



Determination 2014/062

Regarding the refusal to issue a code compliance certificate and the issue of a notice to fix for an 11-year-old house with mixed claddings at 20 Ian Sage Avenue, Torbay, Auckland



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, B Frey (“the applicant”)
 - the Auckland Council (“the authority”)², carrying out its duties as a territorial authority or building consent authority.
- 1.3 I consider the Moisture Detection Company (“the MDU provider”) to be a person with an interest in this determination.
- 1.4 This determination arises from the decisions of the authority to refuse to issue a code compliance certificate and to issue a notice to fix for the 11-year-old house because the authority was not satisfied that the building work complied with certain clauses³ of the Building Code (First Schedule, Building Regulations 1992). The authority’s concerns relate to the weathertightness of the claddings.
- 1.5 The matter to be determined⁴ is therefore whether the authority was correct in its decisions to refuse to issue a code compliance certificate and to issue the notice to fix.

¹ The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.govt.nz or by contacting the Ministry on 0800 242 243.

² Before the application was made, North Shore City Council was transitioned into Auckland Council; the term “the authority” is used for both.

³ In this determination, unless otherwise stated, references to sections are to sections of the current Act and references to clauses are to clauses of the Building Code that was current at the time the building consent was issued.

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

1.6 In deciding this matter, I must consider whether the exterior building envelope complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code that was current at the time the consent was issued. The “building envelope” includes the components of the systems (such as the wall and roof claddings, the windows, the decks and the flashings), as well as the way components have been installed and work together. Any structural implications (Clause B1) associated with weathertightness are considered within this matter.

1.7 Matters outside this determination

1.7.1 The notice to fix outlined requirements for durability of building elements and stated that the applicant may apply to the authority for a modification of the requirements of Clause B2.3.1 to allow durability periods to commence from the date of substantial completion in 2003. I leave this matter to the parties to resolve once the building work has been made compliant.

1.7.2 In his submission dated 25 February and reiterated in his submission dated 28 April 2014, the applicant’s consultant considered that if the determination found the building work did not comply with the Building Code the Ministry should provide a ‘definitive statement’ about the work required to achieve compliance. The applicant’s consultant has also requested that the determination decision be reworded to instruct the authority to issue the code compliance certificate once any remedial works have been carried out.

1.7.3 Under section 188(1)(a) of the Act I am required to make a decision on the exercise of an authority’s powers, in this case in relation to the authority’s refusal to issue a code compliance certificate and issuing of the notice to fix. In order to make my decision I gather sufficient information to do so, but I do not consider such that decision needs to be based on a definitive list of matters that may or may not be code-compliant. (Refer also paragraph 4.5.4.)

1.8 In making my decision, I have considered:

- the submissions of the parties
- the reports of the MDU provider commissioned by the applicant to measure moisture levels in the framing
- the report of the expert commissioned by the Ministry to advise on this dispute (“the expert”)
- the other evidence in this matter.

2. The building work

2.1 The building work is a detached house that is two-storeys-high in part and is situated on a south-sloping site located in a medium wind zone for the purposes of NZS 3604⁵. The expert has taken the main entrance as facing north and this determination follows that convention. The house is assessed as having a high weathertightness risk.

2.2 Construction is generally conventional light timber frame, with concrete foundations and floor slab to the northern end and timber pole foundations elsewhere. The house has four different wall claddings, aluminium joinery and corrugated metal roofing, with a small area of low-pitched membrane roof above the entry foyer. Except above several recessed walls, the multi-level 8° monopitched roofs have no roof overhangs.

⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

2.3 Wall claddings

- 2.3.1 The main wall claddings are timber weatherboards and EIFS⁶. Horizontal metal weatherboards are installed above the garage door on the north elevation. The inner faces of the upper deck balustrades and a wing wall adjacent to the main entry are clad in paint-finished fibre-cement sheet. All wall claddings are fixed through the building wrap directly to the framing timbers.
- 2.3.2 Walls to the southeast and northeast corners of the lower level, and the western end of the upper level are clad in horizontal timber weatherboards. The cladding consists of bevel-backed weatherboards fixed through the building wrap directly to framing timbers, with metal soakers at external corners and scribes at internal corners.
- 2.3.3 The remaining walls are clad in a proprietary EIFS, system which in this instance consists of 60mm polystyrene backing sheets fixed directly to the framing over the building wrap, to which a mesh-reinforced plaster system has been applied. Vertical drainage grooves are formed in the back of the polystyrene sheets and the system includes purpose-made flashings to windows, edges and other junctions.

2.4 The decks

- 2.4.1 A small cantilevered timber deck extends to the east from the upper level, with clad balustrades and 'floating' timber decking over underlying butyl rubber membrane. The balustrades are clad in timber weatherboards on the outside and painted fibre-cement sheet to the inner faces, with a flat timber capping.
- 2.4.2 At the south end of an eastern paved terrace to kitchen and dining areas, timber steps lead to a timber framed deck along the east wall of the family room. The upper timber step sits above the terrace paving with lower steps leading to the deck area, which has open timber balustrades and spaced timber decking. At the north end of the paved terrace, timber decking forms paths around the northeast corner.

2.5 Timber treatment to framing

- 2.5.1 Although 'H1' treatment was commonly used at the time of framing in early 2003, and this was variable in terms of treatment type and level, the timber supplier provided a statement dated 21 September 2005 which confirmed that all 'external pre-nailed walls were constructed with H1.2 treated timber'.
- 2.5.2 The drawings call for the cantilevered deck to have 'H3 joists', but I have seen no information on the level of treatment (if any) to deck balustrade framing. The expert observed 'H1' stamps to some sub-floor framing, with no markings to larger floor joists. I am unable to determine the level and type of treatment described as H1.
- 2.5.3 On 5 February 2014, the applicant's consultant provided the following samples to a laboratory⁷ for decay and preservative analysis (descriptions of locations as provided by the consultant):
- Sample 1: 'Joist'
 - Sample 2: 'Deck, east side nog'
 - Sample 3: Probe location 16 [near the entry adjacent to garage door wall]
 - Sample 4: Probe location 18 [near the entry]

⁶ Exterior Insulation and Finish System

⁷ The laboratory is part of a firm that specialises in Agricultural and Horticultural products, with a focus on plant health

- Sample 5: 'Joist 200'
- Sample 6: 'Deck, joist East side'

2.5.4 The laboratory provided a report dated 12 February 2014 which noted:

- five of the samples showed 'positive for tin', and one sample (#4 from near the entry) was 'positive for copper'
- one sample (#3 near entry adjacent to garage door wall) showed incipient decay⁸
- all six samples were described as 'sound'

2.5.5 The external wall framing is likely to be treated to a level that will provide resistance to fungal decay. While the laboratory report says the sample are positive for either copper or tin, the report does not reference this to the recognised treatment levels described in B2/AS1.

3. Background

3.1 The authority issued a building consent (No. BB/08704/02) under the Building Act 1991 ("the former Act") on 21 November 2002. The consent conditions listed the inspections required during construction, which included a pre-lining and a pre-plaster inspection. The conditions also included the requirement for a producer statement from 'licensed contractors for installation and application of coatings'.

3.2 The authority carried out various inspections during construction, including a pre-line inspection on 25 March 2003. The last inspection record I have seen is of a drainage inspection on 12 May 2003, and it appears that no final inspections were carried out although the house was substantially completed and occupied in 2003.

3.3 In the MDU provider's submission (refer paragraph 4.8) it was noted that the wing wall at the entrance of the building was constructed after the building was completed in 2003. The submission described this work as 'over and above the existing wall and [including] replacement of some of the original wall.' In addition some work was carried out to the roof with a modification to a flashing sometime around 2005.

3.4 On 25 July 2006 the authority carried out a final inspection. The authority identified 23 items to be completed and the inspection record refers to plumbing and drainage items noted in the 12 May 2003 inspection as still needing to be addressed. The list included calling for 'a weathertightness inspection on EIFS cladding'.

3.5 The 2006 refusal to issue a code compliance certificate

3.5.1 The applicant requested a code compliance certificate and the authority responded in a letter dated 8 September 2006. The authority stated that the Building Code required that building work must remain durable for specific periods of time after the code compliance certificate is issued and noted that the inspection process for monolithic claddings had changed since the time that the building consent for the house was processed.

