RDKB
HomeSmart

Guidance

Introduction

This guide is part of the RDKB HomeSmart program, designed to help make our homes more energy efficient and better prepared for local changing climate. By doing this, it also improves the health, safety and comfort of our homes. The program aligns with the RDKB Climate Action Plan.

Who is it for? The RDKB HomeSmart program guide is for:

- Owners of single-family homes, manufactured homes, duplex homes, row and town homes,
- Tenants, renters and their landlords, and
- Home builders and renovation contractors.

This guide is for you if:

- Climate changes are affecting your health, safety, and comfort at home and you want to learn how to improve things.
- You're investing in home improvements and want to make your home more energy efficient and climate resilient, improving value and your own health and comfort.

How to use the guide:

- **This guide supports your RDKB HomeSmart journey; please consult a professional for expert advice.**
- This guide is organized by building parts: building envelope, heating and cooling, home interior and home exterior. It also includes a section on maintenance and preparedness.
- Icons in the guide show how improvements help with climate resiliency and energy efficiency. Look for the icons and climate hazard descriptions on page 3.

House as a system approach (HAAS)

The "house as a system" concept means your home has four main parts: the building, the mechanical systems (heating, cooling, ventilation), the environment, and the people living in it. These parts work together, so changing one can affect the others. When making upgrades, consider how changes might impact performance, moisture, air quality, comfort, safety and durability.

The five most impactful climate retrofits are identified below with important HAAS considerations to ensure you get the most out of every improvement. These retrofits and more are described throughout the pages that follow.

Improve home air sealing

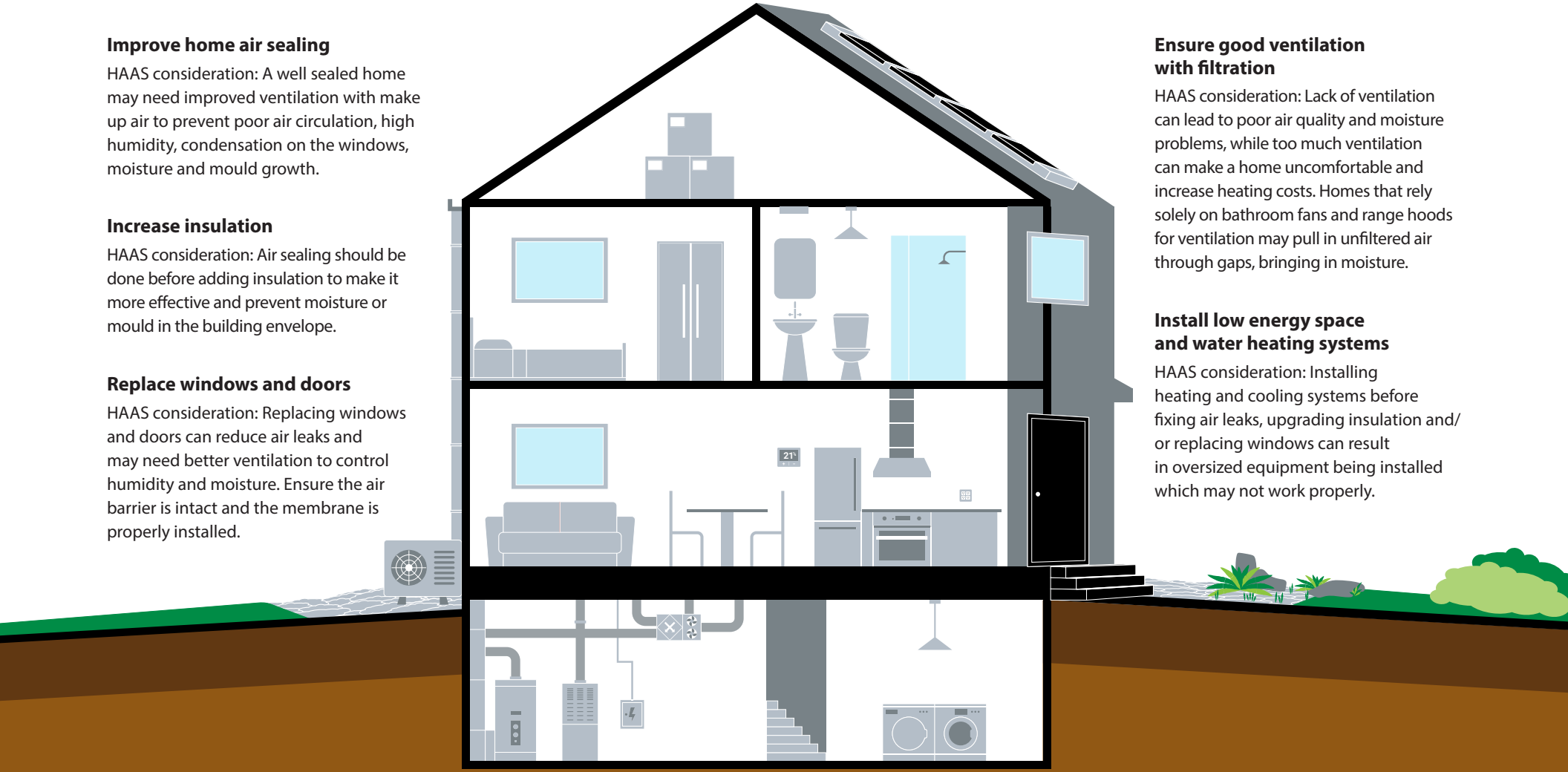
HAAS consideration: A well sealed home may need improved ventilation with make up air to prevent poor air circulation, high humidity, condensation on the windows, moisture and mould growth.

