



Determination 2009/20

Determination regarding the code compliance of a 13-year-old house with monolithic cladding at 289 St Georges Road North, Hastings



1. The matters 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 applicants are the owners, J and M Harper (“the applicants”), and the other party is the Hastings District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 13-year-old house because it was not satisfied that it complied with certain clauses of the Building Code² (First Schedule, Building Regulations 1992).

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.

In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

1.3 The matters for determination are:

1.3.1 Matter 1: The cladding

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 systems (such as the backing materials, the plaster, the flashings and the coatings), as well as the way the components have been installed and work together. (I consider this matter in paragraph 6.2.)

1.3.2 Matter 2: The deck

Whether the cantilevered deck complies with Building Code Clause B1 Structure, taking into account the likelihood of decay to the framing. (I consider this matter in paragraph 8.)

1.3.3 Matter 3: The durability considerations

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

1.4 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”), and 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 L-shaped house that is 2-storeys in part and is situated on a flat rural site in a medium wind zone for the purposes of NZS 3604³. Construction is conventional light timber frame, with a stepped concrete slab, concrete block foundations, monolithic cladding and aluminium windows.

2.2 The house is fairly complex in plan and form, with a 25° pitch profiled metal roof that has eaves and verge projections of about 400mm. The large gable over the northern end accommodates an upper level master bedroom, ensuite and office, with a dormer window to the eastern slope and a clear-roofed timber pergola infilling the northwest corner. The southern “leg” accommodates a garage, laundry and study under a hipped roof, with the roof extending at a low pitch to form a carport at the south. There are two areas of flat membrane roof at the side of the dormer window and at the entrance canopy to the southwest internal corner.

2.3 A cantilevered deck, with a membrane floor, lined soffit and open metal balustrades, extends to the north from the upper level master bedroom. The balustrades are vertically fixed into an upstand clad with solid plaster, which extends around the front and sides of the deck.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.4 The expert has noted that the timber framing is marked as H1 treated. Given the date of framing installation early in 1995, I accept that the external wall framing is likely to be boron treated.
- 2.5 The monolithic cladding to the house is a system described as solid plaster over a solid backing. In this instance it consists of 4.5 mm fibre-cement sheets fixed through the building wrap directly to the framing timbers, and covered by a slip layer of building wrap, and 25mm thick solid plaster that is reinforced with metal mesh and finished with a flexible paint coating.

3. Background

- 3.1 The authority issued a building consent for the house (No. 94/1741) on 9 December 1994, under the Building Act 1991.
- 3.2 The authority carried out 5 inspections, with the last inspection undertaken on 24 March 1995 when most linings had been installed. No further inspections were called for or carried out, although the house appears to have been completed in 1995.
- 3.3 I am not aware of any correspondence with the authority until the applicants sought a code compliance certificate in 2008. The authority carried out a final inspection of the house on 28 July 2008. The inspection record notes that interior work appeared satisfactory, but identifies various cladding defects, including likely decay at the deck upstand and “signs of early wear” in the roof claddings.
- 3.4 The applicants subsequently engaged a property inspection company (“the inspection company”), which inspected the house and reported to the applicants on 10 September 2008. The inspection included non-invasive moisture testing of the cladding, but did not include any invasive testing. The report identified no areas of moisture penetration and concluded:
- This is a generally well built home which has been well maintained.
- With normal ongoing future maintenance it will be capable of providing an excellent standard of accommodation for many years.
- 3.5 In a letter to the applicants dated 5 November 2008, the authority refused to issue a code compliance certificate and attached a “Notice pursuant to sections 95A & 436 Building Act 2004”, which provided the reasons and are summarised as follows:
- The consent required 10 inspections, but only 5 inspections were carried out.
 - There was a lapse of more than 13 years between the last construction inspection and the final inspection.
 - The final inspection on 28 July 2008 identified defects, including:
 - lack of clearance from the bottom of the cladding to the ground or paving
 - metal balustrades fixed through the top of the deck upstand and movement in the balustrades indicating likely moisture entry and decay
 - fascia boards embedded into the plaster cladding
 - unsealed control joints in the plaster exposing the substrate to weather

- lack of clearance from the bottom of the cladding to the roof apron flashings and the deck membrane
- inadequate turndowns of the window head flashings.

The authority concluded that it could not be:

... satisfied that the dwelling meets or met the requirements of the NZ Building Code that was in force at the time the building consent was issued, in particular B1-Structure, B2-Durability and E2-External Moisture.

3.6 The Department received an application for a determination on 18 November 2008.

4. The submissions

4.1 The applicants forwarded copies of:

- the drawings and some of the consent documentation
- the inspection company's report dated 10 September 2008
- the correspondence from the authority
- various other information.

4.2 The authority acknowledged the application, and forwarded copies of:

- the drawings and specification
- the consent documentation
- the inspection records
- various other information.

