

Determination 2006/98

Refusal of a code compliance certificate for a straw bale building with a plastered cladding system at Two Chain Road, Rolleston, Christchurch



1. The dispute 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, Determinations Manager, Department of Building and Housing, for and on behalf of the Chief Executive of that Department. The applicants are the owners, Mr Knight (who was also the builder) and Ms Wilson (“the applicants”), and the other party is the Selwyn District Council (“the territorial authority”).
- 1.2 The dispute for determination is whether the territorial authority’s decision to decline to issue a code compliance certificate for a 3-year-old house because it was not satisfied that the plastered straw bale cladding to the walls of the house complied

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

with clauses B2 “Durability” and E2 “External Moisture” of the Building Code² (First Schedule, Building Regulations 1992) is correct.

1.3 The questions to be determined are:

1.3.1 Issue 1: The cladding

1.3.2 Whether I am satisfied on reasonable grounds that the plastered straw bale cladding as installed to the walls of the building (“the cladding”), complies with the Building Code (see sections 177 and 188 of the Act). By “plastered straw bale cladding as installed” I mean the components of the system (such as the straw bales, the plaster, the ties, the sealants and the coating) as well as the way the components have been installed and work together.

1.3.3 Issue 2: The additional durability considerations

1.3.4 Whether the cladding is able to comply with clause B2 of the Building Code, considering the particular risks and special durability considerations that apply to the type of construction used in this house.

1.4 In making my decision, I have considered the submissions of the parties, the reports of the independent expert (“the expert”) and the independent consultant (“the consultant”), both commissioned by the Department to advise on this dispute, and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 7.1. I have not considered any other aspects of the Act or the Building Code.

2. The building

2.1 The building work consists of a detached house situated on a flat site, which is in a high wind zone for the purposes of NZS 3604³. The house is one and a half storeys high, with specifically engineered construction. The exterior walls are made up of a post and beam structure. This consists of H5 treated 200mm poles set 1500mm into the ground tied together by a reinforced concrete ground beam and slab and fixed to a steel central portal system combined with braced internal walls to resist wind and earthquake forces. This structure is in-filled with non-loadbearing straw bales to form a mass wall that is about 450mm thick with solid plaster applied to both sides.

2.2 The house has a 30° pitch profiled metal roof and aluminium windows that are recessed into the walls by about 300mm. The house is a reasonably simple “T” shape, with a two-storey section over about a third of the ground floor. The lower level hipped roofs have deep eaves projections that vary from 1.2m to 2m above all walls which generally provide good protection to the ground floor windows, except for a north facing bay window where the projection is reduced to about 300mm. The upper level gabled roof has three additional smaller gables extending from the main roofline, and has eaves and verge projections of about 600mm above all upper walls. While the infill panels are not primary structural elements they must resist some

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

³ ³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

wind loading, and if the main structure also moves under wind or earthquake, the results could be cracking, particularly around the windows.

- 2.3 The specification calls for the post and beam structure to be “H3 timber or better”, and the expert were informed by the engineer (refer paragraph 3.2) that the timber was treated. Given also that there is reference in the inspection records to H5 treatment I accept that the timber in the post and beam structure is likely to be treated to a level of H5 for the posts and H3 or better for the timber that is not in contact with the ground.
- 2.4 The straw bale walls of the house are finished externally and internally with a 30mm two-coat mesh-reinforced plaster. The metal wire mesh is secured with bale twine threaded through the bales to tie the inside and outside mesh to the bales. The first plaster coat, including chopped straw for added strength, is a scratch coat that is cured for 4 to 6 weeks before application of the final plaster coat. The finished plaster is coated with an acrylic “Resene X200” paint coating. This coating, being relatively impermeable would inhibit drying in the event of any future moisture ingress.
- 2.5 The plasterer, Mr Hinga, provided a statement dated 8 April 2004 that described the process used to plaster over the straw bale substrate.
- 2.6 I consider it appropriate to discuss here the qualities of “straw bale” construction and to make comment on how those qualities may be relevant to this determination:
- Straw bail construction is attractive to some owners because it can provide good levels of thermal insulation and sound absorption which contribute to a comfortable internal environment for the occupants of the house.
 - The properties of straw, as an organic material that is not naturally resistant to decay when damp, means that it is intrinsically more prone to decaying quickly if it becomes continually wet.
 - Straw-based claddings are thus less tolerant of moisture ingress and are characterised by requirements for more frequent inspection and maintenance and probable partial or complete replacement during the intended life of the building than is the case with inherently more robust materials.
 - While those requirements are likely to be accepted by the present owner they will also be an obligation for future owners. It is important that such owners are aware of that obligation.
 - It is appropriate to recognise these issues in the determination.

