



Local Governments
for Sustainability
Les gouvernements locaux
pour le développement durable
CANADA

Standards and Guidelines for Climate Resilience

Slide decks presented by CSA
Group and EGBC.





Standards and Guidelines for Resilience

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HOLDING THE FUTURE TO A HIGHER STANDARD

Standards & Codes

CSA Group



2,000
Employees

11,000+
Members

3,000+
Standards

39
Offices

+13
Countries

CSA Group At-a-Glance

Holding the future to a higher standard

Standards Development Organization

Commercial Subsidiaries



CSA Group & the UN Sustainable Development Goals

- Provide standards users with critical, reliable, and transparent information on how CSA Group standards connect to the 17 SDGs at the target or indicator level.
- Help inform standards users on how the application of specific standards can assist their organizations in achieving their SDGs-related goals.
- Identify immediate opportunities for strengthening the integration of sustainable development principles in standards development.

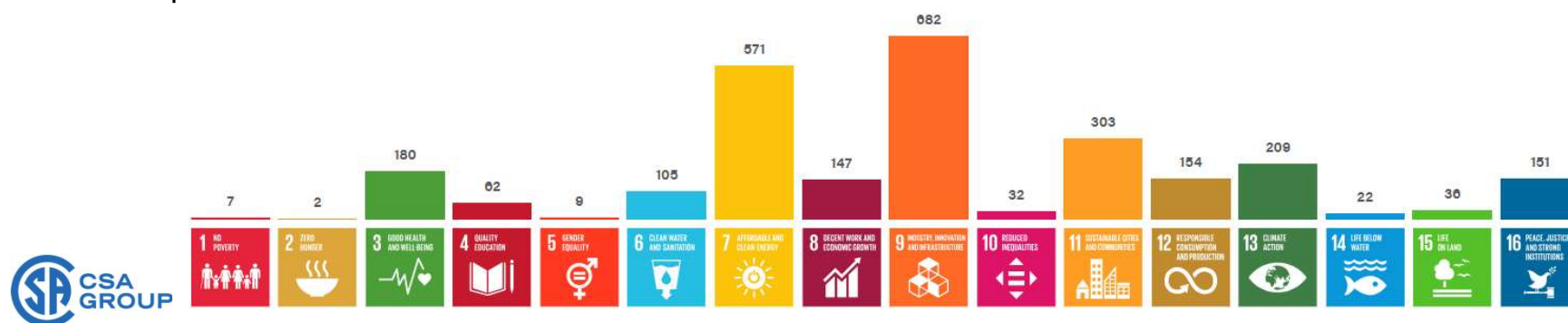


Target 13.1

- **Ambition** - Canadians reduce their greenhouse gas emissions
Target - Achieve 40 to 45% greenhouse gas emission reductions below 2005 levels by 2030, and achieve net-zero greenhouse gas emissions by 2050

Target 13.2

- **Ambition** - Canadians are well-equipped and resilient to face the effects of Climate change
Target - No specific target



Areas of Focus

Climate Resilience

- Buildings
- Infrastructure
- Communities



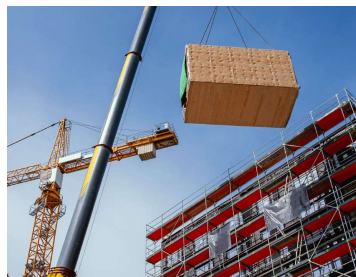
Circular Economy

- Adaptable Buildings
- Durability
- Deconstruction



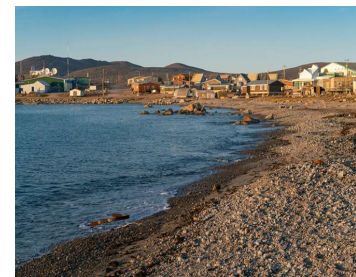
Modular Construction

- Processes
- Design
- Regulatory Tools



Northern Infrastructure

- Assets
- Fire/Wind
- Communities



A photograph of a flooded residential street. In the foreground, several large, light-colored sandbags are piled up on a grey tarp. In the background, three people wearing red and black waders are standing in the floodwater, near a small red inflatable boat. The street is lined with trees and houses, and the water reflects the surrounding environment.

