

CELEBRATING LOCAL LEADERSHIP

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Across Canada, different types of public infrastructure are impacted by a wide range of climate hazards. This includes heatwaves, ice storms, severe wind, extreme rainfall, hailstorms, coastal flooding, and wildfires. Each year, municipal buildings, transportation systems, water supply and wastewater treatment systems, and many other types of public infrastructure are affected by severe weather events in communities across the country. As Canadian municipalities continue to be threatened and impacted by these events, most communities are rethinking the way they design and manage municipal infrastructure to ensure their long-term durability and performance under current and future climate conditions.

Most public infrastructure in Canada was designed many years ago using construction codes and standards that were based on historical climate data in planning for extreme weather conditions. Recently, however, communities have observed firsthand that these construction norms often result in assets that cannot properly withstand current climate extremes, which puts them at even greater risk under future climate predictions. Furthermore, according to the federation of Canadian municipalities (FCM), nearly 60% of public infrastructure in Canada is built and maintained by municipalities. The increased risk faced by infrastructure across all provinces and territories has led several municipalities to consider the current and future resilience of their infrastructure, when faced with rehabilitating or building new assets.

Extreme weather and climate events are expected to be more frequent in the future in our changing climate. As demonstrated in the cases featured in this report, many municipalities have showcased leadership in enhancing the climate resiliency of their infrastructure by planning with future climate conditions in mind, assessing the state of their assets, monitoring, performing regular maintenance, and investing in structural changes. The role of municipalities in developing and implementing local solutions and tailoring broad strategies to suit the local context is especially important. While there is still much more to be done to narrow the infrastructure gap in a national context of aging infrastructure, this report celebrates the many Canadian communities that have demonstrated their ability to adapt and plan ahead as they work to design and rehabilitate their local infrastructure.

Previous Cities Adapt publications celebrated the actions taken by municipalities to adapt to specific natural hazards including extreme rainfall, extreme heat, and severe wildfires. Frequently this includes efforts to build back stronger and to implement risk reduction initiatives. Many case studies in the previous reports presented adaptation



Figure 1: *Communities across Canada are rethinking how they design their public infrastructure to reduce their vulnerabilities to climate risks. (Source: City of St John's)*

actions focused on community engagements, incentive programs and changes in local regulations. Adding to the body of knowledge from previous Cities Adapt reports, this edition focuses specifically on the actions taken by municipalities to ensure the climate resilience of their infrastructure against multiple hazards. More specifically, it highlights the efforts of communities in better understanding the risks faced by their infrastructure and the methods used to rehabilitate and design new infrastructure based on future climate conditions. In addition, it also focuses on various funding mechanisms used by communities to secure investments in public infrastructure.

As Canada's leading disaster research institute, the Institute for Catastrophic Loss Reduction (ICLR) continues to support municipalities in their efforts to improve the climate resilience of their infrastructure. Affiliated with Western University and supported by its 120-member insurers, ICLR has worked to support municipal climate resilience for 25 years. The Institute is a pioneer in leading and promoting disaster risk reduction research and outreach with municipal support that includes ICLR's Resilience in Recovery program and ICLR's Showcase Homes program.

The case studies presented in the report are a testament to the importance of municipal action based on the four priority areas identified in the Sendai Framework

for Disaster Risk Reduction, published by the United Nations to offer guidance on reducing the risk of loss and damage from seismic and climate disasters. The cases presented here cover a wide cross-section of infrastructure types including sewer systems, treatment facilities, buildings, roads and related infrastructure such as culverts, bridges and coastal infrastructure. As stated in the Framework, the resilience of new and existing critical infrastructure is instrumental in achieving enhanced preparedness at the community level.

The four priorities of the Sendai Framework are:

- Understanding disaster risk
- Strengthening disaster risk governance
- Investing in disaster risk reduction
- Building back better in recovery

The adaptation actions taken by the 20 local governments presented in this report align with the Sendai Framework's recommendations. The local leadership showcased in this report is inspirational and presents tangible examples of what communities can achieve and what should be built upon into the future. Most case studies presented have had great success by establishing successful partnerships and collaborations with provincial, federal, and territorial governments, as well as the private sector.

This publication presents cases from eight provinces and one territory, featuring communities ranging from under 3 km² to over 5,000 km². It includes both urban and rural communities as well as various scales of infrastructure. Yet, from this diverse group, each community has taken strong action to reduce their vulnerability and improve the climate resilience of various infrastructure assets.

While many communities continue to experience the devastating impacts of aging infrastructure destroyed by more frequent extreme climate and weather events, the 20 communities presented in this report prove that a lot can be done to ensure greater resilience of public infrastructure. Municipal adoption of best practices like the Public Infrastructure Engineering Vulnerability Committee (PIEVC) protocol has helped communities to understand the state of their assets and provides recommendations on concrete actions to be taken to improve resilience. The benefits of taking action extend way beyond the avoided damage to the infrastructure itself and include the broader social, natural, and economic environment.