⁸ Described in the report as being colonized by fungal hyphae but not extensive enough to establish decay; will progress on to decay with loss of cell wall strength and integrity of treatment chemicals are inadequate or moisture levels remain high and the framing has not dried out; can be left in situ if it has high treatment and moisture levels are reduced to below 18% as soon as possible; should it become wet in future then the decay will reactivate.

3.5.2 The authority identified 14 risk factors and listed 13 weathertightness defects observed during its ‘standard visual inspection’ as follows:

1. No flashing on top of the meter box
2. Holes through bottom of meter box not sealed
3. Weatherboards not completed by roof flashing, in front of house
4. Head flashing missing to one window
5. No saddle flashing to front wing wall/cladding junction
6. Framing timber visible at gaps above front entry
7. Framing timber and building wrap visible between window and weatherboard (front of house)
8. Cracks to cladding around some windows
9. Cladding in contact with ground in places
- 10.No head flashing to garage door
- 11.Ends of head flashings not sealed to weatherboard in some places
- 12.Paintwork to weatherboards in need of maintenance

3.5.3 The authority also noted that items identified in earlier inspections had ‘not been cleared’, and required a number of producer statements. The letter concluded:

Due to the risk factors involved and identification of some defects, [the authority] cannot be satisfied on reasonable grounds that the cladding system as installed, will meet the functional requirements of clause E2, External Moisture and clause B2, Durability of the New Zealand Building Code. Therefore [the authority] is unable to issue a code compliance certificate.

3.6 The building consultant

3.6.1 Following a telephone discussion with the authority, the applicant wrote to the authority on 20 September 2006 seeking ‘... approval to approach a council-approved consultant to complete a weathertightness survey and provide a remedial works proposal’.

3.6.2 The authority responded on 4 January 2007, agreeing that, as an ‘acceptable alternative’ to a determination, the applicant could:

...engage the services of a Certified Weathertightness Surveyor who is a member of the New Zealand Institute of Building Surveyors, or other Council approved consultant to survey the works and investigate all weathertightness issues, and to provide a remedial works proposal for Council approval.

The authority also noted that the consultant must investigate and establish the reasons for any elevated moisture levels before proceeding with any repairs.

3.6.3 It appears that the applicant subsequently engaged a building consultant (“the consultant”) and elected to have a moisture monitoring system installed.

3.7 The moisture detection system

3.7.1 In March 2007 a moisture detection system was installed, with more than 80 permanent moisture probes (moisture detection units or “MDUs”) inserted into bottom plates. These provide information on the moisture content of the timber at probe locations by recording moisture content at about 4mm from the outer face of the bottom plates.

- 3.7.2 During probe installation, a ‘timber strength comparative measurement tool’ provides a comparative indication of the residual timber strength at the inner and outer sides of the framing. Probe drillings are also collected and those samples are assessed for visual discolouration of the framing timber at that location.
- 3.7.3 The monitoring company provides a ‘Building Evidential Report’ on results, which recommends that MDUs are read at least every six months to monitor moisture levels against natural seasonal equilibrium levels in order to ‘be warned of maintenance requirements and leaks that have developed subsequent to construction or last repair’. Guidance by a ‘suitably qualified building professional’ is recommended for interpretation of probe data.
- 3.7.4 Over the following five years moisture levels in the house were monitored once or twice a year. Report results are provided in colour-coded groups and Table 1 summarises results for the visual colour rating (“VCR”) of timber drillings at probe installation and for one set of moisture readings per year up to July 2013:

Table 1:

Colour	Description	Timber drillings VCR's Mar 07		Moisture levels	No. of MDUs						
					Aug 07	Dec 08	Aug 09	Dec 10	June 11	Dec 12	Jul 13
Green	‘OK’	A	2	up to 15%	64	69	64	48	60	81	47
Yellow	‘Watch’	B	77	15% to 18%	17	14	14	33	19	3	32
Orange	‘Warning’	C	4	18% to 25%	2	1	5	3	5	0	4
Red	‘Danger’	D	1	over 25%	1	0	1	0	0	0	1

- 3.7.5 Most moisture readings were below 18%, with the number of elevated readings varying from one MDU (December 2008) to six MDUs (August 2009). I note that some drilling samples were assessed as visually discoloured, indicating decay was present; however, those MDUs recorded low moisture readings.
- 3.7.6 The applicant has provided a submission indicating items from the authority’s inspection records and items listed in the letter of September 2006 which the applicant considers to have been remediated or that either ‘can’t be done’ or ‘could be done but [the applicant] would argue the point’. The expert has made some observations on the remedial work (refer paragraph 5.8.1).
- 3.8 I am not aware of any further correspondence between the parties until the applicant sought a code compliance certificate and the authority carried out a further final inspection of the house on 9 November 2011.

3.9 The 2011 notice to fix

- 3.9.1 Under cover of a letter to the applicant dated 15 December 2011, the authority attached a notice to fix and a ‘photo file’ of items identified during its inspection. The authority stated that the house did not comply with the Building Code ‘in a number of respects’ although the breaches identified in the notice to fix were stated in terms of items ‘not ... installed in accordance with the relevant acceptable solution/alternative solutions’.
- 3.9.2 The notice to fix (No.3749) dated 19 December 2011 identified a number of Building Code clauses that the building work was in breach of and listed ‘details of the contravention’, which included a ‘brief summary of events’. The latter included a note that ‘it is unknown as to what has happened between 2007 and 2011’.

3.9.3 The notice listed weathertightness concerns identified during the inspection and shown in the 'photo file', including (in summary):

- rainwater drainage in regard to:
 - upper level roofs
 - insufficient downpipe fixings
 - overflow provision to upper deck
 - ponding on membrane roof to foyer
- flashings in regard to:
 - deck/wall junctions
 - deck balustrade timber cappings
 - inter-cladding junctions
 - the bottom of apron flashings
 - roof/wall junctions
 - parapet/wall junctions
- window flashings
- drip edges to bottom of claddings
- clearances from bottom plates to ground or paving
- unsealed wall and roof penetrations.

3.9.4 The notice to fix cited a contravention of Clauses B1 Structure, E1 Surface Water and H1 Energy Efficiency although there are no specific items identified and I have received no evidence from the parties relating to these clauses. I have considered Clause B1 only in relation to potential structural implications associated with weathertightness.

3.9.5 The notice also stated that the applicant may apply to the authority for a modification of the requirements to allow durability periods to commence from the date of substantial completion (see paragraph 1.7.1).

3.10 The Ministry received an application for a determination on 2 July 2013.

4. The submissions

4.1 The applicant outlined the background to the situation, noting that progress had been made on all issues raised by the authority over the years. The applicant considered the notice to fix was unwarranted in the circumstances as the moisture monitoring results showed that 'the building is dry throughout' and every effort had been made to meet all requirements 'where reasonable and justifiable'. The applicant also noted the use of treated framing timber, the drainage grooves to the back of the EIFS backing sheets, and the low risk nature of the weatherboard cladding.

4.2 The applicant forwarded copies of:

- the notice to fix
- some of the consent drawings
- some of the inspection records
- some correspondence with the authority

- a moisture monitoring report dated 20 December 2012
- various certificates, producer statements and other technical information.

4.3 The authority forwarded a CD-Rom, entitled 'Property File', which contained some additional documents pertinent to this determination including:

- the building consent
- the consent drawings.

4.4 The first draft determination

4.4.1 The first draft determination was issued to the parties for comment on 16 October 2013.

4.4.2 The consultant responded to the draft determination in a detailed submission dated 14 November 2013. The consultant made the following comments on the draft (in summary):

- Performance should be assessed against the Building Code criteria of "undue damage" and "damage to building elements". The draft seeks 'absolute certainty beyond doubt' rather than reasonable grounds. The test of 'satisfaction on reasonable grounds' is a low threshold that should be an easy test to satisfy unless non-compliance is self-evident and visually obvious.
- A moisture detection system provides more than reasonable grounds as it also assesses 'future maintenance reaction and response'. The framing's resistance to decay means that verifying moisture levels via the MDUs gives an owner time to correct any problems should moisture levels rise.
- The house is not required to remain weathertight. Durability must be judged against the materials used and whether maintenance 'was or could be done'. The adequacy of a wall's weathertightness should be assessed against its ability to protect against undue dampness and 'not necessarily discrete decay damage'.
- This house has treated timber framing and claddings with draining capacity so 'demands a different approach to code compliance' rather than an emphasis on leaks.
- Defects are not failures of durability if they are not currently failing and with normal maintenance wouldn't be expected to. 'B2 failure only occurs when insufficiently durable materials are used to achieve compliance in the first place.'
- Information collected over a 7-year period demonstrates the good condition of the framing, and confirms the claddings good performance over that time. Items identified by the expert are, at worst, areas that need future monitoring, rather than being considered current defects.
- The authority's decision to issue the notice to fix was incorrect as no contravention was identified.

