

Traffic Operations Manual
SIGNS AND MARKINGS
Volume



November 1997



Manual Notice 2006-1

To: Holders of Subject Manual

From: Carlos A. Lopez, P.E.
Traffic Operations Division *Carlos A. Lopez, P.E.*

Manual: *Signs and Markings Manual*
(formerly the *Signs and Markings Volume* of the *Traffic Operations Manual*)

Effective Date: March 1, 2006

Purpose

This manual revision includes the following new sections added to Chapter 7:

- ◆ Section 16, “Memorial Marker and Named Marker Highways and Structures” (formerly titled “Named and Memorialized Highways”)
- ◆ Section 17, “Historic Routes”
- ◆ Section 18, “Street-Named Highways”
- ◆ Section 19, “Historical Markers”

In addition the following changes have been made to Chapter 7:

- ◆ Section 4, “Signing for County Roads,” has been revised to reflect current signing standards.
- ◆ Section 9, “Traffic Generators, Special Events, and Government Offices,” has been revised with a new segment on the use of commercial names.
- ◆ Section 21 (formerly 19), “WELCOME TO TEXAS Signs,” has been revised to comply with Texas Transportation Code, Section 201.617.
- ◆ Section 22 (formerly 20), “Accessibility Signing for Rest and Picnic Areas,” has been revised to reflect current signing standards.
- ◆ Other minor technical updates have also been incorporated.

Review

The Office of General Counsel and Audit Office both reviewed the draft version of this revision and found it adequate for its purpose.

Content and Instructions

This manual notice includes a complete revision to Chapter 7.

In the print version of this manual (*Signs and Markings Volume of the Traffic Operations Manual*), replace the entirety of the main Table of Contents and Chapter 7 with this new content. Revised portions are marked with highlighting or, in the case of entire pages, vertical bars in the outside margins.

The on-line version of this manual now contains only this revised Chapter 7. For other content, see the print version.

Contact

Address questions concerning information contained in this manual notice to Greg Brinkmeyer of the Traffic Operations Division, 512-416-3120.

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Manual Notice 2004-1

To: Holders of Subject Manual
From: Carlos A. Lopez, P.E.
Traffic Operations Division *Carlos A. Lopez, P.E.*
Manual: *Signs and Markings Volume of the Traffic Operations Manual*
Effective Date: October 1, 2004

Purpose

This manual revision incorporates current procedures and requirements for restricted truck lanes in conformance with Title 43, Texas Administrative Code, Sections 25.601–25.604

Review

The Office of General Counsel and Audit Office both reviewed the draft version of this revision and found it adequate for its purpose.

Content and Instructions

This manual notice includes the following new material, which should be incorporated into the existing manual as follows:

New Pages:	Instructions:
<i>i</i> through <i>ii</i> (in the table of contents)	Replace existing pages.
5-1 through 5-2	Replace existing pages.
5-19 through 5-20	Replace existing pages.
5-29 through 5-38	Replace existing pages 5-29 through 5-30.

Revised portions are marked with vertical bars in the outside margins.

Contact

Address questions concerning information contained in this manual notice to Darren McDaniel of the Traffic Operations Division, 512-416-3331.

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Manual Notice 2003-1

To: Holders of Subject Manual
From: Carlos A. Lopez, P.E.
Traffic Operations Division

*Carlos A. Lopez, P.E.
for CAC*

Manual: *Signs and Markings Volume of the Traffic Operations Manual*

Effective Date: December 1, 2003

Purpose

This manual revision incorporates current procedures and requirements for non-radioactive hazardous materials (NRHM) routing in conformance with Title 43, Texas Administrative Code, Sections 25.101-25.104.

Review

The material covered by this manual revision has circulated in the form of a memorandum to all district engineers dated February 6, 1998, and signed by David T. Newbern, P.E. Districts have commented on the contents, and suggestions have been incorporated into this revision as appropriate.

The Office of General Counsel reviewed the draft version of this revision and suggested additional language, which was incorporated.

Contents and Instructions

This manual notice includes the following new material, which should be incorporated into the existing manual as follows:

New Pages:	Instructions:
5-1 through 5-2	Replace existing pages.
5-21 through 5-30	Replace existing pages 5-21 through 5-24.

Revised portions are marked with vertical bars in the outside margins.

Contact

Address questions concerning information contained in this manual notice to Charles Koonce of the Traffic Operations Division, 512-416-3234.

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30



Manual Notice 01-1

TO: Holders of Subject Manual Volume

FROM: Carlos A. Lopez, P.E.
Traffic Operations Division

DATE: May 17, 2001

MANUAL: *Signs and Markings Volume*
of the *Traffic Operations Manual*

Purpose

This manual notice amends the requirement for reporting vertical clearance measurements to include district bridge inspection personnel.

Effective Date

June 1, 2001

Contents and Instructions

This manual notice includes the following new material, which should be incorporated into the existing manual volume as follows:

RECEIVED at Tx DOT
23 DEC - 1 AM 11:11
TRANSPORTATION
ENGINEERING OFFICE

New Pages	Instructions
6-7g and 6-8	Replace existing pages

Contact

Address questions concerning information contained in this Manual Notice to Greg Brinkmeyer, P.E., Traffic Operations Division, 512-416-3120 or fax 512-416-3161.

Copyright Notice

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Manual Notice 00-1

TO: Holders of Subject Manual Volume

FROM: Carlos A. Lopez, P.E.
Traffic Operations Division

Carlos A. Lopez, P.E.

DATE: May 4, 2000

MANUAL: *Signs and Markings Volume*
of the Traffic Operations Manual

Purpose

This manual notice revises the guidelines for the use and installation of pavement markings, markers, and delineators.

Effective Date

Immediately

Contents and Instructions

This manual notice includes the following new material, which should be incorporated into the existing manual volume as follows:

New Pages	Instructions
10-1 through 10-30	Replace existing pages 10-1 through 10-28
iii & iv (in the Table of Contents)	Replace existing pages iii & iv

Contact

Address questions concerning information contained in this Manual Notice to Greg Brinkmeyer, P.E., Traffic Operations Division, 512-416-3120 or fax 512-416-3161.

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Manual Notice 97-1

TO: Recipients of Subject Manual Volume

FROM: B. F. Templeton, P.E.
Assistant Executive Director
Field Operations

MANUAL: *Signs and Markings Volume*
of the *Traffic Operations Manual*

DATE: September 22, 1997

Purpose

This volume of the *Traffic Operations Manual* sets forth TxDOT standard practices and procedures regarding signs, markings, and some other traffic control devices. This volume supplements the information contained in the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*.

Supersedes

This volume supersedes:

- ◆ the following portions of the *Safety and Maintenance Operations Division Procedures Manual*:
 - Chapter VI, Section 3, "Maintenance of Traffic Signs"
 - Chapter VI, Section 5, "Maintenance of Traffic Control Markings"
 - Chapter VI, Subsection 6-604, "Expressway and Freeway Signing"
 - Chapter VI, Subsection 6-605, "Conventional Highway Signing"
 - Chapter VIII, Subsection 8-403, "Interstate Guide Sign Refurbishing Program"
- ◆ Part 3 ("Expressway and Freeway Signing Procedures" of the *Traffic Engineering Procedures* manual
- ◆ Administrative Circular No. 15-90, "Standard Sheeting for Small Signs"

Contents

- ◆ This Manual Notice
- ◆ Table of Contents
- ◆ Chapters 1 through 11
- ◆ Appendices A through F
- ◆ Index
- ◆ Divider tabs
- ◆ Front cover insert
- ◆ Spine insert

Instructions

This is a new volume. Insert these chapters and related matter with tabs into a three-ring binder.

Effective Date

November 1, 1997

Contact

Address questions concerning information contained in this Manual Notice to Greg Brinkmeyer, P.E., Traffic Operations Division, 512/416-3120 or fax 512/416-3161.



Traffic Operations Manual
SIGNS AND MARKINGS
Volume



November 1997

Table of Contents

Chapter 1: Introduction

Section 1 – Overview.....	1-3
Section 2 – Authority to Erect Signs	1-5
Section 3 – Reference Sources	1-9
Section 4 – Maintenance and Distribution of the <i>TMUTCD</i>	1-15

Chapter 2: Sign Location and Installation

Section 1 – Sign Location.....	2-3
Section 2 – Methods of Sign Installation.....	2-7

Chapter 3: Sign Materials and Supports

Section 1 – Roadside Sign Supports.....	3-3
Section 2 – Sign Substrate and Structure.....	3-7
Section 3 – Retroreflectorization.....	3-9
Section 4 – Sign Legends	3-11
Section 5 – Sign Identification Decal	3-13
Section 6 – Storage and Transportation.....	3-17
Section 7 – New and Experimental Products	3-19
Section 8 – Special Sign Applications.....	3-21

Chapter 4: Sign Maintenance

Section 1 – Overview.....	4-3
Section 2 – General Guidelines	4-4
Section 3 – Sign Inspection	4-7
Section 4 – Roadside Sign Supports.....	4-11
Section 5 – Overhead Signs.....	4-13
Section 6 – Sign Rehabilitation	4-15

Chapter 5: Regulatory Signs

Section 1 – Overview.....	5-3
Section 2 – STOP and YIELD Signs	5-5
Section 3 – SPEED LIMIT Signs	5-11
Section 4 – Handicapped Parking.....	5-13
Section 5 – WEIGHT LIMIT and Inspection Station Signs	5-15
Section 6 – Truck Routes.....	5-17
Section 7 – Non-Radioactive Hazardous Materials Routing.....	5-21
Section 8 – Restricted Truck Lanes.....	5-29
Section 9 – Special Practices.....	5-37

Chapter 6: Warning Signs

Section 1 – Overview.....	6-3
Section 2 – T-Intersections	6-5
Section 3 – Vertical Clearance	6-7
Section 4 – Advisory Speeds	6-9
Section 5 – WATCH FOR ICE ON BRIDGE Sign.....	6-11
Section 6 – Special Practices	6-13

Chapter 7: Guide Signs

Section 1 – Overview.....	7-3
Section 2 – Concurrent Routes	7-5
Section 3 – Oversized Street Name Signs	7-7
Section 4 – Signing for County Roads	7-9
Section 5 – Interstate Highway Numbering	7-11
Section 6 – Special Route Markers.....	7-13
Section 7 – Destination and Distance Signing.....	7-15
Section 8 – Destination Signing for Border Cities in Mexico.....	7-19
Section 9 – Traffic Generators, Special Events, and Government Offices	7-21
Section 10 – State Parks	7-25
Section 11 – Public Beaches.....	7-27
Section 12 – Wildlife Viewing Areas.....	7-29

(continued...)

Chapter 7: Guide Signs *(continued)*

Section 13 – General Services Signs	7-31
Section 14 – Radio Information Signs.....	7-33
Section 15 – Reference Markers and Mileposts	7-35
Section 16 – Memorial Marker and Named Marker Highways and Structures	7-37
Section 17 – Historic Routes	7-43
Section 18 – Street-Named Highways.....	7-47
Section 19 – Historical Markers	7-55
Section 20 – County Line Signs	7-61
Section 21 – WELCOME TO TEXAS Signs	7-63
Section 22 – Accessibility Signing for Rest and Picnic Areas	7-65

Chapter 8: Miscellaneous Signs

Section 1 – Overview.....	8-3
Section 2 – Temporary Signs and Banners Not Placed by TxDOT	8-5
Section 3 – Adopt-a-Highway Signs	8-7
Section 4 – Telephone Number and Public Awareness Signing	8-11
Section 5 – THE EYES OF TEXAS Sign.....	8-15
Section 6 – Other Picnic and Rest Area Signs.....	8-17
Section 7 – Municipal and Road Utility District Signs	8-19
Section 8 – City Pride Signs	8-21
Section 9 – Public Water System Signs.....	8-27
Section 10 – Wellhead Protection Area Signs.....	8-29
Section 11 – Clean Cities 2000.....	8-31
Section 12 – Lone Star City Signs.....	8-33

Chapter 9: Expressway and Freeway Signing

Section 1 – Expanded Use of Expressway Signing Standards	9-3
Section 2 – Sequence Signs	9-7
Section 3 – Freeway Guide Signs.....	9-11
Section 4 – Overhead Sign Lighting.....	9-15
Section 5 – Project Development	9-17

(continued...)

Chapter 9: Expressway and Freeway Signing *(continued)*

Section 6 – Field Work.....	9-21
Section 7 – Plans.....	9-23
Section 8 – Specifications.....	9-29

Chapter 10: Markings and Delineators

Section 1 – Overview.....	10-3
Section 2 – Pavement Marking Materials.....	10-5
Section 3 – Prefabricated Tape, Paint, and Thermoplastic Markings	10-7
Section 4 – Raised Pavement Markings	10-11
Section 5 – Which Type of Marking To Use.....	10-13
Section 6 – Delineators.....	10-15
Section 7 – Special Uses of Pavement Markings	10-17
Section 8 – Installation	10-21
Section 9 – Inspecting and Testing Pavement Markings.....	10-25
Section 10 – Maintenance and Reconstruction.....	10-27

Chapter 11: Other Traffic Control Situations

Section 1 – Overview.....	11-3
Section 2 – School Areas.....	11-5
Section 3 – Bicycle Facilities	11-7

Appendix A – Forms

- ◆ Sign and Striping Inspection Report Form

Appendix B – Obtaining Other Publications

Appendix C – Standard Abbreviations for Freeway Guide Signs

Appendix D – Replacement Costs for Various Traffic Control Devices

Appendix E – Accessing Traffic Control Standard Sheet Graphic Design Files

Appendix F – WATCH FOR ICE ON BRIDGE Sign Display Schedule

Index

Chapter 1

Introduction

Contents

This chapter contains the following sections:

Section 1 — Overview	1-3
Section 2 — Authority to Erect Signs	1-5
Section 3 — Reference Sources	1-9
Section 4 — Maintenance and Distribution of the <i>TMUTCD</i>	1-15

Your Notes:

Section 1 Overview

Definitions

Traffic control device — any sign, signal, marking, or device placed on, over, or adjacent to a street or highway to regulate, warn, or guide traffic.

Highway sign — a traffic control device mounted on a support above the level of the roadway with the purpose of conveying a specific message to motorists by means of words and/or symbols.

Sign support structure — may be of the overhead or roadside type. Roadside sign supports are also commonly referred to as “ground-mounted” sign supports.

Purpose of This Volume

This volume provides information and internal procedures for the placement and use of all types of traffic control devices (except signals) on state roadways.

This volume is not meant to be comprehensive, but rather to provide additional information and procedures specific to TxDOT (Texas Department of Transportation) operations which are not covered in the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* or other TxDOT manuals. (See Section 3 of this chapter for a listing of other relevant TxDOT references sources.)

Importance of Uniformity

In many aspects of highway operation, the procedures used by field maintenance personnel allow considerable freedom for innovation and experimentation. However, because highway safety depends on the proper use and interpretation of traffic control devices by motorists, uniformity and standardization are vital. For this reason, the application of traffic control devices must be in accordance with the *TMUTCD* and other standards adopted by TxDOT.

Your Notes:

Section 2

Authority to Erect Signs

Legal Authority

Section 544.002 of the Texas Transportation Code grants TxDOT authority to place (install) and maintain (or provide for such placement and maintenance) traffic control devices on state highways in accordance with the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*. The same section grants local jurisdictions the same authority on roads and highways under their jurisdictions. Local authorities may not place or maintain traffic control devices on highways under the jurisdiction of TxDOT without TxDOT's permission.

Payment by Others for Erection of Traffic Control Devices

With certain exceptions, Title 43 of the Texas Administrative Code, Section 25.6, requires that all installation of, maintenance of, and changes to traffic control devices along designated routes of the state highway system be at the expense of TxDOT. Exceptions are as follows:

Agreements. Provisions of an agreement executed with a local jurisdiction may delegate responsibilities for installation and/or maintenance of the traffic control devices to others. (See the *Traffic Engineering Agreements Volume* of the *Traffic Operations Manual* for more information.)

Unnecessary but Allowable Devices. When a particular device requested by local officials within cities or individuals outside of incorporated cities is not deemed necessary by the department for the regulation, warning, or guidance of motorists, but the requested device could be installed in accordance with the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* without adverse effect on motorist safety, TxDOT may install the device at the expense of others. This generally applies only to guide signs.

(continued...)

Payment by Others for Erection of Traffic Control Devices *(continued)*

Guide Sign Change. When a guide sign change is required on the main lanes of a freeway, TxDOT may charge the cost of the change to others when all the following conditions are satisfied:

- ◆ The facility on which the change is requested has already been signed to interstate standards.
- ◆ The requested sign change involves the addition of a name for a previously unnamed road or street, or a change in the name of a city street or county road which resulted from the official action of the city or county governing body.
- ◆ The requested change in name cannot be accomplished within the available space on the existing sign or requires changes in the sign support.
- ◆ The requested sign changes are requested to be made prior to the time the affected signs require maintenance replacement.

Temporary Signs for Special Events. TxDOT may place at the expense of others signs of a temporary nature requested to be erected on a highway route for a special event, provided the following conditions are satisfied:

- ◆ The design and size of the temporary sign is approved by TxDOT.
- ◆ The sign does not in any way interfere with other traffic control devices.
- ◆ The sign is placed only for such times and in such locations as approved by TxDOT.
- ◆ The sign is necessary for guidance of a large number of motorists to a destination open to the general public and does not adversely affect the safety of the motoring public.
- ◆ The sign is not reusable on a regular basis and is needed for less than one month.

Logo Signs. Specific information logo signs carry brand names of selected services of interest to motorists. Businesses pay an annual rental fee to participate in the program. (See Chapter 7 of this volume for more information.)

City Pride and TNRCC Signs. The City Pride Sign Program (CPSP) allows cities to erect and maintain a sign (at city expense) near the city limits sign. Attachment signs on the City Pride sign display the names of civic organizations and other messages determined by the city. The program is intended to remove non-official signing from TxDOT sign supports. (See Chapter 8 of this volume for more information.)

TNRCC Signs. The CPSP rules also allow the Texas Natural Resource Conservation Commission signs to be placed on a separate, independent (non-TxDOT) sign support, in addition to the City Pride Sign. (See Chapter 8 of this volume for more information.)

Erection of Traffic Control Devices by Others

TxDOT may authorize the placement of special signs by others within highway rights-of-way, when necessary as a service to the motoring public, where the following conditions are satisfied:

- ◆ The design and size of the special signs are approved by TxDOT.
- ◆ The signs are placed only for such times and in such locations as authorized by TxDOT.
- ◆ The signs do not in any way interfere with other traffic control devices.
- ◆ The signs are for a destination open to the general public.

Illegal Traffic Control Devices

Traffic control devices on public highways, roads, and streets are unenforceable if placed by other than public authority. Unofficial or nonstandard devices are legally prohibited in all jurisdictions in Texas.

The erection of signs or other devices that hide from view or otherwise interfere with the effectiveness of any traffic control device or railroad sign or signal are likewise prohibited (Section 392.033 of the Texas Transportation Code and 43 TAC, 25.10). Procedures for removal of illegal signs can be found in the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division).

Your Notes:

Section 3

Reference Sources

Introduction

Users of this manual should consult the following TxDOT publications for information not contained here.

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*

Section 544.001 of the Texas Transportation Code requires TxDOT to adopt a manual and specifications for a uniform system of traffic control devices for use on streets, roads, and highways within the state. The uniform system must correlate with and, so far as possible, conform to the system then current as approved by the Federal Highway Administration (FHWA) and set forth in the *National Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)*. The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* basically follows the national *MUTCD*, except where the national standards conflict with state law or where modifications are necessary to more closely fit Texas conditions. The 1980 *TMUTCD* was adopted by Commission Minute Order No. 77548 on July 21, 1980, referenced in the Texas Administrative Code found in Title 43 TAC, Section 25.1.

Contact TxDOT's Traffic Operations Division (TRF) to obtain copies.

Using the *TMUTCD*

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* contains the standards and basic principles governing the design and usage of traffic control devices in Texas. The provisions of the *TMUTCD* apply to all streets and highways in the State including those under the jurisdiction of cities and counties. It should be the governing document on any question regarding the application of traffic control devices.

Readers are urged to consult the *TMUTCD* for additional information on the topics covered in this volume.

Standard Highway Sign Designs for Texas (SHSD)

The *Standard Highway Sign Designs for Texas (SHSD)* (commonly referred to as the “Shop Manual”) contains design and fabrication details for signs, pavement markings, and certain other traffic control devices. The *SHSD* is based on the similar FHWA publication, *Standard Highway Signs*. The *SHSD* is available to district sign shops and for purchases by the public.

Contact TxDOT's Traffic Operations Division (TRF) to obtain copies.

Traffic Control Standard Sheets

The *Traffic Control Standard Sheets (TCSS)* contains one-half scale (240 x 297 mm [11 x 17 inch]) prints of standard plan sheets for projects involving the installation of traffic control devices, illumination, and the design of traffic control plans. These sheets illustrate fabrication and installation details for:

- ◆ signs
- ◆ sign supports and foundation
- ◆ traffic signals
- ◆ illumination
- ◆ pavement markings
- ◆ delineation
- ◆ barricade and construction standards
- ◆ typical traffic control plans.

The *TCSS* graphic design files are accessible using the Ethernet network and file transfer protocol (FTP). See Appendix E of this volume for more information and procedures.

Contact TxDOT's Traffic Operations Division (TRF) to obtain copies.

Barricade and Construction Standard Sheets

The *Barricade and Construction Standard Sheets*, commonly referred to as “BC Sheets,” are normally required in all contract project plans. As the name implies, these sheets illustrate the standard placement and design of barricades, signs, and miscellaneous traffic control devices commonly required on all construction projects.

Traffic control details on these sheets should also be followed for maintenance contract projects and, when applicable, for work accomplished by maintenance forces.

Standard BC Sheets are required for each project and are listed on the Title Sheet. The divisions insert a tracing of each listed sheet into the plans when the project plans, specifications, and estimate (PS&E) are submitted for letting.

Because several divisions have responsibility for safety in construction areas, the BC sheets are developed through the cooperation of the Construction and Maintenance Division (CMD), the Design Division (DES), the Occupational Safety Division (OCC), and the Traffic Operations Division (TRF).

Contact TxDOT's Traffic Operations Division (TRF) to obtain copies.

“Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations”

Part VI of the *TMUTCD*, “Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations,” is published as a separate booklet. It includes standards for the design and application of signing, barricading, and other traffic control devices used during construction and maintenance activities.

The special conditions encountered where traffic must be moved through or around road construction and maintenance operations may adversely affect traffic flow. Being essentially temporary, these conditions are more difficult for motorists to deal with, because they are unexpected and not in accord with the normal pattern of traffic.

Contact TxDOT's Traffic Operations Division (TRF) to obtain copies.

Sign Crew Field Book

The *Sign Crew Field Book* provides information and guidance on the use, placement, and installation of conventional guide signs on non-access controlled facilities. The book addresses signing situations beyond those covered in the *TMUTCD* and the *Traffic Control Standard Sheets*. However, the book does not establish or supersede any standards, specifications, recommended practices, or regulations.

Contact TxDOT's Traffic Operations Division (TRF) to obtain copies.

Procedures for Establishing Speed Zones

Procedures for Establishing Speed Zones, a volume of the *Traffic Operations Manual*, contains information and procedures used in conducting engineering studies to determine the lawful maximum speed limits for public streets and highways.

Contact TxDOT's General Services Division (GSD), Publication Sales, to obtain copies.

Highway Illumination

Highway Illumination, a volume of the *Traffic Operations Manual*, contains lighting terms, equipment descriptions, TxDOT policy, and design guidelines for conventional lighting systems. This volume is used in the Design Level III training course.

Contact TxDOT's General Services Division (GSD), Publication Sales, to obtain copies.

Traffic Signals

Traffic signals will be covered in the forthcoming *Traffic Signal Design and Application Volume* of the *Traffic Operations Manual*. Contact TxDOT's General Services Division (GSD), Publication Sales, to obtain copies when available.

Standard Specifications

Standard Specifications for Construction of Highways, Streets and Bridges contains standard specifications for installation of traffic control devices and illumination by contract. The book is published by the Design Division (DES) and may be obtained from the General Services Division (GSD), Publication Sales.

The Traffic Operations Division (TRF) also works with GSD to develop standard purchase specifications for traffic control devices and illumination to be installed by maintenance. The use of these standard specifications assists GSD in requisitioning equipment and materials more efficiently.

Both contract and purchase specifications reference TxDOT's *Departmental Materials Specifications* published by the Materials and Tests Division (MAT).

Obtaining the Publications

The publications listed in this section are available free of charge to TxDOT personnel. All others, including private individuals, businesses, commercial enterprises, and public entities desiring copies in addition to complimentary copies received (see Section 4 of this chapter), are charged the price currently in effect. (State law requires non-TxDOT individuals desiring these publications to purchase them.) Prices are based on the actual cost of the publication and materials. A price list with request form is available upon request from the Traffic Operations Division (TRF).

TRF maintains a database of names and addresses of all holders of the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*, *Standard Highway Signs Designs for Texas (SHSD)*, and the *Traffic Control Standard Sheets*. When a revision is made to these publications, all department manual holders and those with complimentary copies are forwarded a copy of the revision. All others receive notice of the revision, and the cost for purchase.

Your Notes:

Section 4

Maintenance and Distribution of the *TMUTCD***Responsibility**

The Traffic Operations Division (TRF) is responsible for publishing and updating the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*. TRF also has responsibility for distribution of the *TMUTCD* and its revisions.

Distribution

Depending on the particular responsibility to the general public in the area of traffic planning and operations, certain public entities outside TxDOT may be entitled to complimentary copies of the *TMUTCD*. Complimentary (free) copies are sent directly to the requesting entity according to the following criteria:

***TMUTCD* — Complimentary Distribution**

Entity or Individual	What They Get
All Texas incorporated cities of 5,000 or more population	<ul style="list-style-type: none"> ◆ one copy for city administration ◆ one additional copy, upon request, if the city has a traffic engineering organization or other department responsible for traffic planning and operations.
All Texas incorporated cities under 5,000 population	one copy sent to city administration.
All Texas Counties	one copy sent to the county commissioners' court.
The executive and legislative branches of the state	copies when requested for state business.
All courts above district courts in the Judicial Branch	copies when requested for state business.
Federal Highway Administration personnel having a need	copies upon request.
Official highway and public transportation organizations having a need (such as the American Association of State Highway and Transportation Officials, Institute of Transportation Engineers, National Committee on Uniform Traffic Control Devices, Highway Transportation Research Board, National Safety Council, and others of similar status)	copies upon request.
All Texas state agencies having a need, such as the Department of Public Safety and others of similar status	copies upon request.
All other official governmental agencies, such as other states, foreign countries, and others of similar status	copies upon request.

Your Notes:

Chapter 2

Sign Location and Installation

Contents

This chapter contains the following sections:

Section 1 — Sign Location	2-3
Section 2 — Methods of Sign Installation	2-7

Your Notes:

Section 1

Sign Location

Requirements for Effective Signs

To be effective, a traffic control device should meet five basic requirements:

- ◆ fulfill a need
- ◆ command attention
- ◆ convey a clear, simple meaning
- ◆ command the respect of road users
- ◆ give adequate time for proper response.

Five basic considerations are used to ensure that these requirements are met. They are:

- ◆ design
- ◆ placement
- ◆ operation
- ◆ maintenance
- ◆ uniformity.

More Information

The *Texas Manual on Uniform Traffic Control Devices for Streets and Highways (TMUTCD)* provides information and requirements for the location and spacing of signs (including a detailed discussion of the foregoing requirements in Section 1A-2). Some sign locations are more exactly defined than others. The *TMUTCD* should be consulted to determine sign location, color, text, and the rationale for using various signs. Part II of the *TMUTCD*, "Signs," provides general information about this matter.

TxDOT's *Sign Crew Field Book* provides additional basic placement considerations as well as guidelines on height of signs and assemblies and lateral placement.

Determination of Need

Traffic engineers usually indicate signing needs on a schematic or drawing of the location.

Schematics for freeway guide signs must be approved by the Traffic Operations Division (TRF). See Chapter 9 of this volume for details.

Field Review

After determining what signs are needed and approximately where they should be located based on the *TMUTCD*, traffic engineers should conduct a field review to refine sign locations.

Most of the field work required for plan preparation is to:

- ◆ verify or establish the final location of signs shown on the plan and profile sheets
- ◆ determine roadside sign post lengths
- ◆ determine overhead sign support spans and tower heights
- ◆ determine any site restrictions and to document existing or proposed conditions that could affect sign visibility.

Considerations for Sign Placement

Many physical features may enter into the consideration of sign placement. These include:

- ◆ right-of-way width
- ◆ driveways
- ◆ bar ditches and culverts
- ◆ trees and shrubs
- ◆ other signs
- ◆ parking areas
- ◆ building overhangs
- ◆ overall sight distance due to curves and hills.

Choosing the correct sign location requires good engineering judgement. Where possible, sign posts should not be placed in ditches or drainage channels.

Where possible, signs of different shapes should not be mounted back-to-back on the same post.

Mounting Height

TxDOT roadside signs are mounted a minimum of 2.1 m (7 feet) above the edge of the pavement in both rural and urban areas. The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* provides more detail on mounting height.

Lateral Clearance

Minimum lateral clearances for both large and small roadside signs are shown in the *Traffic Control Standard Sheets*. Special considerations pertaining to divided highways are discussed in Chapter 9 of this volume and in the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*, Part II.

Rural Intersections

Information and typical examples of appropriate signing and spacing for rural intersections can be found in the *Sign Crew Field Book*.

Your Notes:

Section 2

Methods of Sign Installation

Background

Signing projects may be accomplished by state forces, maintenance contracts, or construction contract.

Maintenance Projects

Maintenance projects vary widely in size and complexity. A maintenance project is done with state forces and may be as simple as installing a new or replacement sign or installing many signs. Small and simple projects usually involve only verbal instructions. Complex projects often require a drawing (schematic) of the location showing the signs and their station numbers.

Contract Projects

Contract projects involve schematic preparation, schematic approval by the Traffic Operations Division, plan preparation, inspection of the contractor's work, and much more paper work than a maintenance project. See *Plans, Specifications, and Estimate Preparation Guide for Construction Projects* for schematic and plan preparation procedures.

Pros and Cons of Using State Forces

Advantages to using state force include timely installations, availability of materials, and cost savings. Furthermore, some signing projects which are small or of a special nature are not attractive to contractors and may be more cost-effectively handled by state forces.

Some disadvantages to the use of state forces are the expenditures of maintenance time and money, unavailability of personnel to accomplish the work, and the need for state force justification on federal projects.

NOTE: New signing on expressways and freeways is usually installed by contract and funded through the appropriate construction program. Signing is normally included in roadway construction contracts.

Signing Required as a Result of Construction

Signing required as a result of roadway construction should be part of the construction project so that:

- ◆ maintenance workload and budgets are not adversely affected
- ◆ the costs are tabulated as construction costs rather than maintenance costs.

Even though signing on a construction project is not considered a maintenance cost, the work, if very minor, may be accomplished by force account. Whether signing is done by contract or maintenance forces, the same type of materials should be used.

Programming Sign Installation

For information on programming sign installation on expressway and freeway projects, see Chapter 9 of this volume.

Chapter 3

Sign Materials and Supports

Contents

This chapter contains the following sections:

Section 1 — Roadside Sign Supports	3-3
Section 2 — Sign Substrate and Structure	3-7
Section 3 — Retroreflectorization	3-9
Section 4 — Sign Legends	3-11
Section 5 — Sign Identification Decal	3-13
Section 6 — Storage and Transport	3-17
Section 7 — New and Experimental Products	3-19
Section 8 — Special Sign Applications	3-21

Your Notes:

Section 1

Roadside Sign Supports

Introduction

Sign supports and their foundations are designed and constructed to hold sign panels rigidly in the proper position. Supports should resist swaying and failure due to wind or displacement by pedestrians or vandals. When hit by a vehicle, a support should break away as designed so that it does not pose a safety hazard to motorists.

The type of support depends primarily on the size of the sign. A variety of shapes and sizes of support material are used.

Chapter 4 of this volume contains more information on roadside sign supports. Overhead sign supports are covered in Chapter 9 of this volume.

Foundations

Non-reinforced concrete drilled shafts are used as foundations for small roadside supports that require foundations. Foundations for large roadside sign supports greater than or equal to 0.61 m (24 inches) in diameter are reinforced concrete drilled shafts.

Driveable sign supports which do not require foundations are permissible as alternatives to several of the small sign support types. Design details for concrete foundations and installation details for driveable supports are shown on the *Traffic Control Standard Sheets*, “Sign Mounting Details” (SMD-Series).

Types of Supports

Through the years, TxDOT has used many types of roadside sign supports. Since the early 1960's, the emphasis has been on the yielding or breakaway sign support, designed to break away upon impact. All TxDOT standard supports are breakaway. TxDOT uses several kinds of breakaway supports. The *Traffic Control Standard Sheets* (SMD-Series) details all of the designs and appropriate size sign to be mounted on each.

(continued...)

Types of Supports *(continued)*

The following table lists the common types of roadside sign supports. Details and procedures for these supports may be found in *Traffic Control Standard Sheets* (SMD-Series).

Common Types of Roadside Sign Supports

Material	Description
fiberglass reinforced plastic (FRP)	Fits inside a universal anchor set in a concrete footing. (See the information on use following this table.)
structural steel (rectangular slip base)	Uses a concrete footing with a “stub post.”
thin wall tube	Has a base socket driven into the ground or set in concrete.
triangular slip base	Uses a concrete foundation with a stub base.

Use of Fiberglass Reinforced Plastic

Yellow fiberglass reinforced plastic (FRP) posts may be cost-effective at intersections where signs are frequently replaced. Yellow FRP posts may also be used to draw attention to warning and regulatory signs to improve safety.

FRP posts may be used for any sign or combination of signs when the total sign area does not exceed 1.5 m² (16 square feet), except FR6-1 and WI-6 signs (see Type D-1). Double post installations can hold up to 3.0 m² (32 square feet). The area of the regulatory or warning sign supplementary plaques is not used in determining the total sign area.

FRP posts are installed using the universal anchor system, which is detailed in Traffic Engineering Standard Sheet SMD (1-4)

See Chapter 4 of this volume for information on handling and recycling FRP posts.

Special Supports

Special sign supports are sometimes used for mounting periodically required signs, such as the WATCH FOR ICE ON BRIDGE sign. One design used in the past has been a rotating type support, which can be oriented such that the sign is not visible to traffic when it is not necessary. Because of concern about the impact behavior of this support, rotating type bases should not be used, except at locations where the support is protected by guardrail.

Approval of Shop Drawings

The fabricator's shop drawings for all roadside sign supports on contract projects and district-originated purchase requisitions should be submitted to the districts for initial review and approval. Following initial approval, additional shop drawings are not necessary unless there is a design change.

Your Notes:

Section 2

Sign Substrate and Structure

Substrate

The sign substrate provides the rigid structural backing and shape for the sign. The substrate must be rigid enough to prevent the sign from flexing or waving in the wind or warping in the sun.

Common substrate materials are steel, aluminum, fiberglass, and plywood. TxDOT standards specify plywood or aluminum. As an option, fiberglass reinforced plastic may be used for signs 457 x 610 mm (18 x 24 inches) or smaller.

Structural Support System

Some signs also require a structural support system. The *Traffic Control Standard Sheets* details the types of materials, thicknesses, support systems, and various other details. *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* contains specifications to be used in contracts.

Overhead Sign Walkways

Overhead sign walkways are designed so that maintenance personnel can easily work on the signs and lights. The walkways provide easy access all along the bridge. Details regarding sign walkways are provided in the *Traffic Control Standard Sheets*.

Overhead sign walkways are optional, since needs may vary from location to location within the district. Factors to consider are traffic conditions, anticipated maintenance, and maintenance equipment available.

See Chapter 4 of this volume for information on overhead sign maintenance.

Your Notes:

Section 3 Retroreflectorization

Introduction

“Retroreflectorization” refers to the property of the sign sheeting material that causes light to reflect such that the paths of the rays are parallel to those of the incident rays.

Sign retroreflectorization is accomplished by the use of a commercially made retroreflective sheeting applied to the substrate.

Retroreflective Sheeting Types

There are several types of retroreflective sheeting. They are primarily classified by their brightness. Various factors determine the desirability of one type of sheeting over another on certain types of signs. TxDOT standards use two types:

- ◆ Engineer Grade Type A *and*
- ◆ High Intensity Type C.

TxDOT Standard

After conducting a thorough review of retroreflective sheeting for small signs, TxDOT upgraded from engineer grade (Type A) to the brighter high intensity sheeting (Type C) for selected signs to:

- ◆ improve readability for drivers
- ◆ improve the target value of signs
- ◆ improve traffic safety
- ◆ increase the nighttime retroreflectivity of the signing.

TxDOT's standard for retroreflective sheeting on various types of signs is as follows:

TxDOT Retroreflective Sheeting Standard

Grade of Sheeting	Application
Engineer Grade Type A	White regulatory signs, except those attached to guide signs.
High Intensity Type C	All blue and brown signs. All red and yellow signs. All work zone signs and channelizing devices. All railroad crossing signs. All green guide signs and signs attached to guide signs.

All construction plans reflect this retroreflective sheeting standard. Existing signs not in conformance with the standard should be replaced on a maintenance replacement basis.

Deterioration of Retroreflectivity

The retroreflective quality of the sheeting material deteriorates over time, eventually requiring replacement of the sign. The sheeting warranties are specified in TxDOT's material specifications. Premature failures of the sheeting should be reported to the Materials and Test Division (MAT). (See Chapter 4 of this volume for information on maintaining proper retroreflectivity.)

Section 4

Sign Legends

Introduction

The sign legend includes all text messages (words and numbers) and symbols intended to convey specific meanings. For purposes of design, borders are included as part of the sign legend. To allow drivers time to understand and respond to the message, the legend and any accompanying symbols must be simple and clear. The size and spacing of letters and symbols is also critical to sign legibility.

Standard Highway Sign Design for Texas (SHSD) details dimensions and letter spacing for all standard signs in the *TMUTCD*. If a special sign is needed, the Traffic Operations Division (TRF) can assist in the layout of the text.

Text Size and Spacing

The height of the letters, spaces between words, spaces between lines of words, and various other details are based on a national standard prescribed in the “Standard Alphabets for Highway Signs,” published by the Federal Highway Administration. This document provides letter and numeral stroke width and spacing for six standard capital letter alphabets, Series B through F. (The requirements of this document are incorporated into the *TMUTCD*.) The letter width varies from the slender Series B through the thicker (bolder) Series F. A lower case alphabet is also provided for use with Series E (modified). The *SHSD* shows the appropriate letter series for each sign.

The rule of thumb for good sign readability is to provide 25.40 mm (1 inch) of letter height for each 15.24 m (50 feet) of viewing distance. Therefore, if a sign needs to be read at 91.44 m (300 feet), the letters need to be 152.40 mm (6 inches) high.

Symbols

The use of symbols for signs has become a major element in driver communications. Symbol signs can be interpreted at a glance without the need to read a word message. The *TMUTCD* illustrates the symbols approved for use on signs.

Application Methods

Legends can be applied in several ways, depending on the sign type. The following table explains the various legend application methods.

Sign Legend Application Methods	
Type of Sign	Normal Method(s) of Legend Application
Regulatory, Warning, Route Marker	<ul style="list-style-type: none"> ◆ Either direct or reverse silk screening process (ink squeezed through a screen) ◆ Cut-out, vinyl non-reflective decal sheeting (blank only).
Small roadside D-Series Destination Signs	<ul style="list-style-type: none"> ◆ Cut-out, stick-on retroreflective sheeting.
Large roadside and overhead Guide Signs	<ul style="list-style-type: none"> ◆ Cut-out, stick-on retroreflective sheeting* ◆ Sheet aluminum route markers where applicable.
<p>* The legend on new large roadside and overhead guide signs should be cut-out letters from high intensity sheeting. Removable reflective button copy may be used to replace the text during maintenance of existing guide signs.</p>	

Signs purchased from the TxDOT's regional supply centers have the reflective sheeting applied with the message "screened" onto the sheeting. This work is done by the Texas Department of Criminal Justice (TDCJ).

Regional supply centers also stock sign panels without text so that districts can fabricate low volume signs, such as destination and mileage signs. The district applies the message with the "screen process" or with cut-out text from retroreflective sheeting.

Section 5

Sign Identification Decal

Decal Required

A sign identification decal is required on the back of all signs installed by TxDOT after August 15, 1980. TxDOT's *Standard Specifications for Construction of Highways, Streets and Bridges* provides the specification for the sign identification decal.

Purpose

The sign identification decal is used to record sufficient information about the reflective sheeting to determine its origin in case of premature failure of the material. The Materials and Tests Division (MAT) should be notified of suspected failures. Information reported to MAT should include the location and orientation of the sign.

The decal identifies:

- ◆ the manufacturer of the reflective sheeting
- ◆ the place and time (year and month) of sign fabrication
- ◆ the date on which the sign was installed in the field.

Identifying the date of installation facilitates analysis of the durability of different manufacturers' sign materials under varying field conditions and assists in determining the need for replacement.

Use of Decal

The sign fabricator performs the initial (fabrication) coding of the sign identification decal (description follows) and affixes it to the sign back in the lower left hand corner in such a way that the sign support does not block the view of the decal. Figure 3-1 shows an example of a sign identification decal. The rows are numbered for reference to the following fabrication and installation coding instructions.

Row #	TxDOT											
① →	C	FABRICATION										T
② →	J	F	M	A	M	J	J	A	S	O	N	D
③ →	199		200		201		202		203		204	
④ →		0	1	2	3	4	5	6	7	8	9	
	SHEETING MFR											
⑤ →	A	B	C	D	E	F	G	H	J	K	L	M
	INSTALLATION DATE											
⑥ →	DAY		0	1	2	3						
⑦ →		0	1	2	3	4	5	6	7	8	9	
⑧ →	J	F	M	A	M	J	J	A	S	O	N	D
⑨ →	199		200		201		202		203		204	
⑩ →		0	1	2	3	4	5	6	7	8	9	

Figure 3-1. Sign identification decal. (Row numbers referenced in the following fabrication and installation coding instructions.)

Fabrication Coding

When the sign is fabricated, the sign identification decal is coded as follows:

Row 1: Indicate the fabricator of the sign as follows:

If sign was fabricated by...	Then punch out...
a commercial fabricator	“C” in the upper left corner
the Texas Department of Criminal Justice	“T” in the upper right corner
the district	Both “C” and “T”

(continued...)

Fabrication Coding *(continued)*

Row 2: Punch out the letter indicating the month of fabrication.

Row 3: Punch out the three-digit group indicating the decade of fabrication (for example, punch out “199” for fabrication from 1990 through 1999).

Row 4: Punch out the digit indicating the year of fabrication (for example, “8” for fabrication in 1998).

Row 5: Punch out the letter indicating the code for the brand name of the sheeting product. The letter codes are as follows:

Code/Sheeting Manufacturer		Code/Sheeting Manufacturer	
A	Nikkalite (Seibulite)	G	Kiwalite
B	Adcolite	H	Reflexite
C	Scotchlite	J	
D	Fasign	K	
E	Maclite	L	
F	Stimsonite	M	

After the decal has been coded, the decal should be affixed to the sign back in the lower left hand corner so that the sign support does not block the view of the decal.

Installation Coding

When the sign is installed, the decal is coded as follows:

Row 6: Punch out the first digit of the installation date. Punch out the zero for dates 1 through 9.

Row 7: Punch out the second digit of the installation date.

Row 8: Punch out the letter indicating the month of installation.

Row 9: Punch out the three-digit group indicating the decade of installation (for example, punch out “199” for fabrication from 1990 through 1999).

Row 10: Punch out the digit indicating the year of installation (for example, “8” for fabrication in 1998).

Your Notes:

Section 6
Storage and Transport

Storage

Traffic signs should be stored under cover in a dry place and arranged so that warping or disfigurement does not occur. Shelves and vertical compartments are usually constructed in such a manner that the reflectorized face does not come in contact with the adjacent signs.

Signs should be stored in a vertical position with air spaces between all signs. Waxed paper must not be used to protect stored signs.

Transport

Care should be exercised in transporting signs from storage to field location, since the sign face is a soft material and can be damaged very easily. Signs should be individually wrapped in heavy paper or separated by grooved racks.

Your Notes:

Section 7 New and Experimental Products

New Product Evaluation

Before TxDOT can purchase a product for which it does not have a current specification, the product must undergo an evaluation process. The *Research Manual* sets forth the new product evaluation process.

A vendor or person wishing to introduce a new product should fill out the Preliminary Information for Product Evaluation Form (TxDOT Form 1684). The forms are available from the Research and Technology Transfer Office (RTT). Completed forms should be submitted to the Product Evaluation Committee (PEC) (described under the following subheading) through RTT.

When a new product is submitted to the PEC, the PEC then initiates the evaluation process described in the *Research Manual*.

Product Evaluation Committee

The Product Evaluation Committee (PEC) is TxDOT's official contact for all new products. The PEC reviews and coordinates evaluations of new products.

The PEC is composed of representatives from various TxDOT divisions, offices, and districts. The Research and Technology Transfer Office (RTT) representative chairs the committee. (See the *Research Manual* for a complete description of the PEC's composition and responsibilities.)

New Product Evaluation Data Base

The Research and Technology Transfer Office (RTT) maintains a database within the Technology Transfer System (TTS) for each product evaluated. The database provides the status of the evaluation, the contact person, and the evaluation results. The database is accessible to all TxDOT employees. (See the *Research Manual* for procedures for accessing the database.)

Experimental Products

The procedures for experimentation with a traffic control device *not* defined by the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* are outlined in Section 1A-6 of the *TMUTCD*. This formal experimentation process should be coordinated with the Federal Highway Administration (FHWA) through the Traffic Operations Division (TRF).

Persons wishing to experiment with a new traffic control device should study Parts I and II of the *TMUTCD* and discuss the concept with TRF.

Section 8

Special Sign Applications

Flashing Beacons Attached to Signs

Flashing beacons attached to warning or regulatory signs (see *TMUTCD*, Section 2A-20) are not considered traffic control signals.

The installation of flashing beacons attached to signs does not require an authorization form; however, when mounted overhead, an authorization form should be kept on file at the district office and a copy sent to the Traffic Operations Division (TRF).

Flashing Beacons Erected by Local Authorities

Intersection flashing beacons erected by local authorities as official traffic control devices on streets carrying highway routes require TxDOT approval by the use of the Traffic Signal Authorization Form. (See the *Traffic Signal Design and Application Volume* of the *Traffic Operations Manual*.)

Vehicle Flashing Lights

No permit or approval is needed from TxDOT for a flashing light mounted on emergency vehicles or utility vehicles working in the roadway.

Portable Changeable Message Signs

Portable changeable message signs are normally mounted on trailers so that they can be towed to and left at a specific location for a temporary need. They are used for construction projects, maintenance projects, special events, and emergency situations. They are an effective and versatile tool for responding to changing or temporary traffic management situations.

Permanent Changeable Message Signs

Permanent changeable message signs are normally mounted on freeways to provide timely messages to the motorists. They are used where special conditions indicate a need to provide this extra level of information.

Your Notes:

Chapter 4

Sign Maintenance

Contents

This chapter contains the following sections:

Section 1 — Overview	4-3
Section 2 — General Guidelines	4-5
Section 3 — Sign Inspection	4-7
Section 4 — Roadside Sign Supports	4-11
Section 5 — Overhead Signs	4-13
Section 6 — Sign Rehabilitation	4-15

Your Notes:

Section 1 Overview

Introduction

This chapter describes the methods, procedures, and materials used to maintain traffic signs to the standards of design, layout, installation, location, etc., as prescribed by the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*.

Maintenance in Cities

TxDOT enters into Municipal Maintenance Agreements with each incorporated city in the state, defining the responsibilities of the city and the state. Inside cities, the maintenance responsibility for traffic control devices is set forth in these agreements.

The latest edition of the standard Municipal Maintenance Agreement can be found in the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division).

Importance of Sign Maintenance

To command the respect of motorists all traffic signs and sign supports should be:

- ◆ maintained in a straight and plumb position
- ◆ in the proper location (for both viewing and providing the required clearance)
- ◆ clean and legible both day and night.

Damaged traffic signs should be replaced as soon as practicable if their effectiveness is impaired.

Well maintained signs:

- ◆ enhance the safety of the driving public
- ◆ enhance the general appearance of a highway
- ◆ reflect the quality standards of the maintenance section.

Elements of Good Maintenance

Efficient sign maintenance requires:

- ◆ complete records of all sign installations and inspections
- ◆ scheduled inspections by trained personnel
- ◆ continual observations of sign conditions by all department employees.

Level of Service Guidelines

The *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division) contains “Level of Service” guidelines for planning and performing various maintenance activities in accordance with available funds. The guidelines define three possible funding levels: desirable (highest), acceptable, and tolerable (lowest). Maintenance priorities are assigned, based on the level of funding, and maintenance forces are supposed to “substantially maintain” the various highway components accordingly.

See the *Infrastructure Maintenance Manual* for specific level of service guidelines for signs and delineators under each level of funding.

Sign Maintenance Equipment

Specially designed trucks are useful for the field maintenance of signs, including the transportation of signs and support replacement. These trucks should carry the necessary equipment, tools, and supplies for performing all the necessary maintenance tasks.

Aerial devices on the sign trucks are often beneficial for the safe and efficient placement and maintenance of signs.

Department Stock Items

The General Services Division (GSD) is responsible for maintaining sufficient stock of signing products. Quantities are stocked according to their historical use data. If a district anticipates the need for a large quantity of a particular item, GSD should be notified as soon as possible, so that the item can be ordered if stock is inadequate.

Overhead sign supports are not a stock item. They are normally built to fit each specific location, and the work is typically done by contract.

Replacement Costs of Traffic Control Devices

The Traffic Operations Division (TRF) maintains an illustrated guide showing average costs for replacing various traffic control devices. Appendix D of this volume contains a copy of the guide. The information is primarily used by the Department of Public Safety to estimate the cost of damage caused by motor vehicle crashes. If the district is called upon for an estimate, this guide can be used or a more detailed estimate may be done. The costs shown in the guide include materials and labor.

Section 2 General Guidelines

Sign Visibility

Keeping the signs (especially regulatory and warning signs) clearly visible and unobscured by vegetation, snow, parked vehicles and other obstructions is an extremely important maintenance task.

Tree foliage, grass, and weeds are the most common obstructions to sign visibility on rural highways. When visibility cannot be maintained with normal right-of-way mowing operations, special mowing operations, trimming, or vegetation control with appropriate herbicides should be initiated. This should also include removing the growth obscuring STOP (R1-1) and YIELD (R1-2) signs on approach roads within the highway right-of-way.

Vegetative growth beyond the right-of-way that may obscure STOP (R1-1) and YIELD (R1-2) signs on approach roads should be called to the attention of the local authorities. These clearings should be of such width and length as to furnish maximum sign visibility to approaching traffic.

When to Replace Signs

Time alone does not determine when to replace a sign. Signs facing the sun require replacement more frequently than those that do not. Vandalism is a major cause of sign replacement.

Sign replacement is required when:

- ◆ the sign or its support suffers major damage *or*
- ◆ legibility is impaired by the failure of the message, symbols, or reflectorized background.

Maintenance personnel should use good judgement in determining whether to replace a sign and return it to the sign shop for repair or make repairs in the field. In borderline cases, the decision should be made in favor of replacement.

If one sign in a group has been damaged and is in need of replacement, all of the signs in that group should be replaced, if they have been in place for four or more years.

Positioning Replaced Signs

When a sign is replaced, its position in relation to roadway centerline and pavement edge should always be in accordance with the latest revisions of the *TMUTCD*.

Sign Recycling

Used metal signs should be sent to the regional supply center for reprocessing. There are, however, limitations on what can be reprocessed. Metal signs bent more than 45 degrees or with gunshot holes *from both sides* are not recyclable and should be sold as scrap.

Used wooden signs 48 x 48 inches and larger should be returned to the regional supply.

Consult the *Equipment and Procurement Volume* of the *Procurement Manual* for details.

Handling Fiberglass Reinforced Plastic (FRP) Posts

Field cutting of FRP posts is acceptable if safety precautions (eye and hand protection) are observed.

Recycling Fiberglass Reinforced Plastic (FRP)

All surplus FRP pipe should be stockpiled for recycling.

Old FRP posts and scraps should be placed in the back of a sign truck or pickup truck and transported to the district warehouse.

FRP posts and fragments of posts are transported to a regional supply center for stockpiling. Stockpiled materials are picked up by the manufacturer and recycled.

Section 3

Sign Inspection

General

All signs, including supports, should be inspected twice a year for:

- ◆ position
- ◆ damage
- ◆ legibility
- ◆ obvious indications of structural distress or failure
- ◆ general condition.

One of the two annual inspections should be conducted at night to check legibility and reflectance (see following subheading).

Inspections should be made by two persons, so one can take notes while the other drives.

All personnel who frequently travel the highways should be instructed to report any obscured or damaged signs. Maintenance personnel should be alert at all times, observing signs for legibility, position, and minor damage for which immediate remedial action can be taken.

Sign Reflectance

Often, sign failure is simply due to loss of reflectance after the retroreflectorized background material begins to reach its life expectancy. This is the usual cause of failure of the large guide signs on expressways and freeways. Reflectance failure usually occurs to a group of signs facing the same direction at about the same time, since they were usually installed at the same time.

If the signs are no longer reflective, they should be scheduled for immediate replacement. Overhead guide signs which have a non-reflective background should also be refurbished when legibility is impaired by fading or streaking of the background.

Reflective Sheeting Performance

Department Materials Specification D-9-8300, “Flat Surface Reflective Sheeting,” defines:

- ◆ performance requirements
- ◆ the manufacturer's replacement obligation
- ◆ the department's obligation
- ◆ many other pertinent items.

