December 2025

Charles County Government Salt Management Plan

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1 Background

In 2010, the Maryland State Legislature passed House Bill 0903 and Senate Bill 0775, which required the establishment of a Statewide Salt Management Plan. The legislature tasked the Maryland State Highway Administration (SHA), in conjunction with the Maryland Department of the Environment (MDE), to develop a road salt management best practices guidance document to be used by SHA and referenced by local jurisdictions for the purpose of minimizing adverse environmental impacts of road salt runoff. This plan was completed in October 2017 and provides best salt practices.

In 2022, Charles County Government (County) received its Municipal Separate Storm Sewer System Discharge Permit Number 22-DP-3322 (MD0068365) from MDE. It includes Part IV.D.4.d stating:

> *The County shall reduce the use of winter weather deicing and anti-icing materials, without compromising public safety, by developing a County Salt Management Plan (SMP) to be submitted to MDE in its third-year annual report and implemented thereafter. The SMP shall be based on the guidance provided on best road salt management practices described in the Maryland Department of Transportation, State Highway Administration's Maryland Statewide Salt Management Plan, developed and updated annually as required by the Maryland Code, Transportation §8-602.1. The County's SMP shall include, but not be limited to:*
>
> *i. A plan for evaluation of new equipment and methods, and other strategies for continual program improvement.*
>
> *ii. Training and outreach:*
>
> - *Creating a local "Salt Academy" that annually provides County winter weather operator personnel and contractors with the latest training in deicer and anti-icer management, or the participation of County personnel and contractors in a "Salt Academy" administered by another MS4 permittee or State agency.*
> - *Developing and distributing best salt management practices outreach for educating residents within the County.*
>
> *iii. Tracking and reporting:*
>
> - *Starting with the fourth year annual report, during storm events where deicing or anti-icing materials are applied to County roads, track and record the amount of materials used and snowfall in inches per event, if applicable, and;*
> - *Report the deicing or anti-icing application by event or date, and the monthly and annual pounds used per lane mile per inch of snow.*

The primary objective of the County's SMP is to provide a policy and procedural framework for enabling the County's Department of Public Works (DPW) to continuously improve on the management of road salt, and deliver safe, efficient roadway systems during winter storms in a cost effective, environmentally sound, and sustainable manner. The secondary objective of this plan is to consolidate countywide practices, training, tracking, and outreach programs into a single comprehensive guidance document.

Everyone within the County Department of Public Works and supporting departments connected to winter road maintenance has some responsibility for developing, implementing and reviewing the success of the County's SMP. Cooperation between entities will reduce the environmental impacts of road salt while maintaining safe roads.

2 Salt Management Framework

2.1 Mission

The County's Department of Public Works Facilities operations staff will optimize the use of deicers on all County roads while striving to minimize salt impacts to the environment.

2.2 Mandate

The County's Department of Public Works Facilities 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 Board of County Commissioners of Charles County.

See Appendix A for the County Standard Operating Procedure: Winter Weather Emergencies and Snow Removal (Last update 02/05/2020).

2.3 Policy

A. Adhere to the procedures contained within the Salt Management Plan.

B. Monitor, review and update the Salt Management Plan on an annual basis to incorporate new technologies and/or new developments and to ensure effectiveness of the Plan.

C. Commit to ongoing winter maintenance staff training and education.

D. Commit to providing best salt management practices to residents and businesses.

E. Track salt application through Cartegraph software for use in analyzing trends related to costs (i.e. products, equipment, contractual, environmental, pavement replacement, landscape replacement, etc.) and water quality (i.e. chloride monitoring, specific conductance measurements, biomonitoring, etc.), annual reporting to MDE, and creating a historical record in the case of employee turn-over.

2.4 Application

The Salt Management Plan is to be approved by the Director of Public Works and will apply to all County employees and contractors who are involved in winter maintenance operations.

2.5 Elements of the Salt Management Plan

A. Safety and Mobility

B. Goals to Reduce Negative Impacts of Salt

C. Winter Materials Storage and Handling

D. Winter Equipment

E. Winter Operations Training

F. Winter Storm Management

G. Post-Storm Operations

H. Record Keeping and Data Analysis

I. Public Education and Outreach

3 Safety and Mobility

The County is keenly aware of the goal to provide safety and mobility during winter storms in a cost-effective manner while minimizing environmental impacts to the maximum extent practicable.

The County defines safety and mobility in terms of a “passable roadway”, considering the limitations imposed by weather conditions, resource availability and environmental concerns.

> “Passable roadway” is a roadway surface that is free from snow drifts, snow ridges, and as much ice and snow as is practical that can be traveled safely at a “reasonable speed for the conditions”. A passable roadway should not be confused with bare pavement, which is essentially free of all ice, snow, and any moisture. It should be assumed that a bare pavement condition may not exist until the weather conditions improve, and plowing can remove the full amount of snow and slush from the pavement.
>
> "Reasonable speed" is defined as a speed at which a vehicle can travel without losing traction. During and immediately after a winter storm event, a reasonable speed is assumed to be lower than the posted speed limit. Motorists should expect some inconvenience and modify their driving practices to safely navigate winter road conditions.

3.1 Passable roadway expectations

It is considered inappropriate to attempt to melt snow as fast as it hits the ground or to keep the highway wet to eliminate any accumulation. Ideally, the proper combination of plowing with the appropriate amount of salt is used to prevent the bond from forming. If snowpack should occur, agencies should strive for “passable roadway” conditions and eventually “bare pavement” as soon as practical after the winter storm event has ended. A storm has “ended” when wind has diminished, and temperatures start to rise above freezing.

3.2 1st Priority: Primary Roads

Roads in this category typically have high traffic volumes that make it necessary to focus on more than just the driving lanes during the winter storm event. On these roads “passable roadway” conditions should be achieved on the driving lanes, turn lanes and acceleration/ deceleration lanes as soon as practical after the winter storm event has ended. A thin layer road salt should be applied as soon as frozen precipitation begins to keep the precipitation from bonding to the roadway surface. Plowing is the priority for snow removal. The County strives to keep the snow from packing on the driving lanes, turn lanes and acceleration/deceleration lanes during the winter storm event. Only enough road salt should be re-applied to keep the precipitation from bonding to the roadway surface.

3.3 2nd Priority: Neighborhood Roads

On neighborhood roads, the County strives for “passable roadway” conditions on the driving lanes, as soon as practical after the winter storm event has ended. Plowing is the priority for snow removal. The goal is to keep the snow from packing on the driving lanes during the event and only applying enough road salt to keep the precipitation from bonding to the roadway surface.

3.4 Exceptions

Exceptions to this guideline will occur when a winter storm event is followed by subsequent storms that happen at a frequency where it is not possible to obtain passable roadway conditions and bare pavement between events. The severity of an event, roadway temperatures, geography, time of day, day of the week, and availability of re-deployable resources will dictate how soon passable roadway conditions and bare pavement can be obtained.

4 Goals to Reduce the Negative Impacts of Salt

The practice the County uses to provide safe, passable roadways is the tried-and-true combination of plowing and salting.

While the use of this combination provides passable roads, it also creates collateral damage. Plowing and salting can deteriorate concrete, corrode aluminum and steel, cause costly damage to trees, grass, and other plants, and often has detrimental impacts to water quality and aquatic organisms.

Perhaps worst of all from the perspective of the road maintenance manager, the heavy and repeated use of salt and other winter materials can permanently damage the structure of landscape soils, reduce the ability of soils to physically support traffic loads or resist rutting, and can destroy the ability of the soil to sustain plant growth. These consequences can lead to large areas of bare soil, embankment erosion, and various types of structural failures.

As the use of salt and other winter materials increase in any area, the severity, economic costs, and environmental impacts of salt also tend to increase. The purpose of the County's SMP is ultimately to reduce the likelihood, severity and costs of winter materials and their consequences. To that end, some understanding of the specific problems that may be caused by winter materials are useful to understand.

Rock salt is predominantly sodium chloride. In addition to damaging structures, sodium causes physical deterioration of soils, makes soil more alkaline and removes nutrients, and after years of sufficiently heavy use can cause such extensive damage that complete removal and restoration of the soil is the only practical solution. In addition to damage from sodium, the chloride content of rock salt is cumulatively damaging to soils, plants, and water quality. Because Charles County primarily uses deep wells located beneath a confining layer of clay, road salt does not typically impact the drinking water supply.

Although soils can absorb and safely 'excrete' relatively large amounts of sodium and chloride over time due to the cleansing action of rainfall, the heavy and repeated application of salt is eventually unsustainable and leads to irreversible damage. Likewise, heavy and repeated use of brine solutions which may contain sodium chloride as well as magnesium chloride pose similar problems and are eventually damaging to both plants and soils when applied in excess.

Winter operations managers must track salt usage along with other related snow and ice control efforts, and they should also measure the severity of winter weather to determine how severity correlates to salt use and salt damage to road structures and landscaping.

Measurements should be used to recognize and respond to trends and usage patterns, rather than to simply develop annual reduction goals. By analyzing trends and understanding the negative impacts of winter materials, it is possible to develop and implement a responsible plan with long-term goals that reduce the likelihood of damage while maintaining acceptable safety and mobility for highway users.

5 Equipment and Materials

Winter operations require specific equipment and materials to maintain safe, passable roads. The equipment must be properly serviced, calibrated and/or repaired prior to the beginning of the season. Materials require proper storage, handling, and distribution across the roadway system.

5.1 Types of Winter Materials

A. Rock Salt (sodium chloride) (freeze point 20° F)

Rock salt is the primary snow and ice control material used by the County It is used because it is effective for winter storms in Maryland, inexpensive, easily stored, and readily available. Rock salt is used primarily during storms when precipitation has already begun to fall.

B. Liquid Salt Brine (23.3% sodium chloride concentration) (freeze point -6° F)

Brine is an easily manufactured solution used by SHA primarily in anti-icing operations by direct application prior to storms to prevent snow and ice from bonding to pavements. A benefit of brine is that it tends to stay on the road once in a dry state and doesn't "bounce off" like rock salt, therefore less can be used. This is not currently used by the County.

