



Determination 2017/087¹

The refusal to issue a code compliance certificate for a 19-year-old house with EIFS wall cladding at 184 Adams Road, RD1, West Melton



Summary

This determination is concerned with the compliance of a 19-year-old house. The determination considers the authority's reasons for refusing to issue a code compliance certificate, and whether the house complies with the requirements of the Building Code, particularly with respect to weathertightness and durability.

1. The matter to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004² (“the current Act”) made under due authorisation by me, Katie Gordon, Manager Determinations, 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 owners of the house, C and C Ross (“the applicants”)
 - the Selwyn District Council (“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 19-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); in particular in regard to the weathertightness of the external building envelope, given the age of the house.

¹ Subject to a clarification under section 189 of the Building Act 2004. The determination was originally issued on 6 December 2017.

² 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.

³ In this determination, 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 determined⁴ is the authority's exercise of its powers of decision in refusing to issue a code compliance certificate for the reasons given in its letter dated 8 February 2017. 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 roof cladding and the deck) as well as the way the components have been installed and work together. This includes compliance with Clause B1 Structure as it applies to the weathertightness of the house. I consider this in paragraph 7.7.
- Whether an oil-fired appliance installed in the laundry of the house (“the diesel boiler”) complies with the relevant clause of the Building Code in place when the building consent was issued; namely Clause C1 Outbreak of fire. I consider this in paragraph 7.8.
- Whether other items identified by the authority comply with the relevant Building Code clauses: namely B1 Structure, E1 Surface water, E3 Internal moisture, G9 Electricity, G12 Water supplies and G13 Foul water. I consider these clauses in paragraph 7.10.

1.5 Matters within this determination

- 1.5.1 In its final inspection, the authority identified a lack of documentation to show that the diesel boiler system installation complied with the relevant Standards⁵. The diesel boiler was not listed as an item in the authority's refusal to issue a code compliance certificate. However, at the authority's request the Ministry agreed that this determination should also consider compliance of the diesel boiler installation, as this might otherwise remain a matter in need of further clarification or determination.
- 1.5.2 The authority has limited its concerns to items associated with the clauses outlined in paragraph 1.4 and this determination does not address other clauses of the Building Code.
- 1.5.3 This determination is also limited to construction carried out under building consent number R418895 and does not consider the following building work completed by about 2009 (which apparently have code compliance certificates):
- the detached garage building
 - the extension to the western end of the house.
- 1.5.4 I also note that the owner can apply to the authority for a modification of the durability provisions to allow the durability periods specified in Clause B2.3.1 to commence from the date of substantial completion in November 1998. Although I leave this matter to the parties to resolve in due course, I have taken the anticipated modification into account in making my decisions.
- 1.6 In making my decisions, I have considered the submissions of the parties, the two reports of the expert commissioned by the Ministry to advise on this dispute (“the expert”) and the other evidence in this matter.

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

⁵ AS 1960: SAA Domestic oil-fired Appliances Safe Design Code and AS 1961 - 1985: Domestic Oil-fired Appliances - Installation

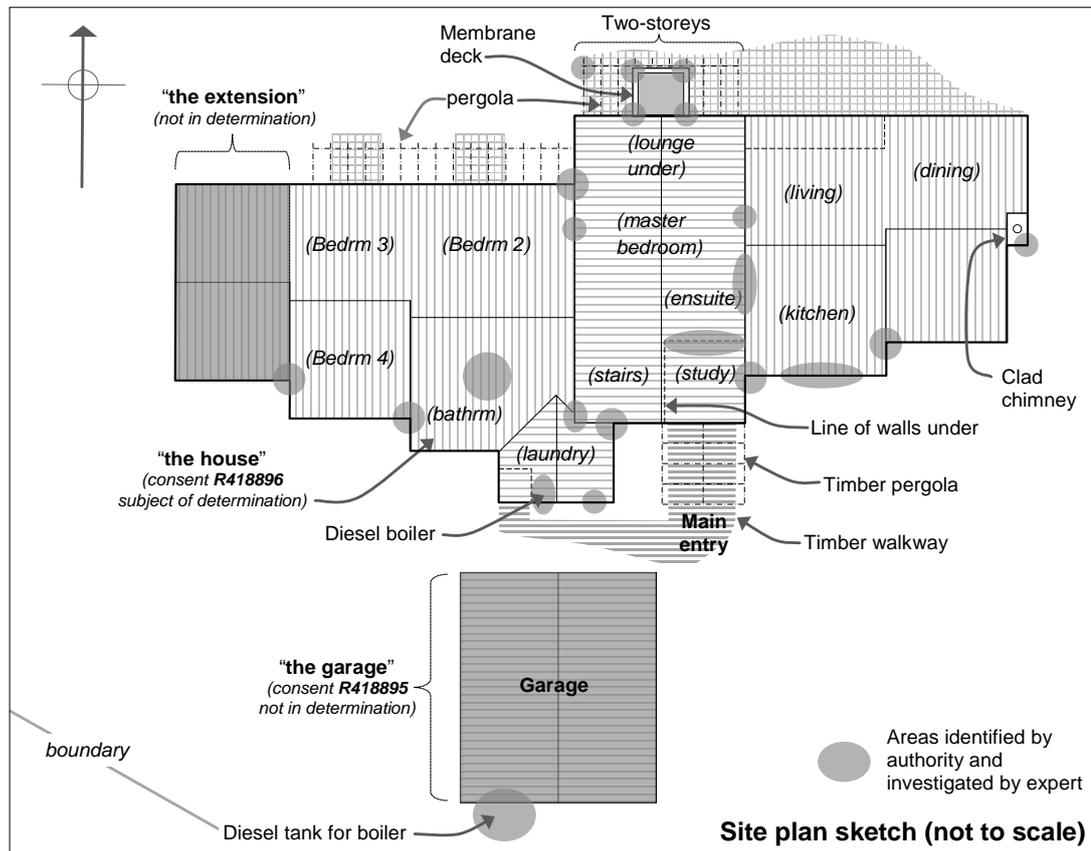
2. The building work

2.1 The building work consists of a four bedroom house situated on a large level rural site in a high wind zone for the purposes of NZS 3604⁶. The central portion of the house is two storeys, with the remainder single storey. The elevations of the house are assessed as having weathertightness risk ranging from moderate to very high (see paragraph 7.4).

