Project Documentation

Abstract

© Peter Cook

Vanquish Owen Lane Auchenflower Brisbane Australia

Data of building

Year of construction	2020	**Space heating**	**7 kWh/(m²a)**
U-value external wall	0.326 W/(m²K)	**Space Cooling & Dehumidification**	**16 kWh/(m²a)**
U-value basement	na W/(m²K)	Primary Energy Renewable (PER)	37 kWh/(m²a)
U-value roof	.220 W/(m²K)	Generation of renewable Energy	88 kWh/(m²a)
U-value window	1.35 W/(m²K)	Non-renewable Primary Energy (PE)	59.5 kWh/(m²a)
Heat recovery	80 %	Pressurization test n_{50}	0,7 h^{-1}
Special features	Dehimidifcation installed post ERV on supply line communicating with ERV to control humidity in sub tropical environment		

Brief Description

Passive House Auchenflower Brisbane Austrlaia

This high end luxurious home is located in the inner suburb of Brisbane city. It is located mid- way up an incline in a densely populated area suburb approx. 4 klms from the CBD. The house has a northern aspect to the rear of the block which is also the downhill side of the site. The living areas open out onto an expansive view of the CBD.

The 253.4m^2 (TFA) home is two stories of living with an extended internal flight of stairs leading to an open terrace on a third level. Ground floor is slab on ground with tiled finish, external walls are a combination of mass and lightweight with insulation in the forY of PIR, and fibreglass blanket.

In this sub-tropical environment an energy recovery ventilation (ERV) system was installed to control air temperature and humidity. Conscious of the large and frequent variances in humidity levels experienced through out the Summer months it was decided to include an independent dehumidification unit located immediately after the ERV to allow additional water gas, not transferred by the ERV to be removed when required. The ERV and dehumidifier communicate monitor the humidity levels and deal with them where necessary.

The home was completed in the second half on 2020 and kept off the market to allow it to be experienced by member of the industry and public and also to allow the University of Queensland to monitor its performance unoccupied. It has been occupied since February 2021 and monitoring will continue for a further 6 months to allow comparative information to be gathered.

1. Responsible project participants

Architect	Joe Adsett Architects https://www.joeadsett.com.au/
Implementation planning	-
Building systems	NA
Structural engineering	Incode Engineers http://www.incode .com.au
Building physics	LAB Design Wufi.
Passive House project planning	John Moynihan. Certified PH Consultant. Role was to carry out all PH work as neither builder or architect had any knowledge of PH.
Construction management	Solaire Properties https://solaireproperties.com.au

Certifying body

Detail Green
https://www.detailgreen.com.au/

Certification ID

6668	Project-ID 2019-05_807_AU_Luc_Plowman_Owen - Auchenflower

Author of project documentation

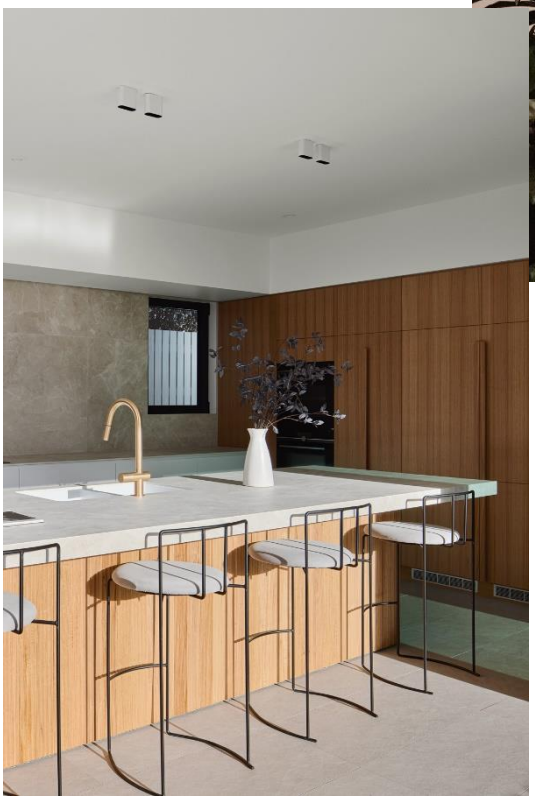
John Moynihan
www.passiv.de

Date	Signature
02/06/2021	John Moynihan Digitally signed by John Moynihan DN: c=AU - AUSTRALIA, email=john@ecolateral.com, o=Ecolateral, ou=Ecolateral, cn=John Moynihan Date: 2021.05.28 12:21:05 +10'00'

