

# Project Documentation | Gebäude-Dokumentation



## 1. Abstract | Zusammenfassung



## Wheelhouse

### 1.1 Building Data | Gebäudedaten

|   |                               |   |                                    |
|---|-------------------------------|---|------------------------------------|
| Year of construction<br>Baujahr           | 2021                          | <b>Space heating<br/>Heizwärmebedarf</b>                                  | <b>12<br/>kWh/(m<sup>2</sup>a)</b> |
| U-value external wall<br>U-Wert Außenwand | 0.212<br>W/(m <sup>2</sup> K) |   |                                    |
| U-value basement<br>U-Wert Kellerdecke    | 0.158<br>W/(m <sup>2</sup> K) | Primary Energy Renewable (PER)<br>Erneuerbare Primärenergie (PER)         | 38 kWh/(m <sup>2</sup> a)          |
| U-value roof<br>U-Wert Dach               | 0.146<br>W/(m <sup>2</sup> K) | Generation of renewable Energy<br>Erzeugung erneuerb. Energie             | 0 kWh/(m <sup>2</sup> a)           |
| U-value window<br>U-Wert Fenster          | 0.96<br>W/(m <sup>2</sup> K)  | Non-renewable Primary Energy (PE)<br>Nicht erneuerbare Primärenergie (PE) | 87 kWh/(m <sup>2</sup> a)          |
| Heat recovery<br>Wärmerückgewinnung       | 83 %                          | Pressurization test n <sub>50</sub><br>Drucktest n <sub>50</sub>          | 0.36 h <sup>-1</sup>               |

## 1.2 Brief Description

## Kurzbeschreibung der Bauaufgabe

### Wheelhouse

The project a single level family home on a sloping site with outstanding views over Whitby and Porirua Harbour (Pāuatahanui Arm).

The narrow site limited most windows and views to the east and west, therefore, opportunities for views to the north and beneficial solar gain are maximised to dramatic effect.

The living area is made up of several rooms that are partially open plan creating an open flow between spaces. Vistas are available in all directions both directly and indirectly through other spaces. The central ceiling follows the slope of the roof upwards towards the north, emphasising the dramatic large window and view to the north

The sleeping area is made up of a main bedroom with ensuite, 2 family bedrooms and a semi self-contained 4<sup>th</sup> bedroom attached to the family bathroom. This is a cellular part of the house separated from the living areas to provide privacy and quiet. The bedrooms accommodate two generations living in the house and frequent visits from the third and fourth generation of the family.

### Steuerhaus

Das Projekt ist ein einstöckiges Einfamilienhaus in Hanglage mit herrlichem Blick über Whitby und Porirua Harbour (Pāuatahanui Arm).

Der schmale Standort begrenzte die meisten Fenster und Blicke nach Osten und Westen, daher werden die Möglichkeiten für Blicke nach Norden und vorteilhafte Sonnengewinne auf dramatische Weise maximiert.

Der Wohnbereich besteht aus mehreren Räumen, die teilweise offen gestaltet sind und einen offenen Fluss zwischen den Räumen schaffen. Aussichten sind in alle Richtungen sowohl direkt als auch indirekt durch andere Räume verfügbar. Die zentrale Decke folgt der Dachschräge nach Norden und betont die dramatische große Fensterfront und den Blick nach Norden  
Der Schlafbereich besteht aus einem Hauptschlafzimmer mit eigenem Bad, 2 Familienschlafzimmern und einem halb in sich geschlossenen 4. Schlafzimmer, das an das Familienbadzimmer angeschlossen ist. Dies ist ein zellularer Teil des Hauses, der von den Wohnbereichen getrennt ist, um Privatsphäre und Ruhe zu bieten. Die Schlafzimmer beherbergen zwei im Haus lebende Generationen und häufige Besuche der dritten und vierten Generation der Familie.

### 1.3 Responsible project participants | Verantwortliche Projektbeteiligte

|   |  |
|---|--|
| Architect<br>Entwurfsverfasser                | Elrond Burrell, VIA architecture Ltd<br><a href="https://via-architecture.net">https://via-architecture.net</a>  |
| Implementation planning<br>Ausführungsplanung |  |
| Building systems<br>Haustechnik               | Elrond Burrell, VIA architecture Ltd<br><a href="https://via-architecture.net">https://via-architecture.net</a>  |
| Structural engineering<br>Baustatik           | John Wilson, King & Dawson architects & engineers Ltd<br><a href="https://kd.net.nz">https://kd.net.nz</a>   |
| Building physics<br>Bauphysik                 | Elrond Burrell, VIA architecture Ltd<br><a href="https://via-architecture.net">https://via-architecture.net</a>  |
| Passive House project<br>planning             | Elrond Burrell, VIA architecture Ltd<br><a href="https://via-architecture.net">https://via-architecture.net</a>  |
| Passivhaus-Projektierung                      |  |
| Construction management<br>Bauleitung         | Chris Beggs, North Face Construction Ltd<br><a href="https://www.northface.co.nz">https://www.northface.co.nz</a>  |
| Certifying body<br>Zertifizierungsstelle      | Jason Quinn, Sustainable Engineering Ltd<br><a href="https://sustainableengineering.co.nz">https://sustainableengineering.co.nz</a>  |
| Certification ID<br>Zertifizierungs ID        | Project-ID ( <a href="https://passivehouse-database.org/">https://passivehouse-database.org/</a> )      6637<br>Projekt-ID ( <a href="http://passivhausprojekte.de/">http://passivhausprojekte.de/</a> ) |
| Author of project<br>documentation            | Elrond Burrell, VIA architecture Ltd<br><a href="https://via-architecture.net">https://via-architecture.net</a>  |
| Verfasser der Gebäude-<br>Dokumentation       |  |

Date, Signature  
Datum, Unterschrift

24 July 2021



## 2. Exterior Photos | Ansichtsfotos



North and west facades



West and south facades (garage on the south)