C. Liquid Magnesium Chloride (freeze point of -23° F)

This can be used with very cold pavement temperatures to pre-wet salt but is not typically used for direct liquid application as it can make road surfaces slippery under certain atmospheric conditions, during the hours leading up to the start of the storm. Liquid Magnesium Chloride is not currently used by the County.

D. Liquid Calcium Chloride (freeze point of -62° F)

This can be used during extremely cold winter storms and is usually used to pre-wet salt. This is not currently used by the County.

E. Abrasives (sand or crushed stone)

These materials are sometimes used in winter operations although have no snow melting characteristics. Additionally, they can clog drainage structures, contribute to air pollution and be discharged to receiving waters.

5.2 Material Storage and Handling

The County stores all its salt material in barns and other permanent structures.

5.2.1 Maintenance of Storage Structures

The salt structures are to be well maintained. Potential problems are identified during routine operations and through quarterly inspections for bulging, expanding, leaking, dripping, and any other findings. Maintenance is performed during the non-winter months.

The preventive measure of only loading a salt structure to design capacity, is the most

effective method in maintaining the salt structures and the safety of County employees and contractors.

5.2.2. Pollution Prevention for Storage Structures

To prevent salt from spilling out of storage structures, the County places wooden gates or straw bales at the structures' entrances. If salt still escapes the structures or is spilled near salt structures during loading and unloading operations it is returned to the salt structure as soon as possible. Large salt spills are addressed using equipment such as a front-end loader, while small amounts are addressed with a shovel and broom.

The County maintains a MDE Stormwater Discharge permit and the required Stormwater Pollution Prevention Plan (SWPPP) for its primary facility at the Department of Public Works Radio Station Road facility and implements the County's Good Housekeeping Plan for three satellite salt storage facilities at Breeze Farm, Pisgah Park and Salt Barn Place.

The SWPPP and Good Housekeeping Plan outline these same pollution prevention measures for salt storage and handling. To ensure implementation of the pollution prevention measures, routine quarterly inspections are conducted by DPW facility personnel.

The quarterly inspections at all four salt storage facilities are documented using Cartegraph software.

5.2.3. Salt Spill Prevention and Management During Loading

When loading salt at storage locations, trucks should never be overloaded. If they are, salt can spill from the sides or back of the truck when it is leaving the facility or when it is on route.

The center of the salt load should not exceed the height of the truck bed, and the edges of the salt load should be at minimum six inches below truck bed height. If spillage occurs, it should be addressed during the storm if time allows or at the close of the event.

After loading salt, the truck bed is to be covered and kept covered during the entire route to prevent wind erosion.

Another best practice is the deployment of tailgate flaps that prevent salt from spilling out of the back of dump trucks. These small triangular pieces of metal can be made in house for a few dollars but can save tons of salt over the course of a winter season. The County requires tailgate flaps on all County and contractor trucks.

There are times when salt can spill from a truck that was not overloaded. If the auger in a truck's salt spreader box becomes jammed with a large chunk of salt or debris, the operator may have to manually clear the box. At times, the jam is cleared but salt falls to the pavement. At other times, a truck operator may have to raise the dump truck bed to move material to the rear of the truck. This occurs when the salt in the bed of the dump truck begins to get low. During this operation material can spill from the rear of the truck.

Whenever salt spills from a truck due to malfunction it should be swept up and placed back in the bed of the dump truck. Operators must do this in a safe fashion so as not to endanger themselves or motorists. If stopping to do this is not feasible or safe the operator must note the spill location and report it to the route supervisor immediately.

Effective salt management does not allow for unsafe practices.

All unused salt after running a salt route is required to be returned to a County salt storage structure as soon as possible. Any spills of salt during a route are to be reported to the route supervisor immediately for clean-up as soon as possible.

5.3 Snow and Ice Control Equipment

The County purchases a variety of equipment to meet its needs.

5.3.1 Dump Trucks

The County maintains a fleet of dump trucks, the majority of which are single axle units capable of carrying 5 to 6 tons of salt. The remainder of its dump truck fleet consists of tandem, triaxle, or quad-axle trucks capable of carrying 10 to 15 tons of salt. The dump trucks are equipped with well-maintained plows, and electronically controlled spreaders that can apply the required amount of salt on roads in an effective pattern that limits material waste. The equipment is calibrated for accuracy prior to the winter season. The County also has a limited fleet of specialty equipment including front end loaders, and motor graders.

Any major repair should be addressed prior to the winter season or immediately after the end of the previous storm. It is imperative that equipment is working properly and prepared for operations.

5.3.2 Salt Spreading Equipment

The County calibrates all salt spreading equipment, including contractors' equipment, prior to the start of each winter season and checks for accuracy periodically throughout the season. This is a critical aspect of effective salt management.

5.3.3 Specialty Equipment

The County may use other specialty equipment for removal of snow from roads, when appropriate. Front end loaders are effective in removing a heavy buildup of snow from sections of roads where plows are not effective. Motor graders may be needed to mechanically remove snow or ice that has "packed' on roads. Effective use of these specialized pieces of equipment minimizes the need for salt application.

The County continues to explore and research innovative equipment for the mechanical removal of snow and ice from the roadways and for tracking salt usage. Examples include:

A. Salt Tracking Barcode Scanner

The County is exploring a salt tracking barcode scanner cell phone application where any contractor using salt from the County's salt structures will have to scan the amount of salt taken and returned. If salt is found to be improperly applied the specific contractor can be retrained or removed from the program.

B. Loaders Equipped with Built-in Scales

Loaders with built-in scales accurately weigh the salt being loaded into trucks. This allows for better tracking of salt usage by each truck as it completes its assigned routes. The

feature is particularly useful for monitoring application rates in environmentally sensitive areas, such as wetlands and drainage areas with high quality streams.

C. Automatic Vehicle Location (AVL)
AVL is a useful tool in knowing where snow fighting equipment is at all times. The AVL system allows managers to track progress during winter storms. It can be used to determine if a truck is plowing and spreading salt, and if so, determine the application rate. Data captured through the AVL system can be analyzed after winter storms to identify opportunities to increase the efficiency of winter operations. AVL is also a tool to increase the safety of the drivers.

D. Maintenance Decision Support System (MDSS)
The MDSS program provides high resolution weather and pavement forecast for snow routes along with recommended material application rates. Having this information may assist in finding the lowest salt application rate while still maintaining passable roads and is under review by SHA. The County may consider this program in the future.

5.3.4 Hired Equipment Contract for Snow Removal Services

Charles County hires supplemental contract equipment to support its operations as needed to maintain passable roads. Hired equipment must be equipped with well-maintained plows and spreaders to assure effective and efficient snow removal and salting operations.

The County ensures that contractors' trucks and spreaders are calibrated and can pass a stringent quality control inspection prior to entering a contract.

Spreader systems on contracted equipment must be calibrated prior to winter. Tests are performed on each unit to ensure that the amount of salt physically spread on a road correlates to a setting on the control knobs in the truck's cab.

It is critical that contract trucks are calibrated correctly and maintained properly, and the operators are closely monitored by County personnel to avoid improper salting.

6 Training Initiatives

Training is a critical component of salt management and a best practice in winter operations. Charles County regularly provides training in salt management to its employees emphasizing best practices that prioritize using the least amount of salt necessary to provide safe, passable roadways for motorists.

6.1. Staff Training

In the fall of every year, an employee expert at winter maintenance operations and salt management best practices conducts training at the maintenance facilities for all staff working outdoors. This training session presents information on the previous season's salt usage, equipment/storage upgrades, winter materials inventory, effective winter storm management and other winter topics relevant to any new initiatives.

Internal outreach with our staff has had a huge impact on our salt reduction successes. Discussions encompass all aspects of the County's salt usage and our obligation, not only to the environment but the individual customer as well. The information communicated among all parties has been extremely beneficial, leading to the creation of best practices in our salt reduction strategies that will be useful for years to come.

The County also provides additional training for frontline supervisors on effective management of contractors and their equipment. This is to ensure that contract operators are following the County's policies and procedures, particularly in salt usage.

County staff also attends snow conferences and trainings such as the Smart Salting Certification course and share this information with the winter operations staff.

6.2. Hired Equipment Operator Training

Training is also provided to all hired equipment operators and temporary employees. This training concentrates on the need to adhere to the County's snow and ice control policies and procedures. A major focus of this training is on the proper use of salt and other winter materials. However, it covers all facets of plowing and salting operations.

This training is provided online and must be completed prior to beginning work.

See Appendix B for the training slides.

7 Route Assessment

7.1 Suitable Routes

Suitable routes for each equipment operator are identified and predetermined. Each route has a backup operator identified.

7.2 Sensitive Areas

Although all waterways in the County are important and should have the least amount of salt applied as possible, some areas are identified as having potentially higher susceptibility. These include the following:

- Wetlands of Special State Concern as defined in COMAR 26.23.06.
- Tier II streams, also known as high quality streams and as defined in COMAR 26.08.02.04-2. It is important to recognize that significant portions of the Nanjemoy, Mattawoman, Patuxent and Zekiah Watersheds are classified as Tier II streams.
- Waterways listed by MDE as impaired for chloride, such as Mattawoman Creek.
- Areas already exhibiting indicators of salt contamination such as soil failure, pavement failure, dead plants and other indicators.

Stream monitoring occurs throughout the County to prevent over-salting and protect water quality.

7.3 Stockpiling Locations

Stockpiling and disposal of removed snow may be necessary for extremely heavy snows. The County will work to identify and coordinate approval of appropriate storage locations prior to the snow season. These pre-approved locations should be in less environmentally sensitive areas since the snow may contain salt or other materials, which are released during melting.

8 Winter Storm Management

Winter storm management involves effective planning, execution, and review.

8.1 Weather and Pavement Condition Forecast

The quality of the weather and pavement forecast is a key component of effective winter storm management. County staff monitors storms as they are forming which can be up to 72 hours in advance of local precipitation. Sources include local weather forecasts from the National Weather Service, Intellicast Internet Radar, local television weather channels, other local counties, and the Maryland State Highway Administration.

