PROJECT DOCUMENTATION

Certified
Passive House
Passive House Institute
| classic | plus | premium |

ABSTRACT

STANDALONE RESIDENTIAL FAMILY HOME IN OHOKA, CHRISTCHURCH, NEW ZEALAND

BUILDING DATA

Year of Construction	2018/19	Space Heating	25 kWh/(m²a)
U-Value External Wall	0.200 W/m²K		
U-Value floor	0.147 W/m²K	Primary Energy Demand (PER)	55 kWh/(m²a)
U-Value roof	0.133 W/m²K	Generation of Renewable Energy	0 kWh/(m²a)
U-Value windows	0.94 W/m²K	Non-renewable Primary Energy (PE)	126 kWh/(m²a)
Heat Recovery	81.5%	Pressurization test n_{50}	0.3
Special features	Prefabricated wall elements http://www.prefabnz.com/News/gibbons-family-home-precise-prefabrication		

BRIEF DESCRIPTION

The family home was designed for the family of Simon Gibbon who has been part of the Proclima family since the product got introduced into New Zealand about 10 years ago.

Having been exposed to high performance housing market for a long period of time naturally the choice to build a Passive House was a given and construction methods were chosen to accommodate the use of Proclima products. The timber framing method using a service cavity had been proven to be most effective in the New Zealand market, for cost and constructability, for external wall and roof. The insulation values that can be achieved are generally sufficient for the New Zealand climate and have been the popular choice for many other high-performance houses.

The building is designed around the horse paddocks and hence has a barn style verandah around the East and Northern elevations facing the property entrance and paddocks.
The West elevations include the garage, boat shed and entrance area with limited window openings to prevent overheating during the afternoons.

Architecture	Wyatt and Grey Architects Ltd https://www.wyattgrayarchitects.nz
Implementation Planning	Wyatt and Grey Architects Ltd https://www.wyattgrayarchitects.nz
Building Systems	Fantech (NZ) Ltd https://www.fantech.com.au
Structural Engineer	
Building Physics	BEO Ltd https://beo.co.nz
Passive House Planning	BEO Ltd https://beo.co.nz
Construction Management	L Johnston Construction Ltd
Certifying Body	Sustainable Engineering Ltd https://sustainableengineering.co.nz
Certification ID	5299 https://passivehouse-database.org/#d_5299