East facade

### 3. Interior Photos | Innenfoto exemplarisch

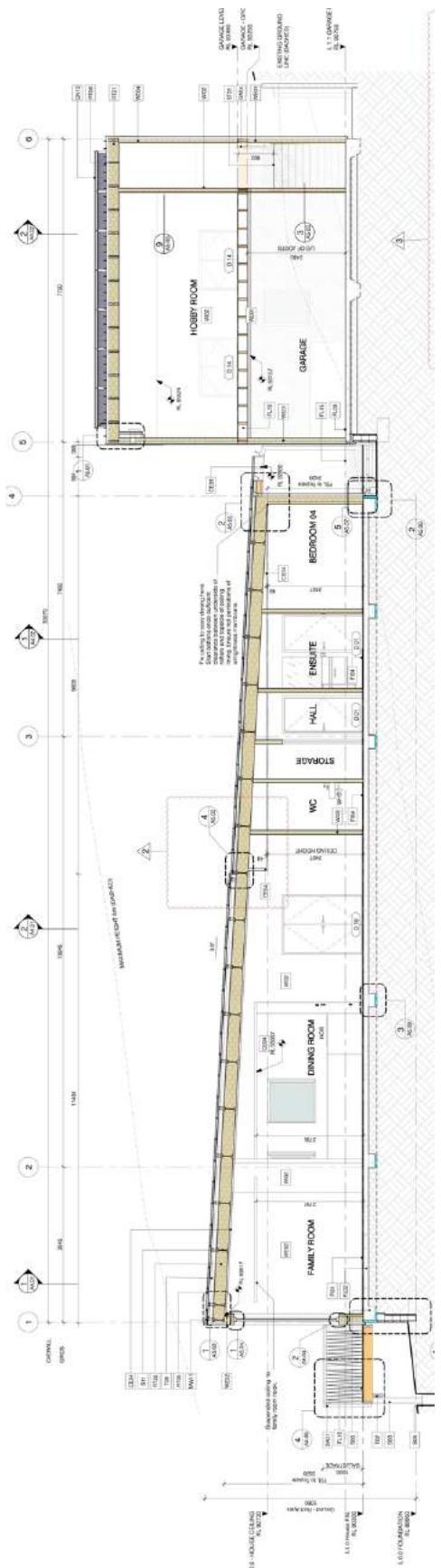


Living areas looking towards the northwest

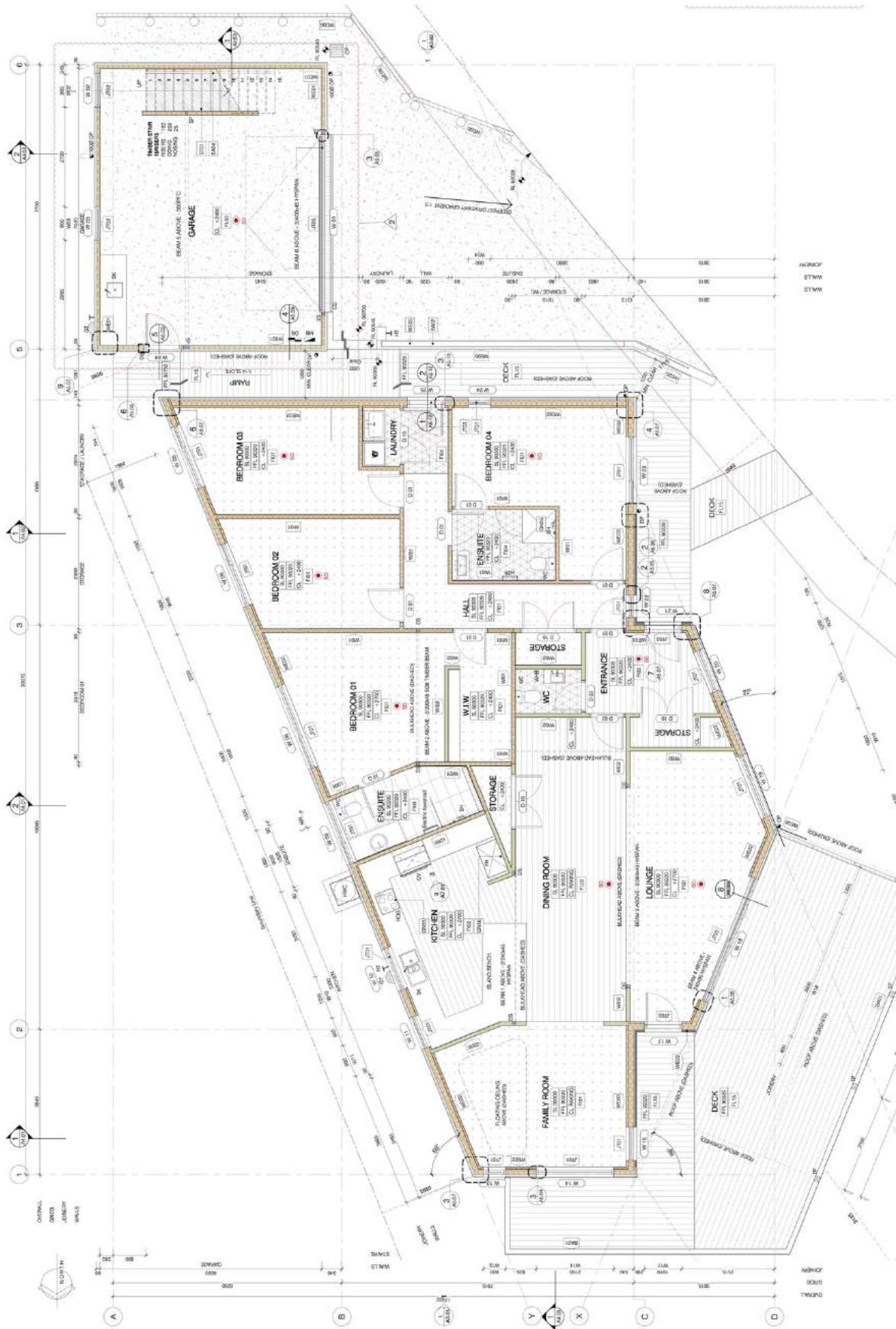


Living areas looking towards the east

#### 4. Section | Schnittzeichnung

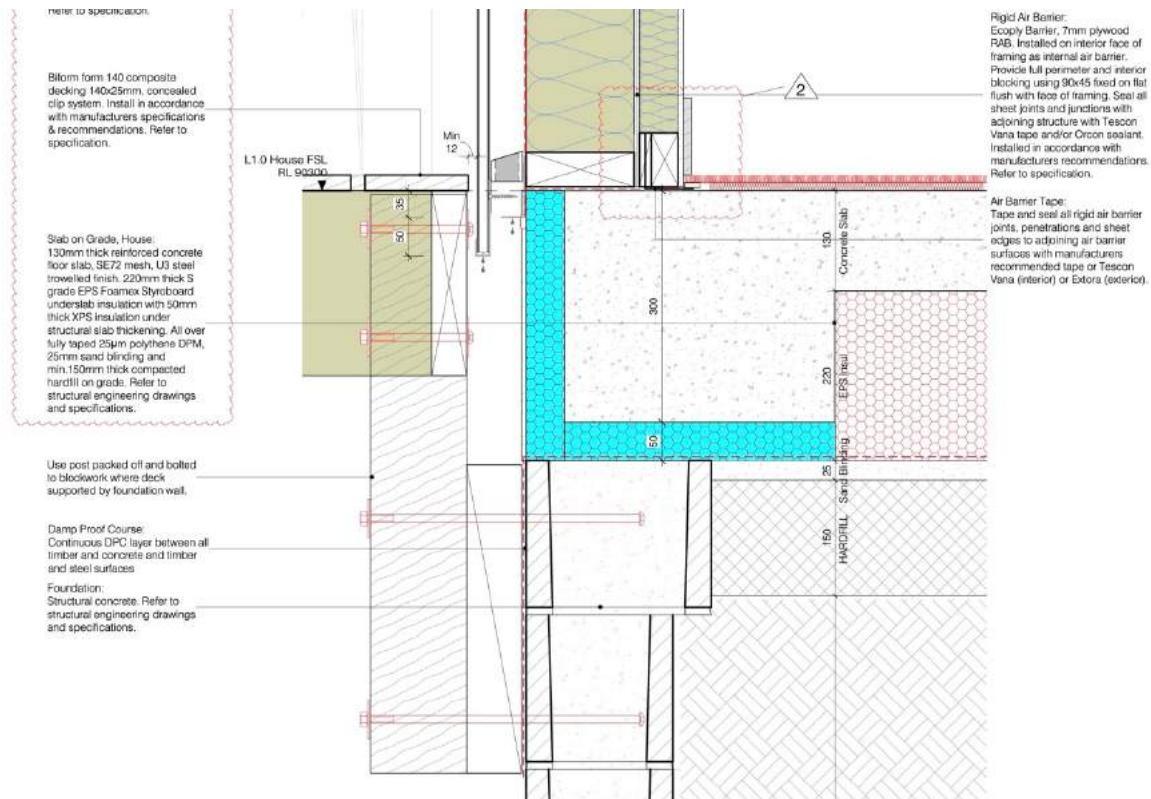


## 5. Floor plans | Grundrisse



## 6. Floor slab/ basement ceiling construction| Konstruktion der Bodenplatte

The floor slab is 130mm reinforced concrete (reduce to 100mm in shower recesses) on 220mm EPS insulation with 50mm XPS insulation below ground beams and edge thickenings and on the slab edge. Ground beams are supported on timber piles. Where the floor level is above natural ground, there is a concrete block retaining wall around the slab perimeter. 20mm diameter stainless steel connection rods tie the slab to the retaining wall. U-value = 0.158 W/(m<sup>2</sup>K)



