



Determination 2017/003

Regarding the refusal to issue a code compliance certificate for a 12- to 15-year-old house with monolithic cladding at 4 Komokoriki Hill Road, Warkworth



Summary

This determination is concerned with the compliance of a 12 to 15-year-old house. The determination considers the authority's reasons for refusing the code compliance certificate, and whether the house complies with the requirements of the Building Code, particularly with respect to weathertightness and durability.

1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ ("the current Act") made under due authorisation by me, John Gardiner, Manager Determinations and Assurance, Ministry of Business, Innovation and Employment ("the Ministry"), for and on behalf of the Chief Executive of the Ministry.
- 1.2 The parties to the determination are:
 - the owner of the house, T and E Family Trust ("the applicant") acting via an agent ("the building surveyor")
 - Auckland Council² ("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 14-year-old house. The refusal arose because the authority is not satisfied that the building work complies with certain clauses³ of the Building Code (First Schedule, Building Regulations 1992). The authority's concerns relate to the weathertightness and durability 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.building.govt.nz or by contacting the Ministry on 0800 242 243.

² After the house was completed, Rodney District Council was transitioned into Auckland Council. The term "authority" is used for both.

³ In this determination, references to sections are to sections of the Building Act and references to clauses are to clauses of the Building Code.

1.4 The matter to be determined⁴ is therefore whether the authority was correct to refuse to issue a code compliance certificate for the reasons given in its letter dated 25 November 2015 (see paragraph 3.4). In deciding this matter, I must consider whether the external building envelope of the house complies with Clause B2 Durability and Clause E2 External moisture of the Building Code that was in force at the time the consent was issued. The building envelope includes the components of the systems (such as the wall cladding, the windows, the decks and the roof cladding) as well as the way components have been installed and work together. This matter includes compliance with Clause B1 Structure, insofar as it relates to the weathertightness of the house.

1.5 Matters outside this determination

1.5.1 In its final inspection and refusal to issue the code compliance certificate, the authority noted the lack of restrictors to bathroom windows (Clause F4), which the applicant does not dispute. And although the expert has commented on the requirements for some documentation, this determination is limited to the above clauses and I leave any remaining issues to the parties to resolve.

1.5.2 The authority's final inspection records refer to the 'related consents' on the property. This determination is limited to building work carried out under consent ABA 521 and does not consider work carried out under:

- ABA 961131 issued on 17 May 1996 for a detached barn "the studio"
- ABA 1005309 in 2009 for 'deck and steps'.

1.5.3 I also note that the owner will be able to apply to the authority for a modification of durability provisions to allow the durability periods specified in Clause B2.3.1 to commence from substantial completion (see paragraph 3.2.4), which I take to be:

- late 2001 for the external building envelope and structure of the house
- late 2004 for completion of the interior.

Although I leave this matter to the parties to resolve in due course, I have taken the anticipated modification into account when considering cladding durability.

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 detached house which is two-storeys high in part and is situated on a north-sloping rural site in a low to medium wind zone for the purposes of NZS 3604⁵. Although fairly simple in plan, the house is complex in form and is assessed as having a high weathertightness risk.

2.2 The large ground floor garage and workshop area is at the southeast high point of the site and includes a concrete slab, with concrete block foundations and perimeter walls. The remaining construction is generally conventional light timber frame with some steel beams, which includes pile footings, multi-level timber framed floors, monolithic wall cladding, aluminium windows and asphalt shingle roofing. The

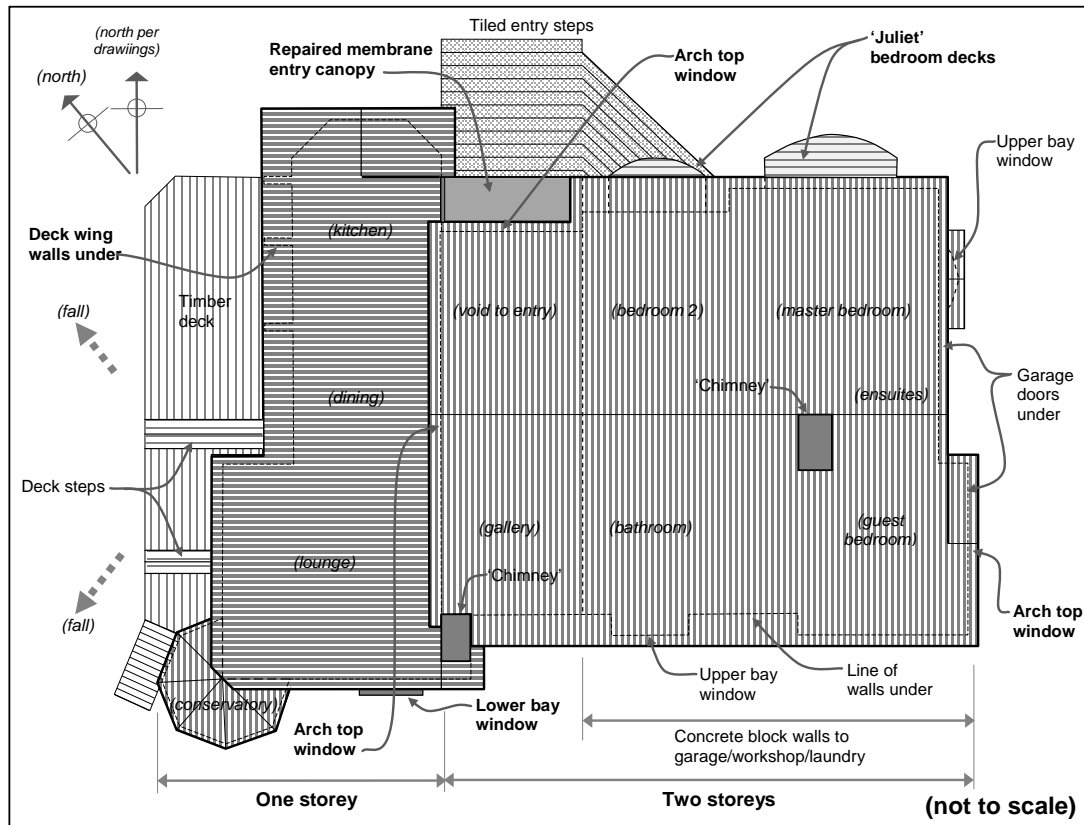
⁴ Under sections 177(1)(b) and 177(2)(d) of the Act

⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

25° pitched roof is a mix of gables and lean-tos, with the main upper roof including eaves and verges varying from 900mm above recessed walls to 300mm elsewhere.

