

Determination 2006/111

Refusal of a code compliance certificate for a house with a monolithic cladding system at 14 Bluefin Way, Hobsonville



1 The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Determinations Manager, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicants are the owners, Young Ok Lee and Ha Sung Lee, acting through their agent, (“the applicants”) and the other party is the Waitakere City Council (“the territorial authority”). The application arises because the territorial authority declines to issue a code compliance certificate for a house, unless changes are made to its monolithic cladding system and other building elements.
- 1.2 The matter for determination is whether I am satisfied on reasonable grounds that the territorial authority’s decision to decline to issue a code compliance certificate for a 9-year-old house is correct. The territorial authority declined the application because it was not satisfied that:

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

1. The monolithic cladding as installed on the building complied with clause E2 “External Moisture” of the Building Code (First Schedule, Building Regulations 1992). By “the monolithic 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.
 2. Other elements in this building complied with clauses B1 “Structure”, B2 “Durability”, D1 “Access”, E2 “External Moisture”, and E3 “Internal Moisture” of the Building Code.
- 1.3 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter.

2 The building

- 2.1 The building work consists of a two-storey house situated on an excavated sloping site that is in a high wind zone in terms of NZS 3604². Construction is of conventional light-timber framing built either on concrete slabs or timber framed floors, which at the lower level are supported on a piled foundation. The building is reasonably complex in plan and form. The main steeply pitched roofs are covered with Radiata pine shingles and have hip, valley, and wall-to-roof junctions, and 300 mm wide eaves projections. There is one small area with a low-pitched roof and a curved roof is constructed over the master bedroom external joinery. These latter roofs have butyl-rubber coverings that have wall-to-roof junctions but generally do not have eaves projections.
- 2.2 A large timber-framed open-boarded deck with a timber-framed monolithic-clad balustrade, which is part cantilevered and part supported on circular columns, is constructed outside the north elevation of the house. Part of the deck edge is curved on plan. A similarly constructed large deck is situated outside the south and west elevations of the house. Part of this deck balustrade is formed with timber balusters and handrails and the deck is partly constructed on the sub-floor framing linked to the main house. A small timber-framed balcony with a timber-framed monolithic-clad balustrade is constructed outside the master bedroom. A butyl-rubber flat roof supported on a circular corner column protects the main entry doors. A timber-framed pergola was originally attached to the house adjoining the family room but has subsequently been removed.
- 2.3 Apart from some minor areas, where timber appears to be CCA treated, the expert has noted that he found no evidence of treatment on the timber he was able to inspect. I have not received any information as to the treatment, if any, of the timber used to construct the external walls of the building. Accordingly, I accept that the external wall framing is unlikely to be treated.
- 2.4 The wall cladding to the timber-framed walls is a monolithic cladding system described on the drawings as “21mm textured [stucco] plaster finish . . .” on

² New Zealand Standard NZS 3604: 1999 “Timber framed buildings”.

“Hardibacker” fibre-cement backing sheets fixed through the building wrap directly to the framing timbers. The plaster is finished with an acrylic paint system. The lower wall areas are partly constructed in concrete blockwork, which is either painted or plastered. A protruding plastered band is formed at the horizontal junction of the stucco plaster and plastered foundation walls on the southeast elevation of the building.

- 2.5 The expert has noted some departures from the original consented plans. These in the main relate to the deck balustrades, cladding clearances, pergola construction, shingle roof material and the bathrooms.

3 Sequence of events

- 3.1 The territorial authority issued a building consent on 18 October 1996.
- 3.2 The territorial authority carried out various inspections during the construction of the building work. In a letter to the original developer (“the developer”) dated 30 January 1998, the territorial authority noted that, following one such inspection, five issues required attention before the file could be finalised. None of these issues related to the cladding.
- 3.3 The territorial authority wrote to the developer on 9 February 1998, stating that issues relating to downpipes, cesspits, silt traps, soil pipes, hot water cylinder restraints and terminal vents required attention.
- 3.4 A drainage consultant inspected the house sewer and stormwater drainage and reported to the developer by letter on 23 September 1998. The letter outlined deficiencies in the drainage systems and made certain recommendations for their rectification.
- 3.5 Following an application for a code compliance certificate the territorial authority carried out a final building inspection on 9 September 2005. Following this inspection, the territorial authority wrote to the applicants on 29 September 2005. The territorial authority noted that:

There are some areas of concern with regards to the monolithic cladding system that has been installed.

