

Determination 2006/65

Determination regarding a code compliance certificate for a house with monolithic cladding at 478 Ararimu Road, Drury



1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“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 Colebourne (“the applicant”), and the other party is 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 a 5-year-old house because it is not satisfied that it complies with clauses B2 and E2 of the Building Code² (First Schedule, Building Regulations 1992).

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

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

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 large detached house situated on an open rural site, which is in a high wind zone for the purposes of NZS 3604³. The house is two storeys high with most of the upper level accommodated within the roofline. The construction of the house is conventional light timber frame, with a concrete slab, concrete block foundation walls, monolithic cladding and aluminium windows (some of which have heads angled to match gable ends). The house is complex in plan and form, with a 45° pitch asphaltic shingle gabled roof that has eave and verge projections of about 330mm. The roof incorporates a number of complex roof junctions and intersections, dormer windows, gable projections and skylights. The walls of the projecting entrance porch to the east are clad in stone veneer which continues as low planter walls in front of adjacent walls.

2.2 A timber pergola is fixed to the west wall of the projecting dining room, and a stone-clad “chimney” structure rises through the eaves on the south wall.

2.3 The expert noted that the timber he was able to inspect did not appear to be treated. The specification calls for wall framing to comply with NZS 3604, which at the time of construction would permit untreated timber. I also note that the inspection record notes the framing as “chemical free”, and a biodeterioration consultant’s analysis confirms this (refer paragraph 5.7). I therefore accept that the external wall framing is not treated and will be unable to resist decay if it becomes wet and cannot dry out.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.4 The cladding system applied to the majority of the exterior walls is what is described as monolithic cladding, which in this instance is a “Thermaclad” system by Plaster Systems Ltd (“the manufacturer”). The cladding consists of 60mm polystyrene backing sheets fixed directly to the framing over the building wrap, to which a sponge finish plaster system has been applied. The plaster is finished with a flexible acrylic paint system. Vertical grooves are formed in the back of the polystyrene sheets.
- 2.5 Plaster Systems Ltd provided a “Producer Statement” dated 18 October 2006, for the “Thermaclad Plaster” system. It also provided a 15-year “Materials Components Guarantee” and a 5-year “Workmanship Guarantee”, both dated 18 October 2006. Both guarantees also carried an exclusion clause, whereby Plaster Systems Ltd did not accept responsibility for consequential damage of any kind to any building component that has occurred as a result of the use of untreated timber.

3. Background

- 3.1 The territorial authority issued a building consent (No. 38439) dated 25 June 2001, based on a building certificate (No. 2001-3832) dated 19 June 2001 issued by A1 Building Certifiers Ltd (“the building certifier”).
- 3.2 The building certifier carried out various inspections during construction including a pre-line inspection on 3 April 2002 and an inspection of the plaster substrate on 17 July 2002 (which appears to be the last recorded inspection). The building certifier’s monthly progress report dated 22 October 2002 indicates a number of relatively minor outstanding items and incomplete documentation.
- 3.3 The building certifier’s approval as a certifier expired on 18 September 2002 and the project was handed back to the territorial authority.
- 3.4 In a letter to the owners dated 18 October 2002, the territorial authority advised that the building certifier was unable to continue to certify the building work. I have received no records of any further inspections until the territorial authority carried out a final inspection on 2 March 2004, which identified five outstanding items, one of which was that the “monolithic cladding requires determination”.
- 3.5 In a letter to the owner dated 5 March 2004, the territorial authority noted that recent information had cast doubts as to whether monolithic claddings meet requirements of clauses B2 and E2 and advised the owner to seek a determination, noting:
- 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.
- 3.6 The territorial authority did not issue a Notice to Rectify under the Building Act 1991 (“the former Act”) or a notice to fix as required under section 164(2) of the Act.
- 3.7 The Department received an application for a determination on 27 October 2006, and sought additional information, which was received on 15 January 2007.

4. The submissions

4.1 The applicant forwarded copies of:

- the drawings
- the cladding manufacturer's details dated January 2000
- a producer statement and guarantees for the cladding.

4.2 In a letter to the Department dated 21 December 2006 the territorial authority acknowledged the application and said:

It would appear that the building was substantially completed on or about 17th June 2002. Council therefore requests that any Determination decision include a provision for an exemption from, or modification of, Clause B2 of the Building Code so that the durability periods of the building components start from that date.

I have therefore added this as a matter for determination (refer paragraph 1.3.2).

4.3 The territorial authority forwarded copies of:

- some of the consent documentation
- the original drawings and amended drawings
- the final inspection checklist dated 11 November 2003
- the Notice to Rectify and letter to the applicant dated 25 January 2005
- various other statements and information.

