Determination 2023/042

The compliance of a wall made of ponga logs with clauses B1 and B2 of the Building Code

1/12 Rokino Road, Taupō

Summary

This determination considers whether a wall made of ponga logs, which is located on or near a property boundary, is a 'retaining wall' and a 'building'. It also considers whether the structure complies with Building Code clauses B1 *Structure* and B2 *Durability*.

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, Manager Advisory, 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. P Paalvast, the owner of the property at 1/12 Rokino Road ("the owner")

1.2.2. Taupō District Council, the applicant for the determination, carrying out its duties as a territorial authority or building consent authority ("the authority")

1.2.3. D Spencer-Smith and Liston Trustee Services 2020 Ltd, the owners of the neighbouring property at 14 Rokino Road ("the neighbours").

1.3. This determination arises from the authority's decision to issue several notices to fix in respect of work to install a section of wall made of ponga[2] logs (the "ponga wall"), located on or near the boundary between the owner's and the neighbours' property.[3] The wall replaces a previously existing ponga log wall built in the same location.

1.4. The authority is of the view that the work undertaken to construct the ponga wall does not comply with Building Code clauses B1 *Structure* and B2 *Durability*. The owner considers that the Building Act and Building Code do not apply to the work.

1.5. The matter to be determined, under section 177(1)(a), is whether the construction of a section of ponga wall, on or near the property boundary, complies with clauses B1 and B2 of the Building Code.

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

[2] 'Ponga' is the silver tree fern (*Cyathea dealbata*). It appears that the species of tree fern commonly used in this application is 'whekī' (*Dicksonia squarrosa*), which forms buds on its trunk and can resprout if the fronds and roots are cut off (What's a punga? | Te Papa's Blog, accessed 05/10/23). I also note that the term 'punga' appears to be a widely used colloquial version of the Māori term 'ponga'. When quoting the parties, the spelling has been kept as 'punga'.

[3] I have assumed from the parties' submissions that the horizontal distance from the ponga wall to the property boundary is less than the height of the ponga wall.

Issues outside this determination

1.6. The owner's submissions and correspondence contained their views on various additional matters that they are concerned about.[4] These additional matters are either outside the scope of this determination or are not matters that can be considered by the determinations process. Accordingly, I have not summarised them or considered them in the determination.

1.7. In their submissions, the owner has referred to several other enactments (eg the Resource Management Act 1991). I have no jurisdiction under other enactments, this determination only considers matters relating to the Building Act and its regulations.

1.8. The following issues are also outside the scope of the determination:

1.8.1. the compliance of any other section of the retaining wall (other than the section that was being replaced at the time of the authority's site visit)

1.8.2. the authority's decisions to issue several notices to fix in respect of the work

1.8.3. whether the building work did, or did not, require a building consent under Schedule 1 of the Act[5]

1.8.4. whether the work meets the requirements of Building Code clauses E1 *Surface water* and F4 *Safety from falling*.

2. The building work

2.1. The owner's property is a back section in a residential area in Taupō and is accessed down a long driveway from Rokino Road. The section contains the owner's house, set toward the north-east of the property.

2.2. There is an existing retaining wall running the extent of the south-west boundary between the owner's and the neighbours' properties. This existing wall, including the section that is being replaced, is located on or near the boundary between the two properties (see Figure 1). The face of the wall is visible from the neighbours' property, with the wall retaining the ground level on the owner's property, which is higher in elevation than the neighbours' land (see Figure 2).

[4] Items raised include (but are not limited to) contracts, the status of the owner as a 'living man', grammar manual styles, foreign corporations, postal service rules etc.

[5] Sections 41(1)(b) and 42A.

Figure 1: Aerial photograph provided by the authority, showing the approximate location of the new section of ponga wall, circled in red

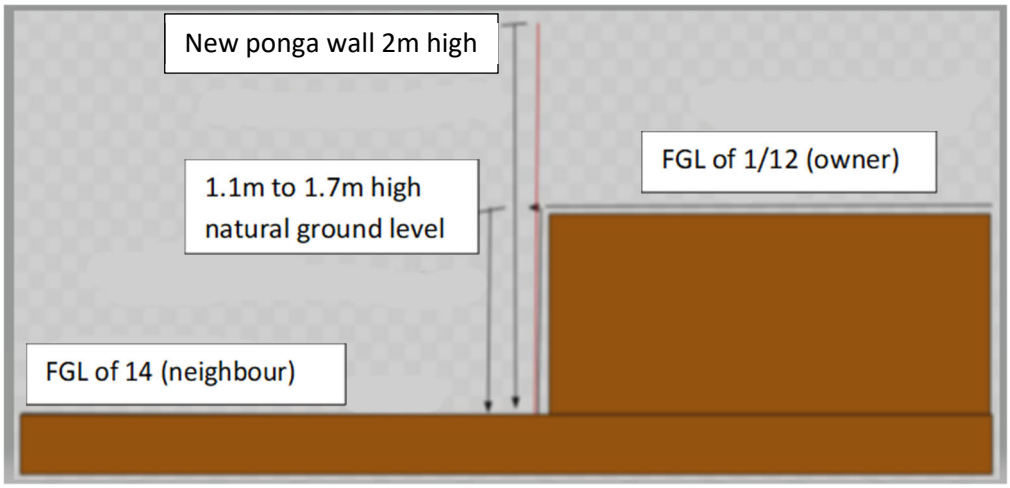

Figure 2: Diagram showing the relative finished ground level (FGL) of the properties (not to scale)[6]

2.3. The wall is approximately 17.85m long and is made up of four sections, comprising (from north to south along the south-west boundary):

2.3.1. a 2m long by 2.5m high section of original wall constructed from ponga logs

2.3.2. a 6.05m long by 2.5m high section of original wall constructed from wooden posts and boards, which retains earth on the owner's property approximately to the height of the top of the wall (2.5m)

[6] This diagram has been reproduced from a similar diagram provided by the authority.

