Determination 2005/116

Refusal of a code compliance certificate for a building with a "monolithic" cladding system at 178 Atawhai Drive, Nelson – House 101

1 THE DISPUTE TO BE DETERMINED

1.1 This is a determination of a dispute referred to the Chief Executive of the Department of Building and Housing ("the Chief Executive") under section 17 of the Building Act 1991 ("the Act"), as amended by section 424 of the Building Act 2004. The applicants are the joint-owners, Mr and Mrs Knight (referred to throughout this determination as the "owner"), and the other party is the Nelson City Council (referred to throughout this determination as the "territorial authority"). The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 2-year-old house unless changes are made to its monolithic cladding system.

1.2 My task in this determination is to consider whether I am satisfied on reasonable grounds that the external cladding as installed ("the cladding"), which is applied to the timber-framed external walls of this house complies with the building code (see sections 18 and 20 of the Act). By "external cladding as installed" I mean the components of the system (such as the backing sheets, 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 This determination is made under the Building Act 1991 subject to section 424 of the Building Act 2004. That section came into force ("commenced") on 30 November 2004, and its relevant provisions are:

> ". . .on and after the commencement of this section,—
>
> > "(a) a reference to the Authority in the Building Act 1991 must be read as a reference to the chief executive; and
> >
> > "(b) the Building Act 1991 must be read with all necessary modifications to enable the chief executive to perform the functions and duties, and exercise the powers, of the Authority . . "

It should be noted that the new legislation does not amend the determination process set out under the 1991 Act, other than to transfer the power to make a determination from the Building Industry Authority ("the Authority") to the Chief Executive.

1.4 This determination refers to the former Authority:

(a) When quoting from documents received in the course of the determination, and

(b) When referring to determinations made by the Authority before section 424 came into force.

1.5 In making my decision, I have not considered any other aspects of the Act or the building code.

1.6 The house itself is described in paragraphs 2.1 to 2.4, and paragraph 8 sets out the decision.

2 PROCEDURE

The building

2.1 The building is a three-storey detached house situated on a steep excavated site, which is in a high-wind zone in terms of NZS 3604: 1999 "Timber framed buildings". The external walls of conventional light-timber-frame construction are basically to the two top storeys of the house, and are built on blockwork foundation or retaining walls, and are sheathed with monolithic cladding. The house is of a complex shape with some offset sections. The main low-pitch metal tray clad roof has a large butyl rubber-clad internal valley gutter and has monolithic-clad parapet upstands with metal cappings. The house also has one large and one smaller butyl rubber clad low-pitch roof extensions over the balconies and these have folded steel butyl rubber lined gutters. The aluminium external windows and doors are surface mounted.

2.2 Two timber-framed balconies are constructed at the upper floor levels. The larger of the balconies is constructed partly over a habitable space, and the smaller lower-level balcony is supported on timber posts and beams outside the line of the building. The balcony decks are lined with a butyl rubber membrane over a plywood substrate, with open-boarded timber decks fixed over the membrane. The upper balcony has a timber-framed balustrade that is monolithic-clad on both faces and is finished with a metal capping. A timber handrail with short metal supports is fixed through the capping, which on the plans, is shown to be sealed at the surface junction. The lower balcony has a metal balustrade.

2.3 No evidence has been produced as to the type of treatment, if any, applied to the timber used to construct the external wall framing.

2.4 The cladding system consists of fibre-cement sheets with expressed joints. Contrary to what is specified in the manufacturer's data sheets ("the manufacturer's instructions" and shown in the manufacturer's detail), both of which show the use of

9mm sheet, the cladding to the walls of the house incorporates 7.5 mm "Eterpan" fibre-cement backing sheets fixed to 50mm x 25mm timber battens over the building wrap and finished with an acrylic paint system. The manufacturer's instructions include details for flashings at various junctions over a drained ventilated cavity. The expert commissioned by the Department has noted that the battens behind the backing lack the grooves indicated in the manufacturer's recommendations, and consequently, do not allow for the drainage of the cavity.

Sequence of events

2.5 The territorial authority issued a building consent in 2002, apparently based on a certificate provided by Prime Building Compliance Ltd ("the building certifier"). The building certifier carried out inspections during the course of construction.