4.4 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

4.5 A copy of the draft determination was sent to the parties for comment on 2 May 2007. The territorial authority accepted the draft.

4.6 The draft was also issued for the parties to agree a date when all the building elements installed in the house, apart from the items that have to be rectified, complied with the durability provisions of the building code. The territorial authority advised that it had agreed with the applicant that the date should be 1 December 2002 (refer paragraph 4.7).

4.7 In a letter to the Department dated 10 May 2007, the applicant confirmed that the house was occupied from December 2002 and generally accepted the draft determination, apart from questions with regard to the following:

- The flashings around the chimney were carefully considered and installed, and are unlikely to be inadequate.
- The aim of using a cavity behind the planters was to separate the garden from the wall cladding, and perhaps some additional ventilation may be added.
- In the stonework walls at the entrance, there is a 40mm cavity behind the fibre cement backing sheets to the stone veneer.

I have considered these comments and have amended the draft as I consider appropriate (refer paragraph 6.3.2).

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 21 March 2007, and furnished a report that was completed on 27 March 2007. The expert noted that the workmanship was generally “reasonable but not high standard”, with the plaster coating “straight, flat and fair”.
- 5.3 The expert noted that the building work generally conformed to the consent drawings, but there were significant variations as follows:
- Stucco cladding was replaced with EIFS (and the external wall insulation was therefore omitted).
 - Metal roof tiles were replaced with asphaltic shingles.
 - Stone planters were added on the other side of the entry.
- 5.4 The expert noted that control joints are not specified by the manufacturer as necessary for the dimensions of the cladding on the walls of this building.
- 5.5 The expert noted that the windows were recessed by the thickness of the cladding, and had metal head flashings. The expert removed a small section of plaster at the jamb to sill junction of a north-facing family room window and noted that uPVC flashings were generally installed in accordance with the manufacturer's recommendations at the time, with corner soakers installed at the junction. However, the expert also noted that decorative projecting sill bands (formed from polystyrene off-cuts) were installed between the uPVC sill flashing and the wall cladding below. The expert noted that these bands had caused moisture problems (refer paragraph 5.8).
- 5.6 The expert inspected the interior of the house and no evidence of moisture was observed. The expert took non-invasive moisture readings internally around the house and some elevated readings were noted. The expert arranged for 96 moisture probes to provide invasive moisture readings (and “indicative strength” test results). Two elevated moisture readings were noted as follows:
- 19% in the bottom plate of the southeast corner of the stairwell walls
 - 66% beside the glazed doors of the dining room (under the pergola).

The indicative strength tests at the probe locations resulted in scores of between 4 and 7 on a scale from 0 to 10 with 5 reported as “warning” or “danger” levels.

The expert noted that the readings were taken at the end of summer, and higher readings would be expected during winter months (I note that a number of moisture readings were over 15%, which may become elevated in wetter seasons). Moisture

levels that vary significantly after the cladding is in place generally indicate that external moisture is entering the structure and further investigation is required.

5.7 While invasive tests of the moisture content of the wall framing showed few high readings, given the widespread potential faults, the expert took 2 timber samples from timber at the cut-out and forwarded them to a testing laboratory for analysis. Although the samples tested negative for boron preservative treatment, the wood samples were found to be “sound”.

5.8 Commenting specifically on the cladding, the expert noted that:

- the soil of the planters is supported by a timber retaining wall at the rear – which is separated from the cladding by about 100mm. The resulting gap is bridged with a removable timber plate that creates a damp unvented and undrained cavity against the cladding
- the stonework around the entrance appears to be glue-fixed directly to sealed fibre-cement sheets (with no cavity)
- the paintwork system as applied is unsatisfactory in terms of the number of coats, the application and the paint type
- the sill to jamb junctions of the uPVC window flashings are not adequately sealed to the corner soakers, and the decorative window sills trap moisture in the top groove of the polystyrene – allowing moisture to run down the joints and into the cladding below (and there are signs of moisture penetration in a number of locations)
- some of the rubber seals to the windows are loose
- on all elevations, there are a number of cracks in the plaster coating below windows (at the backing sheet joints)
- there are no jamb flashings installed at the garage doors
- the ribbon plate of the west pergola is unflushed and fixed directly to the framing – and the fixings are starting to corrode (indicating moisture penetration into the wall framing)
- some pipe penetrations through the cladding are inadequately sealed.

