
Operational & Environmental Considerations of Road Salt Usage On The Provincial Highway Network

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- **Agenda**

Background – the provincial highway network

Environmental management plans for road salt handling

Road salt application considerations



Background – the provincial highway network

Background - The Provincial Network

The provincial highway network consists of **32,000**km of roadway!

In order to manage the operational aspect of this vast network, the province is divided into 25 different Contract Management Areas (aka CMAs).

- Maintenance activity is outsourced to industry.
- There are approximately 150 active highway maintenance yards located across the network.
- There approximately 700 snowplows/graders that provide service during winter storm events.



Background – Environmental Considerations

The application of road salts goes back many decades as it has been long recognized that it is an effective deicer; leading to increase driver safety.

To minimize environmental impacts Transportation and Economic Corridors has established specifications to protect:

- *Waterbodies*
- *Vegetation*
- *Soil*
- *Groundwater*



Background – Regulatory

Although it is recognized that salt is harmful to the environment, it is acknowledged by both provincial and federal regulators that the application of road salts is necessary for driver safety.

- The department is obliged to report non-compliant releases to the provincial regulator under the *Alberta Environmental Protection & Enhancement Act*.
- The department also conforms to the federal *Code of Practice for the Environmental Management for Road Salts*.



ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT

Revised Statutes of Alberta 2000
Chapter E-12

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Application to the Network

Road Salt Application

- 3 types of commonly used deicers – sodium chloride, calcium chloride (more hygroscopic) and magnesium chloride (there also alternative deicers and additives ie; beet juice)
 - Both in solid and liquid form
 - Salt usage is tracked and reported to Transport Canada
- Snowplows are equipped with computerized sand/salt spreaders that control the rate of application based on ground speed
- Bridge deck icing (temperature differential from surrounding roads) typically require preferential ice control (especially early winter season)
- Decision to apply deicing chemicals is based on current and anticipated temperature, time of day, and safety impacts to the travelling public.
 - Snowplow operators are trained in proper salt and sand application

RWIS

Road Weather Information Systems (RWIS) are used by many road agencies as a tool to enhance winter maintenance. Each station has passive pavement sensors, atmospheric sensors, and a video camera capable of capturing still-frames.