3. Sequence of events

- 3.1 The territorial authority issued a building consent on 11 July 2001, based on a building certificate, dated 27 June 2001, issued by Nationwide Building Certifiers Ltd (“the building certifier”). The scope of engagement attached to the building certificate noted no exclusions. The intended life of the dwelling was recorded on the consent as “Indefinite, but not less than 50 years”.
- 3.2 The building certifier carried out various inspections during construction, including prelining inspections on 2 April 2002 and 5 April 2002. The designer of the structural system, Mr Cuseil (“the engineer”), undertook “construction observation services” of the structural components during construction.
- 3.3 In January 2003 the building certifier’s scope of approval was amended to exclude approval of exterior claddings outside the scope of E2/AS1.
- 3.4 The building certifier carried out a final inspection on 22 March 2004. The inspection record identified a number of outstanding items and noted that the applicant was to “advise when the above is completed so as we may reinspect with the SDC for the exterior cladding system.”
- 3.5 The territorial authority inspected the exterior cladding on 3 May 2004. The inspection record notes that reinspection was not required and that the work was “generally looking OK”. The building certifier carried out a reinspection on 7 May 2004 and noted that all outstanding items had been completed.
- 3.6 In a letter to the Building Industry Authority dated 10 May 2004, the territorial authority sought advice on the status of the building certifier’s scope of approval. The Building Industry Authority replied on 18 June 2004, explaining that the certifier could no longer issue a code compliance certificate for the cladding system of the house and:
- Selwyn District Council will now need to take all measures necessary to establish if compliance has been achieved in order to be able to issue a Code Compliance Certificate.
- 3.7 The building certifier issued an interim code compliance certificate, dated 29 June 2004, which excluded the exterior cladding; and forwarded to the territorial authority an “Advice of completion of building work” (also dated 29 June 2004) , which noted that:
- All of the building work under the above building consent is believed to have been completed to the extent required by that building consent.
- 3.8 The territorial authority subsequently sought additional information on the house construction from the applicant, the engineer and the plasterer. The applicant supplied photos of the construction and details of the window installation.
- 3.9 In a letter to the applicant dated 27 August 2004, the territorial authority stated that it required further information about the construction and explained that the issue was

whether the cladding (as an alternative solution) complied with the requirements of the building code, noting:

The Council would consider favourably a positive 'Report' from a recognised authority on the construction method, and I would suggest that this may be an avenue worth considering.

3.10 On 15 November 2004, in response to a request from the territorial authority, the engineer provided additional detailed construction information, together with proposed window modifications to provide additional protection for the more exposed upper floor windows.

3.11 In a letter dated 22 December 2004, the territorial authority sought an opinion from Mr North of Graeme North Architects ("the specialist"), attaching relevant information on the house construction and the proposed rectification work to the windows and saying:

Your assistance in providing an independent expert opinion on the proposed rectification work and whether or not it will meet the provisions of the NZ Building Code Section E2 – External Moisture are appreciated.

3.12 In a response to the territorial authority dated 11 January 2005, the specialist explained that the cladding system used for this house included an exterior acrylic waterproof coating (risking any moisture penetrating past the coating being trapped within the wall) rather than using a permeable plaster, noting:

...this building uses an overall system that does not agree with my approach and therefore I am unable to say whether this building or its proposed remedial work is adequate or not to meet the requirements of the NZBC.

The specialist added that he was aware of buildings built in a similar manner to this house that appear to be performing adequately and suggested that moisture testing of the straw bale walls might establish if there was a problem, and could be a suitable approach for the territorial authority to consider, noting, "If it isn't broken, don't fix it!".

3.13 In a letter to the applicants dated 11 March 2005, the territorial authority explained the requirements of clause E2, asked for information on proposed maintenance, a producer statement from the plasterer, an updated expanded producer statement from the engineer, queried the proposed window modifications and noted:

Following receipt of the above information to Council's satisfaction, an amendment can be issued and the project can proceed to the next stage which will require the rectification work to be carried out and inspected as work proceeds to check compliance with the NZ Building Code.

