



**WILSONVILLE**  
**OREGON**

# WINTER WEATHER RESPONSE PLAN

City of Wilsonville

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# Contents

Introduction.....	3
Objectives.....	3
Community Members' Cooperation.....	3
Disclaimer .....	4
Implementation.....	4
Level of Service.....	4
<i>Streets</i> .....	5
<i>City Maintained Sidewalks</i> .....	5
<i>City Buildings</i> .....	5
<i>City Owned Parking Lots</i> .....	5
<i>Public Parks</i> .....	5
Priorities .....	5
<i>City Streets:</i> .....	6
<i>City Sidewalks, Facility Walkways, and Park Pathways:</i> .....	6
<i>City Facility Parking Lots</i> .....	6
<i>City Park Parking Lots</i> .....	7
Operational Guidelines .....	7
<i>Snow Plowing Guidelines</i> .....	7
<i>Sanding Guidelines</i> .....	7
<i>Anti-Icing / Deicing</i> .....	8
<i>Woody Debris Collection Guidelines</i> .....	8
<i>Available Equipment</i> .....	8
Safety Guidelines .....	9
<i>Personal Protection Equipment</i> .....	9
<i>Safety Stand-down</i> .....	9
Appendix A: WINTER WEATHER Response Routes.....	10
Appendix B: Anti-Icing / Deicing Application Guidelines .....	14
<i>Weather factors</i> .....	14
<i>Operational considerations</i> .....	15
<i>Deicer Application Tables</i> .....	16
Table 1. <i>LIGHT SNOW</i> .....	16
Table 2. <i>LIGHT SNOW (Period of Moderate or Heavy Snow)</i> .....	17
Table 3. <i>MODERATE OR HEAVY SNOW</i> .....	18
Table 4. <i>FROST OR BLACK ICE</i> .....	19

Table 5. *FREEZING RAINSTORM* ..... 20  
Table 6. *SLEET STORM* ..... 21  
Appendix C: Equipment Operator Guidance ..... 22  
*Plow Installation/Removal on Truck 13* ..... 23  
*Plow Installation/Removal on Truck 17* ..... 23  
*Sander Pre-Trip* ..... 24  
*Plow Pre-Trip* ..... 24

## **INTRODUCTION**

Oregon’s weather can change quickly and without warning. Ice and snow storms can cause a severe economic impact on the community depending on the intensity and duration of the storm. Whenever there is a chance of stormy conditions the City of Wilsonville prepares to enact its “Winter Weather Response Plan” (WWP). This plan is designed to keep primary components of the transportation system as operational and safe as possible during ice/snow storm events with the goal of minimizing the economic impact on the community and to provide the prudent motorist with a reasonably safe traveling surface. This WWRP consists of a three-phased approach intended to provide the greatest level of service for the commuting public. These phases are; Prevention, Response and Recovery

The first phase is preventative in nature and consists of actions such as applying anti-icing agents in order to prevent or minimize the accumulation of ice, and if necessary targeted road closures for known problem areas. This is followed by reactionary response measures to address known snow and ice accumulation by either applying targeted deicing agent, snow plowing, sand application or additional road closures. Recovery efforts such as debris removal would occur after conditions improve allowing for the safe collection and disposal of any debris.

## **OBJECTIVES**

It is the goal and intent of the City of Wilsonville to provide timely, efficient and cost-effective winter maintenance, snow removal and ice control on the streets and walkways in the City of Wilsonville. These services are provided for the safety and benefit of the City’s residents and the general public traveling within the city limits.

- Provide safe designated passable routes for vehicles and pedestrians.
- Maintain access to essential City services
- Provide emergency sanding for police, fire, public transit, and schools
- Ensure the safety of the public and City personnel

## **COMMUNITY MEMBERS’ COOPERATION**

Residents of Wilsonville are requested to support the efforts of the City’s operations to achieve the best possible results in the most efficient manner. During snow events and winter storm conditions, residents are asked to keep parked vehicles off of the City’s Snow and Sanding routes.

Property owners are also responsible for clearing snow and ice from the sidewalk along their property per City Code 6.212. It is recommended that sidewalks along Snow Plowing Routes (see Appendix A: Map 1)) be cleared after the plow has traveled through that route. Property owners are responsible for clearing access to their driveway.

Snow removal by property owners or occupants should not be piled or stacked over catch basins or at culvert pipe openings. Rapid warming or thawing could overwhelm the drainage

system causing local flooding or potential property damage. Citizens are encouraged to clear blocked catch basins and culverts if needed.

All garbage and recycling containers set out for collection should be kept behind the curb or in residential driveways at all times.

In the event of a large debris generating event such as an ice storm, City crews will be tasked with addressing the debris removal from all designated priority plowing routes. Private property owners are required to collect and dispose of any woody debris from their property. Depending on the severity of the debris event, the City may designate a debris disposal location for community members to bring their woody debris.

## **DISCLAIMER**

The policy, as set forth, is the current Winter Weather policy for the City and will be enforced equally throughout the City. The following conditions may prevent or delay implementation of this policy; equipment breakdown, parked, stalled or disabled vehicles that prevent or restrict access, severe weather requiring crews to halt operations, breaks required for re-fueling, refilling material spreaders, etc., other unforeseen emergencies, available staffing levels and/or regional traffic conditions and closures

## **IMPLEMENTATION**

The Winter Weather Plan will be implemented when it is determined by a Public Works Department to be the best solution for the conditions that exist. The City relies upon the National Weather Service and regional Emergency Managers working groups to inform these decisions. The criteria for that decision are:

- Reasonable prediction that inclement weather will occur within 24 to 48 hours
- Icy conditions which effect travel
- Snow accumulation
- Freezing rain

## **LEVEL OF SERVICE**

Winter Weather operations are intended to provide a reasonably safe traveling surface, not bare or dry pavement. These operations are intended to provide the prudent motorist with a reasonably safe traveling surface. During heavy snowfall or severe icing conditions motorists may need to install chains or other traction devices.

