

# Maintenance Operations Manual



Revised March 2024

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## Manual Notice 2024-1

**From:** James Stevenson, P.E., Director, Maintenance Division

**Manual:** *Maintenance Operations Manual*

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### Purpose

The *Maintenance Operations Manual* has been revised to reflect policies emergency operations.

### Contents

**Chapter 5, Section 1** – Updated the Overview to include a summary for Bridge Collapse Response

**Chapter 5, Section 7** – A new Section 7 was added to the manual

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# Chapter 1 — Pavement

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## Section 1 — Overview

### Introduction to Maintenance Operations

The *Maintenance Operations Manual* contains the following chapters:

- ◆ Chapter 1, Pavement: Provides guidelines for routine and preventive pavement maintenance for both rigid and flexible pavement. Maintenance of shoulders and driveways are also discussed. A section on preventive maintenance is included.
- ◆ Chapter 2, Roadside: Contains basic information about litter; vegetation management; erosion control; roadside drainage; culverts and storm drains; rest areas and picnic areas; and guardrails, median barriers, and attenuators.
- ◆ Chapter 3, Bridges: Includes definitions and policies, as well as information about inspection, deck-protection and vertical clearance. Sections are also included on drawbridges and ferries.
- ◆ Chapter 4, Traffic Operations: Contains limited information about signs, signals, illumination, pavement markings and delineators. Primary directions for traffic control are contained in other manuals, which are referenced.
- ◆ Chapter 5, Emergency Operations: Discusses snow and ice operations, oil and hazardous material spills, courtesy patrols and accidents and incidents, and homeland security.
- ◆ Chapter 6, Work For or By Others: Describes circumstances where the department performs work on other agencies' facilities or where others are allowed to voluntarily work on TxDOT's right of way. An example of the department working for others is work performed on park roads and other Texas Parks and Wildlife Department facilities. An example of others working on the TxDOT right of way is the Adopt-a-Highway Program, where volunteers pick up trash over a designated section of highway.

### Introduction to this Chapter

This chapter discusses routine maintenance for different types of pavement distress and gives priorities for work on each distress type. A discussion of the maintenance requirements for three shoulder types is given. The responsibility for maintenance of driveways is defined. Preventive maintenance options for both rigid and flexible pavements are discussed.

## Section 2 — Routine Pavement Maintenance

### General Objectives of Pavement Maintenance

The general objectives of roadway pavement maintenance are to provide a safe roadway surface, preserve the state's capital investments in the pavement and to maintain a riding quality satisfactory to the traveling public. Maintenance of roadway pavement includes the restoration and repair of both surface and underlying layers. Maintenance of the [shoulder](#) and approaches can also effect the pavement and will be discussed in [Section 3](#).

### Pavement Distress

Pictures and definitions of distress in pavements may be found in the *Distress Identification Manual for the Long-Term Pavement Performance Project*, SHRP-P-338. Refer to the *Pavement Management Information System Rater's Manual*, June 1988, for examples and photographs of distress.

### Flexible Pavement Distress Maintenance

**Types of flexible pavement distress are listed below with guidelines for maintenance.**

- ◆ **Alligator cracking** is a type of distress that is generally caused by inadequate base support or brittle asphalt surface. Since cracks allow surface water to enter the subgrade and further destroy the stability of the subgrade, sealing should be accomplished as soon as practical. When cracking has progressed to the extent that failure of the roadway surface is imminent, repairs should be made as soon as possible. The alligator cracked surface material approaching failure will normally have to be removed and replaced with asphalt patching material. Where the base is unstable or wet, the base material will need to be removed replaced or stabilized.
- ◆ **Corrugations** are deviations of the pavement surface from its original cross section and are generally caused by excessive bitumen, improper aggregate gradation in the pavement, insufficient compaction of the mix or low interparticle friction to a degree that causes an unstable pavement with low resistance to traffic loads. Grooving, rutting, and shoving will also occur where the pavement is unstable. These distresses cause considerable annoyance to motorists. Repairs should be made as soon as practical when severe corrugations are evident. Repairs will normally involve removing the corrugated material and replacing it with new asphalt concrete.
- ◆ **Cracks** are considered significant when the pavement is cracked to the extent that water or foreign material can cause structural damage. At this point, cracks should be sealed as soon as practical. Efforts should be made to avoid a buildup of crack sealing material.
- ◆ **Edge cracking** frequently happens on narrow pavements at the same time drop-offs occur. This distress can be started by shrinkage of the asphalt at the edge of the pavement or

shrinkage cracks in the base or subgrade. Edge loads tend to cause failure of this type by breaking off the pavement edge.

- ◆ **Failures and potholes** are subject to rapid enlargement and may result in considerable pavement loss and objectionable ride and may affect vehicle control. Failures and potholes should be repaired as soon as possible after they are observed or reported. In inclement weather, temporary repairs should be made and permanent repairs scheduled.
- ◆ **Pavement edge drop-offs** frequently occur on narrow pavement or pavement without paved shoulders where the wheels of vehicle frequently traverse off the pavement. New overlay may also leave a drop-off. When drop-offs get deep enough to cause hazards, repairs should be made as soon as possible. Pavement edge repairs are made by two accepted methods:
  - One method is to bring the natural material from the shoulder or the embankment material up to the level of the pavement surface edge.
  - The second method is to bring in asphalt or other material and add it to the edge of the pavement to remove the drop-off.
- ◆ **Raveling** is the progressive failure of the binder and loss of aggregate from the surface by weathering and/or traffic abrasion. When surface raveling begins to impair safety and/or extensive pavement loss is imminent, corrective action should be taken as soon as practical. Less critical raveling should be scheduled for correction on a priority basis.
- ◆ **Rutting** occurs when wheel track depressions have the undesirable effect of trapping water and may make vehicle control difficult. Corrections to the depressions should be made as soon as possible wherever ruts are determined to be a safety problem.
- ◆ **Slippery pavement** is the surface texture of bituminous pavement that is subject to adverse change as a result of aging, excessive asphalt, wearing, etc. Continuous surveillance of pavement texture should be made with particular attention being given to pavements that become slippery. Obvious slippery areas should be corrected as soon as practical to the extent feasible under the prevailing conditions. When additional corrective action is necessary, it should be scheduled and initiated promptly.
- ◆ **Waves, sags, and humps** are surface defects that often result in poor ride quality, and excessive impact loading of bridges and slabs, and may also make vehicle control difficult. Typical causes are fill settlement, unstable cuts, expansive soils and embankment shear failures. This type of defect may not cause any problem at low speeds but would be objectionable or intolerable at high speeds. Corrections to the surface should be made as soon as practical when ride quality is objectionable.

## Rigid Pavement Distress Maintenance

**Types of rigid pavement distress are listed below with guidelines for maintenance.**

- ◆ **Blowups** are caused by expansion of concrete to the point where the stress causes the concrete to be raised. This can result in a problem ranging from a small bump to a shattering of concrete

as if an explosion occurred. When blowups occur, the loose material should be removed and temporary repairs should be made until permanent repairs are practical.

- ◆ **Cracks**, both longitudinal and transverse, may occur in concrete pavement. Transverse cracks are meant to occur in continuously reinforced concrete pavement (CRCP) and should not be sealed. These cracks have little effect on ride quality and should not allow moisture to enter underlying layers and lead to other distress. However, transverse cracks on jointed concrete pavement tend to be wider and will allow moisture into the pavement and should be sealed.
- ◆ **Failures** are punchouts, corner breaks and other major distresses that can cause very uncomfortable ride and in severe conditions could result in vehicle damage. Make repairs whenever areas of the pavement become cracked or broken to the extent that ride quality and structural integrity of the pavement is lost.
- ◆ **Joint failures** (jointed pavements) occur at various spacing on jointed concrete pavement and can cause an unpleasant ride if not properly maintained. Joint failures appear in many forms from minor to major spalling to blowups. Deep spalls and failures may affect vehicle contact with the pavement and should be repaired as soon as possible. Joints should be inspected routinely and should be maintained to exclude foreign material and to preserve the integrity of the joint. When excessive foreign material or infiltration of water is evident, cleaning which includes the repairing and sealing of the joints should be scheduled. This should be done in accordance with "Standard Specification Item 438 Cleaning and/or Sealing Joints and Cracks" (Portland Cement Concrete).
- ◆ **Settlement, heave, and/or faulting** can occur in jointed pavement. Settlement and heave are normally gradual changes and can lead to an uncomfortable ride. Faulting can occur rather suddenly when a slab rises or lowers. Repairs should be made as soon as practical when the ride quality becomes objectionable. Severe faulting that may affect vehicle control should be repaired as soon as possible.
- ◆ **Surface deterioration** such as raveling, popouts, joint spalling and other surface type deterioration allows moisture to penetrate to steel reinforcing, causing further distress. Ride quality also becomes uncomfortable. Repairs are to be made as soon as possible when a section of a roadway is considered to have a severe condition of this type.

## Section 3 — Shoulders and Approaches Guidelines

### General Guidelines for Shoulders and Approaches

Shoulders are the portions of the roadway adjacent to the travelway that are used for the following purposes:

- ◆ accommodation of stopped vehicles
- ◆ emergency use
- ◆ lateral support of base and surface courses.

