

**City of Kirkland Snow and Ice
Response Plan**

January 2018

Public Works Department



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INTRODUCTION

The mission of the City of Kirkland's Street Division is to operate and maintain the transportation network while ensuring that the network functions as safely and efficiently as possible. During wind, snow, and ice events, the Streets Division conducts snow removal operations, anti/de-icing, traction improvements and selected road closures to mitigate hazardous travelling conditions; if events dictate and additional staff is needed, crews from Public Grounds, Water, Sanitary Sewer, Storm, Fleet, and Parks will supplement Street Division forces.

The purpose of this Snow and Ice Response Plan is to provide effective, clear, consistent and environmentally responsible guidelines and procedures, resulting in the best possible service to the citizens of Kirkland.

During inclement weather events, the administration and coordination of crews is especially critical to ensure that emergency situations will be responded to in an efficient, effective and timely manner. The primary goal is to provide passable routes for emergency vehicles, school buses, public transportation, commercial vehicles, travelers, and commuters during conditions of snow, ice or severe frost on the City's roads and streets. Public Works is responsible for approximately 240 center lane miles of roadway including approximately 40 lane miles of arterial lifeline routes that provide connectivity from residential areas to the State highway system and key service centers.

As the City of Kirkland's topography is extremely diverse and creates a variety of situations throughout the City during winter weather, Public Works annually re-evaluates equipment, crews and response scenarios to address a variety of scenarios. Public Works Department staff work closely with King County Metro Transit, the Lake Washington School District, adjoining jurisdictions such as Redmond, Bothell and Bellevue, local universities, and hospitals to assist in maintaining mobility for our residents and businesses. Some winters bring heavy snowfall, and other years see no snow accumulation at all. In any city, snow removal is complicated by urban factors such as parked cars, pedestrians and narrow streets. Cities with regular heavy snowfall often have winter parking restrictions that make it easier to plow streets. Since Kirkland doesn't have regular significant snowfall, these sorts of parking restrictions are not practical.

The City of Kirkland commits to plowing snow from identified routes throughout the City within 24 hours of a significant lull in the storm. This level of service strives to reach bare pavement along priority routes, however, it will be highly dependent upon individual storm conditions. Differing event patterns may alter this outcome. The following bullets highlight the snow/ice response:

- The priority route map can help the public know what to expect and provides clear direction to operations staff.
- Crews will plow snow to the right of the roadways so that melting snow will not pass back over the street surface and refreeze when the temperature drops at night. If a car is parked on snow route, the owner may have to dig it out. Driveways often are blocked when several inches of snow falls. Residents are asked to dig them out as well.
- Businesses and residents are responsible for shoveling and de-icing their sidewalks and steps. This is important since our population is aging and a simple slip can be debilitating. Public Works staff begins preparing early for the snow season by getting snow equipment ready and stockpiling supplies. Crews use the same trucks for paving streets that they do for winter weather response. Balancing our investments in equipment assures maximum efficiency and provides the staff critical

use of the equipment year around. The Fleet relies on fall preparation time for winter equipment cleaning, tune up and repairs.

- Another important fall activity is staff snow and ice response training. Staff are annually trained on the City’s Snow and Ice Response Plan and standard operating procedures (SOP). The snow response priority route map has been reviewed and updated to ensure the annexed areas are included as well as changed conditions, (environmental, development and street improvements). It is important to protect our traffic control assets, such as roadway markings and reflectors/road buttons from plow wear or accidental removals. During a snow storm, city crews work around the clock. Designated emergency hospital, citywide arterial and neighborhood priority routes are cleared first. This approach aids our fire, medical and police staff response, as well as transit, school buses and commuter traffic. If snowfall is continuous, arterials routes will require repeated plowing and sanding before crews can work to clear neighborhood streets. We ask the public, if at all possible, please stay home until the storm has passed and driving and walking/biking routes are cleared.

PLANNING/PREPAREDNESS SCHEDULE

| | |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| September | Chemical anti/de-icing materials are purchased and spray trucks are purged of chemicals used for vegetation control during summer months. |
| October | Weather and temperatures are more closely monitored; anti-ice treatment typically begins as colder conditions warrant. Staff begins priority route modification process based on changes in the community, and staff shift schedules are drafted. |
| November | King County Office of Emergency Management, Washington State Department of Transportation, and City of Kirkland annual kickoff meetings are held to discuss weather preparedness, nature of anticipated winter predictions (such as “Neutral”, “El Nino,” or “La Nina”). Training curriculum is finalized and training conducted. Materials and equipment are stockpiled and prepared. |
| Dec – Mar | Most inclement weather occurs during this timeframe. Crews perform emergency response activities, such as anti-icing, plowing, sweeping, cleaning of enclosed drainage systems, and responses to wind and other events. |
| April | Typically, April is a transition month, winding down from winter weather response mode. Equipment is returned to non-winter month status. For example, anti-icing trucks are returned to vegetation control preparation; plows and sanders are cleaned, maintenance and stored. |

The Snow and Ice Response Plan reflects the following concepts:

Constant Vigilance:

Public Works staff monitor conditions and follow weather reports 24 hours a day.

