Contractor may submit a precast concrete alternate in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at:

<https://www.txdot.gov/inside-txdot/forms-publications/consultants-Contractors/publications/bridge.html#design>.

Acceptance or denial of an alternate is at the sole discretion of the Department. Contractor is responsible for impacts to the project schedule and cost resulting from the use of alternates.

Underground utilities owned by the City of Waco may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the Traffic Signal Office (254)749-7373 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254)867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

**ITEM 6: CONTROL OF MATERIALS**

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

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

The Buy America Material Classification Sheet is located at the below link.  
<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for clarification on material categorization.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

#### **ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES**

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer.

Personal vehicles of the contractor's employees will not be parked within the right of way at any time including any section closed to public traffic unless the vehicle is being utilized for construction procedures. However, the contractor's employees may park on the right of way at the sites where the contractor has his office, equipment, and materials storage yard.

#### **ITEM 8: PROSECUTION AND PROGRESS**

This Project will be a Standard Workweek in accordance with Article 8.3.1.4.

For this project, provide a Bar Chart progress schedule.

#### **ITEM 100: PREPARING RIGHT OF WAY**

The limits of preparing right of way will be measured as shown on the project layout sheets and includes the width from mow strip to the existing drainage ditch and includes removal of trees.

#### **ITEMS 110 & 132: EXCAVATION & EMBANKMENT**

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.

#### **ITEM 500: MOBILIZATION**

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

#### **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.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor's Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

#### **ITEM 506: TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS**

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

No soil disturbing activities will begin on any section of ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed, and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Cleaning and sweeping of open roadways due to material spillage or loss from Contractor equipment or tires will be the responsibility of the Contractor at no cost to TxDOT. This work will not be charged as Item 738, "Cleaning and Sweeping Highways". Cleaning and sweeping of roadways will be completed as directed, including multiple times per day if necessary, to maintain acceptable roadways for the traveling public and to meet environmental regulations. Construction activities will cease when material deposited on the roadway is not properly removed or when equipment is not available as needed. Adequate construction exits will be planned, constructed and maintained by the Contractor per Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls".

**ITEM 636: SIGNS**

Stake the location of the relocated signs to be approved.

**ITEM 644: SMALL ROADSIDE SIGN ASSEMBLIES**

As practical with new construction, leave the existing sign assemblies in place until the proposed foundation, post and sign are in installed, and then remove the old sign assemblies.

Do not leave any sign foundation holes open overnight. Ensure all holes drilled are at least the minimum required depth with no loose material remaining in the hole.

Stake proposed sign locations and receive approval before installation of sign foundations.

Expanded foam foundations are not permitted.

Cut the bottom of all posts square.

For sign types which design details are not shown on these plans, fabricate according to the "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS".

Removed material that is deemed salvageable (signs and posts) will be the property of TxDOT. Deliver salvageable material to the TxDOT Maintenance Office. Remove unsalvageable material.

**ITEM 658: DELINEATOR AND OBJECT MARKER ASSEMBLIES**

All flexible and GF2 delineators will have a tubular body.

The delineator assembly BRF Class A (D-SW) and (D-SY) are to be single delineators (Class I) attached to a flat, plastic bracket to facilitate the mounting of the delineator on top of the bridge rail at the locations shown on the plans. Submit a sample for approval before ordering materials.

**ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN**

This project will require "full matrix" type portable changeable message signs.

Ensure that the Contractor's Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

**ITEM 6185 TRUCK MOUNTED ATTENUATORS**

The TMA/TA used for installation/removal of traffic control for a work area will be subsidiary to the TMA/TA used to perform the work.

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

| TCP 2 Series | Scenario | Required TMA |
|--------------|----------|--------------|
| (2-1)-18     | All      | 1            |

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the day and must be available for use at any time as determined by the Engineer.

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the contractor expects compensation will require prior approval from the Engineer.





# Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0909-22-190

DISTRICT Waco  
HIGHWAY PRIMROSE


COUNTY McLennan

| CONTROL SECTION JOB |           |   |      | 0909-22-190 |       | TOTAL EST. | TOTAL FINAL |
|---------------------|-----------|---|------|-------------|-------|------------|-------------|
| PROJECT ID          |           |   |      | A00177259   |       |            |             |
| COUNTY              |           |   |      | McLennan    |       |            |             |
| HIGHWAY             |           |   |      | PRIMROSE    |       |            |             |
| ALT                 | BID CODE  | DESCRIPTION   | UNIT | EST.        | FINAL |            |             |
|                     | 100-6001  | PREPARING ROW   | AC   | 0.500       |       | 0.500      |             |
|                     | 432-6045  | RIPRAP (MOW STRIP)(4 IN)  | CY   | 254.000     |       | 254.000    |             |
|                     | 500-6001  | MOBILIZATION  | LS   | 1.000       |       | 1.000      |             |
|                     | 502-6001  | BARRICADES, SIGNS AND TRAFFIC HANDLING                            | MO   | 3.000       |       | 3.000      |             |
|                     | 506-6002  | ROCK FILTER DAMS (INSTALL) (TY 2)                                 | LF   | 100.000     |       | 100.000    |             |
|                     | 506-6011  | ROCK FILTER DAMS (REMOVE)   | LF   | 100.000     |       | 100.000    |             |
|                     | 506-6038  | TEMP SEDMT CONT FENCE (INSTALL)                                   | LF   | 5,110.000   |       | 5,110.000  |             |
|                     | 506-6039  | TEMP SEDMT CONT FENCE (REMOVE)                                    | LF   | 5,110.000   |       | 5,110.000  |             |
|                     | 506-6040  | BIODEG EROSN CONT LOGS (INSTL) (8")                               | LF   | 1,000.000   |       | 1,000.000  |             |
|                     | 506-6043  | BIODEG EROSN CONT LOGS (REMOVE)                                   | LF   | 1,000.000   |       | 1,000.000  |             |
|                     | 512-6009  | PORT CTB (FUR & INST)(LOW PROF)(TY 1)                             | LF   | 4,580.000   |       | 4,580.000  |             |
|                     | 512-6010  | PORT CTB (FUR & INST)(LOW PROF)(TY 2)                             | LF   | 360.000     |       | 360.000    |             |
|                     | 542-6001  | REMOVE METAL BEAM GUARD FENCE                                     | LF   | 5,110.000   |       | 5,110.000  |             |
|                     | 644-6068  | RELOCATE SM RD SN SUP&AM TY 10BWG                                 | EA   | 13.000      |       | 13.000     |             |
|                     | 658-6062  | INSTL DEL ASSM (D-SW)SZ 1(BRF)GF2(BI)                             | EA   | 57.000      |       | 57.000     |             |
|                     | 6001-6001 | PORTABLE CHANGEABLE MESSAGE SIGN                                  | DAY  | 10.000      |       | 10.000     |             |
|                     | 6185-6002 | TMA (STATIONARY)  | DAY  | 10.000      |       | 10.000     |             |
|                     | 18        | SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING) | LS   | 1.000       |       | 1.000      |             |
|                     |           | EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART) | LS   | 1.000       |       | 1.000      |             |

|                  |                      |         | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN) | * 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1) | * 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2) | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI) |
|------------------|----------------------|---------|---|--|--|--|
| SHEET            | LIMITS (APPROXIMATE) | SECTION | CY  | LF   | LF   | EA   |
| 1                | 25TH ST TO 23RD ST   | A       | 35.00                                       | 660  | 40   | 8  |
| 2                | 23RD ST TO 21ST ST   | B       | 45.00                                       | 860  | 40   | 10   |
| 3                | 21ST ST TO 18TH ST   | C, D, E | 50.00                                       | 920  | 80   | 11   |
| 4                | 18TH ST TO 16TH ST   | F       | 35.00                                       | 620  | 80   | 8  |
| 5                | 16TH ST TO 12TH ST   | G       | 49.00                                       | 940  | 40   | 11   |
| 6                | 16TH ST TO 12TH ST   | H, I    | 33.00                                       | 580  | 80   | 9  |
| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00                                      | 4580   | 360  | 57   |

\* PROVIDE NEW CONCRETE BARRIER FOR PERMANENT USE PER DMS-7350 SEE TXDOT MPL

| 100 6001<br>PREPARING ROW | 506 6002<br>ROCK FILTER<br>DAMS (INSTALL)<br>(TY 2) | 506 6011<br>ROCK FILTER<br>DAMS (REMOVE) | 506 6038<br>TEMP SEDMT<br>CONT FENCE<br>(INSTALL) | 506 6039<br>TEMP SEDMT<br>CONT FENCE<br>(REMOVE) | 506 6040<br>BIODEG EROSN<br>CONT LOGS<br>(INSTL)(8") | 506 6043<br>BIODEG EROSN<br>CONT LOGS<br>(REMOVE) | 542 6001<br>REMOVE METAL<br>BEAM GUARD<br>FENCE | 644 6068<br>RELOCATE<br>SM RD SN<br>SUP & AM<br>TY 10 BWG | 6001-6001<br>PORTABLE<br>CHANGEABLE<br>MESSAGE SIGN | 6185-6002<br>TMA<br>(STATIONARY) |
|---------------------------|---|--|---|--|--|---|---|---|---|----------------------------------|
| 0.5                       | 100   | 100                                      | 5110  | 5110   | 1000   | 1000  | 5110  | 13  | 10  | 10                               |
| AC                        | LF  | LF                                       | LF  | LF   | LF   | LF  | LF  | EA  | DAY   | DAY                              |

|  |                   |       |          |     |           |
|--|-------------------|-------|----------|-----|-----------|
| <br>SUMMARY OF QUANTITIES |                   |       |          |     |           |
| NIS  |                   |       |          |     |           |
| SHEET 1 OF 1   |                   |       |          |     |           |
| CHANGE ORDER   | FED. RD. DIV. NO. | CONT. | SECT.    | JOB | HIGHWAY   |
|  | 6                 | 0909  | 22       | 190 | CS        |
|  | STATE             | DIST. | COUNTY   |     | SHEET NO. |
|  | TEXAS             | WPC   | MCLENNAN |     | 5         |



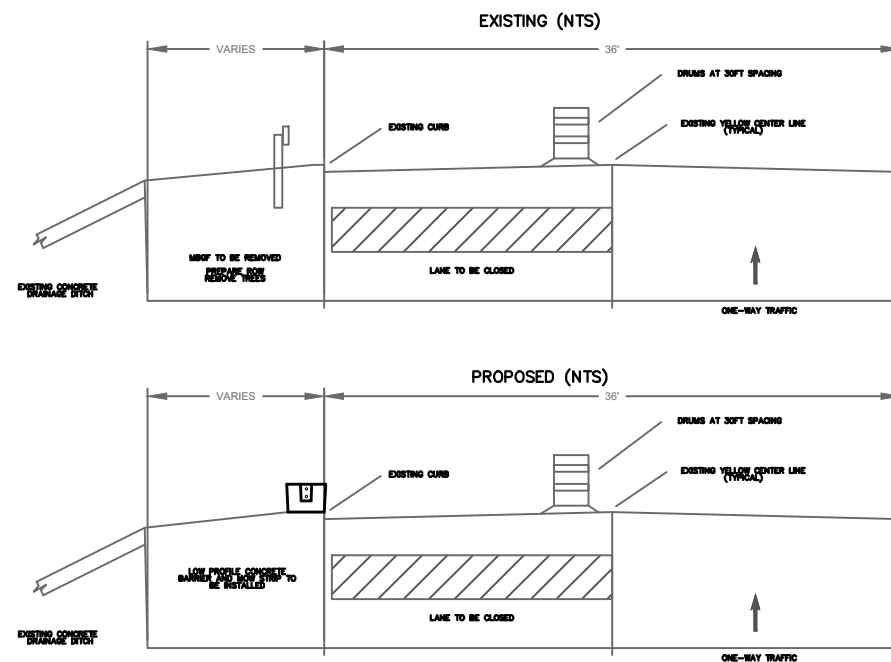
LOCATION MAP (NTS)

GENERAL

- 1) INSTALL ALL SIGNS, BARRICADES AND TRAFFIC CONTROL DEVICES AS SHOWN AND IN ACCORDANCE WITH THE STANDARD BC SHEETS AND AS DIRECTED.
- 2) ADDITIONAL SIGNS, BARRICADES OR TRAFFIC CONTROL DEVICES OTHER THAN THOSE SPECIFIED MAY BE REQUIRED FOR THE SAFE MOVEMENT OF TRAFFIC THROUGH THE PROJECT. PAYMENT SHALL BE CONSIDERED AS SUBSIDIARY TO ITEM 502, "BARRICADES SIGNS AND TRAFFIC HANDLING".
- 3) WORK SITES SHOULD BE MONITORED TO ENSURE THAT TRAFFIC CONTROL MEASURES ARE OPERATING EFFECTIVELY AND THAT ALL DEVICES USED ARE CLEARLY VISIBLE AT 7FT MOUNTING HEIGHT, CLEAN AND IN GOOD CONDITION.
- 4) THE CONTRACTOR WILL PROVIDE SAFE ACCESS TO AND FROM ALL PRIVATE PROPERTY AT ALL TIMES AND ALL WEATHER CONDITIONS.
- 5) THE CONTRACTOR WILL BE REQUIRED TO SUBMIT A DETAILED SCHEDULE OF WORK TO THE PROJECT ENGINEER.
- 6) COMPLETE ALL WORK ON THE PROJECT AS SHOWN ON THE PLANS SHEETS AND IN COMPLIANCE WITH THE GENERAL NOTES OF THIS CONTRACT.
- 7) ANY REQUEST TO ALTER THE SEQUENCE OF OPERATION OR TRAFFIC CONTROL WILL BE SUBMITTED TO THE ENGINEER FOR WRITTEN APPROVAL.

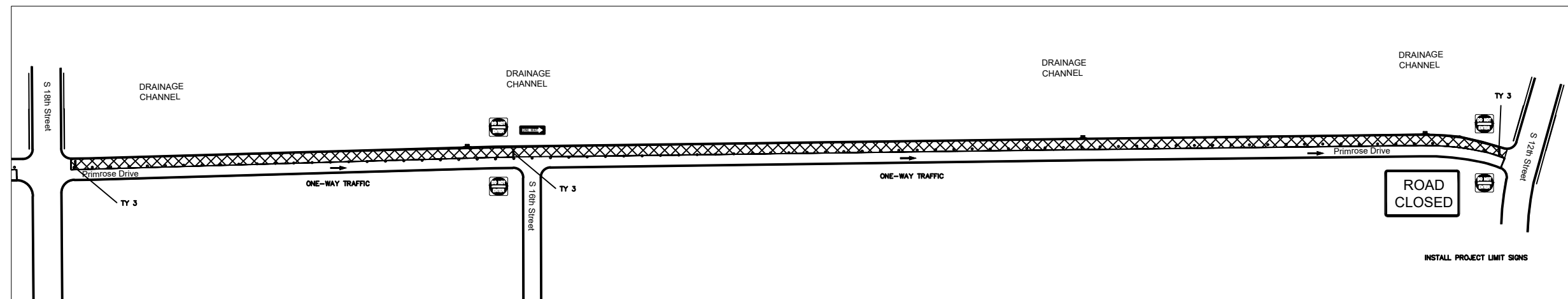
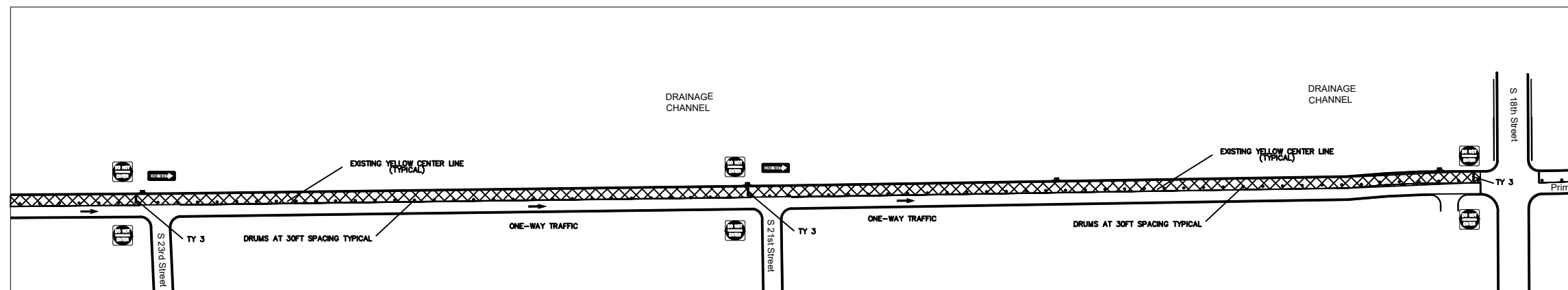
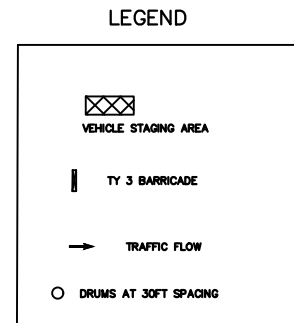
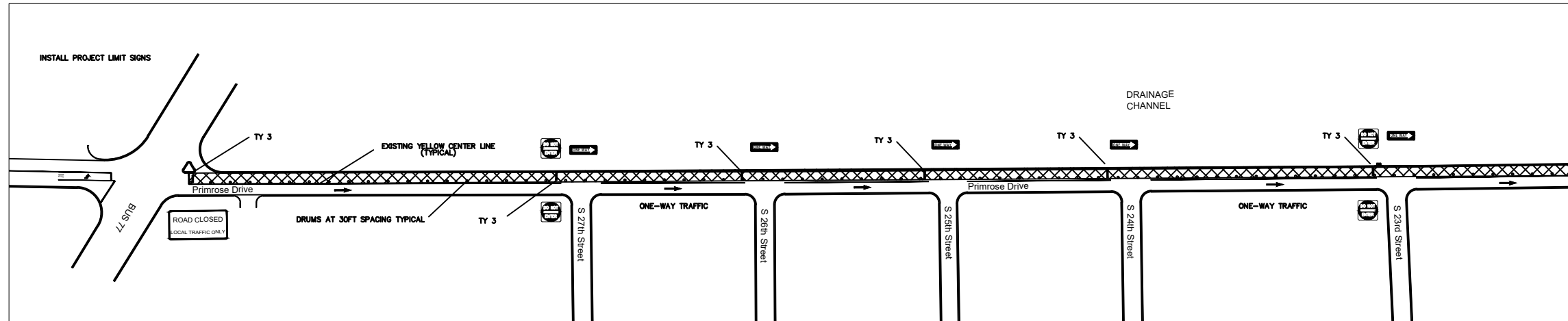
SEQUENCE OF WORK

- 1) CONTRACTOR TO SET BARRICADES AND TRAFFIC CONTROL
- 2) TRAFFIC ON PRIMROSE WILL BE ONE-WAY NORTHBOUND FOR DURATION OF PROJECT
- 3) CONTRACTOR TO SET EROSION CONTROL DEVICES
- 4) REMOVE OF METAL BEAM GUARD FENCE AND POST
- 5) PREPARATION OF ROW INCLUDES REMOVAL OF TREES
- 6) EVERY EFFORT MUST BE MADE TO KEEP SOIL FROM THE EXISTING DRAINAGE DITCH
- 7) EXISTING MATERIAL WILL BE CONSOLIDATED
- 8) CONTRACTOR TO INSTALL MOW STRIP
- 9) SET LOW PROFILE CONCRETE BARRIER AFTER MOW STRIP CONCRETE HAS CURED
- 10) RELOCATE PERMANENT SIGNS AND REMOVE TRAFFIC CONTROL AND CLEAN

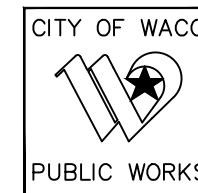
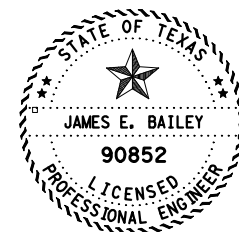


| SEQUENCE OF CONSTRUCTION |                   |       |          |     |           |
|--------------------------|-------------------|-------|----------|-----|-----------|
| SHEET 1 OF 1             |                   |       |          |     |           |
| CHANGE ORDER             | FED. RD. DIV. NO. | CONT. | SECT.    | JOB | HIGHWAY   |
|                          | 6                 | 0909  | 22       | 190 | CS        |
|                          | STATE             | DIST. | COUNTY   |     | SHEET NO. |
|                          | TEXAS             | WAC   | MCLENNAN |     | 6         |





*James E. Bailey*  
 JAMES E. BAILEY, P.E.  
 5-31-2023  
 DATE



2023  
 Texas Department of Transportation

TRAFFIC CONTROL PLAN

1 IN = 200 FT SHEET 1 OF 1

| CHANGE ORDER | FED. RD. DIV. NO. | CONT. | SECT.    | JOB | HIGHWAY   |
|--------------|-------------------|-------|----------|-----|-----------|
|              | 6                 | 0909  | 22       | 190 | CS        |
|              | STATE             | DIST. | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC   | MCLENNAN |     | 7         |

**BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:**

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

**WORKER SAFETY NOTES:**

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

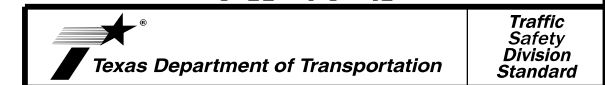
**COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES**

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

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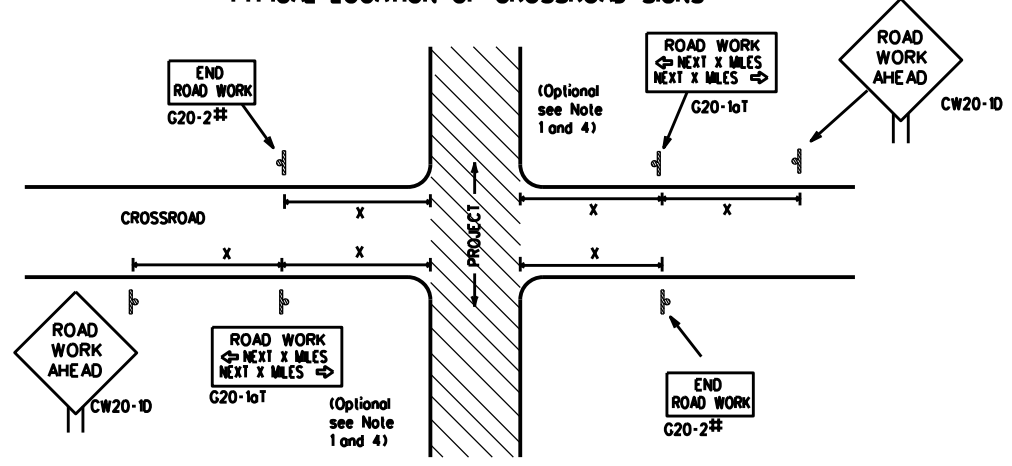


**BARRICADE AND CONSTRUCTION  
 GENERAL NOTES  
 AND REQUIREMENTS**

**BC(1)-21**

|         |               |      |          |     |           |     |       |     |       |
|---------|---------------|------|----------|-----|-----------|-----|-------|-----|-------|
| FILE:   | bc-21.dgn     | DN:  | TxDOT    | CK: | TxDOT     | DW: | TxDOT | CK: | TxDOT |
| © TxDOT | November 2002 | CONT | SECT     | JOB | HIGHWAY   |     |       |     |       |
|         |               | 0909 | 22       | 190 | CS        |     |       |     |       |
|         |               | 4-03 | 7-13     |     |           |     |       |     |       |
|         |               | 9-07 | 8-14     |     |           |     |       |     |       |
|         |               | 5-10 | 5-21     |     |           |     |       |     |       |
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|         |               | WACO | MCLENNAN |     | 8         |     |       |     |       |

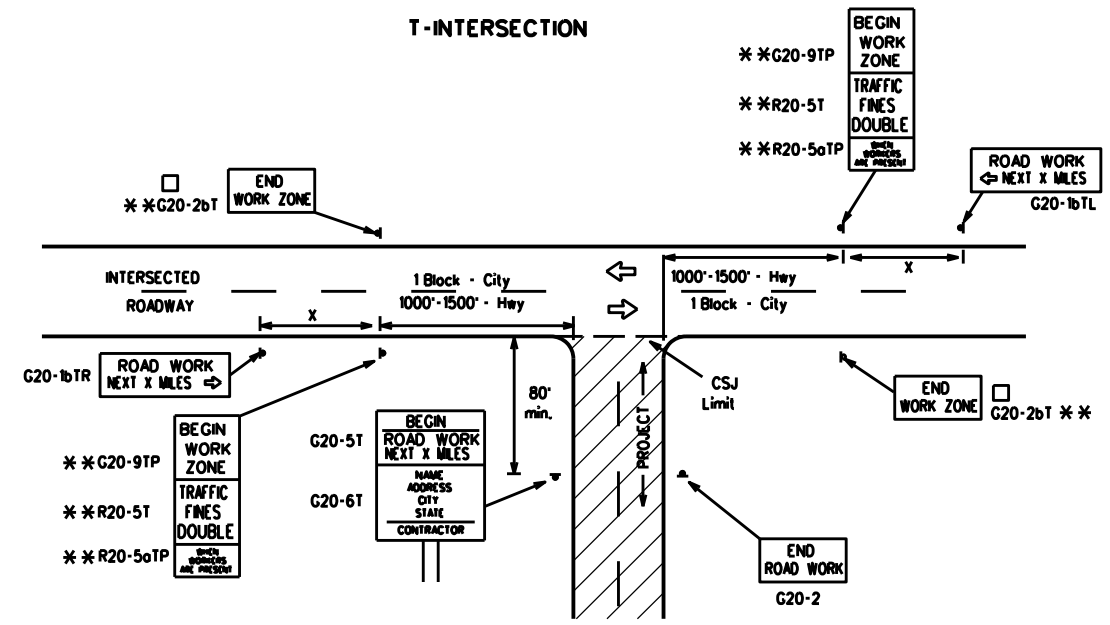
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING

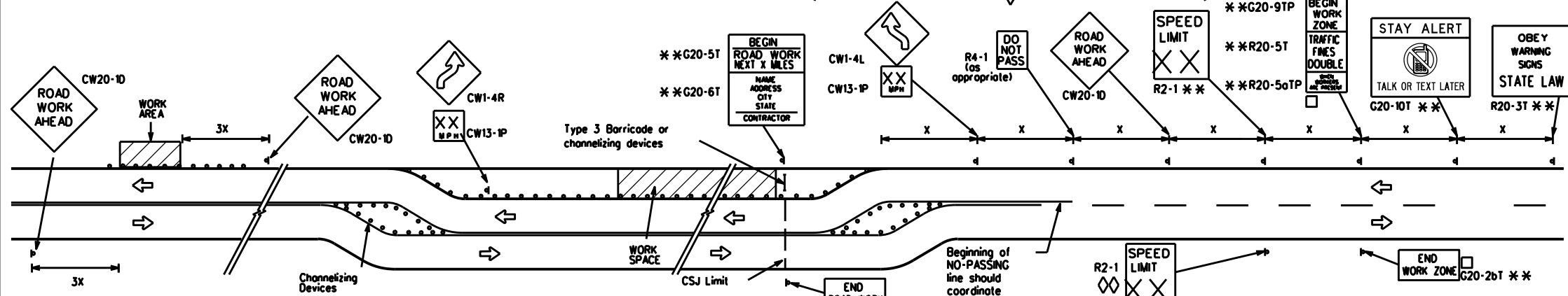
| Sign Number or Series                 | SIZE              |                    | SPACING          |                                |
|---------------------------------------|-------------------|--------------------|------------------|--------------------------------|
|                             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

- 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

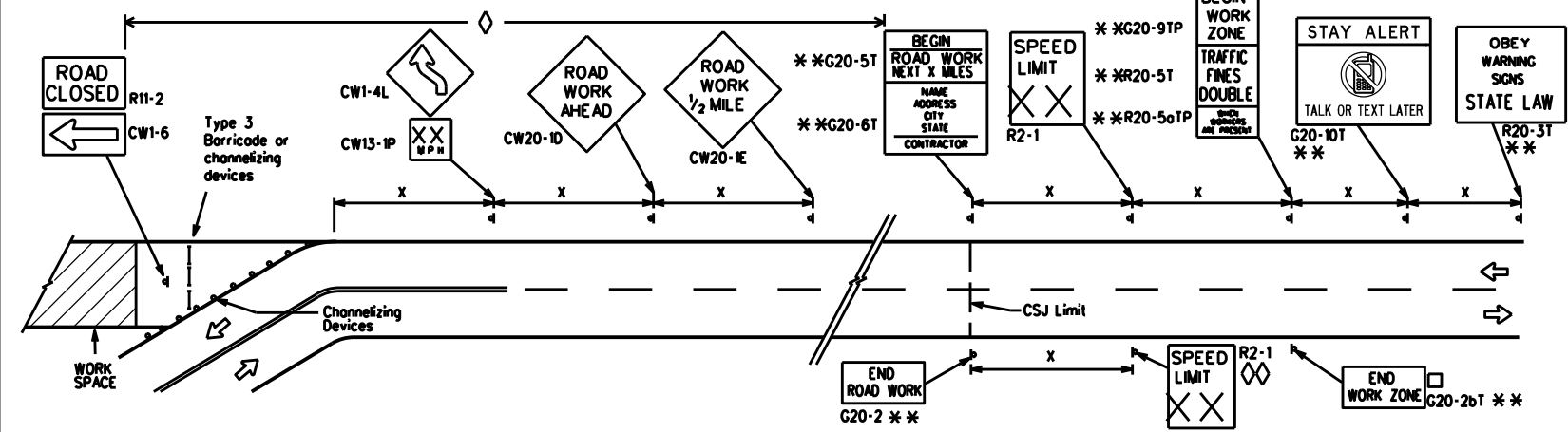
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
- Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

|                                   |            |                  |             |             |
|-----------------------------------|------------|------------------|-------------|-------------|
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| © TxDOT November 2002             | CONT: 0909 | SECT: 22         | JOB: 190    | HIGHWAY: CS |
| REVISIONS: 9-07 8-14<br>7-13 5-21 | DIST: WACO | COUNTY: MCLENNAN | SHEET NO. 9 |             |

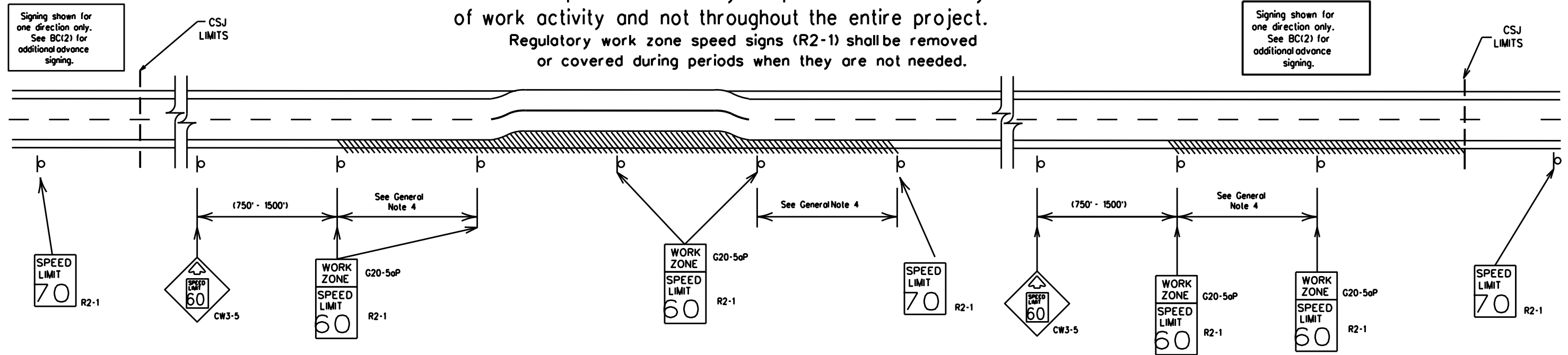
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# TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



## GUIDANCE FOR USE:

### LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

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

### SHORT TERM WORK ZONE SPEED LIMITS

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

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

### GENERAL NOTES

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

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SHEET 3 OF 12

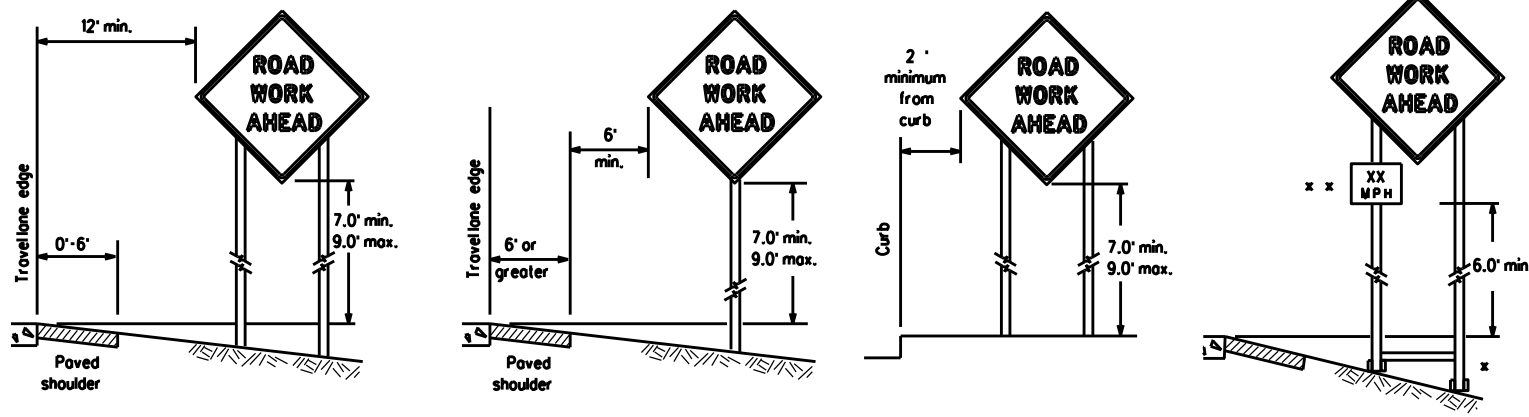


## BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

|                       |           |           |           |           |
|-----------------------|-----------|-----------|-----------|-----------|
| FILE: bc-21.dgn       | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
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| REVISIONS             | 0909      | 22        | 190       | CS        |
| 9-07 8-14             | DIST      | COUNTY    | SHEET NO. |           |
| 7-13 5-21             | WACO      | MCLENNAN  | 10        |           |

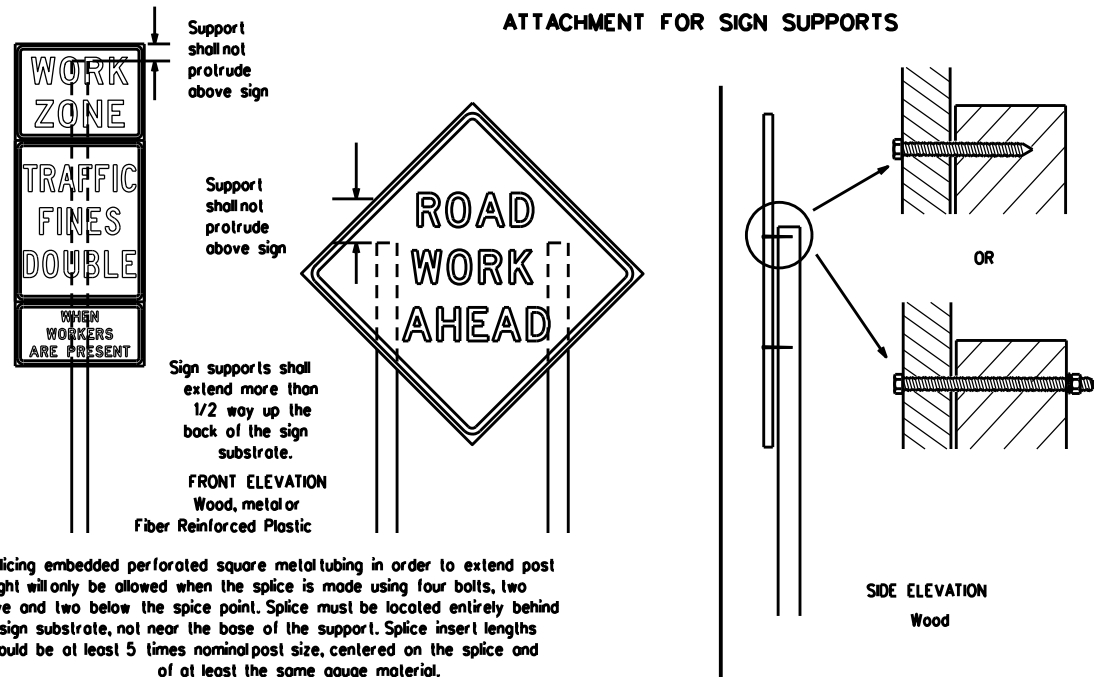
**TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS**



\* 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**



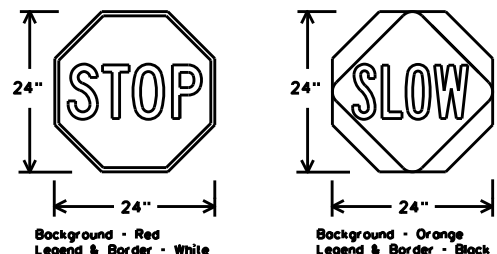
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nois 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 splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

**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 retroreflective 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 <sub>TL</sub> OR C <sub>TL</sub> 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 or Type C<sub>L</sub>, 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.



**BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES**

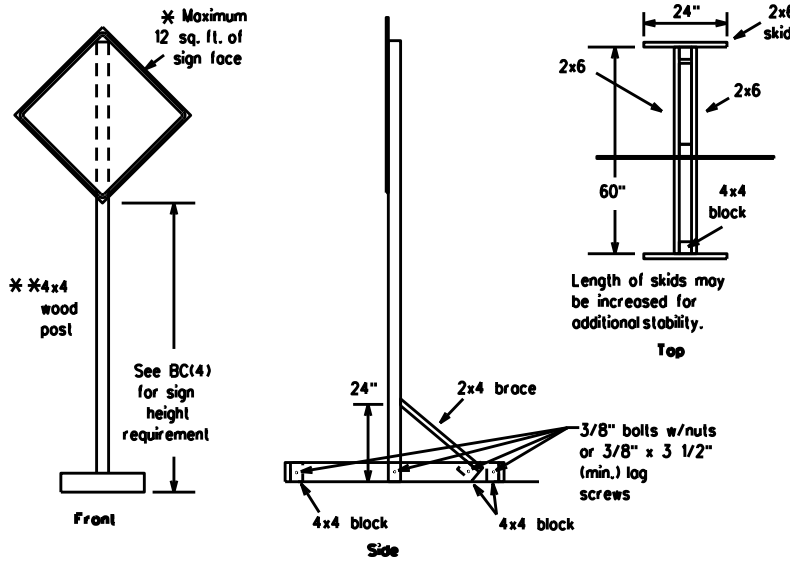
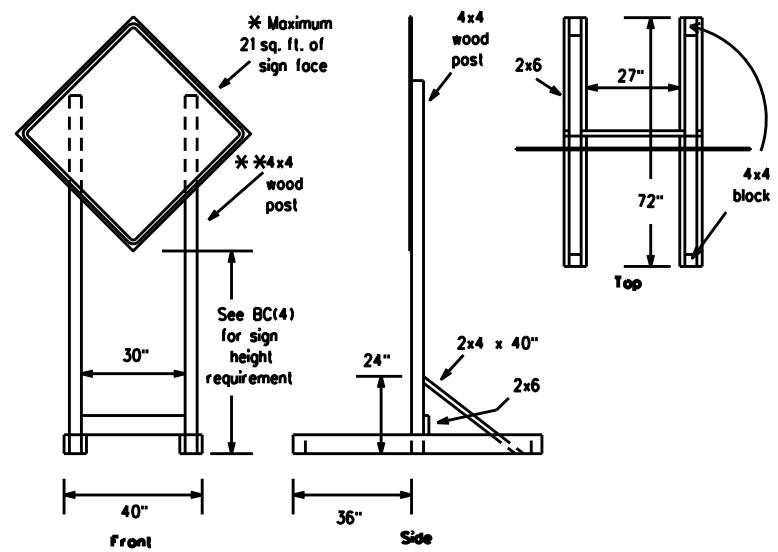
BC(4)-21

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| © TxDOT November 2002 | CONT      | SECT      | JOB       | HIGHWAY   |
| REVISIONS             | 0909      | 22        | 190       | CS        |
| 9-07 8-14             | DIST      | COUNTY    | SHEET NO. |           |
| 7-13 5-21             | WACO      | MCLENNAN  | 11        |           |

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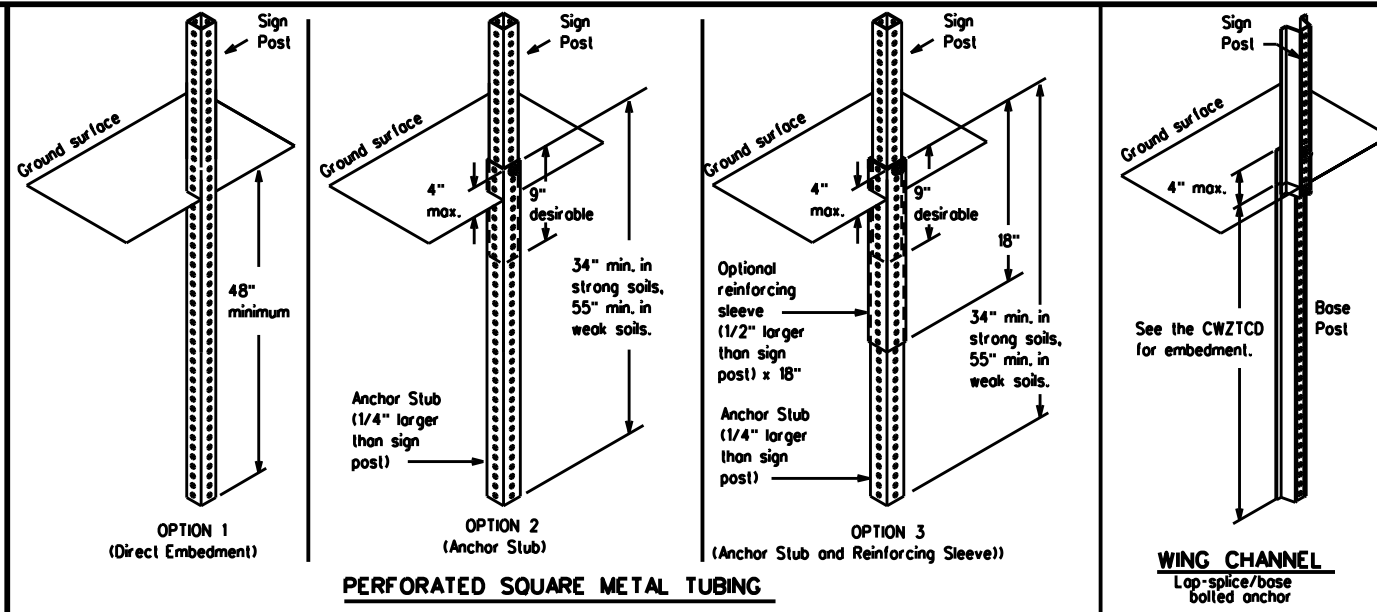
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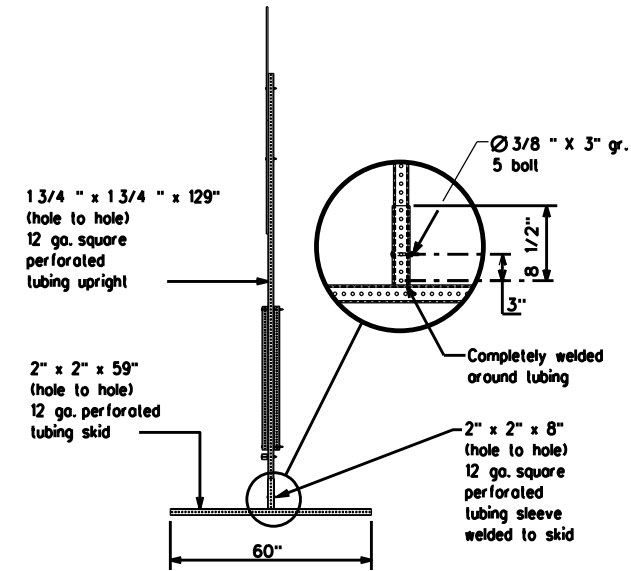
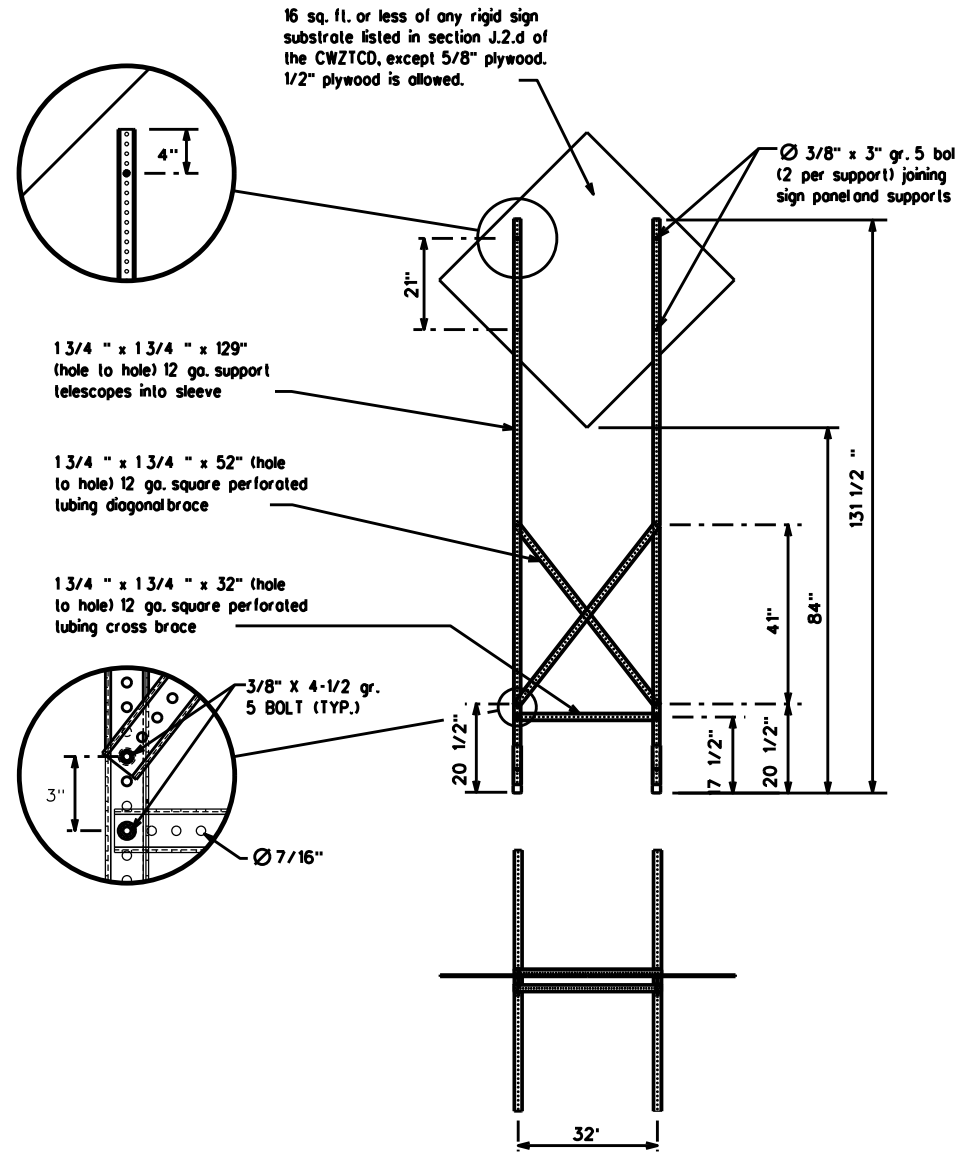
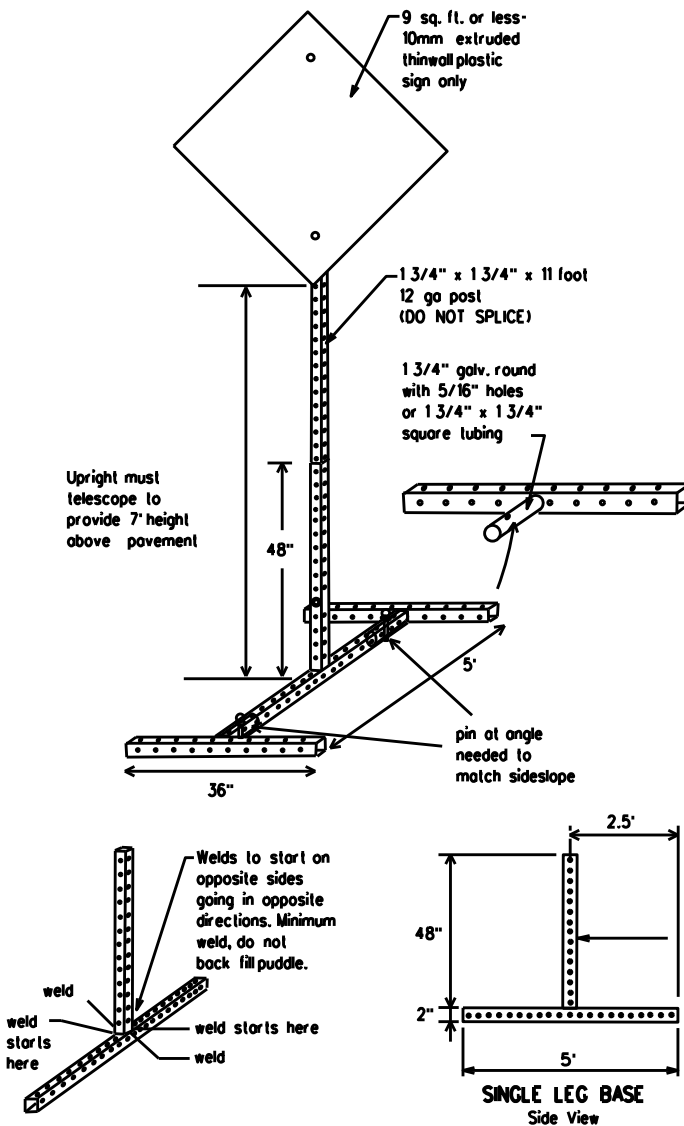
### SKID MOUNTED WOOD SIGN SUPPORTS

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



### GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTC 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 CWZTC 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 CWZTC 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 CWZTC for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



## BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

|                       |           |           |           |           |
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| © TxDOT November 2002 | CONT      | SECT      | JOB       | HIGHWAY   |
| REVISIONS             | 0909      | 22        | 190       | CS        |
| 9-07 8-14             | DIST      | COUNTY    | SHEET NO. |           |
| 7-13 5-21             | WACO      | MCLENNAN  | 12        |           |

DATE: FILE:



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

# RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

## PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

## Phase 1: Condition Lists

### Road/Lane/Ramp Closure List

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

### Other Condition List

|                          |
|--------------------------|
| FRONTAGE ROAD CLOSED     |
| SHOULDER CLOSED XXX FT   |
| RIGHT LN CLOSED XXX FT   |
| RIGHT X LANES OPEN       |
| DAYTIME LANE CLOSURES    |
| I-XX SOUTH EXIT CLOSED   |
| EXIT XXX CLOSED X MILE   |
| RIGHT LN TO BE CLOSED    |
| X LANES CLOSED TUE - FRI |

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

## Phase 2: Possible Component Lists

### Action to Take/Effect on Travel List

|                      |
|----------------------|
| MERGE RIGHT          |
| DETOUR NEXT X EXITS  |
| USE EXIT XXX         |
| STAY ON US XXX SOUTH |
| TRUCKS USE US XXX N  |
| WATCH FOR TRUCKS     |
| EXPECT DELAYS        |
| REDUCE SPEED XXX FT  |
| USE OTHER ROUTES     |
| STAY IN LANE         |

### Location List

|                          |
|--------------------------|
| AT FM XXXX               |
| BEFORE RAILROAD CROSSING |
| NEXT X MILES             |
| PAST US XXX EXIT         |
| XXXXXXXX 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

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

## WORDING ALTERNATIVES

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

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

## FULL MATRIX PCMS SIGNS

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

SHEET 6 OF 12



## BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

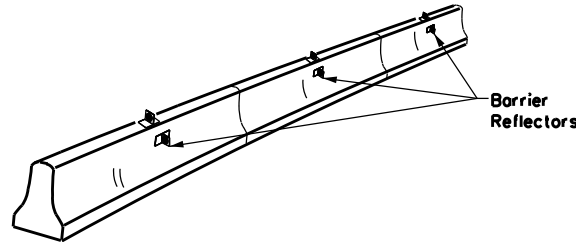
BC(6)-21

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| © TxDOT November 2002 | CONT: 0909 | SECT: 22     | JOB: 190       | HIGHWAY: CS   |
| REVISIONS: 9-07 8-14  | DIST: 7-13 | COUNTY: 5-21 | WACO: MCLENNAN | SHEET NO.: 13 |

DATE: FILE:

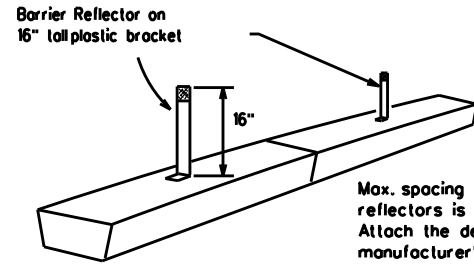
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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



**CONCRETE TRAFFIC BARRIER (CTB)**

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



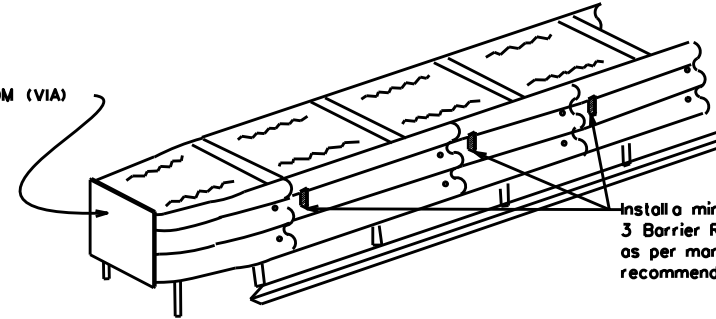
**LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES**

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

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

**LOW PROFILE CONCRETE BARRIER (LPCB)**

See D & OM (VIA)



**DELINEATION OF END TREATMENTS**

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

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

**BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS**

**WARNING LIGHTS**

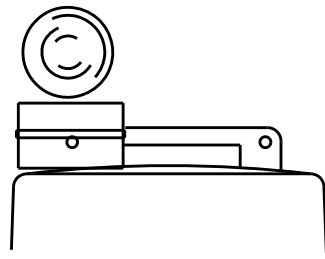
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

**WARNING LIGHTS MOUNTED ON PLASTIC DRUMS**

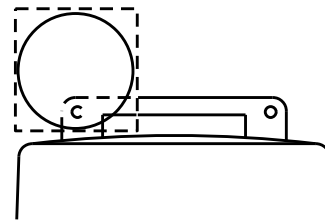
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



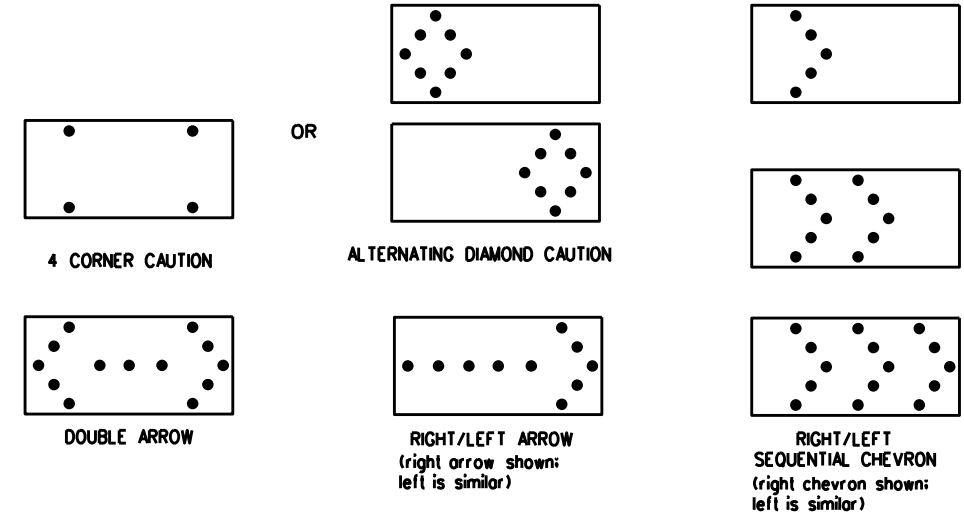
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



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

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

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



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

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

**ATTENTION**  
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

**FLASHING ARROW BOARDS**

SHEET 7 OF 12

**TRUCK-MOUNTED ATTENUATORS**

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



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

**BC(7)-21**

|                                |            |                  |              |             |
|--------------------------------|------------|------------------|--------------|-------------|
| FILE: bc-21.dgn                | DN: TxDOT  | CK: TxDOT        | DW: TxDOT    | CK: TxDOT   |
| © TxDOT November 2002          | CONT: 0909 | SECT: 22         | JOB: 190     | HIGHWAY: CS |
| REVISIONS: 9-07 8-14 7-13 5-21 | DIST: WACO | COUNTY: MCLENNAN | SHEET NO. 14 |             |

DATE: FILE:

**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:

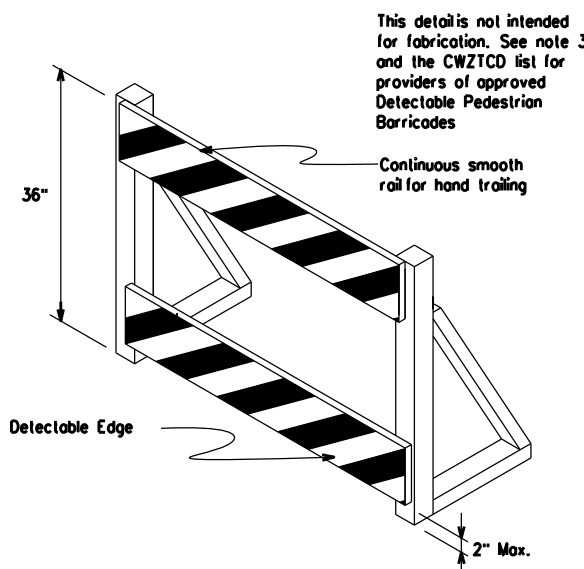
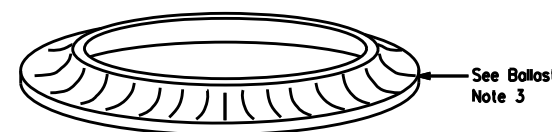
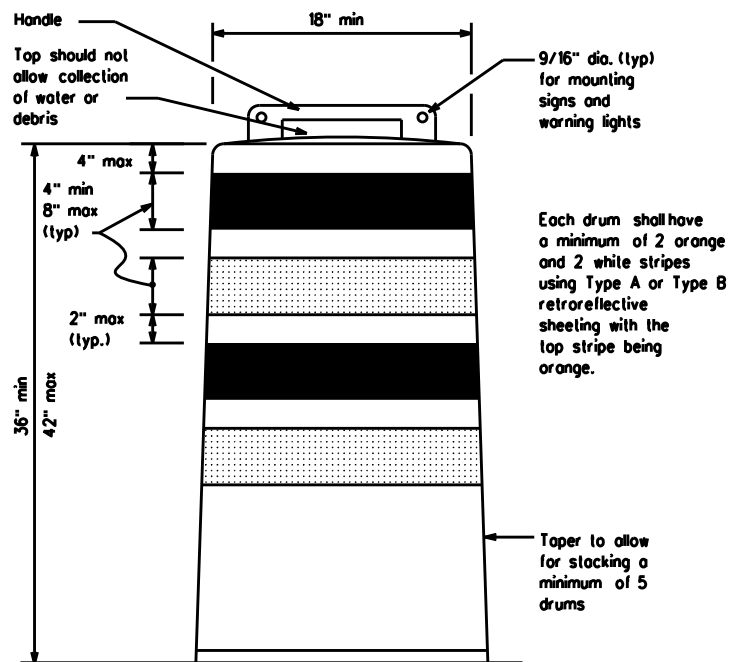
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

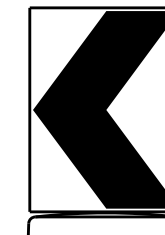
**BALLAST**

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.

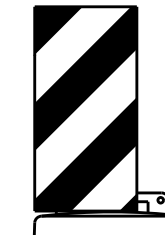


**DETECTABLE PEDESTRIAN BARRICADES**

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 or Type C 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 of 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.

SHEET 8 OF 12



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

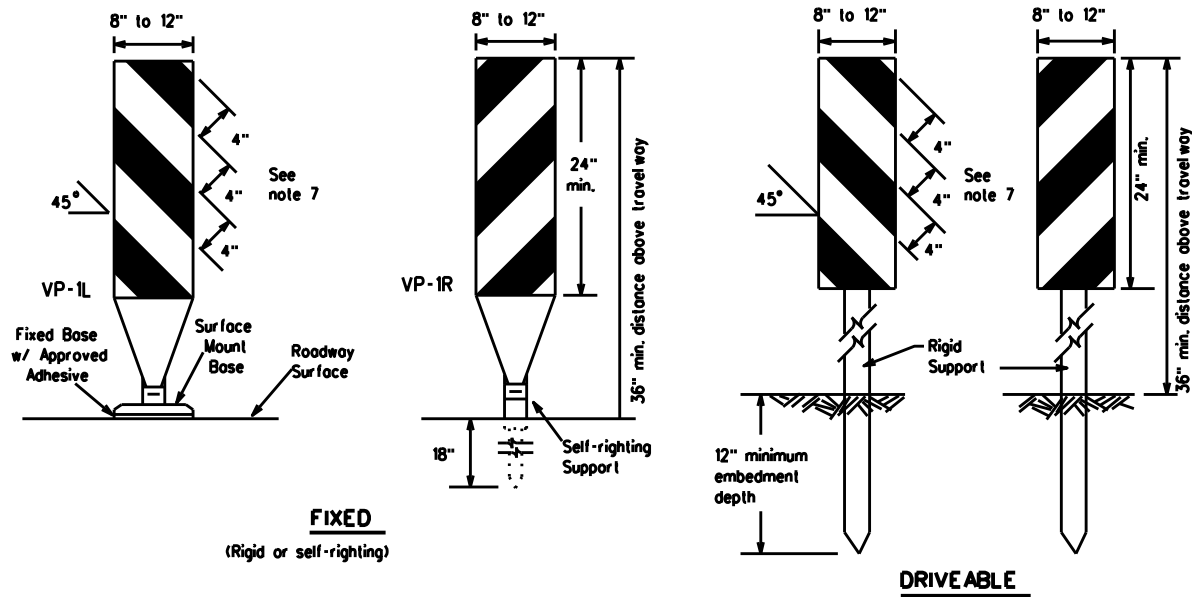
**BC(8)-21**

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| © TxDOT   | November 2002 | CONT | SECT  | JOB      | HIGHWAY   |     |       |     |       |
| REVISIONS |               | 0909 | 22    | 190      | CS        |     |       |     |       |
| 4-03      | 8-14          | DIST |       | COUNTY   | SHEET NO. |     |       |     |       |
| 9-07      | 5-21          | WACO |       | MCLENNAN | 15        |     |       |     |       |
| 7-13      |               |      |       |          |           |     |       |     |       |

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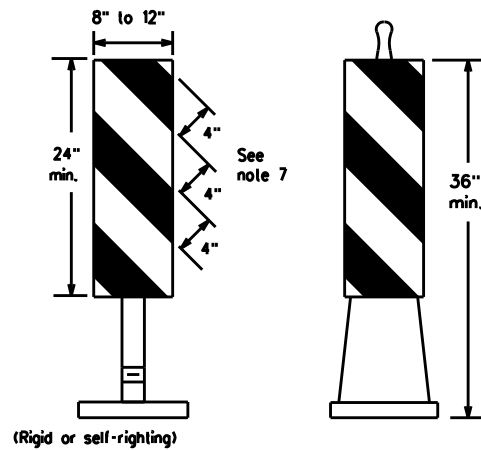
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**FIXED**  
(Rigid or self-righting)

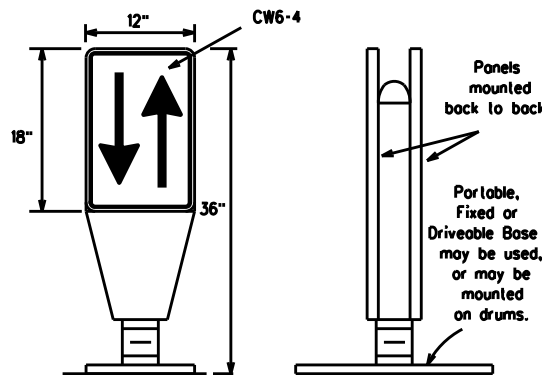
**DRIVEABLE**



**PORTABLE**

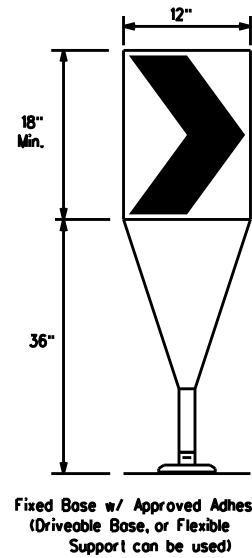
**VERTICAL PANELS (VPs)**

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



**OPPOSING TRAFFIC LANE DIVIDERS (OTLD)**

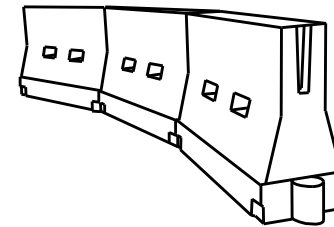
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLDs are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base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



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

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

**CHEVRONS**



**LONGITUDINAL CHANNELIZING DEVICES (LCD)**

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

**WATER BALLASTED SYSTEMS USED AS BARRIERS**

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

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

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

**GENERAL NOTES**

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

| Posted Speed | Formula                  | Minimum Desirable Taper Lengths |            |            | Suggested Maximum Spacing of Channelizing Devices |              |
|--------------|--------------------------|---------------------------------|------------|------------|---|--------------|
|              |                          | 10' Offset                      | 11' Offset | 12' Offset | On a Taper  | On a Tangent |
| 30           | L = WS <sup>2</sup> / 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'  |              |

x x 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



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC(9)-21**

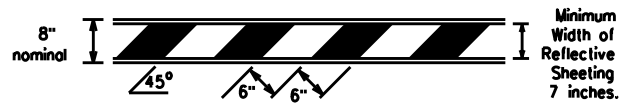
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| REVISIONS: 9-07 8-14  | DIST: WACO | COUNTY: MCLENNAN | SHEET NO. 16 |             |
| 7-13 5-21             |            |                  |              |             |

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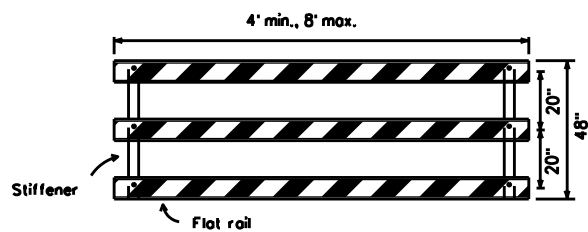
**TYPE 3 BARRICADES**

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stocked 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.

