

Snow & Ice Removal Plan



REVISED JANUARY 2015



City of Louisville Snow and Ice Removal Plan

TABLE OF CONTENTS

I.	Purpose, Considerations, Policy, Scope of Responsibility, Level of Service	3
II.	Implementation	6
III.	Vehicle and Equipment Preparation	7
IV.	Priorities	10
V.	Snow and Ice Control Operations, Winter Storm Categories	15
VI.	Park and Recreation Department's Snow Removal Policies and Procedures	18
VII.	De-icing Solutions / Materials	19
VIII.	After the Storm	22
IX.	How Residents Can Help, Safe Driving Tips	24
X.	Winter Safety Tips	26
XI.	Questions & Answers for Residents	28
	Emergency Contacts	30
APPENDIX		32
A.	Snow Priority Map for Public Works Operations	
B.	Snow Removal Map for Parks & Recreation	



I. Purpose , Policy, Considerations, Level of Service

Purpose

The purpose of the Snow and Ice Policy and Procedure plan is to communicate the process and level of service for snow removal and ice control for the City of Louisville. The City's streets are divided into arterials, collector streets, streets that serve schools and hospitals, and residential loop streets. Arterials, collectors, school and hospital streets receive de-icing and plowing priorities. This assures each residential area is in

close proximity to a plowed street and that emergency services can be provided. Winter storms can be trying for all of us, motorists, residents and snowplow operators alike.

The goal of the Public Works Operations Division and Parks Department maintenance is to remove snow and ice from our roadways and sidewalks as rapidly and efficiently as possible while keeping roads open and essential traffic moving. This does not mean bare, dry pavement should be expected after a snowstorm.

The aim of snow and ice control operations is to return road surfaces to safe winter driving conditions as soon as feasible within the limitations of this policy, our limited

resources and weather conditions. With proper use of storm forecasts, personnel, equipment, and deicing materials, the desired result can usually be attained. However, flexibility is needed to adapt to the variety of circumstances and conditions during a snow or ice storm.



The Snow and Ice Removal Plan also incorporates standard operating procedures (SOP's) to aid in efforts to preserve air and water quality in our community. The following policies and procedures serve as a practical guide for effective snow and ice control procedures in the City of Louisville.

Plan Considerations

In developing the policies for how to best undertake winter maintenance activities the City considers a number of factors including, but not limited to the following:

- Public safety.
- The amount of funds available for these activities.
- The number and availability of personnel for these activities.
- The desire to maintain a safe and efficient transportation system.
- The ability to deliver emergency services.
- Environmental impacts.
- Weather conditions including temperature and snowfall amounts.
- Protection of City property and personal property, and;
- Effectively allocating resources.

Policy Statement

The snow and ice control objectives of the City are to:

- Provide safe traveling conditions for pedestrians and motorists.
- Provide cost effective snow and ice control services.
- Reduce economic losses to the municipality and to businesses that can result from workers being unable to get to their jobs.
- Assist Police, Fire and Emergency Medical Services in fulfilling their duties, and;
- Provide safe, passable roads and school bus routes.

The City of Louisville has a commitment to provide effective and efficient winter maintenance to its citizens. However, it must be noted that the following circumstances may prevent or delay complete implementation of this Plan:

- Equipment breakdown.
- Vehicles disabled in deep snow and weather so severe as to cause crews to be called in from their duties for their safety.
- Equipment rendered inadequate by the depths of the snow or drifts.
- Crew breaks, and breaks required for re-fueling and refilling deicing materials.
- Mechanical failures and needed repair.
- Parked or stalled private vehicles that restrict or prevent safe roadway movement and plowing.
- Unforeseen emergencies.

Scope of Responsibility

- The City of Louisville Public Works Operations Division is responsible for snow and ice control on municipal streets within the city limits.
- The freeway segments and portions of state routes within the city limits are handled by the Colorado Department of Transportation (CDOT).

- The City does not remove snow and ice from private streets, parking lots or driveways.
- The City is not responsible for snow and ice control on sidewalks except those immediately abutting or within municipal facilities or properties.
- City parking lots, sidewalks and paved trails are handled by the Parks & Recreation Department.

Level of Service

- *It is the expectation of our citizens that we will keep all of the city streets sufficiently passable during and following a winter weather incident. To accomplish this, the City will provide, to the extent reasonably possible, effective and efficient measures consistent with generally accepted standard practices to restore mobility. Due to the many variables associated with winter weather, each event is unique. Factors that influence when and what measures we use include: air and pavement temperatures, wind speeds and directions, precipitation rates and types, time of onset, duration and traffic activity. Availability of equipment, personnel and materials are also key factors that affect the effectiveness of snow and ice control efforts.*
- *Snow and ice control measures are directed to achieving and maintaining relatively safe traffic movement on public streets within a reasonable time period. Therefore, efforts are first concentrated on the main arterials, collectors, and school and hospital streets that carry most of the traffic. Residential and other low-volume streets and cul-de-sacs are handled when resources are available.*
- *The best level of service is reached when the major thoroughfare streets are down to “bare pavement” clear of snow and ice from curb-to-curb. Reaching that objective takes time which is affected by the variables of meteorological conditions, traffic activity and type and amount of materials applied. The width of certain streets and number of turn lanes also are factors.*
- *The minimum level of service for thoroughfares is to clear the through lanes and left-turn lanes at intersections and median breaks down to a packed snow cover. Exclusive right-turn lanes and joint center turn lanes may be left unplowed during main operations.*



II. Implementation

These following policies and procedures outlined herein will be in effect when weather conditions could cause accumulations of frost, sleet, ice or snow on our maintained roadways, school streets or municipal lots and will be in effect during the normal winter season. The City of Louisville Public Works Operations Division begins preparing for winter as early as August. All snow equipment is serviced, mounted and checked to see that it is in good working order. Anti-icing materials are stockpiled so that enough is on hand for a number of storms.

Monitoring Snow / Ice Events

Snow Emergency

During normal working hours, (7:00am to 3:30pm., Monday thru Friday) the observations of the Public Works and Parks Departments and Police will alert the first response for snow and ice removal. After normal working hours, police officers will make observations and recommendations to the Public Works Emergency On-Call personnel regarding street conditions. Based on the observations of the Police, the foreman in-charge will perform his/her own review of the road conditions, and make necessary decisions to begin snow / ice removal operations. The Operations and Parks supervisors will be notified of any snow removal issues or traffic emergencies and make adjustments to snow removal operations as needed.

