MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Determination 2015/023

Regarding the refusal to issue a code compliance certificate for a house constructed with structural insulated panels at 420 Blackrock Road, Masterton

1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("the Act") made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ("the Ministry"), for and on behalf of the Chief Executive of the Ministry.

1.2 The parties to the determination are:

- the owner of the house, H Morgan ("the applicant")
- the designer of the house, G Senior ("the designer") as the LPB[2] and who is therefore a party to the matter
- Masterton District Council ("the authority"), carrying out its duties as a territorial authority or building consent authority.

1.3 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for the house. The refusal arose because the authority was not satisfied the building work complies with the following clauses[3] of the Building Code (First Schedule, Building Regulations 1992):

- Clause B1 in respect of the roof/wall connections, and
- Clause E2 in respect of window flashings.

1.4 The matter to be determined[4] is therefore whether the authority was correct in its decision to refuse to issue a code compliance certificate. In making my decision I have considered the compliance of the building work with respect to Clause B1 in

[1] The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243.
[2] Licenced building practitioner
[3] In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.
[4] Under sections 177(1)(b) and 177(2)(d) of the Act

regards to the roof/wall junction, and Clause E2 in regards to the weathertightness of the exterior joinery (refer paragraph 3.2.2). I have not considered any other building elements or other clauses of the Building Code.

1.5 In making my decision I have considered the submissions of the parties, the report of the independent expert engaged by the Ministry to advise on this dispute ("the expert"), and the other evidence in this matter.

2. The building work

2.1 The building is a single storey house located on a rural section in an elevated position in a very high wind zone. The building is fairly simple "T" shape in plan, with the leg of the "T" having a gable roof and the remainder a single pitched roof.

2.2 The construction consists of a structural insulated panel ("SIP") system that has been used as the suspended floor, exterior walls, and roof. The cladding is factory painted flat metal generally, with profiled metal to the roof. The panels consist of an expanded polystyrene core and a pre-finished galvanised steel 'skin' to both faces; the wall panels are 100mm thick, and roof and floor panels are 150mm thick. The interior walls are 36mm thick medium density particle board with 'MDF' skins. Fascia, barges and other flashings are of folded pre-finished galvanised steel.

2.3 Foundations are concrete pads supporting a timber pile and bearer subfloor to all but the garage which has a concrete slab on grade. There is an elevated slatted timber deck on the northern side of the building.

2.4 Roof/wall connections

2.4.1 A steel channel sits over the top of the wall panel and is riveted to both the inside and outside skins of the external walls. The roof is screwed down to the web of the steel channel at 250mm centres. The screws run through the full depth of the roof panel from the top of the cladding ribs to the steel wall channel.

2.4.2 The construction methodology is that the channel is positioned on the wall but not initially fixed; the roof panel is then screwed in place, which pulls the channel to the same angle as the roof to ensure a flush junction. With the channel at the correct angle it is then riveted to the wall panel.

2.4.3 Flashings at the roof/wall junctions were fixed to the face of the soffits and the expert assumed the fixings were sealed. For the mono-pitched roofs wind-driven rain can run down the eaves to the walls and the expert also assumed that flashings at the roof/wall junctions are adequately sealed.

2.4.4 Eaves provide good protection to the roof/wall junctions with the exception of the high side of the single sloping roof.

2.5 Windows

2.5.1 Openings for windows and exterior doors are cut out of the wall panels and trimmed on all sides with an aluminium channel that is sealed and pop-riveted into place. The channel closes off the exposed edge of the expanded polystyrene and provides a solid surface for the fixing of the door and window joinery.

2.5.2 The joinery is face-fixed to the wall panels where the channel takes the place of a normal sill flashing, the head section is sealed to the outside face of the wall panels with two continuous beads of sealant, and one sealant bead is provided to the jambs. The sill section is bedded on sealant located between the joinery and the channel, and

the sill overhang at the exterior is left as an open free-draining joint. An expanded foam airseal is installed between the jamb-liner to the joinery and the channel.

2.5.3 Eaves provide some protection to the majority of windows with the exception of those in the gable end walls.

3. Background

3.1 The consent

3.1.1 An application for building consent was made some time in 2013.

3.1.2 In a letter dated 26 November 2013 the authority raised its concerns about compliance with Clause B1 in regards to the connection between the roof and wall panels. The authority requested calculations to demonstrate that the roof panels would have sufficient strength to resist uplift forces due to wind load, and that the steel channels to the top of the walls would be able to transfer the roof load to the wall.

3.1.3 In a further letter dated 26 November 2013, the authority also noted that the information provided did not demonstrate compliance with Clause E2 in respect of window and door openings, and requested further information.

