

Determination 2023/031

Decision by an authority to grant a building consent and issue a code compliance certificate for a small dwelling

251 Priest Road, Eketāhuna

Summary

This determination considers the decision of the authority to grant a building consent and issue a code compliance certificate for a dwelling. The owner is of the view that several aspects of both the design and as-built construction do not comply with various clauses of the Building Code. The main issues relate to the weathertightness and stability of the dwelling.



The legislation discussed in this determination is contained in Appendix B. In this determination, unless otherwise stated, references to “sections” are to sections of the Building Act 2004 (“the Act”) and references to “clauses” are to clauses in Schedule 1 (“the Building Code”) of the Building Regulations 1992.

The Act and the Building Code are available at www.legislation.govt.nz. Information about the legislation, as well as past determinations, compliance documents (eg Acceptable Solutions) and guidance issued by the Ministry, is available at www.building.govt.nz.

1. The matter to be determined

- 1.1. This is a determination made under due authorisation by me, Peta Hird, Principal Advisor Determinations, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.¹
- 1.2. The parties to the determination are:
 - 1.2.1. S Lamb, the owner of the property where the dwelling is located (“the owner”)
 - 1.2.2. Tararua District Council, carrying out its duties as a territorial authority or building consent authority (“the authority”)
 - 1.2.3. G Alexander, the licensed building practitioner (Design 1) concerned with the relevant building work in terms of the design of the dwelling’s external moisture-management system (“the designer”).² The designer was not involved in the construction of the dwelling and did not make any submissions during the determination.
 - 1.2.4. A Holland, the structural engineer concerned with the building work in terms of the design of the dwellings ground anchor and bracing systems (“the engineer”). The engineer was not involved in the construction of the dwelling and did not make any submissions during the determination.
- 1.3. I consider the directors of the company that manufactured the dwelling, M and A Parker (“the manufacturers”), are persons with an interest in this matter. M and A Parker are directors of Bale House Farm Limited, trading as Ark Designs. The dwelling was constructed onsite by A Parker.³

¹ The Building Act 2004, section 185(1)(a) provides the Chief Executive of the Ministry with the power to make determinations.

² The designer is a party under section 176(d) of the Act because they designed the external moisture-management system, which is restricted building work and is a subject of this determination.

³ A Parker is not a licensed building practitioner. Therefore, under section 176 of the Act, they are not a party to the determination in their capacity as the builder of the dwelling.

- 1.4. The determination arises the authority's decision to grant a building consent and issue a code compliance certificate for the owner's dwelling, which the owner considers should not have been granted and issued. The owner is of the view that several aspects of both the design and as-built construction do not comply with various clauses of the Building Code. The main issues relate to the weathertightness and stability of the dwelling.
- 1.5. The matters to be determined are:
- 1.5.1. Under section 177(1)(b) and (2)(a): the authority's decision to grant the building consent. This turns on whether the building work would have complied with the Building Code if completed in accordance with the plans and specifications lodged with the building consent application.⁴ This determination concerns only those items identified by the applicant, as identified in Table 1, and accordingly I have not undertaken a full review of all the design details.
- 1.5.2. Under section 177(1)(b) and (2)(d): the authority's decision to issue the code compliance certificate. This turns on whether the building work, at the time the code compliance certificate was issued, was completed in accordance with the building consent.⁵ In particular, I have considered the lack of underfloor insulation and the 'As-built' items in Table 1.
- 1.5.3. Under section 177(1)(a): Whether particular aspects of the building work, as proposed in the building consent and as constructed (ie. the design and as-built work respectively), comply with relevant clauses of the Building Code, including clause B2 *Durability*. The specific matters considered are detailed in Table 1. I have not considered the compliance of the building work with the Building Code beyond the items identified in Table 1.
- 1.6. Given the A-frame design, in this determination I refer to the curved sides as "the roof" and the vertical walls at either end as "the walls". The inside surface is referred to as "the internal lining".

Table 1: Matters of dispute pertaining to the design and as-built construction

Matter	Assessment
Clause B1 <i>Structure</i>	
Installation of ground anchors	As-built
Bracing	As-built
Location (with regard to ultimate wind speed limit as per the design) ⁶	As-built

⁴ Section 49(1).

⁵ Section 94(1)(a)

⁶ This item was initially framed as "Location (with regard to the ultimate wind speed limit in Multiproof certificate)", but the design and construction is not within the scope of the Multiproof Certificate.

Clause E2 <i>External moisture</i>	
Timber barges to the roof	Design and as-built
Lack of flashings at ends of the roof	As-built
Door construction (lack of head flashing on the French doors and profile sill not recessed)	As-built
Cladding/deck junction (including the lack of gap between the deck and house)	Design and as-built
Cladding/deck lack of flashing at junctions and joints and moisture ingress at junctions between wall and roof	As-built
Moisture ingress at windows	Design and as-built
Clause E3 <i>Internal moisture</i>	
Shower	As-built
Roof assembly (condensation)	Design and as-built

1.7. I note the manufacturers hold a Multiproof certificate⁷ (A10135) (“the Multiproof”) for a dwelling which is very similar in design to the dwelling under consideration. Up until the application for the determination, parties believed that the Multiproof plans applied to the subject dwelling, and the consent was issued on that basis. However, after the application for determination was made it was established that the plans lodged with the building consent application were outside the scope of the Multiproof certificate (see paragraph 3.4 for more detail).

2. The building work

- 2.1. The dwelling that is the subject of this determination (“the Ark”) is a self-contained, 4.8m by 9m A-frame building with a total floor area of 58m². The ground floor has an open space at the front, a bathroom, and a kitchen that was originally located at the rear. The entry into the dwelling is through French doors at the front. There is a folding ladder to a mezzanine loft area which is used for sleeping.
- 2.2. The A-frame roof is constructed with curved laminated beams which are encased in plywood and horizontal corrugated iron sheeting. Between the curved frames, sheets of 25mm thick polystyrene insulation are installed end to end. The wall assembly at the front and rear consists of a 9mm H3 plywood ‘external skin’, and 25mm thick polystyrene insulation. Untreated plywood is used for the internal lining of the walls and roof (refer to Figure 2).
- 2.3. There are three circular windows in the rear wall of the Ark, located in the loft, galley, and bathroom (see Figures 1 and 3). There is one fixed circular window in the front wall of the Ark, above the French doors. These windows are constructed of acrylic within a timber frame.

⁷ ‘Multiproof certificates’ are issued by the Ministry under section 30F of the Building Act, by the group responsible for the National Multiple-Use Approval scheme.

2.4. In the opening windows, the acrylic pane is split at the midpoint with hinges connecting the two pieces and an additional strip of acrylic attached on the inside that covers the joint. A string that is drilled through the frame at the top is used to open the window. The string is pulled from the inside, raising the bottom piece upwards, and then wrapped around a cleat on the inside to hold the window in the open position. A second string is attached to the inside surface of the lower pane, with a cleat below the window to secure the string. There are no other latches to hold the window closed.

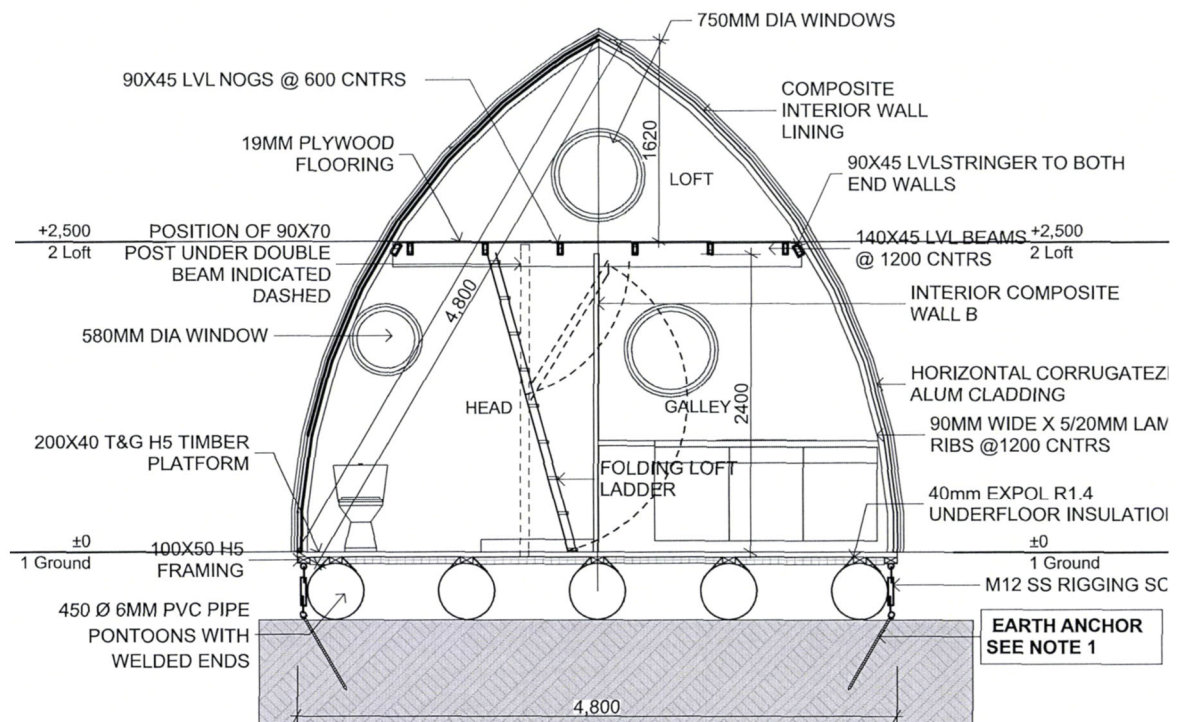


Figure 1: Section showing construction of dwelling (not to scale).



