



Determination 2011/017

Refusal to issue a code compliance certificate for 3-year-old addition and alterations to a house at 18 Hodgkins Road, Pukehangi, Rotorua

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, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department.
- 1.2 The parties to the determination are:
- the owners, M and J Grondsma (“the applicants”), acting through the builder (“the builder”), and
 - the Rotorua District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for 3-year-old additions and alterations to a house (“the additions”) because it was not satisfied that the building work complied with certain clauses² of the Building Code (Schedule 1, Building Regulations 1992). The authority’s concerns about the compliance of the building work relate primarily to the weathertightness of the exterior building envelope of the additions.
- 1.4 The matter to be determined³ is therefore whether the authority was correct in its decision to refuse to issue a code compliance certificate for the additions. In deciding this matter, I must consider whether the external claddings to the additions (“the claddings”) comply with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The claddings include the components of the systems (such as the wall claddings, the windows, the roof claddings and the flashings, as well as the way the components have been installed and work together.

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

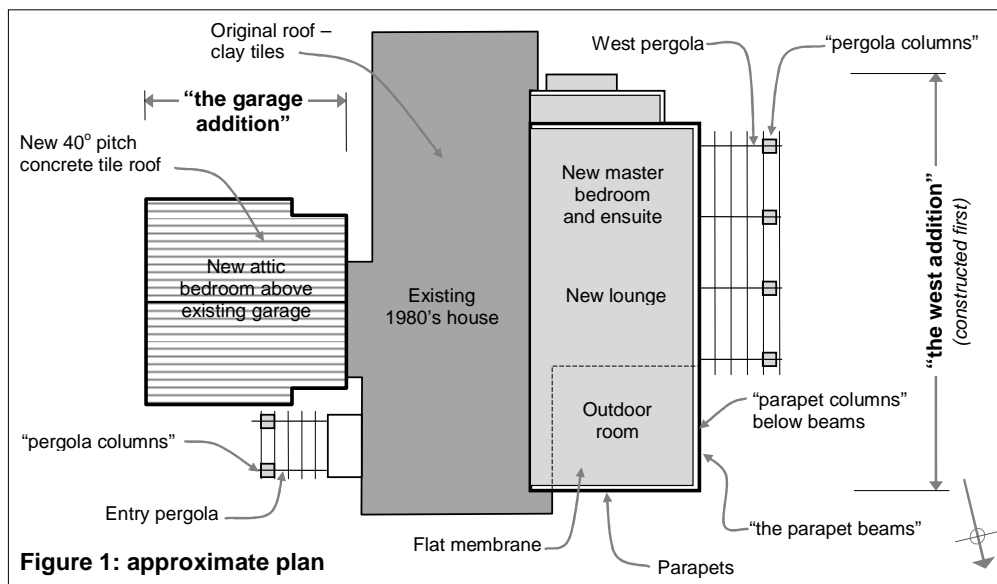
² In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

³ Under sections 177(1)(b) and 177(2)(d) of the Act

- 1.5 In making my decision, I have considered the submissions of the parties, the report of the expert commissioned by the Department to advise on this dispute (“the expert”) and the other evidence in this matter.

2. The building work

- 2.1 The building work considered in this determination consists of additions and alterations to an existing house on a level site in a medium wind zone⁴ for the purposes of NZS 3604⁵. The alterations are assessed as having a low to medium weathertightness risk (see paragraph 6.2).
- 2.2 The original 1980’s house was a simple single-storey three bedroom building with an attached garage. The timber-framed house had concrete foundations and floor slab, brick veneer cladding, aluminium windows and a clay tile hipped roof. Construction of the additions is generally conventional light timber framing, with concrete foundations and floor slabs, monolithic wall claddings and aluminium windows.
- 2.3 The additions are shown in Figure 1:



- 2.4 The building work includes:

- a single-storey extension to the west (“the west addition”) to provide:
 - a master bedroom and ensuite at the southern end
 - a new lounge
 - an ‘outdoor room’ beneath the northern end of the roof
- an attic bedroom and ensuite above the garage (“the garage addition”)
- timber pergolas to:
 - to the east wall of the main entry (“the entry pergola”)
 - to the west wall of the new bedroom and lounge (“the west pergola”)

⁴ As assessed by the authority

⁵ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- plastering of the existing brick veneer to match the new stucco cladding
- various alterations to the interior of the original house.

