



DESIGN GUIDANCE FOR FLOOD RESILIENT HOMES

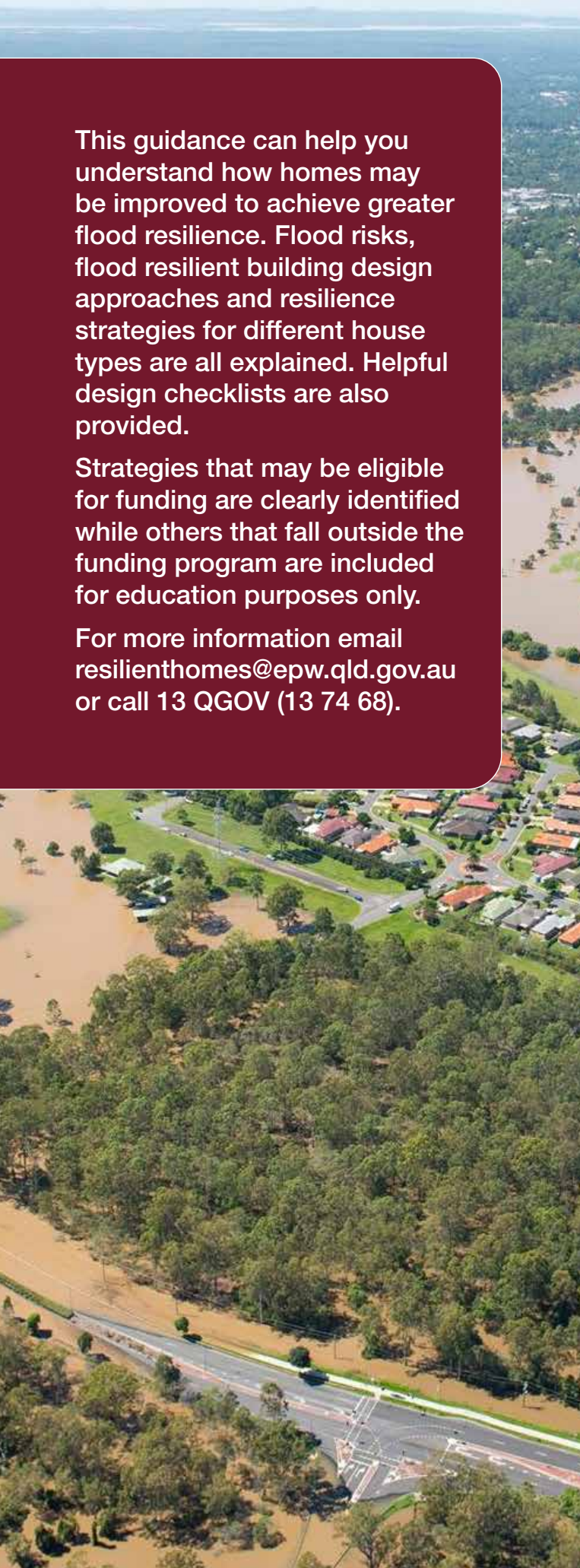
August 2022



Australian Government



Queensland
Government



This guidance can help you understand how homes may be improved to achieve greater flood resilience. Flood risks, flood resilient building design approaches and resilience strategies for different house types are all explained. Helpful design checklists are also provided.

Strategies that may be eligible for funding are clearly identified while others that fall outside the funding program are included for education purposes only.

For more information email resilienthomes@epw.qld.gov.au or call 13 QGOV (13 74 68).

Flood Resilience in Queensland

Resilient Homes Fund

Queensland homeowners who experienced damage to their residential property as a result of flooding in 2021–22 can now register their interest for the \$741 million Resilient Homes Fund.

The Resilient Homes Fund was developed following the 2021–22 disaster season and applies to flood-affected residential properties within 39 local government areas (LGA) activated for Disaster Recovery Funding Arrangements for recent flooding.

The program recognises there is not a ‘one size fits all’ approach. Funding will be used to repair, retrofit, raise or buy-back eligible properties.

Different options for homeowners will be considered on a case-by-case basis, which will be specific to their level of flood damage, future flood risk, property type and personal circumstance.

Resilient Retrofit Program

Funding is available to incorporate flood resilient design and materials in liveable rooms or areas and to raise or relocate services essential to the continued liveability of the home. Funding is available to both insured and uninsured homeowners. Funding does not cover the yard, other ancillary structures or any common property areas.

Home Raising Program

Funding is available to both insured and uninsured homeowners to raise their home to reduce the impact of future flood events. The habitable floor of the home is to be raised to meet or exceed the Flood Hazard Level (minimum habitable floor level), as defined by the relevant local government planning scheme.

Voluntary Home Buy-back Program

Homes in areas of known high flood risk areas which are determined not be suitable for retrofit or raising, will be considered for Voluntary Home Buy-back. This program will be delivered on a case by case basis, taking into account owner preferences, flood risk and economic viability.

Understanding your flood risk

Refer to your LGA council website to access flood risk information about your property.

It is important to note, there are three common types of flooding:

Local overland flow flooding is water that runs across the ground after heavy rain and occurs very quickly during storm events.

Creek flooding is caused by heavy rainfall in the local catchments. It often flows quickly and can cause flash flooding within an hour of areas around creeks and waterways.

River flooding is caused when widespread, prolonged rain falls over the river catchment area (e.g. Brisbane river catchment, Burnett river catchment) causing high flows of water to rise and flow over our river's banks. River flooding downstream can occur days after the rain has stopped.

What is Flood Resilient Building Design?

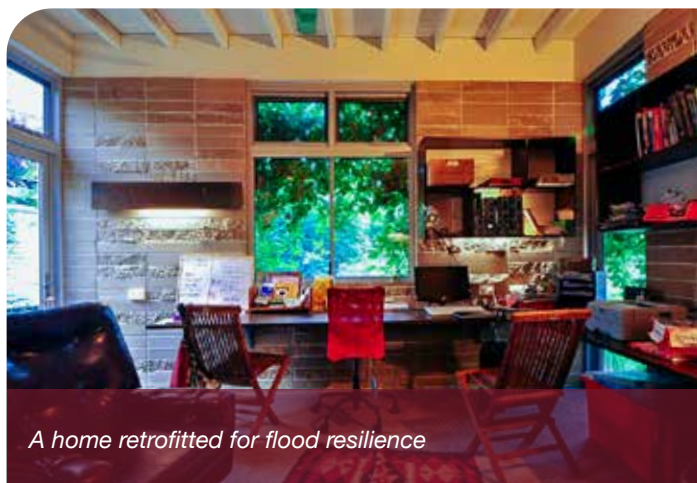
The use of materials, construction systems and house design types that can withstand substantial and multiple inundations by actively mitigating the effects of, and decreasing the consequences of flooding.

Flood resilient building design enables homeowners to safely remove and store belongings prior to a flood event and easily clean, repair and quickly resume normal life after the flood waters recede, with minimal long term disruption to family and finances.

The Benefits of a Flood Resilient Home

A flood resilient home may help:

- Minimise the chance of flood damage to your property.
- Minimise the costs and inconveniences of getting your life back to normal after flood events.
- Save you in the long-term from having to pay for repetitive repairs to your home following flood events.
- Prepare your home for changing flood conditions in the future, particularly from climate change.



A home retrofitted for flood resilience



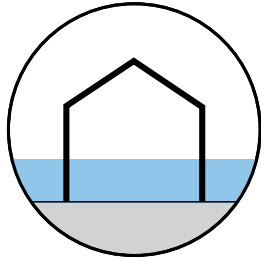
This guidance aims to minimise the impact of flooding for existing flood affected homes through the use of flood resilient materials and construction methods. All works should be undertaken in accordance with your local planning scheme's flood hazard overlay code and relevant building codes and standards.

Flood Resilient Building Design Approaches

You can consider a combination of wet proofing and elevation design approaches to improve your home's resilience.

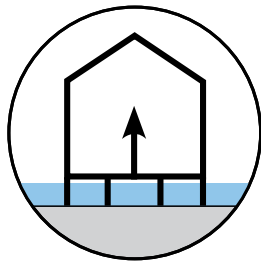
Wet proofing

Wet proofing involves using flood resilient materials and construction techniques to allow flood waters to enter the house with a minimised chance of damage and moisture problems afterwards. By accepting a level of risk through wet proofing, and creating space for water to flow, you can be better prepared for the next time a flood happens. This means working with water rather than against it.



Elevation

Raising the level of the house and its services is effective at mitigating flood damage to your home. Footings, posts, slabs and other structures all need to withstand flood water flowing across the site. Services such as external air conditioning condenser units, hot water units and electrical meter boards can be raised to minimise the chance of important utilities failing. Elevation does not guarantee the property won't flood again in the future. Homeowners are encouraged to consider the future flood levels projected for their property when elevating their home.



For detailed flood information specific to your property you should contact your local council or seek advice from a suitably qualified engineer.

There are other design approaches, such as dry proofing, which may be appropriate in specific circumstances. Dry proofing of houses is not covered by the Resilient Homes Fund.

Flood Resilient Building Design and Insurance

Homes at a higher risk of flooding may face increasingly higher insurance premiums. The insurance industry recognises that the use of flood resilient design principles is effective in reducing damage costs.

Homeowners are encouraged to speak with their insurance provider about the resilient building works undertaken on their property.

Common problems from flooding

Some parts of the home are more vulnerable to flooding.



Mould and rot



Disintegration of linings



Swelling of cabinetry



Malfunctioning services

Resilient Retrofit Program

The following sections illustrate a range of flood-resilient strategies covered by the Resilient Retrofit Program, and how four common house types in Queensland could apply these strategies to become flood resilient.

Though not a comprehensive list of house types, the flood resilient strategies shown are common for many types of buildings and can help reduce the impact of flooding on your home.

Look at your house type and find the strategies that may help improve the resilience of your home.



A home retrofitted for flood resilience
Photo credit: Scott Burrows Photographer

Resilient Retrofit Program

Expert assessments

The Resilient Homes Fund provides support to homeowners who experienced damage from Queensland's major flood events in 2021 and 2022. This support includes a Home Assessment where our expert assessors help affected homeowners understand their flood risks and identify opportunities to improve the resilience of the home. An assessment includes identifying which resilient retrofit strategies are suitable and can be covered by the Resilient Retrofit Program and providing preliminary advice on suitability for the House-raising Program or the Voluntary Home Buy-back Program.

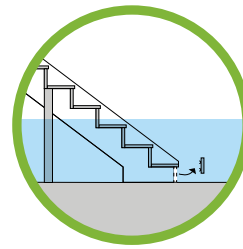
Under the Resilient Retrofit Program funding is available for covered resilient retrofit strategies (as shown on this page) in rooms or areas of the home assessed as being affected by flooding. The illustrations of house types on the following pages show all the strategies covered by the Resilient Homes Fund, along with other strategies that may be suitable for your home but are not covered by the funding program (for example raising the pool pump is not covered by the program). Look at your house type and find the strategies that may help improve the resilience of your home.

Homeowners are advised to consider the structural condition of their home, property levels, building code compliance and planning scheme requirements before agreeing to any works.

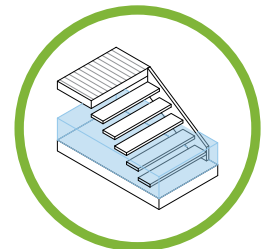
Eligible Strategies

The Resilient Retrofit Program helps homeowners with a wide range of flood resilient retrofitting strategies to suit the many different house types in Queensland. Throughout the document, strategies that may be covered by the fund are circled green, while others are provided for educational purposes only.

