UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square – Suite 100
BOSTON, MA 02109-3912

July 23, 2019

RE: Public Notice of Community Specific permit requirements for the Town of Derry NH
2017 National Pollutant Discharge Elimination System (NPDES) General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in New Hampshire

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In accordance with Part 1.7.2 of the 2017 New Hampshire MS4 General Permit the Town of Derry submitted an alternative TMDL implementation plan consistent with the requirements in Appendix F part I.2 of the permit seeking community specific permit requirements replacing Appendix F part I.1.

The attached document contains proposed community specific permit requirements for the Town of Derry that will replace the requirements of Appendix F part I.1. The updated Appendix F part I.1 community specific permit requirements were informed by the material submitted by the Town of Derry as part of their Notice of Intent for coverage under the 2017 New Hampshire MS4 General Permit.

EPA will take comment on the enclosed community specific permit requirements for the Town of Derry from **July 23, 2019** to **August 21, 2019**. After the close of the public comment period EPA will respond to all comments received finalize the community specific permit requirements prior to issuing authorization to discharge under the 2017 New Hampshire MS4 General Permit discharge to the Town of Derry.

Please send all comments to stormwater.reports@epa.gov or to the following address:

United States Environmental Protection Agency
ATTN: Suzanne Warner
5 Post Office Square – Suite 100
Mail Code – OEP06-4
Boston, Massachusetts 02109-3912

Community Specific Permit Requirements – Town of Derry NH

I. Chloride TMDLs- Derry NH

The Town of Derry discharges to Beaver Brook and shall reduce discharges of chloride to support achievement the Waste Load Allocation for chloride detailed in: Total Maximum Daily Load (TMDL) Study For Waterbodies in the Vicinity of the I-93 Corridor from Massachusetts to Manchester, NH: Beaver Brook in Derry and Londonderry, NH (2008). The following permit conditions apply to the Town of Derry and replace Appendix F Part I.1 of the 2017 New Hampshire MS4 General Permit for the Town of Derry.

1. The Town of Derry shall continue to implement its Salt Reduction Plan (SRP) (last revised 9/1/2018) (Attachment 1) and update the SRP as needed to support achievement of the Waste Load Allocation for chloride and as directed by NHDES.

2. Within 2 years of the permit effective date the Town of Derry shall update and implement the Department of Public Works Winter Maintenance Snow and Ice Control Policy (last revised October 2007)(Attachment 2) to be consistent with the SRP, including operations procedures for all Equipment identified in Section 4.1 of the SRP.

3. The Town of Derry shall update and implement the Department of Public Works Winter Maintenance Snow and Ice Control Policy within 120 days of any update to the SRP to include operating procedures for all new equipment required by the SRP.

4. The Town of Derry shall require that all contractors hired by the Town of Derry for roadway/parking lot deicing and salt application must be trained and certified in accordance with Env-Wq 2203, and report annual salt usage by the Town of Derry or its contractors using the UNH Technology Transfer Center online tool (http://www.roadsalt.unh.edu/Salt/, retrieved 6/3/19).

5. The Town of Derry shall conduct an annual public education and outreach campaign to all commercial businesses within the MS4 to promote NH Green Snow Pro program (https://t2.unh.edu/green-snowpro-salt-applicator-certification-training, retrieved 6/3/19) and encourage the use of commercial salt applicators that are trained and certified in accordance with Env-Wq 2203.

ATTACHMENT 1

Town of Derry, NH

Salt Reduction Plan For:

Beaver Brook

Original Approved by Council:
Revision 1: *8/11/2011*
Revision 2: *3/9/2016*
Revision 3: *9/1/2018*

Legal Notices:

These are General guidelines used by the Derry, NH Public Works Dept. Each decision to mobilize crews, extend operation hours, and to apply de-icing, anti-icing, and pre-treatment materials is made based on particular weather conditions, past experience, and the availability of resources and therefore may not adhere strictly to this policy.

Jeffrey H. Taylor & Associates
136 North Main Street, Suite 4
Concord, NH 03301
603-224-6555

December 6, 2010

TO: Salt Reduction Steering Committee Members

FROM: Steve Whitman

RE: Derry, Londonderry, and Windham Salt Reduction Plans

On Friday December 3, 2010 I circulated three local Salt Reduction Plans (Derry, Londonderry, and Windham, NH) by email to the New Hampshire Salt Reduction Steering Committee. A representative of each of the four agencies represented on the Steering Committee was asked to respond and indicate their support of these plans. Below is a record of the responses:

NH Department of Environmental Services – Eric Williams
Approved the Derry, Londonderry, and Windham Plans on 12/3/2010

NH Department of Transportation – Mark Hemmerlein
Approved the Derry, Londonderry, and Windham Plans on 12/3/2010

Federal Highway Administration – Jamie Sikora
Approved the Derry, Londonderry, and Windham Plans on 12/3/2010

Environmental Protection Agency – Carl DeLoi
Approved Windam plan on 12/3/2010, Derry and Londonderry on 12/6/2010

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

Beaver Brook has been identified as impaired by the New Hampshire Department of Environmental Services (DES) and the US Environmental Protection Agency (EPA) for chloride concentrations that exceed state and federal water quality standards. NH DES has completed a Total Maximum Daily Load (TMDL) analysis (April 2008) to quantify pollutant reductions needed to meet the state water quality standards for chlorides. The goal of the TMDL is to reduce chloride loads from all sources (municipal, state and private/commercial sources) so that water quality standards for all the designated uses affected by chloride pollution are met in all areas of the Beaver Brook watershed.

