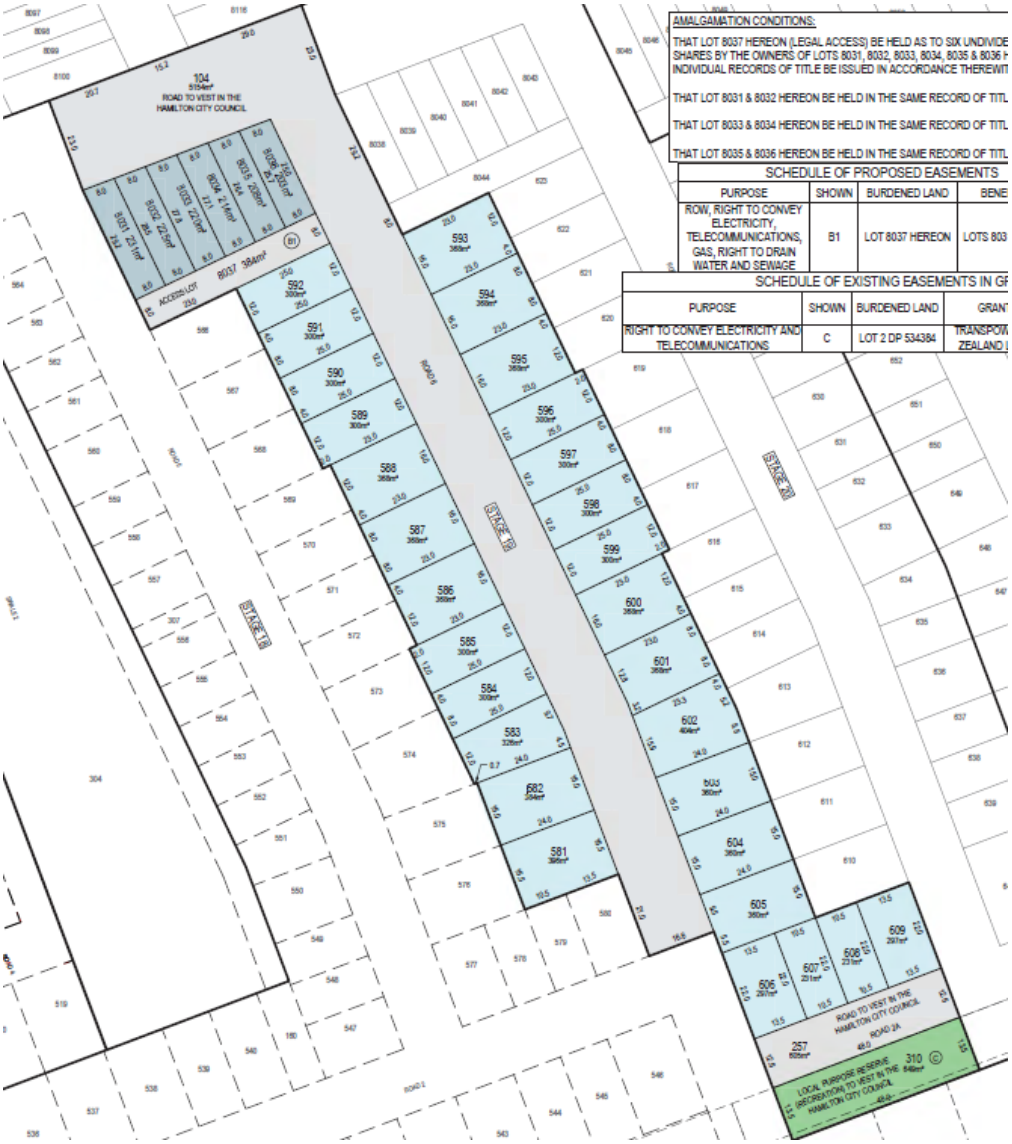
CORE50
SOLUTIONS ENGINEERED

GREENHILL PARK RESIDENTIAL SUBDIVISION

STAGE 19 (Lots 581-609 & 8031-8036)
Area LUK, Greenhill Park, Hamilton

GEOTECHNICAL COMPLETION REPORT ON SUBDIVISION EARTHWORKS AND RECOMMENDATIONS FOR BUILDING DEVELOPMENT



Our Ref: CR171738-S19-01 V2

Prepared for: Chedworth Properties Limited

Date: April 2023

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1.0 Subdivision Development Earthworks

1.1 Introduction

Stage 19 of Greenhill Park is currently accessible from Webb Drive and Watkins Street. Stage 19 comprises 35 residential lots (numbered 581-609 & 8031-8036). The locations of these lots are shown on attached subdivision plan 19-30410-19-RC1 Rev. 6 included in Appendix A.

Bulk earthworks have been completed to re-contour the previously agricultural landscape for Stage 19 of the Greenhill Park Residential Subdivision in Hamilton. Works have been carried out in accordance with Hamilton City Council's (HCC) Subdivision Resource Consent: 0011.2019.7140.003. Prior to commencement of earthworks, geotechnical investigations were carried out by Beca Ltd (Beca) in 2016 [1] and summaries in DBCE Preliminary Report for L&K&Eldone (December 2019).

The Regional Infrastructure Technical Specifications (RITS) for Waikato set out the minimum standards for design and construction of public infrastructure within Hamilton City. Section 2.1.6 of the *Earthworks and Geotechnical Requirements* of the RITS states that the developer shall appoint a geo-professional to carry out functions as described in NZS 4404[5] Section 2.2.4. RITS Section 2.3.4.1 states that a geotechnical completion report shall be submitted as per NZS 4404 Section 2.6 including a statement of professional opinion on the suitability of land for building construction [4]. The developer has appointed CORE50 Ltd as the geo-professional.

To satisfy the requirements of HCC's Resource Consent, the RITS and NZS 4404, this report summarizes the observations and testing undertaken during the development of the stage, discusses the suitability of the ground for the support of the proposed residential buildings and contains recommendations for the disposal of stormwater runoff generated on individual sites.

Included in Appendix A of this report is the proposed subdivision plan comprising the proposed new lots for Area LUK Stage 19. The included earthworks plan shows the cut/fill extent of the earthworks undertaken, test positions, road and lot locations.

1.2 Earthworks in the Subdivision

The earthworks for Stage 19 of the subdivision development were undertaken between October 2020 and May 2022 with minor earthworks completed in March 2023.

These earthworks comprised:

1. The stripping of surface topsoil to expose underlying natural soils.
2. Cut of up to 1.0m.
3. The placement of filling within majority of the stage.
4. Backfilling and raising the ground level with new fill to create uniform fill platforms.
5. The reinstatement of the surface topsoil cover and subsequent grassing.

The soils encountered during the formation of the site and road subgrades were a mixture of silty sands and sandy silts, typical of younger Hinuera deposits, overlying clayey silt and silty clay, typical of Walton group deposits. The Walton Subgroup rises out of the Hinuera deposits that formed a ridge line running through the greater LUK area. These soils were those that had been identified in pre-construction site investigations by the Beca Report 2016. The published geology indicates that Area LUK soils comprise Hinuera Formation alluvium at surface with Walton Subgroup overlain by Hamilton Ash in the gently sloping hill within the LUK area.

The filling work was undertaken using the Walton Subgroup soils gained from areas of cut within stages 16 to 18a and the larger Greenhill Subdivision. Filling was undertaken during the summers of 2020 to 2023 when drying back of the soils was possible to close to optimum moisture contents to achieve near maximum compaction densities and undrained shear strengths.

Some rockfill was placed (using AP100)at the base of the fill areas to provide an improved working surface and under drainage prior to placing the locally won fill. Depths and locals of the fill are shown in the attached cut/fill plan (Appendix A). Rockfill was proof rolled as a means or confirming suitable compaction was maintained. The target criteria was rock fill layer not prone to weaving that the building platforms could then be formed above. The rock fill was typically 1.6m or more below the surface.

Upon completion of the earthworks, approximately 100 to 300 mm of topsoil was placed across the sites and the finished surfaces were grassed in accordance with Conditions of the Resource Consent. Areas where an initial grass strike did not take place were re-grassed. While the target topsoil depths after the earthworks were to be around 300 mm, no guarantee is implied or given that the topsoil on any part of any lot is 300 mm or less and it is recommended that future owners or designers or builders check topsoil depths when preparing site development plans and cost schedules.

1.3 Earthworks Standards

The earthworks in filling were undertaken using in situ Silty CLAY and Clayey SILT mixtures gained from areas of cut within stages 16 to 18a and across the larger subdivision. The standards for the placement of filling, as stated in the earthworks contract documents, were to comply with NZS 4431:1989 "Code of Practice for Earth fill for Residential Development" and the Council RITS. Filling placed to these standards may be considered as good ground in terms of NZS 3604:2011 "Timber Framed Structures".

The compaction of the filling placed was monitored and tested for compaction density using a hand-held shear vane and nuclear densometer in finer grained Clayey SILT and Silty CLAY. The compaction control criteria adopted for engineered fill on site were as follows:

- Air voids percentage average value less than 10 %.
- Air voids percentage maximum single value 12 %.
- Undrained shear strength average value not less than 140 kPa.
- Undrained shear strength minimum single value 110 kPa.
- Compaction percentage average value not less than 95%.
- Compaction percentage minimum single value 90%.

1.4 Filled Ground

During the placement of filling on the road subgrades and on areas intended for residential development, the contractor, OLC, stripped and removed all topsoil and other surface organic soils. Post construction testing was carried out to confirm the interface between the cut and fill. Filling was placed in discrete layers with compaction applied through sheepsfoot drum rollers.

Subgrade inspections were carried out by the contractor and by CORE50 for verification purposes. The CORE50 subgrade and fill testing included a site walkover by the geotechnical engineer and site testing by a Geo-technician. As most of the filling placed comprised Clayey SILT and Silty CLAY identified in the pre-subdivision boreholes, testing of the compaction achieved was undertaken with a handheld shear vane and NDM testing (Nuclear Density Meter). Testing was based on the required air voids ratio (averaging 10% and no individual value of over 12%). In our experience, oven tests for air void correction can vary the air void result in this material by up to 3%. Oven tests were typically used for any on field air void result ≥6%. Solid density values were based on the same value used in the lab testing (2800kg/m^3). This is a higher value that would typically be used but provides a conservative result so has been adopted without further question or testing.

1.5 Areas of Cut

Areas partly developed I cut are shown on the cut fill plan (Appendix A). In these areas, the ground at formation levels was observed to comprise of Silty and Sandy Hinuera deposits.

1.6 Test Results in Filling Placed

A summary of the tests undertaken by CORE50 is present in Appendix D.

The shear vane and nuclear densometer test results show that acceptable soil strengths had been developed in all fill areas tested. Any areas with test results that did not meet the compaction control criteria was reworked.

1.7 Land Hazards

1.7.1 Land Stability

All lots across stage 19 have been graded as flat as possible with a desirable gradient of 0.5%. Standard good practice around small slopes of the site will be required where these are presence (i.e. lots 588-562 upon modifying ground levels). Buildings should be set back from the slopes and avoid either surcharging the slopes or undermining the slopes. All foundations within this area are subject to specific engineering design, and an assessment of the building location and earthworks should be carried out as a part of the engineering design/review of any section adjacent to a slope.

1.7.2 Flooding

The final lot levels have been set based on infrastructure requirements and freeboard from flood levels developed as part of the stormwater design for the larger subdivision. The means of disposal of stormwater runoff from lots in these stages of the subdivision are described in the catchment and overland flow assessments by Beca (interpretive Report Lot Levels Area LUK). In the report for area LUK, a 1% AEP flood event is identified for each swale system. A list of Minimum Lot Levels for Stage 19 is included in Appendix E.

Site grading during house construction must not lower finished levels below the minimum finished ground levels identified by S&L without further review of the impacts on flooding. Earthworks must not direct stormwater runoff to adjacent properties, or towards buildings, or create areas of localized ponding. All overland flow is to be towards the road frontage on each section, where falls will direct surface flow towards the swale system. Special note is given to Lots 588-592. These lots fall to the rear of the section on completion of earthworks. Final development will need to raise the rear of these lots to direct flow to the front of the lots.

It is the responsibility of the building design professional to ensure that the requirements for mitigation for the hazard of flooding are met by the design prior to submitting to Council for consent. Confirmation of the swale construction and flood levels are excluded from the scope of this report and are to be covered separately with sign-off of infrastructure works.

1.7.3 Liquefaction

The potential for the hazard of liquefaction for Area LUK of the Greenhill Park Subdivision is discussed in the DBCE Preliminary Geotechnical Report. Geologically, stage 19 is a transition zone between younger Hinuera Deposits and older Walton Subgroup. The Hinuera deposits are considered liquefaction prone is subject to a seismic event coupled with a high groundwater. Zones of the subdivision that are in the low lying area will typically be subject to liquefaction effects during the ULS earthquake. Modelling using CLiq indicates that zones with less than 2m of additional raising fill over original ground levels are considered TC2 unless further assessment is carried out.

For lots with greater than 2m of fill added or sites on cohesive (i.e. Walton Group) deposits the risk is reduced and TC1 foundations are appropriate. The foundation summary has provided a recommendation for the site class based on the net additional fill added to this area. At time of completion, all lots are deemed TC2 and have less than 2m of raised platforms. Modifications to subgrades and building levels may be carried out to reduce the liquefaction risk to a lower category as a part of building development works.

Note that updated liquefaction parameters (0.25g and M=5.9) have been used for checking the threshold as a part of the adjavcent Stage 18 review, with LSN = 10 indicated for sites with 2m of fill added during subdivision earthworks. Additional fill/ground raising will reduce the risk of liquefaction triggering by increasing the non-liquefiable rafting layer.

Foundations near the top of the swales are subject to Specific Engineering Designs. The liquefaction summary plan is appended to this Completion report (Appendix A). Specifically, the requirements are:

- 0m – 1.5m no habitable dwellings to be built within 1.5 m of the swale crest.
- No lots are adjacent to storm water swales in Stage 19.

1.7.4 Expansive Soils

Underlying soils within stage 19 are typically either Hinuera Formation based deposits, or Walton Subgroup (insitu or used as fill). The Hinuera Formation is predominantly sand, and silt based and considered non expansive or slightly expansive. The Walton Subgroup has a much higher clay content and is considered slightly to moderately expansive. Given the volcanic origins, the expansive nature of the soils is generally non-recoverable i.e., shrinkage only. However, the relatively high shrinkage potential of the Walton Subgroup means it would be normal to classify this as moderately expansive in its in-situ state i.e., Ys= 20-39mm.

1.7.5 Subsidence (Consolidation Settlement)

The DBCE Preliminary Geotechnical Report has identified areas within stage 19 may experience settlement of fill through consolidation of underlying Hinuera deposits. A minimum 6 month holding period between completion of bulk filling and foundation construction should be observed for Lots 581-609, and 8031-8036. This period is based on other settlement monitoring carried out on previous projects on a similar ground type. No settlement monitoring has been done for the subject site. Settlement predictions (based on CPT 308) are in the order of 70-80mm of vertical settlement under 1.1m of additional fill weight. Previously monitored fill on nearby projects (sections of the expressway) encountered 500-600mm of settlement under 4-5m of fill surcharge. The majority (over 90%) of this settlement occurred within the first 1 month of loading. Based on the similar geology, a 6 month withholding period is considered suitable with no further monitoring required.

Completion of the bulk earthworks has been completed early 2022. At time of reporting March 2023, no building works have taken place. We consider this has provided sufficient time for settlement to have occurred for the bulk earthworks carried out. Residential development can proceed without further consolidation periods required unless more fill is added. If more fill is placed to raise the ground level, a delay between filling and building works should be observed. As a rule of thumb (for and future filling), one week of additional settlement period for every 100mm of new fill placed should be observed before building works take place. This allows for at least one month of settlement period for any deeper fills (450mm of fill or more) that may result in noticeable surface settlement affecting construction. We therefore consider this additional period is appropriate to realise the majority of the predicted additional settlement.

2.0 Disposal of Stormwater

Greenhill Park has been designed with a swale network to limit peak flows from the subdivision to 80 % of the 1 % AEP pre-development rate. S&L have provided the stormwater design for the current stage of the subdivision. As a part of this design, 100% of the onsite stormwater (up to the allowable impermeable area) has been allowed for in the system design. As such, no at source on site stormwater measures are required as a part of the overall stormwater design. This allows for a centralized stormwater system which has been stated as preferred for long term maintenance by Council. The piped drainage network has been designed to convey the 10% AEP flows from roads and lots to the swale network, with each lot to be provided with a piped service connection. Flow volumes over this design event may run overland into the swale network as secondary flow.

We recommend that reduced onsite water efficiency measures such as catchpit filters and reuse tanks be encouraged to improve water efficiency and reduce the sediment load downstream. Such measures should be at the discretion of the end user on a case-by-case basis.

The above recommendations do not supersede any additional measures that Council may require of each individual lot. Any council requirements in addition to the subdivision design should be followed. Any such requirements should be confirmed from council for this area. Any lot coverage over the maximum permitted will require site specific stormwater management to offset the effects of added runoff volume.

3.0 Retaining Walls

No retaining walls have been carried out as a part of subdivision works. Small retaining walls may be required on Lots 588-592 as a part of site recontouring to modify the slopes on these lots. Such walls would be in the order of 0.5m high and would be considered a landscaping wall (alternatively small batters can be used).

4.0 Preliminary Foundation Recommendations

Based on our post-completion investigations, observations during construction and understanding of the site's geology and geotechnical hazards, we believe suitable foundations will generally be typically TC2, or modified ground subgrade allowing for a Ribraft type foundation.

The lot summary table in Appendix B provides a summary of the anticipated ground conditions and preliminary foundation recommendations for each lot. Further lot-specific testing will be required to confirm foundation requirements. This may include testing prior to consent applications or during foundation excavations. The timing of the testing will be subject to Council requirements.

5.0 Professional Opinion

It has been demonstrated in this Geotechnical Completion Report, that earthworks have been completed and building platforms have been constructed to comply with Council's RITS specifications and the New Zealand Building Code. Recommendations have been provided within the report for the disposal of stormwater from individual lots, for the ongoing development of the lots and for the mitigation of liquefaction risk where applicable.

In accordance with RITS Section 2.3.4.1, a statement of professional opinion is enclosed in Appendix II of this document. This statement is presented in the form of Checklist 2.2 of Council's Development Manual, Volume 4: Quality Systems for Land Development, and is accompanied by a *Summary of Geotechnical Data for Individual Lots* which summarises the information and recommendations contained in this report.

6.0 Applicability

Recommendations contained in this document are based on data from observations of site earthworks, boreholes, and test results. Inferences about the nature and continuity of subsoils away from these locations are made but cannot be guaranteed.

In all circumstances, if variations in the subsoils occur which differ from those described or are assumed to exist, the site should be inspected by an engineer suitably qualified to make an informed judgement and provide advice on appropriate improvement measures.

This report has been prepared specifically for Stage 19 as shown for Lots: Lots 581-609, and 8031-8036 of Area LUK, Stage 19 within the Greenhill Park Residential Subdivision. No responsibility is accepted by CORE50 Ltd for the use of any part of this report for other development sites without their written approval.

Report Prepared By:  Date: 29th March 2023

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Aaron Kennedy

Civil Engineer

Report Reviewed By:  Date: 17th April 2023

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Michael Richardson

Geotechnical Engineer CPEng

References

[1] Ruakura Land Development - LDP Geotechnical Factual Report by Beca, 15 April 2016.

[2] C. Hughes and K. Read, "Ruakura Development - Stage 1 Geotechnical Investigation – Liquefaction Potential Detailed Assessment," Opus International Consultants, Ltd., Hamilton, New Zealand, 2014.

[3] M. Hughes and L. Shuler, "Report on Preliminary Geotechnical Investigation, Ruakura Development, Hamilton," S&L Consultants, Ltd., Tauranga, New Zealand, 2015.