- Public Works uses a forecasting tool developed with the University of Washington called SNOWWATCH to learn how a storm will most likely affect different neighborhoods. This information helps determine priorities for clearing roads.
- Kirkland subscribes to a forecast service provided by Weathernet. In 2016, Kirkland installed two weather stations connected to the city technology system, (two surface and ambient temperature tracking guns mounted on poles). The stations alert management and key staff when temperatures drop below 34 degrees. Stations are located on Big Finn Hill next to the

Fire Station on Juanita Blvd. and near Evergreen Hospital in the Kingsgate area. The Big Finn station is connected via fiber cable to the city technology system and the Kingsgate station is connected via Wi-Fi.

Being Proactive:

City Departments, including Public Works, Parks, Fire and Police Departments proactively “get in front” of emergency winter response to the greatest extent possible. Community preparedness, communications and collaboration is key for a successful community response to winter storms. Specific steps in moving toward a proactive approach include the following:

- **Emergency Response Activation:** To stay ahead of the storm events, the Public Works Director will determine when crews and equipment are to be activated. Public Works will respond to requests from the Police and Fire departments for site specific road closures, and assist in preparing emergency response fleet equipment, provide fuel and other actions needed.
- **Staff shifts:** For small frost events, street maintenance staff may shift work times. Early de-icing chemical “Boost” applications, (calcium chloride with anti-corrosive additives), are done prior to commute traffic to reduce ice bonding onto the street surfaces. For large short term events, all Public Works Operations Maintenance staff will shift to two (12) hour shifts to maximize staffing resources, make the most efficient use of equipment, and to align service practices with neighboring jurisdictions. For longer events, three (8) hour shifts may be applied to reduce staff fatigue. Staffing is pre-assigned to each shift, with specific task and equipment assignments.
- **Assignment of “Strike Teams” for Minor Events:** Far more frequent than full-blown snow events, are periods of freezing or high winds events. Public Works will pro-actively assign a small crew with a lead worker to perform de-icing, flood response, and/or windstorm cleanup based on weather forecasts. If events ramp up, staffing levels will too. The “Strike teams” will be assigned backup work (such as the backlog of public sidewalk maintenance in front of public facilities) to perform in the event emergency response services are not needed.
- **Boost Application:** The City of Kirkland uses anti-ice equipment and chemicals (calcium chloride with anti-corrosive additive - Boost) and will pre-treat key streets, bridges, and pedestrian overpasses, when it is dry and as temperatures continue to drop below 34 degrees. Staying ahead of the storm and applying anti-ice treatments before the snow falls helps to prevent ice from bonding to the street and sidewalk surfaces. Pre-treatment is weather dependent; anti-icing chemicals should not be applied in wet weather or be combined or overlapped with non-calcium chloride de-icing chemicals. This is an important point for private parking lots. Anti-ice applications will track on tires often carrying chemicals from private lots to the public roadways. If the chemical is not calcium chloride it can increase slippery conditions.
- **Service:** As the snow begins to fall, the crews continue to maintain the response planned routes and sidewalk areas, treating the transportation system surfaces. Staff may apply a 2 parts sand/one part salt mixture from dump truck sanding equipment sparingly. Applying the minimum amount of sand needed is important to prevent the stormwater conveyance systems from plugging with sand and needing additional cleanings. It is best for public to remain 50 feet away from all snow response equipment. Applications can disperse at wide rates and it is best for the public to not have the materials coat their windshields for visibility. If it does get

onto private vehicles, the public should rinse it from the vehicle as soon as possible to reduce corrosion and maintain clear window views.

