New Hampshire Small MS4

Salt Reduction Plan

Town of Stratham, NH

Revised August 2024

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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 Town of Stratham 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 Town of Stratham plans to require 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 Town of Stratham **does** track all salt applied to all municipally owned and maintained surfaces. Salt use will be reported to the New Hampshire Department of Environmental Services using a form provided by NH DES or the New Hampshire Salt Management System online tool when it becomes available.

Section 2.2: BMPs for Salt Reduction

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

The Town of Stratham **does** currently use 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. Pre-wetting and Pre-Treating the Salt Pile

The Town of Stratham **does not** currently utilize pre-wetting agents (e.g., salt brine) on salt piles in order to help salt work more efficiently and to reduce road salt scatter and bounce. The Town of Stratham utilizes solar salt rather than pre-treated salt. Solar salt has similar benefits as pre-treated salt as solar salt clings to pavement and is not bounced off or washed away by traffic similar to pre-treated 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.

B. Increasing Plowing Prior to De-Icing

The Town of Stratham currently **does** the following:

- As much snow as possible is removed using mechanical means like plowing, blowing, 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. Therefore it is best to remove as much snow as possible from the roads and parking lots before applying deicers.

C. Roadway Anti-icing (Pre-treatment)

The Town of Stratham **does not** currently pretreat roadway surfaces with anti-icing agents, such as brine, prior to precipitation. Anti-icing pre-treatment can be used to prevent the formation of bonded snow and ice to the roadway surface. Stratham DPW staff attended a seminar on August 12, 2024 on the use of anti-icing agents. An initial capital investment of approximately $30,000 is necessary to initiate the use. The Town of Stratham is evaluating options for funding the investment prior to the 2025-2026 winter season.

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.

D. Monitoring of Road Surface Temperatures

The Town of Stratham 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 (located on the webpage linked in the background information section below) is referenced 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 Town of Stratham **does not** currently utilize automated pre-treating systems on municipally owned salting trucks in order to pre-treat the de-icing agents before it is dispensed onto roads and parking lots. The Town currently uses solar salt which does not require pre-treatment. The DPW will evaluate the effectiveness and efficiency of automated pre-wetting systems by June 30, 2025, to determine if they would further enhance our ability to meet the community's salt reduction goals over the usage of the solar 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 Town of Stratham currently **does** the following:

- Equipment is calibrated at the beginning of each season to reduce and optimize salt use and ensure deicing agents are being used efficiently.
- 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 Town of Stratham currently **does** the following:

- Equipment is washed using proper procedures stated in the permittee's 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 Town of Stratham **will ensure** 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 Town of Stratham **will ensure** 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.
- 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 Town of Stratham **will ensure** that training is provided to municipal personnel through the NHDES Green SnowPro certification program that is managed by NHDES to improve efficiency in salt use in upcoming reporting years. Moreover, additional or independent in-house training is provided to municipal personnel to improve efficiency in salt use.

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.

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

The Town of Stratham **does not** currently have the following guidelines in place:

- Guidelines to apply enough deicer so that plows can remove the snow and ice. The application rate of deicers should be adjusted based on the type of storm, type of agent used, and anti-icing and pre-wetting techniques used.
- Guidelines to pre-treat roads before storm events to help prevent ice from forming and to make plowing easier.

Though the Town of Stratham does not currently have the guidelines in place, we will be hosting NHDES Green SnowPro training in October 2024. After that, we will be able to have those guidelines in place by June 30, 2025.

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. See the application rate charts on the webpage linked in the background information section below for the current salt application rate depending on the different factors of the weather event which include; the pavement temperature, weather condition and type of salt being used.

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

The Town of Stratham **evaluated** municipally-owned roads within 500 feet of Parkman Brook to determine whether low salt or no salt zone designations to reduce chloride loadings are appropriate to meet the community's salt reduction goals. Only seven roads fall within 500 feet of Parkman Brook and only two of those roads are maintained by the Town of Stratham. Approximately 600 feet of the middle of Holmgren Road is just inside the 500-foot buffer of a headwater to Parkman Brook. Additionally there are no catch basins from Holmgren Road that discharge to Parkman Brook. Stormwater infiltrates onto grass swales along the roadside. The second is Stratham Heights Road and includes two sections. One section is approximately 1,000 feet also crossing a headwater to Parkman Brook and the other section is the final 800 feet of road before Stratham Heights Road intersects with Portsmouth Avenue. This intersection is prone to traffic accidents. Additionally, it is the Town's view that the only water body with a chloride impairment in Stratham, Parkman Brook, is likely impaired primarily due to salt treatments on state-owned highways, including NH Route 101 and NH Route 108 (Portsmouth Avenue). For these reasons, the Town of Stratham will not designate any low salt or no salt zones.

A map showing roadways within 500-feet of Parkman Brook is included at the conclusion of this plan.

