



Determination 2012/013

The issue of a building consent with a specified intended life for additions using a straw bale system to an existing house at 243 Ripponvale Road, Cromwell

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, G Smith (“the applicant”), and the other party is Central Otago District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 This determination arises from a decision by the authority to require the inclusion of a specified intended life of 15 years on a building consent for the addition of straw bale infill walls to a house. The authority’s concerns appear to be compliance of the straw bale wall system with Clause B2 Durability (refer paragraph 3.2).
- 1.3 The matter to be determined² is therefore whether the authority was correct in the exercise of its powers to require the inclusion of a specified intended life of 15 years as a condition of the building consent granted in respect of the proposed addition of straw bale infill walls. In deciding this matter, I must consider whether the consented work will comply with the Building Code to the extent required by the Act, in particular Clause B2 Durability of the Building Code considering the special risks and durability considerations that apply to the particular type of construction used in this addition.
- 1.4 I have received no evidence relating to a dispute about other matters related to the proposed building work, and this determination is therefore limited to the above mentioned straw bale wall system.

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

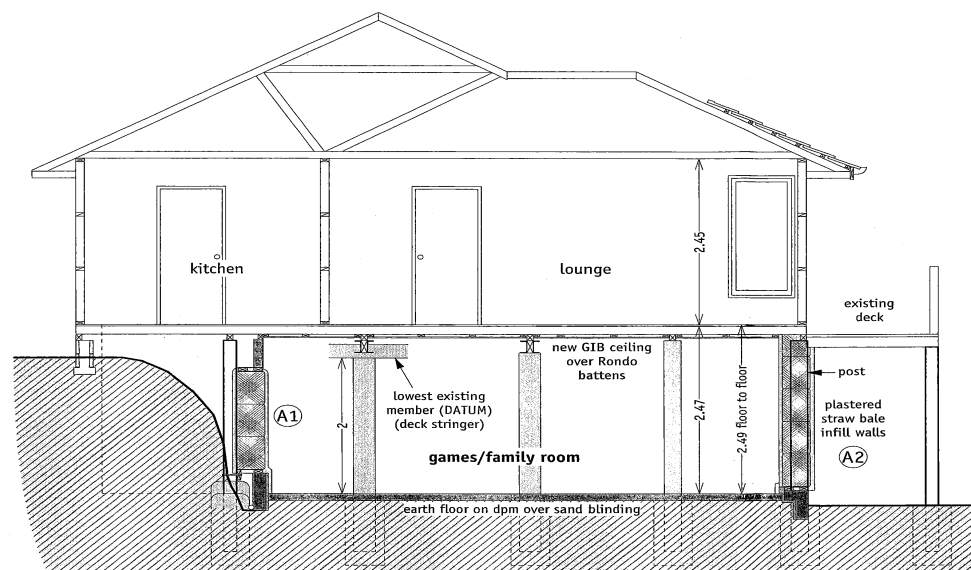
- 1.5 In making my decision, I have considered the submissions by the parties, including the applicant's drawings, specification and maintenance schedule, and the other evidence in this matter.

2. The building work

- 2.1 The proposed building work consists of the enclosure of a basement area below an existing single story house to form a single space to be used as a games / family room. The existing house was constructed circa 1950s and relocated to the site in 2003. The house is sited in a relatively sheltered sloping rural site, which is in a very high wind zone for the purposes of NZS 3604³.
- 2.2 The consented work includes the installation of a perimeter concrete footing and earth floor, plastered straw bale walls, exterior timber door and window joinery, and plasterboard ceiling lining. The existing house is supported on wooden poles treated to H5, and timber braces treated to H3. The plastered straw bale walls enclose many of the existing posts.

2.3 The infill walls

- 2.3.1 The general construction of the addition is shown in the following sketch:



- 2.3.2 The straw bale infill walls are formed from 900mm x 455mm x 355mm straw bales tightly stacked on edge between the poles, forming mass walls more than 400mm thick, and it is proposed that moisture sensors will be installed within the bales. The straw bale walls are non-load bearing.
- 2.3.3 The specification for the straw bale walls and this determination refer to the set of Standards for earth buildings⁴ (“the earth standards”).

