

## Determination 2008/20

### Determination regarding a code compliance certificate for a 6-year-old building with monolithic cladding at 2 Te Puroa Place, Hamilton



#### 1. The matter 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. The applicant is B Durston (“the agent”) acting on behalf of the former owner J Taverner (“the former owner”), and the other party is the Hamilton City Council (“the territorial authority”). The agent has named the current owners Mr and Mrs W Lee (“the owners”) as interested parties to this matter.
- 1.2 This determination arises from the decision of the territorial authority to refuse to issue a code compliance certificate for a 6-year-old building because it is not satisfied that the building work complies with Clauses B2 and E2 of the Building Code<sup>2</sup> (First Schedule, Building Regulations 1992).

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<sup>1</sup> The Building Act 2004 is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

<sup>2</sup> The Building Code is available from the Department’s website at [www.dbh.govt.nz](http://www.dbh.govt.nz).

1.3 The matters for determination are:

**1.3.1 Matter 1: The cladding**

Whether the cladding as installed on the building (“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**

Whether the elements that make up the building comply with Building Code Clause B2 “Durability”, taking into account the age of the building.

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 dispute (“the expert”), the building envelope report of the specialist inspection company commissioned by the former owner (refer paragraph 3.5), 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 a flat rural site, which is in a medium wind zone for the purposes of NZS 3604<sup>3</sup>. The house is two storeys high except for the garage area to the west and two gables to the east. The construction of the house is generally conventional light timber frame, with a concrete slab, concrete block foundations, monolithic cladding and aluminium windows. The house is complex in plan and form, with 30° pitch pressed metal tile gable roofs that incorporate a number of complex roof junctions and intersections. The roofs have no verge projections and eaves projections are about 500mm overall, with decorative plastered brackets beneath the ends of gutters and curved-top timber louvres at the apex of the gable end walls.

2.2 The expert has noted that he was unable to confirm whether the wall framing is treated. However, I note that the report from the specialist inspection company states that the timber is untreated (refer paragraph 3.5). Given the date of construction and the lack of other evidence, I consider that the external wall framing is untreated.

2.3 The cladding is a monolithic cladding system described as solid plaster over a flexible backing. In this instance it consists of 21mm solid plaster reinforced with zinc-coated “Dimond Riblath” metal mesh that is fixed through heavy weight “Tyvek” building wrap directly to the framing timbers. The cladding is finished with a “Dulux Elastomeric” flexible paint coating system.

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

2.4 Although I have not received a copy of it, it appears that a producer statement was provided by the plasterer stating that the cladding complied with of NZS 4251<sup>4</sup> and the BRANZ Good Practice Guide: Stucco.

### 3. Background

3.1 The territorial authority issued a building consent (No. 1406/2001) for the house on 13 September 2001. I note that the conditions attached to the consent included the requirement for pre-line, post-line and cladding inspections, the last requiring “solid plaster systems to have their reinforcing and flashings around openings, but no coating of plaster”.

3.2 It appears that the territorial authority carried out various inspections during construction, including a pre-line inspection on 24 October 2001. According to the territorial authority, the house was completed and occupied by February 2002 (although a cladding inspection of minor cracking in the completed plaster cladding was noted on 16 April 2002). There appear to have been no outstanding matters to prevent a code compliance certificate from being issued during 2002.

3.3 The former owner sold the house in February 2004, with a condition of the sales contract being an implied warranty that the house complied with the building code. I am not aware of any correspondence with the territorial authority until 2007, when the former owner sought a code compliance certificate.

3.4 The former owner engaged a specialist inspection company (“the inspection company”) to visually inspect and report on the condition of the claddings. As a member of the inspection company, the agent carried out inspections on 15 and 17 August 2007 and provided a “building envelope report” for the building. I note that the builder and the plasterer attended the first inspection, with the territorial authority present during both inspections.

3.5 The building envelope report covered the following aspects of the house:

- The history of the construction and ownership
- The weathertightness risks of the building
- The use of untreated timber framing
- The description of the solid plaster cladding system
- The description of the window flashing system, noting that the building wrap lined the openings with flexible flashing tape applied to each corner (refer paragraph 5.3.2)
- The lack of evidence of moisture penetration through the cladding
- The identification of movement cracks in the plaster, with repair work advised
- The lack of kickouts at the bottom of apron flashings
- The pergola direct-fixed against the cladding

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

- Other maintenance matters

The report concluded that the cladding appeared to generally comply with the manufacturer's specifications at the time of installation and, providing appropriate repairs were undertaken to remedy the identified defects, the cladding would comply with the building code.

- 3.6 In a letter to the inspection company dated 13 September 2007, the territorial authority agreed with the findings of the building envelope report and with the proposed remediation of high risk areas identified in the report in order to safeguard against future weathertightness problems. However, the territorial authority also noted its concerns about the age of the house, stating:

Council is of the view that we are not in a position to issue a CCC because we are dealing with a building that is some 5-years old and has elements of construction that pose significant risks in terms of durability and weathertightness. We are therefore not satisfied on reasonable grounds that the building meets the building code in terms of B2 and E2.

