These modelling guidance notes describe step by step instructions on how to model NatHERS Example 4 using **HERO** 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 online HERO Knowledge Base, the NatHERS Technical Note and the NatHERS Handbook.

1.   Set up the construction template

1.1   Under the **Walls tab**, set the project default external and internal wall details, including the height, construction, insulation, and colour (solar absorptance).

1.2   Under the **Floors tab**, set the project default floor details, including construction, insulation, and covering.

1.3   Under the **Ceilings tab**, set the project default ceiling details, including construction, insulation, and colour (solar absorptance).

1.4   Under the **Windows tab**, set the project default window specification, including individual styles, heights, frame colour (solar absorptance) and shading.

1.5   Under the **Doors tab**, set the project default external and internal door details, including construction, height, openability, colour (solar absorptance), along with the permanent opening height.

1.6   Under the **Levels and Shading tab**, enter the Lowest Level Height above Ground, finished floor level (FFL) to FFL height along with the default screen and eave height.

1.7   Under the **Zone Items tab**, enter the default values for ceiling fans and ceiling penetrations under the Zone Items tab.

1.8   Select the 'Lock to Template Values' option to keep the template values current during modelling. Note: This step is optional, you can choose to keep it unlocked if you prefer. When selected, building elements will always use the user-defined Construction Template defaults as you start entering information in the **Visual View**.

1.9   Click 'Save the current template to file' and enter a file name when prompted. Note: This step is optional.

2.   Enter project information

2.1   On the Data Grid of the **Project tab**, enter the project details. This information is available on the accompanying drawing set. You can use the Tab key to enter and move to the following field. Refer to 'HERO Model: Project' in the online HERO Knowledge Base.

2.2   Enter the project name (or click in the check box to use the Address for the project name) and reference number.

2.3   Select the appropriate Building Class as per the NCC; Class 1a.

2.4   Enter the dwelling address under the Address section, including the postcode. HERO will automatically select the most appropriate climate zone based on the postcode. For this example, it will be NatHERS Climate Zone 5, Townsville.

2.5   Set the correct Exposure; 'Suburban'. Refer to the NatHERS Handbook and FirstRate5 manual for more information on defining exposure types.

2.6   Enter the Plan/Document information, including name, version number and who prepared the drawing documentation.

2.7   Complete the Assessor Details section, including the applicable 'Declaration of Interest'.

2.1   Any specific project information can be reported under the Certificate Notes section.

2.2   For instance, if any provisional or default values were used. This information is shown on the NatHERS certificate.

2.8   Any personal notes can be entered under the User Internal Notes section. This information is for your own reference and is not shown on the certificate.

3.   Import and scale drawings

3.1   On the lower level, import the ground floor plan of the dwelling using 'Add a Background Image' accessed on the **Visual View** left toolbar. Choose the correct page and check the scale. Refer to 'HERO Model: Background Images' in the online HERO Knowledge Base.

3.2   Add another level using Add New Level. Refer to 'HERO Model: Levels' in the online HERO Knowledge Base.

3.3   On the upper level, import the first floor plan of the dwelling using 'Add a Background Image' accessed on the **Visual View** left toolbar. Choose the correct page and check the scale.

3.4   If necessary, align the two backgrounds by double left-clicking on the background to be moved.

4.   Define wall constructions

4.1   Under the **Library tab**, there are standard wall constructions available in the Walls Assembly Library. Select any default project-specific wall assembly types.

4.2 A range of wall constructions have been specified, but any additional custom wall constructions must be created. Create or copy/clone a wall construction to suit the specified wall construction in the drawing set. Refer to 'HERO Model: Walls' in the online HERO Knowledge Base.

5. Create zones

5.1 The next step is to draw or trace the background around the inside of each room to define the zone boundary. The snap to background option can be helpful in creating the geometry. The default floor, wall and ceiling/roof construction will be used from the initial Construction Template (refer to Section 1.0). Refer to 'HERO Model: Zones' in the online HERO Knowledge Base.

5.2 Once all zones have been drawn, name all zones and check the appropriate zone type. If the Detect PDF Text option is selected in the zone drawing mode, Hero will attempt to extract the zone name. HERO will also attempt to choose the most appropriate zone type based on the zone name. Confirm all names and zone-types in the **Zone data-grid tab**. 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.

ROOM NAME	ZONE TYPE
STORAGE	Daytime
OFFICE	Daytime
LAUNDRY	Unconditioned
BED 1	Bedroom
BED 2	Bedroom
WIR	Night-time
ENSUITE	Night-time
KITCHEN	Kitchen/Living
LIVING/MEALS	Living
BATH	Unconditioned
WC	Unconditioned
BED 3	Bedroom
HALL	Daytime

5.3 In the **Data Grid** under the **Floors tab**, enter the roof space soffit area to outdoor air below (the area should be 29.3m2). Note: The attic roof space is automatically created in HERO, but check to ensure the type is: 'Roofspace – Hip Roof' in the **Zone Data Grid tab**.