8.2 Pre-Storm Planning

Pre-storm planning is an effective tool for managing salt usage in a storm and a best practice in winter operations. Effective planning prior to storms will equate to better performance during a storm including more efficient usage of salt. The County's pre-storm planning begins as early as 72 hours prior to major winter storms. The County's planning for typical winter storms begins 18 to 24 hours prior to events.

The County holds pre-storm meetings with frontline personnel for all events. These meetings provide managers with an opportunity to alert truck operators about the latest weather and road forecasts, emphasize the need for effective plowing, reiterate the need for sensible salting, identify appropriate salt application rates, and allows for information exchange and identifying opportunities for improvement.

County personnel and hired contractors, if applicable, need to report to their facilities with enough lead time to thoroughly inspect plow trucks and make any minor repairs. All hired equipment units reporting for winter event operations should do so in effective, working condition. Any necessary repairs must be completed prior to the winter season or immediately after the end of the previous storm. It is imperative that equipment is working properly and prepared for operations.

County and hired truck operators will load salt materials on their equipment following environmental guidelines outlined in their facility's SWPPP.

Once the equipment is ready, it should be pre-positioned on its snow route prior to the start of the event. Pre-positioned snow equipment speeds up the response time. This is particularly important if the forecasted start time of the storm could affect morning or evening rush hour traffic. If snow fighting equipment becomes trapped by traffic congestion, it might not be able to get to its snow route in an acceptable time.

8.3 Winter Storm Operations

Once a storm begins and precipitation starts to accumulate on highway surfaces, County facilities begin deicing operations. If a typical winter storm begins with light snowfall, a light coat of granular salt should be applied. If a winter storm begins with moderate to heavy snowfall, applications should be adjusted accordingly.

The key is to get material onto the roadway as early as possible to prevent snow or ice

from bonding to the highway surface, but not so early that traffic moves it onto the shoulders, rendering it useless. This will allow for effective plowing and lighter salt applications throughout the remainder of a storm.

As the storm continues, tactics need to react to changing conditions. As the initial application of salt begins to lose effectiveness and snow continues to build on highways, plowing operations should begin. If the initial application was successful, the buildup will be easy to remove with proper plowing techniques. The plow operator should re-apply just enough salt to keep subsequent snowfall from bonding to the pavement. This process may have to be repeated multiple times during a winter storm.

8.4 Severe Winter Storms

During severe winter storms the County steps up their response throughout the event, from pre-planning operations to final storm cleanup. The County focuses on keeping roads passable. while fighting heavy accumulations of snow, freezing rain, or blizzard conditions.

When fighting storms with heavy accumulations of snow, the County concentrates on plowing operations and limits salt applications. However, plow trucks still spread a small amount of salt to prevent snow from packing on the road. As the storm begins to wind down and most of the snow has been removed, an appropriate amount of salt will help remove the remaining frozen precipitation from the surface.

Freezing rainstorms also present special challenges. If left untreated, it will coat highways with ice, creating severe safety and mobility issues for motorists. The County has found that the best treatment for freezing rain is applying light salt and replacing the application when it washes away to prevent ice formation.

Winter storms that occur at the start of or during rush hour traffic pose significant challenges to effective salt management. A winter storm that drops one or two inches of snow during rush hour can be more troublesome than a winter storm that drops five or six inches during off-peak travel times. The County and other agencies have learned that they must place salt on roads prior to heavy traffic. Once traffic builds up on roads, plow and salt trucks cannot address snow buildup. In addition, snow can be “packed” on the road surface, requiring very heavy plowing and salting to remedy it.

Appropriate salt applications prior to rush hour are one of an agency’s best tools in limiting total salt usage during this type of event.

Severe winter events such as back-to-back storms create unique challenges to the County for effective salt management. While normal plowing and salting can keep roads in a passable condition during a typical winter storm, heavy snowfall requires more intensive plowing operations and potentially the need to stockpile snow. Stockpiles are to be located at pre-designated approved locations.

Cycle times of plows to cover their assigned routes are severely challenged with heavy snowfall storms. In these events, the County still applies salt, at a reduced rate, during each plow cycle. This is critical to avoid snowpack or icepack. Salting should keep subsequent snowfall in a plowable state, so it can be addressed in the next plowing cycle.

8.5 Operations in Sensitive Areas

The Department of Public Works coordinates with MDE and County environmental planners to establish criteria for identifying areas sensitive to salt runoff. Streams are monitored throughout the County to determine if changes in practices and salt usage can be made to reduce impacts. Additionally, roadside areas showing signs of salt contamination are tracked.

9 Post Storm Operations

Post Storm Operations include a variety of tasks including equipment inspection, cleaning and storage, cleaning inlets, spillage checks on snow routes, stockpile maintenance, and operation reviews.

9.1 Equipment Cleaning and Maintenance

Cleaning of snowplows, trucks, salt spreaders, and plow blades that have been removed from vehicles should occur immediately after operations are complete, whenever possible. These cleaning operations must occur inside the wash bay at the County facility or at a commercial facility.

Indoor washing is necessary so that wastewater does not discharge into stormwater systems or onto the ground. This is in accordance with the Charles County's State issued General Permit for Discharges from Stormwater Associated with Industrial Activities (Discharge Permit No. 20-SW).

Per this permit the County implements a site-specific Stormwater Pollution Prevention Plan (SWPPP) for the Department of Public Works Radio Station Road facility. The SWPPP contains consistent protocols, inspections, documentation, and reporting requirements related to potential pollution sources such as equipment cleaning and maintenance operations.

9.2 Material Cleanup at Storage Facilities

Immediately after winter storm operations have ceased, all unused salt is required to be returned to a storage facility. Any uncovered salt or other loose materials is required to be moved to a covered facility or covered securely with a tarp.

The County's SWPPPs include requirements for material storage at maintenance facilities.

9.3 Operations Review for Continual Improvement

The County reviews operations after most winter events. These reviews concentrate on three key elements: what worked well, what did not work well, and most importantly, opportunities for improvement.

The opportunities for improvement lead to best practices. Post storm reviews help identify "champion operators" who get snow routes cleared with less salt. These operators are encouraged to share ideas with others to encourage and promote efficiency in salt application for all winter operations.

9.4 Post Storm Data Analysis

Items tracked for analysis include event date, event start and end time, number of winter operators applying salt, miles of road treated with salt, tons of salt distributed, amount and type of precipitation during the event. From this information monthly and annual pounds of salt used per lane mile per inch of snow are determined.

The County can assess and compare salt usage performance between trucks on the same routes and different routes to improve efficiency and reduce salt usage.

9.5 Annual Wrap-up Meeting

At the end of the season, the County holds an annual meeting to review winter operations, focusing on insights learned from post-storm analysis, and identify areas of concern such as salt management, equipment improvements, etc.

The annual meeting can be used to identify key opportunities for improvement and set up teams to tackle them over the summer. It is critical that the progress of the teams is tracked closely so that the efforts come to completion prior to the following winter.

10 Recordkeeping and Annual Reports

The County keeps up-to-date records of all winter operations documenting each winter event and each winter season. This allows for seasonal analysis and the identification of trends in operations. Data points are recorded in Cartegraph software as shown below.

The analysis is used by senior management to evaluate and make necessary changes in policies, procedures, processes, and expenditures, as well as any budgetary implications. Additionally, DPW shares this information with the Department of Planning and Growth Management (PGM) for inclusion in the annual MS4 permit reporting to the Maryland Department of Environment.

10.3 Cartegraph Recording

A. Snow Events
- Date
- Start time/End Time
- Personnel (Staff and Contract)
- Equipment (Staff and Contract)
- Precipitation type and amount in inches
- Lane miles treated with salt
- Pounds of Salt Applied

B. Salt Barns
- Quarterly inspections
- Post storm inspections

C. Budget
- Each material order: Product name, company name, company contact, date ordered, quantity purchased, cost per ton, date delivered
- Each equipment order: Item description, company name, company contact, date ordered, quantity purchased, cost per item, date delivered
- Contractor costs
- Maintenance Costs

D. Environmental Impacts
- Location and type of impact (salt spill, damaged pavement or other infrastructure, damaged or dead plant materials within proximity of roadways, etc.)

11 Public Education and Outreach

Charles County makes a concerted effort to provide the public with information about their winter operations and winter storm activities. The County's "Snow Operations" webpage provides the public with information regarding the County's approach to managing winter conditions. There are also efforts to reach the public about the environmental impacts of winter salt use.

The County, in partnership with a local southern Maryland radio station, educates the public about salt management with a "Use Less Salt" radio commercial in English and Spanish, which has been aired annually since 2023. The County also engages with students about the importance of salt management.

In Spring 2024, the County provided a grant to a non-profit to organize a video contest at a local high school encouraging students to create short videos about the environmental impacts of deicing salt.

Educational information on the County's "Help Stop Water Pollution!" webpage informs residents that salt pollutes waterways and groundwater. The webpage provides recommendations for shoveling driveways, using sand for traction, and sweeping up excess material to reduce the amount of salt entering waterways.

The County provides customer service for its citizens during and after winter storm events via telephone and internet. On the "Snow Operations" webpage, residents can report a snow concern. Charles County's maintenance, garage, and emergency operations personnel can respond directly to citizen needs in real-time on a localized basis. General questions about operations are handled by office personnel.

In 2025 the County released its Click-It web application which allows residents to report snow concerns including salt piles.

12 Summary

Charles County views these Best Practices for Salt Management as a foundation for their winter operations and continues to strive for optimal salt management and road safety.

The County continues to seek opportunities to work with various regional, county, and local organizations to provide seamless operations during winter storms.

As plans for improved practices are to be implemented, checklists and other applicable tools will be developed.

This Salt Management Plan is intended to be a living document and updated on a regular basis. In that regard, the County intends to modify this tool as needed to ensure passable roads during winter storms, promote cost-effectiveness, and provide environmental protections.

