

WINTER WEATHER PLAN

City of Oak Ridge
Public Works Department

2019-20



CITY OF OAK RIDGE WINTER WEATHER PLAN 2019-2020



GENERAL GUIDELINES

The Winter Weather Plan has been developed in order to plan and prepare for winter weather events when they occur. The Public Works Operations Division Manager reviews the previous version of the “Winter Weather Plan” with key staff members in October of each year and makes any required changes due to technology, staffing, equipment, material availability, and other factors. Using best practices developed by the American Public Works Association, the Salt Institute, and fellow agencies throughout the country, the Oak Ridge Public Works Department is prepared to return the streets to normal operation as soon as practical following the end a storm or series of storms.

ORGANIZATIONAL GUIDELINES

The Public Works Operations Division Manager is the lead coordinator of the Winter Weather Plan and serves as the primary liaison with Emergency Services during winter weather events. The Streets and Fleet Manager will be the lead person in the absence of the Operations Division Manager. Once the plan has been put into operation, a designated Snow Team Leader will be in charge of the operations and will have full authority to contact the required staff members to report for duty and to implement the plan. The Snow Team Leaders alternate weekly as the person contacted for the initial response to a storm. This assignment will coincide with the standby week, which begins at 7:30 am each Monday. A schedule will be posted with the Public Safety Dispatchers on the standby sheet that is distributed each month listing the first person to contact during a winter weather event.

All Public Works field personnel are considered essential employees, and as such, are expected to report to work when called upon in the event of adverse winter weather. Essential employees may also be asked to report earlier or later than the normal workday starting time, work overtime, work a different shift or on weekends and holidays depending on the nature of the weather emergency. Exceptions must be requested in advance and approved by the employee’s supervisor and manager. Every employee will have a role to play in support of the snow removal operations effort to help keep the roadways safe and restore streets to normal as soon as possible after the weather event.

Public Works is responsible for the removal of snow and ice from building entrance landings, steps and walks for most City buildings, while the Parks Division will be responsible for the Civic Center complex and the other Recreation and Parks buildings.

ADVANCED PREPARATIONS

Each year, on or before the 15th of October, the manager of the Winter Weather Plan is responsible for the following:

- Finalize strategies for any changes to the previous Winter Weather Plan;
- Appoint the Snow Team Leaders who will be in charge of operations;
- Confirm the stock of salt, ice melt and sand, plow blades, chains and de-icer, then advise Materials Management to order as necessary;
- Inventory and assure that the brine manufacturing and distribution equipment is in working order;
- Establish any required new or refresher training of personnel; and,
- Designate the lead person to prepare the trucks for winter weather, and to operationally test all snow removal and salt spreading equipment.

PRE-EVENT MEETING

Approximately two (2) days before a forecasted large snow or ice event, the Operations Division Manager will schedule a meeting of the Winter Weather Team at the Central Services Complex. Attendees at this meeting will include:

- City Manager
- Public Works Director and Managers
- Electric Department Director and/or designee
- Public Safety Chiefs and Key Personnel
- Public Works Snow Team Leaders who will be in charge of operations
- Fleet and Streets Maintenance Manager
- Utility Crew Chiefs
- Equipment Shop Crew Chief
- Other management, Schools and field personnel deemed essential for the predicted event

This purpose of the pre-event meeting is to discuss the specifics of the imminent weather event. The agenda for this meeting will include:

- A review of the weather forecast including live National Weather Service briefings and other local news weather forecast information
- Staffing level contingencies and any modifications to staff work schedules, shift reporting times or job assignments
- Informing personnel to be prepared to return to work if needed
- Scheduling of brine pre-treatment application
- Verify the operation of equipment and install chains (Equipment Shop)
- Availability of salt, brine, sand and/or other ice melt products
- Review the status of scheduled City events and facilities affected
- Preparing the Winter Weather Headquarters and checking communications

PRIOR TO THE PREDICTED EVENT

After a winter weather storm has been predicted and if weather conditions are favorable, the Public Works Department will begin to pre-treat the streets with a salt brine solution. The streets will be treated in the same general order and designation as the snow removal priority listing. Brine application will take place on as many of the level 1, 2 and 3 streets as possible prior to the event. Due to the size of the equipment needed to distribute the brine, most Level 4 streets will not be pre-treated.