- 2.3 The northwest gable end wall includes an arched window above the lean-to roof to the single storey living areas. As shown in Figure 1, roofs form gables above three projections and a hipped roof conservatory extends from the west corner, with apron flashings at roof/wall junctions. Curved membrane roofing forms an entry canopy, with internal gutters to the roof/wall junctions at the ends.

Figure 1: Approximate site plan



2.4 The decks

- 2.4.1 On the upper northeast wall, two cantilevered 'Juliet' decks extend from the master bedroom and bedroom 2. The decks have floors of spaced timber decking, with open metal balustrades. Deck soffits and the outer curved floor perimeter are clad with the same spaced timber decking boards.
- 2.4.2 On the ground floor, an attached timber framed deck with open metal balustrades extends along the northwest elevation. The deck floor steps down towards the southwest, with a flight of steps down to ground level beside the conservatory. Three wing walls extend from the northwest wall beneath the 800mm deep eaves soffit ("the deck wing walls") as shown in Figure 1.

2.5 The wall cladding

- 2.5.1 The cladding is a proprietary monolithic cladding system which incorporates 4.5mm thick fibre-cement backing sheets fixed through the building wrap directly to framing timbers. A 10mm layer of insulating plaster is applied over the sheets, followed by a fibreglass mesh-reinforced layer of plaster and a final textured finish. The same painted plaster finish has been applied to the concrete block exterior walls.

- 2.5.2 The authority's limited records include the manufacturer's detail sheets dated from March 1995 to October 1997, which show purpose-made flashings and polystyrene 'screed guides' to windows, edges and other junctions. The cladding system was subject to a BRANZ appraisal⁶ at the time of installation, which has since been withdrawn.
- 2.6 The expert forwarded moisture-damaged samples of framing timber for laboratory testing, which detected preservative in two samples, with none detected in the third⁷. Taking account of the expert's comments as outlined in paragraph 5.1.4, I consider that wall framing is generally boron-treated to H1.2 level and will provide some resistance to fungal decay.

3. Background

- 3.1 The documentation contained within the authority's property file provided for this determination is incomplete. It includes no information held by the former council and no records of the original construction of the buildings on the property: the following is therefore based on limited property information.

3.2 The original construction

- 3.2.1 I have not seen a copy of the building consent, the stamped consent documents or any of the individual inspection records. According to the applicant, the authority issued building consent no. ABA 521 for the house on 6 April 2000 under the Building Act 1991 ("the former Act").
- 3.2.2 The expert's photograph of a handwritten inspection summary from the applicant records indicates that construction was generally as follows:
- foundations, floor slab and masonry walls in May/June 2000
 - framing from about July to October 2000
 - external claddings completed by late 2000 (based on a pre-plaster inspection dated as 10 October 2000).
- 3.2.3 At the time of a pre-plaster inspection, cladding backing sheets, joinery and flashings would have been installed in preparation for plastering; which is expected to have followed shortly afterwards in accordance with the manufacturer's instructions.
- 3.2.4 Comments made in the builder's report (see paragraph 3.5) and the building surveyor's report (see paragraph 3.7) indicate that the building envelope was substantially complete by the end of 2001. (I note that Quotable Value includes the house in its 'property changes' from a date of 31 January 2001.) However, the completion of interior work is not clear; the inspection summary shows a total of eight 'pre-line' and 'post-line' inspections from March 2002 to September 2004.
- 3.2.5 A final inspection record of the studio in 2013 identified some defects regarding the deck and noted that the same roof and wall cladding systems used for the studio as for the subject house. It is therefore assumed that the consent for 'deck and steps' was associated with the studio building (see paragraph 1.5.2).

⁶ BRANZ appraisal 309 (1995)

⁷ The third sample was possibly LOSP-treated or had low levels of boron which have leached over time.

3.3 The 2015 final inspection

3.3.1 I have seen no correspondence between the parties regarding a final inspection until the authority carried out a final inspection on 23 November 2015. The authority's 'Durability final inspection checklist' identified the following items as needing attention or further investigation:

1. Restraints to bathroom windows
2. Fascia embedded in plaster
3. Minimal clearance cladding to apron flashing
4. No kick out flashings evident
5. Arched windows – no kick out flashings evident
6. Mitred window junctions – some cracks to sills
7. Juliet decks – cantilevered joists no saddle flashings evident.

3.3.2 The record also noted changes to the upper 'Juliet' decks; with metal balustrades in lieu of clad barriers and slatted timber decking in lieu of tiled membrane deck floors. The record concluded that the work 'may be in breach of' Clauses B1, B2, E2 and F4 and added 'subject to peer review and documentation'.

3.4 The refusal to issue a code compliance certificate

3.4.1 The authority wrote to the applicant on 25 November 2015 to advise that 'under Section 95A of the Building Act 2004 a code compliance certificate cannot be issued at this stage.' The authority recommended that:

... you engage the services of a suitably qualified individual (Building Surveyor) who is qualified in Weather Tight assessment and Remedial Design.

This person must further investigate the performance of this building, also taking into account the items below and provide a 'scope of works' and any recommendations to [the authority] for further review.