Appendix A: Standard Operating Procedure Winter Weather Emergencies and Snow Removal

Charles County Government
Department Standard Operating Procedure

Title:	Winter Weather Emergencies and Snow Removal	**SOP#:** DP.DPW.05.001
Department:	Public Works	**Effective Date:** 05/16/2008
Division:	Roads	**Last Review Date:** 02/05/2020
Purpose:	To ensure the safety and drivability of the County road system during a winter weather emergency, and to determine when to mobilize snow removal crews and equipment.	
References:	N/A	
Attachments:	N/A	

Procedure:

1.0 Preparation and Responsibility

1.1 The Department of Public Works -Roads Division will be prepared 7 days-a-week, 24 hours-a-day to respond to all winter weather conditions.

1.2 Snowplows and salt spreaders will be installed on all County snow equipment from November 15 to March 15.

2.0 Monitoring Weather Conditions

2.1 When winter weather is forecast within the next 24 hours, the Department of Public Works will begin monitoring weather conditions on an hourly basis via the National Weather Service.

2.2 As the storm approaches, the Chief of Roads and staff wil1 monitor local weather forecasts from the National Weather Service, Intellicast Internet Radar, local television weather channels, other local counties, and the Maryland State Highway Administration.

3.0 Notification

3.1 All snow removal staff, to include contractors, will be placed on an "on-call" status as dictated by the anticipated or existing circumstances.

3.2 Once the Chief of Roads has an estimated time as to when the storm will begin per the National Weather Service, the following procedures will be implemented:

3.2.1 The County Administrator will be notified in advance of any impending winter weather emergency.

3.2.2 The Roads Division requires a minimum of four hours to contact contractors and load contractor loaned or owned equipment. The Roads Division equipment is sufficient to treat bridges, intersections, and cold spots.

4.0 Mobilization and Implementation

4.1 Based on the required lead time and expected storm time, the Chief of Roads will recommend to the Director of Public Works an implementation time for the snow removal operation to begin.

4.2 The Director of Public Works and the County Administrator will approve mobilization and implementation of County staff and contractors.

4.3 The Chief of Roads will meet with all supervisory staff to advise them on weather conditions and the appropriate snow removal procedures to follow.

5.0 Communication and Coordination

5.1 Public awareness information will be provided before and throughout the winter season to the public via the County's Public Information Office. The 1-888-460-SNOW telephone number will be available for the public to access information during snow storms.

5.2 The Department of Public Works, Department of Emergency Services, and Charles County Sheriff's Office will maintain a hotline at all times during the winter weather event.

5.3 The Department of Planning and Growth Management will be notified that the plan has been activated so they can monitor developer projects with privately owned roads (roads have not been accepted by the County) to ensure these roads are properly maintained throughout the winter weather event

6.0 Strategy and Execution

6.1 County roads are classified as primary or residential roads.

6.2 When it snows, snowplows concentrate on keeping the primary County roads and major residential neighborhood streets passable. These roads are cleared down to bare pavement as soon as possible after the storm is over. This is dependent on the amount and type of snowfall, as well as wind and temperatures following the storm.

6.3 Plowing of primary and residential streets generally begins when snow becomes 1 to 3 inches deep and the temperature indicates that there will be no melting.

6.4 Snow that has been hard packed by traffic often remains on the street, and snowplows arc unable to remove it completely. In this situation, a mixture of salt and/or sand is spread to provide adequate traction.

6.5 County, contractor loaned, and contractor equipment will remain in operation until it is determined by the Director of Public Works and the Chief of Roads that all roads are passable. County equipment may remain in operation until all phases of the snow removal operations are complete.

Target Response Time for Snow Accumulation

Road Designation	Snow Accumulation	Targeted Response Time
Primary Roads & Major Residential Roads	3 to 4 inches	Passable within 12 hours
	5 to 7 inches	Passable within 18 to 24 hours
	8 to 10 inches	Passable within 24 to 36 hours
	11 to 15 inches	Passable within 36 to 48 hours
	24 inches	Passable within 48 to 60 hours
Minor Residential Roads and Cul-de-sacs	3 to 4 inches	I pass made within 12 hours
	5 to 7 inches	1 pass made within 18 hours
	8 to 10 inches	I pass made within 24 hours
	11 to 15 inches	I pass made within 36 hours
	24 inches	l pass made, within 48 hours

7.0 Recovery and Reporting

7.1 County equipment will be cleaned, repaired, and prepped at the end of each storm.

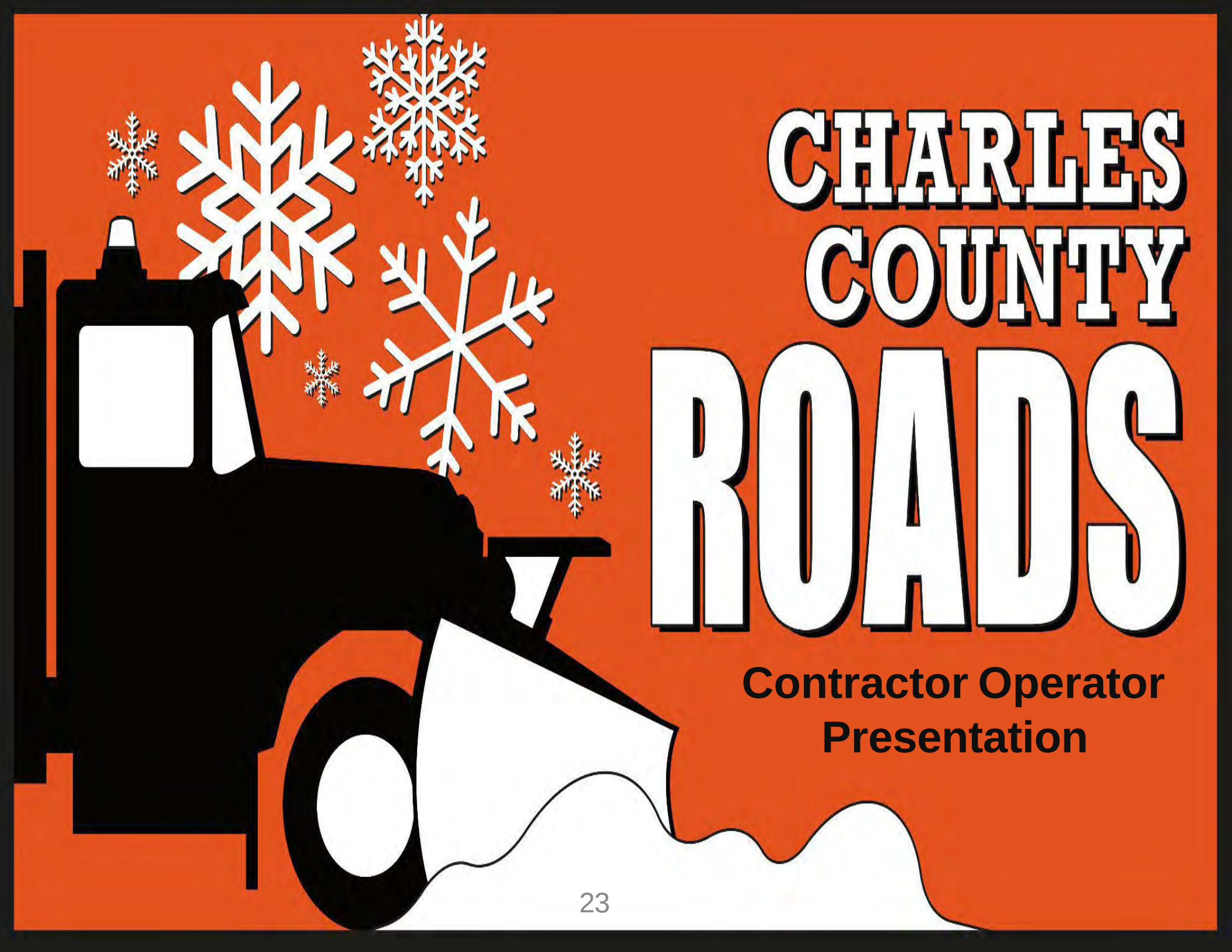
7.2 All salt, chemicals, and supplies will be replenished at the end of each storm.

7.3 A written report will be completed at the end of each storm to summarize the weather conditions, labor hours, and costs.

8.0 Exceptions

8.1 Any and all exceptions to this procedure must be approved in advance by the Director of Public Works.

Appendix B: Contractor Operator Presentation


CHARLES
COUNTY
ROADS
Contractor Operator
Presentation

Invoicing Requirements

Snowstorm Invoices:

- Snowstorm invoices are required to be submitted within 5 working days from the completion of the call out. You as a contractor, are responsible for submitting an invoice for payment.
- Snowstorm invoices are to be completed using one invoice per day, per vehicle.
- Snowstorm invoices are required to be submitted by email, fax, drop-off, mail, or online using the county roads website.
- A valid email address shall be listed on the Contractor information sheet in the Contract.
- Snowstorm invoices must be the provided county invoices. No other invoices will be accepted.
- Payments will be distributed within three to four weeks after the invoice is received. DO NOT call or visit the Government building for your check.
- All checks will be mailed unless you have enrolled in direct deposit.

Invoicing Requirements

Retainer Fee Invoices:

- It is the Contractor's responsibility to submit an invoice to the Public Works after April 15th.
- Only single, tandem, tri-axle, and/or tractors can receive the retainer fee.
- All vehicles must have a snow route or have been called out during the snow season to obtain the retainer fee.
- All county equipment MUST BE picked up before November 12th and returned before April 14th. County equipment must be returned with all plow pins and in clean, free of salt/dirt condition.

Equipment Numbers:

- Equipment number(s) have been established for equipment type/configurations in the Contract. These will be required on the Contractor Equipment Statement and all invoices.
- If item number(s) and equipment type/configurations are not included on the Contract/invoices this will delay payment.

Insurance/Registrations

- All insurance policies/registration(s) must be maintained, at a minimum, from November 1st through April 30th.

