

Determination 2009/66

Subject to clarification of 6 October 2009¹

Determination regarding the code compliance of a four-year-old house with monolithic cladding at 4 Petrel Lane, Whitby



1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004² (“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, L and B Gay (“the applicants”), acting through an agent, and the other party is the Porirua City Council (“the authority”), carrying out its duties and functions 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 a 4-year-old house because it was not satisfied that the monolithic cladding complied with Clauses B2 and E2 of the Building Code³ (First Schedule, Building Regulations 1992).

¹ The clarification is appended to this determination as pages 10 to 12

² The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

³ The Building Code is available from the Department’s website at www.dbh.govt.nz.

- 1.3 The matter for determination, in terms of section 177(a) and 177(b)(i) of the Act⁴, is whether the cladding as installed on the house (“the cladding”) complies with Building Code Clause B2 Durability and Clause E2 External Moisture. By “the cladding as installed” I mean the components of the system (such as the backing sheets, the joints, the drained cavity and the coatings), as well as the way the components have been installed and work together.
- 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 other evidence in this matter. With regard to the cladding, I have evaluated this information using a framework that I describe in paragraph 6.1.

2. The building work

- 2.1 The building work consists of a large single-storey house that is situated on a steeply sloping excavated site in a medium wind zone for the purposes of NZS 3604⁵. Construction is generally conventional light timber frame, with timber pole foundations, a concrete masonry retaining wall to the north of the house, timber-framed floor, monolithic cladding, aluminium windows and a pressed metal tile roof.
- 2.2 The house is fairly complex in plan and form, with a 30° pitch hipped roof that has two small gables at each end of the north elevation, and another above the north entry. Eaves projections are about 600mm overall and verges are about 300mm, except above recessed walls at the northwest and southwest corners and at the north entry. A timber deck, with spaced timber slats and open timber balustrades, extends along part of the south elevation, with a similar smaller deck at the southwest corner.
- 2.3 The wall cladding is a form of monolithic cladding, which consists of 9 mm thick fibre-cement sheets fixed through 20mm timber battens and the building wrap to the framing, and finished with an applied textured coating system. The H3 treated cavity battens form a cavity between the cladding sheets and the building wrap.
- 2.4 The expert has noted that he found no evidence of treatment on framing timber he was able to inspect. The applicant has submitted copies of invoices from the timber supplier, which indicate that the exterior wall framing supplied for the house is “Radiata merch CF KD PG”. Based on this evidence, I consider that the wall framing is unlikely to be treated.

3. Background

- 3.1 The authority issued a building consent for the house (No. ABA 40212) on 9 September 2003, under the Building Act 1991. I have not seen a copy of the consent.
- 3.2 The authority carried out various inspections during construction, including a pre-clad inspection on 22 April 2004, a pre-line inspection on 5 May 2004 and a post-line inspection on 31 May 2004.

⁴ 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.

⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 3.3 While the drawings indicate that the wall cladding is fixed directly to the framing, the applicants decided to incorporate a drained cavity. (I note that the first edition of the current E2/AS1, which provided details for drained cavities, was issued on 1 July 2004 although the provisions did not take effect until the following year.)
- 3.4 The house was substantially completed and occupied in August 2005 and the applicants completed landscaping and exterior works over the next two years. It appears that a final inspection was carried out on 3 November 2006, which identified some items to be attended to. I have not seen a copy of that inspection record.
- 3.5 According to the applicants, a number of hairline cracks to some cladding joints had appeared over a period of time, particularly on the north elevation. The applicant, who is a carpenter, decided to replace the jointing compound with a more flexible product and all cladding joints were replaced (refer paragraph 5.5).
- 3.6 The applicants applied for a code compliance certificate in 2008 and the authority carried out inspections on 4 December 2008 and 22 January 2009. The record of the latter inspection noted 'pass' and stated 'all items previously listed have been completed'.
- 3.7 In a letter to the applicant dated 21 November 2008, the authority refused to issue a code compliance certificate because:
- Council has concerns regarding the long term durability of the exterior wall cladding system. It is evident that repairs have been undertaken at the joint between the sheets since the dwelling was constructed.
- 3.8 The Department received an application for a determination on 20 March 2009.