Increase insulation

HAAS consideration: Air sealing should be done before adding insulation to make it more effective and prevent moisture or mould in the building envelope.

Replace windows and doors

HAAS consideration: Replacing windows and doors can reduce air leaks and may need better ventilation to control humidity and moisture. Ensure the air barrier is intact and the membrane is properly installed.



Ensure good ventilation with filtration

HAAS consideration: Lack of ventilation can lead to poor air quality and moisture problems, while too much ventilation can make a home uncomfortable and increase heating costs. Homes that rely solely on bathroom fans and range hoods for ventilation may pull in unfiltered air through gaps, bringing in moisture.

Install low energy space and water heating systems

HAAS consideration: Installing heating and cooling systems before fixing air leaks, upgrading insulation and/or replacing windows can result in oversized equipment being installed which may not work properly.

Ensure all work is reviewed by a qualified building envelope consultant to confirm it meets safety and performance standards.

RDKB HomeSmart guidance icons

Home improvements can help mitigate climate change, reduce your costs and improve health and comfort.

Indoor air quality

Wildfire smoke, gases from appliances, and dampness or mould can harm indoor air quality and pose health risks, especially for those with respiratory conditions.

Energy efficiency

An energy efficient, low carbon home saves you money, improves comfort and helps meet our community's climate action goals.

Climate hazards in the region

Our region faces climate hazards like wildfire, drought, extreme temperatures and weather and flooding. Preparing homes for these hazards can provide peace of mind and help keep them safer during emergencies.

Addressing potential exposures

Please see Interior Health's webpage to learn more about radon gas and testing kits. The libraries in the RDKB have kits to borrow.

Homes built before 1990 may have lead and asbestos (including vermiculite insulation) which need to be handled with care. A contractor should test for these and dispose of them appropriately.

Extreme heat

Homes in our region are not commonly equipped with air conditioning and can become uncomfortable or pose health risks on hot summer days.

Drought

Prolonged periods of dryness are common in the summer months and frequently lead to water shortages and restrictions.

Extreme cold

Temperatures in our region frequently dip well below zero. Extreme cold warnings can be issued by Environment Canada throughout the winter.

Wildfire

Wildfires pose a significant risk to life and property, and are becoming more common with warmer, drier summers.

Severe weather

Strong wind, heavy rain, snowfall, rain on snow, and ice all pose health and safety risks throughout the year.

Flood

Floods pose a risk to low lying areas near waterbodies. Heavy rainfall can also cause overland flooding across the region.

Building envelope and enclosure

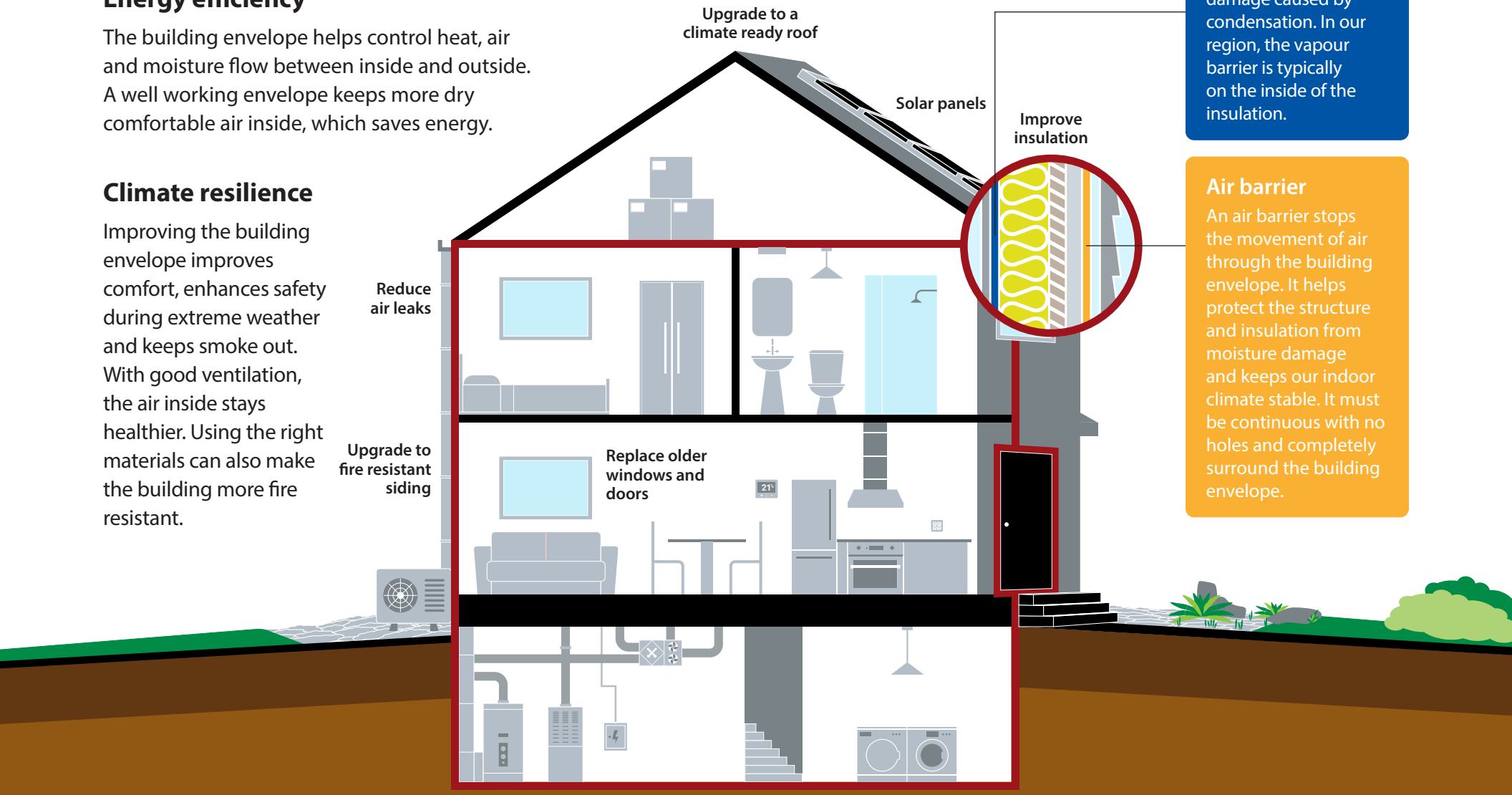
The building envelope is the shell of the home including above and below ground walls, the roof, windows and doors.

