BUILDING PERFORMANCE

Determination 2026/005

An authority's decision to grant a building consent under section 72 on land that is subject to a natural hazard of inundation

12 Clifford Avenue, Merivale, Christchurch

Summary

This determination considers an authority's decision to grant a building consent under section 72 for the construction of a new dwelling on a property that is subject or likely to be subject to the natural hazard of inundation. It considers whether the hazard is likely and whether 'adequate provision' has been made to protect the land, building work and other property.

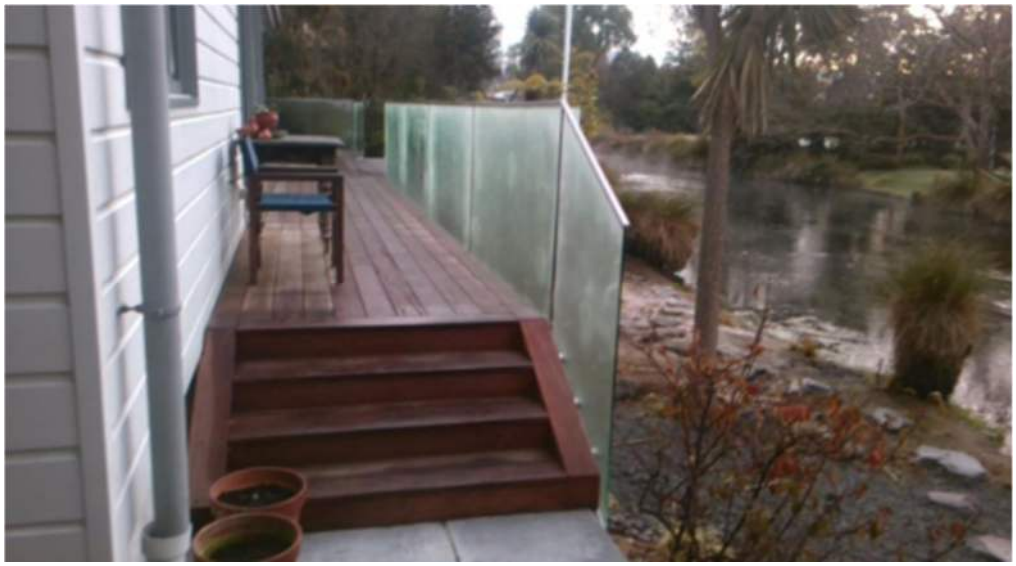

Figure 1: Position of the new dwelling & deck in relation to nearby Wairarapa Stream

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, Andrew Eames, Principal Advisor Determinations, for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment ("the Ministry").[1]

1.2. The parties to the determination are:

1.2.1. G R and J C Atkinson, the owners of the property ("the owners")

1.2.2. Christchurch City Council, carrying out its duties as a territorial authority and building consent authority ("the authority").

1.3. This determination arises from the authority's decision to grant a building consent under section 72 of the Act for building work on land in relation to the natural hazard of inundation[2]. This included a condition on the building consent that a section 73 entry be made on the property's record of title. The owners of the property dispute the need for the building consent to be granted under section 72.

1.4. The matter to be determined, under section 177(1)(b) and (2)(a), is the authority's decision to grant the building consent BCN/2016/7401 under section 72.

1.5. In deciding this matter, I will consider whether the owners' land is likely to be subject to a natural hazard (as required by section 71(1)(a)) and whether adequate provision has been made to protect the land, building work and other property from the natural hazard, in terms of section 71(2)(a).

2. The background and building work

2.1. The owners' property is a 677m² section situated on the banks of the Wairarapa Stream in a residential area of Christchurch. The property is a rear section with access down a long driveway from Clifford Avenue. The majority of the section, and the area where the building work occurred, is at the rear of the property and slopes gently down to the stream edge.

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

[2] As defined by section 71(3)(d).

2.2. The owners applied for a building consent on 30 August 2016. The building consent was for the construction of a new two-level dwelling with attached garage.

2.3. The design for the building work included foundation stabilisation and ground improvements, increased site levels around the proposed dwelling, a raised finished floor level (FFL) in the new dwelling (compared to the floor levels of the existing dwelling that was being replaced), and a deck on the streamside of the property.

2.4. On 8 September 2016, the authority issued a request for further information (RFI) in relation to the application. The RFI included that "*[a]s it is proposed to construct the dwelling within a waterway set back and parts of the building platform is[sic] below the required height, a section 72 will be required. (Please complete and return the attached hazard notice form)*".

2.5. The authority requested the owners to return the signed form to acknowledge that a section 73 hazard notice was to be placed on their property's record of title. The owners initially provided the acknowledgment form but subsequently advised that they had reconsidered. They wished to explore further the implications on insurance and financing of the proposed building work. The owners requested the authority to treat the form as unsigned.

2.6. Between October and December 2016, the owners and the authority exchanged emails regarding the proposed section 73 hazard notice, with the owners escalating their concerns to the authority's chief executive. The owners were of the view that a section 73 notice was not required. The authority's view was that it was, and in an email dated 25 October 2016, it explained its reasoning:

> Almost the entire site is subject to predicted inundation of 400mm or more in depth in a 1:50 year flood event. The portion of the site adjacent to the stream at the rear of the property is subject to depths much greater than this. All flood waters will be subject to significant flow velocity due to the adjacent stream. A large portion of the proposed dwelling is within the waterway set back.

