

Determination 2007/60

Determination regarding a code compliance certificate for a house with monolithic and weatherboard wall cladding systems at 11A Blease Street, New Lynn, 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, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicant is the owner, Mr M Thomas (“the applicant”), and the other party is the Waitakere City Council (“the territorial authority”).
- 1.2 This determination arises from the decision of the territorial authority to refuse to issue a code compliance certificate for a 6-year-old house because it is not satisfied

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

that it complies with clauses B2 “Durability” and E2 “External Moisture” of the Building Code²² (First Schedule, Building Regulations 1992).

- 1.3 The matter for determination is whether the claddings as installed on the house (“the claddings”) comply with clause E2 “External Moisture” of the Building Code. By “the claddings as installed” I mean the components of the systems (such as the backing materials, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.
- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1.
- 1.5 In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

2 The building

- 2.1 The building work consists of a 2-storey detached house, situated on an excavated sloping site, which is in a medium wind zone for the purposes of NZS 3604³. The house is conventional light timber frame construction, with a concrete slab and foundations, aluminium windows, monolithic cladding to the lower level and timber weatherboards to the upper level. The house is a simple rectangular shape, with the upper floor oversailing lower walls by about 500mm on the narrow west and east walls, and a 20° pressed metal tile gabled roof. The roof extends over a small projection on the south elevation, with a lean-to canopy over the ground floor entry. Eaves projections are more than 400mm and verges are about 200mm.
- 2.2 An attached deck, with a timber slat floor and weatherboard-clad balustrades, extends from the living room on the upper north wall. A timber pergola over the deck is attached to the wall beneath the eaves.
- 2.3 The expert has noted no evidence as to timber treatment. I have received no information as to the treatment if any of the house framing, and the date of construction would permit the use of untreated timber, provide its moisture content could be kept at not greater than 18%. Given the date of construction and the lack of other evidence, I consider that the external wall framing is unlikely to be treated.
- 2.4 Monolithic cladding is installed to all lower walls, to a small recess in the upper north wall, and the projection to the south wall. The monolithic cladding is a “Duraplast” system by Plaster Systems Ltd (“the manufacturer”), which incorporates 4.5mm thick “Hardibacker” fibre-cement backing sheets fixed through the building wrap directly to the framing timbers. A 10mm layer of insulating plaster is applied over the sheets, followed by a fibreglass-reinforced layer of plaster and a final plaster sponge finish. The Duraplast technical information dated March 1995 noted that

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

control joints should be spaced at “20 metres horizontally and two storeys vertically”. The cladding was subject to BRANZ appraisal 309 (1995), which has since been withdrawn.

- 2.5 The remaining upper floor walls have horizontal bevel-back cedar weatherboards fixed through the building wrap to the framing with copper soakers at the external corners.
- 2.6 I have received no evidence of producer statements or warranties for the cladding.

3 Sequence of events

- 3.1 The territorial authority issued a building consent number 20010212 on 7 January 2001 and carried out various inspections during construction (although I have seen no inspection records). According to the territorial authority, a final inspection was not undertaken until August 2006.
- 3.2 The territorial authority subsequently issued a notice to fix dated 14 September 2006, which included a list of defects (with photographs) identified in the final inspection.
- 3.3 The Department received an application for a determination on 5 December 2006. Clarification was sought from the applicant which was received by 29 January 2007.

4 The submissions

- 4.1 In a statement dated 30 November 2006, which accompanied the application, the applicant commented on the defects listed in the notice to fix; noting that, while he was prepared to remedy defects, he could not understand some of the items and had been unable to obtain expert advice on the remedial work required. The applicant also noted that there are no signs of cracks in the cladding after 5 years, and

...no signs or suggestions that the house is leaking due to the cladding not being to the manufacturer's specifications.

- 4.2 The applicant forwarded copies of:
- one drawing and the specification
 - the notice to fix dated 14 September 2006
 - various other statements and technical information.

