Determination 2008/65

Determination regarding a code compliance certificate for a 7-year-old building with monolithic cladding at 88 Delamare Road, Hamilton

1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("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 P Cotton ("the applicant"), and the other party is the Hamilton City Council, ("the authority") carrying out its duties and functions 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 7-year-old building because it is not satisfied that the building work complies with Clauses B2 and E2 of the Building Code[2] (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.

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 3.4), 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 detached two storey house with a linked single storey garage building situated on a flat site, which is in a medium wind zone for the purposes of NZS 3604[3]. The construction of the house is generally conventional light timber frame, with a concrete slab, concrete block foundations, monolithic cladding and aluminium windows. The building is fairly complex in plan and form, with 30^{o} pitch asphaltic shingle gable roofs that incorporate a number of flat membrane covered roofs, with complex roof junctions and intersections.

2.2 The roofs have parapets to the gable ends and eaves projections of about 500mm overall only to the north-east elevation and above the garage doors. A timber framed chimney structure projects from the centre of the north-west gable-end parapet wall. On either side of the main entry on the south-west elevation, flat roofs extend from the slope of the main roof. These flat roofed areas are bounded by two-storey parapet walls, with a sloping roof in between, which extends down from the main roof to form an entry canopy supported by plastered concrete block columns.

2.3 Timber pergolas are attached to the lower walls on the north-east and north-west elevations, and supported at the walls and the outer edges by plastered concrete block columns.

2.4 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

[3] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

that the timber is untreated (refer paragraph 3.4). Given the date of construction and the lack of other evidence, I consider that the external wall framing is untreated.

2.5 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 the building wrap directly to the framing timbers. The cladding is finished with a flexible paint coating system.

3. Background

3.1 It appears that the authority issued a building consent in 1999 or early 2000. I have not seen the building consent or the consent documentation.

3.2 I have received no records of the inspections, if any, carried out by the authority during construction, but it appears that the house was completed in 2000 although the applicant did not seek a code compliance certificate until 2007. It appears that the request and refusal were only verbal (refer paragraph 3.8).

3.3 The applicant engaged a specialist inspection company ("the inspection company") to visually inspect and report on the condition of the claddings. The inspection company carried out an inspection on 9 October 2007 and provided a "building envelope report" for the building. I note that a representative from the authority attended the inspection.

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

- The description of the construction and materials.
- The weathertightness risks of the building.
- The use of untreated timber framing.
- The description of the solid plaster cladding system.
- The evidence of moisture penetration through the cladding in some areas.
- The identification of movement cracks in the plaster, with repair work advised.
- The lack of clearance of the cladding above the ground and paving.
- The pergolas spaced out from the cladding.
- Other maintenance matters and repair recommendations.

The report noted that the moisture penetration appeared to be confined to the doors and windows, and recommended that remedial work be undertaken to fix the identified defects. It concluded that, providing appropriate repairs were undertaken to remedy the identified defects, the cladding would comply with the building code.

3.5 I am not aware of any correspondence from the authority, but it appears that it continued to refuse to issue a code compliance certificate, as the inspection company applied for a determination on behalf of the applicant on 23 October 2007.

3.6 In early November 2007, the applicant asked the Department to delay work on the determination until remedial work was carried out on the building. On 17 April 2008, the applicant advised that the repair work had been completed and the determination could proceed.

3.7 The authority responded to requests for clarification in an email to the Department dated 7 May 2008, and noted that it had only recently been made aware that repair work on the building had proceeded, based only on the inspection company's report. The authority added:

> I have not received any building consent application for the repair work and we have not inspected any repair work.

3.8 In subsequent emails to the Department, the authority confirmed that the applicant had not formally requested a code compliance certificate for the house, and noted that the authority's major concerns were Clauses E2 and B2 and the age of the house in terms of ongoing durability of other building elements.

4. The submissions

4.1 In a statement dated 23 October 2007 accompanying the application the inspection company (acting as agent for the applicant) stated that a determination was needed because the authority "may not be satisfied" that the building complied with the weathertightness and durability (including the age of the building consent) provisions of the building code.

4.2 The applicant forwarded copies of:

- incomplete plans
- the building envelope report dated October 2007

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

4.4 The draft determination was sent to the parties on 6 June 2008. The draft was issued for comment and to agree a date when the building complied with Building Code Clause B2 Durability.

4.5 The parties accepted the draft and agreed that compliance with Clause B2 was achieved on 13 March 2000. The applicant advised that was the day she moved into the house.

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 Architects. The expert inspected the house on 26 May 2008, and furnished a report that was completed on 28 May 2008.

5.2 The expert noted that the plaster wall cladding 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 and painted. The expert added that the quality of the finish was "not necessarily indicative of build quality behind the surface".

5.3 The expert also noted that, with the exception of the items outlined in paragraph 5.6, 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.

5.4 The expert noted that the windows and doors were recessed with the sill recess flat and no metal head flashings or evidence of other flashings. The expert removed a small section of cladding at the jamb to sill junction of a garage window and noted that the window installation did not include jamb or sill flashings. Polythene damp proof course had been used at the corners in lieu of flexible flashing tape, and this had been fixed with staples through the building wrap. The window had been installed without sealing behind the jamb flange, and a thin fillet of sealant had been recently applied to the junction of the window flanges and the plaster. I accept that the window junction exposed is typical of similar areas elsewhere in the house.

5.5 Moisture observations

5.5.1 The expert inspected the interior of the house and noted the recent repair and repainting work. Non-invasive moisture readings were elevated at several areas.