Stairs

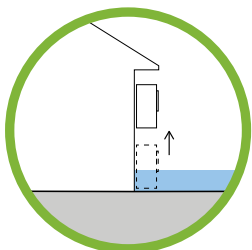


Make the bottom riser of stairs removable for easy cleaning and drying out

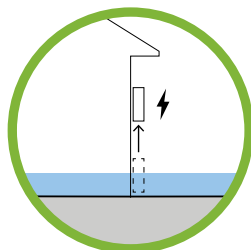


Replace closed riser stairs with open riser stairs made from flood resilient materials

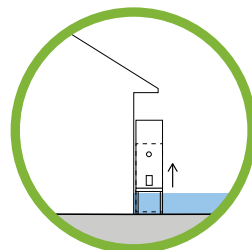
Services



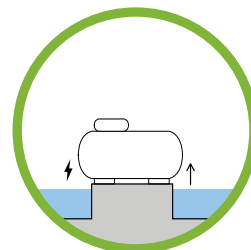
Raise air conditioning condenser units



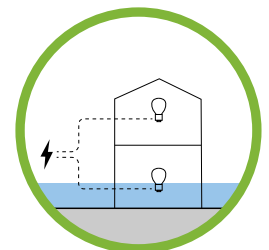
Raise the electrical switchboard



Raise storage hot water unit or replace with a raised instantaneous gas hot water unit

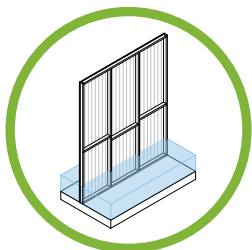


Raise the water tank pump and electrical systems

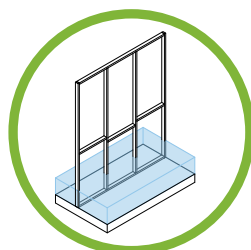


Install separate circuits (with breakers) on the lower and upper levels

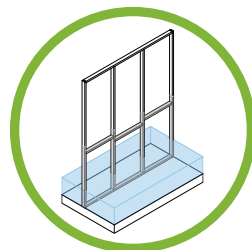
Walls



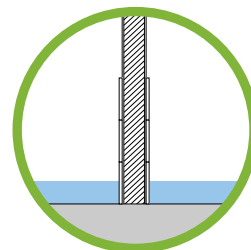
Where possible, replace cavity walls with non-cavity walls to minimise the chance of mould



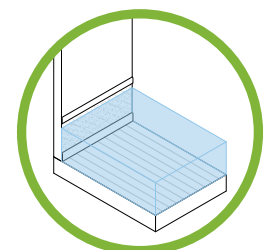
Use flood resilient wall framing to minimise the chance of mould or damage,



Paint existing pine frame cavity walls to assist in future cleaning and prevent mould growth

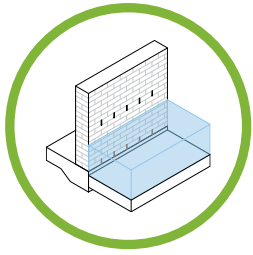


Replace loose-fill insulation with rigid cell insulation in cavity walls

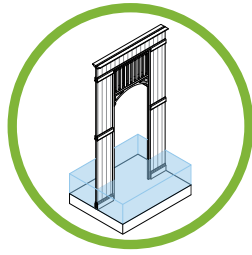


Replace wall linings with flood resilient wall linings

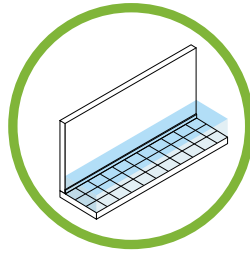
Walls (continued)



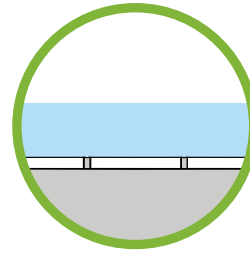
Add additional weep holes to help dry out the wall cavity or sub-floor



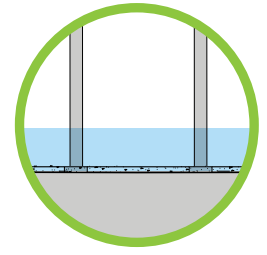
Replace non-resilient mouldings and skirtings with water impervious mouldings



Replace non-resilient flooring and skirting with flood resilient flooring and skirting

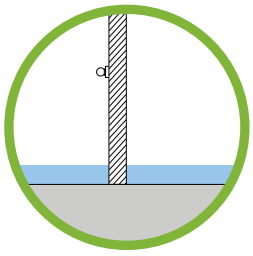


Use flood resilient grout and apply flood resilient sealant when tiling or re-tiling wet areas

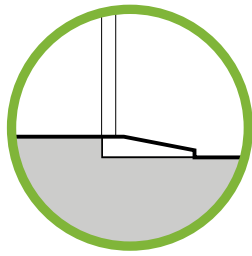


Surface control on sub-floor ground to increase resilience

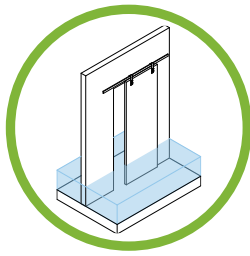
Openings



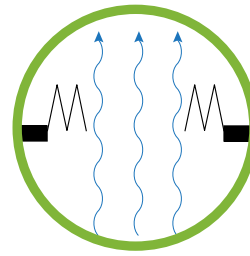
Replace hollow core doors with solid core doors



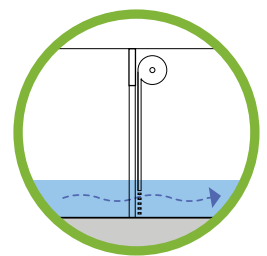
Install flush door sills to ensure easy cleaning after a flood event



Replace cavity sliding doors with a swing or face-of-wall sliding doors

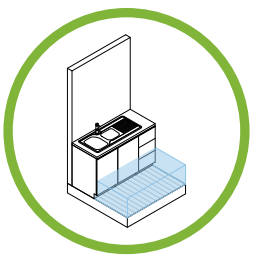


Door changes to maximise the existing opening

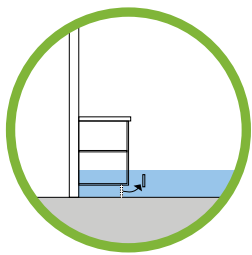


Retrofit garage doors with permeable doors to allow water to flow through

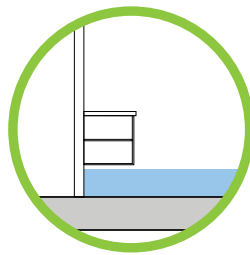
Cabinetry, bathrooms and laundry



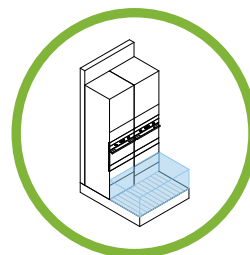
Replace non-resilient cabinetry with flood resilient cabinetry



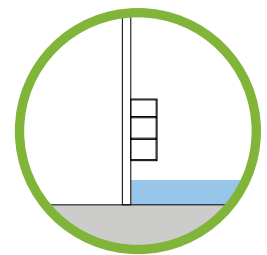
Allow cabinetry kickboards to be removable



Install raised cabinetry

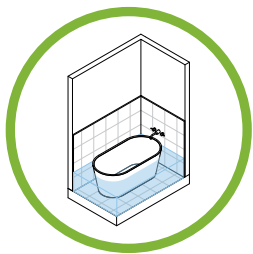


Raise kitchen appliances

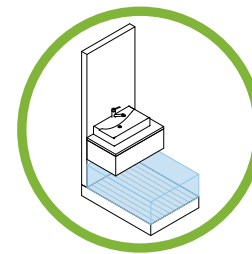


Raise storage shelves

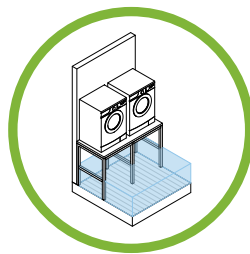
Cabinetry, bathrooms and laundry



Install a removable panel or replace the built-in bathtub with a freestanding bathtub or a shower

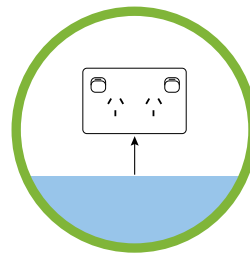


Install wall hung cabinetry, or install wall hung vanity bench with no cabinetry

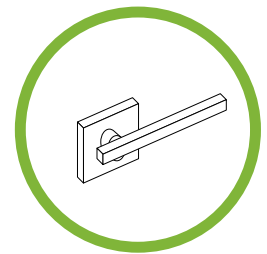


Raise the washing machine and dryer

Fixtures



Raise data and electrical points



Install corrosion-resistant door and window hardware

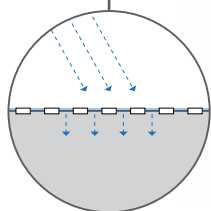
Double storey, ground floor double brick walls, slab on ground

House types help contextualise options on your property. The strategies outlined are not exclusive for this type and could be applied to many situations.

Legend

- May be covered by Resilient Homes Fund
- Not covered by the Resilient Homes Fund

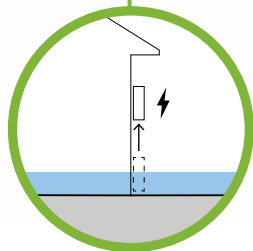
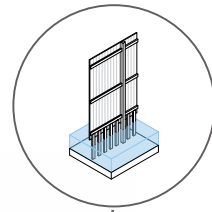
Garden beds with deep friable soils can help to slow, filter and collect water



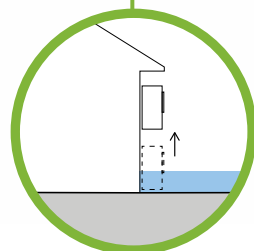
Replace existing ground cover with permeable materials to absorb and slow the flow of water



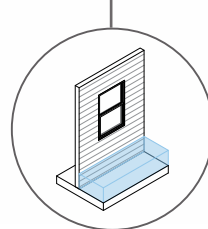
Replace existing fences with permeable fencing components that allow water to flow through



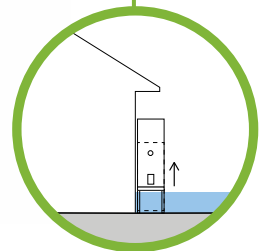
Raise the electrical switchboard



Raise air conditioning condenser units



Raise window sills to minimise chance of water entry

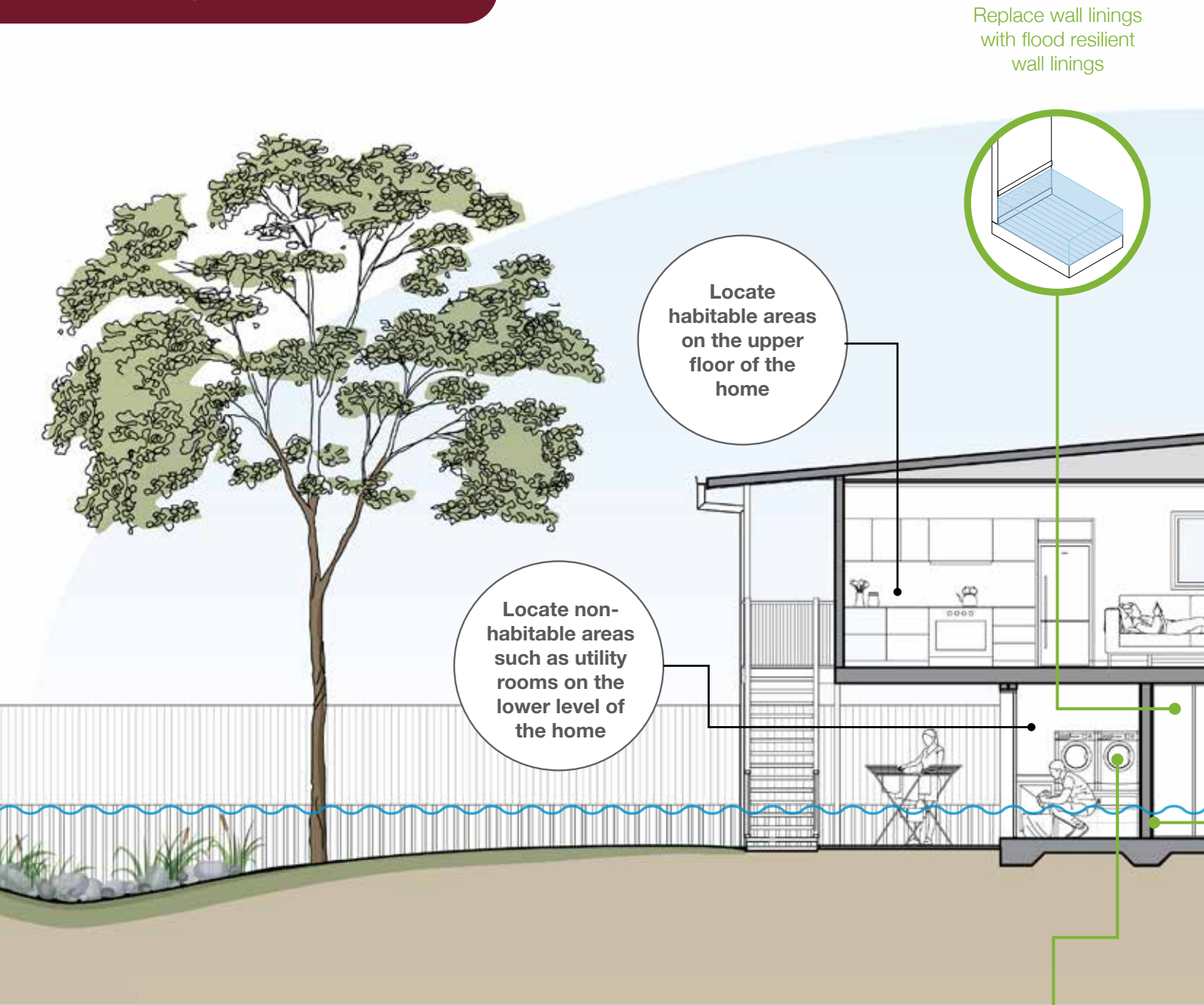


Raise the hot water unit

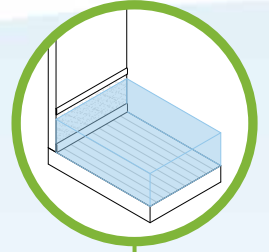
Double storey, ground floor double brick walls, slab on ground