GENERAL INFORMATION

Administration and coordination of crews during snow and ice conditions is conducted by the staff at the City of Kirkland Maintenance Center, 915 8th Street, Kirkland, WA. From this location, Public Works crews are capable of providing 24 hour, 7 day per week snow and ice control activities. Parks and Community Services crews operate out of 1129 8th Street (the "Park Maintenance Building") to the north of the Maintenance Center, in order to carry out their responsibilities during snow and ice events. In a declared City emergency during which the Emergency Operations Center (EOC) is activated, the Maintenance Center will still function as the focal point for direct coordination of crew activities; however, priorities for snow and ice control efforts or other emergency conditions by all crews will be as directed by the EOC from City Hall.

STAFF ORGANIZATION

Effective management and accomplishment of snow and ice control objectives must be accomplished through an integrated and coordinated effort by Public Works and Parks and their respective Managers, Supervisors, Lead persons and crews. Generally the areas of responsibility for snow and ice control efforts between Public Works and Parks are as follows:

Public Works: Field crews will be responsible for snow and ice control activities within the public right-of-ways (streets, pedestrian overpass bridges, CKC, trails, some public staircases connected to parking lots, and sidewalks adjacent to Park Lane or the Park Lane parking lot) and within the yard component of the Public Works Maintenance Center (sand, anti/de-icing, etc.). Field crews may be drawn from Streets & Public Grounds, Water, Sewer, and/or Storm Divisions.

Fleet Division: Will be responsible for setup, maintenance, and repair of vehicles and equipment including the emergency generator at the Maintenance Center during power outages.

Facilities: Will be responsible for ongoing City exterior structural building maintenance, power and plumbing systems, HVAC systems, furniture systems, elevators, windows, flooring, roof systems and indoor structural system needs. They may need to delay responses to individual office furniture and box moving requests to locations not accessible due to unsafe roadway conditions. Facilities include City Hall, Justice Center, Fire Stations, Community Centers, Maintenance Centers, Annex Building, Heritage Hall and other park facilities and city parking garage.

Parks & Community Services: Will be responsible for snow and ice control activities around the exterior of all public buildings and facilities including driveways at Fire Stations and parking facilities and walkways. Included are the parking lots at City Hall, Kirkland Justice Center, Maintenance Center, the Senior Center, North Kirkland Community Center (NKCC), and other City facilities as necessary.

The Public Works Operations and Maintenance Divisions (Streets, Public Grounds, Water, Sewer, Storm, and Fleet) have approximately 80 full time field crew and approximately 12 administrative/management staff situated at the Maintenance Center. Consultation between the Division Managers, the Deputy Director, Director of Public Works, and/or the City Manager or an EOC appointed operative - activates field crew employees which will be assigned to two pre-determined, around-the-clock, "12-hour" shifts as follows (see 2017-2018 shift schedule attached to plan):

| | |
|------------------|-------------------------|
| Shift #1 (day) | 10:45 a.m. – 10:45 p.m. |
| Shift #2 (swing) | 10:45 p.m. – 10:45 a.m. |

This shift arrangement allows for complete 24 hour coverage, providing smooth transition of plowing, sanding, and de-icing activities. This coverage maximizes available equipment and crews (approximately 40 operational staff will be available for each shift). This approach also allows each employee two one-half hour meal periods during their shift. Generally, this shift will be followed for as long as needed to effectively satisfy the mission statement objectives. On each shift one or more Public Works Managers, Supervisors and Leadpersons will be responsible for coordinating, planning, scheduling and dispatching crews during the snow and ice conditions. The supervisors or lead persons will operate under the general direction of the Division Public Works Director and Public Works Deputy Director who will have oversight of the snow and ice control operations.

Because each shift includes two, one-half hour lunches, the physical time worked is 11 hours. 8 hours of each shift will receive a 20% shift differential, and 4 hours will be at time and a half. Management is expected to perform a short meeting (15 minute) exchange of critical information before each shift activates.

The Parks Maintenance Division has approximately 30 full time crew, two administrative employees, three lead persons, two supervisors and one division manager situated at the Park Maintenance Building. Parks Maintenance is responsible for planning, scheduling and coordination of Parks Department snow and ice control activities to meet their mission goals and objectives.

Preparation of emergency vehicles (Fire and Police) is done in coordination with the individual stations. The Fire Department maintains an inventory of chains for all apparatus at each station which includes cable chains and "lug" chains (used if snow reaches 6 inches). All firefighters receive training on how to install the chains, however Fleet personnel are utilized if issues arise. Fleet also maintains a complete set of cable chains and back-up chains for all Police vehicles, and Fleet staff install the chains during an event. The Public Works Department has two mechanics assigned at the Kirkland Justice Center and three mechanics at the Public Works Fleet Shop at the Maintenance Center. Fleet staff can utilize a small pick-up mounted plow to performing minor clearing activities at the Kirkland Justice Center to assist the Parks Department staff.

