BUILDING PERFORMANCE

Determination 2024/043

Regarding the purported refusal of a building consent

70 Union Line, Marton, Rangitikei

Summary

This determination considers an authority's purported decision to refuse to grant a building consent for an extension to an existing shed. The determination considers the authority's requirement for a geotechnical report prepared by a Chartered Professional Engineer with a practice field in geotechnical engineering.

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, 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. D Mulholland, the applicant and Licenced Building Practitioner concerned with the relevant building work ("the engineer")[2]

1.2.2. Rangitikei District Council ("the authority"), carrying out its duties as a building consent authority

1.2.3. A R Page, the owner of the property ("the owner").

1.3. This determination concerns a building consent application (No. 220283) for an extension to an existing shed. A dispute arose when the authority required a geotechnical report prepared by a Chartered Professional Engineer ("CPEng") with a practice field of geotechnical engineering to support the application.[3]

1.4. The engineer is of the view the scala penetrometer test results they provided are sufficient to demonstrate compliance with the Building Code.

1.5. The matter to be determined, under section 177(1)(b) and (2)(a), is the purported refusal by the authority to grant the building consent.[4] In deciding this matter, I have considered the authority's requirement for a report from a geotechnical engineer.

---

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

[2] The applicant is a Chartered Professional Engineer (CPEng), with practice fields in civil engineering and structural engineering, and is a Licenced Building Practitioner (design and site, area of practice 3) pursuant to section 5 of the Building (Designation of Building Work Licencing Classes) Order 2010.

[3] In this determination I use the term "geotechnical engineer" to mean an engineer whose practice area, as defined in the Chartered Professional Engineers of New Zealand Rules (No 2) 2002, is geotechnical engineering.

[4] The authority did not make a decision to refuse to the grant the building consent under section 50, but would not continue processing the building consent application without a 'full geotechnical report' from a geotechnical engineer.

2. The building work and background

2.1. The property is in a rural location to the west of Marton, Rangitikei District. An existing 97m² shed is located close to the east boundary of the property near to the road access (Union Line).

2.2. The building work involves adding an approximate 57m² single-storey extension to the west end of this existing shed, and a veranda of approximately 27m².

2.3. The extension incorporates two bedrooms, a combined living and kitchen area, bathroom and cupboard. It is to be constructed using timber framing, and lightweight profiled metal roof and wall cladding.

2.4. The extension incorporates shallow reinforced concrete foundations, and associated thickenings under load-bearing walls, and a 125mm thick reinforced concrete floor slab.

2.5. The foundations for the veranda are timber posts and piles embedded in concrete.

2.6. The engineer provided a Producer Statement – Design (PS1), dated 1 May 2023 the addition to the existing shed. The engineer states that they had been engaged to provide "soil test and foundation design". The PS1 states the proposed building work was designed in accordance with Verification Method B1/VM1,[5] subject to site verification of the design assumptions to "good ground…NZS3604"[6] ("NZS 3604").

2.7. Accompanying the PS1 was a page of calculations that refers to "good ground – see soil report attached" and concluded "bearing pressure quite ok". The report was a 'scala penetrometer test sheet' dated 27 April 2023[7] and associated sketch plan. The test sheet shows the results for three test locations and the safe bearing capacities and blows per 100mm down to depths of between 1.1m and 1.2m below ground level.[8]

2.8. On 20 December 2022, the owner applied for the building consent.

2.9. Between 26 May 2023 and 4 July 2023, the authority and engineer exchanged emails in which the authority stated (in summary):

---

[5] Acceptable Solution and Verification Method for B1 Structure, first edition, amendment 20 (effective on 29 November 2021 until 1 November 2023). I note here that B1/VM1 cites B1/VM4 for foundation design, and B1/VM4 does not include means of determining soil parameters but includes information for guidance only on the types of investigations that may need to be conducted to determine soil parameters.

[6] New Zealand Standard NZS 3604:2011 *Timber-framed buildings*. 'Good ground' is defined in section 1.3 'Definitions', and as amended by B1/AS1 (first edition, amendment 20).

