



Determination 2016/038

Regarding the code-compliance of weatherboards to a partly constructed house at 28 Roberta Drive, Spreydon, Christchurch



Summary

This determination considers the compliance of Western Red Cedar weatherboards as installed with respect to weathertightness and durability. The key issues involved are the departure from the manufacturer's specifications in regards to the use of galvanised steel holding brads and the placement of the fixings.

1. The matter to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ ("the 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 owners of the house J and S Gibson, who are the applicants in this determination ("the applicants"), acting via Southern Response Earthquake Services Limited² ("the insurer")
- Christchurch City Council ("the authority"), carrying out its duties as a territorial authority or building consent authority.
- the site manager and licensed building practitioner³ ("the builder"), who is acting via a lawyer ("the lawyer").

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

² Southern Response, formerly AMI Insurance Limited, is a Crown-owned company with a Board of Directors appointed by the Crown as sole shareholder.

- 1.3 The insurer has also named the main contractor for the house as a person with an interest in this determination (“the contractor”). The same lawyer is acting on behalf of the contractor and the builder.
- 1.4 This determination arises from a dispute as to whether the weatherboard wall cladding to a partly constructed house complies with certain clauses⁴ of the Building Code (Schedule 1, Building Regulations 1992).
- 1.5 The matter to be determined⁵ is therefore whether the weatherboard cladding complies with the Building Code. In deciding this, I must consider whether the weatherboard cladding complies with Clause E2 External Moisture and Clause B2 Durability of the Building Code. The cladding includes the components of the system (such as the boards and the fixings) as well as the way components have been installed and work together.
- 1.6 This determination is limited to the installation of the weatherboard cladding as outlined above and does not consider other matters raised by the insurer or the authority, or any matters associated with contractual disputes; those issues are beyond the scope of section 177 of the Act.
- 1.7 This determination also does not consider the other wall claddings to the house and is limited to the installation of the weatherboard cladding to the upper sections of the two-storey section of the house.
- 1.8 In making my decision I have considered:
- the submissions of the parties and person with an interest
 - the report of the building surveyor engaged by the insurer to report on the weatherboard installation (“the building surveyor”)
 - the report of the building consultant engaged by the contractor and builder to report on the weatherboard installation (“the consultant”)
 - 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 consists of weatherboards installed on limited areas to some walls of a detached house that is two-storeys-high in part and is situated on a level site in a low to medium wind zone for the purposes of NZS 3604⁶. The building replaces an earthquake-damaged house and is similar in plan and form to the original.
- 2.2 Construction is generally conventional light timber frame with some specifically engineered elements; and has concrete foundations and floor slab, three types of wall claddings as indicated in Figure 1 (over page), aluminium joinery and profiled metal roofing. The monopitched roofs have eaves and verge overhangs of about 100mm, except for deeper overhangs to single-storey areas on the northwest elevation.

