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Climate Information to Inform New Codes and Standards

Climate change has the potential to impact the safety of existing structures, increase the frequency of weather-related disasters, accelerate premature weathering of structures, change climatic design criteria for codes and standards and alter engineering practices. With Canadian buildings and infrastructure assets valued at more than \$5.5 trillion and the construction sector accounting for a significant component of Canada's economy, the impacts from our changing climate will be significant, requiring adaptation solutions.

Since almost all of today's infrastructure has been designed using climatic design values derived from historical climate data, any changes in future climates will require modifications to how structures are engineered, maintained and operated. As infrastructure built in current times is intended to survive for decades to come, it is important that adaptation options for the changing climate be developed today and that future climate changes be incorporated into infrastructure design whenever possible. Other interim approaches are needed for the design of new infrastructure and for codes and standards. These approaches will need to bridge the historical climatic design information with observed trends and the uncertainties of future projected climate changes. At the same time, existing infrastructure will become increasingly at risk and will need to be assessed, risk managed and prioritized for new vulnerabilities, the variable lifecycles of structures and for replacement and maintenance cycles.

In support of these interim approaches, Environment Canada and the Canadian Commission on Building and Fire Codes are updating and improving more than 6000 specific climatic design values used in the National Building Code of Canada and by many Canadian Standards Association (CSA) national standards. Other research and development is targeting the development of new guidance on current and future climate conditions for incorporation into engineering practices and codes and standards.

Canada's Arctic is one of the most sensitive regions to climate change. The infrastructure in the Arctic regions highlights the challenges that lie ahead for other regions. Northern infrastructure has already been exposed to significant impacts that require urgent changes to engineering practices, climatic design information, codes and standards from melting permafrost, warming temperatures, changing snow loads and other extreme precipitation. As part of ongoing efforts, Environment Canada is working with the Canadian Standards Association and Territorial, community, private sector and academic partners to develop risk management guidance for siting and design of community structures in melting permafrost regions. A Guide entitled "Infrastructure foundations in permafrost: A practice guide for climate change adaptation" provides climate change projection and uncertainty information in a form that can be used for planning and design decisions.

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