EQUIPMENT AND RESOURCES

The City owned equipment identified in Figure A is available for snow and ice control. All vehicles are radio equipped and city owned cellphones are made available.

The Fleet Division mechanics, facilities, equipment and parts are housed at the Maintenance Yard located across the street from the maintenance administration building. On duty mechanics will perform equipment maintenance and repairs during shifts and assess equipment during shift changes to prevent equipment failures.

- A limited supply of bagged salt is stored indoors on pallets if needed; this salt can be added to sand or mixed with water to create a brine mix for preventing ice.
- Calcium Chloride with Boost is applied when temperatures drop below 34 degrees and not raining. Two 6,500 gallon storage tanks are installed at the maintenance center and are able to provide anti-icing material by two Kirkland spray equipped vehicles.
- Salt brine is also available at the Maintenance Center which can be used to "pre-wet" sand by the one large 10 yard plow/sander with pre-wetting equipment.

The Public Works Department has access to a limited amount of materials (two parts sand and one part salt) from the Washington State Department of Transportation (WSDOT) yard facility located at the south end of the City near Northup Way and SR 520. This stockpile is available as a mutual aid and support basis and limited to \$5,000 annually. In addition, through agreement with the City of Redmond and Cadman Sand and Gravel located in Redmond, Kirkland has access to an articulated loader from the City of Redmond and can combine re-stock orders of Calcium Chloride anti-icer with the eastside agencies, and can access the sand stockpile at Cadman's yard. Redmond staff have a key to the Cadman yard for emergency access to the supplies. This access is normally unattended and on the honor system for payment to Cadman Sand and Gravel, which is presently one of the City of Kirkland's contracted sand and gravel supplier.