³ Licensed Building Practitioner Number BP125753

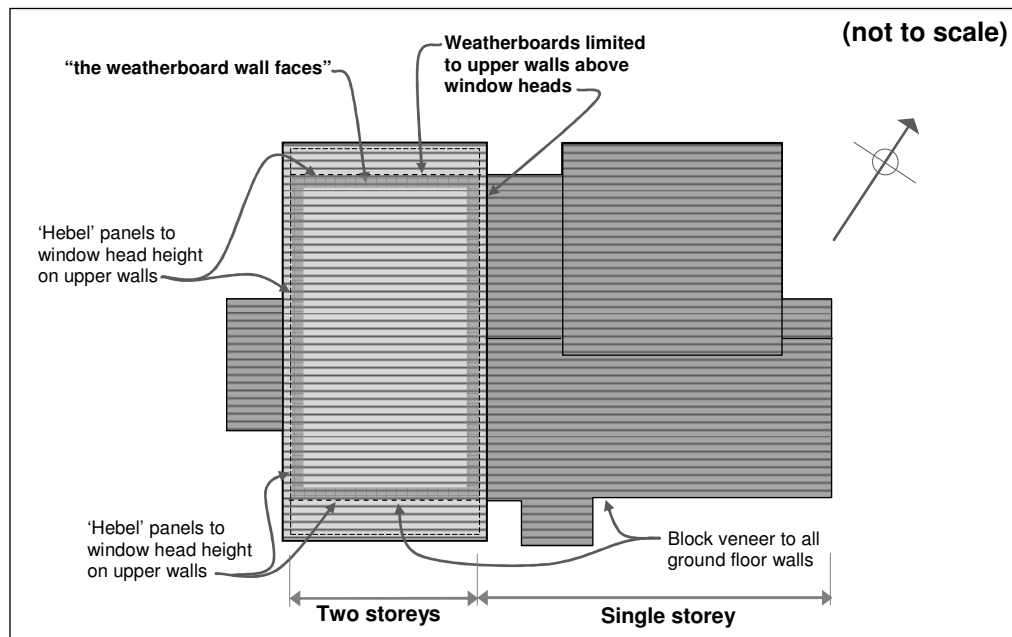
⁴ In this determination, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

⁵ Under section 177(1)(a) of the Act

⁶ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

Wall claddings are a mix of weatherboards, masonry veneer and plaster-finished AAC⁷ cladding.

Figure 1: Wall claddings



2.3 The weatherboards

- 2.3.1 The weatherboards are western red cedar with a rusticated profile, which are fixed through 20mm H3 treated timber battens and the building wrap to the framing, and finished with an exterior grade oil-based penetrating stain. The battens form a drained cavity between the weatherboards and the building wrap.
- 2.3.2 The consent specification calls for the weatherboards to be from a specific manufacturer. The manufacturer provides recommended details for windows, edges and other junctions for weatherboard systems. The installed weatherboards are 135mm x 18.5mm thick with a board profile of 'HP67 rusticated' and have proprietary cover boards installed at external corners.
- 2.3.3 The proprietary weatherboard system has a BRANZ Appraisal⁸ which states that the system 'will prevent the penetration of moisture that could cause undue dampness or damage to building elements' for 'a serviceable life of at least 20 years' when installed and maintained in accordance with the manufacturer's instructions.