Legend

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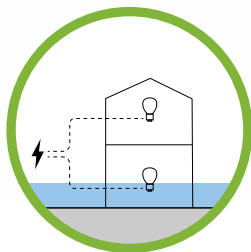


Replace wall linings with flood resilient wall linings

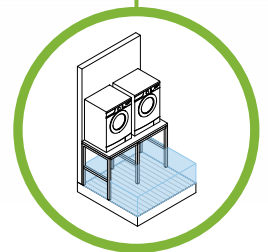


Locate habitable areas on the upper floor of the home

Locate non-habitable areas such as utility rooms on the lower level of the home

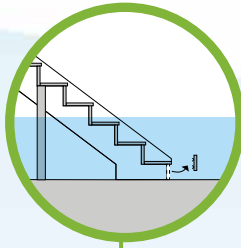


Install separate circuits (with breakers) on the lower and upper levels

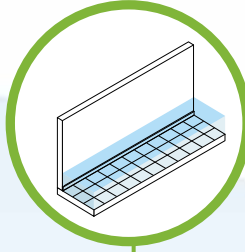


Raise the washing machine and dryer

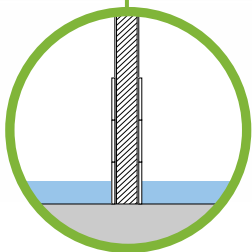
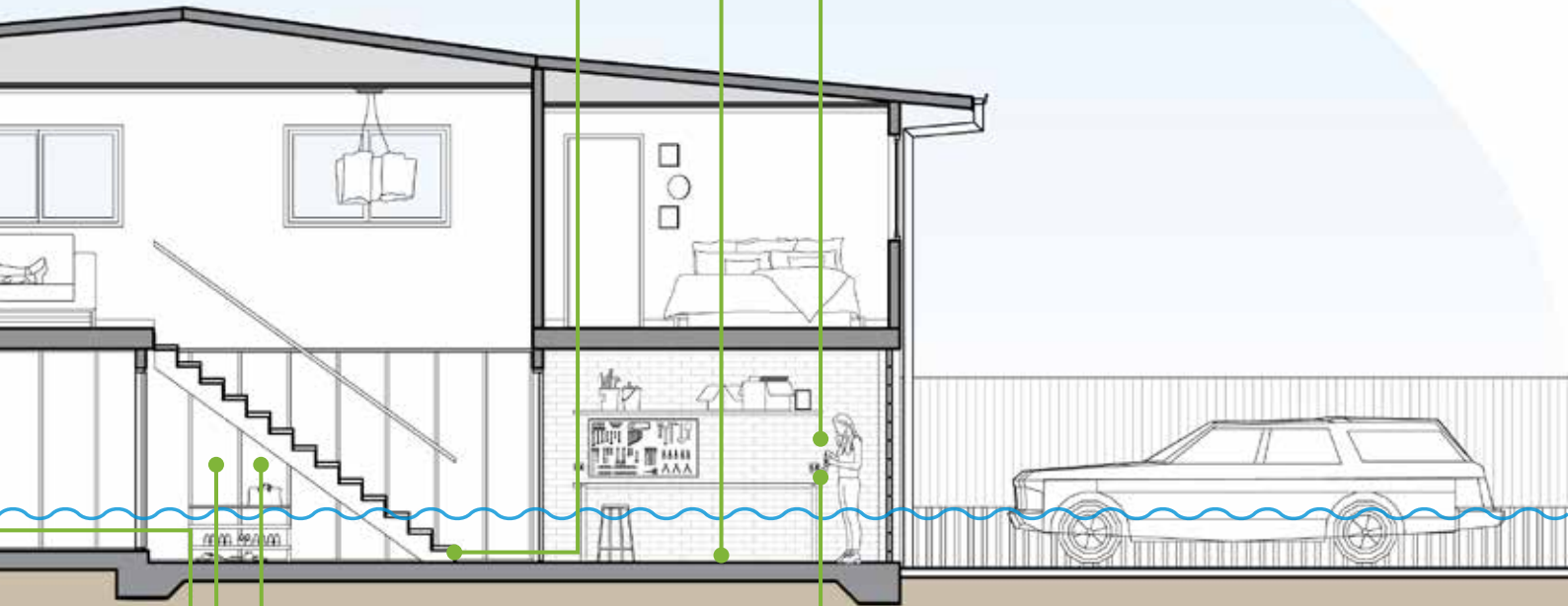
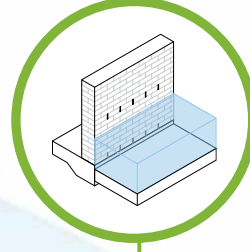
Make the bottom riser of stairs removable for easy cleaning and drying out



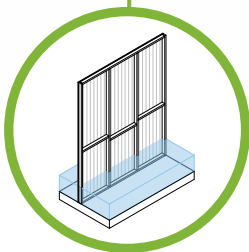
Replace non-resilient flooring with flood resilient flooring



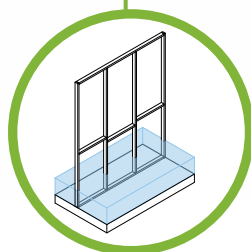
Add additional weep holes to help dry out the wall cavity



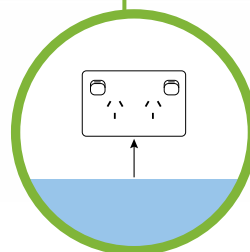
Replace loose-fill insulation with rigid cell insulation in cavity walls



Where possible, replace cavity walls with non-cavity walls



Use flood resilient wall framing to minimise the chance of mould or damage

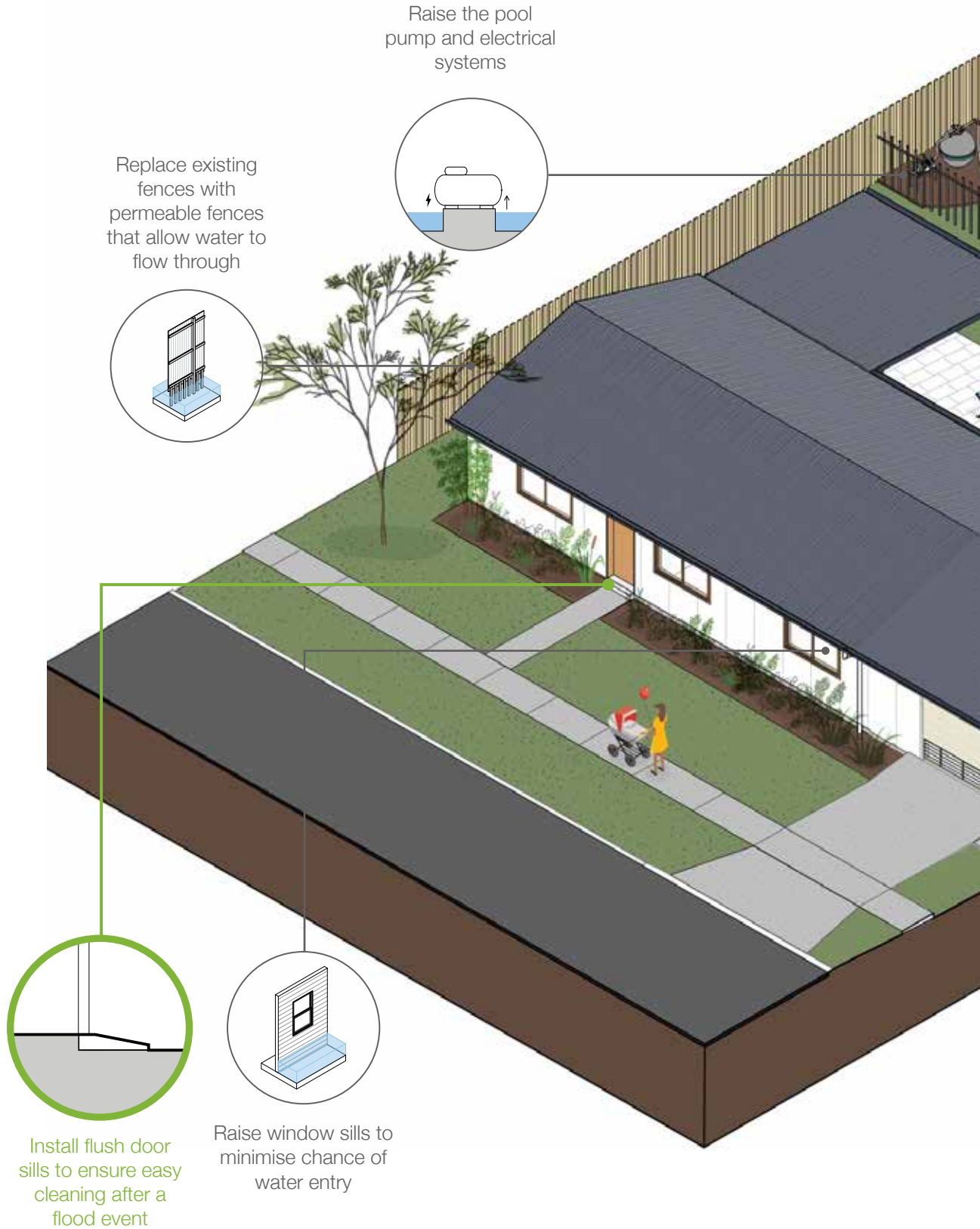


Raise data and electrical points

Single storey, timber framed walls, slab on ground

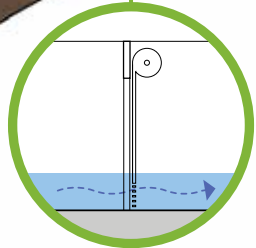
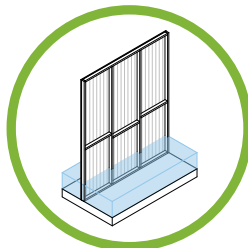
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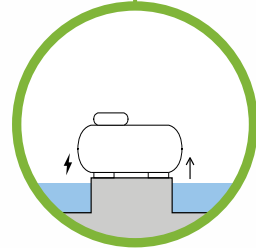




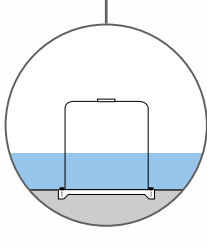
Where possible, replace cavity walls with non-cavity walls to minimise the chance of mould



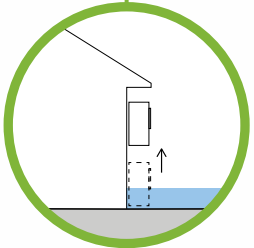
Retrofit garage doors with permeable doors to allow water to flow through



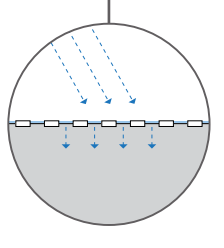
Raise the water tank pump and electrical systems



Install water tanks to collect rainwater. Ensure unit is secured to ground.



