Determination 2007/127

Determination regarding a code compliance certificate for a house with monolithic cladding at 9 Langana Drive, Browns Bay

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, the N Jamieson Family Trust ("the applicant"), and the other party is the North Shore 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 9-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 The matters for determination are:

1.3.1 Matter 1: The cladding

Whether the 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] 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.

1.3.2 Matter 2: The durability considerations

Whether the elements that make up the building work complies with Building Code clause B2 "Durability", taking into account the age of the building work.

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

- the submissions of the parties
- the report of the independent expert commissioned by the Weathertight Homes Resolution Service ("the WHRS expert")
- the report of the weathertightness consultant ("the consultant") commissioned by the applicant to advise on the building
- the other evidence in this matter.

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

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 site, which is in a low wind zone for the purposes of NZS 3604[3]. The house is two storeys high, except for several single-storey ground floor projections. Construction is conventional light timber frame, with concrete slab and foundations, aluminium windows and monolithic wall cladding. The house shape is moderately complex in plan and form, with 35^{o} pitch concrete tile hip roofs over upper and lower roofs. Eaves projections are 600mm wide overall, except for the ends of lower level lean-tos, which have no verge projections. A timber pergola, supported by monolithic-clad columns, extends from the garage along the north elevation to the northeast corner.

2.2 Two adjacent enclosed decks, with tiled floors and monolithic-clad balustrades, extend to the north from upper level bedrooms. The larger master bedroom deck sits partly above an enclosed garage area below, and is separated from the adjacent small deck by a monolithic-clad balustrade.

2.3 The WHRS expert took timber samples from exterior wall and column framing and forwarded them to a testing laboratory for analysis (refer paragraph 5.5). The testing laboratory's analysis indicated that the wall framing samples were untreated, while the column framing appeared to be treated to a level equivalent to H3. Given the test results and the date of construction, I accept that the exterior wall framing timber is untreated, and the column framing timber is H3 treated.

2.4 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] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

3. Background

3.1 The territorial authority issued a building consent (No. E12268) on 3 September 1997, and carried out various inspections during construction, including a pre-line inspection on 28 October 1997 and a post-line inspection on 4 November 1997.

3.2 The territorial authority carried out a final inspection on 29 January 1998, which identified 3 outstanding items. In a facsimile dated 21 April 1998, the territorial authority provided the original owners with copies of the final inspection records, and noted that "reinspections will be required when outstanding works are completed".

3.3 I have no records of any further correspondence after that date, and the applicant purchased the building on 6 December 2002, apparently unaware that a code compliance certificate had not been issued.

3.4 When the applicant offered the house for sale in 2006, a prospective buyer discovered the lack of a code compliance certificate and commissioned a pre-purchase report that highlighted some weathertightness issues.

3.5 The applicant subsequently sought a final inspection of the house, which the territorial authority carried out on 5 May 2006. The inspection report identified defects and outstanding documentation, and noted:

> Monolithic weathertightness inspection notice has been issued to owners.

3.6 During the inspection, the applicants were given a standard letter dated 5 May 2006, in which the territorial authority explained that a weathertightness inspection was required as:

> Consented building works in North Shore City Council clad with any type of monolithic cladding without a cavity will be reviewed on a case by case basis before determining if a code compliance certificate (CCC) can be issued.

3.7 The applicant subsequently commissioned the consultant to inspect and report on the weathertightness of the house. In a letter to the applicant dated 13 July 2006, the consultant identified a significant number of defects and concerns which "will jeopardise the long-term integrity of the exterior envelope of the building", also noted that the territorial authority might not issue a code compliance certificate following remedial work due to the age of the house. The consultant provided several options, with his recommendation being:

> ...to carry out a complete reclad of the property, in an appropriate cladding to suit the house (possibly weatherboard).

3.8 The applicant lodged a claim with the Weathertight Homes Resolution Service ("WHRS") on 31 July 2006, and the house was subsequently assessed with the report completed on 14 September 2006. (In paragraph 5 I have outlined the findings of the WHRS inspection that are relevant to this determination.)

3.9 On receipt of the WHRS report, the applicant asked the consultant to comment on the findings. In a letter to the applicant dated 12 October 2006, the consultant identified a number of weathertightness defects and concerns that he considered should be

included. I have considered these comments and those contained in the consultant's letter dated 13 July 2006 as evidence in this matter (refer paragraphs 1.4 and 6).

3.10 In a letter to the WHRS dated 17 October 2006, the applicant summarised the consultant's comments on the WHRS report, concluding:

> This work will involve considerable more work on the cladding and so the costing should now include the possibility of a total re-clad of the building.

3.11 It appears that the consultant subsequently contacted the territorial authority with regard to further action resulting from the final inspection (refer paragraph 3.6), and a weathertightness inspection was carried out by the territorial authority.