3.1.4 The supplier of the SIP system ("the supplier") responded to the authority by letter on 9 December 2013, noting that the details for the window and door openings were the standard method for sealing aluminium joinery in SIP systems and had been used both commercially and in domestic construction 'for over 30 years, with no problems'. The supplier noted:

> Because of the nature of the panel it isn't possible to fit a flashing under the external facing. There are no cavities for water to pool in, and if there were ever to be a failure, the leak would be evident immediately.

The authority responded to the supplier requesting that the solution be presented to the authority as an alternative solution proposal for its consideration.

3.1.5 On 11 December 2013 the authority produced an 'alternative solution assessment' which noted that:

- the installation system to the window/door surrounds was accepted as an alternative solution
- the silicone sealant must be applied correctly between the window/door surrounding outer edges and the external face of the SIP
- the authority was satisfied as to compliance with Clause E2.

3.1.6 On 16 December 2013 a structural engineer emailed the authority, providing confirmation of the adequacy of the roof panels to withstand the wind uplift forces, with appropriate calculations provided, and of the roof/wall fixings with relevant data sheets provided.

3.1.7 The authority provided the information to a firm of structural engineers for peer review. It appears that after receiving the correspondence from the structural engineers on 17 January 2014, the authority accepted the outstanding issues were resolved and it issued the building consent (No. 130535) on 22 January 2014 (I have not seen the correspondence referred to in the email from the structural engineers).

3.1.8 The building consent noted that sealants around the door, window and pipe penetrations need to remain functional for a minimum period of 15 years and are to

be inspected and replaced if necessary in accordance with the maintenance schedule described in the SIP manufacturer's guide.

3.2 The refusal

3.2.1 An application for a code compliance certificate was lodged with the authority on 29 April 2014. The authority carried out a number of inspections after the application was made.

3.2.2 On 21 October 2014 the authority wrote to the applicant advising that it was refusing to issue the code compliance certificate on the following grounds 'and non-compliance with the following clauses':

1. B1 Structure; Roof/wall connections
2. E2 Lack of window flashings

The author of the letter noted that he was not involved in the issuing of the building consent and that he was personally not satisfied that the details complied with the Building Code.

3.3 The Ministry received an application for a determination on 6 November 2014.

4. The submissions

4.1 The applicant provided a covering letter dated 30 October 2014 setting out the background to the dispute, and provided copies of:

- the authority's letter of refusal dated 21 October 2014
- a 'timeline' of events
- plans, including detail drawings of roof/wall connections

4.2 The authority provided copies of relevant documentation in respect of the building work, including:

- plans and specifications
- correspondence relating to the two issues (roof/wall connections and joinery)
- the authority's completed consent processing checklist
- the application for the code compliance certificate.

4.3 In an undated 'summary of events' included in the information provided by the authority, the authority stated that

> During site inspections it became even more clear that this system is not going to stand up to the elements; square holes cut into the panels, windows pop riveted into place and sealed along the edges.
>
> Roof panels spanning 4.6 mtrs, note the actual fixings were never assessed, only the rigidity of the panels (see engineer's peer review)
>
> An "accident" saw several roof panels damaged over a weekend, uplifted by strong winds, photos by owner.

The letter concluded that the authority continued to hold the view that a code compliance certificate should not be issued.

4.4 A draft determination was issued to the parties for comment on 1 April 2015.

4.5 The applicant and the designer accepted the draft without further comment in responses received on 9 April and 20 April 2015 respectively.

4.6 The authority accepted the draft in a response received on 13 April 2015, noting the following as concerns:

- The authority considers the description of the plans as "fairly sparse" to be an understatement and questions whether the additional plans obtained by the expert were going to be attached to the consent.
- The authority agrees with the statement at paragraph 6.4 that it is unclear on what basis the consent was issued, commenting that the responding officer 'still had to work with the approved documents as they were'.
- The authority agrees the consent should be amended to include the maintenance schedule for the window sealing system.
- The authority considers a 50 year structural warranty (Clause B1) should be provided for the wall panels; finding it on a brochure 'is not good enough'.

5. The expert's report

5.1 As described in paragraph 1.5, I engaged an expert, who is a registered architect, to assist me. The expert carried out a site visit on 8 January 2015 and produced a report that was completed on 5 March 2015. The report was sent to the parties on 19 March 2015.

5.2 The report described the house, the SIP system and relevant details considered in this determination, and some of the background to the dispute. During the site visit, the expert viewed offcuts of the components used in construction and observed that the building was of a basic design and build, and that it was 'functional and appeared to be performing correctly'.

5.3 Compliance with approved consent documents

5.3.1 The expert observed that the building was generally constructed in accordance with the documents lodged for the building consent. The consent documents were 'fairly sparse', and the details for window and door installations although clear that had been drawn at too small a scale. The expert obtained better quality details for the joinery installation from the SIP supplier and confirmed the as-built construction was in accordance with those details. It is not known why these details did not form part of the consent documentation as should have been the case.