When Operations Begin

The Operations Supervisors will decide when to begin snow/ice control operations. The Parks Department Supervisors will also decide when to start snow/ ice removal on city sidewalks, paved trails and parking lots. The criteria for that decision is:

- *Snow accumulation, or expected accumulation, of 0 -1” inches or more;*

- Icy conditions which affect travel;
- Time of snowfall in relationship to traffic volumes.

Snow and ice control operations are expensive and involve the use of limited personnel and equipment. During a snow event, snow removal becomes a 24/7 operation until all priority streets, collectors, arterials and school and hospital streets, are cleared. For snow storms lasting longer than 24 hours, personnel are divided into crews working alternating 12-hour schedules depending on the shift that they are assigned. They work either night shift from 3:00pm to 3:00am, or day shift from 3:00am to 3:00pm. The use of weather reports from the National Weather Service, review of live local television satellite storm tracking and commercial radio will be used concurrently with existing street condition reports to determine the appropriate storm response.

How Snow is Removed

Arterials - Snow will be plowed in a manner so as to minimize traffic obstructions. The center of the roadway will be plowed first. The snow is pushed from left to right. The discharge shall go onto the shoulder area of the street. In times of extreme snowfall and ice, streets will not always be able to be completely cleared. Plowing will normally begin when one or more inches of snow accumulate.



The primary routes will always have priority when engaged in plowing. Hills on main arterials have top priority. Plows will remain working on their assigned routes during adverse conditions.

Once the primary routes are open, the secondary and residential routes can be plowed. Operators will plow whenever possible to make right turns, this helps keep the intersections from developing a berm for cross traffic to go over. Operators are trained while on multi-lane roads, to plow the inside lane first and plow snow to the outside whenever possible. It is common practice to plow the turn lanes on the first pass and avoid burying fire hydrants with snow spoils. Operators plow slush at speeds not to cause damage or injury to property or people by the spoils coming off the blade.

Employees assigned to snow removal shall be responsible for the completion of their assigned route and appropriate snow removal based on weather or roadway conditions. Each operator assigned to a specified route shall be responsible for monitoring its condition and shall maintain communication with the assigned supervisor to report on their progress and the effectiveness of the deicing and plowing efforts.

Supervisors will be responsible to direct and coordinate work crews to complete snow and ice removal in accordance with established priority ratings.

Personnel Responsibility

The snow and ice control plan used by the City of Louisville has been developed to establish a chain of command through which winter maintenance policies can be transformed into an effective and uniform set of actions. The actions taken by snow crews are the result of the general policies established by the administration, and procedures set forth in this plan, as approved by the Director of Public Works.

Operators:

The snowplow operators are the key to the success of the Snow and Ice Removal Plan. These operators are responsible for:

- Maintaining a positive work environment to enhance the teamwork concept;
- Providing a timely, effective service for their designated routes;
- Maintaining vehicles, plows and sanders in safe working order;
- Properly documenting snow removal activities;
- Serving as good-will ambassadors for the City.

Supervisors:

Crew supervisors are responsible for:

- Maintaining a positive work environment to enhance the teamwork concept;
- Coordination of service to ensure timely, effective coverage;
- Coordinating vehicle, plow and sander maintenance and repair to ensure safe operations and adequate coverage;
- Maintaining deicing inventories and other vital supplies;
- Timely, courteous response to service complaints, requests and inquiries; and
- Providing training opportunities for snowplow operators.

Management:

Management is responsible for:

- Maintaining a positive work environment to enhance the teamwork concept;
- Providing adequate resources to ensure timely, effective service;
- Creating training and feedback avenues for supervisors and operators; and
- Utilizing various forums to create and maintain public awareness and support for snow removal activities.



“If everyone is moving forward together, then success takes care of itself”

~ Henry Ford~

III. Vehicle and Equipment Preparation



All vehicles and equipment utilized in the Snow and Ice Control Removal Plan are inspected for readiness and repairs in advance and as needed during the snow season by Fleet Maintenance to ensure efficient operations for snow removal service.

Primary Snow Response Equipment

Vehicles and equipment *Public Works Operations* uses for snow and ice control:

5	Single Axle Dump Trucks with 11' Blades and Sanders
2	4x4 One Ton Truck with 9' Blades and Sanders
2	Front End Loaders
2	John Deere Backhoes
1	Vacuum Sweeper

Vehicles and equipment the *Parks and Recreation Department* uses for snow and ice control:

3	4x4 Trucks with 7' Blades
2	Utility Vehicles with 5' Blades
1	Small Tractors with a 4' Angle Blade
2	ATV's with plow blades
1	Backhoe if needed
2	Polar Tracks w 4' Plows

IV. Priorities



During snow / ice conditions, calls from the Police and Fire Departments regarding accidents, medical or other emergency situations are given top priority. Upon request of the appropriate agency, the Public Works Operations Division will provide assistance as necessary. Because of the high priority assigned to snow and ice control, almost all other Public Works operations become secondary to snow removal activities. Streets will be plowed and have anti-icing materials applied according to established priorities. Priorities are set based upon traffic volume, public safety, and access to emergency facilities and schools. During major storms, crews will plow continuously and apply anti-icing materials (where required) prior to high volume traffic hours. Depending upon the type and intensity of the storm, plowing operations may be suspended during peak traffic hours to devote maximum effort to deicing operations to provide better traction. All streets in Louisville are prioritized into groups for conducting snow removal operations, and snow plowing routes are also color coded for easy identification. Occasionally multi-lane roads may require tandem plowing; this is a judgment call as conditions warrant. If this becomes necessary, employees will contact the on-duty supervisor before leaving assigned route to provide assistance in an adjoining route. The following summarizes the snow removal priorities.

Priority 1 - Major Arterials - RED

These roadways are the major arterial streets and have four or more travel lanes. These streets are given first priority since they provide the interconnecting link from all corners of the City. Also included are streets that provide access for emergency services such as fire stations, hospitals and the Police Department. School Zones in the city are also considered Priority 1 during normal opening hours. Priority 1 streets will be maintained for all snow events.

Priority 2 - Primary Collectors - BLUE

These roadways are minor arterial and major collector streets and are generally streets that connect major arterial streets to residential streets. Also included are streets that provide access to major office areas and business areas such as grocery stores and service stations. Priority 2 streets will be maintained for all snow events.