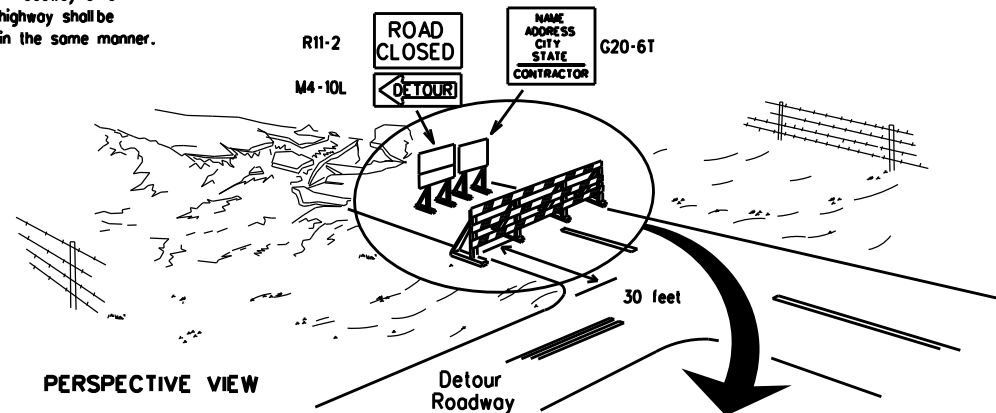


**TYPICAL STRIPING DETAIL FOR BARRICADE RAIL**



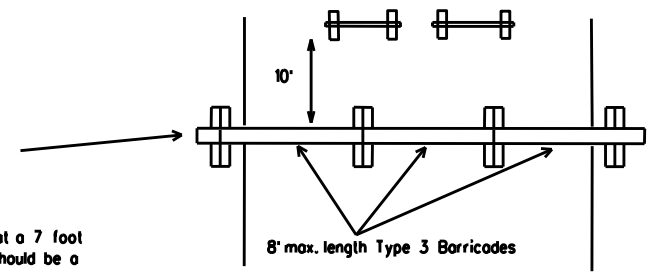
**TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES**

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



PERSPECTIVE VIEW

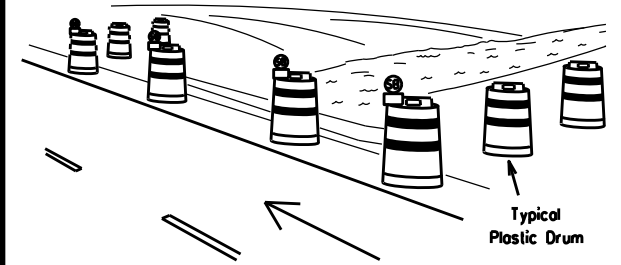
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



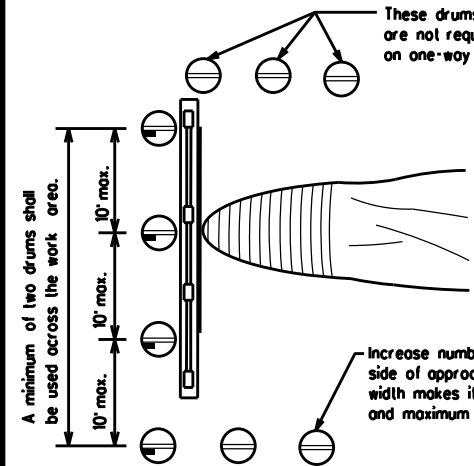
PLAN VIEW

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

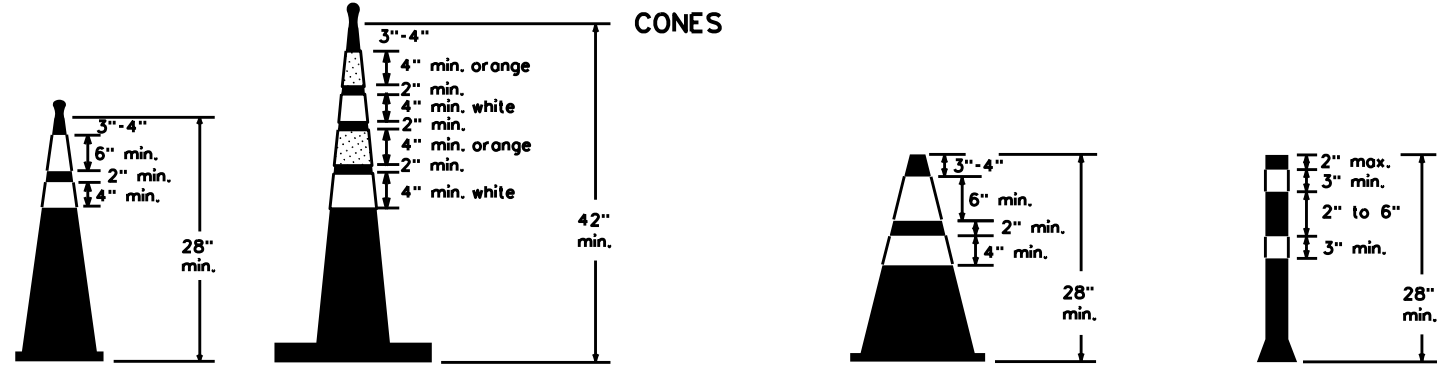


PLAN VIEW

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

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

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

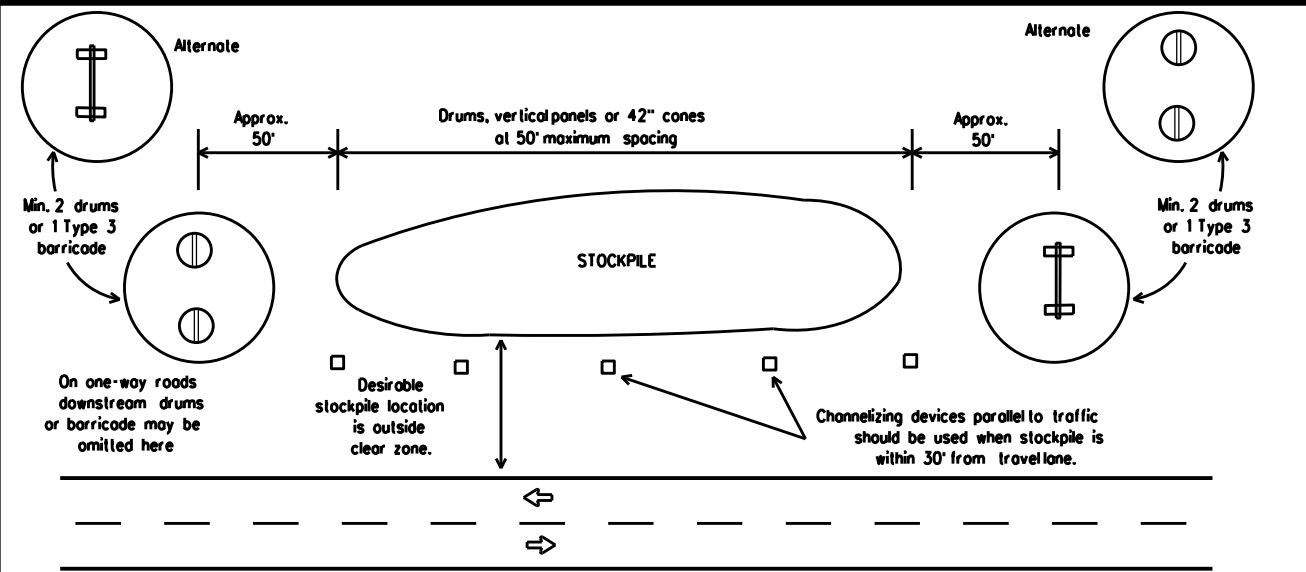


Two-Piece cones

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.



**TRAFFIC CONTROL FOR MATERIAL STOCKPILES**

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 in BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



**BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES**

**BC(10)-21**

|                                 |            |                  |               |             |
|---------------------------------|------------|------------------|---------------|-------------|
| FILE: bc-21.dgn                 | DN: TxDOT  | CK: TxDOT        | DW: TxDOT     | CK: TxDOT   |
| © TxDOT November 2002           | CONT: 0909 | SECT: 22         | JOB: 190      | HIGHWAY: CS |
| REVISIONS: 9-07 8-14, 7-13 5-21 | DIST: WACO | COUNTY: MCLENNAN | SHEET NO.: 17 |             |

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DATE: FILE:

## 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.

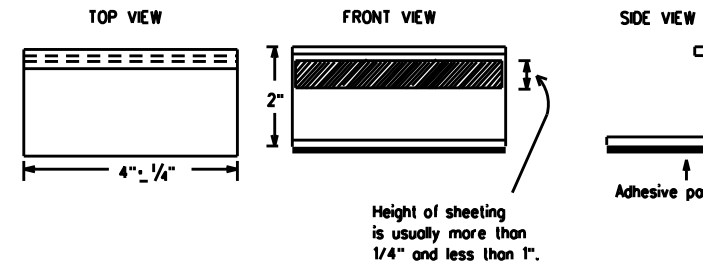
### MAINTAINING WORK ZONE PAVEMENT MARKINGS

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. Block-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).

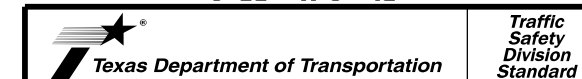
| DEPARTMENTAL MATERIAL SPECIFICATIONS                 |          |
|--|----------|
| PAVEMENT MARKERS (REFLECTORIZED)                     | DMS-4200 |
| TRAFFIC BUTTONS                                      | DMS-4300 |
| EPOXY AND ADHESIVES                                  | DMS-6100 |
| BITUMINOUS 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).

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DATE:  
FILE:

SHEET 11 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

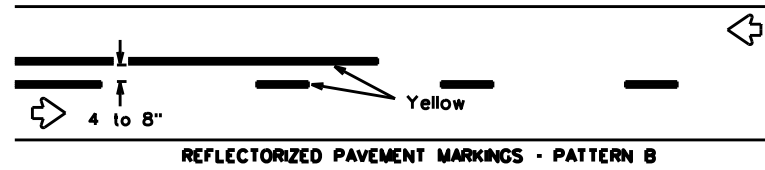
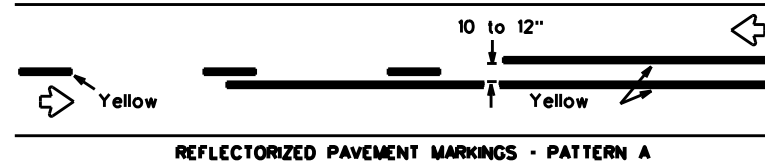
BC(11)-21

|                       |           |           |           |           |
|-----------------------|-----------|-----------|-----------|-----------|
| FILE: bc-21.dgn       | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| © TxDOT February 1998 | CONT      | SECT      | JOB       | HIGHWAY   |
|                       | 0909      | 22        | 190       | CS        |
| REVISIONS             |           |           |           |           |
| 2-98                  | 9-07      | 5-21      |           |           |
| 1-02                  | 7-13      |           |           |           |
| 11-02                 | 8-14      |           |           |           |
|                       | DIST      | COUNTY    | SHEET NO. |           |
|                       | WACO      | MCLENNAN  | 18        |           |

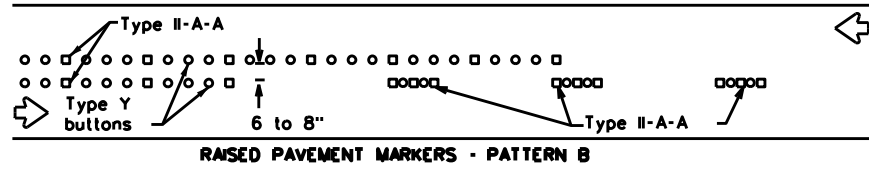
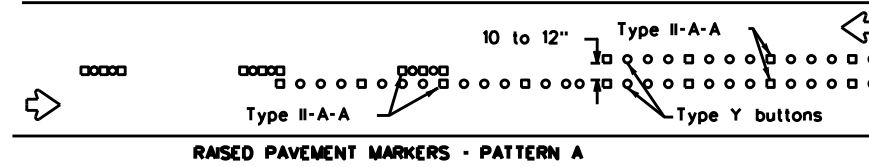
105



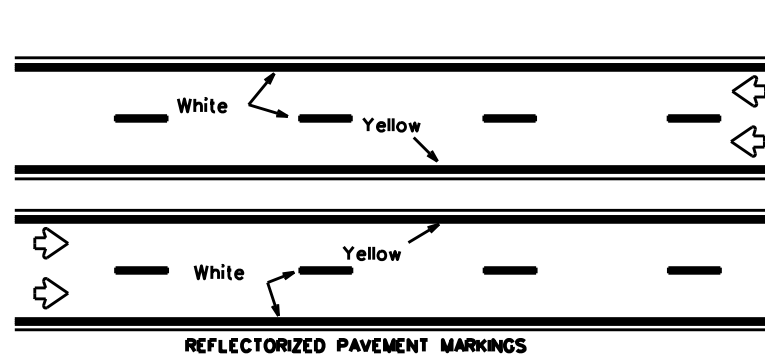
## PAVEMENT MARKING PATTERNS



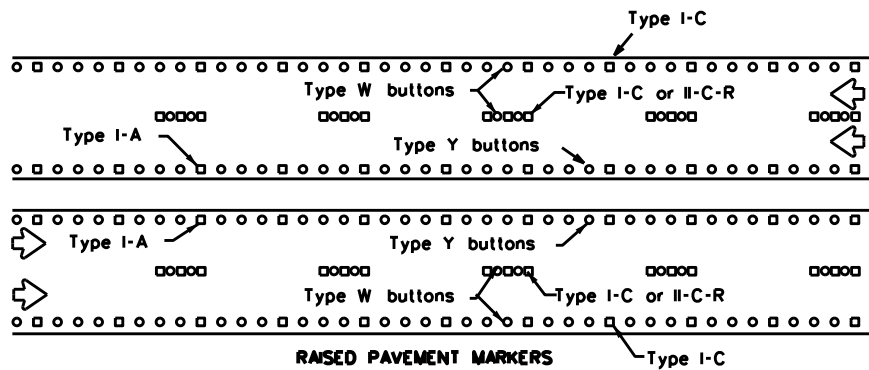
Pattern A is the TxDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.



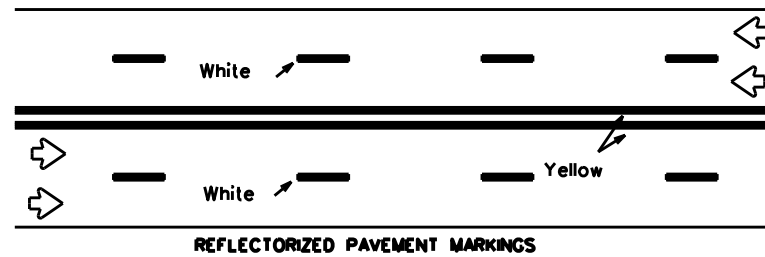
## CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



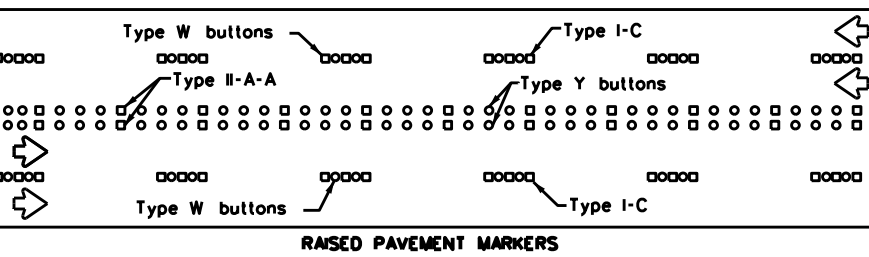
Prefabricated markings may be substituted for reflectORIZED pavement markings.



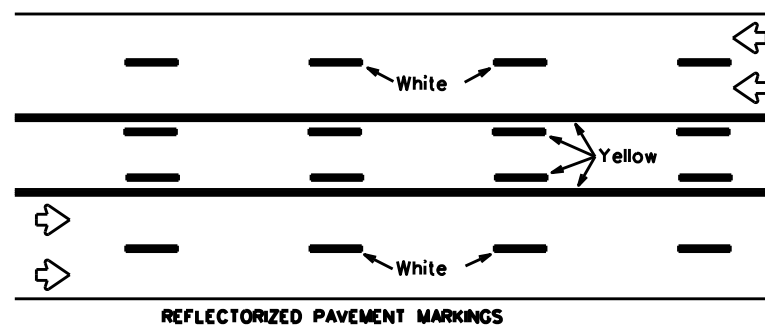
## EDGE & LANE LINES FOR DIVIDED HIGHWAY



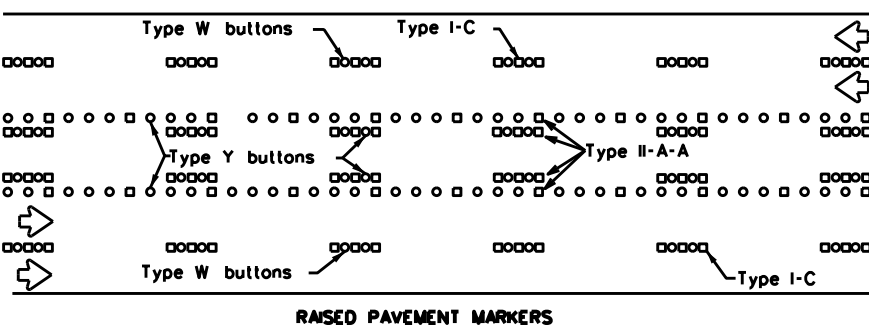
Prefabricated markings may be substituted for reflectORIZED pavement markings.



## LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

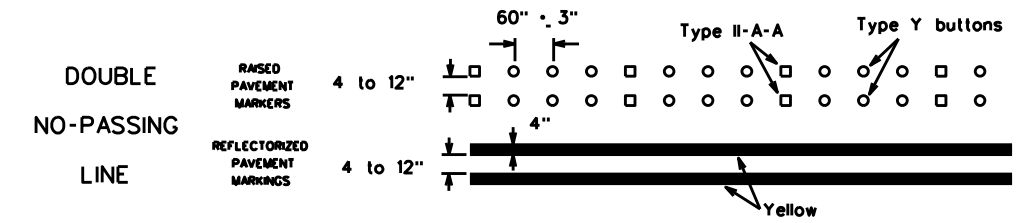


Prefabricated markings may be substituted for reflectORIZED pavement markings.

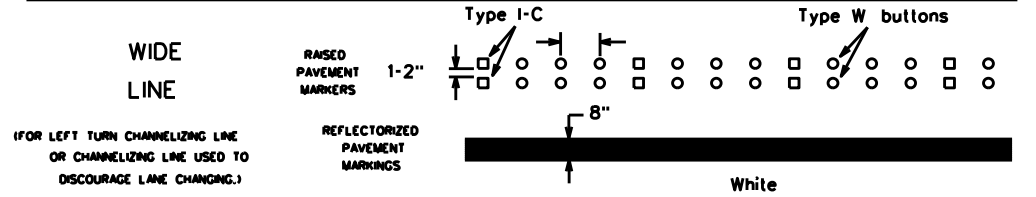
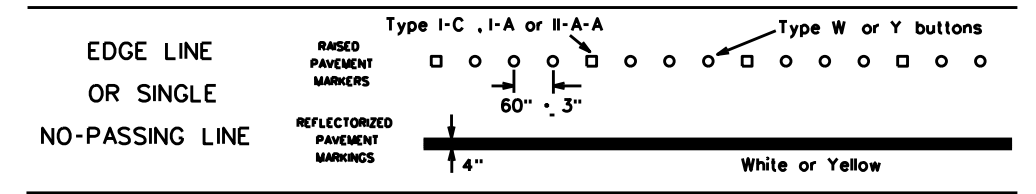


## TWO-WAY LEFT TURN LANE

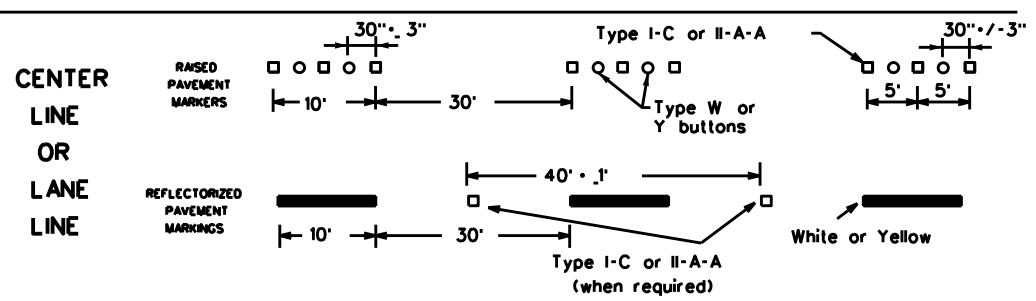
## STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



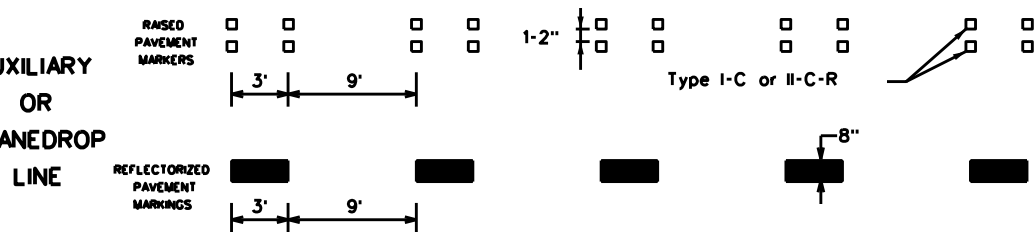
### SOLID LINES



### BROKEN LINES

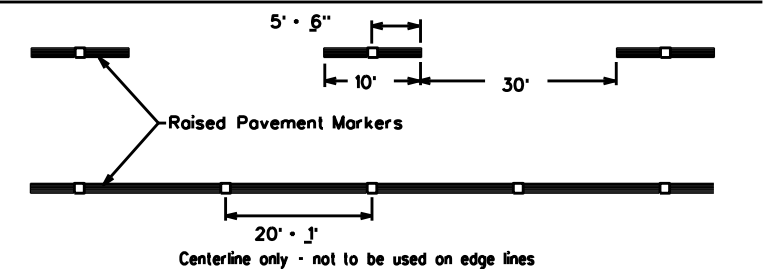


### AUXILIARY OR LANEDROP LINE



### REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



## BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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."

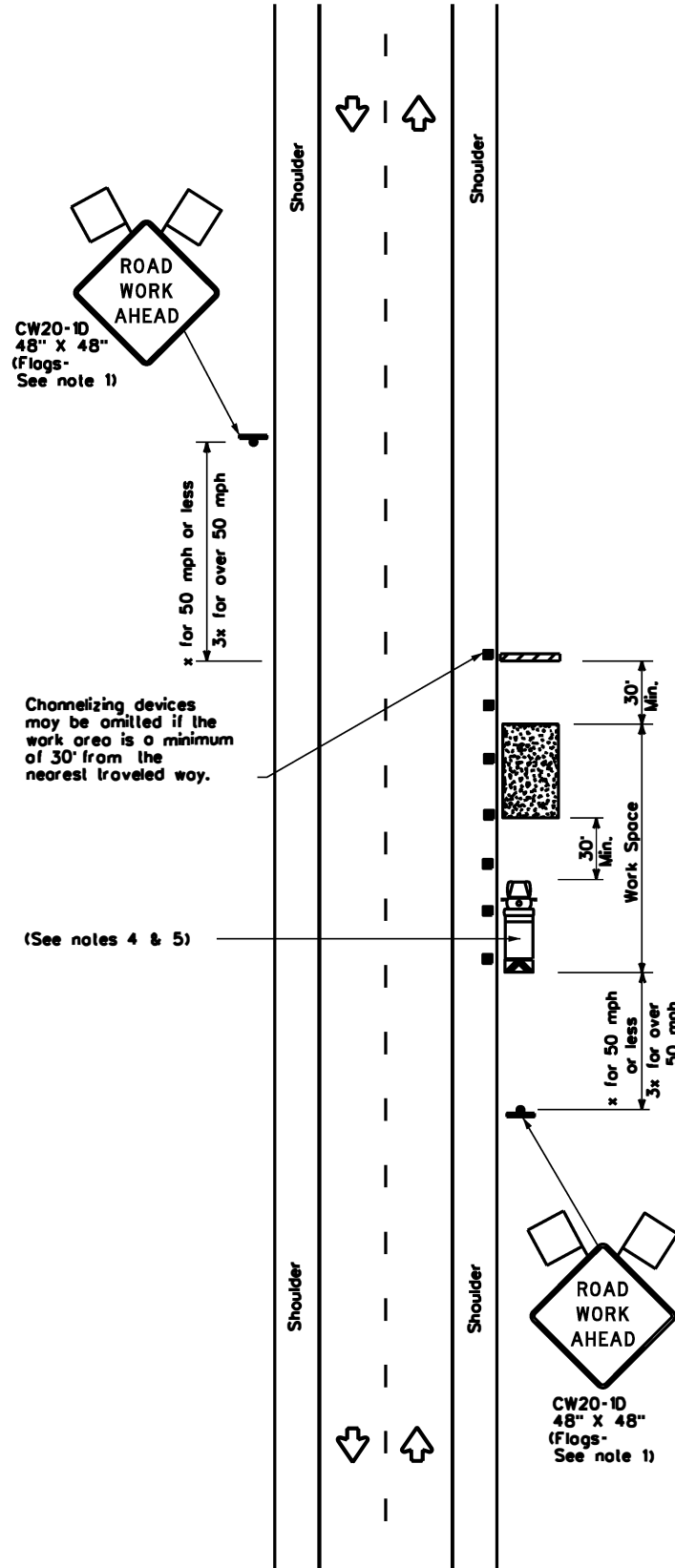
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|-----------------------|-----------|-----------|-----------|-----------|
| FILE: bc-21.dgn       | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| © TxDOT February 1998 | CONT      | SECT      | JOB       | HIGHWAY   |
| REVISIONS             | 0909      | 22        | 190       | CS        |
| 1-97 9-07 5-21        | DIST      | COUNTY    | SHEET NO. |           |
| 2-98 7-13             | WACO      | MCLENNAN  | 19        |           |
| 11-02 8-14            |           |           |           |           |

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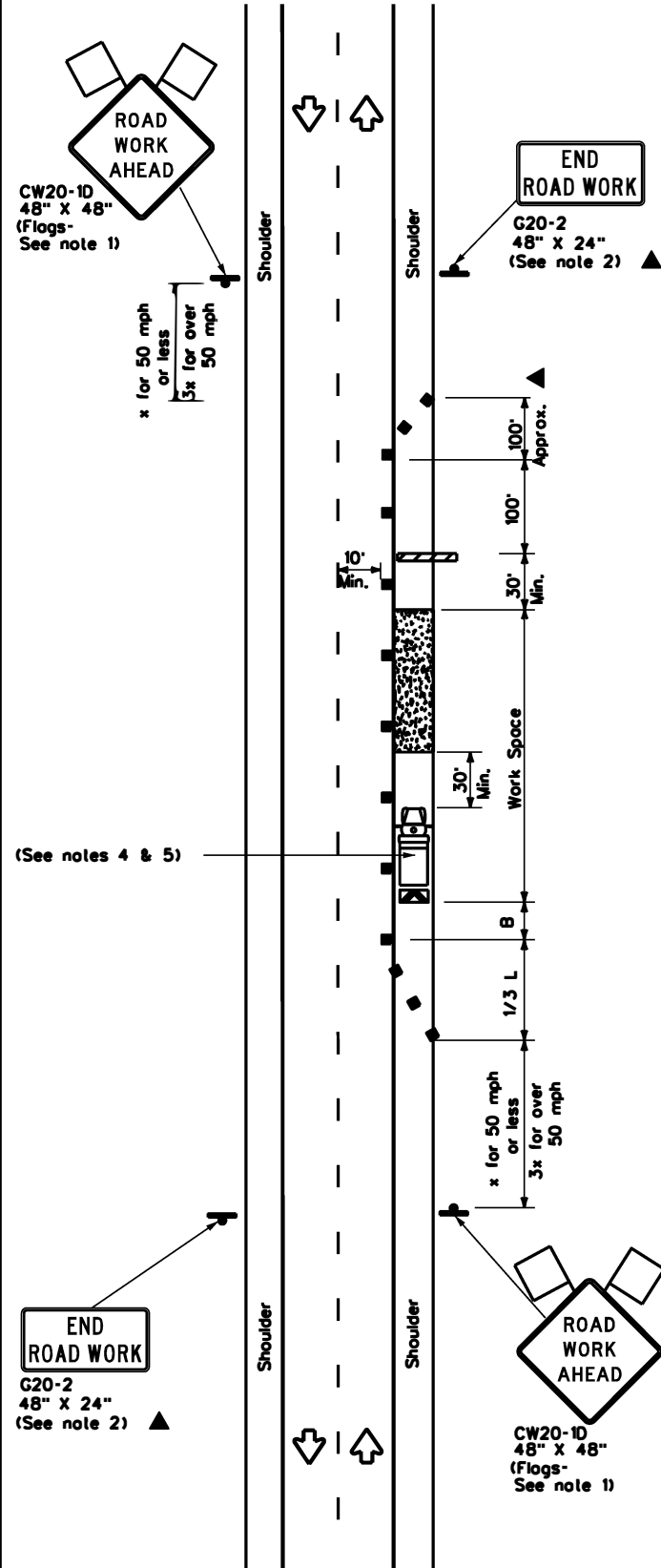
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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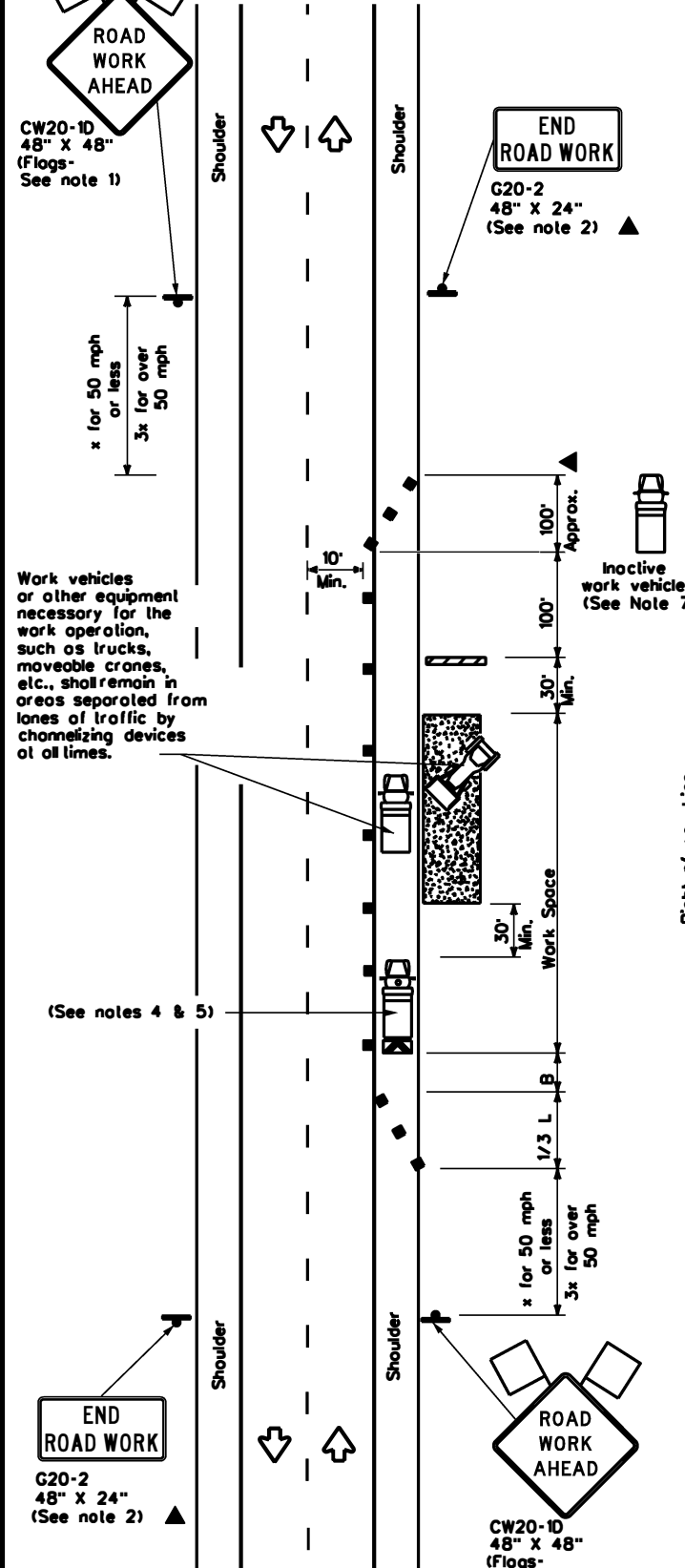
TCP (2-1a)

**WORK SPACE NEAR SHOULDER**  
Conventional Roads



TCP (2-1b)

**WORK SPACE ON SHOULDER**  
Conventional Roads



TCP (2-1c)

**WORK VEHICLES ON SHOULDER**  
Conventional Roads

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

| Posted Speed<br>x | Formula     | Minimum Desirable Taper Lengths x |            |            | Suggested Maximum Spacing of Channelizing Devices |              | Minimum Sign Spacing "x" Distance | Suggested Longitudinal Buffer Space "B" |
|-------------------|-------------|-----------------------------------|------------|------------|---|--------------|-----------------------------------|---|
|                   |             | 10' Offset                        | 11' Offset | 12' Offset | On a Taper  | On a Tangent |                                   |   |
| 30                | L = WS / 60 | 150'                              | 165'       | 180'       | 30'   | 60'          | 120'                              | 90'                                     |
| 35                |             | 205'                              | 225'       | 245'       | 35'   | 70'          | 160'                              | 120'                                    |
| 40                | L = WS      | 265'                              | 295'       | 320'       | 40'   | 80'          | 240'                              | 155'                                    |
| 45                |             | 450'                              | 495'       | 540'       | 45'   | 90'          | 320'                              | 195'                                    |
| 50                | L = WS      | 500'                              | 550'       | 600'       | 50'   | 100'         | 400'                              | 240'                                    |
| 55                |             | 550'                              | 605'       | 660'       | 55'   | 110'         | 500'                              | 295'                                    |
| 60                | L = WS      | 600'                              | 660'       | 720'       | 60'   | 120'         | 600'                              | 350'                                    |
| 65                |             | 650'                              | 715'       | 780'       | 65'   | 130'         | 700'                              | 410'                                    |
| 70                | L = WS      | 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 |
|               | ✓              | ✓                     | ✓                            | ✓                    |

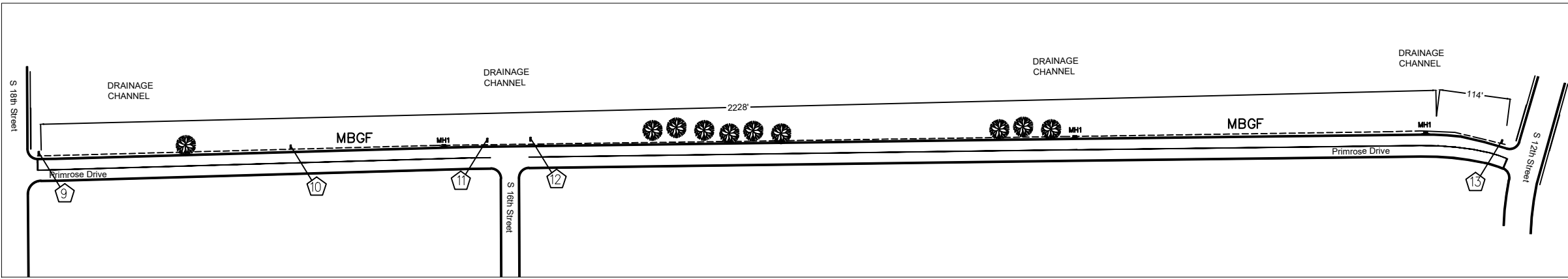
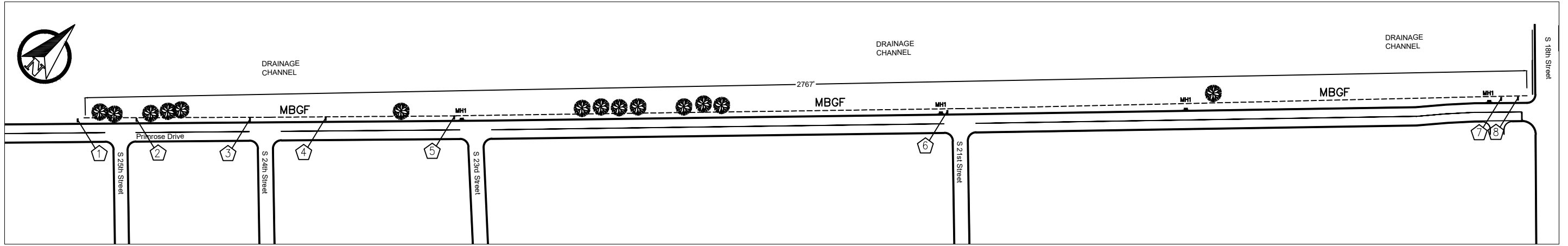
**GENERAL NOTES**

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when slated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- 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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

**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             | 0909 | 22       | 190       | CS      |
| 2-94 4-98             | DIST | COUNTY   | SHEET NO. |         |
| 8-95 2-12             | WACO | MCLENNAN | 20        |         |
| 1-97 2-18             |      |          |           |         |

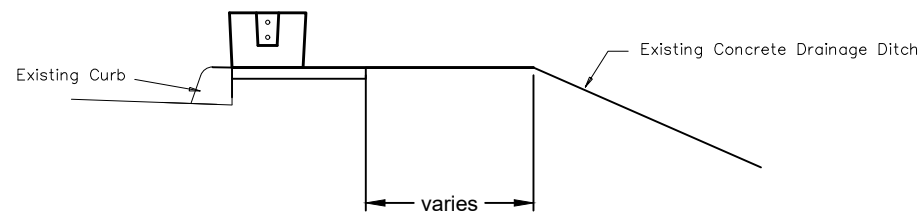


**LEGEND**

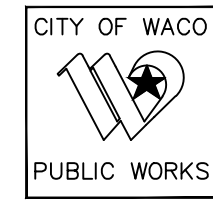
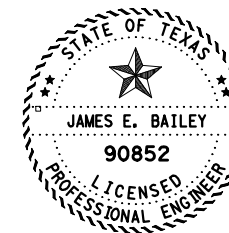
- MBGF
- MH # EXISTING MANHOLE
- RELOCATE SMALL SIGN
- TREE

| RELOCATE SMALL SIGNS |                                 |
|----------------------|---------------------------------|
| 1                    | Bike Lane/No Parking/No Dumping |
| 2                    | No Parking                      |
| 3                    | Bike Lane/No Parking            |
| 4                    | No Parking                      |
| 5                    | Bike Lane/No Parking            |
| 6                    | Bike Lane/No Parking            |
| 7                    | No Parking                      |
| 8                    | Bike Lane/No Parking            |
| 9                    | STOP                            |
| 10                   | STOP AHEAD                      |
| 11                   | Bike Lane/No Parking            |
| 12                   | Alta Vista Neighborhood         |
| 13                   | Bike Lane/No Parking            |

|                           |   |  |   |  |  |   |   |  |
|---------------------------|---|--|---|--|--|---|---|--|
| 100 6001<br>PREPARING ROW | 506 6002<br>ROCK FILTER<br>DAMS (INSTALL)<br>(TY 2) | 506 6011<br>ROCK FILTER<br>DAMS (REMOVE) | 506 6038<br>TEMP SEDMT<br>CONT FENCE<br>(INSTALL) | 506 6039<br>TEMP SEDMT<br>CONT FENCE<br>(REMOVE) | 506 6040<br>BIODEG EROSN<br>CONT LOGS<br>(INSTL)(8") | 506 6043<br>BIODEG EROSN<br>CONT LOGS<br>(REMOVE) | 542 6001<br>REMOVE METAL<br>BEAM GUARD<br>FENCE | 644 6068<br>RELOCATE<br>SM RD SN<br>SUP &AM<br>TY 10 BWG |
| 0.5                       | 100   | 100                                      | 5110  | 5110   | 1000   | 1000  | 5110  | 13   |
| AC                        | LF  | LF                                       | LF  | LF   | LF   | LF  | LF  | EA   |



\* PREPARE ROW BID ITEM AREA FROM MOW STRIP TO DITCH  
REMOVAL OF TREES IS SUBSIDIARY TO PREPARE ROW



*James E. Bailey*  
JAMES E. BAILEY, P.E.

