Department of Building and Housing
Te Tari Kaupapa Whare

Determination 2009/64

The issue of a notice to fix for a house at 191A Campbell Road, Greenlane, Auckland

1. The matters to be determined

1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004[1] ("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, V Keenan ("the applicant"), acting through a building consultant ("the consultant"). 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 refuse to issue a code compliance certificate and issue a notice to fix for a 15-year-old house because it was not satisfied that it complied with certain clauses of the Building Code[2] (First Schedule, Building Regulations 1992).

1.3 In order to determine whether the decision to issue the notice to fix was correct, I consider that the matter for determination, in terms of sections 177(a) and 188 of the Act[3], is whether the external envelope of the house complies with Clause B2

[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.
[3] 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.

Durability and Clause E2 External Moisture of the Building Code. The "external envelope" includes the wall and roof claddings as installed to this house, their configuration, components and junctions with other building elements. By "the wall and roof claddings as installed" I mean the components of the systems (such as the backing materials, the plaster, the weatherboards, the roof tiles, the deck membrane, the flashings and the coatings), as well as the way the components have been installed and work together.

1.4 Matters outside this determination

1.4.1 The notice to fix cites contraventions of Clauses B1, B2, D1, E1, E2, E3 and H1 of the Building Code. I note that there are no specific items within the notice that relate directly to Clauses B1 and H1, and I have received no evidence relating to a dispute about them. I have therefore not considered these clauses within this determination.

1.4.2 I also note that correspondence between the authority and the consultant, as outlined in paragraph 3.6.2 indicates that the parties are in the process of resolving those items in the notice to fix not related to the claddings. In his submission, the consultant has confirmed that the applicant is prepared to have that work done, and I leave those matters to the parties to resolve. I have therefore not considered Clauses D1, E1 and E3 within this determination. This leaves compliance with Clauses E2, and B2 as items for my consideration in the determination

1.4.3 The notice to fix also stated that the applicant may apply to the authority for a modification in respect of the durability provisions of Clause B2, and I note that the consultant states that the applicant intends to do this when the remedial work is completed. I therefore also leave this matter to the parties to resolve once the cladding and all associated work has been made code compliant.

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 other evidence in this matter. I have evaluated this information using a framework that I describe in paragraph 6.

2. The building work

2.1 The building work consists of a house that is two storeys high in part and is situated on a sloping site in a wind zone assumed to be medium for the purposes of NZS 3604[4]. The front (west) elevation is one-storey high, with the height increasing to two storeys at the rear. Construction is generally conventional light timber frame, with concrete foundations and floor slabs, concrete block foundation walls, monolithic, brick veneer and timber shingle wall claddings, aluminium windows and concrete tile roofs. An open timber deck, with open timber balustrades, extends around the northeast corner to about half way along the east elevation.

2.2 The house is fairly complex in plan and form, with roofs at multiple levels and pitches. Most roof pitches are 35^{o} or 15^{o}, with a mix of gables, hips and monopitched lean-tos. The pitch of the tiled roof at the north east corner reduces to 12.5^{o} and there is a monopitched dormer to the north with a flat membrane roof.

[4] New Zealand Standard NZS 3604:1999 Timber Framed Buildings

Apart from some 500mm roof projections to the west elevation, there are generally no eaves or verge projections.

2.3 The expert has noted that the condition of the timber, given the high level of moisture penetration apparent, indicates that the framing was boron treated. Based on this evidence and the date of construction in 1993, I accept that the framing is treated to provide some resistance to timber decay.

2.4 The wall claddings

2.4.1 The majority of ground floor walls to the west (front) elevation are clad in brick veneer. The side and front walls to the two dormers are clad in cedar shingles.

2.4.2 The remaining walls, including the upper walls to the stepped roof, are clad in monolithic cladding. The system is described as solid plaster ("stucco") over a rigid backing. In this instance the backing consists of fibre-cement sheets fixed through the building wrap directly to the framing timbers, and covered by a slip layer of building wrap, and metal-reinforced solid plaster with a flexible paint coating.

3. Background

3.1 The authority issued a building consent for the house (No. TC/93/03471) on 3 August 1993 under the Building Act 1991, and the authority carried out foundation inspections during August.