The TMDL is expressed as a load duration curve and is based on a 4-day average concentration. The units for the TMDL are expressed as tons of chloride per day. The TMDL was set at the level necessary to achieve the EPA and DES standard of 230 mg Cl/L standard which includes a 10% margin of safety in order to address impacts associated with chlorides on the instream, benthic, and riparian communities. In order to meet water quality standards, significant reductions from current chloride loading from all sources are required. The Town of Derry has agreed to implement reduction measures and improve storage, handling and application operations in order to reduce the amount of chlorides applied during snow and ice removal operations while maintaining an acceptable level of service (LOS) on roadways. See Appendix A for a copy of the approved Municipal Resolution stating same.

This salt reduction plan will serve as a general scope of work for implementation of salt reduction efforts. The Federal Highway Administration has allocated funds to assist municipalities with salt source reductions to implement the chloride TMDL in the I-93 corridor. Preparation of this Salt Reduction Plan is a prerequisite to eligibility for these funds.

For purposes of this plan, salt or chloride reduction efforts not only include simply applying less de-icing materials that contain chloride, but a series of actions that include operational changes and improvements, mechanical upgrades, outreach and awareness activities, and monitoring, all of which are designed and implemented with the result being a net decrease in chloride loading to the watershed.

It is important to note that since the development of the TMDL and prior to development of this plan, the Town of Derry has already started taking chloride reduction measures including construction of a new salt/sand storage facility and loading procedures, calibration of spreaders, preparation of a draft outreach brochure targeted at the private/commercial sectors, and periodic conductivity monitoring of select tributaries to Beaver Brook that is separate from monitoring conducted by NHDES.

Beaver Brook is a 4.86 mile stream segment located in Auburn, Derry, Chester, and Londonderry, NH. The associated watershed is 30.33 square miles (NHDES, Total Maximum Daily Load (TMDL) Study for Waterbodies in the Vicinity of the I-93 Corridor from Massachusetts to Manchester, NH: Beaver Brook in Auburn, Chester, Derry, and Londonderry 2008) (see figure 3).

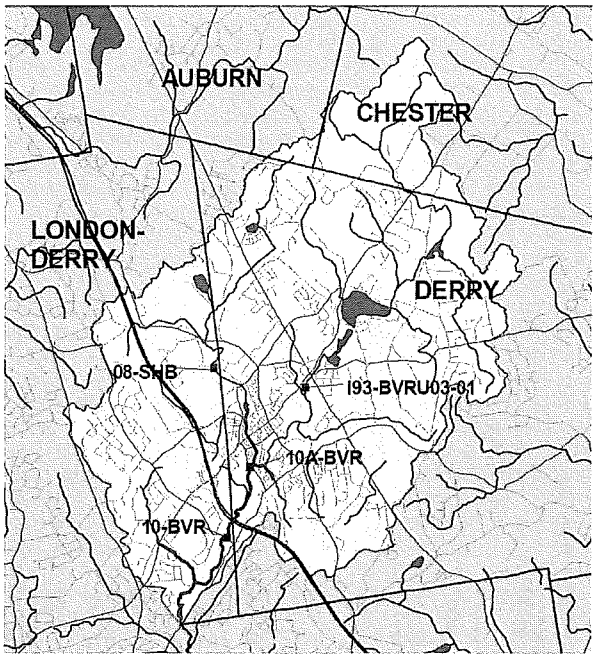

Figure 1: Beaver Brook[1]

Derry is responsible for winter maintenance on 212.78[2] lane miles (106.39 road miles) of road within the watershed. Derry maintains 29[4] parking lots (14.4 Acres – 627,483 Sq. Ft.) within the watershed. These parking lots include paved (impervious) lots associated with municipal operations (employee lots, highway and waste water facilities, fire and police stations, etc), general public use parking (town parks, municipal lots, library, cemetery, etc.) and the associated parking lot driveways

NHDOT is responsible for winter maintenance operations on approximately 53[2] lane miles within the entire Beaver Brook Watershed. Within the municipal boundaries of Derry (within the watershed) NHDOT maintains approximately 4.4 lane miles of Interstate I-93 and approximately 17.6 miles of other state routes.

Roadways and parking lots which are not maintained by Derry or DOT are classified as private. These paved surfaces are maintained each winter season by a private snow and ice removal company hired by the respective land owner. Within the watershed and within the municipal boundaries of Derry there are approximately 31.5[2] lane miles (15.75 road miles) of private roads, 270.5[3] acres of parking lots, and 9.18[3] miles of parking lot driveways as of the date of this plan. The area of parking lots and parking lot driveways is expected to increase as additional development occurs in areas approved as commercial and industrial.

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[1] Photo Credit: NHDES TMDL 2008
[2] NHDOT 2010 GIS Road Centerline File
[3] PSU Parking Lot Study
[4] Derry GIS 2010

2.0 Plan Development

The goal for the Salt Reduction Plan (SRP) is to set a policy and procedural framework to demonstrate how the Town of Derry will continuously work to improve winter maintenance operations while effectively and efficiently using road salt during snow and ice removal operations. New practices contained within this plan are intended to reduce the amount of road salt applied by the Town thus working towards meeting the Town's allocation of the required TMDL load reductions while continuing to meet town level of service (LOS).