- 3.7 In respect of the cladding the territorial authority said it was:

satisfied on reasonable grounds from our own observation of testing conducted by . . . that the building is not leaking in the area tested or certainly there is no evidence to support any weathertightness concerns from our examination of the entire building. The proposed remediation of high risk areas identified in your report seems a reasonable approach to safeguarding against any future problems.

- 3.8 The Department received an application for a determination from the agent on behalf of the former owner on 14 September 2007. However, payment of the appropriate fee was not received until 1 October 2007.

## **4. The submissions**

- 4.1 In the statement accompanying the application the agent stated that a determination was needed because the territorial authority "may not be satisfied" that the building complied with the weathertightness and durability provisions of the building code.

- 4.2 The agent forwarded copies of:

- incomplete plans and elevations
- some of the building consent documentation
- the building envelope report dated August 2007
- the letter from the territorial authority dated 13 September 2007.

- 4.3 Copies of the agent's submission were provided to the territorial authority, which made no submission in response.

- 4.4 The draft determination was sent to the parties on 12 December 2007 which was accepted without comment.

- 4.5 The draft determination was again referred to the parties on 8 February 2008 to agree a date when the building complied with Building Code Clause B2 Durability. The parties agreed that compliance with Clause B2 was achieved 1 February 2002.

## **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 22 November 2007, and furnished a report that was completed on 27 November 2007. The expert noted that the plaster was “generally straight and fair”, with the coating “generally uniform, well adhered and free from discolouration or other signs of aging”, although a number of cracks had been recently repaired, but not yet painted. The expert noted that, with the exception of the lack of kickouts, the “workmanship of the visible part of the roof flashings appeared adequate”. The expert also noted that penetrations through the cladding appeared to be adequately sealed, and the pergola timber appears to be satisfactorily spaced away from the cladding.

### **5.3 The windows and doors**

- 5.3.1 The expert noted that the windows were recessed without metal head flashings, and included a decorative projecting sill formed from a planted timber plate covered by the building wrap and the plaster coating. Apart from the decorative projecting sill, door installation appeared to be similar. The expert also noted that gaskets to several windows required attention as gaps were apparent.
- 5.3.2 The expert removed a small section of cladding at the jamb to sill junction of a north window and noted that the window flanges were sealed against the building wrap, with no jamb flashings, sill flashing or flexible flashing tape at the corner (refer paragraph 3.5).
- 5.3.3 The expert also removed a small section of plaster at the jamb to sill junction of a window on the west garage wall and noted that no jamb or sill flashings were visible. In this case, the window had been installed prior to the application of a thin fillet of sealant to the junction of the window flanges and the wrap.
- 5.3.4 I accept that the window junctions exposed are typical of similar areas elsewhere in the house.
- 5.3.5 The expert also noted that the timber louvres at gable ends were face-fixed through the timber facings into the cladding, with no visible flashings.
- 5.4 The expert also removed a small section of cladding at the bottom of a north wall to observe the underlying construction, and noted that the plaster extended from the wall framing down over the concrete block foundation to below ground level. The building wrap overlapped the foundation by about 50mm, with the framing 120mm above the ground. The expert noted that the horizontal groove was decorative only,

with no anti-capillary gap behind. I accept that the area exposed is typical of similar positions elsewhere in the house.

## 5.5 Moisture observations

5.5.1 The expert inspected the interior of the house and took non-invasive moisture readings, and no evidence of moisture was noted. At areas of repaired and non-repaired cracks, the expert took surface readings in order to compare the relative results, and noted that the wide variation in the readings indicated moisture penetration at areas where cracks had not been repaired.

5.5.2 The expert took invasive moisture readings from the inside using long probes to reach the cladding side of the framing, and from the outside through the solid plaster at high risk locations. I note that the lower levels of moisture varied from 10% to 13%, which I consider to be the equilibrium moisture levels in the framing at the time of inspection. Out of the 18 readings, 9 were comparatively elevated as follows:

- 17% in the bottom plate in the garage south wall.
- 19% in the sill timber at the west garage window.
- 17% in the trim stud at the west garage window.
- 19% and 27% at the bottom plates beside the north breakfast area doors.
- 39% in the sill timber at the north window cut-out, with decay apparent.
- 21% in the trim stud at the north window cut-out.
- 23% in the bottom plate below the north window cut-out.
- 30% in the bottom plate of the upper north wall of bedroom 4 (below the end of the apron flashing).

Moisture levels that vary significantly after cladding is in place generally indicate that external moisture is entering the structure. I note that most of the elevated readings appear to be associated with doors and windows.