4.4.3 The authority responded to the draft by email on 16 December 2013. The authority accepted the draft, noting that the expert's report mirrors the authority's concerns 'as clearly there are some areas of risk that will involve more maintenance than would be described as "normal maintenance"'.

4.4.4 I took account of the responses to the first draft determination and issued a second draft determination to the parties for comment on 23 December 2013.

4.5 The second draft determination

4.5.1 The authority responded to the second draft determination on 19 February 2014, accepting the decision in principle subject to confirming its right to issue a new notice to fix. The authority noted that it did not completely agree with my view regarding the notice to fix not having sufficient foundation, but accepted that in the period since the notice had been issued, specific defects or non-compliances have been identified and it is more appropriate for any further notice to refer to those.

4.5.2 The consultant provided a detailed submission by email on 25 February 2014. The submission included comment on the expert's report, and results of laboratory analysis of timber samples the consultant had taken from six locations in the house. Where the consultant has commented on items referred to in the expert's report I have noted these in paragraph 6.

4.5.3 The consultant sought to have the determination decision changed to the effect that, subject to certain work being completed to the satisfaction of the authority there is sufficient evidence to establish that the external envelope complies with Clauses B2 and E2, and requested that I reverse the authority's decision on that basis. (Refer also paragraph 1.7.2)

4.5.4 In response I note that the matter to be determined is the authority's decision to refuse to issue the code compliance certificate, and the determination considers whether or not that decision was correctly made at that point in time (refer paragraph 10.5). I consider that a reversal of the authority's decision to refuse to issue the code compliance certificate cannot be made where that reversal is conditional on future actions that may or may not be taken by the applicant.

4.5.5 The consultant reiterated the matters raised in the previous submission and added (in summary):

- Treated timber has the capacity to resist decay as the drying cycle occurs; the MDUs have shown the drying cycle has been sufficient to alleviate the risk of undue dampness or damage (refer paragraph 8.3.3).
- The suggestion that past performance failures, even if rectified, mean that future moisture ingress could cause undue dampness is not accepted.
- 'The 15 year [durability] period must have an allowance for normal wear and tear...'. 'It is not reasonable to ... say that cladding faults may let water in the future when this hasn't happened in the last 10 years of life'.
- It was not accepted that water ingress to date was an indication of future moisture ingress, and if the Building Code required certainly that there would be no 'future moisture ingress [that] could cause undue dampness, then no building can be code compliant'.
- 'Some degrading as long as intervention is possible and the timber is still fit for purpose is acceptable...'

- Normal maintenance may include ‘any repairs possible to ensure compliance’. A greater level of maintenance (by way of inspections and repairs) must be able to support ‘lesser constructions’. If maintenance is possible then there is no contravention of the code clause. Details that are at risk should translate to ‘heightened awareness’ of increased maintenance.

4.5.6 The authority’s legal adviser emailed the Ministry on 4 March 2014 in response to the consultant’s submission, noting that the authority continued to support the findings of the second draft determination but welcomed any further clarification on the reasons for the decision.

4.6 Subsequent submissions

4.6.1 On 13 March 2014 I wrote to the parties and the consultant in respect of a request from the consultant that a third draft be issued or a hearing held.

4.6.2 The authority responded on 13 March 2014, noting that it did not consider a hearing was necessary given the parties ability to provide written information and evidence.

4.6.3 The consultant responded on 19 March 2014, asking that a third draft be issued and reserving the option of requesting a hearing. The consultant provided a further submission, which I have summarised as follows:

- The consultant compared this determination with two previous determinations (2014/001⁹ and 2014/004¹⁰) in terms of the grounds on which a code compliance certificate can be issued and the decisions in those determinations to reverse an authority’s refusal to issue.
- The decay analysis from the samples confirms the timber is compliant.
- There is ‘now no evidence of water ingress at this time and the only elevated reading of 27% found by [the] expert for MBIE has been rectified.’ Compliance with Clause E2.3.2 has been achieved.

4.7 My response to the consultant’s submissions

4.7.1 I respond below to some of the matters raised in the consultant’s submissions that are not considered elsewhere:

- ‘Wear and tear’ to buildings and building elements is considered in the Act, the Building Code and the Acceptable Solutions by the provision for exempt building work under Schedule 1(1), the required durability periods for building elements under Clause B2.3.1, and maintenance (as described in B2/AS1 and E2/AS1). In my view defects present in as-built construction cannot be considered ‘wear and tear’. The effects of wear and tear can be remedied as an item of maintenance.
- The consultant has referred to Determinations 2014/001 and 2014/004. The houses in those determinations were 10 and 13 years old and the framing was untreated, however I do not consider they provide a useful comparison with this house. Both determinations considered specific items identified by the authorities concerned. The decisions made in those determinations were based on the risks associated with each case, the proven performance of the cladding, and the lack of any evidence of water ingress.

⁹ Determination 2014/001 The refusal to issue a code compliance certificate for a 10-year-old house with metal and monolithic claddings

¹⁰ Determination 2014/004: Regarding the refusal to issue a code compliance certificate for a house.

4.8 Submissions in response to the third draft determination

- 4.8.1 A third draft was issued to the parties for comment and in order to confirm whether or not a hearing was requested.
- 4.8.2 The consultant responded in a letter dated 28 April 2014, noting that he considered insufficient weight had been given to his investigation. The consultant reiterated his views expressed in previous submissions. I have considered the consultant's submission.

Submission from the MDU provider

- 4.8.3 On 23 May 2014 I received a submission from the MDU provider. The MDU provider had undertaken a review of the information from the moisture monitoring and the timber samples and had questioned the applicant on some points. The submission set out the provider's view that a "deficiency" sighted in visual inspections is not a "defect" unless it is failing the performance requirements of the Building Code, and that either testing or sufficient visual evidence of non-performance would be required before determining that a deficiency was a defect. The provider considers that in instances where the issue of a code compliance certificate has been delayed, defects created at the time of construction should be repaired and deficiencies can be managed by way of maintenance plans or alterations at the owners' discretion.
- 4.8.4 The MDU provider noted moisture readings that had previously been high and outlined the causes and repairs or remedial work carried out in response. These were (in summary):

Entrance and Lounge

- Timber treatment findings varied (stud to CCA and base plates positive for Boron) due to wing wall constructed as an addition (refer paragraph 3.3).
- In reference to paragraph 5.9.1; no timber was discovered of poor condition and this area would have been reviewed when the wing wall was built and has remained dry since monitoring began.
- Lounge/entrance roof junction; readings currently low.
- Lounge corner window; thought to be caused by blocked drainage holes in the door frame – these have since been re-bored and more holes added. Most recent moisture reading 20.7%. The provider noted some high risk details and suggested it be monitored and included on the maintenance plan.

Laundry

- Testing of a wall to the laundry cupboard indicated moisture had been present but that the timber was sound; the provider accepted the applicant's explanation of the cause as being from a washing machine failure.

Study

- Beneath a roof-to-wall junction with two cladding types; believed to be where a roofer modified the flashing (refer paragraph 3.3).

Main bedroom

- Below the right hand side of a window next to the gutter; this wall was repainted in 2012 including resealing of window jambs. The MDU provider suggested this be managed with monitoring and entered into the maintenance plan.

Deck and family room

- Below the deck junction to the family room; additional flashing installed between the deck surface and the bottom plate, some time after August 2007.
- Corner ground; a slow leak caused by a nail perforating a roof drainage flashing, repaired some time after August 2009.

