

Project Documentation

Gebäude-Dokumentation



1 Abstract / Zusammenfassung



Noonameena House in Redesdale Australia

Data of building / Gebäudedaten

Year of construction/ Baujahr	2017	Space heating / Heizwärmebedarf	23 kWh/(m²a)
U-value external wall/ U-Wert Außenwand	0.155 W/(m ² K)		
U-value basement ceiling/ U-Wert Kellerdecke	0.632 W/(m ² K)	Primary Energy Renewable (PER) / Erneuerbare Primärenergie (PER)	39 kWh/(m ² a)
U-value roof/ U-Wert Dach	0.141 W/(m ² K)	Generation of renewable energy / Erzeugung erneuerb. Energie	- kWh/(m ² a)
U-value window/ U-Wert Fenster	0.92 W/(m ² K)	Non-renewable Primary Energy (PE) / Nicht erneuerbare Primärenergie (PE)	81 kWh/(m ² a)
Heat recovery/ Wärmerückgewinnung	86 %	Pressure test n ₅₀ / Drucktest n ₅₀	1.0 h ⁻¹
Special features/ Besonderheiten	The first PHI certified Low Energy Building in Australia to be made of straw bales.		

2 Project Description

Noonameena House – Low Energy Building

Noonameena is an owner-built, prefabricated strawbale panel house that is located on the banks of the Coliban River in central Victoria, Australia. It is named after the aboriginal word meaning a “resting place in the bush”.

The house is a single family home and has three bedrooms and a total living area of 179m².

The house has highly glazed facades facing west and north-west to capture the views of the nearby river. The blower door test achieved 0.28 ACHn50 during construction, but the final result was 1.0 ACHn50 so the project achieved the PHI Low Energy Building Standard.

Harley Truong from H3space was responsible for modelling the building envelope in PHPP and Flixo at the design stage. Various scenarios were then modelled to give the client and designer options on how to meet the Passivhaus standard. The consultancy services also included discussions on how to detail the house to achieve airtightness, avoid summer overheating and how to safely incorporate a fireplace.

Responsible project participants / Verantwortliche Projektbeteiligte

Architect/ Entwurfsverfasser	David Rayson, Urban Perspective		
Implementation planning/ Ausführungsplanung	David Rayson, Urban Perspective		
Building systems/ Haustechnik	Fantech Aust Pty Ltd		
Structural engineering/ Baustatik	Maurice Farrugia and Associates Pty Ltd		
Building physics/ Bauphysik	H3Space		
Passive House project planning/ Passivhaus-Projektierung	H3Space		
Construction management/ Bauleitung	Stuart Lee, Craftmen Quality Builders		
Certifying body/ Zertifizierungsstelle	Detail Green		
Certification ID/ Zertifizierungs ID	Project-ID (www.passivehouse-database.org) Projekt-ID (www.passivehouse-database .org)	5437	
Author of project documentation / Verfasser der Gebäude-Dokumentation	Harley Truong H3Space		
Date, Signature/ Datum, Unterschrift	29 June 2025		

