



# NatHERS Technical Note

Nationwide House Energy Rating Scheme (NatHERS)  
Requirements for NatHERS assessments

Version 1 September 2022

For use with software tools using CSIRO Chenath engine 3.22

(Note [Version June 2019](#))

For use with software versions using CSIRO Chenath engine 3.21)

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**About the Nationwide House Energy Rating Scheme (NatHERS)**

NatHERS supports improvements to the energy efficiency and comfort of Australia’s residential buildings by providing a standardised approach and guidelines for NatHERS accredited software tools used to assess dwellings across Australia.

The Australian Government administers NatHERS on behalf of the Commonwealth and state and territory governments.

**For more information visit [www.nathers.gov.au](http://www.nathers.gov.au)**

# 1 Introduction

## Purpose

This Technical Note details the requirements that must be followed when conducting a NatHERS assessment in regulation mode for demonstrating compliance to the deemed-to-satisfy NatHERS pathway of the National Construction Code (NCC). It is applicable to both NatHERS Accredited Assessors and non-accredited assessors. It also forms a part of the End User Licence Agreement assessors entered into as a condition of using the software and via their accreditation as a NatHERS Accredited Assessor. This enables completion of NatHERS assessments in a consistent way.

Assessors must use this Technical Note for all NatHERS assessments using Chenath engine 3.22. Chenath engine 3.22 is designed for use with NCC 2022.<sup>1</sup>

NatHERS accredited software tools are used to assess new builds and major renovations of NCC Class 1a, 2, and Class 4 parts of buildings. Attached Class 10a buildings must also be modelled as part of the assessment.

The expansion of the tool to include a Whole of Home assessment builds on the results of the thermal performance assessment. The additional features include heating and cooling systems, hot water systems, lighting, pools and spas pumps, and onsite energy generation and storage.

## Regulatory requirements

Assessors conducting NatHERS assessments must apply the requirements in this Technical Note unless state or territory regulatory requirements apply. State or territory regulatory requirements such as the Building Sustainability Index (BASIX) in NSW, prevail in the event of inconsistency. Refer to the NCC for jurisdictional variations or contact the state/territory regulator and/or council for their requirements.

## Status of this Technical Note

This Technical Note prevails in all matters covered by the NatHERS Assessor Handbook, specific software training manuals, help files, technical support, Assessor Accrediting Organisation (AAO) guidance, Registered Training Organisations (RTOs) and software trainers' advice.

AAOs may issue additional modelling guidance and practice notes that support this Technical Note. Where there is a perceived contradiction, this Technical Note prevails.

Where this Technical Note does not cover part of a complex modelling situation, assessors should use their professional judgement. Accredited Assessors should contact their AAO support desk for direction and advice before using own judgement. All supporting information that informs a decision must be kept with the plans and documentation.

Software tool providers provide software tool support. The AAOs and the NatHERS Administrator provide modelling support.

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<sup>1</sup> Revise text when static information on Certificate is confirmed by ABCB

## Quality Assurance

Quality assurance (QA) activities and audits are undertaken regularly. The client, regulators, AAOs or NatHERS Administrator may request supporting information to conduct QA. The QA will include assessment of adherence to the Technical Note for NCC compliance. As part of QA activities, the NatHERS Administrator and stakeholders may access and use assessment information, and where appropriate, contact affected parties and regulatory authorities.

## Consequences of misuse

All accredited and non-accredited assessors<sup>2</sup> must follow the requirements of this Technical Note when conducting a NatHERS assessment. This forms a part of the software end user licence agreement for use of NatHERS accredited software tools in regulation mode. Furthermore all Accredited Assessors must adhere to the terms of their accreditation as a NatHERS Accredited Assessor. In the case of an inconsistency with the terms of those agreements, this Technical Note prevails except where state and territory requirements overrule it.

The consequences of not meeting the requirements of the Technical Note may include:

- a. suspension or cancellation of accreditation
- b. additional quality assurance/auditing of past and future ratings
- c. software tools access cancellation
- d. the relevant regulatory authority being notified by the NatHERS Administrator
- e. inaccurate simulation results.

## Updates

An update to this Technical Note will be issued from time to time. It is the responsibility of assessors to ensure they are using the appropriate version. The latest version is available from [www.nathers.gov.au](http://www.nathers.gov.au). Notification of updates will be provided to assessors through their AAO, software tool providers and jurisdictional building authorities.

The sections in the NatHERS Assessor Handbook correspond to the chapters (1 to 11 and 13) in this Technical Note and provide general principles and assessment guidance to support the Technical Note. The Assessor Handbook is available on the NatHERS website ([www.nathers.gov.au](http://www.nathers.gov.au)). Chapter 12 Appliances (Whole of Home) in this Technical Note is supported by the Whole of Home Guidance Note which will be integrated into the Assessor Handbook post 2022.

## Feedback on this Technical Note

Assessors must refer all enquiries and comments about this Technical Note to their AAO in the first instance, or the state or territory building regulator if assessor accreditation or licensing is not required in the jurisdiction. Where necessary, these organisations will refer the matter to the NatHERS Administrator for advice. The NatHERS Administrator may provide guidance and/or issue an amended Technical Note.

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<sup>2</sup> Non-accredited assessors are also referred to as “raters”

## Disclaimer

When conducting a NatHERS assessment, the assessor must comply with the material in this Technical Note. It is made available for Assessors who use NatHERS accredited software tools in the mode accredited under NatHERS only and on the understanding that the NatHERS Administrator, the state and territory governments and the Commonwealth (the Participating Bodies) are not providing professional advice, nor indicating a commitment by the Participating Bodies to a particular course of action.

Reasonable efforts have been made to ensure the information in this Technical Note is accurate, correct and reliable. The Participating Bodies and all persons acting for the Participating Bodies preparing this publication accept no liability for the accuracy of, or inferences from, the material contained in this publication. The NatHERS Administrator expressly disclaims liability for any person's loss arising directly or indirectly from the use of, inferences drawn, deductions made, or acts done in reliance on this Technical Note. The material in this Technical Note may include the views or recommendations of third parties, which do not necessarily reflect the views of the Participating Bodies, or indicate their commitment to a particular course of action.

## 2 Before you start

### Correct software version

- 2.1 Ensure that you are using the latest version of the software:
  - a. Class 1 ratings must be started in the latest version of the software
  - b. Class 2 ratings, if it is the first in the development, must be started in the latest version of the software.
- 2.2 When reviewing and finalising a rating after a building permit has been granted, use the latest version or, if necessary, use the version that was in place at the time the building permit was granted. You must have a written request from a regulator to use the older version.

