



## Determination 2011/032

### Refusal to issue a code compliance certificate for an 8-year-old house at 10 Ocean Parade, Pukerua Bay, Porirua



#### 1. The matters to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicant is the owner of the house H Neale (“the applicant”) acting via the engineers for the house, and the other party is the Porirua City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for an 8-year-old house, because it is not satisfied that the building work complies with the Building Code (First Schedule, Building Regulations 1992). The refusal arose because the authority has concerns about:

- the adequacy of inspections undertaken during construction
- the compliance of the house with certain clauses<sup>2</sup> of the Building Code, relating to weathertightness of the building envelope and the adequacy of the structural elements
- the durability of the building work as it was substantially completed in 2003.

<sup>1</sup> The Building Act 2004 is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

<sup>2</sup> In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

1.3 The matter to be determined<sup>3</sup> is therefore whether the authority was correct to refuse to issue a code compliance certificate. In deciding this, I must consider:

**1.3.1 Matter 1: The external envelope**

Whether the external building envelope of the house complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The building envelope includes the components of the systems (such as the plywood cladding, the profiled metal cladding, the concrete block walls, the windows, the decks, the roof cladding and the flashings), as well as the way the components have been installed and work together. (I consider this in paragraph 7.)

**1.3.2 Matter 2: The structural elements**

Whether the house complies with Clause B1 Structure of the Building Code, taking into account the level of oversight provided by the engineers and the authority during construction. (I consider this in paragraph 8.)

**1.3.3 Matter 3: The durability considerations**

Whether the building elements comply with Clause B2 Durability of the Building Code, taking into account the age of the house. (I consider this in paragraph 9.)

1.4 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”) and the other evidence in this matter.

## **2. The building work**

2.1 The building work consists of a detached house that is three storeys in part and is situated on a long narrow site that faces the shoreline across the street. The house has been assessed by the engineer as being in a very high wind zone for the purposes of NZS 3604<sup>4</sup>. The site was excavated to provide a level building platform, with the south wall of the house at the side boundary and a narrow path providing access to the rear along the other side of the house.

2.2 While simple in plan and form, the house incorporates complex junctions and is assessed as having a high weathertightness risk (see paragraph 7.2). The house has a monopitched skillion roof at 10° pitch, with limited eaves projections to the south and west and no eaves to the north and east. A low level lean-to roof extends to the boundary wall to provide a narrow garage and carport to the south. The south concrete block wall forms a boundary firewall that projects above the garage roof, with an internal gutter to the roof.

### **2.3 The construction**

2.3.1 The engineers designed reinforced concrete block walls (partly retaining) to the east and south walls, a structural steel transverse frame over the ground floor lounge and garage, and the general wall bracing. The engineers’ ‘Producer Statement PS1 – Design’ covered these elements, based on ‘further testing and site measurements once site has been cleared on old house etc’.

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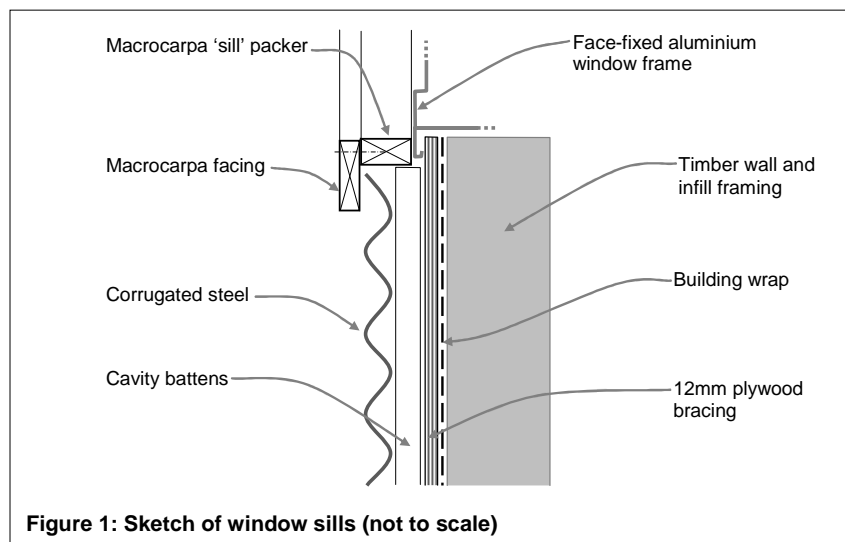
<sup>3</sup> Under sections 177(1)(b) and 177(2)(d) of the Act

<sup>4</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.3.2 The remaining construction is generally conventional light timber frame, with concrete foundations and floor slab, plywood and profiled metal wall claddings, aluminium windows and profiled metal roofing.
- 2.3.3 The drawings call for 'H3' treated framing to external walls and rafters, 'H1' treated framing to interior walls, and 'tan' joists to the decks, which I take to be CCA treated joists. However the expert observed markings on the garage roof framing that indicated the roof framing was untreated. The expert forwarded a sample of wall framing to a testing laboratory, which reported that the sample contained no evidence of treatment. Given this evidence and the date of construction in 2003, I consider the wall and roof framing to be untreated.

