Ministry of Business, Innovation & Employment

Determination 2013/002

Regarding the refusal to issue a code compliance certificate for a 17-year-old house with monolithic cladding at 33 Karaka Road, Beachlands, Auckland

1. The matters 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, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ("the Ministry")[2], for and on behalf of the Chief Executive of the Ministry.

1.2 The parties to the determination are:

- the new owners[3] of the house, C and M Ramsey ("the applicants")
- Auckland Council[4] ("the authority"), carrying out its duties as a territorial authority or building consent authority.

1.3 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 17-year-old house because it was not satisfied that the building work complied with certain clauses[5] of the Building Code (First Schedule, Building Regulations 1992). The authority's concerns regarding compliance of the building work relate primarily to the weathertightness of the claddings.

[1] The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243.
[2] After the application was made, and before the determination was completed, the Department of Building and Housing was transitioned into the Ministry of Business, Innovation and Employment. The term "the Ministry" is used for both.
[3] After the application for this determination was made by the former owner, the applicants purchased the property and elected to proceed with the determination.
[4] Before the application was made, Manukau City Council was transitioned into Auckland Council. The term authority is used for both.
[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.

1.4 The matter to be determined[6] is therefore whether the authority was correct in its decision to refuse to issue a code compliance certificate for the house. In deciding this, I must consider:

1.4.1 Matter 1: the external building envelope

Whether the external claddings ("the claddings") comply with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The claddings include the components of the systems (such as the plaster, the backing sheets, the windows, the roof claddings and the flashings), as well as the way components have been installed and work together. Any structural implications (Clause B1) associated with weathertightness are considered within this matter. I consider this in paragraph 6.

1.4.2 Matter 2: The remaining code requirements

Whether other items identified in the notice to fix comply with relevant Building Code clauses: namely Clauses E1 Surface Water, E3 Internal Moisture, F2 Hazardous Building Materials, F4 Safety from Falling, G12 Water Supplies and G13 Foul Water. I consider this matter in paragraph 7.

1.5 Matters outside this determination

1.5.1 This determination is limited to items identified during the authority's final inspection of the house (see paragraph 3.7); other building elements associated with clauses identified in Matter 2 are not considered in this determination.

1.5.2 The notice to fix also cited Clause G7 Natural Light, but the authority has since stated that this clause should not have been included in the notice.

1.5.3 The notice to fix also outlined requirements for durability of building elements and stated that the owner may apply to the authority for a modification of Clause B2.3.1 to allow durability periods to commence from the date of substantial completion of the house. I note that the former owner has applied for such a modification (see paragraph 3.6) and I therefore leave this matter to the parties to resolve once the building work is code-compliant.

1.6 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Ministry to advise on this dispute ("the expert") and the other evidence in this matter.

2. The building work

2.1 The building work consists of a two-storey-high detached house on a gently sloping site identified in the engineer's calculations as located in a high wind zone for the purposes of NZS 3604[7]. The house is assessed as having a moderate weathertightness risk (see paragraph 6.2).

2.2 Construction is generally conventional light timber frame, with concrete foundations and floor slab, monolithic wall cladding, aluminium joinery and 20° pitch pressed

[6] Under sections 177(1)(b) and 177(2)(d) of the Act
[7] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

metal tile hipped roofs with eaves of more than 600mm. Lower roofs form lean-tos against upper walls on the west, east and south elevations.

2.3 The wall cladding is a monolithic cladding system described as stucco plaster over a solid backing. In this instance it consists of 4.5mm fibre-cement sheets fixed through the building wrap directly to the framing timbers, and covered by a slip layer of building wrap and metal mesh-reinforced solid plaster.

2.4 The house has an enclosed deck opening from the upper north living areas which is partly situated above a ground floor bedroom, and a ground floor deck with a spaced slat floor and open timber balustrades. The upper deck floor is butyl rubber membrane over a plywood substrate. The deck membrane is dressed down over the fascia, with side-fixed metal-framed glazed balustrades. At deck ends, monolithic-clad balustrades with flat plastered tops extend past the lower lean-to roofs.

