23 June 2026 Document Ref: CHC2026-0002AD | Rev 0

Earlsbrook West Residential Ltd
Level 2, ASB House
166 Cashel Street, Christchurch

RE: LOT 277 GEOTECHNICAL REPORT
EARLSBROOK SUBDIVISION STAGE 2, LINCOLN

1.0 INTRODUCTION

Earlsbrook West Residential Limited has engaged CMW Geotechnical (NZ) Limited (CMW) to provide lot specific geotechnical reports for Stage 2 of the Earlsbrook Subdivision in Lincoln.

The purpose of this report is to provide foundation options and recommendations for residential development on Lot 277. This report can be included within an application for residential building consent.

The scope of work and associated terms and conditions of our engagement were detailed in our Short Form Agreement (SFA) referenced CHC2026-0002AA, dated 4 February 2026.

Key references include:

- Ministry of Business, Innovation and Employment (MBIE), Repairing and rebuilding houses affected by the Canterbury earthquakes[1], published December 2012.
- MBIE, Updates and clarifications to the residential guidance[2], last updated June 2018.
- Tetra Tech Coffey, Geotechnical Assessment Report[3], issued 10 June 2025.
- CMW, Earthworks Completion Report[4], issued June 2026.
- Inovo, As-Built Engineer Fill Plan[5], issued June 2026.

[1] https://www.building.govt.nz/building-code-compliance/canterbury-rebuild/repairing-and-rebuilding-houses-affected-by-the-canterbury-earthquakes, accessed June 2026.
[2] http://www.building.govt.nz/building-code-compliance/canterbury-rebuild/updates-clarifications-residential-guidance/, accessed June 2026.
[3] Tetra Tech Coffey (NZ) Limited, Earlsbrook Subdivision Stages 2 and 3, Geotechnical Assessment Report, dated: 10/06/2025.
[4] CMW Geotechnical NZ Ltd, Earlsbrook Subdivision – Stages 1A and 1B', Earthworks Completion Report, dated June 2026.
[5] Inovo Projects Limited, As-Built Engineer Fill Plan, drawing nos: 15721-S1-AB 2000 to 2009, rev: 1, dated: 29/05/2026.

2.0 LOT 277: GEOTECHNICAL REPORT

Table 1: Geotechnical Summary

Item	Comment
Development Proposal	Domestic dwelling to be designed (by others) to NZS 3604:2011, incorporating relevant supplementary recommendations issued by the MBIE.
Earthworks & Ground Preparation	Earthworks have been completed across the majority of the lot and consisted of: removal of topsoil and unsuitable material; placement and compaction of engineered fill to design levels; and placement of topsoil. CMW conducted observations during construction, reviewed contractor provided quality assurance information, and have confirmed that earthworks were completed as specified in our ECR[4].
Site Investigation	CMW completed 1 hand augered borehole (HA) within the lot to a maximum depth of 0.65mbgl, and 2 dynamic cone penetrometer tests (DCPs) to a maximum depth of 0.7mbgl. These investigation locations are shown within the attached plan.
Ground Conditions	Based on our lot specific investigation and review of the *Inovo As-Built Engineer Fill Plans*, we expect the ground profile to comprise 0.35m of topsoil underlain by engineered fill or natural soil. Topsoil depths away from the hand auger location may vary. The Tetra Tech Coffey Geotechnical Assessment Report[3] for Stage 2 of the Earlsbrook Subdivision describes a seasonal high groundwater starting from approximately 1.0 to 2.5mbgl, with seasonal lows up to 1.5m lower. The HA completed within the lot to a maximum depth of 0.65mbgl did not encounter groundwater.
Bearing Capacity	A geotechnical ultimate bearing capacity (GUBC) of 200kPa may be adopted from below topsoil, which is expected to be 0.35mbgl. See Ground Preparation section below. CMW should be contacted for further advice if the foundation design requires a static ultimate bearing capacity in excess of 200kPa.
Liquefaction Hazard Assessment	A liquefaction assessment[3] has been carried out by Tetra Tech Coffey for Stage 2 of the Earlsbrook Subdivision. Lot 277 has been assessed to have TC1-like liquefaction performance after completion of subdivision development. The future land performance expectation for a TC1 site is "*liquefaction damage is unlikely in a future large earthquake*" (MBIE Table 3.1)[1, 2].
Foundation Requirements	Use foundations provided in NZS 3604:2011 Timber Framed Buildings, as modified by MBIE amendments and guidance documents, along with specific design to accommodate the GUBC noted above. For this TC1 lot, an overview of the design process is provided in Figure 5.1 of the MBIE guidance. In accordance with NZS1170.5, Section 3.1.3, a Site Subsoil Class of "Class D – Deep Soft soil sites" may be assumed for this site. Any development (e.g. foundations) planned within a 45-degree zone of influence above pipe inverts will require engineering input.
Ground Preparation	Topsoil is required to be excavated prior to installing the foundations. It is recommended that the foundation excavation is proof rolled prior to placing concrete. This ensures the founding soils are tight and free of soft or loose material. If required, engineered backfill (e.g. GAP40) should be placed in layers to reach the design founding level. Each layer should have a maximum compacted thickness of 200mm and be compacted to achieve 95% of its maximum dry density (MDD).
Ground Inspection	We recommend the good practice of having a competent, suitably experienced person to confirm that the ground at the actual foundation location is consistent with the ground conditions encountered during earthworks construction (i.e. as reported above – see *Ground Conditions*). CMW can provide this service.