## 2.4 The wall claddings

- 2.4.1 The front and rear walls and the south wall of the ground floor lounge are clad with a proprietary plywood sheet cladding system which consists of H3 treated 12mm five-ply plywood sheets fixed through the building wrap to the framing. The sheets have vertical shiplap joints, which are covered with 50mm x 25mm (nominal) battens with weathergrooves to the inner face. Additional decorative battens are fixed through the sheets to imitate vertical board and batten cladding, with continuous horizontal battens at the top and over flashed horizontal joints. Timber facings border windows and doors, and the cladding is finished with a UV resistant semi-transparent stain.
- 2.4.2 On the north and south elevations, the plywood continues as sheet bracing over the side walls of the house. The outer cladding is horizontal corrugated steel and the drawings call for this to be fixed through 50mm x 25mm treated battens and the plywood into the framing. There are no window details in the drawings, however, based on the expert's description and the photographs, the installation appears to be similar to the sketch in Figure 1:



## 2.5 The decks

- 2.5.1 The first and second floors each step back from the floor below to provide two large decks with membrane floors, with the first floor deck including a large central raised skylight. At the north and south sides, lower walls extend to provide balustrades,

with the decks draining to the front beneath glazed balustrades with metal posts fixed through baseplates to the deck framing. The exposed membrane edges are sealed to uPVC mouldings that turn down over the top of the wall and provide a drip edge.

- 2.5.2 A third timber framed deck behind the house at first floor level extends across to the original ground level of the steep hill. The deck floor is spaced timber slats, with open timber balustrades and timber steps leading down to the side path below.

## **2.6 The deck membrane system**

- 2.6.1 The deck membrane is a 1.5mm thick polyvinyl chloride sheet adhered to 19mm CCA treated plywood. The membrane has a coloured stippled finish and the joints are heat-welded to provide a seamless surface.
- 2.6.2 The membrane system has been appraised by BRANZ<sup>5</sup>; and the current appraisal states that the membrane will comply with Clauses E2 and B2, providing the system is 'designed, used, installed and maintained' according to the conditions described in the certificate. These conditions include:
- deck falls to be a minimum of 1:60 (1°), with 'no ponding of water'
  - membrane joints to be overlapped by 20mm minimum.

## **3. Background**

- 3.1 The authority issued a building consent for the house (No. ABA 30273) on 4 October 2002 under the Building Act 1991. Although the conditions appended to the consent made no reference to any required inspections, the authority maintains that it was 'standard practice' at that time was to provide an inspection schedule as a separate document to the building consent. I have not been provided with a copy of the inspection schedule.

### **3.2 The inspections**

- 3.2.1 In accordance with the producer statement, the engineers tested founding material on 4 November 2002 when the site was clear. The authority carried out various inspections during construction including (all inspections passed unless noted otherwise):
- a pre-pour inspection on 11 November 2002, with the record showing the items 'ticked' relating to the footings, reinforcing, foundation walls, DPC, column pads, and underslab plumbing. The record noted twice 'Engineer Inspected.'
  - pre-cladding and sub-floor on 10 December 2002, with the record showing ticks for framing, fixings, wall bracing, bracing straps and wrap. The record 'ticked' the timber treatment entry and noted it as 'Tan[alised]'
  - pre-line plumbing and drainage on 24 December 2002, with the record 'ticked' for framing, fixings, wall bracing, bracing straps, joinery, water pipes and waste pipes

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<sup>5</sup> BRANZ Appraisal Certificate No. 411 (2005), which replaced 411 (2000)

- drainage on 10 February 2003 and re-inspection on 19 February 2003, with the records 'ticked' for drain depths and gradients, gully traps, waste pipes, soil stack, stormwater and connections to mains.

3.2.2 Although the house was substantially complete by February 2003, no final inspection was carried out until the following year. The authority carried out a final inspection on 13 August 2004, identifying some minor outstanding items to be completed and noting that a re-inspection was required.

3.2.3 There are no records of further inspections until the applicant prepared to sell the property in 2010. The authority carried out a final building and plumbing 'site visit' on 12 August 2010 and identified a number of outstanding items and required documentation, including 'Engineer's PS4 and site reports'. The authority re-visited the site on 15 September and 11 October 2010; recording the latter inspection as a 'pass', with all outstanding work completed.

### 3.3 The authority's refusal to issue a code compliance certificate

3.3.1 In a letter to the applicant dated 10 November 2010, the authority attached copies of inspection records and noted that the building work 'appears to have been completed as required by the consented documents.' However, after outlining the durability requirements under Clause B2, the authority stated:

If the CCC were issued today, this would essentially mean that Council is satisfied that the building envelope will remain durable for a further 15 years, being 2010 + 15 years which we are unable to do.

As discussed with you unfortunately current legislation prevents Councils from backdating code compliance certificates.

Given the time that has passed since ABA30273 was granted and the performance requirements of Clause B2.3.1, [the authority] is unable to grant or issue a code of compliance certificate...