On this basis, Council is unable to be satisfied that the cladding, as installed, complies with clause E2 (external Moisture) of the New Zealand Building Code and has to refuse to issue the Code Compliance Certificate, on the dwelling, “as is”.

The territorial authority required the applicants to either apply for a determination or address the areas of concern.

- 3.6 The territorial authority attached a notice to fix also dated 29 September 2005 to this letter. This notice stated that the dwelling did not comply with the objectives and functional requirements of clauses B1, D1, E2, and E3 of the Building Code. The detailed particulars of “Contravention and Non Compliance” listed:

- nine items relating to the cladding
- three items relating to the steps and balusters
- three items relating to the piles and bearers
- the sub-floor ventilation.

3.7 The territorial authority wrote to the applicants on 5 October 2005, referring to their letter of 9 February 1998 to the developer and to the drainage consultant's report of 23 September 1998. The territorial authority noted that none of the issues raised by the territorial authority and the consultant had been completed. The territorial authority requested that the applicants engage the services of an experienced registered drainlayer with CCTV facilities.

3.8 The applicants' application for a determination was dated 3 March 2006.

4 The submissions

4.1 On 3 April 2006 the Department received from a person acting as an agent of the applicant ("the agent") a letter, dated December 2005, which noted that the defects pointed out to the developer should have been resolved by the developer in 1998. The agent was concerned that items additional to those described by the territorial authority in 1998 now required rectification.

4.2 Subsequently the agent forwarded copies of:

- the plans
- some of the territorial authority's inspection documentation
- the notice to fix
- the correspondence from the territorial authority and the drainage consultant.

4.3 Copies of the submissions and other evidence were provided to each of the parties.

4.4 The draft determination was sent to the parties for comment on 9 August 2006. Both parties accepted the draft.

5 The expert's report

5.1 The expert inspected the cladding and other relevant elements of the building on 14 June 2006 and furnished a report that was completed on 29 June 2006. The expert noted that the cladding appearance is generally straight and flat with only minor variations to line and level. While the paint finish appears uniform, some locations are affected by the age of the coating and the presence of moisture, and are starting to deteriorate. The workmanship in many locations is "below or very below" minimum standards, both internally and externally. The finish of the penetrations, junctions and transitions is also of a very poor standard.

- 5.2 The expert removed areas of the plaster and some items of trim to examine the construction details and the extent of water damage. I am prepared to accept that these examples are representative and apply to similar details throughout the house. There is also evidence that some repairs have been undertaken on the cladding, including the removal and replacement of the plaster.
- 5.3 The expert took non-invasive moisture readings through interior linings of the exterior walls, and “elevated” to “significantly elevated” readings were recorded adjacent to the doors and windows and other high-risk areas. Similar readings were obtained at the linings attached to the block walls of the rumpus room.
- 5.4 The expert then took both non-invasive and invasive moisture readings at exterior of the cladding and in some of the sub-floor areas. Areas where elevated readings were recorded are as follows:
- 30%+ at the south-sloping soffit
 - 40%+ adjacent to the ground floor shower cubicle
 - 44% at the bottom plate to the east wall of the family room
 - 40%+ at the west end of the deck balustrade adjoining the family room
 - 50%+ in the flooring and 60%+ in the bottom plate adjoining the dining area ranch slider. The floor at these locations is bulged up by at least 20mm and the tiles are cracked and lifting
 - 50%+ below the master bedroom and entry lobby.

Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

- 5.5 The expert also noted that there is decay, which was advanced in some cases, to the flooring, wall and floor framing, and window liners at numerous locations. Damage attributable to moisture ingress was evident in some of the internal and external linings, the carpets, and the finishings. Leakage from the ground floor shower is also causing damage. Many of the metal framing and backing sheet fixings were showing signs of corrosion.