Kirkland Snow/Ice Equipment - Winter 2017/2018

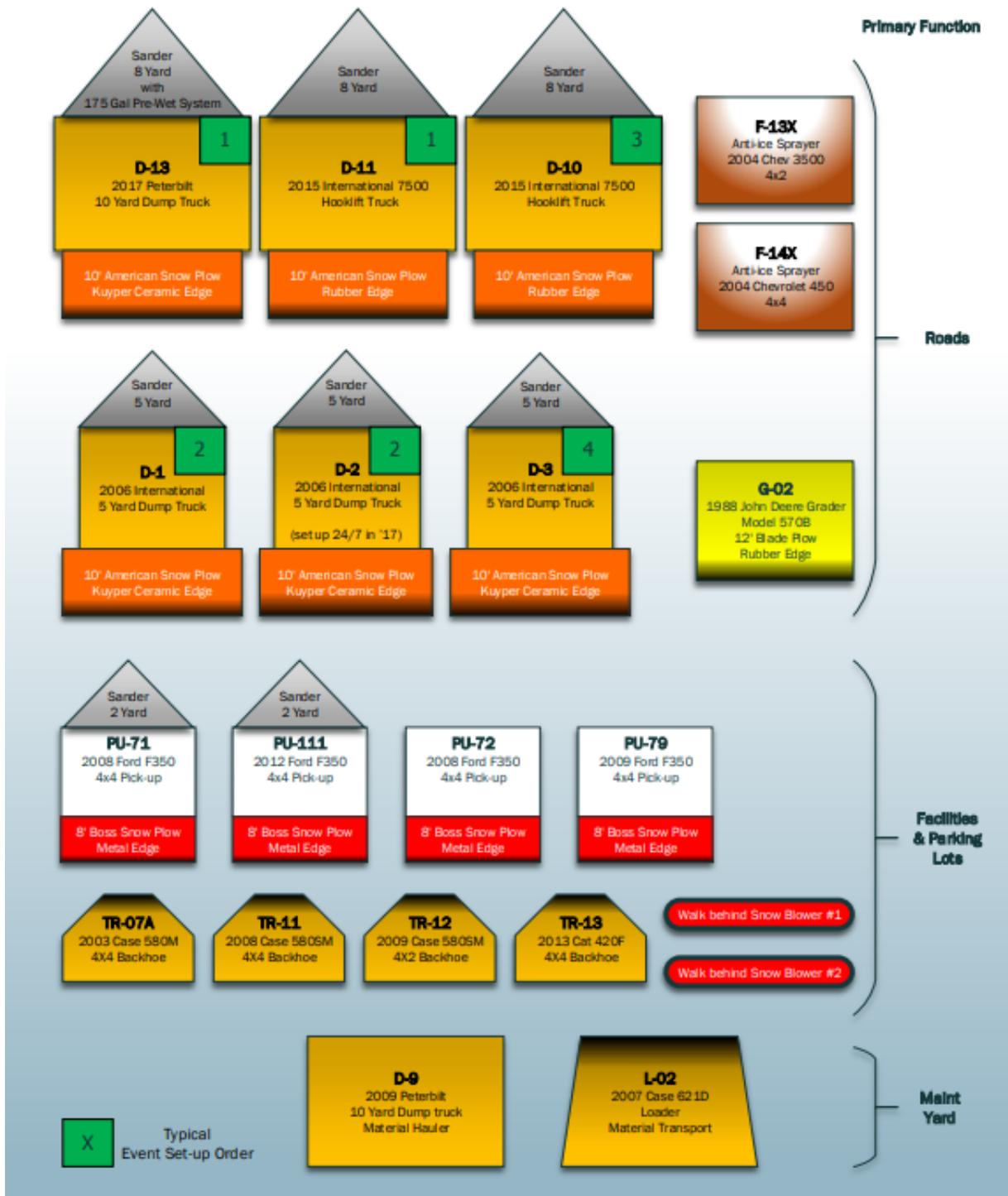


FIGURE A - WINTER SNOW/ICE RESPONSE EQUIPMENT

RESPONSE TO SNOW/ICE EVENTS

During inclement weather events, response will be based on priority routes established annually before each winter season. Snow and Ice crews will mobilize based on the severity of the event. The roadway prioritization is based on access to "lifeline" facilities (such as Evergreen Hospital and the Kirkland Justice Center), roadway classification, and topographic considerations. Since each event will vary in its impact and duration, these pre-determined routes will be considered to be in effect unless the situation requires that resources be redirected.

The inventory of travelled roadway lanes in the City of Kirkland exceeds the available personnel, equipment, and resources in terms of snow and ice operations. Therefore a three level priority system has been developed through coordination with Police, Fire, adjacent Cities, the Universities, King County Metro, Lake Washington Schools and Evergreen Hospital.

- Priority 1 routes: include major arterials, bus routes, and access to and from the Kirkland Justice Center, some Fire Stations, Evergreen Hospital and freeway interchanges in the Totem Lake area.
- Priority 2 routes: include remaining arterials throughout the City.
- Priority 3 routes: are collectors serving key areas.
- Priority 4 routes (new 2018): shaded, north and east-facing routes existing beyond full snow response to Priority 1-3 routes
- Pre-Treatment Routes: in addition to covering Priority 1 and 2 routes, the pre-treatment (anti-ice) priority covers hilly, shady areas as well as bridges and overpasses.

Operations:

City Staff will mobilize based upon the severity of a snow and ice event and as directed by the Public Works Director.

First Phase - Pre-treatment is activated when temperatures continue dropping below 34 degrees and there is no rain, and/or measurable snow and/or severe black ice conditions are predicted.

- The supervisor may shift schedules for early morning and evening applications of anti-icing agents, if weather conditions are conducive to anti-icing treatment.
- Priority 1 and 2 routes are checked for snow or freezing conditions.
- Fleets and Streets Division prepares equipment for snow and ice operations.
- The supervisor adjusts the initial response schedules as the weather event unfolds.
- Citizen and emergency service requests are taken by Public Works staff and assigned based on crew availability according to pre-established priority routes.
- Crews remain on regular schedules unless the event occurs after hours at which the standby person calls for additional personnel as conditions warrant.
- Depending on weather forecasts, "skeleton crews" may be assigned, or full-crew, 12-hour shifts may be assigned. (Usually the Deputy Director or Public Works Director makes the decision for a full-crew or for two, 12-hour shifts to be activated.)

Second Phase - Snow and Ice conditions have occurred. Isolated to widespread accumulations have affected City roads.

- Public Works Director makes the call to initiate snow and ice response, if this has not already been done based on the weather forecast. Supervisor of snow event (Public Works Deputy Director or Streets and Grounds Manager or Utilities Manager or Operations and Planning Manager or Standby activate MOC response center.)
- Snow and Ice Crews and associated Administrative staff start twelve hour shifts providing 24 hour coverage.

- The City of Kirkland EOC may be activated.
- Supervisor directs and assigns prioritization of snow and ice removal based on defined Priority routes.
- Shifts remain in place until Public Works Director terminates shifting.