2.5 The former owner provided invoices dated October 1994 noting framing as 'H1' treated. Six timber samples from exterior deck and wall framing were sent by the expert for testing and were confirmed as boric-treated to an equivalent of H1.2 (see paragraph 5.3.3). Taking account of this evidence and the date of construction in 1994, I accept that the external wall and deck framing is treated.

3. Background

3.1 The authority issued a building consent (No. 94/3023) dated 23 August 1994 to the former owner under the Building Act 1991. The consent conditions included a list of inspections required during construction; the list did not include a pre-plaster inspection.

3.2 Construction

3.2.1 I have not seen copies of the authority's inspection records, but the former owner has submitted copies of handwritten notations made on the consent drawings, which were signed and dated by the authority's inspector at the time of construction.

3.2.2 Although the notations are difficult to read, they indicate that the authority carried out the following inspections during construction:

- Footings and floor slabs from September to October 1994.
- Pre-line building and plumbing inspections during November 1994, which listed changes and outstanding framing fixing/bracing items.
- Pre-line re-inspection on 24 November 1994, which noted 'all items above have been completed as on engineers design on site' except for 3 items, which appear to have been signed as approved on 1 December 1994.

3.2.3 The authority was provided with revised engineer's calculations dated 20 November 1994, which were stamped as approved on 29 November 1994. From the description in the covering letter, the framing was exposed at that stage. The house appears to have been substantially completed and occupied in 1995.

3.3 According to the former owner, the authority carried out a final inspection on 21 January 1997 which identified that only range hood venting needed to be completed. This was remedied and the authority apparently advised that this single item could be inspected from the outside. Shortly after, the former owner 'received a bond reimbursement and assumed that everything had been completed'.

3.4 The inspection report

3.4.1 Intending to offer the property for sale during 2011, the former owner engaged a property inspection company ("the inspection company") to inspect the house. The inspection company inspected the house on 16 February 2011 and submitted a report titled 'Comprehensive moisture inspection report'.

3.4.2 The inspection company inspected the exterior and interior of the house, taking non-invasive readings and using thermal imaging techniques that showed any thermal anomaly which was reported to indicate higher moisture levels. The inspection company identified areas and anomalies requiring invasive moisture testing or further investigation, along with features considered to be at risk of moisture penetration.

3.4.3 The report photographed and commented on various areas (with moisture readings shown in brackets) including

Upper floor

- swollen trim in ensuite bathroom (17%) and at dining doors (17%)
- moisture wicking into stucco from deck carpet, with anomaly at doors (16%)
- suspect joinery mitre to kitchen corner window (20%)

Lower floor

- fine cracks in stucco, with anomaly at west bedroom window (14%)
- fine cracks in stucco, with anomaly at northwest corner (17%)
- plumbing leak, with swollen trim and lining damage in laundry (over 40%) and watermarked carpet in adjacent rumpus room (20%)
- no cladding clearance beside garage doors (20%)

Exterior defects

- moisture in soffit above laundry door, under bottom of apron flashing
- fine cracks in stucco, with no control joints to walls
- thermal anomalies and moisture in bubbling paint under some windows
- some poorly sealed penetrations
- bottom of apron flashings lack kick-outs
- dented roof tiles and debris in gutters
- gully traps too low and lower bathroom waste pipes short of gully trap
- moisture marks to flat plastered top of clad balustrades.

3.5 The former owner subsequently carried out limited maintenance and repairs and offered the property for sale in November 2011. A sales agreement was entered into, with settlement dependent on obtaining a code compliance certificate for the house.

3.6 Under cover of a letter to the authority dated 19 December 2011, the former owner submitted an application for a code compliance certificate and also a 'Request for Waiver or Modification relating B2 Durability on a Code Compliance Certificate' (see paragraph 1.5.3).

3.7 The final inspection

3.7.1 The authority carried out a final inspection on 27 February 2012, which 'failed' a number of items. The record states that a notice to fix would be issued and notes the type of cladding system and that there were no control joints, and that there were 'signs that the membrane is failing, and various other items of non-compliance.'