Energy efficiency

The building envelope helps control heat, air and moisture flow between inside and outside. A well working envelope keeps more dry comfortable air inside, which saves energy.

Climate resilience

Improving the building envelope improves comfort, enhances safety during extreme weather and keeps smoke out. With good ventilation, the air inside stays healthier. Using the right materials can also make the building more fire resistant.



Vapour barrier

This barrier stops water vapour that moves from inside the home to the outside. This helps prevent moisture damage caused by condensation. In our region, the vapour barrier is typically on the inside of the insulation.

Air barrier

An air barrier stops the movement of air through the building envelope. It helps protect the structure and insulation from moisture damage and keeps our indoor climate stable. It must be continuous with no holes and completely surround the building envelope.

All homes are different so always ask your contractor what the pros and cons of retrofit improvements will be.

Envelope retrofits have combined energy efficiency and climate resiliency benefits

Reduce air leaks

Hire a professional to complete a comprehensive assessment to find leaks and seal the envelope. Leaks are especially likely to occur around windows, doors, wiring and plumbing holes and attic hatches. Some leaks can be easily addressed by adding adhesive-backed weatherstripping or sealant to the area.

HEAT COLD AIR QUALITY ENERGY EFFICIENCY

Improve insulation

Increases safety and comfort during extreme weather and lowers energy use.

- Attic upgrades are generally the easiest and cheapest.
- Basement improvements can be the most effective.
- Wall upgrades are effective but may require removing interior finishes or exterior siding.

HEAT COLD WILDFIRE ENERGY EFFICIENCY

What is an R-Value?

Insulation is rated by how well it prevents heat from moving through the building envelope. A higher R-value means better insulation as it slows down heat transfer.

Replace older windows and doors

Well fitted, multi pane windows reduce drafts, reduce heat loss and improve wildfire protection. Ensure the air barrier is intact and the membrane is properly installed. Fire rated, properly fitted doors add extra safety and efficiency.

HEAT COLD WILDFIRE SEVERE WEATHER ENERGY EFFICIENCY

What is a U-Factor?

The U-Factor measures how well the window insulates. The lower the U-Factor, the better the window maintains internal temperatures.

What is a Solar Heat Gain Coefficient (SHGC)?

SHGC measures how much of the sun's heat comes through the window. The lower the SHGC, the better.

Upgrade to fire resistant siding

Stucco, aluminum, metal, brick, concrete and fiber cement siding offer superior fire resistance compared to vinyl and untreated wood siding.

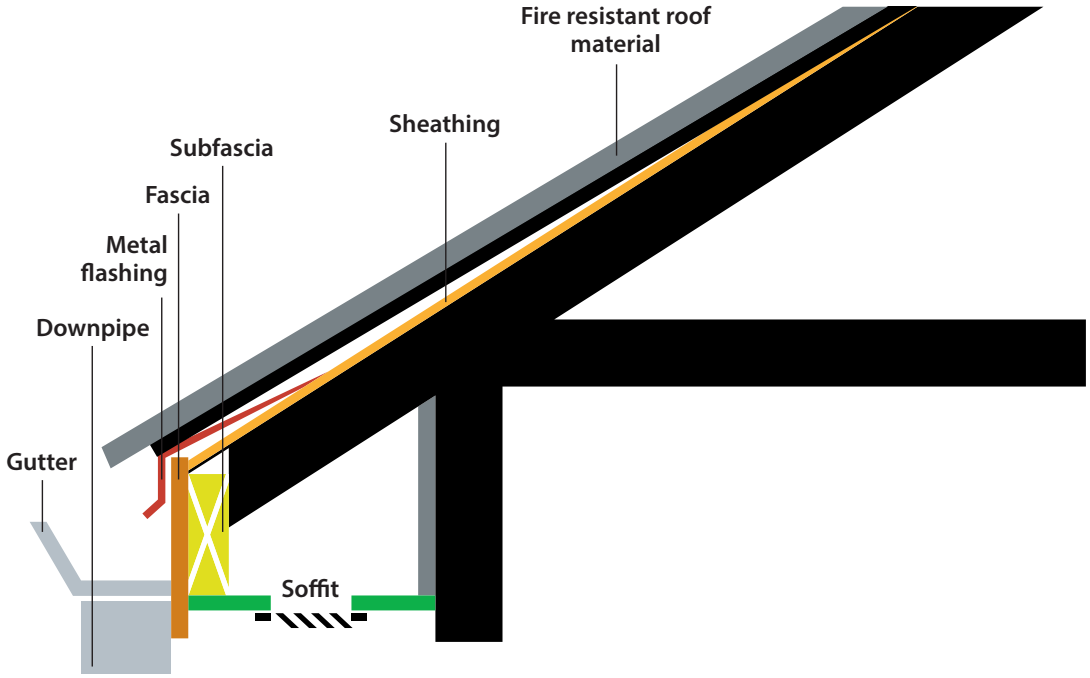
- Leave a 15cm non-combustible clearance between siding and ground.
- Consider adding exterior insulation and checking your air barrier if your siding is off.