3.0 CLOSURE

This report has been prepared for use by Earlsbrook West Residential Ltd and future owners of the Lot in relation to Stage 2 of the Earlsbrook Subdivision in accordance with the scope, proposed uses and limitations described in the report. Should you have further questions relating to the use of your report please do not hesitate to contact us.

Where a party other than Earlsbrook West Residential Ltd seeks to rely upon or otherwise use this report, the consent of CMW should be sought prior to any such use. CMW can then advise whether the report and its contents are suitable for the intended use by the other party.

For and on behalf of CMW Geosciences

Prepared by:

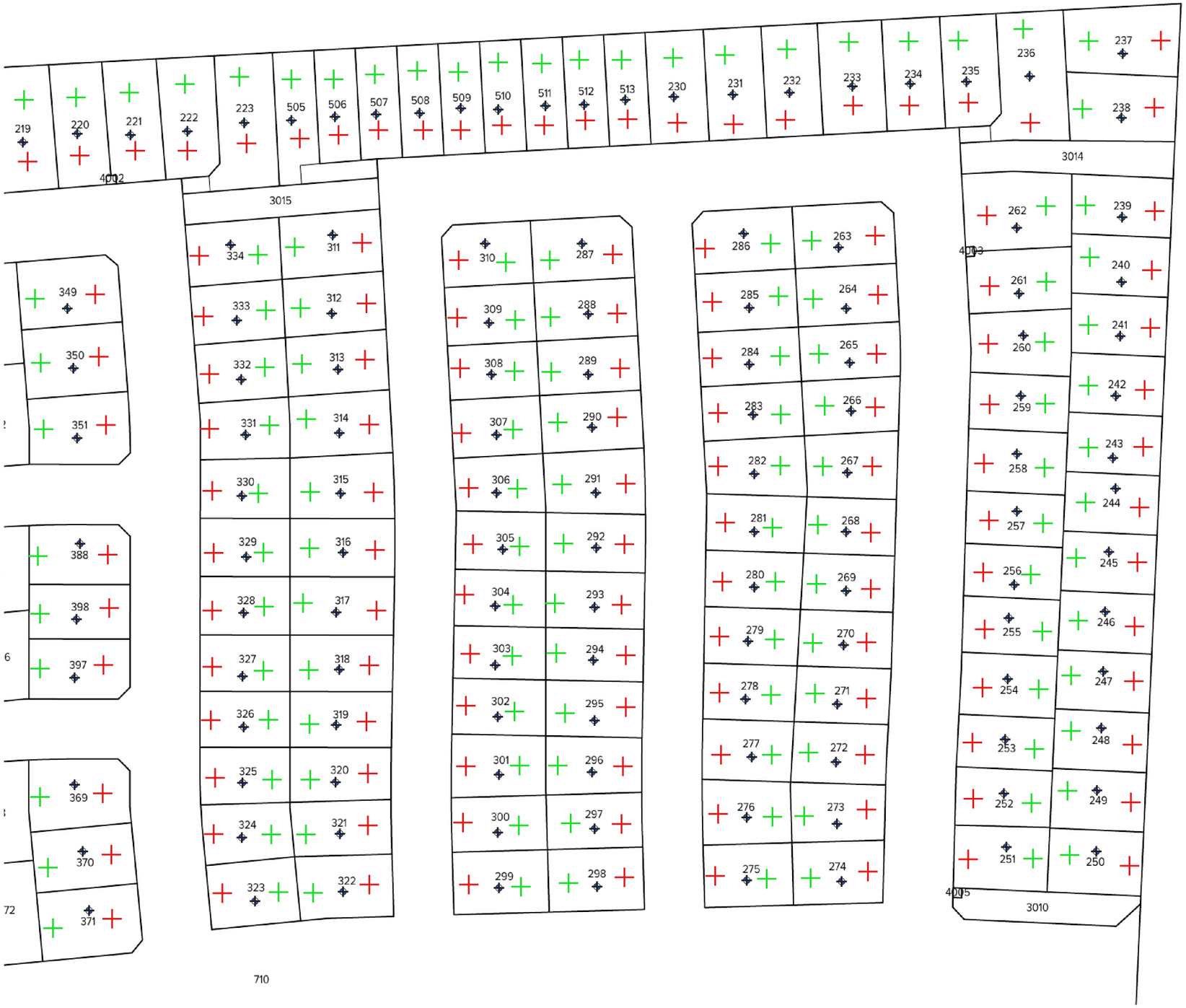
Nathan Cash
Geotechnical Engineer

Reviewed and authorised by:

Kori Lentfer
Principal Engineering Geologist CMEngNZ, PEngGeol

Distribution: 1 electronic copy to Earlsbrook West Residential Ltd via email
Original held at CMW Geosciences

Attachments: Geotechnical Investigation Plan
Hand Auger logs



LEGEND:

Test Locations

- DCP1
- DCP2
- HAND AUGER TEST LOCATION

NOTES:

1. Hand Auger locations are approximately at center of the lot.
2. Map not to scale