Slab edge detail



Slab edge construction

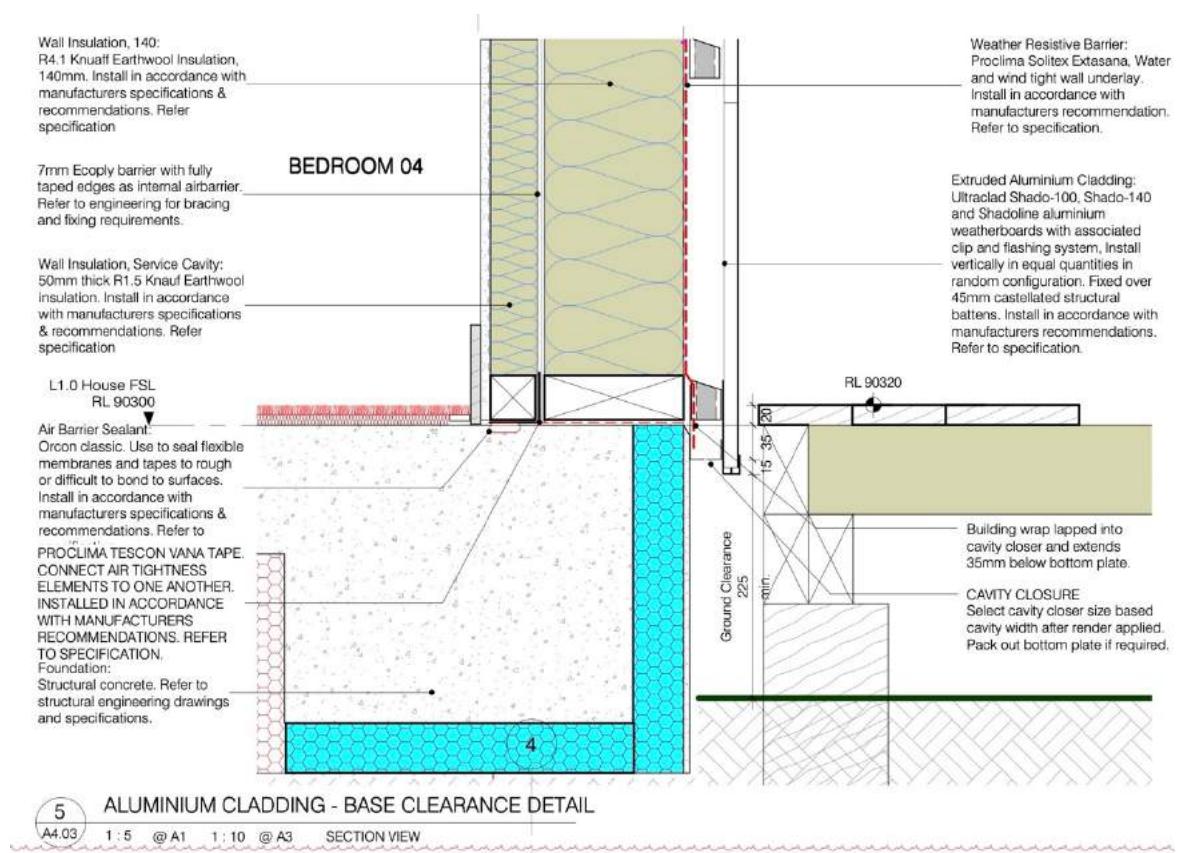


Slab edge thickening construction

## 7. Wall construction | Konstruktion der Außenwände

The walls are 140mm timber framing cantilevered 50mm over the slab edge (in line with slab edge insulation) with a flexible external wall underlay (pro clima Solitex Extasana), structural cavity battens and extruded aluminium weatherboard cladding (Ullrich Ultraclad). Cladding in selected locations is render on 60mm AAC panels on 20mm EPS cavity battens (Specialized EZPanel system). The air/vapour control layer is 7mm Ecoply Barrier on the inside of the framing, 70x35mm timber battens are packed off with 18mm plywood blocks to create a 50mm insulated service cavity, lined with 10mm plasterboard (USG Boral Sheetrock) on the inside. Knauf Earthwool glasswool insulation is used in the walls.

U-value = 0.212 W/(m<sup>2</sup>K)



External wall detail



External wall framing construction

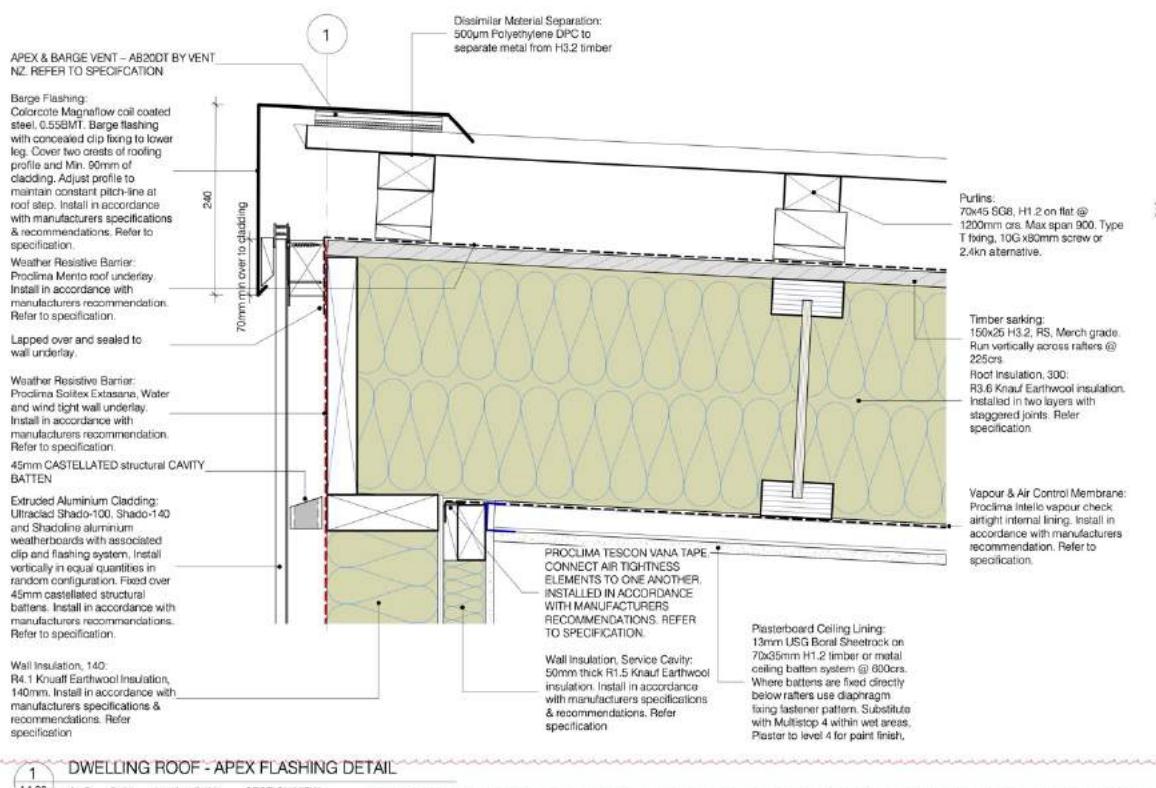


Framing cantilevered over edge insulation

## 8. Roof construction | Konstruktion des Daches

The skillion roof is made up with 300mm I-beam purlin rafters (CHH Hyjoist) with 25mm sarking boards, a flexible roof underlay (pro clima Solitex Mento), timber purlins and profile sheet metal roof cladding (Quin buildings QD5). The air/vapour control layer on the underside of the roof is a flexible membrane (pro clima Intello). 70x35mm timber battens create a service cavity, lined with 13mm plasterboard (USG Boral Sheetrock) on the ceiling. Two layers of Knauf Earthwool glasswool insulation are used in the roof.

