Determination 2008/44

Determination regarding a code compliance certificate for a 10-year-old house with monolithic cladding at 11 Riverlinks Lane, 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 Mr S Aldridge ("the applicant"), and the other party is the Hamilton City Council ("the territorial authority").

1.2 This determination arises from the decision of the territorial authority to refuse to issue a code compliance certificate for a 10-year-old house 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).

1.3 Paragraph 4.1 refers to three broad areas of non-compliance being, Clause B2 "Durability", Clause E2 "External moisture", and "*other appropriate provisions of the building code*." The territorial authority made no submission in response to the application, nor did it confirm with the applicant why it would not issue the code compliance certificate. I do not consider this satisfactory.

[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.

1.4 Given the scale and complexity of the building, the information and evidence that has been made available to me, and the lack of clarity about other matters the territorial authority believes to be non-compliant, the matters for determination are therefore limited to:

1.4.1 Matter 1: The cladding

Whether the roof and wall cladding as installed on the house ("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.

1.4.2 Matter 2: The durability considerations

Whether the building elements comply with Clause B2 "Durability" of the Building Code, taking into account the age of the building work.

1.5 In making my decision, I have considered the following evidence:

- the submission of the applicant
- the report of the expert commissioned by the Department to advise on this dispute ("the expert")
- the report of the inspection company commissioned by the applicant to advise on the building
- other evidence in this matter.

I have evaluated this information using a framework that I describe more fully in paragraph 7.1.

1.6 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 very large detached house situated along a large rural riverside site, which is in a medium wind zone for the purposes of NZS 3604[3]. The upper half of the building platform is generally flat, with a steep southwest slope down to a tennis court area beside the river. The front of the house faces away from the river, and the main two-storey section is linked to a single-storey garage wing to the southeast. The rear of the house steps down the slope towards the tennis court, incorporating a partial basement level along the southwest elevation, and the garage wing roof extends above the south basement level to provide the high ceiling height necessary for a squash court.

2.2 Construction is generally conventional light timber frame, with some specifically engineered elements; and incorporates concrete slabs and foundations, concrete block basement walls and retaining walls, aluminium windows and monolithic wall cladding. The house shape is very complex in plan and form, with multi-level 22.5^{o}

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

pitch clay-tile hipped and gabled roofs, which have eaves and verge projections that are generally less than 250mm wide overall. A circular "turret" structure with an octagonal segmented roof accommodates the stairwell beside the main entry, where a porte-cochere extends over part of the driveway.

2.3 The northwest living areas form an L-shape, and incorporate an attached timber pergola structure, supported by monolithic-clad columns, that radiates out from the internal corner. The associated paving steps down in terraces towards a swimming pool to the north. The extensive landscaping extends along the southwest elevation, with terraces, planters and steps accommodating the steep slope to the tennis court.

2.4 Two enclosed decks, with tiled floors and clad deck upstands, open from upper level bedrooms and sit above living areas below. The deck upstands are monolithic-clad, and support decorative lightweight precast concrete balustrades.

2.5 The expert forwarded two timber samples to a testing laboratory for analysis (refer paragraph 5.5), and the biodeterioration consultant's analysis indicated that the wall framing samples were boric treated to a level equivalent to H1.2. I have not seen the specification and I note that the inspection company's report described the timber as untreated (refer paragraph 3.3). However, given the test results and the lack of other evidence, I accept that at least some of the exterior wall framing timber is treated.

2.6 The cladding system to the building is what is described as monolithic cladding, and is a "Harditex" system with 7.5 mm thick fibre-cement sheets fixed through the building wrap to the framing, and finished with an applied textured coating system.

3. Background

3.1 The territorial authority issued a building consent (No. 96/2570) on 9 April 1997 (which I have not seen). I have received no information about the inspections undertaken during construction, but it appears that the house was completed during 1998. The territorial authority conducted what appears to be a final inspection of the building in about February 2000.

3.2 The applicant purchased the property in 2006, apparently aware that no code compliance certificate had been issued for the house.

3.3 The applicant engaged an inspection company to visually inspect and report on the condition of the claddings. The inspection company carried out inspections on 16 April and 23 October 2007 and provided a "building envelope report" for the house, dated October 2007. I note that the territorial authority was present during both inspections.

