

# **Annual Report for Year 1 (2022-2023) of the Time Limited Water Quality Standard for Chloride**

**NPDES ID ILG103028**

**Annual Report 4.3**

**Prepared by the City of Joliet**

**1203 Cedarwood Dr, Joliet, IL 60403**

with assistance from Baxter & Woodman, Inc.



The City of Joliet is a member of the  
Lower Des Plaines Watershed  
Group.



## **1.0 Introduction to Chloride Issues in the CAWS/LDPR**

A Pollutant Minimization Plan (PMP) has been prepared by the City of Joliet to reduce the environmental impacts of chloride from the City's winter roadway operations. The City is a discharger covered under the Time Limited Water Quality Standard for Chloride for the Chicago Area Waterways System and Lower Des Plaines River watersheds. The PMP has been prepared to meet the requirements laid out in the Time Limited Water Quality Standard (TLWQS) for Chloride. The term of the PMP covers the first 5-years of the TLWQS period and will be updated following the re-evaluations at Years 4 ½, 9 ½, and 14 ½.

Chloride is a permanent pollutant. It does not degrade over time and continues to accumulate in the environment. Proactive measures to reduce the amount of chloride discharged can help reduce the impacts from chloride on receiving waterways and the environment. Chloride impacts aquatic life, vegetation, and infrastructure. As the chloride concentrations increase and our waters become saltier, aquatic and plant biodiversity decreases and native species are overtaken by salt tolerant invasive species.

Chlorides are commonly found in road salt, fertilizers, water softeners, dust suppressants, and certain industrial processes. Chloride-based deicers, like rock salt, are used on parking lots, sidewalks, and roads to provide safe surfaces to the public during the winter months. These deicers are one of most common sources of chloride in the Chicago region.

The water quality standard for chloride for the Chicago Area Waterway System (CAWS) was updated as part of the rulemaking process related to changing the designated use of the CAWS. The chloride standard was updated from 1,500 mg/L during the winter and 500 mg/L during the summer to 500 mg/L all year round. The change in the chloride water quality standard took effect in 2018. Because portions of the CAWS were not going to meet this new standard due to the need to maintain public safety on roads, highways, sidewalks and parking lots during the winter months, a joint submittal and supporting individual petitions were submitted between 2015 and 2018 to the Illinois Pollution Control Board for a variance from the chloride standard. The joint petition laid out best management practices that can be achieved by the petitioners to reduce their chloride use while maintaining public safety during winter storms. In addition to the CAWS, portions of the Lower Des Plaines River watershed were included as it receives water from the CAWS.

On November 4, 2021, the IPCB issued an Opinion and Order for a Time Limited Water Quality Standard (TLWQS) for Chloride for portions of the CAWS and Lower Des Plaines River watersheds. The TLWQS for Chloride watersheds are defined in the Opinion and Order as the Des Plaines River watershed from the Kankakee River to the Will County Line (except for the DuPage River watershed) and the CAWS watershed (except the North Branch Chicago River watershed upstream of the North Shore Channel and those portions of the watershed located in Indiana). This is a watershed-based approach to reduce the chloride concentrations in the CAWS and Lower Des Plaines River. The TLWQS for Chloride requires all dischargers covered under the TLWQS for Chloride to create PMPs and implement specific best management practices based on their operations to reduce their chloride discharges.

## 2.0 Organization, Facility Information

Agency Name: City of Joliet		
Facility Name: City of Joliet Public Works		Permit Number: ILG103028
Facility Address: 1203 Cedarwood Dr		
City: Joliet	State: IL	Zip Code: 60403

### 2.1 Level of Service for Winter Maintenance Activities

The City uses a Priority Ranking System to prioritize salting and snow plowing that is outlined in the City's Snow Removal Policies and Procedures Manual. High traffic main roads within the City are cleared first, and then the secondary roads and local roads within subdivisions are cleared. Further details about winter maintenance practices currently being implemented by the City of Joliet are included in the City's Snow Removal Policies and Procedures Manual.

The City utilizes five (5) truck mounted applicators to help prevent the bonding of snow and ice to the road surface prior to an ice and snow event. The City uses a blend of organics, house-made brine, and additional chlorides to pretreat roads prior to snow events. The City has a fleet of 44 various trucks and equipment that is used in snow removal activities. The City calibrates vehicle application rates for each truck annually.

The City uses the National Weather Service and Weather Command to track weather forecasts. The City foreman scan pavements and use 10 mounted permanent sensors to track pavement temperatures and snow melt throughout the City.

## 3.0 Best Management Practices

Details regarding the City's implementation of the best management practices (BMPs) identified as part of the TLWQS for Chloride are included below.

### Workgroup BMP

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
The permittee must participate in a Chlorides workgroup for the CAWS or LDPR, depending on the watershed within which the facility's discharge is located.	The City of Joliet is a member of the Lower Des Plaines Watershed Group and City staff attends workgroup meetings.

