Town of Vienna, Virginia

Chloride TMDL Action Plan for Accotink Creek

Public Review Draft – April 14, 2025

Town of Vienna
Department of Public Works
127 Center Street, South
Vienna, Virginia 22180

Prepared with assistance by:
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TOWN OF VIENNA

wsp

Prepared in Compliance with Municipal Separate Storm Sewer System (MS4) Permit No. VAR040066

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name	Title	Date

RECORD OF PLAN UPDATES

May 1, 2021	Original plan submitted to DEQ.
TBD, 2025	Update in accordance with 2023 MS4 permit.

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Acronyms and Terms

Acronym	Explanation	Definition
BMP	Best Management Practice	Structural or non-structural techniques used to reduce pollution at its source or to capture and treat stormwater runoff.
DEQ	Virginia Department of Environmental Quality	The state regulatory agency responsible for issuance of VPDES permits.
IDDE	Illicit Discharge Detection and Elimination	An IDDE plan is developed and implemented to identify and eliminate illicit discharges to the MS4.
MCM	Minimum Control Measures	Minimum measures that must be implemented to reduce and eliminate sources of pollution. There are six MCMs in the Town's MS4 VPDES permit.
MS4	Municipal Separate Storm Sewer System	A conveyance or system of conveyances that is owned and/or operated by a public entity.
TMDL	Total Maximum Daily Load	The maximum amount of a pollutant that can enter a water body without violating water quality standards.
VPDES	Virginia Pollutant Discharge Elimination System	The permit issued to an entity that allows for the discharge of stormwater to waters of the state under prescribed conditions. Loudoun holds a VPDES permit for its MS4.
USEPA	United States Environmental Protection Agency	The federal agency responsible for environmental regulation and enforcement.
WLA	Wasteload Allocation	The portion of a receiving water's loading capacity that is allocated to a specific source (such as a MS4).

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1. Introduction

1.1 Purpose

This Chloride TMDL Action Plan for Accotink Creek documents how the Town of Vienna intends to meet the "Local TMDL Special Condition" in Part II B of the General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The Town of Vienna's current MS4 permit (VAR040066) issued by the Virginia Department of Environmental Quality (DEQ) became effective November 1, 2023. In accordance with the MS4 permit, the Town must update the plan no later than 18 months after the effective permit date (May 1, 2025). This plan replaces previous plans.

The Town's MS4 permit requires the development and implementation of action plans for impaired streams where a TMDL approved by the State Water Control Board assigns a waste load allocation (WLA) to the Town. A TMDL establishes the maximum amount of a pollutant that can enter a water body without violating water quality standards. A WLA represents the total pollutant loading that is allocated to a specific permitted source.

The "Chloride TMDLs for the Accotink Creek Watershed, Fairfax County, Virginia" was approved by the SWCB on April 12, 2018. The TMDL assigns a WLA to the portion of the Town's MS4 regulated area draining to Accotink Creek. While deicers and anti-icers like chloride are important for maintaining public safety during winter weather events, they can also cause damage to the environment. After application, salts infiltrate into the groundwater or wash off into local streams. This has serious impacts on aquatic ecosystems, including sensitive species of fish as well as salamanders and frogs. Salt can also impede or kill vegetation, which can result in bare areas and erosion. Traditional stormwater management facilities are not designed to remove chloride. As a result, effective preventive management strategies are key to reducing these negative impacts.[1]

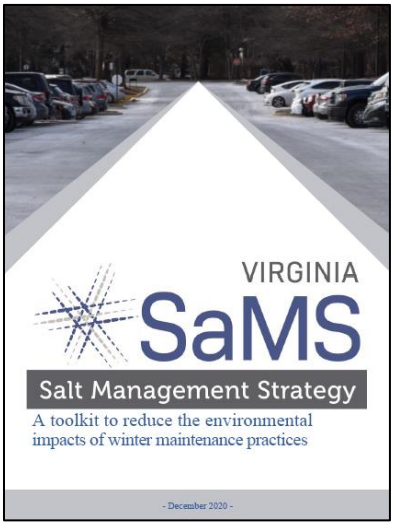
This plan addresses the requirements of the MS4 permit by: (1) describing the WLAs assigned to the Town and the corresponding reduction requirements; (2) identifying significant sources of the pollutants of concern discharging from the Town's MS4; (3) identifying best management practices (BMPs) to reduce the pollutants of concern in accordance with special permit requirements; (4) calculating existing and planned pollutant reductions; (5) developing outreach strategies to enhance the public's ability to eliminate and reduce discharges of pollutants; and, (6) establishing an implementation schedule for the permit term.

[1] "Why Some are Salty About Winter Roads: Road Salt and Stream Salinization," February 27, 2020, Virginia Tech, Virginia Water Resources Research Center.

In accordance with Part II B 2 a of the MS4 permit, the plan also includes an evaluation of the results achieved by the previous action plan and a description of any adaptive management strategies incorporated into the plan based on the evaluation.

1.2 Salt Management Strategy

To assist with the planning and implementation process, DEQ and the Interstate Commission on the Potomac River Basin (ICPRB), in coordination with a stakeholder advisory committee, developed the "Salt Management Strategy – A Toolkit to Reduce the Environmental Impacts of Winter Maintenance Practices." The Salt Management Strategy (SaMS) includes a range of practices and strategies that can be applied by both government and non-government entities to reduce the impacts of winter weather practices while maintaining public safety.



SaMS is designed so that the right mix of tools can be chosen from a menu to address situation-specific needs and objectives. The SaMS Toolkit has been used by the Town of Vienna in the development of this action plan and will continue to be referenced as the Town continuously assesses and adjusts its program.

1.3 Permit Compliance Crosswalk

Table 1A provides an overview of the organization of this plan and how each section addresses the 2023 MS4 permit.

Table 1A – Action Plan and Permit Compliance Crosswalk

Action Plan	Plan Element	2023 MS4 Permit	
Section 1	Introduction		
Section 2.1	Overview of TMDL	Part II B 4	a. The TMDL project name. b. The EPA approval date of the TMDL.
Section 2.2	Waste Load Allocation	Part II B 4	c. The wasteload allocated to the permittee (individually or in aggregate), and the corresponding percent reduction, if applicable.
Section 2.3	Identification of Significant Sources of Chloride	Part II B 4	d. Identification of the significant sources of the pollutants of concern discharging to the permittee's MS4 and that are not covered under a separate VPDES permit. For the purpose of this requirement, a significant source of pollutants of concern means a discharge where the expected pollutant loading is greater than the

Action Plan	Plan Element	2023 MS4 Permit	
			average pollutant loading for the land use identified in the TMDL.
Section 2.4	Evaluation of Previous Action Plan and Adaptive Management Strategies	Part II B 2	a. For TMDLs approved by EPA prior to July 1, 2018, and in which an individual or aggregate wasteload has been allocated to the permittee, the permittee shall develop and initiate or update as applicable the local TMDL action plans to meet the conditions of Part II B 4, B 6, B 7, and B 8, as applicable no later than 18 months after permit effective date and continue implementation of the action plan. Updated plans shall include: (1) an evaluation of the results achieved by the previous action plan; and, (2) any adaptive management strategies incorporated into updated action plans based on action plan evaluation.
Section 2.5	Best Management Practices	Part II B 4	e. The BMPs designed to reduce the pollutants of concern in accordance with Part II B 5, B 6, B 7, and B 8.[2] f. Any calculations required in accordance with Part II B 5, B 6, B 7, or B 8.
		Part II B 8	c. No later than 36 months after permit issuance, the permittee shall review good housekeeping procedures for anti-icing and deicing agent application, handling, storage, and transport activities required under Part I E 6 b (1) (a) and identify a minimum of two strategies for implementing enhanced BMPs that promote efficient management and application of anti-icing and deicing agents while maintaining public safety.
Section 2.6	Outreach Strategy	Part II B 4	g. For action plans developed in accordance with Part II B 5, B 6, and B 8, an outreach strategy to enhance the public's education (including employees) on methods to

[2] The permit only includes reference to bacteria, nutrients, sediment, and PCBs in Parts II B 4, 5, and 6. For the purpose of this plan, the Town assumes any pollutant should have BMPs and an outreach strategy.

Action Plan	Plan Element	2023 MS4 Permit	
			eliminate and reduce discharges of the pollutants.
		Part II B 8	a. No later than 36 months after permit effective date, permittees shall develop an anti-icing and deicing agent education and outreach strategy that identifies target audiences for increasing awareness of anti-icing and deicing agent application impacts on receiving waters and encourages implementation of enhanced BMPs for application, handling, and storage of anti-icing and deicing agents use for snow and ice management. b. Anti-icing and deicing agent education and outreach strategies shall contain a schedule to implement two or more of the strategies listed in Part I E 1 d Table 1 per year to communicate to target audiences the importance of responsible anti-icing and deicing agent application, transport, and storage.
Section 3	Schedule of Anticipated Actions	Part II B 4	h. A schedule of anticipated actions planned for implementation during this permit term.
Section 4	Opportunity for Public Comment	Part II B 9	Prior to submittal of the action plan required in Part II B 2, the permittee shall provide an opportunity for public comment of no fewer than 15 days on the proposal to meet the local TMDL action plan requirements.