3.7.2 The authority also produced a 'photo file' of defects identified during its final inspection. Identified defects included (in summary)

- in regard to Clauses E2 and B2:
  - lack of control joints to stucco
  - cracking of the stucco plaster
  - lack of clearances to bottom of plaster
  - unsealed penetrations
  - inadequate window flashings
  - possible moisture ingress at curved window
  - lack of deck fall and deteriorating deck membrane
  - insufficient step-down onto deck
  - lack of outlet drain to deck
  - flat tops to plastered balustrades and lack of saddle flashings
  - lack of kick-outs and gutter clearance at bottom of apron flashings
  - lack of spreaders from upper roofs and damage to roof tiles
  - deteriorated paintwork
- in regard to Clause E3:
  - possible moisture ingress to sink unit at dishwasher
  - bath not sealed to walls
  - unsealed/unsecured laundry tub and unsealed wall finishes
- in regard to Clause G12:
  - laundry plumbing leak causing moisture damage
  - hot water cylinder relief pipe with tundish and air gap
  - non-return valves to showers
  - seismic restraints to hot water cylinder[8]

[8] Seismic restraints to cylinders covered in G12/AS1 at the time of consent and construction

- Other clauses:
  - lack of smoke alarms (C)
  - lack of safety markings to glass balustrades (F2)
  - insufficient height of plastered balustrades (F4)
  - lack of raised rim to gully trap (G13).

3.8 The notice to fix

3.8.1 The authority issued a notice to fix dated 12 March 2012. In the accompanying letter the authority stated that the house did not comply 'with the building code in a number of respects' and recommended that the former owner

> ...engage the services of a suitably qualified person to review the attached NTF and to develop a proposed scope of work, which in their view would address all the areas of contravention. [The authority] will then review this proposal and if it agrees with it, will then advise you as to whether a building consent needs to be applied for.

3.8.2 The notice identified a number of Building Code clauses that the building work was 'in breach of' and listed 'details of the contravention', including the following areas of concern listed under Item 3.0:

> External Envelope (Cladding)
>
> Roofing
>
> Flashing systems
>
> Membrane, balustrade (height and fixings) and lack of fall on deck
>
> Ground clearances
>
> Drainage systems
>
> Internal moisture
>
> Stormwater disposal.

3.9 The Ministry received an application for a determination from the former owner on 13 April 2012.

3.10 In October 2012, the applicants purchased the property and elected to proceed with the determination.

4. The submissions

4.1 The former owner outlined the background to the situation, adding that the property had sold but that a code compliance certificate was required to settle. The former owner stated that the house complied with the Building Code and that it was approved by the authority at the time it was constructed; explaining that the bond release following completion of one outstanding item had lead to an assumption that 'everything had been completed'.

4.1.1 The former owner forwarded copies of

- the consent drawings and specification
- the building consent
- the handwritten inspection notes
- the inspection report dated 16 February
- the application for the code compliance certificate
- the notice to fix dated 12 March 2012
- various other calculations, letters and other information.

4.2 The authority clarified parts of the notice to fix in a letter to the Ministry dated 2 May 2012 and forwarded copies of

- the record of the final inspection dated 27 February 2012
- the 'photo file' for the house dated 27 February 2012.

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

4.4 A draft determination was issued to the parties for comment on 25 June 2012. In October 2012, the applicants purchased the property and elected to proceed with the determination.

4.5 The applicants' response to the draft determination

4.5.1 The applicants engaged a building consultant ("the consultant"), who responded to the draft determination in a report to the Ministry dated 23 October 2012. The consultant considered that sufficient investigation had been carried out to enable discrete repairs to be identified; noting that the draft had stated that a more thorough investigation of the condition of the framing was required. The consultant advised that 'an early warning moisture probe system' had been installed to provide 'this greater understanding'.

4.5.2 The consultant accepted there were 'issues that preclude the issuing of the CCC at this stage', but considered that many identified defects could be considered as 'deferred maintenance' to be expected for a house of this age.