Raise air conditioning condenser units

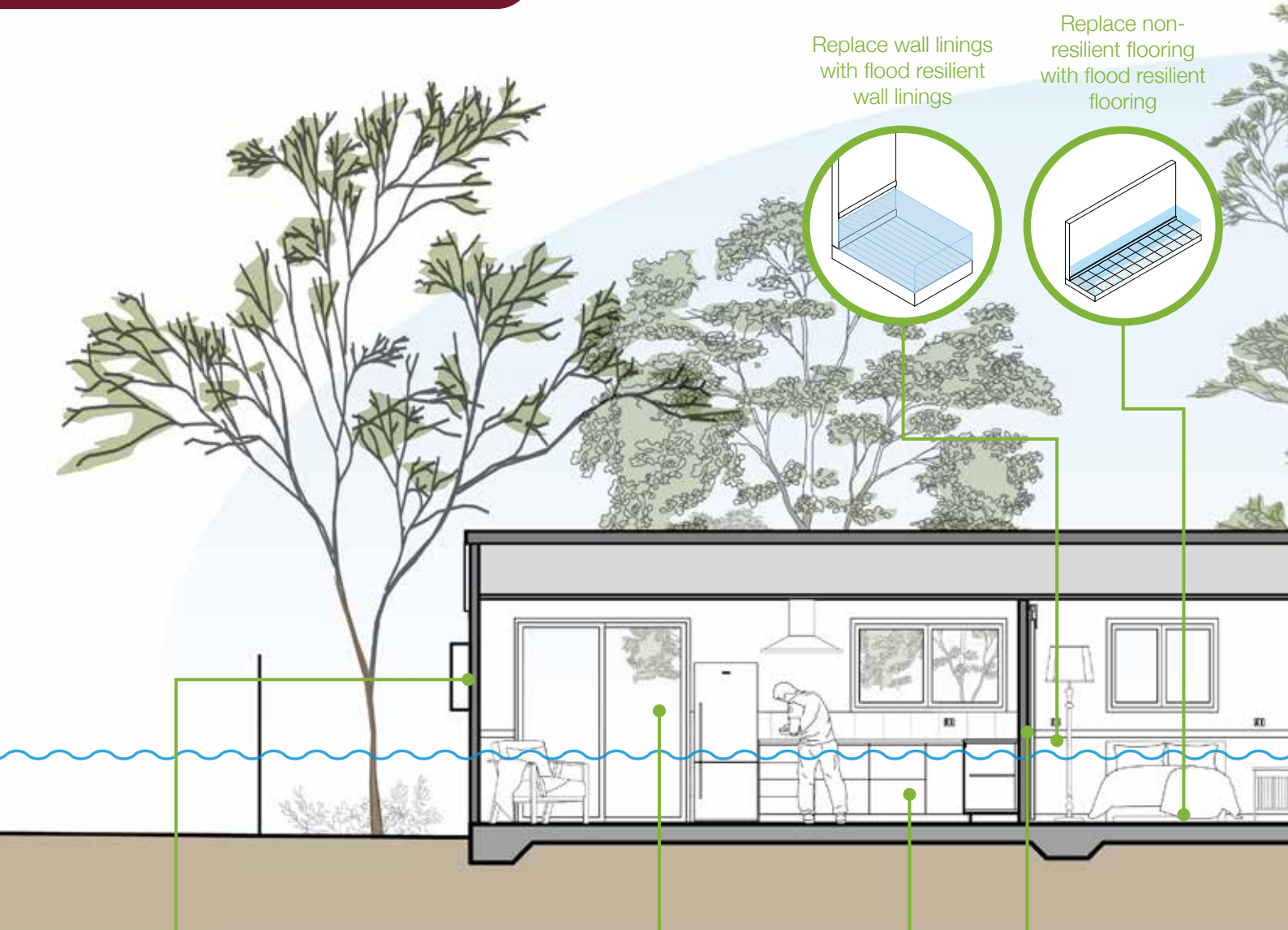


Replace existing ground cover with permeable materials to absorb and slow the flow of water

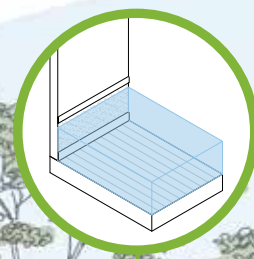
Single storey, timber framed walls, slab on ground

Legend

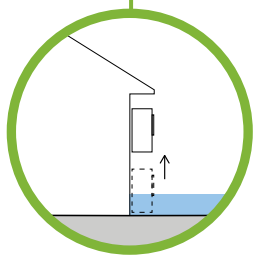
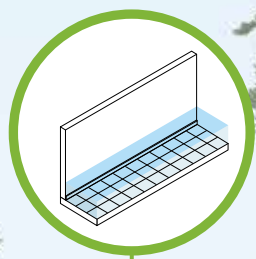
- May be covered by Resilient Homes Fund
- Not covered by the Resilient Homes Fund



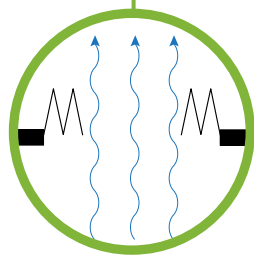
Replace wall linings with flood resilient wall linings



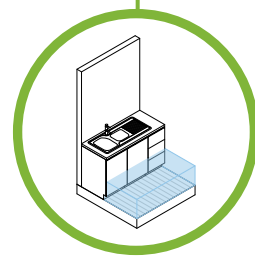
Replace non-resilient flooring with flood resilient flooring



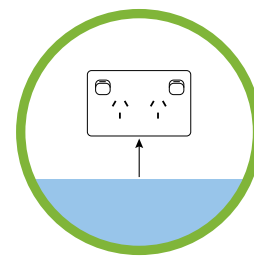
Replace storage hot water units with a raised instantaneous gas hot water unit



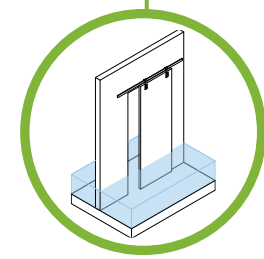
Door changes to maximise the existing opening



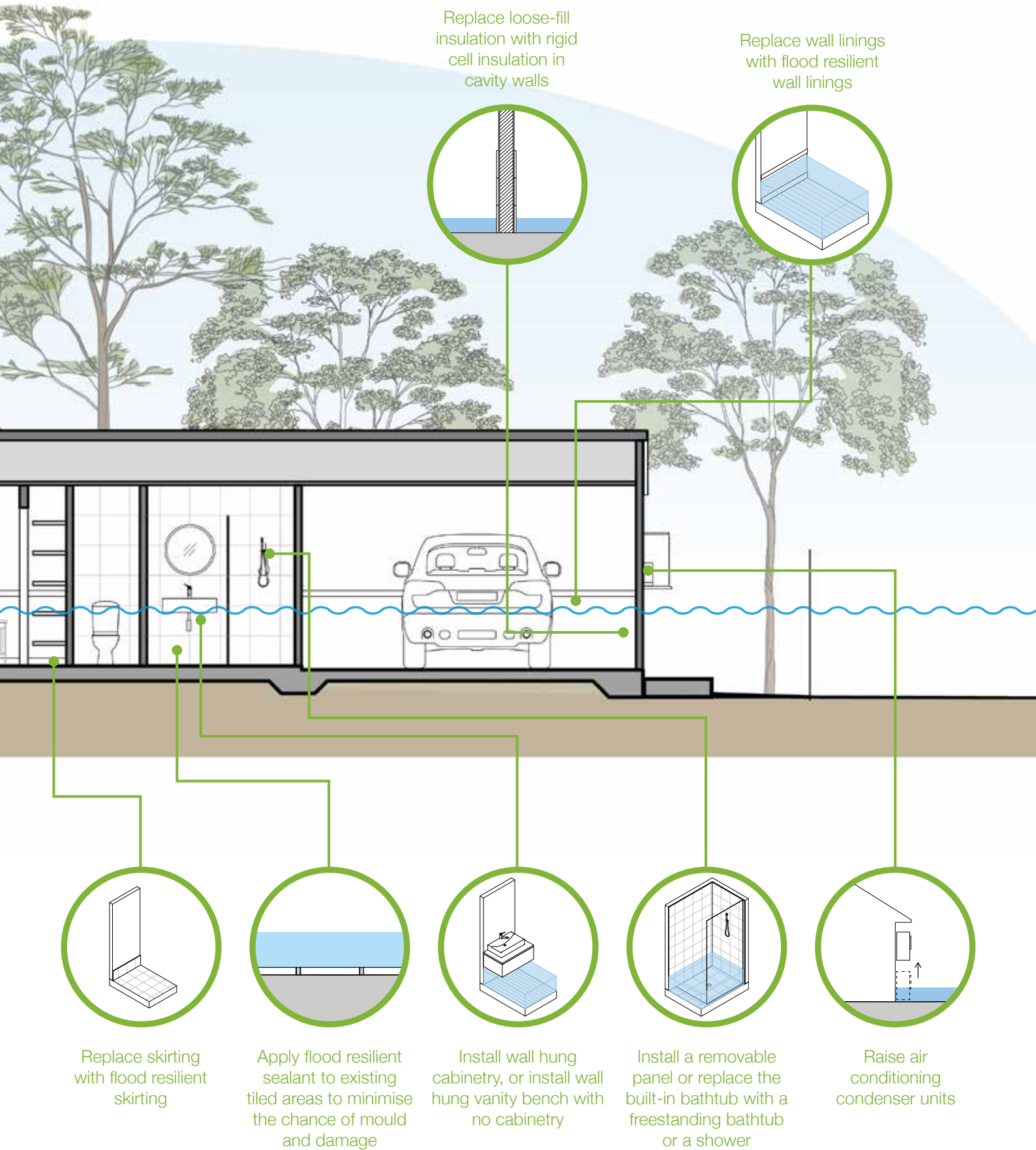
Replace cabinetry with flood resilient cabinetry



Raise data and electrical points



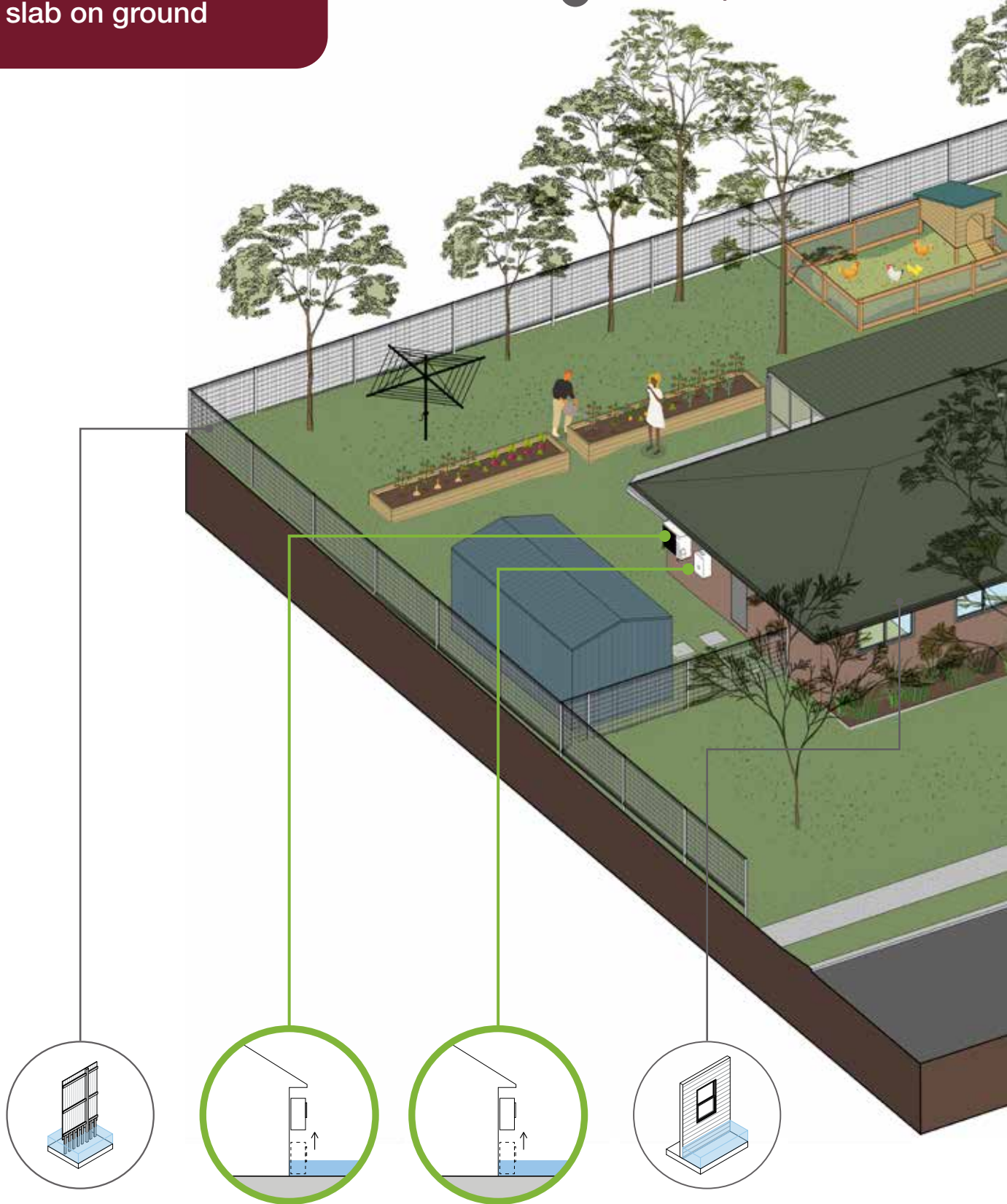
Replace cavity sliding doors with a swing or face of wall sliding doors



Single storey, brick veneer walls, slab on ground

Legend

- May be covered by Resilient Homes Fund
- Not covered by the Resilient Homes Fund



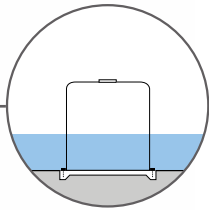
Replace existing fences with permeable fencing components that allow water to flow through

Raise air conditioner condenser units

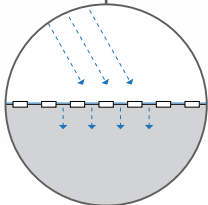
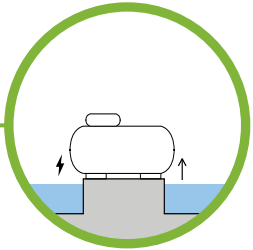
Replace storage hot water units with a raised instantaneous gas hot water unit

Raise window sills to minimise chance of water entry

Install water tanks to collect rainwater.
Ensure unit is secured to ground.



