



Anne Arundel County Salt Management Plan

Revised 2026

Department of Public Works

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1.0 Introduction

The following plan has been developed to identify the actions required to effectively manage road salt for winter maintenance activities consistent with guidance provided under the Maryland Statewide Salt Management Plan.

1.1 Overview

In 2010, the Maryland State Legislature passed legislation (HB 0903/SB 0775) that mandated a Maryland Statewide Salt Management Plan. Tasked by the legislature, the State Highway Administration (SHA) and Maryland Department of the Environment (MDE) developed best practices to minimize environmental impacts from salt runoff. These best practices for salt management cover the use of salt from its delivery, storage and handling at salt storage locations to its placement on highways during winter storms and to post storm cleanup operations.

The following Best Management Practices (BMP) should be seen as a starting point in an agency's plan to minimize the impact of salt on the environment in Maryland. The Maryland Department of the Environment (MDE) expanded local jurisdiction NPDES Permit requirements to require the submission of a County specific salt management plan in the third year of the fifth-Generation NPDES MS4 Permit (issued November 5, 2021).

The Anne Arundel County Salt Management Plan (SMP) serves as a localized adaptation of the Maryland Statewide Salt Management Plan. Its goal is to provide the Department of Public Works (DPW) staff with the necessary guidance to ensure high-level roadway performance and public safety during winter events. This plan integrates statewide best practices with county-specific operational requirements to balance fiscal responsibility with the protection of Maryland's natural resources.

The SMP contains the following principles that define the basic goals of a jurisdiction in delivering service to the public while meeting agency missions:

Public Safety

Public safety is the primary goal of this SMP. Effective winter storm maintenance has a direct impact on safety of the roadway users and on the personnel performing the maintenance. Hazardous conditions can pose direct risks to drivers, emergency response vehicles and maintenance crews; hence public safety is at the forefront of this SMP.

Environmental Protection

The County recognizes that the environmental impact of winter maintenance materials requires a strategic balance between public safety and ecological protection. High salinity levels can degrade the quality of Maryland's waterways; therefore, the development of these BMP is centered on minimizing road salt usage. Through the implementation of this plan, Anne Arundel County seeks to optimize material efficiency, ensuring that the safety of the roadway network is maintained through environmentally responsible operations.

Efficient Transportation System

Efficient transportation systems are necessary in maintaining the mobility necessary for economic stability and in providing the quality of life expected by the County's constituency. SMP has been developed with these priorities in mind.

Fiscal Responsibility

State and local jurisdictions must operate within the fiscal budgets set by their governing bodies; accordingly, this SMP is designed to be effective within the County's existing financial framework. As funding allows, the County will seek to enhance its technological capabilities to further improve salt efficiency and environmental outcomes.

Continual Improvement

In order to progress in the reduction of salt usage and the resultant environmental impacts, goals, technologies, practices, materials and equipment need to be revisited on a re-occurring basis to determine if changes can affect salt usage or can bring about reduced environmental impacts. Since these changes may have a fiscal impact on agency budgets, there must be recognition that the changes may be incremental.

Local Development of Salt Management Plans

The County has developed this localized SMP to provide the DPW with a precise roadmap for protecting public safety while reducing salt impacts on the environment. This plan is designed as a living document, allowing the County to recalibrate strategies in response to shifting environmental benchmarks and diverse winter conditions. Regular, structured reviews ensure that our operations consistently leverage the latest in salt-reduction technology. Through this plan, the County upholds its dual commitment to providing safe transit for its citizens and preserving the natural integrity of our local watersheds.

1.2 Purposes of this Document

The purpose of this document is to set out a policy and procedural framework for enabling the DPW to continuously improve on the management of road salt used in winter maintenance operations consistent with the best practices for salt management outlined in the Statewide Salt Management Plan. This local plan is meant to be dynamic to allow DPW to evaluate and phase in any changes, new approaches and technologies in winter maintenance activities in a fiscally sound manner. At the same time, any modifications to winter maintenance activities must ensure that roadway safety is not compromised.

1.3 Responsibilities

All personnel within the DPW and supporting departments, including contractors, involved in winter maintenance share responsibility for the implementation and success of this plan.

2.0 Salt Management Framework

2.1 Vision, Mission, Mandate

Vision: Anne Arundel County will be recognized as a leader in improving winter maintenance operations while reducing environmental impacts and ensuring public safety.

