

## Determination 2007/66

### Determination regarding a code compliance certificate for a house with monolithic cladding at 61B Newhaven Terrace, Mairangi Bay, North Shore



#### 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 applicant is the owner, Mr Evans (“the applicant”), and the other party is North Shore City 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 a 10-year-old house because it is not satisfied that it complies with clauses B2 “Durability” and E2 “External Moisture” 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).

I acknowledge that the applicant originally sought the determination because he believed the territorial authority would not issue a certificate of acceptance. The applicant has since confirmed that he is seeking a code compliance certificate.

1.3 The matters for determination are whether:

**1.3.1 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.

**1.3.2 Matter 2: The durability considerations**

The elements that make up the building work 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 commissioned by the Department to advise on this matter (“the expert”), and the other evidence in this matter. 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 small 2-storey detached house, situated on a gently sloping site, which is in a moderate wind zone for the purposes of NZS 3604<sup>3</sup>. The house is conventional light timber frame construction, with a concrete slab, foundations and low retaining walls to the west and south walls, monolithic cladding and aluminium windows. The house is simple in plan and form, with a single level roof over the upper floor and a lower level projection to the south elevation. Both low-pitched roofs are clad in curved profiled metal, with exposed rafters at soffits and eaves and verge projections that vary from about 300mm to more than 600mm. A small canopy, with a flat membrane roof, extends above the main entry door on the east elevation. A timber pergola is fixed to part of the north wall.

2.2 The building was originally designed and constructed to incorporate a garage to the lower level, with a bedsitting room above. However, in its present form, the house now has the kitchen and living areas on the lower level, with 2 bedrooms in the upper level. The garage door has been retained, and additional narrow horizontal windows have been installed above the door head, with additional glazed doors installed to the north. The expert has noted that a 300mm deep two-storey projection to the north wall (enclosing a void) was added after the original building was completed (refer paragraph 5.3).

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

- 2.3 The expert noted no evidence as to timber treatment. Due to the age of the building the external timber framing is likely to be boron treated but I have received no evidence to confirm this.
- 2.4 The cladding system is what is described as monolithic cladding. In this instance it consists of 7.5mm thick fibre-cement sheets fixed directly through the building wrap to the framing, and finished with an applied textured coating system.

### 3. Background

- 3.1 The territorial authority issued two building consents (No. E10779) on 23 April 1996 and (No. E10978) on 12 June 1996 (neither of which I have seen) which relate to the original construction. It appears that a later amendment to the consents (No. E13828) was subsequently issued, but I am unaware of the date or the building work covered by that amendment. It appears that the territorial authority carried out various inspections during construction, including a preline insulation inspection on 25 September 1996.
- 3.2 The house appears to have been completed before the end of 1996, although I have received no records of a final inspection. The owner has stated that the house was occupied “during March 1996”.
- 3.3 The applicant sought a code compliance certificate in 2006 and the territorial authority carried out a visual “weathertightness inspection”. In a letter to the owner dated 14 December 2006, the territorial authority noted that “the allowance of moisture ingress, together with the use of untreated timber framing, has become a major problem to the structural integrity of buildings”, and cladding systems were now selected to suit the weathertightness risk of the design. The territorial authority also noted that the Building Code required certain minimum durabilities of all elements in a building, with the times to commence on the issue of a code compliance certificate.
- 3.4 The territorial authority listed certain risk factors identified with the building, together with a list of defects and outstanding items, and stated that, due to the risk factors, defects and other compliance requirements, it could not be satisfied on reasonable grounds that the cladding system complied with clauses E2 and B2 of the Building Code. The territorial authority also required the applicant to provide a report from a “Certified Weathertightness Surveyor” to investigate the weathertightness of the cladding, confirm the moisture levels in the exterior framing and propose remedial work if necessary. The territorial authority noted that:
- On completion of all required remedial work and all outstanding requirements for compliance, to Council satisfaction, the Council will issue a letter stating it is satisfied on reasonable grounds that the building work has been completed to the approved building consent, and to the performance requirements of the New Zealand Building Code, except for clause B2 Durability.
- 3.5 The Department received an application for a determination on 15 January 2007.

## 4. The submissions

4.1 Within the application, the applicant noted that the matter for determination was whether the building complies with the Building Code in respect to:

E2 External moisture for the cladding system and B2 Durability of elements of the building.

4.2 The applicant forwarded copies of:

- the drawings
- engineering calculations
- the letter dated 14 December 2006 from the territorial authority.

4.3 In a letter to the Department, dated 19 December 2007, the territorial authority said:

After assessment for a Code Compliance Certificate the Council is not satisfied on reasonable grounds that the dwelling complies with the relevant clauses of the Building Code due to cladding issues and the age of construction.