Derry will provide winter maintenance to ensure the designated LOS to roadways, parking lots and sidewalks is maintained according to applicable state and local legislation while striving to minimize adverse impacts to the environment. These commitments will be met by:

- Adhering to the procedures contained within this Salt Reduction Plan;
- Committing to ongoing winter maintenance staff training and education;
- Reporting fiscal year salt use data to the NH DES
- Re-evaluating the effectiveness of the Salt Reduction Plan as needed to incorporate new cost-effective technologies or changes in procedures.

The SRP is meant to be dynamic to allow the municipality to evaluate and phase-in any changes, new approaches and technologies in winter maintenance activities in a fiscally sound manner.

To reduce the financial burden on municipal tax payers the town will participate in the I-93 Watersheds municipal salt reduction program developed in 2008 by the NH Department of Transportation in cooperation with the Federal Highway Administration. The program will administer a reimbursement process to assist towns with implementing TMDL load reductions. This SRP has been prepared in partial fulfillment of program requirements to address TMDL chloride load reductions.

3.0 Winter Maintenance Overview

Derry is responsible for winter maintenance on various roads and parking lots within the watershed and winter maintenance involves numerous activities, not all of which involve snow clearing or deicing. The summary below provides detail on paved surface maintained, material usage, application rates, and level of service policy. The major activities related to winter maintenance are:

Table 1: Winter Maintenance Activities

Snow Plowing	Snow Storage
Salt/Sand Spreading	Sidewalk Plowing & De-icing
Salt & Sand Storage	Install Hydrant Flags, Hydrant Clearing
Snow & Ice Removal	Drainage Clearing

The Town of Derry currently maintains 160.81[4] miles of public roads town-wide, and 14.4 acres of parking lots. Town-maintained parking lots include: town municipal offices, Derry Library, Derry Fire Dept., Derry Police Dept. Derry Transfer Station, Derry recreational parks, and a few public lots. All of the parking lots are located within the watershed, however approximately 66% of roads are within the watershed.

Table 2: Town-Wide Road Mileage Summary

Road Classification	Average Daily Traffic	Typical Road Width	Number of Lane Miles
Arterial	3,000 +	24' – 36'	56.6
Collector	1,000 – 3,000	22' – 24'	63.2
Access Street	< 500	18' – 20'	210

Note: Road classifications per NHOEP (http://www.nh.gov/oep/resourcelibrary/documents/12-roads.pdf)

Derry roads have been classified based on the average daily traffic and maintainer in order that LOS can be set for each classification of road. It should be noted that the LOS policy has remained consistent throughout the TMDL process. During snow and ice events, the LOS and operating procedures constantly change depending on numerous factors, all of which change depending on forecasts, projected road conditions, and the actual conditions observed. Some of the factors that affect the Town's LOS and OP include but are not limited to observed and anticipated precipitation rates, regular forecasts of snowfall and temperature changes throughout the storm, projected post-storm forecast (warm-up or deep freeze), time of day (solar assistance), and locality (hills or high traffic intersections). Derry also does not apply salt each time that plows are out and does not apply salt on unpaved roads. The Town's Snow and Ice Control Policy is included in Appendix B. Also included are select pages to the Town of Derry Winter Operations Booklet which is updated annually. Some pages are omitted as they include operators personal information (names and home phone numbers) which are subject to frequent changes.

Table 3: Summarized Level of Service Policy

Arterial Roads	Full width bare pavement as soon as practical after storm event terminates.
Collector Streets	Full width bare pavement as soon as practical after storm event terminates.
Access Streets	Full width bare pavement as soon as practical after storm event terminates.

Materials used in winter maintenance vary annually and are a function of winter weather severity. The table below provides an overview of average material usage. A detailed 10 year average is provided within Appendix C. The 10 year average is used to evaluate salt usage to normalize the effects of more and less severe winters. NHDOT analysis has found that a 10 year average is approximately equal to the Weather Severity Index (WSI) normalized average.

Table 4: Annual Town Wide Material Usage Summary (last 2 fiscal years)

Material	2014/2015	2015/2016	10 Year Average
Solids			
Rock Salt (NaCl)	5200 Tons	4200 Tons	3977 Tons

Table 5: Beaver Brook Watershed Usage

Material	2014/2015	2015/2016	10 Year Average
Solids			
Rock Salt (NaCl)	3772 Tons	3432 Tons	2625 Tons

Current application rates town wide are set at approximately 300 lb/lane mile (±50lb). The material applied varies from a 100% salt application to a 20-25% Salt/Sand Mix. Town-wide plow route maps are included in Appendix D.

4.0 Proposed Best Management Practices (BMPs)

4.1 Previous (Rounds 1-3) Best Management Practices Summary

Derry has demonstrated an ongoing commitment to salt reduction in several key areas

Equipment: Derry has participated in each round of federal funding for salt reduction. It has purchased a total of five (5) salt reducing plow trucks with pre-wetting sprayers, groundspeed controls, pavement temperature sensors, and instituted a calibration program to ensure accurate application.

Training: All Derry municipal operators have been trained in the Green Snow Pro Program offered by the UNH Technology Transfer Center, and the municipality regularly hosts the training in its municipal center on Manning Street. Derry Officials also supported the passage of the Voluntary Certified Salt Applicator law each time it was presented to the legislature.

Public Outreach: The town has filmed and broadcasted plow truck ride-alongs on its public access television station. It has also provided ride-alongs for the DES Salt Reduction Coordinator. Additionally Derry public television also interviewed DES and UNH salt reduction experts during a segment about the chloride contamination issues in Beaver Brook.