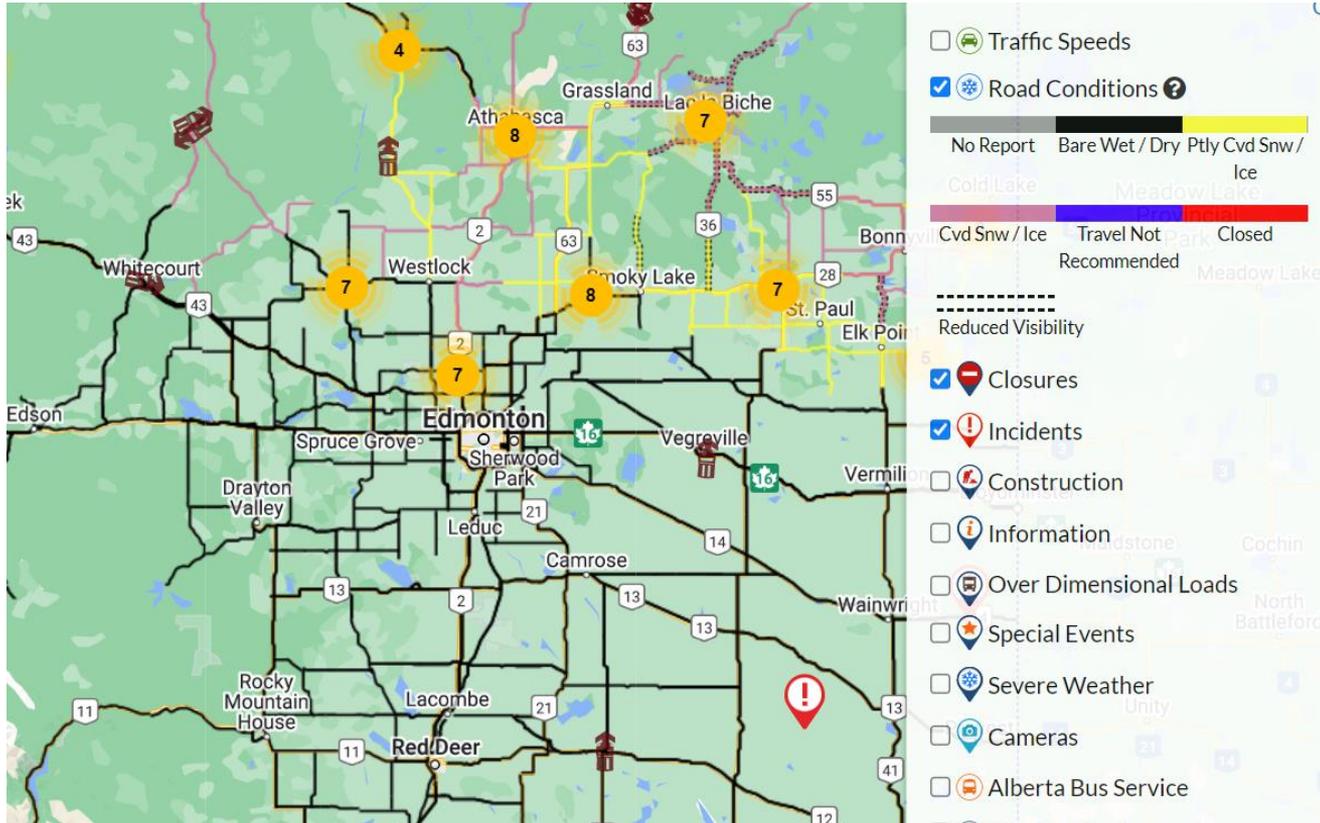
Information obtained from the ~125 RWIS stations, located across the provincial highway network, provide real time weather information to the highway maintenance contractors allowing for rapid preparedness & response to winter storm events.

These measures can include:

- Preparedness of snow removal equipment
- **Applying anti-icing to highways in advance of snow fall reduces adhesion to the driving surface.**



Winter Maintenance – 511 Alberta





Environmental Management Plans

Environmental Management Plans (EMPs)

The department requires the implementation of EMPs, at select highway maintenance yards, in order to maintain a compliant approach with respect to salt storage and handling.

EMPs were initially developed in 2005 with input from industry, Environment, and the department.

The department establishes EMP specifications within the contract documents that the highway maintenance contractors (HMCs) must adhere to.



Environmental Management Plans (EMPs)

The purpose of the EMP is to ensure a consistent approach with respect to salt storage/handling.

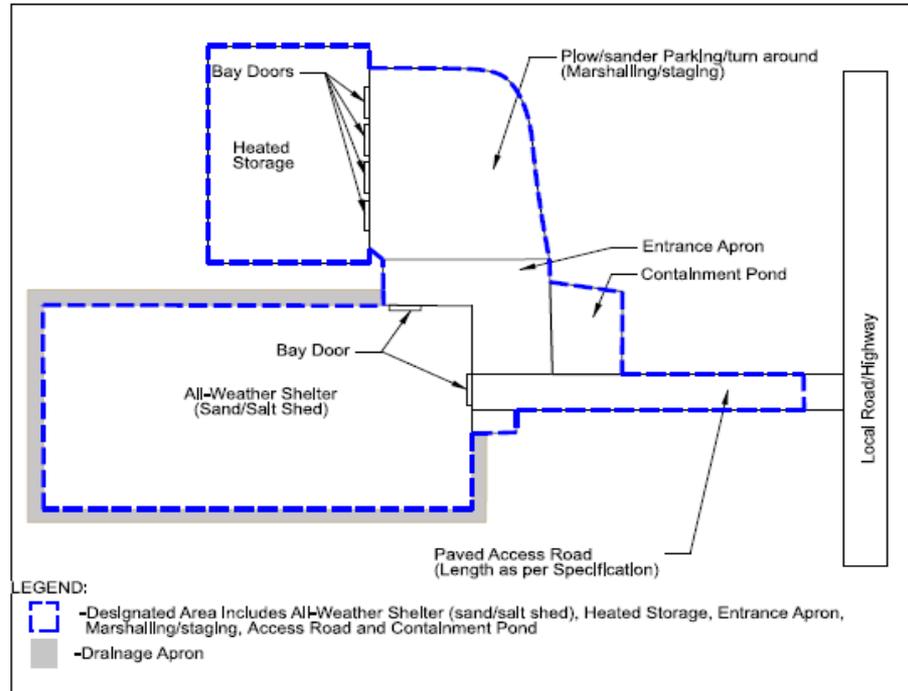
The primary objectives of the EMP guideline are to:

