

CITY OF MILWAUKEE

Snow and Ice Control Policy

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This manual is intended to serve as a quick reference on ice control operations and snow plowing.

If you have any questions, please contact the Fleet Services Manager at 286-2549.

CITY OF MILWAUKEE SNOW AND ICE CONTROL POLICY

Public Safety is the number one priority when it comes to snow and ice control protocol established by the City of Milwaukee Department of Public Works (DPW). The Environmental Services Division coordinates and supervises snow and ice control operations on the City's over 1,400 miles of streets. Snow fighting equipment is maintained and dispatched by the DPW Fleet Services Division. Personnel from all four DPW divisions are involved in plowing operations.

The primary mission is to remove snow and ice as expeditiously and economically as possible to restore safe motorist and pedestrian travel, to minimize economic losses to the community and industry when workers are unable to get to or perform their jobs, and to facilitate Fire and Police Department responses to emergencies. Salt is applied at the minimum rate needed to achieve public safety.

The City's operational response is based on the severity of the storm. Snow and ice control operations vary in size from intermittent saltings of isolated slippery spots with one or two salt trucks to full scale plowings using over 360 pieces of equipment. The most common operation is a General Ice Control, in which 90 salt trucks are sent out, citywide and are supervised from the six sanitation districts.

All streets are prioritized for salting and snow plowing operations based on traffic volume, public transportation routes, and access to emergency services and schools. Both salt and plow routes are divided into "mains" and "districts". The mains, which are cleared first, are the major traffic and commercial streets. Secondary arterials are cleared after mains. During storms of long duration, plows concentrate on keeping main streets open. District streets, typically residential streets, are cleared last. The city does not plow alleys.

When a major storm occurs, a general plowing is called. It can take between 18 and 24 hours after snow stops falling to complete, depending on the severity of the storm. Snow operations will continue with cleanup such as clearing snow islands left by parked cars, touching up intersections and crossovers, and widening residential streets is finished.

Cleanup can last for several days after a storm. It is critical to clear streets to the greatest extent possible because plowed snow banks quickly harden. Streets narrowed by snow banks can restrict travel and reduce safety. Consequently, shoveled driveway approaches are sometimes unavoidably plowed in. When clearing their driveway approaches, residents should pile most of the snow to the side of the driveway away from the direction of traffic, usually to the right as you face the street. This will minimize the amount of snow pushed back into the driveway approach by a plow.

Because the same people who drive the snow plows operate the sidewalk and bus stop cleanup equipment, these operations begin after all street plowing is finished. City properties and hardship residents are plowed first, then crosswalks and alley openings. It takes three days to complete a sidewalk operation. The DPW Infrastructure Division is responsible for bus stop snow removal operations.

I. INTRODUCTION

Snow and ice control in the City of Milwaukee is the responsibility of the Department of Public Works (DPW). The Commissioner of Public Works has charged the Operations Division with the coordination and supervision all snow and ice control operations on Milwaukee's 1,415 miles of streets in accordance with Milwaukee's Snow and Ice Control Policy. Environmental Services managers receive and analyze storm alerts and warnings, decide the type and timing of operational responses, alert other Divisions and Environmental Services personnel, control all operations, and monitor conditions to guide DPW-wide strategy during full scale plowing operations.

All snow and ice control operations are considered emergency in nature because public safety is involved. Consequently, regardless of time of day or day of the week, the work is accomplished as expeditiously as possible. To achieve this level of readiness, DPW's long range planning and equipment preparation is coordinated by the Operations Division before each snow season. Short range operational planning and preparation is done by Environmental Services every time weather forecasts indicate a potential for adverse weather.

Advance preparation is often difficult because of the infinite variety of conditions that can occur during the long snow and ice season. The rate and accumulation of snowfall; moisture content; sleet, freezing rain or hail; temperature during and after the storm; wind velocity; time of day or night; day or days of the week; storm duration; and intervals between storms all interact to make each storm unique in many aspects.

To further complicate planning, despite the best forecast information available, meteorology is still an inexact science. Storm movements can be unpredictable. Sometimes we plow six inches of partly cloudy; sometimes we remove plow blades from trucks readied yesterday afternoon for a predicted overnight storm and resume normal DPW operations in the morning. Consequently, although advance storm planning is based on the most likely scenario, contingencies are also prepared for different responses.

Generally, the greater the snow accumulation, the greater the problem. However, a snow plan based on snow depth alone would be too simplistic to be effective. For example, a rapid rate of snow accumulation can close streets before plows get to them. High winds can quickly clog plowed streets with drifted snow, requiring repeated plowings. Heavy, wet snow is harder for plows to push than light, dry snow. Timing and temperature also cause adverse effects. A storm during a weekday rush hour is harder to combat than one on a weekend due to congested streets. A moderate snowfall on warm pavements may melt quickly when salted. However, a comparable snow storm during subzero weather may require plowing and applications of salt pre-wetted with liquid calcium chloride before satisfactory conditions are achieved.