5.5.2 The expert took invasive moisture readings from the inside using long probes to reach the cladding side of the framing. I note that the lower levels of moisture varied from 10% to 15%, which I consider to be indicative of the equilibrium moisture level in the framing at the time of inspection. Out of the 15 readings, 6 were comparatively elevated as follows:

- 19% in the bottom plate below the southwest TV room window.
- 22% in the bottom plate beside the northwest TV room doors.
- 33% in the bottom plate beside the northwest lounge doors.
- 23% in the bottom plate beside the northeast lounge doors.
- 29% at the bottom plate beside the northeast dining area doors.
- 25% at the bottom plate below the northeast garage window.

Moisture levels that vary significantly from the apparent equilibrium moisture level 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.

5.5.3 When conducting invasive moisture tests, the expert also noted severe decay in the bottom plate beside the northeast lounge doors and soft timber drillings in the bottom plate beside the northeast dining area doors.

5.5.4 When the plaster was removed from the garage window as outlined in paragraph 5.4, the expert noted that the sill plate and top of the stud under the window was severely decayed and able to be crumbled in the fingers.

5.5.5 The expert also noted that the batten at the edge of the laundry porch membrane roof was completely decayed in parts, and that the plywood substrate was also decayed at the edge.

5.6 Commenting specifically on the wall and roof claddings, 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[4]
- there are no horizontal control joints in the 2-storey high walls
- although the plaster has been recently repaired, there are horizontal movement cracks in some areas, some of which have been painted over
- 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
- the windows and doors lack head, sill and jamb flashings, and associated moisture penetration is apparent, with severe decay exposed at the cut-out
- the plaster over the recess at the window sills is almost flat, allowing moisture penetration, and the underlying untreated timber is decaying
- some of the concrete block columns beneath the pergolas form pilasters that butt against the wall cladding and have poorly applied sealant between the flat tops and the wall plaster, allowing moisture to penetrate the junction
- the larger flat membrane roof areas have insufficient slope, and water is ponding against the junction with the sloping roof
- the lapped membrane joints lack lap tape, relying on adhesive only
- the ends of the membrane roof to wall junctions are poorly weatherproofed, relying only on sealant to prevent moisture penetration
- the metal parapet cappings above the low roof linking the garage with the house lack saddle flashings at the parapet to wall junctions, and are reliant on sealant for weatherproofing
- the edge of the membrane over the laundry porch roof is inadequately weatherproofed, as the timber batten and the edge of the plywood has decayed.

5.7 The expert also noted that, although lacking a head flashing, the meter box is sheltered from prevailing winds 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 May 2008.

[4] New Zealand Standard NZS 4251: Solid plastering; Part 1: 1998 Cement plasters for walls, ceilings and soffits

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[5], 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[6] (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

6.1.3 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less robust. In any event, there is a need for both the design of the cladding system and its installation to be carefully carried out.

6.2 Weathertightness risk

6.2.1 In relation to these characteristics I find that this 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 parapets to three elevations 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.

[5] 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.
[6] Copies of all determinations issued by the Department can be obtained from the Department's website.

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 one elevation of this building demonstrates a moderate weathertightness risk rating and all of the others a high 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 2000, 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.

Matter 1: The cladding

7. Discussion

7.1 Taking into account the expert's report, I am satisfied that the current performance of the cladding installed on this house is inadequate because it has not been installed according to good trade practice. In particular, the monolithic cladding demonstrates the key defects listed in paragraph 5.6 and is allowing significant moisture penetration into the walls through these defects, which in turn has led to decay in the untreated framing timber at some locations.

7.2 I have also identified the presence of a range of known weathertightness risk factors in 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 significant faults identified in the cladding system. It is that combination of risk factors and faults that indicate that the structure does not have sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding system as installed complies with Clause E2 of the Building Code.

7.3 In addition, the building is also required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement for the house to remain weathertight. Because the cladding faults on the building are allowing moisture penetration in some locations now, or are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of Clause B2.

7.4 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, with the information available to me, that fixing the identified faults, as opposed to partial or full re-cladding, could result in compliance with Clauses B2 or E2. I consider that final decisions on

whether code compliance can be achieved by either particular repairs 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 repair option should be submitted to the authority for its consideration and approval.

7.5 I note that the Department has produced a guidance document[7] on weathertightness remediation, available by calling the Department's Freephone number 0800 242 243. 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 to her when considering the upcoming work required to the house.

7.6 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 in 2000.

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 7-year delay between the substantial completion of the building work consented in 2000 and the applicant's request for a code compliance certificate raises the matter of when all the elements of the building complied with Clause B2. I have not been

[7] External moisture – A guide to weathertightness remediation

provided with any evidence that the authority did not accept that those elements complied with Clause B2 at a date in 2000.

8.5 It is not disputed, and I am therefore satisfied, that all the building elements complied with Clause B2 on 13 March 2000. 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 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 2000.

8.8 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.

9. What is to be done now?

9.1 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 5.6 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.

9.2 I would 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 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.

10. The decision

10.1 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

accordingly confirm the authority's decision to refuse to issue a code compliance certificate.

10.2 I also determine that:

(a) all the building elements installed in the building, apart from roof and wall claddings as described in this determination, complied with Clause B2 on 13 March 2000.

(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 13 March 2000, 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 5.6 of Determination 2008/65.

(c) the authority is to issue a code compliance certificate in respect of the building consent as amended, once the roof and wall claddings have been fixed to its satisfaction.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 18 July 2008.

John Gardiner
Manager Determinations