2.2 As shown in Figure 1, the house accommodates the following:

- The ground floor:
 - in the central area, the main entry pergola, foyer and stairs to the south, with a lounge opening onto paving and pergola to the north
 - in the east wing, family room/dining/kitchen area opening onto paving
 - in the west wing, three bedrooms, bathroom and laundry, with two of the bedrooms opening onto paving and a pergola to the north
- The upper level: the master bedroom opening onto a deck to the north (“the bedroom deck”), dressing room, ensuite and study.

Figure 1: Approximate plan



2.3 Construction is generally conventional light timber frame, with concrete slab foundations, monolithic wall cladding, aluminium windows and pressed metal tile roofing. The 30° pitch gabled roofs have no roof overhang, except for several recessed wall areas.

2.4 An enclosed deck extends to the north from the upper level master bedroom, with a membrane floor and monolithic-clad balustrades. I note that the drawings do not

⁶ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

show a balustrade capping, and a stainless steel capping was apparently not installed until 2003 (see paragraph 3.3.1 Item 1 and paragraph 3.4).

- 2.5 The specification calls for wall framing to conform to relevant standards of the time. Laboratory testing of wall framing samples identified the samples as likely to be Douglas fir and radiata pine, with no treatment detected in any of the samples. Given the sample testing and the date of construction in 1998, I consider that external wall framing is likely to be a mix of untreated radiata pine and Douglas fir.
- 2.6 The house includes a diesel boiler installed in the laundry, which delivers hot water to radiators throughout the house. The boiler was installed during construction of the house, with the service agreement noting an installation date of 24 November 1998. An external storage tank for the fuel is installed behind the detached garage building as indicated in Figure 1.

2.7 The wall cladding

- 2.7.1 The wall cladding is a form of monolithic cladding system known as EIFS⁷. In this instance, the proprietary cladding system consists of 40mm polystyrene backing sheets fixed directly to the framing over the building wrap, to which a mesh-reinforced plaster system has been applied. The system includes purpose-made flashings to windows, edges and other junctions.
- 2.7.2 The installer provided a ‘certificate of completion’ that noted the wall cladding was completed in August 1998 in accordance with the manufacturer’s specification and provided a ‘10 year manufacturer’s warranty’ and a ‘5 year workmanship warranty’ for the cladding.

3. Background

3.1 The consent documentation

- 3.1.1 I note that the drawings submitted with the consent application covered both the house and the detached garage. The consent drawings are rudimentary, with minimal description and no expanded details. The specification is similarly rudimentary.
- 3.1.2 The authority simultaneously issued the following building consents to the applicants on 14 August 1998 under the Building Act 1991 (“the former Act”):
- No. R418895 for the house
 - No. R418896 for the garage.
- 3.1.3 The conditions attached to the building consent for the house listed the inspections required during construction, which did not include any pre-plaster and cladding inspections.

3.2 Construction

- 3.2.1 The construction of the house and garage commenced simultaneously, with foundations, under-slab drainage and slab reinforcing inspected in August 1998.
- 3.2.2 Following the floor slabs, work continued on the house only and the authority carried out the following inspections:
- Drainage on 10 September 1998 (which passed).

⁷ Exterior Insulation and Finish System

- Pre-line framing, bracing and insulation on 23 September 1998 (which passed).
- Post-line bracing on 28 September 1998 (which passed).

3.3 The 1998 final inspection and interim code compliance certificate

3.3.1 The authority carried out a final inspection of the house on 23 November 1998. The inspection record noted ‘dwelling 95% complete, structure 100%, Durability 100%’ and listed the following outstanding items:

1. Parapet capping to deck
2. Jetmaster (or similar) to be placed
3. Final coats to sills on windows and jambs
4. Handrail to stairwell
5. Ensuite fixtures, floor covering and painting to be completed
6. Painting to bathroom to be completed
7. Hot water system to be completed.

3.3.2 The authority issued an interim code compliance certificate on 23 November 1998 under Section 43(3) of the Building Act 1991. The certificate stated that it was issued ‘in respect of part only, as specified in the following particulars, of the building work’ under building consent R418895. I note that the particulars are set out in the following paragraph that states:

Further building work is required to be completed as detailed in the most recent building inspection site sheet. When all works are completed the building owner is required to notify [the authority] where a further inspection may be required to ensure compliance. When all building works approved under the above building consent comply, a full Code Compliance Certificate will be issued.

3.4 The 2003 house inspections

3.4.1 In 2003, the authority followed up on final inspections of the house, with an inspection record dated 18 February 2003 noting that the applicants had been ‘advised that all work was not completed’ and stating:

[The authority] requires this work to be completed and re-inspection [is] required within 28 days or the building consent may be withdrawn.

3.4.2 The authority re-inspected the house on 26 February 2003 and the record listed the following outstanding items (in summary):

- fit flooring and hand basin to master ensuite bathroom
- handrail required to staircase
- fit fire to living area
- seal ends of stainless steel deck balustrade capping and patch plaster cracks
- provide deck overflow
- provide producer statement for EIFS cladding.

3.4.3 The authority re-inspected the house on 5 August 2003, noting that:

- the fire is installed in accordance with the specifications, with the surround and mantel still to be completed
- handrail to staircase now installed
- ensuite flooring and vanity installed.

(No code compliance certificate was applied for because the authority required a further inspection)

- 3.4.4 The house was subsequently extended under a new building consent (see Figure 1) and a code compliance certificate was issued for the extension in April 2010. During the Canterbury earthquakes in 2011, the house suffered some damage and repairs apparently took some time to complete – delaying the application for a code compliance certificate for the original house until 2016.

3.5 The 2017 final inspection

- 3.5.1 In 2016, the applicants applied for a code compliance certificate and the authority carried out a further final inspection on 2 February 2017. The inspection notice listed 19 areas that required attention, including (in summary):

- B1 Structure (including B2):
 - support posts to deck not continuous
 - treatment of deck support posts not confirmed
- E1 Surface water:
 - lack of spreaders from upper roof
 - lack of overflow provision to deck
 - lack of leaf guard to deck drain
- E2 External moisture (including B2):
 - cladding clearances
 - unsealed penetrations
 - bottom of apron flashings
 - apron flashing upstand at ensuite window
 - gutter discharge upper roof
 - top of clad chimney changed to flue and capping
 - roofing changed from profiled metal to pressed metal tiles
 - lack of overflow provision to deck
 - lack of saddle flashings to pergola penetrations
 - lack of saddle flashing to balustrade capping/wall junctions
 - unsealed mitre joints at turn downs to balustrade capping
 - lack of leaf guard to deck drain
- E3 Internal moisture:
 - leaking to lower bathroom shower tray
- G10 Piped services:
 - diesel boiler unit not in consent documents
- G12 Water supplies:
 - lack of lagging to gas califont⁸ pipework
- G13 Foul water:
 - proximity of opening window to main vent termination

⁸ A gas water heater

- open vent replaced with an air admittance valve (AAV)
- Documentation required:
 - electrical certificate
 - supporting documentation for diesel boiler installation.

