



CITY OF CAMBRIDGE
INTEROFFICE CORRESPONDENCE

To : Robert W. Healy
City Manager

Date : March 2, 1984

From : Everett R. Kennedy *ERM*
Commissioner of Public Works

Reference

Subject : Council Order No. 7 - February 6, 1984 - Councillor Wolf
Re: Use of Salt for Snow and Ice Control

In regard to the use of salt (sodium chloride) for winter maintenance, I have taken the liberty of attaching a copy of a report dated 4-10-81, in which I outlined the general procedures in effect during winter conditions. This report should address the questions of methods, locations, amounts of materials etc.

The real question, that of acceptable substitute for salt, is under constant review by public works officials in snow belt communities. The alternatives include:

1. No use of chemicals
2. Mixtures of salt and aggregate
3. Straight salt
4. Straight sand (aggregate)
5. Use of other chemicals, i.e.,
calcium chloride, urea

The use of chemicals is essential to "bare pavement" conditions, which in turn allow unencumbered movement for both vehicles and pedestrians. Other chemicals, such as calcium chloride, can be used, but are cost prohibitive. The elimination of chemicals altogether has been tried, with disastrous results. The report indicates that a judicious use of materials with a watchful eye to locations where used and amounts necessary to achieve acceptable conditions, is the key to a sensible, effective winter maintenance program.

Attachment

RECEIVED
MAR 2 2 30 PM '84
OFFICE OF THE
CITY MANAGER

WINTER MAINTENANCE

I. INTRODUCTION

In order to understand the procedures of the city today a brief review should be made of the major conditions which effect the overall winter operation. A discussion will ensue involving the development of street priorities, the use of materials and the modernization of equipment. There are two major influences on the use of any chemicals for winter maintenance, these are equipment available and the procedures involved in using these pieces of equipment. The use of various types of chemicals has been tried throughout the northeast over the last decade, but essentially the two materials that are presently being used are salt, either rock or solar and sand.

II. EQUIPMENT

Since WW II winter maintenance has progressed from a hand spreading process from the tailgate of open trucks to the use of mechanical spreaders and more sophisticated plowing equipment. Mechanical spreaders have been used primarily during the last 15-10 years, the original spreading apparatus being powered by gasoline engines. During the past three years the city of Cambridge has changed all of its spreaders using gasoline engines to those utilizing hydraulic motors. This allows us a control of materials by use of sophisticated sensors and controls, so that a very definite rate of flow of pounds per lane mile can be utilized. The equipment that we are using today can effectively reduce the use of salt from 500 lbs. per lane mile to about 100 lbs. per lane mile. This decrease of materials has been reflected in our review of the last

four years and has resulted in a savings of as much as 50% in materials. From 9700 tons of salt during FY's 1978-79 to 3800 tons of salt in FY's 1980-81. A similar drastic cut has been made in the use of sand. As better equipment becomes available in future years a more scientific control can be made on the use of any kinds of chemicals or sand.

The mechanical difficulties with gasoline engines have been completely eliminated and during the past winter we have not had a single breakdown involving hydraulic equipment. Thus we have been able to maintain a more effective fleet without mechanical difficulties and provide a more uniform rate of application and lesser amounts of materials.

Coupled with the hydraulic equipment, we have underbody plows mounted between the front and rear wheels of the truck. These particular units clear snow away from the rear wheels and allow the use of less rock salt, a better penetration of remaining snow or ice on the streets and thus enabling the Department to maintain a cleaner pavement, particularly on arterial streets which necessarily handle large amounts of traffic particularly during commuting hours. It should be clearly understood that the combination of hydraulic spreading equipment and underbody plows contained on each of eight large units gives the city the most effective early storm control that is available today. Of course the city continues to use the so-called Bombardier plows for sidewalk activities and conventional plows, front-mounted, as required by heavier snowfall.

III. PROCEDURES

The city for several years has used a weather forecast service receiving information relating directly to the local area. Since weather conditions vary from East Cambridge to North Cambridge it is imperative that we receive information relating to Cambridge rather than any other more centralized area. This service has proved effective not only from the originating forecast but it also provides us with updated changes as necessary during the course of any given storm.