The performance requirements cover the following possible defects and their associated tolerances:

- ◆ cracking
- ◆ peeling
- ◆ shrinkage
- ◆ fading or loss of color
- ◆ loss of reflectivity.

Sign inspectors should be aware of this specification and be familiar with the sheeting application requirements and warranties.

Inspection Report

Documentation of sign inspections is important to a successful sign program. Sign inspectors should fill out an inspection report for each inspection run. The reports should be filed at the district office with a copy retained by the maintenance supervisor.

Typically a sign inspection report should include:

- ◆ the date
- ◆ the maintenance section
- ◆ the supervisor's signature
- ◆ the inspector's signature
- ◆ the roadways checked and findings
- ◆ immediate action taken
- ◆ future action needed
- ◆ comments.

To document inspections, inspectors may use the Sign and Striping Inspection Report form provided in Appendix A of this volume. The form may be photocopied as necessary. If a different format or a more detailed report is preferred, districts may produce their own form.

Your Notes:

Section 4

Roadside Sign Supports

Introduction

This section contains maintenance information and procedures for roadside sign supports (posts).

Additional information concerning sign supports can be found in Chapter 3 of this Volume.

Keep Posts Straight

Sign supports should be maintained in a vertical upright and plumb position to provide the best appearance along the roadway.

Breakaway Posts

Breakaway sign supports should be maintained to assure performance of the breakaway feature.

On rectangular slip base sign supports, the slip base plate and fuse plate connection bolts should be examined for proper tightness, and the fuse plates and post-flanges should be examined for cracking or failure. (See *Traffic Control Standard Sheets (TCSS)* for details.) Over tightening of the base plates can cause the support not to break away properly.

The bolt keeper plate for bolted breakaway sign posts should be in place between the stub post base plate and the sign post base plate to ensure that the sign support system functions properly. Also all washers should be installed as shown on *TCSS* standards.

The foundation should also be checked for erosion of surrounding soil.

Straightening Bent Posts

Damaged galvanized metal supports should be straightened if reasonably possible. Any damage to the protective coating should be repaired with a zinc-rich coating (available from the appropriate regional supply center).

I-Beam Supports

Large, ground-mounted guide signs are supported with a steel I-beam support system that breaks away when hit by a vehicle. High wind gusts sometimes blow the sign over, with failure at the “hinge.” See the *Traffic Control Standard Sheets* for hinge details.

The tension fuse plate can be ordered from the regional supply centers. The fuse plate is listed as: “PLATE, FUSE, galvanized.” Fuse plates are ordered by size to fit the post and all bolts, nuts, and washers must be ordered separately.

Repair of Large, Ground-Mounted Sign Supports

The following procedure may be used to repair large, ground-mounted guide sign supports when the foundation and post below the hinge point are undamaged.

Repair of Large, Ground-mounted Guide Sign Supports

Step	Action
1	Saw or torch cut through post width, making edges level and smooth.
2	Clean cut surfaces to near-white metal by wire brushing, light grinding, or mild blasting. Cut surfaces should be clean, dry, and free of all grease, welding slag or flux, and corrosion products before application of organic zinc-rich paint.
3	Install fuse plates and reassemble post with H.S. hex-head bolts, hex-head nut, and washers. Use washers as shown in the <i>Traffic Control Standard Sheets (TCSS)</i> . New fuse plates, bolts, nuts, and washers should be used.
4	Torque all bolts as required by specifications.
5	Apply zinc-rich paint to cleaned cut surfaces as per manufacturer's recommendations.

Tension Fuse Plate. All holes must be drilled. All plate cuts should be saw cut; however, flame cutting is permissible, provided all edges are ground. Metal must not project beyond the plane of the plate face. Steel fuse plates must conform to the requirements of ASTM-A36, ASTM-A441, ASTM-572 Grade 50, or ASTM-A588 may be substituted for A36 at the option of the fabricator. Mill test reports must be submitted for fuse plates. Steel used must have an ultimate tensile strength not in excess of 80 ksi. (See *Traffic Control Standard Sheets (TCSS)* for tension fuse plate detail.)

Section 5 Overhead Signs

Introduction

High speed, high volume highways depend on fully effective overhead signs. Therefore, it is essential that overhead signs be properly maintained at all times.

Except for supports, overhead signs should require less maintenance than ground mounted signs. This is a result of their mounting height and the materials the overhead signs are made of. Damage by vandalism is also less. However, when damage does occur, immediate measures should be taken to repair the damage, if sign effectiveness is impaired. Most damage to overhead signs is caused by thrown objects and firearms, usually resulting in minor damage.

Special Equipment

Special equipment is required for economical maintenance of overhead signs. For routine maintenance such as cleaning, patching, replacement of letters and panels, aerial-boom type equipment is probably the most satisfactory. Repairs can be made without interrupting traffic by parking the equipment on the shoulder of the roadway.

Supports

All overhead sign supports should be thoroughly inspected every two years for actual or probable structural distress or failure. Possible causes of distress and failure include overload fatigue, corrosion, vandalism, and collision damage. Components to be examined include:

- ◆ foundations
- ◆ anchor bolts and nuts
- ◆ base plate assemblies
- ◆ tower columns, web members, and connections
- ◆ span member to tower connections
- ◆ span member chords, web members, and connections
- ◆ light brackets, walkways, luminaires, and connections.

Walkway and Lights

Walkways should be inspected and maintained to ensure structural integrity.

The light fixtures are either fluorescent or mercury vapor, so bulbs, ballasts, and cleaning are normally the only maintenance.

A lamp replacement and inspection schedule should be instituted for all illuminated overhead signs. The effectiveness of non-retroreflectorized background signs is greatly reduced when illumination is off.

Section 6

Sign Rehabilitation

Non-Interstate Roadways

Sign rehabilitation on roadways other than interstates is normally accomplished through the district's maintenance program, although state construction money (Construction Category 10A — “Traffic Control Devices”) may be used for this type of work if a district desires to include it in a state construction program. Project development follows the normal programming procedures for state funded construction work.

Individual Signs on Interstate Highways

Rehabilitation of individual or isolated groups of signs on interstate highways is considered maintenance and is normally accomplished through a district's maintenance program with maintenance money.

Interstate Guide Sign Refurbishment

Federal-aid interstate funding (Construction Category 2 — “Interstate Maintenance”) is available for the refurbishing of guide signs on the Interstate System when they have deteriorated to the extent that they no longer meet minimum performance standards. Projects for this type of work are to approximate the scope of the original project in which the signs were first placed.

Your Notes:

Chapter 5

Regulatory Signs

Contents:

Section 1 — Overview.....	5-3
Section 2 — STOP and YIELD Signs.....	5-5
Section 3 — SPEED LIMIT Signs.....	5-11
Section 4 — Handicapped Parking.....	5-13
Section 5 — WEIGHT LIMIT and Inspection Station Signs.....	5-15
Section 6 — Truck Routes.....	5-17
Section 7 — Non-Radioactive Hazardous Materials Routing.....	5-21
Section 8 — Restricted Truck Lanes.....	5-29
Section 9 — Special Practices.....	5-37

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Section 1 Overview

Introduction

Regulatory signs inform highway users of traffic laws and regulations and indicate the applicability of legal requirements that would not otherwise be apparent.

Part II-B of the *Texas Manual on Uniform Traffic Control Devices for Streets and Highways (TMUTCD)* provides detailed information and guidelines on the application of regulatory signs. This chapter provides additional information and guidelines specific to TxDOT operations on the use of certain regulatory signs.

Your Notes:

Section 2

STOP and YIELD Signs

County Road Intersections with State Highways

TxDOT erects and maintains STOP (R1-1) and YIELD (R1-2) signs on all county road and street approaches to intersections with a state highways outside of incorporated cities. These signs are maintained to the same standards as other state maintained signs.

YIELD Sign Standard

TxDOT has adopted a standard yield sign larger than that stipulated by the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*. The 1,067 mm (42 inch) YIELD (SR1-2) sign is the TxDOT standard for use on highway routes.

Frontage Road-Ramp Intersection Control

Section 545.154 of the Texas Transportation Code requires “access or feeder road” (frontage road) traffic to yield the right of way to traffic entering an on-ramp or leaving an off-ramp on controlled access highways (see Figure 5-1 for examples). However, YIELD signs are not necessary and are not recommended where a free lane is available to off-ramp traffic and neither traffic needs to yield (see Figure 5-2 and 5-3). The law also applies in rural areas where two-way frontage roads exist.

(continued...)

Frontage Road-Ramp Intersection Control (continued)

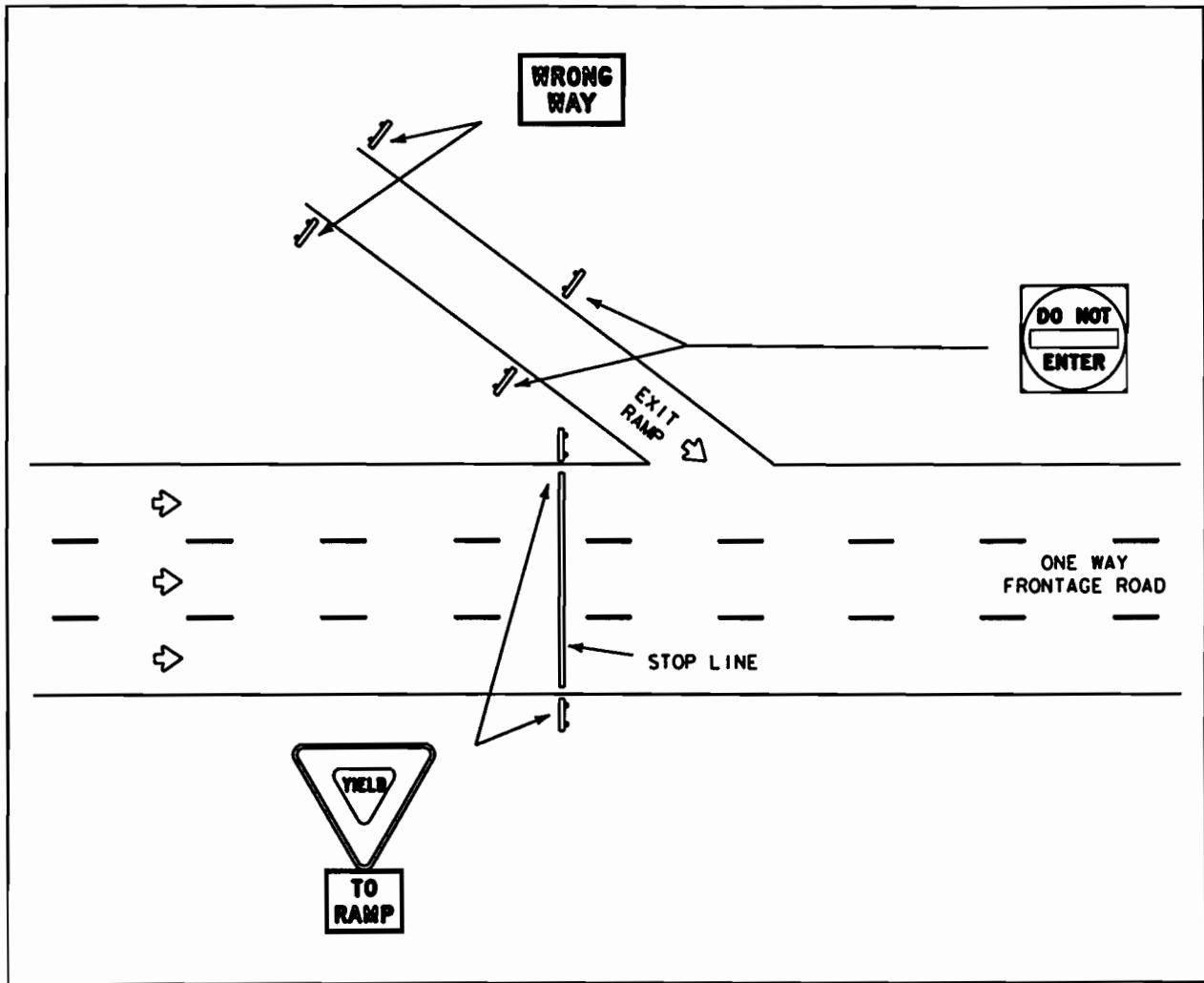


Figure 5-1. Typical signing for off-ramp from controlled access highway onto frontage road without free lane available to the off-ramp (applicable for two or more lanes).

(continued...)

Frontage Road-Ramp Intersection Control (continued)

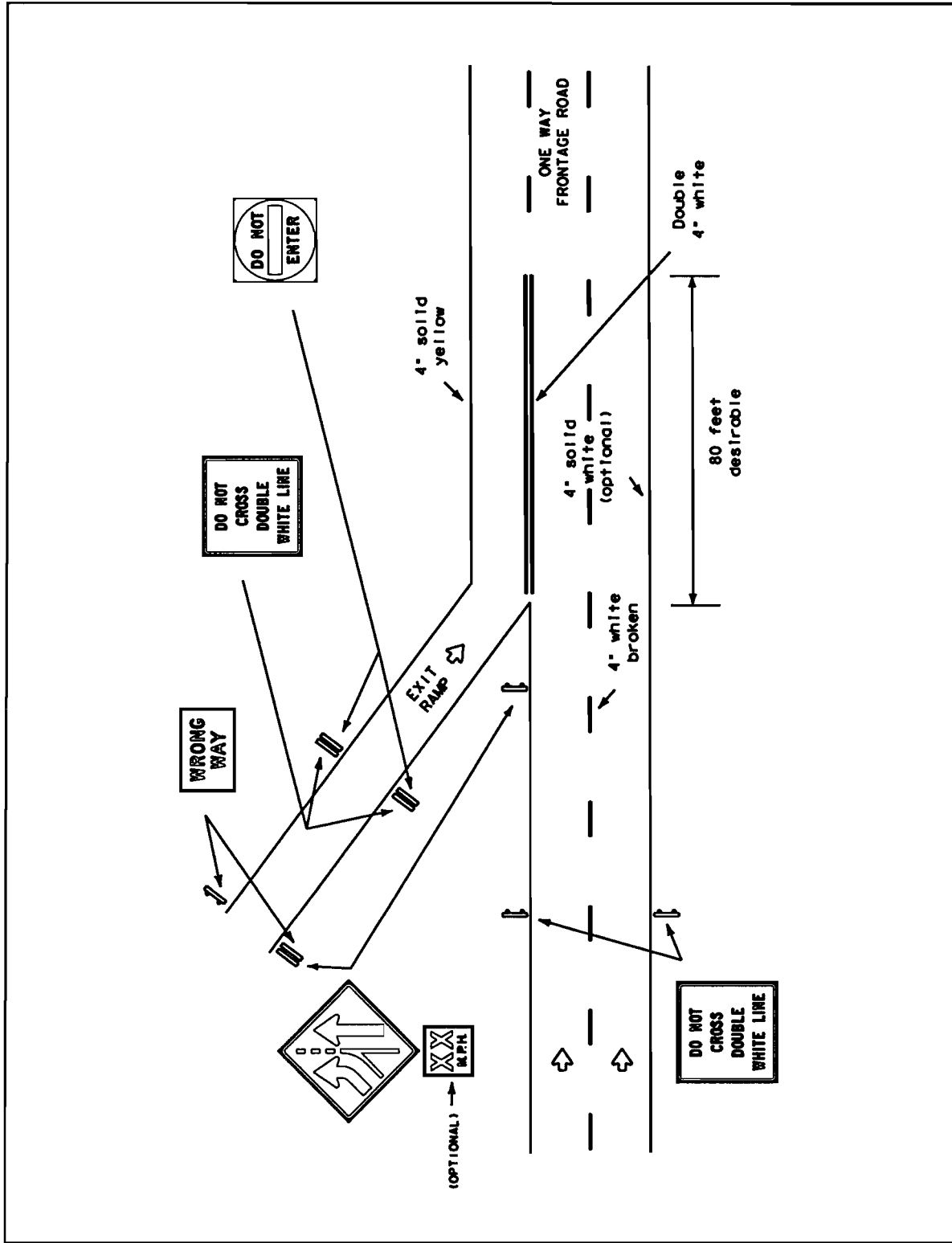


Figure 5-2. Typical signing and striping for off-ramp from controlled access highway onto frontage road with free lane available to the off-ramp traffic.

(continued...)

Frontage Road-Ramp Intersection Control (continued)

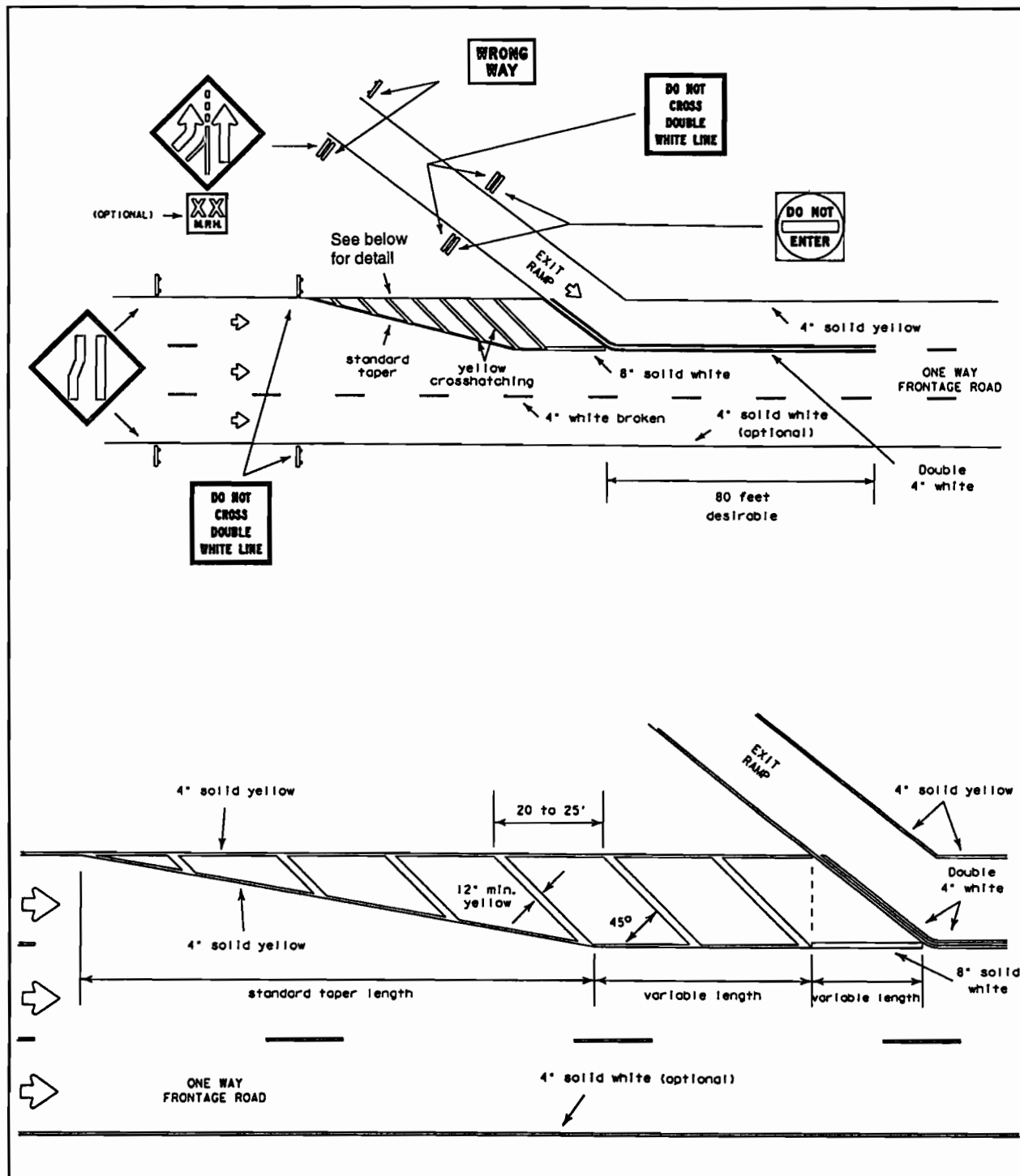


Figure 5-3. Alternate signing and striping for off-ramp from controlled access highway onto frontage road with free lane available to the off-ramp traffic.

Ramps Intersecting Separately Numbered Highways

TxDOT interprets the law requiring frontage road traffic to yield the right of way to traffic entering or exiting a controlled access highway to exclude locations where ramps to and from a controlled access facility directly intersect another state designated highway which appears to function as a frontage road. This situation occurs most commonly in areas where the freeway or expressway was built parallel and in close proximity to an existing designated route or where the freeway interchanges with a business route serving a community bypassed by the main lanes.

In these instances, the business route or parallel facility should be a separate route and should not be considered an “access” or “feeder” road of the freeway or expressway. The traffic control incorporated at ramp intersections with this type facility should be the same as used at other ramp-crossroad intersections; that is, traffic demands should dictate right of way assignment.

Where STOP or YIELD signs are placed on exit ramps which intersect a separately numbered highway route which appears to serve as a frontage road, proper route marker assemblies should also be used on the ramp. This exception applies only to ramp intersections with facilities which have route designations different from that of the main lanes of the controlled access highway and which are listed separately in the road inventory log and have a separate control section and reference marker.

Your Notes:

Section 3 SPEED LIMIT Signs

Speed Limit Signs

SPEED LIMIT signs (R2-1 and R2-2) that alter the statewide maximum speed limit for streets and highways can only be posted after a speed zone study has been made and a strip map has been approved by Traffic Operations Division (TRF) and the Transportation Commission or by city ordinance if within the city. (See the *Procedures for Establishing Speed Zones Volume of the Traffic Operations Manual.*)

On conventional highways, in cities, or urban areas it may be desirable to use the oversize SPEED LIMIT (ER2-1) sign to emphasize the speed reduction location.

Reduced Speed Ahead

TxDOT's standard sign for use in advance of a reduced speed zone is the REDUCED SPEED AHEAD sign (R2-5a).

Your Notes:

Section 4

Handicapped Parking

Handicapped Parking Sign

The *TMUTCD* discusses the various uses of and requirements regarding handicapped (disabled) parking signing. The handicapped parking sign (R7-8) carries the message RESERVED PARKING.

TxDOT furnishes stencils of the handicapped parking signs. However, since the message has to be screened or made of reflective sheeting, the public should be advised to purchase signs from a local sign company. Handicapped parking signs for TxDOT's use can be ordered through the regional supply centers.

See PM(AP) in the *Traffic Control Standard Sheets* for typical pavement marking patterns for accessible parking.

Parking Space Design and Restrictions

Handicapped parking space design and restrictions are the responsibility of the Texas Department of Licensing and Regulation. For information, write or call:

Texas Department of Licensing and Regulation Elimination of Architectural Barriers P. O. Box 12157 Austin, Texas 78711 Phone: (512) 463-3519
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Licenses and Permits

Members of the public should contact their county of residence to apply for vehicle license plates or temporary permits to use disabled parking spaces.

Your Notes:

Section 5**WEIGHT LIMIT and Inspection Station Signs****Weight Limit Signs**

The posting of weight limits (R12-1 through R12-8) may be necessitated by new construction, deterioration of a roadway or bridge, or other conditions. Weights posted should be coordinated through the Design Division (DES). It is also very important that TxDOT's Motor Carrier Division (MCD) be notified of weight limits so that they can operate efficiently and issue permits properly.

Weigh and Inspection Station Signs

The Texas Department of Public Safety (DPS) operates weigh stations, and various federal agencies operate inspection stations. TxDOT works with these agencies to develop a safe environment for them to work in and a safe way to stop the traffic.

Adequate advance signing of these locations is important. The standard sign messages are ALL TRUCKS COMMERCIAL VEHICLES NEXT RIGHT (R13-1) or ALL TRUCKS NEXT RIGHT (R13-1T). Normally these signs include an "open/closed" message. TxDOT furnishes and installs the signs. The operating agency opens the signs when weighing or inspection operations are in progress.

Signing Guidelines

The TRUCK ROUTE (R14-1) sign applies to truck routes. The *TMUTCD* explains the use of this sign.

Proposed truck route signing should be adequate and in compliance with current signing practice. All signs required must conform to current standards as set out in the *TMUTCD* with regard to shape, size, color, letter size and style, mounting, location, etc.

The city must submit to the district office a suitable sign design detail drawn to scale showing the proposed sign shape, color, size, text and locations.

TxDOT installs all signs on expressways and freeways. Depending on the provisions of the municipal maintenance agreement, a city may be allowed to install signs on a conventional highway within its corporate limits. TxDOT installs signs on highways outside the corporate limits of a city as necessary to achieve a continuous connecting route.

The city bears all costs for signs and sign installations.

The TRUCK (M4-4) panel sign is not used in conjunction with an interstate route marker. Designation of truck U.S. highway routes must be approved by AASHTO. The M4-4 sign should only be used on AASHTO designated truck routes.

Map for Motor Carrier Division

After the city passes the ordinance establishing the truck route, the district should provide a map which clearly defines the route to TRF. TRF then forwards a copy of the map to the Motor Carrier Division (MCD).

Process Summary

The process of establishing a truck route is as follows:

1. City submits proposal for truck route to TxDOT district.
2. District reviews proposal and forwards it to TRF for approval.
3. TRF approves (or disapproves) proposal (obtaining FHWA approval if necessary) and notifies district.
4. District notifies city of approval.
5. City passes ordinance establishing truck route.
6. District or city installs signs.
7. District provides TRF with map clearly defining the route.
8. TRF forwards map to Motor Carrier Division (MCD).

Restricted Truck Lanes

For information on restricted truck lanes, see Section 8 of this chapter.

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Section 7

Non-Radioactive Hazardous Materials Routing

Introduction

TxDOT is the state routing agency in charge of approving all non-radioactive hazardous materials (NRHM) routes in Texas. A statewide listing of NRHM routes and maps showing the limits of these routes are available online from TxDOT's homepage at: <http://www.dot.state.tx.us/TRF/te/nrhm.htm>.

For *radioactive* hazardous materials routing, the Texas Department of Health is the routing agency.

Authority

Rules for NRHM routing are contained in the Texas Administrative Code under Title 43, Sections 25.101–25.104. These rules authorize a political subdivision of a state to establish NRHM route designations consistent with the federal regulations (Title 49, Code of Federal Regulations, Part 397, Subpart C).

As the state routing agency, TxDOT is required to approve all new NRHM routing designations or revisions to existing routing designations. In addition, state law requires a municipality with a population of more than 750,000 to develop a route for commercial motor vehicles carrying NRHM on a road or highway in the municipality and to submit the proposed route to TxDOT for approval.

A city or political subdivision cannot simply pass an ordinance to establish an NRHM route. A new NRHM route or modification to an existing route must be established in accordance with the state and federal regulations listed above.

Terminology

Specialized terms used in this section are defined as follows:

commercial motor vehicle — any vehicle used on the highways for the transportation of hazardous materials in commerce, in a quantity requiring placarding under regulations issued under the federal Hazardous Materials Transportation Act (Title 49, United States Code, §5101 et seq.).

hazardous material — a substance or material, including a hazardous substance, which has been determined by the United States Secretary of Transportation, pursuant to the Hazardous Materials Regulations contained in Title 49, Code of Federal Regulations, Chapter I, Subchapter C, to be capable of posing an unreasonable risk to health, safety, or property when transported in commerce, and which has been so designated.

(continued...)

Terminology *(continued)*

highway route — any road or highway open to the public. This includes roads under the jurisdiction of a city or county.

local delivery — transportation that originates within the routing boundaries established by a political subdivision, is bound for the political subdivision having designated routes, or both.

NRHM — abbreviation for non-radioactive hazardous materials. An NRHM transported by a motor vehicle in certain types and quantities requires placarding pursuant to Table 1 or 2 of 49 CFR §172.504. NRHM includes gasoline, diesel, and aviation fuel.

political subdivision — a county, municipality, local board, authority or commission, or public corporation, established under the laws of the state of Texas, that has the authority to construct and maintain a public road or highway.

prohibited route — portions of a highway route (see definition for “highway route” above) on which the transportation of *all* NRHM is prohibited for both local delivery and through traffic *at all times*.

routing designation — any regulation, limitation, restriction, curfew, time of travel restriction, lane restriction, routing ban, port-of-entry designation, or route weight restriction applicable to the highway transportation of NRHMs over a specific highway route or portion of a route.

through route — route intended for through traffic transportation that originates outside of the routing boundaries established by a political subdivision and whose destination is outside of these boundaries, and involves no deliveries or pickups within these boundaries.

Who Initiates the Process?

Typically, a political subdivision initiates the process of obtaining an NRHM designation.

Joint Submissions. NRHM routes may be submitted as a joint proposal on behalf of two or more political subdivisions if the proposed route affects multiple jurisdictions. References to “political subdivision” in this section also apply to submitters of joint proposals.

NOTE: In special circumstances and with the executive director’s advance permission, TxDOT may propose an NRHM route on any road or highway of the state open to the public for the enhancement of public safety in the transportation of NRHM. Such action will be on a limited basis. It is the intention of TxDOT to have political subdivisions initiate and propose NRHM routes. For more information regarding the procedures for TxDOT to establish an NRHM route contact the Traffic Operations Division (TRF).

Financial Responsibility

The political subdivision is responsible for all costs of NRHM route development, including proposal preparation, public hearings, signs, sign supports, sign installation, and sign maintenance. The TxDOT local district office should obtain or amend any agreements as appropriate.

Establishing or Revising an NRHM Route

In establishing or revising an NRHM route, a political subdivision must comply with both federal and state regulations for NRHM routing (49 CFR, Part 397, Subpart C, and 43 TAC, Sections 25.101–25.104).

The following steps outline the process of establishing or revising an NRHM route.

Step 1: Initial Contact

A political subdivision considering the establishment of an NRHM route must contact the local TxDOT district office and any other political subdivisions within a 25 mile radius of any point along the proposed route. The political subdivision must consult with the district office and other affected political subdivisions during the process of determining the best NRHM route. Coordination with the Texas Department of Public Safety (DPS) and the local emergency planning council or committee is encouraged.

The district office is encouraged to contact TRF for assistance with the procedures.

Step 2: Route Analysis and Proposal

The political subdivision must develop a route proposal. The written proposal must address all of the federal standards and factors listed in 49 CFR Section 397.71(b). The political subdivision must use the most current version of the United States Department of Transportation publication entitled *Guidelines for Applying Criteria to Designate Routes for Transporting Hazardous Materials* or an equivalent routing analysis tool to develop the route proposal. If an equivalent routing analysis tool is used, the political subdivision must include in its route proposal a written explanation of how the tool is equivalent to the United States Department of Transportation standards.

Step 3: Local Public Hearing

The political subdivision must hold at least one public hearing on the proposed NRHM routing designation. Public hearings may take the form of a city council or commissioners court meeting and must conform to all applicable state laws governing public meetings, including the Texas Open Meetings Act, Government Code, Chapter 551. Public notification of the hearing must comply with the following criteria:

- ◆ The public must be given 30 days prior notice of the hearing through publication in at least two newspapers of general circulation in the affected area, one of which is a newspaper with statewide circulation.
- ◆ The notice must contain a complete description of the proposed route, including the location, route name, highway number if the route is on the state highway system, and beginning and ending points of the route. The notice must also provide the date, time, and location of the public hearing.
- ◆ The notice must initiate a 30-day public comment period and inform the public where to send written comments.

Step 4: Proposal Submission

After performing the analysis and conducting a local public hearing, the political subdivision must submit eight copies of the NRHM route designation proposal and one original color map of the proposed NRHM route to TRF for approval.

The proposal must include:

- ◆ documentation demonstrating compliance with 49 CFR Part 397, Subpart C, and TAC, Section 25.103
- ◆ a complete description of the proposed route
- ◆ a signature of approval by an authorized official of the political subdivision such as the mayor, city manager, county judge, or an equivalent level of authority.

If a proposed route extends beyond the proposing political subdivision's jurisdiction into an adjacent jurisdiction, then a city council resolution from any affected adjacent jurisdiction must be included with the routing proposal.

The proposal and map must be submitted to the following address:

Texas Department of Transportation
Traffic Operations Division
125 E. 11th Street
Austin TX 78701-2483

Step 5: Proposal Review

TxDOT Public Hearing. TRF will provide the public with notice through publication in the *Texas Register* and a 30-day period in which to comment. TRF will also conduct a public hearing to receive additional comments on the proposed NRHM routing designation. TRF will publish a notice satisfying the criteria described in Step 3 above. The notice must be published in two newspapers of general circulation in the affected area. The public hearing must be held in Austin, Texas. The public hearing must be conducted before the executive director or the designee of the executive director.

NOTE: If the proposed route is located in Austin, then *two* public hearings would be required in Austin, the local and the statewide.

Coordination. TRF provides copies of the proposed route designation for review and comment to the local TxDOT district office, the Texas DPS headquarters office, and appropriate TxDOT division offices.

In coordination with the local TxDOT district office, TRF contacts the political subdivision proposing the route to resolve any concerns or issues about the proposed route designation and subsequent proposal expressed at the public hearing or received as written comments.

Step 6: Consultation with Other States and Indian Tribes

At least 60 days prior to establishing the NRHM routing designation, TRF will provide written notice to the officials responsible for NRHM highway routing in all other affected states or Indian tribes. If no response is received within 60 days from the date of receipt of the notification of the proposed routing designation, the routing designation will be considered approved by the affected states or Indian tribes.

TRF will attempt to resolve any concerns or disagreements related to the proposed routing designation expressed by any consulted states or Indian tribes. If these concerns or disagreements are not resolved, TxDOT will petition the Federal Highway Administration for resolution of the dispute in accordance with 49 CFR §397.75.

Step 7: Authorization and Approval

If TxDOT determines that a route has met all of the criteria for approval, TRF will submit the proposed NRHM routing designation to the TxDOT executive director for approval.

Upon approval by the TxDOT executive director, TRF will notify the political subdivision in writing that the proposed routing designation is authorized, and will issue appropriate notice to the Federal Highway Administration and the Texas DPS.

Step 8: Route Designation and Signing

Designation. Upon receipt of a letter of approval from TxDOT, the political subdivision must designate the NRHM route by ordinance, resolution, rule, regulation, or other official order. The political subdivision must forward a copy of the order to TRF within 30 days of receipt of the letter of approval.

Signing. After passage of the order, the political subdivision must submit the proposed sign and installation locations of the NRHM route designation to the local TxDOT district office for approval. All signs must conform to the latest version of the *Texas Manual on Uniform Traffic Control Devices* (see “Route Signing Guidelines” below).

The local TxDOT district office should submit the proposed signing schematic to TRF for review.

The political subdivision must coordinate sign installations with the local TxDOT district office prior to placement.

Route Signing Guidelines

The *Texas Manual on Uniform Traffic Control Devices* contains some guidelines for signing hazardous cargo routes. This segment elaborates on the use of these signs. In an effort to limit the number of signs and provide statewide consistency, while satisfying the federal reporting requirements, the guidelines listed in this segment should be followed.

Through Routing (Large Guide Signs). The Hazardous Cargo route (R14-2) sign is used to identify through hazardous cargo routes. In most cases, the R14-2 sign is installed on pull-through guide signs located on the designated HC route. The R14-2 should be located above the parent sign as shown on the *Traffic Engineering Standard Sheets*. Where two through HC routes intersect, the R14-2 should be carried on advance guide and exit direction signs in addition to pull-through guide signs. The HC MUST FOLLOW (R14-6) sign, as shown on the *Traffic Engineering Standard Sheets*, may be used on a numbered inbound route in advance of the designated through HC routes as appropriate. This sign may either be ground-mounted or mounted overhead (see Figure 5-4).

(continued...)

Route Signing Guidelines (continued)

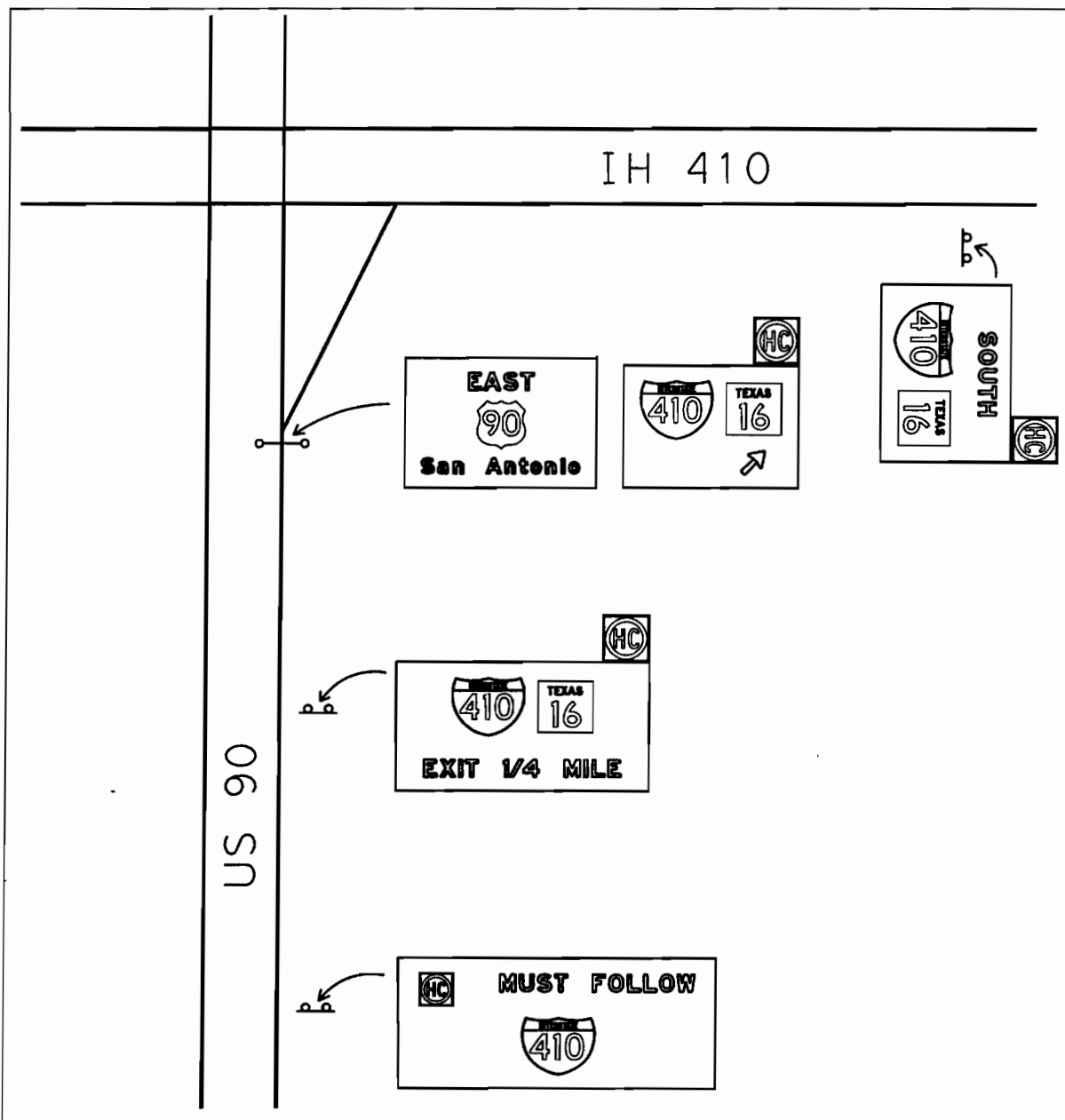


Figure 5-4. Typical signing for a designated through NRHM route on an expressway or freeway.

Through Routing (Small Roadside Signs). The R14-2 may be mounted below the existing ground mounted confirmation route marker assembly. The R14-2 is treated as another route marker, but must always be mounted on the bottom of the assembly directly below the route shield. The R14-2 may be mounted below existing junction markers where two through HC routes intersect (which may include FM or SH routes) (see Figure 5-5).

(continued...)

Route Signing Guidelines (continued)

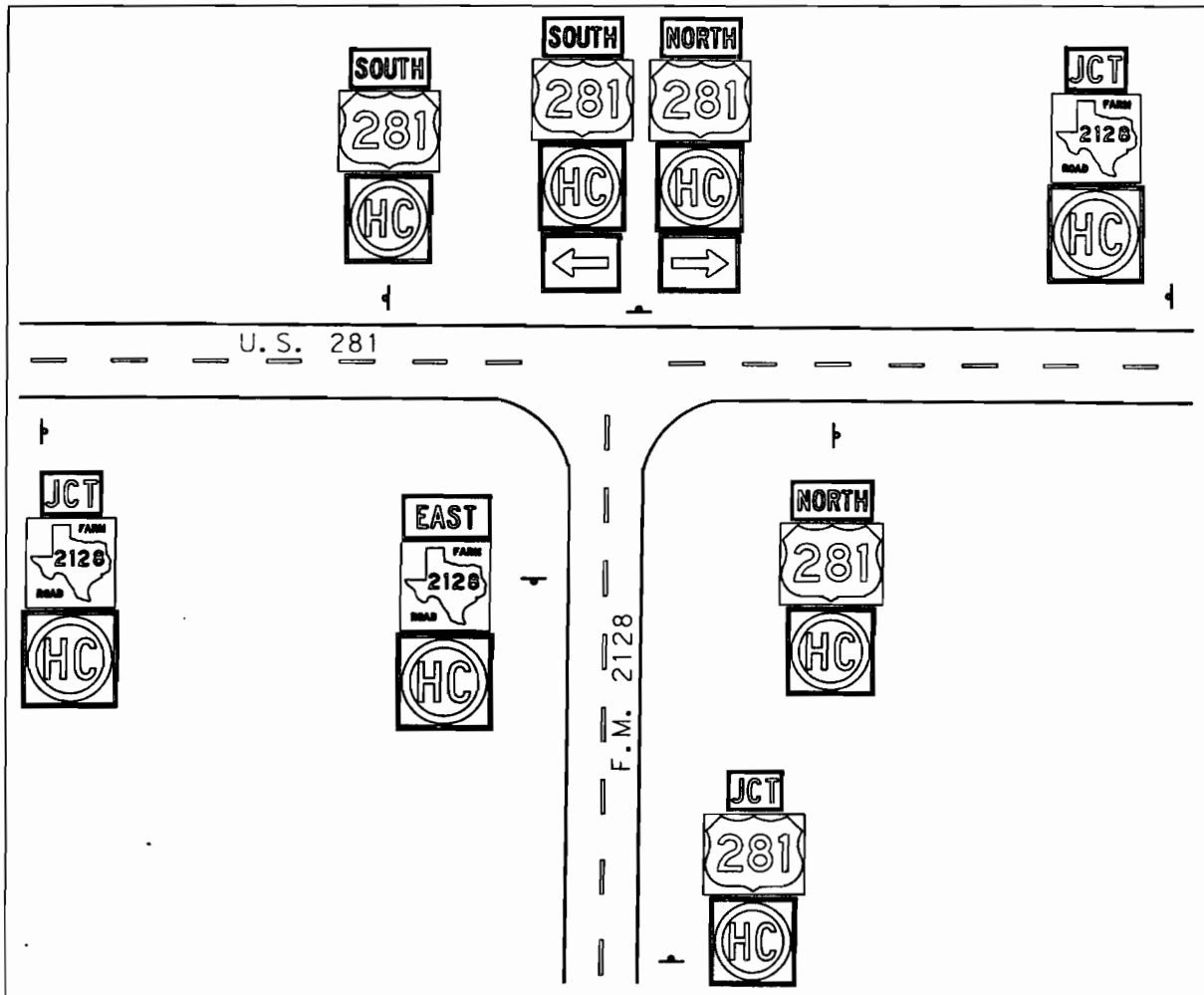


Figure 5-5. Typical signing for a designated through NRHM route on small roadside route marker assemblies.

If the R14-2 sign is added to an existing sign support, then the R14-2 sign must be installed at the minimum 7 foot height. Sign post lengths may need to be modified when adding the R14-2 sign to existing supports. In some cases, the sign post may need to be replaced to accommodate the additional R14-2 sign.

Prohibited Routes. The Hazardous Cargo Prohibition (R14-3) sign is used on routes where hazardous cargo is prohibited at all times. The R14-3 must be used as described in section 2B.46 of the *Texas Manual on Uniform Traffic Control Devices*. This includes mounting R14-3 above pull-through, advance guide, and exit direction signs. Note that the use of this sign will be very limited because it applies to routes that are prohibited *at all times*. Signing that contains stipulations for certain types of NRHM or special time-of-day allowances is discouraged.

Signing Upgrades. Any signing upgrades should reflect the guidelines outlined here.

TRF Review of Schematics. Signing schematics for NRHM routes may be submitted to TRF for review.

Section 8

Restricted Truck Lanes

Introduction

TxDOT, cities, and counties are allowed to enact lane restrictions under certain circumstances. These restrictions typically prohibit trucks with 3 or more axels from using a particular traffic lane of a freeway with 3 or more lanes.

Authority

Rules for restricted truck lanes are contained in the Texas Administrative Code under Title 43, Sections 25.601–25.604. These rules authorize a city, county, or TxDOT to restrict through traffic, by class of vehicle, to 2 or more designated lanes of traffic on certain portions of the designated state highway system.

As the state routing agency, TxDOT is required to approve all new lane restrictions or revisions to existing lane restrictions. A city or county cannot simply pass an ordinance or resolution to establish a lane restriction.

Terminology

Specialized terms used in this section are defined as follows:

class of vehicle — all or any of the types of vehicles, machines, tractors, trailers, or semitrailers, or any combination thereof, propelled or drawn by mechanical power and used on a highway. A vehicle class includes, but is not limited to:

- a semitrailer
- special mobile equipment
- a trailer
- a truck.

truck — a motor vehicle with 3 or more axels, designed, used, or maintained primarily to transport property.

truck tractor — a motor vehicle designed and used primarily to draw another vehicle but not constructed to carry a load other than a part of the weight of the other vehicle and its load.

(continued...)

Terminology *(continued)*

controlled access facility — as defined in Transportation Code, §203.001, a designated state highway to or from which access is denied or controlled, in whole or in part, from or to adjoining real property or an intersecting public or private way, without regard to whether the designated state highway is located in or outside a local jurisdiction as defined below.

highway — a public roadway that:

- is in the designated state highway system
- is designated a controlled access facility
- has a minimum of 3 travel lanes, excluding access or frontage roads, in each direction of traffic that may be part of a single roadway or may be separate roadways that are constructed as an upper and lower deck.

local jurisdiction — a home-rule, general-law, or special-law municipality incorporated under the laws of the state of Texas or any of the state's 254 counties.

order — a resolution or order of a county commissioner's court or municipal ordinance.

transcript — a verbatim written record of a meeting required under this subchapter as prepared and certified by a court reporter or by an employee of a local jurisdiction and certified by an appropriate official of a local jurisdiction.

Who Initiates the Process?

A local jurisdiction or TxDOT may initiate the process of enacting a lane restriction.

Financial Responsibility

If local jurisdictions initiate the process of enacting a lane restriction, each local jurisdiction is responsible for all costs related to restriction development, including proposal preparation, local jurisdiction public hearings, and public information announcements regarding the order enforcing the restriction.

TxDOT will conduct the traffic study to evaluate the effect of the proposed restriction and will provide, install, and maintain appropriate traffic control devices along the restricted route.

If TxDOT initiates the process of enacting a lane restriction, then TxDOT is responsible for all costs associated with enacting the restriction and will provide, install, and maintain appropriate traffic control devices along the restricted route.

Establishing a Lane Restriction

The process for establishing restricted truck lanes varies depending on how the process is initiated. The following 3 subheadings describe the process when initiated by a single city or county, by contiguous cities or counties, and by TxDOT.

Single City or County Initiated Process

If a single city or county initiates the process for establishing restricted truck lanes, the process proceeds as follows:

1. The city or county submits a description of the proposed restriction to the local TxDOT district.
2. The district conducts a traffic study to evaluate the probable effect.
3. The city or county holds a public hearing. Notification of public hearing must include a complete description of proposed restriction, including location, route numbers, and beginning and ending points of the restriction. A city council or commissioner's court meeting that allows the public to comment is acceptable.
4. The city or county submits to the district a formal proposal, which must include:
 - 6 copies of the proposed ordinance
 - documentation of a traffic study conducted in compliance with Section 545.0651 of the Texas Transportation Code
 - 2 original plan views of the roadway
 - signature of approval by an authorized city or county official
 - a transcript of any public comments received.
5. The district engineer sends the Traffic Operations Division (TRF) director the formal proposal from the city or county and the traffic study used to evaluate the impact.
6. The district (through TRF) provides the Office of General Counsel (OGC) with a formal notice for publication in the Texas Register, which includes:
 - complete description of proposed restriction
 - notification of 30-day public comment period
 - instruction to send comments to TRF.
7. OGC handles publication in the Texas Register.
8. TRF receives the comments resulting from the Texas Register. Based upon the comments, the TRF director and the district engineer decide if and where a hearing will be held.
9. TRF forwards the proposal package to the executive director for approval or disapproval.

(continued...)

Single City or County Initiated Process *(continued)*

10. The executive director sends approval or disapproval letter to the city or county with a copy to the district engineer and OGC.
11. The city or county passes an ordinance or order.
12. The district funds and erects signs.

The executive director may suspend or rescind approval based upon any of the following factors:

- ◆ changes in pavement conditions
- ◆ changes in traffic conditions
- ◆ geometric changes in roadway configuration
- ◆ construction or maintenance activities
- ◆ emergency or incident management.

Contiguous Cities or Counties Initiated Process

If contiguous cities or counties jointly initiate the process for establishing restricted truck lanes, the process proceeds as follows:

1. The cities or counties jointly submit a description of the proposed restriction to the district.
2. The district conducts a traffic study to evaluate the probable effect.
3. Each city or county holds a public hearing. Notification of public hearing must include a complete description of proposed restriction, including location, route numbers, and beginning and ending points of the restriction. A city council or commissioner's court meeting that allows the public to comment is acceptable.
4. Each city or county submits to the district a formal proposal, which must include:
 - 6 copies of the proposed ordinance
 - documentation of a traffic study conducted in compliance with Section 545.0651 of the Texas Transportation Code
 - 2 original plan views of the roadway
 - signature of approval by an authorized city or county official
 - transcript of any public comments received.

(continued...)

Contiguous Cities or Counties Initiated Process *(continued)*

5. The district (through TRF) provides OGC with a formal notice for publication in the Texas Register, which includes:
 - the date, time, and location of public hearings
 - complete description of proposed restriction
 - notification of 30-day public comment period
 - instruction to send comments to the district.
6. OGC handles publication in the Texas Register.
7. The district holds at least one public hearing at the local district office or other suitable location. Notification of the public hearing must appear in the Texas Register at least 10 days prior to the date of the hearing.
8. The district receives the comments resulting from the Texas Register. Based upon the comments, the TRF director and the district engineer decide if and where another hearing will be held.
9. The district engineer sends the TRF director:
 - the formal proposal from each city or county
 - traffic study used to evaluate the impact
 - transcript of public hearing held at the district office
 - written public comments received from the Texas Register
10. TRF forwards the proposal package to the executive director for approval or disapproval.
11. The executive director sends approval or disapproval letter to each city or county with a copy to the district engineer and OGC.
12. The cities or counties pass ordinances or orders.
13. The district funds and erects signs.

The executive director may suspend or rescind approval based upon any of the following factors:

- ◆ changes in pavement conditions
- ◆ changes in traffic conditions
- ◆ geometric changes in roadway configuration
- ◆ construction or maintenance activities
- ◆ emergency or incident management.

TxDOT Initiated Process

If TxDOT initiates the process for establishing restricted truck lanes, the process proceeds as follows:

1. The district conducts a traffic study to evaluate the probable effects.
2. The district consults with affected city or county.
3. The district (through TRF) provides OGC with a formal notice for publication in the Texas Register, which must include:
 - the date, time, and location of public hearings
 - complete description of proposed restriction
 - notification of 30-day public comment period
 - instruction to send comments to the district
4. OGC handles publication in the Texas Register.
5. The district holds at least one public hearing at the local district office or other suitable location. Notification of the public hearing must be in the Texas Register at least 10 days prior to the date of the hearing.
6. The district receives the comments from the Texas Register. Based upon the comments, the TRF director and the district engineer decide if and where another hearing will be held.
7. The district engineer sends the TRF director a formal proposal, which includes:
 - a complete description of proposed restriction
 - documentation of a traffic study conducted in compliance with Section 545.0651 of the Texas Transportation Code
 - 2 original plan views of the roadway
 - transcript of any public comments received
 - written public comments received from the Texas Register
8. TRF consults with the district on preparation of minute order.
9. TRF submits the minute order to the executive director for Transportation Commission approval.
10. The Commission approves or denies the minute order based on factors included in TAC, Section 25.604(f).
11. Upon approval, the district funds and erects signs.

In an emergency, the executive director may temporarily suspend for 90 days an existing restriction based upon any of the following factors:

- ◆ incident management
- ◆ inclement weather
- ◆ construction or maintenance activities
- ◆ other factors.

Example Signing for Left Lane Restriction

If a left lane restriction is established, the NO TRUCKS LEFT LANE sign should be mounted as close to the left lane as possible, as shown in Figure 5-1. The sign can be mounted on:

- ◆ an overhead sign bridge or cantilever
- ◆ a large roadside sign support
- ◆ a tower of an overhead sign bridge or cantilever.