3.4.2 The authority repeated the items identified in its final inspection (see paragraph 3.3.1), adding as item 8 'Domed roof membrane – Proof of performance⁸'. The changes in the decks were noted and the following documentation was required:

- As built drawings for [the Juliet decks]
- Electrical work certificate
- PS4 Hi Bond floor
- Scope of work from a suitably qualified individual (Building Surveyor) prior to any remediation
- Site specific maintenance plan which covers roof, roof/deck membranes, exterior cladding and gutters – to be signed by existing owners and passed on to new owners if property is sold.

3.5 The builder's report

3.5.1 The applicant subsequently engaged a property inspection company to assess the house against the authority's list of outstanding items and a builder ("the builder") inspected the house in early December, providing a weathertightness assessment report dated 12 December 2015.

3.5.2 The builder took non-invasive moisture readings internally at external walls adjacent to fascia ends, arched window ends and bay window corners, and found these to be low and consistent when compared with a reading taken on an interior wall.

⁸ Apparently referring to a requirement for a producer statement/guarantee for the membrane

- 3.5.3 The builder inspected and commented on items identified by the authority, noting in regard to item 1 that ‘window restraints have been purchased and are to be fitted’. In regard to the remaining items, the builder noted:
- Item 2 Fascia: Although some fascia ends are embedded in plaster, the detail is performing satisfactorily - as the roofing and gutter shelters the junction, which is well sealed with no elevated moisture levels in the adjacent framing.
 - Item 3 Cladding/apron clearances: The bottom of the cladding has a uPVC ‘J’ mould fitted that protects the bottom edge of the fibre-cement backing sheet, and increasing clearances would be very difficult. Given the lack of moisture penetration, the junction has performed satisfactorily.
 - Item 4 Lack of kick outs: The end of the copper apron flashing is bent to divert water into the gutter and has performed satisfactorily for 15 years. However purpose-made diverters could be installed over the ends.
 - Item 5 The ends of arched window head: The window head is sheltered by an arched ‘eyebrow’ and the soffit. The window has performed satisfactorily and cutting away plaster to install kickouts would risk compromising integrity.
 - Item 6 Mitred windows: Mitres to internal reveals have shrunk and cracked at joint, which is likely due to condensation as bay window units are factory-assembled. There are no elevated moisture levels in framing below.
 - Item 7 Deck joist penetrations: Saddle flashings were not commonly fitted in 2000. There is no sign of moisture damage and junctions are well sealed.
 - Item 8 The canopy membrane: The butyl rubber membrane has performed without any problem and is now out of the 15-year warranty period. It is easily replaced if necessary and is outside of the main building envelope.

3.5.4 The builder concluded:

The whole of the building envelope has been performing as intended for the past fifteen years or so. The only remedial works required would be the window restraint stays and the fitting of purpose made diverter flashings to the bottom end of the copper apron flashings.

- 3.6 The applicant provided the authority with the builder’s report’s together with other required documentation on 4 March 2016 (see Table 2). I have seen no record of any response to the builder’s report from the authority and I must therefore assume that either the report was not considered acceptable, although reasons for this are not made clear.

3.7 The building surveyor’s report

- 3.7.1 Some purpose-made kick-out flashings were subsequently retrofitted over the ends of lower level apron flashings and the applicant engaged the building surveyor to address the refusal to issue a code compliance certificate. The surveyor visited the house and reported to the authority on 13 April 2016.
- 3.7.2 The surveyor noted that the house had ‘been exceptionally well maintained’, but identified the following ‘potentially vulnerable’ features:
- cantilevered deck joists
 - curved window heads
 - curved roof with an internal gutter
 - apron flashing terminations.

3.7.3 The surveyor inspected and commented on items identified by the authority, carrying out 'a number of invasive investigations to ascertain performance.' In regard to item 1, the surveyor noted that window restraints 'will be fitted' and in regard to remaining items included the following comments (in summary):

- Item 2 Fascias: The junctions are well sealed and well maintained, with no signs of moisture penetration:
 - to framing observed where kitchen downlights removed
 - to underside of flooring below junctions
 - recorded by semi-invasive moisture readings taken behind junctions in master and guest bedrooms.
- Item 3 Cladding/apron clearances: A small non-dimensioned gap was shown in the manufacturer's 1995 details, and a gap has been provided. Junctions are considered satisfactory, given that:
 - there is no evidence of moisture penetration
 - roof overhangs shelter junctions
 - the 25° roof pitch provides good falls away from junctions
 - increasing clearances is likely to damage the bottom of the cladding.
- Item 4 Lack of kick outs: Some retro-fitted copper diverter flashings have been fitted to lower roofs, which should also be added to upper roof aprons. The original junctions had apparently performed since 2000 given that:
 - there is no evidence of moisture penetration
 - roof falls and overhangs limit water running over junctions
 - the house has been well maintained since construction.
- Item 5 The ends of arched window head: Diverters were not commonly installed to ends at the time and invasive investigations of wall framing from the inside behind all three arched windows and junctions show satisfactory performance, given that:
 - there is no evidence of moisture penetration
 - roof overhangs shelter junctions
 - retrofitting stop ends is likely to damage the cladding.
- Item 6 Mitred windows: In regard to the lounge bay window, mitres are prone to failure and condensation was observed. Ventilation grilles to the enclosed seat were recommended but the window appeared to have performed to date, with no signs of moisture:
 - to the top of flooring inside the window seat
 - to the underside of flooring within the sub-floor.
- Item 7 Deck joist penetrations: Saddle flashings were not commonly fitted in 2000. Junctions are considered satisfactory, given that:
 - the open decking and metal balustrades reduce risks
 - there is no evidence of moisture penetration
 - although the master bedroom sill liner is damaged with elevated moisture at jamb, this is likely to result from joinery mitre joint failure and an aluminium specialist repairer is recommended.