[7] There appears to be a typographical error, with the test sheet referring to NZS 4402:1986 rather than 1988. I have taken this reference to be to NZS 4402.6.5.2:1988 "Hand method using a dynamic cone penetrometer".

[8] I note the depth of the tests are not in accordance with sub-section 3.3.4 of NZS 3604, and neither have I received evidence to confirm excavations were undertaken in accordance with NZS 4402, paragraphs 6.5.2.4.2 or 6.5.2.4.3.

2.9.1. The engineer is not a geotechnical engineer and is not qualified to provide a geotechnical report.

2.9.2. A "full geotechnical report" is required from a geotechnical engineer, "not a scala penetrometer test".

2.10. I understand the authority subsequently issued the building consent on 22 February 2024, based on foundation recommendations prepared by a geotechnical engineer.

3. Submissions

The engineer

3.1. The engineer submits (in summary):

3.1.1. A shallow geotechnical investigation may be sufficient for simple building work in low-seismicity areas.[9]

3.1.2. A single storey shed addition of only 56.35m² based upon good clay ground (confirmed by the scala penetrometer soil testing) demonstrates compliance without the need of a full geotechnical report.

3.1.3. They relied on the Engineering NZ 'Geotechnical Input Decision Chart for Structural Engineers' for the "specific purpose of ascertaining whether input from a specialist geotechnical engineer is likely". The outcome is "Probably OK for Structural/Civil engineer design".[10]

3.1.4. They were not aware importance level 2 (IL2) buildings[11], which include timber framed dwellings, require a full geotechnical report [as indicated by the authority].

3.1.5. They are not a registered geotechnical engineer but consider the interpretation of the scala penetrometer test results for the foundation design can be used by civil engineers.

3.1.6. Registration as a geotechnical engineer is not a requirement to perform scala penetrometer tests, or to use those results for simple foundation design work.

[9] The engineer referred to information available on the Ministry's website at Ensuring new buildings can withstand liquefaction effects | Building Performance (accessed on 17 June 2024 and NZS 3604, section 5, figure 5.4 'Earthquake zones', and Marton being in earthquake zone 3.

[10] The decision chart is available at https://www.engineeringnz.org/news-insights/grounds-for-interference/. The engineer had completed the decision chart by answering "No" against each of the 15 questions asked. On this basis, the outcome was recorded as "Probably OK for Structural/Civil engineer design".

[11] Clause A3 'Building Importance Levels'. IL2: 'Buildings posing normal risk to human life of the environment, or a normal economic cost, should the building fail. These are typical residential, commercial, and industrial buildings'.

3.1.7. The building consent was not refused by the authority, but it would not consider the application because the engineer was not a geotechnical engineer.

3.2. Regarding the site and site testing, the engineer submitted:

3.2.1. The property is not in a natural hazard or potential landslide area. The site is relative level and located on "rolling hillside no evidence of alluvial setting".

3.2.2. The scala penetrometer test results show relatively firm to stiff clay material, and no other soil tests are required. No peat was discovered or anticipated.

3.2.3. Liquefaction[12] and ground water are highly unlikely in clay soils, and there is no evidence of expansive soils.

3.2.4. The bearing stresses imposed by the shed extension sitting on a 125mm thick reinforced concrete slab foundation are well within allowable limits for the clay soil and the vertical loads and the lateral earthquake forces imposed on the timber roof structure supported on timber walls are both relatively light.

3.3. The engineer also provided a copy of a letter dated 23 March 2023 regarding their engineering practice field from the Registration Authority for Chartered Professional Engineers. The Registration Authority confirmed (in summary):

3.3.1. The practice field may include simple geotechnical work in relation to the design, assessment, and construction monitoring of low-rise buildings.

3.3.2. The engineer's assessed practice field is civil and structural engineer, but this does not preclude the engineer from being able to practice in other fields of engineering.

3.3.3. As a Chartered Professional Engineer and a Chartered Member of Engineering New Zealand, the engineer is obligated to comply with the Code of Ethical Conduct, including only undertaking engineering activities that are within their competence.