Figure 2: Photos showing construction of the roof, including the corrugated iron sheeting (left), curved frames and polystyrene insulation (middle) and internal plywood lining (right).

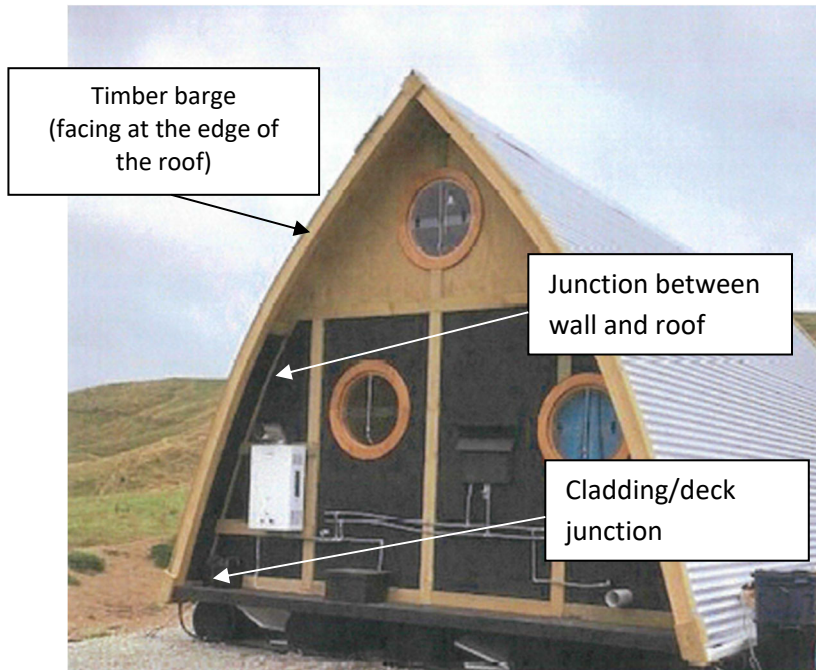


Figure 3: Rear view of the Ark.

- 2.5. The Ark is built on a tongue and groove timber platform, which plans specified as treated to H5. The platform rests on five “pontoons” (see Figure 1). The pontoons are made of PVC pipes which have had ends welded on and are filled with water to provide weight to the dwelling.⁸ The structure is then anchored to the ground using “earth anchors” (see Figures 1 and 4).



Figure 4: Photograph showing a pontoon and earth anchor (left) and earth anchors located on the side of the dwelling (right). Note the angle of rigging screws and anchors.

- 2.6. There is a gas califont attached to the rear wall for heating water. For electricity, the building consent application notes that a petrol generator was to be used initially, with solar power installed in the future.

⁸ The owner confirmed the pontoons were filled with water at the site visit conducted by the Ministry on 5 August 2022.

- 2.7. In the time since the code compliance certificate was issued, alterations have been made to the dwelling and property. The following alterations were observed during a site visit by a Ministry Advisor on 5 August 2022:
- 2.7.1. A new front door has been installed.
 - 2.7.2. The kitchen has been moved to the front part of the dwelling, alongside the wall on the right side (from the entrance to the dwelling).
 - 2.7.3. Solar panels have been installed.
 - 2.7.4. A large fence has been constructed to the side of the dwelling.
 - 2.7.5. Several posts and piles have been added around the platform of the dwelling. A metal plate that laps over the existing platform has been attached to the new pile.

3. Background

- 3.1. The owner's property is a 2.2 hectare life-style block in Eketāhuna, in the Manawatū-Whanganui region.
- 3.2. The owner purchased the building from the manufacturers who supply and build small A-frame dwellings. Their website shows they offer various sizes and fit out options at different price brackets.⁹

The building consent

- 3.3. On 29 October 2018, the owner applied for a building consent (No. 303348) to construction the building. As noted earlier, the manufacturers hold a Multiproof certificate for a particular size and configuration of the design with a specified intended life of 15 years,¹⁰ and that certificate was submitted with the building consent application.
- 3.4. The plans submitted with the building consent application were for a 9m x 4.8m building with 5 pontoons, while the approved Multiproof plans are for a 6m x 4.8m building with 4 pontoons. This variation in size was not a permitted change under the terms of the Multiproof, and the plans lodged with the building consent were

⁹ [ARK DESIGNS - NZ made cabins, sleep-outs and granny flats. http://www.arkdesigns.co.nz/](http://www.arkdesigns.co.nz/). Accessed 20/05/2022.

¹⁰ "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. A territorial authority may grant a building consent for construction of a building with a specified intended life of less than 50 years only if the consent is subject to a condition that the building is altered, removed, or demolished before the end of the specified intended life.

therefore outside the scope of the certificate. However, the authority has acknowledged it processed the application as though the Multiproof applied.

- 3.5. A structural assessment by a Chartered Professional Engineer (“the engineer”) of the 9m x 4.8m building was provided to support the building consent application. The structural analysis assumed a design working life of 15 years. It also noted that the bracing was a combination of multistraps and ply sheeting:

As per the attached calculations the sheeting only provides 66% of the wind capacity required and 48% of the earthquake capacity required. The further 12% needed can be taken from the addition of multibrace straps running alongside the outside of the portals. The straps are required to be tensioned...

The bracing along the length of the structure needs to be increased with the addition of multistrap braces at all four corners.

- 3.6. The engineer’s calculations for sliding and overturning include a note that the anchors will provide “additional resistance to overturning” and the pontoons “are required to be filled with water”. The engineer’s assessment states that the anchors, in terms of their resistance, were “adequate to resist the sliding and overturning loads”.
- 3.7. The engineering assessment specified earth anchors with a pull-out resistance in sand of about 15kN or alternative proprietary anchors for use in “sandy gravel and better (dense) sand”. The approved drawings noted the two anchor options for use in different soils and to “ensure anchors are installed at 40°-45° in non-saturated sand and are tensioned when installed”.
- 3.8. The building consent application identified the wind speed zone as “very high”. In relation to wind speed, the engineer’s assessment stated:

The Ark has been assessed against wind and earthquake loading for the worst-case scenario in New Zealand, as the design has no specific designated locations ...

For the wind loading a terrain category of 1 (Exposed, Open Terrain) has been assumed, and the wind region around the Cook Strait (W) has been adopted as the worst case for New Zealand.

- 3.9. The application form was completed with following information about the Multiproof and specified intended life:
- 3.9.1. Under “What are you applying for?”, the box was ticked stating a “Building Consent using a National Multiple-Use Approval (‘Multiproof’)”. The Multiproof certificate number A10135 (which is for the 6m Ark with a specified intended life of 15 years) was entered.

- 3.9.2. The question “What is the intended life of the building?” was answered as “50+ years”. The answer “Limited Life” and question “If Limited Life, please indicate the intended life of the building” were left blank.¹¹
- 3.10. The authority’s checklist for the building consent application noted that the following clauses were excluded from the Multiproof certificate and needed to be assessed: B1 NZS3604:2011^[12], B2 *Durability*, E1 *Surface water*, E2 *External moisture*, G2 *Laundering*, G9 *Electricity*, G10 *Piped services*, G11 *Gas as an energy source*, G12 *Water supplies*, G13 *Foul water* and H1 *Energy efficiency*.
- 3.11. The authority also noted:
- 3.11.1. the design involves a specific engineering design
 - 3.11.2. the building is located in a high wind zone as indicated on the BRANZ wind maps
 - 3.11.3. the application involves a ‘Specified Intended Life’ of “15 years as noted in the Multiproof certificate”
 - 3.11.4. regarding restricted building work, the authority stated “Approved under the Multi proof system. Design LBP was received from [the designer]”.
- 3.12. The building consent was issued on 30 November 2018.

Inspections

- 3.13. The Ark was built onsite by one of the directors of Ark Designs, who was not a licenced building practitioner.
- 3.14. The authority undertook a number of inspections between 19 March 2019 and 16 September 2019. On 19 March 2019, the “Foundation/Pile/Concrete Floor” inspection passed, while the “Subfloor Building”, “Roof and wall framing”, “External Moisture Walls/Roof” and “Drainage” inspections failed. These inspections were subsequently passed on 21 March 2019; other than the “Drainage” inspection which was passed on 20 May 2019. The “Small Works” inspection failed on 21 March 2019 and 17 July 2019, and subsequently passed on 16 September 2019.
- 3.15. The authority’s site inspection reports indicate the multistrip bracing was not installed. The site inspection report on 19 March 2019 notes in regard to the wall bracing: “Ply used as a brace, the strap bracing and additional brace straps shown in the consented details were not inspected”. In regard to the roof bracing, the report notes “Ply bracing, additional roof multi strap braces shown on the plans have not

¹¹ Limited intended lives are significant in terms of defining applicable wind/seismic B1 loads, and for structural element durability B2 (ref B1).

¹² NZS3604:2011 Timber framed buildings

been sighted". The "Wall/Roof Framing" was reinspected and passed on 21 March 2019. The site inspection report noted that "Additional Multi brace (strap bracing) is not required to the roof/wall as the ply acts as a bracing element".

- 3.16. The designer of the Ark was in contact with the authority and appears to have dealt with the requests for further information relating to the consent application and particular items in the failed inspections.
- 3.17. A final inspection was conducted on 13 November 2019. The outstanding failed item was the requirement to provide a "Record of Building Work".¹³
- 3.18. In an email to the owner on 16 January 2020, the authority confirmed that the Ark had not been built by a licenced building practitioner. In a further email on 22 January 2020, the authority confirmed that it intended to issue a code compliance certificate, despite there being no Record of Work. The email stated:

As the Building Consent was vetted and processed by MBIE as a Multiproof Certificate (and the legislation states we must accept this)¹⁴, [the authority is] not required to take any responsibility for this aspect. Rather, our input is to ensure that the building has been built as per the approved plans.

