

2023-04-05

Greg Dewe
Land Operations Manager
Fulton Hogan Ltd

Via email: Gregory.Dewe@fultonhogan.com

Dear Greg

Rosemerryn Subdivision – Stage 17 Geotechnical Completion Letter Report

This geotechnical completion letter report is submitted to fulfil the geotechnical requirements of Condition 21 of the Selwyn District Council Resource Consent RC 225189.

1 Introduction

As part of the Fulton Hogan Land Development Limited (FHLD) Rosemerryn Subdivision Development located at Lincoln, Aurecon has completed geotechnical investigation and assessment for Stages 10 to 18 and Stages 19 to 24. These two area wide investigations both includes parts of the area now known as Stage 17 which spans the two original investigation areas. The investigation and assessment are detailed in the Aurecon geotechnical report “*Rosemerryn Subdivision, Lincoln, Stages 10 to 18 Geotechnical Investigation Report*”, dated 25 September 2015 and “*Rosemerryn Subdivision, Lincoln, Stages 19 to 24 Geotechnical Investigation Report*”, dated 22 June 2018.

2 Liquefaction Hazard Assessment

The report was issued following the publication of the Ministry of Business Innovation & Employment (MBIE), guidelines in December 2012 and subsequent updates, which define the Technical Category zoning and the liquefaction induced deformation limits for each Technical Category.

The categories and corresponding criteria are as follows:

- **Technical Category 1 (TC1)** – Future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.
- **Technical Category 2 (TC2)** – Minor to moderate land damage from liquefaction is possible in future large earthquakes.
- **Technical Category 3 (TC3)** – Moderate to significant land damage from liquefaction is possible in future large earthquakes.

The indicative vertical and horizontal displacements associated with each Technical Category classification, together with the impact of liquefaction on house foundations, are presented in Table 1 below.

Table 1 Liquefaction Deformation Limits and House Foundation Implications

Technical Category	Index Liquefaction Deformation Limits				Likely Implication for House Foundations (subject to individual assessment)
	Vertical		Lateral Spread		
	SLS	ULS	SLS	ULS	
TC1	15mm	25mm	Nil	Nil	Standard NZS3604 type foundations with tied slabs are acceptable subject to shallow geotechnical investigation.
TC2	50mm	100mm	50mm	100mm	MBIE enhanced foundation solutions.
TC3	>50mm	>100mm	>50mm	>100mm	Site specific foundation solution.

A liquefaction hazard assessment was carried out as part of the site assessments in 2015 and 2022 using the prescribed in the Ministry of Business, Innovation, and Employment (MBIE, 2012) *Guidelines for Residential Development in Canterbury following the Canterbury Earthquake Sequence*, and subsequent updates.

The liquefaction analysis for Stage 17 was based on the boreholes and CPT testing carried out as part of the geotechnical investigations for the larger subdivision. The geotechnical investigation information used to assess Stage 17 is part of a large group of geotechnical information and only the tests that are relevant for this stage have been assessed. Consideration was given to information and data from outside the stage boundary when assessing geotechnical hazards and issues.

3 Technical Category Classification

Based on this assessment and, observed site performance, we consider that:

- **Lots 587 to 591, 613 to 620, 633 to 637, 659 to 665, 670 to 674, 678 to 682, 890 to 896, 927 and 928 fulfil the requirements of a TC1 Classification.**
- **Lots 586, 876, 877, and 938 to 945 fulfil the requirements of a TC2 Classification.**
- **Lots 7020 roading areas; therefore, no Technical Category Classification is applicable for these lots.**

4 Clayey-Silty Soils

Investigations undertaken by Aurecon indicate soft to firm silty and clayey soils may be encountered in isolated pockets across Rosemerryn Stage 17. For any parts of the site that are found to have soft to firm silty and clayey soils, it is anticipated bearing capacities from the near surface soils are likely to be readily accommodated by a TC2 type foundation system, pending detailed foundation investigation and design at building consent stage.

Due to the anticipated presence of soft to firm silty and clayey soils, even in the parts of the site consistent with a TC1 Classification, NZS3604 type footings may still not appropriate. With the TC2 Classification equivalent parts of Stage 17 NZS3604 type footings are not appropriate anyway. The presence, or otherwise, of soft to firm silty and clayey soils needs to be assessed on a lot of specific basis with detailed lot specific shallow geotechnical investigations to confirm the building specific foundation system.

5 Additional Comments

Bulk shallow earthworks have been undertaken across parts of the site to form the finished lots etc. We understand that this fill material comprised site won silty silts. The bulk earthworks and compaction signoff have been observed and sign-off separately by the project Civil Engineers Davie Lovell-Smith Ltd.

Aurecon has geotechnically investigated and assessed Stage 17 on a subdivision wide scale only prior to earthworks being undertaken. Aurecon has not undertaken lot specific shallow geotechnical investigations, intended to support detailed house foundation design.

6 Recommendations

Due to the identified underlying ground conditions (TC2 and with the potential for softer silty soils) lot and building specific shallow geotechnical investigations shall be undertaken for all lots in Stage 17 in accordance with the requirements of NZS3604.

This report is not intended to be used for detailed design of site-specific shallow foundations and is not suitable to support individual building consent applications. Site specific investigations are required at building consent stage.

7 Reference

Aurecon, 2015. *Rosemerryn Subdivision, Lincoln, Stages 10 to 18 Geotechnical Investigation Report, Rev3* - dated 25 September 2015. Aurecon New Zealand Limited, Christchurch, New Zealand.

Aurecon, 2022. *Rosemerryn Subdivision, Lincoln, Stages 19 to 24 Geotechnical Investigation Report, Rev0* - dated 22 June 2018. Aurecon New Zealand Limited, Christchurch, New Zealand.

MBIE, 2012. *Repairing and rebuilding houses affected by the Canterbury earthquakes*. Ministry of Business, Innovation and Employment, Wellington, New Zealand – December 2012.

8 Explanatory Statement

The contents of this letter are for the sole use of the Client and no responsibility or liability will be accepted to any third party. Information or opinions contained within this letter may not be used in other contexts or for any other purposes without our prior agreement.

The comments in this letter are based on our investigations of the site for the sole purposes of the geotechnical aspects only, as requested by the Client. Only a finite amount of information has been collected and this letter does not purport to completely describe all the site characteristics and properties.

The extent of our investigations and the results of all the tests carried out are as presented in the geotechnical report for Stages 10 to 18 "*Rosemerryn Subdivision, Lincoln, Stages 10 to 18 Geotechnical Investigation Report*", dated 25 September 2015 and "*Rosemerryn Subdivision, Lincoln, Stages 19 to 24 Geotechnical Investigation Report*", dated 22 June 2018.

We trust this meets your requirements and if there are any further queries please do not hesitate to contact us.

Yours faithfully

A handwritten signature in blue ink, appearing to read 'Jan Kupec', written over a large, light blue circular scribble.

Dr Jan Kupec
Principal – Ground Engineering

Enc: SDC Approved Subdivision Plan for Rosemerryn Subdivision Stage 17

**AS APPROVED BY
SELWYN DISTRICT COUNCIL
Planning Department**

**RESOURCE CONSENT
225189**

1/04/2022 halln

AMENDMENT	DATE	DESCRIPTION
R10	25/09/2020	STAGES 15, 16 & 17 BOUNDARIES UPDATED TO TSS, ROAD NAME ADDED
R11	3/12/2020	STAGE 15 UPDATED TO UNDER CONSTRUCTION
R12	02/03/2021	STAGES 15, 18, 19 & 20 BOUNDARIES UPDATED TO TSS
R13	21/04/2021	LOTS 788 & 7013 AMENDED
R14	1/06/2021	COMPLETED STAGES UPDATED
R15	1/07/2021	LOTS 819 - 821 & LOTS 617 - 620 AMENDED
R16	17/12/2021	LOTS 819 & 1028 AMENDED
R17	16/02/2022	LOTS 617-620 AMENDED, LOTS 7020 & 8000 ADDED

- NOTES:
- 1) Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
 - 2) Service easements to be created as required.
 - 3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purposes.



- COMPLETED AS AT FEBRUARY 2022
- PROPOSED
 - COMPLETED
 - UNDER CONSTRUCTION
 - DRAINAGE RESERVES
 - RECREATION RESERVES
 - COMMERCIAL SITES (6230m²)

Stage	Residential Lots	Drainage Reserves	Recreation Reserves
17	55	-	-
21	48	1394m ²	-
22	49	-	0.2059
Completed Stages	683	3.9524ha	4.0037ha
Proposed Stages	152	0.1394ha	0.2059
TOTALS	835	4.0921ha	4.2096ha



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JOB TITLE: **Rosemerryn**

SHEET TITLE: **Proposed Subdivision
Stages 17, 21 & 22**

DRAWING STATUS: **For Consent**

SCALE: 1:2500@A1 DATE: March 2022
1:5000@A3

CAD FILE: J:\19458\Subcon\19458_Stage 17+BALANCE_LOT_R17.dwg REVISION:

DRAWING No: **19458** SHEET No: 1 OF 1 **R17**