

Determination 2006/120

Refusal of a code compliance certificate for a house with a monolithic cladding system at 8 Takitimu Street, Orakei, Auckland



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, Mr and Mrs Glasgow-Palmer (“the applicants”) and the other party is the Auckland 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.
- 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 on a

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

5-year-old house is correct. The territorial authority declined the application because it was not satisfied that the monolithic cladding as installed on the building complied with clause E2 “External Moisture” of the Building Code² (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 matter (“the expert”), and the other evidence in this matter.

2 The building

- 2.1 The building work consists of a detached two-storey house with the floors at 6 main levels. The house is situated on an excavated steeply sloping site that is in a low wind zone in terms of NZS 3604³. Construction is of conventional light-timber framing built either on concrete or blockwork foundation walls or timber framed floors, some of which are supported on timber piles. The building is reasonably complex in plan and form. The roofs (both low and steeply pitched) are clad with a bituminous membrane installed over battens and painted to give the appearance of lead sheeting. The roofs generally have parapet walls at their perimeters and lack eaves projections at the gutter and exposed verge locations.
- 2.2 A steel and timber-framed balcony, which is partly cantilevered and partly constructed over a living space, is constructed at level 6 on the north elevation. This balcony has a metal and glass balustrade, which differs from that shown on the consented plans. A large timber-framed deck with a metal balustrade is constructed at level 5 of the north elevation. I note that this deck is not shown on the consented plans. A small cantilevered canopy with a square exposed edge and roofed with a bituminous membrane is constructed over the main entrance. A metal and glass balustrade separates the canopy from the internal house void. A full height timber-framed and monolithic-clad chimney is constructed against one external wall.
- 2.3 The applicants advised the expert that kiln-dried timber was used for the external wall framing. As I have not received any written information as to the treatment, if any, of the timber used to construct these walls, I accept that the external wall framing is unlikely to be treated.
- 2.4 Apart from the Cedar cladding adjacent to the bedroom 2 wardrobe, the wall cladding to the external timber-framed walls is a monolithic cladding system. This consists of a solid backing fixed through the building wrap directly to the framing timbers to which is applied a textured plaster system. On the south wall, parts of the north and east walls, and the chimney, the solid backing consists of fibre-cement sheets. The balance of the monolithic cladding has EIFS⁴ backing sheets, which vary in thickness from 50mm to 70mm. The applicants advised the expert that the EIFS cladding was installed by “Futureproof” and the expert understands that it was

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

⁴ EIFS – External Insulation and Finish System

a “one-off system that lacked the support of appraisal, manufacturer’s recommendations, manufacturer’s details, etc”.

- 2.5 The blockwork external walls have generally been finished with a solid plaster system. However, some areas either have no weatherproofing applied or are painted with a bituminous paint system.
- 2.6 I have not received any copies of producer statements or warranties for the various cladding systems.

3 Sequence of events

- 3.1 The territorial authority issued building consent No AC/01/09979 on 16 March 2001.
- 3.2 The territorial authority carried out various inspections during the construction of the building work.
- 3.3 The project architect wrote to the applicants on 15 September 2002, in response to a query from the territorial authority’s inspector, noting that the bracing calculations had been re-calculated and setting out the requirements to ensure that the bracing was adequate.
- 3.4 The territorial authority carried out a final inspection of the completed house on 26 September 2003 and, in a letter to the applicants dated 10 October 2003, noted that a code compliance certificate would be issued on receipt of:
 - fee payments
 - advice of completion
 - the drainage as-built drawings
 - producer statements for masonry and foundations
 - a surveyor’s certificate
 - an amended bracing plan.
- 3.5 The project architect wrote to the applicants on 7 December 2003, stating that he was a New Zealand registered engineer and as he had observed the excavation and masonry work, it was his opinion that producer statements were not required for these elements.
- 3.6 The territorial authority carried out a further inspection of the property and, in a letter to the applicants dated 13 February 2004, noted that as the house cladding lacked a ventilated cavity, the territorial authority would have to carry out further investigations regarding the cladding.
- 3.7 In a second letter to the owner dated 24 February 2004, the territorial authority regretted that the house might not comply with the Building Code in a number of respects. The territorial authority noted that the monolithic cladding did not have a

cavity and that the territorial authority had now revised its processes in assessing what is required for buildings incorporating such claddings.

3.8 The territorial authority attached a Notice to Rectify, also dated 24 February 2004, to this letter, together with a set of photographs illustrating items of non-compliance. The “Particulars of Contravention” attached to the notice listed requirements under the following headings:

1. Items not installed per the manufacturer's specifications
2. Items not installed in accordance with the relevant acceptable solutions of the building code (no alternative solutions have been applied for)
3. Items not installed per accepted trade practice
4. Ventilated cavity system.