2. Chloride TMDL Action Plan

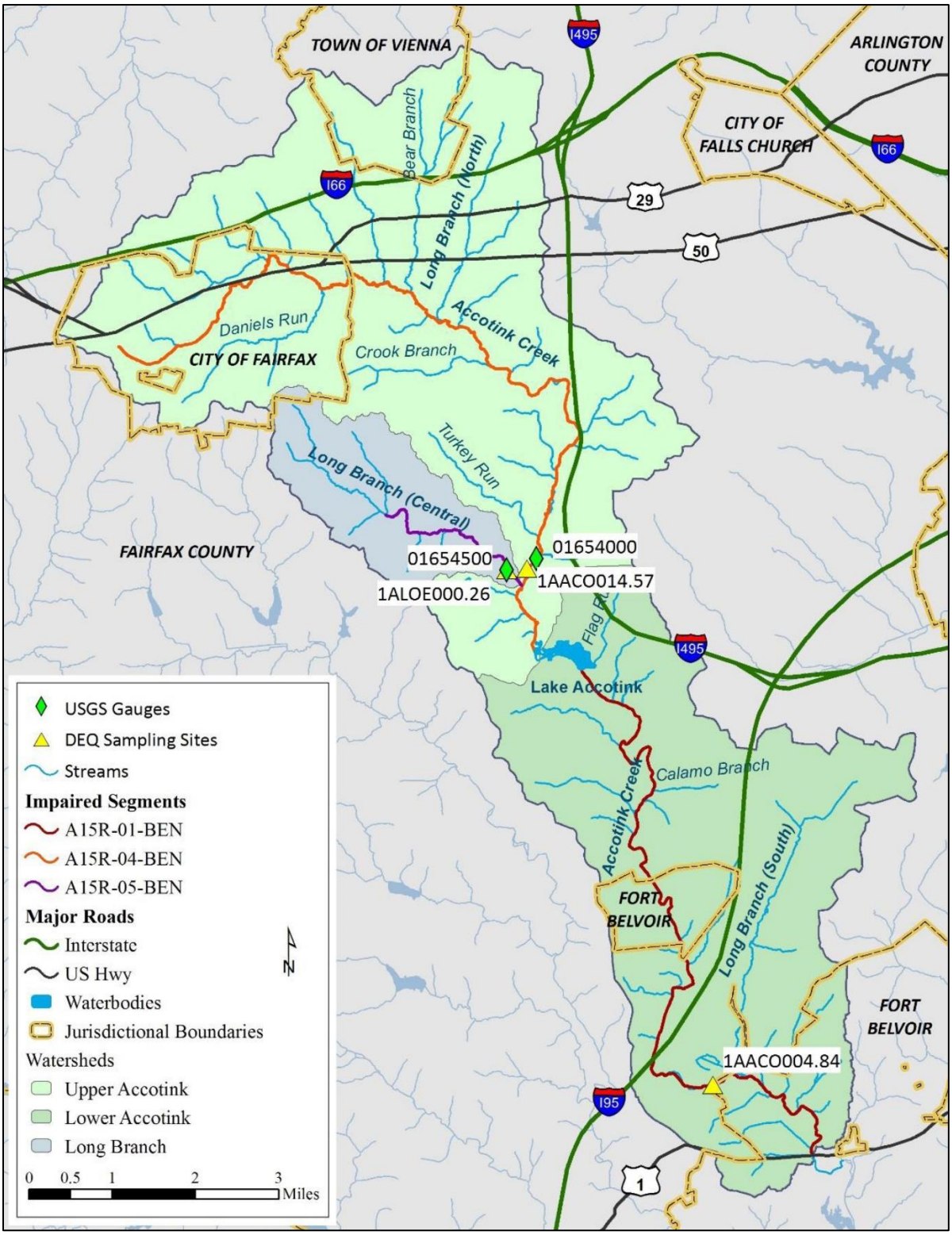
2.1 Overview of the TMDL

This TMDL action plan addresses the chloride WLA assigned to the Town of Vienna. The "Chloride TMDLs for the Accotink Creek Watershed, Fairfax County, Virginia" was approved by the State Water Control Board on April 12, 2018 and the U.S. EPA on May 23, 2018. Map 2A show the location of the Accotink Creek watershed in relation to the Town and the surrounding area.

Accotink Creek is on Virginia's List of Impaired Waters (Category 5 of the Integrated List) for not supporting its Aquatic Life Use. A Stressor Identification analysis was performed to determine the source(s) of the impairment. Ambient water quality monitoring was conducted as part of this analysis. Virginia's water quality standard for chloride includes an acute maximum concentration of 860 mg/l and a chronic maximum concentration of 230 mg/l. The acute maximum is defined as a one-hour average not to be exceeded more than once every three years. The chronic maximum is defined as a four-day average not to be exceeded more than once every three years. Seven chloride concentrations in the upper Accotink Creek (in which the Town is located) exceeded the acute criterion between 2010 and 2016. The chronic maximum was exceeded in the upper Accotink Creek during a snowmelt in late January 2016 and a combined snow/rain event in February 2016. As a result, the analysis concluded that chloride is a likely cause of the impairment.

In addition to chloride, the analysis identified hydro-modification, habitat modification, and sediment as likely stressors. However, only chloride and sediment are defined as pollutants. As a result, TMDLs were developed for chloride and sediment. A separate TMDL action plan for sediment has been adopted by the Town for both the Accotink Creek and Difficult Run watersheds.

Map 2A – Accotink Creek Watershed



Source: Chloride TMDLs for the Accotink Creek Watershed, Fairfax County, Virginia.

2.2 Waste Load Allocation

The Town is responsible for stormwater discharges from its MS4. The MS4 is defined in the MS4 permit as a system that discharges to waters of the Commonwealth that is owned or operated by the permittee. As a practical matter, the regulated MS4 area includes all the Town with the exception of areas draining directly to a local stream without entering the Town's storm sewer system. Map 2B shows the Accotink Creek watershed in relation to the Town's MS4 service area.

According to the TMDL, Accotink Creek drains approximately 52 square miles, mostly within Fairfax County. The Town of Vienna represents approximately 4% of the total drainage area. The Accotink Creek watershed is divided into three impaired segments – Lower Accotink, Long Branch, and Upper Accotink. The Town is in the Upper Accotink, which includes the headwaters of Accotink Creek to Lake Accotink. Major tributaries of Accotink Creek within the Town are Hunter's Branch and Bear Branch.

The WLA for MS4 permit holders in the Accotink Creek watershed is aggregated. Table 2A summarizes the TMDL and WLA for the Upper Accotink Creek.[3]

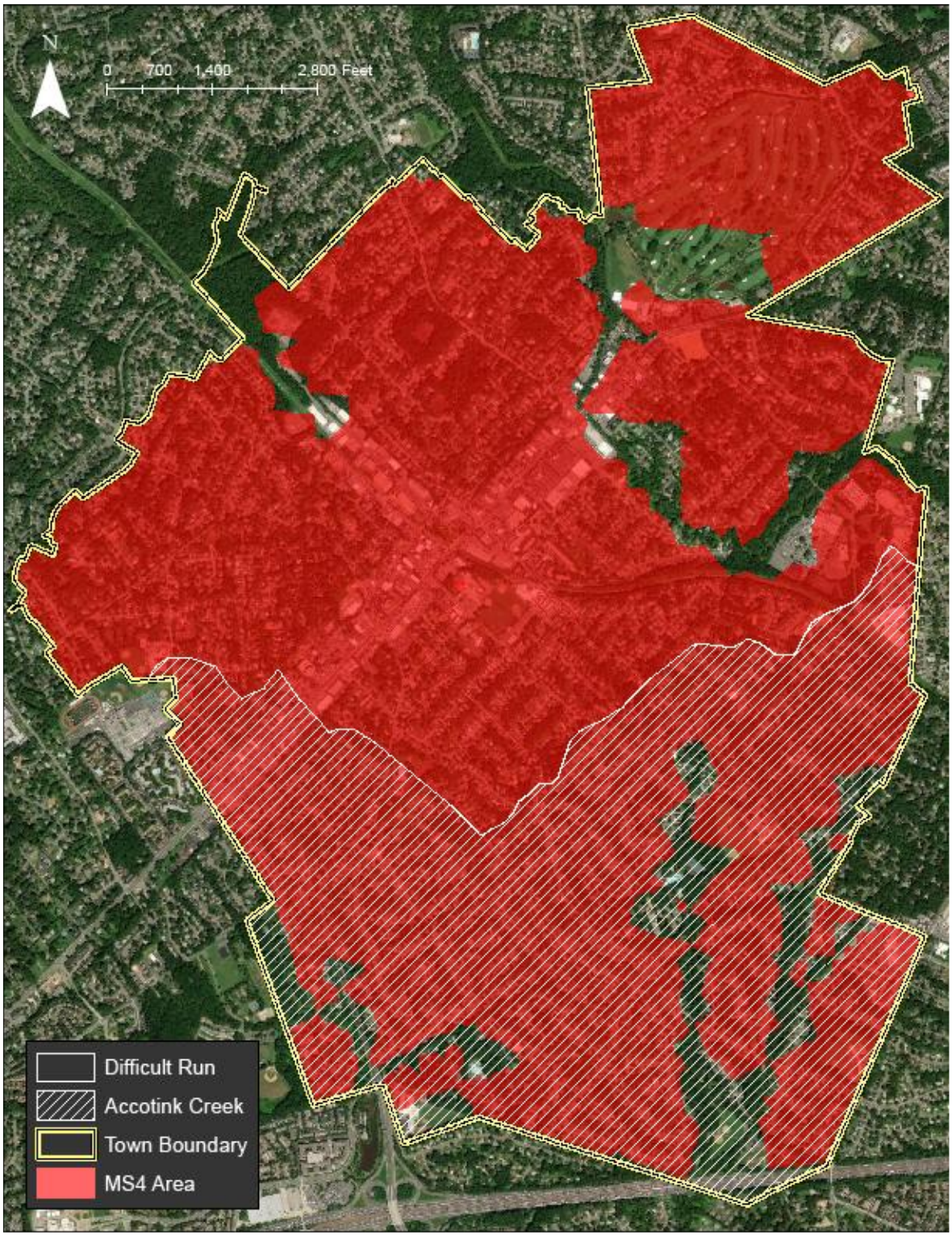
Table 2A – Upper Accotink Creek Aggregate MS4 WLA[4]

Aggregated MS4s	TMDL (lbs/year)	MS4 WLA (lbs/year)	% of TMDL
Town of Vienna City of Fairfax Fairfax County Virginia Department of Transportation Fairfax County Public Schools Northern Virginia Community College	8,217,030	4,972,399	66%

Unlike most TMDLs, the methodology used to develop the chloride TMDL did not allow for the estimation of baseline conditions. As a result, the percent reduction required to achieve the MS4 WLA is unknown. In addition, due to lack of information about chloride application rates, the TMDL does not attempt to refine the geographic distribution of the WLA beyond the aggregated MS4s. Therefore, the TMDL states that "aggregate WLAs are to be implemented using a performance-based BMP approach in accordance with 40 CFR § 122.44(k) as it is not appropriate, nor intended, to establish individual, numeric effluent limits for regulated stormwater sources using load duration-based TMDL WLAs."

[3] Table 4-1 of the TMDL.
[4] Does not include Long Branch or Lower Accotink Creek.

Map 2B – Town of Vienna MS4 Service Area



2.3 Identification of Significant Sources of Chloride

The TMDL states that deicing/anti-icing materials applied to roads, sidewalks, driveways, and other impervious surfaces are the primary source of chloride in urbanized watersheds such as Accotink Creek. Sources can be further refined as materials applied to transportation surfaces (public rights-of-way), other public property, commercial/institutional property (e.g. walkways and parking lots), homeowner/ condominium association common property, and individual private property.

Transportation Surfaces

According to the SaMS, transportation surfaces make up approximately 24% of impervious surfaces in the Accotink Creek watershed that have the potential to be treated with salt (that is, impervious surfaces minus features such as roof tops). Transportation is the largest land use category (followed by commercial/institutional and residential) and is the area most likely to have salt and other deicing/anti-icing materials consistently applied for safety reasons. It is also the area where the Town has the greatest amount of operational control. As such, it makes sense that transportation surfaces are the primary focus of the Town's chloride reduction efforts.

Application of deicers/anti-icers on transportation surfaces is the responsibility of the Streets Maintenance Division of the Department of Public Works. All public right-of-way is owned and maintained by the Town. Transportation-related operations are staged from the Northside Property Yard, which is located in the Difficult Run watershed. Dry materials are stored in a salt dome while liquid materials are stored in brine storage containers at the site.

