New Hampshire Small MS4
Salt Reduction Plan
City of Dover, NH

EPA NPDES Permit Number NHR041000

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Section 1: Introduction:

This Salt Reduction Plan features BMPs to help reduce the amount of chloride discharging to the impaired waterbodies.

The City of Dover, performs a variety of maintenance activities to ensure safe winter driving conditions on its roads and parking lots as well as activates to limit the amount of snow and/or deicing chemicals entering surface waters. These are described in detail under Section 2 of this document.

The City of Dover also requires that private property owners track salt usage and develop plans to limit salt application. These are described in Section 3 of this document.

Section 2: Actions or Enhanced BMPs for Municipally Maintained Surfaces

This section applies directly to municipally owned and maintained surfaces. This section provides information on how the amount of salt used will be tracked and also includes the different BMPs that will be used as part of this Salt Reduction Plan.

Section 2.1: Salt Tracking

The City of Dover will track all salt applied to all municipally owned and maintained surfaces. Salt use will be reported to NHDES via the NHDES Annual Salt Usage Report Form.

Section 2.2: BMPs for Salt Reduction

This section describes BMPs to help to reduce the amount of chloride discharged to impaired waterbodies.

The City of Dover currently uses a number of activities related to winter maintenance and salt reduction which include the BMPs and actions items listed under the following sections.

Section 2.2.1 Operational BMPs:

A. Increasing Plowing Prior to De-Icing

The City of Dover currently does the following:

- As much snow as possible is removed using mechanical means like plowing, or shoveling before deicing agents are applied to reduce the need for road salt or other deicing chemicals.

Proper plowing of the road is essential to controlling the amount of deicer used. Snow plowing needs to remove as much snow as possible prior to the application of deicers. Snow and ice that is left on the pavement will only work to dilute the deicer that has been applied and decrease the effectiveness. Applying more deicer will have little benefit if the snow is not adhering to the pavement surface, when plowing is the appropriate operation. Therefor it is best to remove as much snow as possible from the roads and parking lots before applying deicers.

B. Roadway Anti-icing (Pre-treatment)

The City of Dover currently does the following:

- Designated roadway surfaces are pre-treated with anti-icing agents, such as brine, prior to precipitation to prevent the formation of bonded snow and ice to the roadway surface.

Anti-icing is a proactive approach to roadway winter maintenance and can be the first of a series of practices to manage roadways during a snow / ice storm. It differs from deicing procedures because brine is applied to the roadways before precipitation begins. The intent is to apply freezing point depressants before the storm to prevent the bond from forming between the roadway surface and snow or ice. Low sodium chloride brine is the most effective choice for ant-icing.

C. Monitoring of Road Surface Temperatures

The City of Dover currently does the following:

- Road surface temperatures are monitored during storm events to find the correct treatment options for those certain circumstances.
- Road salt is only applied when pavement temperatures are above 15° F.
- The NH Road Salt Application Rates for Deicing Roads and Parking Lots charts are used during each storm event to find the appropriate treatment options.

The two most critical factors that can produce winter road hazards are pavement temperature and the dew point/precipitation rate. Pavement temperature, not air temperature, is the deciding factor for treatment type and duration. The pavement temperature directly effects the formation, development, and breaking of a bond between fallen or compacted precipitation and the road surface. The pavement temperature also determines the effectiveness of any applied chemicals.

Section 2.2.2 Equipment BMPs / Modifications:

A. Automated Pre-Wetting Equipment Systems

The City of Dover will ensure that:

- Pre-wetting systems are installed on many existing and all new municipally owned salting trucks to pre-treat the de-icing agents before it is dispensed onto roads and parking lots.
- Contractors hired to assist City Operations during snow events do not apply any salt.

Pre-wetting is a term referring to a liquid deicer that is applied to a solid-based deicer in order to create a quicker reaction time for the solid deicer to begin melting snow and ice. Salt doesn't work until it is in solution, so it is recommended that all dry salt be pre-wetted regardless of the temperature. By introducing moisture into salt prior to application, the results are a quicker melting action, reduced bounce and scatter of material, and a reduced application rate. With a quicker melting action, the application rate of pre-wet salt can be decreased by approximately 20 percent over dry salt, which saves money, increases level of service, and reduces chloride in the environment. Pre-wetting systems or automated systems can help improve the pre-wetting operations during a storm.

B. Routine Calibration Rates & Adjustments

The City of Dover currently does the following:

- Equipment is calibrated yearly to reduce and optimize salt use and ensure deicing agents are being used efficiently.
- A calibration chart is maintained for each truck.
- Recalibration is completed if any service is done on a truck or the type of deicing chemical being dispensed from the truck is changed.