2. photos

North & East

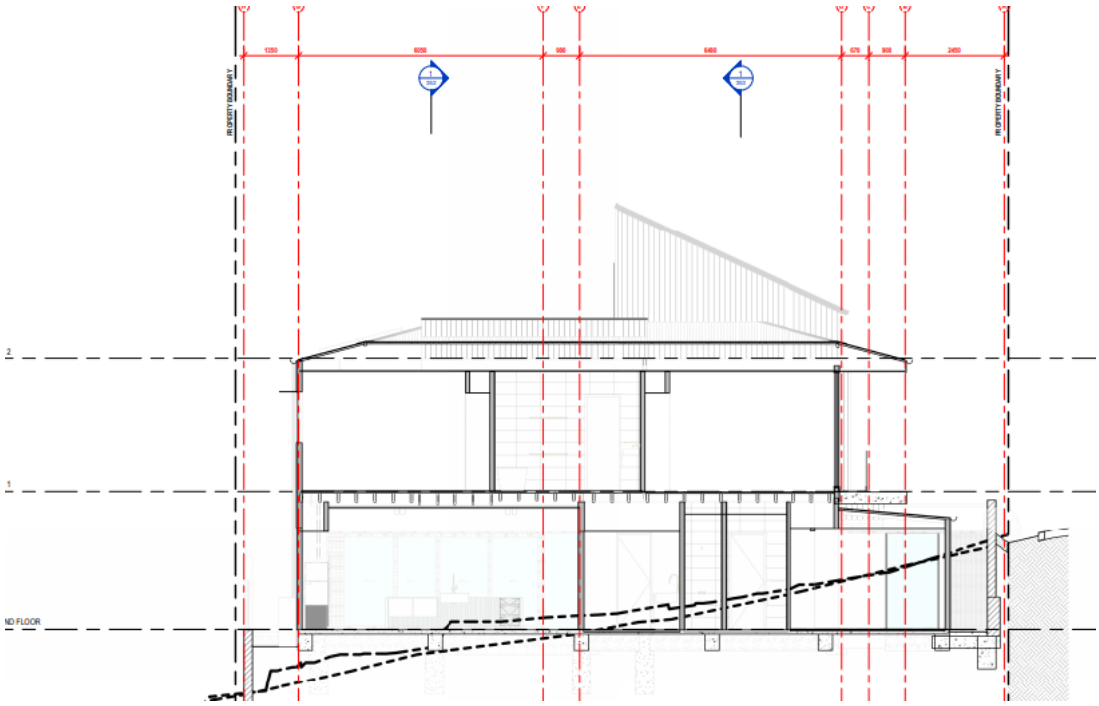
South



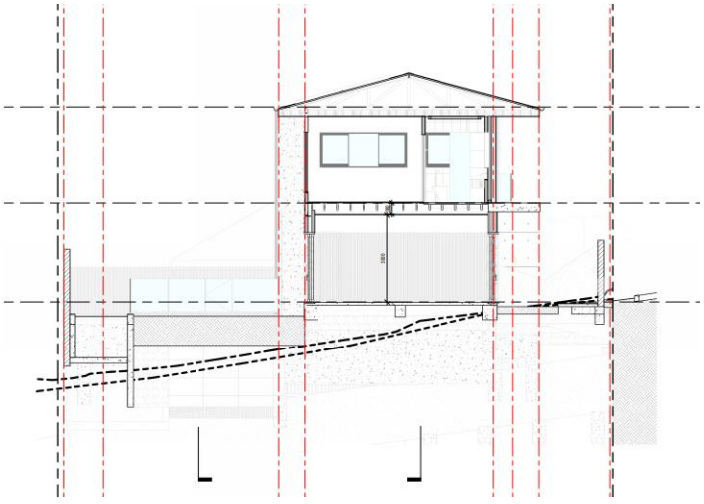
Kitchen

Lounge

3. Sections

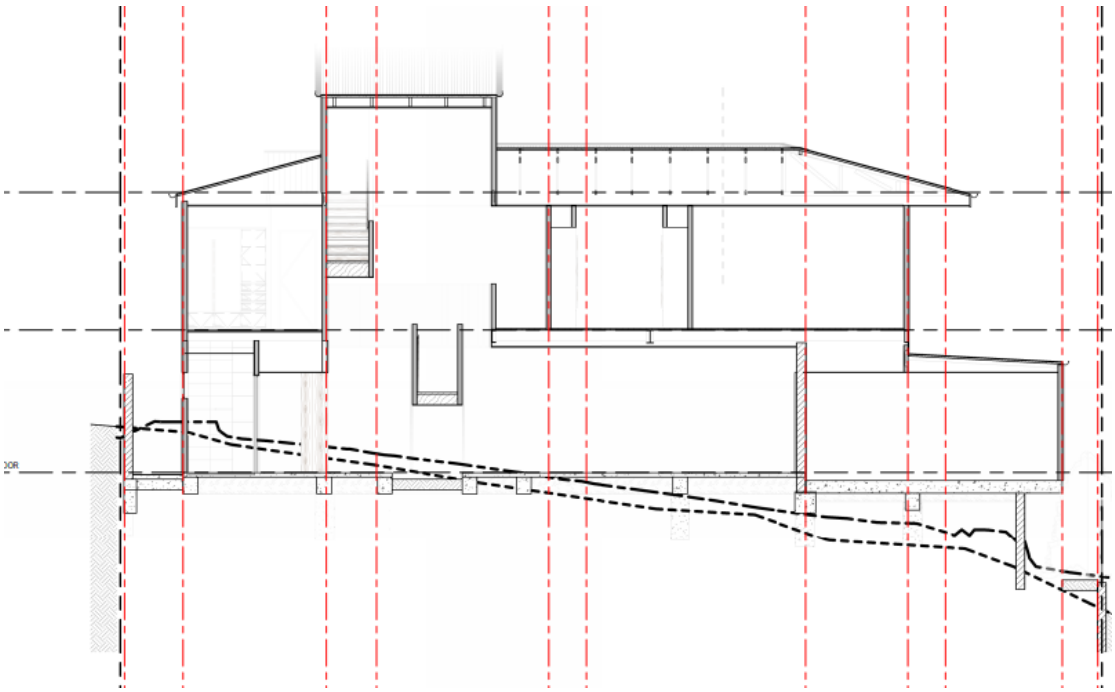


North South through Western wing



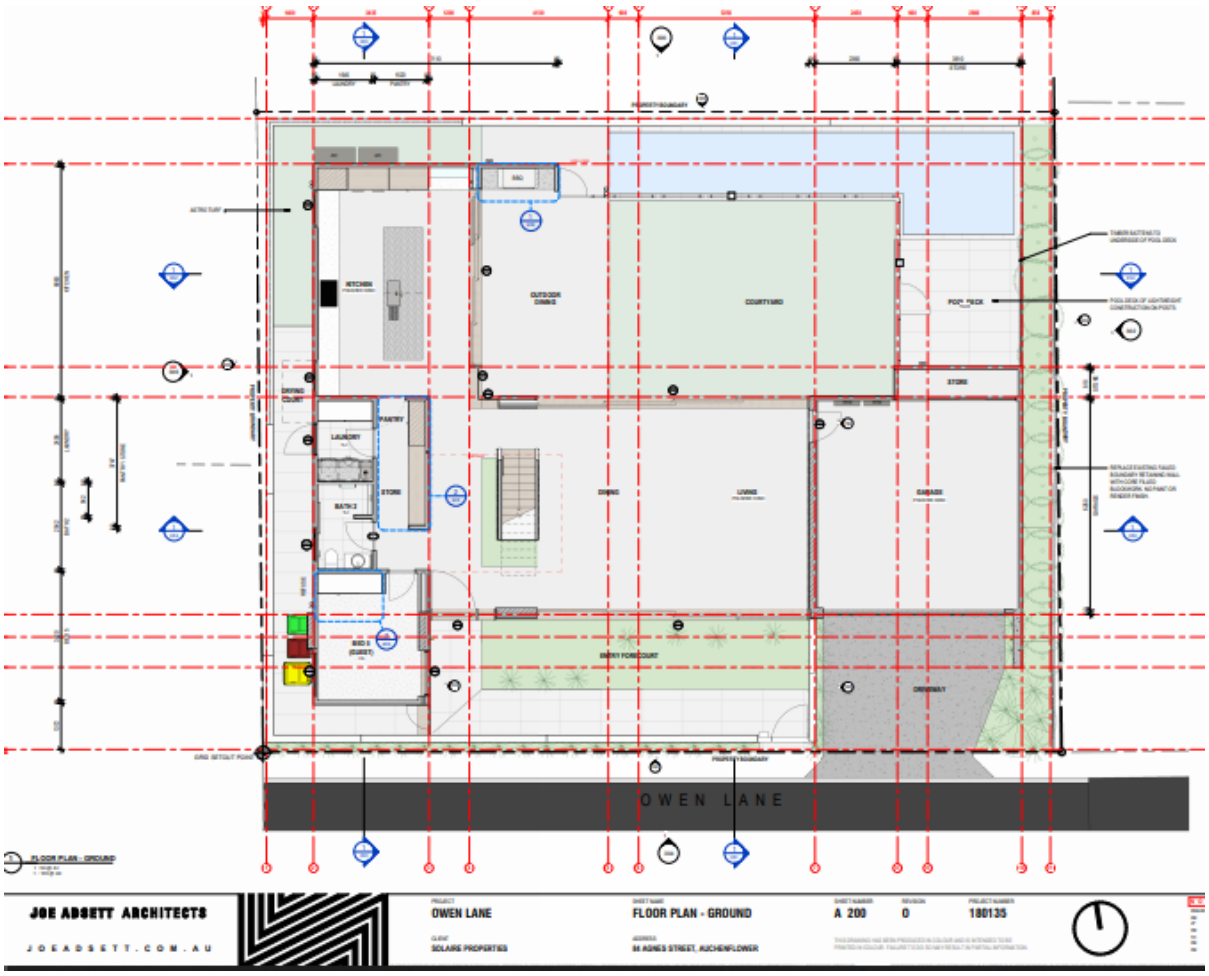
North South through Eastern wing

3. Sections



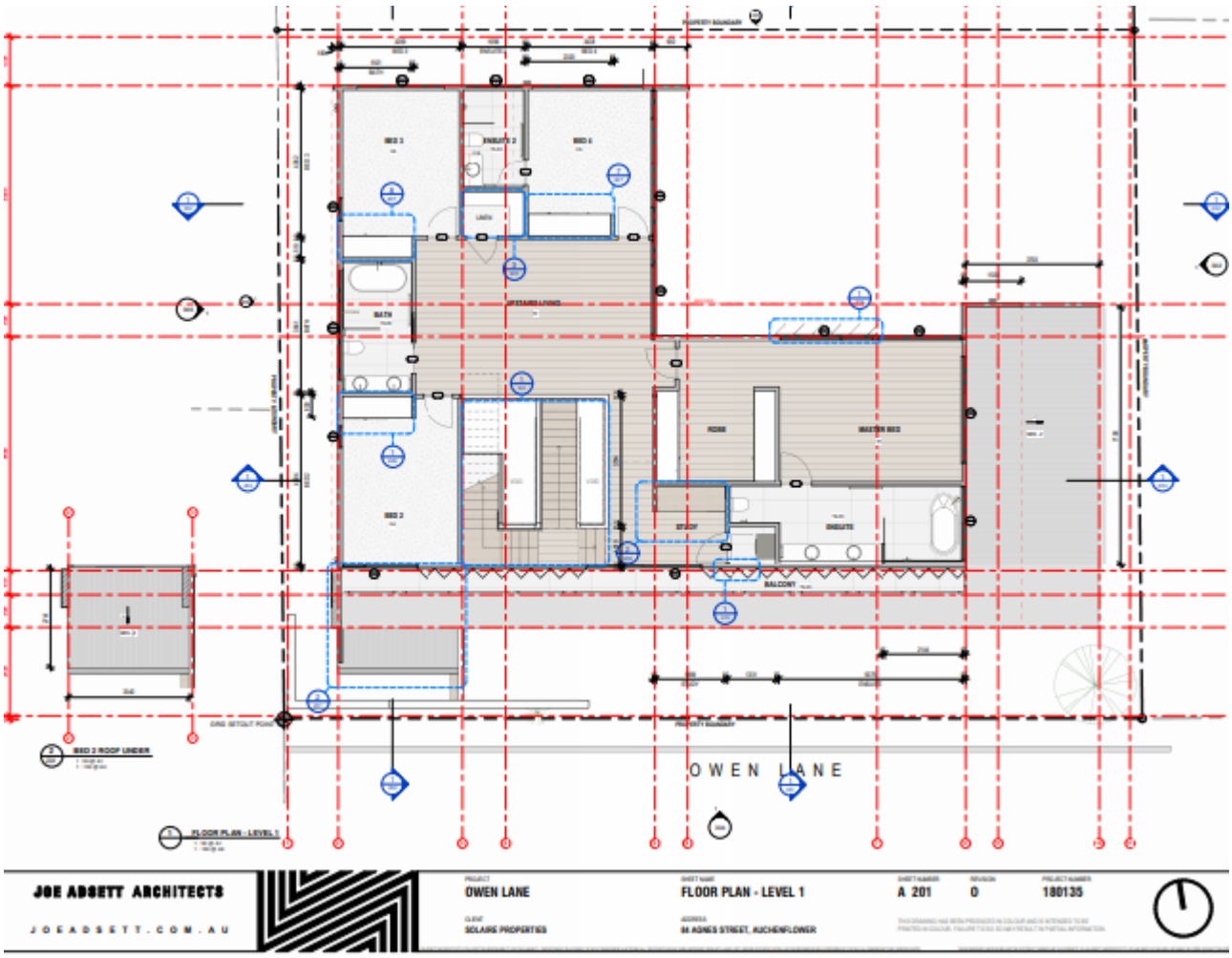
East - West

4. PLANS



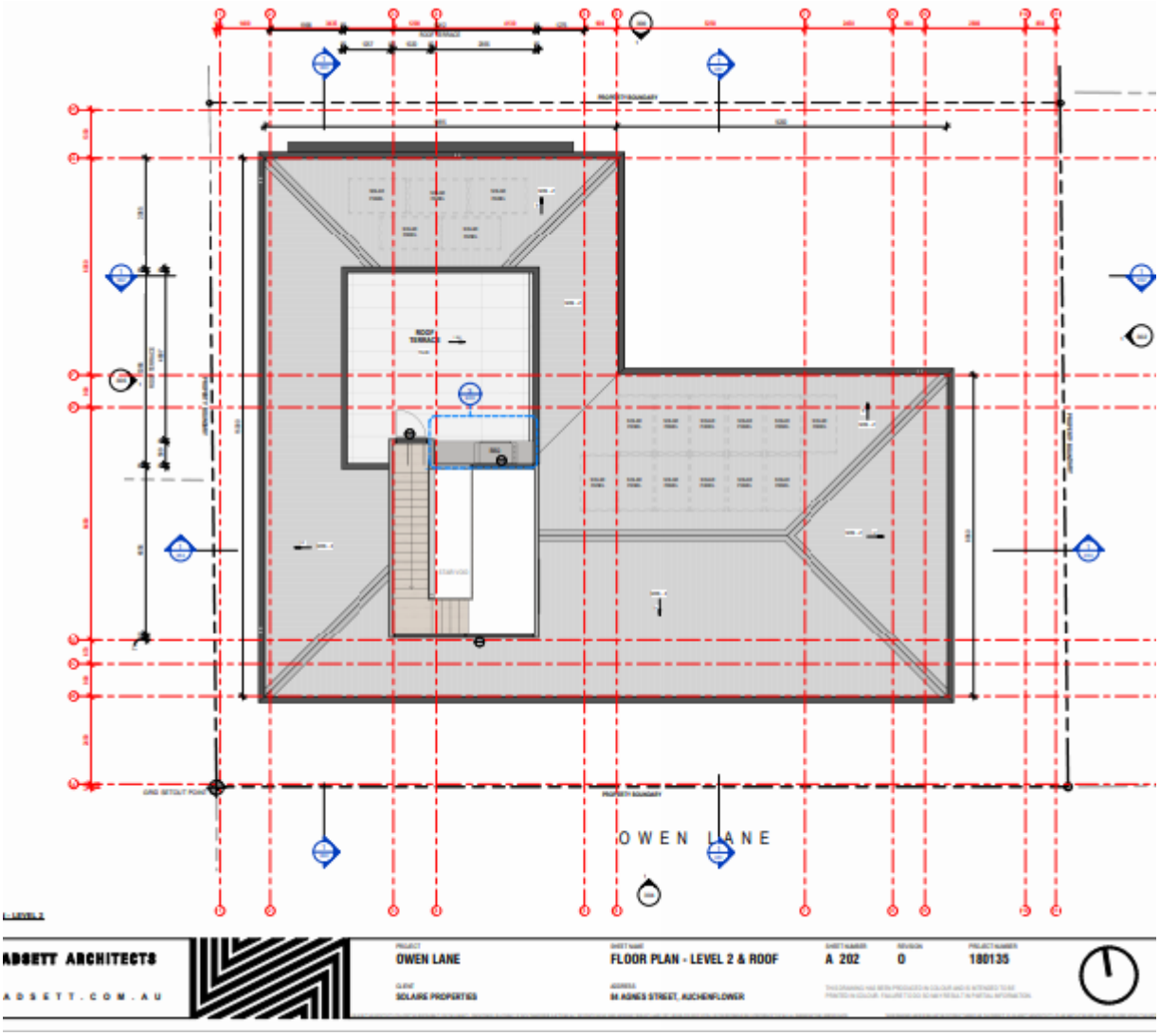