4.5.3 The consultant made various detailed comments which I have considered and that included the following in summary:

The consultant's summarised comments	My response	Relevant paragraphs
Distinction must be made between new buildings and those 'subjected to the "test of time" with an in-service history to support it.' Cladding is more than 15 years old, so has already satisfied durability requirements. Repairs as part of 'normal maintenance' are to be expected in a building of this age, without these being a breach of clause B2.	There is no evidence that the cladding was weathertight for the first 15 years after installation. There is strong evidence of moisture penetration and damage over a prolonged period, which indicates that cladding did not meet the durability requirements.	4.6.5 5.3 5.4 6.3.1

The present failures must be seen as deferred maintenance rather than 'strict non compliance and breaches of code clauses'.	The extent of identified defects and required investigation is significantly beyond what may be considered as maintenance.	5.6
Timber framing is accepted as H1 treated, which should provide confidence in discrete repairs.	H1.2 provides only limited protection against decay, given the evidence of long-term moisture penetration and timber damage.	4.6.5 5.3 5.4
The only area showing significant decay was due to an isolated leak, which can be addressed with discrete repairs.	The monitoring report identifies other locations with visual evidence of timber damage, which need further investigation.	4.6.5
Windows are face-fixed, so are at lower risk of leaking than recessed windows.	While sill and jamb flashings would generally not be required, the windows still lack jamb seals.	5.5.1 5.6
Retrofitted control joints are not required or likely to be effective.	Cracks in the stucco are likely to be due to uncontrolled movement in the cladding.	5.6
The movement in the plywood deck substrate can be investigated during maintenance of the membrane.	Further investigation of the deck framing is required, as MDU[9]'s do not cover the deck or balustrades.	5.6
The balustrade cladding is performing, with fungal growth only indicating that the timber treatment does not support decay damage.	Extremely dense fungal growth has resulted from moisture penetration and further investigation of the framing is required. The MDU's were not located to assess the balustrade framing.	5.6
The laundry is finished with a laminate-faced wall lining. No additional sealing is required in these circumstances.	Further sealing is not necessary in these circumstances.	7.2
The balustrade height (920mm) was not in accordance with F4/AS1 but the extent of non-compliance was trivial.	At time of consent F4/AS1 said that minimum barrier heights to were to be 1000mm	7.1
Shower water supply is from a tank, which is protected by a non-return valve to the pump.	Non-return valves not necessary in these circumstances.	7.2
Investigation has now been done in the form of the probe installation.	The monitoring report identifies other locations with visual evidence of timber damage, which need further investigation.	4.6.5
The determination must result in a clearly defined scope of work.	It is the owner's responsibility to submit a proposed scope of work for the authority's approval, based on sufficient investigations.	9.3

4.6 The moisture detection system results

4.6.1 The consultant also provided a 'Building Evidential Report' dated 17 October 2012, which provided results of a moisture detection system installed on 9 October 2012. This involved the installation of 114 permanent moisture detection units ("MDUs") into bottom plates and various other at-risk locations. These provide information on the moisture content of the timber at those locations by continually recording moisture content at about 4mm in from the outer face of the bottom plates.

[9] Moisture detection unit

4.6.2 During probe installation, a 'timber strength comparative measurement tool' was used to provide a comparative indication of the residual timber strength at the inner and outer sides of the framing. Probe drillings are also collected and those samples were assessed for visual discolouration of the framing timber at that location and given a visual colour rating ("VCR"). Report results are provided in colour-coded groups.

4.6.3 The monitoring report for this house shows the following results[10]:

Colour	Description	Moisture level	No. of MDUs	VCR	No. of MDUs	%'s of MDUs with high moisture levels and/or signs of damage	
Green	'OK'	up to 15%	43	A	43		
Yellow	'Watch'	15% to 18%	33	B	46		
Orange	'Warning'	18% to 25%	27	C	14	45	39%
Red	'Danger'	over 25%	11	D	9		

4.6.4 I note that some drilling samples were assessed as visually discoloured, despite low moisture readings in the same locations. 39% of locations demonstrate high moisture levels (over 18%) and/or visual signs of timber damage; indicating that some framing has deteriorated due to moisture ingress sometime in the seventeen years prior to installation of the MDUs in October 2012.

