

Determination 2015/020

Dispute over an amendment to a building consent to use uPVC window and door joinery to a house at 101 Copland Road, Waimumu, Gore



1. The matters 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 owner of the house, A Copland (“the applicant”)
 - the Southland District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 I also consider Weathertight Windows and Doors Ltd (“the window supplier”), to be a person with an interest in the matter.
- 1.4 This determination arises from a decision of the authority to refuse to grant an amendment to a building consent for the substitution of aluminium window and door joinery with uPVC² joinery to a partially-constructed house because it is not satisfied that the uPVC joinery will comply with certain clauses³ of the Building Code (Schedule 1, Building Regulations 1992). The authority’s concerns relate to the joinery’s installation, weathertightness detailing, and durability.
- 1.5 The matter to be determined⁴ is therefore whether the authority was correct to refuse to issue an amended building consent for the uPVC joinery. In deciding this, I must consider whether the substituted window and door joinery (“the uPVC joinery”) as it is proposed to be installed will comply with Clauses B1 Structure, B2 Durability, and E2 External Moisture of the Building Code.

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 Unplasticised Polyvinyl Chloride

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

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

- 1.6 The uPVC joinery includes the windows and doors, the fixings and supports, the flashings and the junctions with adjacent walls and claddings, as well as the way the components are intended to be installed and work together.
- 1.7 The authority's concerns are in respect of Building Code Clauses B1, B2 and E2 and this determination is therefore limited to those clauses. I have not considered any other amendments to the building consent. This determination is limited to the matter outlined in paragraph 1.5.
- 1.8 In making my decision, I have considered:
- The consultant's submission on behalf of the applicant, which includes:
 - technical information from the joinery manufacturer
 - the timber technologist's report on the likely durability of the joinery timber and factory-applied preservative
 - 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 a large detached single-storey house situated on a level exposed site in a very high wind zone for the purposes of NZS 3604⁵. The house is made up of three simple linked structures; a living/dining wing to the north, a garage to the south and a bedroom wing between. Each structure is simple in plan and form, with a low weathertightness risk.
- 2.2 Construction is generally conventional light timber frame with some specifically engineered elements, concrete floors and foundations, vertical timber shiplap wall cladding and profiled metal roofing. The 32° pitched gable roofs include eaves overhangs of about 600mm including gutters.