[The authority is] satisfied on reasonable grounds that the building has been constructed as per the approved documents. On that basis we are prepared to issue the Code Compliance Certificate. The lack of a Record of Work is not one of the documents that would prevent us from doing so.

- 3.19. On 28 January 2020, the final inspection was passed, with the notice stating:

Record of work is not and will not be available as the builder is NOT LBP registered. While this is a requirement under the Building Act, it is not a document that we can withhold [code compliance certificate] for.

The code compliance certificate and remedial work

- 3.20. The code compliance certificate was issued on 24 February 2020. Prior to the code compliance certificate being issued, the owner raised concerns about the weathertightness of the dwelling and failure of the foundations (ie ground anchors) with the authority.

¹³ A 'record of building work' (also called a 'Memorandum' or just 'record of work') is written by each licensed building practitioner that carried out or supervised building work that is 'restricted building work'. Restricted building work includes, but is not limited to, residential design and construction that involves the primary structure and weathertightness of some types of buildings and must be carried out by a licensed building practitioner.

¹⁴ Under section 19(1)(ca), a building consent authority must accept a current national multiple-use approval issued under section 30F as establishing compliance with the Building Code if every relevant condition in that national multiple-use approval is met.

- 3.21. The owner engaged the services of an arbitrator¹⁵ to inspect the dwelling and provide advice. The arbitrator provided a report to the owner in March 2020. The report identified several issues with the consent process, including:
- 3.21.1. No documents had been supplied to show compliance with the building code clauses excluded from the Multiproof certificate. The building consent application form noted that clauses E1, G2, G9, G10, G12, G13 and H1 would be complied with, and indicated that the application was to be assessed against Acceptable Solutions.¹⁶ The arbitrator noted that, “in my view the consent should never have been issued as it failed to show compliance with those clauses”.
 - 3.21.2. The Multiproof certificate states that the design working life is 15 years, while the building consent application form indicated the intended life of the building was to be 50+ years.
 - 3.21.3. The building consent form indicated that the project included restricted building work. Therefore, a licenced building practitioner should have carried out the restricted work and provided a Record of Work on completion. Without this, the authority should not have issued the code compliance certificate.¹⁷
- 3.22. The report also identified several issues with the design and as-built construction of the dwelling, including:
- 3.22.1. The lack of head flashing on the French doors which were shown in the design but not installed.
 - 3.22.2. The exterior cladding is required to be at least 50mm below the floor or framing as per the manufacturer’s installation guide, but it sits on the wooden floor. The plywood sitting directly on the floor will allow moisture to penetrate the building envelope.
 - 3.22.3. The way the timber barges are fitted to the roof and wall cladding will not provide a weathertight solution. The detail in the consented drawings is vague and should not have been accepted.

¹⁵ The Arbitrator is a member of AMINZ (Arbitrators’ and Mediators’ Institute of New Zealand) Adjudication Panel, building contractor, and member of Registered Master Builders Association.

¹⁶ Acceptable Solutions are prepared by the Ministry for use in establishing compliance with the New Zealand Building Code. A person who complies with an Acceptable Solution will be treated as having complied with the provisions of the Building Code to which the Acceptable Solution relates. However, using an Acceptable Solution is only one method of complying with the Building Code. There may be alternative ways to comply.

¹⁷ The Arbitrator concluded that the code compliance certificate should not have been issued without a record of work. I note a record of work is one way to demonstrate that the restricted building work was carried out by a suitably qualified person. It is not the only factor available for a building consent authority to confirm the compliance of the building work.

- 3.22.4. The shower has not been installed in accordance with the product manufacturer's instructions and it leaks. It should have been tested at the final inspection.
- 3.23. On 3 June 2020, the owner and arbitrator attended a meeting with the authority. Agreement was reached on several items to be rectified, and remedial work was carried out on 17 August 2020. These items and the actions taken were:
- (1) Underfloor insulation installed.
 - (2) Head flashing above front door installed.
 - (3) Shower leaking – New shower liner installed and shower sealed.
 - (4) Seal wall and floor junction at the front and rear of dwelling – Timber beading installed and sealed.
 - (5) Seal barge flashing at both ends of dwelling – Flashing tape and bitumen seal installed.
- 3.24. Despite these actions, in an email on 11 November 2020, the owner informed the authority that the back wall of the Ark was still leaking, and there was black mould inside the dwelling which the owner believes is also likely to be in the wall cavity, framing and insulation.
- 3.25. The Ministry received an application for a determination on 17 November 2021.

4. Site visit

- 4.1. A site visit was conducted by the Ministry on 5 August 2022. This was attended by a senior advisor and technical writer from the Ministry, and the owner.
- 4.2. The purpose of the site visit was to carry out a visual assessment of the building and to assess the compliance matters that had been identified in the application for determination. A full walk around of the exterior, interior and loft area was undertaken. A site report was provided to the parties on 10 November 2022. The observations from the site visit assessment have been taken into account in forming my views on the compliance of the building work.

5. Submissions

The owner

- 5.1. The owner confirmed the matters they would like to have determined as being whether the authority was correct to grant the building consent, whether the authority was correct to issue the code compliance certificate, and whether the building work (including aspects of both the design and as-built construction)

complies with the Building Code. In support of their views, the owner provided several photographs as evidence.

5.2. The owner's submissions describe several issues with the dwelling, and any steps that had been taken regarding these issues, as below:

5.2.1. The underfloor insulation was on the approved plans (see Figure 1) but was not installed by the manufacturers. During the consenting process, the authority accepted the manufacturers' explanation that the dwelling did not need to comply with clause H1 because it was off the grid. The insulation was installed as part of the remediation work.

5.2.2. The French door was not installed as per the plans, as the profiled sill was not recessed. The owner subsequently replaced the door due to it leaking and not closing from swelling. The builder engaged by the owner and who carried out the remedial work installed the new door and noted that there was not a 12mm gap between the deck and the dwelling. They also noted that there was no flashing on junctions or joints, no mechanical flashing or tape used, and no expanding foam. The head flashing on the door has since been installed, as per the plans.

5.2.3. There has been substantial moisture ingress into the dwelling, which was present before the code compliance certificate was issued and has since worsened. Water has absorbed into the internal linings causing significant black mould and water damage.

5.2.4. The main area of moisture ingress is at the junction between the bottom of the roof and wall panels and the wooden platform they sit on. The cladding is not 50mm below the framing, which the owner believes is a design fault. The owner provided photographs showing a significant area of black mould on the rear wall, next to the junction with the floor. The owner states that the remedy for the leaking (refer to paragraph 3.23) was inadequate.

5.2.5. There is no flashing at the ends of the roof, allowing water to penetrate the interior. The owner states there has not been any attempt to seal junctions between the walls and the roof. The owner provided photographs that show moisture ingress at the junction between the rear wall and roof, with water clearly leaking down the internal plywood lining.

5.2.6. The owner also does not believe the construction of the A-frame roof assembly is adequate to protect the internal lining and framing from moisture created from condensation.

5.2.7. The owner advised that the windows have never closed properly and have never been watertight. Water comes in through the joint in the middle as well as from below. The owner provided photographs showing ponding

water on the inside windowsill. The owner believes the lack of weathertightness of the windows is both a design and as-built fault.

- 5.2.8. The owner contends the shower was not checked for watertightness at the first building inspection and despite the remedial work (refer to paragraph 3.23(3)) the shower is still leaking. The tray is not level, which has caused large gaps between the tray and the lining. The lining has also become unstuck, which the owner believes may be due to faulty installation or to the movement of the building. Although more sealant was added, this has not stopped the leaking but has caused water to go through the wall instead.
- 5.2.9. The owner does not believe multistrap bracing was installed on the outside of the “portals” (roof), as per the design. They also state that there is no mechanism to keep the polystyrene insulation from falling inside the roof and walls. There is nothing to stop vermin entering the roof cavity, and chewed insulation is continuously found in the gutters.
- 5.2.10. The owner does not believe the earth anchors have been installed as per the product manufacturer’s instructions and the design, or that they are sufficient for the wind zone. The owner states they were “banged in” rather than being screwed in as per the product manufacturer’s instructions. The anchors have started to pull up out of the ground and the building jolts in the wind. The owner has since added piles on two corners of the building, but these have not stopped the shaking. The owner also submitted a video taken from inside the dwelling which demonstrated the shaking.

The authority

The building consent

- 5.3. The authority acknowledged that there were errors in the processing of the building consent. Regarding the specified intended life of the dwelling, it confirmed that the consenting officer processed the application on the basis that the building would have a reduced life of 15 years, as specified in the Multiproof. The authority “agrees that it made an error in issuing the building consent without imposing a condition that the specified intended life of the building was 15 years”. The authority notes that the failure to impose the required condition under section 113(2) appears to have been an administrative error.
- 5.4. The authority also identified that the plans and specifications provided in the building consent application differed to those approved under the Multiproof. It appears that the consenting officer did not notice the differences between the Multiproof and submitted plans, and the consent application was processed on the basis that the Multiproof applied.
- 5.5. Section 45B(1) of the Act provides that when applying for a building consent in reliance on plans and specifications for which a Multiproof has been issued, changes

may be made if they are permitted under the terms of the Multiproof.¹⁸ In this case, no changes were permitted under the terms of the Multiproof.¹⁹ As per section 45B(2), the effect of making changes that are not permitted, is that the Multiproof does not apply.