Total Estimated Planned reductions from rounds 1-3 are summarized below:

Table 6: Summarized Estimated Reductions from rounds 1-3

Watershed	Existing Imports[5]	Estimated Reduction	Estimated Reduction	Estimated Reduced Imports	TMDL Allocation
	Tons/Year	*Percent*	*Tons/Year*	*Tons/Year*	*Tons/Year*
Beaver Brook	2705.05	18%	486.91	2,218.14	2,264.4

4.2 Optional Equipment Upgrade Automatic Vehicle Location

The town proposed to equip several vehicles that operate within Beaver Brook with Automatic Vehicle Location (AVL) technology. This optional BMP installation was proposed subject to available town funding, availability of federal funding match, a review by NHDES of recent chloride monitoring results, and the necessity of additional salt reduction BMPs. Due to significant salt reductions realized and improvements in surface water quality, this BMP is on hold indefinitely.

This technology will allow the town to track the amount of salt applied on each of the salt routes dynamically. It will also log the amount of salt applied in a central database so that

[5] per 10 year average from Round 1

town staff can analyze application rates per route and storm for further optimization.

The system will also feature an in cab display where operators can view a 90 minute trail of the position of other plow vehicles. By viewing this trail operators will be able to stop spreading de-icing chemical in areas where they overlap with other plow trucks. Studies suggest that because Derry is somewhat rural the town is estimating only a 4% reduction due to implementation of this technology.

Table 7: AVL Estimated Reductions for Optional Round 4

Watershed	Existing Imports[6]	Estimated Reduction	Estimated Reduction	Estimated Reduced Imports	TMDL Allocation
	Tons/Year	*Percent*	*Tons/Year*	*Tons/Year*	*Tons/Year*
Beaver Brook	2,625	4%	105	2,520	2264.4

5.0 Implementation Timeline

The purchase and implementation have been placed on hold indefinitely due observed improvements in chloride concentrations in Beaver Brook and realized reductions in salt imports to the watershed.

[6] Using Current 10 year average

6.0 Salt Usage Evaluation & Monitoring

Derry continues to monitor its salt usage with respect to TMDL compliance. Derry is committed to a multi-year program of efforts and operational modifications that would result in salt reduction with the goal of meeting TMDL load allocation requirements. It is anticipated that salt usage data will be compiled throughout the winter and be summarized and analyzed during the spring. Data will be provided to state agencies on an annual basis, and will be used in future salt reduction plans. Salt usage data will be substantiated with documentation such as invoices, cancelled checks, purchase orders, and or delivery receipts and be provided in total annual usage format based on fiscal/seasonal year on town letterhead.

DES proposes TMDL compliance will be measured using a 10 year average and confidence intervals as currently described in a DRAFT document titled "TMDL IMPLEMENTATION PLAN CONSIDERATIONS" dated April 15, 2010 prepared by NHDES and is included in Appendix E. This document is subject to change following additional Salt Reduction Workgroup discussions.

It is noted that determination of TMDL compliance hinges upon 1) monitoring conducted by DES at the compliance points and 2) DES providing Derry with compliance point monitoring data in a timely manner as it becomes available.

7.0 Summary

The town commits to providing a written report and oral presentation to the salt reduction workgroup. The town is committing to reducing is chloride imports into the Beaver Brook Watershed by implementing the BMP's contained herein.

APPENDIX A
Municipal Resolution

TOWN OF DERRY

Certificate

The Derry Town Council, after a duly noticed public hearing held on Tuesday, January 5, 2010, approved by a vote of 7-0-0, that the Derry Town Council authorize the Town Administrator to generate the Salt Management Plan for the purpose of supporting chloride reduction in the 1-93 Corridor.

See attached Resolution

Richard Metts, Chair
Derry Town Council

Denise E. Neale
Town Clerk

Received and Recorded Jan 7, 2010

RESOLUTION

The Town Council of Derry, New Hampshire

A resolution expressing the Town Council's commitment to reduce salt loading in impaired watersheds in the Interstate 93 Corridor

WHEREAS: Beaver Brook does not meet water quality standards for chloride; and,

WHEREAS: The Total Maximum Daily Load (TMDL) studies show that municipal road salt application must be reduced to meet water quality standards; and,

WHEREAS: The I-93 Corridor municipalities, private transportation facility managers, and the Department of Transportation are working together as the I-93 Salt Reduction Work Group to collectively reduce road salt application to Impaired watersheds

THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF DERRY, that the Town commits to reduce municipal application of road salt and to work with the New Hampshire Department of Transportation, the New Hampshire Department of Environmental Services and private salt applicators to reduce chloride loading to impaired watershed in the I-93 Corridor.

This resolution does not bind the town to any specific salt reduction technique.

The foregoing resolution was duly passed and adopted by the Derry Town Council this 5 day of January, 2010

Richard M. Metts, Chair
Town Council

ATTEST:

Denise Ehrle
Town Clerk

SECTION ALLOCATION AGREEMENT

Date: April 4, 2011

Re: Revised Beaver Brook Sector Allocation

Summary:

Pursuant to the sector allocation meeting of October 15, 2010 this agreement has been drafted to define the commitments of each party specifically with respect to private sector outreach.

Municipal Commitment: Derry and Londonderry (TOWNS) did not alter their TMDL sector allocations. The TOWNS reaffirm the private sector outreach efforts detailed in their salt reduction plans, including directly contacting private parking lot owners in the respective towns to inform them about certification and training opportunities provided through the University of New Hampshire Technology Transfer Center. Such communication will be provided annually.