WILDFIRE SEVERE WEATHER HEAT/COLD (WITH INSULATION)

Upgrade to a climate ready roof

Always check the latest BC Building Code, local Building Bylaw and Official Community Plan requirements. Climate ready roofs have a durable sheathing material and fire resistant roofing material.

WILDFIRE SEVERE WEATHER DROUGHT (WITH GUTTER)



Control the flow of rainwater

- Direct downspouts at least 2 metres away from foundations.
- Install a water storage tank or barrel to collect rainwater, with an overflow hose directing water 2 metres from the foundation.

Protect eaves and vents from sparks and embers

- Install vents made of non-combustible material with 3 millimetre screening, or ASTM fire rated vents. Open eaves also create a surface for embers and direct heat.
- Install properly fitted non-combustible soffits and fascia to reduce the risk of embers and heat from reaching wooden rafters.

Install solar panels

- Lower electricity bills by reducing power use from the grid.
- Paired with battery backup, they can ease the load on local utilities and support homes running during power outages with clean energy.
- Get your roof assessed to check it can handle the load.

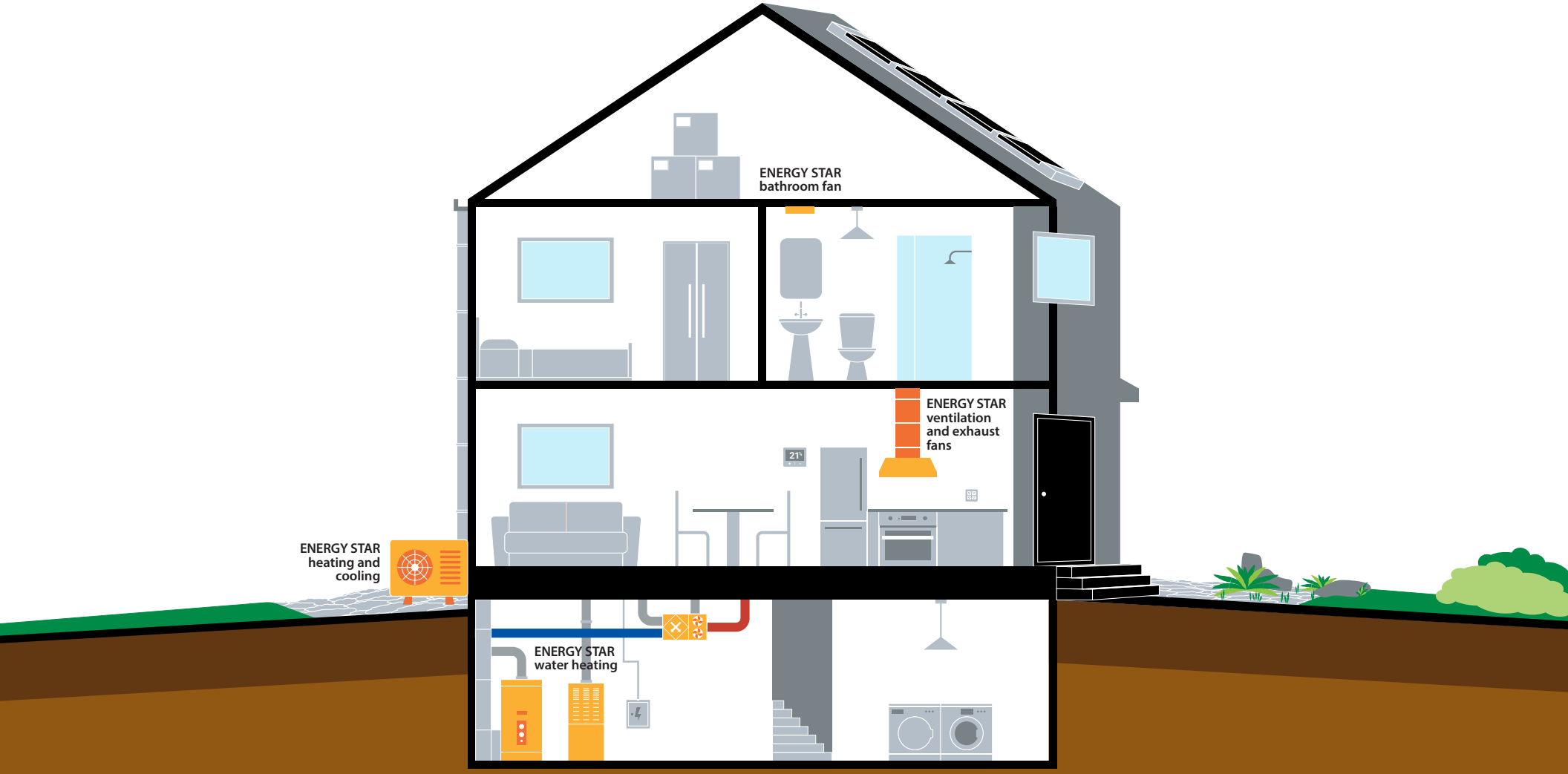
Building heating, cooling and ventilation

Energy efficiency

Choosing energy efficient mechanical systems combined with an airtight building envelope can reduce energy consumption while improving indoor comfort.