Also, based on limited operational resources, the focus of the response is limited to major/minor arterial and collector class roadways within the city limits. The City does not conduct snow and ice removal on residential or local streets. Appendix A identifies all the predefined snow and ice routes.

### ***Streets***

Plowing of designated roadways will occur after the accumulation of approximately two inches (2") or more of snow. During heavy snowfall or severe icing conditions, motorists may need to install chains or other traction devices.

During an inclement weather event, streets may be temporarily closed for safety reasons.

### ***City Maintained Sidewalks***

The removal of snow and ice accumulation on sidewalks is the responsibility of the adjacent property owner. The sidewalk sections for which the City is responsible are noted in Appendix A: Map 2, Sidewalk Responsibility. For City maintained sidewalks, a minimum four (4) foot width will be cleared. Removal of ice from sidewalks will occur upon accumulation. Removal of snow during daylight hours will occur within six (6) hours following the end of snow fall. If snow accumulates after sunset, removal will occur within six (6) hours after sunrise or the end of the snow fall, whichever is later.

### ***City Buildings***

City facilities shall have pathways cleared of accumulated snow and ice for safe pedestrian ingress and egress. The operational needs of each facility will be used to determine the appropriate pathway layout.

### ***City Owned Parking Lots***

Pathways servicing the parking lots at City facilities shall be cleared first. The remainder of the parking lot shall be cleared on a scheduled basis after other higher priority areas are made safe.

### ***Public Parks***

Parks with restrooms shall have pathways cleared of accumulated snow and ice for safe pedestrian ingress and egress. The parking lots shall be cleared on a scheduled basis after other higher priorities are made safe.

## **PRIORITIES**

In order to maximize the utilization of finite resources the City has developed a list of priority streets for the application of preventative and reactionary winter weather actions. During the activation of the WWRP the City will prioritize services to these designated streets but reserves the right to reprioritize streets based on emergent conditions at the City's discretion. The City has prepared this priority streets list based on the following criteria:

- Traffic volumes
- Public Transportation utilization

- Critical Infrastructure service locations (emergency services, hospitals, schools & public utilities)
- Geographic constraints (steep hills)
- Historically hazardous traffic locations
- Elevated structures (bridges and overpasses)

***City Streets:***

Snow Routes are shown on the Appendix A: Map 1 Snow Plowing Route Map.

- Priority 1 and 2 routes will be serviced to provide a transportation system to connect essential facilities, schools, fire stations, public transit facilities and the police station.
- Priority 3 routes will be serviced as time and resources allow in order to provide secondary connectivity and mitigate known problem areas.
- Streets not designated as a snow route will not be plowed or sanded unless specifically requested by police or fire departments.

***City Sidewalks, Facility Walkways, and Park Pathways:***

Sidewalks for which the City is responsible will be cleared to a minimum width of four (4) feet and have de-icer applied as needed in the following priority order (Appendix A: Map 2 City Sidewalk Map).

- Sidewalks adjacent to streets around the perimeter of City Facilities and Parks
- Facility Walkways
  - WES Transit Station
  - Public Works/Police Building
  - Community Center
  - City Hall
  - Library
  - Parks and Recreation Building
- Main Park pathways
- Only the public sidewalks and paths mentioned above will be mitigated.

***City Facility Parking Lots***

Facility parking lots will be cleared in the following priority order.

- WES Transit Station
- Public Works/Police Building
- Fleet/Transit Building
- Library
- City Hall
- Community Center
- Parks and Recreation Administration Building

- Water Treatment Plant
- Wastewater Treatment Plant

### ***City Park Parking Lots***

Park parking lots will be cleared in the following priority order.

- Murase/Memorial Park
- Boones Ferry Park
- River Fox Park
- Canyon Creek Park

## **OPERATIONAL GUIDELINES**

### ***Snow Plowing Guidelines***

- Snow plowing will be conducted along designated priority routes (see Appendix A). **Plowing activities will not begin until roads have accumulated two (2) or more inches of snowfall.** Plowing prior to this level threatens to impair the overall road condition and is not cost effective for the City's limited resources. Conversely, after prolonged snowfall, accumulated snow becomes compacted and plowing becomes ineffective, at this point the City will revert to merely anti-icing / deicing chemicals and/or sand application.
- **Streets not on the snow route list will not be maintained under Winter Weather operations** even if requested by property owners/citizens. Attempting to sand and plow non-prioritized streets (i.e. residential streets) would be an inefficient use of the minimal anti-icing / deicing, sanding and plowing resources available. The City, at its discretion, may alter this procedure to address unique issues as they arise.
- Streets will be plowed in such a way to minimize the impact to in-ground lighting, raised pavement markers and rumble strips. Streets will not be plowed to bare pavement.

### ***Sanding Guidelines***

Sand does not melt ice but improves traction on slippery surfaces and has relatively few impacts on the environment. See Appendix A: Map 3 Street Sanding Map for primary sanding locations.

- Sanding will occur only when conditions warrant.
- During icy conditions, sand will be spread on hills, corners, intersections, bridges, crash sites, and known problem areas or as directed by a supervisor.
- When it is snowing, sand will be spread to aid traffic in climbing hills, at crash sites, known problem areas or as directed by a supervisor.
- Areas will be sanded as requested by police, fire departments or ambulance services as a number one priority.



### ***Anti-Icing / Deicing***

- Ice control operations will consist of the application of anti-icing / deicing chemicals and/or sand along designated routes. The City's preferred ice control method is the application of anti-icing / deicing agents. To this end deicing and anti-icing chemicals with corrosion inhibitors may be used in quantities necessary to keep sand stockpiles and sanding equipment operational.
- A detailed application schedule and guidelines for anti-icing and deicing operations are included in Appendix B.
- During ice control operations anti-icing / deicing chemicals and/or sand will normally be applied within 100 feet of a controlled intersection, on bridges, overpasses and their approaches, and along curves and steep grades. Application of anti-icing / deicing chemicals may occur days prior to freezing conditions on designated routes. The city may alter this pattern to address unique storm conditions as necessary.
- Streets that are not designated snow routes will not be treated with anti-icing / deicing agents, sanded or plowed unless specifically requested by the police or fire services and only as resources allow (See Appendix A).