The goal of calibrating is to know how much material you are putting down on a roadway or parking lot for every setting on your truck that you use. Calibrating your equipment is the first step to reducing salt use.

During winter operations, changes may occur in mechanical linkages, hydraulic systems and other components. Yearly calibration of equipment allows for better control of application rates for various gate heights/openings. Gate heights or gate openings should be adjusted to spread the desired chemical application rate for each set of unique conditions. Recalibration should be done if any changes are made to the equipment or if a different deicing material is used.

C. Equipment Cleaning & Maintenance

The City of Dover currently does the following:

- Equipment is washed using proper procedures stated in the permittee's SWMP under MCM #6 to prevent pollutants from entering the stormwater system. Dry cleanup procedures are used when possible.

- Designated wash areas contain wash-water controls or treatment and ensure that all washing activities only occur in those locations.
- Equipment is regularly inspected and maintain to reduce the potential for leaks.

During winter operations, proper equipment cleaning and maintenance can help ensure equipment and machinery functions properly and maintains calibration measures for longer periods of time. This may require washing equipment on a more routine basis which can produce wash-water or runoff with higher levels of chloride or sand. For this reason, washing and maintenance procedures should be completed following carefully planned procedures and in proper locations.

Section 2.2.3 Facility Modifications and Good Housekeeping BMPs:

A. Snow Storage

The City of Dover ensures that:

- Snow is not pushed or dumped into waterbodies or wetlands, into stormwater drainage swales or ditches, or on top of catch basins.
- Snow is not stored near drinking water areas, waterbodies, or wetlands.
- Snow storage is not located in areas that are unstable, areas of potential erosion, or high points where snow may melt and collect debris as runoff before it enters the stormwater system.

Proper snow storage and good housekeeping can help reduce runoff and direct snowmelt from reaching nearby waterbodies and resources, which can minimize chloride loadings.

B. Salt Stockpile BMPs & Protection from Precipitation and Runoff:

The City of Dover ensures that:

- Deicing product(s) (salt, sand, or alternative products) storage piles are located under cover or enclosed areas and on impervious surfaces.
- Deicing product(s) (salt, sand, or alternative products) storage piles are stored in areas that will not impact surface water resources, groundwater resources, recharge areas, and wells. Salt operations run out of the Mast Road Facility are heavily monitored to ensure that no spillage occurs in the aquifer protection zone.
- The deicing product(s) (salt, sand, or alternative products) storage areas have adequate drainage controls to prevent runoff from entering the stormwater system.
- Appropriate loading and unloading procedures are used, such as not overfill trucks with deicing materials, to reduce the chances of spills.
- The unloading/loading of trucks is performed on impervious surfaces whenever possible.
- Storage/loading areas are frequently swept to reduce the amount of salt, sand, or other materials that are tracked out.
- Liquid deicing chemicals have secondary storage containment.

In addition to managing how salt is applied to parking lots and roadways, it is also important to manage how dry salt, pre-wet salt, salt brine, salt/sand mixtures, and snow piles are stored and handled.

Chloride storage facilities can contribute to both surface and ground water contamination. The location of a storage facility should not be in an area that is environmentally sensitive. Avoid areas where there are wells, reservoirs, or within the footprint of stratified drift aquifers. Ideally deicing material storage facilities should be completely enclosed, with storage and working areas on impervious surfaces such as asphalt or coated concrete. Buildings should have concrete foundations and can be designed using dome, barn, or fabric style structures.

Section 2.2.4 Training, Outreach & Regulations

A. Training and Certifications

The City of Dover currently does the following:

- Training has been provided in the past to municipal personnel through the Green SnowPro certification program that is managed by NHDES to improve efficiency in salt use. Note that the Green SnowPro program is not currently applicable to municipalities, so training has been suspended.
- Additional or independent in-house training is provided to municipal personnel to improve efficiency in salt use. All employees involved in snow removal activities are trained annually, and salt reduction strategies are highlighted at the annual snow meeting held at the beginning of every winter season.

The Green SnowPro certification is a program managed by NHDES to improve efficiency in salt use, such that the least amount of salt is used to ensure safe conditions on surfaces traveled by pedestrians and vehicles in winter conditions; reduce the amount of salt used by commercial applicators, as measured in tons of salt per acre per year, over time while maintaining safe conditions for pedestrians and vehicles in winter conditions; and establish a voluntary system for commercial salt applicators to track their salt use and provide information annually to the salt accounting system.

Training municipal personnel on best winter maintenance and salt reduction practices is the most effective practice you can employ to ensure your team is successful in reducing salt usage. There are a variety of viable options for training your team. Training is offered through the Green SnowPro Program and incorporates both a full course and a refresher course. The full course is a 4-hour course with an exam. The refresher course is 2 hours, and reviews basic practices, with a focus on certain aspects of salt reduction such as brine, calibration, and application rates.