DOT Commitment: An additional 244.7 tons was reallocated from the private sector to the State maintained (NHDOT) sector. It is agreed that this redistribution is reasonable as there is the potential for significant reductions within the private sector with a concerted team effort. NHDOT will continue to provide outreach to private parking lot owners and maintainers on the use of liquids for winter maintenance. Such outreach will include demonstrations at NHDOT park and ride lots in the southern I-93 corridor and reporting of the results of such demonstrations. NHDOT will co-sign letters to the local chambers of commerce promoting private sector certification and training on an annual basis.

Resulting Allocation: The following table details the agreed upon allocations per the sector allocation on October 15, 2010.

Beaver Brook NEW** TMDL Allocations

Source	Agency	FY08 Salt Imports (tons salt/yr)	Allocation of Loads (tons salt/yr)	Total Allocation
State Roads	NHDOT PS 508	126.7	97.92	1145.3
	NHDOT PS 512	375.4	290.33	
	NHDOT PS 513	124.3	96.14	
	NHDOT PS 514	187.4	144.97	
	NHDOT PS 528	667.2	515.93	
Municipal Roads	Auburn	12.0	7.3	2,983.6
	Chester	67.6	41.1	
	Derry	3,643.6	2,215.8	
	Londonderry	1,183.0	719.4	
Private Roads	Chester	23.9	14.5	316.4
	Derry	349.3	212.4	
	Londonderry	147.1	89.5	
Parking Lots	Derry	3,617.8	2,043.8	3,200
	Londonderry	2,046.6	1,156.2	
Salt Piles	Derry	0.3	0.0	0.0
	Londonderry	1.3	0.0	0.0
Water Softeners	NA	272.3	272.3	272.3
Food Waste	NA	149.5	149.5	149.5
Atmospheric Deposition	NA	95.1	95.1	95.1
Margin of Safety	NA		906.9	906.9
Total		13,090.3	**9,069.2**	**9,069.2**

Acceptance:

By signing this Sector Allocation Agreement the parties agree to perform the outlined outreach efforts, and agree to accept the revised sector allocations until such a time as they are amended with consent of all parties and approval of the Salt Reduction Work Group.

For NHDOT:

William J. Cass, P.E.
Director of Project Development
NHDOT

Date: 4/15/11

For NHDES:

Date: 4/20/11

For Derry, NH:

Date: 4/27/11

For Londonderry, NH:

Date: 5-10-2011

ATTACHMENT 2

TOWN OF DERRY
DEPARTMENT OF PUBLIC WORKS
WINTER MAINTENANCE
SNOW AND ICE CONTROL POLICY

MARCH 1999
(Revised October 2007)

Michael Fowler, P.E.
Director

Alan R. Cote
Supt. of Operations

TABLE OF CONTENTS

RESOLUTION

BE IT RESOLVED that the Town Council of the Town of Derry adopt the following statement of policy regarding winter snow and ice operations:

1) NOT WITHSTANDING the circumstances involved with changing climatic conditions, the Town will endeavor to keep Town roads and designated walkways in a reasonably safe condition for travelers and
2) Town employees will endeavor to exercise reasonable care and diligence in the performance of their duties, consistent with the intent of the current Town of Derry Department of Public Works Snow and Ice Manual and Procedures and
3) Travelers who use Town roads and designated walkways are expected to demonstrate due care and reasonable caution, especially under adverse winter conditions.

Executed at Derry, this _____ day of _____ 1999.

_____

Carol M. Granfield, Town Administrator

_____

Alan G. Swan P.E., Director

_____

Craig Bulkley , Council Chairperson

II. RESOURCES AVAILABLE

The Town of Derry has the following resources available to it in its winter operations: (See appendices for detailed listing.)

A. Weather information

Local Radio: WOKQ 97.5 FM
WZID 95.7 FM
Local T.V. WMUR CH 9
Cable T.V. NECN
Weather Channel

B. Personnel (see appendix A)

The Town D.P.W. has ten truck drivers, two equipment operators and three mechanics, and a road foreman available for normal storm responses. This includes personnel from Highway, Water, and Wastewater divisions. Additional manpower is available in the Parks, Buildings and Grounds and Solid Waste divisions.

Personnel are called in and assigned to work by the Supt. of Operations or "on call" foreman. Normally the truck drivers are assigned to their specific routes. An equipment operator loads trucks and the drivers not holding a commercial drivers license (C.D.L.) drive small trucks on assigned routes. Supervision is provided by the Director and/or Supt. of Operations during normal working hours and by the Supt. of Operations and/or "on-call" foreman during off hours. The Director provides supervision during off duty storms as needed depending on the severity of the storm.

C. Equipment:

The Town has available 7 "front line" dump trucks (3 ten wheelers, and 4 six wheelers equipped with hydraulic sanders, eleven foot bull plows, and eight foot

wing plows; one "low profile" dump truck, two one tons with wing plows, and several one tons and pickup trucks. The Town supplements its forces with contracted equipment including 33,000 GVW six wheelers with sanders and plows, one tons, pickup trucks, and loader/back hoes with plows from private contractors. Three pickup trucks are also available from the parks department to plow parking lots.

One 3 C.Y. loader is garaged at the Town Garage and is used to load trucks and plow the garage area. Another 3 C.Y. loader used at the transfer station is used as a backup to load trucks. This piece of equipment is also used to pull out trucks that are stuck and to plow parking lots.