Mission: DPW's operations staff will optimize the use of deicers on all County roads while striving to minimize salt impacts to the environment.

Mandate: DPW's operations staff will provide safe winter conditions for vehicular and pedestrian movements as required by the level of service policies and funding established by the Administration and Council.

2.2 Policy Statement

The County will provide efficient and effective winter maintenance to ensure the safety of users of the road network in keeping with applicable best practices and accepted standards while striving to minimize adverse impacts to the environment. These commitments will be met by:

- Adhering to the procedures contained within the SMP, with a primary focus on anti-icing (pre-treating) and pre-wetting de-icing materials.
- Implementing precision application methods, including the use of Road Weather Information Systems (RWIS) or forecast services and calibrating application equipment to ensure the minimum effective application rate is used based on pavement temperature and weather conditions.
- Committing to ongoing winter maintenance staff training and education, with an annual review of best practices and equipment operation.
- Maintaining BMP for material handling and storage, including covered, impervious storage for materials and proper management of salt-impacted snow disposal sites.
- Reviewing and updating the SMP on an annual basis to incorporate new technologies and/or new developments, analyzing salt usage data (e.g., pounds per lane-mile per storm) to ensure the effectiveness and continual improvement of the Plan.

2.3 Application

The SMP is to be endorsed by the Director of the Department of Public Works and will apply to all County employees and contractors who are involved in winter maintenance operations.

2.4 Establishing Goals for Achieving Reduction in the Environmental Impact of Salt

The SMP implements best practices designed to balance the necessity of ice control materials for safe roads with fiscal responsibility and environmental awareness. The primary objective is to ensure the roadway system remains functional and safe for drivers during winter storms, while actively optimizing material use to reduce operational costs and minimize ecological impacts.

Because winter weather is inherently unpredictable, establishing annual salt reduction goals can be difficult. Therefore, the SMP works to manage and optimize salt application by focusing on the following strategies:

- **Tracking Usage:** Consistently and accurately measuring the volume of salt applied during winter operations to better manage inventory and budgetary resources.
- **Analyzing Trends:** Acknowledging that while set annual percentage reductions are not always feasible due to fluctuating storm severity, studying historical usage trends and adhering to the SMP will drive long-term material efficiency and significant cost savings.
- **Committing to Long-Term Efficiency:** Embracing sustained, optimized salt usage as a highly desirable goal that maximizes the impact of taxpayer dollars while remaining environmentally responsible.

3.0 Salt Management Plan

3.1 Overview

This section outlines the strategic practices established to effectively manage road salt during winter maintenance activities within the County. To ensure a systematic approach, the framework is organized into the following core operational areas:

- Safety, mobility and winter maintenance policies
- Trends and data analysis
- Material logistics, including ordering, delivery, storage, handling, and record-keeping
- Equipment protocols, including upgrades, calibration, and washing
- Snow and ice control training
- Weather forecasting and storm response
- Winter patrol and level of service monitoring
- Protection of environmentally sensitive areas
- Public outreach and education initiatives
- Continuous technology review

Rather than serving as a catalog of all potential best management practices, this section acts as a focused roadmap. It documents current operational standards while identifying strategic, future improvements that are both environmentally beneficial and practically feasible under present operational conditions.

Ultimately, this roadmap is designed as a living document that will be updated on a regular basis to reflect evolving best practices and changing conditions. It should be viewed as a key tool in the ongoing commitment to provide Anne Arundel County residents with reliable safety and mobility during winter storm events, ensuring these essential services are delivered in a cost-effective and environmentally sustainable way.

3.2 Safety, Mobility, and Winter Maintenance Policies

General	The County annually reviews its winter maintenance policies and defined levels of service to ensure they remain effective and environmentally responsible. While the County's current maintenance standards are well-established and accepted by the community, the County recognizes the need to formalize a dedicated "Sensible Salting" policy to further align operations with environmental best practices.
Goal/Timetable	Staff will finalize a dedicated "Sensible Salting" policy that will support the goals of this SMP and the MDE Enhanced Winter Maintenance Training Manual. Winter maintenance policies will be reviewed annually and updated, as needed. If changes are required, Director endorsement is to be obtained.
Responsibility	Director, Public Works; Deputy Director, Highways
Environmental Impacts	Established winter maintenance policies dictate operational behavior in the field. Integrating "Sensible Salting" principles directly into foundational policy ensures that environmental protection and salt reduction remain primary objectives alongside public safety and roadway mobility.
Performance Measure	Director-level approval of a formal winter maintenance policy, including "Sensible Salting" techniques. Annual review of winter maintenance policy.