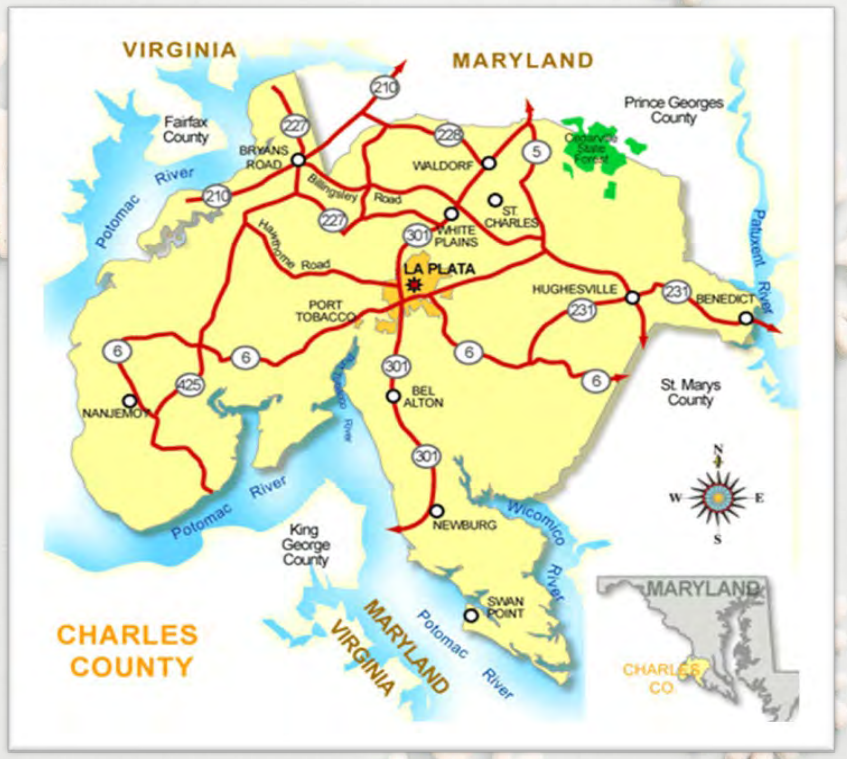
- The failure to maintain all insurance/registration requirements throughout the term of the Contract will be cause for termination of the Contract and will void the post-season retainer and any remaining minimum payment guaranteed due to the Contractor.

- The contractor shall make CCG aware of any changes to the status of certificate(s) of insurance or registration(s) within five (5) calendar days.

Maps and/or GPS

- Check your route before it snows for obstructions (tree limbs, manhole risers, potholes, etc.) If you see an obstruction, please notify Public Works.

- All snowplow drivers must know their routes before a snow event, or have one of the following:
  - GPS
  - Map Book



Winter Operations

- Safety is CCG's number one priority during all snowstorm activities.
- Snow removal equally shares first priority regarding highway maintenance operations.
- CCG and Contract forces are jointly responsible for minimizing impacts to our environment and minimizing winter operations costs.
- CCG's Policy states that winter operations will continue until all county roads are free from snow and ice.
- If needed, relief operators shall be employed by the Contractor and shift changes shall occur on the assigned snow route or at a predetermined location.
- Contractor operators/equipment are not exempt from any FMCSA laws or regulations, including hours of service, while performing winter operations for CCG.

Contractor Equipment Basic Guidelines

Single Axle

- GVW Min. 26,000
- Load capacity Approx. 8 tons/5yd min

Tandem Axle

- GVW Min. 55,000
- Load capacity approx. 15 tons/10 yd min

Triaxle Axle

- GVW Min 70,000
- Load capacity approx. 22 tons/15 yd min

4 Wheel Drive Trucks

- ¾- two ton pick up style trucks/ includes dual wheel "dually"
- **NO** tailgate spreaders

Tractors

- No tractors lower than 50 hp
- Tractors must have snowplows not buckets

See section F of the contract for all guidelines.

Contractor Equipment Requirements

- All equipment used for snow removal operations shall have met the Contract requirements.
- All equipment used for snow removal operations shall be inspected and approved by CCG and listed on or added to the Contract prior to its use.
- All new or returning contractors who are adding new equipment are required to pass inspection.
- All equipment inspections are by **APPOINTMENT ONLY!**
- Equipment inspections are done Monday-Friday from 7:00am – 2:00pm.
- If any equipment used by the vendor is found to be non-compliant and in breach of the Contract, it may be terminated.

County Equipment Pickup & Returns

- All county equipment must be picked up by November 12th
- All county equipment must be returned by April 14th unless told otherwise
- Please make sure you call or email roads staff for pickups and returns. You will be turned away, if you show up without an appointment. If you can't get through by phone, please email Jessie Settle at SettleJ@charlescountymd.gov
- If the county equipment needs to be repaired, please notify roads staff or the shop before returning the equipment.

CHARLES COUNTY GOVERNMENT
Department of Public Works
Facilities Division
Bill Shreve
Director

I, _____, agree to return Charles County snow
Print Name of Contractor
equipment listed below, properly cleaned and in good working condition to the Department of Public Works by April 15, 2019. I agree to forfeit my end of season retainer fee of $500.00 if these conditions are not satisfactory.

County Plow #	County Frame #	County Spreader #
PL-	FR-	SP-
PL-	FR-	SP-
PL-	FR-	SP-
PL-	FR-	SP-
PL-	FR-	SP-

Signature of Contractor or Representative

Print Company Name

Pick-Up Date

Witnessed By

Date Returned: _____

Condition: _____

Signature of Inspector: _____

Signature of Contractor: _____

Equal Opportunity Employer
www.CharlesCountyMD.gov

Snow Removal Requirements

- Operators are required to have all equipment calibrated and operational prior to check-in.
- All contract personnel and equipment must be logged in and out of service and, at the request of the facility, operators must provide their cell phone number.
- **NO REPAIR DELAYS!** All equipment should be ready for work upon arrival.
- CCG will not pay for down time on trucks and equipment that extends beyond one hour. This will include any piece of equipment that is involved in an accident, at fault or not.

Call-Out Phases

- Each storm is evaluated based on the forecasted accumulation and severity.
- Report times can be accelerated based on intensity of the storm, timing of the event, and other factors beyond CCG's control.
- CCG will consider all factors when determining the proper response for each event.

Salt Impacts on the Environment

So, what's the big deal?? Salt is a naturally occurring substance!

While salt is a naturally occurring substance, high concentrations of salt negatively affect or destroy land and aquatic habitat/species

- Once granular salt mixes with snow or ice it becomes a brine solution. This solution then runs off the roadway and is forever stored in soil or water and can reach levels that are considered unhealthy to the environment.
- Salt will contaminate drinking water supplies in wells and reservoirs, slows the establishment of vegetation or crops and destroys waterways for fish and other marine life.

Salt

- Only use salt when told to do so by your supervisor.
- Make sure your salt box is calibrated
- Report salt spills immediately
- Return all salt to DPW Yard (La Plata Shop)
- You will need a sticker in order to receive salt
- County trucks will be loaded first
- All first-round salt will be loaded at either the La Plata Shop or White Pains (Demarr Rd).
  - 4x4 Trucks – White Plains
  - Six & Ten Wheelers – La Plata Shop

Salt

- A Public Works staff member will be walking the salt line to sign you in
- Once signed in contact your supervisor (if they don’t answer leave a message)
- Supervisor will inform you on where to meet, which will be the same location for the year, unless told otherwise or your truck is moved to a different route
- MOST IMPORTANT- Stay in contact with your supervisor at all times. If they don’t answer leave a message, if you don’t hear back within 15 minutes call the superintendent (located on route sheet), or the main office.

Salt Domes

La Plata Shop

1001 Radio Station Road La Plata, Md. 20646

Demarr Rd

10791 Demarr Rd Salt Barn Place La Plata, Md. 20646

Breeze Farms

15950 Cobb Island Rd Cobb Island Md. 20625

Pisgah

Pisgah Park Pl /Landfill Rd

TMDL

- **T**otal **M**aximum **D**aily **L**oad

- Definition: a regulatory term in the U.S. Clean Water Act, describing a value of the maximum amount of a pollutant that a body of water can ingest daily while still meeting water quality standards.

- TMDL's already exist for phosphorus, nitrogen, and sediment for many watersheds and waterways in Maryland.

YOU play a more prominent role in protecting our environment during winter operations than you may have originally thought

Practical Salt Usage

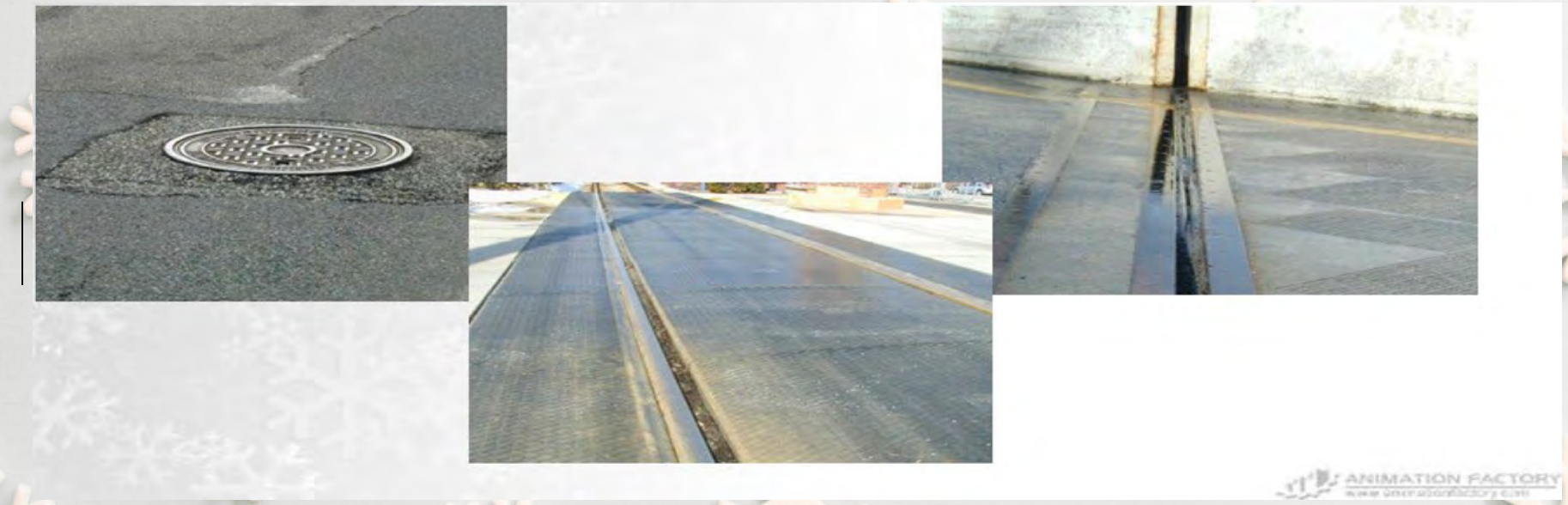
- A well-trained operator knows when to apply salt and when not to.
- Use the correct amount of salt necessary to get the job done.
- Using more salt than necessary works against you and damages the environment.
- Never overload trucks to avoid spillage of salt at CCG facilities and on the road.
- Always travel at a safe speed for optimum performance, safety, and to help keep salt on the road and out of the roadside ditches.