4.3 Copies of the submissions and other evidence were provided to each of the parties. Neither the applicants nor the authority made any further submissions in response to the submissions of the other party.

4.4 A draft determination was issued to the parties for comment on 27 January 2009. The draft was issued for comment and for the parties to agree a date when the house complied with Building Code Clause B2 Durability.

4.5 The parties agreed that compliance with Clause B2 was achieved on 1 December 1995. The authority accepted the draft without comment.

4.6 In a letter to the Department dated 24 February 2009, the applicants noted that the house is clearly in "an excellent condition", with the control joints purposely expressed. Most joints are about 10mm deep and are generally well covered by the paint coating. The applicants also noted that the water staining mentioned in paragraph 5.6.1 has not resulted from the window leaking but from keeping it continually open to ventilate the garage storage area.

4.7 I have considered the applicants' comments and have amended the determination as I consider appropriate.

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 26 November 2008 and furnished a report that was completed on 7 December 2008.

5.2 The expert noted that the house generally appeared to be constructed in accordance with the consent drawings. The general standard of construction appeared to be good, with the interior "well presented and finished", although the roof was in need of maintenance, with hail damage to the corrugated iron and heavy lichen growth to the flat membrane at the dormer window.

5.3 The expert was able to observe the plaster thickness and metal netting at a section of broken cladding beneath a door, noting that the stucco was approximately 25mm thick. Behind the building wrap in the unlined garage loft area, the expert was also able to sight the fibre-cement backing sheets and the staples fixing the netting (along with framing timber marked as H1).

5.4 The control joints

5.4.1 The expert noted that control joints are cut into the plaster in line with most of the window jambs and at many horizontal and vertical joints in the backing sheets. Apart from the areas outlined below, the control joints appear to be preventing movement cracking in the cladding.

5.4.2 The cuts appear to penetrate the solid plaster by up to about 20mm and are unsealed, with exposed cut edges and reduced cover to the mesh and backing sheets. Shallower decorative cuts have also been made to outline the windows.

5.5 The expert noted that the windows are face-fixed over the cladding, with metal head flashings. The expert removed a small section of cladding at the jamb to sill junction of a window, and noted no evidence of sill flashings or jamb seals. I accept that the exposed junction is typical of similar locations elsewhere in the house.

5.6 Moisture

5.6.1 The expert inspected the lined interior of the house and no evidence of current moisture was observed. However, water staining was observed in the exposed framing at the sill to jamb junction of the upper window in the unlined garage loft.

5.6.2 The expert took 11 invasive moisture readings through the cladding at areas considered at risk, and 7 of these were elevated as follows:

The windows and doors

- 29% below the jamb to sill junction of the south bedroom 3 window, with 20% in the bottom plate below
- 21% below the jamb to sill junction of a north window to the dining area
- 19% towards the bottom of the east laundry door jamb

- 18% at a crack between the deck doors and adjacent window

The bottom plates

- 23% in the bottom plate of the garage on the west elevation

The deck

- more than 50% in the top plate of the deck upstand, below a balustrade fixing, with decay apparent in the upstand framing.

I note that the other readings varied between 8% and 11%. Moisture levels that vary significantly generally indicate that external moisture is entering the structure and further investigation is required.

5.6.3 The expert noted that the testing was carried out during a period of dry weather, and moisture levels could be expected to be higher during wetter times of the year.

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

- there are some cracks in the cladding
- the control joints cut into the plaster are unsealed, with bare plaster exposed at cut edges and limited cover to the netting and the fibre cement backing sheets
- the bottom of the stucco lacks drip edges and extends below the paving and ground, allowing moisture to “wick up” to the framing, and there are cracks at some of the foundation to bottom plate junctions
- there is insufficient clearance from paving or ground to the interior floor level of the lower level floor slab in the south leg of the house
- the bottom of the upper stucco cladding butts against the metal apron flashings, the flat membrane roofs and the deck membrane
- the ends of the timber barge and fascia boards are embedded in the plaster
- the projecting roof to the corner lounge window is embedded into plaster, with cracks apparent
- the window head flashings lack drip edges, have inadequate cover over the head flanges and do not project sufficiently beyond the jamb flanges
- there are no sill flashings and jamb seals, with moisture apparent below the jamb to sill junctions
- there are high moisture levels in the plastered upstand to the upper deck, with cracks, staining and decay apparent
- the metal balustrade is fixed to the flat uncapped top of the deck upstand, which lacks a drip edge in the plaster at the outer cladding to soffit junction
- there is no evidence of saddle flashings at the junction of the deck upstand with the walls and cracks in the cladding are visible.

5.8 The expert also noted that the building work appeared to be in accordance with other relevant clauses of the Building Code, with no apparent problems identified (apart from the possible implications of the decay to the deck as outlined above).

