



Transmittal Number 05-013	Date February 2005
Publication Distribution To: All holders of the <i>Maintenance Manual</i> M 51-01	
Publication Title <i>Maintenance Manual</i>	Publication Number M 51-01
Originating Organization Maintenance and Operations	

**Remarks**

**Please be aware that this revision is only available electronically.**

**Who to Contact**

Please contact Helen Simmonds at (360) 705-7866 with comments, questions, or suggestions for improvement to the Maintenance Manual.

**Available On-Line**

To obtain the Maintenance Manual in its entirety, it is available on the Internet at:

**<http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/MaintenanceManual.pdf>**

**Please be aware that there have been some formatting changes in the manual.**

**Instructions:**

Page numbers and corresponding sheet-counts are given in the table below to indicate portions of the Maintenance Manual that are to be removed and inserted to accomplish this revision.

Chapter	Remove		Insert	
	Pages		Pages	
Table of Contents	All		1-8	
Chapter 7	All		1-10	
Index	All		1-8	

Distributed By Directional Documents and Engineering Publications	Phone Number (360) 705-7430 FAX: 705-6861	Signature <i>Stephanie Williams</i>
-------------------------------------------------------------------------	-------------------------------------------------	----------------------------------------

---

<b>Foreword</b>	i
<b>Introduction</b>	ii
<b>Chapter 1 Emergency Procedures</b>	
General Responsibilities .....	1-1
Regional Emergency Response Plans .....	1-2
WSDOT Disaster Plan .....	1-2
Concepts of Operations .....	1-2
Organization and Assignment of Responsibilities .....	1-2
Administration and Logistics .....	1-3
Plan Development and Maintenance .....	1-3
Training and Exercises .....	1-3
Emergency Operating Procedures .....	1-3
General .....	1-3
Maintenance Field Personnel .....	1-4
Maintenance Superintendent or Supervisor .....	1-5
Abandoned Cargo .....	1-5
Clearing the Highway .....	1-6
Open Road Policy .....	1-6
<b>Chapter 2 Work Zone Traffic Control and Safety</b>	
General .....	2-1
Fundamental Principles .....	2-1
Traffic Control Zones .....	2-2
Traffic Control Devices .....	2-3
Cone Placement Procedure .....	2-5
Traffic Control Procedures .....	2-8
Off-Road Activities .....	2-9
Nighttime Activities .....	2-9
Non-motorized Traffic Control .....	2-10
Pedestrian Control .....	2-10
Bicycle Control .....	2-10
Safety .....	2-11
Work Zone Operations .....	2-11
Enforcement .....	2-12
Resources for Traffic Control and Work Zone Safety .....	2-12

### Chapter 3 Pavement Patching & Repair

General.....	3-1
Maintenance of Flexible Pavements .....	3-2
Load & Speed Restrictions .....	3-2
Pavement Deficiencies.....	3-2
Rutting .....	3-2
Alligator Cracking .....	3-2
Longitudinal Cracking.....	3-3
Transverse Cracking.....	3-3
Potholes .....	3-3
Raveling & Pitting .....	3-3
Flushing .....	3-4
Sags and Humps .....	3-4
Edge Raveling .....	3-4
Pavement Maintenance Techniques.....	3-4
Patching .....	3-4
Patching with Base Repair.....	3-4
Overlay Patches .....	3-6
Spreader Box Patching.....	3-7
Grader Patching .....	3-8
Rolling Hot Mix Patches.....	3-8
Effects of Traffic on a Patching Operation .....	3-9
Crack Sealing (or Pouring).....	3-10
Hot Pour Method .....	3-10
Cold Pour Method .....	3-10
Maintenance of Rigid Pavements .....	3-11
Portland Cement Concrete Pavement Crack Pouring.....	3-11
Asphalt Emulsion Surface Treatment.....	3-14
Fog Seals .....	3-14
Sand Seal .....	3-14
Aggregate (Chip) Seal.....	3-14
Pavement Conditions for a Successful Project .....	3-15
Material Selection.....	3-15
Asphalts and Emulsions .....	3-15
Common Types of Emulsions Used for Chip Seals .....	3-15
Aggregate .....	3-16
Weather .....	3-16
Roadway Preparation .....	3-16
Equipment .....	3-16

Distributor .....	3-16
Calibration Procedures.....	3-17
Distributor Calibrations.....	3-17
Nozzle Size .....	3-18
Proper Pressure .....	3-18
Spray Bar Height .....	3-20
Proper Nozzle Angle.....	3-21
Streaking Will Occur:.....	3-21
Cleaning of Distributor.....	3-21
Checking the Bitumeter.....	3-22
Traffic Control .....	3-22
Application of Asphalt.....	3-22
Spreading Aggregate.....	3-23
Chip spreader Calibration.....	3-23
Chip Spreader .....	3-24
Rolling .....	3-25
Spreading of Fines or Choking - Optional.....	3-25
Post-Seal Inspection.....	3-26
DOs of Seal Coating.....	3-26
DO NOTs of Seal Coating.....	3-27
Blade Mixed Asphalt Mix.....	3-27
Handling Emulsified Asphalts .....	3-28