Ground Floor

4. PLANS



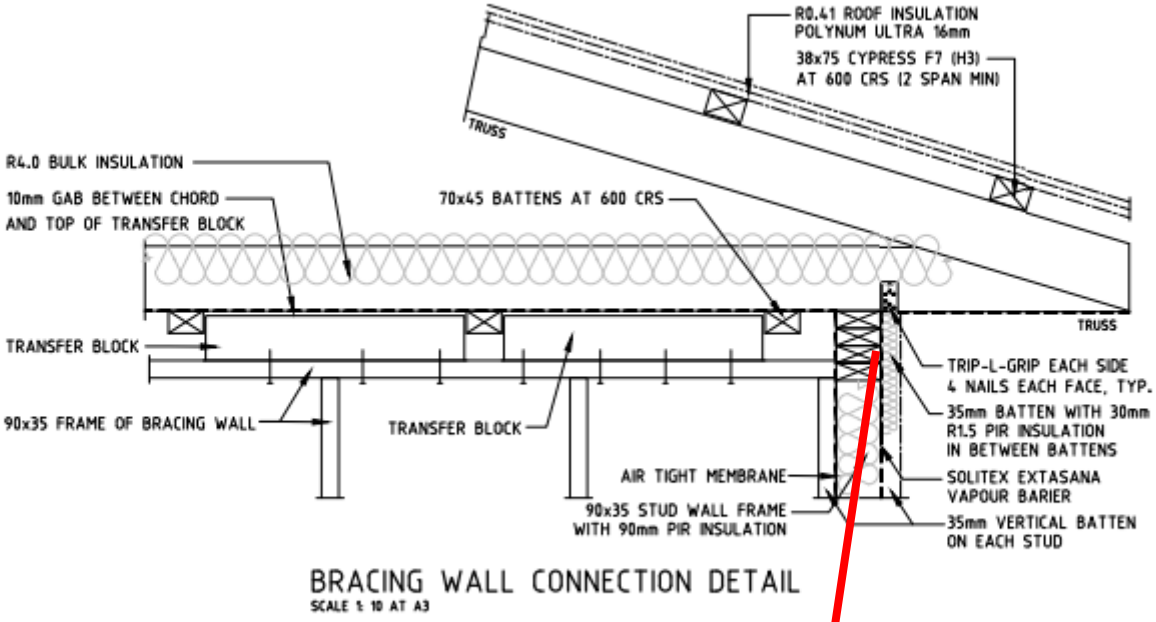
First Floor

4. PLANS

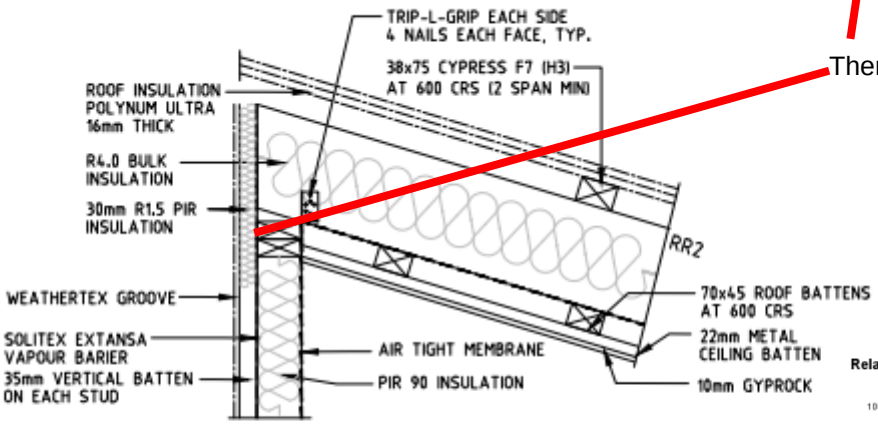


Second Floor

5. Wall and Insulation details



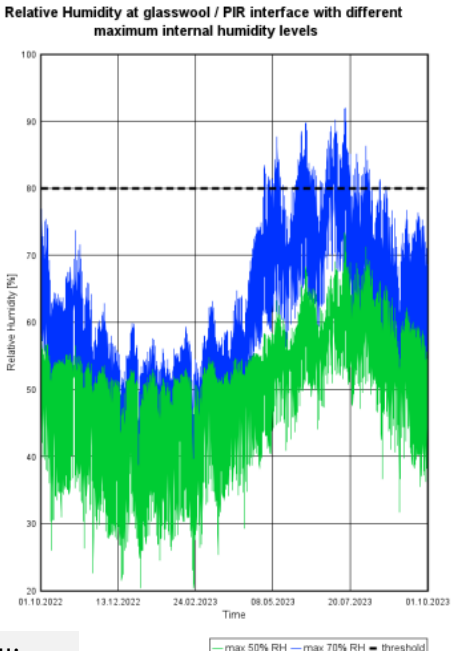
BRACING WALL CONNECTION DETAIL
SCALE 1: 10 AT A3



CONNECTION DETAIL RAFTER TO WALL
SCALE 1: 10 AT A3
SECTION DETAIL 1 ON ARCHITECTURAL DRAWINGS

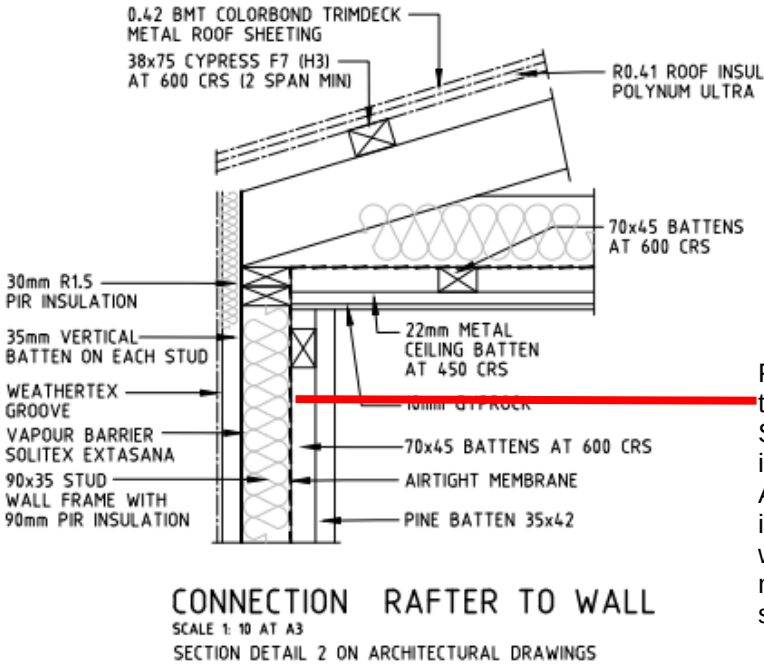
Thermal bridge prevented by PIR

NOTES:
Working in a sub tropical environment the predominant influence is the hot humid Summer. (max 35+ C and 85% RH Winter min + 8C 55% humidity. Critical factor is keeping external humidity out of the walls but also allowing internal to dry out. The Wufi was undertaken to ensure that the PIR's high Sd value did not trap water vapour in the internal insulation.