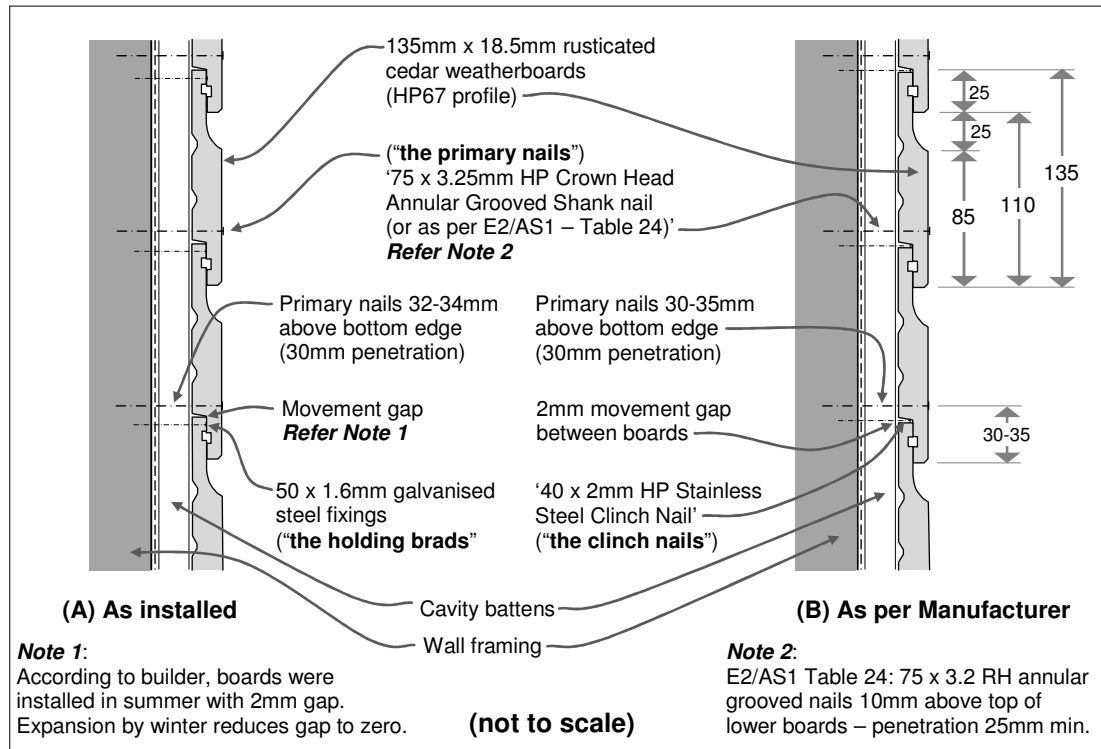
2.4 The weatherboard installation

- 2.4.1 The manufacturer's instructions call for '75 x 3.25mm HP Crown Head Annular Grooved shank' nail fixings⁹ ("the primary nails") positioned 30mm to 35mm above the bottom edge of the board. Board overlaps are 25mm with weathergrooves aligned and hidden nails ("the clinch nails") in a 2mm gap between the boards.
- 2.4.2 The expert's investigations show that the weatherboards have been installed as indicated in the sketch in Figure 2(A), which can be compared to the manufacturer's details as indicated in Figure 2(B).

⁷ Autoclaved aerated concrete, specified as 'Hebel' in the documents

⁸ The current BRANZ Appraisal No.658 (2014) is dated 16 September 2014 and replaces No.658 (2009), which would have applied when the building consent was issued.

⁹ Or 'as per A2/AS1 – Table 24'

Figure 2: Weatherboard fixings

2.4.3 As shown in Figure 2:

- Sketch 2(A): during installation, boards were held in place using the holding brads to allow set out prior to being fixed with the primary nails. The holding brads are 50 x 1.6mm galvanised steel nails fixed through the top of the boards into every second cavity batten.
- Note 1 to Figure 2(A): the weatherboards appear to have been installed in about December 2015 and the builder has stated that a 2mm movement gap was included, with expansion of the boards up to the time of the expert's inspection (June 2016) taking up that gap (see paragraph 3.3).
- Sketch 2(B): the manufacturer specifies 40 x 2mm stainless steel clinch nails, which allow board set out prior to being fixed with the primary nails. The clinch nails are positioned in the 2mm movement gap between boards and are shaped to hold the top of the board in place without penetrating its surface.
- Note 2 to Figure 2(B): the Acceptable Solution E2/AS1 calls for primary nails to be RH grooved nails that miss the lower board and penetrate through the battens and into framing by a minimum of 25mm, with the nail positioned 10mm above the top of the lower board.

3. Background

- 3.1 The authority issued a building consent (No. BCN/2014/1400) to the applicants on 5 May 2014. A contract agreement for construction of the house was entered into on 30 June 2014 between the applicants, the insurer and the contractor.

3.2 Construction commenced with the builder as site manager for the project. The authority carried out inspections during construction, including (in summary):

- Pre-pour foundations at 31 October 2014
- Pre-roof framing on 9 December 2014 and 21 January 2015
- Building wrap on 12 February 2015
- Blockwork on 6 March 2015
- Half high masonry veneer on 3 and 14 July 2015
- Cavity battens and flashings on 23 July 2015.

3.3 The weatherboard installation

3.3.1 It appears that weatherboard installation commenced in about December 2015 and the applicants took photographs of the first board installed above the top flashing to the plastered AAC cladding. In addition to the primary nails, photographs show the holding brads penetrating the top of the board into every second cavity batten.