### ***Road Closures***

- Any road closures should be approved by the PW Supervisor overseeing the response activities. Complete road closures require advance notification prior to the closure and detouring to the maximum extent possible. Partial closures or single lane closures are permitted as the discretion of the response personnel.
- In instances of debris obstructing the right of way, efforts should be made to move the debris to the edge of the ROW as much as possible. In the event that the debris cannot be moved or the weather makes it unfeasible, traffic control devices should be used to mark the obstruction till conditions improve.

### ***Woody Debris Collection Guidelines***

- Debris collection activities will not begin until the Public Works Director or Operations Manager determine that conditions are safe and conducive for debris collection.
- Woody debris will be collected along designated priority routes (see Appendix A).
  - Initial Pass - Staff will attempt to clear woody debris from the Right of Way. Debris can be stacked along the adjacent planter strip if possible for collection at a later time. Staff should avoid stacking debris on sidewalks if possible.
  - Subsequent passes through an area will focus on cutting, chipping and removal of the material to a designated debris collection location.

### ***Available Equipment***

- 2 trucks with snow blade and sand dispensing bin
- 5 sidewalk snow blowers

- Tool Cat vehicle with brush
- Tractors with bucket and box attachments
- Ventrac unit with brushes
- 1 Deicer application tank and pump
- Large Wood Chipper (Bandit Model 990 XP)

## ***SAFETY GUIDELINES***

### ***Personal Protection Equipment***

All staff members operating in response to a winter weather event will utilize the following personal protective equipment while conducting work activities. This list can be supplemented as events dictate.

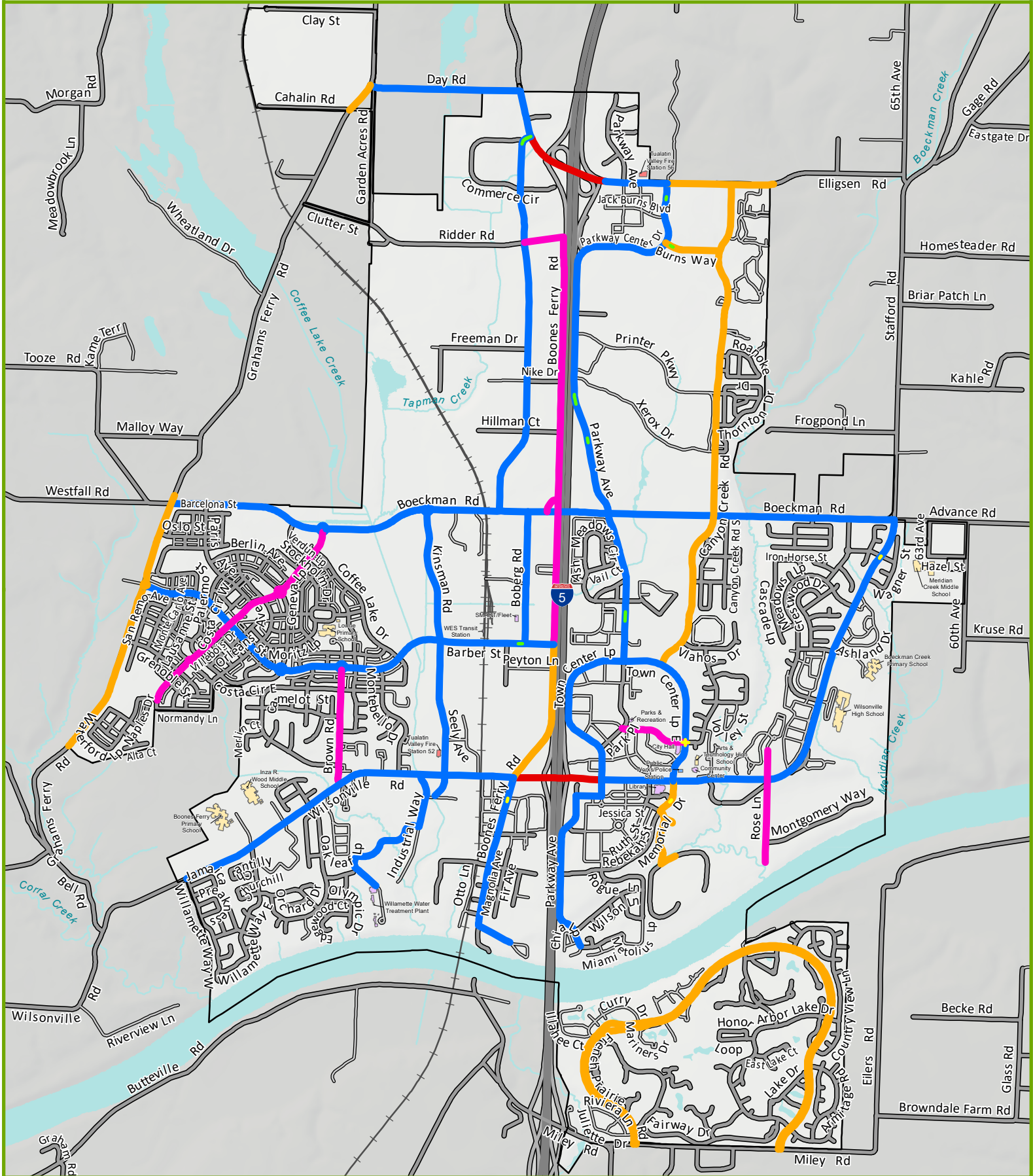
- Type II / Type III Vest or Jacket
- Gloves
- Safety Glasses
- Ice Trekkers (for boots)
- Hard Hat
- Studded Tires
- Tire Chains
- Flashlight

### ***Safety Stand-down***

If, in the course of a response, weather conditions have deteriorated to the point that it poses an apparent threat to the safety of staff, the supervisor overseeing operations, the PW Operations Manager or the PW Director, can call for a safety stand down of all operations. Staff will be instructed to either shelter in place or return to a central location for accountability. Staff will routinely reevaluate the conditions to determine when operations may safely resume.

