Determination 2006/20

Refusal of a code compliance certificate for an alteration to a house with a "monolithic" cladding system at 8 Prospect Terrace, Milford, North Shore City

1 The dispute to be determined

1.1 This is a determination of a dispute referred to the Chief Executive of the Department of Building and Housing ("the Chief Executive") under section 17 of the Building Act 1991 ("the Act") as amended by section 424 of the Building Act 2004. The applicants are the owners Mr and Mrs Wade ("the owner"), and the other party is the North Shore City Council ("the territorial authority"). The application arises from the refusal by the territorial authority to issue a code compliance certificate for a 4-year-old alteration to an existing house, unless changes are made to its monolithic cladding system.

1.2 The question to be determined is whether I am satisfied on reasonable grounds that the monolithic wall cladding as installed to the new timber-framed external walls of the house ("the cladding"), complies with the building (see sections 18 and 20 of the Act). By "the monolithic wall cladding as installed", I mean the components of the system (such as the backing sheets, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.

1.3 This determination is made under the Building Act 1991 subject to section 424 of the Building Act 2004. That section came into force ("commenced") on 30 November 2004, and its relevant provisions are:

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

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

1.5 This determination refers to the former Authority:

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

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

1.6 In making my decision, I have not considered any other aspects of the Building Act or the Building Code.

2 Procedure

2.1 The building

2.1.1 The building work consists of a series of alterations to an existing two-storey house ("the house") situated on an excavated sloping site that is in a high wind zone in terms of NZS 3604: 1999 "Timber framed buildings". The main alterations consist of a new garage, and extensions to the existing garage and games room at the ground floor level, and the construction of a partly enclosed terrace to two elevations of the house at the first floor level. The terrace is cantilevered at two locations and these sections have curved perimeters. The resultant building is of a relatively simple shape on plan but with some complex features. Apart from the concrete block walls to the existing garage extension, the new exterior walls are of conventional light-timber frame construction built on either concrete ground floor slabs or intermediate timber-framed floors and sheathed with monolithic cladding. The monolithic cladding has also been applied over timber packers to some areas of the concrete block walls and, without packers, to some of the existing timber-framed walls where the original cladding has been removed.

2.1.2 The garage extension has a pitched roof with wall-to-roof junctions, and the terrace has a low-pitched roof extension to one end and an adjoining elevation return. This roof extension has a framed-up perimeter gutter and an opening that is infilled with pergola rafters. The balance of the terrace is covered by an extension of the existing roof, which has a re-built perimeter gutter that joins up with the end roof gutter. The terrace roofs are supported on monolithic-clad, timber-framed columns with shaped capitals. The upper roof eaves projections range from 1000mm to 2200mm and the verge projections are generally 800mm wide. The roof and upper floor projections over the lower level walls range from 300mm to 1000mm. The open areas of the terrace have proprietary metal balustrades fixed between the support columns. The enclosed terrace areas have monolithic-clad, timber-framed balustrades, some of which have timber louvres fixed over them.

2.1.3 The expert commissioned by the Department to inspect the cladding ("the expert". See also paragraph 5.1) has commented on several areas where the constructed building differs from the consented plans. Of particular concern are changes that

include the downpipes penetrating the cladding, the complex roof junctions, the discharge of water from the terrace decks, the lack of trimmer stud flashing and the soffit lining ventilation. The expert has also noted that there are areas of work, which have yet to be completed.

2.1.4 The specification prepared by the architect in March 2001 calls for all wall framing to be H1 treated and also notes that no untreated timber is to be used. In an email to the owner dated 2 May 2005, the builder stated that the internal framing was "laserframe", which I take to mean that such timber was not treated. The expert has noted that while the existing timber wall framing was likely to be boric treated, the new garage wall framing unlikely to be treated. I have received no other written evidence as to the treatment, if any, of the new external wall framing timber and I therefore consider that this framing is unlikely to be treated.

2.1.5 The cladding system to the upper areas of the exterior walls is what is described as monolithic cladding and consists of 7.5mm "Harditex" fibre-cement backing sheets fixed directly to the framing over the building wrap, to which a "Duraplast" sponge finish plaster system has been applied. The plaster is finished with a paint coating system.

2.1.6 Plaster Systems Ltd provided "Producer Statements" dated 10 November 2004, for the "Duraplast" system in regard to work completed by C J Lusby Plasterers Ltd and 18 November 2004, for the "Duraplast" system in regard to work completed by Exterior Solutions Ltd. Plaster Systems also issued two "Materials Components Guarantees" and two "Workmanship Guarantees", all dated 19 November 2004, in relation to the "Duraplast" and "Ezytex" systems for the lower and upper floors of the house. All four of these documents excluded responsibility for consequential danger to any building component arising from the use of untreated framing.