3.3.2 The applicant sought advice from the engineers, who contacted the Department regarding the durability issues raised by the authority. The engineers wrote to the authority on the applicant's behalf on 16 November 2010, noting that the 'timing issue in relation to B2 is easily resolved' by the authority simply modifying the building consent to the date of occupation on 15 February 2003 to reflect substantial completion of the house. The engineers concluded:

It appears to us that some [authorities] are abusing the system by requiring these determinations when the precedent was set in 2005 and they know what the outcome of such a determination is very likely to be. This has an unnecessary cost to the taxpayer and significant costs to the affected parties, particularly if the sale of a property is jeopardised or delayed, as is the case with our client. It also clogs the system for more legitimate issues referred for determination to [the Department].

3.3.3 The authority responded in a letter dated 18 November 2010, stating that 'the information supplied by the Department is their opinion and interpretation on waivers and modifications only and has little relevance within the legal framework of the Building Act 2004'. The authority therefore considered its decision was reasonable as the Department's 'interpretations have no legality'. The authority stated that its refusal to issue the code compliance certificate remained and provided the applicants with the following options (in summary):

- seek a determination on the matter
- sell the property without a code compliance certificate
- obtain an appropriate assessment on compliance of the house.

### **3.4 The engineers' construction review**

3.4.1 At the request of the applicant, the engineers reviewed construction of their specifically designed elements. The engineers reviewed their records and carried out further investigations; providing a report to the applicant on 29 November 2010.

3.4.2 The engineers confirmed inspections for stability and founding conditions carried out during construction, noting that they had not been called back to make further structural inspections of the structural steel transverse frame and the block walls. The report also noted that the timber wall bracing 'is standard NZS 3604 type and it is normal for Council to carry out inspections and approve as part of its duties'.

3.4.3 The engineers visited the site on 23 and 24 November 2010 and carried out further inspections and testing, including (in summary):

- cover meter checking for reinforcement of concrete block walls and the pilaster supporting the end of the structural steel transverse frame
- opening inspection holes in the pilaster and at two lap locations in the wall
- removing linings to key joints on one side of the steel frame.

3.4.4 The report concluded:

From our inspection of the foundations during construction, together with recent cover testing of blockwork and examination of steelwork we are of the opinion that construction of the above mentioned specific design items has been satisfactorily carried out in accordance with our [structural calculations, sketches etc] which we understand were approved for Building Consent.

3.5 On 3 December 2010, the Department received an application for a determination from the engineers on behalf of the applicants.

## **4. The submissions**

4.1 The engineers provided copies of:

- the consent drawings, specifications
- The Producer Statement – PS1 – Design, including the design calculations
- the building consent, plus the consent conditions
- the authority's inspection records
- the correspondence with the authority
- the engineering construction review report dated 29 November 2010
- various other statements, certificates and information.

## 4.2 The authority's initial submission

- 4.2.1 The authority acknowledged the application in an email to the Department dated 8 December 2010, noting that it had originally refused to issue a code compliance certificate due to the age of the building work and the lack of inspections. However, the authority now also had concerns regarding 'compliance with Clauses B1, B2 and E2 and the limited inspections undertaken by [the authority] and the engineer'. The authority therefore requested the determination to 'consider all relevant issues preventing the issue of the code compliance certificate.'
- 4.2.2 In a further letter to the Department dated 31 January 2011, the authority made a lengthy submission which included the following points (in summary):

### The engineer's inspections

- It was submitted that the engineers' design included the:
  - ... foundations, block walls, reinforcing steel, retaining walls, bracing, [parallel flange channel] and timber beams including all connections, columns and bottom plate connections as well as the subsoil drainage requirements behind the retaining walls ...
- It was submitted that the engineers' review and report could not be accepted as verification of compliance, and the following information was required:
  - An 'unequivocal' Producer Statement – PS4 – Construction Review covering all the building work designed by the engineer, not part only.
  - Verification that bracing complies as the authority did not inspect this.
- It was submitted that the engineers had not provided site inspection notes and could not issue an 'unequivocal PS4' as they were not given the opportunity to inspect all specifically designed elements
- The authority's inspections allowed work to proceed only on the understanding that:
  - the engineer was involved in inspecting all non specific building work designed by him.
 And that:
  - [It was] standard industry practice for an engineer to inspect all aspects of a building subject to an engineers non-specific design.

### Weathertightness

- The authority submitted that the direct-fixed plywood also acts as bracing, and must therefore be maintained with a paint system and fixings in accordance with the manufacturer's instructions.
- Recent authority site visits identified at-risk features and defects of the external envelope; it considered the external envelope, including the underlying timber and substrates required a thorough investigation.
- Plywood bracing to side walls cannot be maintained as it is now covered. There is also no evidence that deck plywood substrates were inspected.
- It was standard practice at the time of construction for the authority to advise of the inspections required (refer paragraph 3.1). Inspection and monitoring regimes were not as 'robust and comprehensive as they are today'. The

‘detailing and weathertightness construction of this building would not be acceptable by today’s standards’.

The authority also listed matters taken from the authority’s ‘limited observations on site’. These matters were identified for inclusion in the expert’s site visit (refer paragraph 6).

### **The durability provisions**

- The legal basis for considering modifying the application of the durability provisions is flawed and the authority will not issue a modification or a code compliance certificate unless instructed to do so.
- Given concerns regarding the ‘exceptionally high weathertightness risk profile’ and the non-compliance with Clauses B1, B2 and E2, there are not reasonable grounds to consider a modification of the durability provisions.