Staff conducting operations within the field may stand down from individual operations assignments if they feel that conditions pose an individual threat or require a reevaluation. Staff should communicate with their supervisor regarding this course of action to coordinate actions, determine if conditions can be safely mitigated or possibly be re-tasked.

# Map # 1: Snow Plowing Routes



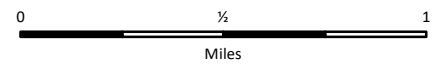
**Essential Routes**

- Priority 1
- Priority 2
- Priority 3
- ODOT Responsibility

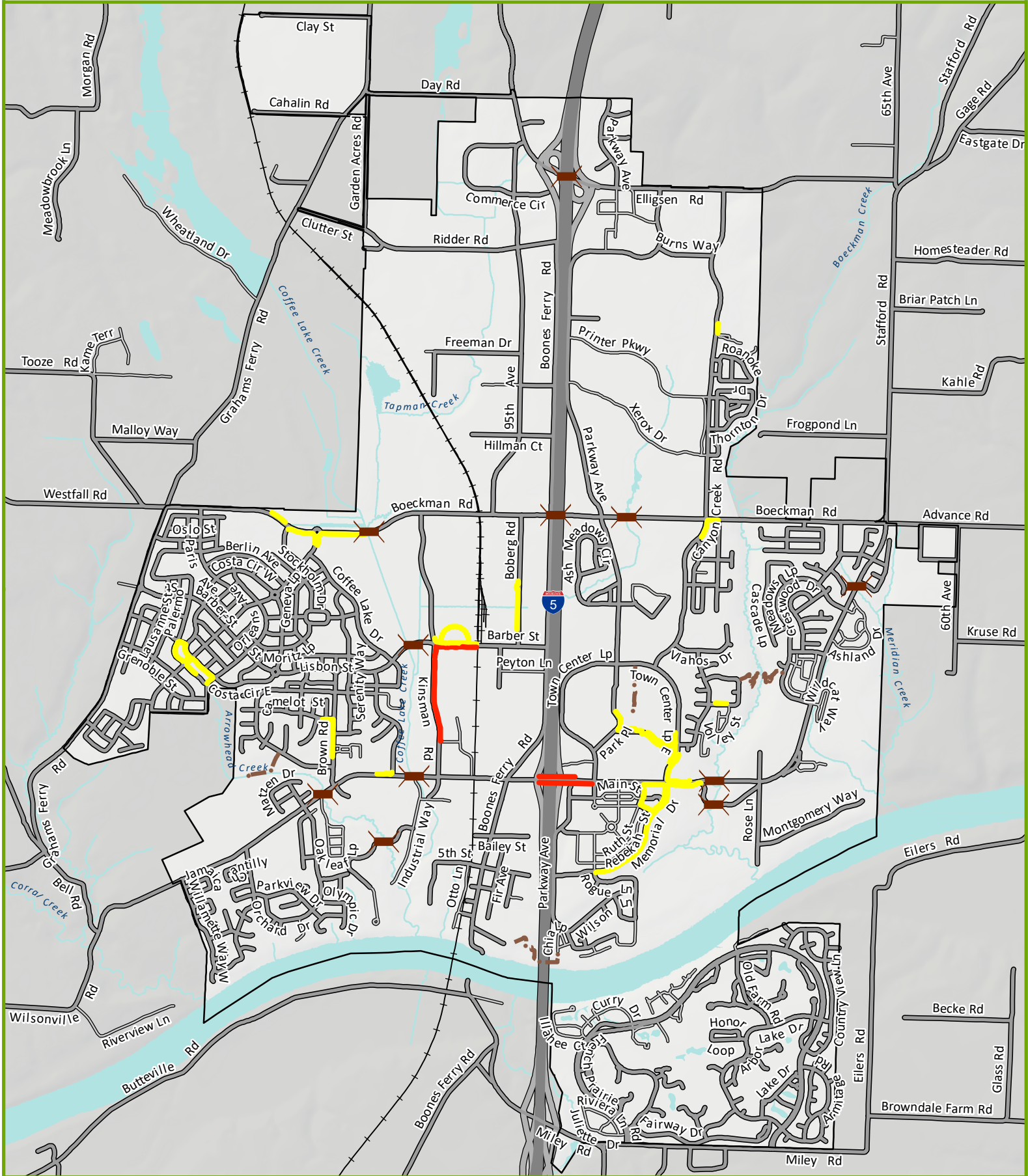
**Obstacles**

- Concrete island
- In-ground flashers

- Police/Public Works
- Fire Station
- Schools
- City Facilities



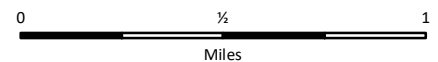
# Map # 2: Sidewalk Responsibility



**Sidewalks**

- Adjacent to city owned property
- Has maintenance agreement

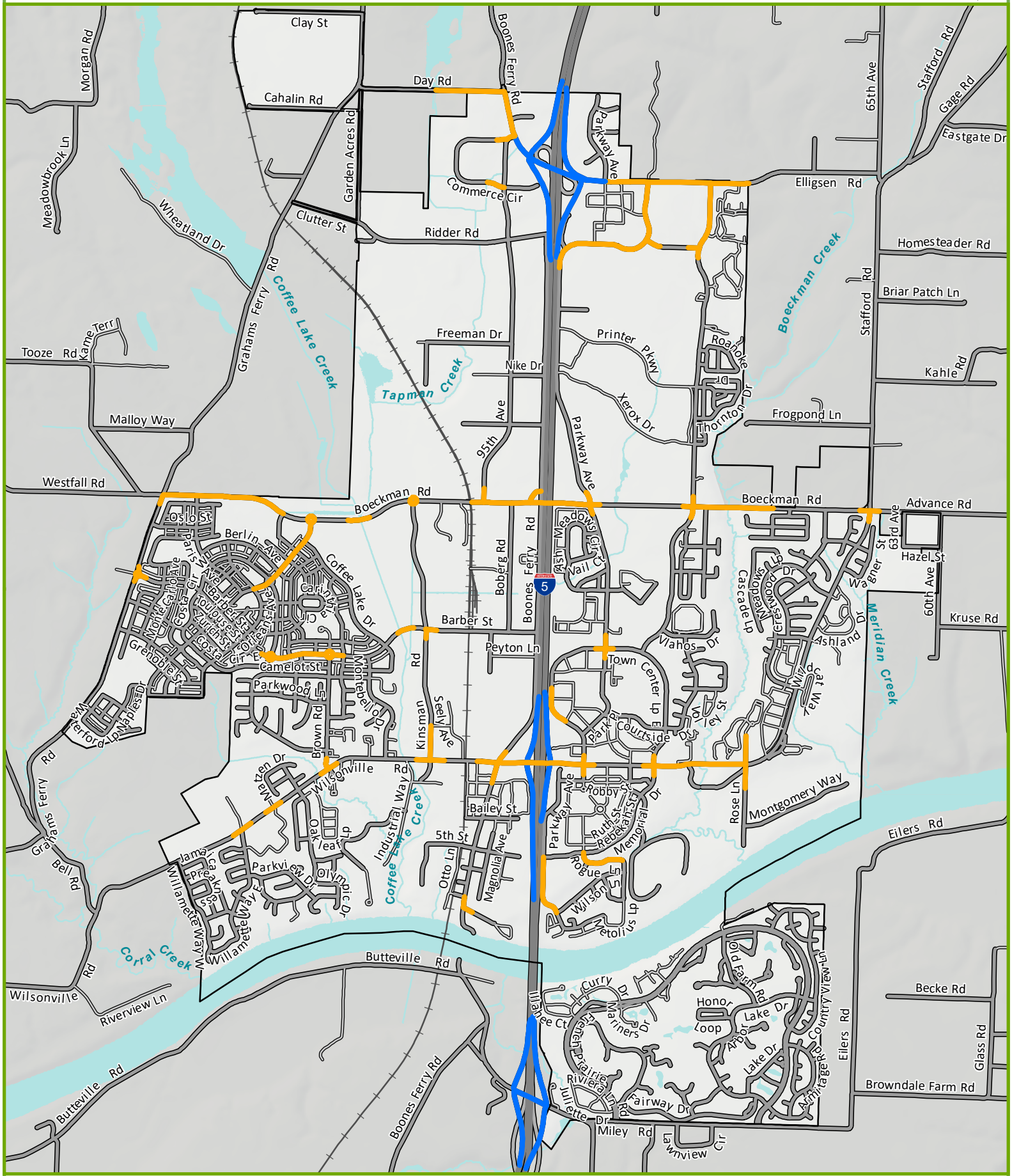
- - - Trail/Path
- ⊗ Bridge/Culvert



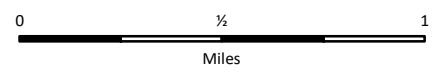




# Map # 3: Street Sanding



- CoW Primary Locations to Sand
- ODOT Responsibility





## **APPENDIX B: ANTI-ICING / DEICING APPLICATION GUIDELINES**

Public Works Operations Division (PW) has established guidelines for the use of anti-icing and deicing agents as a tool to combat winter storms. The information contained herein is intended as a basic guideline only. This in no way constitutes a systematic process or procedure for the use of anti-icing/deicing materials, chemicals, or equipment. The successful use of anti-icing and deicing agents is a learning process through which knowledge, training and experience are gained. The use of anti-icing and deicing agents can be a very beneficial tool when used in conjunction with other best management practices (BMPs) and methods for snow and ice control.

Guidance for anti-icing/deicing operations is presented in Tables 1- 6 for six distinctive winter weather events. The six winter weather events are:

- 1) Light Snow Storm
- 2) Light Snow Storm with Period(s) of Moderate or Heavy Snow
- 3) Moderate or Heavy Snow Storm
- 4) Frost or Black Ice
- 5) Freezing Rain Storm
- 6) Sleet Storm