3.3 Trends & Data Analysis

General	At the close of each winter season, the County conducts an in-depth analysis of its operations, including a focus on material usage. This analysis serves as a critical tool for identifying operational trends, learning from past events, and developing strategic recommendations for the following winter. Highways senior management utilizes this data to evaluate the need for procedural, policy, and expenditure changes, as well as to determine any budgetary implications. By consistently analyzing these trends and adhering to a responsible management plan, the County can establish long-term goals that systematically reduce salt usage without compromising the safety and mobility of the motoring public.
Goal/Timetable	The County will continue to track and measure salt and brine usage relative to the number of lane miles serviced and the total inches of snow per precipitation event. Additionally, Highways will conduct an annual post-season review meeting to evaluate overall winter operations, consolidate lessons learned from individual post-storm reviews, and address areas of concern, such as salt management and equipment needs. This meeting will be used to identify key opportunities for

	improvement and to form dedicated task teams to implement these upgrades over the summer. Over the next two to five years, the County's goal is to utilize this operational data to guide and justify the upgrading of current anti-icing equipment with newer, more efficient technology systems as they become available.
Responsibility	Chief of Road Operations
Environmental Impacts	Effective salt management relies on the accurate accounting of salt usage relative to actual storm severity. Identifying precise operational trends enables the County to set realistic, data-driven reduction goals, which directly minimizes excess chloride runoff into the environment.
Performance Measure	Decrease the amount of salt used per lane mile per inch of snow. Annual review meeting

3.4 Material Ordering and Delivery

General	The County adheres to strict best practices for the ordering, delivery, and receiving of de-icing materials. During the fall and throughout the winter season as needed, all salt deliveries must be immediately stockpiled inside a covered barn, dome, or shed. To minimize material loss into the environment, extended outdoor storage, and deliveries made during wet weather must be covered with a waterproof tarpaulin. All loading pads must be swept clean immediately following the transfer of materials. The initial seasonal stockpiling must be completed prior to December 1st of each year. For every delivery, staff must collect a Weigh Ticket and record the following information: • Truck number and net weight • Current weather conditions • Confirmation that delivered road salt was transferred to a covered structure within 24 hours. • Confirmation that the loading pad was cleaned following the transfer
Goal/Timetable	The County has established and currently maintains comprehensive procedures for material ordering and delivery that meet all necessary operational and environmental standards. Because these best practices are fully integrated into current daily operations, there are no additional future goals or timetables required for this section at this time.
Responsibility	District Superintendent for ensuring that the ordering and delivery practices are implemented.

Environmental Impacts	Improper housekeeping practices relating to the delivery and handling of salt can increase loss to the environment.
Performance Measure	Compliance of housekeeping practices through periodic yard inspection.

3.5 Materials Storage and Handling

General	The County utilizes salt, calcium chloride, and liquid brine for its winter maintenance operations. Liquid de-icing liquid is stored within double walled tanks or in single walled tanks with secondary containment. Solid de-icing salt is securely stored in seven (7) covered barns distributed across various Road Maintenance Yards. Each indoor storage area features an impervious pad, and designated paved loading pads are utilized when filling spreader trucks. All tanks and storage barns undergo comprehensive facility inspections annually each June as part of the Stormwater Pollution Prevention Plan. To minimize environmental exposure, the following good housekeeping practices must be adhered to: Solid Materials: • All outside loading must occur exclusively on the impervious loading pad. • Spreaders must never be loaded beyond their maximum capacity. • Any spilled material during the loading process must be swept up and returned to the storage structure. • All unused salt must be returned to a covered storage facility at the end of an operation. • Maintain documentation for all barn inspections and repairs. Liquid Materials: • All liquid materials must be stored in well-maintained, clearly labeled tanks. • Tanks must feature secondary containment systems to capture potential spills. • Tanks must be physically protected against accidental damage from vehicles or equipment. • Tanks must be inspected regularly; any drips or leaks must be repaired immediately.
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Goal/Timetable	Periodic inspections of all maintenance yards and both solid and liquid material storage facilities will be conducted to ensure ongoing compliance.
Responsibility	Road Maintenance Supervisor; Operators to ensure that the guidelines for "good housekeeping practices" are followed.
Environmental Impacts	Improper housekeeping practices related to the storage and handling of salt can increase the potential for loss to the environment.
Performance Measure	Compliance through periodic yard inspections. Inspection rate depends on the type of material stored.

