Determination 2006/75

Refusal of a code compliance certificate for a building with a monolithic cladding system at 229 Gelling Road, Hunua

1. The dispute 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, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicants are the owners, Mr and Mrs Crookes ("the applicants"), and the other party is the Franklin District Council ("the territorial authority").

1.2 The dispute for determination is whether the territorial authority's decision to decline to issue a code compliance certificate for an 11-year-old house because it was not satisfied that the monolithic cladding complied with clauses B2 "Durability" and E2

[1] The Building Act 2004 is available from the Department's website at www.dbh.govt.nz.

"External Moisture" of the Building Code[2] (First Schedule, Building Regulations 1992) is correct.

1.3 The question to be determined is whether I am satisfied on reasonable grounds that the monolithic wall cladding as installed to the external walls of the building ("the cladding"), complies with the Building Code (see sections 177 and 188 of the Act). By "the monolithic wall 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 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to inspect the house ("the expert"), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1. I have not considered any other aspects of the Act or the Building Code.

2. The building

2.1 The building work consists of a single storey house situated on a flat rural site, which is in a medium wind zone for the purposes of NZS 3604[3]. Construction is conventional light timber frame, with a concrete slab and foundations, aluminium windows and monolithic wall cladding. The house has a fairly simple cruciform plan form, with 45^{o} profiled metal gable roofs that rise to more than 2-storey height at the ridges. The roof projects about 1200mm beyond the garage door, with monolithic clad wing walls at both ends. Elsewhere, eaves projections are provided by the gutter width only, and there are no verge projections. There are timber pergolas extending from beneath the gutters on the north and south elevations.

2.2 The expert commissioned by the Department to inspect the cladding provided evidence from a laboratory (refer paragraph 5.4) that the wall framing timber is boric treated to varying levels, some of which would provide little or no resistance to decay. The specification calls for wall framing to be boric treated, but does not specify the level of treatment. Based on this evidence, I consider that the wall framing of this house is unlikely to be consistently treated to a level that will provide resistance to fungal decay.

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

2.4 I have seen no evidence of producer statements or warranties for the cladding.

[2] The Building Code is available from the Department's website at www.dbh.govt.nz.
[3] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

3. Sequence of events

3.1 The territorial authority issued a building consent on 8 February 1994 and carried out various inspections during the course of construction, including prior to lining installation and following lining installation. The house appears to have been substantially complete in 1995, although an amendment to the consent for changes to the pergolas was approved on 13 December 1999. The final inspection was not undertaken until 13 September 2004, and the territorial authority issued an interim Notice to Rectify (number 4835) dated 15 September 2004, which listed items to be completed or rectified.

3.2 In a letter to the applicants dated 15 September 2004, the territorial listed the items covered in the interim Notice to Rectify. The territorial authority also raised concerns about the Harditex cladding and suggested that the applicants apply for a determination, noting that:

> Council needs to be assured that it meets the requirements of the NZ Building Code before a final building code compliance certificate can be issued.

3.3 The applicants applied for a determination on 15 September 2004.

3.4 The Department made arrangements for an expert to inspect the house. However, prior to the inspection, the applicants requested a delay as they had made a claim to the Weathertight Homes Resolution Service ("WHRS"). It appears that the applicants had become aware of leaks in the house before 2002, and had made some apparently unsuccessful attempts.

3.5 The territorial authority carried out a further final inspection on 11 January 2005, and the inspection summary notes "still waiting on determination – all other items from NTR 4835 completed".

3.6 The expert engaged by the WHRS ("the WHRS expert") inspected the house and provided a report dated 28 February 2005 ("the WHRS report"). I refer to some of the findings of the WHRS report in paragraph 5.

3.7 In a letter to the Department dated 4 April 2005, the applicants noted that they had met with the territorial authority to discuss the WHRS report, and had been advised to forward the report to the Department for consideration in the determination. The applicants reported that the territorial authority had:

> …stated that if your response after considering the remedial works in the report was a positive one ie. the works would meet the requirements of the Building Act, then Council would reply to us in writing outlining the works which need to be undertaken…

3.8 The Department responded in a letter to the applicants dated 14 April 2005, explaining that the recommendations in the WHRS report were intended to provide an outline of the work necessary in order to repair past leaks and damage, while the determination must consider the code compliance of the complete house, including the durability of the wall cladding. The Department explained that if the house were

to be built in 2005, such a cladding would require a drained cavity. The Department also noted other cladding defects not covered in the WHRS report, such as the lack of control joints, sheet layouts and the window installation, and suggested that the applicants should consider recladding, with a cavity incorporated into the system.