[4] "Section 2 Earthworks and Geotechnical Requirements," in *Regional Infrastructure Technical Specifications*, Waikato Local Authority Shared Services, May 2018.

[5] "NZS 4404 Land Development and Subdivision Infrastructure," in *New Zealand Standards*, Wellington, New Zealand, Standards New Zealand, 2010.

[6] "Greenhill Park - Geotechnical Interpretation and Design-Area 1" by Beca 28 October 2016.

[7] "Part 5: Earthquake Actions - New Zealand," in *NZS 1170.5:2004 Structural Design Actions*, Standards New Zealand, 2004.

[8] "Greenhill Park Design Report - Area I (Stage 5, 6, 7 & 8) by Beca 20 December 2016

[9] "Clause B1: Structure," in *Acceptable Solutions and Verification Methods For New Zealand Building Code*, Wellington, Ministry of Business, Innovation and Employment, 2014.

[10] "Part A: Technical Guidance," in *Repairing and rebuilding houses affected by the Canterbury earthquakes*, Wellington, Ministry of Business, Innovation and Employment, 2012.

[11] "Clause E1: Surface Water," in *Acceptable Solutions and Verification Methods For New Zealand Building Code*, Wellington, Ministry of Business, Innovation and Employment, 2014.

[12] *Regional Infrastructure Technical Specifications*, Waikato Local Authority Shared Services, May 2018.

[13] "Preliminary Geotechnical Report Area K, L & Eldone," DB Consulting Engineers, December 2019.

Appendix A *Reference Drawings*

Subdivision Plan: 19-30410-19-RC1 Rev. 6

Cut/Fill Plan: 30410-01-S19-EW1 Rev. AB1

Preliminary Subdivision Foundation Plan: DB 171738-AREA-K&L&Eldone-01

AMALGAMATION CONDITIONS:

THAT LOT 8037 HEREON (LEGAL ACCESS) BE HELD AS TO SIX UNDIVIDED ONE SIXTH SHARES BY THE OWNERS OF LOTS 8031, 8032, 8033, 8034, 8035 & 8036 HEREON AND INDIVIDUAL RECORDS OF TITLE BE ISSUED IN ACCORDANCE THEREWITH.

THAT LOT 8031 & 8032 HEREON BE HELD IN THE SAME RECORD OF TITLE

THAT LOT 8033 & 8034 HEREON BE HELD IN THE SAME RECORD OF TITLE

THAT LOT 8035 & 8036 HEREON BE HELD IN THE SAME RECORD OF TITLE

SCHEDULE OF PROPOSED EASEMENTS

PURPOSE	SHOWN	BURDENED LAND	BENEFITED LAND
ROW, RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS, GAS, RIGHT TO DRAIN WATER AND SEWAGE	B1	LOT 8037 HEREON	LOTS 8031-8036 HEREON

SCHEDULE OF EXISTING EASEMENTS IN GROSS

PURPOSE	SHOWN	BURDENED LAND	GRANTEE	DOCUMENT NUMBER
RIGHT TO CONVEY ELECTRICITY AND TELECOMMUNICATIONS	C	LOT 2 DP 534384	TRANSPOWER NEW ZEALAND LIMITED	EI 11070524.14

SHRIMPTON & LIPINSKI
LAND DEVELOPMENT & DESIGN SPECIALISTS
Ph. 07 577 6069
Email: info@sltga.co.nz
P.O. Box 231, Tauranga 3140
www.sltga.co.nz

NOTES:

1. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSES OF SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991 AND SHOULD NOT BE RELIED ON FOR ANY OTHER PURPOSE.
2. AREAS AND DIMENSIONS ARE APPROXIMATE ONLY AND SUBJECT TO SURVEY.

Received
PLANNING GUIDANCE
05 November 2021

LEGEND:

- LOT BOUNDARY
- PROPOSED CADASTRAL LAYOUT
- CONCEPT BOUNDARY
- STAGE BOUNDARY
- ABUTTALS
- FUTURE STAGES
- HIGHER DENSITY LOTS
- RECREATION RESERVE
- STORMWATER RESERVE
- ROAD RESERVE

Rev	DESCRIPTION	DRN	CKD	APP	DATE
0	INTERNAL ISSUE	NW	JL	NF	12/19
1	ISSUED FOR APPROVAL	NW	JL	NF	12/19
2	HCC REQUIREMENTS	NW	JL	NF	02/20
3	LAYOUT AMENDED	NW	NF	NF	04/20
4	LAYOUT AMENDED	NP	NF	NF	09/20
5	STAGE BDY'S UPDATED	NP	BP	GC	10/21
6	RESERVES CHANGED	NP	GC	GC	11/21

	NAME	DATE		NAME	DATE
SURVEYED			DESIGNED		

COORDINATE SYSTEM: NZGD 2000 (MOUNT EDEN CIRCUIT)
ORIGIN OF COORDINATES:
HEIGHT DATUM: MOTURIKI LVD 1953
ORIGIN OF HEIGHT:

TITLE

AREAS LU & K SCHEME PLAN STAGE 19

PREPARED FOR

Chedworth Properties Limited
GREENHILL PARK

AREAS LU & K

ORIGINAL SCALES @ A3	STATUS
1:1000 DO NOT SCALE DIMENSIONS	FOR APPROVAL

DRAWING NO	REVISION
19-30410-19-RC1	6

H:\0000 - H Drive\parkinson\Autocad\19-30410-19-RC1 - Scheme Plan - Stage 19\19-30410-19-RC1 - Scheme Plan - Stage 19.dwg - Plotted: 4/11/2021

Cut Fill Plan
Scale 1:1250

Depth of Rock Plan
Scale 1:1500

Rock Cover Plan
Scale 1:1500

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LAND SPECIALISTS
Ph. 07 577 6069
Email: info@sltga.co.nz
P.O. Box 231, Tauranga 3140
www.sltga.co.nz

Legend:
- Major Contour
- Minor Contour
- Cut Area
- Fill Area

Contour Interval 0.25m

Rev	DESCRIPTION	DRN	CKD	APP	DATE
0	PRELIMINARY	NP	BP	PH	27-03-23
AB1	AS-BUILT	NP	BP	PH	27-03-23

	NAME	DATE		NAME	DATE
SURVEYED			DESIGNED		

COORDINATE SYSTEM:
ORIGIN OF COORDINATES:
HEIGHT DATUM:
ORIGIN OF HEIGHT:

TITLE

STAGE 19
CUT FILL PLAN

PREPARED FOR
GREENHILL PARK
Chedworth Properties Limited

STAGE 19

ORIGINAL SCALES @ A3: AS SHOWN
DO NOT SCALE DIMENSIONS
STATUS: AS-BUILT

DRAWING NO: 30410-01-S19-EW1
REVISION: AB1

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SHRIMPTON & LIPINSKI
LAND SPECIALISTS
Ph. 07 577 6069
Email: info@sltga.co.nz
P.O. Box 231, Tauranga 3140
www.sltga.co.nz

Legend:

- Major Contour
- Minor Contour
- Cut Area
- Fill Area

Contour Interval 0.25m

Rev	DESCRIPTION	DRN	CKD	APP	DATE
0	PRELIMINARY	NP	BP	PH	27-03-23
AB1	AS-BUILT	NP	BP	PH	27-03-23

	NAME	DATE		NAME	DATE
SURVEYED			DESIGNED		

COORDINATE SYSTEM:
ORIGIN OF COORDINATES:
HEIGHT DATUM:
ORIGIN OF HEIGHT:

TITLE

STAGE 19
CUT FILL PLAN
ORIGINAL TO AS-BUILT

PREPARED FOR

GREENHILL PARK
Chedworth Properties Limited

STAGE 19

ORIGINAL SCALES @ A3: 1:1250
DO NOT SCALE DIMENSIONS
STATUS: AS-BUILT

DRAWING NO: 30410-01-S19-EW2
REVISION: AB1

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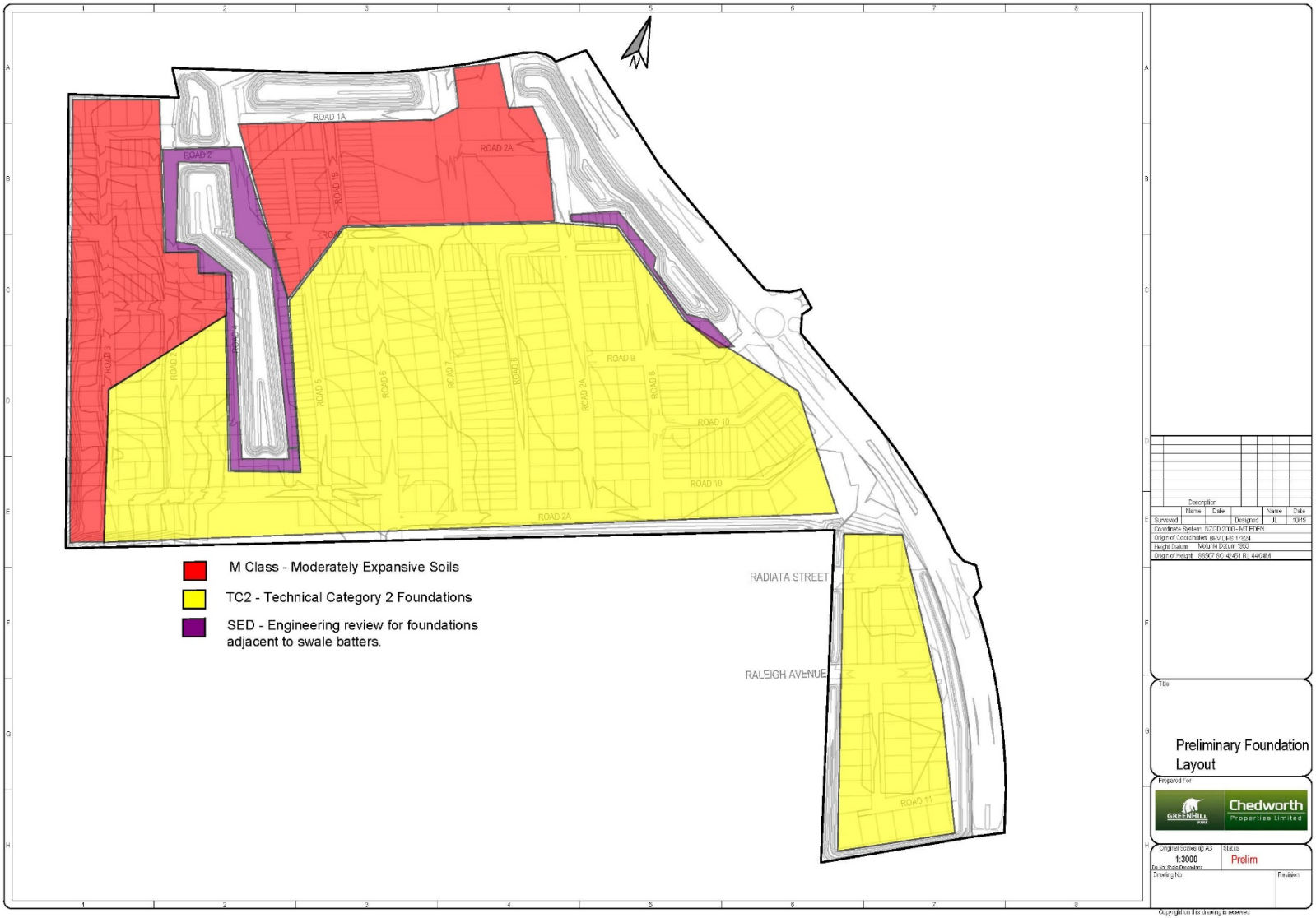
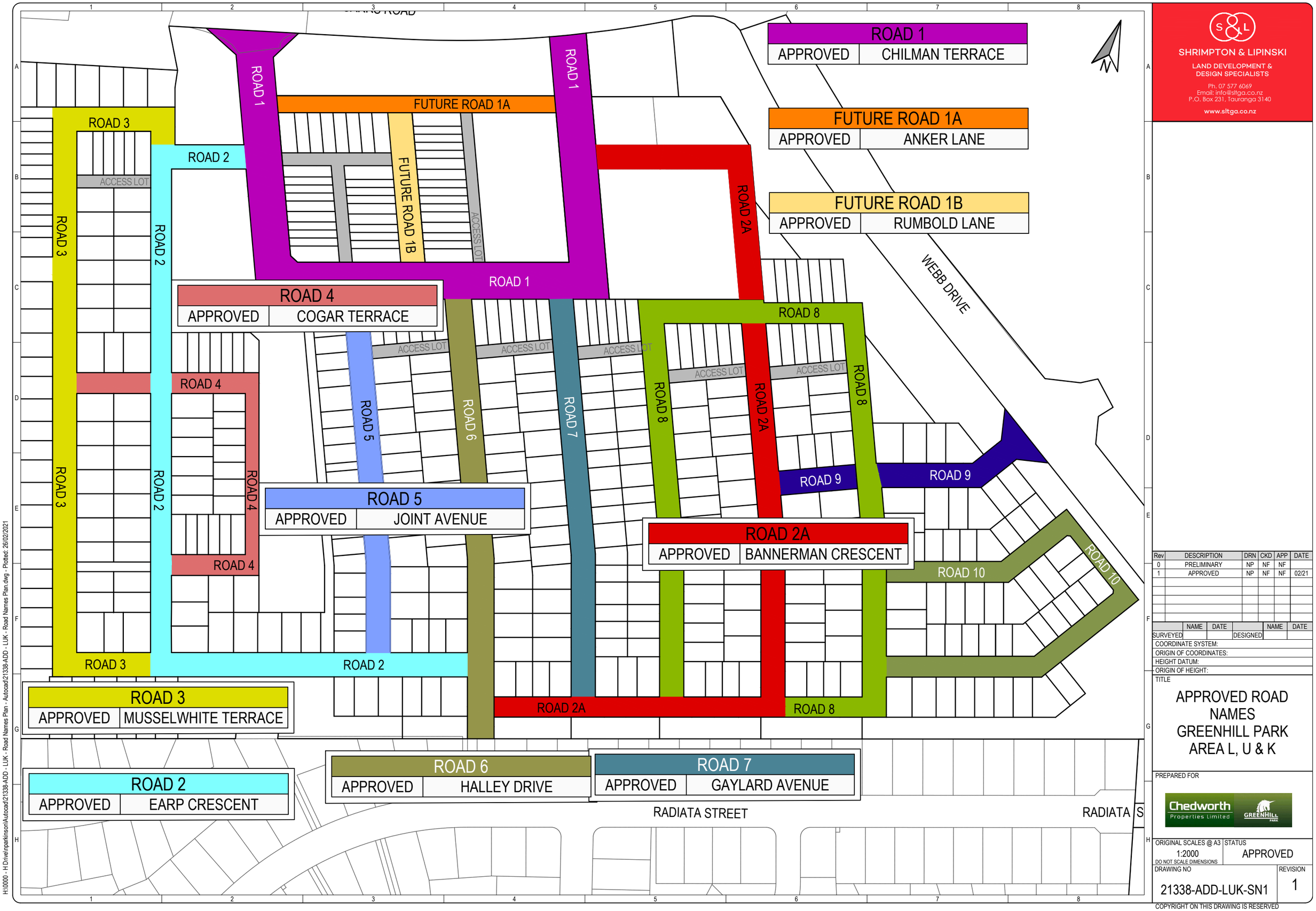

ROAD 1A
ROAD 2
ROAD 2A
ROAD 1B
ROAD 3
ROAD 4
ROAD 5
ROAD 6
ROAD 7
ROAD 8
ROAD 9
ROAD 10
ROAD 11
RADIATA STREET
RALEIGH AVENUE
M Class - Moderately Expansive Soils
TC2 - Technical Category 2 Foundations
SED - Engineering review for foundations adjacent to swale batters.
Description
Surveyed
Designed
JL
Coordinate System: NZGD2000 - MT EDEN
Origin of Coordinates: BPV DP6 17824
Height Datum: Moturiki Datum 1953
Origin of Height: SS507 SC 42451 RL 4.40484
Title
Preliminary Foundation Layout
Prepared for
GREENHILL PARK
Chedworth Properties Limited
Original Scales @ A3
1:3000
Do not Scale Dimension
Drawing No
Revision
Status
Prelim
Copyright on this drawing is reserved



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LAND DEVELOPMENT & DESIGN SPECIALISTS
Ph. 07 577 6069
Email: info@sltga.co.nz
P.O. Box 231, Tauranga 3140
www.sltga.co.nz

Rev	DESCRIPTION	DRN	CKD	APP	DATE
0	PRELIMINARY	NP	NF	NF	
1	APPROVED	NP	NF	NF	02/21

	NAME	DATE		NAME	DATE
SURVEYED			DESIGNED		

COORDINATE SYSTEM:
ORIGIN OF COORDINATES:
HEIGHT DATUM:
ORIGIN OF HEIGHT:

TITLE

APPROVED ROAD NAMES GREENHILL PARK AREA L, U & K

PREPARED FOR

Chedworth Properties Limited
GREENHILL PARK

ORIGINAL SCALES @ A3: 1:2000
DO NOT SCALE DIMENSIONS

STATUS: APPROVED

DRAWING NO: 21338-ADD-LUK-SN1

REVISION: 1

H:\0000 - H Drive\nparkinson\Autocad\21338-ADD - LUK - Road Names Plan - Autocad\21338-ADD - LUK - Road Names Plan.dwg - Plotted: 26/02/2021

Appendix B *Geotechnical Completion Forms*

Checklist 2.2 - Statement of Professional Opinion

Summary of Geotechnical Data for Individual Lots

NZS 4404: 2010 SCHEDULE2A (Checklist 2.2)

STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND FOR BUILDING CONSTRUCTION

Development: Greenhill Park LUK Stage 19 **Developer:** Chedworth Properties Limited

At Pardoa Boulevard, Chartwell, Hamilton (Chilman Terrace, Halley Drive and Bannerman Crescent)

I, Michael Richardson of CORE50 Ltd, PO Box 1123, Taupo

Hereby confirm that:

1.0 I am a geo-professional as defined in clause 1.2.2 of NZS 4404:2010 and was retained by the developer as the geo- professional on the above development.

2.0 The extent of my inspections during construction, and the results of all tests carried out are described in my geotechnical completion report for Greenhill Park Area LUK Stage 19 dated March 2023 (reference 171738-S19-01)

3.0 In my professional opinion, not to be construed as a guarantee, I consider that:

- **a. The completed works give due regard to land slope and foundation stability considerations.**
- **b. The site ground affected by engineered certified filling is suitable for the erection thereon of buildings designed according to the report recommendations provided that:**
  - **i. Lots 581-609, and 8031-8036 are subject to specific engineering review of foundations addressing TC2 liquefaction ground damage for the ULS design case.**
  - **ii. Lots may be modified for subgrade improvement to reduce the TC2 requirement down to TC1 under supervision on an engineer.**
  - **iii. All lots are subject to an engineering inspection during foundation excavations in lieu of further soils testing. Construction supervision from an engineer shall be carried out to confirm the shallow ground conditions are in accordance with this report and suitable for NZS3604 foundations for bearing strength.**
  - **iv. All lots need to observe minimum floor levels and require surface falls from the rear of the lot to the front. Specifically, Lots 588 to 592 will require modification of the ground levels to achieve this surface fall towards the road frontage.**

4.0 This professional opinion is furnished to Hamilton City Council and the developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.