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

- there are no vertical control joints in walls where dimensions exceed the 4m length limit between such joints recommended in NZS 4251<sup>5</sup>
- there are no horizontal control joints in the 2-storey high walls
- the plaster has movement cracks in various areas, some of which have not been repaired and some which have cracked following repairs
- the bottom of the cladding lacks a drip edge, with the plaster continuing down to ground level, so allowing trapped moisture to “wick” up towards the framing
- there is insufficient clearance from the inside floor level to the paving or ground in some areas

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<sup>5</sup> New Zealand Standard NZS 4251: Solid plastering; Part 1: 1998 Cement plasters for walls, ceilings and soffits

- the plaster over the projecting decorative window sills is allowing moisture penetration and the underlying untreated timber is decaying in some areas
- the windows and doors lack head, sill and jamb flashings, and associated moisture penetration is apparent
- gaskets to several windows require attention as gaps are apparent.
- the garage doors have plastered reveals with no head flashing or drip edge
- the timber louvres in the gable ends lack flashings
- there are no kickouts at the bottom of the apron flashings, with gaps showing in some areas and evidence of associated moisture penetration.

5.7 The expert also noted that, although lacking a head flashing, the meter box is sheltered beneath the eaves and is well sealed against the cladding. Providing the sealant is well-maintained, the expert considered that the meter box should remain weathertight.

5.8 A copy of the expert's report was provided to each of the parties on 30 November 2007.

## **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 Solutions<sup>6</sup>, 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 are written conservatively to cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add one or more other provisions to compensate for that in order to comply with the Building Code.

6.1.2 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 determinations<sup>7</sup> (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

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<sup>6</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.dbh.govt.nz](http://www.dbh.govt.nz).

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

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 building:

- is built in a medium wind zone
- is a maximum of two storeys high
- is complex in plan and form
- has solid plaster cladding that is directly fixed to the framing
- has no verge projections and eaves projections of about 500mm overall
- has external wall framing that is not treated to a level that will provide resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 The building 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 all elevations of this building demonstrate a high weathertightness risk rating.

6.2.4 Under the Building Act I am required, as is the territorial authority under section 436, to consider the Code Clause E2 requirements applicable at the date of the building consent in 2001, and I note that at that time the relevant acceptable solution E2/AS1 permitted direct-fixed solid plaster applied in accordance with NZS 4251 over a drainage slip layer and without a cavity. In contrast, the current E2/AS1 requires a drained cavity for all risk exposures for this system.

## **6.3 Weathertightness performance: exterior cladding**

6.3.1 In some respects, the cladding has not been installed in accordance with good trade practice or in accordance with the manufacturer's instructions at the time of installation. Taking account of the expert's report, I conclude that remedial work is necessary in respect of the following:

- the lack of vertical and horizontal control joints
- the movement cracks in some areas of plaster
- the base detail of the cladding, with the plaster lacking ground clearances, drip edges or any means of allowing moisture to drain to the outside



- the inadequate floor clearance above ground in some areas
- the lack of flashings to doors, windows and timber louvres, with associated moisture penetration evident in some areas
- the projecting decorative window “sills”, with moisture penetration and decay apparent in some areas
- the gaps in some window gaskets
- the lack of a head flashing or drip edge to the garage door head
- the lack of kickouts to the bottom of the roof apron flashings.

6.3.2 I note the expert’s comment in paragraph 5.7, and accept that the meterbox is adequately weatherproofed in the circumstances.

6.3.3 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
- the house has eaves that provide good shelter above many walls
- the house has no attached decks
- the moisture penetration appears to be limited to areas where defects have been identified.

6.3.4 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.

## **Matter 1: The cladding**

### **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 work 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 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. I have given further consideration to the question of B2 compliance under Matter 2 of this determination.

- 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 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.
- 7.5 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 durability considerations**

### **8. Discussion**

- 8.1 There are concerns about the durability, and hence the compliance with the building code, of certain elements of the building taking into consideration the age of the building work completed early in 2002. It appears that the territorial authority carried out a final inspection in 2002 that indicated compliance with clause B2 at that time.
- 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 The 6-year delay between the substantial completion of the house and the applicant’s request for a code compliance certificate raises the issue of when all the elements of the building complied with clause B2. I have not been provided with any evidence that the territorial authority did not accept that those elements complied with clause B2 when the house was completed in 2002.

- 8.5 It is not disputed, and I am therefore satisfied, that all the building elements complied with Clause B2 on 1 February 2002. This date has been agreed between the parties, refer paragraph 4.5.
- 8.6 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.
- 8.7 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 building work had been issued in 2002.
- 8.8 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. 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 on 1 February 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 February 2002 instead of from the time of issue of the code compliance certificate for all building elements constructed under the original building consent except those items to be rectified as described in paragraph 6.3.1 of Determination 2008/20.
  - (c) the territorial authority is to issue a code compliance certificate in respect of the building consent as amended, once the matters set out in paragraph 6.3.1 have been fixed to its satisfaction.
- 9.3 The territorial authority should now issue a notice to fix that requires the owners to bring the building into compliance with the Building Code, incorporating the defects listed in paragraphs 6.3.1 and referring to any further defects that might be

discovered in the course of rectification. The notice to fix should not specify how those defects are to be fixed. That is a matter for the owner to propose and for the territorial authority to accept or reject.

- 9.4 I 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 9 April 2008.

John Gardiner  
**Manager Determinations**