

Determination 2008/51

Building consent for a house at 25 Emmett Street, Herne Bay, Auckland

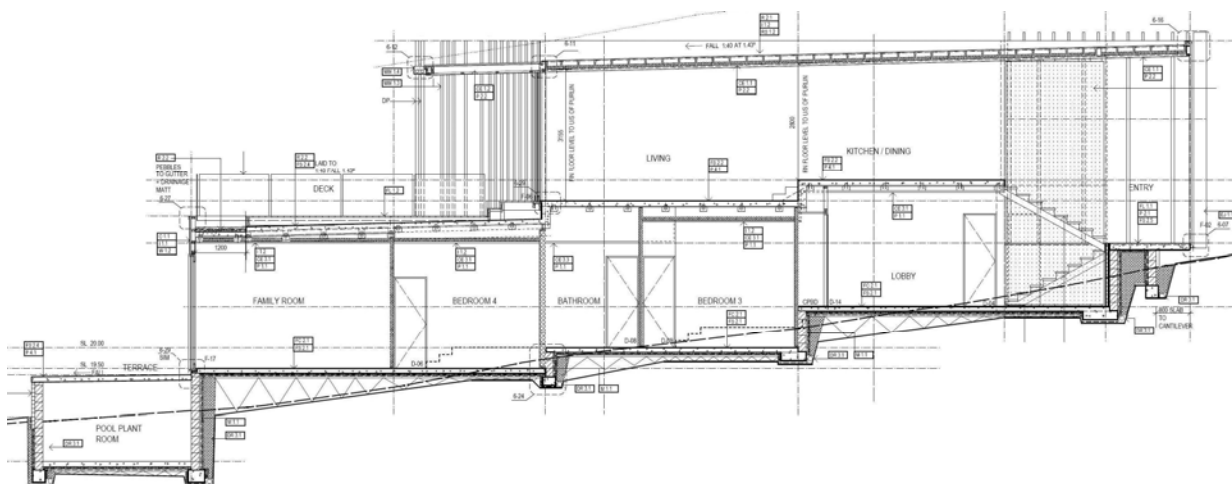


Figure 1: Long section through house

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. The applicants are the owners, P Vujcich and D Brown, acting through the architect for the building (“the architect”). The other party is the Auckland City Council, in its role as a building consent authority (“the authority”).
- 1.2 The application is in respect of a decision by the authority to refuse to grant a building consent for the construction of a proposed house unless changes are made to the design of the roof, on the grounds of its inability to shed water.
- 1.3 I note that the authority has restricted its concern to the upper roof of the building, and this determination is therefore limited to that matter.

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

1.4 I therefore consider that the matter for determination is whether the roof cladding system as proposed for the upper roof of the house (“the roof”) complies with Clause E2 “External Moisture” of the Building Code² (Schedule 1, Building Regulations 1992). By “the roof cladding system as proposed” I mean the components of the system (such as the roof structure, the substrate material and the membrane) as well as the way the components are designed to work together.

1.5 In order to determine this matter, I must address the following questions:

- (a) Whether the proposed building work complies with the provisions of the Building Code in respect of shedding water from the roof.
- (b) Whether to confirm, reverse, or modify the authority’s decision to refuse to grant the building consent.

I address question (a) in paragraph 7 and question (b) in paragraph 8.1.

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

2.1 The proposed building work consists of a 2-storey detached house situated on a long and narrow north-sloping site as shown in Figure 1. The house is in a high wind zone for the purposes of NZS 3604³. The house is essentially rectangular in plan to suit the site constraints, with roof parapets to the east, south and west elevations and several lower level projecting roofs and decks. The construction is specifically engineered, with concrete slabs, concrete block foundations and retaining walls, some double-skin brick reinforced concrete masonry walls and suspended concrete floors to the upper levels. The remaining construction is a mixture of steel posts, beams and timber framing.

2.2 The upper roof

2.2.1 The roof falls along the length of the house at a fall of 1:40 towards a membrane-lined gutter across the north end, at the edge of the canopy over the lower deck area.

2.2.2 The roof structure incorporates a main steel beam that runs along the length of the roof, with a secondary beam spanning across a projection to the east. Timber joists span a maximum of about 3m between the walls and the beams. 17mm plywood sheets overlay the framing to form the substrate to the membrane roof cladding.

2.3 The roof membrane

2.4 The roof membrane is a 2-layer ‘torch on’ manufactured by De Boer NT, called “De Boer Duo HTS C180”, supplied by Equus Industries Ltd. It is a polyester reinforced modified waterproofing bituminous membrane system that is made up of a 2.5mm base layer followed by a 4.3mm top layer, with each layer adhered using the application of heat. The total membrane thickness is 6.8mm, with the top layer incorporating a UV resistant flexible coating.