3.6 The refusal to issue a code compliance certificate

- 3.6.1 In a letter to the applicant dated 8 February 2017, the authority noted that the building consent had been issued in 1998 but no application for a code compliance certificate had been made until July 2016. The letter was ‘written notification under section 95A’ that the authority refused to issue the code compliance certificate because it was ‘unable to meet its statutory obligation’ due to its concerns as to whether:
- the various building elements will continue to satisfy the durability provisions of the Building Code, given that the required durability ‘period starts from the date the code compliance certificate is issued’
 - the building work identified in the final inspection complies with Building Code clauses ‘B1 (Structure), B2 (Durability), E1 (Surface Water), E2 (External Moisture), E3 (Internal Moisture), G11 (Gas as an Energy Source and G13 (Foul Water)’.
- 3.6.2 The Ministry received an application for a determination from the applicants on 17 February 2017.
- 3.6.3 In a letter to the Ministry dated 1 March 2017, the authority attached further information, noted the absence of an electrical certificate, and asked that the determination include the compliance of the installation of the diesel boiler as identified in the final inspection.

4. The submissions

- 4.1 The applicants made no submission but provided copies of:
- the original consent documentation
 - the building consents for the house and the garage
 - the 1998 inspection records for the house and the garage slab
 - the interim code compliance certificate for the house dated 23 November 1998
 - the 2003 inspection records for the house and the garage slab
 - the code compliance certificate for the garage slab dated 26 February 2003
 - the 2017 inspection notice dated 2 February 2017
 - the authority’s refusal to issue a code compliance certificate dated 8 February 2017
 - other correspondence from the authority
 - various calculations, statements, technical brochures and other information.
- 4.2 The authority made no submission in response to the application but provided copies of substantially the same documents as the applicants.

4.3 Responses to the draft determination

- 4.3.1 A draft determination was initially issued to the parties for comment on 15 June 2017. However, on 21 June 2017, the Ministry asked the parties to disregard that draft as the expert had been asked to revisit the house to review the matters raised by the authority in response to the expert's first report (paragraph 5.9.1). The Ministry also asked the expert to assess the compliance of the diesel boiler.
- 4.3.2 Following the expert's addendum report, an updated draft determination was issued to the parties for comment on 28 August 2017.
- 4.3.3 On 11 September 2017 the applicants responded stating they accepted the draft determination, and made no further comments.
- 4.3.4 On 25 September 2017 the authority responded that it did not accept the draft determination and made the following comments (in summary):
- The authority is of the view that the deck was not designed to be cantilevered, and attached a floor plan that showed the boundary joists supported by posts.
 - In regard to the E2/AS1 risk matrix comment, the north elevation has a score higher than 20. If E2/AS1 was used, the elevation would require a re-design to reduce the weathertightness risk, not just a drained cavity.
 - The authority does not accept that the inspection on 23 November 1998 accepted the installation of the diesel boiler and tank installation, as the only comment noted was 'Hot water system to be completed'. The authority noted the expert's report stated the diesel boiler was installed on 30 November 1998⁹, which was a week after the authority's final inspection.
 - The authority did not have a copy of the energy works certificate because it only requests the certificate once the work has been completed, and a code compliance certificate has been sought.

5. The expert's first report

- 5.1 As mentioned in paragraph 1.6, the then Manager Determinations and Assurance engaged an independent expert to assist. The expert is a member of the New Zealand Institute of Building Surveyors and inspected the house on 1 and 10 May 2017. The expert provided a report dated 26 May 2017, which was sent to the parties on 30 May 2017.
- 5.1.1 The scope of the expert's role was to provide an assessment of the matters raised by the authority and to form a view as to compliance, while taking into account the age, risk profile and performance in use since completion of the house.

5.2 Construction quality

- 5.2.1 The expert considered the exterior cladding and internal linings were generally acceptable. The quality of the finish of the exterior envelope was 'generally to an acceptable trade standard', with roofing and flashings 'neatly installed' and 'operating effectively, (apart from the bottoms of the apron flashing terminations)'.
- 5.2.2 The expert observed that the wall cladding was 'generally straight and fair of finish', with a 'reasonably new skim coating of new plaster' installed over the original

⁹ The install date of the diesel boiler was 24 November 1998 as noted on the service agreement.

plaster as part of earthquake repairs. Except for the defects outlined below, the expert saw ‘no evidence of the building not having been maintained properly’.

5.3 Moisture investigations (Clauses B1, E2 and E3)

5.3.1 The expert took invasive readings of the plasterboard linings, above the skirting, at intervals of one metre. All readings into the plasterboard ‘were well within an acceptable range’. He also drilled through the skirtings and the bottom plates in various at-risk locations using long probes to take invasive readings within 10mm of the outer face. Moisture content readings were generally low¹⁰ except for bottom plates and framing beneath:

- the bottom of apron flashings
- the gas califont
- the internal gutter at the south west corner of the stairwell
- around the shower tray to the lower bathroom

that ranged from 18% to over 24%¹¹.

5.3.2 The expert inspected roof spaces and noted the following signs of past or current moisture penetration:

- water stains and decay in framing at the south east corner of the clad chimney
- water stains and decay to framing below the bottom of some apron flashings
- water stains to framing below the internal gutter at the south west corner of the stairwell.

5.3.3 The expert removed timber samples from the following areas:

- the top of the north west pergola post (sample 1)
- the deteriorated base of the north west pergola post (sample 2)
- at the bottom of the apron flashing to the bathroom/bedroom 4 wall:
 - the top chord of the truss above (sample 3)
 - the ceiling plate below (sample 4)
 - the base of the wall framing (sample 5).

5.3.4 The expert forwarded the five samples to a laboratory for analysis. The laboratory report dated 16 May 2017 noted the following (in summary):

- No treatment was detected in any of the samples.
- Samples 1 and 4 were identified as Douglas fir, with samples 2, 3 and 5 tentatively identified as radiata pine.
- Sample 1: from the top of the pergola post contained ‘pockets of well-established soft rot across the depth’.
- Sample 2: from the bottom of the pergola post contained ‘advanced soft rot across the depth’.