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

⁴ NZS 4297:1998 Engineering design of earth buildings, NZS 4298:1998 Materials and workmanship for earth buildings and NZS 4299:1998 Earth buildings not requiring specific design

- 2.3.4 The straw bale walls are finished on both sides with a multi-coat plaster system that is about 40mm thick. The system consists of a slip coat, a body coat of earth (clay), sand and chopped straw, with a 'body coat' and two coats of fibre-reinforced lime plaster applied to all exterior and interior wall surfaces.
- 2.3.5 The northeast and northwest infill walls are largely sheltered by decks, with the southeast elevation sheltered by the existing block foundation wall and the building over hang. Two sections of wall to the northwest and southeast elevation not protected by decks have a 400mm wide steel cowling installed at the top of the infill walls that, in effect, provide eaves protection to the plastered walls beneath. The applicant has proposed to increase the cowl width to 600mm (refer paragraph 3.6).

3. Background

- 3.1 The applicant applied for building consent on 25 July 2011. The application noted the intended life of the works was 50 years.

- 3.2 In a letter to the applicant dated 11 August 2011, the authority stated that:

It is not [the authority's] policy to give straw bale construction an unlimited life and the general accepted specified life for this type of construction is 15 years which is in line with the durability requirements for cladding under B2/AS1. On or before the end of the 15 year intended life, application can be made to [the authority] for an extension of life, at which time the building would be inspected and assessed for a suitable period of extension.

The authority's letter also questioned whether the existing timber bracing was to be removed, however, this matter appears to have subsequently resolved.

- 3.3 The applicant disputed the authority's stance regarding the requirement for a specified intended life of 15 years and the parties discussed the matter but it was not resolved. In order to progress the building work the applicant accepted the inclusion of the condition for a 15 year specified intended life on the understanding that the applicant would seek a determination on the matter.

- 3.4 On 30 August 2011 the authority issued building consent No. 110589 for 'Internal alterations to existing dwelling'. A condition placed on the consent stated that:

The building must be altered, removed or demolished on or before the end of 15 years from the date of issue of the consent (being the specified intended life of the building).

- 3.5 The Department received an application for a determination on 15 December 2011.

- 3.6 In an email to the Department on 20 January 2012, the applicant proposed increasing the width of the cowling details from 440mm to 600mm. The applicant also verbally advised that a carport was to be located on the southwest elevation.

4. The submissions

4.1 The applicant forwarded copies of:

- the drawings and specifications
- the correspondence with the authority
- a table of comparison with Determination 2010/64⁵
- two photographs of the existing house.

4.2 The applicant's submission referenced determination 2010/64 and the applicant is of the view that the findings in that determination are relevant to the proposed building work. I note the straw bale panels in this case are to be built to the same specification; that is two coats of earth lime plaster with finish coat, and the bales are to be edge laid and sufficiently compressed to achieve stability.

4.3 The authority acknowledged the application but made no submission in response.

4.4 The draft determination was issued to the parties for comment on 25 January 2012. The applicant accepted the draft without comment.

4.5 The authority accepted the draft and made the following comments:

- The building consent was for 'enclosing an open basement of an existing building on piles' and not an 'internal alterations to existing dwelling' as noted in paragraph 3.4.
- The authority did not accept that the imposition of the 15 year specified intended life arose from a policy position, and not from a detailed consideration of compliance. The authority noted the process it had followed in seeking information from the applicant about compliance matters.

4.6 In response to the authority's submission I note the following:

- The description of the consented work noted in paragraph 3.4 is taken verbatim from the building consent issued by the authority.
- I accept that the authority considered the technical aspects of the application, but the authority's letter of 11 August 2011 specifically refers to its policy with respect to straw bale construction (refer paragraph 3.2).