Brine is applied as a liquid (with a freezing temperature of approximately 6 degrees) to road surfaces in advance of a predicted snow or ice event. Ideally, pre-storm applications are done during dry weather, allowing the brine to dry completely and become embedded into the asphalt before frozen precipitation (snow/ice) arrives. When snow hits the asphalt, the brine activates and immediately lowers the freezing point of water. The melting process does not happen immediately. Streets may appear to be completely snow covered, but don't be deceived; the objective of brine is to prevent the bonding of ice or snow to the roadway, not to melt it, which allows for smoother and easier plowing during the weather event.

The industry refers to this as a "squeegee" removal process rather than plowing, as the plows are equipped with rubber strips which make contact with the pavement. These rubber strips are used to protect the pavement markings and reflectors that are used on the State highways and many of the City streets.

The Public Works Department utilizes salt brine as a tool in managing frozen precipitation on roadways during the winter season. Using salt brine provides City staff with additional time to respond to freezing precipitation. In addition, the application of salt brine may reduce the need to call in employees on an overtime basis to treat bridges and overpasses that have a tendency to freeze or when small snow showers pass through the area overnight and leave a dusting on the roadways.

DURING THE WEATHER EVENT

PLAN IMPLEMENTATION PROCEDURE AND NOTIFICATION

- The Operations Division Manager will inform the City Manager and Public Works Director of the decision to implement the plan and mobilize the needed level of staffing.
- Each Snow Team Leader will contact their assigned personnel to verify the adequate staffing required to implement the plan and inform the employee that they are required to be fit for duty at any time. Employees that live a long distance or in areas where roads are not cleared by other agencies may be required to stay in hotels provided by the City until they are scheduled or called in for duty.
- Personnel who are on Public Works standby status will not be called for snow removal except in times of extreme emergency. On Sunday, the personnel scheduled to begin standby status on Monday will not be scheduled to work after 4:00 pm.
- Staff members will report to the Winter Weather Headquarters, located in the back area of the Central Services Complex, for assignment immediately after clocking in for duty.
- During extreme snow events, a 12 hour on /12 hour off shift may be implemented. This will require personnel to be physically able to perform at all times in order to maintain the level of staffing necessary to perform any duties required by the Public Works Department.

GOALS

The following plan is a prioritization system for clearing streets and supporting the public safety and health system (Police, Fire, Ambulance Service and Hospital) during snow and ice events. The Public Works Department's ability to clear routes depends on the amount and intensity of precipitation received and the temperature of the streets.

LEVEL OF SERVICE

Our goal is to provide adequate mobility and safety for properly equipped and prudently operated vehicles within a reasonable time after the end of a storm. The safest place to be during a storm will be in your home and driving should only take place if it is absolutely necessary. Please remember that even four-wheel drive vehicles and vehicles equipped with snow tires and/or chains will have trouble stopping on icy roads.

The best level of service we strive for on major roads is wet or clear pavement from curb to curb, this level also includes center and left turn lanes. This service level will normally not be met until all precipitation has ended and temperatures are at or above freezing.

The minimum level of service we strive for is plowed driving lanes or wet wheel paths. This minimum level also includes left turn lanes. Snow or slush will likely still be on the roads and in the center turn lanes, bike paths, etc., but should be navigable using due caution.

For residential streets and other low volume roads, the acceptable level of service is to provide a navigable surface which would include plowing deep snow to the sides of the road, but the street may remain covered with snow or packed ice, and plowed snow may block driveways.

Please understand that extremely heavy snow, very cold temperatures and multiple waves of snow can and will delay attaining the goals of acceptable level of service as outlined above. Operations may be suspended when extremely icy or other dangerous conditions exist.

SNOW and ICE REMOVAL PRIORITIES

The City maintained streets have been prioritized into four (4) categories according to volume of traffic or public health and safety factors. A complete listing of streets by category is located at the end of the plan.

- **Level 1:** State Highways and Hospital Routes
- **Level 2:** Arterial Streets, feeder streets to State highways and known trouble spots such as hills and shady areas.
- **Level 3:** Collector streets, streets providing access to subdivisions and the main Connector streets at the neighborhood level.
- **Level 4:** All other local neighborhood streets are categorized as Level 4. Many of these streets have on-street parking and provide minimal turning space for snowplows. The decision and ability of the Public Works Department to clear Level 4 routes is based on a number of factors, including current and predicted weather conditions, safety for parked vehicles, salt/chemical reserves, and the threat of additional inclement weather.