2.3.3. a 4.2m long by 2.5m high section of original wall constructed of ponga logs, which retains earth on the owner's property approximately to the height of the top of the wall (2.5m), which then slopes downwards (towards the new section of wall)

2.3.4. a 5.6m long by 2m high section of new wall constructed of ponga logs, which is the section of wall that is the subject of this determination (see Figure 1).

2.4. The authority advises it has no information about the construction of the original wall on its property files. However, the owner has indicated the wall has been in place for approximately 35 years.

2.5. At some point, the 5.6m long section of original wall (on the southern end of the boundary) collapsed. The owner has stated that this was due to a heavy rain fall. The owner then began to install new ponga logs in the area where the existing wall had collapsed. The owner states these logs were shorter than the original length used in this section, as the original length was not available. The owner considered they were planting the ponga logs rather than doing building work.

2.6. I have not received any plans or specifications detailing the design and construction of the ponga wall. However, from the photograph supplied by the authority it appears that the ponga logs have been sawn to a regular length, with flat tops and bottoms, and all side stalks, fronds and roots removed. The ponga logs appear to be thicker at the bottom than at the top, and are of varying diameters (see Figure 3).

Figure 3: Photograph of the new ponga wall (5.6m long and 2m high), from the neighbours' side, provided by the authority

2.7. In terms of the installation, the ground adjacent to the new ponga wall has been excavated on the owner's side of the ponga wall. The excavation appears to have been in two steps; there is a narrow trench immediately alongside where the logs have been installed, which rises to an embankment. The excavation is not uniform,

and the narrow trench does not appear to continue the full length of the new wall. The embankment rises to approximately 1.1m above the ground-level of the neighbours' property (see Figure 4).

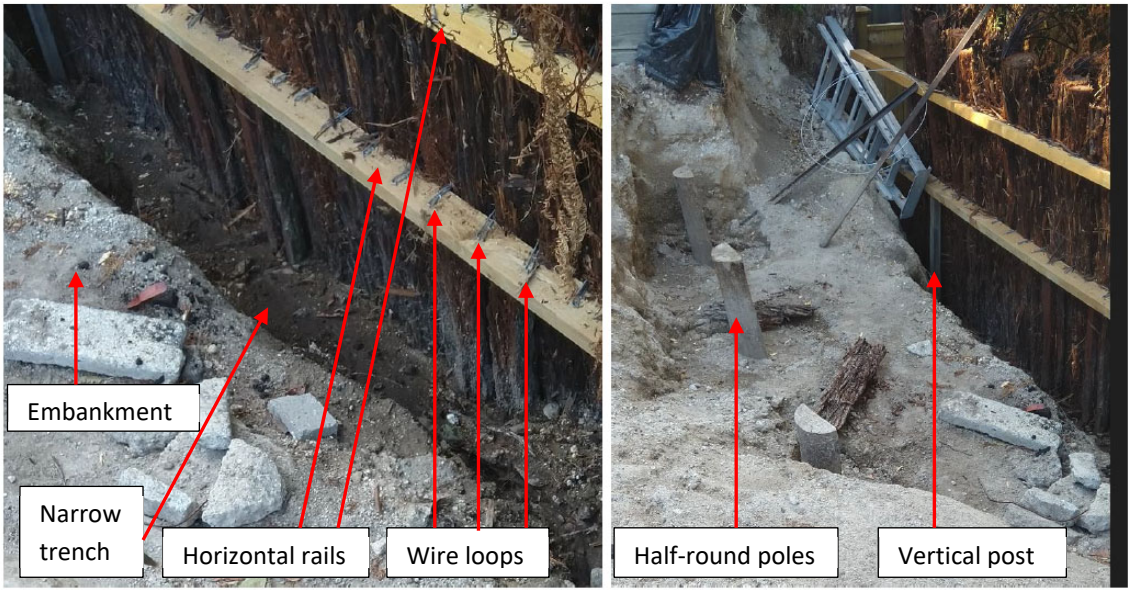

Figure 4: Photographs showing the excavation and ponga wall from the owner's side

2.8. The ponga logs have been fixed in place by two horizontal timber rails that run the full length of the new ponga wall. One of these rails is near the top of the ponga wall, and the other is about halfway down its height. The ponga logs have been fixed to these rails using wire loops (see Figure 4). It appears that U-shaped fixings have been used to attach the wire loops to the horizontal rails. One vertical post supporting the lower rail is shown in the photos, but it is not clear if this is permanent or a temporary post. The bases of the ponga logs have also been wired together in places.

2.9. No information has been provided by the parties to confirm if the ponga wall is supported by any form of foundation. However, the photographs provided by the authority appear to indicate the bases of the ponga logs are sitting directly on the ground (at ground-level of the neighbours' property) and have not been embedded into the ground to any depth. This has not been confirmed by either the owner or the authority, nor has it been contradicted in submissions. I also note that there are three half-round timber poles embedded in the embankment (see Figure 4). It appears that the owner may have intended to install tiebacks between the half-round poles (as anchors) and the ponga log facing or horizontal rails, although I have not been provided any design information from the owner to confirm.