2.5 The west addition

2.5.1 The west addition has a large membrane roof that falls towards an internal gutter and roof parapets. At the northern end, the extended family room and the new lounge open to an ‘outdoor room’, with monolithic-clad beams and columns supporting the roof above. Spaces between columns are in-filled with monolithic-clad bench seats.

2.5.2 At the southern end, the lower level flat membrane roofs extend over the ensuite to the master bedroom. A timber pergola, supported on monolithic-clad columns, extends from the west walls of the bedroom and lounge, with glazed doors opening to a patio.

2.6 The east additions

2.6.1 An upper level has been added above the original garage, to provide an attic bedroom and ensuite. The new 40° pitch roof to the garage wing has verge projections of about 500mm and eaves more than 1m deep overall above the garage walls, with the soffit spaces providing storage areas. The eaves reduce to about 450mm overall above the staircase and laundry walls.

2.6.2 At the north end of the existing house, a new canopy extends to the west above the main entry. The canopy has a flat membrane roof and parapets over monolithic-clad columns and beams. A timber pergola, supported on monolithic-clad columns, extends from the canopy over a pathway.

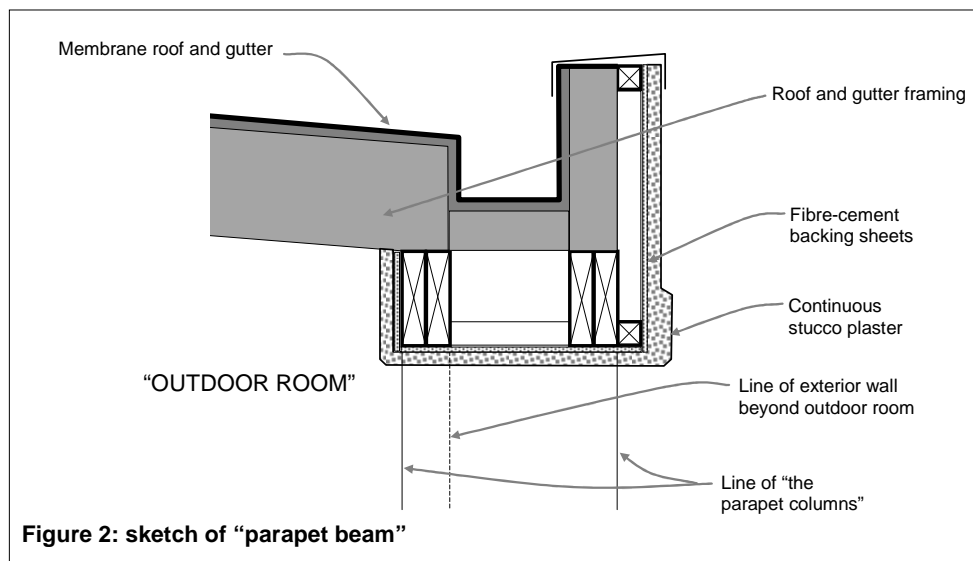
2.7 The stucco plaster cladding

2.7.1 The wall cladding is a monolithic cladding system described as stucco plaster over a solid backing. Apart from some new garage walls where the solid backing is shown as ‘20mm tanalised plywood’, the solid backing consists of 4.5mm fibre-cement.

2.7.2 The backing sheets are fixed through 20mm timber cavity battens and the building wrap to the framing, and covered by a slip layer of building wrap, metal-reinforced solid plaster and a flexible paint coating. The remaining original brick veneer walls are plastered to match the new stucco walls.

2.7.3 Framed columns that support the pergolas (“the pergola columns”) and the north end of the west addition roof (“the parapet columns”) are clad in stucco over fibre-cement sheet, which is fixed directly to the framing, with no cavity provided.

2.7.4 Based on the drawings and the builder’s description to the authority, the framed beams below the west addition parapet (“the parapet beams”) appear to be constructed approximately as shown in the following sketch:



2.7.5 As shown in Figure 2, the stucco extends from the outer face over the underside of the parapet beams between the parapet columns, with no drained cavity provided. The framed columns and parapet beam continue along the west elevation, around the recessed walls to the lounge and the master bedroom.