¹⁰ Moisture content readings up to 18% are considered low as generally this level will not support timber decay. Refer *Weathertightness: Guide to the Diagnosis of Leaky Buildings* (May 2011), Department of Building and Housing.

¹¹ Moisture content readings of 18% - 24% indicate that problems exist, and a warning that remedial action is required. Readings over 24 percent will allow decay to initiate depending upon the treatment of the timber.

- With regard to the bottom of the apron flashing at the bathroom/bedroom 4 wall:
 - Sample 3: from the top chord of the truss contained ‘advanced soft rot across the depth’
 - Sample 4: from the ceiling plate contained ‘dense fungal growths’ with traces of ‘superficial soft rot’ but ‘no structurally significant decay’
 - Sample 5: from the base of the wall framing below contained ‘advanced soft rot throughout’
- The condition of the framing samples ‘was consistent with exposure to at least 5-10 years of elevated moisture conducive to decay’ or a longer period ‘of more intermittent moisture elevation’.

5.3.5 The report concluded that samples 2, 3 and 5 (the untreated radiata pine) contained advanced decay ‘which had probably caused loss of the bulk of the original structural integrity in affected areas’. The report stated:

The fungal morphology, its distribution and the fungal and decay types identified suggested that the examples examined had been exposed to moisture conditions that are inconsistent with sound building practice and/or weather-tight design, and that appropriate remediation is needed to correct this.

5.4 Clauses E2 External moisture, B1 Structure and B2 Durability

5.4.1 The expert inspected the external building envelope of the house, taking into account the age of the building work and the risks applying to particular junctions and intersections (refer to Figure 1 for locations of significant observations).

5.4.2 In regard to the bottom of apron flashings, the expert noted that:

- there are four roof/wall junctions between the off-set gables on the south elevation and one on the north elevation
- the bottom of all apron flashings lack kick-outs and rely on sealant for weatherproofing; with gaps and unsealed cladding apparent at four areas
- inspection of the ceiling space revealed past water stains, current moisture, deteriorated roof underlay and/or signs of decay to most of the areas
- at the roof/wall junction over the bathroom and bedroom 4, laboratory analysis revealed decay to samples taken from the timber truss, ceiling plate and bottom plate of the wall
- the decay to the bottom plate in the south east corner of bedroom 4 appeared well established and the junction is likely to have leaked within the first 15 years after construction.

5.4.3 Commenting on other aspects of the external envelope in regard to the authority’s concerns, the expert noted:

- holes in the bottom of the califont box are not sealed and moisture is elevated in the bottom plate below
- although the chimney capping is neatly fabricated with welded seams and there is no evidence of current moisture penetration, the capping was not installed

until 2016¹² (17 years after substantial completion), with evidence of leaking in the past and decayed framing in the south east corner

- despite the lack of evidence of current moisture penetration at corners of the stainless steel capping to the bedroom deck, there are gaps in the welded joints of the mitre downturns, and I note that the metal capping was not installed until some years after substantial completion of the house.

5.4.4 The expert also commented as follows:

- Although the upstand to the apron flashing under the ensuite window is limited to 60mm by the raked window sill; the sill flange overlaps the upstand by about 20mm, the roof slope disperses water quickly past the junction and there is no evidence of past or current moisture in associated framing.
- Although profiled metal roofing was substituted with pressed metal tiles, the material is of a similar weight. The authority accepted the change without comment during construction and there is no effect on the performance of the roof cladding.
- Although the north pergola rafters penetrate the cladding and rely on sealant for weathertightness of the junction, there is no evidence of past or current moisture in the associated framing.
- Although ends of the stainless steel balustrade capping are butted against the wall cladding with no saddle flashings, there is no evidence of past or current moisture in the associated framing and junctions should remain weathertight given regular maintenance of the sealant.

5.4.5 Although the expert recommended some repairs as part of maintenance (see paragraph 5.8.2), he noted that the following areas appeared to have remained weathertight to date as there was no evidence of associated past or current moisture penetration into framing. The following areas had therefore already met the minimum performance requirements of the Building Code:

- areas with little clearance between cladding and ground
- the unsealed or poorly sealed penetrations
- the lack of spreaders to downpipes from the upper roof
- the lack of overflow provision and the lack of leaf guard to the deck drain of the bedroom deck
- the deteriorating boot flashings to the roof penetrations (not identified by the authority).

5.4.6 During the 2017 final inspection, the authority had raised concerns about the pergola posts that appeared to structurally support the bedroom deck via a block above the pergola beam. The expert investigated the deck structure and noted:

- the blocks were skew-nailed against the deck soffit lining, with a pen able to be inserted between the timber and the lining
- a cut-out was made through the lounge ceiling lining and cantilevered deck joists could be seen continuing above the wall framing

¹² Installer's invoice dated 18 March 2016

- a 200mm long blade could be inserted between the cantilevered floor joists and blocking above the wall framing.

5.4.7 The expert concluded that the blocks are decorative only and that the pergola posts only carry their own weight. Although laboratory testing had found decay to the bottom of one of the posts, the expert considered that the pergola structure could be left in place without affecting the self-supported cantilevered structure of the deck.

5.5 Clause E1 Surface Water

5.5.1 Although downpipes from the upper roof lacked spreaders, the ends are directed away from the roof/wall junctions and there was no evidence of moisture penetration after 19 years. The expert therefore considered that minimum performance requirements had been met, although he noted that it ‘would be a wise precaution to fit spreaders as preventative maintenance’.

5.5.2 Although the bedroom deck lacked any provision for overflow, the expert noted no evidence of moisture penetration as a result. However, he noted the small drainage outlet could be subject to blockage if the house were to be left unoccupied. Although minimum performance requirements had been met, the expert therefore strongly recommended ‘fitting an overflow as preventative maintenance’.

5.6 Clause E3 Internal moisture

5.6.1 The expert investigated the walls adjacent to the lower bathroom shower and noted:

- after the shower rose is directed into the rear corner of the shower cubicle, water appears on the bathroom floor after about 30 seconds
- invasive moisture readings at each corner were significantly elevated and the underlying framing may be damaged.

5.7 Remaining clauses (identified and not identified by the authority)

5.7.1 The expert considered that documentation related to the installation of the diesel boiler unit was ‘an issue of administration and paperwork to be sorted out between the parties’. (However, the boiler and tank were subsequently addressed in the expert’s addendum report – see paragraph 6.3).