### Conflict of interest declaration

- 2.3 Any potential or actual conflict of interest must be outlined in 'additional notes' including what the conflict relates to (e.g. financial interest, relationship to certifiers, builders or owners).

### Consent to collect and share data

- 2.4 Persons performing NatHERS assessments must inform their client that they will collect personal information, including their name, email address, telephone number, ABN (where applicable), NatHERS assessments and design documentation used for the assessment. This information:
  - a. will be disclosed to software providers, and
  - b. may be disclosed the NatHERS Administrator and applicable Assessor Accrediting Organisation (AAO) for the purposes of quality assurance, investigation and audits including consent for these persons/entities to contact the client in relation to any findings relevant to the assessment.

## Design documentation

- 2.5 The minimum design documentation required when modelling the thermal properties of a dwelling is:
- a. site plan — including a north point as documented on the survey
  - b. floor plan/s
  - c. elevations
  - d. sections
  - e. construction material details
  - f. electrical schedule (see Table 4 for default values if this schedule is incomplete)
  - g. window, skylight, roof window and door schedule/details including size, preferred glass and frame type, opening style, location.

## 3 Data entry and retention

- 3.1 NatHERS software tools are used to assess an entire dwelling. Additions or extensions to an existing dwelling must be modelled as part of the entire dwelling.
- 3.2 Each dwelling must have its own individual rating modelled in accordance with this Technical Note. This includes all Class 2 dwellings in a single building or development.
- 3.3 The project details and dwelling modelling must be consistent with the design documentation.

If the design documentation used for producing a NatHERS Certificate changes and the rating is impacted, the Certificate is no longer valid. A new assessment and NatHERS Certificate will need to be completed for regulatory approval purposes.

- 3.4 If the assessor recommends a change to any element of the design, the client must update the design documentation before the assessor finalises the assessment and issues the NatHERS Certificate.
- 3.5 Clarification must be sought from the client where information is ambiguous or inconsistent and any appropriate revisions must be made to the design documentation before issuing a NatHERS Certificate.
- 3.6 If the client has not provided the required information, requests for clarification and client responses must be kept with the assessment for review purposes.
- 3.7 When modelling Whole of Home, refer to fixed appliance specifications (if available, else select default values). If the specified type of appliance is not available in the software, guidance from the assessor's AAO or the NatHERS Administrator must be sought and noted in 'additional notes' on the certificate.

### 3.8 Defaults

- 3.8.1 An assessment must be undertaken using the default values in this Technical Note where clarification has been sought but not received. The client should be advised that some defaults represent the worst-case scenario and the rating may be adversely affected.
- 3.8.2 Any defaults used for the assessment must be detailed in the NatHERS Certificate 'additional notes' (excluding default windows, which are itemised separately in the certificate).

### Data retention

- 3.9 Subject to 2.4, the assessor must retain (for a minimum of seven years or a greater time as required by the jurisdiction) all design, assessment and supporting documentation in line with the jurisdictions' requirements and for AAO and NatHERS auditing and quality assurance purposes.

## 4 Climate, exposure, ground reflectance and orientation

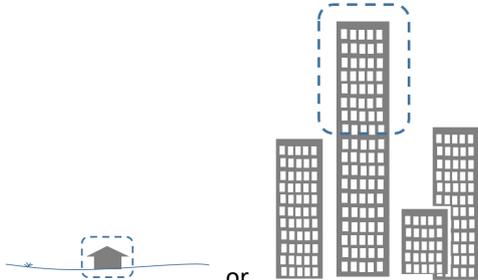
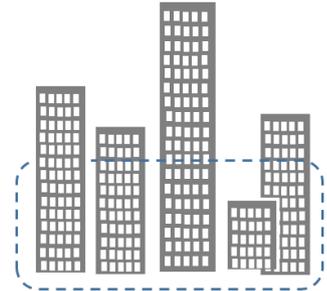
### Climate zone selection

- 4.1 In NatHERS software tools, each postcode is allocated a 'principal climate zone' and sometimes one or two alternative climate zones. Assessors are to use the principal climate zone in most cases. The following rules apply when selecting a climate zone:
  - 4.1.1 Assessments must use the postcode in NatHERS software tools that correspond to the location. If a newly developed suburb has not yet been allocated a postcode or the postcode is not available in NatHERS software tools, the postcode of the nearest existing suburb with similar climatic properties must be used. This must be detailed in the 'additional notes' section of the NatHERS Certificate.
  - 4.1.2 Assessors must only use an alternative climate zone where there is a justification for doing so (e.g. change in altitude). This justification must be detailed in the 'additional notes' section of the NatHERS Certificate.

### Exposure categories

- 4.2 The exposure category best suited to the terrain surrounding the dwelling must be used. Exposure can vary for apartments in a single building and this must be considered in assessments. Table 1 provides guidance on the indicative characteristics of exposure categories.

Table 1 – Exposure category guidance

Category	Terrain and built environment characteristics	Examples
Exposed	Few or no obstructions 	Flat grazing land, lakeside or ocean frontage, desert, exposed high-rise unit without obstructions at a similar height to the dwelling
Open	Grasslands with few well scattered obstructions less than or equal to 10 m high 	Farmland with scattered sheds, lightly vegetated bush blocks, elevated units with a few obstructions of similar height to the dwelling
Suburban	Numerous closely spaced obstructions less than or equal to 10 m high 	Suburban housing, heavily vegetated bushland areas, townhouses
Protected	Numerous closely spaced obstructions greater than 10 m high 	City and industrial areas

### Ground reflectance

4.3 A ground reflectance setting of 0.2 must be modelled at all times.

### Orientation

4.4 Dwelling orientation must be based on the rotation of the dwelling with respect to true north, not magnetic north.

4.5 If an assessor is unsure whether the plans are depicting true or magnetic north, assessors must clarify the direction of true north.