2.8 The authority inspections record that the wall framing is treated. The expert took a timber sample from the bottom plate of the pergola columns and the biodeterioration consultant confirmed that the timber was treated to the equivalent of H3.2.

3. Background

3.1 The authority issued a building consent (No. 37989) for the west addition and the pergolas on 26 January 2007 under the Building Act 2004. On 14 February 2007, an additional drawing was submitted, which added the garage addition to the building work. This drawing called for the cladding to new walls to be plywood with battened joints.

3.2 The authority's inspections

3.2.1 The authority carried out various inspections of the west addition including a pre-line inspection on 3 April 2007 and a pre-plaster inspection on 1 May 2007. The amendment to the building consent for the garage addition was approved on 11 May 2007, based on the drawings dated 14 February 2007.

3.2.2 However, the new walls to the garage addition were constructed with stucco plaster over fibre-cement backing sheets, with inspections that included:

- wrap and cavity batten inspection on 20 November 2007
- pre-line inspections during December 2007
- pre-plaster inspection on 10 December 2008
- plaster and control joints inspection on 12 December 2008.

- 3.2.3 Amended drawings for the cladding change to the garage addition were not submitted until 5 February 2009 and the authority approved an amendment to the building consent on 17 April 2009.
- 3.2.4 During 2009, framed and plastered bench seats to the outdoor room were installed between the parapet columns with the plaster to the benches butting against the column plaster.
- 3.2.5 The applicant applied for a code compliance certificate on 16 June 2009 and the authority carried out a final inspection on 17 June 2009. Along with some outstanding documentation, the authority identified and photographed various defects in the stucco cladding.
- 3.2.6 In a letter to the builder dated 28 July 2009, the authority noted its concerns about the following issues (in summary):
- the lack of clearance below the stucco cladding
 - the unconsented outdoor room benches between the parapet columns
 - the junctions of the west pergola timbers with the stucco plaster
 - the lack of cappings and overhangs at the top of the pergola columns
 - the apparent lack of overflow outlets to the internal gutters.
- 3.2.7 Following meetings, discussions and correspondence between the authority and the builder, the authority re-visited the site on 8 January 2010 to re-assess the cladding. During that visit, the authority photographed (with annotations) and recorded:
- parapet to tile roof junction, noting ‘no separation between roof and cladding’
 - the bottom of the stucco walls, recording areas where plaster is buried
 - the outdoor room bench seats, noting ‘no junction flashing details available’
 - framed parapet beams, noting ‘no ventilated cavity closer or cavity installed’
 - the tops to the pergola columns, with a note ‘flashing needs to be on top of plastered columns’ on a construction photo showing underlying membrane
 - pergola to wall junction, noting ‘no sealant around brackets’

3.3 The authority’s refusal to issue a code compliance certificate

- 3.3.1 In a letter to the applicants dated 11 February 2010 the authority noted its concerns about the stucco cladding, which included (in summary):
- lack of clearances from the stucco to the west paving and southeast garden
 - unconsented changes resulting in some ‘inherent design flaws’ including:
 - lack of stucco to roof clearances
 - direct fixed stucco to the framed beams and columns
 - unsealed pergola brackets and other ‘key junctions’
 - lack of cappings to the tops of the pergola columns
 - lack of drainage from back flashings at roof to wall junctions
 - lack of flashings between the outdoor room benches and the columns.

3.3.2 The authority concluded that:

The construction has not been completed in accordance with the Building Consent and the changes made to the cladding system have not been done in accordance with the performance criteria of the Building Code given the type of cladding chosen.

It is [the authority's] opinion that the construction does not meet Building Code clauses E2 External Moisture or B2 Durability.

For these reasons Council will not be issuing a Code Compliance Certificate...

3.3.3 The builder subsequently carried out some remedial work, but was advised by phone in June 2010 that a determination should be sought as the authority 'was unlikely to sign off'.

3.3.4 On 24 September 2010, the authority again visited the site; noting clear roofing installed over the west pergola, a metal cover flashing fitted at the roof to parapet junction, and the ground levels reduced at the southeast corner. The authority advised the builder that it was 'still unable to issue CCC' due to the issues raised in its letter of 11 February 2010 (refer paragraph 3.3.1).