HOLDING THE FUTURE TO A HIGHER STANDARD

Climate Resilience



Management Systems

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Management Systems

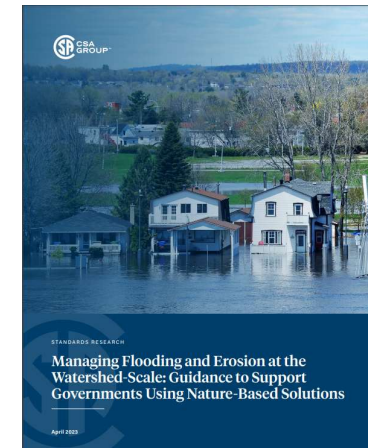
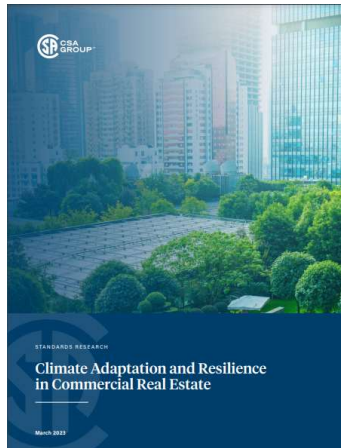
RESILIENCE AREA 1: BROAD BASED STANDARDIZATION & RESEARCH

ISO/TC 207 SC 7 Greenhouse Gas Management

- **ISO 14090** - Adaptation to climate change — Principles, requirements and guidelines
- **ISO 14091** - Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment
- **TS** to support the application of the adoptions geared towards **transportation infrastructure management** and climate change assessment
- **TS** to support the application and integration of the adoptions into **asset management frameworks**

ISO/TC 262 Risk Management

- CSA-ISO 31000:2018 Risk Management for Climate Adaptation & Resilience



(New) ISO/TC 251 Asset Management

- New application submitted to SCC
- Alignment with Natural Asset Management, Digital twins and BIM (C&I)
- Grey/Green Infrastructure



Water and Flood Resilience

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Water and Flood Resilience

RESILIENCE AREA 2: SECTOR SPECIFIC STANDARDIZATION

Flood Resilience National Standards

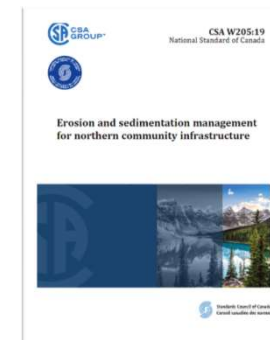
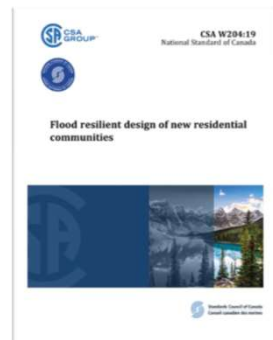
- Flood resilient design of new residential communities (W204)
- Prioritization of flood risk in existing communities (W210)
- Design of bioretention systems (W200)
- Construction of bioretention systems (W201)
- Management standard for stormwater systems (W211)
- Coastal flood risk assessment for buildings and infrastructure (W224)
- Erosion and sediment control inspection and monitoring (W202)
- Erosion and sediment control installation and maintenance (W208)

(New) In Development

- Developing and interpreting intensity-duration-frequency (IDF) under a changing climate (W231)
- Airborne LiDAR data acquisition for flood mapping purposes (W229.1)
- Geomatics for flood mapping (W229.2)
- Watershed-based flood and erosion management using natural and nature-based solutions (W234)
- Water and wastewater distribution systems in northern communities (TS 006)

Additional Standards

- Specifications for natural asset inventories (W218)
- (NISI) Community drainage planning, design, and maintenance in northern communities (S503)
- (NISI) Erosion and sediment management for northern community infrastructure (W205)
- 4 NSC on Weather Stations and related data