3.6 Material Record Keeping

General	The County keeps up-to-date records of all of its winter operations, especially records of salting. Records are kept for each winter event, and for each winter season. This allows for seasonal analysis and the identification of trends.
Goal/Timetable	A material tracking system is in place to track material usage that allows the County to report the amount of deicing material applied to roads per precipitation event and the monthly and annual pounds used per lane mile per inch of snow, as required in the MS4 Annual Report. The County currently tracks salt brine use in gallons but intends in 1-5 years to track salt brine use in pounds per lane mile for reporting purposes and continues work to implement technology to track and report this information. On a seasonal basis, the amount of material used versus amount stored is to be reconciled with deliveries and usage records. This data is presented in the County's MS4 annual report and reviewed by MDE.
Responsibility	Chief of Road Operations for the design and implementation of a material tracking protocol. Road Maintenance Management Administrator for the seasonal reconciliation. Road Maintenance Supervisor for ensuring data collection.
Environmental Considerations	Accurate accounting of salt usage is the foundation of an effective salt management program. This data allows the County to identify exact areas of over-application, adjust field practices, and ultimately minimize excess chloride runoff into the environment.
Performance Measure	Accurate material usage records (by storm and route) to support MS4 annual reporting requirements and long-term trend analysis

3.7 Equipment Upgrading

General	The winter maintenance fleet must be equipped to deliver precise and appropriate levels of de-icing materials. Currently, a large percentage of the fleet has spreader units that are equipped with electronic controls with data retrieval capabilities to monitor the volume and location of material spread. The use of infrared thermometers (IRTs) further ensures accurate application volumes based on real-time pavement temperatures. Additionally, operations staff routinely utilize pre-wetting techniques. Spraying liquid de-icing chemicals directly onto solid salt helps the material adhere to the pavement, reducing the total volume of salt required by approximately 20%-30%.
Goal/Timetable	As the spreader fleet is replaced, IRTs and pre-wet capabilities will consistently be included in all new spreader truck specifications. Furthermore, as older plow blades wear out, they will be replaced with modern, high-efficiency blade systems. Funding is requested each budget year in accordance with an established heavy equipment replacement plan. Equipment upgrading is subject to annual appropriations that can be influenced by budget constraints and general economic uncertainty. The County's goal is to upgrade the current fleet with comprehensive pre-wet systems, advanced plow blades, and additional plowing attachments.
Responsibility	Chief of Road Operations, contingent on appropriated funds; and Fleet Coordinator to prepare specifications for equipment upgrades.
Environmental Impacts	Modernizing equipment ensures that operators can apply the exact right amount of de-icing material in the right place at the right time. This precision maximizes the operational effectiveness of the salt while drastically reducing excess material that would otherwise become environmental runoff.
Performance Measure	Percentage of equipment equipped with electronic spreader controls, IRT's and pre wet capability.

3.8 Equipment Calibration

General	Properly calibrated equipment is one of the keys to the effective placement of deicer material on County roadways.
Goal/Timetable	All salt spreaders must be calibrated and routes benchmarked prior to the start of each winter season. Throughout the season, spreader units will be inspected and recalibrated as needed during routine equipment maintenance.
Responsibility	District Superintendents; Road Maintenance Supervisors
Environmental Impacts	Accurate equipment calibration prevents the over-application of materials. By ensuring only the exact required volume of de-icing

	salt is applied to the roadway, the County directly reduces excess environmental runoff.
Performance Measure	Salt spreaders calibrated by November 1 of each year. Ongoing monitoring and comparison of material spread rates across different routes and vehicles throughout the winter season.

