

These modelling guidance notes describe step by step instructions on how to model the NatHERS Example 1 using **AccuRate** software (Chenath v3.22). If this example is modelled in Chenath v3.21, the results may differ slightly. These instructions should not replace appropriate software training, and are to be read in conjunction with the supporting documentation referenced, such as the AccuRate User Manual produced by CSIRO, the NatHERS Technical Note and the NatHERS Handbook.

1. Prepare data

- 1.1 Before you start, it is critical to ensure you have all the information you need. This includes extracting and/or translating necessary data from the drawing set. Refer to 'Before you start your rating: Gathering dwelling information' in the AccuRate User Manual.
- 1.2 Create a spreadsheet to calculate and record critical data. This should include the volume of all zones based on the area and average height of each zone. The following table can be used as a guide to ensure all zones are covered, but you should take the time to calculate and confirm (this is an essential step in the data extraction and entry process).

NO.	ROOM NAME	AREA (M ²)	VOLUME (M ³)	FLOOR HEIGHT (MM)	MAX. CEILING HEIGHT (MM)
1	WIR 5	2.72	6.80	250	2500
2	Bed 5 Ensuite	3.91	9.78	250	2500
3	Bed 5	11.97	29.93	250	2500
4	Living	20.46	51.15	250	2500
5	Sub-floor	126.96	114.26	2150	900
6	Garage	32.07	101.01	2350	3150
7	Lounge	29.66	72.65	2750	2450
8	Entry	7.54	19.46	2750	2450
9	Bed 1	14.08	34.49	2750	2450
10	Bed 1 Ensuite	4.42	9.70	2750	2450
11	Bed 2	3.96	28.25	2750	2450
12	Bed 3	11.53	29.37	2750	2450
13	Bathroom	11.99	13.22	2750	2450
14	Bed 4	5.40	29.32	2750	2450
15	Laundry	11.97	16.18	2750	2450
16	Kitchen/Meals	6.60	114.18	2750	4340
17	Bed 1 WIR	11.36	10.83	2750	2450
18	Hall	1.65	27.82	2750	2450
19	WC	40.37	4.04	2750	2450
20	Roof space	267.64	194.32	5200	2423



- 1.3 Remember, all horizontal offsets are relative to the right-hand end of the wall when standing on the inside looking out, and vertical offsets are relative to the top of the wall.

2. Enter project details

- 2.1 On the **Project tab**, enter the project details. This information is available on the accompanying drawing set. It is vital to click 'Apply' after entering any data.
- 2.2 Enter the Project Name. This is a free text field. Refer to 'Getting started: Entering project details' in the AccuRate User Manual.
- 2.3 Enter the Project Code (optional). This is also a free text field.
- 2.4 Select the appropriate Building Class as per the NCC; Class 1a.
- 2.5 Select the appropriate Dwelling Type; 'New home'.
- 2.6 Set the correct Exposure; 'Suburban'.
- 2.7 Enter the Council (local government) area; 'Hobart City Council'. This is a free text field.
- 2.8 Complete the Assessor Details tab and ensure you have correctly selected the applicable 'Declaration of Interest'.
- 2.9 Enter the Client Details as per the drawing set.
- 2.10 Enter the Project Document information, including the version number, plan reference and/or date and who prepared the documentation.
- 2.11 Any specific project information can be reported under the Additional Information section. For instance, if any provisional or default values were used. This information is shown on the NatHERS certificate.

3. Enter construction details

- 3.1 On the **Constructions tab**; load, modify or create all external wall constructions. Refer to Tasks 1-2 in the AccuRate User Manual.
- 3.2 Load the Default Window library and add all applicable window groups. Refer to Task 3 in the AccuRate User Manual.
- 3.3 Load, modify or create all external door constructions. Refer to Task 6 in the AccuRate User Manual.
- 3.4 Load, modify or create all floor and ceiling constructions. Refer to Task 7 in the AccuRate User Manual. It is important to allow for all floor coverings, so multiple floor constructions are required for each floor finish.



- 3.5 Load, modify or create all internal wall constructions. Refer to Task 8 in the AccuRate User Manual.
- 3.6 Load, modify or create all roof constructions. Refer to Task 9 in the AccuRate User Manual.
- 3.7 Load the Default Roof Window library and add all applicable roof windows. Refer to Task 10 in the AccuRate User Manual.