**Chapter 4 Drainage**

General.....	4-1
Drainage from Abutting Properties.....	4-1
Ditches and Gutters.....	4-2
Rockfall Ditches and Slope Benches.....	4-3
Dry Wells .....	4-3
Culverts.....	4-3
Automatic Pumps.....	4-4
Under Drains.....	4-4
Storm Sewers .....	4-4
Bank Protection .....	4-5
Detention Ponds and Tanks.....	4-6

**Chapter 5 Maintenance of Structures**

General ..... 5-1  
Bridge Repair Guidelines ..... 5-4  
Bridge Information ..... 5-5  
Environmental Aspects ..... 5-5  
Utility Installations ..... 5-7

**Chapter 6 Roadside Management**

General ..... 6-1  
Definitions ..... 6-1  
Reference ..... 6-2  
Resources ..... 6-2  
Roadside Functions ..... 6-3  
Roadside Treatment ..... 6-4  
Maintenance Involvement in the Roadside Management Process ..... 6-4  
Roadside Maintenance and the Maintenance Accountability Process ..... 6-4  
Roadside Management Zones ..... 6-5  
Typical Roadside Management Zones ..... 6-7  
Functional Zone Objectives ..... 6-7  
Maintenance of Zone 1 ..... 6-8  
    Policy ..... 6-8  
    Methods ..... 6-8  
Maintenance of Zone 2 ..... 6-9  
    Policy ..... 6-9  
    Methods ..... 6-9  
Maintenance of Zone 3 ..... 6-10  
    Policy ..... 6-10  
    Methods ..... 6-10  
Integrated Vegetation Management ..... 6-10  
Methods ..... 6-11  
Noxious Weed Control ..... 6-12  
    First Priority ..... 6-12  
    Second Priority ..... 6-12  
    Lowest Priority ..... 6-13  
Danger Trees ..... 6-13  
Disposal of Logs Dumped on Right of Way ..... 6-13  
Removal of Dangerous Objects and Structures ..... 6-14  
Trespass and Encroachment ..... 6-14  
Encroachments- General ..... 6-14  
Encroachment- Maintenance Crew Responsibilities ..... 6-14

Franchises and Permits .....	6-15
The Use of Pesticides.....	6-16
Pesticide License .....	6-16
Record Keeping .....	6-16
Product Labels .....	6-16
Posting Requirements .....	6-17
Aquatic Pesticide Applications .....	6-17
Pesticide Sensitive Individuals .....	6-17
Container Disposal .....	6-17
Use of Mowing Equipment.....	6-18
Other Cutting Methods .....	6-19
Cultural Control Methods .....	6-19
Biological Control .....	6-19
Burning Debris.....	6-20
Illegal Tree Removal.....	6-20
Significant Roadside Activities.....	6-20
Definitions.....	6-21
Notification .....	6-21
Removal of Debris and Rubbish.....	6-22
Litter Control and Partnerships for Roadside Enhancement .....	6-22
Adopt-a-Highway .....	6-23
Program Rules .....	6-23
Participant Eligibility.....	6-23
Assignment of Sections .....	6-24
Volunteer Adoptions .....	6-24
Sponsored Adoptions .....	6-25
General Permits for Roadside Enhancement .....	6-26
AAH Administrative Roles and Responsibilities .....	6-26
Maintenance & Operations Responsibilities .....	6-26
Region Responsibilities .....	6-27
Auxiliary Facilities .....	6-27
Safety Rest Areas .....	6-27
Park and Ride Lots .....	6-28
Historical Markers .....	6-28
Viewpoints .....	6-29