- 5.6. Therefore, the consent was processed under the incorrect belief that the Multiproof certificate applied. The authority notes that:

As such, the consenting officer did not consider whether the proposed building work complied with all relevant provisions of the Building Code.

In light of this, [the authority] does not consider that the consenting officer could have been 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. Accordingly, it considers that the building consent was wrongly granted under section 49(1) of the Building Act.

The code compliance certificate

- 5.7. The authority does not believe that the building work complied with the consented plans at the time the code compliance certificate was issued. This is because:

The approved plans provided for subfloor insulation, but this had not been installed.

Doors had not been rebated into the floor and there were a lack of flashings to the doors.

Roof flashings had not been sealed.

Holes drilled through the glazing on the round windows had not been sealed or addressed.

Exterior cladding not as per the plan at the floor junction.

The shower was improperly installed.

The plumbing pipe work installed to the exterior is not insulated or protected from UV.

The anchor fixings are not installed at angles for the ground conditions.

- 5.8. Accordingly, the authority does not believe that the issuing officer could have been satisfied on reasonable grounds that the building work complied with the building consent.²⁰

¹⁸ There is also a second exception in section 45B(1)(b), which relates to minor customisations permitted by regulations made under section 402(1)(kc), which does not apply in this case.

¹⁹ Clause 2 of the Multiproof schedule states that "If there are any changes to the approved plans and specifications this National Multiple-Use Approval does not apply".

²⁰ As required by section 94(1) of the Act.

Whether particular aspects of the building work comply with the Building Code

- 5.9. Although the Multiproof did not apply, it was relied on to show compliance with those provisions of the Building Code that were listed on the Multiproof certificate. However, the authority's opinion is that the Multiproof design itself lacked details to show compliance with the Building Code, and this has contributed to the issues with the dwelling. In particular, the design lacked details on how compliance with E2 would be achieved, with a lack of cladding clearances and no flashing details. There was also a lack of additional information submitted with the consent application to confirm whether the design complied with the Building Code in all respects.
- 5.10. The authority undertook a review of the design and photographs of the as-built work. It assessed whether those aspects of the design and as-built work identified as being part of the determination comply with the specific clauses of the Building Code. The authority's comments are summarised in Table 2 (Appendix A).

Should the code compliance certificate and building consent be reversed?

- 5.11. The authority considers that the code compliance certificate was wrongly issued, and that it would be appropriate for it to be reversed.
- 5.12. Considering the flaws identified in the granting of the building consent, there is also the issue of whether the building consent should be reversed. The authority referred to *Cooper v Tasman District Council*,²¹ noting the Court identified factors as relevant to the question of whether a building consent should be reversed (refer paragraph 6.36).
- 5.13. The authority considers that the defects listed in paragraph 5.7 are issues which may be able to be rectified and made code compliant. However, the authority believes that further investigation is required regarding the issues relating to moisture ingress, as well as the question of whether the approved designs comply with the Building Code or a different Multiproof. Therefore, in its initial submission, the authority refrained from taking a firm view on whether the building consent should be reversed.

The manufacturers

- 5.14. The manufacturers state that the authority was made aware that the building consent application was for a 9m rather than 6m Ark and that at the time the application was made, they were in the process of applying for an amendment to the Multiproof. It was their understanding they could build the 9m Ark, but it would be up to the authority to accept the amendment to the design. The manufacturers

²¹ DC Nelson CIV-2009-042-11.

state that the authority was made aware of this, and “made the decision to accept the amendment alongside the use of the multi-proof”.

- 5.15. The manufacturers state that there were also discussions with the authority regarding the 15-year design lifespan. According to the manufacturers, it was agreed with the authority that in 15 years’ time, a certified engineer would need to inspect the building to determine whether its lifespan could be extended. The manufacturers state that “Any issues would be treated as an alteration to the design, therefore expanding the life of the building”.²² They state that they also advise clients that it is important to paint the interior and exterior plywood to prolong the life of the lining and cladding.
- 5.16. The manufacturers state that there was a licenced building practitioner (LBP) present during construction,²³ but the lead builder was not an LBP. At that time, they were not aware that the LBP who was present could have acted as a supervising LBP.
- 5.17. In relation to the concerns raised in the authority’s submission, the manufacturers explained some of the methods used in the construction of the Ark, such as:
- 5.17.1. Timber barges to the roof and wall cladding: There is “flexible flashing” installed at this connection. This is an addition to the design and is not referenced on the plans.
- 5.17.2. Lack of head flashing on the French doors: There was a “flexible flashing” installed over the French door, but this may not be visible from the outside.
- 5.17.3. Cladding/floor junction: There is a “flexible flashing” used at this junction, as well as a “grab” in the floor, which allows the flashing to connect to the underside of the subfloor.
- 5.17.4. Moisture ingress at the windows: There is a strip of acrylic along the join between the two windowpanes to stop water entering the dwelling through this gap. The design of the windows is the same as the Multiproof design. On both the outside and inside, the rim of the window frame is 25mm thick and sandwiches the composite wall. This allows two lines of sealant to be applied on each side, meaning there are four lines of sealant acting as a barrier. The window can be successfully closed by using the string and cleat on the inside of the window frame. There is one hole through the plexiglass and frame of the window, directly under the top cleat, which allows the string to move through the window. They state they have not received any complaints suggesting there are issues with moisture entering through this hole.

²² I note there is dispute between the parties about the intended lifespan of the building.

²³ The name and licence number of the LBP who was present during construction have not been provided.

5.17.5. Shower: The shower was installed following the product manufacturer's instructions.

The engineer

5.18. The engineer advised they were not involved in the construction of the dwelling and would not make a submission on the substantive matters but noted that ground anchors are supposed to be verified by geotechnical testing.

Draft determination

5.19. On 16 June 2023, a draft of this determination was issued to the parties for comment.

5.20. The owner accepted the draft determination.

5.21. The authority accepted the draft determination subject to a minor amendment.

5.22. I did not receive submissions from the architect or engineer.

5.23. The manufacturers did not accept the draft and provided additional comments. Regarding weathertightness, the manufacturers noted that the alternative solution designs considered in the determination had been assessed and approved as part of the Multiproof. The manufacturers contend the moisture issues in this case are due to condensation rather than external moisture ingress, and that "this can be improved with the addition of a shower dome and increase in ventilation".

5.24. I have taken into account the submissions received and have amended the determination as I consider appropriate.

6. Discussion

6.1. As outlined at paragraph 1.5, the matters to be determined are:

6.1.1. the authority's decision to grant the building consent

6.1.2. the authority's decision to issue the code compliance certificate

6.1.3. whether particular aspects of the building work (in terms of both the design and as-built work) comply with relevant clauses of the Building Code.

6.2. The determination also considers whether the authority's decisions to issue the code compliance certificate and building consent should be reversed.

The decision to grant the building consent

6.3. Section 49(1) of the Building Act states:

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.

The Multiproof certificate

6.4. As noted previously, the building consent was applied for with the Multiproof certificate submitted as the means of compliance with several Building Code clauses.

6.5. Section 19 of the Act is concerned with how compliance with the Building Code is established, and provides that:

- (1) A building consent authority must accept ... the following as establishing compliance with the building code...
 - (ca) a current national multiple-use approval issued under section 30F, if every relevant condition in that national multiple-use approval is met...

6.6. In this case, the following conditions in the relevant Multiproof Schedule were not met:

Condition 2: "If there are any changes to the approved plans and specifications this National Multiple-Use Approval does not apply."

6.6.1. Although the design of the dwelling is similar to the design in the Multiproof, the approved Multiproof plans differed from the submitted plans. The approved Multiproof plans were for a 6m x 4.8m building with 4 pontoons, while the submitted plans were for a 9m x 4.8m building with 5 pontoons. As no changes were permitted under Condition 2 of the Multiproof Schedule, the Multiproof did not apply.

Condition 5.f: "Design working life: 15 years, therefore Building Act 2004 section 113 applies at Building Consent stage."

6.6.2. Section 113 applies to proposed buildings which are intended to have a life of less than 50 years. Under section 113(2)(a), a building consent may only be granted if the consent is subject to a condition that the building is altered, removed or demolished before the end of the specified intended life. The scope of the Multiproof was limited to buildings with a design working life of 15 years. However, the consent application did not propose a specified intended life less than 50 years and the consent was not granted subject to that condition.

6.7. Further, section 45B states that:

- (1) When applying for a building consent in reliance on plans and specifications for which a national multiple-use approval has been issued or for an amendment to such a building consent under section 45(4), changes may be made to those plans and specifications if –
 - (a) the changes are permitted under the terms of the national multiple-use approval; ...
- (2) If any other changes are made to the plans and specifications referred to in subsection (1), the national multiple-use approval does not apply.

As noted at paragraph 6.6.1, no changes were permitted under the terms of the Multiproof. Under section 45B(2), the effect of making changes that are not permitted is that the Multiproof does not apply.