All these factors should be considered when formulating snow and ice control operations and again when evaluating their effectiveness in minimizing a storm's impact on the community.

Because snow and ice storms in a city of Milwaukee's size require rapid, diverse responses with complex, large scale operations, all DPW divisions are involved with snow fighting to some degree. To achieve the inter-division coordination and rapid response necessary, considerable advance planning and organization is done by DPW.

When DPW is diverted to a large scale snow plowing operation, many normal department operations are suspended or cut back as equipment and personnel are reallocated to the snow fighting effort. This diversion is most noticeable in Sanitation's solid waste and recycling collections. A general plowing stops garbage and recycling collections completely because Sanitation's garbage and recycling packers form the backbone of the city's snow plow complement.

The media plays an important part in keeping the public up-to-date on affected services. The Department of Public Works Communication Manager alerts local newspapers, television and radio stations when a general plowing begins. In addition, Environmental Service managers and supervisors are frequently interviewed by the media during operations to update information. Media releases are prepared by the DPW Communications Manager in advance of the snow season. Spot announcements concerning the status of snow emergency work are made throughout major snow storms.

II. SNOW FIGHTERS

Two DPW sections, Environmental Services and Fleet Services, are involved in all snow and ice control operations.

A. Environmental Services (E.S.)

E.S. calls out and maintains operational control of snow and ice control operations for the City of Milwaukee. All snow and ice control responses operate from the city's six Sanitation Districts. Salt, plowing and sidewalk clearing equipment complements report directly to these districts for route assignment.

E.S. administrators, managers and supervisors are on duty 24-hours a day, seven days a week during the snow season on a six-week rotating basis. They are responsible for obtaining, analyzing, and acting on weather forecasts, alerts and surface sensor data.

E.S. is also responsible for calling out the 125+ Operation Driver Workers (ODW) needed for plowing operations. ODW's are the Sanitation employees who drive the garbage and recycling collection packers.

Sanitation's organization and snow and ice control responsibilities are detailed in Section III, Snow and Ice Control Operations.

B. Fleet Services (F.S.)

F.S. plays a critical role in the mobilization of personnel and equipment for both snow plowing and ice control as well as other emergency situations. Much of this responsibility is centralized in the section's dispatch office.

F.S. furnishes, services and maintains all city equipment required by E.S. to combat ice and/or snow storms. Because of the importance of this function, F.S. administrators are involved in the operational decision-making process when dealing with storms of long duration or larger magnitude.

F.S. also trains and furnishes truck drivers and equipment operators. The section is authorized by the State of Wisconsin to provide Commercial Drivers License (CDL) training and testing. F.S. also provides large scale maintenance support to keep the equipment on the streets in operating condition.

The section is further responsible for preparing contracts and specifications for acquiring the services of necessary snow fighting equipment including plows, endloaders, winch trucks, sidewalk plows, etc., from the private sector.

C. Forestry

Besides providing frontline snow and ice managers and supervisors, this section provides salt truck drivers for all General Ice Control and plowing operations. Snow plow route supervisors and progress coordinators are assigned to Sanitation during general plowing operations. In addition, Forestry attends to the City's trees damaged by ice, snow and wind.

When a snow storm warrants a full-scale general plowing of all city streets, the five other DPW divisions are called into the operation to assist Sanitation. The divisions and their responsibilities are:

D. Infrastructure, Streets and Bridges (S & B)

S & B also provides E.S. with snow plow route supervisors, progress coordinators and drivers for general plowings.

To ensure that snow plow routes remain accurate, S.B. also provides E.S. with parking regulation changes whenever they are approved by the Common Council.

S & B is responsible for clearing snow from the walk areas of buildings and bridges under its jurisdiction. In addition, B & B workers shovel walk areas too narrow for mechanized equipment.

E. Infrastructure - Support

This section provides E.S. with snow supervisors, progress coordinators, and drivers for general plowings.

Infrastructure Support is also responsible for snow removal from bus stop loading areas, key intersections, and along the curb lines of critical streets identified by S & Bas requiring widening.

F. Infrastructure, Engineering

The Engineering Section contributes to the snow fighting effort by providing plow route supervisors and progress coordinators for general plowings. The Section also provides Sanitation with lists of new street construction or other changes, which may affect snow plow routing or de-icing chemical application.

G. Water

The Water Works provides plow route supervisors and progress coordinators to Sanitation during general plowings. The division also responds to water breaks 24-hours a day.

H. Administration, Parking

Arranges for towing of illegally parked vehicles interfering with snow and ice operations.

I. All DPW Divisions

To ensure that the City has an adequate pool of snow plow drivers, all laboring positions hired by the Department of Public Works must obtain Commercial Drivers License (CDL) and complete snow plow training conducted by F.S. These workers augment F.S. drivers and operation driver workers during snow and ice control operations.