**Chapter 7 Snow and Ice Control**

General..... 7-1

Preparation for Winter Operations..... 7-1

Highway Categories..... 7-3

Special Criteria ..... 7-4

Work on State Highways ..... 7-4

City Streets on the State Highway System ..... 7-6

Work on Other Roads and Areas..... 7-6

Abandoned or Illegally Parked Vehicles..... 7-7

Closures ..... 7-7

Emergency Assistance ..... 7-8

Precautions..... 7-9

Service Level Quality Measurement ..... 7-9

**Chapter 8 Traffic Services**

General..... 8-1

Reconstruction Principles ..... 8-1

Signing ..... 8-2

Signing Responsibility..... 8-2

Sign Installation ..... 8-2

Maintenance..... 8-3

Sign Visibility ..... 8-4

Sign Storage and Transportation..... 8-4

Delineation..... 8-5

Pavement Markings ..... 8-5

Materials ..... 8-6

Application ..... 8-6

Marking Renewal or Replacement Frequency ..... 8-7

Removal of Markings ..... 8-7

Guideposts ..... 8-8

Traffic Barriers and Impact Attenuators ..... 8-8

Maintenance..... 8-8

Inspection..... 8-8

Repair..... 8-8

    Standard Run of Barrier ..... 8-9

Transitions ..... 8-10

Impact Attenuators ..... 8-10

Maintenance..... 8-10

Islands ..... 8-11

Transit Vehicle Stop Zones ..... 8-11

    Maintenance ..... 8-11

**Chapter 9 Electrical System Maintenance**

General..... 9-1

Wiring and Connection Maintenance ..... 9-1

Enclosure Maintenance..... 9-1

Documentation..... 9-1

Changeable Message Sign Systems..... 9-1

Drain Pump Systems..... 9-2

Gate and Barrier Systems ..... 9-2

    Minor ..... 9-2

    Major ..... 9-2

Intersection Control Beacons(Includes Hazard Beacons) ..... 9-2

Illumination Systems ..... 9-2

    Roadway Illumination Systems..... 9-2

Sign Lighting Systems ..... 9-3

Services..... 9-3

Signal Systems..... 9-3

Vehicle Detection Systems ..... 9-3

Pedestrian Detection and Display System ..... 9-3

Vehicle Display Systems..... 9-3

Signal Control Systems..... 9-4

Sprinkler Systems ..... 9-4

Television Systems ..... 9-4

**Chapter 10 Miscellaneous**

Right of Way Fences..... 10-1

Road Approaches- General ..... 10-1

Typical Maintenance Responsibilities in Cities..... 10-1

Maintenance Yards..... 10-6

Stockpile Sites ..... 10-6

Materials from State Quarries or Pits ..... 10-7

Procurement of Materials ..... 10-7

Material Specifications-General ..... 10-7

Disposal of Surplus Items ..... 10-8

    Equipment ..... 10-8

    Inventoried Items ..... 10-8

    Non-Inventoried Items ..... 10-8

Instructions for Radio Operation ..... 10-8

General Technique ..... 10-8

Helpful Reminders..... 10-8

Work Scheduling and Reporting..... 10-9



**Contents**

Budget..... 10-9  
Scheduling ..... 10-9  
Reporting ..... 10-10  
Environmental Sensitivity ..... 10-10

**Acronyms and Abbreviations**

**Appendices**

**City Streets as Part of State Highways**

City Streets as Part of State Highways ..... 1-2  
Agreed Upon Guidelines ..... 1-2  
Concurrences ..... 1-9  
Concurrences with Recommendations for Acceptance ..... 1-9  
Recommendations Accepted..... 1-9

**Figures**

**Emergency Procedures Manual**

**Work Zone Traffic Control Guidelines**

**Highway Engineering Field Formulas**

**Index**

### General

Removal of snow and ice from the roadway is extremely important and takes precedence over all non-emergency work.

The roadway must be plowed, sanded or deiced if necessary, and widened as quickly as possible. Snow and ice removal continues until the job is done, even if it involves working extra hours at night, weekends, or legal holidays. Work vigorously to maintain the roads in as good a condition as is possible with the equipment, materials, and personnel assigned to the work.

The department's policy is to remove snow from all high priority regularly traveled highways. After priority highways are cleared, snow removal occurs on lower priority highways according to established region/area criteria.

Some mountain passes are closed each year once deep winter snows arrive. These road closures occur where light traffic and deep snowfall does not justify the hazard and expense of attempting to keep roads open.

The snow removal operation is intended to provide the prudent motorist with a reasonably safe traveling surface. Although plowing starts soon after the storm begins, it takes time to complete the operation. During heavy snowfalls there may be periods of time when the roads will not be sanded or deiced and the motorist may need to install chains or other traction devices.

Safety for the traveling department and public personnel is the primary consideration at all times.

Economy and efficiency of operation is the goal of all maintenance personnel.

The Snow and Ice Plan is available to view at:

[http://wwwi.wsdot.wa.gov/maintops/SI\\_PlanNovember04-1.pdf](http://wwwi.wsdot.wa.gov/maintops/SI_PlanNovember04-1.pdf)

### Preparation for Winter Operations

Make plans early for winter work. Get snow plowing equipment, anti-icing/deicing equipment, sanding equipment, radio equipment, equipment operators, deicing materials, sanding materials, and supplies including signs, flags, barricades, small tools, and equipment parts ready for the first frost or snowstorm. Don't be caught unprepared for an early snow.

Prepare each roadway for effective plowing.

- Keep side ditches clean.
- Shoulders should be smooth and flush with the pavement.
- Clean sand out from under guardrail.
- Cut and remove all tall weeds, grass, and brush that may cause snow drifting.
- Clear right of way fences of wind-blown weeds and sand drifts.
- Erect snow stakes, if necessary, to indicate hazards or the edge of the roadway which may be covered with snow.

Each Area Maintenance Superintendent has maps that shows local priority routes for anti-icing, snowplowing and sanding in multilane and urban sections. Equipment operators are responsible to study the maps and become thoroughly familiar with the priority routes. These maps are available at each maintenance section shed before winter begins.

Maintenance Supervisors are responsible to:

- Assure their employees know what is expected of them.
- Keep records that document work directions given to crews.
- Instruct all operators in the proper operation and maintenance of equipment.

WSDOT has a Winter Snow and Ice Training Program in place that instructs employees on how to properly perform winter anti-icing, deicing, snow plowing and sanding. This training especially targets the intermittent, seasonal and new permanent employee.