2.7. On 12 December 2016, the owners and their agent met with the authority to discuss the proposed hazard notice. At this meeting, it was agreed that the authority would grant the building consent under section 72, without a signed acknowledgement, and that the owners would seek a determination to remove the section 73 hazard notice.

2.8. On 19 December 2016, the authority granted building consent BC/2016/7401, under section 72 subject to a section 73 natural hazard notification. The section 73 notice was recorded against the record of title of the owners' property on 22 December 2016.

2.9. The building work proceeded and was substantially completed in 2018, with the authority issuing a code compliance certificate in respect of it.

2.10. On 2 December 2024, the owners wrote to the authority to 'request the section 73 notice be removed from the record of title of their property on the grounds that no hazard of inundation existed and that the authority had been "unable or unwilling to demonstrate exactly what the hazard comprises".

2.11. Correspondence then passed between the parties in which the authority considered its original decision was correct and that to consider removing the notice it would require evidence from a suitable expert "that the land subject to inundation … will not be significantly damaged due to inundation".

2.12. The owners subsequently applied for a determination.

3. Submissions

The owner

3.1. With respect to the remediation and mitigation works undertaken on their property, the owners advised (in summary):

3.1.1. When the property was purchased in 1993, the owners were concerned with the dilapidated condition of the existing streamside retaining wall and approached the authority for advice.

3.1.2. The authority's policy at that time was to encourage the development of a soft natural edge with riparian planting. This was achieved by extending the bank into the stream with low-lying rock edging and overplanting of native grasses, with the work carried out by the authority. Periodic overflow was expected and deemed to be an ecologically friendly option.

3.1.3. During periods of extremely high rainfall, the stream does on occasion rise to cover some of the bankside plantings by a few centimetres. However, this overflow generally drains back into the stream within a matter of hours, with no lasting damage. The building platform for the owners' dwelling is "well-above this level and indeed any projected flood plain level".

3.1.4. The building platform of the owners' dwelling was raised approximately 800mm higher than both the previous dwelling and other existing neighbouring dwellings, yet these properties are not subject to similar hazard notices.

3.1.5. No additional mitigation work has been carried out since the building consent was granted in 2016, as in the owners' view there has never been any significant risk of damage.

3.2. With respect to the potential for inundation, the owners made the following submissions (in summary):

3.2.1. Any potential surface flooding is unlikely to be anything other than temporary and unlikely to cause personal hazard or any significant or lasting damage to their dwelling or land.

3.2.2. Any potential inundation will be slow flowing, as the property is effectively shielded by the adjacent upstream building as well as a substantial wooden fence and several large trees and other mature vegetation.

3.2.3. They believe the authority's original 2016 hazard assessment was based upon inaccurate data and subsequent misinterpretation of that data.

3.2.4. The authority has not provided evidence that surface flooding is likely to cause damage, and in their opinion, the section 73 notice should not have been placed on their title.

The authority

3.3. The authority made the following submissions (in summary):

3.3.1. Although the owners' building consent was processed on the authority's behalf by an external consultant, it was the authority that assessed the need for and decided a hazard notice was required.

3.3.2. The authority does not have modelling of water flow and levels for a 1% AEP.[3] Instead, it relies on data for a 2% AEP and 0.5% AEP. The authority is comfortable using the 2% AEP levels in the majority of assessments.

3.3.3. The authority's internal practice note details where a hazard notice need not be considered. A notice is not applied automatically where the guidance is not met, but "the situation needs to be considered more specifically".

3.3.4. In assessing the likelihood of inundation for the owners' property, the authority relied on an October 2015 Avon River hydraulic flood model status report. Using this report, the modelled inundation on the land intimately associated with the building on the owners' property exceeded 400mm in depth and was not considered to be slow flowing.

3.3.5. In assessing the building consent, the land, particularly between the house and the river, was considered at significant risk from fast-flowing inundation.

3.3.6. The land to the north-west of the property, being the primary entrance to the house and driveway, was modelled to only have nominal risk from inundation and was of lesser concern.

[3] Annual exceedance probability (AEP) is the probability of a certain sized flood occurring in a single year. A 1% AEP is equivalent to a once-in-a-100-year event, a 2% AEP a once-in-a-50-year event, and 0.5% AEP is equivalent to a once-in-a-200-year event.

3.3.7. At the time the building consent was issued in 2016, the 2% AEP was set at RL[4] 18.19m. In late 2024, the authority requested the latest modelling for the property. This resulted in the levels in a 2% AEP in 50 years' time increasing by 10mm to RL 18.29m, which is only nominally different to the earlier model.

3.3.8. The authority noted that, at the time the building consent was issued, it did not have any evidence that measures had been put in place to protect the land from inundation. It has still not been provided with sufficient evidence to the contrary.

4. Expert's report

4.1. The Ministry engaged a technical expert to provide assistance in making the determination. The expert is a chartered civil and environmental engineer experienced in hydrology and flood-risk management, and was supported by a chartered geotechnical engineer experienced in geotechnical assessment, and hazard management, including slope stability and foundation performance.