5. Discussion

5.1 The granting of the building consent

5.1.1 Under section 49 of the Act, the authority is required to grant a building consent if it is satisfied on reasonable grounds that the provisions of the Building Code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.

⁵ Determination 2010/064: Refusal to issue a building consent for an addition to a house with straw bale walls at 35 Loach Road, Wanaka

- 5.1.2 From the authority's letter of 11 August 2011 it is clear that the authority has applied a "policy position" in imposing the requirement for a 15 year specified intended life.

5.2 The compliance of the proposed building work

- 5.2.1 In order to consider whether the authority was correct to include the specified intended life on the building consent, I must first consider whether the inclusion of such a condition is appropriate given the nature of the proposed building work. In making this decision I must consider whether the proposed work will comply with the Building Code, in particular Clauses B2 Durability, E2 External Moisture, and B1 Structure.
- 5.2.2 Previous determinations⁶ on straw bale systems have included a detailed assessment methodology that, in my view, can be used to form a view about Building Code compliance. The methodology includes the following:
- the adequacy of the documentation supporting the consent application
 - the history of approval and/or use of comparable wall systems
 - the findings of previous determinations that have used straw bale specialists
 - the climatic and design features which influence the weathertightness risk
 - the maintenance required to achieve Clause B2, and the inclusion of a scheduled maintenance regime.

In my view assessment against the same methodology is appropriate in this instance.

5.3 Compliance with Clause B2 Durability and E2 External moisture

- 5.3.1 This addition has the following environmental and design features which influence its weathertightness risk profile:

Increasing risk

- the building is in a very high wind zone, although moderated by local shelter

Decreasing risk

- the building is in an area with very low annual rainfall and relative humidity
- all infill walls are sheltered by decks or by a deep cowling that will provide the equivalent of eaves protection.

- 5.3.2 The proposed straw bale system is fully consistent with that proposed in other determinations which have found such systems to be compliant. The consent also specifies a maintenance regime (refer paragraph 5.5). It is also noted that the compliance of the straw bale system with Clause E2 has not been disputed by the authority.

- 5.3.3 The foundations have been in place since 2003, since when they will have been exposed to the elements to a greater extent than will be the case when the proposed work is completed. I note that the straw bale walls will incorporate moisture sensors to monitor moisture levels. Although these do not protect against moisture

⁶ 2010/064, 2010/136, and 2011/067

penetration, they can reduce its consequences by alerting an owner to the need for repairs.

- 5.3.4 The weathertightness of the straw bale wall system will be dependent on the weathertightness risk features of the addition as a whole, the features that protect the walls from the weather, the application of the plaster system, the weathertightness detailing, and the consequences and likelihood of failure on the building elements themselves.
- 5.3.5 Taking account of information provided with the application and subsequently, I consider there are reasonable grounds to come to the view that in principal the building work will comply with Clause E2 and B2 (refer also paragraph 6).

5.4 The existing basement structure: compliance with Clause B1 Structure and Clause B2 Durability

- 5.4.1 The straw bale system is non-load bearing.
- 5.4.2 The exiting basement structure comprises H5 treated timber piles, and H3 treated timber bracing. The basement structure supports the existing house and therefore must be durable for a period of not less than 50 years, or the life of the building, whichever is the greater.
- 5.4.3 The proposed work will encase many of the timber posts. As noted in paragraph 5.3.3, I consider the basement structure will be exposed to no greater an extent to the elements than if the basement are remained open as existing. The moisture levels in the straw bale walls will be monitored and will be the subject of a scheduled maintenance regime.
- 5.4.4 The straw bales themselves will have a greater susceptibility to the ingress of moisture than the timber elements being enclosed. However, this consequence is already reflected in the differing durability requirements of these elements as described in Clause B2.
- 5.4.5 In my opinion the level of treatment of the basement structure is more than sufficient to ensure the house will continue to comply with Clause B1 and B2.