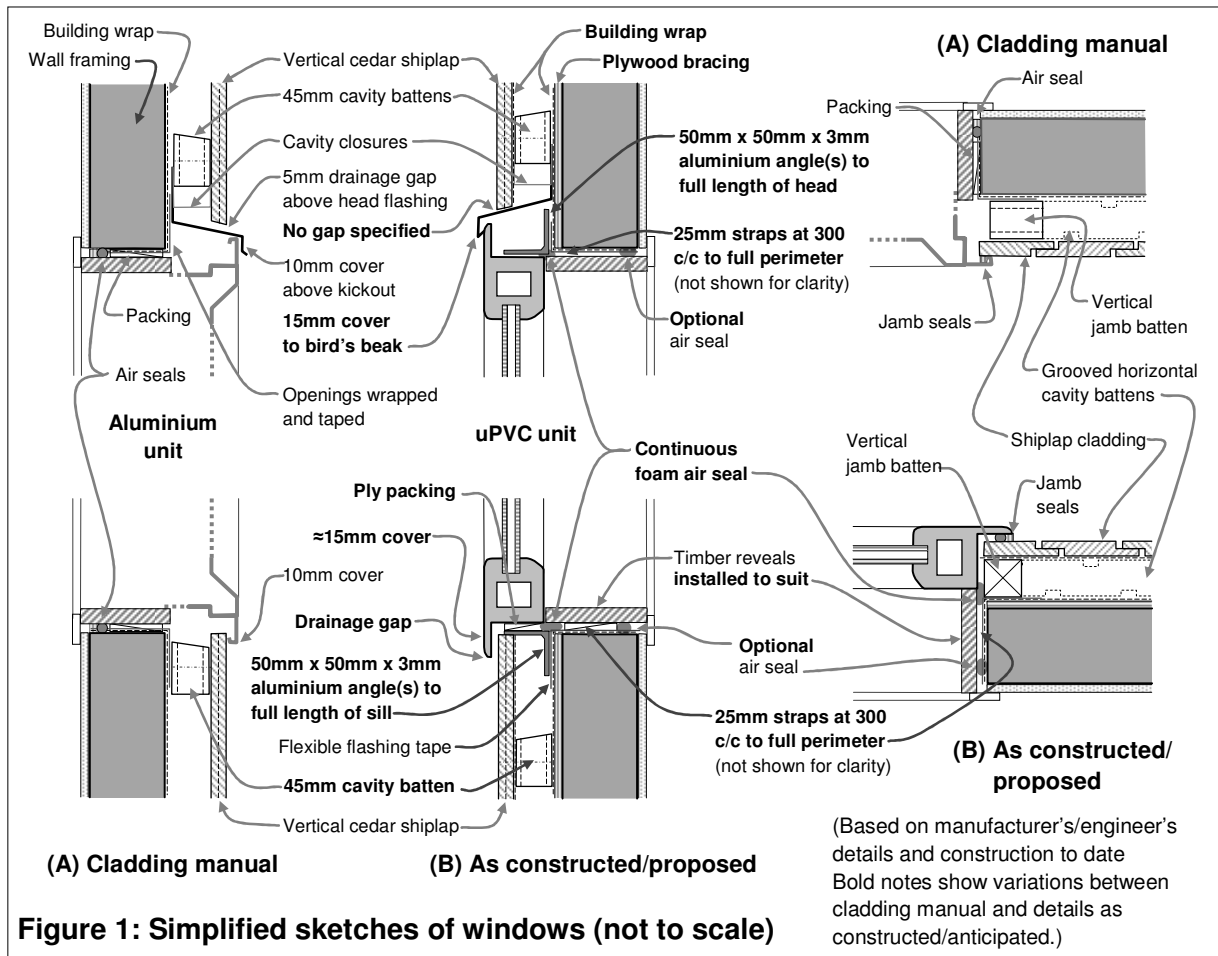
2.3 The exterior wall cladding

- 2.3.1 The exterior wall cladding is a proprietary cedar cladding system which in this instance consists of 19mm thick shiplap vertical weatherboards fixed through a layer of building wrap into H3.2 treated battens to create a cavity 45mm wide. Battens include 7mm deep staggered drainage grooves to both sides and are fixed through the building wrap and plywood bracing to the framing timbers. The cladding manufacturer's technical information ("the cladding manual") includes recommended details for windows, edges and other junctions.
- 2.3.2 At the time of the expert's inspection, the house structure and roof were substantially complete, with the structural battens and an outer layer of building wrap installed. Some windows had been fixed but flashings and weatherboards were yet to be installed pending resolution of the consent amendment.

⁵ New Zealand Standard NZS 3604:2011 Timber Framed Buildings

2.4 uPVC windows and doors

2.4.1 The original consent drawings called for aluminium joinery and the amendment sought to use uPVC windows and doors to be fitted. The installation details, as now proposed by the window supplier, are as shown in outline in Figure 1.



2.4.2 As shown in Figure 1:

- uPVC units are offset from the framing line by up to about 15mm, and photographs and the window supplier's installation details allow for the cedar cladding to underlap jamb flanges to provide a sill drainage gap
- continuous aluminium angles provide sill support fixed into the timber sill plates but not to the window. The engineer's drawings and the supplier's details call for window fixings to be provided by galvanised mild steel '25 x 1 strap braces' to be fixed 'around all four sides at 300crs'
- a continuous aluminium angle to the head provides the backing to the airseal. The angle to the head is not required for structural support and is not shown on the engineer's drawings
- the supplier's details show two continuous expanding foam air seals; with the outer air seal at the unit/wall/reveal junction and the inner noted as an 'optional secondary air seal' located between the reveal and sill plate
- the uPVC units do not include timber reveals which are to be installed by the builder after the installation of the windows.