D. Public Education:

The Town of Stratham **does** provide public education covering the following outreach topics:

- Impacts of salt use and
- Methods to reduce salt use on private property (e.g. Green SnowPro contractors and link to NHDES SnowPro tips page)

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 following chart provided by SBSC can be used for reference to provide estimates for salt reduction or other references/reduction estimate methods can be used:

BMP	Municipal Recommendations	Reduction of Salt % Per Storm	Estimated Cost	Estimated Annual Savings (Assumed usage: 4,000 ton annually @$80/ton)
Spreader Calibration	Calibrate all spreaders minimally annually to ensure accurate	5-30% (dependent on existing usage)	2 Staff @ 1hr/spreader ($200/ spreader) For 10 trucks $2,000	At 5% savings $16,000 At 30% savings $96,000
Adapt Rates to Pavement Temperatures	Utilize Lower application rates at warmer pavement temperatures.	5-10% (dependent on existing usage)	Hand Held Temp. $100/per $1,000 for 10 staff Truck Mounted $500/Per $5,000 for 10 trucks	At 5% savings $16,000 At 10% Savings $32,000
Pre-Treated Salt	Utilize pre-treated salt	20% Reduction	$10 additional cost per ton for 4,000 tons $40,000	at 20% savings $64,000
Ground-Speed Controls	Equip trucks with ground speed controllers[1]	5% Reduction	$700 per spreader For 10 Trucks $7,000	At 5% savings $16,000
Anti-Icing[2]	Utilize Anti-Icing in advance of Storms	20% Reduction	$100,000 Brine Maker $15,000 Storage Tanks $30,000 Tanker Truck $145,000 Total Investment	At 20% Savings $64,000 (breakeven in ~2.5 years) At 10% Savings $32,000 (breakeven in ~4.5 years)

[1] Depending on age and equipment not all trucks can be equipped with ground-speed controllers.

[2] Estimated annual savings do not account for reduced staff time due to less application of de-icing chemicals outside of normal operating hours. Material cost of brine is considered in the % reduction of salt used.

The Town of Stratham has estimated anticipated 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 Loading per storm	Estimated % Reduction per storm	Estimated Reduction per storm	Estimated Number of Storms per year	Estimated Salt Reduction Total per year
Calibrate all spreaders annually.	3.425 tons	10%	0.3425 tons	25	8.5625 tons
Roadway Anti-Icing	DPW is researching roadway anti-icing for possible implementation in the 2025-2026 winter season.				
Estimated Salt Reduction Total: 8 to 9 tons					

Section 2.4: Schedule of Planned Activities / BMPs

The Town of Stratham has developed a schedule for implantation of this Salt Reduction Plan based on the BMPs listed below. The anticipated schedule with milestone tracking dates is summarized in the table below:

Schedule of Planned Activities Table

BMP or Activity	Date(s) Implemented:	Date(s) Completed:
Calibrate all spreaders annually.	Winter 2022-2023	ongoing
Anti Icing	Proposed Winter 2025-2026	

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

Section 3.1: Identification of Private Parking Lots

The list of private parking lots with 10 or more parking spaces draining to the designed MS4 area was prepared by a collaborative effort between the UNH Stormwater Center and New Hampshire Department of Environmental Services. For all of Stratham's private parcels containing buildings, if known, the building area was removed from the parcel's total impervious cover. The remaining impervious area was then considered to be paved impervious cover, such as parking lots and driveways. It was then estimated that a typical parking lot containing 10 parking spaces had an approximate area of 185 m^2. Based on this calculation, only parcels with a minimum of 185 m^2 of impervious cover were included in list provided to Stratham. Stratham further refined the list by removing parcels that are not within the MS4 area and those that were determined by review of aerial photography to not have 10 or more parking spaces. This list of private parking lots can be found in Attachment A of this plan.

Section 3.2: Requirements for Private Parking Lots

The Town of Stratham plans to distribute annually an outreach letter and brochure to the owners and operators of private parking lots with 10 or more parking spaces draining to the designed MS4 area which were identified in Part 3.1 of this Plan. This was completed first in January 2024 and is scheduled to be repeated annually by August 31. The outreach materials inform owners and operators that they are required to use commercial salt applicators trained and certified in accordance with Env-Wq 2203 and that they are required to either report their annual salt usage to the New Hampshire Green SnowPro Program directly or supply their annual salt usage to the Town of Stratham. The letter contained links to where additional information could be found out about the New Hampshire Green SnowPro program, including a database that includes all currently certified Green SnowPro contractors.

Section 3.3: New Development and Redevelopment

The Town of Stratham plans to adopt regulations by June 30, 2025 requiring new development and redevelopment projects to take steps to minimize salt usage and track and report the amounts of salt used to the New Hampshire Green SnowPro Program.

Attachment A

List of Private Roads or Parking Lots with 10 or More Parking Spaces in the MS4

Number	Street
ALL	Blossom Lane, Cortland Ave, Cider Mill Lane
ALL	Drumlin Road, Parkman Brook Lane and Quail Hollow
ALL	Kirriemuir Rd
ALL	Meadows
ALL	Pheasant Run
ALL	Stratham Green
2	College Road
6	Emery Lane
2	Portsmouth Avenue
3	Portsmouth Avenue
9	Portsmouth Avenue
81	Portsmouth Avenue
85	Portsmouth Avenue
89	Portsmouth Avenue
91	Portsmouth Avenue
94	Portsmouth Avenue
95	Portsmouth Avenue
98	Portsmouth Avenue
100	Portsmouth Avenue
104	Portsmouth Avenue
108	Portsmouth Avenue
118	Portsmouth Avenue
132	Portsmouth Avenue
137	Portsmouth Avenue
139	Portsmouth Avenue
142	Portsmouth Avenue
145	Portsmouth Avenue
149	Portsmouth Avenue
157	Portsmouth Avenue
159	Portsmouth Avenue
160	Portsmouth Avenue
216	Portsmouth Avenue
257	Portsmouth Avenue
275	Portsmouth Avenue
313	Portsmouth Avenue
151R	Portsmouth Avenue
2/2A	Raeder Drive
1	West Rd
4	West Rd
4	Winnicutt Road