3.14 The applicant responded in a letter to the territorial authority dated 22 May 2005, providing information on maintenance and the proposed window modifications.

3.15 In a letter to the applicant dated 22 November 2005, the territorial authority noted that it had been in contact with various people over an extended length of time without achieving a reasonable assurance of compliance and had concluded that:

As the exterior cladding had been completed prior to the Council being advised that it had a responsibility for compliance, and as the Council has exhausted avenues to satisfy itself

that compliance can be achieved it has now declined to issue a Code Compliance Certificate.

- 3.16 The territorial authority did not issue a notice to fix as required under section 164(2) of the Building Act 2004.
- 3.17 An application for a determination was received by the Department on 9 February 2006.

4. The submissions

- 4.1 In a letter dated 7 February 2006 which accompanied the application, the applicant noted that similar cladding systems had been used by the engineer within the Christchurch region without problems and the engineer had provided a report and recommendations to alleviate the territorial authority's concerns. The applicant also expressed his confidence in the window installation, noting that high quality sealants had been correctly used with no evidence of any problems over the past 3 years.
- 4.2 The applicant forwarded copies of:
- the plans and specifications
 - the consent documentation
 - some of the inspection records
 - the correspondence with the territorial authority
 - the correspondence from the engineer, including various sketches
 - various other correspondence, producer statements, and other statements.
- 4.3 The territorial authority made a submission dated 9 March 2006, which outlined its concerns about the cladding system and included the following points:
- the engineer's producer statement excludes the straw bale walls
 - there was no opportunity to review the design or to inspect the construction
 - twine was used as ties in lieu of wire, and there is uncertainty as to the spacing and the possible implication for the stress on the ties should raised moisture content in the bales make them heavier
 - the submitted proposal for the windows is not considered adequate
- 4.4 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.

- 4.5 A copy of the draft determination was sent to the parties for comment on 1 September 2006. The applicant accepted the draft.
- 4.6 In response to the draft determination, the territorial authority, in a letter to the Department dated 19 September 2006, pointed out some typographical errors in the determination and requested, in paragraph 1.2, that the determination refer to the house being 5-years old. In paragraph 1.2 I have taken the age of the house from the date of the final inspection in March 2004.

5. The expert's report

- 5.1 The expert inspected the cladding of the building (with particular emphasis on the exposed windows) on 1 May 2006, and furnished a report that was completed on 13 May 2006. The expert noted that the workmanship and finish to the cladding appeared to be good, with no cracking and "very neat" finishing around the windows. The expert noted that the upper gable ends had been plastered in lieu of the timber shingles shown in the consent drawings. The windows were deeply recessed from the face of the walls with curved plaster reveals.
- 5.2 The expert removed small sections of plaster at the sill to jamb junctions of three windows and noted that the plaster was 30mm thick with a synthetic wrap at the sill. The expert removed samples of straw, and noted that these were "clean, bright in colour and clean smelling". The expert recorded the inside and outside temperature and relative humidity at each of the three windows.
- 5.3 The straw samples were submitted for analysis by a plant pathologist from Plantwise Services Ltd ("the scientist"). In a letter to the expert dated 4 May 2006, the scientist noted that, at the temperature and relative humidity levels reported by the expert, the moisture content of the samples should be between 12% and 14%, and have virtually no microbial activity. The scientist concluded that the straw "is in good condition and was suitable as a material for the construction of this type of building."
- 5.4 The expert made the following specific comments on the windows:
- The windows have no flashings and are reliant on sealants for weatherproofing, which does not accord with the standard for solid plastering, NZS 4251:1998.
 - The plaster reveals curve back to the window head with no drip edges.
 - The sills slope from 8° to 10°, with the upper windows separated from the lower roof by an upstand.
 - The plaster is a 2-coat system, which does not accord with NZS 4251, although the plaster is thicker than required in the standard.
- 5.5 The expert concluded that, although the windows appeared to be currently weathertight, the installation details and exposure of the upper level windows in the gable ends placed these windows at particularly high risk of moisture penetration.

