



Determination 2009/30

The issue of a notice to fix for a house at 169 Campbell Road, One Tree Hill, Auckland



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, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicant is the owner, the Win Family Trust (“the applicant”) acting through an agent, and the other party is the Auckland City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 This determination arises from the decision of the authority to issue a notice to fix for a 13-year-old house because it is not satisfied that the building work (the additions built between 1993 and 1995) complies with the requirements of certain clauses of the Building Code² (First Schedule, Building Regulations 1992). Specifically, the notice to fix cites contraventions of Clauses B1 “Structure”, B2 “Durability”, E2 “External moisture”, E3 “Internal moisture”, F4 “Safety from falling”, G4 “Ventilation”, and G13 “Foul water”.
- 1.3 In order to determine whether the decision to issue the notice to fix was correct, I consider the matters for determination are:

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

² The Building Code is available from the Department’s website at www.dbh.govt.nz.

1.3.1 **Matter 1: The cladding**

Whether the cladding as installed on the building (“the cladding”) complies with Clause E2 “External Moisture” of the Building Code. By “the cladding as installed” I mean the components of the system (such as the backing materials, the flashings, the joints and the plaster and/or the coatings) as well as the way the components have been installed and work together.

1.3.2 **Matter 2: The remaining Building Code matters**

Whether certain building elements in the house, other than the claddings, comply with the relevant clauses of the Building Code.

1.3.3 **Matter 3: The durability considerations**

Whether the building elements in the house comply with Clause B2 “Durability” of the Building Code, taking into account the age of the building work.

1.4 I note that the notice to fix indicates that some aspects of the building work contravene Clauses B1 and G4 of the Building Code. I note that there are no specific items within the notice that relate directly to these clauses, and I have received no evidence relating to a dispute about them. I have therefore not considered these clauses further within this determination.

1.5 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1.

1.6 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.

2. The building work

2.1 The building is a two storey house on a flat site, which is in a low wind zone for the purposes of NZS 3604³.

2.2 The original 1960s house

2.2.1 The house was originally a single storey mid-1960s built house (“the original house”) with a timber frame supported on concrete piles, clad with weatherboards.

2.3 The additions

2.3.1 The original house was extended between 1993 and 1995, with an addition of a second storey in the roof space, new dormers, and a two storey addition to the south east end of the house containing a garage on the lower storey and an attic room above (“the additions”). The two storey east end addition was built with a light timber frame above concrete foundations and ground floor slab.

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.4 The external walls of the addition are clad with a monolithic cladding. This cladding was also been applied to the external walls of the original house, which were originally clad with weatherboard. The house has aluminium joinery, excluding the entrance and garage doors which are timber framed. The roof has metal tiles and a 37° pitch for the main roof, with a 12.5° pitch for the dormer roofs. The garage has 560mm eaves and the dormers and verges have 240mm eaves. There is a raised, tiled, ground floor level deck at the north-west end of the house.
- 2.5 The monolithic cladding consists of solid cement/sand plaster (“stucco”) applied directly to 40mm thick expanded polystyrene (“EPS”) sheets as rigid backing, with reinforced galvanised mesh close to the internal face. The EPS was fixed directly to the timber frame, and no building paper or building wrap was used. The north-west wall and part of the south-west wall have concrete block masonry at subfloor level.
- 2.6 The expert (refer to paragraph 5) noted that some of the jack studs in the subfloor space below the guest bedroom were marked Pinex H1 and it is likely that this was generally used for new wall framing in the additions. Given construction was between 1993 and 1995; I consider that this indicates that the timber framing of the additions was sufficiently treated to resist decay.

3. Background

- 3.1 The original house was built under building permits No. 15845 and No. 99689 between 1964 and 1967.
- 3.2 The authority issued building consent BLD0930256001 (TC/93/2560) in July 1993 for additions to the original house.
- 3.3 Inspections of the additions began in September 1993. A notice to rectify was issued to the former owner by the authority on 10 September 1993 citing items that required rectifying, including details pertaining to rafters, lintels, bracing, and ceiling framing.
- 3.4 A further notice to rectify was issued to the former owner by the authority on 18 August 1995 citing the requirement for a ‘catch-pit’ to be installed to control surface water, as required in the building consent.
- 3.5 A final inspection was completed on 1 September 1995, at which time the work was substantially completed. Following this inspection, the authority wrote to the former owner in a letter dated 1 September 1995 citing items that required rectifying, including details pertaining to cladding, subfloor loadings and ventilation, staircase balustrades, and plumbing and drainage.
- 3.6 The authority wrote to the former owner on 12 December 1996 explaining that the work pertaining to the 18 August 1995 notice to rectify had not been completed and the work urgently needed to be done.
- 3.7 The applicants took over ownership of the property in June 2007.
- 3.8 The authority issued building consent BLD20071049401 on 5 June 2007 for an addition of an ensuite to the guest bedroom (“the 2007 building work”). Inspections