5.0 This certificate shall be read in conjunction with my geotechnical completion report referred to in clause 2 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

Signed **Date: 17 April 2023**

Michael Richardson

Chartered Professional Engineer (Geotechnical)

CPEng 1005467

Site Specific Geotechnical Summary and Foundation Recommendations Table

CORE50 SOLUTIONS ENGINEERED

Job Ref	CR171738-S19-01	Date	28/03/2023	Client	Chedworth Properties Limited		Project Address	Stage 19, Greenhill Park, Hamilton
RC No:	11/2019/7140/003	DP No:	TB210C400					

Lot #	Area (m^2)	Site Soils Characteristics						Foundation Recommendations							Notes
		Topsoil Depth Encountered (mm) Note 1	Encountered Soils	GWT (mm)	Asbuilt Cut/Fill Depths (m) Note 2		Expansivity Class (AS2870)	Conventional Shallow Foundation to NZS3604:2011	Building Setback Zones (Y/N) Note 3	Storm Water Specific Design (Y/N) Note 4	Codemark Ribraft (Y/N) Note 5 & 6	Liquefaction Technical Category	Minimum Building Platform (Y/N) Note 8	Consent Notice (Y/N) Note 7	
					Cut	Fill									
581	396m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.3-2.4	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
582	384m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	0.9-2.2	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
583	326m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.6-2.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
584	300m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	3400	0.8-2.0	1.6-2.2	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
585	300m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.4	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
586	368m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.4	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
587	368m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	2.2-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
588	368m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	2.2-2.4	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	Final developed ground levels to be modified to fall from rear to front of site for water runoff
589	300m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.2	2.2-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	Final developed ground levels to be modified to fall from rear to front of site for water runoff
590	300m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.2	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	Final developed ground levels to be modified to fall from rear to front of site for water runoff
591	300m²	100	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.2	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	Final developed ground levels to be modified to fall from rear to front of site for water runoff
592	300m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.2-2.4	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	Final developed ground levels to be modified to fall from rear to front of site for water runoff
593	368m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.6-1.9	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
594	368m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.2	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
595	368m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
596	300m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	2.4-2.9	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
597	300m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	2.4-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
598	300m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
599	300m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	2.4-2.9	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
600	368m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
601	368m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
602	404m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.6	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
603	360m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.9	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
604	360m²	300	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.2	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
605	360m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	2800	0.3	1.6-2.2	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
606	297m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.6-2.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
607	231m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.6-1.9	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
608	231m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.6-2.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
609	297m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3	1.9-2.4	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-

Site Specific Geotechnical Summary and Foundation Recommendations Table

Lot #	Area (m^2)	Site Soils Characteristics						Foundation Recommendations							Notes
		Topsoil Depth Encountered (mm) Note 1	Encountered Soils	GWT (mm)	Asbuilt Cut/Fill Depths (m) Note 2		Expansivity Class (AS2870)	Conventional Shallow Foundation to NZS3604:2011	Building Setback Zones (Y/N) Note 3	Storm Water Specific Design (Y/N) Note 4	Codemark Ribraft (Y/N) Note 5 & 6	Liquefaction Technical Category	Minimum Building Platform (Y/N) Note 8	Consent Notice (Y/N) Note 7	
					Cut	Fill									
8031	231m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.5	0.2-1.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
8032	225m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.5	0.2-1.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
8033	220m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	3400	0.3-1.5	0.4-1.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
8034	214m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	3400	0.3-1.5	0.6-1.5	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
8035	208m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.5	0.7-2.0	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-
8036	203m²	200	Engineered Fill, Silts and Sands (Hinuera Formation).	NE	0.3-1.5	1.2-2.2	S	N	N	N[4]	N[5]	TC2 - Like	Y[8]	Y[7]	-

Notes:

1) Respread Topsoil depths approximate only as Topsoiling works were still in progress at time of Post Construction Soil Testing.

2) Depths are taken from Asbuilt Cut/Fill Plans supplied by S&L. This considers approximately 300mm of topsoil removal across all lots prior to subdivision filling.

3) Setback required for properties adjacent swales. SED type foundation to be adopted for all lots adjacent to swales. No foundations to be constructed <1.5m from top of slope. No specific engineer design required >3m from top of slope.

4) Soakage Testing is not required on individual lots. On site stormwater runoff reduction measures encouraged, i.e.; Re-use tanks, filters and catchpits.

5) TC2 Foundations Recommended. Ministry of Business, Innovation and Employment (MBIE) and New Zealand Geotechnical Society (NZGS) Repairing and rebuilding houses affected by the Canterbury earthquakes, Part A: Technical Guidance – Section 5.

6) M Class Foundations Recommended.

7) Consent Notice relation to Stormwater Controls required on all lots.

8) Refer appendix E for minimum Finished Floor levels per Lot.

NE = Not Encountered, GWT = Ground Water Table, SRP = Sediment Retention Pond, e.g.l. = existing ground level.

Appendix C *Laboratory Testing*

Fill Material Lab Testing.

PLASTICITY INDEX FOR SOILS
TEST REPORT

Project :	Greenhill Park
Location :	Greenhill Park
Client :	DB Consulting Limited
Contractor :	-
Sampled by :	Client
Date sampled :	9/10/2020
Date received :	12/10/2020
Sampling method :	Bulk Sample
Sample condition :	As received

Project No :	2-68165.00
Lab Ref No :	HA6441_PI
Client Ref No :	

Test Results

Sample Lab Ref No :	HA6441	
Sample Location ID :	Not Stated	
Sample Depth (m) :	Not Stated	
Soil Fraction Tested :	-425µm	
Natural Water Content (%) :	50.8	
Liquid Limit :	111	
Plastic Limit :	50	
Plasticity Index :	61	
Sample Description :	HA6441_PI	CLAY with some silt and trace sand

Test Methods		Notes
Water Content	NZS 4402 : 1986, Test 2.1	Soil fraction tested as shown.
Liquid Limit	NZS 4402 : 1986, Test 2.2	
Plastic Limit	NZS 4402 : 1986, Test 2.3	
Plasticity Index	NZS 4402 : 1986, Test 2.4	

Date tested : 16/10/20
Date reported : 21/10/20

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full
All information supplied by Client

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 21/10/20

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

WSP
Hamilton (Fox St)
Quality Management Systems Certified to ISO 9001

4 Fox Street
Private Bag 3057, Waikato Mail Centre, 3240,
Hamilton, New Zealand

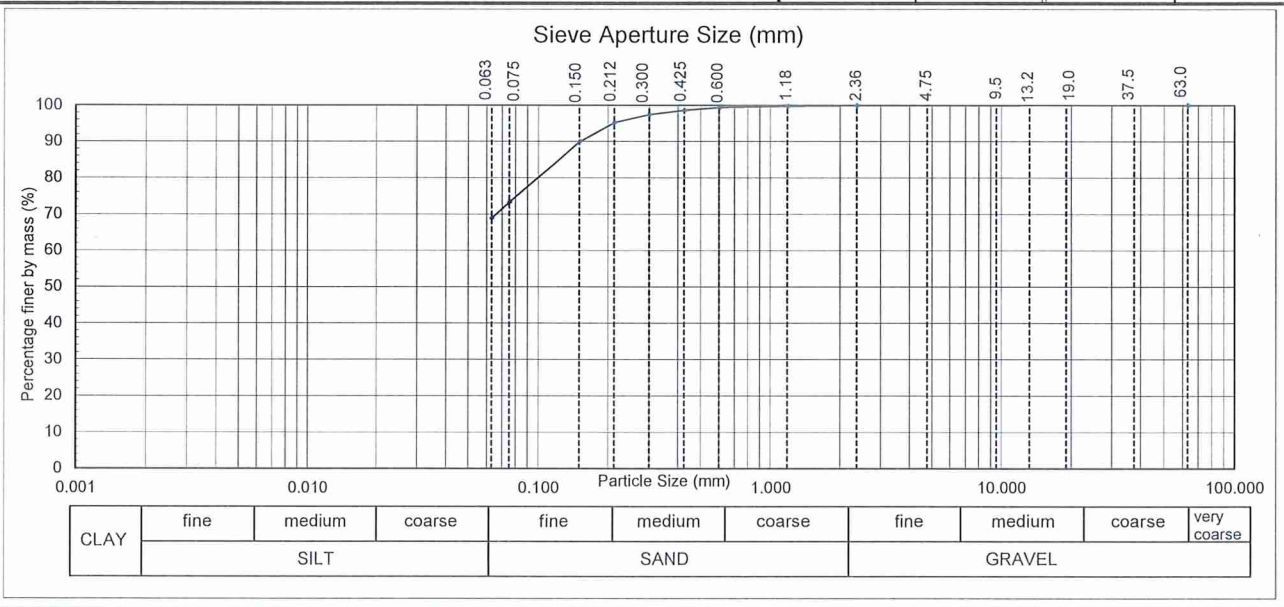
Telephone +64 7 856 2870
Website www.wsp.com/nz

PARTICLE SIZE ANALYSIS (WET SIEVE METHOD)
TEST REPORT

Project :	Greenhill Park
Location :	Greenhill Park
Client :	DB Consulting Limited
Client/Sample Ref :	Not Stated
Contractor :	-
Borehole No:	Not Stated Depth: Not Stated
Sampled by :	Client
Date received :	12/10/20
Sampling method :	Bulk Sample
Sample condition :	As received
Sample description :	Sandy CLAY/SILT
Solid Particle Density (t/m^3):	N/A
Water Content (as received):	38.8 %

Project No:	2-68165.00
Lab Ref No:	HA6441_PSD
Client Ref:	

Sieve Analysis						Hydrometer Analysis			
Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)
63.0	--	4.75	--	0.300	97	--	--	--	--
37.5	--	2.36	100	0.212	95	--	--	--	--
19.0	--	1.18	100	0.150	90	--	--	--	--
13.2	--	0.600	99	0.075	73	--	--	--	--
9.5	--	0.425	99	0.063	69	--	--	--	--
Note:	"--" denotes sieve not used and/or hydrometer analysis not tested					--	--		



Test Methods	Notes
Particle Size Analysis: NZS 4402:1986: Test 2.8.1 (Wet Sieve Method)	

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date Tested: 19/10/20

Date Reported: 21/10/20

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 21/10/20

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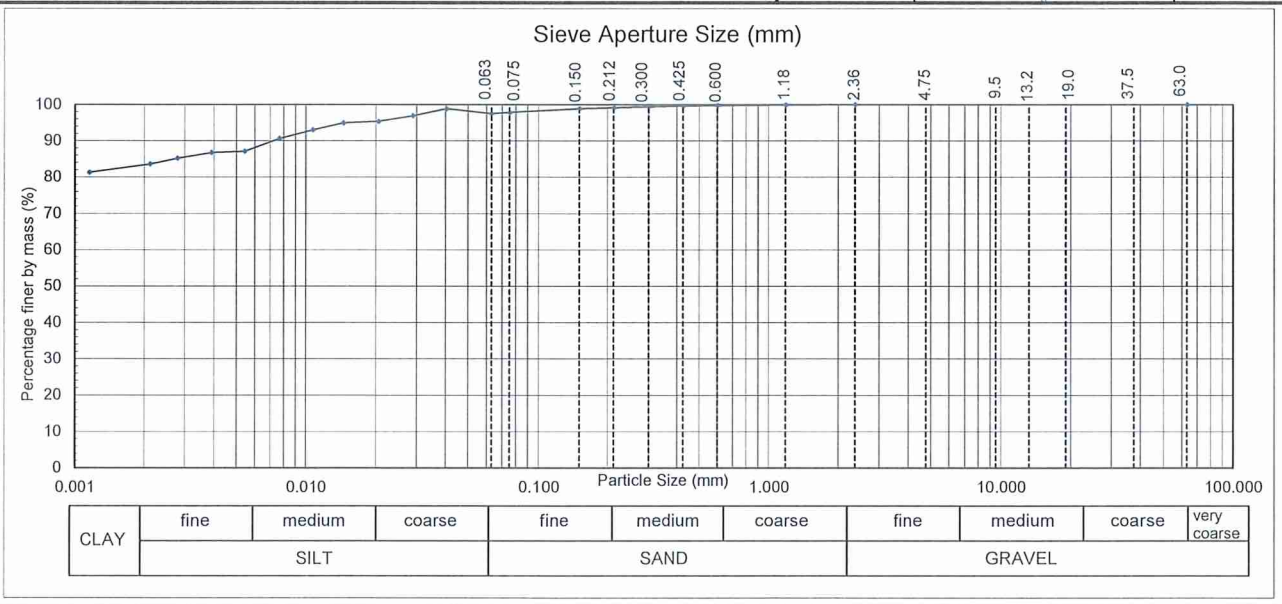
PARTICLE SIZE ANALYSIS (HYDROMETER METHOD)
TEST REPORT

Project :	Greenhill Park
Location :	Greenhill Park
Client :	DB Consulting Limited
Client/Sample Ref :	Not Stated
Contractor :	-
Borehole No:	Not Stated Depth: Not Stated
Sampled by :	Client
Date received :	12/10/20
Sampling method :	Bulk Sample
Sample condition :	As received
Sample description :	CLAY with some silt and trace sand
Solid Particle Density (t/m^3):	2.80 Assumed
Water Content (as received):	50.8 %

Project No:	2-68165.00
Lab Ref No:	HA6441_PSA
Client Ref:	

Sieve Analysis						Hydrometer Analysis			
Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)
63.0	--	4.75	--	0.300	99	0.0403	99	0.0054	87
37.5	--	2.36	100	0.212	99	0.0288	97	0.0039	87
19.0	--	1.18	100	0.150	99	0.0205	95	0.0028	85
13.2	--	0.600	100	0.075	98	0.0145	95	0.0021	84
9.5	--	0.425	100	0.063	98	0.0107	93	0.0012	81
Note:	"--" denotes sieve not used and/or hydrometer analysis not tested					0.0077	91		



Test Methods	Notes
Particle Size Analysis: NZS 4402:1986: Test 2.8.4 (Washed Grading & Hydrometer Method)	pH of suspension : 8.0 (Whatmans Full Range pH Indicator paper) All information supplied by Client

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date Tested: 20/10/20

Date Reported: 21/10/20

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 21/10/20

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LINEAR SHRINKAGE FOR SOILS
TEST REPORT

Project :	Greenhill Park
Location :	Greenhill Park
Client :	DB Consulting Engineers Ltd
Contractor :	-
Sampled by :	Client
Date sampled :	09/10/20
Date received :	12/10/20
Sampling method :	Bulk Sample
Sample condition :	As received

Project No :	2-68165.00
Lab Ref No :	HA6441_LS
Client Ref No :	

Test Results

Sample Lab Ref No :	HA6441
Location ID :	Not Stated
Sample Depth (m) :	Not Stated
Soil Fraction Tested :	-425µm
Sample History :	Natural
Water Content as Rec'd (%) :	50.8
Water Content at LS test (%) :	110.4
Linear Shrinkage (%) :	24

Sample Description : HA6441 CLAY with some silt and trace sand

Test Methods		Notes
Water Content	NZS 4402 : 1986, Test 2.1	
Linear Shrinkage	NZS 4402 : 1986, Test 2.6	

Date tested : 20/10/20
Date reported : 21/10/20

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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All information supplied by Client

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 21/10/20

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Website www.wsp.com/nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

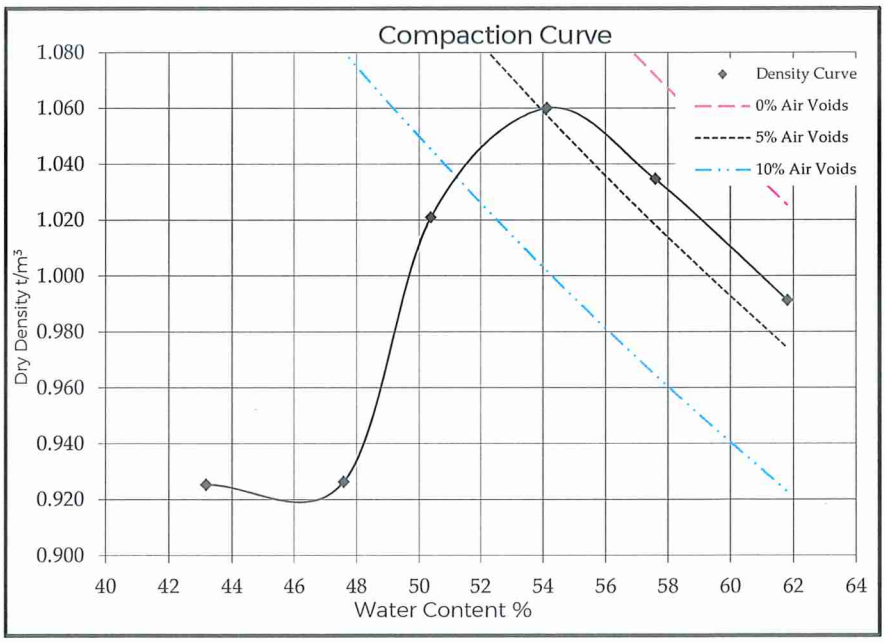
Project :	Greenhill Park
Location :	Greenhill Park
Client :	DB Consulting Engineers Ltd
Contractor :	-
Sampled by :	Client
Date sampled :	9/10/20
Sampling method :	Bulk Sample
Sample description :	CLAY with some silt and trace sand. Reddish brown
Sample condition :	As received
Solid density :	2.80 t/m³ (Assumed)
Source:	Not Stated

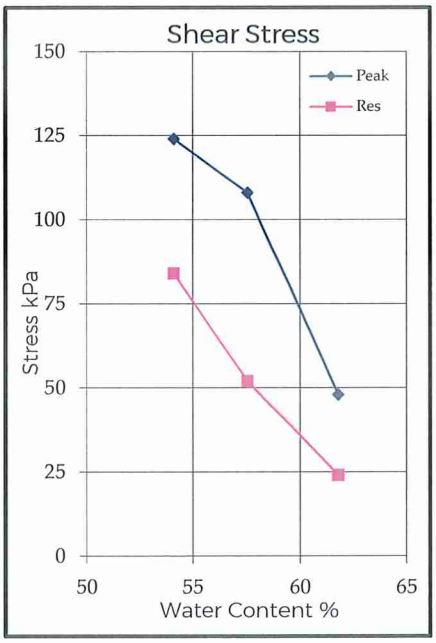
Project No :	2-68165.00
Lab Ref No :	HA6441/2_MDD
Client Ref No :	

Test Results

Maximum dry density	1.06	t/m³	Natural water content	50.4 %
Optimum water content	54	%	Fraction tested	100% Passing 19mm sieve

Sample ID		-120	-60	Nat	60	120	180	
Bulk density	t/m³	1.325	1.367	1.535	1.634	1.631	1.604	
Water content	%	43.2	47.6	50.4	54.1	57.6	61.8	
Dry density	t/m³	0.925	0.926	1.021	1.060	1.035	0.991	
Sample condition		Hard Dry	Hard Moist	V.Stiff Moist	Stiff Moist	Firm Moist-wet	Soft Wet	
Peak stress	kPa	U.T.P	U.T.P	>192	124	108	48	
Remoulded stress	kPa	-	-	>192	84	52	24	





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 21/10/20
Date reported : 27/10/20

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 27/10/20

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DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