Special Priority: Certain streets that do not meet the classification of Priority 1 or 2 streets have been identified for snow and ice control operations at specific locations. The locations for streets in this category are limited to chronic icing problems at hills, curves or intersections that are likely to cause traffic accidents. These streets will be maintained after completion of the Priority 1 and 2 streets.

Priority 3 - Residential thru Streets/Loop Roads - GREEN

Selected local streets within residential and commercial areas will be plowed on a limited basis after priority one and two streets are passable. The first local streets to be plowed will be primary streets and loop streets through subdivisions. This plan allows all residences to be in close proximity of a plowed street in the shortest amount of time. The City will address the remaining residential streets as time permits and weather conditions warrant. The City attempts to plow local streets prior to times of greatest use, i.e. the hours when residents leave home and return from work, provided higher priority streets are passable.

Non-Priority - Residential Streets

Non-priority residential streets do not receive regular winter maintenance. Snow removal service is provided on residential streets only during the most extreme weather conditions as approved by the Public Works Director. The basic roadway network consisting of Priority 1 and certain Priority 2 streets will be maintained with the maximum service level at all times. Priority 3 streets will be maintained as winter storm conditions allow. Procedures are established in this plan in the event that winter conditions require road closures.

For a complete showing of the Department's responsibilities please review the Public Works Operations Snow Removal Priority Map. (*Appendix A*)

U.S. Highway 36 and Highway 42 are maintained by the *Colorado Department of Transportation* (CDOT). For information regarding conditions on these roadways, please call 303.442.4382.

South Boulder Road, west of McCaslin Boulevard is maintained by *Boulder County*. For information regarding its condition, please call 303.441.3962.

Travel Restrictions and Street Closures

During certain winter storm events it may become necessary to close streets or portions of streets to traffic. The City of Louisville Police Department may restrict the type of vehicles that may be operated on city streets during severe weather conditions and may order that certain streets be closed. Every effort will be made to alert the public of any restrictions and/or closures through the news media, community contacts, and posted on the city's web site; this action will only be taken if extreme weather conditions deem an area of the city unsafe for transit.

Note: To help our crews perform in a safe and efficient manner, vehicles abandoned during severe weather may be towed.

PRIORITY 1 STREETS *RED*

Major Arterials & Primary Collectors

South Boulder Road to McCaslin Boulevard
McCaslin Boulevard to US 36
Via Appia to McCaslin Blvd
W. Cherry Street / Bella Vista Drive to County Road
County Road to Pine St
Pine Street to Via Appia
Tyler Ave from Via Appia to Pine St
Roosevelt Ave to Main Street
Main Street

Griffith St from Main St to Hwy 42
Jefferson Ave (from S. Boulder Rd) to Lafayette Street (School Zone - LMS)
Hutchinson St (School Zone - LES)
Garfield Ave & McKinley Ave from Pine St (School Zone – LES)
South St / Grant Ave / Walnut St (School Zone Radius -St Louis CS)
W Tamarisk St (School Zone - Coal Creek Elementary)
Centennial Parkway including Infinite Drive
Dillon Road to 104 th Street
88 th Street to US 36 (Overpass)
Health Park Drive / Campus Drive (Hospital & School Zone - MHS)
96 th Street from Hwy 42 to NW Parkway
104 th Street from Dillon Rd to Hwy 42
CTC – Cherry St / Pierce Ave,

PRIORITY 2 STREETS *BLUE*

Secondary Collectors & Priority Residential

Centennial Drive
Eisenhower Ave
Hecla Drive / Plaza Drive
Garfield Ave / Lincoln Ave
Kennedy Ave to W Tamarisk Street / W Alder Street
Washington Ave
Arapahoe Drive / Willow Place
Grove Drive/ Wildrose Way / Pine Street to Via Appia
Tyler Ave from Washington Street to Via Appia
W Hickory Street / W Sagebrush Drive / W Arrowhead / Sagebrush Way
Lafayette Street from Via Appia to Main Street

Eldorado Lane / Larkspur Lane
Hillside Lane
Century Drive from W Dahlia Street
S Polk Ave / W Dahlia Street from Pine Street to Dillon Road
W Mulberry Street to Century Drive
S Madison Ave from W Cherry St to W Dahlia Street
Hoover Ave from Bella Vista Drive to Pine Street
West Street
Front Street from Pine Street to South Street
Spruce Street from Front Street to La Farge Ave
La Farge Ave from Spruce Street to Walnut Street
Walnut Street from La Farge to Front Street
CTC - Taylor Ave from Pierce Ave to 104 th Street
CTC - Arthur Ave / CTC Boulevard / Boxelder Street
CTC - Dogwood Street / Prairie Way

PRIORITY 3 STREETS

GREEN

Residential Loop Roads

Continental View / Azure Way / Hays Drive
W Hawthorn Street / W Cedar Place / Polk Ave / W Ash Street
Dogwood Circle / Cliffrose Lane
Evans Ave / Franklin Ave / Monarch Street / McKinley Ave
Ridgeview Drive / W Linden Street / W Willow Street
Kennedy Ave from W Tamarisk / Harper Lake Drive
Trail Ridge Drive / Estes Way
W Enclave Circle / W Enclave Way
W Harper Street / W Griffith Street
Griffith Street / Adams Place / Harper Street
Caledonia Circle
Jackson Circle

Buckthorn Way / Cleveland Ave / W Spruce Way
W Elm Street / W Sycamore Lane / Adams Ave
Lincoln Circle / Lois Way
W Sycamore Circle / Owl Drive
S Washington Ave
W Hackleberry Street / S Cleveland Ave/ Madison Ave
W Mahogany Ave
S Chestnut Circle / S Lark Ave
Cherrywood Lane
Orchard Drive / Orchard Way
Club Circle / Rose Place
Fairfield Lane / Coal Creek Lane (To Roundabout)
S Adams Drive / Dahlia Drive
Lilac Circle / Chestnut Street / S Hoover Ave
Jefferson Ave / Aspen Way
Lee Ave / South Street / Spruce Street from Hwy 42
Summit View Dr. / W Hecla Dr. / South side of Paschal Dr.
Magpie Lane/Treece Street/Wagon Way
Majestic View Drive

V. *Snow and Ice Control Operations*



Winter Storm Categories

Winter storms that occur in our area may be categorized into four basic types. The response to the storm is different for each category. The following discussion presents information concerning these categories, the service levels maintained and the materials used for each type of storm.

Category I

Predicted Snow Fall Amount: Trace – 2”

Service Level: Maintain primary (red priority) and secondary (blue priority) routes during storm. Lower priority snow routes usually do not require service.