AUTHOR OF PROJECT DOCUMENTATION

BEO Ltd
https://beo.co.nz

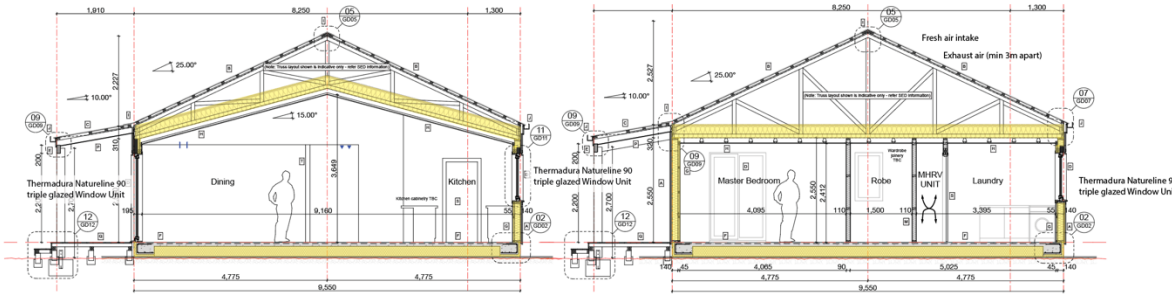
Date
28 January 2020

Signature

1. BUILDING PHOTOS

2. INTERIOR PHOTOS

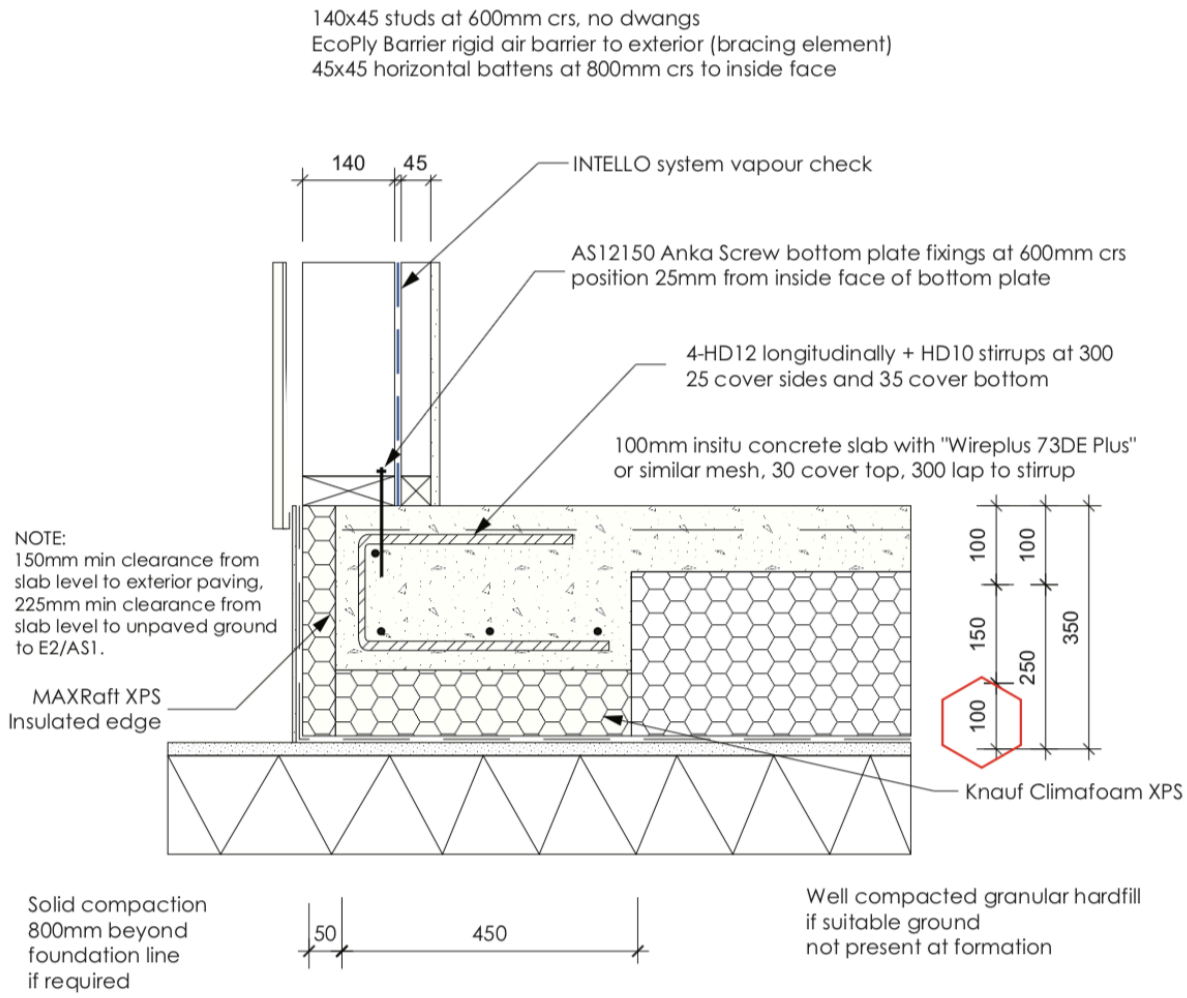
3. SECTION



4. PLAN

5. FOUNDATION AND FLOOR CONSTRUCTION

MAXRaft Slab Edge Detail
1:10



Assembly no.		Interior insulation?
03ud	Ground floor - MaxRaft	

Heat transmission resistance [m²K/W]

Orientation of building element:	3-Floor	interior R_{si}:	0.17
Adjacent to:	2-Ground	exterior R_{se}:	0.00

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Concrete	2.400					100
EPS- sGrade	0.038					250