## 5 Zoning

- 5.1 Assessors must assign zones for all parts of the dwelling that can be fully enclosed by the dwelling envelope (the physical separator between the dwelling being assessed and the outside environment or neighbour). **Appendix 1** outlines software zoning type definitions and requirements.
- 5.1.1 All parts within the dwelling envelope must be allocated or included in a zone.
- 5.1.2 Conditioned outdoor living areas (i.e. mechanically heated or cooled) must be considered within the dwelling envelope and assigned a zone when capable of being fully enclosed by solid construction elements (e.g. walls, windows, bi-fold or sliding doors).
- 5.1.3 Outdoor living areas (enclosed or partially open), 'alfresco' spaces and detached garages are not allocated a zone and are an exception. These areas must be considered for shading purposes only (See Appendix 1 for further details).
- 5.2 Minimum zoning requirements are:
- 5.2.1 All dwellings must:
- contain one main kitchen/living zone
  - contain a minimum of three zones excluding the garage (e.g. a kitchen/living, bedroom and an unconditioned zone)
  - have walls, a floor and a ceiling and/or a roof for each zone.
- 5.2.2 Studios, bedsits and open-plan apartments must:
- contain at least three zones (kitchen/living, bedroom and an unconditioned zone) and
  - when there are no obvious features by which to zone the open plan studio or bedsit, then (for modelling purposes only):
    - kitchen/living zone floor area(s) = minimum of 30%
    - bedroom zone floor area = minimum of 20% and
    - these two zones shall be separated by an artificial plasterboard-on-stud internal dividing wall(s) with a wall area of no less than 40% between zones.

### Combining zones

- 5.3 There are only two situations where zones may be combined:
- Workshops, store rooms, WC's and laundries may be combined with the garage if they meet all of the following:
    - are within the garage
    - can be accessed from the garage and/or by an external door and
    - do not contain an internal door to the dwelling.
  - If the dwelling contains more than 50 zones, adjacent zones (e.g. bedrooms) may be combined if they meet all of the following:
    - have external windows or doors to the same orientation

- are the same zone and conditioning type
- open to the same internal zone (e.g. an internal hallway) and
- do not have external ventilation to more than one orientation.

### Bathrooms, WCs and ensuites

- 5.4 All dwellings must have at least one main bathroom and one main WC that are available for general household use (these may be combined or in separate rooms). They must be zoned as:
- a. daytime if they have no external openable windows or doors or
  - b. unconditioned if they have external windows or doors.
- 5.5 For NatHERS purposes, an ensuite is considered a secondary bathroom and/or WC that:
- a. is not the main bathroom and WC for general household use (as per clause 5.4) or
  - b. is exclusively associated with a bedroom.

### Unconditioned zones

- 5.6 Every dwelling must have at least one unconditioned zone.
- 5.7 Laundries, main bathrooms (see clause 5.4), WCs or powder rooms that have an external wall with at least one or more ventilation opening (openable window or door) are unconditioned zones.
- 5.7.1 An airlock is a small, relatively airtight space that can be modelled as unconditioned space if it:
- a. is located at a dwelling entrance
  - b. has one or more external wall
  - c. has one or more internal wall
  - d. has an external door and
  - e. has one or more internal doors, of which, only one opens to a conditioned zone.
- 5.7.2 Where an area labelled as an airlock does not meet the conditions of clause 5.7.1, it must be modelled as a daytime zone.
- 5.8 If no rooms fit the definition of unconditioned, then choose the smallest zone and model this as unconditioned.

## 6 Floors

Thermal bridging – see section 11

### Waffle pods

- 6.1 Where Expanded Polystyrene (EPS) waffle pods are specified, assessors must use the waffle pod thickness:

- a. closest to what is on the design documentation, but never higher, and
  - b. measured from the underside of the top slab to the bottom of the waffle pod construction.
- 6.2 Where the waffle pod thickness is not shown on the design documentation, the default 175mm thickness option must be used.
- 6.3 Unless otherwise shown on the plans a minimum 85mm concrete cover must be applied to the waffle pod.

### Floor coverings

- 6.4 Where no floor coverings are specified, assessors must use the following defaults:
- a. garages have concrete floors
  - b. wet areas, butler's pantries and kitchens have ceramic tiles
  - c. small storage and void spaces have the same flooring finish as the parent zone
  - d. the colour medium (solar absorptance = 0.5).

### Dwellings above car parks and public spaces

- 6.5 Assessors must model dwellings directly above carparks and unconditioned public spaces as per Table 2.

**Table 2 – Modelling adjacencies matrix for Classes 2 and 4**

	↓ Adjacent area	→ Dwelling feature	Floor adjacent to ...	Ceiling adjacent to ...	Wall adjacent to ...	Dwelling entrance door
1.	Apartment		Neighbour	Neighbour	Neighbour	Model 0% openability
2.	Shared basement carpark — enclosed		Shared basement carpark zone <sup>3</sup>	Shared basement carpark zone	Shared basement carpark zone	Model 0% openability
3.	Shared basement carpark — ventilated		Outside air	Outside air	Outside air	Model 0% openability
4.	Garage (private) — accessed from dwelling and own vehicular access door <b>NOT</b> part of larger enclosed basement carpark		Garage zone	Garage zone	Garage zone	Model 0% openability
5.	Garage (private, walled) — accessed from dwelling and own vehicular access door and <b>PART OF</b> larger enclosed basement carpark		Shared basement enclosed carpark zone	Shared basement enclosed carpark zone	Shared basement enclosed carpark zone	Model 0% openability

<sup>3</sup> Model entire zone including floor (only the level directly adjacent to the dwelling and assume it is on ground); external walls and their adjacencies (including the underground external walls as retaining walls with a 5m thick soil layer), ceilings and roofs and their adjacencies.

	↓ Adjacent area → Dwelling feature	Floor adjacent to ...	Ceiling adjacent to ...	Wall adjacent to ...	Dwelling entrance door
6.	Commercial premises	Neighbour	Neighbour	Neighbour	Model 0% openability
7.	Common corridor — no glazing, conditioned, enclosed	Neighbour	Neighbour	Neighbour	Model 0% openability
8.	Common corridor — no glazing, unconditioned, enclosed <sup>4</sup>	Neighbour	Neighbour	Neighbour	Model 0% openability
9.	Common corridor — with glazing, unconditioned, enclosed	Glazed common area zone <sup>5</sup>	Glazed common area zone	Glazed common area zone	Model 0% openability
10.	Common corridor — with glazing, conditioned	Neighbour	Neighbour	Neighbour	Model 0% openability
11.	Common corridor — with permanent opening to outside air	Outside air	Outside air	Wall with eaves same length & width	Model documented openability
12.	Common public area — mostly enclosed	Neighbour	Neighbour	Neighbour	Model 0% openability
13.	Common public area — highly ventilated	Outside air	Outside air	Outside air	Model documented openability
14.	Lift	Neighbour	Neighbour	Neighbour	Model 0% openability
15.	Stairwell — enclosed	Neighbour	Neighbour	Neighbour	Model 0% openability
16.	Stairwell — open	Outside air	Outside air	Outside air	Model documented openability

<sup>4</sup> e.g. corridors accessible via lifts, or stairwells, or with an airlock between corridor and external air

<sup>5</sup> This applies if:

- ♦ the apartment wall is adjacent to any glazing or
- ♦ the apartment is directly opposite any glazing and closer than 3 times the height of the corridor's ceiling (e.g. if the ceiling is 3 metres high, model apartments opposite any glazing if they are within 9 metres)

Model either:

- ♦ entire zone or
- ♦ zone section adjacent to the apartment wall and including the relevant glazed element. If needed, the zone can be enclosed by an artificial internal wall with adjacency to neighbour.

