



## Determination 2010/006

### Determination regarding the refusal to issue a code compliance certificate for a ten-year old addition to a house at 44 Britannia Heights, Nelson



#### 1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004<sup>1</sup> (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department.
- 1.2 The applicant is the owner, R Curtis (the applicant), and the other party is Nelson City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a ten-year-old addition because it was not satisfied that the building work complies with certain clauses<sup>2</sup> of the Building Code (First Schedule, Building Regulations 1992).

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<sup>1</sup> The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at [www.dbh.govt.nz](http://www.dbh.govt.nz) or by contacting the Department on 0800 242 243

<sup>2</sup> 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.

- 1.4 I consider that the matter for determination, in terms of section 177(b)(i) of the Act, is whether the decision of the authority to decline to issue a code compliance certificate was correct. In making this decision I have considered whether the external envelope of the building complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The “external envelope” includes the cladding, its configuration and components, junctions with other building elements, formed openings for windows etc, penetrations, decks, parapets and the proximity of building elements to the ground.
- 1.5 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, and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.

## **2. The building work**

- 2.1 The building work that is the subject of this determination is an upper level addition to an existing house. The addition comprises a bedroom, en suite, study, two balconies and associated passageways.
- 2.2 The house is situated in a high wind zone and within a sea spray zone for the purposes of NZS 3604<sup>3</sup>. It is exposed to weather to the west/northwest, but the rest of the house is sheltered by other buildings and land topography.
- 2.3 The cladding to the addition is stucco with a roughcast finish installed on building paper generally over a rigid backing with reinforcing contained 10-15 mm from the rear face. The stucco has a body thickness of 30-40 mm. The windows are aluminium and the roof is 30° pitch profiled metal.
- 2.4 The upper level addition penetrates the existing roof structure and some lower level wall areas. Some lower wall areas and outer balustrade faces present exposed framing within the roof spaces. Both balconies have tiled floors installed over butyl rubber membranes. The balcony off the bedroom has a timber-capped balustrade, and the balcony off the study has a glass balustrade. The balcony off the study has a built-in seat and raised ledge.
- 2.5 The eastern elevation is constructed and flashed over an existing concrete retaining wall to the lower level garage. There is no eave overhang, and small parapet/inbuilt gutters extend over the eastern elevation and around the deck off the study.
- 2.6 Other gable areas are fitted with a barge flashing system which finishes to the upper edge of the stucco cladding.
- 2.7 Most of the timber used in the building work was untreated and will not provide any resistance to decay.

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

### 3. Background

3.1 Building consent 980613 for the upper level addition was issued by the authority on 9 June 1998 under the Building Act 1991. The building work was carried out by previous owners of the house in 1998.

3.2 The authority carried out a number of inspections during construction in 1998 and 1999. A further inspection was done on 7 January 1999 and a final inspection on 24 July 2008. The final inspection record notes that re-inspection was required due to nine non-complying items, including:

Age of consent an issue. Stucco an issue due to construction, lack of capillary breaks, ground levels, other members, spouting etc buried in stucco.

3.3 It appears that a further inspection was carried out on 3 December 2008 and six of the items are annotated as 'OK' and dated. An additional non-compliant item was also identified and I am unaware of whether there was a further inspection or the outstanding items were resolved.

3.4 In a letter to the previous owner dated 3 December 2008 the authority declined to issue a code compliance certificate for the upper level addition due to the time elapsed since construction. The authority stated the options available to the owners were to either have a [named] building consultant undertake a full review of the cladding and structure or to seek a determination on the matter.

### 4. Submissions

4.1 The Department received an application for a determination on 12 August 2009. The applicant provided copies of:

- architectural plans for the addition
- specifications
- correspondence from the authority to the previous owner
- property information sheet
- application for building consent
- building consent enquiry
- site inspections sheets and producer statements
- photos of the building

4.2 The authority acknowledged the application but made no submission or provided any further information.

4.3 A draft determination was issued to the parties for comment on 10 December 2009. Both parties accepted the draft without comment.

## **5. The expert's report**

5.1 As noted in paragraph 1.5, I engaged an independent expert to provide an assessment of the condition of those building elements that are the subject of this determination. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the house on 14 September and 1 October 2009 and provided a report dated 16 October 2009.

5.2 The expert removed cladding at four locations and I accept that the exposed detailing is typical of similar locations elsewhere in the addition.

### **5.3 Compliance with the building consent**

5.3.1 The expert noted that the glass balustrade on the deck off the study differs both in shape and means of support from the building consent documents. The expert also noted that the configuration of the deck and the balustrade does not comply with clause F4 Safety from Falling.

### **5.4 Moisture levels**

5.4.1 The expert inspected the interior of the addition and no evidence of moisture was observed. The expert took a total of 34 invasive moisture content readings through the cladding at areas considered at risk. The readings ranged from 9% to 32%, and all but six were elevated.