5. The expert's report

5.1 As stated in paragraph 1.8, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Building Surveyors. The expert inspected the house on 13 September 2013, providing a report dated 24 September 2013 which was provided to the parties on 24 September 2013. The expert was limited to visual observation of the building work only as the applicant did not give permission for any invasive testing to be carried out.

5.2 General

5.2.1 The expert noted that 'poor quality' framing set out and fascia installation indicated the building work was 'below average'. The EIFS cladding also appeared to be not well installed, with many departures from the manufacturer's installation details, although there appeared to be no cracks.

5.2.2 The expert limited his inspection to the external envelope of the house and observed a number of departures from the consent drawings, including

- cladding not extended down over bearers on east and south elevations
- changes to the small membrane roof over the entrance area
- changes to the wing wall at the north entry door.

5.2.3 The expert noted that penetrations through the cladding were dependent on sealant for weathertightness, which would need to be well maintained as any moisture getting in would be unable to drain easily to the outside.

5.2.4 The expert was able to observe the bottom of small underlying flashings to internal corner junctions between weatherboards and EIFS. However, some flashings terminated on top of the EIFS; trapping any water that entered the junction.

5.3 The sub-floor area

5.3.1 Although the scope of his inspection was limited to the exterior claddings, the expert also noted that the subfloor area appeared to have limited bracing as only one angle brace was visible. He could not find specific bracing calculations for the subfloor area, so was unable to confirm whether bracing provided by the cantilevered poles and the angle brace accorded with the structural design.

5.3.2 The expert also observed that the performance of the angle brace depended on exposed bolts, which were showing premature deterioration from water soluble salts attacking the zinc coating (with some joist hangers also deteriorating). The 150mm x 50mm floor framing was stamped as 'H1', but the expert could see no markings on the larger floor joists and noted that many had mould growing on them.

(I leave these issues to the parties to resolve and have not considered these items further in this determination).

5.3.3 The expert also noted that floor framing orientation beneath the kitchen area had been changed; with some solid floor joist blocking and a bearer omitted, and a jack stud subsequently added.

5.4 The bottom of the EIFS cladding

5.4.1 In most areas, the cladding extends at least 50mm past the bottom plate. However, the expert noted the following areas where wall frames were misaligned against the concrete foundations or the subfloor framing:

- at the northwest corner, wall frames do not align with the floor slab and the foundation wall projects beyond the EIFS face, with a flashing over the projection
- at one side of the garage door, the EIFS cladding is cut to accommodate the misaligned bottom plate
- at the southeast corner, floor joists do not overhang bearers, resulting in EIFS butting against the top of the bearers rather than extending below bearers to provide a drip edge to prevent water reaching the framing which appeared to have no or limited treatment against decay
- at the south end, bearers project beyond the bottom of the EIFS, with the ends of the bearers metal capped and cracks at the cladding/bearer junction.

5.4.2 The expert noted that the decking and ribbon plate to the ground floor deck butts against the EIFS, with no drainage provided at the junction. The fibre-cement sheet to the entry wing wall also butts against the concrete paving.

5.5 Windows

5.5.1 Windows in EIFS cladding are recessed by the cladding thickness and the expert was unable to confirm underlying jamb and sill flashings without removing cladding at the sill/jamb junction (which the applicant did not give approval for). However, the bottom of jamb flashings could be seen extending below the doors and I consider it likely that window jamb flashings are similarly provided. The expert compared window installation with the manufacturer's details, noting the following:

- no drainage was provided above the head flashing
- the proprietary uPVC head flashings were replaced with metal
- the plaster had been lapped onto the sill flanges.

5.5.2 Windows and doors in the weatherboard cladding are face-fixed with metal head flashings, no sill flashings and scribes against jamb flanges. The expert noted that the head flashings projected past the jamb scribes. On the upper level, a single head flashing extends above two windows, resulting in an exposed gap.

5.6 The upper deck

- 5.6.1 The expert was unable to obtain the applicant's permission to take timber samples in order to confirm the level of timber treatment to the balustrade framing and the cantilevered deck joists.
- 5.6.2 The expert noted that the bottom of weatherboards to the outer face of the balustrades is flush with the soffit lining, with no drip edge provided to avoid water tracking onto the lining and via cracks into the framing.
- 5.6.3 The balustrades are capped with flat timber, with metal cappings at corners. Although there was no evidence of saddle flashings at balustrade/wall junctions, the balustrade appeared to have been constructed after EIFS backing sheets were installed, which would protect against moisture penetration into exterior walls.
- 5.6.4 The expert removed the floating decking from the deck floor, noting the 'good step down at the door'. He observed that the underlying membrane drained to a small internal gutter at the deck doors and noted that the gutter was ponding at the time of inspection. The gutter drained to a single outlet, with no overflow provided.

5.7 Roof cladding and junctions

- 5.7.1 The membrane roof to the entrance area had leaked in the past and decay was found in the bottom plate under the parapet to the wing wall when MDUs were installed in March 2007. Additional layers of membrane had repaired the leaks and moisture levels were now low, however decayed timber had not been replaced. The expert noted
- a bubble in the top layer of the additional membrane used in repairs
 - no overflow provision should the single outlet through the parapet block
 - no drip edge to the parapet outlet pipe over the rainwater head, with reliance on sealant for water tightness
 - 'suspect' junctions between membrane upstands and upper wall claddings
 - top-fixed metal capping to the flat parapet and 'suspect' junctions to ends.
- 5.7.2 The remaining metal roofs include apron flashings at junctions with the upper walls. The junction above the family room had shown high moisture levels in the probe below and had been repaired in August 2007 when a proprietary kickout flashing was added to the bottom of the apron. For other apron flashings, the expert noted:
- several lack diverters or kickouts
 - sheet metal flashings had been added to the bottom of two aprons, one of these above the rear garage door following high probe readings below.
- 5.7.3 The expert noted several areas where the fascia is installed directly against the polystyrene backing sheets, with the bottom of the board buried within the plaster coating. At a south weatherboard wall, there is a large gap between the fascia and the top board that will allow wind-blown water penetration.

5.8 MDU readings: moisture levels and history

5.8.1 Based on the history of probe readings and the applicant's advice, the expert noted:

- an apron flashing diverter was installed to the family room south wall (see paragraph 5.7.2) and linings were removed following a 25% MDU reading in August 2007, with no timber testing carried out and no photographs taken
- an apron flashing diverter was also installed above the rear garage wall following a 23% MDU reading in August 2007
- further unrecorded remedial work was apparently undertaken following MDU readings above 18% in August 2009, including the lounge northeast corner, which also recorded high levels in June 2011, July 2013 and September 2013, with moisture levels lowering during drier periods
- despite consistently low MDU readings, drillings showed decay below the parapet wall to the foyer which was not further investigated (likely to be due to an earlier leak from the gutter above, repaired in time for the timber to dry).

5.8.2 The expert noted that MDUs were installed in bottom plates of exterior walls, but did not monitor framing directly adjacent to various at-risk details, including:

- the deck floor and balustrade framing to the cantilevered deck
- the extension of the parapet wall to form the wing wall at the entry
- many of the roof/wall junctions
- inter-cladding junctions terminating above joinery openings
- penetrations of the projecting bearers to the south end.

5.8.3 The expert took readings from a number of representative probe locations to compare these to the most recent monitoring report showing readings taken on 18 July 2013. Taking account of all readings taken since the MDUs were installed in 2007, the expert considered that equilibrium moisture levels in the house were likely to range from 10% to 14% in the lower level and 9% to 12% in the upper level. The expert noted that his readings were all slightly lower, with the most elevated reading being 27% at the northeast corner of the lounge. (I note that readings above 18% or which vary significantly generally indicate that external moisture is entering the structure and further investigation is required.)

5.8.4 The expert noted that if 'H1' timber framing had been treated to a level equivalent to the current H1.2 level, then some periodic wetting may not be sufficient to damage the underlying timber, but that laboratory analysis would be required to establish this.

5.9 The expert's conclusions

5.9.1 The expert considered that the decayed framing left in place at the entry parapet wall was 'an obvious issue', though the expert could not establish the extent and severity without destructive investigation.

5.9.2 The history of moisture probe readings indicates that moisture entry has been limited, with remedial actions undertaken or framing able to periodically dry out. However, the MDUs do not cover all potentially defective areas observed during the inspection.