3.4. The engineer also provided an undated letter from the authority;[13] which said:

> As the changes for B1 for Foundations changed in November 2021 we need to implement the following
>
> …

[12] Liquefaction is a natural process where earthquake shaking increases the water pressure in the ground in some types of soil resulting in temporary loss of soil strength. Three key factors that influence whether liquefaction occurs and severity of the resulting ground damage are soil condition (material type and density), groundwater table depth and earthquake shaking (duration and intensity).

[13] The engineer received a copy of the authority's letter (via an email) on 18 May 2022.

> All…Importance Level 2…will require a full Geotech report to show ground bearing requirements in accordance with NZS 4404[14] as per the requirements of NZS 3604 3.1.3(G)[15]. The Geotech report will need to be submitted for processing with the Building Consent Application…

The authority

3.5. The authority submits (in summary):

3.5.1. It requires a report from a geotechnical engineer "on the basis that Acceptable Solution B1/AS1 is excluded from being used on liquefaction-prone ground which came into effect from 29 November 2021".[16]

3.5.2. The change revokes the use of a "deemed to comply" pathway [namely B1/AS1] for foundations unless the ground has been assessed and or categorised as not being liquefaction-prone i.e. good ground.

3.5.3. It has relied on guidance provided by the Ministry titled 'Ensuring new buildings can withstand liquefaction effects'.[17]

3.5.4. It also relied on other guidance provided jointly by the Ministry and New Zealand Geotechnical Society Inc, titled 'Earthquake geotechnical engineering practice Module 2. Geotechnical Investigations for earthquake engineering'.[18]

3.5.5. The building is importance level 2 (IL2) and the authority requires "geotechnical testing for any IL2 or higher building".

3.5.6. The authority only has high level liquefaction maps.

3.5.7. The area is in a high seismic risk area where the Z-factor is greater than or equal to 0.3; Marton has a Z-factor of 0.3.[19]

3.5.8. The "test for good ground had not been met" based solely on scala penetrometer test results. The "request for a geotechnical report…did not revolve around the design of the shallow foundation".

---

[14] New Zealand Standard NZS 4404:2010 *Land Development and Subdivision Infrastructure*.

[15] NZS 3604:2011, 3.1.3: 'The soil supporting the footings shall be assumed to be good ground when all the following conditions are met [(a) to (d)]…And any of the following…(g) When geotechnical completion reports in accordance with NZS 4404 identify subsoil class and areas that provide good ground'.

[16] The authority was referring to a change made to Acceptable Solution B1/AS1, first edition, amendment 20 effective on 29 November 2021 until November 2023. Section 3.1.1 of B1/AS1 amended the definition of 'good ground' in section 1.3 of NZS 3604 by adding "liquefaction, lateral spread' in subparagraph (c). Further at section 3.1.14 of B1/AS1 A 'comment' states, 'Foundations for houses built on ground that has the potential for liquefaction or lateral spread are outside the scope of B1/AS1…'.

[17] Dated 27 July 2021.

[18] Dated November 2021.

[19] The authority stated it was relying on 'Z-values to determine seismic risk' available at www.building.govt.nz.

3.5.9. The authority is not questioning the engineer's ability to design foundations. Rather, the engineer "has provided limited information…of how good ground has been achieved with just Scala [penetrometer] results".

The owner

3.6. On 8 November 2023, the owner informed the Ministry they had obtained a report from a company that specialises in geotechnical, civil, and structural engineering, followed on-site investigations, and this report had been accepted by the authority.

4. Discussion

4.1. The matter for determination is the purported refusal by the authority to grant a building consent. The authority has not issued a written notice under section 50 but refused to continue processing the building consent application.

4.2. The building consent has since been granted and issued based on foundation recommendations prepared by a geotechnical engineer. However, the matter for determination relates to the original building consent application and the authority's requirement that a "full geotechnical report" be provided by a geotechnical engineer.

Legislation

4.3. Section 49 of the Act states that:

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

4.4. Section 45, 'How to apply for a building consent', states:

> (1) An application for a building consent must–
>
> (a) be in the prescribed form; and
>
> (b) be accompanied by plans and specifications that are–
>
> (i) required by regulations made under section 401; or
>
> (ii) if the regulations do not so require, required by a building consent authority; and
>
> …
>
> (c) contain or be accompanied by any other information that the building consent authority reasonably requires; and
>
> …

4.5. Section 45 therefore requires there to be enough information within the building consent application to enable an authority to make a decision under section 49.

