



Determination 2010/031

Determination regarding the code compliance of the weatherboard and monolithic cladding to an 11-year-old house at 1 Bengal Street, Khandallah



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 applicant is the owner of the house, K Campbell (“the applicant”) and the other party is the Wellington City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority. I consider that the former owners of the house (“the former owners”) are persons with an interest in this determination.
- 1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for an 11-year-old house because it was not satisfied that the

¹ The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at www.dbh.govt.nz or by contacting the Department on 0800 242 243.

house complied with certain clauses² of the Building Code (First Schedule, Building Regulations 1992).

1.3 The matter to be determined³ is therefore whether the authority's decision to refuse to issue a code compliance certificate was correct. In deciding this, I must consider:

1.3.1 **Matter 1: The external envelope**

Whether the external claddings to the house ("the claddings") comply with the Building Code with regard to Clause B2 Durability and Clause E2 External Moisture. The claddings include the components of the systems (such as the weatherboards, the monolithic wall cladding, the windows, the roof claddings and the flashings), as well as the way the components have been installed and work together. I consider this matter in section 6.

1.3.2 **Matter 2: The remaining Building Code clauses**

Whether the building complies with the remaining Building Code clauses relevant to this house. I consider this matter in section 7.

1.3.3 **Matter 3: The durability considerations**

Whether the elements that make up the building work comply with Building Code Clause B2 Durability, taking into account the age of the house. I consider this matter in section 8.

1.4 In making my decision, I have considered the submissions of the parties, the report of the property inspection company engaged by the former owners ("the inspection company"), the report of the independent expert commissioned by the Department to advise on this dispute ("the expert") and the other evidence in this matter. With regard to the external envelope, I have evaluated this information using a framework that I describe more fully in paragraph 6.1.

2. The building work

2.1 The building work consists of a part 3-storey house with an attached garage situated on a steep south-sloping site that the structural engineer for the building defined as a very high wind zone for the purposes of NZS 3604⁴. The foundations are specifically engineered timber poles with a concrete slab and foundations to the lowest level. The remaining construction is conventional light timber frame, with monolithic and weatherboard wall claddings, and aluminium windows. The 20° pitch profiled metal multi-level roofs are gabled and hipped, with verges and eaves of 100mm maximum.

2.2 The house is complex in plan and form, with three floor levels that step down the steep slope. The house is single-storey on the north garage elevation, 3-storeys in the central section and 2-storeys high on the south elevation. The single-storey garage aligns with the master bedroom and ensuite, with living and kitchen areas in the middle floor of the house and bedrooms on the lowest level. The house is assessed as having high weathertightness risk (refer to paragraph 6.2)

² 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.

³ Under section 177(b)(i) of the Act

⁴ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

2.3 The decks

- 2.3.1 There are decks at each level. On the upper floor, a timber framed walkway with metal balustrades links the street with the main entry. To the south, an enclosed south deck from the master bedroom is set down into the slope of the lower roof, with a gabled roof canopy above that is supported on timber columns. This deck has a membrane floor and metal balustrades to the open western side, with the inside face of the other sides clad in fibre cement sheet and topped with a timber capping.
- 2.3.2 At the middle level floor, a deck with a membrane floor and metal balustrades extends to the west from the living areas. A deck to the south, with a membrane floor and metal balustrades, is located partly over a lower bedroom. A third timber deck extends to the north at ground level below the garage.
- 2.3.3 On the lowest level, a timber deck with spaced timber decking and no balustrades, wraps around the south end of the house at ground level. A triangular timber pergola extends over part of this deck.

2.4 The wall claddings

- 2.4.1 The monolithic cladding is installed to the garage walls, the upper west walls and the walls of a 3-storey high glazed roof bay projection to the east. The monolithic cladding consists of 7.5 mm thick fibre-cement sheets fixed through the building wrap to the framing, and finished with an applied textured coating system.
- 2.4.2 The remaining walls are clad in unfinished rusticated cedar weatherboards that are fixed through the building wrap to the framing. Timber facings are installed at external corners.
- 2.5 The expert noted no evidence as to timber treatment. Given the date of construction in 1998 and the lack of other evidence, I consider that the exterior wall framing is unlikely to be treated to a level that will provide resistance to fungal decay.