## 7 Walls

Thermal bridging – see section 11

### Exterior colour

- 7.1 Assessors must model the exterior wall colour or solar absorptance as detailed on the design documentation. In the absence of a solar absorptance value, this may be calculated as follows:

$$\text{solar absorptance} = 1 - \text{solar reflectance}$$

- 7.2 Where no exterior wall colours, solar reflectance or absorptance are specified, assessors must select the default colour medium.

### Internal colour

- 7.3 Where there is an option to nominate an internal wall colour in the software and no internal wall colours are specified on the design documentation, assessors must select the default internal wall colour as medium.

### Shared walls (modelling adjacency) in Class 2 buildings

- 7.4 Assessors must model the dwelling as outlined in Table 2 where a dwelling wall does not have open air or another dwelling on the other side.

### Insulation

- 7.5 Where insulation is added to a wall, assessors must remove any air gap thickness that has been partially or fully displaced by bulk insulation.
- 7.6 Assessors must ensure that the bulk insulation thickness will fit within the wall cavity. Bulk insulation thickness greater than the internal wall space is compressed and must not be modelled.

## 8 Windows and doors

- 8.1 All garage doors to the outside must be modelled and assigned zero percent openability and no weather-stripping.
- 8.2 All garage windows must be modelled and assigned zero percent openability, with insect screens and weather-stripping.
- 8.3 Fully or partially glazed hinged doors and sliding doors are considered to be windows in NatHERS software tools. Only the glazed portion of a partially glazed door is to be modelled as a window. The remaining component of the partially glazed door is to be modelled as a solid door.
- 8.3.1 If the glazing component is less than 25% of the door, the door may be modelled as a solid door.
- 8.4 When modelling windows or glazed doors, assessors must use either:
- the Australian Fenestration Rating Council (AFRC) custom window codes corresponding to the windows specified on the design documentation or
  - default windows.

- 8.5 When performing the thermal assessment, if a custom window is specified on the design documentation that is not available in the NatHERS custom window library, assessors must choose:
- a. a default window with the specified opening type or
  - b. an available custom window that meets all of the following parameters:
    - identical opening type (e.g. fixed, awning, casement, sliding) to the window specified on the documentation
    - a total window system U-value ( $U_w$ ) equal to, or greater than, the window specified on the documentation (e.g. if the  $U_w$  of the specified custom window is 1.5, the modelled window selected could be 3.5) and
    - a total window system Solar Heat Gain Coefficient (SHGC<sub>w</sub>)  $\pm 5\%$  of the window specified on the documentation. Any substitutions must be itemised in 'additional notes'.
  - c. substituted values for custom or default windows must be based on the Australian Fenestration Rating Council (AFRC) protocol rather than, for instance, the European ratings.
- 8.6 When using default windows, obscure glass (for instance, in a bathroom or WC) may be considered as either:
- a. clear if the glass is clear patterned, or
  - b. tint if the glass is a tint or translucent laminate.
- 8.7 In the absence of obscure glass in the custom windows library, assessors must model either a:
- a. default clear window if the glass is clear patterned, or
  - b. a default tint window if the glass is a tint or translucent laminate,
  - c. if the glass is clear patterned then a clear window from the same range of custom windows that is being used (i.e. same frame type and frame material),
  - d. if the glass is tint or translucent laminate, then a tint window from the same range of custom windows that is being used (i.e. same frame type and frame material).
- 8.8 When modelling windows, apply the default opening percentage in Table 3 – Default window opening percentages. These reflect the area of window that can open and deducts a percentage for the window frame.
- 8.9 Where there is an option to nominate a window frame colour in the software and no window frame colours are specified on the design documentation or available on request, assessors must select the default window frame colour as medium (solar absorptance = 0.5).
- 8.10 Combination windows that comprise various glazing components and opening styles, and therefore fall outside the parameters of Table 3, must be entered into the NatHERS software as either:

a.  $(a/b) \times 100 = c\%$

Where:

a = the sum of each glazing component's area multiplied by its corresponding default opening percentage based on Table 3

b = the area of the single (combination) window

c = the percentage openability of the single (combination) window

Note:

- i. This formula can be applied to any configuration of combination window with both fixed and operable component/s to calculate its total opening percentage.
- ii. Use the window code that corresponds to the glazing component with the largest window openability.

or

- b. an itemisation of each individual glazing component where each component of the combination window has a separate window code. The multiple window codes that represent the single, combination window must also be explained in the 'additional notes' section.

8.11 Assessors must adjust opening percentages to windows with restricted opening safety requirements and no complying security screen. If the restricted opening percentage is not specified on the design documentation where they are required, assessors must use the default opening percentage of 10% for all operable window types.

**Table 3 – Default window opening percentages**

Type	Default opening percentage
Fixed	0%
Operable component	
All windows types shown with safety restrictors (see 8.11)	10%
Double hung	45% <sup>6</sup>
Sliding	45% <sup>7</sup>
Awning	90%
Casement / tilt n' turn	90%
Louvre	90%

<sup>6</sup> Two window sashes where the movable sash, or sashes, can open a maximum of 45% of the entire window

<sup>7</sup> Sliding window or door where the movable sash opens a maximum of 45% of the entire opening

## 9 Ceilings and roofs

For thermal bridging – see section 11

### Roof colour

- 9.1 Assessors must model the roof colour and solar absorptance as detailed on the design documentation. If only a roofing material manufacturer’s colour is specified then the solar absorptance can be taken from the manufacturer’s colour charts. Alternatively, in the absence of a solar absorptance value, this may be calculated as follows:

$$\text{solar absorptance} = 1 - \text{solar reflectance}$$

- 9.2 Where the roof colour or solar absorptance is not detailed on the design documentation, the assessor must select the default roof colour as medium (solar absorptance = 0.5).