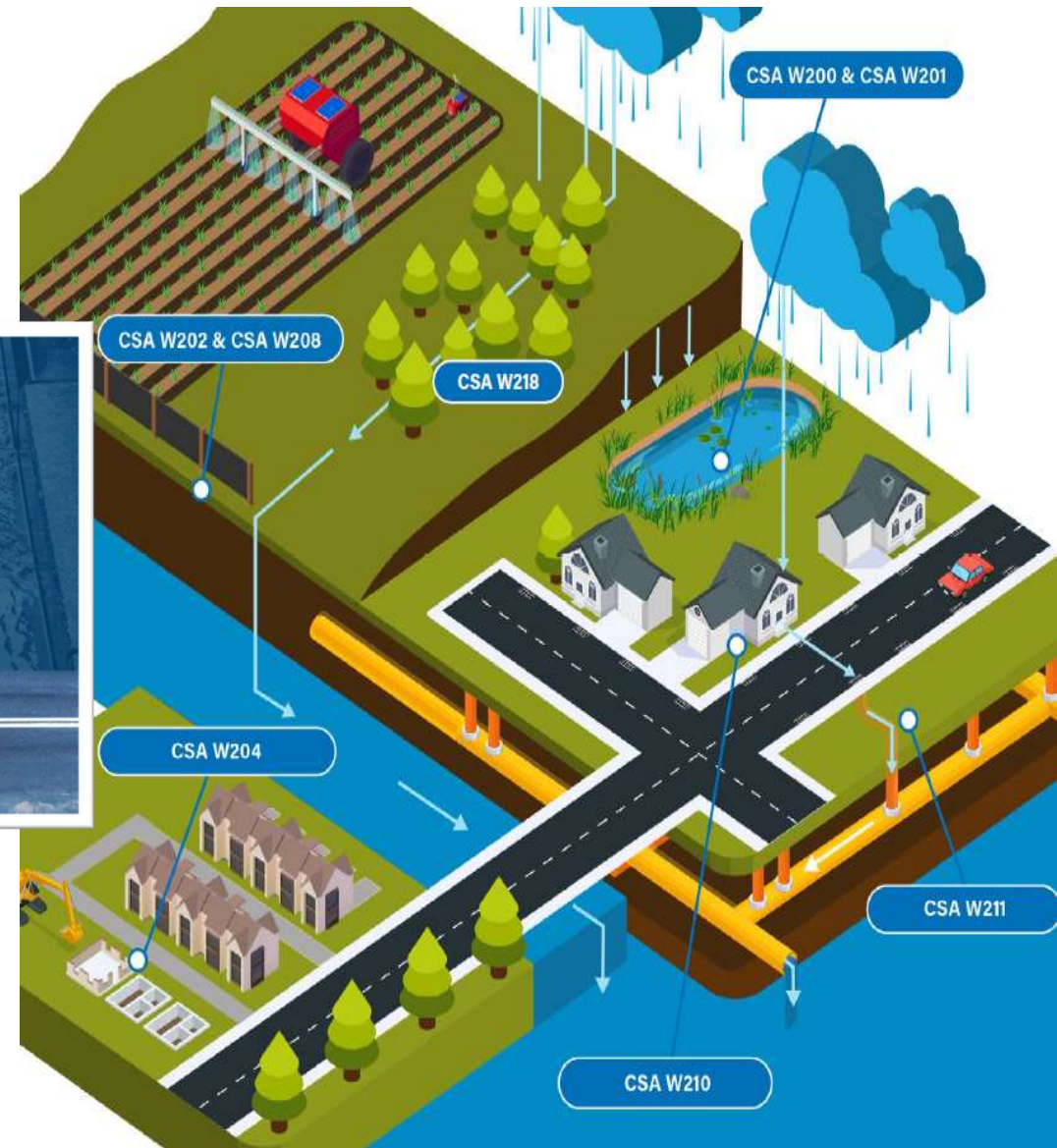


Water and Flood Resilience

RESILIENCE AREA 3: INTEGRATION AND IMPACT

A resource developed by CSA Group to support municipalities

- Highlights available CSA standards:
 - flood resiliency
 - stormwater
 - bioretention systems, and
 - erosion and sediment control
- Examples of by-law and policy wording that can be “cut and paste” into policy and planning documents, development and emergency preparedness plans, as well as proposals and contract materials



Effective Integration



Regional-Level Plans - policy documents

- Regional Plan
- Conservation Authority Requirements (Ontario only)



Municipal Long-Range Plans - policy documents

- Official Community Plan / Municipal Development Plan
- Zoning Bylaw / Land Use Bylaw
- Stormwater Management Plan
- Flood Mitigation Plan
- Development Permit Area (British Columbia only)
- Sustainability Strategies



Development Approvals - technical/engineering documents

- Subdivision and Development Bylaw / Development Manual
- Subdivision Agreement / Development Agreement
- Erosion and Sediment Control Guidelines / Bylaw



Official Community Plan or Development Plan

Official community plans or development plans describe the long-term vision of communities and guide decisions on municipal land use. Official community plan policies impact a community's sustainability and resilience. The following are several sample policies – basic policies for greenfield and existing residential development and more comprehensive policies for greenfield and existing residential development. The Official Community Plan should also contain maps of the hazardous areas to help assure development is limited.



Basic Official Community Plan or Development Plan Policy

POLICY FOR GREENFIELD RESIDENTIAL DEVELOPMENT:

"New residential development shall be designed in compliance with the CSA Group Standard CSA W204:19 Flood resilient design of new residential communities."