5.6 Copies of the expert's report were provided to each of the parties.

6. The consultant's report

6.1 The consultant reviewed the submissions, the expert's report and other evidence, visited the building on 26 May 2006, and furnished a report that was completed on 8 June 2006. The consultant's general impression was that "the house was well built and it is likely that the care shown in the visible construction would have been applied to the hidden parts." The following summarises the main issues discussed in the consultant's report.

6.2 The windows

6.2.1 The ground floor windows are well sheltered on all sides, except for the north facing bay window which has an eave of about 300mm. However, the prevailing northwest winds are dry winds, and the window is easily accessible for maintenance.

6.2.2 The detailing around the windows is critical to ensuring that the straw bales remain dry, and the window sills have no capacity for allowing any water that penetrates past the sealant at the head or jambs to drain back to the outside.

6.2.3 There is no waterproofing membrane under the sill plaster to prevent water penetration during heavy or prolonged rainfall, although the benefits of adding such a membrane at this stage should be balanced against the potential problems of sealing new stucco against existing stucco.

6.2.4 The recommended installation of a drip edge to the head, in conjunction with the deep recess, should prevent water from running down the curved head reveal and into the unflushed window head.

6.3 The plaster

6.3.1 It is possible to achieve an adequate plaster finish with a 2-coat system, which can then comply with the code as an alternative solution to NZS 4251.

6.3.2 For this house, the 30mm thickness of the plaster coating is a mitigating factor, along with the stability of this type of construction. The 450mm straw bale walls are unlikely to move as much as conventional timber-framed walls during horizontal forces from earthquakes and strong winds.

6.4 The paint finish

6.4.1 It appears that the paint finish, described by Resene as "an acrylic waterproofing membrane", has a vapour transmission resistance that is higher than a building wrap, but not as high as a vapour barrier. The principle is that it will seal all surfaces, including cracks up to 1mm. This contrasts with the approach taken by the specialist, who advocates the use of breathable plasters and finishes (refer paragraph 3.12), which allow moisture into the wall and then let it out again.

6.4.2 The approach of sealing the outer face of the exterior walls, as used in this house, requires high workmanship and ongoing monitoring to ensure that the weatherproof coating is not compromised. This has implications for the durability requirements under clause B2 of the building code.

6.5 The durability requirements

6.5.1 The issues to be considered with regard to the durability of a straw bale house are:

- an appropriate durability period
- the applicable failure factors
- the maintenance required to achieve the durability period, and whether this is “normal” maintenance for a straw bale house.

6.5.2 The wall structure is post and beam, and any failure in the straw bale infills should be detectable from signs of cracking in the plaster, or via monitoring the moisture level of the bales. The infills would be moderately difficult to access and replace in this house, so a durability period of not less than 15 years is considered appropriate.

6.5.3 The relevant failure factor for the straw bale is that moulds will grow if the moisture content exceeds 15 to 18 %. I consider that this factor is more critical than the vulnerability to decay of the Douglas Fir window sub-frame (which could be heart or sap wood).

6.5.4 This straw bale house relies on the preservation of the paint coating, the plaster and the window seals to ensure the on-going weathertightness of the cladding. It is therefore considered prudent to visually check the exterior plaster and window seals at least annually, in addition to checking after earthquakes, very strong winds or storms. While the recommendation of the paint manufacturer is to repaint after a minimum of 10 years, it would be prudent to reduce this to 7 years.

6.6 The moisture content of walls

6.6.1 The scientist has advised that the moisture content of the straw bales appears to be in the range of 12% to 14%, which indicates that the cladding is likely to be currently weathertight and in compliance with clause E2 of the Building Code.

6.6.2 The most vulnerable area of the walls is likely to be below window jambs, and the moisture content of the straw in the centre of the wall should be measured at those locations under the upper floor windows.

6.6.3 Moisture testing may be carried out with long-probe meters, or by inserting permanent moisture sensors to allow ongoing monitoring against initial readings.

6.7 The specified intended life

6.7.1 The performance-based New Zealand Building Code allows for alternative, innovative types of construction of which the expected life is not as predictable as

that of more long-established types. It accommodates the uncertainty of that life by providing for buildings to have a specified intended life of 50 years or less, with certain conditions attached. The effect of the specified life is to require that, at the end of the specified life of the building, the owner must apply for a consent to extend the life of the building, specifying the building work to be done to achieve that extended longevity. Obviously, if the building is lasting well it will be easier to obtain that consent than if the building has deteriorated badly during its life to that point. If the owner does not apply to extend the life the building consent authority may require the building to be demolished. I note that for the house that is the subject of this determination the consent did not specify an intended life of 50 years or less, but said that the intended life would be “indefinite, but not less than 50 years” (see paragraph 3.1).

