Millwater Arran Hills Residential Subdivision
Precinct 6
Stage 2B

Geotechnical Completion Report

WFH Properties Limited

Reference: 773-AKLGE206639-BX

12 June 2024

MILLWATER ARRAN HILLS RESIDENTIAL SUBDIVISION, PRECINCT 6, STAGE 2B

Geotechnical Completion Report

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PREPARED FOR

WFH Properties Limited
C/- Fulton Hogan Land Development Ltd.
Private Bag 1190
Ellerslie
Auckland 1542

PREPARED BY

Tetra Tech Coffey
Level 2, 88 Broadway, Newmarket
Auckland
1023 New Zealand
p: +64 9 379 9463

NZBN 9429033691923

Document authorisation

Our ref: 773-AKLGE206639-BX

This Geotechnical Completion Report presents all supporting geotechnical data, Woods Limited as-built plans, and our Suitability Statement in relation to land development works undertaken to form Stage 2B of the Millwater Arran Hills Precinct 6 residential subdivision.

It has been prepared in accordance with instructions received from WFH Properties Limited and forms part of the documentation required by Auckland Council to achieve certification under Section 224(c) of the Resource Management Act.

If you have any queries, or require further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

For and on behalf of Tetra Tech Coffey

Stephen Parkes
Associate Engineering Geologist

QUALITY INFORMATION

Revision history

Revision	Description	Date	Author	Reviewer	Approver
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APPENDICES

1. INTRODUCTION

This Geotechnical Completion Report (GCR) has been prepared for WFH Properties Limited (WFH) as part of the documentation required to be submitted to Auckland Council following residential subdivisional development and bulk earthworks.

It contains Tetra Tech Coffey's Suitability Statement, relevant test data, and the Woods Limited as-built plan set relating to Stage 2B of the Millwater Arran Hills, Precinct 6 residential subdivision. The Woods Limited as-built plan set is listed below in Table 1.

Table 1: Schedule of Precinct 6 - Stage 2B Subdivision As-Built Plans

Title	Reference No.	Date
Final Surface As-built Plan	P22-436-00-1000-AB	27/08/2024
Cut and Fill As-built Plan – Original Surface to Final Surface	P22-436-00-1100-AB	26/08/2024
Cut and Fill As-built Plan – Original Surface to Lowest Surface	P22-436-00-1101-AB	26/08/2024
Cut and Fill As-built Plan – Lowest Surface to Final Surface	P22-436-00-1102-AB	26/08/2024
Subsoils As-Built Plan	P22-436-00-1200-AB	29/08/2024
Retaining Wall As-Built Plan	P22-436-00-1400 to 1401-AB	20/08/2024
Stormwater As-Builts	P22-436-00-3000 to 3004-AB	20/08/2024
Wastewater As-Builts	P22-436-00-4000 to 4002-AB	20/08/2024
Palisade Wall As-Built Plans	37600-00-1300 to 1302-AB	05/09/22

The following Tetra Tech Coffey (formerly Coffey) and Woods Limited (Woods) drawings, and Auckland Council Standard Details are presented in Appendix B for reference.

Table 2: Summary of Appended Reference Drawings

Title	Reference No.	Date
Tetra Tech Coffey Geotechnical Building Limitation Zone Plans	BX/001 and BX/002	29/08/2024
Tetra Tech Coffey Geotechnical Investigation Plan(1)	BX/003	28/04/2024
Tetra Tech Coffey Geotechnical Works Plans(2)	BX/004 to BX/006	03/09/2024
Tetra Tech Coffey Geotechnical Remediation Plans Rev. D	AG/001, AG/002, and AG/003.	14/06/2022
Tetra Tech Coffey Subsoil Drainage Standard Details Rev. C	AG/007	18/06/2021
Tetra Tech Coffey Undercut Detail Plan Rev. C	AG/008	14/08/2021
Woods Retaining Wall 303 Longitudinal Section	37600-01-154-EW	Sept 2021
Tetra Tech Coffey Wall 303 / RE Slope 310 Design Detail Drawing Rev. A	AL/009	12/04/2022
Woods Retaining Wall 701 Longitudinal Section	37600-03-174-EW	24/03/21
Coffey Wall 701 Design Detail	AL/007	01/04/2021
Coffey Shear Key 2A to 2C Detail	AE-02 to AE-04	08/07/2019

Tetra Tech Coffey Geotechnical Remediation Plan – Western Section Rev.B	AY-003	30/09/2021
Tetra Tech Coffey PW805 Geotechnical Design Drawing Rev.C	AY-004	12/11/2021
Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements	AC-STD-SW22	17/01/2022
Auckland Council Pipe and Manhole Construction Clearance	WW26	04/12/2017
Auckland Council Building Close to or Over Local Network Wastewater	WW27	04/12/2017
Auckland Council Guideline for Building Close to or Over Transmission Wastewater	WW28	13/07/2018

Notes (relating to Table 2)

(1) Depicts Tetra Tech Coffey Geotechnical Investigation locations, carried out at the completion of Stage 2B subdivision works to assess ultimate bearing capacity and topsoil depths on the completed lots.

(2) Depicts all geotechnical works carried out within the subdivision boundary, including any geotechnical works certified prior to issue of this report.

This GCR covers the construction period April 2019 to July 2024 and is intended to be used for certification purposes for the following lots associated with subdivision consent SUB60305557:

- 14 residential lots numbered Lots 1 to 7 (inclusive), 46 to 51 (inclusive) and Lot 76;
- Two new residential Super-Lots numbered lots 1000 and 1001;
- Two new sections of existing public roads named Skulander Crescent (formerly Road 1) and Pekanga Road (formerly Road 2);
- One new Jointly Owned Access Lot (JOAL) numbered Lot 500; and
- One New Esplanade Reserve (to Vest) numbered Lot 800.

The subdivision encompasses part of existing property 11 Pekanga Road, Upper Orewa (legal description Lot 9000 DP 594022).

Stage 2B is bound by future subdivision stages associated with the Millwater Precinct 6 subdivisional development to the south west, NZTA owned land bordering State Highway 1 to the west, a tributary of the Orewa River to the north and recently completed subdivision Stages 2 and 1C to the South and East respectively.

The earthworks detailed and certified in this report were carried out under Resource Consent LUC60305555.

2. RELATED REPORTS

The following geotechnical reports have been prepared by Tetra Tech Coffey (formerly Coffey) for various aspects of the subdivision:

- 773-AKLGE204203-AA, dated 25 May 2017 – Geotechnical Investigation Report for Millwater Precinct 6
- 773-AKLGE206639-AE Rev.1, dated 29 November 2019 – Geotechnical Design Report for Shear Key 2
- 773-AKLGE206639-AC Rev. 2, dated 29 November 2019 – Geotechnical Works Specification
- 773-AKLGE206639-AD Rev.1, dated 24 October 2019 – Geotechnical Design Philosophy
- 773-AKLGE206639-AG Rev. 1, dated 25 August 2020 – General Earthworks Design Report
- 773-AKLGE206639-AI, dated 9, December 2019 – Settlement Assessment Report
- 773-AKLGE206639-AL Rev. 2, dated 15 April 2021 – Geotechnical Design Report for Mass Block Walls
- 773-AKLGE2066369-AN Rev.2, dated 13 May 2020 – Geotechnical Monitoring Protocol
- 773-AKLGE206639-BH, dated 16 June 2022 – Producer Statement – Construction Review (PS4) for Retaining Walls 311 and 312
- 773-AKLGE206639-AY Rev. 1, 12 November 2021 – Western Boundary Geotechnical Design Report
- 773-AKLGE206639-BV, dated 3 July 2024 – Producer Statement – Construction Review (PS4) for Retaining Wall 303
- 773-AKLGE206639 NTE16 Rev. 1, dated 10 December 2020 – Gully 2 Geotechnical Works
- 773-AKLGE206639 NTE39 Rev. 1, dated 23 November 2021 – Wall 312 Drainage
- 773-AKLGE206639-NTE47, dated 18 January 2023 - Wall 303 Foundation Detail
- 773-AKLGE206639-NTE50, dated 28 March 2023 – Proposed Additional Subsoil Drain – Wall 303 Undercut

The following historic reports were prepared by Tonkin and Taylor (T&T) for various aspects of this stage of the development, and were reviewed as part of the writing of this report;

- 21854.0034/AHP6EW.v1, dated June 2019 – Millwater Precinct 6 Enabling Works Geotechnical Completion Report

3. CONSTRUCTION WORKS

3.1 PLANT

The main items of plant used by the main contractor for bulk earthworks, Hick Bros. Civil Construction Limited, comprised:

- D8 Bulldozer and scoop
- D7 Bulldozer and scoop
- D6 Bulldozer and scoop
- Reticulated Dump Trucks
- 623 Motor scraper
- 36-tonne excavator
- 30-tonne excavator
- 20-tonne excavator
- 8-tonne excavator
- 5-tonne excavator
- 815 compactors
- Padfoot roller
- 25-tonne water truck
- Front-end loader
- Tractor and pulled discs

The main items of plant used by the main contractor for civil works on Stage 2B, Hick Bros. Civil Construction Limited, were:

- 22.5-tonne excavators
- 13.5-tonne excavator
- 5-tonne excavators
- 1.5-tonne excavators
- 6-wheel dump trucks
- Tractor and pulled discs
- Smooth drum roller
- Pad-foot roller
- Grader
- Front-end loader
- 25-tonne water truck

3.2 CONSTRUCTION PROGRAMME

3.2.1 Enabling Earthworks (March to November 2017)

Prior to commencement of the main bulk earthworks contract, an enabling earthworks package of work was completed between March and November 2017, under the supervision of Tonkin & Taylor (T&T). This work is

detailed and certified in the T&T Geotechnical Completion Report reference 21854.0034/AHP6EW.v1, dated June 2019.

In summary, the enabling earthworks carried out within the Stage 2B boundary involved:

- Stripping of vegetation and organic material.
- Earthworks involving cuts of up to 6.5m depth.

3.2.2 Bulk Earthworks (April 2019 to September 2022)

Bulk earthworks carried out under the main earthworks contract encompassing Stage 2B commenced in April 2019 with the stripping of topsoil and the construction of a temporary sediment retention pond (SRP) within Gully 2.

Throughout the 2019-2020 earthworks season, cuts progressed across the eastern half of Stage 2B to reduce the elevation of the existing ridgeline to close to design levels.

To maintain global stability in the long-term, a Shear Key (SK2) was constructed adjacent to the northern boundary of Stage 2B. Construction of the shear key involved excavation of the overburden soils and upper 1m of bedrock, removing linear planes of weakness within the soil and rock in the process, on which slope failures can occur. This material was replaced with drainage and engineered fill.

Construction of the shear key commenced in March 2020 and was progressed from east to west in 25m open sections (i.e. 25m excavated and fully backfilled prior to commencement of the following 25m section), eventually reaching completion at the north west corner of Stage 2B in March 2023.

Portions of Mass Bloc Retaining Wall 312 (located just south of the Stage 2B boundary) which were to be founded in natural soils, and natural soils beneath the entirety of Wall 303, were undercut to 2m below finished ground level, and replaced with engineered clay fill to prevent bearing capacity type failures at the wall toe and deep-seated rotational failures extending beneath the wall. These undercuts, namely Undercuts 3, 4 and 303 as shown on the appended Tetra Tech Coffey Geotechnical Works Plans ref: BX/004 to BX/006, extended into Stage 2B. The design details for these undercuts are shown on the Undercut Details Plan, referenced AG/008 in Appendix B.

Undercut 4 was excavated and fully backfilled in March 2020, Undercut 3 in February 2022, and Undercut 310 was completed between April 2022 and March 2023.

Development of Gully 2, north of the Enabling Works extent, commenced in December 2020. The purpose of these works was to create a suitable foundation for the bulk filling beneath Stage 2 and Stage 2B, and installation of drainage to relieve sub-fill pore water pressures.

The gully 2 works commenced with the removal of organic and soft compressible alluvial soils down to more competent Residual East Coast Bays Formation soils. Following this, as described in Coffey report 773-AKLGE206639-NTE16 referenced in Section 2, several layers of underfill drainage were installed to ensure adequate redundancy was built into the underfill drainage network. Elements of this involved thrusting of a drainage pipe to intersect previously installed drainage constructed during the Enabling Works package, and installation of a manhole in the base of the gully for discharging of the upper gully drainage, ensuring the upper and lower gullies discharged via separate outfall structures.

The Gully 2 manhole and a settlement monitoring device placed on the stripped natural soils within the base of the gully were progressively extended vertically with additional risers and rods, respectively, as the filling operation advanced. The manhole was capped 3m below finished ground level and installed with several drain coils extending to ground level to provide a discharge point for the future retaining wall drainage of Wall 312.

Outlet structures comprising precast concrete wingwalls and riprap set in a concrete apron were installed adjacent to the stream at the northern boundary of Stage 2B to discharge the Gully 2 underfill drainage network into the adjoining watercourse.

Upon completion of the Gully 2 works in January 2021, the fill operation could progress across the eastern portion of the Stage 2B area. Cut and fill earthworks were ongoing throughout the subsequent two earthworks seasons, with the eastern portion of Stage 2B generally reaching finished subgrade levels in November 2022.

Mass Block Retaining Wall 701, which is located partially within the northeastern portion of Stage 2B, was constructed above completed SK2, and forms the southern abutment of a pedestrian bridge over a tributary of the Orewa River. The wall comprises a block of geogrid reinforced engineered fill, drainage and no-fines concrete facing blocks to heights of up to 6.5m. The wall was constructed between November 2021 and April 2022.

Construction of the adjoining Retaining Wall 312 commenced in February 2022, the drainage of which was advanced beneath JOAL 500 and discharges into the manholes shown on the appended Woods Subsoil Drainage As-built drawing referenced P22-436-00-1200-AB.

The western boundary of Stage 2B, which adjoins publicly owned land adjacent to State Highway 1, was identified during previous geotechnical investigations to comprise historically unstable ground. For this reason, an in-ground pile (Palisade) wall, namely PW805, was prescribed to support a 228m long section of the western site boundary. The wall involved installation of steel reinforced concrete piles at lateral centres of 1.5m, to depths of up to 12m below ground level, to arrest any potential movement of upslope land. PW805 was constructed between March and August of 2022.

A network of Counterfort and Underfill drains were installed across the western portion of Stage 2B to relieve pore water pressures underlying the western fill area and from highly saturated natural soils within the western cut areas. The general construction details for these drains are shown on the Tetra Tech Coffey Subsoil Drain Standard Details plan referenced AG/007 in Appendix B. All of the drains discharge to the watercourse at the northern site boundary via specifically designed outfall structures.

Mass Bloc Retaining Wall 303 was constructed immediately upslope of completed PW805 between March and October 2023. Additional drainage was installed within the Wall 303 undercut prior to commencement of construction following groundwater seepage being observed within the wall footing. Upon completion of the wall, the overlying 3m high Reinforced Earth Slope (RE310) was constructed to form the finished lot gradients.

RE Slopes RE604-A to RE604-E were installed to support Skulander Crescent and allow sufficient steepening of the fill slope within Esplanade Reserve 800 to accommodate the public shared footpath. These slopes varied in extent and engineering input, with some sections requiring more substantial geosynthetic reinforcement and drainage than other sections. The slopes were progressively completed as upslope areas reached finished subgrade level, with the final slope, RE604-D, reaching completion in November 2023.

3.2.3 Civil Works (January 2024 to July 2024)

Stage 2B civil construction works commenced in January 2024 with the installation of stormwater, wastewater, and the mucking out and backfilling of a temporary SRP within Superlots 1000 and 1001. These works were completed by the end of February 2024.

Road gulletting of Roads 1 and 2 commenced in mid-February. All subgrade was prepped and tested in 10m increments by Scala Penetrometer Testing by mid-March, immediately prior to lime stabilisation of the subgrade and construction of all road underchannel drains. Several areas of subgrade required undercutting to achieve the required design CBR. These areas are shown on the Woods Limited Cut and Fill as-built drawing referenced P22-436-00-1102-AB.

Sub-base course aggregate was placed across all roads throughout April and May, followed by placement of basecourse aggregate. The compaction of both pavement layers was tested via Nuclear Densometer Test at a frequency of 1 test per 10m of pavement, and the basecourse layer deflections were also assessed via Benkelman Beam Testing to confirm performance criteria. Asphalt was placed across all roads in early June.

JOAL 500 subgrade was trimmed and metalled prior to pouring of concrete by the end of February 2024. Sections of the JOAL were progressively boxed and poured throughout March to completion of the JOAL in April.

Other concrete works including kerbing, parking bays, vehicle crossings and footpaths were poured throughout April and May, eventually reaching completion with the final pour for the Esplanade Reserve shared footpath in early June.

All services including electricity, gas, water, telecommunications and fibre were installed by the end of April.

Topsoiling of lots progressed from West to East throughout March 2024. All berm areas were topsoiled and hydroseeded in May. Final topsoiling followed the placement of Geoweb erosion protection on the face of RE slopes RE310 and RE604 in June.

Pedestrian and crash barriers were installed behind Retaining Walls 303 and 701 in July 2024.

4. QUALITY ASSURANCE AND CONTROLS

4.1 CONSTRUCTION OBSERVATIONS

Construction observations were undertaken during the earthworks and civil works on a near daily basis to assess compliance with NZS 4431 and our project specific recommendations and specifications presented in the various geotechnical reports referenced above in Section 2. Our site observation work included:

- Topsoil stripping and benching of slopes prior to the placement of earth fills;
- Observations of exposed ground conditions and construction details (e.g. excavation dimensions, drainage placement, outlet locations) within the excavation of SK2;
- Placement of geogrid reinforcement and drainage for reinforced earth (RE) slopes, including construction of outfall structures;
- Excavation and construction of two retaining walls including foundation preparation, geogrid placement and lateral embedment, drainage placement and backfill compaction;
- Ground conditions and founding material exposed in undercuts beneath retaining walls and RE slopes;
- Installation of pedestrian and crash barriers along the crests of retaining walls;
- Observations of the removal of soft alluvial and organic natural soils and placement of underfill drainage in natural Gully 2 beneath the main fill area, prior to fill placement;
- Construction of counterfort and underfill drains; and
- Flush testing of the underfill and counterfort drains upon completion.

Test measurements undertaken during site inspections included:

- Compaction Testing of clay fill in accordance with the Tetra Tech Coffey Geotechnical Works Specification;
- Compaction Testing of hardfill for the Mass Block retaining wall backfill;
- Dynamic Cone Penetrometer Tests (Scala's) on natural and stabilised road and JOAL pavement subgrades in accordance with NZS 4402: 1998 Test 6.5.2 – Hand method using a Dynamic Cone Penetrometer.
- Nuclear Densometer (NDM) Compaction testing of subbase course and basecourse aggregates for public roads.

4.2 EARTH FILL QUALITY CONTROL CRITERIA

The quality control criteria for compaction testing of earth fills were based on minimum allowable shear strength and maximum allowable air voids in accordance with the Tetra Tech Coffey Geotechnical Works Specification for Millwater as follows:

Air Voids Percentage: (as defined in NZS 4402:1986) taken as 1 test per 1500m^3 of fill placed and not less than 1 test per 500mm lift of fill per fill area.

- Maximum Single Value: 12%
- Average Value: 10%

Undrained Shear Strength: (measured by calibrated shear vane to BS1337 method).

- Minimum Single Value: 110 kPa
- Average Value: 140 kPa

In-situ density, shear strength and water content tests were carried out in areas of filling at or in excess of the frequency recommended by NZS 4431. Test results are IANZ (International Accreditation New Zealand) endorsed and full details are appended.

In addition, laboratory Triaxial Tests of Engineered fill sampled from high importance areas (i.e. RE Slope backfill) has been carried out to confirm design soil parameters. Testing was carried out in accordance with test method AS1289.6.4.2 (Note 4).

5. PROJECT EVALUATION

5.1 STABILITY EVALUATION

Global stability conditions in Precinct 6 Stage 2B were assessed under a range of groundwater conditions and seismic loading. The results of which are contained within previous reporting. The soil parameters used for the analyses (as referred to in our design philosophy report referenced 773-AKLGE206639-AD) were adopted based on extensive investigation and modelling of the site.

The stability analysis results have demonstrated factors of safety against instability in accordance with the requirements of Auckland Council Code of Practice for Land Development and Subdivision – Section 2 Earthworks and Geotechnical Requirements Version 1.6 dated 24 September 2013.

We consider that the results are acceptable, and we are therefore satisfied that the building platform areas in all Stage 2B residential lots are not subject to the hazards described in Section 106 of the Resource Management Act 1991 and Section 71(3) of the Building Act 2004.

To the best of our knowledge, there have been no significant departures to the landform than was considered in the aforementioned Tetra Tech Coffey investigation and design reports (see referenced reports in Section 2). Furthermore, observations of earthworks and undercuts have confirmed that the ground model forming the basis of the stability analyses presented in these reports is applicable.

On this basis, the stability analysis conclusions presented in the Tetra Tech Coffey reports may continue to be relied upon.

Notwithstanding our confidence in the stability analysis results, the Tetra Tech Coffey Geotechnical Building Limitation Zones Plan, reference BX-001 and BX-002, presented in Appendix B, shows the extent of a series of zones which are intended to, among other things, maintain long term factors of safety against instability. The Building Limitation Zones include:

- No-Build Zone;
- Specific Design Zone (Slope);
- Specific Design Zone (Retaining Walls)

Full descriptions of the limitations associated with each of these zones are presented in the Suitability Statement below.

5.2 RETAINING WALLS

5.2.1 Existing Retaining Walls

Two Modular Block retaining walls (Wall 303 and 701) were constructed within Precinct 6 Stage 2B. Wall 303 was constructed under Building Consent number BCO10301029-9 and Wall 701 was constructed under Building Consent number BCO10301029-7. The Producer Statement – Construction Review (PS4's) for these walls are provided in Appendix F.

Table 3 below summarises the retaining wall construction details.

Table 3: Summary of Modular Block Retaining Wall Construction Details

Wall #	Retaining Wall Length (m)	Retaining Wall Facing System	Wall Backfill	Geogrid Type	Max. Geogrid Embedment Length (m)	Design Wall Surcharge Load (kPa)	Drainage Outlets
303	84.1	Mass Bloc	3m width of GAP65 hardfill behind the blocks, then engineered clay fill to the extent of geogrid reinforcement	Tensar RE540 and RE570	8.5	12	Outfall Structures to Adjoining Watercourse
701	138			Tensar RE580	11.5	12	
312	Wall Structure Outside of Stage 2B						Outlet drainage aligned 3.5m offset from toe of wall beneath JOAL 500. Drainage discharges to Gully 2 Manhole and into public stormwater network.

The retaining walls were constructed with subsoil drainage (see Woods subsoil drainage As-Built Plan drawing P22-436-00-1200-AB), which incorporates regular specifically designed outfall structures at the locations shown on the appended Tetra Tech Coffey Geotechnical Works Plans (ref: BX004 to BX/006).

Additionally, the subsoil drainage for Retaining Wall 312, located adjacent to the southern boundary of JOAL 500, extends into Stage 2B. The majority of the drainage discharges into the Gully 2 manhole, the lid level of which is located 3m below JOAL subgrade level, and the easternmost drainage discharges into the sealed public stormwater drainage network on an adjacent subdivision stage, and certified in a previous Geotechnical Completion Report.

If any of the retaining wall drains are intercepted by future construction works, they should be reinstated under the supervision of a Chartered Professional Engineer, familiar with the contents of this report. The capacity of the retaining wall drains to function should not be reduced or compromised as blocked retaining wall drainage can in some circumstances, lead to failure of the retaining wall.

Wall 303 was designed to accommodate a 12 kPa uniformly distributed surcharge load behind the crest of the wall (or behind the crest of adjoining RE310) to account for potential future fill placement or applied loads from dwellings. Any greater loading will require an engineering solution to transfer loads below the zone of influence of the wall. Details on the Specific Design Zone requirements on the residential lots adjoining the retaining walls is provided below in Section 5.4.3 and in the Suitability Statement (Section 6).

Survey monitoring of the retaining walls was carried out post-construction in accordance with the Tetra Tech Coffey Geotechnical Monitoring Protocol, referenced in Section 2, to confirm vertical and lateral movements were within design tolerances for the retaining walls. The majority of the deflections of the monitoring points observed were accredited to earthworks plant operating in the area. As such, we are satisfied that any post-construction movements have now likely attenuated. The monitoring results are provided in Appendix E.

The retaining wall design drawings are provided in Appendix B for reference.

5.2.2 Future Retaining Walls on the Private Lots

Retaining walls to be constructed on the residential lots may be designed in accordance with the soil parameters provided in Table 4 below:

Table 4: Summary of Suggested Retaining Wall Design Parameters

Soil Unit Weight, γ (kN/m^3)	Effective Cohesion, c' (kPa)	Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	Undrained Shear Strength of Foundation Soils, s_u (kPa)
18	0	28	50

Retaining wall designs should give due regard to any sloping ground above or below the proposed wall locations, and make appropriate allowances for traffic and building surcharge loads. In all cases, wall designs should aim to not only address potential failures of the retaining wall itself, but also of deep-seated rotational failures that extend beneath the wall.

The retaining wall designs should, where applicable, be carried out in accordance with the Specific Design Zone building requirements discussed in Section 5.4 and the Suitability Statement.

More information regarding future retaining walls within the rear yard areas of Lots 1-7 is provided in Section 5.6 and the Suitability Statement.

5.3 REINFORCED EARTH SLOPES

The finished lot contours have generally been eased across the subdivision by the construction of six Reinforced Earth Slopes comprising gradients of up to 1V:1.5H and heights of up to 7.6m.

Table 5 below summarises the RE slope construction details.

Table 5: Summary of RE Slope Construction Details

RE Slope #	Max. Vertical Slope Height (m)	Geogrid Type	Geogrid Embedment Lengths	Design Surcharge Load at Slope Crest (kPa)
310	3	Tensar SS20	2m long geogrid layers	12
604-A	5.5	Tensar SS20	2m long geogrid layers	12
604-B	1.5	Tensar SS20	2m long geogrid layers	12
604-C	6.8	Tensar SS20	2m long geogrid layers	12
604-D	7.6	Tensar SS20	Alternating 2m and 5m lengths at 0.5m vertical centres	12
604-E	4.4	Tensar SS20	2m long geogrid layers	12

The RE Slopes were constructed with subsoil drainage comprising a 300mm wide SAP50 scoria blanket drain behind the geogrid reinforced block, with regular outlets which discharge to adjoining watercourses at the locations shown on the Woods Limited as-built drawings reference P22-436-00-1200-AB. If any of the RE Slope drains are intercepted by future construction works, they should be reinstated under the supervision of a Chartered Professional Engineer familiar with the contents of this report. The capacity of the subsoil drains

to function should not be reduced or compromised as blocked RE Slope drainage can in some circumstances, result in failure of the slope.

All of the RE Slopes were installed with a Geoweb topsoil retention system to reduce the risk or scour and erosion on the slope face. The Geoweb is fixed into position via Duckbill anchors installed into the ground at approximately 1.3m lateral centres at the slope crest.

It is important that no drainage or service trenches are excavated immediately behind the RE slope crests on public land or residential lots as this may cause damage to anchors resulting in surficial slumping of the topsoil on the batter faces. Any piled foundations should also be offset to avoid the anchors.

Further details relating to building limitations on and adjacent to the RE slopes is provided below in Section 5.4 and in the Suitability Statement (Section 6).

The RE slope design drawings are provided in Appendix B for reference.

5.4 BUILDING LIMITATION ZONES

The steeper areas of filled and natural ground in Stage 2B and adjoining land parcels are more sensitive to future changes in geometry, groundwater and surface water than other less steep areas. Accordingly, the appended Suitability Statement and the following sub-sections contain details of building restrictions (No Build Zones) and Specific Design Zones pertaining to cutting near batter toes or filling/loading near batter crests (Specific Design Zone (Slope)) to maintain the long-term integrity of these areas.

Additionally, Specific Design Zones have been applied to land adjoining Retaining Wall 303, to ensure the long-term integrity of the constituting wall components.

The Building Limitation Zones are shown on Tetra Tech Coffey drawing BX/001 and BX/002 in Appendix B.

5.4.1 No Build Zone

The RE Slope constructed within Lots 1 to 3 (inclusive) consists of geogrid reinforcement integral to maintaining long term factors of safety against instability. In addition, the no-fines concrete facing blocks comprising Wall 303 are not designed to accommodate axial loading from dwellings or ancillary structures. For this reason, these areas on the future residential lots have been designated as No Build Zone.

Building slabs may be suspended and cantilevered into the No Build Zone areas, but no foundations or earthworks are permitted within these zones.

To reduce the potential for scour and erosion of the RE slope faces, topsoil has been placed on the batter faces and planted, and fixed in place by a Geoweb Erosion Control System. These features should be able to remain in place long term without significant maintenance.

Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. It is important that no excavations, even of minimal depths and temporary in nature, are carried out on the batter faces, as this will result in damage to the Geoweb and potentially in failure of the Geoweb across a large portion of the slope. This restriction also applies to excavations at the batter crest, where the anchors which fix the Geoweb in place have been installed.

The contribution of appropriate vegetation cover to erosion control should not be underestimated. Weeds are permitted to the removed, but landscaped vegetation in the No Build Zones must be protected and preserved.

5.4.2 Specific Design Zone (Slope)

Specific Design Zone (Slope) has been applied to all sloping lot areas comprising gradients of between 1V:2H and 1V:4H or land located immediately upslope or downslope of such areas. Any future earthworks and any future building development within the Specific Design Zone (Slope) should be the subject of a specific engineering design carried out by a Chartered Professional Engineer experienced in geomechanics and who is familiar with the contents of this report. This will also require an assessment of natural hazards as detailed in Section 71(3) of the Building Act. The design engineer should consider the effects of filling behind batter crests or cutting at batter toes, on the stability of the adjacent batters.

Individual lot developers must take particular care when planning any unsupported cuts (e.g. for retaining walls or benched platforms), even of a temporary nature within the Specific Design Zone (Slope) areas. Risk reduction methods that should be employed include (but are not limited to) staging of excavation works along slope portions, covering excavations with polythene to prevent ingress of rain, installation of temporary retention piles prior to excavation works (i.e. top-down construction methodologies) and careful planning of works to avoid poor weather and to ensure that excavations are only left unsupported for short periods of time. This is of particular relevance to the Specific Design Zone (Slope) areas within Lots 5, 6 and 7, where failure of temporary retaining wall excavations has the potential to extend beyond the site boundary and affect upslope publicly vested roading and services.

In addition, it is important that neither groundwater nor surface water is concentrated on or near the Specific Design Zone (Slope) areas. Any future development on or close to batter crests will need to ensure that temporary works and landscaping does not result in land shaping that directs surface water over the batters. On no account should unlined stormwater soakage pits (or similar) be located on lots above the batters or in designated other areas as described in the appended Suitability Statement.

The Specific Engineering Design requirement also applies to the design of any retaining walls, which may not normally require specific design were they proposed outside of the Specific Design Zone.

Unless retaining walls are proposed to reduce site gradients, foundations within the Specific Design Zone (Slope) should be piled in accordance with the recommendations provided in Section 5.8 and the Suitability Statement (Section 6).

Individual lot owners must take particular care when planning fills of any depth within Specific Design Zone (Slope) areas, as fill induced loading of slopes may trigger instability into downslope properties.

To reduce the potential for scour and erosion of these batters, topsoil has been placed on the batter faces and planted. These features should be able to remain in place long term without significant maintenance. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. Further, depths of mulch and topsoil applied to these areas should be limited to less than 150mm (combined) to reduce the risks of saturation leading to localised surficial slumping. The contribution of appropriate vegetation cover to erosion control should not be underestimated.

Further lot-specific comments are provided in the suitability statement.

5.4.3 Specific Design Zone (Retaining Walls)

Specific Design Zone (Retaining Walls) has been applied to areas within the residential lots located immediately above Wall 303. Development within these zones should be designed and certified by a Chartered Professional Engineer experienced in geomechanics, familiar with the contents of this report, to ensure that:

1. The geogrid reinforcement and engineered fill that constitute the retaining wall is protected; and

2. The surcharge loads applied above the existing block walls do not exceed the loads assumed in the design.

Further details on the requirements associated with building within the Specific Design Zone (Retaining Walls) on affected lots is provided in the Suitability Statement.

5.5 FILL INDUCED SETTLEMENT

Subdivision bulk earthworks undertaken included mucking out of organic and soft deposits from gully inverts prior to filling, the installation of subsoil/underfill drainage and quality control testing during the placement of the fill to confirm compliance with the fill compaction specification. These works have been undertaken as part of the normal earthworks process and, amongst other things, serve to reduce the magnitude and time for post-filling settlements to attenuate.

A series of settlement monitoring devices were installed across Stage 2B to measure induced settlements. The locations are shown on the Settlement Monitoring Location plan in Appendix E. Settlement plates were placed on the stripped natural ground level beneath fill areas prior to fill placement and brought up to ground level as filling progressed to monitor the consolidation of the underlying natural soils. In addition, settlement markers were installed in the finished ground surface to monitor surface movements upon completion of the earthworks.

Each of the monitoring locations were selected to observe maximum anticipated settlements (maximum fill depths), as well as at specific locations of interest, such as proposed public drainage alignments.

The monitoring results in Appendix E show that settlement rates appear to have attenuated to low levels and that t_{90} (the time associated with 90% of primary settlement having occurred) has most likely been surpassed. The markers were decommissioned to allow site operations to continue, following approval Tetra Tech Coffey.

5.6 PALISADE WALL PW805

Palisade Wall PW805 was constructed adjacent to the western Stage 2B boundary to maintain adequate global stability factors of safety. The location of the wall is shown on the Woods Limited Palisade Wall As-built Plans referenced 37600-00-1300 to 1302 -AB.

The Palisade Wall was constructed under Building Consent BCO10301029-8. The Producer Statement – Construction Review (PS4) for the wall is provided in Appendix F.

The construction details for the wall are provided in Table 6 as follows:

Table 6: PW805 Construction Details

Wall I.D	Wall Length	Lots Intersected	Min. Pile Depth (m)	Pile Diameter (mm)	Pile Spacing, c-c (m)	Steel Section	Design Surcharge (kPa)
PW805-A	55*	1, 2 (partial)	12.0	600	1.5	310 UC 158	10
PW805-B	39	2 (partial, 3, 4	12.0	600	1.5	310 UC 137	10
PW805-C	39	5, 6, 7	10.0	650	1.5	460 UB 82.1	10

*Includes wall sections only within the Stage 2B boundary

It is important that no fill loads are placed upslope of the palisade wall, over the 600mm of subfloor filling that is allowed for in NZS3604, as this may exceed the wall capacity.

Retaining walls constructed to reduce gradients within the rear yard areas of Lots 1 to 7 are permitted, but the backfill behind these walls should comprise Expanded Polystyrene (EPS) blocks to minimise the risk of overloading PW805 with excessive fill loads.

Further lot specific information regarding construction upslope of PW805 is provided in the Suitability Statement.

5.7 SUBSOIL DRAINAGE

The following sub-sections contain a description of the underfill and counterfort drainage (collectively referred to as subsoil drainage) installed during bulk earthworks to control groundwater levels across Stage 2B and to allow for the dissipation of generated pore water pressures. The drain locations are shown on the Woods Subsoil Drainage as-built plans referenced P22-436-00-1200-AB in Appendix A. The subsoil drain design details are shown on the Coffey Subsoil Drainage Standard Details drawing ref: AG/007 in Appendix B.

The capacity of the subsoil drains to function as intended should not be reduced or compromised, as blocked subsoil drainage may, in certain circumstances, have a detrimental effect on site stability.

Where any subsoil drain is intercepted by building works it must be reinstated under the direction of a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report, to ensure the integrity of the subsoil drainage system in maintained.

5.7.1 Underfill Drains

Perforated underfill drains were placed in mucked out gully inverts prior to filling to tap groundwater seepage and relieve fill induced excess pore water pressures, as required by NZS 4431.These drains require no specific maintenance.

The locations of the underfill drains are shown on Woods drawing P22-436-00-1200-AB. Retaining Walls and excavations within Lots 1 to 7 must be offset sufficiently from the underfill drain passing beneath the lot frontage, as shown on the as-built drawing, so as not to damage the drain. This underfill drain serves to discharge the bulk of the subsoil drainage network within this portion of the subdivision, and it is therefore imperative that its function is not reduced or compromised.

5.7.2 Counterfort Drains

During earthworks construction of four counterfort drains were installed under direction from Tetra Tech Coffey, to assist in controlling local groundwater levels in areas where groundwater seepage was observed. Typical trench excavation depths for the counterfort drains was up to 5m from the undercut ground level, and a typical trench width of 600mm. Drainage aggregate used for the counterfort drains was SAP50 scoria.

These drains outlet into the adjacent watercourse to the north via specifically designed outfall structures.

The counterfort drains were generally aligned beneath lot boundaries and constructed with a minimum 1.5m cap of engineered clay fill above the drains.

5.7.3 Flushing of Subsoil Drains

Flush testing of the subsoil drains to confirm their function was undertaken using water carts connected to the drain inlet Novaflos. A Tetra Tech Coffey engineer was on-site to observe flushing operations. Each of the subsoil drains was successfully flush tested prior to placement of the drains clay capping layer.

5.8 FOUNDATIONS AND BEARING CAPACITY

Following the completion of earthworks operations, a series of hand auger boreholes were drilled in appropriate areas of cut and filled ground to assess representative finished subsurface conditions and hence evaluate likely foundation options for future residential building development. Our resulting bearing capacity recommendations are presented in the appended Suitability Statement.

At current subgrade levels, all cut, filled and undisturbed original ground has a geotechnical ultimate bearing capacity of 300 kPa (as required by NZS3604) within the zone of influence of conventional shallow residential building foundation loads.

Where a geotechnical ultimate bearing capacity greater than 300 kPa is required, further site-specific investigation and design of foundations should be carried out prior to Building Consent application.

It should be noted that NZS 3604 only allows a maximum fill depth of 600mm above finished ground level across the building platform of a dwelling unless an Engineering design solution is proposed, due to the risk of induced settlement or instability of the subsoils caused by the weight of the fill.

On sloping lots, piled foundations may be the most appropriate foundation system. Pile foundations on this subdivision may be designed in accordance with the following design parameters:

Table 7: Suggested Pile Design Parameters

Effective Internal Angle of Frictional Resistance, ϕ' (degrees)	Soil Unit Weight, γ (kN/m^3)	Undrained Shear Strength, s_u (kPa)	Ultimate side adhesion beyond 1.0m depth (kPa)*
28	18	50	30

*Side adhesion to be ignored within the upper 1m of soil

The structural designer should attend to the details of pile type, depth, spacing, diameter and load capacity, and also ensure there is allowance in the design for any differential movements that may occur between piled and unpiled portions of the dwelling.

Soil creep on sloping ground should be mitigated by designing piles to resist lateral loads over the upper 1.0m of pile equivalent to 3 x pile diameters.

Where piles are proposed within the Specific Design Zone (Slope) adjoining RE Slope 310, piles should be positioned to avoid severing anchors installed to restrain the Geoweb Erosion Control System.

5.9 EXPANSIVE SOILS

Nine sets of Laboratory Expansive Soil Tests were carried out on soil samples retrieved from Lots 1, 4, 7, 46, 49, 51, 75 (outside of Stage boundary), 1000 and 1001 (as shown on Tetra Tech Coffey drawing BX/003 in Appendix B) and from within the zone of likely influence of shallow building foundations.

Testing to assess the Shrink Swell Index (I_{SS}) was carried out in accordance with AS1289 Test 7.1.1 and was used in conjunction with the advice in Acceptable Solution B1/AS1 of the New Zealand Building Code and BRANZ addendum Study report 120A (2008) – Soil Expansivity in the Auckland Region to calculate the characteristic surface movement (y_s) and expansive soil site class.

All test results are IANZ (International Accreditation New Zealand) endorsed and full details are included in Appendix C.

Based on the results of laboratory testing, plus our visual and tactile assessment of the soils on site, we have assessed the AS2870 expansive site class as M (Moderately reactive) or H (Highly Reactive) for all residential lots.

On some expansive clay sites, if cast on-grade floor slab construction takes place during a long dry summer, exposed building platform soils may dry out and become highly desiccated.

Over time the presence of the floor slab will cause capillary rise of moisture to the underside of the damp proof course and potentially expansive dry ground may wet up and swell, causing floor slab uplift. The effect may be very slight in some cases and extreme in others, especially if free water can reach the central underside of the slab as could occur if any subsoil drainage is discharged beneath the slab or, an under-slab water pipe leaks.

Floor slab uplift usually remains unnoticed in carpeted homes but can cause distress on tile floors and in garages where cracks are more apparent. It may also rack upper storeys if non-load bearing ground floor walls are lifted and act as struts. Further, it may cause drainage problems on flat roofed houses where gutter gradients may be reversed.

Thorough soaking (in the form of low flow sprinklers for an extended period rather than flooding of the surface with a hose once is recommended) of the exposed building platform area, a few days before hardfill placement, can help to reduce the problem. Careful detailing of construction joints in brittle building elements can also be of benefit. Alternatively, removal and replacement of the desiccated surface layers is recommended.

It is also advisable for site specific testing be carried out by individual lot owners to ascertain the expansive site class for each individual lot.

5.10 STORMWATER CONTROLS

It is important on all lots that due care is paid to the design and construction of appropriate stormwater disposal systems. These systems should serve to collect all runoff from roofs, driveways and paved areas, together with discharges from retaining wall drains and other subsoil drains and should connect directly into the sealed public stormwater drainage network.

Uncontrolled stormwater discharges onto the ground surface or into soakage pits can cause erosion, scour and/or instability on sloping land and are not permitted on any of the residential lots.

5.11 SERVICE TRENCHES

As is normal on all subdivisions, construction of foundations within the 45-degree zone of influence from 0.5m below pipe inverts will require engineering input. The Auckland Council drawing referenced SW22 provided in Appendix B extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision, Version 3.0, January 2022, depicts bridging requirements for stormwater pipes. Details for water and wastewater pipes are available in Watercare COP1, namely WW53 and WW54, which are standard construction drawings. All aforementioned details are provided in Appendix B.

A number of the lots are shown to have public drainage trenches within their boundaries as shown on the Woods Stormwater and Wastewater as-built plans referenced P22-436-00-3000 to 3004-AB and P22-436-00-4000 to 4002-AB respectively (provided in Appendix A). The resulting limitations are discussed in the following Suitability Statement.

5.12 TOPSOIL

Upon completion of the subdivisional works a series of shallow hand auger boreholes were drilled at the locations of each likely building platform (as shown on Tetra Tech Coffey drawing BX/003 in Appendix B) to assess indicative topsoil depths on all residential lots.

Depths of topsoil were found to range from 100 to 200mm, however, due to the nature of the method of investigation, variation in topsoil depths across the lots is expected.

Site specific findings are presented in the Suitability Statement Summary (Table 8) in Section 6. However, we strongly recommend that lot purchasers complete their own checks of actual topsoil depths across their specific lot.

5.13 PUBLIC ROAD AND JOAL SUBGRADES

Scala Penetration Resistance (Dynamic Cone Penetrometer) Tests were undertaken at regular intervals along the road subgrades in Stage 2B. The test results were subsequently forwarded to Woods for pavement design validation purposes. Areas demonstrating low equivalent CBR values were typically either reworked with lime/cement stabilisation treatment, or undercut and replaced with hardfill or engineered clay fill.

5.14 CONTRACTORS WORK

We have relied on the Contractor's work practices and assume that the works have been carried out in accordance with:

(i) The approved Contract drawings and design details;

(ii) The approved Contract specifications;

(iii) Authorised Variations issued during the execution of the works;

(iv) The conditions of Resource, Earthworks and Building Consents where applicable; and

(v) The relevant Tetra Tech Coffey reports, recommendations, specifications and site instructions.

In addition we assume that all As-Built information and other details provided to the Client and/or Tetra Tech Coffey by the Contractor and other consultants are accurate and correct in all respects.

6. STATEMENT OF PROFESSIONAL OPPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, Stephen Parkes of Tetra Tech Coffey (NZ) Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineering Geologist experienced in the field of geotechnical engineering as defined in section 1.2.3 of NZS 4404 and was retained by the Owner/Developer as the Geotechnical Engineer for Stage 2B, Precinct 6 of the Millwater Subdivisional Development.
2. The extent of investigations carried out to date are described in the Geotechnical Investigation Report referenced 773-AKLGE204203-AA, dated 25 July 2017, and the geotechnical design reports referenced above in Section 2. The Tonkin and Taylor Geotechnical Completion Report referenced 21854.0034/AHP6Ew.v1, dated June 2019 provides earthworks certification for the enabling works package, completed at the site prior to the works detailed in this report. The conclusions and recommendations of these documents have been re-evaluated as part of the preparation of this report.
3. Engineered fill placed as part of Precinct 6 Stage 2B construction and shown on the appended Woods Limited as-built plans, is certified herein.
4. In my professional opinion, not to be construed as a guarantee, I consider that:

   (a) The completed earthworks give due regard to land, slope and foundation stability considerations within the residential lots, but as shown on the appended Woods Limited Final Surface As Built Plan, ref P22-436-00-1000-AB, areas on some lots have gradients steeper than 1(v) in 4 (h) (and generally up to 1(v) in 1.5(h)), or are adjacent to land having such gradients.

   Additionally, some slopes comprise geogrid reinforcement whose structural integrity is critical in maintaining the stability of these areas.

   Accordingly, limitations incorporating No Build Zone and Specific Design Zone (Slope) have been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plans BX/001 and BX/002, dated 29/08/2024, and described as follows:

   i. **No Build Zone** has been applied to portions of land in Lots 1, 2 and 3 and encompasses land comprising geogrid reinforced earth (RE) slopes and facing blocks of Retaining Wall 303. No building or earthworks are permitted within these zones as development in these areas could have a detrimental effect on land stability.

      Building slabs may be suspended and cantilevered into the No Build Zone areas, but no foundations or earthworks are permitted within these zones.

   ii. **Specific Design Zone (Slope)** has been applied to portions of land in Lots 1, 2, 3, 5, 6, 7, 46 to 51 (inclusive) and 76, and encompasses land having slope gradients of 1(v) in 4(h) to 1(v) in 2(h) or adjoining slopes having such gradients.

      No building construction and no earthworks (i.e. cut or fills of any depth) should take place within designated Specific Design Zones (Slope) unless endorsed by geotechnical design of all earthworks, foundations and retaining walls and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics who is familiar with the contents of this report, as such operations may, in certain circumstances, have detrimental effects on site stability. The endorsing Engineer will need to assess natural hazards under Section 71(3) of the Building Act, and consider the implications of temporary (construction case) and long-term stability conditions and soil creep on the development proposals, including the impact of surcharge loads from the land above batters, ancillary structures such as water tanks, effects of services and associated trench backfills and control of surface water.

      This limitation also applies to long term landscaping works and vegetation change, including any proposed minor cuts either on the batter slopes or at their toes, which are to be retained by landscaping walls that might not normally require specific engineering input, and also to fills on, or immediately above the batter slopes. Risk mitigation for construction of these works should also be considered.

      Foundations constructed within the Specific Design Zone (Slope) in Lots 1, 2, and 3 shall incorporate the piling of the leading (downslope) edge for dwellings and deck foundations.

Suggested parameters for the design of pile foundations are provided in Section 5.8. It is important that piles constructed within this zone are positioned so as not to damage the Geoweb Erosion Control System (the plastic system fixed to the slope face to maintain topsoil cover) or the securing anchors that fix the Geoweb in place. The anchors are located within 1m of the slope crest, and should be positively identified and surveyed prior to the design of house foundations.

The piling requirement also applies to foundations within the Specific Design Zone (Slope) areas within Lots 5, 6, 7, 46 to 51 (inclusive) and 76, or alternatively, a Specifically Engineer Designed Retaining Wall may be constructed to level gradients across the Specific Design Zone. In this latter case, shallow foundations on the levelled building platform are acceptable, but piling of the leading (downslope) edge may still be necessary if in close proximity to sloping ground.

The structural designer should attend to the details of pile type, depth, spacing, diameter and load capacity, and also ensure there is allowance in the design for any differential movements that may occur between piled and unpiled portions of the dwelling.

(b) One retaining wall (namely Wall 303) comprising geogrid reinforcement and drainage borders Lot 1. Accordingly, **Specific Design Zone (Retaining Walls)** has been applied as depicted on Tetra Tech Coffey Geotechnical Building Limitation Zone Plans BX/001and BX/002, dated 29/08/2024, and described as follows:

Specific Design Zone (Retaining Walls) has been applied to portions of land within Lot 1, to ensure the geogrid reinforcement and drainage comprising the adjacent retaining wall which extends into this lot is not damaged, and that applied surcharge loads do not exceed the design surcharge loads for the retaining wall.

Fills to create building platforms within the Specific Design Zone (Retaining Walls) in Lot 1, are limited to a maximum depth of 500mm and the total combined depths of cuts to create building platforms and foundations is limited to a maximum of 600mm below current subgrade (i.e. base of topsoil) level. This also applies to depths of any piles for foundations, retaining walls or decks.

(c) The design of Palisade Wall PW805, installed within the boundary of Lots 1 to 7 (inclusive), does not incorporate excessive fill loads upslope of the piles.

Any retaining wall constructed to reduce slope gradients within the rear yard areas of Lots 3 to 7 (inclusive), upslope of PW805, should be backfilled to a minimum of 600mm below the full height of wall with Expanded Polystyrene Blocks (EPS), as additional fill loads applied to wall PW805 may result in a reduction in site stability.

Additionally, depths of underslab fill placement within lots 3 to 7 (inclusive) shall not exceed the 600mm depth allowed for in NZS3604.

(d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all residential lots in Stage 2B.

Where a geotechnical ultimate bearing capacity greater than 300 kPa is required, (i.e. outside the limits of NZS 3604), further specific site investigation and foundation design should be carried out prior to building consent application.

(e) The function of the subsoil drains (including outlets and the Gully 2 Manhole), as depicted on the appended Tetra Tech Coffey Geotechnical Works Plans referenced BX/004 to BX/006, and Woods Limited Subsoil Drainage As-built Plan referenced P22-436-00-1200-AB, should not be compromised by any future building development or landscaping works. Any bored or driven piles or retaining walls should be positioned to avoid damaging the drains. **Where any subsoil drain is intercepted by building works, it must be reinstated under the direction of a Chartered Professional Engineer to ensure the long-term function and integrity of the subsoil drainage system is maintained.**

This is of especially relevant to owners of Lots 1 -7 (inclusive), who should ensure that the Underfill Drain present beneath the lot frontage is not disturbed by any building work or excavation.

(f) The backfilling and compaction of the stormwater and wastewater trenches on this subdivision has, where possible, been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

Nevertheless, no building development should take place within the 45-degree zone of influence extrapolated from 0.5m beneath drain inverts unless endorsed by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are

addressed, and that building loads are transferred beyond the influence of the pipe and beyond the extent of the trench backfill.

Woods as-built plans P22-436-00-3000 to 3004-AB and P22-436-00-4000 to 4002-AB should be referred to for the locations of public drainage lines on all lots. A copy of drawing SW22 extracted from Chapter 4 of Auckland Council Code of Practice of Land Development and Subdivision is provided in Appendix B for reference. Details pertaining to building over/adjacent to public wastewater pipes are shown on Watercare drawings, namely WW53 and WW54, also included in Appendix B.

(g) On no account should stormwater be concentrated into pits (including stormwater detention or bio-retention treatment type pits) near sloping ground or batters or in areas of sandy soils or fractured rock unless endorsed by specific designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that appropriate permanent impervious lining of the pit is incorporated so that long term infiltration into the surrounding soils is not increased on account of its potentially adverse impact on local and global stability.

(h) The assessed AS 2870 Expansive Site Class is M (Moderately reactive) for Lots 1 to 7 (inclusive), 46, 47, 48, 76 and 1001, and H (Highly Expansive) for Lots 49, 50, 51 and 1000. It is recommended that site specific testing is carried out by individual lot owners to ascertain the Expansive Site Class on each individual lot.

(i) The seismic site subsoil category on all residential lots is assessed to be Class C (shallow soil site) in accordance with NZS1170.5.

(j) Subject to the geotechnical limitations, recommendations and expansive soil assessments associated with Section 6, Items 4(a), 4(b), 4(c), 4(d), 4(e), 4(f), 4(g), 4(h) and 4(i) above:

i. The cut, filled and undisturbed original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 (that incorporate specific foundation and associated structural design considering the expansive soils site class) and related documents.

ii. On all lots in Stage 2B, shallow foundation design may be carried out in accordance with AS 2870 (Class M or H), or alternatively, a specific foundation and structural design may be undertaken for NZS3604 type foundations by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum foundation embedment depth below cleared ground level may be ascertained from NZS3604, or from Table 7.4A or 7.4B in Amendment 19 to the Acceptable Solutions and Verification Methods to Clause B1 Structure of the New Zealand Building Code, dated 28 November 2019.

Table 8 below summarises the status of each residential lot covered by this Suitability Statement.

7. LIMITATIONS

The professional opinion contained within this report is furnished to Auckland Council and WFH Properties Limited for their purposes alone on the express condition that it will not be relied upon by any other person. Prospective purchasers should still satisfy themselves as to any specific conditions pertaining to their particular land interest.

This opinion does not remove the necessity for the normal inspection of ground conditions and the design of foundations as would be made under all normal conditions.