3.9 Equipment Washing

General	The County's objective is to reduce the amount of chlorides, oil, grease, and grit discharged into the environment during maintenance operations. Currently, equipment washing takes place at one (1) indoor location and one (1) outdoor location. Both designated wash areas are equipped with oil/water separators, ensuring all wash water is safely discharged directly into the sanitary sewer system.
Goal/Timetable	The County will continue the strict practice of washing all equipment in designated equipment washes with full wash water recovery. This ensures full utilization of the oil/water separator systems and wash water collection, significantly minimizing the risk of any untreated wash water discharging into the surrounding environment.
Responsibility	Road Maintenance Supervisors; Operators to ensure equipment washing is inside.
Environmental Impacts	Vehicle wash water contains high concentrations of residual salts, oil, grease, and dirt. If allowed to drain freely, this runoff can severely contaminate the soils and groundwater.
Performance Measure	Zero washing of equipment will occur outside designated equipment washes with full wash water recovery.

3.10 Snow and Ice Control Training

General	The County requires that all staff and contractors involved in snow and ice operations receive comprehensive training in effective salt management. While personnel have historically received baseline winter maintenance training, the County is now formalizing an ongoing, structured training program dedicated strictly to salt management practices.
Goal/Timetable	The County will develop and implement a new, formalized training program focused on winter maintenance policy and salt management. All personnel—including hired equipment operators and temporary employees—will be required to complete this training and undergo annual refresher courses. The training will focus specifically on implementing the County's Salt Management Plan (SMP) procedures and will include the following modules:

	• Good housekeeping practices at storage facilities. • Interpretation of weather forecasts and pavement conditions. • Proper use of infrared thermometers. • Appropriate timing, methods, and application rates for chemical deicers. • Health and safety requirements. • Proper operational record-keeping and post-storm review.
Responsibility	Chief of Road Operations to arrange for the appropriate annual training modules for all staff and contractors.
Environmental Impacts	A thorough understanding of good housekeeping and efficient snow and ice control measures significantly increases the success of the Salt Management Plan. Well-trained operators are the most effective tool in preventing the over-application of materials, directly reducing the volume of excess salt entering the local environment.
Performance Measure	Tracking the total number of staff and contractors who successfully complete annual snow and ice control training.

3.11 Weather Forecasting

General	Staff utilize various professional weather reporting services to access current and forecasted weather data. To assess real-time, on-the-ground conditions, staff coordinate directly with one of three on-call Duty Supervisors who actively patrol roadways within each District.
Goal/Timetable	The County will initiate discussions with the State to explore options for accessing enhanced, real-time weather and pavement data, such as through SHA Road Weather Information System (RWIS) stations. Over the next two to five years, the County's goal is to closely monitor the accuracy of storm forecasts against actual field conditions to refine response strategies.. Severe winter storms present unique challenges for salt management and maintaining an acceptable Level of Service. Response strategies must adapt based on the specific type of weather event.
Responsibility	Chief of Road Operations
Environmental Impacts	The effective and efficient use of de-icing materials heavily depends on accurate weather forecasting and informed decision-making. Inaccurate data can lead to the mistimed,

	unnecessary, or excessive application of road salt, which increases harmful environmental runoff.
Performance Measure	Delivery of clear, accurate weather forecasts at least four times daily between November and April of each year.

3.12 Storm Response

General	The County relies on established criteria and guidelines to standardize staff responses across varying combinations of precipitation, pavement temperatures, and traffic volumes.
Goal/Timetable	The County will update its snow and ice control plan to supplement existing response protocols. This includes preparing formal maintenance guidelines tailored to specific storm events, pavement conditions, and operational phases. Over the next two to five years, the County's goal is to closely monitor storm response records against these guidelines to assess necessary updates and to continue upgrading the fleet with additional road temperature sensors. Additionally, the County will conduct post-storm reviews at the garage or district level for most winter storms, scaling up to agency-wide reviews for major storm events. These reviews will focus on three key elements: what worked well, what did not work well, and opportunities for continuous improvement.
Responsibility	Chief of Road Operations; for preparing formal storm response guidelines. District Superintendents for ensuring the implementation of appropriate storm response treatments.
Environmental Impacts	Snow and ice control decisions that fail to align with actual weather and road conditions lead to operational inefficiencies and inappropriate material application. Standardizing the response ensures materials are used efficiently, mitigating excess environmental runoff.
Performance Measure	Maintenance of a fully documented and updated storm response plan. Accurate and complete record-keeping of all storm responses.

