Determination 2006/96

Refusal of a code compliance certificate for a building with a brick veneer and monolithic cladding system at 47 San Bernadino Drive, Henderson

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 ("the Department"), for and on behalf of the Chief Executive of that Department. The applicants are the owners, Mr and Mrs Watts ("the applicants") and the other party is the Waitakere City Council ("the territorial authority").

1.2 The dispute for determination is whether I am satisfied on reasonable grounds that the territorial authority's decision to decline to issue a code compliance certificate on

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

a 4-year-old house is correct. The territorial authority declined the application because it was not satisfied that the monolithic cladding as installed to some of the walls of 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.

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 detached house situated on a steeply sloping and excavated site, which is in a medium wind zone for the purposes of NZS 3604[2]. The house is two-storeys high on the east elevation and one storey on the west, with the foundations stepped to suit the slope of the site. Construction of the house is conventional light timber frame, with concrete slabs to the two-storey portion and the garage, and timber-framed floors to the remaining single storey area. The house has concrete block foundations, perimeter subfloor walls and retaining walls, concrete tile roofs, aluminium windows and doors, and brick veneer cladding to most walls, with monolithic wall cladding to remaining areas.

2.2 The house shape is fairly simple in plan, but has a roof of 25^{o} hips and gables with complex intersections and junctions. Eaves projections are generally 500mm and verges are 300mm, except for several recessed areas with deeper roof overhangs. A small gable extends to the west from the main roof to form an entrance canopy that is supported by brick-clad columns. On the south side of the canopy, a gable roof extends from the main roof over the garage, and on the north side a gable roof extends from a higher monolithic-clad gable-end wall. The higher canopy roof is connected to the lower gable roofs by monolithic-clad walls with internal gutters at the junctions.

2.3 A solid floor deck, with monolithic-clad balustrades, extends around the northeast corner. The deck is constructed partly over living areas on the north elevation and is cantilevered on the east. The walls adjoining the deck are monolithic-clad; and are recessed beneath deep roof overhangs, with a monolithic-clad column supporting the roof corner.

2.4 The expert has noted that the timber he was able to inspect from the sub-floor area was marked as untreated, except for the bottom plates which "had a tanalith appearance". The applicants supplied invoices indicating that the timber framing used in the deck was treated to H3 (refer paragraph 5.7). Based on this evidence, I consider that the deck framing is treated to H3 and the external wall framing (other

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

than the bottom plates) is untreated. I note the deck framing is enclosed and the H3 treatment will meet the durability requirements of NZS 3602[3].

2.5 The cladding referred to herein as monolithic cladding is a "Monotek" system with 7.5 mm thick fibre cement sheets fixed through the building wrap to the framing, and finished with an applied "Monotex" textured coating system. There are also infill panels of painted fibre cement sheet above some of the windows in the brick veneer.

2.6 Orica New Zealand Ltd provided a 7-year material and workmanship warranty dated 27 February 2004 for the "Monotex" coating system, which noted the completion of the cladding system as November 2002.

3. Sequence of events

3.1 The territorial authority issued a building consent on 26 February 2002 and made various inspections during the course of construction, including a preline on 12 September 2002 and gibnail on 27 September 2002. The territorial authority carried out a "Plaster exterior cladding" inspection on 3 September 2002, and the inspection summary notes "Passed inspection".

3.2 The territorial authority carried out a final inspection on 23 February 2004, and the inspection summary notes "Harditex cladding Notice to Rectify req'd – no cavity system.

3.3 The territorial authority issued a notice to rectify dated 24 February 2004, and the attached "Particulars of Contravention" noted:

> Monolithic cladding systems without a 20mm cavity, provision for adequate ventilation, drainage, and vapour dissipation will, in the event of leakage and/or the effect of residual moisture, cause irrecoverable damage to the structural elements of the building.
>
> You are required to:
>
> - Provide adequate ventilation to the monolithic cladding and into the wall frame space by means of either a ventilated cavity or alternate approved system; or
> - Remove the monolithic cladding and replace with an approved cladding system…

3.4 The application for a determination was received by the Department on 16 May 2006.

4. The submissions

4.1 Within the application, the applicants noted that the "Matter of doubt or dispute" was the "Monolithic cladding without cavity system".

[3] New Zealand Standard NZS 3602:2003 Timber and Wood-based Products for Use in Buildings

4.2 The applicants forwarded copies of:

- the building elevations
- the inspection summary
- technical information about the Monotek cladding
- various other warranties, invoices and other statements.