The cladding

- 5.6 The expert made the following comments regarding the cladding:
- it is likely that the sheet set-out is incorrect at some locations
 - the plaster is excessively thick (measured at 18 to 30mm) and there is evidence that it may have been poorly cured
 - the reinforcing to the plaster is incorrectly positioned at some locations where it hard down on the backing board
 - apart from vertical control joints at the junctions of the balcony and main house walls, the cladding lacks control or relief joints

- there is efflorescence coming through the paintwork at some locations, which is an indication that moisture is present behind the paint film
- the cladding is extensively cracked on all elevations, particularly around the curved and lounge windows, and the wall below the deck adjacent to the master bedroom is bulging
- the required 50 mm overlap of the cladding at the floor levels is not achieved
- the protruding plastered band at the horizontal junction of the stucco plaster and plastered foundation walls on the southeast elevation of the building lacks a flashing and the deck timbers impinge onto the band
- the base of the cladding has insufficient ground clearance or finishes hard onto the paving or decking at some locations
- the base of the cladding to the family room extension finishes below ground level
- some apron flashings and their junctions with the cladding are inadequately constructed
- the required capillary gaps between the plaster and the roof apron flashings are not present
- no effective kickouts have been installed to some apron flashings, including those to the dormer windows of the master bedroom and ensuite
- the upstands of the head flashings to the exterior joinery units lack the required height
- there are no jamb or sill flashings nor any sill trays or sealant installed to the exterior joinery units
- the head flashing to the south-facing bedroom ranch slider is sloped into the framing and lacks sealants
- the cladding is not continued behind the ribbon boards supporting the decks and the plaster is not continued down to the bottom edge of the backing to form a drip edge
- the ends of some fascias are buried in the cladding
- there is no evidence of either flashings or sealant at the junction between the decks and the exterior or sub-floor areas and water has passed into the framing causing significant decay and damage
- no flashings are installed between the balustrade walls and the house cladding nor are there any underflashings along the tops of the balustrades, which also lack cross-falls
- the balustrade handrail fixings are not sealed and one end of the timber handrail is buried into the cladding
- the electrical meter board lacks a head flashing and water is entering the meter box
- penetrations through the cladding are not sealed and in some locations there are large holes around the penetrations

- some pipes entering the building have falls towards the cladding that can direct water into it.

The roofing

5.7 The expert made the following comments regarding the roofing:

- taking into account the building's location and construction, both the timber shingle and butyl-rubber roofing systems are inadequately designed and constructed
- no drip edges are formed to the edge of the membrane-clad roofs or where the roofs adjoin the cladding
- the barge and fascia details are generally not constructed in accordance with the acceptable practice for the type of roofs installed on this house
- there is no flashing or sealant at the barge board/roof junction to at least one location and the junction of the barge with the fascia at the hip is not flashed
- Roof shingles are of an unknown timber species (and therefore of unknown durability).

Other issues

5.8 The expert made the following comments on other issues:

- there is no evidence of compliance with the required bracing requirements, especially as regards nailing and strapping
- not all the deck and balcony balustrades are the required height of 1000mm and some are not constructed in accordance with the consented plans
- some of the exterior drainage has not been adequately completed and there are pipework items requiring attention
- the south elevation downpipes are not connected to the stormwater system and are discharging onto the ground
- some upper level downpipes lack spreaders
- there are deficiencies in the south deck stair construction
- there is inadequate sub-floor ventilation
- the close proximity of the public sewer adjacent to the building may be affecting the stability of the house
- there is inadequate bracing to the sub-floor areas
- the vent pipe from one hot water cylinder discharges into the sub-floor area

- some internal plumbing fittings are incorrectly installed, there is apparently no water-proofing to the showers and the floor waste gully shown on the plans has been omitted
- the mechanical ventilation to the ground floor shower is defective
- the slope to the southeast bedroom floor is outside the required tolerances and the building is not square at some locations

5.9 The expert also had concerns regarding the structural stability of the decks and the lintel over the garage door opening and suggested that temporary propping should be installed to protect these elements. There is a lack of proper fixings and at least one floor joist is “overspanned”. The expert suggested that the design and construction of the decks also be reviewed and that the installation of smoke alarms should be considered.

5.10 Following discussions between the expert and the applicant’s agent, the timber-framed pergola was removed.

5.11 A copy of the expert’s report was sent to each of the parties on 4 July 2006.

6 Evaluation for code compliance

6.1 Weathertightness 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 Solution³, in this case E2/AS1, which will assist in determining whether the named 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; and
- Usually when there is non-compliance with one provision of an Acceptable Solution, it may be necessary to add some other provision to compensate for that in order to obtain compliance 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 overall design of the building, the surrounding environment, the detailed 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*)⁴ relating to cladding and these factors are also used in the evaluation process.

³ An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way of complying with the Building Code. The Acceptable Solutions are available from The Department’s Website at www.dbh.govt.nz.

⁴ Copies of all determinations issued by the Department can be obtained from the Department’s website.