PLAN IMPLEMENTATION

When snow begins to cover roads, Public Works crews spread salt and/or plow all Level 1 streets and Hospital Routes. Crews also respond to emergency requests for assistance from the E-911 dispatch center. E-911 emergency requests (life safety) are handled as priority calls throughout an entire snow event and every effort will be made to clear the way for emergency services. Crews will continue to focus all available resources on Level 1 streets until all routes are in a passable condition.

As conditions warrant, Public Works equipment operators will begin snow removal from highways, bridges and streets based on the pre-approved, prioritized plan. This plan has been developed to first clear the streets that carry the highest volume of traffic and the main access routes to the hospital. All Level 1 streets will be worked until a satisfactory level of service has been achieved before the Level 2 streets are cleared.

Once Level 1 streets are cleared, crews will then transition to Level 2 streets and routine trouble areas. This plowing will continue until all Level 1 and 2 streets have achieved the satisfactory level of service.

If additional snowfall covers the Level 1 streets again, the concentration of service will return to Level 1 until these streets have again been cleared, at which time snow removal operations will resume on Level 2 streets.

Level 3 streets will be cleared **ONLY** after Level 1 and 2 streets are completed. The decision and ability of the Public Works Department to clear Level 3 routes is based on a number of factors, including current weather conditions, salt/chemical reserves, and the threat of additional inclement weather.

After Level 1 and 2 streets are cleared, a decision when to begin the treatment of Level 3 and 4 streets will be determined by several factors, including the timing of the storm and the amount of precipitation that has fallen, along with the current and predicted weather conditions, available materials, and personnel.

Please note that parking vehicles on the street will make snow removal more difficult to perform. A good example would be a typical Oak Ridge residential street that does not have designated on-street parking. The residents decide to park on both sides of the street due to their steep driveways in order to get out first thing the next morning. A snow plow will have minimal room to work and may not be able to safely plow this street or only be able to plow the middle of the road. Due to the crown of the road, constructed to drain the pavement during a rain event, the plow cannot remove much of the snow and may not be able to safely distribute salt on the street due to the parked cars.

Residents are reminded that choosing to drive on treated roads will leave salt residue on your vehicle that can and will damage driveways, garage floors, vehicles and interior home surfaces. Caution should be taken to minimize the exposure of salt to your property.

RESOURCES

During winter weather events, the City of Oak Ridge Public Works Department has up to 35 employees and 12 pieces of equipment available to clear streets, repair equipment, maintain water services and support Police and Fire emergency services. The Public Works Department uses salt, calcium chloride, truck mounted snow plows and trailer mounted de-icing solution distributors to clear streets during an event. Sand and other aggregates can also be used for specific applications such as steep roadways or in emergency situations.

GPS equipment has been added to the snow removal equipment in order to better serve the citizens. The location of the plows will be monitored and the closest plow can be dispatched immediately to assist emergency services, as well as maintain an accurate location and time when streets have been serviced

Salt - dissolved salt adds foreign particles into water to lower the freezing point below 32 degrees for improved melting.

Calcium Chloride - highly affective chemical agent can be used with salt or sand to increase the melting process even at extremely low temperatures.

Plowing – truck mounted plows are used to move large volumes of snow from primary travel lanes to the edge or side of the street. Plows are very effective during heavy snow events, but are not very effective during light dustings up to an inch or two of snow.

Sand/Aggregates – fine aggregates do little to directly affect the melting process, but sand placed on top of ice and snow adds friction/traction for vehicles and pedestrians. Dark sands will absorb heat from sun light and provide some thermal benefits for melting. These materials will be used infrequently due to their ineffectiveness and the requirement to remove them from the street after the streets have returned to normal

Please note that extremely cold temperatures (at or below 20 degrees) will delay the melting effect of salt and other chemicals on roadways.

SALT BRINE INFORMATION

Brine is applied to road surfaces several days in advance of a predicted snow event. Ideally, pre-applications are performed during dry weather, allowing the brine to dry completely and embed into the asphalt before freezing precipitation (snow/ice) arrives. When frozen precipitation hits the pavement, the brine activates and immediately lowers the freezing point of water. Please understand that the melting process does not happen immediately.

Another positive fact is that much of the brine will stay bound to the asphalt even after the snow and ice has been removed from the surface. Studies show that when rock salt is spread onto the street, up to 30% of this material bounces to the curb or the shoulder, and when a treated street is plowed, most of the salt is pushed off the road surface along with the snow.