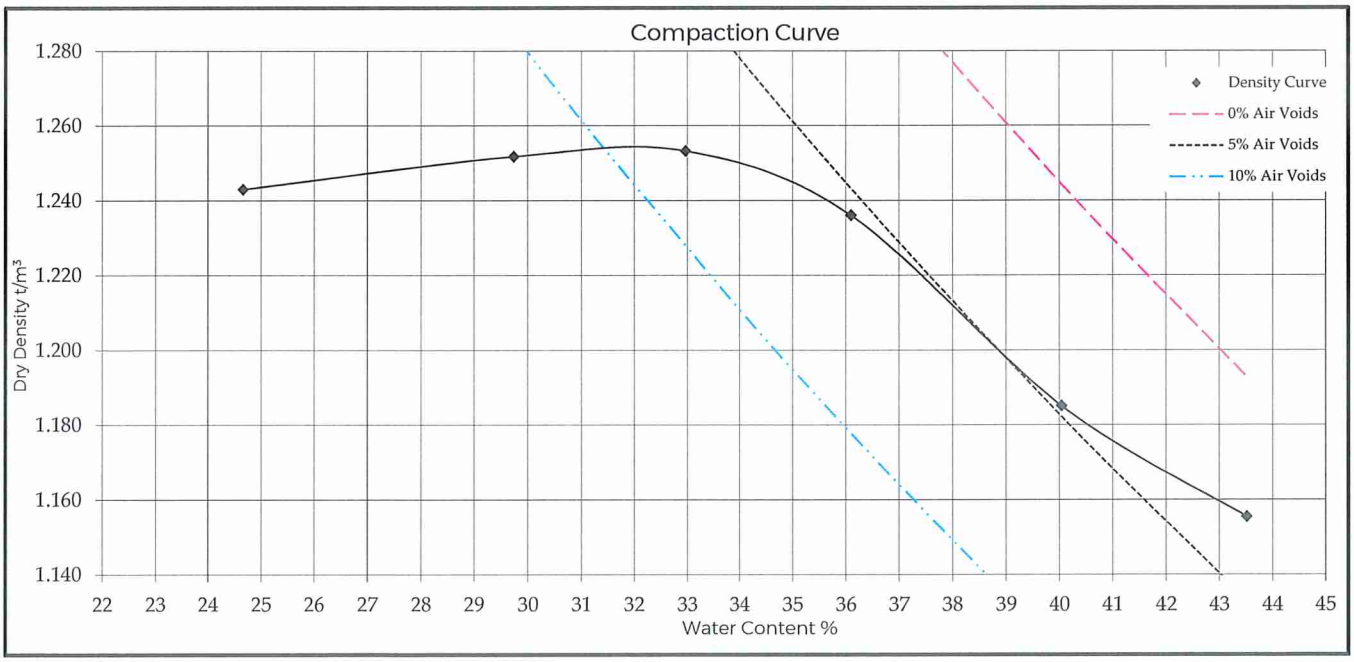
Project :	Greenhill Park
Location :	Greenhill Park
Client :	DB Consulting Engineers Ltd
Contractor :	-
Sampled by :	Client
Date sampled :	09/10/20
Sampling method :	Bulk Sample
Sample description :	Sandy CLAY/SILT, grey
Sample condition :	As received
Solid density :	2.48 t/m³ (Assumed)
Source :	Not Stated

Project No :	2-68165.00
Lab Ref No :	HA6441/1_MDD
Client Ref No :	

Test Results

Maximum dry density	1.25	t/m³	
Optimum water content	32	%	
Natural water content	40.0	%	
Fraction tested	100% Passing 19mm		

Sample ID		-240	-180	-120	-60	Nat	60	
Bulk density	t/m³	1.550	1.624	1.666	1.682	1.660	1.658	
Water content	%	24.7	29.7	33.0	36.1	40.0	43.5	
Dry density	t/m³	1.243	1.252	1.253	1.236	1.185	1.155	
Sample condition		V.Dense Moist	V.Dense Moist	V.Dense Moist	Dense Moist	M.Dense Moist-Wet	Loose Wet-Sat'	



Test Methods		Notes
Compaction	NZS 4402 : 1986 Test 4.1.1 (Standard)	

Date tested : 21/10/20
Date reported : 27/10/20

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Designation : *Senior Civil Engineering Technician*
Date : 27/10/20

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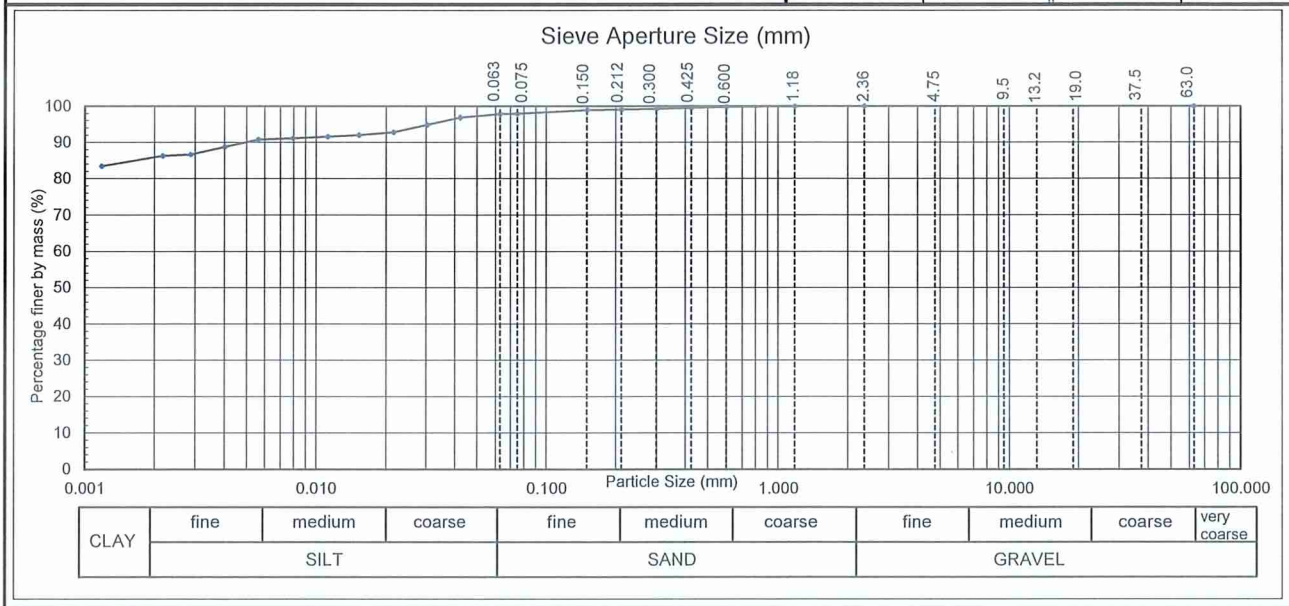
PARTICLE SIZE ANALYSIS (HYDROMETER METHOD)
TEST REPORT

Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sample Ref No:	#1
Sampled by :	Client (Aaron Kennedy)
Date sampled :	11/03/22
Sampling method :	Bulk Sample
Sample condition :	As received
Sample description :	CLAY, some silt, trace sand
Solid Particle Density (t/m^3):	2.66 Tested
Water Content (as received):	55.7 %

Project No:	2-68311.00
Lab Ref No:	HA8743/1_HYD
Client Ref:	171738-LUK-SI

Sieve Analysis						Hydrometer Analysis			
Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)
63.0	--	4.75	--	0.300	99	0.0424	97	0.0056	91
37.5	--	2.36	100	0.212	99	0.0303	95	0.0040	89
19.0	--	1.18	100	0.150	99	0.0216	93	0.0029	87
13.2	--	0.600	100	0.075	98	0.0153	92	0.0022	86
9.5	--	0.425	100	0.063	98	0.0112	92	0.0012	83
Note:	"--" denotes sieve not used and/or hydrometer analysis not tested					0.0080	91		



Test Methods	Notes
Particle Size Analysis: NZS 4402:1986: Test 2.8.4 (Washed Grading & Hydrometer Method)	pH of suspension : 8.0 (Whatmans Full Range pH Indicator paper) All information supplied by Client

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date Tested: 28/03/22

Date Reported: 29/03/22

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 29/03/22

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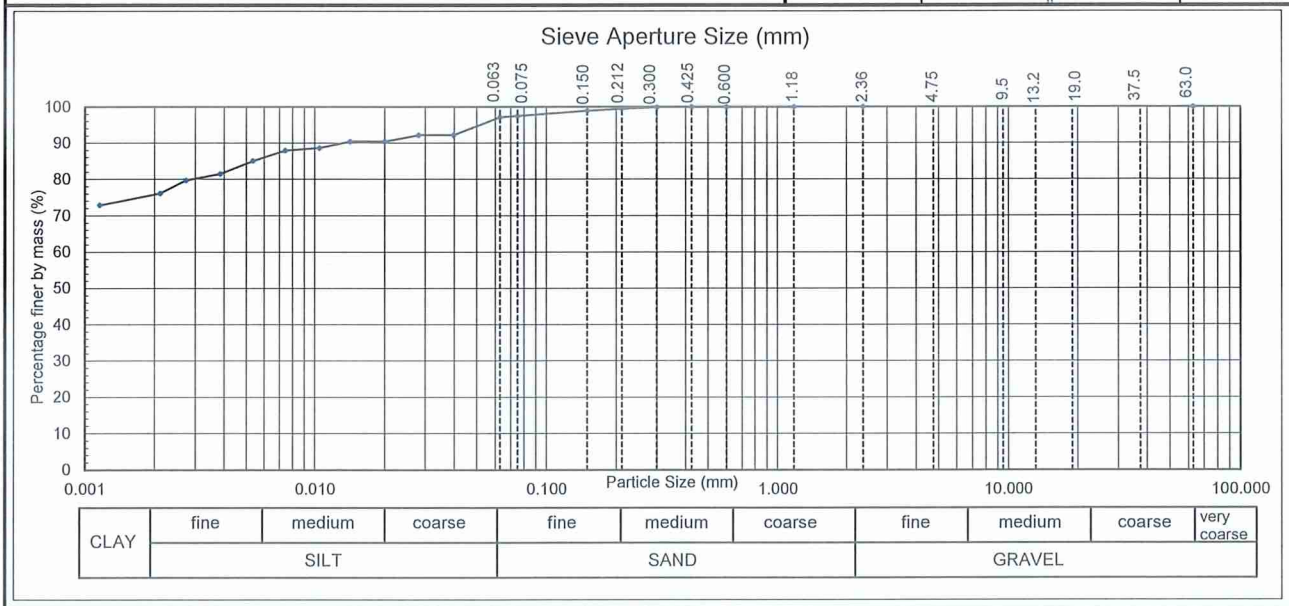
Website www.wsp.com/nz

PARTICLE SIZE ANALYSIS (HYDROMETER METHOD)
TEST REPORT

Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sample Ref No:	#2
Sampled by :	Client (Aaron Kennedy)
Date sampled :	11/03/22
Sampling method :	Bulk Sample
Sample condition :	As received
Sample description :	Silty CLAY, trace sand
Solid Particle Density (t/m^3):	2.74 Tested
Water Content (as received):	62.0 %

Project No:	2-68311.00
Lab Ref No:	HA8743/2_HYD
Client Ref:	171738-LUK-SI

Sieve Analysis						Hydrometer Analysis			
Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Sieve Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)	Particle Size (mm)	Passing (%)
63.0	--	4.75	--	0.300	100	0.0398	92	0.0054	85
37.5	--	2.36	100	0.212	100	0.0282	92	0.0039	82
19.0	--	1.18	100	0.150	99	0.0201	90	0.0028	80
13.2	--	0.600	100	0.075	98	0.0142	90	0.0021	76
9.5	--	0.425	100	0.063	97	0.0105	89	0.0012	73
Note:	"--" denotes sieve not used and/or hydrometer analysis not tested					0.0074	88		



Test Methods	Notes
Particle Size Analysis: NZS 4402:1986: Test 2.8.4 (Washed Grading & Hydrometer Method)	pH of suspension : 8.0 (Whatmans Full Range pH Indicator paper) All information supplied by Client

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.

Date Tested: 28/03/22

Date Reported: 29/03/22

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 29/03/22

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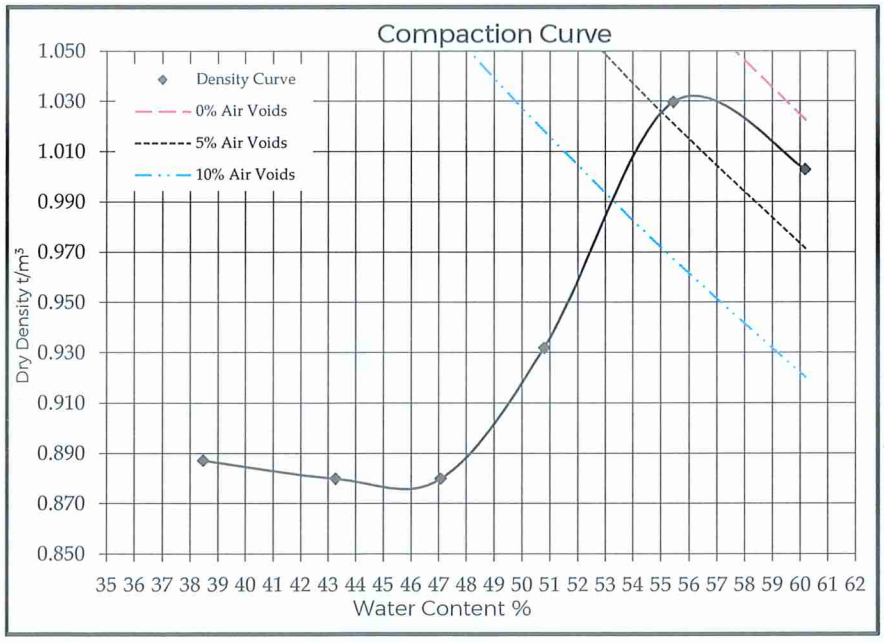
DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

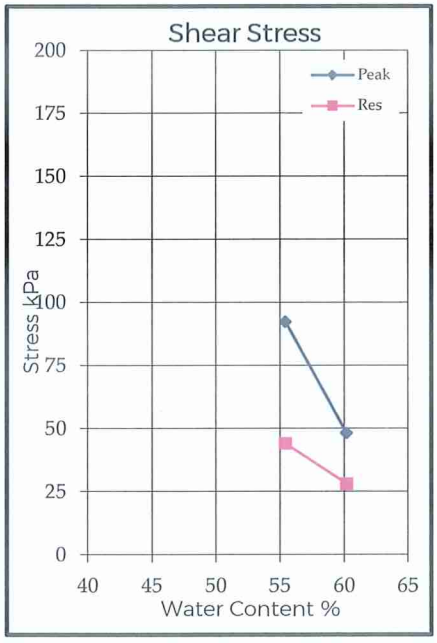
Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sampled by :	Client (Aaron Kennedy)
Date sampled :	11/03/22
Sampling method :	Bulk Sample
Sample description :	CLAY, some silt, trace sand
Sample condition :	As received
Solid density :	2.66 t/m³ (Tested)
Source:	#2

Project No :	2-68311.00
Lab Ref No :	HA8743/1_MDD
Client Ref No :	171738-LUK-SI

Test Results

Maximum dry density		1.03	t/m³	Natural water content		55.4	%
Optimum water content		56	%	Fraction tested		100% Passing 19mm	
Sample ID		-240	-180	-120	-60	Nat	60
Bulk density	t/m³	1.228	1.261	1.294	1.405	1.601	1.606
Water content	%	38.5	43.3	47.1	50.8	55.4	60.2
Dry density	t/m³	0.887	0.880	0.880	0.932	1.030	1.003
Sample condition		Hard Moist	Hard Moist	Hard Moist	Hard Moist-Wet	V. Stiff Wet	Stiff Wet
Peak stress	kPa	UTP	UTP	UTP	>209	92	48
Remoulded stress	kPa	-	-	-	-	44	28





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 22/03/22
Date reported : 29/03/22

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 29/03/22

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Website www.wsp.com/nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

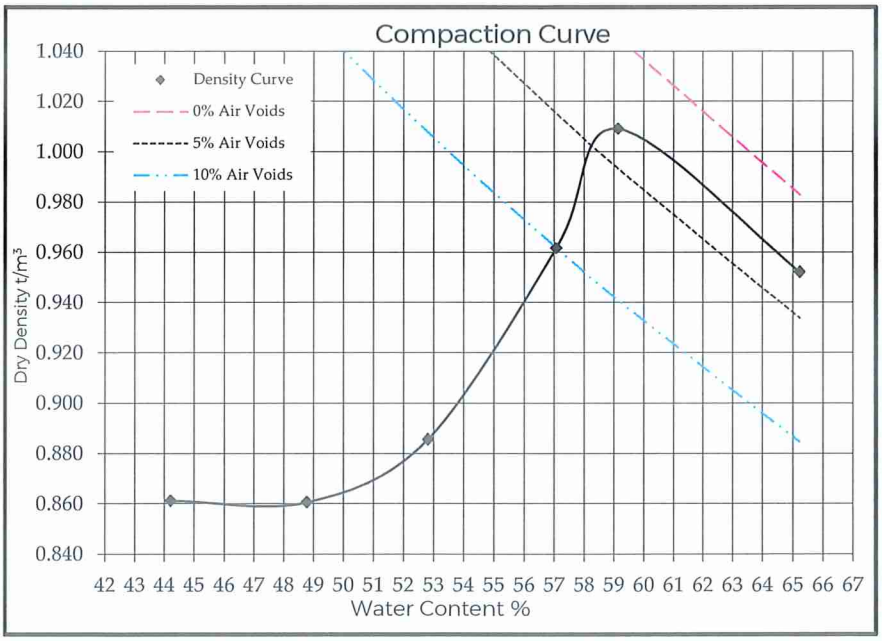
Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sampled by :	Client (Aaron Kennedy)
Date sampled :	11/03/22
Sampling method :	Bulk Sample
Sample description :	Silty CLAY, trace sand
Sample condition :	As received
Solid density :	2.74 t/m³ (Tested)
Source:	#2

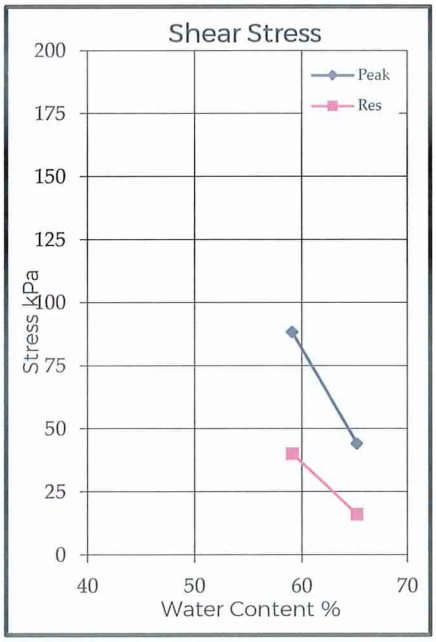
Project No :	2-68311.00
Lab Ref No :	HA8743/2_MDD
Client Ref No :	171738-LUK-SI

Test Results

Maximum dry density	1.01	t/m³	Natural water content	59.1 %
Optimum water content	59	%	Fraction tested	100% Passing 19mm

Sample ID		-240	-180	-120	-60	Nat	60	
Bulk density	t/m³	1.242	1.280	1.353	1.511	1.606	1.573	
Water content	%	44.2	48.8	52.8	57.1	59.1	65.2	
Dry density	t/m³	0.861	0.861	0.886	0.962	1.009	0.952	
Sample condition		Hard Moist	Hard Moist	Hard Moist	Hard Moist-Wet	V. Stiff Wet	Firm Wet	
Peak stress	kPa	UTP	UTP	UTP	>209	88	44	
Remoulded stress	kPa	-	-	-	-	40	16	





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 22/03/22
Date reported : 29/03/22

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IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 29/03/22

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PLASTICITY INDEX FOR SOILS
TEST REPORT

Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sampled by :	Client (Aaron Kennedy)
Date sampled :	11/03/2022
Date received :	14/03/2022
Sampling method :	Bulk Sample
Sample condition :	As received

Project No :	2-68311.00
Lab Ref No :	HA8743_PI
Client Ref No :	171738-LUK_SI

Test Results

Sample Lab Ref No :	HA8743/1_PI	HA8743/2_PI
Sample Location ID :	#1	#2
Sample Depth (m) :	-	-
Soil Fraction Tested :	-425µm	-425µm
Natural Water Content (%) :	55.7	62.0
Liquid Limit :	120	101
Plastic Limit :	47	50
Plasticity Index :	73	51