5.9 Commenting specifically on the roof, the expert noted that:

- a number of roof to roof flashings are inadequately terminated, directing water into the soffits and/or wall cladding, and some fascias are buried in the plaster
- the kickouts at the bottom of the apron flashings are generally inadequate with gaps, poor sealing and detailing that directs water into the cladding in some locations
- the stone-clad chimney structure is inadequately flashed to the roof cladding.

5.10 A copy of the expert’s report was provided to each of the parties on 13 April 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 Solutions⁴, 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 determinations⁵ (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 high wind zone
- is a maximum of two storeys high
- is complex in plan and form
- has monolithic cladding fixed directly to the framing
- has eaves or verge projections of about 300mm
- has external wall framing that is not treated to a level that provides resistance to the onset of decay if the framing absorbs and retains moisture.

⁴ 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.

⁵ 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 cavity.

6.2.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.2.1 show that three elevations of this house demonstrate a high weathertightness risk rating and one elevation a moderate risk rating.

6.3 Weathertightness performance: exterior cladding

6.3.1 Generally the cladding appears to have been installed in accordance with good trade practice. However, I accept the expert's opinion that remedial work is necessary in respect of the following:

- damp cavities created at the back of the planters
- inadequate paintwork to the cladding
- inadequately sealed sill to jamb junctions of the uPVC window flashings.
- inadequate installation of the decorative polystyrene window sills
- rubber seals to some of the window joinery
- cracks in the plaster around many of the windows
- lack of jamb flashings to the garage doors
- inadequate weatherproofing of the pergola attachment to the wall
- inadequately sealed pipe penetrations in some locations
- inadequately formed and weatherproofed kickouts to apron flashings
- inadequately formed and weatherproofed roof flashing junctions and terminations in some areas (including where gutters and fascias are embedded into the plaster).

6.3.2 I note the expert's comments and concerns about the weathertightness of the stonework at the walls of the entry area and the flashings around the chimney. I also note the applicant's comments (as outlined in paragraph 4.7) with regard to these items, and draw the following matters to the attention of the territorial authority for further investigation and reconsideration:

- The adequacy of the chimney flashings.
- The stonework at the entry area, which the expert has stated is fixed with adhesive. The applicant has stated that the walls incorporate a cavity behind the stonework.

- 6.3.3 I note the applicant's proposal (as outlined in paragraph 4.7) to provide ventilation to the cavities at the back of the planter, and consider that this is best left to the territorial authority for its consideration.
- 6.3.4 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 assist the performance of the cladding in this particular case:
- apart from the noted exceptions, the cladding is installed to good trade practice
- 6.3.5 I consider that this factor helps 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.

Matter 1: The cladding and other code requirements

7. Discussion

- 7.1 I consider the expert's report establishes that the current performance of the cladding is not adequate because it is allowing water penetration into the building at present. Consequently, I am satisfied that the building does not comply with clause E2 of the Building Code.
- 7.2 In addition, the building 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 building are likely to continue to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.
- 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 becoming and remaining weathertight and in compliance with clauses B2 and E2.
- 7.4 I also note that some further investigation and consideration by the territorial authority is required with regard to the items outlined in paragraph 6.3.2.
- 7.5 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.
- 7.6 Effective maintenance of claddings (in particular of monolithic claddings) is important to ensure ongoing compliance with clauses B2 and E2 of the Building Code and is the responsibility of the building owner. Clause B2.3.1 of the Building Code requires that the cladding be subject to "normal maintenance", however that term is not defined in the Act.

- 7.7 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. With respect to the cladding, the extent and nature of the maintenance will depend on the material, or system, its geographical location and level of exposure. Following regular inspection, normal maintenance tasks should include but not be limited to:
- where applicable, following manufacturers' maintenance recommendations
 - washing down surfaces, particularly those subject to wind-driven salt spray
 - re-coating protective finishes
 - replacing sealant, seals and gaskets in joints.
- 7.8 As the external wall framing of this house is not treated to a level that will resist the onset of decay if it gets wet, periodic checking of its moisture content should also be carried out as part of normal maintenance.

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 in 2002.
- 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 December 2002. 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 2002.

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 clauses E2 and B2 of the Building Code, and that the items listed in paragraph 6.3.1 are not code-compliant and the items listed in paragraph 6.3.2 require further investigation. 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 at 1 December 2002.
- (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 December 2002, 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 paragraphs 6.3.1 and 6.3.2 of Determination 2007/65.
- (c) the territorial authority, once the matters set out in paragraphs 6.3.1 and 6.3.2 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, identifying the defects listed in paragraphs 6.3.1 and 6.3.2 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 25 June 2007.

John Gardiner
Manager Determinations