4.6.5 Although timber framing is treated to an H1.2 level, the results indicate that moisture entry has occurred over a prolonged period in order to lead to the damage identified. I therefore consider that the monitoring report supports my conclusion that the likelihood of timber damage needs to be further explored as part of an investigation into the extent and level of timber damage in the framing (see paragraph 6.3).

4.7 The notice to fix

4.7.1 The consultant also raised other matters in relation to the notice to fix, in that it was not the appropriate regulatory process to be used in this situation. The consultant has raised these matters in another determination was being considered concurrently. That determination considers these matters in detail and I have not included my response to those same arguments in this determination.

4.8 The second draft determination

4.8.1 A second draft determination was issued to the parties for comment on 19 November 2012.

4.8.2 The authority accepted the draft without further comment in a response received on 28 November 2012.

4.8.3 The applicants responded by email on 17 January 2013, accepting the draft subject to amendment regarding the verification of the glass balustrade as grade A safety glazing. The applicants provided photographs of the two glass panels showing the safety markings; I have amended the determination accordingly.

[10] At the outer side of the framing at the MDU location.

5. The expert's report

5.1 As mentioned in paragraph 1.6, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Architects. The expert inspected the house on 17 May 2012 and provided a report dated 12 June 2012.

5.1.1 In regards to the items of contravention listed in the notice to fix, the expert categorised the items noted as 'fail' in the final inspection record into the 'areas of concern' listed in item 3.0 of the notice to fix and concluded on these. I have taken those conclusions into account in paragraph 8.1.

5.2 General

5.2.1 The expert noted that the standard of overall workmanship was 'variable', with defects such as the lack of control joints and flat topped balustrades suggesting a lack of familiarity with information and standards such as NZS 4251[11]. While generally 'straight and fair', the stucco was 'extensively cracked in some areas'.

5.2.2 The expert noted that variations from the consent drawings included

- various changes to windows
- 400mm high plastered upstands under glazed balustrades omitted
- plastered balustrades added to sides of upper deck
- concrete bases to deck and awning posts omitted.

5.3 Destructive investigations

5.3.1 The expert removed small sections of cladding at

- the jamb/sill junction of a ground floor bedroom window (Cut-out A)
- the top of the inner face of the plastered balustrade (Cut-out B)

5.3.2 The expert noted that, although the cladding was beyond the required 15 year service, it was important to establish whether it had prevented moisture penetration into the framing since completion. In order to establish historic performance, six timber samples were taken for analysis from the following areas:

- Sample 1: bottom plate beside garage door
- Sample 2: bottom plate under jamb of ground floor west window
- Sample 3: bottom plate under jamb of ground floor east window
- Sample 4: bottom plate at dining deck doors below north curved window
- Sample 5: deck boundary joist exposed at end of apron flashing
- Sample 6: top plate under flat plastered top to deck balustrade.

5.3.3 The laboratory report dated 27 May 2012 stated that tests indicated all samples were boric-treated to a level equivalent of H1.2 and found that

[11] NZS 4251:1974 Code of practice for solid plastering

- samples 1 to 3 and sample 6 contained 'highly prolific fungal growths but no structurally significant decay was detected'
- sample 4 beneath the curved dining window was similar to the above sample, with the addition of 'superficial soft rot'
- sample 5 from the deck boundary joist contained 'advanced decay that had caused loss of the bulk of the original structural integrity in affected areas'.

5.3.4 The report noted that 'it is important to establish the limits of fungal infection and/or decay and establish the causes' as serious decay may be nearby; concluding that:

> Results suggested that at least some of these samples had almost certainly come very close to conditions conducive to serious decay, e.g. decay nearby or future decay is not unlikely. Presence of boron preservative had almost certainly prevented serious decay in some cases.

5.4 Moisture levels

5.4.1 The expert inspected the interior, noting swollen skirting beside the dining room doors and in the laundry where a plumbing leak was reported and since repaired. All current non-invasive moisture readings were low.