POLICY FOR EXISTING RESIDENTIAL DEVELOPMENT:

"Existing residential development shall be prioritized for flood protection in compliance with CSA W210:21, Prioritization of flood risk in existing communities."

POLICY FOR LOW-IMPACT DEVELOPMENT:

"The municipality shall encourage the use of innovative low-impact development design, as per CSA W200:18 (R2023), Design of bioretention systems and CSA W201:18 (R2023), Construction of bioretention systems, in new development and redevelopment in addition to, or as an alternative to, the required stormwater management quantity facilities."

Comprehensive Official Community Plan Policy

POLICY FOR GREENFIELD RESIDENTIAL DEVELOPMENT:

"Development in the flood-prone area may be permitted provided that existing or potential hazards can be mitigated through accepted engineering techniques and resource management practices which meet the approval of the Municipality, [the relevant Conservation Authority], and the other appropriate agencies as necessary, and where the risk to public safety and other effects can be mitigated in accordance with the following policies and standards:

- The flooding and erosion hazards can be safely addressed, and the development and site alteration is carried out in accordance with standards (e.g., CSA W202:18 (R2023), CSA W208:20)*
- Existing hazards are not aggravated, or new hazards are not created;*
- No adverse environmental impacts and no negative impact on natural heritage features will result. An Environmental Impact Assessment may be required to demonstrate that no adverse environmental impacts will result;*
- Vehicles and people have a way of safe ingress and egress during times of flooding, erosion, or other emergencies; and*
- The development is carried out in accordance with CSA W204:19, Flood resilient design of new residential communities."*



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Construction and Infrastructure

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Infrastructure Vulnerability in Canada

Future climate conditions may exceed the design specifications reflected in building codes, engineering standards, and other measures, and increase the likelihood of critical damage and infrastructure failures¹.

Prevalence

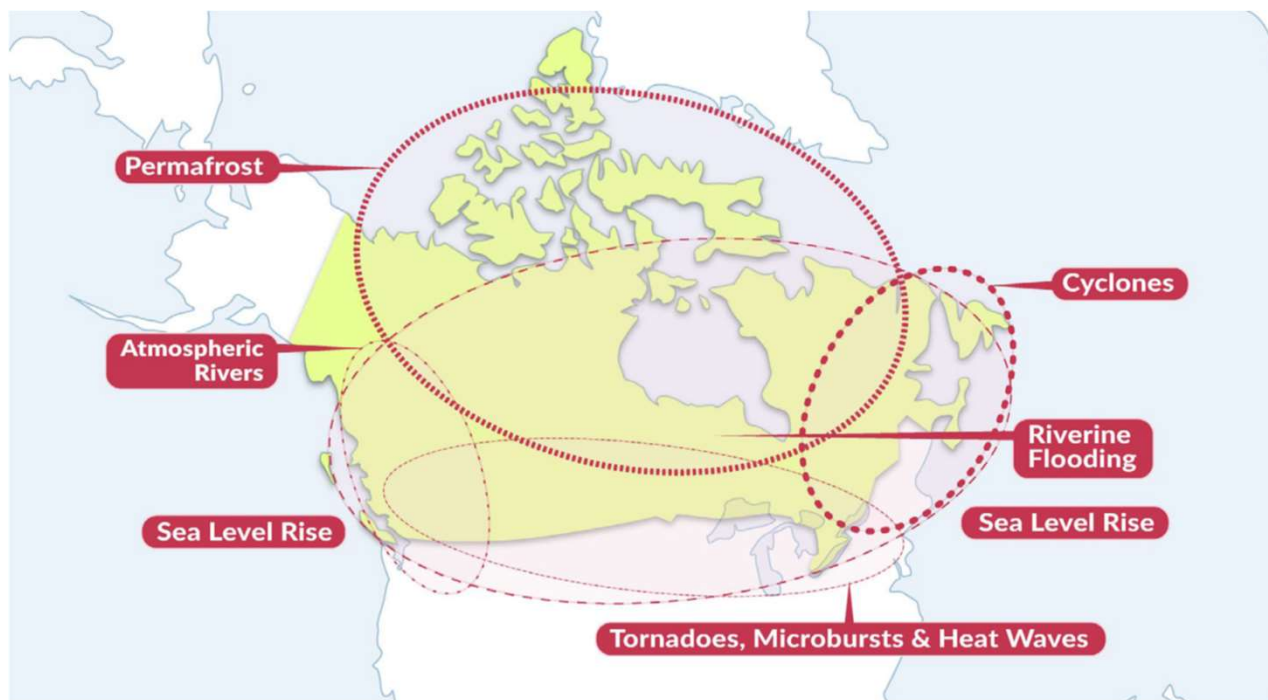
Infrastructure is one of the **top six (6)** areas of climate risk in Canada;