4.2. The Ministry is not required (and does not expect) to engage an expert in every determination to gather information to this extent in support of the parties' views. The Ministry decided in this case to engage an expert because:

4.2.1. the flood modelling provided by the authority in support of its decision was significantly data driven in relation to the potential for inundation and the stream's characteristics, with less emphasis given to the potential effects of any inundation that did occur

4.2.2. the proximity of the building work and the site levels in relation to the stream indicated that there was a high probability of inundation occurring during a high-rainfall event; meaning a site-specific assessment was required to ascertain the likelihood and level of damage to the land, building work, and other property of such inundation

4.2.3. it considered it would be useful to provide greater understanding for the industry on assessing the effects of inundation on the land, building work and other property.

4.3. The expert provided a report dated 13 November 2025 ("the expert's report"). An overview of the report is provided below, with a full summary given in Appendix A. The assessment contained in the report was based on:

- The building consent plans and specifications.

[4] RL = reduced level, being the vertical distance of a point above or below a standard reference datum. The RL for Christchurch drainage is based on the Christchurch Drainage Datum (CDD), a local benchmark originally set 50 feet below the Cathedral floor.

- supplied geotechnical reports, which were used to understand the ground conditions of the site

- hydraulic flood modelling, which was used to predict the depth and velocity of flood waters on the owners' property during a 1% AEP flooding event.

4.4. In terms of ground conditions, the report noted that:

- the owners' property is a gently sloping site, characterised by a low relief and low riverbank slopes of <2m

- "near surface soils comprise sandy gravels and gravel sands with layers of sand"

- groundwater is encountered at 0.5m depth.

4.5. The report also noted ground improvements and foundation building works undertaken at the site.

4.6. The hydraulic flood modelling informing the assessment in the report was based on the ''Citywide Model' of the Avon River', which was used to estimate the river's likely 'depth and velocity' at the owners' property. This model was considered more recent and preferable to the October 2015 'Avon River Hydraulic Model – Model Status Report' relied on by the authority when it made its assessment, which the expert stated did not contain sufficient specific outputs for the owners' property. A 1% AEP modelled flooding event was used as, in terms of the Act, an event of this severity is considered "'likely' … within the life expectancy of a residential dwelling and is therefore the event used to assess the potential for damage".

4.7. The modelling showed that flood depth across the property during a 1% AEP flooding event would range from "<100 mm to about 750 mm along the stream boundary in all scenarios", with the velocity of the flood waters remaining "consistently low (0.15–0.21 m/s) with little variation". These results were noted to be "approximate" but also to "indicate shallow depths and low, stable velocities", due to the "backwater effects from Fendalton Bridge downstream. The report stated that "At these velocities, erosion is unlikely to occur as grass tolerates much higher flows. Instead, sediment and minor debris may deposit, though floatable materials like bark mulch could be displaced during flooding."

4.8. The report noted that the predicted depth and velocity of flood waters meant that the owners' property had a "maximum flood hazard" category of H3 in terms of the *Australian Disaster Resilience Guideline 7-3 Flood Hazard (AIDR 2017)*,[5] which

[5] Australian Institute of Disaster Resilience. (2017). *Australian disaster resilience guideline 7-3: Flood hazard (AIDR 2017)*. Australian Government.

provides guidance on assessing and classifying flood hazards (referred to in the report as AIDR 2017b). Flooding categorised as H3 is considered to be "unsafe for vehicles, children, and the elderly", but unlike the higher risk categories (for example, H5 and H6) does not pose a structural risk to buildings.

4.9. The report further noted that at low velocities the predicted inundation of the owners' property "pose[d] no risk to foundation piles", that "Pier scour is also unlikely at these flow conditions", and that "No geotechnical land damage (e.g., reduced soil strength, settlement, or instability) is expected".

4.10. In conclusion, the report stated that "Based on the available information, there is no clear evidence of risk to the property, land, or building structure from flood damage or erosion", and that while, "In general, the [authority's] model is appropriate for defining flood risk and erosion potential at macro scale … engineering judgement is required when applied at a site-specific (micro) scale".

The authority's response

4.11. The authority provided the following additional comments in response to the expert's report.

4.11.1. It considers the experts who undertook the report to be suitably qualified, experienced and respected in their fields of work.

4.11.2. It does not have access to the data model used by the expert, but it appears to be a variation of the authority's master model. The authority does not expect significant differences between these models from this time period in this reach of the river.

4.11.3. It considers the conclusions reached about the likely velocities to be sound. Velocities on the edge of the channel, where vegetation and other private improvements increase the resistance to flow, would be expected to be low.

4.11.4. The expert focused on model outputs based on a coarse model terrain. A more accurate view would be to compare modelled flood levels to the site survey and proposed ground levels in the building consent.

4.11.5. Taking this approach, the authority notes that the 2% AEP level is approximately RL 18.29m across the site. Cross-sections in the building consent show some levels immediately adjacent to the dwelling on the waterway side could be approximately RL 17.60m, resulting in approximately 690mm depth of flooding under the deck. The majority of levels surrounding the dwelling appear to be above RL 18.00m corresponding to flood depths of less than 300mm in a flooding event.