## Salt Storage and Handling BMPs

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
Store all salt on an impermeable pad that must be constructed to ensure that minimal stormwater is coming into contact with salt unless the salt is stored in a container that ensures stormwater does not come into contact with the salt.	All salt stored by the City is stored in three dedicated permanent covered structures on a concrete pads for containment and to prevent contact with stormwater.
Cover salt piles at all times except when in active use, unless stored indoors.	Orders for salt delivery are regularly made to keep the storage facilities at capacity. If the City over purchases salt, the salt will be temporarily stored on an impervious pad and covered with a heavy-duty tarp.
For working areas, provide berms and or sufficient slope to allow snow melt and stormwater to drain away from the area. If snow melt and stormwater cannot be drained away from the working area, channeling water to a collection point such as a sump, holding tank or lined basin for collection, discharge at a later time, use for prewetting, and use for make-up water for brine must be considered.	All salt is stored inside the permanent structures. The impervious surface of each structure is pitched away from the opening, and salt is swept away from the opening.
<b>MS4/CSO Only</b> - Use deicing material storage structures for all communities covered under General Permit ILR40 for MS4 communities.	The City has three permanent, covered structures for salt storage. Liquid deicer solutions are stored in outdoor tanks outside of each salt storage facility.
Good housekeeping practices must be implemented at the site, including: <ul style="list-style-type: none"> <li>• cleanup of salt at the end of each day or conclusion of a storm event;</li> <li>• tarping of trucks for transportation of bulk chloride;</li> <li>• maintaining the pad and equipment;</li> <li>• good practices during loading and unloading;</li> </ul>	The City implements good housekeeping practices: <ul style="list-style-type: none"> <li>• salt is cleaned up at the end of each day or conclusion of a storm event;</li> <li>• trucks are tarped before salt is transported</li> <li>• the City maintains the impervious pads and equipment;</li> <li>• good practices during loading and unloading are performed;</li> <li>• vehicles and equipment are washed outside of the garage after each snow/ice event. The wash waste runs to nearby sanitary sewers. The City would like to create a designated washing area that drains to the sanitary sewer;</li> <li>• the City performs inspections of its facilities, structures, and work areas as a part of its MS4 program;</li> </ul>

<ul style="list-style-type: none"> <li>• cleanup of loading and spreading equipment after each snow/ice event;</li> <li>• a written inspection program for storage facility, structures and work area;</li> <li>• removing surplus materials from the site when winter activity finished where applicable;</li> <li>• annual inspection and repairs completed when practical;</li> <li>• evaluate the opportunity to reduce or reuse the wash water.</li> </ul>	<ul style="list-style-type: none"> <li>• if the City over purchases salt, the salt will be temporarily stored on an impervious pad and covered with a heavy duty tarp outside of the storage structures;</li> <li>• annual inspection and repairs completed as a part of normal operations;</li> <li>• the City produces its own brine and blends is with organics to use in the prewetting of roads .</li> </ul>
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#### Winter Maintenance Operations BMPs

BMP	Agency Description of Current Implementation or Status Update to the Plan to Implement the BMP
Calibrate all salt spreading equipment at least annually before November 30th. Records of the calibration results must be maintained for each piece of spreading equipment.	Application rate is calibrated before the start of the winter season on each truck, every year.
Pre-wet road salt before use, either by applying liquids to the salt stockpile, or by applying liquids by way of the spreading equipment as the salt is deposited on the road.	The City utilizes five (5) truck mounted applicators to help prevent the bonding of snow and ice to the road surface prior to an ice and snow event. The City uses a blend of organics, house-made brine, and additional chlorides to pretreat roads prior to snow events. The City uses a spray rack to prewet salt as truck leaves and also has on board wetting on some trucks. All salt is prewetted before application.
Use equipment to measure the pavement temperature unless such equipment has already been installed on road salt spreading vehicles.	The City uses the National Weather Service and Weather Command to track weather forecasts. The City foreman scan pavements and use 10 mounted permanent sensors to track pavement temperatures and snow melt throughout the City.
Develop and implement a protocol to vary the salt application rate based on pavement temperature, existing weather conditions, and forecasted weather conditions.	The City has a protocol in place that is outlined in the City's Snow Removal Policies and Procedures Manual.

Track and record salt quantity used and storm conditions from each call-out.	The City records salt usage for each winter event. The annual salt usage is used to approximate the salt required for the next winter season.
Develop a written plan for implementation of anti-icing, with milestones. The plan should consider increased use of liquids (e.g., carbohydrate products) beginning with critical locations such as bridges over streams.	The City has a protocol in place that is outlined in the City's Snow Removal Policies and Procedures Manual.
Provide employees involved in winter maintenance operations with annual training before November 30th on best management practices in the use of road salt in operations, including the practice of plowing first and applying salt only after snow has been cleared.	Annual winter maintenance training is attended in house. Staff Leaders also attend the annual APWA Snow Conference. The City intends to send staff to annual watershed training.
Be responsible for complying with all applicable BMPs even when deicing practices are contracted out and ensure that contractors are properly trained and comply with all applicable BMPs.	In an effort to become more efficient, the City may contract out the plowing of cul-de-sacs during snow events over 4 inches. Contractors will make one full pass around the perimeter of the cul-de-sac with the snowplow, pushing the snow to the inside of the cul-de-sac. The cul-de-sacs will be salted and snow will be plowed off the cul-de-sac at a later time by City staff after all other priority streets have been completed.
Complete an annual report, as required by paragraph 3(B) of this order, which is standardized in an electronic format and submitted to the IEPA's website and to the watershed group.	Annual report will be completed by October 31, 2023..
Obtain and put into place equipment necessary to implement all salt spreading/deicing measure specified in this BMP, such as any new or retrofitted salt spreading equipment necessary to allow for pre- wetting and proper rates of application.	The City has the necessary equipment.
<b>MS4/CSO/IDOT/TOLLWAY Only</b> - Install equipment to measure the pavement temperature on the winter maintenance fleet for a sufficient number of vehicles	The City uses the National Weather Service and Weather Command to track weather forecasts. The City foreman scan pavements and use 10 mounted permanent sensors to track pavement temperatures and snow melt throughout the City.