- 4.3 In a letter to the Department dated 4 January 2007, the territorial authority outlined the history of the project, noting that (in addition to the defects identified in the notice to fix) inspection procedures had changed since the house construction and:

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 first line of defence, the Council does not believe it is able to be satisfied, on reasonable grounds, that the cladding applied to this building will achieve the functional requirements of Clause E2.2, or the performance requirements of Clause E2.3.2 of the Building Code.

- 4.4 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.
- 4.5 A copy of the draft determination was sent to the parties for comment on 29 March 2007. The territorial authority accepted the draft in an email to the Department dated 21 May 2007.
- 4.6 The applicant responded to the draft determination in a letter to the Department dated 31 March 2007. The applicant expressed concern about the value to be gained from the determination process, and the difficulty in obtaining expert advice about the necessary remedial work. The applicant also submitted that:

[Paragraph 6.3.1 — third bullet point refers to]. ‘Some windows’ [The experts report specifically references] the ‘ground floor bathroom window’ (photo 12). Is this the only window affected by this issue?

Can we please have it documented that a moisture detection system is not required.

I have considered this submission in paragraph 7.4.

5 The expert’s report

- 5.1 The expert visited the house on 27 February 2007, and furnished a report that was completed on 1 March 2007. The expert noted that the building work generally conformed to the consent drawings, and the Duraplast cladding was “generally straight and fair”, with the coating “generally uniform and well adhered” and showing no discolouration or chalking. The expert observed no cladding cracks, and noted that control joints were not specified by the manufacturer as necessary for the dimensions of Duraplast used on the walls of this building. The expert also noted that the apron flashings to the lean-to canopy roof appeared satisfactory, and the pergola ribbon plates were fixed through the weatherboards directly below the eaves, which provide good protection against water penetration.
- 5.2 The expert inspected the windows in both claddings to observe installation details.
- 5.2.1 The expert noted that the installation of the windows in the Duraplast cladding conformed in most respects with the manufacturer’s recommendations at October 1997 with metal head flashings and uPVC mouldings at jambs and sills. However, some installation defects were apparent, as identified in paragraph 5.4.
- 5.2.2 The expert noted that the windows in the weatherboard cladding were face-fixed, with metal head flashings, no sill flashings, and with triangular plugs closing the gaps beneath the jamb flanges.
- 5.3 The expert inspected and took non-invasive moisture readings throughout the interior of the house and no evidence of moisture was noted. The expert took invasive moisture tests at 6 high-risk areas, and the highest reading was recorded at 14%. The expert noted that the readings would be likely to be higher in winter periods.

- 5.4 The expert made the following specific comments on the cladding:
- clearances from the bottom of the cladding to the ground or paving are inadequate in some parts of all elevations
 - the bottom edge of the plaster is unsealed
 - in the Duraplast cladding, some of the uPVC window sill mouldings do not extend beneath the bottom of the jamb mouldings as shown in the manufacturer's instructions (a wire was able to be inserted through a gap in the sealant where the sill moulding butted against the side of the jamb moulding in the lower bathroom window)
 - the garage door jambs lack flashings, and rely on sealant between the jamb liners and the cladding for weathertightness
 - some pipe and fixing penetrations are unsealed
 - the horizontal junction between the weatherboards and the Duraplast (on the north and south elevations) is poorly weatherproofed with inadequate overlaps and wrap protection, and the bottom board on the north elevation is severely warped (creating gaps up to 30mm wide)
 - the vertical junctions between the weatherboards and the Duraplast (at the recess to the north elevation and the projection to the south elevation) are poorly weatherproofed (lacking scribes or underlying flashings)
 - in the weatherboard cladding, some of the plugs under window jamb flanges are loose and unsealed risking moisture penetration
 - the deck stringer is fixed against the wall, with the Duraplast finishing below and the weatherboards stopping above (with inadequate clearance to the cladding). A flashing is installed under the bottom board with the apron sitting against the deck slat risking moisture travelling under the apron, through the timber slat and ribbon plate, and into the cladding below
 - the deck timbers are CCA treated (so requiring stainless steel fixings), but the fixings and joist hangers are galvanised steel.
- 5.5 The expert noted that the Duraplast manufacturer's details (refer paragraph 5.2.1) showed the upstand on the head flashing in front of the Hardibacker and the sill moulding underlapping the window sill flange (rather than the full depth of the sill extrusion). The expert considered that this arrangement risked any moisture in the plaster travelling behind the head flashing, without being able to drain to the outside via the sill flashing. However, the expert concluded that (providing the inter-cladding junction above was weathertight) this feature together with the lack of adequate drainage at the head was unlikely to lead to water penetration in this house as the cladding areas above windows were very small.
- 5.6 The expert noted that, while the cedar weatherboards had splits in some areas, he considered these were cosmetic and unlikely to lead to moisture penetration.
- 5.7 A copy of the expert's report was provided to each of the parties on 20 February 2007.