5.4.2 The expert also took invasive moisture readings using long probes from the inside and at cut-outs, with lower readings from about 11% to 14% indicating likely equilibrium levels. The expert noted the following:

- 21% and 18% (Sample 1) in bottom plates beside the south garage doors
- 19% (Sample 2) in bottom plate under a lower west window
- 21% (Sample 6) in plastered balustrade top plate
- 16% and 18% (Sample 4) in bottom plates beside north dining deck doors with curved window above
- 10% but decay in Sample 5 from exposed deck boundary joist
- 14% but dense fungal growth in Sample 3 in bottom plate under east window.

5.4.3 Moisture levels above 18%, or which vary significantly from the equilibrium levels, generally indicate that external moisture is entering the structure and investigation is needed. I also note that moisture readings were taken during the autumn and are expected to increase during wetter seasons.

5.5 Windows

5.5.1 Windows and doors are face-fitted against the cladding with metal head flashings. At Cut-out A, the expert observed that no sill flashings had been installed and no back flashing or seals were installed behind the jamb flanges.

5.5.2 The expert noted that head flashings generally accorded with the manufacturer's details at the time. Although these called for jamb and sill flashings, I note that the details were for windows partly recessed within the stucco thickness whereas the subject windows were face-fixed with joinery flanges overlapping the cladding.

5.6 Commenting specifically on the external envelope, the expert noted:

The plastered walls

- there are no vertical control joints installed in walls beyond 4m and no horizontal control joint in the two-storey-high south staircase walls
- the stucco is insufficiently thick in some areas and there are cracks in the plaster cladding, particularly in the east and west walls
- some penetrations through the stucco are insufficiently sealed

Clearances and overlaps

- there is no clearance from the bottom of the stucco beside the garage doors, with elevated moisture in bottom plates
- although clearances to the ground floor level are sufficient, plaster is continued down over the foundation wall and down below ground and paving level, allowing moisture to wick up the plaster into bottom plates

Windows and doors

- windows and doors lack seals behind jamb flanges, with evidence of past and current moisture penetration in bottom plates below

Roof claddings and junctions

- ends of apron flashings are not weathertight, with no kickouts and gaps
- at the east end of the deck, the deck boundary joist is exposed below the end of the apron flashing, with decay found in Sample 5
- there are no spreaders to downpipes from upper roofs

The upper deck

- some laps to the butyl rubber membrane to the west deck are lifting
- the plywood substrate moves under foot pressure at some junctions and requires further investigation
- the clad balustrades have flat plastered tops, with evidence of past and current moisture penetration found in Sample 6
- parts of the soffit need to be removed to assess the performance of the deck membrane and condition of the deck framing and substrate.

5.7 The expert made the following additional comments:

- Although the meter box lacks a head flashing, the top is sheltered beneath the eaves and there is no indication of associated moisture entry.
- Although roof tiles are dented, this damage has occurred since completion and is considered a maintenance issue with no associated moisture entry.
- Although wall plaster butts against the top of head flashings, due to the shelter from the eaves this is unlikely to be a cause of moisture penetration.

- Although the step down at the upper deck threshold is less than 100mm, some shelter is provided by eaves and there is no evidence of associated moisture ingress.
- Although the 0.4^{o} deck fall is minimal, the length of fall towards the edge of the deck is limited and there are no signs of ponding on the deck surface.
- Although the upper deck lacks gutters or outlets and drains directly into the garden, the runoff is dispersed and unlikely to cause a surface water problem given the limited deck area and distance from lower walls and the boundary.
- The glass balustrade is within an aluminium frame.

5.8 Other Building Code clauses

5.8.1 I note that some maintenance appears to have been carried out since the notice to fix was issued and the expert noted that repair work to laundry finishes and tub sealing were in progress. However, at the time of his visit, the expert noted:

- laundry tub to wall junctions are unsealed (E3)
- laundry finishes are unsealed (E3)
- the plastered balustrade to the upper deck is only 920mm high (F4)
- the hot water cylinder lacks seismic restraints (G12)
- the showers over the baths lack non-return valves (G12)
- gully traps lacked raised surrounds to prevent ingress of surface water (G13).