Efforts should be made to maintain a smooth transition between the travelway and the shoulder. When a shoulder drop-off is objectionable, corrective action should be taken as soon as possible. When a shoulder drop-off condition presents a danger to the traveling public, corrective action should be taken as soon as possible.

### Shoulders

**The following guidelines are recommended for different types of shoulders:**

- ◆ **Open base shoulders** should be lightly bladed periodically to maintain a uniform slope sufficient to properly drain the roadway surface. Serious and habitual rutting in critical areas should be corrected by the addition of suitable material as soon as practical. Excessive material losses should be corrected by adding additional material as soon as practical.
- ◆ **Paved shoulders** are subject to the same distresses and deterioration as similar roadway surfaces and should be maintained in the same manner.
- ◆ **Sod shoulders** should be lightly bladed as needed in order to prevent shoulder buildup and drop-off and to provide a uniform slope sufficient to properly drain the roadway surface. Serious and habitual rutting in critical areas should be corrected by the addition of suitable material as soon as practical.

### Driveways

Rules and regulations governing the construction and maintenance of access driveways are located in the “Access Management Manual.” General guidelines for driveways include the following:

- ◆ **Commercial driveways** are to be constructed and maintained by the owner of the commercial establishment served by the driveway. Commercial driveways include any entrance to or exit from any commercial or business establishment and includes approaches or exits to or from schools, churches, cemeteries, and other public places or buildings of a similar character.

- ◆ **Private driveways** are to be constructed and maintained by the owner of the property served by the driveway. Private driveways include entrances to or exits from a residential dwelling, farm, or ranch for the exclusive use and benefit of the permittee.
- ◆ **Public driveways** include all approaches to state highways from a publicly maintained street, road, or highway. The cost of materials, installation, construction, reconstruction, relocation, enlargement, and modification shall be the responsibility of the permittee, except as provided for in [43 Texas Administrative Code Section 11.54 subsection \(c\)](#). The department shall maintain all portions of public driveways that lie within the state highway right of way and that connect to highways that are the maintenance responsibility of the department.

## Section 4 — Preventive Maintenance Guidelines

### Importance of Preventive Maintenance

An effective preventive maintenance program should include periodic application of preventive maintenance treatments. In order to be cost-effective, preventive maintenance should be performed before pavements display significant amounts of distress. Pavements with extensive cracking, potholes and patches or unstable asphalt concrete may not be good candidates for preventive maintenance, but may be considered for reconstruction.

### Flexible Pavement Preventive Maintenance

Several types of treatments can be used for pavement preventive maintenance. Options for flexible pavements follow:

- ◆ **Crack seal** is an application of sealing material directly in the cracks of the pavement surface to prevent moisture damage.
- ◆ **Fog seal** is bitumen materials sprayed directly on the surface of the existing pavement. This treatment enriches the surface of the pavement edges and can prevent the loss of aggregates and seal coat.
- ◆ **Seal coat** is a spray application of binder immediately covered by a single layer of one-sized aggregates. Seal coat can be placed in either single or multiple layers.
- ◆ **Thin hot-mix overlays** are similar to conventional overlays except the thickness is 2 inches or less. Generally, thin hot-mix overlays can correct irregularities that cannot be corrected with most other types of preventive maintenance.

### Options for Rigid Pavements

Fewer preventive maintenance options are available for rigid pavements. Generally, joint seals and crack seals are the options for jointed concrete pavement. Joints should be inspected routinely and should be maintained to exclude foreign material to preserve the integrity of the joint. Voids under the pavement can be filled with a grout material. For rapidly deteriorating continuously reinforced concrete pavement, the slab failure should be repaired and a thin overlay may be applied.

## Chapter 2 — Roadside

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## **Section 1 — Overview**

### **Introduction**

The Roadside (Environment Protection) chapter contains basic information about litter; vegetation management, roadside drainage, culverts and storm drains, storm water management, abandoned hazardous materials, emergency spill response, safety rest areas and picnic areas, guardrail, median barriers, attenuators, stockpiles on the right of way and fire control and prevention.

### **Summary**

Roadsides are the areas between the outside edges of the shoulders and the right of way boundaries. On multi-lane highways, the median and/or outer separations are included. The type of work performed on the roadside includes litter pickup, vegetation management, roadside drainage, picnic area maintenance, rest area maintenance, barrier maintenance and guardrail repair.

The TxDOT goal of building a transportation system that is not only safe and efficient but also environmentally sensitive will be incomplete unless maintenance of highways is also performed with the goal of minimizing its impact on the environment.

## Section 2 — Litter

### General Policy

Litter is defined as trash and/or garbage, including but not limited to scrap metals, rags, paper, wood, plastic, glass and rubber products including tires that are discarded onto the right of way.

TxDOT's litter pickup and disposal policy is based on the need to provide a safe and attractive right of way for the traveling public. To meet this need, all litter on the right of way should be removed promptly and be disposed of at a state-approved solid waste site. Potentially hazardous items in the roadways should be removed as soon as possible.

### Items Found on the Right of Way

Any items of value that are picked up by state forces when working on the right of way should be brought to the district warehouse for disposal through proper established procedures, as outlined in the Support Services Division's *Property Management Policy Manual*. Reasonable judgment should be used to establish what items are of value.

### Litter Inside City Limits

Within a city's limit, the city is responsible for litter pickup on designated state highways except for controlled access highways, where the department is responsible for litter pickup. The department may assist the city when requested by the city if state resources are available. The department's responsibility is defined in the Municipal Maintenance Agreement.

### Animal Remains

The remains of animals should be removed promptly from the roadway and disposed of properly. In rural areas, dead animals found on the right of way can be buried on the roadside, away from any adjacent homes. Care should be taken when digging along the right of way to avoid hitting underground utilities. In the event that the dead animal is a cow or horse, a by-products or rendering company should be called, if possible, to pick up the animal. Proper care should be taken to protect the health of personnel handling dead animals.

In urban areas, the dead animals should be taken to an approved sanitary landfill or municipal solid waste facility. If this is not practical, the animals should be moved to a rural section of right of way and disposed of properly. Department employees are urged to be sensitive to the feelings of pet owners.

## Litter Barrels

Place litter barrels at safety rest areas and picnic areas where traffic can stop safely. They should be emptied regularly and replaced when they become rusty, worn, bent, or unsightly. Plastic liners should be used.

## Solid Waste Disposal

Litter and other solid waste picked up from roadside parks, litter barrels and highway rights of way should be disposed of in sanitary landfills or other disposal facilities which are operated in compliance with State Department of Health regulations.

Should disposal of household or other refuse (solid waste) become a serious problem at any location along the right of way the following options are available which may assist in alleviating this condition.

- ◆ If the identity of the offender can be determined through addresses on envelopes, etc. write a letter pointing out the litter barrel is to be used by highway travelers.
- ◆ Bring the matter to the attention of the appropriate county official (county attorney, county health officer or commissioners).
- ◆ Request assistance from the Maintenance Division.

Good judgment should be used when handling these matters to prevent adverse publicity or criticism of the department.

## Sanitary Landfill Operations

Applications for operation of sanitary landfills near a highway rights of way and a notice of proposed public hearings are generally submitted by the Texas Commission on Environmental Quality (TCEQ) to the Maintenance Division for review. The Maintenance Division may request assistance from the districts to complete this review.

## Adopt-A-Highway Program

The Adopt-A-Highway Program was established to create public involvement in keeping Texas highways free of litter. Volunteers from civic organizations, non-profit organizations, commercial and other private enterprises are permitted to "adopt" a highway for purposes of litter control and receive recognition for their participation. Information about this program may be obtained from the Travel Division. Information regarding the sign details may be found in the *Sign Guidelines and Applications Manual*.

## Section 3 — Vegetation Management

### Overview

Detailed information on mowing is contained in the *Roadside Vegetation Management Manual*. This manual contains the following:

- ◆ vegetation management guidelines
- ◆ herbicide operations
- ◆ native grasses, wildflowers and legumes
- ◆ pruning and brush management
- ◆ vegetation management and wildlife habitat glossary.

### Vegetation Management

The department will maintain highway right of way vegetation in an environmentally sensitive and uniform manner consistent with the special conditions presented by local climate, topography vegetation and level of urbanization.

### Chemical Selection for Control of Pests

TxDOT should use chemicals that are proven to be effective on the target pest species, low in toxicity and are not dangerous to the traveling public, applicators or the environment. Most materials used to control growth of vegetation are either patented or proprietary products. Materials proposed for departmental use are continually being tested for possible highway use to determine their effectiveness and any harmful side effects. Research and test applications are coordinated through the Vegetation Management Section. Detailed information on herbicide operations is located online in the [Roadside Vegetation Management Manual](#).

### Training in Pesticide Application

Personnel assigned to apply pesticides should be trained and certified in the proper use of chemicals and equipment. The Vegetation Management staff of the Maintenance Division is available to assist the district vegetation manager in training programs for district personnel.

### Wildflower Program

The wildflower program is part of a comprehensive vegetation management program. It not only improves the appearance of the highways, but also reduces the cost of maintenance by encouraging

the growth of native species that requires less mowing and care. As with grasses, it strives to establish roadsides that blend into their surroundings. The grasses and wildflowers also help to conserve water, control erosion and provide a habitat for wildlife. Mowing should be delayed until wildflowers have set mature seeds, thus assuring the preservation and propagation of wildflower species. Detailed information on the wildflower program is located in the printed *Roadside Vegetation Management Manual*.