5.7.2 The expert also identified the following defects not recorded by the authority:

- the lack of vermin proofing to the roofing, with bird nesting material observed in the roof space above the south west corner of the bathroom
- the water stained timber below the small internal gutter at the south west corner of the stairwell indicating that the gutter is regularly blocking and overflowing.

5.7.3 The expert also endorsed the authority’s concerns about Building Code compliance (with relevant clauses shown in brackets):

- the uninsulated exposed pipework to the gas califont (Clause G12),
- the proximity of the laundry window to the terminal vent (Clause G13)
- the air admittance valve noted by the authority was no longer in place, but the terminal vent for the drain extends through the roof too close to the ensuite opening window (Clause G13)
- Not identified by authority: insulation in ceiling space in contact with some downlights (Clauses C1 and G9).

- 5.7.4 Regarding the uninsulated pipework to the gas califont, I note while the authority referred to this as being an issue in terms of Clause G11 (Gas as an energy source), I have assumed that it intended to refer to Clause G12 (Water supplies). It is the latter clause the expert referred to when he cited the Acceptable Solution G12/AS1, which contains the requirement where there is likelihood of freezing, to insulate piping outside the thermal envelope of the building in order to protect it from freezing.

5.8 The expert's conclusion

- 5.8.1 The expert concluded that the following areas do not comply with the Building Code in place at the time the house was constructed (with relevant clauses shown in brackets):

- damaged timber wall and roof framing (B1, B2):
 - at the south east corner of the clad chimney
 - below the bottom of some apron flashings
 - below the internal gutter at the south west corner of the stairwell
 - around the shower tray to the lower bathroom
- the lack of kick-outs to the bottom of the apron flashings (E2, B2)
- the internal gutter at the south west corner of the stairwell (E2, B2)
- unsealed holes at the bottom of the gas califont box (E2, B2)
- gaps in the downturns of mitred corners to the balustrade capping (E2, B2)
- the lack of vermin proofing to the roof cladding (E2, B2)
- the shower tray to the lower bathroom (E3)
- the uninsulated exposed pipework to the gas califont (G12)
- the proximity of the terminal vent to the laundry window (G13)
- the proximity of the terminal vent to the ensuite window (G13)
- insulation in ceiling space in contact with downlights (C1 and G9).

- 5.8.2 Based on his investigations and taking into account the age and performance of the construction to date, the expert strongly recommended that the following should be attended to as part of ongoing maintenance of the house (in summary):

- increasing clearances from cladding to soil at the south elevation
- sealing of all cladding penetrations
- installation of spreaders to downpipes on the upper roof
- installation of an overflow outlet and drain leaf guard to the bedroom deck
- replacing deteriorating boot flashings to roof penetrations.

5.9 Response to the expert's report

- 5.9.1 A copy of the expert's first report was forwarded to the parties on 30 May 2017. The authority responded on 2 June 2017, disputing the expert's finding that the posts under the pergola and bedroom deck were not loadbearing as the structure is supported by cantilevered floor joists.

6. The expert's addendum report

6.1 As noted above, the authority disputed the expert's findings about the pergola and bedroom deck. In addition, the authority had previously requested that the determination include the compliance of the diesel boiler, which had not been included within the scope of the expert's initial assessment and report. Consequently the expert was asked to provide a supplementary report addressing those two matters.

6.2 The expert revisited the house on 27 July 2017 to provide an assessment of the above matters and provided a report dated 28 July 2017, which was forwarded to the parties on 22 August 2017.

6.3 The diesel boiler

6.3.1 The expert noted that the boiler installed in the laundry of the house heats water that is reticulated to radiators throughout the house for about nine months per year.

6.3.2 In regard to the boiler, the expert noted the following (in summary):

- the boiler was installed during construction of the house and has been 'running safely' for over 18 years
- because the boiler sits on the concrete slab, no hearth is required
- the rear of the boiler is 60mm from the adjacent wall, with the side 18mm from the side wall
- a heat shield protects the wall at the flue penetration, with a temperature of 26° recorded on the heat shield
- at the time of the visit, the boiler had been running continuously for four months and the surface temperatures of wall linings around the appliance were recorded as ranging from 20° to 25°.

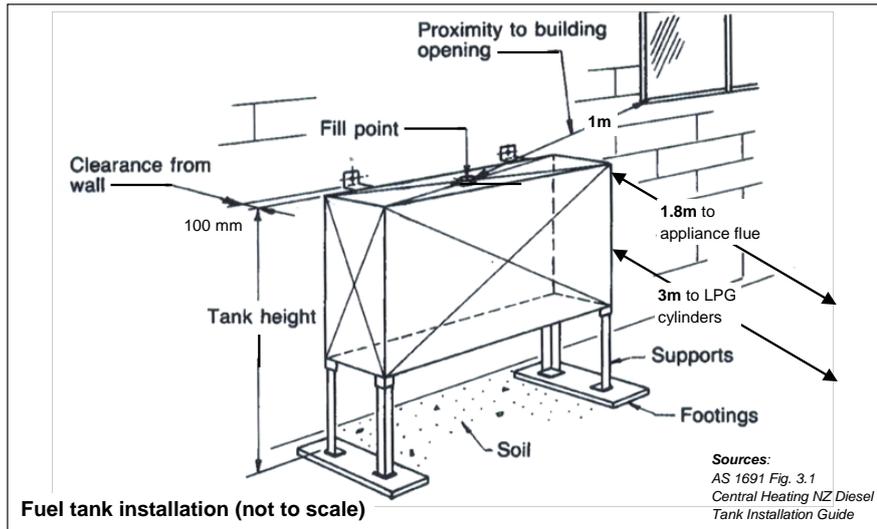
6.3.3 The expert concluded there was no indication of any past or current problems with the appliance.

6.4 The diesel storage tank

6.4.1 The 460 litre fuel tank is located behind the detached garage (see Figure 1). The expert assessed the location of the tank against the requirements of AS 1691 Section 3. Oil Fuel Tanks¹³. Minimum separation distances required from adjacent construction are shown in Figure 2:

¹³ While this Standard is not cited in the relevant Approved Document at the time the consent was issued, it is cited in Acceptable Solution C/AS1.