### Ceiling colour

- 9.3 Where there is an option to nominate a ceiling colour in the software and no ceiling colour is specified in the design documentation, assessors must select the default internal ceiling colour as medium.

### Ceiling penetrations

- 9.4 Assessors must model all recessed light fittings (referred to as downlights), vents, flues and exhaust fans as ceiling penetrations.
- 9.5 Assessors must input information about ceiling penetrations in accordance with the dwelling’s documentation.
- 9.6 If any of the ceiling penetration information for the dwelling is unspecified or incomplete, apply the defaults in Table 4. Existing parts of homes undergoing a major renovation will require informed assessor discretion as the Table 4 defaults may be inappropriate.

**Table 4 – Default ceiling penetration modelling**

Type	How to model defaults
No lighting specifications	<ul style="list-style-type: none"> <li>Sealed</li> <li>Zone area &lt;5 m<sup>2</sup>: model 1 downlight</li> <li>Zone area 5-10 m<sup>2</sup>: model 2 downlights</li> <li>Zone area &gt;10 m<sup>2</sup>: model 1 downlight per 2.5 m<sup>2</sup></li> <li>50 mm insulation clearance</li> </ul>
Lights indicated, but no details	<ul style="list-style-type: none"> <li>Sealed downlight</li> <li>50 mm insulation clearance</li> </ul>
Exhaust fan	<ul style="list-style-type: none"> <li>Unsealed</li> <li>250 mm diameter</li> <li>50 mm insulation clearance</li> </ul>
Kitchen rangehood	<ul style="list-style-type: none"> <li>250 mm diameter sealed exhaust fan</li> <li>50 mm insulation clearance</li> </ul>
Fan light heater	<ul style="list-style-type: none"> <li>Unsealed</li> <li>250 mm exhaust fan</li> <li>50 mm insulation clearance</li> </ul>

Type	How to model defaults
Heating device flue	<ul style="list-style-type: none"> <li>• Add 100 mm clearance if flue diameter is known</li> <li>• If flue diameter is not known allow a total of 300 mm insulation clearance</li> </ul>

- 9.7 Downlights must be modelled regardless of the adjoining zone (e.g. roof space, neighbour or second storey floor).
- 9.8 Treat permanent static ventilation openings in the building fabric (e.g. unflued gas heater vent) as a wall or ceiling vent.

### Insulation

- 9.9 Assessors must model any edge batts shown in the documentation. The default R3.0 and 450 mm width must be applied if values are not obtainable.

## 10 Shading

- 10.1 Assessors must model all fixed and non-fixed shade features shown in the documentation.
- 10.2 Where there is a limit to the number of shading features that can be modelled in the software tool, model the three that have the largest impact on the rating.

### Eaves and horizontal shading device

- 10.3 Assessors must model the width of an eave or horizontal shading device from the face of the external wall to the bottom of the fascia board or the underside of the outer edge of the horizontal shading device. Gutters may be modelled at the assessor's discretion.

### Neighbouring buildings and features

- 10.4 Assessors must model neighbouring buildings and surrounding topographical features that obstruct the sun on level ground. Assessors must model all single-storey neighbours within 10m and two-storey neighbours within 20m of the dwelling. Assessors must consider the impact of level changes and retaining walls when modelling these features.
- 10.5 Assessors must model all neighbouring shade features north of the Tropic of Capricorn. Shade features south of the Tropic of Capricorn between the midpoints SSE and S, and S and SSW (i.e. within the range of 168°45' to 191°15') need not be modelled.
- 10.6 Where information on neighbouring buildings and fences is not shown on the design documentation, assessors must request the documentation be updated or obtain supporting evidence of existing neighbouring buildings for the purpose of modelling (e.g. Google maps).
- 10.7 Where neighbouring buildings are unknown because the dwelling is located in a new development, the following defaults must be applied:
- 10.7.1 The size of the neighbouring building is to fit into a rectangle having the same floor, wall and roof height (e.g. a two storey dwelling should presume a two-storey neighbour), length and width as the one being modelled; no other allowance is to be made for courtyards or building offsets of the dwelling being rated.

- 10.7.2 The setback from the street of the neighbouring building is to be the same setback from the street as the dwelling being rated.
- 10.7.3 The side and rear fence heights of the neighbouring building are to be 1.8m if local planning requirements are unknown.
- 10.7.4 Heights of the neighbouring building are to be modelled to include all known site level changes that will impact on shading the dwelling being rated.
- 10.7.5 A neighbouring building's setbacks must be located parallel to the fence line and at a distance equal to the shortest distance between the rated building and the fence line. This setback is to be calculated independently for each boundary where a neighbour is required to be modelled. Ignore neighbouring unattached dwellings to the south except if the dwelling is north of the Tropic of Capricorn (refer 10.5).

### Glazed verandahs, loggias, winter gardens or porticos

- 10.8 Assessors must treat spaces which are not "zones" e.g. balconies or other similar spaces with solid, glazed or partially glazed walls attached to either side of the parent wall, as wing walls.
- 10.9 Assessors must treat balcony walls with solid building elements directly in front of the parent wall as a vertical shading device (i.e. external screen), and model:
  - a. 100% shading for the portion of the wall that is solid
  - b. 10% shading for the portion of the wall that is glazed.

### Protected trees

- 10.10 Only trees with an existing preservation order or heritage protection must be modelled. No other vegetation may be modelled as shade. The design documentation must include:
  - a. the tree canopy drawn to scale or dimensioned and
  - b. existing preservation order or heritage listing.
- 10.11 May include a species shading schedule.

## 11 Thermal bridging

### Applicable building elements

- 11.1 Thermal bridging only applies to repeating steel frame elements:
  - a. where insulation is interrupted by steel framing elements and
  - b. that are a floor, wall, ceiling or roof as per Table 5.