Cost

Costs of incorporating future climate conditions are small compared to costs of rebuilding or repairing in the future (World Bank, 2016).¹

Opportunity

Investing in resilience can avoid 75% of costs over 20 years¹



Where we have come

Codes and Design

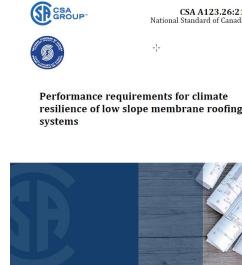
- CHBDC (S6)
- Pedestrian, cycling, and multiuse bridge design guideline (S7)
- Antennas and towers (S37)
- Durability in buildings (S478)
- Wind-resistant buildings (S520)
- Wastewater treatment plants (S900)
- Building foundations (Z240.10.1)

Products and Materials

- Building Guards (A500)
- Backflow preventers (B64 Series)
- Basement flooding
- Rainwater harvesting (B805)
- Roofing performance (A123.26)
- Resilient fenestration (A440)

Northern Infrastructure

- Infrastructure in permafrost (4011)
- Thermosyphon foundations (S500)
- Managing snow loads (S502)
- Fire resilient planning (S504)
- High winds & snow drifting (S505)
- Asset Management (TS506)
- Managing Mould in new & existing Residential Buildings in Canada's North (underway)





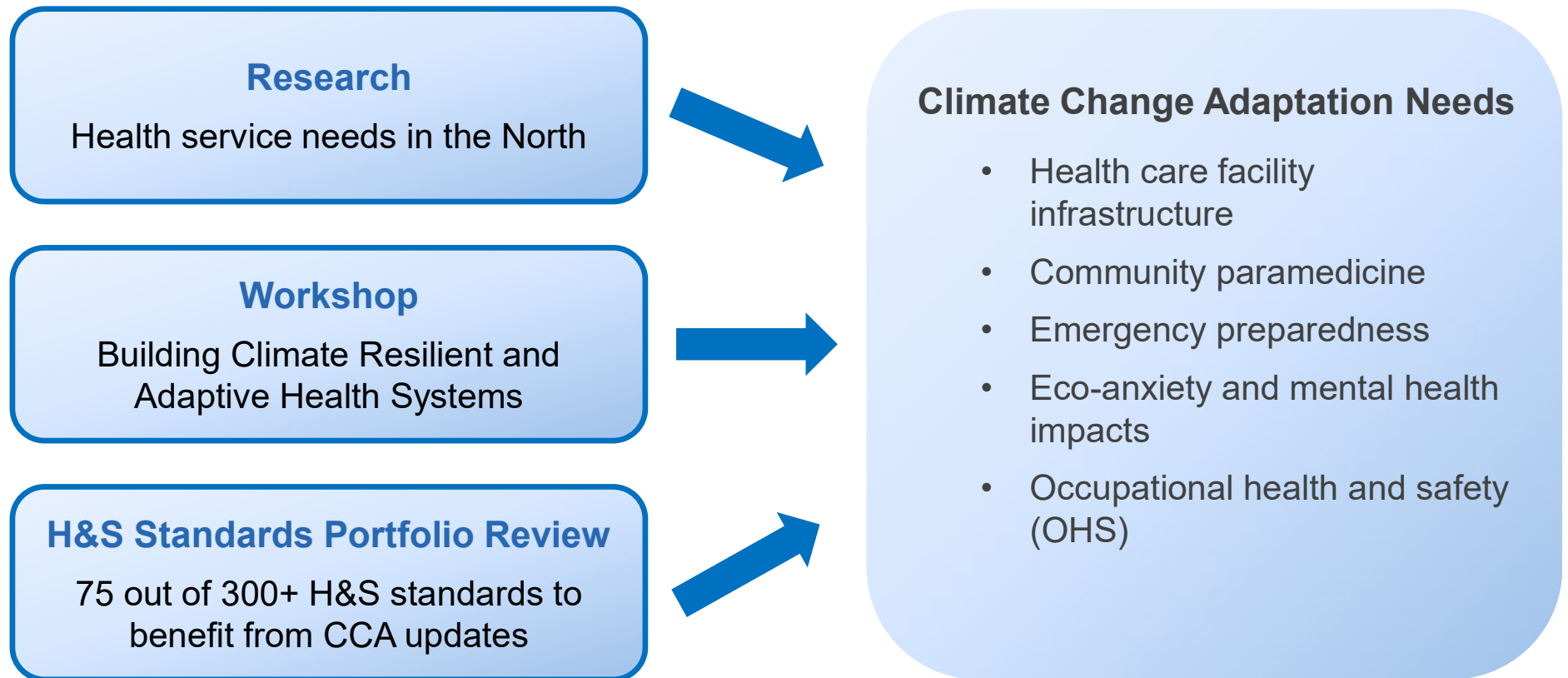
Health and Safety

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Health and Safety (H&S) Standards Opportunities