1. Whether the installed cladding systems comply with clause E2...
2. Whether all building elements comply with clause B2... ...considering the age of construction.

4.4 A copy of the draft determination was issued to the parties on 20 March 2007. The draft was issued for comment and for the parties to agree a date when the building elements complied with Building Code Clause B2 “Durability”. The territorial authority accepted the draft determination.

4.5 In a letter to the Department dated 12 April 2007, the applicant made the following (summarised) points on the draft determination:

- The lack of control joints would, in the applicant’s view, have been accepted by the territorial authority at the time of construction, and to install them now would risk creating future problems.
- The only cracks in the cladding are at the foundation level which does not necessarily mean that the area is leaking, as the cracks may only be superficial.
- The cladding defects listed in paragraph 5.7 are generally minor and easily rectified, but some relate to current requirements and not those that applied at the time.
- The building is 11 years old, and the expert’s report verifies that there are no abnormal moisture readings.
- Apart from the moisture ingress on the north face, which could be attributed to poor workmanship, the building is not leaking.

I have considered these comments and address them in paragraph 7.1.

4.6 The territorial authority nominated 1 March 1996 as the date when the building elements complied with the durability provisions of the Building Code. The territorial authority noted that this date had been agreed in a telephone conversation

with the applicant. The submission received from the applicant also noted that the building was occupied in March 1996.

## 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 16 February 2007, and furnished a report that was completed on 26 February 2007. The expert noted:
- The apparent recoating of the dwelling has not completely concealed evidence of some previous joint cracking blemishes.
- 5.3 The expert noted that the building work differed significantly from the consent drawings, including the:
- upper level altered from a bedsitting area to two bedrooms
  - lower level altered from a garage to kitchen and living areas (with the garage doors remaining in place)
  - addition of a row of narrow windows above the garage door head
  - new main entry door, with a small canopy above, beside the garage door
  - addition of a timber pergola and a 2-storey projection (enclosing a void) to the north wall
  - omission of the decorative bands around the windows.
- 5.4 The expert noted that the windows had been face-fixed with adequate metal head flashings and no sill or jamb flashings and with the coating applied after the window installation. The expert removed a small section of cladding at the sill to jamb junction of a window to observe the sealing. I accept that the location opened is typical of similar locations elsewhere in the house.
- 5.5 The expert also removed a small section of cladding at the bottom of the northeast corner of the void projection to the north wall, and observed that the projection had been constructed later than the original building, with a tanalised plate separating the original wall from a new concrete slab.
- 5.6 The expert took non-invasive moisture readings through internal linings of exterior walls throughout the house, and no elevated readings or signs of moisture were noted. The expert took 24 invasive moisture readings through the external cladding at various risky areas, and the following elevated readings were noted:
- 18% in the bottom plate at the south corner of the east wall.
  - 19% in the bottom plate beside the attached gate post on the east wall.
  - 20% in the bottom plate of the north projecting wall, with decay apparent at the cut-out to the northeast corner.

The expert noted that moisture levels could be significantly higher during winter months. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.7 The expert made the following specific comments on the cladding:

- There are no horizontal control joints to the 2-storey high walls, and there is evidence of cracking at the inter-storey level (beneath the new paint coating).
- There is no evidence of vertical control joints to the 7.5m east and west walls, where the cladding lengths exceed the 5.4m limit recommended by manufacturers of flush-finished fibre-cement cladding systems, and there is evidence of cracking showing beneath the new paint coating.
- There are cracks in the coating (including at the inter-storey junction, vertical joints in the fibre-cement backing sheets and at the junctions with the concrete foundation or retaining walls).
- There are no seals installed between the window flanges and the unsealed fibre-cement backing sheets, with a fillet of sealant applied at the edge and the coating overlapping onto the flange. There is also no drainage gap provided at the window sills.
- There are inadequate clearances between the inside floor level and ground levels and no clearance from the bottom of the cladding to the paving along the north and east walls.
- There is no drainage gap provided at the bottom of the cladding and some areas of wall cladding do not adequately overlap the concrete foundation wall.
- The junction of the top of the cladding with the timber rafters and soffits is unflushed, and there are gaps showing in some areas.
- There is little or no cladding clearance above the roof of the lower projection to the south elevation, and no kickouts to the bottom of the apron flashings with the ends of the gutters buried in the coating, and gaps and bare timber showing.
- The membrane roof to the entry canopy turns up against the wall cladding, with the upstand terminating within a full-depth chase in the fibre-cement sheet and the junction is reliant on sealant at the top and sides for weatherproofing.
- Penetrations through the cladding by pipes and cables are poorly sealed.
- The gatepost is fixed directly to the cladding of the east wall, with unsealed fixing and associated elevated moisture in the adjacent bottom plate.
- The coating is not continuous behind the downpipe brackets.