4.11.6. The authority noted that these findings generally agree with those from the expert, unless consideration needed to be given to levels closer to the

waterway, further from the dwelling or in regard to a larger flood event scenario.

4.11.7. The flood hazard vulnerability methodology used by the expert (AIDR 2017b) is an accepted industry standard used throughout Australia and New Zealand. With the parameters noted above, the authority agrees that this does not indicate that damage to buildings would be likely in this case.

4.11.8. The waterway edging along this site was renewed in 1994 and the authority is not aware of any erosion concerns associated with this.

5. Discussion

5.1. The matter to be determined is the authority's decision to grant a building consent under section 72 with a condition of the consent being that a section 73 notice would be registered against the title of the owners' property.

5.2. The authority made this decision as it believed that adequate provision had not been made to protect the land from the natural hazard of inundation. The owners dispute that the land is or will be subject to inundation to the extent that it could cause damage.

The legislation

5.3. The legislative provisions relating to construction of buildings on land that is subject to natural hazards can be found in sections 71 to 74 of the Act.

5.4. Section 71(1) provides that an authority must refuse to grant a building consent for certain types of building work on land that is subject to a natural hazard, while section 71(2) creates exceptions where subsection (1) does not apply.

> **71 Building on land subject to natural hazards**
>
> (1) A building consent authority must refuse to grant a building consent for construction of a building, or major alterations to a building, if—
>
> > (a) the land on which the building work is to be carried out is subject or is likely to be subject to 1 or more natural hazards; or
> >
> > (b) the building work is likely to accelerate, worsen, or result in a natural hazard on that land or any other property.
>
> (2) Subsection (1) does not apply if the building consent authority is satisfied that adequate provision has been or will be made to—
>
> > (a) protect the land, building work, or other property referred to in that subsection from the natural hazard or hazards; or

(b) restore any damage to that land or other property as a result of the building work.

5.5. Section 72 identifies situations where an authority must still grant a building consent for building work, even though the land on which the work is being carried is subject to a natural hazard.

> **72 Building consent for building on land subject to natural hazards must be granted in certain cases**
>
> Despite section 71, a building consent authority that is a territorial authority must grant a building consent if the building consent authority considers that—
>
> (a) the building work to which an application for a building consent relates will not accelerate, worsen, or result in a natural hazard on the land on which the building work is to be carried out or any other property; and
>
> (b) the land is subject or is likely to be subject to 1 or more natural hazards; and
>
> (c) it is reasonable to grant a waiver or modification of the building code in respect of the natural hazard concerned.

5.6. Section 73 describes the conditions that must be included in a building consent when it is granted under section 72, including notification of the consent to the Registrar-General of Land. Upon receiving the notification, the Registrar-General of Land must record on the property's record of title an entry confirming that a building consent has been granted under section 72 and the natural hazard to which it relates.

5.7. As has been previously discussed in Determination 2024/025,[6] one of the purposes of this entry on the record of title is to make prospective purchasers of land 'aware that council would receive specific statutory immunity from liability in return for permission to undertake building work'.

5.8. Accordingly, in the current case I must consider:

5.8.1. whether the land on which the building work has been carried out is subject or likely to be subject to a natural hazard, under section 71(1)(a); and

5.8.2. if so, whether adequate provision has been made to protect the land, building work and other property from the natural hazard, as required under section 71(2)(a).

5.9. I note as a preliminary point that, as the building work provided for under building consent BCN/2016/7401 was for the construction of a 'building', the threshold requirement in section 71(1) has been met.

[6] *Determination 2025/025 An authority's decision to grant building consents under section 72 at 97 Taranaki Street, Te Aro, Wellington*, at paragraph 6.12.

Is the hazard likely?

5.10. The natural hazard in question in this case, under section 71(3)(d), is inundation by flooding.

5.11. Section 71(1)(a) therefore requires that the land on which the building work was carried out *is or is likely to be* subject to inundation.

5.12. Previous determinations[7] have discussed the use of the term 'likely'. In determination 2008/082[8] the discussion took into account a number of court decisions that had looked at the meaning of 'likely', and more recently, this discussion has been referred to in determinations 2024/025 and 2024/053.[9] I continue to agree with the statements made in these determinations regarding the meaning of 'likely' in section 71.

5.13. In summary of these previous determinations, the approach has been taken that a 1% AEP event is an appropriate measure for whether inundation is likely to occur, as a 1% AEP event 'could well happen' in the life-time of the building, being at least 50 years[10] in this case.

5.14. I continue to consider it appropriate to use this event scale when considering if the owners' land is likely to be subject to inundation as required by section 71(1)(a).

5.15. The authority has identified that the owners' property is located within a modelled 2% AEP (50-year return period) rainfall event floodplain, and the owners have not disputed this assessment. The authority's use of a 2% AEP event for its modelling of flooding risk indicates that there is an even higher likelihood of an inundation event occurring on the owners' property than is allowed for using the 1% AEP measure of flooding risk. In other words, it is more probable that flooding will occur on a property than is considered 'likely' using the 1% AEP standard, which means the likelihood test in section 71(1)(a) is met.