3.13 Winter Patrol and Level of Service Monitoring

General	The County monitors winter road conditions to be able to react to changing weather and road conditions and to ensure that the published levels of service for the motoring public are maintained. Winter Patrol staff inform mobilization decisions through visual
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	field patrols. Throughout a storm response, dedicated route monitors are deployed to ensure acceptable levels of service are consistently maintained for the motoring public.
Goal/Timetable	The County will update its formal guidelines for mobilization of spreader trucks. All related policies will be reviewed annually to ensure ongoing consistency with the County's level-of-service expectations.
Responsibility	Chief of Road Operations for preparing guidelines. District Superintendents for ensuring implementation and mobilizing Route Monitors.
Environmental Impacts	Accurately interpreting weather and road conditions ensures that the appropriate level of action is taken. This results in the timely, efficient, and targeted application of winter de-icing materials, which minimizes over-application and reduces excess environmental runoff.
Performance Measure	Tracking the number of operations staff formally trained in snow and ice decision-making through courses such as the APWA Winter Maintenance Supervisor Certificate Program.

3.14 Environmentally Sensitive Areas

General	The County acknowledges the environmental impact that winter maintenance practices can have on sensitive local ecosystems. While the Maryland Department of the Environment (MDE) emphasizes the protection of all state waters, the following have been identified as highly susceptible areas: • Wetlands of Special State Concern (as defined in COMAR 26.23.06) • Tier II Waters (as defined in MDE's TMDL Integrated 303(d) Reports) • Wellhead Protection Areas (as designated in MDE's Wellhead Protection Program)
Goal/Timetable	Because operations must occasionally occur in sensitive areas, Highways will coordinate with BWPR and MDE to establish clear criteria for identifying zones at risk of salt exposure and runoff. Action plans for these sensitive areas may include reducing salt usage, eliminating salt altogether, or utilizing alternative snow and ice control materials. Because modifying normal plowing and salting operations can result in a reduced level of service, specialized signage may be required to alert motorists to slow down and drive with caution.

	The County will utilize its Maintenance Decision Support System (MDSS). This program provides high-resolution weather and pavement forecasts alongside recommended material application rates. The goal of the MDSS is to determine the absolute minimum amount of salt or alternative materials required while still maintaining an acceptable level of service for motorists.
Responsibility	Chief of Road Operations; BWPR MS4 Coordinator
Environmental Impacts	Environmentally sensitive areas impacted by winter maintenance may require unique, site-specific action plans and mitigation measures to minimize ecological harm.
Performance Measure	Short term success will be measured by the identification and ranking of environmentally sensitive areas.

3.15 Public Education & Outreach

General	The County provides customer support to residents during and after winter storm events via phone and online channels. The County hosts a level-of-service webpage where residents can search their address to identify the governing body responsible for their specific road and locate the correct contact information for their road district. To ensure real-time responsiveness, the County provides an after-hours emergency dispatch number for residents. The Department of Public Works also maintains dedicated webpages detailing the County's snow removal and winter weather operations, as well as its sensible salting practices. Additional information is also available for Snow Removal Professionals.
Goal/Timetable	The County will support MDE's Smart Salt Program initiatives through outreach and education efforts including adding MDE Guidance for private HOAs on our Winter Road Salt Reduction page: • MDE's Winter Weather Resources Webpages • MDE's Guide to Designing Winter Weather Maintenance Contracts • Training Video for Contracting with Road Salt Applicators A "Sensible Salting" brochure will be developed and made available to the public. This brochure will be reviewed annually and updated as necessary to ensure accuracy. Additionally, the County will expand its social media strategy to improve public communication. This includes coordinating with local media outlets, relaying school delays and closings, and sharing pre-event planning details, including potential road closures.
Responsibility	Chief of Road Operations; DPW Customer Service Team

Environmental Impacts	Increasing public awareness regarding the logistics of snow and ice control provides residents and staff with a better understanding of the challenges involved in combating winter storms. Furthermore, educating the community through the "Sensible Salting" brochure is intended to encourage reduced, more efficient salt usage at public facilities and private residences.
Performance Measure	Distribution of the "Sensible Salting" brochure to the public and staff. Continuous maintenance of accurate, up-to-date winter operations information on the Department's website.