For and on behalf of Tetra Tech Coffey

Prepared by:

Stephen Parkes
Associate Engineering Geologist
CMEng.NZ, PEngGeol

Reviewed and Authorised By

Chris Armstrong
Principal Geotechnical Engineer
CMEng.NZ, CPEng

Table 8: Suitability Statement Summary

Lot #	Comments	Topsoil Depth (mm)	Ultimate Bearing Capacity (kPa)	AS2870 Expansive Site Class
1	No Build Zone Limitations Apply (refer to clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M
2	No Build Zone Limitations Apply (refer to clause 6.4(a)(i)) Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing	100	300	M

	depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
3	No Build Zone Limitations Apply (refer to clause 6.4(a)(i)) Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b)) Palisade Wall limitations apply (refer to Clause 6.4(c)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M
4	Palisade Wall limitations apply (refer to Clause 6.4(c)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M
5	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii))	100	300	M

	Palisade Wall limitations apply (refer to Clause 6.4(c)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
6	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Palisade Wall limitations apply (refer to Clause 6.4(c)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(h)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M
7	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Palisade Wall limitations apply (refer to Clause 6.4(c))	100	300	M

	Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
46	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M
47	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M

48	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	M
49	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	H
50	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to	100	300	H

	section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
51	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Specific Design Zone (Retaining Walls) limitations apply (refer to Clause 6.4(b)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	100	300	H
76	Specific Design Zone (Slope) limitations apply (refer to Clause 6.4(a)(ii)) Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	200	300	M
1000	Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i))	100	300	H

	Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations			
1001	Protection of the function of subsoil drains required (refer to Clause (6.4(e)) Sewer/ Stormwater line limitations apply (refer to Clause 6.4(f)) Care required with Stormwater disposal (refer to Clause 6.4(g)) The NZS1170.5 Seismic Site Subsoil Class is assessed to be Class C (refer to Clause 6.4(i)) Elsewhere, AS 2870 foundation design or specific CPEng design with minimum footing depth in accordance with Amendment 19 to section B1 of the NZ Building Code, for Class M NZS 3604 type strip or pad foundations	200	300	M

APPENDIX A: WOODS AS-BUILT DRAWINGS

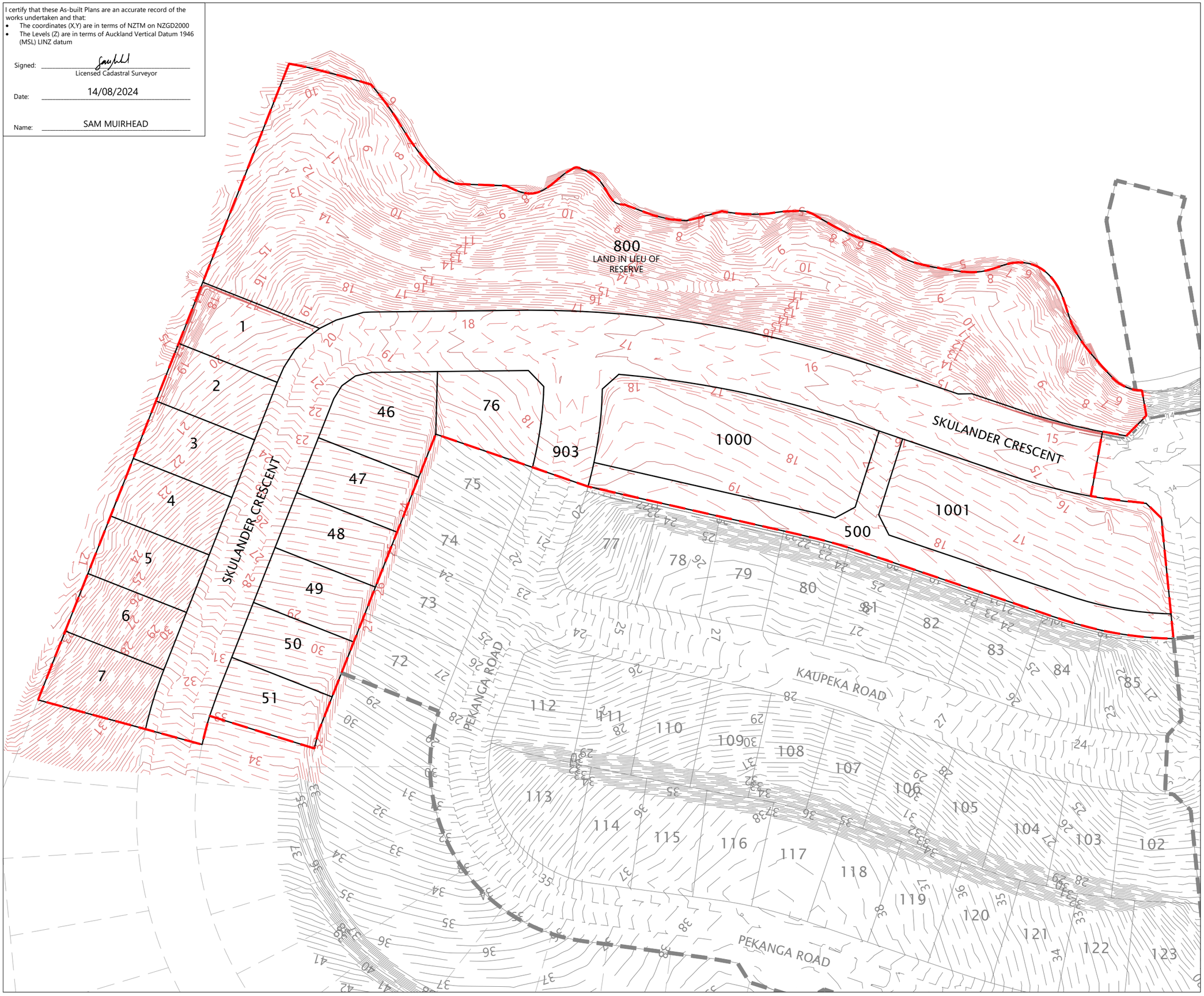
I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: _____
Licensed Cadastral Surveyor

Date: 14/08/2024

Name: SAM MUIRHEAD



NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. ORIGIN OF COORDINATES IS ALP 7 DP537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
3. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
4. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
2. CONTOURS ARE AT 0.25m INTERVALS.

LEGEND

MAJOR CONTOURS	10
MINOR CONTOURS	
EXISTING CONTOURS	10
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION BASED ON THIS DRAWING FILE.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	14/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

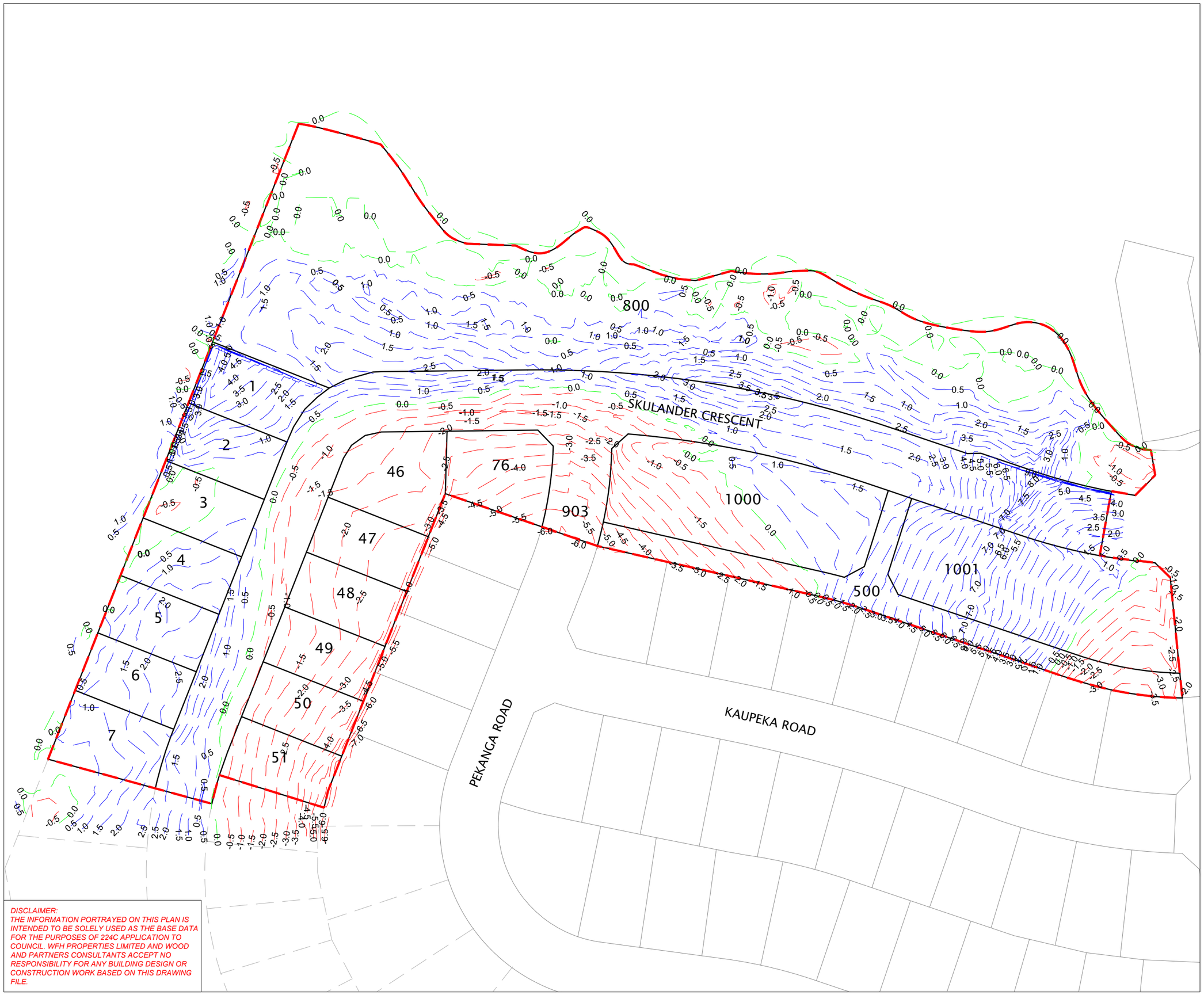
MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

FINAL SURFACE ASBUILT PLAN

STATUS	AS-BUILT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-2B-1000-AB	

Plot Date: 12:22:23 pm,26 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436- P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-1000-AB FINAL SURFACE.DWG



NOTES

1. ORIGIN OF COORDINATES IS ALP 7 DP537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
2. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
3. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
4. CONTOURS ARE AT 0.5m INTERVALS.
5. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.
6. ORIGINAL AND LOWEST SURFACES PROVIDED BY CONTRACTOR

LEGEND

ZERO CONTOUR	0.0
CUT CONTOUR	-1.0
FILL CONTOUR	1.0
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	26/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

CUT AND FILL ASBUILT
SHEET 1 OF 3
ORIGINAL SURFACE TO
FINAL SURFACE

STATUS	FOR INFORMATION	REV
SCALE	1 : 1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-1100-AB	

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

Plot Date: 3:43:48 pm,27 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_212511CAD\SURV\AB S2B\P22-436-00-1100-AB CUT FILL CONTOURS.DWG

WOODS
EST.1970

NOTES

1. ORIGIN OF COORDINATES IS ALP 7 DP537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
2. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
3. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
4. CONTOURS ARE AT 0.5m INTERVALS.
5. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.
6. ORIGINAL AND LOWEST SURFACES PROVIDED BY CONTRACTOR

LEGEND

ZERO CONTOUR	0.0
CUT CONTOUR	-1.0
FILL CONTOUR	1.0
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	26/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

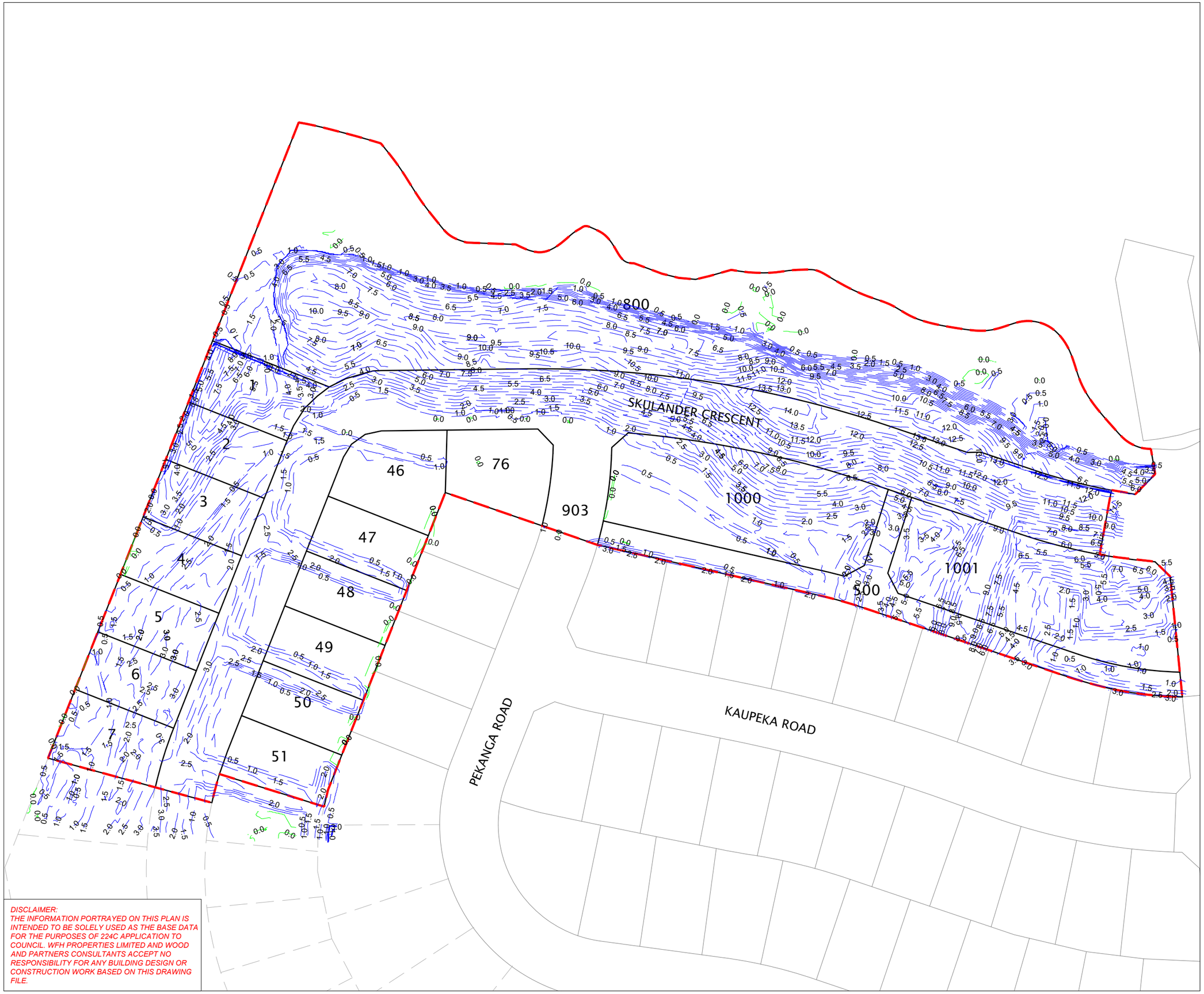
CUT AND FILL ASBUILT
SHEET 2 OF 3
ORIGINAL SURFACE TO
LOWEST SURFACE

STATUS	FOR INFORMATION	REV
SCALE	1 : 1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-1101-AB	

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

Plot Date: 343:53 pm,27 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURVAB SZB\P22-436-00-1100-AB CUT FILL CONTOURS.DWG



DISCLAIMER:
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WOODS
EST.1970

Plot Date: 3:43:57 pm,27 August 2024, SAMANTHAM

NOTES

1. ORIGIN OF COORDINATES IS ALP 7 DP537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
2. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
3. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
4. CONTOURS ARE AT 0.5m INTERVALS.
5. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.
6. ORIGINAL AND LOWEST SURFACES PROVIDED BY CONTRACTOR

LEGEND

ZERO CONTOUR	0.0
CUT CONTOUR	-1.0
FILL CONTOUR	1.0
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
STAGE BOUNDARY	

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	26/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

CUT AND FILL ASBUILT
SHEET 3 OF 3
LOWEST SURFACE TO
FINAL SURFACE

STATUS	FOR INFORMATION	REV
SCALE	1 : 1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-1102-AB	

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-1100-AB CUT FILL CONTOURS.DWG

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

DISCLAIMER:
SUBSOIL DRAINS ARE INDICATIVE ONLY. IT IS OWNERS RESPONSIBILITY TO LOCATE AND PROTECT ALL SUBSOIL DRAINAGE.

WOODS
EST.1970

Plot Date: 1:48:44 pm,29 August 2024, EDWINC

NOTES

1. COORDINATES ARE IN TERMS OF NZTM ON NZGD2000. ORIGIN OF COORDINATES IS ALP 7 DP537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
2. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL) LINZ DATUM. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
4. SUBSOIL DATA AND LOWEST SURFACE SUPPLIED BY CONTRACTOR.
5. CONTOURS ARE OF LOWEST SURFACE AND AT 0.5m INTERVALS.
6. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR.

LEGEND

- RE SLOPE/ RETAINING WALL DRAINAGE
- COUNTERFORT DRAINS
- UNDERFILL DRAINS
- SHEAR KEY DRAINAGE
- MANHOLE AND 300ø PE OUTLET LINE
- STAGE BOUNDARIES
- LOT BOUNDARIES
- LOWEST SURFACE MAJOR CONTOURS
- LOWEST SURFACE MINOR CONTOURS

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	29/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

SUBSOILS ASBUILT PLAN

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1 : 1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-1200-AB	

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-1200-AB SUBSOILS.DWG

1 2 3 4 5 6 7 46 47 48 49 50 51 76 800 LAND IN LIEU OF RESERVE 903 1000 1001 500

SKULANDER CRESCENT

PEKANGA ROAD

KAUPEKA ROAD

STAGE 2

STAGE 2C

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

DISCLAIMER:
SUBSOIL DRAINS ARE INDICTIVE ONLY. IT IS OWNERS RESPONSIBILITY TO LOCATE AND PROTECT ALL SUBSOIL DRAINAGE.

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/24

Name: Sam Muirhead

WOODS
EST.1970

SHEET 1401

800
LAND IN LIEU OF RESERVE

500

903

1000

1001

CONCRETE BLOCK WALL
NU-GUARD PVB® STEEL GUARDRAIL SYSTEM

SKULANDER CRESCENT

PEKANGA ROAD

KAUPEKA ROAD

1 2 3 4 5 6 7 8 9 10 11

46 47 48 49 50 51 52 53 54 55 56

69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85

102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123

67 68

NOTES

1. ORIGIN OF COORDINATES IS ALP 7 DP537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
2. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
4. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
5. SUBSOIL DATA SUPPLIED BY CONTRACTOR.
6. BOUNDARY OFFSET DIMENSIONS MEASURED FROM BOTTOM OF WALL UNLESS OTHERWISE SPECIFIED.

LEGEND

- TOP OF WALL
- BOTTOM OF WALL
- WALL TO BOUNDARY OFFSET — 0.10m
- FENCE
- RE SLOPE/RE WALL DRAINAGE
- PE DRAINAGE OUTLET
- STORMWATER NETWORK
- TOP OF BANK
- BOTTOM OF BANK
- SLOPE STABILISATON DEVICE
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

RETAINING WALL ASBUILT PLAN
SHEET 1 OF 2
LAYOUT SHEET

STATUS	AS-BUILT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-1400-AB	

Plot Date: 12:25:28 pm,26 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-1400-WALLS.DWG

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/24

Name: Sam Muirhead

DISCLAIMER:
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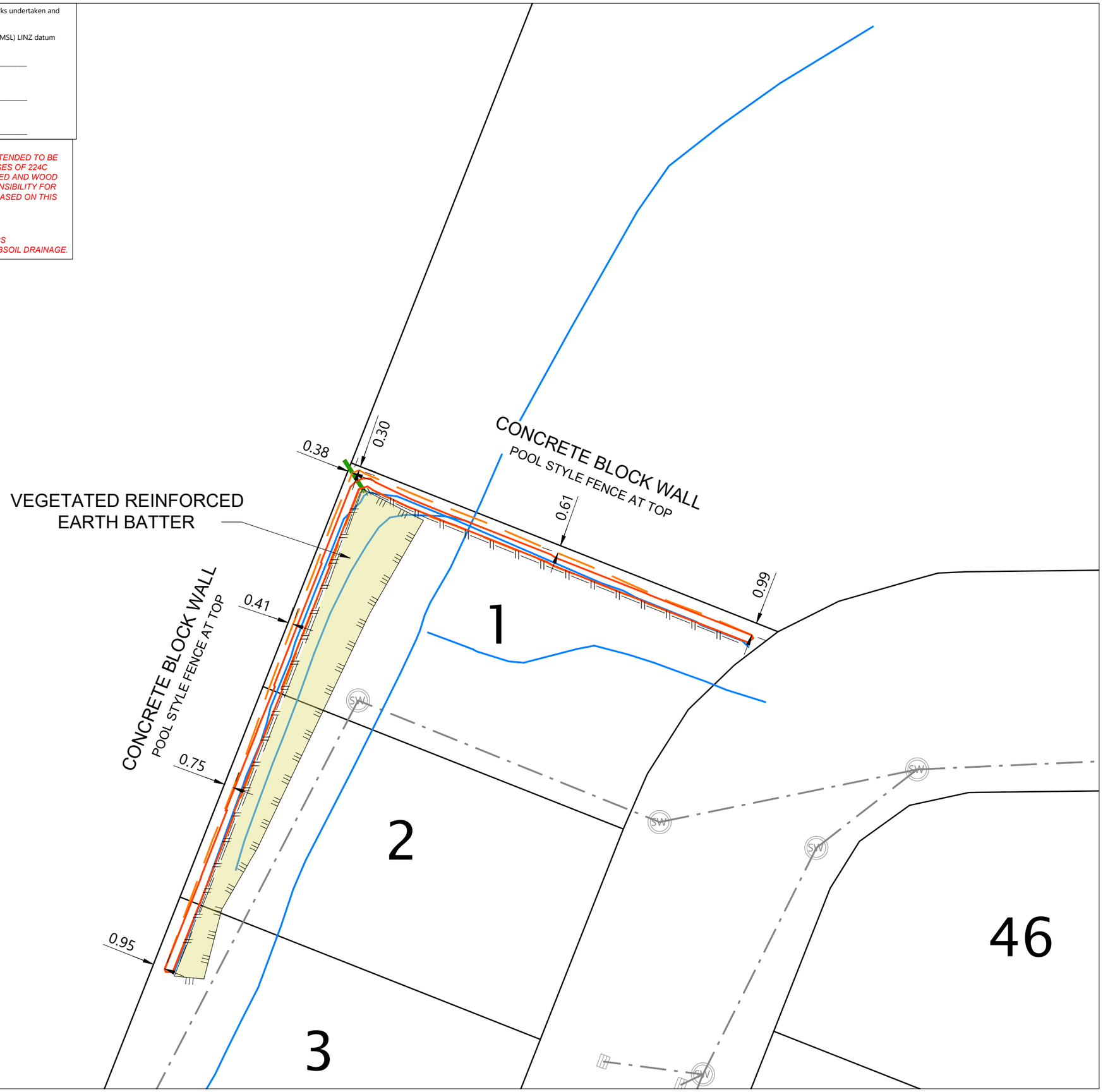
DISCLAIMER:
SUBSOIL DRAINS ARE INDICTIVE ONLY. IT IS OWNERS RESPONSIBILITY TO LOCATE AND PROTECT ALL SUBSOIL DRAINAGE.



NOTES

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   ~ 5948950.35mN 1749158.12mE
2. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
4. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
5. SUBSOIL DATA SUPPLIED BY CONTRACTOR.
6. BOUNDARY OFFSET DIMENSIONS MEASURED FROM BOTTOM OF WALL UNLESS OTHERWISE SPECIFIED.

LEGEND

- TOP OF WALL
- BOTTOM OF WALL
- WALL TO BOUNDARY OFFSET — 0.10m
- FENCE
- RE SLOPE/RE WALL DRAINAGE
- PE DRAINAGE OUTLET
- STORMWATER NETWORK
- TOP OF BANK
- BOTTOM OF BANK
- SLOPE STABILISATON DEVICE
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- STAGE BOUNDARY

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	TETRATECH	
APPROVED	SM	WOODS.CO.NZ

N

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

RETAINING WALL ASBUILT PLAN SHEET 2 OF 2

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-1401-AB	

Plot Date: 12:25:28 pm,26 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-1400-WALLS.DWG

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

I certify that these As-Built Plans are an accurate record of the works undertaken and that:

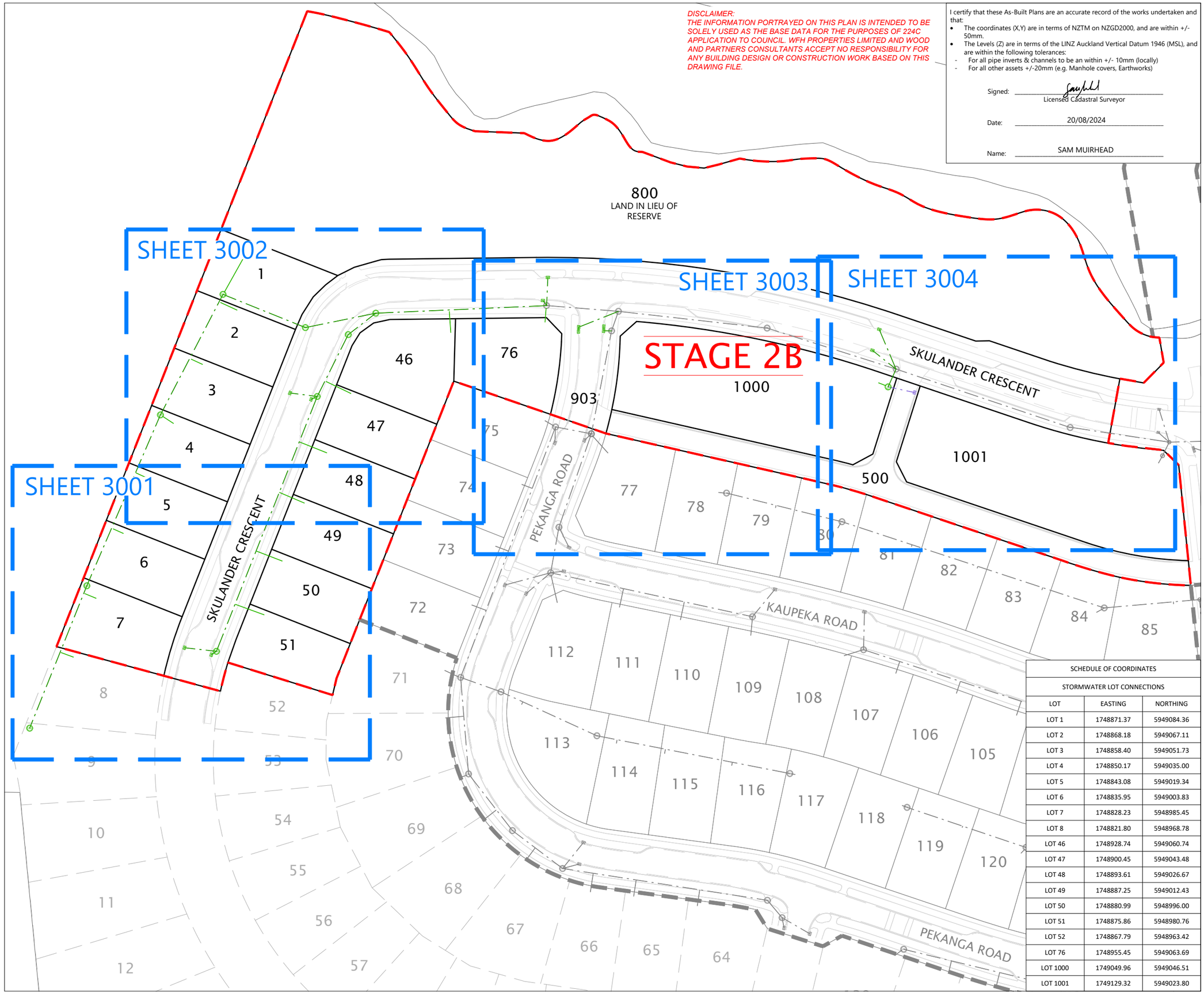
- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL), and are within the following tolerances:
  - For all pipe inverts & channels to be an within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

WOODS
Est.1970



SCHEDULE OF COORDINATES		
STORMWATER LOT CONNECTIONS		
LOT	EASTING	NORTHING
LOT 1	1748871.37	5949084.36
LOT 2	1748868.18	5949067.11
LOT 3	1748858.40	5949051.73
LOT 4	1748850.17	5949035.00
LOT 5	1748843.08	5949019.34
LOT 6	1748835.95	5949003.83
LOT 7	1748828.23	5948985.45
LOT 8	1748821.80	5948968.78
LOT 46	1748928.74	5949060.74
LOT 47	1748900.45	5949043.48
LOT 48	1748893.61	5949026.67
LOT 49	1748887.25	5949012.43
LOT 50	1748880.99	5948996.00
LOT 51	1748875.86	5948980.76
LOT 52	1748867.79	5948963.42
LOT 76	1748955.45	5949063.69
LOT 1000	1749049.96	5949046.51
LOT 1001	1749129.32	5949023.80

LEGEND

- STORMWATER MANHOLE
- STORMWATER CESSPIT
- NEW STORMWATER
- PRIVATE STORMWATER
- EXISTING STORMWATER
- STAGE BOUNDARY
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- LID TO BE SET WITH FUTURE STAGE — LNS
- UPDATED EXISTING LID LEVEL — UDLL

NOTES

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   ~ 5948950.35mN 1749158.12mE
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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

STORMWATER ASBUILT PLAN
SHEET 1 OF 5
LAYOUT SHEET

STATUS	AS-BUILT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-3000-AB	

Plot Date: 1:43:32 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-3000-AB STORMWATER.DWG

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  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

DISCLAIMER:
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LEGEND

- STORMWATER MANHOLE
- STORMWATER CESSPIT
- NEW STORMWATER
- PRIVATE STORMWATER
- EXISTING STORMWATER
- STAGE BOUNDARY
- LOT BOUNDARY
- EXISTING LOT BOUNDARY
- FUTURE LOT BOUNDARY
- LID TO BE SET WITH FUTURE STAGE — LNS
- UPDATED EXISTING LID LEVEL — UDLL

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

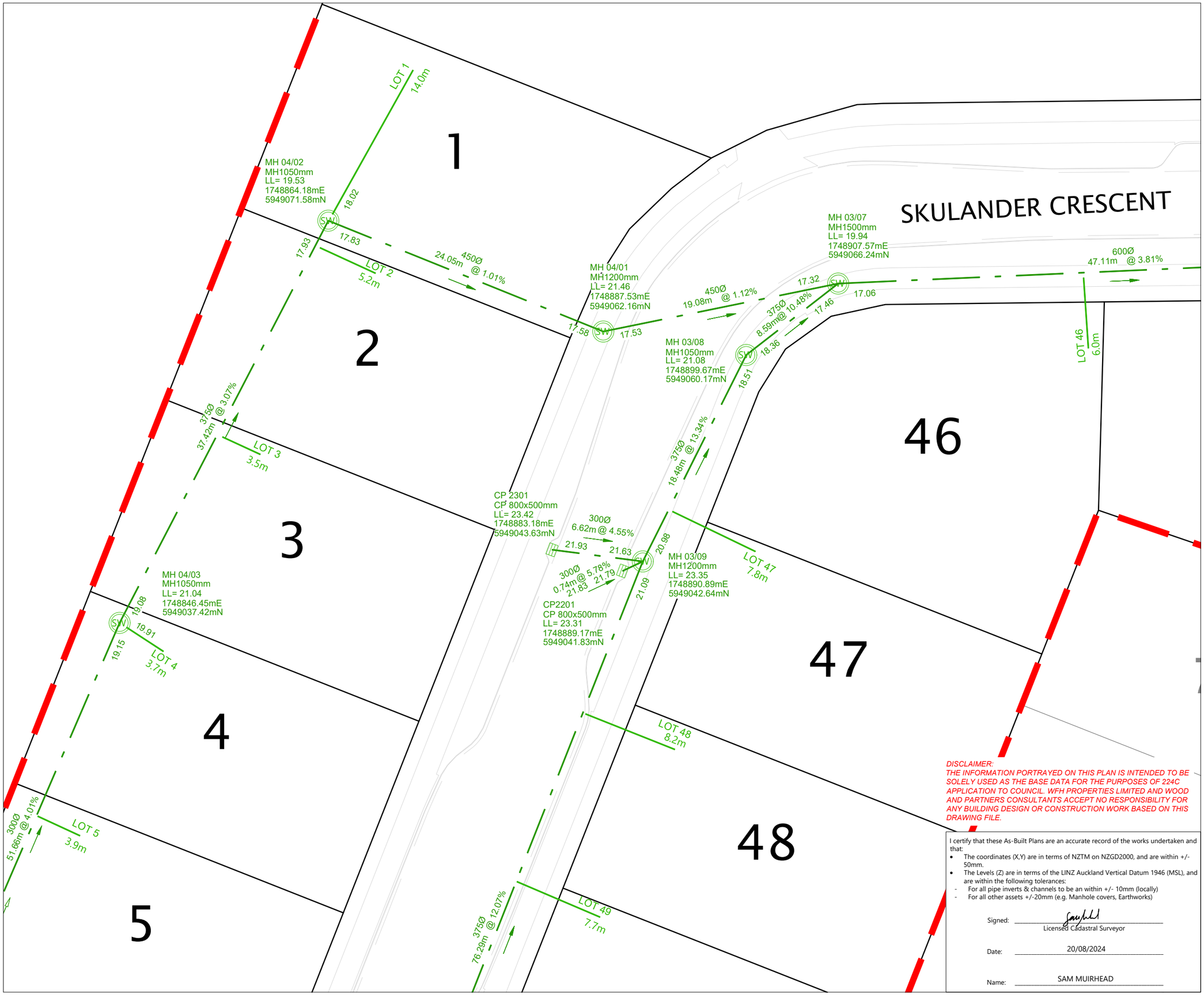
MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

STORMWATER ASBUILT PLAN SHEET 2 OF 5

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-3001-AB	

Plot Date: 1:43:32 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-3000-AB STORMWATER.DWG



LEGEND

STORMWATER MANHOLE	SW
STORMWATER CESSPIT	
NEW STORMWATER	
PRIVATE STORMWATER	
EXISTING STORMWATER	SW
STAGE BOUNDARY	
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
LID TO BE SET WITH FUTURE STAGE	LNS
UPDATED EXISTING LID LEVEL	UDLL

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

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Signed: _____ Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

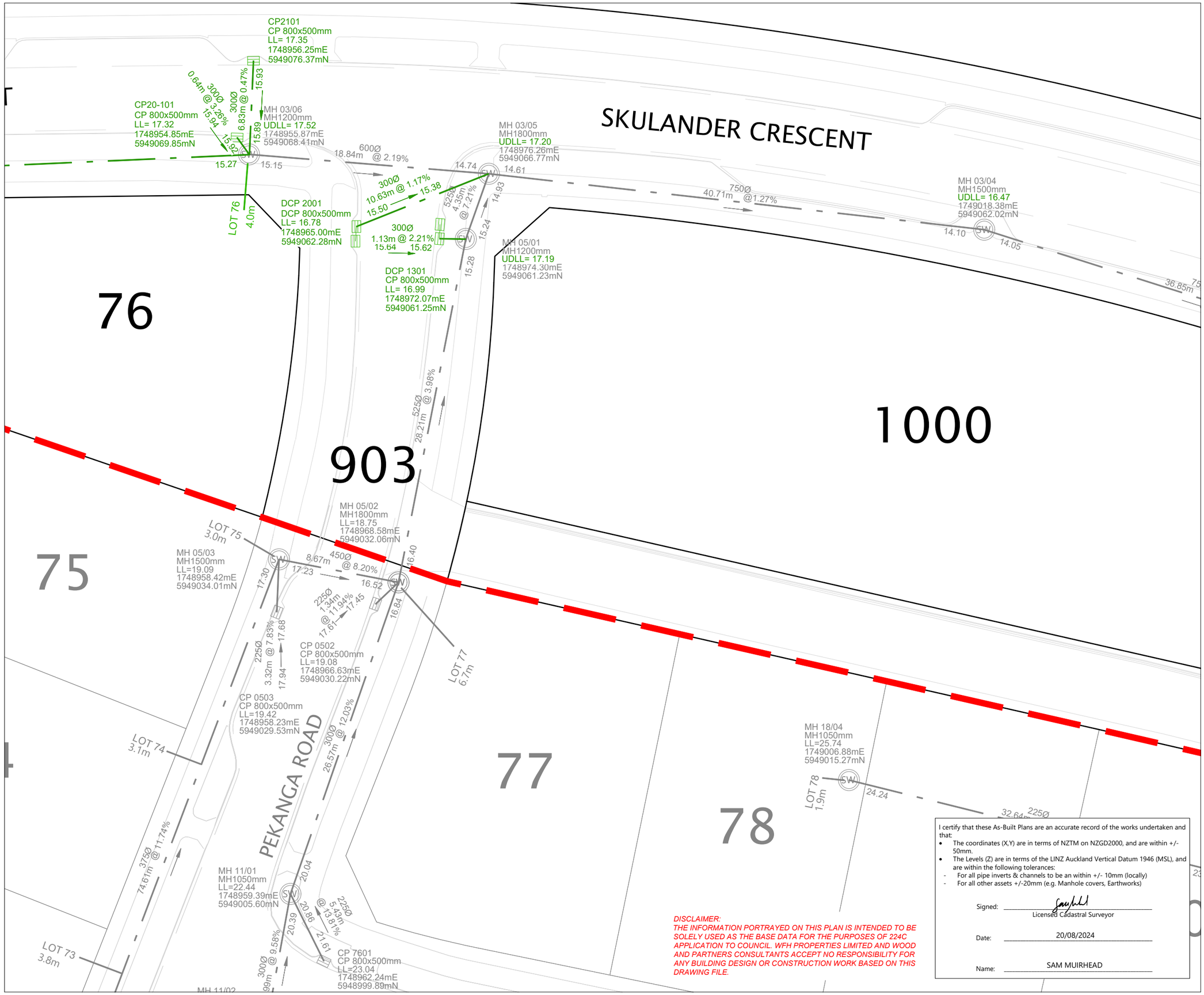
MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

STORMWATER ASBUILT PLAN SHEET 3 OF 5

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-3002-AB	

Plot Date: 1:43:32 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-3000-AB STORMWATER.DWG



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Signed: _____ Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

WOODS
Est.1970

LEGEND

STORMWATER MANHOLE	SW
STORMWATER CESSPIT	
NEW STORMWATER	
PRIVATE STORMWATER	
EXISTING STORMWATER	SW
STAGE BOUNDARY	
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
LID TO BE SET WITH FUTURE STAGE	LNS
UPDATED EXISTING LID LEVEL	UDLL

NOTES

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

STORMWATER ASBUILT PLAN SHEET 4 OF 5

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-3003-AB	

Plot Date: 1:43:33 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB S2B\P22-436-00-3000-AB STORMWATER.DWG

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Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

WOODS
Est.1970

SKULANDER CRESCENT

1001

500

80

CP 1201
CP 800x500mm
LL=15.68
1749050.17mE
5949061.64mN

CP 1101
CP 800x500mm
LL=15.69
1749048.24mE
5949055.71mN

MH 03/03
MH1500mm
UDLL= 15.85
1749054.95mE
5949050.39mN

MH 31/01
MH1050mm
LL= 16.61
1749052.68mE
5949045.36mN

CP 8101
CP 800x500mm
LL= 16.00
1749060.17mE
5949043.76mN

MH 03/02
MH1200mm
UDLL= 14.93
1749104.27mE
5949033.84mN

CP0701
CP800x500mm
LL=14.18
1749129.49mE
5949038.98mN

CP0801
CP800x500mm
LL=14.17
1749129.24mE
5949032.47mN

MH. 30/01
MH1050mm
UDLL= 14.54
1749130.45mE
5949025.85mN

MH 18/03
MH1050mm
LL=25.41
1749039.59mE
5949007.15mN

LOT 1000
LOT 1001
LOT 80

LEGEND

STORMWATER MANHOLE	SW
STORMWATER CESSPIT	
NEW STORMWATER	
PRIVATE STORMWATER	
EXISTING STORMWATER	SW
STAGE BOUNDARY	
LOT BOUNDARY	
EXISTING LOT BOUNDARY	
FUTURE LOT BOUNDARY	
LID TO BE SET WITH FUTURE STAGE	LNS
UPDATED EXISTING LID LEVEL	UDLL

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

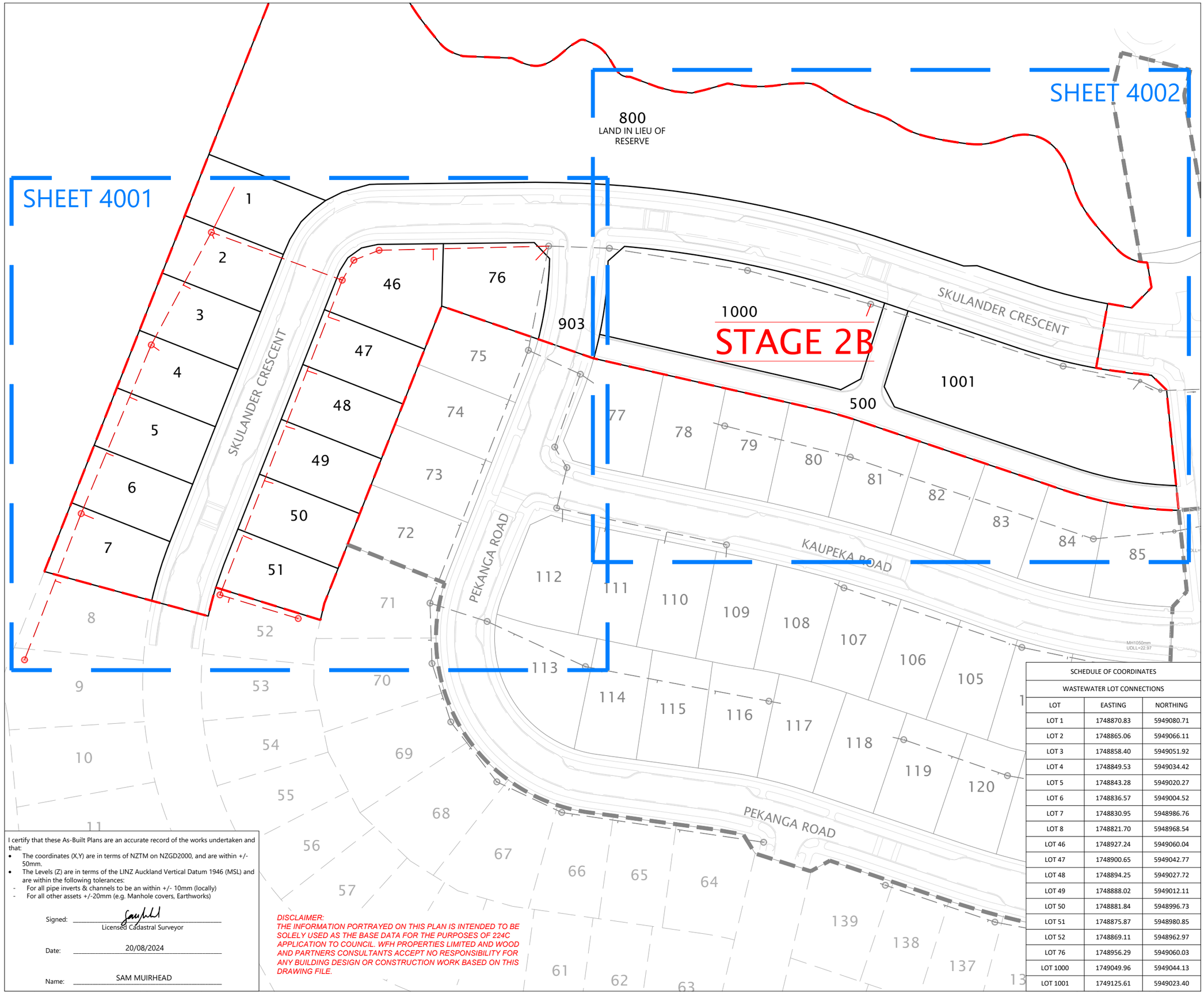
MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

STORMWATER ASBUILT PLAN SHEET 5 OF 5

STATUS	AS-BUILT	REV
SCALE	1:300 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-3004-AB	

Plot Date: 1:43:33 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_21251\CAD\SURV\AB 528\P22-436-00-3000-AB STORMWATER.DWG



LEGEND

NEW SANITARY SEWER MANHOLE	SS
NEW SANITARY SEWER	
EXISTING SANITARY SEWER MANHOLE	SS
EXISTING SANITARY SEWER	
LOT BOUNDARIES	
FUTURE LOT BOUNDARIES	
STAGE BOUNDARY	
DROP-PROTECTION STRUCTURE	(DPS)
LID TO BE SET WITH FUTURE STAGE	LL=
UPDATED EXISTING LID LEVEL	UDLL

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	RT	08/08/24
2	LOT 903 ID AMENDED	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

WASTEWATER ASBUILT PLAN SHEET 1 OF 3

STATUS	AS-BUILT	REV
SCALE	1:1000 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-4000-AB	

SCHEDULE OF COORDINATES

WASTEWATER LOT CONNECTIONS

LOT	EASTING	NORTHING
LOT 1	1748870.83	5949080.71
LOT 2	1748865.06	5949066.11
LOT 3	1748858.40	5949051.92
LOT 4	1748849.53	5949034.42
LOT 5	1748843.28	5949020.27
LOT 6	1748836.57	5949004.52
LOT 7	1748830.95	5948986.76
LOT 8	1748821.70	5948968.54
LOT 46	1748927.24	5949060.04
LOT 47	1748900.65	5949042.77
LOT 48	1748894.25	5949027.72
LOT 49	1748888.02	5949012.11
LOT 50	1748881.84	5948996.73
LOT 51	1748875.87	5948980.85
LOT 52	1748869.11	5948962.97
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LOT 1000	1749049.96	5949044.13
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Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

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Plot Date: 1:20:01 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_2125\CAD\SURV\AB S2B\P22-436-00-4000-AB WASTEWATER.DWG

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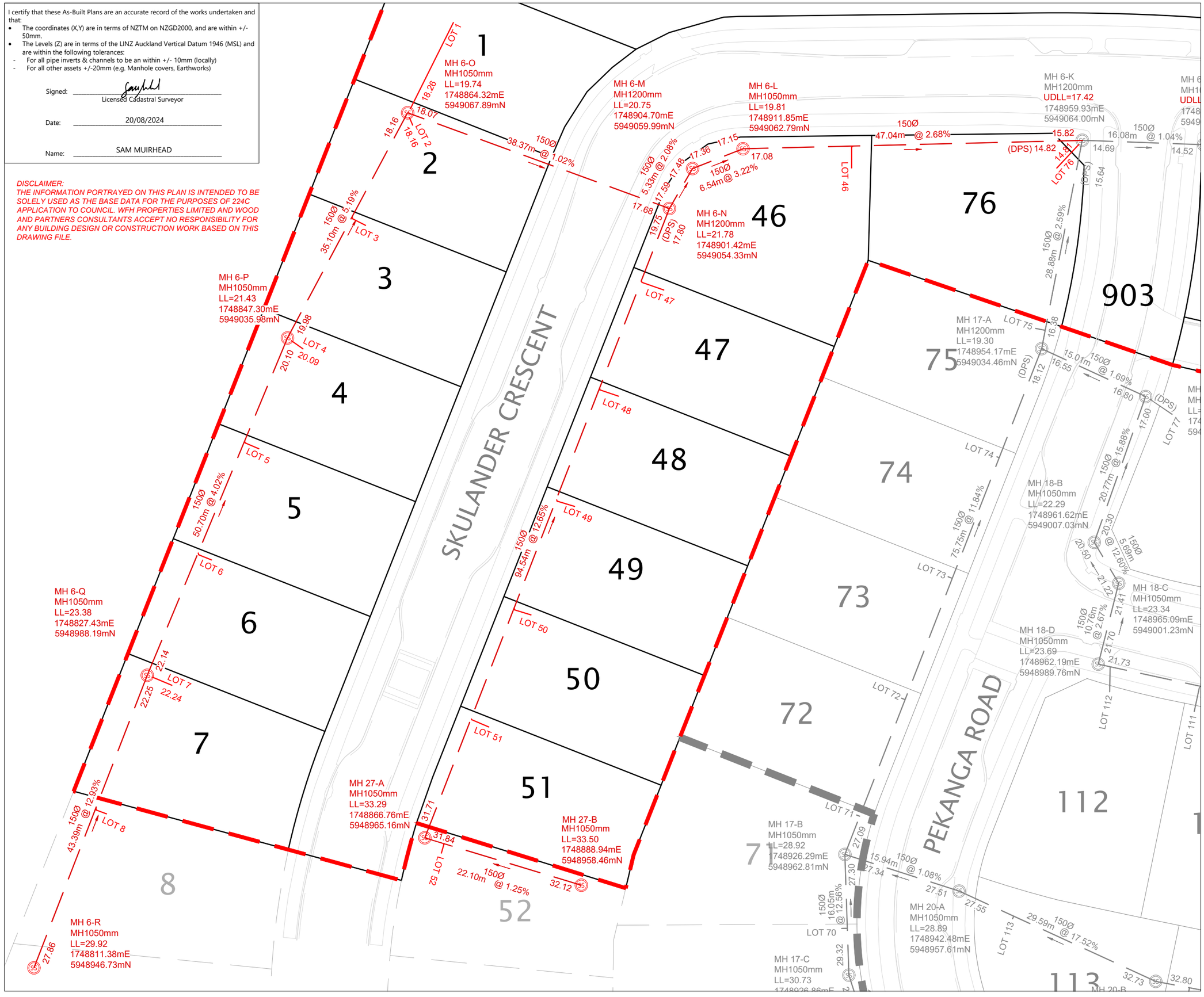

LEGEND

NEW SANITARY SEWER MANHOLE	SS
NEW SANITARY SEWER	
EXISTING SANITARY SEWER MANHOLE	SS
EXISTING SANITARY SEWER	
LOT BOUNDARIES	
FUTURE LOT BOUNDARIES	
STAGE BOUNDARY	
DROP-PROTECTION STRUCTURE	(DPS)
LID TO BE SET WITH FUTURE STAGE	LL=
UPDATED EXISTING LID LEVEL	UDLL

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REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	RT	08/08/24
2	LOT 903 ID AMENDED	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

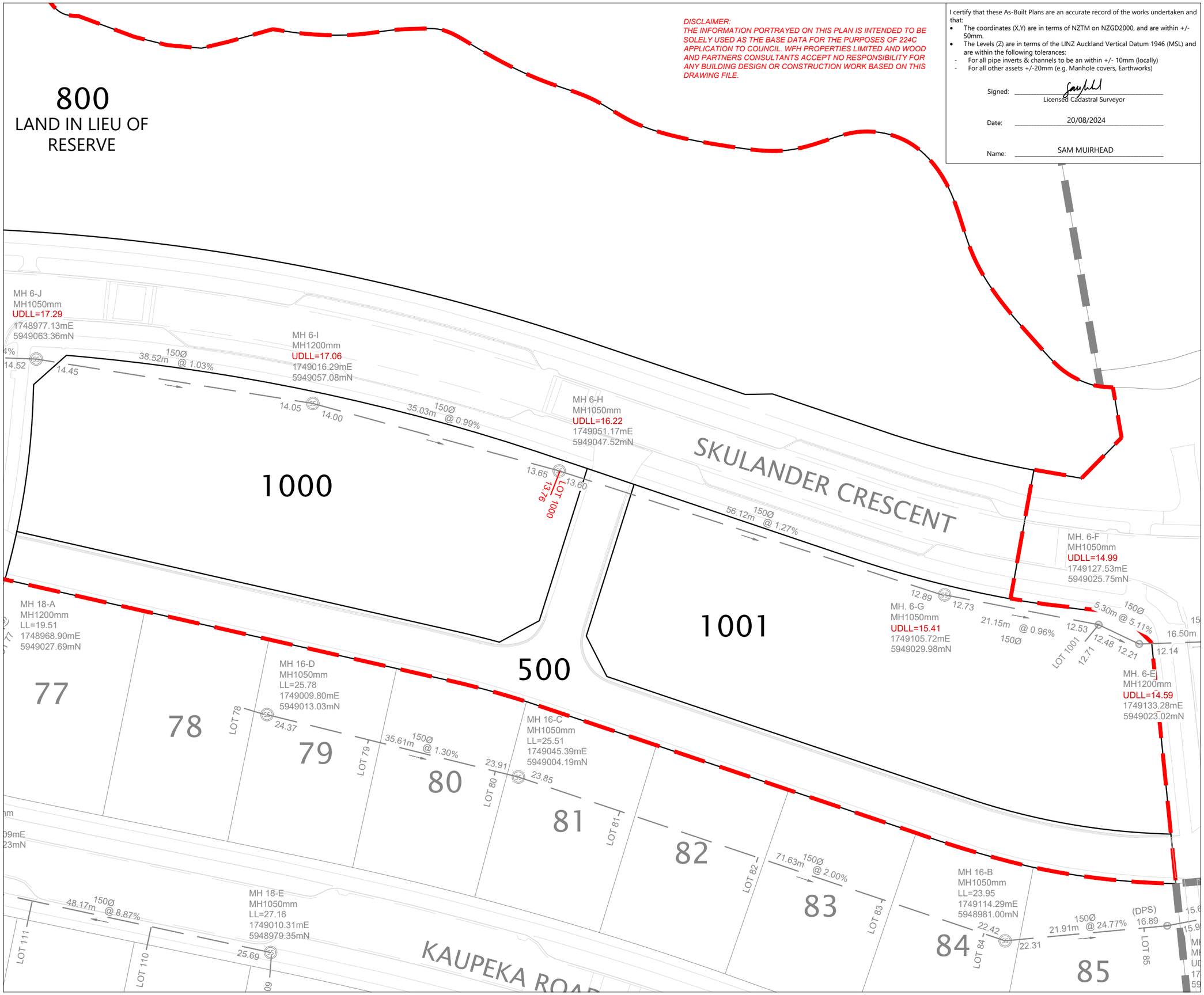
MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

WASTEWATER ASBUILT PLAN SHEET 2 OF 3

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-4001-AB	

Plot Date: 1:20:02 pm,21 August 2024, SAMANTHAM

File: C:\12DSYNERGY\DATA\WP-PEN-APP-01\P22-436 - P6 STAGE 2B_2125\CAD\SURV\AB S2B\P22-436-00-4000-AB WASTEWATER.DWG



DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

I certify that these As-Built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the LINZ Auckland Vertical Datum 1946 (MSL) and are within the following tolerances:
  - For all pipe inverts & channels to be an within +/- 10mm (locally)
  - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: _____
Licensed Cadastral Surveyor

Date: 20/08/2024

Name: SAM MUIRHEAD

WOODS
Est.1970

LEGEND

NEW SANITARY SEWER MANHOLE	SS
NEW SANITARY SEWER	
EXISTING SANITARY SEWER MANHOLE	SS
EXISTING SANITARY SEWER	
LOT BOUNDARIES	
FUTURE LOT BOUNDARIES	
STAGE BOUNDARY	
DROP-PROTECTION STRUCTURE	(DPS)
LID TO BE SET WITH FUTURE STAGE	LL=
UPDATED EXISTING LID LEVEL	UDLL

NOTES

1. APPROVED EPA NUMBER: ENG60362263
2. ORIGIN OF COORDINATES ALP 7 DP 537959 SOURCED FROM LINZ DATABASE.
   ~ 5948950.35mN 1749158.12mE
3. ORIGIN OF LEVELS IS CA15 (GD CODE B3BQ), RL = 24.83m, SOURCED FROM LINZ DATABASE.
4. LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
5. ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY DATA AND CONTRACTOR RECEIVED DATA.
6. ALL PIPES ARE uPVC SN16.
7. ALL PRIVATE LOT CONNECTIONS ARE 100mmØ uPVC SN16.
8. ALL PIPE AND MH DIAMETERS ARE INTERNAL AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
9. ALL MANHOLES ARE REINFORCED CONCRETE UNLESS OTHERWISE SPECIFIED.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	RT	08/08/24
2	LOT 903 ID AMENDED	SM	20/08/24