- **Item 8** The canopy membrane: The butyl rubber membrane was installed over nail-fixed curved plywood as was common practice at the time. Although some maintenance repair is now needed as a nail is protruding, the membrane had performed satisfactorily to date given:
 - the membrane is over 15 years old
 - there is no evidence of moisture penetration
 - the canopy is outside of the building line.

3.7.4 The building surveyor also made some recommendations about the framing to the northwest timber deck, which I do not consider in this determination (see paragraph 1.5). The surveyor concluded that:

The issue discovered in the main bedroom ... is not a systemic failure across the building.

As long as this can be remediated effectively and that other items are attended to in a timely and effective manner and then as long as it is continued to be maintained regularly and routinely I am of the opinion that the building will continue to perform and meets its obligations of the New Zealand building code...

3.7.5 The authority responded in an email on 29 April 2016 to the building surveyor, attaching a copy of the report with responses added as shown below:

Table 1: Council responses

Authority's concerns (25 11 15)		Building surveyor's conclusion (see paragraph 3.7.3)	Authority's response (29 04 16)
1	Bathroom window restraint	Will be fitted	Agreed
2	Fascias	Satisfactory in circumstances	Accepted
3	Cladding/apron clearances	Satisfactory in circumstances	Accepted
4	Lack of kick outs	Past performance satisfactory Kick out flashings over upper junctions recommended	Retro-fit flashings Accepted in principle
5	Ends of arched window head	Ends of arched heads satisfactory	Accepted
6	Mitred windows	Past performance satisfactory Vents to enclosed window seat in lounge recommended	Accepted
7	Deck joist penetrations	Past performance satisfactory Investigation/repair to door sill mitres recommended	Accepted in principle Further investigation/repair
8	The canopy membrane	Past performance satisfactory Maintenance now required	Membrane replacement accepted in principle

3.8 The second final inspection

3.8.1 The applicant subsequently carried out the recommended investigations/repairs and also provided extra documentation, which was added to that already provided in response to documentation listed in the authority's refusal to issue a code compliance certificate (see paragraph 3.4.2). The documentation provided and included in the authority's digital property file is shown in the following table:

Table 2: Additional documentation provided

Authority's (S95A list)	Received by authority	Contents
As built drawings for [the Juliet decks]	Stamped 4 March 2016	Deck details dated 17 January 2016
Electrical work certificates	Stamped 4 March 2016	<ul style="list-style-type: none"> • 4 July 2009 • 28 February 2013 • 21 May 2013
PS4 Hi Bond floor	Stamped 4 March 2016	18 February 2016 PS4 – Construction Review (entrance deck concrete)
Scope of work	<ul style="list-style-type: none"> • Date stamp 4 March 2016 • 13 April 2016 	<ul style="list-style-type: none"> • Builder's Report • Building surveyors report
Site specific maintenance plan	Date stamp 4 March 2016	<ul style="list-style-type: none"> • 'Recommended Maintenance for Buildings' Building Surveyor (undated) • Undated 'Maintenance Schedule'
Subsequent repairs		
Strengthening of NW timber deck	Stamped 4 March 2016	2 February 2016 PS1 – Design (deck strengthening)
Master bedroom sliding doors	Not stamped	14 May 2016 PS3 – Clean and reseal mitres on doors
Canopy repairs	Not stamped	<ul style="list-style-type: none"> • June 2016 Butyl rubber supplier - Material guarantee • 4 July 2016 – Invoice from membrane installer.

- 3.8.2 The authority re-inspected the house on 15 July 2016 and the record identified no specific items that required attention, but noted 'Fail subject to peer review and documentation'. In an email to the applicant dated 20 July 2016, the authority noted that the peer review process following the final inspection had identified:

Items/Issues Outstanding:-

- a) Please provide PS3 and product and applicator warranty for membrane roof replacement.
- 3.8.3 The applicant was unable to meet this requirement because the butynol installer stated that such a statement would affirm that the work had been completed 'according to the plans and specs as per the building consent'. The installer considered that the invoice was proof that repairs had been carried out. Despite discussions and correspondence, the question of the need for a producer statement was not resolved.

3.9 Additional investigations

- 3.9.1 Because the authority had rejected arguments regarding producer statement for the membrane repair and had suggested a determination be sought, the building surveyor met with the authority on 11 August 2016 to attempt to resolve the situation.
- 3.9.2 It appears that no progress was made regarding the canopy membrane. Instead the authority questioned the evidence of the performance of the house in regard to the investigations carried out. The authority considered it now required further invasive investigation.

- 3.9.3 In an email to the authority dated 12 August 2016, the building surveyor noted that the applicant ‘had reluctantly’ agreed to invasive investigation of the cladding. The surveyor attached photographs of elevations with proposed locations attached and asked the authority to confirm their agreement with the proposed investigations.
- 3.9.4 The authority responded on 15 August 2016, acknowledging the proposed additional investigations but adding additional areas required. (I note that these include areas not earlier identified or areas that had formerly been accepted.) The authority stated:
- In terms of the openings there are additional areas of high risk building methods which should also be assessed. Included but not limited to;
- Either side of the entrance porch, membrane transition to wall.
 - Above porch, roof/wall ridge detail.
 - Decks... ..Please use the findings made on [the studio] as a basis.
 - The sloped head & sill window area and method serving the south wall.
 - The vents serving the chimney.
 - Outer faces of bay windows.
 - Parallel apron flashings.
- The authority concluded by recommending the applicant apply for a determination.
- 3.10 The Ministry received the application for a determination on 19 August 2016 and requested further clarification as to the matters in dispute. Additional information and copies of emails relating to the additional required investigations were provided by the applicant and the building surveyor by 3 September 2016.