5.16. The Ministry's expert has estimated that the maximum flood depth on the owners' property under all of the modelled scenarios (0.5% AEP, 1% AEP and 2% AEP) would vary from approximately <100mm to 750mm, with the deepest point being immediately along the stream boundary.

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[7] See for example determinations 2008/082, 2019/067, 2024/025 and 2024/053.

[8] *Determination 2008/082 Building consent for a storage shed on land subject to inundation at 58 Brookvale Lane, Taupaki.*

[9] Op. cit. footnote 5; and *Determination 2024/053 An authority's decision to grant a building consent under section 72 for building work on land that is subject to a natural hazard of inundation at 91 Valley Road, Mount Maunganui, Tauranga*.

[10] Clause B2.3.1 provides for building elements to perform for "the life of the building, being not less than 50 years". This timeframe is also referenced in section 113 of the Act. I have taken these as context for placing the lifetime of the building at 50 years for the purposes of the Act.

5.17. Therefore, based on the authority's and the expert's modelling, I consider it likely that the owners' property is likely to be subject to inundation in terms of the Act.

Is the land connected to the building work?

5.18. It is not sufficient that the owners' property is likely to be subject to inundation, as section 71(1)(a) specifies that it is 'the land on which the building work is to be carried out' that must be likely to be affected.

5.19. I have discussed this requirement for the 'land' to be 'intimately connected' to the building work in previous determinations; and in determination 2021/013,[11] I stated that consideration must be given to 'the position of the building work on the property relative to that part of the land affected by the hazard'.

5.20. With respect to the owners' property, the source of the potential hazard is the Wairarapa Stream, which runs along the extent of the south-eastern boundary. The banks of the stream are low at <2m and sloped, with the slope continuing up under the deck. I have not been provided with exact measurements, but it would appear from the plans that the distance from the stream bank to the deck is approximately 2m, with the distance from the bank to the nearest point of the dwelling being approximately 1m more than this.

5.21. Given this, I consider that the land intimately connected with the building work in this case is not limited to only the land directly supporting the building work. The size of the site is relatively small at 677m² and the Wairarapa Stream boundary is a major feature of it and very close to the land on which the building work has taken place. Accordingly, I am of the view the entire property (with the exception of some small area of the driveway on the north-western end of the property) constitutes the 'land' for the purposes of "the land on which the building work is to be carried out" in section 71(1)(a).

Has adequate provision been made?

5.22. Section 71(2) provides that if adequate provision to protect the land, building work and other property from the natural hazard has been or will be made, then section 71(1) does not apply, and a building consent must be granted in the normal way under section 49(1) and without any conditions that would result in a hazard notice[12] being entered against the property title.

5.23. I must therefore consider what, if any provision, had been made to protect each of these three areas from inundation at the time that the building consent was granted.

[11] *Determination 2021/013 Regarding the proposed granting of a building consent for an alteration to a building on land subject to a natural hazard at 45 Darlington Road, Miramar, Wellington*, at paragraph 6.42.
[12] Being the entry required to be registered on the property title under section 73.

Provision to protect the land

5.24. Regarding the land, at the time the building consent was issued the authority's modelled flood levels during a 2% AEP was set at RL 18.19m. At that point, the existing site levels for the owners' property ranged from RL 18.20m at the street access, to RL 17.75m to RL 18.06m around the original dwelling, and RL 16.97m to RL 17.07m at the water's edge. The floor level of the original dwelling was noted as RL 18.17m.

5.25. The building consent plans included proposed foundation stabilisation and ground improvements. However, the approved plans only referred to '*ground improvements by others. Refer to geotechnical engineer for details*'.

5.26. Despite this, the authority's processing check sheet refers to sighting a Foundation Stabilisation Report[13] which recommended '*ground improvement RAP[14] 600 wide, 1.85m c/c, taken to 2m below dwelling and 3m in vicinity of stream – buffer of ground improvement between stream and dwelling*'.

5.27. The approved plans show finished ground levels around the new dwelling were proposed to be between RL 18.00m and RL 18.20m.[15]

5.28. The Ministry's expert has noted that the flood depth across the property is predicted to range from <100mm to about 750mm along the stream boundary under all of the modelled scenarios, including the 2% AEP scenario referenced by the authority.

5.29. However, the expert has also concluded that any potential inundation flood water would have low velocities, that erosion would be unlikely to occur, and that only minor debris may be expected to deposit. Furthermore, no geotechnical land damage (e.g., reduced soil strength, settlement, or instability) is expected.

5.30. For these reasons, I believe that adequate provision has been made to protect the land from the natural hazard of inundation, and no damage to the land is likely.

Provision to protect the building work

5.31. Regarding the building work, the key Building Code clauses that I believe are appropriate in relation to assessing whether adequate provision has been made are B1 *Structure*, B2 *Durability*, E1 *Surface water*, G9 *Electricity* and G13 *Foul water*.

5.32. With respect to surface water, Clause E1.3.2 requires that:

[13] Supplied by Golder Associates and dated November 2016.
[14] Rammed aggregate piers.
[15] Noting that some unfinished levels under the deck at the waterway side of the dwelling range down to RL 17.47m.

> Surface water, resulting from an event having a 2% probability of occurring annually, shall not enter buildings.