3.4 The report briefly covered the history and ownership of the house and include the following matters:

- The weathertightness risks of the building.
- A description of the roof and wall cladding systems.
- A description of the window installation.
- The lack of evidence of moisture penetration through the cladding, based on non-invasive moisture testing and thermographic images throughout the interior of the house.
- The pergola fixings through the cladding.
- Various other matters.

The report concluded that the claddings generally appeared to comply with the building code.

3.5 The territorial authority apparently did not accept that the house was code compliant as it refused to issue a code compliance certificate, and the Department received an application for a determination on 3 December 2007.

4. The submissions

4.1 In a letter to the Department dated 14 November 2007, the applicant stated that he wished to a apply for a determination because the territorial authority:

> ...will not issue a Code of Compliance Certificate where the building consent was issued prior to the Building Act 2004 (either before the Building Act 1991 or in terms of the Building Act 1991) because the Council may not be satisfied on reasonable grounds that the provisions of the building code for:
>
> 1. Durability in terms of B2 and/or
> 2. Weathertightness in terms of E2 and/or
> 3. Other appropriate provisions of the building code
>
> have been met and maintained in the period since the issue of the Building Consent.

4.2 The applicant forwarded copies of:

- the drawings
- the inspection company's building envelope report, dated October 2007.

4.3 The territorial authority made no submission, nor did it provide any information from its records for the building, such as the building consent or any inspection records.

4.4 A draft determination was issued to the parties on 18 March 2008. The draft was issued for comment and for the parties to agree a date when the building elements complied with Building Code Clause B2 "Durability".

4.5 The parties accepted the draft. The territorial authority said it did not know when compliance with B2 was achieved. The applicant produced a letter from the

territorial authority, dated 8 February 2000, that confirmed the minor items that were required to be fixed before a code compliance certificate could be issued. The applicant submitted that date of this letter could be taken to mean that compliance with Clause B2 was achieved on 8 February 2000. The territorial authority accepted this proposal. It is unclear why the territorial authority was not able to furnish this information itself.

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 4 February 2008, and furnished a report that was completed on 21 February 2008. The expert noted that, on first viewing, the cladding appeared to be in good condition, with only minor cracking apparent. The expert noted that he was unable to gain access to ceiling spaces and to the high level roof areas.

5.3 The expert noted that the windows were recessed back from the cladding face, with clad reveals, no visible head flashings, sealant applied around the window flanges and decorative planted polystyrene "sills". The expert removed a small section of cladding at the jamb to sill junction of two windows to observe the window installation, and sent timber samples to a testing laboratory for analysis (refer paragraphs 2.5 and 5.5.3). I accept that the junctions exposed are typical of similar locations throughout the building.

5.4 The expert also removed a small section of cladding on the upper inside face of a deck upstand to observe the underlying construction. I accept that the area exposed is typical of similar deck upstands in the building.

5.5 Moisture levels

5.5.1 The expert took invasive moisture readings through the cladding at 25 high risk locations, and the following elevated readings were noted:

- 24% in the framing below one of the pergola attachments
- 24% in the bottom of the laundry door jamb
- 26% in the framing of the master bedroom deck upstand.

5.5.2 I note that the invasive readings indicated that the equilibrium moisture content ("EMC") ranged from about 9% to 12% at the time of inspection. Moisture levels that vary significantly from the EMC range generally indicate that external moisture is entering the structure and further investigation is required.

5.5.3 I also note that moisture readings in the framing at the cut-outs of the two windows (refer paragraph 5.3) were recorded at 11% and 13%. Despite these low moisture levels, the biodeterioration consultant's analysis indicated that one of the samples contained "pockets of well established decay" indicative of 3 to 5 years exposure to

elevated moisture levels. The other sample contained a "large number of active fungal Hyphae", which also indicated some exposure to moisture.

5.5.4 The expert noted that his inspection followed an extended dry spell, and considered that moisture levels would increase at other times of year and more areas would be likely to exceed safe levels during periods of wet weather.