- 5.9.3 The expert considered that a ‘more thorough, destructive investigation’, would be required to enable enough information to be collected to inform a detailed scope of remedial works.

6. The consultant’s investigation

- 6.1 Subsequent to the issue of the second draft determination, the consultant carried out an assessment in relation to items raised in the expert’s report, including analysis of timber samples (refer paragraph 2.5.4). The consultant included commentary in his submission dated 24 February 2014 which outlined his views regarding whether or not remedial work was required and what remedial work was proposed: this is summarised below.
- 6.2 In respect of the expert’s elevated reading of 27% at the northeast corner of the lounge (refer paragraph 5.8.3), the consultant observed that the bi-fold door sill was filled with water. Drain holes were cleared and the consultant considered that a reading of 16% indicates the remedy was successful.
- 6.3 Sample #4 was taken near the entry where the expert noted drillings showed decay (refer paragraph 5.8.1); no decay was found in the analysis. (I note that advice on the drillings was provided as part of the application information which also noted ‘decayed timber’ at this location.)
- 6.4 The consultant considered that no action was required to remedy the majority of the issues noted by the expert and gave his reasoning for that opinion. The remedial work proposed by the consultant included the following:
- Where cladding is more than 500mm in height above windows then holes will be drilled into plaster above the head flashing to allow drainage (see paragraph 5.5.1)
 - An overflow to be provided to the deck (see paragraph 5.6.4)
 - The membrane to the flat roof above the entry to be replaced, the substrate checked and the parapet outlet upgraded (see paragraph 5.7.1)
 - Inter-cladding and fascia junctions to be checked and resealed.
 - Two vertical supports bolted under beams in the subfloor to be replaced with H4 treated timber.

7. The hearing

- 7.1 I held a hearing in Auckland on 23 July 2014 at the request of the applicant. I was accompanied by a Referee engaged by the Chief Executive under section 187(2) of the Act, and two officers of the Ministry. Present at the hearing were
- two officers of the authority
 - the applicant and the consultant, and a second consultant acting for the applicant.
- 7.2 All of those present at the hearing had the opportunity to speak. The information presented enabled me to amplify and clarify various matters of fact and was of assistance to me in preparing this determination. As the parties’ submissions have already been summarised, I have only noted below the further issues raised by those present.

7.3 Evidence base

- 7.3.1 Those present discussed the differing methodologies for establishing performance of the external envelope and the evidence base on which the authority could form its view on compliance.
- 7.3.2 The authority considered that the use of MDUs, while useful to demonstrate performance, was heavily reliant on the precise location of the probes and wasn't appropriate as a sole means of demonstrating compliance. The authority had concerns that there are construction details in this instance that are at high risk of allowing moisture ingress and which aren't being monitored, and that there may be damage that was caused prior to the repairs that were carried out and that damage is not picked up by the MDUs.
- 7.3.3 The authority discussed the alternative method, being moisture readings and then removal of some lining in areas of high readings or at high risk areas. This allows for a visual inspection over a larger area to identify moisture ingress, for example where there is evidence of staining, and also sampling of the timber where necessary.
- 7.3.4 The consultant held the view that the use of MDUs provides a more thorough understanding of the building's performance over the long term as opposed to the one-time observation through invasive investigation. In this case remedial work had been undertaken where readings were high and subsequently the readings had decreased.

7.4 Maintenance and the use of MDUs (see also paragraph 9)

- 7.4.1 The consultant considers that the performance of the building envelope can be confirmed through continued monitoring and that where elevated readings occur the applicant was able to act to ensure the building envelope continued to perform. The consultant holds the view that such monitoring and intervention can be considered normal maintenance as it would fall within the definition in B2/AS1 as "periodic inspection". The consultant proposed that in this regard a maintenance schedule signed by the applicant could "underpin" a code compliance certificate.
- 7.4.2 The consultant was also of the view that targeted remedial work would fall within E2/AS1 2.5.1(b) as it was 'preserving performance', and that such repairs were less than 'reconstruction or major renovation' set out in B2.2.
- 7.4.3 The authority does not consider the monitoring of MDUs to be normal maintenance particularly for areas of the building envelope where the performance may be compromised by the construction detailing.
- 7.4.4 In addition to the concerns regarding locations of the MDUs, the authority noted that it relied on the applicant and any future owner continuing to carry out readings at an appropriate frequency. The authority noted that any new owner would not be party to a maintenance schedule agreed to by the applicant and that there was no regulatory mechanism to enforce such an agreement; MDUs could also be removed subsequent to the issue of a code compliance certificate. The authority maintains the view that the building itself must comply regardless of whether MDUs are used or not and that the authority needs to know that the building will comply for the required durability period.

7.5 Undue dampness

- 7.5.1 The consultant holds the view that undue dampness applies to the building i.e. whether there is impact on the occupants of the building, as opposed to damage to building elements.
- 7.5.2 The authority noted that factors relevant to what can be considered undue dampness include frequency of moisture (such as seasonal or regular wet and dry cycles), the ability of the material to dry, the reduction of levels of treatment through leaching and the consequences in terms of resilience. The authority observed that the only measure for undue dampness is the reference to acceptable moisture levels before closing in.

7.6 Reasonable grounds

- 7.6.1 The consultant put forward the view that the reasonable grounds test was a low legal threshold and that unless there was evidence to the contrary then there was reasonable grounds to be satisfied as to compliance. The consultant expressed concern that the authority was looking for a higher level of assurance (certainty) before it would issue a code compliance certificate.
- 7.6.2 The applicant's second consultant considers the reasonable grounds threshold higher than low, but also was of the view that the authority appears to want to be certain of future performance.
- 7.6.3 The authority stated that it was not seeking 'certainty', but held the view that the Act was not written contemplating situations where there is a significant gap between the time the building work is completed and when the code compliance certificate is sought. Accordingly the authority considered that the reasonable grounds test is different for new builds versus older construction.
- 7.6.4 In this instance the authority holds the view that the building was not well constructed but has been well maintained, and the question becomes whether the areas that were not well constructed are going to continue to perform. For older buildings constructed using Acceptable Solutions that have been superseded, the authority applies an approach like that used for alternative solutions.
- 7.6.5 The applicant's second consultant accepted that the experience of the authority forms a part of the reasonable grounds decision, but that the authority must ensure it is comparing like-for-like, for example the use of treated timber and the levels of drainage.

7.7 Compliance of specific items

- 7.7.1 Those present at the hearing discussed the compliance of specific items that had been identified in the draft determination as requiring further investigation, and I summarise the discussion in the following table (paragraph references in brackets):

Table 2:

Item 1: Overflow to the upper deck and upper deck balustrades (5.6)	
Applicant/consultant	Have previously proposed installing overflow (6.4)
Consultant	The junction of the balustrade to house was monitored and the consultant was of the view that as this was the higher risk junction and was performing it could be assumed that the lower risk areas were also performing.

Item 2: Ground clearances at the front entrance and on west side of the house (5.4)	
Applicant/consultant	Wicking of moisture was less of a concern due to the type of cladding used (as opposed to fibre-cement sheet). MDUs have established that it has performed.
Authority	It is not 'normal maintenance' to open up the ground clearance. Concerned that the wing wall is supporting the membrane roof.
Item 3: EIFS butting against the bearers (5.4)	
Applicant	The area was able to be easily seen and requested the authority inspect it.
Authority	The subfloor should be protected by the cladding and the detail provides insufficient protection to the joists. Expressed concern regarding possible decay at end grain of joist.
Consultant	Any water ingress can evaporate quickly means that the detail would not lead to damage from moisture.
Item 4: Membrane roof to parapet wall at the entry and cap flashings (5.7.1)	
Authority	Noted concerns regarding the penetrations to the parapet flashings at the front entry, considered that the butynol should be replaced and the outlet upgraded. The overflow for the membrane roof comes out in an express joint in the cladding system and is reliant on sealant for weathertightness.
Consultant	Agrees that parapets are a high risk detail, but that there was no evidence of failure and this should be considered reasonable grounds. Attention to 'maintenance' should be adequate. Some of the features discussed aren't currently monitored, but the consultant had carried out further investigation (6)
Applicant	A number of options had been considered, such as resurfacing the butynol and in that process taking the cap off and assess the performance and install a solution.