to provide sufficient information to adjust application rates for the most efficient levels. Develop and complete a plan to equip the winter maintenance fleet before the first re-evaluation.	
<b>MS4/CSO/IDOT/TOLLWAY Only</b> - Before the first re-evaluation, develop a method for conducting a post-winter review to identify areas of success and areas in need of improvement. Items to be completed as part of the review must include, but are not limited to, an evaluation of each salt spreader's application rate, variations in application rates, and discussion of the variation compared to the recommended rates. Once developed, the review should occur annually in the spring/early summer following each winter season.	The City holds unofficial performance review meetings after major snow/ice events. The City plans to hold annual post winter/spring meetings to discuss areas of success and areas in need of improvement.

#### **Additional BMPs Identified for Agency/Facility**

<b>BMP</b>	<b>Agency Description of Current Implementation</b>
N/A	

#### **3.1 Analysis of BMPs Implemented**

Winter operations BMPs were determined to be effective at managing the use and storage of road salt and chloride containing liquids. No changes to the BMPs are proposed at this time.

#### **3.2 Analysis of Alternative Treatments or New Technology**

No alternative winter operations practices or new technologies are being considered at this time.

#### **4.0 Deicing/Anti-Icing Agents Used**

Materials used by the City for the 2022-2023 winter season are included as Appendix 1.

#### **4.1 Application Rates**

Each year, the City calibrates each truck before the start of the winter season. Application rates will be tracked in future years and included in a future Appendix 2 to this report.

##### **4.1.1 Application Rate Analysis**

Application rates will be evaluated in future years.

#### **4.2 Application Practices**

The City utilizes five (5) truck mounted applicators to help prevent the bonding of snow and ice to the road surface prior to an ice and snow event. The City uses a blend of organics, house-made brine, and additional chlorides to pretreat roads prior to snow events. The City has a fleet of 44 various trucks and equipment that is used in snow removal activities. The City calibrates vehicle application rates for each truck annually.

The City uses the National Weather Service and Weather Command to track weather forecasts. The City foreman scan pavements and use 10 mounted permanent sensors to track pavement temperatures and snow melt throughout the City.

#### **4.3 Call Outs**

A total of 9.95 inches of snow was reported in the City for the 2022-2023 winter. There were 3 freezing rain event(s) and 8 snow event(s) for the 2022-2023 winter. The City had 11 of call outs completed during the 2022-2023 winter. A log of all call outs completed by the City are included as Appendix 3.

#### **4.4 Use of Liquids**

The City has equipment for anti-icing (pretreatment) of select route areas. Anti-icing is performed as needed based on weather forecast, pavement temperature, and other factors.

### **5.0 Training**

Annual winter maintenance training is attended in house. Staff Leaders also attend the annual APWA Snow Conference. The City intends to send staff to annual watershed training. A list of annual training topics by type of employee is included as Appendix 4.

### **6.0 Deicing and Snow Removal Equipment and Maintenance**

The City uses equipment listed in Appendix 5 during winter maintenance activities.

#### **6.1 Description of Equipment Washing and Wash Water Collection**

The City does not currently have a designated wash bay to wash equipment. Vehicles and equipment are washed outside of the garage after each snow/ice event. The wash waste runs to nearby sanitary sewers. The City has plans to construct a designated area for washing.

## **7.0 Material Storage**

The City maintains three (3) storage areas. Information regarding the storage areas is included in Appendix 6.

## **8.0 Capital Purchases**

No capital purchases were determined necessary in the City Chloride PMP (Appendix 7).

## **9.0 Environmental Monitoring Data**

Chloride monitoring data is collected for the Lower Des Plaines River watershed per the IPCB order. The data is maintained by the Lower Des Plaines Watershed Group. The watershed group also maintains a USGS monitoring station in the Des Plaines River at Channahon, IL that collects continuous conductivity data to estimate chloride concentrations.

Chloride monitoring data reports are posted to <https://www.cawswatershed.org/reports/> and <https://ldpwatersheds.org/about-us/lower-des-plaines-watershed-group/our-work/chloride-tlwqs/>.

## **10.0 Program Evaluation**

### **10.1 Proposed Steps for the Coming Year**

Continue to implement the City's Chloride PMP and produce an annual report.

## **11.0 Workgroup Participation**

The City of Joliet is a member of the Lower Des Plaines Watershed Group and City staff attends workgroup meetings.

**Organization Name: City of Joliet**

## Chloride TLWQS Annual Report

### Appendix 1 - Deicing/Anti-Icing Agents Used

[illegible]

# Chloride TLWQS Annual Report

## Appendix 3 - Callouts Log

EVENT TYPE Snow

EVENT DATE 12/16/2022

AMOUNT OF SNOWFALL/ICE/RAIN 0.5"

<b>DISTRICT 1</b>		
HOURS	21.00	\$960.44
LIQUID	0.00	\$0.00
SALT (TON)	40.50	\$3,173.58
<b>SUB-TOTAL</b>		<b>\$4,134.02</b>
<b>DISTRICT 2</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>
<b>DISTRICT 3</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>
<b>DISTRICT 4</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>
<b>DISTRICT 5</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>