III. SNOW AND ICE CONTROL OPERATIONS

A. Weather Information

Detailed weather forecast and condition information is critical for effective snow and ice control. Weather forecasting is the triggering mechanism for operational responses to adverse winter weather. One of six Operations Division Managers, who rotate snow duty on a weekly basis, is available at all times, day or night, weekdays, weekends, and holidays to receive weather information and alerts from the city's consulting meteorologists. Detailed forecast information is received by phone, fax, and on a computer dedicated to weather forecast and current condition information at E.S. headquarters. The Duty Manager also has computer access to this information 24-hours a day.

Sanitation contracts with Murray and Trettel (M & T) of Northfield, IL and Surface Systems, Inc. (SSI) of St. Louis, MO for weather alerts whenever necessary 24-hours a day. These alerts are designed to provide Sanitation the information and lead time necessary to respond. M & T has provided this service to Milwaukee since 1954. Surface Systems, Inc. provides three weather forecasts daily via Sanitation's weather computer and maintains the city's surface sensor system. Appendix 1 contains examples of the formats and types of weather information that Sanitation receives.

Milwaukee has access to State of Wisconsin Department of Transportation surface. The city is also part of the State of Wisconsin's sensor network. All network sensors can be accessed for weather information. These instruments collect pavement surface temperature, pavement surface status, air temperature, relative humidity, dew point, wind and speed direction, current precipitation status and chemical factor data. They can also record changes in these factors over time. (Appendix 2) Environmental Services uses the Sixth Street Bridge sensor frequently to monitor conditions. Surface sensor locations are mapped in Appendix 3. Satellite pictures and radar displays received on the weather computer through a link to SSI are also used to track storm movements over time.

In addition to M & T and SSI, E.S. routinely contacts the National Weather Service Office in Sullivan, WI for weather forecast information. Local media forecasts are also monitored.

B. Ice Control

The first step in fighting any snow storm is the spreading of salt or salt treated with liquid calcium chloride on arterials that carry heavy traffic volumes. The goal is to return arterial driving lanes to a bare pavement condition. To minimize

environmental impacts, salt is applied at the minimum rate needed to restore public safety.

When all major arterials and collector streets have been completed, residential streets are treated with a reduced amount of salt. A quick return to bare pavement conditions is not needed on side streets to preserve public safety. When residential streets are salted one pass is made down the center of the road, placing the material on the crown of the roadway. This procedure minimizes salt usage because two lanes of roadway are treated simultaneously. It also reduces the amount of time it takes to complete the operation.

To help ensure proper application rates, all city truck mounted salt spreaders carry microprocessor-based salt spreading controls which automatically and almost instantaneously adjust the salt spread rate to changes in truck speed. These controls make it possible to apply salt uniformly and accurately in urban stop and go traffic.

Rock salt (NaCl) is the most widely used de-icing agent in the United States because of its cost and effectiveness. With favorable temperatures above about 25 degrees, salt can melt several inches of snow and will prevent or reduce the bonding of compacted snow to the pavement surface. This insures a cleaner job should plowing later become necessary.

Salt is less effective at temperatures below 25 degrees and/or when traffic volumes are too light to activate the chemicals. For lower temperatures, a 32% solution of liquid calcium chloride is used to pre-wet the salt. The calcium chloride reacts with the salt to create effective melting at temperatures below those at which normal rock salt alone is effective.

Treating salt with liquid can be beneficial at higher temperatures also. The melting action starts immediately and the salt granules have less of a tendency to bounce off to the side of the roadway. The general guideline for the use of liquid calcium chloride is:

1. Temperature 25 degrees or higher – not likely to fall below 25 degrees following the storm: no liquid calcium.
2. Temperature below 25 degrees or falling: Eight gallons per ton. In extremely cold weather conditions a 70-75% salt/25-30% sand mix is applied when abrasives are necessary to provide temporary traction.
 - a. Operational Organization

The City of Milwaukee is divided into six Sanitation districts (Appendix 4). Each of these districts has salt and liquid calcium storage. To reduce salt truck travel times there is also a

Northside "satellite" salt and liquid calcium chloride storage location. These locations and storage capacities are:

		Salt Tons	Liquid CaCl ₂ /g
North I	6732 N. Industrial Rd	10,000	6,000
North II	2931 W. Cameron Ave	4,400	6,400
Satellite I	7222 W Fond du Lac Ave	2,300	6,000
Central I	5230 W State	4,500	6,400
Central II	1600 N 14 th St	2,000	6,000
South I	2363 S 35 th St	10,000	6,000
South II	4031 S 6 th St	4,500	6,000
TOTAL CAPACITIES		37,700	42,800

Environmental Services has replaced its open salt storage sheds with enclosed salt storage building to increase storage capacities and ensure environmentally safe salt storage that meets DOT standards.