The Streets Maintenance Division monitors winter weather forecasts and communicates with VDOT, Fairfax County, and other regional partners to gauge the extent and timing of precipitation events as well as to identify the strategies most appropriate to the situation. Liquid anti-icing materials (typically brine) may be applied prior to a winter weather event if there is no rain in the forecast. Typically, it takes three days to brine all roads in the Town. The Town currently uses salt as its primary deicer. For deicing operations, the Town uses the auger speed and gate height controls on spreaders to place the minimum effective level of material based on the current and forecasted weather conditions. Deicing materials are supplemented with sand at a 2:1 ratio if the temperature drops below freezing to help with traction during icy events. Once accumulation starts, the use of deicing materials stops and the strategy focuses on plowing. After roads are clear and accumulation has stopped, the Town may apply additional deicing materials to prevent refreezing.

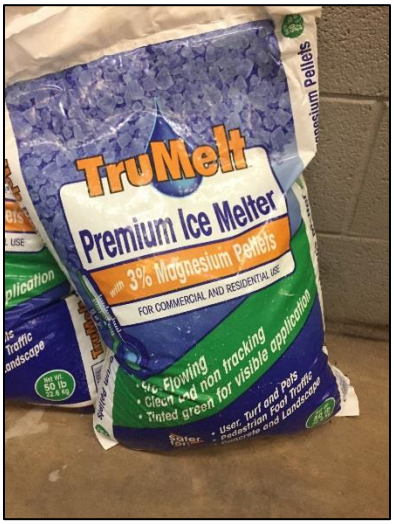
Town personnel are trained to identify areas of excess deicing material after each storm event, both at the Northside Property Yard and throughout the Town, so that the material may be collected. The Town also has a street sweeping program that typically begins in March.

Other Public Property

The Parks and Recreation Department is responsible for treating impervious surfaces around public buildings, including sidewalks and entrances. These areas may be pre-treated with brine and hand spreaders. Individual bags of deicing/anti-icing materials for these smaller applications are stored at the Northside Property Yard. The Town typically uses a commercially-available magnesium/chloride blend. Although still containing chloride, these products can be less harmful to surrounding vegetation when applied at recommended rates.

There are four Town properties in the MS4 service area of the Accotink Creek watershed where deicing/anti-icing materials may be applied. These properties include:

- Meadow Lane Park
- Southside Park
- Sarah Walker Mercer Park
- Nutley Street Maintenance Yard



None of these properties have impervious cover greater than one acre.

In addition to Town properties, Fairfax County Public Schools operates several properties in the Accotink Creek watershed. These include Louise Archer Elementary, Marshall Road Elementary, Cunningham Park Elementary, and Cedar Lane School. FCPS is covered under Fairfax County's MS4 permit. By agreement with the County, any pollutant loading from property owned by FCPS within the Town is the responsibility of the County. As a result, it is expected that these properties will be included in the chloride TMDL action plan developed by Fairfax County.

Commercial/Institutional Property

According to the SaMS, commercial/institutional properties make up approximately 20% of impervious surfaces in the Accotink Creek watershed that have the potential to be treated with salt. Property owners may apply salt and other deicers/anti-icers to parking lots, sidewalks, and building entrances. This may be done by the property owner or through the use of a contractor.

In the Accotink Creek portion of the Town, commercial properties are concentrated along Maple Avenue W (roughly the area between Pleasant Street and the southwestern Town boundary). Other areas of commercial activity in the Accotink Creek watershed include Cedar Park Shopping Mall and office complexes near the intersection of Follin Lane and Electric Avenue. There are several institutional uses throughout the watershed, including faith-based organizations. Overall, the Town has records of approximately 40 commercial properties with about 140 respective owners within the Accotink Creek watershed.

Homeowner/Condominium Association Common Property

Similar to commercial/institutional property, managers of HOA/condominium association property may apply salt and other deicers/anti-icers to parking lots, sidewalks, building entrances, and other common property on behalf of residents. This may be done by the property manager or by a contractor. The Town has records of six residential HOA/condominium associations within the Accotink Creek watershed.

Single Family Residential Property

Vienna's portion of the Accotink Creek watershed is dominated by single family residential properties. Property owners may apply salt and other deicers/anti-icers to driveways and sidewalks. In comparison to other property types, the application of materials is more likely to be done by the resident themselves using small quantities purchased locally.

2.4 Plan Evaluation and Adaptive Management Strategies

The Town successfully implemented the previous action plan as demonstrated in MS4 annual reports found acceptable to DEQ. While the TMDL action plan has only been in place for four years, the Town has identified two data points to help evaluate the results of the action plan: (1) full implementation of the SaMS Fundamental 5; and, (2) the Clean Water Partners annual survey to capture knowledge, awareness, and behaviors surrounding stormwater quality. This action plan has been reviewed based on this information and updated, as appropriate.

Salt Management Strategy Toolkit – Fundamental 5 Implementation

At the core of the Town's salt reduction strategy is implementation of the Fundamental 5 identified in the SaMS toolkit. The Fundamental 5 includes five key BMPs needed for an effective and environmentally sustainable winter weather response. These BMPs include (1) Winter Weather Planning, (2) Levels of Service, (3) Training, (4) Calibration, and (5) Measurement. The Town has now fully implemented the Fundamental 5 as demonstrated in the FY2024 MS4 annual report. Documentation includes training sign-in sheets and completed deicer/anti-icer application forms.

Clean Water Partners

The Town participates in the Clean Water Partners regional stormwater quality public education and outreach program. Program participants recognized the need to track and assess the effectiveness of efforts to educate residents on how to reduce the impacts of salt on the environment. As a result, several new questions were added in 2024 to the annual Northern Virginia Resident Stormwater Knowledge and Behavior Study. Since these questions are new, they establish a baseline from which to gauge progress over time. According to the results of the 2024 survey, 33.3% of Fairfax County residents (inclusive of the Town of Vienna) always or frequently apply deicers during winter weather events. Likewise, 14.7% of residents apply an abrasive. The survey also tested perceived impacts of salting on tap water and local waterways – with 33.5% and 47.5%, respectively, saying that salting has a very negative or somewhat negative impact. The goal of the Town is to increase these percentages and provide residents with tools to reduce the application of salt while maintaining public safety.

2.5 Best Management Practices

The MS4 permit (Part II B 8) requires the Town to review good housekeeping procedures for anti-icing and deicing agent application, handling, storage, and transport activities under Part I E 6 b (1) (a) and to identify at least two BMPs that promote efficient management of these materials while maintaining public safety. The following strategies have been identified and adopted by the Town.

Snow Operating Procedure SOP

The Town has adopted a Snow and Deicing/Anti-icing Operations Stormwater Pollution Prevention Standard Operating Procedure (SOP). The SOP was first developed in July 2015 and has been periodically updated to incorporate additional best practices and standards. The most recent version, dated May 1, 2021, was revised to account for the chloride TMDL and in consideration of the SaMS tool kit. The SOP applies to all Town operations and operations conducted by contractors on behalf of the Town. A summary of the SOP is provided below. The full SOP is found in Appendix A.

- Establishes responsible parties, including Town staff and contractors.

- Prohibits the use of deicing/anti-icing agents containing urea or other nutrients.
- Specifies that the SOP applies to small applications as well as large applications.
- Specifies best practices and standards for deicer/anti-icer storage.
- Specifies best practices and standards for deicer/anti-icer use, including application rate, equipment calibration, and loading/unloading.
- Specifies best practices and standards for deicer/anti-icer clean up after a winter event.
- Provides that the SOP will be incorporated into annual training for applicable employees.

Salt Management Strategy Toolkit

The SaMS toolkit includes a range of strategies that can be applied by both government and non-government entities to reduce the impacts of winter weather practices while maintaining public safety.

The Town has elected to implement those BMPs identified as the Fundamental 5. Table 2B provides a list of the Fundamental 5, the status of strategy implementation in the Town, and follow-up actions. Follow-up actions will be reported in the Town's annual MS4 reports to DEQ.

Table 2B – SaMS BMP Menu – Fundamental 5 Priorities

BMP	BMP Description	Status	Actions
Winter Operations Planning	Develop a winter maintenance plan	See Appendix B for Winter Weather Events SOP.	Ongoing implementation.
	Pre-season meetings	Implemented.	Document meeting dates.
	Post-season meetings	Implemented.	Document meeting dates.
	Plan snowplow routes	Primary streets are cleared first, followed by secondary, and then neighborhood streets. See Winter Weather Events SOP.	Ongoing implementation.
Levels of Service	Communicate LOS internally	LOS defined in the SOP.	None.
	Communicate LOS externally	Town Council, Town Manager, and department heads are informed of the LOS and SOP during annual department presentations.	Ongoing implementation.
Training	Training	Annual snow and stormwater SOP training is provided to staff from Sanitation, Parks and Recreation, Street Maintenance, Vehicle	Document training and sign-in forms. Refine training based on effectiveness and feedback.

		Maintenance, and General Maintenance.	
Calibration	Establish calibration process	Staff are instructed on proper equipment calibration during training. All equipment is calibrated in accordance with the manufacturer's specifications. Instructions are kept at the Northside Property Yard.	Ongoing implementation.
	Calibrate equipment	Equipment calibration includes plow speed, gate height, auger speed, and spreader settings. Settings are determined prior to each shift and checked by supervisor.	Ongoing implementation.
Measurement	Measure and record deicer use	See Appendix C for salt application tracking sheets.	Ongoing implementation.

2.6 Outreach Strategy

Pat II B 4 of the MS4 permit requires the development of an education and outreach strategy for reducing the impacts of salt on water quality. This includes both the public as well as Town employees. Further, Part II B 8 of the MS4 permit requires identification of target audiences and implementation of two or more strategies listed in Part I E 1 d Table 1 per year to communicate to target audiences.

In developing its targeting and messaging strategy, the Town utilized the following five principles from the SaMS toolkit (Appendix I):

(1) The importance of public safety.
(2) The unintended environmental impacts of salt use.
(3) Why minimizing salt application matters.
(4) The pros and cons of winter salt use.
(5) Specific actions the target audience can use to address the issue.

The following chloride reduction education and outreach strategies have been fully integrated into the Town's MS4 Program Plan. Implementation will be documented in MS4 annual reports to DEQ.

Table 2C – Chloride Education and Outreach Strategies

Audience	**Table 1 Reference**	**Strategy**	**Actions**
Single Family Residential	Traditional written materials	Distribute information on proper use of deicing/anti-icing materials through one of the following: (1) seasonally appropriate press release; (2) article	At least once annually (ideally immediately before winter months).

		in the Vienna Voice newsletter; (3) message in the Town Calendar; (4) message in the quarterly residential water bill.	
Single Family Residential	Media materials	Include a message about the proper use and application of deicing/anti-icing materials using a social medial platform.	At least annually (ideally immediately prior to a winter weather event).
HOA/Condominium Associations	Traditional written materials	Distribute a deicing/anti-icing fact sheet to HOA/condominium associations.	Once during permit cycle (FY27 or FY28).
HOA/Condominium Association	Speaking engagements	Be available to provide presentations on proper deicing/anti-icing techniques at HOA/condominium meetings (presentation previously developed by the Town).	Ongoing.
Commercial/ Institutional	Traditional written materials	Distribute deicing/anti-icing fact sheet to commercial/institutional property owners.	Once during permit cycle (FY27 or FY28).
General Audience	Media materials	Maintain information about chloride reduction strategies on the Town website.	Ongoing.