3.2 Although documentation for the consent application proposes 11 inspections for the building, including pre-line and post-line inspections to be undertaken, it appears that some six inspections were undertaken during the course of the work, starting on 26 August 1993, with the last inspection noted in the summary is a plumbing and drainage test carried out on 18 October 1993 .

3.3 The authority did not carry out a final inspection until 29 March 1999, and the inspection record lists the outstanding items to be completed. According to the applicant's lawyer, the authority wrote to the applicant on 10 October 2000. I have not seen that letter, but it apparently noted that there remained:

> ...a few outstanding items left to do. If this work is now completed and you would like us to issue your final Code Compliance Certificate then please ring [name] and arrange another inspection.

3.4 Some of the outstanding work was completed and the authority re-inspected the house on 13 December 2000 and issued a memo to the applicant, which listed six items to be completed, some of which had not been in the previous list of outstanding items. Correspondence between the applicant's lawyer and the authority followed without resolution. No notice to fix was issued then and I am not aware of any further correspondence until 2008.

3.5 The notice to fix

3.5.1 The authority re-inspected the house on 12 May 2008, and the record notes that the inspection 'failed' and that numerous items needed to be addressed, with 'issues relating to cladding'. The record also noted that a notice to fix was to be issued.

3.5.2 The authority wrote to the applicant on 16 June 2008, stating that it was not satisfied that the building work complied with the consent, or with the Building code in 'a number of respects', or with the Building Act. The authority recommended that:

> ...you engage the services of a suitably qualified person to review the attached NTF and to develop a proposed scope of work, which in their view would address all the areas of contravention. Council will then review this proposal and if it agrees with it, will then advise you as to whether a building consent needs to be applied for.

3.5.3 The notice included a 'Photo file' of defects identified in the building. The 'particulars of contravention or non-compliance' listed defects and requirements and required the applicant to prepare a proposed scope of work to address the areas of non-compliance. I have summarised this list in paragraph 8.1.

3.5.4 With regard to durability requirements, the notice stated that the applicant could apply to the authority for a modification to allow the requirements of Clause B2 to 'commence from the date of substantial completion, as opposed to the date of the Code Compliance Certificate.'

3.6 The response to the notice to fix

3.6.1 In response to the notice the applicant engaged a consultant to liaise with the authority in order to address the items raised in the notice to fix. In a letter to the applicant dated 9 September 2008, the consultant responded to each item in the notice to fix, outlining the remedial work proposed to address each defect. The consultant's proposed 'scope of works' was then forwarded to the authority.

3.6.2 In a letter to the applicant dated 25 September 2008, the authority accepted parts of the consultant's proposal with regard to a number of items in the notice to fix; and I note these in paragraph 8.1. However, the authority also stated that the consultant's proposals did not satisfy all of the concerns raised in the notice to fix, particularly in relation to the cladding; and required revision or 'further clarification and detail for some of the issues'.

3.7 The Department received an application for a determination on 18 May 2009.

4. The submissions

4.1 In a statement dated 11 May 2009, which accompanied the application, the consultant outlined the background to the dispute. The consultant considered that the monolithic cladding had been installed 'in accordance with accepted trade practice for 1993-1994', noting that no problems had been identified until the final re-inspection in 2008. The consultant also noted that 'all other items in the notice to fix can be addressed if the issue of the cladding can be resolved, concluding:

> All parties agree that a determination by your department will achieve some finality with this issue. [The applicant] is prepared to have all items of work done but has some understandable concern about re cladding a large part of the exterior when there are no obvious signs of moisture ingress in any area of the house.

4.2 The consultant forwarded copies of:

- the consent application documentation
- some of the drawings
- the inspection records
- the notice to fix dated 16 June 2008
- the consultant's response to the notice, dated 9 September 2008
- the correspondence with the authority.

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

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

4.5 A draft determination was issued to the parties for comment on 8 July 2009.

4.6 The authority accepted the draft in a letter dated 14 July 2009 but noted that the notice to fix included areas of contravention to Clauses B1, B2, D1, E1, E2, E3, and H1. However the authority did not provide any further information regarding specific items that contravened those Clauses.