2.6 On 9 August 2004, the building certifier wrote to the owner confirming that the building certifier had not completed the pre-cladding and final inspections. The building certifier stated that it was the responsibility of the builder or project manager to request such inspections. The owner was required to satisfy the building certifier and the territorial authority that, on reasonable grounds, all building work was code compliant. The building certifier also noted that the Authority had restricted the scope of approval of the building certifier by excluding cladding systems outside those described in E2/AS1.

2.7 The builder wrote to the architect on 13 August 2004, and in this letter noted that the builder had discussed the cladding details with the building certifier while it was being installed. All the required inspections were notified, and reminders were forwarded on at least 2 occasions.

2.8 On 6 September 2004, the building certifier wrote to the owner regarding the project. The building certifier commented in the letter that no inspection records existed for the cladding and that the building certifier had not carried out any such inspections. The building certifier said that discussions between the builder and the building certifier were not inspections. The building certifier went on to say that, as the cladding was now outside its scope, it would require an inspection and sign-off by the territorial authority. The building certifier then went on to describe the various procedures that the owner could follow to approach the territorial authority regarding the cladding issues.

2.9 On 8 November the architect wrote to the owner stating that the cladding system as installed predated, and thus did not comply with, current requirements. Accordingly, it was pointless to remove the cladding and it should be assessed on 2002 criteria.

2.10 The territorial authority did not issue a Notice to Rectify as required under section 43(6) of the Act.

2.11 The owner applied for a determination on 31 December 2004.

3 THE SUBMISSIONS

3.1 The owner wrote to the Department on 31 December 2004, noting that the architect had specified a cladding system that incorporated additional waterproofing features over and above those specified by the manufacturer. Neither the owner, the architect or the builder had been informed by the building certifier during the time that the cladding was being installed that a cladding inspection had not been carried out. Nor had they been informed that the building certifier had lost its authority to inspect the house's specific cladding, which was an Alternative Solution.

3.2 The owner supplied copies of:

- The plans and specifications;
- The correspondence with the territorial authority, the building certifier, the builder and the architect;
- Minutes of 3 site meetings, which discussed certain aspects of the cladding installation, and which were also attended by a representative of the building certifier.
- Some of the cladding system supplier's construction details; and
- Photographs showing some of the stages of construction.

3.3 The copies of the submission and other evidence were provided to each of the parties. Neither the owner nor the territorial authority made any further submissions in response to the submissions of the other party.

4 THE RELEVANT PROVISIONS OF THE BUILDING CODE

4.1 The dispute for determination is whether the territorial authority's decision to refuse to issue a code compliance certificate because it was not satisfied that the cladding complied with clauses B2.3.1 and E2.3.2 of the building code (First Schedule, Building Regulations 1992) is correct.

4.2 There are no Acceptable Solutions that have been approved under section 49 of the Act that cover this cladding. The cladding is not accredited under section 59 of the Act. I am therefore of the opinion that the cladding system as installed can be considered to be an alternative solution.

4.3 In several previous determinations, the Authority has made the following general observations, which remain valid in this case in my view, about acceptable solutions and alternative solutions:

- 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; and

- 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.

5 THE EXPERTS' REPORTS

5.1 Because of a lack of detailed information and inspection records, the Department commissioned an independent expert ("the expert") to inspect and report on the cladding. The expert inspected the building on 14 February 2005 and furnished a report that was completed on 25 February 2005. As previously described, the expert noted that the cavity battens lacked grooves, which would lessen the efficiency of the cavity. The cavity is also closed by the soffit lining under the first-floor bedroom. The expert was of the opinion that there are no jamb or sill flashings installed to the external joinery units. The expert also made the following comments regarding the cladding:

- There is movement at the top edge of the cladding below the window sills allowing the ingress of moisture which will be trapped by the non-grooved battens;
- The head flashings to the external windows and doors are cut level with the joinery jamb lines and do not extend the recommended 30mm with up-turned edges;
- The parapet cappings are loose in some locations;
- The main roof and balcony balustrade cappings have level tops;
- The metal handrail supports at the upper balcony penetrate the top of the balustrade capping;
- The saddle flashing detail at the balustrade/main wall junctions is inadequate;
- The upper balcony lacks an overflow;
- There is no weather seal around the light fittings where they penetrate the cladding of the main walls adjoining the balcony; and
- The paint finish is not likely to be a high build acrylic waterproof membrane.