5.5 Maintenance of the straw bale system

- 5.5.1 Effective maintenance of the straw bale wall system is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner.
- 5.5.2 The specification for this work includes a season-based maintenance schedule for the straw bale wall system. The maintenance specified includes monitoring moisture levels within the straw bales. Any moisture reading in excess of 15% will trigger the need to locate and repair any water ingress.
- 5.5.3 This straw bale addition relies on the preservation of the exterior lime plaster coating as protection against moisture penetration into the wall. It is therefore considered prudent to visually check the exterior plaster at least annually, in addition to checking after earthquakes, very strong winds or storms.

5.6 Is a specified intended life required?

- 5.6.1 The straw bale system is proposed as a non-load bearing infill cladding in the proposed work. The Building Code requires that such building elements are to achieve a durability period of at least 15 years with normal maintenance.
- 5.6.2 The authority has imposed a specified intended life on the proposed work, but this appears to be on the based on the authority's view that the 15-year life required by Clause B2 will, in fact, be achieved.
- 5.6.3 In my view, given that the application for consent was for a 50 year intended life (though unnecessarily so), the imposition of a 15-year specified intended life on the building work is in effect 'penalising' the straw bale system for meeting the stated requirements of the Building Code. Therefore, imposition of a 15-year specified intended life on all the consented work has no meaning and should be removed.

5.7 Conclusion

- 5.7.1 I conclude that in principal the proposed building work will comply with the Building Code in respect of Clauses B2 and E2, with building elements meeting the requirements of 15 or 5 years as required. Accordingly I consider that the authority incorrectly exercised its powers in respect of the requirement for the condition of a 15 year specified intended life to be included in the building consent.

6. What happens now?

- 6.1 The applicant should ensure the authority is provided with a set of plans showing the revised details indicated in paragraph 3.6.
- 6.2 While I am satisfied that in principal the proposed building work will comply with the Building Code, it is not clear how the straw bale wall at the rear of the addition is to be constructed and maintained, given the very limited clearance from the lower portions of the finished wall to the steeply-sloped earth bank immediately behind the wall (the clearance is in the order of 60 to 150mm). This matter needs to be clarified to the satisfaction of the authority.
- 6.3 On provision of details described in paragraphs 6.1 and 6.2 to the satisfaction of the authority, the authority the consent should be re-issued without the condition of a 15 year specified intended life of the building.

7. The decision

- 7.1 In accordance with section 188 of the Act, I hereby determine the authority incorrectly exercised its powers in requiring the inclusion of a specified intended life of 15 years as a condition of building consent No. 110589, and accordingly I reverse the authority's decision to issue the building consent with this condition.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 24 February 2012.

John Gardiner
Manager Determinations

Appendix: The legislation

A1. The relevant section of the Act in regard to the granting of building consent:

49 Grant of building consent

- (1) A building consent authority must grant a building consent if it is satisfied on reasonable grounds that the provisions of the building code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.
- (2) ...

A2. The relevant sections of the Act in regard to a specified intended life are:

113 Buildings with specified intended lives

- (1) This section applies if a proposed building, or an existing building proposed to be altered, is intended to have a life of less than 50 years.
- (2) A territorial authority may grant a building consent only if the consent is subject to—
 - (a) the condition that the building must be altered, removed, or demolished on or before the end of the specified intended life; and
 - (b) any other conditions that the territorial authority considers necessary.
- (3) In subsection (2), **specified intended life**, in relation to a building, means the period of time, as stated in an application for a building consent or in the consent itself, for which the building is proposed to be used for its intended use.

116 Code compliance requirements: extension of life

- (1) The owner of a building with a specified intended life must not extend its life without the written consent of the territorial authority.
- (2) This subsection applies to a building with a specified intended life if—
 - (a) under section 113(2), a building consent for its building or alteration was issued subject to the condition that it must be altered on or before the end of the specified intended life; or...
- (3) The territorial authority must not give its consent to the extension of the life of a building to which subsection (2) applies unless satisfied, on reasonable grounds, that the building—
 - (a) has been altered in accordance with the condition; and
 - (b) complies with section 112.