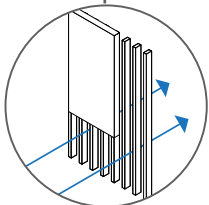
Raise the water tank pump and electrical systems



Replace existing ground cover with permeable materials to absorb and slow the flow of water



Garden beds with deep friable soils can help to slow, filter and collect water

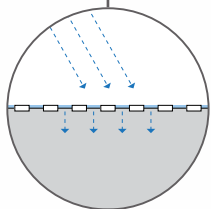
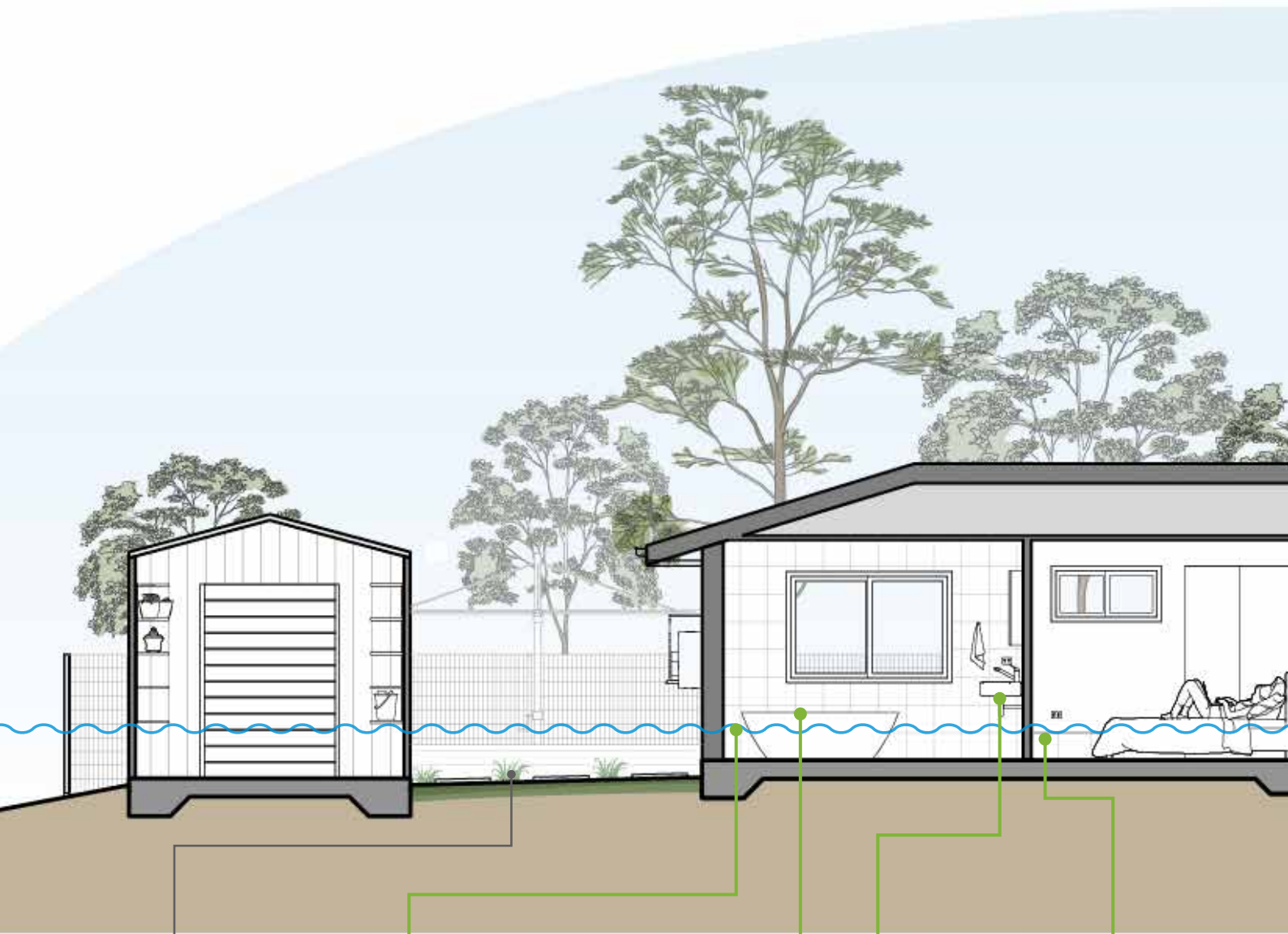


Retrofit carport with permeable screening to allow water to flow through

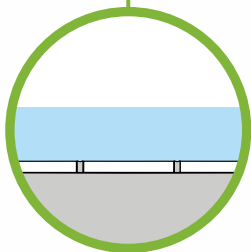
Single storey, brick veneer walls, slab on ground

Legend

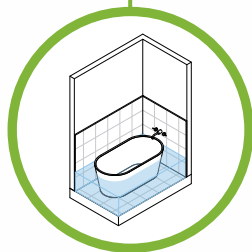
- May be covered by Resilient Homes Fund
- Not covered by the Resilient Homes Fund



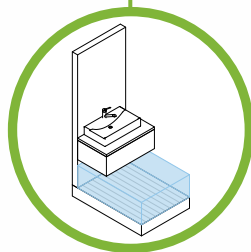
Replace existing ground cover with permeable materials to absorb and slow the flow of water



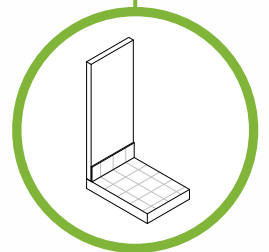
Use flood resilient grout when tiling or re-tiling wet areas



Replace the built-in bathtub with a freestanding bathtub or a shower

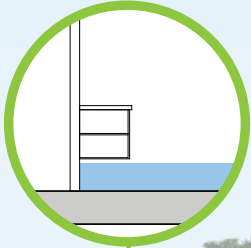


Install wall hung cabinetry, or install wall hung vanity bench with no cabinetry

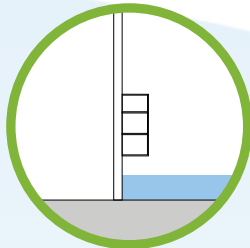


Replace skirting with flood resilient skirting

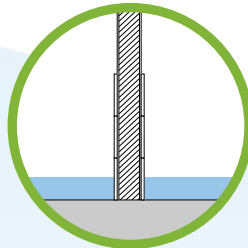
Install raised cabinetry



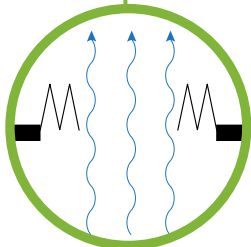
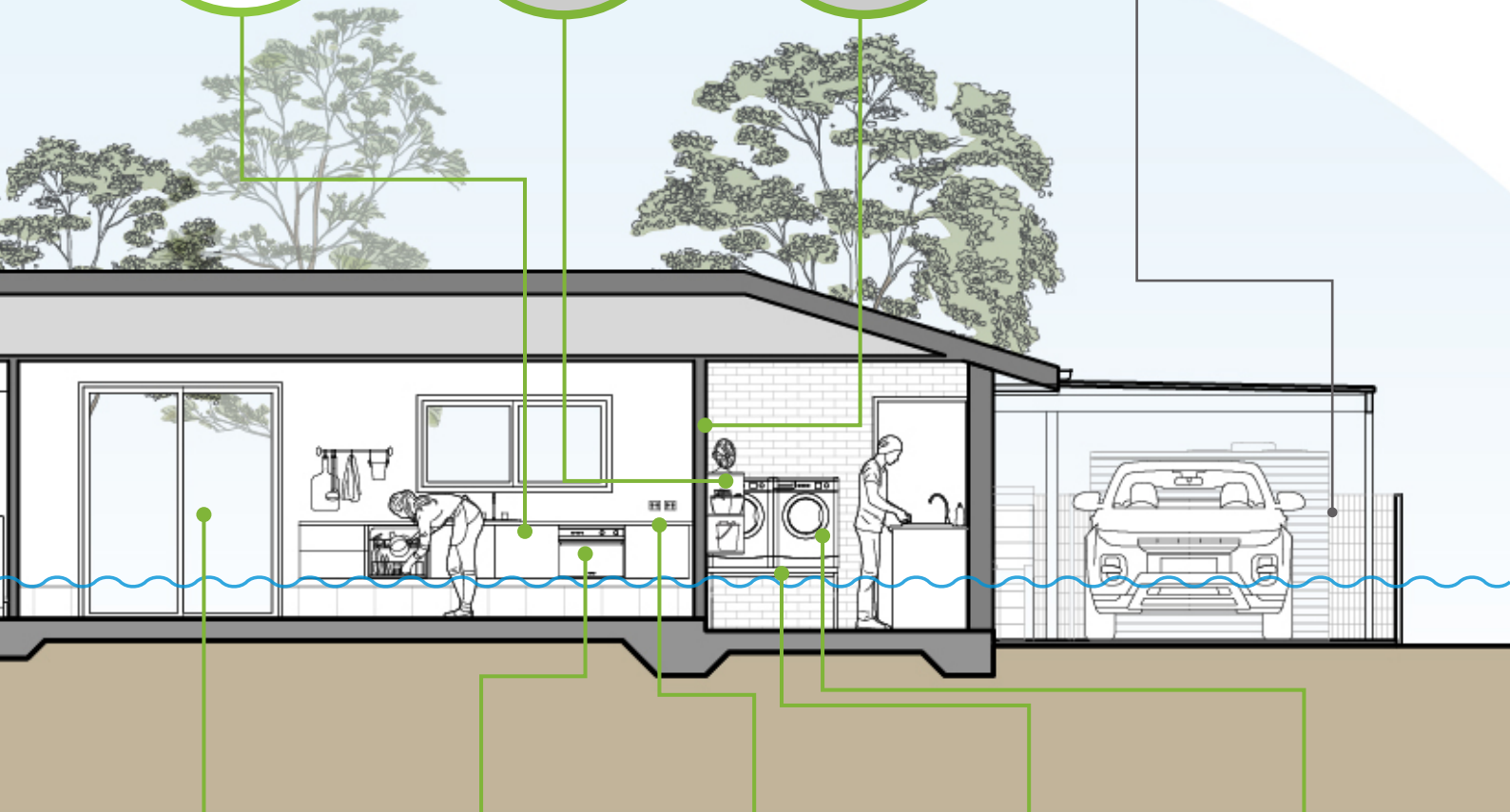
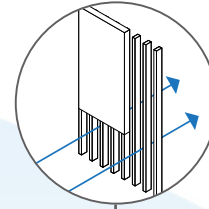
Raise storage shelves



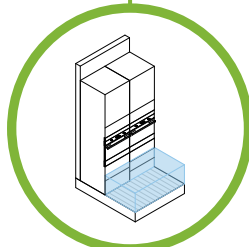
Replace loose-fill insulation with rigid cell insulation in cavity walls



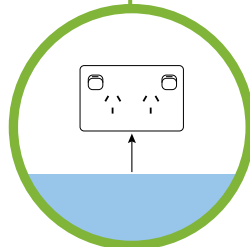
Retrofit carport with permeable screening to allow water to flow through



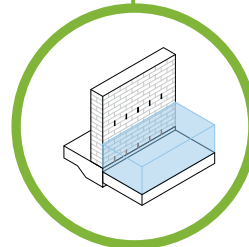
Door changes to maximise the existing opening



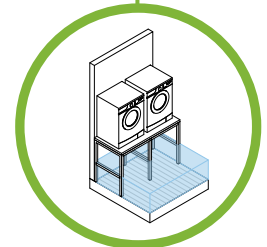
Raise kitchen appliances



Raise data and electrical points



Add additional weep holes to help dry out the wall cavity



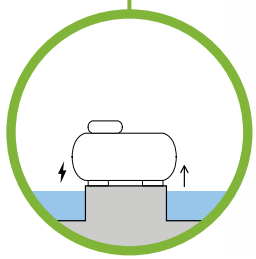
Raise the washing machine and dryer

Single storey with attic, timber framed walls, raised on stumps

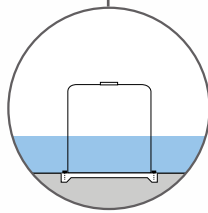
Legend

- May be covered by Resilient Homes Fund
- Not covered by the Resilient Homes Fund

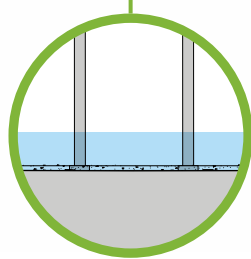
A mezzanine or loft space can be a safe refuge during major flood events



Raise the water tank pump and electrical systems



Install water tanks to collect rainwater. Ensure unit is secured to ground.