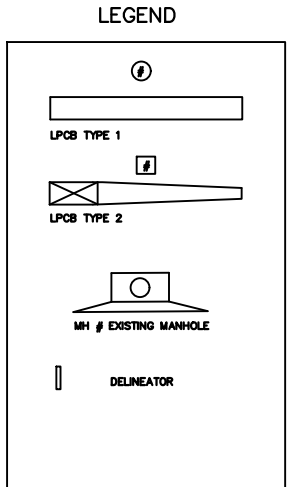
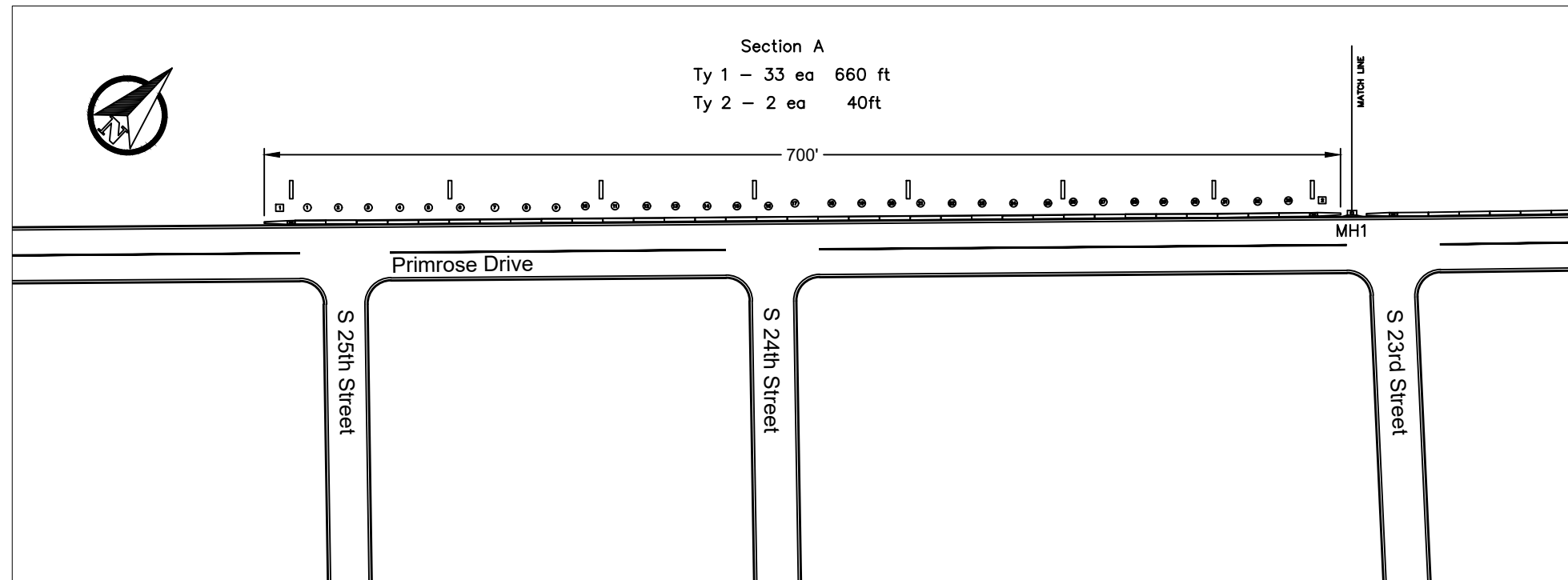
8-1-2023  
DATE

1 IN = 200 FT

SHEET 1 OF 1

| CHANGE ORDER | FED. RD. DIV. NO. | CONT | SECT     | JOB | HIGHWAY   |
|--------------|-------------------|------|----------|-----|-----------|
|              | 6                 | 0909 | 22       | 190 | CS        |
|              | STATE             | DIST | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC  | MCLENNAN |     | 21        |

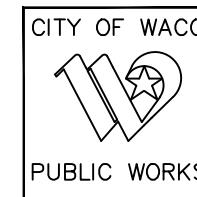
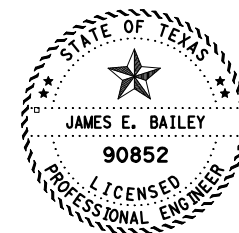
**REMOVALS**



| SHEET            | LIMITS (APPROXIMATE) | SECTION | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN)<br>CY | 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1)<br>LF | 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2)<br>LF | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI)<br>EA |
|------------------|----------------------|---------|---|--|--|--|
| 1                | 25TH ST TO 23RD ST   | A       | 35.00   | 660  | 40   | 8  |
| 2                | 23RD ST TO 21ST ST   | B       | 45.00   | 860  | 40   | 10   |
| 3                | 21ST ST TO 18TH ST   | C, D, E | 50.00   | 920  | 80   | 11   |
| 4                | 18TH ST TO 16TH ST   | F       | 35.00   | 620  | 80   | 8  |
| 5                | 16TH ST TO 12TH ST   | G       | 49.00   | 940  | 40   | 11   |
| 6                | 16TH ST TO 12TH ST   | H, I    | 33.00   | 580  | 80   | 9  |
| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00  | 4580   | 360  | 57   |

← SHEET 1 TOTALS

*James E. Bailey*  
 JAMES E. BAILEY, P.E.  
 5-31-2023  
 DATE



**Texas Department of Transportation** 2023

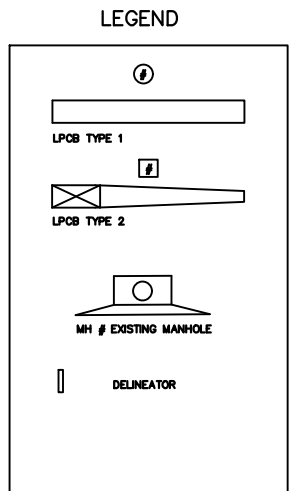
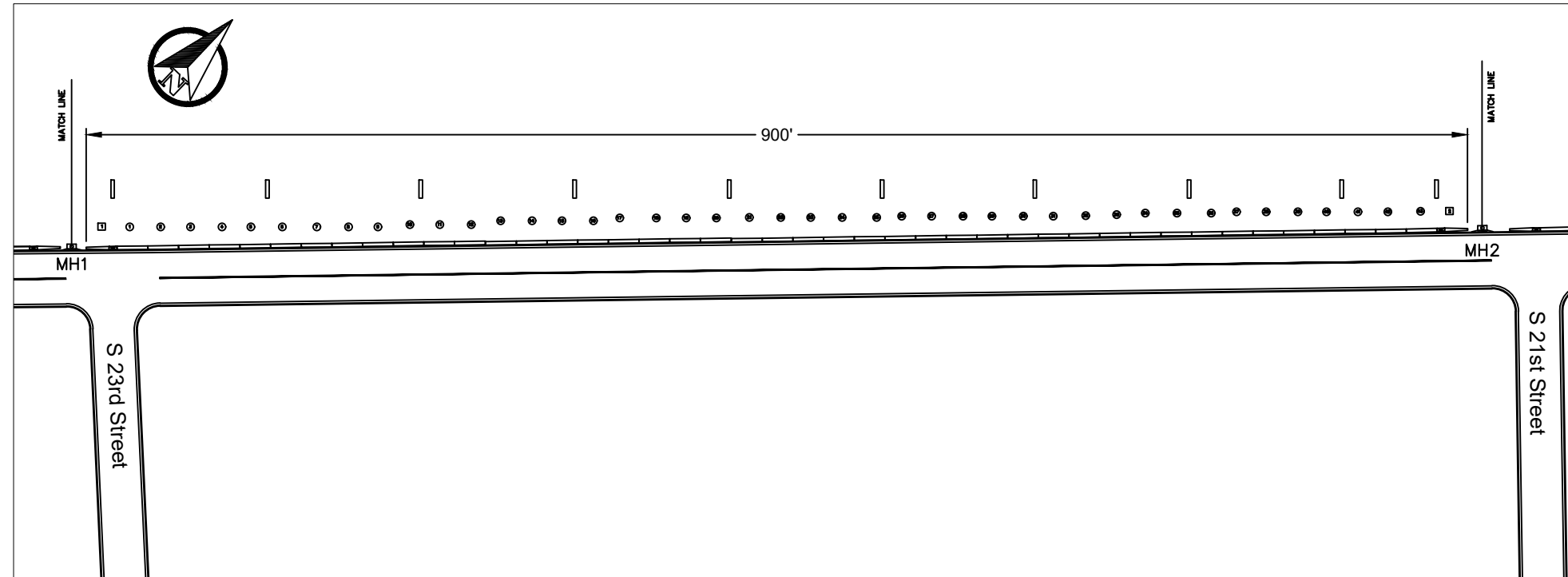
LAYOUTS

1 IN = 100 FT

SHEET 1 OF 6

|              |                   |       |          |     |           |
|--------------|-------------------|-------|----------|-----|-----------|
| CHANGE ORDER | FED. RD. DIV. NO. | CONT. | SECT.    | JOB | HIGHWAY   |
|              | 6                 | 0909  | 22       | 190 | CS        |
|              | STATE             | DIST. | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC   | MCLENNAN |     | 22        |

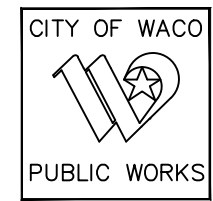
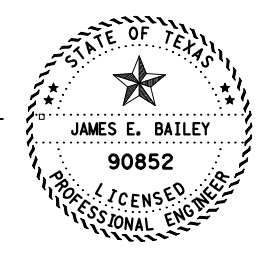
Section B  
 Ty 1 - 43 ea 860ft  
 Ty 2- 2 ea 40 ft



| SHEET            | LIMITS (APPROXIMATE) | SECTION | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN)<br>CY | 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1)<br>LF | 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2)<br>LF | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI)<br>EA |
|------------------|----------------------|---------|---|--|--|--|
| 1                | 25TH ST TO 23RD ST   | A       | 35.00   | 660  | 40   | 8  |
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| 5                | 16TH ST TO 12TH ST   | G       | 49.00   | 940  | 40   | 11   |
| 6                | 16TH ST TO 12TH ST   | H, I    | 33.00   | 580  | 80   | 9  |
| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00  | 4580   | 360  | 57   |

← SHEET 2 TOTALS

*James E. Bailey*  
 JAMES E. BAILEY, P.E.  
 5-31-2023  
 DATE

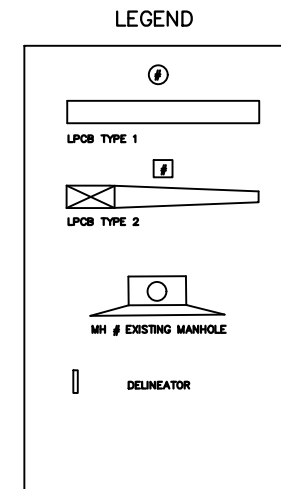
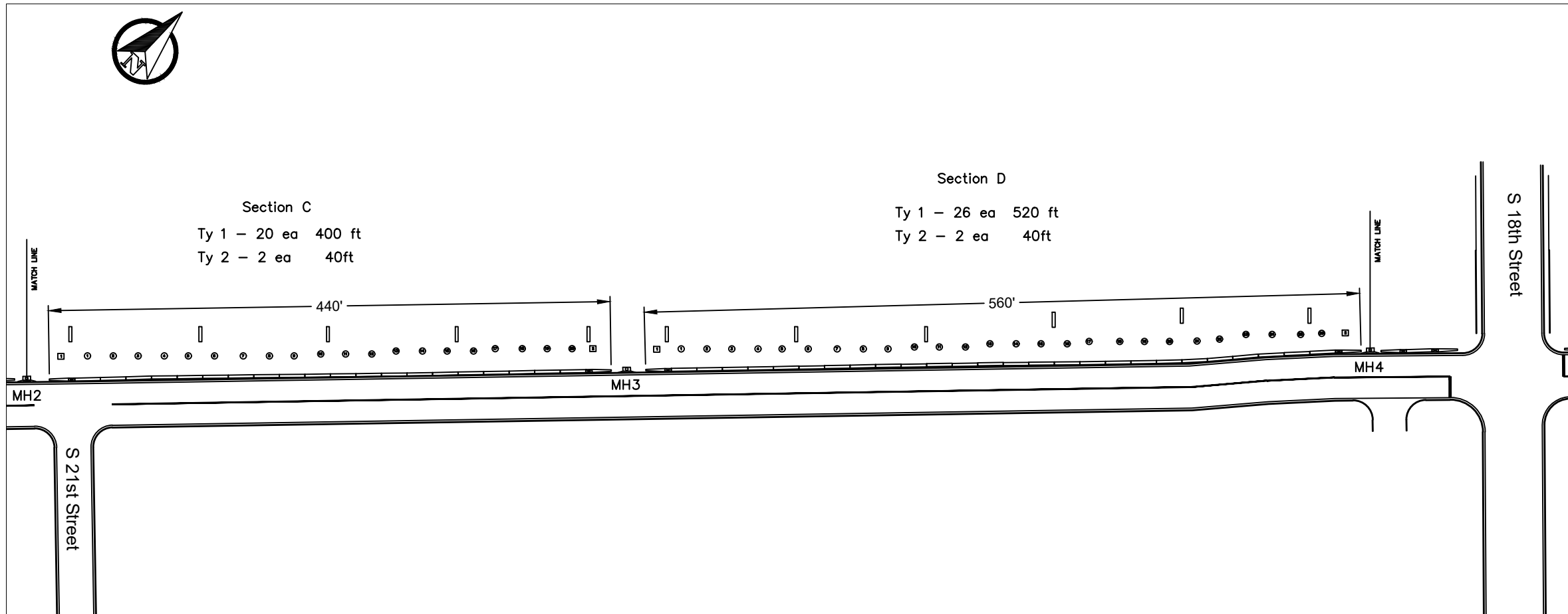


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LAYOUTS

1 IN = 100 FT SHEET 2 OF 6

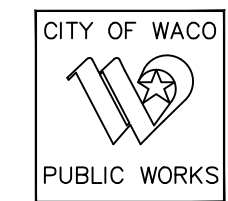
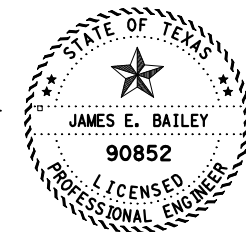
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|--------------|-------------------|------|----------|-----|-----------|
| CHANGE ORDER | FED. RD. DIV. NO. | CONT | SECT     | JOB | HIGHWAY   |
|              | 6                 | 0909 | 22       | 190 | CS        |
|              | STATE             | DIST | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC  | MCLENNAN |     | 23        |



| SHEET            | LIMITS (APPROXIMATE) | SECTION | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN)<br>CY | 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1)<br>LF | 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2)<br>LF | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI)<br>EA |
|------------------|----------------------|---------|---|--|--|--|
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| 6                | 16TH ST TO 12TH ST   | H, I    | 33.00   | 580  | 80   | 9  |
| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00  | 4580   | 360  | 57   |

← SHEET 3 TOTALS

*James E. Bailey*  
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 5-31-2023  
 DATE



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 Texas Department of Transportation

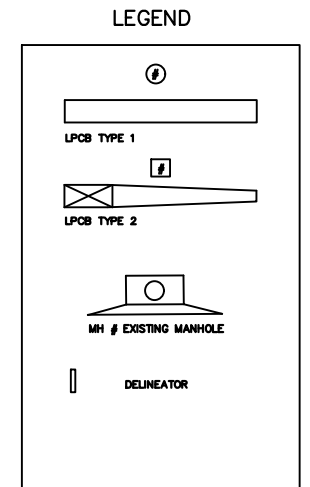
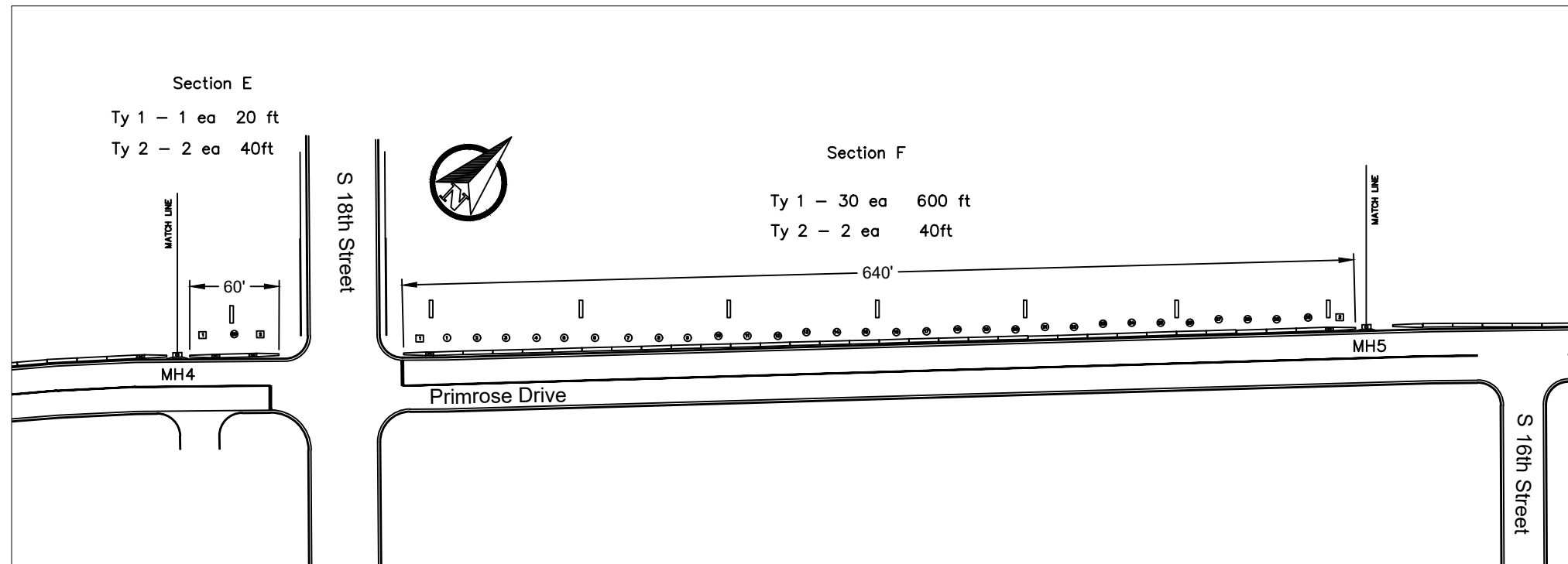
LAYOUTS

1 IN = 100 FT

SHEET 3 OF 6

| CHANGE ORDER | FED. RD. DIV. NO. | CONT | SECT     | JOB | HIGHWAY   |
|--------------|-------------------|------|----------|-----|-----------|
|              | 6                 | 0909 | 22       | 190 | CS        |
|              | STATE             | DIST | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC  | MCLINMAN |     | 24        |

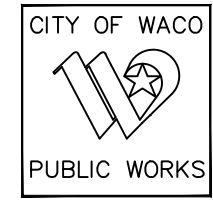
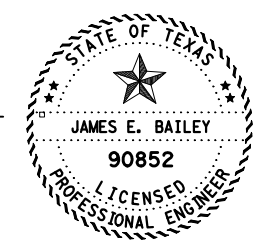




| SHEET            | LIMITS (APPROXIMATE) | SECTION | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN)<br>CY | 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1)<br>LF | 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2)<br>LF | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI)<br>EA |
|------------------|----------------------|---------|---|--|--|--|
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| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00  | 4580   | 360  | 57   |

← SHEET 4 TOTALS

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 5-31-2023  
 DATE



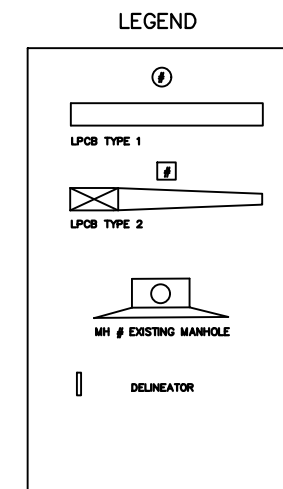
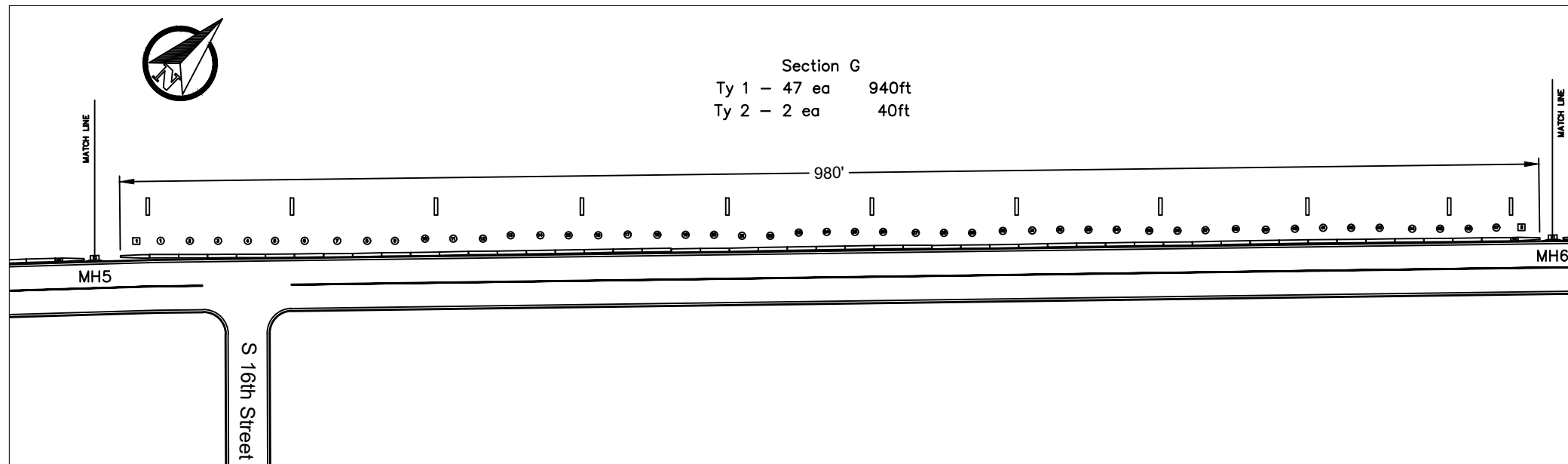
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LAYOUTS

1 IN = 100 FT

SHEET 4 OF 6

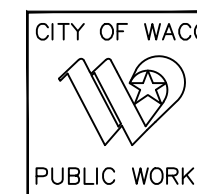
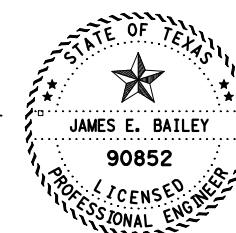
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|--------------|-------------------|------|----------|-----|-----------|
|              | 6                 | 0009 | 22       | 190 | CS        |
|              | STATE             | DIST | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC  | MCLENNAN |     | 25        |



| SHEET            | LIMITS (APPROXIMATE) | SECTION | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN)<br>CY | 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1)<br>LF | 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2)<br>LF | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI)<br>EA |
|------------------|----------------------|---------|---|--|--|--|
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| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00  | 4580   | 360  | 57   |

← SHEET 5 TOTALS

*James E. Bailey*  
 \_\_\_\_\_  
 JAMES E. BAILEY, P.E.  
 5-31-2023  
 \_\_\_\_\_  
 DATE

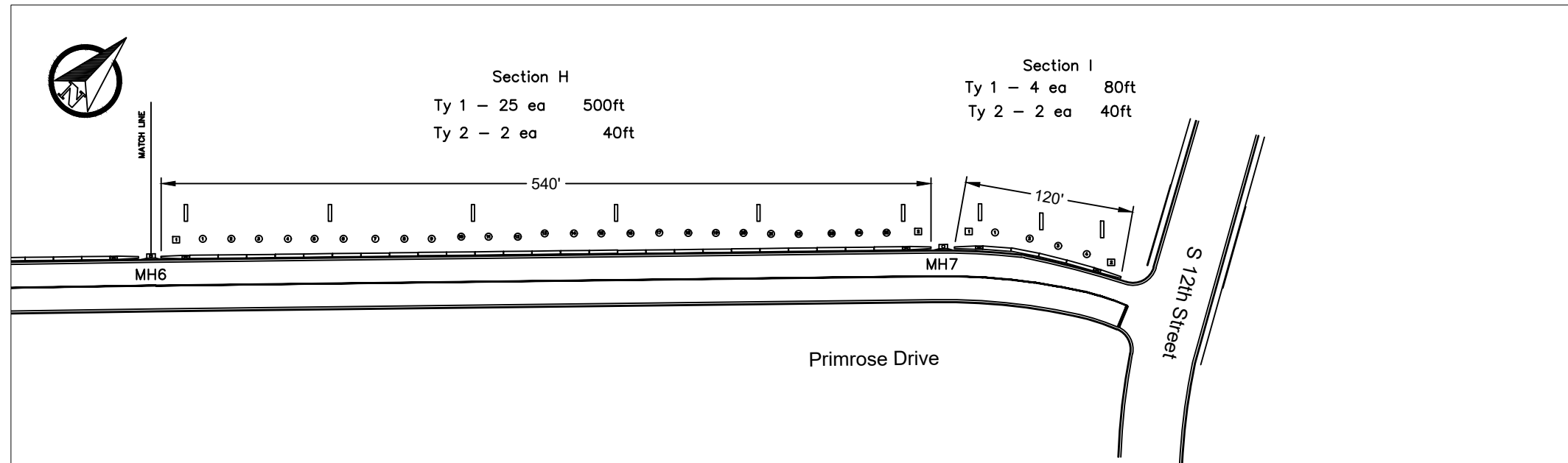


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LAYOUTS

1 IN = 100 FT SHEET 5 OF 6

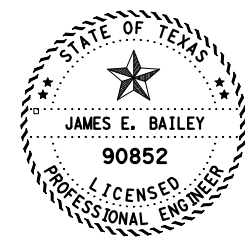
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|--------------|-------------------|------|----------|-----|-----------|
| CHANGE ORDER | FED. RD. DIV. NO. | CONT | SECT     | JOB | HIGHWAY   |
|              | 6                 | 0909 | 22       | 190 | CS        |
|              | STATE             | DIST | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC  | MCLENNAN |     | 26        |



| SHEET            | LIMITS (APPROXIMATE) | SECTION | 432 6045<br>RIPRAP<br>(MOW STRIP)<br>(4 IN)<br>CY | 512 6009<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 1)<br>LF | 512 6010<br>PORT CTB<br>(FUR & INST)<br>(LOW PROF)<br>(TY 2)<br>LF | 658 6062<br>INSTL DEL ASSM<br>(D-SW)SZ 1<br>(BRF)GF2(BI)<br>EA |
|------------------|----------------------|---------|---|--|--|--|
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| AT 7 EA MANHOLES |                      |         | 7.00  |  |  |  |
| PROJECT TOTALS   |                      |         | 254.00  | 4580   | 360  | 57   |

← SHEET 6 TOTALS

*James E. Bailey*  
 \_\_\_\_\_  
 JAMES E. BAILEY, P.E.  
 5-31-2023  
 \_\_\_\_\_  
 DATE

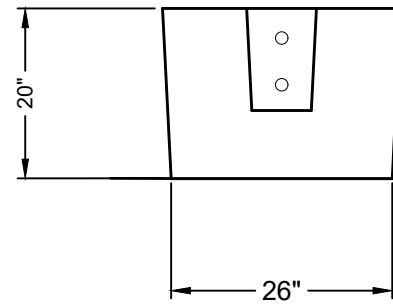


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 Texas Department of Transportation

LAYOUTS

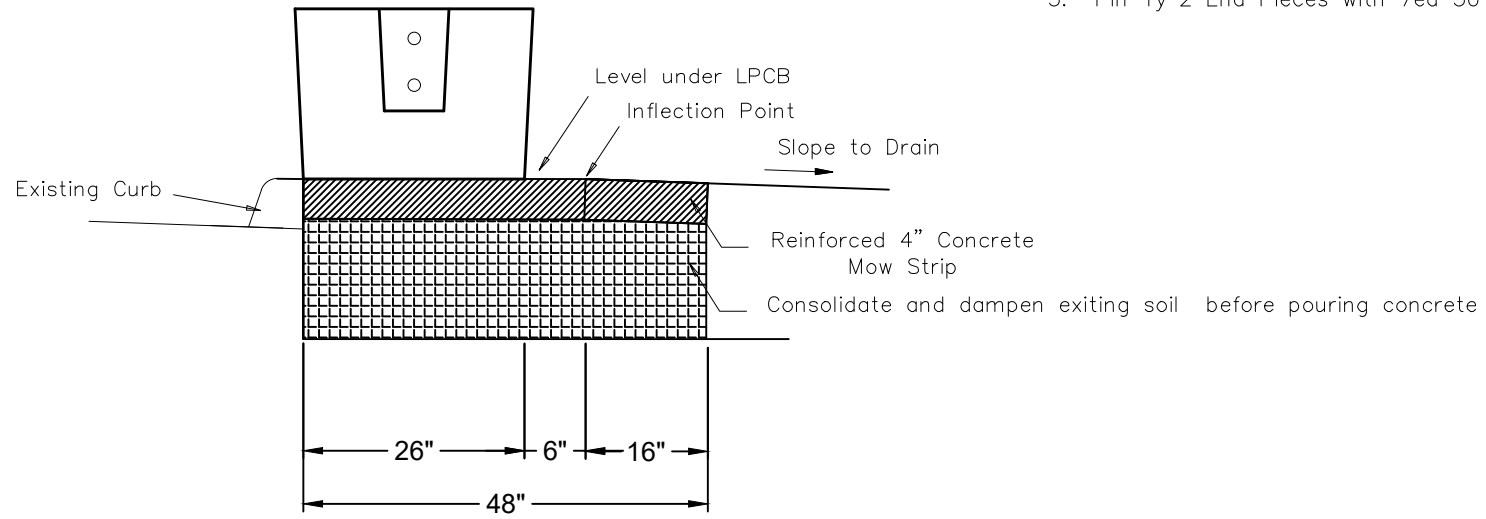
1 IN = 100 FT SHEET 6 OF 6

| CHANGE ORDER | FED. RD. DIV. NO. | CONT. | SECT.    | JOB | HIGHWAY   |
|--------------|-------------------|-------|----------|-----|-----------|
|              | 6                 | 0909  | 22       | 190 | CS        |
|              | STATE             | DIST. | COUNTY   |     | SHEET NO. |
|              | TEXAS             | WAC   | MCLENNAN |     | 27        |



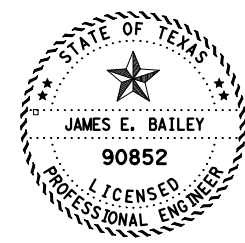
**GENERAL NOTES**

1. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
2. Thickness of the mow strip will be 4".
3. Pin Ty 2 End Pieces with 7ea 30" pin at 24" spacing.