Routes are normally first plowed to best facilitate the next morning or afternoon/evening rush hour traffic direction. All other routes are plowed based upon overall traffic volumes or public safety and are scheduled to coincide with the event patterns. Local streets, cul-de-sacs and dead ends have a lesser priority than heavier traveled streets, and depending on the inclement weather pattern and available resources, may not receive treatment. Typically, citizen requests are handled within the established priority system.

Depending on the severity of a snow and ice event, Parks crews are responsible to remove snow from parking lots, driveways, and pedestrian access paths to City facilities. These include all staffed City buildings, the Kirkland Justice Center, and Fire Stations as follows:

- | | |
|---------------------------|------------------------------------------------------------------------------|
| • Station 21 | 9816 Forbes Creek Dr. / Market Street |
| • Station 22 | 6602 108 th Avenue NE |
| • Station 25 | <i>(Through 7/18) 8411 NE 141st Street -- 12033 76th Place NE</i> |
| • Station 26 | 9930 124 th Avenue NE |
| • Station 27 | 11210 NE 132 nd Street, Kirkland |
| • City Hall | 123 5 th Avenue |
| • Kirkland Justice Center | 11511 NE 118 th Street |
| • N.K.C.C. | 12421 103 rd Avenue NE |
| • Senior Center | 406 Kirkland Avenue |
| • Maintenance Center | 915 8 th Street |
| • Annex Building | Directly South of City Hall |
| • Heritage Hall | Market and 5 th West Street. |

Parks crews may not be able to reach every Fire Station due to traffic or street blockages. In those instances, Fire Station personnel will be responsible to assist to the extent possible by hand shoveling and clearing of walkways and driveways. 5 gallon containers of anti-ice chemical are located at each Fire Station.

During inclement weather events, vehicles and equipment will be assigned in a manner which provides the best use and application for the particular event. Generally, the equipment having plowing capability will be assigned to plowing high priority streets which include major arterials, bus routes, access to and from schools, police and fire stations, freeway interchanges and Evergreen Hospital. The 10-yard and five-cubic yard dump trucks and one-ton pickups with snowplows/sanders will be assigned in an equitable or prioritized manner throughout the community. The grader, if used, will focus primarily on Juanita Drive and may assist the transit center bus access for Metro. Staff will avoid using the grader at night. Extra available equipment (backhoes are not safe on the roadways but may be staged at City Hall and Justice Center parking lots if large piles of snow need to be managed) will be used to assist plowing and respond to intersection and accident related requests. The two trucks mounted with deicing equipment will be assigned to areas on a priority basis. The articulated loader will remain in the Maintenance Center yard for use in stockpiling and loading sand and doing snow removal in the Maintenance Center yard and parking lot areas. The remaining (2) 10 yard dump trucks will be available to haul sand materials to the Maintenance Center to replenish inventoried materials. Cadman materials can be accessed at night if the stock needs to be replenished for the day shift.

Truck mounted small plows and the backhoe/loaders will be operated by Parks along with snow blowers to assist them in maintaining designated public facilities.

Public Works and Parks Department crews may assist the equipment rental group in preparing vehicles and equipment for snow and ice tasks. This may include assisting with mounting the plows and sanding equipment and chaining vehicles based on equipment rental priorities (Fire, Police, Public Works and Parks).

DISPATCHING

The initiation of snow and ice control procedures is by Public Works as determined by the Public Works Director and/or Deputy Director. The Kirkland Police Leadership in charge will provide regular assessments of current conditions to the Public Works Director, Public Works Standby and/or the MOC Manager in charge if shifting has been activated. Crews may be activated by the Public Works Standby and Manager in charge during non-work hours. The Weathernet stations will be monitored via email by those identified on the email notification list (see in appendix) when the temperature continues to drop below 34 degrees. Staff continue to monitor various weather information when storms are predicted. The Deputy Director is the lead to alert the Director's office when responding to a winter storm event.

NORCOM will provide site-specific emergency dispatching services to the phone messaging system the Public Works Department contracts with who then alert the Public Works command staff. Public Works command staff will make specific crew assignments.

COMMUNICATIONS

- All vehicles and equipment in use for snow and ice control are to be radio equipped with a hand held portable radio. The city maintains a bank of hand-held portable radios. All dispatching of field crews will be by the Manager in charge, face to face, by radio or wireless device.
- Telephone lines are the primary communication link between the Police Dispatch and the Maintenance Center Manager on duty. These lines may fail or be damaged during heavy snow or ice events. As a backup to the telephone system, Police Dispatch may contact the Manager directly on the Public Works band on the 800 MHz radio or via cell phone (see emergency cell phone list in appendix).
- Members of the public who call the Maintenance Center or come to the Maintenance Center in person will deal directly with administration staff or the Manager on duty for service requests or other services. Requests outside of the pre-established priority routes will not receive high priority due to resource limitations.
- The City's Public Information Office and City Manager's office will be notified if shifting is activated and will be regularly updated on status and issues by phone and template report noted below. The City Manager also has a hand held radio device and cell phones.