Calibrate each sand spreader to make the spreads required at a reasonable speed. Several drivers typically operate the same piece of sanding equipment during the winter. Some drivers may not be familiar with the specifications (or quirks) of a particular vehicle. To remedy this, post a card in the cab of each vehicle showing the truck speed or tachometer reading and adjustment to the spreader to deliver specified spreads. Variations from this calibrated rate may be necessary in accordance with actual field conditions.

Get stockpiles of sand ready for winter use. Locate stockpiles on smooth surfaces. If possible, set stockpiles up to work from the south side with maximum exposure to sunlight. Get loaders ready for operation at these sites.

Snow and ice control chemicals should be mixed into winter abrasives stockpiles only at locations where cold winter weather would typically freeze an un-conditioned stockpile.

When abrasives stockpiles are conditioned, either rock salt or solid, corrosion-inhibited chemicals may be used for this purpose. No more than the minimum amount of chemicals needed to keep the abrasives stockpile workable

should be used. In many locations around the state, this will be a ratio of 20:1 (twenty parts abrasives to one part chemical) by volume. In some areas with wetter climates, a stronger concentration, up to 10:1, is required to keep stockpiles from freezing.

At times, stockpiles are conditioned at a rate stronger than the minimum concentration needed to keep them workable so that ice-melting capabilities are added to the abrasives. This is generally viewed as a less-than-optimal approach to snow and ice control. The current belief is that straight chemicals should be used to melt snow or ice and that adding abrasives to this equation results in costs and adverse impacts that outweigh its benefits. However, if maintenance personnel are working with some unique circumstances where such a mixture provides the most cost-effective method for improved road conditions, they can mix and use stockpiles with stronger concentrations of anti-icing chemicals. In such cases of stockpiles being conditioned at a chemical concentration of stronger than 10:1, only corrosion-inhibited chemicals shall be used.

## **Highway Categories**

The priority of maintenance given to a state highway facility is influenced by the functional class and amount of use (traffic) that it receives. In general highways are prioritized according to the following categories.

Category -1- Highway

Interstate with an ADT (greater than) > 80,000

Category -2- Highway

Interstate or Principal Arterial with an ADT (greater than) > 20,000

Category -3- Highway

Interstate or Principal Arterial with an ADT (less than) < 20,000

Minor Arterial with an ADT (greater than) > 10,000

Category -4- Highway

Principal Arterial with an ADT (less than) < 10,000

Minor Arterial with an ADT (less than) < 5,000

Collector with an ADT (greater than) > 5,000

Category -5- Highway

Principal Arterial with an ADT (less than) < 5,000

Minor Arterial with an ADT (less than) < 5,000

Collector with an ADT (less than) < 5,000

## **Special Criteria**

The priority of a highway may be raised or lowered a category, based on the following special criteria:

1. Importance to commerce, truck routes, etc.
2. Important commuter routes
3. School bus routes
4. Proximity to population centers
5. Curvature and grade of highway alignment

## **Work on State Highways**

**Area of Responsibility.** Snow and ice control operations on state highways are restricted to the highway right of way. This includes those portions of intersecting public roads that are within the state highway right of way.

**Snow Control Operations.** Snow control operations consist of removing accumulated snow from the traveled way, shoulders, widened areas, and public highway approaches within highway right of way. When accumulated snow becomes compact and removal is not possible with available equipment, the accumulation is treated as an ice control operation.

**Ice Control Operations.** Ice control operations are done on the highway and on public accesses within highway right of way. This can consist of pretreatment of the roadway surface with anti-icing chemicals or the application of abrasives and/or deicer chemicals. When removal of compact snow and ice is not immediately possible, an abrasive application at bridges, curves, intersections, railroad crossings, steep grades, and isolated shaded areas is acceptable. Ice and compact snow are best removed under thawing conditions.

If possible, schedule ice and compact snow removal operations during the temperature rise that often occurs between 11:00 a.m. and 3:00 p.m. Use this time to clear surfaces of melting snow and ice, and to remove as much slush as possible prior to evening temperature declines. The use of road graders for ice removal is most effective during this period. Proper use of this warmer temperature period can make the difference between efficient and non-efficient cleanup operations.

**Anti-icing & Deicing Chemicals.** The use of anti-icing and deicing chemicals containing reduced chlorides such as Calcium Chloride and Magnesium Chloride or no chloride like Calcium Magnesium Acetate is encouraged. Use anti-icers/deicers in all areas where the Regional Administrator has determined there are benefits of such application.

Adverse impacts of a storm can be reduced when forecasts are used to apply anti-icing chemicals. Roadway weather information systems such as "RWIS" help WSDOT estimate the onset of road surface ice. With this information maintenance crews can apply anti-icing treatments just before a storm or ice condition hits.

**Level of Service Coordination.** Proper snow and ice control operations include coordination between adjacent regions. This assures that obvious changes in level of service on continuous sections of highway are avoided.

**Tandem Plowing.** Tandem plowing can be used for snow removal on multilane highways. Where reversible plows are available, it is often advantageous to operate one plow toward the left plowing to the median strip. In areas where drifting snow is a frequent problem, caution should be exercised in placing snow on the median. A narrow median filled with snow can cause drifting in adjacent lanes. Also, melting snow in the median can cause icy roadways during colder nights. Take care to assure that plowed snow is not thrown into the path of oncoming vehicles or onto a roadway below the highway being plowed.

