

## 7-1      **General**

Removal or prevention of snow and ice accumulation on the roadway is a top priority and will generally take precedence over other non-emergency maintenance functions.

Washington State Department of Transportation (WSDOT) policy is to remove or prevent snow and ice accumulation starting with higher priority highways such as Interstates and other high ADT routes. After priority highways are cleared, snow removal occurs on lower priority highways according to the Roadway Treatment Goals as established in the [Statewide Snow and Ice Plan](#).

Some mountain pass highways are closed each year once winter snows arrive. Pass closures occur where light traffic does not justify the hazard and expense of attempting to keep roads open in the presence of heavy snowfall and avalanche occurrences.

When snowstorms occur, plowing starts soon after the storm begins. It takes time to complete the operation so during heavy snowfalls there will be periods of time when the roads will not be free of snow and ice and the travelers may need to install chains or other traction devices. Snow removal operations are intended to provide the traveling public with a reasonably safe driving surface. Snow and ice removal continues until roads are returned to a drivable condition even if it involves working extra hours at night, on weekends, and on legal holidays.

Freezing rain, freezing fog, and frost events can occur quickly and sometimes without warning. Deicing operations will begin after notice is made of such events and crews have time to react and treat such conditions appropriately. When conditions are appropriate, snow and ice material pre-treatments will be made to prevent the bonding of snow and ice to the roadway surface.

## 7-2      **Preparation for Winter Operations**

Winter operational planning begins well ahead of winter so that equipment, materials, and labor forces can be prepared for early events. All items in the [Statewide Snow and Ice Plan](#), Chapter 3, Annual Review of Snow and Ice Procedures, are reviewed and documented. Equipment is adapted to snow and ice response and new personnel are signed off on equipment operation by a qualified person. Material supplies are topped off, and other tools and supplies readied as needed. Night and weekend schedules and contingency schedules are updated and implemented to provide coverage for snow and ice response. Instructions on winter time chain of command, communication procedures, priority routes, and treatment specifications are provided to all maintenance personnel. Public agency, transit, school district, and other affected parties are notified of winter operations plans where appropriate.

### 7-3 Treatment Levels and Goals

There are five treatment levels assigned to highways in Washington State. They range from Level 1 highways, which include all of the Interstates, down to Level 5 roads which comprise those sections of highway which are closed in the winter. These levels are assigned primarily based on ADT. A color-coded treatment level map of all state highways is available for review in the [Statewide Snow and Ice Plan](#), Chapter 1.

In addition to the treatment levels assigned to all state highways, there are a series of special criteria which must be considered when assigning priority response to segments of state highway. These include:

- Importance to commerce.
- Commuter routes.
- School bus routes.
- Proximity to population centers.
- Curvature and grade of highway alignment.

These criteria are mostly location specific so it is important that priorities are assigned and understood by the area maintenance personnel where such segments deviate from the larger treatment level assignments.

The Treatment Level Goals assigned to the various levels are also available in the [Statewide Snow and Ice Plan](#), Chapter 1. Level 1 highways receive the highest degree of response followed in descending order by the other four levels. In areas where Level 1 highways do not exist, the corresponding treatment level goals may be applied to highways of lower priority. The language in the [Statewide Snow and Ice Plan](#) allows for Level 2 highways to be treated the same as Level 1 highways to the extent that resources allow. However, Level 1 highways where they do exist will take precedence over all other roads and resources may be shifted accordingly.

### 7-4 Other Facilities

The primary function and mission of the snow and ice program is response to roadway conditions in order to keep travelers moving and to provide for the accustomed level of service. WSDOT recognizes that there are other facilities besides state highways that may rely upon state forces for winter response in order to keep those facilities functional. These can include WSDOT ferries parking lots, park and ride lots, WSDOT regional and area facility lots and some sidewalks that were constructed using federal funds.

In all cases, response to roadway conditions will take precedence over any such activities, and these facilities will be handled on a “as conditions allow” basis. This may mean that such facilities will remain unmaintained until such time that all roadways in any given region are clear, level of service goals are met, and normal movement of goods and services is restored.

## 7-5 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 consist of removing accumulated snow from the traveled way, shoulders, widened areas, and public highway approaches within highway right of way.

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. Snow and ice control activities may inadvertently result in the deposit or the windrowing 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.

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 an agreement with the other governmental agency. Agreements are processed by the Regional Administrator or his/her authorized representative.

## 7-6 Abandoned or Illegally Parked Vehicles

[Revised Code of Washington 46.55.085](#) allows the Washington State Patrol (WSP) 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, WSP can arrange for immediate removal. WSP has requested that WSDOT record any department requests for such removal in order to support WSP's actions should a conflict arise with the owner of the vehicle.