2.2 Sequence of events

2.2.1 The territorial authority issued a building consent on 1 May 2001.

2.2.2 Approved Building Certifiers Ltd ("the building certifier") issued an undated "Appended Conditions to Plan" document that related to the removal of existing walls, the ventilation fans, and the durability of the exposed structural fixings.

2.2.3 According to the owner, the construction process took place between October 2001 and November 2004.

2.2.4 The building certifier carried out various inspections during the course of construction, and passed the pre-line building and the external linings (flashings) inspections on 14 February 2002.

2.2.5 The territorial authority carried out a visual inspection on 16 December 2004. In a letter to the owner dated 16 February 2005, the territorial authority stated that the Building Code required the durability of the cladding to be 15 years and that of the timber framing to be 50 years. The territorial authority also noted that the inspection process for monolithic claddings had changed since the time that the building consent for the house was processed. The territorial authority then listed certain weathertightness risk factors identified with the building, together with a list of

defects. The territorial authority stated that, due to the risk factors and defects, it could not be satisfied on reasonable grounds that the cladding system was code compliant.

2.2.6 The territorial authority did not issue a Notice to Rectify as required by section 43(6) of the Building Act 1991.

2.2.7 The balustrade fixer wrote to the owner on 1 March 2003, giving details of the balustrade post fixings.

2.2.8 The builder wrote to the owner on 9 March 2005, stating that H1 Boric treated timber was used for the balustrades and that the window head flashings and "Hardibacker" "nail off" were approved in February 2002. The builder described the column construction and the edge finish to the butyl-rubber roofing, and noted that he had not fitted a capping flashing. The builder had no knowledge as to the presence of sill flashings, back flashings, and cladding relief joints. The builder also stated that the building certifier had been called at every stage as required for the building and plumbing work.

2.2.9 In an e-mail to the owner dated 2 May 2005, the builder confirmed the timber treatments. In particular, the column posts were H1 treated, the internal framing was "laserframe" and the deck plywood was H3 treated. The builder also noted that high-risk areas had been discussed with the architect and had been modified as agreed to ensure weathertightness. All work and materials had been systematically checked and passed by the building certifier.

2.2.10 The Department received the owner's application for determination on 8 April 2005.

3 The submissions

3.1 In a covering letter to the Department dated 24 March 2005, the owner described some of the events leading up to this determination. In response to the defects noted by the territorial authority, the owner stated that the plaster at the west end of the deck was damaged during construction and this had been repaired prior to its future removal when the external stairs are installed. There was polystyrene installed over the blockwork where the cladding adjoins the blockwork. The owner noted that the house had wide roof overhangs and that there had been no noticeable leaks even during easterly storms.

3.2 The owner provided copies of:

- the building plans and specifications
- a time line of the construction and inspection processes
- the building consent information and some of the building certifier's inspection documentation

- the correspondence with the territorial authority, the builder and the balustrade installer
- the guarantees and producer statements
- some technical information
- a set of photographs showing the house.

3.3 The territorial authority made a submission in the form of a letter to the Department dated 3 June 2005 that summarised the consent and inspection processes relating to the house. This summary also noted that the cladding system as installed differed from that shown on the consented plans. The territorial authority also noted that, in light of current knowledge, the verification process had become more complicated. The territorial authority also listed the risk factors and cladding defects that it had identified. The territorial authority stated that the matter of doubt is:

- Whether the installed cladding system complies with clauses B2.3.1 and E2.3.2 of the Building Code.

3.4 The territorial authority provided copies of:

- some inspection documentation
- its letter to the owner dated 16 February 2004.

3.5 The owner wrote to the Department on 6 June 2005, commenting on the territorial authority's letter to the Department of 3 June 2005. The owner attached an amended consented plan that showed the cladding to be "Duraplast", which appears to support the owner's contention that the territorial authority was informed of the change. The owner also noted that the eaves overhang to the south gable was 900mm, not the 800m noted by the territorial authority. In addition, no plaster was used over the existing vertical cedar boarding as the boarding was all removed before the plaster was applied.

3.6 Copies of the submissions and other evidence were provided to each of the parties. Neither the owner nor the territorial authority made any further submissions in response to the submissions of the other party.

3.7 The territorial authority unconditionally accepted the draft determination that had been forwarded to the parties. The owner accepted the draft subject to comments that I have discussed in relation to the expert's report in paragraph 5.6.

4 The relevant provisions of the Building Code

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

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

4.3 In several previous determinations, the Department has made the following general observations, which remain valid in this case in my view, about Acceptable Solutions and alternative solutions.