Sample Description :		
	HA8743/1_PI	CLAY, some silt, trace sand
	HA8743/2_PI	Silty CLAY, trace sand

Test Methods		Notes
Water Content	NZS 4402 : 1986, Test 2.1	Soil fraction tested as shown.
Liquid Limit	NZS 4402 : 1986, Test 2.2	
Plastic Limit	NZS 4402 : 1986, Test 2.3	
Plasticity Index	NZS 4402 : 1986, Test 2.4	

Date tested : 28/03/22
Date reported : 04/04/22

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full
All information supplied by Client

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 04/04/22

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LINEAR SHRINKAGE FOR SOILS
TEST REPORT

Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sampled by :	Client
Date sampled :	11/03/22
Date received :	14/03/22
Sampling method :	Bulk Sample
Sample condition :	As received

Project No :	2-68311.00
Lab Ref No :	HA8743_LS
Client Ref No :	171738-LUK-SI

Test Results

Sample Lab Ref No :	HA8743/1_LS	HA8743/2_LS
Location ID :	#1	#2
Sample Depth (m) :	-	-
Soil Fraction Tested :	-425µm	-425µm
Sample History :	Natural	Natural
Water Content as Rec'd (%) :	55.7	62.0
Water Content at LS test (%) :	120.7	100.6
Linear Shrinkage (%) :	22	19

Sample Description : HA8743/1_LS — CLAY, some silt, trace sand
HA8743/2_LS — Silty CLAY, trace sand

Test Methods		Notes
Water Content	NZS 4402 : 1986, Test 2.1	Sample description is not IANZ endorsed.
Linear Shrinkage	NZS 4402 : 1986, Test 2.6	

Date tested : 01/04/22
Date reported : 04/04/22

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full
All information supplied by Client

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 04/04/22

ACCREDITED IANZ TESTING LABORATORY

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SOLID DENSITY OF SOIL PARTICLES TEST REPORT

Project :	Greenhill Park Area LUK
Location :	Greenhill Park Area LUK EW.S2
Client :	Chedworth Properties c/o CORE50 Ltd
Contractor :	ONLINE Contractors
Sampled by :	Client (Aaron Kennedy)
Date sampled :	11/03/2022
Date received :	14/03/2022
Sampling method :	Bulk sample
Sample condition :	As received

Project No :	2-68311.00
Lab Ref No :	HA8743_SD
Client Ref No :	171738-LUK_SI

Test Results

Sample Lab Ref No :	HA8743/1_SD	HA8743/2_SD
Location :	#1	#2
Sample Depth (m) :	-	-
Soil Fraction Tested :	Whole	Whole
Sample History :	Natural	Natural
Solid Density (t/m^3) :	2.66	2.74

Sample Description :	HA8743/1_SD	CLAY, some silt, trace sand
	HA8743/2_SD	Silty CLAY, trace sand

Test Methods		Notes
Solid Density :	NZS 4402 : 1986 Test 2.7.2	

Date tested : 22/03/22
Date reported : 29/03/22

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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All information supplied by Client

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 29/03/22

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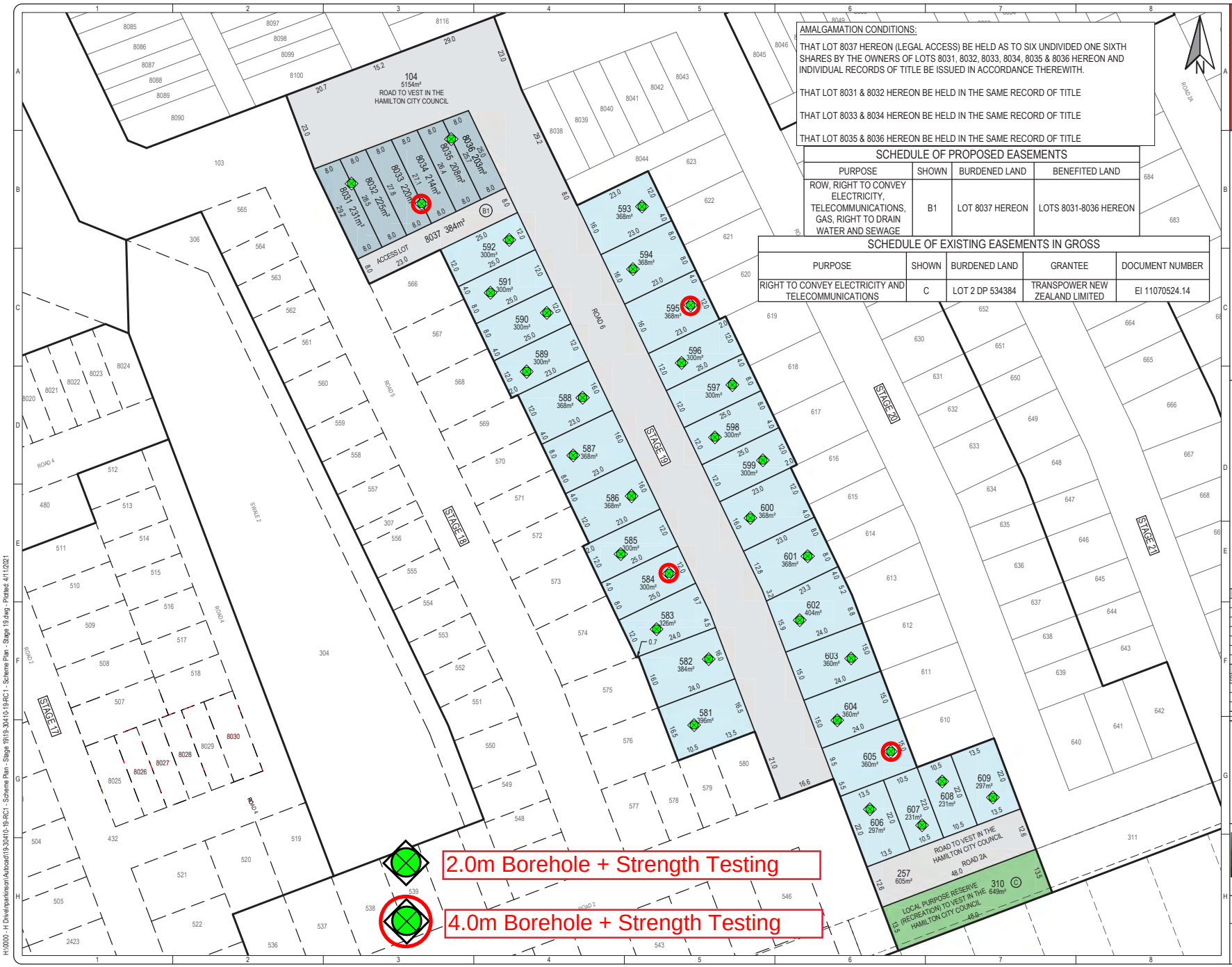
Appendix D *Post Construction Test Results*
Soil Tests by CORE50
NDMs



AMALGAMATION CONDITIONS:

THAT LOT 8037 HEREON (LEGAL ACCESS) BE HELD AS TO SIX UNDIVIDED ONE SIXTH SHARES BY THE OWNERS OF LOTS 8031, 8032, 8033, 8034, 8035 & 8036 HEREON AND INDIVIDUAL RECORDS OF TITLE BE ISSUED IN ACCORDANCE THEREWITH.

THAT LOT 8031 & 8032 HEREON BE HELD IN THE SAME RECORD OF TITLE

THAT LOT 8033 & 8034 HEREON BE HELD IN THE SAME RECORD OF TITLE

THAT LOT 8035 & 8036 HEREON BE HELD IN THE SAME RECORD OF TITLE

SCHEDULE OF PROPOSED EASEMENTS

PURPOSE	SHOWN	BURDENED LAND	BENEFITED LAND
ROW, RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS, GAS, RIGHT TO DRAIN WATER AND SEWAGE	B1	LOT 8037 HEREON	LOTS 8031-8036 HEREON

SCHEDULE OF EXISTING EASEMENTS IN GROSS

PURPOSE	SHOWN	BURDENED LAND	GRANTEE	DOCUMENT NUMBER
RIGHT TO CONVEY ELECTRICITY AND TELECOMMUNICATIONS	C	LOT 2 DP 534384	TRANSPOWER NEW ZEALAND LIMITED	EI 11070524.14

SHRIMPTON & LIPINSKI
LAND DEVELOPMENT & DESIGN SPECIALISTS
Ph. 07 577 6069
Email: info@sltga.co.nz
P.O. Box 231, Tauranga 3140
www.sltga.co.nz

NOTES:

1. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSES OF SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991 AND SHOULD NOT BE RELIED ON FOR ANY OTHER PURPOSE.
2. AREAS AND DIMENSIONS ARE APPROXIMATE ONLY AND SUBJECT TO SURVEY.

LEGEND:

- LOT BOUNDARY
- PROPOSED CADASTRAL LAYOUT
- CONCEPT BOUNDARY
- STAGE BOUNDARY
- ABUTTALS
- FUTURE STAGES
- HIGHER DENSITY LOTS
- RECREATION RESERVE
- STORMWATER RESERVE
- ROAD RESERVE

Rev	DESCRIPTION	DRN	CKD	APP	DATE
0	INTERNAL ISSUE	NW	JL	NF	12/19
1	ISSUED FOR APPROVAL	NW	JL	NF	12/19
2	HCC REQUIREMENTS	NW	JL	NF	02/20
3	LAYOUT AMENDED	NW	NF	NF	04/20
4	LAYOUT AMENDED	NP	NF	NF	09/20
5	STAGE BDY'S UPDATED	NP	BP	GC	10/21
6	RESERVES CHANGED	NP	GC	GC	11/21

	NAME	DATE		NAME	DATE
SURVEYED			DESIGNED		

COORDINATE SYSTEM: NZGD 2000 (MOUNT EDEN CIRCUIT)
ORIGIN OF COORDINATES:
HEIGHT DATUM: MOTURIKI LVD 1953
ORIGIN OF HEIGHT:

TITLE

AREAS LU & K SCHEME PLAN STAGE 19

PREPARED FOR

Chedworth Properties Limited
GREENHILL PARK

AREAS LU & K

ORIGINAL SCALES @ A3	STATUS
1:1000 DO NOT SCALE DIMENSIONS	FOR APPROVAL

DRAWING NO	REVISION
19-30410-19-RC1	6

H:\0000 - H Drive\parkinson\Autocad\19-30410-19-RC1 - Scheme Plan - Stage 19\19-30410-19-RC1 - Scheme Plan - Stage 19.dwg - Plotted: 4/11/2021

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	581	MA581

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1	Good Ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		2			
300		2		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown, grey and brown mixture; very stiff; low moisture to moist; high plasticity; moderately sensitive; low dilatancy.	
400		3			
500	179/77	4			
600		4			
700		4			
800		4			
900	138/48	6		ENGINEERED FILL: Fine to medium Sandy SILT, traces of Clay, fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
1000		8			
1100		6			
1200		5			
1300		5		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown, grey and brown mixture; very stiff; low moisture to moist; high plasticity; moderately sensitive; low dilatancy.	
1400		5			
1500		5			
1600		12			
1700		UTP		ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard.	
1800					
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

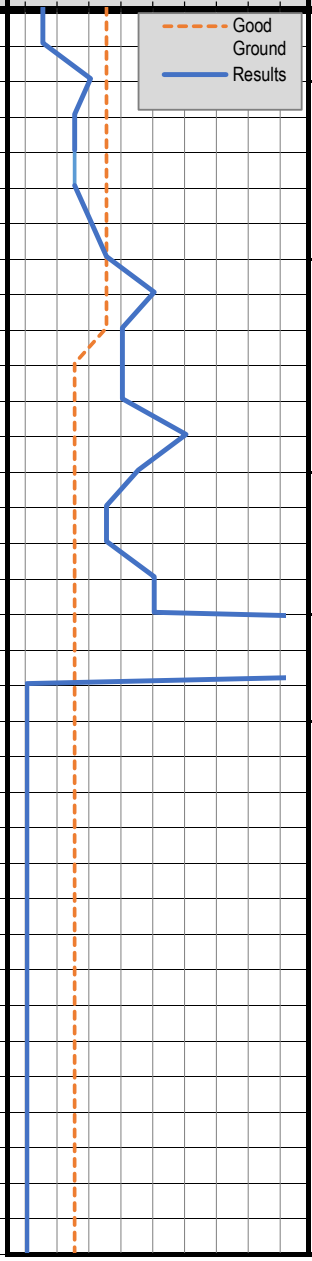
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		**171738-S19-01**	
Tested by	Date	Lot No.	Test Site
AK	**9/02/2023**	**582**	**MA582**

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Soil Description	Water Table
100		1	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1		
300		4	ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; sensitive.	
400	>193/	3		
500		3		
600		3		
700	177/34	4		
800		5	ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
900		8		
1000		6		
1100		6		
1200		6		
1300		10	1300mm: Becoming fine to coarse SAND; brown.	
1400		7	ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
1500		5		
1600		5		
1700		8		
1800		8	ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard.	
1900		UTP		
2000				
2100			EOB at 2.0m, Target Borehole Depth.	
2200				
2300				
2400				
2500				
2600				
2700				
2800				
2900				
3000				
3100				
3200				
3300				
3400				
3500				



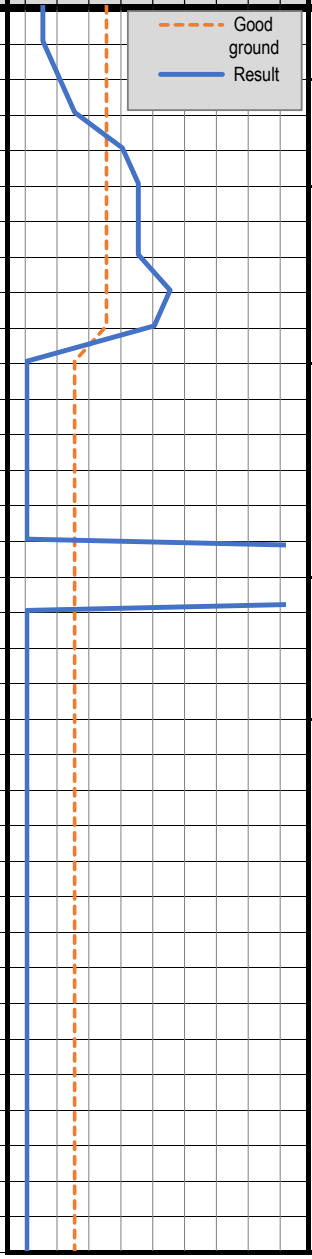
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

Rev3.7

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	583	MA583

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1			
300	>193/	2		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy.	
400		3			
500		6			
600		7		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
700		7			
800		7			
900		9			
1000		8			
1100	>193/			ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy.	
1200					
1300					
1400	>193/				
1500					
1600	>193/				
1700		UTP		ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard.	
1800					
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

Rev3.7

CORE50
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Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
GetGeo	26/01/2023	584	MA584

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Soil Description	Water Table
100		1	FILL, respread topsoil, gravels	
200		1		
300		2		
400	>193/	4	(Engineered) FILL, silt, some clay, mixed orange-brown moist	
500		5		
600		6		
700		6	(Engineered) FILL, silt, sand, angular gravels, minor clay mixed grey-brown, moist	
800		7		
900		7		
1000		9		
1100				
1200				
1300	>193/		(Engineered) FILL, silt, clay, orange-brown, moist	
1400				
1500				
1600				
1700	>193/			
1800				
1900				
2000		UTP	(Engineered) FILL, silt, gravels, minor pumice, minor clay mixed greys and browns, moist	
2100				
2200				
2300				
2400				
2500			SILT, minor fine sand, light grey-brown moderate dilatancy	
2600				
2700				
2800			becoming wet, high dilatancy, moderate plasticity	
2900				
3000				
3100				
3200			3200-3300mm interbedded silty Sand, blue-grey, wet	
3300				
3400				
3500				
3600				
3700				
3800			Organic SILT, dark grey-brown, moist to wet	
3900			SILT, minor fine sand, light grey-brown, wet	
4000			EOB @ 4.0m, Target Depth	

Scala Penetrometer (Blows/100mm)
0 2 4 6 8 10 12 14 16
Good Ground
Result

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1 Weather leading up to testing was: Fine for the previous 3 days.
2 Ground water was at 3400mm below ground level during testing
3 Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4 Shear Vane records include Re-moulded values where possible
5 Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	585	MA585

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		4		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		3			
300		4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	179/63	4			
500		4			
600		3			
700		4		500mm: Fine Sandy SILT; light grey; low moisture.	
800		7			
900		8			
1000					
1100	>193/				
1200					
1300					
1400	>193/				
1500					
1600	>193/				
1700					
1800				ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard.	
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Good Ground
Result

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

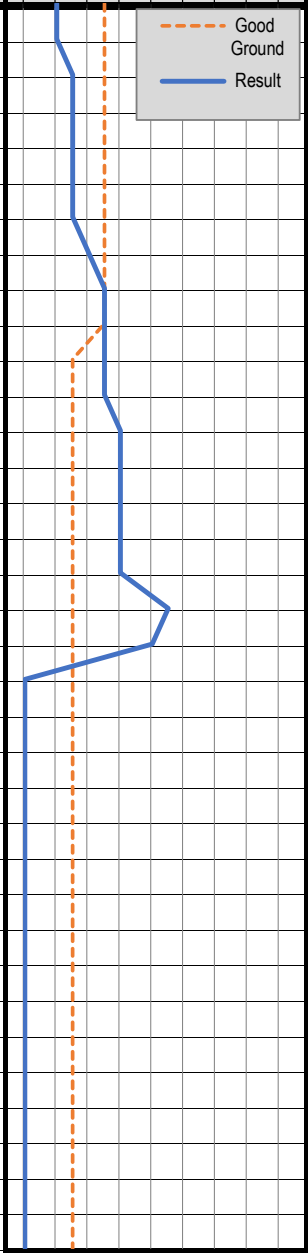
1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

Rev3.7

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	586	MA586

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		2		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		2			
300		3			
400	190/63	3		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
500		3			
600		3			
700	>193/	3			
800		4			
900		5		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
1000		5			
1100		5			
1200	>193/	5		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
1300		6			
1400		6			
1500	>193/	6			
1600		6		1400mm: Cream streaks.	
1700		6			
1800		9			
1900	>193/	8			
2000				EOB at 2.0m, Target Borehole Depth.	
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	587	MA587

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100			Result / Good Ground	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200					
300					
400	>193/			ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
500					
600					
700	>193/				
800					
900					
1000					
1100	164/74				
1200					
1300					
1400				1400mm: Orange streaks.	
1500	141/63				
1600					
1700					
1800	138/63				
1900					
2000	UTP			2000mm: Becoming GRAVEL.	
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	588	MA588

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		2	Good Ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		2			
300		2			
400	164/60	3		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
500		3			
600		3			
700		4			
800	>193/	4			
900		4			
1000					
1100	141/51				
1200				1200mm: Cream streaks, minor mica.	
1300					
1400	164/63				
1500					
1600					
1700	>193/				
1800					
1900					
2000	177/57				
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	589	MA589

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100			Good Ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200					
300				ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	>193/				
500					
600					
700					
800	>193/				
900					
1000					
1100	138/57				
1200					
1300					
1400					
1500	>193/				
1600					
1700					
1800	>193/			1800mm: Streaks light grey.	
1900				1900mm: Becoming sandy SILT; grey; moist.	
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	590	MA590

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100			Result / Good Ground	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200					
300				ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400					
500					
600				600mm: Light brown mix.	
700					
800					
900					
1000					
1100					
1200					
1300					
1400					
1500					
1600					
1700					
1800					
1900				ENGINEERED FILL: Fine to coarse angular Silty GRAVEL with some Sand; blue grey brown; low moisture.	
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