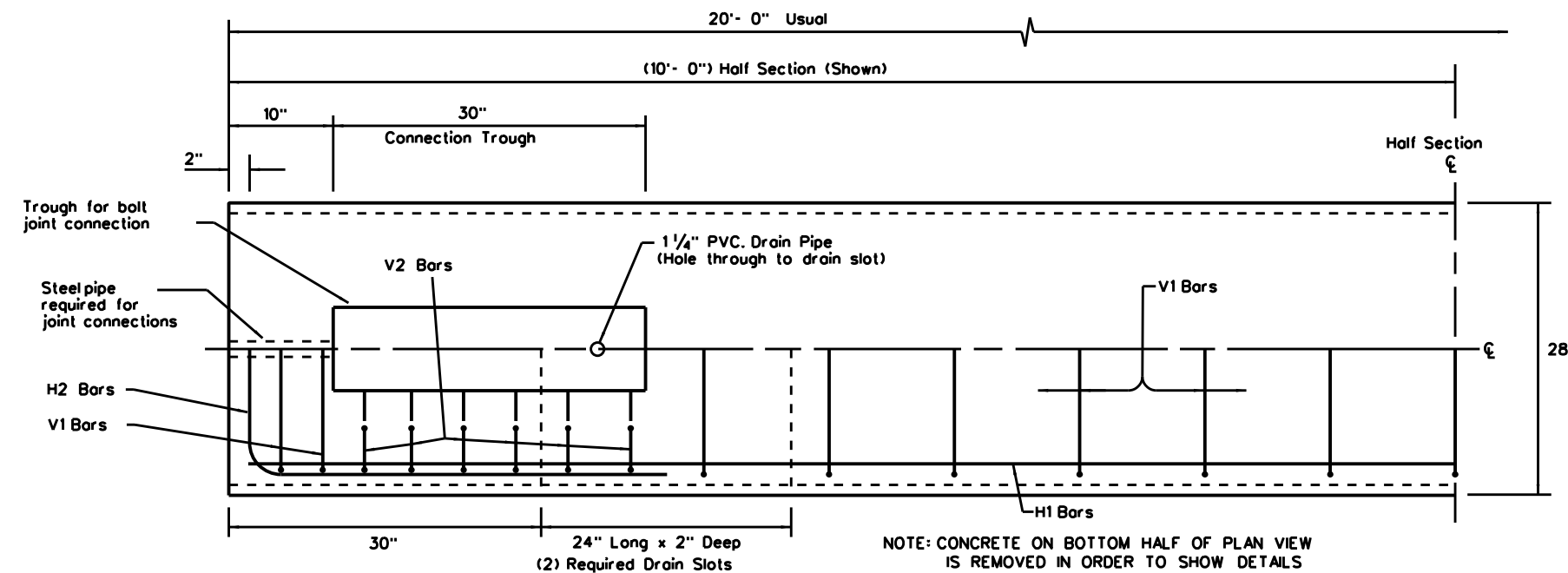
**LOW PROFILE CONCRETE BARRIER AND MOW STRIP**

*James E. Bailey*  
 JAMES E. BAILEY, P.E.  
 5-31-2023  
 DATE

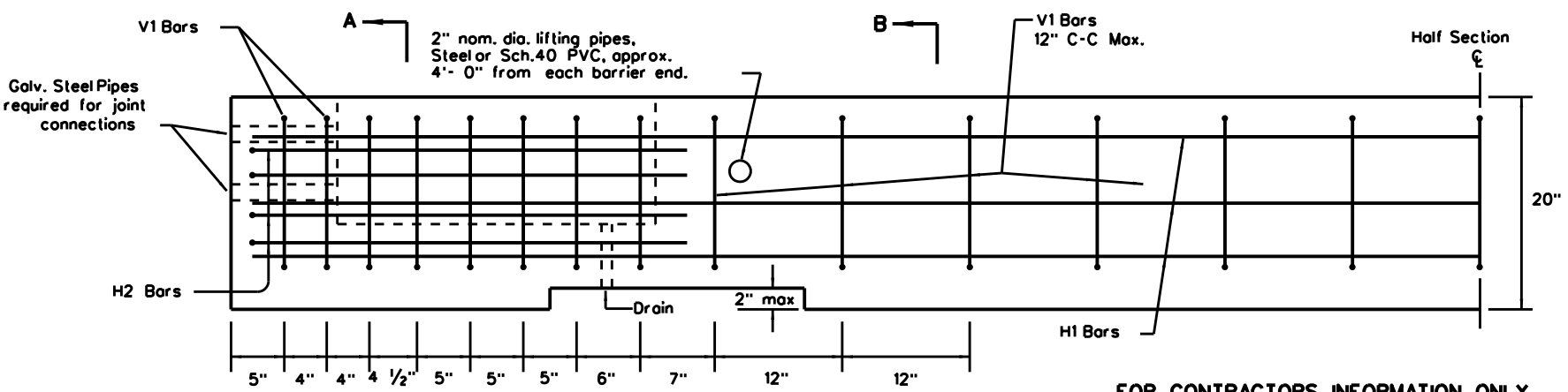


|                        |                   |      |          |     |           |
|------------------------|-------------------|------|----------|-----|-----------|
| <b>TYPICAL SECTION</b> |                   |      |          |     |           |
| SHEET OF               |                   |      |          |     |           |
| CHANGE ORDER           | FED. RD. DIV. NO. | CONT | SECT     | JOB | HIGHWAY   |
|                        | 6                 | 0909 | 22       | 190 | CS        |
|                        | STATE             | DIST | COUNTY   |     | SHEET NO. |
|                        | TEXAS             | WAC  | MCLENNAN |     | 28        |

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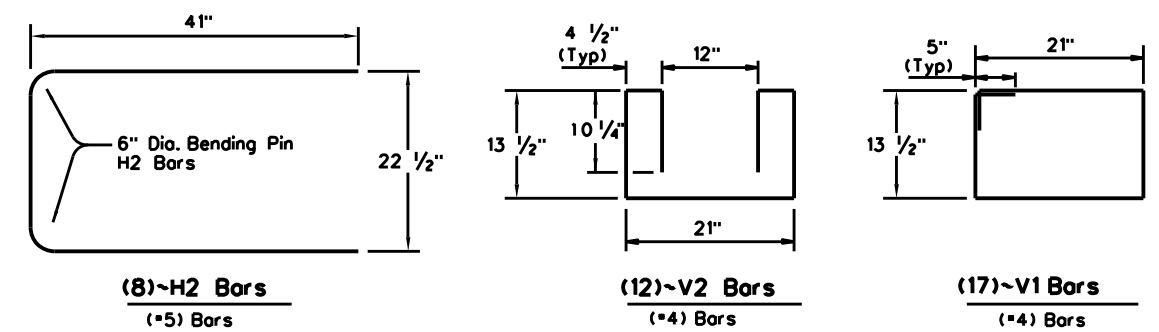
**PLAN**  
**(TYPE 1) BARRIER SEGMENT**  
(SYMMETRICAL ABOUT CENTER LINES)



**ELEVATION**  
**(TYPE 1) BARRIER SEGMENT**  
(SYMMETRICAL ABOUT CENTER LINES)

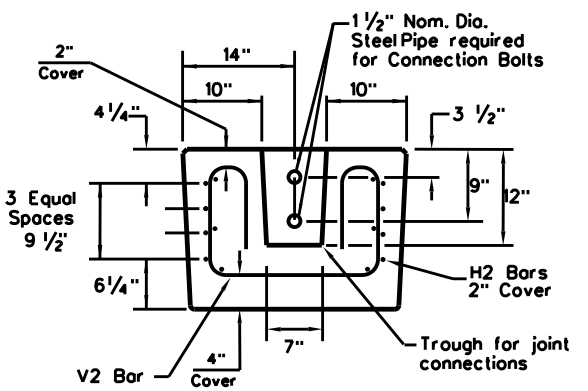
**FOR CONTRACTORS INFORMATION ONLY**

| (TYPE 1)<br>APPROX. QUANTITIES 20 FT. SECTION |     |       |
|---|-----|-------|
| CONCRETE                                      | CY  | 2.6   |
| REINFORCING STEEL                             | LBS | 330   |
| TOTAL BARRIER WT.                             | LBS | 11000 |

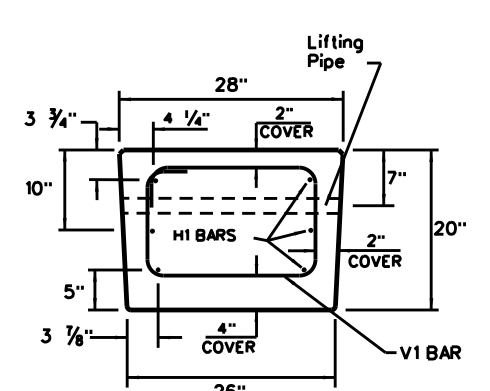


**REINFORCING STEEL DETAILS**  
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



**SECTION A-A**



**SECTION B-B**

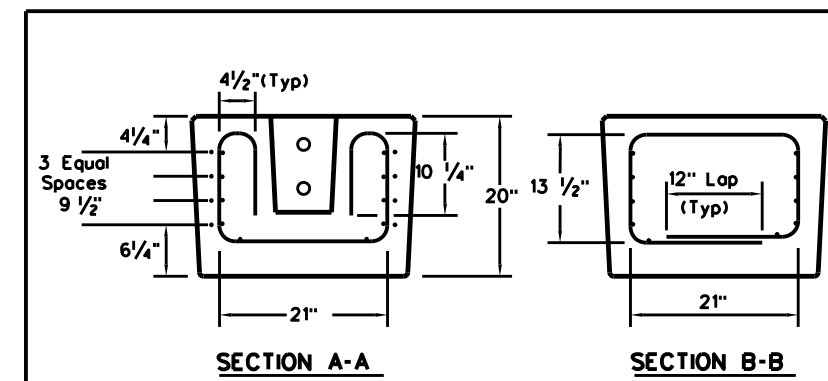
**GENERAL NOTES**

1. Low Profile Concrete Barrier (LPCB), is approved permanent use for this project, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have 3/4" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts," and is considered subsidiary.
7. Steelpipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.



The seal appearing on this document was authorized by James E. Bailey, P.E. 90852, on

*James E. Bailey*  
5/31/2023



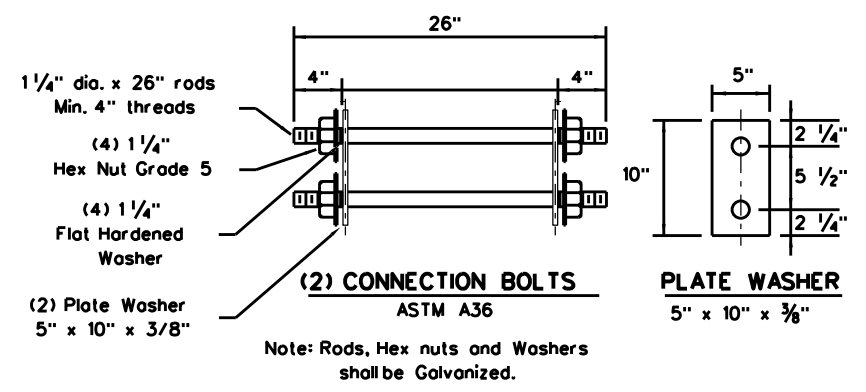
**WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING**

**(WWR) GENERAL NOTES**

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

**REQUIRED (WWR) WIRE DESIGN**

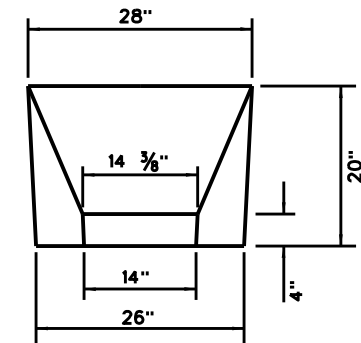
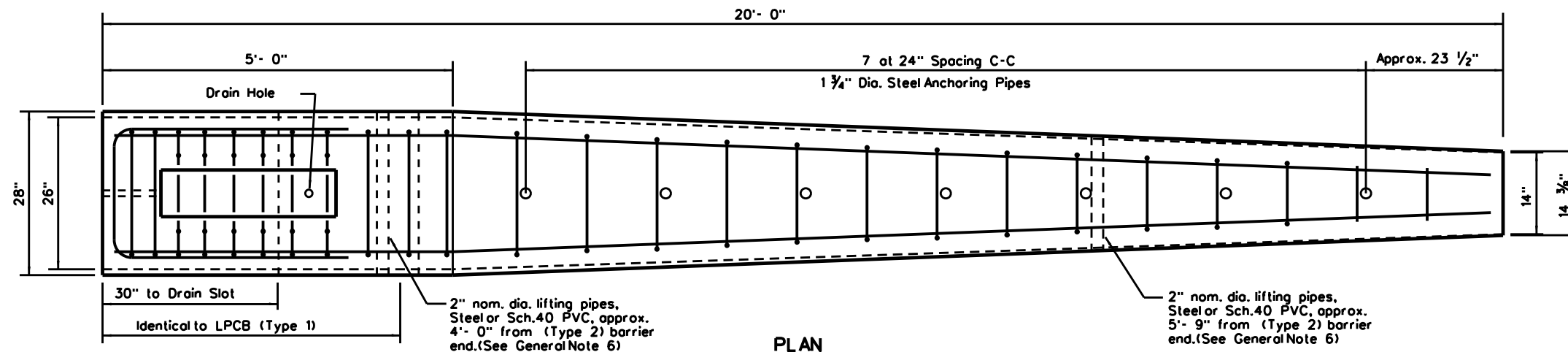
- 8 ~ (D31) Horizontal Wires (Equally spaced)
- 10 ~ (D20) Horizontal Wires (Equally spaced)
- 29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)



|  |                  |                          |             |
|--|------------------|--------------------------|-------------|
| Texas Department of Transportation   |                  | Design Division Standard |             |
| <b>LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 1) LPCB-13 (MOD)</b> |                  |                          |             |
| FILE: lpcb13.dgn   | DN: TxDOT        | CK: AM                   | DW: VP      |
| © TxDOT December 2010  | CONT: 0909       | SECT: 22                 | JOB: 190    |
| REVISIONS  |                  |                          | HIGHWAY: CS |
| DIST: WACO   | COUNTY: MCLENNAN | SHEET NO. 29             |             |

DATE: FILE:

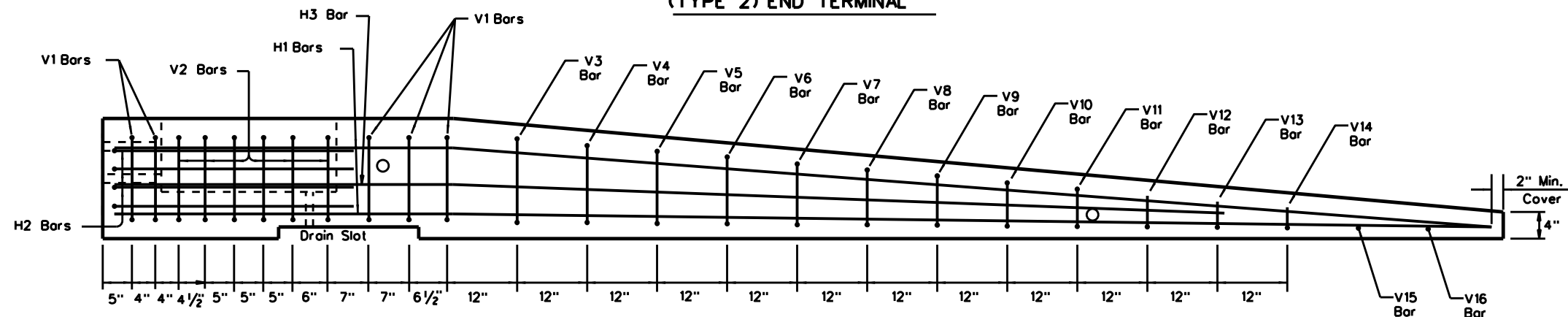
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APPROACH VIEW

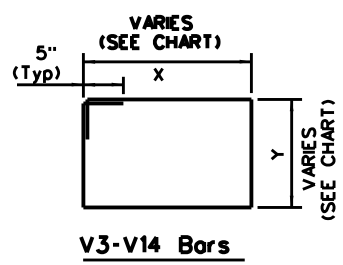
**TYPE 2 - NOTES**

1. Welded wire reinforcement (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.

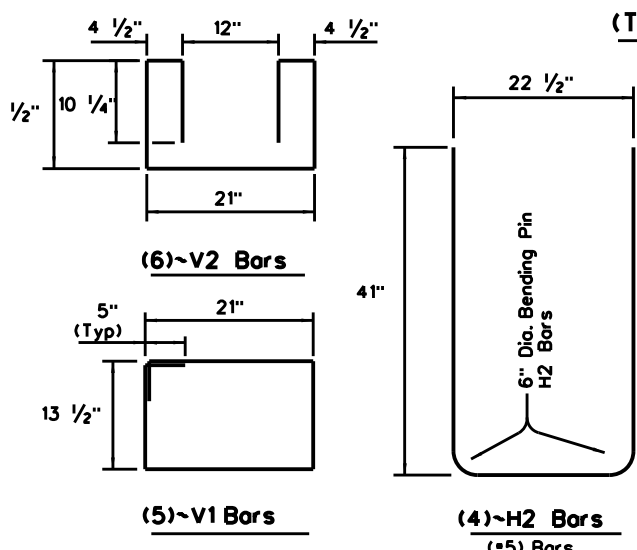


**ELEVATION (TYPE 2) END TERMINAL**

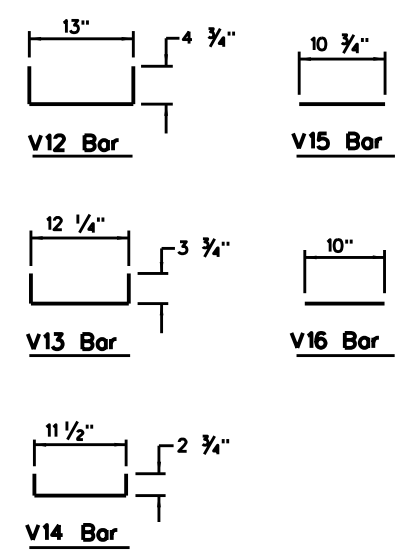
Note: Anchoring pipes not shown in Elevation View



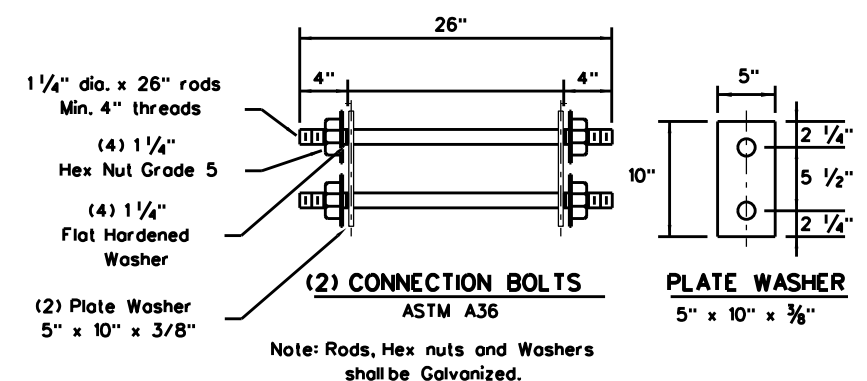
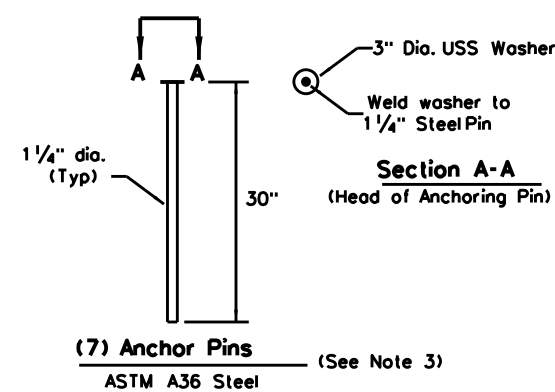
| BAR (#) | X (IN.) | Y (IN.) |
|---------|---------|---------|
| V3 BAR  | 20 1/4  | 14 1/2  |
| V4 BAR  | 19 1/2  | 13 1/2  |
| V5 BAR  | 18 1/2  | 12 1/4  |
| V6 BAR  | 17 1/2  | 11 1/4  |
| V7 BAR  | 17      | 10 1/4  |
| V8 BAR  | 16 1/4  | 9       |
| V9 BAR  | 15 1/2  | 8       |
| V10 BAR | 14 1/2  | 7       |
| V11 BAR | 13 3/4  | 6       |



**REINFORCING STEEL DETAILS TYPE 2 - END TERMINAL**

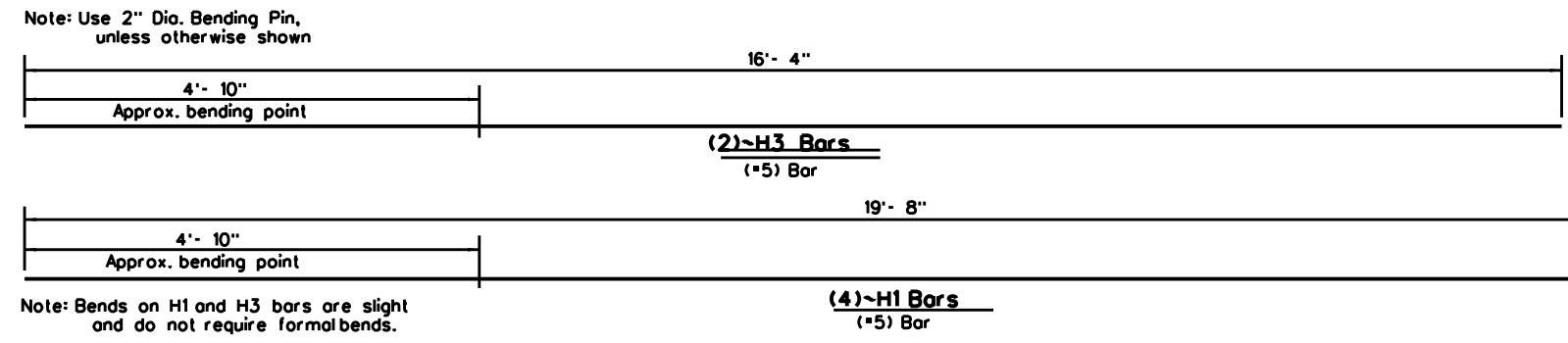


Note: All V Bars are (#4)



**FOR CONTRACTORS INFORMATION ONLY**

| (TYPE 2) APPROX. QUANTITIES 20 FT. SECTION |     |      |
|--|-----|------|
| CONCRETE                                   | CY  | 1.65 |
| REINFORCING STEEL                          | LBS | 240  |
| TOTAL BARRIER WT.                          | LBS | 7000 |



Texas Department of Transportation Design Division Standard

**LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 2) LPCB-13**

|                       |           |        |           |         |
|-----------------------|-----------|--------|-----------|---------|
| FILE: lpcb13.dgn      | DN: TxDOT | CK: AM | DW: VP    | CK:     |
| © TxDOT December 2010 | CONT      | SECT   | JOB       | HIGHWAY |
| REVISIONS             | 0909      | 22     | 190       | CS      |
| DIST                  | COUNTY    |        | SHEET NO. |         |
| WACO                  | MCLENNAN  |        | 33        |         |

DATE: FILE:



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

**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 only 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. City of Waco (LESS THAN ONE ACRE OF DISTURBED SOIL)

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:**

|  |  |  |
|--|--|--|
| <b>Erosion</b>   | <b>Sedimentation</b>                                   | <b>Post-Construction TSS</b>                           |
| <input type="checkbox"/> Temporary Vegetation          | <input checked="" type="checkbox"/> Silt Fence         | <input type="checkbox"/> Vegetative Filter Strips      |
| <input type="checkbox"/> Blankets/Matting              | <input type="checkbox"/> Rock Berm                     | <input type="checkbox"/> Retention/Irrigation Systems  |
| <input type="checkbox"/> Mulch                         | <input type="checkbox"/> Triangular Filter Dike        | <input type="checkbox"/> Extended Detention Basin      |
| <input type="checkbox"/> Sodding                       | <input type="checkbox"/> Sand Bag Berm                 | <input type="checkbox"/> Constructed Wetlands          |
| <input type="checkbox"/> Interceptor Seals             | <input type="checkbox"/> Straw Bale Dike               | <input type="checkbox"/> Wet Basin                     |
| <input type="checkbox"/> Diversion Dike                | <input type="checkbox"/> Brush Berms                   | <input type="checkbox"/> Erosion Control Compost       |
| <input type="checkbox"/> Erosion Control Compost       | <input type="checkbox"/> Erosion Control Compost       | <input type="checkbox"/> Mulch Filter Berm and Socks   |
| <input type="checkbox"/> Mulch Filter Berm and Socks   | <input type="checkbox"/> Mulch Filter Berm and Socks   | <input type="checkbox"/> Compost Filter Berm and Socks |
| <input type="checkbox"/> Compost Filter Berm and Socks | <input type="checkbox"/> Compost Filter Berm and Socks | <input type="checkbox"/> Vegetation Lined Ditches      |
|  | <input type="checkbox"/> Stone Outlet Sediment Traps   | <input type="checkbox"/> Sand Filter Systems           |
|  | <input type="checkbox"/> Sediment Basins               | <input type="checkbox"/> 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. SEE STATEMENT ABOVE
- 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. SEE STATEMENT ABOVE
- 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. SEE STATEMENT BELOW
- 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 coves 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 |
| MSA: Municipal Separate Stormwater Sewer System | TPWD: Texas Parks and Wildlife Department           |
| MRTA: Migratory Bird Treaty Act                 | TxDOT: Texas Department of Transportation           |
| NOI: Notice of Intent                           | T&E: Threatened and Endangered Species              |
| NWP: Nationwide Permit                          | USACE: U.S. Army Corps of Engineers                 |
| NO: 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 bore ground and covered, for products which may be hazardous. Maintain product labeling 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, containers, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Does the project involve any bridge cross structure rehabilitation or replacements (bridge cross 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 details 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.

**VII. OTHER ENVIRONMENTAL ISSUES**

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

No Action Required  Required Action

Action No.

- 1.
- 2.
- 3.



**ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC**

|  |           |          |           |         |
|--|-----------|----------|-----------|---------|
| FILE: epic.dgn   | DN: TxDOT | CK: RG   | DW: VP    | CK: AR  |
| © TxDOT: February 2015   | CONT      | SECT     | JOB       | HIGHWAY |
| 12-12-2011 (DS) REVISIONS  | 0909      | 22       | 190       | CS      |
| 05-07-14 ADDED NOTE SECTION IV.  | DIST      | COUNTY   | SHEET NO. |         |
| 01-23-2015 SECTION I CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES. | WACO      | MCLENNAN | 31        |         |

DATE: FILE:

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

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

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

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

**1.0 SITE/PROJECT DESCRIPTION**

**1.1 PROJECT CONTROL SECTION JOB (CSJ):**  
0909-22-190

**1.2 PROJECT LIMITS:**  
From: BUS 77  
To: S 12TH ST

**1.3 PROJECT COORDINATES:**  
BEGIN: (Lat) 31.520566, (Long) -97.130995  
END: (Lat) 31.533088, (Long) -97.116753

**1.4 TOTAL PROJECT AREA (Acres):** <1

**1.5 TOTAL AREA TO BE DISTURBED (Acres):** <1

**1.6 NATURE OF CONSTRUCTION ACTIVITY:**  
1.210 MI  
SAFETY TREAT FIX OBJECTS

**1.7 MAJOR SOIL TYPES:**

| Soil Type | Description |
|-----------|-------------|
|           | NA          |
|           |             |
|           |             |
|           |             |
|           |             |
|           |             |
|           |             |
|           |             |

**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 |
|------|----------|
|      | NA       |
|      |          |
|      |          |
|      |          |
|      |          |

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

**1.9 CONSTRUCTION ACTIVITIES:**

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

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

Other: \_\_\_\_\_  
 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 |
|-------------|----------------------|
|             | NA                   |
|             |                      |
|             |                      |
|             |                      |
|             |                      |
|             |                      |

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

**1.12 ROLES AND RESPONSIBILITIES: TxDOT**

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

**1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR**

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

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

|                   |             |          |             |           |
|-------------------|-------------|----------|-------------|-----------|
| FED. RD. DIV. NO. | PROJECT NO. |          |             | SHEET NO. |
|                   |             |          |             | 32        |
| STATE             | STATE DIST. | COUNTY   |             |           |
| TEXAS             | WACO        | MCLENNAN |             |           |
| CONT.             | SECT.       | JOB      | HIGHWAY NO. |           |
| 0909              | 22          | 190      | CS          |           |

**STORMWATER POLLUTION PREVENTION PLAN (SWP3):**

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

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

**2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:**

**T / P**

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

**2.2 SEDIMENT CONTROL BMPs:**

**T / P**

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

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

**2.3 PERMANENT CONTROLS:**

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

BMPs To Be Left In Place Post Construction:

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

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

**2.4 OFFSITE VEHICLE TRACKING CONTROLS:**

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

**2.5 POLLUTION PREVENTION MEASURES:**

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

**2.6 VEGETATED BUFFER ZONES:**

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 |
| NA   |            |    |
|      |            |    |
|      |            |    |
|      |            |    |
|      |            |    |
|      |            |    |

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

**2.7 ALLOWABLE NON-STORMWATER DISCHARGES:**

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

**2.8 INSPECTIONS:**

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

**2.9 MAINTENANCE:**

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

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

|                   |             |          |             |           |
|-------------------|-------------|----------|-------------|-----------|
| FED. RD. DIV. NO. | PROJECT NO. |          |             | SHEET NO. |
|                   |             |          |             | 33        |
| STATE             | STATE DIST. | COUNTY   |             |           |
| TEXAS             | WACO        | MCLENNAN |             |           |
| CONT.             | SECT.       | JOB      | HIGHWAY NO. |           |
| 0909              | 22          | 190      | CS          |           |

## BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:
  - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.
  - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.
  - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.
  - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.
  - Provide scale drawings of all ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.
  - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.
  - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.
  - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.
  - Provide documentation required for Waters of the US, Note #3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.
  - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.
  - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring culling or torching of steel, coated with lead containing paints.
2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.
3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.
4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).
5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.
6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.
7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.
8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE - NTS SHEET 1 OF 10

 **Texas Department of Transportation**  
Waco District Standard

### TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

**TA-BMP**

|                      |      |          |     |           |
|----------------------|------|----------|-----|-----------|
| FILE: BMPLAYOUTS.dgn | DNF  | CK:      | DW: | CK:       |
| © TxDOT 2009         | CONT | SECT     | JOB | HIGHWAY   |
| REVISIONS            | 0909 | 22       | 190 | CS        |
| DEC 2013             | DIST | COUNTY   |     | SHEET NO. |
| FEB 2015             | WACO | MCLENNAN |     | 34        |

## BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.
10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.
11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.
12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.
13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.
14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).  
  
The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.
15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.
16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.
17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.
18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.
19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.
20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.
21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.
22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.
23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.
24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.
25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

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### TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

**TA-BMP**

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## BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.
27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls: on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.
28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.
29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.
30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.
31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.
32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.
33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.
34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.
35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.
36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.
37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.
38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.
39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.
40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.
41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.
42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.
43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

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### TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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## BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.
45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.
46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.
47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.
48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.
49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.
50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.
51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