The tables suggest the appropriate maintenance action to take during preemptive and subsequent reactionary (follow-up) anti-icing/deicing operation for a given precipitation or icing event. Each action is defined for a range of pavement temperatures and an associated temperature trend. Application rates are suggested rates and should be adjusted if necessary to achieve effectiveness or efficiency for local conditions. Comments and notes are given in each table where appropriate to further guide maintenance field personnel in their anti-icing/deicing operations. Included in the following charts are recommendations for the use of pre-wet sand.

Additional factors that should be considered prior and during winter weather anti-icing / deicing response activities are listed below. Each of the items outline basic decision making criteria, and lists some of the basic operational functions to consider and/or follow when applying chemical anti-icing/deicing agents or abrasives.

### ***Weather factors***

- Do not apply chemicals prior to forecasted rain
- Do not apply chemicals if temperatures are above 32 F and steady
- Do not apply chemicals in strong winds
- Do not apply chemicals if rain is predicted before a snow storm

- Use caution when anti-icing/deicing in warm conditions with low humidity as a chemical slipperiness condition may occur especially when using heavier application rates
- Do not apply MgCl on a heavy snow or ice packs
- Do not apply MgCl in temperatures below 15 F
- Apply only abrasives in temperatures below 15 F
- Residual effects can remain for up to several days after application of chemicals if precipitation does not dilute the initial application. Refreezing of the surface can occur when precipitation or moisture in the air dilutes the chemical on the surface

### *Operational considerations*

- Always record time, location and rate of chemicals and abrasive application
- Do not over apply chemicals within an intersection.
- Avoid applying chemicals in heavy traffic. Application of anti-icing/deicing agents should be done if possible during slow commuting hours
- Always check equipment and spray operations prior to leaving PW yard
- **More is not always BETTER.** High application rates can cause slippery conditions