2.10. Neither the owner or authority have confirmed the size, specification, and timber treatment (if any) of the rails. Similarly, no information has been provided regarding the size and specification of the wire loops or the fixings used to secure them to the horizontal timber rails. Further, no information has been provided to confirm if a

means of reducing any hydrostatic pressure at the base of the ponga wall has been installed (for example, a sub-soil drainage coil).

2.11. The authority advises that the owner's intention was to backfill the excavated area behind the ponga wall once it had been installed, to make the ground level immediately adjacent to the ponga logs level with the natural ground level of the owner's property. The authority advises this would mean the finished ground level behind the ponga wall would be between 1.5m and 1.7m higher than the ground level of the neighbours' property. However, I have received no information to confirm what depth of ground has been reinstated behind the ponga wall. There is also no information known about the geotechnical attributes of the retained ground, such as its inherent stability (without effective lateral retention) or whether it may be able to support additional surcharge.

3. Background

3.1. The neighbour alerted the authority to work to replace a section of the ponga wall in December 2021.

3.2. The authority visited the owner's property in January 2022, where it observed the work to install the ponga logs was underway. The authority advised the owner that the work required a building consent or certificate of acceptance, as it was a retaining wall over 1.5m high and was possibly retaining a surcharge. The owner disagreed that a building consent was required.

3.3. On 18 January 2022, the authority emailed an 'informal NTF' (notice to fix)[7] to the owner. Correspondence passed between the parties. The owner disagreed with the requirement to obtain a building consent and continued work on the installation of the ponga logs.

3.4. Between 27 January 2022 and 22 September 2022, the authority issued five notices to fix to the owner in relation to the ponga wall.

3.5. The parties met on 20 June 2022 and correspondence between the parties continued.

3.6. In October 2022, the authority sought guidance from a company of consulting engineers ("the engineering firm") around the construction of ponga retaining walls.[8] The engineering firm advised that:

> As far as we know there are no guidance documents for Punga retaining walls, as you know the pungas would fail to meet the requirements of B1 and B2 and should only be used for landscape garden fencing only.

[7] I would note there is no power outlined in the Act for an informal notice to fix.

[8] The advice was provided in response to a query from the authority, and it appears that the consulting engineer did not attend site at either property or observe the as-built ponga wall.

> You could limit the life to get around B2, but without extensive testing of each punga it would be nearly impossible to prove compliance with B1.

3.7. On 6 November 2022, the authority proposed a solution to the issue by reducing the depth of ground to be retained by the ponga wall. However, this was rejected by the owner in an email sent to the authority on 7 November 2022.

3.8. In the same email to the authority, the owner stated their view that the Building Act "clearly does not apply to our activity". The owner stated the purpose of the Act is to ensure that people who use buildings can do so safely, without endangering their health, and there was no evidence that people using the wall could not do so safely or without endangering their health. The owner also disputed whether "punga plantings" could be considered a retaining wall, building, building work or sitework.

3.9. On 14 November, the authority provided the owner with a "path of compliance" to demonstrate how the Act applied to the ponga wall, citing sections 7, 8, 14B, 14E and 19 of the Act to establish that the wall was required to comply with clauses B1 and B2 of the Building Code.

3.10. The owner replied on 24 November 2022, setting out their understanding of statutory interpretation, and repeating their view that the Building Act did not apply to their "punga planting activity".

3.11. The Ministry received an application for determination from the authority, which was accepted on 22 March 2023.

4. Submissions

The authority

4.1. The authority sought a determination on whether ponga plantings "used as a building element to retain earth on a property boundary as a retaining wall" can meet the requirements of clauses B1 and B2.

4.2. The authority included its own views on the matter to be determined, as well as additional comments from the engineering firm.[9]

4.3. In terms of clause B1, the engineering firm noted:

> B1 requires the structure of a wall or building to be demonstrated by using engineering principles or another compliance pathway. A key principle it [sic] the performance of materials i.e. are the materials used engineered, or otherwise. A punga wall is not considered an engineering material (such as stress tested timber

[9] It appears the engineering firm had not inspected the building work or seen photos of the excavation and new ponga wall, given that it had assumed the work had not yet been undertaken. The engineering firm also appears to have understood the excavation to have removed the "right of support" to the neighbouring property; when in fact, it is the owner's property that is retained and supported by the wall.

> or concrete). In theory, testing could be carried out to prove the performance of the material, but this is well beyond the scope of a normal landscaping project or [authority's] review process. Therefore Punga logs as a material are considered to be a face material only, and provide reduction to erosion from wind, sun and surface rain. For this reason a 'Punga Wall' is considered landscape facing only, and not a structural element… Punga facing does not avoid collapse or provide support to the wall, but instead reduces the rate that erosion occurs for a wall.

4.4. In terms of clause B2, the engineering firm noted:

> A punga fence has a design life in the order of 5-15 years. While some may perform longer than that, they are generally becoming unsound following that time unless the punga resprout and come alive. This tends to occur in the order of 10% of pungas used in this application, but is not generally a reliable pathway for B2 compliance. Some punga faced walls can use engineered products and gain durability from them. We are not aware of any engineered or consented wall being used in conjunction with this site. That is a viable pathway for engineering a 'punga wall'.