on the 2007 building work were carried out in July 2007 with the final inspection for this work completed on 24 July 2007.

- 3.9 On 5 September 2007, the authority completed a final inspection of the outstanding 1993 building work, as a part of the process to enable a code compliance certificate to be issued.
- 3.10 Following this inspection, the authority issued a notice to fix on 21 November 2007. The authority explained that they could not be satisfied that the house complies with the Building Code, citing contraventions of the Act, the building consent, and the Building Code.
- 3.11 The Department received an application for a determination on 13 November 2008.

4. The submissions

- 4.1 The applicant made a submission that included copies of:
- the notice to fix, dated 21 November 2007
 - the final inspection notes from the inspection of the 2007 building work
 - the consent plans from the 1995 building work
- 4.2 The authority submitted a CD-Rom, entitled “Property File”, which contained documents pertinent to this determination, including:
- the consent documentation for the 1993, and 2007 consents
 - the inspection records for the original house and the 1993-1995 and 2007 building work
 - historical correspondence and property information
 - correspondence between the authority and the applicant
 - the notice to fix dated, 21 November 2007.
- 4.3 A draft determination was issued to the parties for comment on 2 March.2009. Both parties accepted the draft determination without comment.

5. The expert’s report

- 5.1 As discussed in paragraph 1.5, I engaged an independent expert to provide an assessment of the condition of those building elements subject to the determination. The expert is a member of the New Zealand Institute of Architects. The expert inspected the house on 29 January 2009 and furnished a report that was completed on 6 February 2009.
- 5.2 The expert noted that the drawings did not distinguish between the original house and the 1993 building work that the notice to fix are applied to, but the house appeared to be generally in accordance with the documents.

- 5.3 The expert noted that some of the authority's correspondence refers to the cladding as being an EIFS system⁴, whereas the cladding is stucco applied to EPS sheets as rigid backing. Consequently, some of the non-compliance comments in the notice to fix are inappropriate.
- 5.4 The specification for the 1993 building work, from a microfilm scan provided by the submission of the authority, states that 'the exterior wall surfaces to soffit level are to be clad with stucco over insulation and the existing weather boards...' and 'upper level frames shall be fitted with 50# PFC set between rafters and upper wall studs with exterior weatherboards attached directly to the framing'. The expert noted that the EPS was fixed directly to the subfloor wall framing. The expert measured the overall wall thickness in two areas, as representative of the whole building, and noted that the measurements corresponded to the EPS being fixed directly to the frame.
- 5.5 The expert took non-invasive moisture readings of the interior linings of the exterior walls, noting that most of the readings were low, indicating that the linings and internal face of the framing were dry at the time of inspection. There were some high and very high readings, and sample invasive readings were taken at these locations. The expert took 11 invasive sample readings and noted seven elevated readings as follows:

- 23% at the bottom plate of the under floor space (timber severely decayed)
- 23% at the bottom plate of the laundry adjacent to the timber framed garage door
- 20% at the bottom plate of the timber framed garage door
- 19% at the bottom plate of the laundry window
- 28% at the bottom plate of the corner of the lounge
- 33% at the bottom plate below the lounge window.

Framing with moisture content over 26% is likely to be affected by decay. Moisture levels above 18% recorded after cladding is in place generally indicate that external moisture is entering the structure. I note the other readings ranged from 14% to 17%, and the inspection was carried out during summer and represents the low end of seasonal variation. I consider that the moisture levels recorded are likely to represent lower levels than expected at other times of the year.