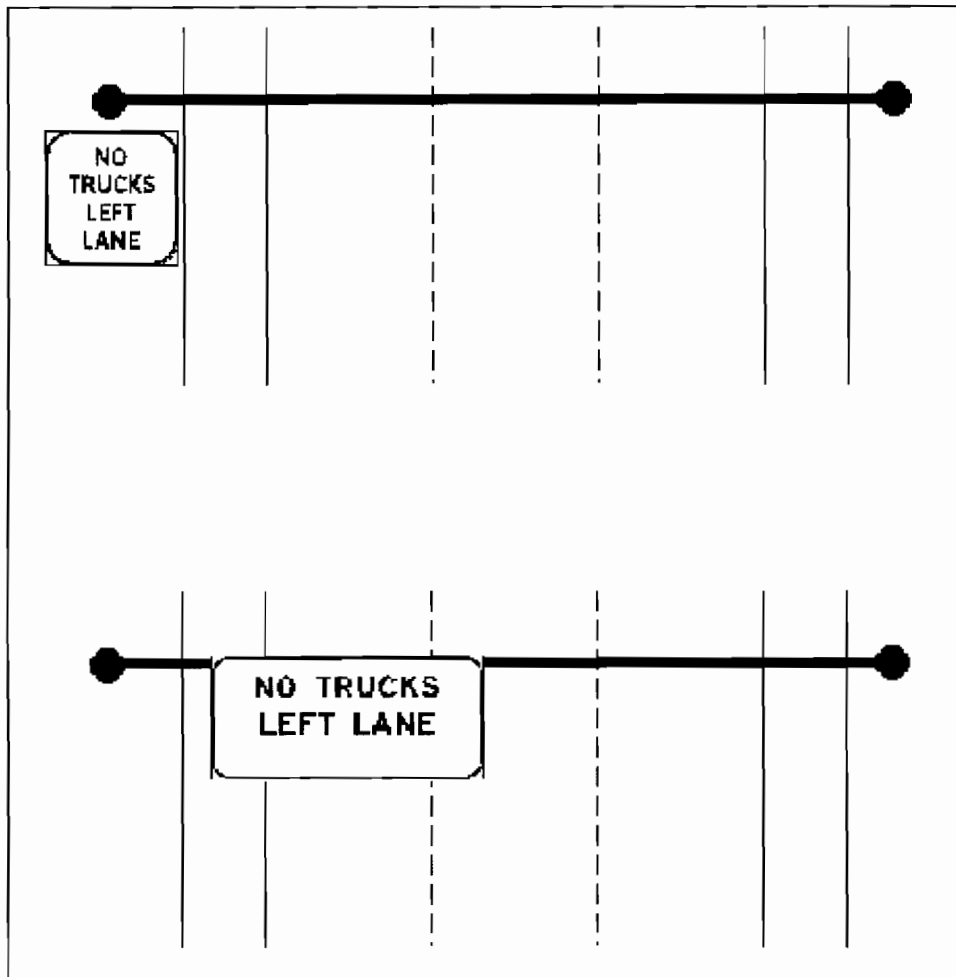


Figure 5-1. Typical signing for a left lane truck restriction on a freeway.

Advance warning using the AHEAD plaque over the NO TRUCKS LEFT LANE sign should be used in advance of the restricted truck lane. The BEGIN plaque over the NO TRUCKS LEFT LANE sign and the END plaque over the NO TRUCKS LEFT LANE sign should be used at the restriction limits. If the restriction is not 24 hours a day, 7 days a week, then the restricted times should be mounted below the NO TRUCKS LEFT LANE sign. The typical plaques used in conjunction with the NO TRUCKS LEFT LANE sign are shown in Figure 5-2.

(continued...)

Example Signing for Left Lane Restriction (continued)

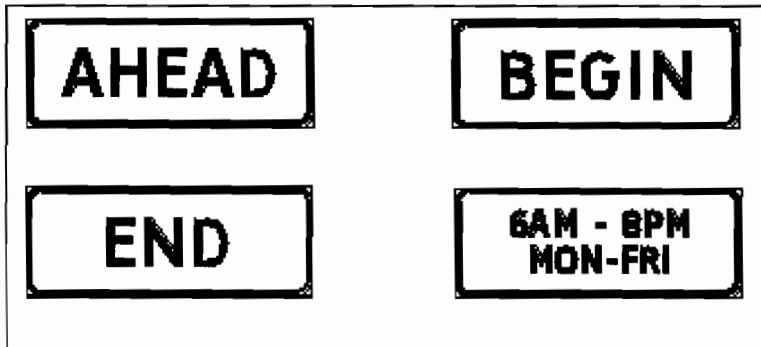


Figure 5-2. Typical plaques for a left lane truck restriction on a freeway.

Section 9

Special Practices

Introduction

The practices recommended in this section are the result of research conducted by the Texas Transportation Institute (TTI) (Study 1261, “Assessment and Improvement of Motorist Understanding of Traffic Control Devices”). The study found that certain changes in signing practices may improve the level of understanding of some signs by drivers.

For changes in warning signs recommended as a result of the TTI study, see Chapter 6 of this volume.

Implementation

Recommended signs should be used only after existing stocks are depleted. All signs should be replaced on a maintenance replacement basis.

REDUCE SPEED AHEAD

The REDUCE SPEED AHEAD sign (R2-5a) should be used to replace the SPEED ZONE AHEAD sign (R2-5c). All sizes of signs are affected.

DO NOT CROSS DOUBLE WHITE LINE

When double solid lane lines are used, the DO NOT CROSS DOUBLE WHITE LINE sign (R4-3b) should be used. All sizes of signs are affected.

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Chapter 6

Warning Signs

Contents

This chapter contains the following sections:

Section 1 — Overview	6-3
Section 2 — T-Intersections	6-5
Section 3 — Vertical Clearance	6-7
Section 4 — Advisory Speeds	6-9
Section 5 — WATCH FOR ICE ON BRIDGE Sign	6-11
Section 6 — Special Practices	6-13

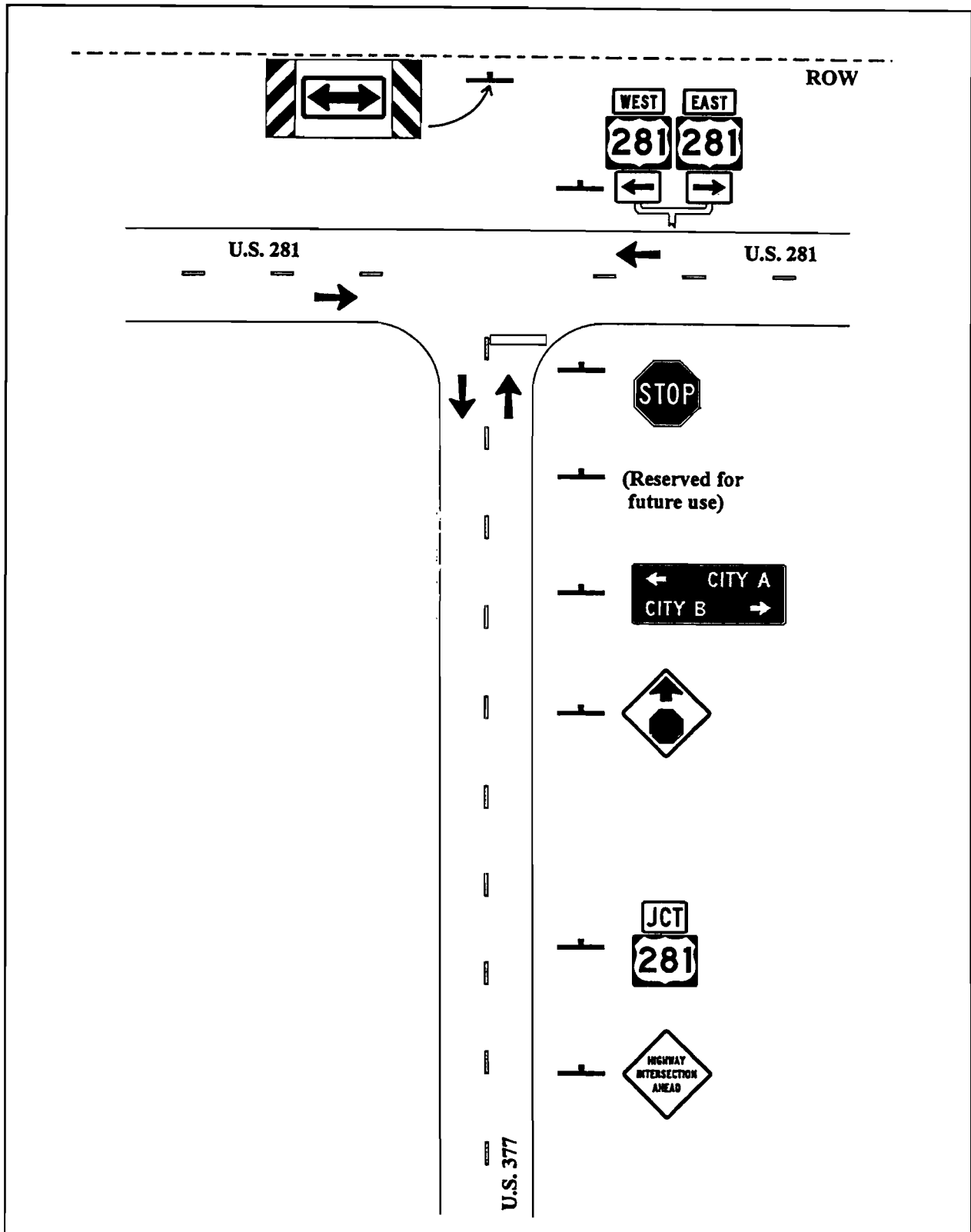


Figure 6-1. T-intersection treatments. If the large arrow sign is used, it should be as close to the ROW line as practical.

Section 3

Vertical Clearance

Introduction

Sections 621.207 and 621.504 of the Texas Transportation Code restrict a vehicle and its load to a height of no more than 14 feet, unless an oversize/overweight permit is obtained from TxDOT. Furthermore, it is unlawful to operate a vehicle over or on any bridge or through any underpass or similar structure unless the height of the vehicle, including its load, is less than the vertical clearance of such structure as shown by TxDOT's records.

Signs

CLEARANCE signs (W12-2 through W12-4) need to reflect the vertical clearance between the roadway and the overhead obstruction.

This section provides guidelines intended to supplement the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*. Consult the *TMUTCD* for more information on this topic and for specific information concerning sign placement criteria.

When to Measure

Vertical clearance may change with milling operations, overlays, and new construction. All construction or maintenance activities which may affect the vertical clearance of an overhead obstruction should be coordinated with the district oversize/overweight permit coordinator in advance to ensure that accurate and current records are maintained.

Any condition that could result in a change to the vertical clearance, such as an overlay or reconstruction of the roadway, requires new measurements.

How to Measure Minimum Vertical Clearance

Minimum vertical clearance measurements apply to the total travelway, which includes the travel lanes and any usable paved shoulder. A usable shoulder is defined as a paved surface adjacent to and flush with the travel lanes for which the minimum measured clearance is not less than 10 feet. Where a paved shoulder, or section of paved shoulder, passes beneath an overhead obstruction with a minimum vertical clearance less than 10 feet, the installation of a positive barrier or jiggle bar tiles should be considered as an additional roadside safety treatment (see Figure 6-2). An elevated paved shoulder at the edge of the travel lanes is not included in clearance measurements. Similarly, raised medians are not considered part of the travelway.

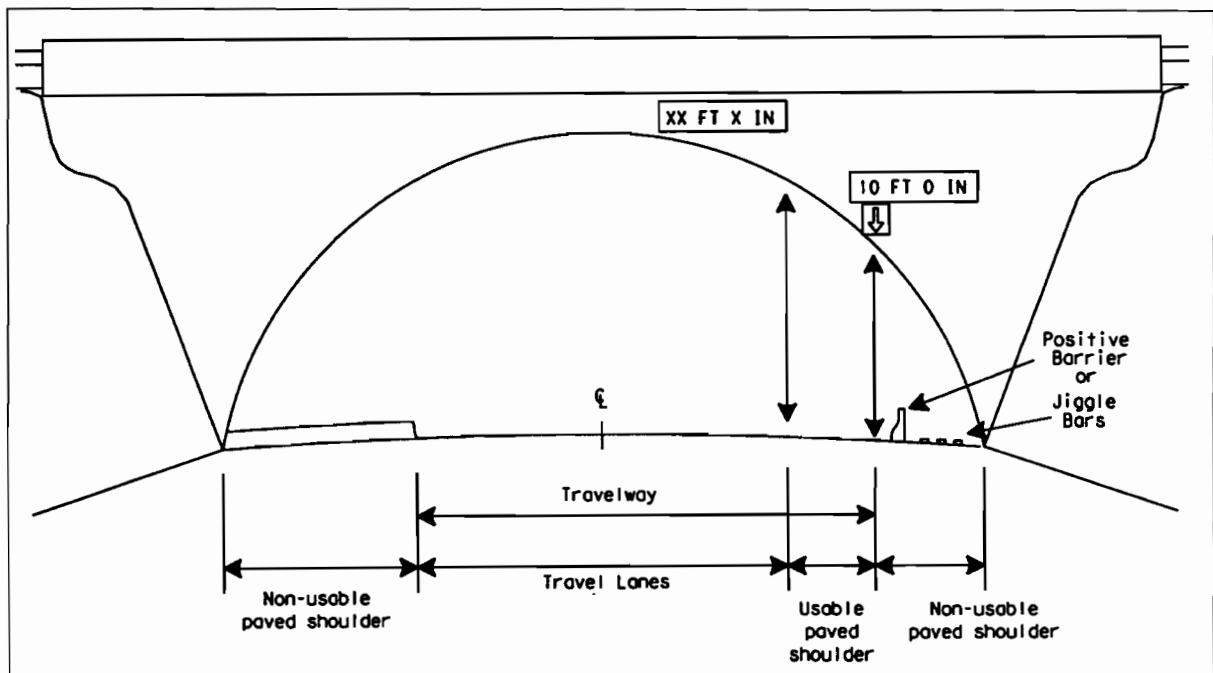


Figure 6-2. Measuring minimum vertical clearance.

A sufficient number of measurements should be taken across the width and depth of the obstruction to ensure that the minimum clearance is determined. Measurements should be rounded down to the lowest whole inch.

(continued...)

How to Measure Minimum Vertical Clearance (continued)

Depressed Vertical Curves. A special measurement method is used for measuring the clearance under structures spanning depressed vertical curves. Figure 6-3 illustrates this method and provides the equation for calculating the clearance.

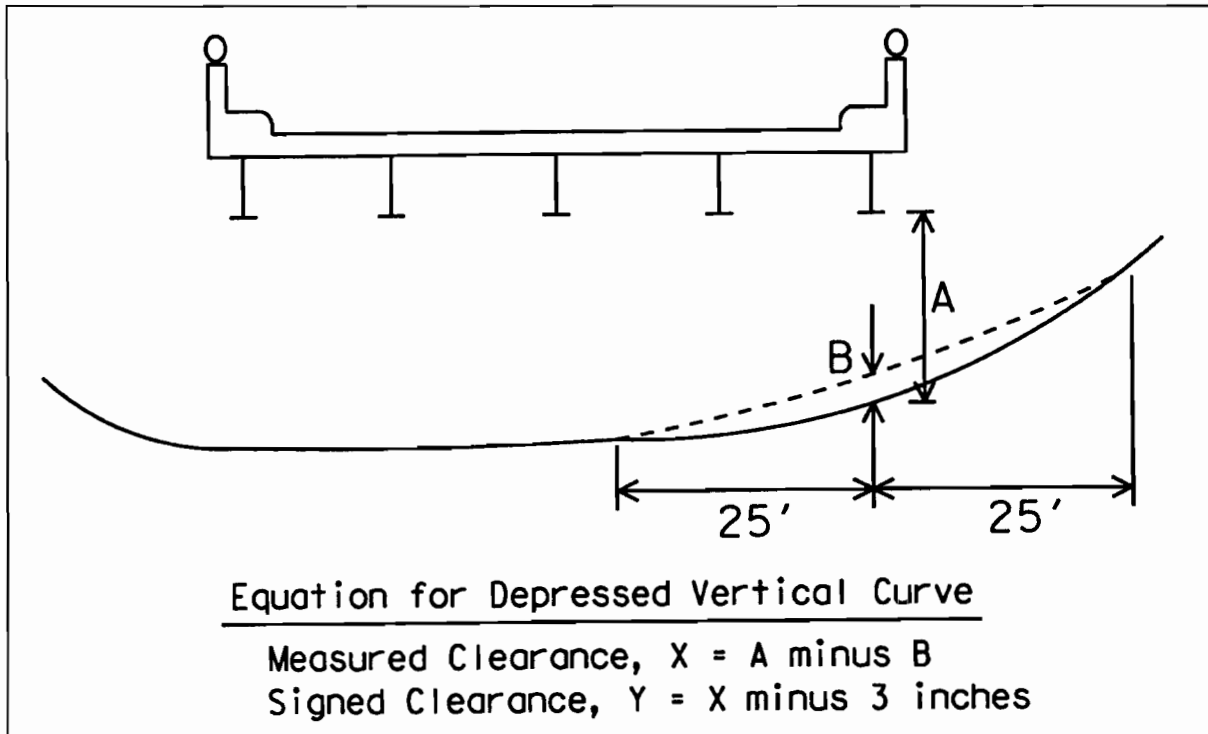


Figure 6-3. Determining vertical clearance for a structure over a depressed vertical curve.

Signing Minimum Vertical Clearance

The “signed clearance” (the clearance shown on the sign) should be 3 inches *less* than the actual measured clearance. This establishes a “clearance buffer” to allow for future surface overlays. The following signing requirements are summarized in Figure 6-4.

Structures Not Requiring Signing. Overhead obstructions with minimum clearances exceeding 20 feet do not require any clearance signs. The CLEARANCE sign (W12-3) should not be applied to overhead sign support structures.

Structures Requiring Signing. All overhead obstructions, except overhead sign structures, that have a minimum measured clearance of 20 feet or less require both advance CLEARANCE (W12-2T) and structure mounted CLEARANCE (W12-3) signs, unless the immediately preceding structure is lower and no access (entrance or exit ramps, driveways, or intersections) for traffic exists between the structures. When the advanced CLEARANCE sign legend is less than 14 feet, 6 inches, the LOW CLEARANCE plaque (W12-2P) should be included on the advance sign assembly.

(continued...)

Signing Minimum Vertical Clearance (continued)

The W12-2T sign must not be located between a MERGE sign and the entrance ramp or between an EXIT DIRECTION sign and the exit ramp. See the *TMUTCD* for more sign placement information.

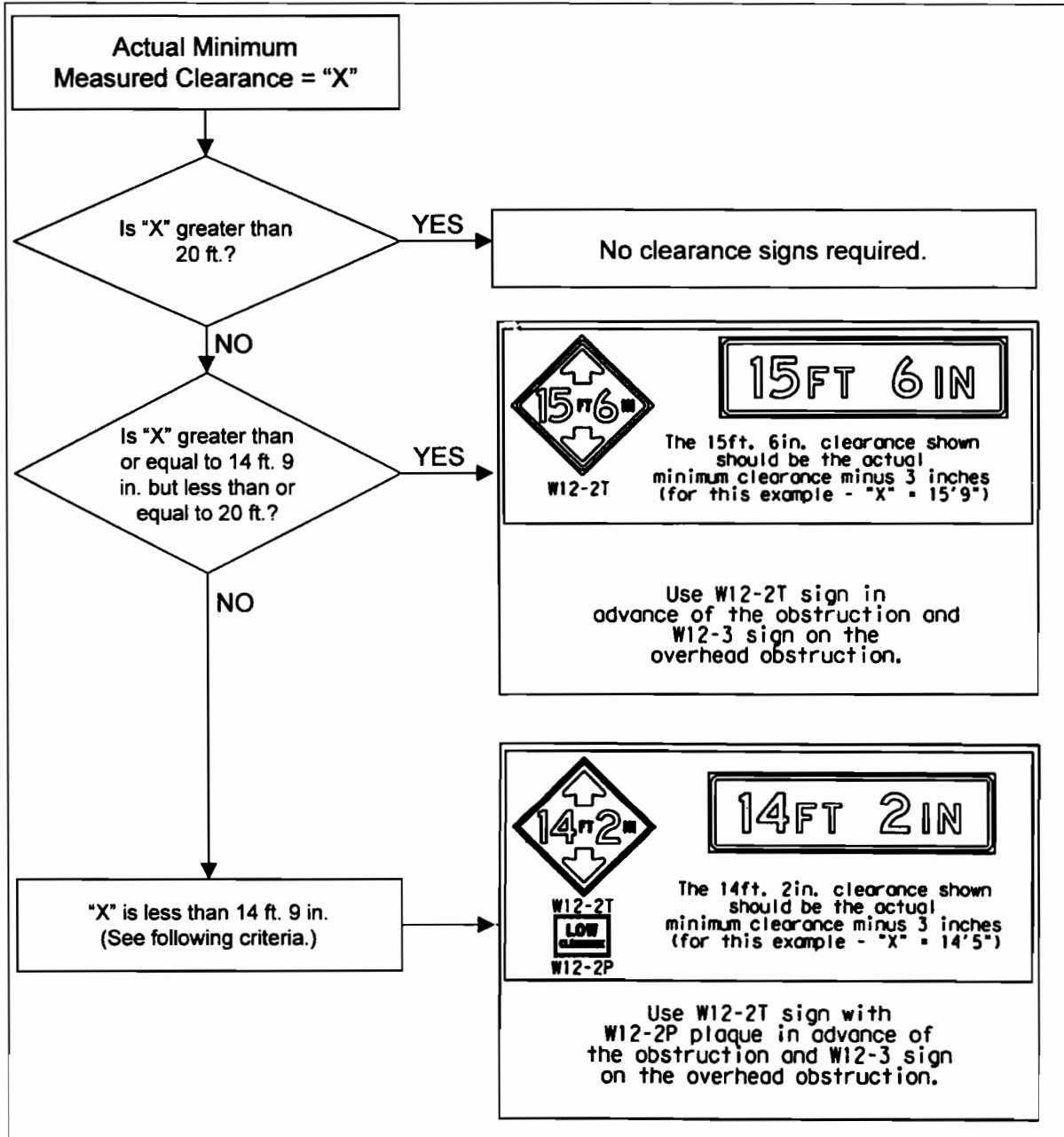


Figure 6-4. Initial determination of need for warning signs for overhead obstructions. (Signed clearance should be 3 inches less than the actual measured clearance.)

(continued...)

Signing Minimum Vertical Clearance (continued)

When the minimum measured clearance over the travelway is less than 14 feet, 9 inches, use the following CRITERIA to determine the necessary signing:

Criteria for Signing Vertical Clearance Measured at Less than 14 Feet, 9 Inches

Criterion	If...	Then...
1	the minimum measured clearance over the travelway is located within the travel lanes,	only one clearance sign is required at the obstruction (see Figure 6-5 for example).
2	If the difference between the minimum measured clearance above the travel lanes and the minimum measured clearance above the usable shoulder is 6 inches or greater,	the travel lane and shoulder clearances should be signed independently on the structure (see Figure 6-6 for example); otherwise, only one clearance sign is required.
3	If the minimum measured clearance over the travel lanes requires a signed clearance greater than or equal to 14 feet, and if the minimum measured clearance over the usable shoulders requires a signed clearance of less than 14 feet,	the travel lane and shoulder clearances should be signed independently (see Figure 6-7 for example).

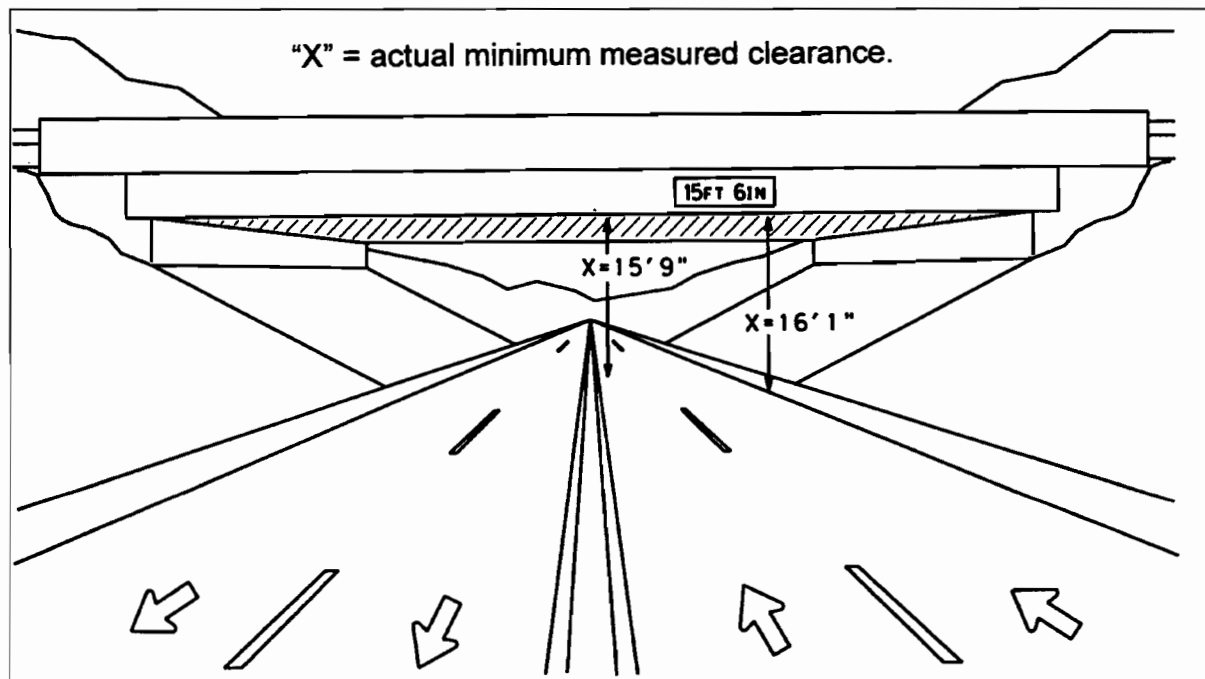


Figure 6-5. Criterion 1. If the shoulder clearance is greater than that of the travel lane, then only one sign is required.

(continued...)

Signing Minimum Vertical Clearance (continued)

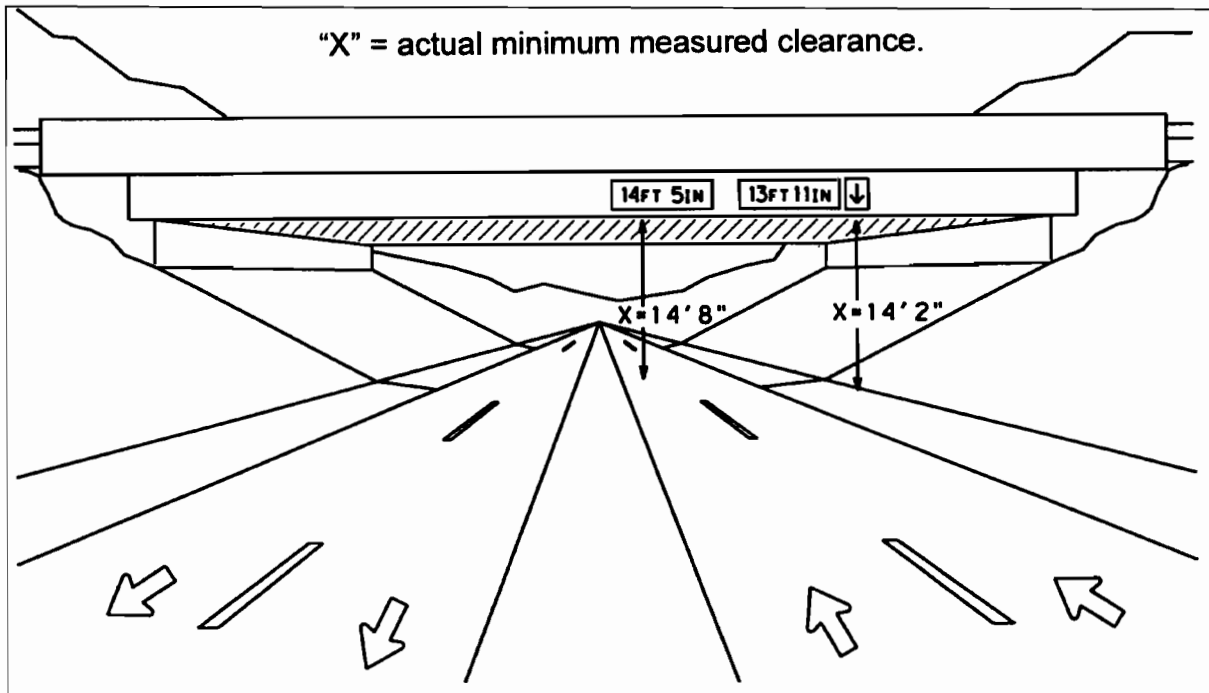


Figure 6-6. Criterion 2. If the difference between the minimum measured clearance above the travel lanes and the minimum measured clearance above the usable shoulder is 6 inches or greater, then the travel lane and shoulder clearances should be signed independently on the structure.

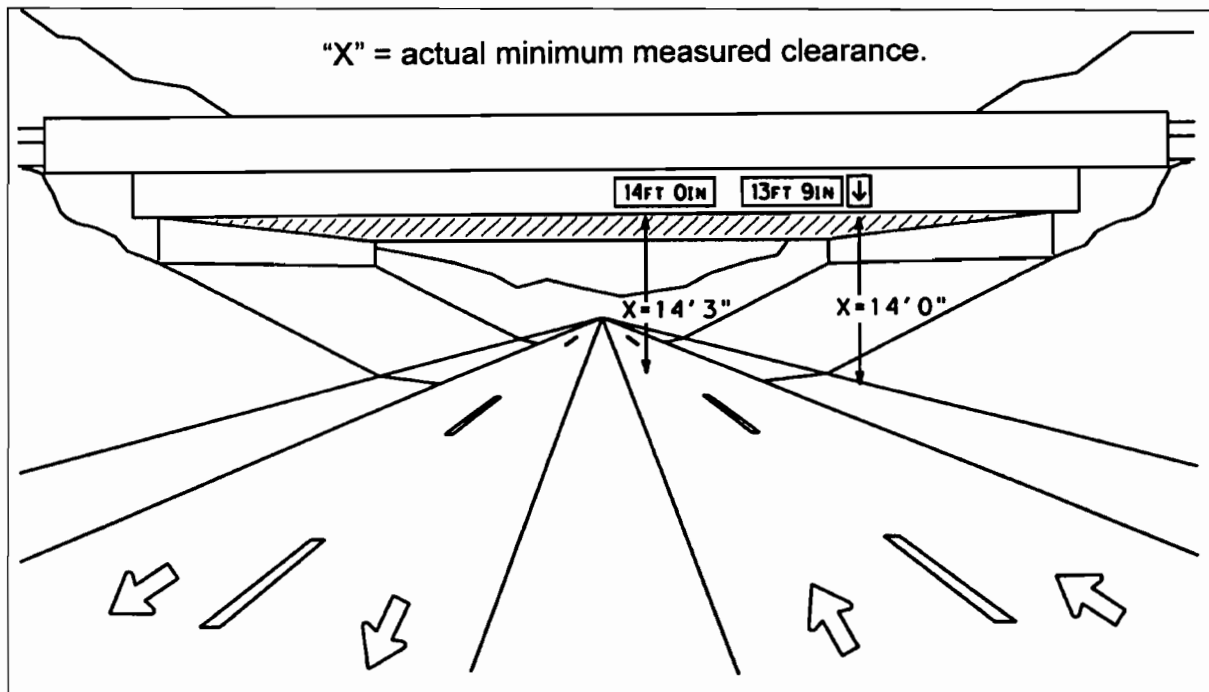


Figure 6-7. Criterion 3. If the minimum measured clearance over the travel lanes requires a signed clearance greater than or equal to 14 ft., and if the minimum measured clearance over the usable shoulders requires a signed clearance of less than 14 ft., then travel lane and shoulder clearances should be signed independently.

(continued...)

Signing Minimum Vertical Clearance (*continued*)

Shoulder Clearance Signing. When an additional clearance sign is installed over a shoulder, the advanced CLEARANCE signs (W12-2 and W12-2T) should indicate the same clearance as shown on the sign mounted over the travel lanes. Additional CLEARANCE signing for the shoulder must include an ARROW plaque (W12-3P). The ARROW plaque should be located adjacent to the shoulder CLEARANCE sign and centered over the point for which the signed clearance applies, typically the outside edge of the usable shoulder.

Reporting Measurements

Whenever vertical clearance measurements are taken, both the actual and the signed clearance should be reported to the district oversize/overweight permit coordinator and to the district bridge inspection personnel.

The Motor Carrier Division (MCD) bases the clearance shown on the district permit maps on correspondence from each district. The vertical clearances on the district permit maps should show clearances in one-half foot increments, but never greater than the “signed clearance.”

Updating Vertical Clearance Signing

Vertical clearances must be measured immediately after any construction or maintenance activity that could affect the minimum vertical clearance of a structure. If the minimum measured clearance is less than or equal to the existing signed clearance, then the clearance sign must be replaced or modified and the district oversize/overweight permit coordinator should be notified before traffic is allowed to pass under the obstruction. If the minimum measured clearance is greater than the existing signed clearance and the *clearance buffer* (described under “Signing Minimum Vertical Clearance”) is less than two inches, then the clearance sign legend should be changed as soon as practicable. The following table summarizes these directions.

Determination of Need to Update Warning Signs for Overhead Obstructions

If the measured overhead clearance is...	Then...
less than or equal to the existing signed clearance,	replace the signs and notify the district oversize/overweight permit coordinator prior to opening roadway to traffic.
greater than the existing signed clearance but not by at least 2 inches,	replace the signs.
greater than the existing signed clearance by at least 2 inches,	existing signs are okay.
NOTE: The actual measured clearance should be 3 inches greater than signed clearance. If the existing signed clearance is within an inch of the correct signed clearance (3 inches \pm 1 inch of the actual measurement), the warning signs do not require replacement.	

Your Notes:

Section 4

Advisory Speeds

Advisory Speed Sign

An Advisory Speed sign (W13-1) is added to a warning sign to advise motorists that a speed lower than the speed limit should be considered. The use of this sign is discussed in the *TMUTCD* and in the *Procedures for Establishing Speed Zones Volume of the Traffic Operations Manual*.

The Advisory Speed sign should not be used by itself; it should only be used as a supplement to warning signs for:

- ◆ curves and turns (W1-1 through W1-5) (see following heading)
- ◆ intersections (W2-1 through W2-8)
- ◆ narrow and one lane bridges
- ◆ bump or dips (W8-1 and W8-2)
- ◆ descending grades (hills) steeper than 6 percent (W7-1 and W7-1b)
- ◆ temporary traffic control zones
- ◆ other conditions.

These warning signs and their proper uses are discussed in the *TMUTCD* and the *Procedures for Establishing Speed Zones Volume of the Traffic Operations Manual*.

Curve Symbol

The Curve Symbol sign (W1-2) should have an advisory speed plaque. Advisory speed for the plaque should be determined as described in the *Procedures for Establishing Speed Zones Volume of the Traffic Operations Manual*. This applies to all sign sizes.

Turn Symbol

The Turn Symbol sign (W1-1) should have an advisory speed plaque. This sign should be used for turns which have recommended speeds between 5 and 30 miles per hour. This applies to all sign sizes.

Advisory Exit Speed Sign

The independently mounted Advisory Exit Speed signs (W13-2 and W13-3) are used to display the maximum recommended speed on expressway and freeway exit ramps. These signs are discussed in the *TMUTCD*. The *Procedures for Establishing Speed Zones Volume* of the *Traffic Operations Manual* contains procedures for determining and posting these signs.

Section 5

WATCH FOR ICE ON BRIDGE Sign

Use of the Sign

This section contains guidelines for use of the WATCH FOR ICE ON BRIDGE (WFIOB) warning sign (W19-2). The W19-2 sign is TxDOT's standard sign for warning motorists that ice may be present on bridges.

The WFIOB sign is a discretionary sign, and its use should be based on the district's determination of need. It is not necessary for every bridge to have advance WFIOB signs. Typically, areas that seldom have icy conditions do not need permanently installed folding signs. Other areas may use permanently installed folding signs based on work force availability during icy conditions.

Warning lights are not required, regardless of the type of sheeting. Older signs are replaced with signs fabricated with high specific intensity grade (Type C) sheeting.

Display Guidelines

WFIOB signs should be displayed according to the Sign Display Schedule (provided at the end of this section). Work should be scheduled so that signs are displayed no more than 10 days in advance of the recommended “display from” dates and removed from view within 10 days after the recommended “display to” dates.

Signs should remain displayed throughout the cold weather season and should not be removed from view until the recommended removal date.

When the signs are displayed (unfolded or turned to view), the sign should be *bolted* in place so it is flat.

If inclement weather requires display of the sign message before the recommended display date, the signs should be *bolted* in place and should remain displayed throughout the cold weather season. Conversely, if inclement weather prevents removal from view until after the recommended “display to” date, the signs should remain displayed until no longer applicable.

Documentation

Whenever a WFIOB sign is displayed or removed from view, the maintenance supervisor should document the date and time of work.

Documentation of WFIOB sign display and removal from view should be kept on file for five years in maintenance section files or another appropriate location as determined by the district. After five years, these records may be stored with other records and should remain accessible for an additional five years.

Sign Display Schedule

The WATCH FOR ICE ON BRIDGE Sign Display Schedule (Appendix F of this volume) lists recommended “display from” and “display to” (remove from view) dates obtained using the State Climatologist's map of expected first and last date of freezing weather. A safety factor of 7 to 14 days was added to ensure that signs are displayed if early or late freezes occur.

Section 6

Special Practices

Introduction

The practices recommended in this section are the result of research conducted by the Texas Transportation Institute (TTI) (Study 1261, “Assessment and Improvement of Motorist Understanding of Traffic Control Devices”). The study found that certain changes in signing practices may improve the level of understanding of some signs by drivers.

For changes in regulatory signs recommended as a result of the TTI study, see Chapter 5 of this volume.

Implementation

Recommended signs should be used only after existing stocks are depleted. All signs should be replaced on a maintenance replacement basis. Warning signs that are recommended should be placed to provide adequate advance warning of the condition and at locations that are a reasonable distance from existing signs.

Curve and Turn Symbol

Both the Curve Symbol sign (W1-2) and the Turn Symbol sign (W1-1) should be accompanied by advisory speed plaques. This subject is covered in Section 4 of this chapter.

Divided Highway Ends / Two-Way Traffic

The Divided Highway Ends Symbol sign (W6-2) should be used at the end of a section of divided highway and then followed after 150 to 230 m (500 to 750 feet) by a Two-way Traffic Symbol sign. All sizes of signs are affected.

ROUGH ROAD

The ROUGH ROAD sign (W8-8) should replace the GROOVED PAVEMENT AHEAD sign (W8-12). All sizes of signs are affected. Note: The GROOVED PAVEMENT AHEAD sign is no longer in the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*.

Your Notes:

Chapter 7

Guide Signs

Contents:

Section 1 — Overview.....	7-3
Section 2 — Concurrent Routes	7-5
Section 3 — Oversize Street Name Signs	7-7
Section 4 — Signing for County Roads	7-9
Section 5 — Interstate Highway Numbering.....	7-11
Section 6 — Special Route Markers.....	7-13
Section 7 — Destination and Distance Signing.....	7-15
Section 8 — Destination Signing for Border Cities in Mexico	7-19
Section 9 — Traffic Generators, Special Events, and Government Offices	7-21
Section 10 — State Parks	7-25
Section 11 — Public Beaches.....	7-27
Section 12 — Wildlife Viewing Areas.....	7-29
Section 13 — General-Services Signs.....	7-31
Section 14 — Radio Information Signs.....	7-33
Section 15 — Reference Markers and Mileposts	7-35
Section 16 — Memorial Marker and Named Marker Highways and Structures	7-37
Section 17 — Historic Routes	7-43
Section 18 — Street-Named Highways.....	7-47
Section 19 — Historical Markers	7-55
Section 20 — County Line Signs	7-61
Section 21 — WELCOME TO TEXAS Signs	7-63
Section 22 — Accessibility Signing for Rest and Picnic Areas	7-65

Section 1

Overview

Introduction

Chapters 2D and 2E of the *Texas Manual on Uniform Traffic Control Devices for Streets and Highways (TMUTCD)* provide detailed information on the application of highway guide signs. TxDOT's *Sign Crew Field Book* contains further detailed information on the types and uses of guide signs on conventional highways, including detailed discussions and illustrations of:

- ◆ guide sign components
- ◆ arrangement of guide signs on the sign assemblies
- ◆ placement of guide signs at intersection approaches and departures.

This chapter of this volume provides additional information and guidelines specific to TxDOT operations. Guide signing for freeways, expressways, and certain divided highways is covered in Chapter 9 of this volume.

The recommendations and guidelines contained in this chapter should be treated as general goals intended to improve the guidance of motorists; they are not necessarily applicable to every situation.

Purpose of Guide Signs

Guide signs are used to

- ◆ guide motorists along streets and highways
- ◆ inform motorists of intersecting routes
- ◆ direct motorists to streets, highways, cities, towns, villages, or other important destinations
- ◆ provide other information of value to road users.

Guide sign messages should generally be as simple and direct as possible.

Use of Brown Background

Brown background color should be used for recreational, cultural interest, and historical areas signing.

Section 2

Concurrent Routes

Avoiding Unnecessary Concurrent Routes

Concurrent routes should be avoided and their number reduced where possible.

EXAMPLE: A state highway joins a US highway and runs concurrent with it into Town X. The US highway continues through the town, but the state highway ends at the town (see Figure 7-1). The concurrent signing should be eliminated, terminating the signing of the state highway where it joins the US highway.

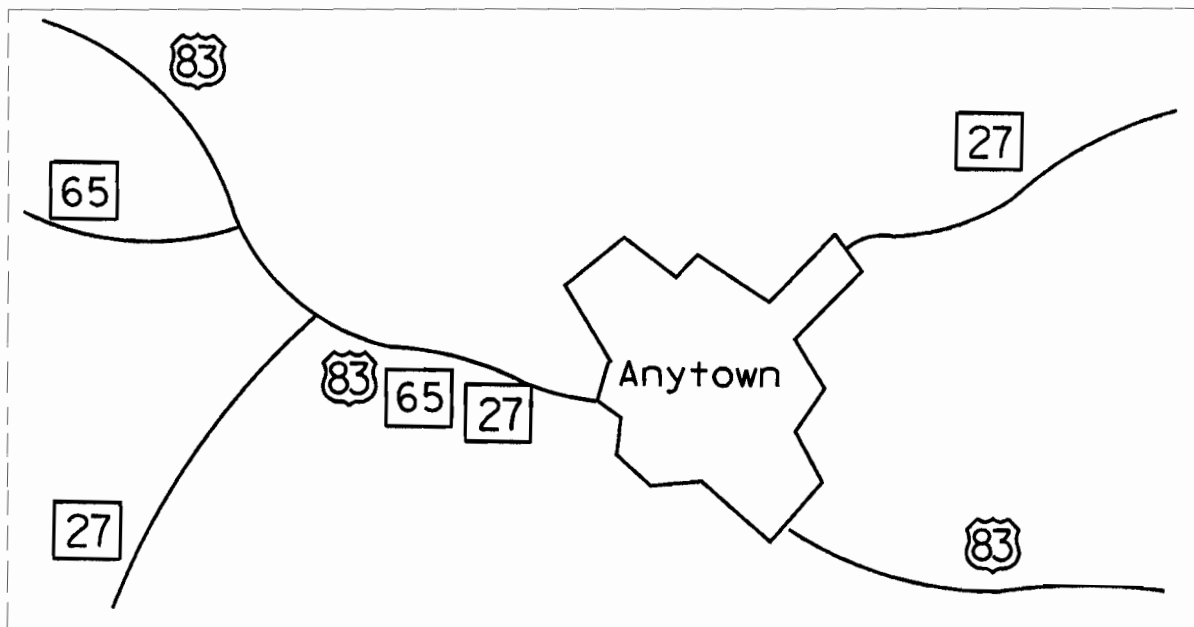


Figure 7-1. Example of unnecessary concurrent signing. Signing for SH 65 should terminate at its junction with US 83.

Concurrent Route Confirmation Assemblies

The Texas Reference Marker (TRM) system marks the highway so that all data collected and recorded identifies the correct section of road in the TxDOT data base. The Transportation Planning and Programming Division (TPP) has established a highway system hierarchy listing all classes of highways in the data base. On roadways having more than one route number assigned to them, it is very important that the route markers (M1 series) be mounted according to the roadway system hierarchy shown in Figure 7-2 to help data collectors record the proper highway number.

(continued...)

Concurrent Route Confirmation Assemblies (continued)

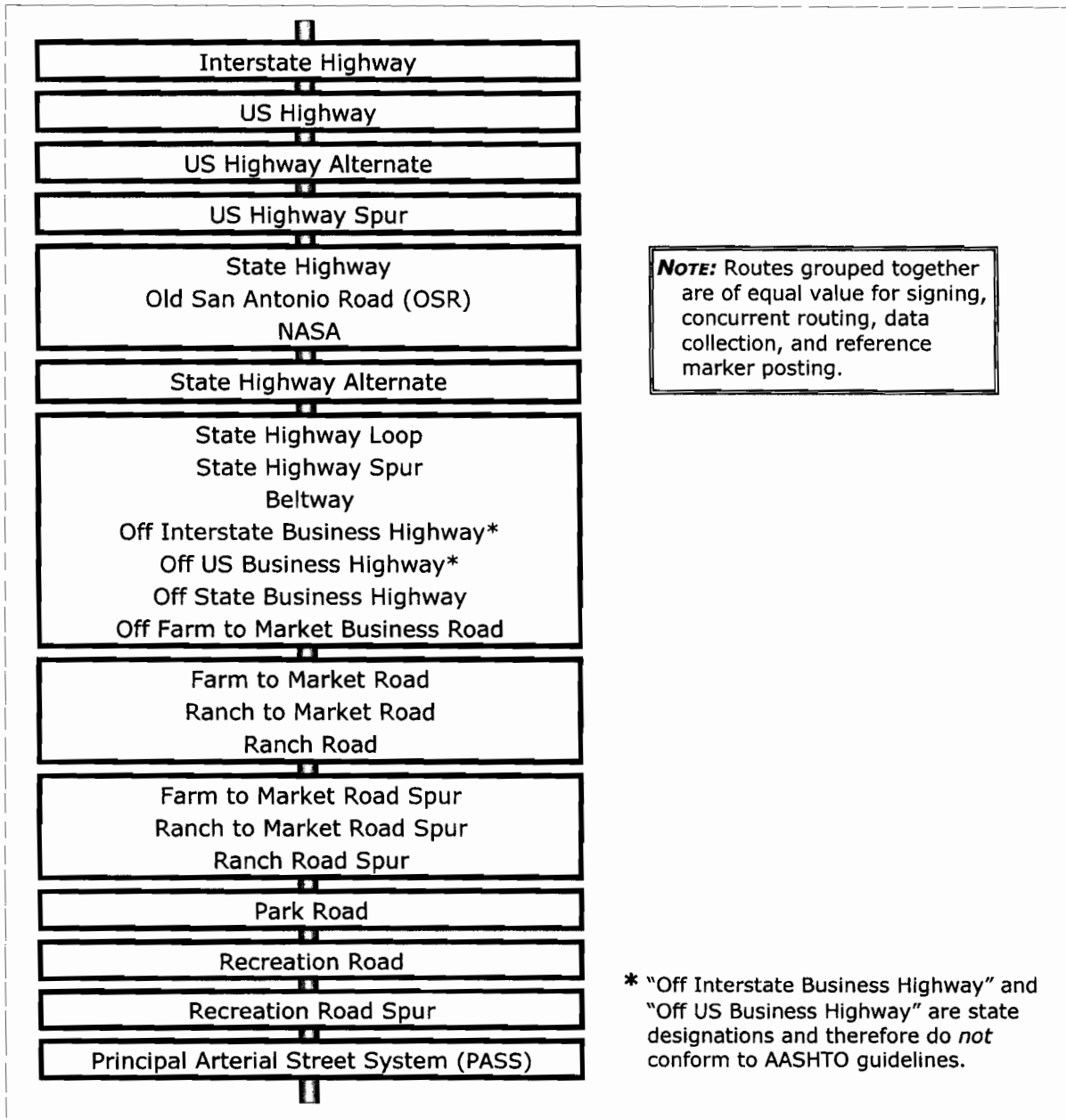


Figure 7-2. Roadway system hierarchy.

Markers for higher ranked systems are mounted either *above* or *to the left* of lower ranked systems.

EXAMPLE: If a US and state highway are concurrent, the US shield is mounted above or to the left of the state highway shield.

Section 3

Oversize Street Name Signs

Recommended Use

Oversized or illuminated street name signs should be mounted on signalized intersection mast arms or span wires where possible.

Letter Size

The minimum recommended letter height for street names is 10 inch, except that 8 inches may be used where any of the following circumstances exist:

- ◆ dual street names at intersections
- ◆ space limitations restrict the overall size of the sign
- ◆ roadway with speed limit of 30 miles per hour or less.

Dimensions

See *Standard Highway Sign Designs for Texas* for the recommended dimensions for oversized street name signs. See the traffic control standard sheets for sheeting, font, and substrate requirements for oversize street name signs.

Section 4

Signing for County Roads

Introduction

TxDOT furnishes and erects advance county road name or number signs on the state highway system. The guidelines contained in this section are intended to provide statewide uniformity.

Eligible County Roads

The following considerations govern the decision to install county road signs on state highways:

- ◆ the development of the 911 system and the importance of directing emergency vehicles
- ◆ the adequacy of any existing signing at night
- ◆ the need for directing non-local drivers.

Only county roads that have been officially assigned a name or route number by the commissioners court of a county qualify for signing.

Signing Standards

All signing for county roads on the state highway system use I-2e series signs (white on green), whether for named or numbered roads. The abbreviation for “county road” used on signs with road numbers is “CO RD.”

The recommended minimum letter size is 6 inches, except where circumstances restrict the overall size of the sign. Advance guide signs should be placed at least 200 feet in advance of the intersection. On major highways or for major county roads, larger letter size and increased advance distance from the county road should be considered. See *Standard Highway Sign Designs for Texas* for recommended dimensions for county road signs. See the traffic control standard sheets for sheeting, font, and substrate requirements for county road signs.

When Warning Signs are Used

At intersections with county roads where the W2 series intersection warning are used, the D1 series county road name or number sign may be used instead of the warning signs. Although the *TMUTCD* allows county road name signs to be mounted below the intersection warning signs, in order to be consistent, separate supports should be used if both warning and guide signs are erected for the same intersecting road.

Signs Provided by County

Counties may provide county road name or number signs for placement similar to street names on top of supports of TxDOT maintained STOP and YIELD signs. Signs provided by the county for this purpose must:

- ◆ meet the design requirements of the *TMUTCD*
- ◆ be of the quality materials approved by the district engineer (including sign blanks, reflectorization, and mounting hardware)

Existing Signs

All existing county road signing not in conformance with these guidelines may remain in place until the end of its service life. As existing signs are replaced, new signs will conform to established guidelines.

Section 5

Interstate Highway Numbering

Original Numbering System

The original numbering system for interstate highways established that:

- ◆ north-south routes end in 5, beginning with 5 on the west coast and increasing on routes east of IH 5
- ◆ east-west routes end in zero, beginning with 10 in the south and increasing on routes north of IH 10.

Current Numbering System

After the initial interstate routes were designated, additional corridors became eligible for interstate highway funding. Since the initial routes had used all the available numbers ending with “0” and “5,” an alternate numbering system was developed using even and odd numbers, as follows:

- ◆ Odd numbers designate routes that generally run in a north-south direction.
- ◆ Even numbers designate routes that generally run in an east-west direction.

The number selected would generally fall in the normal sequence between two existing interstate routes. For example, IH 27 is located between IH 25 (New Mexico, Colorado, Wyoming, etc.) and IH 35 (Texas, Oklahoma, Kansas, etc.).

Loops

Interstate loops use three digits; the first digit is an even number, while the last two digits are associated with the interstate highway that carries the major traffic stream.

Business Loops. Interstate business loops typically retain the number of the interstate highway traversing the city or town and use a green route sign.

Interstate Loops in Texas. Texas interstate loops (both existing and possible) are as follows:

Interstate Loops in Texas	
Loop Number	Location
IH 210	El Paso (possible)
IH 235	Austin (possible)
IH 410	San Antonio
IH 435	Waco (possible)
IH 610	Houston
IH 635	Dallas
IH 810	Beaumont (possible)
IH 820	Fort Worth

Section 6

Special Route Markers

Hurricane Evacuation Route Signing (EM-1 series)

The Division of Emergency Management and the Department of Public Safety, acting through local disaster district committees, have established hurricane evacuation routes for each of the five coastal districts. The HURRICANE EVACUATION ROUTE sign (EM-1) with a hurricane symbol should be used to mark these routes. See *Standard Highway Sign Designs for Texas* for sign details.

HURRICANE EVACUATION ROUTE signs should be installed at critical intersections along evacuation routes and any other appropriate locations between intersections. The sign should be mounted under the route marker for evacuation routes on the existing support, if possible. If a sign is independently mounted as a confirmation route or with a directional arrow or a directional marker, it should be installed on an approved breakaway support.

Texas Travel Trails

The Texas Travel Trails were officially established by the Texas Transportation Commission. The trails follow routes that have historical, cultural, or geographical significance.

TxDOT erects and maintains the Texas Travel Trails signs. The signs are 42 × 24 inches. The trail arrows are 18 inches in diameter. Signs and trail arrows are obtained from the General Services Division's regional supply centers. Figure 7-3 shows an example of a Texas Travel Trail marker and associated directional arrow. See *Standard Highway Sign Designs for Texas* for sign details.

(continued...)

Texas Travel Trails *(continued)*

Districts should maintain close observation of trail signing, and promptly obtain and erect replacements as needed to assure that the route remains well marked for motorists who are following the trail. Any problems or confusion about a particular trail route segment should be brought to the attention of the Travel and Information Division (TRV).