Practical Salt Usage

- Always keep your load covered to avoid unnecessary loss of material when traveling.
- Don't salt roads that have already been salted
- Only apply salt to your designated snow route when directed by CCG personnel
- Always use appropriate shop application rates or rates as directed by CCG management
- Don't apply salt to an undesignated snow route unless directed to by CCG personnel
- All unused salt must be returned to the barn that it was located from
- Never spread salt just to get rid of it

Best Practices for Plowing Safety

- Be aware of the weight of heavy snow and the damage it can cause when thrown by a plow
- Watch out for manholes, railroad tracks, expansion joints, bridge abutments, utility cuts, mailboxes, etc.



Best Practices for Plowing Safety

- Watch for curbs and steel plates
- Be aware your truck's bed height – watch for overhead signs, traffic signals, utility wires, tree limbs and bridges

Intersections

- Empty your plow before crossing intersections
- Reduce the size of the windrow
- Avoid building snowbanks that interfere with sight distance
- Keep traffic signs unobstructed from view

Curves

- Plow curves from the high side to the low side
- Spread salt on the high side of curves
- Keep your speed down on all curves

Bridges and Overpasses

- Bridge surface may be higher than the road surface due to the bridge freezing and expanding

Shoulders, Medians & Jersey Barriers

- Plow away from medians with minimum width shoulder and barrier wall
- Avoid plowing snow against a jersey barrier as this creates a ramp for vehicles to possibly become airborne

Hills

- Traction is limited on hills
- Stopping can be difficult on hills
- Watch for melted snow refreezing in the road valley

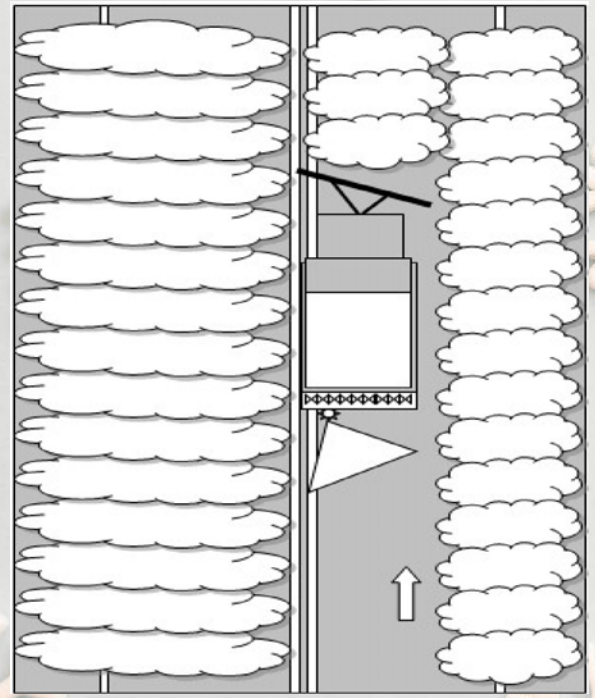
Railroad Crossing

- Avoid piling snow against signals, switch boxes, signs, etc.
- Raise plows slightly when crossing railroad tracks
- Watch for flashing lights and mast arms blocking the roadways

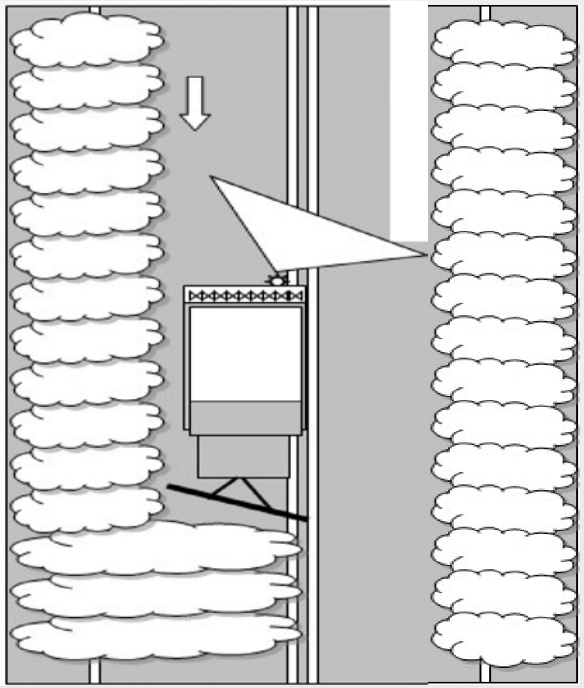
Two Way Road Single Truck

First Pass & Second Pass

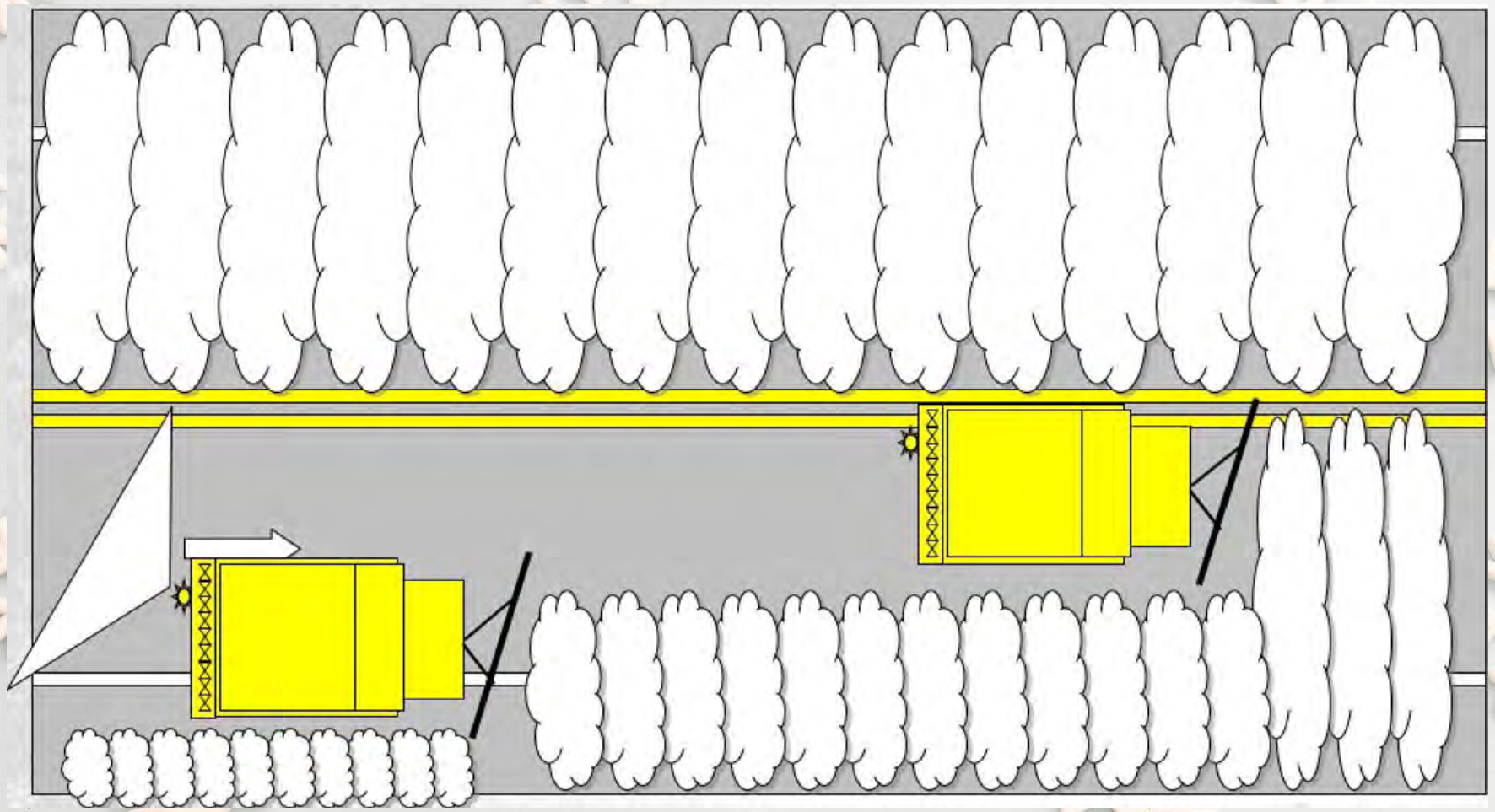
1st - Plow lane in one direction and drop salt behind truck



2nd - After plowing in one direction, turn at end of route, plow lane in opposite direction and salt both lanes