TOTAL WORK HOURS COST		
DIVISION HOURS	21.00	\$905.66
Subtotal		\$905.66

TOTAL MATERIAL COSTS		
<b>SALT</b>		
CASS ST (TONS)	0.00	
GAEL DR (TONS)	0.00	
ARBEITER RD (TONS)	40.50	
TOTAL	40.50	
SALT COST	\$3,173.58	
<b>LIQUID</b>		
CASS ST (GAL)	0.00	
GAEL DR (GAL)	0.00	
ARBEITER RD (GAL)	0.00	
TOTAL	0.00	
LIQUID COST	\$0.00	
		<b>SALT COST</b>
		\$634.72
		<b>\$634.72 SAVINGS</b>

**TOTAL EVENT COST** **\$4,079.24**

TOTAL LANES MILES PLOWED	250.30
TOTAL SNOW/ICE AMOUNT	0.5"
TOTAL COST PER LANE MILE	\$16.30
TOTAL COST PER INCH OF SNOW/ICE	#VALUE!
POUNDS OF SALT PER LANE MILE	323.61
GALLONS OF CHEMICAL PER LANE MILE	0.00

EVENT TYPE      Snow/Wind/Drifting

EVENT DATE      12/22/2022 - 12/24/2022

AMOUNT OF SNOWFALL/ICE/RAIN      2.8

<b>DISTRICT 1</b>		
HOURS	325.00	\$20,609.11
LIQUID	0.00	\$0.00
SALT (TON)	90.75	\$7,111.17
<b>SUB-TOTAL</b>		<b>\$27,720.28</b>
<b>DISTRICT 2</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>
<b>DISTRICT 3</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>
<b>DISTRICT 4</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		<b>\$0.00</b>
<b>DISTRICT 5</b>		
HOURS	240.00	\$15,303.60
LIQUID	1980.00	\$1,089.00
SALT (TON)	188.25	\$14,751.27
<b>SUB-TOTAL</b>		<b>\$31,143.87</b>

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	565.00	\$33,135.24
Subtotal		\$33,135.24

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	188.25	
GAEL DR (TONS)	0.00	
ARBEITER RD (TONS)	90.75	
TOTAL	279.00	
SALT COST	\$7,111.17	
<b>LIQUID</b>		
CASS ST (GAL)	1980.00	
GAEL DR (GAL)	0.00	
ARBEITER RD (GAL)	0.00	
TOTAL	1980.00	
LIQUID COST	\$851.40	
		<b>SALT COST</b>
		\$4,372.49
		\$3,521.09 SAVINGS

**TOTAL EVENT COST      \$41,097.81**

TOTAL LANES MILES PLOWED	1667.50
TOTAL SNOW/ICE AMOUNT	2.80
TOTAL COST PER LANE MILE	24.64635982
TOTAL COST PER INCH OF SNOW/ICE	14677.7875
POUNDS OF SALT PER LANE MILE	334.63
GALLONS OF CHEMICAL PER LANE MILE	1.187406297

EVENT TYPE light snow

EVENT DATE 1/5/2023

AMOUNT OF SNOWFALL/ICE/RAIN 0.1

<b>DISTRICT 1</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	45.00	\$3,526.20
<b>SUB-TOTAL</b>		\$3,526.20
<b>DISTRICT 2</b>		
HOURS	3.00	\$240.89
LIQUID	0.00	\$0.00
SALT (TON)	65.25	\$5,112.99
<b>SUB-TOTAL</b>		\$5,353.88
<b>DISTRICT 3</b>		
HOURS	64.00	\$3,118.16
LIQUID	218.00	\$119.90
SALT (TON)	21.00	\$1,645.56
<b>SUB-TOTAL</b>		\$4,883.62
<b>DISTRICT 4</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	40.50	\$3,173.58
<b>SUB-TOTAL</b>		\$3,173.58
<b>DISTRICT 5</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	57.75	\$4,525.29
<b>SUB-TOTAL</b>		\$4,525.29

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	67.00	\$3,088.83
Subtotal		\$3,088.83

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	98.25	
GAEL DR (TONS)	86.25	
ARBEITER RD (TONS)	45.00	
TOTAL	229.50	
SALT COST	\$13,458.33	
<b>LIQUID</b>		
CASS ST (GAL)	0.00	
GAEL DR (GAL)	218.00	
ARBEITER RD (GAL)	0.00	
TOTAL	218.00	
LIQUID COST	\$93.74	
		<b>SALT COST</b>
		\$3,596.72
		\$3,502.98 SAVINGS

**TOTAL EVENT COST \$16,640.90**

TOTAL LANES MILES PLOWED	743.20
TOTAL SNOW/ICE AMOUNT	0.10
TOTAL COST PER LANE MILE	22.39
TOTAL COST PER INCH OF SNOW/ICE	166408.95
POUNDS OF SALT PER LANE MILE	617.60
GALLONS OF CHEMICAL PER LANE MILE	0.293326157