Existing designated Texas Travel Trails are:

- ◆ Texas Brazos Trail
- ◆ Texas Forest Trail
- ◆ Texas Forts Trail
- ◆ Texas Hill Country Trail
- ◆ Texas Independence Trail
- ◆ Texas Lakes Trail
- ◆ Texas Mountain Trail
- ◆ Texas Pecos Trail
- ◆ Texas Plains Trail
- ◆ Texas Tropical Trail.



*Figure 7-3. Example of Texas Travel Trail marker.
(Trail arrow may be reversed for left turn.)*

Section 7

Destination and Distance Signing

Introduction

Destination signs (D1 series) provide guidance information in the form of a city name (destination) and the direction to the city. Destination signs are typically used in advance of intersections to help drivers decide which way to turn at the intersection.

Distance Signs (D2 series) indicate the distance to the city shown on the sign.

Destination and distance signs are especially valuable to motorists unfamiliar with a particular area. Because some motorists are inattentive, read maps poorly, or do not adequately plan their trips, additional destination and distance signs can help “pull” them through an area.

People familiar with an area often do not readily see a problem with destination signing. This section presents suggestions for handling situations that often present problems for motorists unfamiliar with an area.

Additional information on destination and distance signing can be found in the *TMUTCD* and the *Sign Crew Field Book*.

Combination of Routes Between Major Destinations

When traversing a combination of routes between major cities or destinations, motorists may find guide signing showing only route numbers confusing. Sometimes maps, with their limited detail, may also contribute to the disorientation.

Trailblazing signs for major cities or destinations placed between routes can help “pull” motorists following a combination of routes through an area. Figure 7-4 on the following page shows a typical situation.

(continued...)

Combination of Routes Between Major Destinations (continued)

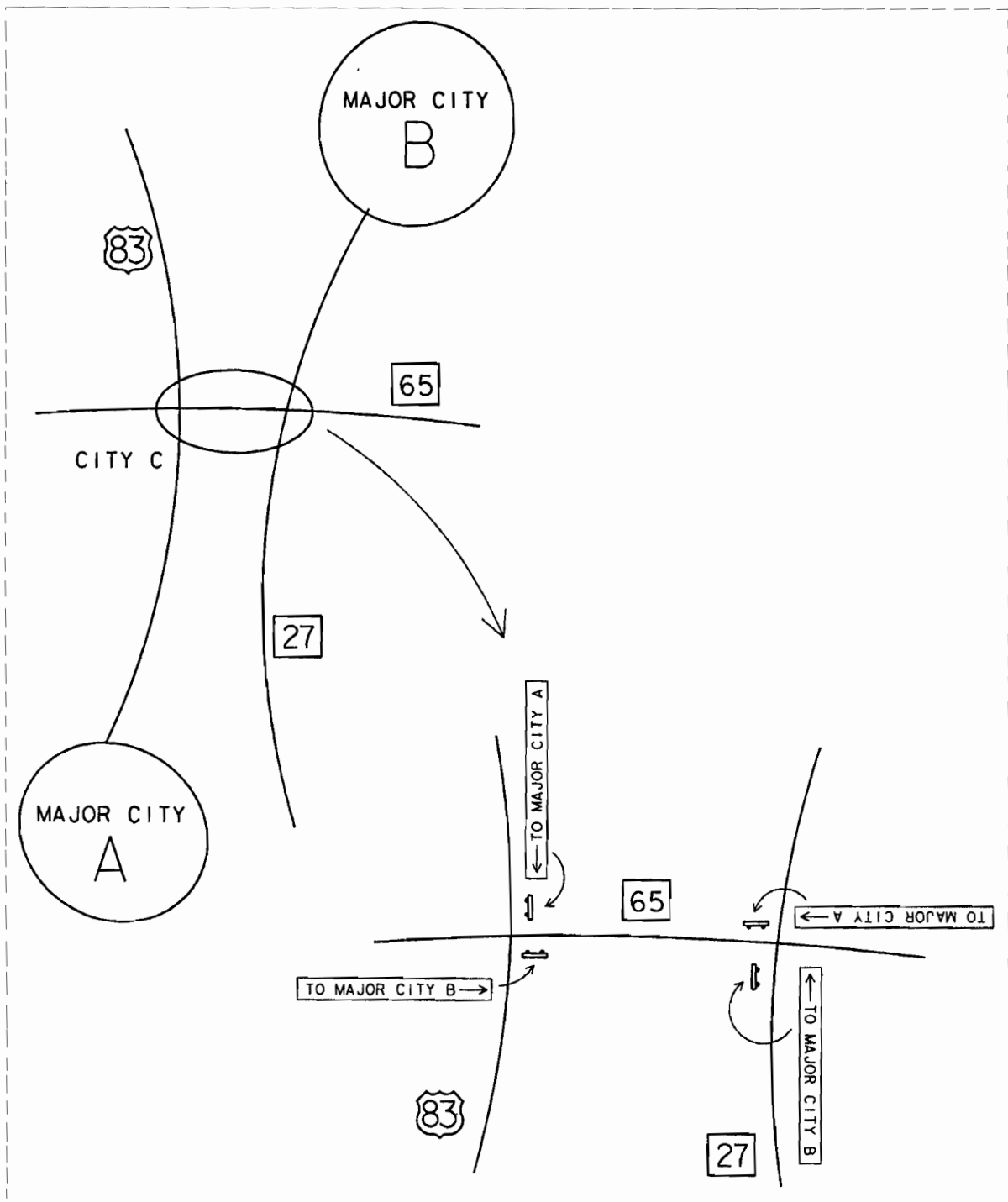


Figure 7-4. Because travel between City A and City B Requires a combination of routes, destination signing in City C helps pull motorists through.

Additional Distance Signing

Distance signs are normally used to advise motorists of distances to destinations on a route. The destinations shown are selected based on the guidelines in the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*, Section 2D-36.

Because many people navigate by destination names instead of route numbers, distance signing for other major destinations, in addition to that already in place, should be provided where applicable (subject to the maximum text permitted by the *TMUTCD*). Also, as previously discussed, trailblazing over a combination of routes for major destinations may be necessary if the routes together serve as a primary connecting link. Figure 7-5 on the following page shows an example.

Because such distance signing and trailblazing expands the scope of normal distance signing, coordination with neighboring district offices is necessary.

Spacing Additional Destination and Distance Signs

When additional destination and distance signs are required, the spacing between adjacent signs should be 300 feet minimum, with 400 feet desirable, on highways with 55 miles per hour or greater speed limits.

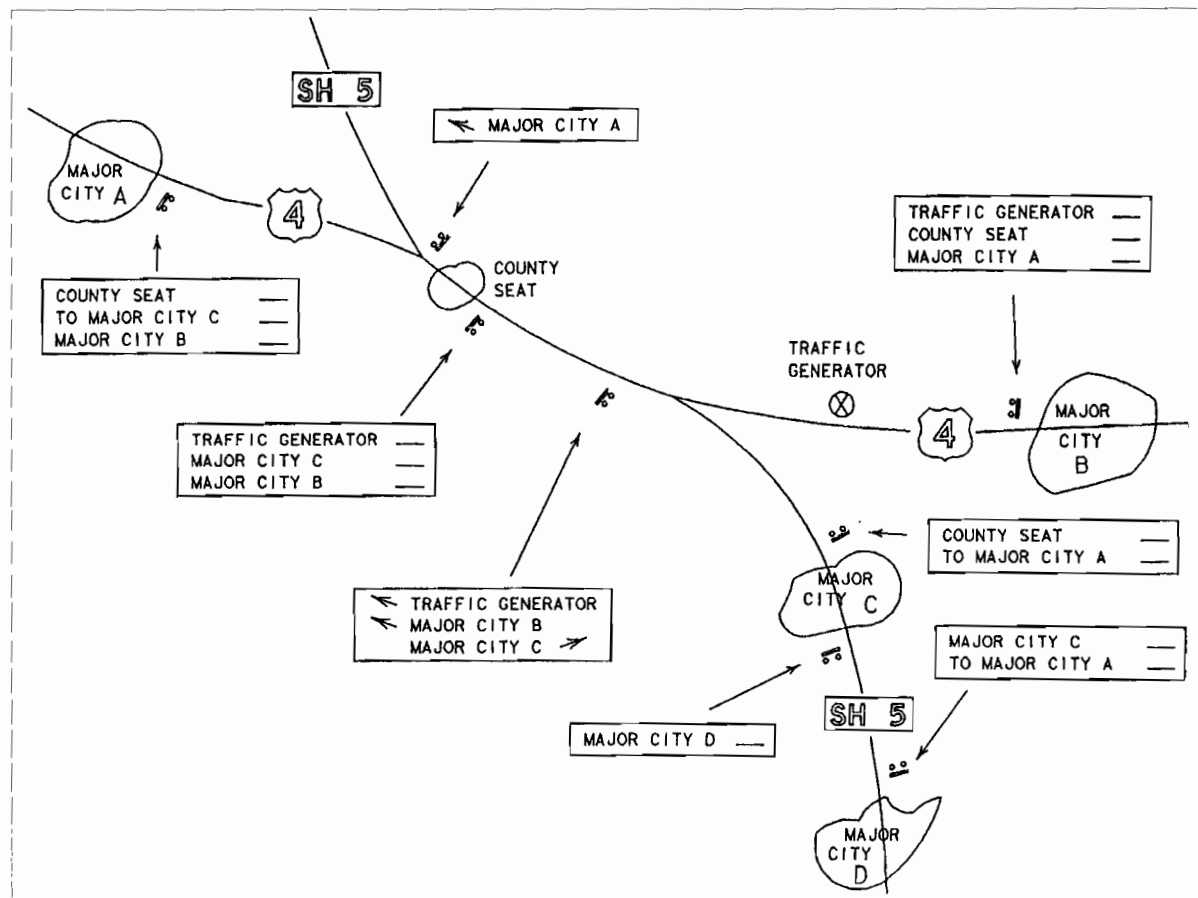


Figure 7-5. Example of supplemental destination distance signing.

Section 8

Destination Signing for Border Cities in Mexico

Introduction

TxDOT provides destination and mileage signing for Mexican border cities and border crossings in a manner similar to that provided for Texas cities where sign size and spacing allow. Mexican border cities should be shown along with the corresponding Texas cities when appropriate.

Types of Border Crossings

There are two types of border crossings: “international” and “port of entry.”

International crossings are major crossings open 24 hours a day, 7 days a week

Port of entry crossings are minor crossings open fewer than 24 hours a day.

Sign Content

The destination signing should identify the city name and/or the type of crossing. If a city name is used without specifying the type of crossing, it implies that the crossing is an international crossing.

Destination signing for Mexican border cities should indicate the city name(s), but *not* the country name “Mexico,” except when necessary to prevent confusion.

Smaller cities with crossings should have destination and any necessary mileage signs at the nearest intersecting highway for the crossing roadway.

Where a Texas city is adjacent to a Mexican city, it may be desirable to sign both cities. For example, Eagle Pass and Piedras Negras might appear on the same sign because both cities are of similar importance.

Sign Placement

On US and state highways, destination signing for major border crossing cities should be placed at major intersecting highways in accordance with the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*. On freeways and expressways, either advance guide and exit direction signs or supplemental signs may be used to sign major intersecting highway routes leading to border cities.

Where multiple routes to a destination exist in the same area, the best route for each direction of travel should be signed. Because routes to major border cities in Mexico may involve a combination of routes, additional destination signing may be appropriate. (See Section 7 of this chapter.)

Normally, signing for border cities in Mexico should not extend more than about 50 miles from the Texas-Mexico border.

Section 9

Traffic Generators, Special Events, and Government Offices

Signing for Traffic Generators

Signing for traffic generators (D1, E1, and E2 series) and special events presents a challenge because of the wide variety of generators and their various sizes and locations in relation to highways. The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* contains a chart showing various generators and eligibility criteria for signing. Districts should follow these guidelines as closely as possible to maintain statewide consistency for signing requests.

Local Authority Requests for Traffic Generator Signs

Local authorities often request TxDOT to sign for various traffic generators. The following guidelines apply.

Outside city limits TxDOT erects signs for generators that meet the criteria established in Appendix D of the *TMUTCD*.

Inside city limits:

- ◆ TxDOT erects signs for tourist information centers, historic districts, schools, etc. that meet the criteria for signing traffic generators shown in the *TMUTCD* when space is available.
- ◆ Cities may erect such signs on conventional highways and frontage roads of freeways, provided they are agreed to by TxDOT and they do not conflict with or obstruct existing signing. (This is presently covered in municipal maintenance agreements.)
- ◆ Signs placed by the city must not be attached to existing TxDOT supports.

Commercial Names

Traffic generators that meet the guidelines and have proper nouns such as “Ford Park” often hint at commercial signing. In this case the Ford Motor Company purchased the rights for the name of the facility, an entertainment center with various attractions. In these cases, TxDOT signs for the official name, regardless of its apparent commercial implication. On the other hand, a message such as “Sponsored by Ford Motor Company” would be deemed as advertising and would not be permitted under the standard set forth in the *TMUTCD*, Chapter 1A: “Traffic control devices or their supports shall not bear any advertising message or any other message that is not related to traffic control.”

Seasonal and Special Events Signing

Temporary signing on various routes to seasonal or special events attracting a large number of motorists should be provided similar to that for permanent generators. All temporary special-events signing must meet the requirements of Title 43 of the Texas Administrative Code (TAC), Section 22.15 and be approved by the Maintenance Division.

Airports

In 1988 there was considerable interest in trailblazing routes to international airports serving metropolitan areas from central business districts and convention center locations. The result of this effort was the guidelines for such ground-mounted signs (I-5 series) described in the *TMUTCD* and overhead signs described in the *Traffic Control Standard Sheets*. Cities were asked to add signs on their street system to enhance the state route signs.

In cases where there is more than one international airport, a name plaque may be added above the airplane symbol sign to define which airport was being signed.

All of these signs should continue to be maintained.

Offices of Elected US and State Officials

Districts may erect modified D1 series guide signs with recommended 6-inch letters on conventional highways to indicate the local offices of U.S. and state representatives and senators in accordance with the criteria for state and federal government facilities outlined in the *TMUTCD*. The name of the elected official should be used on these signs. The representative or senatorial district number may also be included on the sign, but should not replace the name of the official. Phone numbers and physical or Web addresses are not allowed on these signs. The font size may be reduced if space limitations restrict the overall size of the sign.

The signs should be erected only when requested by the elected official. The distance restrictions in the signing criteria should be strictly followed. The signs may be erected on *conventional highways only*. Freeway and expressway main lane signing should be limited to the types of traffic generators listed for freeways. (Freeway frontage roads are considered conventional highways.)

Texas Lottery Claim Centers

Districts should erect D1 guide signs for Texas Lottery claim centers on conventional highways in accordance with the criteria for state and federal government facilities outlined in the *TMUTCD*. When a lottery claim center is located in an existing comptroller's office and there is an existing sign on the state system for COMPTROLLER OF PUBLIC ACCOUNTS, the lottery claim center sign should be mounted below it.

If the center is off-system and on a city street, districts should work with the city to have the sign erected at city or comptroller's expense.

Section 10

State Parks

Introduction

TxDOT provides an extensive system of guide signs (D7 series) for state parks.

See *Standard Highway Sign Design for Texas* and the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* for sign details. Brown background color is used for recreational, cultural interest, and historical areas signing.

Sign Placement

Districts should make sure signing is compatible with the information shown on travel maps issued by TxDOT. On these travel maps, each park is listed and a “near city” is shown. Therefore, as a minimum, each park should be signed from the “near city” without regard to distance, number of routes, or annual attendance. This signing should originate on the closest major route(s) in the “near cities.”

Because of park attendance or other factors, signing for a park may extend beyond the “near city.” In addition, if a more direct route to the park is available from a location other than the “near city,” signing from this location is also encouraged.

Section 11

Public Beaches

Introduction

Senate Concurrent Resolution 46 of the 66th Texas Legislative, Regular Session, requested TxDOT to sign for free beach accessways and free beach-user parking areas. Minute Order No. 76653 dated January 23, 1980 directed the Engineer-Director to sign for warranted locations.

This section provides guidelines to administer this policy. Standard designs for the public beach access and parking signs (D55 and D56 series) are included in *Standard Highway Sign Designs for Texas*. Brown background color is used for recreational, cultural interest, and historical areas signing.

Access Roads

Public beach access roads should be signed with an advance sign 0.25 to 0.5 miles in advance of the intersection and a directional sign at the intersection.

A series of closely spaced access roads may have a combined advance sign with the text “NEXT XX MILES.” In such a case, the access roads should be numbered sequentially, and the number shown on each directional sign.

Parking Lots

When the public beach parking lot entrance fronts directly on a highway route, one advance sign should be erected 700 to 1500 feet in advance of the entrance, with a directional sign at the entrance. Multiple lots in the same vicinity with several access points on the same highway route should be numbered sequentially, and the number should be indicated on the appropriate signs.

Funding of Signs

Funding for public beach access and parking signs comes from the appropriate district account.

Section 12

Wildlife Viewing Areas

Introduction

The “Watchable Wildlife Project,” coordinated by the Texas Parks and Wildlife Department (TPWD), has identified certain sites throughout the state as accessible wildlife viewing sites. The wildlife sites are described in the *Texas Wildlife Viewing Guide*, published by TPWD.

To promote environmental and ecological awareness and to help the public find the wildlife sites, TxDOT installs and maintains WILDLIFE VIEWING AREA signing (D7-12 and D7-13). See *Standard Highway Sign Designs for Texas* for sign details.

Signing Standards

The WILDLIFE VIEWING AREA signing should correspond to the directions given in the *Texas Wildlife Viewing Guide*.

The 48 × 30 inch WILDLIFE VIEWING AREA sign should be placed at the nearest major intersection, and the 18 × 18 inch binocular-logo sign with supplemental arrow plaque should be used as necessary.

For sites on TxDOT right-of-way property, the actual site location may be signed with the binocular logo. Signing should *not* be used in locations where stopping to view wildlife could be hazardous. Signing required at off-right-of-way locations is financed and installed by others.

Many of the locations named in the *Texas Wildlife Viewing Guide* are state parks or other identifiable areas that may already be signed. In these cases, no additional signs are necessary. The existing guide signing for these areas, together with the guide directions, should normally suffice for guiding the motorist to these viewing areas.

Examples of a signed location and a complete list of Watchable Wildlife sites by district may be obtained from the Traffic Operations Division.

Section 13

General-Services Signs

Introduction

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* contains guidelines for businesses qualifying for general-services signing, both on freeways and conventional highways. This section expands and elaborates on the use of these signs.

Expanded Use on Conventional Highways

As a result of the emphasis on removing illegal advertising signs adjacent to highways, TxDOT has received complaints from businesses that without these advertising signs, motorists are unaware of their services. Often these businesses provide necessary motorist services (GAS, FOOD, LODGING, and CAMPING) for which general-services signs (D9 series) can be provided by TxDOT. General-services signs for qualifying businesses may help alleviate business owners' complaints of reduced retail sales due to the removal of illegal advertising signs.

In the past general-services signing (E20 series) was primarily used on freeways and expressways where an exit maneuver had to be made before the services became visible to motorists. General-services signing is usually unnecessary on conventional highways where the businesses are adjacent to and directly accessible from the highway. However, some businesses providing motorists services which are not directly visible or accessible from a conventional highway may be signed (D9 series) as referenced in the *TMUTCD*, Section 2E.51. Districts should consider greater use of general-services signs in areas where motorist services are infrequent.

Verification

When requests are received for additional signs for motorist services (either on conventional highways or expressways and freeways), districts should verify that the service requesting signing meets the guideline criteria contained in the *TMUTCD*.

For campgrounds, the verification of acceptable drinking water supplies can be accomplished by contacting the regional engineer of the Texas Department of Health.

For hospitals, determination of the emergency medical facility's "level" may be found by contacting TRF, which has a list of qualifying hospitals supplied by the Texas Department of Health.

Section 14

Radio Information Signs

Background

The Federal Communications Commission (FCC) reserves certain AM broadcast frequencies for “travelers information stations.” The stations normally operate over a 2 to 10 mile radius and may broadcast information on:

- ◆ traffic and travel advisories
- ◆ availability of lodging, rest stops, and service stations
- ◆ descriptions of points of interest
- ◆ highway construction information
- ◆ on-site disaster information
- ◆ local emergency notifications
- ◆ weather (rebroadcasts of NOAA Weather Radio information).

Specifically *not* allowed on the broadcasts are:

- ◆ identification of commercial names
- ◆ commercial messages.

Districts may contact the Traffic Operations Division (TRF) for information on obtaining a license to operate a travelers information stations. The stations are also discussed in the *Radio Operations Volume* of the *Traffic Operations Manual*.

Signing

TxDOT installs and maintains signs identifying travelers information radio stations (D12-1 and D12-3) with the lead messages shown in the following table.

Signing for Travelers Information Radio

Lead Message	Note
TOURIST INFO	Tourist Information radio stations are usually purchased and operated by a local chamber of commerce, convention center, or tourist bureau.
WEATHER INFO	Weather Information Radio has had only limited use in far west Texas. The <i>TMUTCD</i> provides signing criteria for these stations.
HIGHWAY ADVISORY	Highway Advisory Radio (HAR) may be used on selected construction projects to enhance traffic operations.

Section 15

Reference Markers and Mileposts

Reference Markers

The Highway Reference Marker Location System has replaced the Milepost Marker System on all highways *except* the interstates. For installation and numbering system requirements for reference markers, see the *Texas Reference Marker System User's Manual*. For specifications for reference markers (D10 series), see the *Traffic Control Standard Sheets*.

Reference markers should be accurately maintained so that reliable data can be gathered.

Milepost Markers

The Milepost Marker System remains in use on interstate highways (using the D10 series), because it is the national standard for the Interstate Highway System. Milepost markers, like reference markers, should be accurately maintained. The *TMUTCD* describes the applicable standards.

Section 16

Memorial Marker and Named Marker Highways and Structures

Introduction

A city, county, or the Texas Legislature may assign a memorial or other identifying designation to part of the state highway system (including a highway, bridge, or other structure). In referring to highways and structures so designated, TxDOT uses the modifiers “memorial marker” and “named marker.”

Highways. Normally identifying signs or special markers for memorial marker and named marker highways are not placed so as to be read from the highway main lanes, except in special cases specified by the Texas Legislature. They are typically placed on either end of the highway and at 75-mile intervals. They are usually placed in rest or picnic areas or turnouts. They are usually small and designed to be read by people on foot. The names never appear on intersecting cross streets or highways (this is covered in Section 18, “Street-Named Highways”). For more information on signing standards, see “Policy Guidance for Signing,” “Sign Placement Standards,” and “Sign Design Standards” later in this section. For exceptions see “Exceptions to Signing Standards” later in this section.

Bridges and Other Structures. Memorial marker and named marker bridges and other structures are usually single bridges, interchanges, or even pedestrian bridges that have been given a memorialization or name by a city, county, or the Legislature. In most cases, the identifying instrument is a small marker or sign placed off the main lanes of the associated highway, typically in a parking or pedestrian area for reading by people on foot. For more information on signing standards, see “Policy Guidance for Signing,” “Sign Placement Standards,” and “Sign Design Standards” later in this section. For exceptions see “Exceptions to Signing Standards” later in this section.

Legal Basis for Naming and Signing

Texas Transportation Code, Chapter 225, Subchapter A, grants local governments the authority to confer memorial or other names on state highways and portions of the state highway system and establishes how this is coordinated with TxDOT. TxDOT is specifically prohibited from naming or otherwise designating a highway, street, or bridge with any name or symbol other than the “regular highway number.” Subchapter B covers specific memorial marker and named marker highways established by the Legislature.

Title 43, Texas Administrative Code, Section 25.9, provides the rules for implementing Chapter 225 of the Texas Transportation Code.

Records Management

Memorial marker and named marker highways, bridges, interchanges, and other structures and historic routes are recorded and tracked by the Traffic Operations Division (TRF).

Overlaps. TRF strives to prevent overlaps of memorial marker and named marker routes. Overlapping is defined as two names covering the same highway route or corridor. Memorial marker and named marker bridges, structures, or interchanges on a memorial marker or named marker route or corridor do not constitute an overlap.

Designation Process Varies

The process for designating and signing memorial marker and named marker highways and structures varies depending on whether the action is accomplished through local action (by a county or city) or through Legislative action. Descriptions of both processes follow under separate subheadings.

Designation through Local Action

The following table describes the process by which a county, city, or public group designates a memorial marker or named marker highway, bridge, or other structure on the state highway system.

NOTE: The “requestor” mentioned in this process, which may be any interested party, must work through a city or county as the official sponsor.

Designation of Memorial or Named Highway or Structure through Local Action

Step	Responsible Party	Action
1	Requestor	Submits initial general request to the appropriate TxDOT district office. This general request is simply the basic information concerning the highway, bridge, or other structure and the proposed name.
2	District office	Checks with TRF to verify that the highway or structure does not already have a name. If the facility is not already named and the requestor is still interested, then the district advises the requestor to work through the county or city. The district should provide the requestor with general information concerning the process, including the requirements and standards contained in this section.
3	City or county	Passes the necessary resolution or ordinance and furnishes it to the district along with the details of the marker, plaque, or sign (size, proposed wording, color, and any other pertinent information).
4	District office	Investigates to see if satisfactory space is available for the markers, plaques, or signs to be located safely and without interference with maintenance activities. For further details on signing standards and exceptions, see “Policy Guidance for Signing,” “Sign Placement Standards,” and “Sign Design Standards” later in this section.
5	District office	Forwards the information to TRF for final approval of the size, color, and wording.

(continued...)

Designation of Memorial or Named Highway or Structure through Local Action

Step	Responsible Party	Action
6	TRF	Reviews the request, and if the request is acceptable, records the name and limits (if a highway is involved) and prepares an approval memo for the executive director's signature. See "Approval of Names" later in this section.
7	TxDOT executive director	Signs the approval memo, which is then forwarded to the district office.
8	District office	Negotiates an advanced funding and general terms agreement with the sponsor. (The sponsor gets one original and the district retains one original.) See "Financing and Agreement" following this table.
9	District office	Installs the markers, plaques, or signs after the advanced funding arrives and as time and conditions permit.

Financing and Agreement. The requestor must pay for the sign, marker, or plaque and its installation through the sponsor. The sponsor (county or city) must sign an advance funding and general terms agreement with the state. The relevant agreement — "Named Marker or Memorial Marker Highway Sign Agreement" — can be accessed through the TxDOT intranet at <http://crossroads/org/cso/standard_contract_forms.htm#Traffic> under "Traffic."

Replacement of Signs and Maintenance of Grounds. If the marker, plaque, or sign is damaged or needs replacing, the sponsor must provide a new or refurbished marker, plaque, or sign upon notification by TxDOT. Failure to do so within a reasonable time (usually 6 months) will result in the removal of the marker, plaque, or sign in accordance with the terms of the agreement. The agreement can be revised if the length of time is not reasonable due to the frequency of the sponsor's official meeting schedules. TxDOT maintains the grounds where the marker, plaque, or sign is displayed.

Designation through Legislative Action

The Texas Legislature may designate a memorial marker or named marker highway, bridge, or other structure on the state highway system.

After legislation is passed, TRF notifies the district or districts involved and develops a legislative implementation plan. The district or districts work with TRF to erect the signs.

Financing. Unless the enabling legislation provides for a grant or donation through a private entity to assist in financing the construction and maintenance of the sign or signs, TxDOT bears all expenses associated with the signing.

If a grant or donation will be provided, then the process follows the "Instructions for Acceptance of Donations" outlined in Chapter 10 of the *Contract Management Manual*. After the private entity provides the funding, TxDOT lets a contract or uses state forces to install the markers (signs). The district should not accept any checks until the Commission approves the donation and the Donation Agreement (if required) is executed.

Approval of Names

TxDOT has the authority to review the text and approve or disapprove the marker, plaque, or sign message for memorial and name designations proposed by cities and counties.

Use of Commercial Names. If the text is determined to border on commercial advertising (such as “Ford Motor Company Freeway”) it would be turned down because the *Texas Manual on Uniform Traffic Control Devices* (TMUTCD) forbids commercial advertising. However, if the designation were “Henry Ford Freeway,” for example, then TxDOT would approve it. The name of a person, whether dead or alive, is acceptable. Note that the policy against commercial names for memorial marker and named marker highways is more restrictive than that applied to signing for traffic generators (see “Commercial Names” in Section 9 of this chapter).

Name Must be Inoffensive. All designations must be reasonably inoffensive to the public as determined by TxDOT.

Policy Guidance for Signing

The TMUTCD contains the following guidance (Section 2E.08):

Freeways and expressways should not be signed as memorial highways, except in special cases specified by the Texas Legislature. If a route, bridge, or highway component is officially designated as a memorial, and if notification of the memorial is to be made on the highway right of way, such notification should consist of installing a memorial plaque in a rest area, scenic overlook, recreational area, or other appropriate location where parking is provided with the signing inconspicuously located relative to vehicle operations along the highway, unless otherwise provided for by state statute.

As an option, the TMUTCD suggests the following:

If the installation of a memorial plaque off the main roadway is not practical, a memorial sign may be installed on the mainline.

The TMUTCD lists the following standards where memorial signs are installed on the mainline:

- ◆ Memorial names must not appear on directional guide signs.
- ◆ Memorial signs must not interfere with the placement of any other necessary highway signing.
- ◆ Memorial signs must not compromise the safety or efficiency of traffic flow.

(continued...)

Policy Guidance for Signing *(continued)*

The TMUTCD further requires that memorial signing be limited to one sign at each end of the designated limits, and at such intermediate sites that markers are approximately 75 miles apart.

The TMUTCD offers similar guidance for conventional roads and streets in Section 2D.48.

Sign Placement Standards

Frequency of Markers for Highways. For memorial marker and named marker highways, Texas statutes allow for intermittent markers every 75 miles and one marker on each end of the designated highway.

EXAMPLES:

- ◆ ***EXAMPLE 1:*** A designated highway is 140 miles long, so it gets one marker at each end and one in each direction at the 75 mile point from each end approximately.
- ◆ ***EXAMPLE 2:*** A designated highway is 100 miles long, so it is eligible for a marker on each end and the 50 mile points for each direction. This highway technically would have the intermittent markers at 75 miles, but it makes more sense in this case to place the markers midway as long as the entire length is more than 75 miles. However, the literal interpretation can also be applied if necessary and if the sites are available.

The main-lane signs, when used, should be located at a safe and non-obtrusive site just after the beginning of the designated highway, typically within $\frac{1}{4}$ to $\frac{3}{4}$ mile if practical. Markers in rest areas, scenic areas, turn-outs, etc. may be located wherever practical. Sometimes only one marker will be erected, depending on the sponsor's request. Signs should not be posted on the main lanes, unless it is impractical to do otherwise. The exception is for routes designated by the Legislature. In this case a precedent has been set to install signs on the main lanes always and to follow other specific instructions contained in the statute.

If More Than One Numbered Highway Is Involved. Occasionally a memorial marker or named marker highway follows the path of more than one numbered highway. In such cases, each differently numbered segment of the named highway will receive a marker at each end and, if a segment is more than 75 miles in length, intermittent markers every 75 miles.

For Bridges and Other Structures. For memorial marker and named marker bridges and other structures the marker should be installed out of sight of the main lanes, if practical. Generally only one plaque or marker is furnished by local authorities for installation in a viewing area. Sometimes one sign on each approach is required if the legislature is involved, or if there are no practical viewing areas, then a sign is required on the main lanes.

Sign Design Standards

For Non-Highway Viewing. Memorial marker and named marker highway and structure signs not facing the main lanes (those mounted in rest areas, picnic areas, turnouts, parking areas, etc.) should be simple in design and relatively small. If a sign is used, it should have a green background with white legend. If a plaque or marker is used, it should have a black or green background with a white, aluminum, or silver legend. Some variation may be allowed as long as the design is in good taste. None of these signs or markers (plaques) located off the main lanes need to be reflective. The legend size must be for pedestrian reading, not for high speed traffic viewing, generally one-inch letters or smaller. They should be limited in size to what will fit on one pipe support. Signs with breakaway features should be used if subject to impact by vehicles traveling more than 10 mph. Plaques and markers need to be protected or placed well out of the clear zone, since these are not breakaway tested.

For Highway Viewing. Memorial marker and named marker highway and structure signs mounted for viewing from highway lanes fall under the category of general information signs. They must be reflective with green background and white legend. The lettering standard, varies according to the highway type, as follows:

Signs Mounted for Viewing from Highway Lanes
(Memorial Marker and Named Marker Highways and Structures)

Highway Type	Typical Lettering Standard
Freeways (including Expressways)	Clearview font with uppercase sized at 13.3 in. (Clearview font automatically sizes the lowercase at 10 in.) <i>NOTE:</i> This is essentially the same size as the place name for supplemental freeway signs in the current TMUTCD; however, the TMUTCD does not mention expressways or the lowercase sizes.
Conventional Highways	Clearview font with uppercase of 8 in., lowercase 6 in.

Exceptions to Signing Standards

Signs for Designated Highways. For memorial marker and named marker highways, exceptions to the above sign placement standards are made in accordance with legislative requirements or where there are no other suitable alternatives. Occasionally legislation has called for signs on the main lanes and at specific spacings. In these cases the highway number and memorial or name designation are both on the same sign and on the main lanes.

Signs for Bridges and Other Structures. For memorial marker and named marker bridges and other structures, exceptions to the above sign placement standards are made in accordance with legislative requirements or where there are no other suitable alternatives. For example, in special cases involving a legislative request or lack of a practical viewing area, a general information sign carrying the name of the structure is installed on the main lanes.

Section 17

Historic Routes

Introduction

A county historical commission working through the Texas Historical Commission may assign an historic route designation to a farm-to-market or ranch-to-market highway. Signing for such routes is placed at the beginning and end of the highway (TxDOT practice allows a maximum of two signs per route). Signs are reflective and have a brown background and white legend. For further details on signing standards, see “Sign Placement and Standards” later in this section.

Legal Basis for Naming and Signing

Texas Transportation Code, Chapter 225, Subchapter A, establishes the process for designating historical routes through the Texas Historical Commission in coordination with TxDOT.

Title 43, Texas Administrative Code, Section 25.9, provides the rules for implementing Chapter 225 of the Texas Transportation Code.

NOTE: TxDOT is specifically prohibited from naming or otherwise designating a highway, street, or bridge with any name or symbol other than the “regular highway number.”

Records Management

Historic routes are recorded and tracked by the Traffic Operations Division (TRF).

Designation Process

The process by which a farm-to-market or ranch-to-market road may be designated as a historic route is as follows:

Designation of Historic Routes

Step	Responsible Party	Action
1	County historical commission	Applies to the Texas Historical Commission and TxDOT for marking an FM or RM road with an historic name. The application should include evidence showing that the name has been in common usage in the area for at least 50 years, and must be supported by affidavits from at least five long-time residents of the area.
2	Texas Historical Commission	Certifies, based on the evidence submitted by the county historical commission, that the name has been in common use in the area for at least 50 years
3	Texas Historical Commission	Submits a request to TxDOT along with the certification and supporting documents and the name of the historic route.
4	TRF	Reviews the certification and sends it to the appropriate district office.

(continued...)

Designation of Historic Routes

Step	Responsible Party	Action
5	District office	Contacts the county historical commission that originally applied for the designation and initiates an advanced funding and general terms agreement, which requires that the county historical commission pay the cost of preparing, installing, and maintaining the signs.
6	County historical commission	Executes the agreement and provides the necessary funding to the state. See “Agreement” following this table.
7	District office	Prepares and installs the signs indicating the road’s historic name (see “Sign Placement and Standards” later in this section), then informs TRF and the county historical commission that the signs have been installed.

Agreement

Before TxDOT installs an historic route sign on the right of way, an executed “County Historical Commission Historical Route Sign Agreement” is required. This agreement can be accessed through the TxDOT intranet at http://crossroads/org/cso/standard_contract_forms.htm#Traffic under “Traffic.”

Sign Placement and Standards

TxDOT fabricates and erects a maximum of two signs per historic FM or RM route.

Sign Placement. Historic route signs must be mounted independently in accordance with TxDOT installation procedures and at a suitable location near each end of the route. The signs *must not* be erected within 1,000 feet of an intersection. The signs *must not* be mounted on the same support with other traffic control signs. See Figure 7-7.

NOTE: The highway route markers must *not* contain the historic route name.

Sign Standards. Historic route signs must be reflective and fabricated in accordance with TxDOT specifications and procedures. The sign must have a brown background with a white border and white, 8- or 6-inch Clearview letters (8-inch preferred). Overall dimensions may vary; however, it is recommended the text be limited to 3 lines. Figure 7-6 shows a sample sign layout, and Figure 7-7 shows a suggested signing schematic.

(continued...)

Sign Placement and Standards (continued)

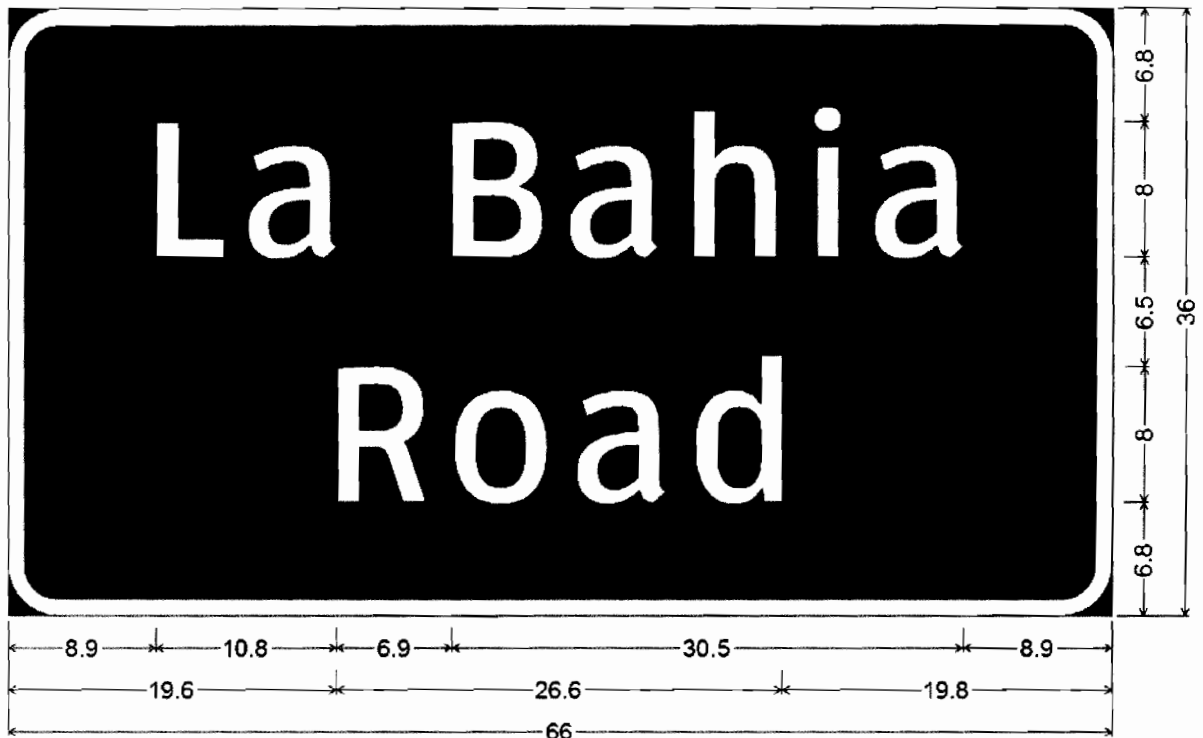


Figure 7-6. Typical historic route sign. Eight-inch letters are preferred, but 6-inch letters are acceptable.

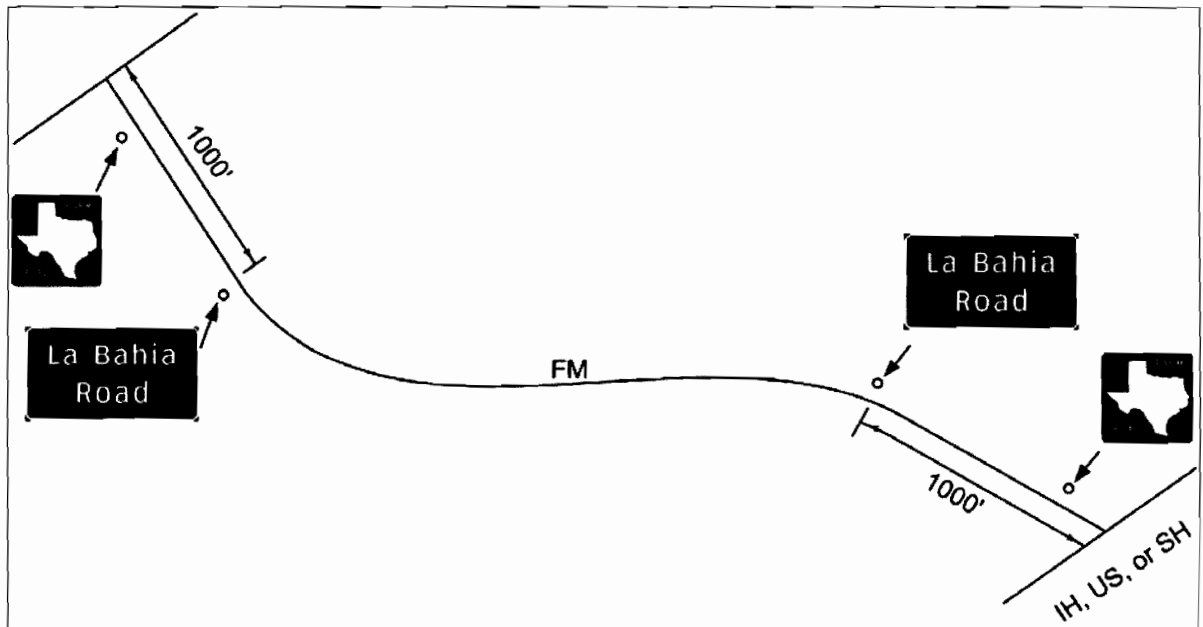


Figure 7-7. Layout and suggested schematic for historic route signs.



Section 18

Street-Named Highways

Introduction

Street-named highways bear names that only appear on the cross streets or intersecting highways. These commonly appear as street signs mounted at intersection corners or on traffic signal mast arms. However, when a freeway or expressway crosses a street-named highway, the name may appear on guide signs directing motorist to the street-named highway. These street names never appear on or visible to the street-named highway itself.

Legal Basis for Naming

Texas Transportation Code, Chapter 311 contains “General Provisions Relating to Municipal Streets.” Sections 311.001–003 grant municipalities control over their streets. This control extends to assigning street names to highways within their jurisdiction.

NOTE: Counties are not allowed to “street name” numbered highways except in unusual circumstances where mail delivery is a factor.

NOTE: TxDOT is specifically prohibited from naming or otherwise designating a highway, street, or bridge with any name or symbol other than the “regular highway number.”

Records Management

Street-named highways are not tracked by TRF. Each district should keep track of street-named highways within its boundaries.

Designation Process Varies

The process for designating and signing a street-named highway differs depending on whether it is done by a city or the Legislature. Descriptions of both processes follow under separate subheadings.

Designation by a City

A city may assign a street name to a portion of highway within its limits. Counties may not assign street names to numbered highways, except in unusual circumstances where mail delivery is a factor.

The process by which a city normally designates a portion of highway within its limits with a street name is as follows:

Designation of Street-Named Highways

Step	Responsible Party	Action
1	City	Enacts a resolution or ordinance naming the highway with a street name and sends the TxDOT district office a letter of notification and a copy of the official document. If more than one jurisdiction is involved, then each jurisdiction must provide a notification letter and copy of the official document.
2	District office	Sends the document to TRF-TE for review.
3	TRF	Reviews the name for possible problems.
4	District office	May change out guide signs on crossing freeways, expressways, etc. in accordance with payment conditions outlined following this table and after the execution of any necessary agreement. For details on signing see "Signing Practices" later in this section.

Payment for Street-Name Signs. Street-name signs on corners and frontage roads are the responsibility of the city. Street name signs on special advanced overhead-pole structures and traffic signal poles are paid for by TxDOT if the traffic signal or advanced pole structure belongs to TxDOT, unless the existing Municipal Maintenance Agreement (MMA) states otherwise.

Payment for Guide Signing. If the street name change requires the replacement of existing guide signs or structures, TxDOT will ask the city to pay for the new signs and structures when both of the following are true:

- ◆ The total expected cost of the change is greater than \$500 *and*
- ◆ the existing affected signs and structures are not scheduled for replacement within two years.

Agreement. Generally if the cost of the changes will be more than \$500, an advance funding agreement is pursued (contact the Office of General Counsel (OGC), Contract Services Section for assistance). If an agreement will be pursued, first determine if a master advance funding agreement (MAFA) with the city exists by checking the "MAFA Spreadsheet (Local Governments currently in MAFA program)" at <<http://crossroads/org/cso/MAFAs.xls>>. Then proceed as follows:

If...	Then...
an MAFA exists	use the short-form agreement — "LPAFA for Voluntary Local Government Contributions to Transportation Improvement Projects with No Required Match."
an MAFA does not exist	use the long-form agreement — "AFA for Voluntary Local Government Contributions to Transportation Improvement Projects with no required match (No Federal/State Funding)."
Both agreement forms are available at < http://crossroads/org/cso/standard_contract_forms.htm >. Look under "Advance Funding Agreements" (AFA).	

Designation by the Legislature

The Legislature may assign a street-name to a highway. After such legislation is passed, TRF notifies the district or districts involved.

Financing. Unless the enabling legislation provides financing, TxDOT bears all expenses associated with the signing.

Signing Practices

Details for freeway and expressway guide signing for street-named highways are shown in Figure 7-8 through Figure 7-11.

Crossing Street Names on Bridges. On freeways and expressways in large urban areas, the crossing street name may appear on the crossing roadway bridge. This practice is allowed to assist motorists in using maps. These signs are usually a little smaller than the clearance signs on the bridges and located so they won't interfere with the clearance signs. These are not guide signs, but simply street signs mounted on bridges and paid for, installed, and maintained by TxDOT.

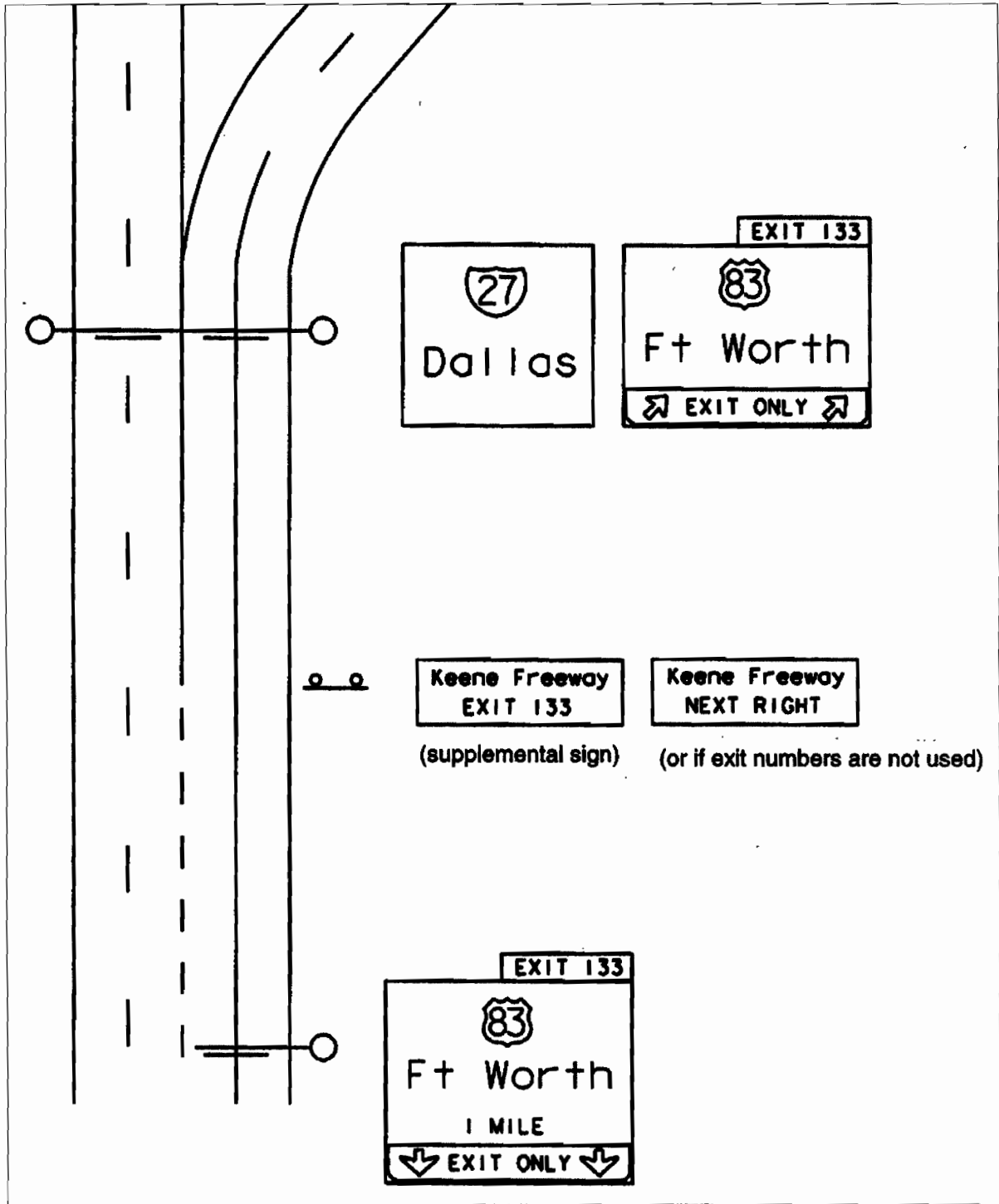


Figure 7-8. Signing on an expressway or freeway for a named intersected freeway route.
NOTE: A supplemental sign may be used only when space is available. Freeway name should only be used when name applies to entire length in urban area, even when more than one jurisdiction is involved.

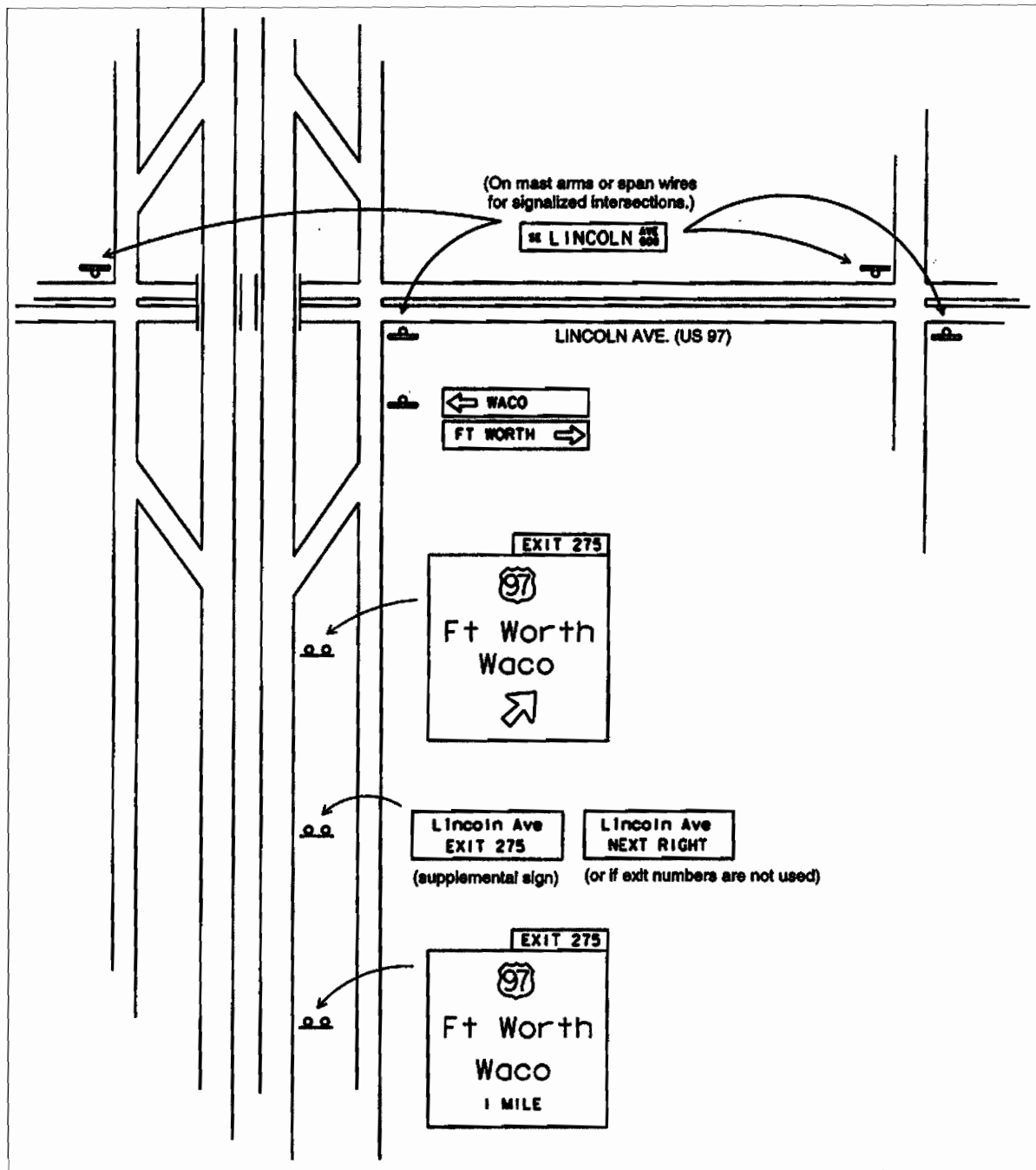


Figure 7-9. Normal case signing on an expressway or freeway for an intersected highway route that is a named city street. (For information on oversize street name signs at intersections, see Section 3 of this chapter.)