## 7-7 City Streets on the State Highway System

[RCW 47.24.020](#) 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. Cities are also required to clean the streets, including catch basins, except WSDOT is responsible to plow snow on the roadway when necessary\*.

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 highways outside city jurisdiction 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.

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\*See [2013 City Streets As Part of State Highways Conformed Agreement](#) for a definition of "when necessary"

## 7-8 Operational Considerations

The following guidelines are of a general nature as more specific guidelines are available in the [Statewide Snow and Ice Plan](#) and in regional and area plans and operator handbooks. These guidelines are also meant to address issues of statewide significance which have arisen in the recent past.

### 7-8.1 Road Closures and Restrictions

These may occur occasionally when conditions overwhelm the ability of maintenance forces to effectively respond. Deep snow drifts, spin-out accidents, avalanche control missions, and white-out conditions are among the causes of such measures. The safety of our employees and the traveling public is paramount, and when conditions prevent safe travel or response to conditions roads will be closed to safeguard employees 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 WSP and other pertinent organizations.
- Immediately erect appropriate traffic control devices and/or electronic message signs 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.

### 7-8.2 Emergency Assistance

Limited to actions that safeguard life and property. Time spent dealing with minor problems could result in deteriorating road conditions that will affect many more motorists. Employees may render emergency assistance to motorists at the motorist's request, provided:

- The stranded vehicle is drivable.
- The motorist makes his/her own chain or cable hook-up to their vehicle.
- A tow truck is not immediately available.
- Snow and ice conditions are under reasonable control.

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.

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

It may be necessary occasionally for an employee to exercise judgment as to whether a motorist is capable of driving his/her vehicle. If the motorist appears impaired or otherwise unsuited to drive notify law enforcement agencies by radio or other available means as soon as possible.

Employees are required to notify the State Patrol about any crashes/collisions that occur on the highway.

WSDOT desires to avoid situations that can cause the department or its employees to be harmed or 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 travelers under emergency conditions, exercising very careful judgment when doing so, and keeping the TMC or a supervisor informed of such actions as they occur.

### 7-8.3 *Plowing*

Must be done at speeds appropriate to conditions to avoid damage to roadside hardware, highway signs, utility lines, mail boxes, parked cars, and other private property. Special care must be taken to avoid blocking sidewalks and bike lanes in areas where pedestrians may be present. Moderate speeds must be maintained when plowing wet snow and slush as they tend to be cast much further and faster than dry snow. Dry snow can also cause problems when plowed too fast by creating snow clouds which obscure visibility.

Care must be taken when plowing on the centerline or against median barriers to avoid casting snow into the oncoming lanes. Be especially careful when passing or being overtaken by other traffic to avoid casting 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.

Extreme care should be taken when plowing near or around railroad crossings, raised curbs, raised pavement markings, and other obstructions. When possible, such obstructions should be marked and/or maintenance personnel should be made aware of the locations of such obstructions.

When accumulated, snow becomes compact and removal is not possible with available equipment, the accumulation is treated as an ice control operation. 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.

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.

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

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 for snow storage, established turnouts, mailboxes, etc., may be accomplished when available manpower and equipment permit. Shoulders are plowed in conjunction with plowing of the traveled way, or immediately after the storm is over. Clearing shoulders provides storage space for additional snow, makes the highway safer for traveling public helps prevent drifting, damage to the road bed 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.

After the priority lanes are cleared, attention is needed to make sure the bike lanes and sidewalks are travelable.

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

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

#### **7-8.4** *Material Applications*

Must be done according to “sensible salting” strategies, that is, using the least amount of material necessary for the desired outcome. Outcomes are driven by service level goals for any given state route, and should not exceed the [Statewide Snow and Ice Plan](#) defined desired outcome through the excessive use of salt or deicers. Operators must be familiar with local application guidelines specific to the materials in use for that area. They should also be familiar with the characteristics and limitations of those materials.

WSDOT has a chemical priority policy for snow and ice response, but does not preclude the appropriate use of sand or abrasives to apply a traction component when needed. Sand can be an effective stand-alone treatment for certain conditions such as extreme cold or heavy compact snow which would require extremely heavy salt and deicer treatments to remove. The combination of salt and sand in some ratio can be an efficient and cost effective treatment.

Material application equipment must be calibrated pre-season and as needed during the season. The use of precision material controllers in combination with closed loop hydraulic systems is the preferred means of material delivery. Equipping all trucks with such technology is a WSDOT priority and should result in cost savings through more efficient applications of snow and ice material.