2.5 The proposed uPVC joinery

- 2.5.1 The proprietary double-glazed units are ‘ZENDOW’ windows and stacking doors assembled from profiles manufactured in Belgium by Deceuninck NV (“the joinery manufacturer”), which designs and produces PVC systems for windows, doors and other building products. The company was founded in 1937 and operates in more than 75 countries, with subsidiaries in Europe, North America and Asia.
- 2.5.2 The joinery is manufactured locally by the window supplier from a range of imported uPVC extrusions, which provide thermal chambers to prevent heat transfer and surround a hollow aluminium core to reinforce the units. Joinery profiles used in Australia and New Zealand contains a minimum of 9% Titanium Dioxide to improve overall durability. A range of standard opening frames are available and the windows to this house are a mix of fixed and top-hung awning sashes.
- 2.5.3 The joinery was tested in Australia in 2006 against relevant AS/NZ standards by a registered⁶ product assessment laboratory accredited for compliance with ISO/IEC 17025⁷. Test results⁸ are also shown in UK trade literature for air permeability, water tightness and exposure category (see paragraph 6.2).
- 2.5.4 Other regions provide similar test results, including North America where the joinery manufacturer has been a member of AAMA⁹ for almost 50 years which means that the joinery is assessed against American-based and international standards which are not quoted in this determination and is labelled as AAMA certified¹⁰.
- 2.5.5 The imported uPVC extrusions are available in a range of factory-applied colour coatings, which is comprised of three coats and is laminated onto uPVC profiles. The colour film system has been evaluated by SKZ, an internationally-accredited testing service¹¹, and the test report dated 3 October 2009 evaluates the coating for weather resistance and durability against the relevant international standards.

3. Background

- 3.1 The building consent for the house (RBW/2012/100050/1) was issued on 12 November 2012, based on drawings that specified aluminium joinery and specifically engineered structural insulated panel walls. The applicant subsequently elected to change the proposed walls to conventional timber framing and it appears that change was approved although I have not seen copies of the relevant documentation.
- 3.2 At some stage the applicant also elected to change the joinery from aluminium to uPVC and revised architectural drawings were prepared in March 2014. I have seen an undated/ unsigned application for an amendment to the consent, which I assume was completed and approved at the time. The application attached elevations, plans and joinery details dated 21 March 2014 and noted that the amendment included:

Wall cavity changed from 20mm [cavity batten] to 45mm H3.1 pinus radiata.
Windows/doors changed to uPVC...

⁶ Registered by NATA, the authority responsible for the accreditation of laboratories, inspection bodies, calibration services, producers of certified reference materials and proficiency testing scheme providers throughout Australia

⁷ ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories, the main ISO standard used by testing and calibration laboratories and the standard for which most labs must hold accreditation in order to be deemed technically competent

⁸ Provided by an independent accredited laboratory testing plastic products in accordance with national and international standards

⁹ American Architectural Manufacturers Association, representing manufacturers and professionals in the fenestration industry

¹⁰ Tested as conforming to performance standards for air and water infiltration, structural integrity, and resistance to forced entry.

¹¹ SKZ testing laboratory, accredited in 1993 in accordance with DIN EN ISO/IEC 17025 to test plastic products in accordance with national and international standards.