3.16 Technology Review

General	The County will continually evaluate both existing and emerging technologies to assess their potential for improving and modernizing current winter maintenance practices.
Goal/Timetable	The County will review new technologies and proven alternative maintenance methods on an annual basis. As part of ongoing modernization, all county snow plows are currently equipped with telematics systems. This technology provides real-time data on service locations, operational start and finish times, distances salted and plowed, and average application rates. Over the next two to five years, the County's goal is to closely monitor storm salt and brine usage against established guidelines and continue upgrading the fleet with additional pre-wetting systems.
Responsibility	Chief of Road Operations; Automotive Maintenance Manager
Environmental Impacts	Adopting new techniques, procedures, and technologies can offer more effective ways to monitor operations and significantly reduce the volume of salt entering the environment.
Performance Measure	Annual review of new technology in snow and ice control.

3.17 SMP Progress Areas

General	Implementation of a localized SMP in 2014 has led to improvements in the management of road salt used in winter maintenance operations consistent with the best practices for salt management outlined in the Statewide Salt Management Plan.
Progress Areas	• Safety, Mobility, and Winter Maintenance Policies – A "sensible salting policy" was incorporated into winter training materials.

	• Trends & Data Analysis – Implemented the ability to measure salt usage in relation to the number of lane miles served, and inches of snow fall. • Material Ordering and Delivery – All deliveries are accompanied by a Weigh Ticket; 2) deliveries of salt are covered with a waterproof tarpaulin if they occur in wet weather; 3) salt deliveries are put in a storage barn the same day; 4) loading pads are swept clean of material. • Material Record Keeping – Digital spreader controllers have been included in spreader truck specifications since 2016 and data log salt application amounts. • Equipment Upgrading – Infra-red thermometers (IRTs) have been included in spreader truck specifications since 2016. Pre-wet capabilities have been included in spreader truck specifications since 2016. • Equipment Calibration – Spreader trucks are calibrated before each winter season. • Equipment Washing – All washing takes place in a vehicle wash to minimize any discharge back into the environment. • Snow and Ice Control Training – Salt management practices have been incorporated into annual snow and ice control training. • Weather Forecasting – A Maintenance Decision Support System (MDSS) is used to assist with optimal winter treatment decisions based upon expected weather conditions. • Storm Response – An emergency action plan guides organizational response to winter weather events. Liquid salt brine was introduced as a new winter maintenance tool following investments in associated equipment beginning in Fiscal Year 2015 and continued each subsequent year. • Winter Patrol and Level of Service Monitoring – On-Call Duty Supervisors are tasked with patrol duties to monitor road conditions. • Environmentally Sensitive Areas – Two environmentally sensitive areas have been identified, labeled on snow maps, with a reduced salt use protocol implemented. • Public Education & Outreach – A Winter Road Salt Reduction webpage was created by the Bureau of Watershed Protection and includes sensible salting practices. • Technology Review – An automated vehicle location system was implemented for the winter snow removal fleet to optimize operations and communicate with the public.
Responsibility	Chief of Road Operations

Environmental Impacts	Adopting new techniques, procedures, and technologies can offer more effective ways to monitor operations and significantly reduce the volume of salt entering the environment.
Performance Measure	Annual review of new technology in snow and ice control.

4.0 Monitoring and Updating the Salt Management Plan

4.1 Overview

To ensure its continued effectiveness, this SMP will serve as a dynamic framework, undergoing regular reviews and updates to incorporate industry advancements and emerging technologies. The ultimate long-term objective is to balance the safety and mobility of winter roads with the critical need to protect the local environment from excessive road salt concentrations.

To achieve this balance, the SMP outlines a strategic set of short- and long-term goals, complete with implementation timelines for the Department. Pending formal endorsement by the Administration, these essential plan elements will be strategically integrated into the County's capital and operating budgets.