Climate resilience

Efficient mechanical systems help keep your indoor environment stable during extreme weather. Systems like heat pumps, air conditioners and heat recovery ventilators filter out smoke particles and improve indoor air quality. Heat recovery ventilators also warm up the outdoor air before bringing it back inside, which reduces the strain on your heating system.



Be sure to ask the installer about maintenance.

Upgrade space heating and cooling

Air source heat pumps provide both heating and cooling.

- In our climate, cold climate heat pumps are needed, and they are often integrated with a furnace (electric or gas). If there is no furnace, it's a good idea to have another heat source like baseboard heaters or a woodstove.

ENERGY EFFICIENCY HEAT COLD AIR QUALITY

Upgrade water heating

- An ENERGY STAR heat pump water heater uses much less energy than older electric and gas models.
- Tankless (on-demand) water heaters are more efficient than tanked heaters.
- Year round solar hot water systems provide a good energy saving option but may require an efficient backup heater for winter.

ENERGY EFFICIENCY

Install intake and vent screens

To improve home resilience to wildfire and reduce ember entry points:

- Install vents made of non-combustible material with 3 millimetre non-combustible mesh screening on air intakes and vents.
- Do not install a screen on clothes dryer vents, as this poses a serious fire hazard.

WILDFIRE

Improve ventilation and indoor air quality

Ventilation improves indoor air quality by removing gases from appliances and cooking, and by filtering incoming air. It also reduces moisture damage and evenly spreads heat, which saves energy on heating and cooling.

AIR QUALITY ENERGY EFFICIENCY

Heat recovery ventilator (HRV) or energy recovery ventilator (ERV)

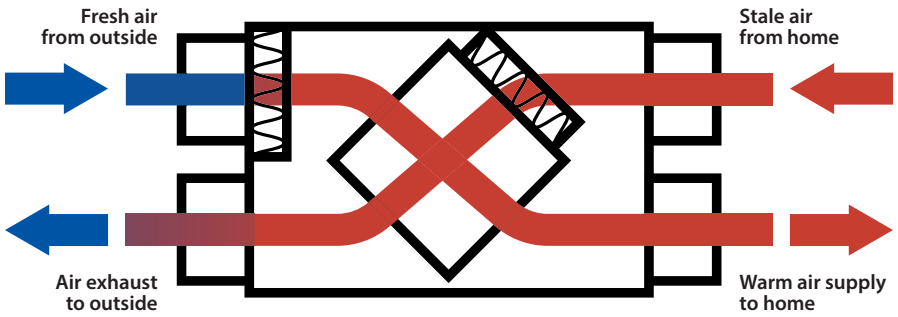
These ventilators bring in fresh air and keep indoor air healthy in well sealed, energy efficient homes.

- MERV 13 filters are recommended for removing the harmful contaminants of wildfire smoke.

ENERGY STAR ventilation and exhaust fans

Use much less energy than a standard model, enhance indoor air quality and are quiet and reliable. Look for ENERGY STAR certified ventilation fans and use an accredited installer.

Heat Recovery Ventilator Unit



Inside your home

Energy efficiency

Making home devices like appliances and lighting more efficient reduces energy use and can save water.