- 3.3 It appears that window installation proceeded on the basis of the joinery supplier's installation details and the authority issued a 'failed inspection notice' in May 2014 which requested a consent application for the changed window details.
- 3.4 The architect subsequently provided the joinery supplier's details, the structural engineer's drawing for sill supports and fixings, and the engineer's producer statement for the design dated 10 June 2014. An application dated 18 June 2014 was submitted to the authority for approval of an amendment to the consent for:
- Alteration to window fixing detail – new detail provided by [the joinery supplier].
- 3.5 The authority acknowledged the application on 29 June 2014 and requested further relating to (in summary):
- a producer statement for design to cover Clause E2 for the air seals
 - inconsistency of details with the as-built partial installation
 - lack of detail as to the uPVC joinery to timber frame connections
 - ongoing flexibility and maintenance of the joinery/wall/reveal silicone seal.
- 3.6 The architect provided some updated information and responded to the above on 13 August 2014 as follows (in summary):
- the engineer's revised details and producer statement are limited to structural compliance and now cover the offset of the windows from the framing
 - the window supplier has updated the details to show the window frames sealed to the timber reveals with a silicon bead
 - the updated drawings accord with on-site construction
 - the uPVC profiles include aluminium cores so frames cannot deflect unduly and windows are rigidly fixed to framing, with jamb liners also fixed
 - the window supplier will ensure the units are not moving excessively and confirms that a silicon bead is adequate for anticipated movement.
- 3.7 The authority acknowledged the updated application on 29 August 2014, noting that it still had concerns regarding Clauses E2 and B2 of the Building Code, stating:
- The technical information around durability and weathertightness is outside our scope to interpret as to whether it meets the NZ Building Code. Please have all of the information supplied reviewed by an accredited New Zealand testing body to assess the uPVC window and door system for compliance with B1, B2, E2, F2 and H1.
- The authority also listed specific matters. The authority later clarified its concerns to those described in paragraph 4.2.
- 3.8 The Ministry received an application for a determination from the window supplier on behalf of the applicant on 9 October 2014, which was accepted on 17 October 2014.

4. The submissions

- 4.1 With the application and in later correspondence the applicant provided copies of:
- the architect's original revised drawings dated March 2014
 - various versions of the window supplier's installation details for the uPVC joinery
 - the engineer's Producer Statement – Design, ("the PS1"), with various amendments until the final amendment dated 11 March 2015. The PS1 included drawings showing the fixing details for the uPVC joinery.
 - the joinery manufacturer's technical information and statements
 - the test reports from the Australian product assessor for the uPVC joinery
 - various other test reports on the uPVC product and the colour film.
- 4.2 In its original submission in October 2014 and subsequent clarification dated 16 December 2014, the authority stated that it refused to issue the amendment consent as it considered the documentation supplied did not adequately demonstrate compliance with Building Code Clauses B1, B2 and E2 and outlined its concerns as follows (in summary):
- The lack of connection of sill supports to framing and adequacy of strap bracing as connections to the framing and the concrete floor. The PS1 does not detail these connections.
 - The joinery units are not easy to replace once cladding and linings are installed and durability is therefore concerning (the authority was initially of the opinion that the windows were required to have a 50 year durability, this was later revised to 15 years).
 - The lack of local testing under New Zealand conditions
 - The impracticality and effectiveness of the concealed air seal
 - The lack of consistency between the proposed details and on-site construction.
- 4.3 The authority forwarded a copy of its property file for the house, which contained some additional documents pertinent to this determination including:
- the building consent, with the original consent drawings and specifications
 - undated construction photographs of the partially installed joinery
 - correspondence with the architect and the applicant.
- 4.4 A draft determination was issued to the parties for comment on 17 March 2015.
- 4.5 The authority accepted the draft without comment on 20 March 2015.
- 4.6 The applicant accepted the draft subject to comment on 30 March 2015. The owner provided revised details that took into account the comments made in the draft determination at paragraph 6.5.3. The same details were provided by the window supplier in an email to the Ministry also received on 30 March 2015.
- 4.7 On 30 March 2015 the authority referred to the revised details provided by the window supplier noting that:
- the drawings did not detail the fixing of the door sills at the concrete slab

- the 20mm extension at either end of the head flashing to the triple sliding doors was not carried through to the remaining joinery
- the authority sought clarity about the airseals given the opinion of the expert and the determination's decision. The authority was of the view that junction of the uPVC joinery and the jamb liner needed to be sealed.