3.3.2 The contractor has stated that the weatherboards were ‘installed with a 2mm expansion gap between the overlap during the summer months’ when boards would not have experienced moisture-generated expansion¹⁰.

3.3.3 On receiving the photographs, the insurer investigated the matter and an internal email from a technical advisor dated 17 December 2015 noted that he had consulted BRANZ about the holding brads:

...and their response was what I thought;

1. [The manufacturer has] the right to refuse product warranty as the builder hasn't followed the specification
2. In their opinion the Cedar boards won't split given this is a soft timber
3. Cedar boards unlikely to leach given the finishing brad used will take a long time to deteriorate along with the boards [having] been sealed with oil
4. Builder LBP is liable if failure occurs as he hasn't followed the manufacturers specification
5. Given the information we have, which is only verbal, he believed it was unreasonable to make the builder remove the entire Cedar weatherboard cladding.

3.4 The building surveyor's report

3.4.1 The insurer subsequently engaged the building surveyor to inspect and report on the weatherboard cladding. The surveyor visited the house and provided a ‘Construction Deficiency Report’ dated February 2016.

3.4.2 The building surveyor reviewed the documentation and compared the weatherboard installation to the manufacturer's requirements, NZS 3604, E2/AS1 and to BRANZ Good Practice Guide: Timber Cladding, noting that the BRANZ recommendations:

...are not mandatory nor are considered Acceptable Solutions. However, the publications provide details on good trade practice and demonstrate the level of knowledge and understanding within the building industry at the time of construction.

¹⁰ Metservice records for October and November 2015 show 12mm and 16mm rainfall, compared to 54mm and 43mm historical averages.

3.4.3 In regard to the weatherboard fixings, the building survey commented as follows:

- The holding brads were visible in the photographs taken during installation but are now hidden by the overlapping boards.
- NZS 3604¹¹ requires stainless steel or silicon bronze fixings for fixing western red cedar, but the holding brads are reportedly mild steel although the type of metal could not be confirmed.
- There is no indication of failure or corrosion staining as a result of the holding brads, but this ‘may well take place in the future’ because good trade practice recommends single nailing to prevent splitting and durability issues.
- The holding brads are not in accordance with the consent documentation, which ‘will potentially pose a problem when a code compliance certificate and completion warranty from the cladding supplier is applied for.’

3.4.4 The building surveyor recommended the following work:

Remove weather cladding and install as per manufacturers specific instructions contained within the building consent and accepted trade best practice literature.

3.5 The authority carried out pre-line building and plumbing inspections on 22 March 2016, which noted ‘exterior cladding has been inspected and is in accordance with consented plans, conditions and specifications’. I note that by the date of this inspection, the primary nails would have been visible but the holding brads would be concealed behind the weatherboard laps.

3.6 The application for determination

3.6.1 The Ministry received an application for a determination on 2 May 2016 and sought clarification regarding the parties, which was received on 16 May 2016.

3.6.2 During the process of receiving submissions on the matter for determination, the lawyer for the contractor and the builder provided a report prepared by a building consultant. For clarity, this report is summarised in paragraph 3.7.

3.7 The consultant’s report

3.7.1 The contractor and the builder engaged a building consultant to carry out a ‘desktop review’ based on the information and reports available to date, which included:

- the authority’s construction documentation
- relevant sections of the Acceptable Solutions E2/AS1 and B2/AS1
- relevant sections of NZS 3604
- the building surveyor’s ‘Construction Deficiency Report’ dated February 2015
- various other photographs of the weatherboards
- the expert’s report dated 15 June 2016.

3.7.2 The consultant provided a report dated 23 June 2016 titled ‘Documentation Review’, which noted that the scope of the report was to review the documentation:

...and to provide a report for the purposes of a MBIE determination in order to ascertain whether the cedar weatherboards as installed will comply with the performance requirements of clauses E2 & B2 of the New Zealand Building Code.