3. Schedule of Anticipated Actions

The Town will implement actions in accordance with the timelines in Table 2B and Table 2C and document implementation in MS4 annual report to DEQ.

4. Assessment of Effectiveness

Unlike structural stormwater management controls, the practices put in place to reduce chloride pollution do not have assigned reduction efficiencies. However, the Town has identified several strategies for assessing the effectiveness of its chloride reduction strategies.

As stated in the SaMS, "You can't manage what you don't measure." The Town has adopted a Salt Tracking and Reporting Data form, which is located in Appendix C. The Town will utilize this, or similar form, for tracking purposes and include them in the MS4 annual reports to DEQ.

The Clean Water Partners annual Northern Virginia Resident Stormwater Knowledge and Behavior Study will be used to assess the effectiveness of public education and outreach efforts. Each year, the Town will review trends and determine whether any changes are needed to target audiences and/or messaging.

The Northern Virginia Regional Commission coordinates regional meetings to discuss preparation for winter storm events and to share BMPs for reducing the impacts of chloride on water quality. This includes Winter Salt Coordination Meetings and additional meetings throughout the year to discuss specific topics. The Town will participate in these meetings to learn from other stakeholders in the region and to identify new BMPs and update existing BMPs as needed.

5. Opportunity for Public Comment

In accordance with Part II B 9 of the MS4 permit, this plan must be made available for public comment for at least 15 days. The draft plan was put on the Town's stormwater web page with an invitation for the public to provide comment from XXXXX through XXXXX. The opportunity to provide comment was also advertised through the Town's social media outlets. A snapshot of the web page and social media post are provided below. Public comments and the Town's responses are provided below.

Appendix A

Stormwater Pollution Prevention SOP
Snow and Deicing/Anti-icing Operations

Town of Vienna, Virginia

Stormwater Pollution Prevention Standard Operating Procedure (SOP)

Snow and Deicing/Anti-icing Operations	
Date:	July 16, 2015; Revised April 8, 2019; May 1, 2021
Purpose of SOP:	To minimize or prevent pollutant discharge from operations associated with snow removal and deicing/anti-icing.
MS4 Permit Reference	Part I E 6 a; Part II B "Local TMDL Special Condition"
Responsible Parties	Michael Gallagher, PE, Director of Public Works Christine Horner, PE, Water Quality Engineer James Kirby, Director, Streets Maintenance Division, DPW Leslie Herman, Director of Parks and Recreation

This SOP is designed to minimize, to the extent practical, the impacts of snow removal and deicing/anti-icing operations on local water quality while still ensuring public safety. This includes the storage and application of sand, salt, and other deicing/anti-icing chemicals.

1. Responsible Parties

a) Department of Public Works. The Street Maintenance Division of the Department of Public Works is responsible for snow removal and deicing/anti-icing operations in the Town's road right-of-way.

b) Department of Parks and Recreation. The Department of Parks and Recreation is responsible for deicing/anti-icing activities at public buildings, parks and recreational facilities, and adjoining sidewalks/access points.

c) Other Town Staff. Other Town staff members may engage in minor treatment of sidewalks and building entrances using bagged or boxed deicing/anti-icing materials.

d) Contractors. This SOP must be adopted by reference or otherwise incorporated into all contracting agreements dealing with snow removal or deicing/anti-icing operations within the Town's road right-of-way or on Town property.

2. Use of Deicing/Anti-icing Agents Containing Urea or Other Nutrients

The Town, including contractors, will not apply any deicing/anti-icing agent containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, sidewalks, or other paved surfaces.

3. Small Applications

This SOP applies to smaller small applications of deicing/anti-icing materials, such as to sidewalks or building entrances, as appropriate. Smaller areas may be pre-treated with brine or hand spreaders. The area being treated should be the minimum necessary for safety purposes. The use of materials containing magnesium is encouraged to reduce impacts on water quality and surrounding vegetation. To the extent practical, excess materials should be swept up and disposed of properly when weather conditions allow.

4. Salt and Deicer/Anti-icer Storage

a) Proper Containment. Salt and other chemical deicers/anti-icers will be stored in a covered, corrosion-resistant structure or container at all times, unless active loading or spreading is occurring. The structure will have an impervious bottom such as a concrete slab. For the Town of Vienna, these are the salt dome and brine storage containers at the Northside Property Yard.

b) Temporary Storage. Temporary storage of salt and other chemical deicers/anti-icers is not recommended; however, if materials must be stored outside of a permanent structure, the storage must be on a temporary basis only. Temporary storage piles must be on an impervious surface (the use of a tarp as an impervious bottom is not adequate) and covered with a tarp that is adequately secured at all times when not being actively worked.

c) Management of Run-on and Run-off. Storage structures must provide adequate barriers to prevent run-on into the storage pile, and minimize erosion from the pile. All run-off from salt and other chemical deicer/anti-icer piles must be eliminated at all times. Any run-off containing salt material must be captured and either returned to the storage pile, managed as salt brine, or discharged to a sanitary sewer system in accordance with Fairfax County guidelines.

5. Sand and Deicer/Anti-icer Use

a) Deicing Material. Prior to each winter season, the Town will assess deicing materials, and to the extent practical, will select the materials and mix that has the least impact on water quality while still effectively meeting the Town's public safety needs.

b) Anti-icing.
- Liquid anti-icing materials (typically brine) may be applied prior to storm events to prevent the bond between winter precipitation and the road surface. This can effectively reduce the amount of deicing material necessary for a storm event.

- Prior to each winter season, the Town will assess anti-icing materials, and to the extent practical, will select the materials and mix that has the least impact on water quality while still effectively meeting the Town's public safety needs.
- Anti-icing should only occur if no rain is forecast prior to the event.
- Applications should be conducted per manufacturer's recommendations.

c) Application Rate. The Town will use the lowest application rate that will effectively treat surfaces to meet safety needs based on the forecast and current weather events.

d) Equipment Calibration.
- All equipment will be calibrated in accordance with the manufacturer's instructions and the specified applications rates for the material being applied. The manufacturer's instructions will be kept at the Northside Property Yard and referenced prior to each winter storm event.
- Calibration will include plowing speed, gate height, auger speed, and other applicable spreader settings.
- The appropriate gate height and auger speed will be determined prior to each shift and checked by the supervisor between shifts.

e) Loading. When loading salt, sand, or other deicers, care will be taken to not overfill the truck or tank.

6. Sand and Deicer/Anti-icer Clean Up

a) Clean-Up.
- Loading areas will be swept frequently to prevent salt or sand build-up and run-off. At a minimum, loading areas should be inspected and swept following each storm event or other period when handling occurs.
- To the extent practical, excess materials on Town right-of-way and property will be cleaned up after each winter weather event.

b) Street Sweeping. The Town conducts routine street sweeping beginning in spring to clean up debris and other materials that collect during winter months, including salt, sand, and other deicers.

c) Vehicle Washing. Spreading and other equipment used during deicing operations will only be washed inside the bay designed for that purpose at the Northside Property Yard. Wash water from that facility enters the sanitary sewer system.

7. Training

This SOP will be incorporated into annual training for applicable employees in accordance with the Town's MS4 Program Plan that involve snow and deicing/anti-icing operations. Documentation of the training, including sign-in sheets and materials used, will be included in the Town's MS4 annual reports.

Appendix B

Winter Weather Events Standard Operating Procedures

TOWN OF VIENNA
DEPARTMENT OF PUBLIC WORKS

STANDARD OPERATING PROCEDURE
Winter Weather Events

OBJECTIVE
Our objective is to provide timely, efficient and effective anti-icing, de-icing, and mechanical removal of snow and ice from roadways and other means of travel during winter weather events. Delivering safe travel for town residents and the traveling public, while ensuring our teams return home safely at the end of every shift.

PROCEDURE
We will achieve our objective by promptly putting into action the Standard Operating Procedure for Winter Weather Events that is outlined in this document under the direction of the Director of Public Works or his/her designee. Due to the numerous variables that are inherent with winter weather in this area, each winter weather event will require different effort or emphasis on the maintenance task, which will determine the overall strategy for snow/ice removal and control.

It is important when any winter weather event arises, that crews are mobilized in advance of the predicted onset of a winter storm to ensure that the SOP can be put into action immediately. It is much better to have crews on standby and not have to use them than to wait too long and have a serious accident result from the delay.

LEVEL OF SERVICE
It may not be possible to maintain a snow or ice-free road during a winter weather event. The Town's fleet of plows and chemical spreaders will operate in 12 hour shifts until the roads are made safe. The Operations Superintendent or their designee will lead one shift, and the Street Maintenance Supervisor or their designee will the lead the other.

The Superintendent of Operations or their designee shall establish and maintain a clear procedure by which the potential for hazardous travel conditions is communicated from the Operations Department. This will be accomplished through weather reports, and/or field observations by the Superintendent, Supervisor and other staff. Additional information may also be communicated from the Town of Vienna Police Department, The Office of Emergency Management of Fairfax or MWCOG.

The Superintendent of Operations or their designee shall provide current road information by email at the end of shift or as needed to the Director of Public Works, the Town Manager, the Police Chief and Public Information Officer.

The Police Department will be responsible for notifying the Public Information Office and/or the Town Council in the event that an incident requiring Council notification occurs, following Police Department policies already established.

WORKFORCE
The Superintendent of Operations or their designee may/will utilize at their discretion employees from both the Public Works Department and Parks & Recreation for winter weather events to accomplish the Town's objective.

SHIFTS
Shifts will typically be 12-13 hours in duration with one shift to start at 12:00 a.m., and the other at 12:00 p.m. Shift work will be declared in advance, as soon as storm predictions indicate necessity. **All designated essential personal will report to their shift supervisor ½ hour prior to the beginning of their assigned shift for assignments and again at the end of their shift for clarification on next steps.**

Policy's concerning reporting for duty, pay, meals and lodging for essential personnel will be dictated by the policies outlined in Administrative Regulation 2.10; Inclement Weather/Unforeseen Emergency Conditions.

OPERATIONS
There will be three phases of town commitment depending on the expected accumulation and duration. The phase implemented may be influenced by factors other than listed such as temperature, changing forecast, or the storms actual impact before reaching the Town of Vienna.

An operational phase may need to be increased/decreased during a winter weather event depending on the actual accumulation/duration of the storm.

Phase 1: Department of Public Works will coordinate all snow and/or ice removal with the support of the Parks & Recreation Staff. Expected accumulation of 1-3 three inches, staffing will consist of enough drivers/operators to operate the spreader trucks and loaders for two shifts, along with Parks and Recreation crews as needed. The Superintendent of Operations or their designee, Street Maintenance Supervisor and team members as deemed necessary and possibly staffing for the Emergency Operations Center. DPW will be responsible for the streets; Parks & Recreation will be responsible for Town owned parking lots, steps and walkways, along with designated sidewalks.

