

# Assessing Building Vulnerability

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

## 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. Addressing these issues can be some of the largest and most costly actions associated with climate change in the North.



## OBJECTIVE

This project develops tools for evaluating risks associated with changing snow loads and thawing permafrost occurring because climate change.

These tools will be used to assess GNWT building assets and to prioritize repairs and replacement.

## APPROACH

GNWT Department of Public Works and Services is leading a team of consultants to

develop the tools needed to evaluate buildings. This team is assessing building assets, inspecting buildings, completing a risk assessment and analysis, developing recommendations, and updating the state of knowledge.

Initial tools for risk assessment and evaluation will be piloted on GNWT building assets in Fort Simpson in 2013. Priority in the pilot evaluation will be given to older buildings. After refinement, the tools will be used in other NWT communities

## 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. FCIs are calculated using the following formula:

$$\text{FCI} = \frac{\text{Total Maintenance, Repair, and Replacement Deficiencies of the Facility}}{\text{Current Replacement Value of the Facility}}$$

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

- Government of the NWT 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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