EVENT TYPE      Wet Snow

EVENT DATE      1/25/2023

AMOUNT OF SNOWFALL/ICE/RAIN      4.3

<b>DISTRICT 1</b>		
HOURS	120.00	\$7,038.94
LIQUID	1502.00	\$826.10
SALT (TON)	138.75	\$10,872.45
<b>SUB-TOTAL</b>		\$18,737.49
<b>DISTRICT 2</b>		
HOURS	124.00	\$7,044.68
LIQUID	1632.00	\$897.60
SALT (TON)	179.50	\$14,065.62
<b>SUB-TOTAL</b>		\$22,007.90
<b>DISTRICT 3</b>		
HOURS	108.00	\$6,194.02
LIQUID	872.00	\$479.60
SALT (TON)	#VALUE!	#VALUE!
<b>SUB-TOTAL</b>		#VALUE!
<b>DISTRICT 4</b>		
HOURS	88.00	\$5,168.24
LIQUID	0.00	\$0.00
SALT (TON)	86.75	\$6,797.73
<b>SUB-TOTAL</b>		\$11,965.97
<b>DISTRICT 5</b>		
HOURS	116.00	\$6,895.66
LIQUID	1080.00	\$594.00
SALT (TON)	138.50	\$10,852.86
<b>SUB-TOTAL</b>		\$18,342.52

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	468.00	\$27,173.30
Subtotal		\$27,173.30

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	225.25	
GAEL DR (TONS)	#VALUE!	
ARBEITER RD (TONS)	138.75	
TOTAL	#VALUE!	
SALT COST	#VALUE!	
<b>LIQUID</b>		
CASS ST (GAL)	1080.00	
GAEL DR (GAL)	2504.00	
ARBEITER RD (GAL)	1502.00	
TOTAL	5086.00	
LIQUID COST	\$2,186.98	
		<b>SALT COST</b>
		#VALUE!
		#VALUE! SAVINGS

TOTAL EVENT COST      #VALUE!

TOTAL LANES MILES PLOWED	2847.01
TOTAL SNOW/ICE AMOUNT	4.30
TOTAL COST PER LANE MILE	#VALUE!
TOTAL COST PER INCH OF SNOW/ICE	#VALUE!
POUNDS OF SALT PER LANE MILE	#VALUE!
GALLONS OF CHEMICAL PER LANE MILE	1.79

EVENT TYPE      Snow, light powdery

EVENT DATE      1/26/2023

AMOUNT OF SNOWFALL/ICE/RAIN      0.5

<b>DISTRICT 1</b>		
HOURS	100.00	\$5,339.51
LIQUID	930.00	\$511.50
SALT (TON)	87.00	\$6,817.32
<b>SUB-TOTAL</b>		\$12,668.33
<b>DISTRICT 2</b>		
HOURS	80.50	\$4,017.10
LIQUID	1482.00	\$815.10
SALT (TON)	136.50	\$10,696.14
<b>SUB-TOTAL</b>		\$15,528.34
<b>DISTRICT 3</b>		
HOURS	90.00	\$4,866.73
LIQUID	872.00	\$479.60
SALT (TON)	93.00	\$7,287.48
<b>SUB-TOTAL</b>		\$12,633.81
<b>DISTRICT 4</b>		
HOURS	71.00	\$3,922.61
LIQUID	0.00	\$0.00
SALT (TON)	93.75	\$7,346.25
<b>SUB-TOTAL</b>		\$11,268.86
<b>DISTRICT 5</b>		
HOURS	90.00	\$4,929.76
LIQUID	1080.00	\$594.00
SALT (TON)	120.75	\$9,461.97
<b>SUB-TOTAL</b>		\$14,985.73

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	360.50	\$19,153.10
Subtotal		\$19,153.10

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	214.50	
GAEL DR (TONS)	229.50	
ARBEITER RD (TONS)	87.00	
TOTAL	531.00	
SALT COST	\$32,147.19	
<b>LIQUID</b>		
CASS ST (GAL)	1080.00	
GAEL DR (GAL)	2354.00	
ARBEITER RD (GAL)	930.00	
TOTAL	4364.00	
LIQUID COST	\$1,876.52	
		<b>SALT COST</b>
		\$8,321.83
		\$6,445.31 SAVINGS

**TOTAL EVENT COST      \$53,176.81**

TOTAL LANES MILES PLOWED	1610.42
TOTAL SNOW/ICE AMOUNT	0.50
TOTAL COST PER LANE MILE	33.02
TOTAL COST PER INCH OF SNOW/ICE	\$106,353.61
POUNDS OF SALT PER LANE MILE	659.46
GALLONS OF CHEMICAL PER LANE MILE	2.71

EVENT TYPE      Snow

EVENT DATE      1/27/2023

AMOUNT OF SNOWFALL/ICE/RAIN      0.5

<b>DISTRICT 1</b>		
HOURS	74.00	\$4,096.52
LIQUID	0.00	\$0.00
SALT (TON)	54.00	\$4,231.44
<b>SUB-TOTAL</b>		\$8,327.96
<b>DISTRICT 2</b>		
HOURS	68.25	\$3,322.86
LIQUID	1082.00	\$595.10
SALT (TON)	72.00	\$5,641.92
<b>SUB-TOTAL</b>		\$9,559.88
<b>DISTRICT 3</b>		
HOURS	87.75	\$4,700.82
LIQUID	872.00	\$479.60
SALT (TON)	84.00	\$6,582.24
<b>SUB-TOTAL</b>		\$11,762.66
<b>DISTRICT 4</b>		
HOURS	59.50	\$3,161.52
LIQUID	0.00	\$0.00
SALT (TON)	26.25	\$2,056.95
<b>SUB-TOTAL</b>		\$5,218.47
<b>DISTRICT 5</b>		
HOURS	64.00	\$3,353.37
LIQUID	700.00	\$385.00
SALT (TON)	69.00	\$5,406.84
<b>SUB-TOTAL</b>		\$9,145.21