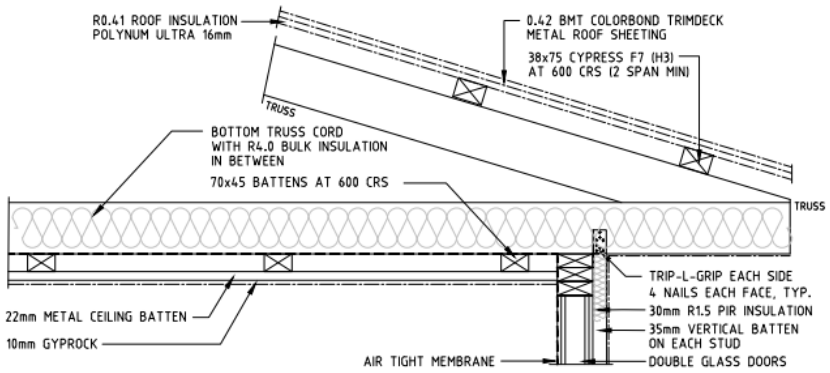
WUFI Modelling

5. Wall and Insulation details



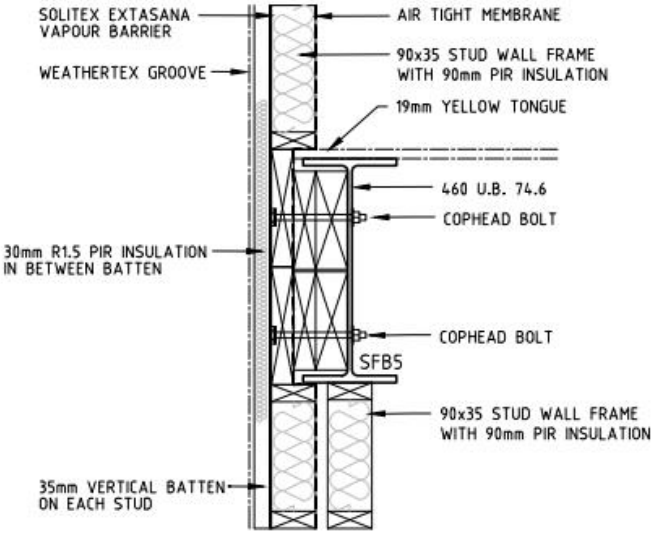
CONNECTION RAFTER TO WALL
SCALE 1: 10 AT A3
SECTION DETAIL 2 ON ARCHITECTURAL DRAWINGS

ProClima Intello was used on the intenral face of the 90mm stud. Stapled in place as per suppliers instruction.
Air tight tape used at floor intersection. The electrical supply was brought through the AT membrane at one point and then serviced the building form there.

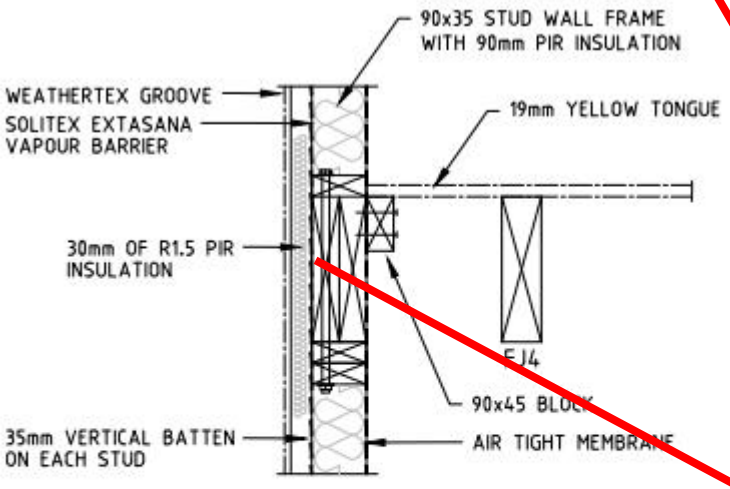


CONNECTION BOTTOM CORD TO DOOR
SCALE 1: 10 AT A3
SECTION DETAIL 3 ON ARCHITECTURAL DRAWINGS

6. Wall construction details



CONNECTION DETAIL
BEAM TO STUD WALLS
SCALE 1: 10 AT A3
SECTION DETAIL 11 ON ARCHITECTURAL DRAWINGS



CONNECTION DETAIL
YELLOW TONG TO STUD WALL
SCALE 1: 10 AT A3

Steel contacts with external frame or concrete controlled thermal bridges through the use of armatherm isolation pads and fixing sleeves.

Floor joists membrane were fitted when joists placed with upper and lower starter flaps. Then joined to wall membrane above and below with air tight tape.

Wedge-shaped assembly layer -> (on the right)

Unheated / uncooled attic -> (on the right)

Assembly no.	Building assembly description	Interior insulation?
01ud	Wall - External Stud	

Heat transmission resistance [m²K/W]

Orientation of building element: 2-Wall — interior R_{si}: 0.13

Adjacent to: 1-Outdoor ai — exterior R_{se}: 0.04

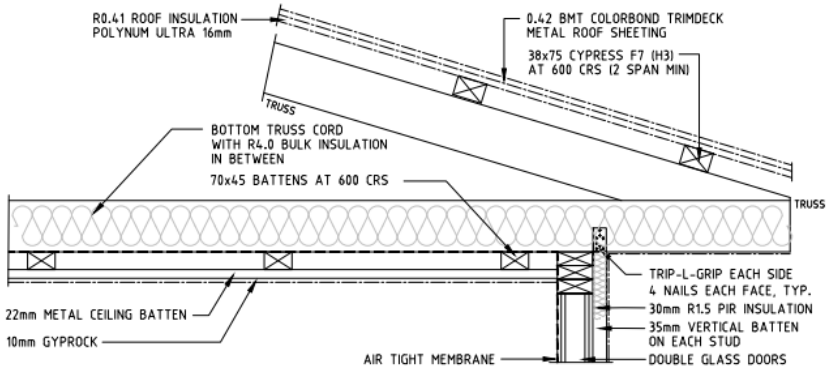
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
FC Sheeting	0.195					9
InsulBreak R0.2	0.033					7
Bulk Insulation	0.021	Timber Stud	0.130			70
Airspace	0.194	Timber batten	0.130			35
Plasterboard	0.180					10

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
90%	10.0%		13.1 cm

U-value supplement: W/(m²K)

U-value: 0.326 W/(m²K)

7. Roof



CONNECTION BOTTOM CORD TO DOOR

SCALE 1: 10 AT A3

SECTION DETAIL 3 ON ARCHITECTURAL DRAWINGS

Assembly no.		Interior insulation?
03ud	Roof- Main	

Heat transmission resistance [m²K/W]

Orientation of building element: 0.1 — interior R_{si}: 0.10

Adjacent to: 1-Outdoor ai — exterior R_{se}: 0.04

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Custom orb	0.000					3
Polynum Ultra R0.41	0.039					16
Air Space	0.194	Timber Batten	0.130			50
Bulk Insulaiton	0.044	Timber Joist	0.130			175
Air Space	0.194	Timber Batten	0.130			45
Plasterboard	0.180					13

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
88%	12.0%		30.2 cm

U-value supplement: W/(m²K)

U-value: 0.223 W/(m²K)