4.5. The engineering firm also noted that ponga logs typically vary between 150-200mm in diameter when used in this application and are selected for their size and uniformity.

4.6. The authority considers:

4.6.1. "…The earthworks and the punga 'wall' is building work".

4.6.2. "Compliance of a retaining wall is typically demonstrated by calculation (e.g. B1/VM4)". However, B1/VM4 and its cited materials and standards cannot be used as these documents do not include ponga logs as an engineering material. To conclude "that something is compliant with B1 not using engineering principles would need substantive evidence which is not available".

4.6.3. In addition, the authority cannot establish that the wall is compliant by way of an alternative solution, because:

- There are no known test methods, calculation methods, alternative pathway or the like that can be used to verify the specific punga logs as structural retaining wall members in this specific situation.
- The wall has not been in place long enough to be satisfied compliance is met through "in-service history". Just because something looks okay now does not necessarily mean it will be that way for its required life.
- We are not aware of existing situations where a punga wall has performed as a retaining wall which we can compare this situation to.
- There is no known trade literature or appraisal available that we can refer to for this situation.
- Expert opinion from a CPEng structural engineer has given an opinion that punga walls are not structural members.

4.7. The authority confirmed that it does not have information regarding:

4.7.1. the specifications of the horizontal timber rails and the wire that have been used

4.7.2. whether the ponga wall has foundations of any kind, or how deep the bottom ends of the ponga logs are buried (if at all)

4.7.3. how the wall is connected to the sections of wall or fence at either end (if at all)

4.7.4. whether subsurface coil drainage has been installed behind the wall.

4.8. The authority submitted that given the lack of information provided (or otherwise available to it), it cannot be satisfied on reasonable grounds that the wall is compliant. The authority noted that no building consent was applied for and access to the property has not been permitted by the owner.

The owner

4.9. The owner submits (in summary):

4.9.1. The Building Act does not apply because there is no connection between the "punga plantings" and the purpose of the Act, which needs to be satisfied before the other provisions apply. The work does not come within the purpose of the Act because there is no risk to anyone's health or safety.

4.9.2. The authority has misinterpreted the Act. The terms 'building', 'building work', 'person' and 'sitework' can only have the meanings defined in section 7 of the Act. The authority has used 'the general meanings' and 'common usage' of the words, not their statutory definition. This misuse of these words has followed through into the authority's application for a determination "on a matter that has no relationship/relevance to the purpose of the Act".

4.9.3. The authority's position is based on the point that a "retaining wall is a structure". To be a structure it must "align with the wording of the Act", in particular the definition in section 8. The definition in section 8 is limited to structures for the "occupation of people, animals, machinery, or chattels", which the owner's "punga planting" is not.

4.9.4. In addition, the owner's activity must "align with the meaning of 'building work'". The activity does not come within the definition of 'building work' in section 7 of the Act, as it is not associated with "the construction, alteration, demolition, or removal of a building".

4.9.5. The work is also not sitework, as it is not earthworks preparatory to or associated with the construction, alteration, demolition or removal of a

building, as required by section 7. The owner considers the authority has provided no evidence to prove the contrary.

4.9.6. The work is not new as it is a "a repair to an existing planting". The planting is all on the owner's property, and not on the boundary, as the authority suggests. The authority should treat the work as exempt from requiring a building consent under clause 1 of Schedule 1 of the Act, as a 'General repair, maintenance, and replacement', but the authority has ignored this offer.

4.9.7. The owner in no way accepts that their "activity" is a retaining wall or structure requiring regulation. The owner states that "[A] retaining wall must be built with building materials otherwise it is not built and nor is it a retaining wall". The owner has asked the authority to "provide evidence that Pungas are a building material thus needing to be regulated", but the authority has not done this. The authority has also not provided evidence to show the ponga are affecting any building.

4.9.8. The authority has to prove that retaining walls can be constructed from "living things that grow when planted in soil irrespective of how they are planted" and will also have to show that "retaining walls can grow". Ponga are not building materials and will grow roots "similar to hydroseeding", yet hydroseeding of banks is to not considered to be a retaining wall. Further, people are "allowed to put soils to any depth around any part of what they plant".

4.9.9. The authority has not provided "any evidence of any people that could have or did suffered [sic] any injury or loss of amenity and any property that was physically damaged", as required by the objective of clause B1 of the Building Code. Accordingly, there is no issue under clause B1.

4.10. On 26 July 2023, the Ministry requested information from the owner regarding the ponga wall, including details of the materials and construction method used, whether the wall has now been completed and the current ground level behind the wall. The owner did not provide any of the requested information.

The neighbours

4.11. The neighbours did not make a submission.

5. Discussion

5.1. The matter to be determined is whether the ponga wall described in paragraph 2.3.4 complies with clauses B1 and B2 of the Building Code. However, I must firstly address the owner's view that their "punga plantings" are not a 'building' and are not subject to regulation under the Building Act.

Is the ponga wall subject to the Building Act?

Is the ponga wall a retaining wall?

5.2. The owner considers that their "punga planting" is not a retaining wall or a building, and that no building work was undertaken. The term 'retaining wall' is not defined in the Act or the Building Code. It is therefore appropriate for me to consider its dictionary meaning:

> Serving to retain or hold by physical force or resistance[10]

5.3. The owner compared the ponga wall to the hydroseeding of a bank, noting that a hydroseeded bank is not considered to be a retaining wall. I do not consider that securing 2m long ponga logs to timber rails with wire to protect a vertical earth face is comparable to hydroseeding the sloping face of an embankment, which is inherently stable.