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
100%			35.0 cm

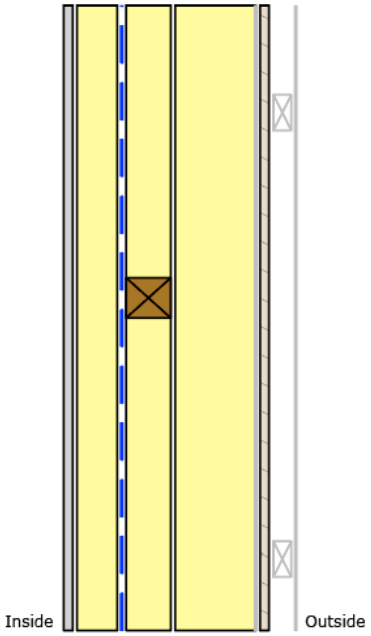
U-value supplement: W/(m²K)

U-value: 0.147 W/(m²K)

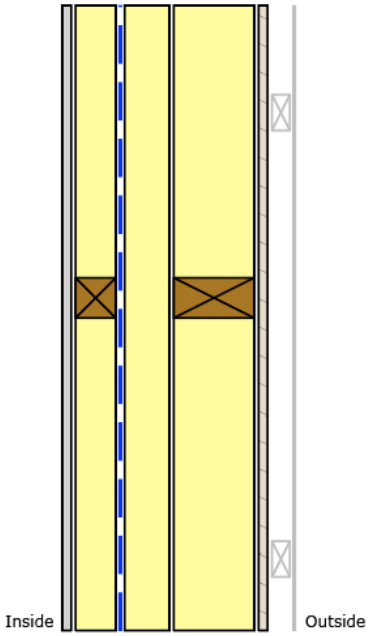
6. EXTERNAL WALL

During construction the project owner decided to change the external wall insulation from a 140mm thick insulation to a 90mm, plus a 50mm insulation product.

EXTERNAL WALL
Section view



EXTERNAL WALL
Plan view



Assembly no.						Interior insulation?
04ud	External wall new					

Heat transmission resistance [m²K/W]

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

Adjacent to: 3-Ventilated — exterior R_{se}: 0.13

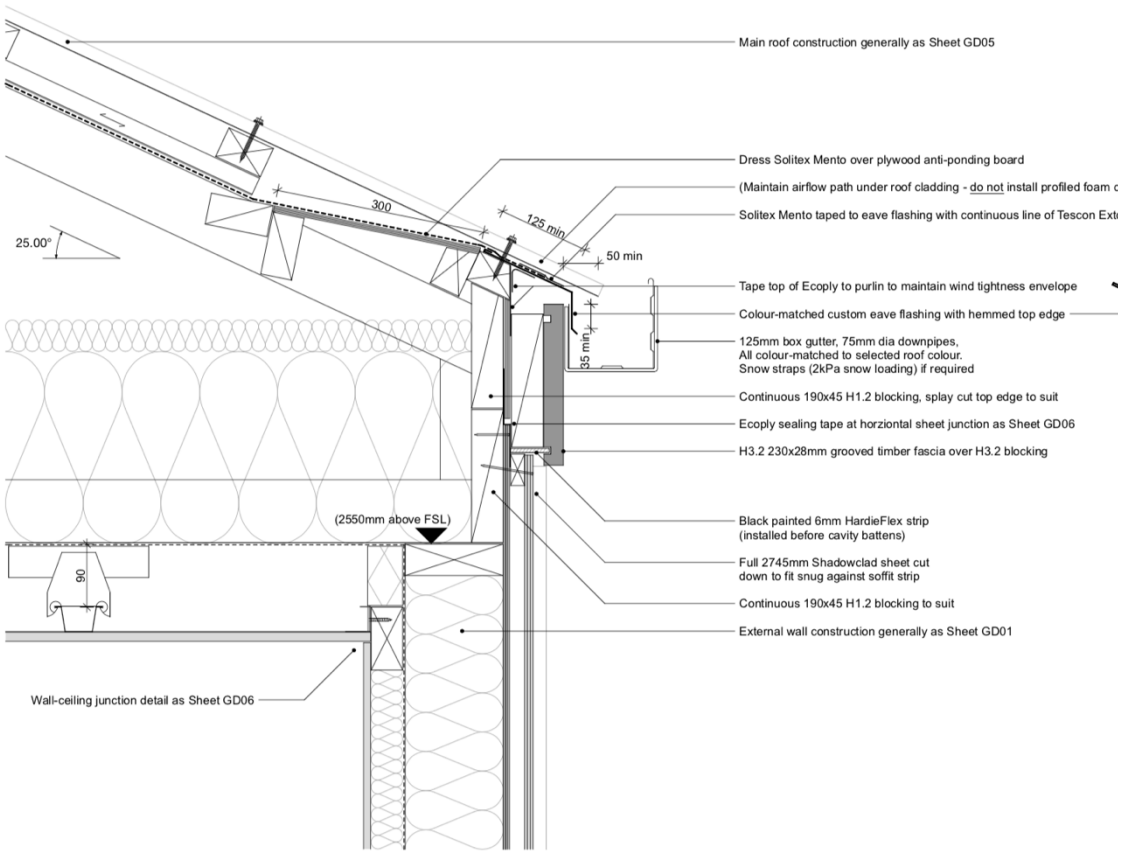
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Plywood	0.120					9
Knauf, R2.8	0.032	Timber Studs and dwangs	0.120			90
Knauf R, 1.4	0.036			Studs	0.120	50
Knauf R, 1.4	0.036			battens	0.120	45
Plasterboard	0.250					12