8. Windows/ External Doors

ReynaersPassive House certified swing Doors

Reynares Triple glazed argon filled windows and sliding Ř22ŇǎŇ

Go to glazing list Go to window frames list

rough ngs	Installed in	Glazing	Frame	g-Value	U-Value		Ψ Glazing edge	Installation situation user determined value for $\Psi_{installation}$ or '1': $\Psi_{installation}$ from 'Components' worksheet '0': in the case of abutting windows					Results			
Height	Selection from 'Areas' worksheet	Selection from 'Components' worksheet	Selection from 'Components' worksheet	Perpen-dicular radiation	Glazing	Frames (avg.)	$\Psi_{Glazing\ edge}$ (Avg.)	left	right	bottom	top	$\Psi_{Installation}$ (Avg.)	Window Area	Glazing area	U_w installed	Glazed fraction per window
m		2-Sorting: BY ID	1-Sorting: LIKE LIST	-	W/(m²K)	W/(m²K)	W/(mK)	W/(mK) or 1/0				W/(mK)	m²	m²	W/(m²K)	%
2.375	10-South-Lower	01ud-Viridian - TPS Low E G	04ud-Reynaers - Masterline8 Swing Door W/ Side Lig	0.34	0.68	1.61	0.028	1	0	1	1	0.040	2.9	1.94	1.10	68%
2.375	10-South-Lower	01ud-Viridian - TPS Low E G	07ud-Reynaers - Masterline8 Fixed Panel - RH	0.34	0.68	2.10	0.028	0	1	1	1	0.040	1.1	0.81	1.28	76%
2.397	10-South-Lower	01ud-Viridian - TPS Low E G	01ud-Reynaers - CP155 LS - LH	0.34	0.68	2.65	0.028	1	0	1	1	0.040	4.5	3.31	1.29	74%
2.397	10-South-Lower	01ud-Viridian - TPS Low E G	02ud-Reynaers - CP155 LS - C	0.34	0.68	2.73	0.028	0	0	1	1	0.040	4.2	3.19	1.26	75%
2.397	10-South-Lower	01ud-Viridian - TPS Low E G	02ud-Reynaers - CP155 LS - C	0.34	0.68	2.73	0.028	0	0	1	1	0.040	4.2	3.19	1.26	75%
2.397	10-South-Lower	01ud-Viridian - TPS Low E G	03ud-Reynaers - CP155 LS - RH	0.34	0.68	2.89	0.028	0	1	1	1	0.040	4.5	3.31	1.36	74%
2.397	26-Garage/Living R	01ud-Viridian - TPS Low E G	04ud-Reynaers - Masterline8 Swing Door	0.34	0.68	1.59	0.028	1	1	1	1	0.040	2.3	1.43	1.21	63%
2.397	2-North-Lower	01ud-Viridian - TPS Low E G	01ud-Reynaers - CP155 LS - LH	0.34	0.68	2.65	0.028	1	0	1	1	0.040	4.5	3.31	1.29	74%
2.397	2-North-Lower	01ud-Viridian - TPS Low E G	02ud-Reynaers - CP155 LS - C	0.34	0.68	2.73	0.028	0	0	1	1	0.040	4.2	3.19	1.26	75%
2.397	2-North-Lower	01ud-Viridian - TPS Low E G	02ud-Reynaers - CP155 LS - C	0.34	0.68	2.73	0.028	0	0	1	1	0.040	4.2	3.19	1.26	75%
2.397	2-North-Lower	01ud-Viridian - TPS Low E G	03ud-Reynaers - CP155 LS - RH	0.34	0.68	2.89	0.028	0	1	1	1	0.040	4.5	3.31	1.36	74%
2.382	2-North-Lower	01ud-Viridian - TPS Low E G	05ud-Reynaers - Masterline8 Fixed Panel - LH	0.34	0.68	2.10	0.028	1	0	1	1	0.040	1.7	1.44	1.10	83%
2.382	5-East-Lower	01ud-Viridian - TPS Low E G	07ud-Reynaers - Masterline8 Fixed Panel - RH	0.34	0.68	2.10	0.028	0	1	1	1	0.040	1.7	1.44	1.10	83%
2.397	5-East-Lower	01ud-Viridian - TPS Low E G	01ud-Reynaers - CP155 LS - LH	0.34	0.68	2.66	0.028	1	0	1	1	0.040	3.4	2.39	1.39	70%

9. Airtight Envelope

Blower door tests where carried out at the following stages of construction:

Stage	Result of aggregated Pressure and De-pressure @ 50 Pa
1. Intello Membrane fully fitted and taped.	.65
2. Post plaster	.65
3. Final PC.	. 68

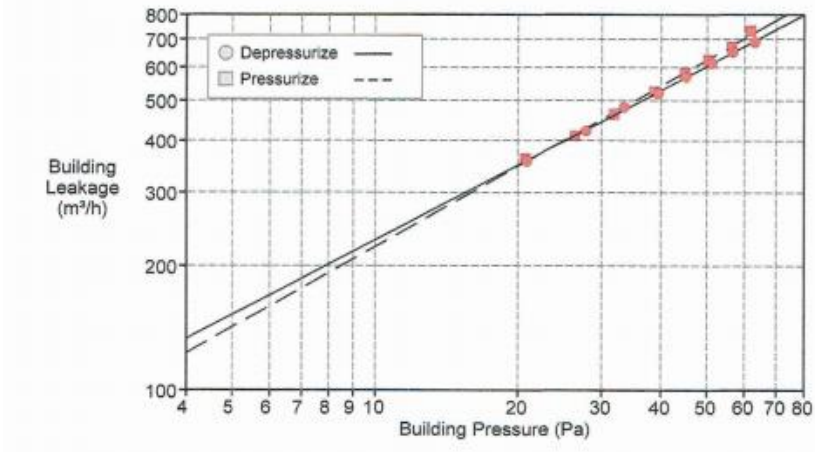
Project Number: Vanquish

Customer: Solaire Properties
9/43 Lang Parade
Milton, Qld 4064
Phone:
Fax:

Building Address: Vanquish
Owen Lane
Auchenflower, Qld 4066

Test Results at 50 Pascals:	Depressurization	Pressurization	Average
q_{50} : m³/h (Airflow)	604 (+/- 0.9 %)	625 (+/- 1.4 %)	614
n_{50} : 1/h (Air Change Rate)	0.67	0.69	0.68
q_{F50} : m³/(h·m² Floor Area)	4.78	4.95	4.87
q_{E50} : m³/(h·m² Envelope Area)	0.81	0.83	0.82
Leakage Areas:			
ELA $_{50}$: m²	0.0184 (+/- 1.4 %)	0.0190 (+/- 1.4 %)	0.0187
ELA $_{F50}$: m²/m²	0.0001458	0.0001508	0.0001483
ELA $_{E50}$: m²/m²	0.0000246	0.0000254	0.0000250
Building Leakage Curve:			
Air Flow Coefficient (C_{env}) m³/(h·Pa^n)	58.3 (+/- 7.7 %)	50.8 (+/- 12.2 %)	
Air Leakage Coefficient (C_L) m³/(h·Pa^n)	58.4 (+/- 7.7 %)	50.7 (+/- 12.2 %)	
Exponent (n)	0.597 (+/- 0.021)	0.642 (+/- 0.033)	
Coefficient of Determination (r²)	0.99879	0.99733	

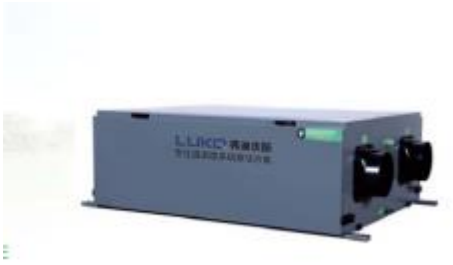
Test Standard: ISO 9972
Test Mode: Depressurization and Pressurization
Type of Test Method: Method 2 - Test of Building Envelope
Purpose of Test: n50 ≤ 1 1/h



10. Ventilation Unit

In the warm humid subtropical climate a Steibel Eltron ERV system was used with an off shelf dehumidifier post ERV on supply line. ERV and dehumidifier communictaed to work together to maintain a 55 -60% RH.