## **4.3 The draft determination**

4.3.1 The draft determination was issued to the parties for comment on 25 February 2011. The applicant accepted the draft determination.

4.3.2 The authority responded to the draft determination in a submission dated 16 March 2011. The authority largely reiterated the views expressed in its submission dated 31 January 2011. The submission expanded on some matters, summarised as follows:

### **General**

- The authority submitted it was:
  - entitled to rely on determinations as a means of establishing compliance with the Building Code as outlined in the ... Act.
  - not satisfied on reasonable grounds that the building complied with the Building Code when constructed or will comply with the Building Code in the future after the suggested limited remedial work is undertaken. [The authority will] not issue a code compliance certificate ... unless ... specifically directed to do so by the Department ...

### **Wind zone**

- The authority’s records indicate the house is situated in an area identified as a specific engineering design (“SED”) wind zone and it is the authority’s view that ‘a full wind speed assessment must be completed by a suitably qualified engineer’. (I note this information is included with the engineer’s PS1.)

### **Weathertightness**

- The authority was of the view that, in respect of the remedial work, ‘the only viable option is to remove and replace all of the cladding and investigate the condition of the underlying untreated timber framing’.

### **Structure**

- Verification was required that all bracing has been fixed as required by the engineer’s design. The authority’s was of the view that to state that the fixings appear to comply with the manufacturer’s specifications (refer paragraph 6.3.1) is not reasonable grounds on which to establish compliance.



- The authority quoted the plywood manufactures' documentation, dated June 2007, that said that external plywood bracing elements 'must be painted with an acrylic latex paint system ...'.
- It appears that neither the authority nor the engineer inspected the specifically-designed structural elements, and therefore the authority is not satisfied that the house complies with Clause B1.
- The authority noted that in granting the building consent a specific number of inspections were required that these had not all been completed.
- The effect of the additional door in the block wall (refer paragraph 6.2.2) should be verified by the engineer. The building consent should be amended to reflect this change.
- The decay in the untreated garage roof framing observed by the expert indicates failure of Clauses B1, B2 and E2.

### **The durability provisions**

- As the defects that constitute a failure of Clause B2 were present at the time of construction, it was the authority's position that it was unreasonable to modify Clause B2.3.1.

4.3.3 The engineer submitted a response dated 18 March 2011 to the authority's submission dated 16 March 2011. The engineer took issue with the authority on a number of matters. The engineer also noted that:

- it is normal practice for consulting engineers, when designing specific wall bracing in residential homes, to use NZS 3604-type solutions where possible to facilitate everyday construction that can be monitored by authority personnel
- the wall bracing was checked by the authority and passed (the engineers response included a copy of the authority's inspection record dated 24 December 2002, refer paragraph 3.2.1)
- the wind assessment carried out in 2002 to NZS 4203:1992 placed the building in the 'very high wind' category in 3 of 8 directions, and the remainder were calculated to be 'high wind' or lower. The assessment was conservative as the stepped profile of the house would reduce the building height effect and therefore lead to lower wind speeds than were used in design.

4.3.4 The engineer concluded by saying that the applicant was 'keen to engage expert advice to specify necessary repairs' and to receive a code compliance certificate on completion.

4.3.5 The authority submitted a response to the engineer's submission in a letter dated 22 March 2011. The authority said it maintained its views in its response to the draft determination and reiterated some statements it had made before.

4.3.6 The authority's 24 December 2002 inspection report was not disputed, but it was noted that the record referred to 'slab floor' against the Subfloor section (the record contains three sections 'Building', 'Subfloor' and 'Plumbing'). The authority took the 'slab floor' reference to mean that the inspector 'was indicating that he had undertaken a preline and subfloor inspection of the slab level floor only'.

#### **4.4 My response to the authority's submissions**

4.4.1 I have considered the authority's submissions and amended the determination as appropriate. I respond to some of the specific issues raised as follows:

##### **Inspections by the engineer**

4.4.2 The authority maintains that it undertook inspections 'on the understanding that the engineer should have inspected all building work subject to "non-specific design" by the engineer' (the meaning of "non specific" in this context is unclear: engineers are more likely to inspect specifically designed building elements).

4.4.3 The engineer's PS1 makes specific reference to those elements requiring site verification of the design assumptions; in this instance the site verification was in respect of 'Further testing and site measurement once site has been cleared of old home etc' (refer paragraph 2.3.1). The authority's inspection record, dated 11 November 2002, serves to indicate that the authority's inspector knew that inspection by the engineer was necessary and that the engineer's inspection had been completed. The engineer did not require any other elements to be inspected by him, nor did the specific conditions of consent require such inspections.

4.4.4 I accept the engineer's position that no specific inspections by him were required in order to verify compliance with Clause B1, other than the inspection of the site as noted above. I do not accept the authority's argument that inspections by the engineer were "understood" to be necessary.

4.4.5 The fact that the engineer did not inspect certain building elements does not, in my view, mean that the work concerned is not code-compliant. I accept that the inspection records serve to show that the necessary inspections were successfully completed by the authority. I do not accept the authority's position that the inspection carried out on 24 December 2002 should be taken to mean that it was limited to the 'preline and subfloor inspection of the slab level floor' only.