5.2 The expert took non-invasive readings at the interior linings of the external walls throughout the house and the recorded readings ranged between 10.4% and 12.2%. The expert also took non-invasive and invasive moisture readings on the exterior of these walls and two non-invasive readings of 26% and 45.8% were recorded. However, at these locations the timber framing, when tested invasively, was found to be dry, which indicated moisture is being absorbed into the cladding material. Moisture levels above 18% recorded in the framing after cladding is in place generally indicate that external moisture is entering the structure.

5.3 The expert also noted the lack of a handrail to the south elevation retaining walls and the front entrance stairway.

5.4 Copies of the expert's report were provided to each of the parties. The territorial authority did not respond and the owners informed the Department that the architect would be forwarding a written response. The architect provided this response under a covering letter dated 8 April 2005. The report noted that the architect was retrospectively informed that the building certifier had not carried out inspections and that it no longer had the authority to certify the building.

5.5 The report described the cladding and batten system used on the house, the window, parapet and balcony flashings, the balcony flat roof drainage channel and the sealing of the light fittings. The architect disputed the expert's opinion that the cavity cannot drain and that the windows and doors do not have jamb and sill flashings. The architect also commented on certain of the photographs attached to the expert's report. In conclusion, the architect was of the opinion that the cladding complied with clauses E2 and B2 and that the system should be assessed against the original consent. The building was designed to mitigate the effects of moisture on the building structure, including the use of battens and the application of acrylic paint. There is no evidence of dampness or degradation in the timber framing.

5.6 The Department commissioned a second expert to inspect window flashing details and the cladding system. This second inspection took place on 1 June 2005 and the report relating to this inspection was dated 1 July 2005. The expert noted that the use of battens behind the fibre-cement sheets couldn't be described as a cavity system. There is a continuous horizontal member at the bottom of the cavity and there is no drainage facility at this location. The second expert noted that horizontal and vertical joints are installed in accordance with the manufacturer's instructions. The aluminum backing strips fitted behind the expressed joints continue behind the window jambs and sills and were considered by the second expert to constitute flashings provided there was a folded edge behind the jamb extrusion but the expert was unable to establish whether the flashing had the required return fold or foam tape. The expert also made various comments regarding the cladding as follows:

- The jointing to the cladding above the ground floor entrance and the upper floor balcony balustrade has failed and cracks have formed at these locations;
- The filler used to stop up the screw fixings at the expressed joints is falling out in some locations;
- No sealant is installed at the junction of the jamb flashings of the external joinery units and the cladding as required by the "Eterpan" details;
- The head flashings to the exterior joinery units do not overhang the frames by the required 50mm; and
- At some locations the cladding completely seals the bottom flanges of the windowsill flashings.

5.7 Copies of the second expert's report were provided to each of the parties. The territorial authority did not respond. The architect provided a response in a letter to

the Department dated 28 July 2005. The report commented on the flashings to the external joinery units and noted that the construction system is battened to ensure that water entering the building is kept away from the structural frame.

6 DISCUSSION

General

6.1 I have considered the submissions of the parties, the expert's report and the other evidence in this matter. The approach in determining whether building work complies with clauses B2 and E2 is to examine 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 Building Industry Authority and the Department have described the weathertightness risk factors in previous determinations (Refer to Determination 2004/01 *et al*) relating to monolithic cladding, and I have taken these comments into account in this determination.

Weathertightness risk

6.2 In relation to these characteristics, I find that this house:

- Has, apart from the roofs over the balconies, no eaves projections to provide cladding protection;
- Is in a high-wind zone;
- Is three stories high;
- Has an envelope that is complex on plan;
- Has two high-level balconies, one of which is partially constructed over a habitable space; and
- Has external walls that are likely to be constructed with untreated timber, which provides little resistance to decay if it gets wet and cannot dry out.

Weathertightness performance

6.3 Generally, the cladding appears to have been installed according to reasonably good trade practice, but some junctions, edges, and penetrations are not well constructed. Some areas that have been painted with a dark colour are showing signs of joint cracking. These areas are described in paragraphs 5.1 and 5.6, and in the experts' reports, and these I summarise as being:

- The failed jointing and cladding to the cladding above the ground floor entrance and the upper floor balcony balustrade;
- The ineffective stopping of the screw fixings at the expressed joints at some

locations;

- The head flashings to the external windows and doors being cut level with the joinery jamb lines;
- The lack of sealant at the junction of the external joinery unit jamb flashings and the cladding;
- The sealed junction between the window sill flashings and the cladding;
- The movement at the top edge of the cladding below the window sills;
- The loose parapet cappings at some locations;
- The level tops to the main roof and balcony balustrade cappings;
- The metal handrail supports at the upper balcony penetrating the top of the balustrade capping;
- The inadequate saddle flashings detail at the balustrade/main wall junctions;
- The lack of an upper balcony overflow;
- The lack of a weather seal around the light fittings where they penetrate the cladding of the main walls adjoining the balcony;
- The paint finish probably not being a high build acrylic waterproof membrane; and
- The lack of provision for drainage at the lower edge of the cavity formed by the cladding panels.

