29 September 2026 Document Ref: CHC2026-0002AD | Rev 2

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

# RE: LOT 450 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 450. 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 August 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 September 2026.
[2] http://www.building.govt.nz/building-code-compliance/canterbury-rebuild/updates-clarifications-residential-guidance/, accessed September 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 – Stage 2 South, Earthworks Completion Report, dated August 2026.
[5] Inovo Projects Limited, As-Built Engineer Fill Plan, drawing nos: 15721-S1-AB 2000 to 2009, rev: 4, dated: 29/06/2026.

# 2.0 LOT 450: 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 entirety 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.<br>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 1.15mbgl, and 2 dynamic cone penetrometer tests (DCPs) to a maximum depth of 1.9mbgl. 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 . Topsoil depths away from the hand auger location may vary.<br>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 1.15mbgl 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 mbgl. See Ground Preparation section below.<br>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 and has been assessed to have a low liquefaction risk. |
| 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.<br>Due to varying fill types within this lot a TC2 foundation is required. The minimum foundation requirements for a concrete slab-on-grade foundation is outlined in section 5.3.1 of the MBIE guidance, with an overview of the TC2 design process shown in Figure 5.2. 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.<br>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.<br>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.<br>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:

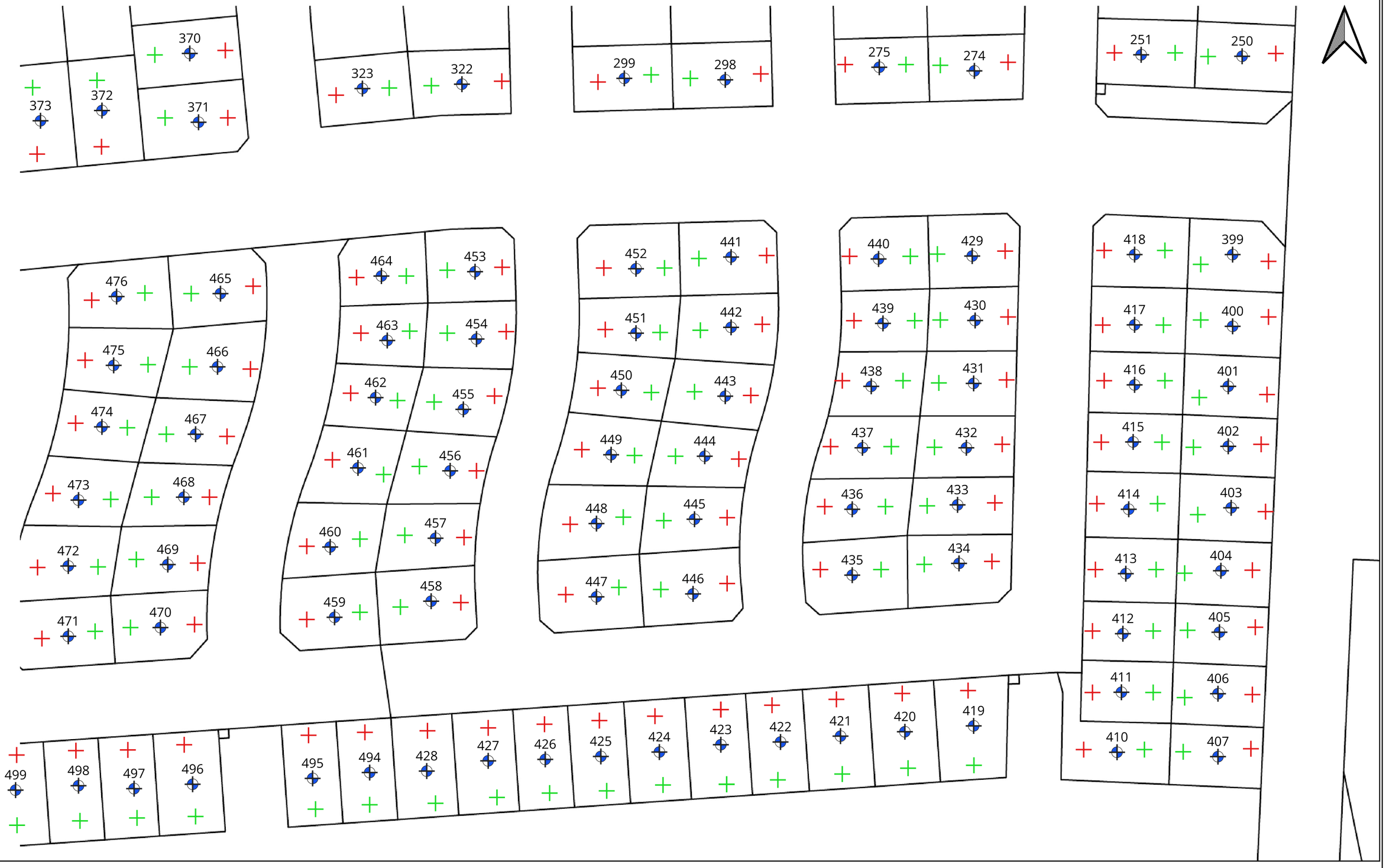
Nathan Cash
Geotechnical Engineer

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-450

Client: Earlsbrook West Residential Ltd
Project: Earlsbrook Land Development
Site Location: Lincoln
Project No.: CHC2026-0002
Date: 16/06/2026
Borehole Location: Refer to Site Plan  Logged by: PN  Checked by: HG  Scale: 1:15  Sheet 1 of 1

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Position: 1557027.8mE; 5165929.4mN Projection: NZTM 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 | DCP02 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ML: SILT: with trace of fine to medium grained gravels, dark brown, low plasticity. (Topsoil) | D to M | | 6, 5, 6, 7 | 5, 3, 3, 4 |
| | | | | | | ML: Sandy SILT: with trace of fine grained gravels, brownish yellow, sand is fine grained. (Engineered Fill) | D to M | St to VSt | 18, 8, 6, 5, 4, 3 | 8, 7, 6, 4, 4, 4 |
| | | | | 1 | | ML: SILT: with minor fine to medium grained gravels, dark greyish brown. (Engineered Fill) | D to M | St to VSt | 10, 9 | 3, 9 |
| | | | | | | Borehole terminated at 1.15 m | | | 6, 5, 5, 5, 4, 3, 4 | 6, 5, 5, 6, 4, 4, 5 |
| | | | | 2 | | | | | | |
| | | | | 3 | | | | | | |

Termination Reason: Refusal on gravel.
Shear Vane No:  DCP No: 39
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.