Climate resilience

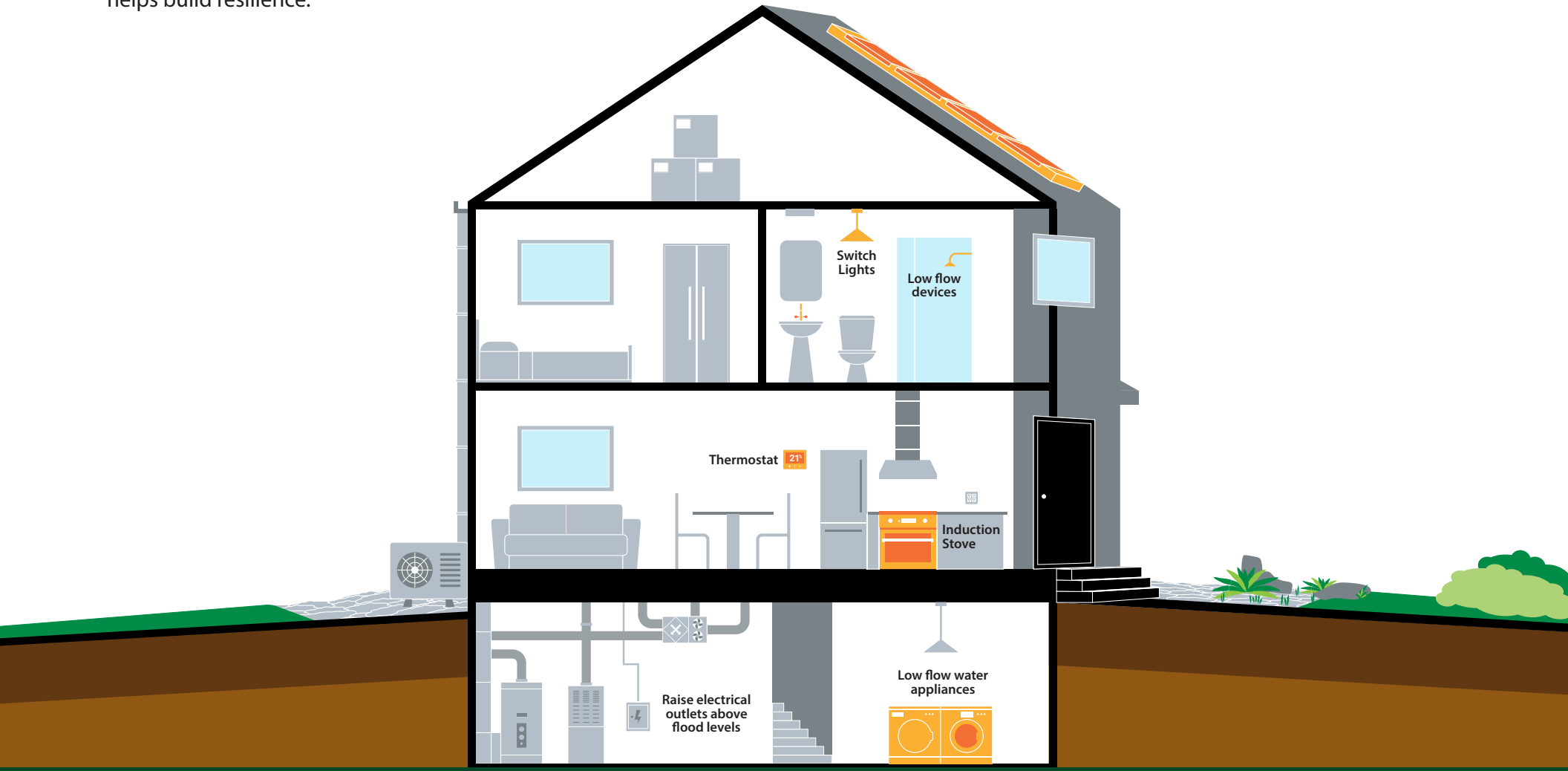
Conserving water helps as summers get hotter and drier. Planning for basic needs, like drinking water and food, during power outages helps build resilience.

Install low flow water use appliances and fixtures

To reduce indoor water use and conserve water and energy.

- Replace old appliances with ENERGY STAR models that use less water.
- Install low flow showerheads, faucets and toilets.

DROUGHT ENERGY EFFICIENCY FLOOD



Install smart or programmable thermostats

To keep your home comfortable when you're there and save energy when you're not.

- Programmable thermostats can adjust heating and cooling at different set times and smart thermostats adjust based on your habits.

ENERGY EFFICIENCY

Consider an induction stove

They are more efficient than traditional gas and electric stoves, heat faster and help maintain good indoor air quality.

AIR QUALITY ENERGY EFFICIENCY

Switch lighting

They provide an easy way to save energy.

- LED bulbs use less energy and offer colour changing options.
- ENERGY STAR CFLs also save energy and last twice as long as traditional bulbs.

ENERGY EFFICIENCY

Consider back-up power

To provide resilience during extreme weather.

- Solar panels paired with batteries can keep essential devices running for a few hours to a few days, depending on the system size, battery capacity, energy use, sunlight and the season.
- A standalone battery or backup generator is another option for extra power.

HEAT COLD SEVERE WEATHER

Insulate pipes

To prevent freezing, reduce heat loss and improve energy efficiency.

- Focus on exterior piping and those in exterior walls, crawl spaces, attics and basements.
- Insulate hot water pipes, especially close to the hot water tank.

COLD ENERGY EFFICIENCY

Test well drinking water supply

During flooding, well water can get contaminated. Test it to ensure it is safe before using it for drinking, cooking, bathing, showering or brushing teeth.

FLOOD

Minimize flood damage inside the home

- Consider using flood resistant drywall in flood prone areas when renovating your basement.
- Raise electrical outlets above flood levels.

FLOOD

Rainwater harvesting systems

Rainwater harvesting systems collect rainwater from roofs and store it for later use. The collected water is non-potable and can be used for watering non-food purpose plants, washing clothes and flushing toilets. Use of rainwater in a building must meet BC Building Codes and be approved by the local authority.

Outside your home

Climate resilience

FireSmart treatment around your home reduces the potential impact of a wildfire on your home.

FireSmart landscaping and xeriscaping with plants help save water during hot, dry summers and reduce wildfire impacts.

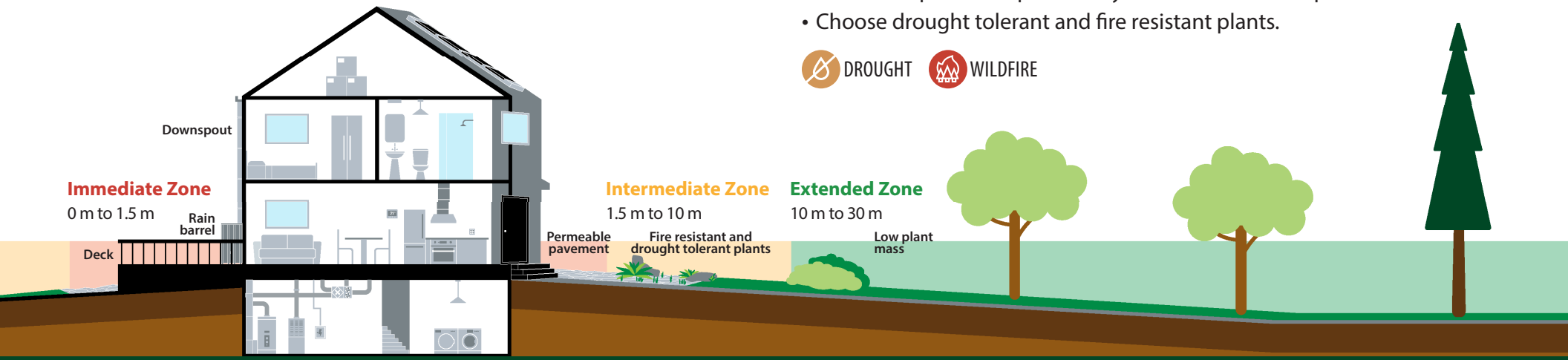
Growing food, maintaining healthy riparian areas and supporting biodiversity all help your property be more climate resilient.

