

Infrastructure Services

Site Design Guidelines to Promote Salt Reduction

This summary document outlines design features which, when implemented into site design, can significantly reduce the need for winter salt application to achieve winter maintenance standards.

A fully comprehensive guideline on site design for salt management is available online at: <https://www.lsrca.on.ca/Shared%20Documents/reports/Parking-Lot-Design-Guidelines-Salt-Reduction.pdf> .

Note that each site has unique characteristics. These characteristics should be considered carefully when selecting appropriate site design features.

Not all of the measures listed below will be appropriate for every site. For example, measures that encourage infiltration of meltwater (such as vegetated swales or bioretention) may not be appropriate for sites located in Issues Contributing Areas (ICAs) for sodium and chloride. ICAs are areas where activities can contribute to observed exceedances of contaminants in drinking water. In ICAs for sodium and chloride direct infiltration of salt laden meltwater in ICAs is not encouraged. Mapping of ICAs is available online at: <https://orangeville.maps.arcgis.com/apps/InformationLookup/index.html?appid=33b73e8961504f26a5a0cef426c2f5a3>

Site Design Measures that Minimize the Need for Repeat Salt Application:

- **Effective parking lot grading:** Effective grading can minimize the freezing of wet pavement surfaces as well as prevent melt water from ponding and refreezing; this reduces the need for re-application of salts, and directs melt water towards stormwater collection infrastructure.
 - Create slopes of 2 to 4% ; this minimizes the potential for the formation of depressions and ponding where ice can accumulate
 - Ensure melting snow is directed away from high traffic areas and does not travel far to a collection point such as a catchbasin
 - Direct roof gutters and downspouts away from paved areas. The locations of roof gutters and downspouts should be outlined in the stormwater management plan and grading plan for the subject property

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- **Snow Pile Storage Location:** Strategically locating snow storage piles can reduce the need for frequent salt application. It is important to locate snow storage piles in a manner that prevents visual obstructions for drivers, pedestrians and cyclists. It is also important to understand wind patterns on the subject property and locate snow piles in an area that is least likely to cause snow drifts.
 - Situate snow storage piles in areas that receive a lot of sun (i.e. canopy free, south facing) to help to accelerate melting
 - Locate piles downgradient from high traffic areas and close to stormwater collection points
 - Situate snow storage piles on the low side of paved areas to alleviate the formation of ice as a result of meltwater, if possible, the main snow pile should be placed at the lowest point of the parking lot
 - Avoid major wind patterns to minimize snow drift
 - Design designated snow storage areas to promote sheet flow across shallow sloped vegetated surfaces to promote water quality improvements
 - Design snow piles storage locations to promote melt water that drains away from high traffic areas towards specific, **nearby** catch basins through grading. Where possible, snow piles should be located directly upgradient and in the immediate vicinity of a catch basin to minimize the area subject to meltwater runoff
 - Clearly delineate snow pile location to avoid customer parking in that area
- **Sidewalk Design and Pedestrian Flow:** Careful consideration of location and layout of sidewalks/pedestrian walkways can eliminate oversalting of unused walkways. The design process should consider that pedestrians typically follow the path of shortest distance and do not necessarily use the designed walkways. Occasionally, this leads to pedestrians walking along the vehicle routes and not the designed walkways, especially in large parking lots with walkways around the outer edge.
 - Minimize the amount of unused walkways. Close off low traffic walkways during winter months to reduce the required winter maintenance. Priority should be given to the proper planning and placement of walkways during the initial planning process to **avoid unnecessary walkways**
 - Construct pedestrian sidewalks with a width of at least 1.5 m. This allows contractors to plow, thus minimizing the potential of chemical snow removal methods
 - Use paving material that provides enhanced grip during the winter months to reduce salt application

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- **Landscaping Features:** Landscaping features can lead to a reduced requirement of salt application by reducing the amount of paved surface, reducing ponding and encouraging snow melt.
 - Site design should include vegetated swales, bio-retention, or landscaped islands with curb cut inlets to collect and retain melt water runoff. The vegetation used in swales and landscaped islands should be salt tolerant and suited to each site's soil, climate and moisture conditions
 - Incorporate vegetated islands to minimize paved surfaces requiring salt application
 - Include deciduous trees in the planting plan to allow the sun to directly hit the parking lot during winter months to melt snow and ice
 - Include evergreen trees and shrubs as windbreaks along the site perimeter. This should consider the predominant wind direction and adequate setback to avoid accumulation of snow drifts

- **Other Design Feature Options**
 - Install permeable pavers. Permeable pavers consist of interlocking pavers with a permeable joint material in the voids between the pavers to promote infiltration. Permeable pavers can reduce the need for salt application in parking lots by improving drainage and preventing melt water from ponding and refreezing. With permeable pavers consider underground catchment to avoid infiltration of salty water
 - Install turf and grass block paver, which are similar to permeable pavers and can be used for pedestrian or low vehicular use areas. This option preserves the look of a lawn while providing additional infiltration and structural support
 - Select dark coloured pavers to increase the absorption of solar radiation leading to higher ice melting potential
 - Install shaded roof canopies. Shaded roof canopies can be constructed over pedestrian walkways and building entrances to minimize snow and ice deposition. Special consideration should be taken for the runoff generated from the canopy so it does not lead to ponding/refreezing on the walkway. Typically shaded canopies are considered for feature areas and for high traffic areas
 - Install conductive pavement on walkways and entrances. The use of conductive pavement can eliminate the need for salt application in heavy traffic areas. Conductive pavements, once connected to a power or heat source, conduct electricity and emit heat to the pavement surface, melting ice and snow with constant and uniform heat

For more information and resources visit:

<https://www.lsrca.on.ca/Shared%20Documents/reports/Parking-Lot-Design-Guidelines-Salt-Reduction.pdf>