5.8.2 The expert also noted that a photo in the authority's photo file showed the bottom of the dishwasher and the adjacent joinery and was labelled 'possible ingress to joinery unit', although the area does not lead to any specific risk. (I note that there are very limited descriptions under the photos as to the nature of the defects).

5.9 A copy of the expert's report was provided to the parties on 18 June 2012.

6. The external envelope

6.1 The evaluation of building work for compliance with the Building Code and the risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).

6.2 Weathertightness risk

6.2.1 This house has the following environmental and design features, which influence its weathertightness risk profile:

Increasing risk

- the house is in a high wind zone
- the house is two-storeys high in part with some complex roof junctions
- the walls have monolithic cladding fixed directly to the framing

- there is an enclosed deck attached to the upper level of the house

Decreasing risk

- most of the wall cladding is sheltered by eaves
- the external wall framing is treated to a level that provides some resistance to decay if it absorbs and retains moisture.

6.2.2 Using the E2/AS1 risk matrix to evaluate these features, the elevations are assessed as having a moderate weathertightness risk rating. If details shown in the current E2/AS1 were adopted to show code-compliance, a drained cavity would be required for all elevations. However, this was not a requirement at the time of construction.

6.3 Weathertightness conclusion

6.3.1 I consider the expert's report establishes that the current performance of the building envelope is not adequate because there is evidence of past and/or current moisture penetration into the timber framing. This opinion is confirmed by the Building Evidential Report in paragraph 4.6. Consequently, I am satisfied that the house does not comply with Clause E2 of the Building Code.

6.3.2 In addition, the building envelope 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 will continue allow the ingress of moisture into the framing (which has a 50-year service requirement) in the future, the building work does not comply with the durability requirements of Clause B2.

6.3.3 While some investigation has been undertaken to the full extent of any moisture penetration, I consider further investigation is required of specific areas that were not assessed in Building Evidential Report.

6.3.4 I note that the Ministry has produced a guidance document on weathertightness remediation[12]. I consider that this guide will assist the owners in understanding the issues and processes involved in remediation work to the cladding, and in exploring various options that may be available when considering the upcoming work required to the house.

7. The remaining Building Code clauses

7.1 Taking account of the expert's report, as outlined in paragraph 5.8, I consider that the following items require attention or completion (associated code clauses are shown in brackets):

- inadequate height of the plastered balustrade to the upper deck (F4)
- lack of seismic restraints to the hot water cylinder (G12)
- surface water is able to enter gully traps (G13).

[12] Weathertightness: Guide to remediation design. This guide is available on the Ministry's website, or in hard copy by phoning 0800 242 243.

7.2 The hot water cylinder is fitted with a relief pipe that runs to the exterior. However, an airbreak is required to the combined drain from the relief valve and the cold water expansion valve, or alternatively a separate drain may be provided for each device.

7.3 The expert considered that the glazing to the glass balustrade was adequate to satisfy the requirements of Clause F2 Hazardous building materials, and the applicants have subsequently also verified that the glass complies with Table 3.1 of NZS 4223[13] (F2).

7.4 With respect to the authority's requirement for 'non-return valves to showers' and the prevention of contamination of potable water under Clause G12.3.2; I do not consider the low risk associated with use of a flexible shower hose over a shower cubicle warrants the need for measures to protect the water supply. I accept that the shower hoses are acceptable in these circumstances (G12).

7.5 I accept the consultant's advice that as the laundry is finished with a laminate-faced wall lining, and I accept that no additional sealing is required to prevent water splash penetrating linings or into concealed spaces (E3).