The Public Works Maintenance Deputy Director, Division Managers, Supervisors and Lead persons will have access to portable weather alert radios during imminent inclement weather periods. Calls for snow and ice control should be made directly through the Maintenance Center at 425-587-3900. Telephones will be staffed during snow and ice events.

Template Event Report - A summary of Maintenance Center snow and ice shift highlights (see template form to use in appendix) are completed by the shift manager and forwarded at the end of each shift to the Street and Public Grounds Manager. The data will then be compiled and forward to the Public Works Department's Deputy Director, who will then forward the data to the Public Works Director, City Manager and Communications Program Manager.

STREET CLOSURES

During significant snow and ice events certain streets may be closed due to steep grades which create a hazard to motorists due to the inability to stop at the bottom or at intersections on the steep street (see Inclement Weather Route maps). Impacted streets are generally not high volume streets, although it may be necessary to close certain high volume streets as needed due to the inability to maintain the street sufficiently to protect public safety. Street closures will be coordinated with the Police and Fire Departments for their emergency response planning during snow and ice events.

Any given road within the City may at any given time be closed due to event specific situations; however, the following streets will be proactively closed (and mapped as such) during significant snow and ice events due to steep grade of the streets and the inability to provide sufficient traction for safety:

| <u>CLOSED STREET</u> | <u>FROM</u> | <u>TO</u> |
|-----------------------------|-----------------------------|---------------------------------|
| NE 52 nd Street | Lake Washington Blvd. | 108 th Avenue NE |
| 5 th Avenue S | Lake Street S. | State Street S. |
| Kirkland Ave | 10 th Street S | I-405 pedestrian crossing |
| 5 th Place | 15 th Avenue | 18 th Avenue |
| 10 th Avenue | Market Street | 1 st Street |
| 11 th Avenue | Market Street | 1 st Street |
| 12 th Avenue | Market Street | 1 st Street |
| 13 th Avenue | Market Street | 1 st Street |
| 14 th Avenue | Market Street | 1 st Street |
| 15 th Avenue | Market Street | 1 st Street |
| 18 th Avenue | Market Street | 1 st Street |
| 19 th Avenue | Market Street | 1 st Street |
| NE 112 th Street | 100 th Avenue NE | 104 th Avenue NE |
| NE 97 th Street | 112 th Avenue NE | 110 th Avenue NE |
| NE 104 th Street | 111 th Avenue NE | 112 th PI NE |
| NE 116 th Place | Juanita Drive | NE 117 th Place |
| NE 117 th Place | NE 120 th Street | 90 th Ave NE |
| | | |
| <u>POSSIBLY CLOSED</u> | <u>FROM</u> | <u>TO</u> |
| 108 TH Avenue NE | NE 38 th Street | NE 44 th street |
| NE 120 th Street | Slater Avenue NE | 132 nd Avenue NE |
| 120 th Ave NE | NE 85 th Street | NE 90 th Street |
| 120 th Ave NE | NE 128 th Street | Bottom of hill (@ Trader Joe's) |
| 116 th Ave NE | NE 132 nd Street | NE 133 rd Street |
| NE 136 th Street | 95 th Ave NE | 98 th Ave NE |
| Willows Road | 139 th Ave NE | Approx. NE 125 th St |
| NE 128 th Street | NE 126 th Place | 136 th Ave NE |

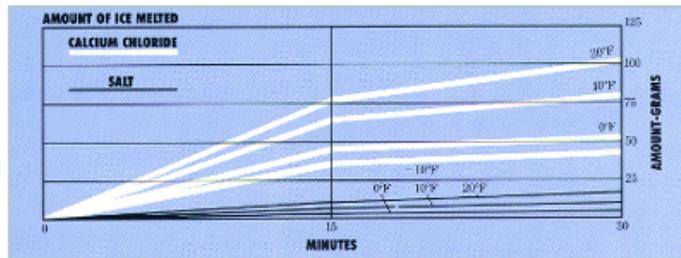
GUIDELINES FOR SNOW PLOWING AND CHEMICAL APPLICATION

The objectives of these guidelines are to compliment the decision making and management of a systematic snow and ice removal program resulting in road systems that can be navigated by the public.

