

## Determination 2007/112

### Determination regarding a code compliance certificate for an 11-year-old house at 300 Pukekohe East Road, Pukekohe



#### 1. The matter 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 applicants are the owners P and K O’Connell (“the applicants”), and the other party is the Franklin District Council (“the territorial authority”).
- 1.2 This determination arises from the decision of the territorial authority to refuse to issue a code compliance certificate for an 11-year-old house because it is not satisfied that the building work complies with clauses B2 and E2 of the Building Code<sup>2</sup> (First Schedule, Building Regulations 1992).

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

- 1.3 The matters for determination are whether:

**Matter 1: The cladding**

The cladding as installed on the house (“the cladding”) complies with clause E2 “External Moisture” of the Building Code. By “the cladding as installed” I mean the components of the system (such as the backing materials, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.

**Matter 2: The durability considerations**

The elements that make up the house comply with Building Code clause B2 “Durability”, taking into account the age of the building work.

- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent expert (“the expert”) commissioned by the Department (refer section 5) to advise on this matter, and the other evidence in this matter in regard to the claddings. I have evaluated this information using a framework that I describe more fully in paragraph 6.1.
- 1.5 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.

## 2. The building

- 2.1 The building work consists of a detached house situated on a gently sloping large rural site, which is in a very high wind zone for the purposes of NZS 3604<sup>3</sup>. The construction of the house is conventional light timber frame, with a concrete slab, concrete block foundations, monolithic and brick veneer claddings, and aluminium windows. The house is generally one storey high, except where the lower roof rises to accommodate a partial upper level. The house is fairly complex in plan and form, with 25° pitch profiled metal gable roofs that have eaves and verge projections of about 500mm. A timber slat deck extends to the north at ground level.
- 2.2 The expert has noted no evidence as to timber treatment. I note that the framing schedule from the timber supplier specifies the external wall framing as “bor. rad.”, and the specification calls for “treated pine”. However, given the date of construction of the house framing in 1994, I am unable to determine the particular level of treatment that was used or whether the wall framing of this house is treated to a level that will provide resistance to fungal decay if it absorbs moisture.
- 2.3 The house has brick veneer cladding to the lower walls of the west, north and east elevations. The cladding to the upper level, the south elevation and the lower gable ends is what is described as monolithic cladding. In this instance, the cladding is a “Harditex” system with 7.5 mm thick fibre-cement sheets fixed through the building wrap to the framing, and finished with an applied textured coating system.

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<sup>3</sup> New Zealand Standard NZS 3604:1999 Timber Framed Buildings

### **3. Background**

- 3.1 The territorial authority issued a building consent (No. 3920) on 27 June 1994, and construction was managed by the owners, with the house built over a prolonged period. The territorial authority carried out various inspections during construction, with a pre-line inspection on undertaken on 13 December 1994, and a “gib-nail” inspection taking place on 15 August 1996.
- 3.2 It appears that the further building work was completed during 1996, although a final inspection was not undertaken until 8 July 2002. The final inspection noted that a handrail to the staircase was needed, which was subsequently completed, although the owners did not apply for a code compliance certificate until 2007.
- 3.3 In a letter to the applicants dated 10 May 2007, the territorial authority noted that recent information had cast doubts as to whether monolithic claddings meet the requirements of clauses B2 and E2 and advised the owner to seek a determination:
- As the monolithic cladding system fixed to your building has been individually assessed as being such a cladding, Council needs to be assured that it meets the requirements of the NZ Building Code before a final code compliance certificate can be issued.
- 3.4 Apart from an undated Interim Notice to Rectify relating to the Gibraltar board linings, the territorial authority did not issue a final Notice to Rectify under the Building Act 1991 (“the former Act”) or a final notice to fix as required under section 164(2) of the Act.
- 3.5 The Department received an application for a determination on 10 July 2007.