3.9 In a letter to the Department dated 26 April 2005, the applicants explained that they were not financially able to reclad the house and questioned whether they were being asked to "meet building standards in excess of what was required at the time of our building consent being issued."

3.10 The Department responded in a letter to the applicants dated 13 May 2005, explaining that Harditex installation details had evolved since the house was built, and that "compliance with a manufacturer's recommendation may not always mean compliance with the building code".

3.11 No further correspondence was received, and the Department wrote to the applicants on 26 January 2006 to ask whether they wished to proceed with the determination. The applicants responded in an email dated 9 March 2006, explaining that they had found it difficult to find suitable expert advice and had engaged a project manager.

3.12 The Department commissioned the WHRS expert to inspect the house for this determination, in order to allow the inspection to follow on from the work undertaken during his earlier inspection.

4. The submissions

4.1 In a letter dated 13 September 2004 that accompanied the application, the applicant noted that:

> We have been working steadily, as finance and personal circumstances have permitted, to finish our home. However we have now been advised by Franklin District Council they will not issue a final Code of Compliance for our house due to the Harditex cladding.

4.2 The applicant forwarded copies of:

- the building plans and specification
- some of the inspection records
- the interim Notice to Rectify
- correspondence from the territorial authority.

4.3 The territorial authority made no submission.

4.4 Copies of the submission and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

5. The expert's report

5.1 The expert inspected the claddings of the building on 17 March 2006, and furnished a report that was completed on 1 May 2006. The expert noted that the report should be read in conjunction with the WHRS report, as it had been "abbreviated to supplement a WHRS report and to consider additional issues relevant to Code Compliance". The expert noted that the cladding was "uniform and appeared flat" but "was clearly in need of repairs and maintenance".

5.2 The expert took non-invasive moisture readings through interior linings throughout the house, and noted elevated readings in similar areas as noted in his previous inspection.

5.3 The expert took invasive moisture readings through the wall cladding, at three of the areas where high readings had been recorded during his previous inspection, and noted that readings were similar to those reported in the WHRS report. The expert concluded that "there had not been a significant change since my previous investigation." The WHRS report had recorded the following elevated readings (without adjustment for timber treatment):

North elevation

- 18%, 20%, 30% and 47% in the family room walls
- more than 50% in the walk-in wardrobe of bedroom 1
- 47% in bedroom 3

West elevation

- 34% and 35% in bedroom 1
- 21%, 36% and more than 50% in the walk-in wardrobe of bedroom 1

South elevation

- more than 50% in the hallway to bedrooms 2 and 3
- 19% in the garage.

As noted in paragraph 2.2, the tested timber samples showed variable levels of boric treatment, so I consider that the unadjusted readings will give a reasonable indication of moisture levels in the timber framing. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

5.4 Following the WHRS inspection, the expert had forwarded six samples of timber (from bedroom 1, the wardrobe, the family room and bedroom 3) to an independent testing laboratory ("the laboratory") for investigation of decay. The laboratory identified decay varying from incipient (beginning) to advanced brown and/or soft rot in five of the samples, with possible incipient decay in the sixth.

5.5 The expert made the following specific comments on the cladding:

- no control joints have been provided, and there are a number of cracks in the walls of all elevations
- there are no vertical control joints in the numerous walls that exceed the 5.4 m limit between control joints for flush-finished fibre cement recommended by the manufacturer
- no horizontal control joints have been provided at gable ends and set-backs to the roof line, where walls exceed one storey in height
- the backing sheet joints coincide with window openings in several locations, contrary to the manufacturer's instructions
- windows are face-fitted against uncoated fibre cement, with no flashings at jambs or sills and a fillet of sealant (which appears to be aging) applied at the jamb. The junction of the family room curved window head with the jamb allows water to penetrate behind the jamb flange
- the clearances from the base of the cladding to the ground are inadequate in some areas
- the top of the cladding (and the building wrap) does not extend behind fascia and barge boards, and gutters are fixed directly to framing in some locations
- the bottoms of the apron flashings at roof to wall junctions are poorly weatherproofed, with no kickouts, gaps, and gutters embedded in the coating
- the pergolas are fixed directly through the cladding, without adequate weatherproofing at the junctions
- a monolithic-clad fence (with a flat monolithic top) abutts the cladding at the corner of the wardrobe, with no evidence of weatherproofing at the top and the junction with the wall
- the wing walls on either side of the garage door are supported from timber end posts buried in the ground, which allows moisture to travel up into the framing
- the sealant at pipe penetrations through the cladding is in poor condition.