### **Brush Control, Tree Removal and Tree Trimming**

Timely tree and brush removal, tree trimming, and pruning is necessary for:

- ◆ maintaining required sight distance
- ◆ maintaining adequate clear zones on each side and above the roadway
- ◆ removing low branches or brush that may be hazardous to equipment operated on the right of way such as mowers
- ◆ aesthetics.

All tree trimming, tree removal and brush removal should follow the guideline provided in Chapter 5 of the *Roadside Vegetation Management Manual*, [Pruning Guidelines](#).

### **Landscape Agreement**

Incorporated municipalities may request an agreement to be used in areas within the jurisdiction of cities under a Municipal Maintenance Agreement. The purpose of the Landscape Agreement is to establish the responsibility for maintenance of various landscape features within the right of way, including median plantings and any cost sharing or beautification plantings. Please contact the Travel Division, who administers the Adopt-A-Highway Program, for landscaping by an individual.

All landscaping performed within the right of way will be done in compliance with the Presidential Executive Memorandum on Beneficial Landscaping and Presidential Executive Order 13112 on Invasive Species.

The [Landscape Maintenance Agreement](#) is a separate agreement with the city that is added by resolution to become a supplement to the [Municipal Maintenance Agreement](#). The Landscape Maintenance Agreement should be executed in duplicate and supported by Municipal Maintenance Ordinance/Resolution and City Secretary Certificate.

## Section 4 — Roadside Drainage

### General Roadside Drainage Guidelines

Roadside drainage appurtenances should be preserved as near as practical to the originally constructed or subsequently modified conditions to assure normal runoff is collected and removed from the roadway and/or right of way. Such appurtenances include:

- ◆ ditches
- ◆ gutters
- ◆ side drains
- ◆ outlets
- ◆ irrigation ditches.

### Maintenance and Repair

Drainage appurtenances can be clogged by the following obstructions:

- ◆ silting
- ◆ erosion
- ◆ earth slides
- ◆ excessive brush and vegetation.

Obstructions should be removed as soon as practical when they create conditions that could restrict flow.

### Erosion Control

TxDOT's maintenance activities occasionally require erosion control measures. The primary tool to reduce erosion is the timely revegetation of disturbed areas. For additional information, see the reference manual for revegetation activities, [A Guide to Roadside Vegetation Establishment](#).

## Section 5 — Culverts and Storm Drains

### Maintenance Policy

The operational characteristics of all culverts, storm drains and similar appurtenances should be preserved as near as practical to the originally constructed or subsequently modified conditions. This will assure normal cross-roadway drainage. Such appurtenances include:

- ◆ non-bridge classified culverts
- ◆ catch basins and drop inlets
- ◆ dips
- ◆ storm sewers
- ◆ irrigation siphons
- ◆ drainage pumping stations
- ◆ stock passes.

### Maintenance and Repair

Culverts and storm drains may become clogged by:

- ◆ silting
- ◆ drift
- ◆ collapse or crushing
- ◆ grate and sewer clogging
- ◆ erosion at culvert ends.

These appurtenances should be cleared as soon as practical after a significant loss of hydraulic capacity has been observed or reported. Significant erosion should be repaired as soon as practical. Deficient appurtenances should be repaired or replaced as soon as practical. Please refer to the Wetlands/Streambed Permits for requirements in wetland areas.

(*Maintenance Management Manual*, Chapter 5, [Section 5](#))

Drainage pump stations should be maintained in a serviceable condition. Periodic inspection of pumps and related equipment should be performed to insure proper operation.

## Section 6 — Safety Rest Areas and Picnic Areas

### Maintenance

Safety rest areas and picnic areas are provided for the safety, comfort and convenience of the traveling public. Safety rest areas (which include restroom facilities) and picnic areas should be maintained as necessary to assure that all equipment is operating properly and that the facility is clean and aesthetically pleasing.

The traveling public has an opportunity to observe the department's operation up close when they stop at safety rest areas. It is critical to maintain them at a very high level of service.

### Historic Picnic Areas

Approximately forty picnic areas in the state are considered to be historically significant and eligible for listing in the National Register of Historic Places. These picnic areas were constructed in the 1930s as part of the Depression era work program of the National Youth Administration, a part of the Civilian Conservation Corps. They typically have stone fixtures, historical markers and other rustic-style stone features.

Care should be taken to maintain and preserve historic features, such as table and bench sets, rock walls and fireplaces. Damaged elements should be repaired "in kind" using original types of materials with elements that are similar in size and dimensions to the original features. Historic features should not be removed if they can be repaired. Sensitive cleaning methods other than sandblasting should be used if possible. The Environmental Affairs Division can provide guidance for appropriate cleaning methods for historic stone and concrete picnic fixtures.

In 1994 TxDOT made a commitment to the Texas Historical Commission to retain as many historic picnic areas as possible. In many cases, historic picnic areas have long associations with communities. Often, there is also a strong local sentiment for them to remain open to the public. The Maintenance Division should be consulted if consideration is being given to closing one of these facilities.

### New Safety Rest Areas or Picnic Areas

New rest area construction should be part of a planned statewide program. A long term "Rest Area Plan" is published by the Maintenance Division that identifies proposed new construction, reconstruction and rehabilitation plans. Districts should consult the Rest Area Plan and coordinate right of way acquisition, design and construction with the Maintenance Division.



New picnic areas may be designed and constructed by the districts. This work should be coordinated with the Maintenance Division. In the past, some picnic areas were dedicated to a member of the family that donated the land for the park. However, this practice is strongly discouraged for any new picnic areas. If a picnic area needs to be closed, these types of dedications may make the closing difficult.

### **Closing of Safety Rest Areas or Picnic Areas**

It may be necessary to close an existing rest area or picnic area. Reasons may include highway expansion, continual abuse or lack of use.

Before deciding to close the facility, the following should be done:

- ◆ Contact at least 3 groups in the area that could take over maintenance of the facility instead of closing it (civic groups, non-profits, etc)
- ◆ Get written concurrence from the county commissioner on closing the facility
- ◆ Check with local law enforcement on any potential issues with closing the facility

If a group is willing to take over maintenance of the facility, the district will work with the applicant to execute a “Picnic Area Maintenance Agreement”, Form 2901. The applicant will be approved by the Travel Division, the sign design will be approved by the Traffic Safety Division, and the agreement will be approved by the Maintenance Division prior to executing.

Concurrence from the Maintenance Division should be requested before any closing to ensure that policies are administered consistently statewide. A request to close a rest area or picnic area should include the following information:

- ◆ location including county, highway, reference marker and class code
- ◆ existence and description of any historical markers or dedication markers
- ◆ approximate size and description of features
- ◆ primary reason(s) for the closing
- ◆ if known, support or opposition by
  - law enforcement officials
  - county or city officials
  - general public (attach appropriate support or opposition documents if they exist).
- ◆ any deed restrictions.

Once the area is closed, the district must file a "Notice of Change Roadway Maintenance File," Form [1125](#), and distribute it as indicated on the form.

## Section 7 — Guardrail, Barriers and Attenuators

### Overview

When a rail or barrier has been damaged to the extent that it will not function properly, it should be replaced or repaired as soon as practical. Minor repairs should be made when scheduling will allow.

### Guardrail

When a guardrail installation is damaged, a review should be made to determine whether it is feasible to upgrade the installation to current design standards. "Guardrail Damage Ahead" signs should be installed only when substantial damage occurs to guardrail barriers or attenuators which causes them to not function properly. Repairs should be made as soon as practical. The following items should generally be considered in this analysis:

- ◆ Is the section of guardrail still required under current design standards?
- ◆ Can the guardrail installation be avoided with the elimination of the hazard or the flattening of the slope?
- ◆ If it is determined that the guardrail is still necessary and more than approximately 25 percent or more of the installation requires replacement, the installation should be upgraded to current design standards.

### Attenuators

Damages which result in inadequate protection or which cause the attenuator not to function properly should be repaired as soon as possible. Minor damage should be repaired as soon as practical.

## Section 8 — Stockpiles on Right of Way

### Location of Stockpiles

No stockpile should be placed on controlled access right of way if it is to remain in place for more than six months (except when not visible to the traveling public.) Things to consider before locating stockpiles on highways other than controlled access are:

- ◆ appearance
- ◆ effect on traffic
- ◆ effect on the highway
- ◆ effect on developed property.

In general, stockpiles should be located as far away as possible from the travelway (not within clear zone), and kept in neat condition. Where stockpiles must be located in the proximity of the travelway, appropriate barricades and warning signs should be placed to adequately warn motorists. Locations of stockpiles at intersections normally should be avoided, as appearance and sight distance are most critical at these points.

### Lease Stockpile Site

To lease right of way for stockpiles, please refer to the *Maintenance Management Manual*, Chapter 5: Agreements, Permits and Reports, [Section 9](#), "Agreement for Storage Site Lease."

## **Section 9 — Fire Control and Prevention**

### **Policy**

All maintenance employees are to exert every possible precaution to prevent grass fires on the right of way. When such fires occur, employees must use all means possible to extinguish them before they spread and endanger adjoining property. In timbered and ranch areas, where quick action must be taken, maintenance personnel should be equipped with suitable small tools or any other equipment necessary for quickly extinguishing a fire.

