Our Ref.: 25048
27 May 2025

Tasman District Council
By PDF to: Jeremy.Butler@tasman.govt.nz

Attention: Jeremy Butler

Dear Jeremy

PRELIMINARY GEOECHNICAL EXECUTIVE SUMMARY FOR POTENTIAL LAND REZONING AT 120 HIGGS ROAD & 49 STAFFORD DRIVE, MAPUA

1.0 Introduction

This preliminary executive summary has been prepared before the issuance of our geotechnical assessment report to inform an upcoming Tasman District Council (TDC) committee deliberation.

We understand that TDC is looking to rezone a portion of property along Higgs Road and another along the northeastern side of Seaton Valley Road as part of the Mapua Masterplan, and one option is to allow commercial development here. You have provided us with marked-up aerial photographs showing the general areas of interest, but you have also stated that the final extent is not fixed. You have asked us to investigate the feasibility of developing these two areas on a commercial or residential basis, perhaps with a supermarket or two-storey townhouses.

We completed test pit investigations and site walkover surveys across both of the above sites on 20 May 2025. We returned on 26 May 2025 to capture aerial photographs using a drone.

We anticipate that our completed preliminary geotechnical assessment report (*our current scope*) will be issued in approximately two weeks.

The preliminary executive summary below provides both sites' key findings and development opportunities. As we have not yet completed our full assessment and reporting, it should be noted that there may be further key recommendations that are not identified here.

2.0 Preliminary Executive Summary

2.1. 120 Higgs Road Site

1. We understand that this property is a HAIL site based on its previous use as an orchard and the pesticides used during that time. We know that the current landowners have previously had soil contamination testing completed, but we have not been provided with those results. Further work will be required at this site to determine the level of soil contamination, which will inform the options for its potential re-use or disposal off-site. Disposal of contaminated soils can be costly, particularly if they need to go to an approved landfill.
2. Part of the site is located in a gully with an ephemeral stream with a sizable catchment from the surrounding undeveloped properties (*primarily in grass and vineyard at present*

– *attached Photograph 1 refers*). Whilst we have not been engaged to complete a stormwater assessment, based on the size of the catchment, we consider that engineering a suitable stormwater system in the gully should be feasible. Depending on how the site is developed, it could involve either an open stormwater channel or a buried piped solution (*or a combination of both*). In any case, either stormwater detention within the site itself or upgraded stormwater infrastructure downstream of the site will be required.

3. The soils encountered in the gully near the northeastern corner of the site consist of a generous layer of topsoil (*around 500 mm*), soft silts and buried organic peats and swamp deposits to a depth of at least 2 m. Beneath were competent, gravelly alluvial deposits, and we anticipate that there will be competent Moutere Gravel Formation silty/gravelly soils beneath. We expect the depth of the soft silts and swamp deposits should lessen further up the gully. Due to the existing vineyard in this gully area, we were not able to verify this with test pit investigations. The adjacent hillside comprised competent *in situ* silty soils with increasing gravels, of the Moutere Gravel Formation.
4. There are large gum trees adjacent to Mapua Drive. There will be disturbed ground around their root balls which will need to be removed and potentially replaced with certified fill if these areas are to be developed.
5. From a geotechnical perspective, we consider that the most resilient option that would also provide long-term versatility of the site would be to remove ALL of the soft silts and organic swamp deposits, and replace them with certified fills. This will result in a significant volume of unsuitable soils to be disposed of elsewhere on the property, or off-site. Fills will need to be placed back into the gully and be certified by a GeoProfessional[1] in accordance with NZS 4431:2022, if buildings, hardstandings and accessways are to be founded on them. We consider that the area/volume involved should not be prohibitive in the context of the likely development as a whole.
6. Site-won fill could be sourced from the adjacent hillsides comprising Moutere Gravel Foundation silts and gravels. There may be an opportunity to source suitable fill materials from the slopes within the site, or from the adjacent undeveloped lot (*Pt Lot 1 DP 950*) should subdivision earthworks ever be completed there.
7. Whilst it could be possible to found new building on piled foundations into competent soils at depth below the swamp deposits and leaving the majority of the unsuitable soils *in situ*, there would still be some level of earthworks required to stabilise the surrounding hardstandings, parking areas etc. We do not consider this option particularly appealing from an engineering or versatility perspective (*i.e. there could be issues locating utilities in soft soils, and any future redevelopment of the site could be challenging)*.
8. Development of the hillsides would likely require earthwork cuts to create level platforms for buildings and hardstandings. The earthwork cuts could be cut at 1V:2H (26°) without resulting in a slope instability hazard, and would allow for topsoil and planting of them. The current slopes range from approximately 5-10°, so there is scope to create level building platforms that could be at least 30-40 m wide on the southeastern side of the gully (*possibly wider depending on the elevation of the platforms*). The cut material from this hill could be placed in the adjacent gully once the unsuitable soils are removed.

[1] CPEng(*Geotechnical*) or PEngGeol, both as administered by Engineering NZ.