Brine Pretreatment Information

- Brine is mixed at the Public Works Complex. The operation consists of a water and rock salt mixing machine producing 2000 gallons/hour and two 5000 gallon storage tanks.
- When needed, brine is transferred to two (2), 1,000 gallon tanks mounted on trailers, taking approximately 15 minutes to fill each trailer.
- Brine is applied (gravity fed) at a flow rate of approximately 40 gallons per lane mile.
- Public Works pre-treats approximately 134 lane miles for the City's Level 1 and 2 streets, and time permitting will pre-treat as many of the Level 3 streets (100 lane miles) as possible.
- Brine improves road conditions at the onset of freezing precipitation.
- Pre-treatment provides City staff with additional time to mobilize and respond to freezing precipitation.
- Brine provides protection from frosting of bridges, hills and other problematic roadways, and reduces the cost of snow removal service

Below is an example of resources used for both the traditional salting and brine pretreatment methods to treat all level 1 and 2 streets to compare the cost savings using the brine method.

Traditional Salt Methods		Salt Brine Pretreatment	
Level 1 and 2 streets	175 (lane miles)	Level 1 and 2 streets	175 (lane miles)
Tons of salt required	90	Tons of salt required	9
Number of employees required	14	Number of employees required	3
Number of trucks required	10	Number of trucks required	2
Cost for salt @ \$100/ton	\$9,000	Cost for salt @ \$100/ton	\$900
Estimated Time for treatment	10 hours	Estimated Time for treatment	16 hours
Estimated crew hours for treatment	140	Estimated crew hours for pretreatment	48

Past usage shows that when brine can be applied in advance of storms, the labor costs are substantially reduced since the product is most often applied during a regular work shift, thus reducing overtime costs. Other advantages that have been observed were a safer application due to daytime and dry roadway conditions, and that the reduced salt usage is better for the environment.

Industry experts estimates are that the impact of introducing salt to the environment is reduced by at least 30 % using the brine solution in conjunction with the traditional method, and that the environmental impact is many times less if additional salting of the roads is not required.

Quick Facts about the Salt Brine Program

- The ability to pretreat with brine when a storm is predicted results in Public Works not having to respond the instant snowfall begins in order to get ahead of the weather.
- The cost of salt has increased from \$34/ton to \$100/ton in the last few years, and the ability to purchase an additional supply is limited during the winter months.
- TDOT will reimburse the City for brine application on State highways.
- Due to the ability to pretreat, many of the streets have been moved up in ranking from the traditional plowing and salting method and will be pretreated when conditions permit.
- Occasionally the weather forecast is wrong. Due to the lower cost of materials and manpower, the City has found that when roads are pretreated and it either rained or the predicted winter weather did not occur, we would have to be wrong several times before the cost of pretreating would equal the cost of the traditional salting method. Recent history proves the City can pretreat more than 20 lane miles of streets with brine using the same amount of salt that would treat only one (1) lane mile using the traditional method.
- The City has the ability to store 10,000 gallons of brine solution, enough to pretreat all of the Level 1, 2 and 3 streets, and can manufacture approximately 1,600 gallons of brine per hour.
- Two (2) trucks pulling trailers carrying 1000 gallon tanks will place the brine on the streets. These trailers are well marked so that the public will be warned the brine solution is being placed down. The trailers are equipped with multiple rear strobe lights to warn the motoring public of a slower moving vehicle on the roadway. The trailers have been equipped with a splash guard to prevent brine from splashing onto vehicles behind them.
- An additional 4-wheel drive truck will be outfitted with brine capabilities to pretreat known trouble areas that are difficult to access with the trailer, including City parking lots.
- The liquid brine solution will only cover approximately 10% of the road surface, so there is little danger in creating slick roads during the application process; however, drivers should avoid driving through brine if possible.
- The brine solution can also be used to pretreat the sidewalks and steps at the publicly used buildings, and can make for a safer entrance and also reduce the tracking of chemicals into the building.
- Many of the snow events we experience in Oak Ridge occur overnight and leave measurable precipitation in the 1 to 3 inch range. If brine has been placed on the streets prior to the event and the weather is predicted to warm up, then the need for applying additional salt could be reduced or eliminated.
- Many of the Level 4 streets are short, relatively flat streets that have a limited turning area and/or on-street parking. Therefore, a truck and trailer distributing brine with a combined length of 40 feet simply cannot maneuver safely on these streets. The minimum turning radius for a brine application vehicle is 60 feet on dry pavement.