### **Fireguards**

Fireguards should be bladed only upon request and on private property whenever possible. Fireguards should be bladed as close to the fence as possible when they are bladed on the right of way.

## **Section 10 — Right of Way Encroachments**

### **Overview**

Encroachments on the right of way can be dangerous to the health and safety of the public, displaced individuals, traveling public and those working in the right of way. The Texas Transportation Code sections 472.012, 472.013, and 472.014 allows the Department to remove personal property without the consent of the owner or the carrier of the property. In addition, under this subchapter the Department can recuperate the costs of removal and disposition.

### **Homeless Encampments**

Texas Legislature enacted Penal Code, §48.05 (House Bill 1925, 87th Legislative Session, 2021), which makes it a Class C misdemeanor for camping in a public place without effective consent of the officer or agency having legal authority to manage that public space. It is the policy of the Texas Transportation Commission and Texas Department of Transportation to not authorize any state right of way to be used for camping in a manner that provides an exception to House Bill.

The Department must cooperate with local law enforcement agencies and the Texas Department of Public Safety in the enforcement of Penal Code, §48.05 if TxDOT reasonably believes a violation has occurred. In addition, if a Municipal Maintenance Agreement (MMA) with a City exists in the area of the violation the Department can reach out the City for assistance with the removal of the encroachment as well.

# Chapter 3 — Bridges

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## Section 1 — Overview

### Summary

This chapter deals with the policies, procedures and materials used in the maintenance of the state's bridges, moveable span bridges and ferries in order to assure uninterrupted, safe traffic flow and protection of investment.

## Section 2 — Bridge Maintenance

### Overview

**Bridge**, as used in this chapter, is defined as the following: "A structure including supports erected over a depression or an obstruction, such as water, highway or railway, and having a track or passageway for carrying traffic or other moving loads and having an opening measured along the center of the roadway, track or passageway of 20 feet or more between undercopings of abutments, backwalls, spring lines of arches or extreme ends of openings for multiple boxes or having an inside diameter of 20 feet or greater, in the case of pipes."

### Bridge Maintenance Policy

The structural and operational characteristics of all highway bridge and tunnel structures should be preserved as near as practical to the originally constructed or subsequently modified conditions.

The area below bridges and within tunnels or near their openings (portals) should be maintained free of flammable or explosive material. Flammable materials may include any number of items including construction materials and homeless encampments. Fuel tanks and cylinders of compressed gases should not be stored within 100 feet of a bridge or tunnel.

Maintaining bridge joints, keeping debris from accumulating around bearing devices, and addressing issues with drainage to prevent undermining of approaches and slope protection is critical. Such objectives are accomplished by timely performance of preventive maintenance and repair as determined by constant alertness and deliberate inspection.

Documentation of all work performed on a bridge is to be provided to the district bridge inspection coordinator to ensure all relevant information regarding bridge maintenance is retained and uploaded to AssetWise for each structure worked on.

Documentation includes what work was done, when it was completed, who performed the work (contract or in-house), and the cost.

Include photos of the completed work to help with the documentation. The district bridge inspection coordinator will add all documentation provided to the permanent bridge record for each bridge.



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## Section 3 — Bridge Inspection

### Routine Safety Inspections

A federally mandated routine bridge safety inspection typically occurs on each bridge every other year. These inspections are performed by specialty consultant engineering company staff and a report is generated assigning structural condition ratings to components of the bridge. Simply, if the rating is 7 or higher, component is considered in good condition, if 4 or lower, component is considered in poor condition, and if 5 or 6, component is considered in fair condition. Additionally, some limited commentary is provided discussing observed condition and on occasion, some specific areas of concern may be listed which may also show up on the follow-up-action (FUA) list as recommendations to take action to address the noted deficiency.

Inspectors recommend action be taken on bridge defects they deem a significant structural concern or action that may prevent other more serious issues from occurring in the future. FUA recommendations should be reviewed to determine the significance of the issue and addressed as appropriate. Seek assistance of bridge engineering staff when needed if unsure of significance of the issue.

### Off-Year Bridge Maintenance Inspection

Off-year inspections are required to be performed by TxDOT staff. These inspections are in addition to and are not replaced by the contracted federal routine bridge safety inspection. The term “off-year” is used because these inspections are scheduled to generally occur in the alternating years that routine safety inspections do not occur. The off-year inspection reports should be reviewed by the engineer responsible for maintenance. Prompt scheduling of necessary preventive maintenance and repairs should follow this review.

Attention should also be given to routine or preventive maintenance work such as:

- ◆ cleaning the approach roadway and bridge deck surfaces of debris and contaminants
- ◆ restoration, delineation and signing
- ◆ cleaning and servicing joints and bearings
- ◆ removal of drift from around substructures.

Prompt maintenance and repair should follow these inspections.

Notify the district bridge inspection coordinator of the type of work performed and when it was done.

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## Damage Inspections

Damage inspections should be performed immediately following any significant event such as permit overloads, floods or impact damage that could alter the condition of the structure. These inspections are not intended to be detailed but rather a quick assessment of damage and/or deterioration for the purpose of determining repair needs or to identify safety hazards. Particular attention should be given to:

- ◆ structural damage
- ◆ settlement or sagging of bridge or approach to bridge
- ◆ damage to bridge railing or approach guard fence
- ◆ quality of riding surface
- ◆ performance and condition of the channel and bank protection measures
- ◆ adequacy of deck drainage.

When initial inspections following a seismic event are necessary, the following items should be inspected:

- ◆ alignment of joints, edges of slab, railing, and pavement markings for any indication of differential movement
- ◆ beam ends to confirm that there is sufficient support and no differential movement between the beams and the substructure
- ◆ bearings at abutments and interior bents for excessive movement or displacement
- ◆ columns at interior bents for cracking.

If significant damage is found during one of these inspections, the area engineer and the district's bridge inspection coordinator should be notified immediately. See TxDOT's [Bridge Inspection Manual](#) for more information on documentation requirements when damage is identified.

## Program Coordination

The system of record for off-year bridge inspections is the Maintenance Bridge Inspection Tracking System (MBITS). The Maintenance Division will identify an MBITS Program Coordinator who is responsible for the following:

- ◆ Sending the list of bridges needing inspection for the upcoming calendar year well in advance of the year and on a quarterly basis to the districts with required inspections for that year. The MBITS Program Coordinator will provide a window for the districts to complete the off-year bridge inspections from 6-18 months after the previous contracted federal routine bridge inspection was completed.

- ◆ Performing spot checks each quarter of MBITS forms completed in the system to verify dates are correct, all information is completed on forms, and forms are relevant. They will reach out to MBITS District Coordinators for any issues encountered and keep a record of forms reviewed.
- ◆ Working with the MBITS Training Coordinator to ensure individuals in need of training are included the next time a training course is available in the district of need or possibly an adjacent district.
- ◆ Providing a brief summary after the end of the year to the Maintenance Division Director on the percentage of off-year bridge inspections that were completed by each district, the total and percentage of bridges in each district that are overdue for inspection, the number of employees who took the MBITS class (MNT 127), and the list of individuals in each district responsible for reviewing the inspections for planning the various bridge program work.

Each district will identify an MBITS District Coordinator who is responsible for the following:

- ◆ Coordinating with district maintenance, district bridge, and each maintenance section to ensure all off-year bridge inspections are completed.
- ◆ Reviewing all MBITS forms to ensure they are filled out properly.
- ◆ Creating an internal electronic folder where pictures can be uploaded by inspectors and reviewed by district maintenance and bridge personnel.
- ◆ Sending an annual follow up to the MBITS Program Coordinator that all off-year bridge inspections have been completed, including identifying who has/will be reviewing the inspections for consideration in Bridge Maintenance Improvement Program (BMIP), Bridge Preventive Maintenance (BPM) program, in house repairs, etc. This individual will be copied on the email response.
- ◆ On an annual basis, sending the list of individuals at the district who are in need of MNT 127 training to the MBITS Program Coordinator. This list is based on individuals who performed off-year bridge inspections in the previous year who have never had the training and from polling from maintenance supervisors. The MBITS District Coordinator can also provide an overview inspection course in lieu of MNT127 if a need is identified and there are not any upcoming MNT127 courses in the district.

### **Completing MBITS Forms**

When completing an off-year bridge inspection and entering data into MBITS, the following guidelines are provided:

- ◆ Separate forms are used for bridges and bridge class culverts
- ◆ Ensure all header information on the top of the form is accurate in MBITS, including the date of when the inspection was performed.

- ◆ An answer of 'Yes', 'No', or 'N/A' is needed on all questions. For answers of 'No', an explanation is required. Provide a brief description of the issue observed and location of the issue. For example, instead of stating 'deck spalling', state 'a 6"x6" spall about 2" deep was observed 100' from the west abutment near the sidewalk on the eastbound lane.'
- ◆ One picture may be uploaded into MBITS for each question. However, inspectors are encouraged to take additional pictures as needed and upload into a district folder separate from the MBITS.
- ◆ Most bridges have defects, though some are more major than others. Always describe any issues seen, unless considered insignificant, and do not simply check 'Yes' on all questions.

### **Record Retention**

All completed MBITS forms are to be retained electronically for the life of the bridge asset plus an additional 5 years.