4.2 Short Term Goals (1-5 years)

To achieve immediate improvements in salt management, the County has established the following short-term goals:

- **Equipment Upgrades:** Upfit all new snow removal vehicles by installing pre-wet systems and utilizing advanced technology plow blades.
- **Winter Maintenance Policies:** Attain official endorsement for the maintenance and level of service policies that act as the foundation for delivering this program.
- **Record Keeping:** Shift away from manual reconciliation by enhancing tracking systems to precisely document salt application during each storm event.
- **Winter Maintenance Training:** Administer comprehensive Winter Maintenance and Operations Training for all staff members to ensure a thorough understanding of proper housekeeping practices. This will result in a greater probability of success with the SMP.
- **Communications:** Actively share salt management initiatives with both the public and staff, primarily leveraging the County's webpage to boost awareness on the role of de-icing materials.
- **GPS Integration:** Modernize the Snow Operations fleet with an automated vehicle location (GPS) system to facilitate accurate record-keeping and allow for real-time spread rate adjustments. By providing precise, time-stamped vehicle tracking throughout a storm, this technology will also assist in promptly resolving public inquiries and providing verifiable data to manage liability claims.

4.3 Longer Term Goals (5-10 years)

The County will focus on these long-term goals:

- **Continuous Equipment Modernization:** As older spreader fleet vehicles are replaced, consistently equip the new fleet with modern plow blades, electronic controllers, infrared thermometers (IRTs), and pre-wet capabilities.
- **Environmentally Sensitive Areas:** Systematically identify and rank vulnerable ecological zones to evaluate the impacts of winter maintenance and create targeted action plans, if feasible, that minimize chloride exposure.
- **Pre-Treatment Strategies:** Expand Direct Liquid Application (DLA) routes from six to ten or more. Rely on precise weather forecasts to apply liquid brine ahead of snowfall, effectively preventing ice from bonding to the pavement.
- **Active Event Management:** Ensure all salt spreaders are accurately calibrated and begin blending other chemicals (such as CACL) into the Salt Brine. Practice "Sensible Salting" by targeting high-traffic areas and avoiding over-application.
- **Post-Event Protocol:** Whenever conditions permit, sweep up residual excess salt from sidewalks and roadways, and ensure all salt is securely stored within covered, impermeable structures.

4.4 Monitoring and Evaluation

Consistent monitoring and thorough evaluation are critical to measuring the overall effectiveness of the SMP.

The following metrics will be tracked:

Metric	Frequency	Responsible Party
Salt Usage (tons/event)	After each event	Chief, Road Operations
Pavement Conditions	Daily during events	Chief, Road Operations
Equipment Calibration Records	Pre-season	Chief, Road Operations

To ensure transparency and alignment, information regarding the SMP will be communicated to relevant stakeholders through the following channels:

- Internal training sessions specifically focused on the SMP and Pre-Wet Training.
- Organized public awareness campaigns.
- Regular updates provided during scheduled meetings.

This SMP will be reviewed annually in August and updated as necessary to incorporate new technologies, best practices, and regulatory changes. Feedback from operational staff and environmental experts will be considered during the review process.

5.0 Summary

The Anne Arundel County SMP provides a strategic framework designed to balance effective winter roadway maintenance with the preservation of local environments.

Developed in response to the Maryland Statewide Salt Management Plan, this document outlines how the County will deliver high levels of safety and mobility during winter storms while actively reducing salt runoff into Maryland waterways.

The core of the plan centers on best management practices covering the full lifecycle of winter materials, including:

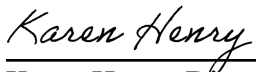
- **Preparation and Storage:** Requiring that materials are delivered and housed in covered, impervious facilities to prevent environmental leakage, and mandating that all equipment is precisely calibrated before the season begins.
- **Operational Execution:** Prioritizing anti-icing strategies before storms, utilizing pre-wetted salt during events to maximize efficiency, and adhering strictly to a Sensible Salting policy that targets high-traffic zones rather than over- applying materials.
- **Post-Storm and Continuous Improvement:** Thorough equipment cleaning, unused material recovery, and post-storm data reviews to adapt methodologies.

Furthermore, the updated document outlines key short and long-term goals focused on technological upgrades, such as adding Automated Vehicle Location (AVL) systems, pre-wet capabilities, and advanced plow blades to the fleet.

It establishes firm guidelines for ongoing staff training, precise material record-keeping, and the identification of environmentally sensitive areas to mitigate chloride impacts.

By reviewing operations annually and integrating public outreach, Anne Arundel County aims to continuously innovate its winter response, ensuring both fiscal responsibility and the protection of local natural resources.

Approval:



Karen Henry, Director
Department of Public Works
Anne Arundel County

8/10/2026
Date