

2022-03-16

Greg Dewe
Land Operations Manager
Fulton Hogan Ltd

Via email: Gregory.Dewe@fultonhogan.com

Dear Greg

Rosemerryn Subdivision – Stage 19 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 RC185574.

1 Introduction

As part of the Fulton Hogan Land Development Limited (FHLD) Rosemerryn Subdivision Development located at Lincoln, Aurecon has completed a geotechnical investigation and assessment for Stages 19 to 24, including the area now known as Stage 19. The extent of Stage 19 is shown on the attached plan, reference DLS 19458, Rev.16, Dec. 21. by the project Civil Engineers Davie Lovell-Smith. The investigation and assessment are detailed in the Aurecon geotechnical report “*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 in 2018, 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 2018 using the prescribed in the Ministry of Business, Innovation, and Employment (MBIE, 2018) guidelines for residential development in Canterbury following the Canterbury earthquake sequence.

The liquefaction analysis for Stage 19 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 19 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:

- **All Lots (Lots 750 to 791) fulfil the requirements of a TC2 Classification.**
- **Lots 1027, 7013 roading, utilities, and reserve 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 at shallow depths across the entirety of Stage 19 of the Rosemerryn Subdivision. However, as Stage 19 is expected to have a performance equivalent to TC2 and therefore standard NZS3604 type footings are not appropriate.

Lot specific shallow geotechnical investigations will be required for all lots as part of the detailed building design process. The 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.

5 Additional Comments

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 19 on a subdivision wide scale only. 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 19 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 19 to 24 Geotechnical Investigation Report, Rev0* - dated 25 September 2015. 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.

MBIE, 2018. *Repairing and rebuilding houses affected by the Canterbury earthquakes*. Ministry of Business, Innovation and Employment, Wellington, New Zealand – May 2018.

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 19 to 24 “*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.

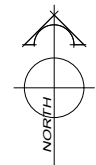
Yours faithfully



Dr Jan Kupec
PhD MSc candIng FEngNZ CPEng IntPE
Principal – Ground Engineering

Enc: SDC Approved Subdivision Plan for Rosemerryn Subdivision Stage 19

Stage	Residential Lots	Drainage Reserves	Recreation Reserves
15	42	-	-
16	45	917m ²	-
17	57	-	4546m ²
18A	41	78m ²	-
18B	20	2235m ²	1.6078ha
19	42	9108m ²	-
20	35	8469m ²	-
21	49	1397m ²	-
22	28	-	-
23	30	-	-
24	35	183m ²	-
Completed Stages	458	1.0248ha	2.8845ha
Proposed Stages	424	2.2387ha	2.0628ha
TOTALS	882	3.2635ha	4.9473ha