Each Sanitation Area is run by two District Managers who are assisted by 14 DPW supervisors. These 16 individuals rotate snow duty weekly with three persons on duty at all times and ready to respond as directed by the Duty Manager. When a plowing operation is required all supervisors work. The District Manager is responsible for devising and revising all snow and ice control routes in his/her district.

b. General Ice Control – Alert

It is the responsibility of the Duty Manager to monitor the weather. In addition to the forecasting methods mentioned previously, the F.S. duty dispatcher and the Police Department report "surprise" weather conditions and pavement problems to the Duty Manager during the night. Once weather information has been received and analyzed by the Duty Manager, he/she makes a decision on the proper course of action in consultation with one of DPW's administrators who

also rotate duty weeks. An E.S. patrol supervisor can be dispatched to check street conditions and report weather conditions during the night. The Duty Manager tries to avoid recommending an operation prematurely because each standby hour cost over \$5,000. It is also wise to have supervisors and operators as rested as possible at the start of an operation.

Regardless of whether the operation is called during working or non-working hours, the Duty Manager first notifies the F.S. dispatch office and orders an operational response. The most common is a General Ice Control in which 90 salt trucks are sent out citywide and are supervised from the six Sanitation districts. F.S. calls out the requested equipment and drivers and assigns each Sanitation district's complement of equipment. The Duty Manager then uses a tree alerting system to notify Sanitation personnel. Each district alerts their support personnel.

During a weekday operation, "A" team drivers from E.S. or F.S. are assigned to drive the 90 insert body salt trucks (or sensors as they are commonly called) used for a General Ice Control. These 90 drivers are called the "A Team" and are given pagers to ensure a timely response. They are called for all General Ice Controls during the work week. During extended operations the "A Team" is relieved by the "B Team", a group of Forestry and other DPW workers trained in salt truck operation. Two teams of salt truck drivers alternating in 12 hour shifts allow continuous around-the-clock operation whenever necessary to maintain or restore public safety.

The "A Team" drivers perform various tasks for their winter divisions when not driving snow equipment, i.e. supplementing solid waste collection crews, serving as the workers on bulky item collection trucks, and washing and performing light maintenance on spreader trucks. The seven endloader operators needed for an ice control work in F.S. during normal weekday operations. This system provides a quick initial response should an ice or snow emergency arise without much advance warning.

During the workday, the dispatch office activates each drivers' pager and notifies each section of the personnel needed. Each section ensures that all drivers have been contacted. During off duty hours the dispatch office contacts all required drivers and equipment operators.

On the weekend, the dispatch office is responsible for calling all the necessary drivers and equipment operators. The duty dispatcher calls the "A" team first and replacements form a list of volunteers. Should any jobs remain unfilled and this list is expended, employees are contacted by seniority in all DPW divisions until all the jobs are filled.

The operation alert sent by the Duty Manager to the District Managers contains a brief weather report of what is expected, and the amount of chemicals which are to be applied at the start of the operation. As conditions change, the Duty Manager updates the field

district offices as well as receives reports from them on the progress of the operation and existing conditions.

C. Types of Ice Control Operation

1. Incidental Salting Operation

This operation uses one or more F.S. equipment operators or drivers. They handle such things as water main breaks, isolated slippery spots, icy conditions at a fire site, or any other small ice control situation. During the work day each Sanitation district takes care of their trouble spots with their assigned drivers. Outside of normal working hours the dispatch office calls out operators as necessary. Salt trucks are parked at Central East for incidental salting operations. Problem reports from the Police and Fire Department, other division managers, or citizens are forwarded by the City Hall Switchboard to Sanitation during the work day and to the dispatch office after hours.

2. Bridge Operation

This operation uses 18 insert-body salt spreader trucks to treat all bridge overhangs and viaducts in one hour. When a Bridge Run alert is given, each district is responsible for their overhangs. The number of Bridge Run routes each district has varies between two and four based on the number of overhangs in each district. Each district provides one supervisor or district manager and one clerk.

3. Partial (or limited) Salting Operation

This operation uses a variable number of the insert-body salt spreader trucks to deal with spotty or localized problems. Each district garages an endloader and several salt trucks to ensure a quick response to these types of conditions.

4. General Ice Control (G.I.C.)

A complement of 90 insert-body salt spreader trucks are dispatched to the six Sanitation districts to treat main, collector and residential streets as needed. Trucks are assigned on the basis of miles of roadway. The number of trucks assigned to each district varies between 12 in South District 1 and 18 in Central District 2, which includes Milwaukee's downtown.

It takes approximately two hours to salt the main streets in the city. Side streets take about five hours to complete.

Snow plow blades may be attached to the insert-body trucks to address drifting conditions in open areas or to clear snow accumulations, which do not warrant a full scale

plowing, or declaration of a snow emergency. Typically, when accumulations of four or more inches are forecast, salt trucks will start plowing arterial driving lanes when two inches of snow have fallen additional equipment is often used when partial plowings are called for.

Approximately half of the salt trucks are currently equipped with underbody plows. These pieces can plow and salt even during congested rush hours.

Once a G.I.C. is called, the Duty Manager is responsible for city-wide operational control. Using weather reports, updated alerts, surface sensor and radar information, and input from the supervisors working the G.I.C. across the city, the Duty Manager must decide on appropriate chemical applications, routing priorities, reassigning equipment to meet localized needs, mounting plow blades, and ordering extra plow trucks or special equipment. Finally, the Duty Manager secures the operation when street conditions are satisfactory. A "G.I.C. Checklist" (Appendix 5) is used by the Duty Manager to track operational responses.