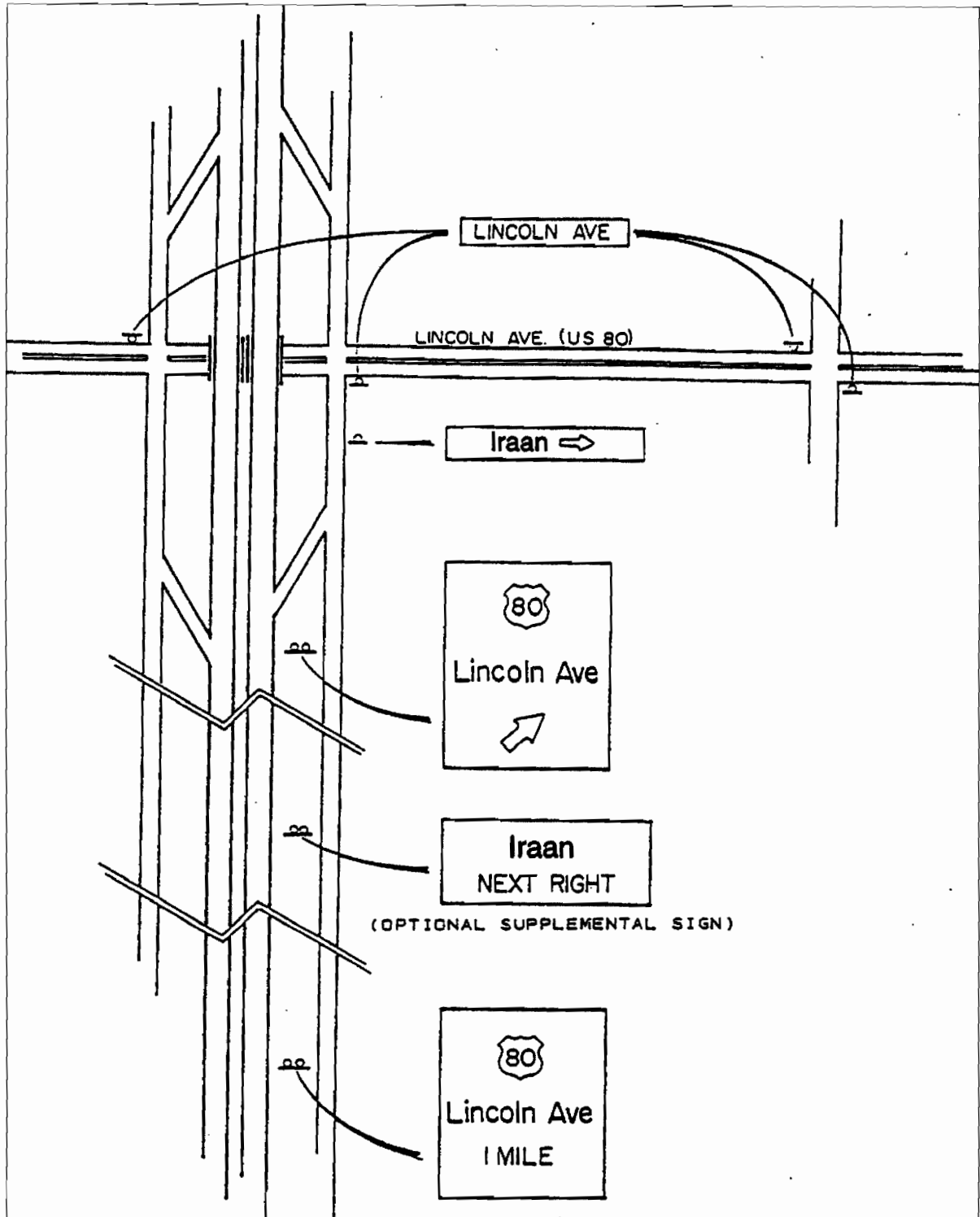


Figure 7-10. Special case signing on an expressway or freeway for an intersected highway route that is a named city street that is more significant than the destination name.

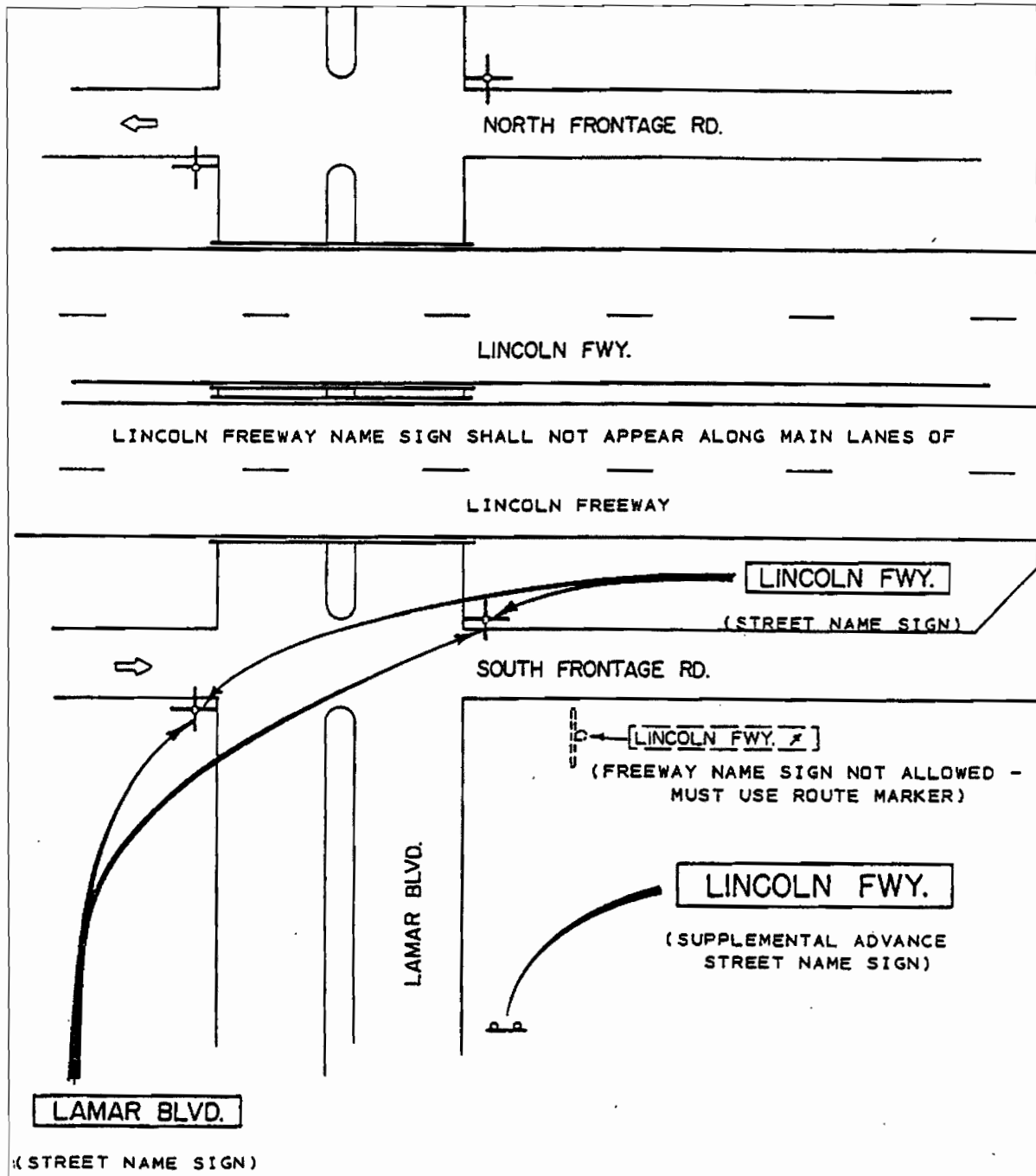


Figure 7-11. Street signs on city streets for a named freeway route.

NOTE: Street name signs are usually the city's responsibility under standard maintenance agreement.

Section 19

Historical Markers

Introduction

Historical markers are used to interpret, promote, and protect historic and cultural resources. Requests for markers are initiated through local county historical commissions and approved through the Texas Historical Commission (THC). TRF works with the THC to approve markers placed on TxDOT right of way. TxDOT provides advance and directional guide signs for all historical markers on TxDOT right of way outside of city limits on conventional highways.

Historical Marker Process Overview

All requests for historical markers made by the public should be directed to the local county historical commission. If the marker will be placed on TxDOT right of way, the process of approval and erection proceeds as follows:

Historical Marker Process — Request, Approval, and Installation

Step	Responsible Party	Action
1	County historical commission	Upon concurring with the request, applies to the Texas Historical Commission (THC). The necessary forms and instructions can be downloaded at http://www.thc.state.tx.us/markersdesigns/madmark.html .
2	THC	Reviews the request and, upon approval, sends a memorandum detailing the proposed historical marker and its wording, along with the marker number (from the Texas Historic Sites Atlas), job number, and contact person, to TRF.
3	TRF	Reviews the memorandum and associated data and, upon approval, sends a form memorandum, along with the marker and job number and Atlas number and name of contact person, to the appropriate district office.
4	THC	Provides the historical marker to the district.
5	District office	Works with the chairman of the local county historical commission to determine the actual placement location for the historical marker (see following segment on “Marker Placement”). The district installs the marker (see “Marker Design and Installation” later in this section) and also provides and installs advance and directional guide signs using the guidelines in this section and the <i>Texas Manual on Uniform Traffic Control Devices</i> (TMUTCD).

Marker Placement

The safety of the traveling public is a major priority in the location of the historical marker itself. The markers are not mounted on breakaway supports and have not been tested for vehicle impacts; therefore, they are to be considered non-breakaway. They should be located outside the clear zone or protected or not installed at all.

(continued...)

Marker Placement *(continued)*

TxDOT policy specifies that markers be located in roadside parks, at existing turnouts, or at a specially prepared turnout. The primary effort in locating these markers should be to utilize existing facilities. Where such cannot be done, locations should be selected that would require a minimum amount of improvement. In these instances, the usage by the public should determine the extent of development necessary. Often soil conditions will require only minor grading or a minimum amount of stabilization. Surfacing will be justified for very few marker facilities. TxDOT strives to cooperate with the historical marker program by placing markers in locations accessible to the public. Nevertheless, the scope of the program is such that the economic aspects deserve careful attention.

Marker placement can be discussed with the county historical commission.

Design and Installation of Markers

All Texas historical markers must conform to the standard design approved by agreement between TxDOT and THC. Free-standing markers consist of a one-piece aluminum marker welded to a 7-foot aluminum pole. The pole should have a mark indicating the depth to which the pole needs to be buried within the concrete foundation.

New markers are shipped directly from the foundry to the district. TxDOT only furnishes the foundation and the labor to install the marker.

Maintenance of Markers

The district maintains the grounds around the historical markers on TxDOT right of way.

If the historical marker is damaged or vandalized, THC is responsible for cleaning, repair, or providing a new replacement marker. The district should notify THC's chief historian of the need for maintenance (cleaning, etc.) or replacement. (THC's phone number is 512-463-5853.) THC then works directly with the local county historical commission, who is responsible for cleaning or replacing the marker. Replacement markers must conform to the approved standard design described under "Design and Installation of Markers" above.

Marker Numbers

As part of a statewide identification and reference system, the THC has assigned marker numbers (also called "Atlas numbers" because they are compiled in the Texas Historic Sites Atlas) to all historical markers.

State law (Chapter 442, Texas Government Code, Section 442.0065) requires that all advance and directional historical-marker guide signs that are newly installed or replaced on a maintenance basis include the relevant marker's identifying number. This requirement affects D7-6, D7-7, D7-8, D7-7a R(L), and related signs (see "Advance and Directional Signing Standards" later in this section).

(continued...)

Marker Numbers *(continued)*

Finding the Number. The best way to find the marker number for a sign being replaced on a maintenance replacement basis and which currently does not display a marker number is to use the THC's on-line Texas Historic Sites Atlas. The Atlas can provide a list of historical markers by county. Each marker's number is listed, along with other pertinent information such as text, site name, and address. To find a marker number, proceed as follows:

1. Go to <http://atlas.thc.state.tx.us>
2. Click on “**Enter the Atlas**” at the bottom of the page.
3. Under “Keyword and Phrase Search,” set the following search criteria:
 - Under “Word(s) or Phrase(s),” enter “**Full Record.**”
 - Under “Scope of Search,” select the “**County**” button and then select a county name from the pull-down list.
 - Under “Record types to view,” uncheck everything except “**Historical Markers.**”
4. Click the **Search** button. The “full record” of historical markers for the county you selected appears in the left frame of the screen.
5. Find the marker you're looking for and click on “**Historical Marker.**” Information about the marker appears in the right frame of the screen with the marker number listed at the very top.
6. Verify the location by clicking on “**Location Map,**” if available.

NOTE: The web site lists *all* historical markers — off-system, on-system, and those within city limits.

Booklet Available

Also, in compliance with the same law, the Travel Division (TRV) publishes a booklet, *Texas Historical Markers*, providing brief descriptions (including Atlas marker numbers) of those historical markers located on on-system conventional highways outside of cities. The booklet is available to the public for free, and will be updated as determined by TRV. TRF maintains a database for TxDOT use with these historical markers and their corresponding numbers that are or will eventually be signed for on conventional highways. This database is used to compile the booklet.

Advance and Directional Signing Standards

Advance and directional historical marker guide signs provide motorists guidance to historical marker sites on TxDOT's conventional highway system outside of city limits. Only historical markers within the right of way of an on-system conventional highway are eligible to be signed for by TxDOT.

All historical markers installed after November 1, 1962, should have advance guide and directional signing. As explained earlier, all new or replaced historical-marker guide signs must display the Atlas marker number (see following segment on "Advance and Directional Sign Details").

Placement. Generally the advance guide sign is placed approximately one mile before the directional sign. If the roadway is one lane in each direction and undivided, then at the engineer's discretion, the directional signs at the marker may be mounted on one side of the road, back-to-back.

Markers Within Cities. Although TxDOT does not sign for individual historical markers within incorporated cities or those not on TxDOT right of way, the HISTORICAL MARKERS IN CITY signs, which are furnished by THC, are used to alert motorists that a city has historical markers within its city limits. This sign should be incorporated into the City Pride Sign Program (see Chapter 8, Section 9, for information).

If a city incorporates an existing historical marker into its city limits, which is on one of TxDOT's conventional highways, the directional and advance historical marker guide signs should be removed at the end of their useful life. TRF should be notified (including a brief description of the historical marker content along with the marker number) by memorandum or e-mail when these signs are removed. TRF will notify TRV so that TRV can update their booklet.

Advance and Directional Sign Details

Details of various advance and directional historical marker guide signs with Atlas marker numbers are shown in Figure 7-12 through Figure 7-14.

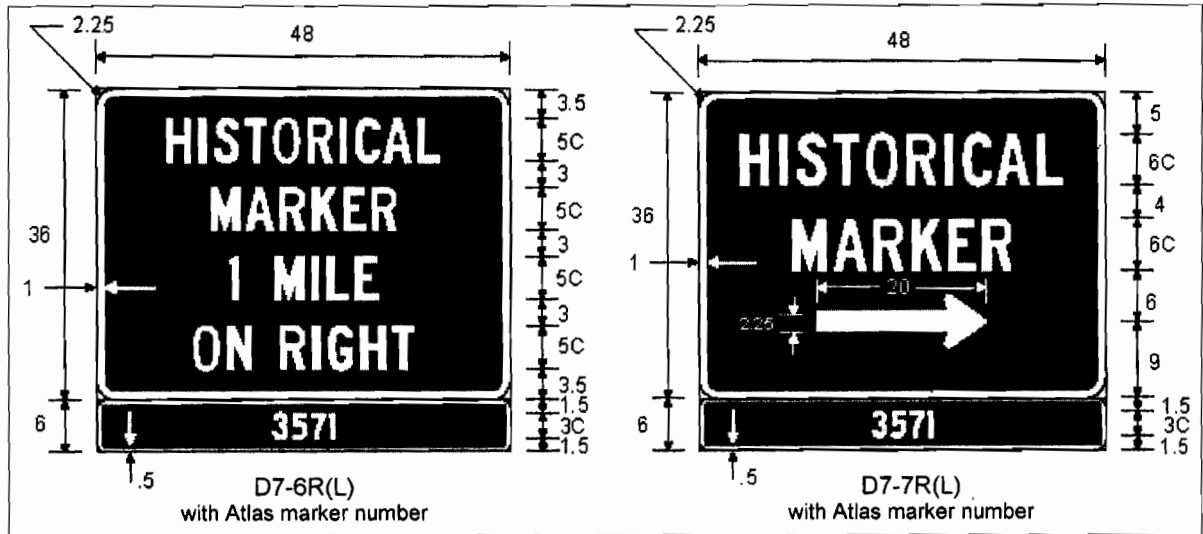


Figure 7-12. Advance and directional historical marker guide signs with Atlas marker numbers.

Colors: legend — white (retroreflective); background — brown (retroreflective)

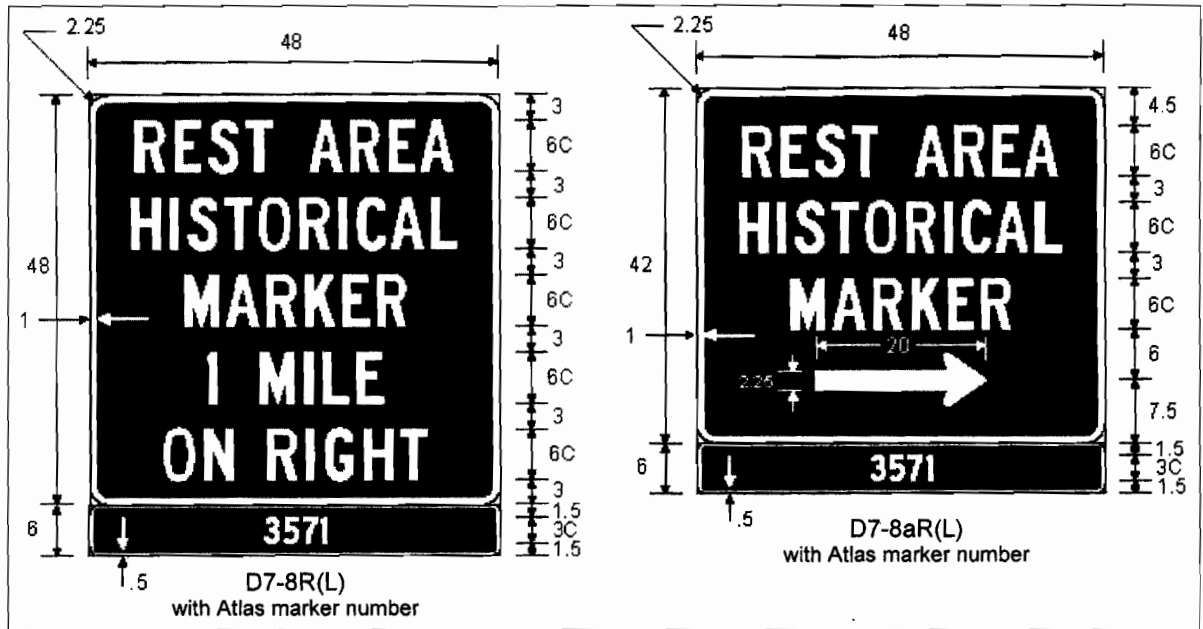


Figure 7-13. Advance and directional rest area historical marker guide signs with Atlas marker numbers.

Colors: legend — white (retroreflective); background — blue (retroreflective)

(continued...)

Advance and Directional Sign Details (continued)

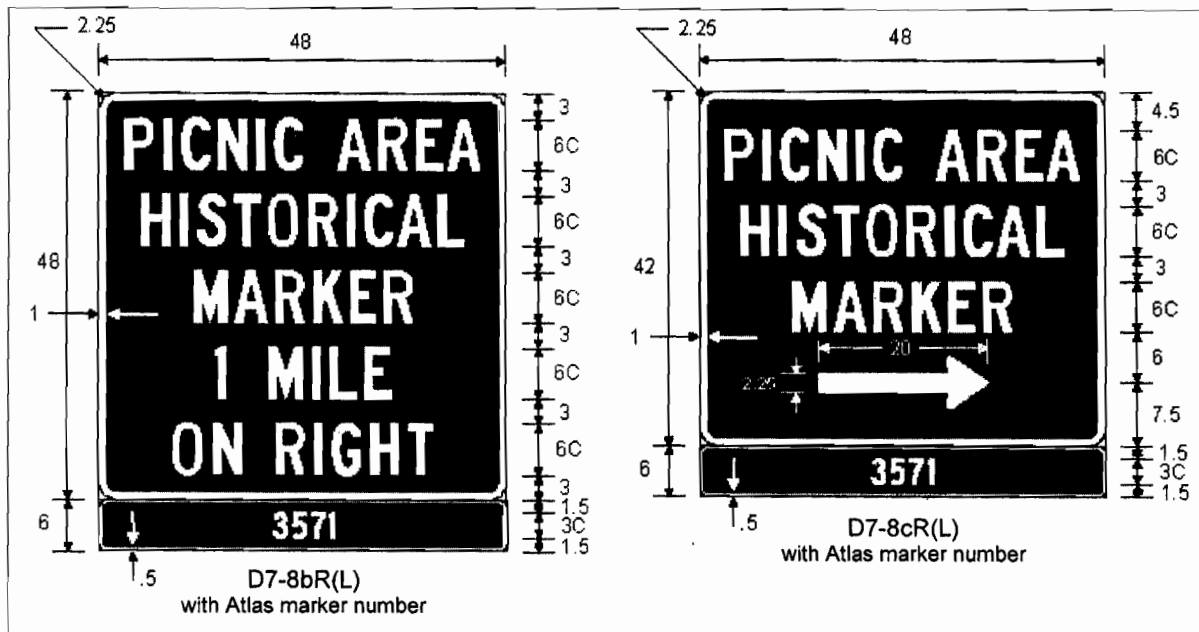


Figure 7-14. Advance and directional picnic area historical marker guide signs with Atlas marker numbers.

Colors: legend — white (retroreflective); background — blue (retroreflective)

Section 20

County Line Signs

Expressways and Freeways

County line signing for expressways and freeways should conform to the *TMUTCD*. An I-2d type sign design should be used, incorporating a recommended minimum 8-inch letters. Dimensions for the I-2d type sign can be found in *Standard Highway Sign Designs for Texas*.

Placement

On low-volume farm to market roads, county line signs may be mounted back-to-back. High volume farm to market roads and U.S. highways should use independent mounts for county line signs in each direction.

Section 21

WELCOME TO TEXAS Signs

Introduction

TxDOT installs WELCOME TO TEXAS signs on each interstate, U.S., and state highway entering the state. Materials for these signs may be obtained from the General Services Division's regional supply centers.

Standards

Texas Transportation Code, Section 201.617 requires the following elements on the WELCOME TO TEXAS sign:

- ◆ a depiction of the state flag
- ◆ the phrase "Drive Friendly — the Texas Way"
- ◆ the phrase "Welcome to Texas — Proud Home of President George W. Bush."

Figure 7-15 shows the WELCOME TO TEXAS sign. The sign background is reflective interstate green. The legend and border are reflective white. The flag is red, white, and blue, as per the state flag. The "Proud Home" plaque may be a separate attachment.



Figure 7-15. WELCOME TO TEXAS sign for interstate highways.

Sign Size. The size of the sign and the accompanying plaque depends on the type of highway on which it is used, as shown in the following table.

Welcome to Texas Sign Sizes		
Highway Type	Parent Sign	Plaque
Interstate	18' × 11'	18' × 1.5'
U.S. and State Routes	12' × 8'	12' × 1'
FM Routes	6' × 4'	6' × 0.5'

Placement

WELCOME TO TEXAS signs should be erected as close to the state line as practical.

Interstate Routes. On interstate routes, districts should make sure the welcome sign does not conflict with existing signing and submit schematics showing the proposed location to the Traffic Operations Division (TRF) for review.

U.S. & State Highways. On U.S. and state highways, the welcome sign should be located within 500 feet of the border.

Section 22

Accessibility Signing for Rest and Picnic Areas

Introduction

Many of the rest and picnic areas throughout the state have been modified to meet the requirements of the Americans with Disabilities Act (ADA). The signs described in this section are intended to better inform the public of TxDOT's continuing effort to provide accessibility at all facilities.

Use of the ACCESSIBILITY Plaque

Divided Highways and Freeways. Rest and picnic areas on divided highways and freeways that have been modified to meet ADA requirements should be signed with the D9-6 ACCESSIBILITY plaque as illustrated in Figure 7-16. The D9-6 ACCESSIBILITY plaque should be attached to the parent sign, not to the parent sign supports (see Figure 7-16). The preferred position is above the parent sign, but if it is mounted below, a 7-foot minimum clearance between the bottom of the plaque and the ground must be maintained.



Figure 7-16. ADA accessibility plaques (D9-6) attached to advance picnic and rest area signs for divided highways and freeways.

Conventional Roadways. Rest and picnic areas on conventional roadways that have been modified to meet ADA requirements should be signed with the D9-6a ACCESSIBILITY plaque (Figure 7-17), indicating that the facility provides ADA accessibility to one or more picnic areas. The D9-6a ACCESSIBILITY plaque may be attached above or below existing advance and directional REST AREA and PICNIC AREA (D5 series) signs (as shown in Figure 7-17) or incorporated as a standard design for new signs (shown in *Standard Highway Sign Designs for Texas*). If the plaque is mounted below the parent sign, a 7-foot minimum clearance between the bottom of the plaque and the ground must be maintained.

(continued...)

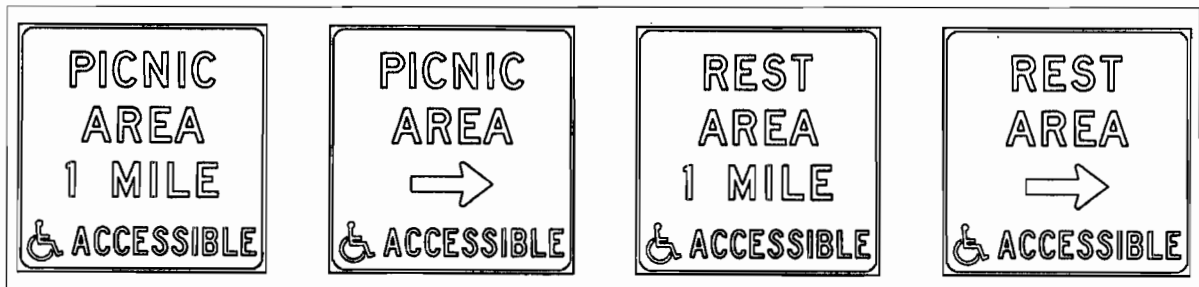
Use of the ACCESSIBILITY Plaque (continued)

Figure 7-17. Advance and directional rest and picnic area signs (D9-6a) for conventional highways showing ADA accessible message.

Historic Picnic Areas

Thirty-eight picnic areas around the state will not be modified to fully meet ADA standards due to their historic significance. To notify the public of the historic significance of these picnic areas and the reasons they are not fully ADA accessible, the HISTORIC ROADSIDE PARK sign (D7-10b) should be used at these sites. (See *Standard Highway Sign Designs for Texas* for sign details.) The sign is shaped to resemble a 1930s Texas Highway Department ROADSIDE PARK sign. In addition to a unique message explaining the site's historical significance, the sign contains the following explanation:

In order to preserve its historic character and significance, this picnic area may not be fully accessible under the normal standards for public facilities set forth in the 1990 Americans With Disabilities Act.

The sign should be erected within the picnic area, and is not intended to be visible from the roadway.

A listing of the historic picnic areas may be obtained from the Traffic Operations Division (TRF).

Chapter 8

Miscellaneous Signs

Contents

This chapter contains the following sections:

Section 1 — Overview	8-3
Section 2 — Temporary Signs and Banners Not Placed by TxDOT	8-5
Section 3 — Adopt-a-Highway Signs	8-7
Section 4 — Special Public Information Signs	8-9
Section 5 — Telephone Number and Public Awareness Signing	8-11
Section 6 — THE EYES OF TEXAS Sign	8-15
Section 7 — Other Picnic and Rest Area Signs	8-17
Section 8 — Municipal and Road Utility District Signs	8-19
Section 9 — City Pride Signs	8-21
Section 10 — Public Water System Signs	8-27
Section 11 — Wellhead Protection Area Signs	8-29
Section 12 — Clean Cities 2000	8-31
Section 13 — Lone Star City Signs	8-33

Chapter 8 — Miscellaneous Signs

Your Notes:

Section 1 Overview

Introduction

TxDOT allows certain non-traffic related signs on state highway rights-of-way, such as DWI fatality markers, neighborhood watch signs, and city pride signs.

TxDOT also erects and maintains certain non-traffic related signs to alert the public to specific laws and public concerns, such as driving while intoxicated (DWI).

General Guidelines

All non-traffic related signing should:

- ◆ be located in rest areas, off the ROW, or well off the roadway as near as practical to the ROW line
- ◆ be near a utility pole or behind guard fence so as to minimize ROW mowing problems
- ◆ not be located between main lanes and frontage roads of controlled access highways
- ◆ not be placed in front of developed property, unless written permission of the owner is secured by the requestor.

Your Notes:

Section 2

Temporary Signs and Banners Not Placed by TxDOT

Introduction

Signs and overhead banners not placed by TxDOT are normally considered encroachments on the state right-of-way, except under certain conditions described in this section.

Authorized Temporary Signs

Special Events and Commercial Entrances. TxDOT may authorize a person or entity to erect temporary signs or banners on the highway right-of-way for special events or to identify commercial entrances along a state highway under construction. Such authorized signs are addressed in Title 43 TAC, Section 22.15. For procedures and restrictions pertaining to such authorized signs, see the Texas Administrative Code or the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division).

Film and Video Productions. A film or video production company operating under an agreement with TxDOT (as described in Title 43 TAC, Section 22.13) may place temporary signs to guide their personnel to the production site. For procedures and restrictions pertaining to such signs, see the Texas Administrative Code or the *Traffic Engineering Agreements Volume* of the *Traffic Operations Manual*.

DWI Fatality Markers. Organizations and relatives of persons killed in traffic crashes caused by drunk drivers frequently want to erect commemorative markers (such as crosses) beside the road at the location of the crash. TxDOT allows such markers, provided the district approves the location of the marker. See the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division) for guidelines for these markers.

Unauthorized Signs

Unauthorized signs and banners on the state highway right-of-way are addressed in Title 43 TAC, Section 25.10 and in the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division).

Political (Campaign) Signs

During campaign seasons prior to elections, political candidates are interested in placing political campaign signs in high-visibility areas along roadways. TxDOT has developed a brochure that outlines legal and illegal campaign signing. The Legislative Affairs Office (LAO) distributes the brochure to all primary candidates in statewide, legislative, or congressional races prior to elections. Additional copies of the brochure may be obtained from LAO. Removal of political campaign signs is covered in the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division).

Section 3

Adopt-a-Highway Signs

Introduction

Procedures and requirements for the Adopt-a-Highway program can be found in the *Travel and Information Manual* and in Title 43 TAC, Section 25.801 through 25.809. This section provides guidelines details for the ADOPT-A-HIGHWAY signs.

Signing Guidelines

TxDOT provides and installs ADOPT-A-HIGHWAY signs displaying the participating group's name or acronym. The signs should be placed at each end of the adopted section of highway.

The sign may be mounted on a 76 mm (3 inch) pipe with triangular slip base breakaway support.

Sign Details

The ADOPT-A-HIGHWAY sign (D12-4) measures 1.22 m (48 inches) square and consists of two panels of equal size (Figure 8-1).

The top panel displays the legend: ADOPT A HIGHWAY NEXT X MILES. The text and border are white; the background is blue.

The bottom panel displays either:

- ◆ the participating group's name or acronym (text and border white; background blue)
or
- ◆ the message: THIS SECTION AVAILABLE FOR ADOPTION and the appropriate district office telephone number (text and border blue; background white).

The bottom panel is designed to be easily removed or replaced when the participating group changes.

Full sign details are illustrated in Figure 8-1.

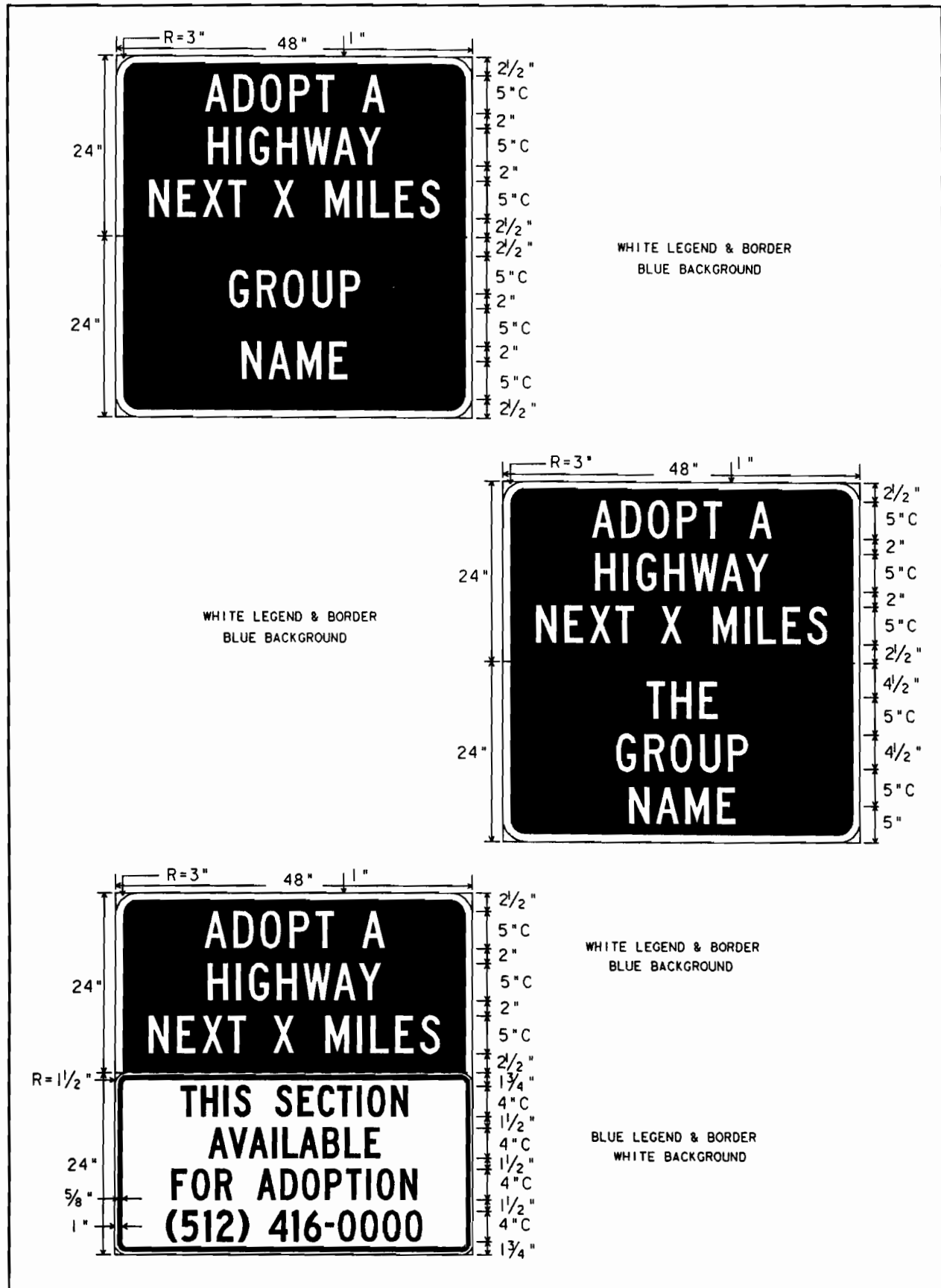


Figure 8-1. ADOPT-A-HIGHWAY sign details. All signs are D12-4.

Section 4

Special Public Information Signs

Introduction

All high-traffic volume, high-visibility construction projects of substantial duration will include the Special Public Information Sign (G20-8). When major construction along a roadway is planned to be accomplished by several separate and adjacent projects, placement of the Special Public Information Sign should be coordinated outside of all active work areas, regardless of project limits. These signs are intended to help inform the public about the use of their tax dollars and the completion dates of projects.

Sign Description

The Special Public Information Sign is composed of two panels. The top panel consists of the blue and red TxDOT logo, with blue legend and blue border on a white reflective background. The TxDOT logo is a standardized and registered trademark; therefore, it cannot be changed or altered. This includes colors, fonts, and letter heights. Due to the difficulty of fabricating the TxDOT logo for this sign, the top panel is intended to be reused on future projects.

The bottom panel, which includes the scheduled completion date, consists of white text and border on a blue reflective background. The bottom panel should be fabricated as a separate sign so it may be revised or replaced if it is anticipated the project will substantially exceed its posted scheduled completion date.

Standards for the Special Public Information Sign can be found in *Traffic Control Standard Sheets* [WZ(SPIS)].

Inclusion in Contracts

Standard sheet WZ (SPIS) may be included in project plans. A general note should also be included to alert the contractor of this additional signage requirement. An example general note would be:

ITEM 502: The contractor is required to fabricate, erect, and maintain (X) signs as illustrated on sheet WZ (SPIS)-96. This sign will not be paid for directly, but shall be considered subsidiary to the item "Barricades, Signs, and Traffic Handling."

Responsibility

District engineers are responsible for identifying high-visibility, long-duration projects that are suitable for the Special Public Information Sign.

District project engineers are responsible for coordinating with contractors on the placement of Special Public Information Signs.

District project engineers are responsible for ensuring that district public information officers are informed about the sequence of construction, the placement of the Special Public Information Signs so that inquiries from the general public and news media can be answered accurately.

Sign Placement

When major construction along a roadway is planned to be accomplished by several separate and adjacent projects, care should be taken to coordinate the placement of the Special Public Information Signs outside of all active work areas, regardless of project limits. Special Public Information Signs should only be placed at the beginning and end of the entire length of the work area. This requires coordination between adjacent TxDOT project engineers and contractors to avoid presenting erroneous or conflicting information.

The signs should be placed at or near the project limits (as shown in the standard), with additional signs posted at major roadway entrances throughout the projects. Most projects only require one sign along each approach of the affected roadway. Placement of the sign should not obscure construction signing or existing regulatory, warning, or guide signs.

Section 5

Telephone Number and Public Awareness Signing

Introduction

The statewide Crime Stoppers Program, the Office of the Governor, the Department of Public Safety (DPS), the Travel and Information Division (TRV), and the Traffic Operations Division (TRF) have developed the telephone number and public awareness information sign for installation in rest areas statewide. This sign should only be erected in rest areas with telephone service. (A current list of rest areas with telephone service may be obtained from TRF.) If telephones are installed in a rest area in the future, signs should be erected after the new telephone service is activated.

TxDOT fabricates, erects, and maintains the signs. Districts should advise local law enforcement, DPS officials, and 9-1-1 services of the approximate date of new sign erection.

Sign Description

The Telephone Number and Public Awareness sign measures 1.22 x 0.91 m (48 x 36 inches) and consists of two panels:

- ◆ the rest area “location designation” panel, fabricated with white legend and border on blue reflective background
- ◆ the telephone number listings panel, fabricated with black legend, no border, and white reflective background.

See *Standard Highway Sign Designs for Texas* for sign details.

Sign Text

The sign text is the result of an agreement between the participating organizations and agencies and, therefore, cannot be altered. The phone numbers listed are currently active statewide, except for a few areas where 9-1-1 service has not been implemented.

Rest Area Location Designation

Rest areas are identified on the location designation panel of the sign according to standard methods. The location designation method varies depending on whether the rest area is on a milepost-numbered highway or not.

Interstate and Other Milepost-Numbered Highways. Rest areas located on interstate and other milepost-numbered highways are designated by the following, in sequence:

1. highway designation and route number
2. cardinal direction (NORTH, SOUTH, EAST, or WEST when applicable)
3. the exit number.

EXAMPLES:

Appropriate Rest Area Designations:	Explanation:
IH 10 WEST EXIT 252 REST AREA	For westbound traffic only.
IH 10 EAST EXIT 251 REST AREA	For eastbound traffic only.
IH 20 EXIT 458 REST AREA	For rest areas accessible from both directions of travel.

Non-Milepost-Numbered Highways. Districts develop designations for rest areas located on non-milepost-numbered highways. Such designations should be developed in conjunctions with local law enforcement and DPS to ensure consistent and quick recognition. The designation should include the following items, in sequence:

1. highway designation and route number
2. cardinal direction (NORTH, SOUTH, EAST, or WEST only)
3. other information, such as a geographic location, that uniquely identifies the location (approximate distance, acronyms, or unusual terminology should be avoided).

NOTE: State law prohibits TxDOT from naming or memorializing any part of the highway system after any person (living or dead), organization, or event.

EXAMPLES of recommended and non-recommended rest area designations:

✓ Recommended	US 82 NORTH PECOS RIVER REST AREA
✓ Recommended	SH 36 WEST MOUNTAIN VIEW REST AREA
✗ Not Recommended	JOHNNY J. JONES MEMORIAL REST AREA
✗ Not Recommended	SIX MILES EAST OF COMMERCE REST AREA

(continued...)

Rest Area Location Designation *(continued)*

To assist telephone operators, districts should submit a list of the non-milepost numbered highway rest area designations to the following:

- ◆ Texas Department of Public Safety (DPS)
- ◆ local law enforcement
- ◆ 9-1-1
- ◆ the Travel and Information Division (TRV).

Sign Placement

The sign should be independently mounted with a 2.13 m (7 foot) mounting height. The sign should be located between 3.05 and 15.24 m (10 and 50 feet) from the nearest rest area telephone. If the rest area has telephones at more than one location, the district should determine if more than one sign is necessary.

The sign is intended to be viewed by pedestrians and should be mounted parallel to the travelway. Where possible, allowances should be made to provide sign visibility for motorists getting out of their vehicles and pedestrians within parking lots.

Exit Number Panels for Rest Area Signs

Rest area signing along milepost numbered highways should include exit number panels on the advance sign, the exit direction sign, and the exit gore sign (see Figure 8-2). The exit number panels provide assistance to agencies responding to calls from the rest areas.

Exit number panels should be fabricated as detailed in the *Traffic Control Standard Sheets (TCSS)*. However, to match existing rest area signing, blue background material should be substituted for green background.

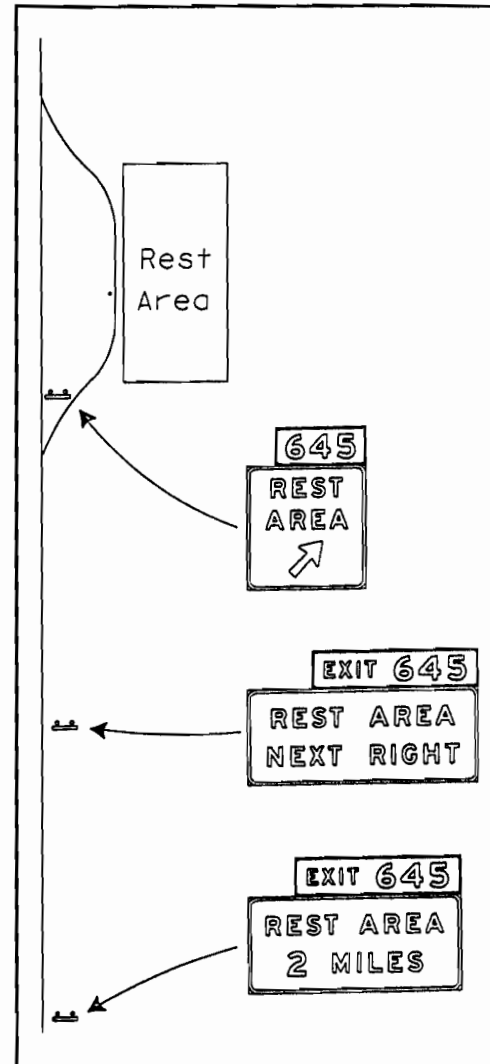


Figure 8-2. Typical rest area signing with exit number panels. All signs and panels have white legends and borders and blue backgrounds.

List of Rest Areas

The Traffic Operations Division (TRF) maintains a current list of rest areas by exit number for milepost numbered highways and by physical location for non-milepost numbered highways. Discrepancies in this list should be brought to the attention of TRF.

Section 6

THE EYES OF TEXAS Sign

Introduction

THE EYES OF TEXAS ARE UPON YOU...CALL 911 sign (D12-5) may be erected near the entrance gore of rest areas and travel information centers statewide at the districts' discretion. The visibility and message of this sign are intended to help reduce crime and vandalism at TxDOT's motorists facilities by soliciting the assistance of cellular phone users. Figure 8-3 shows the sign design and dimensions.

Use of Graphic Design Limited

THE EYES OF TEXAS...CALL 911 sign design is the creation of professional artist and graphic designer Mr. Jorge Mata of Laredo. Mr. Mata has graciously allowed TxDOT to display this design upon these signs. Mr. Mata's permission for the use of this design is limited to signs within these areas and Mr. Mata retains full rights to develop future products or royalties from the design. Therefore, TxDOT cannot display or create similar signs, images, or messages based on the artwork. This includes the production of promotional items or erecting additional signs at locations other than rest areas and travel information centers. TxDOT's agreement with Mr. Mata also allows his signature to be included on the left side of the sign.

Sign Availability and Size

Since THE EYES OF TEXAS...CALL 911 sign contains a unique multi-colored design and several differently styled lettering sizes and fonts, all signs will be produced at the Texas Department of Criminal Justice (TDCJ) sign facility and made available to the districts through the general warehouses. The sign is available only in the standard 0.61 × 1.07 m (24×42 inch) size (DHT #153304).

Sign Placement and Use

Figure 8-3 shows a typical placement example of THE EYES OF TEXAS...CALL 911 sign near the entrance gore of a rest area.

The sign is intended to supplement current existing signage. It should not be considered as a replacement for the Telephone Number and Public Awareness signing. Generally only one THE EYES OF TEXAS...CALL 911 sign per location should be sufficient.

Before erecting the signs, local cellular phone services should be contacted to ensure that 911 service is operational in the area.

(continued...)

Sign Placement and Use (continued)

Due to the unique appearance and design of the sign, the sign be mounted at least at (or in excess of) the standard 2.13 m (7 foot) minimum mounting height and attached to the support with vandal-resistant fasteners.

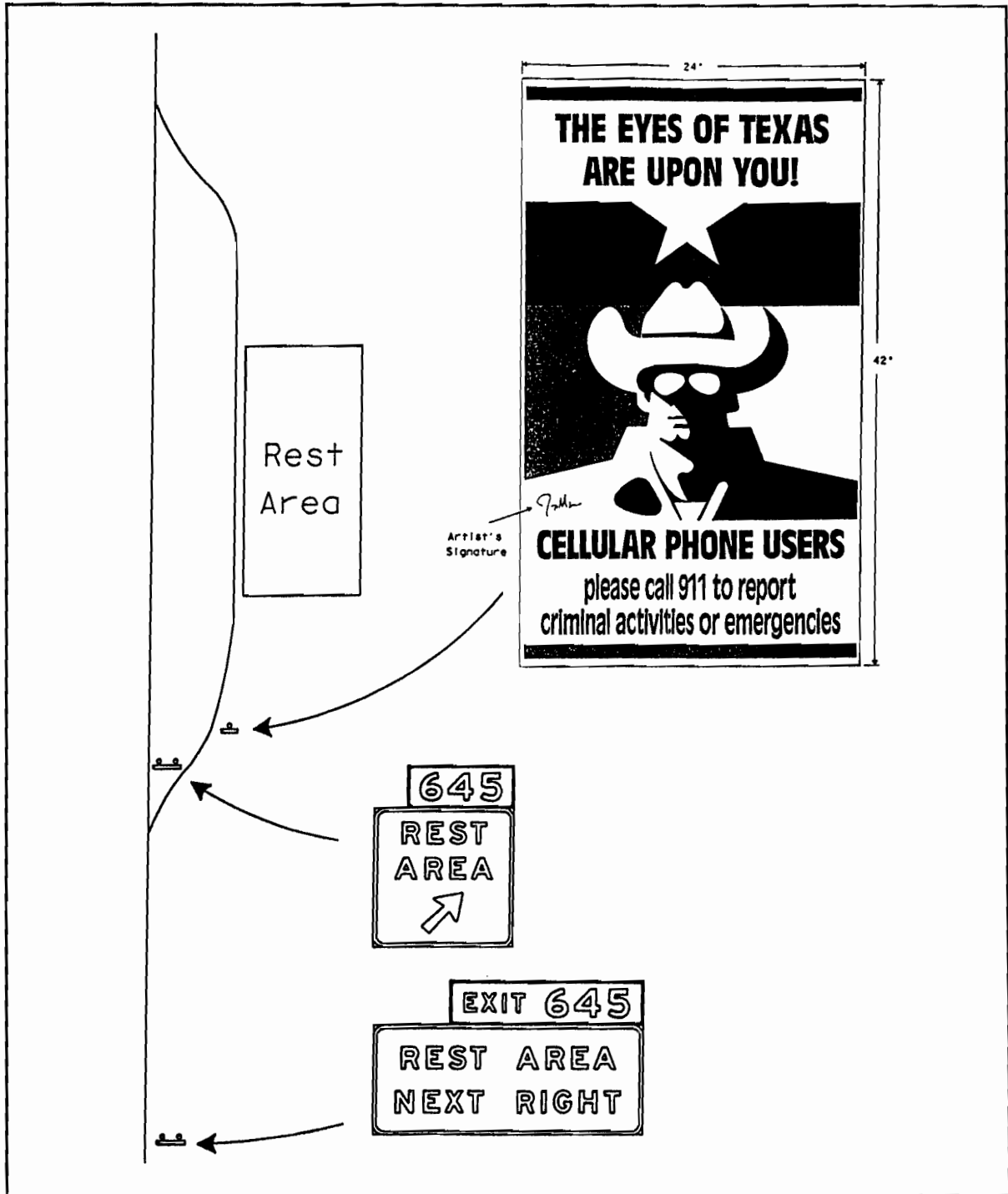


Figure 8-3. THE EYES OF TEXAS...CALL 911 sign (D12-5). Typical placement near a rest area entrance gore. (Note sign design and dimensions shown.)

Section 7
Other Picnic and Rest Area Signs

DWI — YOU CAN'T AFFORD IT Sign

The DWI — YOU CAN'T AFFORD IT sign may be used in picnic and rest areas. It should not be located on the main travelway.

The sign measures 1.22 m (48 inch) square and should conform to the details shown in Figure 8-4.

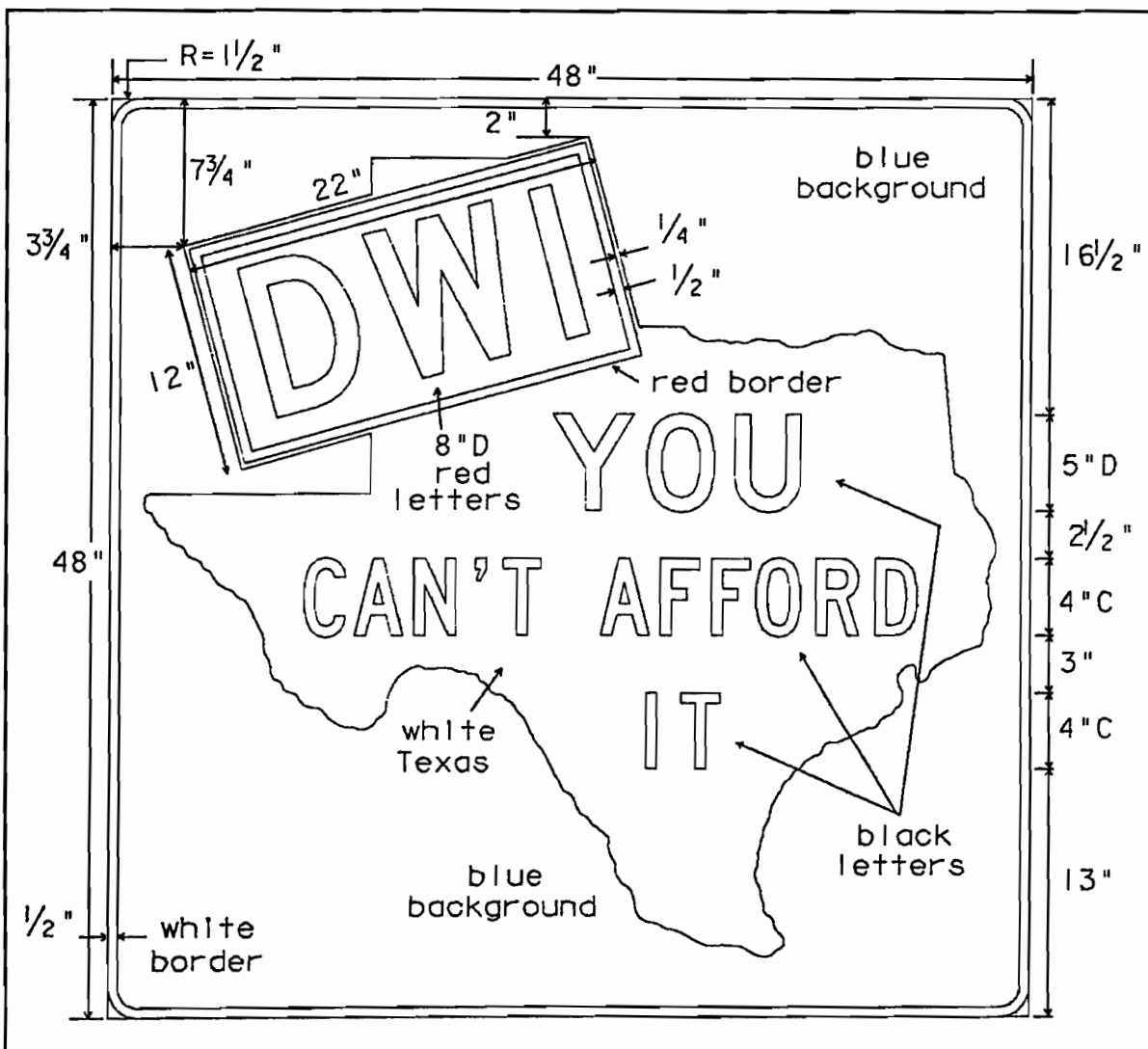


Figure 8-4. DWI — YOU CAN'T AFFORD IT sign details.