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	294.00	\$15,473.57
Subtotal		\$15,473.57

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	95.25	
GAEL DR (TONS)	156.00	
ARBEITER RD (TONS)	54.00	
TOTAL	305.25	
SALT COST	\$18,512.55	
<b>LIQUID</b>		
CASS ST (GAL)	700.00	
GAEL DR (GAL)	1954.00	
ARBEITER RD (GAL)	0.00	
TOTAL	2654.00	
LIQUID COST	\$1,141.22	
		<b>SALT COST</b>
		\$4,783.88
		\$3,642.66 SAVINGS

**TOTAL EVENT COST      \$35,127.34**

TOTAL LANES MILES PLOWED	853.90
TOTAL SNOW/ICE AMOUNT	0.50
TOTAL COST PER LANE MILE	\$41.14
TOTAL COST PER INCH OF SNOW/ICE	\$70,254.68
POUNDS OF SALT PER LANE MILE	714.95
GALLONS OF CHEMICAL PER LANE MILE	3.11

EVENT TYPE Freezing Rain/Ice

EVENT DATE 1/28/23 - 1/29/23

AMOUNT OF SNOWFALL/ICE/RAIN 0.1

<b>DISTRICT 1</b>		
HOURS	52.50	\$3,822.60
LIQUID	0.00	\$0.00
SALT (TON)	93.00	\$7,287.48
<b>SUB-TOTAL</b>		\$11,110.08
<b>DISTRICT 2</b>		
HOURS	60.00	\$4,317.12
LIQUID	1632.00	\$897.60
SALT (TON)	192.00	\$15,045.12
<b>SUB-TOTAL</b>		\$20,259.84
<b>DISTRICT 3</b>		
HOURS	54.00	\$3,981.87
LIQUID	72.00	\$39.60
SALT (TON)	133.50	\$10,461.06
<b>SUB-TOTAL</b>		\$14,482.53
<b>DISTRICT 4</b>		
HOURS	31.50	\$2,367.50
LIQUID	0.00	\$0.00
SALT (TON)	65.75	\$5,152.17
<b>SUB-TOTAL</b>		\$7,519.67
<b>DISTRICT 5</b>		
HOURS	36.00	\$2,654.78
LIQUID	0.00	\$0.00
SALT (TON)	90.50	\$7,091.58
<b>SUB-TOTAL</b>		\$9,746.36

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	202.50	\$14,776.37
Subtotal		\$14,776.37

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	156.25	
GAEL DR (TONS)	325.50	
ARBEITER RD (TONS)	93.00	
TOTAL	574.75	
SALT COST	\$37,945.83	
<b>LIQUID</b>		
CASS ST (GAL)	0.00	
GAEL DR (GAL)	1704.00	
ARBEITER RD (GAL)	0.00	
TOTAL	1704.00	
LIQUID COST	\$732.72	
		<b>SALT COST</b>
		\$9,007.48
		\$8,274.76 SAVINGS

**TOTAL EVENT COST \$53,454.92**

TOTAL LANES MILES PLOWED	1892.90
TOTAL SNOW/ICE AMOUNT	0.10
TOTAL COST PER LANE MILE	\$28.24
TOTAL COST PER INCH OF SNOW/ICE	\$534,549.19
POUNDS OF SALT PER LANE MILE	607.27
GALLONS OF CHEMICAL PER LANE MILE	0.90

EVENT TYPE      Rain/Freezing Rain

EVENT DATE      2/16/2023

AMOUNT OF SNOWFALL/ICE/RAIN      0.05"

<b>DISTRICT 1</b>		
HOURS	122.00	\$6,951.10
LIQUID	0.00	\$0.00
SALT (TON)	168.00	\$13,164.48
<b>SUB-TOTAL</b>		<b>\$20,115.58</b>
<b>DISTRICT 2</b>		
HOURS	120.00	\$6,715.52
LIQUID	1632.00	\$897.60
SALT (TON)	192.00	\$15,045.12
<b>SUB-TOTAL</b>		<b>\$22,658.24</b>
<b>DISTRICT 3</b>		
HOURS	96.00	\$5,306.84
LIQUID	0.00	\$0.00
SALT (TON)	172.50	\$13,517.10
<b>SUB-TOTAL</b>		<b>\$18,823.94</b>
<b>DISTRICT 4</b>		
HOURS	72.00	\$4,308.64
LIQUID	0.00	\$0.00
SALT (TON)	92.25	\$7,228.71
<b>SUB-TOTAL</b>		<b>\$11,537.35</b>
<b>DISTRICT 5</b>		
HOURS	96.00	\$5,387.06
LIQUID	1380.00	\$759.00
SALT (TON)	132.75	\$10,402.29
<b>SUB-TOTAL</b>		<b>\$16,548.35</b>

TOTAL WORK HOURS COST		
DIVISION HOURS	434.00	\$24,360.52
Subtotal		\$24,360.52

TOTAL MATERIAL COSTS		
<b>SALT</b>		
CASS ST (TONS)	225.00	
GAEL DR (TONS)	364.50	
ARBEITER RD (TONS)	168.00	
TOTAL	757.50	
SALT COST	\$48,955.41	
<b>LIQUID</b>		
CASS ST (GAL)	1380.00	
GAEL DR (GAL)	1632.00	
ARBEITER RD (GAL)	0.00	
TOTAL	3012.00	
LIQUID COST	\$1,295.16	
		<b>SALT COST</b>
		\$11,871.54
		\$10,576.38 SAVINGS