### **4. The submissions**

- 4.1 In a statement accompanying the application, the owners outlined the history of the project, noting that all work had been carefully carried out and inspected at the time. The owners explained that the house had never experienced moisture problems although they had recently noticed an area of “soft patches” on the cladding, which had also been identified by the territorial authority during the final inspection.
- 4.2 The applicants forwarded copies of:
- the drawings and specification
  - the building consent
  - the territorial authority’s inspection summary
  - the letter from the territorial authority dated 10 May 2007
  - various producer statements, calculations and other statements.
- 4.3 The territorial authority made a submission in the form of a letter to the Department dated 18 July 2007, noting that the building was substantially completed on or about 1 December 1996 and asking that the age of the construction also be addressed in this determination as:

Council is concerned that the durability period of the building's componentry will be extended unnecessarily...

- 4.4 Copies of the submissions and other evidence were provided to the other parties, who made no submissions in response.
- 4.5 The draft determination was sent to the parties on 21 August 2007. The draft was issued for comment and for the parties to agree a date when the building elements installed in the building complied with Building Code Clause B2 Durability.
- 4.6 The territorial authority accepted the draft and accepted that the building elements complied with the durability provisions of the building code on 1 January 1995.
- 4.7 The applicants responded to the draft determination and the expert's report (refer paragraph 5.7) in a letter to the Department dated 28 August 2007. The applicants submitted that compliance with B2 was achieved in January 1995.
- 4.8 With respect to the draft determination the applicants said there was general agreement about the matters to be fixed and that these would be attended to. The applicants said the timber treatment used was H1 Boron, and although the determination found some faults with the cladding, in other respects the cladding had proven to be effective in keeping the house dry. The applicants commented on the non-invasive moisture readings (refer paragraph 5.5), and noted that the delay in seeking a final inspection had arisen from an oversight about the status of a lining inspection. The applicants disagreed with the recommendation that the determination be included on the LIM as this would identify the building as a "leaky home".
- 4.9 I have amended the determination as appropriate. In response to the last matter, I note that the recommendation that the determination appear on the LIM is intended to provide a record of the modification of the B2 durability periods only.

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

- 5.1 As discussed in paragraph 1.4, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the New Zealand Institute of Building Surveyors.
- 5.2 The expert inspected the house on 1 August 2007, and furnished a report that was completed on 6 August 2007. The expert noted that the cladding was "generally straight and fair", with the coating "generally uniform, well adhered and free from fading, chalking and other deterioration". The expert observed that uPVC jointers were used at all horizontal joints, including at short joints beside windows. The expert considered that the latter, and the defects outlined in paragraph 5.6, suggested that the builder had not been experienced in the installation of this type of cladding.
- 5.3 The expert observed that the west wall of the garage used Harditex cladding in lieu of the brick veneer shown in the elevations of the consent drawings. (However, I note that Harditex is indicated on this wall in the consent floor plans).

- 5.4 The expert noted that the windows are face-fixed with satisfactory metal head flashings. The expert probed behind the jamb and sill flanges of one window, and noted no evidence of seals and flashings. I accept that this window is typical of other similar windows elsewhere in the house.
- 5.5 The expert inspected the interior of the house and no evidence of moisture was observed. The expert took indicative non-invasive moisture readings internally, which showed several elevated readings. The expert then took 6 invasive readings at high risk locations (including cracks in the cladding), and the obtained readings fell within a narrow range from 13% to 16%, (which is considered to be acceptable).
- 5.6 Commenting specifically on the cladding, the expert noted that:
- the bottom of the south garage apron flashing lacks a kick-out, with uncoated fibre-cement and a gap apparent
  - the top of the brick veneer beside the bay window to the kitchen protrudes beyond the gutter, without a top flashing,
  - there are cracks and joint bulges in the cladding in some areas
  - the joints of the backing sheets line up with the window jambs in some areas, resulting in joint cracks
  - the clearance from the bottom of the cladding to the paving is insufficient at the southeast corner of the garage (with a crack at the corner) and along the south wall of the laundry
  - there are no seals behind the window jamb flanges, with the coating applied after window installation
  - bare timber and edges of the fibre-cement backing sheets are exposed at the cat door in the south wall of the garage
  - there is uncoated fibre-cement behind the downpipes and fixings, and at the ends of the gutters (with the coating applied after installation)
  - overflow from a water tank is ponding on the paving at the south of the garage, putting at risk the bottom of the cladding in that area.
- 5.7 A copy of the expert's report was provided to each of the parties on 7 August 2007. The applicants responded to the report in a letter to the Department dated 28 August 2007. The applicants generally agreed with the expert's findings but noted some errors in the draft.