Think FireSmart

Start by addressing threats in each of the three zones, beginning with the immediate zone around your home and working outward.

- **Immediate Zone:** Extend a non-combustible surface around the entire home including any attachments such as decks.
- **Intermediate Zone:** Remove materials that could easily ignite from a wildfire. Use fire resistant and drought tolerant plants and grasses and avoid wood mulch. Move firewood to the extended zone and clear branches around power lines. Remove conifers.
- **Extended Zone:** Clear debris, space trees 3 metres apart and prune branches up to 2 metres above the ground.

WILDFIRE



FireSmart landscaping and xeriscaping with plants

Design your landscape in zones, prioritizing fire resistance in areas closest to the home, and incorporate more drought tolerant landscape design further away from structures. Pick plants that are both drought tolerant and fire resistant, and choose drought tolerant grass for lawns. Group plants with similar water needs to save water. Use fire resistant mulches like gravel or rocks and regularly remove dead or dry plants.

Protect decks, sheds and outbuildings

Treat these with the same FireSmart considerations as your home.

- Use fire resistant material and enclose the underside of balconies and decks with fire resistant material.
- Separate fences and boardwalks from the house with metal attachments or gates.

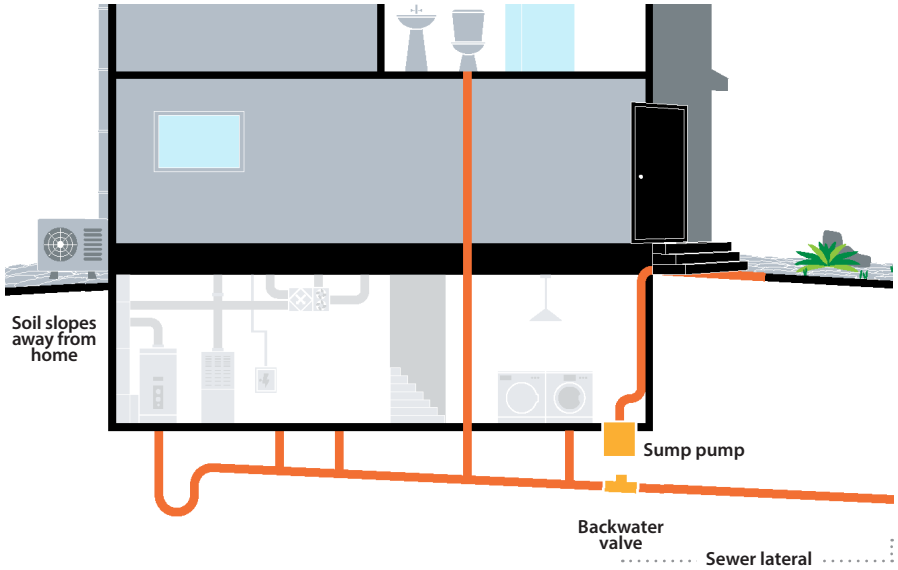
WILDFIRE

Landscape using xeriscaping principles

This is a fire and drought conscious choice.

- Use native plants adapted to dry conditions and less plant mass.
- Choose drought tolerant and fire resistant plants.

DROUGHT WILDFIRE



Install drip irrigation

Drip irrigation to the plant root zone is the most efficient way to use water and energy.

- Hire a certified professional to design and install the system.
- Add a 20cm layer of good quality soil to help retain moisture.

DROUGHT

Collect rainwater

Collect rainwater from roof downspouts using tanks or barrels for rainwater harvesting. Water storage tanks are larger, can collect water from multiple sources, and can be above or below ground.

Reduce runoff to help prevent local waterway pollution and erosion.

HEAT DROUGHT

Minimize flood damage

- Install a non-return or backflow preventer valve in the sewer line at the base of your basement wall to stop sewer backflow into your home.
- Install and maintain a sump pump and regularly check that it drains properly by pouring water into the sump pit to ensure it starts automatically. Consider back-up power.
- Maintain the sewer connection between your home and the sewer system. It is your responsibility.

FLOOD

Install and maintain good property drainage

- Drain water away from your home's foundation.
- Reduce hard surfaces to improve water infiltration and cut down on runoff into ditches and drains.
- Permeable pavement helps with infiltration and supports FireSmart practices.
- Drain water along multiple channels where possible to avoid erosion.

FLOOD

Maintain septic systems

Keep well maintained and free of clogs. If possible, avoid pumping the septic tank when flooding is forecast.

FLOOD

Emergency preparedness

Climate resilience

Being prepared for emergencies can lessen their impact and reduce stress.