### **Where to Find Additional Information**

Additional information on the bridge inspection program is contained in the [Bridge Inspection Manual](#) published by the Bridge Division. The Bridge Inspection Form [1085-1](#) is also maintained by the Bridge Division.

## Section 4 — Bridge Maintenance Actions

### Bridge Joints

Joints are typically placed at each end of the span or for bridges built in the last 40 years, at the ends of bridge units to accommodate bridge movements related to temperature change. A sealed joint creates a barrier which keeps the joints clean and free of debris to allow for the needed movement, protects the beam ends and bent caps from deterioration related to deicing salt use and other contaminants and prevent debris build up accumulating around the bearings which is also problematic. Maintaining bridge joint seals is the most beneficial activity to prolong the life of the bridge.

When there is damage to a steel expansion joint system, removal of loose steel joint members is recommended. Typically, removing the loose steel pieces will not create large openings in the roadway, except in the case of finger joints. If finger joint plates come loose, contact the Bridge Division for support. Never weld additional steel members across an open expansion joint. Bridging an open joint with welded steel members will cause additional damage to what may not be damaged.

### Bridge Bearings

Bridge bearings accommodate load transfer to the supports as well as allow for thermal movements associated with temperature change. Debris accumulation around moving bearing devices can result in malfunction. Keep debris from accumulating around bearings by joint maintenance. Additionally, remove debris that has accumulated around the bridge bearings and off the tops of caps.

### Bridge Drainage

Flow of water off and toward bridges can cause significant undermining of the bridge approaches and slope protection. Where concrete riprap was placed as slope protection, water migrating under it will erode the fill and potentially extend under the abutment cap and approach slab and roadway. Paying careful attention to early signs of erosion can prevent significant loss of support to the approach roadway which can require closure and extensive repair to address.

### Bridge Drains

Drains cast into bridge decks to release water from the roadway appear to collect debris easily which prevent the drains from functioning properly. When joints are maintained and kept sealed, open drains become essential to allow drainage off the roadway at desired locations.

### **Asphalt Treated Surfaces on Bridges**

It was common practice to place seal coats and asphalt overlays on bridges in the past. TxDOT promoted the practice of placing the Texas Bridge Deck Protection System, consisting of a two-course surface treatment followed by an asphalt overlay. This practice is no longer considered effective to deter deck deterioration and contributes to other issues such as: it lowers the bridge rail height from the roadway not allowing the rail to function as designed under impact; the asphalt ravel at expansion joints resulting in costly bridge joint treatment; and it creates in-effective joint sealing. Placing asphalt treated surfaces on bridge decks is no longer recommended, but it is recommended to maintain the asphalt surface by milling down to the bridge deck surface before applying the new asphalt treated surface. When asphalt extends over bridge expansion joints, it is recommended to saw cut the asphalt two-thirds overlay depth and seal with a hot pour rubber seal.

### **Penetrating Concrete Surface Treatment**

Applying penetrating concrete treatment (silane or other penetrating sealers) to concrete surfaces is beneficial to reduce deicing salts from penetrating the concrete. When salt reaches the reinforcing steel, it will corrode and result in spalling concrete. The most effective means of ensuring performance from silane is proper concrete surface preparation prior to application. Shot blasting the surface is believed to be the best surface preparation treatment, then abrasive blasting. Lastly water blasting is also allowed, but intensity of water must be sufficient to prepare the surface to absorb the sealer plus the concrete must be allowed to dry out sufficiently to accept the material which makes this the least desirable surface treatment. When traffic control is set up across a bridge for roadway work, it is a good practice to address the concrete bridge deck while mobilized. Maximum recommended reapplication interval is ten years.

### **Washing Bridge Decks**

Sweeping and power washing bridge decks without overlays is recommended after the winter season concludes if salts were applied during the winter season.

### **Concrete Spall Repair**

The most noticeable and problematic concrete spalls occur on the bridge deck surfaces. When spalls occur on the driving surface of the bridge deck, investigation on the underside of the deck (soffit) at that location should occur to verify the distress is contained to the upper surface, which is usually the case. If significant cracking of the soffit of the deck corresponds with the upper surface spall, immediate action may be necessary to address the situation. The main short-term issues related to riding surface spalling are driver disruption and potential reinforcing steel failure.

## Section 5 — Measuring Vertical Clearance

### Measuring Vertical Clearance

All vertical clearance measurements of grade separation structures should be verified at least once a year. The measurements taken for “Actual Clearance,” “Signed Clearance,” type of work performed and when it was done should be reported to the Department of Motor Vehicles and the district bridge inspection coordinator.

[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 the department. 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 the structure as shown by the department's records.

### Clearance Determination

Vertical clearance determination should apply to the total travelway, which includes the travel lanes and any usable paved shoulders. 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 rolled curb or elevated shoulder exists, clearances should not include the shoulder area. Where a flush shoulder exists (with or without jiggle bars,) the clearance determination should include the shoulder area.

A sufficient number of measurements should be taken to ensure the critical clearance is determined. In locations where an encroachment over the usable shoulder would significantly reduce the vertical clearance, two clearances may be shown. The travel lane and shoulder clearances should be signed independently on the structure.

### Requirements for New Measurements

Any condition which results in a change to the vertical clearance of a structure such as an overlay or reconstruction of the roadway will require new measurements and resubmission of the “Actual Clearance” and “Signed Clearance” to the Department of Motor Vehicles and the district bridge inspection coordinator.

Refer to the *Sign Guidelines and Applications Manual*, Chapter 6, “Warning Signs,” [Section 3 “Vertical Clearance,”](#) for information concerning the actual minimum measured vertical clearance.

**Signs**

Clearance signs need to reflect the vertical clearance between the roadway and the overhead obstruction. Refer to the [Texas Manual on Uniform Traffic Control Devices](#) for specific information on signing criteria of the travel lane and shoulder clearances. The district should notify the Department of Motor Vehicles before traffic is allowed to pass under the obstruction.



## Section 6 — Bridges Over Navigable Waterways

### Additional Inspection and Maintenance Requirements

In addition to the inspection and maintenance procedures common with other bridges, bridges located over navigable waterways require special attention. Fixed span bridges and moveable span bridges have lighting required by the U.S. Coast Guard that may involve frequent maintenance. Fender systems that protect bridge supports also require routine inspection and maintenance. Additionally, moveable span bridges require special attention to the mechanism and power unit that provides movement.

Fender systems and lighting systems should be inspected as part of the routine bridge inspection. Additional inspections should also be performed following any significant event such as flooding or impact damage. Repairs to lighting systems, including replacing burned out bulbs, should be performed as soon as possible.

Moveable span bridges should be maintained in a serviceable condition and operated at intervals frequent enough to make certain the machinery is in proper operating condition.

### Lighting

Fixed span bridges should be lighted in accordance with the requirements of Title 33, Part 118.65, “Lights on Fixed Bridges,” of the Code of Federal Regulations (33 CFR 118.65).

Swing span bridges should be lighted in accordance with the requirements of Title 33, Part 118.70, “Lights on Swing Bridges,” of the Code of Federal Regulations (33 CFR 118.70).

Click on <https://ecfr.io/Title-33/Volume-1> to access these references in the Code of Federal Regulations.

## Section 7 — Ferry Guidelines

### General Maintenance

Maintain ferries as near as practical to the originally constructed or subsequently modified conditions and operate in accordance with established regulations.

### Regulations

The state owned ferry systems are located in Galveston/Port Bolivar and Port Aransas/Aransas Pass in the Houston and Corpus Christi Districts respectively.

The regulation and operation of the ferry systems are contained in [Title 43, Texas Administrative Code, Sections 29.41-29.50](#).

# Chapter 4 — Traffic Operations

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[Section 1 — Overview](#)

[Section 2 — Signs](#)

[Section 3 — Signals and Illumination](#)

[Section 4 — Pavement Markings and Delineators](#)

## Section 1 — Overview

### Purpose

This section provides general information, references and procedures for traffic operation items, i.e., [signs](#), signals, illumination, [markings](#) and [delineators](#).

### References

**Please refer to the following for additional detailed information.**

- ◆ *Sign Crew Field Book* – This book is a guide to proper locations and installation of signs and other devices and provides information beyond that contained in the Texas MUTCD. Contact the Traffic Operations Division for a copy.
- ◆ *Texas Manual of Uniform Traffic Control Devices* ([Texas MUTCD](#))
- ◆ *Traffic Engineering Standard Sheets*

### Other Resources

Other resources include the following:

- ◆ district traffic operations personnel
- ◆ Traffic Operations Division (TRF)

## Section 2 — Signs

### Maintenance Policy

Highway [signs](#) should be kept in proper position, plumb, clean and legible. For missing or damaged regulatory and warning signs, replacement or repair should be done as soon as possible. Replace or repair other damaged or missing signs as soon as practical.