Phase 2: Department of Public Works will coordinate all snow and/or ice removal with the support of the Parks & Recreation Staff. Expected accumulation is between 3-6 inches and a storm of short duration (typically less than 12 hours of precipitation expected). Staffing will consist of enough drivers/operators to operate snow removal equipment for two shifts, along with Parks and Recreation crews. The Superintendent of Operations or their designee, Street Maintenance Supervisor and team members as deemed necessary, and staffing for the Emergency Operations Center. DPW will be responsible for the streets with assistance from Parks & Recreation as deemed necessary. Parks & Recreation will be responsible for Town owned parking lots, steps and walkways, along with designated sidewalks.

Phase 3: Department of Public Works will coordinate all snow and/or ice removal with the support of the Parks & Recreation Staff. Expected accumulation is at least 6 inches and a storm

of long duration (typically over 12 hours of precipitation expected). Staffing will consist of enough drivers/operators to operate snow removal equipment for two shifts Superintendent of Operations or their designee, Street Supervisor and team members as deemed necessary, and staffing for the Emergency Operations Center. . DPW will be responsible for the streets with assistance from Parks & Recreation staff as deemed necessary. **DPW and Parks & Recreation staff at the conclusion of a storm of substantial size will be responsible for Town owned parking lots, steps, walkways and designated sidewalks.**

BE ADVISED**:** DURING ANY PHASE**: 1, 2, or 3.** Some things may not be addressed until after the storm has finished and roadways have been cleared. (i.e. some building walkways, parking lots, and designated sidewalks.)

REFUSE COLLECTION
During phase 1, 2, or 3 Refuse collection may be canceled due to unsafe working conditions.

SNOW REMOVAL SEQUENCE
Snow removal Sequence will be:

1. Anti-icing when possible
2. Primary Plow/Sanding Routes
3. Secondary routes and cul-de-sacs
4. Town owned facilities, parking lots and sidewalks
5. Widening of roads and/or Removal of Snow from designated streets when major accumulations occur.(Clean-up, removal)

WINTER STORM MAINTENANCE

Upon the forecast of a winter weather event, the Superintendent of Operations or their designee will notify the appropriate TOV staff of the need to prepare for shift work.

Roads will be treated in the following manner:

1. Anti-icing of the road surface with salt brine will be done when a winter event is predicted within the next three days. Rain is not predicted and the pavement is dry. The road surface temperature is above 20 degrees and there is sufficient time for the pavement to dry before the air temperature falls below 20 degrees. Anti-icing agents should be applied at 30 to 50 gallons per lane mile

2. Spreader trucks will be sent out to treat all TOV roads with chemicals at the onset of a winter storm. Chemical spreading will continue until all Town roads are treated as necessary or the accumulation has reached approximately 1½ - 2 inches. It should be noted that chemicals on treated roads effect is slower on melting snow and ice at lower temperatures. (At the discretion of the supervisor on duty chemicals, may not be applied when temperatures are well below their effective working temperature).

3. As the storm develops and approximately 1½ - 2 inches of snow has accumulated, drivers and equipment will begin to plow in their assigned areas. Designated primary streets will be cleared first, followed by secondary streets and cul-de-sacs. There will be times when additional accumulation will make it necessary to return to the primary routes before completing secondary routes.

4. After the storm has ended, plowing will continue until all streets are cleared from curb to curb as thoroughly as possible considering obstacles (such as parked cars) in the roadway. Roadway surfaces may be given additional treatment as determined by the supervisor on duty. Salt, and/or any chemical that the Town has for use as a de-icing agent may be used to help melt the build-up of snow. Sand may be applied to allow for additional traction. Weather conditions will determine if, when and how much and what type of treatment may be applied.

5. Town owned facilities, parking lots and sidewalks will be cleared. (This may be done concurrently with other activities as decided by the supervisor on duty.)

6. In the event of a storm with greater than 6 inches of snow sidewalks and parking lots may not be done with the exception of the V.P.D**.** & Northside Property Yard until all streets have been cleared.

7. In the event of a major snow fall, designated streets may have the snow removed. Typically snow removal may occur on Church Street between Park and Lawyers, Intersections on Maple Avenue from town line to town line along with Nutley St. S., parking spaces adjacent to Town Hall, and other locations where it has been deemed necessary.

EXECUTION

The Policy outline above is intended to serve as the normal operating procedure for winter weather events, snow removal and/or ice control for the Town of Vienna. One or more of the following, which may delay or prevent the implementation of this policy, may affect all or any part of this policy:

- Snow accumulation greater than 1 inch per hour
- Freezing rain, sleet or other icing conditions
- Unsafe operating conditions
- Traffic congestion
- Public emergencies
- Downed Power Lines
- Personnel staffing
- Equipment break down

EQUIPMENT

The Operations Division has the following pieces of equipment available for snow removal and ice control operations:

- 1 Anti-icing truck 41

- 6 Single axle trucks with plows and material spreaders 28, 29, 53, 39, 41, 88
- 4 Tandem axle dump trucks with plows 38, 65, 83, 85
- 4 One ton trucks with plows 27, 30, 34, 57
- 2 Skid steer loaders (with snow blowers if necessary) 140, 144
- 2 Front end loaders 163, 195
- 2 Backhoe/loader 164, 260

Parks & Recreation has the following pieces of equipment to aid in the effort.

- 2 ATV's with plows 429, 462
- 2 One ton trucks with plows 61, 92
- 2 Tractors with front buckets 402, 408
- 1 Bobcat (with snow blower if necessary) 440
- Multiple snow blowers

OPERATIONAL AREAS

For purposes of snow removal and ice control operations, the Town has designated six primary routes, six secondary routes and the cul-de-sacs which are broken into the four quadrants, NE, NW, SE and SW.

The Primary routes include the following streets:

- Beulah Road NE
- Branch Road SE
- Center Street North & South
- Cherry Street SE (Center to Park)
- Church Street NE & NW
- Cottage Street SW
- Courthouse Road SW
- Creek Crossing Road NE
- Electric Avenue SE
- Follin Lane SE
- Glyndon Street NE & SE
- Kingsley Road SW (Nutley to Park)
- Lawyers Road NW
- Locust Street SE & SW
- Malcolm Road NW
- Maple Avenue East & West
- Marshall Road SW
- Nutley Street NW & SW (Marshall to Malcolm)
- Old Courthouse Road NE
- Park Street SE & NE
- Tapawingo Road SE & SW (Nutley to Park)

Secondary routes include all other streets and cul-de-sacs.

COMMUNICATIONS

Most of the vehicles utilized for snow removal are equipped with radios capable of transmitting and receiving messages and those that do not, the operator will be assigned a hand held radio. Each vehicle is assigned a unique call number. In addition, the Operations Superintendent, Supervisor and Crew Leaders are issued cell phones.

MATERIALS

Snow Operations uses salt-brine for anti-icing. Then may use salt, sand and or magnesium chloride as treating agents; contracts are in place with local suppliers for replenishment as needed. There are three 3,000 gallon and one 5,000 gallon tanks at Northside Property Yard that can be used for salt-brine. The Property Yard Salt Dome holds approximately 1,000 tons of salt. The salt-brine is used as an anti-icing agent on the road surface when snow is predicted within the next three days. Anti-icing helps prevent the snow and/or ice from bonding to the road surface. The salt is utilized as a de-icing agent and as it is spread on the roadway surface, it helps to melt the snow or ice so it can be removed by mechanical means (plowing) and helps resists future snow and ice packing.

Primary Sanding Routes

#28

Cottage St.:	Shopping Center	to	Cedar
Tapawingo Rd.:	Park	to	Moore Place
Kingsley Rd.:	Park	to	Nutley

#88

John Marshall Dr.:	Glyndon	to	McKinley
Beulah Rd.:	Maple	to	Town Line
Creek Crossing:	Beulah	to	Town Line
Old Courthouse Rd.:	Town Line	to	Town Line

#41

Maple Ave.:	Town Line E	to	Town Line W
Nutley St.:	Malcolm	to	Marshall Rd.
Marshall Rd.:	Nutley	to	Hillcrest

#29

Locust St. SE:	Park	to	Branch
Glyndon St.:	Church	to	Locust
Branch Rd.:	Maple	to	Valley
Follin La.:	Maple	to	Town Line

#39

Church St.:	Pleasant	to	East
Park St.:	North	and	South
Lawyers Rd.:	Maple	to	Town Line
Malcolm Rd.:	Lawyers	to	Town Line

#53

Center:	North	and	South
Mill St. N:	Center	to	Bike Path
Town Hall	Parking Lot		
Locust:	Center	to	Courthouse
Courthouse Rd:	Maple	to	Town Line
Police Department	and	Church	Parking Lot
Community Center	Parking lot		

Primary Plow Routes

#53 & #29

Maple Ave.

Center St.:	Moore Ave.	to	Town Line North
Mill St. N	Center St.	to	Bike Path
Cherry St.	Center St.	to	Park St.
Tapawingo Rd.	Park St.	to	Moore PL.(including)
Kingsley Rd.	Nutley St.	to	Park St.
Marshall Rd.	Nutley St.	to	Hillcrest Dr.

#39 & #28

Maple Ave.		to	
Lawyers Rd.	Maple Ave.	to	Town Line N
Malcolm Rd.	Lawyers Rd.	to	Town Line W
Courthouse Rd.	Maple Ave.	to	Town Line W
Locust St. SW	Center St.	to	Courthouse Rd.
Cottage St.	Shopping Center	to	Cedar Lane

#88 & #41

Maple Ave.

