

CASE STUDY: XDI NANAIMO

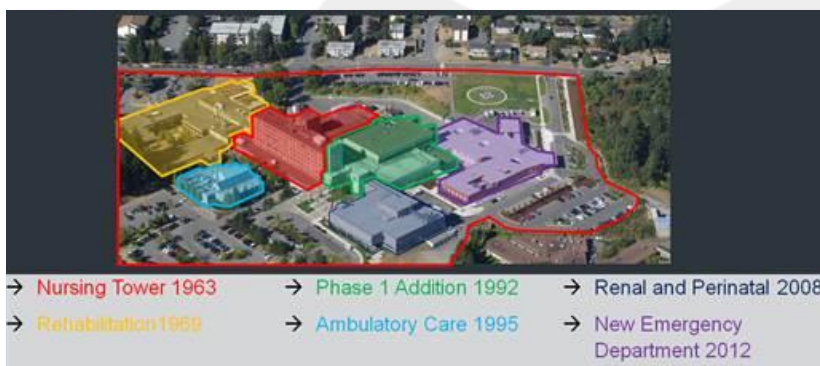
REGIONAL PILOT FOR CLIMATE RISK AND HEALTH INFRASTRUCTURE IN BRITISH COLUMBIA

The Government of British Columbia engaged XDI to undertake a climate risk analysis and adaptation assessment for health infrastructure in Nanaimo, B.C. Funded by the Government of Canada, the project assessed the XDI Platform's suitability for infrastructure risk assessment and decision making in the region, as well as its potential for deployment in a broader provincial and national context. The Nanaimo Regional General Hospital and its surrounding infrastructure were used as the location for this pilot.

Assessing the use of XDI in PIEVC Protocol

The XDI Platform was assessed in two contexts:

First, the project assessed the applicability of the XDI Platform for health infrastructure. XDI provided deep analysis of a single complex facility (Nanaimo Regional General Hospital) to test the sophistication and detail of the XDI Platform. This assessment was compared to the findings from a previous assessment, which used the Canadian Public Infrastructure Engineering Vulnerability Committee (PIEVC) standard Engineering Protocol. This comparison established that whilst the PIEVC process considered direct climate risks to the facility, it did not evaluate upstream or downstream interdependencies such as power and water connections. The XDI Platform analysis provided significant additional information for the assessment of risks and opportunities at the site, as well as a cross dependency analysis for supply chain services including power, water, communications, and transport.



Nanaimo Regional General Hospital

Second, the value of the XDI Platform was considered for improving financial and service level decision-making at a regional level. The application of the XDI Platform was examined across a wider and more diverse area, with multiple asset types, hazards, vulnerabilities and stakeholder communities.



Nanaimo Regional General Hospital overall cross dependency results

Hazard Analysis and Adaptation Options

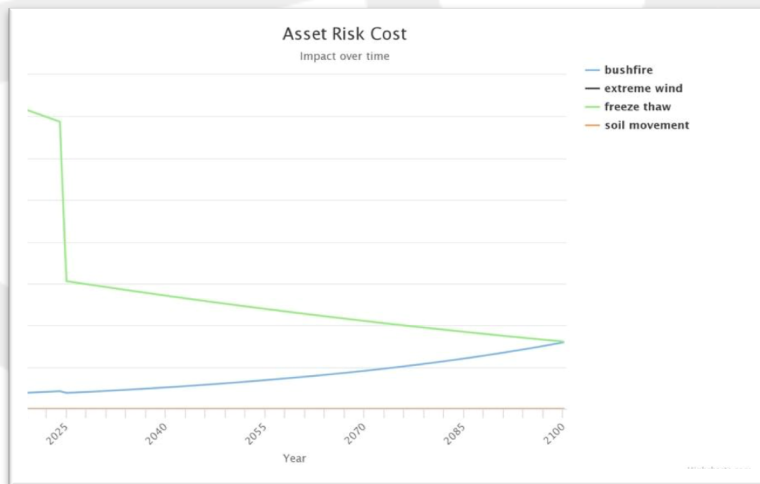
XDI provided an overview of the assets' exposure and failure risk, then identified adaptation options that would mitigate the cost of the risks.

A total of 25,824 individual assets in the Nanaimo region were assessed, including government buildings (hospital, public safety buildings), power & telecommunications, transport, water & sewage. Assets were analysed for risk from extreme weather hazards, including climate change projections that may increase the risk to these assets over time. A new hazard, Freeze-Thaw, was included in the assessment due to the local climate and significant risk the hazard poses to the region.

The XDI Platform models risk reduction and financial impacts through adaptation pathways. This is done through the hypothetical modelling of different adaptation actions, their timing, and their costs. Adaptation options for freeze-thaw and heat were considered for this project, as they represented the most material impacts. The XDI Platform identified that all assets were exposed to risk from freeze-thaw, resulting in potential weakening of the asset's structural integrity.

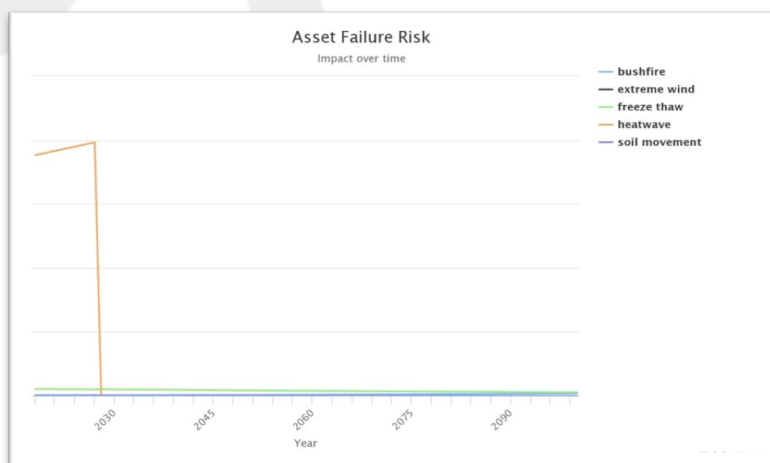
Impacts of Adaptation Actions

Tower upgrade cladding and foundations were applied as adaptation options for projected freeze-thaw conditions, demonstrating a significant reduction in freeze-thaw risk.



Freeze-Thaw Adaptation: Tower upgrade cladding and foundations- 2030

Heat only showed risk for the Hospitals' assets, however, it was identified to be a significant risk that could lead to internal temperatures of the building becoming unbearable and/or lead to failure of electrical and electronic systems. Decreasing the heat threshold for chiller upgrade was considered as an adaptation measure, which eliminated the heat failure risk.



Heatwave Adaptation: Upgrade chiller (45 °C)

The results from the XDI Platform analysis will be available to decision makers responsible for capital upgrades at the Nanaimo Regional General Hospital. Additionally, they will be used to identify opportunities for the application to be used in a broader provincial and national context.