FREQUENTLY ASKED QUESTIONS ABOUT SNOW REMOVAL

1. Who removes snow and ice from the City's streets?

The City of Oak Ridge Public Works Department is responsible for planning and administering the Snow and Ice Removal Plan.

2. Who clears the roads at the DOE facilities?

The Department of Energy or their contractors maintain these privately controlled roads.

3. When does the City start the Snow and Ice Removal Plan?

The City is prepared for all weather events and will begin pretreatment of the streets ASAP, weather permitting, and then snow and ice removal as soon as the conditions warrant.

4. What is an emergency route?

Emergency routes, or hospital routes, are those routes that lead to the Methodist Medical Center. However, during an event, the Public Works Department also responds to specific emergency situations as requested by the 911 Dispatch Center to assist the Oak Ridge Police and Fire Departments, and the Anderson County Ambulance Service.

5. What constitutes the Level number designation for snow removal routes?

- **Level 1** routes are the State highways, plus streets carrying the highest volume of traffic, and hospital routes.
- **Level 2** routes are streets connecting to the main streets, along with feeder streets to connecting streets.
- **Level 3** routes are main streets and connections at the neighborhood level, and are only pre-treated or salted once Level 1 and 2 streets are completed.

6. What are Level 4 routes?

All other local neighborhood streets are categorized as Level 4. The decision and ability of the Public Works Department to clear Level 4 routes is based on a number of factors, including current weather conditions, salt/chemical reserves, and the threat of additional inclement weather. A listing of street designations is shown on the next page.

7. What resources does the City have to remove snow?

The Public Works Department can call on over 35 employees, 12 pieces of snow removal and de-icing equipment, and 1800 tons of salt during snow removal operations.

8. Who do I contact in an emergency?

For all life threatening emergencies, contact 911. Call the Police and Fire Departments at 911 only in life threatening emergencies or for emergency Fire and Rescue services.

9. Who do I contact about a non-emergency?

Contact the Public Works Department by calling 865-425-1875

10. How can I find out which routes have been cleared?

Contact the Public Works Department between the hours of 8:00 am and 5:00 pm, Monday through Friday, to find out which routes have been cleared.

STREET PRIORITY DESIGNATIONS

Level 1 Streets (80 lane miles)

Edgemoor Road (SR 170)
North Illinois Avenue (SR 62)
South Illinois Avenue (SR 62)
Oak Ridge Turnpike (SR 95)
Solway Bridge (SR 62)
Edgemoor Bridge (SR 170)
Hospital adjacent streets

Level 2 Streets (95 lane miles)

Bear Creek Road (Water Plant)
Bethel Valley Road
Briarcliff Avenue
Bus Terminal Road
Commerce Park Drive
Emory Valley Road
Fairbanks Road
Florida Avenue
Georgia Avenue
Gum Hollow Road
Jefferson Avenue
Laboratory Road
Lafayette Drive
Melton Lake Drive
New York Avenue
ORAU Way
Outer Drive
Pennsylvania Avenue
Robertsville Road
Rutgers Avenue
Scarboro Road
E. Tennessee Avenue
W. Tennessee Avenue
S. Tulane Avenue
Tulsa Road
E. Tulsa Road
Tuskegee Drive
West Outer Drive
Whippoorwill Drive
Wisconsin Avenue

Level 3 Streets (50 lane miles)

Alger Road
Amanda Drive
Athens Road
Arkansas Avenue
Baltimore Drive
Broadberry Street

Level 3 Streets (continued)

California Avenue
Center Park Drive
Centrifuge Way
S. Columbia Drive
Cumberland View Drive
Dana Drive
Dayton Road
Delaware Avenue
East Drive
ETTP City Streets
Glassboro Drive
Greystone Drive
Hendrix Drive
Highland Avenue
Hillside Road
Kentucky Avenue
Louisiana Avenue
Manchester Road
Manhattan Avenue
E. Melbourne Road
Michigan Avenue
Middlebury Road
Mississippi Avenue
Montana Avenue
Monterey Road
Nebraska Avenue
Morningside Drive
Newport Drive
Newridge Road
Palisades Parkway
Park Meade Drive
Providence Road
Rivers Run Boulevard
Rivers Run Way
Riverside Drive
Rockingham Lane
Rolling Links Boulevard
Salem Road
N. Tulane Avenue
Union Valley Road
E. Vance Road
Vanderbilt Drive
Weinberg Drive
Wilberforce Avenue
William Lane
Winchester Circle

***ALL OTHER STREETS ARE
DESIGNATED AS LEVEL 4***