3.12 In a letter to the applicant and the consultant, dated 27 November 2006, the territorial authority stated that the Building Code required that building work must remain durable for specific periods of time after the code compliance certificate is issued and noted that the inspection process for monolithic claddings had changed since the time that the building consent for the house was processed. The territorial authority listed 20 risk factors identified with the building, together with 27 weathertightness defects identified during a visual inspection and some other outstanding items, and stated that, due to the risk factors, defects and other compliance requirements, it could not be satisfied on reasonable grounds that the cladding system complied with clauses E2 and B2 of the Building Code. The territorial authority also raised the issue of the age of the house, concluding that:

> The Council is unable to issue a Code Compliance Certificate for this dwelling, as we are not satisfied on reasonable grounds that the following compliance requirements have been achieved.
>
> 1. Compliance of the installed cladding system with clause E2 External Moisture and clause B2 Durability of the New Zealand Building Code.
> 2. Compliance of all other elements of your building with clause B2 Durability of the New Zealand Building Code, considering the age of the construction.

3.13 The territorial authority did not issue a Notice to Rectify under the Building Act 1991 ("the former Act") or a notice to fix as required under section 164(2) of the Act.

3.14 The Department received an application for a determination on 11 June 2007 and sought additional information that was received on 16 July 2007.

4. The submissions

4.1 The applicant forwarded copies of:

- the correspondence with the territorial authority
- the correspondence from the consultant
- the WHRS report dated 14 September 2006, which included:
    - the drawings and specification
    - the consent documentation
    - the territorial authority's inspection records

- the testing laboratory's report dated 19 August 2006
- various other technical data.

4.2 A draft determination was issued to the parties on 8 August 2007. The draft was issued for comment and for the parties to agree a date when the building elements complied with the durability provisions of the Building Code.

4.3 The applicants accepted the draft in a letter to the Department dated 20 August 2007 and submitted that the building elements complied with clause B2 on 1 April 1998.

4.4 The territorial authority responded to the draft determination in a fax to the Department dated 25 October 2007. The territorial authority accepted the draft and agreed the date when the building elements complied with the durability provisions of the Building Code was 1 April 1998. The territorial authority also noted that it had not received a copy of the application (form D2) or the submission from the applicant.

5. The WHRS expert's report

5.1 As discussed in paragraph 1.4, I consider the WHRS expert's report forms part of the evidence that allows me to assess the condition of those building elements subject to the determination. The WHRS expert is independent and a member of the New Zealand Institute of Building Surveyors.

5.2 The WHRS expert inspected the house on 10 and 11 August 2006, and furnished a report that was completed on 14 September 2006. The WHRS expert noted that the cladding appeared to be in good condition, with only minor cracking apparent.

5.3 The WHRS expert noted that the windows were faced fixed against the backing sheets, with metal head flashings, no jamb or sill flashings and the coating applied after the window installation.

5.4 The WHRS expert inspected the interior of the house and took non-invasive moisture readings internally around the house. The expert noted swelling skirtings in the lounge and entry areas, with elevated readings at these locations. Twenty nine invasive moisture readings were taken through the cladding at high risk locations, and a number of elevated readings were noted, including:

- 3 readings of 24% to more than 40% in the framing of the pergola columns
- 7 readings of 20% to 37% in the balustrade framing of both decks

I note that the invasive readings indicated that the equilibrium moisture content ("EMC") ranged from about 9% to 15% 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 Given the elevated moisture readings in the columns and the balustrades, the WHRS expert removed small sections of cladding at one of the pergola columns and two areas at the deck balustrades, and noted signs of decay. The expert removed and

forwarded three timber samples from the cut-outs to a testing laboratory for analysis. The sample from the pergola column tested positive for copper, with the balustrade samples indicating no evidence of timber treatment. One of the balustrade samples contained "advanced brown rot", and the other samples contained "light brown rot".

5.6 The WHRS expert identified the following defects:

- There are no vertical control joints, or horizontal inter-storey control joints.
- There are peaked joints and cracks in the cladding in some areas, including at the junction of the coating with the window flanges.
- The monolithic-clad tops of the pergola columns are flat, with the beams penetrating the cladding, and the bottom of the pergola column cladding is buried in the ground.
- The fascias and barge boards are fixed directly against the backing sheets, with the coating applied after installation.
- The ends of the gutters and fascias butt against uncoated cladding.
- Clearances from the cladding to roof apron flashings are inadequate, and the apron flashings lack kickouts at the bottom.
- A downpipe on the south elevation is disconnected and is discharging directly onto the cladding.
- Clearances from the cladding to the paving are inadequate in some areas.
- The change in levels from the inside floor to the deck tiles, and the clearances from the cladding to the deck tiles are inadequate.
- The balustrade-to-wall junctions are inadequately weatherproofed, with no indication that saddle flashings have been installed.
- The monolithic clad tops of the balustrades are flat and are penetrated by the fixings of the handrails, with significant moisture penetration apparent.
- In the small deck, the only drainage provided is in the form of a small slot (clogged with debris) through the balustrade to the master bedroom deck
- Fixings and penetrations of pipes through the cladding are poorly sealed.
- The pergola stringer and the gate post are fixed directly to the cladding, with no drainage gap.

