

These modelling guidance notes describe step by step instructions on how to model the NatHERS Example 2 using **BERS Pro** 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 BERS Pro Help Notes, the NatHERS Technical Note and the NatHERS Handbook.

## 1. Enter project information

Refer to 'Project Details' in the BERS Pro Help Notes.

- 1.1 Open the **Project Details** dialog and enter the Assessor Details.
- 1.2 Enter the Project Name. This is a custom user-definable field and will also be the filename.
- 1.3 Select the applicable 'Declaration of Interest' from the dropdown.
- 1.4 Enter the Client Details.
- 1.5 Enter the Dwelling Details and select the appropriate 'NCC Class'; 1a.
- 1.6 Enter the Plan Documents information.
- 1.7 Any specific project information can be reported in the 'Comments' box.
- 1.8 Open the **Location** dialog and set the project location by selecting 'Location from Post Code' and entering the dwelling post code. For this example, it will be 7000. Select the correct location from the results, and ensure the most appropriate climate file is selected. Refer to 'Location From Postcode' in the BERS Pro Help notes.
- 1.9 Set the appropriate 'Wind Shielding' exposure type; 'Suburban'. Refer to the NatHERS Handbook and 'Location' in the BERS Pro Help Notes for more information on defining exposure types.
- 1.10 Based on the drawing set information, enter the 'Height Above Ground' and 'Maximum Ceiling Height', both in meters.
- 1.11 In the required text box, enter the **north point azimuth** according to the drawing set information. Zero is due north.

## 2. Enter default building element properties

Refer to 'Defaults' in the BERS Pro Help Notes.

- 2.1 Open the **Defaults for Level 1** dialog and set the default properties for each building element for the lowest level on the plans. To save time, ensure the defaults reflect the most common construction detailed on the drawings.



- 2.2 Open the **External Wall Default** dialog and modify the default properties. Refer to 'External Wall' in the BERS Pro Help Notes.
- 2.3 Open the **Internal Wall Default** dialog and modify the default properties. Refer to 'Internal Wall' in the BERS Pro Help Notes.
- 2.4 Open the **Default External Floor** dialog and modify the default properties. Refer to 'External Floor' in the BERS Pro Help Notes.
- 2.5 Open the **Default Internal Ceiling** dialog and modify the default properties. Refer to 'Ceiling Between Levels' in the BERS Pro Help Notes.
- 2.6 Open the **Default Door** dialog and modify the default properties. Refer to 'Door' in the BERS Pro Help Notes.
- 2.7 Open the **Default Window** dialog and modify the default properties. Refer to 'Window' in the BERS Pro Help Notes.

### 3. Import and scale drawings

Refer to 'Importing a Plan' in the BERS Pro Help Notes.

- 3.1 Open the **Background Picture** dialog and import the appropriate floor plan for level 1 from the drawings.
- 3.2 The imported image will be at a scale of 1:1. Set the correct scale.

### 4. Create level 2 properties

- 4.1 Select 'Add level above current level.'
- 4.2 Enter the default building element properties for Level 2. Refer to Step 2, with attention to the following additional points.
  - Open the **Default Internal Floor Covering** dialog and modify the default properties. Refer to 'Internal Floor Covering' in the BERS Pro Help Notes.
  - Open the **Default Ceiling** dialog and modify the default properties. Refer to 'Ceiling to Roof' in the BERS Pro Help Notes.
  - Open the **Default Roof** dialog and modify the default properties. Refer to 'Roof' in the BERS Pro Help Notes.
  - Open the **Default Skylight** dialog and modify the default properties. Refer to 'Skylights and Clerestory Windows' in the BERS Pro Help Notes.



4.3 Import the background for Level 2. Refer to Step 3 above for guidance, and 'Importing a Plan' in the BERS Pro Help Notes.

## 5. Create zones

Refer to 'Create a New Zone' in the BERS Pro Help Notes.

5.1 Select Level 1 and open the **New Zone 1** dialog.

5.2 Enter the zone 'name' and select the appropriate 'type'. Refer to 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. Note: The sub-floor and roof space/attic is automatically created in BERS Pro.

ROOM NAME	ZONE TYPE
<b>GARAGE</b>	Garage
<b>ENTRY</b>	Daytime
<b>HALL</b>	Daytime
<b>KITCHEN</b>	Kitchen/Living
<b>MEALS/FAMILY</b>	Daytime*
<b>LIVING</b>	Living
<b>LOUNGE</b>	Living
<b>BATHROOM</b>	Unconditioned
<b>WC</b>	Daytime
<b>LAUNDRY</b>	Unconditioned
<b>BED 1</b>	Bedroom
<b>BED 1 ENSUITE</b>	Night-time
<b>BED 1 WIR</b>	Night-time
<b>BED 2</b>	Bedroom
<b>BED 3</b>	Bedroom
<b>BED 4</b>	Bedroom
<b>BED 5</b>	Bedroom
<b>BED 5 ENSUITE</b>	Night-time
<b>BED 5 WIR</b>	Night-time

\* Set Kitchen as parent zone when adding internal opening to this zone in Step 9.4. Note: The Kitchen and meals/family are not modelled as one zone because of different ceiling constructions.