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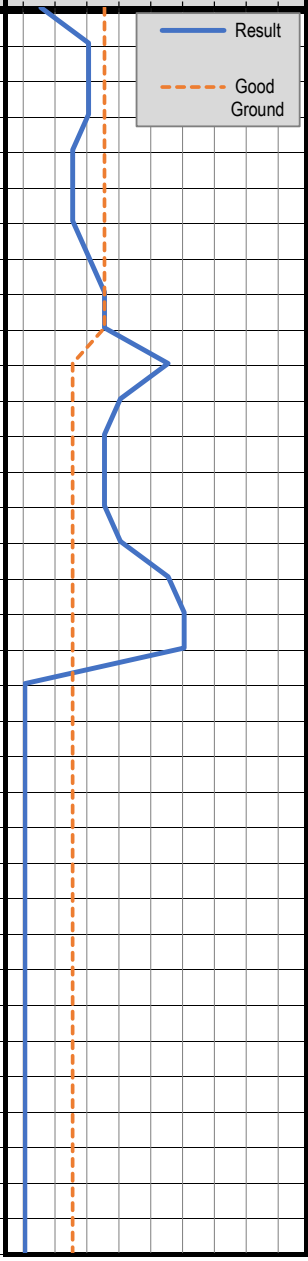
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	9/02/2023	591	MA591

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		Respread TOPSOIL ; dark brown; dry.	
200	>193/	4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
300		4			
400	>193/	4			
500		3			
600		3			
700	>193/	3			
800		4			
900		5			
1000		5		ENGINEERED FILL: Fine to medium Sandy SILT with some Clay; brown grey mix; moist; low plasticity; low dilatancy.	
1100		9			
1200		6			
1300		5			
1400		5			
1500		5			
1600		6			
1700		9			
1800		10			
1900		10			
2000				EOB at 2.0m, Target Borehole Depth.	
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	7/03/2023	592	MA592

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3	Good Ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1			
300	164/39	2		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; orange brown mixture; very stiff; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400		3			
500		3			
600	179/83	3			
700		4			
800		3			
900				900mm: Moist.	
1000	141/66				
1100					
1200				1200mm: Traces of fine to medium gravel.	
1300	>193/				
1400					
1500				1500mm: Moist.	
1600				1600mm: Becoming fine to medium Silty SAND and minor fine angular Gravels; light grey brown.	
1700					
1800					
1900	132/48			1900mm: Becoming CLAY SILT; orange brown; very stiff; low moisture.	
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

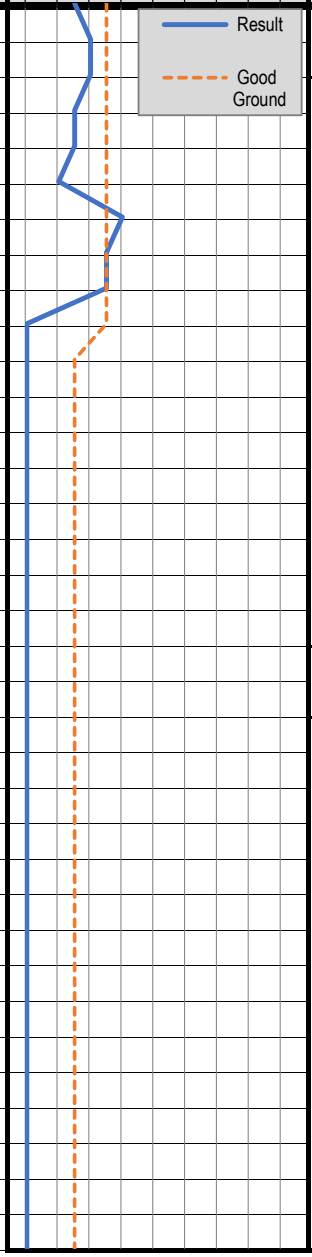
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	593	MA593

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
400	193/63	3			
500		3			
600		2			
700		6			
800	>193/	5			
900		5			
1000					
1100					
1200	>193/				
1300					
1400					
1500				1500mm: 100mm of fine Sandy SILT; light grey.	
1600	>193/				
1700					
1800					
1900	UTP			Fine Silty SAND, traces of fine pumice; light grey; low moisture; medium dense; high dilatancy.	
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	594	MA594

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		3		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; sensitive; low dilatancy.	
400	>193/	2			
500		2			
600		1			
700		3			
800	>193/	6			
900		5			
1000					
1100					
1200	>193/				
1300					
1400				Fine Silty SAND, traces of fine pumice; light grey brown; low moisture; medium dense; high dilatancy.	
1500					
1600					
1700				1700mm: Becoming fine to medium SAND, some Silt.	
1800				1800mm: Becoming grey brown.	
1900					
2000				2000mm: Becoming fine Sandy SILT.	
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Good Ground
Result

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

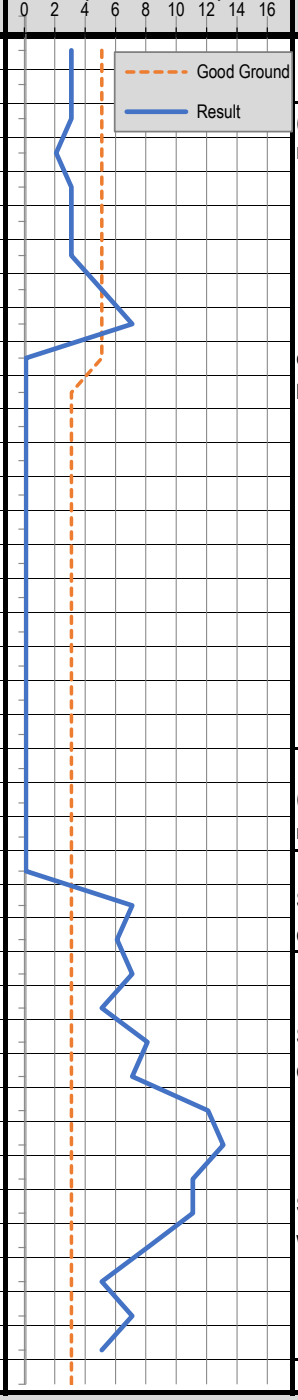
1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
GetGeo	26/01/2023	595	MA595

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Soil Description	Water Table
100		3	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		3		
300	182/66	3	(Engineered) FILL, clay silt mix, orange-brown, moist, moderately sensitive.	
400		2		
500		3		
600		3		
700		3		
800		5		
900		7		
1000			consistent composition through augered depth	
1100			hard	
1200				
1300				
1400				
1500	177/68			
1600				
1700				
1800				
1900				
2000	182/74			
2100				
2200				
2300			(Engineered) FILL, gravel, silt, sand	
2400			mixed brown, dry to moist	
2500				
2600		7	Silty fine SAND, trace fine pumiceous material to 1mm	
2700		6	creamy light-brown, moist	
2800		7		
2900		5		
3000		8	SILT, minor fine sand, trace clay	
3100		7	creamy light-brown, trace orange-mottling, moist	
3200		12		
3300		13		
3400		11		
3500		11	Silt, some sand, grey-brown, some orange-mottling	
3600		8	wet	
3700		5		
3800		7		
3900		5		
4000		7	EOB @ 4.0m, Target Depth	

Scala Penetrometer (Blows/100mm)



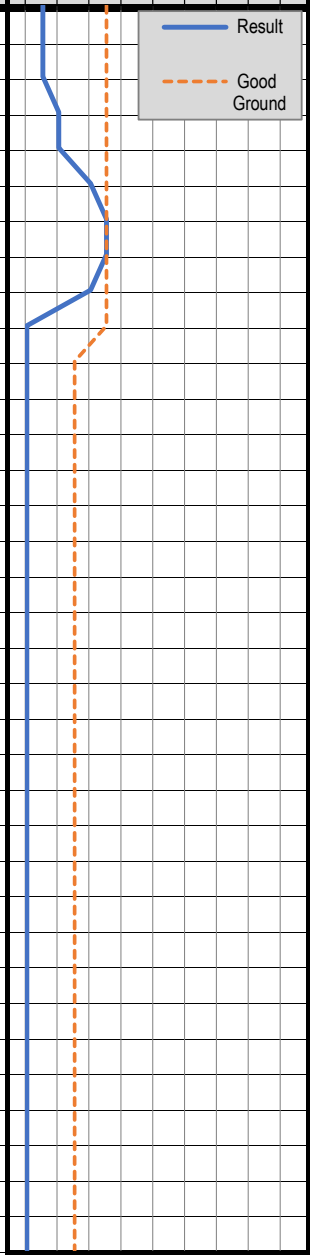
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1 Weather leading up to testing was: Fine for the previous 3 days.
2 Ground water was not encountered during testing
3 Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4 Shear Vane records include Re-moulded values where possible
5 Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	596	MA596

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1			
300		1			
400	>193/	2		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
500		2			
600		4			
700		5			
800	>193/	5			
900		4			
1000					
1100					
1200	>193/				
1300					
1400					
1500	>193/				
1600					
1700					
1800					
1900					
2000	>193/				
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	597	MA597

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		4	Good Ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		4			
400	167/48	4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
500		4			
600		4			
700	>193/	4			
800		4			
900		5			
1000	>193/				
1100					
1200					
1300					
1400	>193/				
1500					
1600					
1700					
1800	>193/				
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

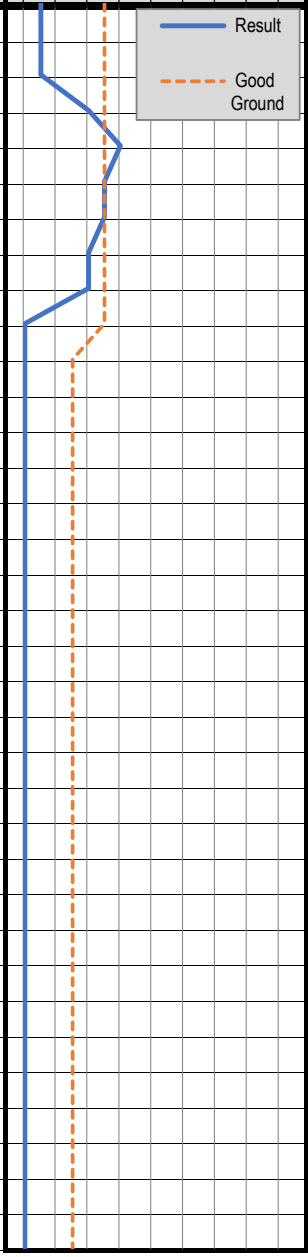
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	598	MA598

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1			
300		1			
400	>193/	4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
500		6			
600		5			
700		5			
800	>193/	4			
900		4			
1000					
1100	155/60				
1200					
1300					
1400					
1500	>193/				
1600					
1700					
1800					
1900	>193/				
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



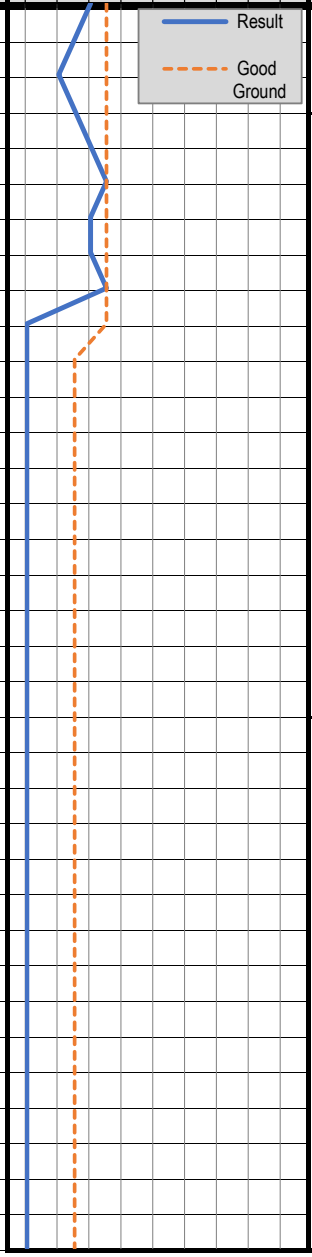
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	599	MA599

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		4		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		3			
300		2		300mm: Minor sand and clay.	
400	>193/	3		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
500		4			
600		5			
700	>193/	4			
800		4			
900		5			
1000					
1100	138/51				
1200					
1300					
1400					
1500	160/89				
1600					
1700					
1800					
1900					
2000	>193/				
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	600	MA600

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		3		300mm: Becoming clayey.	
400		6		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
500		5			
600		5			
700		5			
800		9		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
900		6			
1000	155/42				
1100					
1200					
1300					
1400					
1500	>193/				
1600					
1700					
1800					
1900	138/95			1900mm: Becoming insensitive.	
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Good Ground
Result

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	601	MA601

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3	Good Ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		3			
400		3		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
500		8			
600		9			
700		11			
800		12			
900		8			
1000					
1100					
1200				ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and orange brown mixture; very stiff; low moisture; high plasticity; moderately sensitive; low dilatancy.	
1300	152/63				
1400					
1500					
1600					
1700					
1800	135/60				
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	602	MA602

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3	Good Ground / Results	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		7			
400		8		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre to dry; low plasticity; high dilatancy.	
500		9			
600		9			
700		8			
800		9			
900		11			
1000					
1100					
1200	167/57			ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and orange brown mixture; very stiff; low moisture; high plasticity; moderately sensitive; low dilatancy.	
1300					
1400					
1500	149/66				
1600					
1700					
1800					
1900					
2000	138/63			EOB at 2.0m, Target Borehole Depth.	
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		**171738-S19-01**	
Tested by	Date	Lot No.	Test Site
AK	**26/01/2023**	**603**	**MA603**

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		4	Good ground / Result	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		5			
300		7			
400		8		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
500		9			
600		6			
700		7			
800		9			
900		12			
1000					
1100				ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff; low moisture; high plasticity; moderately sensitive; low dilatancy.	
1200	162/48				
1300					
1400					
1500					
1600	164/63				
1700					
1800				ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard; difficult augering.	
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

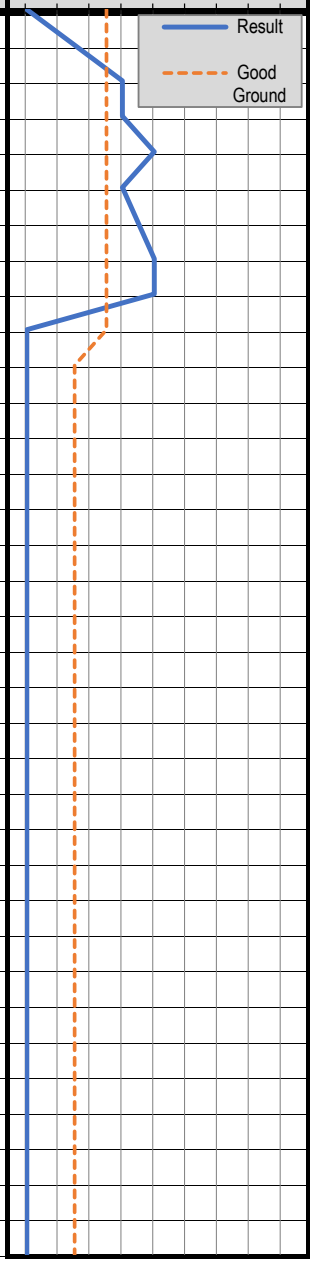
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	26/01/2023	604	MA604

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		3			
300		6			
400		6		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
500		8			
600		6			
700		7			
800		8			
900		8			
1000				ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; moderately sensitive; low dilatancy.	
1100	>193/				
1200					
1300					
1400					
1500	152/57				
1600					
1700				ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard; difficult augering.	
1800					
1900					
2000				SILT, trace Clay; light grey; low moisture; low plasticity.	
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

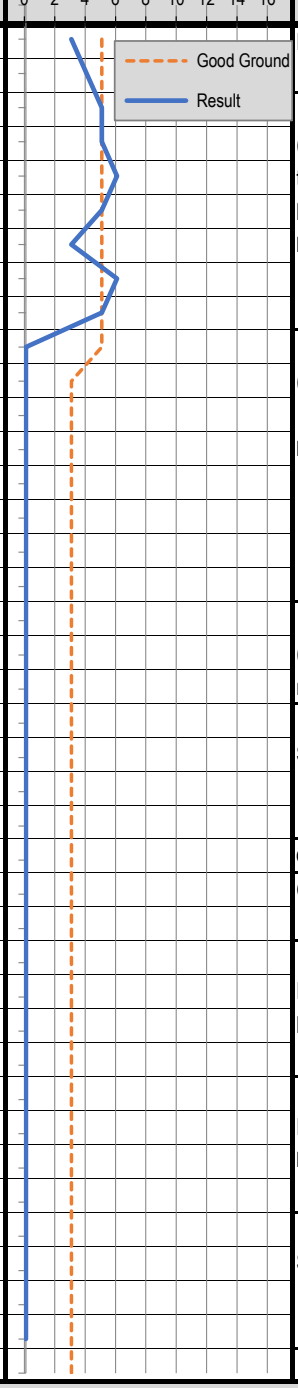
1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

Rev3.7

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
GetGeo	26/01/2023	605	MA605

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Soil Description	Water Table
100		3	FILL, respread Topsoil, some gravels	
200		4		
300		5		
400		5	(Engineered) FILL, Silt, fine sand	
500		6	trace fine pumiceous material to 1mm	
600		5	light grey-brown, trace orange mottling, moist	
700		3	hard	
800		6		
900		5		
1000				
1100			(Engineered) FILL, Silt, orange-brown, moist	
1200	182/42			
1300			hard	
1400				
1500				
1600	169/104			
1700				
1800				
1900			(Enginnered) FILL, silt, sand, some angular gravels	
2000			mixed browns, dry to moist	
2100				
2200			SILT, trace fine sand, creamy light-brown, moist	
2300				
2400				
2500			Organic SILT, minor organic fibres to 1mm diameter, brown.	
2600			Organic SILT, grey-brown, very moist	
2700				
2800				
2900			Fine sandy SILT, light blue-grey, very moist	
3000			high dilatancy	
3100				
3200				
3300			Fine SAND, some silt, grey, wet	
3400			becoming trace fine to medium pumiceous sand	
3500				
3600				
3700			SILT, trace fine sand, light grey-brown, wet	
3800				
3900				
4000			EOB @ 4.0m, Target Depth	



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was at 2800mm below ground level during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

Rev3.7

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	7/03/2023	606	MA606

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		4			
300		2		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; orange brown mixture; very stiff; moist; high plasticity; low dilatancy; moderately sensitive.	
400	164/63	2			
500		2			
600		2			
700	149/48	2			
800		5		ENGINEERED FILL: Fine to medium Sandy SILT, traces of Clay, fine Gravel and pumice; light grey mottled orange; medium dense; low moisutre; low plasticity; high dilatancy.	
900		5			
1000		5			
1100		6			
1200		5		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; orange brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
1300	>193/	5			
1400		6			
1500		5			
1600		UTP		ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard.	
1700					
1800					
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