##### **Plywood Bracing**

4.4.6 According to the engineer's PS1, the exterior plywood bracing is limited to four panels on each of Levels 2 and 3 (to the front and rear elevations only). There are no plywood bracing elements used on Level 1 and the remaining plywood bracing elements in Levels 2 and 3 (to the side elevations) are not exposed to the elements.

4.4.7 The plywood bracing panels are structural elements and are required to have a durability life of not less than 50 years, or not less than the life of the building. The exterior plywood panels need protection from the elements to achieve the required durability period. I acknowledge the authority's position that the exposed plywood bracing panels require additional protection from the elements, but this is only in respect of the four panels to each of Levels 2 and 3.

4.4.8 I note that while the plywood bracing elements are required to be a minimum of 7mm thick<sup>6</sup>, 12mm thick plywood has been installed which must afford greater protection to the bracing elements themselves. The rear elevations are sheltered from the elements and have very limited, if any, exposure to the sun. I also note that entire

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<sup>6</sup> Refer: Ecoply Bracing Manual, CHH Woodproducts, dated March 2005

rear walls to Levels 2 and 3 are clad with plywood, with the exception of a single door to Level 2

- 4.4.9 In my view normal maintenance of the current paint system to the plywood cladding on the rear elevations will be sufficient to ensure these panels achieve their intended life. However, consideration needs to be given to improving the weather protection of the bracing panels to the front elevations on Levels 2 and 3.

### **The authority's view of the legislation**

- 4.5 I am concerned at the comments of the authority's officer that the Department's interpretation of waivers and modifications 'has little relevance within the legal framework of the Building Act 2004' and that such interpretations 'have no legality'. These views have led the authority to take the position that it:

... will therefore not issue a code compliance certificate or grant a modification of Clause B2.3.1 unless we are specifically directed to do so by the Department ... in the final Determination.

- 4.6 The authority's motivations for taking this approach to the issue of code compliance certificates is revealed in its letter dated 18 November 2010 to the engineers:

Waivers and modifications including modifications of Clause B2.3.1 once issued do not remove the implications of Section 393 of the Building Act 2004 in terms of any future civil proceedings. ...

[The authority] like most [authorities have] petitioned the Department in a bid to instigate changes to the provisions of B2.3.1 and Section 393 given the liability currently facing ratepayers. The Department however has failed to make the necessary changes to the Act and Code that are required in order to reduce the current liability faced by ratepayers in regards to the older building consent issued under the former Act.

- 4.7 It is not appropriate for the authority to refuse to exercise its powers and functions because it disagrees with the law. The authority is a statutory body with statutory powers and functions under the Act. Upon receiving an application for a code compliance certificate that complies with the requirements of section 92 of the Act the authority is required to consider the application within the timeframe in section 93 of the Act and determine whether or not to issue a code compliance certificate in accordance with sections 94 and 95 of the Act. The authority is required to provide reasons if it refuses to issue a code compliance certificate (section 95A of the Act).

- 4.8 If the authority has concerns about the power to modify the commencement date for the durability periods in Clause B2.3.1 it should pursue its concerns through the proper legal channels. I note the authority has been involved in other determinations involving modifications of the commencement date for the durability periods in Clause B2.3.1 but has not appealed the Chief Executive's decision in any of those determinations.

- 4.9 The Department has received formal advice from authorities under section 67 of the Act about modifications of the Building Code; and I note that many authorities issue modifications of Clause B2 in response to requests by owners without the need for direction from the Department.

- 4.10 In the absence of any decision by a Court that there is no power to modify the commencement date for the durability periods in Clause B2.3.1 the answer to the authority's concerns lies in section 19(1)(c) of the Act that provides that the authority 'must accept [a determination by the chief executive] as establishing compliance with the building code'.
- 4.11 If the applicant undertakes the necessary remedial work in accordance with a proposal accepted by the authority (refer paragraph 10.2) then on receipt of an application for a code compliance certificate the authority has a statutory obligation to consider that application and decide whether to issue a code compliance certificate. I expect the authority to comply with its statutory obligations. The adoption of a fixed policy that the authority will refuse to consider any request to modify the commencement date for the durability periods in Clause B2.3.1 and to refuse any application for a code compliance certificate would be unlawful.

## **5. Grounds for the establishment of code compliance**

- 5.1 In order for me to form a view as to the code compliance of the building work, I established what evidence was available and what could be obtained considering that some elements are not able to be cost-effectively inspected.
- 5.2 The engineers maintain that their inspection during construction along with those of the authority, and their recent review, confirm that the specifically-designed structural elements accord with the consented design. However, the authority does not accept that the review provides sufficient verification of structural compliance. The authority maintains that other elements of the external envelope may not have been adequately inspected during construction.
- 5.3 In the case of this house, I observe that:
- the engineers' recent review of construction generally confirms that specific structural elements accord with the consented design
  - the inspection records indicate that the authority inspected all stages of construction that included foundations, pre-cladding, pre-line, bracing, plumbing, drainage, and the external envelope (refer paragraph 3.2).
  - the first final inspection in 2004 identified only minor outstanding items and made no mention of outstanding inspections
  - defects identified in the authority's site visit in August 2010 were confirmed as completed following two further visits and a 'pass' was recorded.
- 5.4 In my opinion I am entitled to rely on the likelihood that structural elements accord with the consented documents, and also that the authority carried out sufficient satisfactory inspections during construction of elements that are now hidden. However, that reliance rests on corroboration of the building's performance by inspection of the accessible building elements.
- 5.5 Some corroboration has already provided by the outcome of the authority's site visit in August 2010, and the engineers inspection in November 2010. I have sought

further corroboration by the engagement of the expert, as below, with particular note taken of the condition and performance of the external envelope.