Materials: Solid de-icer (Ice Slicer) as needed.

Road treatment primarily consists of applying Ice Slicer if necessary prior to the onset of the storm. Typically these storms move out of Louisville within 24 hours and one application of Ice Slicer is sufficient to maintain the desired service level. (This storm category does not typically require multiple work shifts).

Category II

Predicted Snow Fall Amount: 2" – 6"

Service Level: Maintain primary (red priority) and secondary (blue priority) routes during the storm. Loop roads during this category will receive removal service.

Materials: Ice Slicer as needed.

Storms in this category require all available snow plows from operating departments. Heavy equipment is not required for storms at this level. Road treatment primarily consists of applying Ice Slicer as needed during the storm. Plowing may be required depending upon the weather conditions. If plowing is required, primary (red priority) snow routes are maintained throughout the storm. Lower priority routes are maintained as the storm abates or ends. Multiple work shifts are usually required for this type of storm. Additional supervision may also be necessary to manage the storm response.

Category III

Predicted Snow Fall Amount: 6" – 12"

Service Level: Maintain primary (red) and secondary (blue) routes during storm. Secondary (blue) priority routes may be delayed depending upon weather conditions. Lower priority routes require service at the end of the storm

Materials: Ice Slicer as needed

Storms at this level require all available equipment including snowplows and heavy equipment. Typically, multiple work shifts over more than one day are needed to maintain the road system in passable condition. Road treatment may initially consist of applying Ice Slicer at the onset of the storm, but typically progresses quickly to snow plowing with spot application of more material. During the storm, primary (red priority) snow routes are the only routes maintained. Secondary (blue priority) routes are treated and/or plowed as personnel and equipment are available after the first priority routes are completed. Lower priority routes are plowed after the snow has ceased and after the primary.

Category IV

Predicted Snow Fall Amount: 12" or more

Service Level: Primary (red) routes remain passable during storm event. Secondary routes are plowed after the main arterial streets are fully opened and passable. Residential streets may be plowed after the storm if determined by the Public Works Director.

Materials: Ice Slicer as the storm abates.

This category includes storms with sufficient snowfall to cause a major disruption in the transportation system. Major roadways including interstate highways may be closed. Businesses and schools may also be closed. During the storm, primary (red priority) routes will remain passable. All other routes will be plowed as personnel and equipment permit, typically after snowfall has ceased. Snow removal may be required on residential streets depending upon the final storm accumulation. Storms in this category require all available City personnel and equipment and may include contracted snow removal personnel and equipment.

Plowing / De-icing of Non-Designated Streets

Under certain severe snowstorm conditions it may be necessary to plow all streets in the City. The following conditions will be evaluated using the criteria listed in a Category IV deployment snow event to determine the necessity of plowing residential streets that are not designated in the plan. Some of the criteria used are:

Snow Fall Accumulation

Approximately 15 inches of snow should have accumulated in a 48-hour period.

Availability of Funds

Careful examination of the current year Snow Removal services budget as well as the status of snow removal reserve.

Time of Year

Stronger consideration should be given to plowing residential streets in the winter as compared to the spring and fall, when warmer weather is likely to melt much of the snow within two days.

Delay of Snow Removal Services

Removal of snow and ice is a difficult task. It is extremely rough on the equipment and on personnel. Delay of some services is inevitable. At least one or more of the following situations may delay all or some of the services provided during snow events:

- Vehicles parked and blocking the street.
- Vehicles getting stuck in the street blocking access for the plows.
- Equipment breakdown. Public Works Fleet Maintenance provides emergency repairs to its own equipment.

- Manpower shortage due to sickness, injury or failure to respond to call may leave some routes temporarily unmanned and result in delay of services.
- Manpower shortage due to the length of the storm requiring personnel to be pulled off the streets for rest. This will result in routes temporarily unmanned and in delay of services.
- Operator breaks for rest, meals, refueling, or for loading deicing material; breaks required to install chains and/or new cutting edges on snow plow blades.
- Downed trees and branches and downed utility wires can block access to streets and entire neighborhoods.
- Frozen water mains divert snow fighting personnel to respond to the emergency.
- Daytime storm--traffic and pedestrians severely disrupt our ability to deliver required services.
- Vehicles parked overnight in municipal parking lots limits our ability to plow these lots and requires diverting other more specialized equipment off the streets and into the parking lots.
- Snow being placed on the street after we have plowed requires crews to return to these streets again, diverting attention from other needs.
- Weather so severe - as to cause crews to be called in for their own protection.
- Unforeseen conditions and emergencies.

Some of these delays are unavoidable and caused by forces beyond our control; and may require the City to alter its procedures to resolve.

VI. Parks and Recreation Department



Snow Removal Policies and Procedures

The Parks and Recreation Department's snow removal responsibilities are primarily focused on plowing parking lots at public facilities, plowing paved trails, and plowing sidewalks along City property (property and business owners are required by city ordinance to keep the sidewalk in front of their property clear of snow and ice). Parking lots such as the Police Station, Recreation Center, City Hall and the Library are given top priority. Once cleared paved trails and walks around schools and along primary thoroughfares such as Via Appia and



McCaslin Blvd are plowed. During large snow events, only one side of these main routes is prioritized. Soft surface trails such as the Coal Creek Trail are not plowed. There are 11 parking lots plowed by this Department and approximately 30 miles of trails and walks. The trails and walks are made up of approximately 15 miles of 8' paths and 15 miles of 4' sidewalks.

All City Facility walks are cleared of snow. De-icing materials are applied as needed.

The 11 parking lots are listed below in priority order. De-icing materials are applied as needed.

1	Police Station
2	Recreation Center
3	Library
4	City Hall and the Park and Recreation Administrative Building
5	Lafarge Av./Daycare
6	Community Park
7	Heritage Park
8	Cottonwood Park
9	Steinbaugh Pavilion
10	Historical Museum
11	Harper Lake

For a complete showing of the Department's responsibilities please review the Park and Recreation's Snow Removal Map. (*Appendix B*)

VII. De-icing Solutions / Materials



De-icing Solids – Ice Slicer®

During normal ice control operations, a solid deicing material is spread on the street pavement to melt ice and packed snow. The City of Louisville Public Works Operations Division currently deploys the use of Ice Slicer. Ice Slicer is a bulk granular de-icing product used for ice control on roads and parking lots. It has been used extensively by state and city highway authorities across the country and was adopted by the City during the 2014/2015 winter operations season. Ice Slicer is a specialized, naturally occurring complex chloride with 60 plus trace minerals. It has a moisture content of approximately 3% and at least 92% complex chlorides. Its natural, darker color makes application easier and improves its ability to absorb solar energy, increasing its melting rate. The trace minerals and micro nutrients serve to buffer the effects of sodium chloride on vegetation and the environment. It is low in alkali and less corrosive than plain white sodium chloride. Ice Slicer tends to remain in place and persist longer between applications than liquids. The numerous and changing deicing solids that are

commercially available will be evaluated prior to each winter season by the public works department and purchased based on performance and cost. (Please see Ice Slicer Material Safety Data sheet for further information).