AMENDMENTS:		
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

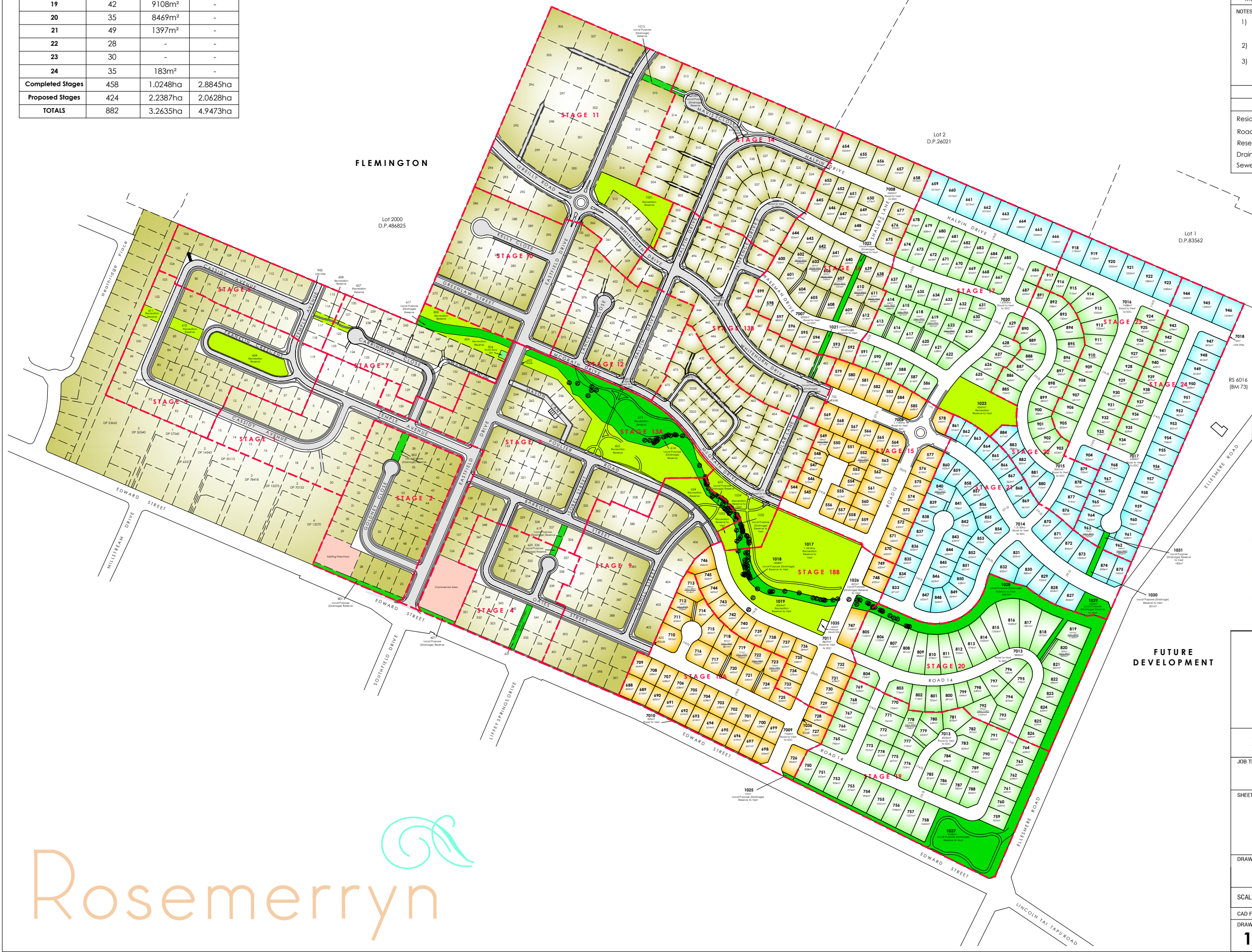
- NOTES:
- 1) Areas and dimensions are approximate only and are subject to final survey and deposit of plans.
 - 2) Service easements to be created as required.
 - 3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purposes.

STAGES 13-24 SCHEDULE OF AREAS	
Description	Area
Residential Lots (Average: 745m ²)	37.7946ha
Roading	11.9049ha
Reserve	2.5056ha
Drainage Reserve	2.3246ha
Sewer Pumpstation	160m ²

STAGES 13-24 DENSITY	
Total Area	54.5461ha
Net Area	52.2214ha
Lots	534
Lots/ha	10.226
OVERALL DENSITY	
Total Area	91.6704ha
Net Area	87.7839ha
Lots	882
Lots/ha	10.047

COMPLETED AS AT 30 JUNE 2021

- COMPLETED
- UNDER CONSTRUCTION
- EARTHWORKS COMPLETED
NO CIVILS STARTED
- CONSENTED BALANCE AREA: 14.0756ha
- DRAINAGE RESERVES
- RECREATION RESERVES
- COMMERCIAL SITES (6230m²)



FUTURE DEVELOPMENT



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JOB TITLE: **Rosemerryn**

SHEET TITLE: **Proposed Subdivision Stages 15 - 24**

DRAWING STATUS: **For Consent**

SCALE: 1:2500@A1 DATE: December 2021
1:5000@A3

CAD FILE: J:\19458\Subcon\19458_Stages 15-24_R16.dwg REVISION:
DRAWING No: SHEET No:
19458 1 OF 1 **R16**