3 Elevation Views



South elevation



North elevation



West elevation



East elevation

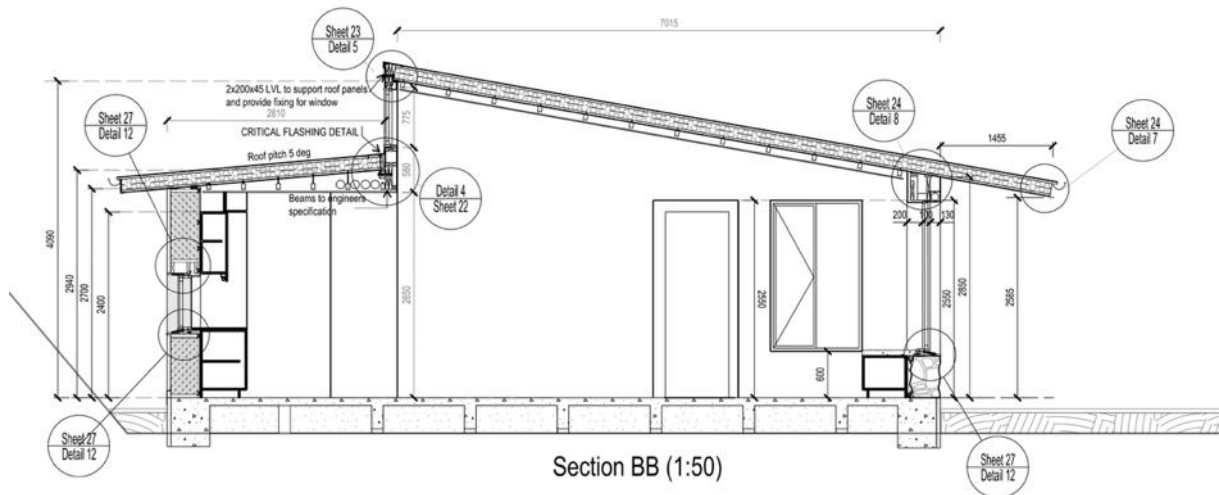
4 Internal Views



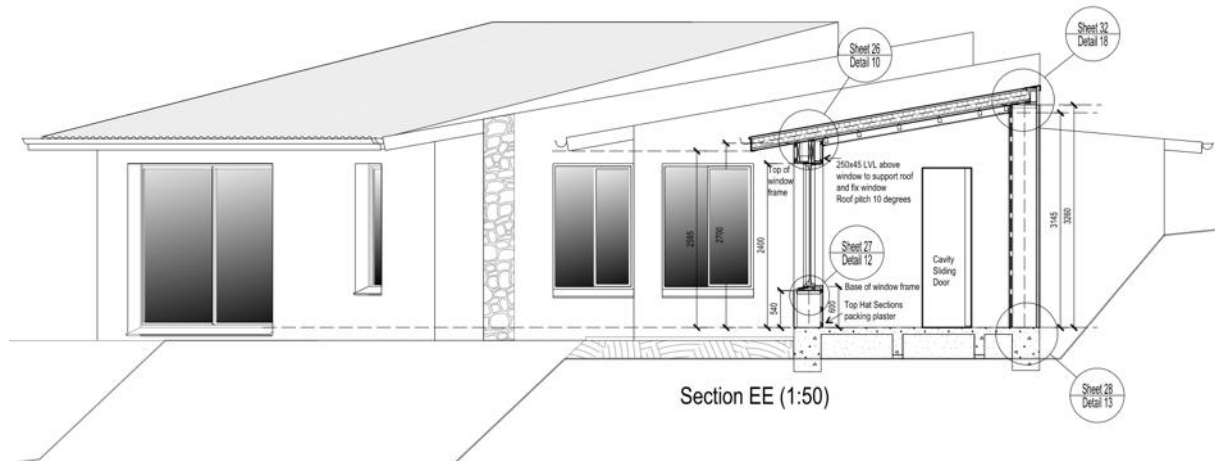
Interior

5 Section drawings

The thermal envelope consists of prefabricated Situp strawbale wall panels sitting on a concrete slab with foam insulation below. The roof is made of Ritek insulated roof panels with an average 185mm EPS foam thickness and steel sheets top and bottom.