4.8 I respond to the authority's comments as follows:

- While I accept the installation drawings could show the fixing detail better, I do not consider the matter sufficiently significant that it needs to be resolved before the issue of the consent. This is also true of the 20mm extension to the head flashing which in any event is a standard feature of Acceptable Solution E2/AS1 which the approved consent documents cite at the means of compliance for Clause E2.
- The inner seal is noted at paragraph 6.5.2 as being 'optional'. If the airseal is installed between the uPVC joiner and the framing, the inner seal is not necessary, nor is any seal required between the uPVC joinery and the jamb liner.

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 and inspected the partially installed uPVC joinery on 2 December 2014; providing a report dated 12 January 2015.

5.2 General

- 5.2.1 The expert noted that his instructions were to visit the site to verify what work on the window installation had been done and to report on the installation of windows already installed in regard to the details provided by the window suppliers and on the proposed and/or the as built details; with particular regard to the authority's concerns on compliance of the joinery system with Building Code Clauses B1, B2 and E2.
- 5.2.2 The expert noted that his report was based on his observations of the joinery installation to date and on inspection of the window supplier's factory and production line in order to clarify the assembly and operation of the joinery units.
- 5.2.3 When the expert visited the building, the house was under construction and had 'reached the stage of roof on, windows and doors installed with building wrap in place, over construction plywood and cavity battens.'

5.3 The uPVC joinery

- 5.3.1 The expert noted that the uPVC units are not supplied with reveals fitted to the frames, which are fitted by the builder following joinery installation according to owners' preferences. In this house, reveals had not yet been installed by the builder at the time of inspection.
- 5.3.2 The expert inspected the window installation to date peeling back the outer building wrap as necessary and noted that:
- windows are supported from the framed wall by sill brackets and brace straps in accordance with the engineer's details and are outside of the framing line

- the triple sliding doors have a wide overall section and are located partly within the line of wall framing as shown in the window supplier's details
- the openings in timber framed walls are fully wrapped, with flexible flashing tape to corners and sills of the rough opening.
- the vertical cavity batten at jambs and the continuous angles to the head and sill as shown in the window supplier's details have not been installed so lack of a continuous backing had prevents air seal installation as shown in the details
- additional sections could be added between existing support brackets at the head and sill and the vertical jamb batten can be added, which would then provide sufficient backing for the outer air seal to be installed prior to the timber reveals being fitted by the builder.

5.3.3 However, the expert noted that the inner seal, noted as the 'optional secondary air seal' in the window supplier's details, could provide an adequate air seal if satisfactorily installed. This would then make the outer fillet seal redundant and would accord with conventional details for aluminium windows (see Figure 1).

5.4 The expert's conclusions

5.4.1 In regard to compliance with Clause B2, the expert said:

- test reports have been provided from a recognised building performance testing laboratory based in Victoria Australia, which confirm that the uPVC joinery has been 'tested to a rigorous standard'
- the joinery has been accepted as an alternative solution 'for at least three to four years' by a number of other authorities in the South Island, including the Christchurch City Council, the Dunedin City Council and the Queenstown Lakes District Council.

5.4.2 In regard to compliance with Clause E2, the expert concluded that providing the installation is completed in such a way as to provide at least one satisfactory continuous air seal, the joinery installation will comply with the weathertightness provisions of the Building Code.

5.5 The expert's report was forwarded to the parties on 16 January 2015 and the authority responded on 20 January 2015, reiterating their concerns about the joinery and its installation. I have taken the comments into account when preparing this determination.

6. Code compliance of the uPVC joinery

6.1 General

6.1.1 In order for me to form a view as to code compliance of the uPVC joinery system, it is important to look for evidence that establishes whether the joinery systems are adequate to meet the performance requirements of the Building Code when installed in accordance with the supplier's instructions.

6.1.2 In the case of this house, I consider that the evidence consists of:

- the expert's report on the partially installed joinery and the local production of the joinery units (refer paragraph 5)
- the available test and technical information on the uPVC joinery

- the history of use of the uPVC joinery
- other information on uPVC joinery systems.