**Spinner Shut-off.** In most cases spinner assemblies are used to distribute abrasives. In these situations, turn off the spinner temporarily when the sanding truck meets oncoming traffic. Stop sanding temporarily to allow backed up traffic to pass.

**Operations at Interchanges.** Interchange ramps are considered as separate roadways independent of the highway they serve. Priorities are determined by traffic volume. Ramp roadways are normally treated after one or more lanes are open on the main roadway.

**Railroad Crossings.** Never leave a windrow of snow on a railroad grade crossing. Drivers are to raise or otherwise adjust the blade before reaching the crossing to prevent damage to the crossing and/or equipment. Be aware of and avoid any conflicts between snow removal operations and approaching railway traffic.

**Widening.** Widening for snow storage, established turnouts, mailboxes, etc., may be accomplished when available manpower and equipment permit. Shoulders are often plowed in conjunction with the traveled way, or immediately after the storm is over. Clearing shoulders provides storage space for additional snow, makes the highway safer for motorists, helps prevent drifting, damage to the roadbed from moisture infiltration, and excessive runoff onto the pavement. Perform shoulder plowing in the direction of travel. Always establish proper traffic control before plowing against traffic on the median shoulder of divided highways.

**Drainage Ways.** Clear all drainage ways from the roadway surface prior to thawing conditions. Utilize a road grader or wing plow if possible.

**Highway Sign Installations.** Clear snow-covered highway signs after normal snow and ice control operations have been accomplished. Give first attention to regulatory and warning signs.

**Construction Projects.** Perform state-force snow and ice control operations on construction projects only if the project is open to traffic. Before beginning, assure that appropriate arrangements between region maintenance, construction staff and the contractor have been agreed to.

**Pedestrian Facilities.** In some urban locations, plowing operations may clog sidewalks or other pedestrian facilities. Regions need to initiate coordination with local jurisdictions in the fall to establish responsibilities and priorities for keeping pedestrian facilities free of snow. Keep in mind that areas outside the curb line are a city responsibility.

## **City Streets on the State Highway System**

RCW 47.24.20 defines the jurisdiction of the state and the cities for those city streets that serve as a part of the state highway system within the corporate limits of a city.

In respect to snow and ice control, the law provides that a city or town shall remove all snow at its own expense. Except, WSDOT is responsible to plow snow on the roadway when necessary. Cities are also required to clean the streets, including catch basins.

Cities generally plow city streets and are expected to plow the state highways in the city as well. State crews are expected to assist by plowing on the way through town. However, plowing on city streets is a secondary priority to be completed after rural lanes have been cleared.

The general exception is routes within cities that are designated as limited access highways. In those instances, the state exercises full responsibility for the entire facility and all maintenance operations.

## **Work on Other Roads and Areas**

**Other Governmental Agencies.** Snowplowing for other governmental agencies may be performed when authorized, on a reimbursable basis. When winter operations are conducted for other agencies, agreements are processed by the Region Administrator or his/her authorized representative.

Snow and ice control operations on roads and other facilities under the jurisdiction of other governmental agencies are secondary to work on state highways. Work is completed in accordance with the provisions of the agreement with the other governmental agency.

**Private Approaches.** Snow and ice control on private approaches, including that portion that may be located within the state highway right of way, is the responsibility of the abutting property owner.

WSDOT does not remove snow, ice, or sleet from private driveways, including any portion that may be located within the state highway right of way. All such activities are the responsibility of the abutting property owner.

Snow and ice control activities may inadvertently result in the deposit or the wind rowing of snow, ice or sleet onto private approaches. The department does not assume responsibility for the removal or clearance of such material, even if caused by normal winter maintenance operations. However, all employees involved in snow control operations are expected to be sensitive, considerate, and courteous when carrying out these policies.

Mailbox turnouts on the shoulders may be plowed as a part of the shoulder widening operation.

### **Abandoned or Illegally Parked Vehicles**

RCW 46.55.085 allows the State Patrol to impound abandoned or illegally parked vehicles after documented attempts to notify the owner. This process can require several days. However, if the vehicle is determined to be a hazard, the Patrol can arrange for immediate removal. The State Patrol has requested that WSDOT record any department requests for such removal, in order to support the Patrol's actions should a conflict arise with the owner of the vehicle.

### **Closures**

Occasionally winter conditions are so severe they overwhelm the capability of maintenance crews to effectively respond. This happens despite our best planning efforts and highly motivated crews. Temporary road restrictions or closures may be the only safe alternative in these situations.

The Secretary or his designated representative may temporarily close or place temporary traffic restrictions on any state highway for any reason. The Secretary or designee may also close any state highway, without delay, in an emergency. When it becomes apparent that a road section will be closed by snow, ice, snow slides, or for any other reason, maintenance personnel must take immediate action to safeguard themselves, and the public.

The following actions are taken when a road must be closed for more than an hour.