SURVEYED	WOODS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	WOODS	
DRAWN	RT	
CHECKED	FS	
APPROVED	SM	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER OREWA WEST PRECINCT 6 - STAGE 2B

WASTEWATER ASBUILT PLAN SHEET 3 OF 3

STATUS	AS-BUILT	REV
SCALE	1:500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P22-436-00-4002-AB	

Plot Date: 1:20:02 pm,21 August 2024, SAMANTHAM

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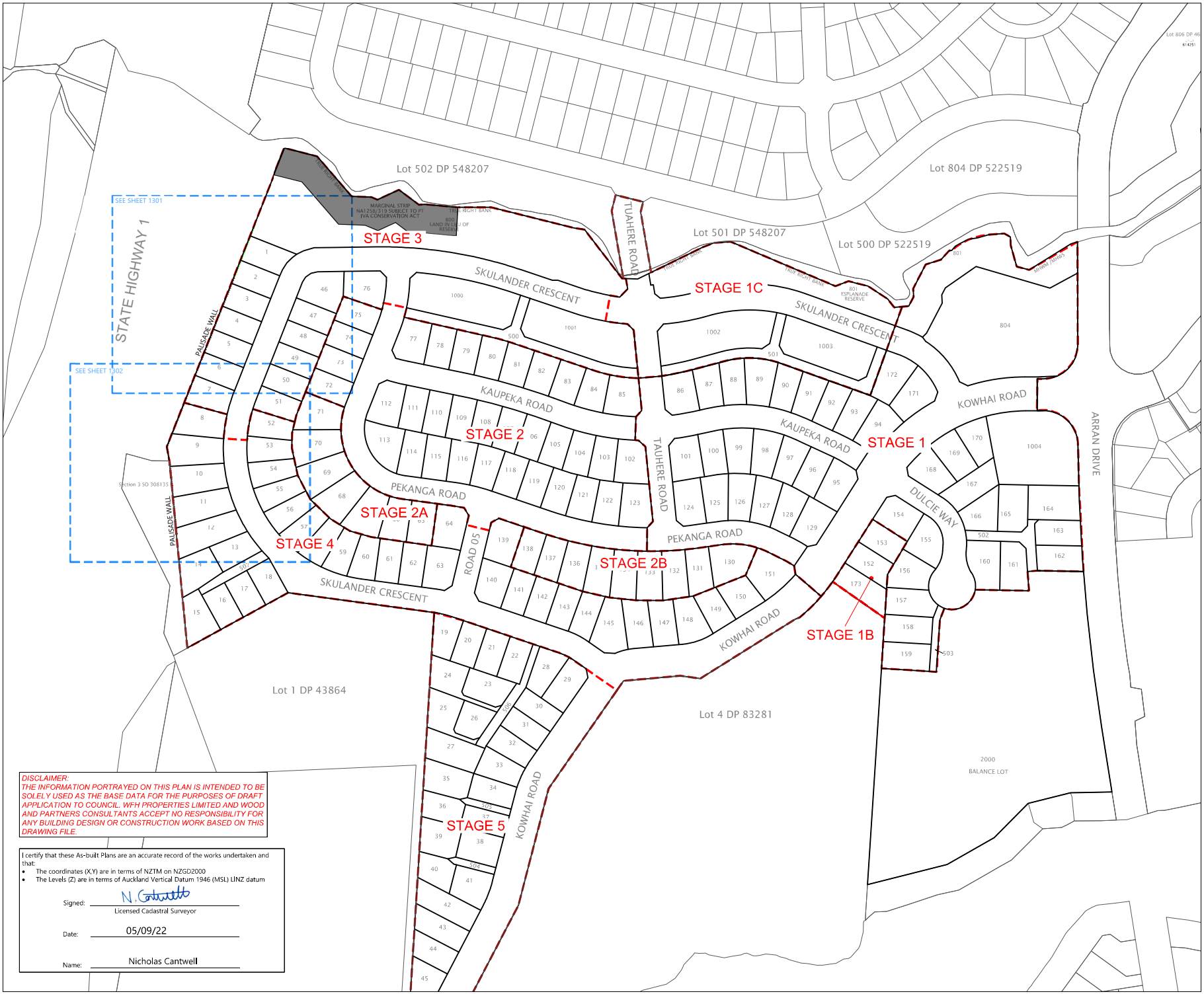

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I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
Licensed Cadastral Surveyor

Date: 05/09/22

Name: Nicholas Cantwell

WOODS Est.1970

LEGEND:

- 600MM STEEL REINFORCED CONCRETE PILE
- 650MM STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY
- STAGE BOUNDARY

NOTES:

-PILES ARE 600mm & 650mm IN DIAMETER
-PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR ASBUILT	MD	05/09/22

SURVEYED	HICKS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	TETRA TECH	
DRAWN	MD	
CHECKED	NC	
APPROVED	NC	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER - PRECINCT 6 OREWA WEST

PALISADE WALL ASBUILT LAYOUT PLAN SHEET 1 OF 3

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-00-1300-AB	

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DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF DRAFT APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

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- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
Licensed Cadastral Surveyor

Date: 05/09/22

Name: Nicholas Cantwell

WOODS Est.1970

LEGEND:

- 600MM STEEL REINFORCED CONCRETE PILE
- 650MM STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY
- STAGE BOUNDARY

NOTES:

-PILES ARE 600mm & 650mm IN DIAMETER
-PILES DATA SUPPLIED BY CONTRACTOR

REVISION	DETAILS	BY	DATE
1	ISSUED FOR ASBUILT	MD	05/09/22

SURVEYED	HICKS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	TETRA TECH	
DRAWN	MD	
CHECKED	NC	
APPROVED	NC	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER - PRECINCT 6
OREWA WEST

PALISADE WALL ASBUILT
SHEET 2 OF 3

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-00-1301-AB	

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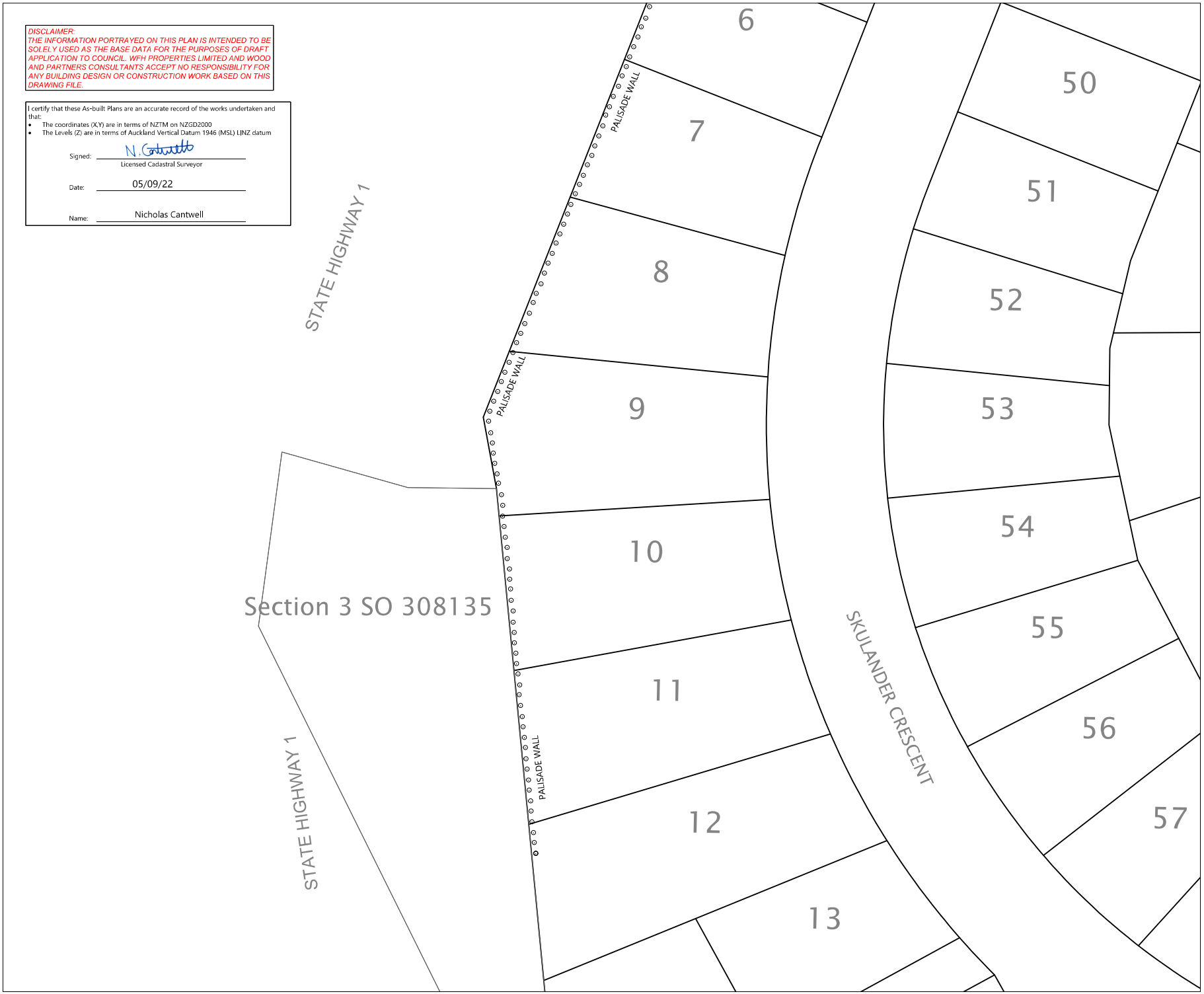

DISCLAIMER:
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- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
Licensed Cadastral Surveyor

Date: 05/09/22

Name: Nicholas Cantwell

WOODS Est.1970

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- 600MM STEEL REINFORCED CONCRETE PILE
- 650MM STEEL REINFORCED CONCRETE PILE
- LOT BOUNDARY
- STAGE BOUNDARY

NOTES:

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-PILES DATA SUPPLIED BY CONTRACTOR

REVISION DETAILS		BY	DATE
1	ISSUED FOR ASBUILT	MD	05/09/22

SURVEYED	HICKS	BUILDING B, LEVEL 1 8 NUGENT STREET GRAFTON AUCKLAND 1023
DESIGNED	TETRA TECH	
DRAWN	MD	
CHECKED	NC	
APPROVED	NC	WOODS.CO.NZ

N

WFH PROPERTIES

MILLWATER - PRECINCT 6
OREWA WEST

PALISADE WALL ASBUILT
SHEET 3 OF 3

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-00-1302-AB	

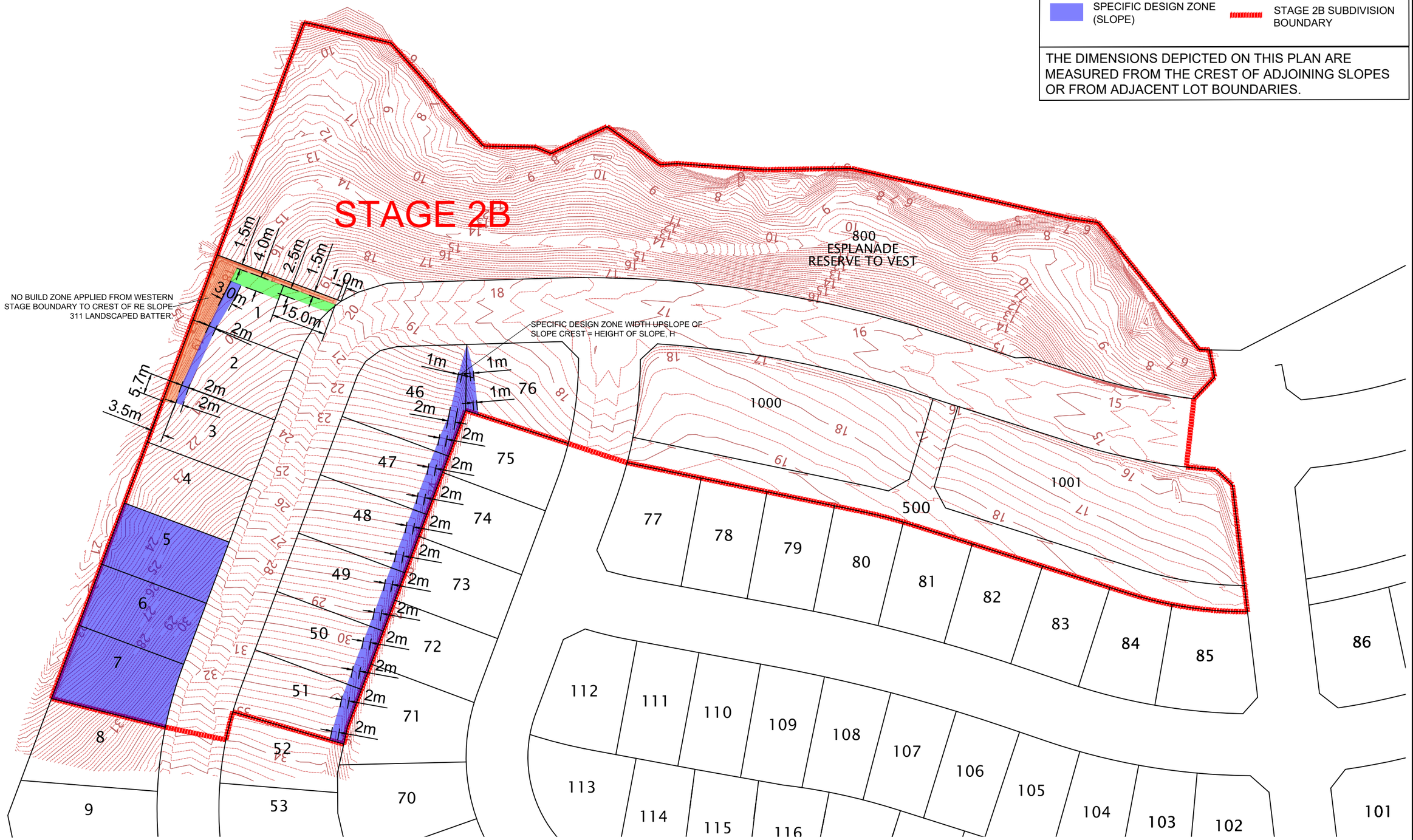
C:\12DSYNERGY\DATA\WP-PEN-APP-01\37600 - PRECINCT 6_328\CAD\SURV\AB\37600_00_1302_AB PALISADE WALLS.DWG, 2022-Sep-05 09:52, PRINT AS PDF FLAT.PC3, MattD

APPENDIX B: REFERENCE DRAWINGS

LEGEND

- NO BUILD ZONE
- SPECIFIC DESIGN ZONE (SLOPE)
- SPECIFIC DESIGN ZONE (RETAINING WALLS)
- STAGE 2B SUBDIVISION BOUNDARY

THE DIMENSIONS DEPICTED ON THIS PLAN ARE MEASURED FROM THE CREST OF ADJOINING SLOPES OR FROM ADJACENT LOT BOUNDARIES.



revision	no.	description	drawn	approved	date
	A	FOR STAGE 2B GEOTECHNCIAL COMPLETION REPORT	FS	SP	23/05/2024
	B	FOR GCR FOLLOWING RECEIPT OF AS-BUILTS	FS	SP	29/08/2024

0 10 20 30 40 50
SCALE 1:1000 (A3) METRES

drawn	FS
approved	SP
date	29/08/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2B

title: GEOTECHNICAL BUILDING LIMITATION ZONE PLAN 1/2

project no: 773-AKLGE206639 | figure no: BX/001 | rev: B

PLOT DATE: 29/08/2024 4:08:48 pm DWG FILE: F:\GENZ9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GCR PLANS\004 STAGE 2B\BX001 2B BUILDING LIMITATION ZONE PLAN.DWG

STAGE 2B

LEGEND

- NO BUILD ZONE
- SPECIFIC DESIGN ZONE (SLOPE)
- SPECIFIC DESIGN ZONE (RETAINING WALLS)
- STAGE 2B SUBDIVISION BOUNDARY

THE DIMENSIONS DEPICTED ON THIS PLAN ARE MEASURED FROM THE CREST OF ADJOINING SLOPES OR FROM ADJACENT LOT BOUNDARIES.

NO BUILD ZONE APPLIED FROM WESTERN STAGE BOUNDARY TO CREST OF RE SLOPE 311 LANDSCAPED BATTER.

SPECIFIC DESIGN ZONE WIDTH UPSLOPE OF SLOPE CREST = HEIGHT OF SLOPE, H

1.5m 4.0m 2.5m 1.5m 1.0m 3.0m 15.0m 2m 5.7m 2m 2m 3.5m 1m 1m 1m 2m 2m 2m 2m 2m 2m 2m 2m 2m 2m 2m 2m 2m 1 2 3 4 5 6 7 8 46 47 48 49 50 51 52 76 75 74 73 72 71 77 78 112 111 110

revision	no.	description	drawn	approved	date
	A	FOR STAGE 2B GEOTECHNCIAL COMPLETION REPORT	FS	SP	23/05/2024
	B	FOR GCR FOLLOWING RECEIPT OF AS-BUILTS	FS	SP	29/08/2024

SCALE 1:600 (A3) 0 6 12 18 24 30 METRES

drawn	FS
approved	SP
date	29/08/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2B

title: GEOTECHNICAL BUILDING LIMITATION ZONE PLAN 2/2

project no: 773-AKLGE206639 | figure no: BX/002 | rev: B

PLOT DATE: 29/08/2024 4:08:53 pm DWG FILE: F:\GENZ9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GCR PLANS\004 STAGE 2B\BX001 2B BUILDING LIMITATION ZONE PLAN.DWG

LEGEND

- SHRINK SWELL INDEX SOIL SAMPLE LOCATION
- HAND AUGER BOREHOLE
- AS-BUILT FINAL CONTOURS
- PT06 SHRINK SWELL INDEX SOIL SAMPLE I.D.

STAGE 2B

800 ESPLANADE RESERVE TO VEST

A

PT01 PT02 PT03 PT04 PT05 PT06 PT06B PT17 PT18

1 2 3 4 5 6 7 8 9 46 47 48 49 50 51 52 53 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 1000 1001 500 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116

revision	no.	description	drawn	approved	date
	A	FOR STAGE 2B GEOTECHNCIAL COMPLETION REPORT	EP	SP	28/02/2024
	B	FOR STAGE 2B GEOTECHNCIAL COMPLETION REPORT	FS	SP	08/04/2024

SCALE 0 10 20 30 40 50 METRES 1:1000 (A3)

drawn	EP
approved	SP
date	28/04/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

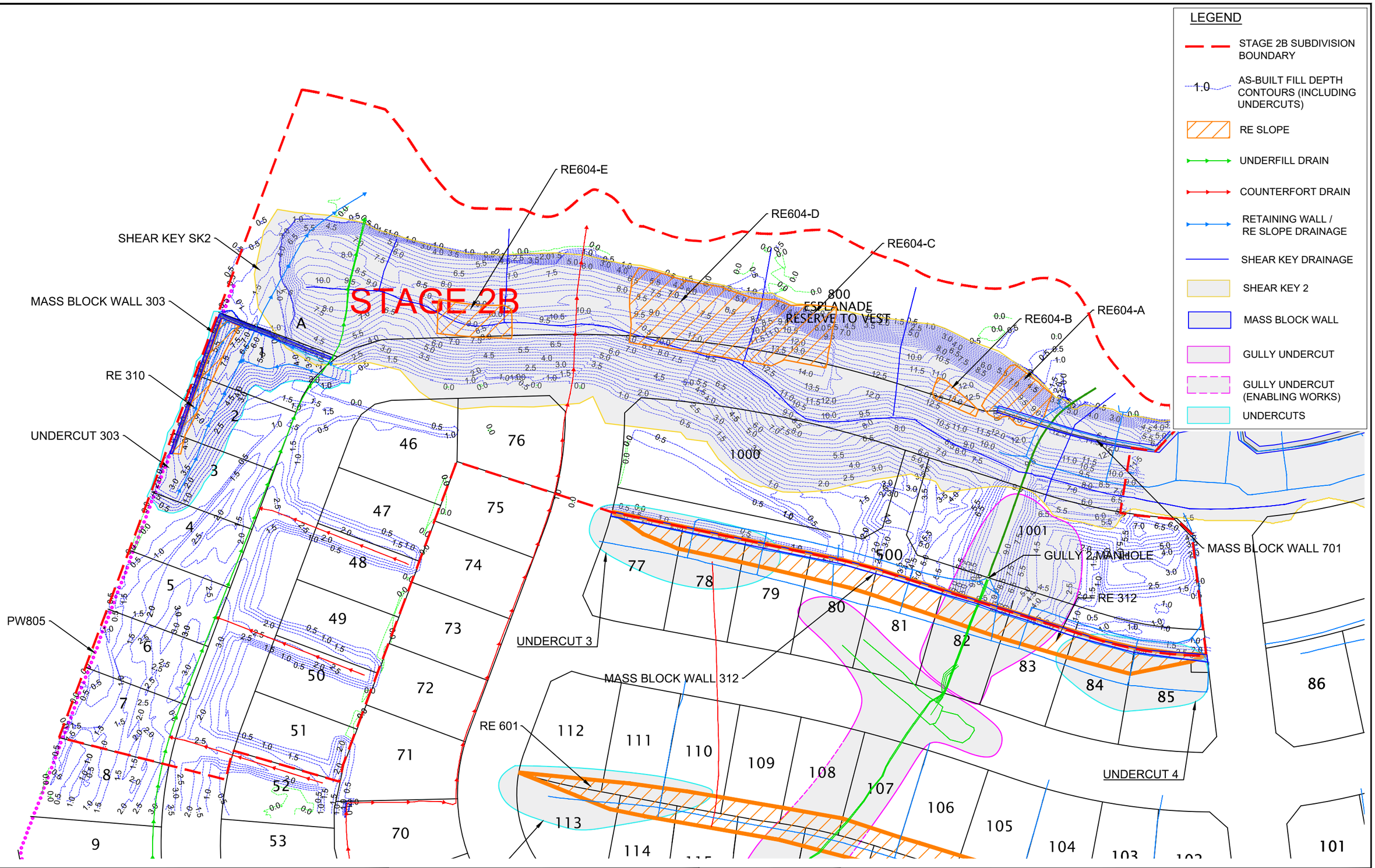
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2B

title: GEOTECHNICAL INVESTIGATION PLAN

project no: 773-AKLGE206639 | figure no: BX/003 | rev: B

PLOT DATE: 30/08/2024 4:47:47 pm DWG FILE: F:\GEN\29 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GCR PLANS\004 STAGE 2B\BX004 2B INVESTIGATION PLAN.DWG



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	A	FOR STAGE 2B GEOTECHNCIAL COMPLETION REPORT	EP	SP	03/09/2024

SCALE 1:1000 (A3) METRES (0 10 20 30 40 50)

drawn	EP
approved	SP
date	03/09/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

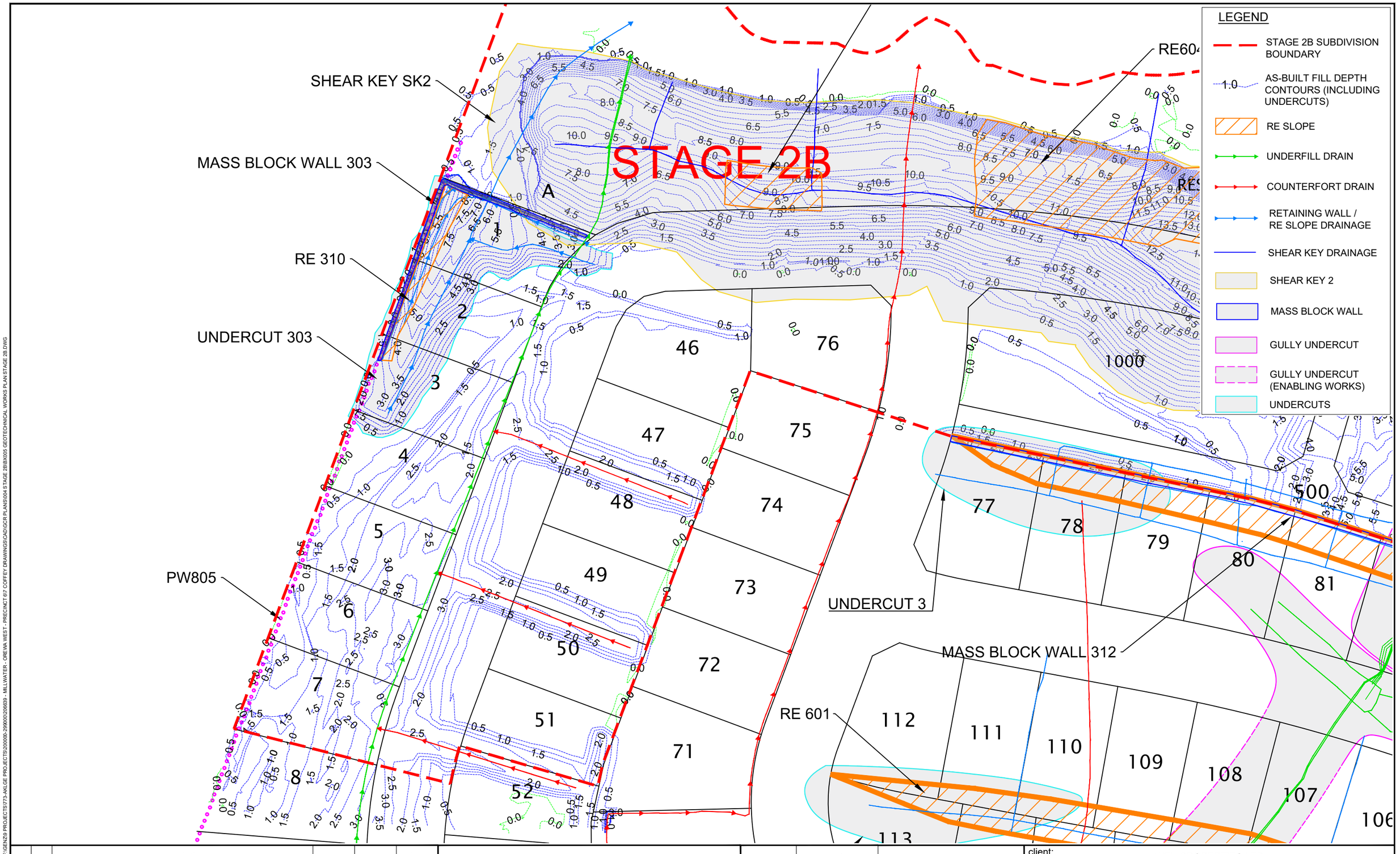
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2B

title: GEOTECHNICAL WORKS PLAN 1/3

project no: 773-AKLGE206639 | figure no: BX/004 | rev: A

PLOT DATE: 4/09/2024 12:15:10 pm DWG FILE: F:\GEN\259 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GCR PLANS\004 STAGE 2B\BX005 GEOTECHNICAL WORKS PLAN STAGE 2B.DWG



revision	no.	description	drawn	approved	date
	A	FOR STAGE 2B GEOTECHNCIAL COMPLETION REPORT	EP	SP	03/09/2024

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SCALE 1:750 (A3) METRES

drawn	EP
approved	SP
date	03/09/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

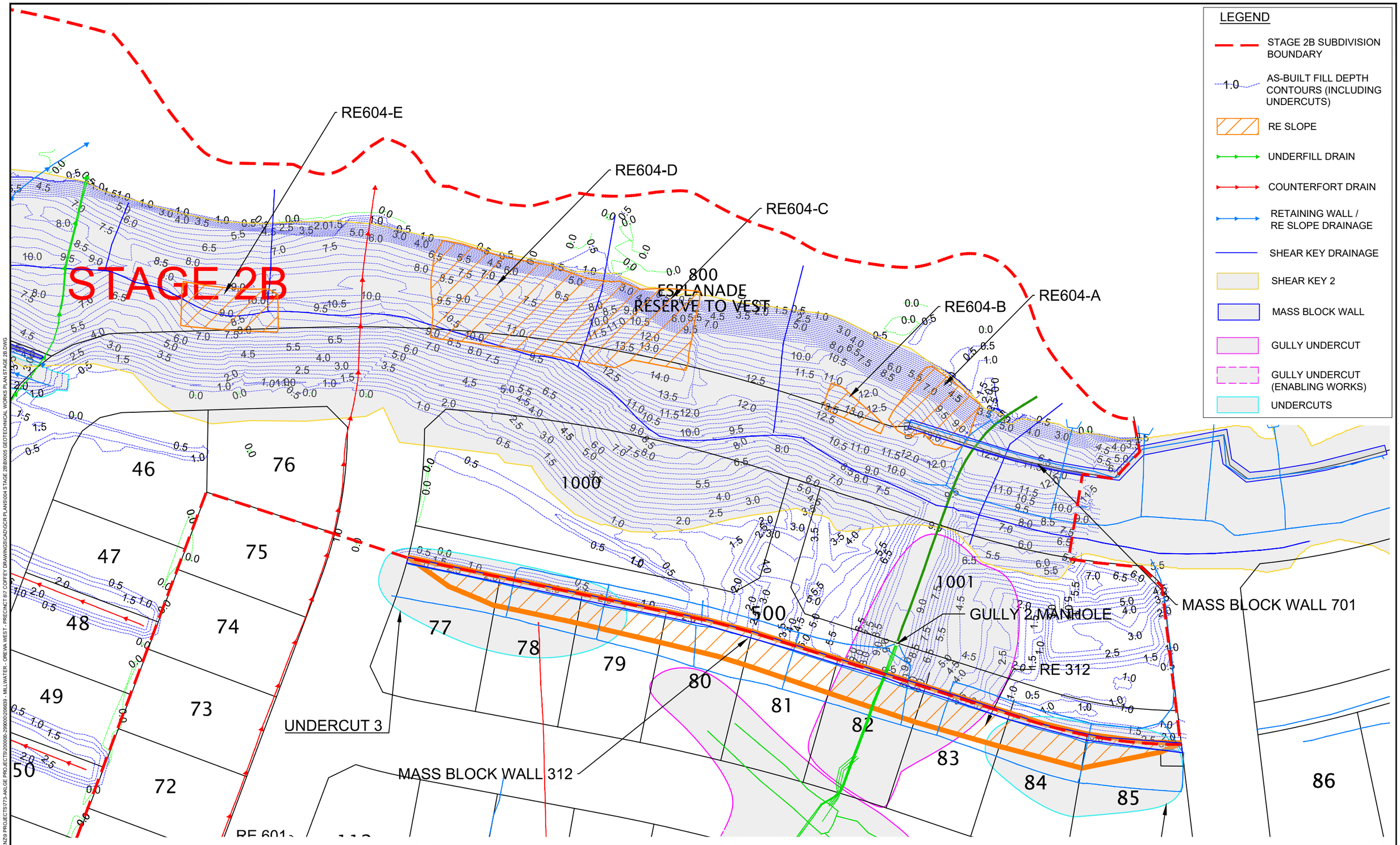
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2B

title: GEOTECHNICAL WORKS PLAN 2/3

project no: 773-AKLGE206639 | figure no: BX/005 | rev: A

PLOT DATE: 4/09/2024 12:15:23 pm DWG FILE: F:\GEN\Z9 PROJECTS\773-AKLGE PROJECTS\200000-299000\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GCR PLANS\004 STAGE 2B\BX005 GEOTECHNICAL WORKS PLAN STAGE 2B.DWG



revision	no.	description	drawn	approved	date
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SCALE 1:750 (A3) METRES

drawn	EP
approved	SP
date	03/09/2024
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

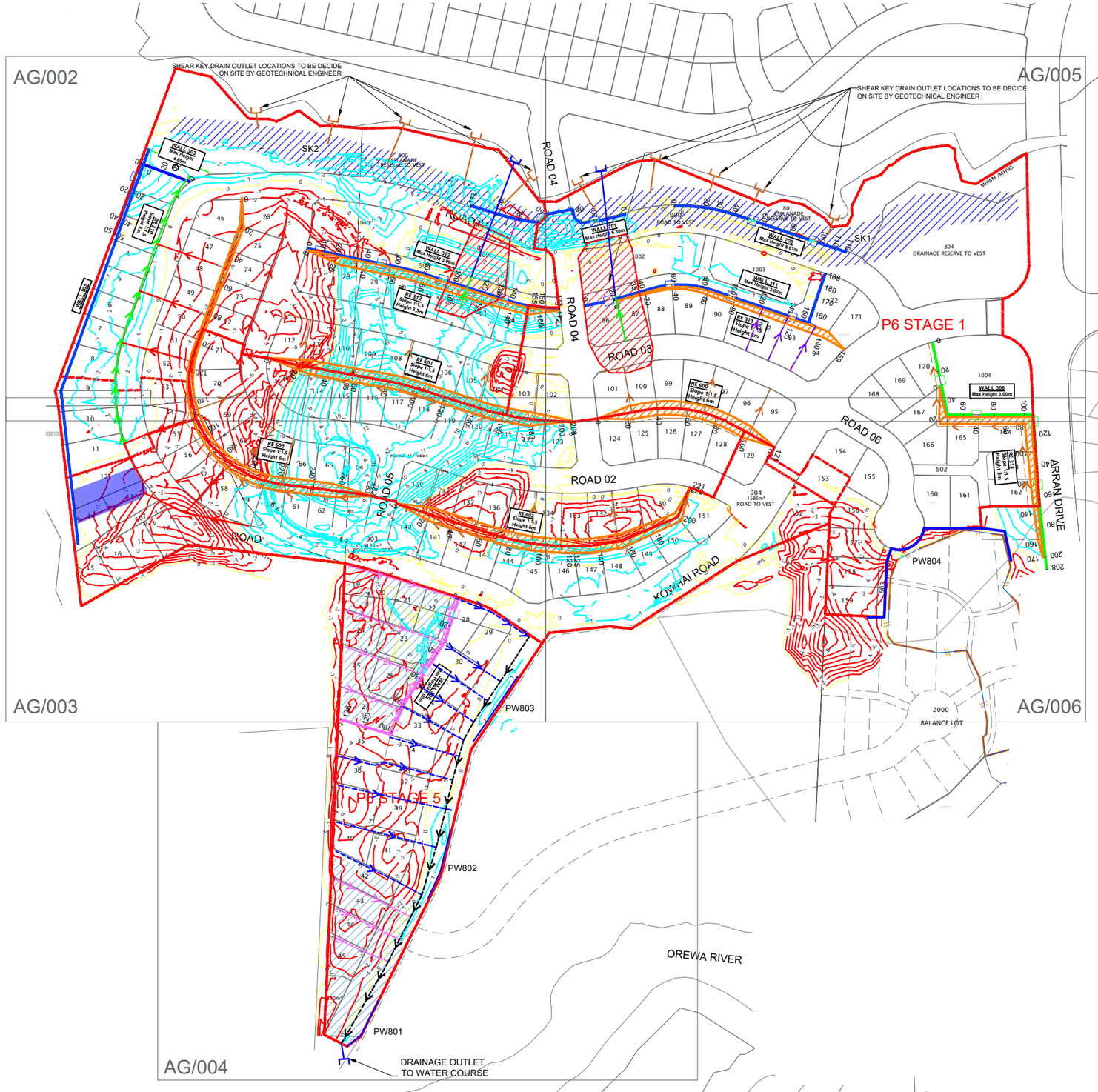
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6 SUBDIVISION STAGE 2B

title: GEOTECHNICAL WORKS PLAN 3/3

project no: 773-AKLGE206639 | figure no: BX/006 | rev: A

PLOT DATE: 4/09/2024 12:15:39 pm DWG FILE: F:\GEN\29 PROJECTS\773-AKLGE PROJECTS\200000-299000\206699 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\GCR PLANS\004 STAGE 2B\BX006 GEOTECHNICAL WORKS PLAN STAGE 2B.DWG



EARTHWORKS VOLUMES		
STAGE	CUT	FILL
STAGE 1		
STAGE 2		
STAGE 3	26,000m3	93,000m3
STAGE 4	21,000m3	60,400m3
STAGE 5	39,000m3	-

LEGEND

- PROPOSED CUT CONTOURS (1m INTERVAL)
- PROPOSED FILL CONTOURS (1m INTERVAL)
- REINFORCED EARTH WALL
- RETAINING WALL - TIMBER
- RETAINING WALL - KEYSTONE
- RETAINING WALL - MASS BLOCK
- BOUNDARY
- STAGE BOUNDARY
- WICK DRAINS
- PALISADE WALL PW806
- SHEAR KEY EXCAVATION
- 2.5M NOMINAL UNDERCUTS
- UNSUITABLE UNDERCUTS
- UNDERCUT KEY
- CF DRAINS (DETAIL 1)
- CF DRAINS (DETAIL 2)
- CF DRAINS (DETAIL 3)
- CF DRAINS (DETAIL 4)
- UNDERFILL DRAINS
- RE SLOPE DRAINS
- COLLECTOR DRAINS
- PE OUTLET LINE
- SHEAR KEY OUTLET
- PROPOSED PALISADE WALLS
- PROPOSED MANHOLE LOCATION

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	04/12/2019
	B	UPDAT TO CF DRAIN LAYOUT	RZ	SP	20/07/2020
	C	UPDATED AS OF END OF 2020/2021 EARTHWORKS SEASON	RZ	SP	18/06/2021
	D	UPDATED AS OF END OF 2021/2022 EARTHWORKS SEASON	SP	SP	14/06/2022

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SCALE 1:3000 (A3) METRES

drawn	RZ
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6

title: GEOTECHNICAL REMEDIATION PLAN

project no: 773-AKLGE206639 | figure no: AG/001 | rev: D

PLOT DATE: 14/06/2022 9:15:53 pm DWG FILE: F:\GENZ9 PROJECTS\773-AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\STEPHEN\773-AKLGE206639-AG_V4.DWG

SHEAR KEY DRAIN OUTLET LOCATIONS TO BE DECIDE
ON SITE BY GEOTECHNICAL ENGINEER

WALL 303
Max Height
4.69m

SK2

800
ESPLANADE
RESERVE TO VEST

ROAD U4

ROAD 01

RE 310
Slope 1:1.5
Height 3m

WALL 805

WALL 312
Max Height 3.00m

RE 312
Slope 1:1.5
Height 3.5m

RE 601
Slope 1:1.5
Height 6m

PROPOSED POND

LEGEND

- PROPOSED CUT CONTOURS (1m INTERVAL)
- PROPOSED FILL CONTOURS (1m INTERVAL)
- REINFORCED EARTH WALL
- RETAINING WALL - TIMBER
- RETAINING WALL - KEYSTONE
- RETAINING WALL - MASS BLOCK
- BOUNDARY
- STAGE BOUNDARY
- WICK DRAINS
- DSM COLUMNS
- SHEAR KEY EXCAVATION
- 2.5M NOMINAL UNDERCUTS
- UNSUITABLE UNDERCUTS
- CF DRAINS (DETAIL 1)
- CF DRAINS (DETAIL 2)
- CF DRAINS (DETAIL 3)
- CF DRAINS (DETAIL 4)
- UNDERFILL DRAINS
- RE SLOPE DRAINS
- COLLECTOR DRAINS
- PE OUTLET LINE
- SHEAR KEY OUTLET
- PROPOSED PALISADE WALLS
- PROPOSED MANHOLE LOCATION

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	04/12/2019
	B	UPDAT TO CF DRAIN LAYOUT	RZ	SP	20/07/2020
	C	UPDATED AS OF END OF 2020/2021 EARTHWORKS SEASON	RZ	SP	18/06/2021
	D	UPDATED AS OF END OF 2021/2022 EARTHWORKS SEASON	SP	SP	14/06/2022

0 10 20 30 40 50
SCALE 1:1000 (A3) METRES

drawn	RZ
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

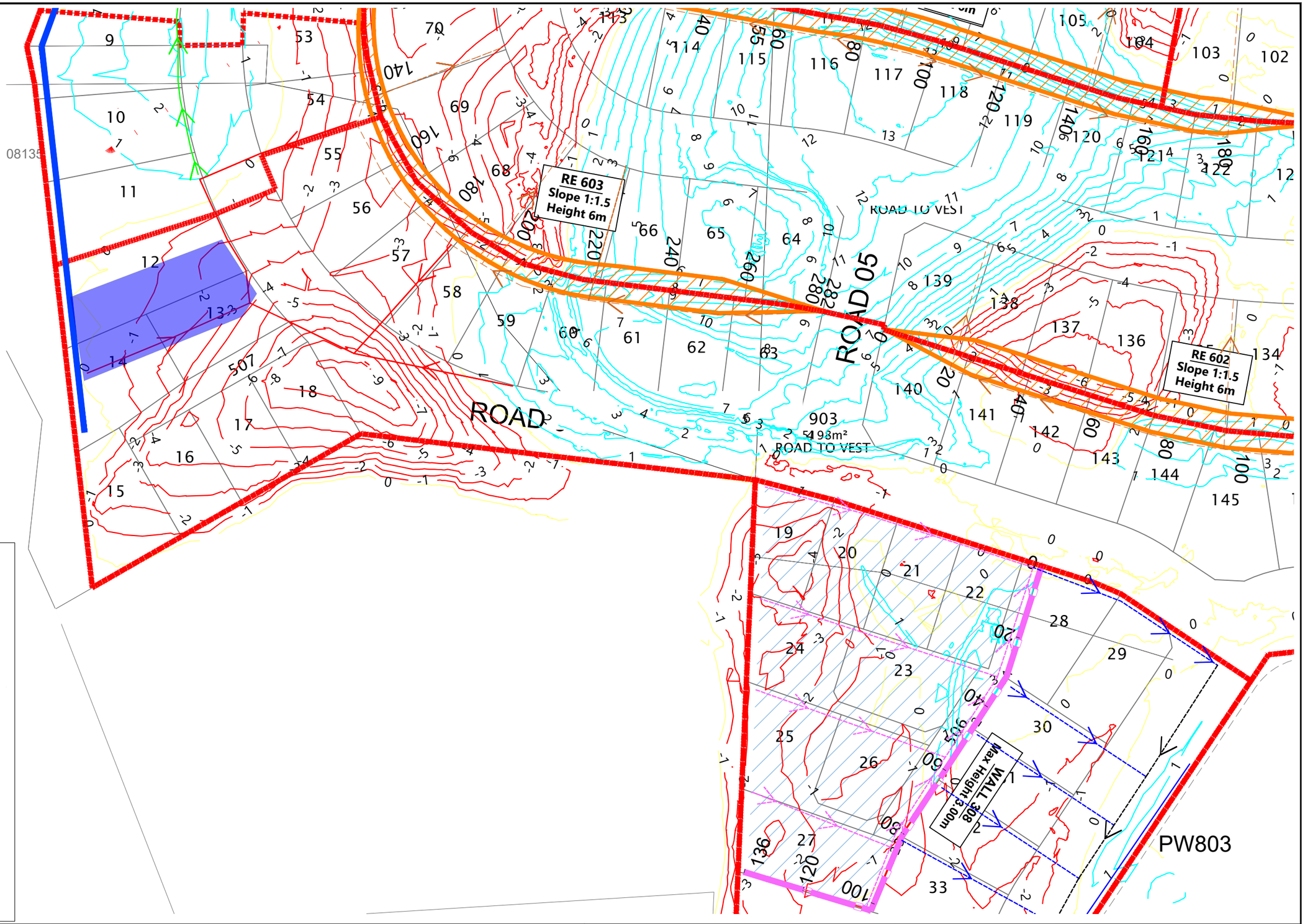
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6

title: GEOTECHNICAL REMEDIATION PLAN

project no: 773-AKLGE206639 | figure no: AG/002 | rev: C

PLOT DATE: 14/06/2022 9:16:28pm DWG FILE: F:\GEN\Z9 PROJECTS\773-AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\STEPHEN\773-AKLGE206639-AG_V4.DWG



LEGEND

- PROPOSED CUT CONTOURS (1m INTERVAL)
- PROPOSED FILL CONTOURS (1m INTERVAL)
- REINFORCED EARTH WALL
- RETAINING WALL - TIMBER
- RETAINING WALL - KEYSTONE
- RETAINING WALL - MASS BLOCK
- BOUNDARY
- STAGE BOUNDARY
- WICK DRAINS
- DSM COLUMNS
- SHEAR KEY EXCAVATION
- 2.5M NOMINAL UNDERCUTS
- UNSUITABLE UNDERCUTS
- UNDERCUT KEY
- CF DRAINS (DETAIL 1)
- CF DRAINS (DETAIL 2)
- CF DRAINS (DETAIL 3)
- CF DRAINS (DETAIL 4)
- UNDERFILL DRAINS
- RE SLOPE DRAINS
- COLLECTOR DRAINS
- PE OUTLET LINE
- SHEAR KEY OUTLET
- PROPOSED PALISADE WALLS
- PROPOSED MANHOLE LOCATION

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	04/12/2019
	B	UPDAT TO CF DRAIN LAYOUT	RZ	SP	20/07/2020
	C	UPDATED AS OF END OF 2020/2021 EARTHWORKS SEASON	RZ	SP	18/06/2021
	D	UPDATED AS OF END OF 2021/2022 EARTHWORKS SEASON	SP	SP	14/06/2022

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SCALE 1:1000 (A3) METRES

drawn	RZ
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

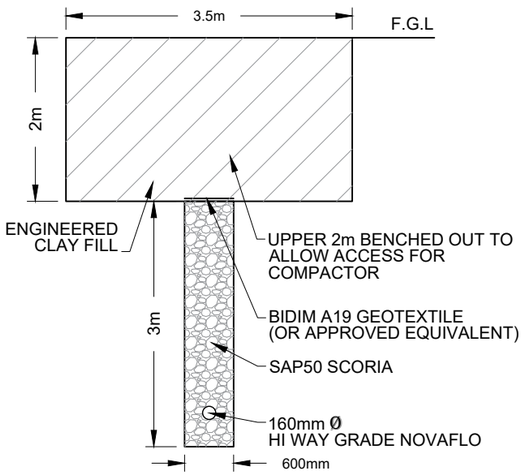
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6

title: GEOTECHNICAL REMEDIATION PLAN

project no: 773-AKLGE206639 | figure no: AG/003 | rev: D

PLOT DATE: 14/06/2022 9:17:04 pm DWG FILE: F:\GEN\29 PROJECTS\773-AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\STEPHEN\773-AKLGE206639-AG_V4773-AKLGE206639-AG.DWG



CF DRAIN DETAIL 1
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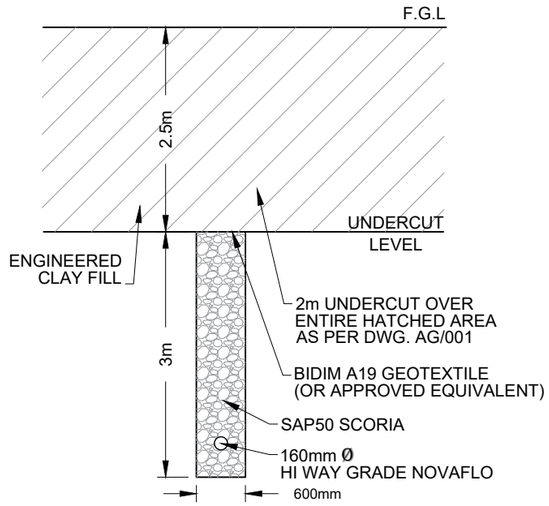

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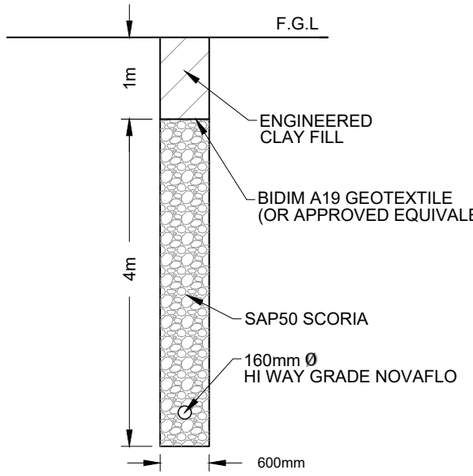

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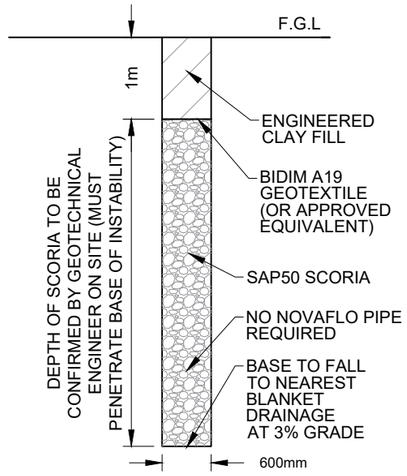

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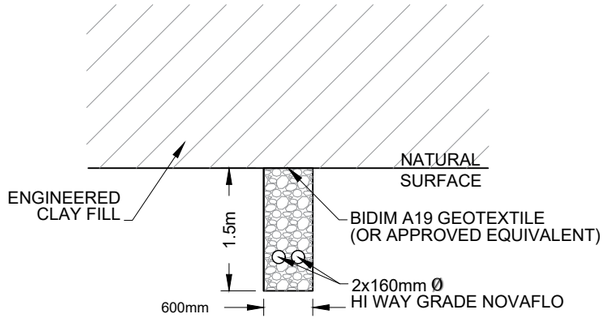
SCALE:1:75



UNDERFILL DRAIN STANDARD DETAIL
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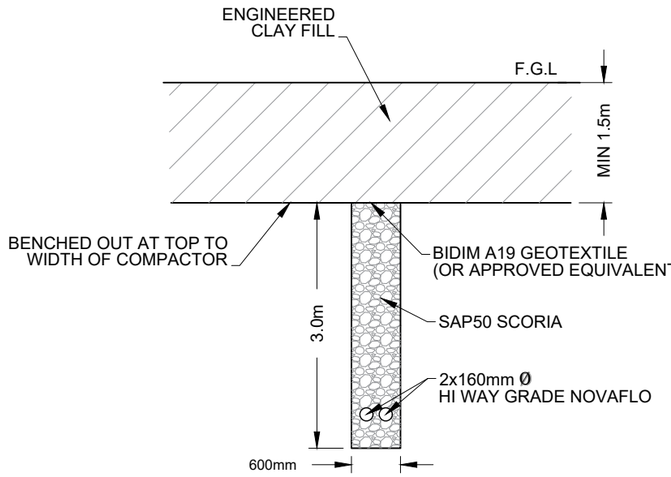

COLLECTOR DRAIN DETAIL
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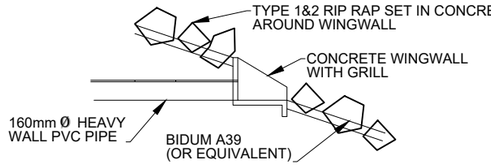
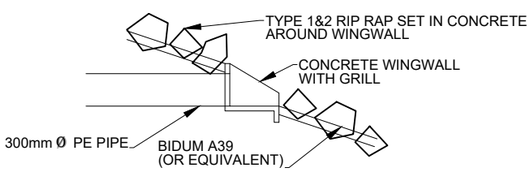


SHEARKEY OUTLET DETAIL
SCALE:1:150



UNDERFILL OUTLET DETAIL
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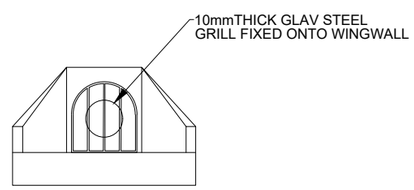


WINGWALL GRILL DETAIL
SCALE:1:150

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE (FOR EW GDR)	RZ	SP	04/12/2019
	B	UPDAT TO CF DRAIN LAYOUT	RZ	SP	20/07/2020
	C	UPDATED AS OF END OF 2020/2021 EARTHWORKS SEASON	RZ	SP	18/06/2021

drawn	RZ
approved	SP
date	18/06/2021
scale	AS SHOWN
original size	A3

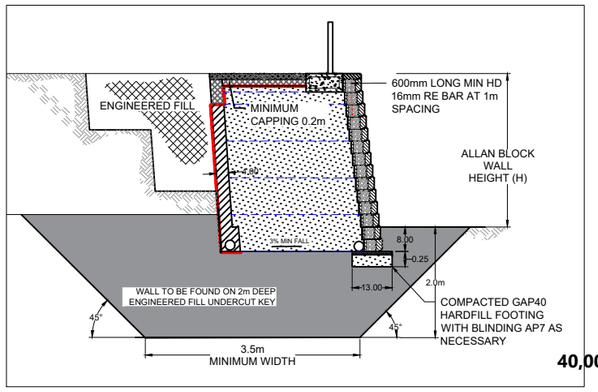
TETRA TECH COFFEY

client: WFH PROPERTIES LTD

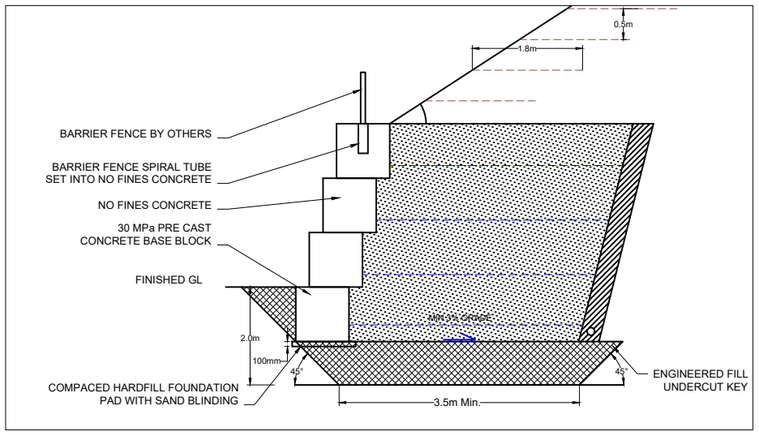
project: MILLWATER - OREWA WEST - PRECINCT 6

title: SUBSOIL DRAINAGE STANDARD DETAILS

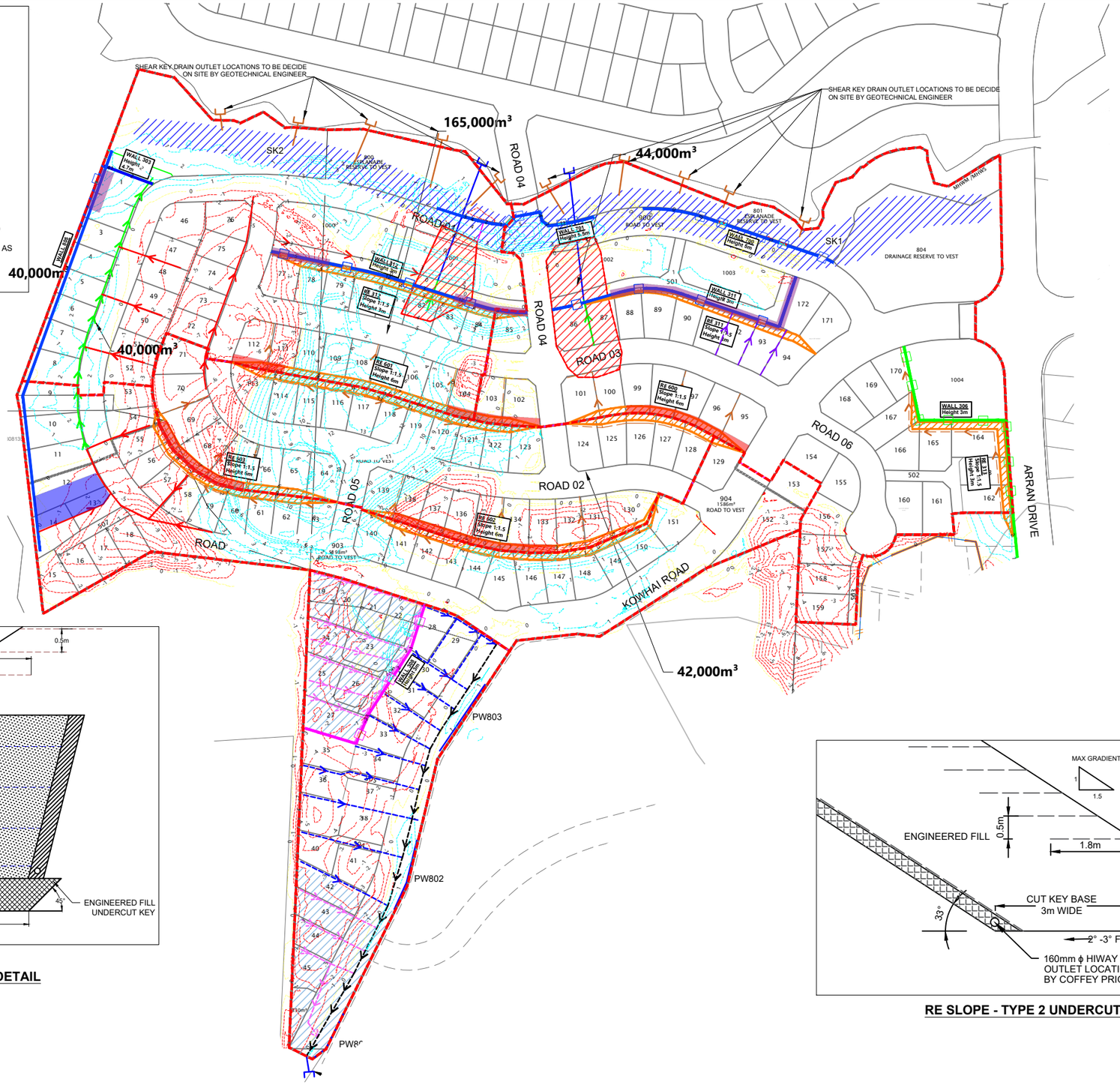
project no: 773-AKLGE206639 | figure no: AG/007 | rev: C