5.6 In summary, I consider the following evidence allows me to form a view as to the code compliance of the building work as a whole:

- the authority's inspections completed during 2002 and 2003, the final inspection completed in 2004, and the authority's 2010 site report
- the engineering construction review report dated 29 November 2010
- the expert's report as below.

## **6. The expert's report**

6.1 As mentioned in paragraph 1.4, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Building Surveyors and inspected the house on 8 and 16 February 2011, providing a report dated 21 February 2011.

### **6.2 General**

6.2.1 The expert noted that the overall construction quality appeared to be 'excellent', with the house 'completed in a tradesman like fashion and generally to a high standard'. However, he noted that the protective stain to the cladding was due for recoating, some roof fixings were beginning to corrode, sliding door channel drains were blocked and debris was blocking the internal gutter at the garage boundary wall.

6.2.2 The expert observed a door had been added to the single-storey concrete block wall to the eastern end of the garage, which I note is not shown in consent drawings. I also note that the timber deck to the east has changed from the consented drawings.

6.2.3 The expert observed the garage roof framing was marked 'keep dry', indicating untreated timber. Testing of a timber sample from the internal wall between the garage and the lounge confirmed that the sample was untreated. I note that this wall extends to form the external wall to the first floor and the second floor balustrade.

### **6.3 The plywood cladding**

6.3.1 The expert noted that the plywood cladding appeared to accord with manufacturer's instructions for fixings. He expected that plywood behind the corrugated cladding would be similar and no internal evidence of bracing problems were observed.

6.3.2 The expert also noted that the plywood manufacturer describes both stained and painted plywood. While observing some cut edges needing sealing, he noted that most bottom edges would not have been cut. The expert also commented that the ply required regular maintenance to adequately protect it from the elements.

6.3.3 The expert noted that the timber cover battens include rear weathergrooves. The horizontal joints included mechanical flashings under the battens and most of the vertical shiplap joints are further protected by timber battens.

## 6.4 Windows and doors

- 6.4.1 Face-fixed windows and doors in the plywood cladding appeared satisfactory, with metal head flashings and timber facings above the flashings and over the jamb flanges. The expert observed water trapped in a deck door channel, but was able to drain this by opening the blocked sill drains.
- 6.4.2 The expert observed that windows installed in the corrugated metal cladding appeared to be face-fixed over the plywood bracing, with a timber 'sill' plate extending out to the face of the cladding and timber facings then fixed into the plate. No sill flashings were installed. This resulted in the sill plate being sandwiched between the window sill flange and the facing (see paragraph 2.4.2 and Figure 1).

## 6.5 Moisture levels

- 6.5.1 The expert noted the following signs of moisture penetration in the interior (with applicable moisture readings shown in brackets):
- water stains on the ceiling below the upper deck sash door
  - cracks in the ceiling under the lower deck near the skylight
  - wet carpet at the upper deck sash door and staining in an adjacent bedroom
  - mildew in the rear storeroom
  - in the south area in the garage:
    - efflorescence to the upper level of the concrete block boundary wall
    - water stains, some timber decay and a crack in the blockwork that may relate to corroding reinforcing steel at the southeast corner
    - water stains at the top of the southwest corner beside the garage door.
- 6.5.2 On the exterior, the expert noted that the following areas showed signs of moisture penetration (with applicable invasive moisture readings shown in brackets):
- the top of the concrete block boundary wall (99% at the west end)
  - the sill packers to the windows in the corrugated metal (17% to 18%)
  - the junction of the timber steps with the east plywood cladding (69%)
  - the bottom of the plywood cladding to the wing wall beside the garage (99%)
  - a small area associated with a lifting joint to the upper deck.
- 6.5.3 The expert removed cover battens at the clad balustrade to wall junction to observe the underlying construction, and noted that junction was sealed, with drilling indicating a metal flashing behind the plywood cladding. However, the cover battens did not allow for free drainage and some water staining was apparent.
- 6.6 Commenting specifically on the external envelope, the expert noted that:
- General**
- there is no clearance from the paving to the plywood beside the garage door and from the timber steps to the plywood on the east wall

- cut edges to some plywood sheets are unsealed and there is some delamination of lower edges at the upper deck
- although polystyrene and drainage material to the rear retaining wall is visible, some of the concrete surface appears to be unsealed below the ground
- some plumbing penetrations through the corrugated cladding are unsealed
- some fixings to the metal roofing and cladding are corroding
- cutting blockwork to install a rear door to the garage has caused adjacent damage at the top of the single-storey high block wall

#### **The windows**

- windows sills to the corrugated metal side walls are not weatherproof, with water able to be trapped between the timber sill packer and the sill flange
- further investigation of the underlying cavity below window sills is needed
- in the kitchen, the timber upstand to the sink bench is not properly sealed to the bench top, with water damaged timber apparent (Clause E3)