5.9 A copy of the expert's report was provided to the parties on 13 January 2009.

Matter 1: The cladding

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 Solutions⁴, 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 some other provision to compensate for that in order to comply with the Building Code.

6.2 Evaluation of the building 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 determinations⁵ (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.

6.3 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 2-storeys high in part

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.

- the house is fairly complex in plan, with a roof form that includes a dormer window, varying slopes and materials and complex wall to roof junctions
- the walls have monolithic cladding fixed directly to the framing
- a cantilevered deck extends from the upper floor, with metal balustrades fixed to a monolithic-clad upstand
- the external wall framing is treated to a level effective in resisting decay if it absorbs and retains moisture.

Decreasing risk

- the house is in a medium wind zone, which is moderated at the lower level by surrounding trees
- there are 400mm eaves and verge projections above most walls.

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 two elevations demonstrate a moderate weathertightness risk rating and two elevations a high risk rating. I note that, although a drained cavity is now required by E2/AS1 for solid plaster cladding at all risk levels, this was not a requirement at the time the house was constructed.

6.4 Weathertightness performance: exterior cladding

6.4.1 Generally the cladding appears to have been installed in accordance with good trade practice. However, taking account of the expert's report, I conclude that remedial work is necessary in respect of:

- the cracks in the cladding in some areas
- the unsealed control joints cut into the plaster
- the lack of drip edges and clearances from the bottom of the cladding and, in the lower level floor slab, to the paving or ground
- the lack of clearances from the bottom of the cladding to the metal apron flashings, the membrane roofs and the deck membrane
- the ends of the timber barge and fascia boards and the projecting roof to the corner lounge window, which are embedded in the plaster
- the lack of drip edges and cover to the head flanges and the inadequate projections beyond the jamb flanges of the window head flashings, and the lack of window sill flashings and jamb seals

- the fixing of the metal balustrade to the flat uncapped top of the deck upstand, the probable lack of saddle flashings at the deck upstand to wall junctions and the moisture and apparent decay in the deck framing.

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

- Apart from the noted exceptions the cladding is installed to good trade practice.
- The cladding incorporates control joints.
- Cracking appears to be limited to areas where defects have been identified.
- Moisture penetration is limited to areas where defects have been identified.

6.4.3 I consider that these factors help compensate for the lack of a drained cavity and can assist the building 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 not adequate because it is allowing water penetration into the house 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 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.

7.3 Because the faults identified with the cladding occur in discrete areas, I am able to conclude that satisfactory rectification and investigation of the items outlined in paragraph 6.4.1 will result in the house being brought into compliance with Clauses B2 and E2.

7.4 It is emphasised 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 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 deck

8. Discussion

- 8.1 I consider the expert's report establishes that there is significant water penetration into the framing of the cantilevered deck which has resulted in decay to the timber.
- 8.2 While the severity and extent of the timber damage cannot be established without further investigation, I consider that the deck structure may not comply with Clause B1 of the Building Code.

Matter 3: The durability considerations

9. Discussion

- 9.1 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 of the building work during 1995.
- 9.2 The relevant provision of Clause B2 of the Building Code requires that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods ("durability periods") "from the time of issue of the applicable code compliance certificate" (Clause B2.3.1).
- 9.3 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.
- 9.4 In this case the delay between the completion of the building work in 1995 and the applicants' request for a code compliance certificate has raised concerns that various elements of the building are now well through or beyond their required durability periods, and would consequently no longer comply with Clause B2 if a code compliance certificate were to be issued effective from today's date. I have not been provided with any evidence that the authority did not accept that those elements complied with Clause B2 at a date in 1995.
- 9.5 It is not disputed, and I am therefore satisfied, that all the building elements complied with Clause B2 on 1 December 1995, refer paragraph 4.5.
- 9.6 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.

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

- (a) the 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 1995.

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

10. What is to be done now?

10.1 A notice to fix should be issued that requires the owner to bring the house into compliance with the Building Code, identifying the items listed in paragraph 6.4.1 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.

10.2 I would suggest that the parties adopt the following process to meet the requirements of paragraph 10.1. Initially, the authority should issue the notice to fix. The owner should then produce a response to this in the form of a detailed proposal, based on further investigation as necessary and 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.

10.3 I draw to the authority's attention the evidence of severe moisture penetration and timber decay to the deck framing, which could compromise the structural integrity of the deck. I suggest that the authority urgently investigate the deck framing to determine the extent of damage and instigate any remedial work that might be required to ensure the continuing structural stability of these members.

10.4 Once the matters set out in paragraph 6.4.1 have been rectified to its satisfaction, the authority may issue a code compliance certificate in respect of the building consent as amended.

11. The decision

11.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the house does not comply with Clauses B1, E2 and B2 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.

11.2 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 December 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 December 1995 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 6.4.1 of 2009/20.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 20 March 2009.

John Gardiner
Manager Determinations