8. The notice to fix

8.1 Taking into account the expert's comments and the authority's photo file, the following table summarises my conclusions on items in the notice to fix and final inspection; referring also to related paragraphs within this determination:

'Failed' items per final inspection	My conclusions	Clauses	Paragraph references
External envelope (Cladding)			
Cladding clearances	Remedial work required.	**E2, B2**	5.6
External cladding integrity (assumed to refer to overall condition)	Investigation and remedial work required	**E2, B2**	5.6
No control joints	Remedial work required.	**E2, B2**	5.6
Cladding paintwork	Maintenance	**E2, B2**	
Roofing			
Inadequate apron flashings (assumed to refer to bottom of apron flashings)	Remedial work required	**E2, B2**	5.6
Spouting clearance	Included above	**E2, B2**	5.6
Spreaders	Remedial work required	**E2, B2**	5.6
Damaged roof tiles	Maintenance	**E2, B2**	5.7
Membrane, balustrade (height and fixings) and lack of fall on deck			
Top of clad balustrades	Remedial work required.	**E2, B2**	5.6
Clad balustrade - height	Remedial work required	**F4**	7.1
Step down from interior	Adequate	**E2, B2**	5.7
Outlet drain	Adequate	**E2, B2**	5.7
Deck slope	Adequate	**E2, B2**	5.7
Waterproof membrane	Investigation required	**E2, B2**	5.6
Overflow drain	Adequate	**E2, B2**	5.7
Glass balustrade markings	Safety glazing material verified	**F2**	7.3

[13] New Zealand Standard 'NZS 4223: 1993 Code of practice for Glazing in Buildings Part 3 Human Impact Safely Requirements', which was cited in Compliance Document F2/AS1 that was in force at the time the consent was issued.

'Failed' items per final inspection	My conclusions	Clauses	Paragraph references
Ground clearances			
Floor clearances	Adequate	**E2, B2**	5.6
Clearances to bottom of plaster	Remedial work required	**E2, B2**	5.6
Drainage systems			
Haunching of gullies	Remedial work required	**G13**	7.1
Internal moisture			
Laundry wall finishes sealed	Now adequate	**E3**	7.2
Laundry tub sealed and secured	Now adequate	**E3**	7.2
Other items in final inspection			
Smoke detectors	Not required at time consent was issued	**F7**	8.2
Hot water cylinder seismic restraint	Remedial work required	**G12**	7.1
HWC tundish and air gap	Remedial work required	**G12**	7.2
HWC relief pipe	Adequate	**G12**	7.2
Non-return valves to showers	Not considered necessary	**G12**	7.2
Plumbing leak in laundry	Now repaired	**G12**	5.4.1

8.2 I note that the final inspection identified the lack of smoke detectors. While these were not a requirement of the Building Code when the house was constructed, I strongly suggest the owners install smoke detectors in accordance with the current compliance document F7/AS1.

8.3 I am satisfied that the house does not comply with the Building Code and that the authority made appropriate decision to refuse to issue the code compliance certificate and it was within the authority's powers to issue the notice to fix. However, I consider some items identified in the notice are adequate and the notice to fix should be modified accordingly.

9. What happens next?

9.1 The notice to fix is to be modified to take account the findings of this determination and to referring to any further defects that might be discovered in the course of investigation and rectification, but not specifying how those defects are to be fixed. It is not for the notice to stipulate directly how the defects are to be remedied and the house brought to compliance with the Building Code.

9.2 Alternatively the authority may elect to withdraw the notice to fix and deal with the matter via a notice issued under section 95A of the Act.

9.3 The applicants can then produce a response, to either the modified notice to fix or the notice issued under section 95A, in the form of a detailed proposal for the remediation of the non-compliant matters. It is strongly suggested this proposal is produced in conjunction with a competent person with suitable experience in weathertightness remediation.

9.4 I note that the expert has identified changes from the consent drawings (refer paragraph 5.2.2) and I leave these to the parties to resolve in due course.

10. The decision

10.1 In accordance with section 188 of the Act, I hereby determine that:

- the external envelope does not comply with Building Code Clause E2, and Clause B2 in respect of Clauses B1 and E2
- some other elements in the house do not comply with Clauses F4, G12 and G13 of the Building Code

and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate.

10.2 I also determine that the authority is to modify the notice to fix, dated 27 April 2009, to take account of the findings of this determination.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 22 January 2013.

John Gardiner
Manager Determinations and Assurance