*Deicer Application Tables*

**Table 1. LIGHT SNOW**

**Magnesium Chloride 27%  
Pre-wet Sand/Magnesium Chloride**

Pavement Temperature Range, and Trend	Pavement surface at time of initial operation	Initial Operations		Subsequent Operations		Comments
		Maintenance Action*		Maintenance Action*		
		MgCl gals/ LnMi	Pre-wet Sand	MgCl gals/ LnMi	Pre-wet Sand	N/R=Not Recommended
Above 32 F, steady and rising	Dry, wet, slush, or light cover snow	N/R See comment	N/R See comment	N/R See comment	N/R See comment	Monitor pavement temperature closely Treat icy patches if needed with MgCl @ 15-35 G/LnMi or pre-wet sand
32 F, or below is eminent	Dry	Apply @ 15-35 G/ LnMi	N/R	Reapply @ 15-35 G/ LnMi plow as needed	Apply	Application rates will depend on dilution potential
20 to 32 F, remaining in range	Wet, slush, or light snow cover	Apply @ 20-40 G/ LnMi	Plow as needed and apply	Reapply @ 20-40 G/ LnMi plow as needed	Plow as needed and apply	Application rates will depend on dilution potential
15 to 20 F, remaining in range	Dry, wet, slush, or light cover snow	Apply @ 45-65 G/ LnMi	Plow as needed and apply	Reapply @ 45-65 G/ LnMi plow as needed	Plow as needed and apply	Application rates will depend on dilution potential
Below 15 F, steady or falling	Dry or light snow cover	N/R plow as needed	Apply and plow as needed	N/R plow as needed	Plow as needed and apply	Do not apply MgCl at this temperature range Apply pre-wet sand only

\* Recommended maintenance actions are subject to change depending on environmental and operational conditions.

**CHEMICAL APPLICATIONS:** These application rates are starting points. Local experience should refine these recommendations. Time chemical applications to prevent deteriorating conditions or development of packed and bonded snow. Monitor temperature and humidity to determine application timing.

**PLOWING:** Before applying any ice control chemical, the road surface should be clear of as much snow and ice as possible.

**CHEMICAL RATES:** The recommended snow and ice control material application rates depend on atmospheric and pavement conditions at the time of treatment and on how these conditions are expected to change over the time period (window) between the current treatment and the next anticipated treatment.

**Table 2. *LIGHT SNOW (Period of Moderate or Heavy Snow)***

**Magnesium Chloride 27%  
Pre-wet Sand/Magnesium Chloride**

Pavement Temperature Range, and Trend	Pavement surface at time of initial operation	Initial Operations		Subsequent Operations		Comments
		Maintenance Action*		Maintenance Action*		
		MgCl gals/ LnMi	Pre-wet Sand	MgCl gals/ LnMi	Pre-wet Sand	N/R=Not Recommended
Above 32 F, steady and rising	Dry, wet, slush, or light cover snow	N/R See comment	N/R See comment	N/R See comment	N/R See comment	Monitor pavement temperature closely Treat icy patches if needed with MgCl @ 15-35/lm or pre-wet sand.
32 F, or below is eminent	Dry	Apply @ 15-35 G/ LnMi	N/R	Reapply @ 15-35 G/ LnMi	N/R	Application rates will depend on dilution potential
20 to 32 F, remaining in range	Wet, slush, or light snow cover	Apply @ 20-40 G/ LnMi plow as needed	Plow as needed and apply	Reapply @ 20-40 G/ LnMi plow as needed	Plow as needed and apply	Application rates will depend on dilution potential
15 to 20 F, remaining in range	Dry, wet, slush, or light cover snow	Apply @ 45-70 G/ LnMi	Plow as needed and apply	Reapply @ 45-70 G/ LnMi plow as needed	Plow as needed and apply	Application rates will depend on dilution potential
Below 15 F, steady or falling	Dry or light snow cover	N/R plow as needed	Apply and plow as needed	N/R plow as needed	Plow as needed and apply	Do not apply MgCl at this temperature range Apply pre-wet sand only

\* Recommended maintenance actions are subject to change depending on environmental and operational conditions.

**CHEMICAL APPLICATIONS:** These application rates are starting points. Local experience should refine these recommendations. Time chemical applications to prevent deteriorating conditions or development of packed and bonded snow. Monitor temperature and humidity to determine application timing.

**PLOWING:** Before applying any ice control chemical, the road surface should be clear of as much snow and ice as possible.

**CHEMICAL RATES:** The recommended snow and ice control material application rates depend on atmospheric and pavement conditions at the time of treatment and on how these conditions are expected to change over the time period (window) between the current treatment and the next anticipated treatment.

**Table 3. MODERATE OR HEAVY SNOW**

**Magnesium Chloride 27%  
Pre-wet Sand/Magnesium Chloride**

Pavement Temperature Range, and Trend	Pavement surface at time of initial operation	Initial Operations		Subsequent Operations		Comments
		Maintenance Action*		Maintenance Action*		
		MgCl gals/ LnMi	Pre-wet Sand	MgCl gals/ LnMi	Pre-wet Sand	N/R=Not Recommended
<b>Above 32 F, steady and rising</b>	Dry, wet, slush, or light cover snow	N/R	N/R	N/R	N/R	Monitor pavement temperature closely Treat icy patches if needed with MgCl @ 15-35/lm
<b>32 F, or below is eminent</b>	Dry	Apply @ 15-35G/ LnMi	N/R	Reapply @ 15-35G/ LnMi	N/R	Application rates will depend on dilution potential Do not apply MgCl on heavy snow accumulation or snow pack
<b>20 to 32 F, remaining in range</b>	Wet, slush, or light snow cover	N/R plow as needed	Plow as needed and apply	N/R plow as needed	Plow as needed and apply	Do not apply MgCl on heavy snow accumulation or snow pack Apply pre-wet sand only
<b>15 to 20 F, remaining in range</b>	Dry, wet, slush, or light cover snow	N/R plow as needed	Plow as needed and apply	N/R plow as needed	Plow as needed and apply	Do not apply MgCl on heavy snow accumulation or snow pack Apply pre-wet sand only
<b>Below 15 F, steady or falling</b>	Dry or light snow cover	N/R plow as needed	Plow as needed and apply	N/R plow as needed	Plow as needed and apply	Do not apply MgCl at this temperature range Apply pre-wet sand only

\* Recommended maintenance actions are subject to change depending on environmental and operational conditions.