Cross section



Cross section

7 Construction of Floor slab

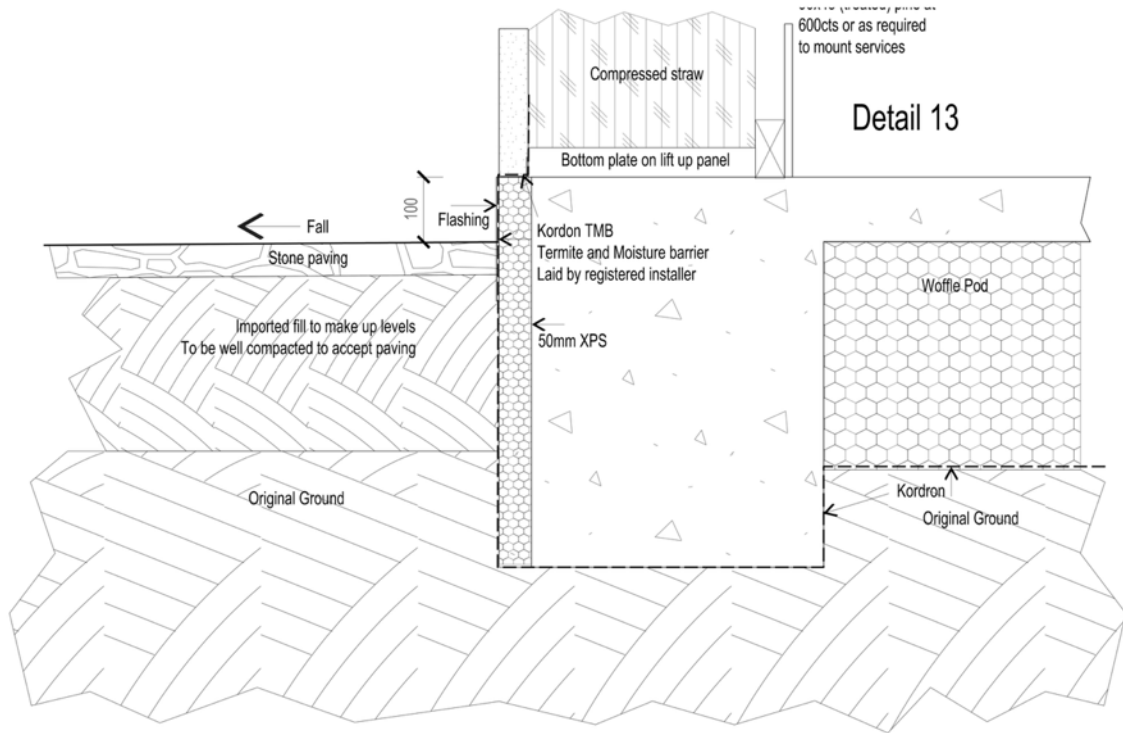
The house has a concrete slab floor that is insulated below with 50mm of EPS foam (Lambda 0.044 W/mK) and on the edges with 50mm of XPS foam (Lambda 0.03 W/mK). The strawbale wall panels sit directly on the slab.



Slab insulation



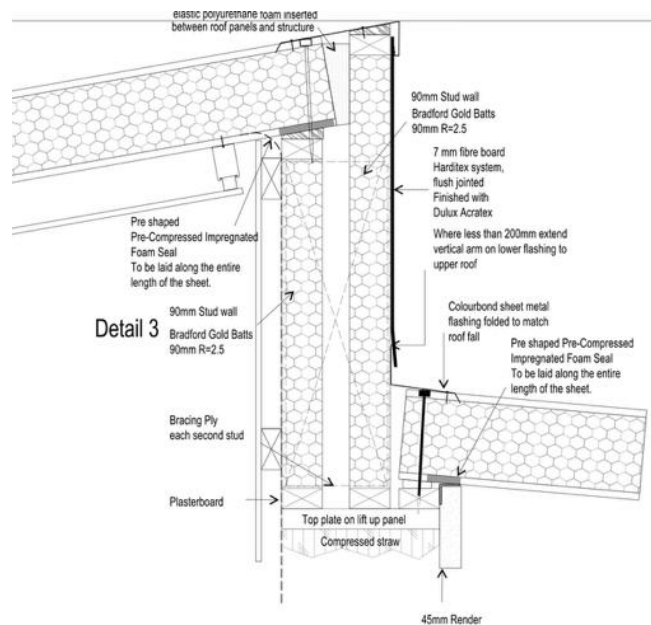
Finished Slab



Detailed cross section - Floor slab to wall connection

8 Construction of Exterior walls

The walls consist of 350mm compacted straw (Lambda 0.055 W/mK) in between timber structural members and lime rendered on the outside with a thickness of 45mm. The inside is lined with plasterboard.