Currently municipalities and other governing bodies are unable to be certified under this Program. During the 2020 New Hampshire legislation period, the NHDES proposed a bill to create and implement a municipal salt reduction and certification program. The legislation has been delayed.

B. Adoption of Guidelines for Application Rates for Roads and Parking Lots:

The City of Dover currently does the following:

- Guidelines have been adopted and embraced by the City of Dover Public Works/Highway Department in charge of snow removal operations.

The goal of winter operations is to maintain the specified level of service and safety to the public while using the minimum practical amount of deicer. Spreading rates and timing of application are decisions that need to be made based on variables in weather conditions. By adopting NHDES's application rates you can save money on salt usage and also help to reduce the amount of chloride ending up in your MS4's impaired waterbodies.

C. Designation of Low Salt and/or No Salt Zones:

The City of Dover, will ensure that all areas in and around the Mast Road Public Works Facility is designated a No Salt Zone. Additionally roads within 500 feet of waterbodies that are water quality limited for chloride are specifically pointed out to crews to reduce chloride loadings. See Appendix B for these locations.

D. Public Education:

The City of Dover provides public education covering the following outreach topics:

- Impacts of salt use;
- Methods to reduce salt use on private property;
- Modifications to driving behavior in winter weather;
- Any other educational information about salt/ winter maintenance;

Educating the public can also be a good way to help reduce the amount of chloride that ends up in the permittee's waterbodies. By educating the public on various chloride/winter related issues, they can reduce their salt use as well.

Section 2.3: Estimate of Annual Salt Usage Reductions

The City of Dover has estimated achieved salt reduction based on the BMPs listed in this Salt Reduction Plan and these estimates are summarized and totaled in the table below:

Estimated Salt Reduction Table	
BMP or Activity	**Estimated Salt Reduction Total per year per BMP**
Spreader Calibration	5-30%
Adapt Rates to Pavement Temperatures	5-10%
Pre-Wetting Salt	±5% (only 20% of fleet)
Anti-Icing (Brine)	±20%
Estimated Salt Reduction Total:	±40%

Section 2.4: Schedule of Planned Activities / BMPs

The City of Dover municipal operations is already implementing this Salt Reduction Plan. As new equipment is added to the snow removal fleet, pre-wetting devices will be included.

The City Staff will continue to work with private property owners to ensure salt reduction strategies are being implemented.

Section 3: Actions or Enhanced BMPs for Privately Maintained Facilities that Drain to the MS4

Section 3.1: Identification of Private Parking Lots

The City of Dover has completed the following identification methods in order to meet the requirements of the permit:

Section 3.2: Requirements for Private Parking Lots

The City of Dover has implemented requirements for winter maintenance and salt usage tracking of private parking lots through the following:

Section 3.3: New Development and Redevelopment

The City of Dover has incorporated to following into the Site Plan regulations for all New Development and Redevelopment projects:

Section153-14 (3) (a):

[6] Salt and other deicing materials shall be stored under cover or located such that no direct discharges to receiving waters are possible. Snow storage areas shall be located such that no direct discharges to receiving waters are possible. See the NHDES guidance fact sheet on road salt and snow disposal.

[7] The use of sodium-chloride-based materials for winter maintenance shall be the minimum necessary for safety. The use of sodium-chloride-based materials is discouraged within the groundwater protection districts.

[8] Impervious surfaces for parking areas and roads shall be minimized to the extent possible.

Section 153-14 (3) (g)[1]

> [c] Snow and ice removal shall be performed by a contractor certified by the "Green SnoPro" Program, or approved equivalent, following best management practices for the application of deicing materials.
>
> [d] Deicing log to track amount and type of deicing material applied.