IDENTIFYING NEEDS FOR CLIMATE CHANGE ADAPTATION



Health Care Facilities (HCFs)

CLIMATE ADAPTATION, SUSTAINABILITY AND NORTHERN CONSIDERATIONS

- Updates to 7 HCF standards (CSA Z8000, CSA Z317 series)
- New **CSA Technical Subcommittee on *Environmentally Resilient Health Care Facilities***
- **Workshops**
 - Northern, Small, and Remote Health Care Facilities Design
 - Low Carbon Climate Resilient Health Care Facilities Design
- **Companion document** for each standard publication to outline climate considerations
- **How to Guide** to promote awareness, understanding and uptake of the series of HCF standards





Thank you.

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ENGINEERS &
GEOSCIENTISTS
BRITISH COLUMBIA

PROFESSIONAL PRACTICE RESOURCES RELATED TO CLIMATE ADAPTATION

ICLEI - Coastal Climate Resilience Collaborative

16 May 2025

CONTEXT

Engineers and Geoscientists BC's Mandate Under *PGA*

Professional Governance Act Section 22(2)(f)

- "...enhance the ability of its registrants to respond to changes in practice environments, advances in technology and other emerging issues"

Engineers and Geoscientists BC's Guide to the Code of Ethics

- "Hold paramount the safety, health, and welfare of the public, including the protection of the environment..."
- "Have regard for applicable standards, policies, plans, and practices established by the government or Engineers and Geoscientists BC..."

Climate Change Action Plan – What We Heard Report

Sectors:

- Building
- Chemical
- Critical Infrastructure and Transportation (public sector)
- Forestry
- Hydropower
- Oil & Gas
- Manufacturing
- Mining

Impacts & Concerns:

- Major GHG emissions from buildings
- Policy for GHG emission reduction
- Water supply risk, stormwater management
- Reasonable flood risk actions
- Dam flow changes
- GHG emission intensive sector
- Impact of climate variables
- Impact on abandoned structures

Overall Concerns:

- Uncertainty for climate projections affecting projects/services
- Better data and data sharing regarding climate

Enforceability of Professional Practice Guidelines

- Guidelines chosen through risk-based analysis
- Prioritize guidelines involving increased risk to the safety, health, and welfare of the public,
- All Professional Registrants expected to have regard for Guidelines (Bylaw section 7.3.1)
- Record of all decisions to depart from guidelines (Bylaw section 7.3.2)
- Guidelines used in disciplinary proceedings as evidence of professional standard