7.7.2 A site visit was undertaken at the end of the hearing; the authority elected not to attend.

7.8 The fourth draft determination

7.8.1 A fourth draft determination was issued to the parties for comment on 22 September 2014.

7.8.2 Subsequent to the fourth draft, the applicant and the authority met and corresponded regarding the issues that would need to be addressed before a code compliance certificate could be issued. In correspondence to the Ministry, by email on 18 November 2014, the applicant expressed concern about what he considered could be an 'open-ended requirement for further invasive investigations' and the authority's interpretation of the fourth draft determination.

7.8.3 In response to the applicant's concerns I outlined in an email to the parties on 1 December 2014 an additional paragraph to be included in the final determination to provide the parties with some guidance on what could happen after the determination is issued (refer paragraph 12).

7.8.4 The applicant responded by email on 8 December 2014, noting that on the basis of the guidance included in paragraph 12 he accepted the draft determination. The applicant remained concerned about the level of evidence required that would be considered sufficient to establish compliance with the Building Code, and noted that

many code compliance certificates would have been issued in cases where buildings were later found to have been seriously compromised in terms of weathertightness.

8. The compliance of the external envelope

8.1 General

8.1.1 The evaluation of building work for compliance with the Building Code (Clause E2 and Clause B2) and the risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).

8.1.2 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 and fairly complex in plan and form
- the monopitched roofs are set at varying levels, with roof parapets, no verges and few eaves to shelter the claddings
- there are three types of wall claddings, with inter-cladding junctions
- the wall claddings are fixed directly to the framing
- there is a cantilevered deck with clad balustrades to the upper level

Decreasing risk

- the house is in a medium wind zone.

8.1.3 Using the E2/AS1 risk matrix to evaluate these features, the elevations are assessed as having a high risk rating. (I note here that the consultant disputes the risk rating). If details shown in the current E2/AS1 were adopted to show code compliance, a drained cavity would be required for all of the claddings. However, this was not a requirement at the time of construction.

8.2 The requirements of Clause E2 and B2

8.2.1 Taken in conjunction with section 16 and 17, section 18 makes the performance criteria of the Building Code the key enforceable requirements (this is further described in Determination 2012/061). While the functional requirements can influence the interpretation of the performance criteria and hence affect the nature and scope of the performance criteria compliance, if compliance with the performance criteria has been satisfied, a person cannot be required to do more: it is the performance criteria that a building must comply with.

8.2.2 The functional requirement for Clause E2 (at the time the consent was issued) was:

Clause E2.2 *Buildings* must be constructed to provide *adequate* resistance to penetration by, and the accumulation of, moisture from the outside.

In respect of the building's external envelope the performance requirement (at the time the consent was issued) was set out in Clause E2.3.2 as follows:

E2.3.2 Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, or damage to *building elements*.

8.2.3 The functional requirement for Clause B2 (at the time the consent was issued) was:

Clause B2.2 *Building* materials, components and *construction* methods shall be sufficiently durable to ensure that the building, without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of the *building*.

Clause B2.3.1 sets out the periods for which building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code.

8.2.4 The relevant requirement in the former Act for a code compliance certificate to be issued is that the authority must be satisfied on reasonable grounds that the building work complies with provisions of the Building Code that were in force at the time the consent was issued.

8.3 Discussion

8.3.1 The terms “undue dampness” and “damage” are not defined in the Building Act or Building Code. In terms of Clause E2.3.2 of the Building Code, I consider the term “undue dampness” to be a level of moisture that has, or will, result in detrimental effects on building elements, or the building occupants, or both. I do not consider that “damage” (for example decay in framing or premature deterioration of building wrap) needs to have occurred in order to satisfy the test of “undue dampness”. A breach of Clause E2.3.2 can arise from either damage to building elements or undue dampness; it does not require both.

8.3.2 I do not agree with the consultant’s view that undue dampness applies only to the building environment and effect on the occupants of the building. Building elements, such as structural members, must be protected from the effects of dampness in order to achieve their required durability periods; this premise is established in the Acceptable Solutions. The form of protection in regards to timber framing for example includes a combination of the level of treatment of the timber, physical barriers such as cladding, and drainage and ventilation built into the system.

8.3.3 I agree with the consultant that intermittent moisture ingress does not necessarily equate with a failure of Clause E2.3.2. Where the level or frequency of moisture ingress is low, or where there is sufficient drainage and drying capacity in the building envelope, the moisture may not cause undue dampness or damage. However, timber that is insufficiently treated may well be detrimentally affected by continuous wetting and drying cycles, or a prolonged period of elevated moisture levels.

8.3.4 If a cladding is allowing moisture ingress as a regular occurrence, this demonstrates the current risks associated with the cladding and the possibility that future moisture ingress could cause undue dampness as the building elements degrade. In this case the nature of some of the construction details is such that even with normal maintenance these details would not be expected to comply with Clause E2 for the durability periods set out in Clause B2

8.3.5 The consultant has submitted that ‘discrete decay damage’ is not necessarily a failure to comply with Clause E2.3.2 unless this has impaired building envelope to the point of it being dangerous or insanitary under section 123. I do not accept this view. Even where the damage is discrete or localised, the fact that there has been moisture ingress to a level that has caused undue dampness or damage to a building element means there has been a failure of Clause E2.3.2. Whether a building is dangerous or

insanitary is a high test, which in the normal course of events may well mean that a building, or part of a building, is unable to be occupied.

- 8.3.6 The consultant has submitted that ‘a B2 failure only occurs when insufficiently durable materials are used to achieve compliance in the first place’. I agree that is one aspect of the durability clause, however, Clause B2.2 applies to ‘components and construction methods’ as well as ‘materials’. The cladding cannot be said to be meeting the performance requirements of the Building Code if the building envelope (including the ‘building materials, components or construction methods’) does not continue to prevent the penetration of water that would cause undue dampness or damage for the periods set out in Clause B2.3.1 sufficiently to satisfy Clause E2.
- 8.3.7 Compliance with Clause E2.3.2 for the periods set by Clause B2.3.1 will be dependent on a number of factors, including the exposure of the building elements, the consequences and frequency of possible moisture ingress, the presence of any redundancy in the cladding system, and the details that determine the level of drainage and drying.
- 8.3.8 The consultant has submitted that non-compliance, being undue dampness or damage to building elements, has not occurred and that elevated moisture readings indicate only intermittent moisture ingress. I disagree with this view as there is historical evidence that the external building envelope has failed to comply with Clause E2 in some locations (see paragraph 5.8.1), and it is unclear what effect this has had on the building elements.
- 8.3.9 The present cladding systems are required to satisfy Clause E2 for a minimum of 15 years under Clause B2.3.1. However, I note the expected life of the building itself is a minimum of 50 years. Careful attention to the performance of the claddings is needed to ensure that the external envelope continues to protect the underlying structure for its minimum required life of 50 years.
- 8.3.10 Because the cladding faults, including some of the repaired areas, are likely to allow moisture ingress during the remainder of the 15-year period stated in Clause B2.3.1(b), I consider there is evidence the building work does not comply with the durability requirements of Clause B2.

8.4 Conclusion

- 8.4.1 Not all areas of the wall and roof claddings appear have been installed in accordance with good trade practice and the manufacturer’s instructions. I consider there is sufficient evidence to show that the membrane roof to the entrance area has not satisfied Clause E2.
- 8.4.2 There are some items identified by the authority and in the expert’s report that the applicant has subsequently proposed to address, and there are some items that I consider comply with the Building Code. I also consider that further investigation is required to establish whether compliance with Clauses E2 and B2 has been achieved in relation to some construction details before a code compliance certificate can be issued. I have summarised my conclusions on compliance in the following table with references to relevant paragraphs in this determination:

Table 3:

Item description	Paragraph	My conclusion
Ground clearances		
Misalignment EIFS/floor slab at northwest corner	5.4.1 (bp #1)	Sufficient evidence of performance. Complies
EIFS at one side of garage cut to accommodate misaligned bottom plate	5.4.1 (bp #2)	Sufficient evidence of performance. Complies
Ground floor deck butts against EIFS	5.4.2	Gap observed at site visit. Complies.
Entry wing wall fibre-cement butts against concrete paving.	5.4.2	Exposed and subject to surface water. Does not comply
Subfloor		
Bearers project beyond EIFS (not monitored)	5.4.1 (bp #4)	Sufficient ventilation. Complies
Windows		
No drainage above head flashing	5.5.1 (bp #1)	Applicant proposes remedial action (6.4 bp #1).
Single head flashing extended above 2 windows resulting in an exposed gap.	5.5.2	Low risk; application of sealant would be sufficient to provide reasonable grounds that this will comply.
The upper deck		
No drop edge to stop water tracking onto lining	5.6.2	Sufficient evidence of performance. Complies
Balustrades capped with flat timber with metal capping at corners	5.6.3	Ongoing performance will impact on underlying structure and achievement of 50 yr durability period. Strongly suggest monitoring or periodic investigation beyond the cladding's 15yr durability period.
Balustrade/wall junctions	5.6.3	Observed continuous cladding at site visit. Complies
Gutter drained to a single outlet, no overflow provided	5.6.4	Applicant proposes remedial action (6.4 bp #2).
Ponding in the small internal gutter servicing the membrane	5.6.4	Does not comply. Requires remedial work to ensure the deck surface fall and water flows to the outlet. I suggest this be addressed the same time the applicant addresses the lack of overflow.
Membrane roof/parapet wall		
Historical failure to perform, decayed timber not replaced	5.7.1	Further assessment of extent and severity of damage caused by historical leak is required. I suggest this be addressed in conjunction with inadequate clearance of cladding and remedial work to the membrane roof.
Various deficiencies in construction/repair to the membrane roof and parapets.	5.7.1	Applicant proposes remedial action (6.4 bp #3). I leave this matter to the applicant and authority to agree on the appropriate investigation and remediation.

Item description	Paragraph	My conclusion
<i>Apron flashings and various other inter-cladding and fascia junctions</i>		
Apron flashings lacking diverters or kickouts	5.7.2	Not sufficient information to establish on reasonable grounds that this construction detailing complies; the same detail has previously failed in one area (above family room). Applicant may elect to carry out invasive investigation, or appropriate monitoring to establish performance, or undertake targeted remedial work to alter the detail.
Fascia installed directly against polystyrene backing sheets	5.7.3	Applicant proposes inter-cladding and fascia junctions to be checked and resealed (6.4 bp #4).
Gap between fascia and the top board allows wind-blown water penetration	5.7.3	Does not comply. Requires sealing.
Inter-cladding junctions terminating above joinery openings – not monitored	5.8.2	Further investigation or monitoring required to provide reasonable grounds as to compliance. Whether remedial work is required will depend on the results.

- 8.4.3 Although the framing appears to be treated, investigations indicate that some moisture entry resulted in timber damage in the four years prior to probe installation (refer paragraphs 3.7.4 and 3.7.5). The expert's assessment has also satisfied me that further investigation is needed in regards to the performance of some construction details. I do not consider the assessment carried out by the consultant is of itself sufficient to show the work is compliant. I conclude that there is sufficient evidence to establish on reasonable grounds that the external building envelope both historically and currently does not comply with Clause E2 of the Building Code.
- 8.4.4 Without further investigation of the areas identified in the table above, I am unable to conclude on the level of satisfactory rectification that is likely to result in the external building envelope being brought into compliance with Clauses B2 and E2 of the Building Code.
- 8.4.5 In his submission of 24 February 2014, the consultant provided comment on the items listed in the third draft determination as requiring further investigation and indicated where the consultant considered remedial work would be carried out (see paragraph 6.4). Establishing the extent of remedial work required, and the methods of achieving compliance for the purpose of obtaining a code compliance certificate is not a matter for this determination to consider; that is for the applicant to propose and for the authority to consider and accept or reject.
- 8.4.6 In the covering letter to the application the applicant requested 'a list that we can rely on as being final'; the applicant reiterated at the hearing his wish to have it clearly set out the items that required remediation in order for a code compliance certificate to be issued.
- 8.4.7 I note that the determination process does not provide an exhaustive list of defects nor a recommendation on how any matter of non-compliance should be remedied. A determination provides a means by which the decisions made by authorities in

respect of building work can be reviewed. I am only required to seek sufficient evidence in order to confirm, reverse or modify an authority's decision as provided for under section 188 of the Act.

9. 'Normal Maintenance' and the use of the MDUs

9.1 Much of the consultant's submissions regarding the application of the Act and the Building Code turns on his view regarding what can be considered 'normal maintenance'. The consultant has also placed much weight on 'intervention with maintenance' as a means of complying with the Building Code, and that construction defects are not failures of durability if they are not currently failing and with 'normal maintenance' would not be expected to. Given the features of this building, the consultant believes the use of MDUs can be considered 'normal maintenance' for the purposes of compliance with Clause B2. (See also paragraph 7.4.)

9.2 Where the cladding has failed to satisfy Clause E2.3.3 within the 15-year period set out in Clause B2.3.1 and the cladding undergoes remedial work, if that work is an alteration to the as-built system then it cannot in my view be considered to be 'normal maintenance' as described in B2/AS1 and E2/AS1. I do not consider that the corrective actions described in paragraph 5.8.1 and proposed in paragraph 6.4 can be considered normal maintenance as they constitute a modification of the as-built system. The fact that they were required and/or considered necessary can be taken to mean that the cladding did not satisfy Clause E2.

9.3 I continue to hold the view expressed in Determination 2010/079 where I said:

7.5.1 The purpose of maintenance under Clause B2 is to ensure an ongoing compliance of a building that is already code compliant.

7.5.2 The need for maintenance arises from the normally expected deterioration of the building elements due to their exposure and in-service use. The extent of maintenance required for any particular cladding will be dependent on the nature of the cladding, the complexity of building envelope, the building's exposure, its location, and similar.

7.5.4 I consider that the rectification of construction defects (including design defects), such as the installation of flashings or movement joints, is not maintenance. Construction defects should, wherever possible, be rectified before a code compliance certificate is issued. However, if defects are latent, or not immediately evident, they may be identified during maintenance. The discovery of defects at a later stage does not make the correction of these defects 'maintenance'.

9.4 Where a cladding can be considered satisfying Clause E2, then maintenance can be carried out to ensure ongoing compliance. However, in my view there is an important distinction between 'normal maintenance', and 'remedial work' that is required to remedy a contravention of the Building Code; just because a problem is promptly identified and rectified does not make it any less of a contravention

9.5 The value to be gained by the use of MDUs has been considered in previous determinations (for example 2010/079) and I continue to hold the view expressed in those determinations. In summary:

- MDUs can provide useful information about the historical performance of a cladding system;
- MDUs will not stop water ingress or necessarily result in effective repairs;
- MDUs require an understanding of their use and application;

- MDUs in themselves are not evidence of code compliance.
- 9.6 I do not consider the use of MDUs a part of normal maintenance, but I accept there are situations where they may form part of a maintenance schedule for particular cladding systems and where the maintenance requirements form part of the consented work; see for example Determination 2012/013. The use of MDUs in this case was not included in the consent.
- 9.7 In the case of this particular house, I consider that the moisture monitoring reports have indicated areas of past moisture penetration and provided the applicant with information that has allowed for repair work to be carried out and to therefore limit moisture damage. The monitoring has also provided evidence that indicates areas that have performed adequately despite poor construction detailing. However, while 86 MDUs have been installed I accept the expert's view that some at-risk areas are not being directly monitored (see paragraphs 5.8.2 and my comments in Table 3 at paragraph 8.4.2).

10. The refusal to issue a code compliance certificate

- 10.1 The building consent 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 that consent. Section 436(3)(b)(i) the Act requires the authority to issue a code compliance certificate if it 'is satisfied that the building work concerned complies with the building code that applied at the time the building consent was granted'.
- 10.2 In the normal course of events an owner would apply for a code compliance certificate on completion of the building work. In this instance the decision is being made some ten years after the building work was substantially complete. The decision-maker has the benefit of additional knowledge about weathertightness performance and the risks associated with particular materials, construction methods and details. I am of the view that in such instances the actual performance of the building work to date can be taken into account in making a decision as to whether the building work complies with the Building Code.
- 10.3 The assessment of the building's performance is dependent on a number of factors. Authorities may be able to make an assessment easily in cases where the risk of non-compliance is low; in others where there are 'at risk' construction details, an authority may seek further information from owners to confirm a building's performance. In making a decision regarding the ongoing compliance of building work i.e. the performance requirements of Clause B2, I consider that along with objective measures such as evidence of in-service performance to date the authority's experience with similar construction methods and materials can also be taken into account in its decision.
- 10.4 I do not agree with the consultant's submission that the establishment of 'reasonable grounds' is a low threshold, nor that it should be an easy test to satisfy. The process of establishing compliance is not a matter of weighing up the evidence for and against compliance and reaching a view on the balance of probabilities, rather it is an assessment whether the evidence provided (or sought) supports the conclusion that the building work complies with the Building Code. The amount of evidence will vary but the determining factor will usually be whether there is clear evidence of non-compliance.