- 6.7.2 Taking account of the reports I received from the expert and the consultant, and noting the relatively lower robustness of straw-bale cladding as compared with some more durable cladding systems, I consider it would be appropriate to modify the building consent under section 113 (2) of the Act so that it specifies the intended life of the building to be 15 years, being the minimum durability period required under Building Code clause B 2.3.1. This modification would be subject to the condition that the building must be altered, removed, or demolished on or before the end of the specified intended life of 15 years. For the avoidance of doubt I consider the specified intended life should be measured from 11 July 2001, being the date on which the original building consent was issued.
- 6.7.3 The effect of the modification described in paragraph 6.7.2, which should be recorded on the property file along with this determination, will be to alert future owners to the special nature of the cladding system used on this house. It will also ensure that the ongoing performance of the cladding is subjected to technical scrutiny after an appropriate test period. If, on inspection by the territorial authority, the cladding is then found to have been well maintained and performing well, the then owner’s application for consent to extend the life will no doubt be approved. The length of that extension will be a matter for agreement between the owner and the territorial authority at the time. . If the cladding, or any other part of the building, is found to be deteriorating the territorial authority may issue a notice to fix and the owner must then apply for a new building consent to carry out whatever remedial work is required.

6.8 The consultant’s conclusions

- 6.8.1 The consultant recommended that:
- the heads of the upper floor windows be modified to provide drip edges
 - the building consent be amended to include a specified intended life of 10 or 12 years, with specified maintenance conditions
 - the house be repainted after no more than 7 years
 - a moisture monitoring system be installed to monitor moisture levels in the centre of the thickness of the wall beneath the jambs of the upper windows.

7. Evaluation for code compliance

7.1 Evaluation framework

7.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solution⁴, in this case E2/AS1, 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 some other provision to compensate for that in order to comply with the Building Code.

7.1.2 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 determinations⁵ (refer to Determination 2004/1 *et al*) relating to cladding and these factors are also used in the evaluation process.

7.1.3 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 In relation to these characteristics I find that this house:

- is built in a high wind zone
- is a maximum of two storeys high
- is reasonably simple in plan and form
- has eaves projections of more than 1200mm above ground floor walls and eaves and verge projections of 600mm above first floor walls, which provide good protection to most walls and windows beneath them

⁴ 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.

⁵ Copies of all determinations issued by the Department can be obtained from the Department's website.

- has plastered straw bale exterior wall cladding
- has a timber post and beam structure that is treated, so providing good resistance to the onset of decay if the timber absorbs and retains moisture.

7.2.2 When evaluated using the E2/AS1 risk matrix, the elevations of this house demonstrate a moderate weathertightness risk. The matrix is an assessment tool that is intended to be used at the time of application for consent, before the building work has begun and, consequently, before any assessment of the quality of the building work can be made. Poorly executed building work introduces a risk that cannot be taken into account in the consent stage but must be taken into account when the building as actually built is assessed for the purposes of issuing a code compliance certificate.

7.3 Weathertightness performance

7.3.1 Generally the cladding appears to have been installed with good workmanship and in accordance with good trade practice. However, both the expert's report and the consultant's report identify the upper floor windows as areas of particularly high risk. I also note from the certifier's inspection sheet No. 3615 "all cracks in the exterior plaster system are to be filled and sealed". This indicates there were cracks in the plaster, and, although these were sealed by the paint system the concern expressed regarding possible future cracking has an historical basis. Some junctions in those windows are not well constructed to mitigate that risk, and these areas are as described in paragraph 5.4 and paragraph 6.2, as being the:

- lack of a drip edge to the window heads
- lack of a sill flashing.

7.3.2 I note the consultant's comments in paragraph 6.5 and paragraph 6.8.1, and accept that the risks involved in the type of relatively untested construction used in this house justify a modification of the consent to amend the usual requirements of clause B2.3.1 of the Building Code.