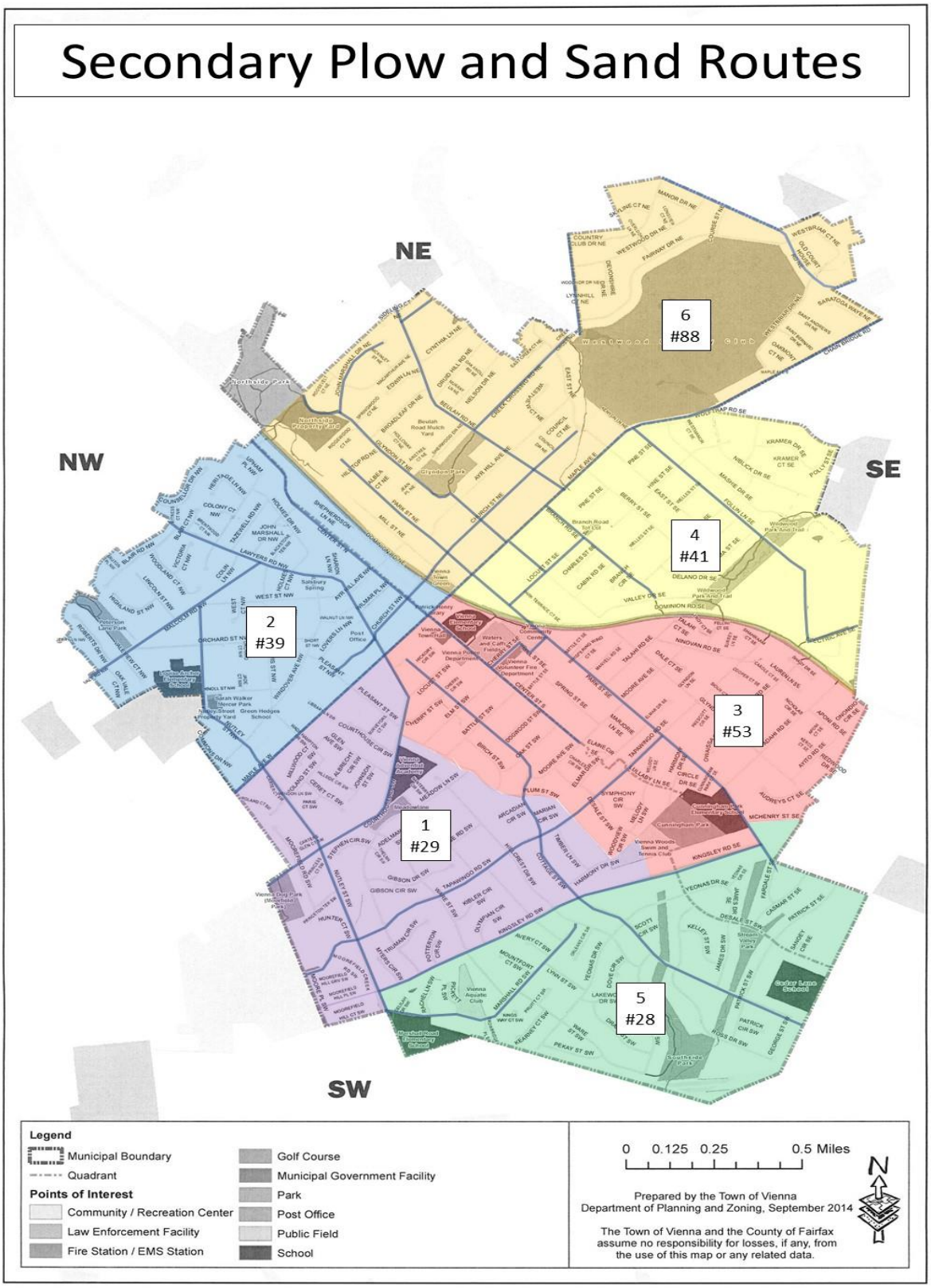
Church St	Pleasant St.	to	East St.
Beulah Rd.	Maple Ave.	to	Town Line N
Creek Crossing Rd.	Beulah Rd.	to	Town Line E
Old Court House Rd.	Town Line E	to	Town Line W
Branch Rd.	Maple Ave.	to	Valley Dr.

#85 & 65

Maple Ave.

Nutley St.	Malcom Rd.	to	Marshall Rd.
Park St.	Dead End N	to	Cedar Lane
Locust St. SE	Park St.	to	Branch Rd.
Glyndon St.	Northside PY	to	Valley Dr.
Follin Lane	Maple Ave.	to	Town Line S

Secondary Plow and Sand Routes



Building Sidewalks, Parking Lots, and Right-of-Way Sidewalks to be cleared.

Building Sidewalks

- Northside Property Yard
- Vienna Police Department
- Town Hall
- 301 Center St. (Church)
- Bowman House
- Community Center
- Freeman Store & Museum (low priority)
- Town Green (low priority)

Parking Lots

- Northside Property Yard
- Police Department
- Town Hall
- Bowman House
- 301 Center St. (Church)
- Community Center
- Nutley Property Yard
- Glyndon Park parking lot (low priority)
- Southside Park parking lot (low priority)
- NOVA Parks parking lot across from train station (low priority)
- Dog Park on Courthouse Rd. (low priority)

ROW Sidewalks

- Nutley Street S – Maple Avenue to Marshall Road (both sides)
- Maple Avenue – Nutley to Follin Lane (both sides)
- Church Street – Park St. Street to Lawyers Road (both sides)
- Lawyers Road – Church Street to Maple Avenue (both sides)
- Center Street S – Church to Cherry Street (both sides)

- Locust Street SW – Courthouse Road to Center Street (one side)
- Courthouse Road – Locust Street to Nutley Street (south side – “Church” side)
- Marshall Road – Kings Way Court to Ware Street (south side)
- Malcolm Road – Nutley Street to Lawyers (north side along fencing)
- Nutley Street S – Maple to Marshall Road (both sides)
- Sidewalk around Meadow Lane Park – Ware to Meadow Lane to Fredrick St. SW (park side)
- Cherry Street SE – Park Street to Center St. (community center & ballfield side only)
- Park Street SE– Cherry Street to Locust St (both sides) including x-walks
- Park Street SE– Casmar to McHenry Street (school side)
- Mill Street – Maple to Church Street (both sides)

Low Priority Sidewalks

- 124 Courthouse Rd. SW (Robinson Property)
- 440 Beulah Rd. - Front of House to Glyndon Park
- Beulah Rd. -East side Ayrhill to Maple Ave.

Appendix C

Salt Tracking Forms and Instructions

Salt Tracking and Reporting Data: Sheet #1 - Operations

Organization Name:						
Sub-Organization Name:						
Geographic Area(s) of Operations:	Area 1	Area 2	Area 3	Area 4	Area 5	Other (insert text)
Winter Season:						

Operational Area Description

Total Highways and Roads (lane miles)	0		
Total Bike/Other Maintained Trails (miles)	0		
Total Area of Treated Parking Lots	0	**Parking Area Units of Measure**	Acres
Total Area of Treated Travelways	0	**Driveways Units of Measure**	Linear Ft or Sq. Ft.
Total Area of Treated Sidewalks	0	**Sidewalks Units of Measure**	Linear Ft or Sq. Ft.
Total Area of "Other#1" Types of Treated Surfaces	0	**Units for "Other"**	Acres or Sq. Ft.
Total Area of "Other#2" Types of Treated Surfaces	0	**Units for "Other"**	Acres or Sq. Ft.

Detailed Property /Route Information

	Units	**Property/ Route #1**	**Property/ Route #2**	**Property/ Route #3**	**Property/ Route #4**	**Property/ Route #5**
Total Highways and Roads (lane miles)	lane miles					
Total Trails (miles)	miles					
Total Area of Treated Parking Lots	Acres or Sq. Ft.					

Salt Tracking and Reporting Data: Sheet #2 - Storms Tracking

Organization Name:							
Sub-Organization Name:							
Geographic Area(s) of Operations:	Area 1	Area 2	Area 3	Area 4	Area 5	Other (insert text)	
Winter Season:	0	**# Storm Operations (Seasonal Total):**					

Storm Descriptions

	Seasonal Total	**Storm 1**		**Storm 2**		**Storm 3**		**Storm 4**	
Beginning Date, Time of Each Storm Operations Deployment		Date	Time	Date	Time	Date	Time	Date	Time
End Date, Time of Operations:		Date	Time	Date	Time	Date	Time	Date	Time
Beginning Date, Time of Storm Precipitation		Date	Time	Date	Time	Date	Time	Date	Time
End Date, Time of Precipitation:		Date	Time	Date	Time	Date	Time	Date	Time
Full or Partial Deployment?		F, P		F, P		F, P		F, P	
Storm Type (Heavy Snow > 6", Medium 2-6", Light < 2")		H, M, L		H, M, L		H, M, L		H, M, L	
Inches of Snowfall:	**0**	**0**		**0**		**0**		**0**	
Ice or Freezing Rain?		Y, N		Y, N		Y, N		Y, N	
Road Temperature During Storm (Warm, >32, Mid, 25-32, Cold, <25 degrees F)		W, M, C		W, M, C		W, M, C		W, M, C	
Early Storm Conditions: Starts as Snow, SS; Starts as Rain, SR		SS, SR		SS, SR		SS, SR		SS, SR	
Winds During Storm (Light, < 15 mph, Strong, > 15 mph)		L, S		L, S		L, S		L, S	
Winds After Storm (Light, < 15 mph, Strong, > 15 mph)		L, S		L, S		L, S		L, S	
Forecasted Post Storm Temps (Same, Rising, Falling)		S, R, F		S, R, F		S, R, F		S, R, F	
Sources Used for Storm Information (NWS, Own Observation, other?)									
Other Notes Describing Storm Conditions (narrative)									

Salt Tracking and Reporting Data: Sheet #3 - Product Use

Organization Name:							
Sub-Organization Name:							
Geographic Area(s) of Operations:	Area 1	Area 2	Area 3	Area 4	Area 5	Other (insert text)	
Winter Season:	0						

Product Use Data

Treatment Products	Seasonal Total	Units of Measure	Amount used in Storm 1	Amount used in Storm 2	Amount used in Storm 3	Amount used in Storm 4	Amount used in Storm 10	Was this product effective? (narrative as applicable):	Is product planned for continuation? (Yes or No)
Sodium Chloride (NaCl)	**0**	dry lbs, tons							Y, N
Magnesium Chloride (MgCl)	**0**	dry lbs, tons							Y, N
Calcium Chloride (CaCl)	**0**	dry lbs, tons							Y, N
Sodium Chloride Brine % Brine Mixture: ____	**0**	gallons	Y, N	Y, N	Y, N	Y, N	Y, N		Y, N
Magnesium Chloride Brine % Brine Mixture: ____	**0**	gallons	Y, N	Y, N	Y, N	Y, N	Y, N		Y, N
Calcium Chloride Brine % Brine Mixture: ____	**0**	gallons	Y, N	Y, N	Y, N	Y, N	Y, N		Y, N
Abrasives Applied	**0**	sq. yds, tons							Y, N
Other Products Used? Name: .	**0**	Units							Y, N
Other Products Used? Name: .	**0**	Units							Y, N
Other Products Used? Name: .	**0**	Units							Y, N
Notes on Treatment Products Used									

Salt Tracking and Reporting Form Data Dictionary

This tool is provided for winter pavement treatment operators to record data that can be used over time to reduce costs while maintaining standards of service.