¹¹ NZS 3604:2011, 4.4.3 Nails, Table 4.3

- 3.7.3 The consultant considered the building surveyor's report and noted (in summary):
- The holding brads were noted as 'mild steel' but are noted in the photographs as galvanised and reported by the builder as 50 x 1.6mm galvanised steel brads.
 - The photographs indicate that the holding brads are installed to every second cavity batten rather than to every batten.
 - The holding brads are 'sacrificial fixings', which are commonly used to assist weatherboard installation and which become redundant on completion as the primary nails provide the structural fixing of the boards.
- 3.7.4 The consultant also considered the building consent documentation and included the following comments (in summary):
- The specification refers to both E2/AS1 and also to an alternative solution outlined in BRANZ Appraisal 658 for the specified weatherboards.
 - The manufacturer's instructions state 'install level, true to line and face, to NZBC E2/AS1: 9.4 Timber Weatherboards', with the method of installation detailed and confirmed in the BRANZ Appraisal.
 - The manufacturer's instructions include stainless steel 'clinch nails' above each board. These nails are shaped to hold the top of the board in place without penetrating the surface of the board.
 - For applications outside the scope of the details, the manufacturer's literature states that the design must comply with the Building Code. Table 24 of E2/AS1 provides the requirements for the primary fixings to the boards, with no reference to clinch nails or holding brads as used in this case.
 - The contractor advises that the boards are fixed in accordance with E2/AS1, rather than with the manufacturer's instructions.
- 3.7.5 The consultant sought the advice of a material and corrosion expert¹², who considered that:

The galvanised steel fixing behind the weatherboard will be redundant once the cedar cladding is installed. The redundant fixing has no bearing on whether the cladding will provide at least 15 years serviceable life as required by NZBC Clause B2 Durability.

The galvanised steel fixing will slowly corrode in contact with the cedar timber (slightly acidic). First, white rust (oxidised zinc) will form on the steel fixing as the zinc coating sacrifices itself. After some time the zinc will be consumed to form white rust. Then the steel substrate of the fixing will corrode to form red rust (iron oxide). Red rust may slowly 'bleed' from the fixing onto the cedar timber around the fixing. The red rust bleed will likely move downward from the insertion point in the cedar under gravity.

However, the fixing is hidden behind the cedar weatherboard, so any rust bleed that did form will likely not be visible at all; i.e. the rust is not visible so it does not become an aesthetic issue. Therefore, the presence of the redundant fixing behind the cladding is technically an enigma.

¹² A material and corrosion consultancy based in New Zealand which offers professional results orientated consulting services in the fields of materials technology, corrosion engineering, metallurgical engineering and corrosion management.

3.7.6 The consultant considered the primary issues were corrosion, splitting and the expansion gap; including the following comments on these risks (in summary):

Corrosion of the holding brads

- Although E2/AS1 and NZS 3604 note the potential risk of corrosion due to the acidic nature of cedar timber, the holding brads are concealed and any risk would have no bearing on the performance of the cladding.
- A corrosion expert has confirmed that the galvanised holding brads would not affect the required minimum 15 year durability of the cladding required by Clause B2 of the Building Code (see paragraph 3.7.5).
- Ensuring that the cladding oil stain is maintained according to the stain manufacturer's instructions will reduce any corrosion risk by limiting the amount of moisture able to reach the galvanised holding brads.

Splitting at the holding brads

- Although there is a risk of splitting, the holding brads are concealed behind the weatherboard lap, with about 25mm cover below.
- Any localised splitting would not adversely affect the ability of the boards to deflect moisture and any moisture that might penetrate would be drained away by the cavity.
- The use of holding brads is common practice and the risk of splitting is considered to be reduced when brad are used at the top, rather than in the weathergroove or lower down the boards.
- Because the holding brads were gun-applied, the heads have been punched about halfway through the 9mm top tongue of the boards. Any movement will therefore affect less than 5mm of the timber, thus reducing the propensity of splitting.