The procedures for the City of Kirkland are based on the approaches made the adjacent city Public Works Departments (Bellevue, Bothell, Kenmore, Redmond and Woodinville and the Washington State Department of Transportation (WSDOT) standard operating procedures and the "Manual of Practice for an Effective Anti-Icing Program" (Appendix 1).

De-icer application of Calcium Chloride:

Information About Calcium Chloride



Calcium chloride outdistances traditional deicing materials to achieve safer, bare pavement - faster than salt or abrasives alone. Calcium chloride melts up to eight times as much ice as does salt alone - within the first 30 minutes at 20F (-7C) following application. Pre-mixed with salt and abrasives, calcium chloride becomes a cost-effective edge for winter road safety.

PROPERTIES

- › Exothermic: calcium chloride releases heat to activate salt's melting ability.
- › Hygroscopic: calcium chloride attracts moisture required for rock salt's melting action.
- › Fast acting calcium chloride begins to dissolve immediately upon application to break the bond between pavement and ice.
- › Powerful calcium chloride brine remains active for prolonged periods of time to prevent ice from bonding to the highway.
- › Low eutectic point calcium chloride melts to much lower temperatures than salt.

BENEFITS

- › Highway Safety: studies show that, in 85% of applications, calcium chloride/ salt mixtures achieve bare pavement faster than salt alone at temperatures near 30F (-1C), to ease traffic and reduce accidents.
- › Savings: calcium chloride increases salt's effectiveness, therefore reducing the number of applications necessary during storms - saving manpower, equipment and material costs. Plus, it freeze-proofs abrasives to help them embed in ice and snow, so you lose less material to spreader bounce and traffic scattering,

- The City of Kirkland standards call for application at a rate of 14-15lbs/lane mile, which is then refined based on given agency staff experience.
- The attached tables (Appendix 1) provide guidance for application of liquid chemicals and solid chemicals under six different winter weather conditions and include:

1. Light Snow
2. Light Snow with Periods of Moderate/Heavy Snow
3. Moderate or Heavy Snow Storm
4. Frost or Black Ice
5. Freezing Rainstorm
6. Sleet Storm

Plowing:

Accumulation of snow: If snow has accumulated due to stalled or abandoned vehicles, it may not be possible to clear the streets. The Police Department, along with tow truck companies may need to assist to clear the main arterials and tow the abandoned private vehicles to the nearest side street. It is important for the Public Works staff and equipment to stay in front of the event. If not, prolonged snow conditions, accumulate and may not be able to be removed with a snow plow blade. In these instances sufficient sand will be used only in the acceleration and deceleration lanes and on downslopes in order to allow traffic to start and stop at intersections and hills on high priority streets. De-icing brine will be distributed in the cleared travel lane(s), and salt is used only in sufficient quantities to mix with sand to keep the sand from freezing in the sander units. De-icing can be applied to ice areas and allow traffic to roll and track it. Over a period of time it will aid in the breakdown of the ice accumulated and can then be plowed.

Sanding/Salting:

Extended full length sanding and salting of streets is not possible due to two primary reasons: there is not enough sand or salt available to sand more than the areas stated; and the use of pure rock salt is environmentally detrimental to the receiving waters in Lake Washington. In general, sanding (pre-wetted, 2 parts sand/one part salt) is only applied at key intersections, at steep grades, or in locations of historical ice accumulation due to water/drainage (i.e., from road sub-base) along the priority routes. Specific roadway conditions will be monitored, and sand will be applied as needed in the travelled roadway. Managing sand applications is important to protect the stormwater conveyance system and reduce the amount of post storm cleaning required. Tracking the all response and follow up cleaning major winter storm data is important for potential FEMA post storm, fund restoration programs. See in the appendix the tracking forms that aid administration to respond to FEMA program relief funds.

Appendix 1: Treatment Scenario Tables

Appendix 2: Glossary of terms

Appendix 3 a, b, c: Route Maps (snow plowing, anti-icing, wind storm sweeping)

Appendix 4: 2017-2018 Crew Shift Schedule

Appendix 5: Calcium Chloride with Boost recommendations

Appendix 6: Template Storm Report

Appendix 7: City and Public Works Emergency Cell Phone Numbers (private phone numbers - restricted distribution list)

Appendix 8: Administration Resource Tracking Form

Appendix 9: Department and Maintenance Center Emergency Phone Trees (private phone numbers – restricted distribution list)