Each district is staffed with three supervisors, a Field Headquarters Clerk, and a yard worker. The supervisors are responsible for the district's operation. They supervise the district's salt trucks to ensure that all streets are treated properly, and reports progress and conditions in the district to the Duty Manager. The clerk remains in the office to maintain all records, calculate chemical usage for each sensor, maintain constant radio communication with all vehicles, and answer the telephones. The yard worker assists the supervisors with setting up each sensor for proper application and spread rates, expedites the loading of salt and calcium chloride, and mounts plow blades as necessary.

D. Salting and Plowing

Sometimes conditions are such that an ice control alone is not satisfactory but general plowing is unnecessary. For example, a salt application might melt an early spring 3 ½ inch snowfall from arterial traffic lanes but leave an unacceptable snow build up in the parking lanes and along the curb-line of side streets. A "limited plowing" might be appropriate under these circumstances to remove the snow buildup economically. Often, between 90 and 125 Sanitation garbage collection packers and enough special equipment to clear dead-ends and cul-de-sacs are added to the 90 salt trucks. Because only "curb cuts" are needed on many streets, this limited plow complement can clean the streets curb-to-curb in an acceptable time frame.

IV. SNOW PLOWING

A. Operator Training

Snow plow operator training takes place during a good portion of the entire year and is one of the major responsibilities of F.S. While there is no substitute for actually plowing snow, individuals receive training on the operation of the

equipment during the non-winter months. Remedial training is made available on an individualized basis if problems are identified by field supervisors or driving instructors. All employees trained as snow plow drivers also receive a copy of the city's "Snow Plow Driver's Manual". The manual contains the policies, practices, and procedures that should be followed by all personnel operating snow plows. Several different categories of drivers are trained:

1. Regular F.S. Equipment Operators and Operation Driver Workers
2. Sanitation Operation Driver Workers
3. All Department of Public Works workers who were hired since 1984

These are approximately 600 people available to operate city owned plowing equipment.

B. Plow Route Supervisor and Progress Coordinator Training

Plow route supervisors and progress coordinators from other DPW divisions are assigned to a specific Sanitation district for the entire snow season. This continuity allows them to become familiar with the district and their routes.

Every October a half-day training session is held at each district for the assigned supervisors and progress coordinators. Routes, procedures, priorities, and paperwork are covered and the District Manager explains how and why things will be handled during a plowing. Each person also gets a copy of the "Snow Plow Driver's Manual."

C. Full Scale Plowing

Full scale plowing operations generally do not commence unless snow accumulations measure more than four inches and snow is continuing to fall and/pr weather forecasts call for additional accumulations of four or more inches.

Depending on the severity of the storm, it takes between 18 and 24 hours after snow stops falling to complete a general plowing on all 1,415 miles of streets. Salting and snow plowing operations are frequently conducted concurrently.

D. Snow Emergency

When snow accumulations warrant the Commissioner of Public Works can declare a snow emergency. This authorization is contained in a s. 101-26, City of Milwaukee Code of Ordinances. The declaration of a snow emergency automatically puts into effect snow emergency parking regulations.

During a "Snow Emergency" no parking is allowed on arterials, bus lines, or through highways from 11:00 P.M. until 6:00 A.M. Vehicles parked on streets designated as "Snow Route Tow-away Zones" or that are obstructing traffic will be towed. Other posted parking restrictions must be obeyed.

E. Plowing Equipment

Appendix 6, a "Plow Equipment/Progress Report" form, contains a listing of all equipment assigned for a general plowing including contract vehicles. The 395 piece front line complement is composed of 90 salt trucks, 163 garbage and recycling packers, 67 pieces of private contract equipment, and 75 other pieces of city equipment. All City garbage and recyclables collection vehicles are equipped to plow snow. F.S. dispatches this complement from the dispatch office. The city owns 437 pieces of snow-fighting equipment.

Each Sanitation district calls its regularly assigned ODW's. After the districts have completed their call-outs, F.S. headquarters makes replacements as necessary to ensure that each district's complement is filled.

The F.S. equipment is matched up with operators via a computerized dispatch system developed by F.S. and run by the dispatch office. The system is updated on a daily basis so that all information regarding the status of equipment and availability of personnel is kept current during the entire snow season from November 15th to April 15th.

F. Operational Control and Communication

The E.S. "Snow Headquarters" is responsible for the overall control and coordination of the ice and snow fighting effort throughout the city. The Commissioner of Public Works, E.S. and F.S. administrators and the Duty Managers plan the operation including shift changes, contracting for additional equipment such as endloaders, and scheduling cleanup operations. Therefore, it is extremely important that the six E.S. Managers provide updated intelligence as necessary to provide "Snow Headquarters" with the information necessary to make operational decisions.

Because of the complexity of plowing operations and the necessity to retain continuity over extended periods of time E.S. administrators and Duty Managers work off a "DPW Plowing Plan" worksheet (Appendix 8) and a comprehensive snow and ice control binder called the "Snow Bible". Appendix 9 is the index from the "Snow Bible".

Regularly assigned supervisory vehicles and all snow equipment are radio equipped. Vehicle equipment numbers become call letters for the purposes of snow related communications. The Duty Manager again maintains operational control and is relieved as necessary by "backup" Duty Manager.

Each Sanitation District Manager is responsible for their district's snow and ice control operation within the operational framework established by Sanitation

“Snow Headquarters”. Each District Manager coordinates the plowing, makes route assignments, and maintains local control. They have the flexibility to respond to local conditions.

Districts must also report plowing progress, changing weather conditions, and other problems that affect the operation to “Snow Headquarters”.

E.S. supervisors are responsible for plow and special equipment routes in their districts. Two supervisors are initially kept in reserve to ensure continuity during round-the-clock, long duration operations.

In addition, personnel from the other six DPW snow fighting divisions used to augment E.S. supervision are called into the operation by “Snow Headquarters”. Emergency plow route supervisors and progress coordinators are assigned to Sanitation districts and work under the direction of the District Manager.

Plowing proceeds along predetermined prioritized snow plow routes within each Sanitation district. Routes are broken into two parts; mains and districts. Main streets are plowed first. District streets, typically residential with low traffic volumes, are plowed after the main streets. These routes list each street, line by line, in the sequential order in which it is to be plowed. Each route also includes a street map. (Appendix 10)

A “Snow Headquarters” progress coordinator receives plowing progress from each district and generates a detailed city-wide progress report every hour. The “Plow Equipment/Progress Report” includes main and district street progress for each Sanitation district, overall city progress, and the amount and type of equipment each district has working. (Appendix 6).

This report is provided to E.S. administrators, the Duty Manager, the Operations Director, the F.S. dispatch office and the Commissioner of Public Works. The report is used to assess progress, adjust overall and district equipment complements, and report operational conditions to the media.

Each of the six Sanitation districts has a progress coordinator to record the time equipment reports, its number and type, the name of each driver and operator, individual plow route progress, breakdown and repair status, and other pertinent operational information like accidents or streets unable to be plowed due to parked cars. Data on route progress and equipment availability is forwarded to the “Snow Headquarters” progress coordinator throughout a plowing operation.

As each route is completed, the equipment is moved to other routes until all routes in a district are completed. As districts are completed, the equipment may be retained and moved to another district or knocked off.

The following priorities apply to snow plowing operations in general:

- Priority 1: Open mass transit routes (includes now tow-away routes).
- Priority 2: Open main streets, arterials and fire lanes to through traffic.
- Priority 3: Open residential streets to through traffic (includes the clearing of dead-ends, cul-de-sacs and boulevard openings.
- Priority 4: Alternate side plowing and cleanup.
- Priority 5: Plowing of sidewalks, crosswalks and alley openings.
- Priority 6: Clearing of bus stops, parking meters, litter cans, etc. As warranted by snow accumulations:
- Priority 7: Snow removal – street and/or intersection widening.

G. Plow Assignments

The F.S. computerized dispatch system mentioned previously is utilized to bring as much uniformity to the snow plowing operation as possible. The computerized assignments are based on the location of an operator's daily assignment or home address to help assure familiarity with the section of the city her or she will be clearing snow in. Private contract equipment is assigned to individual Sanitation District on a seasonal basis to develop this familiarity. Each Sanitation District calls their regularly assigned Operation Driver Workers to ensure Sanitation assignment continuity.

The Sanitation District Managers then make all individual route assignments within their district. A District Manager attempts to place as many drivers as possible into neighborhoods for which they may have daily responsibility. For example, the drivers of the garbage packers are assigned to plow routes that coincide with the collection routes in which they are working on a regular weekly basis.

Ideally, each operator should return to the same truck and route for each snow plowing operation, barring his absence or the breakdown of the vehicle. This gives the driver an opportunity to become familiar with his assignment under good weather conditions. The assignment of contract vehicles is the only pre-emptor of the policy, since for reasons of ease of maintenance and travel time they are placed in districts located as near as possible to their company garages.

H. Plow Mounting

Snow plow mounting is facilitated by the use of a quick hitch arrangement installed on all snow plow vehicles. The plows used have hydraulic reversible blades, which allow the operator to automatically adjust the angle of the snow plow blade or raise and lower the blade from inside the cab of the vehicle.

Plow blades are stored in various locations around the city, usually at F.S. garage facilities or Sanitation district yards if space allows. Management personnel are

assigned to all major plow mounting locations not associated with a district facility to expedite the plow mounting operation and help troubleshoot should problems arise. They have the authority to expedite minor repairs in order to get trucks on the road as quickly as possible. In addition, these individuals provide all equipment operators and drivers with timesheets noting their official starting times. The Sanitation District closest to each consolidated parking location must provide sufficient workers to assist the snow plow drivers in mounting snow plow blades.

I. Plow Starting Times

Ideally, snow plowing operations commence during the evening hours after traffic volumes have decreased. However, the starting time of a plowing operation must remain flexible to react to each individual storm. Consequently, snow plowing operations start at any hour of the day or night.

Curb-to-curb daytime plowing operations may be seriously hampered by vehicular traffic and on-street parking in business and commercial areas and congested neighborhoods. In many residential areas, however, daytime plowing may be accomplished advantageously without too many curbside parking problems.

When a "Snow Emergency" is declared by the Commissioner of Public Works, the provisions of the city's "Snow Emergency Ordinance" prohibit the parking of cars on arterial highways or bus routes from 11:00 p.m. to 6 a.m.

J. Cleanup Operations

Following a major snow plowing operation, cleanup plowing continues on an as needed basis with a reduced complement of equipment. This cleanup operation addresses such things as the alternate side of residential streets where parking had been legal during the initial plowing effort, snow islands (mounds of snow left behind after cars which were plowed around have been dug out and moved), and touch up work to left and right turn lanes, boulevard crossovers and wind-rows at intersection corners.

The amount of equipment used for this operation and its duration varies depending on the severity of the storm and the amount of cleanup effort that will be needed. Typically, the salt trucks, contract private equipment, and special equipment continue to work on cleanup after a general plowing is completed. Garbage and recycling trucks and other city equipment are not used for cleanup operations so that Sanitation's and DPW's regular daily work can be resumed.

In areas with high density on street overnight parking, it may be necessary to use more equipment over a longer period of time in order to achieve results similar to where there is little on-street overnight parking. Cleanup operations continue until a satisfactory result is achieved.

K. Contract Equipment

The Department of Public Works uses 67 pieces of contract snowplowing equipment. This complement consists of 19 endloaders and 48 heavy plow trucks with plow hitches, blades, and the hydraulic package necessary to operate the blade. Contracts are awarded on a bid basis through the DPW General Office.

Contract equipment must report to its assigned Sanitation district within three hours of notification. The contracts also specify 24-hour a day operation. The combination of the 90 salt trucks with two shifts of drivers and the 48 contract plows gives Sanitation the capability of running at least 164 pieces of equipment 24 hours a day. Contract trucks are usually paired with a city vehicle for radio communication and route familiarity reasons.

In return for making the equipment and operators available on a three hour notice basis, contractors are paid a "standby rate" predetermined by bid, i.e., so many dollars per month. This not only assures them an income for the winters where there is below average snowfall, but also helps to amortize snow plowing equipment.

Before a contract is awarded, and annually each fall, F.S. inspects the contractor's equipment to make sure it meets the bid specifications, is licensed, and in good working order. Contractors must deposit a performance bond and are penalized by forfeiture of all or part of the monthly standby fee if they do not fulfill the contract. They are also required to have insurance and are responsible for any damages incurred by their operators. The contractor is also responsible for his own field repairs and fuel. Any down time is deducted from final payments made.

L. Towing Operations

Upon declaration of a "Snow Emergency", the DPW Parking Enforcement Office is also notified. A DPW towing coordinator is present in the field to act as liaison along with enforcement authorities and the tow trucks. He/she maintains radio contact with "Snow Headquarters" and the appropriate Sanitation districts. Enforcement begins as soon as possible after 11:00 p.m. The police tow desk designates the destinations for the snow tows. This towing operation continues until a higher priority towing is needed, i.e., cars impeding plow trucks or accidents.

M. Snow Parking

Most residential streets in Milwaukee have alternating side overnight parking restrictions. Some streets have one side parking and a section of the heavily congested east side has two side parking when snow is not present on the roadway.

1. One Side Parking

In specified areas of the city where roadway widths are 36 feet or less and there is a high population density, Traffic Engineering has installed one side no parking signs. Over 1900 blocks (roughly 20% of the city) are currently signed with some form of winter restriction. One side winter parking restrictions alleviate the problem of roadways becoming too narrow for snowplows to pass through safely when cars are parked on both sides of the street. On some streets the parking side is rotated on a monthly basis during the months of December, January, and February. The signs read: "NO PARKING DEC. & FEB." or "NO PARKING JAN". This allows for cleanup of snow accumulations at alternate times during the season. Most streets, however, have fixed one side parking from December 1st through March 1st.

2. Two Side Parking

A pilot program to test the feasibility of two side parking was instituted on the east side of Milwaukee near the University of Wisconsin-Milwaukee in 1989. Parking is limited to one side of the street in this neighborhood was insufficient to accommodate parking demand created by the combination of a high population density and the university.

Residential streets in the area wide enough to support two side parking are posted on one side with "NO PARKING AFTER FOUR INCHES OF SNOWFALL" signs. Once the snowfall accumulation has been cleared parking is again permissible on the posted side.

Although the "four inch" parking is intended to improve parking conditions in this area, illegally parked cars hinder plowing and cleanup operations during harsh winters.

N. Sidewalk Snow Plowing

According to ordinance, property owners are responsible for clearing ice or snow from walks intersection corners or crossing abutting their property within twenty-

four (24) hours after the cessation of the snowfall. This includes the crosswalk area for those residents with corner lots or those, which might contain a mid-block crosswalk. This will be enforced through E.S. Inspectors. The city is responsible for alley crossovers and other areas identified as belonging to the city. However, E.S. plows crosswalks, alley openings, and the public sidewalks on some city and private properties after a plowing operation. Sidewalks are plowed by mechanical equipment.

Because the same F.S. operators who drive the street snow equipment drive the sidewalk equipment, sidewalk clearing begins the day after a General Plowing is completed. The city has 39 pieces of sidewalk equipment. This complement is sometimes augmented by private equipment hired with service orders. A sidewalk clearing operation usually takes three days to complete.

The city has a sidewalk hardship exception policy for elderly or handicapped individuals for the removal of snow and ice from their public sidewalks. To be eligible for this service residents must certify that they and all other occupants in their house are senior citizens or handicapped and are physically unable to shovel the sidewalk. They also have to certify that they were unable to obtain the services of any other individual. An application, which is obtained by calling Sanitation, must be returned to the division with a doctor's certificate acknowledging the physical disability. A medical certification is not required from senior citizens. The cost for this service is assessed against the property at a rate prescribed by the Department of Public Works.

The owner of the property is also notified that he is still responsible for meeting the provisions of Chapter 6, Section 8 of the Milwaukee Code, which deals with sidewalk snow removal.

V. Snow Removal Operations

The City of Milwaukee does not normally remove and haul snow. It is plowed to the sides of roadways. There are three exceptions: bus stops, street widening required for public safety and rural type mailboxes when necessary to ensure mail delivery.

A. Bus Stops

The Street and Bridges Section clears snow from bus stops after a plowing operation. Snow is removed from the front door loading area only, except at transfer corners, signalized or all way stop intersections, and high movements stops such as schools, where the backdoor unloading area is also cleared. Endloaders are used when snow removal is not necessary. After moderate or heavy snowfalls, endloaders and dump trucks remove the snow as necessary.

The operation is initiated by the Commissioner of Public Works based on a recommendation from E. S.

B. Street Widening

Street widening operations, under the supervision of Street and Bridge Section and E.S., are also initiated by the Commissioner of Public Works based on field observations by E.S. and recommendations from the Traffic Engineer. These operations are only necessary after the plowed snow banks created by a succession snow storms have restricted streets to the point where travel is unsafe or parked cars will hinder or prevent emergency vehicle response on them.

The Traffic Engineer identifies and prioritizes those arterials, which need to be widened. Streets and Bridge Section then makes up snow removal routes and posts them with temporary "NO PARKING, SNOW REMOVAL", signs before each night's operation.

Snow removal crews generally consist of a Sno-Go (a large mechanized tractor-mounted snow blower), an endloader, and enough dump trucks to support each crew's loading operation. The dump trucks haul the snow to the city snow dump.

E.S. conducts street widening operations when snow removal is not necessary. Blocks are posed in advance with temporary "NO PARKING THIS SIDE" sign posts that are hammered into the snow banks. Endloaders than widen the streets and pile the snow where ever possible.

C. Mail Boxes

The Postal Service will not deliver mail to curbside rural-type mail boxes if the mail carrier has to step from his/her vehicle to reach the mail box, even if the resident has shoveled the box out. Sanitation uses endloaders and/or Sno-Gos to "shave" snow banks back around mail boxes to ensure mail delivery.

D. Snow Dump

The Sanitation Section operates one primary site near Lake Michigan where both private contractors and city forces can dump snow from removal operations. In addition, the section has worked with the Redevelopment Authority and the Department of City Development to identify "temporary dump sites" on vacant city-owned property should there be an extreme emergency and a need for additional dumping locations.

VI. Miscellaneous Responsibilities

A. Sandboxes

Sanitation places and maintains about 500 sandboxes throughout the City. A small amount of salt is mixed with the sand to prevent it from freezing inside the

boxes. Sandboxes are placed at hills, school crossings, crosswalks, underpasses, or busy intersections. Crossing guards, pedestrians, motorists, or police patrols use the sand to provide temporary traction until slippery conditions are addressed during a snow and ice control operation.

B. Snow Fencing

Each Fall Sanitation erects snow fencing in approximately 40 locations around the city to minimize the problems of blowing and drifting snow in large open areas. The fencing is taken down each spring.

C. Damage Complaints

Curb or lawn damage complaints caused by snow plows are investigated by Sanitation. Repair will not be authorized at city expense unless plow damage is verifiable. If justified, repairs are made by the Forestry and Street and Bridge Section in the spring. Repair costs are paid by Sanitation.

VII. Conclusion

The task of snow and ice control in a city the size of Milwaukee is a monumental one. It is only through the dedication of our Department of Public Works snowfighters, our contract equipment suppliers and operators, the support of our elected officials, and the cooperation of our citizens that Milwaukee has developed and retains a national reputation for expedient and professional snow and ice control.