3.4 The Department received an application for a determination on 3 December 2010.

4. The submissions

4.1 On behalf of the applicants, the builder forwarded copies of:

- the building consent
- the authority's inspection records
- correspondence with the authority
- various other statements and certificates.

4.2 The authority forwarded a CD-Rom, which contained some additional documents pertinent to this determination including:

- the consent drawings and specifications
- records of meetings with the builder on 1 December 2009 and 28 January 2010.

4.3 Copies of the submissions and other evidence were provided to each of the parties.

4.4 A draft determination was issued to the parties for comment on 14 February 2011.

4.5 The parties accepted the draft but the authority noted additional locations where paving had been laid against the plaster. I have amended the determination as appropriate.

5. The expert's report

5.1 As mentioned in paragraph 1.5, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Architects. The expert inspected the additions on 11 and 18 January 2010 and provided a report on 31 January 2011.

5.2 General

5.2.1 The expert considered that overall construction quality was 'average', with the stucco cladding generally well fixed and aligned. Although window head flashings were 'tidy and effective', the expert noted that apron flashings were 'not constructed correctly'.

5.2.2 The expert noted that;

- the membrane roof to the west addition was well constructed with a 'good sized' internal gutter discharging into a rainwater head at the south and a 'well formed' metal capping to the parapet
- a metal cover flashing was fixed over the former butyl rubber apron flashing at the north junction of the west addition with the original roof tiles, in response to the authority's concerns about the junction
- windows and doors are recessed, with metal head flashings, and proprietary jamb and sill flashings. In the garage addition, upper windows are sheltered by the verge overhangs, while the west windows of the west addition are sheltered beneath the projecting parapet beam (see Figure 2 and paragraph 2.7.5).

5.3 Moisture levels

5.3.1 The expert inspected the interior of the house, taking non-invasive moisture readings internally, and noted no evidence of moisture. The expert also took 8 invasive readings (from 8% to 18%) through internal linings and trim and recorded an invasive moisture reading of 16% at the bottom of a west pergola column outside the lounge. Taking account of an internal equilibrium reading of 16%, the expert concluded that the moisture readings were satisfactory.

5.4 Destructive testing

5.4.1 The expert removed a small section of plaster at the top of a column (beneath the clear roofing) and observed the butyl rubber flashing at the top of the framing.

5.4.2 The expert also removed a small section of plaster and backing sheet at the bottom of an exposed south column to investigate the underlying construction. The expert noted that the stucco was direct-fixed to the framing, which was constructed on a concrete nib with fibre-cement packers under the bottom plate. The expert recorded an invasive moisture reading of 19% in the bottom plate.

5.4.3 The expert removed a sample of timber from the bottom plate at the cut-out and forwarded it to a biodeterioration consultant for analysis. The laboratory report dated 18 January 2010 noted that the sample was CCA treated to an equivalent of H3.2 level and contained 'very recently active prolific fungal growths' indicating that it:

...had been exposed to moisture conditions that are inconsistent with sound building practice and/or weathertight design, and that appropriate remediation is needed to correct this.

5.5 Commenting specifically on the external envelope, the expert noted that:

General

- clearances to the cladding and the interior floor slab level are insufficient, and in some places concrete paving has been poured against the stucco plaster, at the south end of the west addition and at the northwest corner of the extended family room; providing the possibility of moisture to wick up into the backing sheets in future.
- the underlying membrane apron flashing at the north junction of the west addition with the original roof tiles is not likely to remain weatherproof in the long term, with no kick-out and gaps in the cover flashing leaving the underlying end of the apron flashing vulnerable to moisture penetration
- the plastered bench seats to the outdoor room lack any flashings at the junctions with the framed columns

I also note that:

- the framed parapet beams lack any drainage to allow any moisture penetrating the cladding to escape to the outside (see Figure 2)
- the timber sample analysis taken from the bottom of the pergola column indicates that further investigation is required to establish the cause(s) for the moisture penetration and the fungal growth in the treated timber.

5.6 The expert also made the following comments:

- Although wall cavities do not include a proprietary perforated cavity closer at the bottom, the builder has stated that drainage from the cavities is provided via sloping battens separated by a 10mm gap with double saw-cuts in the battens.
- Although the tops of the pergola columns lack metal cap flashings as shown in the consent drawings, the west pergola is covered with clear uPVC roofing.
- Although the tops of the other pergola columns are not protected by roofing, a membrane flashing was installed beneath the sloping polystyrene backing to the stucco top (see paragraph 3.2.7 and paragraph 5.4.1).