Application

Ice Slicer is used as a replacement for sand and salt. It has also been mixed with sand. The designed application is to use this product on existing snow and ice (de-icing)

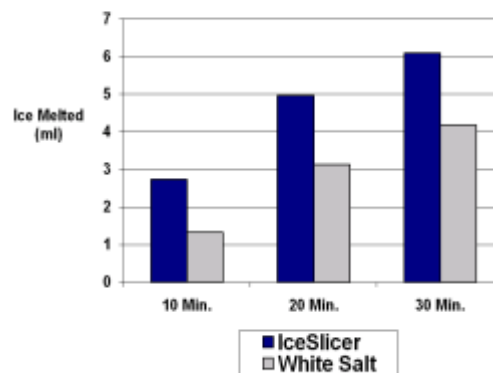


because the crystals will penetrate the deep ice. Though liquids may be used for either de-icing or pre-storm (anti-icing) applications, they should be used instead of *Ice Slicer* for anti-icing because they won't bounce and scatter from the desired locations. Application rates cannot be standardized because there are so many variables in its use. For example, if the ambient temperature is 12 degrees F and there is a thin layer of snow that the snow plow couldn't pick up, that would require substantially less product to "clear" the parking lot of snow or ice versus 0 degrees F and 1 inch of ice on a drive lane in the shadow of a North-facing building. However, the opinions of many snow removal professionals suggest that application rates are between half and three quarters the amount of sand. It should be obvious that the thin film of snow left behind the

plow requires only a light broadcast of *Ice Slicer* and a shades drain pan with several inches of ice would require several time that amount. The desired outcome would be that when the *Ice Slicer* crystals are dissolved into the brine stage the snow or ice should be melted also.

Melting vs. Traction

Sand has always been thrown down for traction. Then a percentage of salt was added for melting power. Plain white salt, however, becomes ineffective below 15 degrees so the sand gets smashed down into the snow pack until the air temperature rises above freezing. *Ice Slicer* provides traction at first but within a short period of time it melts the ice and the travel surface no longer needs traction because the ice is gone. In thick ice situations, heavier application rates can be used and if the ice isn't completely melted the *Ice Slicer* will have penetrated and melted to the point that the remaining ice can be plowed off. In other words, traction is a non-issue because these high performance de-icers, like *Ice Slicer*, eliminate the ice and the pavement becomes the traction.



The Costs of Salt / Sand

*The sand that was thrown down on the ice for traction and safety becomes a hazard after the ice is all melted. Sand (which is really small gravel) acts like ball bearings on dry pavement. A parking lot sweeper called out to clean up the loose sand is a costly operation. The sand that was so cheap to throw down now costs upwards of \$200/ton, because of clean up costs. Sand has also been a major contributor to the “brown cloud” that hangs over the Denver metro area. Some municipalities and businesses have banned the use of sand. Ice Slicer is an ice melter. When properly applied, it dissolves while it melts. When the ice is gone, so is the Ice Slicer. There is nothing left, which also eliminates street sweeping costs. (For further information regarding this product please refer to the Material Safety Data Sheet – MSD *Appendix C*)*

De-icing Solids – MeltDown Absolute Zero™

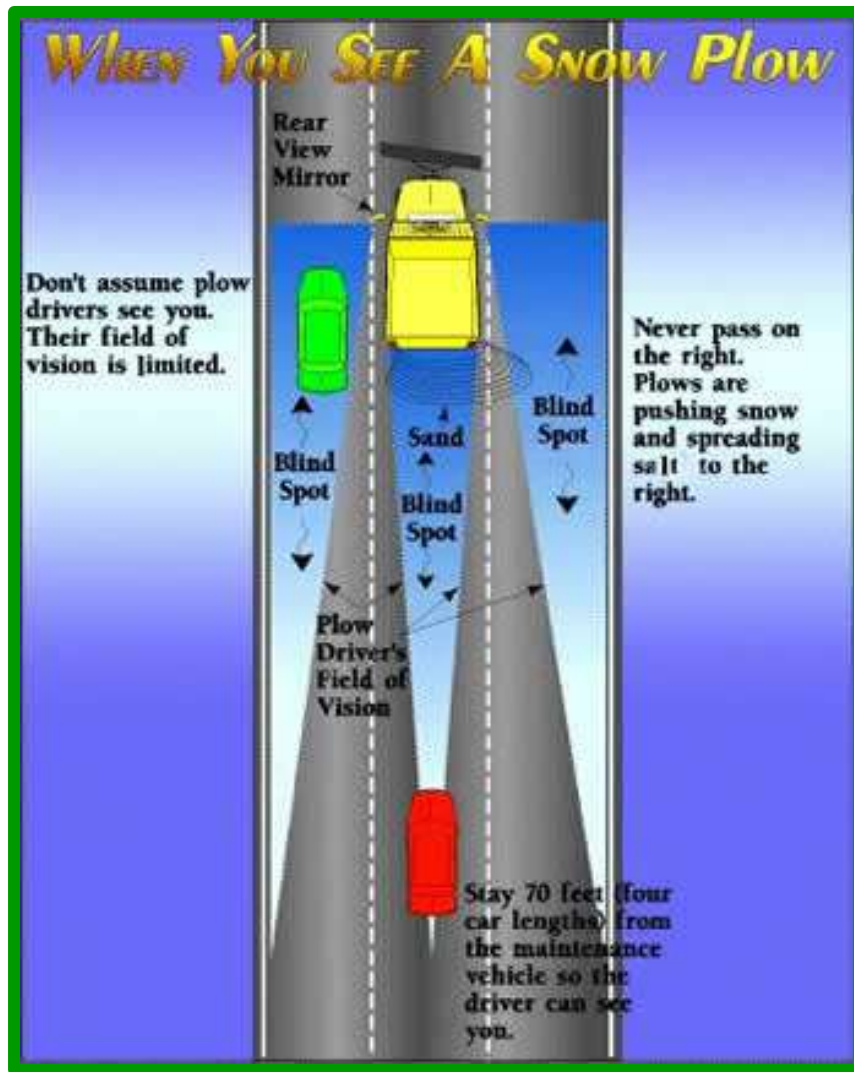
MeltDown Absolute Zero is an environmentally friendly, low-corrosion de-icing product used by the City of Louisville Parks and Recreation Department to clear snow and ice from sidewalks, driveways, and parking lots.