#### **The garage boundary wall**

- the top of the concrete block boundary wall to the garage has a liquid-applied membrane capping, which is allowing moisture into the blockwork, with a crack apparent at the western end
- further investigation is needed into the cause(s) of the moisture penetration into the garage concrete block walls, including the crack at the top of the corner

#### **The decks**

- the deck membrane has heat-welded joints without overlaps, with a mid-deck joint lifting and internal corners not adhering
- decks have insufficient falls and are ponding; particularly around the heavy plate glass topped skylight structure, with signs of damage to ceilings below
- metal balustrade post fixings appear sealed (I note that this was done following the authority's inspection in 2010 – some 7 years after completion)
- investigation is needed into the condition of deck substrates and framing
- cover battens to the clad balustrade to wall junctions do not allow drainage
- the exposed sash door to the upper deck is not square within the frame, and has been leaking around the sash.

6.7 The expert also commented on the compliance of the house with other relevant clauses of the Building Code; concluding that the house complied with the other relevant clauses.

6.8 A copy of the expert's report was provided to the parties on 23 February 2011.

## Matter 1: The cladding

### 7. Weathertightness

7.1 The evaluation of building work for compliance with the Building Code and the risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).

#### 7.2 Weathertightness risk

7.2.1 The house has the following environmental and design features which influence its weathertightness risk profile:

##### Increasing risk

- the house is three-storeys high in part and sited in a very high wind zone
- the house includes complex junctions and multiple claddings
- most walls have plywood fixed directly to the framing
- two upper level enclosed decks are situated above rooms
- there are limited roof projections to shelter the walls
- the external wall framing is not treated to a level that provides sufficient resistance to decay if it absorbs and retains moisture

##### Decreasing risk

- the house is reasonably simple in plan and form
- the corrugated metal cladding is fixed over a cavity.

7.2.2 When evaluated using the E2/AS1 risk matrix, these features show that all elevations of the house demonstrate a high weathertightness risk rating. I note that if the details shown in the current E2/AS1 were adopted to show code compliance the plywood cladding to this house would require a drained cavity. However, I also note that this was not a requirement of E2/AS1 at the time of construction.

#### 7.3 Weathertightness performance

7.3.1 Generally the claddings appear to have been installed in accordance with good trade practice at the time, although the additional weather protection is necessary in respect of the some of the plywood bracing elements (refer paragraph 4.4.9). Taking account of the expert's comments in paragraph 6.6, I conclude that further investigation and remedial work is necessary for:

##### The windows

- inadequate window sills to the corrugated metal side walls, with water able to be trapped between the timber sill packer and the sill flange
- the weathertightness of the window details to the corrugated metal side walls requires specific investigation along with investigation of any cavities below window sills



**Internal moisture**

- lack of sealing at the junction of the timber splashback to the kitchen sink bench beneath the window, with water damage apparent (Clause E3)

**The concrete block walls**

- inadequate weatherproofing of the top of the concrete block boundary wall
- further investigation of:
  - the cause(s) of the moisture penetration into the garage boundary wall, including the crack at the top of the block wall
  - whether the rear retaining wall is appropriately sealed below ground level
  - verifying the operation of the subsoil drain behind the block walls. (I am of the view it is reasonable to assume that the authority inspected the installation of the subsoil drain given the inspections it completed)

**The decks**

- further investigation of the deck floors and membrane in regard to:
  - lack of joint overlaps, a failed joint and lack of adherence at corners
  - inadequate deck falls and ponding
  - signs of damage to ceilings below the decks and possible damage to the plywood substrate and deck framing
  - recently sealed top-fixed balustrade posts
- inadequate drainage to cover battens at the clad balustrade to wall junctions
- lack of weathertightness of the exposed sash door to the upper deck

**General**

- inadequate clearances from the plywood at the garage door and the timber steps
- unsealed pipe penetrations through the corrugated metal cladding
- damage to blockwork beside the rear garage door
- delamination of bottom edges to some plywood to upper deck walls
- general maintenance relating to:
  - re-coating of the plywood cladding (other than the bracing panels referred to in paragraph 4.4.9) with the appropriate product, and sealing of any holes
  - unsealed cut edges to the bottom of the plywood cladding
  - corroding roof fixings
  - debris blocking the garage internal gutter.

7.3.2 Notwithstanding the fact that the plywood wall cladding is fixed directly to the framing, thus inhibiting free drainage and ventilation behind the cladding, I have noted certain compensating factors that assist the plywood cladding's performance in this particular case:

- After eight years, moisture ingress is limited to areas with identified defects.

- The joinery is adequately flashed, with no evidence of moisture penetration associated with junctions of frames with the plywood cladding.
- The plywood is generally installed to the manufacturer's instructions; however, the bracing panels will require additional protection from exposure to the elements by painting with an acrylic paint system or similar.

These factors can assist the plywood cladding to comply with the weathertightness and durability provisions of the Building Code.