5.33. To ensure the requirements in clause E1.3.2 are met, the authority's internal practice is that the minimum finished floor level (FFL) of the dwelling must be over 400mm above the 2% AEP level, to incorporate a freeboard allowance.[16]

5.34. The modelled flood level on the owners' property during a 2% AEP event is RL 18.19m. The plans for the dwelling show that it was to have an FFL of RL 18.80m, which exceeds the minimum requirement to ensure the dwelling complies with Clause E1.3.2.

5.35. While the ground levels adjacent to dwelling in the area close to the stream edge are below 2% AEP levels (ranging from RL 17.47m to RL 18.00m), the dwelling's foundation has been designed to mitigate the risk of the inundation. This includes a blockwork perimeter foundation wall on a 300mm deep by 600mm-wide footing to retain the gravel raft ground improvements. In addition, a 700mm-deep waffle slab was positioned above the gravel raft to achieve the FFL of RL 18.80m along the waterway elevation of the dwelling.

5.36. The consented plans show that the FFL of the garage was set at a lower level of RL 18.50m. Clause E1.3.2 does not apply to the attached garage if considered an outbuilding under Clause A1[17]. However, the effects on elements of the building potentially subject to the inundation still needs to be considered, for example to achieve compliance with Clauses B1 Structure, B2 Durability and G9 Electricity. The design mitigated the potential for damage due to inundation by incorporating a 140mm-wide concrete upstand or nib wall, terminating +300mm above the garage FFL. This ensured that the garage framing and insulation were set at the same heights as those in the main dwelling.

5.37. I note that, on the consented plans, the external cladding (horizontal cedar weatherboards on H3.1 battens over 7mm H3.2 rigid air barrier) around the garage extends below the authority's minimum level for the property of RL 18.59m. However, the materials used in the cladding system are such, that in the event of inundation, the system can dry out and maintain its durability requirements. Should a worst-case scenario occur, and the property become subject to extensive inundation, only the lower boards of the cladding system would require maintenance.

5.38. Likewise, the bracing elements of the garage include the rigid air barrier which, given its H3.2 timber treatment, would maintain its integrity and durability in the event of the inundation indicated by the expert. The plasterboard lining (as a

[16] A freeboard allowance is the vertical distance added above the predicted water level (such as flood or wave height) to provide a safety margin against uncertainties like wave action, storm surge, or future conditions.

[17] The limits on application in Clause E1.3.2 state it shall apply only to *housing*, *communal residential* and *communal non-residential buildings*.

decorative lining, not providing bracing) within the garage would only be affected below the level of the timber framing against the concrete nib wall. Any impact of the inundation on this lower area of lining can be dealt with as normal maintenance.

5.39. With the FFL of the dwelling and the level of the top of the garage nib wall both set above the flood level, I consider this supports compliance with B1 Structure and B2 Durability for those building elements that may be exposed to some inundation has been achieved.

5.40. In relation to Clause B1 Structure, the expert has further noted that the low velocities of any potential flood water "*are not expected to be a risk for the building's foundation piles either, with wind and seismic loads being higher. 'Pier scour' around the piles is also not expected at such low velocities*".

5.41. The electrical outlets in the garage are all shown on the plans as being positioned well above the level of any flooding, including within the garage with its nib wall design, thereby achieving compliance with Clause G9 Electricity.

5.42. With respect to Clause G13 Foul water, the building's drainage system has been designed in accordance with AS/NZS 3500.2.2003[18] in order to comply with Acceptable Solution G13/AS3. Such a system is relatively enclosed, with the overflow relief gully positioned on the north-western paved terrace (which is further away from stream) which has an FSL[19] of RL 18.78m. The design is such that inundation flood water is unlikely to enter the drainage system and so the design complies with G13.

5.43. I am therefore of the view that, in achieving compliance with the Building Code in respect to these various clauses, adequate provision has been made to protect the building work from the natural hazard of inundation.

Provision to protect other property

5.44. While the site levels on the owners' property have been increased, and various ground and foundation improvement have been made, I note that the levels across the owner's property have not significantly increased from the levels that existed prior to the building work.

5.45. The building consent also details strips of land along either boundary where the existing site levels have been retained.

5.46. I also note that the property is not located in a dedicated overland flow path, and that in the event of inundation to the site, the neighbouring properties are likely to

[18] AS/NZS 3500.2:2003 Plumbing and drainage - Sanitary plumbing and drainage, current at the time of building consent
[19] Finished surface level (FSL)

receive similar depths of flood waters from the stream, given its location along their boundaries.

5.47. The proposed works do not increase the risk of damage from or redirect the inundation hazard onto neighbouring sites. As such, I believe adequate provision has been made to protect other property.

Conclusion

5.48. The owners' property is likely to be subject to a natural hazard in terms of section 71(1)(a) and adequate provision has been made to protect the land, building work and other property from that natural hazard, as required under section 71(2)(a).

5.49. As a result, the applicable pathway to grant the building consent for the building work on the owners' property was section 49 rather than section 72, and hence there was no requirement for a notice to be added to the title of the property under section 73.