3. Background

- 3.1 The authority issued a building consent (No. 35225) in 1997 under the Building Act 1991.
- 3.2 The authority carried out various inspections during construction, including:
- Slab and footing reinforcing on 19 and 25 November 1997 (which passed).
 - Partial pre-line, pole excavations and foundation wall on 28 January 1998 (noting 'OK by engineer'. A letter dated 28 January 1998 from the structural engineer confirms that the foundation conditions and pole installation had been observed during construction).
 - Pre-line plumbing inspections on 11 and 18 March 1998 (which passed).
 - Pre-line building inspection on 24 March 1998 (which passed).
 - First final inspection on 3 September 1998 (which listed outstanding items and noted 'Several items to do for final. List to builder.').

- Re-inspection on 25 January 2000 (which listed 8 outstanding items, none of which related to claddings, refer to paragraph 3.4.4).

3.3 No further re-inspection was carried out, and the property was sold twice before the former owners purchased it in December 2008. The following year, they became aware that the house lacked a code compliance certificate and contacted the authority. In response, the authority wrote to the former owners on 5 August 2009 to confirm that an inspection of the house could be requested. The authority also noted its concerns regarding the age of the building work and compliance with durability requirements, explaining that before issuing a code compliance certificate it:

...needs to be satisfied, on reasonable grounds, that all work done under the consent meets the requirements of the Building Code 1992 at the time the consent was issued.

3.4 The inspection company's report

3.4.1 The former owners engaged the inspection company to inspect the building. The inspection company visited the house on 7 September 2009 and provided a final report on 8 October 2009 (with an earlier draft forwarded to the authority).

3.4.2 The report described the construction of the house and included photographs of various features and junctions. The report also noted that the external wall framing appeared to be H1 treated, noting that that this was 'primarily a borer treatment'.

3.4.3 The inspection company carried out non-invasive moisture testing to the inside face of external walls and noted no evidence of moisture penetration. While the inspection found that most elements of the external envelope were in sound condition, an area of 'low level decay' to a bottom weatherboard was noted. Some maintenance work was recommended, including staining the weatherboards in the short term and re-applying the deck membrane in the medium term.

3.4.4 The inspection company also inspected the building work for apparent compliance with other relevant clauses of the Building Code and no issues were identified, with the report noting that items identified by the authority during the last final re-inspection 'have now been addressed'.

3.4.5 The report concluded that the inspection had found no areas of concern, noting:

...however as with the majority of properties there are items that would benefit from attention. The items identified in this report must be kept in context, as they are general maintenance recommendations only.

3.5 In an email to the authority dated 30 September 2009, the former owners attached a draft of the inspection company's report and explained that they wished to resolve the situation as they planned to sell the house. They proposed that the authority inspect the house as a re-inspection of the outstanding items identified in the inspection of 25 January 2000. If these items were satisfactory, then a code compliance certificate could be issued and "back-dated" to January 2000.

3.6 In a letter to the former owners dated 2 October 2009, the authority explained the durability provisions of the Building Code and stated that, after reviewing the situation, it could not 'provide you with an assurance of building code compliance' for the house simply because 'too long a period has elapsed since it was built'. The

authority stated that if a code compliance certificate was wanted, then a ‘suitably qualified Architect or Building Surveyor’ should be engaged to assess the:

...compliance for all the work in relation to NZBC but with specific regard to B2 (Durability) and E2 (External moisture). The assessment must also provide a report on any remedial work required, so that the requirements of the Building Act can be clearly seen to be met.

3.7 The Department received an application for a determination from the former owners on 13 October 2009. The house was subsequently sold to the applicant, who elected to continue with the determination.

4. The submissions

4.1 In a letter to the Department dated 12 October, the former owners outlined the background to the situation, noting that the authority had refused to issue a code compliance certificate for the house ‘because it was constructed over 11 years ago’ and a modification of the building consent was needed so that the durability provisions could apply from the construction completion date.