6.2 The technical and test information for the uPVC joinery

6.2.1 In the case of the uPVC joinery to this house, the technical information includes:

- from the original consent documentation, the architect's details for aluminium joinery and the shiplap cladding manufacturer's cladding manual details
- the architect's original amended joinery details and the uPVC joinery supplier's installation details
- the engineer's details and producer statement for the support systems
- the joinery manufacturer's general technical information on the joinery as described in this determination
- the proposed window installation as outlined in Figure 1.

6.2.2 The test information on the uPVC joinery consists of:

- Reports provided by the Australian product assessor, which is a registered¹² product assessment laboratory accredited for compliance with ISO/IEC 17025¹³. The assessor tested the product in 2006 in Australia against AS2047¹⁴, AS 4420:1996¹⁵, AS 4055:1992¹⁶ and AS/NZ 1170¹⁷.
- Information and test results available from various other sources for the uPVC joinery products and its colour coatings, which includes:
 - from the United Kingdom, test results in trade literature showing air permeability, water tightness and exposure category, when assessed by BBA¹⁸ to BS 7412¹⁹/ES 6375-1²⁰ standards
 - from the United States, the joinery manufacturer's 50-year membership of AAMA²¹, with certified results of testing²² against American-based and international standards available
 - from the joinery manufacturer, test results provided by an internationally accredited testing service, which evaluated the factory-applied colour film for weather resistance and durability against relevant international standards.
 - various other accredited test results available from other regions, which I have not explored.

¹² Registered by NATA, the authority responsible for the accreditation of laboratories throughout Australia

¹³ ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories, the main ISO standard used by testing and calibration laboratories and the standard for which most labs must hold accreditation in order to be deemed technically competent

¹⁴ AS2047:1999: Windows in buildings - Selection and installation (superseded in 2014)

¹⁵ AS 4420:1996: Windows – Methods of test

¹⁶ AS 4055:1992: Wind loads for housing

¹⁷ AS/NZ 1170 – Structural design actions

¹⁸ British Board of Agrément (The UK Government has designated the BBA to issue approval based on testing carried out to agreed European levels and to represent the UK in the European Organisation for Technical Assessment for construction products)

¹⁹ BS 7412:2007: Specification for windows and doorsets made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles

²⁰ BS 6375-1:2009: Performance of windows and doors. Classification for weathertightness and guidance on selection and specification

²¹ American Architectural Manufacturers Association, representing manufacturers and professionals in the fenestration industry

²² Tested as conforming to performance standards for air and water infiltration, structural integrity, and resistance to forced entry.

- 6.2.3 I consider that the above information includes independent confirmation on the uPVC joinery and its qualities, including its durability and weathertightness performance when installed over a wide range of climatic conditions.
- 6.2.4 I am of the view that the information from the Australian product assessor allows me to readily translate the product data supplied by the joinery manufacturer to the performance requirements of the New Zealand Building Code.

6.3 The history of use and compliance with Clause B2

- 6.3.1 The joinery manufacturer was founded in 1937 and it now operates in more than 75 countries, with subsidiaries across Europe, North America and Asia. In particular, it has operated in Europe and North America for some 50 years. (I note that the North American operation offers a warranty for the lifetime of the original purchaser while still the homeowner or for 30 years for commercial installations).
- 6.3.2 UPVC window systems have been used internationally for many years. Although introduced to the local market within the past five years, other types of uPVC window systems have been used in New Zealand in the order of 20 years.
- 6.3.3 UPVC windows are an established product that has been used successfully for many years in climates with greater weather extremes than are experienced in New Zealand. The formulation of the uPVC resin used to create the joinery profiles used in this case has been modified to incorporate a minimum of 9% Titanium Dioxide to improve durability. (WANZ²³ recommends a minimum 8% Titanium Dioxide for profiles used in New Zealand.)
- 6.3.4 Given the above and the information and test results noted in paragraph 6.2, I am of the opinion that the uPVC joinery will satisfy Clause B2 Durability.
- 6.3.5 The expert reports that the subject joinery has been accepted as an alternative solution 'for at least three to four years' by a number of authorities in the South Island, including the Christchurch City Council, the Dunedin City Council and the Queenstown Lakes District Council.