- The Regional Administrator or designee notifies the State Patrol and other pertinent organizations.
- Immediately erect appropriate traffic control devices advising motorists of the closure and possible detours.
- Take all necessary measures to prevent motorists from entering and becoming stranded in the closed section.



- Keep the Regional Public Information Officer apprised of road conditions so that the news media can be informed of closures. Emergency closures require that the Area Superintendent, Regional Maintenance Engineer, Regional Administrator and the Regional Public Information Officer be notified as soon as possible.
- Keep the State Maintenance Engineer informed of all closures that are expected to last for four hours or more and of all actions taken to reopen the roads.

## **Emergency Assistance**

During winter maintenance operations, limit emergency assistance to actions that safeguard life and property. Time spent helping motorists with minor problems could result in road conditions that would cause more serious problems for other motorists.

Employees may render emergency assistance to motorists, at the motorist's request. Stranded vehicles may be pulled onto the highway, provided the vehicle is driveable. The motorist must make his/her own tow chain or cable hookup and disconnect. This kind of assistance is typically permissible only when snow or ice conditions are reasonably under control and when private towing trucks are not available.

It may be necessary occasionally for an employee to exercise judgment as to whether a motorist is capable of driving his vehicle. Sometimes it appears that the motorist is inebriated or otherwise unsuited to drive. In these situations notify law enforcement agencies by radio or other available means as soon as possible. Employees are required to notify the State Patrol about any accidents that occur on the highway.

Never tow any vehicle that may be unable to proceed because of lack of power or traction, except when the vehicle blocks the traveled way. In this instance, the stalled vehicle may be towed a sufficient distance to clear the normally traveled portion of the roadway to allow the safe passage of other vehicles.

Department employees may not accept compensation of any kind for this or any other type of assistance.

WSDOT desires to avoid situations that can cause the department or its employees to be sued. This has resulted in a general policy that non-employees do not ride in state-owned vehicles. However, employees may provide transportation in state-owned vehicles to stranded motorists under emergency conditions. Employees are advised to consider the particular circumstances and exercise careful judgment.

## **Precautions**

Take precautions to prevent damage to signs, mail box posts, sign posts, and other roadside appurtenances. Rotary snowplow operators are to reduce speed when in an area where adjacent buildings or facilities might be damaged from the flying snow. Redirecting the chutes helps minimize this danger. Utility lines and transformers can also be damaged by rotary plows.

Trucks must be operated at moderate speeds when removing snow, especially when slush exists. When plowing shoulders or when meeting traffic, operators need to be aware of what is going on around them. Stop or slow down occasionally to allow traffic from the rear to pass. Plowing slush at high speeds deposits the slush on signs and other vehicles and thereby obliterates warning signs. Plowing snow at high speeds causes excessive snow clouds, making the highway less safe for the traveling public.

Be especially careful when passing or being overtaken by other traffic. Avoid throwing snow onto windshields and obstructing the vision of other drivers.

Take care while removing snow in the vicinity of cars parked adjacent to the highway. Even though the cars may be illegally parked on the traveled way, take reasonable care consistent with the necessity of accomplishing the work.

Raised traffic buttons are often used in western Washington for lane stripe delineation. Care must be taken to minimize damage to the raised traffic buttons. Snowplows with rubber bits are used for this purpose—they are effective in slushy snow or in snow that has not been compacted by traffic.

## **Service Level Quality Measurement**

The Headquarters Maintenance Office has developed quality performance measurements for snow and ice control. These performance measurements have been established to assess how well maintenance offices are able to control snow and ice. The purpose is to find the best ways to do our jobs with reduced funding and personnel. These measures focus on providing targeted levels of service for snow and ice control based on the highway category and local maintenance area priority. For more details on how this process affects you, check with your supervisor.



## A

- AAH Administrative Roles and Responsibilities, 6-26
- Abandoned Cargo, 1-5
- Abandoned or Illegally Parked Vehicles, 7-7
- Abutments, Bulkheads, Piers, and Intermediate Bents., 5-3
- Acronyms and Abbreviations, 11
- Administration and Logistics, 1-2
- Adopt-a-Highway, 6-23
- Advance warning, 2-2
- Aggregate, 3-16
- Aggregate (Chip) Seal, 3-14
- Agreed Upon Guidelines, 1-2
- Alligator Cracking, 3-2
- Application, 8-6
- Application of Asphalt, 3-22
- Aquatic Pesticide Applications, 6-17
- Asphalts and Emulsions, 3-15
- Asphalt Emulsion Surface Treatment, 3-14
- Asphalt Wearing Surface., 5-3
- Assignment of Sections, 6-24
- Automatic Pumps, 4-4
- Auxiliary Facilities, 6-27

## B

- Bank Protection, 4-5
- Betterments - Pavement Markings, 1-3
- Bicycle Control, 2-10
- Biological Control, 6-19
- Blade Mixed Asphalt Mix, 3-27
- Bridge Drains., 5-3
- Bridge Information, 5-5
- Bridge Repair Guidelines, 5-4
- Budget, 10-9
- Buffer space, 2-3
- Burning Debris, 6-20

