

# Assessing Building Vulnerability

The Government of the Northwest Territories is developing tools for evaluating the effects of climate change on buildings and other infrastructure assets.

## CONTEXT

The Government of the Northwest Territories (GNWT) maintains more than 750 public buildings including schools, hospitals, offices, correctional facilities and many other community assets. Climate change has serious impacts on building foundations, increased temperatures result in permafrost thaw, which can compromise building foundations. Also, changes in snow patterns may result in increased snow on buildings, possibly resulting in damage or collapse.

Photo Credit: Pan-Territorial Adaptation Partnership



## OBJECTIVE

To create a tool that assess infrastructure, in particular buildings, for their capacity to withstand changes in climate, focusing on snow loads and permafrost degradation. The tool should:

- Provide accurate assessment information on the likely capacity of a building to withstand adverse changes in climate.
- Provide an assessment score that can be used to make building remediation, management, and maintenance decision.
- Be easy to use.
- Provide results that can be stored electronically

so past results can be accessed and likely trends in capacity identified.

## APPROACH

GNWT Department of Public Works and Services (PWS) is leading a team of consultants to develop the tools needed to evaluate buildings. The team is assessing building assets, inspecting buildings, completing a risk assessment and analysis, developing recommendations, and updating the state of knowledge.

Initial tools for the risk assessment and evaluation have been, and will continue to be, plotted on GNWT building assets. The final year of funding will include the development of the software tool, any associated instructions-for-use/training for operators, and assessments ratings for each building assessed throughout the project.

## EXPECTED RESULTS

Data from the climate change evaluation of buildings gathered during this four-year project will be integrated into the GNWT maintenance database. This data will allow for facility condition indices (FCI) to be calculated for buildings. The FCI will be used to determine if it is cost-effective to invest in repairs or if the GNWT should instead consider building new structures.

This project will help adaptation and capital planning within the GNWT by completing a risk evaluation of public buildings in many NWT communities. Buildings in need of maintenance, or those with an FCI score suggesting replacement is necessary, will be identified and addressed based on the project results.

## Significance

*Permafrost that supports building foundations and snow loads on roofs are changing with a warming Northern climate. Buildings designed for different climatic conditions could now be becoming at risk.*

## Partners

- GNWT Environment and Natural Resources, Public Works and Services
- Aboriginal Affairs and Northern Development Canada
- Associated Engineering
- Risk Sciences International
- EBA Engineering
- Wayne Guy Architects

## FOR MORE INFO

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