## Matter 1: The cladding

### 6. Evaluation for code compliance

#### 6.1 Evaluation framework: exterior cladding

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions<sup>4</sup>, which will assist in determining whether the features of the building work are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions are written to cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add one or more other provisions to compensate for that in order to comply with the Building Code.

6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations<sup>5</sup> (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

6.1.3 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less robust. In any event, there is a need for both the design of the cladding system and its installation to be carefully carried out.

#### 6.2 Weathertightness risk

6.2.1 In relation to these characteristics I find that this house:

- is built in a very high wind zone
- is a maximum of two storeys high
- is moderately complex in plan and form
- has brick veneer over a cavity and monolithic cladding fixed directly to the framing
- has eaves and verge projections of about 500mm above all walls

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<sup>4</sup> An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way (but not the only way) of complying with the Building Code. The Acceptable Solutions are available from The Department's Website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

<sup>5</sup> Copies of all determinations issued by the Department can be obtained from the Department's website.

- has a timber slat deck at ground level
- has external wall framing that is unlikely to be treated to a level that provides resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 The house has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. The resulting level of risk can range from 'low' to 'very high'. The risk level is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing; for example, a high risk level is likely to require a particular type of cladding to be installed over a drained cavity.

6.2.3 The weathertightness features outlined in paragraph 6.2.1 show that two elevations of this house demonstrate a low weathertightness risk rating and two elevations a moderate risk rating.

### **6.3 Weathertightness performance: exterior cladding**

6.3.1 In some respects the cladding appears to have been installed in accordance with the manufacturer's recommendation. However, based on the expert's opinion I accept that remedial work is necessary in respect of the following:

- the gap and lack of a kick-out at the bottom of the garage apron flashing
- the inadequate weatherproofing of the top of the protruding brick veneer
- the cladding cracks and joint bulges in the cladding
- the backing sheet layout around some of the windows
- the inadequate clearance from the bottom of the cladding to the paving at the southeast corner of the garage and the south wall of the laundry
- the lack of seals behind window jamb flanges
- the exposed timber and fibre-cement edges at the cat door
- the uncoated fibre-cement behind downpipes, fixings, and ends of gutters
- the water ponding on the paving beside the south garage cladding
- any other defects discovered during the rectification process.

6.3.2 Notwithstanding the fact that the cladding is fixed directly to the timber framing, thus limiting drainage and ventilation behind the cladding, I have noted certain compensating factors that have assisted the performance of the cladding in this particular case:

- apart from the noted exceptions, the cladding is installed to a reasonable standard
- the house has 500mm eaves and verges above all walls, which provide protection to the cladding areas below them
- the cladding has been in place for about 11 years, without evidence of leaking.

- 6.3.3 I consider that these factors have helped compensate for the lack of a drained cavity to the walls, and can assist the building work to comply with the weathertightness and durability provisions of the Building Code.