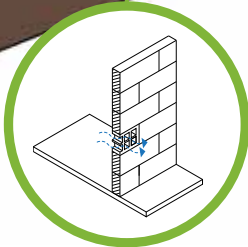
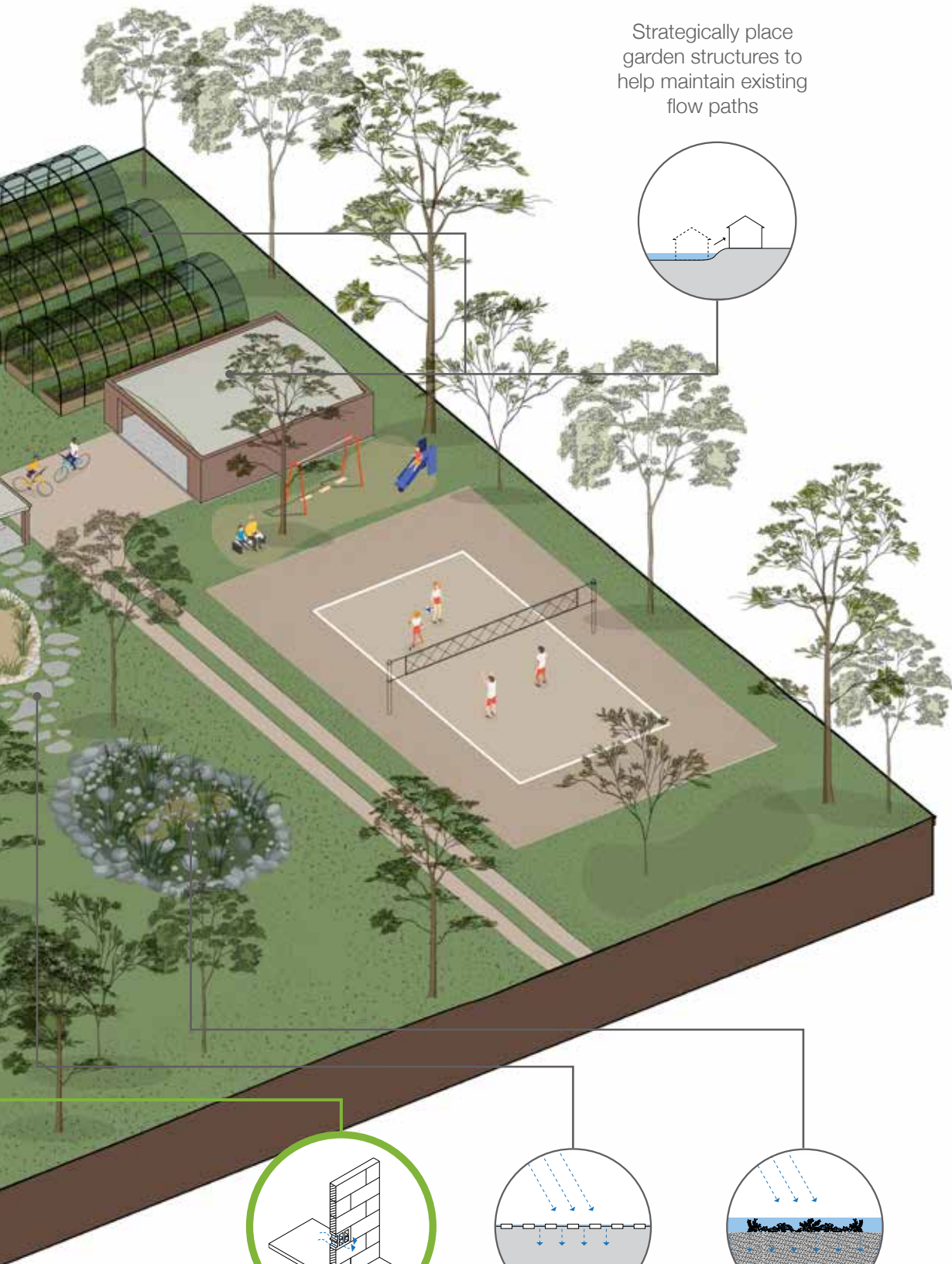
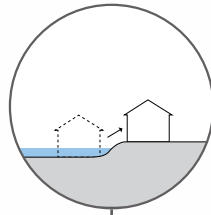


Surface control on sub-floor ground to increase resilience

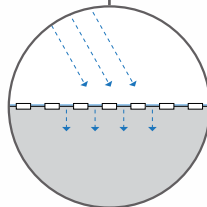


Garden beds with deep friable soils can help to slow, filter and collect water

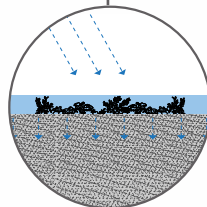
Strategically place garden structures to help maintain existing flow paths



Add air vents to enclosed sub-floor spaces and garages



Replace existing ground cover with permeable materials to absorb and slow the flow of water



Create a rain garden system to help slow, filter and collect flood water

Single storey with attic, timber framed walls, raised on stumps

Legend

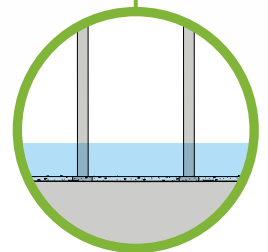
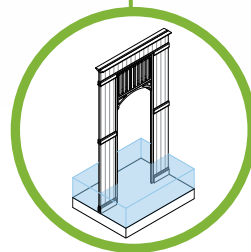
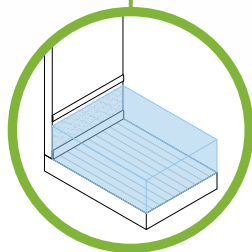
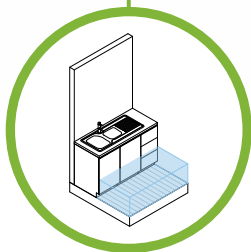
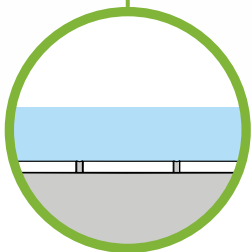
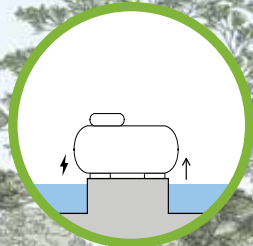
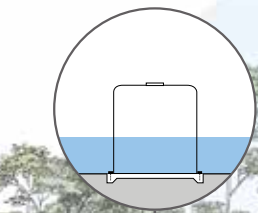
- May be covered by Resilient Homes Fund
- Not covered by the Resilient Homes Fund

Install water tanks to collect rainwater. Ensure unit is secured to ground.

Raise the water tank pump and electrical systems

Utilise the roof space to store belongings during a flood event

A mezzanine or loft space can be a safe refuge during major flood events



Apply flood resilient sealant to existing tiled areas to minimise the chance of mould and damage

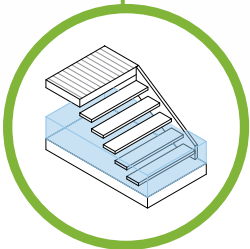
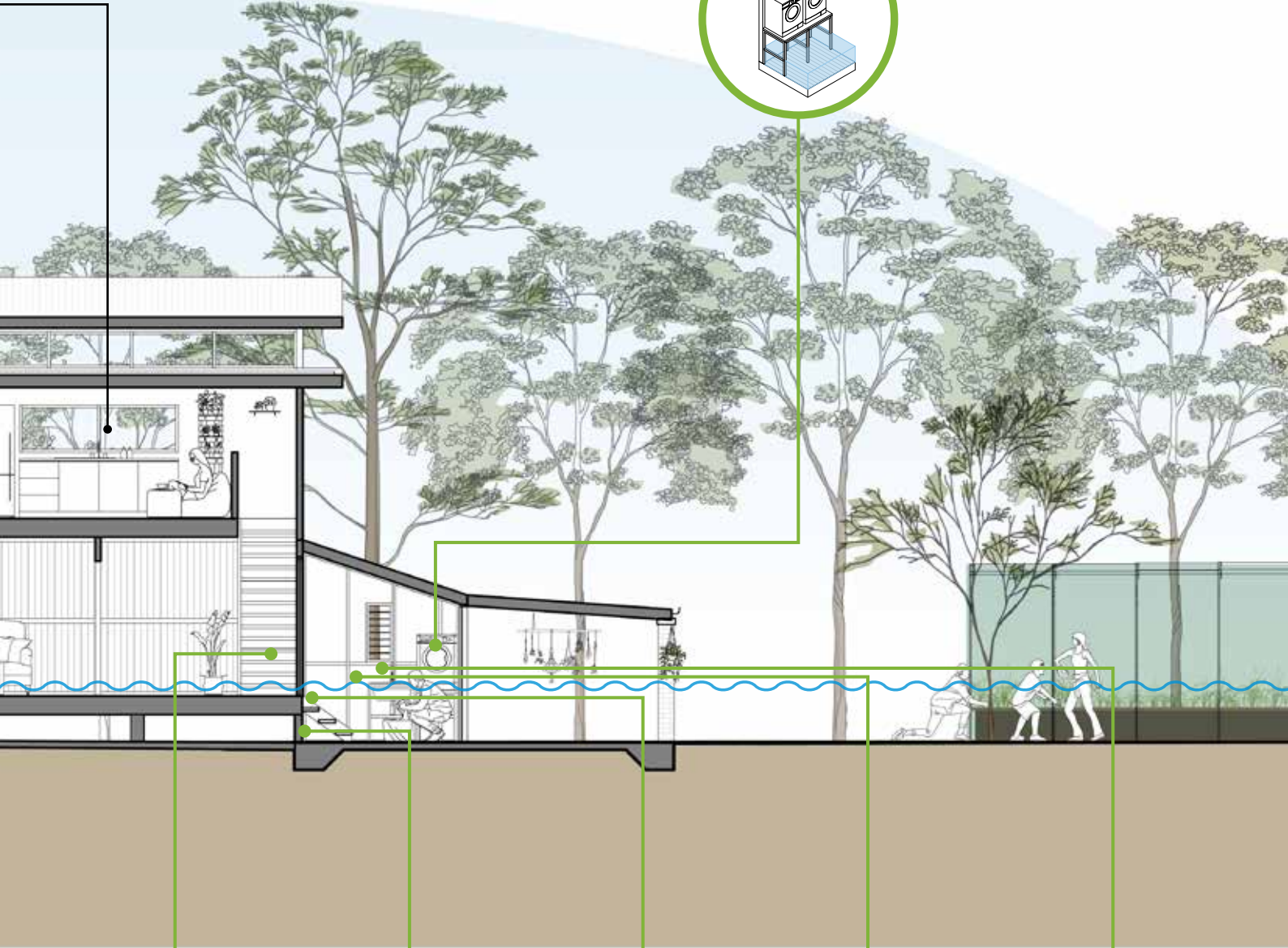
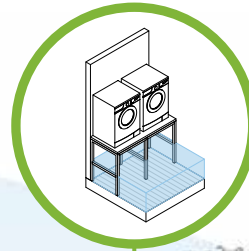
Replace cabinetry with flood resilient cabinetry

Replace wall linings with flood resilient wall linings

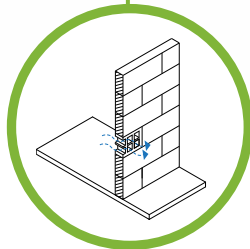
Replace mouldings with water impervious mouldings

Surface control on sub-floor ground to increase resilience

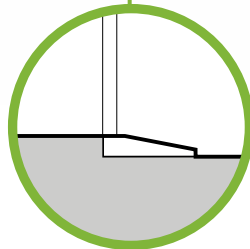
Raise the washing machine and dryer



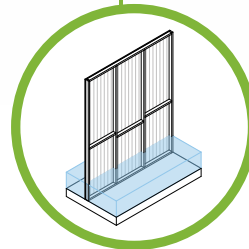
Replace closer riser stairs with open riser stairs made from flood resilient materials



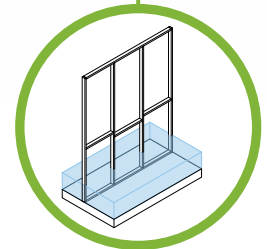
Add air vents to enclosed sub-floor spaces and garages



Install flush door sills to ensure easy cleaning after a flood event



Where possible, replace cavity walls with non-cavity walls



Use flood resilient wall framing to minimise the chance of mould or damage



You can use a combination of wet proofing and elevation to improve your home's flood resilience. Speak to a building professional about what is practical and financially possible for your situation.