- 5.6 Commenting specifically on the wall cladding, the expert noted that:

Ground clearance and foundation overlap details

- the soil or paving level was generally at or above the level of the bottom edge of the stucco
- the base of the EPS was not supported by a metal angle
- the framing was supported by piled foundations (allowing greater movement than the continuous concrete foundations that are now required for stucco claddings)

⁴ External Insulation and Finish System

- the base of the stucco was damaged in some areas

Flashings at windows and doors

- there was no sealant or seals at the joins of the aluminium framing, and cladding junctions (the silicone applied as a fillet appeared to be a remedial measure)
- there were no flashings, only black polythene sheet fixed over the window studs
- timber framing at entrance and garage door was not sealed to the cladding

Subfloor ventilation

- there is no or limited subfloor ventilation

Clearance from cladding edge to roofing

- the stucco and EPS were incomplete and timber framing was visible at kick out detail above the garage

Cladding system construction, control joints and EPS sheet layout

- there was no building paper or wrap applied on either side of the EPS
- the wire mesh reinforcement was at the back face of the stucco
- EPS sheets were visible in the under floor space at the north-east side of the building and there was no framing behind the horizontal board edges
- the dimension of some plastered surfaces exceeded four metres and there was a lack of control joints
- there was no clearance or flashing detail between the stucco and concrete blockwork
- the underside of the bell mouth feature below the north west gable sloped inward rather than outward

Deck junctions

- there was no separation between the base of the stucco and deck paving, and not all areas were protected by upper floor

Penetration sealing

- some services penetrations were inadequately sealed
- there was no flashing at the junction of the meter box

Continuity of cladding behind obstructions

- the stucco was discontinued behind one of the barge junctions.

5.7 The expert observed systematic cracking of the cladding at the corners of windows and random cracks of the cladding elsewhere, and that the majority of the cracks had paint applied over them. The expert concluded the causes of the cracking were likely to include:

- moisture expansion of framing due to leaks at inadequately sealed windows and doors

- the location of the wire reinforcement at the back of the plaster, where it was not effective
- the lack of angle to support the base of the EPS, the lack of control joints, and the lack of continuous concrete foundations.

5.8 Commenting on compliance with other Building Code Clauses, the expert noted the following:

- the balustrade does not comply with Clause F4/AS1 in that the space between the balusters was 280mm
- there was a single smoke detector above the top floor landing that does not meet the requirements for this dwelling of Clause F7
- the gully dish has had soil build up above cover level allowing surface water to enter the sewer system.

5.9 A copy of the expert's report was provided to each of the parties on 12 February 2009.

6. Evaluation for code compliance

6.1 Evaluation framework

6.1.1 I have evaluated the code compliance of this building by considering the following two broad categories of the building work:

- The weathertightness of the external building envelope (Clause E2) and durability (Clause B2 in so far as it relates to Clause E2).
- The remaining relevant code requirements.

In the case of this house, weathertightness considerations are addressed first.

6.1.2 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions⁵, which will assist in determining whether the features of this house are 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 one or more other provisions to compensate for that in order to comply with the Building Code.

⁵ An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way (but not the only way) of complying with the Building Code. The Acceptable Solutions are available from The Department's Website at www.dbh.govt.nz.

Matter 1: The cladding

7. Weathertightness

7.1.1 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, the cladding system, its installation, and the moisture tolerance of the external framing. The Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations⁶ (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

7.1.2 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.

7.2 Weathertightness risk

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

Features tending to increase risk

- the house is two storeys high
- the bottoms of roof flashings terminate within wall faces
- has stucco on EPS cladding fixed directly to the framing
- has a predominantly enclosed slat deck at ground floor level

Features tending to decrease risk

- the house is in a low wind zone
- the house has a simple envelope shape
- has 560mm eaves on the garage and 240mm eaves on the dormers and verges.

7.2.2 The house has been evaluated using the E2/AS1 risk matrix. The risk matrix allows the summing of a range of design and location factors applying to a specific building design. 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 Copies of all determinations issued by the Department can be obtained from the Department's website.

7.2.3 When evaluated using the E2/AS1 risk matrix, the weathertightness features outlined in paragraph 7.2.1 show that all elevations of the house demonstrate a medium to high weathertightness risk rating and would now require the incorporation of a drained cavity. However, this was not a requirement at the time of construction in 1993.

7.3 **Weathertightness performance**

7.3.1 I note that the use of expanded plastics as a backing for plaster is noted in the contemporary plastering standard NZS 4251 1974⁷, Section 4.2d, but it provides no guidance as to the requirements of the plastics, such as thickness, type, or installation requirements. Details first appeared in a national standard in the BRANZ Good Stucco Practice Guide 1996 and NZS 3604 Section 11.8. Therefore at the time of construction, the use of stucco applied to EPS, as applied to this building, was an alternative solution, unsupported by national standards.