4. The submissions

- 4.1.1 In response to the Ministry’s request for clarification, the applicant set out the recent background to the dispute in an email dated 29 August 2016, explaining that since the canopy roof repair, the authority:
- ...now appears to be introducing other requests [The authority] are now requesting further investigation be carried out as the team leader is now saying that he can’t be reasonably satisfied the building is performing at this point in time.
- 4.1.2 The applicants provided copies of:
- the authority’s refusal to issue a code compliance certificate dated 25 November 2015
 - the building surveyor’s report dated 13 April 2016
 - the authority’s response dated 13 April 2016 to the above report
 - email correspondence between the parties.
 - various producer statements, certificates, and other information.

4.2 The authority’s submission

- 4.2.1 The authority made no submission but forwarded a CD-Rom, entitled ‘Property File’, which contained some documents pertinent to this determination.

4.3 The draft determination and submissions in response

- 4.3.1 A draft determination was issued to the parties for comment on 4 November 2016.
- 4.3.2 The applicant's agent responded on 21 November 2016, querying the moisture readings taken by the expert and noting that further investigation of the southwest bay window had been carried out and there was no sign of staining to the framing or building wrap or any mould or musty odour that would indicate moisture penetration. The agent provided photographs taken which appear to be from the investigation referred to.
- 4.3.3 The authority did not accept the draft determination, and made a submission by email on 5 December 2016 (in summary):
- The vents serving the chimney had not been addressed by the expert.
 - The repair work to the canopy membrane should be compliant 'with the manufacturer's specifications and/or the building code'. The repair work cannot be approved by the authority 'as it appears to be non-compliant' (refer paragraph 5.6).
 - Further investigation and remedial work is required in regards to the cause of elevated moisture readings in framing below the lounge southwest bay window has not yet been investigated (refer paragraph 5.4.4) and framing at joist penetrations to both decks (refer paragraph 5.8.5). The authority requires an updated scope of works to address these issues.
- 4.3.4 The applicant responded on 4 December 2016 (in summary):
- The chimney vents were approved and 'signed off by a fire place installer' and that document was provided to the authority.
 - The investigation of the southwest bay window had been carried out and that information provided to the Ministry and the authority on 21 November 2016. Some of the plasterboard and insulating batts had also been taken to a meeting with the authority on 21 November 2016.
 - The canopy structure is 2 layers of 9mm ply with staggered joins and was approved in the consent, the screws were replaced with stainless steel screws and there is no reason for the authority to require "alternative screws". The applicator's invoice and product warranty have been supplied to the authority.
 - The applicant accepts the issue of the decks requires addressing and a scope of works is being prepared.
 - The agent also sought clarification regarding the moisture content readings taken by the expert (refer paragraph 5.11).

5. The expert's report

5.1 General

- 5.1.1 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 and inspected the house on 23 September 2016, providing a report completed on 12 October 2016. The parties were provided with a copy of the report on 26 October 2016.

- 5.1.2 The expert noted that the scope of his inspection was to provide an opinion about items identified in the authority's section 95A refusal to issue a code compliance certificate dated 25 November 2015 and to assess code compliance of areas identified by the authority with the associated parts of Clauses B2 and E2.
- 5.1.3 The expert considered that the layout of the house was generally as indicated on the drawings except for the following changes:
- Juliet decks changed to open slat floors with metal balustrades in lieu of membrane floors and clad balustrades
 - some window locations and configurations changed
 - (I also note some changes to the front entry deck/steps and the rear deck.)
- 5.1.4 The applicants advised that wall framing was 'boric treated to H1 level' but were unable to provide records, so the expert took a sample from a bottom plate within the sub-floor at the level change under the living room (sample 1) – located about 1m from the external wall and 1.2m above soil level. Laboratory analysis (see paragraph 5.2.4) confirmed that the wood was boric treated and the expert therefore considered it 'reasonable to conclude the wall framing was generally treated to H1 level.'

5.2 Moisture testing and sample analysis

- 5.2.1 The expert inspected the interior, observing that the internal linings were 'free from mould, stains, swelling or other clear signs of moisture ingress.' The expert took non-invasive moisture readings internally, with all readings 'consistent and low'.
- 5.2.2 The expert also took sample invasive moisture readings using long probes from the inside or through holes drilled through the cladding and 10mm into the framing. The expert recorded:
- 22% in the boundary joist beneath the northeast master bedroom deck (sample 3)
 - 18% in the boundary joist beneath the northeast bedroom 2 deck
 - 21% and 22% in bottom plates to the northwest deck wing walls (sample 2)
 - 19% and 20% beneath the living room bay window sill.
- 5.2.3 Readings over 18% generally indicate that moisture is entering the framing and further investigation is needed. The expert noted that his inspection followed periods of heavy spring rain and readings therefore represented the peak of expected seasonal variation, with lower readings expected during drier months.
- 5.2.4 The expert forwarded the three samples for analysis and the laboratory report dated 3 October 2016 noted the following:
- sample 1 was boric-treated to H1.2 level and contained:
 - 'dense fungal growths'; with decay fungi showing 'morphology suggestive of historical activity' not recent activity
 - yeasts and secondary moulds suggesting recent activity
 - sample 2 was CCA-treated to H3.2 level and:
 - contained 'dense fungal growths' of fungi, yeasts and secondary moulds
 - contained 'superficial soft rot' but no structurally significant decay
 - had been 'exposed to conditions conducive to decay', with such samples 'typically found in moisture compromised wall cavities'

- sample 3 contained:
 - no detected preservative, with wood either untreated or LOSP-treated
 - ‘early to moderate soft rot’ and ‘suspected incipient brown rot’; and would likely require replacement.

5.2.5 The expert noted that sample 1 was protected from the weather within the subfloor (see paragraph 5.1.4) and therefore considered that the historic fungi were likely to have resulted from exposure prior to framing being enclosed, while recent yeasts and secondary moulds would have resulted from subfloor humidity.