4. The submissions

- 4.1 Within a covering letter the applicants outlined the history of the project and explained that 'small hairline cracks' had appeared several years after house was completed. Due to the inclusion of the drained cavity, the cracks had not initially caused concern and the joints were later replaced. The applicants concluded:
- We feel we carried out all inspections required before and during the house construction to the period November 2006. The cladding has never been an issue until very recently. We built the house for our own occupation for the long term. [The applicant] has himself been involved in the building industry for 40 years and took an active interest in all the building stages. We are very proud of this house and the construction of it.
- 4.2 The applicants forwarded copies of:
- the drawings
 - the inspection records
 - the letter from the authority dated 21 November 2008
 - a series of construction photographs
 - copies of invoices for construction materials.

4.3 The authority acknowledged the application and made a submission in a letter to the Department dated 3 April 2009. The authority noted that the ‘extensive repairs’ to the cladding indicated that the cladding systems had ‘suffered a significant failure’, and considered that repair work had been carried out without due consideration of how the joint failure might have affected other underlying building elements. The authority concluded:

The Council cannot issue the code compliance certificate because the cladding system has suffered a significant failure, the repairs have been undertaken without any input or verification from council, an assessment was not undertaken to establish the condition of the underlying building elements, and the cladding system is nearly 1/3 of the way through its intended life of 15 years.

4.4 A draft determination was issued to the parties for comment on 2 June 2009. Both the parties accepted the draft without comment. The authority’s response was not received until 20 July 2009.

4.5 On 3 August 2009 I sought agreement from the parties as to when the work contained in the first consent complied with clause B2 “Durability” of the building code. Both parties agreed that compliance with Clause B2 was achieved on August 2005.

5. The expert’s report

5.1 As mentioned 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. The expert inspected the house on 16 April 2009 and furnished a report that was completed on 22 April 2009. The expert noted that his inspection was primarily related to the work carried out to the cladding joints.

5.2 The expert noted that the house generally appeared to accord with the drawings except for:

- the addition of a drained cavity behind the cladding
- the use of pressed metal tiles in lieu of profiled metal roofing.

5.3 The expert noted that the house generally appeared to be ‘maintained to a high standard’ and the general quality of construction was ‘excellent’.

5.4 The drained cavity

5.4.1 The expert examined the construction photographs supplied by the applicant, which provide a clear indication of various phases of the cavity construction and window installation.

5.4.2 The cavity is installed to drain satisfactorily, with no horizontal blocking. Additional short off cuts of cavity battens are installed vertically above and below windows to provide fixings for the backing sheets.

5.4.3 A perforated uPVC cavity closure strip is installed at the base of the cavity and above the window head flashings. The bottom strip can also be seen from the sub-floor area, where plywood is installed to the underside of the floor framing.

5.4.4 The window openings in the framing were wrapped and a compressible foam strip installed at the jambs, prior to the installation of the face-fixed windows and doors.

5.5 The cladding joints

5.5.1 The expert discussed the work with the applicant, who described the hairline cracks that had appeared in (mainly) the north elevation. The applicant explained that he considered the original jointing compound to be too rigid, so he had decided to replace it with a more flexible product.

5.5.2 All joints had been raked out and the tape removed, then new tape and joint compound had been applied and the areas had been repainted. The applicant had decided not to re-texture the cladding, so the replaced joints are visually apparent.

5.5.3 The replaced joints had been in place for about a year and the expert noted that the vertical joints appeared to be in excellent condition. However, several horizontal joints had not been installed according to the manufacturer's instructions and had continued to crack (refer paragraph 5.7).

5.6 Moisture

5.6.1 The expert took non-invasive moisture readings through the cladding at areas known to be dry, and established that equilibrium moisture levels in the cavity behind the cladding were about 15%. Non-invasive readings were taken at other areas around the house and elevated readings of 21% were noted at the ends of some window head flashings.

5.6.2 However, in the case of the wall construction of this house, I note that any such moisture will be entering the drained cavity behind the cladding, and will not penetrate further past the building wrap and into the wall framing.

5.7 Commenting specifically on the wall cladding, the expert noted that:

- there are several horizontal joints in the cladding of the north gable end walls, which have been flush-finished and are continuing to crack
- the head flashings project beyond the window jambs and the ends are not adequately sealed, with moisture entering the cavity in some areas
- the joints behind some exterior light fittings are not sealed
- the inner face and bottom edge of the cladding is visible from the subfloor area and the exposed fibre cement backing sheet has not been painted.