7.3.2 I also note that there is no cavity to ensure that water passing through the external cladding can drain away. There is also only limited ability for air circulation in the wall framing and a lack of subfloor ventilation to ensure that damp timber can dry out. However, I note that the incorporation of a cavity into the cladding system was not mandatory or regarded as normal practice in 1993.

7.3.3 It is clear from the expert's report that the monolithic cladding installed on the house is unsatisfactory in terms of its weathertightness. The lack of window flashings, and inadequate reinforcing are likely to have contributed to the systemic failure.

7.3.4 Taking into account the expert's report and comments as outlined in 5.4 and 5.6, I conclude that the following items require rectification with respect to weathertightness:

- the defects in the cladding (refer to paragraph 5.6)
- the inadequate base details
- the lack of window flashings or adequate seals between the joinery and the cladding
- an inadequate kick out detail at the bottom of the apron flashing
- inadequate deck details
- inadequate penetration sealing

7.3.5 Further investigation is necessary, including the systematic survey of all risk locations, to determine the full extent of the repairs required.

⁷ Code of practice for solid plastering

7.4 Weathertightness conclusion

- 7.4.1 I consider the expert's report establishes that the current performance of the cladding is not adequate because there is evidence of moisture penetration and decay, and the cladding has not been installed according to good trade practice. In particular, the cladding demonstrates the key defects listed in paragraph 5.6, which are likely to have contributed to the significant and widespread levels of moisture penetration evident within the external walls of this building.
- 7.4.2 I have also identified the presence of a range of known weathertightness risk factors in this house. The presence of the risk factors on their own is not necessarily a concern, but they have to be considered in combination with the faults identified in the cladding system. It is that combination of risk factors and faults that indicate that the structure does not have sufficient provisions that would compensate for the lack of a drained and ventilated cavity. Consequently, I am not satisfied that the cladding system, as installed, complies with clause E2 of the Building Code.
- 7.4.3 In addition, the building work is also required to comply with the durability requirements of Clause B2. Clause B2 requires that a building continues to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement for the house to remain weathertight. Because the cladding faults on the addition may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.
- 7.4.4 I consider that final decisions on whether code compliance can be achieved by either remediation or re-cladding, or a combination of both, can only be made after a more thorough investigation of the cladding. This will require a careful analysis by an appropriately qualified expert. Once that decision is made, the chosen remedial option should be submitted to the territorial authority for its comment and approval.

Matter 2: The remaining Building Code matters

8. Discussion

- 8.1 It is clear from the expert's report that there are a several contraventions of the Building Code, notwithstanding compliance with Clause E2, including:
- the balustrade at the internal staircase does not comply with Clause F4
 - the gully dish, which is allowing surface water to enter the sewer system does not comply with Clause G13.
- 8.2 I accept the authority's contention that the vanities and laundry tubs need to be sealed to the wall linings to be compliant with Clause E3. I do not accept the contention that vermin proofing is required in the bathroom, ensuite, and laundry. This is a requirement of Clause G3.3.1(a) for food preparation facilities.
- 8.3 While I accept that the dwelling does not currently comply with Clause F7 "Warning Systems" (refer to paragraph 5.8), I do not accept that this is the case for the 1993 building work. The installation of smoke detectors was not a requirement at the time

the consent was issued and therefore this should not be included in the notice to fix for the 1993 building work. I would recommend that this matter be resolved, however, it should be resolved with respect to the 2007 building work, as it was a condition of this building consent.

Matter 3: The durability considerations

9. Discussion

- 9.1 As set out in paragraph 3.10, it appears that the authority has concerns about the durability, and hence the compliance with the Building Code, of certain elements of the building, taking into consideration the substantial completion of the 1993 building work in 1995.
- 9.2 The relevant provision of Clause B2 of the Building Code requires that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods (“durability periods”) “from the time of issue of the applicable code compliance certificate” (Clause B2.3.1).
- 9.3 In previous determinations (for example Determination 2006/85) I have taken the view that a waiver of this requirement can be granted if I can be satisfied that the building complied with the durability requirements at a date earlier than the date of issue of the code compliance certificate, that is agreed to by the parties and that, if there are matters that are required to be fixed, they are discrete in nature.
- 9.4 Because of the extent of the defects in the cladding, and the possible consequential impact on the building’s timber framing and therefore its structure, I am not satisfied that I have sufficient information on which to make a decision about this matter. However, the matter may be referred to the Department for a further determination once the cladding and all associated work has been made code compliant.