The notice also set out the actions that the applicant was to undertake to remedy the contravention or items of non-compliance.

3.9 The applicant’s application for a determination was received by the Department on 16 May 2006.

4 The submissions

4.1 In a covering letter to the Department dated 24 May 2006, the applicants set out the timeline regarding the territorial authority’s involvement in the project.

4.2 The applicants forwarded copies of:

- some of the consent and inspection documentation
- the Notice to Rectify
- the correspondence from the territorial authority and the project architect.

4.3 In a letter to the Department dated 19 May 2006, the territorial authority described the Particulars of Contravention.

4.4 The territorial authority also forwarded copies of:

- the plans
- some of the territorial authority’s consent documentation
- the Notice to Rectify
- the correspondence with the applicants.

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

4.6 I issued a draft determination to the parties on 22 September 2006. The territorial authority responded on 10 October 2006, stating that it accepted the draft determination. In a letter to the Department dated 6 October 2006, the applicants stated that they also accepted the draft, subject to two minor amendments that

identified the roofing used on the project. I have amended this final determination accordingly.

5 The expert's report

- 5.1 The expert inspected the cladding of the building on 4 July 2006 and furnished a report that was completed on 12 July 2006. The expert was of the opinion that the textured finish has a uniform smooth finish. He did not observe any areas of discolouration or flaking. Apart from the specific exceptions noted, the standard of finish is generally good, however the high standard of detail design is not consistently carried through on site. The expert removed areas of the plaster adjoining two of the external joinery units to reveal the perimeter finishes. I am prepared to accept that these examples are representative and apply to similar details throughout the house.
- 5.2 The expert was of the opinion that, taking into account the dimensions of the house neither of the two monolithic cladding systems required vertical control joints.
- 5.3 The expert took non-invasive moisture readings through interior linings of the exterior walls, and while readings were generally within the "safe/air dry" range, there were some "borderline" readings adjacent to the doors and windows. The expert noted that, apart from the noted exceptions, the interior finishes were "free from mould, mildew, swelling or other evidence of water penetration to the interior".
- 5.4 The expert then took 7 invasive moisture readings of the framing at sample risk locations. Areas where corrected elevated readings were recorded are as follows:
- 18.2% at a stud adjoining the study window head (fibre-cement backed cladding)
 - 22.6% at a corridor bottom plate(fibre-cement cladding)
 - 24.5 % and 26.7% at rumpus room bottom plates (EIFS-backed cladding)
 - 26.7% at a bedroom 2 bottom plate where drilling the holes for the moisture meter probes produced wet wood fragments (EIFS-backed cladding).

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

- 5.5 The expert made the following comments regarding the fibre-cement backed cladding:
- there is no formed joint at the junction of the base of the cladding and the plastered brickwork below it at the first floor ensuite location
 - the cladding is cracked at its junctions with the masonry at the rear of the garage, the chimney, and other claddings
 - the base of the cladding has insufficient ground clearance at some locations, including the apron flashings
 - no capillary break or drainage is provided between the chimney cladding and the balcony tiled upstand

- the textured finish is not continuous at some locations
- there are no jamb or sill flashings nor any sealants installed to the exterior joinery units
- the textured finish is applied onto the exterior joinery unit head flashings
- no clearance is provided between the deck boarding and the cladding
- the balcony deck edge flashing is not correctly returned
- some penetrations through the cladding are not properly sealed.

5.6 The expert made the following comments regarding the EIFS-backed cladding:

- the cladding is cracked at its junctions with other claddings
- the base of the cladding continues onto or below the paving on the northwest and southwest elevations
- there is an inadequate flashing between the base of the cladding and the foundation wall plaster at the west end of bedroom 2
- some aspects of the external joinery unit perimeter finishes are not effective
- no clearance is provided between the deck boarding and the cladding
- some penetrations through the cladding are not properly sealed.

5.7 The expert also made reference to some of the other building issues, observing that:

- there is no clearance between the Cedar boarding and the painted membrane base flashing
- some of the condensation drainage slots at the sills of the exterior joinery units are blocked with paint
- the exterior bi-fold doors lack weather hoods
- the head of the door from bedroom 1 to the deck staircase is not in contact with its gasket
- the upper living area louver windows may be susceptible to leakage
- the corner of the block wall at the level 1 rumpus bathroom and the corridor is not painted or weatherproofed
- the bituminous paint weatherproofing applied to remainder of this block wall is not protected from the effects of UV rays or physical damage
- the canopy flat roof lacks sufficient falls and moisture is passing through the soffit lining.

5.8 The expert also noted that the interior floor level is only 50mm above the balcony deck level. However, as there was no evidence of leaks inside the upper living area or ceiling below, I am prepared to accept that differential is sufficient in this instance.