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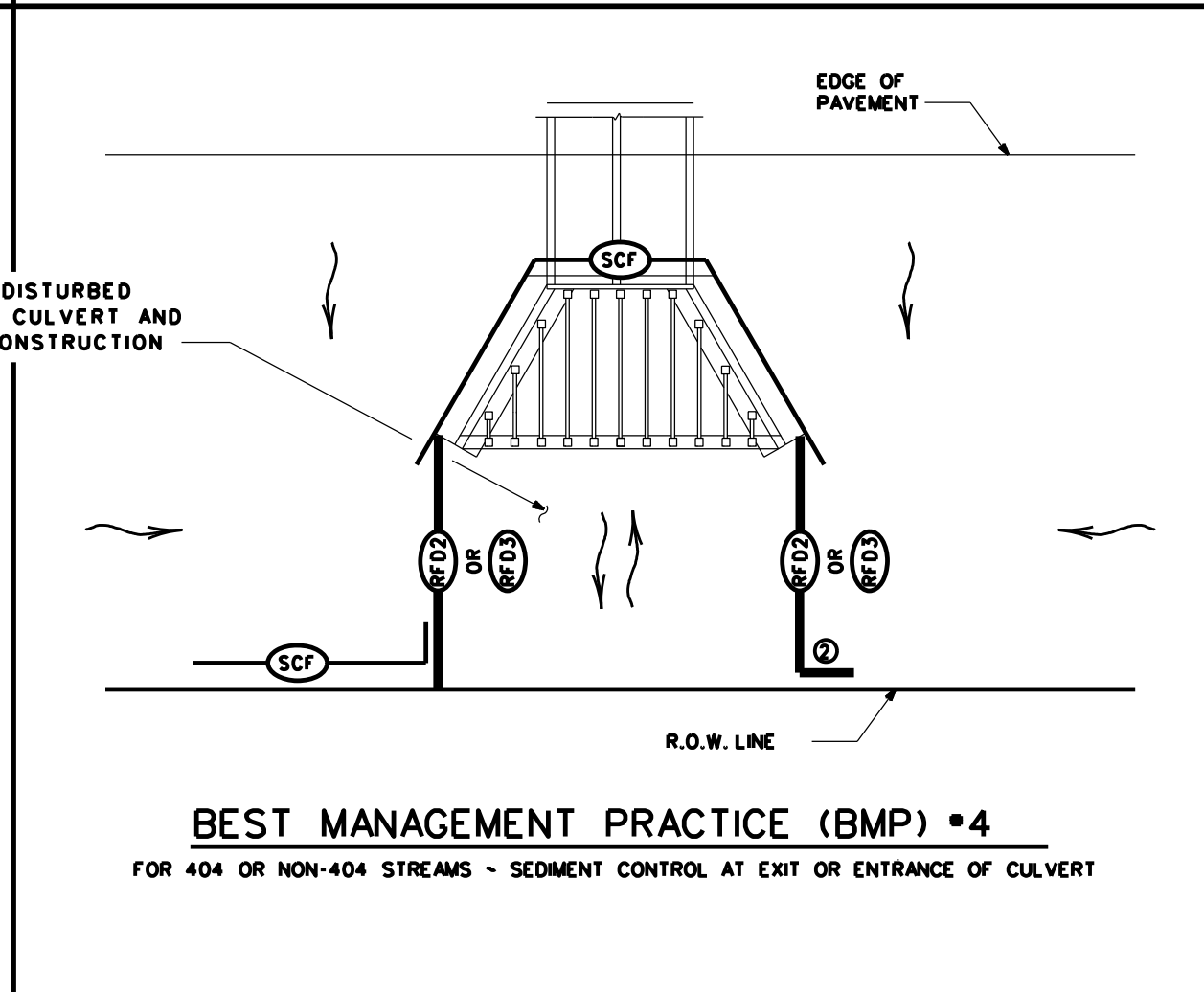
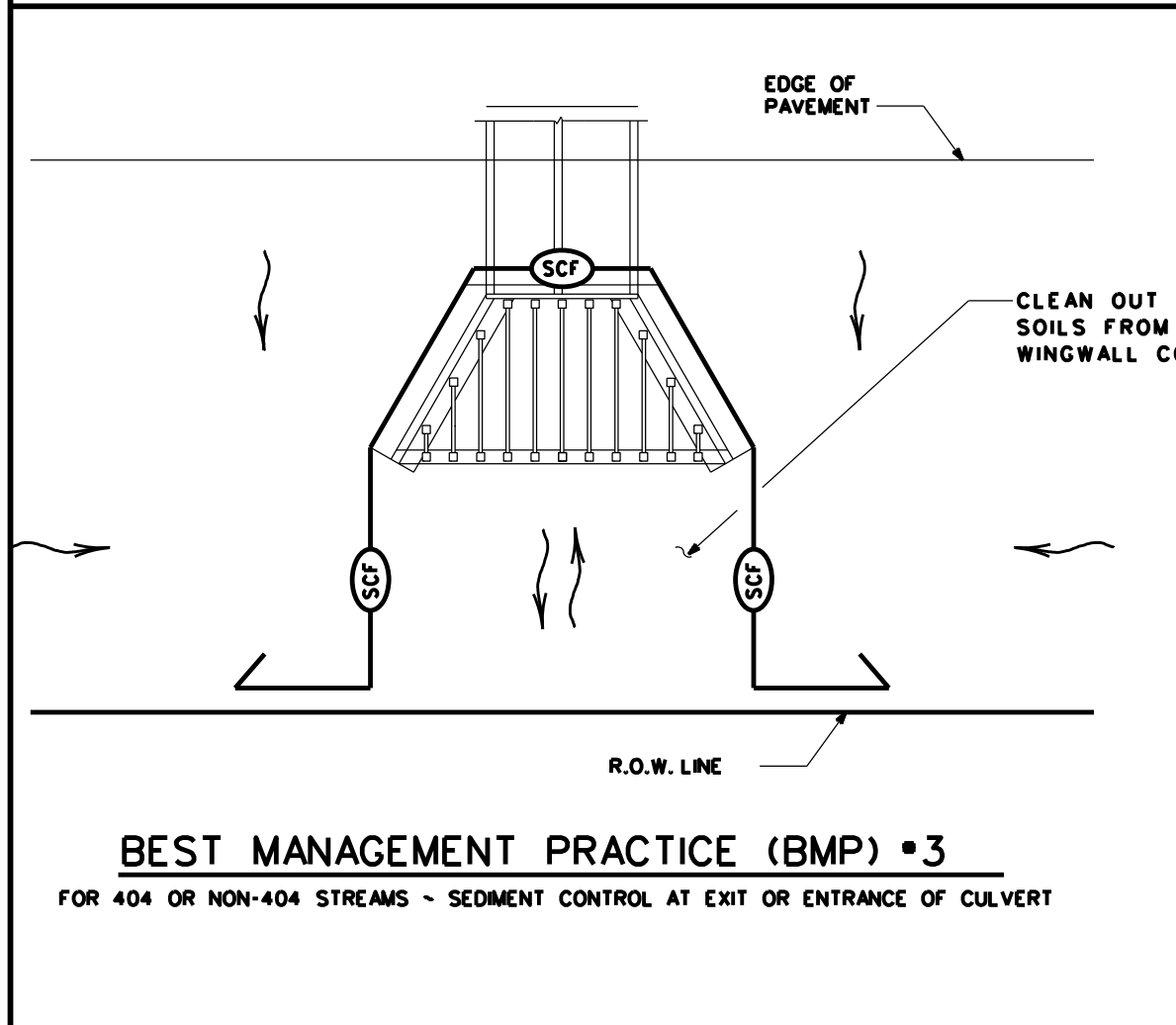
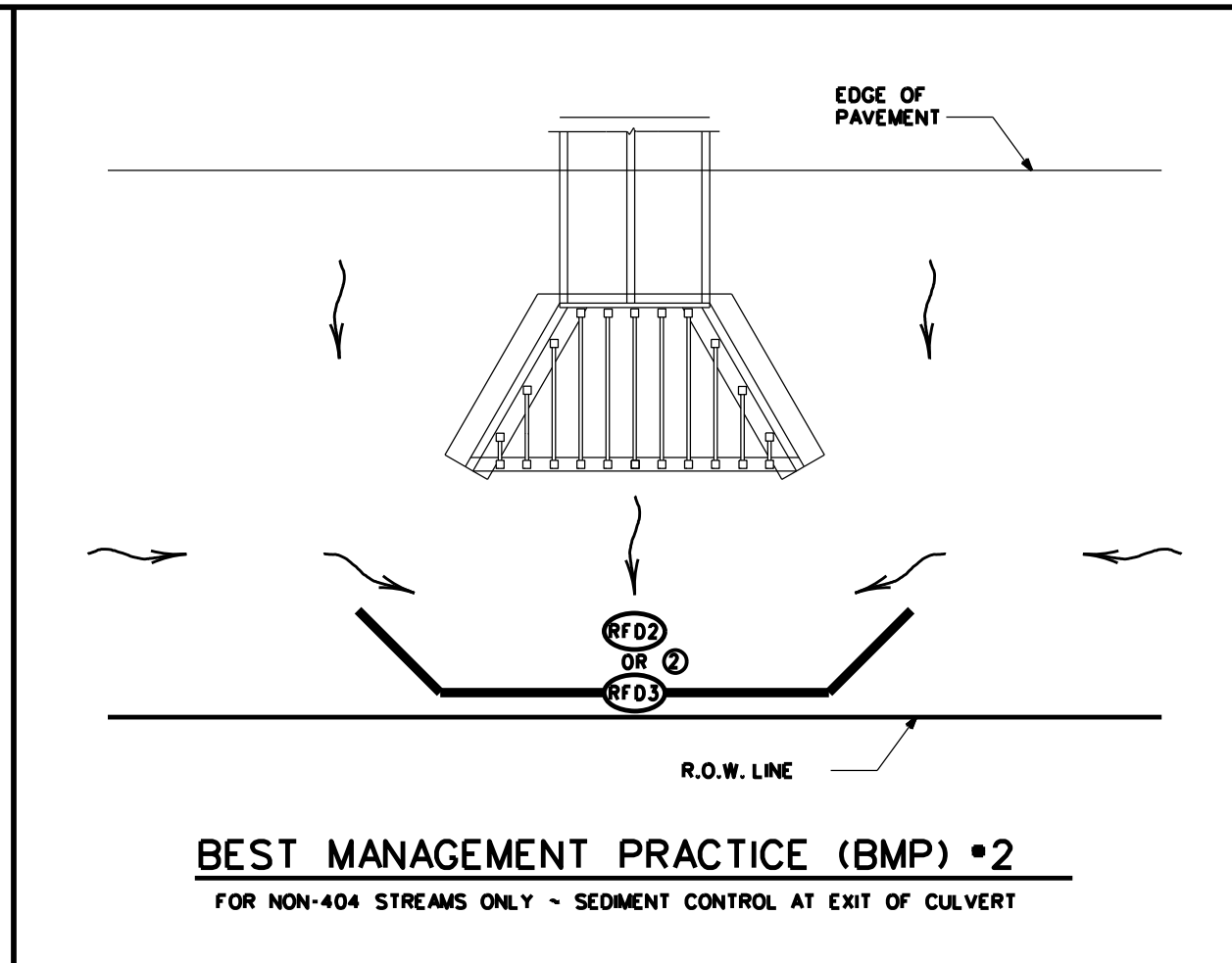
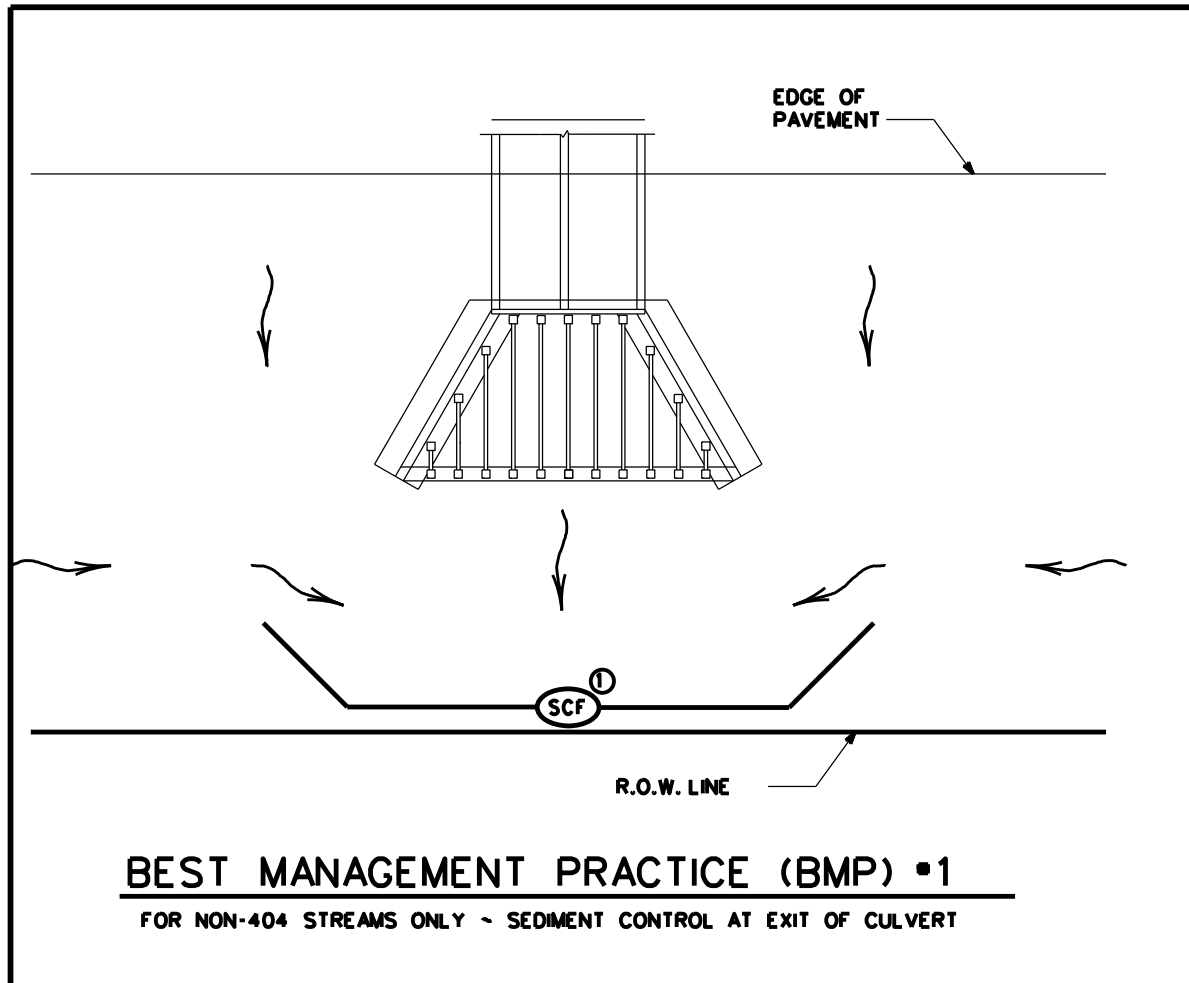
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|  |                        |
|--|------------------------|
|  | SEDIMENT CONTROL FENCE |
|  | ROCK FILTER DAM (TY 2) |
|  | ROCK FILTER DAM (TY 3) |
|  | DIRECTION OF FLOW      |

- NOTES:
- ① EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
  - ② EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

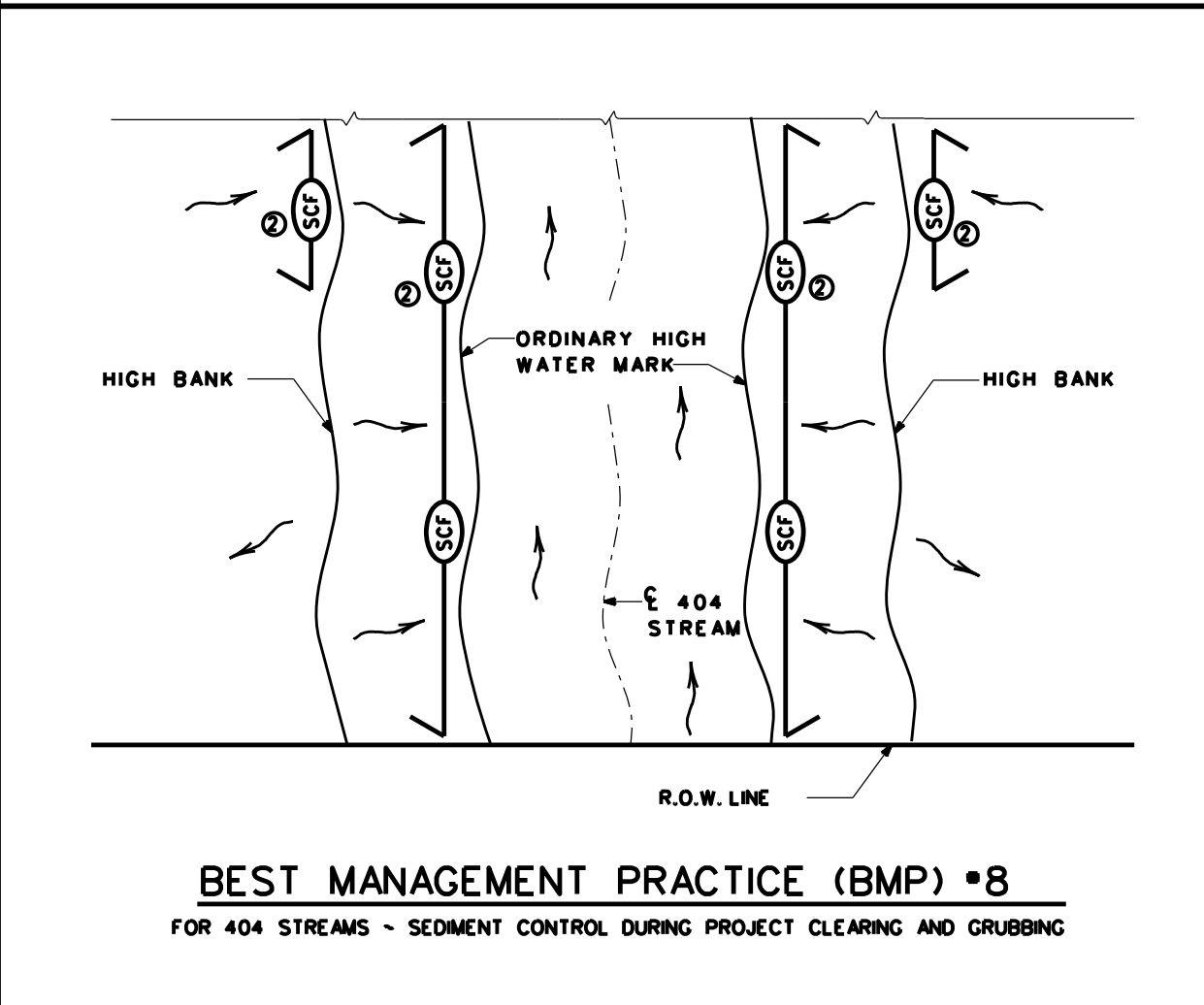
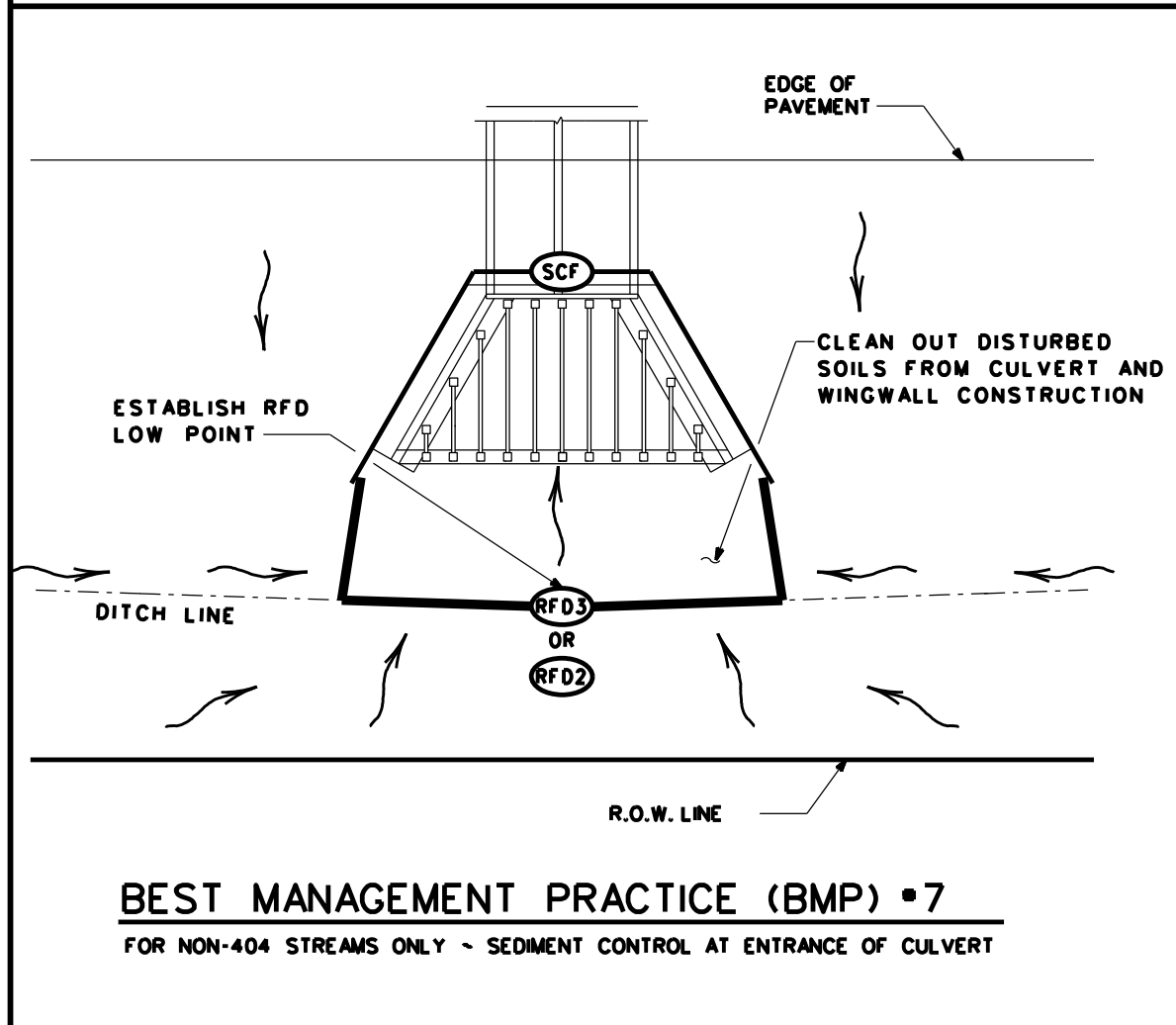
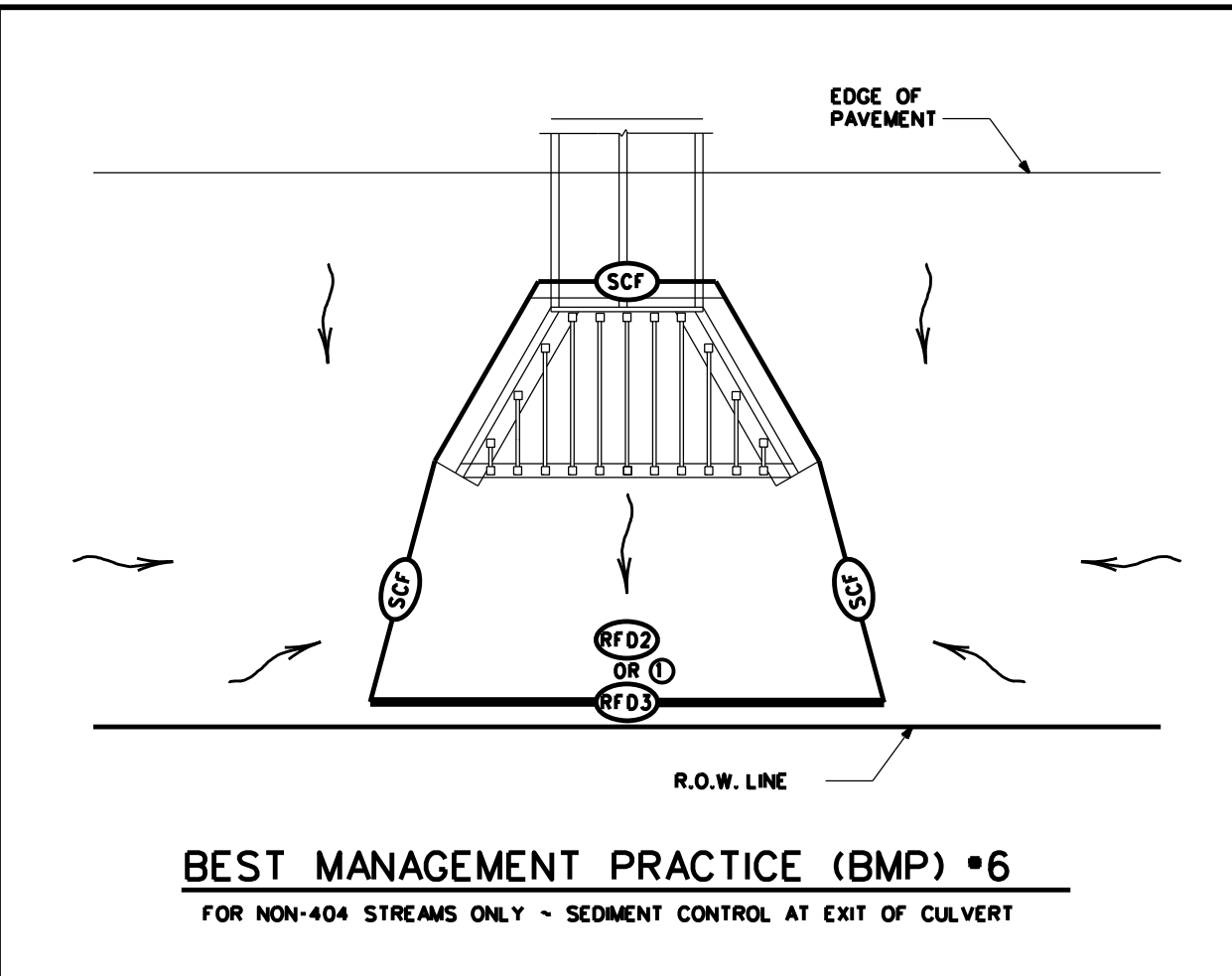
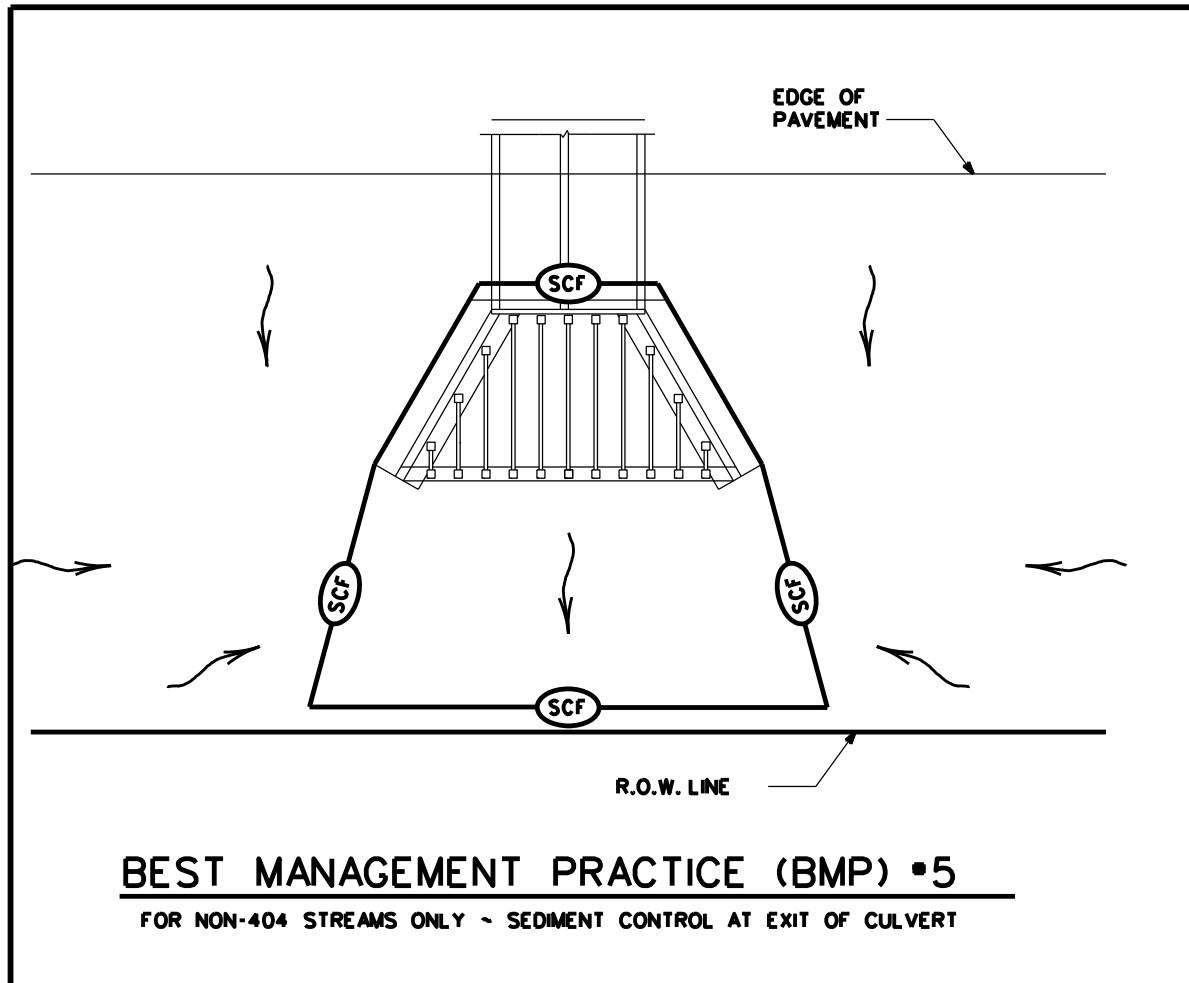
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**TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES**

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|  | SEDIMENT CONTROL FENCE |
|  | ROCK FILTER DAM (TY 2) |
|  | ROCK FILTER DAM (TY 3) |
|  | DIRECTION OF FLOW      |

- NOTES:
- PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.
  - USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT

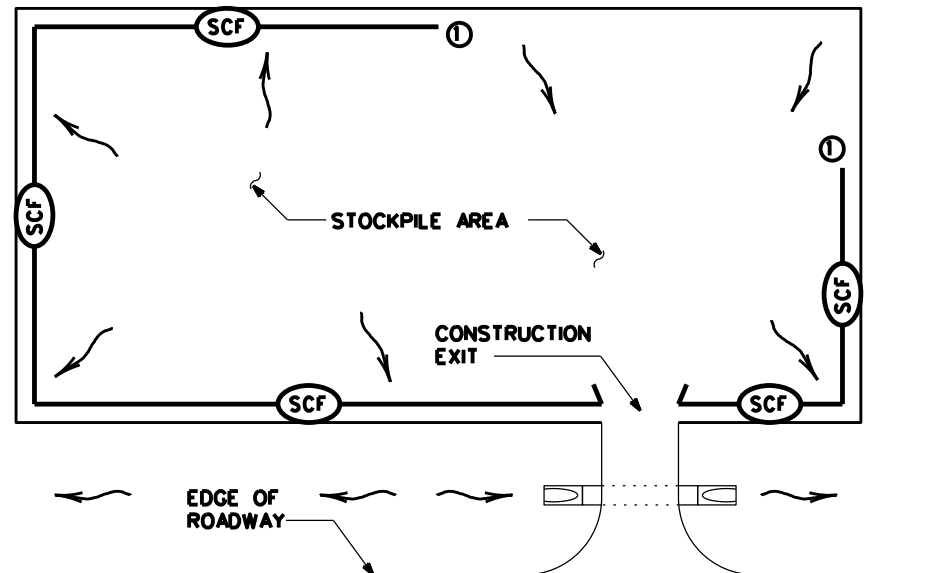
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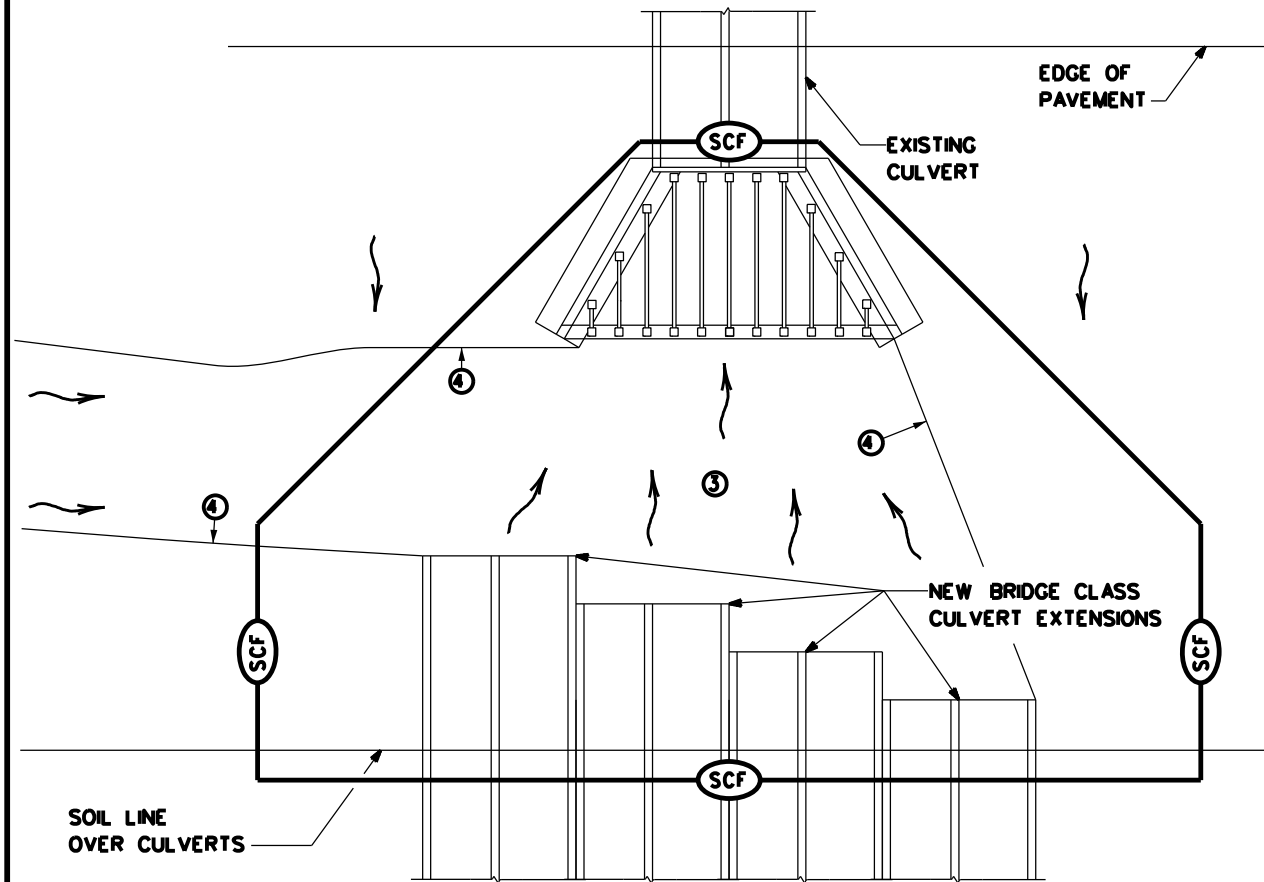
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BEST MANAGEMENT  
PRACTICES**

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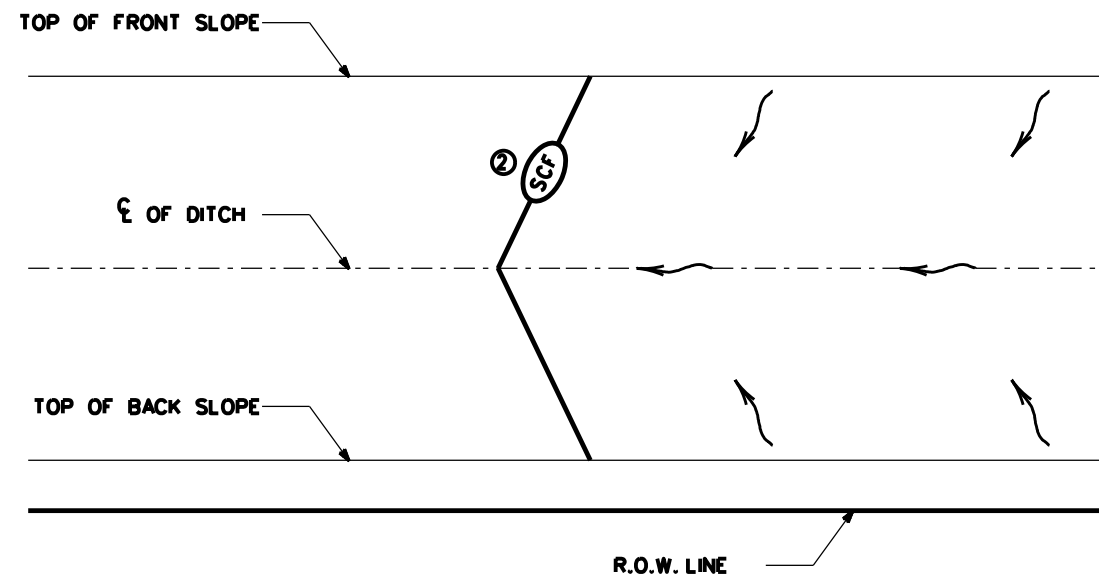
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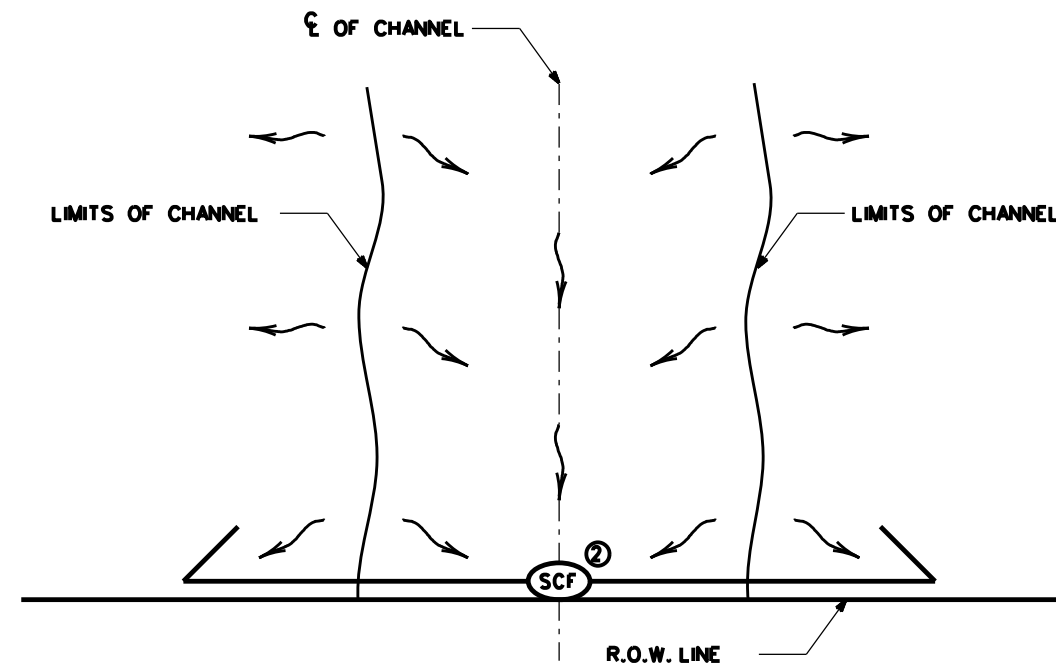
**BEST MANAGEMENT PRACTICE (BMP) #9**  
STOCKPILE SEDIMENT CONTROL



**BEST MANAGEMENT PRACTICE (BMP) #10**  
FOR 404 OR NON-404 STREAMS ONLY ~  
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS



**BEST MANAGEMENT PRACTICE (BMP) #11**  
BOUNDARY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE



**BEST MANAGEMENT PRACTICE (BMP) #12**  
BOUNDARY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

|  |                        |
|--|------------------------|
|  | SEDIMENT CONTROL FENCE |
|  | ROCK FILTER DAM (TY 2) |
|  | ROCK FILTER DAM (TY 3) |
|  | DIRECTION OF FLOW      |

- NOTES:
- START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED
  - ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.
  - PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.
  - PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TXDOT.