**Table 5 – Minimum application of thermal bridging to steel framed elements**

Building element	When to apply thermal bridging <sup>8</sup>
External walls (Class 1)	Apply. Ignore external walls of attached <b>unconditioned</b> garage.
Apartment walls (Classes 2 and 4)	Apply if adjacent to non-neighbour spaces such as stair wells, corridors, car parks, and other shared public spaces. Ignore if adjacent to neighbour.
Internal walls	Apply if adjacent to <b>unconditioned</b> garages, roof space or subfloor zones. Ignore all other internal walls.
Ceilings	Apply to ceilings: <ul style="list-style-type: none"> <li>below a roof space</li> <li>non-neighbour public areas or</li> <li>directly attached to roof (e.g. flat, skillion or cathedral roof).</li> </ul> Ignore if adjacent to another zone (excluding roof space).
Floors	Apply to suspended floors above: <ul style="list-style-type: none"> <li>outside air (including sub-floors)</li> <li>unconditioned garage</li> <li>“non-neighbour” public areas (see Table 2).</li> </ul> Ignore if: <ul style="list-style-type: none"> <li>in-between floors of multi-level Class 1 dwelling</li> <li>adjacent to neighbour zone.</li> </ul>

### Steel frame dimensions

- 11.2 If the software has the functionality to enter metal framing specifications, this may be used to apply thermal bridging to the relevant elements.
- 11.3 Where no framing details are specified in the design documentation, assessors must select the defaults provided in Table 6.

**Table 6 – Default steel framing details**

Building feature	Frame element	Steel frame dimensions
Ceiling/roof without roof cavity	Rafter	200 x 75 mm
	Rafter spacing	900 mm
	Base metal thickness	1.5 mm
	Flange width	75 mm

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<sup>8</sup> Thermal bridging must be modelled for these features listed in this table. However, Thermal bridging may be modelled for additional features.

Building feature	Frame element	Steel frame dimensions
Ceiling with roof cavity elements – raftered roofs with concealed rafters or horizontal ceilings. Apply to edge batts as well as centre/non-edge batts	Joist	90 x 40 mm
	Joist spacing	900 mm
	Flange width	40 mm
	Base metal thickness	0.75 mm
Wall	Stud	90 x 40 mm
	Stud spacing	600 mm
	Flange width	40 mm
	Base metal thickness	0.75 mm
	Nogging dimensions	90 x 40 mm
	Nogging spacing	1200 mm
Floor	Joist	100 x 50 mm
	Joist spacing	450 mm
	Flange width	50 mm
	Base metal thickness	1.5 mm

### NatHERS alignment with NZS4214

- 11.4 The assessor must enter an additional R0.16 to any thermally bridged external cavity wall/s or thermally bridged internal cavity wall/s to unconditioned garage or roof space/s (e.g. masonry/brick veneer), if the software has the functionality.

### Thermal breaks

- 11.5 Thermal breaks can be modelled only after thermal bridging is applied. They include materials with an R-value greater than or equal to R0.2 and must separate the metal frame from the cladding.
- 11.6 The assessor must model any thermal breaks specified in the design documentation in accordance with the software’s instructions.
- 11.7 When thermal breaks are not specified in the design documentation, assessors must select the defaults provided in Table 7.

**Table 7 – Modelling default thermal breaks**

Typical insulated steel construction examples	Type	Thermal break R0.2 <sup>9</sup>
External wall	Direct fix external lightweight cladding <sup>10</sup> to the same insulated steel member as the wall lining, or does not have a wall lining	Yes
	Cavity e.g. masonry (brick) veneer	No
Internal wall to unconditioned garage or roof space	Lining on one or both sides of frame	No
Cathedral ceiling (metal roof only)	Direct fix metal sheet roofing to the same insulated steel member as the ceiling lining, or does not have a ceiling lining	Yes
Ceiling with roof cavity/space	-	No
Suspended floor above unconditioned garage, outdoor air or non-neighbour	With or without lining	No

## 12 Appliances (Whole of Home assessments only)

### Heating and cooling

- 12.1 Assessors must model the main and any additional heating and cooling appliance type for each NatHERS designated conditioned zone as shown on the design documentation. Default performance levels and/or star ratings in Table 8 must be selected if not specified.
- 12.2 If the tool allows only one appliance per zone to be entered, the Assessor must use the main heating and cooling appliance in the zone. The main heating or cooling appliance is that which serves at least 70% of the conditioned zone. If no single heating and cooling equipment serves at least 70%, then the appliance that results in the highest energy value must be used. This may require multiple simulations to determine. For the purposes of NatHERS ratings the main heating device and the main cooling device must be assessed separately (e.g. a reverse cycle air conditioner and a gas heater in the same space may result in the air conditioner as the main cooler but the gas heater as the main heater).
- 12.3 If the tool flags that the entered efficiency is higher than what is known to be available in the marketplace, the assessor must notify the designer and include this in the 'additional notes'.

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<sup>9</sup> Thermal breaks are materials with an R-value greater than or equal to R0.2. This includes, but is not limited to, materials such as timber battens greater than or equal to 20 mm thick, continuous thermal breaks such as polystyrene insulation sheeting, plastic strips or furring channels.

<sup>10</sup> Lightweight cladding includes weatherboard, fibre-cement, metal or autoclaved aerated concrete.

- 12.4 If no appliance is specified, the default heating or cooling appliance (reverse cycle air-conditioner [heat pump]) shown in Table 8 is applied to conditioned zones.
- 12.5 In the case of a ducted system, the assessor must define all zones it services.

**Table 8 – Default heating and cooling appliance performance levels and star ratings**

Climate type	Heating		Cooling	
	Default performance level (HSPF)	Star rating	Default performance level (TCSPF)	Star rating
Cold	2.5	1.0	3.5	2.0
Mixed (average)	3.5	2.0	3.5	2.0
Hot and humid (hot)	4.0	2.5	4.0	2.5

### Hot water systems

- 12.6 Assessors must enter the hot water system specified by the design documentation.
- 12.6.1 If a solar photovoltaic diverter (PV diverter) hot water system is specified, the Assessor must select the type of system to be installed:
- Type 1: Simple timer. These systems are a standard electric storage hot water system with a timer installed so that they heat water during the day rather than overnight. The assessor must provide evidence of the energisation profile for the system to be able to select Type 1 PV diverter. If no evidence is available assessors may not select PV diverter hot water system and must model an electric storage hot water system.
  - Type 2: Modulated input into an existing storage tank – add-on product. This type of system has a retrofitted external control added to an existing standard electric storage hot water system. The controller monitors the house load and local PV generation and diverts any excess local PV generation to the water heater where possible. The assessor must provide evidence of the add-on product being used in order to select Type 2 PV diverter. If no evidence is available assessors may not select PV diverter hot water system and must model an electric storage hot water system.
  - Type 3: Bespoke PV Diverter - dedicated product. This is a specially designed PV solar diverter hot water system. The controller is able to monitor the house load and local PV generation and diverts excess solar energy to the water heater. The assessor must provide evidence of the system being used (e.g. product sheet from the manufacturer) in order to select Type 3 PV diverter. If no evidence is available assessors may not select PV diverter hot water system and must model an electric storage hot water system.
  - Users may not use a solar PV diverter hot water system if no solar PV is specified in the design documentation.