The Town has three Trackless (articulated) sidewalk machines equipped with plows and snow blowers for large accumulations of snow. These machines are used to clear sidewalks.

D. Materials

Sand is purchased from a Town bid sand supplier and is stockpiled at the Town Garage. Approximately 1000 C.Y. are used each year. Sand is used as an abrasive for immediate traction but is not effective in melting ice.

Sodium Chloride (Salt) is purchased through a consortium bid. The Town will use approximately 3800 tons of salt in a normal winter. The Town strives to keep the salt shed as close to full as possible. The salt stock is replenished after each storm when possible. This is done to ensure a continuous supply of salt in the event of long duration storms or an inability to get salt for an extended period of time. Salt is most effective for melting purposes at temperatures above 20 degrees Fahrenheit, becoming slower acting as the temperature drops.

Calcium chloride flake is purchased in 100# Bags to mix with salt in trucks when temperatures drop below 6 degrees Fahrenheit and is expected to stay that cold for more than two days. This material is mixed manually adding about 200# to a six ton load of salt. Calcium chloride is used to activate the rock salt. If it is

judged to be excessively cold and salt will be ineffective straight sand may be applied to try to offer traction with grit.

III. OPERATIONS:

A. General:

Winter weather in northern New England is difficult to predict. There are many variables affecting winter maintenance operations such as type of precipitation, air temperature and pavement temperature, traffic, wind, time of day, and day of week.

The Public Works Department's snow removal and ice control policy has been based for many years on the goal of obtaining bare and dry pavements at the earliest practical time following the cessation of a storm. It is virtually impossible to provide bare pavement during a winter storm and the Public Works Department does not attempt to do so.

Traffic volume and speed are the primary factors in determining the level of winter maintenance service (effort) with gradient also being an important factor. Therefore, the principal arterials including West Broadway, East Broadway, North Main Street, South Main Street, Chester Road, East Derry Road, Crystal Ave., Birch Street, Rockingham Road, Tsienneto Road, and Pinkerton Street as well as other heavily traveled roadways are maintained in such a manner that bare pavement in produced as soon as possible after termination of a storm. On other town roadways, the Public Works Department attempts to provide some bare pavement, but not necessarily shoulder to shoulder, within a day or two of the storms end.

It is impractical to develop specific rules on winter maintenance operations. Due to numerous variables involved in winter storms, the judgement of the on-call foreman, the Supt. of Operations, or the Public Works Director governs the

quantities and type of material used to control snow and ice. In general, the purpose of salt is to (1) reduce adherence of snow to the pavement, (2) keep snow in a "mealy" condition and thereby permit nearly full removal by plowing, and, (3) prevent the formation of ice or snow ice (hardpack). Salt is not intended to eliminate the need for snow plows. Sand treated with chlorides to prevent freezing in stock piles is used when temperatures become to cold for salt to activate, around Beaver Lake and Island Pond, and on gravel roads.

The Derry Public Works Department has the responsibility for maintaining essential services on over 160 miles of Town roadways, of which 2% are gravel and 98% are paved. A significant portion of the Department's overall efforts is directed towards maintaining the essential transportation services during periods of high precipitation, low temperatures, and heavy winds.
The Public Works Director has direct responsibility for daily operation of the Department, acting under the general direction of the Town Administrator. The Supt. of Operations supervises the day to day operations of the highway department. Appendix A contains an organizational chart identifying Department positions and individuals.

B. Applications

1. Application of De-Icing Materials

The use of chemicals, abrasives, or chemical-abrasive mixtures is dependent not only on present roadway and weather conditions, but also on anticipated changes in these conditions and fiscal constraints experienced by the Public Works Department. The effects of peak traffic periods, approaching nightfall or

daybreak, predicted temperature changes, and end of storm, are considered and evaluated prior to selecting the proper materials or rate of application.

Adverse roadway conditions existing during periods of low temperatures which are predicted to rise would generally be treated in accordance with the recommendations for the higher temperature. If the time of day, trend and weather forecast is such that a drop in temperature may reasonably be expected, treatment would generally be for the lower temperature. Neither chemicals nor abrasives should be used at low temperatures if the pavement is dry and snow is blowing off the pavement.

Generally straight sodium chloride is the chemical of choice for most storm situations. Sodium Chloride is used to prevent snow and ice build-up on the pavement and to aid removal of any build-up that occurs.

The recommended guideline to adequately maintain highways is 300 lbs. per lane mile.

For exceptionally high volume roads where traffic will enhance the action of salt, this rate may be decreased to 200 lbs. per lane mile.

Abrasive –chemical mix may be needed at extremely low temperatures or on very lightly traveled roadways.

Chemicals are generally applied to the middle 1/3 of pavement width and on high side of bank curves. Spread width may be increased or decreased depending on action of traffic. Materials are applied early in the storm s that brine develops on the pavement and prevents build-up of packed snow. If snow continues and accumulates on the pavement plowing should continue. At the end of the storm when all roadways have been plowed, an additional treatment of salt and /or abrasives may be applied if deemed necessary.

There are many additional circumstances which will necessitate modifications to these treatments. Some circumstances are:

- Rising or Falling temperatures
- When pavement is cold and dry and dry snow is falling, chemicals may not be applied. Plowing and treatment of icy spots, if they develop is recommended.
- An abrasive and chemical mix may be needed at extremely low temperatures or on very lightly travelled roadways. Under these conditions the effectiveness of salt is reduced and abrasives may be needed for traction.