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

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.5 I note that the authority accepted the general use of the membrane system in a letter to the suppliers dated 11 June 2007, which notes:
- . . . [the authority] accept De Boer Duo torch on waterproofing membrane complies with E2 and B2 of the New Zealand Code, as a waterproofing membrane.
- 2.6 The certification⁴ of the membrane system by the British Board of Agrément deems the membrane to be suitable for roofs with a fall of 1:80, providing specific design detailing is fully known and understood.
- 2.7 The membrane supplier has confirmed that its 20-year product warranty would apply to the system proposed and, an installation warranty will be supplied by its certified applicators, based on the manufacturer's installation specifications.

3. Background

- 3.1 On 18 February 2008, the architect applied for a building consent (No. BLD 20080360801) on behalf of the applicants.
- 3.2 In a facsimile to the architect dated 5 March 2008, the authority confirmed discussions and stated that the roofs and decks in the proposed house were required to have falls in accordance with the authority's 'Practice Note PN 42', ("the practice note"), which specifies falls of 1:30.
- 3.3 In a letter to the authority dated 7 March 2008, the architect noted that the drawings specified falls of 1:40 in accordance with the relevant Acceptable Solution⁵ E2/AS1 of the Building Code, and also in accordance with the membrane manufacturer's recommendations and warranty conditions. The architect noted that the practice note had not been made available to designers and concluded:
- Legally the council has no right to apply more restrictive performance criteria than the building code and as such have attached a page out of the Building Act 2004 which quite clearly states my point. Auckland City Council must comply with the Building Act.
- 3.4 Following further discussions, the authority responded in a letter to the architect dated 2 April 2008, noting that the relevant Clause E2.3.1 of the Building Code states that roofs must shed precipitated moisture but is silent on what the particular falls must be. The authority explained that its experience had shown that minimum falls are often not practically achieved due to movement and deflection, resulting in ponding not in accordance with the code's performance requirements. The authority went on to note that it had no objections to the use of the particular membrane specified for this house, but the falls specified in E2/AS1 did not apply as:
- This document (E2/AS1) covers Butyl rubber and EPDM roof and decking membranes only. All other membranes are beyond the compliance documents and therefore alternative solutions, for which Council can accept, decline or impose conditions that are in Council's opinion appropriate.
- 3.5 In a letter to the authority dated 7 April 2008, the applicants expressed their concerns regarding the time and cost implications of the authority's stance. The owners felt

⁴ Agrément Certificate No. 98/3537/C

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.

this stance was not justified when their proposed house was not a flexible timber framed structure and the architects had not been made aware of the locally imposed requirements, noting:

It beggars belief that ACC can arbitrarily change the requirements of the New Zealand Building Code and not ensure that every architect, designer and draughtsperson is made aware of the change. To learn of this requirement after all of the consent drawings and engineering calculations have been completed is outrageous and I doubt such incompetence would be tolerated in the private sector!

- 3.6 Following discussions, the membrane supplier wrote to the architect on 24 April 2008, describing the European certification conditions for minimum falls for the product and confirming that “normal Warranties” would apply to the system as drawn and detailed for the proposed house, stating:

We are fully prepared, on behalf of our principals De Boer N.V (Metropoolstraat 33, 2900 Schoten, Belgium) to warrant and stand behind the use of these materials in systems applied at 1:40 falls on roofs, and 1:100 in gutters as per E2/AS1.

- 3.7 The Department received an application for a determination on 29 April 2008.

- 3.8 Following correspondence between the Department and the authority, seeking clarification on the particular matters to be considered in the determination, the authority advised the Department that the particular area of concern was the roof to the upper level.

4. The submissions

- 4.1 On behalf of the applicants, the architect described the background to the dispute, noting that the authority’s stance appears to be that its practice note takes precedence over the building code although the Act does not empower it to do this, and the refusal to issue a building consent on this basis is unreasonable. The architect also explained the practical problems that would follow if the authority imposed its more rigid requirements at this stage of the design, noting:

We are not able to make these changes without a significant redesign of the building, which was designed to relevant information at the time, ie: the building code and manufacturer’s information in July 2007 which is still current at the time of writing. We are not able to simply raise the roof and parapet any higher as we are constrained by the maximum height and height-to-boundary. Nor are we able to simply lower the ceiling levels to accommodate these pitches as they will result in ceiling heights in some areas that do not comply with the Building Code.

- 4.2 The applicant forwarded copies of:

- the consent application drawings and specification
- the correspondence with the authority
- information from, and correspondence with, the membrane supplier.

- 4.3 Copies of the submissions and other evidence were provided to each of the parties. Neither party made any further submissions in response to the submission of the other party.