Service Area (Tab #1) **data can be entered by Operational Units (light green shaded section of Tab1), which will sum for the whole organization,** or **simply enter data at the organizational level (light blue shaded portion of Tab1).**

Winter Weather (Tab #2)**data can be entered by Storm Events (light green shaded section of Tab2), which will sum for the season,** or **simply enter data at the seasonal level (light blue shaded portion of Tab2).**

Product Use (Tab #3) **data can be entered by storm event (light green shaded section of Tab2), which will sum for the season,** or **simply enter data at the seasonal level (light blue shaded portion of Tab2).**

BMP Implementation (Tab #4) **data is only enterred at the seasonal level (light blue shaded portion of Tab4).**

Data Element	Data Element Definition/Data Entry Instructions
Tab 1: Operations	Organization Name, Geographic Areas of Operations, Winter Season Years, and the total extent of Transportation and Property Management areas maintained are **Core Tracking Elements**
Organization Name:	**Enter** name of Public or Private Organization tracking its winter operations
Sub-Organization Name:	**Enter** name of Sub-unit of the Organization for tracking information being recorded. Example Transportation Division, Property Maintanence Div., etc.
Geographic Area(s) of Operations:	**Select** all NoVA jurisdictions in which the organization conducts winter operations (B4-F4), with All NoVA an option. If > 5 individual areas, can specify any remaining areas of operations (G4)
Winter Season:	**Enter** the years corresponding to the winter season being tracked (i.e., 2020-21).
Seasonal Tracking	
Total Highways and Roads (lane miles)	**Enter t**otal lanes miles for all road surfaces maintained in the winter by the organization
Total Bike/Other Maintained Trails (miles)	**Enter t**otal miles for all trails maintained in the winter by the organization
Total Area of Treated Parking Lots	**Enter** total area for all Parking Lots treated by the organization. **Select** either Acres or Sq. Ft in the reporting unit field
Total Area of Treated Travelways	**Enter** total area for all "Travelways" treated by the organization, which include driveways, alleys, and other off-road vehicular paths. **Select** either Acres or Sq. Ft in the reporting unit field
Total Area of Treated Sidewalks	**Enter** total area for all Sidewalks treated by the organization. **Select** either Sq. Ft or Linear Ft. in the reporting unit field
Total Area of "Other #1" Treated Surfaces	**Enter** the type of surface (Column A) and its total area (Column B) for Other Areas #1 treated by the organization. **Select** either Acres or Sq. Ft in the reporting unit field
Total Area of "Other #2" Treated Surfaces	**Enter** the type of surface (Column A) and its total area (Column B) for Other Areas #2 treated by the organization. **Select** either Acres or Sq. Ft in the reporting unit field
Operations Area Tracking	
Total Highways and Roads (lane miles)	**Enter** lanes miles for road surfaces treated for this Route, add additional columns for >5 Routes/Property Groupings. **Note** that for this and other treatment area fields, if comprehensive data is enterred at "Property/Route" level of detail, organziational totals will be computed.
Total Bike/Other Maintained Trails (miles)	**Enter** Trail miles treated for this Route
Total Area of Treated Parking Lots	**Enter** total area for all Parking Lots treated for this Property Grouping. **Select** either Acres or Sq. Ft in the reporting unit field
Total Area of Treated Travelways	**Enter** total area for all "Travelways" (driveways, alleys, and other off-road vehicular paths) treated for this Property Grouping. **Select** either Acres or Sq. Ft in the reporting unit field
Total Area of Treated Sidewalks	**Enter** total area for all Sidewalks treated for this Property Grouping. **Select** either Sq. Ft or Linear Ft. in the reporting unit field
Total Area of "Other#1" Treated Surfaces	**Enter** the type of surface (Column A) and its total area (Column B) for Other Areas #1 treated for this Property Grouping. **Select** either Acres or Sq. Ft in the reporting unit field. Examples might include stairs, bus stops, etc.
Total Area of "Other#2" Treated Surfaces	**Enter** the type of surface (Column A) and its total area (Column B) for Other Areas #2 treated for this Property Grouping. **Select** either Acres or Sq. Ft in the reporting unit field. Examples might include stairs, bus stops, etc.
Tab 2: Storms Tracking	Number of Storm Operation Deployments and Total Inches of Snowfall for Season are **Core Tracking Elements**
Organization Name:	Auto Populates from Tab #1, similarly done for Tabs #3 and 4
Sub-Organization Name:	Auto Populates from Tab #1, similarly done for Tabs #3 and 4
Geographic Area(s) of Operations:	Auto Populates from Tab #1, similarly done for Tabs #3 and 4
Winter Season:	Auto Populates from Tab #1, similarly done for Tabs #3 and 4
Number of Storm Operations (Seasonal Total):	**Enter** the number of winter storms during which plowing and/or anti- or deicing activities were conducted.
Beginning Date, Time of Each Storm Operations Deployment	**Enter** the Date and Time that Storm Operations Deployment began - this could be a couple days in advance of forecast winter precipitation
End Date, Time of Operations:	**Enter** the Date and Time that Storm Operations Deployment ended - this could be a couple days after winter precipitation ended.
Beginning Date, Time of Storm Precipitation	**Enter** the Date and Time that Storm Precipitation actually began.
End Date, Time of Precipitation:	**Enter** the Date and Time that Storm Precipitation actually ended.
Storm Type (Heavy Snow > 6", Medium 2-6", Light < 2")	**Select** the code for the Storm Type; Heavy Snow (HS = > 6"), Medium Snow (M = 2-6"), or Light Snow (L = < 2").
Inches of Snowfall:	**Enter** the total amount of Snowfall during the winter season (Column B) for your organization, or enter the snowfall for individual storms (Columns C-V), and the seasonal total will be calculated. Add additional columns as needed to allow tracking of > 10 storms for the season.
Ice or Freezing Rain?	**Select** Yes or No to indicate whether the storm precipitation included ice or freezing rain.
Road Temperature During Storm (Warm, >32, Mid, 25-32, Cold, <25 degrees F)	**Select** the code for the Road Temperatures during Storm; Warm (W > 32F), Mid (M = 25-32F), or Cold (C < 25F).
Early Storm Conditions: Starts as Snow, SS; Starts as Rain, SR	**Select** the code for Early Storm Conditions; Starts as Snow (SS), Starts as Rain (SR).

Winds During Storm (Light, < 15 mph, Strong, > 15 mph)	**Select** the code for Wind Conditions during the Storm; Light (L , 15 mph) or Strong (S > 15 mph).
Winds After Storm (Light, < 15 mph, Strong, > 15 mph)	**Select** the code for Wind Conditions after Storm Precipitation ended; Light (L , 15 mph) or Strong (S > 15 mph).
Forecasted Post Storm Temps (Same, Rising, Falling)	**Select** the code for the **Forecasted** Post-Storm Temperatures; Same (S), Rising (R), or Falling (F).
Sources Used for Storm Information (NWS, Own Observation, other?)	**Enter** narrative information to identify the source of storm weather information reported above.
Other Notes Describing Storm Conditions (narrative)	**Enter** narrative information to document details or clarify any additional information desired to describe storm. This could include differences between forecast information and actual storm conditions, or anything else the organization wishes to record for future reference.
Tab #3: Treatment Products	Seasonal Totals for all Products Used are a **Core Tracking Element**
Sodium Chloride (NaCl)	**Enter** the amount of NaCl applied at the Seasonal level (Column B) or for individual storms (Columns D-M, expand for > 10 storms), which will calculate seasonal totals. ***For this and subsequent products*** , ***Select*** *the units (dry lbs or tons) in Column C,* ***Enter*** *narrative information to indicate the product's effectiveness (Column N), and* ***Select*** *a response to indicate whether the product is planned for future use; Yes (Y), or No (N).*
Magnesium Chloride (MgCl)	**Enter** the amount of MgCl applied at the Seasonal level (Column B) or for individual storms (Columns D-M), which will calculate seasonal totals.
Calcium Chloride (CaCl)	**Enter** the amount of CaCl applied at the Seasonal level (Column B) or for individual storms (Columns D-M), which will calculate seasonal totals.
Sodium Chloride Brine	In Column A, second line**, enter the % NaCl** in the brine product**. Enter** the gallons of NaCl **brine** applied at the Seasonal level (Column B), and **Select** Yes or No for brine application during individual storms (Columns D-M).
Magnesium Chloride Brine	In Column A, second line, **enter the % MgCl** in the brine product**. Enter** the gallons of MgCl **brine** applied at the Seasonal level (Column B), and **Select** Yes or No for brine application during individual storms (Columns D-M).
Calcium Chloride Brine	In Column A, second line, **enter the % CaCl** in the brine product. **Enter** the gallons of CaCl **brine** applied at the Seasonal level (Column B), and **Select** Yes or No for brine application during individual storms (Columns D-M).
Abrasives Applied	**Enter** the amount of abrasives applied at the Seasonal level (Column B) or for individual storms (Columns D-M), which will calculate seasonal totals.
Other Products Used? Name:	**Enter** the Product name (Column A), **Enter** the amount of other products applied at the Seasonal level (Column B) or for individual storms (Columns D-M, expand as needed), which will calculate seasonal totals. **Enter** the units used for Other Products (Column C).
Notes on Treatment Products Used	**Enter** narrative information to document and explain anything desired about products used during the winter season. This might include any use of Sand/Salt mixes, Use of Brines with Additives - such as beet juice, use of brines not at Industry Standard/Eustectic composition (23.3%), etc.
Tab #4: BMP Implementation	Indicating (Yes/No) for BMP Implementation at a Seasonal level is a recommended **Core Tracking Element**
Winter Maintenance Plan is developed	**Select** Yes or No (Column C) to indicate whether a written Winter Maintanence Plan has been prepared by organization and reviewed with crew and managers. ***For this and subsequent BMPs,*** *if Yes,* ***Enter*** *narrative information (Column D) to briefly explain the effectiveness of the BMP. If No,* ***Select*** *Yes or No to indicate Future Plans to use BMP (Column E), and, if Yes,* ***Enter*** *narrative information to explain plans to address any impediments or requirements needed to enable future use of the BMP.*
Preseason meetings are held	**Select** Yes or No (Column C) to indicate whether meeting(s) were held with the maintenance crew, supervisors, and management/property manager(s) to review the Winter Maintenance Plan, highlight any changes in operations, and revisit past lessons learned.
Postseason meetings are held	**Select** Yes or No (Column C)to indicate whether meeting(s) were held with the maintenance crew, supervisors, and management/property manager(s) to evaluate how well the season went, what worked, and what could be changed to improve operations.
Accountability is at every level	**Select** Yes or No (Column C) to indicate whether the winter maintenance plan clearly states everyone's accountability; Management accountability for decisions on storm response (i.e., type of material, number of deployed operators, etc.), and Crew Leaders and Operators accountability to follow these decisions and work within the operation's guidelines/policy.
Transportation Audiences - Snowplow routes are planned	**Select** Yes or No (Column C) to indicate whether the plan for road maintenance strategically plans each snowplow route to maximize efficiency, considering cycle time and levels of service for each route.
Property Management Audiences - the properties are visited before the season	**Select** Yes or No (Column C) to indicate whether a property visit/walk with the property manager was conducted to inspect for challenging areas, deicer storage areas (if applicable), and drainage issues prior to the winter season.
Transportation Audiences - Levels of Service are communicated internally	**Select** Yes or No (Column C) to indicate whether the levels of service for the various routes have been communicated to all operations staff.
Transportation Audiences - Levels of Service are communicated externally	**Select** Yes or No (Column C)to indicate whether the levels of service have been communicated to Inform residents and political leaders of the different levels of service for roads treated by the organization.
Property Management Audience - Levels of Service are discussed and agreed upon	**Select** Yes or No (Column C) to indicate whether property managers and service providers have discussed and agreed to the levels of service standards for all winter service areas.
Training is held	**Select** Yes or No (Column C)to indicate whether all staff have been trained on winter operations plans, including managers, operators, contract employees, seasonal employees.
Deicer piles are properly stored	**Select** Yes , No, or N/A to indicate whether storage piles are covered/enclosed to prevent exposure to precipitation, and situated on an impervious surface with stormwater collected and contained within a bermed basin lined with concrete or other impermeable materials or an underground storage tank(s); good housekeeping is practiced around storage piles.
Liquid products are properly stored	**Select** Yes , No, or N/A to indicate whether liquids are stored in double walled tanks or have secondary containment in case of a leak or spill, and that operators know the freezing point of the liquid products and prevent product freezing.
Loading and hauling of deicers are done properly	**Select** Yes or No (Column C) to indicate whether deicers are loaded under cover and on a level surface, and spreading equipment is not overloaded (to avoid spills) and the deicer is covered on the spreader. Good housekeeping practices are used around the loading area, and when deicer spills occur, products are recovered and returned to the stockpile.
Equipment is cleaned and wastewater is contained	**Select** Yes or No (Column C) to indicate whether equipment is cleaned after storm operations conclude, and that wastewater from the cleaning process is contained properly to avoid a discharge.
Property Management Audiences - Storage of deicers and abrasive piles delivered to a property:	**Select** Yes, No, or N/A to indicate whether deicers and abrasive piles delivered to a property are placed on an impervious surface, and covered with durable/waterproof material or placed in a covered storage facility. Storage piles are shaped properly to avoid interaction with precipitation, and if outdoors, piles are windrowed with well-sloped sides.
Property Management Audiences - Storage and handling of deicer bags is done properly	**Select** Yes, No, or N/A to indicate whether deicer bags are protected from precipitation, and located up-gradient/out of the path of stormwater/meltwater and away from waterbodies, wetlands, storm drains, and stormwater capture areas. Empty deicer bags are disposed of in a lined/contained receptacle.
A calibration process is established	**Select** Yes or No (Column C) to indicate whether a calibration process is in place for salt application equipment that takes into account flow settings, conveyor/auger and spinner speeds, ground speed, and material (size, density, etc.). Application rates are standardized across equipment types.
Equipment is calibrated	**Select** Yes,No, or Partially (Column C) to indicate whether (solid and liquid dispensers) are calibrated in the preseason, mid-season, and when equipment or deicer material changes are made to ensure accurate application rates relative to treatment plans.