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
79%	13.1%	7.5%	20.6 cm

U-value supplement: W/(m²K)

U-value: 0.200 W/(m²K)

7. ROOF CONSTRUCTION



Assembly no.		Interior insulation?
02ud	Roof	

Heat transmission resistance [m²K/W]

Orientation of building element	1-Roof	interior R_{si}	0.10
Adjacent to	3-Ventilated	exterior R_{se}	0.10

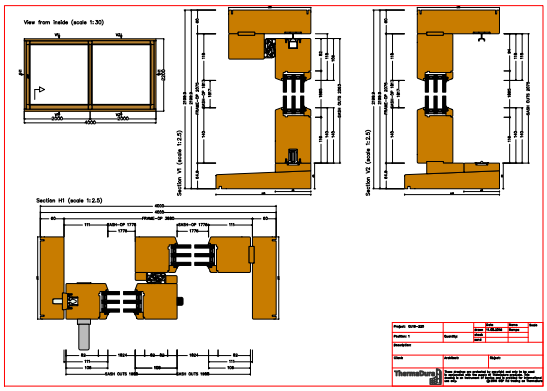
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Knauf R6.3	0.044	Rafters	0.120			275
R1.4	0.036			battens	0.120	50
air layer	0.220					40
Plasterboard	0.250					12

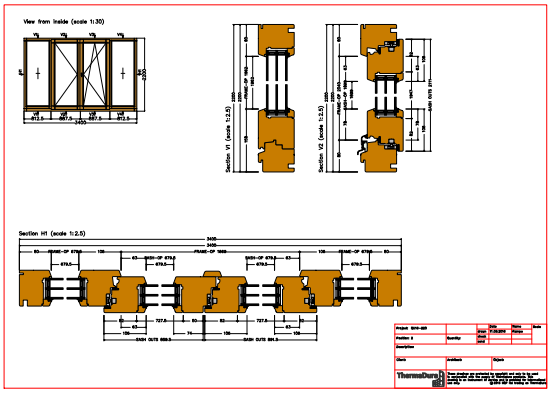
Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
89%	5.5%	5.5%	37.7 cm