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

- there are no vertical control joints, or horizontal inter-storey control joints on any of the external walls
- there are isolated cracks and nail popping in the cladding
- the recessed windows are ineffectively weatherproofed, with no visible head flashings, no sill flashings, butyl rubber jamb flashings butted and sealed against the solid timber sill packer, unsealed fibre-cement under the sill coating, and no drainage gap at the sill flange
- clearances from the bottom of the cladding and the inside floor level to the outside ground and paving are insufficient in most areas
- there is no clearance from the bottom of the cladding to the deck tiles
- the flat uncapped tops of the deck upstands are not adequately weatherproofed, with the deck membrane not extended over the top, and there is evidence of moisture penetration. There is no indication that saddle flashings have been installed at the junction of the upstands with the walls
- the fixings of the pergola beams are inadequately sealed, with evidence of associated moisture penetration, and the small gap between the beams and the walls is likely to collect debris
- clearances from the wall cladding to the roof apron flashings are inadequate, and the apron flashings lack adequate kickouts at the bottom.

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

- some of the clay roof tiles, which have been cut to fit at apron flashings and similar locations, are misaligned and loose, as they are not adequately locked into place.

6. Evaluation for code compliance

6.1 Evaluation framework: exterior cladding

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[4], 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:

[4] An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way (but not the only way) of complying with the Building Code. The Acceptable Solutions are available from The Department's Website at www.dbh.govt.nz.

- Some Acceptable Solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.

6.1.2 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[5] (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 house:

- is built in a medium wind zone
- is a maximum of two storeys high
- is very complex in plan and form
- has monolithic cladding fixed directly to the framing
- has eaves projections of about 250mm above most walls
- has two upper level decks, with tiled floors and monolithic-clad deck upstands, situated above enclosed living areas below
- has a pergola attached to the building
- has external wall framing that is treated to a level that provides some resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 The house has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. The resulting level of risk can range from ‘low’ to ‘very high’. The risk level is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing; for example, a high risk level is likely to require a particular type of cladding to be installed over a drained cavity.

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

6.2.3 The weathertightness features outlined in paragraph 6.2.1 show that all elevations of this house demonstrate a high weathertightness risk rating, and would require a drained cavity in order to comply with the current requirements of E2/AS1.

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 or to manufacturer's recommendations at the time of construction. In particular, the monolithic cladding demonstrates the systemic defects listed in paragraph 5.6 that show non-compliance with the manufacturer's recommendations has resulted in an inadequate cladding installation. As a result there is moisture penetration into the walls through these defects, which in turn has led to decay in the framing timber in at least one location, that is likely to be widespread. Consequently I am not satisfied that the cladding system as installed complies with either Clause B2 or Clause E2 of the Building Code.

7.2 I find that, because of the extent and apparent complexity of the faults that have been identified with the wall cladding (refer paragraph 5.6), 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 localised 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 territorial authority for its consideration and approval.

7.3 The defects to the roof cladding occur in discreet areas and I am able to conclude that satisfactory rectification of the items outlined in paragraph 5.7 with will result in the roof becoming code-compliant.

7.4 I note that the Department has produced a guidance document[6] on weathertightness remediation, and I consider that this guide will assist the owner in understanding the issues and processes involved in remediation work; and in exploring the various options that may be available to him when considering the upcoming work required to the house.

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).

[6] External moisture – A guide to weathertightness remediation

Matter 2: The durability considerations

8. Discussion

8.1 The territorial 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 between 1998 to 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 9-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, with the exception of the cladding, the territorial 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, with the exception of the wall and roof cladding, complied with Clause B2 on 8 February 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 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 house had been issued in 2000.

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. What is to be done now?

9.1 I note that the territorial authority has not issued a notice to fix. The territorial authority should now issue a notice to fix that requires the owners to bring the building up to compliance with the Building Code, indentifying the defects listed in paragraphs 5.6 and 5.7, and referring to any further defects that might be discovered in the course of further investigation and rectification. The notice to fix should not specify how those defects are to be fixed, that is for the owner to propose and for the territorial 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 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.

10. The decision

10.1 In accordance with section 188 of the Act, I determine that the building does not comply with Clauses B2 and E2 of the Building Code, and accordingly confirm the territorial 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 the items that are to be rectified as described in this determination, complied with Clause B2 on 8 February 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 8 February 2000 instead of from the time of issue of the code compliance certificate for all building elements except the roof and wall claddings as set out in paragraphs 5.6 and 5.7 of Determination 2008/44.

(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 5.6 together with any other matters arising from a more extensive investigation, and 5.7, have been rectified to its satisfaction.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 29 May 2008.

John Gardiner
Manager Determinations