Detailed cross section – wall to roof connection



Walls during construction – external view



Walls during construction – internal view

9 Construction of Roof

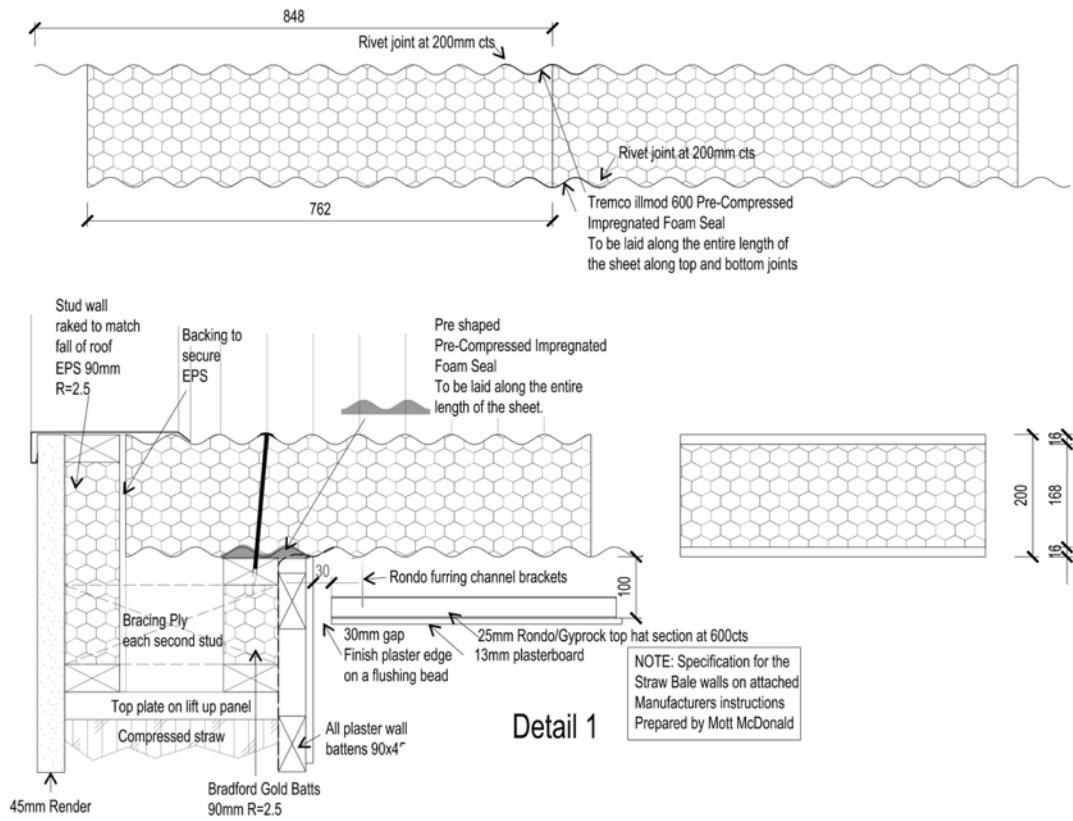
The roof is made from steel Structural Insulated Panels (SIP) consisting of 185mm EPS (Lambda 0.043 W/mK) sandwiched between sheets of 0.42mm steel. There is an additional 90mm of glass wool insulation below the roof (Lambda 0.036 W/mK).