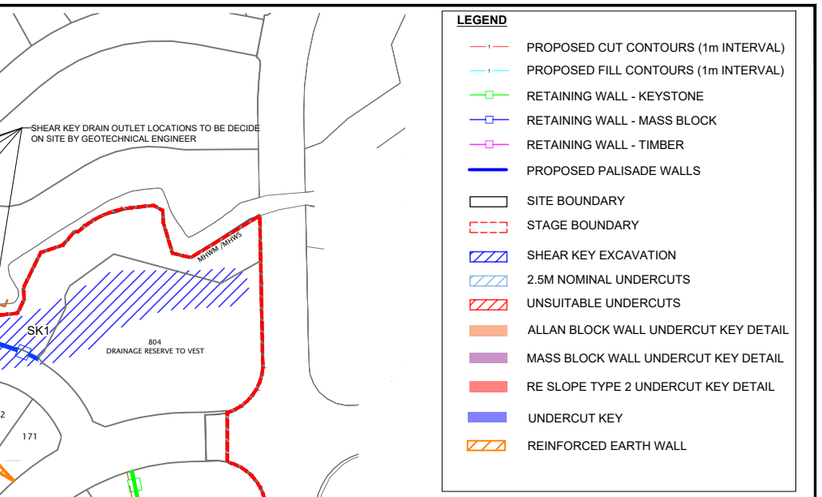


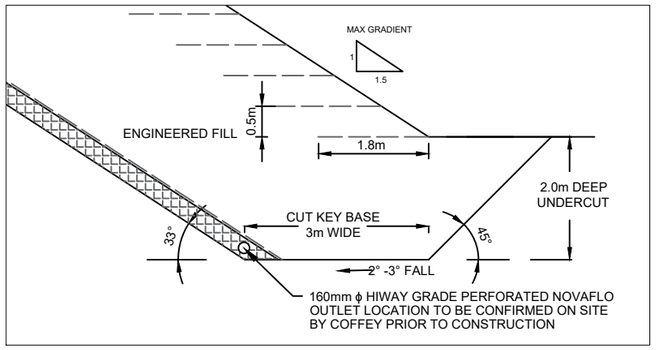
ALLAN BLOCK WALL UNDERCUT KEY DETAIL



MASS BLOCK WALL UNDERCUT KEY DETAIL







RE SLOPE - TYPE 2 UNDERCUT KEY DETAIL

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	SP	20/11/2019
	B	AMENDED FOR 2021/2022 EARTHWORKS SEASON	RZ	SP	19/11/2021
	C	AMENDED FOR 2022/20223 EARTHWORKS SEASON	SP	SP	14/06/2022

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SCALE 1:3000 (A3) METRES

drawn	SP
approved	SP
date	14/06/2022
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

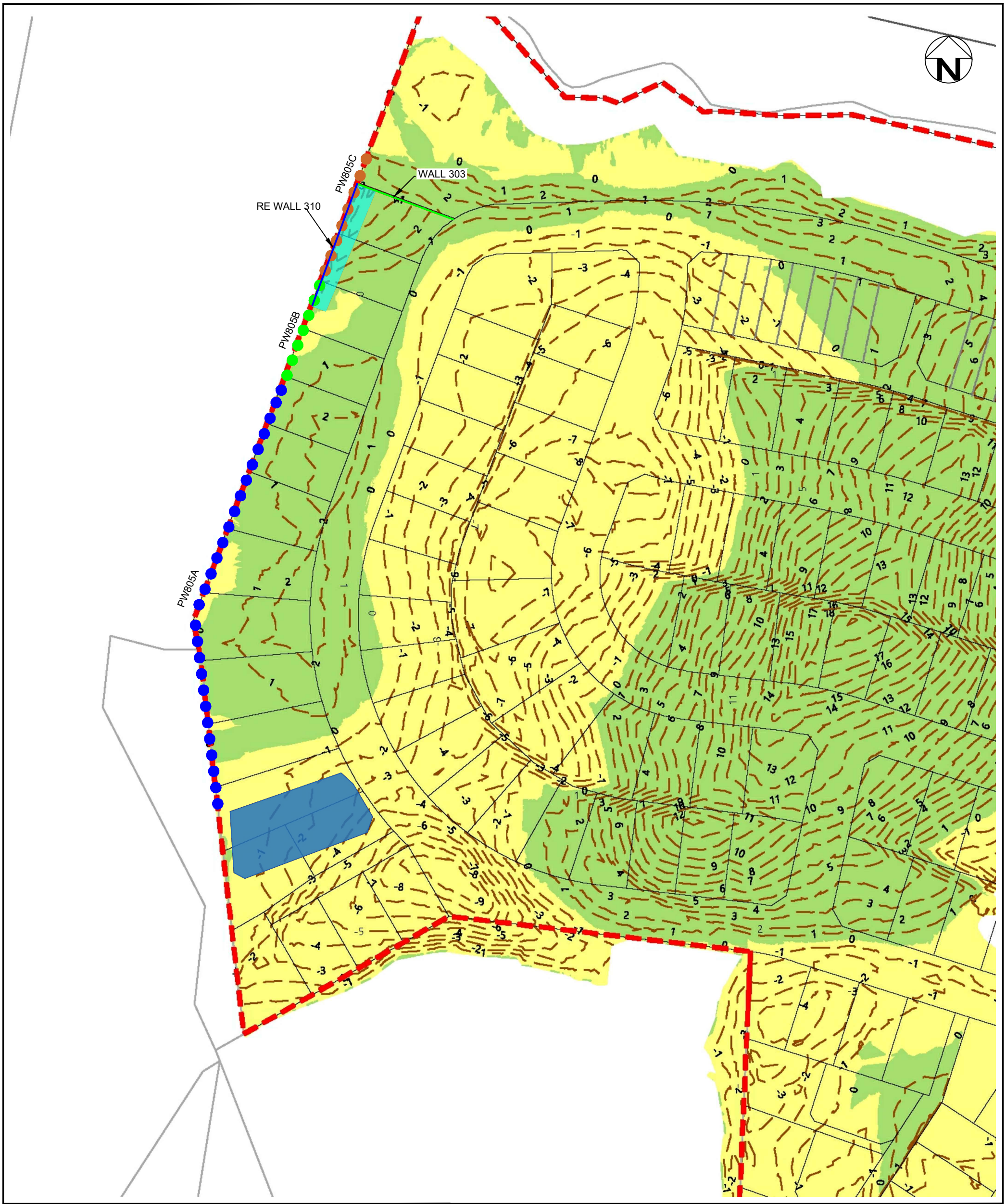
client: WFH PROPERTIES LTD

project: MILLWATER - OREWA WEST - PRECINCT 6

title: UNDERCUT DETAIL PLAN

project no: 773-AKLGE206639 | figure no: AG/008 | rev: C

PLOT DATE: 14/06/2022 8:45:00 pm DWG FILE: F:\GEN\29 PROJECTS\773-AKLGE PROJECTS\206639 - MILLWATER - OREWA WEST - PRECINCT 6\7 COFFEY DRAWINGS\CAD\STEPHEN\773-AKLGE206639-AG.DWG



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	05/10/2021
	B	FOR CONSENT	SP	SP	30/09/2021

LEGEND

- 3 — CUT CONTOUR
- 0 — ZERO CUT / FILL CONTOUR
- 3 — FILL CONTOUR
- BOUNDARY
- CUT AREAS
- FILL AREAS
- UNDERCUT
- WALL 305
- WALL 310
- PW805A
- PW805B
- PW805C
- UNDERCUT KEY

0 12.5 25 37.5 50 62.5

SCALE 1:1250 (A3) METRES

drawn	SP
approved	SP
date	30/09/2021
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD.

project: MILLWATER -OREWA WEST - PRECINCT 6

title: GEOTECHNICAL REMEDIATION PLAN - WESTERN SECTION

project no: 773-AKLGE206639 | figure no: AY-003 | rev: B

PLOT DATE: 5/10/2021 12:37:46 PM DWG FILE: C:\USERS\ROY.ZHOU\DESKTOP\AY\773-AKLGE206639-AY.DWG

IN-GROUND PILE WALL CONSTRUCTION OBSERVATIONS AND MONITORING

OBSERVATIONS OF ALL ASPECTS OF THE RETAINING WALL CONSTRUCTION ARE REQUIRED BY TETRA TECH COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT MAY NOT BE LIMITED TO OBSERVATIONS AT THE FOLLOWING **HOLD POINTS:**

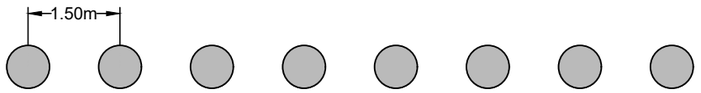
- REVIEW OF SET OUT OF PILE POSITIONS/ WALL ALIGNMENT.
- OBSERVATIONS ARE REQUIRED BY TETRA TECH COFFEY DURING CONSTRUCTION TO CONFIRM EXPECTED GROUND CONDITIONS. COFFEY NEEDS TO OBSERVE THE DRILLING OF ALL PILE HOLES FROM EXISTING GROUND LEVELS TO LOG AND TEST UNDERLYING SOILS SO AS TO CONFIRM ASSUMED SOIL CONDITIONS.
- TETRA TECH COFFEY SHALL OBSERVE AND APPROVE THE FOUNDING DEPTH AND CONDITION OF ALL PILE HOLES PRIOR TO INSTALLATION OF THE STEEL SECTIONS AND POURING OF CONCRETE.
- REVIEW OF ALL CONCRETE BATCHING PLANT RECEIPTS
- FINAL WALK OVER/SITE VISIT UPON COMPLETION.

UPON SATISFACTORY COMPLETION OF THE ABOVE WORKS, TETRA TECH COFFEY WOULD THEN BE IN A POSITION TO ISSUE THE APPROPRIATE PRODUCER STATEMENT - CONSTRUCTION REVIEW (PS4) AS REQUIRED BY COUNCIL.

CONSTRUCTION NOTES:

THIS DRAWING AND ASSOCIATED NOTES ARE TO BE READ IN CONJUNCTION WITH THE TETRA TECH COFFEY DESIGN REPORT, REFERENCED 773-AKLGE206639-AY.

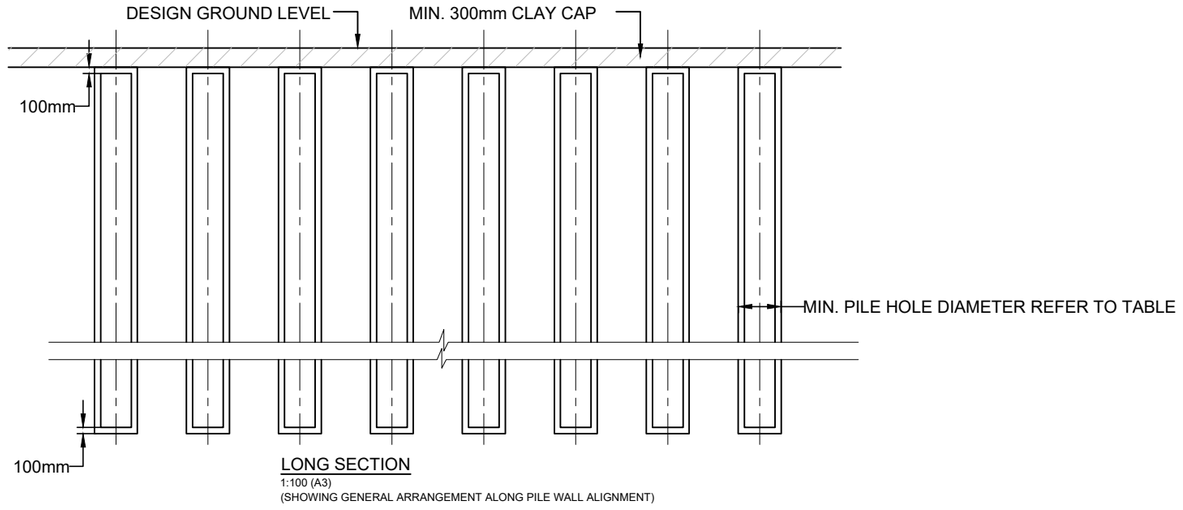
1. ALL EXISTING AND PROPOSED SERVICES SHOULD BE LOCATED AND PROTECTED DURING CONSTRUCTION WORKS BY THE CONTRACTOR.
2. CONSTRUCTION OF IN-GROUND PILE WALLS SHALL BE IN ACCORDANCE WITH THESE DRAWINGS AND RELEVANT RETAINING WALL DESIGN REPORT UNLESS OTHERWISE APPROVED BY TETRA TECH COFFEY.
3. REFER TO SITE PLAN FOR THE GENERAL LOCATION AND EXTENT OF IN-GROUND PILE WALL. SET OUT LOCATIONS TO BE PROVIDED BY OTHERS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. LOCATIONS SHALL BE CONFIRMED BY TETRA TECH COFFEY PRIOR TO DRILLING.
4. ALL STEEL SECTIONS SHALL BE CONCRETE ENCASED WITH A MINIMUM OF 75mm SIDE COVER AND MINIMUM 100MM BASE AND TOP COVER.
5. THE CHARACTERISTIC COMPRESSIVE STRENGTH OF CONCRETE SHALL BE F'C = 32 MPA UNLESS OTHERWISE NOTED.
6. THE CONCRETE ENCASEMENT SHALL BE ADEQUATELY VIBRATED WITH A PENCIL VIBRATOR TO AVOID "HONEY COMBING".
7. FOUNDATION SPOIL SHALL BE REMOVE BY AUGERING TO THE DIMENSIONS DETAILED IN THE DESIGN DRAWINGS, WITH ALL SURPLUS MATERIAL BEING DISPOSED OF AWAY FROM THE PILE LOCATIONS. ALLOWANCE SHALL BE MADE FOR THE CONSTRUCTION OF ACCESS TO AUGERED HOLES FOR CONCRETE TRUCKS. DRIVING OF PILES IS NOT ACCEPTABLE AS AN ALTERNATIVE TO AUGERING. THE CONTRACTOR SHALL VERIFY THE POSITION OF ALL UNDERGROUND SERVICES AND CONFIRM THAT THERE ARE NO CLASHES PRIOR TO CONSTRUCTION.
8. IF SIGNIFICANT OVERLAND FLOW IS PRESENT ABOVE WALL ALIGNMENT SURFACE CUT-OFF DRAINAGE MUST BE INSTALLED TO PREVENT WATER INGRESS INTO PILE HOLES.
9. THE CONTRACTOR SHALL NOTIFY TO THE TETRA TECH COFFEY DESIGN ENGINEER IMMEDIATELY FOR FURTHER INSTRUCTION SHOULD ANY UNFORESEEN CIRCUMSTANCE OR ABNORMAL SITE CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION.
10. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS.
11. IF THERE IS POTENTIAL FOR HOLE COLLAPSE E.G. DUE TO WEAK GROUND CONDITIONS OR GROUND WATER INGRESS IT IS RECOMMENDED THAT NON-CONSECUTIVE HOLES BE DRILLED AND POURED WITH CONCRETE PRIOR TO DRILLING OF ADJOINING HOLES. TEMPORARY CASING MAY ALSO BE REQUIRED.
12. IN-GROUND PILE WALL IS TO CAPPED TO THE FINISHED DESIGN LEVEL WITH A MINIMUM THICKNESS 300MM CLAY CAP OF MINIMUM UNDRAINED SHEAR STRENGTH 100 KPa UNLESS OTHERWISE SPECIFIED.
13. PILE WALL TO EXTEND AS SHOWN ON CIVIL DRAWING. THE LOCATION AND EXTENT ARE TO BE CONFIRMED ON SITE BY TETRA TECH COFFEY DESIGN ENGINEER.



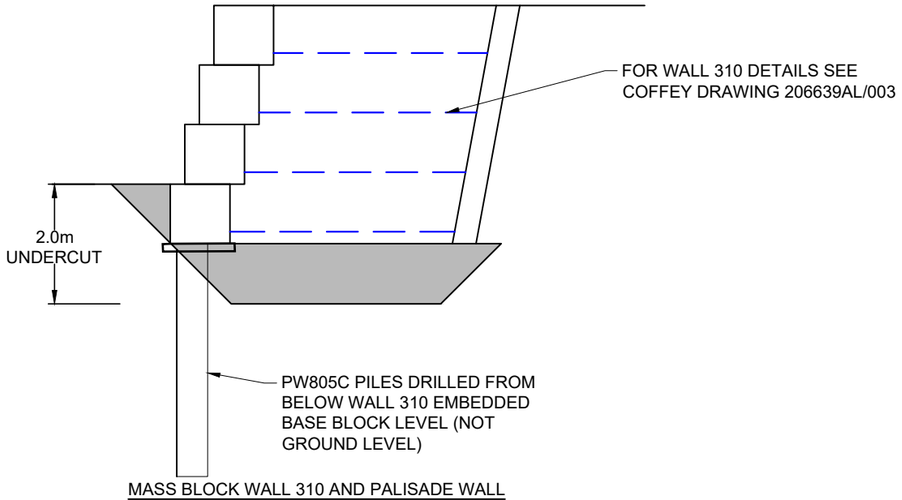
PLAN
1:100 (A3)
(SHOWING GENERAL PILE ARRANGEMENT)

WALL SUB I.D.	WALL LENGTH (m)	PILE DIAMETER (mm)	PILE C-C SPACING (m)	PILE LENGTH (m)	MIN EMBEDMENT INTO N>50 ROCK (m)	STEEL SECTION	MIN CONCRETE STRENGTH (MPa)
PW805-A	150	600	1.5	12	-	310 UC 158	32
PW805-B	39	600	1.5	12	-	310 UC 137	32
PW805-C	39	650	1.5	10*	2.5	460 UB 82.1	32

*Top of pile to be measured from Wall 310 foundation subgrade level, not ground level.



LONG SECTION
1:100 (A3)
(SHOWING GENERAL ARRANGEMENT ALONG PILE WALL ALIGNMENT)



MASS BLOCK WALL 310 AND PALISADE WALL
NTS

FOR INFORMATION

revision	no.	description	drawn	approved	date
	A	FOR ORIGINAL REPORT	RZ	AC	11/02/2021
	B	FOR CONSENT	SP	SP	30/09/2021
	C	AMENDMENTS FOLLOWING PEER REVIEW	SP	SP	12/11/2021

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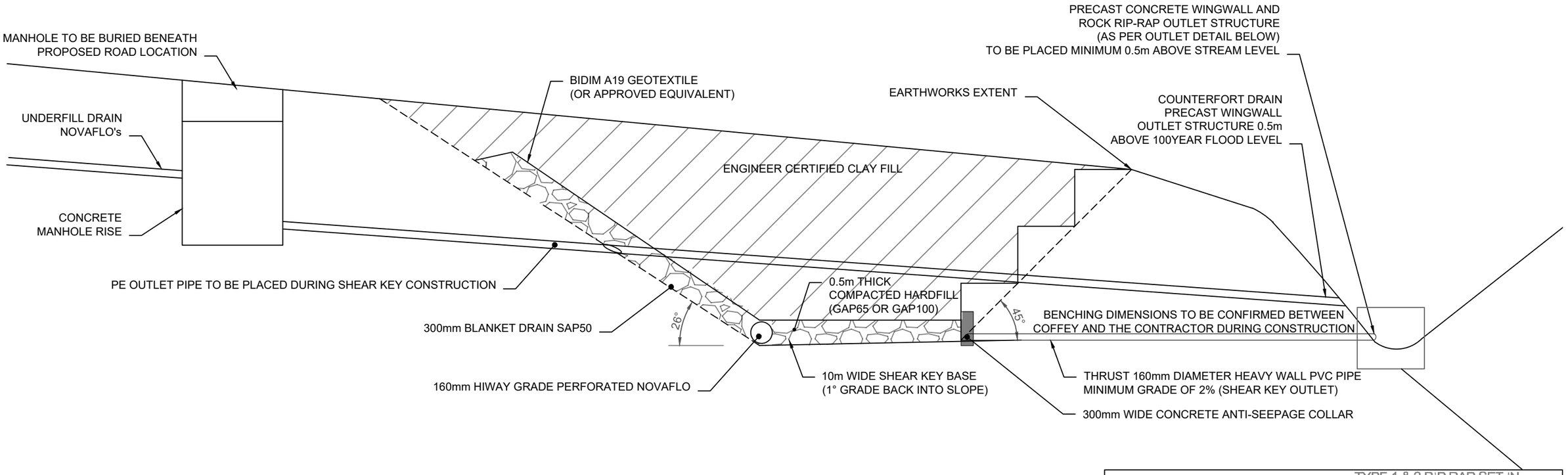
drawn	SP
approved	SP
date	12/11/2021
scale	1:100
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD.
project: MILLWATER PRECINCT 6
title: PW805 GEOTECHNICAL DESIGN DRAWING
project no: 773-AKLGE206639 | drawing no: AY-004 | rev: C



HOLD POINTS:

OBSERVATIONS OF ALL ASPECTS OF THE SHEAR KEY ARE REQUIRED BY COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT ARE NOT LIMITED TO OBSERVATIONS OF THE FOLLOWING HOLD POINTS:

1. SHEAR KEY FOUNDING LEVEL;
2. SHEAR KEY DRAINAGE (PLACEMENT OF ALL DRAIN COIL INCLUDING OUTLET);
3. PLACEMENT OF GEOTEXTILE CLOTH OVER BASAL HARDFILL AND BLANKET DRAINAGE;
4. COMPACTION OF HARDFILL AT THE BASE OF THE SHEAR KEY;
5. DIMENSIONS OF CONSTRUCTED SHEAR KEY (INCLUDING BASE WIDTH AND BATTER ANGLES)

ASBUILT:

ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

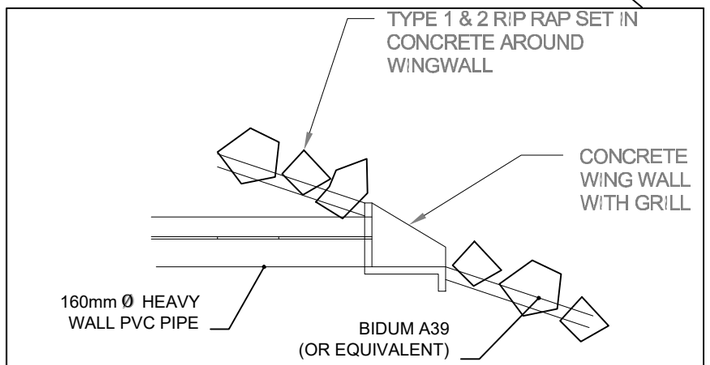
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

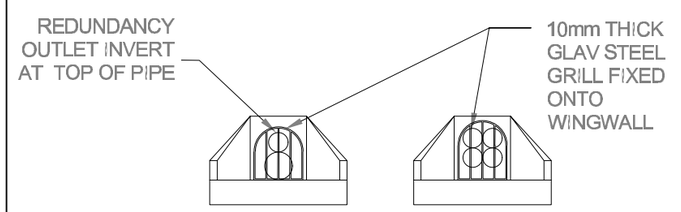
1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE 3m RL BETWEEN CH310 AND CH400);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACVHIEVE A MINIUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED.

QUALITY ASSURANCE:

1. RING SHEAR TESTING OF EXPOSED SHEAR PLANE MATERIAL;
2. TRIAXIAL TESTING OF ENGINEERED FILL MATERIAL.
3. PROOF ROLL OF 150-65 HARDFILL
4. NDM TESTING OF GAP65 HARDFILL (WHERE APPLICABLE)



SHEARKEY OUTLET CROSS SECTION



WINGWALL GRILL DETAIL

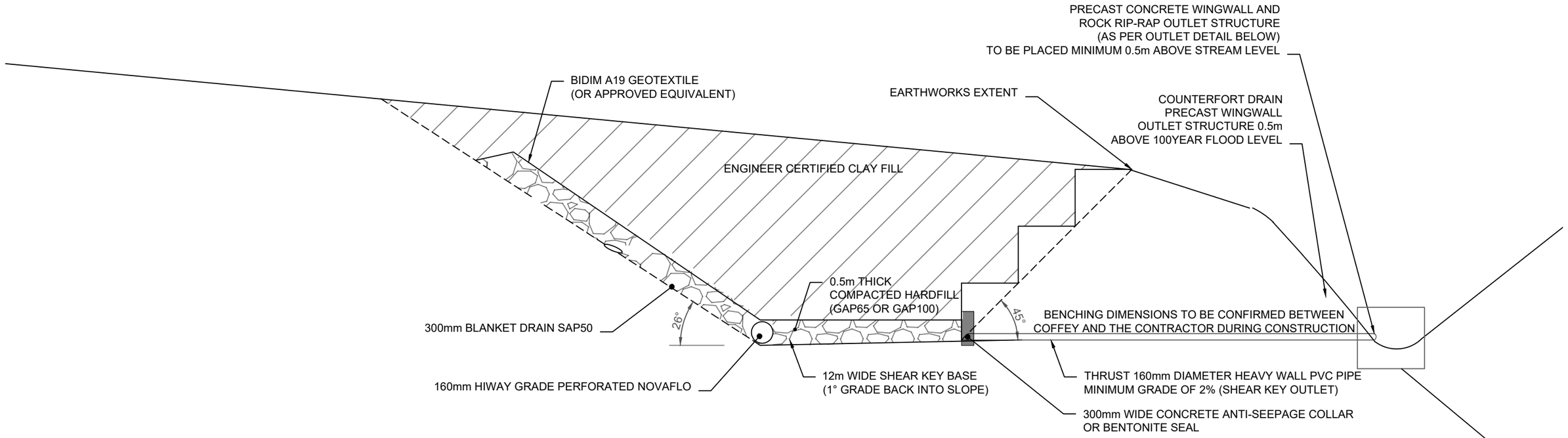
revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	08/07/2019

SCALE 0 1 2 3 4 5 METRES 1:100 (A3)

drawn	RZ
approved	AC
date	08/07/2019
scale	NTS
original size	A3

coffey
A TETRA TECH COMPANY

client:	WFH PROPERTIES LTD
project:	MILLWATER PRECINCT 6
title:	SHEAR KEY 2A DETAIL (CH310 - CH400)
project no:	773-AKLGE206639
figure no:	AE-02
rev:	A



HOLD POINTS:

OBSERVATIONS OF ALL ASPECTS OF THE SHEAR KEY ARE REQUIRED BY COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT ARE NOT LIMITED TO OBSERVATIONS OF THE FOLLOWING HOLD POINTS:

1. SHEAR KEY FOUNDING LEVEL;
2. SHEAR KEY DRAINAGE (PLACEMENT OF ALL DRAIN COIL INCLUDING OUTLET);
3. PLACEMENT OF GEOTEXTILE CLOTH OVER BASAL HARDFILL AND BLANKET DRAINAGE;
4. COMPACTION OF HARDFILL AT THE BASE OF THE SHEAR KEY;
5. DIMENSIONS OF CONSTRUCTED SHEAR KEY (INCLUDING BASE WIDTH AND BATTER ANGLES)

ASBUILT:

ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

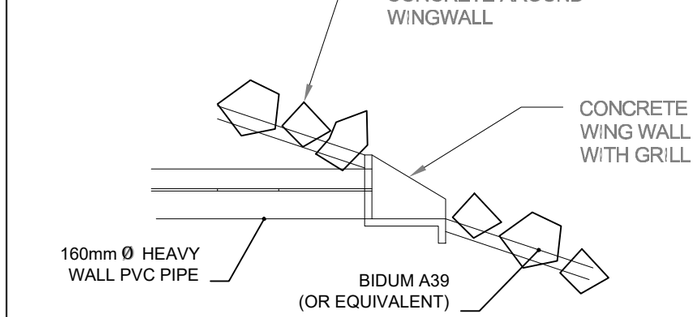
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

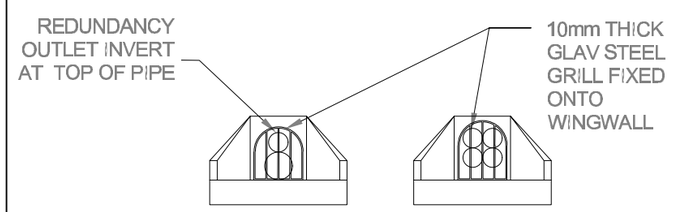
1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE 5.5m RL BETWEEN CH400 AND CH480);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACVHIEVE A MINIUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED.

QUALITY ASSURANCE:

1. RING SHEAR TESTING OF EXPOSED SHEAR PLANE MATERIAL;
2. TRIAXIAL TESTING OF ENGINEERED FILL MATERIAL.
3. PROOF ROLL OF 150-65 HARDFILL
4. NDM TESTING OF GAP65 HARDFILL (WHERE APPLICABLE)



SHEARKEY OUTLET
CROSS SECTION



WINGWALL GRILL DETAIL

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	08/07/2019

0 1 2 3 4 5
SCALE 1:100 (A3) METRES

drawn	RZ
approved	AC
date	08/07/2019
scale	NTS
original size	A3

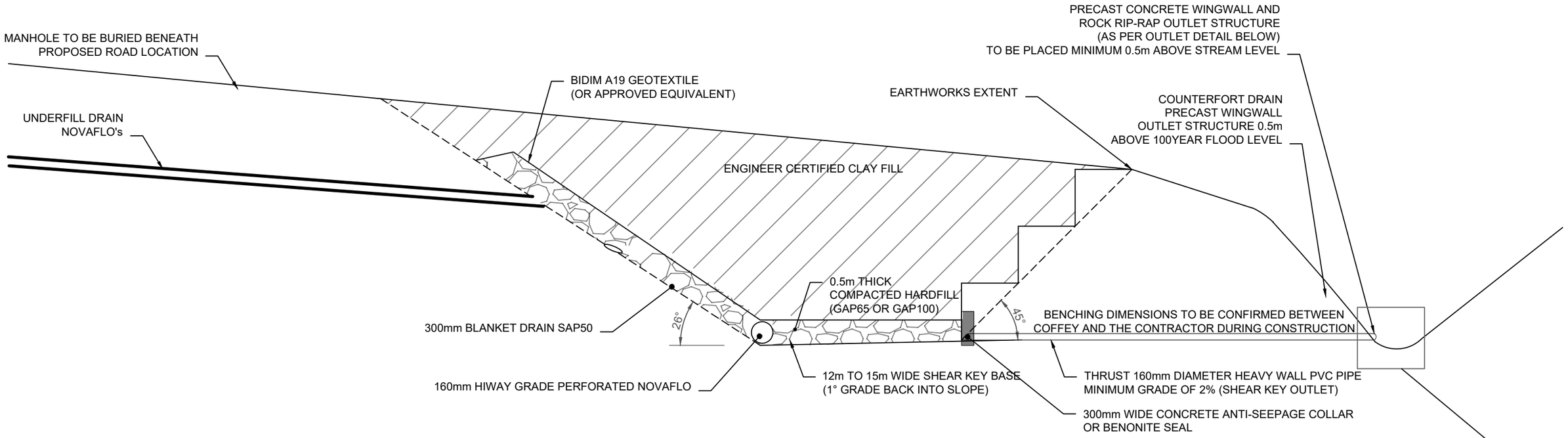
coffey
A TETRA TECH COMPANY

client: WFH PROPERTIES LTD

project: MILLWATER PRECINCT 6

title: SHEAR KEY 2B DETAIL (CH400 - CH480)

project no: 773-AKLGE206639 | figure no: AE-03 | rev: A



HOLD POINTS:

OBSERVATIONS OF ALL ASPECTS OF THE SHEAR KEY ARE REQUIRED BY COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT ARE NOT LIMITED TO OBSERVATIONS OF THE FOLLOWING HOLD POINTS:

1. SHEAR KEY FOUNDING LEVEL;
2. SHEAR KEY DRAINAGE (PLACEMENT OF ALL DRAIN COIL INCLUDING OUTLET);
3. PLACEMENT OF GEOTEXTILE CLOTH OVER BASAL HARDFILL AND BLANKET DRAINAGE;
4. COMPACTION OF HARDFILL AT THE BASE OF THE SHEAR KEY;
5. DIMENSIONS OF CONSTRUCTED SHEAR KEY (INCLUDING BASE WIDTH AND BATTER ANGLES)

ASBUILT:

ACCURATE ASBUILT INFORMATION WILL BE REQUIRED WHICH SHOULD INCLUDE:

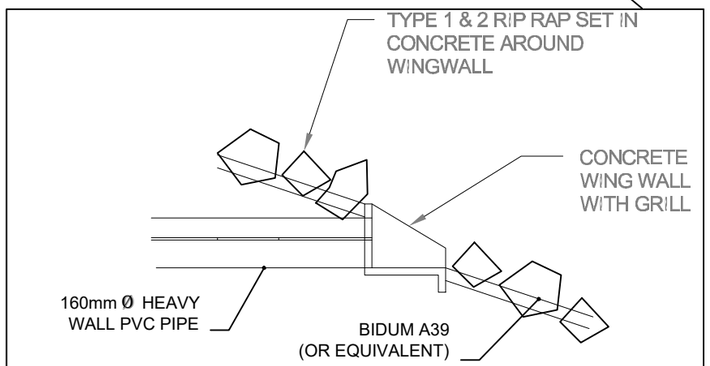
1. SHEAR KEY AND ASSOCIATED BENCHING CONTOURS WHERE APPLICABLE;
2. SHEAR KEY BASAL HARDFILL THICKNESS;
3. SHEAR KEY DRAINAGE;
4. SHEAR KEY DRAINAGE OUTLETS.

NOTES:

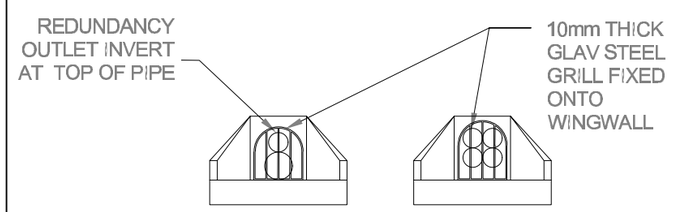
1. SHEAR KEY BASE TO BE EXCAVATED A MINIMUM DEPTH OF 1m INTO COMPETENT IDENTIFIED WAITEMATA GROUP N>50 BEDROCK, (LIKELY TO BE 6m RL BETWEEN CH480 AND CH560);
2. SHEAR KEY BASAL DRAINAGE SHOULD CONSIST OF 160mm HIWAY NOVAFLO DRAINS PLACED WITHIN THE COMPACTED HARDFILL AND WILL BE CONFIRMED DURING CONSTRUCTION;
3. FILL COMPACTION TESTING ON SHEAR KEY CLAY FILL IS REQUIRED EVERY 0.5m VERTICAL LIFT;
4. COHESIVE FILL TO ACHIEVE AN AVERAGE UNDRAINED SHEAR STRENGTH of >140 KPa (MINIMUM SINGLE VALUE OF 110KPa). AVERAGE AIR VOIDS TO BE LESS THAN 10% (MAXIMUM SINGLE TEST OF 12%). BASAL HARDFILL TO ACVHIEVE A MINIUM CLEGG IMPACT VALUE OF 25;
5. THRUST SHEAR KEY OUTLETS REQUIRED APPROXIMATELY EVERY 25m. FINAL POSITIONS TO BE CONFIRMED BY COFFEY ONSITE TO ENSURE LOW POINTS ARE DRAINED AND ADEQUATE FALL IS ACHIEVED;
6. SHEAR KEY BASAL WIDTH 15m (CH480 TO CH510) AND 12m (CH510 TO CH560).

QUALITY ASSURANCE:

1. RING SHEAR TESTING OF EXPOSED SHEAR PLANE MATERIAL;
2. TRIAXIAL TESTING OF ENGINEERED FILL MATERIAL.
3. PROOF ROLL OF 150-65 HARDFILL
4. NDM TESTING OF GAP65 HARDFILL (WHERE APPLICABLE)



SHEARKEY OUTLET CROSS SECTION



WINGWALL GRILL DETAIL

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	08/07/2019

SCALE 0 1 2 3 4 5 METRES 1:100 (A3)

drawn	RZ
approved	AC
date	08/07/2019
scale	NTS
original size	A3

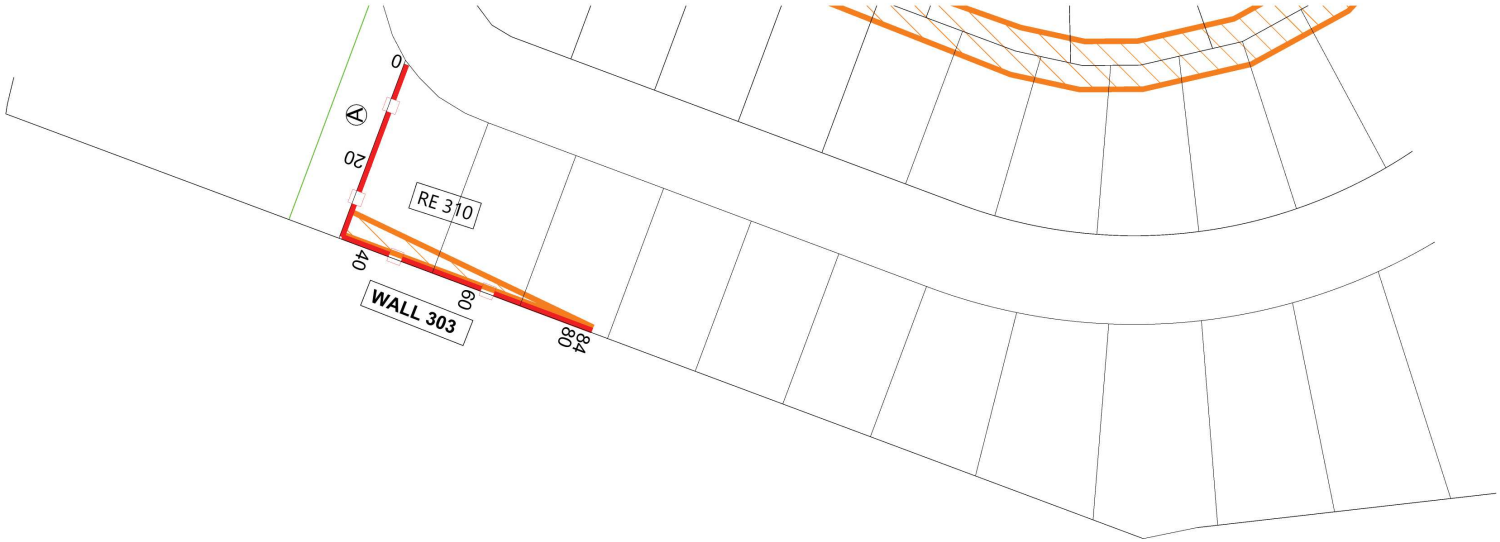
coffey
A TETRA TECH COMPANY

client: WFH PROPERTIES LTD

project: MILLWATER PRECINCT 6

title: SHEAR KEY 2C DETAIL (CH480 - CH560)

project no: 773-AKLGE206639 | figure no: AE-04 | rev: A



RETAINING WALL 303 PLAN

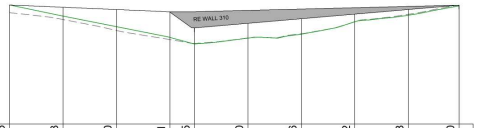
SCALE 1:1000

LEGEND

- TOP OF RETAINING WALL
- BOTTOM OF RETAINING WALL
- EXISTING GROUND LEVEL

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ALL CONCRETE TO BE 17.5MPa 28 DAY CONCRETE STRENGTH.
3. CONTRACTOR IS TO CONFIRM LOCATION AND HEIGHT OF EXISTING SERVICES TO ENGINEER PRIOR TO WORKS COMMENCING.
4. CONTRACTOR TO CONFIRM HEIGHT OF RETAINING WALL PRIOR TO ORDERING OF MATERIALS.
5. WALL SUBSOIL DRAIN TO FEED INTO CESSPITS OR KERB & CHANNEL AS APPROVED BY THE ENGINEER.
6. UNDERFILL DRAINAGE IS TO BE INSTALLED AT THE DIRECTION OF THE ENGINEER. IF THE CONTRACTOR ENCOUNTERS SPRINGS OR OTHER SOURCES OF WATER, THEY ARE TO NOTIFY THE ENGINEER.
7. ALL UNSUITABLE MATERIAL AS DEFINED IN THE SPECIFICATION IS TO BE REMOVED AND THE STRIPPED AREAS INSPECTED BY THE ENGINEER BEFORE COMMENCEMENT.
8. EARTHWORKS ARE NOT TO BE EXTENDED INTO ADJOINING SITES UNLESS THE ENGINEER HAS ISSUED SPECIFIC INSTRUCTIONS.
9. ANY MODIFICATIONS TO THE CONSENTED EROSION AND SEDIMENT CONTROL MEASURES MUST BE APROVED BY THE ENGINEER PRIOR TO THE CONSTRUCTION.
10. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND PROTECTING EXISTING SERVICES AND DRAINAGE ON SITE.
11. THE CONTRACTOR SHALL CLARIFY THE AREAS AND EXTENT OF CLEARING WITH THE ENGINEER BEFORE COMMENCEMENT AND CONFIRM THAT ALL NECESSARY CONSENTS ARE IN PLACE AND ENSURE THAT THEY HAVE A COPY OF THE RESOURCE CONSENT FROM THE ENGINEER.
6. CONTRACTOR TO ENSURE HE HAS ALL APPROVALS FROM LOCAL AUTHORITIES PRIOR TO COMMENCING WORKS.
7. SEDIMENT AND EROSION CONTROL ARE TO BE IN ACCORDANCE WITH ARC TP90 AND ARE TO BE IN PLACE PRIOR TO EARTHWORKS COMMENCING.
8. ALL WORKS ARE TO BE IN ACCORDANCE WITH THE GEOTECHNICAL SPECIFICATION
9. RETAINING WALLS TO BE CLEAR OF BOUNDARIES.



DATUM RL -2.00

TOP OF RETAINING WALL	20.25	19.83	19.40	18.91	15.95	16.80	17.66	18.52	19.38	20.20		
BOTTOM OF RETAINING WALL	20.15	18.18	16.20	14.22	12.95	14.03	14.78	17.10	18.32	20.05		
RETAINED HEIGHT	0.10	1.65	3.20	4.69	3.00	2.77	2.89	1.42	1.07	0.15		
CHAINAGE	0.00	10.00	20.00	30.00	34.60	44.60	54.60	64.60	74.60	84.10		

RETAINING WALL 303 LONGITUDINAL SECTION

SCALEBAR (M)

0 10.0 20.0 50.0

REVISION DETAILS		INT	DATE	SURVEYED		WOODS.CO.NZ
1	ISSUED FOR CONSENT	RV	JULY 2017	DESIGNED	RV	
2	ISSUED FOR s.127	RV	SEPT 2021	DRAWN	RV	
				CHECKED	MR	
				APPROVED	MR	

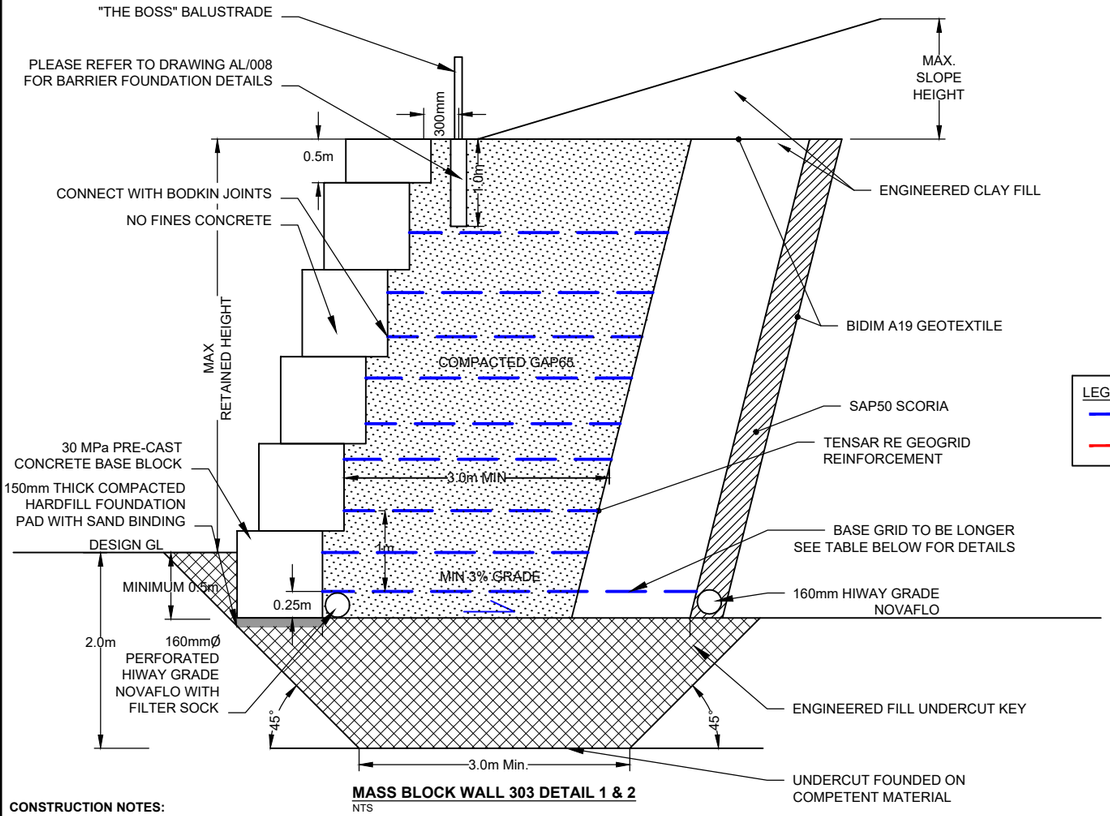
CLIENT: WFH PROPERTIES

MILLWATER - PRECINCT 6

RETAINING WALL PLAN & LONG SECTION

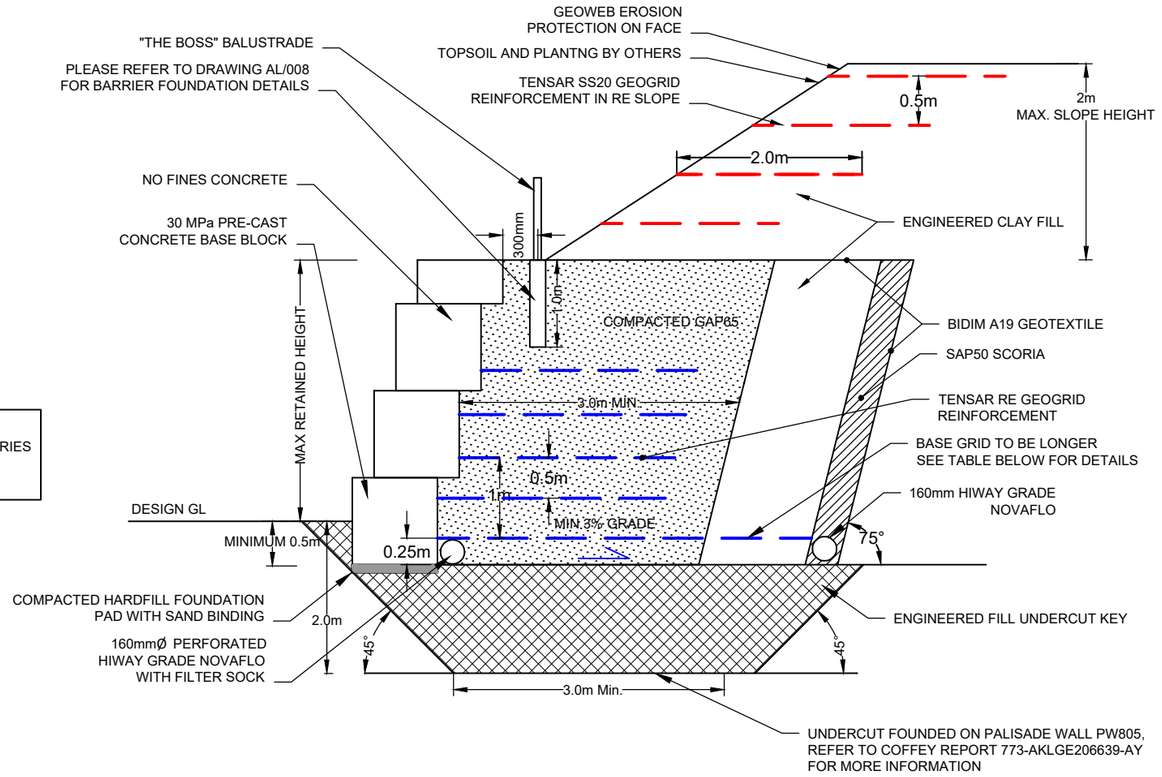
STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1000 @A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-01-154-EW	

Document No. C:\12DSYNERGY\DATA\WP-PEN-APP-01\37600 PRECINCT 6_328\CAD\ENG\37600-01-151-EW.DWG



MASS BLOCK WALL 303 DETAIL 1 & 2
NTS

LEGEND
- TENSAR RE SERIES
- TENSAR SS20



MASS BLOCK WALL 303 DETAIL 3 & 4
NTS

CONSTRUCTION NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE COFFEY DESIGN REPORT FOR REFERENCES AND SPECIFICATIONS AKLGE206639-AL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.

EXCAVATION
WITH ANY EXCAVATION THERE IS A RISK OF BATTER COLLAPSE ESPECIALLY ADJACENT TO BOUNDARIES, STRUCTURES AND SERVICES. THE CONTRACTOR IS RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS. CUT BATTERS SHOULD NOT BE LEFT UNSUPPORTED FOR MORE THAN A FEW DAYS AND NEVER DURING HEAVY RAIN. WHERE BATTERS ARE EXPOSED FOR MORE THAN A FEW DAYS, POLYETHENE SHEETING SHOULD BE INSTALLED TO COVER THE EXPOSED CUT FACE, THIS POLYETHENE MUST BE REMOVED PRIOR TO BACKFILLING.

UNFORSEEN GROUND CONDITIONS
THE CONTRACTOR SHALL REFER TO THE DESIGN ENGINEER AS SOON AS POSSIBLE FOR FURTHER INSTRUCTION SHOULD ANY UNFORSEEN CIRCUMSTANCES OR ABNORMAL SITE CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION.

GEOGRID & BACKFILL MATERIAL
1. THE GEOGRID PRODUCT MUST MATCH THAT SPECIFIED IN THE RECENTGEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ALTERNATIVE PRODUCTS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE DESIGN ENGINEER. GEOGRID HANDLING, TENSIONING, SECURING, AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS. IN PARTICULAR, THE CORRECT ORIENTATION OF UNIAXIAL TYPE GRIDS IS CRITICAL.
2. GEOGRID SPECIFICATIONS ARE SHOWN IN THE SEGMENTAL BLOCK WALL TABLE BELOW. BACKFILL TO BE GAP65 AND GAP20 FOR WALL ROCK OR SIMILAR APPROVED.
3. BACKFILL MATERIAL SHOULD BE PLACED AND COMPACTED IN LAYERS TO 95% OF THE MAXIMUM DRY DENSITY (MDD), AND IN ACCORDANCE WITH THE COFFEY GEOTECHNICAL WORKS SPECIFICATION CONTAINED WITH THE REPORT REFERENCED ABOVE.
4. GEOGRID TO BE PLACED LEVEL OR WITH A 1% FALL TO REAR OF THE WALL. GRID SHOULD BE FREE OF WRINKLES AND LIGHTLY TENSIONED/PULLED TAUT PRIOR TO AND DURING BACKFILLING.
5. CONTRACTOR TO ENSURE GRIDS ARE ORIENTATED CORRECTLY. GRIDS SHOULD BE ROLLED OUT PERPENDICULAR TO THE WALL.
6. GRID LAYERS ARE TO BE CONTINUOUS OVER THE DESIGN REINFORCEMENT DEPTH. NO JOINTS ARE PERMITTED PARALLEL TO THE FACE.
7. UPPER GEOGRID LAYER TO INCLUDE LOCAL CUT TO ALLOW FOR SPIRAL TUBE FOR THE BARRIER POST. SPIRAL TUBE TO BE PLACED PRIOR TO BACKFILLING. EXCAVATION INTO THE SEGMENTAL BLOCK WALL BACKFILL TO RETROFIT THE SPIRAL TUBE IS NOT ACCEPTABLE.
8. THE GEOGRID LAYER EXTENTS AND POSITION ARE TO BE SURVEYED. AS BUILT DATA SHOULD BE SUPPLIED TO COFFEY UPON WALL COMPLETION FOR COA.