- 5.8 In a letter to the Department dated 11 March 2007, the applicant proposed that, as there was no current water penetration, the integrity of the cladding should not be compromised by retrofitting corner soakers to the windows in the monolithic cladding. Instead, the applicant suggested that a moisture detection system should be installed to provide an early warning of leaks.

6 Evaluation for code compliance

6.1 Evaluation framework: exterior cladding

- 6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions⁴, which will assist in determining whether the features of these houses are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions cover the worst case, so that they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
- Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.

- 6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations⁵ (for example, Determination 2004/1) 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 moderate wind zone
- is a maximum of two storeys high
- is fairly simple in plan and form

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.

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

- has monolithic and horizontal weatherboard claddings that are fixed directly to the framing, and inter-cladding junctions that are limited to internal corners and horizontal junctions
- has eaves projections of more than 400mm and verge projections of more than 200mm overall, with the upper floor sheltering the lower floor by about 500mm on the west and east walls
- has a timber pergola fixed below the eaves projection
- has external wall framing that may not be treated to a level that is effective in helping resist decay if it absorbs and retains moisture.

6.2.2 The house has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design to provide a risk rating that can range from 'low' to 'very high'. The risk rating is applied to determine how claddings can be used on a building in order to comply with E2/AS1. A higher risk rating will require more rigorous weatherproof detailing; for example, a higher risk rating is likely to require a particular type of cladding to be installed over a drained cavity.

6.2.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.2.1 show that all elevations of this house demonstrate a moderate weathertightness risk rating. I note that, in order to comply with E2/AS1, the monolithic cladding of this building would require a drained cavity while the weatherboard cladding would not require a drained cavity. On the west and east walls, the upper floor shelters the lower floor by about 500mm: for these situations a drained cavity is not required.

6.3 Weathertightness performance: exterior cladding

6.3.1 Generally the claddings appear to have been installed in accordance with good trade practice. However, taking account of the expert's opinion, I conclude that remedial work is necessary in respect of the following:

- inadequate ground clearances from the bottom of wall claddings in some areas
- the unsealed plaster at the bottom of the cladding
- inadequate weatherproofing of the jamb to sill junctions of some windows in the Duraplast cladding
- inadequate weatherproofing of the garage door jambs
- inadequate weatherproofing of the horizontal and vertical junctions between the weatherboards and the Duraplast claddings
- inadequate weatherproofing of the window jambs in the weatherboard cladding
- inadequate weatherproofing of the deck to wall junction
- inappropriate fixings and joist hangers to the deck
- inadequate weatherproofing of some penetrations through the claddings

- any other building elements associated with the above that are consequentially discovered to be in need of rectification.