### Sign Maintenance Activities

Effective sign maintenance includes the following tasks:

- ◆ maintaining breakaway features of sign supports to ensure they function as designed (no silt or debris over slip base, no signs attached below hinge points)
- ◆ assuring that the sign message is clearly visible at all times (clear of vegetation or other obstructions).
- ◆ reporting damaged signs (a responsibility for all employees)
- ◆ replacing signs and posts as needed
- ◆ straightening posts and sign assemblies
- ◆ completing records of all sign installations (stop signs and regulation)
- ◆ cleaning as necessary
- ◆ tightening sign fasteners
- ◆ proper torquing of slip base plate and fuse plate connecting bolts or breakaway sign posts
- ◆ tightening anchor bolt nuts on overhead sign supports
- ◆ performance of scheduled inspections by trained personnel in accordance with the [Sign Guidelines and Applications Manual](#).

## Section 3 — Signals and Illumination

### Signals

Traffic signals should be maintained in their originally built condition. Traffic signal malfunctions should be repaired as soon as possible. Only trained maintenance personnel should be allowed to perform traffic signal maintenance.

All department personnel should immediately report any malfunctioning traffic signal. Notify law enforcement if traffic control is needed until the signal is repaired.

All maintenance work performed at signal locations should comply with the requirements of the *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* and the *Traffic Engineering Standard Sheets*.

Records should be kept on all traffic signal maintenance or repair. These records should include the time and date of the maintenance at each traffic signal location.

### Illumination

Illumination features should be maintained according to the following guidelines:

- ◆ All illumination should be clearly visible at all times. (Vegetation or other features should not create obstructions.)
- ◆ Each district should have a plan to inspect, report and maintain illumination features to ensure they function as designed.
- ◆ Routine illumination repair or maintenance should be performed as soon as practical.
- ◆ All damage that poses a safety hazard should be performed as soon as possible.

## Section 4 — Pavement Markings and Delineators

### Overview

[Pavement markings](#) and [delineators](#) guide the driver during day and night conditions. Pavement markings include striping, [pavement graphics](#), raised reflective pavement markers and rumble strips. Delineators are used to enhance the visibility of a feature of the highway system. Although not considered an emergency when damaged or worn, pavement markings and delineators should be maintained [as soon as practical](#).

### Striping

Striping should be installed and maintained in accordance with standards established by the Traffic Operations Division. As a minimum, centerline striping should be installed on all paved roads on the state highway system.

### Temporary Markings

When not practical to stripe pavement repairs or areas where striping has been destroyed by maintenance operations, on the same day as the operation, temporary markings should be used as a short-term measure. Usually permanent markings should be placed as soon as practical. Temporary markings may be reflective tabs, tape or paint.

### Pavement Graphics

Pavement graphics include stop bars, school zone crossings, arrows, railroad crossing symbols and other lettering or symbols painted or installed on the pavement. They should be installed and maintained as soon as practical in accordance with standards established by the Traffic Operations Division.

### Raised Reflective Pavement Markers

Raised reflective pavement markers should be maintained as soon as practical on all roadways in accordance with standards established by the Traffic Operations Division.

### Shoulder Texturing Treatments

[Shoulder](#) texturing treatments are used to warn vehicles that have strayed off the travel lanes and onto shoulders and gores. The most effective and least expensive treatments are depressions rolled

or milled into the pavement surface perpendicular to the roadway. Please refer to the [Sign Guidelines and Applications Manual](#) for recommended placement guidelines.

### Delineators and Object Markers

Delineators and object markers are used to enhance visibility of a feature of the highway system. They should be installed in accordance with standards maintained by the Traffic Operations Division. The following minimum standards should be used for installation and maintenance at the following locations:

#### Minimum Standards

| Delineators | Locations   |
|-------------|---|
| Single *    | <ul style="list-style-type: none"> <li>◆ curves on freeways, outside curves of interchange ramps</li> <li>◆ guard rail, bridge rail, barriers **</li> <li>◆ narrow bridge approaches</li> </ul> |
| Double *    | <ul style="list-style-type: none"> <li>◆ acceleration and deceleration lanes</li> <li>◆ crossover for official or emergency use-</li> </ul>   |

| Object Markers                          | Locations   |
|---|---|
| Type 1<br>(18"x18") (red)               | <ul style="list-style-type: none"> <li>◆ end of roadway</li> </ul>  |
| Type 2<br>(vertical panels)             | <ul style="list-style-type: none"> <li>◆ objects adjacent to the roadway—headwalls, etc.</li> <li>◆ mailboxes</li> </ul>                              |
| Type 3<br>(black and yellow striped) ** | <ul style="list-style-type: none"> <li>◆ objects projecting into roadway or shoulder—narrow bridges, attenuators, extruder terminals, etc.</li> </ul> |

\*Note: The color should correspond to the color of the edgeline.

\*\*Note: Continue delineation from the approach rail across bridges to make a uniform appearance. Delineators should face both directions on two-way roadways. Type 3 object markers are not needed unless the bridge is narrower than the approach guard rail. For additional information refer to the *Sign Crew Field Book*.



# Chapter 5 — Emergency Operations

## Contents:

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[Section 4 — Response to Wildfires](#)

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## Section 1 — Overview

### Summary

Emergency operations include snow and ice operations, oil and hazardous material spills, fire control and prevention, and accidents and incidents.

- ◆ Snow and Ice Control – This section contains information about the priority of work, district plans, control methods, road closures, management, limits of work, railroad grade crossings and isolated spots of ice. Detailed methods are provided in the [Snow and Ice Control Operations](#) Manual maintained by the Maintenance Division.
- ◆ Emergency Spill Response – This section explains TxDOT employees' active role in protecting themselves and the traveling public when hazardous materials are spilled or released TxDOT property or rights of way.
- ◆ Response to Wildfires – This section explains the department's role in supporting wildfire fighting efforts.
- ◆ Accidents and Incidents – This section explains policies and procedures for responding to traffic accidents, spilled cargo and other incidents which may obstruct traffic or create safety hazards.
- ◆ Homeland Security – This section explains policy and procedures for reporting suspicious activities.
- ◆ Bridge Collapse Response – This section is intended to document policy related to notification and response following an unanticipated full or partial collapse of an in-service bridge.

## Section 2 — Snow and Ice Operations

### Snow and Ice Control

The diverse areas in Texas require different levels of cold weather preparedness. Resources should be planned on the basis of anticipated need. Removal of snow and ice from the roadway and related control measures are classified as emergency operations that take priority over all non-safety related work. Weather history should serve as a guideline for determining needed resources. Resources should be used appropriately for plowing, sanding or chemical treatments as soon as possible. This may involve working extra hours, nights, weekends or holidays until conditions are stabilized.

More detailed guidance may be found in the [Snow and Ice Control Operations](#) manual that comprises the fourth portion of the Maintenance Management Manual.

### Priority of Work

The priorities for snow and ice operations are as follows:

1. Known trouble spots, such as bridge decks, steep grades, sharp curves, intersections and approaches to railroad crossings
2. Heavier traveled sections of streets and highways
3. Lighter traveled sections of streets and highways.

### District Plan

Each district should have a plan for snow and ice control. The varying winter storm conditions require different snow and ice control plans for different areas of the state. Plans should be made for winter work so that equipment, operators, materials and supplies will be ready for the first storm.

Examples of district plans can be found in the Snow and Ice Control Operations manual.

### Snow and Ice Control Methods

Snow and ice control can include one or both of the following methods:

- ◆ spreading sand and/or aggregate on the ice or snow to increase traction
- ◆ the application of salt, magnesium chloride or other approved materials to the pavement or bridge surface.

Aggregate used for sanding should generally be grade 5, concrete sand or a similar material.

These methods are discussed in more detail in the *Snow & Ice Control Operations Manual*.

### **Road Closures**

When it becomes apparent that a road section will need to be closed because of snow or ice, the Department of Public Safety or local law enforcement jurisdiction should be asked to officially close the road. Notice should be given to all news media and appropriate officials. For all highways crossing district(s) or state line(s), the closure should be coordinated with the appropriate counterparts. Where practical, signs should be erected to advise traffic. After road closure signs are erected, a trip should be made through the closed area to ascertain that no one is stranded in the closed section.

### **Highway Condition Report (HCR)**

As required by the *Maintenance Management Manual*, Chapter 5, [Section 8](#) (HCR), all road closures and weather related conditions should be reported in the HCR.

### **Railroad Grade Crossing**

When plowing the highway, piles of snow should not be left at railroad grade crossings. After plowing, the rail should be cleaned of the snow pack, ice, gravel or dirt.

## Section 3 — Emergency Spill Response

### Background

Hazardous material spills/releases may occur on TxDOT property and the right of way. At the spill location, TxDOT's first concern is human safety. TxDOT employees should take an active role to protect themselves and the traveling public.

### Policy

TxDOT's role in emergency spill response is to provide support to the lead agency—Department of Public Safety ([DPS](#)), Texas Commission on Environmental Quality ([TCEQ](#)), or local fire marshall—in the containment and cleanup. All TxDOT personnel who may encounter a hazardous material spill or release require Hazardous Materials Awareness Training. For more information about TxDOT's hazardous material cleanup policy, including notification requirements, see the *Occupational Safety Manual*, Chapter 5, [Section 6](#).

### Spill Response

Most spills are a result of a traffic accident; usually, TxDOT is called to the scene by law enforcement. Safety of TxDOT personnel and the motoring public is priority. Department personnel are specifically prohibited from handling, cleaning up or otherwise coming in contact with toxic or hazardous materials at accident scenes or abandonment sites on the department's right of way. Vehicle fluid cleanup of less than 25 gallons is the only exception to handling or cleaning up hazardous materials at accident scenes or abandonment sites.