## C

- Calibration Procedures, 3-17
- Changeable message signs, 2-4
- Changeable Message Sign Systems, 9-1
- Channelizing Devices, 2-4
- Checking the Bitumeter, 3-22
- Chip Spreader, 3-24
- Chip spreader Calibration, 3-23
- City/State Maintenance Responsibilities For City Streets As Part Of The State Highway System, 1-5

City/State Maintenance Responsibilities Of Bridges That  
Convey Non-Limited Access State Highways That Are Also City Streets, 1-7  
City Streets as Part of State Highways, 1-1, 1-2  
City Streets on the State Highway System, 7-6  
Cleaning of Distributor, 3-21  
Closures, 7-7  
Cold Pour Method, 3-10  
Common Types of Emulsions Used for Chip Seals, 3-15  
Concepts of Operations, 1-2  
Concrete Deck., 5-3  
Concurrences, 1-9  
Concurrences with Recommendations for Acceptance, 1-9  
Cone Placement Procedure, 2-5  
Container Disposal, 6-17  
Crack Sealing (or Pouring), 3-10  
Cultural Control Methods, 6-19  
Culverts, 4-3  
Curbs and Railings, 5-3

## **D**

Danger Trees, 6-13  
Definitions, 6-1, 6-21  
Delineation, 8-5  
Detention Ponds and Tanks, 4-5  
Devices, 2-7  
Disposal of Logs Dumped on Right of Way, 6-13  
Disposal of Surplus Items, 10-8  
Distributor, 3-16  
Distributor Calibrations, 3-17  
Ditches and Gutters, 4-2  
Documentation, 9-1  
DOs of Seal Coating, 3-26  
DO NOTs of Seal Coating, 3-27  
Drainage, 4-1  
Drainage from Abutting Properties, 4-1  
Drain Pump Systems, 9-2  
Dry Wells, 4-3

## **E**

Edge Raveling, 3-4  
Effects of Traffic on a Patching Operation, 3-9  
Electrical System Maintenance, 9-1  
Emergency Assistance, 7-8  
Emergency Operating Procedures, 1-3  
Emergency Procedures, 1-1  
Enclosure Maintenance, 9-1  
Encroachment- Maintenance Crew Responsibilities, 6-14  
Encroachments- General, 6-14  
Enforcement, 2-12  
Environmental Aspects, 5-5

Environmental Sensitivity, 10-10  
Equipment, 10-8, 3-16  
Expansion Joints., 5-3

## **F**

First Priority, 6-12  
Flushing, 3-4  
Fog Seals, 3-14  
Franchises and Permits, 6-15  
Functional Zone Objectives, 6-7  
Fundamental Principles, 2-1

## **G**

Gate and Barrier Systems, 9-2  
General, 3-1, 4-1, 5-1, 6-1, 7-1, 8-1, 9-1  
General Conditions., 5-3  
General Permits for Roadside Enhancement, 6-26  
General Technique, 10-8  
Grader Patching, 3-8  
Grid Decks., 5-3  
Guardrail (Barriers) Maintenance, 1-3  
Guideposts, 8-8

## **H**

Handling Emulsified Asphalts, 3-28  
Hand Signaling Devices, 2-7  
Helpful Reminders, 10-8  
Highway Categories, 7-3  
Historical Markers, 6-28  
Hot Pour Method, 3-10

## **I**

Illegal Tree Removal, 6-20  
Illumination Systems, 9-2  
Impact Attenuators, 8-10  
Inspection, 5-1, 8-8  
Instructions for Radio Operation, 10-8  
Integrated Vegetation Management, 6-10  
Intersection Control Beacons(Includes Hazard Beacons), 9-2  
Inventoried Items, 10-8  
Islands, 8-11

## **L**

Litter Control and Partnerships for Roadside Enhancement, 6-22  
Load & Speed Restrictions, 3-2  
Longitudinal Cracking, 3-3  
Lowest Priority, 6-13

## M

- Maintenance, 8-3, 8-8, 8-10, 8-11
- Maintenance & Operations Responsibilities, 6-26
- Maintenance Field Personnel, 1-4
- Maintenance Involvement in the Roadside Management Process, 6-4
- Maintenance of Flexible Pavements, 3-2
- Maintenance of Rigid Pavements, 3-11
- Maintenance of Structures, 5-1
- Maintenance of Zone 1, 6-8
- Maintenance of Zone 2, 6-9
- Maintenance of Zone 3, 6-10
- Maintenance Superintendent or Supervisor, 1-4
- Maintenance Yards, 10-6
- Major, 9-2
- Major Structures, 5-1
- Marking Renewal or Replacement Frequency, 8-7
- Materials, 8-6
- Materials from State Quarries or Pits, 10-7
- Material Selection, 3-15
- Material Specifications-General, 10-7
- Methods, 6-8, 6-9, 6-10, 6-11
- Minor, 9-2
- Minor Structures, 5-1
- Miscellaneous, 10-1

## N

- Nighttime Activities, 2-9
- Non-Inventoried Items, 10-8
- Non-motorized Traffic Control, 2-10
- Notification, 6-21
- Noxious Weed Control, 6-12
- Nozzle Size, 3-18