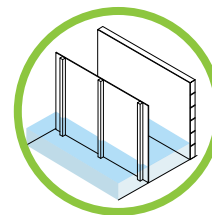
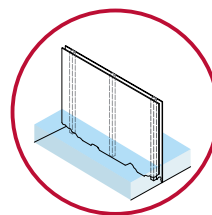
Flood Resilient Design Checklist

In the Home (may be covered by Resilient Homes Fund)



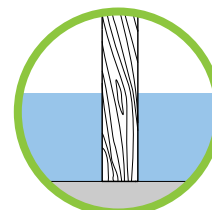
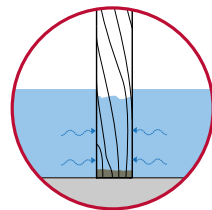
Use single-skin walls rather than cavity walls

Walls with cavities such as brick veneer and typical plasterboard stud walls are prone to trapping water within the wall linings, damaging the framing and forming mould. When replacing or building new walls, the use of single-skin walls is highly recommended.



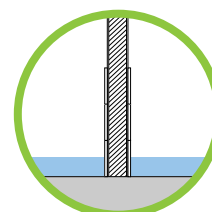
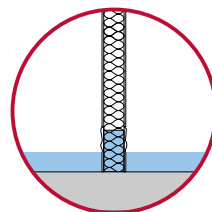
Use water-resistant framing

When building framed walls, it is not recommended to use softwoods such as pine as it is prone to rot and mould after inundation and can decay quickly. It is recommended to build with higher performance water-resistant wall framing materials such as hardwoods or steel. If pine framing is impractical to replace, paint existing frames to assist in future cleaning and prevent mould growth.



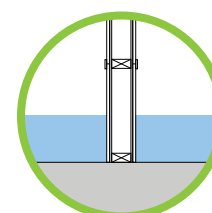
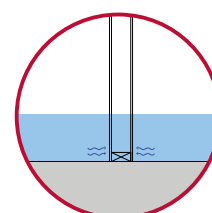
Replace loose-fill insulation with rigid insulation

Loose-fill insulation such as batt insulation is commonly found in wall cavities, however they absorb a great deal of moisture and must be replaced after a flood to avoid mould. Replace loose-fill insulation with rigid or closed-cell insulation such as extruded polystyrene insulation which are water-resistant.



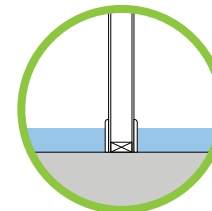
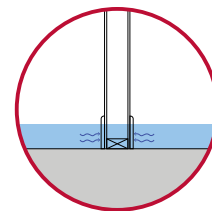
Replace non flood resilient wall linings with flood resilient wall linings

Replace non flood resilient wall linings such as plasterboard with flood resilient wall linings such as fibre cement in order to minimise the chance of flood damage. When installing new flood resilient wall linings, apply waterproofing membrane onto a flood resilient substrate such as fibre cement sheet underneath internal wall linings to further minimise the chance of flood damage.



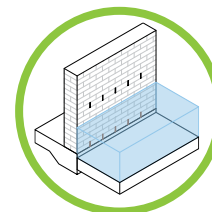
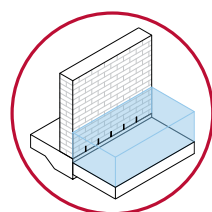
Replace non flood resilient mouldings with flood resilient mouldings

Replace non flood resilient mouldings such as pine with flood resilient mouldings such as hardwood timber to minimise the chance of flood damage. Pine and other softwood moulding is prone to buckling after becoming wet. Replace these with flood resilient mouldings, such as composite or hardwood to ensure resilience.



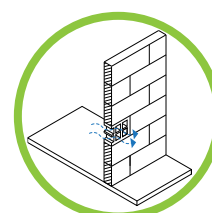
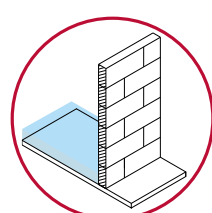
Add additional weep holes to double brick and brick veneer walls

Installing additional weep holes will help to quickly dry out the cavity of a double brick or brick veneer wall. It is important to clean out any existing weep holes to prevent water getting trapped in the wall cavity.



Add air vents to enclosed sub-floor spaces and garages

Installing air vents to enclosed sub-floor areas and garages will help to quickly dry out the area after a flood event.



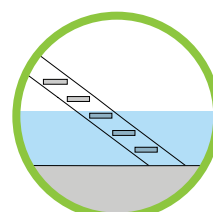
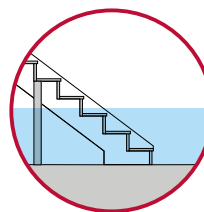
Flood Resilient Design Checklist

In the Home (may be covered by Resilient Homes Fund)



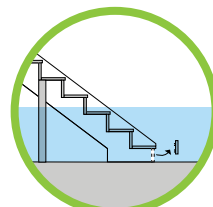
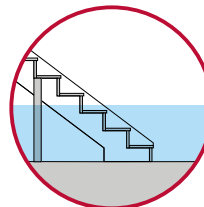
Remove cavities or voids under stairs

To enable an easy post-flood clean-out, stairs should be designed to limit inaccessible areas such as cavities or voids below them. Stairs with open risers (not closed in) made with flood resilient materials will quickly dry out after a flood. Alternatively, stairs up to the possible flood line can be made from solid concrete with no cavity underneath.



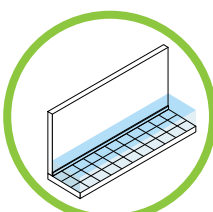
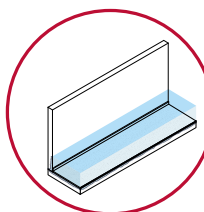
Make the bottom riser of the stairs removable

If an existing cavity stair is at risk of flooding and you cannot replace it with open riser, water-resistant stairs, adjust the bottom riser so that it is removable. This will allow for easy cleaning and drying out after a flood event.



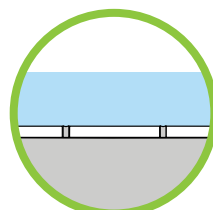
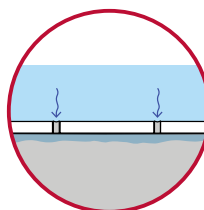
Replace non flood resilient flooring with flood resilient flooring

Replace non flood resilient flooring with flood resilient flooring to minimise the chance of damage and allow for easy cleaning and drying out after a flood event. When replacing flooring, ensure non-resilient substrates (subsurface materials) are replaced with flood resilient substrates. This will minimise warping, rot and damage to the flooring and below the floor.



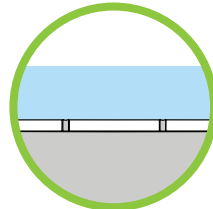
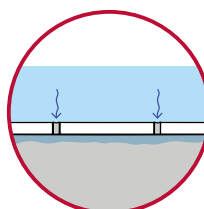
Apply a grout sealant to an existing tiled floor with non flood resilient grout

Adding a grout sealant will help to increase the water resistance of the grout, which will minimise the chance of mould and flood water damage to the tiles after a flood event.



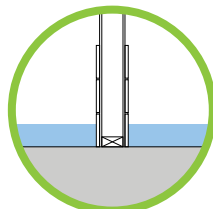
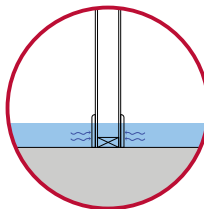
Use flood resilient grout when tiling or re-tiling wet areas

When tiling or re-tiling wet areas, ensure flood resilient grout is used. Otherwise referred to as 'semi-epoxy' this grout is less porous and ensures that the wall lining beneath tiles is protected and minimises the chance of mould.



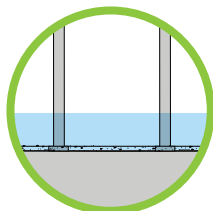
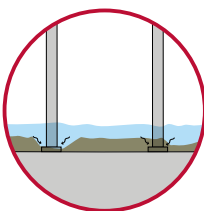
Replace non flood resilient skirtings with flood resilient skirtings

Replace non flood resilient skirtings such as pine with flood resilient skirtings such as hardwood timber or tiles to minimise the chance of flood damage. Non flood resilient skirtings such as pine and other softwoods are prone damage such as warping and rot after becoming wet. Flood resilient skirtings also allow for easy wash out after a flood event.



Add ground surface control to the undercroft of the house

For houses suspended on posts, in some cases, the ground under a house may be causing dirt and mud to interfere with the structure of the house. Ground surface control (e.g. a concrete blinding layer) can help seal the underlying material, protecting the posts and making it easier to clean.



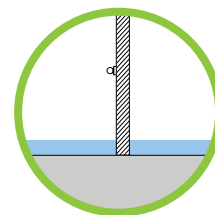
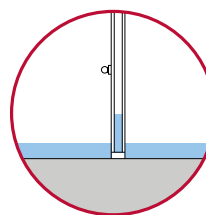
Flood Resilient Design Checklist

In the Home (may be covered by Resilient Homes Fund)



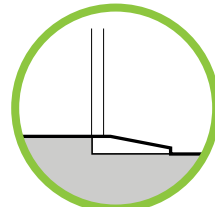
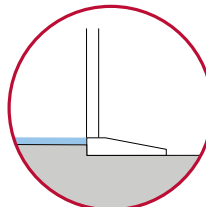
Use solid core doors instead of hollow core doors

Replace hollow core doors with solid core doors to minimise the chance of delamination, warping and rot. As an alternative, use solid timber, aluminium or glass doors.



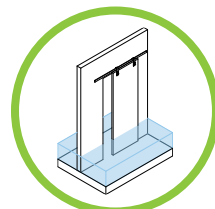
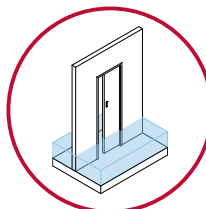
Install flush sills in doorways

Small steps and sills are often the cause of a small layer of water remaining inside of a house, complicating the clean up process after a flood event. Limit the sills which obstruct the drainage and discharge of flood waters from the interior and install flush sills recessed into a concrete floor.



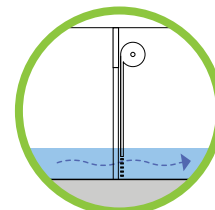
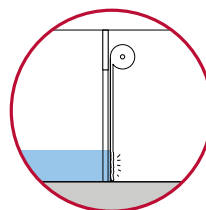
Replace cavity sliding doors with swing or face of wall sliding doors

Replace cavity sliding doors with swing or face of wall sliding doors to minimise the chance of flood water ingress into your cavity wall. Ensure when you replace the door that you also seal off the existing cavity.



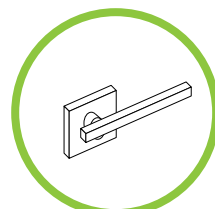
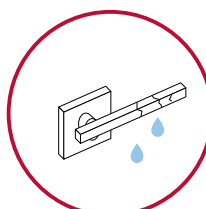
Install a permeable garage door if garage is attached to house

If your garage is attached to your house, permeable garage doors can help in maintaining existing flow paths to reduce adverse impacts to your home and neighbouring properties. Make garage doors permeable so that they do not block the natural flow of water. This should be used in conjunction with other wet-proofing strategies.