**CHEMICAL APPLICATIONS:** These application rates are starting points. Local experience should refine these recommendations. Time chemical applications to prevent deteriorating conditions or development of packed and bonded snow. Monitor temperature and humidity to determine application timing.

**PLOWING:** Before applying any ice control chemical, the road surface should be clear of as much snow and ice as possible.

**CHEMICAL RATES:** The recommended snow and ice control material application rates depend on atmospheric and pavement conditions at the time of treatment and on how these conditions are expected to change over the time period (window) between the current treatment and the next anticipated treatment.

**Table 4. *FROST OR BLACK ICE***

**Magnesium Chloride 27%  
Pre-wet Sand/Magnesium Chloride**

Pavement Temperature Range, and Trend	Traffic Count	Initial Operations		Subsequent Operations		Comments
		Maintenance Action*		Maintenance Action*		
		MgCl gals/ LnMi	Pre-wet Sand	MgCl gals/ LnMi	Pre-wet sand	N/R=Not Recommended
Above 32 F, steady and rising	Any level	N/R	N/R	N/R	N/R	Monitor pavement temperature closely Treat icy patches if needed with MgCl @ 15-35/lm
28 to 32 F, Remaining in range or falling 32 F or below, and equal to or below dew point	< 100 vehicles/hr	Apply @ 15-30 G/ LnMi	Apply	Reapply @ 15-30G/ LnMi	Reapply	Application rates will depend on dilution potential
	> 100 vehicles/hr	Apply @ 20-35G/ LnMi		Reapply @ 20-35G/ LnMi		
25 to 28 F, remaining in range, and equal to or below dew point	Any level	Apply @ 20-35 G/ LnMi	Apply	Reapply @ 20-35 G/ LnMi	Reapply	Application rates will depend on dilution potential
15 to 25 F, remaining in Range, and equal to or below dew point	Any level	Apply @ 25-40 G/ LnMi	Apply	Reapply @ 25-40 G/ LnMi	Reapply	Application rates will depend on dilution potential
Below 15 F, Steady or falling	Any level	N/R	Apply	N/R	Reapply	Do not apply MgCl at this temperature range
Below 15 F, steady or falling	Dry or light snow cover	N/R plow as needed	Apply and plow as needed	N/R plow as needed	Plow as needed and apply	Do not apply MgCl at this temperature range Apply pre-wet sand only

\* Recommended maintenance actions are subject to change depending on environmental and operational conditions.

**CHEMICAL APPLICATIONS:** These application rates are starting points. Local experience should refine these recommendations. Time chemical applications to prevent deteriorating conditions or development of packed and bonded snow. Monitor temperature and humidity to determine application timing.

**PLOWING:** Before applying any ice control chemical, the road surface should be clear of as much snow and ice as possible.

**CHEMICAL RATES:** The recommended snow and ice control material application rates depend on atmospheric and pavement conditions at the time of treatment and on how these conditions are expected to change over the time period (window) between the current treatment and the next anticipated treatment.

**Table 5. *FREEZING RAINSTORM***

**Magnesium Chloride 27%  
Pre-wet Sand/Magnesium Chloride**

Pavement Temperature Range, and Trend	Initial Operations		Subsequent Operations		Comments
	Maintenance Action*		Maintenance Action*		
	MgCl gals/ LnMi	Pre-wet Sand	MgCl gals/ LnMi	Pre-wet Sand	N/R=Not Recommended
Above 32 F, steady and rising	N/R	See comments	N/R	See comments	Monitor pavement temperature closely Treat icy patches if needed with pre-wet sand as needed for traction enhancement
32 F, or below is eminent	N/R	Apply	N/R	Reapply	Apply pre-wet sand for traction enhancement
20 to 32 F, remaining in range	N/R	Apply	N/R	Reapply	Apply pre-wet sand for traction enhancement
15 to 20 F, remaining in range	N/R	Apply	N/R	Reapply	Apply pre-wet sand for traction enhancement
Below 15 F, steady or falling	N/R	Apply	N/R	Reapply	Apply pre-wet sand for traction enhancement

\* Recommended maintenance actions are subject to change depending on environmental and operational conditions.

**CHEMICAL APPLICATIONS:** These application rates are starting points. Local experience should refine these recommendations. Time chemical applications to prevent deteriorating conditions or development of packed and bonded snow. Monitor temperature and humidity to determine application timing.

**PLOWING:** Before applying any ice control chemical, the road surface should be clear of as much snow and ice as possible.

**CHEMICAL RATES:** The recommended snow and ice control material application rates depend on atmospheric and pavement conditions at the time of treatment and on how these conditions are expected to change over the time period (window) between the current treatment and the next anticipated treatment.

**Table 6. *SLEET STORM***

**Magnesium Chloride 27%  
Pre-wet Sand/Magnesium Chloride**

Pavement Temperature Range, and Trend	Initial Operations		Subsequent Operations		Comments
	Maintenance Action*		Maintenance Action*		
	MgCl gals/ LnMi	Pre-wet Sand	MgCl gals/ LnMi	Pre-wet Sand	N/R=Not Recommended
Above 32 F, steady and rising	N/R	See comments	N/R	See comments	Monitor pavement temperature closely for drops towards 32 F Treat icy patches if needed with pre-wet sand as needed for traction enhancement
32 F, or below is eminent	N/R	Apply	N/R	Reapply as needed and plow accumulation	Apply pre-wet sand for traction enhancement
15 to 32 F, remaining in range	N/R	Apply	N/R	Reapply as needed and plow accumulation	Apply pre-wet sand for traction enhancement
Below 15 F, steady or falling	N/R	Apply	N/R	Reapply as needed and plow accumulation	Apply pre-wet sand for traction enhancement

\* Recommended maintenance actions are subject to change depending on environmental and operational conditions.