Figure 2: Diesel tank site requirements



6.4.2 In regard to separation distances, including from LPG cylinders, the expert compared the tank siting with the minimum requirements as shown in Table 1:

Table 1: Diesel tank separation distances

Applicable element	Minimum distances required	Separation provided (in excess of)
The garage wall	100 mm	1 metre
The garage window	1 metre	1 metre
The boiler flue	1.8 metres	5 metres
LPG cylinders	3 metres	5 metres
Nearest property boundary	Not applicable	10 metres

6.4.3 In regard to the tank installation, the expert noted that (in summary):

- The tank rests on a bed of compressed gravel, with no concrete footings.
- AS 1691:1985 made no mention of seismic restraint but requires a strip of concrete under the steel legs at each end.
- Current requirements call for a fuel tank to be seismically restrained and to stand on a 100mm thick concrete slab.
- If concrete pads were to be provided, tank legs may be bolted into the pads to provide seismic restraints (see Figure 2).

6.4.4 The expert’s recommendation was that a concrete foundation should be provided to support the tank.

6.5 The bedroom deck and pergola

6.5.1 The expert considered the authority’s response to his first report and noted that the door lintel beneath the bedroom deck would have been exposed during the pre-line inspection of 23 September 1998. The authority had passed the framing during that inspection without comment on the lintel.

6.5.2 The expert considered the lintel under the bedroom deck, noting that (in summary):

- the gap above the lower doors is parallel
- the lower doors operated without binding

- the top of the door frame and the reveal appear straight
- there is no indication that the lintel is not performing satisfactorily.

6.5.3 Based on his earlier investigations and his current observations, the expert maintained the view that the bedroom deck is cantilevered and therefore not dependent on the pergola posts for support. (I note that the authority continues to dispute this assertion.)

6.5.4 Notwithstanding the above conclusion, the expert added that the owners intend to remove the pergola as part of the upcoming remedial work and have agreed to replace the two posts at the corners of the deck with appropriately treated posts that extend up to the bottom of the deck.

7. Discussion

7.1 The building consent considered in this determination was issued under the former Act, and accordingly the transitional provisions of the 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'.

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

7.3 The external envelope

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

7.4 Weathertightness risk

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

Increasing risk

- the house is two storeys high in part and is in a high wind zone
- the multi-level roof includes complex junctions and intersections
- the walls have EIFS cladding fixed directly to the framing
- there are no roof overhangs to protect the cladding
- an enclosed deck with clad balustrades, which cantilevers from the upper floor
- timber pergola rafters penetrate the wall cladding
- external wall framing is not treated to provide resistance to decay if it absorbs and retains moisture.

7.4.2 Using the E2/AS1 risk matrix to evaluate these features, the different elevations are assessed as having weathertightness risk ratings of moderate to very high.

7.5 Weathertightness performance of the cladding

7.5.1 Inspection records indicate that the first ‘final’ inspection was carried out in November 1998 (see paragraph 3.3.1) and I have taken that into account when considering the weathertightness performance of the external envelope, as most of the wall claddings appear to have continued to perform for more than the minimum 15 years required by Clause B2 of the Building Code.

7.5.2 The expert found:

- The quality of the finish of the EIFS wall claddings was ‘generally to an acceptable trade standard’, and
- that moisture penetration is generally limited to areas with defects of various types as listed in paragraph 5 above.

7.5.3 However, I also note the expert’s comments that the roof to wall junctions are poorly flashed, and there were some areas he would not have expected to be weathertight, hence his recommendation that maintenance and/or remedial work would be needed to ensure ongoing compliance.

7.6 The requirement for a cladding producer statement

7.6.1 A producer statement can provide evidence to assist an authority in deciding the adequacy of various components or systems. Producer statements are not a requirement of the Building Code, nor the only way of establishing compliance.

7.6.2 It is apparent from the evidence that the EIFS system was installed in 1998 by an applicator approved by the cladding manufacturer. The wording of the plasterer’s warranty is such that it effectively forms a producer statement for the EIFS by:

- providing the date of installation
- specifying the particular proprietary product installed
- affirming that installation accorded with the manufacturer’s specification.

7.6.3 The original building consent did not include a requirement for a producer statement for the EIFS wall cladding, which was passed without comment during the authority’s first final inspection in November 1998 and again in the 2003 final inspections. I also note that a producer statement was provided for recoating carried out as part of the recent earthquake repairs. I consider that the original warranty together with the producer statement for the recent recoating work can assist me in establishing the performance of the subject EIFS system.

7.7 Weathertightness conclusion

7.7.1 The expert’s report establishes that the current performance of the building envelope is not adequate because there is evidence of moisture penetration, with decay to untreated timber in a number of areas. The decay evident in some areas of framing indicates moisture has been penetrating the building envelope for some time, and I am therefore satisfied that the building envelope does not comply with Clause E2 of the Building Code that was in force at the time the building consent was issued in 1998.

7.7.2 The house is also 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 (in 1998 and currently) 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.

- 7.7.3 The structurally significant timber damage to the some of the framing, together with the likelihood of further hidden damage to underlying untreated framing behind the linings, also satisfy me that some timber framing does not comply with Clause B1 of the Building Code that was in force at the time the building consent was issued in 1998.
- 7.7.4 Although the roof and wall claddings are now 19 years old, the expert's investigations revealed evidence of moisture ingress over an extended period. Because of the decay damage revealed and the likelihood of further undiscovered damage, I am therefore satisfied that the timber framing has not complied with Clause B2 insofar as it applies to Clauses B1. Evidence of past moisture penetration also satisfies me that the building envelope has not complied with Clause B2 insofar as it applies to E2.

7.8 The diesel boiler and fuel tank

Relevant compliance requirements

- 7.8.1 Clause C1 (Outbreak of fire) that was in place at the time the consent was issued includes the following requirements:

Performance

C1.3.1 Fixed appliances and services shall be installed so as to avoid the accumulation of gases within the installation and in building spaces, where heat or ignition could cause uncontrolled combustion or explosion.

C1.3.2 Fixed appliances shall be installed in a manner that does not raise the temperature of any building element by heat transfer or concentration to a level that would adversely affect its physical or mechanical properties or function.

- 7.8.2 The current equivalent Acceptable Solution – C/AS1 Part 5: Prevention of fire occurring – includes the following:

7.3 Oil-fired appliances

7.3.1 AS 1691, with the modifications given in Paragraph 7.3.2, is an Acceptable Solution for the installation of domestic oil-fired appliances

7.3.2 Modifications to AS 1691

...Delete paragraph 3.1.4 [Stability] and substitute the following:

"3.1.4 Stability

The appliance shall be mechanically fixed to the building...