5.50. The authority must notify the Registrar-General of land that the section 73 notification is not required.

6. Decision

6.1. In accordance with section 188 of the Building Act 2004, I determine that the building consent should have been granted under section 49 and I modify the authority's decision and remove the section 72 condition from the building consent. It is now for the authority to communicate this decision with the Registrar-General of Land.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 19 February 2026.

Andrew Eames
Principal Advisor Determinations

Appendix A: Summary of expert's report

A.1 This summary of the expert's report is provided for guidance on the nature and extent of the assessment undertaken. The Ministry is not required (and does not expect) to engage an expert in every determination to gather information to this extent in support of the parties' views, this was done for very particular reasons set out in the determination.

Background

A.2 The Ministry engaged the expert to provide technical expertise around flood risk management and flood modelling and hydrology for this determination.

A.3 The expert is a chartered civil and environmental engineer with 27 years of experience in flood risk management, including hydrology and flood modelling. He was supported by geotechnical engineer with 30 years of experience in geotechnical assessment, and geotechnical hazard management along with assessment of slope stability and foundation performance.

Site description and ground conditions

A.4 The expert used supplied geotechnical reports dated 2013 and 2016 to understand site, and noted that:

- the site was gently sloping with the key site factor being the low relief with low riverbank slopes <2m
- near surface soils comprise sandy gravels and gravel sands with layers of sand
- groundwater is encountered at 0.5m depth.

Ground improvements and foundations

A.5 With respect to the building work, the expert noted:

- ground improvements to site include rammed aggregate piers to 2m and 3m depths
- the house foundation comprised a waffle slab on reinforced gravel raft with ground improvements, although the specific details of the gravel raft (such as its thickness and number of geogrids) had not been provided
- the riverside deck was founded on shallow piles.

Geotechnical vulnerability

A.6 The expert provided the following summary of the site's geotechnical vulnerability.

Potential Flood Effects	Potential Geotechnical Effects	Susceptibility / Likelihood of Appreciable effects	Conclusion
Inundation	Loss of strength due to saturation of foundation Soils	Very Low - no significant loss of bearing capacity, or soil settlement is likely to occur.	Hence flooding is not expected to result in any land damage or detrimental effect on foundation performance.
	Instability	Very Low - stability unlikely to be effected during water inundation.	Land damage due to instability is not expected during flood inundation
Post Inundation	Instability as flood levels draw down or longer term	Very Low - post inundation instability due to post flood water level drawdown is considered unlikely (good drainage under building and low free face height). Stability of the land would not be worse than current during flood level draw down and in the longer term.	Land damage due to instability is not expected to be less than current after inundation.
Debris / soil deposits	Additional loading of site due to deposits of debris and soil. Limited to area where ground surface outside the buildings is below flood level. Debris and soil deposit thickness likely to be a thin and well less than the approx. 800mm max flood water depth predicted on site.	Very Low – soil / debris deposits are unlikely to increase loading sufficient to cause appreciable settlement or have any significant effect on stability post inundation. Also the debris would presumably be a temporary effect as any such deposits are likely to be removed to restore access and amenity to the property in the long term.	Land damage from settlement or instability is not expected as a result of soil / debris deposits during flooding.
Scour	Scour could have an effect on stability if metres of soil was removed from the river side slope. However the extent of scour is unlikely to be more than minimal.	Very Low - Scour of foundation soils infeasible (prevented by building foundations), and localised / minimal scour of river side slopes unlikely to result in more than minimal effect on stability	Land damage is not expected due to scour as a result of flooding.

TABLE 1 – SUMMARY OF ASSESSMENT OF POTENTIAL GEOTECHNICAL EFFECTS AND VULNERABILITY TO LAND DAMAGE

Flood modelling approach

A.7 With respect to the flood modelling approach used in the assessment, and to flood modelling in general, the expert noted:

- flood risk modelling is not a precise discipline
- a level of conservatism must be applied in modelling due to the simplifications and assumptions that must be made; this is because understanding of hydrology can be limited to relatively short-flow records
- this conservatism allows not only for limitations in knowledge of the catchment, but also future changes to that catchment and, to an extent, operational risks; this could include bridge blockages from debris, urban intensification, land use changes and climatic changes which need to be covered

- authorities should balance the level of model detail against the time and cost involved and potential future changes to the catchment when undertaking flood modelling
- flood models are generally based on publicly available data sets, but may also use proprietary data or authority data that is not publicly available.

Avon river modelling

A.7 With respect to the hydraulic flood models for the Avon River relied on by the authority, and during the subsequent expert's assessment, the expert noted the following points.

- The hydraulic flood model status report relied on the authority is now largely redundant, having been incorporated into a more recent citywide model of the Avon River. The citywide model was used by the expert to predict the river's depth and velocity.
- The expert used Danish Hydrological Institute Water and Environment Ltd (DHI) software, which is considered an industry standard platform for flood modelling and is extensively used across New Zealand by consultants and authorities. The recent work on the Avon River's catchment had been undertaken by a consultant using DHI software and had been peer reviewed by DHI.
- The software covers hydrology, which is the simulation of how rainfall translates to surface run-off and river flow, and hydraulics, which determines how that flow is routed through the catchment.
- 'Hydraulic roughness' is the speed of the flow in terms of speed, volume and depth of the water, accounting for topography, channel form and surface finishes. Surfaces with low roughness, like roads, allow water to travel faster than, for example, dense vegetation, which has higher hydraulic roughness.
- Rainfall data comes from NIWA's statistical analysis of historic records. A hydrological model converts rainfall into river flow, while a hydraulic model simulates how this flow moves through the river corridor to the sea. Soil permeability and saturation are considered to mimic natural runoff processes.
- The flood model integrates three systems:
    - pipe networks (MIKE URBAN)
    - open channels (MIKE 11)
    - floodplain (MIKE 21).