- 6.8. Due to unpermitted changes being made and the consent not being granted subject to a condition pertaining to a specified intended life, the relevant conditions of the Multiproof were not met. Therefore, section 19(1)(ca) did not apply.
- 6.9. For completeness, I note that even if the Multiproof had applied, the authority still needed to have assessed compliance with the Building Code clauses which were excluded from the Multiproof.²⁴

Compliance of Design with the Building Code

- 6.10. As the Multiproof did not apply, the authority needed to have considered whether all the relevant provisions of the Building Code would be met if the building work was properly completed in accordance with the plans and specifications provided with the consent application (as per section 49(1)).
- 6.11. I acknowledge the points raised by the parties regarding some features of this building's design that reflect those in the Multiproof. However, this determination does not consider the issue of that certificate and that decision is not a matter for determination under section 177. I have assessed the compliance of the design of this building on the basis of the plans and specifications presented in the application for building consent.
- 6.12. I am of the view that compliance with clauses E2, E3 and B2 had not been demonstrated in the documentation provided with the building consent application.
- 6.13. In terms of clause E2:

²⁴ As per the Multiproof Schedule, the excluded clauses were E1 *Surface water*, G2 *Laundering*, G9 *Electricity*, G10 *Piped services*, G11 *Gas as an energy source*, G12 *Water supplies*, G13 *Foul water* and H1 *Energy efficiency*.

6.13.1. Performance criteria E2.3.2 states “Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements, or both.”

6.13.2. For the reasons outlined in Table 2 (Appendix A), I consider that the following aspects of the design of the dwelling as detailed in the building consent application do not comply with this requirement (item numbers as per Table 2):

- (4) timber barges to the roof cladding
- (7) cladding/deck junction (including the lack of gap between the deck and house)
- (9) windows

6.13.3. I agree with the views of the arbitrator and the authority regarding the weathertightness detailing in the plans and that the plans provided with the building consent application were not sufficiently detailed. There are several details in the plans, as identified above, that do not demonstrate a weathertight solution.

6.14. In terms of clause E3:

6.14.1. Performance criteria E3.3.1 states “An adequate combination of thermal resistance, ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries, and other spaces where moisture may be generated or may accumulate.”

6.14.2. For the reasons outlined in Table 2 (Appendix A), I consider there is insufficient information in the plans and specifications to demonstrate compliance with clause E3 of both the roof and wall assembly design in respect of condensation and internal moisture management (11).

6.15. In terms of clause B2:

6.15.1. Performance clause B2.3.1 states:

Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or:

- (a) the life of the building, being not less than 50 years, if:
 - (i) those building elements (including floors, walls, and fixings) provide structural stability to the building,
 - (ii) Those building elements are difficult to access or replace, or
 - (iii) Failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building.
- (b) 15 years if:

- (i) Those building elements (including the building envelope, exposed plumbing in the subfloor space, and in-built chimneys and flues) are moderately difficult to access or replace, or
 - (ii) Failure of those building elements to comply with the building code would go undetected during normal use of the building, but would be easily detected during normal maintenance.
- (c) 5 years if:
- (i) The building elements (including services, linings, renewable protective coatings, and fixtures) are easy to access and replace, and
 - (ii) Failure of those building elements to comply with the building code would be easily detected during normal use of the building.

6.15.2. By reference to Acceptable Solution B2/AS1, of the building elements considered above, a durability period of 15 years would apply to the timber barges, cladding/deck junction, cladding and windows. A durability period of 5 years would apply to the interior lining and 50 years for the insulation and structural framing.

6.15.3. In the previous paragraphs I concluded the design details were not compliant with clause E2.3.2. It follows that building elements subject to undue dampness or damage, with only normal maintenance, will not satisfy the performance requirements of the Building Code for the stated durability periods.

6.16. The aspects of the plans and specifications provided with the building consent application as identified in the preceding paragraphs did not demonstrate compliance with the relevant provisions of the Building Code, including clauses E2, E3 and B2. Accordingly, in terms of section 49, I am of the view that the authority could not be satisfied the provisions of the Building Code would be met if the work was properly completed in accordance with the plans and specifications.

6.17. I conclude the authority was incorrect to issue the building consent. This is because the authority had relied on section 19(1)(ca) when that provision did not apply and the application for the building consent does not meet the requirements of section 49(1).

The decision to issue the code compliance certificate

6.18. Section 94 of the Act states:

- (1) A building consent authority must issue a code compliance certificate if it is satisfied, on reasonable grounds,-
 - (a) that the building work complies with the building consent; ...

- 6.19. To determine this matter, I must be satisfied that the building work complied with the building consent at the time the authority made its decision to issue the code compliance certificate.²⁵
- 6.20. For the reasons outlined in Table 2 (Appendix A), I consider that the following aspects of the building work did not comply with the building consent, at the time the code compliance certificate was issued:
- (1) installation of ground anchors
 - (2) bracing
 - (4) timber barges to the roof cladding
 - (6) door construction: lack of head flashing on French doors and profiled sill not recessed
 - (9) windows (in terms of moisture ingress)
- 6.21. In addition to the items above, I note that the underfloor insulation specified in the building consent was not installed at the time the code compliance certificate was issued. Regardless of the owner's intention that the dwelling would be off-grid²⁶, the underfloor insulation was required to be installed for compliance with the consented plans.
- 6.22. I am of the view that where there was inconsistent or contradictory information in the building consent documentation the building work cannot be said to have met the test in section 94(1). As set out in Table 2 (Appendix A), this applies to the cladding/deck junction, including the lack of gap between the deck and house (7).
- 6.23. I am not able to assess whether the original installation of the shower (10) was in accordance with the approved plans and specifications nor whether it complied with the Building Code at the time the code compliance certificate was issued.
- 6.24. Further, it was observed during the Ministry's site visit that the exterior pipework at the rear of the dwelling was not insulated or protected from UV light as noted in the consent plans²⁷.
- 6.25. I agree with the authority that because various aspects of the building work were not constructed in accordance with the building consent the test under section 94 was not met and the code compliance certificate was incorrectly issued.

²⁵ Several items were remediated following the issue of the code compliance certificate. While this is not relevant to the authority's decision to issue the code compliance certificate at the time, it is a relevant consideration under section 188(1)(a).

²⁶ Clause H1 Energy efficiency provisions only apply when the energy is sourced from a network utility operator or a depletable energy resource. As neither source provided the energy used for space heating, underfloor insulation was not required for building code compliance purposes.

²⁷ As hot water heating was provided using a gas califont, for which the energy is a depletable resource, the insulation of the pipes conveying hot water was required for the purposes of both clause H1 compliance and issuing the code compliance certificate.

Compliance of the building work with the Building Code

- 6.26. Section 17 states “All building work must comply with the building code to the extent required by this Act...”. I have assessed aspects of the as-built construction against the relevant performance clauses of the Building Code.
- 6.27. For the reasons outlined in Table 2 (Appendix A), I consider that several aspects of the as-built construction do not comply with clauses B1, B2, E2 and E3.
- 6.28. In terms of clause B1:
- 6.28.1. Performance criteria B1.3.1 states that “Buildings, building elements and sitework shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives.”
- 6.28.2. Performance criteria B.1.3.2 states “Buildings, building elements and sitework shall have a low probability of causing loss of amenity through undue deformation, vibratory response, degradation, or other physical characteristics throughout their lives...”
- 6.28.3. Performance criteria B1.3.3 states that “Account shall be taken of all physical conditions likely to affect the stability of buildings, building elements and sitework, including: ... (h) wind ...”
- 6.28.4. For the reasons outlined in Table 2 (Appendix A), I consider that the following items of the as-built work do not comply with the above clauses:
- (1) Installation of ground anchors
 - (3) Location (with ultimate wind speed as per the design)
- 6.28.5. For the reasons outlined in Table 2 (Appendix A), I consider that there is not sufficient information to determine whether the building’s bracing as-built complies with the Building Code.
- 6.29. In terms of clause E2.3.2, for the reasons outlined in Table 2 (Appendix A), I consider that the following aspects of the as-built work do not comply:
- (4) timber barges to the roof cladding
 - (5) lack of flashing at ends of roof and at junctions and joints.
 - (6) Door construction: lack of head flashing on the French doors and profiled sill not recessed (prior to remediation)
 - (7) cladding/deck junction, including the lack of gap between the deck and house
 - (8) Moisture ingress at junctions between vertical wall and curved roof

- (9) windows (in terms of moisture ingress).

6.30. In terms of clause E3, for the reasons outlined in Table 2 (Appendix A), I conclude:

6.30.1. the roof and wall assembly as-built (11) do not comply with clause E3.3.1 of the Building Code in regard to condensation.

6.30.2. there is not sufficient information to reach a conclusion on whether the building work to install the shower (10) complies with the Building Code (at the time the code compliance certificate was issued)

6.31. Regarding clause B2.3.1, various building elements will be subject to moisture ingress and the effects of condensation which will lead to premature deterioration. Further, with failures of B1, E2 and E3 there will eventually be impacts to the durability of the structure.

6.32. The requirement under section 17 that all building work must comply with the Building Code has not been met because several aspects of the as-built work do not comply with Building Code clauses B1, B2, E2 and E3.

Whether the code compliance certificate and building consent should be reversed

The code compliance certificate

6.33. Previous determinations have established a two-step process for deciding whether to confirm, reverse or modify an authority's decision to issue a code compliance certificate. The first step is to consider whether the building work was completed in accordance with the building consent. If the building work, or elements of the building work, do not comply with the building consent, then I need to consider whether the building work complies with the Building Code.

6.34. As outlined at paragraphs above, there were several items of as-built work that did not comply with the building consent and the criteria in section 94 for issuing a code compliance certificate was not met. I have also concluded that the building as constructed does not comply with the Building Code. Taking into account the nature and extent of non-compliance, I consider the decision to issue the code compliance certificate should be reversed.

The building consent

6.35. As outlined at paragraphs above, the performance criteria in the Building Code would not have been met if the building work was completed in accordance with the plans and specifications. However, in situations where a building consent is later found to contain inadequate details or does not demonstrate compliance with the Building Code, it does not necessarily follow that the building consent should be reversed.