The installed expansion gap

- E2/AS1 section 9.4.4.1 states that a minimum 2mm gap is required between boards to allow for movement that could otherwise result in the boards bowing and possibly splitting. The level of risk of splitting depends on the type of timber, fluctuations in temperature and moisture, and how the board is finished, installed and protected.
- The expert's report (refer paragraph 5) notes that the top boards exposed during his investigation showed that the gap appeared to have been omitted. However, there is a large difference in moisture levels between summer when the boards were apparently installed and winter when the expert inspected them.
- A BRANZ table¹³ indicates that a 200mm western red cedar board can be expected to move up to 1.5mm for a radial (quarter sawn) board or 2.8mm for a tangential (flat sawn) board.
- Taking account of seasonal variation in moisture between installation and inspection, the boards are expected to have expanded to take up the movement gap provided during installation.

¹³ Source: BRANZ Build Magazine October/November 2005

- 3.7.7 In regard to the warranty, the consultant considered that, although the standard manufacturer's warranty would not apply, the usual implied warranties under the Act would remain – providing cover for up to 10 years for the installation.
- 3.7.8 The consultant concluded that, due to the particular circumstances of the weatherboard system, the holding brads:
- ...would appear to have a minimal impact on the cladding systems ability to meet the performance requirements of the New Zealand Building Code, specifically clauses E2 – External Moisture and B2 – Durability.

4. The submissions

- 4.1 The insurer made no submission on behalf of the applicants, but provided copies of:
- the drawings and specifications
 - the inspection records
 - the building surveyor's report dated February 2016
 - various other technical information, photographs and other information.
- 4.2 The authority made no submission in response to the application for determination and submitted no additional information.
- 4.3 The lawyer made a submission on behalf of the contractor and the builder, which noted that the weatherboard installation is 'an alternative solution complying with E2/AS1'. The lawyer explained the contractor and builder 'have had an independent review of the cladding methodology' and summarised the conclusions of the review.
- 4.4 The lawyer provided a copy of the consultant's report dated 23 June 2016 (titled 'Documentation Review'), as outlined in paragraph 3.7.
- 4.5 A draft determination was issued to the parties and person with an interest for comment on 11 July 2016.
- 4.6 The insurer responded on behalf of the applicant on 25 July 2016, and the authority responded on 21 July; both accepted the findings of the draft without further comment.
- 4.7 A response was received on 25 July 2016 from the lawyer on behalf of the builder and contractor; both accepted the findings of the draft.

5. The expert's report

- 5.1 As mentioned 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 subject weatherboards on 7 June 2016 and provided a report dated 15 June 2016.
- 5.2 The expert noted that the scope of his report was to assess the weatherboards as installed in order to verify:
- the type of boards installed
 - the positions of the visible fixings
 - the general standard of the installation.

5.3 The expert noted that construction of the house was not complete at the time of his inspection and a code compliance certificate had not been issued.

5.4 The weatherboards

5.4.1 The expert noted that the cedar weatherboards had been ‘very neatly fitted with a professional look to the finished cladding.’ The primary nail heads were positioned from 32 to 34mm above the bottom of each board at each cavity batten.

5.4.2 The expert compared the weatherboard installation with the manufacturer’s instructions, the BRANZ Appraisal and E2/AS1; removing the top two boards from the northwest side of the north corner beneath the verge overhang to observe the underlying construction.

5.4.3 The expert observed the following:

- The primary nails were 75 x 3.25mm grooved crown head stainless steel positioned so that they missed the top of the underlying board.
- The holding brads were 50 x 1.65mm zinc-plated (galvanised) steel, fixed into the tongue above the weathergroove.
- The holding brads appeared to be fixed into every second cavity batten, and the builder advised that ‘he had only put enough brads in to hold the board while he nailed it off’.
- There was no expansion gap observed between the boards.