6. The consultant's comments

6.1 As discussed in paragraph 1.4, I have also considered the consultant's photographs and advice to the applicant as part of the evidence that allows me to assess the condition of those building elements subject to the determination.

6.2 The consultant identified the following defects (which are in addition to those identified by the WHRS expert outlined in paragraph 5.6):

- The cladding butts against the ground at the garage doors and front door.

- The cladding lacks anti-capillary gaps at the base and drip edges in other areas.
- There is unsealed fibre cement apparent in some areas.
- The barge capping tiles are inadequately weatherproofed and flashed (including at the junctions with walls), there is a cracked roof tile and the ends of the apron flashings are poorly weatherproofed.
- The windows are inadequately flashed and weatherproofed, with no evidence of window seals and the coating blocking the drainage gap under the sill flange.
- Inadequate weatherproofing is allowing moisture to enter under the patio door.
- The electrical meter box lacks a head flashing.

7. Evaluation for code compliance

7.1 Evaluation framework: exterior cladding

7.1.1 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:

- 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.

7.1.2 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.

7.1.3 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.

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

7.2 Weathertightness risk

7.2.1 In relation to these characteristics I find that this house:

- is built in a low wind zone
- is a maximum of two storeys high
- is moderately complex in plan and form
- has monolithic cladding fixed directly to the framing
- has eaves projections of about 600mm above most walls
- has two upper level decks that have membrane floors and clad balustrades, with one deck situated above an enclosed garage area below
- has external wall framing that is not treated to a level that provides resistance to the onset of decay if the framing absorbs and retains moisture.

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

7.2.3 The weathertightness features outlined in paragraph 7.2.1 show that one elevation of this house demonstrate a high weathertightness risk rating and the other elevations a moderate risk rating.

Matter 1: The cladding

8. Discussion

8.1 Taking into account the WHRS expert's report and the consultant's comments, I am satisfied that the current performance of the cladding installed on this house is inadequate. The cladding is allowing water to penetrate the walls through defects in some locations which in turn has led to the framing timber rotting. In particular, the cladding demonstrates the key defects listed in paragraph 5.6 and paragraph 6.2.

8.2 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 either clause B2 or clause E2 of the Building Code. I have given further consideration to the question of B2 compliance under Matter 2 of this determination.

8.3 I find that, because of the extent and complexity of the faults that have been identified in the cladding, I am unable to make a decision about how compliance

might be achieved. I consider this can only be made after a more thorough investigation of the cladding, which will require careful analysis by an appropriately qualified expert. Once that analysis is completed, the chosen repair option (whether targeted repairs, re-cladding, or a combination of both) should be submitted to the territorial authority for its consideration and approval.

Matter 2: The durability considerations

9. Discussion

9.1 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 date of the building by 29 January 1998. I also note that the territorial authority's inspection records indicate compliance with clause B2 at the time of those inspections.

9.2 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).

9.3 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.

9.4 It is not disputed, and I am therefore satisfied that all the building elements installed in the house complied with clause B2 on 1 April 1998. This date has been agreed between the parties, refer paragraphs 4.3 and 4.4

9.5 In order to address these durability issues, I sought some clarification of general legal advice about waivers and modifications. I received that clarification and the legal framework and procedures based on that clarification are described in previous determinations (for example Determination 2006/85) and are used to evaluate the durability issues raised in this determination.

9.6 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 1998.

9.7 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.

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 1 April 1998.

(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 April 1998 instead of from the time of issue of the code compliance certificate for all building elements except that this modification does not apply to the remedial work required to correct the defects described in paragraphs 5.6 and 6.2 of Determination 2007/127.

(c) the territorial authority, once the matters set out in paragraph 5.6 and paragraph 6.2 have been rectified to its satisfaction, is to issue a code compliance certificate in respect of the building consent as amended.

10.3 I note that 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, incorporating the defects listed in paragraph 5.6 and paragraph 6.2, and referring to any further defects that might be discovered in the course of rectification, but not specifying how those defects are to be fixed. It is not for me to decide directly how the defects are to be remedied and the cladding brought to compliance with the Building Code. That is a matter for the owner to propose and for the territorial authority to accept or reject.

10.4 I would suggest that the parties adopt the following process to meet the requirements of paragraph 10.3. 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 13 November 2007.

John Gardiner
Manager Determinations