During the past two winters we have engaged in specific employee training by recognized leaders in winter maintenance including all levels of foremen who are responsible for winter operations and equipment operators. Each year these individual operators receive specific instruction in the use of all equipment particularly new types so that hopefully during the first storm of the season they will be well aware of the complete operation of all equipment. In addition, during each emergency period a strict review of mechanical equipment prior to and during actual storm conditions by working foremen specifically employed for this purpose.

In addition to actual storm periods equipment is available to take care of icing problems, particularly as related to fires and water breaks, and oil spills as occur throughout the city. All of this activity between storms works to maintain good road conditions.

The streets systems are divided into essentially two types, the primary or arterial streets which handle commuter traffic

particularly heavy during peak hours in the morning and in the afternoon, and which require essentially bare pavements. On these streets we use straight salt and control the amount necessary to maintain satisfactory conditions, particularly during the early part of any storm. On the other system of secondary or "side streets" the Department uses a mixture of salt and sand, approximately one part of salt to ten parts of sand. This enables us to provide some vehicular traction during the storm; in addition the salt will interact to help remove the snow during the plowing conditions. Around most of our schools and the watershed area around Fresh Pond we use essentially straight sand. Very little sand/salt mixture is used anywhere except in high traffic pedestrian areas such as the Common and during sanding operations the mixture is controlled to insure a minimum amount of salt being indiscreetly placed upon any grassy or tree areas. The Department has made every effort to restrict the use of salt around any vegetation, trees, shrubs, grass etc. to minimize "chemical kill"; foremen have been explicitly instructed to monitor sanding operations to insure that this policy is complied with by all employees. A historical practice of using straight salt in basins has been eliminated this winter.

IV. MATERIALS

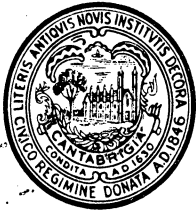
As previously mentioned salt that is used is sodium chloride with straight sand as a second material. Any other chemicals that could be used such as calcium chloride are too expensive and most of its use has been eliminated with the exception of some small areas such as building steps. All of our material storage takes place within three locations: Hampshire Street Yard, Sherman Street Yard and interior storage at the Sidney Street Garage. There is no runoff from chemical stockpiles which materially effect any part of the environment that we are presently aware of. The Department uses a strict record

system of loads of materials used, both sand and salt, to enable us to compare amounts used during varying storm conditions and to keep track of the specific amounts of materials being depleted from storage areas. This enables us to re-order materials as specifically required.

CONCLUSION

The use of chemicals is essential in urban areas to maintain adequate bare pavement to insure the health and safety of all residents; however, every effort will continue to be made to control and minimize chemical use to avoid unnecessary damage to the environment. We in the Department feel we have been working for sometime to improve our operations to the point where the public can be assured this goal will be attained. To reiterate the only introduction of any chemicals into our watershed area as far as we know takes place as a result of activities on RT. 128. There is no point within the system around Fresh Pond that any chemicals are introduced into the Fresh Pond water directly. The State has assured us that every effort will be made to control chemical applications within our watershed area and we feel that there has not been an appreciable growth in the amount of sodium chloride in our water due to any winter maintenance activities.

To recapitulate the position of the Department, we are continuing to strive to make improvements in equipment; chemical procedures to minimize the use of materials; to make every effort to insure the motoring public of the safe availability of our highways as quickly as possible, particularly during ~~the~~ the early part of any storm and during the cleanup period which inevitably follows.



CITY OF CAMBRIDGE

CAMBRIDGE, MASSACHUSETTS 02139

Tel. 498-9011

EXECUTIVE DEPARTMENT

ROBERT W. HEALY

City Manager

March 12, 1984

To the Honorable, the City Council:

With respect to City Council Order No. 7 of February 6,
1984 relative to the use of salt for snow and ice control, enclosed
please find copy of a report from the Commissioner of Public Works.

Very truly yours,

Robert W. Healy
City Manager

RWH/mbf
Enc.

SJ 544

Re: transmitting a report from the Public Works Dept. regarding the use of salt for snow & ice removal.

Sept 10/84
C. DeWay - Took up
the truck. Placed
ON FILE -

In City Council,

March 12, 1984

3/12/84

- ON MOTION OF COONVILLE
WOLF TABLED FOR ONE
WEEK -