5.8 The expert noted that, although the horizontal joints had been flush-finished with jointing compound, the cracks appeared to be associated with adjacent defects (identified in paragraph 5.7). While these particular joints had not been installed in accordance with the manufacturer's instructions, the drained cavity allows any moisture to drain to the outside. Providing the horizontal joints were monitored and

maintained, the expert considered that the cladding would meet the durability requirements.

5.9 A copy of the expert's report was provided to the parties on 12 May 2009.

6. Evaluation for code compliance

6.1 Evaluation framework

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions⁶, which will assist in determining whether the features of this house 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 one or more other provisions to compensate for that in order to comply with the Building Code.

6.1.2 In the case of the cladding to this building, the underlying drained cavity generally complies with the relevant Acceptable Solution, but the cladding includes some flush-finished horizontal joints which do not comply with E2/AS1 and the treatment of these joints is therefore considered as an alternative solution.

6.2 Evaluation of the cladding for E2 and B2 Compliance

6.2.1 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 determinations⁷ (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

6.2.2 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 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.

⁷ Copies of all determinations issued by the Department can be obtained from the Department's website.

6.3 Weathertightness risk

6.3.1 This house has the following environmental and design features which influence its weathertightness risk profile:

Increasing risk

- the house is in a medium wind zone
- the house is fairly complex in plan and form
- the external wall framing is not treated to a level effective in resisting decay if it absorbs and retains moisture

Decreasing risk

- the house is single-storey
- there are eaves and verge projections to shelter most of the walls
- the walls have monolithic cladding installed over a drained cavity.

6.3.2 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.

6.3.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.3.1 show that all elevations demonstrate a low weathertightness risk rating. I note that, if the details shown in E2/AS1 were adopted to show code compliance, the monolithic cladding would not require a drained cavity.

6.4 Weathertightness performance

6.4.1 I consider that the expert’s report has established that the replacement of the cladding joints generally appears to have been carried out satisfactorily. However, I also consider that the report has established that the manufacturer’s instructions for the cladding installation have not been followed with respect to the horizontal joints.

6.4.2 Notwithstanding the above, the cladding generally appears to have been installed in accordance with good trade practice and with the provisions of E2/AS1. Taking account of the expert’s report, I conclude that remedial work is necessary in respect of the areas outlined in paragraph 5.7.

6.4.3 I note the expert’s comments regarding the horizontal joints, as outlined in paragraph 5.8. Due to the low weathertightness risk of this house in conjunction with the additional protection afforded by the drained cavity, I accept that the horizontal joints are likely to be adequate in these particular circumstances. However, I also note that these joints will require careful monitoring and maintenance, although that requirement would be reduced if the previous sealant replacement exercise for vertical joints had been applied to horizontal joints also.

6.5 Weathertightness conclusion

- 6.5.1 I consider that the drained cavity in this house is appropriately constructed to drain moisture that may penetrate the outer cladding to the outside (refer paragraph 5.4). I therefore consider that the current performance of the cladding is adequate because the cavity is preventing water that may have been absorbed into the cladding from penetrating into the wall framing of the house at present. Consequently, I am satisfied that the building complies with Clause E2 of the Building Code.
- 6.5.2 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 may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.
- 6.5.3 Because the faults identified with the cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 5.7 will result in the house being brought into compliance with Clause B2.
- 6.5.4 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that the horizontal cladding joints have been established as being code compliant in relation to this particular building does not necessarily mean that the same type of joints will be code compliant in another situation.
- 6.5.5 I have noted in paragraph 6.4.3 that particular care is needed with regard to monitoring and maintaining the horizontal joints in this cladding. Effective maintenance of claddings 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).

7. What is to be done now?

- 7.1 A notice to fix should be issued that requires the owners to bring the cladding into compliance with the Building Code, identifying the items listed in paragraph 5.7 and referring to any further defects that might be discovered in the course of investigation and rectification, but not specifying how those defects are to be fixed. It is not for the notice to fix to stipulate directly how the defects are to be remedied and the house brought to compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject. Any outstanding items of disagreement can be referred to the Chief Executive for a further binding determination.
- 7.2 I note that the expert has identified some variations between the drawings and the house as constructed, and I leave this matter to the authority to resolve with the owners as it considers appropriate.
- 7.3 I also note the authority's comment on the age of the cladding (refer paragraph 4.3). In previous determinations I have indicated that durability modifications are not

generally appropriate for houses of less than 5 years old, and I note here that this house is near that limit.