- 12.7 If no hot water system is specified, the assessor must select one of the following defaults:
- 4 star gas storage system where reticulated gas is available at the dwelling (i.e. at least 1 gas appliance has been specified in the dwelling) or
  - electric storage hot water system – off peak, where reticulated gas is not available at the dwelling (i.e. no gas appliances have been specified for the dwelling).
- 12.8 Where a centralised hot water system is specified you must obtain the specifications of the hot water system.
- 12.9 For the purposes of this technical note, the small scale technology certificates (STC) values are based on a 10-year deeming period. Assessors should not apply the number of STCs from the Clean Energy Regulator online calculator as the deeming period will be accounted for and will be less than 10 years. This may result in modelling incorrect systems.
- The link to the register of solar water heaters can be found here:  
<https://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Agents-and-installers/Small-scale-systems-eligible-for-certificates/Register-of-solar-water-heaters>
- 12.10 Reassessment of Whole of Home performance rating is required after the initial assessment for any of the following changes:
- solar thermal boost fuel (for example gas to electric)
  - hot water technology (for example solar thermal to heat pump, or PV diverter to standard electric storage)
  - if small scale technology certificates (STCs) of selected hot water system has decreased OR
  - if STCs of selected hot water system in water heater zone 3 has increased such that the nominal size listed in Table 9 changes.

Table 9 – Nominal size of solar water heaters

Nominal size	Nominal STC range in water heater zone 3		
	Solar thermal gas	Solar thermal electric	Heat pump
Small	<22	<25	<25
Medium	22-31	25-34	25 or greater
Large	>31	>34	n/a

## Lighting

- 12.11 Assessors must enter the lighting power density ( $W/m^2$ ) in the design documentation. If unknown, apply the default value of  $5W/m^2$ .

## Pools and spas

**[NOTE: Pool and Spa module is under review as at 1 September 2022. Spa clauses are currently incomplete and will be updated in due course]**

### 12.12 Pools

A pool is a water-retaining structure designed for human use, holds more than 680 litres of water and incorporates, or is connected to, equipment capable of filtering and/or heating the water. It includes any waterslide, wave pool, hydrotherapy pool or other similar structures. Assessors must enter:

- a. volume – if this is unknown, enter the surface area
- b. pump type – if this is unknown, enter single speed
- c. star rating (2019 GEMS determination) – if this is unknown, use the defaults in Table 10 and
- d. cleaning system – if this is unknown, enter the pressure cleaner with booster pump option.

**Table 10 – Default pump star ratings**

Pump type	Default star rating
Single speed	2
Dual speed	5
Multi-speed or variable speed	8

### 12.13 Spas

Methods for evaluating spa energy consumption are under development for NatHERS. If a spa is present in the design documentation, a Whole of Home assessment may still be completed, but it should be noted that the spa has not been included as part of the Whole of Home assessment in the 'additional notes' field of the NatHERS Certificate. This will be updated when the spa module is complete.

## On site renewable energy

12.14 Only solar photovoltaic (PV) systems are included in Whole of Home calculations. Assessors must enter size, inclination, direction and inverter capacity of arrays as provided in the design documentation. Where values are unknown, apply the defaults provided in Table 11 and note in the 'additional notes' field of the NatHERS Certificate.

**Table 11 – Solar array defaults**

Specification	Default
Size (kW)	This must be known, else the solar system cannot be included
Inclination (slope)	Same as documented roof pitch where array will be installed
Direction	Same as documented roof direction where the array will be installed
Inverter capacity	Total system size (kW) x 0.75

- 12.15 Where PV arrays are located on multiple orientations and inclinations, each array must be input separately.
- 12.16 NatHERS currently cannot specify centralised PV systems for Class 2 buildings or Class 4 parts of a building.

### On site energy storage

- 12.17 Assessors must enter the battery technology type and size provided in the design documentation. Where battery technology type and size are not known, the energy storage cannot be included.
- 12.18 NatHERS allows the use of lithium-ion, lead acid and zinc bromine battery types. Other battery types are currently not included in NatHERS software and therefore cannot be included in the assessment.

### Plug loads and cooking loads

- 12.19 Assessors must enter the energy source(s) of cooking appliances.
- 12.20 If energy source(s) for cooking appliances are not specified then an oven and cooktop must be modelled (and noted in the 'additional notes' field of the NatHERS Certificate) using the following defaults:
- a. ovens must be modelled as electric
  - b. cooktops must be modelled as:
    - gas, where reticulated gas is available at the dwelling (i.e. at least 1 gas appliance has been specified in the dwelling) or
    - electric, where reticulated gas is not available at the dwelling (i.e. no gas appliances have been specified for the dwelling).

## 13 Finishing the assessment

### Stamping requirements

- 13.1 Before stamping the design documentation with the NatHERS QR code stamp (also referred to as a mini-certificate) and producing a final NatHERS Certificate, the assessor must:
- a. confirm all requirements detailed in this Technical Note have been met
  - b. confirm the information in the assessment aligns with the design documentation and
  - c. ensure all defaults are noted in the 'additional notes' section of the NatHERS Certificate.
- 13.2 The NatHERS QR code stamp must be added electronically to all design documentation that is relevant to the NatHERS assessment. As a minimum this includes but is not limited to:
- a. site and floor plans
  - b. elevations and sections

- c. materials documentation
- d. window, skylight and door schedules
- e. shadow drawings
- f. electrical plans including lighting and mechanical ventilation
- g. insulation information (e.g. contained within construction drawings) where provided
- h. appliance schedule and
- i. any design amendments.

The stamp should not obscure any information on the design documentation or the mark of any other practitioner.

- 13.3 Accredited Assessors must include their AAO stamp if applicable (generally below the NatHERS stamp). This stamp must be smaller than the NatHERS stamp.
- 13.4 For Class 2 dwellings, the NatHERS Class 2 summary QR code stamp is to be stamped on each page of the documentation that is relevant to the NatHERS assessment (see 13.2 above).