Spreading Practices

Each spreading unit should be calibrated each year prior to the winter season to insure that selected rates of application are attained. Timing of the initial application during each storm is very critical. It should be delayed until there is sufficient accumulation on the pavement to hold and contain the material spread. However, the pavement may become glazed prior to this time and may require an earlier treatment.

Portions of the town are peculiar due to various physical conditions and will require a greater application rate or an additional application during some storms. However, these areas should be judged and treated separately and not used as a barometer to evaluate and subsequently direct complete applications over the entire town. In order to conduct efficient operation, periodic observation of the pavement surface conditions must be performed.

Width of material spread (throw plus roll) should be restricted. Reduction of the spread width by windrowing chlorides will increase the concentration of the

chemical where it is needed and therefore increase the effectiveness of the application. Spreading operations should generally be conducted at speeds less than 25 mph. Air turbulence created at speeds in excess of 25 mph makes it difficult to retain all the material discharged within the desired width. Spinner and belt speeds and spread pattern must be adjusted to obtain the correct spread rate and to retain the material within the lane(s) where additional material is required.

Plowing Operations

Plowing operations are generally initiated after two inches of snow has fallen and continues until the storm has ended. In some cases of long duration storms plowing may be suspended in order to allow drivers to go home and get some sleep. Widening and intersection view clearing is performed following the storm and generally during daylight hours when best visibility prevails.

For snowstorms with a predicted accumulation in excess of two inches, plowing usually begins after the initial salt application has formed a brine and after two inches of snow has fallen (dependent on the intensity of the snowfall) and continues for the duration of the storm. Following plowing operations a light salt application to remove remaining residue may be appropriate.

For light accumulation snowfalls, snow squalls, and so-called "Alberta Clippers" of short duration, plowing may begin immediately and may include simultaneous salting and /or sanding to provide desire results quickly and efficiently.

Truck mounted front plows and in some cases wing plows are utilized to clear roadways of frozen precipitant. Storm intensity generally measured in inches per hour varies considerably in New Hampshire but average major snow storms are approximately one inch per hour. This one inch per hour intensity rate and the allowable snow accumulation is used in planning the availability of equipment

necessary for snow plow operations. The planned allowable snow accumulation on most roads in town is 3 ½ inches with a maximum allowable accumulation of 6 inches and a planned plowing frequency of 3 ½ hours. On some of the principal arterials the planned allowable snow accumulation is 2 ½ inches with a maximum allowable accumulation of 5 inches and a planned plowing frequency of 2 ½ hours. These above mentioned figures are based on an average of 1" per hour under optimum conditions (i.e., no traffic tie ups due to accidents or stuck vehicles and no equipment breakdowns. The maximum allowable depth of snow that a motorist may encounter on highway pavements does not include blizzard conditions or heavy wind and drifting conditions.

Frozen precipitation including sleet and the build up of ice caused by freezing rain are special situations and are not subject to the procedures indicated above. When a changeover from snow or sleet to freezing rain is predicted or anticipated, snow and/or sleet is left on the pavement to capture the freezing thereby preventing a glare ice situation, which without question is the most treacherous condition that occurs on highways.

Judgment based on experience is essential in conducting and timing remedial work to overcome ice and snow hazards. Each storm situation varies, so therefore it must be emphasized that these (general) guidelines are strictly advisory which in no way restricts the freedom of judgement exercised by the On-call Foreman, Supt. of Operations, or Public Works Director.

C. Communications:

1.) Prior to Storm

The Director, Supt. of Operations, On-call Foreman, and Chief Mechanic communicate prior to the storm to determine the level of readiness and probable initiation of snow and ice control operations. The Director and Supt. of Operations utilize the various weather forecasting sources available, as well as

communications from Local Police and School Officials. Normally, the Supt. of Operations monitors the onset of the storm or ice conditions via telephone and Town radio with the Director, Foreman, and Police personnel as appropriate.

2.) Onset of Storm:

Phone or Town radio communications are utilized as the Director and Supt. of Operations make the decision to initiate the Department's response or receive word from the Police Dept. or Fire Dept. that a response may be necessary. Calls to the Director, "On-call Foreman", Police, School Officials, or other highway departments are made as required. Normally the Director and the Supt. of Operations communicate at the storm onset to verify the initial Department response.

The Director, Supt. of Operations, Foreman, or their designee then calls in the response team as required according to procedures.

3.) During Storm Operations

Radio communication is maintained with all response vehicles at least every hour. Special instructions and requests for service are taken via telephone or radio at the Highway garage or D.P.W. office and relayed via radio to appropriate responding personnel. All such requests are logged and transmitted by radio to the Supt. of Operations or Foreman as required. The Supt. of Operations or Foreman will dispatch personnel and equipment when they become available or immediately if it is deemed to be an emergency. The Director or Supt. of Operations or designee will determine the extent of the emergency.

All communications, telephone or radio, with the Director, Supt. of Operations, School Administrators, Bus Managers, Police, and Fire continue at appropriate intervals during the storm.

A log of all incoming calls and response actions is maintained in the Public Works office or garage. Any problems with communications or communications equipment should be noted in the log.

4.) Wrap Up After The Storm

At the close of the snow/ice operations the Supt. of Operations, Director, and On-call Foreman notify each other via telephone or radio that operations are ended and:

a. Where each supervisor will be for follow up communications.
b. Who is available for follow up actions and investigations.
c. The status of equipment, i.e., any major equipment that is down, whether trucks are loaded or not etc.
d. The status of responding personnel i.e., who is next for call-in, supervision, etc.
e. Any potential weather related problems to monitor, i.e., drifting snow, icing conditions, etc.