LWZ 180 / LWZ 280

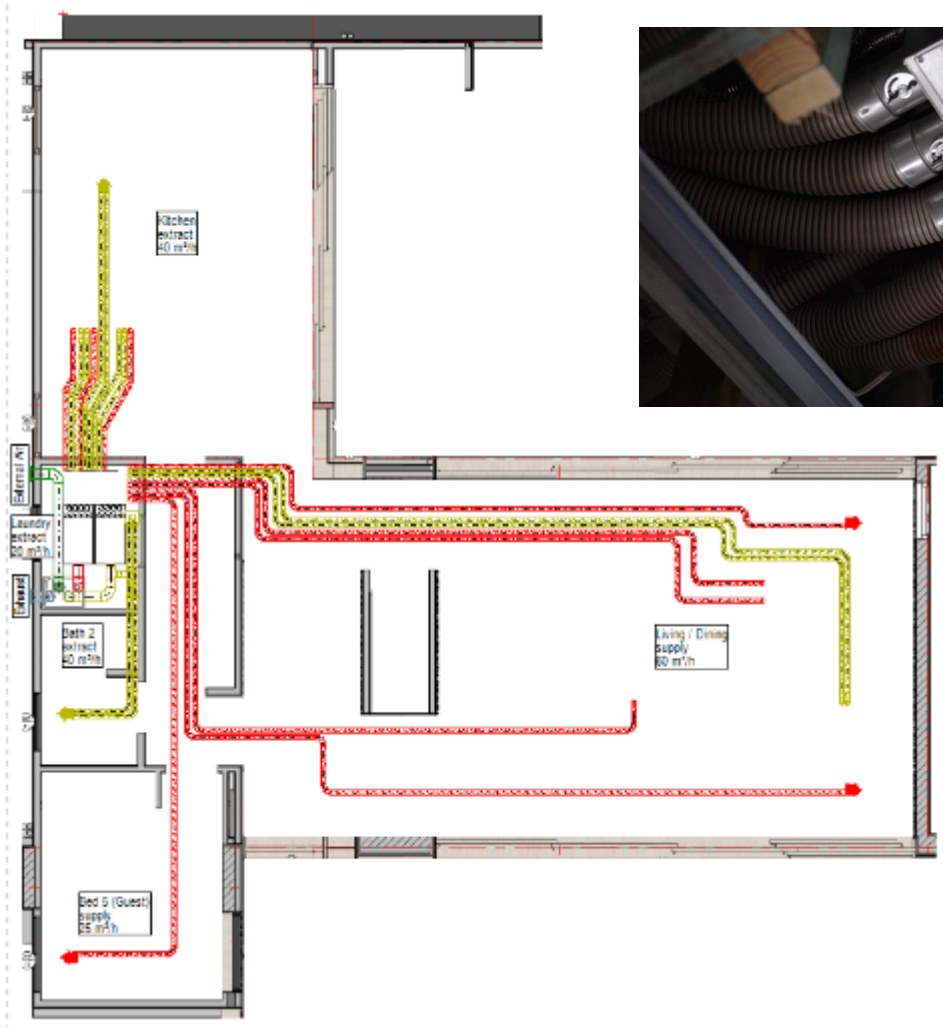


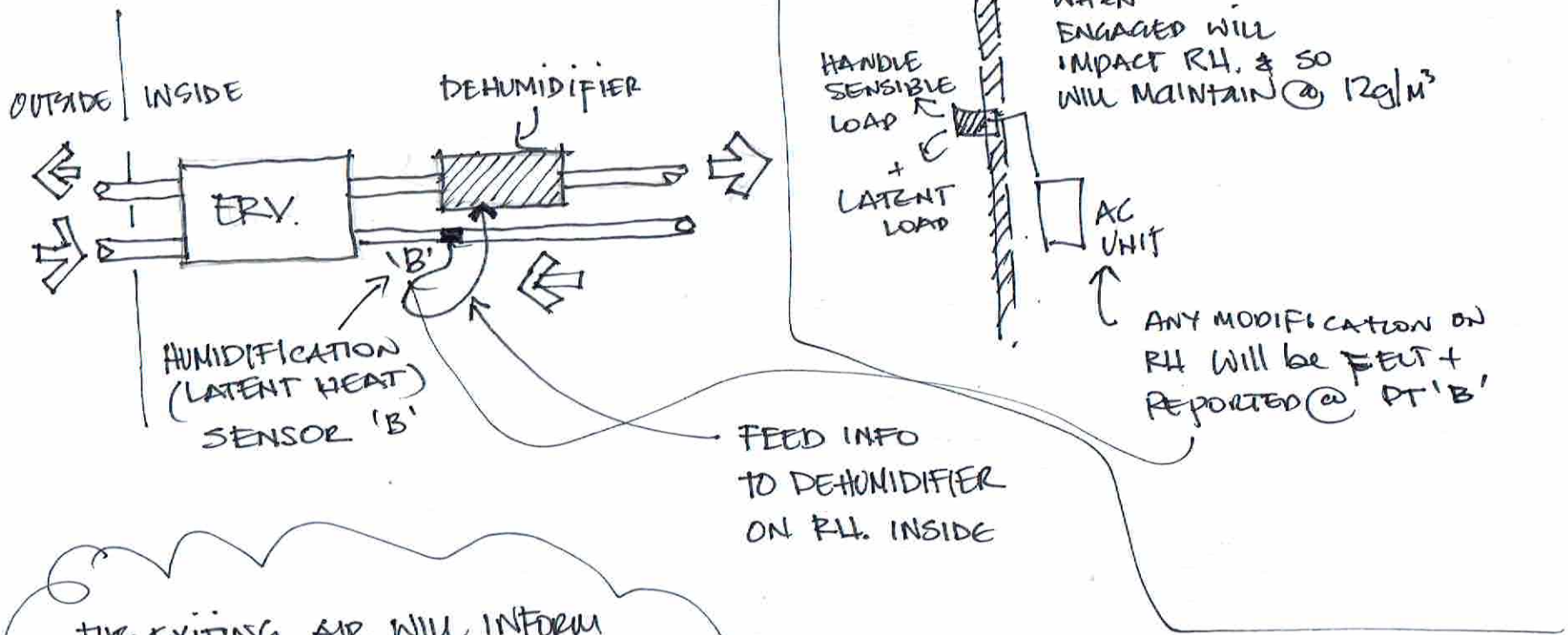
Luko FD-X60L

Make of ERV	**Steilbel Eltron**
Effciiency	94 %
Elektroeffizienz	0,25 Wh/m³

CERTIFIED COMPONENT
Passive House Institute

11. Ventilation planning





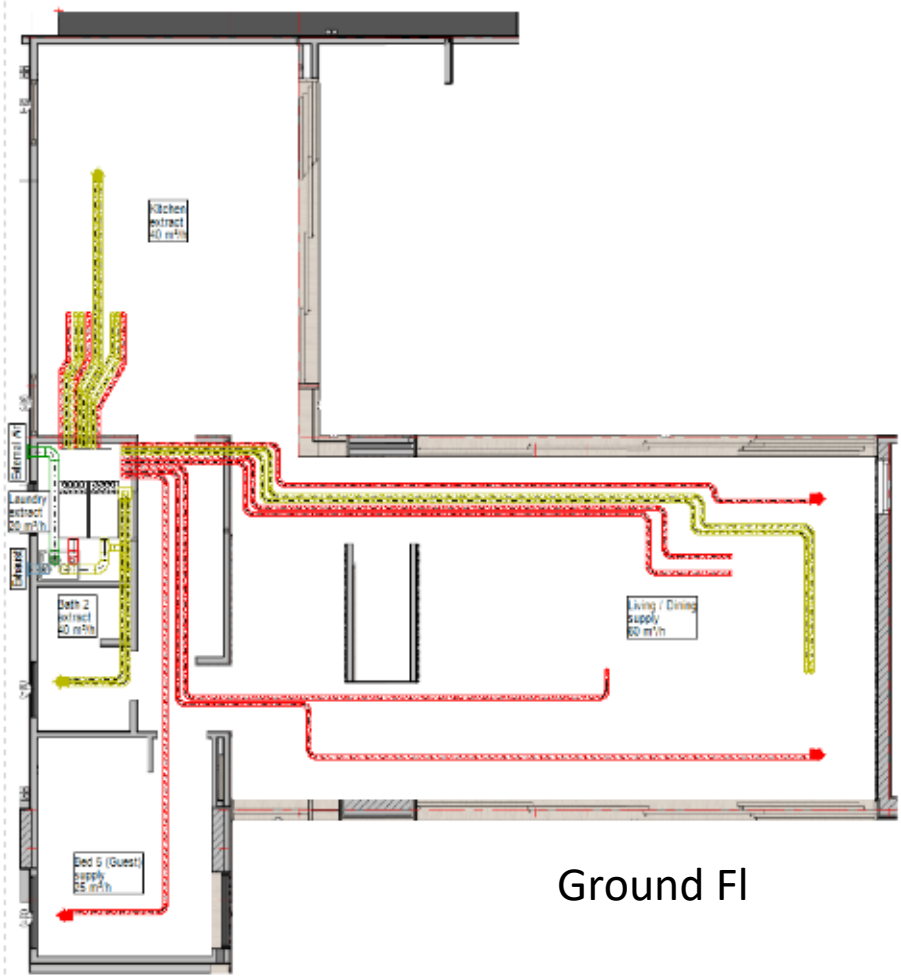
THE EXITING AIR WILL INFORM THE DEHUMIDIFIER OF THE RH of the air (INCLUDING LATENT LOAD CREATED WITHIN THE HOUSE & THE impact AC will have when on).

AND allow IT to ADJUST THE DE HUMIDIFICATION TO AVOID OVER DRYING OF THE AIR

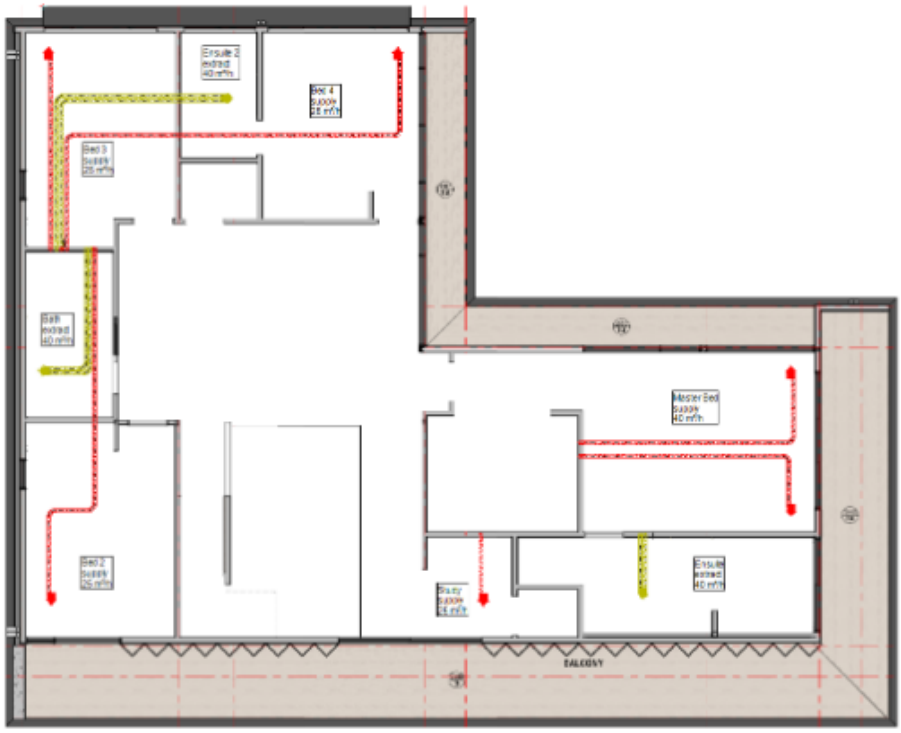
HUMIDITY CONTROL SKETCH (NTS)
by PH consultant.

COUPLING OF DEHUMIDIFIER AND ERV TO MAINTAIN THE RH LEVELS ON HIGH HUMIDITY DAYS AND TO COMPENSATE FOR THE POSSIBLE OVER DRYING BY A SMALL AC UNIT BEING USED

10. Ventilation Unit



Ground Fl



First Fl

12. Hot Water system

How water is supplied by an air to water heat exchanger for Steibel Eltron. WWK 302 | WWK 302 H.

The system is highly efficient and provides immediate water and storacge capacity with a very low carbon footprint. Inthis home it is fitted with an addiitonal heating element that uses excess on site generated energy to raise the water temp by 25% during daylight. This allow increased efficiency of the system.

13. Cost.

Cost of construction of this home has been withheld but believed to be in the region of $2million AUD. The cost of reaching Passive House certification was estimated by the owner/builder to be 15% of the material and labour. No allowance has been made for the operational savings or asset replacement over the life of the building.

15. PHPP-Ergebnisse

PHI Low Energy Building Verification

Building:	Residential		
Street:	84 Owen Lane		
Postcode/City:	4066	brisbane	
Province/Country:	Queensland	AU-Australia	
Building type:	Residential		
Climate data set:	ud---00-AU0014a-Brisbane		