- *Understand and respect environmental legislation.*
- *Protect the environment.*
- *Protect property.*
- *Conduct inspections to verify proper implementation of the EMP.*

Environmental Management Plans (EMPs)

The Designated Area (DA) is that area, within the highway maintenance yard, where salt storage and handling occurs.

Sketch of a conceptual Designated Area.



Environmental Management Plans (EMPs)

Steps to protect the environment are top-of-mind due to ever increasing regulation & growing public expectation.

- *The department routinely works with industry to update the EMP guideline.*
- *Updated EMP guidelines & requirements are incorporated into subsequent contracts as they are retendered.*

Environmental Management Plans (EMPs)

Groundwater monitoring wells must be established, within the DA, on day one of each new contract. The wells are typically tested every spring and fall.

- *Any non-compliant releases are reported to Alberta Environment and Protected Areas immediately!*

Environmental Management Plans (EMPs)

Where contamination has spread beyond the highway maintenance yard fence-line, monitoring wells are established on adjacent properties in order to identify the horizontal and vertical extent of the plume.

EMP Requirements

Design considerations:

- The size and capacity of the All-Weather Shelter needs to accommodate all material loading, unloading, storage and mixing operations.
- The elevation of the floor within the All-Weather Shelter is constructed so that no surface water from outside the Designated Area may enter the All-Weather Shelter and no meltwater from operations may leave the All-Weather Shelter.



EMP Requirements

The exterior of the All-Weather Shelter must be waterproof.

Pre-wetting chemical storage tanks must have 110% secondary containment and must be provided with collision protection. This requirement also applies to parked trucks with storage tanks (excluding plow trucks).

The EMP must include detailed written procedures that describe the steps the Contractor will take to minimize salt tracking outside the All-Weather Shelter.

The Contractor must keep the doors to the All-Weather Shelter closed when Salt operations are not in progress.

The Access Road must be cleaned so that Salt-impacted materials are swept back inside the All-Weather Shelter within 24 hours after the conclusion of any Winter Event that requires the application of Salt

EMP Requirements

A Qualified Professional must conduct an annual inspection of the following:

- (i) The exterior of the All-Weather Shelter*
- (ii) The Impermeable Layer of the Entrance Apron and Drainage Apron*
- (iii) The Impermeable Layer of the Access Road*
- (iv) The Containment Pond liner*

When a deficiency is identified, the Contractor must make immediate amendments to their EMP, as required, to address the deficiencies and must submit these amendments to the Department for review and comment.

Remediation

If a release has occurred, the following steps occur:

- 1. Complete the delineation of the plume.*
- 2. Conduct an engineering assessment to identify the optimal solution (remediation options).*
- 3. Meet with impacted landowners and Environment.*
- 4. Execute the plan.*

Remediation

Typical remediation options include:

1. Risk Management Plan;
2. Partial remediation (hotspot removal);
3. Full remediation (full clean-up); and
4. Other (e.g., interceptor trench/recovery well).



Thank you!