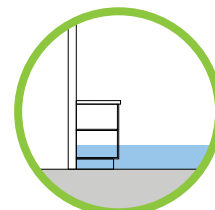
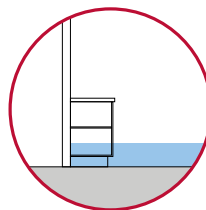
Install corrosion resistant door and window hardware

Install corrosion resistant door and window hardware so these do not need to be repaired or replaced following a flood event.



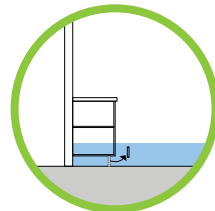
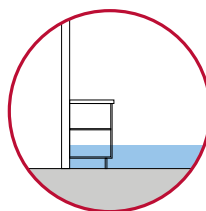
Install flood resilient cabinetry

Cabinetry is often the most expensive element in a house to replace after a flood event. The chance of flood damage can be minimised by using water-resistant materials for all cabinetry including the benchtop, doors, outer panels and the carcass (internal cabinetry frame).



Allow the kickboard to be removable

Adjust the kickboard on the cabinetry units so that they are removable. This will allow for easy cleaning and drying out after a flood event.



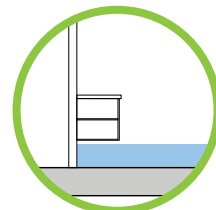
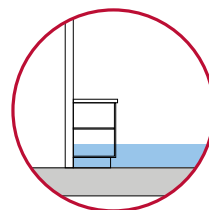
Flood Resilient Design Checklist

In the Home (may be covered by Resilient Homes Fund)



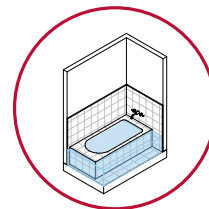
Install raised cabinetry

Where possible, install cabinetry so that it is raised. For example, consider installing wall hung kitchen cabinetry or installing a wall hung vanity basin in the bathroom instead of a built-in cabinetry unit.



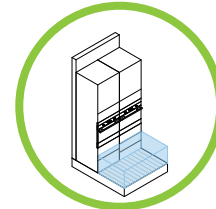
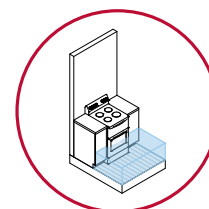
Install a removable panel or replace cavity bathtubs with freestanding bathtubs or showers

Built-in baths with cavities, often built into cabinetry or in tiled areas, are prone to trapping water, damaging the framing and forming mould. A removable panel, freestanding bathtub or shower eliminates gaps where water can be trapped and enables easy access for cleaning around the entire tub.



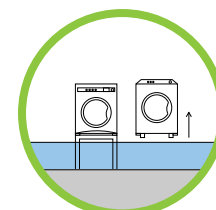
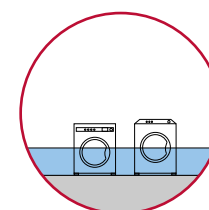
Raise kitchen appliances if possible

Raise fridges, dishwashers, ovens and all other appliances to keep your houses kitchen functioning and prevent failure. This is useful for low levels of flooding.



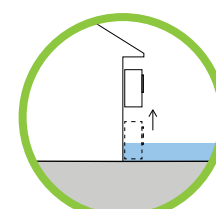
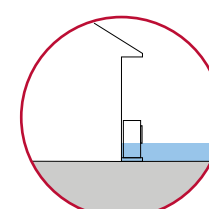
Elevate appliances

Stand-alone appliances such as front-loading washing machines and dryers can be easily raised onto stainless steel benches or wall brackets to minimise the chance of flood damage.



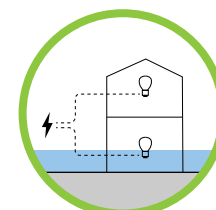
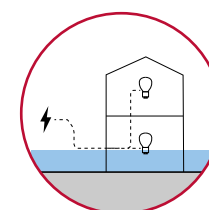
Elevate external services such as air conditioning condenser units, hot water units, rainwater tank pumps and electrical meter boards

Ensure the above external services are raised to keep utilities functioning during a flood event and minimise the chance of flood damage. Hot water units may be replaced by raised instantaneous gas hot water units in some cases. Pool tank pumps are not covered by Resilient Homes Fund.



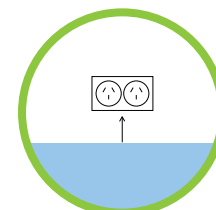
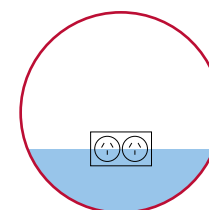
Install separate circuits on the lower and upper levels

Installing separate circuits to each storey allows electricity to run on the upper level if the lower level circuit cuts off due to a flood event.



Elevate powerpoints

Ensure the power-points, data points and all other electrical services are raised to minimise the chance of power outages and faults and allow provision for safety cut-off switches.

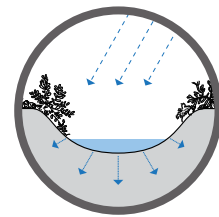


Flood Resilient Design Checklist

In the Yard (not covered by Resilient Homes Fund)

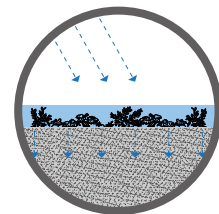
Create a swale

Swales (or bioswales) are a landscape feature and can be used to redirect flood water away from a dwelling. Planted swales are relatively inexpensive and can be aesthetically pleasing. The design and location of swales should complement and support existing stormwater drainage plans for the site. Note: consult a landscape architect.



Create a rain garden system

Similarly to swales, rain gardens collect water and are vegetated with water plants and help slow, filter and collect flood water. Note: consult a landscape architect.



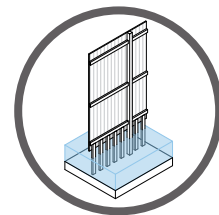
Increase garden absorption area with deep friable topsoil/mulch

Increase the garden areas of your property with plants to filter and slow flood waters. Shaping lawn areas so they have a minimum fall of 1:50 towards gardens and swales help with directing water away from the dwelling. Deep friable top soils are recommended for a greater collection of water and healthy growth of plants and collection. Note: consult a landscape architect.



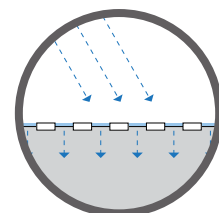
Replace solid fences and screening with permeable fencing components

Reduce flood damage to fences by ensuring the fence is water permeable and made of a resilient material. If privacy or noise is a concern, fences should be permeable up to a height that allows water to flow with ease, and then solid above that point. Some suggested screening materials include: aluminium, composite timber, hardwood timber, and recycled plastic palings.



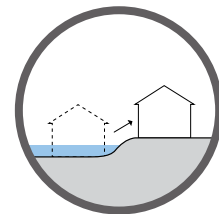
Increase permeable surface areas

Use permeable paving materials and/or remove any unnecessary hard surfaces to allow the ground to absorb water. Some options include: gravel, decomposed granite, permeable pavers, permeable concrete. It is recommended to reduce the width of large paved areas. Note: Consult a Queensland Registered Professional engineer if there are expansive soils and/or if surfaces are close to house.



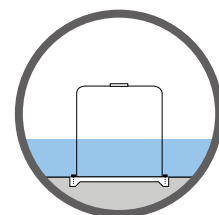
Relocate or replace garden structures that block natural flow paths

Strategically place garden structures to help maintain existing flow paths to reduce adverse impacts on neighbouring properties. Make garden structures permeable so that they do not block the natural flow of water and limit the use of retaining walls that could act as barriers.



Anchor external structures, such as rainwater tanks and sheds

Floods have the ability to uplift structures such as rain water tanks and sweep them downstream toward other properties potentially causing serious damage. Fixing them onto concrete slabs keeps them in place during heavy floods.



Flood Resilient Materials

Identify which of the following non-resilient materials are present in your home and where possible, replace with flood resilient materials.



Building element	Non flood resilient materials/ design	Flood resilient materials
External ground cover	<ul style="list-style-type: none"> • Large areas of impervious concrete surfaces 	<ul style="list-style-type: none"> • Grass • Mulch, deep crumbly soil • Permeable concrete • Permeable paving • Gravel, stones
Fencing	<ul style="list-style-type: none"> • Pine and other softwoods 	<ul style="list-style-type: none"> • Hardwood timber fencing • Composite timber fencing • PVC fencing • Metal fencing
Wall construction	<ul style="list-style-type: none"> • Wall with cavities 	<ul style="list-style-type: none"> • Single skin hardwood stud walls • Single skin brick walls • Single skin concrete block walls • Off-form concrete walls • Autoclaved aerated concrete walls with waterproofing membrane
Wall framing	<ul style="list-style-type: none"> • Pine 	<ul style="list-style-type: none"> • Hardwood • Steel
Internal wall linings	<ul style="list-style-type: none"> • Plasterboard • Panelling made from pine or other softwoods • Medium-density fibreboard (MDF) panels 	<ul style="list-style-type: none"> • FC (fibre cement sheeting) • Tiles • Hardwood panelling • Metal • Polycarbonate/translucent sheeting • Marine grade plywood
Internal flooring	<ul style="list-style-type: none"> • Carpet • Floating timber floors • Vinyl on a non-resilient substrate • Cork 	<ul style="list-style-type: none"> • Polished concrete • Tiles with epoxy grout and water-resistant adhesive • Hardwood flooring on a suspended hardwood sub-floor that is ventilated. • Rubber/vinyl on a flood resilient substrate with chemical set adhesive



Building element	Non flood resilient materials	Flood resilient materials
Internal floor substrate	<ul style="list-style-type: none">• Medium-density fibreboard (MDF) panels• Particle board (yellow tongue sheet flooring)• Low grade, non-marine plywood	<ul style="list-style-type: none">• FC (fibre cement sheeting)
Insulation	<ul style="list-style-type: none">• Wool and fibre cement batts• Other spray products	<ul style="list-style-type: none">• XPS (rigid) insulation• Closed cell flexible sheet insulation• Sprayed polyurethane foam
Doors and windows	<ul style="list-style-type: none">• Hollow core doors	<ul style="list-style-type: none">• Solid core doors (wet proofing)• Aluminium doors and windows• Flood doors (dry proofing)• Hardwood architraves
Mouldings (skirtings, dado rails, architraves, cornices)	<ul style="list-style-type: none">• Pine mouldings	<ul style="list-style-type: none">• Hardwood mouldings• Tile skirting
Cabinetry	<ul style="list-style-type: none">• Particle board• Medium-density fibreboard (MDF) panels	<ul style="list-style-type: none">• Compact laminate• Acrylic solid surface• Marine grade plywood• Composite timber panels• Stainless steel frame (open)• 316 grade stainless steel
Cabinetry benchtops	<ul style="list-style-type: none">• Laminate• Particle board• Medium-density fibreboard (MDF) panels	<ul style="list-style-type: none">• Acrylic solid surface• Marine grade plywood• Stone• Composite stone• 316 grade stainless steel
Grout	<ul style="list-style-type: none">• Cement based grout	<ul style="list-style-type: none">• Semi-epoxy grout• Epoxy grout• Polymer resin grout

Further Information

Refer to your local government area (LGA) council website to access flood risk information about your property.

Refer to your local council's website for latest information on weather warnings, road closures, flood watch cameras, power outages and open evacuation centres.

For information about community support services near you visit Regional community support services.

Refer to the Flood Resilient Building Guidance for Queensland Homes for a more comprehensive guide.

Resilient Homes Fund Registration

Eligible homeowners who are interested in any of these programs are encouraged to visit the [Queensland Government Resilient Homes Fund](#) website and register their interest.

Registrations will help us understand the number of people who require assistance, and the type of assistance they require.

The details provided will also inform the rollout of this significant and complex program, ensuring those who need funding the most – those most vulnerable in our communities – are prioritised.

Acknowledgements

This guidance has been produced in collaboration with the Queensland Reconstruction Authority, Local Government, the Office of The Queensland Government Architect and JDA Co.

For enquiries about the Resilient Homes Fund:

Visit www.qld.gov.au/resilienthomes
Email resilienthomes@epw.qld.gov.au
Call 13 QGOV (13 74 68)