**TOTAL EVENT COST      \$74,611.09**

TOTAL LANES MILES PLOWED	1982.60
TOTAL SNOW/ICE AMOUNT	0.05"
TOTAL COST PER LANE MILE	37.63
TOTAL COST PER INCH OF SNOW/ICE	#VALUE!
POUNDS OF SALT PER LANE MILE	764.15
GALLONS OF CHEMICAL PER LANE MILE	1.52

EVENT TYPE Freezing Rain/Snow

EVENT DATE 2/16/2023

AMOUNT OF SNOWFALL/ICE/RAIN 0.8"

<b>DISTRICT 1</b>		
HOURS	116.00	\$6,485.03
LIQUID	0.00	\$0.00
SALT (TON)	78.00	\$6,112.08
<b>SUB-TOTAL</b>		<b>\$12,597.11</b>
<b>DISTRICT 2</b>		
HOURS	120.00	\$6,715.52
LIQUID	1632.00	\$897.60
SALT (TON)	96.00	\$7,522.56
<b>SUB-TOTAL</b>		<b>\$15,135.68</b>
<b>DISTRICT 3</b>		
HOURS	89.50	\$4,866.30
LIQUID	872.00	\$479.60
SALT (TON)	84.00	\$6,582.24
<b>SUB-TOTAL</b>		<b>\$11,928.14</b>
<b>DISTRICT 4</b>		
HOURS	70.00	\$4,179.70
LIQUID	0.00	\$0.00
SALT (TON)	76.50	\$5,994.54
<b>SUB-TOTAL</b>		<b>\$10,174.24</b>
<b>DISTRICT 5</b>		
HOURS	104.00	\$5,963.53
LIQUID	1230.00	\$676.50
SALT (TON)	91.00	\$7,130.76
<b>SUB-TOTAL</b>		<b>\$13,770.79</b>

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	429.50	\$24,030.38
Subtotal		\$24,030.38

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	167.50	
GAEL DR (TONS)	180.00	
ARBEITER RD (TONS)	78.00	
TOTAL	425.50	
SALT COST	\$26,211.42	
<b>LIQUID</b>		
CASS ST (GAL)	1230.00	
GAEL DR (GAL)	2504.00	
ARBEITER RD (GAL)	0.00	
TOTAL	3734.00	
LIQUID COST	\$1,605.62	
		<b>SALT COST</b>
		\$6,668.44
		\$5,062.82 SAVINGS

**TOTAL EVENT COST \$51,847.42**

TOTAL LANES MILES PLOWED	942.90
TOTAL SNOW/ICE AMOUNT	0.8"
TOTAL COST PER LANE MILE	54.99
TOTAL COST PER INCH OF SNOW/ICE	#VALUE!
POUNDS OF SALT PER LANE MILE	902.53
GALLONS OF CHEMICAL PER LANE MILE	3.96

EVENT TYPE Drizzle

EVENT DATE 3/3/2023

AMOUNT OF SNOWFALL/ICE/RAIN 0.1

<b>DISTRICT 1</b>		
HOURS	32.00	\$2,327.94
LIQUID	0.00	\$0.00
SALT (TON)	51.90	\$4,066.88
<b>SUB-TOTAL</b>		\$6,394.82
<b>DISTRICT 2</b>		
HOURS	104.00	\$5,769.68
LIQUID	1632.00	\$897.60
SALT (TON)	96.00	\$7,522.56
<b>SUB-TOTAL</b>		\$14,189.84
<b>DISTRICT 3</b>		
HOURS	108.00	\$6,194.02
LIQUID	872.00	\$479.60
SALT (TON)	93.00	\$7,287.48
<b>SUB-TOTAL</b>		\$13,961.10
<b>DISTRICT 4</b>		
HOURS	47.00	\$2,815.68
LIQUID	0.00	\$0.00
SALT (TON)	37.50	\$2,938.50
<b>SUB-TOTAL</b>		\$5,754.18
<b>DISTRICT 5</b>		
HOURS	92.00	\$5,445.68
LIQUID	0.00	\$0.00
SALT (TON)	52.50	\$4,113.90
<b>SUB-TOTAL</b>		\$9,559.58

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	336.00	\$19,737.32
Subtotal		\$19,737.32

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	90.00	
GAEL DR (TONS)	189.00	
ARBEITER RD (TONS)	51.90	
TOTAL	330.90	
SALT COST	\$21,815.42	
<b>LIQUID</b>		
CASS ST (GAL)	0.00	
GAEL DR (GAL)	2504.00	
ARBEITER RD (GAL)	0.00	
TOTAL	2504.00	
LIQUID COST	\$1,076.72	
		<b>SALT COST</b>
		\$5,185.86
		\$4,109.14 SAVINGS

**TOTAL EVENT COST \$42,629.46**

TOTAL LANES MILES PLOWED	984.40
TOTAL SNOW/ICE AMOUNT	0.05
TOTAL COST PER LANE MILE	43.31
TOTAL COST PER INCH OF SNOW/ICE	852,589.28
POUNDS OF SALT PER LANE MILE	672.29
GALLONS OF CHEMICAL PER LANE MILE	2.54