Appendix A: Training Log

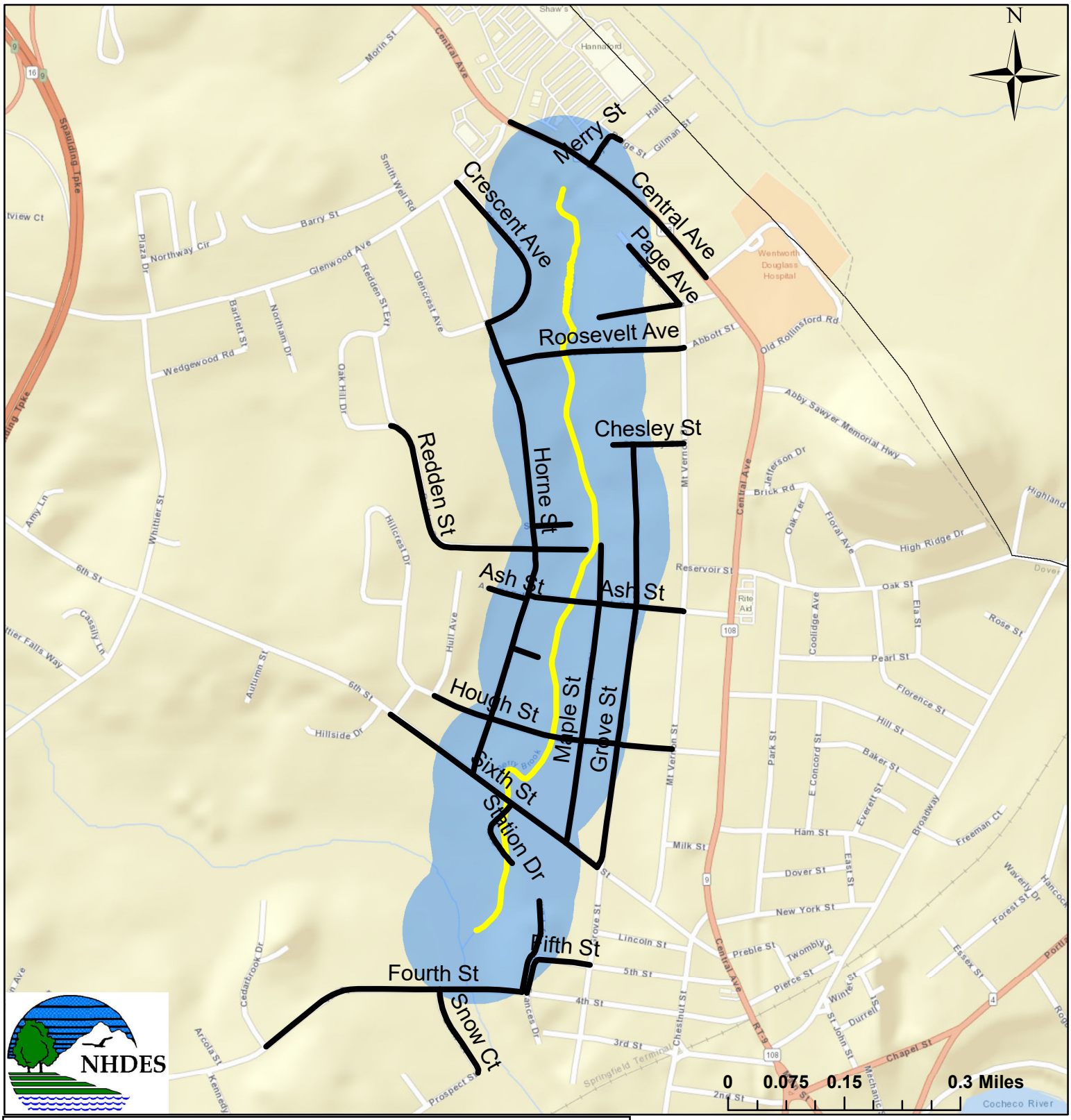
Date	Type of Training	Participants
November 2020	Winter Maintenance Snow Meeting – Staff review of low salt, brining, machine calibrations etc. Meeting lead by Deputy Direction who is Green SnoPro certified and recipient of the EPA Salt award, as well as Highway Foreman who is Green SnoPro Certified	All staff associated with plowing operations and salt applications.
November 2021	Winter Maintenance Snow Meeting – Staff review of low salt, brining, machine calibrations etc. Meeting lead by Deputy Direction who is Green SnoPro certified and recipient of the EPA Salt award, as well as Highway Foreman who is Green SnoPro Certified	All staff associated with plowing operations and salt applications.

Appendix B: Chloride Impaired Waterbodies and associated buffer.

500 Foot Salt Buffer Zones

BERRY BROOK (NHRIV600030608-15)

DOVER



Road/highway segments within 500 feet of the impaired waterbody

500 foot buffers

- Impaired with TMDL
- Impaired without a TMDL

Waterbodies

- Approved TMDL
- Impaired Waterbody

The data presented is under constant revision, and may not depict the most up to date information. The New Hampshire Department of Environmental Information (NHDES) is not responsible for the use or interpretation of this information by third parties. Not for legal use.

500 Foot Salt Buffer Zones

INDIAN BROOK (NHRIV600030608-06)

DOVER

NHDES

Road/highway segments within 500 feet of the impaired waterbody

500 foot buffers

- Impaired with TMDL
- Impaired without a TMDL

Waterbodies

- Approved TMDL
- Impaired Waterbody

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