5.3 Cladding clearances

5.3.1 The expert noted that the plaster finish to the concrete block walls extended below ground and paving levels, which ‘is of no concern.’ In regard to base details of the wall cladding to timber framed walls, he noted that:

- floor levels are typically more than 1m above ground level
- the wall cladding extends down over the subfloor framing, with sufficient clearance to the ground
- the uPVC base mouldings can be seen at the bottom of the cladding.

5.4 Joinery details

5.4.1 The expert inspected the visible installation details of door and window joinery, probing the jamb junction of the southwest study window. In order to assess the underlying construction, the expert also scraped plaster away from the jamb/sill junction of the northwest kitchen window which is sheltered beneath the 900mm eaves overhang.

5.4.2 The expert noted that installation details generally accorded with the manufacturer’s details at the time for recessed windows⁹, with:

- joinery units recessed from the cladding face by about 30mm
- cladding above joinery belled out as ‘eyebrows’ to form drip edges
- visible metal head flashings
- sealant between jamb and plaster reveal
- proprietary uPVC sill and jamb flashings sealed at the jamb/sill junction.

5.4.3 Taking account of the above and the low moisture readings (13% to 17%) recorded in framing below the standard and arched windows, the expert considered these ‘standard’ windows were performing satisfactorily.

5.4.4 However, the expert also noted elevated moisture levels in framing below the lounge southwest bay window, where the building surveyor had also noted high moisture levels. The expert considered the probable cause is ‘inadequate sealing of the frames at the external corners’ but added that further investigation is needed to confirm cause(s).

5.5 Flashings to primary roofing

5.5.1 The expert also assessed roof flashings to the primary roofing and noted that they generally appear satisfactory, with:

⁹ Duraplast Data Sheets October 1997

- copper flashings at roof/wall junctions
- kick-out flashings retro-fitted at the bottom of apron flashings
- a ‘good standard of installation’ evident
- low moisture readings in framing below the ends of apron flashings.

5.6 The membrane to the entry canopy

5.6.1 The expert noted that the membrane to the curved canopy had been partially replaced in 2015 because ‘a nail had worked loose and was stretching the rubber’. In regard to the completed repair work, the expert observed that:

- a strip of the original membrane at the canopy/wall junctions had been left in place in order to avoid cutting into the wall cladding plaster
- the majority of the membrane had been replaced, with lapped joints at junctions with the original
- the lapped joint was well adhered and both the new and original membrane were ‘in sound condition’.

5.6.2 Because repairs used the same material, the expert concluded that the work did not require a building consent. The expert considered that the work appeared satisfactory and ‘therefore not relevant to the issue of a CCC’.

5.6.3 The expert also noted that the fascia had been removed during the repair work and the photo taken at the time showed no significant past moisture penetration behind the fascia. Non-invasive moisture readings indicate continuing weathertightness.

5.7 The northwest deck

5.7.1 The expert noted that the northwest deck to the living and kitchen area had been generally installed with 12mm clearance from the wall cladding. However at the wing walls and kitchen wall, the gap had been closed off with a timber trim and high moisture levels were recorded at the end of a wing wall.

5.7.2 Sample 2 removed from the bottom plate was found to be CCA-treated to H3.2 level, but contained ‘superficial soft rot’ indicating that it had been ‘exposed to conditions conducive to decay’. Although testing found no structurally significant decay, the report also noted that such samples could be ‘on the periphery of more seriously affected framing sometimes in need of replacement.’

5.7.3 The expert considered that the two likely causes for moisture penetration are:

- a) the deck trim which should be removed to reinstate the clearance between the deck and the cladding, and
- b) the position of the bottom plate which is fixed to the deck framing which is often wet.

5.8 The Juliet bedroom decks

5.8.1 The expert noted that the building surveyor had identified moisture penetration under the sliding doors, apparently due to an unsealed mitre in the slider frame. Door repairs were carried out, which involved sealing the mitre and repairing framing and trim – including applying timber preservative to surrounding framing.

5.8.2 The bedroom decks include spaced deck boards on the floors as well as linings to deck soffits and the outer face of the deck floor. The cantilevered deck joists

penetrate the wall cladding, with weatherproofing of junctions dependent on sealant. (Despite gaps between boards, I note that enclosing framing with boarding is likely to have limited ventilation of the timber, and will also have impeded the ease of inspection and maintenance of sealants at the joist penetrations.)

5.8.3 The expert recorded elevated moisture levels at one end of the cantilevered deck to the master bedroom and removed lower soffit lining boards to take a timber sample from the boundary joist. No preservative was detected in the sample, which I note could mean that the boundary joist was either:

- untreated timber
- treated with LOSP, which is not detectible in the tests undertaken
- boron leached from timber due to prolonged exposure to moisture.

5.8.4 Sample 3 contained ‘early to moderate soft rot’ and ‘suspected incipient brown rot’, with replacement likely to be needed. The expert noted that the ‘construction of the bedroom 2 deck is identical and likely to be in a similar condition.’

5.8.5 The expert therefore considered that framing at joist penetrations requires further investigation of both decks to determine the extent and significance of possible past moisture penetration, with framing replacement if necessary. To avoid future problems, the installation of saddle flashings should be considered.

5.9 The authority’s list of concerns

5.9.1 The expert also assessed the list of concerns identified by the authority in its S95A refusal to issue a code compliance certificate; and the following table summarises the expert’s responses (also taking the building surveyor’s comments into account).