- 4.4 A draft determination was issued to the parties on 13 May 2008. The architect accepted the draft determination, on behalf of the applicants, on 20 May 2005.
- 4.5 The authority did not accept the draft. A submission to the Department, dated 15 May 2008, made detailed comments under a series of headings, which are summarised as follows:
- As structures are susceptible to settlement, deflection, shrinkage and movement and, while timber buildings are particularly susceptible, even concrete and steel structures will experience some deflection.
 - The Building Code is a minimum standard but, by default, often becomes the maximum standard. The ability to achieve compliance using such minimal tolerances is often not achieved or achievable.
 - Clause B1.3.3 states that differential movement must be taken account of in a building, and Clause E2.3.1 states that roofs must shed rainwater. A building consent will only be granted if an applicant can demonstrate to the authority's satisfaction that the work will comply with the Building Code.
 - The Acceptable Solution E2/AS1 covers only Butyl and EPDM rubber membranes over plywood substrates, for timber framed buildings up to 10m high. Other systems are alternative solutions, and compliance must be demonstrated by the provision of sufficient supporting information for the authority to assess and accept or reject.
 - Various publications and membrane suppliers recommend a slope more than the minimum specified in E2/AS1, as water can pond behind laps due to building deflection.
 - In this building, the upper roof is supported on steel beams and posts, so is inherently more prone to movement than the lower concrete terraces.
 - While it is acknowledged that the authority cannot apply more restrictive performance criteria than the building code, experience has shown that very low slopes do not allow for movement and failures are occurring.
 - The membrane system proposed for this building is a torch-on membrane that is an alternative solution that the authority accepts as code compliant.
 - E2/AS1 specifies minimum falls that are lower than recommended by various manufacturers and guidance documents and which are resulting in ponding. All information must be taken into account when considering compliance, resulting in a predicament if the compliance document is followed.
 - Introducing a minimum fall that allows for tolerances and movement and still provides a roof that sheds water is a simple way of achieving compliance with the building code now and into the future.
- 4.6 In addition the authority referred to criticism it had previously received because it had not followed manufacture's specifications and not taken account of guidance information produced by organisations such as the Building Research Association of New Zealand ("BRANZ"). These comments were further canvassed at the hearing requested by the authority (refer paragraph 6).

5. The legislation

5.1 The relevant section of the Act is:

18 Building work not required to achieve performance criteria additional to or more restrictive than building code

- (1) A person who carries out any building work is not required by this Act to-
- (a) achieve performance criteria that are additional to , or more restrictive than, the performance criteria prescribed in the building code in relation to that building work; or
 - (b) take any action in respect of that building work if it complies with the building code.

5.2 The relevant provisions of the Building Code are:

E2 External moisture

Performance

E2.3.1 Roofs must shed precipitated moisture...

5.3 The relevant sections of the Acceptable Solution E2/AS1 are:

8.5 Membrane Roofs and Decks

8.5.1 Limitations

This Acceptable Solution is limited to membranes composed of butyl or EPDM installed over plywood substrates for:

- a) Roofs with a minimum fall of 1.5° (1:40)...

8.5.4 Butyl and EPDM

Butyl rubber and EPDM rubber used for membrane roofing or decks shall:

- a) Be a minimum thickness of:
 - i) 1 mm for roofing...

6. The hearing

6.1 The authority requested a hearing, which was held on 10 June 2008. I was accompanied by a Referee engaged by the Chief Executive under section 187(2) of the Building Act 2004. The owners appeared together with the architect (represented by a director and the project architect) and the membrane supplier. The authority was represented by three of its officers. Three staff members and a consultant of the Department also attended.

6.2 The authority's verbal submission was predominantly based on expanding the issues raised in their detailed submission in response to the draft determination. The authority tabled a series of photographs of various roofs and deck, which illustrated common defects encountered related to the lack of fall and consequential ponding.

6.3 In addition to the points summarised in paragraphs 4.5 and 4.6, the authority raised the following summarised points:

- The practice note was not issued lightly, and the background to the minimum slope requirement in the note must be considered in the context of the situations illustrated in the photographs, which had eventuated.

- The code requirements covered by Clauses B1 Structure, B2 Durability and E2 External Moisture must be considered together when assessing whether a specified roof fall will actually deliver a sufficient constructed fall when all practical construction and use influences have been taken into account. These additional considerations include factors such as construction tolerances, structural deflection, settlement and likely future loading imposed on a roof.
- The minimum falls specified in E2/AS1 must be assessed against other available sources of information that provide different recommendations (for example BRANZ guidelines recommend 3°). The status of other information need to be clarified by the Department, as an authority must work with what information is available to it at the time of assessing proposals.
- If the falls specified for membrane roofs and decks in E2/AS1 are insufficient to achieve constructed surfaces that will shed water as required by Clause E2, then those falls should be reviewed and updated in light of currently available information.