Two Way Road Two Trucks



Plowing Points to Remember

- Always give bridges and ramps special attention
- Salt the high sides of curves
- Do not over-use salt. Use just enough to get the job done
- Designate specific trucks in a plow train for salting to ensure no overlap of resources
- Salt loses most of its effectiveness at temperatures below 20°F
- Adding more salt to an already salted roadway can actually cause the brine solution to freeze
- Salt stops working altogether at -6°F

County Guidelines

- Always contact your supervisor prior to leaving your designated snow route or if you get separated from your assigned truck
- Show up or commute time, from the designated CCG facility to assigned route, must not be excessive
- Always communicate the need for fuel or meals with your snow supervisor prior to leaving your assigned route
- Coordinate all refueling to minimize disruptions to the snow removal operations

County Guidelines

- Check the cutting edge of your plow before each event to avoid damage to the plow structure
- When working for CCG, DON'T plow and salt parking lots, driveways or roads that do not belong to CCG
- All trucks loaded with salt while on standby or just plowing should be covered to avoid freezing

Accidents and Damage

- Always maintain a heightened state of awareness when working around salt structures or out on the roadways
- Please report mailbox or vehicle damages to your supervisor ASAP
- Report all accidents involving CCG equipment or facilities promptly to the snow supervisor and obtain a police report
- CCG will not be held responsible for damage incurred to the Contractor’s vehicle while carrying CCG’s snow removal equipment

Accidents and Damage

- Upon returning to the shop, the driver will stay with their truck and assist with the repairs of CCG equipment
- If a repair part is required at the shop, all repair parts must be acquired by a shop mechanic
- All damaged or non-operating equipment must be reported to the snow supervisor, repaired ASAP and/or prior to the next storm

Thank You For Your Attendance!

There is no better time than the present to express our appreciation for your support

The Charles County Government thanks you for making a difference towards out winter snow removal activities

Appendix C: County Operator Presentation


CHARLES
COUNTY
ROADS
County Operator
Presentation

County Operator Guidelines

- Always communicate the need for fuel or meals with your snow supervisor prior to leaving your assigned route
- Coordinate all refueling to minimize disruptions to the snow removal operations
- Check the cutting edge of your plow for wear before each event to avoid damage to the plow structure.
- **DON'T** plow and salt parking lots, driveways or roads that do not belong to CCG.
- All trucks loaded with salt while on standby, plowing and salting should be covered to avoid freezing.

Accidents & Damage

- Always maintain a heightened state of awareness when working around salt structures or out on the roadways.

- Report all accidents involving CCG equipment or facilities promptly to the snow supervisor and obtain a police report.

- CCG will not be held responsible for damage incurred to the Contractor’s vehicle while carrying CCG’s snow removal equipment.

Accidents & Damage

- Upon returning to the shop, the driver will stay with their truck and assist with the repairs of CCG equipment.

- If a repair part is required at the shop, all repair parts must be acquired by a shop mechanic.

- All damaged or non-operating equipment must be reported to the snow supervisor, repaired ASAP and/or prior to the next storm.

Winter Operations Overview

- The primary objective for all maintenance personnel during winter operations is to make every effort to maintain all roadways under their jurisdiction in a safe and passable condition throughout a storm.

    - To provide an exceptionally high level of service to our customers at the lowest possible cost in dollars and damage to the environment and the highway network.

Winter Operations Strategies

- **Anti-icing** is a proactive winter strategy of preventing snow or ice from bonding to the pavement.
    - **De-icing** is traditional reactive winter maintenance strategy of breaking the snow/ice and pavement bond once formed.
        - **Both strategies are critical** and play roles in CCG's snow and ice control operations.

Using Solid Material

- For proper operation, spreader systems need to be calibrated yearly, at a minimum and verified by the snow supervisor.
- At the beginning of a storm, the initial salt application should be made as soon as snow or ice begins to accumulate on the pavement.
    - Salt mixing with initial precipitation produces a brine solution that keeps snow and ice from bonding to the pavement.
        - The prevention or breaking of the snow bond to the road is the primary reason for applying salt.

Using Solid Material

- A well-trained operator knows when to apply salt, and when not to.
  - The main idea in a storm is to use no more salt than is necessary to correct the condition at hand.
    - Using more salt than necessary to correct the condition will work against you and causes the precipitation to freeze. It also causes unnecessary damage to the environment.

Safety

- Snowstorms are the number one hazard to traffic on our roadways.
- Snow removal equipment is the number two hazard to traffic.
- The number two cause of accidents was found to be the snowplow attached to the dump truck.
- Remove the plow after completing snow removal operations.
    - Remove the plow frame or lower the lift arm to reduce the potential hazard to other vehicles.
    - It is never a safe practice to back up a dump truck.

Safety

- Backing equipment during a snowstorm is just asking for trouble.
- Watch for overhead obstructions during salt spreading operations when raising the dump bed.
- The higher the dump bed is raised, the more likely the truck is to tip over.
- The higher the truck bed, the lower the truck’s speed should be.
- Operators must obey the same rules as any other vehicle on the road.

General Knowledge

Roadway Plowing

- Operator's knowledge must include the preventive maintenance (PM) of a dump truck and any related pieces of equipment.
- How to mount the various types of plows, salt box, and spinner.
- The operation of the plow, salt box and spinner.
- How to maneuver a truck around obstacles with a plow mounted.

Trouble Shooting

- Keep an eye on your plow blade for wear and replace when needed.

- Store extra plow pins in trucks.

- Keep all truck lights free of snow and ice.

- Keep radiator grill from obstructions to prevent engine overheating.

Troubleshooting

- Carry spare fuses and bulbs.
- Carry windshield cleaner and an ice scraper.
- Be familiar with the type and size of hoses for replacement.
- Know which hydraulic coupling controls what function.

Pre-Season Preparation Meeting

- Have a meeting with all personnel involved in snow removal operations before the winter begins.
- Personnel involved are shop personnel, route supervisors and county equipment operators.

Some topics that should be covered:

-Route assignments

-Truck assignments (county/contract)

-Roadway/Snow hazards

-Turn around points

-Changes in traffic patterns

-Returning all unused salt

Roadway Hazards

Always be alert to obstructions to your plowing.

Roadway Hazards

Roadway Hazards

- Cold Spots and Black Ice
- Low Shoulders / No Shoulders
- Overhead obstructions – bridges, trees, wires
- And, of course, the traveling public

Salt Barn Loading

- Very little loader articulation is needed to load a barn design versus a dome.

- A longer ramp with less incline is needed to load barn.

- Salt must still be kept below the maximum salt height line.

Pre-Storm Preparation

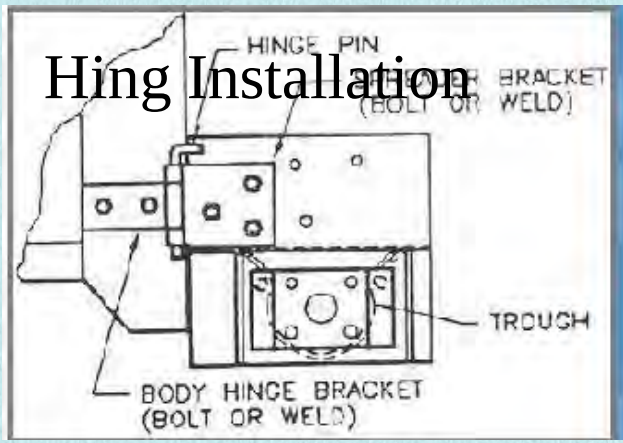
Equipment Checks

- Match plow number to truck number.
- Mount plow frame and plow to truck.
- Load truck bed with salt. Side of load must be at least six inches below the truck sides and the mounded part no higher than the truck sides.
- Cover the load immediately and keep covered to prevent wind erosion.

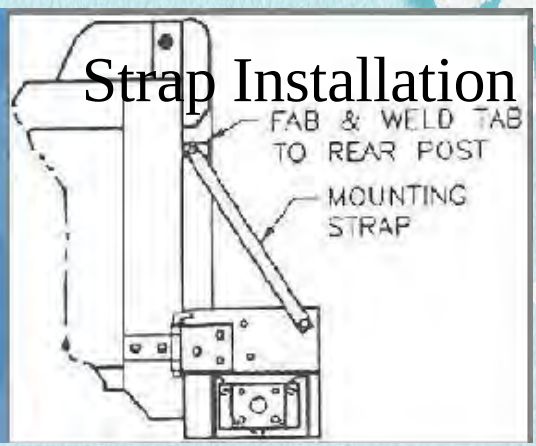
Salt Box Installation & Maintenance

Installation:

Hing Installation



Strap Installation



Maintenance: Clean spreader after each storm in the CCG wash bay.

Roadways & Surfaces

Two-Lane Roadways

- One 12 feet wide lane traveling in each direction.
- The standard plow Angled correctly will clear 8 to 9 feet per pass.
- Four passes needed to clear the entire road.
- Start in the center and work out.
- Clear road shoulders.

Roadway Configurations
Intersections

- Empty your plow before crossing intersections.
- Reduce the size of the windrow.
- Avoid building snowbanks that interfere with sight distance.
- Keep traffic signs unobstructed from view.

Bridges & Overpasses

- Bridge surface may be higher than the road surface due to the bridge freezing and expanding.

- Care must be taken not to throw snow over the bridge.

Hills

- Traction is limited on hills.
- Stopping can be difficult on hills.
- Watch for melted snow refreezing in the road valley.

Railroad Crossings

- Avoid piling snow against signals, switch boxes, signs, etc.
- Raise plows slightly when crossing railroad tracks.