Table 3: The authority’s concerns

Areas of concern in S95A refusal (in summary)		Expert’s comments	Compliance	Relevant paragraphs
1	Bathroom window restraint	<ul style="list-style-type: none"> • Not in dispute • Owner has agreed to fit 	Not considered	
2	Fascias	<ul style="list-style-type: none"> • Ends sheltered by gutters • In service for about 15 years • No evidence of moisture penetration • No evidence of deterioration 	Adequate in circumstances	3.5.3 3.7.3 5.6.3
3	Cladding/apron clearances	<ul style="list-style-type: none"> • In service for about 15 years • Roof/wall junctions sheltered by roof overhangs • 25° roof pitch sheds water away from junctions • No evidence of moisture penetration 	Adequate in circumstances	3.5.3 3.7.3
4	Lack of kick outs	<ul style="list-style-type: none"> • In service for about 15 years • No evidence of moisture penetration • Satisfactory retro-fitted kick-outs now fitted 	Adequate in circumstances	3.5.3
5	Ends of arched window head	<ul style="list-style-type: none"> • In service for about 15 years • Window heads sheltered by ‘eye brows’ • No evidence of moisture penetration 	Adequate in circumstances	3.5.3 3.7.3
6	Mitred windows	<ul style="list-style-type: none"> • Elevated moisture levels below lounge bay window, likely due to window frame mitres 	Investigation/repairs required	5.4.4

7	Deck joist penetrations	<ul style="list-style-type: none"> • No saddle flashings to joist penetrations • Junctions dependent on sealants • Limited ventilation of deck framing and lack of access for monitoring/maintaining sealants • Elevated moisture levels and timber damage below master bedroom doors 	Investigation/repairs required to both decks	5.8
8	The canopy membrane	<ul style="list-style-type: none"> • In service for about 15 years – deteriorated due to nail pushing against membrane • No evidence of past moisture penetration • Original membrane at roof/wall junction left in place to avoid cutting into plaster • Body of membrane replaced • Original and new membrane in good conditions • Lapped joints well adhered • No evidence of current moisture penetration 	Repairs adequate Not relevant to issue of the code compliance certificate	3.7.3 5.6.1
Outstanding documentation			Not relevant to compliance	3.8.1 Table 2

5.9.2 Although the expert commented on the documentation listed in the authority's refusal to issue a code compliance certificate, the authority's property records contain documentation already submitted (see paragraph 3.8.1 Table 2).

5.10 Summary

5.10.1 The expert considered that the following areas required further investigation and repair in order to comply with Clauses E2 and B2:

- the southwest bay window to the lounge
- the bottom of the northwest deck wing walls
- the cantilevered decks to the northeast bedrooms.

5.10.2 The expert concluded that:

The decision of the council not to issue a CCC appears to be correct because not all of the construction complies with the building consent documents (nor with the Building Code). However, this report includes evidence that some building elements which they had concerns about are performing adequately and others are not relevant.

5.11 The further investigation

5.11.1 On 9 December 2016 I sought further comment from the expert in respect of the further investigation carried out (refer paragraph 4.3.2) and the agent's query.

5.11.2 In regards to the clarification sought by the agent, the expert advised:

- readings were not adjusted for preservative treatment as there was no certainty about the type of preservative used and the percentage of preservative salts retained
- the Ministry's guidance document¹⁰ states that in most situations it is too complex to reconcile corrections on site for temperature variations, treatment type, or for timber species that may change from place to place within the building and that are usually unknown on site at the time of investigation

¹⁰ *Weathertightness: Guide to the Diagnosis of Leaky Buildings* (2011), Department of Building and Housing

- both readings taken under the window were 6% above readings in the adjacent window, but within 3% of that at the northwest wing wall where rot was found in the sample.

5.11.3 In regards to the results of the investigation that had been carried out, the expert noted that the surveyor's meter was not set to read Radiata Pine or temperature compensation and that the readings were taken in November when the framing was likely to have dried out somewhat.

6. Discussion

6.1 The building consent considered in this determination was issued under the former Act, and accordingly the transitional provisions of the current Act apply when considering the issue of a code compliance certificate for work completed under this consent. Section 436(3)(b)(i) of the transitional provisions of the current Act requires the authority to issue a code compliance certificate only if it 'is satisfied that the building work concerned complies with the building code that applied at the time the building consent was granted'.

6.2 In order to determine whether the authority correctly exercised its power in refusing to issue a code compliance certificate for the building work, I must therefore consider whether the house complies with the provisions of the Building Code that applied when the consent was issued in 2000.

6.3 Discussion: the external envelope

6.3.1 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).

Weathertightness risk

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

Increasing risk

- the house is two storeys high in part, with roofs at multiple levels
- the house is fairly complex in form
- the house has two upper level cantilevered decks and a ground floor deck
- the house has monolithic wall cladding fixed directly to the framing

Decreasing risk

- the house is in a low to medium wind zone
- there are roof overhangs to shelter most of the wall cladding
- external wall framing is generally treated to provide resistance to decay if it absorbs and retains moisture.

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

Weathertightness performance

- 6.3.4 Comments made in the builder's report (see paragraph 3.5) and the building surveyor's report (see paragraph 3.7.1) indicate that the building envelope was substantially complete by the end of 2001 and I have taken that into account when considering the weathertightness performance, as the wall and roof claddings have generally continued to perform for the minimum 15 years required by Clause B2 of the Building Code.
- 6.3.5 Generally the claddings appear to have been installed in accordance with good trade practice and the wall cladding manufacturer's recommendations at the time of construction. However, I accept that the areas identified by the expert in paragraph 5.10.1 require further investigation and repair.
- 6.3.6 I also note the expert's comments on other areas identified by the authority (see Table 1) and I accept that these are adequate in the particular circumstances.
- 6.3.7 In responding to the draft determination the authority has noted that the expert has not commented on the chimney vents; this item had been included in the authority's correspondence of 15 August 2016 in reference to openings in the external envelope and 'areas of high risk building methods'. The authority has provided no information to indicate that the chimney vents have failed to comply with the performance requirements of Building Code.
- 6.3.8 It is not for the determination to provide a definitive list of items that require remediation; the determination requires only sufficient evidence to establish whether the authority correctly exercised its powers of decision when it refused to issue the code compliance certificate. As the authority has identified this as an area of concern, I suggest that the applicant include further investigation of this area along with addressing the items identified in paragraph 5.10.1.