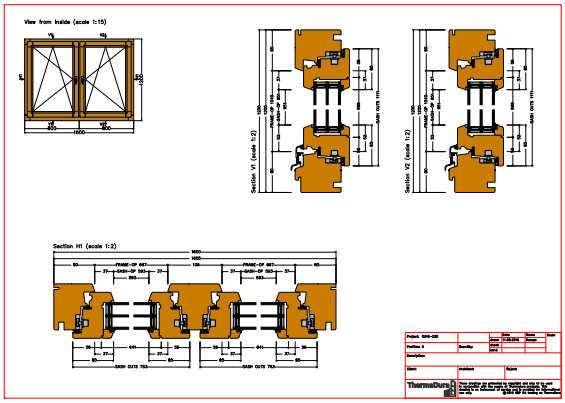
U-value supplement: W/(m²K)

U-value: 0.133 W/(m²K)

8. WINDOWS AND WINDOW INSTALLATION

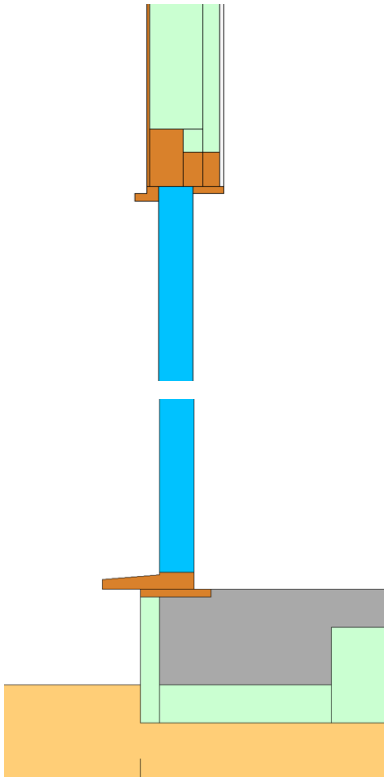


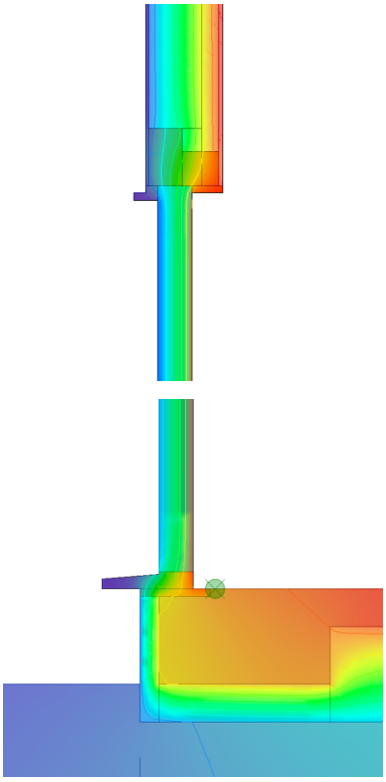




Window Supplier	Thermadura
Frame description	Natureline 90
Frame U-Value	1.12
Glass description	Silverstar EN2 plus 4-20-4-20-4 90% Ar
Glass U-Value	0.55
Glass g-Value	0.53

Window Installation Head and Sill, Foundation edge





9. AIRTIGHT ENVELOPE

The airtight envelope was tested several times during construction by the building owner himself and through BEO Ltd, while filming the construction process through CHH Woodproducts as the main supplier of the product. A final Test was conducted on 12 August 2018 through BEO Ltd.

n_{50} during Blower Door Test at 50Pa (AS/NZS 9972:2015)

0.34 h^{-1}

AIRTIGHT CONCEPT

FLOOR	Concrete Foundation and floor slab
EXTERNAL WALLS	Proclima Intello®
ROOF/CEILING	Proclima Intello®