The table below outlines the responsibilities of each agency involved in an emergency spill response.

**Emergency Spill Response**

| Agency        | Responsibilities   |
|---------------|--|
| TxDOT staff*  | <ul style="list-style-type: none"> <li>◆ restricts public access</li> <li>◆ provides traffic control at the site until relieved by DPS or other on-site coordinator</li> <li>◆ reports all pertinent information to supervisor</li> <li>◆ supervisor reports information to district hazardous material coordinator</li> <li>◆ district engineer/hazardous materials coordinator notifies appropriate governmental agencies such as TCEQ, DPS and local fire department</li> </ul> |
| DPS           | <ul style="list-style-type: none"> <li>◆ performs the on-site coordination of transportation emergencies for all unincorporated areas</li> </ul>   |
| Fire marshall | <ul style="list-style-type: none"> <li>◆ performs on-site coordination of transportation emergencies for all incorporated areas</li> </ul>   |

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**Emergency Spill Response**

| Agency | Responsibilities                               |
|--------|--|
| TCEQ   | ◆ acts as lead state agency for spill response |

\*Note: TxDOT personnel should not handle, clean up or otherwise come in contact with toxic or hazardous materials at accident sites.

**Spill Response Preparation**

TxDOT supervisors are responsible for:

- ◆ ensuring state vehicles have a copy of the *USDOT Emergency Response Guidebook*
- ◆ maintaining updated emergency notification list, including telephone numbers for DPS, local law enforcement, fire department, district hazardous materials coordinator, and the TCEQ
- ◆ instructing employees to remain clear of accident areas contaminated with known or suspected toxic or hazardous materials.

## Section 4 — Response to Wildfires

### Overview

The department is frequently asked to support wildfire fighting operations because of its equipment and personnel resources.

### Request for TxDOT Assistance

Requests for TxDOT to participate in fighting a wildfire should be routed to the district maintenance engineer through the appropriate disaster district, as with any other disaster or potential disaster. This will assure that TxDOT employees are directed by supervisors who have wildfire operations experience.

### Functions of TxDOT Employees in Fighting Fires

Only people trained in fire fighting and equipped with nomex pants and shirts, nomex neck protectors, leather lace-up boots, leather gloves, goggles and hard hats should be in the close proximity of a wildfire.

The department's contributions are limited to activities other than actual firefighting. Activities such as blading fire breaks, providing water trucks and fuel trucks, and mop-up (pushing smoldering fuels away from the perimeter after there are no active flames) are appropriate for TxDOT.

### Fireguard Policy

Unless established as a condition within a previous right of way conveyance document, TxDOT will not provide for the routine disking and/or blading of fireguards as a preventive measure for potential wildfires.

The use of TxDOT resources for disking and/or blading of fireguards are allowed only when approved by the disaster district committee chairperson, director of the Governor's [Division of Emergency Management](#), or the Governor.

Authorization for the use of TxDOT resources could only be expected if the emergency is beyond the capability of the local governmental entity to control and qualifies under one of the following conditions:

- ◆ the emergency is deemed necessary for life saving operations
- ◆ to relieve suffering and hardship as a result of a natural or man-made emergency.

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## Section 5 — Accidents and Incidents

### Overview

Incident response is the activation of a planned strategy for the safe and rapid deployment of the appropriate personnel and equipment to the incident scene. Preplanning is required to assure that adequate communication, coordination and cooperation exist among all response agencies.

Incidents such as traffic accidents, vehicle breakdowns, spilled cargo, adverse weather conditions, rubbernecking, etc. are unpredictable; however, timely and safe resolution of the incident and restoration of traffic to full capacity is necessary.

### Incident Response

Depending upon the incident, law enforcement, fire and rescue, local public works department, [Texas Commission on Environmental Quality \(TCEQ\)](#), Texas Health and Human Services Commission or other agencies may respond. It is important to establish working relationships among the incident response entities. Frequent interaction with these response entities is essential, not only in large urban areas, but smaller jurisdictions as well. The type of incident and location will determine the incident commander.

TxDOT's normal role is to provide traffic control, set up detours, keep traffic moving and clear the roadway as appropriate. Changeable message boards should be used to provide information to motorists for prolonged incidents.

### Spilled Cargo

[Texas Transportation Code 472.011 - 472.014](#) authorizes the department to remove and dispose of spilled cargo or other personal property on the [ROW](#) or portion of the roadway.

The department may, without the consent of the owner or carrier, remove personal property from the State's right of way if the department considers this cargo or property to be blocking the roadway or endangering public safety.

For each occurrence, the department will determine whether the removal of the personal property is warranted based on the following considerations:

- ◆ safety of department employees
- ◆ safety of the public
- ◆ operation of the highway facilities
- ◆ protection of the state investment



- ◆ availability of resources for removal operations
- ◆ availability of storage space at a department facility.

### **Removal**

If determined that removal is necessary, the property will be removed with as much care as practical under the existing conditions.

### **Notification**

The district will attempt to notify the owner or carrier of the property through information obtained from the property or through inquiries from the owner or carrier.

If unable to determine the identity of the property owner within thirty days of removal, the department will dispose of the property in the manner the department deems most suitable.

### **Storage of Property (other than vehicles)**

Refer to the following guidelines when storing removed property:

- ◆ Removal of property may include transportation to and /or storage of the property at a site other than the spill location.
- ◆ The owner or carrier is responsible for the security of the property and the integrity of any perishable goods at all times.
- ◆ The owner or carrier will claim and take possession of the property as soon as possible after its relocation from the spill site. The department may dispose of the property if the owner, after notification, fails to take possession within ten days.
- ◆ The owner or carrier is responsible for the costs of removal and disposing of the property.

### **Removal of Vehicles**

The following guidelines apply to vehicles that must be removed from an incident scene:

- ◆ Disabled or damaged vehicles may be removed from the roadway or shoulder as necessary to prevent it from blocking the roadway or endangering public safety. This may require a vehicle to be moved to a location away from the original site.
- ◆ The vehicle owner will be responsible for all costs associated with the removal and storage of a vehicle.

## Section 6 — Homeland Security

### Overview

The Texas Department of Transportation is responsible for many potential targets of both man-made and natural disasters. TxDOT has some of the most critical infrastructure of any state agency, spanning all 254 counties in the state. Employees at TxDOT must be prepared and remain vigilant for any contingency. Threats to TxDOT infrastructure range from ice storms, hazmat spills and terrorist attacks on bridges and ferries. TxDOT personnel should always be on the lookout for suspicious activities and should never confront or attempt to intervene when suspicious activity is suspected.

### Reporting

When suspicious activity is seen by or reported to a TxDOT employee, the employee should report that activity to their supervisor. The supervisor should then make the decision on whether to report the activity to the proper authorities. If, in the supervisor's opinion, the suspicious activity is related to homeland security or terrorism, the supervisor should notify the Texas Department of Public Safety's counter-terrorism unit at (866) 786-5972. That number will be answered 24 hours a day, 7 days a week and 365 days a year.

If the suspicious activity occurs at an Austin headquarters facility, TxDOT security should be notified at (512) 465-7931. If that line is busy, call their other line at (512) 465-7357. Both of these lines are available 24 hours a day, 7 days a week.

As always, if there is an imminent threat to life or property, the employee should call 911 and then notify their supervisor as soon as possible.

This policy should not preclude any other actions dictated by a specific security policy already in place, but should be considered as an additional step to take when suspicious activities are seen.

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## Section 7 — Bridge Collapse Response

### Purpose

This Section is intended to document policy related to notification and response following an unanticipated full or partial collapse of an in-service bridge.

### Policy

As discussed in Section 5 of this manual, depending on the incident details, TxDOT's response may vary. However, in all instances of a full or partial bridge collapse, the District Engineer will designate an Incident Lead to ensure a coordinated response to reopen the facility. The Incident Lead will:

- ◆ Work with area office, District Director of Operations, and District Director of Maintenance to address immediate concerns.
  - Identify immediate safety hazards resulting from the collapse and initiate efforts to mitigate further damage. Evaluation is to be performed by senior District bridge staff or Bridge Division staff.
  - Identify immediate and long-term traffic control requirements.
- ◆ Assign staff to ensure that proper notifications occur.
  - Contact Chief Engineer, Director of District Operations, and Bridge Division Director by phone.
  - Notifications include TxDOT Form 2111 as required by Maintenance Division.
  - Submit notification of lane or bridge closures to Administration and FHWA in accordance with the TxDOT Bridge Inspection Manual.
  - Notify public of closure and provide status updates as appropriate through the District Public Information Office.
- ◆ Assemble design team.
  - Identify design leads for traffic handling, necessary road improvements, and structural repair or replacement.
  - Once the design team is assembled, coordination meetings should be established.
- ◆ Coordinate with the Maintenance Division on planning and letting of available contract mechanisms or emergency contract and contractor outreach.
  - As appropriate, provide preliminary details to facilitate contractor feedback and input.
  - Cost estimates prepared for Emergency Maintenance Contract (EMC) requests should include allowance for unknowns and account for all associated project costs including necessary traffic control and rapid mobilization of a contractor.