5.5 The expert considered that the lack of the expansion gap to the exposed area did not comply with the manufacturer’s instructions or E2/AS1, but was unable to form a view on the code compliance of the weatherboard cladding due to the limited information available.

5.6 I note that the builder maintains that a 2mm movement gap was included (see paragraph 3.3.2), and I also note that the expert’s inspection has followed a period of high rainfall¹⁴ and therefore high expected expansion of the weatherboards.

5.7 Responses to the expert’s report

5.7.1 The expert’s report was provided to the parties for comment on 17 June 2016. The authority and the insurer made no comment.

5.7.2 The lawyer responded on 24 June 2016 and forwarded a copy of the consultant’s report, which responded to matters raised in the expert’s report and the building surveyor’s report. The consultant’s report is summarised in paragraph 3.7.

¹⁴ Metservice records for May 2016 show 96mm rainfall, compared to 52mm historical average.

6. Evaluating code compliance

6.1 General

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions, which will assist in determining whether this weatherboard installation is code-compliant. However, in making this comparison, the following general observations are valid:

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

6.1.2 An Acceptable Solution is a prescriptive design solution that provides one way, but not the only way, of complying with the Building Code. The weatherboard fixing system does not comply in all respects with E2/AS1, recommended good trade practice or the manufacturer's instructions; and the installation must therefore be considered as an alternative solution, entailing an assessment of the likely performance within the context of this particular house.

6.2 Evaluation of weatherboards for E2 and B2 Compliance

6.2.1 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water and the weatherboard cladding system as installed.

6.2.2 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less robust. In any event, there is a need for both the design of the cladding system and its installation to be carefully carried out.

6.3 Weathertightness risk for the weatherboards

6.3.1 In this instance, the subject weatherboard cladding is limited to upper walls on the two-storey portion of the house as shown in Figure 1 and the weathertightness risk can be assessed for those wall faces ("the weatherboard wall faces") independently of the remainder of the house.

6.3.2 The weathertightness of the weatherboard cladding is therefore dependent on the features in the above elevations that protect the boards from the weather; features included in the weatherboard system; the workmanship of the installed cladding and the consequences of failure on the underlying construction. These features can be considered on their merits and independently of the nails as a general fixing system.

6.3.3 The weatherboard wall faces have the following environmental and design features, which influence their weathertightness risk profile:

Increasing risk

- the wall faces are in a medium wind zone
- weatherboards to one wall face are positioned above another cladding on a cavity, which extends down to a roof/wall junction
- there are limited roof overhangs to shelter the weatherboards

Decreasing risk

- the weatherboard wall faces are simple in plan and form
- the weatherboards are fixed over a drained cavity and above other claddings that incorporate cavities
- apart from the holding brads, the weatherboards are fixed to good trade practice
- the external wall framing is treated to a level that provides resistance to decay if it absorbs and retains moisture.

6.3.4 The sections of weatherboard have been evaluated using the E2/AS1 risk matrix on a ‘wall face approach’¹⁵. The risk matrix allows the summing of a range of design and location factors applying to a specific building design or specific walls of a building. The resulting level of risk can range from ‘low’ to ‘very high’. The risk level is applied to determine what claddings can be used on a building in order to comply with E2/AS1. Higher levels of risk will require more rigorous weatherproof detailing; for example, a high risk level is likely to require a particular type of cladding to be installed over a drained cavity.

6.3.5 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 6.3.3 show that the subject wall faces demonstrate a low weathertightness risk rating. I note that, if the details shown in E2/AS1 were adopted to show code-compliance, the weatherboard cladding to those wall faces would not require a drained cavity.

6.4 Weathertightness performance of the weatherboards

6.4.1 In considering the code-compliance of this particular weatherboard cladding installation, I have taken account of the expert’s report, the building surveyor’s report and the consultant’s report; together with the discussions reported with other authoritative sources (see paragraphs 3.3.3 and 3.7.5).