  These systems are combined in MIKE FLOOD, which ensures interaction between the systems.
- The model represents details for:
    - pipes: based on authority asset data, simplified where possible
    - streams: using surveyed or LiDAR-derived cross-sections
    - the floodplain: modelled as computational cells with LiDAR-based elevation; accounts for flood storage and overland flow

    - roughness: derived from land cover, roads, and buildings (treated as high roughness zones)
    - structures: including bridges and similar features modelled from surveys or as-built drawings.
- The model also includes an ocean boundary at the river mouth, although that was not relevant here as the Avon upstream of Fitzgerald Avenue is not tidally influenced.
- The model uses established St Venant and shallow water hydraulic equations to balance energy and mass for flow simulation.
- The model's results are provided as raster maps showing flow, speed, depth and other hydraulic parameters.
- The model is calibrated to historic flood events where sufficient data exists.
- The model's calibration compares simulated flows with Gloucester Street Bridge measurements. Flood estimates rely on short-gauged records (from the past 30–60 years), which is common practice, despite the 250-year period typically needed for reliable 1% AEP estimates.

Probability

A.9 The expert noted the following factors with respect to the flood event probability used in the assessment.

- A 1% AEP indicates a flood with a 1% probability of occurring in any given year on average.
- This is equivalent to a 1-in-100-year recurrence interval, on average. The 'on average' is important, as you may go 200 years without a flood of that scale, or have two 1% AEP floods in a single year.
- There is an element of randomness that applies to flood frequency, which over time averages out to a defined frequency.
- In terms of the Act, a 1% AEP is considered a 'likely' event within the life expectancy of a residential dwelling and was therefore the event used by the expert to assess the potential for damage.
- However, the authority used a 2% AEP and 0.5% AEP events for flood modelling and to set habitable floor levels.

Potential for damage

A.10 The expert made the following observations about the potential for a 1% AEP flood event to cause damage at the owners' property and how this was assessed.

- Damage refers to the building, its decking and associated land features, such as outbuildings, paths, staircases, and vehicle accessways exposed to floodwaters.

- The Avon River is a former Waimakariri channel, now spring-fed and oversized for its catchment. It lacks a developed floodplain, has generally low flood velocities, and shows minimal meandering due to stable banks and the absence of coarse sediment. Significant erosion is unlikely under current conditions.
- The original report relied on by the authority lacked specific outputs for the owners' property. The expert has, therefore, used depth and velocity data from the updated Citywide Avon flood model, which replaces the earlier model. This data can be requested from the authority.
- The following model scenarios were reviewed:
    - MaxD/MaxV = maximum depth/maximum velocity
    - 2020/2100 = near-current vs future climate/growth
    - 200R07T/50R07T = 0.5% AEP (1:200 year) vs 2% AEP (1:50 year)
    - 09hr/18hr = rainfall duration.
- It should be noted that the authority's model does not currently include a 1% AEP scenario.
- In all of the reviewed scenarios, the modelling showed that flood depth across the owners' property would range from <100mm to about 750mm along the stream boundary. Velocity is predicted to be consistently low (0.15–0.21 m/s) with little variation. Due to the model's coarseness and proximity of the stream boundary, the model's results are approximate, but do indicate shallow depths and low, stable velocities, with little variation between the scenarios.
- The low velocities are likely due to backwater effects from Fendalton Bridge, which is downstream, and where levels are controlled by overtopping of the road crown. At these velocities, erosion is unlikely to occur, as grass tolerates much higher velocities without damage. Instead, there may be deposits of sediment and minor debris, Floatable materials, like bark mulch, could also be displaced during flooding.
- Based on the predicted depth and velocity, the property's maximum flood hazard is likely to be category H3 (based on AIDR 2017b), meaning it may be unsafe for vehicles, children and the elderly. Higher categories of hazard (such as H5 and H6) pose structural risk to buildings, and do not apply here.
- The low velocities will pose no risk to foundation piles; with wind and seismic loads on the piles likely to be far greater. Pier scour is also unlikely at these flow conditions.
- No geotechnical land damage is expected (e.g., reduced soil strength, settlement, or instability).

Conclusions

A.11 The expert reached the following conclusions with respect to the owners' property.

- Based on the available information, there is no clear evidence of risk to the property, land or building structure from flood damage or erosion. While the authority's model is relatively coarse, it provides sufficient detail to support this conclusion.
- In general, the authority's model is appropriate for defining flood risk and erosion potential at a macro scale. However, engineering judgement is required when applied at a site-specific (micro) scale.
- In the expert's opinion, a section 73 notification is "not warranted based on the information received" in relation to the risk of damage and erosion from the river.