Climate zone:	5: Warm	Altitude of location:	36 m
Home owner / Client:	Solaire Properties Pty Ltd		
Street:	Milton		
Postcode/City:		Brisbane	
Province/Country:	Queensland	Australia	

Architecture:	Joe Adsett Architects		
Street:	35 Warry Strett		
Postcode/City:	4006	Brisbane	
Province/Country:	Qld	Australia	
Energy consultancy:	Ecolateral Pty Ltd		
Street:	8 Sassafras St The Gap		
Postcode/City:	4061		
Province/Country:	Qld	AU-Australia	

Mechanical engineer:			
Street:			
Postcode/City:			
Province/Country:			
Certification:	Luc Plowman		
Street:	18 Fletcher Rd Beechworth		
Postcode/City:	3474		
Province/Country:	Victoria		

Year of construction:	2020	Interior temperature winter [°C]:	20.0
No. of dwelling units:	1	Internal heat gains (IHG) heating case [W/m²]:	2.3
No. of occupants:	3.2	Specific capacity [Wh/K per m² TFA]:	84

Interior temp. summer [°C]:	25.0	
IHG cooling case [W/m²]:	2.3	
Mechanical cooling:	x	

Specific building characteristics with reference to the treated floor area — **The PHPP has not been filled completely; it is not valid as verification**

					Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	253.4				
Space heating	Heating demand	kWh/(m²a)	6	≤	30	-	yes
	Heating load	W/m²	9	≤	-	-	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	17	≤	34	-	yes
	Cooling load	W/m²	14	≤	-	-	
	Frequency of overheating (> 25 °C)	%	-	≤	-		-
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	10		yes
Airtightness	Pressurization test result n_{50}	1/h	0.7	≤	1.0		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	60	≤	-		-
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	30	≤	75	75	yes
	Generation of renewable energy (in relation to projected building footprint	kWh/(m²a)	90	≥	-	-	

[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.

Low Energy Building? yes

Task:	First name:	Surname:	Signature:
1-Designer	john	moynihan	

Issued on:	City:
	Brisbane Australia