Roof during construction



Roof interior side insulation



Detailed cross section – roof to wall connection

10 Window installation

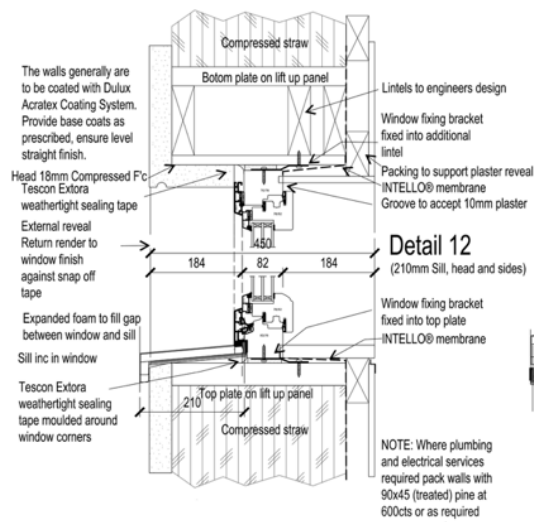
The Windows and doors are Doepfner brand timber – aluminium framed, made of 78mm spruce (λ 0.11 W/mK) and have an average U_f value of 1.25 W/m²K. The glazing is triple glazed Argon filled with low E coatings. The average U_g is 0.71 W/m²K and g-value 0.50.



Windows – exterior view



Windows – interior view



Detailed cross section – window to wall connection

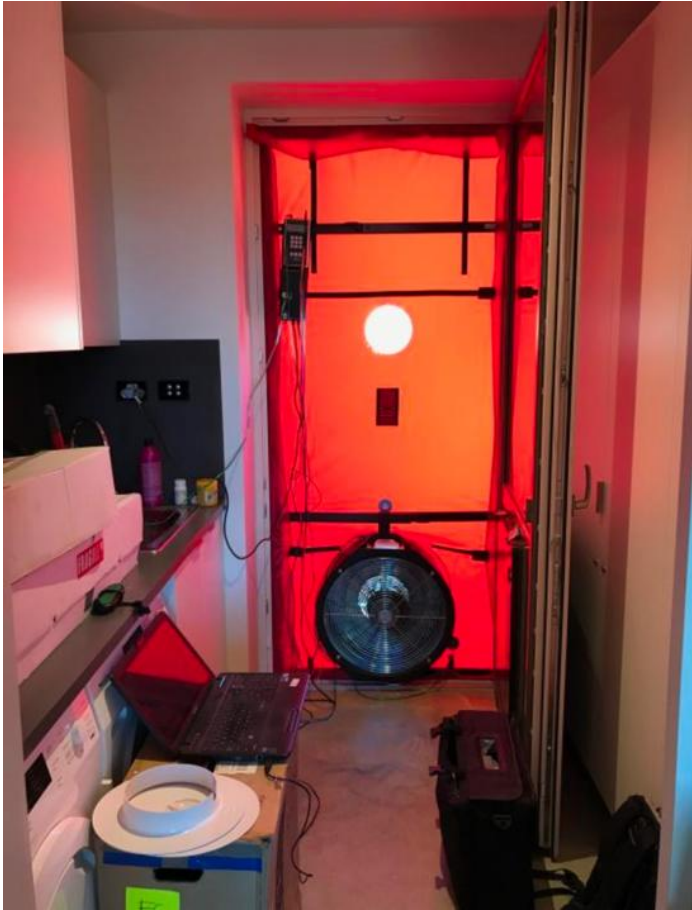
11 Airtightness

Pro Clima Intello airtight membranes are used on the walls for airtightness. These are taped to the windows, doors, and junctions with matching airtight tapes. Penetrations are sealed with grommets. The underside of the metal SIP roof is made of steel and is inherently airtight so this surface is taped to the wall membranes. The slab is airtight and junctions taped to the Intello membranes on the walls.



Interior airtightness membranes

The building achieved an airtightness test result of 1.0 ACHn50. The depressurization result was 1.07 ACH and the pressurization result was 0.92. Detail Green conducted the blower door test.