6.4 The architect's verbal submission, on behalf of the applicants, was predominantly based on issues raised in their original submission. The architect discussed the background to the current situation and described the intended construction. I summarise the submission as follows:

- It appeared the authority had made its decision based on the contents of the practice note before it had looked at the building in detail.
- The roof design had followed the minimum falls specified in E2/AS1, while working within tight constraints on envelope dimensions for this site. The architects believed that E2/AS1 set a consistent benchmark that could be relied on during the design phase, and that the proposal fell within the Acceptable Solution.
- Careful attention had been given to the design, detailing and choice of materials for the construction, in order to provide a high quality, durable and weathertight roof. The architects and membrane supplier were confident about the long-term performance of the proposed roof.
- It was not until consent stage that the authority's different requirements were raised with no prior warning, and without examining the actual drawings of the proposed building.
- The authority's aim of avoiding future problems is agreed with, but the process followed has been unfair and arbitrary. If changes to minimum requirements are made, a proper process must be followed so that designers and their clients are given fair warning in order to avoid unnecessary delays, additional expense and redesign work.
- It is acknowledged that wider issues underlie this particular situation, but those issues must be handled separately from this particular building proposal.

6.5 I have taken account of the submissions at the hearing and amended the first draft determination accordingly. A second draft determination was circulated to the parties on 13 June 2008. Both parties accepted the draft without comment.

7. Discussion

- 7.1 The applicant has submitted that the fall of the roof complies with the falls specified in E2/AS1 (refer paragraph 5.3), and therefore complies with the provisions of the Building Code. The applicant therefore maintains that the authority is requiring the fall of the proposed roof to be greater than that required in the Building Code, in contravention of Section 18(1)(a) of the Act (refer paragraph 5.1).
- 7.2 The authority has produced the practice note which includes specified minimum falls. I consider that such documents may be used as advice only, and cannot take precedence over provisions of the Building Code and the Act (refer paragraph 5.1).
- 7.3 The authority maintains that the proposed roof membrane material does not fall within the scope of E2/AS1, and must therefore be assessed as an alternative solution. I note that the authority has no objections to the use of the membrane specified for this house, but only to the degree of fall proposed for the roof.
- 7.4 In assessing the proposed roof design, the authority is of the opinion that the fall of the roof does not meet the performance requirements of Clause E2 in that it is unable to shed water (refer paragraph 5.2).
- 7.5 I note that the house is designed as a structure that is considerably more rigid than conventional timber framing, with the steel roof beams parallel to the fall of the roof and the short span timber joists across the line of fall. In such a situation, I consider that there is little likelihood of the roof deflecting in such a way as to cause 'ponding' on the membrane surface.
- 7.6 I accept the authority's view that the proposed roof membrane material does not fall within the scope of E2/AS1, and I have therefore considered this particular proposal as an alternative solution.
- 7.7 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solution, which will assist in determining whether the features of the building work are code compliant. In the case of the roof proposed for this house, I make the following observations:

E2/AS1 requirements for roof falls	The proposed membrane system
E2/AS1 specifies a minimum roof fall of 1:40 (refer paragraph 5.3).	Is certified in Europe as suitable for 'flat' roofs (with a minimum fall of 1:80), providing the design detailing is fully known (refer paragraph 2.6). Is accepted by the membrane supplier for a 20-year product warranty at the proposed roof fall of 1:40 and gutter falls of 1:100 (refer paragraph 3.6).
E2/AS1 specifies a minimum thickness of 1mm for membrane roofs (refer paragraph 5.3).	Is a 2-layer system that results in a total membrane thickness of 6.8mm (refer paragraph 2.4).
E2/AS1 is limited to membranes composed of butyl or EPDM (refer paragraph 5.3).	Is accepted in general by the authority (refer paragraph 2.5)

E2/AS1 requirements for roof falls	The proposed membrane system
E2/AS1 is based on flexible conventional timber framed roof and wall structures.	Is laid over a specifically engineered and relatively rigid structure.

- 7.8 Taking into account the above observations, I consider that the membrane system proposed for this house is likely to perform at least as well as the materials and systems included within E2/AS1, and that the roof system thus complies with the performance requirements of Clause E2 of the Building Code. I conclude that the particular design and roof cladding system proposed for this house will meet the performance requirements of Clause E2 for the roof to shed water.
- 7.9 I acknowledge and accept the authority's concerns with respect to the performance of low-pitched membrane roofs to buildings where deflection of the structure may give rise to ponding. I will take up the broader matter of E2/AS1, slopes to membrane roofs and related issues, with other Department officials in order that the authority's substantive concerns can be dealt with.
- 7.10 I note that in this instance the authority could have sought information from the applicants about the expected deflection of the structure and made its decision as to compliance based in the information received.

8. The decision

- 8.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the upper roof to this building complies with Clause E2 of the Building Code, and reverse the authority's decision to refuse to grant the building consent.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 23 June 2008.

John Gardiner
Manager Determinations