8. The decision

8.1 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 insofar as it relates to Clause E2, and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate.

8.2 I also determine that:

- (a) all the building elements installed in the house, apart from the items that are to be rectified as described in this determination, complied with Clause B2 on 1 August 2005.
- (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 August 2005 instead of from the time of issue of the code compliance certificate for all the building elements, except the items to be rectified as set out in paragraph 5.7 of Determination 2009/66.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 24 August 2009.

John Gardiner
Manager Determinations

Clarification of Determination 2009/66 regarding the code compliance certificate of a four-year-old house with a monolithic cladding at 4 Petrel Lane, Whitby

1. Background

- 1.1 This clarification of Determination 2009/66 is made by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department, under section 189 of the Building Act 2004 (“the Act”).
- 1.2 The application for Determination 2009/66 was received on 20 March 2009 under Part 3, Subpart 1, of the Act. The determination was made on 24 August 2009.
- 1.3 The matter for determination was whether the cladding as installed on the house complies with the Building Code and whether the authority was correct in its decision to refuse to issue a code compliance certificate. The parties to the determination were the applicants, L and B Gray, who were the owners of the building (“the applicants”), and Porirua City Council (“the authority”).
- 1.4 The determination found that the cladding did not comply with Clause B2 of the Building Code (insofar as it relates to Clause E2) and confirmed the authority’s decision to refuse to issue a code compliance certificate. The determination also found that the building consent is to be modified to the effect that Clause B2.3.1 applies from 1 August 2005.

2. The application for clarification

- 2.1 I received a letter from the authority dated 15 September 2009, requesting a clarification of the determination. The letter included documents not supplied by the authority during the determination process.
- 2.2 The request from the authority for a clarification included a total of 16 items for consideration.
- 2.3 Section 189 of the Act says:

The chief executive may, within 20 working days after making a determination, amend the determination to clarify it if--

 - (a) the chief executive, on his or her own initiative or on the application of a party to the determination, considers that the determination requires clarification; and

- (b) the clarification is either--
 - (i) not material to any person affected by the determination; or
 - (ii) agreed to by the parties to the determination; and
- (c) no appeal against the determination is pending.

2.4 I have therefore only included those matters that can be considered for clarification by the Chief Executive under section 189 of the Act.

2.5 The draft clarification was sent to the parties for agreement to issue on 23 September 2009. Both parties accepted the draft.

3. Clarifying amendments to the determination

3.1 In accordance with section 189 of the Act, I hereby amend Determination 2009/66 as follows:

1) Paragraph 3.4 is amended as follows:

The house was substantially completed and occupied in August 2004 and the applicants completed landscaping and exterior works over the next two years. A final inspection was carried out on 3 November 2004, which identified some items to be attended to. A copy of that inspection record was supplied to the Department after the determination had been issued (refer also paragraph 4.6). The record noted 'required texture coating to be repaired at front of the garage'.

2) Paragraph 3.6 is amended as follows:

The applicants applied for a code compliance certificate on and the authority carried out inspections on 4 December 2008 and 22 January 2009.

3) In paragraphs 3.7 and 4.2, remove the date "21 November 2008" and replace it with "2 February 2009"

4) Add new paragraph 4.6 as follows:

Subsequent to the determination being made the authority advised the Department that the date of substantial completion was incorrect and it should be August 2004. It is noted that this date is in line with the information supplied in the covering letter to the application. Agreement of the parties was sought by way of a draft clarification for the agreed date of when the building elements complied with the durability provisions of the Building Code to be changed to 1 August 2004.

5) Delete the following sentence from paragraph 5.1

The expert noted that his inspection was primarily related to the work carried out to the cladding joints.

6) Delete paragraph 7.3

7) Paragraph 8.1 is amended as follows:

In accordance with section 188 of the Building Act 2004, I hereby determine that:

- the cladding as installed on this house complies with Clause B2 of the Building Code but does not comply with Clause B2 insofar as it relates to Clause E2,
- and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate.

- 8) In paragraph 8.2(a) and (b), remove the date “1 August 2005” and replace it with “1 August 2004”

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 6 October 2009.

John Gardiner
Manager Determinations