

An Introduction to Climate-Resilient Retrofits

If you aren't building a new structure but are interested making a building more resilient to climate-linked hazards like flood damage, **retrofits** (renovations) are worth exploring.

This is an introductory resource that provides an overview of climate-resilient retrofits.

Partners for Action (P4A), a research initiative from the University of Waterloo, have developed a [Multi-Hazard Resilient Retrofits Database](#) with more comprehensive information on retrofits.

This section shares information about potential retrofits to address the following climate hazards:



Moisture resilience: flood-proofing, drainage, and other retrofits to protect both the exterior and interior from water damage and mould.



Seismic resilience: measures to make a home

Looking for retrofits to aid in fire resilience? Check out the **Housing and Building materials** section of the [Community Fire Resilience handbook](#) for more information.

Instead of providing exact prices, which can fluctuate widely depending on the scope and location of the work, we have noted if a retrofit is a relatively less or more expensive way to protect a structure.

Moisture Resilience

Goal: site and foundation drainage that leads water away from the home.



Relatively less expensive:

Route downspouts to direct rainwater away from the home, which reduces the risk of saturated soil around the foundation.



Relatively more expensive:

Install or improve a foundation perimeter drainage system, such as weeping tile (systems that collect groundwater with a weeping pipe and then directs it away) or French drains (gravel-filled trenches with a pipe to drain water away from the home).

These measures are particularly important for older homes that may have accumulated moisture.

Goal: exterior waterproofing of foundations.



Relatively less expensive:

An interior drainage system can direct water to a sump pump, which will direct water to the exterior of the structure.



Relatively more expensive:

Exterior membrane to block water or **drainage boards** in below-grade wells.

Goal: raised thresholds and flood-proofing



Relatively less expensive:

Flood barriers can be used to raise critical sections of the home, such as electrical panels, appliances, or flood-prone areas.



Relatively more expensive:

Raise the threshold of the home.

Goal: interior moisture control and mould prevention



Relatively less expensive:

Use dehumidifiers, especially in the basement, to aid in vapour and moisture control.



Relatively more expensive:

Seal and insulate the entire home to avoid condensation.

Seismic Resilience

Goal: securing the foundation

Relatively less expensive:

Install shear walls (rigid panels attached to the wall frame) as bracing for walls with less stability.



Relatively more expensive:

Bolt sill plates into the foundation, which anchors the frame and prevents shifting during earthquakes.

Goal: securing non-structural components of the home

Secure significant parts of the home, such as water heaters, propane tanks, and masonry. Brace chimneys.