No Soliciting Sign

Districts should erect NO SOLICITING signs near the entrances to all rest areas and picnic areas on the Interstate Highway System. These signs help reinforce the requirement that organizations operating holiday coffee rest stops not solicit donations from the public.

The sign measures 0.61 x 0.31 m (24 x 12 inches) and should conform to the details shown in Figure 8-5.

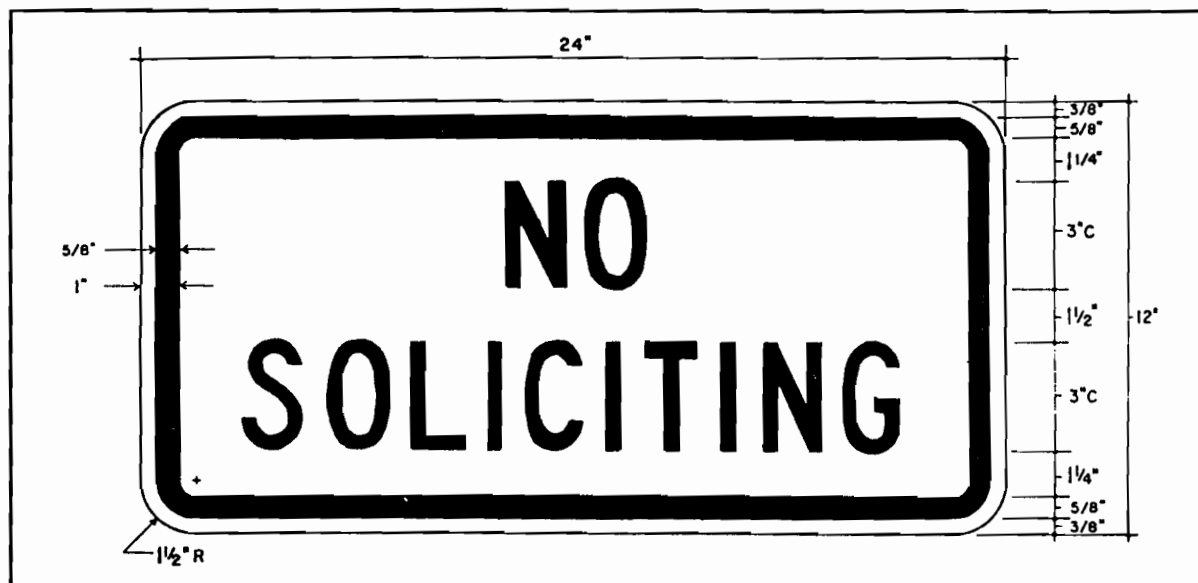


Figure 8-5. NO SOLICITING sign details. Text and border are black. Background is white reflective.

Eisenhower Interstate System Sign

On July 29, 1993, the United States Congress approved the EISENHOWER INTERSTATE SYSTEM sign to nationally recognize President Dwight D. Eisenhower's part in the development of the Interstate Highway System. The sign is 0.91 m (36 inches) square and has a blue background with white legend. (See *Standard Highway Sign Designs for Texas* for sign details.) The sign is available through the regional supply center. An EISENHOWER INTERSTATE SYSTEM sign should be installed in each rest area along the Interstate Highway System.

Section 8 Municipal and Road Utility District Signs

Introduction

Chapter 441 of the Texas transportation Code allows cities, counties, and other political subdivisions to create municipal and road utility districts to finance construction. Such entities are required to post signs at a minimum of two principal entrances to indicate the existence of an additional taxation authority to potential property owners.

Responsibility

The municipal or road utility district is responsible for the erection and total cost of the signs and mounts.

Signing Guidelines

Municipal and road utility district signing should conform to the following guidelines:

- ◆ Signs should be installed off the right-of-way (ROW), if possible. Signs may be installed on the ROW but located near the fence line mounted parallel to the direction of traffic on the highway.
- ◆ If the sign is mounted on the ROW, the sign mounts must conform to current TxDOT specifications, and the sign must conform to the typical details shown in Figure 8-6.
- ◆ Sign locations must be approved by the TxDOT district office so as not to interfere with routine maintenance operations.

(continued...)

Signing Guidelines (continued)

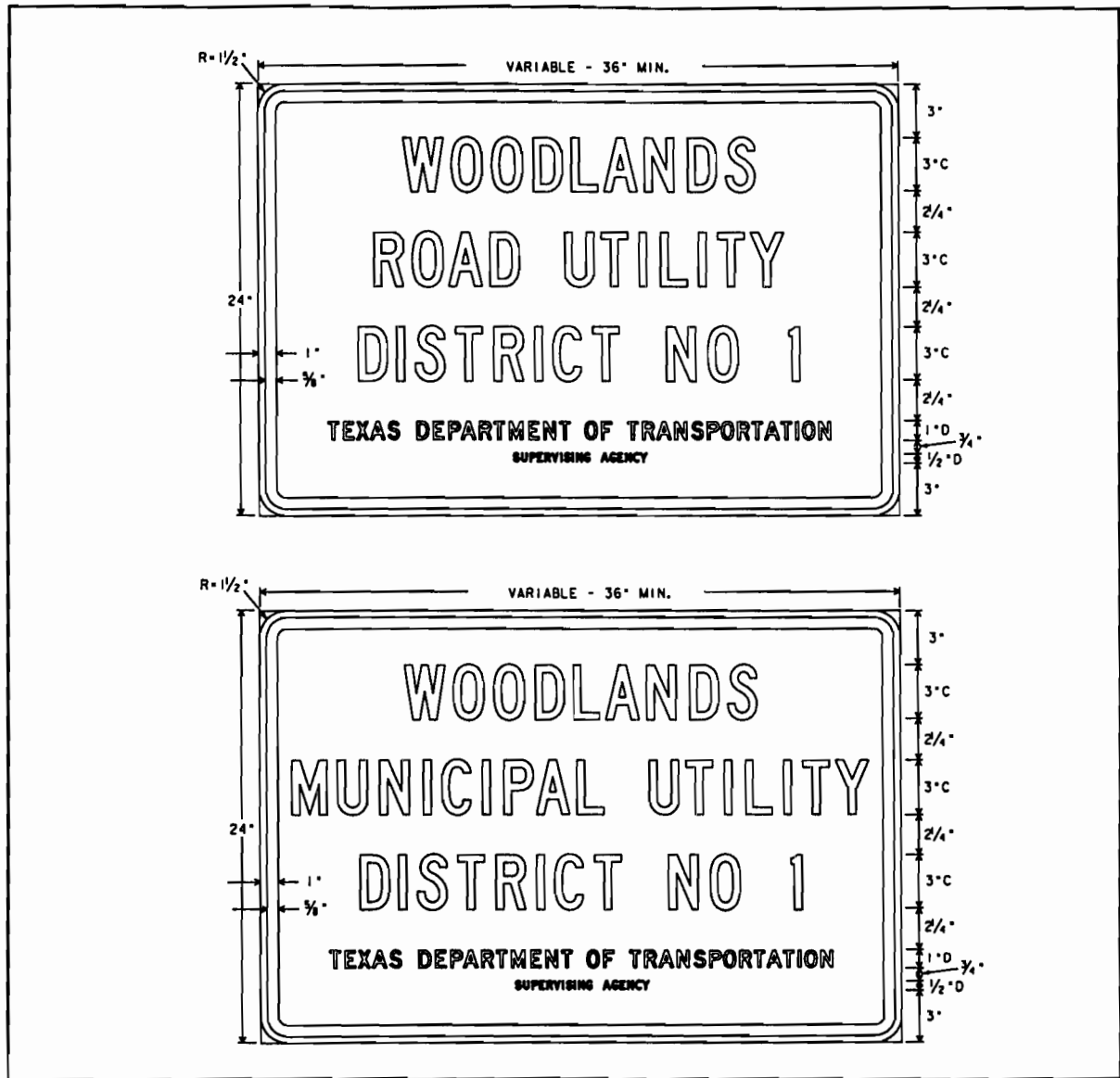


Figure 8-6. Typical utility district signs. Background is white reflective; border and legend are black. The three upper lines are for the district name. Variations in the number of letters per line will depend on the length of the district name.

Section 9

City Pride Signs

Introduction

The City Pride Sign Program (CPSP) allows cities to erect and maintain a sign (at city expense) near the city limits sign. Attachment signs affixed to the city pride sign display the names of civic organizations and other messages determined by the city. The program is intended to remove non-official and non-traffic-related signing (such as SUPERIOR PUBLIC WATER SYSTEM, CLEAN CITIES 2000, KEEP TEXAS BEAUTIFUL, SISTER CITY, NEIGHBORHOOD WATCH) from TxDOT sign supports.

The CPSP rules allow the Texas Natural Resource Conservation Commission's (TNRCC) SUPERIOR (or APPROVED) PUBLIC WATER SYSTEM and the CLEAN CITIES 2000 signs to be placed on a separate, independent (non-TxDOT) sign support, in addition to the city pride sign. Independently mounted non-official or non-traffic-related signing within the right-of-way must comply with the CPSP rules.

This section covers the basic procedures and requirements of the City Pride Sign Program. Complete information on the program can be found in Title 43 TAC, Sections 25.420 through 25.425.

Program Application and Approval

A city may obtain an application for participation in the City Pride Sign Program from the TxDOT district office or the Main Office in Austin. The application may contain a request for more than one sign. One city pride sign and one TNRCC sign may be placed at each eligible highway entrance.

The city submits the CPSP application to the district office.

The district approves CPSP sign designs and locations if the plans meet TxDOT specifications (see "Sign Specifications" and "Sign Placement" later in this section). The district notifies the city in writing as to whether its specifications have met TxDOT criteria, noting deficiencies on the returned application.

The city may resubmit an application after correcting the deficiencies.

Agreement

After the district approves the city's application and proposed sign, the city must enter into an agreement with TxDOT. The CPSP agreement form is available as a word processing file from the Traffic Operations Division. See the *Traffic Engineering Agreements Volume* of the *Traffic Operations Manual* for information on the CPSP agreement and standard form. The requirements and restrictions described in this section are standard inclusions in the agreement.

The district should keep completed CPSP agreements on file.

Cooperation with Contractors

While installing or maintaining the sign, the city must cooperate with any TxDOT contractor working on the state highway system at that location.

Sign Installation and Maintenance

The city or its contractor may install the city pride or TNRCC sign. The district inspects the installation to ensure that the sign meets TxDOT and *TMUTCD* standards. Upon completion of the installation, the city must submit as-built plans to the appropriate TxDOT district office.

The city must maintain the city pride and TNRCC signs in a safe manner and condition, in accordance with TxDOT standards.

Sign Removal or Relocation

If changes in the roadway or changes in highway signing require that a city pride or TNRCC sign be relocated or removed, the city must do so at its own expense.

If the district determines that a city pride or TNRCC sign is damaged, broken, faded, or no longer meets specifications, the city must remove or replace it within 60 calendar days of written notification from the district. If the sign is not removed or replaced within 60 calendar days of such notification, the city is liable for removal and disposal costs (as provided by Title TAC 43, Section 25.10).

Participation of Civic Organizations

Civic organizations apply to the city to have their attachment sign placed on a city pride sign. To be eligible, a civic organization must meet both of the following criteria:

- ◆ be located within or have a member who resides in the city
- ◆ comply with all applicable laws concerning the provisions of public accommodations without regard to race, religion, color, sex, or national origin.

Fees Not Allowed. Neither TxDOT nor the city may require fees for participation in the City Pride Sign Program.

Attachment Signs. The organization's attachment sign must be placed within the available sign space. An organization may have only one attachment sign per city pride sign, unless the city and organization agree to install additional signs.

Sign Specifications

Details of specific TNRCC signs are covered later in this chapter.

City pride and TNRCC signs must:

- ◆ meet the applicable provisions of the *TMUTCD*
- ◆ have background material which conforms with TxDOT specifications
- ◆ be fabricated, erected, and maintained in conformance with TxDOT specifications and fabrication details (including approved breakaway supports).

The standard for city pride signs, (CPS)-[year], shows typical sign designs. TxDOT will consider alternate designs for uniquely shaped backgrounds upon request. The sign message identifying the city may be no greater than 203 mm (8 inches) in height. The maximum allowable sign area is 7.43 m² (80 square feet). Attachment signs must be spaced for a balanced appearance.

City pride signs may *not* contain:

- ◆ advertising or words that may be construed as advertising or the offering of products and services
- ◆ notification of municipal ordinances or regulations
- ◆ attachments that extend beyond the sign borders
- ◆ attachments to the sign supports, including banners or flags (also applies to TNRCC signs).

City pride and TNRCC signs may not display lighting.

(continued...)

Sign Specifications *(continued)*

Attachment Signs. Attachment signs are provided by civic organizations or governmental entities. The attachment signs display points of interest or geographical, recreational, cultural, or civic information, including awards for participation in programs. Attachment signs:

- ◆ may not exceed 1.22 m (48 inches) in width or 0.91 m (36 inches) in height
- ◆ may be any color or combination of colors
- ◆ may not identify a commercial establishment, service, or product
- ◆ may not display a supplemental address or directional information, such as meeting dates or locations
- ◆ may not display a message, symbol, or trademark resembling an official traffic control device.

Sign Placement

Placement of city pride and TNRCC signs is subject to TxDOT approval. One city pride sign and one TNRCC sign may be placed at each eligible highway entrance. The signs must be placed:

- ◆ between 91 m and 244 m (300 and 800 feet) from the city limits
- ◆ to take advantage of natural terrain so that interference with the scenery is minimal
- ◆ to avoid visual conflict with other signs within the state highway right-of-way
- ◆ with a lateral offset greater than existing guide signs
- ◆ without blocking motorists' view of existing traffic control and guide signs
- ◆ in locations other than hanging above the road.

Controlled Access Highways. City pride signs may not be placed adjacent to the main lanes of interstates and other controlled access highways. The signs can be placed between the frontage road and the right-of-way line, but not between the main lanes and the frontage road.

Existing Signs

Traffic Signs. The city may not remove or relocate existing traffic signs (regulatory, warning, destination, guide, recreation, or cultural interest) without the written permission of TxDOT. If TxDOT grants permission to move a traffic sign to accommodate a city pride or TNRCC sign, the city bears both the responsibility and expense.

Non-Traffic Signs. Although a city's participation in the CPSP is voluntary, cities must remove all and non-traffic-related (civic organization) signage not in compliance with the CPSP rules from TxDOT right-of-way by September 1, 1998. Non-official or non-traffic-related signs and attachments can no longer be attached to TxDOT sign supports. To prevent misunderstanding, districts should contact cities to explain the CPSP and request voluntary removal of signs not in compliance before the deadline. An information brochure explaining the CPSP is available from the Traffic Operations Division.

At the city's request, districts may remove non-official and non-traffic related signs from TxDOT supports and return the signs to the city. However, before September 1, 1998, districts should not remove these signs without first contacting the city and allowing the city a chance to remove the signs voluntarily. Signs removed by TxDOT forces should be returned to the city or stored until the city (or others) can be contacted. TxDOT forces should not discard signs that are property of the city (or others) unless there has been no effort to contact TxDOT or retrieve the signs within 60 days of notification.

Program Operation

The city is responsible for selecting the civic organizations and placing the attachment signs. Civic organization, government agencies, etc. apply to the participating city for inclusion in the CPSP. Districts should direct requests for non-official or non-traffic-related signage to the appropriate city.

Other Structures

If a city wishes to erect other permanent structures within the right-of-way, such as walls or berms, displaying "*Welcome to (city name)*" or other messages as an integral part of the overall landscape design, the requests should be forwarded to the Design Division (DES). DES evaluates such requests under the rules of existing landscape programs with regard to project design, adequate sight distance, adequate clear zone, and maintenance.

Your Notes:

Section 10

Public Water System Signs

Introduction

The Texas Natural Resource Conservation Commission (TNRCC) recognizes only the “superior” classifications for public water systems. Cities and towns may erect and maintain signs designating this classifications after obtaining approval from the district office concerning location and height of installation. TxDOT does not fabricate, erect, or maintain the signs.

This and other TNRCC signs are covered by the City Pride Sign Program. See Section 9 of this chapter for more information.

Signing Guidelines

The SUPERIOR PUBLIC WATER SYSTEM sign (D-42) may be erected on all highways entering towns and cities having their public water supply designated as “superior” by the TNRCC. Cities and towns must maintain the signs in first class condition as long as the water system continues to meet the requirements of the designation. If the city or town fails to maintain its rating, the signs must be removed at once and may not be replaced until the status has been re-established.

The signs may be erected only after the district has been consulted as to location and height of the sign. Usually the sign is placed at or inside the limits of the area served by the water system involved and faces incoming traffic. This and other TNRCC signs are covered by the City Pride Sign Program. See Section 9 of this chapter for information on sign placement and installation.

Sign Details

The signs may be fabricated locally according to the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* or purchased from a manufacturer of standard traffic signs. Figure 8-7 shows the sign details.

(continued...)

Sign Details (continued)

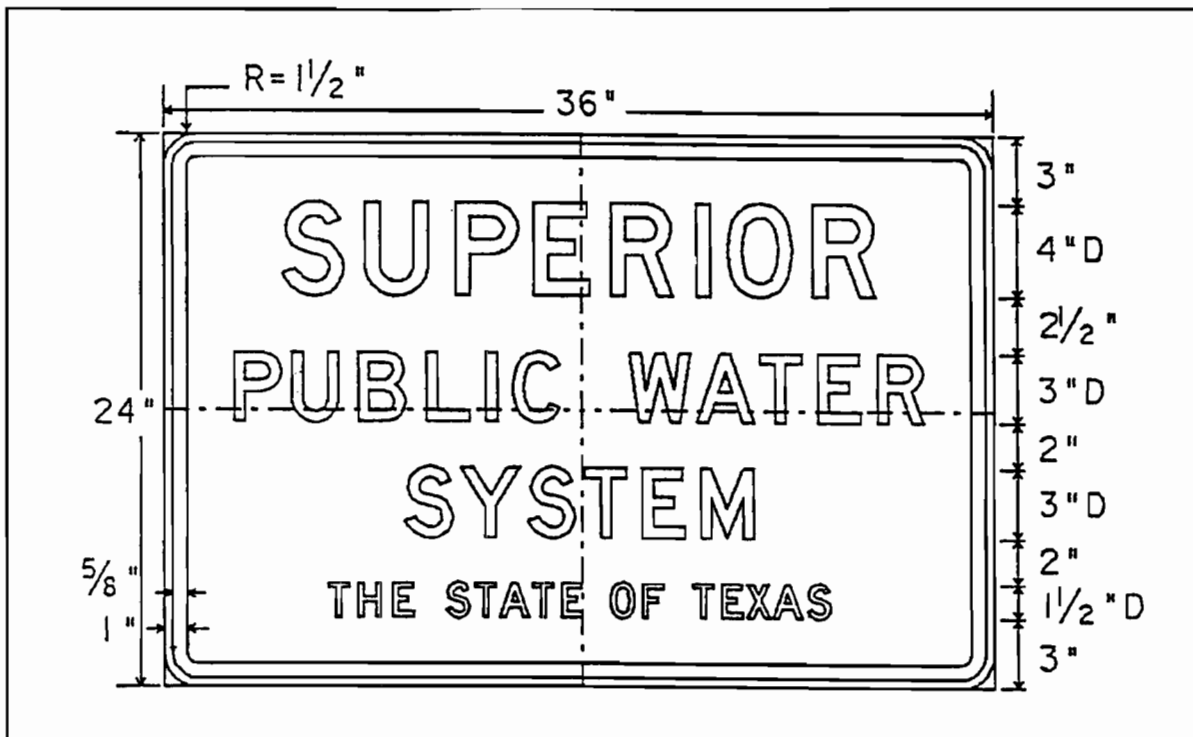


Figure 8-7. Details for SUPERIOR PUBLIC WATER SYSTEM signs. Background is white reflective. Legend and border are black.

Section 11 Wellhead Protection Area Signs

Introduction

In cooperation with the Texas Natural Resource Conservation Commission (TNRCC), TxDOT installs signs on state rights-of-way indicating wellhead protection areas throughout the state. TNRCC provides the signs.

A wellhead protection area is defined as the surface and subsurface area surrounding a public water well or well field through which contaminants could pass and eventually reach the ground water supply.

This and other TNRCC signs are covered by the City Pride Sign Program. See Section 9 of this chapter for more information.

Signing Process

The process for installing WELLHEAD PROTECTION AREA signs is as follows:

1. The local water provider contacts the TxDOT district office requesting sign placement.
2. TxDOT district office contacts TNRCC requesting the appropriate number of signs.
3. TNRCC supplies the necessary signs to the district (see following sign details).
4. TxDOT district installs signs (see following guidelines on sign location).

Sign Location

The WELLHEAD PROTECTION AREA sign may be located at or within the boundary of the protection area, as the water district prefers. One sign for each direction of travel should be sufficient.

This and other TNRCC signs are covered by the City Pride Sign Program. See Section 9 of this chapter for information on sign placement and installation.

Sign Details

The WELLHEAD PROTECTION AREA sign measures 0.61 x 0.91 m (24 x 36 inches). The approved sign design is shown in Figure 8-8.

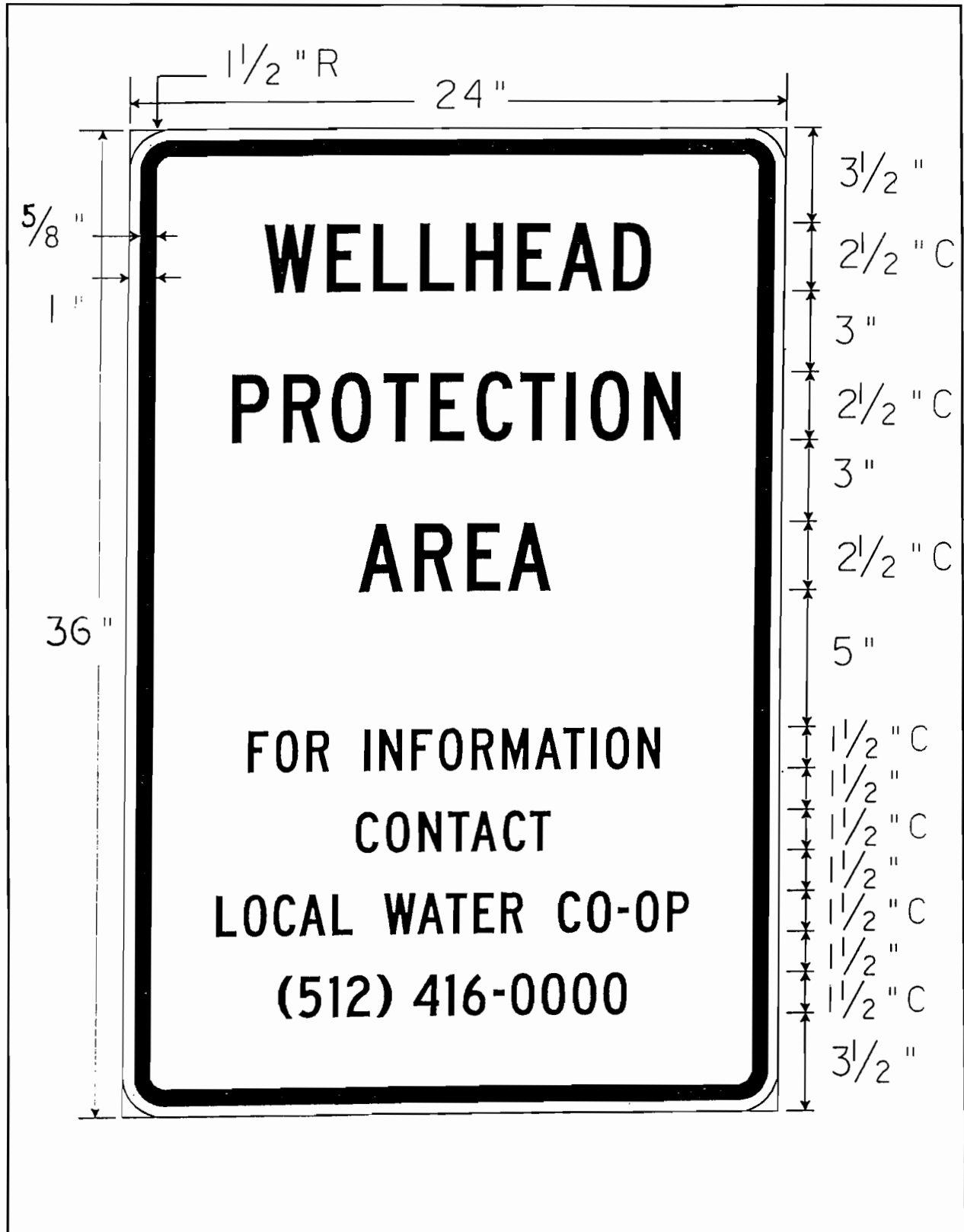


Figure 8-8. WELLHEAD PROTECTION AREA sign details. Legend and border — black. Background — white reflective.

Section 12 Clean Cities 2000

Introduction

The Texas Natural Resources Conservation Commission (TNRCC) has implemented the “Clean Cities 2000” project with various cities around the state to promote pollution prevention and other related environmental protection programs. Usually the sign is placed at or inside the limits of the area served by the water system involved and faces incoming traffic. TxDOT does not fabricate, erect, or maintain these signs.

This and other TNRCC signs are covered by the City Pride Sign Program. See Section 9 of this chapter for information on sign placement and installation.

Sign Details

The MEMBER CLEAN CITIES 2000 sign measures 0.46 x 0.61 m (18 x 24 inches). The approved sign design is shown in Figure 8-9.

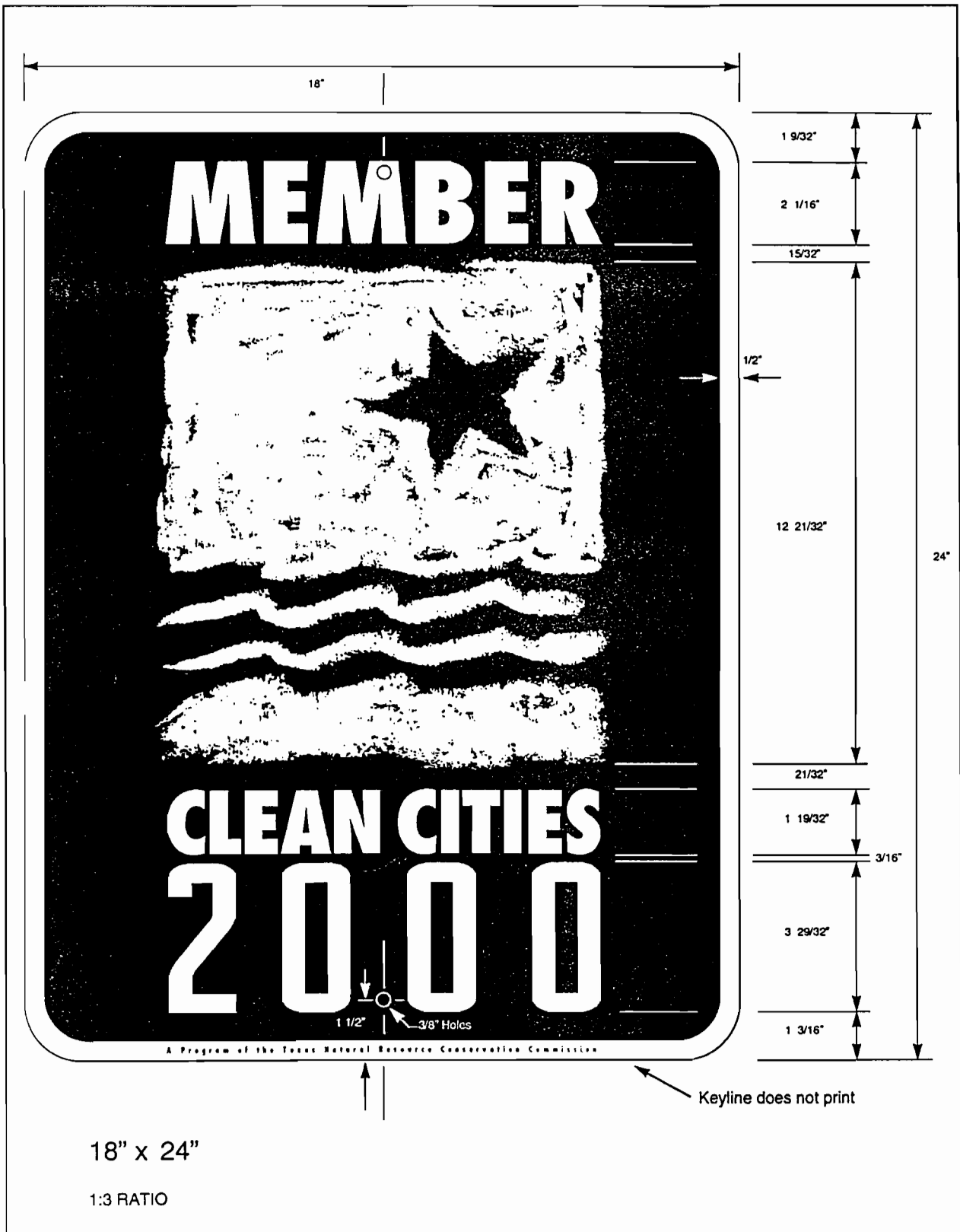


Figure 8-9. MEMBER CLEAN CITIES 2000 sign details. Background — PMS 301/Blue. Legend, logo, and border — white. Corner radius — 38 mm (1.5 inches).

Section 13 Lone Star City Signs

Background

The East Texas Council of Governments initiated the Lone Star Cities Program to foster economic development in communities. Cities who wish to participate must be certified by the East Texas Council of Governments. TxDOT does not fabricate, erect, or maintain these signs.

Sign Installation

Cities may install the LONE STAR CITY sign as an attachment sign on the city pride sign. See Section 9 of this chapter for information on the City Pride Sign Program.

The approved sign design is shown in Figure 8-10.

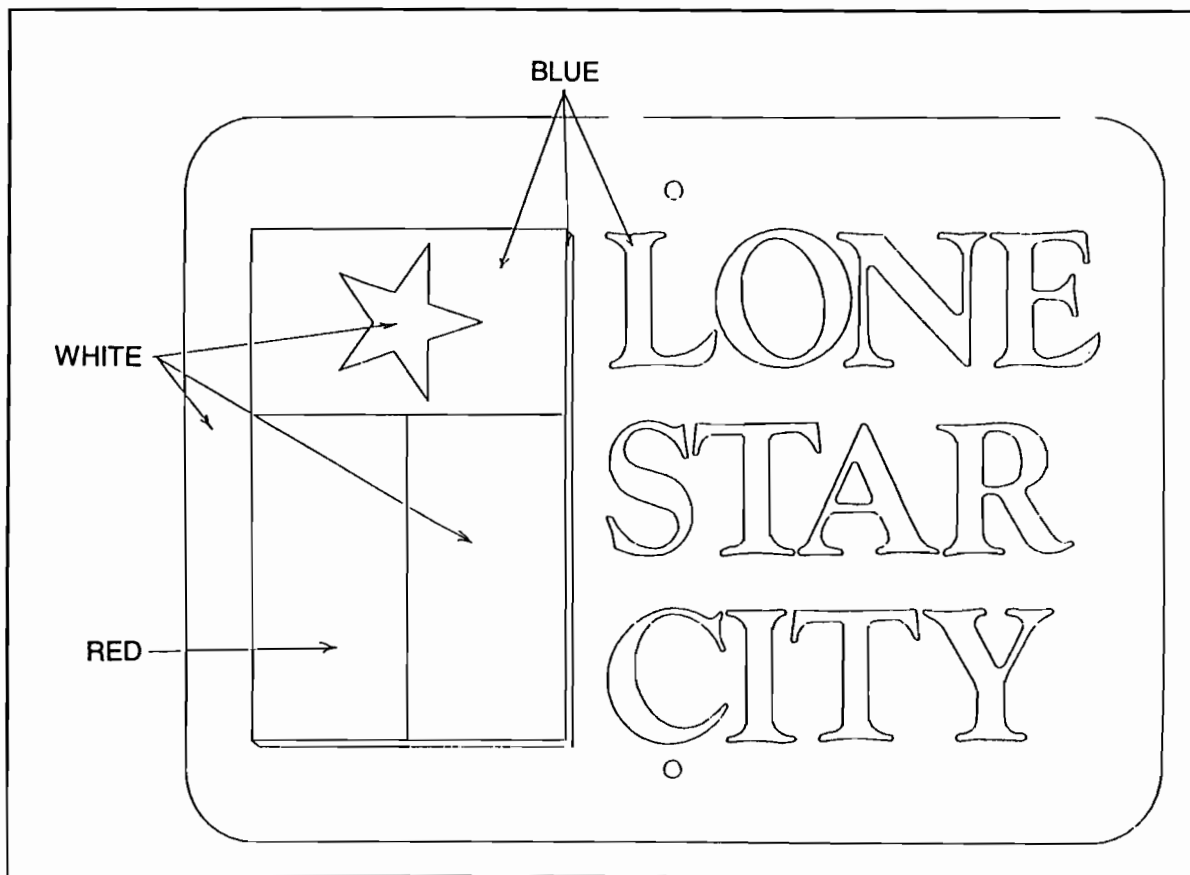


Figure 8-10. LONE STAR CITY sign. Measurements 0.53 x 0.38 m (21 x 15 inches).

Your Notes:

Chapter 9

Expressway and Freeway Signing

Contents

This chapter contains the following sections:

Section 1 — Expanded Use of Expressway Signing Standards	9-3
Section 2 — Sequence Signs	9-7
Section 3 — Freeway Guide Signs	9-11
Section 4 — Overhead Sign Lighting	9-15
Section 5 — Project Development	9-17
Section 6 — Field Work	9-21
Section 7 — Plans	9-23
Section 8 — Specifications	9-29

Chapter 9 — Expressway and Freeway Signing

Your Notes:

Section 1

Expanded Use of Expressway Signing Standards

Standard Practice

Minimum expressway signing standards (as set forth in Part II-E/F of the *TMUTCD*) should be used at *all* grade separated interchanges and other rural intersections where divided highways or major routes diverge or intersect. Figures 9-1 and 9-2 show typical advance signing for such situations.

Signing

Expressway-type guide signs combining route numbers and destinations should be used at major intersections (see Figure 9-1) and at the junction of rural highways (see Figure 9-2). The advance signing should consist of large ground-mounted or overhead signs.

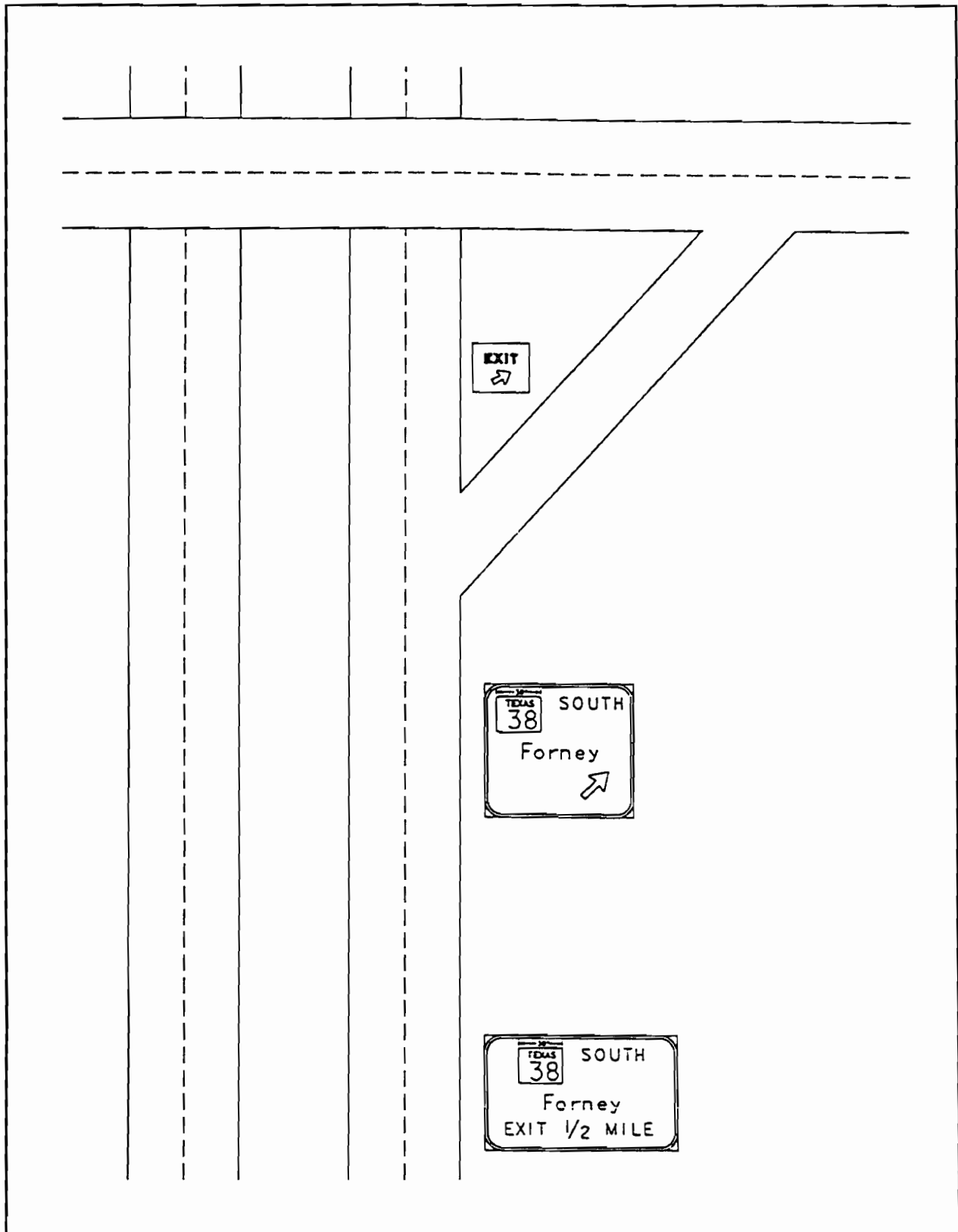


Figure 9-1. Expressway-type guide signing for divided highway.

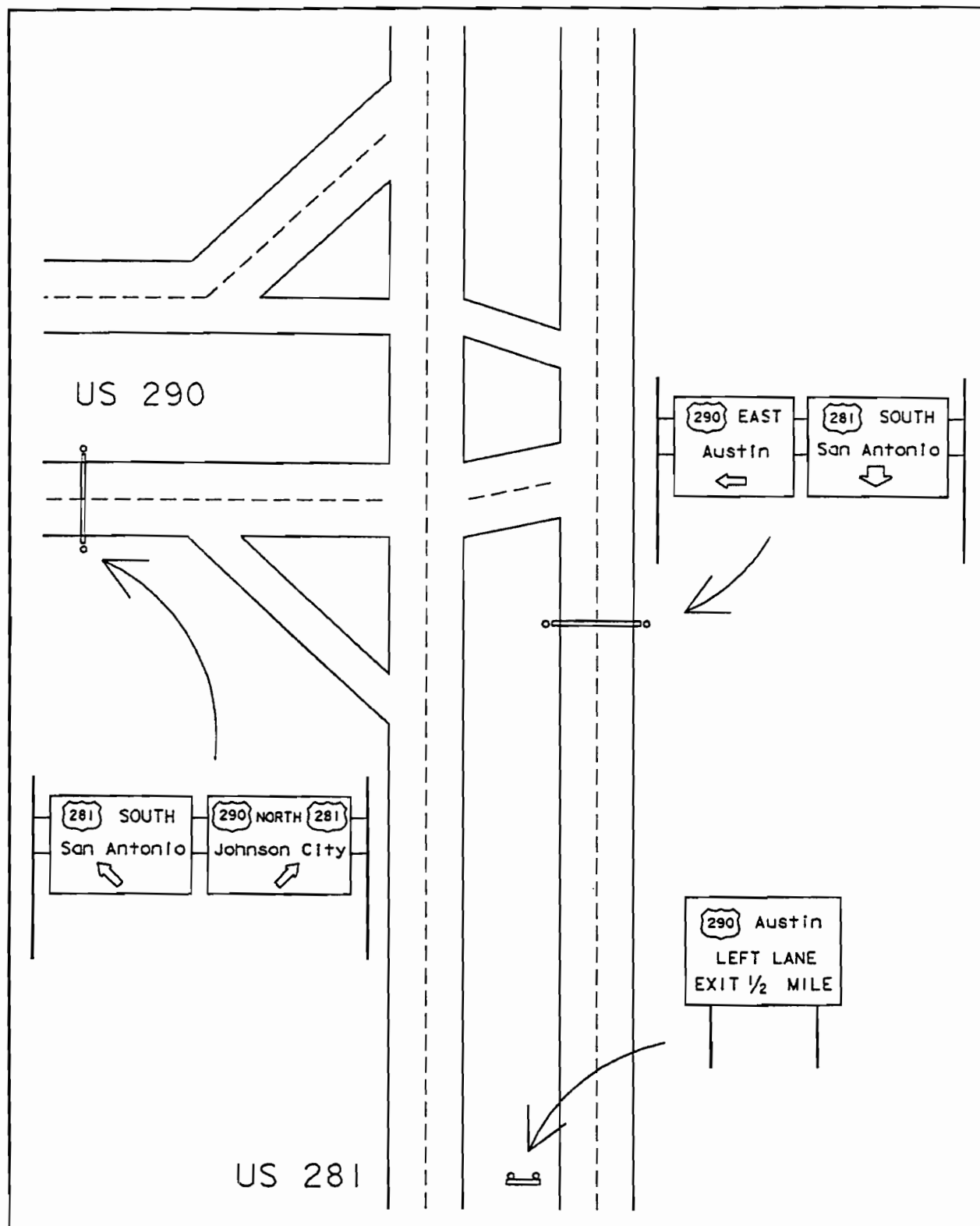


Figure 9-2. Expressway-type guide signing at junction of rural highways.

Your Notes:

Section 2

Sequence Signs

Introduction

Sequence signing on freeways provides motorists with advance information on exit names and distances. It has been used for many years in urban areas throughout the United States and is widely accepted by motorists. Sequence signing is approved by the Federal Highway Administration and described in the *TMUTCD*. Sequence signing supplements the normal advance guide signs.

TxDOT uses sequence signing on all freeways in urban areas with populations of 100,000 or greater.

The information provided in this section supplements that contained in the *TMUTCD*.

Sign Text and Message

A maximum of three exits with no more than four lines of text is allowed on each sequence sign.

Letter heights on sequence signs should be in accordance with the *TMUTCD*.

Sequence signs must list street names left most, followed by route shields, cardinal directions, and distances. (See Figure 9-3.)

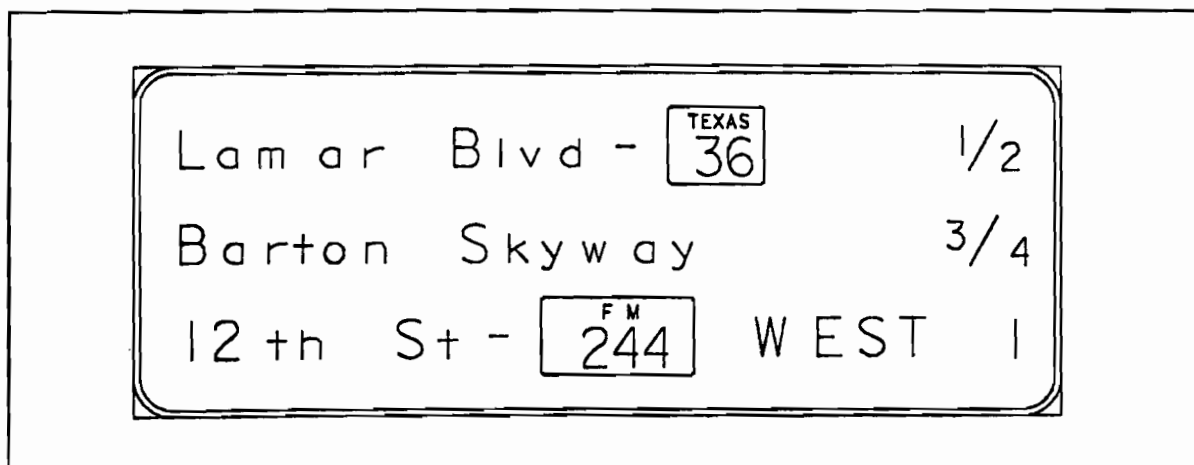


Figure 9-3. Example sequence sign showing order of information: street name — route shield — cardinal direction — distance.

(continued...)

Sign Text and Message *(continued)*

Shields should be used for all numbered routes on sequence signs. Minimum shield heights should be:

- ◆ 914 mm (36 inches) for interstate routes
- ◆ 610 mm (24 inches) for U.S. and state routes.

Distances shown on sequence signs may not be repeated for two or more streets using the same exit. Horizontal lines are used to separate street names sharing an exit. (See Figure 9-4.)

The following *must not* be used on sequence signs:

- ◆ destinations
- ◆ city names
- ◆ memorial highway names
- ◆ periods
- ◆ arrows
- ◆ EXIT ONLY.

General services or supplemental signs

(hospital, camping, phone, etc.) *must not* be included as text or be attached to sequence signs.

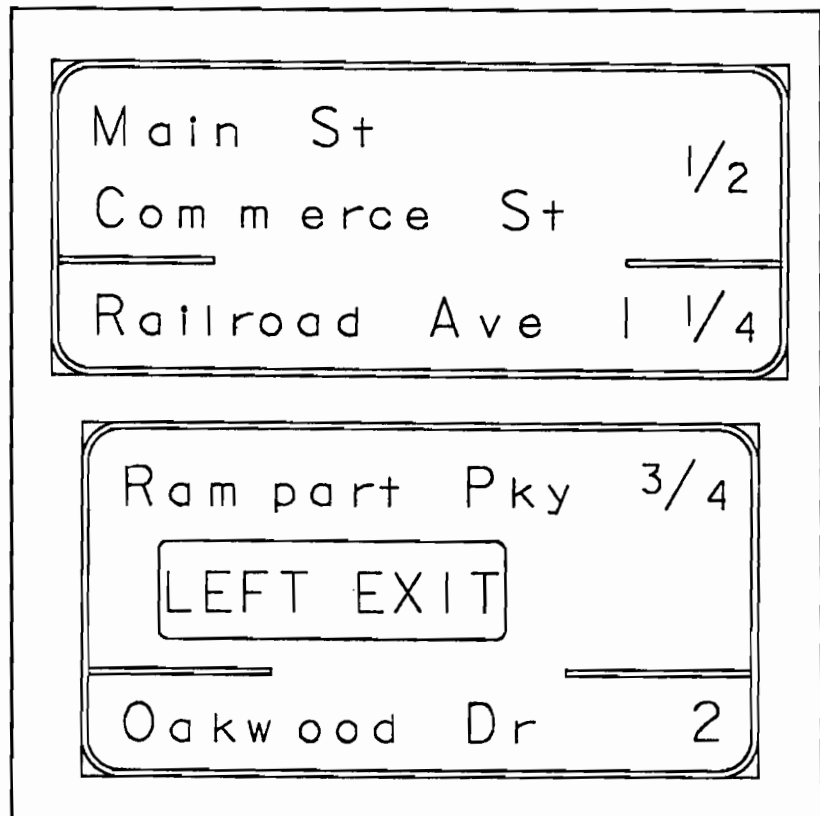


Figure 9-4. Example sequence signs with horizontal line separating two street names sharing an exit.

Sign Location

Sequence signs should be mounted overhead. They may be placed either to the right or left of the roadway, although the left side is preferable, especially where there are four or more lanes in one direction. (See Figure 9-5.)

Where possible, the placement of sequence signs should be consistent and continuous throughout an urban section of roadway.

Only one sequence sign should be used between interchanges. A sequence sign may replace an existing advance guide sign.

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* covers additional considerations concerning signing for LEFT EXIT and EXIT ONLY conditions.

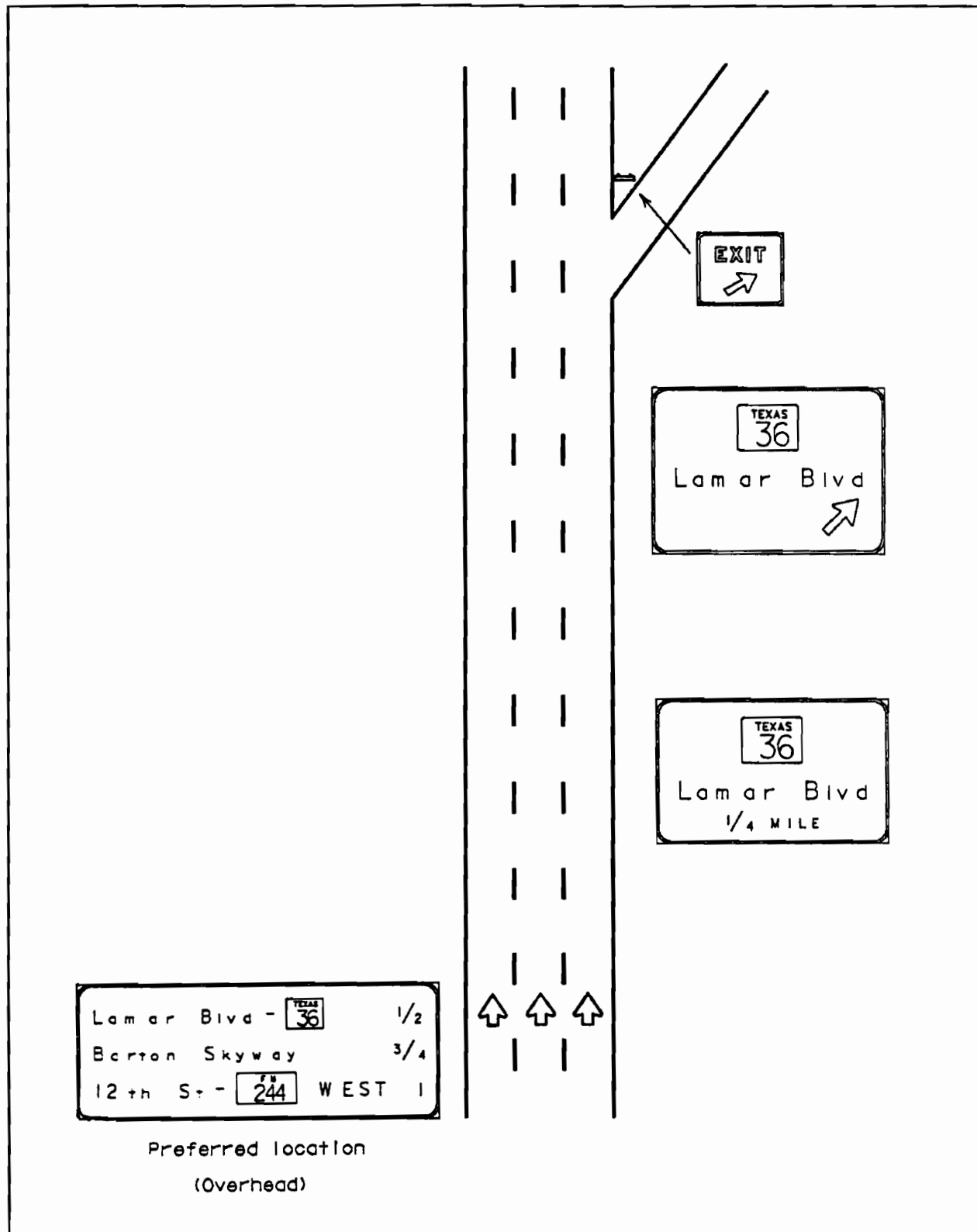


Figure 9-5. Preferred sequence sign placement.

Section 3

Freeway Guide Signs

Introduction

The following information supplements that provided in the Part II-E/F of the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*.

Exit Split Into Separate Ramps

Where a multi-lane exit splits downstream into two separate ramps — one ramp to each destination or highway — a vertical bar should be used to separate the lane assignments on the overhead sign. The vertical bar should be fabricated from sign border materials and should not be wider than twice the sign border width. (See Figure 9-6.)