Pre-storm meetings are held	**Select** Yes or No (Column C) to indicate whether, prior to the start of each storm operation, the maintenance crew, supervisors, and management/property manager(s) review operations plans, highlight potential challenges and solutions for the forecasted storm, and revisit lessons learned from post-storm meetings.
Post-storm meetings are held	**Select** Yes or No (Column C) to indicate whether, after storm operations conclude, the maintenance crew, supervisors, and management/property manager(s) evaluate what was done, how well it worked, and what could be changed to improve operations.
Accurate weather forecasting is obtained and is a part of decision making	**Select** Yes or No (Column C) to indicate whether accurate forecasts that detail the 1) start of precipitation, 2) type of precipitation, 3) total precipitation expected/storm intensity, 4) expected event length, 5) wind conditions (speed, gusts, directions), and temperature trends are considered prior to each storm operation.
Know the surface temperature	**Select** Yes or No (Column C) to indicate whether equipment and/or remote technology is used to know the temperature of the surface that will/may be treated with deicers, and use this information to determine the appropriate application rate for the storm conditions.
Advanced plows are used	**Select** Yes, No, or N/A to indicate whether organization uses plows that maximize the plow-able area; examples include 1) side wing plows, 2) tow plows, and 3) flexible or sectional blades.
Advanced spreaders are used	**Select** Yes, No, or N/A to indicate whether organization uses spreaders that can apply very low rates of deicers, including electronic spreaders that can lock in specific application rates and collect data.
Proper/Advanced equipment needed for making liquid products is used	**Select** Yes, No, or N/A to indicate whether organization has equpment to make and store liquid products, including 1) an open top mixing tank, 2) a holding tank, 3) pumps to transport liquid from mixing tank to holding tanks, to applicator tanks, and 4) a salimeter or a hydrometer to measure the salinity or density of water.
Transportation Audiences - Automated Vehicle Location (AVL) is used	**Select** Yes or No (Column C) to indicate whether organization tracks the position, spreader rate, and plow activity of different snow plows in the fleet (to show results live to supervisors, other plow operators, and the public).
Transportation Audiences - Maintenance Decision Support System (MDSS) is used	**Select** Yes or No (Column C) to indicate whether organization uses existing and new data (weather, road conditions, etc.) to integrate data and generate diagnostic and prognostic maps of road conditions, and provide recommendations on road maintenance actions.
Transportation Audiences - Precision Deicing is used	**Select** Yes or No (Column C) to indicate whether organization integrates LIDAR data, road condition index (severity based on road angles/curves and solar radiation), precipitation data, AVL, and automated spreaders to direct precision deicing that dynamically adjusts application rates of chemicals/liquids based on site-specific, local road conditions.
Anti-icing is used	**Select** Yes or No (Column C) to indicate whether either liquids or solids are used for anti-icing. Anti-icing with liquids (e.g., brines) can be done up to 48 hours before snow/ice fall, and uses significantly less deicer than solids. However, solid anti-icing can work best for events that start as rain or freezing rain.
Plowing early and often is common practice	**Select** Yes or No (Column C) to indicate whether frequent plowing is used to remove snow/ice, rather than using deicers to "burn off" any accumulations; frequent plowing limits the time for snow/ice to compact and bond with the pavement.
Transportation Audiences - Plowing activities are coordinated	**Select** Yes or No (Column C) to indicate whether operators plowing activities are coordinated to prevent plowing off another operator's material.
Transportation Audiences - Plow trains are used	**Select** Yes or No (Column C) to indicate whether plow trains are used on multilane highways to remove as much snow as possible in one coordinated sweep.
Property Management Audiences - The right plow, shovel, pusher, blower, blade, or broom for the property is used	**Select** Yes or No (Column C) to indicate whether plows, shovels, pushers, blowers, blades, and brooms are selectively used in accordance with recommended best practices (such as those contained in BMP Pro/Con guide table for this BMP).
Property Management Audiences - Opportunities to close areas with a small footprint,	**Select** Yes, No, or N/A to indicate whether organization utilizes opportunities to close selected property areas to reduce treatment needs.
Property Management Audiences - Snow is placed in proper places	**Select** Yes or No (Column C) to indicate whether plowed snow is stored downhill from deicer storage areas to stop melt water from interacting with deicers.
Dyed deicers are used	**Select** Yes or No (Column C) to indicate whether dyed deicers are used to observe and show deicer product presence.
Use of Abrasives	**Select** Yes or No (Column C) to indicate whether abrasives are used by organization. Abrasives alone provide traction during 1) freezing rain events, 2) in slow-moving traffic areas, and 3) when deicers are ineffective because it is too cold . For narrowly defined circumstances, a 50/50 blend of deicers and abrasives can be used, but this practice should be limited to those circumstances specifically defined by the organization.
Deicers are cleaned up after storm	**Select** Yes or No (Column C) to indicate whether left over deicer materials are cleaned-up after the snow/ice has melted away.
Transportation Audiences - Spinners set-are up properly	**Select** Yes or No (Column C) to indicate whether organization uses a chute or sets spinners close to the ground to reduce bounce and scatter of solid deicer products.
Transportation Audiences - Plows drive 17-25 mph on non-high-speed roads	**Select** Yes or No (Column C) to indicate whether operators drive at speeds of 17-25 mph when applying deicer to keep material on road.
Transportation Audiences - On high-speed roads deicer is applied to the center of the road or high side of a curve	**Select** Yes or No (Column C) to indicate whether operators apply deicers in center of high speed roads and on the high side of curves.
Transportation Audiences - Auger, shoots, or conveyors are turned off when stopped	**Select** Yes or No (Column C) to indicate whether operators turn off auger, shoot, or conveyor when stopped, even briefly.
Transportation Audiences - Deicer application rate is reduced on successive passes	**Select** Yes or No (Column C) to indicate whether operators reduce application rates on second/subsequent passes of a treated route to leverage deicing capacity of the remaining deicer.
Property Management Audiences - Spread patterns that prevent overlapping applications are used	**Select** Yes or No (Column C) to indicate whether service provider/operator surveys the property, and develops and utilizes a spread pattern that prevents applying deicers over areas that have already been treated.
Property Management Audiences - Drop spreaders or rotary spreaders with shields are used for sidewalks	**Select** Yes or No (Column C) to indicate whether drop spreaders or rotary spreaders with shields are used to prevent spreading deicer off of the sidewalk.
Property Management Audiences - Managing stairways or areas with a small footprint #2	**Select** Yes, No, or N/A to indicate whether when deicers are applied in small areas, the deicer needed is calculated (using an application rate chart) based on the total area to be treated, uses the proper tool (push shovel, scoop shovel, broom or blower, ice scraper, or an ice chisel) to most effectively remove snow and ice from small/challenging areas, and uses hand-held spreaders for more precise application in small treatment areas.
Variable application rates are used for surface temperature, precipitation type/rate, and intended levels of service	**Select** Yes or No (Column C) to indicate whether recommended application rates are varied based on: 1) pavement/surface temperature, 2) precipitation rate and type, and 3) cycle time/bare pavement regain time.
Deicers are used within their temperature range	**Select** Yes or No (Column C) to indicate whether treatment plans (which deicer and/or abrasives will be used) are based on forecasted temperatures/conditions, and organization maintains adequate amounts of the necessary deicers/abrasives to be prepared for extremely cold temperatures, when abrasives alone may be the best option.
Deicers are pretreated	**Select** Yes or No (Column C) to indicate whether solid deicers are pre-treated with a liquid, typically brine, to help deicer material stick to surfaces and speed up the melting process.
Deicers are prewetted	**Select** Yes or No (Column C) to indicate whether liquids, typically brine, are added to solid deicers as they are being applied (prewetting) to help material stick to surfaces and speed up the melting process.
Direct Liquid Application is used	**Select** Yes or No (Column C) to indicate whether mixtures of water and deicer are applied directly to a surface (Direct Liquid Application, or DLA) during or after a storm to deice immediately (there is no lag time for the deicer solution to form).
Deicer use is measured and recorded	**Select** Yes or No (Column C) to indicate whether a standardized process is used to measure and record deicer use as frequently, accurately, and refined (e.g., per route, shift, site, etc.) as possible.
Additional BMPs and Comments: Seasonal or Storm-specific	**Enter** the name of any additional BMPs implemented (Column B) and narrative information as desired to identify and discuss the effectiveness of any other BMPs used in the organization's winter operations (Column C). Additional comments may pertain to overall seasonal operations, or could be specific to individual storm operations. If storm specific, identify the storm that comments pertain to. Add additional rows as desired to accomodate all comments.