

NEWS RELEASE BACKGROUNDER FOR:

Standards Council of Canada supports the development of a fifth National Standard of Canada regarding Northern Geotechnical Site Investigation for Building Foundations in Permafrost

The provisions of Geotechnical Site Investigation for Building Foundations in Permafrost were derived from existing best practices among, and may be incorporated directly into, community land use plans.

Additionally, the standard is intended to:

- Detail a standardized approach for collecting information and evaluating the conditions of the site for the purpose of designing and constructing infrastructure foundations in permafrost regions;
- Address procedures, protocols, or methods by which soil, substrate, groundwater conditions and permafrost are determined and classified (both horizontally and vertically);
- Address procedures, protocols or methods by which ground and air temperature are accurately measured, including accounting for seasonal and climatic (future) changes;
- Specify the components necessary to develop the geo-thermal profile for the site; and
- Detail test methods, sampling protocols and lab requirements.

As part of the Standards Council of Canada's (SCC) Northern Infrastructure Standardization Initiative (NISI), this National Standard of Canada will be developed by the Bureau de normalisation du Québec (BNQ), an SCC-accredited standards development organization.

How NISI improves Northerners' lives

Led by SCC with support from Aboriginal Affairs and Northern Development Canada and with funding from the Government of Canada's Clean Air Agenda, NISI aims to work with Northerners to put in place effective standards to address climate risks inherent in the design, planning and management of Northern infrastructure.

Changes in temperature, precipitation and typical weather patterns have been documented throughout Northern Canada. The effects of these changes to climate and weather patterns could cause significant shifts in permafrost conditions and hydrogeological characteristics of certain building sites, which will directly impact infrastructure in the North and the people who live there.

Addressing the effects of these changes is a priority for the Government of Canada, and this new standard is an important step in supporting the stability of existing and future infrastructure in northern communities. It is one of the many ways SCC is working collaboratively with the Northern Advisory Committee, comprised of representatives from Northern territorial and regional governments and other organizations involved in Canada's standardization network.

Benefits of other NISI standards

The four earlier NISI standards were published by CSA Group.

Community drainage system planning, design, and maintenance in northern communities is designed to aid community drainage planning in the North is unique, due to long periods of extremely low temperatures; exceptionally large and remote drainage basins; permafrost; small, isolated communities with low population density; and consideration for the social and cultural context of land use. The new standard provides guidance on planning, design, construction, rehabilitation and maintenance of drainage systems in Canada's North.

Thermosyphon foundations for buildings in permafrost regions will help ensure that thermosyphon foundations are sited, designed, installed and monitored correctly, ensuring the long-term performance of thermosyphon-supported foundation systems under changing environmental conditions. Thermosyphons keep the ground frozen and stable in cold climates by transferring the heat from the ground to the air when appropriate temperature differentials prevail. Heated structures built on permafrost without mitigate systems, such as thermosyphons, can degrade the permafrost and destabilize a structure's foundation. This standard will ensure the stability of thermosyphon-supported foundations of new buildings constructed on permafrost and the future safety of buildings in Canada's North. [View webinar, *Thermosyphon foundations for buildings in permafrost regions*.](#)

Moderating the effects of permafrost degradation on existing building foundations standard outlines the steps to be taken in order to maintain, assess and mitigate permafrost loss beneath and adjacent to existing buildings. Permafrost is soil and sediment that remains at or below 0°C for at least two consecutive years, while the active layer is the upper part of the soil environment that thaws every summer. Building on permafrost can be difficult because degradation to the permafrost can destabilize the structure. Also, many of the existing buildings in the North were designed without considering climate change or were not adequately designed to account for the rate and extent of permafrost degradation currently projected.

Managing changing snow load risks for buildings in Canada's North is designed to inform communities about safe snow removal methods for rooftops of existing Northern buildings. The standard also aims to reduce the risk to building occupants, of increasing snow accumulations and weights. Arctic regions have seen an increase in snowfall and extreme snow events. Adding to this issue is the occurrence of rain after a snowfall, which turns to ice and increases the weight or load of snow on buildings and housing. This increased weight can lead to structural damage, such as a collapsed roof.