... The appliance and the fuel tank shall resist their respective seismic forces with no significant movement."

7.9 Conclusion on the boiler and tank installation

- 7.9.1 Taking account of the expert's addendum report and his conclusions, I make the following comments about the diesel boiler installation:

- the diesel boiler has been operating satisfactorily for more than 18 years
- with adjacent wall surfaces at only moderate to low temperatures after the boiler had been operating for months, the boiler installation meets the requirements of Building Code Clause C1. Comparing this with the

requirements of the current equivalent Building Code Clause (C2 Prevention of fire occurring), I note that building materials close to the boiler should not exceed 90°, when temperatures measured on site by the expert were all under 30°.

- the boiler has already met the minimum B2 durability requirements of a free-standing heating appliance
- the siting of the diesel fuel tank satisfies the requirements of AS 1691:1985 and the Central Heating NZ Diesel tank Installation Guide
- although the diesel fuel tank lacks concrete footings and seismic restraints, there is no evidence of damage from past earthquake stresses
- there is no indication of any past or present problems in the system.

7.9.2 Taking account of the above, I am satisfied that the diesel boiler installation and the fuel tank location complies with Clause C1 of the Building Code that was in force at the time the building work was carried out.

7.9.3 In regard to seismic restraint of the diesel fuel tank and taking account of the current requirements of C/AS1 Part 7, I note the expert's recommendation is that concrete foundations should be installed, with the tank support legs to be bolted into the concrete in order to provide appropriate long term earthquake resistance. The applicant may wish to consider this step along with the maintenance items that have been recommended (but that are not required to achieve compliance).

7.10 The authority's remaining concerns

Clause B1 Structure

7.10.1 Taking account of the expert's report and his conclusions, I concluded in paragraph 7.7.3 that some of the timber framing does not comply with Clause B1 and also with Clause B2 insofar as it applies to Clause B1 due to external and internal moisture penetration and damage to associated framing.

7.10.2 In regard to the authority's concerns about the north pergola posts, I am satisfied that the expert's initial and subsequent investigations confirm that the pergola posts do not support the bedroom deck. I accept that the pergola could be left in place without affecting the self-supported cantilevered structure, because the lack of deflection in the lintel supports the view that it is adequately sized. Although, I recommend that maintenance to any damaged posts be promptly attended to.

7.10.3 Notwithstanding the above conclusion, I acknowledge the applicants' intention to remove the timber pergola and to replace the two posts beneath the bedroom deck with new posts that extend up to the bottom of the deck. I leave this to the parties to resolve as part of the upcoming remedial work.

Clause E3 Internal moisture

7.10.4 Taking account of the expert's investigations, I am satisfied the shower cubicle to the lower bathroom does not comply with Clause E3, with evidence of moisture penetration into the internal wall framing.

7.10.5 Pending further investigation to determine the condition of the underlying timber, I consider that some of the timber framing to interior walls adjacent to the shower tray may not comply with Clause B1.

Clause G9 Electricity

- 7.10.6 In its inspection notice dated 2 February 2017 the authority noted the lack of an energy works certificate for the electrical work carried out. To address this, the applicants provided a copy of the ‘Certificate of Compliance for domestic electrical work’ dated 19 August 1998, which relates to the installation of the meter box.
- 7.10.7 The house is now 19 years old and the provision of an energy works certificate at this point in time would seem to be of limited value. While failure to provide an outstanding energy works certificate is ‘sufficient reason’¹⁴ to refuse to issue a code compliance certificate, the absence of one does not prevent a code compliance certificate from being issued. This issue has been addressed in previous determinations¹⁵ and I remain of the view that this provision allows the authority to apply this requirement as it considers appropriate.
- 7.10.8 Given the documentation provided, the in-service performance of the electrical work and the absence of any significant electrical problems over 19 years, there is no evidence that the house does not comply with Clause G9 of the Building Code, except for the defect identified by the expert in paragraph 5.8.1. However, compliance with Clause G9 is a matter for the authority to assess when reconsidering an application for a code compliance certificate following the completion of remedial work.

7.11 Conclusion on the remaining clauses

- 7.11.1 Taking account of the expert’s report, I consider the following areas require attention (with relevant clauses shown in brackets):
- confirmed or potentially damaged timber wall and roof framing (B1, B2):
 - at the south east corner of the clad chimney
 - below the bottom of some apron flashings
 - below the internal gutter at the south west corner of the stairwell
 - around the shower tray to the lower bathroom
 - the shower tray to the lower bathroom (E3, B2)
 - the uninsulated exposed pipework to the gas califont (G12)
 - the proximity of the terminal vent to the laundry window (G13)
 - the proximity of the terminal vent to the ensuite window (G13)
 - ceiling insulation in contact with downlights (C1 and G9).

¹⁴ Section 94(3) of the current Act

¹⁵ For example Determination 2013/035 *Regarding the refusal to issue a code compliance certificate for a 14-year-old house and a 15-year-old quarantine building at 591 Ridgens Road, Darfield* (Ministry of Business, Innovation and Employment) 27 June 2013

8. Conclusion

8.1 Taking account of the expert’s report and the age of the house, Table 2 summarises my conclusions on the authority’s concerns identified for this house.

Table 2: Summary of conclusions

Areas of concern (in summary)	My comments (taking account of expert’s report)	Conclusion	
		Compliance	Maintenance
B1 Structure			
Support posts to deck not continuous	<ul style="list-style-type: none"> Deck confirmed as cantilevered No support from pergola posts Blocks decorative only 	Adequate	Owners intend to remove pergola and will install new continuous deck posts
Treatment of deck support posts not confirmed	<ul style="list-style-type: none"> Timber untreated Lab tests found decay at base Posts do not support deck 	Adequate (as landscape feature) in short term	
C1 Outbreak of fire			
Diesel boiler installation	<ul style="list-style-type: none"> Installed November 1998 by registered heating engineers Satisfies the requirements of AS 1691:1985 Adjacent temperatures recorded at below 26° Operating satisfactorily for more than 18 years Met performance requirements 	Adequate, given regular servicing	
Diesel fuel tank installation	<ul style="list-style-type: none"> Tank location and minimum separations satisfactory Tank on compressed gravel No seismic restraint provided Operating satisfactorily for more than 18 years Met performance requirements 	Adequate	Modification recommended to provide concrete foundation and seismic restraint for longer term durability
E1 Surface water			
Lack of spreaders from upper roof	<ul style="list-style-type: none"> Ends turned away from junction Roof pitch drains area quickly No associated moisture entry Met performance requirements Accepted by authority in 1998 	Adequate	Spreaders recommended as precaution
Lack of overflow provision to deck	<ul style="list-style-type: none"> Risk of blockage and flooding Not good practice No associated moisture entry Met performance requirements Accepted by authority in 1998 	Adequate	Provision for overflow recommended for longer term durability
Lack of leaf guard to deck drain	<ul style="list-style-type: none"> No associated moisture entry Met performance requirements 	Adequate	Leaf guard recommended