Section 45 also permits an authority to set reasonable requirements for the documentation that accompanies building consent applications.

4.6. Section 48(2) provides a building consent authority may require further reasonable information in respect of an application for a building consent when processing the building consent application.

4.7. An authority is therefore entitled to set reasonable requirements for the documentation that accompanies a building consent application to ensure the building consent application clearly demonstrates how Building Code compliance is to be achieved.

4.8. Where the building consent application contains inadequate documentation, the authority is entitled to refuse to grant the building consent under section 50 of the Act. This is on the basis that without adequate documentation, the authority cannot be satisfied on reasonable grounds that the building work will be properly completed in accordance with the plans and specifications, such that it will meet the provisions of the Building Code. However, as per section 49 of the Act, the threshold for granting a building consent is only that the authority is satisfied on reasonable grounds, not beyond all reasonable doubt.[20]

The authority's requirements

4.9. The authority has referred to guidance published by the Ministry titled 'Ensuring new buildings can withstand liquefaction effects'. I note that this guidance concerns the revision of B1/AS1, and that the engineer in this case had not relied on B1/AS1 for the purpose of establishing compliance. However, in considering the authority's requirements I have taken into account the three key factors referred to in that guidance (soil condition, ground water, and earthquake shaking) that influence whether liquefaction occurs, and the sort of site investigation necessary to support the building consent.

4.10. The authority required a "full geotechnical report" from a geotechnical engineer, and considered the engineer was not suitably qualified to provide such a report. It is not clear what the authority considers constitutes a "full geotechnical report".

4.11. NZS 3604 3.3.3 (g) provides for a "geotechnical completion report" in compliance with NZS 4404 as a means to identify subsoil class and areas that provide good ground.[21] However, the engineer appears to have relied on tests for soil bearing capacity in accordance with NZS 3604 3.1.3 (e), which cross-references to section 3.3; and neither require the tests to be conducted by a geotechnical engineer.[22]

[20] The Ministry has published guidance on understanding what 'satisfied on reasonable grounds' means and how it is applied by building consent authorities.

[21] As defined in NZS 3604, 'good ground' excludes ground subject to liquefaction and/or lateral spread.

[22] The engineer is a registered Chartered Professional Engineer with practice fields in structural and civil engineering, and, based on the information provided by the Registration Authority (refer to paragraph 3.3), can conduct some simple geotechnical work.

4.12. In regard to site investigations, the authority has referred to the area being a high seismic risk area where the Z-factor is greater than or equal to 0.3, noting that it has only 'high level' liquefaction maps. This is evidenced in AS/NZS 1170.5:2004, table 3.3, where the hazard factor (Z) for Marton is 0.3.[23]

4.13. Seismic risk mapping may indicate site-specific geotechnical assessment is necessary, and those assessments are likely to differ between high-risk and low-risk areas. However, it does not follow that, based only on high-level mapping, a site within a high-risk area requires a detailed site investigation by a geotechnical engineer.

4.14. In this regard, I am of the view the authority provided insufficient reasons for the purported refusal of the application for building consent based on a requirement for a "full geotechnical report".

4.15. The scope of a site assessment (for example, to establish the soil conditions, bearing capacity, and groundwater depth) necessary to support a building consent application should be site specific and take into consideration the complexity and risk of the proposed building work.

4.16. In addition to the high-level mapping in AS/NZS 1170, other possible sources of information on the potential of ground being susceptible to liquefaction include, but may not be limited to:

4.16.1. Published data (eg New Zealand Geotechnical Database[24] and the GNS Science Consultancy Report 2016/040 (dated May 2016)).

4.16.2. Other maps such as GNS Science – local and national geology maps[25]

4.16.3. Geological features that may imply a heightened risk of liquefaction (certain types of soils, such as sands and silts, adjacent bodies of water (eg estuaries and swamps, coastal margins, uncontrolled or poorly compacted fill, flood plains, along rivers, streams and lake), variable ground surface levels etc.