5.4. I note that the new section of wall forms the south section of an existing vertical retaining wall face along or near the property boundary, that is approximately 17.85m in total length, and up to 2.5m in height (as described in paragraph 2.3). This new 5.6m long section was under construction when the authority visited the property in January 2022, and the earth behind this section of the wall had been partially excavated, to expose a near vertical face.

5.5. The Ministry has not received confirmation of the finished ground level behind the new ponga wall. However, the authority advises that the intention was to reinstate the earth behind the wall to the natural ground level of 1.5 to 1.7m.

5.6. I consider that the earth behind the ponga wall would not be inherently stable and would require lateral restraint from the ponga wall to provide the necessary stability. I consider the likely intent of the ponga wall construction is to hold the free draining backfill between the cut face of the embankment and the back face of the ponga wall. The photographs provided by the authority suggest that the concept will be similar to that used within the adjacent wall sections.

5.7. Considering the ponga wall in question forms part of an existing retaining wall, and the intention was to reinstate the earth behind the wall, I consider the ponga wall has been constructed for the purposes of retaining or holding the earth placed against it. Therefore, the ponga wall is likely to be performing the function of a retaining wall, and this would be consistent with the other existing sections of the retaining wall.

Is the ponga wall a 'building'?

5.8. The word 'building' is defined in section 8(1)(a) as "…a temporary or permanent movable or immovable structure (including a structure intended for occupation by

[10] Oxford English Dictionary, accessed online on 11 October 2023.

people, animals, machinery, or chattels)…". I note that there are several exclusions set out in section 9; none of which are applicable to the current case.

5.9. Previous determinations have considered the meaning of 'structure' as it appears in section 8(1)(a). Determination 2016/002[11] states:

> 4.2.4 "Structure" is not defined in the Act and must be taken to have its usual or ordinary meaning: 'A building or other object constructed from several parts'…
>
> 4.2.5 For something to be a "structure" for the purposes of the Act, it must have some elements or constituent parts and/or be of some complexity.

5.10. I consider that as the wall consists of several constituent parts (including the ponga logs, fixings, wire loops, and timber rails) and the interaction of those parts as well as the retention of soil give it some complexity, it is therefore a 'structure' for the purpose of the Act.

5.11. The owner is of the view that the definition in section 8 is limited to structures for the "occupation of people, animals, machinery, or chattels", which the owner's "punga planting" is not. However, the word 'includes' in section 8 does not mean all other structures (that do not house people, animals, machinery or chattels) are excluded. There are numerous structures that are considered to be buildings under that Act that do not house people, animals or chattels, such as those listed in the 'Ancillary' category of Building Code Clause A1 *Classified Uses:*

> **8.0 Ancillary**
>
> **8.0.1** Applies to a building or use not for human habitation and which may be exempted from some amenity provisions, but which are required to comply with structural and safety-related aspects of the building code. Examples: a bridge, derrick, fence, free-standing outdoor fireplace, jetty, mast, path, platform, pylon, **retaining wall**, tank, tunnel or dam. [my emphasis]

5.12. I consider the inclusion of retaining walls within the classified use 'Ancillary' adds weight to a finding that retaining walls are considered to be buildings. I conclude that the ponga wall is a permanent and immovable structure which meets the definition of a building in section 8(1)(a).

5.13. I also note the owner's point of view that "punga plantings" are not building materials and cannot be a building if building materials are not used. The term 'building materials' is not defined in the Building Act or Code. However, the term 'building element' is defined in the Act as "any structural or non-structural component and assembly incorporated into or associated with a building…".[12] As I have reached the view the ponga wall is a building, it follows that the materials used in its construction are building elements; this includes the ponga logs and the

[11] Determination 2016/002 *Regarding the issue of a dangerous building notice in respect of a damaged shared driveway* (20 January 2016).

[12] Clause A2 - *Interpretation*

methodology used to incorporate and assemble them to form the completed structure.

5.14. The owner also states that their activity does not come within the definition of 'building work' in section 7 of the Act, as it is not associated with "the construction, alteration, demolition, or removal of a building". However, as I have concluded that the structure is a 'building', it follows that the work undertaken to construct the ponga wall was building work, including the sitework.[13]

Purposes and principles

5.15. The owner considers that there is no connection between their "punga planting activity" and the purposes of the Act. They state that the purpose of the Act is to ensure that people who use buildings can do so safely and without endangering their health, and there is no evidence that people could not do so in regards to the ponga wall.

5.16. The purposes of the Act are set out as follows:

> **3 Purposes**
>
> This Act has the following purposes:
>
> (a) to provide for the regulation of building work, the establishment of a licensing regime for building practitioners, and the setting of performance standards for buildings to ensure that—
>
> (i) people who use buildings can do so safely and without endangering their health; and
>
> (ii) buildings have attributes that contribute appropriately to the health, physical independence, and well-being of the people who use them; and
>
> …
>
> (b) to promote the accountability of owners, designers, builders, and building consent authorities who have responsibilities for ensuring that building work complies with the building code.