4.7 The applicant accepted the draft without comment in a letter dated 3 August 2009.

5. The expert's report

5.1 As mentioned 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 Building Surveyors. The expert inspected the house on 24 June 2009 and provided a report that was completed on 30 June 2009.

5.2 The expert noted the following variations to the consent documents

- Stucco cladding has replaced timber weatherboards.
- A dormer has been added to the north roof over the dining room.
- Concealed gutter/fascia systems replaced timber fascias with exposed gutters.

5.3 The expert noted that the brick veneer and timber shingle claddings appeared to be 'performing and meeting the requirements of the Building Code', but described the stucco and roof claddings as generally 'below standard'.

5.4 The windows and doors

5.4.1 The expert noted that the windows in the shingle-clad dormers were face-fixed with satisfactory metal head flashings. The expert noted that the upstand to the roof apron flashing probably extended up behind the sill flange to flash the window sill.

5.4.2 For the stucco-clad walls, the expert noted that the aluminium windows and doors have metal head flashings and appeared to have been face-fixed against the fibre-cement backing sheets with the plaster subsequently applied. This has resulted in the joinery being recessed back from the face of the plaster, with no visible signs of sill or jamb flashings.

5.5 Moisture levels

5.5.1 The expert removed some roof tiles at the gutter edge of the 12.5^{o} pitch roof to the north east corner, and noted that there were no anti-ponding boards installed to support the roof underlay. The expert observed bird's nest debris and signs of moisture penetration on the sagging underlay. I accept that the location exposed is likely to be typical of other areas in that roof, and also similar within the 15^{o} pitch roofs.

5.5.2 The expert extracted a sample of timber from the bottom plate beneath the dining room north window. The expert noted that the timber was saturated and obviously decayed, so testing of the sample was not considered necessary.

5.5.3 The expert did not inspect the interior of the house, noting that he was advised by the applicant that there was no evidence of moisture ingress.

5.5.4 The expert took 9 invasive moisture readings through the stucco cladding at areas considered at risk, and all readings were elevated as follows:

- 19% below the right hand side jamb to sill junction of the dining room north window, with 26% in the bottom plate below
- Saturated timber and advanced decay in the cut-out to the bottom plate below the left hand side jamb to sill junction of the dining room north window
- 27% in the bottom plate at the north east corner (at the deck)
- 26% in the bottom plate under the east kitchen window (at the deck)
- 26% in the bottom plate under the east master bedroom window (at the deck)
- 28% in the bottom plate under the east window to the storeroom stairs
- 25% in the bottom plate under the north storeroom window
- 31% in the bottom plate of the south wall of the storeroom.

Moisture levels above 18% generally indicate that external moisture is entering the structure and further investigation is required.

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

The stucco – general

- there are no vertical or horizontal joints provided in the cladding
- there are cracks in the cladding, some which are concealed by recent paintwork

The bottom of the stucco cladding

- the stucco is taken over the concrete block foundation to the paving below, with the plaster continuous over the junction and no cladding overlap provided
- there are no capillary gaps, base flashings or drip edges at the bottom
- the stucco butts against the timber decking, with the edge of the decking taken under the plaster and no allowance for drainage provided.

Windows and doors

- the recessed windows in the stucco lack adequate jamb and sill flashings, with cracking, moisture penetration and decay apparent in a number of areas
- the windows in the timber shingle cladding are not properly sealed under jamb flanges, with shingles shrinking away from the junction and gaps apparent

the roof cladding

- the 12.5^{o} pitch tile roof to the northeast lacks adequate fall, with signs of bird's nest debris and water marks on the roof underlay
- the low-pitched tile roofs lack anti-ponding boards to support the underlay
- some of the lead apron flashings over the concrete tiles have stress fractures
- there are no kick-outs at the bottom of apron flashings, with a heavy reliance on sealant, and water is able to run into the plaster

General

- pipe penetrations through the claddings are not adequately sealed
- the meter box lacks flashings and seals.

5.7 The expert considered that the ground clearances to the brick veneer on the front elevation are sufficient, given the shelter provided by the eaves and that the paving falls away from the building.