- 6.3.2 I note the expert's reservations (noted in paragraph 5.5) with regard to the Duraplast manufacturer's window head details. I also note that the projecting upper floor shelters the window heads to the east wall and those to the north recess and south projection are sheltered by the eaves, and are unlikely to experience water penetration. I also accept that the remaining windows in the Duraplast cladding have limited areas of cladding above, and are unlikely to suffer water penetration at the window heads, providing the horizontal inter-cladding junction is weathertight.
- 6.3.3 I also note the expert's comment in paragraph 5.6 with regard to the weatherboard cladding, and accept that (with the exception of the defects noted in paragraph 5.4) the cladding is adequate.
- 6.3.4 I also note the applicant's comments in paragraph 5.8 with regard to the provision of a moisture detection system. In discussing this suggestion, I make no comment as to the efficacy or otherwise of such a system. While the system may assist monitoring of moisture ingress into the cladding, I do not accept that its installation in any way affects the code compliance of a building. While it may indicate whether compliance with clause E2 is being achieved, it does not in any way contribute to compliance with E2 and will not therefore make the house code compliant. Such a system cannot form part of the cladding of the building in terms of the Building Code, although it may support the maintenance of the cladding (refer paragraph 7.6).
- 6.3.5 Notwithstanding the fact that the monolithic cladding is 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 monolithic cladding in this particular case:
- apart from the noted exceptions, the cladding is installed to good trade practice
 - there is no indication of moisture penetration into the building at present
 - the upper floor shelters the lower floor by about 500mm on the west and east walls, effectively forming a secondary eaves providing protection similar to eaves on a single storey building.
- 6.3.6 I consider that these factors help compensate for the lack of a drained cavity to the monolithic cladding, and can assist the building to comply with the weathertightness and durability provisions of the Building Code.

7 Discussion

- 7.1 I consider that the expert's report establishes there is no evidence of external moisture entering the building, and accordingly, that its cladding does comply with clause E2 at this time.
- 7.2 However, 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 building to remain weathertight. Because the cladding faults on the building are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

- 7.3 Because the faults identified with the cladding system occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.3.1 will result in the building remaining weathertight and in compliance with clause B2.

7.4 Response to the applicant's submissions on the draft determination

- 7.4.1 The weatherproofing defects of the jamb to sill junction to windows in the Duraplast cladding is not limited to the window illustrated by photo 12 in the expert's report (which is labelled "Typical window sill (bathroom)". The defect applies to other windows to an extent that will need to be confirmed.
- 7.4.2 The applicant has asked me to confirm that the determination does not require the installation of a moisture detection system. Such a system was not sought by the territorial authority in its notice to fix, nor is it required by this determination. The presence of a moisture detection system does not, of itself, make a house code compliant, although it may contribute to the effectiveness of building maintenance.
- 7.4.3 The applicant has questioned the value of the determination process and feels that his situation has not progressed as a result. In the event of dispute between the parties a determination is a very necessary first step in determining code compliance as it does, in this instance, clearly separate those matters that are compliant from the matters that need to be fixed. It therefore provides direction to the territorial authority and the applicant as to the next steps to be taken to achieve compliance. The expert's report, although not definitive with respect to identifying every individual defect, has identified the areas of non-compliance. The report and discussion of it in the determination, should assist in evaluating the work required on the house.
- 7.4.4 I accept the difficulty the applicant may be experiencing obtaining suitable technical advice about the proposed remedial work. I am advised that there are experts that are able to assist, and I recommend that the applicant contacts the New Zealand Institute of Building Surveyors, or visit its website⁶, in order to locate Institute members in his area.
- 7.5 I emphasise that each determination is conducted on a case-by-case basis. Accordingly, the fact that particular cladding systems have been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding systems will be code compliant in another situation.
- 7.6 Effective maintenance of claddings (in particular of monolithic claddings) 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

⁶ The website for the New Zealand Institute of Building Surveyors is at www.buildingsurveyor.co.nz.

Code requires that the cladding be subject to “normal maintenance”, however that term is not defined in the Act.

- 7.7 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 The decision

- 8.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the building work does not comply with clause B2 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. The territorial authority should now issue a new notice to fix that requires the owners to bring the building up to compliance with the Building Code, identifying the defects listed in paragraph 6.3.1, but not specifying how those defects are to be fixed. That is a matter for the applicants 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 the notice to fix. The owner should then produce a response to this in the form of a detailed 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.
- 8.4 The territorial authority shall issue a code compliance certificate once the items listed in the new notice to fix have been fixed to its satisfaction.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 11 June 2007.

John Gardiner
Manager Determinations