Product Composition

Magnesium Chloride Hexahydrate has been naturally mined from salt water or brine since the 1960's. A unique solar evaporation process harnesses the power of the sun and gravity to evaporate the salt water. In a typical year, it is estimated that it would require seven million tons of coal to process the same amount using conventional methods. Once the brine has evaporated and settled, it is purified and concentrated to produce MeltDown Absolute Zero (magnesium chloride crystals). This natural process is environmentally friendly, cost effective and produces the highest quality deicer in the world.

Health and Environmental Concerns

MeltDown Absolute Zero is the least harmful of all common deicers to vegetation and groundwater according to studies by independent consultants, cities like Boulder, CO & Missoula, MT, as well as the US Department of Agriculture. MeltDown Absolute Zero is non-irritating and safe to handle. It won't cause burning or stinging associated with other products. MeltDown Absolute Zero's fast melting action penetrates the snow or ice immediately—it doesn't sit on top of the snow or ice and track indoors like other products.



VIII. After the Storm



After snowstorms the City's snow plowing efforts will focus on the continuation of critical City services such as restoring utilities; and public safety emergency response capacities. Additionally, snow removal operations will be conducted in certain areas of the City if temperatures are expected to remain low or more snow is expected. Particular attention will be paid to the downtown and high volume commercial areas such as the Colorado Technical Center (CTC) and Centennial Valley. Other areas include locations in which heavy shading prevents melting and areas where the storm drainage system is entirely above ground. Crews will attempt to remove as much snow and ice as possible, it is important to note these efforts do not always result with bare pavement.

When the snow event is over, the Operations Manager will prepare a written review of the snow and ice control operations that will contain:

- Amount and cost of time and overtime hours for Public Works employees;
- Complete breakdown for equipment and cost (if necessary);
- Recommended additions and/or corrections to be made to the current Snow and Ice Removal Plan.

In addition to the above, begin the following procedures:

- Additional sanding as may be needed
- Cleaning of intersections as soon as possible
- Inspection of all equipment utilized during the storm
- Report needed equipment repairs
- Inventory stockpile of de-icing material
- Have a post-meeting if necessary with all employees to discuss possible improvements

Property Damage

During the course of operations throughout any given winter, a certain amount of damage to city and private property may be incurred by snow removal forces. The Public Works Operations / Park & Recreation Departments will repair damages as soon as the weather permits. If sod is damaged, the city will restore that area at the earliest availability of material. If a plow truck damages a mailbox, either through direct contact or due to the force of snow and ice rolling off the plow, the mailbox will be repaired or replaced. All personnel are required to report all damages to their Shift Supervisors. All property damage and accidents during snow removal operations will be handled in a manner that coincides with City policy. After damage or an accident is reported, the appropriate City staff will investigate per City policy.

Assistance to Motorists

Under no circumstances will a City employee be allowed to use a city owned vehicle to push, pull, or tow a stranded vehicle from a roadway or parking lot. The employee should notify his Shift Supervisor of any emergency situation encountered and the Shift Supervisor will notify the appropriate agency. Under no circumstances will a city employee use a city owned vehicle to perform snow removal operations on privately owned, commercial, or residential property.

Complaints

Plowing snow during a snow storm is a formidable task. The hours can be extremely long, with operations conducted during the most severe weather and driving conditions, generally at night with very limited visibility. We realize that during an operation of such size and complexity there are bound to be complaints or requests for additional service. Calls for service should be avoided early in a storm since it may take several hours for plows to make their way to your area. If after several hours, you feel that we may have missed your area, please call the City's Operations Division at **303-335 4750**.

The Operations Administrator will log your complaint and relay this information to the Operations Manager for a resolution.



IX. How Residents / Motorists Can Help



City of
Louisville

Clear snow from sidewalks as soon as possible, but not later than 24 hours after snow has ceased to fall.

This is to prevent the snow from turning into an icy hazard for pedestrians, or forcing them to walk in the street. Louisville Municipal Code (Chapter 12.16, Sec. 12.16.050) requires property owners to shovel their sidewalks no later than 24 hours from the end of the snow event.

Do not place snow removed from driveways or sidewalks onto the street.

Aim snow blowers into front yards away from sidewalks, the park strip and the street.



Ice and rocks, as well as powder snow are blown out many feet. This material can hit parked or passing cars, which can cause damage to those vehicles as well as possible

accidents. Also, snow blown onto the street will freeze and become a slick spot, which may easily cause accidents. Place snow, shoved into your driveways by snow plows, onto the area between your sidewalk and curb, the park strip; but, not into the street or gutter. Otherwise, if this pile of snow is shoved back into the street, it will freeze and become hidden by new snow. Then, when snowplows or other vehicles hit that pile of ice, they can be shoved back into the traffic lanes and can easily hit passing or parked cars. Also, placing this snow into the gutter will slow down or block drainage. Sidewalk snow removal should be deposited in your yard area, not on the street.

Volunteer your services – Snowbusters!

The City of Louisville oversees a volunteer help program; shoveling snow for elderly Louisville residents. We try to connect volunteers with someone who lives nearby. Snow removal from yards and sidewalks allows seniors to leave their homes safely. For further information – please contact the Parks and Recreation Department - Senior Service Resource Coordinator at **303-335-4919** to volunteer to become a *Snowbuster*.

Remove snow from around fire hydrants near your home. Help save lives and property!

Clear snow from around mailboxes

Sometimes snowplow crews cannot get snow plowed all the way to the curb or crews block the mailbox. Clearing the snow from your mailbox will help keep mail delivery vehicles from blocking traffic and help prevent accidents. If you have any questions, please call the Public Works Operations Department at **303-335-4750**.