Chainage Interval (m)	Wall Detail #	Max Retained Height (m)	Total Wall Height Including Embedment (m)	Max Surcharge Slope		Max Toe Slope Angle	Geogrid					Additional Notes
				Angle (°)	Height (m)		Base Grid Length (m)	Other Grids Length (m)	No. of Reinforcement Layers	Vertical Spacing of Geogrid (m)	Type	
0 - 15	1	2	2.5	7	-	1 in 3	4.3	2.5	5	0.5	RE540	2m Deep Undercut At Toe
15 - 34.6	2	5	5.5	7	SEE NOTE 1	1 in 3	8.5	4.0	9	0.5	RE570	
34.6 - 60	3	3	3.5	33	3	1 in 3	6.7	3.5	6	0.5	RE570	
60 - 84.1	4	2	2.5	33	2	1 in 3	4.0	2.5	4	0.5	RE540	
1. 3m SURCHARGE AT CH34.6m. REDUCING TO 0m AT CH30.												

DRAINAGE
CONTRACTOR SHOULD ENSURE WALL OUTLET DRAINAGE IS MAINTAINED DURING CONSTRUCTION AND ABLE TO DISCHARGE FLOWS DURING CONSTRUCTION WORKS. UNDER NO CIRCUMSTANCES SHOULD DRAINAGE OUTLETS BE COVERED/BLOCKED DURING CONSTRUCTION. ALL DRAINAGE OUTLETS SHOULD BE CONNECTED TO THE DEVELOPMENT RETICULATED STORMWATER SYSTEMS (OR ENGINEER APPROVED STRUCTURE) UPON COMPLETION OF THE WALL. CONNECTION TO THE RETICULATION SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILL/COMPLETION.

SETTING OUT
THE CONTRACTOR IS RESPONSIBLE FOR MAKING SURE THE RETAINING WALL IS SET OUT AT THE CORRECT LOCATION AND THAT THE MAXIMUM RETAINED HEIGHTS, TOE SLOPE ANGLES (BELOW THE WALL) AND SLOPE SURCHARGE ANGLES (ABOVE THE WALL) ARE IN ACCORDANCE WITH THOSE SHOWN ON THE DESIGN CALCULATIONS AND DRAWINGS. THE RETAINED HEIGHT SHALL BE MEASURED FROM THE FINISHED GROUND SURFACE IN FRONT OF THE WALL TO THE FINISHED GROUND SURFACE IMMEDIATELY BEHIND THE WALL. THE MAXIMUM RETAINED HEIGHT, SLOPE SURCHARGE AND TOE SLOPE SHALL BE AS SPECIFIED ON THE COFFEY SERVICES (NZ) LIMITED DRAWINGS AND MUST NOT BE EXCEEDED WITHOUT THE WRITTEN APPROVAL OF THE COFFEY DESIGN ENGINEER.

BARRIER / FALL PREVENTION AND BARRIER POST FOUNDATION
WALLS OVER 1.0 METRE IN HEIGHT SHALL HAVE A HANDRAIL / FALL PREVENTION IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE CLAUSE F4. BARRIER POST FOUNDATION TO BE EITHER MOWING STRIP DESIGNED BY OTHERS OR 400Ø BY 1.0M DEEP SPIRALTUBE.

WASTE MATERIAL
ALL WASTE MATERIALS MUST BE REMOVED FROM SITE ON COMPLETION OF THE WORKS. IT IS NOT ACCEPTABLE TO PLACE THESE MATERIALS BEHIND THE WALL WITHIN THE BACKFILL MATERIAL.

MASS BLOCK RETAINING WALL INSPECTION
INSPECTION OF ALL ASPECTS OF MASS BLOCK RETAINING WALL ARE REQUIRED BY COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT MAY NOT BE LIMITED TO INSPECTION AT THE FOLLOWING **HOLD POINTS:**
- MASS BLOCK WALL FOUNDATION EXCAVATIONS, STRENGTH AND BENCHING;
- FOUNDATION HARDFILL PLACEMENT (FOOTING AND SERVICE CROSSING);
- DRAINAGE AND GEOTEXTILE PLACED AT REAR OF WALL;
- HARDFILL, GEOGRID PLACEMENT AND COMPACTION TESTING;
- DRAINAGE OUTLET CONSTRUCTION;
- BARRIER POST FOUNDATION (SPIRAL SLEEVES), AND;
- REINFORCING BAR AND CONCRETE PLACEMENT FOR TOP THREE BLOCK COURSES.

REINFORCED EARTH SLOPES
- FILL MATERIAL, GENERAL NOTES AND CONSTRUCTION OBSERVATION HOLD POINTS AS DETAILED IN FIGURES 01-03 IN COFFEY GEOTECHNICAL DESIGN REPORT FOR RE SLOPES REFERENCE 773-AKLGE206639-AL

FOR CONSTRUCTION

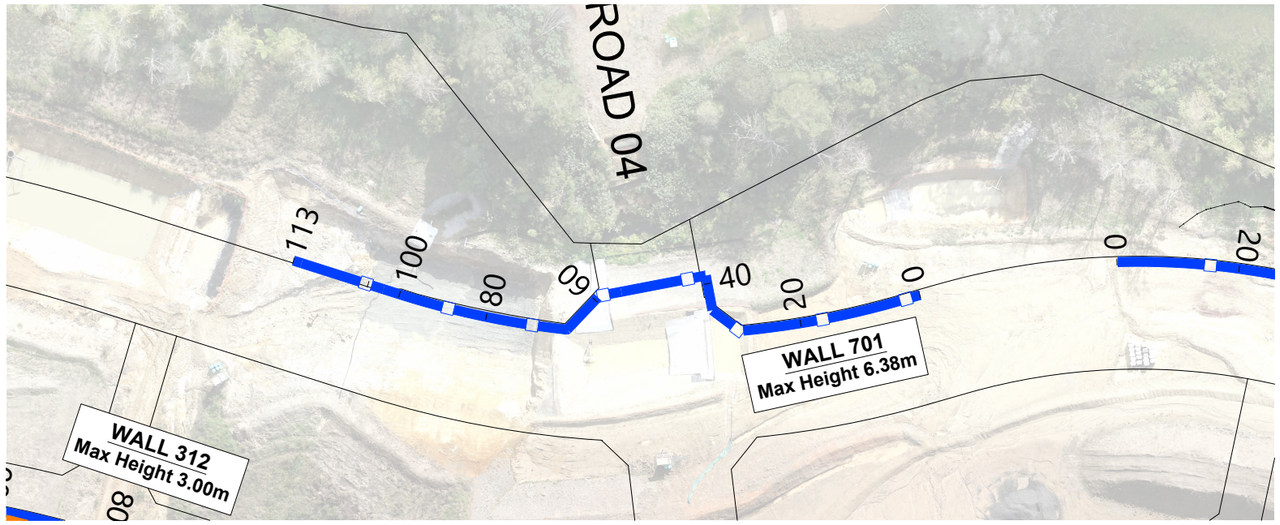
revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	12/04/2022

0 0.5 1.0 1.5 2.0 2.5 3.0
Horizontal Scale (metres)
0 0.5 1.0 1.5 2.0 2.5 3.0
Vertical Scale (metres)

drawn	RZ
approved	AC
date	12/04/2022
scale	NTS
original size	A3

TETRA TECH COFFEY

client: WFH PROPERTIES LTD
project: MILLWATER - OREWA WEST - PRECINCT 6
title: WALL 303 / RE SLOPE 310 DESIGN DETAIL
project no: 773-AKLGE206639 | figure no: AL/009 | rev: A



MASSBLOCK RETAINING WALL 701
PLAN
SCALE 1:1000

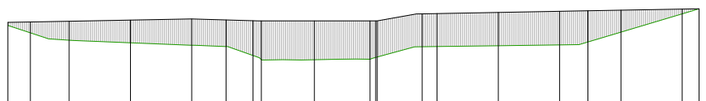
LEGEND

TOP OF RETAINING WALL

BOTTOM OF RETAINING WALL

EXISTING GROUND LEVEL

B



DATUM R.L. = -6.00

TOP OF RETAINING	13.21	13.27	13.39	13.57	13.76	13.60	13.47	13.45	13.45	13.45	13.45	13.45	13.45	14.59	14.64	14.83	15.01	15.10	15.19	15.37	15.42	
BOTTOM OF RETAINING	12.71	11.49	10.30	9.87	9.47	9.27	7.80	7.33	7.11	7.19	7.49	7.56	9.23	9.26	9.39	9.53	10.00	11.61	14.60	15.42		
RETAINED HEIGHT	0.50	1.78	3.09	3.70	4.29	4.33	5.67	6.12	6.34	6.25	5.96	5.89	5.37	5.38	5.43	5.49	5.10	3.58	0.77	0.00		
CHAINAGE	0.00	3.67	10.00	20.00	30.00	35.59	40.00	41.35	50.00	59.08	60.00	60.25	67.57	70.00	80.00	90.00	94.62	100.00	110.00	112.75		

RETAINING WALL 701 LONGITUDINAL SECTION

SCALEBAR (M)

0 10.0 20.0 50.0

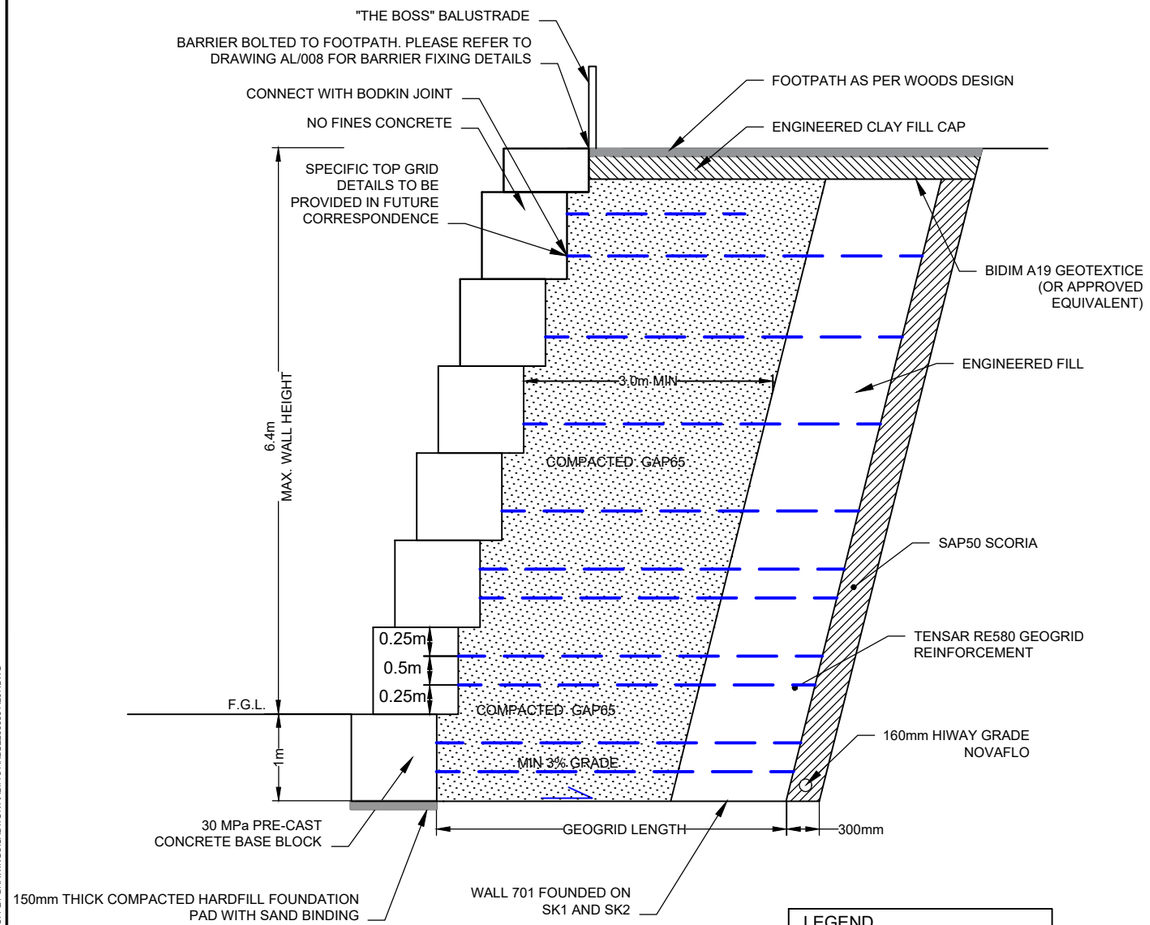
REVISION DETAILS		INT	DATE	SURVEYED		ARRAN DRIVE OREWA AUCKLAND
A	ISSUED FOR CONSTRUCTION	NC	16/09/19	DESIGNED	NC	
B	WALL EXTENDED & VERTICAL ALIGNMENT	NC	24/03/21	DRAWN	NC	
	CHANGED			CHECKED		
				APPROVED		WOODS.CO.NZ

WFH PROPERTIES

MILLWATER - PRECINCT 6
OREWA WEST
BULK EARTHWORKS AND GEOTECHNICAL REMEDIATION
RETAINING WALL PLAN & LONG SECTION

N

STATUS	ISSUED FOR CONSTRUCTION	REV
SCALE	H 1:1000 @A3 V 1:1000 @A3	B
COUNCIL	AUCKLAND COUNCIL	
DWG NO	37600-03-174-EW	



LEGEND

TENSAR RE580

WALL 701 CH0-95
NTS

NOTES:

WALL HEIGHT CHANGES BETWEEN CH30-110. REGARDLESS OF WALL HEIGHT, ALL SECTIONS OF WALL 700 BETWEEN THESE CHAINAGES MUST HAVE 4 LAYERS OF 10M ENBEDDED RE560 CONNECTED TO THE BOTTOM 2 BLOCKS (AS SHOWN ABOVE)

CONSTRUCTION NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE COFFEY DESIGN REPORT FOR REFERENCES AND SPECIFICATIONS AKLGE206639-AL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.

FOUNDATION MATERIAL
FOUNDATION MATERIAL IS REQUIRED TO HAVE A MINIMUM GEOTECHNICAL ULTIMATE BEARING CAPACITY OF 300KPA OTHERWISE AN UNDERCUT OF UP TO 1.0M DEEP IS REQUIRED, TO BE BACKFILLED WITH COMPACTED GAP65 HARDFILL.

EXCAVATION
WITH ANY EXCAVATION THERE IS A RISK OF BATTER COLLAPSE ESPECIALLY ADJACENT TO BOUNDARIES, STRUCTURES AND SERVICES. THE CONTRACTOR IS RESPONSIBLE AT ALL TIMES FOR ENSURING THE TEMPORARY STABILITY OF THE WORKS. CUT BATTERS SHOULD NOT BE LEFT UNSUPPORTED FOR MORE THAN A FEW DAYS AND NEVER DURING HEAVY RAIN. WHERE BATTERS ARE EXPOSED FOR MORE THAN A FEW DAYS, POLYETHENE SHEETING SHOULD BE INSTALLED TO COVER THE EXPOSED CUT FACE, THIS POLYETHENE MUST BE REMOVED PRIOR TO BACKFILLING.

UNFORSEEN GROUND CONDITIONS
THE CONTRACTOR SHALL REFER TO THE DESIGN ENGINEER AS SOON AS POSSIBLE FOR FURTHER INSTRUCTION SHOULD ANY UNFORSEEN CIRCUMSTANCES OR ABNORMAL SITE CONDITIONS BE ENCOUNTERED DURING CONSTRUCTION.

GEOGRID & BACKFILL MATERIAL
1. THE GEOGRID PRODUCT MUST MATCH THAT SPECIFIED IN THE RECENTGEOTECHNICAL DESIGN REPORT AND DESIGN DRAWINGS. ALTERNATIVE PRODUCTS SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE DESIGN ENGINEER. GEOGRID HANDLING, TENSIONING, SECURING, AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS. IN PARTICULAR, THE CORRECT ORIENTATION OF UNIAXIAL TYPE GRIDS IS CRITICAL.
2. GEOGRID SPECIFICATIONS ARE SHOWN IN THE SEGMENTAL BLOCK WALL TABLE BELOW. BACKFILL TO BE GAP65 AND GAP20 FOR WALL ROCK OR SIMILAR APPROVED.
3. BACKFILL MATERIAL SHOULD BE PLACED AND COMPACTED IN LAYERS TO 95% OF THE MAXIMUM DRY DENSITY (MDD), AND IN ACCORDANCE WITH THE COFFEY GEOTECHNICAL WORKS SPECIFICATION CONTAINED WITH THE REPORT REFERENCED ABOVE.
4. GEOGRID TO BE PLACED LEVEL OR WITH A 1% FALL TO REAR OF THE WALL. GRID SHOULD BE FREE OF WRINKLES AND LIGHTLY TENSIONED/PULLED TAUT PRIOR TO AND DURING BACKFILLING.
5. CONTRACTOR TO ENSURE GRIDS ARE ORIENTATED CORRECTLY. GRIDS SHOULD BE ROLLED OUT PERPENDICULAR TO THE WALL.
6. GRID LAYERS ARE TO BE CONTINUOUS OVER THE DESIGN REINFORCEMENT DEPTH. NO JOINTS ARE PERMITTED PARALLEL TO THE FACE.
7. UPPER GEOGRID LAYER TO INCLUDE LOCAL CUT TO ALLOW FOR SPIRAL TUBE FOR THE BARRIER POST. SPIRAL TUBE TO BE PLACED PRIOR TO BACKFILLING. EXCAVATION INTO THE SEGMENTAL BLOCK WALL BACKFILL TO RETROFIT THE SPIRAL TUBE IS NOT ACCEPTABLE.
8. THE GEOGRID LAYER EXTENTS AND POSITION ARE TO BE SURVEYED. AS BUILT DATA SHOULD BE SUPPLIED TO COFFEY UPON WALL COMPLETION FOR COA.

DRAINAGE
CONTRACTOR SHOULD ENSURE WALL OUTLET DRAINAGE IS MAINTAINED DURING CONSTRUCTION AND ABLE TO DISCHARGE FLOWS DURING CONSTRUCTION WORKS. UNDER NO CIRCUMSTANCES SHOULD DRAINAGE OUTLETS BE COVERED/BLOCKED DURING CONSTRUCTION. ALL DRAINAGE OUTLETS SHOULD BE CONNECTED TO THE DEVELOPMENT RETICULATED STORMWATER SYSTEMS (OR ENGINEER APPROVED STRUCTURE) UPON COMPLETION OF THE WALL. CONNECTION TO THE RETICULATION SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILL/COMPLETION.

SETTING OUT
THE CONTRACTOR IS RESPONSIBLE FOR MAKING SURE THE RETAINING WALL IS SET OUT AT THE CORRECT LOCATION AND THAT THE MAXIMUM RETAINED HEIGHTS, TOE SLOPE ANGLES (BELOW THE WALL) AND SLOPE SURCHARGE ANGLES (ABOVE THE WALL) ARE IN ACCORDANCE WITH THOSE SHOWN ON THE DESIGN CALCULATIONS AND DRAWINGS. THE RETAINED HEIGHT SHALL BE MEASURED FROM THE FINISHED GROUND SURFACE IN FRONT OF THE WALL TO THE FINISHED GROUND SURFACE IMMEDIATELY BEHIND THE WALL. THE MAXIMUM RETAINED HEIGHT, SLOPE SURCHARGE AND TOE SLOPE SHALL BE AS SPECIFIED ON THE COFFEY SERVICES (NZ) LIMITED DRAWINGS AND MUST NOT BE EXCEEDED WITHOUT THE WRITTEN APPROVAL OF THE COFFEY DESIGN ENGINEER.

BARRIER / FALL PREVENTION AND BARRIER POST FOUNDATION
WALLS OVER 1.0 METRE IN HEIGHT SHALL HAVE A HANDRAIL / FALL PREVENTION IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE CLAUSE F4. BARRIER POST FOUNDATION TO BE EITHER MOWING STRIP DESIGNED BY OTHERS OR 400Ø BY 1.0M DEEP SPIRALTUBE.

WASTE MATERIAL
ALL WASTE MATERIALS MUST BE REMOVED FROM SITE ON COMPLETION OF THE WORKS. IT IS NOT ACCEPTABLE TO PLACE THESE MATERIALS BEHIND THE WALL WITHIN THE BACKFILL MATERIAL.

MASS BLOCK RETAINING WALL INSPECTION
INSPECTION OF ALL ASPECTS OF MASS BLOCK RETAINING WALL ARE REQUIRED BY COFFEY TO CONFIRM THAT THE DESIGN REQUIREMENTS ARE SATISFIED AND TO ENABLE CERTIFICATION OF THE COMPLETED WORKS. THIS LEVEL OF CONSTRUCTION MONITORING IS CONSISTENT WITH ENGNZ MONITORING LEVEL CM4. THESE INCLUDE, BUT MAY NOT BE LIMITED TO INSPECTION AT THE FOLLOWING **HOLD POINTS:**
- MASS BLOCK WALL FOUNDATION EXCAVATIONS, STRENGTH AND BENCHING;
- FOUNDATION HARDFILL PLACEMENT (FOOTING AND SERVICE CROSSING);
- DRAINAGE AND GEOTEXTILE PLACED AT REAR OF WALL;
- HARDFILL, GEOGRID PLACEMENT AND COMPACTION TESTING;
- DRAINAGE OUTLET CONSTRUCTION;
- BARRIER POST FOUNDATION (SPIRAL SLEEVES), AND;
- REINFORCING BAR AND CONCRETE PLACEMENT FOR TOP THREE BLOCK COURSES.

Chainage Interval (m)	Wall detail #	Max Retained Height (m)	Total Wall Height Including Embedment (m)	Max Surcharge Slope		Max Toe Slope Angle	Geogrid				Additional notes
				Angle (°)	Height (m)		Length (m)	No. of reinforcement layers (Max.)	Vertical spacing of geogrid (m)	Type	
0-25 98-113	1	4.0	5.0	4°	1	1 in 10	8.00	8	0.5/1.0	RE580	Wall to be Founded on shear key 1 and 2. Undercut required beneath base block.
25 - 98	2	6.4	7.4	4°	1	1 in 10	11.50	11	0.5/1.0	RE580	Wall to be Founded on shear key 1 and 2. Undercut required beneath base block.

FOR CONSTRUCTION

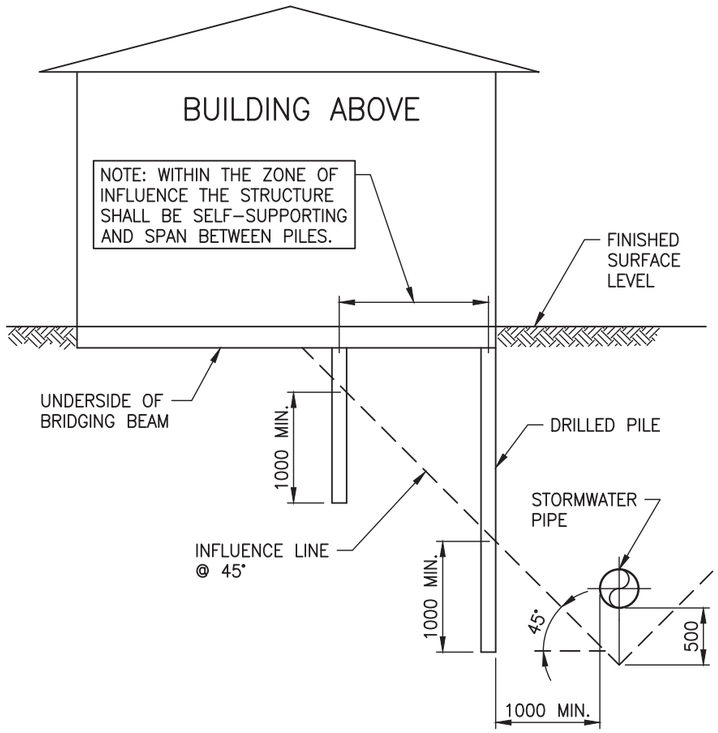
revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	AC	27/11/2019
	B	UPDATE AFTER AMENDMENTS TO DESIGN	RZ	AC	26/02/2020
	C	UPDATE TO BARRIER DETAIL	RZ	SP	13/07/2020
	D	UPDATE AFTER AMENDMENTS TO WALL LENGTH &RETAINED HEIGHT	RZ	AC	31/03/2021

0 0.5 1.0 1.5 2.0 2.5 3.0
Horizontal Scale (metres)
0 0.5 1.0 1.5 2.0 2.5 3.0
Vertical Scale (metres)

drawn	RZ
approved	AC
date	1/04/2021
scale	NTS
original size	A3

coffey
A TETRA TECH COMPANY

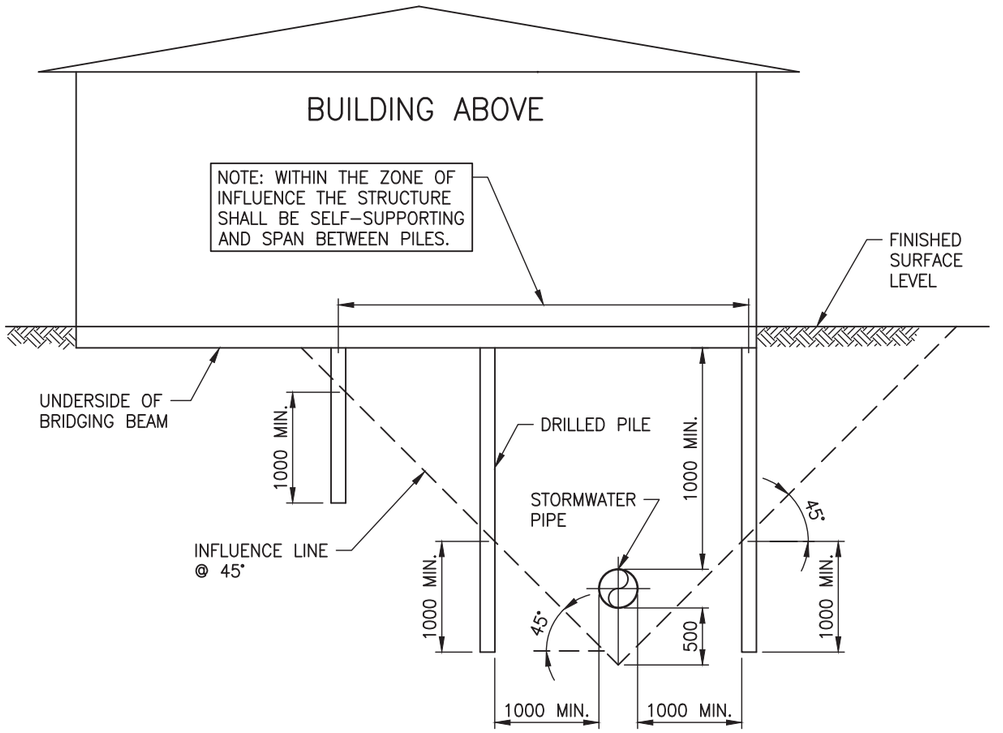
client: WFH PROPERTIES LTD
project: MILLWATER - OREWA WEST - PRECINCT 6
title: WALL 701 DESIGN DETAIL
project no: 773-AKLGE206639 | figure no: AL/007 | rev: D



BUILD CLOSE

'WORKS CLOSE' NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF WORKS ARE ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE SECTION 4.3.5.6 AND 4.3.5.7 OF THE SWCoP FOR FURTHER DETAILS.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.



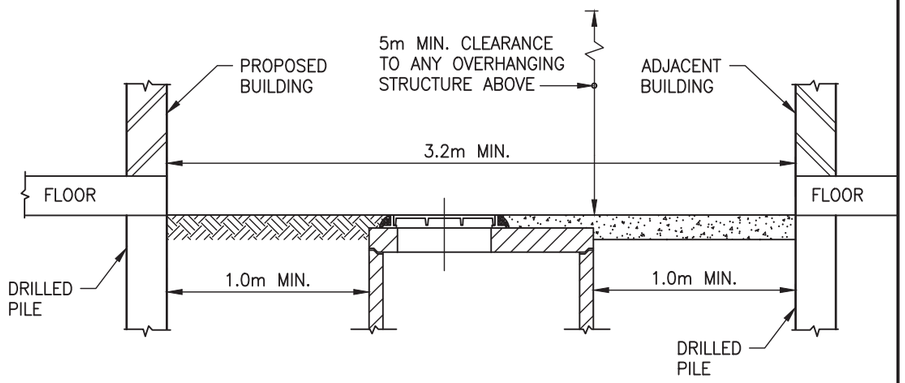
BUILD OVER

'WORKS OVER' NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. THE DETAIL APPLIES TO STORMWATER PIPES ≤ 375mm NOMINAL DIAMETER AND ≤ 2.0m DEPTH TO INVERT.
3. WORKS OVER PIPES LARGER THAN 375mm NOMINAL DIAMETER IS NOT ALLOWED.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.
5. BRIDGING IS NOT ALLOWED OVER PIPES WHERE CLEAR VERTICAL SEPARATION DISTANCE FROM TOP OF PIPE TO UNDERSIDE OF BRIDGING BEAM IS LESS THAN 1.0m.

GENERAL NOTES:

1. THE INFORMATION ON THIS PAGE IS INTENDED TO SHOW EXAMPLES OF TYPICAL SCENARIOS AND SHALL BE USED FOR GENERAL GUIDANCE PURPOSES ONLY. SIGNIFICANT VARIATIONS ON A SITE-BY-SITE BASIS ARE TO BE EXPECTED AND IT IS IN NO WAY IMPLIED THAT MEETING ANY OF THESE REQUIREMENTS WILL GUARANTEE APPROVAL.
2. WHERE CONSTRUCTION WORKS ARE PROPOSED IN THE VICINITY OF EXISTING PUBLIC STORMWATER ASSETS, ANY NECESSARY MEASURES TO PROTECT SUCH ASSETS SHALL BE IMPLEMENTED, IN ACCORDANCE WITH SECTION 4.3.23 OF THE SWCoP.
3. REQUIREMENTS FOR FOUNDATION DESIGN, ETC. APPLY TO BOTH SIDES OF THE PIPE.
4. NO DRIVEN PILES ARE PERMITTED WITHIN 10m OF BRICK STORMWATER STRUCTURES, OR WITHIN 5m OF ALL OTHER STORMWATER STRUCTURES.
5. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL FOR DRIVEN PILES IN PARTIALLY DRILLED HOLES, WITHIN THE 5m-10m ZONE.
6. PILES THAT MAY BE REQUIRED TO RESIST HORIZONTAL FORCES WILL REQUIRE SPECIFIC DESIGN.
7. PILE/FOOTING LOCATION POINT MUST BE BELOW 45° "ZONE OF INFLUENCE".
8. ALL MANHOLES SHALL HAVE 24 HOURS UNOBSTRUCTED ACCESS.
9. MANHOLES IN BASEMENTS, OR IN LOCATIONS WHERE SUFFICIENT CLEARANCE IS UNAVAILABLE, ARE NOT PERMITTED.
10. ALL PIPE 'WORK OVER' WILL REQUIRE SPECIFIC APPROVAL BY AUCKLAND COUNCIL.
11. REFER TO SECTION 4.3.23 OF THE SWCOP FOR PIPE 'WORK OVER' REQUIREMENTS.
12. FOR MANHOLES GREATER THAN 4m DEEP OR LARGER THAN 1200mm DIA. SPECIFIC DESIGN (INCLUDING CLEARANCE REQUIREMENTS) IS REQUIRED.
13. SPECIFIC APPROVAL FROM COUNCIL IS REQUIRED FOR WORKS WITHIN 10 METERS OF A RISING MAIN.
14. WORKS OVER RISING MAIN IS NOT ALLOWED.



MANHOLE CONSTRUCTION CLEARANCE

STORMWATER CODE OF PRACTICE
STANDARD DETAILS

REVISION: 3
REV DATE: 17 JANUARY 2022
CAD FILENAME: AC-STD-SW22.DWG

AUCKLAND COUNCIL

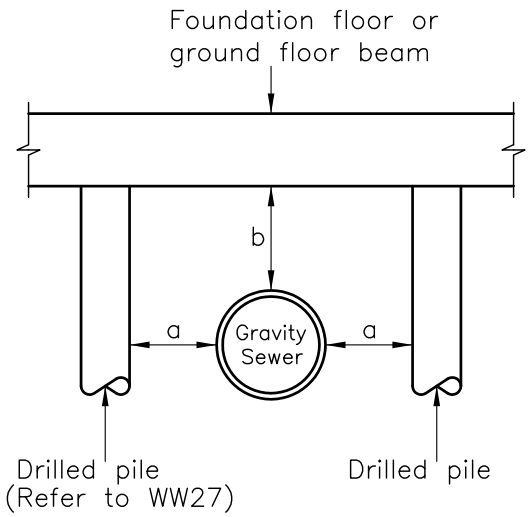
ENVIRONMENTAL-SW

STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS

MANHOLES NEAR WORKS AND WORKS CLOSE TO, OR OVER, PIPES

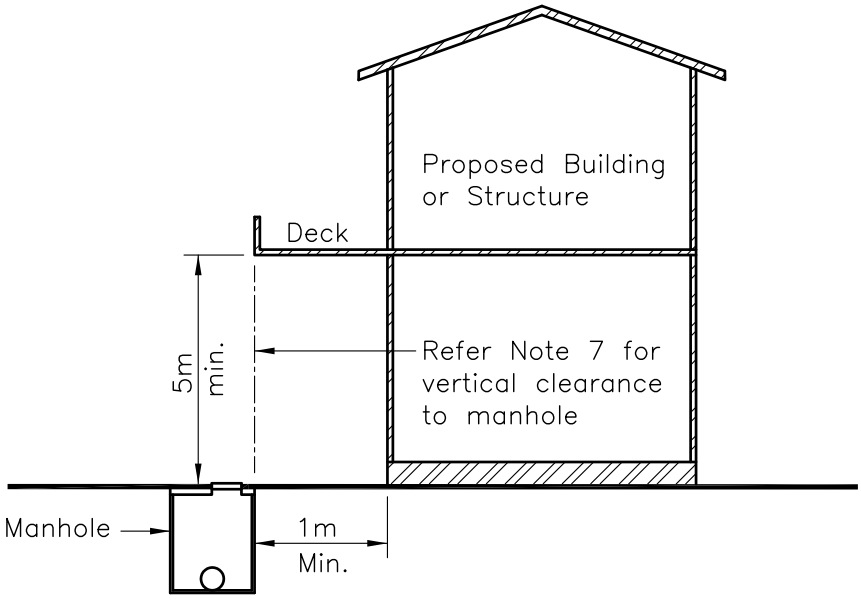
ORIGINAL SCALE A3
SCALE: N.T.S.
DRAWING SET: SWCoP
SHEET: 1 OF 1
DRAWING No.: SW22
REV: 3

Auckland Council
Te Kaunihera o Tāmaki Makaurau



Minimum Pile Clearances						
Type of Sewer	Sewer Depth < 3m		Sewer Depth 3m–5m		Sewer Depth >5m	
	a	b	a	b	a	b
Local Wastewater Network	1m	0.6m	1m	0.6m	1.5m	0.6m
Transmission (Trunk) Sewer	1m	1m	2m	1m	3m	1.5m

PIPE CONSTRUCTION CLEARANCE FOR BRIDGING OPTIONS



MANHOLE CONSTRUCTION CLEARANCE

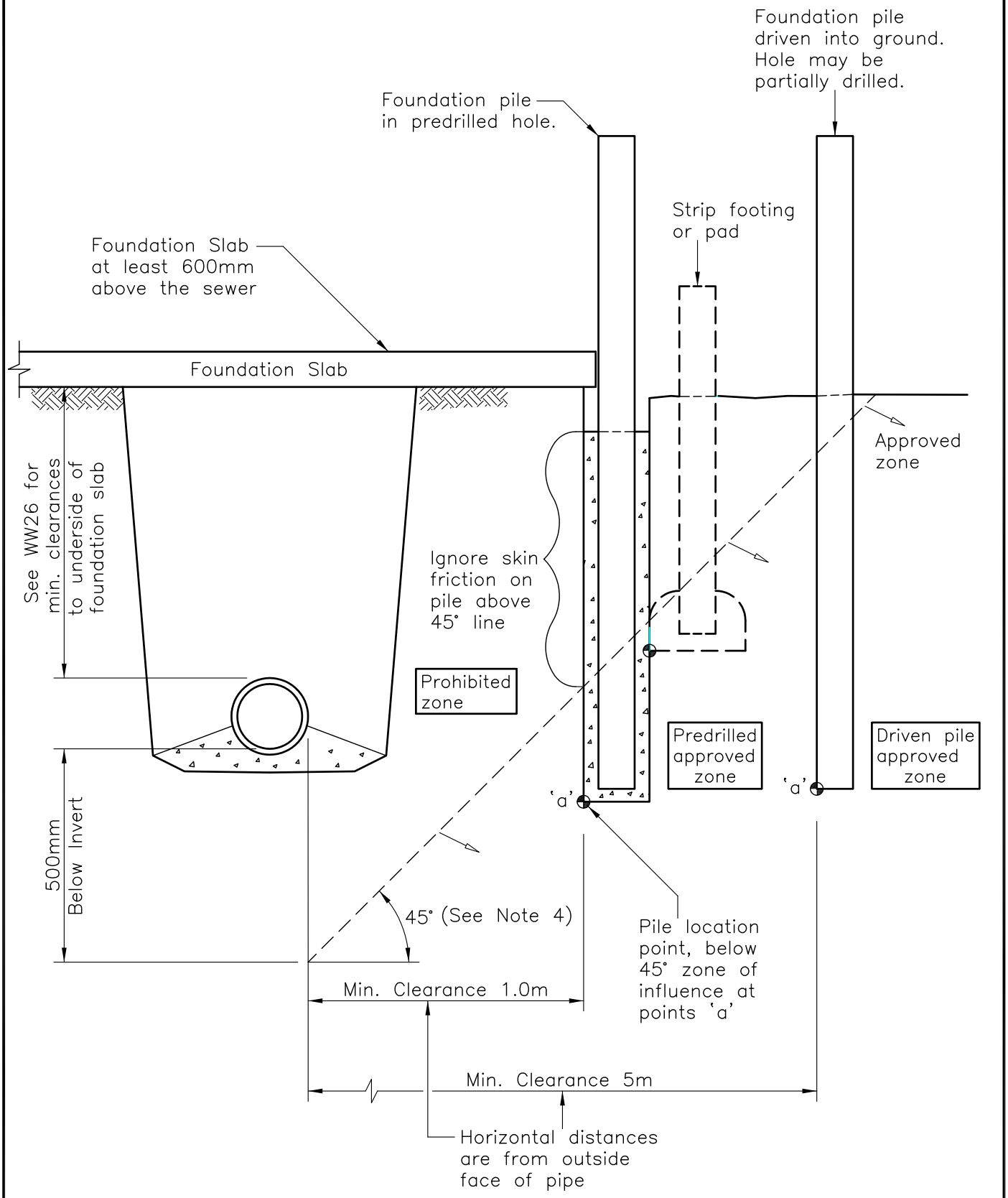
NOTES:

1. Locate sewer to survey accuracy or by hand piloting.
2. No driven piles within 5m of a sewer or 10m of brick sewer.
3. All manholes shall have 24 hrs unobstructed access.
4. No construction shall occur above a manhole or within tolerances 'a' or 'b' in table above.
5. Pressure mains shall not be built over.
6. Brick or poor condition wastewater pipe shall not be built over. Bridging options must be approved.
7. Vertical clearance from the top of the chamber shall be 5m Min. over the full width of the chamber.

O:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044D .DWG

PIPE AND MANHOLE CONSTRUCTION CLEARANCE

SCALE:	N.T.S.
ISSUE DATE:	04–12–2017
DWG No.	2010070.044D
REFERENCE No.	WW 26



NOTES:

1. No driven piles are permitted within 10m of brick Sewers, or within 5m of all other sewers.
2. Piles that are required to resist horizontal forces will require specific design.
3. Pile/Footing location point must be below 45° zone of influence.
4. Zone of influence typically 45° or angle determined by a structural engineer.

O:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.045B .DWG

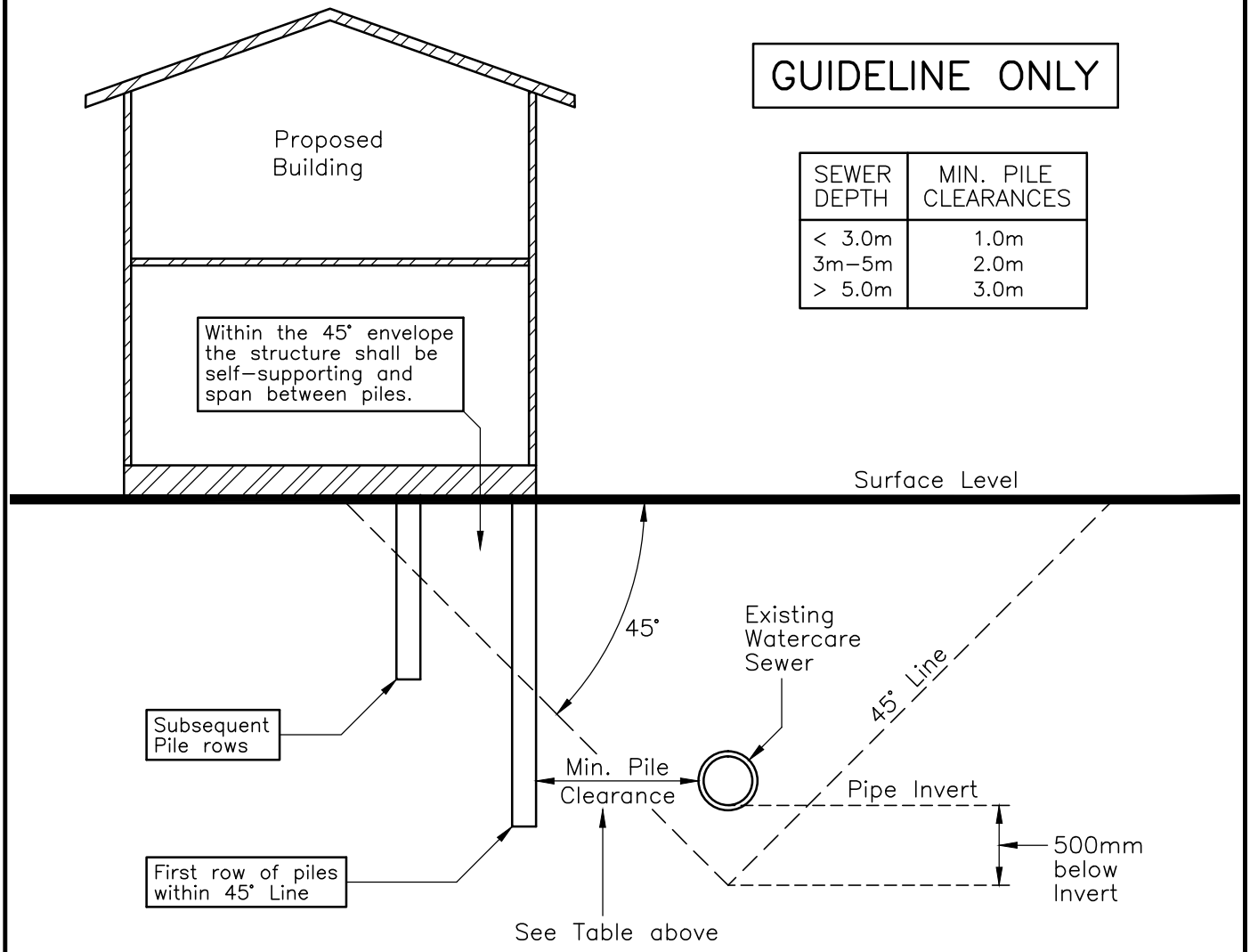
Watercare

BUILDING CLOSE TO OR OVER LOCAL NETWORK WASTEWATER

SCALE:	N.T.S.
ISSUE DATE:	04–12–2017
DWG No.	2010070.045B
REFERENCE No.	WW 27

GUIDELINE ONLY

SEWER DEPTH	MIN. PILE CLEARANCES
< 3.0m	1.0m
3m–5m	2.0m
> 5.0m	3.0m



SECTION THROUGH BUILDING AND TRANSMISSION SEWER

NOTES:

1. This detail shall be used as a guideline only. All applications will be assessed on individual basis and conditions imposed could be more specific than these shown.
2. No structural loads are to be placed on public sewer lines.
3. All structural loads on piles shall be absorbed outside the 45° envelope and below the pipe invert level for the first row of piles.
4. Where raft foundations or strip footings are proposed within the 45° envolope, statement from a structural engineer is required to confirm that the foundation design complies with Clause 2.
5. Driven piles are not permitted within 10 metres of a brick sewer or 5 metres of any other sewers.
6. Closed Circuit Television (CCTV) inspections of Transmission sewer only on approval from Watercare Services Ltd.
7. Manholes shall be minimum 1m clear from buildings as per drawing WW20 and building eaves shall be completely clear.
8. Drawings of the proposed works must accurately identify the location of the sewer/s affected and the distances with cross–section details for all structures. Watercare approved registered surveyor must be engaged to carry out the mark out.

O:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.051C .DWG

Watercare

GUIDELINE FOR BUILDING CLOSE TO OR OVER TRANSMISSION WASTEWATER

SCALE:	N.T.S.
ISSUE DATE:	13–07–2018
DWG No.	2010070.051C
REFERENCE No.	WW 28

APPENDIX C: CLASSIFICATION TESTS

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-05110
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/07/2023

Sample Details

Sample ID:	ETAM23S-05110	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	21/06/2023	**Material:**	Undisturbed Soil
Date Submitted:	23/06/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	26/06/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT18		
Borehole Number:	PT18		
Borehole Depth (m):	-		

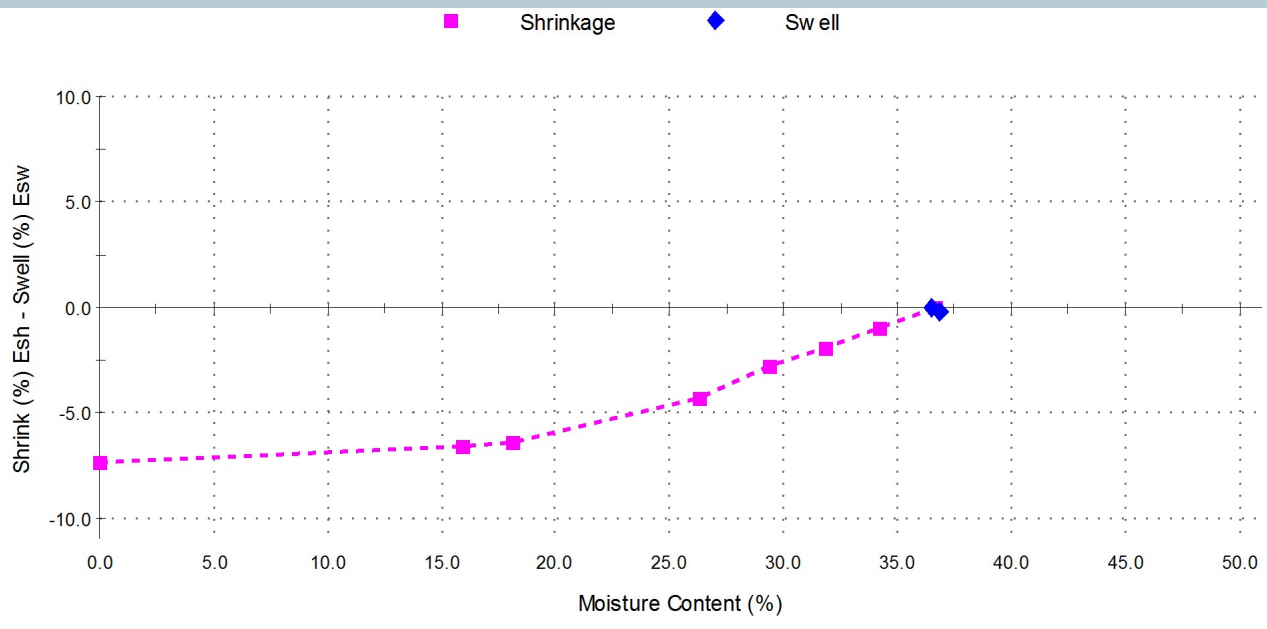
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.2
Moisture Content before (%):	36.5
Moisture Content after (%):	36.9
Est. Unc. Comp. Strength before (kPa):	200
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	7.4
Shrinkage Moisture Content (%):	36.6
Est. inert material (%):	1.5%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 4.1

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W01213
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-05109
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/07/2023

Sample Details

Sample ID:	ETAM23S-05109	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	21/06/2023	**Material:**	Undisturbed Soil
Date Submitted:	23/06/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	26/06/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT17		
Borehole Number:	PT17		
Borehole Depth (m):	-		

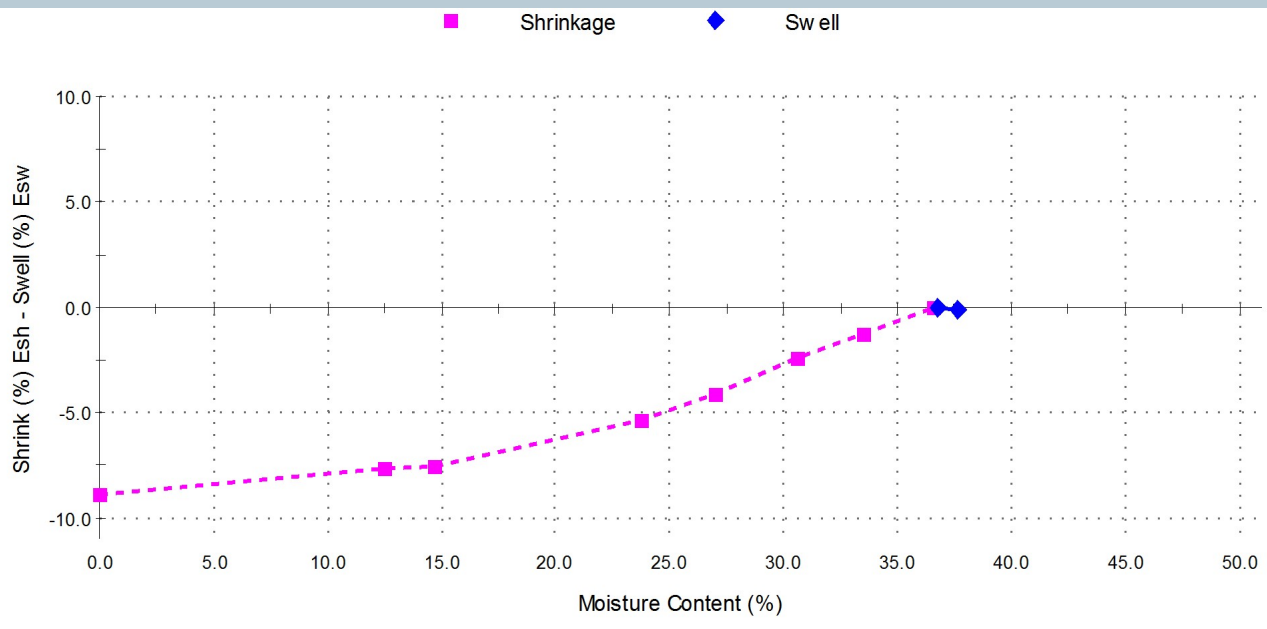
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.1
Moisture Content before (%):	36.8
Moisture Content after (%):	37.6
Est. Unc. Comp. Strength before (kPa):	250
Est. Unc. Comp. Strength after (kPa):	250

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	8.9
Shrinkage Moisture Content (%):	36.6
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 4.9

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W01213
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM23S-00555
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 23/02/2023

Sample Details

Sample ID:	ETAM23S-00555	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	9/02/2023	**Material:**	Undisturbed Soil
Date Submitted:	10/02/2023	**Source:**	Unknown (Sampled by Client)
Date Tested:	14/02/2023		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT06B, 0.0 - 0.3 m		
Borehole Number:	PT06B		
Borehole Depth (m):	0.0 - 0.3		

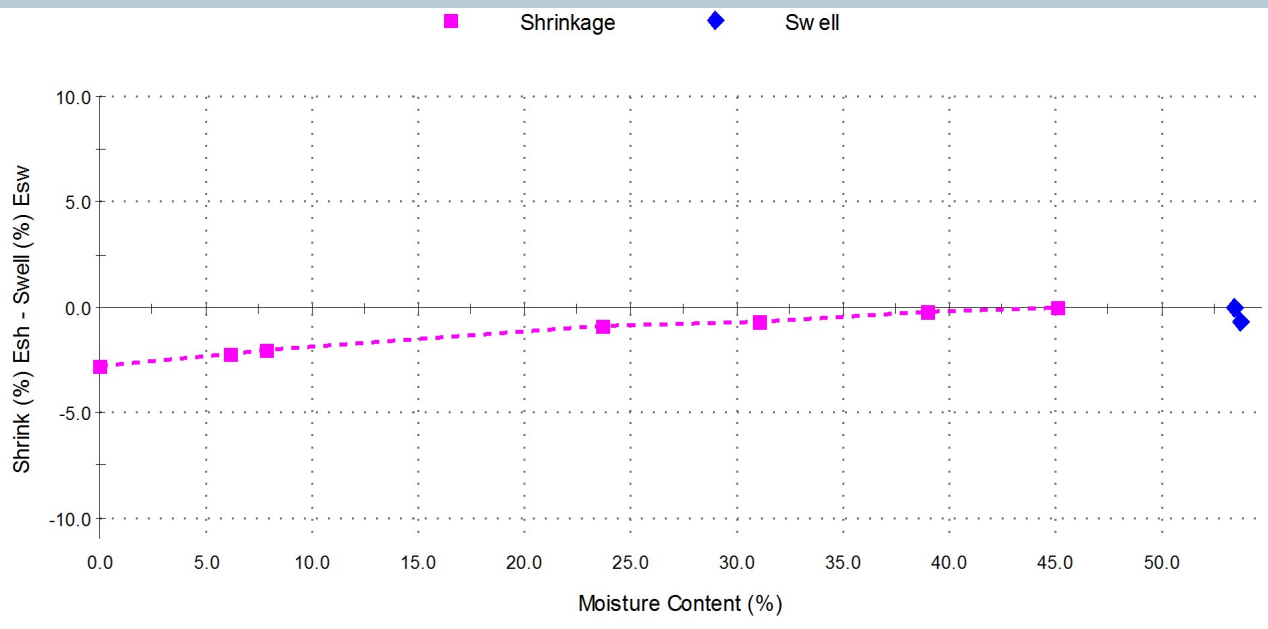
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.7
Moisture Content before (%):	53.4
Moisture Content after (%):	53.7
Est. Unc. Comp. Strength before (kPa):	100
Est. Unc. Comp. Strength after (kPa):	75