Blower door test

BUILDING LEAKAGE TEST Page 2 of 5

Date of Test: 18-Jan-17 Test File: 180118 Final Test_Nooneena

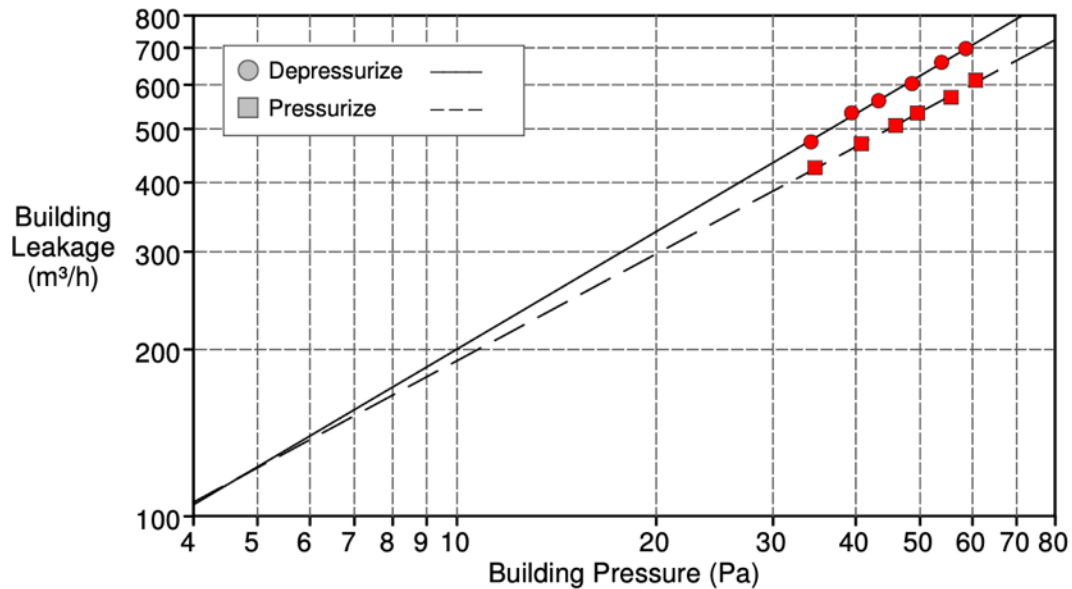
Building Information	
Volume (m³)	580
Surface Area: (m²)	
Floor Area: (m²)	180
Height (m)	3.15
Uncertainty of Dimensions (%)	3
Year of Construction	2017
Type of Heating	Reverse cycle split system, fire place
Type of Air Conditioning	split system
Type of Ventilation	Balanced HRV
Building Wind Exposure	Highly Exposed Building
Wind Class	Calm

Equipment Information				
Type	Manufacturer	Model	Serial Number	Custom Calibration Date
Fan	Energy Conservatory	Model 4 (230V)	CE5406	-
Micromanometer	Energy Conservatory	DG700	42680	18/02/2016

Date of Test: 18-Jan-17

Technician: Luc Plowman
 Project Number: Noonameena
 Building Address: Noonameena
 Redesdale, Vic 3444

	Depressurization	Pressurization	Average
Test Results at 50 Pascals:			
V50: m ³ /h Airflow	622 (+/- 1.3 %)	536 (+/- 0.7 %)	579
n50: 1/h (Air Change Rate)	1.07	0.92	1.00
w50: m ³ /(h·m ² Floor Area)	3.46	2.98	3.22
q50:			
Leakage Areas:			
Canadian EqLA @ 10 Pa (cm ²)	223.3 (+/- 9.7 %)	213.0 (+/- 5.7 %)	218.2
LBL ELA @ 4 Pa (cm ²)	113.1 (+/- 15.5 %)	114.4 (+/- 9.1 %)	113.7
Building Leakage Curve:			
Air Flow Coefficient (Cenv) m ³ /(h·Pa ⁿ)	40.2 (+/- 24.3 %)	43.9 (+/- 14.1 %)	
Air Leakage Coefficient (CL) m ³ /(h·Pa ⁿ)	39.5 (+/- 24.3 %)	43.6 (+/- 14.1 %)	
Exponent (n)	0.705 (+/- 0.064)	0.641 (+/- 0.037)	
Correlation Coefficient	0.99790	0.99915	
Test Standard:	EN 13829		
Test Mode:	Depressurization and Pressurization		
Type of Test Method:	A		
Regulation complied with:	Passive House Low Energy Standard n50 ≤ 1.0 1/h		