5.8 The expert made the following additional comments:

- Although there is no head flashing, the entry door head is sheltered beneath the canopy.
- Although lacking a top flashing, the meterbox is well sealed and sheltered by roof overhangs.

5.9 A copy of the expert's report was provided to each of the parties on 6 March 2007.

## 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 these houses are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions 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 some other provision 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 moderate wind zone
- is a maximum of two storeys high
- is simple in plan and form
- has flush-finished fibre-cement cladding that is fixed directly to the framing
- has eaves and verge projections that vary from 400mm to about 600mm
- has external wall framing that may provide no resistance to decay if it absorbs and retains moisture.

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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.

- 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 and ventilated cavity.
- 6.2.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.2.1 show that all elevations of this house demonstrate a moderate weathertightness risk rating.

## Matter 1: The cladding

### 7. Discussion

- 7.1 The owner has stated (refer paragraph 4.5) that the building complied with the territorial authority's requirements at the time of construction and there are no abnormal moisture readings in the wall framing. I make the following observations in response to the owner's comments:
- The Building Code is part of the Building Regulations 1992 that came into force on 1 June 1992. The performance requirements of the Building Code have not changed significantly since the building's construction. The Acceptable Solution E2/AS1 did exist at the time of construction, however, a significant amendment to E2/AS1 came into force on 1 July 2005.
  - The current E2/AS1 would require the fibre-cement cladding on this building to be installed over a drained and ventilated cavity. The cavity is provided to allow for the risk factors identified in paragraph 6.2 and to allow for the likelihood that some moisture may penetrate the cladding itself.
  - In this instance the cladding is directly fixed to the framing, rather than over a cavity. It must therefore be installed to a good standard to ensure that undue moisture does not enter the building. In various key respects, the installation of the cladding and the windows to the building is poorly executed and has not been carried out in accordance with the manufacturer's instructions.
  - I also note the expert's comment that moisture levels could be significantly higher during winter months (refer paragraph 5.6).
- 7.2 Taking into account the expert's report, I am satisfied that the current performance of the cladding installed on this house is inadequate. The cladding is allowing water to penetrate the walls through defects in some locations which in turn may have led to the framing timber rotting. In particular, the cladding demonstrates the key defects listed in paragraph 5.7.
- 7.3 I have identified the presence of a range of known weathertightness risk factors in this house. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the significant faults identified in the cladding system. It is that combination of risk factors and faults that indicate that

the structure does not have sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding system as installed complies with either clause B2 or clause E2 of the Building Code. I have given further consideration to the question of B2 compliance under Matter 2 of this determination.

- 7.4 I find that, because of the extent and complexity of the faults that have been identified in the cladding, I am unable to make a decision about how compliance might be achieved. I consider this can only be made after a more thorough investigation of the cladding, which will require careful analysis by an appropriately qualified expert. Once that analysis is completed, the chosen repair option (whether targeted repairs, re-cladding, or a combination of both) should be submitted to the territorial authority for its consideration and approval.
- 7.5 I also note that the garage door forms a large proportion of the east wall to what is now the ground floor living area. The door construction may provide insufficient thermal insulation to comply with the requirements of Clause H1 Energy Efficiency. I draw this matter to the attention of the territorial authority for its consideration.

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

### **8. Discussion**

- 8.1 The territorial 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 date of the building by the end of 1996.
- 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 house, apart from those items that have to be rectified, complied with clause B2 on 1 March 1996. This date has been agreed between the parties (refer paragraph 4.6).

- 8.5 In order to address these durability issues, I sought some clarification of general legal advice about waivers and modifications. I have now received that clarification and the legal framework and procedures based on this clarification are described in previous determinations (for example Determination 2006/85) and are used 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 house had been issued in 1996.
- 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 Act, I determine that the building does not comply with clauses B2 and E2 of the Building Code, and accordingly 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, complied with clause B2 at 1 March 1996.
  - (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 March 1996, instead of from the time of issue of the code compliance certificate for all building elements, provided that the modification does not apply to those elements which have been altered or modified as set out in paragraph 5.7 of Determination 2007/66.
  - (c) once the defects set out in paragraph 5.7 of this determination have been fixed to its satisfaction, the territorial authority is to issue a code compliance certificate in respect of the building consent as amended.
- 9.3 I note that the territorial authority has not issued a notice to fix. The notice to fix may list the items to be rectified, including any associated defects discovered during the course of that work, but it should not specify how compliance is to be achieved as that is for the owner to propose and for the territorial authority to accept or reject. 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. It is important to note that the Building Code allows for more than one method of achieving compliance.

- 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 25 June 2007.

John Gardiner  
**Manager Determinations**