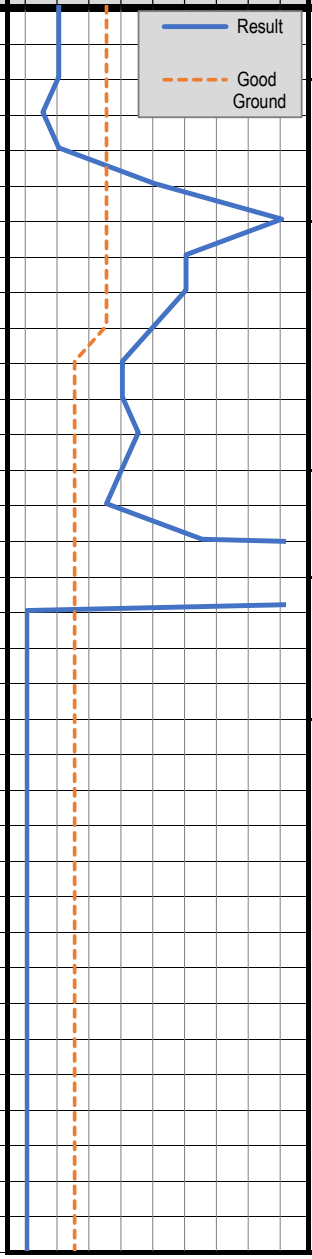
Good Ground
Result

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	7/03/2023	607	MA607

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		2		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		2			
300		2		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	147/45	1			
500		2			
600		8			
700		16		ENGINEERED FILL: Fine to medium Sandy SILT, traces of Clay, fine Gravel and pumice; light grey mottled orange; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
800		10			
900		10			
1000		8			
1100		6			
1200		6			
1300		7			
1400		6		ENGINEERED FILL: CLAY SILT with traces of fine Sand; light brown and brown mixture; very stiff; low moisture; high plasticity; low dilatancy;.	
1500		5			
1600		11			
1700		UTP		ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; blue grey brown; low moisture; hard.	
1800					
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

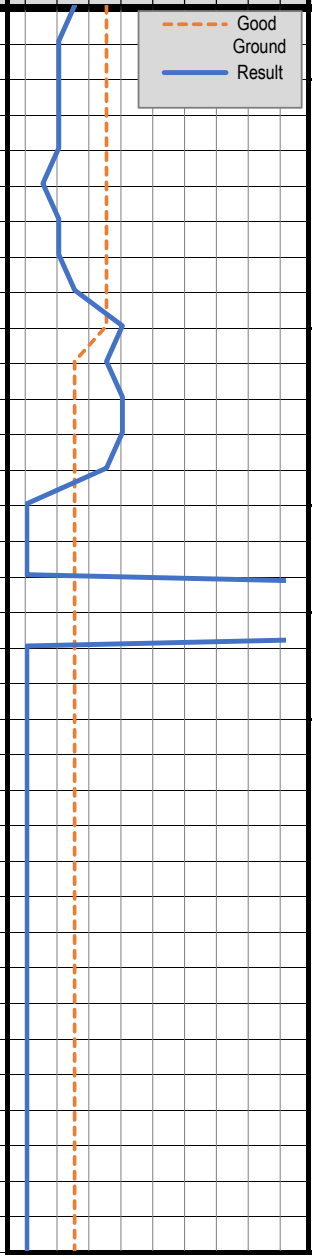
1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

Rev3.7

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	7/03/2023	608	MA608

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Soil Description	Water Table
100		3	Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		2		
300		2	ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	>193/	2		
500		2		
600		1		
700	164/63	2		
800		2		
900		3		
1000		6	ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey mottled orange; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
1100		5		
1200		6		
1300		6		
1400		5		
1500			ENGINEERED FILL: CLAY SILT with traces of fine pumice; brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy.	
1600	>193/			
1700				
1800		UTP	ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; brown grey mix; low moisture to dry; hard.	
1900				
2000				
2100			EOB at 2.0m, Target Borehole Depth.	
2200				
2300				
2400				
2500				
2600				
2700				
2800				
2900				
3000				
3100				
3200				
3300				
3400				
3500				



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

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5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

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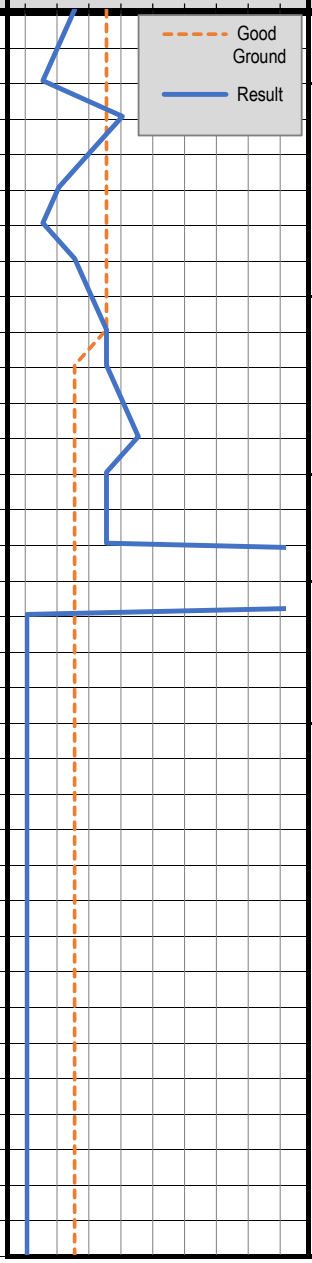
CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
AK	7/03/2023	609	MA609

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		2			
300		1		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	147/63	6			
500		4			
600		2			
700		1		700mm: Moist.	
800		3			
900		4		ENGINEERED FILL: Fine to medium Sandy SILT, traces of fine Gravel and pumice; light grey mottled orange; medium dense to dense; low moisutre; low plasticity; high dilatancy.	
1000		5			
1100		5			
1200		6			
1300		7			
1400		5		ENGINEERED FILL: CLAY SILT with traces of fine Sand; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy.	
1500		5			
1600	>193/	5			
1700		UTP		ENGINEERED FILL: Fine to coarse angular GRAVEL with some Sand and minor Silt; grey brown; low moisture; hard.	
1800					
1900					
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
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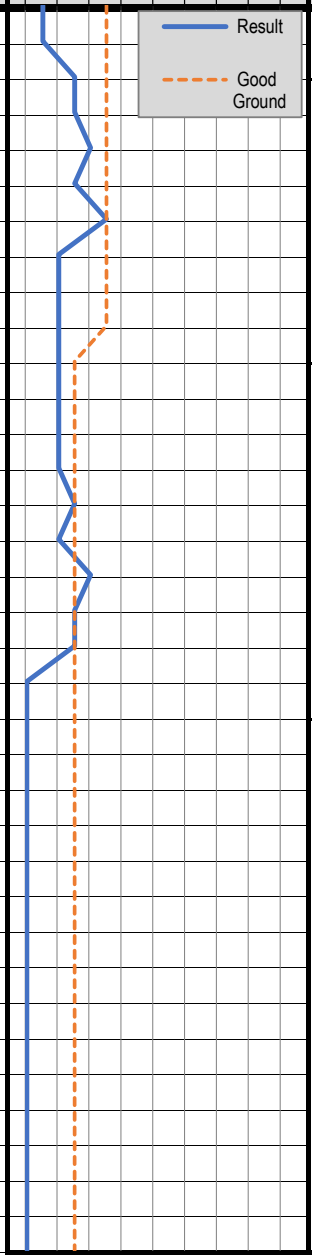
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
RG	9/02/2023	8031	HA8031

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1			
300		3		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	141/63	3			
500		4			
600		3			
700	132/77	5			
800		2		800mm: Becoming mixed with light grey sandy silt.	
900		2			
1000	138/45	2			
1100		2		Fine sandy SILT with traces of clay; light grey mottled orange; loose to medium dense; moist; low plasticity; high dilatancy.	
1200		2			
1300		2			
1400		2			
1500		3			
1600		2			
1700		4			
1800		3			
1900		3			
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

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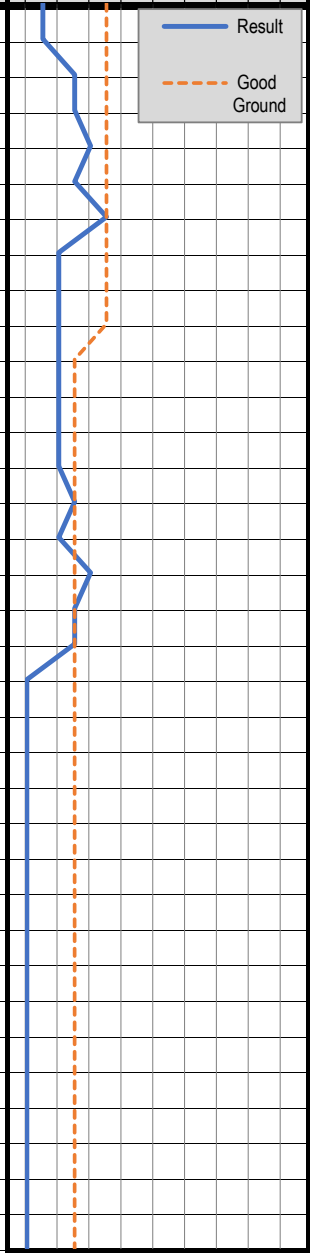
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
RG	9/02/2023	8032	HA8032

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		1			
300		3		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400	141/63	3			
500		4			
600		3			
700	132/77	5			
800		2		800mm: Becoming mixed with light grey sandy silt.	
900		2			
1000	138/45	2			
1100		2		Fine sandy SILT with traces of clay; light grey mottled orange; loose to medium dense; moist; low plasticity; high dilatancy.	
1200		2			
1300		2			
1400		2			
1500		3			
1600		2			
1700		4			
1800		3			
1900		3			
2000				EOB at 2.0m, Target Borehole Depth.	
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

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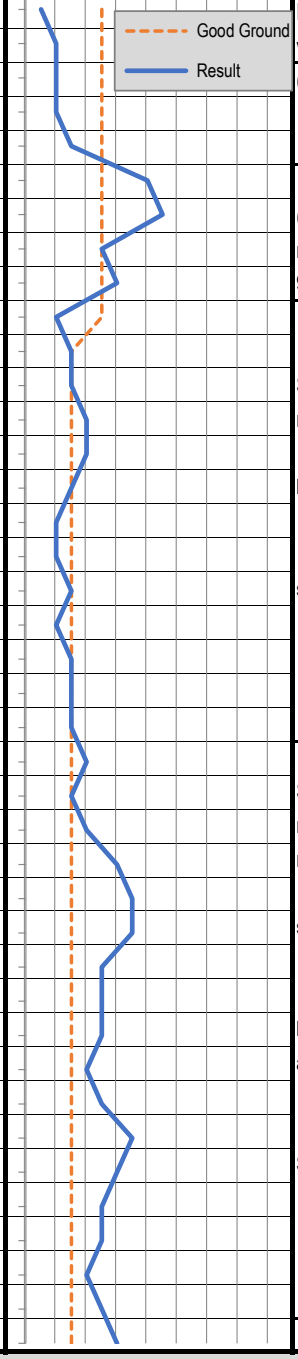
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
GetGeo	26/01/2023	8033	MA8033

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		FILL, repsread topsoil, some gravels	
200		2		varied from 200mm to 500mm, heavily tracked by machinery	
300		2		(Engineered) FILL, silt, some clay, orange-brown, moist	
400		2			
500		3			
600		8			
700		9		(Engineered) FILL, silt, minor gravels, minor pumice	
800		5		minor sand, mixed brown, dry to moist	
900		6		900mm trace topsoil	
1000		2			
1100		3			
1200		3		SILT, some sand, creamy light-brown	
1300		4		minor orange mottling, moist	
1400		4			
1500		3		becoming some clay	
1600		2			
1700		2			
1800		3		sandy Silt, some clay, light orange-brown, wet	
1900		2			
2000		3			
2100		3			
2200		3			
2300		4			
2400		3		SAND, some pumiceous material to 3mm	
2500		4		minor silt, mixed brown and orange-brown layering	
2600		6		moist to very moist	
2700		7			
2800		7		some rounded gravels to 10mm	
2900		5			
3000		5			
3100		5		becoming interbedded pumice Sand with some coarse pumice	
3200		4		and Sand, some silt, minor pumice, grey, wet	
3300		5			
3400		7			
3500		6		Sand, some silt, grey, wet	
3600		5			
3700		5			
3800		4			
3900		5			
4000		6		EOB @ 4m, Target Depth	



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was at 3400mm below ground level during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

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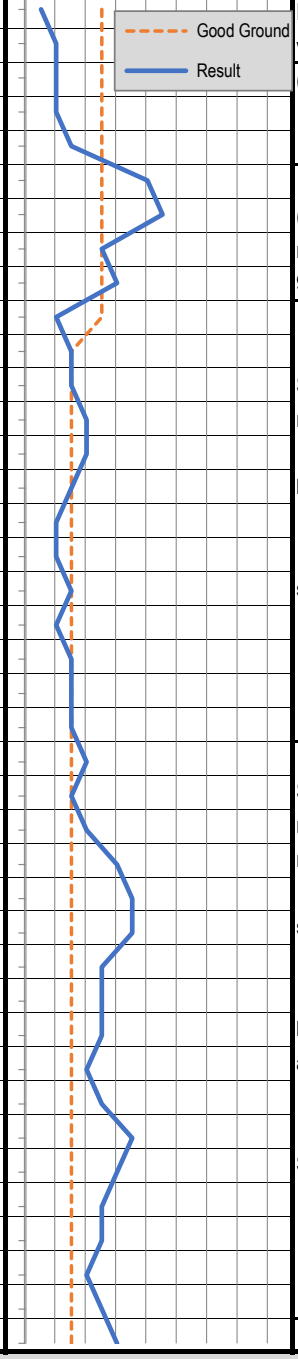
Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
GetGeo	26/01/2023	8034	MA8034

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		1		FILL, repsread topsoil, some gravels	
200		2		varied from 200mm to 500mm, heavily tracked by machinery	
300		2		(Engineered) FILL, silt, some clay, orange-brown, moist	
400		2			
500		3			
600		8			
700		9		(Engineered) FILL, silt, minor gravels, minor pumice	
800		5		minor sand, mixed brown, dry to moist	
900		6		900mm trace topsoil	
1000		2			
1100		3			
1200		3		SILT, some sand, creamy light-brown	
1300		4		minor orange mottling, moist	
1400		4			
1500		3		becoming some clay	
1600		2			
1700		2			
1800		3		sandy Silt, some clay, light orange-brown, wet	
1900		2			
2000		3			
2100		3			
2200		3			
2300		4			
2400		3		SAND, some pumiceous material to 3mm	
2500		4		minor silt, mixed brown and orange-brown layering	
2600		6		moist to very moist	
2700		7			
2800		7		some rounded gravels to 10mm	
2900		5			
3000		5			
3100		5		becoming interbedded pumice Sand with some coarse pumice	
3200		4		and Sand, some silt, minor pumice, grey, wet	
3300		5			
3400		7			
3500		6		Sand, some silt, grey, wet	
3600		5			
3700		5			
3800		4			
3900		5			
4000		6		EOB @ 4m, Target Depth	



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was at 3400mm below ground level during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

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CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
RG	9/02/2023	8035	HA8035

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		6			
300	135/92	4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400		3			
500		2			
600		2			
700	>193/	2			
800		5		800mm: Becoming Silty SAND with some gravel clay.	
900		9			
1000		7			
1100		15			
1200		8			
1300		4			
1400	86/45	4			
1500		4			
1600		9		Fine to coarse SAND with traces of fine Gravel; grey brown; dense to very dense; moist; well graded.	
1700		14			
1800		17			
1900		12			
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Good Ground
Result

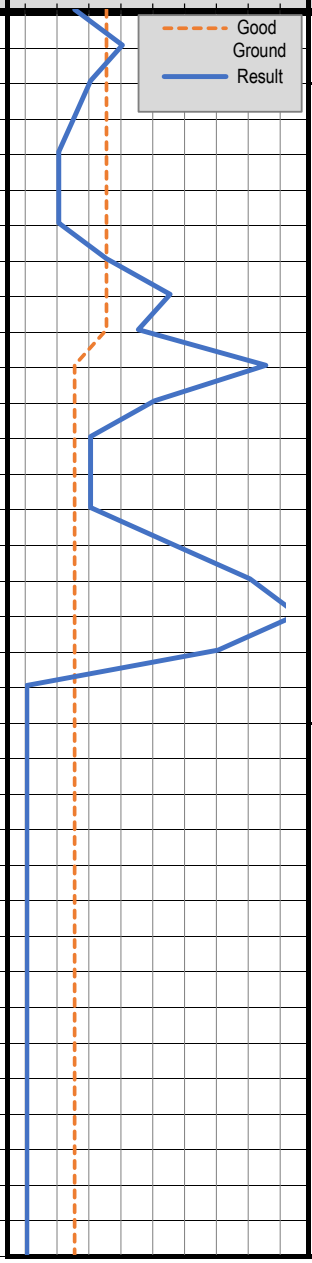
Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

1. Weather leading up to testing was: Fine for the previous 3 days.
2. Ground water was not encountered during testing
3. Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4. Shear Vane records include Re-moulded values where possible
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

CORE50
SOLUTIONS ENGINEERED

Project Name		Job Ref.	
GCR Stage 19, Greenhill Park, Hamilton		171738-S19-01	
Tested by	Date	Lot No.	Test Site
RG	9/02/2023	8036	HA8036

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm) 0 2 4 6 8 10 12 14 16	Soil Description	Water Table
100		3		Respread TOPSOIL with minor clay silt and traces of sand and gravels; dark brown; dry.	
200		6			
300	135/92	4		ENGINEERED FILL: CLAY SILT with traces of fine Sand, fine pumiceous material and mica; light brown and brown mixture; very stiff to hard; low moisture; high plasticity; low dilatancy; moderately sensitive.	
400		3			
500		2			
600		2			
700	>193/	2			
800		5		800mm: Becoming Silty SAND with some gravel clay.	
900		9			
1000		7			
1100		15			
1200		8			
1300		4			
1400	86/45	4			
1500		4			
1600		9		Fine to coarse SAND with traces of fine Gravel; grey brown; dense to very dense; moist; well graded.	
1700		14			
1800		17			
1900		12			
2000					
2100				EOB at 2.0m, Target Borehole Depth.	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					



Notes: **EOB = End Of Borehole** **UTP = Unable To Penetrate** **UTE = Unable To Extract**

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2. Ground water was not encountered during testing
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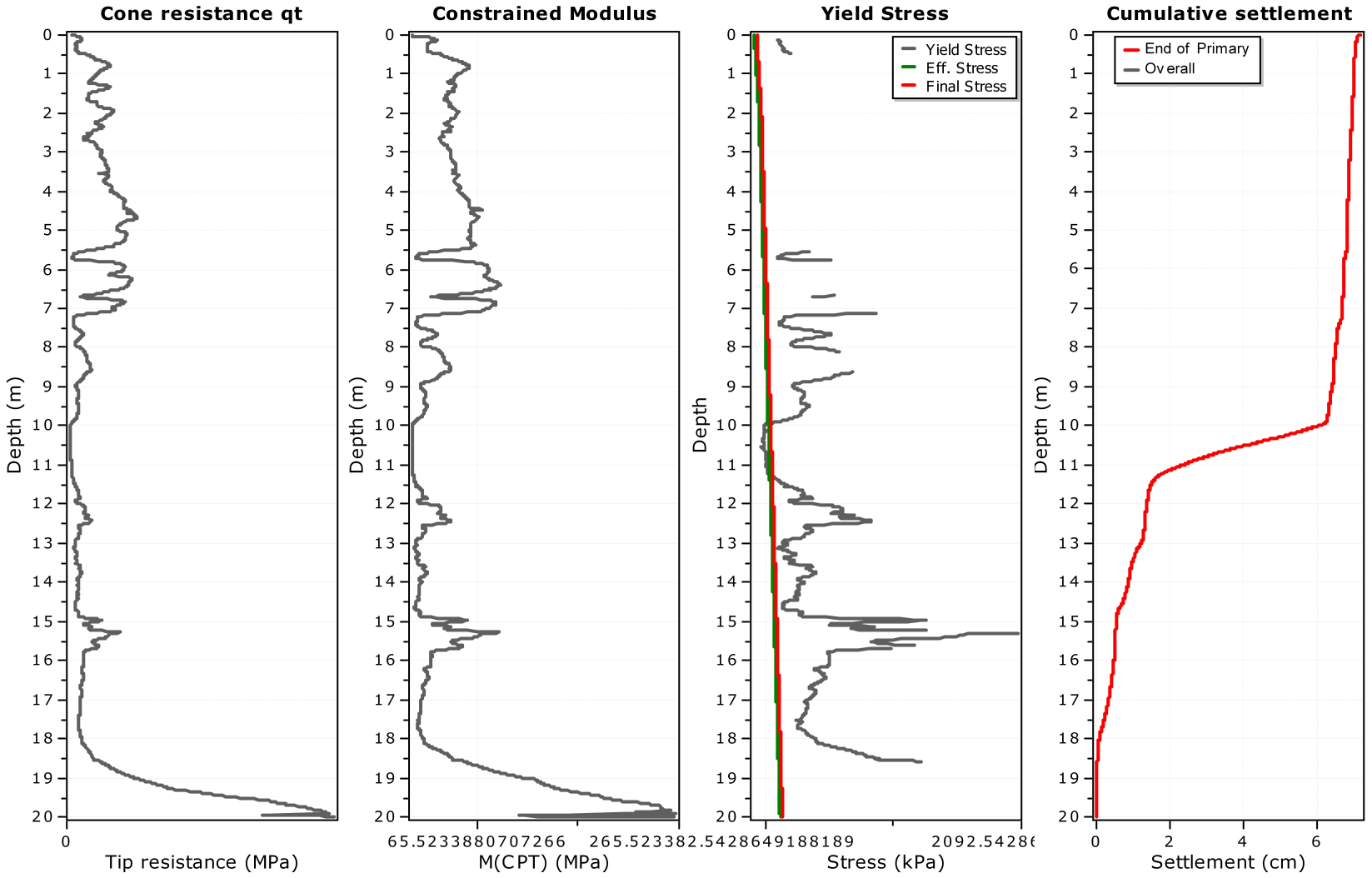
5. Shear Vane Serial No.: 1471 Exp. Date: 28/11/2023