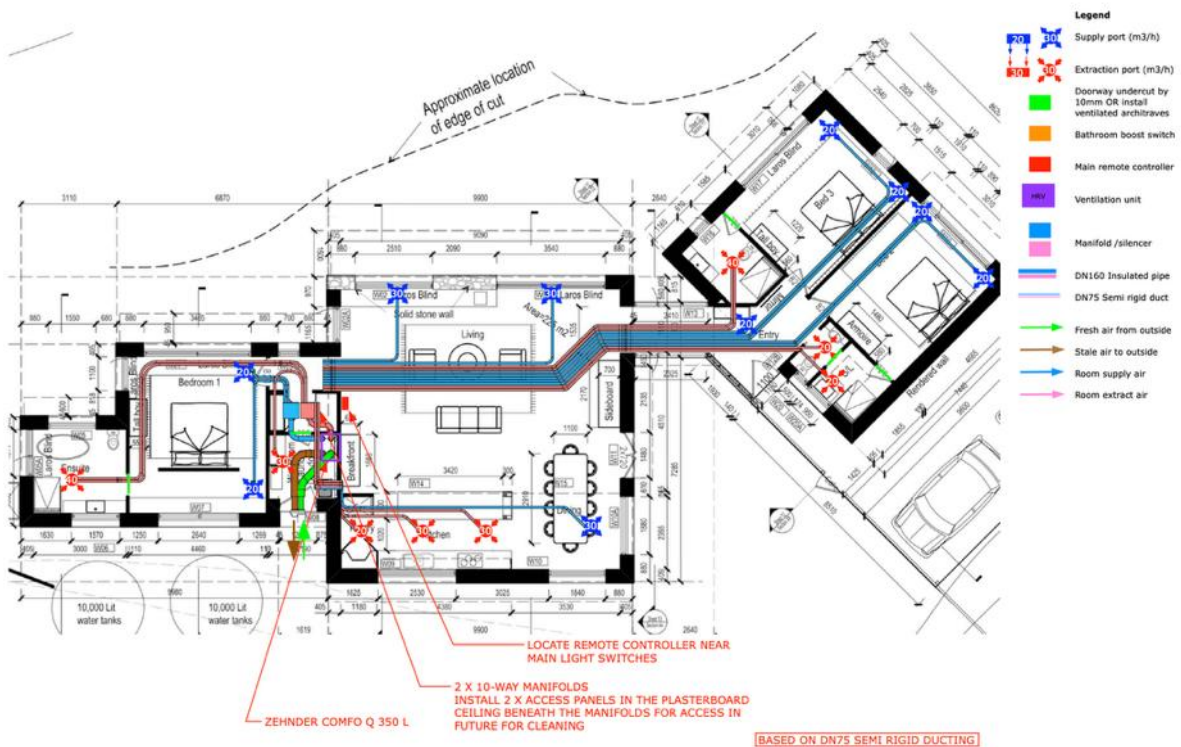


12 Ventilation ducting systems

Air is delivered via DN75 semi-rigid ducting that is located inside the thermal envelope below the roof insulation. The ducting runs in a service cavity created by suspending the plasterboard ceiling on metal hangers.