4.16.4. Evidence of past or historic liquefaction activity.

4.16.5. Geotechnical investigation records and/or authority site inspection records associated with the construction of other buildings on the same property or other properties in the vicinity, which may indicate soil properties and depth of groundwater.

[23] Australian / New Zealand Standard AS/NZS 1170.5:2004 'Structural design actions - Part 5: Earthquake actions – New Zealand'.
[24] Available at https://www.nzgd.org.nz/.
[25] Institute of Geological and Nuclear Sciences Ltd. Available at https://www.gns.cri.nz/data-and-resources/.

4.17. The proposed building work in this case is not complex and is low risk. The single-storey extension is approximately 84m^2 and is a lightweight structure with a simple foundation design. It is not on a steeply sloping site, adjacent a body of water or near a known fault line, nor a flood plain.

4.18. I believe a preliminary investigation, such as that described in Appendix A of B1/VM4, with on-site confirmation of soil parameters and ground water would have been adequate in the circumstances.

The building consent information

4.19. It is open to the person specifying and detailing the building work which method they consider is the most appropriate means of demonstrating compliance with the Building Code.

4.20. Based on the engineer's PS1 (refer to paragraph 2.6), the engineer relied on establishing compliance of the design of the building work with Clause B1 Structure by way of the Verification Method B1/VM1 (as opposed to B1/AS1). In doing so, the engineer noted it was subject to site verification of "good ground acc [according to] NZS 3604".

4.21. NZS 3604 section 3.1.3, sets out conditions that must be met for the soil supporting footings to be assumed to be 'good ground'.[26] Conditions (a) to (d) must all be met, along with any of, but not all, the conditions (e), (f) or (g).

4.22. It appears the engineer relied on a site-specific investigation for soil bearing capacity (ie NZS 3604, 3.1.3 (e)) based on conducting scala penetrometer tests in accordance with NZS 4402.

4.23. The matter to be determined does not turn on the adequacy or completeness of the case specific scala penetrometer test results provided by the engineer since these were not the reason the authority purportedly refused to grant the consent. However, I make the following observations regarding the information submitted in support of the original building consent application:

4.23.1. Sub-section 3.3.6 of NZS 3604 requires bore holes to 'be augered at the site (sufficient to prove ground consistency) of each penetrometer test'; no bore hole logs were provided in support of the original building consent application.

4.23.2. The scala penetrometer test depths of 1m to 1.2m were not to the 2m minimum stated in NZS 3604 sub-section 3.3.4.

4.23.3. NZS 3604, sub-section 3.3.8, requires 'there shall be a minimum of four test sites for a building up to 200 m² plan area'. The proposed building

[26] Good ground as defined in the standard.

additional has a total plan area of approximately 84m², and the engineer has only provided records for three test sites

4.23.4. There was no specific commentary provided in the building consent application by the engineer of the ground conditions, such as expansive soils or liquefaction potential, that might have excluded the ground from requiring more than a simple assessment.

4.24. Therefore, although the PS1 provided by the engineer refers to an assessment of good ground in accordance with NZS 3604, the test method for soil bearing capacity adopted by the engineer and submitted with the original building consent application did not follow the stated means of compliance. In the same way it appears the scala penetrometer tests were not conducted in accordance with NZS 4402 (refer to paragraph 2.7).

Conclusion

4.25. The authority provided insufficient reasons to purportedly refuse to grant the building consent 220283 based on a requirement for a "full geotechnical report" from a geotechnical engineer.

4.26. In this case, the building consent has since been granted and issued by the authority (albeit on the basis of a different set of plans and specifications than those originally provided by the engineer and a geotechnical report reviewed by a Chartered Professional Engineer Geologist) and the associated building work has commenced.

4.27. Therefore, I have elected not to exercise any powers in section 188(1)(a) in this determination.

5. Decision

5.1. In accordance with section 188 of the Building Act 2004, I determine the authority provided insufficient reasons to purportedly refuse to the grant the building consent 220283.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 20 August 2024.

Andrew Eames

Principal Advisor, Determinations