6.36. In *Cooper v Tasman District Council*²⁸ (“*Cooper*”), the District Court considered that the following factors should be taken into account when deciding whether flaws in a building consent mean that the building consent should be reversed:

6.36.1. The effect on the building owner of reversing the consent. The court noted that “...to reverse the consent entails the consequence that the house would have been built unlawfully, with further consequences which could ultimately include an order for its demolition”.²⁹ The court noted that the owner in that case was aware of that consequence and was determined that the consent should be reversed.

6.36.2. Whether the deficiencies in the building consent are relevant to the current issues of concern. Unless the flaws are significantly connected with the current issues of concern, then the consent should not be reversed.

6.36.3. Whether the flaws in the building consent were corrected during the construction of the building, through the process of inspections and the consideration of the issue of a code compliance certificate at the end. If the building ends up code compliant, reversal of the consent may not be appropriate despite shortcomings in the original consent.

6.36.4. On the other hand, if shortcomings in the consent meant that the building could never be code compliant, “...then to reverse the consent would seem to be the appropriate, if not the only, remedy”.³⁰

6.37. In this case, the owner has sought the determination in the belief that the decision to issue the building consent was incorrect.

6.38. The deficiencies in the building consent are significantly connected to the current issues of concern. Several aspects of the design, including various aspects of the external envelope of the building did not demonstrate compliance with clause E2. These deficiencies in the building consent are directly related to the moisture ingress that has resulted in substantial dampness and mould within the dwelling. I also note that the roof assembly is a significant contributing factor in the dwelling’s performance with regard to clause E3 and condensation in the dwelling, which has also resulted in dampness and mould.

6.39. The flaws in the building consent, in terms of both insufficiencies in the information provided and aspects that were not compliant, were not corrected during the construction of the building.

6.40. I have also considered the work that would be required to bring the building into compliance with the Building Code. Determination 2011/119 considered whether

²⁸ DC Nelson CIV-2009-042-11.

²⁹ *Cooper* at [37].

³⁰ *Cooper* at [43].

several building consents should be reversed for dwellings where extensive subsidence had resulted in settlement which was significantly beyond the tolerances permitted by the Building Code. The determination considered whether the buildings could be remediated to achieve compliance. It noted that “in practical terms the scope of remediation involved is likely to be so far from the original approved works as to not be a practicable or cost-effective solution as any successful remediation will most likely require removal of the existing structures”.³¹

- 6.41. In this case, some building elements were remediated after the code compliance certificate was issued. However, I consider that the remaining issues of non-compliance are not minor ones that could be easily addressed. Remediation of the building elements that are causing significant weathertightness issues is likely to require significant demolition and reconstruction in several critical areas and is unlikely to be cost effective.
- 6.42. In my opinion, the building would not be able to be remediated to achieve compliance in all respects without substantial redesign and reconstruction. For that reason, I consider it appropriate to reverse the building consent.

7. Decision and remedy

- 7.1. In accordance with section 188 of the Building Act 2004, I determine that:
- 7.1.1. in relation to the decision to grant the building consent, section 19(1)(ca) did not apply and section 49(1) was not met;
 - 7.1.2. in relation to the decision to issue the code compliance certificate, the building work was not in accordance with the building consent; and
 - 7.1.3. various aspects of the design and as-built work do not comply with the Building Code, as outlined in Table 2 (Appendix A).
- 7.2. I hereby reverse the decisions to issue the code compliance certificate and building consent No. 303348.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 9 November 2023.

Peta Hird

Principal Advisor Determinations

³¹ Determination 2011/119: The issue of building consents and code compliance certificates for three buildings on land that has subsided. Issued 23 December 2011.

Appendix A

Table 2: This table summarises the authority’s view and Ministry’s assessments of the identified items of building work. It also contains the Ministry’s conclusions on whether particular aspects of the design and as-built work³² comply with relevant clauses of the Building Code, and whether particular aspects of the as-built work comply with the building consent.

Building Code Clause	B1 – Structure B1.3.1 Buildings, building elements and site work shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives. B1.3.2 Buildings, building elements and site work shall have a low probability of causing loss of amenity through undue deformation, vibratory response, degradation, or other physical characteristics throughout their lives, or during construction or alteration when the building is in use. B1.3.3 Account shall be taken of all physical conditions likely to affect the stability of buildings, building elements and site work including: (h) wind
Building work item	(1) Installation of ground anchors
Authority’s assessment	<ul style="list-style-type: none"> • The plans note the angle of installation should be 40° to 45°. However, photos show anchors at various angles, which do not appear to meet the parameters specified on the plans. • The authority does not consider that the ground anchors, as-built, comply with B1. The issue could be rectified by removing the anchors and reinstating them at the correct angle.
Ministry’s assessment	<ul style="list-style-type: none"> • Section A shows 22mm stainless steel rigging screws installed vertically along the side/external wall, connecting the timber platform to the load-point (head) of the screwed earth anchor, which is inclined at 40-45degrees (see Figure 1). • The installation guide for the specified proprietary anchor required the anchors to be installed at the same angle (or close to) as the load for maximum pull out strength³³ when guying on an angle. • As-built, the earth anchors are guyed at an angle, meaning the rigging screws are not vertical as per the design. Also, the anchors

³² Unless stated otherwise, the as-built work means the building work as it was when the code compliance certificate was issued.

³³ The pull out strength ranges from 1.56 kN to 37.4 kN depending on the soil class

	<p>have not been installed at the same angle as the load as specified in the manufacturer’s specifications.</p> <ul style="list-style-type: none"> • I confirm the detail, as built, does not comply with the consent. • As the anchors are now set away from building and not secured according to the specifications, sliding resistance cannot be provided by the anchor system and compliance with clauses B1.3.1 and B1.3.3(h) has not been achieved.
Conclusion	<ul style="list-style-type: none"> • The as-built work does not comply with the building consent. • The as-built work does not comply with clause B1.
Building work item	(2) Bracing
Authority’s assessment	<ul style="list-style-type: none"> • The structural design for the bracing was reviewed by a Chartered Professional Engineer (CPEng). Their assessment (“The Ark – 9m Structural Assessment Report”), which was submitted with the building consent, notes it was assessed “against wind and earthquake loading for the worst-case scenario in New Zealand” • Although the compliance of the bracing was not specifically mentioned in the consent processing notes, it is reasonable to rely on the report as establishing compliance with B1. • In terms of the as-built bracing, the documentation does not indicate that there is a compliance issue with B1.
Ministry’s assessment	<ul style="list-style-type: none"> • The as-built bracing does not comply with the consent. • It is clear in the engineer’s structural assessment that the multi-strap brace, the continuation (in part) of the loft and the external bracing member were part of the bracing design. • The multi-strap brace was not installed, the mezzanine floor does not have the 500mm wide lengths along the side to the front wall, and there is no external bracing member at mezzanine level as shown in the plans and engineer’s assessment. • The changes to the bracing were not reviewed by the engineer. • The authority’s site inspection report of 21 March 2019 records it accepted the lack of multi-strap bracing on the basis that “the ply

	<p>acts as a bracing element”.</p> <ul style="list-style-type: none"> • Regardless of the authority’s acceptance of the change to leave out the multi-strap bracing³⁴, the as built work does not comply with the building consent in other respects. • I have insufficient information to confirm that the building as constructed will still perform in the way intended in the original design. Therefore, for the bracing I am unable to make a conclusion on compliance of as-built work with clause B1.
Conclusion	<ul style="list-style-type: none"> • The bracing as built does not comply with the building consent. • Insufficient information to determine compliance of the bracing as built with clause B1.
Building work item	(3) Location (with regard to the ultimate wind speed as per the design)³⁵
Authority’s assessment	<ul style="list-style-type: none"> • Considering the location in relation to the Multiproof would be moot, the design is outside the scope of the Multiproof certificate. • However, the plans submitted with the building consent application state that the design was reviewed by structural engineers and assessed against worst case scenarios in NZ. It does not appear that there is an issue with the wind speed at the location exceeding those provided for in the consented plans.
Ministry’s assessment	<ul style="list-style-type: none"> • B1.3.2 requires buildings, building elements and site work to have a low probability of causing loss of amenity through undue deformation, vibratory response, degradation or other physical characteristics throughout their lives, or during construction or alteration when the building is in use. • B1.3.3 requires consideration of various physical conditions likely to affect stability, including wind (B1.3.3.(h)) • Amenity means an attribute of a building which contributes to the health, physical independence, and wellbeing of the building’s users. • The building is located on an exposed site in a high wind zone. It is evident from the video submitted by the owner that there is

³⁴ Refer clause 3 of the Building (Minor Variations) Regulations 2009. The determination does not consider whether the absence of the multi-strap bracing meets the definition of a minor variation.

³⁵ Note: This item was initially framed as “Location (with regard to the ultimate wind-speed in Multiproof certificate)” but has been reframed because the Multiproof certificate did not apply.

	<p>movement and vibrations experienced in the wind speeds that occur at this site.</p> <ul style="list-style-type: none"> • The foundation system relies on the weight of the building (including the pontoons filled with water) and the ground anchors to prevent the building sliding or overturning. • There is also insufficient information provided in the building consent to demonstrate resistance to uplift and other movements and forces this building may be subjected to. The engineer's assessment does not include calculations relating to: transfer of uplift weight of the waterfilled pontoons from the interior parts of the floor to the external walls without damage to the floor; the resistance of the structural connection between the pontoons and floor platform; and resistance of pontoons rolling with lateral sliding forces applied at platform and resisted by friction at ground level. Therefore, I am unable to reach a conclusion regarding compliance with B1.3.3. • In relation to B1.3.2, I am of the opinion the level of movement and vibration demonstrates non-compliance in respect of amenity. • The owner has made modifications to further stabilize the building platform and installed a windbreak to reduce the impact of winds against the structure. I have not assessed the compliance of the building work after these modifications were made.
Conclusion	<ul style="list-style-type: none"> • As-built, complies with the building consent but there is insufficient information in the consent documentation to demonstrate compliance • As-built, does not comply with the Building Code.
Building Code Clause	<p>E2 – External Moisture</p> <p>E2.3.2 Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements, or both.</p>
Building work item	<p>(4) Timber barges to the roof</p>
Authority's assessment	<ul style="list-style-type: none"> • The installation of the barge boards and the junction of the timber deck are subject to a specific engineer design. The design does not appear to incorporate metal flashings. Flashings and capillary breaks should have been used to protect against moisture ingress.