4.3 The territorial authority made a submission in the form of a letter to the Department dated 29 May 2006, which outlined the history of the project, explained that inspection procedures had changed since the house was constructed and noted:

> In the absence of the additional inspections implemented as a consequence of those changed inspection procedures, and in the absence of a cavity as a second line of defence, the Council does not believe it is able to be satisfied, on reasonable grounds, that the cladding applied to this dwelling will achieve the functional requirements of Clause E2.2 or the performance requirements of Clause E2.3.2 of the Building Code.

4.4 The territorial authority forwarded copies of:

- the building consent
- the inspection summary.

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

4.6 The draft determination was sent to the parties for comment on 7 August 2006. The territorial authority accepted the draft.

4.7 In a letter to the Department dated 15 August 2006, the applicants responded to the draft determination, noting their concern that the territorial authority was able to retrospectively apply new rules after inspecting and approving the construction of the house, and including the following comments:

- Invoices supplied show that the deck framing is H3 treated.
- The cutout in the garage is for access to the mains water valve, and not for the repair of leaks.
- The tape mark on the deck was a result of tape being used to secure Christmas light wires, and not repairs.
- The deck floor is a fibreglass reinforced coating with deck floor paint over.

I have considered these comments and have amended the draft as I consider appropriate.

5. The expert's report

5.1 The expert inspected the claddings of the building on 7 June 2006, and furnished a report that was completed on 19 June 2006. The expert noted that a number of cracks in the Monotek cladding appeared to have been recently repaired and repainted.

5.2 The expert did not remove cladding at windows to inspect the installation, but I note that the invoices submitted by the applicants indicate that uPVC head, jamb, sill and corner soaker flashings, together with flexible flashing tape and Inseal tape were purchased with the fibre cement sheets for the cladding. I therefore consider that the window and door installation is likely to incorporate these flashings as recommended by the manufacturer.

5.3 The expert noted that signs of moisture damage were apparent to linings and skirtings in the garage and in the entry. More than 55 invasive moisture readings were taken inside the entry and the garage, and through the Monotek wall cladding, at window sills, bottom plates and other risky areas, and 25 readings, elevated beyond the 18% level, were noted as follows:

- More than 40% and signs of decay in the north and south garage walls, towards the garage doors.
- 40%, in the bottom plate of an internal wall in the entrance area (at the change of floor level), where the source of the leak could not be located.

Deck

- 4 at 18% in the lower framing of the balustrade.
- 18% and 23% in the corners of the balustrade.
- 23% to 28% at various positions near the handrail fixings.
- 24% in framing beneath the deck overflow pipe.
- 23% at the north balustrade to wall junction, below the interstorey joint.

North elevation

- 26% and 32% under the sill of the door to the basement.
- 19% and 22% to the right of the basement window.
- 2 at 40% below the interstorey uPVC flashing, with signs of decay.

West elevation

- 21% and 36% in the upper wall connecting the south entry column to the brick veneer of the main wall.
- 18% in the bottom plate at the junction of the Monotek with the brick veneer.

South elevation

- 24% beneath the pipe penetration through the cladding of the projecting "box".

The expert noted that if the above readings were corrected for untreated timber, the adjusted readings would be about 1% higher. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure.

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

- The clearance from the garage door reveals to the paving is inadequate.
- The clearance from the bottom of the cladding to the deck floor is inadequate in some locations, although the junction is sheltered by the roof overhang.
- The base of the cladding overlaps the concrete block foundation wall as required, but lacks the recommended 6mm anti-capillary gap.
- The top of the uPVC interstorey jointer slopes towards the cladding, directing water into the wall joint, rather than deflecting it away from the cladding.
- The window sills lack drainage gaps; and the coating has been applied after the window installation, burying the edge of the sill flashing and some window flanges.
- The basement door is poorly weatherproofed and lacks a sill flashing.
- The junctions between the Monotek and the brick veneer appear to be unflashed and unsealed, with uncoated fibre cement showing in some location.
- The junctions of the painted fibre cement window panels with the brick veneer are poorly weatherproofed, with uncoated fibre cement and gaps showing.
- Vertical control joints have not been provided (or have not been constructed in accordance with manufacturers' recommendations) to internal corners and to deck balustrades and various walls where the length of Monotek cladding exceeds the recommended 5.4m limit.
- There are signs of repairs to cracks in a number of locations, with joint filler showing through the coating at joints.
- There are cracks to the walls above the entrance canopy, and areas of unfinished cladding and trim.
- Parts of the balustrade top appear to have flexible flashing tape applied over the fibre cement; and the tape outline shows through the coating as not continuous and with inadequate cover at corners (I note that the manufacturer's instructions show the flashing tape used over the top of the wrapped framing, with an applied waterproofing membrane over the fibre cement sheet).
- The top of the balustrade slopes toward the handrail, which has been fixed to the inner face of the balustrade and appears to be poorly sealed.