Semi rigid ducting



System design

13 Ventilation unit

A Zehnder ComfoQ 350 heat recovery ventilation is used to supply fresh air to the home. The heat recovery efficiency is 86% and electrical efficiency is 0.24 Wh/m³. The unit is located in a laundry cupboard



Heat Recovery Ventilation system

14 Heating and cooling systems

The house has two heating sources: a reverse cycle air sourced heat pump with a capacity of 5 kW and a 'Bionic' standalone wood fire with externally sourced fresh air and exhaust through a triple skin double cowl flue.



Heat pump



Fireplace and double flue

15 PHPP results

PHI Low Energy Building Verification



Architecture: David Rason
 Street: 69 Beaconsfield Pde, Albert Park
 Postcode/City: 3206 Melbourne
 Province/Country: VIC AU-Australia

Energy consultancy: H3space Harley Truong
 Street: 10B Anderson Street Chifley
 Postcode/City: 2606 Canberra
 Province/Country: ACT AU-Australia

Year of construction: 2017
 No. of dwelling units: 1
 No. of occupants: 3.0

Building: Resdesdale House
 Street: [Empty]
 Postcode/City: 3444 Redesdale
 Province/Country: VIC AU-Australia

Building type: Freestanding house
 Climate data set: ud-03-AU0012(a)-Mangalore
 Climate zone: 4: Warm-temperate Altitude of location: 223 m

Home owner / Client:
 Street: [Empty]
 Postcode/City: 3444 Redesdale
 Province/Country: VIC AU-Australia

Mechanical engineer: Fantech
 Street: 42-62 POUND ROAD WEST
 Postcode/City: 3175 DANDENONG SOUTH
 Province/Country: VIC AU-Australia

Certification: Detail Green - Luc Plowman
 Street: [Empty]
 Postcode/City: Beechworth
 Province/Country: VIC AU-Australia

Interior temperature winter [°C]: 20.0 Interior temp. summer [°C]: 25.0
 Internal heat gains (IHG) heating case [W/m²]: 2.4 IHG cooling case [W/m²]: 2.4
 Specific capacity [Wh/K per m² TFA]: 84 Mechanical cooling: x

Specific building characteristics with reference to the treated floor area

			Criteria	Alternative criteria	Fulfilled?²
Space heating	Treated floor area m²	179.2			
	Heating demand kWh/(m²a)	23	≤ 30	-	yes
	Heating load W/m²	18	≤ -	-	yes
Space cooling	Cooling & dehum. demand kWh/(m²a)	8	≤ 30	-	yes
	Cooling load W/m²	17	≤ -	-	-
	Frequency of overheating (> 25 °C) %	-	≤ -	-	-
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤ 10	-	yes
Airtightness	Pressurization test result n ₅₀ 1/h	1.0	≤ 1.0	-	yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	81	≤ 120	-	yes
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	39	≤ -	-	-
	Generation of renewable energy (in relation to projected kWh/(m²a) building footprint area)	-	≥ -	-	-

² Empty field: Data missing; -: No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

PHI Low Energy Building? **yes**
 Signature: [Empty]

Task: 1-Designer First name: Harley Surname: Truong
 Issued on: [Empty] City: Canberra

16 Experience

Some comments from the owner and guests staying overnight.

“A simple set of construction methods (well executed) can attract such interest to turn a nice home into a passive one with minimal extra cost, long term benefits of stable comfortable temperatures all year round, constantly refreshed air and a dramatic reduction in power required to heat and cool your very quiet and calm living place.”

“We came in winter to experience passive house living and were not disappointed by the thoughtfully designed house which stayed close to 20deg as outside reached -2deg.”

“Stunning views of the countryside, and the passive house was amazing. We were very comfortable in what was one of the coldest Easters on record.”

17 Additional information

The house is available to book for short stay holidays:

<https://www.airbnb.com.au/rooms/24078239>

Additional information about the house is available online:

<https://www.passivhausassociation.com.au/project-register/noonameena>

<https://www.youtube.com/watch?v=0iPn2cNhCL8>