4. Create zones

- 4.1 On the **Zoning tab**; create and name all zones, then assign the appropriate zone type. Refer to Tasks 13-14 in the AccuRate User Manual, the NatHERS Technical Note, and NatHERS Handbook for further guidance. The following table can be used as a guide to ensure all zones are covered and the correct zone type assigned.

ROOM NAME	ZONE TYPE
WIR 5	Night-time
BED 5 ENSUITE	Night-time
BED 5	Bedroom
LIVING	Living
GARAGE	Garage
LOUNGE	Living
ENTRY	Daytime
BED 1	Bedroom
BED 1 ENSUITE	Night-time
BED 2	Bedroom
BED 3	Bedroom
BATHROOM	Unconditioned
BED 4	Bedroom
LAUNDRY	Unconditioned
KITCHEN/MEALS	Kitchen/Living
BED 1 WIR	Bedroom
HALL	Daytime
WC	Daytime
SUB-FLOOR	Sub-floor*
ROOF SPACE	Roof space*

*These zone types are unique to AccuRate and must be manually entered and defined.

- 4.2 Based on the prepared date from step 1, enter zone Volume, Floor Height and Maximum (max.) Ceiling Height Above Floor. Refer to Tasks 15-16 in the AccuRate User Manual.



4.3 Enter the details of all ceiling penetrations, e.g. recessed downlights, rangehood and exhaust fans. Refer to Task 17 in the AccuRate User Manual and the NatHERS Technical Note for appropriate clearances. This step is important to compensate for the loss of ceiling insulation and ventilation as a result of ceiling penetrations. The following table can be used as a guide when modelling this example, to ensure all ceiling penetrations are modelled.

NO.	TYPE	SIZE/DIAMETER (MM)	CLEARANCE (MM)
43	Recessed downlight (sealed)	90	50
1	Heat lamp and sealed exhaust fan	376 x 280 (as per manufacturer details)	35 (as per manufacturer details)
3	Ceiling exhaust fan (sealed)	250	50
1	Rangehood exhaust fan (sealed)	160	50

4.4 For the Sub-floor zone, enter the infiltration settings: 'Enclosed' and ensure the wall cavity airflow is set to 'Yes' because the specific external wall construction air gap is 'Ventilated'.

4.5 For the Roof Space zone, enter the infiltration settings; 'Sarked', 'Discontinuous' and 'Ventilated'. Note for this example, the 'Reflective' checkbox should be ticked.

5. Define shading

5.1 On the **Shading tab**; create all horizontal shading schemes i.e. eave overhangs. The shading scheme should represent the entire length of the element, not each external wall length. The vertical offset can be entered when the shading scheme is created, whereas the horizontal offset can be entered when the shading scheme is applied to an external wall. Refer to Task 18 in the AccuRate User Manual.

5.2 Create all vertical shading schemes i.e. dwelling, porch, fences, trees and neighbours (as documented and following the NatHERS Technical Note). Refer to Task 19 in the AccuRate User Manual.

5.3 Shading schemes are assigned to external walls in the **Elements tab** but are easier to predefine before entering the external wall element data.

6. Enter elements

6.1 On the **Elements tab**; enter all external wall data. Refer to Task 20 in the AccuRate User Manual.

7.1 Enter all windows and external doors to the external wall element. Refer to Task 21 in the AccuRate User Manual. For this example, the following table can be used as a guide to select the type and set



the openability. Note: You may need to override the suggested openability. Windows have been split for the different window types and window groups (refer to the NatHERS Technical Note for further information on openability).