GeoLogismiki
Geotechnical Engineers
Merarhias 56
http://www.geologismiki.gr

CPT: GreenhillPark CPT308
Total depth: 20.00 m, Date: 17/04/2023
Surface Elevation: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project:
Location:

Settlements calculation according to theory of elasticity *



Calculation properties

Footing type: Rectangular
Footing width: 100.00 (m)
L/B: 1.0
Footing pressure: 20.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: No
Calculate secondary settlements: No
Time period for primary consolidation: N/A
Time period for second. settlements: N/A

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

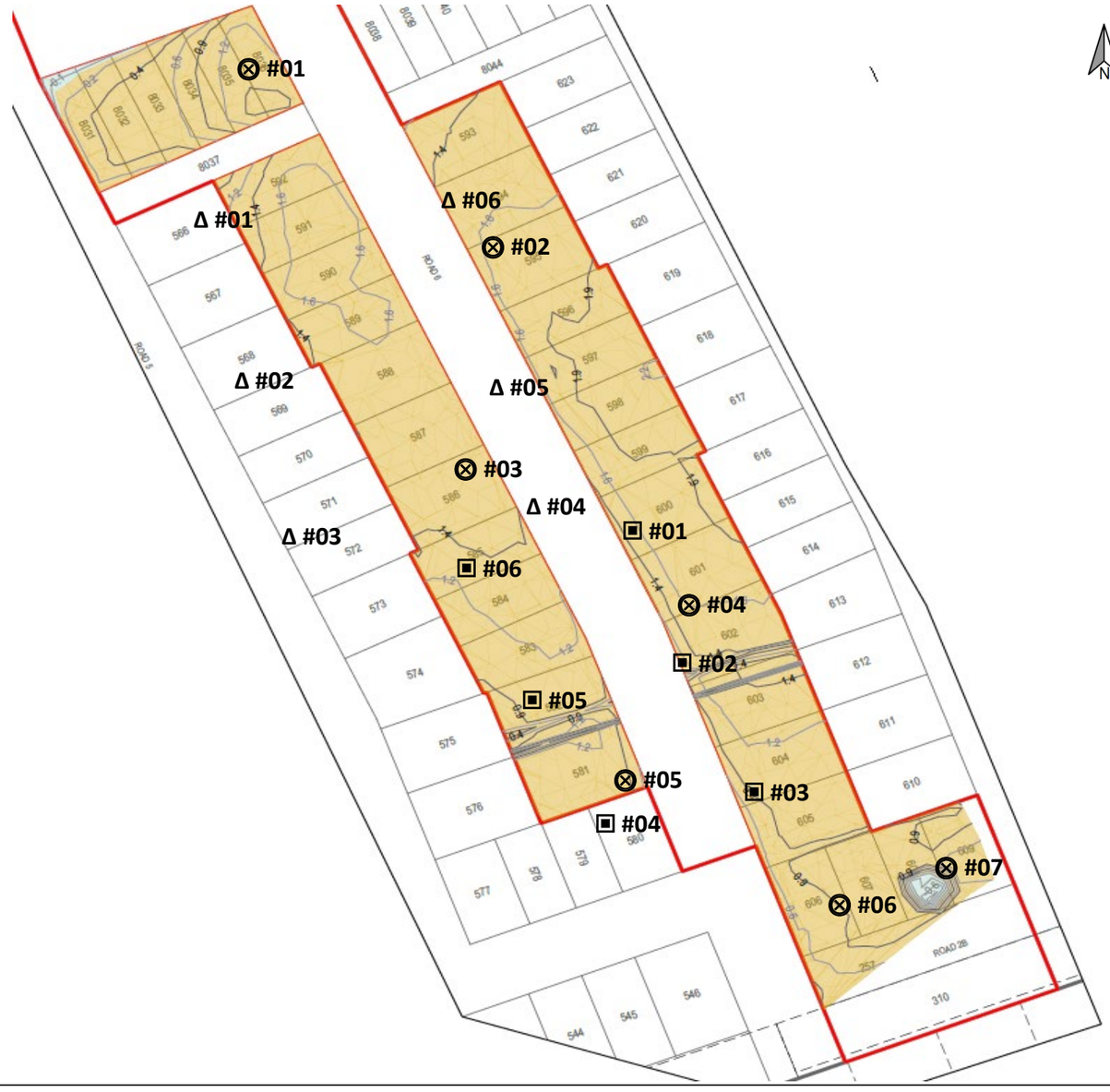
Subdivision Earth Fill Compaction and Quality Assurance

CORE50 Ltd
Hamilton Office: 62 Church Road, Pukete, Hamilton, 3200
Taupo Office: 89 Tahara Road, Taupo, 3330
Phone: 0800 CORE50
Web: Core50.nz

Project Address:	**Stage 19 Area LUK of Greenhill Park, Hamilton**
Job Ref:	**171738-LUK-SI**
Client:	**Chedworth Properties Limited**
Contractor:	**ONLINE Contractors Limited**
Date Started:	**1/10/2020**
Last Updated:	**31/03/2023**
Last Updated By:	**AK**

Test Methods:	**Notes:**
NZS 4402 1986 Test 2.1	Water Content done by External Laboratory
NZS 4407 2015 Test 4.2	NDM Direct Transmission
NZS 4407 2015 Test 4.3	NDM Back Scatter
CETANZ TG1 2011	Scala Dynamic Cone Penetrometer
ASTM D5874 - 16 2007	Clegg Hammer
NZGS: August 2001	Hand Held Shear Vane

Test Site Location Plan - Stage 19 Area LUK



Approximate Locations:
Δ 24/11/202: Schick Testing
▣ 15/12/2020: Coffey Testing
⊗ CORE50 Testing.

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Subdivision Earth Fill Compaction and Quality Assurance

CORE50 Ltd
Hamilton Office: 62 Church Road, Pukete, Hamilton, 3200
Taupo Office: 89 Tahara Road, Taupo, 3330
Phone: 0800 CORE50
Web: Core50.nz

Project Address:	**Area LUK of Greenhill Park, Hamilton**
Job Ref:	**171738-LUK-SI**
Client:	**Chedworth Properties Limited**
Contractor:	**ONLINE Contractors Limited**
Date Started:	**1/10/2020**
Last Updated:	**31/03/2023**
Last Updated By:	**AK**

Test Methods:	**Notes:**
NZS 4402 1986 Test 2.1	Water Content done by External Laboratory
NZS 4407 2015 Test 4.2	NDM Direct Transmission
NZS 4407 2015 Test 4.3	NDM Back Scatter
CETANZ TG1 2011	Scala Dynamic Cone Penetrometer
ASTM D5874 - 16 2007	Clegg Hammer
NZGS: August 2001	Hand Held Shear Vane

Test Site Location: (Refer to test site location plan)							In-situ Soil Strength Testing: Undrained Shear Strength (kPa) UTP = Unable to Penetrate					Lab Material Testing Data			Soil Density NDM Testing Data: Field Gauge Test Results							Oven Corrected Test Results				Result	
Test Date	Test No. N: (NDM) D: (DCP) S: (Shear Vane) C: (Clegg)	RL (Ref Datum: Moturiki 1953)	Co-ordinates Ref Datum: Northings	(Mt Eden 2000) Eastings	Compacted Lift Thickness (mm)	Soil Description	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 at 500mm BGL (kPa)	Average (kPa)	SD: Solid Density (kg/m^3) (Measured)	MDD: Max Dry Density (kg/m^3) (Measured)	OMC: Optimum Water Content. (%)	Gauge NDM Serial No.	Gauge Probe Depth (mm)	Gauge Wet Density (kg/m^3)	Gauge Moisture Content (%)	Gauge Dry Density (kg/m^3)	Gauge Proctor Ratio (PR%)	Gauge Air Voids (%)	Moisture Content (%)	Dry Density (kg/m^3)	Proctor Ratio (PR%)	Air Voids (%)	PASS/FAIL	Comments
20/01/2023	N: 1	39.400	Stage 19	Lot 8036	500	CLAY SILT	UTP	209+	209+	209+	209	2700	1020	57.5	79159	300	1684	54.1	1093	107	0	50.1	1122	110	2	PASS	
20/01/2023	N: 2	40.110	Stage 19	Lot 594	500	CLAY SILT	UTP	209+	209+	209+	209	2700	1020	57.5	79159	300	1656	39.8	1185	116	9	56.8	1056	104	1	PASS	
20/01/2023	N: 3	39.570	Stage 19	Lot 586	500	CLAY SILT	UTP	209+	209+	209+	209	2700	1020	57.5	79159	300	1626	45.9	1114	109	8	48.5	1095	107	6	PASS	
20/01/2023	N: 4	39.150	Stage 19	Lot 601	500	Sandy CLAY SILT	UTP	UTP	UTP	UTP	209	2480	1250	32.0	79159	300	1663	35.8	1225	98	7	40.7	1182	95	4	PASS	Solid density assumed as per Lab report HA5441/1_MDD
20/01/2023	N: 5	38.800	Stage 19	Lot 581	500	CLAY SILT	UTP	209+	209+	161	197	2700	1020	57.5	79159	300	1669	36.9	1219	120	10	40.5	1188	116	8	PASS	
3/03/2023	N: 6	38.900	Stage 19	Lot 606	500	CLAY SILT	164	161	164	176	166	2700	1020	57.5	79159	250	1673	59.4	1050	103	-1	52.8	1095	107	2	PASS	
3/03/2023	N: 7	38.910	Stage 19	Lot 609	500	CLAY SILT	146	209	152	179	171	2700	1020	57.5	79159	300	1674	58.5	1056	104	-1	55.7	1075	105	0	PASS	

Schick Civil Construction
18 Manchester Place,
Te Rapa, Hamilton 3200
Phone: 07 849 3111
Fax: 07 849 4545

SCHICK CIVIL CONSTRUCTION

Field Density Report - NDM

Contract:	DB Con	**Report No:**	SH20112410
Address:	Greenhill Park	**Job No:**	8926
Site:	Greenhill Park area: LUK	**Lot No.:**	-
Material Type:	Subgrade	**Date Placed:**	24-Nov-2020
Limits:	-	**Date Tested:**	24-Nov-2020
Comments:	As per clients locations. Jn: 171738-Area LUK/SI. Unable to prob deeper than 150mm.	**Tested by:**	EA
R/L:	-	**Reported by:**	Euan Acket

Test Procedures:

()NZS4407:2015 Test 4.2 Field W/C and Dry Density of Compacted Materials D/T.
(X)NZS4407:2015 Test 4.3 Field W/C and Dry Density of Compacted Materials B/S.
()NZS4402:1986 Test 4.1.1 Standard Compaction.
(X)NZS4402:1986 Test 4.1.3 Vibratory Compaction.
()NZS4407:2015 Test 3.7.1 Solid Density of Aggregate Particles.
()NZS4402:1986 Test 2.7.2 Solid Density of Soil Particles.
()NZS4407:2015 Test 4.3.6 Moisture Correction.
()NZS4402:1986 Test 2.1 Water Content.
()NZS4407:2015 Test 3.1 Water content
()NZS4407:2015 Test 4.3.7 (e) Degree of Saturation.

Test Site Location	CHN	Nominal Layer Thickness mm	Probe Depth mm	Bulk Density Kg/m³	Dry Density Kg/m³	Reported W/C %	Field W/C %	Degree of Saturation %	Air Voids %	Compaction %
1		1.0m	150	1709	1131.04	51.1	51.1	97	2	107
2		1.0m	150	1689	1147.42	47.2	47.2	92	5	108
3	A	0.5m	150	1585	941.21	68.4	68.4	97	2	90
3	B	0.65m	150	1541	954.77	61.4	61.4	89	7	90
3	C	1.0m	150	1602	1060.23	51.1	51.1	87	8	100
4		1.0m	150	1493	924.46	61.5	61.5	85	10	87
5		1.0m	150	1681	1078.95	55.8	55.8	98	1	102
6		1.0m	150	1690	1061.56	59.2	59.2	101	-1	100

Gauge Used

Humboldt: HS-5001EZ () S/N:5586 Calibration Expiry Date - 02/03/2022
Humboldt: HS-5001SD (X) S/N:8894 Calibration Expiry date -10/07/2022

Average Air Voids %:	**4**
Average Compaction %:	**98**
MDD kg/M³:	**1060**
OMC %:	**54**
Average Reported W/C %:	**57**
Average Field W/C %:	**57**
Average DOS%:	**93**
Refer Lab Report No:	**-**
Refer Lab Report No:	**-**
Refer Lab Report No:	**-**
Refer Lab Report No:	**-**
Refer Lab Report No:	**-**
Measured or Assumed:	**Assumed**

Note 1: Maximum Dry Density determined in accordance with NZS4402:1986 Test 4.1.1(Standard)
Note 2: Maximum Dry Density determined in accordance with NZS4402:1986 Test 4.1.3(Vibe)
Note 3: Water content determined with accordance with NZS4402:1986 Test 2.1
Note 4: Solid Density of aggregate tested in accordance with NZS4407:2015 Test 3.7.1
Note 5: Solid Density of soil tested in accordance with NZS4407:2015 Test 2.7.2
Note 6: Solid Density used: **2800**
Note 7: Offsets Measured From: -

Signatory: EA

Date: 16-Jan-2023

Euan Acket-QA Technician

CETANZ

Figure 1.

Figure 2.

Coffey Testing NZ
3 Tiloki Place
Mount Maunganui

EARTHWORKS FILL REPORT

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuclear Densometer Testing (in accordance with NZS 4407:1991 Test 4.2.1); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Density Calculations (in accordance with NZS 4402:1986 Tests 4.1.1.5(b))

Project No: 773-TAUR00030

Page: 1 of 1

Client: D B Consulting Engineers
42 Tawn Place
Pukete, Hamilton

Principal: Jamie Masters

c.c. to: -

Project: Green Hill Park

Project Location: Carrs Road
-

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Approved Signatory: Eric Paton

Approved Signatory Signature:

Date of Issue: 16/12/2020

IANZ Accredited Laboratory Number:1352

Date	Work Order :	Tested By	Test No.	Wet Density (t/m³)	Oven Water Content (%)	Dry Density (t/m³)	Solid Density (t/m³)	Air Voids %	Field Shear Strength in kPa (UTP = Unable to penetrate)				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
15/12/2020	TAUR20W00631	EP	1	1.72	42.5	1.21	2.8	5.4	NT	NT	NT	NT	Ref to Plan	-	-	-	Silty CLAY	-
15/12/2020	TAUR20W00631	EP	2	1.69	46.3	1.15	2.8	5.5	NT	NT	NT	NT	Ref to Plan	-	-	-	Silty CLAY	-
15/12/2020	TAUR20W00631	EP	3	1.65	54.3	1.07	2.8	3.6	NT	NT	NT	NT	Ref to Plan	-	-	-	Silty CLAY	-
15/12/2020	TAUR20W00631	EP	4	1.64	57.5	1.04	2.8	3.1	NT	NT	NT	NT	Ref to Plan	-	-	-	Silty CLAY	-
15/12/2020	TAUR20W00631	EP	5	1.68	50.1	1.12	2.8	3.9	NT	NT	NT	NT	Ref to Plan	-	-	-	Silty CLAY	-
15/12/2020	TAUR20W00631	EP	6	1.68	46.7	1.15	2.8	5.4	NT	NT	NT	NT	Ref to Plan	-	-	-	Silty CLAY	-

(Please note that Air Void calculations are not IANZ endorsed as part of this report)

Project: Greenhill Park

Location: Carrs Road Hamilton

Tested by: EP

Date tested: 15.12.20

Appendix E *Stormwater Management*

Minimum Lot Levels: 30410-01-S9-G1 Rev. AB1

LOT NUMBER	LOWEST LEVEL	MINIMUM FINISHED FLOOR LEVEL (FFL)
581	39.06	39.21
582	39.26	39.41
583	39.49	39.64
584	39.63	39.78
585	39.80	39.95
586	39.98	40.13
587	40.18	40.33
588	40.24	40.53
589	40.24	40.75
590	40.31	40.75
591	40.18	40.70
592	40.12	40.57
593	40.44	40.59
594	40.62	40.77
595	40.43	40.58
596	40.29	40.44
597	40.23	40.38
598	40.04	40.19
599	39.85	40.00
600	39.72	39.87
601	39.52	39.67
602	39.30	39.45
603	39.14	39.29
604	38.99	39.14
605	39.06	39.21
606	39.06	39.21
607	39.25	39.55
608	39.25	39.59
609	39.30	39.71
8031	39.40	39.55
8032	39.42	39.57
8033	39.48	39.63
8034	39.48	39.63
8035	39.59	39.74
8036	39.81	39.96

SHRIMPTON & LIPINSKI
LAND SPECIALISTS
Ph. 07 577 6069
Email: info@sltga.co.nz
P.O. Box 231, Tauranga 3140
www.sltga.co.nz

LEGEND:

- (38.2) Spot Height Ground Level*
- Slope Arrow
- Major Contour
- Minor Contour

Contour Interval = 0.20m

*Ground Levels are NOT to be used for Building Design.

Rev	DESCRIPTION	DRN	CKD	APP	DATE
0	PRELIMINARY	NP	BP	PH	27-03-23
AB1	AS-BUILT	NP	BP	PH	27-03-23

	NAME	DATE		NAME	DATE
SURVEYED			DESIGNED		

COORDINATE SYSTEM: NZGD 2000 - MT EDEN CIRCUIT
ORIGIN OF COORDINATES:
HEIGHT DATUM: MOTURIKI DATUM 1953
ORIGIN OF HEIGHT:

TITLE

SECTION LEVELS AND FLOW-GEOTECHNICAL REQUIREMENT

PREPARED FOR

GREENHILL PARK — Chedworth Properties Limited

STAGE 19

ORIGINAL SCALES @ A3: 1:1250 DO NOT SCALE DIMENSIONS
STATUS: AS-BUILT
DRAWING NO: 30410-01-S19-G1
REVISION: AB1

R:\Project Files\30410-01-19\01 Drawing Presentation Files\30410 - Stage 18-19-25A - Earthworks\30410-01 - Stage 19 Asbuilt EW and Geotech Plan.dwg - Plotted: 27/03/2023