- 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 can 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 the weathertightness characteristics, I find that the building:
- is situated in a high wind zone
 - is two storeys in height and is of a relatively complex shape on plan
 - has 300mm wide high level eaves projections that provide some protection to the cladding beneath them
 - has one external balcony
 - has two large adjoining timber decks
 - has external wall framing that is unlikely to be treated to a level that is effective in helping resist decay if it absorbs and retains moisture.
- 6.2.2 When evaluated using the E2/AS1 risk matrix, these weathertight features show that one elevation of the building demonstrates a high weathertightness risk rating and the remaining elevations demonstrate a medium rating. 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 Discussion

- 7.1 Taking into account the expert's report, I am satisfied that the current performance of the cladding installed under this consent is inadequate because it has not been installed according to good trade practice. In particular, the cladding is at present allowing water penetration into the wall, through numerous defects in the cladding. This has already led to areas of decay in the framing timbers, including some that are crucial to the structural integrity of the structure. In particular, the cladding demonstrates the key defects listed in paragraph 5.6. I have also identified the presence of a range of known weathertightness risk factors in this house. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the significant faults identified in the cladding system. It is that combination of risk factors and faults that indicate that the structure does not have sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding system as installed complies with clause E2 of the Building Code.

- 7.2 In addition, the parts of the building covered by this consent are 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 in this building are allowing the ingress of moisture at present, the house does not comply with the durability requirements of clause B2.
- 7.3 I am also satisfied, again based on the expert's report, that the current performance of the roofing and other noted building elements installed under this consent is also inadequate. In particular, these elements demonstrate the key defects listed in paragraphs 5.7 and 5.8.

8 Conclusion

- 8.1 I find that, because of the extent and apparent complexity of the faults that have been identified with the cladding, I am unable to conclude, with the information available to me, that remediation of the identified faults, as opposed to partial or full re-cladding, could result in compliance with clause E2. I consider that final decisions on whether code compliance can be achieved by either remediation 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 remedial option should be submitted to the territorial authority for its comment and approval. If the territorial authority chooses to reject the proposal, then the applicants are entitled to seek a further Determination on whether the proposed remedial work will lead to compliance with the requirements of clauses E2 and B2.
- 8.2 I also find that the faults that have been identified regarding roofing and other elements as listed in paragraphs 5.7 and 5.8 mean that the building does not comply with clauses B1, B2, D1, E1, E2, and G11 in respect of these items.
- 8.3 Effective maintenance of claddings (in particular 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. The expert has also noted that the roof has not been properly maintained.
- 8.4 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 should 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.

- 8.5 As the external wall framing of the new and existing sections of the building is likely not to be treated to a level that will resist the onset of decay if it gets wet, periodic checking of its moisture content should also be carried out as part of normal maintenance.
- 8.6 I am also seriously concerned about the continuing structural integrity of the building and its associated decks and balcony. The expert has pointed out how decay and the deficient piling and bracing elements have undermined such integrity. I recommend that the territorial authority urgently inspect the building and order any necessary remedial work to be undertaken to protect the health and safety of its occupants. I note also that the inadequate deck balustrade heights and the entry of water into the electrical meter board require urgent attention.

9 The Decision

- 9.1 In accordance with section 20 of the Building Act 1991, I hereby determine that the building does not comply with clauses B1, B2, D1, E1, E2, and G11 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.
- 9.2 I note that the territorial authority has issued a notice to fix that also required provision for adequate ventilation, drainage and vapour dissipation. Under the Act, a notice to fix can require the owner to bring the house into compliance with the Building Code. The Building Industry Authority has found in a previous Determination 2000/1 that a Notice to Rectify (the equivalent to a notice to fix under the Building Act 2004) cannot specify how that compliance can be achieved. I concur with that view. A new notice to fix should be issued that requires the owners to bring the cladding and the other elements at issue into compliance with the Building Code, without specifying the features (in particular a cavity for the cladding, although the parties may conclude that this is the best system) that are required to be incorporated. It is not for me to dictate how the defects are to be remedied. How that is done is a matter for the owner to propose and for the territorial authority to accept or reject.
- 9.3 I would suggest that the parties adopt the following process to meet the requirements of clause 9.2. Initially, the territorial authority should issue the notice to fix, listing all the items that the territorial authority considers to be non-compliant. The applicant 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.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 16 November 2006.

John Gardiner
Determinations Manager