## **7. Discussion**

- 7.1 I consider the expert's report establishes that the current performance of the cladding is adequate because it is preventing water penetration into the building at present. Consequently, I am satisfied that the building work complies with clause E2 of the Building Code.
- 7.2 However, the building work 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 house to remain weathertight. Because the cladding faults on the house are likely to allow the ingress of moisture in the future, it does not comply with the durability requirements of clause B2. I have given further consideration to the question of B2 compliance under Matter 2 of this determination.
- 7.3 Because the faults identified with the cladding system occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3.1 will result in the building remaining weathertight and in compliance with clauses B2 and E2.
- 7.4 I emphasise that each determination is conducted on a case-by-case basis. Accordingly, the fact that particular cladding systems have been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding systems will be code compliant in another situation.
- 7.5 Effective maintenance of claddings (in particular monolithic cladding) 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, including examples where the external wall framing of the building may not be treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

## **Matter 2: The durability considerations**

### **8. Discussion**

- 8.1 There are concerns about the durability, and hence the compliance with the building code, of certain elements of the building taking into consideration the completion date of most of the building work in 1996. However I note that the territorial authority's inspection records indicate that no final inspection was undertaken in 1996 to verify compliance with clause B2 at that time (refer paragraph 3.2).
- 8.2 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).



8.3 These durability periods are:

- 5 years if the building elements are easy to access and replace, and failure of those elements would be easily detected during the normal use of the building
- 15 years if building elements are moderately difficult to access or replace, or failure of those elements would go undetected during normal use of the building, but would be easily detected during normal maintenance
- the life of the building, being not less than 50 years, if the building elements provide structural stability to the building, or are difficult to access or replace, or failure of those elements would go undetected during both normal use and maintenance.

8.4 It is not disputed, and I am therefore satisfied that all the building elements installed in the building complied with clause B2 on 1 January 1995. This date has been agreed between the parties, refer paragraphs 4.6 and 4.7.

8.5 In order to address these durability issues when they were raised in previous determinations, I sought and received clarification of general legal advice about waivers and modifications. That clarification, and the legal framework and procedures based on the clarification, is described in previous determinations (for example, Determination 2006/85). I have used that advice to evaluate the durability issues raised in this determination.

8.6 I continue to hold that view, and therefore conclude that:

- (a) the territorial authority has the power to grant an appropriate modification of clause B2 in respect of all the building elements.
- (b) it is reasonable to grant such a modification, with appropriate notification, because in practical terms the building is no different from what it would have been if a code compliance certificate for the building work had been issued in 1995.

8.7 I strongly recommend that the territorial authority record this determination and any modifications resulting from it, on the property file and also on any LIM issued concerning this property.

## **9. The decision**

9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the cladding does not comply with clause B2 of the Building Code, and that the items listed in paragraph 6.3.1 are not code-compliant. Accordingly, I confirm the territorial authority's decision to refuse to issue a code compliance certificate.

9.2 I also determine that:

- (a) all the building elements installed in the building, apart from the items that are to be rectified as described in this determination, complied with clause B2 on 1 January 1995.
- (b) the building consent is hereby modified as follows:

The building consent is subject to a modification to the Building Code to the effect that, clause B2.3.1 applies from 1 January 1995 instead of from the time of issue of the code compliance certificate for all the building elements apart from the items that are to be rectified as described in paragraph 6.3.1 of [**this determination**].

- (c) the territorial authority, once the matters set out in paragraph 6.3.1 have been rectified to its satisfaction, is to issue a code compliance certificate in respect of the building consent as amended.

9.3 I note that that the territorial authority has not issued a notice to fix. The territorial authority should now issue a notice to fix that requires the owners to bring the building up to compliance with the Building Code, incorporating the defects listed in paragraph 6.3.1 and referring to any further defects that might be discovered in the course of rectification, but not specifying how those defects are to be fixed. It is not for me to decide directly how the defects are to be remedied and the cladding brought to compliance with the Building Code. That is a matter for the owner to propose and for the territorial authority to accept or reject.

9.4 I would suggest that the parties adopt the following process to meet the requirements of paragraph 9.3. Initially, the territorial authority should issue the notice to fix. The owner should then produce a response to this 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 issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 28 September 2007.

John Gardiner  
**Manager Determinations**