Following the storm-generally on the following day, the storm log is reviewed by the Director, Supt. of Operations, Foreman, and Lead Mechanic as appropriate and required actions or repairs are initiated. Following this, a meeting with the response team should be held to review the storm log and any problems that have occurred.

D. Storm Log

Beginning with the arrival of the Supt. of Operations or responding supervisor at the town garage, a storm log is initiated and kept through the storm event to note all communications, conditions, major events, and requests for service received.

At a minimum, the following information is noted on the log with the time of occurrence:

a. Time each responding piece of equipment begins operation.

b. Weather conditions, snow accumulations and temperature on an hourly basis.
c. Radio checks with responding vehicles on an hourly basis.
d. Driver rest periods (on and off air) .
e. Any reported problems from drivers or operators including equipment failure.
f. Time equipment is down and time that equipment is back in service.
g. Supervisors' comments on storm progress and progress of department operations.
h. Report on accidents and special situations, especially Police calls.

E. Response Teams

Department responses will vary with the conditions encountered, personnel, who are available for work, the time of day and day of week, the temperatures, overall road conditions, preceding weather, anticipated weather, etc.

All things being equal, the Department response teams are as follows:

1.) Spot Salting

The on-call team (three men) will be called in. The on-call foreman will determine whether additional help is needed to cover the icy spots than his team. If necessary he can contact the Highway Coordinator for advice as to whether or not to call in additional help. If additional help is needed, the overtime rotation list is utilized to determine who will be called in to duty.

2.) Salting

When conditions warrant all routes will be salted, all town sanders and all contractors' sanders will be called in to duty. The on-call foreman will run the

operation at this time from the Garage and will only go out on a truck if sufficient drivers can not be located.

3.) Normal Winter Storms

Response to normal winter storms will vary with the storm. Generally, a storm will progress from salting operation to plowing when snow accumulations reach about 2 inches. Response teams will vary from minimum manning to full crew depending on the rate of snow, anticipated conditions, equipment breakdowns, time of day, etc. The Supt. of Operations will be called in to determine when to start plowing and supervise operations.

4.) Blizzard Conditions

Generally, blizzards develop rather than being predicted. When heavy snow and high winds are encountered, all Department personnel may be called to assist in clearing snow from roads and town facilities. A secretary will usually be asked to work answering phone calls and act as a facilitator. All Town personnel must be available if the Director declares an emergency.

F.) Blowing and Drifting Snow

Quite often after a cold, dry snowstorm, blowing and drifting snow will begin to drift across roadways creating hazardous travel conditions.

Areas that are generally prone to drifting include:

Tsienneto Road	Humphrey Road
Folsom Road (near the police dept.)	West View Drive
Old Auburn Road	Kilrea Road
Island Pond Road (near Warner Hill Road)	Damren Road
Pingree Hill Road (near Ledgewood Drive)	Walnut Hill Road
A Street	B Street
English Range Road	Adams Pond Road

G. Towing

Often during snow removal operations, stranded vehicles will be encountered on Town roads. When a car is on a Town road in such a condition, it may be towed under the Town's winter parking ban/ordinance. (See appendix E)

Procedures for having a car towed are as follows:

- Operating personnel call the garage base station who notify the Derry Police at 432-6111. The make of the car, the plate number, and location are given.
- Persons contacting the Public Works Department to retrieve their car after a storm are referred to the Derry Police Department at 432-6111.

H. Post Storm Operations

After a storm event or during periods of lessened storm activity, a number of operations take place to ensure readiness for subsequent winter operations.

1. Equipment inspected using preventative maintenance techniques and repairs made as necessary. Special attention is given to tires, brakes, snowplows and sanders including shoes, bearings, spinners, and hydraulic feed systems.
2. Materials, especially salt, are reordered in order to insure adequate stockpile.
3. Plow routes are driven and checked for identification of problems, especially illegal plowing by driveway contractors, problem mailboxes, snow castles, etc. It is the responsibility of the route driver to identify these problems and report them to their supervisor.
4. It is important to push back snow on road shoulders following each major storm and to clear critical areas to make room for future storage. If the snow

bank height becomes excessive, the top of banks are cut down for proper visibility or future snow storage. If the snow is allowed to melt in place and refreeze, the result is a heavily compacted mass which can not be moved without considerable efforts by snow plows. Therefore, pushing back is an ongoing function which is addressed as soon as the storm subsides and the amount of stockpiled snow dictates that pushing back is needed.

5. The Town begins snow removal (hauling away) when there becomes a need to create storage space for snow and will be done under the following priority list:

Major intersections where sight distance is impaired.

West Broadway from Horne Brook to Merchants Row.

East Broadway from Merchants Row to Derry Public Library.

Crystal Ave. from East Broadway to Ross's Corner.

Birch Street from East Broadway to Beaver Brook.

Folsom Road

Central Street

South Ave.

IV. Public Information

Town residents are advised prior to each winter season of the Town's overnight parking ordinance, mailbox policy, winter safety tips, etc.

In addition, the local media is used to inform residents of particular problems encountered during the winter such as ice pack, drifts, and other unusual circumstances encountered from time to time during the winter.

Finally, the Town's Emergency Management System may be utilized during the winter emergencies.