Safe Driving Habits for Motorists

Sharing the road with snowplows can create special challenges for motorists. You can be better prepared by following a few simple tips when you encounter a snowplow:

- Be visible - keep headlights on at all times when travelling.
- Slow down and keep to the right. Snowplows in residential areas move at much slower speeds than other vehicles. On the highway, snowplows may travel as much as 45 mph. Operators also frequently stop to clean off their lights.
- Don't pass on the right hand side on undivided highways. Snow and debris exit the plow on the right and pose a severe hazard.
- Be cautious when approaching a snowplow from behind - plows may cause snow clouds that reduce visibility.
- Watch for the flashing blue lights on the back of these vehicles. These lights send a very intense, narrow band of light behind the snowplow that increases its visibility.
- Stay well back until the snowplow operator can safely pull over to let you pass. Drivers will turn off the de-icing spreader for passing vehicles whenever possible.



X. Winter Safety Tips

Winter Safety for Drivers

Winter driving poses its own inherent risks and dangers. Working in the worst winter weather and exposure to extreme cold temperatures often cannot be avoided. Exposure to the cold may cause hypothermia or frostbite.

Hypothermia occurs when core body temperature drops below the normal temperature of 98.6 degrees Fahrenheit. Also described as a time when the body cannot warm itself sufficiently.

Frostbite occurs when the fluids and tissues of the body begin to freeze. Toes, fingers, cheeks and the nose are very susceptible to frostbite. Because of the conditions in which operators work, it is very important to be aware of the symptoms of hypothermia and frostbite. It is also important to know how to prevent it from happening.

These are some of the symptoms of hypothermia, listed in order of occurrence:

<i>Shivering</i>	<i>Shivering stops</i>
<i>Slurred speech</i>	<i>Breathing becomes shallow</i>

<i>Stumbling</i>	<i>Pulse becomes faint</i>
<i>Confusion</i>	<i>Muscles are stiff</i>
<i>Deny they are cold</i>	<i>Heartbeat uneven</i>
<i>Become weak and tired</i>	<i>Unconsciousness</i>

These are the symptoms of frostbite:

<i>The skin turns red</i>
<i>Skin turns blotchy white, gray or yellow</i>
<i>Skin turns completely white and may blister</i>
<i>Body part feels cold, painful or numb</i>
<i>No feeling at all in the body part</i>

If you think someone is suffering from frostbite or hypothermia, bring him/her inside or to a shelter and call for help. While you are waiting for help, remove any wet clothing and wrap the victim in dry blankets/dry clothing. If he/she is suffering from hypothermia, gradually warm up the core body (THE CHEST - NOT the arms, legs, hands, or feet) with blankets. Do not put the victim next to a hot stove or heater. If they have frostbite, wrap the body part in a blanket or soak it in warm, NOT HOT, water. It is important that people suffering from hypothermia or frostbite are re-warmed properly.

The following tips should help to prevent hypothermia and frostbite.

Remember - Prevention is the best cure.

<i>Stay dry. Any moisture will cool the body 25 to 30 times faster than normal.</i>
<i>Dress in layers with a wind and water-resistant outer layer. Stay warm but do not sweat.</i>
<i>Make sure you have warm socks, gloves and a hat. Most heat is lost through the head.</i>
<i>Warm up, inside if you are chilled. Wiggle your toes and fingers. If they are numb, go inside and warm up.</i>
<i>Watch each other. People in the middle stages of hypothermia will deny they are cold.</i>
<i>Eat well - keeping the body warm takes a lot of energy.</i>

Avoid alcohol. If you are cold or if you will be exposed to the cold, do not drink alcohol and do not give alcohol to a victim of hypothermia. Alcohol will only hasten death from hypothermia.

Get enough rest. Fatigue will also hasten hypothermia.

Fatigue while winter driving can also take its toll on driver alertness. Try not to become drowsy and get out and walk around periodically or take a break. Opening the vehicle window a crack, allowing circulation may help keep you more alert. Also, make sure your vehicle is checked out and is in good mechanical condition before the winter season. Also, remember to drive defensively, you cannot tell what other drivers are going to do. If you do get into trouble while you are driving call for help and stay dry and find some shelter - like your vehicle. If you stay in your vehicle, conserve fuel and turn your engine off. If you feel that you must keep your engine running, roll your window down part way. Many people die every winter in Colorado because of the cold weather. Be safe and use common sense when you are driving during the winter.

XI. Questions & Answers for Residents Concerns



When will the City start snow or ice control operations?

The Public Works On-Call Crew, in conjunction with weather reports, field staff and police department observations will decide when to begin snow or ice control operations on a case by case basis. The criteria for those decisions are:

- *Weather forecasts & temperatures;*
- *Snow accumulation;*
- *Drifting of snow that causes problems for travel;*
- *Icy conditions which seriously affect travel; and*
- *Time of snowfall in relationship to heavy use of streets.*

What do you put on the streets to melt ice and snow?

The product we put on the street to melt ice and snow is called Ice Slicer®. Ice Slicer is naturally occurring complex chloride ice melter consisting of synergistic trace minerals plus sodium, magnesium, potassium, calcium chlorides and grit. Mined from ancient buried mineral deposits in central Utah, Ice Slicer is protected from the buildup of alkalis and pollutants. Thus, Ice Slicer is a very low corrosive ice melt. Due to its hard crystalline structure, Ice Slicer can provide immediate traction whenever applied. Some users refer to it as “dissolving sand” because it doesn’t leave high volumes of residues as it breaks down. With naturally occurring trace minerals and very low alkalinity, Ice Slicer is also less harmful to roadside vegetation. Ice Slicer’s natural brown color enables it to use the sun to provide additional melting power. It dissolves slowly and

stays on roadways longer to help prevent freezing of new snow or ice so it is more effective over a longer period of time than ordinary salt.

How does the City decide which streets get plowed?

Our first priority is to keep the main arterial streets open. We also ensure that we keep the access open to critical facilities such as the hospital and fire departments. Our second priority is to plow around schools and designated problem areas, such as problem hills and intersections. Other than hills and problem spots, we do not normally plow residential streets. For snow events over five inches the City will plow residential streets enough to make them passable.

Why doesn't the City plow residential streets?

The City will plow residential streets enough to make them passable after a major snow event. This may not take place for several days since all major streets must be cleared first. We do not routinely plow residential streets that are passable because of limited resources and the problem of where to put the snow. A windrow (a line of piled snow) along the side of the street blocks cars and driveways and takes much longer to melt when the weather warms. Windrows also make it difficult for residents to shovel off their driveways and sidewalks. The City uses smaller trucks with v-type plow blades on the residential streets which allows for improved maneuverability and the ability to create one lane of vehicle travel in and out of the neighborhoods.