6.4 Compliance with Clause B1 in relation to the installation of the joinery

- 6.4.1 The PS1 includes installation details for windows and doors and verification of these details with Clause B1. Drawings included with the PS1 include installation details for:
- aluminium support angles under the sills including all fixings to timber and concrete
 - galvanised mild steel straps connecting the head and jambs to the framed openings
 - galvanised mild steel straps securing sill plates to jack studs
- 6.4.2 I consider the PS1 provides reasonable grounds on which to conclude that the joinery installation will comply with Clause B1. It is noted that the installation details are commensurate with any typical window installation where the window joinery is stapled to the timber reveals which in turn are nailed to the framed opening.

²³ Window Association of New Zealand

6.5 Compliance with Clause E2

6.5.1 Clause E2.3.2 of the Building Code requires that ‘exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements, or both’. In addition to factors outlined above; I therefore need to assess risks applying to the particular circumstances of this building, which means considering the consequences of any possible future moisture penetration.

6.5.2 In regard to the risks and consequences of any future failure of the joinery system proposed for this particular house, I make the following observations:

- The shiplap cladding is installed over a 45mm deep cavity. The horizontal cavity battens are grooved on both sides to allow any moisture that penetrates into the cavity to drain to the outside, with plywood bracing and building wrap separating the cavity from the exterior wall framing. I note the plywood bracing is not taken account of in the supplier’s installation details.
- Window units are installed above the drained cavity and are offset beyond the timber framed walls, while the door joinery extends into the framing line due to the depth of the sliding door units.
- The amendment details show a continuous air seal at the joinery/framing/reveal junction, with a second optional seal towards the inner trim.
- The joinery units are off-set by up to 15mm beyond the face of the external walls. The 5mm drainage gap to the window sill and jambs are likely to be greater than the 5mm dimension shown in the supplier’s details. A gap greater than 5mm to the sill is likely to result in the entry of wind-blown rain at this junction.
- The amended details do not specify the capillary gap above the head flashing.

6.5.3 Taking into account the above observations, I considered that in order for the proposed joinery installation to be adequate, the following items required attention:

- verification and detailing of the drainage gap between the cladding and the uPVC sill section, and the sealing of the same gap at the jambs
- detailing of the capillary gap above the head flashings.

6.5.4 I acknowledge the revised details now provided by the window supplier in response to the findings of the draft determination (refer paragraph 4.6), and accept that the revised details will satisfy the matters outlined in paragraph 6.5.3 above.

6.6 Conclusion

6.6.1 I acknowledge and support the authority with respect to the need to properly assess alternative solutions, and how these should be adequately documented when seeking consent for their use.

6.6.2 I have considered the expert’s report and the other available evidence outlined above, together with the risks and consequences described in paragraph 6.5.2. I am of the opinion that there are sufficient grounds for me to conclude that the uPVC joinery will be able to achieve compliance with Clauses B1, B2, and E2 of the Building Code. This opinion does not apply to the uPVC joinery already installed.

6.6.3 I also consider that this uPVC joinery system cannot be described as particularly unusual, and I am therefore of the opinion that the evidence provided by the joinery manufacturer and window supplier, when considered together with other readily

available evidence is sufficient to establish compliance; and that a product appraisal is therefore not justified.

6.6.4 However, it is the responsibility of any the party seeking building consent to provide accurate details that properly shows how compliance is to be achieved, and that adequate information is provided to support the use of any product or system.

6.6.5 I emphasise that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular joinery system has been established as being code compliant in relation to a particular building does not necessarily mean that the same system will be code compliant in another situation.

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the uPVC joinery system as it is now proposed will comply with Clauses B1 Structure, B2 Durability, and E2 External Moisture of the Building Code.

7.2 I consider the authority's decision to refuse to amend the building consent was correct in respect of the proposed uPVC joinery system as originally submitted to it, but I reverse that decision in respect of the revised details now provided.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 6 May 2015.

John Gardiner
Manager Determinations and Assurance