- 10.5 Taking into account the authority's photo file of 9 November 2011, the expert's report, the consultant's submissions and the other evidence, I consider the authority was correct in its decision to refuse to issue the code compliance certificate as it could not be satisfied on reasonable grounds that the building work complied with the Building Code that was in effect at the time the consent was granted.

11. The issue of the notice to fix

- 11.1 The applicant's covering letter to the application for determination stated that the applicant considered the issue of the notice to fix to be unwarranted and referred to a previous determination (2013/015)¹¹ that discusses the relationship between notice under section 95A of a refusal to issue a code compliance certificate and the issue of a notice to fix under section 164.
- 11.2 The notice to fix is dated November 2011; the notice to fix considered in Determination 2013/015 was dated October 2011 and is similar in many respects in its content and form to the current case. In Determination 2013/015 I came to the view that the authority did not exercise its powers correctly in issuing that notice to fix: my view of the notice to fix in that determination is also applicable here. In particular I note the items listed in 2.1 of the notice are largely in respect of the Acceptable Solutions and although departures from the Acceptable Solutions may give rise to concerns regarding compliance it does not necessarily follow that the building work does not comply.
- 11.3 In this instance the authority has identified a number of matters as a result of inspections during construction and up to 2006 when the authority refused to issue the code compliance certificate (refer paragraph 3.5.2) and provided its reasons for that refusal as required under section 95A. A further inspection was carried out in 2011 and the authority subsequently issued the notice to fix dated 9 November 2011 along with the photo file. The notice to fix does not refer to the moisture monitoring report.
- 11.4 For a notice to fix to be issued the authority must consider on reasonable grounds that a person is contravening or failing to comply with the Act or regulations; that belief will require some specific evidence. I consider the details of non-compliance identified in the notice to fix were not fully supported by evidence that established matters of non-compliance, as required by section 164; accordingly I consider the notice to fix was incorrectly issued. A notice issued under section 95A giving the authority's reasons for refusing the code compliance certificate would have been appropriate in the circumstances.

12. What happens next?

- 12.1 This determination reverses the authority's decision to issue the notice to fix. I have discussed the notice to fix in paragraph 11 above, and at paragraph 11.4 noted that a section 95A notice would have been appropriate in the circumstances.
- 12.2 It is now for the applicant to decide whether they wish to obtain a code compliance certificate. In order to do so the applicant would need to undertake the remedial work and further investigation and/or monitoring required, as identified in Table 3 of this determination, in order to establish compliance of the building work. There is no

¹¹ Determination 2013/015: The refusal to issue a code compliance certificate and the simultaneous issue of a notice to fix for a 14-year-old house

requirement that the owner obtain a code compliance certificate. I note here that the section 95A notice would remain on the property file.

- 12.3 Table 3 in this determination (refer paragraph 8.4.2) provides the parties with my views on what would be required in order that a code compliance certificate could be issued by the authority. Table 3 notes some items that do not comply and require remedial work to bring them into compliance with the Building Code. It also notes some items where there is currently insufficient information to form a view on reasonable grounds as to compliance, and includes my view that there are at least two options for gathering the evidence that would support an application for a code compliance certificate.
- 12.4 If no code compliance certificate is issued, the authority retains the option of issuing a notice to fix in the future. For such a notice to be issued there would need to be a breach of the Act or regulations, and the authority's belief that the Act or regulations are being contravened would require some specific evidence in support of that belief before a notice to fix can be issued. I also of the view that the authority should give due regard to the findings of this determination as well as taking into account any remedial work, investigation or monitoring carried out.

13. The decision

- 13.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:
- the authority was correct in its decision to refuse to issue the code compliance certificate in 2011 as it could not be satisfied on reasonable grounds that the building work complied with the Building Code that was in effect at the time the consent was granted;
 - the external building envelope does not comply with Building Code Clauses B2 and E2, and accordingly the decision of the authority to refuse to issue a code compliance is confirmed;
 - the decision of the authority to issue the notice to fix dated 15 December 2011 is reversed.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 17 December 2014.

John Gardiner
Manager Determinations and Assurance

Appendix A

A.1 The relevant clauses of the Building Code include:

E2.3.2 Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to *building elements*, or both.

B2.2 *Building materials*, components and *construction methods* shall be sufficiently durable to ensure that the building, without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of the *building*.

B2.3.1 *Building elements* must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the *specified intended life* of the *building*, if stated, or:

(a) the life of the building, being not less than 50 years, if:

(i) those *building elements* (including floors, walls, and fixings) provide structural stability to the *building*, or

(ii) those *building elements* are difficult to access or replace, or

(iii) failure of those *building elements* to comply with the *building code* would go undetected during both normal use and maintenance of the *building*.

(b) 15 years if:

(i) those *building elements* (including the *building envelope*, exposed plumbing in the subfloor space, and in-built chimneys and flues) are moderately difficult to access or replace, or

(ii) failure of those *building elements* to comply with the *building code* would go undetected during normal use of the *building*, but would be easily detected during normal maintenance.

(c) 5 years if:

(i) the *building elements* (including services, linings, renewable protective coatings, and *fixtures*) are easy to access and replace, and

(ii) failure of those *building elements* to comply with the *building code* would be easily detected during normal use of the *building*

A.2 Relevant paragraphs from the Acceptable Solutions include:

B2/AS1

2.0 Maintenance

2.1 Normal maintenance

2.1.1 Normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given *building element*. The extent and nature of that maintenance will depend on the material, or system, its geographical location and position within the *building*, and can involve the replacement of components subject to accelerated wear.

2.1.2 It is the responsibility of the person specifying the *building element* to determine normal maintenance requirements. These may be based on the manufacturer's recommendations and may also include periodic inspections of elements not readily observable without a specific effort (e.g. access to roof or subfloor spaces).

2.1.3 Basic normal maintenance tasks shall include but not be limited to:

a) Where applicable, following manufacturers' maintenance recommendations,

- b) Washing down surfaces, particularly exterior *building elements* subject to wind driven salt spray,
- c) Re-coating interior and exterior protective finishes,
- d) Replacing sealant, seals and gaskets in joints,
- e) Replacing valves, washers and similar high wear components in easily accessed service equipment and other *building elements*,
- f) Cleaning and replacing filters in *building services* systems,
- g) The regular servicing of boilers, cooling towers, lifts, escalators, emergency lighting and *fire* protection equipment, and
- h) The maintenance of signs for access, *escape routes*, emergency equipment and *hazardous* areas.

COMMENT:

Maintenance does not include such things as upgrading *building elements* to meet the demands of new technology or the increased environmental expectations

E2/AS1**2.5 Maintenance – general**

Maintenance shall be carried out as necessary to achieve the required *durability* of materials, components and junctions. The extent and nature of necessary maintenance is dependent on the:

- a) Type of *cladding* or components used,
- b) Position of *cladding* or components on the *building*,
- c) Geographical location of the *building*, and
- d) Specific site conditions.

COMMENT:

A deterioration in the appearance of the surface of a *cladding* does not necessarily relate to a deterioration in the *weathertightness* of the *cladding*.

2.5.1 Regular maintenance

Regular maintenance of a *building* will include:

- a) Washing exterior surfaces,
- b) Inspecting surfaces and junctions, and repairing or replacing items when necessary, in order to preserve the *weathertightness* of the *building*.
- c) Maintaining clearances between *cladding* and external ground or paving as per Paragraph 9.1.3.
- d) Maintaining minimum 35 mm clearances between *roofing* and *membrane* decking, and *wall cladding* above
- e) Maintaining finish coatings especially for *stucco*, *EIFS* and fibre cement *claddings*.