6. Assign construction properties

6.1 In the **Data Grid** under the **Floors tab** assign or change the floor type to all areas/zones. Refer to 'HERO Model: Floors' in the online HERO Knowledge Base.

6.2 Add floor insulation as specified on the drawing set. And continue to assign the floor coverings.

6.3 In the **Data Grid** under the **Ceilings tab**, assign 'ATTIC-METAL-01' to all roof. Refer to 'HERO Model: Ceilings' in the online HERO Knowledge Base.

6.4 Add ceiling and roof insulation as specified on the drawing set.

6.5 Enter the roof colour (solar absorptance).

6.6 Check to ensure all typical external and internal wall heights are correct.

6.7 Assign or change the external wall types to all areas/zones. Refer to 'HERO Model: Walls' in the online HERO Knowledge Base.

6.8 Most default internal wall types will be correctly assigned; however, some are different, e.g., the internal wall between the Storage, Office and Laundry.

7. Insert doors and windows

7.1 On the **Plan tab**, add/insert all doors and enter the specified properties. Refer to 'HERO Model: Openings' in the online HERO Knowledge Base.

7.2 Insert all windows and enter the specified properties, including the window frame colour (solar absorptance). Similarly, refer to 'HERO Model: Openings' in the online HERO Knowledge Base. 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.

WINDOW TYPE	OPENABILITY
CASEMENT	90%
SLIDING	45%
LOUVRE	90%
OPAQUE LOUVRE	90%

7.2.1 The Office and Laundry door is part solid and glazed. The lower solid door section should be modelled as a door, whereas, the upper glazed door section modelled as a glazed casement window.

7.3.   Insert all permanent openings as per the documentation (i.e. openings between zones that have no door). Note: A permanent opening will also need to be modelled where zone boundaries meet but there is no physical wall in the floor plan. Refer to 'HERO Model: Openings' in the online HERO Knowledge Base.

8.   Model ceiling penetrations

8.1   Enter all ceiling penetrations, e.g., recessed downlights, rangehood and exhaust fans. Refer to 'HERO Model: Ceiling Fans & Penetrations' in the online HERO Knowledge Base and the NatHERS Technical Note for appropriate clearances. This step is important to compensate for the loss of ceiling insulation and ventilations 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)
13	Recessed downlight (sealed)	90	50
1	Heat lamp and sealed exhaust fan	376 x 280 (as per manufacturer details)	35 (as per manufacturer details)
1	Ceiling exhaust fan (sealed)	250	50
1	Rangehood exhaust fan (sealed)	160	50

8.2   Enter ceiling fans as specified in the drawing set.

9.   Define shading

9.1   In the **Visual View**, add all horizontal shading schemes (eaves) to applicable external walls. The shading scheme should represent the entire length of the element, not each external wall length. The vertical offset is to be entered when the shading scheme is created, whereas the horizontal offset is defined automatically when the shading scheme is drawn in the **Visual View**. Refer to 'HERO Model: Eaves' in the online HERO Knowledge Base.

9.1.1   The horizontal offset is relative to the right-hand end of the wall when standing on the inside looking out and vertical offset is relative to the top of the wall.

9.2   Add all vertical shading schemes (screens) to applicable external walls, i.e. dwelling handrail, fences, trees and neighbours (as documented and following the NatHERS Technical Note). Refer to 'HERO Model: Screens' in the online HERO Knowledge Base.

9.2.1   A 'Screen Base' can be entered relative to the finished floor level (FFL).

9.2.2   Add all wing wall vertical shading schemes to applicable external walls (and review any automatic wing-walls if needed). Refer to 'Hero Model: Wing-Walls' in the online HERO Knowledge Base.

10.   Calculate north

10.1   In the **Model View**, set the 'Project Orientation' in decimal degrees to change the North point (zero is due North); the value for this example should be 217º.

10.2   Check the **Alerts View** for errors and alerts due to incorrect or incomplete information. Refer to 'HERO Interface: Alerts' in the online HERO Knowledge Base.

10.3   Perform a quality assurance (QA) review on your project and check all data-entry values. The **Summary View** and the 'Visual Styles' in the **Visual View** are the key workflows to perform a QA review on a finished project. Additionally if available you could ask a colleague for a QA review to further improve modelling accuracy.

10.4   Simulate by clicking on the 'Run' button and view the outcome under the **Results View**. Refer to 'HERO Interface: Simulations' in the online HERO Knowledge Base.

11.   Analyse the energy loads

11.1   Use the **Results View** to analyse the energy loads. You can also use the 'Heating and Cooling' (by Zone) to optimise the project, and the 'Visual Styles Results' categories in the **Visual View**. Refer to 'HERO Interface: Results View' in the online HERO Knowledge Base.

11.2   This example project will achieve 6.7 stars.

11.3   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 Townsville (Climate Zone 5), with considerations to both affordability and ease of construction.

1. Change the roof colour from Colorbond 'Dune' (SA = 0.48) to 'Dover White' (SA = 0.28).
2. Specify non-IC4 rated downlights to reduce overall cost

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