Visit the RDKB Emergency Program website

Sign up for emergency alerts and learn about preparing for emergencies. Register for Voyent Alert.

Know your hazards and be prepared

Understand which hazards you and your property are exposed to and how to get prepared (visit the BC Preparedness Guides).

Make a plan

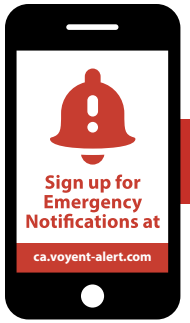
Make your Emergency Ready Plan - build a plan online: including a communication plan and how to turn off your utilities (water, electricity, gas).

Make a Grab and Go Bag.

Learn about flooding in the RDKB

Flood and debris flow hazard in the RDKB varies by location. Check maps and talk to RDKB staff about your flood risk.

- Bylaws may apply to keep your property safe.
- Flood and associated hazard information for the Boundary can be found here.
- Floodplains are identified in the RDKB mapping tool.
- In flood areas, store valuables above flood levels to reduce damage.
- Review the Flood Preparedness Guide for more tips and actions.



ca.voyent-alert.com

Regular maintenance

Energy efficiency

Regular maintenance of your home and appliances helps them work properly and last longer.

Climate resilience

Regular maintenance both inside and outside your home boosts climate resilience against hazards.

Maintenance tips

It is important to understand how to maintain mechanical systems like heat pumps or heat recovery ventilators in your home. Ask your installer for advice and look up tips for your specific system.

Spring	Summer	Fall	Winter
Outside the home (e.g. landscaping, roofing and water systems)			
Clear gutters and install rain barrels. Check your roof for any winter damage.	Address roof damage by patching leaks and repairing gutters as needed.	Clean your gutters and disconnect rain barrels. Ensure your fireplace chimney is clean and has a spark arrestor.	Check your roof for damage before the winter.
Ensure your drainage system is clear and working, keep storm drains near your home clear of debris. Maintain your sump pump and backflow preventer.	Water early in the morning or in the evening, get your rain barrel working, use smart irrigation systems like drip irrigation.	Ensure your drainage system is clear and working; keep storm drains near your home clear of debris. Maintain your sump pump and backflow preventer.	Learn how to keep pipes from freezing, understand how to prepare for winter storms by reading the BC Preparedness Guide.
Apply FireSmart and xeriscaping principles to your landscaping and property. Prune trees early in the spring.	Choose plants that are both drought tolerant and fire resistant. Clean up dead plant material.	Clean up before winter, ensuring dead branches are pruned.	In winter, firewood may be stored closer to the home, but unused firewood should be moved at least 10 m away from the home before spring.
If you're away from home, ask neighbours or friends to help watch your home in case of severe weather and flooding.	Check in on any neighbours you are concerned about when it gets hot or when air quality deteriorates.	Remain prepared for late-season wildfire hazards, and create a plan for upcoming winter weather.	Set up a winter buddy to check in on you and help run errands if you can't leave home.
Inside the home (e.g. heating/cooling systems and lighting)			
Check for air leaks and fix them if needed.	Get ready for heat and smoke with fans, cooling, shades and air filtration.	Have space heating system serviced and ready to go. Replace light bulbs with LED fixtures.	Cover windows with plastic on the inside to keep heat in.

References

Resources

RDKB HomeSmart
https://homesmart.rdkb.com/

RDKB Climate Action plan
https://rdkb.com/Environment/Climate-Action/Climate-Action-Plan

RDKB emergency operations
https://emergency.rdkb.com/

RDKB building permits
https://rdkb.com/Plan-Build/Building/Permits

Emergency preparedness resources

BC Emergency guides and resources
https://www2.gov.bc.ca/gov/content/safety/emergency-management/preparedbc/guides-and-resources

Build an Emergency Ready Plan
https://blog.gov.bc.ca/emergencymanagement/emergencyready

Build a Grab and Go Bag
https://www2.gov.bc.ca/gov/content/safety/emergency-management/preparedbc/build-an-emergency-kit-and-grab-and-go-bag

Voyent alert registration
https://ca.voyent-alert.com/vras/client.html#!/registration

Other resources

Home Performance Stakeholder Council introductory guide on HAAS
https://guides.co/g/home-energy-retrofits-why-use-the-house-as-a-system-haas-approach/194776

FireSmart program
https://firesmartbc.ca

Health information on radon gas
https://www.interiorhealth.ca/health-and-wellness/environmental-health-and-hazards/radon-gas

Keeping the Heat In: resource on home improvements
https://natural-resources.canada.ca/energy-efficiency/homes/make-your-home-more-energy-efficient/keeping-the-heat/15768

Community Energy Association building resources
https://www.communityenergy.ca/?dlm_download_category=buildings

CleanBC Better Homes – Information about home improvements and rebates
https://www.betterhomesbc.ca/

Homeowner Guides to protect your home from various hazards (**ICLR**)
https://www.iclr.org/homeowner/

ENERGY STAR certified appliances
https://natural-resources.canada.ca/energy-efficiency/products/appliances-for-residential-use/13630

Xeriscaping with plants
https://okanaganxeriscape.org/about-xeriscape/how-to-xeriscape/

FireSmart Landscaping Guide
https://firesmartbc.ca/wp-content/uploads/2021/04/FireSmartBC_LandscapingGuide_Web_v2.pdf

Environmental Health and Hazards
https://www.interiorhealth.ca/health-and-wellness/environmental-health-and-hazards

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Pinna Sustainability

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