U-value = 0.146 W/(m<sup>2</sup>K)



Roof detail



Roof Construction

## 9. Window and window installation | Fenster und Fenster-Einbau

The windows are batimet GmbH, TA35 SE FV Aluminium-clad timber frame, insulated by EPS foam. There is one sliding door which is a TA35 DSP and the entrance doors are TA35 DSE TNI. The windows and doors were manufactured by FT-Vilstal GmbH in Germany.

Window  $U_f = 0.72$  to  $0.77 \text{ W}/(\text{m}^2\text{K})$

Doors  $U_f = 1.40 \text{ W}/(\text{m}^2\text{K})$

The windows and doors all use triple glazing with two low-E coatings (6:/14/4/14/:6 90% Ar)

$U_g$ -value =  $0.63 \text{ W}/(\text{m}^2\text{K})$

g-value = 52 %



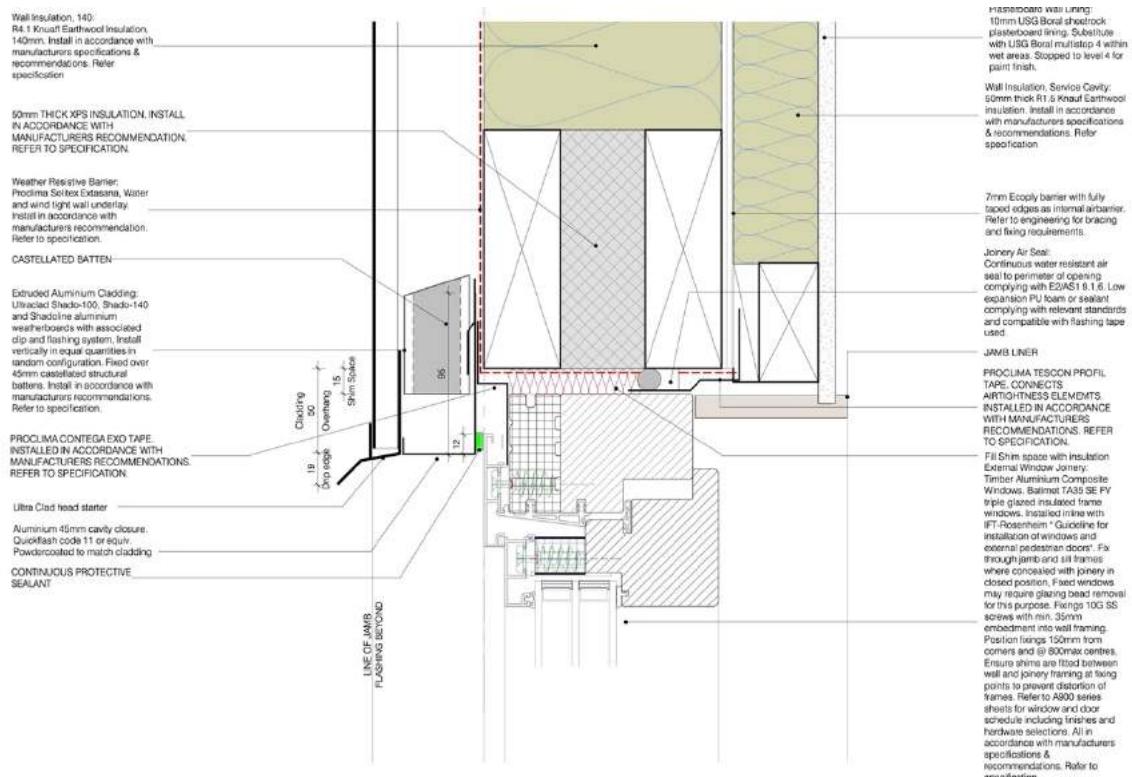
Window installation - outside



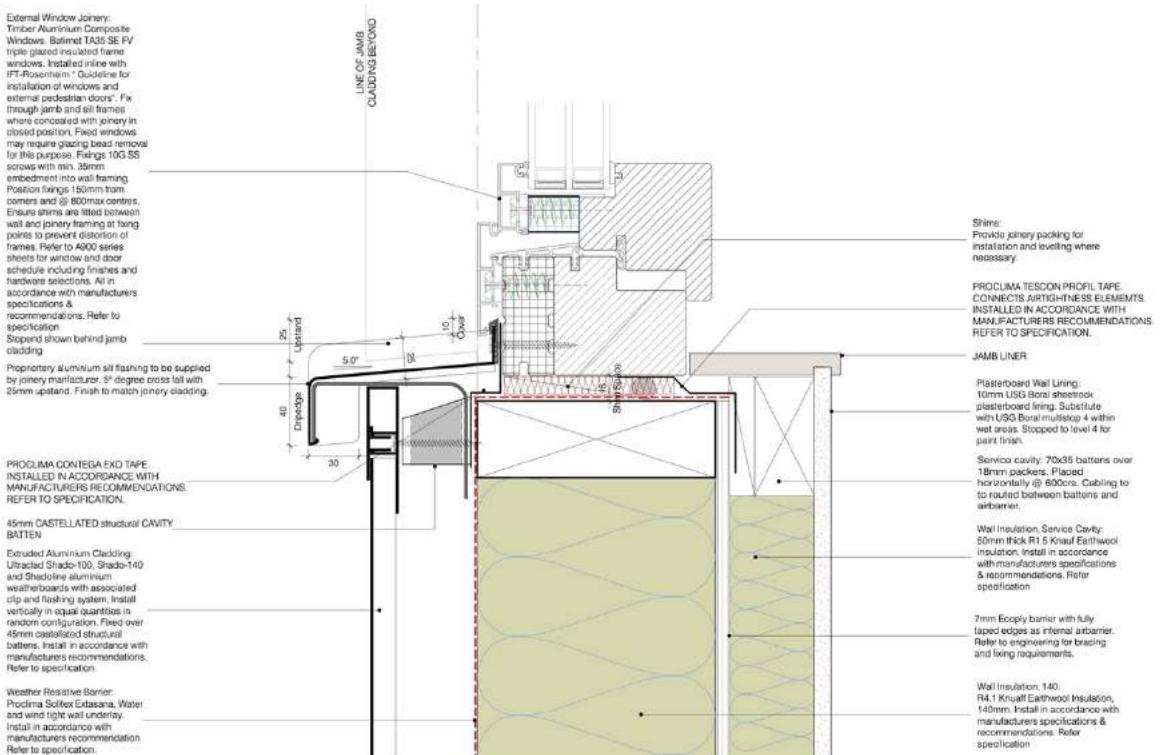
Window installation - inside



Insulated lintel construction



## Window Head detail



## Window sill detail

## 10. Air leakage testing | Beschreibung der luftdichten Hülle

The internal air/vapour control layer is 7mm Ecopy Barrier on the walls, pro clima Intello membrane on the roof, and the concrete slab on the floor. Pro clima tapes and sealants are used for joints and junctions.

$$n_{50} = 0.36 \text{ 1/h}$$

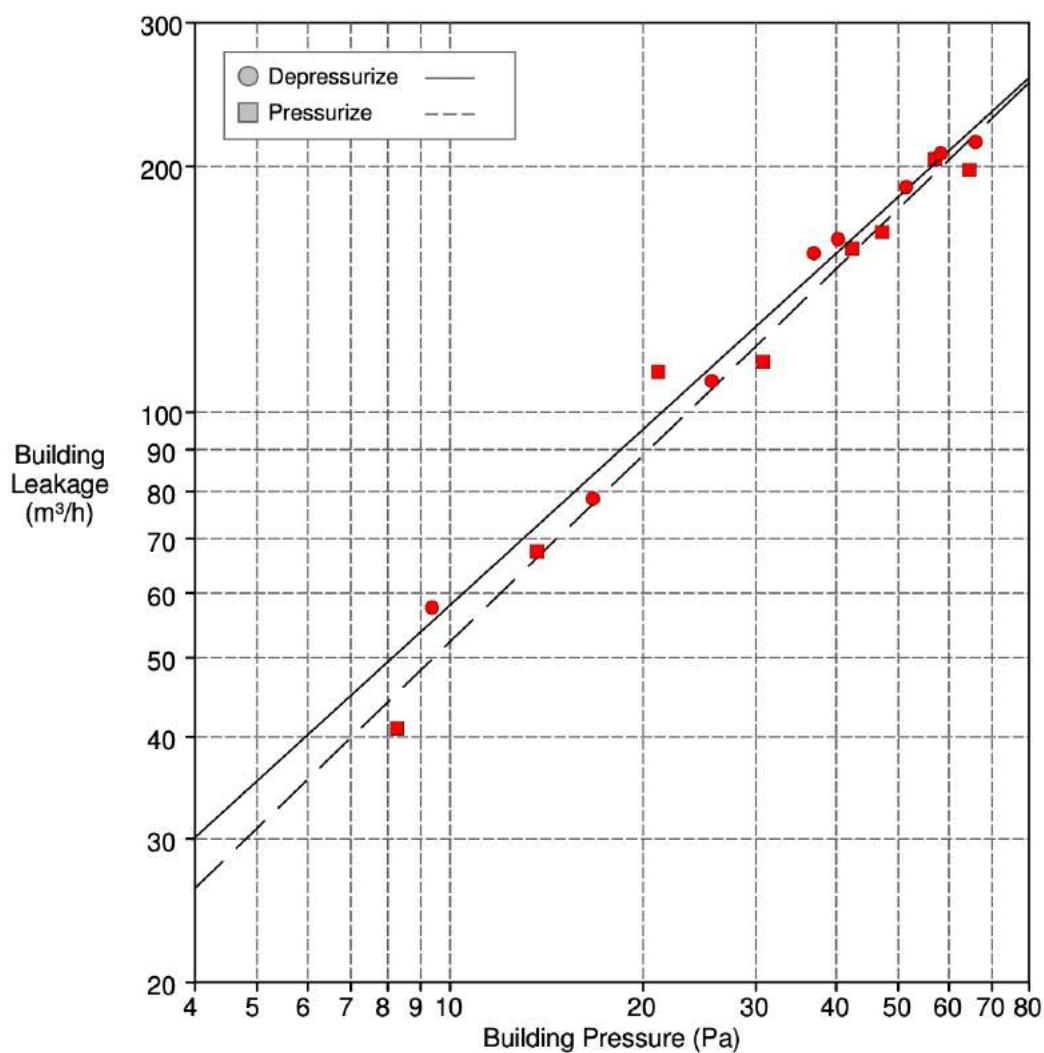
$$q_{E50} = 0.27 \text{ m}^3/(\text{h.m}^2 \text{ Envelope Area})$$