4.2 The former owners forwarded copies of:

- some of the building consent documentation
- the inspection record of the final inspection on 25 January 2000
- the correspondence with the authority
- other information contained in the LIM report.

4.3 In a letter to the Department dated 21 October, the authority noted that it had not carried out an inspection of the building work since 25 January 2000 and the determination would need ‘to address all Building Code Clauses applicable to consented work’. In regard to the age of the building work, the authority stated:

To date, the Departments position in relation to backdating durability is contrary to legal advice provided to Council, in that we have been formally advised that a Local Authority does not have the power to grant modification to the Building Code requirements of an existing consent. The exception being if instructed to do so as a retrospective modification through a formal directive from the Department resulting from a determination...

4.4 In addition to the documents in paragraph 4.2, the authority forwarded copies of:

- the consent drawings and specification
- the inspection summary.

4.5 In a letter to the authority dated 30 October 2009, the Department sought clarification regarding its submission and the intent of its letter to the former owners dated 2 October 2009. The authority’s response was that the determination should cover all relevant clauses because it had ‘not undertaken an inspection of the dwelling since 25 January 2000’.

4.6 The evidence as to compliance can be gained from the inspection records, the performance of the building over the past 11 years, and an assessment of the visual

elements. I acknowledge that while further evidence may need to be gathered to determine compliance with Clause E2 and B2 (as described herein), there are many Building Code Clauses where compliance can be readily determined. I therefore consider the authority's refusal to give any specific reasons as to why it refused to issue the code compliance certificate to be unreasonable and as not satisfying the requirements of section 95A of the Act.

4.7 A draft determination was issued to the parties on 16 February 2010. Both parties accepted the draft without comment.

5. The expert's report

5.1 As mentioned in paragraph 1.4, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the house on 15 and 19 January 2010 and provided a report that was completed on 22 January 2010.

5.2 General

5.2.1 The expert noted the following variations from the consent drawings:

- cedar weatherboards in lieu of board and batten cladding
- the plan of the west mid-level deck changed, with stairs to ground level added
- the north deck below the garage extended full length of the wall
- a ground level timber deck added to the northern end of the house.

5.2.2 The expert noted that, apart from the items outlined in paragraph 5.5, the house appeared to be generally 'well built' with a 'good level of finish' to the cladding, although there were problems related to the lack of flashings at various junctions.

5.3 The windows

5.3.1 The expert noted that the windows in the weatherboards are face fixed against the boards, with metal head flashings and no sill flashings. Timber plugs are used at the window jambs.

5.3.2 The windows in the flush-finished fibre-cement cladding are also face fixed, with metal head flashings and no sill flashings. The windows were installed against the backing sheets, with the surface texture applied after installation.

5.4 Moisture levels

5.4.1 The expert inspected the interior of the house. Noting damp carpet in the west living area, an area of carpet was lifted. The carpet fixings were corroded and the flooring was wet and damaged – indicating an active and long-standing leak. The expert was unable to determine a single source of the leak as the area was below a number of complex junctions.

5.4.2 The expert noted that he was unable to carry out extensive invasive moisture readings⁵, so these were restricted to areas considered particularly at risk and indicative of other similar locations. The following moisture levels were noted:

- 40% in the bottom plate of the east flush-finished fibre-cement-clad bay projection, with decay apparent in the drillings
- 32% in the framing 2m up the above wall, below the horizontal joint and window
- 4 at 40% in the deck framing of each of the mid-level membrane decks, with water stains on the soffits.