10. Conclusion

- 10.1 The following table summarises conclusions on the items listed within the notice to fix dated 21 November 2007 and refers to related paragraphs within this determination:

Notice to fix		My conclusion about the remedial work required	Paragraph reference
Item	Summarised requirement		
2.0	Cladding issues		
	Cladding may not be installed over existing weatherboards as per consent documents	Not in accordance with building consent	5.4
2.1	Not in accordance with specifications		
a	Plaster not complete to behind fascia boards	Remedial work required (in one instance)	5.6
b	No head, jam, and sill flashings	Remedial work required	5.6
c	Silicone as fillet to joinery	Remedial work required	5.6

d	No drip edges installed	Remedial work required	5.6
e	Horizontal cladding surfaces at kitchen bay window	Remedial work required	5.6
f	No flashing between stucco and blockwork	Remedial work required	5.6
g	No timber fixing blocks below plaster for fixings	Not applicable	5.3
h	Penetrations without flanges/gaskets or silicone	Remedial work required	5.6
i	No capping of cladding at deck and clearance above deck inadequate	Remedial work required	5.6
j	Clearance below bottom plates and above ground/paving inadequate	Remedial work required	5.6
k	Plaster finish may not be installed as specified	Not applicable	5.3
l	Uncoated/unsealed areas of cladding	Remedial work required	5.6
2.2	Not in accordance with building consent		
a	See 2.1 g	-	-
b	See 2.1 h	-	-
c	Inadequate subfloor ventilation	Remedial work required	5.6
d	See 2.1 j	-	-
e	No barrier at internal staircase	Remedial work required	5.8, 8.1
2.3	Not in accordance with accepted trade practice		
a	No kickout flashings at lower ends of roof aprons	Remedial work required	5.6
b	Upper level basins not sealed to wall linings and vermin proofing required	Remedial work required with respect to sealing	8.2
c	Laundry tubs not sealed to wall linings and vermin proofing required	Remedial work required with respect to sealing	8.2
d	Gully dish trap does not prevent ingress of surface water	Remedial work required	5.8
2.4	Drainage and ventilation		
	Cladding system does not allow water to drain out and ventilation of system does not ensure that damp timber will dry out	Requires further investigation	7
3.0	Other issues		
	Smoke detectors should be installed	Remedial work required	5.8, 8.3
4.0	Durability issues		
	Durability requirements have not been met	Remedial work required	9

10.2 I am satisfied that the building does not comply with the Building Code. In my opinion the authority made an appropriate decision to issue the notice to fix.

10.3 However, a notice to fix should be correct in the matters it requires to be rectified. In my opinion the notice contains errors, including the following:

- The summary to the notice incorrectly cites breaches of Clauses B1 and G4.

- The notice incorrectly cites a breach of Clause F7 which was not a requirement of the Building Code at the time the building consent was issued. (This matter should have been addressed against the consent for the 2007 building work.)
- The notice requires vermin proofing, which is not applicable in this instance.
- The notice seeks specific remedies in terms of the non-mandatory Acceptable Solutions, without having first established that the work does not comply with the Building Code.

11. What is to be done now?

- 11.1 The notice to fix should be modified and reissued to the owner to take account the findings of this determination. The notice to fix can require the owner to bring the house into compliance with the Building Code, but, as noted in previous determinations, I consider that a notice to fix cannot specify how compliance is to be achieved.
- 11.2 The owner in response to the modified notice to fix, and as discussed in paragraph 7.4.4, should engage a suitably qualified person to undertake a thorough investigation of the cladding to determine the extent of the defects and produce detailed proposal describing how the defects are to be remedied. The proposal should be submitted to the authority for approval. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.
- 11.3 It is important to note that the Building Code allows for more than one means of achieving code compliance.

12. The decision

- 12.1 In accordance with section 188 of the Act, I hereby determine that:
- the 1993 building work does not comply with Building Code Clauses B2, E2, E3, F4, and G13
 - the authority is to modify the notice to fix, dated 21 November 2007, to take account of the findings of this determination.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 28 April 2009.

John Gardiner
Manager Determinations