5.4.2 I note that moisture levels that vary significantly generally indicate that external moisture is entering the structure and further investigation is required.

### **5.5 Timber analysis**

5.5.1 The timber analysis showed that the timber framing was untreated. Three of the four samples tested contained fungal growth, indicating a history of unacceptable levels of moisture, with one sample containing suspected incipient brown rot. The fourth sample was questionable.

### **5.6 Aluminium joinery**

5.6.1 No details exist for window flashings on drawings and no flashings were observed where cladding was removed.

### **5.7 Cladding**

5.7.1 The expert made the following general observations:

- The cladding was generally installed as consented, however, it was noted at one location that a soft composite board was used instead of a rigid backing. The stucco reinforcing appeared to be of something similar to chicken wire.
- An exposed upper edge at all barge flashing/parapet membrane downturn areas suggests that these components are recessed 10-15mm from the outer face of the stucco. This indicates that the roughcast finish to the stucco may have been applied after these components were installed.

- No head flashing extension exists on some doors; raking head flashings finish within the cladding system. This can tend to conduct water behind the cladding and onto timber framing.
- No jamb or sill flashings were observed; in many cases the windows were fitted close to the roof surfaces with some small overlap of the sill frame to the lower apron flashing; however these components were separated by 40mm of stucco, which effectively negates this as a sill flashing provision.
- There is little cracking to the stucco cladding; cracking was observed at one location between a window sill and adjacent apron flashing, and between aluminium window frames and the stucco cladding.
- No control joints are apparent with walls extending in length to approximately 5.5m (I note the requirements for control joints to stucco are set out in NZS 4251<sup>4</sup>).
- The stucco is installed close to decking surfaces and hard onto deck tiles, apron and head flashings.
- Down-pipes and electrical services penetrate the cladding.
- No cavity was evident at any of the locations.

5.7.2 Where the cladding was removed at the inner top face of the main bedroom balustrade, the expert noted that black bituminous building paper was in place over the top of the balustrade framing with green building paper extending on the inner balustrade face to the underside of the balustrade top plate.

5.7.3 Timber analysis of the sample removed from the western end of the bedroom balcony indicated that incipient brown rot may exist in this area.

5.7.4 Where the cladding was removed at the top of the northwest wall of the study, the expert noted:

- moisture and debris on the back face of the stucco
- heavy weight bituminous building paper was installed as a slip layer.

The end grain of the timber behind the core presented a moisture content reading of 32%; a sample of timber was removed for analysis, which confirmed that fungal growth was present, although there was no established or incipient fungal decay.

5.7.5 Where the cladding was removed beneath the sloping sill of the west-facing study window, the expert noted:

- the stucco appeared to be damp, the reinforcing was bunched and exposed at the rear face of the stucco, and the stucco delaminated during extraction
- heavy weight bituminous paper was installed as a slip layer
- the roofing apron flashing extends above the lower angled edge of the window sill facing by approximately 8mm.
- there were gaps and water entrapment areas, dampness and water appeared from an unknown source during the investigation.

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<sup>4</sup> New Zealand Standard NZS 4251: Solid plastering; Part 1: 1998 Cement plasters for walls, ceilings and soffits

## 5.8 Roof cladding

5.8.1 In relation to the roof, the expert noted:

- the house lacks eave overhangs
- it has inbuilt gutters and internal down-pipes
- there are gaps between the fascia and head flashings
- parapet and barge cappings turn down onto the upper edge of stucco cladding. Barge and apron flashings, while installed, do not provide kick-outs, and a gutter end/fascia is encapsulated in the stucco above the main bedroom balcony door and below the study balcony
- a butyl rubber inbuilt gutter membrane finishes over a metal profile and onto the top of the outer face of the stucco wall cladding at the eastern elevations and above the study balcony. Water discharging here is entering in at least two places where there are imperfections or lack of paint protection.
- there is a small area of tiled-over butyl-type membrane on a triangular roof area adjacent to the western end of the main bedroom balcony which is essentially flat; the plywood substrate is untreated and a down-pipe discharges onto this surface. Timber analysis indicated that incipient brown rot may exist in this timber (refer paragraph 5.7.3).

## 5.9 Bedroom balcony

5.9.1 In relation to the balcony of the bedroom, the expert noted:

- some areas of the balustrade framing are installed flat, preventing water from running off efficiently
- a butyl rubber membrane has been installed with an up-stand height varying from the upper edge of the dwang to 100mm above
- the timber capping appears to be either rebated over the top of the balustrade or have grooves machined in the underside at both inner and outer wall areas; gaps are opening at the mitre joints of this capping which appears to be glued in place with no obvious fixings. The drawings referred to “timber capping over colour steel flashing,” however, the expert was unable to confirm the presence of flashing (the capping would need to be removed to do this). The capping is encapsulated in the stucco at either end of the balustrade and no saddle flashings are apparent.