	<ul style="list-style-type: none"> The authority considers that both the design and as-built work do not comply with E2 in this respect.
Ministry's assessment	<ul style="list-style-type: none"> Barge flashings are a common component in buildings to prevent moisture entering the roof assembly and protect the roof edge. The design is using timber boards in place of a barge flashing to achieve compliance with E2.3.2. A construction detail in the drawings³⁶ includes the size, timber treatment, and number of layers: 2 x 90 x 25mm, a 20mm packer capping the corrugated cladding, and another 90 x 25mm board over the cladding. The detail as designed achieves a 70mm overlap but is not watertight. The detail in the design does not show a junction between the barge and the laminated arch, and there is no indication in the design that the arch edges were to be covered. During the site visit, it was noted that the barge was not constructed in accordance the consented plans. However, both the design and the as-built construction lack components to prevent the ingress of external moisture into the roof assembly. The barge has been installed over the top of the arch. It consists of one board (the same size as the laminated arch) that the corrugated cladding butts against, and another board which overlaps and extends over the corrugated cladding. The use of the board over the corrugated cladding provides some protection at the roofing edge. However, the overlap appears to be less than 70mm and in this wind zone junction from wind driven moisture will not be prevented from entering at this junction. In my opinion, this detail as built does not comply with clause E2. In terms of preventing moisture ingress into the roof assembly, the barge boards are also only one part of the assembly (see item below). The barge boards do not protect the edges of the laminated arches and there is evidence of delamination of at least one arch.
Conclusion	<ul style="list-style-type: none"> Design does not comply with clause E2.

³⁶ Detail 2/402 on approved building consent drawings 30/11/2018

	<ul style="list-style-type: none"> As-built, does not comply with the building consent. As-built, does not comply with clause E2.
Building work item	(5) Lack of flashing at ends of roof
Authority's assessment	<ul style="list-style-type: none"> The roof cladding has been designed to run horizontally across the fall of the roof. However, the submitted documentation does not detail how weathertightness is to be achieved. Therefore, the design has insufficient information to show compliance with E2. At the time the code compliance certificate was issued, it appears that the as-built work did not comply with E2. According to correspondence, a foam strip is to be installed between the barge cover board and the cladding, which may have already been completed. If the foam is sufficiently compressed between the two parts, it may keep moisture from penetrating through the join. This should have input from someone experienced in weathertight design as it would be an alternative solution.
Ministry's assessment	<ul style="list-style-type: none"> The plans lack detail on how water entering the ends of the roof behind the timber barge boards would be controlled and diverted to the exterior and not re-enter the roof structure. There are no flashings in the plans. Wind driven moisture along the horizontal corrugations is likely to enter the roof assembly at this point. The ends of the roof have not been constructed with a channel or back flashing, meaning there is no means to control and divert moisture that enters at this junction. In my opinion, and considering the comments above about the barge boards, the detailing at the ends of the roof without a channel or back flashing does not comply with clause E2.3.2.
Conclusion	<ul style="list-style-type: none"> As-built, complies with the building consent but the design lacked sufficient detailing for weathertightness. As-built, does not comply with clause E2.
Building work item	(6) Door construction: lack of head flashing on French doors and profiled sill not recessed
Authority's assessment	<ul style="list-style-type: none"> The documentation which was submitted and approved shows a head flashing.

	<ul style="list-style-type: none"> • However, it appears that head flashings had not been installed at the time the code compliance certificate was issued, and therefore the as-built work did not comply with the consent. • The head flashings have subsequently been installed.
Ministry's assessment	<ul style="list-style-type: none"> • The plans lodged with the building consent application show a head flashing on the French doors and a lowered threshold. • Based on photographs and submissions, it is clear the French doors as constructed did not comply with the building consent nor with clause E2.3.2. The head flashing was not installed, and the door threshold was not in place; instead, the door was installed directly onto the building platform. This resulted in moisture entering the building causing undue dampness. • I note the lack of flashing has since been rectified and the door set replaced. I have not assessed the compliance of the building work after these modifications were made.
Conclusion	<ul style="list-style-type: none"> • As-built, did not comply with the building consent. • As-built, did not comply with clause E2.
Building work item	(7) Cladding/deck junction (including the lack of gap between the deck and house)
Authority's assessment	<ul style="list-style-type: none"> • The installation of the junction of the timber deck is subject to a specific engineer design. The design does not appear to incorporate metal flashings. Flashings and capillary breaks should have been used to protect against moisture ingress. • The wall to floor junction design is poorly detailed and is not sufficient to show compliance with E2. • The end walls should have a step-down and flashings to keep moisture out. • Therefore, it appears there are compliance issues with both the design and as-built work in this respect.
Ministry's assessment	<ul style="list-style-type: none"> • The drawings in the building consent application are inconsistent, with the section B showing a deck extending beyond the front and rear walls, but the detail "door sill" does not show a platform extending beyond the sill. • In addition, there is no capillary gap shown in the drawings between the external deck and internal floor (nor a step down or

	<p>threshold at this transition point).</p> <ul style="list-style-type: none"> Given the inconsistency in the drawings and lack of weathertightness detailing, I am of the view that the design did not show compliance with clause E2. The front and rear walls of the Ark have been constructed on the floor deck and set back from the edge (1270mm from the front and 440mm from the back). The walls are directly fixed to the platform with no physical separation, external flashing or drainage gap. Although there may be a “flexible flashing” (damp proof course) within the wall assembly that cannot be seen from the exterior, the plywood (cladding) sits directly on the platform, with no clearance, slope or element to divert water away from the building. The absence of one or all of these elements allows moisture to accumulate at the junction and absorption into the plywood and the wall cavity. Due to the inconsistency in the drawings, I am of the view the building work cannot be said to have been constructed in compliance with the building consent for the purpose of section 94(1). Some building elements at this junction will be exposed to the moisture ingress, such as the plywood linings (both external and untreated internal skins), and the internal framing around the door (sill and internal framing around opening). Moisture at this junction will cause damage to those building elements over time. This detail as constructed does not comply with clause E2.3.2.
Conclusion	<ul style="list-style-type: none"> Design does not comply with clause E2. As-built, cannot be said to be in compliance with building consent due to inconsistency in consent drawings. As-built, does not comply with clause E2.
Building work item	(8) Moisture ingress at junctions between vertical wall and curved roof
Authority's assessment	<ul style="list-style-type: none"> The design lacks detail on how the junction between the wall and roof is to be treated and is not sufficient to demonstrate compliance with E2. As built, it appears there may be a timber bead installed at the

	<p>external junction of the wall and roof. This will provide some protection against the ingress of moisture. From the photos, it is unclear whether the as-built work complies with E2.</p> <ul style="list-style-type: none"> • A flashing behind the cladding would provide additional protection. This is particularly true for the rear end of the dwelling, which has a smaller overhang and less protection from the weather.
<p>Ministry's assessment</p>	<p><i>Horizontal plywood joints (walls)</i></p> <ul style="list-style-type: none"> • The horizontal detail in the plans show a metal flashing at horizontal plywood joints. • It is not clear from the photos nor observable at the site visit whether a back flashing was installed at the horizontal plywood joints. A timber batten, which was not detailed in the plans, has been installed over the top of the joints. • Without information to confirm that the flashing has been installed, I am not able to reach a view on whether this detail as constructed will comply with clause E2.3.2. <p><i>Junction at wall and roof</i></p> <ul style="list-style-type: none"> • The plans, "curved/side wall and roof lining"³⁷, show a timber bead at the external junction of the wall and roof. There is no flashing or other secondary means of protecting this joint. • The timber bead has been installed, and accordingly it is compliant with the building consent. • It is not clear from the photos if a back flashing was installed, and I have not received any information that would suggest a flashing was installed at this junction. • Moisture ingress at this junction is highly probable and the timber bead is not sufficient protection from moisture tracking to the inside at this junction. The applicant has provided a photograph showing water in the interior at this junction. • The moisture ingress at this junction will result in damage to the untreated ply linings, meaning the junction does not meet the performance criteria in clause E2.3.2.

³⁷ Detail 2/402 on approved building consent drawings 30/11/2018

	<p><i>Junction between roof and deck (see figure 3)</i></p> <ul style="list-style-type: none"> • There is no detail in the plans shown for the junction between the roof and the deck. • It has been constructed with a timber bead, but I have no information about whether there is any flashing at this junction. • The timber bead will not be sufficient protection from moisture tracking inside the building elements at the junction between the roof/deck and at the point where this meets the wall. • The junction between the roof and deck as-built does not prevent moisture from being absorbed and transferred into the roof and wall system at that joint. Moisture will be absorbed and transferred into the building assembly and damage is likely to occur to the ply lining of the roof assembly along this junction and the untreated internal linings. This does not comply with clause E2.3.2.
Conclusion	<ul style="list-style-type: none"> • As-built, complies with the building consent but the design lacks sufficient detailing for weathertightness. • As-built, does not comply with clause E2.
Building work item	(9) Windows
Authority's assessment	<ul style="list-style-type: none"> • The windows, as designed, do not have a seal at the joint where the hinges are located, which will allow moisture to blow through the join. The design of the windows also has no flashings and relies on sealant to maintain weathertightness. • The lower pane has a 10mm lip for the pane to fit into, but it does not appear that there is a way to latch the window closed. Wind would be able to move the pane, allowing moisture to enter the dwelling. • The design was considered as part of the Multiproof which included compliance with E2; however, the authority has concerns as to how it complies. • There are also compliance issues with the as-built work. A hole has been drilled through the window frame, with a cord installed on the outside so that the window can be pulled up. This was not part of the design, it is not sealed in any way, and the string can wick moisture inside.