E2 External moisture			
Ground and cladding clearances	<ul style="list-style-type: none"> • South garden soil raked away from cladding, falls toward wall • Cladding only 20-40mm above ground • No associated moisture entry • Met performance requirements 	Adequate	Modification recommended for longer term durability
TV antenna and boiler flue fixing penetrations	<ul style="list-style-type: none"> • No associated moisture entry • Met performance requirements 	Adequate	
Holes in base of gas califont box	<ul style="list-style-type: none"> • Moisture in bottom plate • Condition of underlying framing unknown 	Repair required, with investigation of timber condition	
Bottom of apron flashings	<ul style="list-style-type: none"> • All apron flashings lack kick-outs • Rely on sealant only • Gaps apparent in most areas • Past/current moisture penetration • Well established decay 	Repair required, with investigation of timber condition	
Apron flashing upstand at ensuite window	<ul style="list-style-type: none"> • 60mm upstand underlaps window sill flange • Roof pitch drains area quickly • No associated moisture entry • Met performance requirements • Accepted by authority 	Adequate in circumstances	
Lack of spreaders from upper roof	See comments under E1 above		
Top of clad chimney changed to flue and capping	<ul style="list-style-type: none"> • Chimney capping weathertight • Capping installed in 2016 • Decayed framing in south east corner • Evidence of past leaking 	Investigation of timber framing and repair of damage required	
Roofing changed from profiled metal to pressed metal tiles	<ul style="list-style-type: none"> • Both materials lightweight • No effect on compliance • Accepted by authority in 1998 	Adequate	
Lack of overflow provision to deck	See comments under E1 above		
Lack of saddle flashings to pergola rafter/wall junctions	<ul style="list-style-type: none"> • Sealant only and junctions • No associated moisture entry • Met performance requirements 	Adequate, given regular maintenance	Regular maintenance required
Lack of saddle flashings to balustrade capping/wall junctions	<ul style="list-style-type: none"> • Top was originally clad • Capping installed in about 2003 • Ends sealed against cladding • No associated moisture entry • Met performance requirements 	Adequate, given regular maintenance	Regular maintenance required
Unsealed mitre joints at downturns to balustrade capping	<ul style="list-style-type: none"> • Gaps in welding of downturns • Capping installed in about 2003 	Repair required	
Lack of leaf guard to deck drain	See comments under E1 above		

E3 Internal Moisture			
Leaking lower bathroom shower tray	<ul style="list-style-type: none"> Evidence of moisture penetration into internal walls Underlying framing may be damaged 	Repair required, with investigation of timber condition	
G12 Water supplies			
Lack of lagging to gas califont exposed pipework	<ul style="list-style-type: none"> Exposed pipe not insulated 	Repair required	
G13 Foul Water			
Proximity of opening window to main vent termination (lower bathroom)	<ul style="list-style-type: none"> Window too close 	Repair required	
Open vent replaced with AAV (above kitchen)	<ul style="list-style-type: none"> Is not AAV Pipe is terminal vent extended through kitchen roof Vent pipe too close to ensuite opening window 	Repair required	
Documentation			
Electrical certificate	Copy of 1998 electrical certificate provided by applicants		

8.2 Maintenance

- 8.2.1 The house design includes a number of high risk features in terms of weathertightness. Ensuring ongoing weathertightness of the roof and wall claddings will require careful consideration of maintenance requirements.
- 8.2.2 Although a modification of durability provisions will mean that most components and elements of the building envelope have already exceeded the minimum life required by the Building Code, the expected life of the building as a whole is considerably longer. Careful maintenance is therefore needed to ensure that elements such as flashings, roofing and gutter systems continue to protect the underlying framing for the minimum required life of 50 years for the structure.
- 8.2.3 Although the house appears to be currently well maintained, the evidence of ongoing past moisture penetration (for example, leaking apron flashings and timber damage to chimney framing prior to the capping installation) indicates that some maintenance may have been deferred during the 17 years prior to the 2017 inspection. I also have no evidence as to the condition of the EIFS cladding prior to its recoating.
- 8.2.4 I note the expert's additional recommendations outlined in paragraph 5.8.2 and included in Table 2 as to measures considered prudent in the circumstances. While these areas do not affect my conclusions on the minimum compliance requirements, I strongly urge the owners to consider their implementation as part of repair work or otherwise as ongoing maintenance of the house. The reduction of future risks will improve longer-term durability and assist the claddings to protect the underlying structure where the minimum durability requirement is 50 years.
- 8.2.5 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 where the external wall framing of the building may not be treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

8.3 The durability considerations

- 8.3.1 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 minimum periods from the time of issue of the applicable code compliance certificate (Clause B2.3.1).
- 8.3.2 In this case the 19-year delay since the substantial completion of the house in 1998 raises concerns that many elements of the building are now 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.
- 8.3.3 I have considered this issue in many previous determinations and I maintain the view that:
- 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
 - 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 building work had been issued at the time of substantial completion in November 1998.

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

8.4 What happens next?

- 8.4.1 The applicants should produce a response 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 person with suitable experience in weathertightness remediation, as to the investigation and rectification or otherwise of the specified matters.
- 8.4.2 Any outstanding items of disagreement could then if necessary be referred back to the Chief Executive for a further binding determination. A code compliance certificate will be able to be issued once these matters have been rectified and the matter of amending the building consent to modify Clause B2.3.1 has been resolved.

9. The decision

9.1 In accordance with section 188 of the Building Act 2004, I hereby determine, with regard to the Building Code that was in force at the time the building consent was issued in 1998:

- some of the timber framing does not comply with Clauses B1 and B2
- the exterior building envelope does not comply with Clauses E2 and B2
- the lower bathroom shower does not comply with Clause E3
- the exposed pipework to the gas califont does not comply with Clause G12
- the positions of the terminal vents do not comply with Clause G13
- insulation contacting downlights does not comply with Clauses C1 and G9

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 30 January 2018.

Katie Gordon
Manager Determinations