**CHEMICAL APPLICATIONS:** These application rates are starting points. Local experience should refine these recommendations. Time chemical applications to prevent deteriorating conditions or development of packed and bonded snow. Monitor temperature and humidity to determine application timing.

**PLOWING:** Before applying any ice control chemical, the road surface should be clear of as much snow and ice as possible.

**CHEMICAL RATES:** The recommended snow and ice control material application rates depend on atmospheric and pavement conditions at the time of treatment and on how these conditions are expected to change over the time period (window) between the current treatment and the next anticipated treatment.

## APPENDIX C: EQUIPMENT OPERATOR GUIDANCE

Truck 13 – Dump Truck	Truck 17 – Snow Plow Truck
<ul style="list-style-type: none"> <li>Take truck out of Overdrive and put in towing mode.</li> </ul>	<ul style="list-style-type: none"> <li>Always have the blade angled <math>\frac{3}{4}</math> turn to the right while transporting.</li> </ul>
<ul style="list-style-type: none"> <li>Do not plow faster than 14 mph or drive more than 40 mph while transporting.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid spinning the tires – it will throw the chains and they will need to be replaced.</li> </ul>
<ul style="list-style-type: none"> <li>Keep the plow controls off while transporting.</li> </ul>	<ul style="list-style-type: none"> <li>Keep an eye on the transmission temp</li> </ul>
<ul style="list-style-type: none"> <li>Avoid spinning the tires – it will throw the chains and they will need to be replaced.</li> </ul>	<ul style="list-style-type: none"> <li>Be considerate of adjacent property owners.</li> </ul>
<ul style="list-style-type: none"> <li>Depending on snow-load, periodically pull over and idle the transmission to cool for at least 10 minutes.</li> </ul>	<ul style="list-style-type: none"> <li>Do not pile snow in front of fire hydrants.</li> </ul>
<ul style="list-style-type: none"> <li>When plowing, angle the plow to the right to form a straight blade.</li> </ul>	<ul style="list-style-type: none"> <li>Must have two employees on shift at the same time, and in separate vehicles.</li> </ul>
<ul style="list-style-type: none"> <li>Use the “Power V” position to punch thru the first pass.</li> </ul>	<ul style="list-style-type: none"> <li>Keep the blade angled right while plowing, except for special conditions.</li> </ul>
<ul style="list-style-type: none"> <li>Use a full blade for 2”-4” of snow.</li> </ul>	<ul style="list-style-type: none"> <li>Use Plow Controls as needed.</li> </ul>
<ul style="list-style-type: none"> <li>Use a <math>\frac{3}{4}</math> angled blade for 4”-6” of snow.</li> </ul>	<ul style="list-style-type: none"> <li>Plow at 20 mph – Transport at 40 mph</li> </ul>
<ul style="list-style-type: none"> <li>Use a <math>\frac{1}{2}</math> angled blade for 6” and over of snow.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<ul style="list-style-type: none"> <li>Push just enough snow with each pass to get the job done efficiently without overloading the equipment.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<ul style="list-style-type: none"> <li>Make sure the vehicle is properly balanced front to back, behind rear axle.</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

Sanding:
<ul style="list-style-type: none"> <li>When sanding, follow the Sanding Map for Priority. Sand only hills, corner, intersections, bridges and crashes, or at historical problem areas defined by the manager.</li> </ul>
<ul style="list-style-type: none"> <li>When it is snowing, sand only to aid traffic in climbing hills at crashes or at historical problem areas as defined by the manager.</li> </ul>
<ul style="list-style-type: none"> <li>Sand straight-aways only at crash sites.</li> </ul>
<ul style="list-style-type: none"> <li>Sand only when the condition exists, don’t pre-sand.</li> </ul>
<ul style="list-style-type: none"> <li>Sand areas requested by police and fire departments.</li> </ul>
<ul style="list-style-type: none"> <li>Two employees on same shift at a time in separate vehicles.</li> </ul>

### ***Plow Installation/Removal on Truck 13***

#### **Installation**

1. Line up truck with plow pin holes and drive in.
2. Plug in electrical on the front of the truck.
3. Hold down button on plow until holes are completely lined up and put bolts through.
4. Test plow function.

#### **Removal**

1. Place plow to the ground.
2. Pull out bolts.
3. Remove electrical.

### ***Plow Installation/Removal on Truck 17***

#### **Installation**

1. Bolt in light bracket to frame and plug in electrical.
2. Line up truck with plow pin holes and have a spotter guide the truck in.
3. Once pin holes are lined up put bolts in.
4. Remove plow jack and place in cab.
5. Plug in hydraulic lines from plow to truck.
6. Apply pressure to the upper frame (going to have to stand on it) until it is all the way down.
7. Bolt on chain clevis to the upper frame.
8. Test plow function.

#### **Removal**

1. Place plow all the way to the ground.
2. Remove bolt from clevis.
3. Leave frame pushed down.
4. Unplug hydraulic lines.
5. Put jack back on.
6. Remove bolts from frame.
7. Leave light bracket on unless told otherwise. To remove just unplug electrical and unbolt from the frame.



### ***Sander Pre-Trip***

1. Make sure everything is bolted in and hooked up properly.
2. Make sure all 4 straps are secure and not frayed.
3. Make sure sander is all the way pushed back to the front of truck bed.
4. Check that hydraulic lines are properly connected and that there are no leaks or damage to the hoses.
5. Make sure sander legs are up all the way and not dragging.
6. Check hopper functionality before loading up rock.

### ***Plow Pre-Trip***

1. Make sure everything is bolted in and hooked up properly.
2. Check rubber blade for damage.
3. Check that hydraulic lines are properly connected and that there are no leaks or damage to the hoses.
4. Make sure lights are fully functional.
5. Check that the plow is fully functional.
6. Make sure plow is greased before every use.