5.5 Commenting specifically on the claddings, the expert noted that:

General

- there is insufficient or no clearance from the bottom of the claddings to the ground and paving in some areas
- the inter-cladding junctions are not weatherproof, with no underlying flashings
- some apron flashings are not weathertight, with no kick-outs to the bottoms

Windows

- the ends of the head flashings are not sufficiently sealed
- the jambs lack seals under the flanges, with gaps apparent against the weatherboards and deteriorating sealant applied to the flange edges against the flush-finished fibre-cement cladding

Cedar Weatherboards

- the uncoated boards are cracked and warped in some areas
- the facings at exterior corners have no underlying flashings and do not protect against moisture penetration
- the junction with the upper level deck is not weathertight
- there is decay in the bottom board at the southern ground level deck

Flush-finished fibre-cement

- horizontal joints are flush-finished, without inter-storey control joints as recommended by the manufacturer
- there are cracks at some external corners

Decks

- there is insufficient or no clearance from the bottom of the claddings to the deck floors, in particular at the ground floor south deck where the bottom weatherboard is decaying
- the membrane coating to deck floors is inconsistent in some areas, with poorly repaired cracking and water marks apparent on some deck soffits
- there are no drip edges provided at the membrane turndowns

⁵ At the request of the present owner as a renting process was underway.

- at the upper inset deck, the canopy posts penetrate the timber capping and the deck edge to wall junction is not weathertight, including at the weatherboard to balustrade junction
- the pergola over the southern ground floor deck is fixed directly against the weatherboards, with no allowance for drainage.

5.6 Other code compliance matters

5.6.1 The expert did not assess compliance with all other clauses of the Building Code in detail, but commented on some aspects noted during his inspection.

5.6.2 Clause B1: Structure

- at the mid-level western deck off the living areas, the deck framing only is nail-fixed to the wall framing

The garage

- timber boarding appears to have been used to retain fill beneath the garage door, with the driveway fill also against boundary joists
- there are signs of timber damage to some of the garage floor framing, with black marks and severe decay to a bearer that is situated against fill
- the ribbon plate to the ends of the cantilevered joists to the covered walkway is not securely fixed where it meets the house

5.6.3 Clause E3: Internal moisture

- the vanity tops in bathrooms are not sealed against the walls
- the laundry bench top is not sealed against the wall

5.6.4 Clause F2: Hazardous building materials

- there is no safety glass in bathroom windows, which have sills less than 1m above floor level

5.7 A copy of the expert's report was provided to the parties on 26 January 2010.

Matter 1: The external envelope

6. Weathertightness

6.1 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to examine 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.

6.2 Weathertightness risk

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

Increasing risk

- the house is in a very high wind zone
- the house is 3-storeys high in part
- the house is complex in plan and form, with roofs at varying levels
- there are decks at all of the levels, with two decks partly or fully over enclosed spaces below
- there are limited eaves and verges to shelter the cladding
- the walls have flush-finished fibre-cement cladding and weatherboards fixed directly to the framing, with complex junctions between the materials
- the external wall framing is unlikely to be treated to a level that provides resistance to decay if it absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, these features show that all elevations of the house demonstrate a high weathertightness risk rating. If the details shown in the current E2/AS1 were adopted to show code compliance, a drained cavity would be required for the flush-finished fibre-cement and weatherboard cladding. However, this was not a requirement when this house was constructed.

6.3 Weathertightness performance

6.3.1 It is clear from the expert's report that the external envelope is unsatisfactory in terms of its weathertightness performance, which has resulted in high levels of moisture penetration with possible decay to the framing.

6.3.2 Taking into account the expert's report, I conclude that the following areas require rectification or further investigation:

- the lack of clearances from the bottom of the claddings to the ground, paving and to some of the decks
- the inadequately flashed exterior corners, inter-cladding junctions, deck edges to wall junctions and roof to wall junctions
- the horizontal joints to the flush-finished fibre-cement cladding
- the cracks and warping in the unfinished weatherboards
- the inadequate window and door junctions and flashings
- the deck membranes, including at the deck edges
- the timber capping to the upper deck balustrade, including the post penetrations
- the attachment of the timber pergola to the walls
- investigation to establish the full extent of moisture penetration likely to have resulted from the defects identified in the external envelope

- investigation into the extent of timber decay in the framing resulting from high levels of moisture penetration into the framing, with timber damage likely to be present in a number of areas.