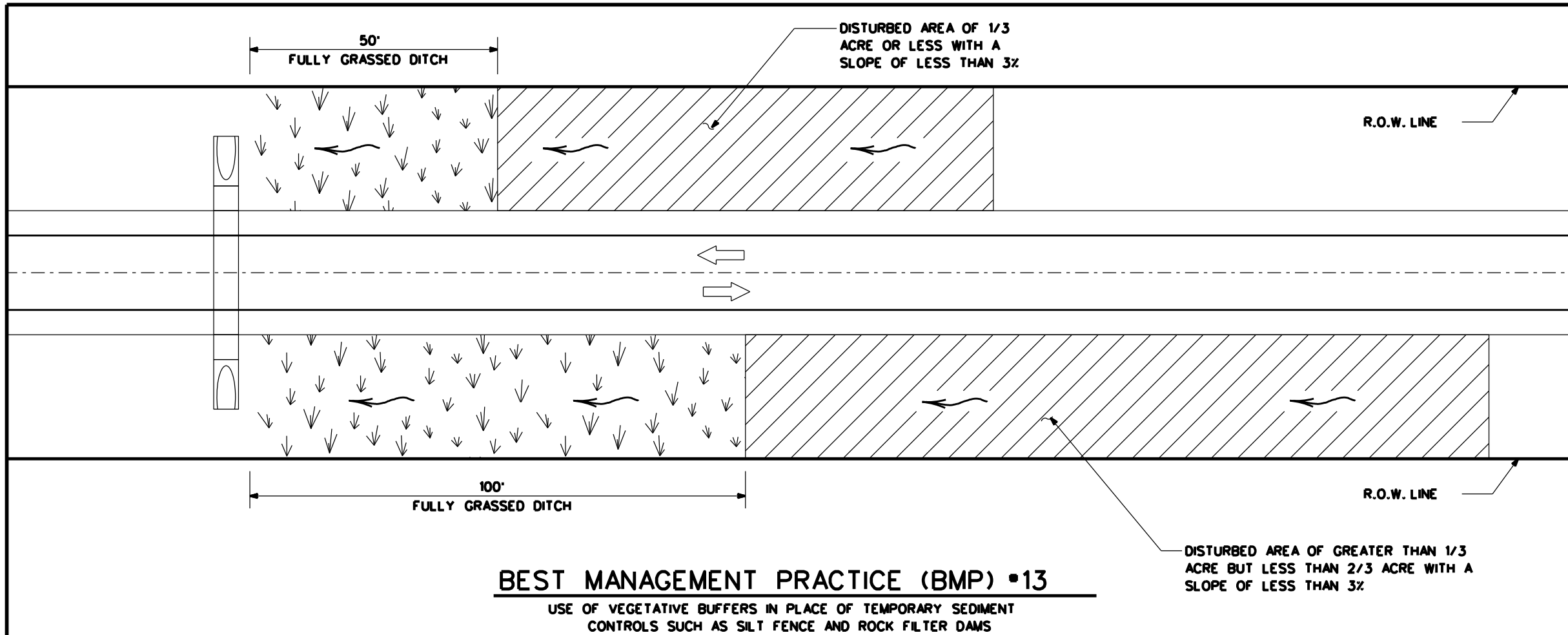
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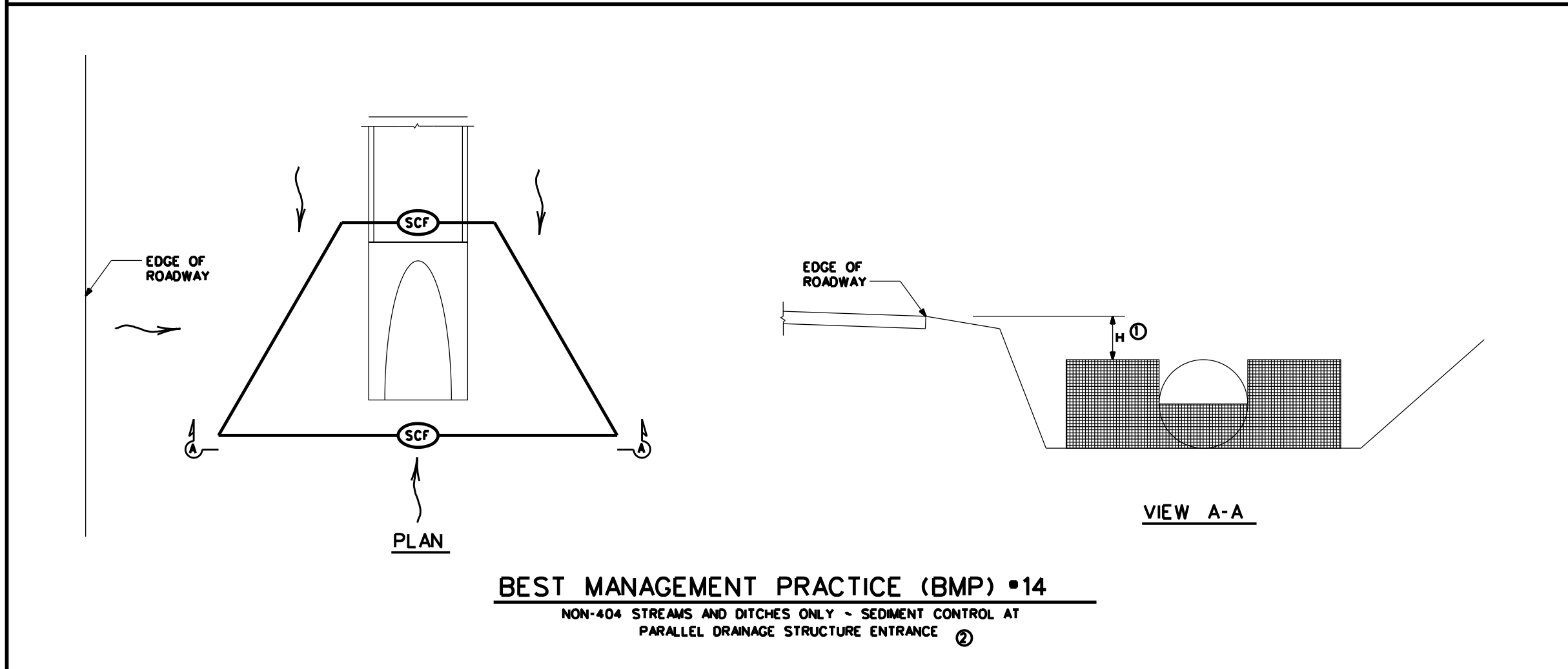


**BEST MANAGEMENT PRACTICE (BMP) #13**

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS

|  |                        |
|--|------------------------|
|  | FULLY GRASSED DITCH    |
|  | DISTURBED AREA         |
|  | DIRECTION OF FLOW      |
|  | SEDIMENT CONTROL FENCE |

- ① FOR H DIMENSIONS LESS THAN 1.5' SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.
- ② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.



**BEST MANAGEMENT PRACTICE (BMP) #14**

NON-404 STREAMS AND DITCHES ONLY - SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

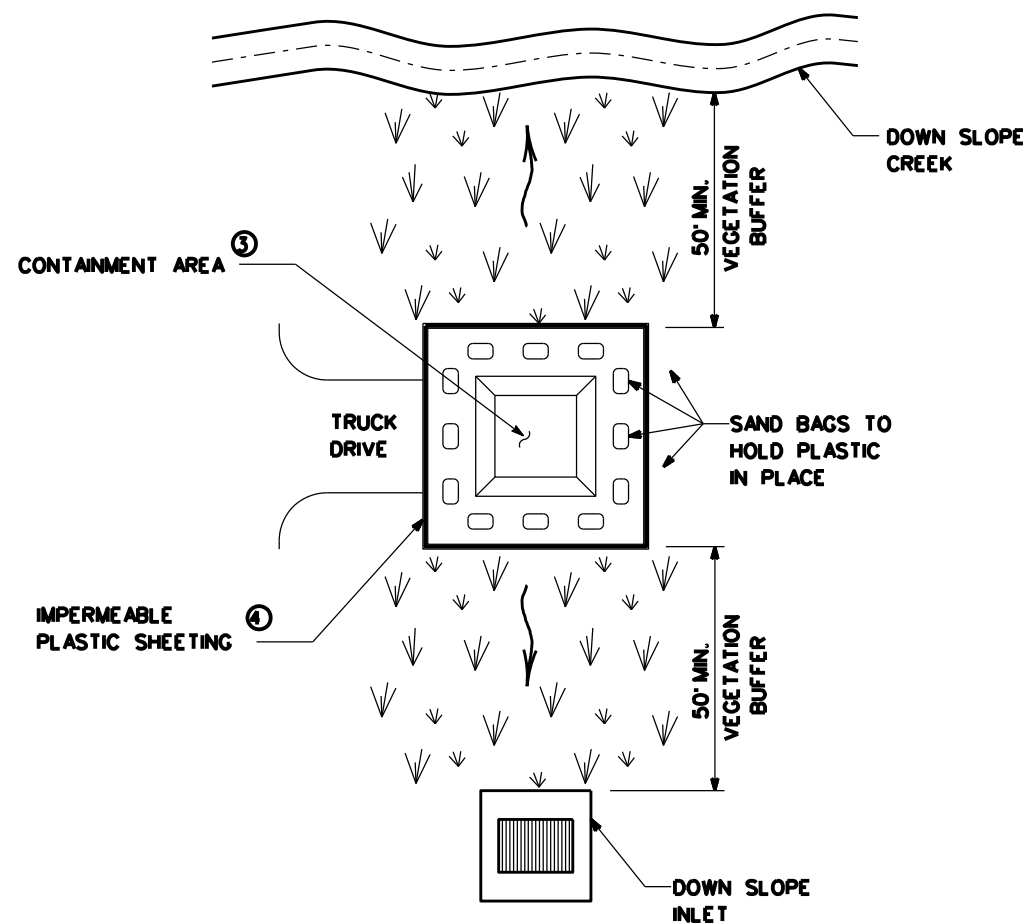
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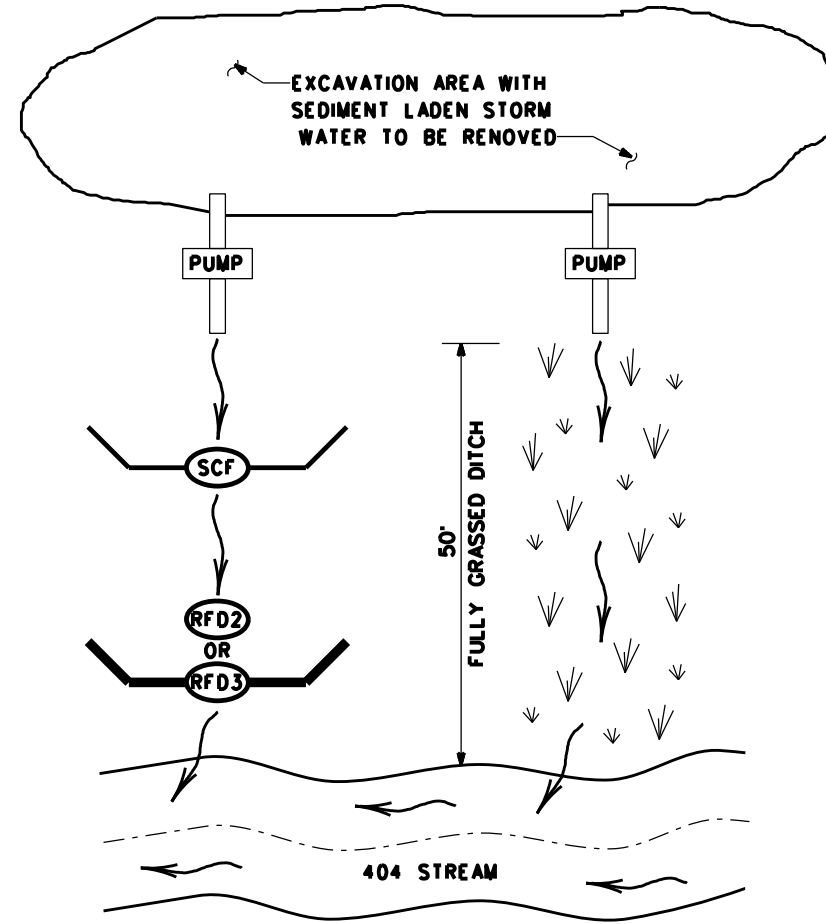
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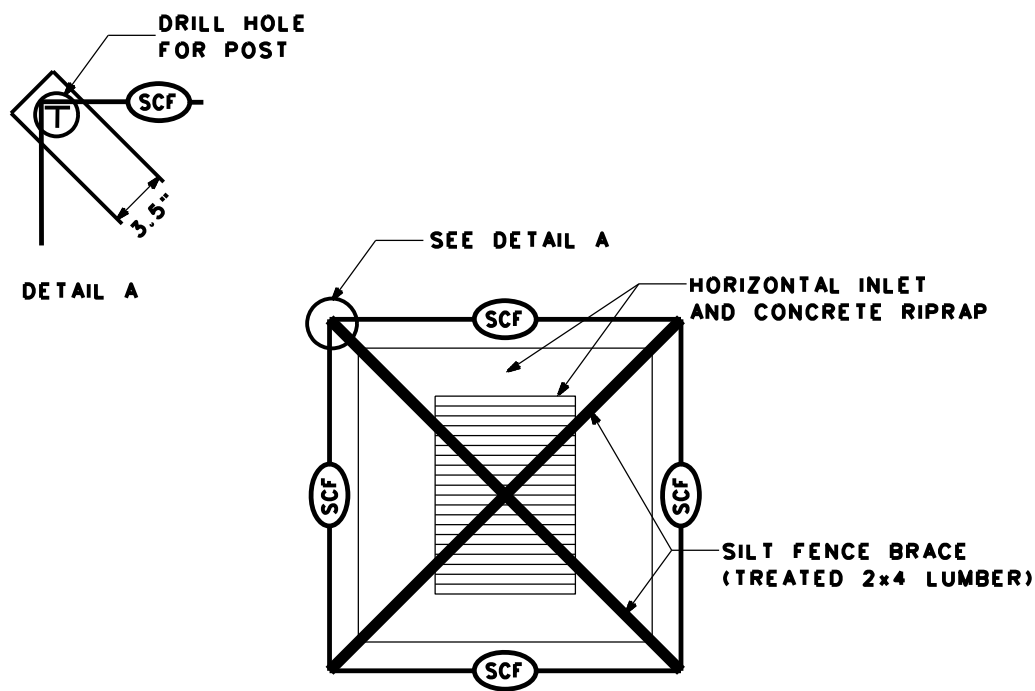
**BEST MANAGEMENT PRACTICE (BMP) • 15**  
CONCRETE TRUCK WASHOUT AREA



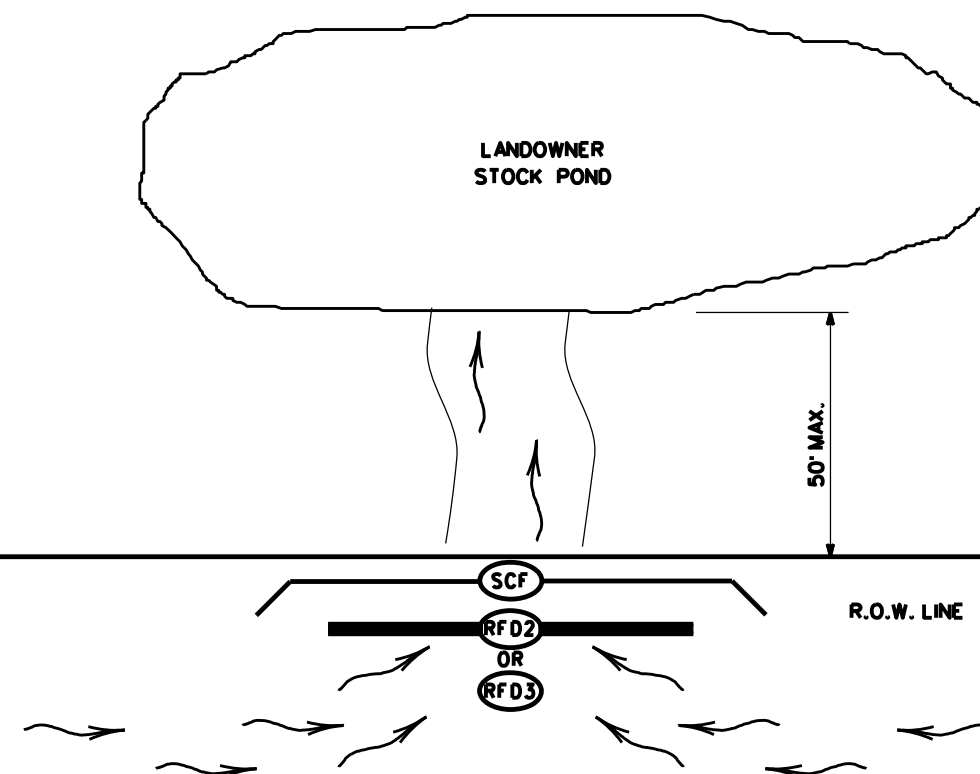
**BEST MANAGEMENT PRACTICE (BMP) • 16**  
PUMPED STORM WATER SEDIMENT CONTROLS ①

|  |                        |
|--|------------------------|
|  | FULLY GRASSED DITCH    |
|  | DIRECTION OF FLOW      |
|  | SEDIMENT CONTROL FENCE |
|  | ROCK FILTER DAM (TY 2) |
|  | ROCK FILTER DAM (TY 3) |

- ① PUMPED STORM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.
- ② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.
- ③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.
- ④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



**BEST MANAGEMENT PRACTICE (BMP) • 17**  
HORIZONTAL INLET SEDIMENT CONTROL



**BEST MANAGEMENT PRACTICE (BMP) • 18**  
LANDOWNER STOCKPOND SEDIMENT CONTROL ②

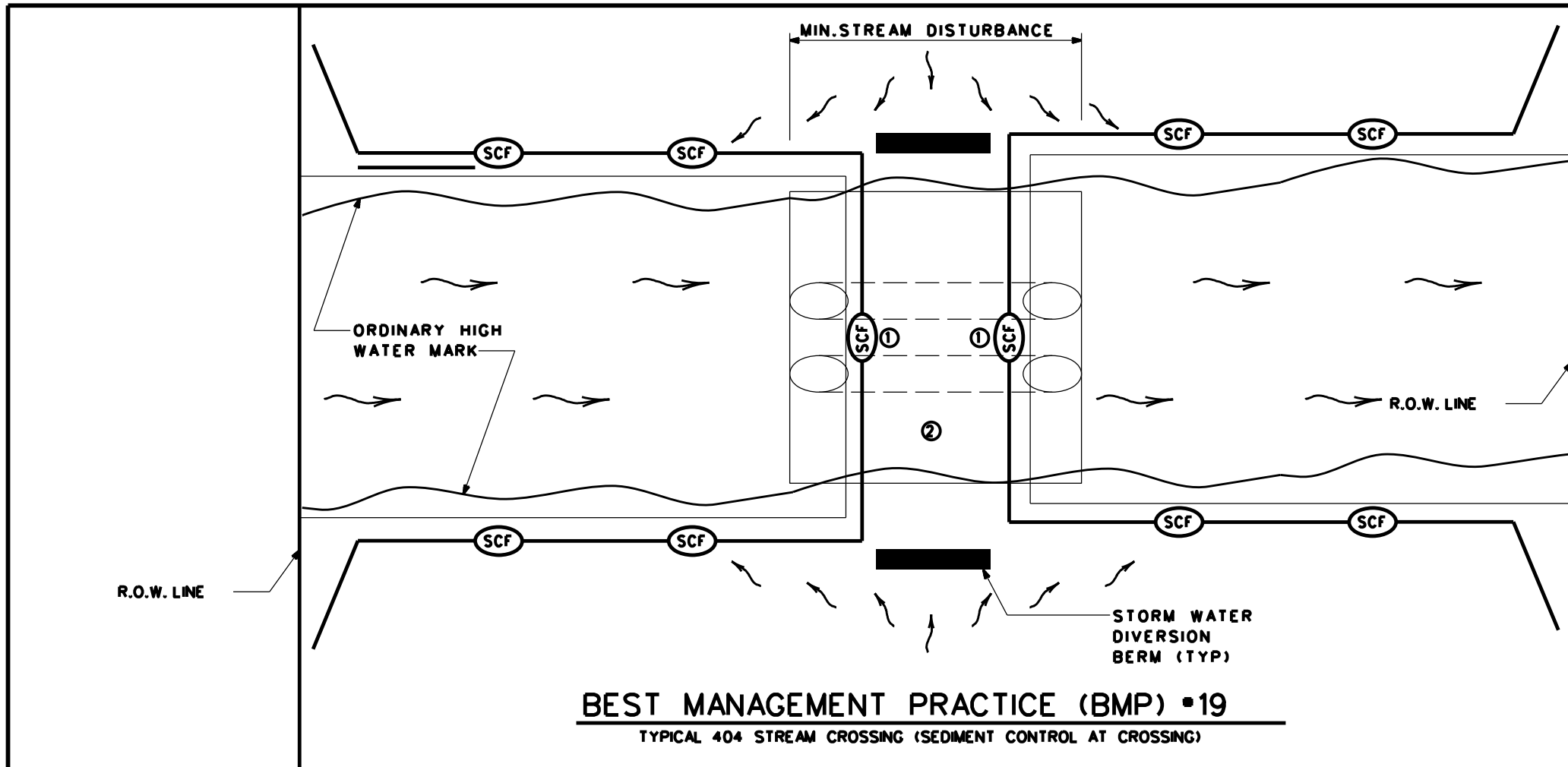
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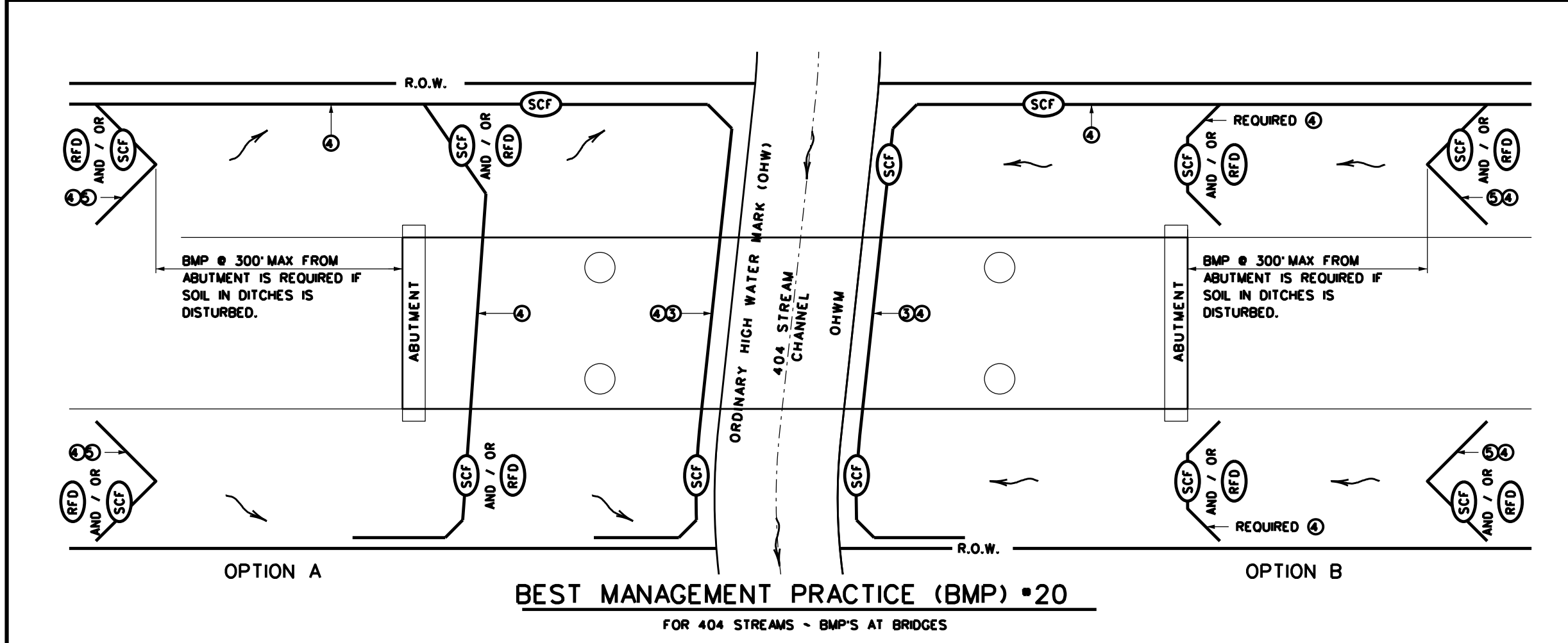
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|  | DIRECTION OF FLOW      |
|  | SEDIMENT CONTROL FENCE |
|  | ROCK FILTER DAM        |
|  | SECURITY FENCING       |

- ① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.
- ② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.
- ③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.
- ④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT
- ⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



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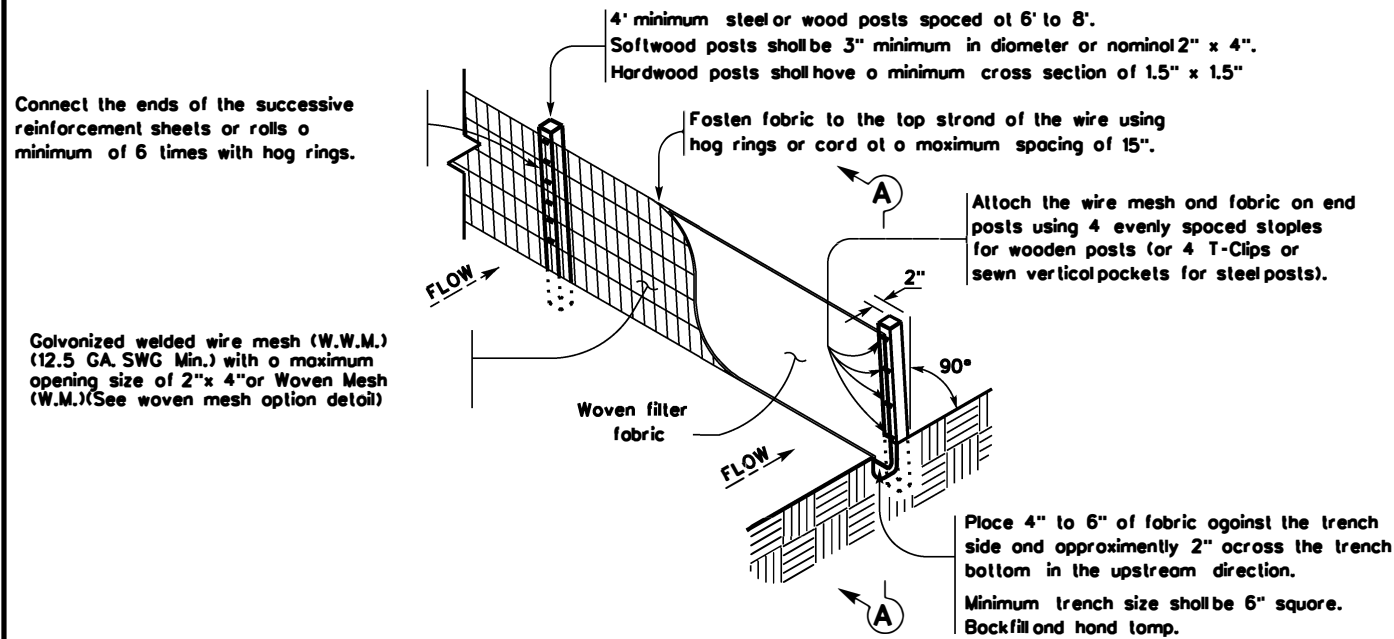


**TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES**

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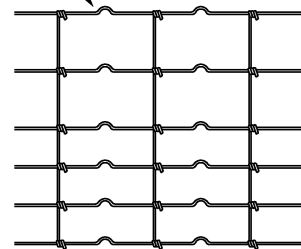


Galvanized welded wire mesh (W.W.M.) (12.5 GA. SWG Min.) with a maximum opening size of 2" x 4" or Woven Mesh (W.M.) (See woven mesh option detail)

**TEMPORARY SEDIMENT CONTROL FENCE**

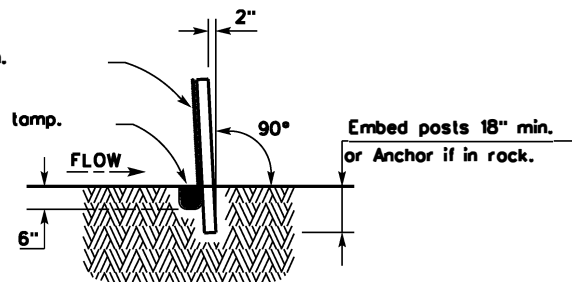
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Top of Fence



Filter fabric 3' min. width.

Backfill & hand tamp.



**SECTION A-A**

**HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL**

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

**SEDIMENT CONTROL FENCE USAGE GUIDELINES**

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

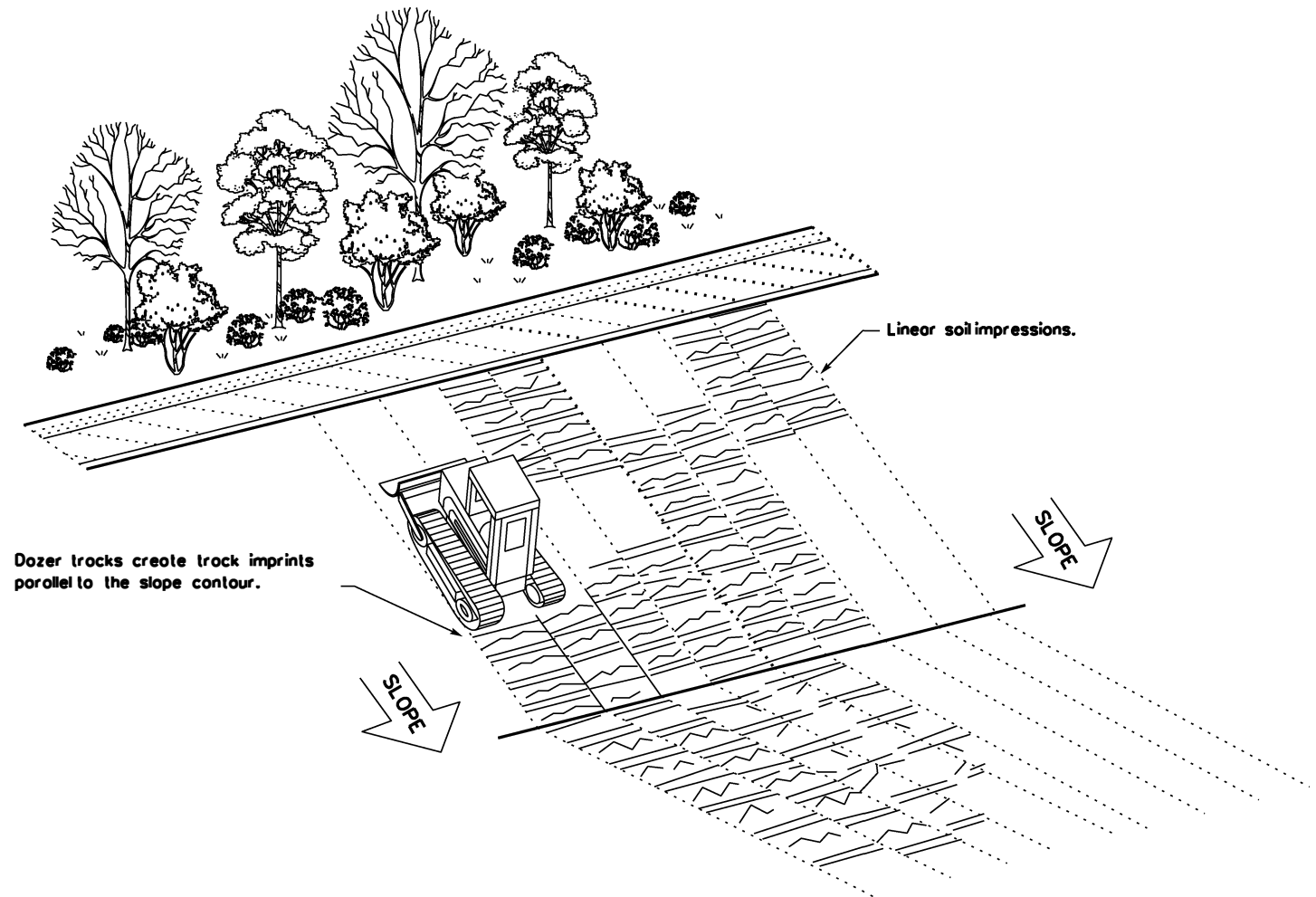
**LEGEND**

Sediment Control Fence

SCF

**GENERAL NOTES**

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



**VERTICAL TRACKING**

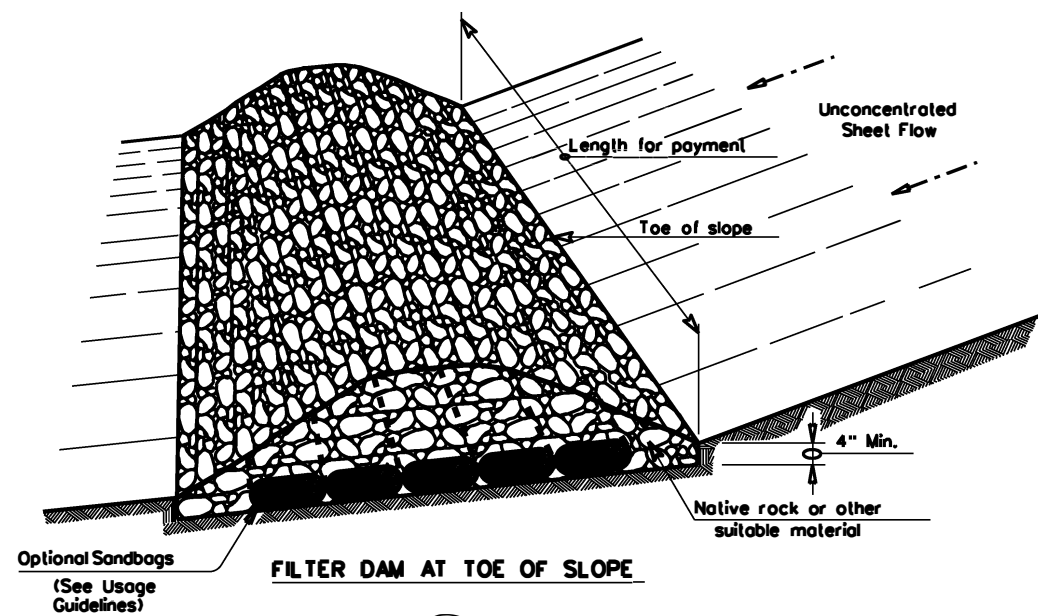
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| <b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE &amp; VERTICAL TRACKING</b><br><b>EC(1)-16</b> |           |          |        |                          |  |
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|  | WACO      | MCLENNAN |        | 44                       |  |