#### Final Documentation – NatHERS Certificate

- 13.5 The assessor must supply the client with the NatHERS Certificate and the stamped design documentation as outlined in 13.2.
- 13.6 For Class 2 dwellings, each unit must have an individual NatHERS Certificate and the entire building must have a summary NatHERS Certificate with an average NatHERS thermal performance rating.
  - 13.6.1 Where a Whole of Home assessment has been conducted for the dwelling, the summary NatHERS Certificate will show the lowest individual Whole of Home rating for a dwelling in the entire building. If all dwellings in the building are not assessed under Whole of Home, the summary certificate will not show a Whole of Home rating.
  - 13.6.2 Where a number of Class 2 multi-unit buildings are located in close physical proximity as part of the same development, or where the strata plan identifies separate lots, a Class 2 summary certificate must be completed for each building/lot separately.
  - 13.6.3 At the request of a client, a single Class 2 summary certificate can be produced for buildings that are combined and share a lot (for example, by a bridge, shared underground space or an enclosed walkway) where NCC requirements for combined buildings are met.

## 14 Definitions

Term / acronym	Definition
BASIX	An integrated part of the NSW planning system, Building Sustainability Index (BASIX) is implemented under the <i>Environmental Planning and Assessment Act 1979</i> . BASIX applies to all residential dwelling types and is part of the Development Application process in NSW.
Chenath	The calculation engine developed by CSIRO that predicts annual totals of hourly heating and cooling energy requirements for residential buildings. It underpins the user interface software tools including AccuRate, HERO, FirstRate5 and BERS.
Dark colour	Solar absorptance = 0.85
Design documentation	Everything that supports the NatHERS rating and certificate, e.g. plans, lighting schedule, window schedule, emails clarifying specifications, etc.
Energy value	The net cost to society including, but not limited to, costs to the building user, the environment and energy networks (as defined in the ABCB Housing Provisions Standard).
HSPF	Heating seasonal performance factor
Light colour	Solar absorptance = 0.3
Medium colour	Solar absorptance = 0.5
Main appliance	The main heating or cooling equipment is that which serves at least 70% of the conditioned zone. If no single heating and cooling equipment serves at least 70%, the equipment that results in the highest energy value.
Solar absorptance	This is the fraction of solar radiation being absorbed by a surface. Solar absorptance = 1 – solar reflectance.
Solar reflectance	This is the fraction of solar radiation being reflected from a surface. Solar reflectance = 1 – solar absorptance.
TCSPF	Total cooling seasonal performance factor

## Appendix 1: Zoning in NatHERS

Situations may arise in unconventional home designs where more than one zone option is possible. In the absence of definitive advice from an AAO or the NatHERS Administrator, the Assessor may need to use discretion, considering for example the **intent** of the zone, including consulting with their relevant certifier. In such circumstances the Assessor must document their decisions for later auditing and quality assurance.

Spaces/ areas	Zones										
	Classes 1, 2 and 4									Class 2 or 4 only	
	Kitchen / living <sub>1</sub>	Living <sub>2</sub>	Daytime	Bedroom	Night time	Unconditioned <sub>3</sub>	Refer to the parent zone <sub>4</sub>	Garage - unconditioned	Garage - conditioned	Glazed common area	Shared basement carpark
<i>Ventilated: has a door and or an openable window on an external wall</i>											
<i>Unventilated: has neither an openable window nor door on an external wall</i>											
Airlock <sup>5</sup>			•			•					
Bathroom <sup>6</sup> , unventilated – see also ensuite							•				
Bathroom <sup>6</sup> , ventilated – see also ensuite						•					
Bathroom with in-floor heating ventilated or unventilated					•						
Bedroom				•							
Cellar, conditioned			•								
Cellar, unconditioned						•					
Corridor within dwelling, fully enclosed by doors or open to other zones			•								
Corridor, public, unconditioned, glazed										•	
Dining room <sup>2</sup>		•	•								
Ensuite, ventilated or unventilated – see also bathroom					• <sup>7</sup>	• <sup>8</sup>	• <sup>9</sup>				
Family room <sup>2</sup>		•	•								
Garage, conditioned									•		
Garage, unconditioned									•		
Gym			•								
Hallway, fully enclosed by doors or open to other zones			•								
Kitchen (main) with or without meals/lounge/living/dining	•										
Kitchen (second) /kitchenette		•									
Laundry, unventilated							•				
Laundry, ventilated						•					
Lift			•								
Living <sup>2</sup>		•	•								
Lounge <sup>2</sup>		•	•								
Media <sup>2</sup>		•	•								
Outdoor living area, capable of being fully enclosed conditioned			•								
Pantry, not walk-in							•				
Pantry, walk-in			•								
Parents' retreat					•						
Pool room			•								
Powder room, unventilated							•				
Powder room, ventilated						•					
Rumpus <sup>2</sup>		•	•								
Sauna			•								
Shared basement carpark enclosed											•
Storage							•				
Storage under staircase							•				
Study with either built-in wardrobe, WIR or ensuite				•							
Study without either built-in wardrobe, WIR or ensuite			•								
Theatre <sup>2</sup>		•	•								
Voids e.g. wall, plumbing, service ducts							•				
Walk-in-robe (WIR)					•						
WC, unventilated							•				
WC, ventilated						•					

- All dwellings must contain only one main kitchen/living zone. All additional smaller kitchens/kitchenettes within the dwelling must be zoned as "living".
- If there are more than two living areas (excluding kitchen/living), then:
  - the two largest living areas are zoned as "living" and
  - the other areas are zoned as "daytime".
- Every dwelling must have at least one unconditioned zone. If no rooms fit the definition of "unconditioned", then choose the smallest zone and model this as "unconditioned".
- The parent zone is the larger zone that the smaller space is accessed from. If the parent zone is a kitchen/living zone, then default to "daytime".

- An airlock must have:
  - an external door and or openable window on an external wall and
  - one or more internal doors, of which, only one opens to a conditioned zone if it does not meet these two criteria it must be zoned as "daytime".
- All dwellings must have at least one main bathroom and one main WC that are available for general household use (these may be combined or separate rooms).
- A secondary bathroom and/or WC (either ventilated or unventilated) that is exclusively associated with a bedroom, i.e. single entry.
- A secondary bathroom and/or WC with a two-way entry and ventilated.
- A secondary bathroom and/or WC with a two-way entry and not ventilated.