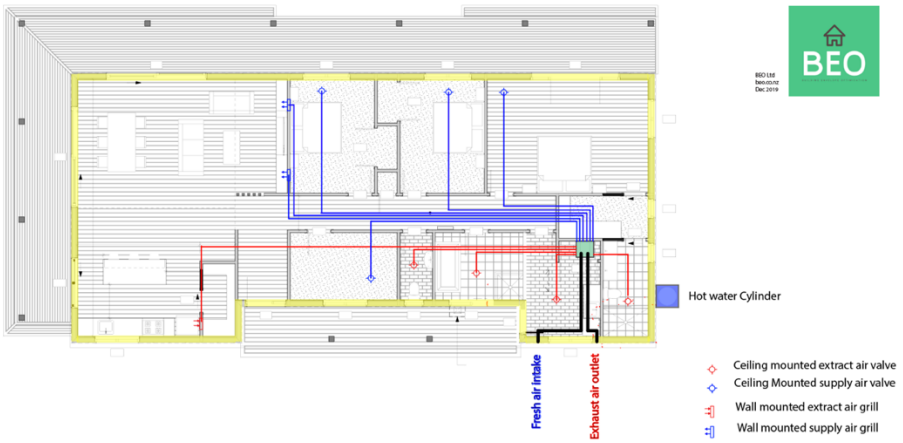
CONNECTION DETAILING FOR AIRTIGHT CONCEPT

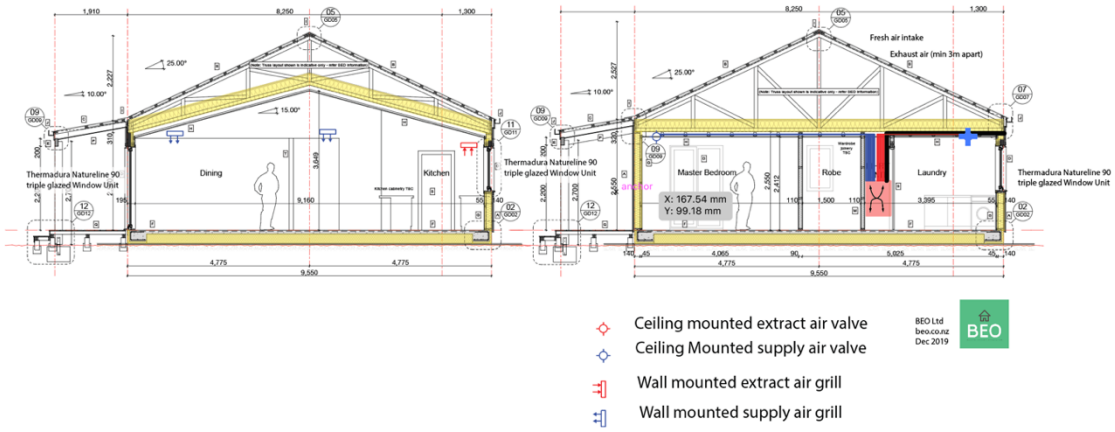
CONNECTION FROM/TO	CEILING/ROOF	EXTERNAL WALL	FLOOR	WINDOWS/DOORS
CEILING/ROOF		Proclima Tescon Tape Intello-Intello		
EXTERNAL WALL	Proclima Tescon Tape Intello-Intello	Proclima Tescon Tape Intello-Intello	Prcolima Orcon Glue Intello – Concrete	Proclima Tescon Tape Intello-frame
FLOOR		Proclima Tescon Tape Intello-Intello		Prcolima Orcon Glue and Proclima Tescon Tape Frame – Concrete
WINDOWS/DOORS		Proclima Tescon Tape Intello-frame	Prcolima Orcon Glue and Proclima Tescon Tape Frame - Concrete	

10. VENTILATION SYSTEM

The Zehnder Comfoair 350 balanced ventilation with heat recovery is installed central inside the building. The distribution ducting is installed in the ceiling cavity inside the Intello airtight membrane, see graphic below.
The heat recovery efficiency was calculated to be at 81.5% at an electric efficiency of 0.29Wh/m^3.

11. VENTILATION DISTRIBUTION





12. HEATING

A 1000W manual convective heater was installed to boost potential peak demand during winter. Model LHZ Crystal, CY10.

The heat load was calculated to be low enough for the supply air to be sufficiently heating the building otherwise.

13. DOMESTIC HOT WATER

The Stiebel Eltron WWK 302 H Hot water heat pump was installed external of the Building with insulated supply ducting into the building.
The installation outside is not ideal for storage and distribution heat losses, with storage taking 2/3 and distribution 1/3 of the total energy demand for domestic hot water, despite the insulation.

14. BUILDING COST

No data has been submitted by the building owner.