5.6 A copy of the expert's report was provided to each of the parties on 2 May 2006.

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 Solution[4], in this case E2/AS1, 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 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 (refer to Determination 2004/1 *et al*) 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 the building:

- is built in a medium wind zone
- is a maximum of two storeys high at the gable ends
- is fairly simple in plan and in form
- has eaves projections provided by the gutters only and no verge projections
- has a number of pergolas fixed to the walls

[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.

- has monolithic cladding which is fixed directly to the framing
- has external wall framing that is unlikely to be consistently treated to a level that will provide resistance to fungal decay, so providing little resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, these factors show that all elevations of the building demonstrate a moderate weathertightness risk. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

6.3 Weathertightness performance

6.3.1 I find that the monolithic cladding system generally (including the windows, gutters and fascias) does not appear to have been installed according to good trade practice. As a result, there are significant defects identified in paragraph 5.5, which are likely to have contributed to the moisture and decay already evident in the external walls of this house.

7. Conclusion

7.1 I am satisfied that the current performance of the monolithic cladding is not adequate because it has not been installed according to good trade practice and is allowing significant water penetration into the walls at a number of locations at present. I have also identified the presence of some known weathertightness risk factors in this design. 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 defects, identified in paragraph 5.5, in the cladding system. It is that combination of risk factors and defects, together with the current moisture penetration, that indicate that the structure does not have sufficient provisions that would compensate for the lack of a full drainage cavity. Consequently, I am satisfied that the cladding system as installed on the building does not comply with clause E2 of the Building Code.

7.2 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 likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

7.3 I find that because of the apparent complexity and extent of the defects that have been identified in this house, I am unable to conclude, with the information available to me, that remediation of the identified defects, as opposed to partial or full recladding, could result in compliance with clauses B2 and E2. I consider that any

final decisions on whether code compliance can be achieved by either remediation or recladding, or a combination of both, can only be made after a more thorough investigation of the cladding and underlying wall framing. This will require a careful analysis by an appropriately qualified expert as to the correct remedial option to be followed. Once that decision has been made, it should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the owner is entitled to seek a further Determination that will rule on whether the proposed remedial work will comply with the requirements of clauses E2 and B2.

7.4 I draw to the attention of the territorial authority the evidence of advanced timber decay, and the likelihood that further investigation may reveal further decay of the wall framing, which could compromise the structural integrity of the building. I also note that the WHRS report was completed almost eighteen months ago, and I consider that the decay reported at that time is likely to have increased in severity and extent during the intervening period. I would also point out that although significant repair work was identified as necessary to make good water damage in the original WHRS report, that repair work would not have made good all B2 non compliance issues. Consequently the house may still not have been code compliant after that work had been satisfactorily completed

7.5 Effective maintenance of claddings (in particular of monolithic cladding) is important to ensure ongoing compliance with clauses B2 and E2 of the Building Code and is the responsibility of the building owner. Clause B2.3.1 of the Building Code requires that the cladding be subject to “normal maintenance”, however, that term is not defined in the Act.

7.6 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. With respect to the cladding, the extent and nature of the maintenance will depend on the material, or system, its geographical location and level of exposure. Following regular inspection, normal maintenance tasks shall include but not be limited to.

- Where applicable, following manufacturers’ maintenance recommendations
- Washing down surfaces, particularly those subject to wind-driven salt spray
- Re-coating protective finishes
- Replacing sealant, seals and gaskets in joints.

7.7 As most of the external wall framing of this building is likely to be untreated, periodic checking of its moisture content should also be carried out as part of normal maintenance.

7.8 In the circumstances, I decline to incorporate any waiver or modification of the Building Code in this determination.

8. The decision

8.1 In accordance with section 188 of the Act, I hereby determine that the monolithic cladding system as installed does not comply with clauses E2 and B2 of the Building Code. Accordingly, I confirm the territorial authority's decision to refuse to issue a code compliance certificate.

8.2 I note that the territorial authority has not issued a notice to rectify. A notice to fix should be issued requiring the owners to bring the house into compliance with the Building Code. The notice to fix may list the items to be rectified but it should not specify how compliance is to be achieved as this is for the owner to propose and for the territorial authority to accept or reject. It is important to note that the Building Code allows for more than one method of achieving compliance.

8.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 8.2. Initially, the territorial authority should issue a notice to fix, listing all the items that the territorial authority considers to be non-compliant. The owner should then produce a response to this in the form of a technically robust 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 21 August 2006.

John Gardiner
Determinations Manager