6.4 Both experts made reference to the horizontal expressed joints between the cladding sheets. These are as per the manufacturers detail for 9mm sheets over a drained ventilated cavity and rely primarily on sealant as a means of deflecting water. Reliance primarily on sealants, as has been noted in previous determinations, does not in my view meet the requirements of clause B2. In this instance moisture has been detected in the cladding material. I am of the view that without some form of protection being introduced into these joints so that all horizontal surfaces are protected, the cladding will not meet the requirements of the code.

6.5 I accept the comments and opinions of the two experts that the batten system installed behind the cladding does not constitute a fully drained and ventilated cavity. While there is no evidence that the framing is absorbing moisture at the present time, the fact that there are locations where the cladding sheets have high moisture content is disturbing. I am of the opinion that over time the framing will begin to absorb moisture and, being untreated, will deteriorate to the extent that it will no longer comply with the requirements of clause B2.

6.6 The first expert has noted the lack of handrails to the retaining walls and stairs. While these issues are outside the ambit of this determination, I would recommend

that the question of installing these be dealt with promptly.

6.7 I note that one elevation of the building demonstrates a moderate weathertightness risk rating, and the remaining elevations a high rating, when calculated using the E2/AS1 risk matrix. 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.

7 CONCLUSION

7.1 I am satisfied that the current performance of the monolithic cladding on the building is not adequate because it is allowing water penetration into the building in at least two locations, which could affect the cladding. Consequently, I am not satisfied that the cladding system as installed on the building complies with clause E2 of the building code.

7.2 In addition, the building also is 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 building to remain weathertight. Because the monolithic cladding faults on the building have already allowed the ingress of water, or will allow the ingress of moisture in the future, it does not comply with the durability requirements of clause B2 of the building code.

7.3 I consider that, because the faults that have been identified with this cladding occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3 and 6.4 should result in the building being weathertight and in compliance with clauses B2 and E2.

7.4 I note that effective maintenance of monolithic claddings is important to ensure ongoing compliance with clause B2 of the building code. That maintenance is the responsibility of the building owner. The code assumes that the normal maintenance necessary to ensure the durability of the cladding is carried out. For that reason clause B2.3.1 of the building code requires that the cladding be subject to "normal maintenance". That term is not defined, and I take the view that it must be given its ordinary and natural meaning in context. In other words, normal maintenance of the cladding means inspections and activities such as regular cleaning, repainting, replacing sealants, and so on.

7.5 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular cladding system has been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.

7.6 I decline to incorporate any waiver or modification of the building code in this determination.

8 THE DECISION

8.1 In accordance with section 20 of the Building Act 1991, I hereby determine that the cladding system as installed on the building does not comply with clause E2 of the building code. There are also a number of items to be remedied to ensure that it remains weathertight and thus meet the durability requirement of the code. Consequently, I find that the building does not comply with clause B2. Accordingly, I confirm the territorial authority's decision to refuse to issue a code compliance certificate.

8.2 I also find that rectification of the items outlined in paragraph 6.3 to the approval of the territorial authority, along with any other faults that may become apparent in the course of that work, will consequently result in the house being weathertight and in compliance with clauses B2 and E2.

8.3 I note that the territorial authority has not issued a Notice to Rectify. The territorial authority should now issue a notice to fix, and the owner is then obliged to bring the house up to compliance with the building code. 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.

8.4 I would suggest that the parties adopt the following process to meet the requirements of clause 8.3. Initially, the territorial authority should issue the 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 an expert, 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. I would also like to add that the Chief Executive might already have decided upon some of the issues that may be raised by the territorial authority in its notice to fix.

8.5 Finally, I consider that the cladding will require ongoing maintenance to ensure its continuing code compliance.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 1 August 2005.

John Gardiner
Determinations Manager