5.8 A copy of the expert's report was provided to the parties on 2 July 2009.

6. Evaluation framework

6.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solutions[5], 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.

[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.

- 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.

7. Weathertightness

7.1 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. Weathertightness risk factors have also been described in previous determinations[6] (for example, Determination 2004/1) relating to cladding and these factors are also used in the evaluation process.

7.2 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.

7.3 Weathertightness risk

7.3.1 This 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 cladding systems 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.

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

Increasing risk

- the house is two-storeys high in part
- the house is complex in plan and form
- the roof has multiple levels and pitches, with complex roof junctions
- most of the walls have monolithic cladding fixed directly to the framing
- there are no eaves or verge projections to most of the walls

Decreasing risk

- the house is in a medium wind zone
- there is an open deck, with open balustrades attached to the ground floor

[6] Copies of all determinations issued by the Department can be obtained from the Department's website.

- the external wall framing is treated to a level that provides some resistance to decay if it absorbs and retains moisture

7.3.3 When evaluated using the E2/AS1 risk matrix, these features show that two elevations of the house demonstrate a moderate weathertightness risk rating and two elevations a high risk rating. While it was not a requirement when this house was constructed, a drained cavity is now required by E2/AS1 for stucco cladding at all risk levels.

7.4 The roof and shingle claddings

7.4.1 Generally the roof claddings appear to have been installed in accordance with good trade practice. However, taking account of the expert's report, I conclude that remedial work is necessary in respect of:

The roof

- the lack of fall to the low-pitched tile roof to the north east
- the lack of anti-ponding boards to the low-pitched roofs
- the stress factures to some of the apron flashings
- the lack of kickouts to the bottom of the apron flashings.

The timber shingles

- the lack of adequate seals to the window jamb flanges.

7.4.2 I note the expert's comments in paragraph 5.7 on the ground clearances at the front of the house, and I accept that this area is adequate in the circumstances.

7.5 The stucco cladding

7.5.1 It is clear from the expert's report that the stucco cladding is unsatisfactory in terms of its weathertightness performance, which has resulted in high levels of moisture penetration and evidence of decay to the framing.

7.5.2 Taking into account the expert's report, I conclude that the following areas require rectification:

- the lack of control joints in the stucco
- the cracks to the stucco
- the lack of clearances from the bottom of the stucco to the paving
- the lack of capillary gaps, overlaps and drip edges to the bottom of the stucco
- the lack of a drainage gap at the junction of the stucco with the timber deck
- the lack of sill and jamb flashings to windows
- the inadequately sealed penetrations through the cladding
- the high levels of moisture penetration into the framing, with decay identified in one area and timber damage likely to also be present in other areas.

7.5.3 The lack of window flashings, and inadequate weatherproofing of other junctions have contributed to a systemic failure and considerable work is required to make the stucco code compliant, including the removal of cladding and the replacement of decayed timber. Further investigation is necessary, including the systematic survey of all risk locations, to determine the full extent of the timber damage and the repairs required.

7.6 Weathertightness conclusion

7.6.1 I consider the expert's report establishes that the current performance of the external envelope is not adequate because it is allowing water penetration into the house at present. Consequently, I am satisfied that the building does not comply with Clause E2 of the Building Code.

7.6.2 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 house may allow the ingress of moisture in the future, the building work does not comply with the durability requirements of Clause B2.

7.7 The stucco cladding - remediation

7.7.1 I consider the expert's report demonstrates the key defects listed in paragraph 7.5.2, which are likely to have contributed to the moisture penetration and decay evident within the external walls.

7.7.2 I have identified the presence of a range of known weathertightness risk factors for 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 stucco 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 within the stucco cladding system.

7.7.3 For the stucco cladding, 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 authority for its approval. I note here that the cladding is 12 years through its required 15 year durability period.

7.7.4 I note that the Department has produced a guidance document on weathertightness remediation[7]. I consider that this guide will assist the owners in understanding the issues and processes involved in remediation work to the stucco cladding in particular, and in exploring various options that may be available to them when considering the upcoming work required to the house.