EVENT TYPE      Snow/Dusting

EVENT DATE      3/13/2023

AMOUNT OF SNOWFALL/ICE/RAIN      0.2

<b>DISTRICT 1</b>		
HOURS	16.00	\$734.36
LIQUID	0.00	\$0.00
SALT (TON)	22.80	\$1,786.61
<b>SUB-TOTAL</b>		\$2,520.97
<b>DISTRICT 2</b>		
HOURS	18.00	\$849.64
LIQUID	0.00	\$0.00
SALT (TON)	84.00	\$6,582.24
<b>SUB-TOTAL</b>		\$7,431.88
<b>DISTRICT 3</b>		
HOURS	0.00	\$0.00
LIQUID	0.00	\$0.00
SALT (TON)	0.00	\$0.00
<b>SUB-TOTAL</b>		\$0.00
<b>DISTRICT 4</b>		
HOURS	6.00	\$322.42
LIQUID	0.00	\$0.00
SALT (TON)	15.00	\$1,175.40
<b>SUB-TOTAL</b>		\$1,497.82
<b>DISTRICT 5</b>		
HOURS	14.00	\$689.18
LIQUID	0.00	\$0.00
SALT (TON)	36.00	\$2,820.96
<b>SUB-TOTAL</b>		\$3,510.14

<b>TOTAL WORK HOURS COST</b>		
DIVISION HOURS	48.00	\$2,273.18
Subtotal		\$2,273.18

<b>TOTAL MATERIAL COSTS</b>		
<b>SALT</b>		
CASS ST (TONS)	51.00	
GAEL DR (TONS)	84.00	
ARBEITER RD (TONS)	22.80	
TOTAL	157.80	
SALT COST	\$9,544.25	
<b>LIQUID</b>		
CASS ST (GAL)	0.00	
GAEL DR (GAL)	0.00	
ARBEITER RD (GAL)	0.00	
TOTAL	0.00	
LIQUID COST	\$0.00	
		<b>SALT COST</b>
		\$2,473.04
		\$2,473.04 SAVINGS

**TOTAL EVENT COST      \$11,817.43**

TOTAL LANES MILES PLOWED	443.20
TOTAL SNOW/ICE AMOUNT	0.20
TOTAL COST PER LANE MILE	26.66
TOTAL COST PER INCH OF SNOW/ICE	59,087.14
POUNDS OF SALT PER LANE MILE	712.09
GALLONS OF CHEMICAL PER LANE MILE	0.00

Role in Winter Operations	Training Topics Covered
Public Works Management	APWA Snow Conference (2022 & 2023)
	Program management, pre-wetting, anti-icing, application rates, record keeping
Operators	In-House Training
	Routes, equipment calibration, weather forecasting, use of salt, pre-wetting, pretreatment of pavement (anti-icing), vehicle clean out / clean up

## Appendix 5 - Equipment

Type of Equipment	Equipment/Vehicle Number	Type of Spreader (mechanically controlled, computer controlled, etc.)	Type of Material Used with Equipment (Dry, Pre-Wet, Pretreated, Liquids)	Other Important Equipment Information
Single Axle Truck		TAILGATE	Dry	
Single Axle Truck		TAILGATE	Dry	
Single Axle Truck		ANTI-ICE	Liquids	
Single Axle Truck		ANTI-ICE	Liquids	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX	Dry	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Single Axle Truck		TAILGATE	Dry	

Appendix 5 - Equipment

Type of Equipment	Equipment/Vehicle Number	Type of Spreader (mechanically controlled, computer controlled, etc.)	Type of Material Used with Equipment (Dry, Pre-Wet, Pretreated, Liquids)	Other Important Equipment Information
Single Axle Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Tandem Axel Truck		V-BOX/PRE-WET	Dry/Pre-wet	
Loader			Dry	
Loader			Dry	
Loader			Dry	
Grader		9FT WING PLOW	Dry	
Grader			Dry	

Location of Storage Area	Material Stored (Rock Salt, Salt Brine, etc.)	Amount of Material Stored 2022-2023	Material stored under permanent cover? (yes/describe other)	Material stored in a fully enclosed structure? (yes/describe other)	Material stored on an impervious pad? (yes/describe other)	Good housekeeping practices followed at storage area? (yes/describe other)
818 E. Cass Street	Rock Salt, Salt Brine, Liquid Calcium Chloride, GEOMELT, Anti Ice Mixture	1,500 tons	Yes	Roack Salt is stored in a permanent covered structure with an open doorway for easy access for loading. The liquid mixtures are ket in fully enclosed containers.	Yes	Yes
1203 Cedarwood Drive	Rock Salt, Salt Brine, Liquid Calcium Chloride, GEOMELT, Anti Ice Mixture	2,500 tons	Yes	Roack Salt is stored in a permanent covered structure with an open doorway for easy access for loading. The liquid mixtures are ket in fully enclosed containers.	Yes	Yes

Location of Storage Area	Material Stored (Rock Salt, Salt Brine, etc.)	Amount of Material Stored 2022-2023	Material stored under permanent cover? (yes/describe other)	Material stored in a fully enclosed structure? (yes/describe other)	Material stored on an impervious pad? (yes/describe other)	Good housekeeping practices followed at storage area? (yes/describe other)
2001 Arbeiter Road	Rock Salt, Salt Brine, Liquid Calcium Chloride, GEOMELT, Anti Ice Mixture	2,000 tons	Yes	Roack Salt is stored in a permanent covered structure with an open doorway for easy access for loading. The liquid mixtures are ket in fully enclosed containers.	Yes	Yes

Capital Purchase Description	Plan/Schedule for Purchase
N/A	