How much does the City's Public Works Department spend on snow removal?

Every snow season is different based on intensity and duration of storm. Because of this it is difficult to forecast next year's storm season and budget for required resources to handle the storms. On average, the City of Louisville experiences 15 separate snow storms per year. The following are the costs for the 2013 - 2014 snow season.

1. *Labor - \$39,6637*
2. *Deicing and snow melt materials - \$54,807*
3. *Vehicle fuel - \$8,205*

The city has invested over \$950,000 in snow removal equipment that is needed to keep our streets, paved trails and public sidewalks passable during winter weather conditions.

Why doesn't the City purchase more equipment so they can plow residential streets?

Considering the relative few days that we have snow and the fact that it normally stays only a few days, it doesn't make economic sense to spend an additional several thousand dollars for the manpower and equipment to have this capability.

Why do you plow snow on my sidewalk after I have cleared it?

We realize this is very frustrating and apologize for the inconvenience. Our snow plow drivers are instructed to keep from getting snow on the sidewalks as much as possible. We try not to throw snow onto the sidewalk, but slowing down is not always the answer.

Slower means fewer roads that get plowed and sometimes the trucks lose traction at slower speeds and can't move the snow. However, with some streets, there is simply nowhere to put the snow other than over the curb and onto the attached sidewalk.



EMERGENCY CONTACTS

<i>Emergency</i>	911
<i>Public Works Operations (Monday thru Friday 7:00am – 3:30pm)</i>	303-335 4750
<i>Public Works Operations On-Call Cell Phone (24 Hours)</i>	303-489 2301
<i>Parks & Recreation Department On-Call Cell Phone</i>	720-641 3150
<i>Louisville Police Department</i>	303-651 8501
<i>Louisville Fire Department</i>	303-666 6595
<i>Boulder County Dispatch (Non-Emergency)</i>	303-441 4444
<i>Boulder County Sheriff's Department</i>	303-441 4605
<i>Colorado State Patrol</i>	303-790 4164
<i>Avista Adventist Hospital</i>	303-673 1000

<i>Boulder Valley School District</i>	303-447 1010
<i>Boulder County Road Maintenance</i>	303-441 3962
<i>Colorado Department of Transportation (CDOT)</i>	303-442 4382

Snow & Ice Removal Plan

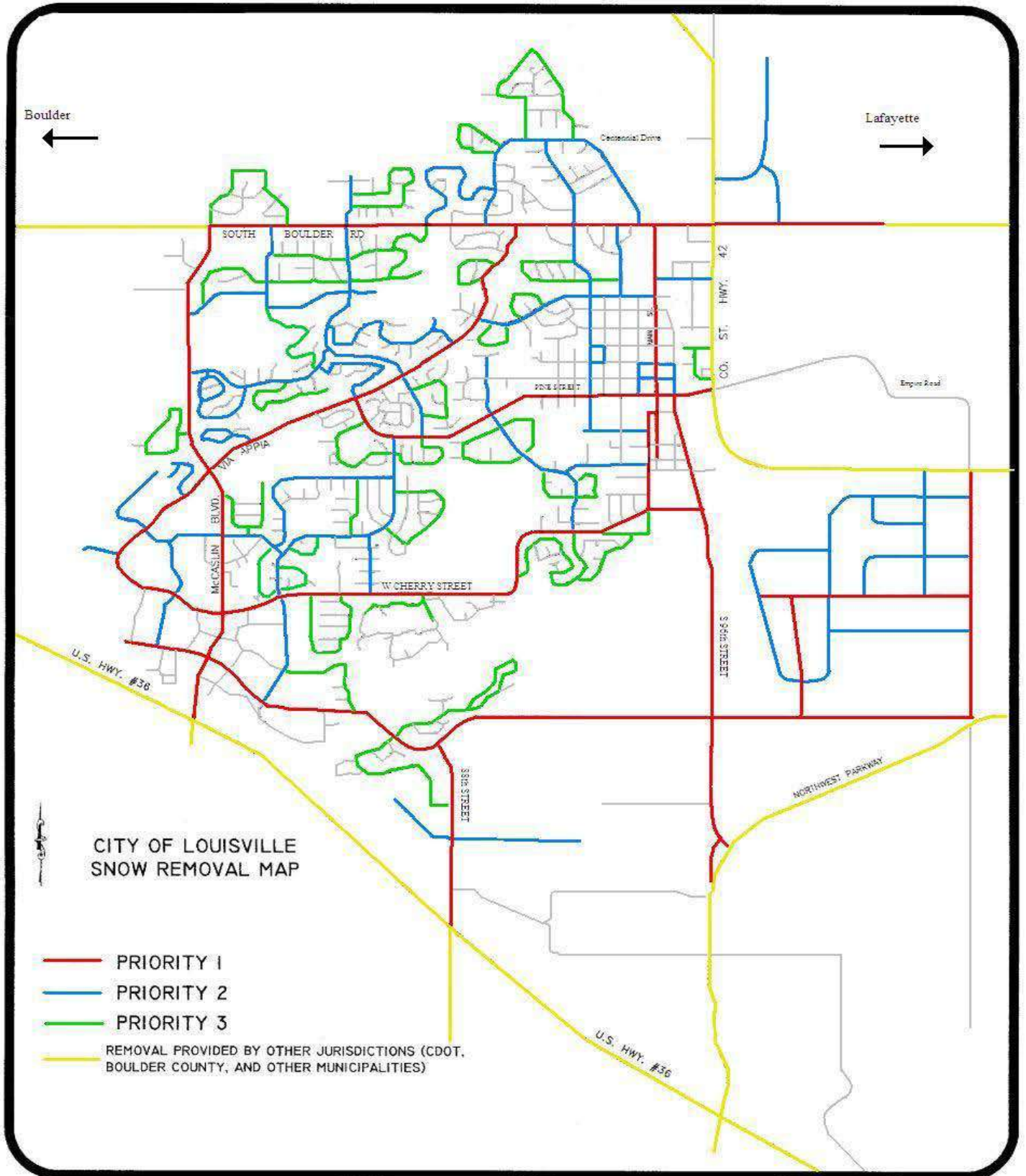
Snow & Ice Removal Plan



APPENDICES

- A. Snow Priority Map for Public Works Operations**
- B. Snow Removal Map for Parks & Recreation**

APPENDIX A Public Works Operations



Appendix B

2014 Parks Department Snow Removal Maps