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.8
Shrinkage Moisture Content (%):	45.1
Est. inert material (%):	1%
Crumbling during shrinkage:	1%
Cracking during shrinkage:	4%

Shrink Swell



Shrink Swell Index - Iss (%): 1.6

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM23W00157
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM24S-03342
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2024

Sample Details

Sample ID:	ETAM24S-03342	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	18/04/2024	**Material:**	Undisturbed Soil
Date Submitted:	19/04/2024	**Source:**	Unknown (Sampled by Client)
Date Tested:	22/04/2024		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT01, 0.1 - 0.3 m		
Borehole Number:	PT01		
Borehole Depth (m):	0.1 - 0.3		

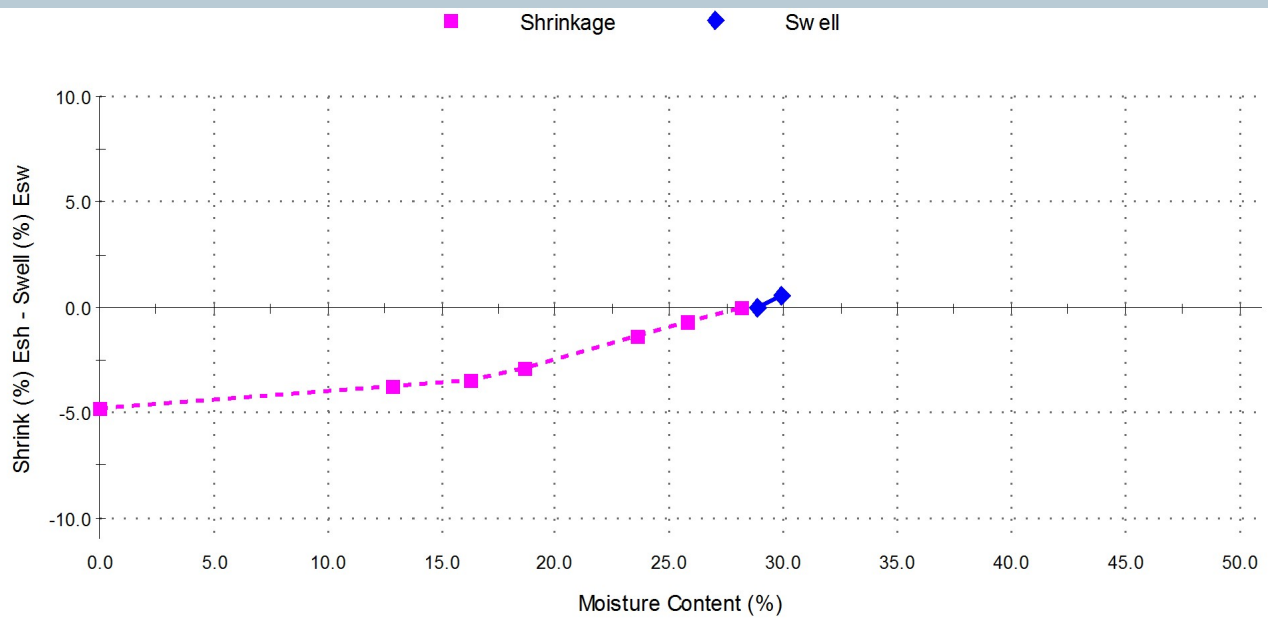
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.6
Moisture Content before (%):	28.8
Moisture Content after (%):	29.9
Est. Unc. Comp. Strength before (kPa):	225
Est. Unc. Comp. Strength after (kPa):	300

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.8
Shrinkage Moisture Content (%):	28.1
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0.5%

Shrink Swell



Shrink Swell Index - Iss (%): 2.8

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM24W00789
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM24S-03343
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

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

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2024

Sample Details

Sample ID:	ETAM24S-03343	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	18/04/2024	**Material:**	Undisturbed Soil
Date Submitted:	19/04/2024	**Source:**	Unknown (Sampled by Client)
Date Tested:	22/04/2024		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT02, 0.2 - 0.4 m		
Borehole Number:	PT02		
Borehole Depth (m):	0.2 - 0.4		

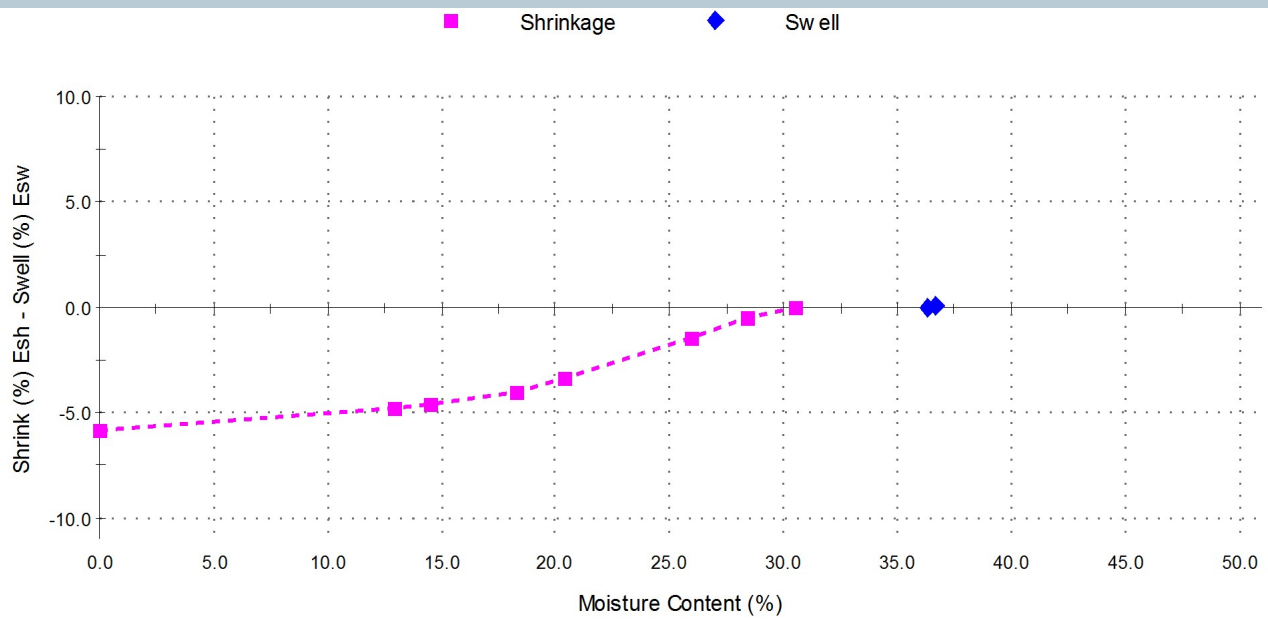
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.0
Moisture Content before (%):	36.3
Moisture Content after (%):	36.7
Est. Unc. Comp. Strength before (kPa):	250
Est. Unc. Comp. Strength after (kPa):	175

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	5.8
Shrinkage Moisture Content (%):	30.5
Est. inert material (%):	2%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0%

Shrink Swell



Shrink Swell Index - Iss (%): 3.3

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM24W00789
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM24S-03344
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2024

Sample Details

Sample ID:	ETAM24S-03344	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	18/04/2024	**Material:**	Undisturbed Soil
Date Submitted:	19/04/2024	**Source:**	Unknown (Sampled by Client)
Date Tested:	22/04/2024		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT03, 0.1 - 0.3 m		
Borehole Number:	PT03		
Borehole Depth (m):	0.1 - 0.3		

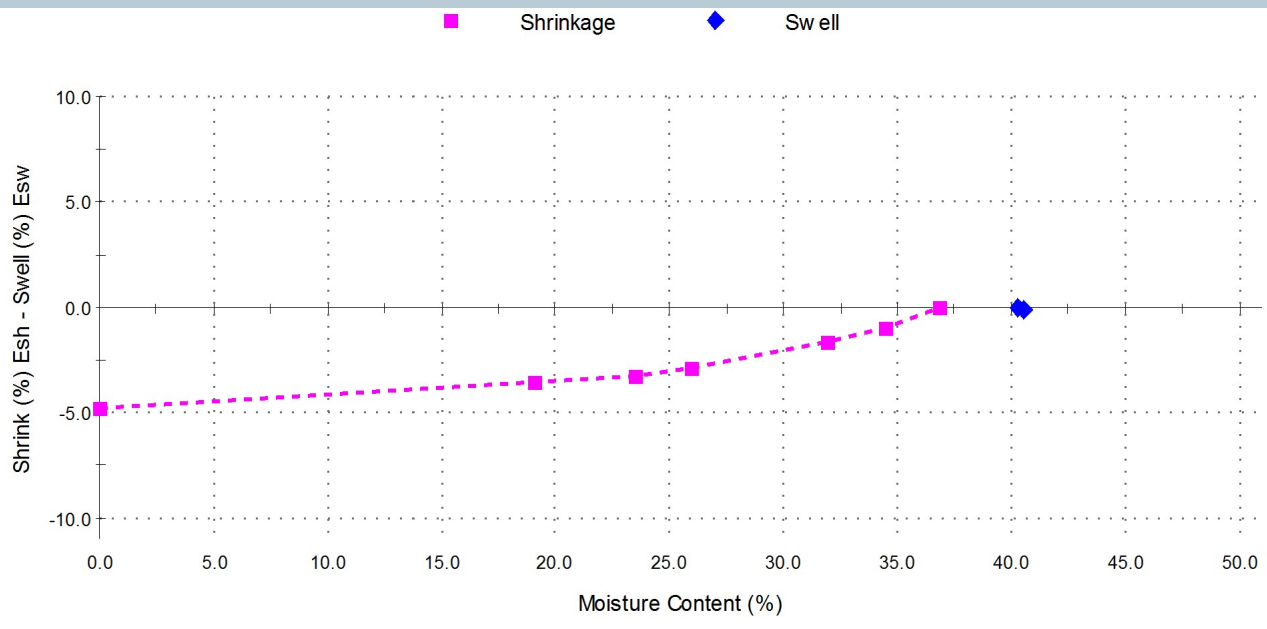
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.1
Moisture Content before (%):	40.2
Moisture Content after (%):	40.5
Est. Unc. Comp. Strength before (kPa):	400
Est. Unc. Comp. Strength after (kPa):	375

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	4.8
Shrinkage Moisture Content (%):	36.9
Est. inert material (%):	2%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 2.7

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM24W00789
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM24S-03345
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2024

Sample Details

Sample ID:	ETAM24S-03345	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	18/04/2024	**Material:**	Undisturbed Soil
Date Submitted:	19/04/2024	**Source:**	Unknown (Sampled by Client)
Date Tested:	23/04/2024		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT04, 0.05 - 0.25 m		
Borehole Number:	PT04		
Borehole Depth (m):	0.05 - 0.25		

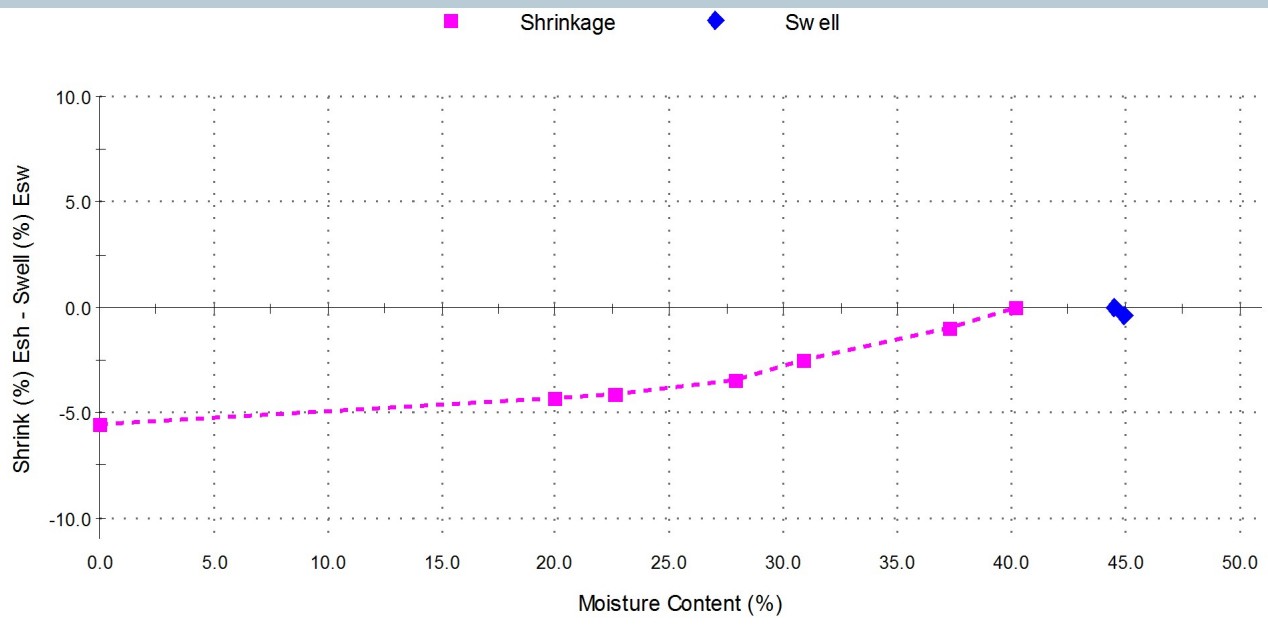
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	-0.4
Moisture Content before (%):	44.5
Moisture Content after (%):	44.9
Est. Unc. Comp. Strength before (kPa):	150
Est. Unc. Comp. Strength after (kPa):	150

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	5.6
Shrinkage Moisture Content (%):	40.1
Est. inert material (%):	1%
Crumbling during shrinkage:	0.5%
Cracking during shrinkage:	2%

Shrink Swell



Shrink Swell Index - Iss (%): 3.1

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM24W00789
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM24S-03346
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

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

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2024

Sample Details

Sample ID:	ETAM24S-03346	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	18/04/2024	**Material:**	Undisturbed Soil
Date Submitted:	19/04/2024	**Source:**	Unknown (Sampled by Client)
Date Tested:	23/04/2024		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT05, 0.1 - 0.3 m		
Borehole Number:	PT05		
Borehole Depth (m):	0.1 - 0.3		

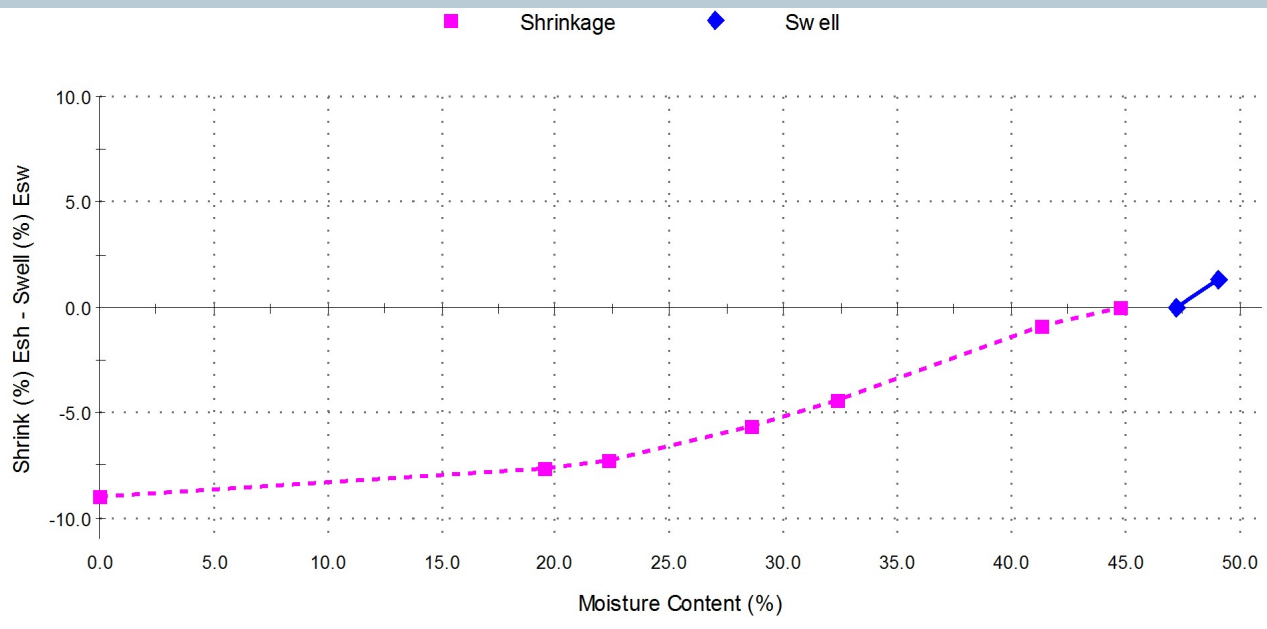
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	1.3
Moisture Content before (%):	47.2
Moisture Content after (%):	49.1
Est. Unc. Comp. Strength before (kPa):	375
Est. Unc. Comp. Strength after (kPa):	300

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	9.0
Shrinkage Moisture Content (%):	44.7
Est. inert material (%):	1%
Crumbling during shrinkage:	0%
Cracking during shrinkage:	0%

Shrink Swell



Shrink Swell Index - Iss (%): 5.4

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM24W00789
Tested By: JM

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Shrink Swell Index Report

Report No: SSI:ETAM24S-03347
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
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Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2024

Sample Details

Sample ID:	ETAM24S-03347	**Sampling Method:**	Unknown (Not IANZ Endorsed)
Date Sampled:	18/04/2024	**Material:**	Undisturbed Soil
Date Submitted:	19/04/2024	**Source:**	Unknown (Sampled by Client)
Date Tested:	23/04/2024		
Project Location:	117 Kowhai Road, Orewa		
Sample Location:	PT06, 0.2 - 0.4 m		
Borehole Number:	PT06		
Borehole Depth (m):	0.2 - 0.4		

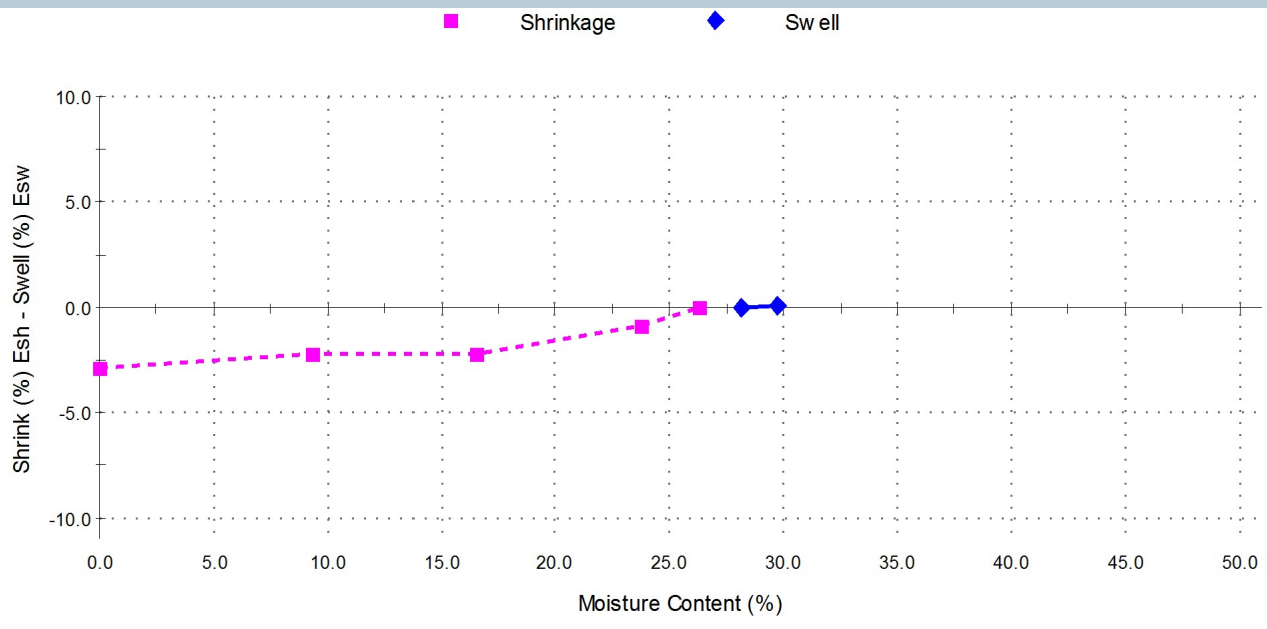
Swell Test — AS 1289.7.1.1

Swell on Saturation (%):	0.0
Moisture Content before (%):	28.1
Moisture Content after (%):	29.7
Est. Unc. Comp. Strength before (kPa):	450+
Est. Unc. Comp. Strength after (kPa):	450+

Shrink Test — AS 1289.7.1.1

Shrink on drying (%):	2.9
Shrinkage Moisture Content (%):	26.3
Est. inert material (%):	13%
Crumbling during shrinkage:	1%
Cracking during shrinkage:	3%

Shrink Swell



Shrink Swell Index - Iss (%): 1.6

Comments

Not accredited
Est. Unc. Comp. Strength readings are not IANZ Endorsed as part of this Report.
Work Order No : ETAM24W00789
Tested By: JM

APPENDIX D: EARTHWORKS FIELD DENSITY SUMMARY SHEETS

Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	.
Attention:	Joshua Fisher		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	23/04/2019

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Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
17/04/2019	19W01518	TR	**1**	Fill	Silty CLAY	Shear Key	1749405	5949050	-	150	~2.3m to Finished Level	UTP	UTP	UTP	UTP	1.92	27.2	1.51	2.70	3
17/04/2019	19W01518	TR	**2**	Fill	Gravelly CLAY	Shear Key	1749417	5949056	-	150	~2.4m to Finished Level	UTP	UTP	UTP	UTP	1.88	26.2	1.49	2.70	6

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SITE PLAN

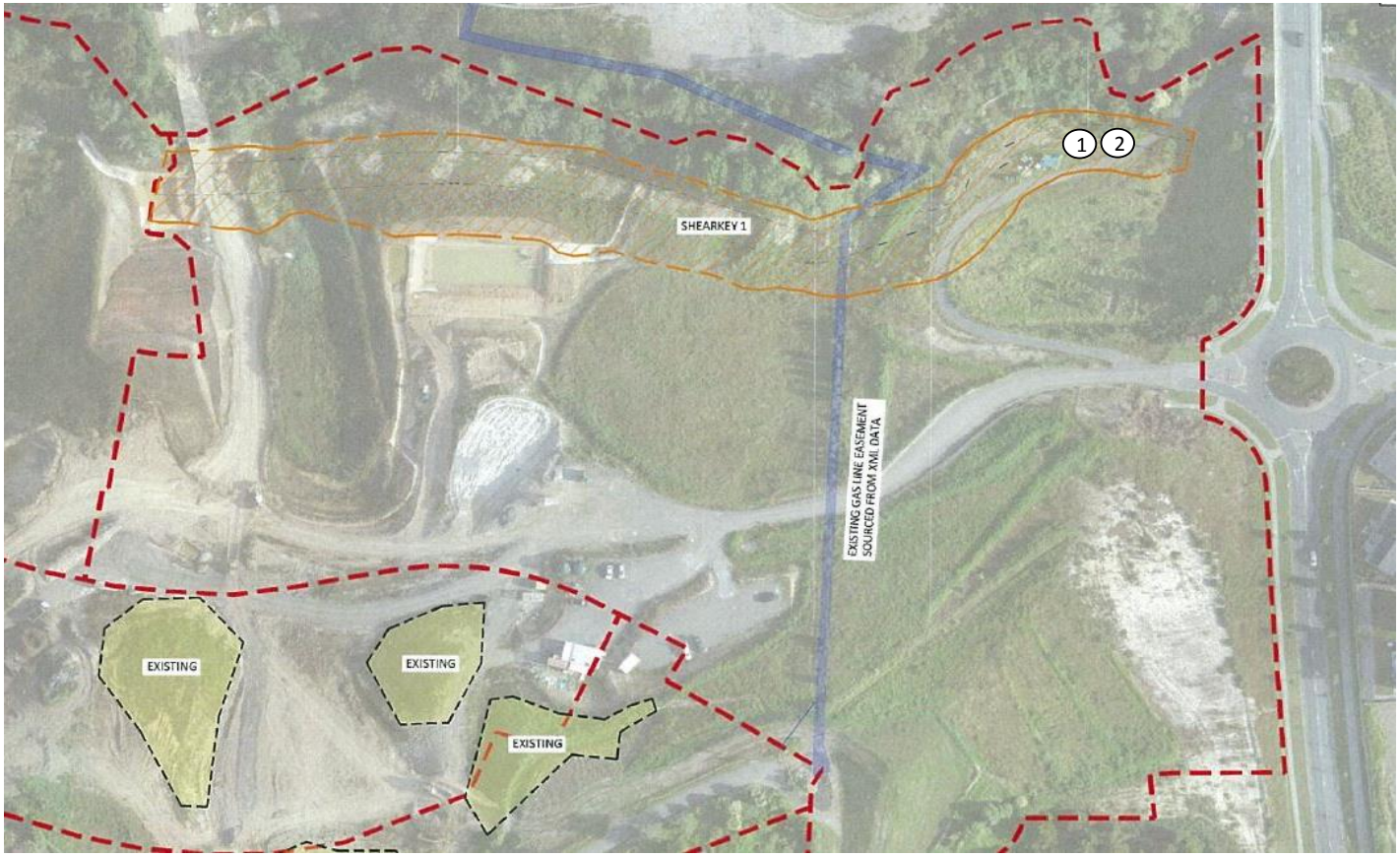
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM19W01518
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 17/04/2019



Issue date: 050517

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PO Box 58877, Botany, Manukau, Auckland 2163
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www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	.
Attention:	Joshua Fisher		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	6/05/2019

IANZ ACCREDITED LABORATORY

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

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
2/05/2019	19W01644	TR	**3**	Fill	Silty CLAY	Shear Key 1	1749397	5949056	-	150	~4.0m to Finished Level	238	238	238	UTP	1.87	31.7	1.42	2.70	3
2/05/2019	19W01644	TR	**4**	Fill	Silty CLAY	Shear Key 1	1749388	5949051	-	150	~3.5m to Finished Level	238	238	210	193	1.76	36.6	1.29	2.70	5

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SITE PLAN

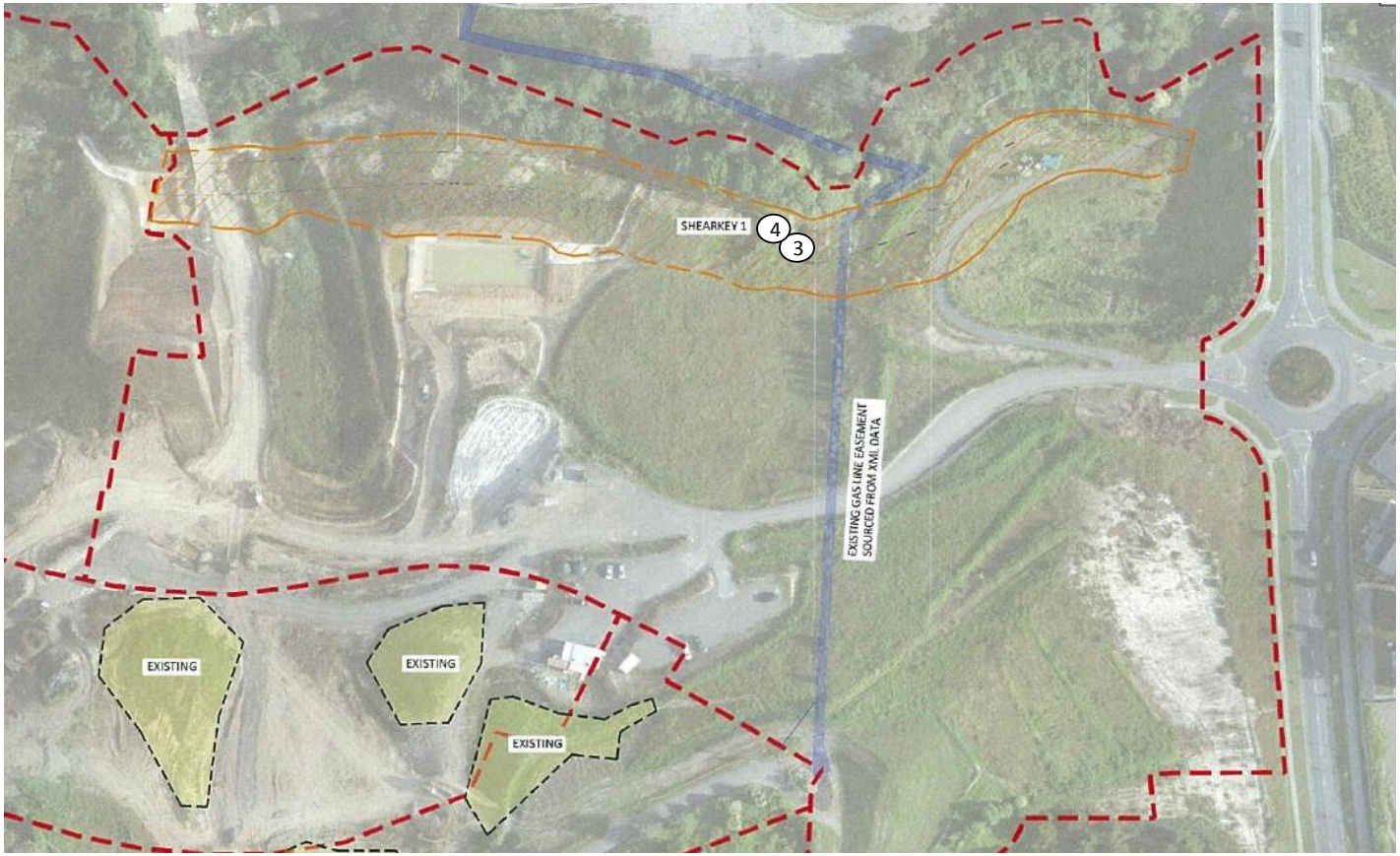
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM19W01644
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 2/05/2019



Issue date: 050517

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PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	.
Attention:	Joshua Fisher		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	6/05/2019

IANZ ACCREDITED LABORATORY

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

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
3/05/2019	19W01662	TR	**5**	Fill	Sandy CLAY	Shear Key 1	1749397	5949055	-	150	~ 6.0m from base	193	193	224	200	1.81	34.0	1.35	2.70	4
3/05/2019	19W01662	TR	**6**	Fill	Sandy CLAY	Shear Key 1	1749405	5949051	-	150	~ 6.0m from base	175	175	224	238	1.87	33.2	1.41	2.70	1

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SITE PLAN

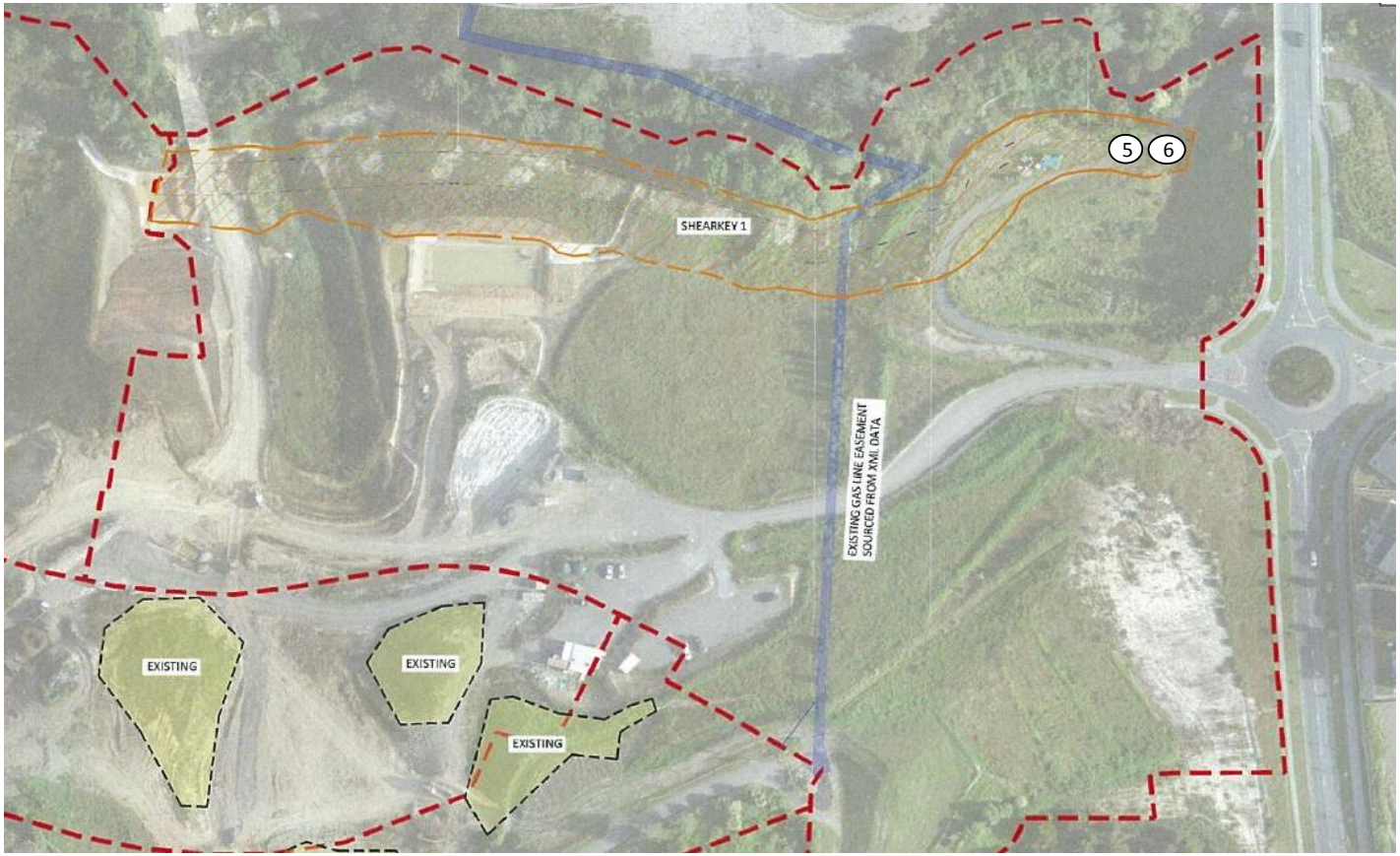
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM19W01662
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 3/05/2019



Issue date: 050517

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PO Box 58877, Botany, Manukau, Auckland 2163
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	.
Attention:	Joshua Fisher		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	14/05/2019

IANZ ACCREDITED LABORATORY

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

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
9/05/2019	19W01760	TR	**7**	Fill	Sandy CLAY	Shear Key 1	1749407	5949054	-	150	~ 6.0m from base	238	238	UTP	UTP	1.79	30.7	1.37	2.70	7
9/05/2019	19W01760	TR	**8**	Fill	Sandy CLAY	Shear Key 1	1749427	5949046	-	150	~ 6.0m from base	155	175	238	234	1.85	27.0	1.46	2.70	7
9/05/2019	19W01760	TR	**9**	Fill	Sandy CLAY	Shear Key 1	1749424	5949035	-	150	~ 6.2m from base	210	193	175	238	1.84	30.6	1.41	2.70	5

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SITE PLAN

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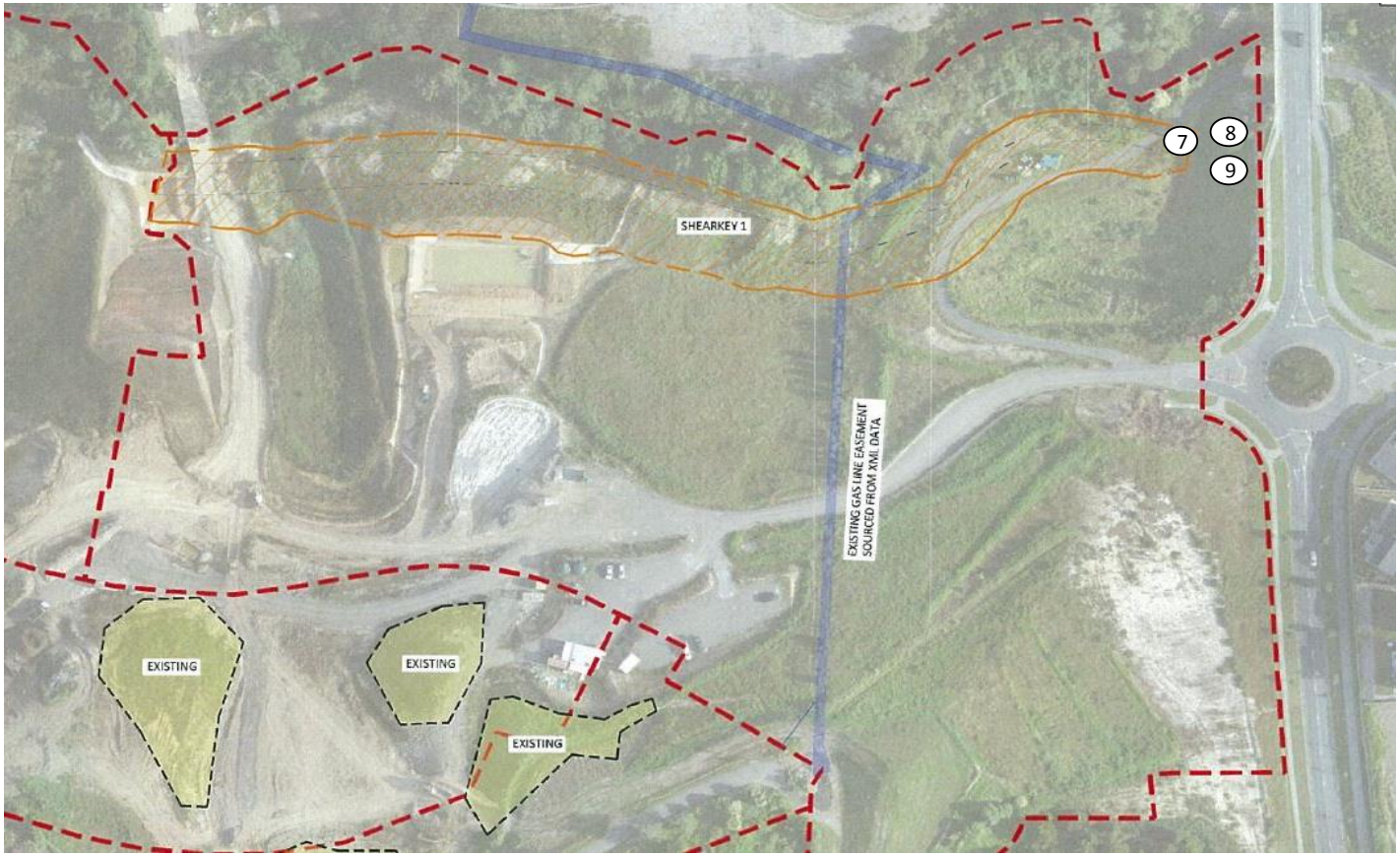
Project No: 773-ETAM00991AA
Work Order No: ETAM19W01760
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 9/05/2019



Issue date: 050517

Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	.
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	23/05/2019

IANZ ACCREDITED LABORATORY

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

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
17/05/2019	19W01847	TR	**10**	Fill	Sandy CLAY	Shear Key 1	1749371	5949036	-	150	~ 4.5m from base	210	143	155	175	1.83	31.7	1.39	2.70	5
17/05/2019	19W01847	TR	**11**	Fill	Sandy CLAY	Shear Key 1	1749372	5949046	-	150	~ 4.5m from base	210	195	155	163	1.85	32.0	1.40	2.70	3

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SITE PLAN

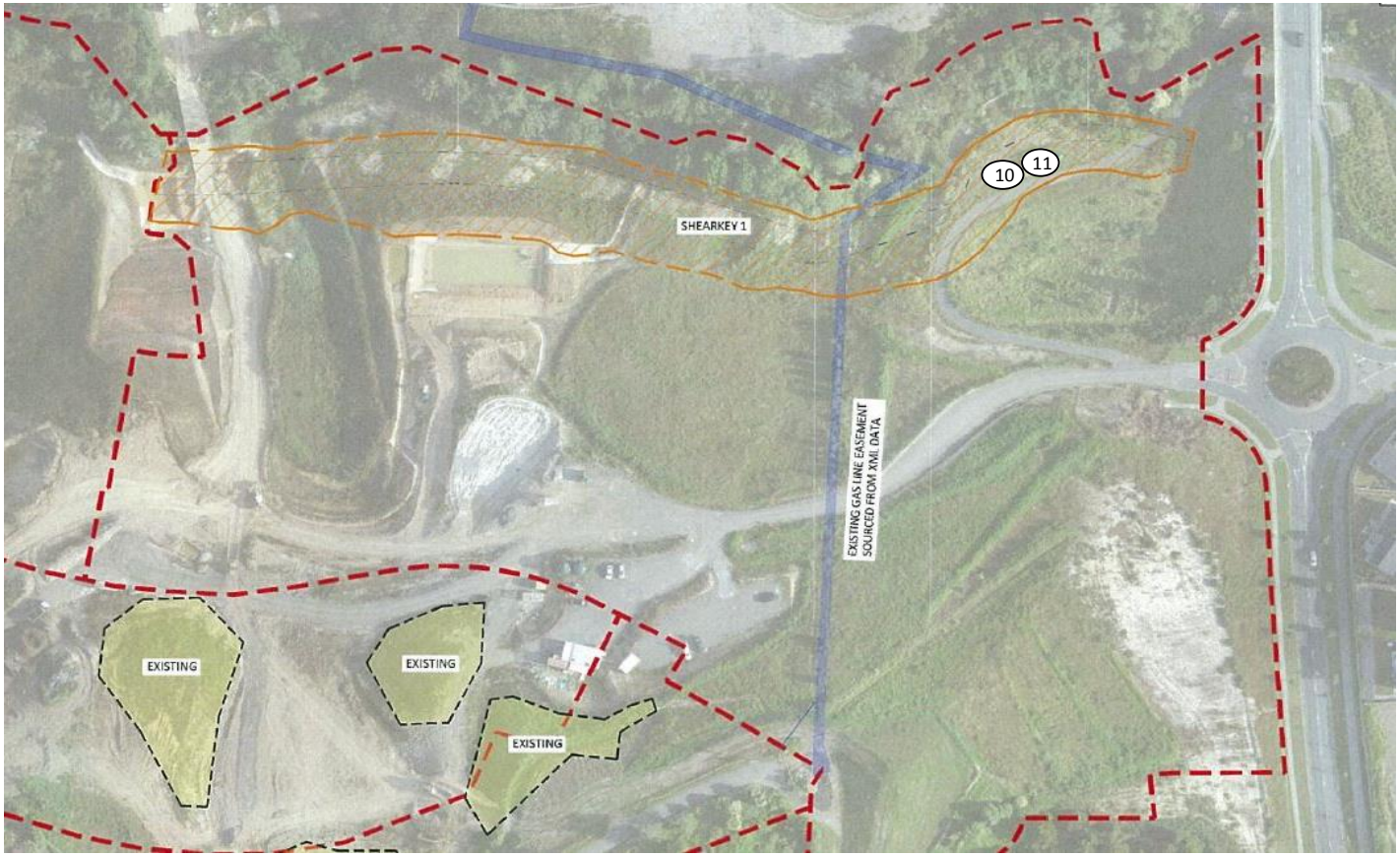
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM19W01847
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 17/05/2019



Issue date: 050517

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PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	.
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	23/05/2019

IANZ ACCREDITED LABORATORY

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

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
20/05/2019	19W01872	TR	**12**	Fill	Sandy CLAY	Shear Key 1	1749373	5949044	-	150	~ 6.5m from base	155	175	193	200	1.88	28.9	1.46	2.70	4
20/05/2019	19W01872	TR	**13**	Fill	Sandy CLAY	Shear Key 1	1749385	5949050	-	150	~ 6.5m from base	238	238	238	238	1.86	30.7	1.42	2.70	3

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PO Box 58 877, Botany, Manukau 2163, New Zealand
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SITE PLAN

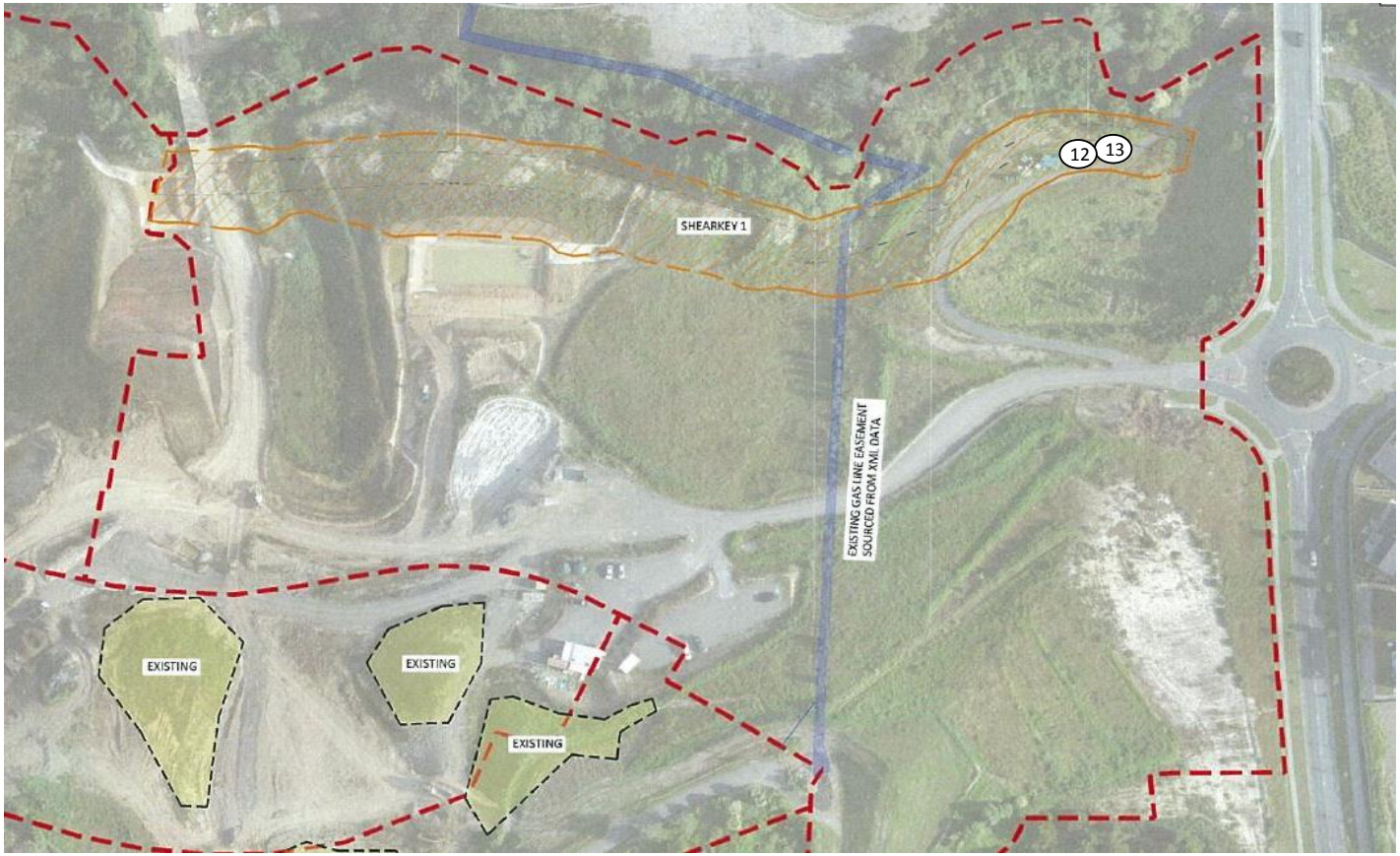
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM19W01872
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 20/05/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)
Address	PO Box 8261, Symonds Street, Auckland 1150
Attention:	Stephen Parkes
c.c:	-
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Location:	Access off Arran Drive, Orewa

PROJECT CODE: 773-ETAM00991AA

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 28/05/2019

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
24/05/2019	19W01946	TR	**19**	Fill	Stabilised Sandy CLAY	Shear Key 1	1749409	5949053	7.5	150		UTP	238	155	193	1.83	31.4	1.39	2.70	5
24/05/2019	19W01946	TR	**20**	Fill	Stabilised Sandy CLAY	Shear Key 1	1749387	5949051	7.5	150		234	234	210	210	1.75	32.3	1.32	2.70	8

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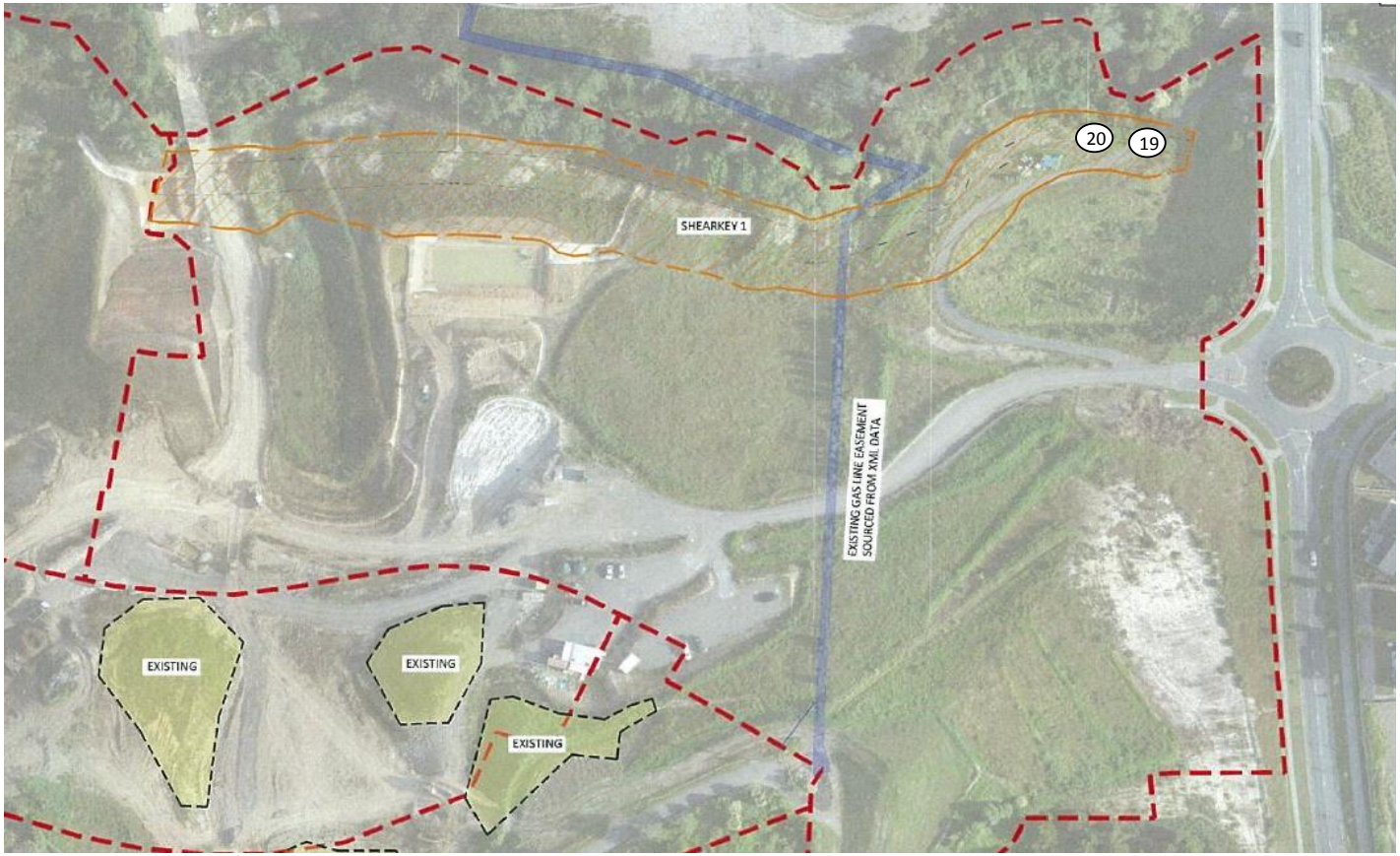
Project No: 773-ETAM00991AA
Work Order No: ETAM19W01946
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 24/05/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 16/10/2019

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
14/10/2019	19W03299	TR	**21**	Fill	Sandy CLAY	Shear Key 1	1749149	5949048	5.73	150	~ 5.7m from base	185	185	202	202+	1.83	31.3	1.39	2.70	5
14/10/2019	19W03299	TR	**22**	Fill	Sandy CLAY	Shear Key 1	1749192	5949052	6.47	150	~ 6.5m from base	173	185	UTP	UTP	1.78	30.5	1.37	2.70	8
14/10/2019	19W03299	TR	**23**	Fill	Sandy CLAY	Shear Key 1	1749188	5949048	7.28	150	~ 7.3m from base	202	185	202+	202+	1.83	27.8	1.43	2.70	7
14/10/2019	19W03299	TR	**24**	Fill	Sandy CLAY	Shear Key 1	1749183	5949047	7.73	150	~ 7.7m from base	202	202	202+	195	1.81	30.8	1.38	2.70	6