5.9 A copy of the expert's report was provided to each of the parties on 18 July 2006. The territorial authority confirmed the receipt of the report in a letter dated 3 August 2006 but did not comment further.

- 5.10 The applicants responded in a letter dated 1 August 2006 accepting the findings of the expert's report. The applicants attached another report, dated 10 July 2006, provided by a consultant who had been engaged by the applicants to carry out further moisture tests on the house. The consultant's report was accepted by the applicants as being consistent with the expert's report regarding the higher moisture readings. The applicants noted that the consultant had installed 66 moisture detection probes, of which 36 showed moisture levels "within the acceptable range for untreated timber". The applicants agreed with the expert that a ventilated cavity was not necessarily required to be installed to achieve code compliance.

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 Solution⁵, 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, has also described weathertightness risk factors in previous determinations (refer to Determination 2004/1 *et al*)⁶ 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 will need to 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 low wind zone

⁵ 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.

⁶ Copies of all determinations issued by the Department can be obtained from the Department's website.

- is two storeys in height and is of a relatively complex shape on plan
- has no eaves projections to provide protection to the cladding
- has one external balcony that is part cantilevered and part constructed over a living space
- has one large timber deck
- 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 all elevations of the building demonstrate a high weathertightness 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, 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 Generally the claddings appear to have been installed in accordance with good trade practice. However, some junctions, penetrations and edges are not well constructed, and these deficiencies are described in paragraphs 5.5, 5.6, and 5.7, and in the expert's report. I accept the expert's opinion that remedial work is necessary in respect of the following:

With respect to the fibre-cement sheet backed cladding:

- there is no formed joint at the junction of the claddings at the first floor ensuite location
- there are cracks in the cladding at junctions with other claddings in various locations
- the clearance between the cladding and ground (in some places) and apron flashings is inadequate
- there is no capillary break to chimney cladding and tiled balcony up-stand
- the textured finish is not continuous in some locations
- the exterior joinery lacks of jamb flashings or in-seal strips
- the textured finish is brought hard down onto the head flashings
- there is deck boarding sitting against the cladding
- there is inadequate balcony deck, edge flashing
- some penetrations not properly sealed.

With respect to the EIFS cladding:

- there are cracks at junctions with other claddings
- there is inadequate clearance between base of cladding and paving on northwest and southeast elevations
- there is inadequate flashing between the cladding and foundation at bedroom 2
- some of the external joinery unit perimeter finishes are not effective
- the deck boarding is sitting against the cladding
- some penetrations are not properly sealed.

Other general building envelope issues observed were:

- there is no clearance between the Cedar boarding and the painted membrane base flashing
- some joinery condensation slots are blocked
- the exterior bi fold doors lack weather hoods
- the head of the door from the bedroom 1 to the deck staircase is not in contact with its gasket
- the upper living room area louver windows may be susceptible to leakage
- the corner of the block wall at the level 1 rumpus room and the corridor is not weatherproofed and the bituminous paint that is there is exposed to the light and likely to be degraded by the UV
- the canopy flat roof lacks sufficient fall and moisture is passing through the soffit lining.

6.3.2 Notwithstanding the fact that the claddings are fixed directly to the timber framing, thus limiting drainage and ventilation behind the cladding, I have noted certain compensating factors that assist the performance of the cladding in this particular case:

- Apart from the noted items, the cladding is generally installed to good trade practice.
- The house is in a low wind zone.

7 Discussion

7.1 I am satisfied that the current performance of the monolithic cladding is not adequate because it is allowing water penetration into the building at several locations at

present. 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 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 have already allowed the ingress of water, or will allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.
- 7.3 Subject to further investigations that may identify other faults, I consider that, because the faults identified with the cladding system occur in discrete areas, I can conclude that satisfactory rectification of the items outlined in paragraph 6.3 is likely to result in the building being weathertight and in compliance with clauses B2 and E2.
- 7.4 The deck that has been constructed at the north elevation of level 5 was not shown on the original consented plans. I therefore suggest that the territorial authority inspect the deck to ensure that it is structurally sound and code compliant. This would also apply to the installed balcony balustrade that is different from that shown on the consented plans.
- 7.5 It is emphasized 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 Conclusion

- 8.1 Subject to further investigations that may identify other faults, I consider that, because the faults identified with the cladding system installed occur in discrete areas, I can conclude that satisfactory rectification of the items outlined in paragraph 6.3 is likely to result in the building being weathertight and in compliance with clauses B2 and E2.
- 8.2 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.
- 8.3 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.

8.4 As the external wall framing 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.

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 B2 and E2 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 Rectify 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 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 6 December 2006.

John Gardiner
Determinations Manager