## 5.10 Study balcony

5.10.1 In relation to the balcony off the study, the expert noted:

- an overflow provision was installed, but is too high above the surface of the deck to be effective
- minimal slope has been provided for on the deck surface, the built in seat and the ledge

- there is a threshold 150mm high at the balcony door, where the deck height is 20-mm higher than the internal floor level.

5.10.2 In addition to observations related to weathertightness, the expert noted that the balustrade above the deck's built-in seat opens onto the steeply sloped roof with an unimpeded fall to the ground. The balustrade extends 1025mm from the deck, but only 625mm above the seat, and 400mm above the raised ledge.

5.11 A copy of the expert's report was provided to the parties on 10 December 2009.

## 6. Evaluation framework for code compliance

6.1 In evaluating the design of a building and its construction, it is useful to make comparisons with the relevant Acceptable Solutions<sup>5</sup>, which will assist in determining whether the features of the building work 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 solutions 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 assess compliance with the Building Code.

6.2 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 and the surrounding environment, and whether the design features that are intended to prevent the penetration of water, the cladding system and its installation, and the moisture tolerance of the external framing are appropriate to the identified risk. Weathertightness risk factors have been described in previous determinations (for example Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

6.3 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.

6.4 The addition has been evaluated using the Clause E2/Acceptable Solution 1 (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 cladding systems 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.

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<sup>5</sup> An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way (but not the only way) of complying with the Building Code. The Acceptable Solutions are available from the Department's website at [www.dhb.govt.nz](http://www.dhb.govt.nz).

## **6.5 Weathertightness risk of the dwelling**

6.5.1 The addition exhibits various weathertightness risk factors:

- it is situated in a high wind zone and sea spray zone
- complex roof to wall junctions
- internal gutters
- lack of eaves
- two decks, one of which is situated above lower rooms of the house
- the framing is not treated to a level effective in resisting decay if it absorbs and retains moisture.

6.5.2 The risk is somewhat mitigated given that the stucco cladding generally appears to be robust, other than at some changes of wall plane/joinery junctions, and some framing is exposed in the roof space which will assist in drying.

6.5.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined above show that the addition demonstrates a high risk weathertightness rating. I note that, if the details shown in the current E2/AS1 were adopted to show code compliance, the cladding on this alteration would require a drained cavity. However, I also note that a drained cavity was not a requirement of E2/AS1 at the time of construction.

## **6.6 Weathertightness conclusion**

6.6.1 Taking the expert's report into account, I conclude that the addition is unsatisfactory in terms of its weathertightness performance. The addition has been poorly constructed and there is significant water penetration through defects in many locations. Consequently, I am satisfied the external envelope of the addition does not comply with Clause E2.

6.6.2 In addition, the parts of the building covered by this consent are 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 external envelope faults in the addition are allowing the ingress of moisture, the addition does not comply with the durability requirements of Clause B2.

6.6.3 I find that, because of the extent and apparent complexity of the faults that have been identified with the cladding, I am unable to conclude the extent of remediation of the identified faults, which could include partial or full re-cladding and re-roofing and reinstallation of the joinery, that would result in compliance with Clause E2.

6.6.4 I consider the final decision on the extent of remediation required to achieve code compliance can only be made after a more thorough investigation of the external envelope. This will require careful investigation and analysis by an appropriately qualified person. The investigation should also involve the systematic survey of all risk locations, in order to establish the extent of the timber damage already sustained.

- 6.6.5 Once that decision is made, the chosen remedial option should be submitted to the authority for its comment and approval.

## **6.7 Compliance of the study balcony with Clause F4**

- 6.7.1 I take the view that the balustrade to the study balcony does not comply with Clause F4 of the Building Code (Safety from Falling).

## **7. What is to be done now?**

- 7.1 I note that the Department has produced a guidance document on weathertightness remediation<sup>6</sup>. I consider that this guide will assist the owner in understanding the issues and processes involved in remediation work and in exploring various options that may be available.
- 7.2 A notice to fix should be issued to take into account the findings of this determination. The notice should require the owners to bring the house into compliance with the Building Code, requiring remedial work or further investigation, 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. It is important to note that the Building Code allows for more than one means of achieving code compliance.
- 7.3 I suggest that the parties adopt the following process to meet the requirements of paragraph 7.2. Initially, the authority should issue the notice to fix. The owner should then produce a detailed proposal, assisted by a suitably qualified person, as to the rectification or otherwise of the listed defects. The proposal can then be submitted to the authority for approval. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.
- 7.4 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 a building may not be treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

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<sup>6</sup> 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

## **8. The decision**

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

- the study balcony does not comply with Clause F4 of the Building Code
- the external envelope of the addition does not comply with Clauses B2 and E2 of the Building Code,

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 1 February 2010.

John Gardiner  
**Manager Determinations**