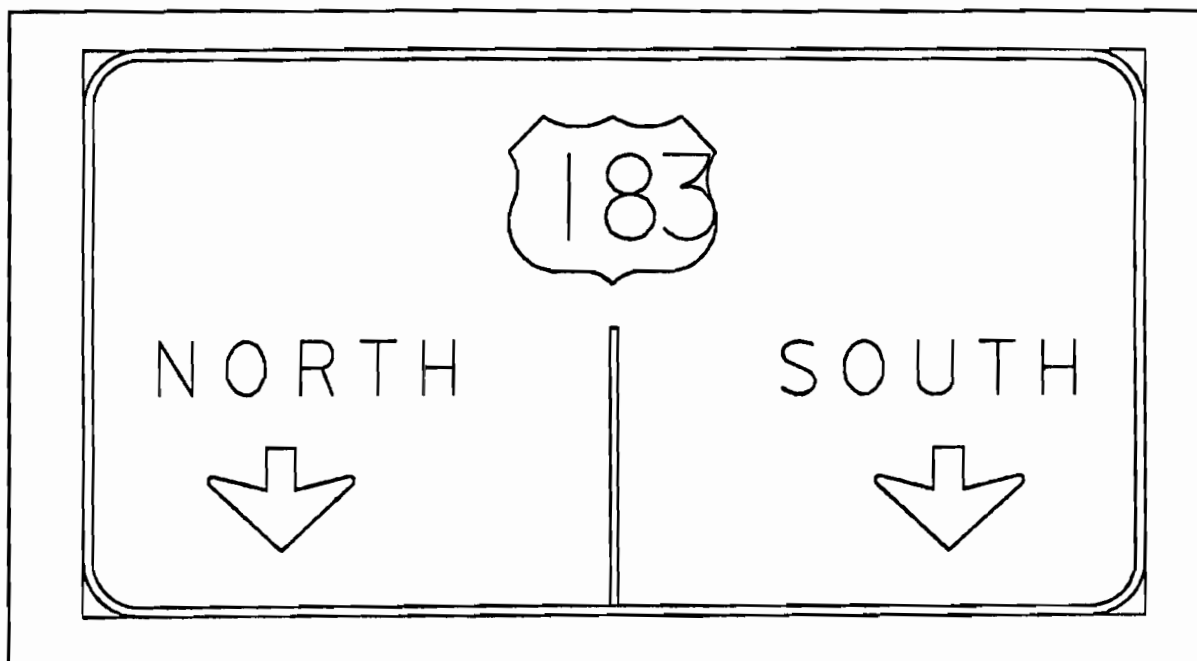


Figure 9-6. Freeway guide sign for multi-lane exit splitting into two separate ramps.

Collector-Distributor Roads

When signing collector-distributor roads, a horizontal line may be used to separate the respective destinations, shields, and cardinal directions. The horizontal line should be fabricated from identical sign border material as the parent sign, and should not be wider than the sign border width. (See Figure 9-7.)

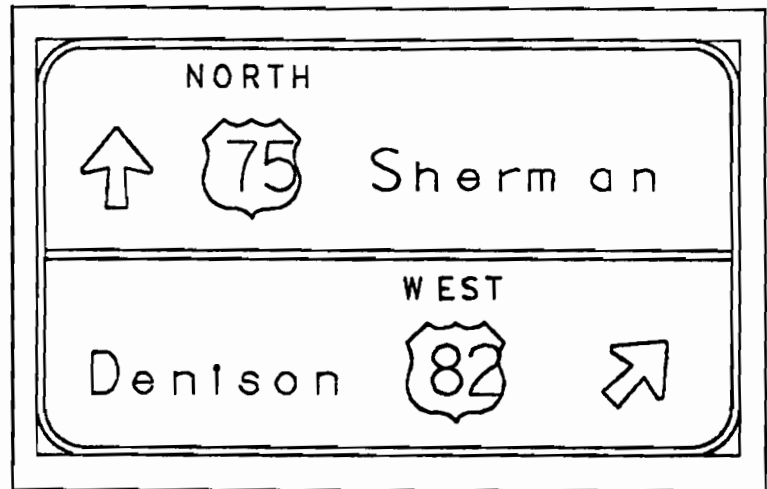


Figure 9-7. Freeway guide signing for collector-distributor roads.

Curved or Circular Arrows

Curved or circular arrows should be used on both the exit direction and exit gore signs when necessary to depict exit ramp geometrics.

In addition, an advisory EXIT SPEED sign (W13-2) should be used in situations where a substantial speed reduction is recommended. (See Figure 9-8.)

(continued...)

Curved or Circular Arrows (continued)

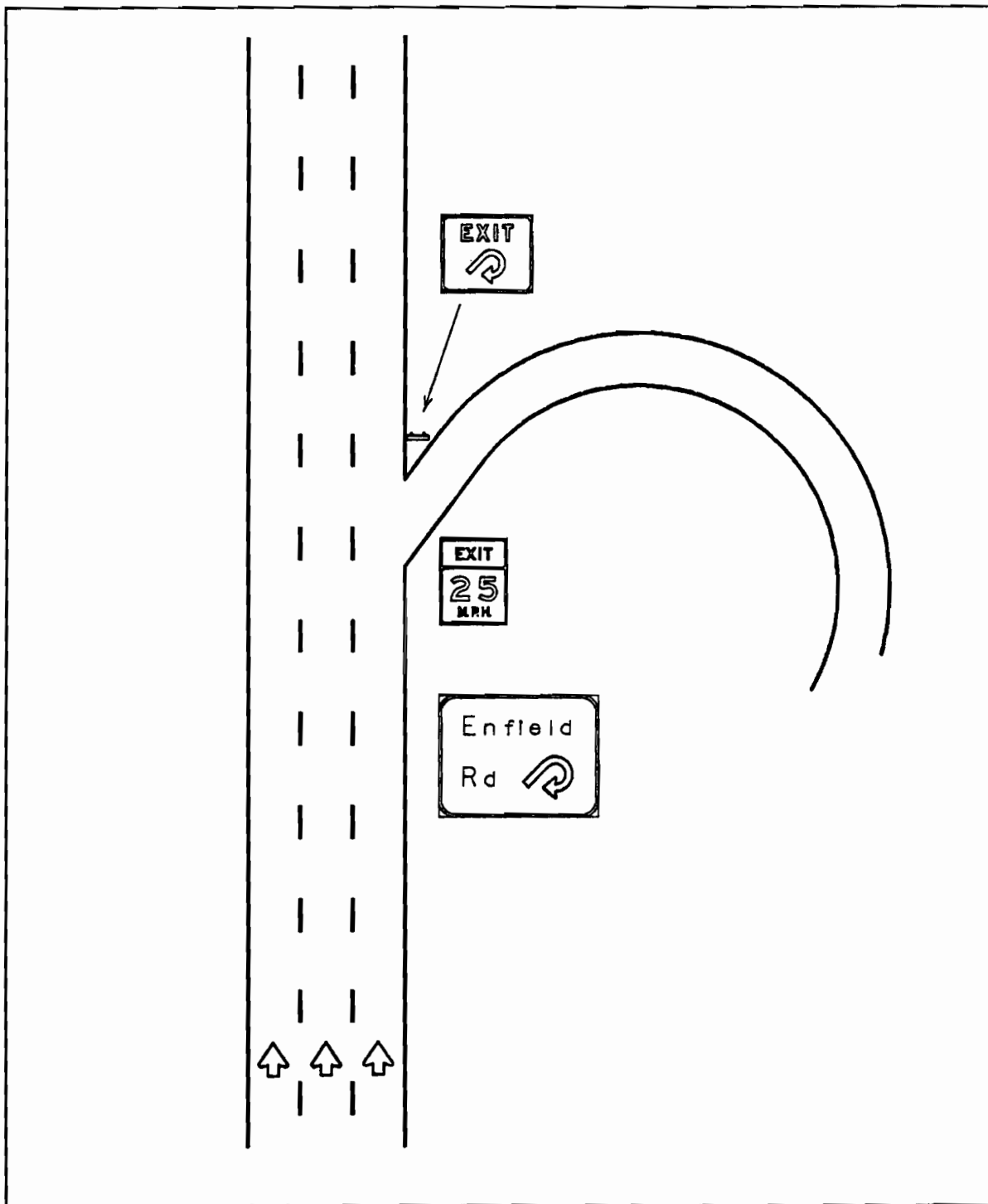


Figure 9-8. Use of circular arrow and exit advisory speed sign.

Abbreviations

Abbreviations should be avoided whenever possible, however abbreviations may be needed to limit the overall width of highway guide signs, especially freeway sequence signs.

Appendix C of this volume lists many acceptable abbreviations.

Except for the cardinal directions, no more than one word per line should be abbreviated. Significant words of the destination should not be abbreviated.

EXAMPLES: The following examples show acceptable and unacceptable abbreviations for street name signs.

North Point Place Boulevard	
✓ N Point Place Blvd	preferable
✗ N Pt Pl Blvd	unacceptable
✗ N Pt Place Blvd	unacceptable
Southwest Parkway	
✓ Southwest Pkwy	preferable
SW Parkway	acceptable
✗ SW Pkwy	unacceptable

Section 4 Overhead Sign Lighting

Standard Designs

Standard designs for overhead sign lights are shown in the *Traffic Control Standards Sheets*.

When to Use Lighting

Overhead lights are not required for signs fabricated with Type C high specific intensity sheeting (now the standard), except in areas where sign sight distance or geometric conditions warrant their use.

When an overhead sign in a rural area is refurbished, the district has the option to remove or retain the existing overhead sign lighting.

When overhead sign lights are omitted, sign walkways are not needed.

Power Supply

Sign lights on many older overhead signs are powered by the same circuits that furnish power to the freeway illumination system. Because freeway illumination systems are usually the maintenance responsibility of the city, TxDOT does not have complete assurance that signs which use illumination circuits will always have power available.

For these older systems with overhead sign lights powered through roadway illumination circuits, it is recommended that a systematic program be initiated to provide a separate metered power source for sign lights.

For new installations, a separate and independent power source for sign lights should be available.

Your Notes:

Section 5

Project Development

Programming Roadway Construction and Reconstruction

Signing is normally included in roadway construction contracts. Therefore, programming for sign work is automatically handled through the Transportation Planning and Programming Division (TPP) in accordance with normal procedures for the roadway project development in each funding category (Interstate, Federal-Aid Primary, Federal-Aid Urban, etc.)

Preparation of Schematics

Schematics are prepared for the entire section of highway within the project limits and should show how the proposed signing interfaces with adjacent signing outside the project limits.

The schematics may be prepared as a stage development of the project plans, and may be used later as plan sheets with the addition of other details and information that might be required.

Each sign should be numbered or tied to a station number for ease of reference in correspondence and later tabulation on plan summary sheets.

Freeways. Signing for freeways is developed in conjunction with the roadway design process, and therefore, freeway signing is to be shown on the preliminary roadway geometric schematics. This involves coordination between traffic engineering and geometric design personnel at an early stage in project development. The schematics must show the location and text of the proposed main lane guide signs, as well as lane configurations normally included in the geometric drawings. Districts submit four copies of the schematics to DES or TRF, depending on the type of project.

Expressways and Other Roadways. Signing for expressways or other roadway types may not be as complicated as that for freeways, so schematics may not be necessary. However, TRF review of schematics for any project with expressway type guide signing is recommended to help avert delays in PS&E review.

Approval of Schematics Required

On interstate highways, any proposed change to the main lane guide signs or the proposed addition of supplemental guide signs requires approval of the Traffic Operations Division (TRF) and the Federal Highway Administration (FHWA).

TRF or FHWA approval is not needed for:

- ◆ changes to regulatory or warning signs on expressways and freeways
- ◆ changes to signs on frontage roads of interstate highways
- ◆ changes to signs on non-interstate freeways or expressways.

NOTE: TRF should review all main lane guide sign changes on freeways.

Approval Process for Schematics

Districts submit schematics to the Traffic Operations Division (TRF) so that agreement can be reached on the proposed signing before the PS&E (plans, specifications, and estimate) stage.

After TRF's review, the district sends copies of the revised schematic drawings to TRF. If changes or additions to interstate highway main lane guide signs are involved, then *two* copies of the schematics should be sent TRF. TRF forwards one copy to the Federal Highway Administration (FHWA) for approval. After FHWA approval is received, TRF notifies the district that they may proceed with the work.

For rehabilitation work, schematics need not be submitted to TRF unless significant changes to existing sign locations or texts are proposed. (See Chapter 4 of this volume.)

Sign Post Weights

Calculation details for total post weights for "S" and "W" shape structural steel are given in the *Traffic Control Standard Sheets* on the work sheet for post selection. The post length to be shown on large sign tabulation sheets is measured from the base connection slip plate to the top of the post and does not include the stub length. The charts on the Post Selection Worksheet are designated by Zones 1, 2, and 3. These zones represent wind velocity regions of the state for design purposes. By referring to the zone map in the *Traffic Control Standard Sheets* and knowing the sign width and depth (height), one can use the selection charts on the work sheet to determine the post size as indicated by the chart curves. Sign mount "type" code should be included in the large sign tabulation sheets.

Sign Mounting Height

The minimum mounting height for large roadside signs should be determined by the vertical distance measured from the top of the edge of the pavement surface to the bottom edge of the sign panel.

Large roadside signs are typically one of the final items completed before a project is accepted as complete or opened to traffic. Due to the many variables during the construction process, the final grade line of the right-of-way may not be determined until the project is near completion. In some situations, the grade line may have changed significantly from the original plans.

To assure proper galvanization of the post end, TxDOT specifications and standards do not allow field cutting of a sign post. Because the contractor generally purchases sign posts in advance of the final determination of the exact grade line, the post lengths cannot be determined at the time of purchase. To alleviate this problem, the minimum and maximum sign heights are:

- ◆ 2.13 m (7 feet) minimum
- ◆ 2.59 m (8 feet, 6 inches) maximum.

Breakaway Mechanism

Although there is some flexibility with the mounting height of the sign as affected by the final grade line, very little flexibility can be given to the height of the sign breakaway mechanism above the final grade line. The stub post foundation and connection details of the breakaway mechanisms and maximum distance above the grade line are provided in the *Traffic Control Standard Sheets (TCSS)*. Project inspectors should be aware of these items for inspection of sign supports.

Overhead Sign Supports

In most cases, the type of overhead sign structure for each location is determined in the schematic stage.

The most common overhead support is the sign bridge with support towers on both sides of the through roadway. Occasionally it is necessary to use a balanced tee or single cantilever support with the tower located to the right or left of the through roadway. Rarely should braced tee or bridge cantilever supports be used.

Under no circumstances is an overhead sign structure tower to be located in the gore of a ramp.

See Section 7 of this chapter for more information on “Overhead Sign Structure Layout Sheets.”

Existing Overhead Supports

Where changes are proposed to existing overhead sign supports or existing overhead panels are being relocated or enlarged, the district is responsible for verifying the structural adequacy of the existing supports with the Design Division (DES) prior to submission of PS&E. The following data concerning such supports should be submitted to DES for review:

- ◆ project and job numbers under which the support was fabricated and erected
- ◆ line drawing of the support, including dimensions of all sign panels, both existing and proposed, and their locations along the span(s)
- ◆ the complete TxDOT standard designation for department designs and information as to whether the support is fabricated or structural steel shapes or steel tubes
- ◆ a set of the original design and shop drawings for the commercial designs, if available, or if not available, a complete description of the support, including span member and towers.

See Section 7 of this chapter for more information on “Modifying Existing Sign Structures.”

Section 6 Field Work

Introduction

After determining what signs are needed and approximately where they should be located based on the *TMUTCD*, traffic engineers conduct a field review to refine sign locations.

The purpose of the field work required for plan preparation is mostly to:

- ◆ verify or establish the final location of signs shown on the plan and profile sheets
- ◆ determine roadside sign post lengths
- ◆ determine overhead sign support spans and tower heights.

This may not be all the field work required, but normally constitutes the majority of it. Of course, some or all field work may be done during the schematic stage.

Sign Locations

For project plans prepared *before* the roadway slopes are constructed, the sign locations, post lengths, overhead support spans, and tower heights must usually be estimated from the roadway construction plans and other available data.

For project plans prepared *after* the final roadway slopes have been constructed, the proposed sign locations can be cross-sectioned and staked and the post lengths calculated from the cross-section data.

Sign Clearance

The minimum lateral clearances for both large and small roadside signs are shown in the *Traffic Control Standard Sheets*. On divided roadways with frontage roads where more than 9.14 m (30 feet) of clearance is available from the main lanes for large guide signs, the 9.14 m (30 foot) clearance should be held and clearance from the frontage road increased up to as much as 6.10 m (20 feet). If both the 6.10 and 9.14 m (20 and 30 foot) clearances can be provided and still more clearance is available, the remainder should be added equally to each. In no case, including that where frontage roads are not present, should a main lane guide sign be placed more than 12.19 m (40 feet) from the edge of the main lane pavement. The following table summarizes these guidelines.

If the available lateral clearance from the main lanes is...	Then lateral clearance between the large guide sign and the main lanes should be...
> 9.14 m (30 feet) but ≤ 15.24 m (50 feet)	9.14 m (30 feet)
> 15.24 m (50 feet) but ≤ 21.34 m (70 feet)	$9.14 \text{ m} + \frac{\text{total distance} - 15.24 \text{ m}}{2}$ -or- $30 \text{ ft.} + \frac{\text{total distance} - 50 \text{ ft.}}{2}$
> 21.34 m (70 feet) or when no frontage road is present	no greater than 12.19 m (40 feet)

Barriers and Attenuators

Normally, overhead sign supports having a lateral clearance of 9.14 m (30 feet) or more from the edge of the main lanes or ramp pavement need not be protected by a positive barrier. However, the decision regarding the usage and type of barrier, regardless of the support clearance from the roadway, should be based on the various considerations as discussed in *Roadway Design Guide for Construction Projects*.

An alternative to the barrier that should be considered is one of the several types of attenuators. Attenuators, if used, may be included in the project contract or may be installed by state forces. Contact the Design Division (DES) for more information on attenuators.

Section 7 Plans

Introduction

This section covers specific requirements that apply to the preparation of sign project plan sheets which are in addition to or in lieu of the requirements found in *Plans, Specifications, and Estimate Preparation Guide for Construction Projects*.

Interstate Sign Sizing Program

The Interstate Sign Sizing Program is a computer program for designing and drawing large green guide signs. The program automatically sizes and locates sign text and plots all the details necessary for use in plans and layout sheets. The program runs on MicroStation.

The Traffic Operations Division can furnish an instruction manual for the Interstate Sign Sizing Program, if there is not one in the district. If problems occur using this program, call the Traffic Operations Division for assistance.

Standard Plan Sheets

The district adds the standard plan sheets shown in the *Traffic Control Standard Sheets* to the project plans. The “Index of Sheets” shown on the title sheet should be checked carefully to ensure that all necessary standard plan sheets have been listed, since they are inserted in the plans according to this list.

Modifications. It may be necessary for a district to modify one or more of the standard plan sheets to fit certain field conditions. Where details on a standard plan sheet are changed, the sheet should be designated “MOD” or “Modified.” A brief description of the change and the date of change should be noted in the space provided near the title block.

NOTE: When a standard is modified, the supervising engineer is *required* to sign, date, and affix a Texas Register Professional Engineer seal.

Specification-Data Sheets

The purpose and use of the specification-data sheets for signing projects is no different than for other types of construction projects. The TxDOT functional manual titled *Plans, Specifications, and Estimate Preparation Guide for Construction Projects* describes these sheets in detail.

Typical Cross-Section Sheets

The district may include one or more typical cross-sections of the roadway within the project limits in the plans, if they would be of benefit to the contractor. This is not, however, a requirement for signing projects.

Estimate and Quantity Sheets

The Traffic Operations Division (TRF) prepares the estimate and quantity sheet from the information in the district's estimate. It is imperative that these estimates be accurate and follow strictly the requirements in the TxDOT functional manual titled *Plans, Specifications, and Estimate Preparation Guide for Construction Projects*. TRF inserts the estimate and quantity sheet during PS&E processing.

Sign Tabulation Sheets

Signing project materials are tabulated and summarized on the sign tabulation sheet(s), as shown on the examples in the *Traffic Control Standard Sheets*. Only pay items need be shown. Non-pay items are considered as subsidiary to other items in the project.

Tabulation of materials for small signs differs from that of large signs.

Small signs are considered by each complete installation (sign, support, foundation, hardware, etc. all together). Because the quantity of materials and labor required is essentially the same for all installations of a particular type of small sign support, tabulation of these signs is simplified by this procedure.

Large signs may vary considerably from one sign to the next in the materials and labor needed to accomplish installation. The tabulation, therefore, is segmented for large signs to show quantities of each material item.

Plan Sheets

Plan sheets graphically depict the placement and orientation of all the signs on the roadway itself. Each sign should be numbered for ease of reference with other plan sheets such as the sign summaries. All information shown on schematics should be included on the plan sheets as well as any other information that may facilitate field placement of the signs. An indication of the type and location of any existing signs, as well as the proposed signs, should be shown.

NOTE: Computer aided drafting (CAD) programs are available for creating plan sheets. Contact the Traffic Operations Division for details.

Guide Sign Layout Sheets

Guide sign layout sheets provide all the details necessary for the sign fabricator to lay out the sign text for each individual guide sign not detailed on the standard plan sheets.

Details included on the guide sign layout sheets are:

- ◆ the overall size of the sign calculated to the nearest multiple of 152 mm (6 inches)
- ◆ the exact text and its arrangement on the sign
- ◆ the heights of the capital, upper case, and lower case letters and numerals on the sign
- ◆ the width of the borders and the radius of the corner radii
- ◆ the size and designation number of route markers for interstate, off-interstate business loop, off-interstate business spur, U.S., Texas, loop, spur, park, F.M., and R.M. routes
- ◆ the width of Texas, loop, spur, park, F.M., and R.M. route markers (which depends on the number of digits in the route number)
- ◆ the interline spacing between all lines of text, including the space from the top and bottom edge of the sign to the adjacent line of text
- ◆ all arrows properly designated as to type as indicated on the standard plan sheets with orientation and location on the sign shown
- ◆ details of any non-standard texts such as may be used on diagrammatic signs
- ◆ any other information the contractor or fabricator may need to prepare working drawings for constructing the signs.

Each sign shown on the guide sign layout sheets should be designated in the same manner as on the plan sheets and the sign tabulations sheets. Also, care must be taken to ensure the sign text shown on the layout sheets agrees with the sign text shown on the plan sheets.

Overhead Sign Structure Layout Sheets

Overhead sign structure layout sheets show:

- ◆ the location of overhead sign structures with respect to roadway features at the proposed location *and*
- ◆ the orientation of signs on the structure in relation to the roadway main lanes and ramps.

It is very important that the layouts show all the information needed in the review, fabrication, and construction process *and* during later modifications or reinstallations.

(continued...)

Overhead Sign Structure Layout Sheets *(continued)*

Standards. The layout's title sheet should list the proper standards for insertion by the district reviewer.

Do not specify the following standards to be placed in PS&E:

- ◆ LOGO (1), (2), or (3) (these sheets are intended for a specific contract administered by TRF)
- ◆ summary of small or large signs — example
- ◆ large guide sign examples
- ◆ WV&IZ Wind Velocity and Ice Zone Worksheet
- ◆ TCP worksheet.

Do not specify truss, tower, or anchor bolt sizes on the layout sheet, as these are shown on the standard sheet.

Elevation View. A simple elevation view, together with the accompanying standard sheets, normally provides the contractor sufficient information to prepare the working drawings, fabricate the structure, and make the installation. If available when the plans are prepared, the following elevations should be shown on each overhead sign structure layout:

- ◆ top and bottom of each footing
- ◆ the centerline of the truss
- ◆ the finished grade line on each footing, if footing extends above grade line
- ◆ the highest point in the roadway
- ◆ the natural ground elevation or the average elevation of the surrounding terrain.

Lateral Positioning of Signs. Lateral positioning of sign panels and lighting fixtures should be shown in their relationship to the roadway lanes, ramps, etc. Sign panel dimensions should be shown, and truss span lengths should be indicated and sized as shown in the *Traffic Control Standard Sheets*. Drill shaft sizes should also be shown.

Vertical Positioning of Signs. A common problem seen on layouts is placement of signs vertically offset from the center of the truss. Sometimes designers position shallow signs with their bottom lines well below the truss and the top of the signs below the centerline. Although this practice may provide space for future deeper signs, the offset creates a significant wind load torsion. The strain of the torsion can reduce the design wind capacity of the structure, even though the actual wind area is less than the design wind area. All signs should be positioned so that approximately 46 percent of the wind area is below the truss centerline, as stated in the Overhead Sign Bridge (OSB) Standards.

(continued...)

Overhead Sign Structure Layout Sheets *(continued)*

Clearance. Normally clearance is set from the bottom of lights to the highest point on the roadway for overhead sign structures. Note, however, that for cantilever sign structures over superelevated roadways, the clearance may actually be less at a point other than directly over the highest point on the roadway.

Design Capacity. Specify the specific design capacity of the structure or foundation on the OSB layout.

EXAMPLE: The overhead sign bridge foundation shown herein is designed for a maximum span of 28.96 m (95 feet) with design wind speeds of 80 mph plus gust factors.

Soil Test Data. Soil test (penetrometer) data for each sign structure location must also be included on overhead sign structure layout sheets. If borings are not available, an assumed penetrometer value should be specified.

Field Verification. Designers should refrain from dependence on the note: “Field verification of existing dimensions must be made before fabrication.” It is important to recognize that the fabricator must work from the overhead sign bridge (OSB) layouts and standard drawings.

Anchor Bolt Orientation. Use the standard orientation for anchor bolts.

Sign Structure Towers and Median Barriers. Sign structure towers should not be imbedded in the median barrier. This design promotes corrosion and hinders proper inspection of the bolts in the future. The practice also adversely affects the tower forces in design wind conditions. The drilled shaft should be extended to the top of the barrier, and the standard anchor bolt orientations should be used. The median barrier should also be widened to provide a minimum of 0.30 m (12 inches) from the face of the barrier to the tower. This helps prevent snagging and failure of the structure when the barrier is hit by trucks, which lean over the barrier face.

Avoid Bridge Structures. Place sign bridges off of bridge structures if possible. Consider using a taller sign bridge supported independently of the bridge structure.

Special Designs. Use OSB standards if possible. All special overhead sign structure designs should be coordinated through the Design Division (DES). DES can often rate another standard design that can be used for the special condition, making the creation of a special design unnecessary. If another standard is used, the specific design capacity of the structure or foundation should be noted on the OSB layout.

EXAMPLE: The sign bridge at station 123+45 is designed Zone 4 with Ice (80 mph) for a span of 175 feet. The towers should be fabricated using standard HOSB-Z1L with an equivalent span of 160 feet. The truss should be fabricated to the 175 foot length using standard HOSB-Z1L for an equivalent span of 165 feet.

Modifying Existing Sign Structures

When modifying existing sign structures, the size and position of the existing base plate and anchor bolts should be shown on the layout sheet. Also show the base plate thickness. Failure to provide this information can cause confusion during shop plan preparation, checking, and construction. Inclusion of the following will ensure the necessary information is present:

- ◆ a small, simple plan of the existing conditions
- ◆ original contract information (contract number, CSJ, and date)
- ◆ original sign structure design and design standard [for example, Zone 4 with Ice (70 mph), HOSB-Z4I].

When adding new signs, lights, or walkways to existing structures, provide basic truss dimension and original design. Always place about 46 percent of the average wind area of the sign below the truss centerline.

Special Mounting Details Sheets

A special mounting detail sheet (or sheets) is required only when special mounting details not shown on the standard plan sheets are required. Probably the most common are those for attaching signs to roadway overpass structures.

Section 8 Specifications

General

Specifications for signs are included in the current *Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges*, published by TxDOT. However, due to periodic departmental changes in materials or work requirements, it may be necessary to modify certain provisions of the standard specifications or to void the standard item altogether. Special provisions and special specifications are developed for those purposes. It should be noted, however, that the standard specifications are worded broadly to cover most general items of work with the intent that minor deviations be handled by plan notes. The development of special specifications and special provisions is therefore to be held to a minimum. Before a new specification is considered, all standard and existing special specifications should be reviewed to determine if an appropriate specification has already been developed for similar work which approximates the proposed work.

Governing Specifications and Special Provisions

All specifications and special provisions applying to any project with signing should be listed on the Governing Specifications and Special Provisions Form as described in the TxDOT functional manual titled *Plans, Specifications, and Estimate Preparation Guide for Construction Projects*

Your Notes:

Chapter 10

Markings, Markers, and Delineators

Contents:

Section 1 — Overview	10-3
Section 2 — Pavement Marking Materials — General	10-5
Section 3 — Prefabricated Tape, Paint, and Thermoplastic Markings	10-7
Section 4 — Raised Pavement Markers	10-11
Section 5 — Which Type of Marking to Use	10-13
Section 6 — Delineators	10-15
Section 7 — Special Uses of Pavement Markings	10-17
Section 8 — Installation	10-21
Section 9 — Inspecting and Testing Pavement Markings	10-25
Section 10 — Maintenance and Reconstruction	10-27

Your Notes:

Section 1 Overview

Introduction

Traffic control markings are in the form of symbols, words, and patterns. They are designed to regulate, warn, or convey information to drivers without diverting attention from the roadway. Traffic control markings may be any of the following:

- ◆ thermoplastic, prefabricated markings, paint and beads, other types of striping material, or raised pavement markers installed on pavements, curbs, and obstructions
- ◆ object markers (light-reflecting devices) fastened to obstructions
- ◆ delineators (light-reflecting devices) used to indicate hazards or roadway alignment.

Purpose

Markings perform definite and important traffic control functions. In some cases, they are used to supplement the regulations or warnings of other devices, such as traffic signs or signals. They also perform independent functions. In such cases, traffic control markings should clearly convey regulatory, warning, or guidance information that would not otherwise be understandable.

EXAMPLE: On a freeway lane drop, lengthening the white channelizing line from the exit gore to well in advance of the gore provides the motorist with sufficient time to safely make a decision as to whether or not to change lanes.

Importance of Markings

Pavement markings are an important component of the communication system on the highway. It is very important that all markings are well maintained and clearly convey the necessary information.

Importance of Uniformity

Markings must be uniform in design, position, and application, as outlined in the *TMUTCD*. As in the case of all other traffic control devices, it is imperative that markings be uniform so that they may be recognized and understood instantly by all drivers.

Design

Careful planning and design of the pavement marking system is important to ensure a functional and accurate initial placement. Removal of permanent pavement markings for the purpose of adjustments or corrections is very expensive, time consuming, and disruptive to traffic.

Some special considerations in the design and placement of a pavement marking system include:

- ◆ adequate turning bay lengths
- ◆ dual turns geometry
- ◆ lane drop geometry
- ◆ merge conditions
- ◆ acceleration and deceleration lanes
- ◆ other channelization situations.

In addition, traffic volumes, requirements of the *TMUTCD*, and geometric design must be considered to achieve a good operating system.

The *Traffic Control Standard Sheets* contain pavement marking standard details which should be used in the development of plans, specifications, and estimates (PS&Es) and the placement of pavement markings.

Classification of Markings

Markings generally fall into the following functional classifications:

- ◆ pavement markings (striping and raised pavement markers)
- ◆ reflective object markers
- ◆ reflective delineators.

Section 2

Pavement Marking Materials — General

Introduction

This section discusses the various materials used for pavement markings. Specific applications of the most commonly used materials are covered in Section 3 and Section 4 of this chapter.

Types of Materials

There are several types of pavement marking materials. These types include:

- ◆ prefabricated (pressure or heat applied)
- ◆ sprayed or extruded
- ◆ raised
- ◆ new, experimental materials.

Descriptions of each of these categories follow under separate subheadings.

Prefabricated Markings

Prefabricated pavement marking tape (pressure or heat applied) has the same function as sprayed or extruded markings. The main difference between the prefabricated markings and sprayed or extruded markings is that the prefabricated markings are designed for greater durability. Prefabricated markings include:

- ◆ prefabricated pavement marking tape (pressure or heat applied)
- ◆ preformed thermoplastic pavement marking.

Section 3 of this chapter explains types and application methods of prefabricated markings.

Sprayed or Extruded Markings

Sprayed or extruded markings, as the term implies, are made by the application of paint-like materials by a machine or by manual methods. Sprayed markings may be thermoplastic or paint and beads; extruded markings are thermoplastic only.

Section 3 of this chapter explains the types and uses these markings.

Raised Markers

Raised pavement markers (RPMs) may be either retroreflective or non-retroreflective markers. They are usually made of high impact plastic or ceramic material. Types of RPMs include:

- ◆ reflectorized RPMs
- ◆ nonreflectorized traffic buttons.

Section 4 of this chapter explains the uses of RPMs.

Recommended Striping Material

Thermoplastic or prefabricated pavement markings are the recommended striping material for use on all roadways.

Factors Affecting Selection

Each type of pavement marking material has advantages and disadvantages. The most important considerations in the selection of a product are:

- ◆ initial cost
- ◆ durability
- ◆ remaining service life of pavement
- ◆ traffic volume.

Conditions and needs vary widely, and final selection of material type should be determined by the district. Further information on the use of prefabricated pavement marking tape, thermoplastic markings, paint and beads, and new experimental striping materials is in Section 3 of this chapter. Information on the use of raised pavement markers is in Section 4 of this chapter.

Section 3

Prefabricated Tape, Paint, and Thermoplastic Markings

Introduction

This section covers the use of prefabricated pavement marking tape, thermoplastic markings, paint and beads, and new experimental materials that may be used with approval from the Traffic Operations Division (TRF).

Prefabricated Pavement Marking Tape

The contract standard specification for prefabricated pavement marking tape is “Prefabricated Pavement Markings.” TxDOT’s Materials Specification DMS 8240, “Prefabricated Pavement Markings — Permanent,” classifies prefabricated pavement marking materials into three types, defined as follows:

Prefabricated Pavement Marking Types

Type	Description and Use	Minimum Projected Reflective Life
A	Pressure applied. Suitable for roadways with traffic volumes up to 10,000 average daily traffic (ADT) <i>per lane</i> .	1 year
B	Pressure applied. Suitable for roadways with traffic volumes up to 20,000 ADT <i>per lane</i> .	2 years
C	Heat applied (requires a propane torch type heat source for application). Suitable for intersection, legend, and symbol markings and for repair of existing, durable markings on all roadways.	2 years
Warranty Tape	Pressure applied. Suitable for all roadways. Preferred use should be limited to roadways with traffic volumes greater than 20,000 ADT per lane.	Refer to terms of warranty

Use of Prefabricated Pavement Marking Tape. Prefabricated pavement marking tape is initially more expensive than other marking systems. However, the use of tape is justifiable for certain specialized applications, as shown in the following table.

Justifiable Uses of Pavement Marking Tape

Situation	Recommended Type
Maintenance activities, such as spot fog seal, spot level up, or spot seal coat where the center line or edge line pavement markings are covered or obliterated	Four inch Type A prefabricated pavement marking tape is cost effective when compared with sending a striper to the location. In addition, better guidance is provided for drivers, since the tape can be applied at the end of the day’s work, eliminating the need for short term markings.
Marking projects where a durable marking is desired.	Type B prefabricated pavement marking tape may be justifiable.
New or existing concrete surfaces or high volume asphalt surfaces	Prefabricated pavement markings with warranty are appropriate.
High volume urban signalized intersections — stop lines, crosswalks, arrows	Type C prefabricated pavement marking tape may be justifiable.

(continued...)

Prefabricated Pavement Marking Tape *(continued)*

Prefabricated pavement markings for long line application should not be placed on top of longitudinal construction joints.

For new asphalt concrete pavement, Type B prefabricated pavement markings may be inlaid into the freshly rolled mat. Refer to the manufacturer's recommendation prior to this type of application.

Words and Symbols. Prefabricated tape cut-out words and symbols are available for most of the words and symbols normally used on pavement. Pavement arrows and railroad symbols are detailed in the *Traffic Control Standard Sheets*.

Material Approval. Prefabricated pavement marking materials are approved by the Materials and Tests Section of the Construction Division (CST) through a two year evaluation on the Austin Test Deck. The Materials and Test Section maintains a list of approved manufacturers and forwards this information to GSD, where it is published on the following Internet site:

<http://www.dot.state.tx.us/insdot/orgchart/gsd/purchasing/supps.htm>

Thermoplastic Pavement Marking

Thermoplastic pavement marking, in accordance with DMS 8220, is heated and applied by either spraying or by extruding onto the pavement. Good installation of this product requires an experienced crew and inspector. When properly formulated and correctly applied, thermoplastic should last from 3 to 4 years.

Use of Thermoplastic Pavement Marking. For construction projects that involve new pavement surface or for pavements that have several years of remaining life, thermoplastic should be used. The use of a longer lasting marking material, such as thermoplastic, reduces exposure of the striping crews and disruptions to traffic. The Federal Highway Administration (FHWA) gave blanket approval for this product on January 17, 1977.

Thermoplastic pavement marking is the Type I material in the contract standard specification "Reflectorized Pavement Markings." The use of hot sprayed thermoplastic material has proven to be a cost effective method of sustaining a good reflective stripe on all roadways.

Paint and Beads Pavement Marking

Paint and bead pavement markings, conforming with TxDOT Material Specifications DMS 8200, WPT-10, YPT-10, and DMS 8290 are included under contract standard specification “Reflectorized Pavement Markings Type II.” Paint and bead pavement markings are applied by spraying the materials onto the pavement surface.

The use of paint and bead pavement markings has been discouraged because the initial reflectivity is lower than other properly applied materials, such as thermoplastic markings. Paint and beads also do not retain their levels of reflectivity as well as other marking materials.

Paint and bead pavement markings may be installed at the district’s discretion under the following circumstances:

- ◆ by maintenance forces when the roadway is to be resurfaced before the cost of thermoplastic could be recovered
- ◆ as an interim striping on seal coats before the placement of thermoplastic.

New Pavement Marking Materials

The Traffic Operations Division (TRF) and the Construction Division (CST) are constantly experimenting with and evaluating new pavement marking materials and application methods in an effort to find more cost-effective and durable markings. Districts interested in experimenting with any of these marking materials should contact TRF to determine locations that can be monitored and evaluated.

Your Notes:

Section 4

Raised Pavement Markers

Introduction

Raised pavement markers (RPMs) include reflectorized raised pavement markers and non-reflectorized traffic buttons.

The contract specification item for all RPMs is “Raised Pavement Markers.”

Use

Reflective RPMs may serve as a positioning guide or a supplement to pavement markings. Raised markers should not be used to form, outline, or supplement stop lines or crosswalks at intersections or other locations, because of the tripping potential for pedestrians and the turnover potential for motorcycles and bicycles making turns under wet conditions. When raised retroreflective markers are used to supplement centerlines or lane lines, roadside delineation may not be necessary (see information on delineation in Section 6 of this chapter).

Position guidance placement is used to show the driver where the centerline or lane lines of the roadway are located. Supplemental markings are installed along the outside of the solid centerlines. The spacing and location of the markings are intended to inform the driver if passing is allowed and also mark the lane line location.

RPMs should not be used in place of pavement markings for pavement marking arrows, symbols or words, except for wrong way arrows.

Reflectorized Raised Pavement Markers

Reflectorized raised pavement markers are high impact plastic markers approximately 4 inches square and $\frac{3}{4}$ inch high with one or two retroreflective faces. Bitumen or epoxy adhesives are used to fasten reflectorized RPMs to the pavement.

Reflectorized RPMs provide good nighttime retroreflectivity on both wet and dry pavement.

Use. Reflectorized RPMs are used (as detailed in the *Traffic Control Standard Sheets*) to:

- ◆ provide retroreflectivity
- ◆ provide delineation and guidance
- ◆ enhance the reflectivity of pavement markings.

An added benefit of reflectorized RPMs is the noise effect which may notify inattentive drivers that they have crossed the center or lane line.

Traffic Buttons

Traffic buttons are round or oval dome-shaped buttons made of ceramic or plastic material with a minimum width of 4 inches and maximum height of 1 inch.

Non-reflective traffic buttons may be used for shoulder texturing as shown on the “Shoulder Texturing” (ST) Standard Sheet. Non-reflective buttons may also be used to simulate striping patterns during construction operations, as detailed on the BC or WZ(STPM) Standard Sheets. If there is a need to simulate permanent striping patterns with some type of raised markings, the preferred method is to use reflectorized profile pavement markings.

Section 5

Which Type of Marking to Use

Introduction

Safety, economics, and durability are some of the factors in determining which combination of pavement markings to use. The life cycle cost of the product is also a major consideration.

NOTE: The guidelines described in this section are minimum standards for use by all districts.

For more information and details on marking patterns that may be installed on the various roadway types, see Part III of the *TMUTCD* and the *Traffic Control Standard Sheets*.

Roadway Considerations

On high volume roadways, such as urban freeways, a more durable product is desirable. Thermoplastic markings or prefabricated tape are durable products. For installation techniques, see Section 8 of this chapter. For maintenance considerations, see Section 10 of this chapter.

On rural freeways and divided highways, properly applied thermoplastic or prefabricated markings provide a highly visible, durable stripe. Reflectorized raised pavement markers (RPMs) installed on 80 foot centers between the lines enhance roadway delineation during both nighttime and inclement weather.

On lower volume roads, thermoplastic markings and reflectorized RPMs provide guidance and delineation along the centerline when installed using vehicle positioning guidelines.

Use of Reflectorized Raised Pavement Markers

Roadway width determines the application of reflectorized RPMs, as shown in the following table:

Application of Reflectorized RPMs	
Roadway Width	Type of Use
all roadways	<p>Must be installed using position guidance spacing at a minimum.</p> <p>EXCEPTION: The Amarillo District and portions of the Lubbock and Childress Districts with roadways on the Caprock are required to install, maintain, and replace reflectorized RPMs spaced for position guidance <i>only</i> on the Interstate Highway System and other high-volume and major roadways. Since raised pavement markers are easily destroyed by snowplows, it may not be cost-effective to install RPMs on every roadway.</p>
24 feet or wider	<p>May be used to supplement standard pavement markings to address safety concerns. They should not be used on a blanket, district-wide basis.</p>

Use of Traffic Buttons

Non-reflective traffic buttons may be used to substitute for pavement markings during construction operations. Since the non-reflective buttons do not increase nighttime or wet weather reflectivity and can become a maintenance problem when installed in high volume traffic areas, they should not be used to simulate striping patterns on permanent installations. Reflectorized profile pavement markings should be used when there is a need to simulate striping patterns with some type of raised marking.

Reflectorized profile pavement markings are the preferred shoulder-texturing device when continuous rolled depressions or milled depressions cannot be installed. Non-reflective traffic buttons may be used as shoulder-texturing devices at the districts' discretion, as shown on the ST Standard Sheets.

High Volume RPMs

High volume (HV) raised pavement markers (RPMs) are suitable on pavements that will not be resurfaced for at least two years.

The following general note to Standard Specification 672, "Raised Pavement Markers," may be used to call the contractor's attention to HV markers on a project:

All raised pavement markers are required to meet Departmental Materials Specification DMS 4200, Pavement markers (Reflectorized), high volume (HV) classification. A list of qualified suppliers is maintained by the department's General Services Division.

Section 6 Delineators

Use of Delineators

Expressways and Freeways. The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* has specific language on the use of post mount delineators on expressways and freeways. Delineators are required on curved sections of expressway and freeway roadways; however, they are considered optional on tangent sections of expressways and freeways when all the specified conditions of the *TMUTCD* are met.

Conventional Highways. The use of delineators on other types of roadways is optional. The *TMUTCD* indicates that single delineators *may* be provided on curves and hills. The *TMUTCD* also recommends the use of double delineators at median crossovers along acceleration/deceleration lanes, the use of single delineators on approaches to narrow bridges, and the use of single delineators to indicate the narrowing of the pavement where either an outside or inside lane merges into an adjacent lane.

The *Sign Crew Field Book* (published by TRF) also contains some information on the use of delineators on the major types of roadways.

Delineation on Guardrail

For details on guardrail or bridge rail delineation, see the *Sign Crew Field Book*.

Raised Pavement Markers vs. Delineators

In determining where to install delineators, consideration should be given to the extra maintenance effort they entail in regard to herbicide use, mowing, and replacement. In many instances raised pavement markers (RPMs) — where allowed by the *TMUTCD* — provide sufficient delineation and may be more cost-effective.

Although RPMs may require replacement as often as once per year, research suggests that they may be more cost-effective at horizontal curve locations where post-mounted delineators are frequently knocked over.

(continued...)

Raised Pavement Markers vs. Delineators *(continued)*

In locations needing additional emphasis, use of several guidance methods, such as RPMs, delineators, and chevrons may be used alone or in combination. The following guidelines may be used for determining the additional delineation needed at horizontal curve locations where the advisory speed is less than the posted speed limit.

Guidelines for Use of Warning Devices at Curves with Advisory Speed Limits

<u>Amount by which Advisory Speed Is Less than Posted Speed</u>	<u>Warning Devices Needed</u>
0 to 14 MPH	RPMs
15 to 24 MPH	RPMs and Delineators
25 MPH or greater	RPMs and Chevrons

Section 7

Special Uses of Pavement Markings

Introduction

This section explains some miscellaneous uses of pavement markings. The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* and the *Traffic Control Standard Sheets (TCSS)* provide greater detail on these markings.

Edge Lines

Pavement edge line markings provide an edge-of-pavement guide for drivers. They have a special value as a visual reference during adverse weather and times of reduced visibility.

Edge lines are required on interstate highway main lanes and on rural multi-lane divided highways.

Edge line pavement markings are required on all undivided highways with traveled ways that are 20 feet wide or wider. (The *traveled way* includes only that portion of the roadway used for vehicular travel and *not* the parking lanes, sidewalks, berms, or shoulders.) This requirement applies to all rural highways, regardless of the number of travel lanes or shoulder characteristics. Edge line pavement markings should be included in PS&E submissions for rural highways.

Shoulder Treatments

The term “shoulder treatment” refers to texturizing the shoulder in a way to provide an audible, vibratory warning to errant drivers who drift onto the shoulder. Shoulder texturing should be installed on rural interstate and rural divided highways of four lanes or more. Shoulder texturing is not recommended for rural four-lane or more undivided and rural two-lane highways, except in special cases where a significant number of crashes, by frequency and percentage of total crashes are run-off-the-road crashes and the installation of shoulder texturing devices is determined to be cost beneficial. Shoulder texturing is not recommended for urban facilities. Shoulder treatment may consist of:

- ◆ milled depressions into existing pavements
- ◆ a series of depressions rolled into the new asphalt
- ◆ edge line made of reflectorized profile pavement markings
- ◆ non-reflective buttons, as shown on the ST Standard Sheet.

Curb Marking

Curb marking for parking restrictions are used to show where parking is prohibited at all times. The TxDOT standard for curb marking is solid yellow color covering the face and top of the curb. Curb markings are usually confined to urban areas where curb and gutter sections prevail. Cities and counties may define by ordinance the color of curb markings for parking restrictions. It is advisable to establish parking regulations through the use of signs. When signs are not used, restrictions should be stenciled on the curb.

Rumble Strips

Several studies have provided inconclusive evidence on the effectiveness of rumble strips or raised pavement markers (RPMs) placed across the travel lanes in preventing crashes. It was found that startled drivers suddenly coming upon a raised profile in the travel lane have a tendency to jam on the brakes and possibly stop prematurely. The action of braking on the raised section of the roadway, especially at high speed, can result in loss of vehicle control.

The use of rumble strips may be warranted in some high crash locations when other warning devices have not worked. The use of rumble strips across the travel lanes should be carefully considered before installation. TRF should be notified of all locations before the installation of rumble strips across the travel lanes.

Temporary (Work Area) Markings

Thermoplastic pavement marking material is recommended for temporary pavement markings for construction and maintenance work areas. Raised reflective pavement markers and non-reflective buttons may be used to simulate striping patterns when deemed necessary by the district. The *TMUTCD* and the Barricade and Construction Standard Sheets in the *Traffic Control Standard Sheets* provide details and more information on work area pavement markings. For seal coat projects, see the standard, "Traffic Control Details for Seal Coat Operations."

Disabled Parking Markings

The Texas Accessibility Standards of the Architecture Barriers Act, adopted April 1, 1994, provides the standard for markings in accordance with the Americans with Disabilities Act (ADA). See PM(AP) in the *Traffic Control Standard Sheets* for typical pavement marking patterns for accessible parking. (See Chapter 5 of this volume for information on signing for disabled parking.)

Flexible Delineator Posts

Flexible (or surface mounted) delineator posts are cost effective in areas where delineators are frequently knocked down and reflectorized raised pavement markers are not sufficient.

Mail Box Support Delineation

For details on mailbox support delineation, see the *Sign Crew Field Book*.

Your Notes:

Section 8 Installation

Importance of Properly Installed Markings

It is essential that all centerlines and lane lines be properly aligned. Straight, uniform, well defined pavement markings contribute to the safety and appearance of the roadway.

Preliminary Delineation

Proper location of centerlines and lane lines is essential for a good marking system. The layout delineation should be easy for the marking machine operator to follow.

Preliminary layout should include:

- ◆ reference points for the termini of no-passing zones
- ◆ suitable indications for pavement width transitions and other pavement markings.

On pavements with longitudinal joints, markings must be offset to permit filling the joint without destroying the stripe.

Traffic lines are not normally continued across an intersection, however, where conditions indicate a need, see Section 3B-7 of the *TMUTCD*.

Who Does the Work?

Pavement markings may be installed by state forces or by contract.

State forces are limited to the types of materials and equipment available to the district. Most state force work is limited to small projects and routine maintenance activities.

Contract work can be used for all types of marking materials. This work can be accomplished under a separate contract or combined with a roadway project.

Pavement Marking Installation Methods

Pavement marking installation methods vary depending on whether the markings are longitudinal or transverse.

Longitudinal markings, usually applied by high speed mechanized strippers, include:

- ◆ center lines
- ◆ lane lines
- ◆ no-passing zone markings (barrier lines)
- ◆ pavement edge lines
- ◆ lane reduction transition
- ◆ channelizing lines.

Transverse markings, which can be more economically applied by low-speed marking equipment or by manual methods, include:

- ◆ approach to obstruction markings
- ◆ stop lines
- ◆ crosswalk lines
- ◆ pavement word and symbol markings
- ◆ preferential lane markings
- ◆ parking space limit markings
- ◆ curb markings for parking restriction.

Curb markings are usually applied with a small self-propelled striping machine equipped with a side attachment designed for the application of paint and beads to a vertical surface.

Cleaning

All pavement marking materials have one installation requirement in common: The pavement must be clean, dry, and free of loose material to achieve a good final product. Commonly used pavement cleaning methods are: brushing, sandblasting, waterblasting, and airblasting.

NOTE: Portland cement concrete surfaces must not be cleaned by grinding.

For contract projects, the standard specification item “Pavement Surface Preparation for Markings” should be used.

Material Specific Information

The contract specifications, the Materials and Tests material specifications, and the manufacturer's instructions provide information on installation techniques for each material. To obtain good results, persons responsible for pavement marking installation must be familiar with the appropriate application techniques.

Temperature Factor. Minimum and maximum pavement temperatures and seasonal restrictions for various pavement marking materials must be considered when choosing the material to use and the time of year for application. This information can be found in the specifications: "ReflectORIZED Pavement Markings" and "Prefabricated Pavement Markings."

Markers on New Pavement

A two-week period is recommended to allow the pavement to "cure" before the markers are installed on new asphaltic concrete pavement (ACP) or seal coat surfaces. This cure time is needed to ensure better adhesion between the asphaltic surface and the RPMs. Seal coats should be broomed before installing RPMs.

Applying Adhesive

When installing raised pavement markers, different amounts of adhesive are needed, depending on the type of pavement surface. Too much adhesive can result in the adhesive being tracked onto the markers' lenses, thus hindering retroreflectivity.

Critical points to bear in mind when applying markers are:

- ✓ Keep the adhesive kettle temperature at or above the lower limit of the specified range.
- ✓ Apply only enough adhesive to the pavement so that the corners of the marker contact the adhesive.
- ✓ Place the marker on the adhesive using little to no pressure before the adhesive glazes over, usually 5 to 10 seconds after the adhesive hits the pavement.

Applying Prefabricated Pavement Marking Tape

The following general rules apply to all tape applications:

- ✘ DO NOT APPLY tape in longitudinal direction on seams or joints of the pavement.
- ✘ DO NOT APPLY tape on deteriorating pavement surfaces.
- ✘ DO NOT APPLY tape over existing marking materials without contacting the appropriate sales or technical representative.

Section 9

Inspecting and Testing Pavement Markings

Introduction

Efficient control of traffic requires well defined traffic lines and pavement markings. During inclement weather and at night, good reflectorized pavement markings are especially important. For this reason, all pavement markings must be maintained in first class condition through a regular inspection and restriping program.

Standard Method

Test Method Tex-828-B, “Method for Determining Functional Characteristics of Pavement Markings for Replacement Scheduling,” sets forth the replacement scheduling and procedures for maintenance restriping. The test method is TxDOT’s uniform statewide standard and can be found in TxDOT’s *Manual of Testing Procedures*. The following guidelines are taken from the test method.

Inspection Guidelines

One day and one night inspection of pavement markings should be conducted yearly. Inspection can be conducted from a moving vehicle. For details on performing these inspections, see Test Method Tex-828-B.

Replacement Guidelines

The number of individual stripes visible on the road ahead indicates the appropriate replacement schedule. The following table shows the replacement schedule for both day and night inspections.

Pavement Marking Replacement Guidelines
(based on inspection results)

Number of Stripes Visible		Replacement Schedule
Day	Night (using low beam)	
6 or fewer*	3 or fewer	As soon as practical
7 to 9	4 or 5	At ½ of current life**
10 or more	6 or more	No scheduling needed
<p>* Check markings failing this criterion to determine if accumulation of dirt or grime has caused the failure. On some roadways, markings may barely meet or fail this criterion yet exhibit good to excellent night performance.</p> <p>** For example, if current markings have been in place for eight months, replacement should be scheduled in approximately four months. Markings should be rechecked prior to actual replacement because markings frequently drop to this level of visibility within four months and then remain constant for an extended period, especially on roadways of less than 3,000 ADT.</p>		

Inspection Report

Documentation of pavement marking inspections is important. Inspectors should fill out an inspection report for each inspection run. The reports should be filed at the district office with a copy retained by the maintenance supervisor. Typically a pavement marking inspection report should include:

- ◆ the date
- ◆ the maintenance section
- ◆ the supervisor's signature
- ◆ the inspector's signature
- ◆ the roadways checked and findings
- ◆ immediate action taken
- ◆ future action needed
- ◆ comments.

To document inspections, inspectors may use the Sign and Striping Inspection Report form. A sample of the form is provided in Appendix A of this volume and may be photocopied as necessary. Copies (electronic or hard) may also be obtained from the Traffic Operations Division. If a different format or a more detailed report is preferred, districts may produce their own form.