2.2. 49 Stafford Drive Site

1. This site consists of gently sloping land adjacent to Seaton Valley Road and a low-lying valley downslope (*refer Photograph 2*).
2. The sloping land should be primarily composed of silty soils with an increasing amount of gravel with depth (*Moutere Gravel Formation*). No groundwater was encountered in our test pit on these slopes.
3. The general soil profile in the valley floor consists of a layer of topsoil, overlying a layer of alluvial SILT (*to between 700 mm and 1.5 m*), overlying a layer of silty fine SAND (*to between 1.5 m to 2.3 m*), and then GRAVELS below (*i.e. a general fining up sequence of alluvial deposits*). Some of the silty/sandy soils could be susceptible to co-seismic liquefaction, however this layer should be relatively thin. Groundwater seepages infiltrated the test pit side walls from all levels in most excavations. Whilst several drainage channels through the valley will help drain the soils, we expect these soils to remain moist to wet for most of the year. This is also indicated by reed grasses which exist across much of the valley, suggestive of generally wet conditions.
4. From a potential development perspective, the soils in the hillslopes are not anticipated to be an issue in terms of either bearing capacity for lightweight timber-framed buildings with shallow foundations, or slope stability.
5. We do not consider that development should occur on the valley floor in its current form due to:
    a. the soft and wet soils that we anticipate existing throughout the year, and;
    b. the current stormwater situation.
6. Structural earthwork filling to raise the land in the valley is recommended if these areas are to be developed. Whilst further investigations would be required to confirm the earthworks design, we envisage that the following could be required:
    a. Strip 300 mm to 400 mm of topsoil and where needed, a small undercut of any soft/weak silty soils;
    b. Place Bidim A29 geotextile (*or similar approved product*) on the exposed subgrade;
    c. Place a 300 mm thick layer of free-draining rockfill to be fully wrapped by Bidim A29 (*creating a 'drainage blanket'*);
    d. Place compacted layers of engineered hardfill (*i.e., AP100/AP65*) and/or certified earthfill in accordance with NZS 4431:2022 to achieve the desired finished level. We understand that there could be a scenario where site-won Moutere Gravel derived soils are sourced from the opposite side of the valley, as part of the potential land development of that part of the site;
    e. Provisional: Pending the outcome of further geotechnical investigations and a detailed geotechnical assessment (*including an evaluation of the potential effects of liquefaction*), a shear key (*i.e., hardfill or rockfill trench*) at the toe of the fill batters could be required.
    f. Provisional: Layers of geogrid near the bottom of the fills could also be required and this could potentially be in lieu of a shear key.

7. A new well-defined stormwater channel will be required beyond the filled ground and through the valley floor. We envisage that this could connect to a lake, wetland or stormwater detention pond, which could be required as part of the site's development.

3.0 Applicability

This report has been prepared solely for the use and benefit of Tasman District Council in relation to the specific project described. No liability is accepted in respect of its use for any other purpose or by any other person or entity. Data or opinions contained in it may not be used in other contexts, by other parties or for any other purpose without our prior review and agreement.

Please refer any further enquiries or correspondence to Rob Hunter.

For and on behalf of Terra Firma Engineering (2016) Ltd.

Yours sincerely

Rob Hunter
Engineering Geologist

Reviewed by:

Andrew Palmer
Principal

Attachments: Photographs 1 & 2

27/05/25
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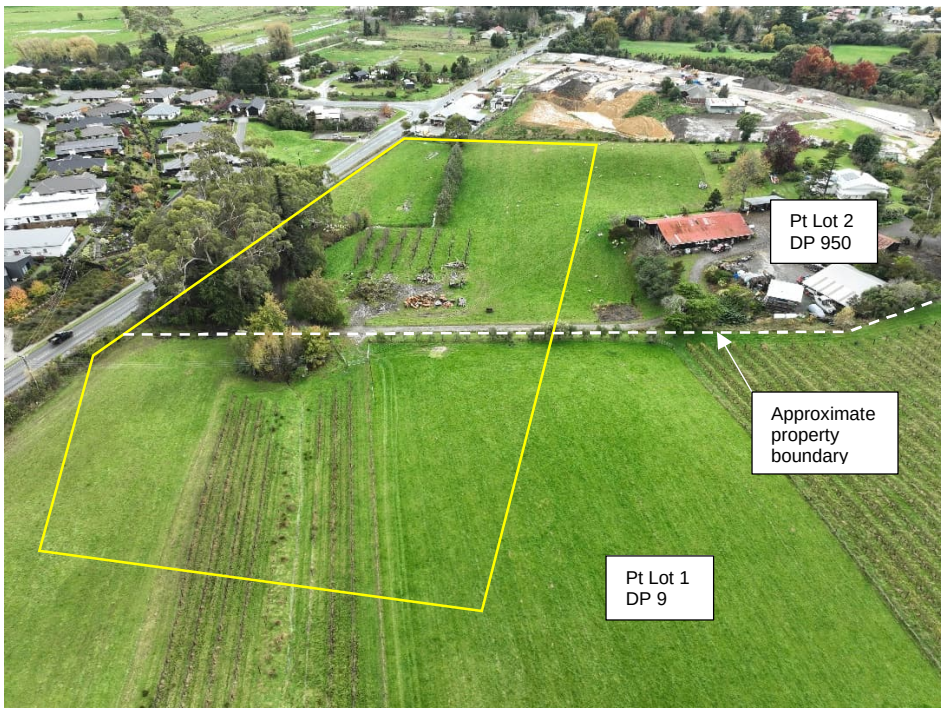
APPENDIX – Photographs 1 & 2



Photograph 1: Looking northeast, showing 120 Higgs Road site. The yellow line shows the approximate extent that we understand is being considered for re-zoning.

Photograph 2: Looking northwest, showing 49 Stafford Drive site. Seaton Valley Road on left. Note multiple drainage channels and elevated land near top-lefthand corner of frame. The yellow line shows the approximate extent that we understand is being considered for re-zoning.