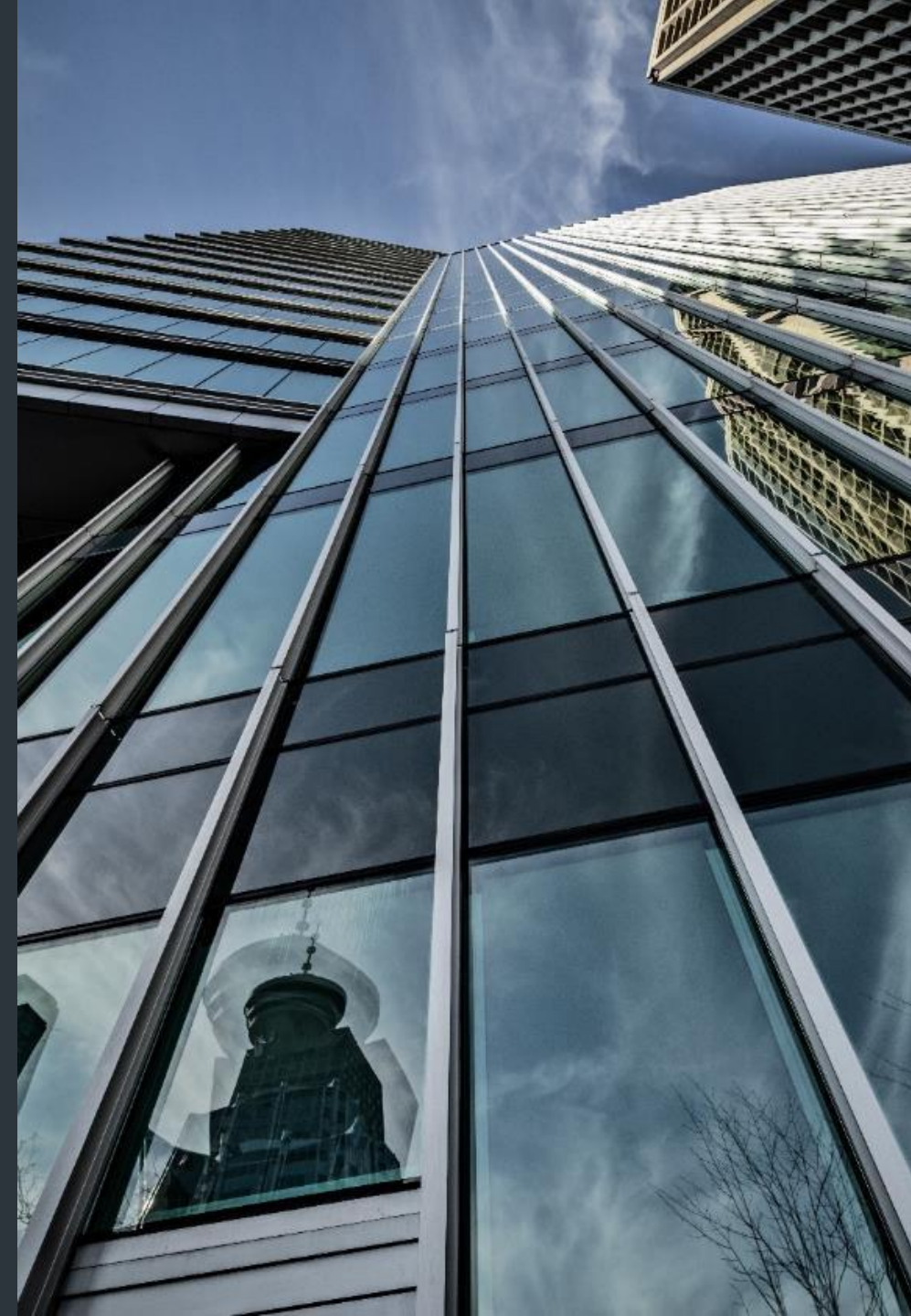
Practice Guideline: Developing Climate Change-Resilient Designs for Highway Infrastructure in BC

- Responds to BC MOTI T-Circular T-04/19
- Identify/establish Climate Risk Tolerance and time horizon for infrastructure
- Design based on existing codes and standards → future climate projections
- Explore the adaptation methods/ revisit owner approved adaptation options
- Communicate risks/ document decisions



Practice Advisory: Electrical Engineering Considerations in Flood-Resilient Design of Buildings

- Electrical feature below flood construction level must be protected against floodwater
- Features operational before, during, and after a flood
- Floodproofing, if and where required