Section 10

Maintenance and Reconstruction

Level of Service

The *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division) contains “Level of Service” guidelines for planning and performing various maintenance activities in accordance with available funds. The guidelines define three possible funding levels: desirable (highest), acceptable, and tolerable (lowest). Maintenance priorities are assigned, based on the level of funding, and maintenance forces are supposed to “substantially maintain” the various highway components accordingly.

See the *Infrastructure Maintenance Manual* for specific level of service guidelines for delineators (same as that for signs) and pavement markings under each level of funding.

Removal of Pavement Markings

The removal of old pavement markings, when necessary, should be accomplished using standard specification item “Eliminating Existing Pavement Markings and Markers.”

“Painting out,” or covering the old stripe with paint, is *not* an acceptable removal technique. After a little wear, the old glass beads show through the newly applied paint, causing the old line to become reflective at night when good markings are critical.

Restriping Must Coincide With Original

In all restriping operations, new traffic lines and pavement markings should accurately coincide with the original, unless the roadway geometrics have changed.

Federal Participation in Raised Pavement Marker Replacement

Federal Highway Administration (FHWA) regulations allow federal participation in raised pavement marker (RPM) replacement projects when existing markers have exceeded their service life and are no longer functional. The FHWA requires that the work be classified as *construction* or *reconstruction*, as opposed to maintenance, and that the state has approved guidelines for marker applications.

Maintenance and Replacement of RPMs

Maintenance of existing raised pavement markers (RPMs) before the recommended full replacement cycle involves the replacement of only those markings that are missing. It is generally practical to maintain RPMs in this manner only at spot locations using butyl rubber adhesive pads or hand mixed epoxy adhesive.

The effectiveness of an RPM system can generally be determined by viewing the markings at night using low beam headlights while driving a passenger car. The following table provides guidelines for maintaining an RPM system based on the results of such a nighttime test inspection.

When to Schedule RPM System Maintenance	
For Markers Spaced at...	Maintenance Should be Scheduled as Soon as Possible if...
80 ft.	fewer than 2 markers are visible.
40 ft.	3 or fewer markers are visible.

If a roadway has several areas needing new RPMs, it is more practical to replace all RPMs on that roadway. The following table *may* be used as a guideline for replacement of a complete marker system.

Suggested Replacement Cycle for Raised Pavement Markers	
Roadway ADT	Replacement Cycle
greater than 50,000 ADT	1 year
greater than or equal to 10,000 ADT	2 – 3 years
less than 10,000 ADT	3 – 4 years

Regardless of its age, a system is considered no longer effective when the raised pavement markers become worn and lose retroreflectivity. Special emphasis should be placed on maintaining a high quality RPM system on interstate highways.

Wrong Way Arrows

Daytime inspections of retroreflective pavement markers for wrong way arrows should be conducted every six months. Nighttime inspections for retroreflectivity should be conducted every 12 months.

Markers should be replaced when arrow shape is no longer distinguishable.

On ramps where wrong way arrows cannot be adequately maintained at a six month frequency, thermoplastic or prefabricated pavement marking arrows could be used. If maintenance problems persist, then the pavement marking arrows could be eliminated in favor of additional signing.

Object Markers and Delineators

Maintenance of object markers and delineators consists of keeping the retroreflective surfaces in good repair and in a state of maximum visibility by cleaning and replacement when necessary. It is also important to keep supports in their installed position.

Maintenance in Cities

The maintenance agreement with the city defines the maintenance responsibility. If the state is responsible, inspection and replacement should be governed by the guidelines set forth in this manual.

Your Notes:

Chapter 11

Other Traffic Control Situations

Contents

This chapter contains the following sections:

Section 1 — Overview	11-3
Section 2 — School Areas	11-5
Section 3 — Bicycle Facilities	11-7

Chapter 11 — Other Traffic Control Situations

Your Notes:

Section 1 Overview

Introduction

This chapter covers certain traffic control situations requiring special treatment. Other uses of the right-of-way not covered in this chapter may be found in the *Infrastructure Maintenance Manual* (to be published by the Construction and Maintenance Division),

For information on temporary use of the right-of-way by persons or entities other than TxDOT (parades, special events, and film and video productions), see the *Traffic Engineering Agreements Volume* of the *Traffic Operations Manual*.

Your Notes:

Section 2

School Areas

Introduction

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)*, Part VII, is devoted to traffic controls for school areas (signs, markings, etc.). *Procedures for Establishing Speed Zones*, a volume of the *Traffic Operations Manual*, covers speed zoning for school areas. This section provides additional information applicable to traffic and pedestrian control in school areas where TxDOT maintains traffic control devices (normally cities with populations under 50,000).

Remedial Measures

TxDOT should make use of all appropriate devices to ensure that maximum safety is provided in school areas. Devices which may be applied singly or in combination as determined necessary by a traffic engineering study include:

- ◆ signs and sign flashers
- ◆ pavement markings
- ◆ the widening of pavement in front of the school
- ◆ channelization to provide turn lanes for traffic entering school driveways
- ◆ overhead flashing beacon in front of school drive if traffic entering and exiting the school creates a hazard (as determined by the traffic engineering study)
- ◆ traffic signals
- ◆ speed zones

TxDOT may also recommend that the school district make certain changes on the school's property to ensure the success of the highway improvements or to increase safety in the area. Examples include:

- ◆ the installation of a fence to encourage use of a crosswalk
- ◆ revising traffic flow patterns in the school parking areas.

Planning

Signing for schools needs to be carefully planned and executed. Close coordination and communication with the school is an important part of the process. District personnel should maintain close contact with school officials so they can become aware of proposed building programs or other problems at an early stage and implement prompt solutions. Foreknowledge of proposed building plans allows districts to offer suggestions on access points and schedule installation of needed safety devices so that they can be in place when needed.

Overhead Signs

In urban areas overhead signs may be necessary to provide adequate sight distance or sight recognition due to ground congestion of trees, poles, signs, awnings, and other things.

Sidewalks

It may be desirable to add sidewalks to help remove the children from the street or channel them to an intersection. Funding of sidewalks is usually a problem, but this may be accomplished through the city, school, and sometimes federally funded projects.

Section 3

Bicycle Facilities

Introduction

Section 201.902 of the Texas Transportation Code and Sections 25.50 – 25.54 of the Texas Administrative Code require TxDOT to:

- ◆ seek comments on policies and certain highway improvement projects from a Bicycle Advisory Committee
- ◆ take bicycle accommodation into consideration during the planning and implementation of all construction and rehabilitation projects.

The *TMUTCD*, Part IX, deals with various functions of signs and markings for bicycle facilities. TxDOT has adopted the American Association of State Highway and Transportation Officials' (AASHTO) "Guide for the Development of Bicycle Facilities," which contains additional standards for bicycle facility design. The *Traffic Control Standard Sheets (TCSS)* contain a series of standards to assist designers in the development of bicycle lanes adjacent to travel lanes. These standards include typical signage and pavement markings.

State Bicycle Coordinator

TxDOT's Multimodal Operations Office (MMO) has a state bicycle coordinator who coordinates highway projects and policies of TxDOT at the state level that might affect bicycle use on the state highway system. The state bicycle coordinator is available to help answer questions and coordinate activities.

District Bicycle Coordinator

Each district appoints a district bicycle coordinator to represent the district in the statewide bicycle effort.

Your Notes:

Appendix A

Forms

Introduction

This appendix contains samples of the forms described in this volume. These forms may be photocopied as necessary. Copies may also be obtained from the Traffic Operations Division.

List of Forms

This appendix contains the following forms in the following order:

TxDOT Form Number/Form Name	# of Pgs.	Described in Chap.
(no #) Sign and Striping Inspection Report	1	4 & 10

Notes:

SIGN AND STRIPING INSPECTION REPORT

Maintenance Section: _____ Inspection Date: _____

Supervisor: _____

Reported by: _____

Roadways Checked & Findings: _____

Immediate Action: _____

Action Needed: _____

Comments: _____

Copy to: _____

Appendix B

Obtaining Other Publications

Publications referenced in this volume may be obtained from the following sources:

Publication	Source
<i>Texas Manual on Uniform Traffic Control Devices (TMUTCD)</i>	Texas Department of Transportation Attn.: General Services Division Publication Sales 125 E. 11th Street Austin, Texas 78701-2483 phone: 512/451-6206
<i>Standard Highway Sign Designs for Texas</i>	
<i>Standard Specifications for Construction of Highways, Streets, and Bridges</i>	
<i>Infrastructure Maintenance Manual</i> (to be published by the Construction and Maintenance Division)	
<i>Traffic Operations Manual</i> (all volumes) (Published by the Traffic Operations Division)	
<i>Traffic Control Standard Sheets (TCSS)</i>	Traffic Operations Division
<i>Barricade and Construction Standard Sheets</i>	
“Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations”	
<i>Interstate Sign Sizing Program Manual</i>	
<i>Sign Crew Field Book</i>	

Notes:

Appendix C

Standard Abbreviations for Freeway Guide Signs

Introduction

This appendix lists standard abbreviations for use on freeway sequence signs and other signs when necessary. See Chapter 9 of this volume for more information on the use of abbreviations.

Sources. These standard abbreviations were compiled from the following sources.

- ◆ FHWA Memorandum 11/5/68
- ◆ United States Postal Service — 1987 Zip Code Directory.

Special Notes

Periods are neither required nor suggested unless noted.

NORTH, SOUTH, EAST, and WEST abbreviations are intended for use with name of place or street. Cardinal directions should not be abbreviated when used in conjunction with route shields.

Abbreviations

Word(s)	Abbreviation
Air Force	(<i>see</i> : United States Air Force)
Air Force Base	AFB
Alternate	ALT <i>or</i> Alt
Arkansas (the state)	Ark (<i>preferred</i>), AR, <i>or</i> Ar
Army	(<i>see</i> : United States Army)
Authorized Vehicle Lane(s)	AVL
Avenue	Ave
Beltway	Bltwy (<i>shield preferred</i> *)
Boulevard	Blvd

N/R = abbreviation of word(s) is not recommended

* In most cases, shields are preferred for designation of highway routes.

Word(s)	Abbreviation
Business	N/R
Bypass	N/R
Causeway	Cswy
Center	Ctr (<i>example: Conv Ctr</i>)
Circle	Cir
Coast Guard	(<i>see: United States Coast Guard</i>)
Construction	Const
Convention	Conv
County	Co
Court (street name only)	Ct
Cove	Cv
Crossing	Xing
Downtown	N/R
Drive	Dr
East	E
Expressway	Expwy
Farm Road	FM (<i>shield preferred*</i>)
Farm to Market Road	FM (<i>shield preferred*</i>)
Fort	Ft
Freeway	Frwy
Gardens	Gdns
Heights	Hts
High Occupancy Vehicle	HOV
Highway	Hwy
Hospital	N/R
Institute	Inst
Interchange	Intchg
International	Intl
Interstate	IH (<i>shield preferred*</i>)
Junction	JCT or Jct

N/R = abbreviation of word(s) is not recommended

* In most cases, shields are preferred for designation of highway routes.

Word(s)	Abbreviation
Junior College	JC or J.C.
Lane	Ln
Left	N/R
Loop	N/R (use shield*)
Louisiana (the state)	La (preferred) or LA
Marine Corps	(see: United States Marine Corps)
Maximum	Max
Mexico	N/R or Mex.
Miles Per Hour	MPH
Minimum	Min
Mount	Mt
Mountain	Mtn
National Guard	N/R
Naval Air Station	NAS
New Mexico (the state)	NM
North	N
Oklahoma (the state)	Okla (preferred), OK, or Ok
Park	N/R
Park Road	PR (shield preferred*)
Parkway	Pkwy
Place	Pl
Point	Pt
Port	N/R
Ranch Road	RM (shield preferred*)
Ranch to Market Road	RM (shield preferred*)
Right	Rt
Road	Rd
Route	Rte
South	S
Spring	Spg

N/R = abbreviation of word(s) is not recommended

* In most cases, shields are preferred for designation of highway routes.

Word(s)	Abbreviation
Spur	<i>N/R (use shield*)</i>
Square	Sq
State	<i>N/R</i>
State Highway	<i>SH (shield preferred*)</i>
Street	St
Summit	Smt
Terrace	Ter
Temporary	Temp
Through	Thru <i>or</i> THRU
Toll Road	<i>N/R</i>
Trail	Tr
Trucks	<i>N/R</i>
Turnpike	Tpke
University	Univ
United States	<i>US or U.S.</i>
United States Air Force	<i>USAF or US Air Force</i>
United States Army	<i>US Army</i>
United States Coast Guard	<i>USCG or US Coast Guard</i>
United States Marine Corps	<i>USMC or US Marine Corps</i>
United States Navy	<i>USN or US Navy</i>
Weight	Wt
West	W

N/R = abbreviation of word(s) is not recommended

* In most cases, shields are preferred for designation of highway routes.

Appendix D

Replacement Costs for Various Traffic Control Devices

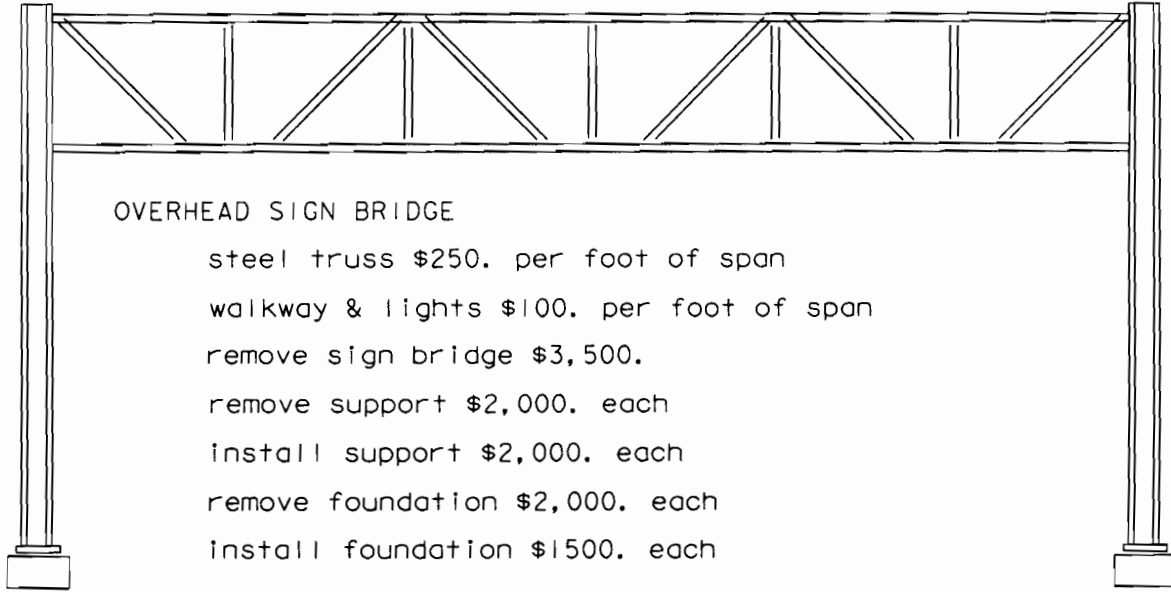
This appendix contains an illustrated guide showing average costs for replacing various traffic control devices. The information is primarily used by the Department of Public Safety to estimate the cost of damage caused by motor vehicle crashes. If the district is called upon for an estimate, this guide can be used or a more detailed estimate may be done. The costs shown in the guide include materials and labor.

Notes:



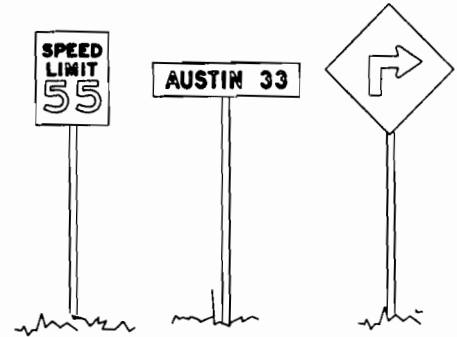
TEXAS DEPARTMENT OF TRANSPORTATION

Prepared by Traffic Operations Division

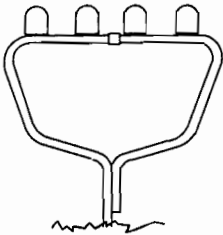
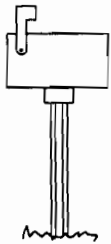


LARGE GUIDE SIGN

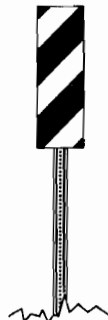
- sign \$20. per sq. ft.
- support \$300. each
- foundation \$300. each



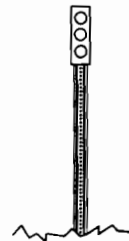
SMALL SIGNS
\$225. each



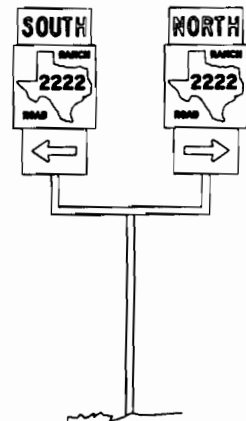
MAIL BOX SUPPORTS
single \$80.
multi-support \$200.



OBJECT MARKER
\$45.



DELINEATOR/
OBJECT MARKER
\$25.



MULTI-SIGN MOUNT
\$600.



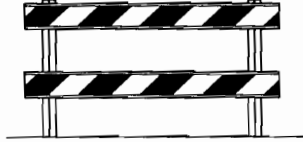
TEXAS DEPARTMENT OF TRANSPORTATION

Prepared by Traffic Operations Division

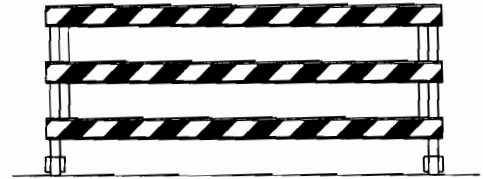
BARRICADES



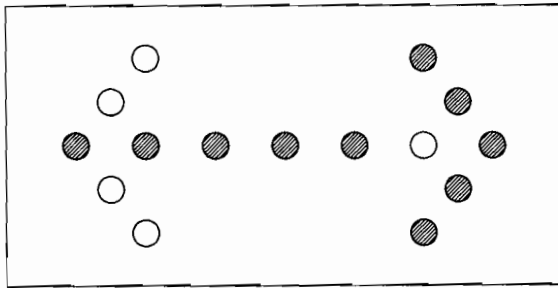
Type I
\$20. per foot



Type II
\$25. per foot



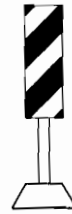
Type III
\$30. per foot



ARROW PANEL
\$4,000. each



DRUMS
\$75. each



VERTICAL PANEL
\$50. each



WARNING LIGHTS
\$30. each

WORK ZONE

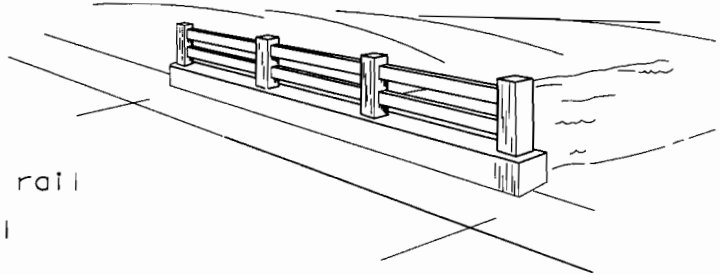


TEXAS DEPARTMENT OF TRANSPORTATION

Prepared by Traffic Operations Division

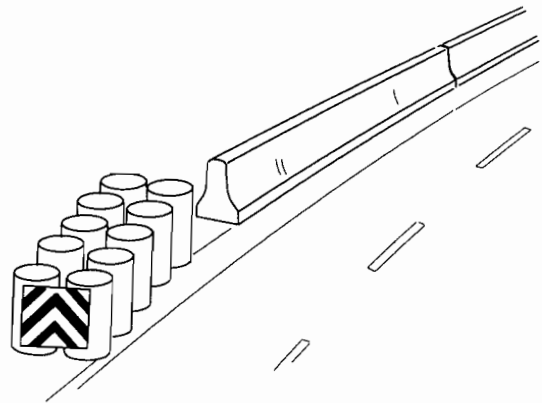
BRIDGE RAIL

concrete \$140. per foot of rail
steel \$40. per foot of rail



CONCRETE BARRIER

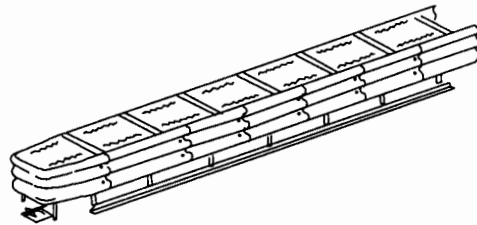
\$30. per foot, major cracks
or exposed reinforcing steel



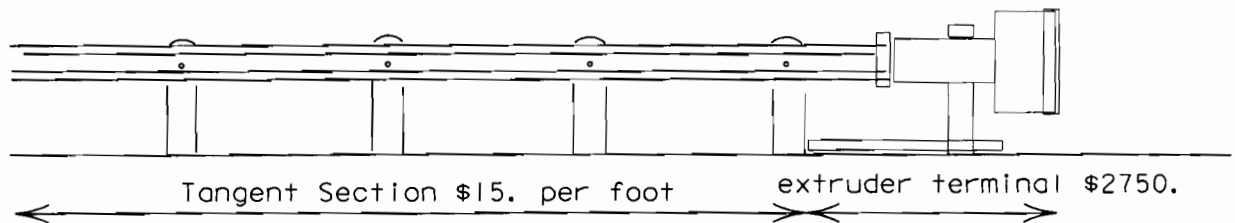
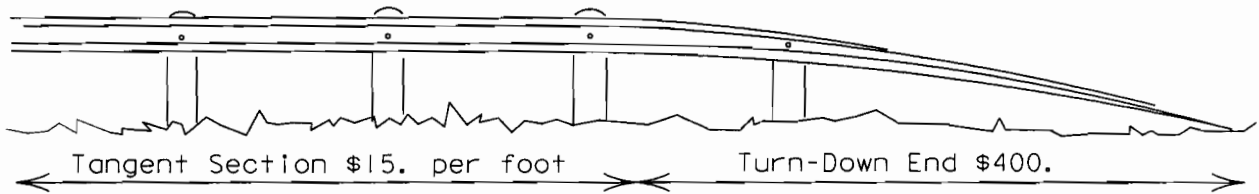
CRASH CUSHION

drum type \$8,000.
sand filled plastic
container \$4,000.

modular \$6,000.



GUARD FENCE



Posts

wood - \$35. each
steel - \$96. each



TEXAS DEPARTMENT OF TRANSPORTATION

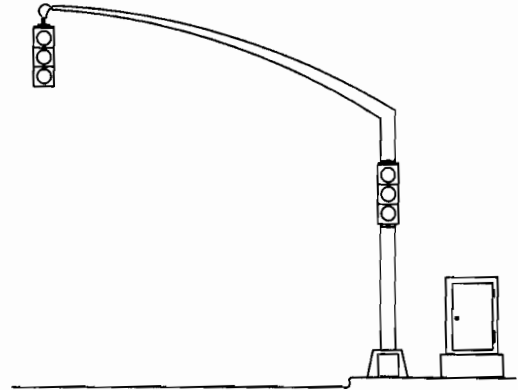
Prepared by Traffic Operations Division

MAST ARM TRAFFIC SIGNAL

- pole \$1,500.
- mast arm \$500.
- signal head \$435.
- pedestrian head \$300.
- pedestrian push button \$150.

TRAFFIC SIGNAL CONTROLLER

- remove \$300.
- install \$5,000.
- foundation \$800.

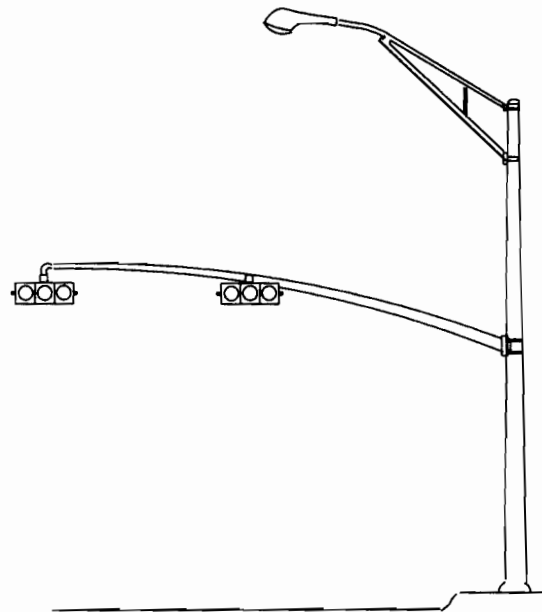


LUMINAIRE & TRAFFIC SIGNAL

- pole \$2,500.
- mast arm \$500.
- signal head \$435.
- luminaire \$500.

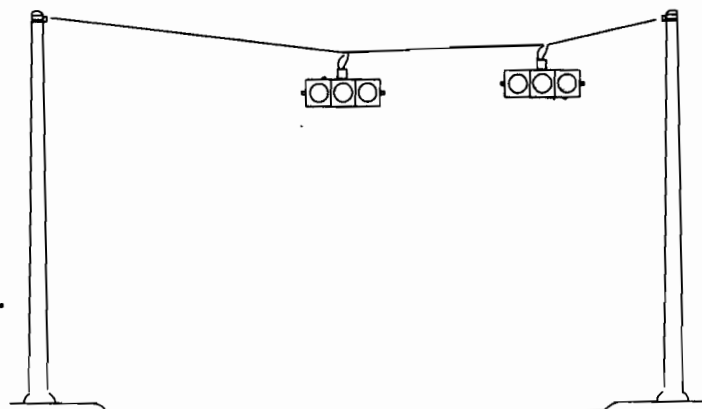
LUMINAIRE ONLY

- remove pole \$150.
- install pole \$2,000
- luminaire \$500.



SPAN WIRE TRAFFIC SIGNAL

- steel pole \$2200.
- wood pole \$1300.
- pedestrian head \$300
- pedestrian push button \$150.
- signal head \$300



TRAFFIC SIGNALS

Appendix E

Accessing Traffic Control Standard Sheet Graphic Design Files

Introduction

The Traffic Control Standard Sheet graphic design files are accessible using the Ethernet network and file transfer protocol (FTP). This appendix provides instructions for accessing the these files.

The graphic design file names for both English and metric versions are indicated on the index sheets of the *Traffic Control Standard Sheets*.

Further Assistance

Questions concerning the standards themselves and access to the standards design files may be directed to the Traffic Operations Division (TRF).

Procedure

To copy Traffic Control Standard Sheet graphic design files, you must have Ethernet access from your workstation or microcomputer. You also must have the ability to use file transfer protocol (FTP).

Details of the procedure vary depending on the system used. The basic procedure is as follows:

1. Connect to "d59islc" or "144.45.84.200" as user "ftp." (No password required.)
2. Change to the "traffic" subdirectory.
3. Set the transfer mode to either "binary" or "ascii," depending on file type.
4. Copy the file(s) you want to your own subdirectory or account.

Table of Contents

A table of contents listing sheet names, revision dates, subjects, and graphic file names for the Traffic Control Standard Sheets is available in two forms:

- ◆ toc95.txt (text file)
- ◆ toc95.dgn (graphic file).

The standards available on graphics will have a “GRAPHIC FILE NAME” listed in the table of contents.

The files with English and metric plan sheets have a “.msd” extension that must be used in accessing them. Design files with the “.dgn” extension currently have only an English plan sheet available.

Appendix F

WATCH FOR ICE ON BRIDGE Sign Display Schedule

The following WATCH FOR ICE ON BRIDGE Sign Display Schedule lists recommended “display from” and “display to” (remove from view) dates obtained using the State Climatologist's map of expected first and last date of freezing weather. A safety factor of 7 to 14 days was added to ensure that signs are displayed if early or late freezes occur.

Further information on the WATCH FOR ICE ON BRIDGE sign can be found in Chapter 6 of this voluem.

District/ County	Display Sign Message...	
	From	To
Abilene District:		
Callahan	November 9	April 7
Fisher	November 9	March 23
Haskell	November 9	April 7
Howard	November 9	April 7
Jones	November 9	April 7
Kent	November 9	March 23
Mitchell	November 9	April 7
Nolan	November 9	April 7
Scurry	November 9	April 7
Shackelford	November 9	March 23
Stonewall	November 9	April 7
Taylor	November 9	April 7

(continued)

District/ County	Display Sign Message...	
	From	To
Amarillo District:		
Armstrong	October 24	April 7
Carson	October 24	April 22
Dallam	October 24	April 22
Deaf Smith	October 24	April 22
Gray	October 24	April 22
Hansford	October 24	April 22
Hartley	October 24	April 22
Hemphill	October 24	April 7
Hutchinson	October 24	April 22
Lipscomb	October 24	April 7
Moore	October 24	April 22
Ochiltree	October 24	April 22
Oldham	October 24	April 22
Pottter	October 24	April 22
Randall	October 24	April 7
Roberts	October 24	April 22
Sherman	October 24	April 22
Atlanta District:		
Bowie	November 9	March 23
Camp	November 9	March 23
Cass	November 9	March 23
Harrison	November 9	March 23
Marion	November 9	March 23
Morris	November 9	March 23
Panla	November 9	March 23
Titus	November 9	March 23
Upshur	November 9	March 23

(continued)

District/ County	Display Sign Message...	
	From	To
Austin District:		
Bastrop	November 25	March 8
Blanco	November 9	March 23
Burnet	November 9	April 7
Caldwell	November 24	March 8
Gillespie	November 9	April 7
Hays	November 24	March 8
Lee	November 24	March 8
Llano	November 9	April 7
Mason	November 9	April 7
Travis	November 24	March 23
Williamson	November 24	March 23
Beaumont District:		
Chambers	November 24	March 8
Hardin	November 9	March 8
Jasper	November 9	March 23
Jefferson	November 9	March 8
Liberty	November 24	March 8
Newton	November 9	March 23
Orange	November 9	March 23
Brownwood District:		
Brown	November 24	March 23
Coleman	November 9	March 23
Comanche	November 24	March 23
Eastland	November 9	March 23
Lampasas	November 9	April 7
McCullouch	November 9	April 7
Mills	November 9	April 7
San Saba	November 9	April 7
Stephens	November 9	April 7

(continued)

District/ County	Display Sign Message...	
	From	To
Bryan District:		
Brazos	December 9	March 8
Burleson	November 24	March 8
Freestone	November 24	March 8
Grimes	November 24	March 8
Leon	November 24	March 8
Madison	December 9	March 8
Milam	November 24	March 8
Robertson	November 24	March 8
Walker	November 24	March 8
Washington	December 9	February 21
Childress District:		
Briscoe	November 9	April 7
Childress	November 9	April 7
Collingsworth	October 24	April 7
Cottle	November 9	April 7
Dickens	November 9	April 7
Donley	October 24	April 7
Foard	November 9	April 7
Hall	November 9	April 7
Hardeman	November 9	April 7
King	November 9	April 7
Knox	November 9	April 7
Motley	November 9	April 7
Wheeler	October 24	April 7
Corpus Christi District:		
Aransas	December 9	February 6
Bee	December 9	February 21
Goliad	December 9	February 21
Jim Wells	December 9	February 21
Karnes	December 9	March 8
Kleberg	December 9	February 6
Live Oak	December 9	February 21
Nueces	December 9	February 21
Refugio	December 9	February 21
San Patricio	December 9	February 21

(continued)

District/ County	Display Sign Message...	
	From	To
Dallas District:		
Collin	November 9	March 23
Dallas	November 9	March 23
Denton	November 9	March 23
Ellis	November 24	March 23
Kaufman	November 24	March 23
Navarro	November 24	March 8
Rockwall	November 9	March 23
El Paso District:		
Brewster	November 9	March 23
Culberson	November 9	April 7
El Paso	November 9	March 23
Hudspeth	October 24	March 23
Jeff Davis	November 9	April 7
Presidio	November 9	March 23
Fort Worth District:		
Erath	November 9	March 23
Hood	November 9	March 23
Jack	November 9	April 7
Johnson	November 9	March 23
Palo Pinto	November 9	April 7
Parker	November 9	March 23
Somervell	November 9	March 23
Tarrant	November 9	March 23
Wise	November 9	March 23
Houston District:		
Brazoria	November 24	March 8
Fort Bend	November 24	February 21
Galveston	November 24	March 8
Harris	November 24	March 8
Montgomery	November 24	March 8
Waller	November 24	February 21

(continued)

District/ County	Display Sign Message...	
	From	To
Laredo District:		
Dimmit	December 9	February 21
Duval	December 9	February 21
Kinney	November 24	March 8
La Salle	December 9	February 21
Maverick	December 9	February 21
Val Verde	November 24	March 23
Webb	December 9	February 21
Zavala	November 24	March 8
Lubbock District:		
Bailey	October 24	April 22
Castro	October 24	April 22
Cochran	October 24	April 22
Crosby	November 9	April 7
Dawson	November 9	April 7
Floyd	November 9	April 7
Gaines	November 9	April 7
Garza	November 9	April 7
Hale	November 9	April 7
Hockley	October 24	April 22
Lamb	October 24	April 22
Lubbock	November 9	April 7
Lynn	November 9	April 7
Parmer	October 24	April 22
Swisher	October 24	April 7
Terry	October 24	April 7
Yoakum	October 24	April 22
Lufkin District:		
Angelina	November 9	March 23
Houston	November 24	March 8
Nacogdoches	November 9	March 8
Polk	November 9	March 8
Sabine	November 9	March 23
San Augustine	November 9	March 23
San Jacinto	November 24	March 8
Shelby	November 9	March 23
Trinity	November 24	March 8
Tyler	November 9	March 23

(continued)

District/ County	Display Sign Message...	
	From	To
Odessa District:		
Andrews	November 9	April 7
Crane	November 9	April 7
Ector	November 9	April 7
Loving	November 9	April 7
Martin	November 9	April 7
Midland	November 9	April 7
Pecos	November 9	April 7
Reeves	November 9	April 7
Terrell	November 9	March 23
Upton	November 9	April 7
Ward	November 9	April 7
Winkler	November 9	April 7
Paris District:		
Delta	November 9	March 23
Fannin	November 9	March 23
Franklin	November 9	March 23
Grayson	November 9	March 23
Hopkins	November 9	March 23
Hunt	November 9	March 23
Lamar	November 9	March 23
Rains	November 24	March 23
Red River	November 9	March 23
Pharr District:		
Brooks	December 9	February 6
Cameron	December 9	February 6
Hidalgo	December 9	February 6
Jim Hogg	December 9	February 21
Kenedy	December 9	February 6
Starr	December 9	February 21
Willacy	December 9	February 6
Zapata	December 9	February 21

(continued)

District/ County	Display Sign Message...	
	From	To
San Angelo District:		
Coke	November 9	April 7
Concho	November 9	April 7
Crockett	November 9	March 23
Edwards	November 9	April 7
Glasscock	November 9	April 7
Irion	November 9	March 23
Kimble	November 9	April 7
Mendard	November 9	April 7
Reagan	November 9	March 23
Real	November 9	April 7
Runnels	November 9	March 23
Schleicher	November 9	March 23
Sterling	November 9	April 7
Sutton	November 9	March 23
Tom Green	November 9	March 23
San Antonio District:		
Atascosa	December 9	February 21
Bandera	November 24	March 23
Bexar	November 24	March 8
Comal	November 24	March 23
Frio	December 9	February 21
Guadalupe	November 24	March 8
Kendall	November 9	March 23
Kerr	November 9	April 7
McMullen	December 9	February 21
Medina	November 24	March 23
Uvalde	November 24	March 23
Wilson	November 24	February 21
Tyler District:		
Anderson	November 24	March 8
Cherokee	November 24	March 8
Gregg	November 9	March 8
Henderson	November 24	March 8
Rusk	November 9	March 8
Smith	November 24	March 8
Van Zandt	November 24	March 23
Wood	November 24	March 23

(continued)

District/ County	Display Sign Message...	
	From	To
Waco District:		
Bell	November 24	March 23
Bosque	November 24	March 23
Coryell	November 24	March 23
Falls	November 24	March 8
Hamilton	November 24	March 23
Hill	November 24	March 23
Limestone	November 24	March 8
McLennan	November 24	March 8
Wichita Falls District:		
Archer	November 9	April 7
Baylor	November 9	April 7
Clay	November 9	April 7
Cooke	November 9	March 23
Montague	November 9	March 23
Throckmorton	November 9	April 7
Wichita	November 9	March 23
Wilbarger	November 9	April 7
Young	November 9	April 7
Yoakum District:		
Austin	December 9	February 21
Calhoun	December 9	February 6
Colorado	December 9	March 8
DeWitt	November 24	March 8
Fayette	December 9	February 21
Gonzales	November 24	February 21
Jackson	December 9	March 8
Lavaca	December 9	March 8
Matagorda	December 9	February 21
Victoria	December 9	March 8
Wharton	November 24	March 8

(continued)

Notes:

Index

- 9-1-1 service/system 7-9, 7-39, 8-11, 8-13, 8-15, 8-16
- abbreviations for guide signs 9-14, Appendix C
- access roads (*See also* frontage roads) for public beaches 7-29
- accessibility signing for rest and picnic areas 7-57 to 7-58
- adhesives 10-21
- Adopt-a-Highway Program and signs 8-7 to 8-8
- advance warning signs 6-5
- advisory speeds 6-9 to 6-10
- agreements 1-5
- airports 7-25
- ALL TRUCKS NEXT RIGHT signs 5-15
- American Legion 7-47
- Americans with Disabilities Act (ADA) 7-57, 7-58, 10-16
- anchor bolts 9-27
- arrows
 - circular 9-12 to 9-13
 - on guide signs 9-25
 - on pavement 10-7, 10-27
 - on warning signs 6-5, 6-6
- asphalt 10-21
- attenuators 9-22
- banners 8-5
- Barricade and Construction Standard Sheets (BC Sheets)* 1-11
- barriers 9-22
- bicycle facilities 11-7
- bolt keeper plate 4-11
- border crossings 7-21
- breakaway supports 4-11, 9-19
- business loops 7-13
- campaign signs 8-6
- CAMPGROUND signs 7-33
- center lines 10-7, 10-20
- changeable message signs 3-21
- channelization 10-3, 10-4, 10-10, 10-16, 10-20, 11-5
- chevrons 10-13
- city limits 1-6, 8-21, 8-24
- City Pride Sign Program (CPSP) 1-6, 8-21 to 8-26
- CLEAN CITIES 2000 signs and program 8-21, 8-31 to 8-32
- cleaning
 - object markers 10-27
 - pavement (before application of markings) 10-20
 - signs 4-13, 4-14
- CLEARANCE signs 6-7
- collector-distributor roads 9-12
- commercial entrances 8-5
- computer aided drafting (CAD) programs 9-24
- concurrent routes 7-5 to 7-6
- construction projects 8-9, 8-10, 10-8
- Construction and Maintenance Division (CMD) 1-7, 1-11, 4-3, 4-4, 8-5, 8-6, 10-25, 11-3
- controlled access highways (*see also* expressways/freeways and interstate highways) 5-5 to 5-9, 8-3, 8-24
- county line signs 7-53

- county roads 7-9 to 7-12
- Crime Stoppers Program 8-11
- cross-section sheets 9-24
- crosswalk lines 10-20
- curb markings 10-15, 10-20
- curve symbol 6-9, 6-13
- delineation 10-9, 10-11, 10-13, 10-17, 10-19
- delineators 10-3, 10-4, 10-9, 10-13 to 10-14, 10-17, 10-25, 10-27
- Department of Public Safety (DPS) 1-15, 4-4, 5-15, 5-21, 7-15, 8-11, 8-13
- Design Division (DES) 1-11, 1-12, 5-15, 8-25, 9-17, 9-20, 9-22, 9-27
- destination signing 7-17 to 7-20
for border cities in Mexico 7-21 to 7-22
- disabled parking (*See* handicapped parking)
- distance signing 7-17 to 7-20
- Divided Highway Ends symbol sign 6-13
- Division of Emergency Management 7-15
- DO NOT CROSS DOUBLE WHITE LINE sign 5-23
- DWI fatality markers 8-5
- DWI – YOU CAN'T AFFORD IT signs 8-17
- edge lines 10-7, 10-15, 10-20
- EISENHOWER INTERSTATE SYSTEM signs 8-18
- estimate and quantity sheets 9-24
- exit (off-) ramps 5-5 to 5-9, 6-10, 9-11, 9-12 to 9-13, 10-16
- exit numbers 8-13
- EXIT ONLY signs 9-8, 9-9
- experimental products 3-29
- expressways/freeways (*see also* controlled access highways *and* interstate highways)
guide signs for 9-11 to 9-14
sequence signs for 9-7 to 9-10
signing project development 9-17 to 9-30
signing standards 9-3 to 9-6
- EYES OF TEXAS...CALL 911 signs 8-15 to 8-16
- Federal Highway Administration (FHWA) 1-9, 1-10, 1-15, 3-11, 3-20, 5-17, 5-19, 9-7, 9-18, 10-8, 10-12, 10-25, 10-26
- feeder roads (*See* frontage roads)
- fiberglass reinforced plastic (FRP) 3-4, 3-7, 4-6
- field review 2-4
- film and video productions 8-5
- final grade line 9-19
- flashing beacons and lights 3-21, 11-5
- flexible delineator posts 10-17
- frontage roads 5-5, 5-9, 7-23, 7-25, 7-48, 8-3, 8-24, 9-18, 9-22
- FRP (*See* fiberglass reinforced plastic)
- fuse plate 4-11, 4-12
- general services signing 7-33
- General Services Division (GSD) 1-12, 4-4, 10-12
- glass beads 10-8
- government offices 7-25
- grade line 9-19
- grade separated interchanges 9-3
- graphic design files (TCSS) Appendix E

- guardrail 10-13
- guide signs 7-1 to 7-60
- abbreviations for 9-14, Appendix C
 - brown background on 7-3
 - expressways and 9-3
 - large
 - layout sheets for 9-25 to 9-28
 - purpose of 7-3
 - refurbishment of 4-15
 - requests for changes to 1-6
- handicapped parking 5-13, 7-39, 10-16
- hazardous material routing 5-21
- HAZARDOUS CARGO routing signs 7-37
- high volume RPMs 10-12
- HIGHWAY INTERSECTION XXXX FT sign 6-5
- historic route names 7-46
- HOSPITAL signs 7-33, 7-37
- hurricane evacuation rout signing 5-15
- I-beam supports 4-12
- illegal or unauthorized signs 1-7
- Infrastructure Maintenance Manual* 1-7, 4-3, 4-4, 8-5, 8-6, 10-25, 11-3
- inspection stations 5-15
- intersections 5-5, 6-5 to 6-6, 6-9, 7-7, 7-8, 7-48 to 7-52, 9-3, 11-6
- pavement markings and 10-19
 - rural 2-5, 7-11
- Interstate highways (*see also* expressways/freeways and controlled access highways) 1-6, 4-15, 5-17, 5-18, 7-43, 8-12, 8-18, 8-24
- edge lines on 10-15
 - numbering of 7-13 to 7-14
 - guide signs on 9-18
- Interstate Sign Sizing Program 9-23
- jiggle bars 10-5, 10-9, 10-15, 10-16
- KEEP TEXAS BEAUTIFUL signs 8-21
- keeper plate (*See* blot keeper plate)
- lane lines 5-23, 10-9, 10-20
- lane reduction transitions 10-20
- lateral clearance 2-5, 9-22
- layout sheets for guide signs 9-25 to 9-28
- legal authority to erect signs 1-5
- lights (for overhead signs) 4-14
- logo signs 1-6, 7-35 to 7-40
- LONE STAR CITY signs and program 8-33
- longitudinal markings 10-7, 10-20
- loops 7-13, 7-14
- lottery claim centers 7-26
- mail box supports 10-17
- Manual on Uniform Traffic Control Devices (MUTCD)* (*See also* *Texas Manual on Uniform Traffic Control Devices*) 1-9
- markings (*see also* delineators, object markers, and pavement markings)
- classification of 10-4
 - design of 10-4
 - inspection of 10-23 to 10-24, Appendix A
 - installation of 10-19 to 10-22
 - maintenance and reconstruction of 10-25 to 10-28
 - purpose of 10-3
 - types of 10-3
- Materials and Tests Division (MAT) 1-12, 3-10, 3-13, 10-7, 10-21
- memorialized highways 7-45 to 7-52
- Mexico 7-21 to 7-22
- MicroStation 9-23

- mileposts 7-43, 8-12
- Motor Carrier Division (MCD) 5-15,
5-18, 5-19, 6-7
- Multimodal Operations Office (MMO)
11-7
- MUNICIPAL UTILITY DISTRICT signs 8-19
to 8-20
- named and memorialized highways 7-45 to
7-52
- NEIGHBORHOOD WATCH signs 8-3, 8-21
- new product evaluation 3-19
- NO SOLICITING signs 8-18
- no-passing zones 10-19, 10-20
- object markers 6-5, 10-3, 10-17
- obstruction markings 10-20
- Occupational Safety Division (OCC) 1-11
- off-ramps (*See* exit ramps)
- on-ramps 10-16
- overhead banners 8-5
- overhead signs 9-9, 9-11, 11-5, 11-6
lighting for 9-15 to 9-16
maintenance and inspection of 4-4,
4-7, 4-13 to 4-14
supports/structures 9-19 to 9-20, 9-25
to 9-27
- oversize street name signs 7-7 to 7-8
- painted markings 10-5, 10-8
- parking space limit markings 10-20
- pavement edge lines (*see* edge lines)
- pavement markings (*see also* markings)
materials for 10-5 to 10-8, 10-11 to
10-12
painted 10-5
prefabricated tape 10-5
raised (*see* raised pavement markings)
reflective life of 10-6
for school areas/zones 11-5
- pavement surfaces
cleaning of 10-20
thermoplastic pavement markings and
10-8
- picnic areas
accessibility signing for 7-57 to 7-58
historic 7-58
special signs for 8-17 to 8-18
- plan sheets 9-23 to 9-28
- Plans, Specifications, and Estimate
Preparation Guide for
Construction Projects* 9-23, 9-24,
9-29
- political (campaign) signs 8-6
- prefabricated pavement marking tape 10-6
to 10-7, 10-22
- preferential lane markings 10-20
- Product Evaluation Committee (PEC) 3-19
- public awareness signing 8-11 to 8-14
- public beaches 7-29
- public water system signs 8-21, 8-27 to
8-28
- Public Information Signs (Special) 8-9 to
8-10
- radio information signs 7-41 to 7-42

- raised pavement markings & markers
(RPMs) 10-5, 10-6, 10-9 to 10-10,
10-11 to 10-12, 10-13, 10-16,
10-17, 10-21, 10-25 to 10-26,
10-27
- REDUCED SPEED AHEAD sign 5-11, 5-23
- reference markers 5-9, 7-5, 7-6, 7-43
- reference sources 1-9 to 1-14, Appendix B
- reflectance or reflectivity (*See also*
retroreflectivity) 4-5, 4-7 to 4-8
of pavement markings 10-8, 10-10,
10-17
delineation on guardrails 10-13
- reflector markings (*see* delineators)
- regulatory signs 5-1 to 5-23
- replacement cost of traffic control devices
4-4, Appendix D
- Research and Technology Transfer Office
(RTT) 3-19
- RESERVED PARKING 5-13
- rest areas
accessibility signing for 7-57 to 7-58
exit signs for 8-13
location designation 8-12 to 8-13
special signs for 8-11 to 8-18
Telephone Number & Public
Awareness signing at 8-11 to 8-14
- restriping 10-23 to 10-24, 10-25
- retroreflectivity
of object markers 10-27
of RPMs 10-9, 10-10, 10-11 to 10-12,
10-21, 10-26, 10-27
of sign sheeting 3-9 to 3-10, 3-12
- ROAD UTILITY DISTRICT signs 8-19 to 8-20
- roadway system hierarchy 7-5 to 7-6
- Roadway Design Guide for Construction
Projects* 9-22
- ROUGH ROAD sign 6-13
- rumble strips 10-10, 10-16
- schematics 9-17 to 9-18
- school areas/zones 11-5 to 11-6
- sequence signs 9-7 to 9-10
- shop drawings 3-5, 9-20
- Shop Manual, the (*see Standard Highway
Sign Designs for Texas*)
- shopping mall signs 7-35 to 7-36
- shoulder treatments 10-15
- sidewalks 11-6
- sign bridges (*see* overhead signs)
- sign identification decal 3-13 to 3-16
- sign layout sheets 9-25 to 9-28
- sign legends 3-11 to 3-12
application methods 3-12
symbols on 3-11
text size and spacing 3-11
- sign substrate 3-7
- sign supports/posts
breakaway 3-3
foundations 3-3
overhead 4-13, 9-19 to 9-20, 9-25 to
9-27
roadside 3-3 to 3-6, 4-11 to 4-12
weights 9-18
- signs
cleaning of 4-13, 4-14
effectiveness of 2-3
inspection of 4-7 to 4-10
installation of 2-7 to 2-8
location and position of 2-3 to 2-6,
4-5, 9-21 to 9-22
maintenance of 4-3 to 4-16
materials for 3-1 to 3-22
mounting height of 2-4, 9-19
- (continued...)

- signs (*continued*)
- recycling of 4-6
 - reflectance of (*See reflectance and retroreflectivity*)
 - rehabilitation of 4-15
 - replacement of 4-5
 - storage and transport of 3-17
 - symbols on 4-5
 - temporary 1-6, 3-21, 7-25, 8-5 to 8-6
 - visibility of 4-5
- sign tabulation sheets 9-18, 9-24
- Sign Crew Field Book* 1-11, 7-3, 7-17
- SISTER CITY signs 8-21
- soil tests 9-27
- special events 7-23, 7-25, 8-5
- Special Public Information Signs 8-9 to 8-10
- specification data sheets 9-23
- speed zones 1-12, 5-11, 5-23, 11-5
- SPEED ZONE AHEAD sign 5-23
- standard specifications 1-12
- Standard Highway Sign Designs for Texas (SHSD)* 1-10, 7-15, 7-29, 7-31, 7-53, 7-57, 7-58, 8-11, 8-18
- state forces 2-7, 10-4, 10-19
- state parks 7-27
- station numbers 9-17, 9-27
- stop lines 10-20
- STOP AHEAD sign 6-5
- STOP signs 5-5, 5-9
- street name signs, oversize 7-7 to 7-8
- structural support system for signs 3-7
- SUPERIOR (or APPROVED) PUBLIC WATER SYSTEM signs 8-21, 8-27 to 8-28
- symbols
- pavement marking 10-6, 10-7, 10-9, 10-20
 - sign 3-11, 7-36, 7-39
- T-intersections 6-5 to 6-6
- tabulation sheets 9-18, 9-24
- TCSS (*See Traffic Control Standard Sheets*)
- Technology Transfer System 3-19
- Telephone Number and Public Awareness Signing 8-11 to 8-14
- telephone signing 7-37
- temporary pavement markings 10-16
- temporary signs 1-6, 3-21, 7-25, 8-5 to 8-6
- temporary traffic control 6-9, 10-16
- tension fuse plate (*See fuse plate*)
- test deck 10-7
- Texas Department of Criminal Justice (TDCJ) 3-12, 3-14, 8-15
- Texas Department of Licensing and Regulation 5-13
- Texas Historical Commission 7-46
- Texas Manual on Uniform Traffic Control Devices (TMUTCD)*
- maintenance and distribution of 1-15 to 1-16
 - obtaining copies 1-15, Appendix B
 - relationship to this volume 1-3
 - responsibility for 1-15
 - role of 1-9
 - use of 1-9
- Texas Natural Resource Conservation Commission (TNRCC) 1-6, 8-21, 8-25, 8-27, 8-29
- Texas Parks and Wildlife Department 7-31

-
- Texas Transportation Institute (TTI) 5-23, 6-13
- Texas Travel Trails 7-15 to 7-16
- Texas Wildlife Viewing Guide* 7-31
- thermoplastic pavement marking 10-7 to 10-8
- traffic buttons 10-5, 10-9, 10-10, 10-11, 10-21
- traffic generators 7-23 to 7-26
- traffic signals 1-3, 1-7, 1-10, 1-12, 3-21, 7-7, 7-8, 11-5
- Traffic Control Standard Sheets (TCSS)*
1-10, 1-11, 1-13, 4-11, 4-12, 5-13, 7-25, 7-43, 8-9, 8-13, 9-18, 9-19, 9-22, 9-23, 9-24, 9-26, 10-4, 10-7, 10-9, 10-10, 10-11, 11-7, 11-7, Appendix B, Appendix E
- trailblazer signing 7-23 to 7-24
- Transportation Planning and Programming Division (TPP) 7-5, 9-17
- Transportation Systems Manual* 7-43
- transverse markings 10-20
- Travel and Information Division (TRV) 7-16, 8-11, 8-13
- travelers information radio 7-41 to 7-42
- truck routes 5-17 to 5-20
- turn symbol 6-9, 6-13
- Two-way Traffic symbol sign 6-13
- unauthorized signs 8-5 to 8-6
- uniformity, importance of 1-3, 10-3
- vertical clearance 6-7 to 6-8, 9-27
- walkways (for overhead signs) 4-14
- warning signs 6-1 to 6-14, 7-11
- WATCH FOR ICE ON BRIDGE sign 3-4, 6-11 to 6-12, Appendix F
- Watchable Wildlife Project 7-31
- weigh station 5-15
- WEIGHT LIMIT signs 5-15
- WELCOME TO TEXAS signs 7-55 to 7-56
- WELLHEAD PROTECTION AREA signs 8-29 to 8-30
- Wildlife Viewing Guide 7-31
- WILDLIFE VIEW AREA signs 7-31
- wind area 9-26, 9-28
- WINERY signs 7-59 to 7-60
- word and symbol markings 10-20
- work areas/zones 3-9, 8-9, 8-10, 10-16
- wrong way arrows 10-27
- YIELD signs 5-5 to 5-10

Your Notes: