



Montgomery County Government

MONTGOMERY COUNTY COUNCIL
OFFICE OF LEGISLATIVE OVERSIGHT

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TITLE

A Description and Evaluation of the County Government's Snow Removal and Ice Treatment Program.

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I. SUMMARY AND MAJOR CONCLUSIONS/RECOMMENDATIONS

1. The County government has a responsibility to respond to all emergencies, natural or man-made. The most frequent emergencies are those resulting from severe weather occurrences: electrical storms, high winds, flooding, winter storms, etc. Of the severe weather occurrences, the winter snow and ice storms are the most common. The primary responsibility of County Government during winter storms is to open the hundreds of miles of County maintained roads and streets so that vehicular traffic can operate safely over these transportation arteries.
2. Responsibility for planning, preparing and conducting snow removal and ice treatment operations for 1700 miles of County maintained roads rests with the Department of Transportation (DOT), specifically the Division of Operations. However, others conduct snow control operations in the County:
 - The State Highway Administration of the Maryland Department of Transportation, has responsibility for 360 miles of State maintained highways (Interstates 270 and 495, Routes 28, 355, etc.).
 - Each municipality and special taxing district makes arrangements for snow and ice control for approximately 240 miles of roadways within its respective jurisdiction.
 - The Maryland-National Capital Park and Planning Commission has responsibility for 15 miles of roadways in the lower County and for all access roads and internal roads in its parks.
 - The Montgomery County Public Schools is responsible for snow and ice removal on all roads and parking lots on their facilities.
3. This report examines the planning, preparation, coordination and operations of the DOT Division of Operations in carrying out the snow removal and ice treatment program.
4. The major conclusions/recommendations of this evaluation are:
 - The County government's snow removal and ice treatment program is executed in a highly effective manner by dedicated County employees of the Department of Transportation.
 - The County government's snow removal and ice treatment program lacks a written policy from Executive management; thus, the operating department has developed its own unwritten policy.
 - There is an opportunity to introduce specific operational changes which may reduce the annual cost of the snow removal and ice treatment program while maintaining an acceptable level of service.
 - Executive management, in cooperation with the County Council, should develop and publish a written policy on the snow removal and ice treatment program; the Division of Operations should examine specific operational changes to reduce the cost of the program while maintaining a level of service.

II. AUTHORITY, SCOPE AND METHODOLOGY

1. Authority. Council Resolution 9-1459, subject, FY 82 Work Program of the Office of Legislative Oversight, adopted September 15, 1981.

2. Scope. Examine the policies, procedures and operations of the County Government's snow removal and ice treatment program and determine by program evaluation the efficiency and effectiveness of this critical program.

3. Methodology. This examination was conducted in two phases: during the winter of 1981-82 to observe field operations during actual snow removal and ice treatment operations; and in the spring of 1982, with a review of documents, to include County laws, executive orders, regulations, procedures and reports. In addition, interviews were conducted with County employees, individual County residents, staff representatives of other departments and agencies which have a responsibility for snow removal and ice treatment in Montgomery County (Division of Parking, Maryland State Highway Administration, Montgomery County Public Schools, Maryland-National Capital Park and Planning Commission, Washington Suburban Sanitary Commission and the City of Rockville) and representatives of other major jurisdictions (Prince George's County, Maryland; Arlington and Fairfax Counties, Virginia; and the Virginia Department of Highways).

III. DESCRIPTION OF THE SNOW REMOVAL AND ICE TREATMENT PROGRAM

General

1. The County government has a responsibility to respond to all emergencies, natural or man-made. The most frequent emergencies are those resulting from severe weather occurrences: electrical storms, high winds, flooding, winter storms, etc. Of the severe weather occurrences, the winter snow and ice storms are the most common. The primary responsibility of County Government during winter storms is to open the hundreds of miles of County maintained roads and streets so that vehicular traffic can operate safely over these transportation arteries.

2. Responsibility for planning, preparing and conducting snow removal and ice treatment operations for County maintained roads rests with the Department of Transportation (DOT), specifically the Division of Operations. However, others conduct snow control operations in the County:

*The State Highway Administration of the Maryland Department of Transportation, has responsibility for snow removal and ice treatment on all State maintained highways (Interstates 270 and 495, Routes 28, 355, etc.).

*Each municipality and special taxing district makes arrangements for snow and ice control on roadways within its respective jurisdiction.

*The Maryland-National Capital Park and Planning Commission has snow and ice control responsibility for specific roadways in the lower County and for all access roads and internal roads in its parks.

*The Montgomery County Public Schools is responsible for snow and ice removal on all roads and parking lots on their facilities.

A breakdown of responsibility of County highways and roads is as follows:

<u>Agency</u>	<u>Roadway Miles</u>
Maryland State Highway Administration	360
Division of Operations, Montgomery County Department of Transportation	1,700
Maryland-National Capital Park and Planning Commission	15
Municipalities & Special Taxing	238
	<u>TOTAL 2,313*</u>

*(Note: In addition there are roads and streets in the County which are under private control (condominium complexes, roads yet to be accepted from the developer by DOT) or control by the Federal government (National Institute of Health, Army Map Service). Snow control on these roads and streets is the responsibility of the condominium association, developer, Federal agency, etc. However, under the Fire Safety Code, the County has the authority to require these roads and driveways to be clear of obstructions to include snow (Sec. 22-33 Montgomery County Code, 1972, as amended).

3. The above 2,313 miles are actual roadway miles. However, the lane miles which must be plowed and/or treated with chemicals and abrasives are much greater because many of the roads have more than one lane. While it is possible to apply chemicals and abrasives to cover a single lane of roadway and most subdivision streets in one "pass," it may require more than one "pass" to plow other roads or a subdivision street. An example, the 1700 miles of County maintained roadway actually represents over 6,700 "plow miles." The total number of "plow miles" within Montgomery County for agencies is estimated to be approximately 10,000 miles.

What is a Typical Winter Storm?

1. One difficulty in evaluating the snow removal operations is that there is no typical or standard winter storm. There are many variables which affect the severity of the winter storm, and consequently, the costs associated with snow removal by plowing and treatment with chemicals and abrasives. Among the variables are:

- Rate of snowfall (number of inches per hour)
- Total accumulation of snow (total number of inches per storm)
- Length of the storm
- Frequency of storms
- Temperature (especially freezing conditions)
- Density of snow (wet or dry)
- Wind (drifting)
- Time of day (normal vs rush hour)
- Day of week (workday vs weekend)
- Other weather conditions (snow in conjunction with rain, hail, fog, etc.).

2. The above variables complicate any attempt to use data such as the number of storms each season and the number of inches of accumulated snow to estimate the cost of snow control. Even in a year where there is a negligible accumulation of snow, there are costs associated with preparing for winter storms: hauling and stockpiling abrasives and chemicals, mounting snow plow frames, mounting and calibrating sand/salt spreaders, erecting and removing snow fence, filling and emplacing 600 sand barrels, and orienting, training and rehearsing crews.

3. Even within the Washington Metropolitan area, significant differences in winter storms are experienced. Although other jurisdictions were examined as a part of this evaluation, the varying characteristics of the storms coupled with the different operating procedures of each jurisdiction (some use cinders, others use sand, still others use neither cinders or sand), makes any meaningful cost comparison impossible.

County Policy on Snow/Ice Control

1. The goal of the snow removal and ice treatment program, as stated in the Division of Operations' budget, is "to keep vehicular traffic arteries open during storms." This appears to be the extent

of any written goal or policy relating to snow removal and ice treatment. Nowhere is there a written document addressing such policy issues as the level of service to be performed (e.g. bare pavement; salt/sand all roads and streets; salt/sand only major arteries and a specified number of subdivision streets; etc.) or the level of effort to be expended (e.g. all equipment committed until all roads and streets are cleared; clear only emergency routes; etc.).

2. The Montgomery County Code, 1972, as amended, contains three references to snow and ice emergencies:

*Sec. 31-6, authorizes the County Executive to designate important roads and streets as snow emergency routes on which driving and parking restrictions apply;

*Sec. 31-13, authorizes the County Executive to restrict parking to alternate sides of roads and streets to facilitate snow removal; and

*Sec. 49-24A, prohibits the accumulation of snow and ice on commercial and multi-family properties.

3. Nowhere in the County Code, or apparently in any other written policy document, is there an explicit assignment of snow removal and ice treatment responsibilities to the Department of Transportation (DOT). Nonetheless, the Department of Transportation's Division of Operations has had the implied responsibility for snow and ice control as an additional road maintenance function. It must be emphasized that the snow removal and ice treatment mission of DOT is an adjunct mission to that of highway maintenance.

Snow/Ice Control Procedures

1. General. Although there is no written policy on snow removal and ice treatment, the Division of Operations has developed unwritten policies on snow and ice emergencies and written detailed procedures to carry out these policies. The Division of Operations' Standing Operating Procedures for snow/ice emergencies are updated annually and cover the essential areas of planning, coordinating, preparing, training and rehearsals.

2. Planning. Planning for snow/ice emergencies is extensive and includes alert notification lists, designation of snow emergency and salt routes, assignment of vehicles and personnel to specific roads and streets, stockpiling of materials, and contracting with a Snow Warning Service (Accu-Weather).

3. Coordinating. The Division of Operations is responsible for snow removal and ice treatment on the 1,700 miles of County maintained roads and streets and the driveways and parking areas of over 50 County facilities. To accomplish this requires coordination with the following agencies and departments:

a) State Highway Administration. The State Highway Administration's Resident Maintenance Engineer for Montgomery County is responsible for snow and ice removal on all Interstate and State highways and ramps. There are a total of 360 miles of State maintained highways and 42 miles of ramps, which includes Interstates 270 and 495, Rockville Pike (Route 355), Georgia Avenue (Route 97), and other key arteries such as Connecticut and New Hampshire Avenues, University and Bradley Boulevards and River Road. Because most State highways and roads are multi-lane, snow control responsibility is approximately 1,200 lane miles.

b) Maryland-National Capital Park and Planning Commission. The Division of Parks is responsible for snow/ice control on 15 miles of roadway: Sligo Creek Parkway, Beach Drive, Little Falls Parkway and Carderock Springs Drive. The Commission uses its own personnel and vehicles to accomplish this task and purchases chemicals and abrasives from the County.

c) Montgomery County Public Schools. The MCPS' Division of Maintenance is responsible for all roads and parking lots on school property. Like M-NCPPC, chemicals and abrasives are purchased from the County.

d) Montgomery College. Montgomery College is responsible for all roads and parking lots on their three campuses using assigned maintenance vehicles. Chemicals and abrasives are obtained from the County.

e) Division of Parking. The Division of Parking is responsible for snow removal and ice treatment on its 40 lots and 11 garages. To accomplish this, the Division uses its own personnel and equipment and purchases abrasives (for parking lots) and sand (for garages) from the County.

f) Police and Fire/Rescue. Detailed coordination is accomplished with these two public safety departments to include procedures to be followed when diverting snow control vehicles to respond to life threatening situations.

g) Services Section. The Services Section (a sub-element of the DOT's Division of Operations) is responsible for plowing 85 miles of roadway and applying abrasives to hills and intersections within that 85 miles within the Suburban District. In addition, the Services Section is responsible for clearing and/or treating the driveways and parking lots of 17 County facilities within the Suburban District. Finally, when snow emergency conditions warrant, Services Section personnel clear cross walks and open drains in the three central business districts (Silver Spring, Bethesda, Wheaton) and relieve Highway Maintenance personnel and equipment assigned to snow removal routes within these districts.

h) Equipment Management Division. During the winter storm period the trucks used for plowing and spreading have the same high priority for repair and service as do public safety vehicles. The Equipment Management Division provides equipment maintenance and repair during snow emergencies by assigning maintenance teams to the four DOT depots, staffing mobile repair road teams, and staffing mechanics at the Seven Locks Equipment Maintenance garage.

i) Executive Management. The Office of the Chief Administrative Officer and the Information Office have responsibility for declaring a snow emergency and issuing the necessary bulletins to the news media.

4. Preparing. Before the arrival of the winter storm period, detailed preparations are made in anticipation of snow. In the past thirteen years (1970-1982) measurable snowfall has occurred every year except for the winter of 1972-73. In the other twelve years the number of storms have ranged from three (FY 74) to thirteen (FY 82). In the thirteen year period, there was an average of 7.4 and median of eight storms. In the same thirteen year period, the least snowfall was zero inches (FY 73) and the most was 42 inches (FY 79) with an average snowfall of 17.3 inches and a median snowfall 17 inches (see TABLE I).

TABLE I

No. of Storms and Snowfall (Inches)
For Winter Periods (FYs) 1970-1982)

<u>FY</u>	<u>No. of Storms</u>	<u>Inches</u>
70	9	26.50
71	8	19.00
72	6	13.00
73	0	0
74	3	17.00
75	4	12.50
76	5	9.50
77	7	12.90
78	11	26.75
79	12	42.30
80	8	17.50
81	10	4.50
82	13	24.00

Details on personnel, equipment and materials preparations, and information on the early warning weather service are outlined below; and the FY 82 breakdown of personnel, equipment and materials for the Division of Operations is at Exhibit A.

a) Personnel. Preparations include developing alert rosters; orienting drivers on routes; familiarization and rehearsal of drivers on the emergency and salt routes; and driver refresher training on safety and operational procedures.

b) Equipment. Plow frames and spreaders are mounted on trucks; spreaders are calibrated to dispense the desired pattern of salt and/or sand; emergency equipment and chains are placed on trucks; approximately 30 miles of snow fence is erected along roads in the upper County; over 600 sand barrels are emplaced; and rental service contracts for specialized equipment (e.g. graders and front loaders) are negotiated so as to be in place should the equipment be needed.

c) Materials. Ice treatment materials--salt (sodium chloride), sand and crushed stone--must be ordered, transported and stockpiled at the four main depots of DOT and sub-depots at Poolesville and Damascus. In the past, calcium chloride was also purchased and mixed with salt/sand to prevent the sand from freezing; however, because of the high cost of this product (currently \$160.00/ton) its use has been curtailed. Crushed stone and sand are stored in conventional bins; however, salt and salt/sand mixture requires special covered storage to protect it from freezing and to prevent any possibility of the salt polluting the soil.

d) Snow Warning Service. The County subscribes to Accu-Weather snow warning service. The most recent annual cost of this service is \$1,500. Accu-Weather provides 24 hours advanced storm alerts, 6-18 hour advanced storm warnings and continuous weather data during snow/ice storms, localized to the Montgomery County area.

5. Snow Emergency Routes. Section 31-6 of the County Code authorizes the County Executive to designate and mark important roads and streets as snow emergency routes. The designation is accomplished by an Executive Order which is published annually before the winter storm season. To operate a vehicle on a snow emergency route during a winter storm requires special snow tires or chains; and parking a vehicle on a snow emergency route during the period of snow emergency is prohibited.* The press release which announces the snow emergency refers to implementation of the "Snow Emergency Plan." In reality there is no written plan; it is simply a term which has come into use to indicate that the above driving and parking restrictions are in effect on the snow emergency routes. Because the snow emergency routes designated in the Executive Order apply only to County maintained roads and streets, announcement of a snow emergency and implementation of the "Snow Emergency Plan" does not apply to highways and roads maintained by the State or municipalities. The Maryland State Police is responsible for announcing snow emergency restrictions for State maintained highways; while municipalities such as Rockville do not formally declare a snow emergency.

*(Note: Declaration of a Snow Emergency also has an effect on taxicab rates. By Executive Order 33-79, Sept. 1, 1979, taxicab operators may charge an additional fee of \$1.00 per trip during the period of a declared Snow Emergency.)

6. Snow Control Routes. All County maintained roads and streets are included in one or more of the following three snow control categories: snow emergency routes, salt routes and plow routes.

a) Snow Emergency Routes. A total of 185 miles of County roads have been designated by Executive Order 2-81 as Snow Emergency Routes. These roads, with the addition of the State highways, constitute the main arteries of the County and are the first to be treated with chemicals and abrasives and/or plowed.

b) Salt Routes. A total of 338 miles of roads have been designated as salt routes, with some of the roads designated as snow emergency routes included in this category. In actual operations, salt routes are treated with chemicals and abrasives at the same time snow emergency routes are treated. When salt routes are treated, hills and intersections in subdivisions (and streets around schools on weekdays) are treated with sand.

c) Plow Routes. All County roads and subdivision streets are considered plow routes. Because plowing operations usually require more than one "pass," the 1,700 miles of County maintained roadway equate to approximately 6,700 "plow miles." Plowing is performed first on the snow emergency routes, then the additional roads and streets on the salt route category, and finally the remainder of the County maintained streets in the subdivisions are plowed.

Snow Control Operations

1. General. Snow control operations are performed by the DOT Division of Operations' Highway Maintenance Section with the assistance of elements of the Services Section (Suburban District). Operations are divided into four districts, one for each of the four DOT depots: Bethesda, Colesville, Gaithersburg and Silver Spring. Gaithersburg district has two sub-districts, Poolesville and Damascus. With the exception of occasionally renting specialized equipment (loaders, graders), the work of snow and ice removal is accomplished entirely with equipment and personnel assigned to the Division of Operations.

2. Storm Alert. Early notice of a winter storm often comes through the local news media. The first confirmed notification is in the form of a Storm Alert or Storm Warning from the weather service, Accu-Weather. Should the alert or warning come during non-duty hours, DOT Snow Patrols are dispatched in radio equipped vehicles to observe first hand the effects of the weather conditions on the roads. Police patrol vehicles also report to the Emergency Operations Center on road conditions. Notification during non-duty hours follows an alert notification plan which parallels the DOT Division of Operations' command chain. Should the storm alert/warning come during duty hours, notification is routine since Highway Maintenance and Services personnel are on duty at the various depots.

In addition to the Snow Patrols, other DOT personnel are notified: those who work in the DOT Snow Emergency Center, supervisors and work force leaders, salt and plow crews, and depot personnel who mix salt/sand and load the trucks.

If the snowfall is gradually building, spreader crews are called out to apply salt/sand to the Salt Routes (which includes the Snow Emergency Routes) and to sand intersections and hills. The overall direction of the spreader crews (and for plow crews if dispatched) is from the Snow Emergency Center located adjacent to the EOC in the County Office Building.

If the snow continues to fall and sufficient accumulation is expected to require removal of the snow, plow crews are called in and a decision is made on whether to declare a Snow Emergency. Only the County Executive has authority to declare a Snow Emergency; however, he has delegated that authority to the Chief Administrative Officer. Upon recommendation of the Director, Department of Transportation, the CAO or his designee decides the time when the "Snow Emergency Plan" is to be put into effect. The Information Office issues the appropriate public release to Washington Metropolitan area media and the Police are notified to start enforcing driving and parking regulations on the snow emergency routes. (It should be noted that the Maryland State Police makes a separate declaration of a snow emergency for Interstate and State highways. Historically, the State usually declares a snow emergency before the County's announcement.)

3. Spreading Operations. While the actual number varies according to weather conditions and equipment availability, approximately fifty spreader crews working about two hours are required to apply salt/sand on the snow emergency and salt routes. For one "pass" over all snow emergency and salt routes requires between 400 and 600 tons of salt/sand, again depending on the severity of the individual snow storm. After completion of the snow emergency and salt routes, hills and intersections are sanded. The application of chemicals and abrasives to all snow emergency and salt routes places most households in a subdivision within 2 or 3 blocks of a treated route.

4. Plowing Operations. All County maintained roads and streets are plowed in the following priority: snow emergency routes, salt routes, then the remaining subdivision roads and streets. Plowing normally does not begin until the depth of the snow is at least two inches. To complete plowing for all plow routes with one "pass" for a snow from 4-6 inches in depth requires over 90 crews working approximately eight hours. Spreading of chemicals and abrasives is usually terminated when plowing operations begin.

5. Personnel. Should a snow storm begin on a duty day, crews are able to return to their respective depots and load salt/sand and mount plows. Should the storm alert come at other than duty hours, crews are notified to report to the depot where their vehicles are

parked. If the storm was predicted, trucks would have been loaded, plows mounted and the crews put on a stand-by status at home. Crews on stand-by status are required to be near a phone and immediately available for work. Stand-by status is compensated at the rate of fifteen percent of the employee's regular hourly salary rate. When notified to report to duty for a snow emergency an employee's stand-by pay terminates and overtime pay of one and one half times the employee's regular hourly salary rate begins. If called back to work, an employee is guaranteed a minimum of three hours of overtime pay. Employees are compensated for travel time between home and depot; however, they are not provided meals or compensated for meals. As indicated in Exhibit A, approximately 375 personnel from the DOT Division of Operations were involved in the snow removal and ice treatment operation in the winter of 1981-82 (FY 82). These figures do not include support personnel from other elements of DOT (Director's Office, Equipment Division, Parking Division, etc.).

6. Equipment. As stated earlier, except for renting some specialized equipment, the entire snow and ice removal operation is done with organic DOT equipment purchased for the Highway Maintenance and Services Sections for their normally assigned missions: maintenance of roads, bridges, culverts and sidewalks; leaf collection, etc. At times, road maintenance equipment has been purchased with the snow removal mission in mind. Examples are heavy duty Oshkosh dump trucks to accomplish heavy plowing and a multi-purpose Uni-Mog vehicle which is used for plowing small courts and cul-de-sacs. All plow/spreader trucks, supervisory vehicles, support vehicles (maintenance) and depots are equipped with radios and are in a snow emergency radio net. That net is controlled from the Snow Emergency Center located next to the EOC in the County Office Building.

7. Materials. The initial step in snow removal is to treat the roadways with a salt and sand mixture. The usual mixture which is used on the Snow Emergency and Salt Routes is four parts salt (sodium chloride) to one part sand. In the past, some calcium chloride was added to this mixture to lower its freezing point. However, the escalating cost of calcium chloride has curtailed its use. When treating hills and intersections in subdivisions, the mixture is reversed: four parts sand and one part salt (to help prevent the sand from freezing). In the upper County, non-paved roads are treated with crushed stone because the use of salt/sand damages the road bed.

Chemicals and abrasives are dispersed by hydraulically operated rotary spreaders mounted on the back of dump trucks. The driver of the vehicle is able to adjust the amount of salt/sand being spread. Some other jurisdictions use a drop spreader which is towed by the truck. The drop spreader is probably more efficient in the use of chemicals/abrasives in that the material is dropped directly on the roadway and not thrown onto the sidewalks and against parked cars. However, a significant limitation of the drop spreader is that only one lane can be covered with each pass, whereas a rotary spreader can cover two lanes with one pass.

In addition to differences in the type snow control equipment which is used, jurisdictions in the Washington Metropolitan area differ in operating procedures and materials used to treat ice. For

example, the City of Rockville and Arlington County use only salt as they consider the benefits of mixing sand with the salt does not offset the later problems the sand creates (clogged storm drains, cars skidding on dry sand). The Maryland State Highway Administration uses cinders in place of sand because cinders are cheaper and, according to the Resident Maintenance Engineer, is a more effective abrasive. Prince Georges County also uses both sand and cinders. The Virginia State Highway Department uses salt before plowing and only sand after plowing.

As indicated at Exhibit A, the DOT depots have a capacity to stockpile over 14,000 tons of salt and 12,000 tons of sand. In addition to satisfying its own needs, Highway Maintenance provides salt/sand mixture to the Montgomery County Public Schools, the Maryland-National Capital Park and Planning Commission, Montgomery College and the Division of Parking.

At TABLE II is the usage of salt, sand and calcium chloride for FY 79-81.

TABLE II

Salt, Sand and Calcium Chloride
Usage in Tons for FY 79 - FY 82

<u>FY</u>	<u>Salt</u>	<u>Sand</u>	<u>Calcium Chloride</u>
1979	8,815	10,300	(unk)
1980	4,974	3,836	204
1981	3,382	4,636	204

Budget/Costs

1. General. The annual operating budget of the Department of Transportation's Division of Operations includes a separate activity titled, Snow, Ice, Wind and Rain Storm Emergencies. At Exhibit B are the cost data for fiscal years 1979 thru 1981 for that activity, with expenditures for wind and rain emergencies excluded. The exhibit also includes the number of snow storms and the snowfall in inches for the same three fiscal years.

2. An analysis of the cost data at Exhibit B for the three fiscal years indicates:

*For the three years, the average percentages of total expenditures by budget category was: Salaries and Wages, 57%; Materials, 25% and Motor Pool charges, 18%.

*For the three years, the most expensive operation was spreading chemicals and abrasives; the average percentage of total costs expended in spreading was 69%.

*Erecting and removing snow fences average approximately 10% of the annual expenditure.

*There is little or no correlation between the number of storms, the amount of snowfall and total expenditures (See TABLE III).

TABLE III

Cost of Snow Control Operations Per Storm and Per Inch of Snowfall, FY 79-81

<u>FY</u>	<u>Total Expenditure</u>	<u>No. Storms</u>	<u>Approx. Cost/Storm</u>	<u>Inches Snowfall</u>	<u>Approx Cost/Inch</u>
79	\$969,621	12	\$81,000	42.30	\$23,000
80	\$561,186	8	\$70,000	17.50	\$32,000
81	\$326,899	10	\$32,700	4.50	\$72,600

IV. EVALUATION OF THE SNOW REMOVAL AND ICE TREATMENT PROGRAM

General

1. The Division of Operations of the Department of Transportation has each year performed with dedication and responsibility the adjunct task of snow and ice removal. The County Council has on numerous occasions publicly recognized the commendable performance of the Highway Maintenance and Services Sections in keeping County roads and streets open and safe during winter storms. During the 1981-82 winter storm period this evaluator examined snow and ice removal operations. In this most recent winter season there were 13 storms with a total snowfall of 24 inches, considerably more than the thirteen year average of seven storms and 17 inches of snow. From personal observations and employee interviews it was quite apparent that the snow and ice removal operations were again accomplished in a highly effective manner.

2. Currently, direct costs do not appear to be a limiting factor in snow operations. At budget formulation sessions, when an estimate for snow removal and ice treatment is identified, the Council has usually appropriated a portion of that estimate. At the end of the fiscal year, when the actual direct costs for snow removal and ice treatment are known (salaries and wages, to include overtime, and operating expenses), the Council has usually honored either a transfer or a supplemental to cover

most or all of any end-of-year shortfall in funds. Some of the shortfall has also been made up by reductions in services elsewhere. When budgeting for snow control operations, the practice has been to have an optimistic approach for a "mild winter," and then to cover almost all actual costs incurred in removing snow and treating ice. For example, \$400,000 was budgeted for snow removal in FY 82. At the end of the fiscal year, a transfer of \$600,000 was necessary to cover most of the actual expenditure of over one million dollars.

Suggested Operational Changes

1. Discussed in this section of the report are suggested operational improvements which, I believe, would result in more efficient and economical snow and ice removal operations without seriously sacrificing the current effectiveness of the program.

2. Develop a written policy and plan on snow removal and ice treatment operations. Over the years, the Division of Operations has developed detailed written procedures for snow removal and ice treatment. The procedures are thorough and cover all the essential operational steps--assignments, routes, radio call signs, alert notification rosters, responsibilities, etc. However, because there is no written policy from the Office of the Executive on snow removal/ice treatment operations, the Division of Operations has had to establish its own unwritten policy, then develop its own goals and objectives, and then create written procedures to accomplish its self-imposed goals. The effect of such an arrangement is that it is difficult to evaluate the snow removal/ice treatment program against a specified policy. In this section of the report, I have outlined several suggested policy decisions to be made by top management to be carried out by the operating department.

a) Specific assignment of responsibility for snow control operations to the Department of Transportation.

b) The level of service to be provided for each category of County maintained roadway. A "bare pavement" policy requires a greater effort than a policy of only salting and sanding (salting operations are accomplished much faster than plowing).

c) The percentage of subdivision streets to be cleared and/or treated. Most of the adjacent jurisdictions have a policy which specifies the subdivision streets to be treated which will result in each household being a specific number of blocks from a treated street. In Rockville, the current policy is that every household be within one block of a chemically treated street. In Arlington County, the policy is that each household be within two blocks of a treated street.

d) A policy on the level of stockpiling materials, especially salt. Currently, DOT has the capacity to stockpile up to 14,300 tons of salt. This appears to be quite adequate in that the average annual usage by the Division of Operations for the four winters (FY's 79-82) has been 6,700 tons. In addition, DOT stored and sold salt to other County public agencies. At the end of the FY 82 winter storm season, DOT had 7,900 tons of salt in storage.

e) A written policy on the responsibilities of the other County departments and agencies in snow removal and ice treatment operations. That void is currently filled by the Division of Operations' detailed procedures which assigns responsibilities to other divisions and departments (Police, Fire/Rescue, Facilities and Services, Equipment Maintenance, etc.). Because the Montgomery County Public Schools, the Maryland-National-Capital Park and Planning Commission, and Montgomery College purchase chemicals and abrasives from DOT, there should be a policy on priorities in the event there is a shortage of chemicals and abrasives which has occurred in the past when the Chesapeake Bay froze and salt/sand barges were unable to bring in the supplies. In the absence of a written policy or agreement, there is nothing to prevent DOT from limiting or even cutting off the issue of chemicals and abrasives to these agencies.

f) Finally, there should be a written Snow Emergency Plan. Under current law (Section 21-6, Montgomery County Code), an Executive Order designating Snow Emergency Routes is published annually. The method of initiating the driving and parking restrictions on those Snow Emergency Routes is through a press release which is given wide distribution by the local media. Although the press release refers to the "Montgomery County Snow Emergency Plan," there is no such plan. It is quite possible that a policy on snow emergency could suffice for a "Snow Emergency Plan."

3. Consider the feasibility of the following actions to possibly reduce costs while maintaining an acceptable level of service.

a) Eliminate the second employee on spreading vehicles. Currently, salt and plow trucks are operated with a driver and either an assistant driver or a helper. The assignment of an additional person on the plow truck is justified for several reasons, a primary one being safety; in a snow storm, plowing operations are hazardous. In addition, the assistant serves as a guide for backing up; assists in keeping the driver alert; operates the plow on some trucks; reads the route maps and directs the driver; and, in extreme emergencies, an assistant who is a licensed driver and has been certified by Risk Management can operate the plow truck. However, the assignment of an additional person on the spreader truck may not be as critical. As indicated on the chart at Exhibit B, and discussed previously in this report, fifty-seven percent of the cost of snow and ice storm operations in FY 79 through FY 81 was in salaries and wages and, in the same three years, an average of 58% of salaries and wages was expended in spreading operations. While safety conditions are important, there are at least two operating conditions which support eliminating the additional employee in most spreading operations. First, each spreader truck is equipped with a radio which can communicate with the Snow Control Center and the supervisor's vehicle. Second, the many supervisors and workforce leaders have radio equipped vehicles to come to the aide of drivers during spreading/plowing operations.

b) Use of cinders instead of sand. The State of Maryland, Prince George's County, and other adjacent Maryland counties use cinders instead of sand. Cinders have several advantages over sand as an abrasive. First, they are more effective because of their odd size and coarse, irregular shape. While sand is an effective abrasive when actually on snow and ice, it can be a hazard after the snow and ice melts because sand on dry pavement may cause skidding. Second, the cost of a ton of cinders in this area is approximately half that of sand. The FY 82 cost for sand picked up at the vendor's location near College Park was \$4.80/ton; and for sand delivered to DOT depots: \$6.25 to \$7.20/ton, depending on the depot receiving the sand. Cinders picked up at the PEPCO plant near Dickerson are currently \$2.50/ton. In addition, because there is more volume to a ton of cinders than there is to a ton of sand, a ton of cinders can be spread over a longer section of road than a ton of sand.

The two apparent drawbacks to the use of cinders are logistics and aesthetics. The source of the cinders, the PEPCO plant near Dickerson, is a greater distance from the Highway Maintenance depots than College Park where sand is picked up. However, the hauling of cinders may be incorporated into another DOT hauling operation. The Department of Transportation currently transports approximately 2,000 truck loads of leaves from three lower County sites to a dump near Sugarland, which is south of Poolesville. The trucks return empty. It may be feasible for these trucks to return by way of Dickerson and pick up cinders. The question of aesthetics is more difficult. Cinders turn the snow and ice black and "dirty." However, Montgomery County is already coping with "dirty" snow in that the State spreads cinders on State Highways criss-crossing the County (Georgia, Wisconsin, Massachusetts, New Hampshire, and Connecticut Avenues, University Boulevard, River Road, etc.). I believe the use of cinders on County maintained roads and streets would not be aesthetically unacceptable, especially if the public were made aware of the cost savings in substituting cinders for sand.

In summary, the use of cinders may be feasible and cost effective as a substitute for sand, especially in operations in the upper and western portions of the County. Their use should at least be examined.

c) Eliminate Snow Fences. To retard drifting, approximately 30 miles of snow fence is erected each fall along roads in the Upper County area. In recent years, the fence has continued to be erected; however, as the fencing wears out, it is not being replaced. One reason for not replacing worn out fencing is the shortage of DOT personnel to install it. Another reason is that it is becoming more difficult to gain access to the private property on which the fence is erected. The average annual cost of erecting and removing snow fencing in FY 79 - FY 81 was almost \$50,000. If the snow fencing is going to be phased out, it would appear to be more cost effective to eliminate it now.

d) Establish a forum for the exchange of information with other agencies and jurisdictions on snow control operations. In preparing for snow removal and ice treatment operations, the Division of Operations coordinates with other departments and agencies. However, there does not appear to be any systematic exchange of snow control information and operating techniques with other agencies and jurisdictions. In discussing snow control programs with transportation officials for the States of Maryland and Virginia, Prince George's, Fairfax, and Arlington Counties, the City of Rockville, and other County and bi-County agencies, there was indicated a need and a desire for some forum to discuss common problems and exchange information on snow removal and ice control operations. Even within the County, there is little exchange of technical information on snow control operations between the Department of Transportation and the State Highway Administration's Resident Maintenance Engineer or between the County and other County agencies.

Department of Transportation personnel do attend an annual National Snow Conference sponsored by the American Public Works Association. However, attendance is quite limited by availability of travel funds. Within the area, a Metro Fleet Managers' Committee has been established which may provide an appropriate forum for the exchange of snow control information.

4. Continue purge of excess and obsolete snow removal equipment and spare parts. The Department of Finance's Division of Auditing completed a physical inventory of snow removal equipment (plows, spreaders, hydraulic plow mounts, etc.) and spare parts in which some obsolete and/or excess inventory was identified. The audit report was issued in January 1982, and initial indications are that the Department of Transportation is actively purging the inventory of unneeded snow removal equipment and spare parts.

V. OTHER MATTERS

1. In the course of this evaluation, several matters relating indirectly to the snow removal and ice treatment program were examined. These matters are presented in this section of the report.

2. Maintenance Management System. Beginning in FY 82, the Department of Transportation initiated a Maintenance Management System (MMS) in two operational subdivisions: Highway Maintenance Section and the Services Section. Under MMS each work activity will have a developed annual work program with set goals, finite resources and performance standards. Management will be able to evaluate actual work accomplishments (production) against these goals, resources and standards. With this management tool, management will be better able to improve scheduling, standardize crew size and work procedures, refine work standards and improve control over resources--all with the potential of improving productivity.

The Maintenance Management System currently monitors the major work activities associated with snow control operations: erection and removal of snow fences, applying chemicals and abrasives, plowing, handling materials and equipment preparation and clean up. At present the MMS is a manual operation but is scheduled to be computerized by mid FY 83.

3. Administrative Procedures relating to emergencies. Section 8 of the Montgomery County Administrative Procedures Manual has a series of administrative procedures relating to safety and emergencies. A review of the documents in that section indicates that many of the procedures have not been reviewed and updated in a timely manner. The Executive branch is currently reviewing the procedures relating to emergency evacuation of residents. In addition, a Division of Emergency Management Planning has been established in the Department of Fire and Rescue Services and the Chief Administrative Officer chairs an Emergency Management Group. These are positive steps toward revising emergency procedures.

One specific administrative procedure which requires attention is AP 8-3, Severe Weather Occurrences. As written, the AP does not include information relating to snow, ice, wind and rain storm emergencies. A revision of the Administrative Procedure could include information on a Snow Emergency Plan, which currently does not exist in any written form.

4. REACT and RACES. Two citizen organizations provide valuable assistance to County citizens during emergencies. One is the Radio Emergency Association Citizens Team (REACT) a group which relays road conditions and other vital information during emergencies over the CB radio channel. The other is the Radio Amature Civil Emergency Services (RACES), a citizen group which assists during emergencies by establishing communications on HAM radio frequencies. Both organizations operate under agreements with the Federal government. The major contributions of these two groups during snow emergencies is in relaying information on road conditions and vehicle accidents, and assisting in the 4-wheel drive vehicle plan. Under this plan, owners of 4-wheel drive vehicles volunteer to transport critical personnel in snow emergencies. During the 1979 Washington's Birthday snowstorm, RACES members with portable radios teamed with 4-wheel drive owners to provide transport for doctors, patients and others in critical need of transportation.

VI. CONCLUSIONS

1. The County government's snow removal and ice treatment program is executed in a highly effective manner by dedicated County employees of the Department of Transportation.

2. The County government's snow removal and ice treatment program lacks a written policy from Executive management; thus, the operating department has developed its own unwritten policy. Among the issues which should be included in a written policy are:

- assignment of specific responsibilities for snow control operations to the Department of Transportation;
- the level of service to be provided;
- the priority of service;
- material stockage levels;
- the specific operational responsibilities of each department of County government during winter storms; and
- a County Snow Emergency Plan.

3. There is an opportunity to introduce specific operational changes which may reduce the annual cost of the snow removal and ice treatment program while maintaining an acceptable level of service:

- eliminate the second employee on spreading vehicles;
- substitute cinders for sand as an abrasive; and
- eliminate snow fences.

4. Efforts should be directed at establishing a forum for the exchange of information on snow control operations with other agencies and jurisdictions.

5. Section 8 of the Administrative Procedures relating to emergencies is generally outdated and requires review and revision.

VII. RECOMMENDATIONS

It is recommended that:

1. Executive management, in cooperation with the County Council, develop and publish a written policy on the snow removal and ice treatment program;

2. Specific operational changes to reduce the cost of snow removal operations while maintaining an acceptable level of service be examined and, where feasible, adopted.

3. Section 8 of the Administrative Procedure be reviewed and revised.

VIII. AGENCY/DEPARTMENT COMMENTS AND OLO RESPONSE

M E M O R A N D U M

September 15, 1982

TO: Mr. Andrew Mansinne, Jr., Director
Office of Legislative Oversight

FROM: Robert W. Wilson, Chief Administrative Officer

SUBJECT: Office of Legislative Oversight Report 82-4,
Snow Removal and Ice Treatment Program

The Department of Transportation staff, Mr. Cichy and I have reviewed your draft report on the County's snow removal and ice treatment program. The conclusion that the snow and ice treatment program is effectively executed by dedicated employees of DOT is appreciated. The employees in the Division take pride in their operation and do provide one of the best operations in the metropolitan region.

The following general comments are made regarding your recommendations:

1. The recommendation to develop and publish a written policy on snow removal and ice treatment should be carefully evaluated by the Executive and County Council before proceeding. Inclusion, for example, of overly restrictive standards and procedures might seriously reduce the operational flexibility which the Department believes, by experience, is necessary for responding to the particular characteristics of each storm.
2. The specific operational changes to reduce the cost of snow removal and ice treatment will be analyzed and those considered feasible will be adopted if no adverse effect is realized on the present level of service or what might be later determined is an acceptable level of service. The extensive use of cinders in down County and mid-County subdivisions would seem to be partly a policy decision related to aesthetics that the Council might like to consider.
3. A review of Section 8 of the Administrative Procedures will be made and revisions made as necessary.
4. We agree on the exchange of ideas, etc., with surrounding jurisdictions and others throughout the counties. We have established a Metro Fleet Managers Committee and will investigate conducting a forum or seminar as soon as possible on snow operations.

There is also a National Snow Conference sponsored by the American Public Works Association conducted each year. We have attempted to attend every other year and/or when held locally.

In addition to these general reactions, the following detailed comments are offered with regard to your findings and recommendations on policy statements and operational changes:

Policy Statements

The statement that there is no written document setting forth the County's policy on snow removal and ice treatment describing a level of service from Executive Management is correct. However, DOT has developed guidelines that have been followed for many years. Precise detailed parameters such as "start plowing at two (2) inches of accumulation" can not always be adhered to. There is no typical winter storm. This, in itself, makes it difficult to equate snow removal operations for different types of storms or with other jurisdictions. The variables listed also make it difficult, it not impossible, to establish a specific policy that will always be capable of being followed.

Snow removal lends itself to a best effort approach. Mandating some written policy of plowing, e.g., at 2 inches, complete within 2 hours, raises questions of 2 inches where, what type of 2 inches (dry, wet, slush, ice), and could subject the County to liability if the standard is not met due to such things as equipment failures, congestion on State routes which prohibit movement of County equipment, and inability of employees to return to the depots.

At present, backup equipment, through budget reductions, has been eliminated from present operations. Mandating a specific level of service would require expenditures for back-up equipment, leasing or contracting if available.

The following comments are submitted on the specific issues recommended to be included in a written policy.

- A) Level of Service to be Provided - The level of service, as with priorities, has been established over the years. The level of service is greatly dependent upon available funds. Recent reductions in the personnel complement and operating funds have reduced the number of vehicles available for snow removal. The Highway Maintenance Section presently has only the number of units required to cover all existing plow routes. These routes have been increased in size over the past few years which increased the time to provide one clear path on all roadways.

The suggested example of level of service on Page 14(2-c) to specify the time to treat or clear each category of roadway is not considered feasible except as a possible guide, which is what we have now. The difference in each snow storm, such as type of snow, inches of accumulation, time of snow (rush hour or weekend, etc.) would affect the timing for clearing roads. Sometimes it may be even a day after a storm before a lane could be cleared as was the case in February 1979. Other times it could be accomplished in less than the normal time to cover a route (eight to ten hours).

- B) Priority of Service - The priority of treating arterials before subdivision streets has been accepted by Executive Management and the County Council. Each year there is program evaluation by top management, Chief Administrative Officer, Executive, and the Council in the budget review and analysis of any supplemental appropriations requested. If the program and level of service was not satisfactory to management, Executive, Council, and the general public, drastic changes in priorities and major operational procedures would have been made long ago or can be changed on an annual basis. In recent years the Executive and Council have opted to rely on a minimized appropriation preferring to approve a supplemental request if needed.
- C) Material Storage Levels - By the approval of the Capital Improvement Project No. 753388 - Highway Maintenance Depot Improvements in 1975, management and the County Council, in effect, approved the level of the stock of snow emergency materials. This project provided and still provides for the installation of material storage buildings at each Highway Maintenance Depot (a total of 13).

As the report states, there is a stock of 26,000 tons of salt/sand maintained by the Highway Maintenance Section. It also shows where over 19,000 tons were used in 1979. In 1977 before the stockpile was increased by construction of all of the approved storage buildings, the Chesapeake Bay froze and the metropolitan area as well as most of the East coast was without shipments of salt. The extreme low temperatures required frequent application of a salt/sand mixture to the roadway due to freezing. Montgomery County was one of very few jurisdictions which had any salt and, even then, had to curtail some applications to avoid complete depletion of stock which would have been disastrous if hit by additional heavy winter storms.

If someone can accurately predict winter storms then a more accurate determination of stock supplies of salt and sand can be made. Until then better safe than sorry!

- D) Specific Operational Responsibilities of Other Departments, Etc. - The responsibilities during snow emergencies of other County departments/divisions are assigned through the budget procedure by approval of funds in their budget for snow emergencies. The assignment of responsibilities within DOT is made by the Director so as to provide personnel and equipment to handle snow emergencies on parking lots, additional service in business districts and supply personnel and equipment maintenance personnel, etc., needed by the Highway Maintenance Section to cover all plow routes. A priority list of County facility parking lots and driveways to be plowed is reviewed and updated each year by the Department of Facilities and Services.

The assignment of responsibilities for snow emergencies, if any, to other County agencies is made by the County Council by approval of their budgets. These agencies, especially the Montgomery County Public Schools, determines what they will do and not do in the case of a snow emergency.

The limiting or cutting off materials such as salt and sand to other agencies outside County government in extreme cases is only recommended by the Division of Operations to the Director of the Department of Transportation who in turn makes recommendations to the Chief Administrative Officer or County Executive, who must approve any such action in the best interest to the entire County.

- E) Include County Snow Emergency Plan in Written Policy - If any change or development of a Snow Emergency Plan is required beyond the present written procedures, action can be taken to accomplish same. It may be advisable even to drop the word "plan" as policy and planning are not the same thing.

Introduce Operational Changes to Reduce Annual Cost of Snow Removal

The report lists a number of operational changes to reduce costs while still maintaining an acceptable level of service.

Our comments on the recommended changes are as follows:

- A) Eliminate the second employee on spreading vehicles: The prime reason for the second employee, when available (usually a Public Service Worker II and not an Equipment Operator) on each vehicle during snow emergency operations is for safety. However, for spreading operations only, we will consider the elimination of the second employee.
- B) Substitute Cinders for Sand as an Abrasive: The acceptance by local jurisdictions of the use of cinders is not as good as the report indicates. The cost to haul in equipment and labor is not considered as cost effective as it once was. This is based on contacts with representatives responsible for snow emergencies in surrounding counties and the State.

Montgomery County presently uses cinders in some districts where it is economically feasible to do so. As cinders are only available at PEPCO's Dickerson plant hauled on County trucks or rented equipment, an analysis of costs reveals that only in the Poolesville district is it cheaper to use cinders instead of sand. Hauling of cinders on County trucks removes vehicles and personnel needed for other duties.

To transport cinders on Services Section's vehicles hauling leaves to Sugarland Road would cause them to have to go out of their way to collect loads. There is only an average of six vehicles hauling leaves which takes from February to September to complete the transportation of 45,000+ cubic yards of leaves each year. To cause any delay by detouring these vehicles, which could only carry the same loads as a Highway Maintenance Section dump truck, could make it impossible to complete the task before the start of the leaf season on November 1st. Consideration is currently being given to the use of the Dickerson Composting Site for leaf disposal and transportation of leaves would be by contract in large tractor/trailer units. In addition the Executive has directed that all County agencies cut fuel consumption, adding additional mileage would not help meet this objective.

- C) Eliminate Snow Fence: The DOT has been decreasing the amount of snow fence installed each year due to opposition by property owners and lack of personnel. While it is possible to eliminate all snow fence, there are a number of locations in the Up-County areas that snow fence, from past experience, is important to be placed because of drifting in relatively light snowfalls.
- D) Establish Forum for Exchange Information: Montgomery County currently exchanges information informally but, as it was pointed out, other jurisdictions do things differently and have different priorities or levels of service. We will, however, attempt to formalize the exchange of information, perhaps under the auspices of COG.

Within the County, we have frequently furnished information to the Montgomery County Public Schools, incorporated areas within the County and anyone who has requested information.

We appreciate the opportunity to respond to your report and, as indicated above, will explore the possible implementation of your recommendations.

RWW: jr
cc: Mr. Cichy

FY 82 DOT DIVISION OF OPERATIONS
SNOW REMOVAL AND ICE TREATMENT PROGRAM
PERSONNEL, EQUIPMENT AND MATERIALS STORAGE

PERSONNEL, EQUIPMENT AND MATERIALS STORAGE									Comparison with
	DEPOTS					Total Hwy. Maint.	Services Section	Winter 1981-82 Total Div. of Operations	Winter 1979-80 Total Div. of Operations
	Both	C-ville	G-burg	Silver Spring	Pool Equip.				
PERSONNEL:									
Administrative Supervisors	8	6	13	6	-	33	9	42	43
Other Personnel ^{a)}	51	45	94	45	-	235	83	318	326
TOTAL PERSONNEL	59	51	107	51	-	276	98	374	381
SNOW MOVING EQUIPMENT:									
Trucks w/plow/spreaders	18	16	26	15	-	75	-	75	78
Trucks w/plow	1	-	8	-	-	9	7	16	17
Loader w/snowblower/plow	-	1	4	-	-	5	-	5	5
Loader w/plow	2	1	1	2	1	7	2	9	9
Grader	-	-	4	-	-	4	-	4	7
TOTAL SNOW MOVING EQUIPMENT	21	18	43	17	1	100	9	109	116
SUPPORTING EQUIPMENT:									
Auto - Administrative	-	-	-	-	-	2	2	4	4
Auto - Field	1	1	1	1	-	4	1	5	4
Pickups	8	4	11	5	1	29	9	38	45
Other Trucks	2	2	5	3	-	12	-	12	5
Bulldozer	-	-	1	-	-	1	-	1	1
Excavator	2	1	2	2	-	7	-	7	6
Loaders	-	-	-	-	-	0	-	0	1
Gas Truck	-	-	1	-	-	1	-	1	1
3/4 ton Truck w/gen.	-	-	1	-	-	1	-	1	1
TOTAL SUPPORTING EQUIPMENT	13	8	22	11	1	57	12	69	68
TOTAL EQUIPMENT	34	26	65	28	2	157	21	178	184
MATERIALS: (Stor. Cap.)^{c)}									
Salt	2000 T.	1400 T.	8900 T. ^{b)}	2000 T.	-	14300 T.	-	14300 T.	14300 T.
Calcium Chloride	-	-	100 T.	-	-	100 T.	-	100 T.	100 T.
Sand	2000 T.	1500 T.	6900 T. ^{b)}	2000 T.	-	12400 T.	-	12400 T.	12400 T.

a) Including watchman and office personnel.

b) 2400 T. Storage capacity at Poolesville and Damascus included in this total

c) Crushed stone is located at all depots.

(Source: DOT Division of Operations Snow and Ice Emergency Procedures)

A-1

EXHIBIT A

EXHIBIT A

FY 82 DOT DIVISION OF OPERATIONS

ACTUAL COST OF SNOW AND ICE STORM OPERATIONS BY ACTIVITY FISCAL YEARS 1979, 1980 and 1981

(Including No. of Storms and Snowfall in Inches)

Fiscal Year	No. of Storms ^{a)}	Inches of Snow ^{b)}	Activity	Actual Costs (% of total) FY Exp.			FY Total (\$)
				Salaries	Materials	Mtr. Pool/ Rental	
1979	12	42.30 ^{c)}	Snow Fence ^{d)}	\$ 43,806	\$ 261	\$ 9,616	\$ 53,683 (61)
			Spread Oper.	224,090	186,003	76,193	486,286 (501)
			Plow Oper.	344,085	8,053	77,514	429,652 (441)
			FY 79 Total (\$)	\$611,981 (631)	\$194,317 (201)	\$153,323 (171)	\$969,621 (1001)
1980	8	17.50	Snow Fence ^{d)}	\$ 42,827	\$ 218	\$ 10,326	\$ 53,371 (101)
			Spread Oper.	193,660	156,323	54,314	404,297 (721)
			Plow Oper.	85,595	637	17,286	103,518 (181)
			FY 80 Total (\$)	\$322,082 (571)	\$157,178 (281)	\$ 81,926 (151)	\$561,186 (1001)
1981	10	4.50	Snow Fence ^{d)}	\$ 32,102	\$ 133	\$ 10,190	\$ 42,425 (131)
			Spread. Oper.	126,950	91,831	58,795	277,576 (851)
			Plow Oper.	4,729	0	2,169	6,898 (21)
			FY 81 Total (\$)	\$163,781 (501)	\$ 91,964 (281)	\$ 71,154 (221)	\$326,899 (1001)

Notes: a) The median number of storms for the past 13 years (FY 70-FY 82) is 8; the average number of storms is 7.4.
b) The median amount of snowfall for the past 13 years (FY 70-FY 82) is 17 inches; the average snowfall is 17.3 inches.
c) Includes Washington Birthday snow storm of 27 inches.
d) Includes erection and removal of fences.

Source: FAM 301C Report--wind and rain storm costs not included)

EXHIBIT B

FY 82 DOT DIVISION OF OPERATIONS

SNOW REMOVAL AND ICE TREATMENT PROGRAM PERSONNEL AND EQUIPMENT ESTIMATED HOURLY OVERTIME COST

EMERGENCY PLAN	DEPOTS				TOTAL HWY. MAINT.	SERVICES SECTION	TOTAL DIV. OF OPERATIONS
	BETHESDA	COLESVILLE	GAITHERSBURG	SILVER SPRING			
1) Patrolling of County during snow warning using four Work Force Leaders:							
a. Labor (at time and one-half)	\$ 18.18	-	\$ 35.91	\$ 17.57	\$ 71.66		\$ 71.66
b. Equipment (pickup truck)	2.50	-	5.00	2.50	10.00		10.00
TOTAL - Plan #1	\$ 20.68		\$ 40.91	\$ 20.07	\$ 81.66		\$ 81.66
2) Emergency call from Police (requiring truck, spreader, driver and helper):							
a. Labor (at time and one-half)	\$ 28.10	\$ 27.17	\$ 56.11	\$ 28.43	\$ 139.81		\$ 139.81
b. Equipment (one truck w/spreader)	6.90	6.90	13.80	6.90	34.50		34.50
TOTAL - Plan #2	\$ 35.00	\$ 34.07	\$ 69.91	\$ 35.33	\$ 174.31		\$ 174.31
3) Two spreader crews in each district and one Supervisor:							
a. Labor (at time and one-half)	\$ 78.25	\$ 73.31	\$ 105.97	\$ 78.84	\$ 336.17		\$ 336.17
b. Equipment (10 trucks w/spreader and 4 sedans)	17.30	17.30	34.60	17.30	86.50		86.50
TOTAL - Plan #3	\$ 95.55	\$ 90.61	\$ 140.57	\$ 95.94	\$ 422.67		\$ 422.67
4) All spreader crews (56) for salt routes (including District Supervisor, one WFL, one Stock Clerk, two EO II's):							
a. Labor (at time and one-half)	\$ 432.31	\$ 348.03	\$ 635.12	\$ 362.46	\$1777.92		\$1777.92
b. Equipment (trucks w/spreaders, loaders, pickups, sedans)	121.20	97.20	188.40	106.80	513.60		513.60
TOTAL - Plan #4	\$ 553.51	\$ 445.23	\$ 823.52	\$ 469.26	\$2091.52		\$2091.52
5) Five spreader crews for unpaved roads in Gaithersburg (includes Supervisor, three WFL's, EO):							
a. Labor (at time and one-half)			\$ 214.41		\$ 214.41		\$ 214.41
b. Equipment (trucks w/spreader, loaders, pickups, sedans)			59.90		59.90		59.90
TOTAL - Plan #5			\$ 274.31		\$ 274.31		\$ 274.31
6) Entire Division on Emergency (including v-blades and snow blowers):							
a. Labor (at time and one-half)	\$ 683.58	\$ 570.13	\$1378.69	\$ 589.66	\$3222.06	\$1025.30	\$4247.36
b. Equipment	194.50	167.10	545.20	169.90	1076.70	144.00	1220.70
TOTAL - Plan #6	\$ 878.08	\$ 737.23	\$1923.89	\$ 759.56	\$4298.76	\$1169.30	\$5468.06

(Source: DOT Division of Operations Snow and Ice Emergency Procedures)

EXHIBIT C

C-1

EXHIBIT C