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

5 The expert's report

5.1 The expert inspected the cladding of the building on 16 June 2005 and furnished a report that was completed on 27 July 2005. The expert noted that the appearance of the cladding is generally straight and flat with only minor variations to line and level. The texture and finish is uniform and sound and there was no evidence of any cracking in the cladding. However, while most of the work is reasonably well done, "there has been a lack of thought or guidance in respect of junctions of different materials and the interface of the various trades". The expert considered that, as the building did not have straight walls that exceeded 20 metres in length, control and expansion joints are not required for this house. The expert removed an area of cladding adjacent to one windowsill, including the sill moulding, in order to reveal the flashing details. The details in general complied with the manufacturer's instructions. The expert made the following comments regarding the cladding:

- the base of the cladding is too close to the paving at some locations
- there is insufficient overlap at the base of the cladding at some locations, including the terrace decks
- some of the backing sheets were not set out in compliance with the manufacturer's instructions. However, there was no evidence that this was causing any problems
- the cladding junctions of the columns may not be suitably weatherproofed
- the bottom edge of the sill flashings of the external joinery units are sealed onto the cladding
- the tops of the terrace balustrades lack cross-falls and metal cappings and the louvre fixings are installed through the top of these balustrades

- the coach screws fixings for the metal balustrade balusters are incorrectly installed and are not effectively sealed
- the areas towards the outside edge of the terrace deck membrane are not waterproof
- the north elevation barge flashing junction overlaps the wrong way
- the cut edges of the aluminum upstand at some terrace deck perimeters are showing signs of corrosion
- some penetrations through the cladding are not effectively sealed
- the fence has been fixed through the cladding on the east side of the new garage. The expert noted that this also was the case at the south side of the existing garage but as this was into a block wall, problems are unlikely to arise at this location
- the garage door opening lacks a head flashing. However, there is a deep reveal at this location and there is an "eyebrow" moulding installed over the reveal.

5.2 The expert took non-invasive readings through the interior linings of the exterior walls and only one elevated reading was obtained. This was a reading of 30% in the southwest corner of the lounge (part of the house not subject to alteration) where the expert also noted water staining to the carpet and the floor. The expert also took further non-invasive readings at exterior areas of the cladding and obtained the following elevated readings:

- 20% at the soffit of the north part of the terrace
- 25% at the deck surface above the previous reading
- 27% to 33% in the curved part of the terrace deck adjoining the lounge. The expert also observed evidence of moisture damage to the plywood and framing at this location as well as mould on the surface of these elements

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

5.4 The expert also noted that there are numerous faults in the liquid-applied membrane that is applied to the decks of the terrace and that some of the deck joists are not treated. In addition, the flashing between the roof, gutter and cladding at the rear of the house around the lounge where the old building adjoins the new work, is failing and some of the junctions between the butyl-rubber membrane and the adjoining roofing are likely to fail.

5.5 Copies of the expert's report were provided to each of the parties. The owner responded by letter dated 24 August 2005, incorporating their comments with those of some of the people who had been involved in the building work and who had seen the expert's report. Some of the comments explained how and why certain work was done. Other comments explained how incomplete work should be completed. The

comments do not appear to contradict the substance of the submissions already received from the parties.

5.6 As described in paragraph 3.7, the owner commented on the draft determination mainly in relation to the expert's report. The owner submitted that the issue of the elevated moisture reading in the southwest lounge wall related to the existing building and was not relevant to the new work. The owner queried why invasive readings were not taken at the locations where non-invasive testing produced higher moisture levels. It was also noted that there had been rain in the 48 hours prior to the expert's inspection and that this could have a bearing on the deck moisture readings. Finally the owner disagreed that there was evidence of moisture damage to the plywood and framing to the curved part of the terrace deck adjoining the lounge.

6 Discussion

6.1 General

6.1.1 I have considered the submissions of the parties, the expert's report and the other evidence in this matter. The approach in determining whether building work complies with clauses B2 and E2 is to examine the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system, its installation, and the moisture tolerance of the external framing. The Building Industry Authority and the Department have described the weathertightness risk factors in previous determinations (Refer to Determination 2004/01 *et al*) relating to monolithic cladding, and I have considered these comments in this determination.

6.2 Weathertightness risk

6.2.1 In relation to the weathertightness characteristics, I find that the house:

- generally has wide eaves, verge, and floor extensions that provide excellent protection to the cladding areas below them
- is in a high wind zone
- is a maximum of two storeys high
- is of a simple shape on plan with some complex features
- has an extensive terrace constructed at the first floor level, which is constructed partially over the garages
- has new external wall framing that is not treated, and so will have little resistance to decay if it absorbs and retains moisture.