As requested by the Incident Lead or as directed by the Bridge Division Director, district bridge staff or Bridge Division staff will respond to investigate the extent and cause of damage, and to evaluate the portions of the structure that could be salvaged. When the state aircraft can expedite TxDOT's response to an emergency, requests must be made through TxDOT's Aviation - Flight Services.

During the design of the bridge repair, outreach to the contracting industry, material suppliers, and fabricators could help to ensure a coordinated response to expedite re-opening a facility. As appropriate, the Structural Materials Section of Materials and Test Division and the Construction and Maintenance Branch of Bridge Division can serve as resources to facilitate discussions regarding material availability or expedited fabrication options. When time is of the essence, standard, pre-fabricated options can frequently offer more rapid mobilization and construction compared to more complicated accelerate bridge construction techniques due to lead times and contractor familiarity with construction methods.

# Chapter 6 — Work For or By Others

## Contents:

[Section 1 — Overview of Work For or By Others](#)

[Section 2 — Adopt-a-Highway Program](#)

[Section 3 — Park Road and TPWD Facilities Maintenance](#)

[Section 4 — Boat Ramp Maintenance](#)

[Section 5 — Airport Maintenance](#)

[Section 6 — Mental Health and Mental Retardation Facilities Maintenance](#)

## **Section 1 — Overview of Work For or By Others**

### **Overview**

The sections in this chapter identify work performed for and by others including:

- ◆ Adopt-a-Highway Program
- ◆ Texas Parks and Wildlife Parking Lots, Park Roads and Boat Ramp Maintenance
- ◆ Routine Airport Maintenance Program (RAMP)
- ◆ Mental Health and Mental Retardation Road and Parking Lot Maintenance

## **Section 2 — Adopt-a-Highway Program**

### **Purpose**

The Adopt-a-Highway Program was established to create public involvement in keeping Texas highways free of litter. Information about this program may be obtained from the Travel and Information Division. Information about the sign designs may be obtained from the Traffic Operations Division.

## Section 3 — Park Road and TPWD Facilities Maintenance

### Background

This section outlines the responsibilities of both the [Texas Parks and Wildlife Department](#) (TPWD) and the Texas Department of Transportation (TxDOT) regarding the maintenance of park roads and TPWD facilities within the state. This information is included in a Memorandum of Agreement between TxDOT and TPWD. The agreement establishes that TxDOT will review the conditions of park roads, determine needs, and set priorities to perform the work. Park Roads (PR designation) are roads that are on the [state highway system](#). Parks and Wildlife Roads (PW designation) are roads, streets and parking lots owned by TPWD.

### TxDOT Responsibilities

The following outlines the responsibilities for TxDOT regarding PW Maintenance.

The Texas Department of Transportation should, at its own expense:

- ◆ Maintain the surface of paved roads. (This will include surface, base, subbase, and subgrade.)
- ◆ Maintain unpaved roads. Surfaces will be bladed as necessary to provide adequate drainage. TPWD may designate some unpaved roads to receive only limited maintenance when requested by the facility manager.
- ◆ Maintain the surface of parking lots and camper pads to provide an acceptable parking surface and to provide for adequate drainage.
- ◆ Provide for maintenance of bridges. All components of bridges and channels within the limits of the normal construction width will be maintained by TxDOT.
- ◆ Maintain drainage inside the construction width of roadways. (Drainage maintenance should include repairs to all structures less than bridge classification and maintenance of all ditches under and adjacent to the road not to exceed the construction width.)
- ◆ Maintain and replace all existing regulatory and warning signs and delineators, such as stop signs, speed limit signs, etc.
- ◆ Maintain all road striping as currently exists and as required for safe traffic operations.
- ◆ Repair and replace existing guardrails and other safety appurtenances as necessary.
- ◆ Provide for the operation of all PR designated roads. TxDOT may close park roads when emergency conditions exist.
- ◆ Coordinate plans and schedules for significant repair such as seal coats with the facility manager.



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The Maintenance Division has the responsibility to provide TPWD with an annual report by facility of maintenance work performed.

### **TPWD Responsibilities**

The following outlines the responsibilities for TPWD regarding PW Maintenance.

The Texas Parks and Wildlife Department should, at its own expense:

- ◆ Perform all mowing, trimming, litter removal, sweeping, herbicide applications, tree and brush removal, and other roadside maintenance.
- ◆ Maintain boat ramps within state parks.
- ◆ Maintain [cattleguards](#).
- ◆ Maintain drainage outside the construction width of roadways.
- ◆ Provide for maintenance and new installation of facility rules and regulation signs and all specialty signs.
- ◆ Provide for the operation of all PW designated roads and parking.
- ◆ PW roads may be closed by TPWD when emergency conditions exist.
- ◆ Method of utility installation along or across PW designated roads and parking should remain the choice of TPWD.
- ◆ Approval by TPWD Regional Director must be obtained prior to paving any unpaved road within a facility.

### **Local Points of Contact**

The primary point of contact for TPWD concerning maintenance of park roads is the park manager for each park. The TPWD point of contact may notify the TxDOT point of contact of maintenance needs as they are observed.

## Section 4 — Boat Ramp Maintenance

### Authority for Maintaining Texas Parks and Wildlife Department Boat Ramps

The Department maintains TPWD operated boat ramp facilities on highway right-of-way, in accordance with the Boat Ramp Memorandum of Agreement (Minute Order No. 103818). The summary of required details in the agreement follows.

### TxDOT Responsibilities

According to the Memorandum of Agreement, TxDOT is responsible for:

- ◆ Providing vegetation management, mowing, and trimming
- ◆ Providing litter pick-up and disposal
- ◆ Providing appropriate directional and regulatory signs
- ◆ Maintaining paved surfaces
- ◆ Maintaining unpaved surfaces by blading as necessary
- ◆ Performing periodic inspections of facilities
- ◆ Submitting to TPWD annual report of the list of ramps that require major rehabilitation

### TPWD Responsibilities

According to the Memorandum of Agreement, TPWD is responsible for:

- ◆ Providing for major rehabilitation of boat ramp parking lots and access roads
- ◆ Performing periodic inspection of the facilities
- ◆ Providing safe boating signs as needed
- ◆ Retaining operational control of the facilities
- ◆ Dredging of the facilities
- ◆ New construction

### Public Boat Ramp Signs

PUBLIC BOAT RAMP sign (D7-5), should be used to designate boat ramps. The signs may be erected in advance of the access road that leads from a marked highway route to a public boat ramp. Only toll free ramps, which are maintained by a public authority, may be signed.

## **Section 5 — Airport Maintenance**

### **Background**

The Routine Airport Maintenance Program (RAMP) assists communities by providing routine maintenance for general aviation airports using district personnel, routine maintenance contracts, or sponsor awarded contracts.

### **Aviation Division Responsibilities**

The Aviation Division (AVN) provides financial assistance through the execution of a grant to the local government. Contact the AVN for more information concerning this program.

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## Section 6 — Mental Health and Mental Retardation Facilities Maintenance

### Policy

This section outlines the responsibilities of the Texas Department of Transportation (TxDOT) regarding the maintenance of the Texas Mental Health and Mental Retardation Department (MHMR) streets, roads and parking lots within the state. This information is included in a Memorandum of Agreement between TxDOT and MHMR. The agreement establishes that TxDOT will review the conditions of MHMR facilities to determine needs and set priorities to perform the work. MHMR roads with the "MR" designation are roads, streets and parking lots owned by MHMR.

### TxDOT Responsibilities

The Texas Department of Transportation should, at its own expense:

- ◆ Maintain the surface of paved roads to TxDOT standards. This will include surface, base, sub-base, and subgrade. The roads will be evaluated on a two-year frequency to determine condition.
- ◆ Maintain the surface of parking lots to provide an acceptable parking surface and to provide for adequate drainage.
- ◆ Provide for maintenance of bridges to TxDOT standards. All components of bridges and the channels within the limits of the normal construction width will be maintained by TxDOT.
- ◆ Maintain drainage inside the construction width of roadways. Drainage maintenance should include repairs to all structures less than bridge classification and maintenance of all ditches under and adjacent to the road not to exceed the construction width.
- ◆ Maintain and replace all existing regulatory and warning signs and delineators, such as stop signs, speed limit signs, etc.
- ◆ Maintain all road striping and parking lot striping as currently exists and as required for safe traffic operations.
- ◆ Repair and replace existing guard rails and other safety appurtenances as necessary.

### MHMR Responsibilities

The Texas Department of Mental Health and Mental Retardation should, at its own expense:

- ◆ Exclusively perform all mowing, trimming, litter removal, sweeping, herbicide applications, tree and brush removal and other roadside maintenance
- ◆ Maintain drainage outside the construction width of roadways

- ◆ Provide for new installation of traffic control signals, and all specialty sign installation and maintenance
- ◆ Provide for the operation of all roads. Roads may be closed by MHMR when emergency conditions exist

**Local Points of Contact**

- ◆ The primary point of contact for MHMR concerning maintenance is the facility maintenance manager for each facility. The MHMR point of contact should notify the TxDOT point of contact of maintenance needs as they are observed.
- ◆ The TxDOT primary point of contact for each MHMR facility is the maintenance supervisor whose area of responsibility for maintenance includes the respective MHMR facility. The TxDOT point of contact should monitor the roads and parking lots on the state facility for maintenance needs in the same manner as the roads on the [state highway system](#) are monitored.