5.17. It is important that a wall is structurally sound so that any people who may use (or be around) the wall are safe. However, while the safety of users of buildings is a fundamental purpose of the Act, it is not the only purpose. As per section 3(b), another purpose is to promote the accountability of owners who have responsibility for ensuring that building work complies with the Building Code.

5.18. This responsibility of owners is also raised in section 4, which sets out the principles of the Act. As per section 4(2)(q), I must take into account:

> …
>
> (q) the need to ensure that owners, designers, builders, and building consent authorities are each accountable for their role in ensuring that—

[13] Section 7, 'Interpretation': Sitework means work on a building site, including earthworks, preparatory to, or associated with, the construction, alteration, demolition, or removal of a building.

> (i) the necessary building consents and other approvals are obtained for proposed building work; and
>
> (ii) plans and specifications are sufficient to result in building work that (if built to those plans and specifications) complies with the building code; and
>
> (iii) building work for which a building consent is issued complies with that building consent; and
>
> (iv) building work for which a building consent is not required complies with the building code.
>
> …

5.19. I also note that section 4(2)(j) requires that I take into account "the need to provide for the protection of other property[14] from physical damage resulting from the construction, use, and demolition of a building". There is an obligation on the owner to construct the wall to a standard that will provide adequate restraint to the earth behind it. Given the proximity of the ponga wall to the property boundary, the neighbouring property may be detrimentally affected by any collapse that may occur.

Does the ponga wall comply with clause B1?

5.20. The objective of Clause B1 *Structure* (provided at B1.1) is to:

> (a) safeguard people from injury caused by structural failure,
> (b) safeguard people from loss of amenity caused by structural behaviour, and
> (c) protect other property from physical damage caused by structural failure.

5.21. The functional requirement at clause B1.2 states, "buildings, building elements and sitework shall withstand the combination of loads that they are likely to experience during construction or alteration and throughout their lives".

5.22. Performance clause B1.3.1 states that:

> **B1.3.1** 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.

5.23. Performance clause B1.3.3 requires that account is taken of all physical conditions likely to affect the stability of buildings, building elements and sitework. Among other conditions, this includes self-weight, earth pressure, water, earthquake, and removal of support.

5.24. Performance clause B1.3.4 requires, among other criteria, that due allowance is made for the consequences of failure and for the effects of uncertainties resulting from construction activities.

[14] As per section 7, other property includes "…any land or buildings, or part of any land or buildings, that are not held under the same allotment; or not held under the same ownership…".

5.25. Performance clause B1.3.6 requires that sitework, where necessary, shall be carried out to provide stability for construction on site and avoid the likelihood of damage to other property.

5.26. The owner states that "anything under B1 is not in dispute" because the authority has not provided "any evidence of any people that could have or did suffer any injury or loss of amenity and any property that was physically damaged". However, the objective and functional requirements of this clause are to ensure buildings are constructed appropriately to prevent these situations from occurring throughout their lives. The performance speaks of probability. There is no requirement for people to have actually suffered injury or loss of amenity, or for other property to have actually suffered physical damage.

5.27. In this case, the building work was undertaken without a building consent.[15] Although the owner considers that the Act does not apply, they have also stated that the work "is clearly a repair" and suggests the authority should consider it exempt from requiring a building consent under clause 1 of Schedule 1.[16] However, section 17 states:

> 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.

5.28. I note that any retaining wall concept would need to incorporate a structural system that transfers lateral face loads from the vertical earth face to a point of stabilising support and be proportioned so that individual elements within the system are appropriately sized for this purpose.

5.29. No plans or specifications have been provided by the owner to either the authority or the Ministry, and the only information known about the construction of the ponga wall is from the authority's site visit and photos. The assessment below is not exhaustive, and is a decision based on the limited information available to me.

Compliance with clause B1 by way of an acceptable solution or verification method

5.30. Section 22(2) of the Building Act states:

> A person who complies with an acceptable solution or a verification method must, for the purposes of this Act, be treated as having complied with the provisions of the building code to which the acceptable solution or verification method relates.

[15] Sections 41(1)(b) and 42A.

[16] Clause 1 of Schedule 1 'General repair, maintenance, and replacement' exempts certain repairs from requiring a building consent. I note that it does not apply where a building product or assembly has failed to satisfy the provisions of the Building Code for durability.

5.31. In this case, the owner has not nominated a compliance pathway by way of an acceptable solution or verification method for the construction of the ponga wall.

5.32. Generally, Verification Method B1/VM4 would be used to cover the ultimate limit state design[17] of foundations of earth retaining structures. Compliance using this method could be established using a specific engineering design solution (eg structural calculations). However, in this case, there is a clear absence of any specific design information about the construction of the ponga wall, including if it was intended to comply with B1/VM4.[18]

5.33. I also note that while B1/VM4 contains information for retaining wall design, it is not sufficiently broad in scope to cover off all types of design. Some aspects also require designers to draw on the specific design rules within B1/VM1 (eg for structural timber, notwithstanding that ponga log timbers are not referenced in that material design standard).

5.34. Given the absence of any specific design information, I consider that the section of wall described in paragraph 2.3.4 does not comply with clause B1 by way of an acceptable solution or verification method.

Compliance with clause B1 by way of an alternative solution

5.35. Section 23 of the Building Act states:

> A person may comply with an acceptable solution or a verification method in order to comply with the provisions of the building code to which that acceptable solution or verification method relates, but doing so is not the only means of complying with those provisions.