6.3.3 The inadequate weatherproofing of many junctions has contributed to a systemic failure and considerable work is required to make the claddings code compliant. Further investigation is necessary, including the systematic survey of all risk locations, to determine the full extent of moisture penetration, timber damage and the repairs required.

6.4 Weathertightness conclusion

6.4.1 I consider the expert's report establishes that the current performance of the claddings are not adequate because there is evidence of high levels of moisture penetration and decay in at least one area. Consequently, I am satisfied that the house does not comply with Clause E2 of the Building Code.

6.4.2 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 building are likely to allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.

6.4.3 In particular, the claddings demonstrate the key defects included in paragraph 6.3.2, which are likely to have contributed to the moisture penetration evident within the external framing. I have also identified the presence of known weathertightness risk factors for 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 faults identified in the cladding systems. It is this combination of risk factors and faults that indicate the structure does not have sufficient provisions to compensate for the lack of a drained and ventilated cavity within the cladding systems.

6.5 I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding. This will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen remedial option should be submitted to the authority for its approval.

6.6 I note that the Department has produced a guidance document on weathertightness remediation⁶. I consider that this guide will assist the owners in understanding the issues and processes involved in remediation work to the monolithic cladding in particular, and in exploring various options that may be available to them when considering the future work required on the house.

6.7 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

⁶ External moisture – A guide to weathertightness remediation. This guide is available on the Department's website, or in hard copy by phoning 0800 242 243

treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

Matter 2: The remaining Building Code clauses

7. Discussion

7.1 Taking account of the expert's report, I conclude that the following items require attention (the relevant Building Code clauses are shown in brackets):

- investigation of the attachment of the mid-level west deck to the house (Clause B1)
- investigation into the floor framing of the garage and walkway (Clause B1)
- the lack of sealing of vanity tops and laundry bench to the wall (Clause E3)
- the lack of safety glass in the bathrooms (Clause F2)

7.2 I also consider that the authority's inspection records and the other documentation lead me to the view that the house is likely to comply with the remaining relevant clauses of the Building Code. However, that conclusion should be confirmed by the authority's own inspection of the visible elements of the building.

Matter 3: The durability considerations

8. Discussion

8.1 The 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 of the building work during 1998.

8.2 The relevant provision of Clause B2 of the Building Code (Clause B2.3.1) 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'.

8.3 In previous determinations (for example Determination 2006/85) I have taken the view that a modification of this requirement can be granted if I can be satisfied that the building complied with the durability requirements at a date earlier than the date of issue of the code compliance certificate, the date being one that is agreed between the parties.

8.4 However, in conjunction with this I also need to consider the nature and extent of the defects, the length of time they may have been evident, and their consequential impact on the building's compliance with other Building Code clauses, particularly Clauses B1 Structure and E2 External Moisture.

8.5 Because of the extent of the defects in the external envelope and the possible consequential impact on the building's timber framing and therefore its structure, I

am not satisfied that there is sufficient information on which to make a decision about the durability of the building at this time.

9. What is to be done now?

- 9.1 The authority should inspect the house and issue a notice to fix that requires the owners to bring the house into compliance with the Building Code. The notice to fix should identify the defects listed in paragraph 6.3.2 and paragraph 7.1 and refer to any further defects that might be discovered in the course of inspection, investigation and rectification, but not specify how those defects are to be fixed. It is not for the notice to fix to specify how the defects are to be remedied and the building brought to compliance with the Building Code. That is a matter for the owners to propose and for the authority to accept or reject.
- 9.2 I suggest that the parties adopt the following process to meet the requirements of paragraph 9.1. Initially, the authority should issue the notice to fix. The applicant should then produce a response to the notice to fix 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 matters.
- 9.3 Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

10. The decision

- 10.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:
- the external envelope does not comply with Building Code Clauses B2 and E2
 - the mid-level west deck and the garage floor structure do not comply with Building Code Clause B1
 - the vanity tops and bench do not comply with Building Code Clause E3
 - the bathroom glass does not comply with Building Code Clause F2
- and accordingly, I confirm the authority's decision to refuse to issue a code compliance certificate.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 8 April 2010.

John Gardiner
Manager Determinations