[7] External moisture – A guide to weathertightness remediation. This guide is available on the Department's website, or in hard copy by phoning 0800 242 243

7.8 The timber shingles and the roofing

7.8.1 With regard to the roof and dormer claddings, because the faults identified occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 7.4.1 will result in these parts of the external envelope being brought into compliance with Clauses B2 and E2.

7.9 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).

8. The notice to fix

8.1 The following table summarises conclusions on the items listed within the notice to fix dated 10 March 2008 and refers to the relevant code clauses and related paragraphs within this determination:

Notice to fix		**My conclusions**	**Code Clauses**	**Paragraph references**
Item	**Summarised requirement**			
2.1	**Not to manufacturer's specifications**			
a)	Insufficient fixing of down-pipes	Not considered – Parties to resolve		1.4.2
b)	Lack of spreaders from upper roofs	Not considered – Parties to resolve		1.4.2
c)	Roofs and walls not weatherproof	Remedial work required.	**E2, B2**	5.6 and 7.5.2
d)	Lack of or no evidence of flashings	Remedial work required.	**E2, B2**	5.6 and 7.5.2
e)	Inadequate step-down to deck	Remedial work required.	**E2, B2**	5.6 and 7.5.2
f)	Lack of gap to timber decking	Remedial work required	**E2, B2**	5.6 and 7.5.2
g)	Inadequate clearances to inside floor levels	Adequate	**E2, B2**	5.7 and 7.4.2
h)	Lack of handrails to stairs	Not considered – Parties to resolve		1.4.2
i)	Cracks in stucco	Remedial work required	**E2, B2**	5.6 and 7.5.2
j)	Surface water drainage provision	Not considered – Parties to resolve		1.4.2
2.2	**Not to accepted trade practice**			
a)	Penetrations not sealed	Inadequate	**E2, B2**	5.6 and 7.5.2
2.3	**Drainage and ventilation**			
a)	Drainage and ventilation of cladding	Inadequate	**E2, B2**	9.1
3.0	**Changes to building consent**			
a)	Weatherboards changed to stucco	Not considered – Parties to resolve		1.4.2
b)	Dormer added above dining area	Not considered – Parties to resolve		1.4.2
4.0	**Other building related issues**			
a)	Lack of smoke detectors	Not considered – Parties to resolve		1.4.2
b)	Lack of flanges to pipe penetrations	Not considered – Parties to resolve		1.4.2
c)	Laundry tub not secured to wall	Not considered – Parties to resolve		1.4.2

8.2 I am satisfied that the building does not comply with the Building Code and that the authority made an appropriate decision to issue the notice to fix. However, I am of the view that some items identified in the notice are adequate in terms of performance. I have also identified some additional items, so the notice should be modified accordingly (refer to paragraph 9.2).

9. What is to be done now?

9.1 I note that the authority has issued a notice to fix that required provision for a cavity to provide for ventilation, drainage and moisture dissipation. Under the Act, a notice to fix can require the owner to bring the house into compliance with the Building Code. The Building Industry Authority has found in a previous Determination 2000/1 that a Notice to Rectify, the equivalent of a notice to fix, cannot specify how that compliance is to be achieved. I concur with that view.

9.2 The notice to fix should be modified and reissued to the owner to take account of the findings of this determination, identifying the items listed in paragraph 7.4.1 and paragraph 7.5.2, 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 stipulate directly how the defects are to be remedied and the house brought to compliance with the Building Code. That is a matter for the owner to propose and for the authority to accept or reject. It is important to note that the Building Code allows for more than one means of achieving code compliance.

9.3 I would suggest that the parties adopt the following process to meet the requirements of paragraph 9.1. Initially, the authority should issue the modified notice to fix. The owner should then produce a response to this in the form of a detailed proposal, based on further investigation as necessary (including investigation of the original framing timbers), and produced in conjunction with a competent and suitably qualified person, as to the rectification or otherwise of the specified issues. Any outstanding items of disagreement can then be referred to the Chief Executive for a further binding determination.

10. The decision

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

- the external envelope does not comply with Building Code Clauses B2 and E2
- the authority is to modify the notice to fix, dated 16 June 2008, 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 19 August 2009.

John Gardiner
Manager Determinations