5.36. An alternative solution is all or part of a building design that demonstrates compliance with the Building Code, but differs completely or partially from the acceptable solutions or verification methods. For an alternative solution, what is evaluated is the solution's compliance with the performance criteria in the Building Code clause.

5.37. I note that established methods of retaining wall design incorporate an identified 'load path' whereby the lateral earth pressures within the elevated soil mass will be transferred into the stabilising system and ultimately to the ground. The structural elements within the wall facing need to be of adequate strength, stiffness and durability to resist those loads for the prescribed life of the system (typically not less than 50 years).

[17] As per Australian/New Zealand Standard AS/NZS 1170.0:2002 at 1.4.10, the ultimate limit state means "States associated with collapse, or with other similar forms of structural failure. NOTE: This generally corresponds to the maximum load-carrying resistance of a structure or structural element but, in some cases, to the maximum applicable strain or deformation".

[18] Including the load combinations given in Australian/New Zealand Standard AS/NZS 1170.0:2002 'Structural design actions Part 0: General principles' as amended by B1/VM1.

5.38. In terms of the sufficiency of ponga logs as building elements, if the owner was proposing to design and construct a tied-back or an embedded retaining wall system (like a conventional timber pole cantilever wall), they would likely need to follow established structural engineering principles to demonstrate that the wall is stable when subject to lateral earth pressure loads. It may be that if the ponga logs were deeply embedded or tied-back, the lateral restraint loads on the stabilising system could be calculated. However, this would require detailed analysis, backed by testing to verify dependable strength, stiffness and durability for a design life of 50 years.

5.39. The authority considers that there is no known trade literature, appraisal, test or calculation methods that can be used to verify the specific ponga logs as structural retaining wall members. Further, if the owner was relying on an alternative solution to demonstrate compliance of the building work with the Building Code, they have not provided sufficient information to support that approach.

5.40. In the absence of any specific design and construction information about the as-built ponga wall (for example, any structural calculations or case studies of similar construction) then any assessment of compliance with the Building Code as an alternative solution is limited to what can be ascertained from the authority's photographs and site report, as well as the submissions made by parties.

5.41. In this case, it is not clear how the ponga wall is supported. For example, whether there is any form of foundation, or whether the part of the structure formed by the ponga logs is embedded into the naturally occurring ground (and to what depth if so). As noted at paragraph 2.9, the half-round poles indicate that the owner may have intended to install tiebacks between the half-round poles and the ponga log facing. However, no design information has been provided to confirm this is the case.[19] As such, it is not clear how any short or long term resistance to potential sliding or removal of support of the ponga wall has been considered in its construction (eg if it was subjected to any imposed surcharge or earth pressure applied to the back of the ponga wall).

5.42. Further, it is not clear what consideration has been given to limiting the effects of any hydrostatic pressure that may otherwise build up behind the retaining wall (such as the inclusion of sub-surface drainage).

5.43. Similarly, it is not clear what considerations (if any) have been taken into account in the construction of the ponga wall in terms of bearing capacity failure or sliding under earthquake loading.

5.44. In the absence of adequate information to assess how the ponga wall is supported or is able to resist any potential imposed loads, such as those that may cause it to overturn, rupture, or lose equilibrium, I am of the view there is more than a low

[19] I note that the positioning of the anchors and tiebacks would be a matter for specific engineering design.

probability of the ponga wall becoming unstable or collapsing throughout its life, as required by clause B1.3.1.

5.45. The ponga logs are closely butted together and connected in a line by timber rails, fixings and wire loops. However, I have been provided with insufficient information to ascertain if, as a whole structure, account has been taken of all physical conditions likely to affect the stability of the building (clause B1.3.3) and avoid the likelihood of damage to other property, throughout the life of the building.

5.46. I also note that the wall has not been in place long enough to have demonstrated compliance through its own in-service history.

5.47. I consider that the section of ponga wall described in paragraph 2.3.4 does not comply with clause B1 by way of an alternative solution.

Does the ponga wall comply with clause B2?

5.48. The objective of Clause B2 *Durability* is "to ensure that a building will throughout its life continue to satisfy the other objectives of this code".[20]

5.49. Clause B2.2 states, "Building materials, components and construction methods shall be sufficiently durable to ensure that the building without reconstruction or major renovation, satisfies the other functional requirements of this code throughout the life of this building."

5.50. To meet this requirement, a building (with only normal maintenance) has to be sufficiently durable to withstand its environmental conditions for the relevant timeframe. Under B2.3.1(a)(i), the durability period for building elements used in a retaining wall is 50 years, because the building elements provide structural stability to the building.[21] I also note that the owner needed to excavate behind the wall in order to construct it. Therefore, the building elements also appear to be difficult to access or replace, as per B2.3.1(a)(ii). For example, the lower of the structural timber rails would be in contact with and covered by the reinstated ground (to the depth advised by the authority).

5.51. I have not been provided information from the owner that indicates they have considered the deterioration of structural elements within the wall. For example, they have provided no information as to whether the ponga logs and horizontal timber rails are preservative treated, and whether the wire (in terms of the loops and possible tiebacks) are corrosion coated.

[20] Clause B2.1.

[21] Determination 2016/028 *Regarding the authority's exercise of its powers in issuing a code compliance certificate for a retaining wall* (19 July 2016) states, at paragraph 10.2.2: "The life of a retaining wall, as defined in Cause B2.3.1 is no less than 50 years."