#### **7.4 Weathertightness conclusion**

- 7.4.1 I consider the expert's report establishes that the current performance of the external envelope is not adequate because there is evidence of moisture penetration in a number of areas. Consequently, I am satisfied that the house does not comply with Clause E2 of the Building Code.
- 7.4.2 The building envelope is also required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement for the building work to remain weathertight.
- 7.4.3 Because faults identified in the external envelope occur in discrete areas, satisfactory investigation and rectification of the items outlined in paragraph 7.3.1 is likely to result in the external envelope being brought into compliance with Clauses B2 and E2 of the Building Code. However, while I consider the cladding faults to be discrete in nature, the faults are sufficiently numerous to require further investigation to determine their extent and the means of rectification.
- 7.4.4 I do not accept the authority's stated position (refer paragraph 4.3.2) that the removal and replacement of all the cladding is the only means by which compliance can be achieved.
- 7.4.5 Further analysis is required, that should include a full investigation of the causes and extent of moisture penetration into the building envelope including any damage that may have occurred. In addition, the extent of any damage to the timber framing as a result of moisture ingress needs investigation; this can be completed in conjunction with the remedial work to the cladding. Once the decision as to the appropriate remediation is made, the chosen remedial option should be submitted to the authority for its approval.
- 7.4.6 The expert has also noted various maintenance issues, such as the plywood coating, the roof fixings, a gutter blocked with debris and a blocked channel to sliding doors. Effective maintenance of the external envelope is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Department has previously described these maintenance requirements (for example, Determination 2007/60).

## Matter 2: The structural elements

### 8. B1 Structure

8.1 In assessing the compliance of this house with Clause B1 Structure, I have taken into account:

- the consent documents
- the expert's report, and the quality of the construction
- the authority's records of satisfactory inspections during construction
- the engineers' inspections during construction and construction review report.

8.2 Apart from concrete block walls and the steel transverse frame to the garage, I note that the construction is conventional light timber frame, which is not expected to be reviewed by a structural engineer, despite the authority's view that it is 'standard industry practice' for an engineer to inspect elements such as conventional bracing and subsoil drainage. Such construction is more appropriately included within an authority's normal inspection procedures and the authority's records indicate that satisfactory inspections of such elements were carried out.

8.3 I make the following observations:

- The engineers' additional testing and construction review provide reasonable grounds to conclude that the reinforced concrete block walls and the steel transverse frame accord with their consented design (refer paragraph 3.4). I note the review was of the finished building that included the additional door to the single-storey concrete block wall to the garage.
- The authority appears to have inspected all stages of construction involving other structural bracing and fixings, and the like (see paragraph 3.2).
- The authority's site visits in 2004 and 2010 identified no defects relating to the structure. The authority's letter to the applicants, dated 10 November 2010, notes the inspections it carried out and advises that the building work 'appears to have been completed as required by the consented documents'.
- The expert recorded no sign of significant structural failure after 8 years, with the problems observed with the concrete block walls related to weathertightness matters.
- While the authority now considers the house does not comply with Clause B1, it has not provided any evidence to support that view.

8.4 Taking the above into account, I am able to conclude that there are reasonable grounds to come to the view that the house currently complies with Clause B1 Structure.

8.5 However, given the extent of non-compliance with Clause E2 and the extent of damage to the external framing, the building's ongoing compliance with Clause B1 must be considered following further investigation (refer paragraph 7.4.5).

### **Matter 3: The durability considerations**

#### **9. Discussion**

- 9.1 The authority has concerns about the durability, and hence the compliance with the Building Code, of certain elements of the building taking into consideration the completion of the house in 2003.
- 9.2 The relevant provision of Clause B2 of the Building Code requires that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods (“durability periods”) “from the time of issue of the applicable code compliance certificate” (Clause B2.3.1).
- 9.3 In previous determinations (for example Determination 2006/85) I have taken the view that a modification of this requirement can be granted if I can be satisfied that the building complied with the durability requirements at a date earlier than the date of issue of the code compliance certificate, that is agreed to by the parties and that, if there are matters that are required to be fixed, they are discrete in nature.
- 9.4 Because of the extent of further investigation required and the potential impact of such an investigation on the external envelope, I am not satisfied that there is sufficient information on which to make a decision about this matter at this time.

#### **10. What is to be done now?**

- 10.1 A notice to fix should be issued that requires the applicant to bring the house into compliance with the Building Code, including the investigations and defects identified in paragraph 7.3.1, but not specifying how those defects are to be fixed. It is not for the notice to fix to specify how the defects are to be remedied and the building brought to compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject.
- 10.2 I suggest that the parties adopt the following process to meet the requirements of paragraph 10.1. The applicant should produce a response to the notice to fix in the form of a detailed proposal, produced in conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified matters. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.
- 10.3 I note the as-built variations from consented documents referred to by the expert in paragraph 6.2.2. I suggest this matter be resolve in conjunction with the proposal for the remedial work.

## 11. The decision

- 11.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:
- the external envelope does not comply with Building Code Clauses B2 and E2
  - the external framing does not comply with Building Code Clause B2 insofar as it relates to Clause B1
  - the kitchen bench top does not comply with Building Code Clause E3
- and accordingly, I confirm the authority's decision to refuse to issue a code compliance certificate.
- 11.2 I also determine that the house complies with the remaining relevant clauses of the Building Code.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 13 April 2011.

John Gardiner  
**Manager Determinations**