5.7 The expert also commented on the compliance of the additions with other relevant clauses of the Building Code, noting that the top of the gully trap at the south end of the west addition has insufficient clearance above the surrounding ground to prevent entry of surface water into the foulwater drain (Clause G13).

5.8 A copy of the expert's report was provided to the parties on 4 February 2011.

Matter 1: The external envelope

6. Weathertightness

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

6.2 Weathertightness risk

6.2.1 These additions have the following environmental and design features, which influence the weathertightness risk profile of the addition:

Increasing risk

- the west addition incorporates roof parapets
- although fairly simple, the additions incorporate some complex junctions
- some of the stucco cladding is fixed directly to the framing

Decreasing risk

- the house is in a medium wind zone
- most of the stucco cladding is sheltered by eaves or projecting parapet beams
- most of the stucco cladding incorporates a cavity
- the external wall framing is unlikely to be treated to a level that provides resistance to decay if it absorbs and retains moisture.

6.2.2 Using the E2/AS1 risk matrix to evaluate these features, the elevations are assessed as having a medium risk rating. If details shown in the current E2/AS1 were adopted to show code compliance, a drained cavity would be required for all stucco cladding.

6.3 Weathertightness performance

6.3.1 Generally the claddings appear to have been installed in accordance with good trade practice. However, taking into account the expert's report, I conclude that the areas outlined in paragraph 5.5 require rectification.

6.3.2 Taking account of the analysis of the timber sample taken from the pergola column bottom plate, I also consider that further investigation is required to establish the cause(s) for the moisture penetration and the prolific fungal growth in the treated timber after only three years (see paragraph 5.4.3). I also note the expert's comments in paragraph 5.6 and I accept that these areas are adequate in these particular circumstances.

6.4 Weathertightness conclusion

6.4.1 I consider the expert's report establishes that the current performance of the building envelope is adequate because there is no evidence of moisture penetration into the framing of the external walls of the additions. Consequently, I am satisfied that the external walls and roof comply with Clause E2 of the Building Code. However,

elevated moisture levels in the pergola columns, while not immediately excessively high show a tendency to accumulate moisture and cannot be considered weathertight.

- 6.4.2 In addition, the building work is required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continue to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement to remain weathertight. Because the cladding faults may allow the ingress of moisture in future, the additions do not comply with the durability requirements of Clause B2.
- 6.4.3 Because the identified cladding faults occur in discrete areas, I conclude that satisfactory investigation and rectification of the items outlined in paragraph 5.5 and paragraph 6.3.2 will result in the additions being brought into compliance with Clauses B2 and E2 of the Building Code.
- 6.4.4 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 Department has previously described these maintenance requirements, including examples where the external wall framing of the building may not be treated to a level that will resist the onset of decay if it gets wet (for example, Determination 2007/60).

7. What is to be done now?

- 7.1 The authority should issue a notice to fix that requires the owners to bring the additions into compliance with the Building Code, identifying the defects and investigations listed in paragraph 5.5 and paragraph 6.3.2 and referring to any further defects that might be discovered in the course of investigation and rectification, but not specifying how those defects are to be fixed. It is not for the notice to fix to specify how the defects are to be remedied and the building brought to compliance with the Building Code. That is a matter for the owners to propose and for the authority to accept or reject.
- 7.2 In addition I suggest the authority satisfy itself as to the adequacy of the fixings of the timber pergola beams to the top of the columns and to the galvanised brackets protruding horizontally from the house.
- 7.3 I suggest that the parties adopt the following process to meet the requirements of paragraph 7.1. The applicants should produce a response to the notice to fix in the form of a detailed proposal, produced in conjunction with a competent and suitably qualified person, for the rectification of the specified items. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

8. The decision

8.1 In accordance with section 188 of the Act, I hereby determine that:

- the external envelope of the additions do not comply with Building Code Clauses B2 and E2
 - the southwest gully trap does not comply with Building Code Clause G13
- and accordingly, I confirm the authority's decision to refuse to issue a code compliance certificate for the additions.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 9 March 2011.

John Gardiner
Manager Determinations