## O

- Off-Road Activities, 2-9
- Oil Separators, 4-6
- Organization and Assignment of Responsibilities, 1-2
- Other Cutting Methods, 6-19
- Overlay Patches, 3-6

## P

- Paint., 5-3
- Parallel Ditches and Cross Culverts, 1-3
- Park and Ride Lots, 6-28
- Participant Eligibility, 6-23
- Patching, 3-4
- Patching with Base Repair, 3-4
- Pavement Conditions for a Successful Project, 3-15
- Pavement Deficiencies, 3-2

- Pavement Maintenance Techniques, 3-4
- Pavement Markings, 8-5
- Pedestrian Control, 2-10
- Pedestrian Detection and Display System, 9-3
- Pesticide License, 6-16
- Pesticide Sensitive Individuals, 6-17
- Plan Development and Maintenance, 1-3
- Policy, 6-10
- Portland Cement Concrete Pavement Crack Pouring, 3-11
- Post-Seal Inspection, 3-26
- Posting Requirements, 6-17
- Potholes, 3-3
- Precautions, 7-9
- Preparation for Winter Operations, 7-1
- Procurement of Materials, 10-7
- Product Labels, 6-16
- Program Rules, 6-23
- Proper Nozzle Angle, 3-21
- Proper Pressure, 3-18

## R

- Raveling & Pitting, 3-3
- Recommendations Accepted, 1-9
- Reconstruction Principles, 8-1
- Record Keeping, 6-16
- Reference, 6-2
- Regional Emergency Response Plans, 1-2
- Region Responsibilities, 6-27
- Removal of Dangerous Objects and Structures, 6-14
- Removal of Debris and Rubbish, 6-22
- Removal of Markings, 8-7
- Repair, 8-8
- Reporting, 10-10
- Resources, 6-2
- Right of Way Fences, 10-1
- Roadside Functions, 6-3
- Roadside Maintenance and the Maintenance Accountability Process, 6-4
- Roadside Management, 6-1
- Roadside Management Zones, 6-5
- Roadside Treatment, 6-4
- Roadway Illumination Systems, 9-2
- Roadway Preparation, 3-16
- Road Approaches- General, 10-1
- Rockfall Ditches and Slope Benches, 4-3
- Rolling, 3-25
- Rolling Hot Mix Patches, 3-8
- Rutting, 3-2



## S

- Safety, 2-1
- Safety Rest Areas, 6-27
- Sags and Humps, 3-4
- Sand Seal, 3-14
- Scheduling, 10-9
- Second Priority, 6-12
- Services, 9-3
- Service Level Quality Measurement, 7-9
- Signal Control Systems, 9-4
- Signal Systems, 9-3
- Significant Roadside Activities, 6-20
- Signing, 8-2
- Signing Responsibility, 8-2
- Signs and Supports, 2-3
- Sign Installation, 8-2
- Sign Lighting Systems, 9-3
- Sign Storage and Transportation, 8-4
- Sign Visibility, 8-4
- Snow and Ice Control, 7-1
- Snow Plowing, 1-4
- Special Criteria, 7-4
- Sponsored Adoptions, 6-25
- Spray Bar Height, 3-20
- Spreader Box Patching, 3-7
- Spreading Aggregate, 3-23
- Spreading of Fines or Choking - Optional, 3-25
- Sprinkler Systems, 9-4
- Standard Run of Barrier, 8-9
- State Owned Bridges That Convey City Or County Traffic Over A Limited Access Or Non-Limited Access Highway Corridor, 1-8
- Steel Truss Members., 5-3
- Stockpile Sites, 10-6
- Storm Sewers, 4-4
- Streaking Will Occur:, 3-21
- Stringers, Caps, and Floor Beams., 5-3

## T

- Television Systems, 9-4
- Terminals and Anchors, 8-9
- The Use of Pesticides, 6-16
- Traffic Barriers and Impact Attenuators, 8-8
- Traffic Control, 3-22
- Traffic Control Devices, 2-3
- Traffic Control Procedures, 2-8
- Traffic Control Zones, 2-2
- Traffic Services, 8-1
- Training and Exercises, 1-3
- Transitions, 8-10

Transit Vehicle Stop Zones, 8-11  
Transverse Cracking, 3-3  
Trespass and Encroachment, 6-14  
Tunnels., 5-4  
Typical Maintenance Responsibilities in Cities, 10-1  
Typical Roadside Management Zones, 6-7

## U

Under Drains, 4-4  
Use of Mowing Equipment, 6-18  
Utility Installations, 5-7

## V

Vehicle Detection Systems, 9-3  
Vehicle Display Systems, 9-3  
Viewpoints, 6-29  
Volunteer Adoptions, 6-24

## W

Walls and Cribbing., 5-4  
Waterways., 5-3  
Water and Concrete Barriers, 2-6  
Weather, 3-16  
Wiring and Connection Maintenance, 9-1  
Wood Truss Members, 5-3  
Work on Other Roads and Areas, 7-6  
Work on State Highways, 7-4  
Work Scheduling and Reporting, 10-9  
Work Zone Safety, 2-12  
WSDOT Disaster Plan, 1-2