Weathertightness conclusion

- 6.3.9 I consider the expert's report establishes that the current performance of the building envelope is not adequate because there is evidence of ongoing moisture penetration into several areas of the timber framing, with timber damage to at least one area. Consequently, I am satisfied that the cladding does not comply with Clause E2 of the Building Code. Because of the timber damage and the potential for further hidden damage, I am also satisfied that the timber framing may not comply with Clause B1.
- 6.3.10 In addition, the house is required to comply with the durability requirements of Clause B2, which requires a building to satisfy all the objectives of the Building Code throughout its effective life. The durability requirements of Clause B2 include a requirement for wall claddings to remain weathertight for a minimum of 15 years and for timber framing to remain structurally adequate for a minimum of 50 years.
- 6.3.11 Although roof and wall claddings are now 15 years old, the expert's investigations have revealed evidence of moisture ingress into the deck wing walls and the cantilevered decks over an extended period. The evidence of current and past moisture penetration therefore satisfies me that the cladding has not complied with Clause B2 insofar as it applies to both Clauses B1 and E2.
- 6.3.12 Because the identified moisture penetration and cladding faults occur in discrete areas, I am able to conclude that satisfactory investigation and rectification of areas outlined in paragraph 5.10.1 will result in the external envelope being brought into compliance with Clauses B1, B2 and E2 of the Building Code.

6.3.13 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.

6.4 Maintenance

6.4.1 Effective maintenance of the house is important to ensure ongoing compliance with the Building Code and is the responsibility of the building owner. The Ministry has previously described maintenance requirements associated with the external building envelope, including examples (for example, Determination 2007/60).

6.4.2 In the case of this particular house, I note the following:

- The house design includes a number of high risk features, which require careful consideration of maintenance requirements of the monolithic cladding in order to ensure its ongoing weathertightness.
- The monolithic cladding has been well-maintained, which I consider to be a key factor in the adequate weathertightness of the majority of the external building envelope over the past fifteen years.
- Although a modification of the durability provisions to allow the provisions to commence from the date of substantial completion in 2001 means that the most of the cladding has remained weathertight for the required minimum 15 year period, the expected life of the building as a whole is considerably longer; and careful maintenance should continue to protect the underlying framing for its minimum required life of 50 years for the structure.

6.5 The requirement for a membrane producer statement

6.5.1 The authority is of the view that a producer statement is now required as ‘proof of performance’ to establish compliance of the entry canopy. There is no basis in the current Act for an authority to demand a producer statement as a condition for establishing compliance and for issuing a code compliance certificate, particularly if it had not made the receipt of one a condition of the consent. Though the authority is entitled to accept the producer statement if one was offered, it should not rely on that to the exclusion of other evidence that demonstrates compliance.

6.5.2 In my view the receipt of a producer statement by an authority does not lessen its liability in establishing code compliance. An authority accepts a producer statement at its discretion in the belief that the author of the producer statement is creditable.

6.5.3 It is apparent from the background and other evidence that the original membrane specified in the consent documents had been installed in 2000 by an applicator approved by the membrane manufacturer. It also appears that the membrane was passed without comment during the authority’s inspections in 2000 and again in the final inspection in November 2015.

6.5.4 Having adequately performed for 15 years, the applicants followed the building surveyor’s advice and elected to carry repairs as part of preventive maintenance of the canopy. I concur with the expert’s opinion that in these circumstances the repair work did not require a building consent and does not affect compliance of the house.

7. The durability considerations

- 7.1 The relevant provision of Clause B2 of the Building Code requires that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods (“durability periods”) “from the time of issue of the applicable code compliance certificate” (Clause B2.3.1).
- 7.2 In this case the 12 to 15-year delay since substantial completion of the external building envelope and structure in 2001 and the remaining work by the end of 2004 raises concerns that many elements of the building are now well through or beyond their required durability periods, and would consequently no longer comply with Clause B2 if a code compliance certificate were to be issued effective from today’s date.
- 7.3 I have considered this in many previous determinations and I maintain the view that:
- (a) the authority has the power to grant an appropriate modification of Clause B2 in respect of all the building elements, if requested by an owner
 - (b) it is reasonable to grant such a modification, with appropriate notification, as in practical terms the building is no different from what it would have been if a code compliance certificate for the house had been issued at the times of substantial completion in 2001 and 2004.

I therefore leave the matter of amending the building consent to modify Clause B2.3.1 to the parties once matters addressed in this determination are resolved.

8. What happens next?

- 8.1 The building consent was issued to the applicants who are the current owners of the house, and the authority may issue a notice to fix that requires the applicant to bring the building work into compliance with the Building Code. The notice should include the investigations and defects identified in paragraph 5.10.1 and any further defects that might be discovered in the course of investigation and rectification, but not specify how those defects are to be fixed – that is a matter for the applicants to propose and for the authority to accept or reject.
- 8.2 The applicant can then produce a response to the notice in the form of a detailed proposal to specifically address the matters of non-compliance and investigation for the areas identified, produced in conjunction with a competent and suitably experienced person, as to the investigation and rectification or otherwise of the specified matters. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

9. The decision

9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that, in regard to the Building Code that was in force at the time the building consent was issued in 2000:

- pending further investigation and repair, some of the timber framing may not comply with Building Code Clauses B1 and B2
 - external wall claddings do not comply with Building Code Clauses E2 and B2
- and accordingly, I confirm the authority's decision to refuse to issue a code compliance certificate for the house.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 18 January 2017.

John Gardiner
Manager Determinations and Assurance