Ecopy Barrier



pro clima Intello

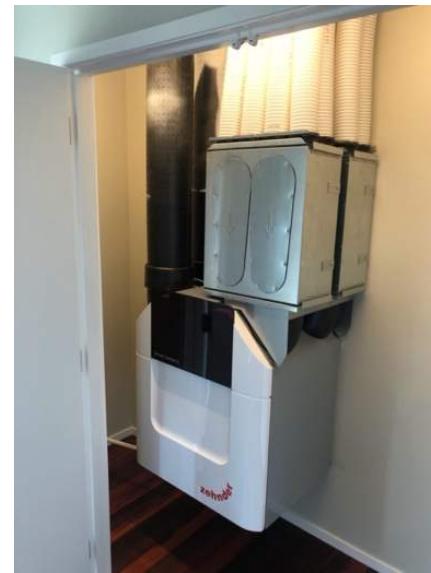


## 11. MVHR | Lüftungsgerät

Unit: Zehnder Q350 HRV

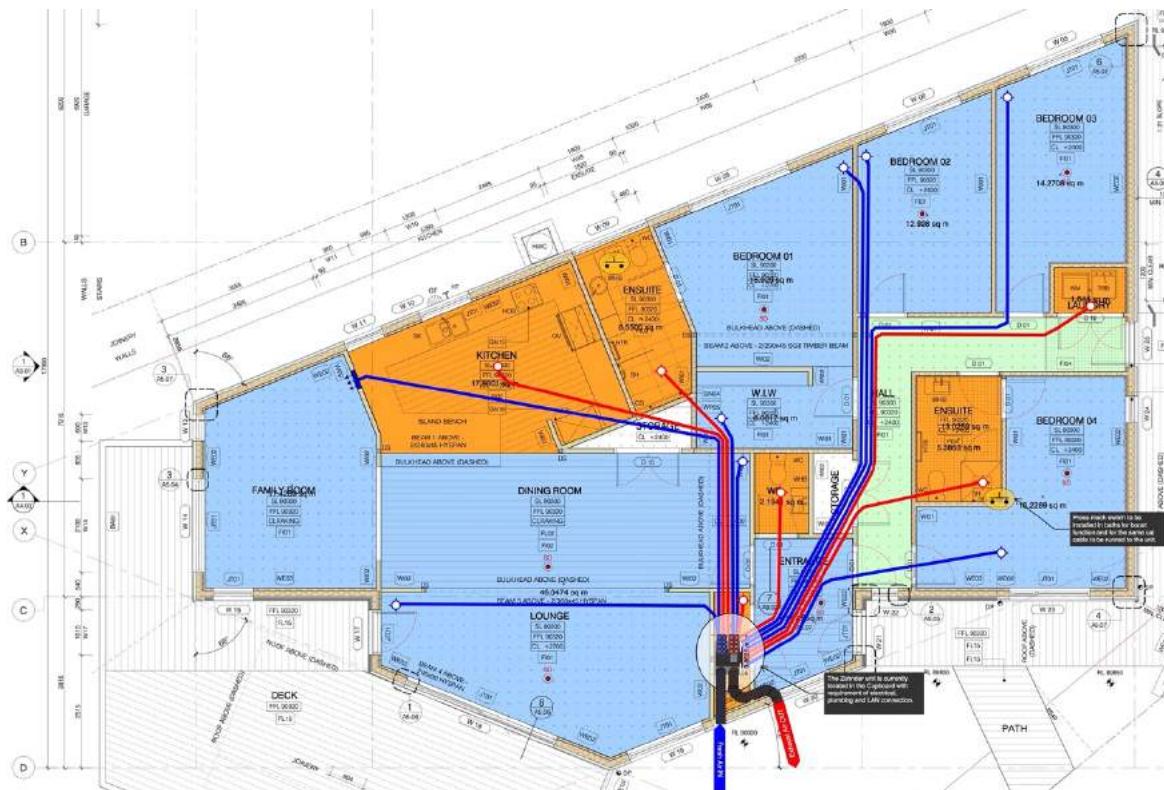
Specific Heat Recovery Efficiency: 82.8%  
Specific Electrical Efficiency: 0.24 Wh/m<sup>3</sup>

The unit is installed inside the thermal envelope near to the external wall.



## 12. Ventilation ductwork | Lüftungsplanung Kanalnetz

The ventilation is designed as a cascade system with fresh air supplied to living spaces, moving through transition spaces with undercut doors and being extracted from wet rooms.



### 13. Heating systems | Wärmeversorgung

Space heating is provided with a high-wall heat pump (mini-split) in the main living space that can also provide cooling. The unit is a Mitsubishi MSZ-GL25 and can provide 3.2 kW heating and 2.5kW cooling. Additionally, there are heated towel rails in the bathrooms.

Hot water is provided by a heat pump hot water system (Syiebel Eltron WWK 302) located outside the house.



High wall heat pump in the living space



Electric towel rails in bathrooms

### 14. Building costs | Baukosten

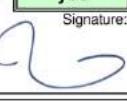
Not available.

### 15. Publications featuring the building | Literatur

Sustainable Engineering case study:

<https://sustainableengineering.co.nz/casestudy/wheelhaus/>

## 16. PHPP | Ergebnisse

| Passive House Verification  |   |   |                      |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
|---|---|---|----------------------|---|--|---|--|---|--|--|-----------------------|----------|----------------------|------------|---------------|--------------------------|-------|----|-----|--|-------------------|-------|---|--|---------------|-----------------------------------|------|----|-----|--|-------------------|-------|---|--|--|--------------------------------------|---|---|--|--|--|------|----|-----|--------------|--|------|-----|-----|-----------------------------------|---------------------|-------|---|--|--------------------------------|----------------------|-------|----|-----|--|---|------|---|--|
|    |   |   |                      |   | <b>Building:</b> Wheehouse<br>Street: Whitby<br>Province/City: Porirua NZ-New Zealand<br>Building type: Single Family Dwelling<br>Climate data set: NZ0002a-Wellington<br>Climate zone: 4: Warm-temperate Altitude of location: 90 m |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| <b>Home owner / Client:</b><br>Street: Whitby<br>Postcode/City: Porirua NZ-New Zealand  |   |   |                      |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| <b>Builder:</b> North Face Construction Ltd<br>Street: 887a State Highway 1<br>Postcode/City: 5581 Te Horo<br>Province/Country: Te Horo NZ-New Zealand  |   |   |                      |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| <b>Certification:</b> Sustainable Engineering<br>Street: 76 Virginia Road<br>Postcode/City: 4500 Whanganui<br>Province/Country: Whanganui NZ-New Zealand  |   |   |                      |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| <b>Architecture:</b> VIA Architecture Ltd<br>Street: PO Box 1707<br>Postcode/City: 5252 Paraparaumu Beach<br>Province/Country: NZ-New Zealand   |   | <b>Energy consultancy:</b> VIA Architecture Ltd<br>Street: PO Box 1707<br>Postcode/City: 5252 Paraparaumu Beach<br>Province/Country: NZ-New Zealand |                      | Year of construction: 2021<br>No. of dwelling units: 1<br>No. of occupants: 3.1 |  | Interior temperature winter [°C]: 20.0<br>Internal heat gains (IHG) heating case [W/m²]: 2.4<br>Specific capacity [Wh/K per m² TFA]: 84 |  | Interior temp. summer [°C]: 25.0<br>IHG cooling case [W/m²]: 2.4<br>Mechanical cooling: x           |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| <b>Specific building characteristics with reference to the treated floor area</b> <table border="1"> <thead> <tr> <th></th> <th>Treated floor area m²</th> <th>Criteria</th> <th>Alternative criteria</th> <th>Fulfilled?</th> </tr> </thead> <tbody> <tr> <td>Space heating</td> <td>Heating demand kWh/(m²a)</td> <td>12.01</td> <td>15</td> <td>yes</td> </tr> <tr> <td></td> <td>Heating load W/m²</td> <td>11.47</td> <td>-</td> <td></td> </tr> <tr> <td>Space cooling</td> <td>Cooling &amp; dehum. demand kWh/(m²a)</td> <td>5.33</td> <td>15</td> <td>yes</td> </tr> <tr> <td></td> <td>Cooling load W/m²</td> <td>10.82</td> <td>-</td> <td></td> </tr> <tr> <td></td> <td>Frequency of overheating (&gt; 25 °C) %</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td></td> <td>Frequency of excessively high humidity (&gt; 12 g/kg) %</td> <td>0.00</td> <td>10</td> <td>yes</td> </tr> <tr> <td>Airtightness</td> <td>Pressurization test result n<sub>50</sub> 1/h</td> <td>0.36</td> <td>0.6</td> <td>yes</td> </tr> <tr> <td>Non-renewable Primary Energy (PE)</td> <td>PE demand kWh/(m²a)</td> <td>87.49</td> <td>-</td> <td></td> </tr> <tr> <td>Primary Energy Renewable (PER)</td> <td>PER demand kWh/(m²a)</td> <td>37.59</td> <td>60</td> <td>yes</td> </tr> <tr> <td></td> <td>Generation of renewable energy (in relation to projected building footprint area)</td> <td>0.00</td> <td>-</td> <td></td> </tr> </tbody> </table> |   |   |                      |   |  |   |  |   |  |  | Treated floor area m² | Criteria | Alternative criteria | Fulfilled? | Space heating | Heating demand kWh/(m²a) | 12.01 | 15 | yes |  | Heating load W/m² | 11.47 | - |  | Space cooling | Cooling & dehum. demand kWh/(m²a) | 5.33 | 15 | yes |  | Cooling load W/m² | 10.82 | - |  |  | Frequency of overheating (> 25 °C) % | - | - |  |  | Frequency of excessively high humidity (> 12 g/kg) % | 0.00 | 10 | yes | Airtightness | Pressurization test result n <sub>50</sub> 1/h | 0.36 | 0.6 | yes | Non-renewable Primary Energy (PE) | PE demand kWh/(m²a) | 87.49 | - |  | Primary Energy Renewable (PER) | PER demand kWh/(m²a) | 37.59 | 60 | yes |  | Generation of renewable energy (in relation to projected building footprint area) | 0.00 | - |  |
|   | Treated floor area m²   | Criteria  | Alternative criteria | Fulfilled?  |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Space heating   | Heating demand kWh/(m²a)  | 12.01   | 15                   | yes   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
|   | Heating load W/m²   | 11.47   | -                    |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Space cooling   | Cooling & dehum. demand kWh/(m²a)   | 5.33  | 15                   | yes   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
|   | Cooling load W/m²   | 10.82   | -                    |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
|   | Frequency of overheating (> 25 °C) %  | -   | -                    |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
|   | Frequency of excessively high humidity (> 12 g/kg) %                              | 0.00  | 10                   | yes   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Airtightness  | Pressurization test result n <sub>50</sub> 1/h                                    | 0.36  | 0.6                  | yes   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Non-renewable Primary Energy (PE)   | PE demand kWh/(m²a)   | 87.49   | -                    |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Primary Energy Renewable (PER)  | PER demand kWh/(m²a)  | 37.59   | 60                   | yes   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
|   | Generation of renewable energy (in relation to projected building footprint area) | 0.00  | -                    |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| <small><sup>2</sup> Empty field: Data missing; '-' No requirement</small>   |   |   |                      |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| 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.   |   |   |                      |   |  |   |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Task:<br>2-Certifier  |   | First name:<br>Jason  |                      | Surname:<br>Quinn   |  | Passive House Classic?<br><input checked="" type="checkbox"/>   |  | Signature:<br> |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |
| Certificate ID<br>31254_SENZ_PH_20210621_JEQ  |   | Issued on:<br>21/06/21  |                      | City:<br>Whanganui  |  |    |  |   |  |  |                       |          |                      |            |               |                          |       |    |     |  |                   |       |   |  |               |                                   |      |    |     |  |                   |       |   |  |  |                                      |   |   |  |  |  |      |    |     |              |  |      |     |     |                                   |                     |       |   |  |                                |                      |       |    |     |  |   |      |   |  |

## 17. Temperature Monitoring | Temperaturüberwachung

After the owners moved in, with their permission, we installed a Netatmo weather station with an indoor and outdoor unit. We have been informally monitoring the temperature, humidity and CO<sub>2</sub> concentration for the 3 months since. The graphs below show a week in July (winter). The outdoor temperature ranges from 5 °C to 16.6 °C, while the indoor temperature stay comfortably between 19.4 °C and 23.3 °C with very space heating being used. (Mainly the towel rails.)