Compliance with clause B2 by way of an acceptable solution or verification method

5.52. The owner has not nominated a compliance pathway for clause B2 by way of an acceptable solution or verification method for the building elements used in the construction of the ponga wall.

5.53. Acceptable Solution B2/AS1[22] refers to standards NZS 3602[23], NZS 3604[24] and NZS 3640[25] as forming an acceptable solution to meet the durability requirements of timber and wood-based building elements installed to perform under particular ground moisture conditions. However, neither B2/AS1 or the standards referenced refer to ponga logs or their use as building elements in the construction of a retaining wall (including when those elements are in contact with the ground and exposed to weather conditions). Therefore, the ponga logs are outside the scope of B2/AS1.

5.54. I also need to consider if the ponga logs used in this case may comply with Verification Method B2/VM1 by proof of performance taking into account the expected in-service exposure conditions by one or more of in-service history, laboratory testing, and comparable performance of similar building elements.

5.55. The authority was first alerted the replacement of the ponga wall in December 2021, and it observed the ponga wall under construction in January 2022. The authority stated, the "wall has not been in place long enough to be satisfied compliance is met through 'in-service history'". I agree. Due to the short period of time that the wall has been in place, insufficient information is available to take into account several factors including (but not limited to) the length of service, environmental conditions, degree of degradation, and reaction with other materials.

5.56. I note other sections of the existing retaining wall are also formed using ponga logs. The owner has advised that part of the existing ponga wall was first constructed approximately 35 years ago. However, I have insufficient information to establish how it has performed to date, although I note that one section of the wall collapsed in (or around) 2021.

[22] Acceptable Solution B2/AS1 (amendment 12, effective 28/11/2019), at [3.2.1].
[23] New Zealand Standard NZS 3602:2003 *Timber and Wood-based Products for Use in Building*, Part 1 'Mandatory requirements for compliance with the durability provisions of clause B2 of the New Zealand building code'.
[24] New Zealand Standard NZS 3604:2011 *Timber-framed buildings*.
[25] New Zealand Standard NZS 3640:2003 *Chemical Preservation of Round and Sawn Timber*.

5.57. I have received no information from the parties to verify whether the durability of the ponga logs used in this case has been based on successful performance in a laboratory test.[26]

5.58. I have received no information from the parties to confirm if the ponga logs in this case could be considered as similar to another building element with proven performance if both were subject to the same controls. If an assessment to determine a degree of similarity between similar materials has been undertaken by either party in this case, I have not been provided any such information to support that approach. This includes (but may not be limited to) an assessment taking into account the product composition, local environment, conditions of use, and performance in use. As such, there is insufficient service history with similar designs in similar environments to provide reasonable assurance of adequate performance. Therefore, I am of the view this work does not comply with clause B2 by way of B2/VM1.

5.59. I also note that neither the owner or authority have confirmed the size, specification, and timber treatment (if any) of the horizontal rails secured to the back of the ponga wall. Similarly, no information has been provided regarding the size and specification of the fixings and wire used to secure the timber rails to the ponga logs, and as part of a possible tie-back system. No laboratory testing or comparison has been provided. Therefore, I am of the view that this work does not comply with clause B2 by way of B2/VM1.

5.60. Taking into account all the factors considered above, I consider the the section of ponga wall described in paragraph 2.3.4 does not comply with Clause B2 by way of Acceptable Solution or Verification Method.

Compliance with clause B2 by way of an alternative solution

5.61. In this case, the building elements include the ponga logs, horizontal timber rails, fixings and wire. As stated previously, I have received insufficient information from the parties regarding the specifications of the building elements used in the construction of the ponga wall.

5.62. I also note the engineering firm (engaged by the authority) states that:

> A punga fence has a design life in the order of 5-15 years. While some may perform longer than that, they are generally becoming unsound following that time unless the punga resprout and come alive. This tends to occur in the order of

[26] For the purposes of this determination, I have not undertaken additional research to establish if laboratory testing may have been undertaken on the durability of ponga logs, for use as a building element, either in New Zealand or elsewhere.

10% of pungas used in this application, but is not generally a reliable pathway for B2 compliance.

5.63. Further, no information has been provided which indicates that any measures to relieve potential hydrostatic pressure have been incorporated into the construction of the ponga wall. This raises the possibility of increased levels of moisture in the earth behind the ponga wall, which may cause the building elements to degrade more quickly than they otherwise would have (although I have received no information about the nature and composition of the naturally occurring soils in proximity to the ponga wall).

5.64. I consider the section of ponga wall described in paragraph 2.3.4 does not comply with clause B2 by way of an alternative solution.

6. Conclusion

6.1. I consider that the ponga wall, located along or near the property boundary between 1/12 Rokino Road and 14 Rokino Road, is a 'building' under section 8(1)(a), and is therefore subject to regulation under the Building Act.

6.2. From the evidence put in front of me, I consider the section of ponga wall described in paragraph 2.3.4 does not comply with clauses B1 and B2 either by way of an acceptable solution or an alternative solution.

7. Decision

7.1. In accordance with section 188 of the Building Act 2004, I determine that:

7.1.1. The section of ponga wall described in paragraph 2.3.4 does not comply with Clause B1 Structure

7.1.2. The section of ponga wall described in paragraph 2.3.4 does not comply with Clause B2 Durability

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 20 December 2023.

Andrew Eames

Manager Advisory, Building Resolution