5.3 Draw the zone, taking care to follow the centreline of any internal walls but inside of external walls.

5.4 Create the remaining zones by repeating the previous steps 5.2-5.3.



## 6. Model zone details

Refer to 'Zone Elements' in the BERS Pro Help Notes.

### 6.1 Open the 'Details for Zone 1' dialog.

#### 6.1.1 Open the 'Air Flow and Ceiling Penetrations' dialog and modify the properties if required.

Refer to 'Air Flow' in the BERS Pro Help Notes, and use the table below as a guide. This step is important to compensate for the loss of ceiling insulation and ventilation as a result of ceiling penetrations.

NO.	TYPE	CLEARANCE* (MM)
43	Recessed downlight (sealed)	90mm + 50 + 50 = <b>190</b>
1	Heat lamp and sealed exhaust fan	325mm + 50 + 50 = <b>425</b>
3	Ceiling exhaust fan (sealed)	250mm + 50 + 50 = <b>350</b>
1	Rangehood exhaust fan (sealed)	160mm + 50 + 50 = <b>260</b>

\*Note: In BERS Pro, the clearance 'clear' field is to include the unit size as well as size clearances.

#### 6.1.2 Open the 'External Floor' dialog and modify the properties if required. Be sure to select any zones sharing the same floor space e.g. all zones on Level 1 and all zones except the Garage on Level 2.

#### 6.1.3 Open the 'Internal Floor Cover' dialog and modify the properties if required.

#### 6.1.4 Open the 'Ceiling' dialog and modify the properties if required. Be sure to select any zones sharing the same roof space e.g. all zones except Meals/Family (raked) on Level 2.

#### 6.1.5 Open the 'Roof' dialog and modify the properties to suit the project specifications.

### 6.2 Repeat the steps in 6.1 to modify the properties of the remaining zones.

## 7. Draw eaves

Refer to 'Eaves Plan' in the BERS Pro Help Notes.

### 7.1 Select Level 1 and click on 'Draw Eaves'.

### 7.2 Draw a polygon representing the extent of any/all horizontal shading on this level.

### 7.3 Repeat this step for Level 2.



## 8. Modify wall properties

- 8.1 Open the 'Details for External Wall' dialog by right clicking on an external wall and modify the properties to match the drawing documentation.
- 8.2 To split the wall horizontally because of different construction properties, click 'Specify' to open the 'Upper External Wall' and modify the properties.
- 8.3 Modify internal wall properties using the same method.

## 9. Add windows

Refer to 'Window' in the BERS Pro Help Notes.

- 9.1 Select 'Insert Window' from the toolbar.
- 9.2 Place the node on the external wall at the midpoint of the window.
- 9.3 Modify the properties of each window as required. The following table can be used as a guide to select the type and set the openability as per the NatHERS Technical Note. 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	OPENABILITY
AWNING	90%
FIXED	0%
SLIDING	45%

- 9.4 Select 'Insert Door' from the toolbar.
- 9.5 Place the node on the external or internal wall at the midpoint of the door. Modify the properties as required. Note: A permanent opening is to be modelled where there is an opening between zones that has no door, or where two zone boundaries meet but there is no physical wall. For example, the kitchen and meals/family zones in this design.
- 9.6 Select 'Insert Skylight' from the toolbar.
- 9.7 Click on the appropriate zone, and modify the properties as required. Note there are skylights in Ensuite 1, Bathroom and WC. The skylight shaft length, reflectance and insulation should be entered in the Skylight dialogue box.
- 9.8 Select 'Insert stairwell' from the toolbar.



9.9 Click the appropriate zone, and modify the properties as required. Refer to 'Stair Well' in the BERS Pro Help Notes for more guidance.

## 10. Define overshadowing

Refer to 'Overshadowing by Obstacles' in the BERS Pro Help Notes and the NatHERS Technical Note.

10.1 Open the 'Sun Obstructions' dialog, and enter details of up to three overshadowing elements for each of the four orientation. Shading elements such as dwelling, porch, fences, trees, neighbours (as documented and following the NatHERS Technical Note).

## 11. Analyse the energy loads

Refer to 'Detailed Description of Building Elements', 'Simulate' in the BERS Pro Help Notes.

11.1 Check the integrity of the data by viewing each of the tabs in the 'Building Details' dialog.

11.2 Run the simulation and view the results.

Use the displayed analysis window to analyse the energy load profile data. You can also view heating and cooling loads of each zone by selecting the Zones button in the analysis window. Refer to 'Analysis' in the BERS Pro Help Notes.

11.3 This example project will achieve 6.2 Stars.

11.4 To improve the energy star rating, see suggested improvements in the following section.



## 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 roof sarking type to non-reflective.
3. Add R1.8 rigid insulation to external wall type WT27 (retaining wall).
4. Add R1.8 rigid insulation to internal wall type WT16 (to sub-floor).
5. Add a nominal air gap above the insulation to the floor construction above the sub-floor.
6. Increase R2.0 glass fibre batt to R2.5 for external wall types WT2, WT15, WT17 and WT28.
7. Increase R2.0 glass fibre batt to R2.5 for internal wall type WT9 (to Garage).

Your improved rating for this example will now achieve 7.0 stars.