6.4.2 I make the following additional observations on compensating circumstances for this particular weatherboard cladding as installed:

- The weatherboard cladding has generally been installed using good workmanship, with satisfactory junctions.
- The authority has made no comment on the inadequacy of the cladding.
- Despite the low weathertightness risk, weatherboards are installed over a drained cavity.

¹⁵ Refer *External moisture – a guide to using the risk matrix*, Ministry of Business, Innovation and Employment (v 2, July 2013) – Section 3.

6.4.3 Taking account of the above evidence, I make the following observations on the circumstances that I consider relevant to assessing these particular weatherboards:

Table 1: risks and mitigating factors

Issue / Potential risk	Particular circumstances	Comment
Holding brads fixed to top of underlying board Splitting lower board	<ul style="list-style-type: none"> • Fixed above weathergroove of lower board. • Used as temporary holding – fixed only into every second batten • Narrower boards subject to less thermal and moisture movement than wider boards. • Cedar unlikely to be split by a small gauge nail • Any localised splitting sheltered from direct rain and protected from capillary action by overlap and grooves. 	Low risk of splitting and any splitting that might occur should not affect weathertightness or durability of cladding
Corrosion of the brad due to acidic nature of cedar	<ul style="list-style-type: none"> • Brads redundant once boards are fixed, so any corrosion has no structural affect. • Zinc will slowly deteriorate over time. • When steel substrate corrodes, red rust will form that may slowly bleed onto cedar. • Brads hidden behind 20mm overlap, so rust stains unlikely to become visible. • Maintaining oil stain will limit corrosion by limiting amount of moisture reaching brad. 	Any corrosion will not affect weathertightness or durability of cladding
Expansion gaps between boards Boards bowing and possibly splitting	<ul style="list-style-type: none"> • Builder states that 2mm movement gap was included during installation in December 2015. • Installation followed two months of warm and very dry weather, resulting in moisture levels and board dimensions expected to be close to minimum levels of seasonal variation. • Expert's inspection followed one month of very high rainfall, so moisture levels and board dimensions expected to be close to maximum levels of seasonal variation. • Boards are expected to have expanded since installation to take up movement gap. • No indication of stress in the boards to date. 	Movement gap likely to have been installed.
Warranty	Warranty may be refused as weatherboards not installed to manufacturer's instructions.	No effect on code-compliance

- 6.4.4 Taking account of the above, I have reasonable grounds to conclude that the weatherboard cladding as installed to exterior walls of this particular house and in the particular circumstances will meet the performance requirements of Clause E2.3.2, E2.3.7 and B2.3.1.

7. Conclusion

- 7.1 I consider the expert's report establishes that the weatherboard installation was not in accordance with the building consent and must therefore be assessed as an alternative solution. However, the consultant's report has also identified that the consent documentation is not consistent in regard to particular requirements for the fixings.
- 7.2 The expert's report and the other evidence provide me with reasonable grounds to conclude the weatherboard cladding is currently weathertight and I am therefore able to conclude that the cladding complies with Clause E2 of the Building Code.
- 7.3 The durability requirements of Clause B2 include a requirement for wall claddings to remain weathertight for a minimum of 15 years. Due to mitigating factors that compensate for any shortcomings of the weatherboard fixing system, I am also able to conclude that there are no defects likely to allow the ingress of moisture within the durability period required for the cladding. Consequently, I am satisfied that the weatherboard cladding as installed complies with Clause B2 of the Building Code.
- 7.4 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular weatherboard fixing system has been established as being code-compliant in a specific instance for a specific house, does not of itself mean that the same system will be code-compliant in other situations.
- 7.5 Effective maintenance of claddings is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Ministry has previously described these maintenance requirements (for example, Determination 2007/60).

8. The decision

- 8.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the weatherboard fixing system as constructed complies with Clause B2 and Clause E2 of the Building Code.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 15 August 2016.

John Gardiner
Manager Determinations and Assurance