- The outer balustrade cladding extends below the deck as a drip edge, and the inner face of the fibre cement is unpainted and exposed.
- The liquid-applied deck floor membrane is puckered at the substrate joints (and diagonally across one area), suggesting that movement in the deck substrate may be stressing the membrane.
- The overflow pipe through the balustrade is unsealed.
- The pipe penetration through the south Monotek box feature is unsealed.
- The bottoms of apron flashings are poorly weatherproofed in some places, with inadequate kickouts, gutters and fascias butting against uncoated fibre cement, and gaps exposing framing and building wrap.
- There are signs of ponding to some internal gutters, and the discharge from upper roofs lack adequate downpipe droppers.
- There is a loose brick above a bedroom window on the east elevation.

5.5 The expert noted that although there was a window installed to the timber sub-floor area it was not providing permanent sub-floor ventilation.

5.6 A copy of the expert's report was provided to each of the parties on 21 June 2006.

5.7 The applicants responded in a letter dated 3 July 2006 with the following comments:

- There is an invoice (which the owner enclosed) showing H3 treated timber was purchased for the deck.
- Damage shown in photos 6 and 7 was the result of water overflowing from a planter rather than from external moisture.
- The tape mark shown in photo 55 was a result of tape being used to secure Christmas light wires and not repairs.

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:

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

- Some Acceptable Solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.

- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.

6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations[5] (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 this house:

- is built in a medium wind zone

- is a maximum of two storeys high

- is fairly complex in form, with two types of wall cladding

- has eaves of 500mm and verges of 300mm above most walls

- has a deck with clad balustrades, which is partly over a living area below and is also partly cantilevered

- has monolithic cladding to some of the walls, which is fixed directly to the framing

- has external wall framing that is unlikely to be treated, so having no resistance to the onset of decay if the framing absorbs and retains moisture.

6.2.2 When evaluated using the E2/AS1 risk matrix, one elevation of this house demonstrates a low weathertightness risk rating, two elevations a medium risk rating and one a high risk 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,

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

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 It is clear from the expert's report that the monolithic cladding installed on the house is unsatisfactory in terms of its weathertightness risk and performance perspectives and considerable work is required to make the building code compliant. The high levels of moisture ingress and signs of decay in the untreated timber are major concerns. Further investigation is urgently required to ensure that the structural integrity of the affected elements has not been compromised.

6.4 I note that a large number of elevated moisture readings were recorded in the deck balustrade, and the deck membrane indicates that movement in the deck substrate is occurring. I recommend that the territorial authority urgently investigate this partly cantilevered deck and balustrade to ensure its continuing structural integrity.

7. Conclusion

7.1 I am satisfied that the current performance of the monolithic cladding is inadequate, because it has not been installed according to good trade practice and is allowing significant water penetration into the walls and deck balustrade through numerous defects at present. In particular, it demonstrates the key defects listed in paragraphs 5.4 and 5.5. 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 conclude that the cladding system as installed 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 currently allowing, or will allow the ingress of moisture in future, the house does not comply with the durability requirements of clause B2.

7.3 I find that, because of the extent and apparent complexity of the faults that have been identified with this 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 led to compliance with the requirements of clauses E2 and B2.

7.4 Effective maintenance of the claddings (in particular of the monolithic cladding) is important to ensure ongoing compliance with clauses B2 and E2 of the Building Code. This 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.

7.5 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.

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

7.7 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 Building Act 2004, I hereby determine that the monolithic cladding system as installed 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.

8.2 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 an owner to bring a building into compliance with the Building Code but it cannot specify how that compliance it to be achieved. A new notice to fix should be issued that requires the applicants to bring the cladding and the other elements at issue 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 applicant 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 25 September 2006.

John Gardiner
Determinations Manager