WINDOW TYPE	ACCURATE TYPE	OPENABILITY
AWNING	Awning	90%
FIXED	Other	0%
SLIDING	Sliding	45%

- 6.2 Add and assign horizontal shading schemes to external walls. Refer to Task 23 in the AccuRate User Manual (this step precedes the next step because selecting a 'Fixed Shade' is before defining wing walls).
- 6.3 Add any wing wall shading to the external walls and check the 'Wall is part of courtyard' for the Portico. Wing walls should be included for all perpendicular retaining walls. Refer to Task 22 in the AccuRate User Manual.
- 6.4 Assign the vertical shading schemes under the 'External Screens in Wall/s' tab. Refer to Task 24 in the AccuRate User Manual. In this example, vertical shading schemes should be assigned for the dwelling, porch, fences and neighbours.
- 6.5 Before proceeding, include any horizontally split external walls, e.g., the south-facing Bed 5 WIR. Refer to Task 25 (Advanced) in the AccuRate User Manual.
- 6.6 Enter all internal walls paying close attention to the difference in the floor to ceiling height across the levels. Refer to Task 26 in the AccuRate User Manual.
- 6.7 Enter the floor data. The floor area should exclude any internal wall area below. Refer to Task 27 in the AccuRate User Manual. Note: an eave lining may be a floor to a roof zone when the space over the eave is effectively part of the attic space. Model the roof space soffit to outdoor air below (the area should be 51.4m²). Do not forget to include slab edge insulation to the lower ground floor (enter R2.7 into the Edge Insulation field).
- 6.8 Enter the ceiling data. The ceiling area should exclude any internal wall area above. Refer to Task 28 in the AccuRate User Manual.
- 6.9 Enter the roof data and make sure you allow for the ceiling area increase to the raked roof section in the Kitchen/Meals room. Refer to Task 29 in the AccuRate User Manual.



- 6.10 Enter the skylights to the Bed 1 Ensuite, Bathroom and WC, including the correct shaft length. Refer to Task 30 in the AccuRate User Manual.
- 6.11 Enter the roof window to the Kitchen/Meals room. Refer to Task 31 in the AccuRate User Manual.
- 6.12 Add internal walls to subfloors, e.g. the Garage. Refer to Task 34 in the AccuRate User Manual.
- 6.13 Add internal walls to roof spaces, e.g. the Family room. Refer to Task 34 in the AccuRate User Manual.

7. Calculate North

- 7.1 On the **Ventilation tab**, enter the North point (zero is due North); the value for this example should be 90°.
- 7.2 Check the integrity of the data with the 'Check' button. Refer to Task 37 in the AccuRate User Manual.
- 7.3 Run the simulation and view the report. Refer to Task 39 in the AccuRate User Manual.

8. Analyse the energy loads

- 8.1 Analyse the energy load profile data and optimise the project if required. Refer to Task 40 in the AccuRate User Manual.
- 8.2 This example project will achieve 6.3 Stars.
- 8.3 To improve the energy star rating, see suggested improvements on the following page.



Improving your star rating

There are many ways an assessor can explore in order to improve a star rating. The following suggested improvements represent just one solution to improving the thermal performance of this example in Hobart (Climate Zone 26), with considerations to both affordability and ease of construction.

1. Change the roof colour from Bristle 'Sunset' (SA = 0.678) to 'Grey' (SA = 0.935).
2. Change the window colour from painted Colorbond 'Shale Grey' (SA = 0.43) to 'Monument' (SA 0.73).
3. Add R2.35 rigid insulation to external wall type WT27 (retaining wall).
4. Add R2.35 rigid insulation to internal wall type WT16 (to sub-floor).
5. Increase R2.1 glass fibre batt to R2.7 for the floor construction above the sub-floor.
6. Increase R2.0 glass fibre batt to R2.7 for external wall types WT2, WT15, WT17 and WT28.
7. Increase R2.0 glass fibre batt to R2.7 for internal wall type WT9 (to Garage).
8. Increase R5.0 glass fibre batt to R6.0 to the upper level flat ceiling and allow for 600mm R2.7 glass fibre batt perimeter ceiling insulation (with a 50mm overlap as per the Australian Standard requirement).
9. Improve the glazing specifications from default to custom window with double glazed 4-8-4ET (WERS glass description) for a lower U-value (reduce heat loss) and similar SHGCw (maintain positive solar heat gain). For example, Stegbar 'Siteline' series;
STG-053-35 W (Awning) $U_w = 2.5$ and $SHGC_w = 0.48$.
STG-055-35 W (Fixed) $U_w = 2.3$ and $SHGC_w = 0.61$.

Your improved rating for this example will now achieve 7 stars.