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CLIENT: Earlsbrook West Residential Ltd	DRAWN: PR	PROJECT: CHC2026-0002
PROJECT: Earlsbrook Land Development	CHECKED: NC	DRAWING: 01
	REVISION: 0	SCALE: NTS
TITLE: LSGR Investigation Plan	DATE: 08/05/2026	SHEET: A3L

HAND AUGER BOREHOLE LOG - HA-277

Client: Earlsbrook West Residential Ltd
Project: Earlsbrook Land Development
Site Location: Lincoln
Project No.: CHC2026-0002
Date: 11/03/2026
Borehole Location: Refer to Site Plan Logged by: OP Checked by: HG Scale: 1:15 Sheet 1 of 1

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Position: 1557085.9mE; 5166056.8mN Projection: Mt Pleasant 2000
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm) DCP01	Dynamic Cone Penetrometer (Blows/100mm) DCP02
						ML: SILT: dark greyish brown, low plasticity. (Topsoil)	M		1, 3, 5, 7	2, 1, 2, 4
						SM: Silty SAND: fine grained, yellowish brown with orange brown mottling. (Engineered Fill)		D to VD	13	13
						SM: Silty SAND: fine grained, yellowish brown. (Alluvium)			15	11
						... from 0.60m to 0.65m, with trace of fine to medium grained gravel.			20	20
						Borehole terminated at 0.65 m				

Termination Reason: Refusal on gravel.
Shear Vane No: DCP No: 38
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.