Types Of Plows, Plowing Tips & Techniques

-The One-Way Plow-

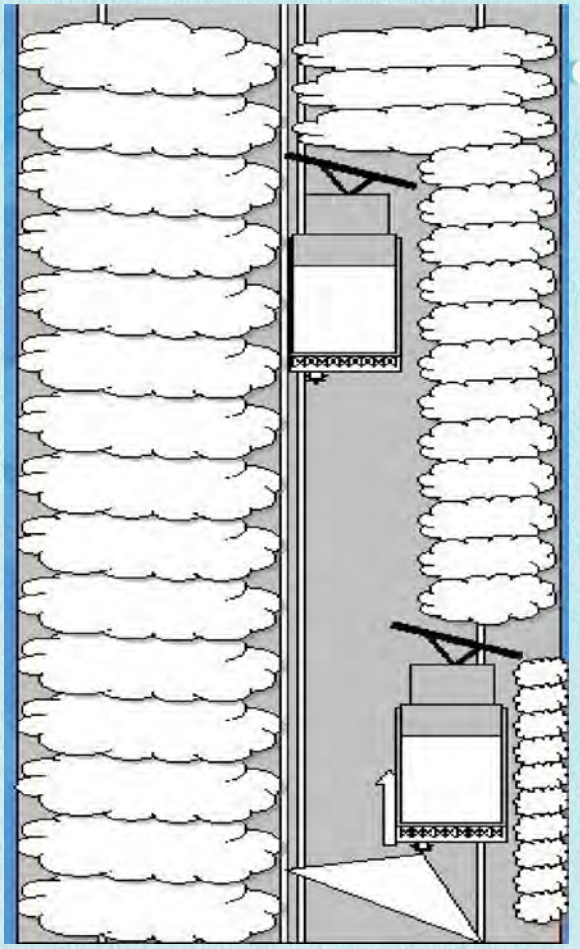
- One-way reversible plow (manual adjust)
- One-way reversible plow (hydraulic adjust)

-Plowing Speed-

- Keep your speed fast enough to move the snow away from the roadway…
- …but slow enough so the windrow does not cause property damage.
- The faster your speed the more unstable the truck.

-Plowing Speed-

- Plowing too fast can create a blizzard-like condition that can obscure your vision.
- Reduce plowing speed at bridges.
- Reduce your left shoulder plowing speed when Jersey Barriers located in the median.
- When part of a plow train, continually adjust your speed to maintain a good, even spacing between trucks.
- The lead truck is in control of the plow train's speed.



Points To Remember

- Always give bridges, hills and ramps special attention.
- Salt the high sides of curves.
- Do not overuse salt.
- Use just enough to get the job done!
- If salt spills from the truck, it must be swept up immediately, or if not safe to do so immediately the location must be noted and reported to the route supervisor as soon as possible for cleanup later.

Points To Remember

- Salt loses most of its effectiveness at temperatures below 20°F.
- Salt stops working altogether at -6°F.
- Adding more salt to an already salted roadway can actually cause the brine solution to freeze.
- Maintain 300 to 500lbs salt distribution per lane mile.
- Do not use “Manual”, “Stationary Unload”, or “Blast” unless absolutely necessary.

Plowing Tips

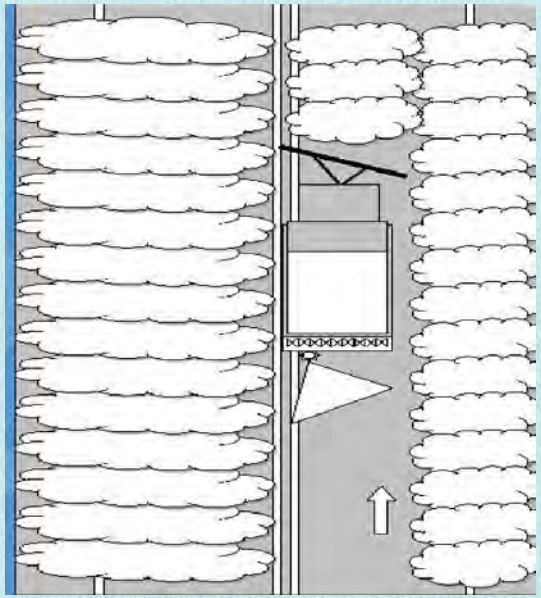
- Never drive faster than the posted speed limit.
- Use a lower gear than normal driving.
- Use extra care plowing curves.
- Plow with direction of traffic.
- Do not block radiator with plow when traveling.
- Plow from centerline out to shoulder.

Plowing Tips

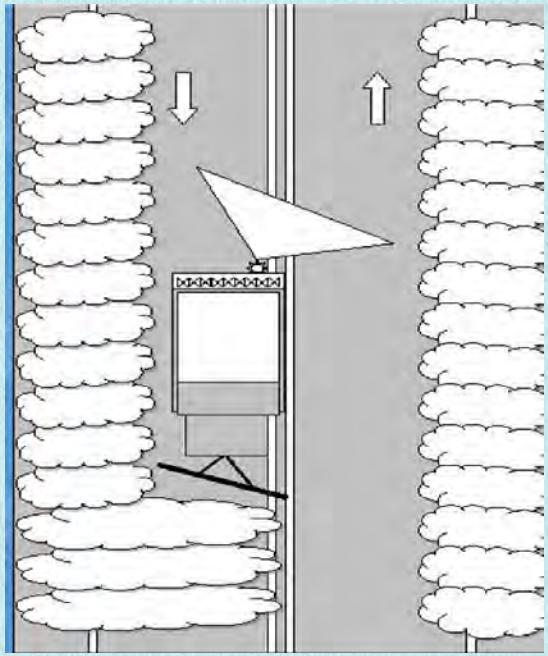
- Plow towards low side of ramps or curves.
- Plow away from wind when possible.
- Raise blade before making sharp turns.
- Don’t leave windrow across an intersection.
- Know your turn around points.
- Refuel with meal breaks or reloading.

Single Vehicle Plowing

- Plow lane in one direction and drop salt behind truck.



- Plow lane in one direction, turn at end of route, plow lane in opposite direction and salt both lanes.



Types Of Snow & Plow Angle

- Wet snow requires more plow angle to discharge snow from plow moldboard.

- Plow must still clear a path for the truck tires.

Winter Operations Environmental Considerations

Winter Materials Storage, Handling and Spreading

As CCG Employees you play an important role in protecting our environment during winter operations by “Salting Sensibly”.

What's the big deal –
Salt is a naturally occurring substance!

While salt is a naturally occurring substance, high concentrations of salt negatively affect or destroy land based and aquatic habitats and species.

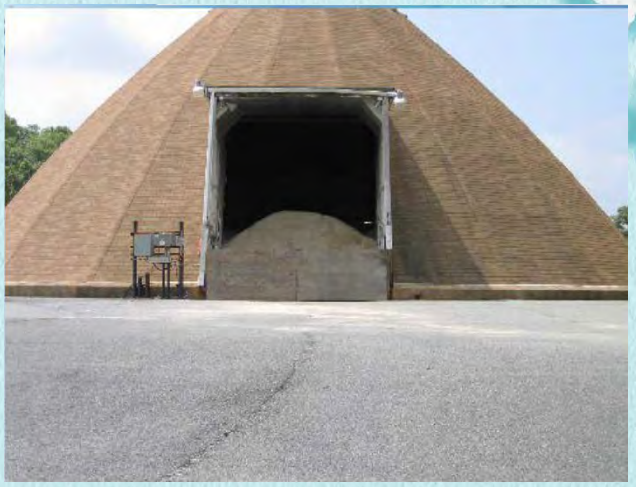
Once salt goes into solution (becomes a brine solution) it cannot be recovered. It is stored in soil or water and can reach levels that are considered contamination.

Salt can contaminate drinking water supplies in well and in reservoirs, inhibit the establishment of vegetation or crops, and eliminate habitat for fish and other aquatic species.

By implementing a few Best Management Practices (BMP's) in handling salt and other de-icing materials, water resources can be protected.

Salt Storage

- During the off-season, a barrier should be placed across the structure's opening to prevent salt from contaminating the environment.



- Make sure when salt is delivered, that all inlets and drainage structures are protected, and all the salt is under covered storage by day's end. Here an inlet is protected by covering it with a sheet signing, but overnight rain-washed dissolved salt into the drainage system discharging it off site.

Salt Handling

- Uncovered salt/abrasive stockpiles are allowed during a storm event; however, they must be placed under cover immediately after plowing operations have stopped and the mixing area must then be free of any residual salt and/or abrasives.

- To minimize spillage do not overfill trucks with salt. The center of the load must be lower than the truck bed sides.
- Upon completion of plowing event, all material on pavement lot much be swept and returned to covered storage.

Materials Spreading

To provide passable roadway conditions in a cost-effective and environmentally responsible manner:

- Use appropriate application rates provided by CCG which match specific storm conditions.
- Unless otherwise directed, only apply salt to your designated route.
- Return unused salt to designated dome or barn. Never spread salt just to get rid of it.
- If salt is spilled along your route, make a note of the location and report it to your route supervisor for removal.

Materials Spreading

By following appropriate Salt Spreading Guidelines, you will be performing your job duties in an environmentally sensitive manner, reducing the amounts of material discharging from the roadway into the natural environment.

Remember – Excess salt run-off not only impacts aquatic habitat but also impacts drinking water in wells and reservoirs.

Materials Spreading

Keep your load covered at all times. The tarp reduces wind erosion of material.

Equipment Preparation & Cleaning

Prior to the winter maintenance season, calibrate equipment to ensure maximum efficiency and proper application rates.

Check all fluid systems for leaks to reduce the risk of discharge of petroleum-based products on roadways and paved lots.

Equipment Preparation & Cleaning

Clean equipment in wash bay so that wash water is treated by the oil/grit separator to minimize the discharge of sediment, salt and heavy metals into the environment. Equipment may also be washed at covered commercial facilities. Equipment may not be washed outside.

Total Daily Maximum Load (TMDL)

- Governs the amounts of specific pollutants discharged into streams, watersheds, rivers, ponds, lakes and other bodies of water that are “impaired waterways” under the authority of the US Environmental Protection Agency and Maryland Department of the Environment.
    - Impaired waterways are those that have been adversely impacted by pollutants to the point that biological functions have been negatively impacted and/or diminished whereby habitat is marginal or non-existent and/or drinking water has been contaminated.

Do your part in helping to protect the environment.

Be an Environmental Steward.

Salt Sensibly.

Thank You For Your Attendance!

There is no better time than the present to express our appreciation for your support.

The Charles County Government thanks you for making a difference towards out winter snow removal activities.