DATE FILE



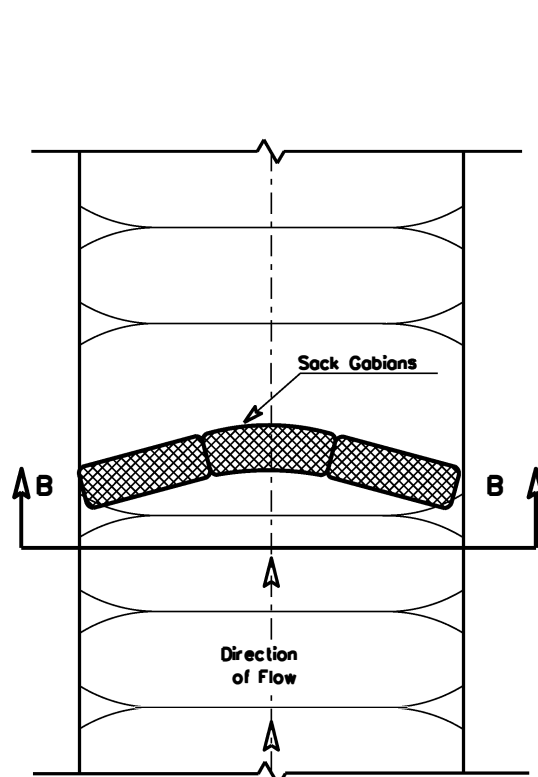
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DATE: FILE:

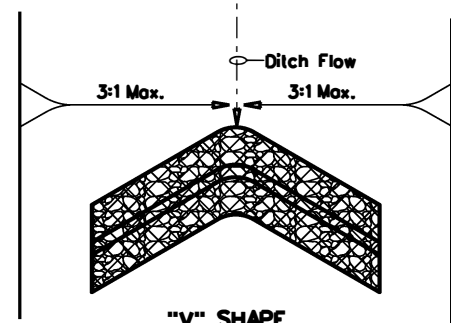


**FILTER DAM AT TOE OF SLOPE**

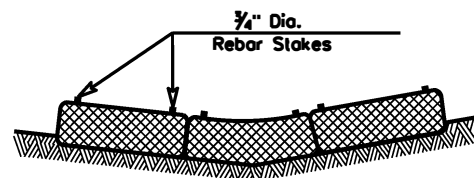
RFD1



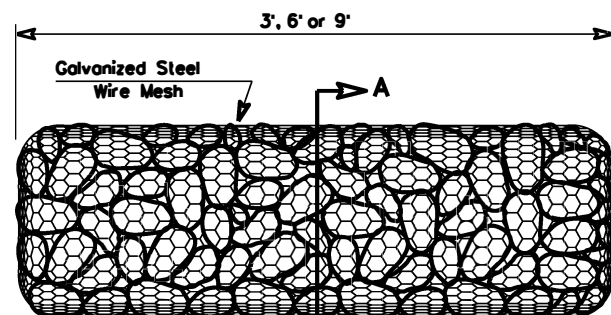
**PLAN VIEW**



**"V" SHAPE PLAN VIEW**

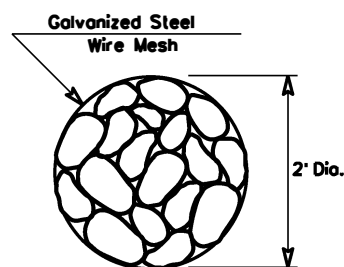


**SECTION B-B**

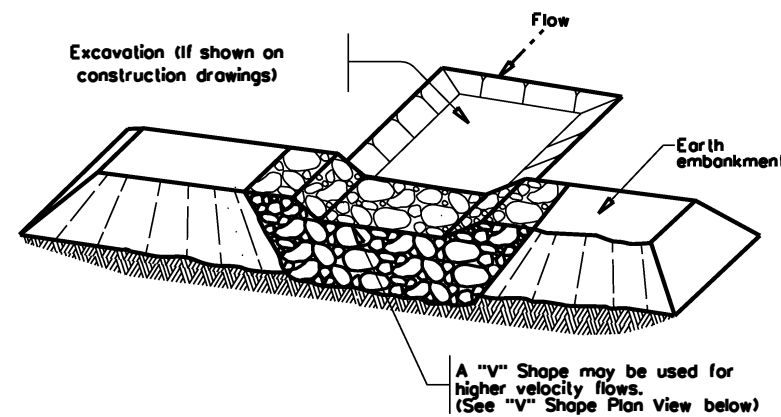


**TYPE 4 (SACK GABIONS)**

RFD4

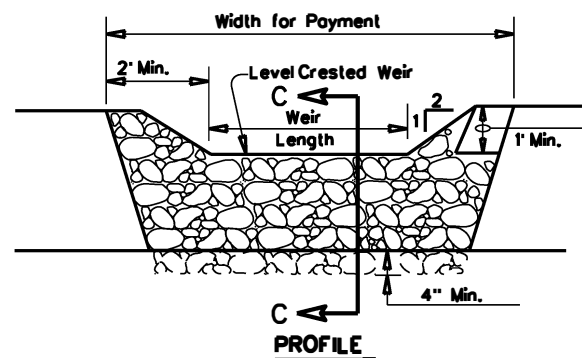


**SECTION A-A**

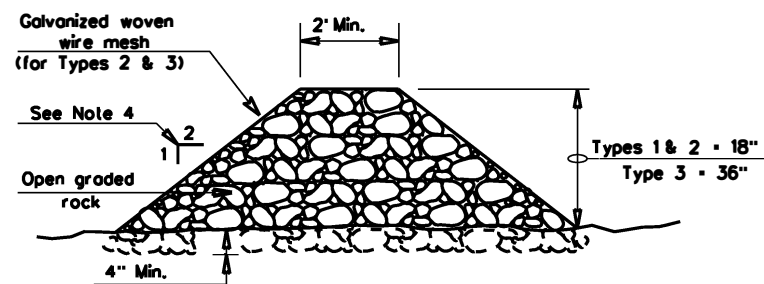


**FILTER DAM AT SEDIMENT TRAP**

RFD1 OR RFD2



**PROFILE**



**SECTION C-C**

**ROCK FILTER DAM USAGE GUIDELINES**

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT<sup>2</sup> of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

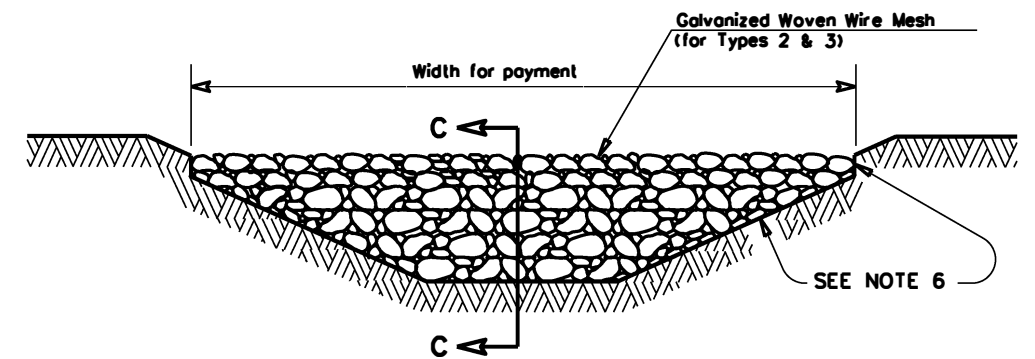
**Type 1 (18" high with no wire mesh) (3" to 6" aggregate):** Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

**Type 2 (18" high with wire mesh) (3" to 6" aggregate):** Type 2 may be used in ditches and at dike or swale outlets.

**Type 3 (36" high with wire mesh) (4" to 8" aggregate):** Type 3 may be used in stream flow and should be secured to the stream bed.

**Type 4 (Sack gabions) (3" to 6" aggregate):** Type 4 may be used in ditches and smaller channels to form an erosion control dam.

**Type 5:** Provide rock filter dams as shown on plans.



**FILTER DAM AT CHANNEL SECTIONS**

RFD1 OR RFD2 OR RFD3

**GENERAL NOTES**

- If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
- Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
- The rock filter dam dimensions shall be as indicated on the SW3P plans.
- Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
- Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
- Filter dams should be embedded a minimum of 4" into existing ground.
- The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
- Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
- Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4"
- Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

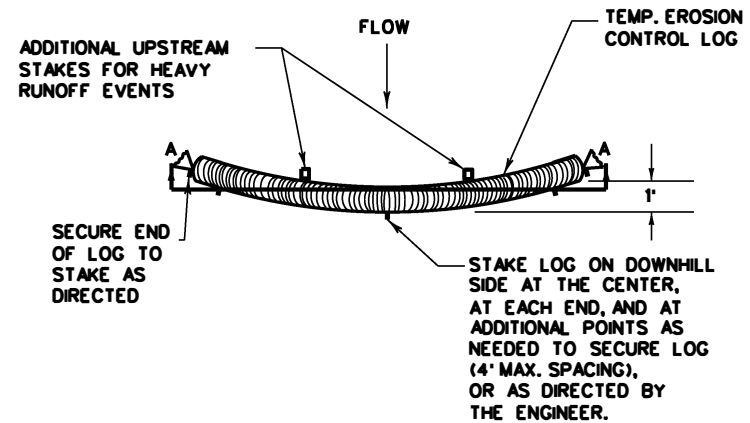
**PLAN SHEET LEGEND**

- Type 1 Rock Filter Dam RFD1
- Type 2 Rock Filter Dam RFD2
- Type 3 Rock Filter Dam RFD3
- Type 4 Rock Filter Dam RFD4

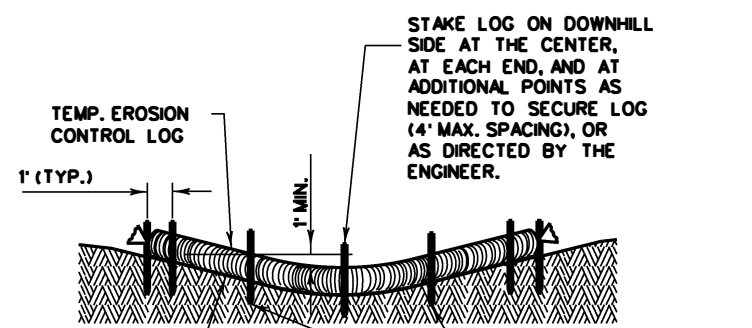
|   |            |                          |               |
|---|------------|--------------------------|---------------|
|   |            | Design Division Standard |               |
| <b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b><br><b>ROCK FILTER DAMS</b><br><b>EC(2)-16</b> |            |                          |               |
| FILE: ec216   | DN: TxDOT  | CK: KM                   | DW: VP        |
| © TxDOT: JULY 2016  | CONT: 0909 | SECT: 22                 | JOB: 190      |
| REVISIONS   | DIST: WACO | COUNTY: MCLENNAN         | SHEET NO.: 45 |

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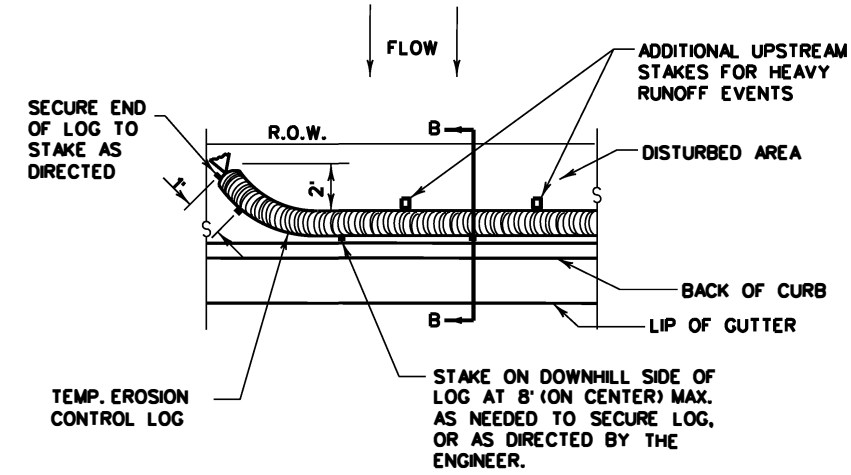


PLAN VIEW

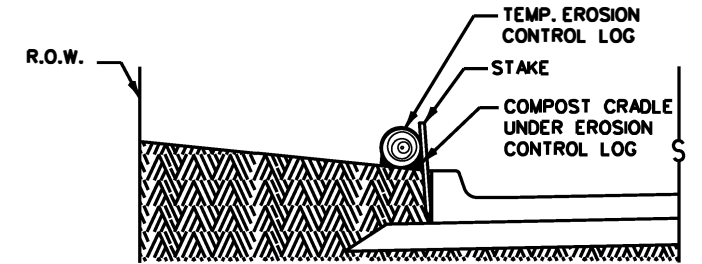


SECTION A-A  
EROSION CONTROL LOG DAM

CL-D

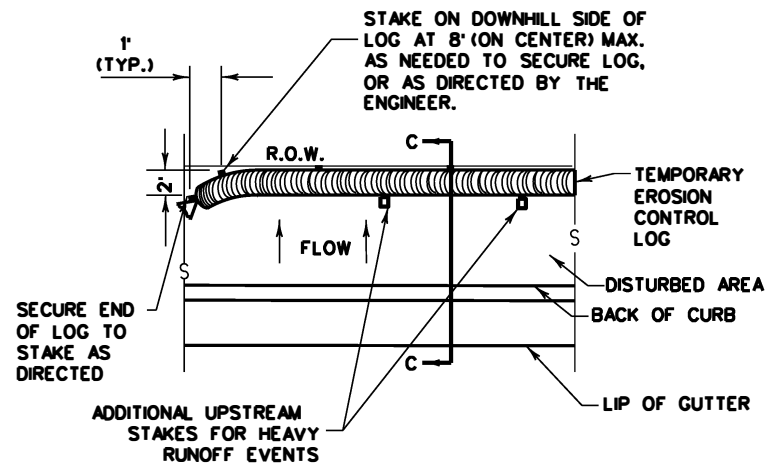


PLAN VIEW

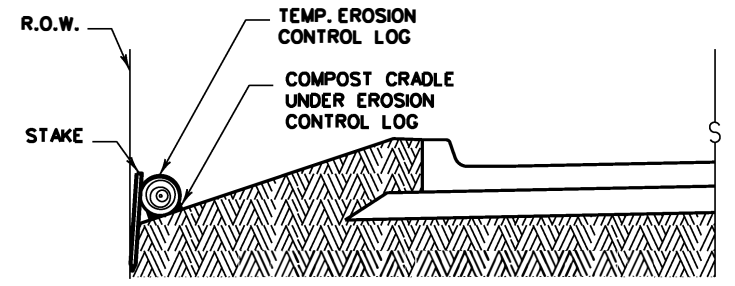


SECTION B-B  
EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



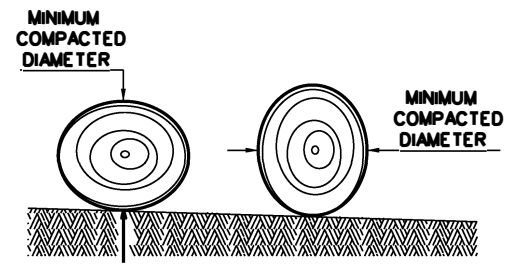
PLAN VIEW



SECTION C-C

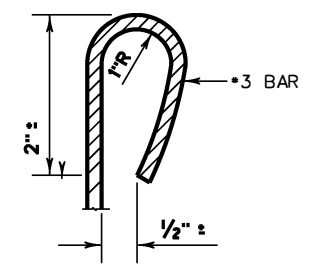
EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

- 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



REBAR STAKE DETAIL

**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" the drainage area).

Controllogs 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.

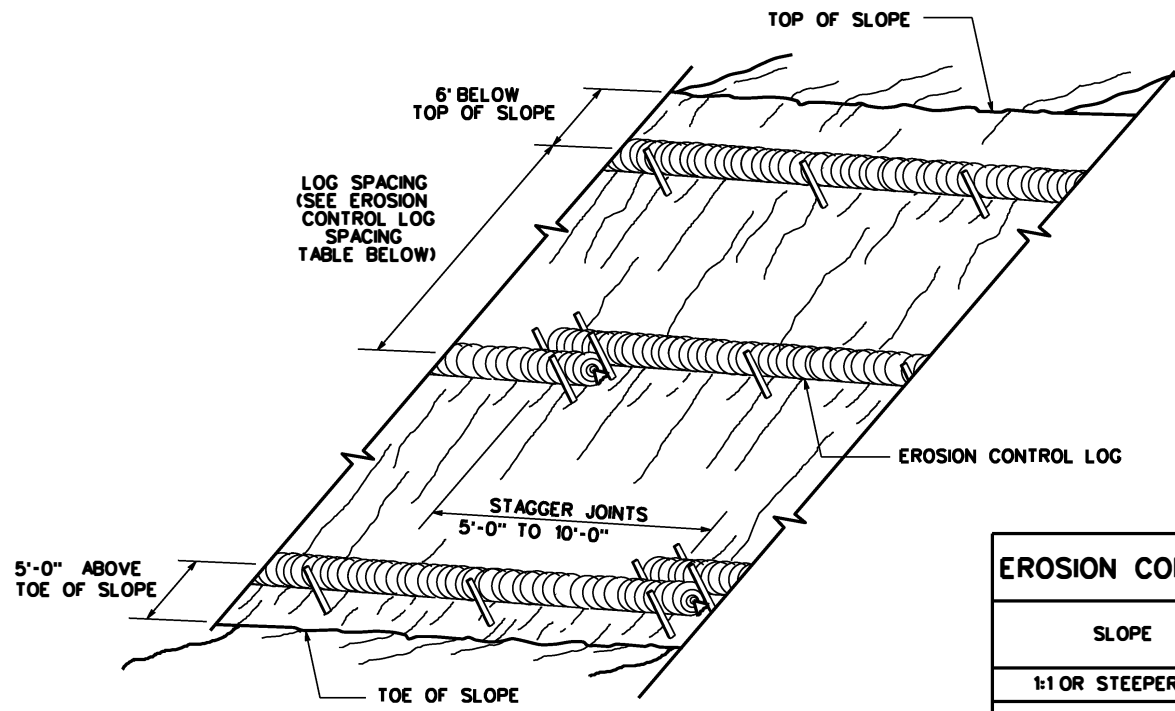
**GENERAL NOTES:**

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'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.

SHEET 1 OF 3

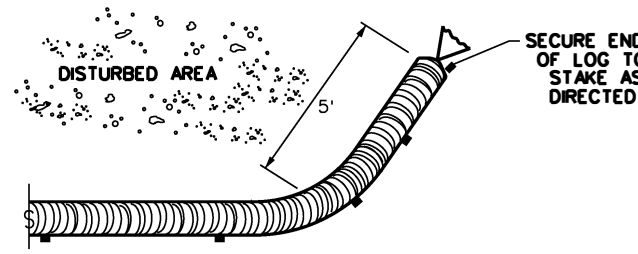
|  |           |                          |           |
|--|-----------|--------------------------|-----------|
|  |           | Design Division Standard |           |
| <b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b><br><b>EROSION CONTROL LOG</b><br><b>EC(9)-16</b> |           |                          |           |
| FILE: ec916  | DN: TxDOT | CK: KM                   | DW: LS/PT |
| © TxDOT: JULY 2016   | CONT      | SECT                     | JOB       |
| REVISIONS  | 0909      | 22                       | 190       |
|  | DIST      | COUNTY                   | SHEET NO. |
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**EROSION CONTROL LOGS ON SLOPES  
STAKE AND TRENCHING ANCHORING**

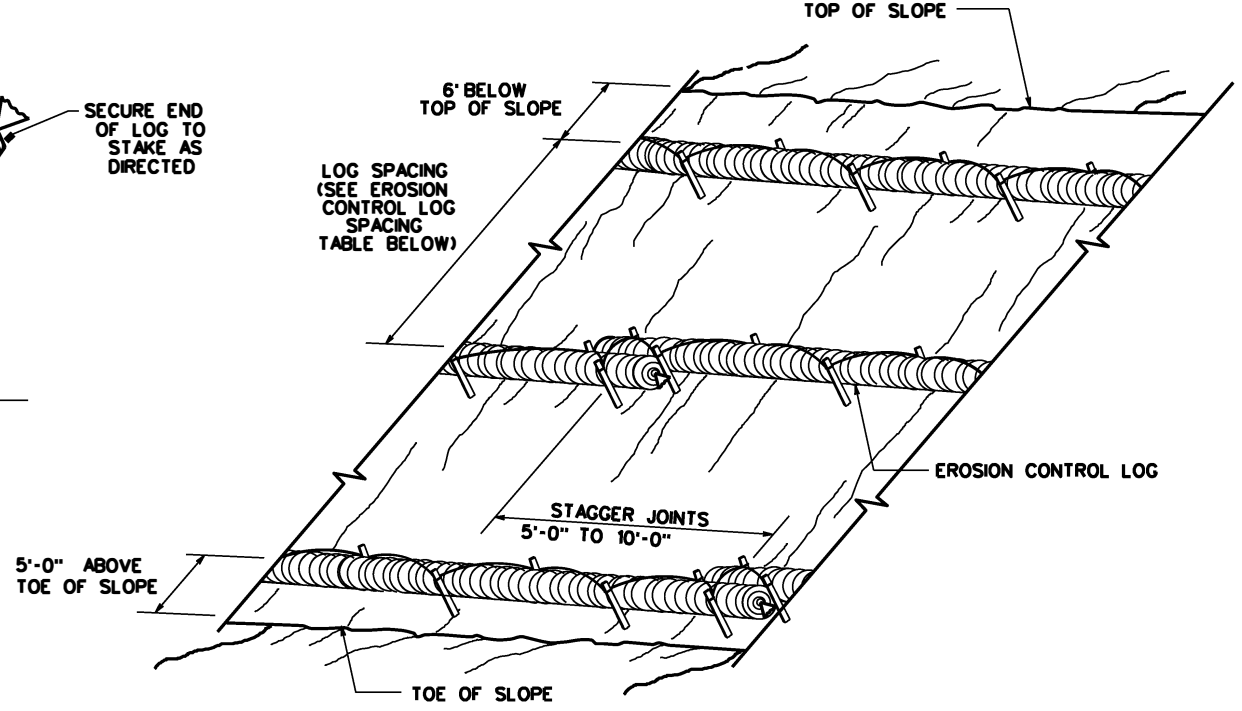
CL-SST



**END SECTION RAP DETAIL**

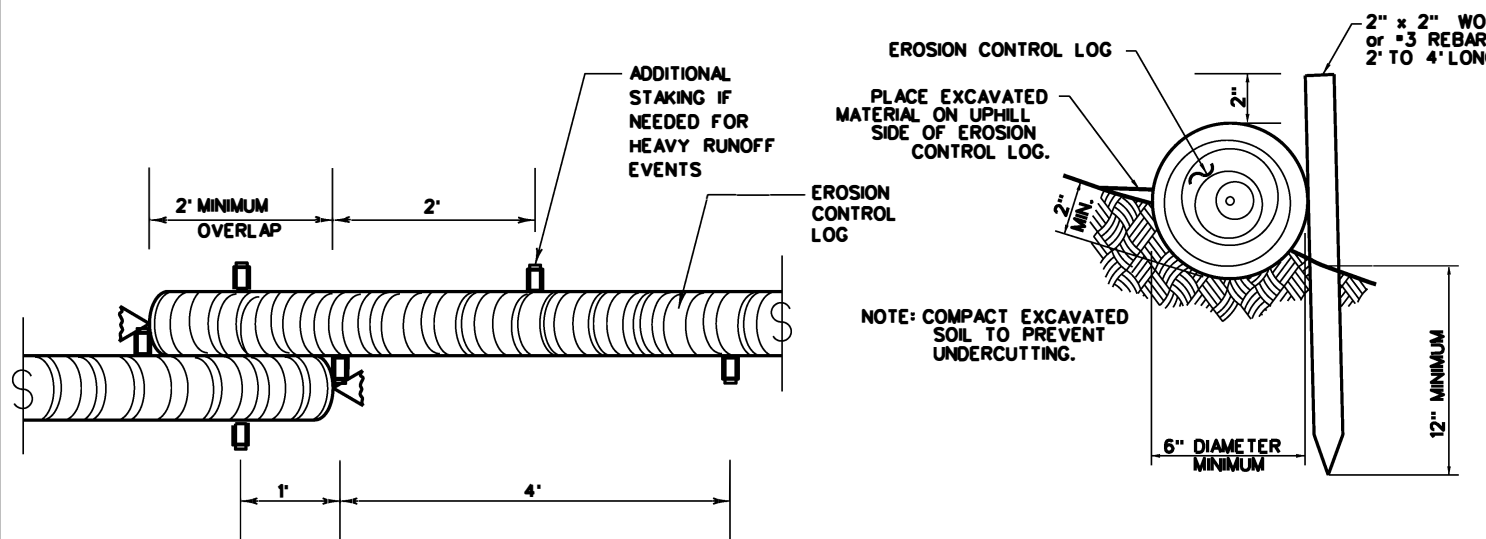
| SLOPE          | LOG DIAMETER |     |     |     |
|----------------|--------------|-----|-----|-----|
|                | 6"           | 8"  | 12" | 18" |
| 1:1 OR STEEPER | 5'           | 10' | 15' | 20' |
| 2:1            | 10'          | 20' | 30' | 40' |
| 3:1            | 15'          | 30' | 45' | 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



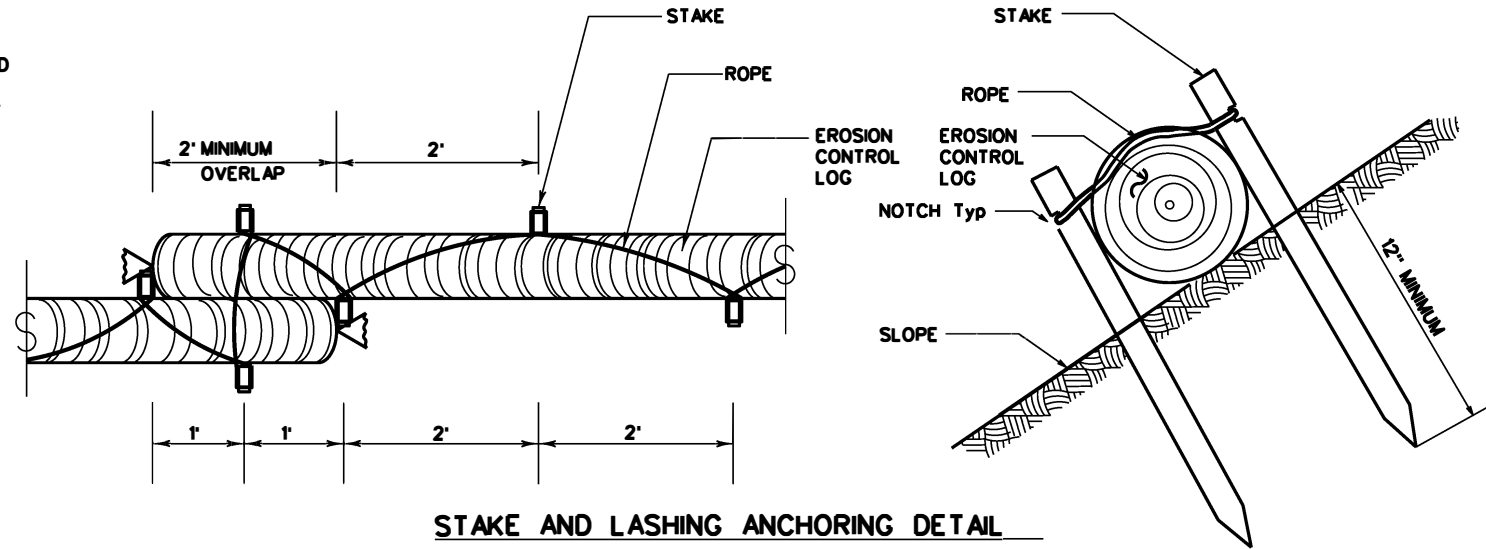
**EROSION CONTROL LOGS ON SLOPES  
STAKE AND LASHING ANCHORING**

CL-SSL



**STAKE AND TRENCHING ANCHORING DETAIL**

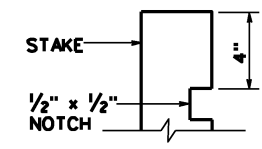
CL-SST



**STAKE AND LASHING ANCHORING DETAIL**

CL-SSL

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



**STAKE NOTCH DETAIL**

SHEET 2 OF 3

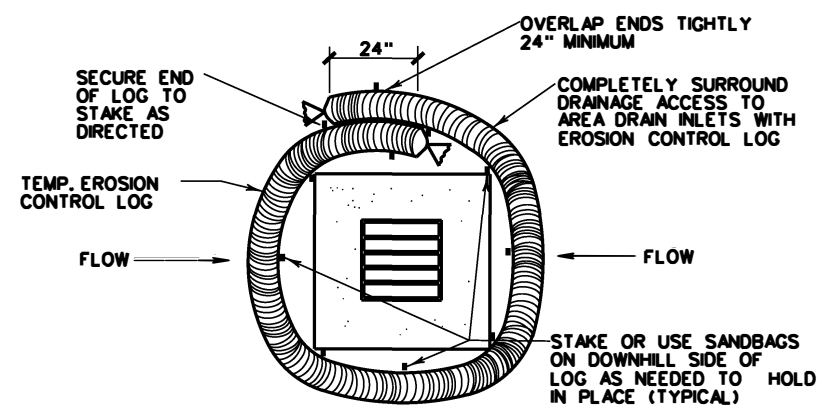
Texas Department of Transportation  
Design Division Standard

**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          | 0909      | 22       | 190       | CS        |
|                    | DIST      | COUNTY   |           | SHEET NO. |
|                    | WACO      | MCLENNAN |           | 47        |

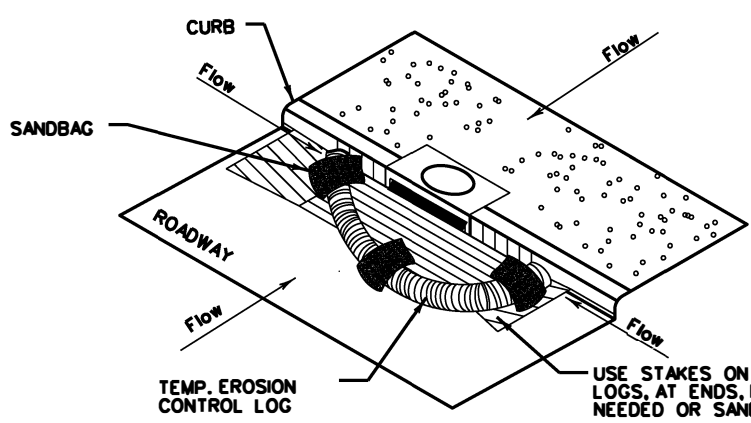
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FILE:

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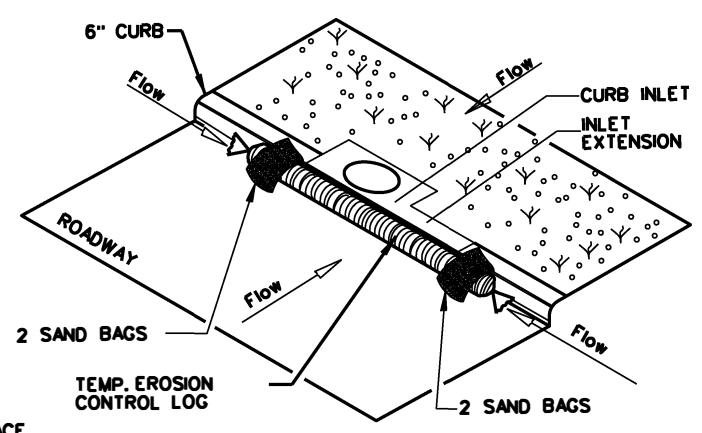
**EROSION CONTROL LOG AT DROP INLET**

CL-DI



**EROSION CONTROL LOG AT CURB INLET**

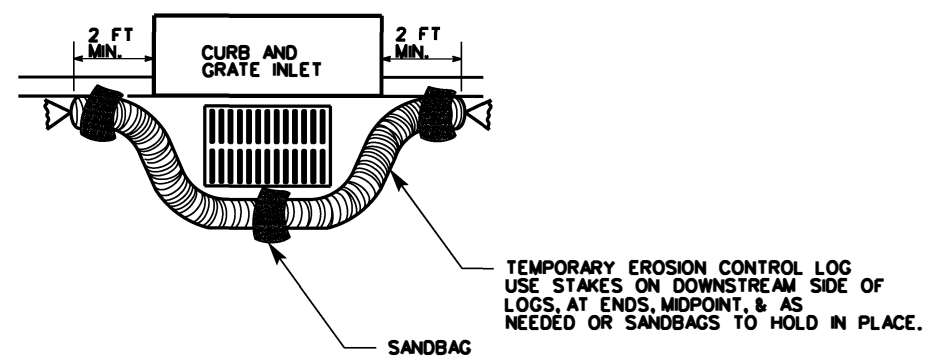
CL-CI



**EROSION CONTROL LOG AT CURB INLET**

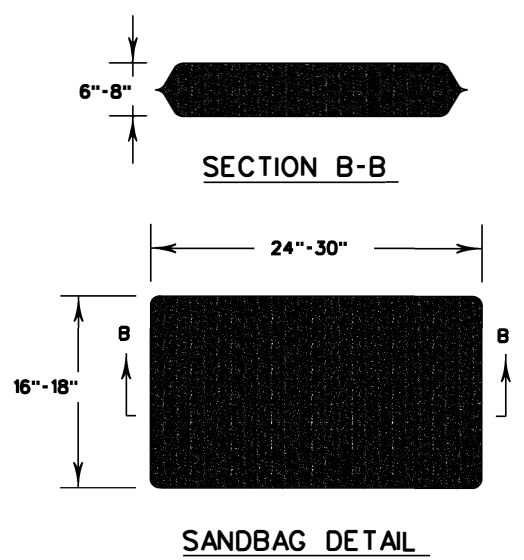
CL-CI

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



SHEET 3 OF 3

|  |           |                                 |           |
|--|-----------|---------------------------------|-----------|
|  |           | <i>Design Division Standard</i> |           |
| <b>TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES</b><br><b>EROSION CONTROL LOG</b><br><b>EC(9)-16</b> |           |                                 |           |
| FILE: ec916  | DN: TxDOT | CK: KM                          | DW: LS/PT |
| © TxDOT: JULY 2016   | CONT      | SECT                            | JOB       |
| REVISIONS  | 0909      | 22                              | 190       |
|  | DIST      | COUNTY                          | SHEET NO. |
|  | WACO      | MCCLENNAN                       | 48        |

DATE:  
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