7.3.3 I also note the consultant's comments in paragraph 6.5.4 and paragraph 6.6, and accept that ongoing maintenance and moisture monitoring is critical to preserve the weathertightness of this house. I therefore consider that an appropriate maintenance regime should be established for this house; with maintenance requirements specified by the territorial authority as a condition of the modified consent. I expect such requirements would include at least annual checking of plaster and seals and repainting at maximum intervals of 7 years.

8. Conclusion

8.1 I am satisfied that the current performance of the cladding is adequate because it is preventing water penetration into the building at present. Consequently, I am

satisfied that the cladding system as installed on the building complies with clause E2 of the Building Code.

- 8.2 In addition, the building 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 building are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.
- 8.3 Subject to further investigations that may identify other faults, I consider that, because the faults that have been identified with the cladding system occur in discrete locations, I am able to conclude that satisfactory rectification of the items outlined in paragraph 7.3.1, together with the amendments outlined in paragraph 7.3.2 and the maintenance described in paragraph 7.3.3, should be expected to result in the building remaining weathertight and in compliance with clauses B2 and E2.
- 8.4 Effective maintenance of claddings (in particular of this type of monolithic cladding) is important to ensure ongoing compliance with clauses B2 and E2 of the Building Code and is the responsibility of the building owner. Clause B2.3.1 of the Building Code requires that the cladding be subject to "normal maintenance", however that term is not defined in the Act.
- 8.5 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. With respect to the cladding, the extent and nature of the maintenance will depend on the material, or system, its geographical location and level of exposure. Following regular inspection, normal maintenance tasks should include but not be limited to:
- where applicable, following manufacturers' maintenance recommendations
 - washing down surfaces, particularly those subject to wind-driven salt spray
 - re-coating protective finishes
 - replacing sealant, seals and gaskets in joints.
- 8.6 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular cladding system has been established as being code compliant in relation to a particular building does not necessarily mean that the same cladding system will be code compliant in another situation.

Issue 1: The cladding

9. The decision

- 9.1 I am satisfied that the current performance of the cladding is adequate because it is preventing water penetration into the building at present. Consequently, I am

satisfied that the cladding system as installed on the building complies with clause E2 of the Building Code.

- 9.2 In addition, the building 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 building are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.
- 9.3 Because the faults that have been identified with the cladding system occur in discrete areas, I also find that rectification of the items outlined in paragraph 7.3.1 will consequently result in the house remaining weathertight and in compliance with clause B2. Work to correct these items may expose additional associated defects that are not yet apparent. All rectification work is to be completed to the approval of the territorial authority.
- 9.4 I note that the territorial authority has not issued a notice to fix. A notice to fix should be issued that requires the owners to bring the cladding into compliance with the Building Code, without specifying the features that are required to be incorporated. It is not for me to decide directly how the defects are to be remedied and the cladding brought to compliance with the Building Code. That is a matter for the owner to propose and for the territorial authority to accept or reject. It is important to note that the Building Code allows for more than one method of achieving compliance.
- 9.5 I would suggest that the parties adopt the following process to meet the requirements of paragraph 9.4. Initially, the territorial authority should issue a notice to fix, listing all the items that the territorial authority considers to be non-compliant. The owner should then produce a response to this in the form of a detailed proposal, 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.

Issue 2: The additional durability considerations

10. Discussion

- 10.1 I note that the relevant provision of clause B2 of the Building Code is that building elements must, with only normal maintenance, continue to satisfy the performance requirements of the Building Code for certain periods “from the time of issue of the applicable code compliance certificate”.
- 10.2 As set out in paragraph 2.5 and paragraph 6.7.2, I have concerns about the durability, and hence the ongoing compliance with the Building Code, of certain elements of the building, taking into consideration the particular risks involved in this straw bale construction and its specific maintenance requirements.

- 10.3 I am of the opinion that the territorial authority should modify the original building consent for the building to include a specified intended life of 15 years, measured from 11 July 2001 when the original consent was issued. I have explained the effect of this modification in paragraph 6.7.3 above. A copy of this determination and of the modification to the consent should be added to the property file for the information of future owners of the house.

11. The decision

- 11.1 I determine that the territorial authority is to modify the consent for the building in accordance with section 113 (2) to include a specified intended life of 15 years measured from 11 July 2001.
- 11.2 Following this modification, any code compliance certificate subsequently issued by the territorial authority should be issued in line with the modified building consent.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 16 October 2006.

John Gardiner
Determinations Manager