Care must be taken to avoid the inadvertent blasting of oncoming traffic with sand or salt. Spinner speed should be adjusted down or spinners turned off when meeting oncoming traffic.

Accurate record keeping of material applications is necessary to demonstrate efforts made to respond to winter conditions for purposes of performance rating, and for response to tort actions. Such record keeping is also useful in determining the “normal” or average material use for a given area over history, and as a budgeting tool. For equipment not yet provided with AVL/GPS technology, records should be kept via PDA or in paper form for later data entry on a PC.

### 7-8.5 **Material Storage**

Must abide by National Pollutant Discharge Elimination System (NPDES) standards where applicable, and by general good housekeeping and spill prevention procedures everywhere. The guidelines below apply to the storage of all winter chemicals for storm water compliance within the NPDES permit area. However, they outline good standards of practice for all areas and should be followed to the extent possible.

Prior to the reissuance of the current (2009) NPDES Permit, WSDOT will evaluate all winter chemical storage areas within the permit area to identify necessary capital structural control BMPs. These capital improvements will be ranked and constructed on a priority basis as funding becomes available. Funding may be needed by the state legislature prior to these BMPs being constructed. Additional capital BMPs may be added to this list as their need is identified.

**Winter Operations** – Winter maintenance chemicals are non-hazardous. However, large quantity spills and small spills that occur over a long period of time may contaminate groundwater drinking water sources and potentially surface water.

#### **Winter Chemical (Solid)**

- Manage only the chemical needed for the season.
- Products will be stored in designated areas.
- Designated areas should be located away from storm drains and water bodies.
- Ideally solid chemical will be stored in a covered shed that protects it from precipitation.
- If a covered shed is not available solid chemical will be covered with plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent).
- For facilities that do not have a covered shed, product remaining at the end of the season should be transferred to a yard that does as soon as possible.

- Spilled solid chemical should be swept up and placed back under cover as soon as possible. During a winter storm event, spilled material should be cleaned up as soon as the storm event is over.
- Solid chemical should be stored on an impervious surface that is sloped so that stormwater does not come into contact with the solid chemical.

#### **Winter Chemical (Mixing and Loading Solids)**

- If possible solid chemical should be dumped directly into the storage shed.
- If it is not possible to directly dump into the storage shed, the following procedure should be followed:
  - Try to obtain solid chemical on a day when precipitation is not expected.
  - Sweep the impervious pad immediately in front of the storage shed prior to delivery of new product.
  - Have the delivery truck dump the solid chemical as close to the storage shed as possible. Immediately push the chemical into the storage shed with a loader.
  - Sweep the impervious pad to pick up any residual chemical and place it into the storage shed.

#### **Conditioned Sand – Sand Mixed With Solid Chemical**

- Only condition the amount of sand expected to be used during the upcoming winter storm event.
- Conditioned sand will be stored in designated areas.
- Designated areas should be located away from storm drains, drainage systems, and water bodies.
- Segregate conditioned sand from unconditioned sand.
- Conditioned sand should be placed in a covered shed if available or should be covered with plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent).
- Spilled conditioned sand should be swept up and placed back in the conditioned sand pile.

#### **Winter Chemical (Liquid)**

- Protect tanks from vehicle impact.
- Install and maintain hose connections so that the flange couplings are protected and leaks are reduced.
- Valves should remain closed when not in use.
- Label tanks with product information.
- Inspect tanks and pipes monthly for leaks, spills, and deterioration.
- Permanent tanks must be located in impervious secondary containment surrounded by dikes or UL approved double-walled. The dike must be of sufficient height to provide a containment volume of either 10 percent of the total enclosed tank volume or 110 percent of the volume contained in the largest tank, whichever is greater, or if a single tank, 110 percent of the volume of that tank.



- All hoses and connections should be contained within the secondary containment enclosure.
- Shut-off valves for secondary containment should remain closed at all times, unless draining rainwater.
- Liquid deicer mixed with rainwater needs to be disposed of properly.
  - Pumped back into tanks.
  - Discharged to sanitary sewer.
  - Used on roads as dust suppressant.
- Leave product remaining at the end of the season in the tank.
- If a bucket is used to collect deicer spills during loading or unloading it should be placed within the containment unit and covered to prevent the introduction of rainwater.

## 7-9 Service Level Quality Measurement

The Headquarters Maintenance Office has developed quality performance measurements for snow and ice control operations. These performance measurements have been established to assess how well field maintenance responds to winter road conditions. These measures are focused on providing targeted levels of service for snow and ice control based on the [Statewide Snow and Ice Plan](#), Chapter 1, Roadway Treatment Goals.