6.3 Weathertightness performance

6.3.1 Generally, the cladding appears to have been installed according to good trade practice, but some junctions, edges, and penetrations are not well constructed. These areas are described in paragraph 5.1, and in the expert's report, as being:

- the base of the cladding being too close to the paving at some locations
- the insufficient overlap at the base of the cladding at some locations, including the terrace decks
- the cladding junctions of the columns being unsuitably weatherproofed
- the bottom edge of the sill flashings of the external joinery units being sealed onto the cladding
- the lack of cross-falls to the tops of the terrace balustrades and metal cappings, and the louvre fixings being installed through the tops of these balustrades
- the incorrectly installed and ineffectively sealed coach screws fixing to the metal balustrade balusters
- the ineffectively installed areas of the terrace deck membrane
- the wrong overlapping of the north elevation barge flashing junction
- the corrosion evident to the cut edges of the aluminum upstand at some terrace deck perimeters
- the ineffectively sealed penetrations through the cladding
- the fence being fixed through the cladding on the east side of the new garage.

6.3.2 I accept the expert's opinion that, while some of the backing sheets are not set out in compliance with the manufacturer's instructions, this is not causing any problems currently, and in my view is unlikely to cause any future problems. I also accept that, as the garage door opening is protected by the reveal and moulding above it, the lack of a head flashing over the garage door is acceptable.

6.3.3 The expert has pointed out some defects in the membrane applied to the terrace decks and to the fact that some of the joists are not treated. I recommend that the territorial authority fully investigate the condition of the decks to check what remedial work should be undertaken to establish and ensure their continuing structural viability. This matter should be treated as urgent considering the possible damage already evident in the deck framing and plywood substrate. In addition, while it was not mentioned by the expert, I am concerned at the potential for failure of the H1 treated monolithic-clad columns supporting the terrace roofs and recommend that the territorial authority inspect these.

6.3.4 Finally, I recommend that the territorial authority address the issues raised by the expert in relation to the roof membrane and flashings.

6.3.5 Notwithstanding the fact that the backing sheets are fixed directly to the timber framing, thus inhibiting drainage and ventilation behind the cladding sheets, I find that as the cladding generally appears to have been installed according to reasonable trade practice that this is a compensating factor assisting the performance of the cladding in this particular case. This factor will also help to compensate for the lack of a full drainage and ventilation cavity and can assist the house to comply with the weathertightness and durability provisions of the Building Code.

6.3.6 I note that all elevations of the building demonstrate a medium weathertightness risk rating as calculated using the E2/AS1 risk matrix. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

7 Conclusion

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

7.2 In addition, the building 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 monolithic cladding faults on the building have already allowed the ingress of water, or will allow the ingress of moisture in the future, it does not comply with the durability requirements of clause B2 of the Building Code.

7.3 Subject to further investigations that may identify other faults, I consider that, because the cladding faults identified by the expert occur in discrete areas, satisfactory rectification of the items outlined in paragraphs 6.3.1, 6.3.3 and 6.3.4 and the completion of outstanding work is likely to result in the building being weathertight and in compliance with clauses B2 and E2.

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

7.5 As the external framing is untreated, periodic checking of its moisture content should be carried out as part of normal maintenance.

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

7.7 I decline to incorporate any waiver or modification of the Building Code in this determination.

7.8 As described in paragraph 3.6, the owner has queried some aspects of the expert's report and the conclusions reached by the Department and I comment as follows:

- while the damage in the southwest corner of the lounge is due to water ingress from the existing structure, this is still a factor affecting the compliance of the new cladding
- the high non-invasive readings were taken at the deck areas where there is evidence of defective membranes and junctions
- there is no certainty that the higher moisture readings at the deck were attributable to the rain evidenced prior to the expert's inspection
- even if there is uncertainty about damage to the plywood and framing of the noted terrace deck there is still potential damage that could occur at this location.

I have noted these comments. However, I am of the opinion that there is sufficient evidence for me to conclude that there is some ingress of some moisture into the building. While the extent of this ingress may be disputed, the fact that it is occurring means that the structure is not watertight.

8 The decision

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

8.2 I also find that rectification of the items outlined in paragraphs 6.3.1, 6.3.3 and 6.3.4 and the completion of outstanding items to the approval of the territorial authority, along with any other faults that may become apparent in the course of that work, will consequently result in the house being weathertight and in compliance with clauses B2 and E2.

8.3 I note that the territorial authority has not issued a Notice to Rectify. The territorial authority should now issue a notice to fix, and the owner will then be obliged to bring the building up to compliance with the Building Code. It is not for me to decide directly how the defects are to be remedied and the cladding brought to compliance with the Building Code. That is a matter for the owner to propose and for the territorial authority to accept or reject.

8.4 I would suggest that the parties adopt the following process to meet the requirements of clause 8.3. Initially, the territorial authority should issue the notice to fix, listing all the items that the territorial authority considers to be non-compliant. The owner should then produce a response to this in the form of a technically robust proposal, produced in conjunction with 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.

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

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 17 March 2006.

John Gardiner
Determinations Manager