**Ministry's
assessment**

- As shown in the plans provided with the building consent application, the window frame and cladding junction relies on marine grade sealant. Sealant has a higher maintenance requirement and is vulnerable to expansion/contraction of the cladding. In this design, there is no secondary protection mechanism for managing moisture ingress at this join.
- In addition, there was insufficient information about the design to confirm performance of the windows in other respects. For example, there is nothing in the design to show how the window would latch closed, without which the pane could move freely with air movement allowing moisture to enter, and the opening mechanism and the holes for the string aren't shown nor the strip to prevent moisture entering at the join of the two panes.
- There is also a lack of detail in the plans to establish compliance with other relevant code clauses: the elevations do not confirm which windows open (*G4 Ventilation* and insofar as this relates to E3), and there is no material specified for the hinges on the windows (B2).
- In my view that as there was insufficient information about the design to be able to be satisfied the building work would comply with clauses E2 and G4 of the Building Code.
- There are several variations in the as-built work from the design: the size of the openable area in the design was greater than 50% (480mm from bottom of frame to hinge point), whereas the split in the window as-built is 50/50 (openable area/fixed); the external timber facing around the outside of the pane projects less than the proposed 51mm from the cladding; plans show a 580mm diameter window for the bathroom and 750mm diameter for all others, but the as-built windows are all the same size. A piece of acrylic has also been added to the internal face of the lower pane across the joint.
- I consider the building as constructed did not comply with the building consent.
- Based on observations on site, the round window units do not meet the external moisture or durability performance clauses of the Building Code, because the windows allow external moisture to enter the dwelling that will cause undue dampness and damage to building elements and some of the materials are failing. For example, corroded hinges and a broken acrylic plate across the join of the two windowpanes.
- Moisture entering beyond the sealant is not diverted to the exterior. Over time, this moisture would enter the timber framing

	<p>and there is no provision in the wall assembly for this moisture to drain or dry.</p> <ul style="list-style-type: none"> • There are several aspects of the window that allow external moisture to enter, and the applicant has provided photographs showing water on the internal sill. The acrylic strip that sits behind the hinge is likely to prevent wind driven moisture from entering directly through the join, but in at least one window this strip has already detached. In addition, holes drilled through the panes for the string are not weathertight. • I agree with the authority that the reliance on the string system to keep the window closed and the light weight of the acrylic panes means that the windows are prone to opening with wind/air movement. • I conclude the windows as constructed do not comply with clause E2. • At the time of the site inspection the hinges had failed, they were corroding/rusting with many of the screws no longer in place and hinges detached. I am of the view that this detail does not comply with clause B2.
Conclusion	<ul style="list-style-type: none"> • Design does not comply with clause E2. • As-built, does not comply with the building consent. • As-built, does not comply with clauses E2 and B2.
Building Code Clause	<p>E3 – Internal Moisture</p> <p>E3.3.1 An adequate combination of thermal resistance, ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries, and other spaces where moisture may be generated or may accumulate.</p>
Building work item	(10) Shower
Authority's assessment	<ul style="list-style-type: none"> • From the information provided, it appears that there is a compliance issue with the as-built work. The shower doors may need to be removed and reinstated to the product manufacturer specifications.
Ministry's assessment	<ul style="list-style-type: none"> • According to the submissions, the shower as originally installed was not installed correctly. The subsequent repairs and replacement indicate that there were issues and work was required to fix them.

	<ul style="list-style-type: none"> Because additional work has been carried out, I am not able to assess whether the original installation was in accordance with the approved plans and specifications nor whether it complied with the Building Code at the time the code compliance certificate was issued. Based on observations of performance at time of the site visit, it would appear there are no longer moisture issues around the base of the shower tray or shower door.
Conclusion	<ul style="list-style-type: none"> Insufficient information to determine whether the as-built work complied with the building consent or clause E3 at the time the code compliance certificate was issued.
Building work item	(11) Roof and wall assembly (condensation)
Authority's assessment	<ul style="list-style-type: none"> To appropriately handle moisture, E3 requires both insulation and ventilation, so G4 <i>Ventilation</i> is also relevant. Natural ventilation has been used as the means of compliance with E3 and G4. At the time the consent was issued, the Building Code required windows and/or other openings to the outside which had a net openable area of no less than 5% of the floor area. The window must be open when the bathroom is in use, in order for natural ventilation to work and compliance to be achieved. This will need to be verified by the owner.³⁸ There is insufficient information to comment on the compliance of the insulation aspect of E3. This will require further evaluation.
Ministry's assessment	<ul style="list-style-type: none"> Performance requirements of clause E3.3.1 rely on a combination of thermal resistance, ventilation and space temperature. The design of the walls and roof assembly is made up of a polystyrene core sandwiched between 9mm H3.2 plywood external skin and a 7mm or 9mm³⁹ untreated plywood internal skin (roof and wall respectively). There is no vapour barrier in the assembly. For thermal performance, the notations on the plans generally refer to the polystyrene core being 25mm, with a discrepancy in the ground floor plan noting 40mm.

³⁸ The owner confirmed they open the window in the bathroom for ventilation.

³⁹ As per sheets 101 and 405 of the approved plans.

	<ul style="list-style-type: none"> • In terms of ventilation, the design relies on three openable windows on the rear wall, but there are no calculations included in the plans for establishing adequate ventilation, such as the minimum openable area in relation to floor area. The plans don't include mechanical ventilation within the dwelling. Regarding the habitable spaces, I am of the view that the design did not have sufficient information to demonstrate it would comply with clause E3.3.1. • As designed, there is minimal air flow in the roof assembly, and no capacity for drainage or drying of any water or water vapour that enters the assembly. This means that any moisture within the roof or wall assemblies (including condensation) will accumulate on enclosed building elements, which creates potential for damage to those building elements. I consider the design does not establish compliance with clause E3.3.1 with regard to moisture in the roof and wall assemblies. • The roof and wall assemblies appear to have been built in accordance with the consent. • As constructed, there is minimal thermal resistance in the roof and wall assemblies and very little ventilation. • As indicated in the submissions, there is a significant amount of condensation that forms on the internal wall linings. I am of the view that the means of controlling the moisture by natural and mechanical ventilation are not adequate and the performance requirements of the clause E3 of the building code are not being met.
<p>Conclusion</p>	<ul style="list-style-type: none"> • Design does not demonstrate compliance with clause E3. • As-built, complies with the building consent (noting the design didn't demonstrate compliance) • As-built, does not comply with clause E3.

Appendix B

Building Act 2004

17 All building work must comply with building code

All building work must comply with the building code to the extent required by this Act, whether or not a building consent is required in respect of that building work.

19 How compliance with building code is established

- (1) A building consent authority must accept any or all of the following as establishing compliance with the building code:
- (a) compliance with regulations referred to in section 20:
 - (b) compliance with an acceptable solution:
 - (ba) compliance with a verification method:
 - (c) a determination to that effect made by the chief executive under subpart 1 of Part 3:
 - (ca) a current national multiple-use approval issued under section 30F, if every relevant condition in that national multiple-use approval is met: ...

45 How to apply for building consent

- (1) An application for a building consent must—
- ...
- (e) in the case of an application for a building consent that relates to restricted building work, state the name of each licensed building practitioner who, as far as the applicant is aware at the time the application is made, will be involved in carrying out or supervising the restricted building work that is the subject of the application; and ...

45B Changes to plans and specifications that have national multiple-use approval

- (1) When applying for a building consent in reliance on plans and specifications for which a national multiple-use approval has been issued, or for an amendment to such a building consent under section 45(4), changes may be made to those plans and specifications if—
- (a) the changes are permitted under the terms of the national multiple-use approval; or
 - (b) the changes are minor customisations permitted by regulations made under section 402(1)(kc).
- (2) If any other changes are made to the plans and specifications referred to in subsection (1), the national multiple-use approval does not apply.

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.
- ...

94 Matters for consideration by building consent authority in deciding issue of code compliance certificate

- (1) A building consent authority must issue a code compliance certificate if it is satisfied, on reasonable grounds,—
- (a) that the building work complies with the building consent; ...

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.

177 Application for determination

- (1) A party may apply to the chief executive for a determination in relation to either or both of the following:
 - (a) whether particular matters comply with the building code:
 - (b) the exercise, failure or refusal to exercise, or proposed or purported exercise by an authority in subsection (2), (3), (4), or (4A) of a power of decision to which this paragraph applies by virtue of that subsection.
 - (2) Subsection (1)(b) applies to any power of decision of a building consent authority in respect of all or any of the following:
 - (a) a building consent:
 - (b) an extension under section 52(b) of the period during which building work must be commenced before a building consent lapses:
 - (c) an extension under section 93(2)(b)(ii) of the period during which the authority must decide whether to issue a code compliance certificate:
 - (d) a code compliance certificate:
 - (e) a compliance schedule:
 - (f) a notice to fix.
- ...