5.3.2 In regards to the consent documentation, the expert noted that:

- the SIP warranty is for 15 years against failure, which the authority raised as a concern; however, the expert noted that the manufacturer's manual states the warranty is in reference to standard roofing and cladding and that where the product performs a structural function the minimum durability is 50 years
- the documents note that windows and doors were to be manufactured and installed to E2/AS1, however, the Acceptable Solution does not include details for this form of construction
- the specification calls for windows and door installation to be to manufacturer's details, however the manufacturer did not provide any details of installation into SIPs – that information was provided by the SIP supplier.

5.4 Roof to wall connection

5.4.1 The expert viewed a sample of the steel channel that sits over the top of and is riveted to the wall. The expert noted that the information supplied to the authority regarding the ability of the roof panels to withstand anticipated wind uplift forces and the transfer of roof load into the wall had been reviewed and accepted by the firm of structural engineers engaged by the authority.

5.4.2 The expert noted the incident during construction where roof panels had lifted in high winds. In discussion with the applicant the expert was given to understand that the final fixing of the channel to the wall was not carried out by the builders before they left the site for the weekend, and that the unattached section of the roof lifted off the wall and buckled during high winds over the weekend.

5.5 Weathertightness of joinery

5.5.1 The expert viewed the joinery as installed, noting that the installation was in accordance with the working drawings. The bottom of the window is left unsealed for drainage purposes and the flange of the aluminium channel was visible.

5.5.2 The expert noted that the proposed methodology to waterproof the window and door installations was accepted by the authority as an alternative solution, and the building consent addenda clearly states that regular inspection of the sealant, and replacement if necessary, is a condition of the methodology being accepted as an alternative solution.

5.6 The expert also noted that in discussion with the authority it appeared that at the time the code compliance certificate was refused the authority was unfamiliar with the construction methodology, and unaware of some of the documentation confirming compliance when the building consent was granted.

6. Discussion

6.1 The applicant has applied for a determination in respect of the authority's decision to refuse to issue a code compliance certificate. Under section 94(1) of the Act, a building consent authority must issue a code compliance certificate if it is satisfied on reasonable grounds that the building work complies with the building consent.

6.2 When considering the issue of a code compliance certificate for a building consent where the as-built construction differs from that consented, or where there is conflicting or insufficient detail in the consent, it is important to consider whether the completed building work complies with the Building Code. I consider the compliance of the roof/wall junction and the exterior joinery in the following paragraphs.

6.3 Compliance with Clause B1

6.3.1 Given the information provided, and the review by the firm of structural engineers engaged by the authority I consider the authority had reasonable grounds on which to form a view on compliance and to grant the building consent in respect of the wind uplift and the securing of the roof panels.

6.3.2 I understand that the damage to the roof panels caused during high winds while the building was under construction would be a cause for concern to the authority when it considered issuing the code compliance certificate. However, I accept the applicant's statement as to the cause being directly attributable to the panels not being correctly secured prior to the high winds.

6.3.3 Given the information before me I consider the building complies with Clause B1 in respect of the roof/wall junction.

6.4 Compliance with Clause E2

6.4.1 As noted by the expert the plans that were approved as part of the building consent were sparse and this is particularly true of the details relating to Clause E2. The expert needed to obtain better quality plans from the SIP supplier in order to confirm the as-built construction for the windows. These details should have formed part of the approved consent, and in this respect it is unclear on what basis the consent was issued.

6.4.2 The correct performance of the exterior joinery is very dependent on careful installation. I accept that the construction is more tolerant of intermittent moisture ingress as the likelihood of damage to building elements is significantly lower than it is for other forms of construction. I also accept that any leaks are likely to be more readily apparent in this form of construction.

6.4.3 In my view the exterior joinery will satisfy the requirements of Clause E2, but this is dependent on the exterior details being maintained in accordance with the maintenance schedule described in the SIP manufacturer's guide. It is not clear whether this maintenance schedule forms part of the consent or not: if it is not then in my view the consent should be amended to include this. I have taken the same approach to formalising the maintenance of critical building elements in previous determinations, for example Determination 2012/013[5].

6.4.4 In response to the authority's question regarding the additional plans (refer paragraph 4.6), I suggest the applicant file these with the authority at the time the maintenance schedule is dealt with.

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the building work complies with Clause B1 in respect of the roof/wall junction and with Clause E2 in respect of the window and door installation; accordingly I reverse the authority's decision to refuse to issue the code compliance certificate on the grounds provided.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 21 May 2015.

John Gardiner
Manager Determinations and Assurance

5 Determination 2012/013 The issue of a building consent with a specified intended life for additions using a straw bale system to an existing house