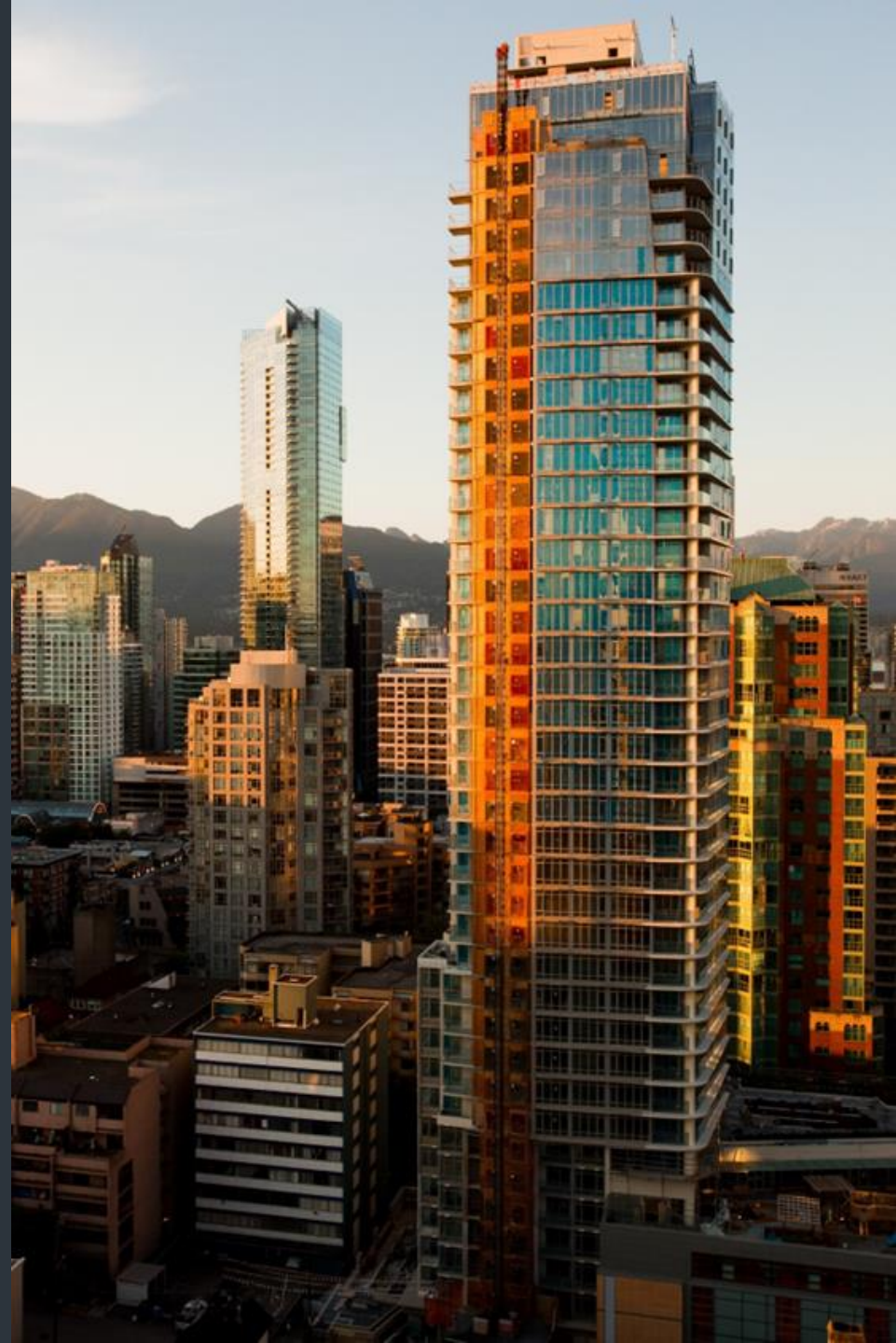
Practice Guidelines: Legislated Flood Assessments in a Changing Climate in BC

- Adjust flood magnitude and frequency for changes in runoff
- Review existing background information and project-specific information
- Assumptions and limitations of assessments



Practice Advisory: Climate Change Considerations for Building Enclosure Engineers

- Thermal Comfort → permanent exterior shade, operable windows
- Indoor Air Quality → fully adhered air barrier materials
- Enclosure Combustibility → specifying class A flammability rated materials, determined by the standard CAN/ULC-S107
- Wind and Precipitation → selecting and extending waterproofing



Interim Professional Practice Guidelines: Preparation of One Water System Risk Management Plans in British Columbia

- One Water lens approach
- Identify relevant water systems, owner, critical infrastructure
- Consider whether risks have been adequately addressed



Practice Advisory: Overheating Considerations for Existing Multi-Unit Residential Buildings

- Passive Cooling Strategies → consider many strategies
- Active Cooling Strategies → consider alongside or after passive cooling strategies
- Address needs, minimize disruption, consider resilience and performance



Looking Ahead...

- Application of climate and equity lens to Professional Practice Guidelines
- Professional Practice Guidelines on Climate Resilience Retrofits
- Finalize Interim Professional Practice Guidelines relating to the One Water System Risk Management
- Climate Resilience Training Program for Building Sector Professionals
- CE on Nature Based Climate Solutions
- Address climate and equity in Regulatory Learning Modules
- Ongoing commitment to be in the know about climate science policy and technology landscape



THANK YOU



Additional Resources

Standards and Guidelines for Climate Resilience

The following resources complement the information shared in the “Standards and Guidelines for Climate Resilience” presentation. This was part of a four-part presentation series developed for the Coastal Climate Resilience Collaborative, a project that is supported by Natural Resources Canada’s Climate-Resilient Coastal Communities Program.

[EGBC Guidelines & Advisories](#) 

[EGBC Climate Change Information Portal](#) 

[EGBC Climate Action Plan](#) 

[Standards and Research for Resilient Communities and Critical Infrastructure](#) 

[Standards for More Resilient Buildings and Infrastructure](#) 

[Standards for Healthcare Facilities](#) 

[Climate Insight Library](#) 