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SITE PLAN

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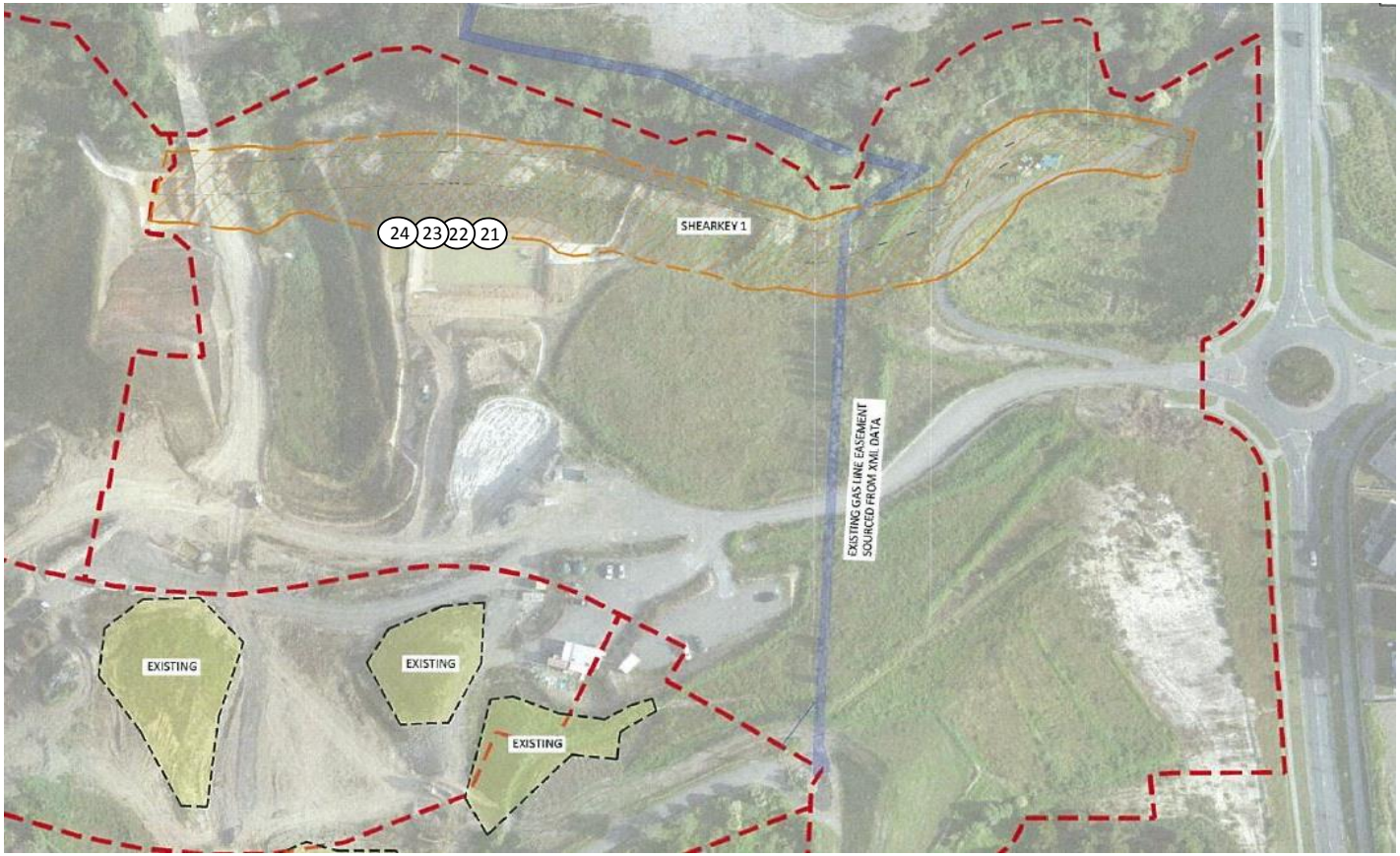
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03299
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 14/10/2019



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 23/10/2019

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
18/10/2019	19W03320	TR	**25**	Fill	Sandy CLAY	Shear Key 1	1749184	5949042	9.54	150		161	189	195	202	1.86	31.7	1.41	2.70	3
18/10/2019	19W03320	TR	**26**	Fill	Sandy CLAY	Shear Key 1	1749192	5949047	9.28	150		157	150	164	173	1.84	32.3	1.39	2.70	3
18/10/2019	19W03320	TR	**27**	Fill	Sandy CLAY	Shear Key 1	1749196	5949057	8.43	150		171	173	189	185	1.86	31.7	1.41	2.70	3
18/10/2019	19W03320	TR	**28**	Fill	Sandy CLAY	Shear Key 1	1749202	5949040	9.62	150		173	185	189	171	1.80	30.0	1.39	2.70	7

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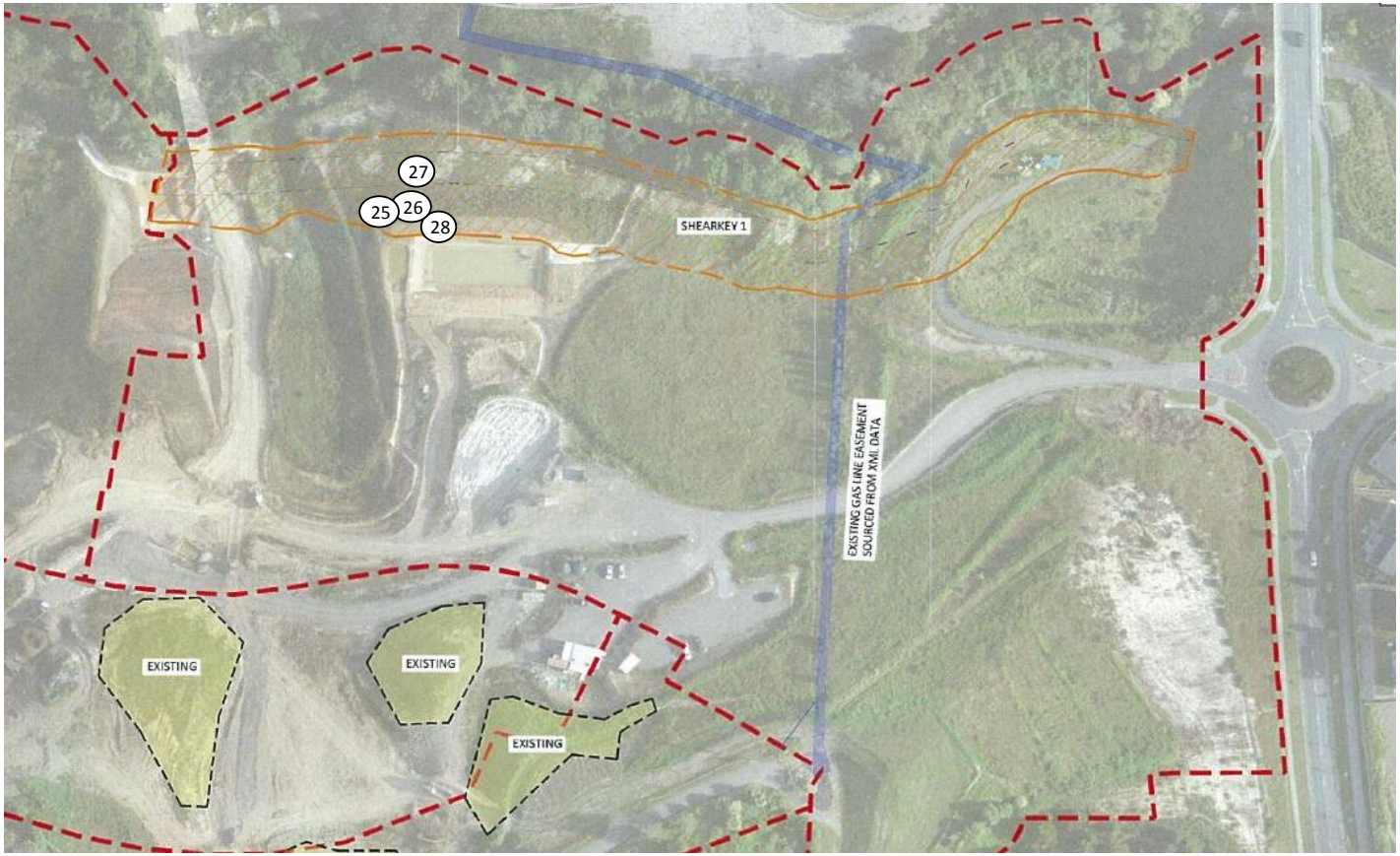
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03320
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 18/10/2019



Issue date: 050517

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PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	24/10/2019

IANZ ACCREDITED LABORATORY

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

Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
22/10/2019	19W03354	TR	**29**	Fill	Stabilised CLAY	Shear Key 1	1749219	5949050	5.44	150		145	143	150	143	1.81	36.3	1.33	2.70	3
22/10/2019	19W03354	TR	**30**	Fill	Stabilised CLAY	Shear Key 1	1749227	5949050	5.44	150		164	171	173	159	1.78	38.0	1.29	2.70	3

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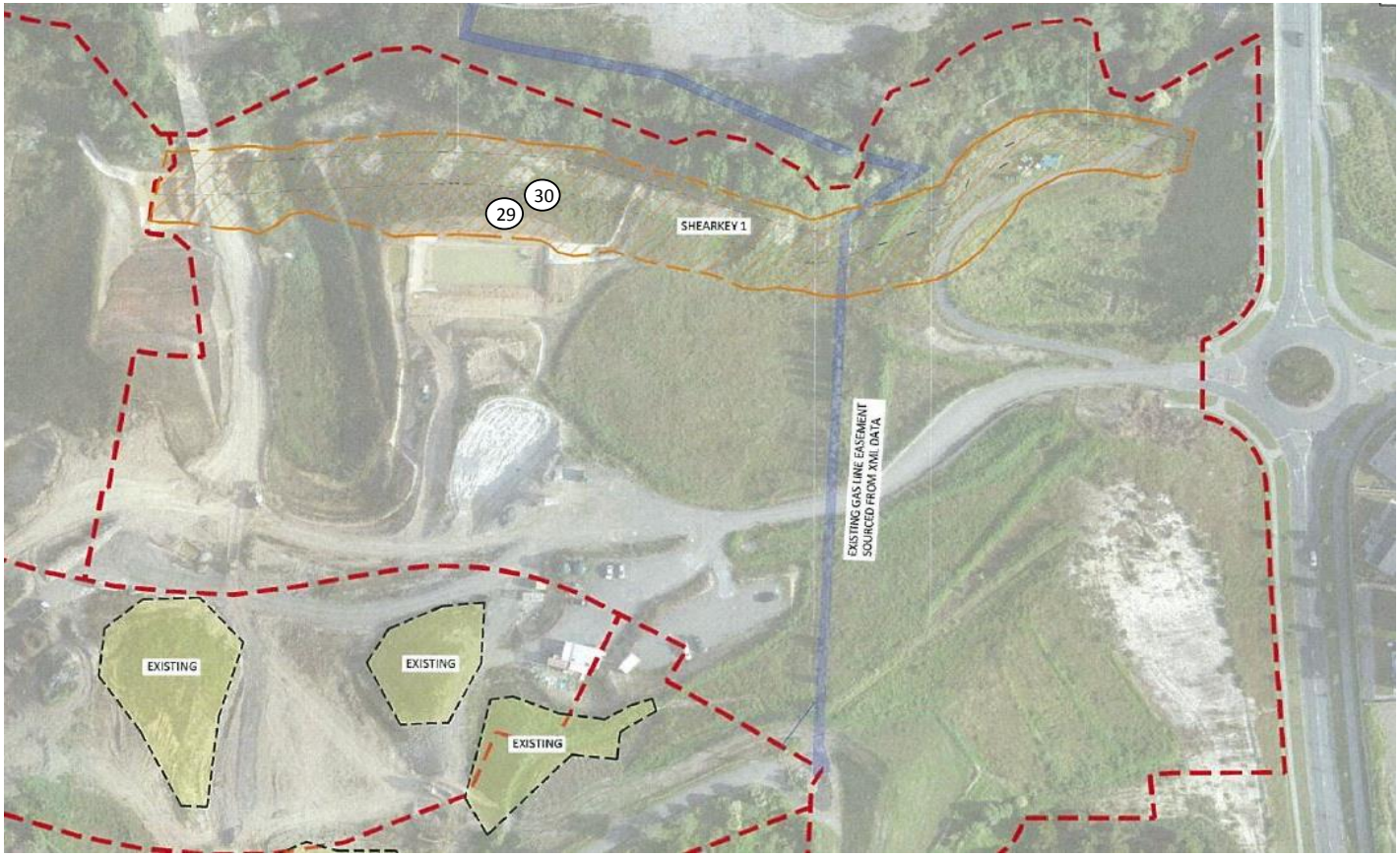
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03354
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 22/10/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura
Issue date: 30/10/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
24/10/2019	19W03374	TR	**31**	Fill	Stabilised CLAY	Shear Key 1	1749212	5949036	-	150	~ 10.0m from base	202+	202+	202+	202+	1.76	36.8	1.29	2.70	5
24/10/2019	19W03374	TR	**32**	Fill	Stabilised CLAY	Shear Key 1	1749207	5949050	-	150	~ 10.0m from base	148	150	150	157	1.82	36.0	1.34	2.70	2
24/10/2019	19W03374	TR	**33**	Fill	Stabilised CLAY	Shear Key 1	1749211	5949044	-	150	~ 10.0m from base	202	182	150	171	1.81	35.2	1.34	2.70	3

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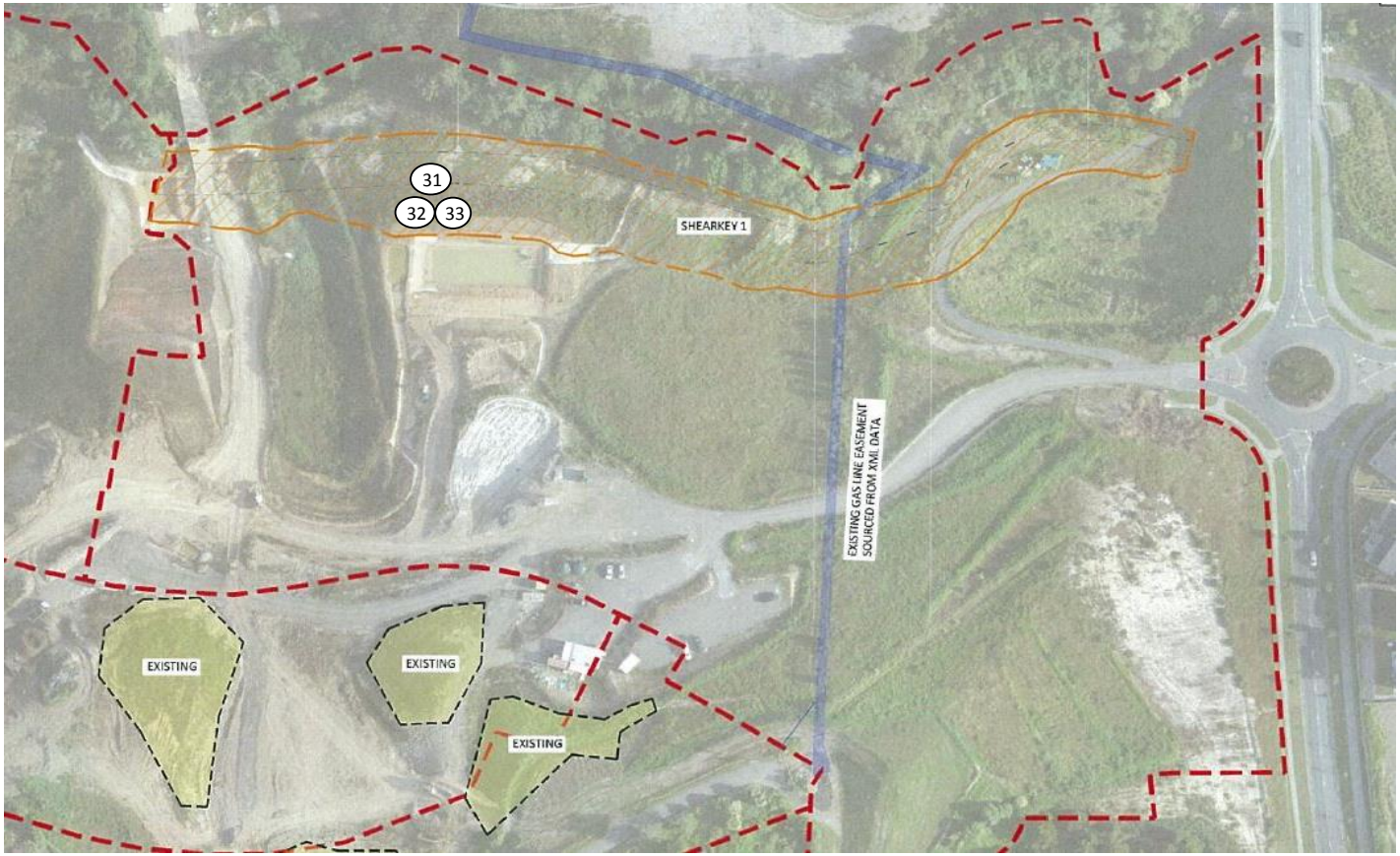
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03374
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 24/10/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)
Address	PO Box 8261, Symonds Street, Auckland 1150
Attention:	Stephen Parkes
c.c:	-
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Location:	Access off Arran Drive, Orewa

PROJECT CODE: 773-ETAM00991AA

Page: 1 of 2

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 14/11/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
4/11/2019	19W03477	TR	**34**	Fill	Stabilised CLAY	Shear Key 1	1749246	5949038	9.22	150		202+	202+	202+	202+	1.77	29.4	1.37	2.70	9
4/11/2019	19W03477	TR	**35**	Fill	Stabilised CLAY	Shear Key 1	1749233	5949044	7.49	150		202+	202+	202+	202+	1.78	33.1	1.34	2.70	6
4/11/2019	19W03477	TR	**36**	Fill	Stabilised CLAY	Shear Key 1	1749237	5949051	6.79	150		202+	202+	202+	202+	1.78	30.9	1.36	2.70	8
4/11/2019	19W03477	TR	**37**	Fill	Stabilised CLAY	Shear Key 1	1749225	5949054	8.32	150		202+	202+	202+	202+	1.76	32.0	1.33	2.70	8

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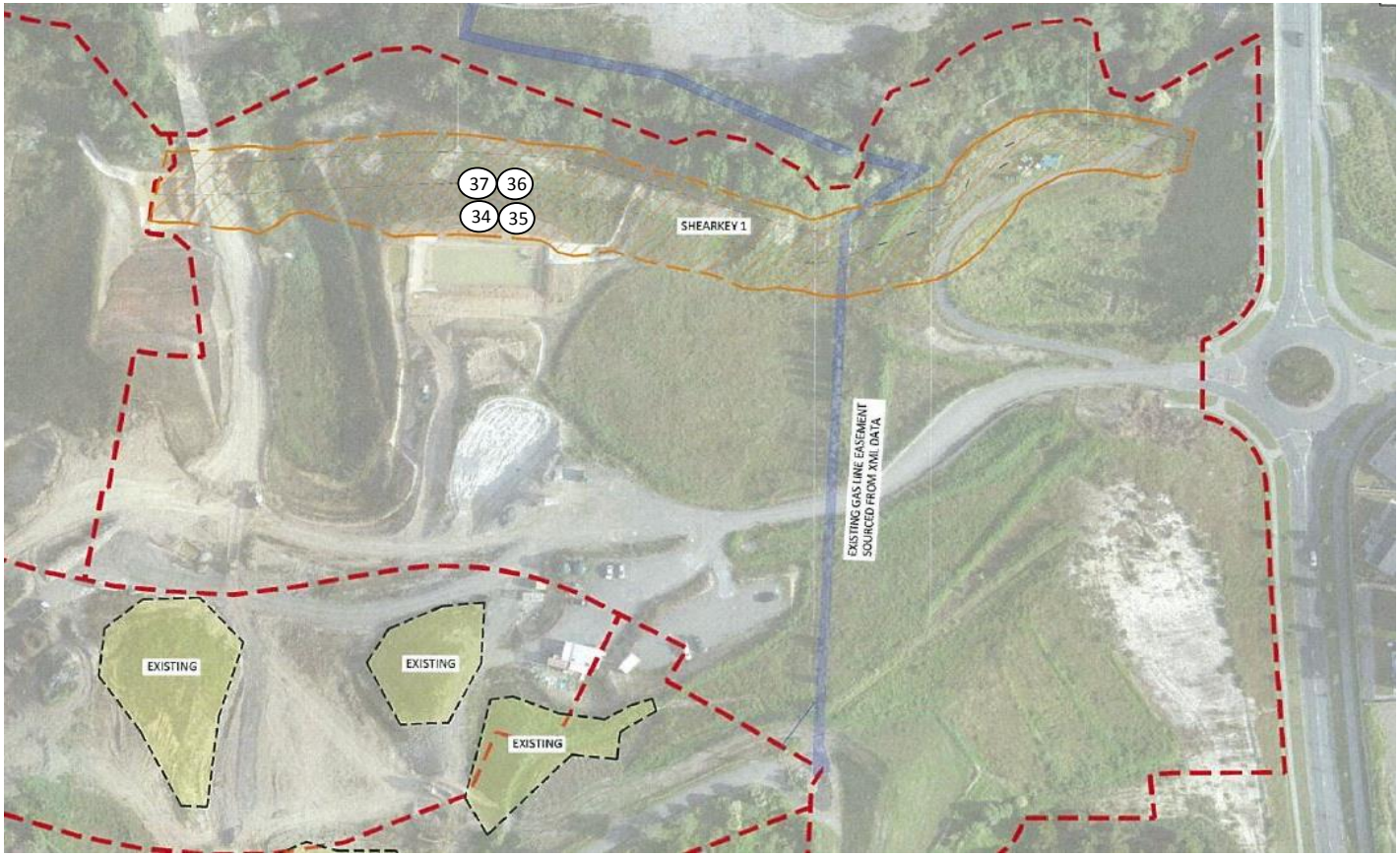
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03477
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 4/11/2019



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 14/11/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
6/11/2019	19W03523	TR	**41**	Fill	Silty CLAY	Sheark Key 1	1749201	5949031	12.50	150		202+	202+	182	202	1.75	33.7	1.31	2.70	8
6/11/2019	19W03523	TR	**42**	Fill	Silty CLAY	Sheark Key 1	1749203	5949042	12.50	150		202+	202+	202	198	1.77	36.8	1.29	2.70	5
6/11/2019	19W03523	TR	**43**	Fill	Silty CLAY	Sheark Key 1	1749204	5949052	12.00	150		202+	182	202	202+	1.76	32.3	1.33	2.70	8
6/11/2019	19W03523	TR	**44**	Fill	Silty CLAY	Sheark Key 1	1749217	5949038	12.00	150		202	198	202	189	1.79	34.1	1.33	2.70	5

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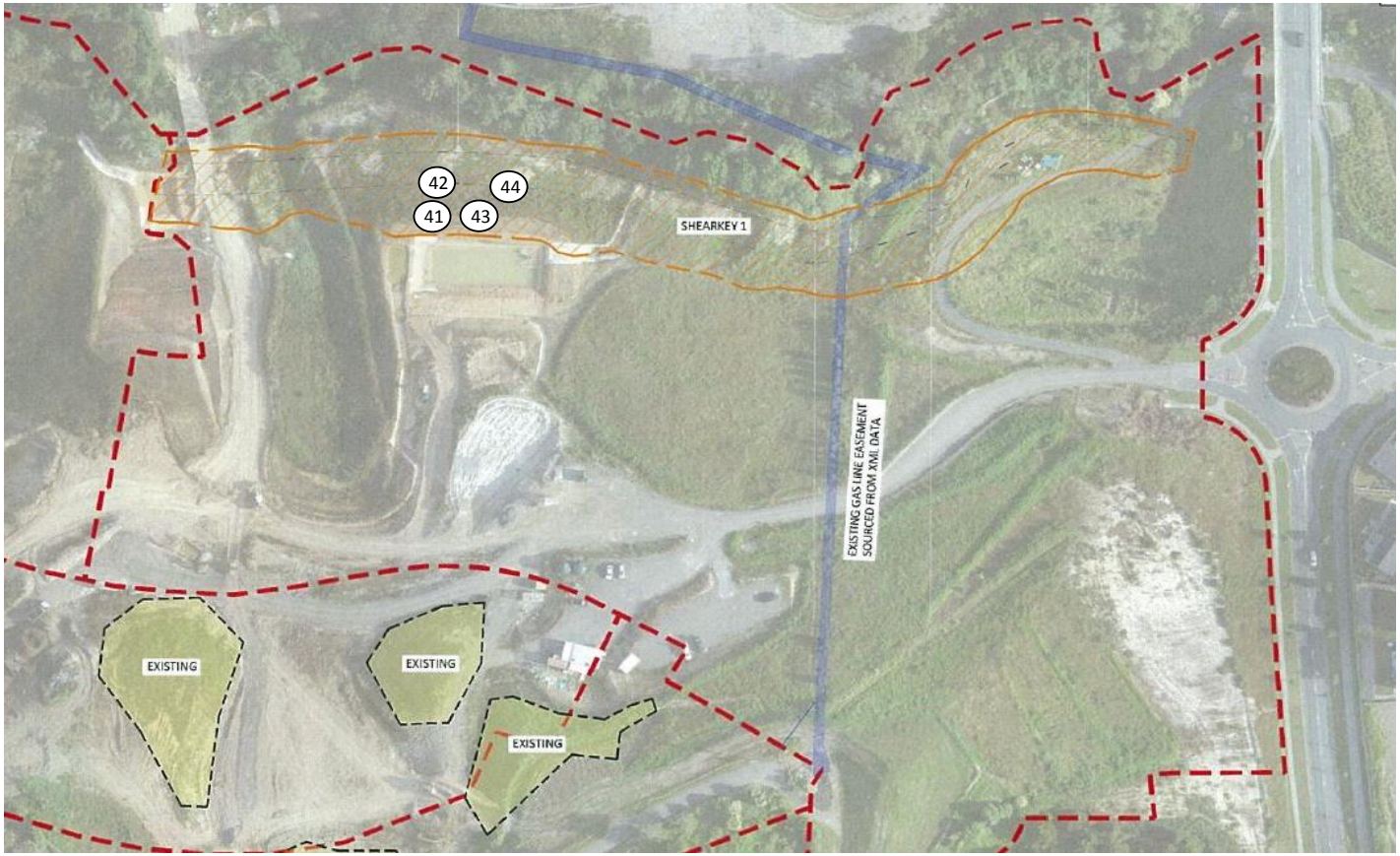
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03523
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 6/11/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 2/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
26/11/2019	19W03739	MP	**45**	Fill	Silty CLAY	Shear Key	1749142	5949044	5.00	150		UTP	UTP	202+	202+	1.86	33.7	1.39	2.70	2
26/11/2019	19W03739	MP	**46**	Fill	Silty CLAY	Shear Key	1749142	5949050	5.00	150		UTP	UTP	UTP	202+	1.79	32.6	1.35	2.70	6
26/11/2019	19W03739	MP	**47**	Fill	Silty CLAY	Shear Key	1749133	5949045	5.00	150		173	173	202+	202+	1.77	33.9	1.32	2.70	6

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PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

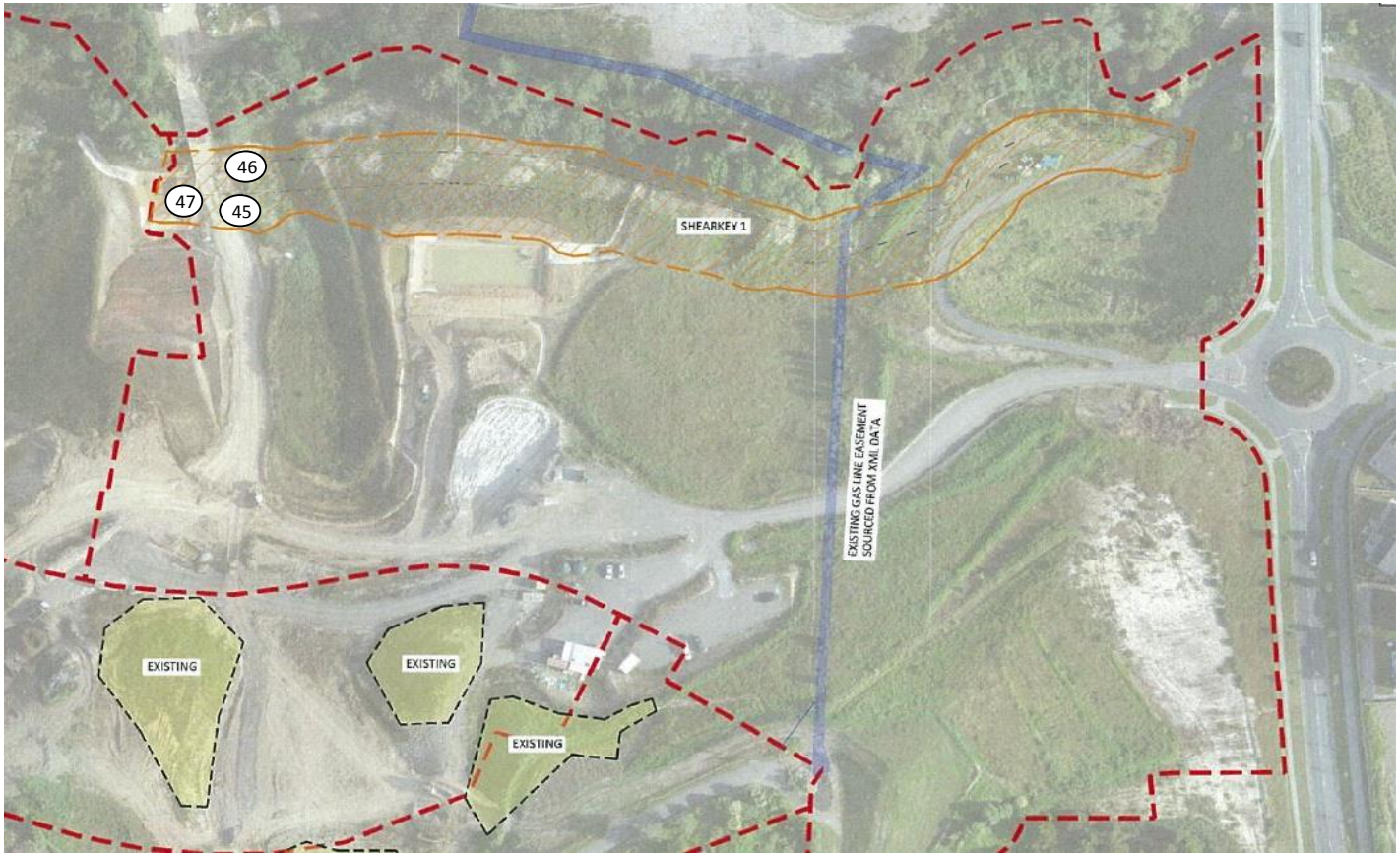
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM19W03739
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP
Date tested: 26/11/2019



Issue date: 050517

Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 2/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
27/11/2019	19W03753	MP	**48**	Fill	Silty CLAY	Shear Key	1749143	5949043	6.00	150		UTP	UTP	UTP	202+	1.78	32.7	1.34	2.70	6
27/11/2019	19W03753	MP	**49**	Fill	Silty CLAY	Shear Key	1749134	5949049	6.00	150		UTP	UTP	UTP	UTP	1.82	31.2	1.39	2.70	5
27/11/2019	19W03753	MP	**50**	Fill	Silty CLAY	Shear Key	1749153	5949053	6.00	150		UTP	UTP	UTP	162	1.82	33.7	1.36	2.70	4

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

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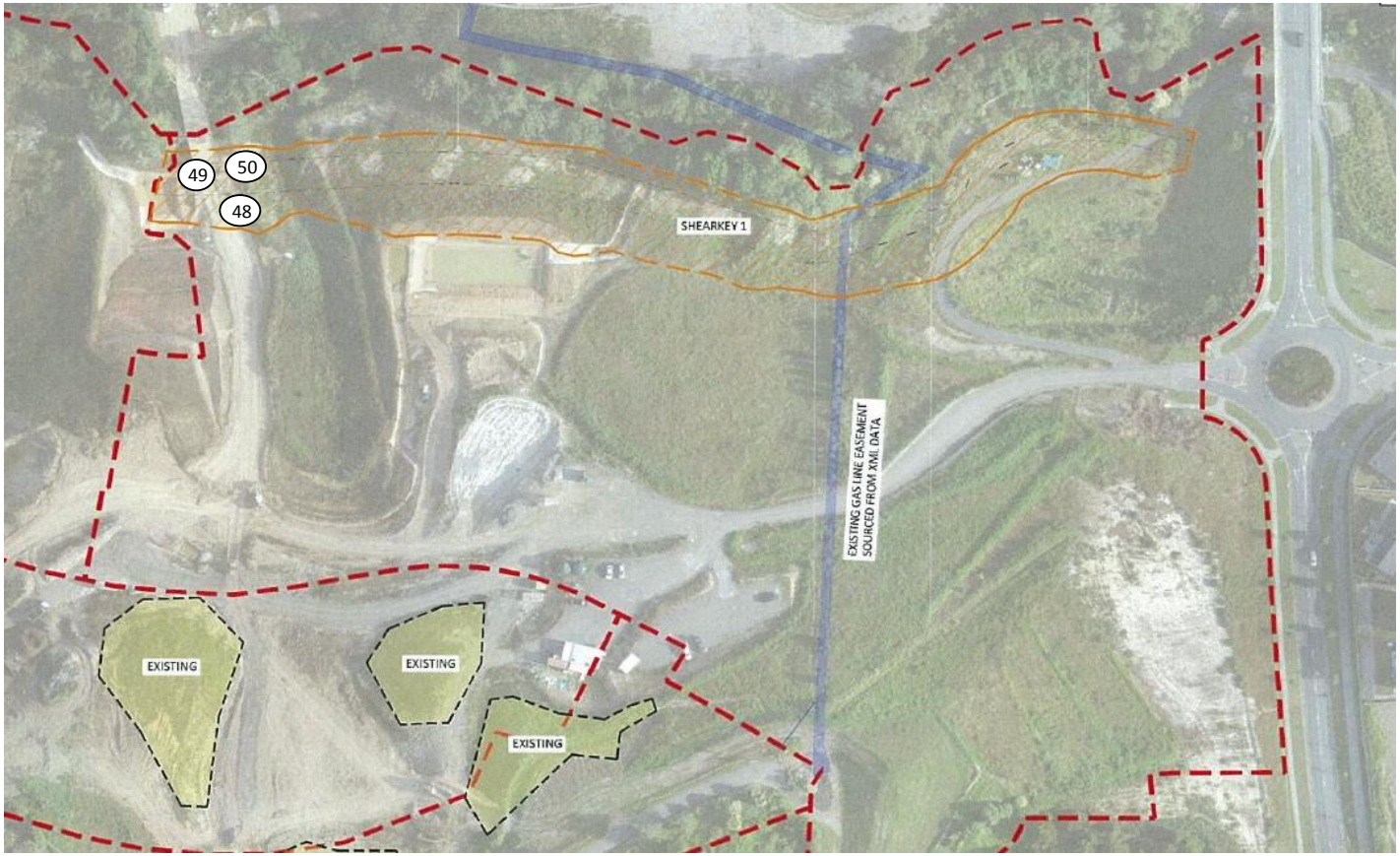
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03753
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP
Date tested: 27/11/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura
Issue date: 4/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
28/11/2019	19W03761	MP	**51**	Fill	Silty CLAY	Shear Key	1749149	5949039	7.00	150		UTP	UTP	UTP	UTP	1.85	32.9	1.39	2.70	3
28/11/2019	19W03761	MP	**52**	Fill	Silty CLAY	Shear Key	1749151	5949036	7.00	150		202+	202+	202+	202+	1.81	32.4	1.37	2.70	5
28/11/2019	19W03761	MP	**53**	Fill	Silty CLAY	Shear Key	1749153	5949049	7.00	150		UTP	UTP	202+	202+	1.75	34.5	1.30	2.70	7

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

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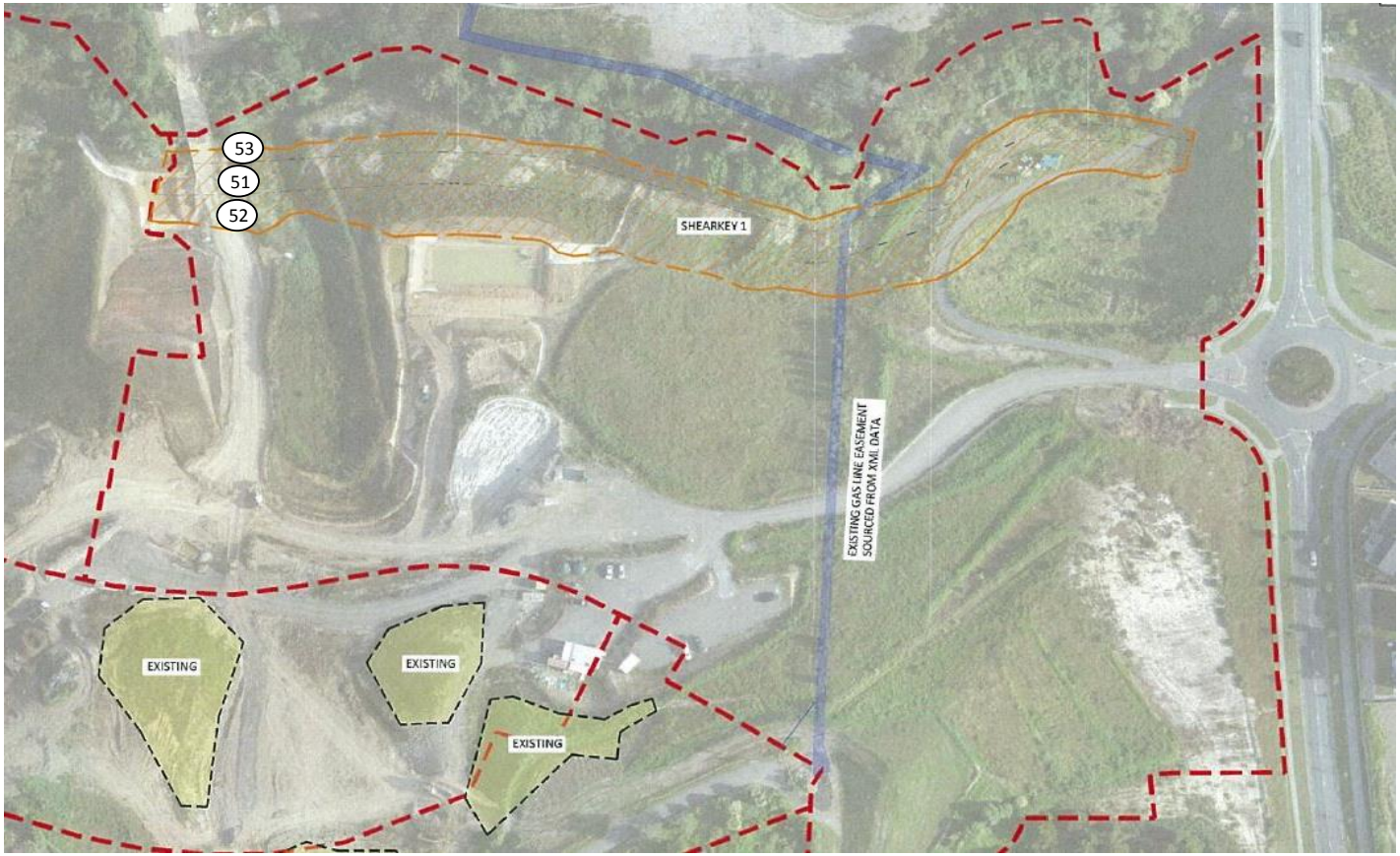
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03761
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP
Date tested: 28/11/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 6/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
29/11/2019	19W03788	MP	**54**	Fill	Silty CLAY	Shear Key	1749159	5949045	8.00	150		202+	202+	202+	UTP	1.88	31.7	1.43	2.70	2
29/11/2019	19W03788	MP	**55**	Fill	Silty CLAY	Shear Key	1749153	5949046	8.00	150		UTP	UTP	UTP	UTP	1.78	28.0	1.39	2.70	9
29/11/2019	19W03788	MP	**56**	Fill	Silty CLAY	Shear Key	1749147	5949045	7.00	150		202+	202+	202+	202+	1.85	30.2	1.42	2.70	5

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
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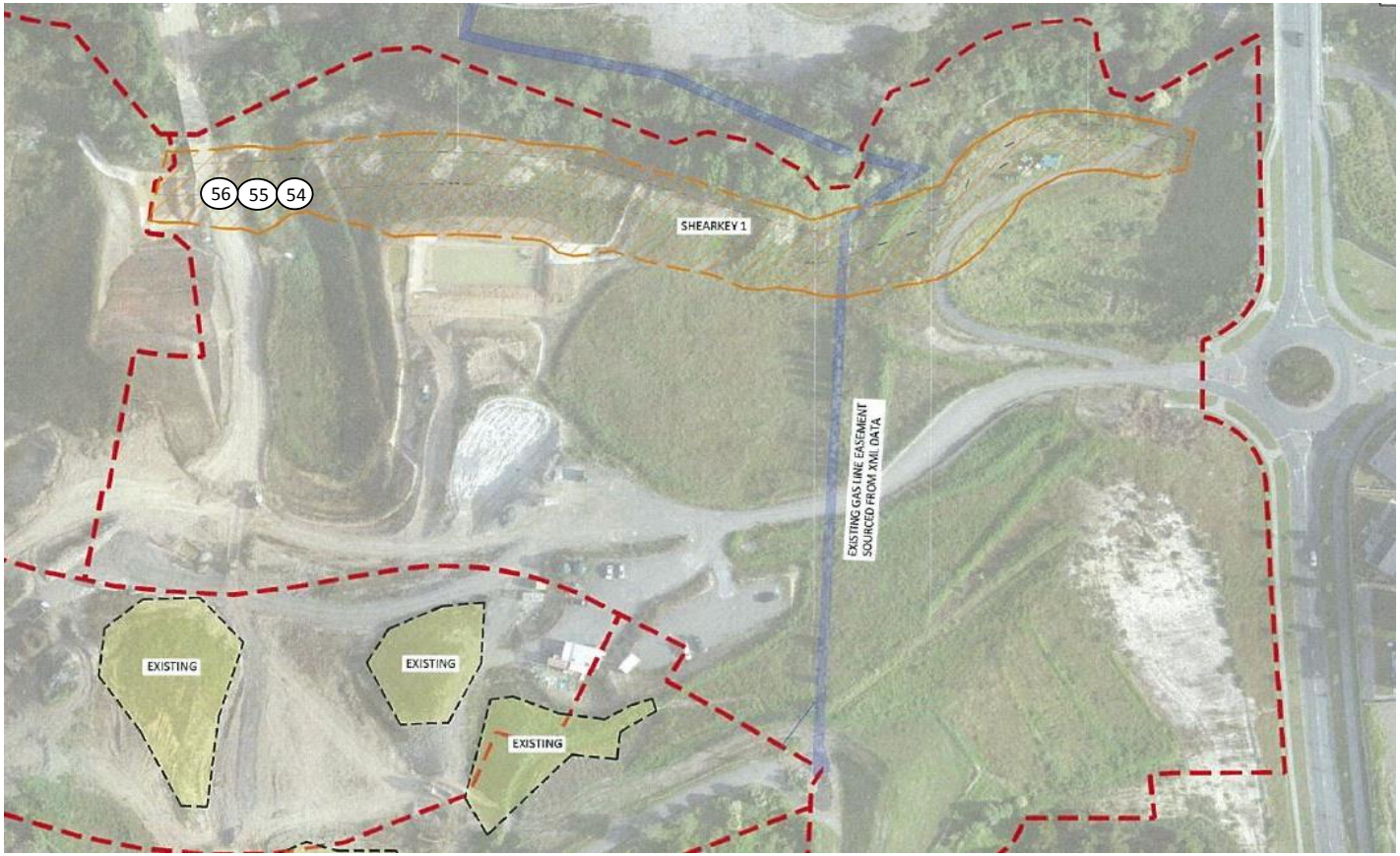
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03788
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP
Date tested: 29/11/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 6/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
2/12/2019	19W03813	TR	**57**	Fill	Gravelly CLAY	Shear Key	1749198	5949047	12.50	150		201	201	201	201	1.79	31.4	1.36	2.70	7
2/12/2019	19W03813	TR	**58**	Fill	Gravelly CLAY	Shear Key	1749198	5949041	11.00	150		201	201	201	201	1.83	31.5	1.39	2.70	5
2/12/2019	19W03813	TR	**59**	Fill	Gravelly CLAY	Shear Key	1749184	5949041	11.00	150		201	201	201	201	1.83	30.9	1.40	2.70	5

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
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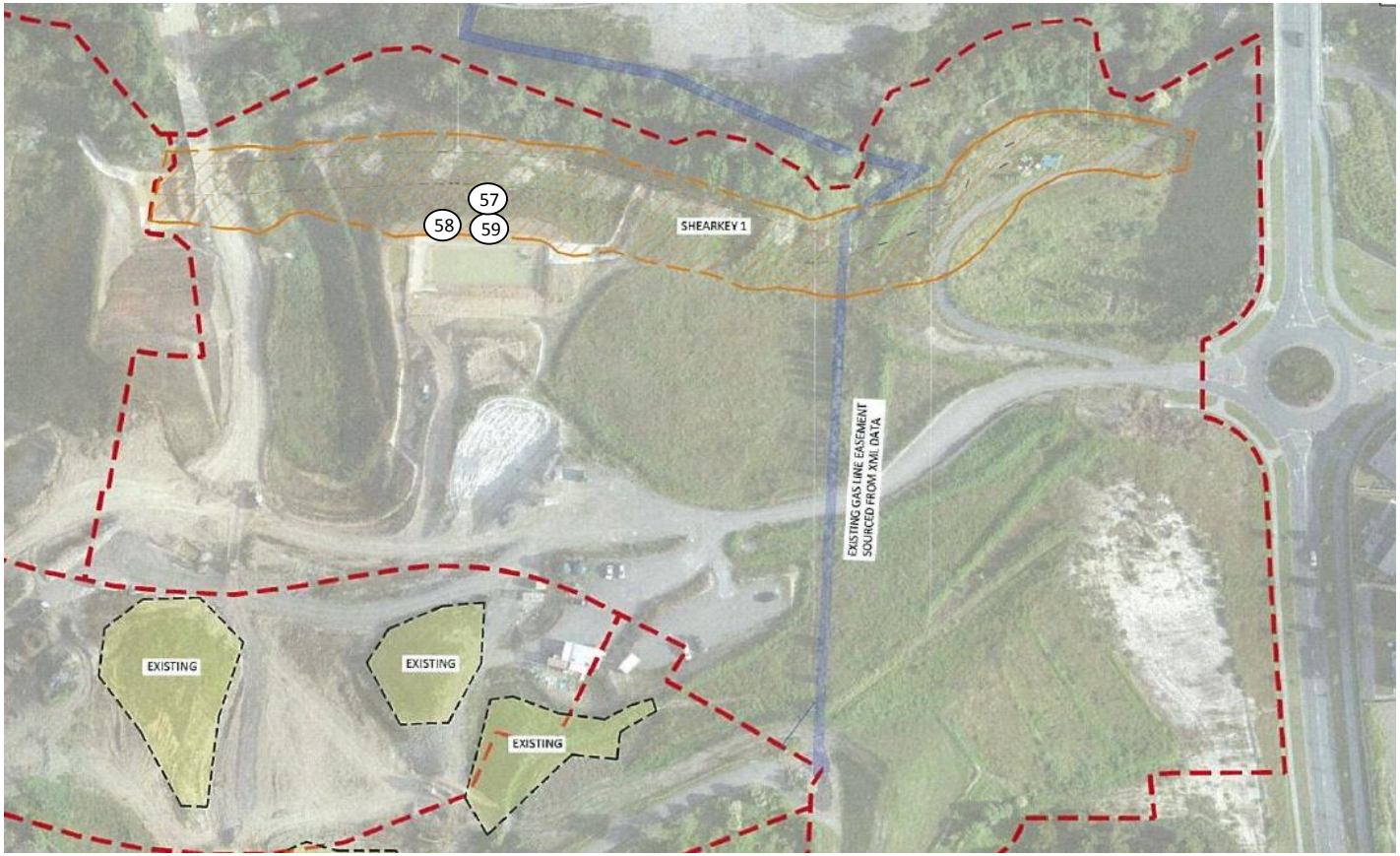
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03813
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP
Date tested: 2/12/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura
Issue date: 12/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
9/12/2019	19W03862	TR	**60**	Fill	Gravelly CLAY	Shear Key	1749264	5949045	2.80	150		202+	202+	202+	189	1.84	31.5	1.40	2.70	4
9/12/2019	19W03862	TR	**61**	Fill	Gravelly CLAY	Shear Key	1749258	5949038	3.90	150		UTP	UTP	UTP	189	1.96	29.5	1.51	2.70	0

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

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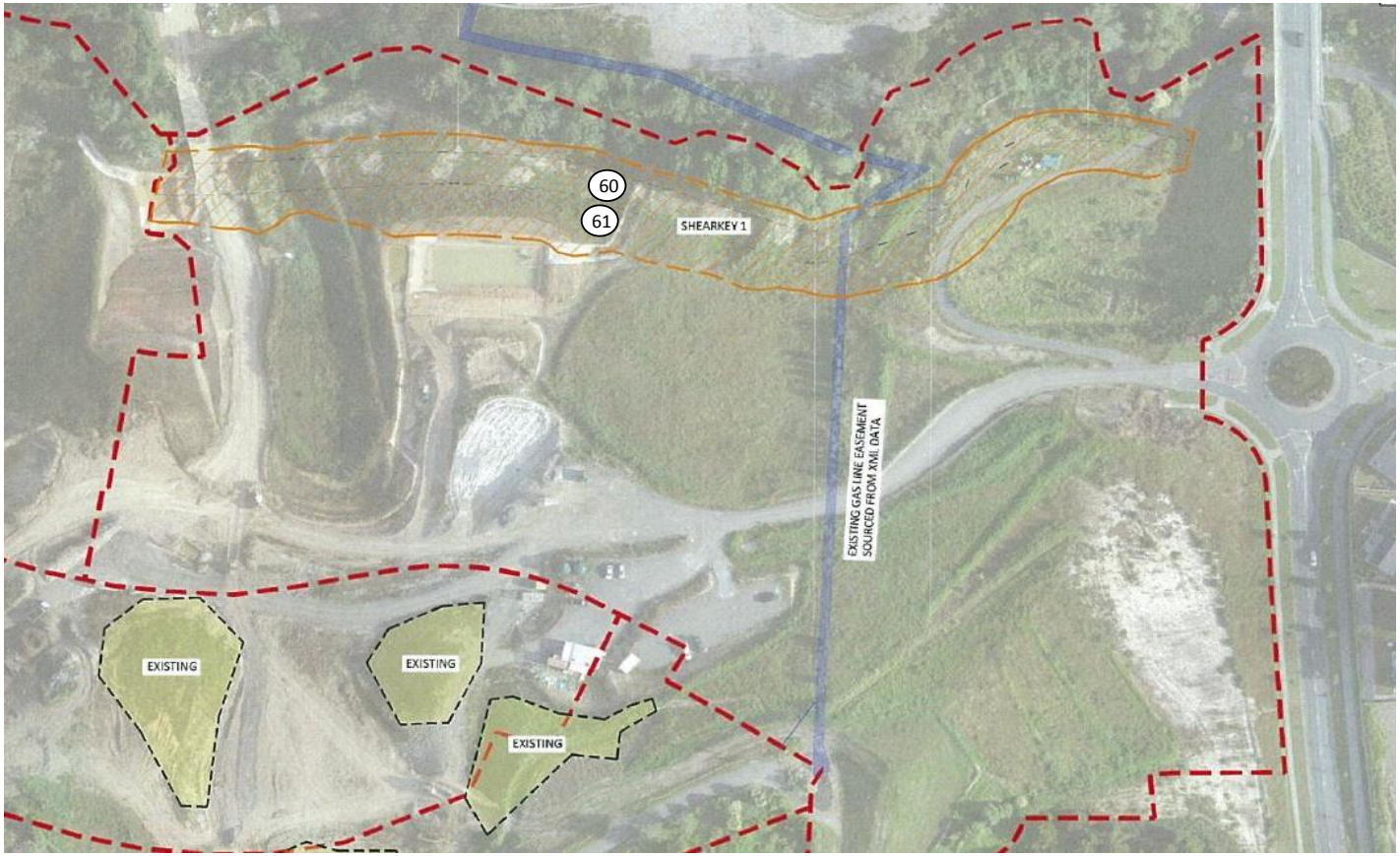
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03862
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 9/12/2019



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 13/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
10/12/2019	19W03883	TR	**62**	Fill	Gravelly CLAY	Shear Key	1749243	5949043	7.70	150		UTP	UTP	UTP	UTP	1.81	28.3	1.41	2.70	8
10/12/2019	19W03883	TR	**63**	Fill	Gravelly CLAY	Shear Key	1749250	5949043	6.20	150		UTP	UTP	202	202	1.80	30.1	1.38	2.70	7
10/12/2019	19W03883	TR	**64**	Fill	Gravelly CLAY	Shear Key	1749248	5949050	6.60	150		UTP	UTP	UTP	202	1.83	29.4	1.41	2.70	6

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
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SITE PLAN

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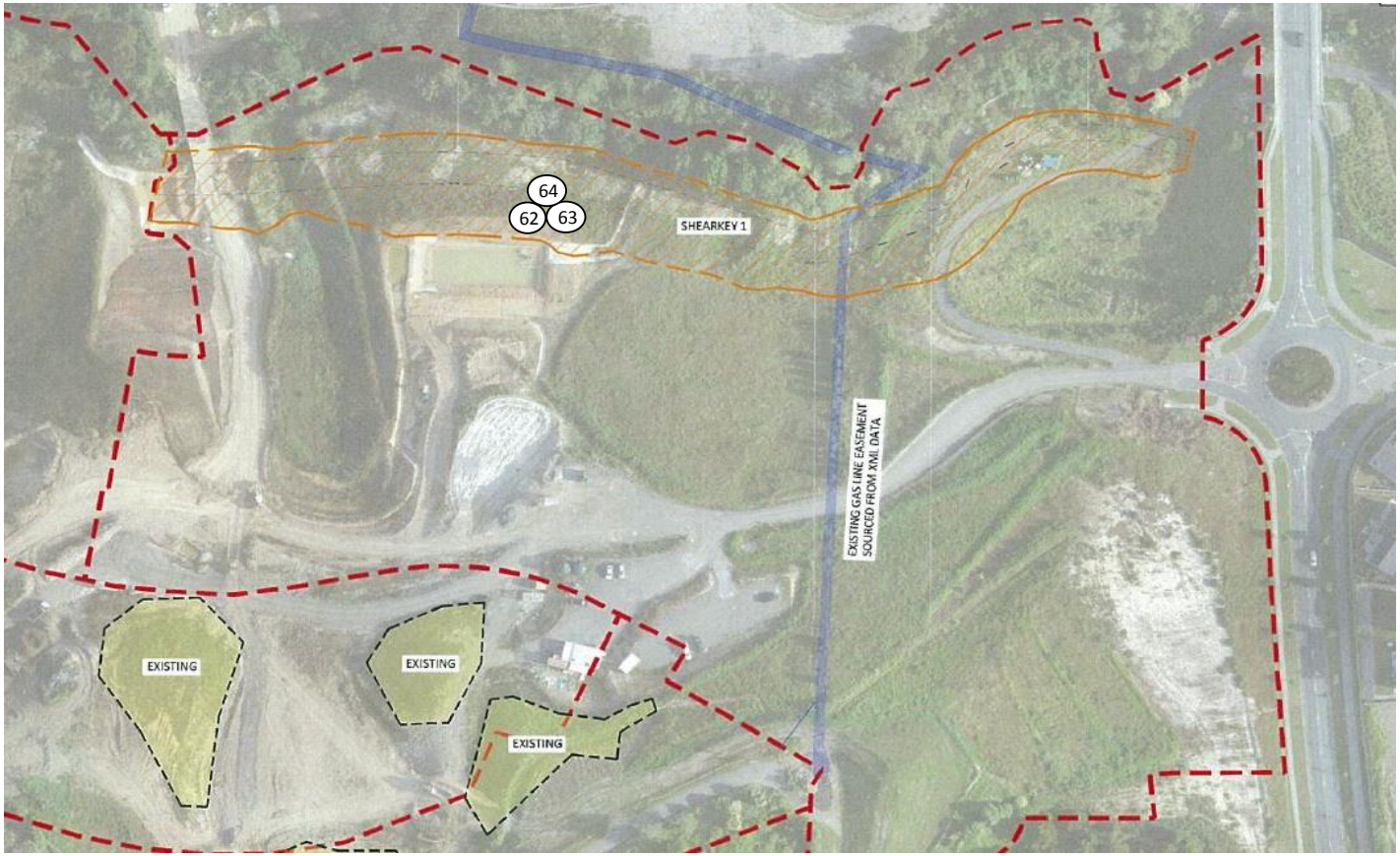
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03883
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 10/12/2019



Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 13/12/2019

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
11/12/2019	19W03884	TR	**65**	Fill	Gravelly CLAY	Shear Key 1	1749248	5949038	-	150		202	202	UTP	UTP	1.88	29.3	1.46	2.70	3
11/12/2019	19W03884	TR	**66**	Fill	Gravelly CLAY	Shear Key 1	1749252	5949036	-	150		UTP	UTP	UTP	UTP	1.83	29.7	1.41	2.70	6
11/12/2019	19W03884	TR	**67**	Fill	Gravelly CLAY	Shear Key 1	1749261	5949032	-	150		UTP	UTP	UTP	UTP	1.81	29.7	1.39	2.70	7

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
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t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

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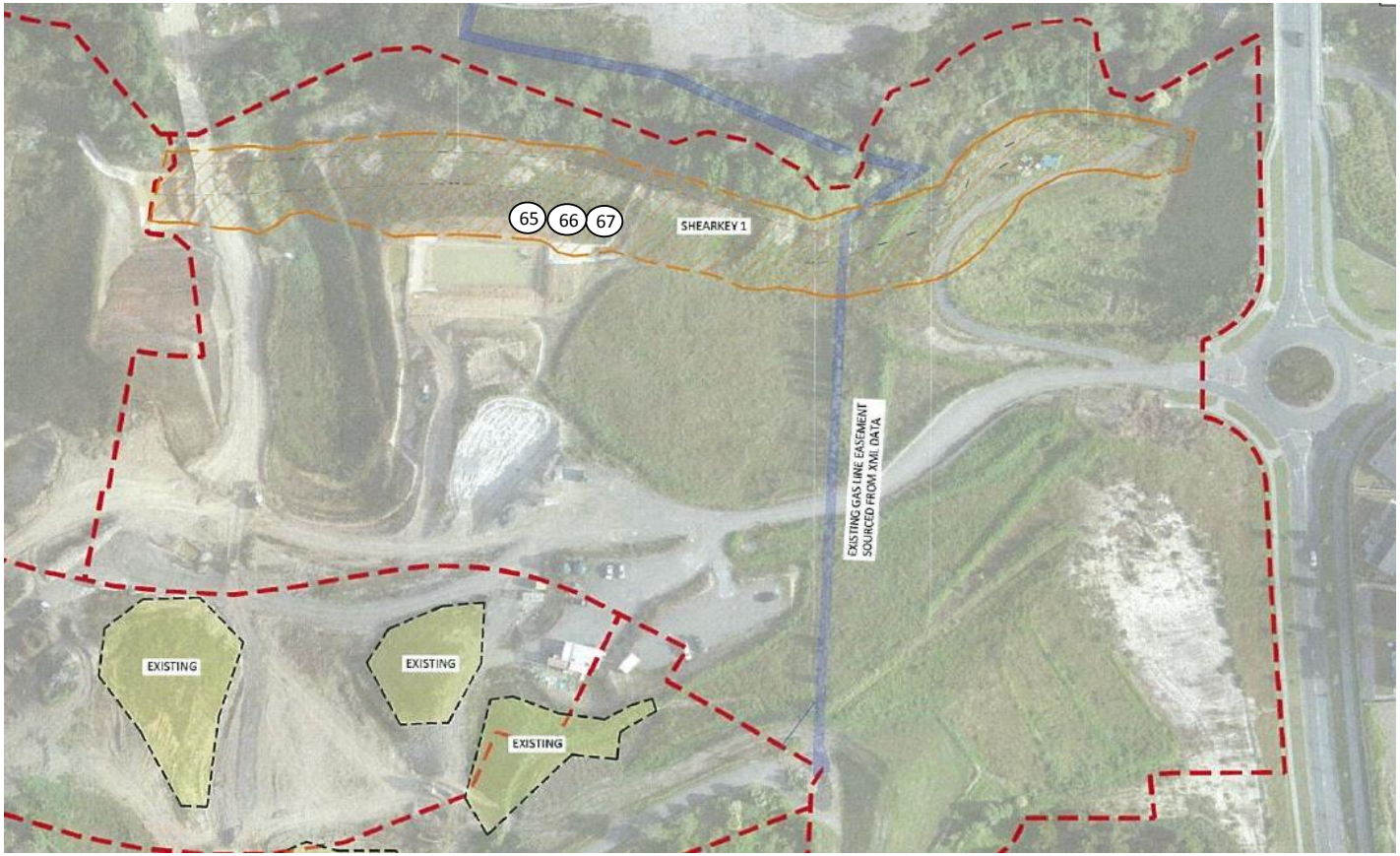
Project No: 773-ETAM00991AA
Work Order No: ETAM19W03884
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 11/12/2019



Issue date: 050517

Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura
Issue date: 4/02/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
30/01/2020	20W00219	TR	**104**	Fill	Silty CLAY	Gully 1	1749162	5948975	18.00	150		150	173	185	159	1.87	33.6	1.40	2.70	1
30/01/2020	20W00219	TR	**105**	Fill	Silty Sandy CLAY	Shearkey	1749253	5949039	6.30	150		150	171	185	202	1.83	39.1	1.31	2.70	0
30/01/2020	20W00219	TR	**106**	Fill	Silty Sandy CLAY	Shearkey	1749268	5949038	4.88	150		157	159	202	182	1.81	35.5	1.33	2.70	3
30/01/2020	20W00219	TR	**107**	Fill	Silty CLAY	Gully 1	1749175	5948960	18.00	150		150	159	164	189	1.87	28.8	1.45	2.70	5

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
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t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

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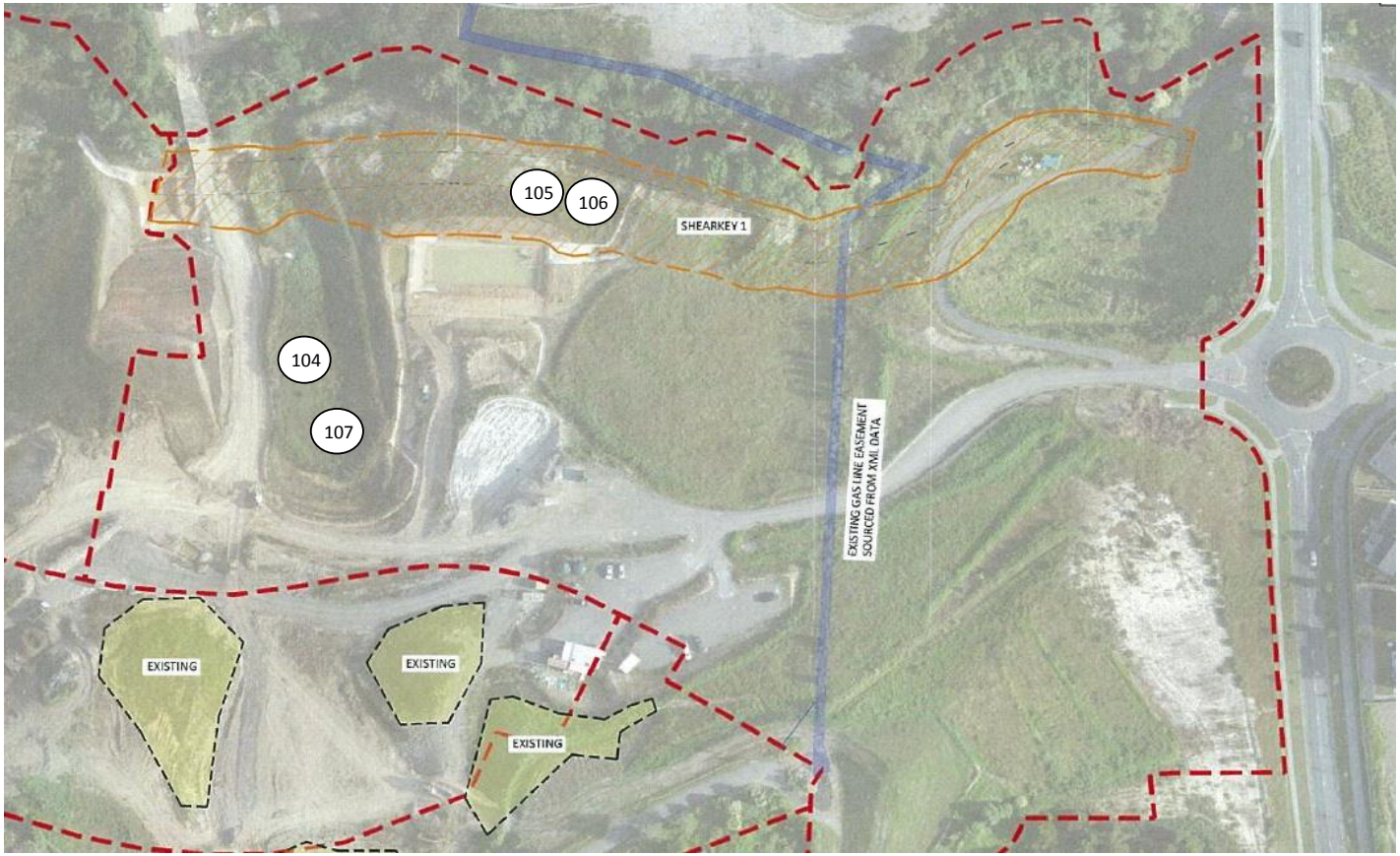
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00219
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 30/01/2020



Issue date: 050517

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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 4/02/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
31/01/2020	20W00230	MP	**108**	Fill	CLAY	Shearkey	1749264	5949039	5.50	150		UTP	UTP	202+	202+	1.90	32.2	1.44	2.70	0
31/01/2020	20W00230	MP	**109**	Fill	CLAY	Shearkey	1749251	5949042	7.00	150		185	162	150	150	1.81	36.4	1.33	2.70	2
31/01/2020	20W00230	MP	**110**	Fill	CLAY	Gully 1	1749161	5948951	19.04	150		150	150	150	185	1.80	34.0	1.35	2.70	4
31/01/2020	20W00230	MP	**111**	Fill	CLAY	Gully 1	1749192	5948974	17.80	150		150	150	150	138	1.82	38.0	1.32	2.70	1
31/01/2020	20W00230	MP	**112**	Fill	CLAY	Undercut	1749450	5948854	20.00	150		202	202	202	202	1.83	30.6	1.40	2.70	5
31/01/2020	20W00230	MP	**113**	Fill	CLAY	Undercut	1749448	5948873	20.00	150		150	150	162	162	1.84	33.6	1.37	2.70	3

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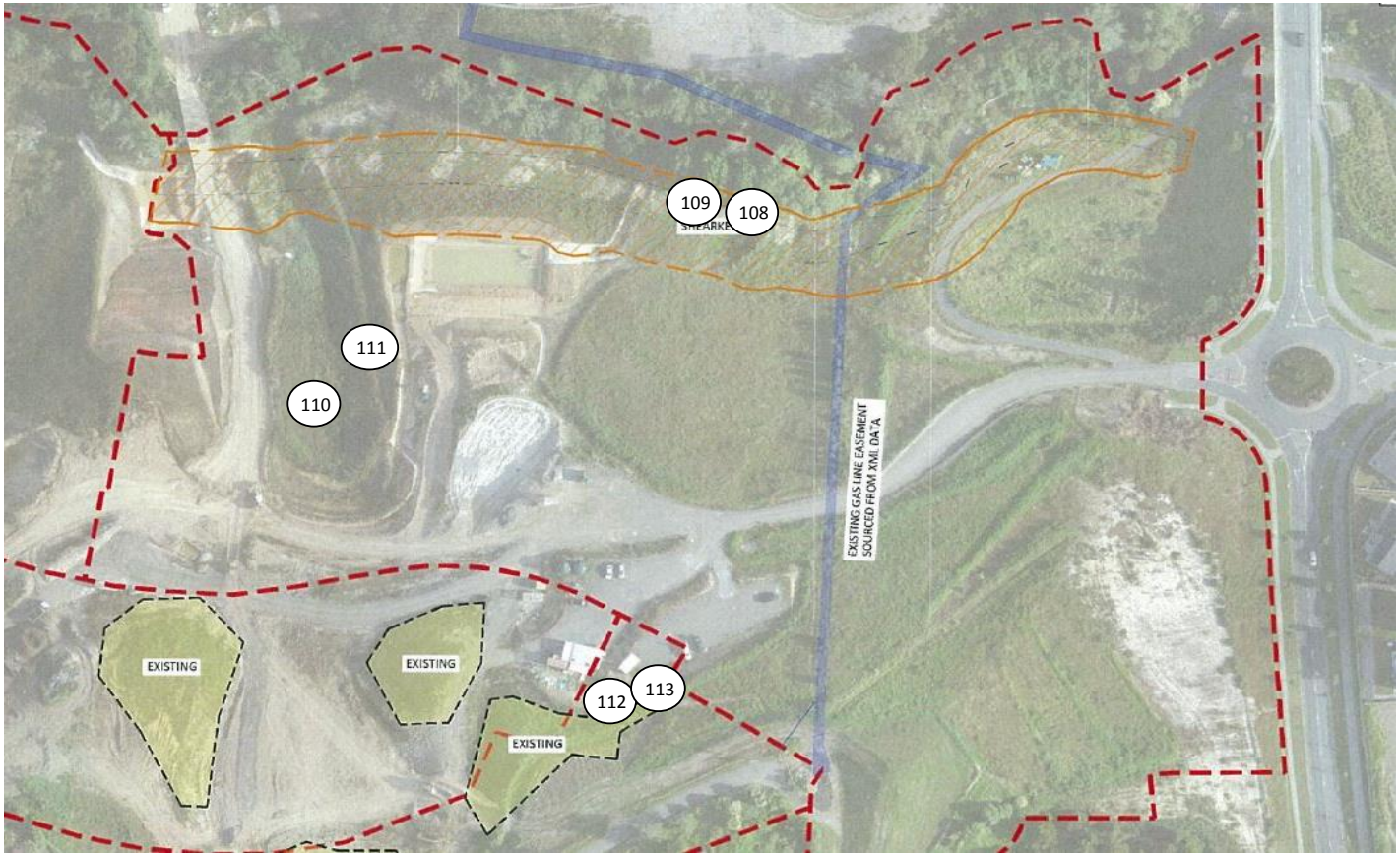
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00230
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MP
Date tested: 31/01/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6	Approved Signatory:	Cesar Pura
Location:	Access off Arran Drive, Orewa	Issue date:	12/02/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
8/02/2020	20W00286	MA	**125**	Fill	CLAY	Area F Shearkey 1	1749704	5949027	4.65	150		152	150	157	192	1.85	34.6	1.37	2.70	2
8/02/2020	20W00286	MA	**126**	Fill	CLAY	Area F Shearkey 1	1749285	5949033	4.96	150		185	202+	192	176	1.84	36.3	1.35	2.70	1
8/02/2020	20W00286	MA	**127**	Fill	CLAY	Area F Shearkey 1	1749261	5949034	5.45	150		202+	202+	202+	202+	1.90	29.6	1.46	2.70	3
8/02/2020	20W00286	MA	**128**	Fill	CLAY	Gully 1	1749215	5948966	21.45	150		202+	202+	198	202+	1.87	28.4	1.46	2.70	5
8/02/2020	20W00286	MA	**129**	Fill	CLAY	Gully 1	1749191	5948934	21.40	150		UTP	UTP	UTP	UTP	1.91	18.7	1.61	2.70	10

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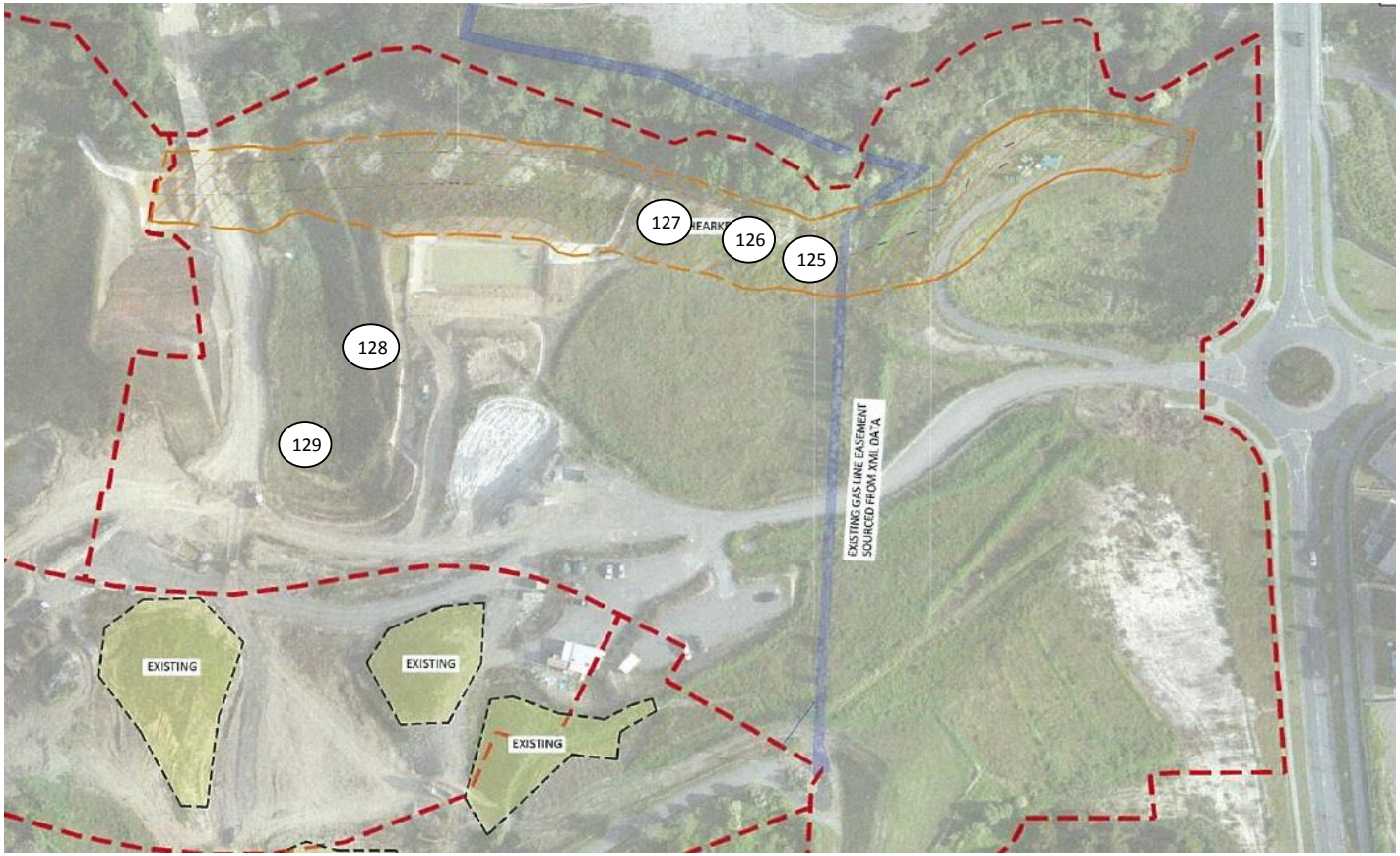
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00286
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: MA
Date tested: 8/02/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6	Approved Signatory:	Cesar Pura
Location:	Access off Arran Drive, Orewa	Issue date:	12/02/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
10/02/2020	20W00298	TR, VD	**130**	Fill	Silty CLAY	Gully 1	1749198	5948931	23.20	150		171	202+	UTP	152	1.87	23.8	1.51	2.70	8
10/02/2020	20W00298	TR, VD	**131**	Fill	Silty CLAY	Gully 1	1749212	5948959	21.30	150		178	182	202+	157	1.89	30.0	1.46	2.70	2
10/02/2020	20W00298	TR, VD	**132**	Fill	Silty CLAY	Shearkey	1749275	5949041	5.60	150		UTP	202+	202+	202+	1.93	29.3	1.49	2.70	1
10/02/2020	20W00298	TR, VD	**133**	Fill	Silty CLAY	Shearkey	1749301	5949025	4.90	150		171	202+	175	159	1.83	33.6	1.37	2.70	3
10/02/2020	20W00298	TR, VD	**134**	Fill	Silty CLAY	Gully 1	1749191	5948952	21.40	150		173	185	UTP	UTP	1.94	26.1	1.54	2.70	3

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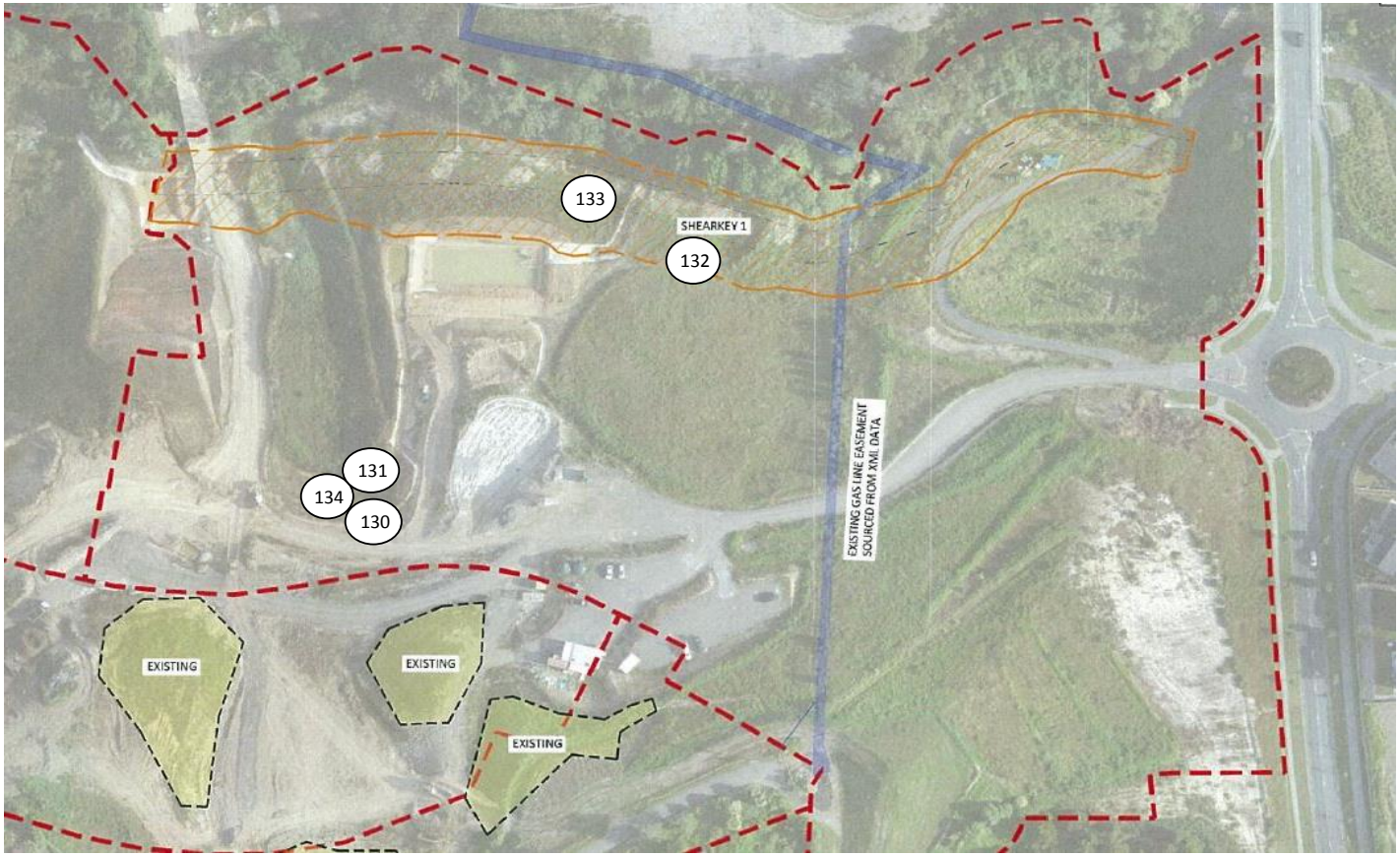
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00298
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR, VD
Date tested: 10/02/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	19/02/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
11/02/2020	20W00309	TR, VD	**135**	Fill	Silty CLAY	Gully 1	1749163	5948827	35.20	150		155	202+	202+	150	1.93	27.4	1.52	2.70	2
11/02/2020	20W00309	TR, VD	**136**	Fill	Silty CLAY	Gully 1	1749171	5948815	34.90	150		148	155	178	202+	1.89	29.4	1.46	2.70	3
11/02/2020	20W00309	TR, VD	**137**	Fill	Silty CLAY	Gully 1	1749195	5948834	34.50	150		159	164	150	171	1.84	32.2	1.39	2.70	4
11/02/2020	20W00309	TR, VD	**138**	Fill	Silty CLAY	Gully 1	1749204	5948838	34.10	150		UTP	UTP	UTP	202+	1.90	23.3	1.54	2.70	7
11/02/2020	20W00309	TR, VD	**139**	Fill	Silty CLAY	Shearkey 1	1749260	5949042	7.00	150		162	202+	189	150	1.75	46.2	1.20	2.70	0
11/02/2020	20W00309	TR, VD	**140**	Fill	Silty CLAY	Shearkey 1	1749302	5949025	5.50	150		171	198	198	202+	1.80	36.0	1.32	2.70	3

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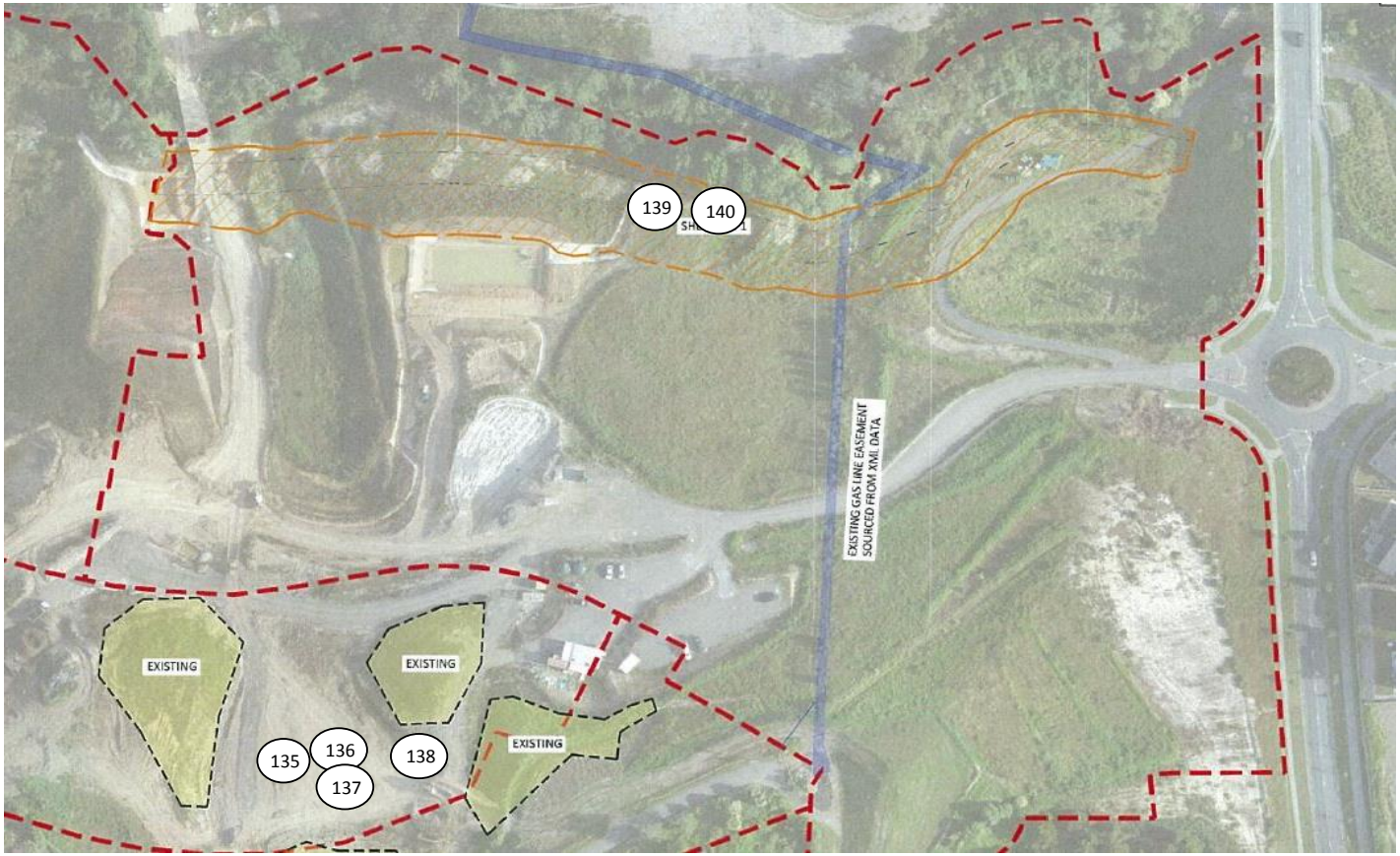
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00309
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR, VD
Date tested: 11/02/2020



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
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Attention:	Stephen Parkes		
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Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	19/02/2020

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Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
12/02/2020	20W00319	TR	**141**	Fill	Silty CLAY	Gully 1	1749157	5948822	35.70	150		189	150	202	202	1.90	27.6	1.49	2.70	4
12/02/2020	20W00319	TR	**142**	Fill	Silty CLAY	Gully 1	1749174	5948806	35.50	150		189	198	202	202	1.91	28.9	1.48	2.70	2
12/02/2020	20W00319	TR	**143**	Fill	Silty CLAY	Gully 1	1749189	5948816	35.30	150		180	189	202	157	1.89	26.7	1.49	2.70	5
12/02/2020	20W00319	TR	**144**	Fill	Silty CLAY	Shearkey 1	1749270	5949028	7.20	150		162	185	150	157	1.75	44.4	1.21	2.70	1
12/02/2020	20W00319	TR	**145**	Fill	Silty CLAY	Shearkey 1	1749288	5949031	6.70	150		185	202	173	171	1.75	36.0	1.29	2.70	6

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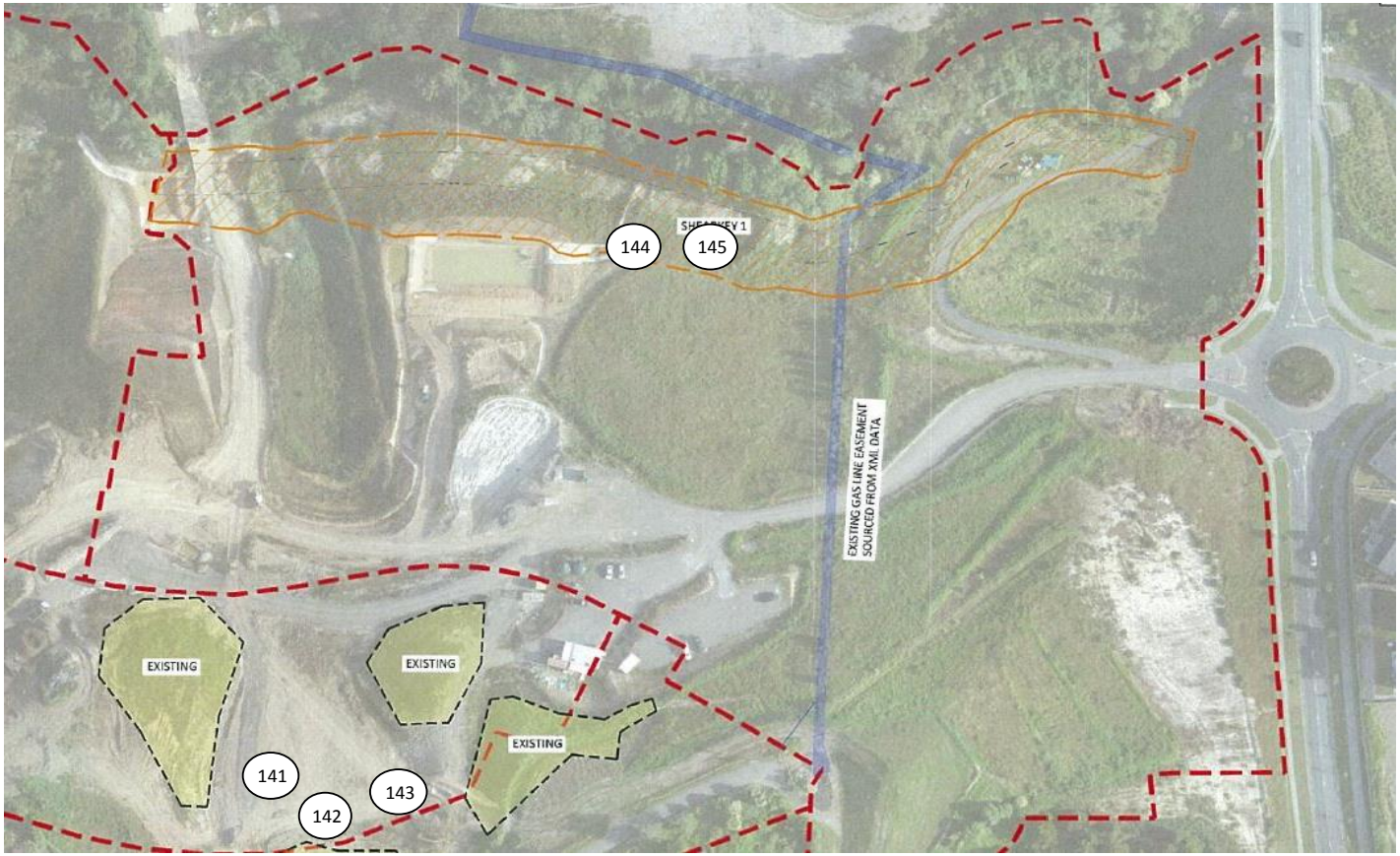
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00319
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 12/02/2020



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	19/02/2020

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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
13/02/2020	20W00321	LW	**146**	Fill	Clayey SILT	Shearkey 1	1749264	5949026	8.80	150		145	179	184+	151	1.83	32.4	1.38	2.70	4
13/02/2020	20W00321	LW	**147**	Fill	Clayey SILT	Shearkey 1	1749280	5949021	8.60	150		138	147	179	174	1.88	28.6	1.46	2.70	4
13/02/2020	20W00321	LW	**148**	Fill	Clayey SILT	Refer to plan	1749185	5948815	35.80	150		170	147	184+	156	1.88	31.3	1.43	2.70	2
13/02/2020	20W00321	LW	**149**	Fill	Clayey SILT	Refer to plan	1749206	5948834	35.30	150		179	161	134	147	1.78	33.0	1.34	2.70	6

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SITE PLAN

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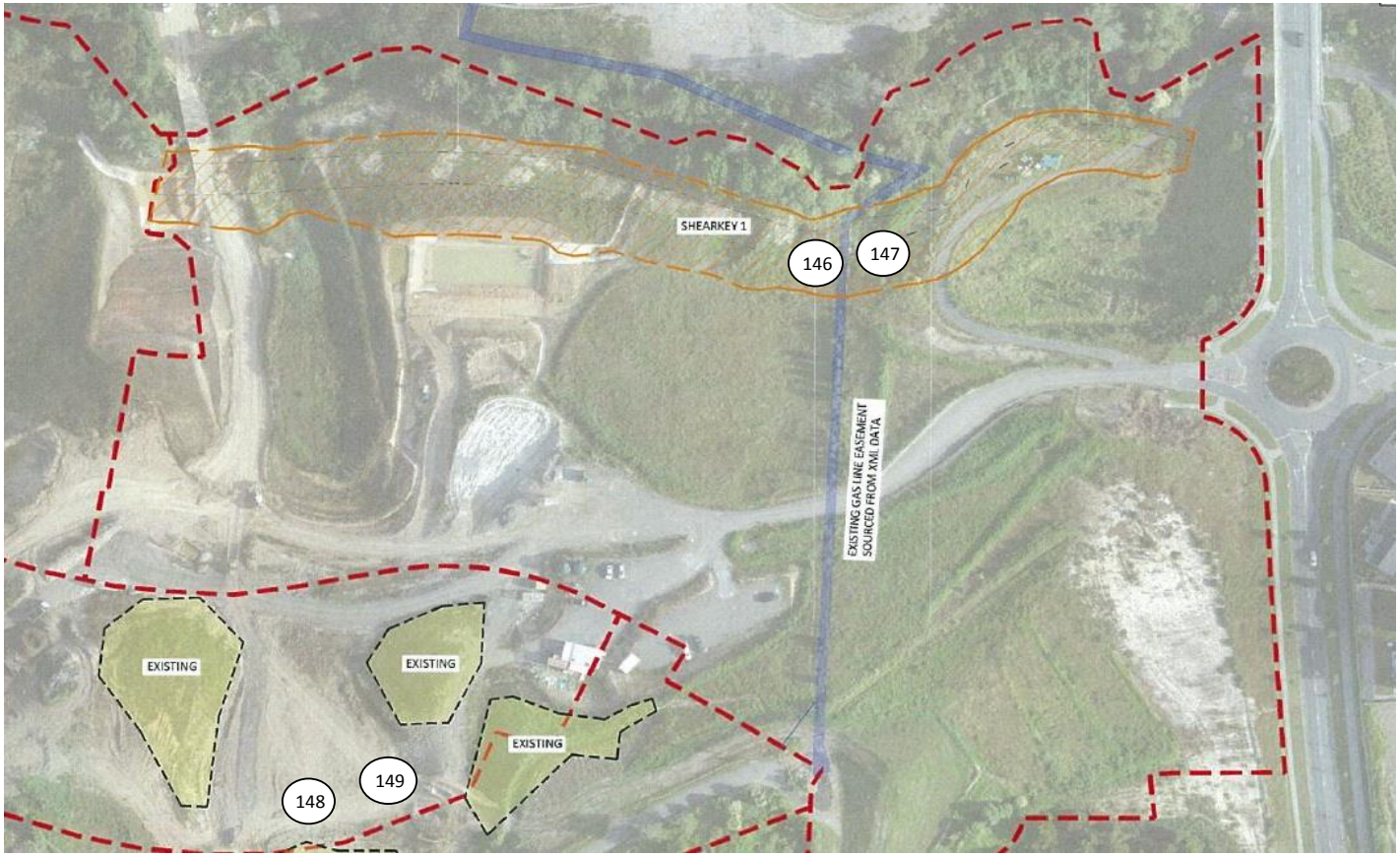
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00321
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 13/02/2020



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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	19/02/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
14/02/2020	20W00335	LW	**150**	Fill	Clayey SILT	Shearkey 1	1749288	5949021	8.90	150		184	170	184+	179	1.81	35.8	1.33	2.70	3
14/02/2020	20W00335	LW	**151**	Fill	Clayey SILT	Shearkey 1	1749236	5949040	10.50	150		UTP	UTP	UTP	184+	1.88	25.9	1.49	2.70	6
14/02/2020	20W00335	LW	**152**	Fill	Clayey SILT	Refer to plan	1749161	5948823	36.60	150		UTP	UTP	184+	156	1.87	31.9	1.42	2.70	2
14/02/2020	20W00335	LW	**153**	Fill	Clayey SILT	Refer to plan	1749170	5948806	36.60	150		UTP	UTP	UTP	170	1.87	31.7	1.42	2.70	2
14/02/2020	20W00335	LW	**154**	Fill	Clayey SILT	Refer to plan	1749201	5948819	36.50	150		184	165	156	184+	1.85	32.0	1.40	2.70	3

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SITE PLAN

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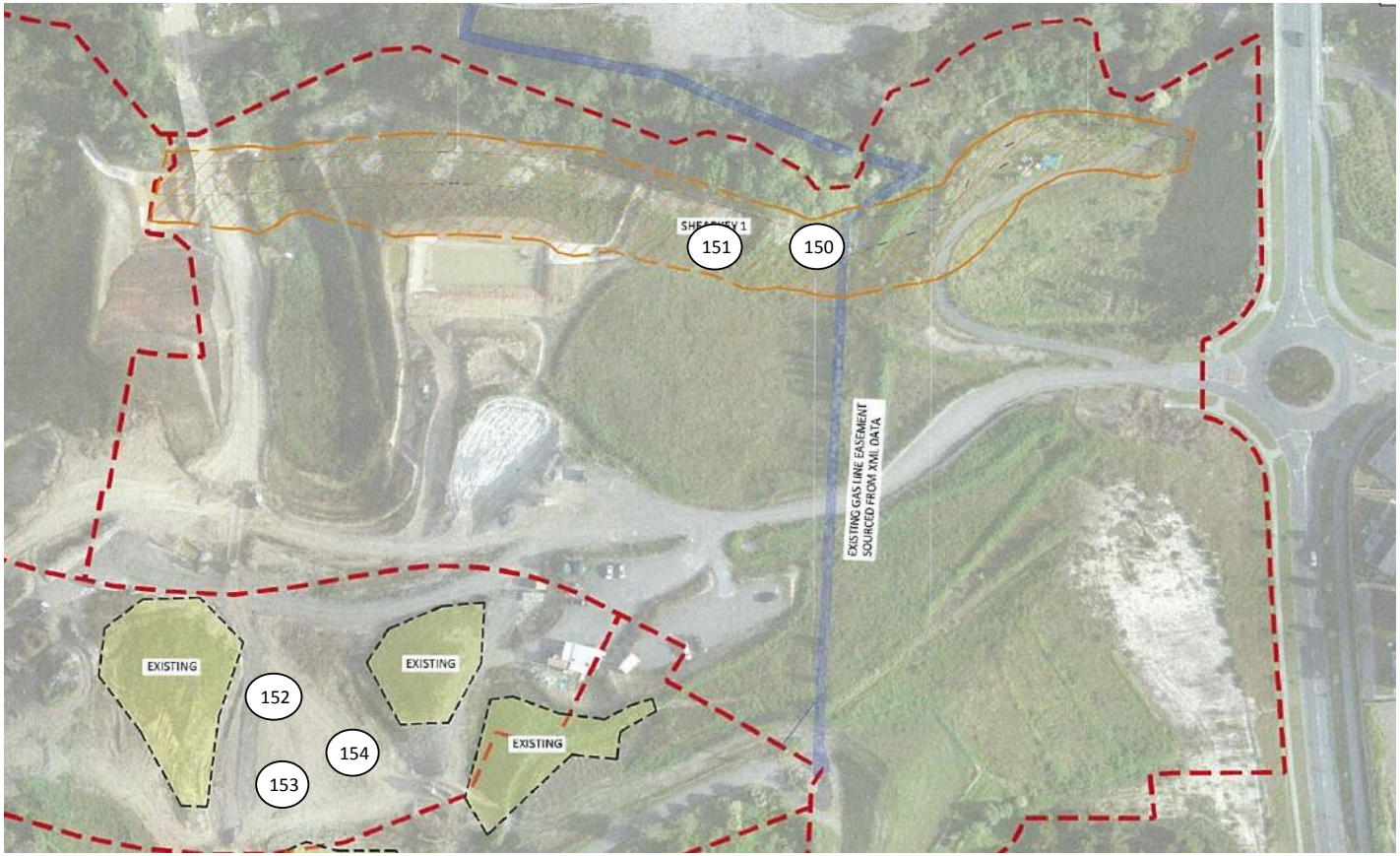
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00335
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 14/02/2020



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura
Issue date: 19/02/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
17/02/2020	20W00341	TR	**155**	Fill	Silty CLAY	Refer to plan	1749231	5949025	-	150		UTP	UTP	202	185	1.88	30.2	1.45	2.70	3
17/02/2020	20W00341	TR	**156**	Fill	Silty CLAY	Refer to plan	1749259	5949014	-	150		202	198	173	166	1.87	25.3	1.49	2.70	7
17/02/2020	20W00341	TR	**157**	Fill	Silty CLAY	Refer to plan	1749265	5949024	-	150		202	202	202	178	1.87	27.9	1.46	2.70	5

Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

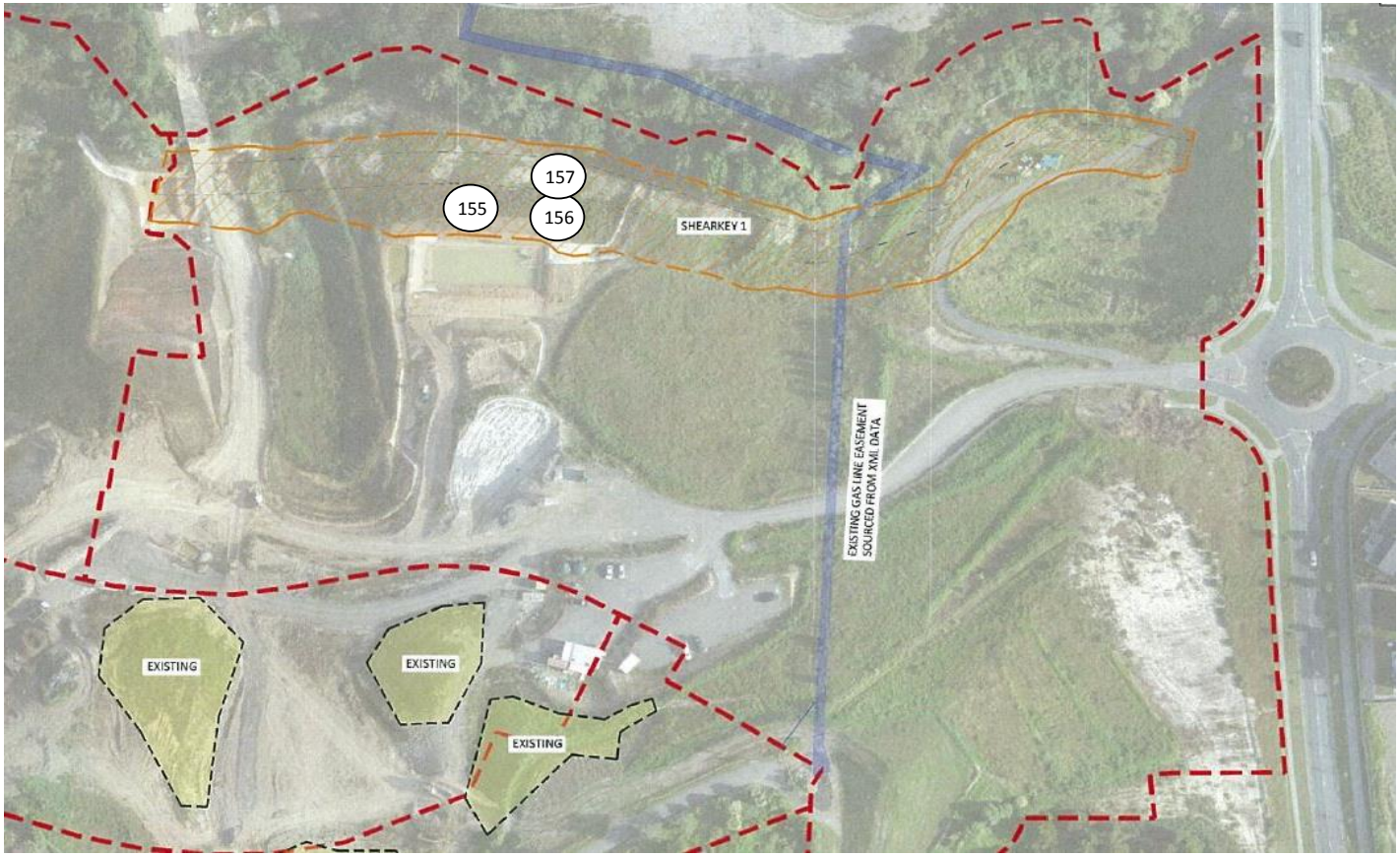
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W00341
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 17/02/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	21/02/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
18/02/2020	20W00350	TR	**158**	Fill	Silty CLAY	Refer to plan	1749239	5949032	12.34	150		UTP	UTP	202	202	1.83	30.3	1.41	2.70	5
18/02/2020	20W00350	TR	**159**	Fill	Silty CLAY	Refer to plan	1749259	5949014	12.61	150		202	202	202	UTP	1.83	30.0	1.41	2.70	6
18/02/2020	20W00350	TR	**160**	Fill	Silty CLAY	Refer to plan	1749285	5949017	11.10	150		162	176	182	185	1.84	30.2	1.41	2.70	5
18/02/2020	20W00350	TR	**161**	Fill	Silty CLAY	Shearkey 1	1749333	5949026	4.60	150		185	182	198	173	1.74	32.7	1.31	2.70	9
18/02/2020	20W00350	TR	**162**	Fill	Silty CLAY	Shearkey 1	1749317	5949027	4.75	150		162	182	173	185	1.80	32.3	1.36	2.70	6

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SITE PLAN

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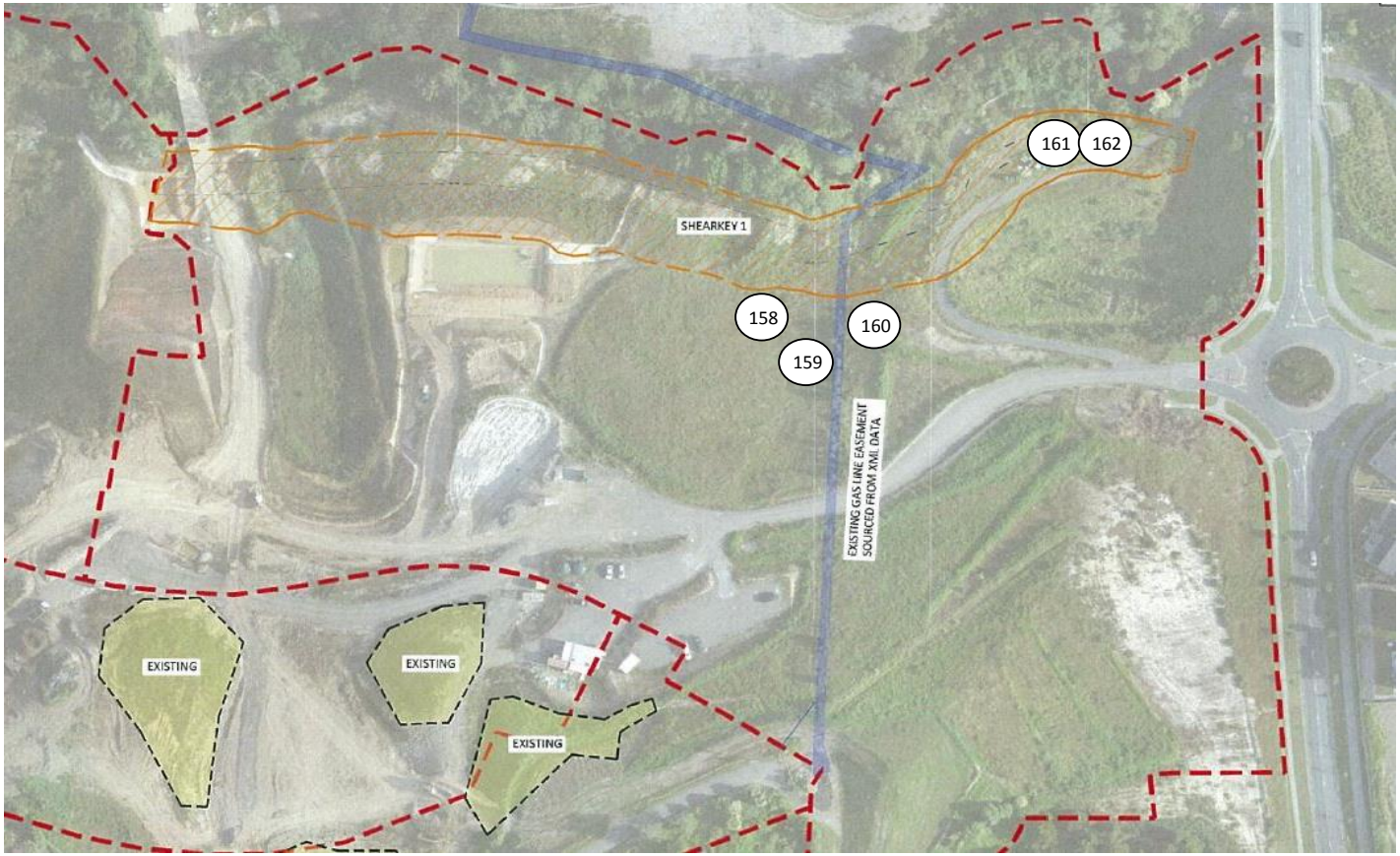
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00350
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 18/02/2020



Issue date: 050517

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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)
Address	PO Box 8261, Symonds Street, Auckland 1150
Attention:	Stephen Parkes
c.c:	-
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Location:	Access off Arran Drive, Orewa

PROJECT CODE: 773-ETAM00991AA

Page: 1 of 2

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

Approved Signatory: Cesar Pura

Issue date: 2/24/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
19/02/2020	20W00361	TR	**163**	Fill	Silty CLAY	Gully 1	1749179	5948827	37.20	150		155	UTP	169	UTP	1.89	24.7	1.52	2.70	6
19/02/2020	20W00361	TR	**164**	Fill	Silty CLAY	Gully 1	1749174	5948807	36.80	150		155	162	169	155	1.86	31.3	1.42	2.70	3
19/02/2020	20W00361	TR	**165**	Fill	Silty CLAY	Gully 1	1749219	5948842	37.50	150		UTP	UTP	UTP	UTP	1.86	33.4	1.39	2.70	2
19/02/2020	20W00361	TR	**166**	Fill	Silty CLAY	Shearkey 1	1749310	5949023	5.90	150		143	148	155	182	1.81	35.6	1.33	2.70	3
19/02/2020	20W00361	TR	**167**	Fill	Silty CLAY	Shearkey 1	1749320	5949018	5.70	150		148	155	147	162	1.81	33.3	1.36	2.70	5

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SITE PLAN

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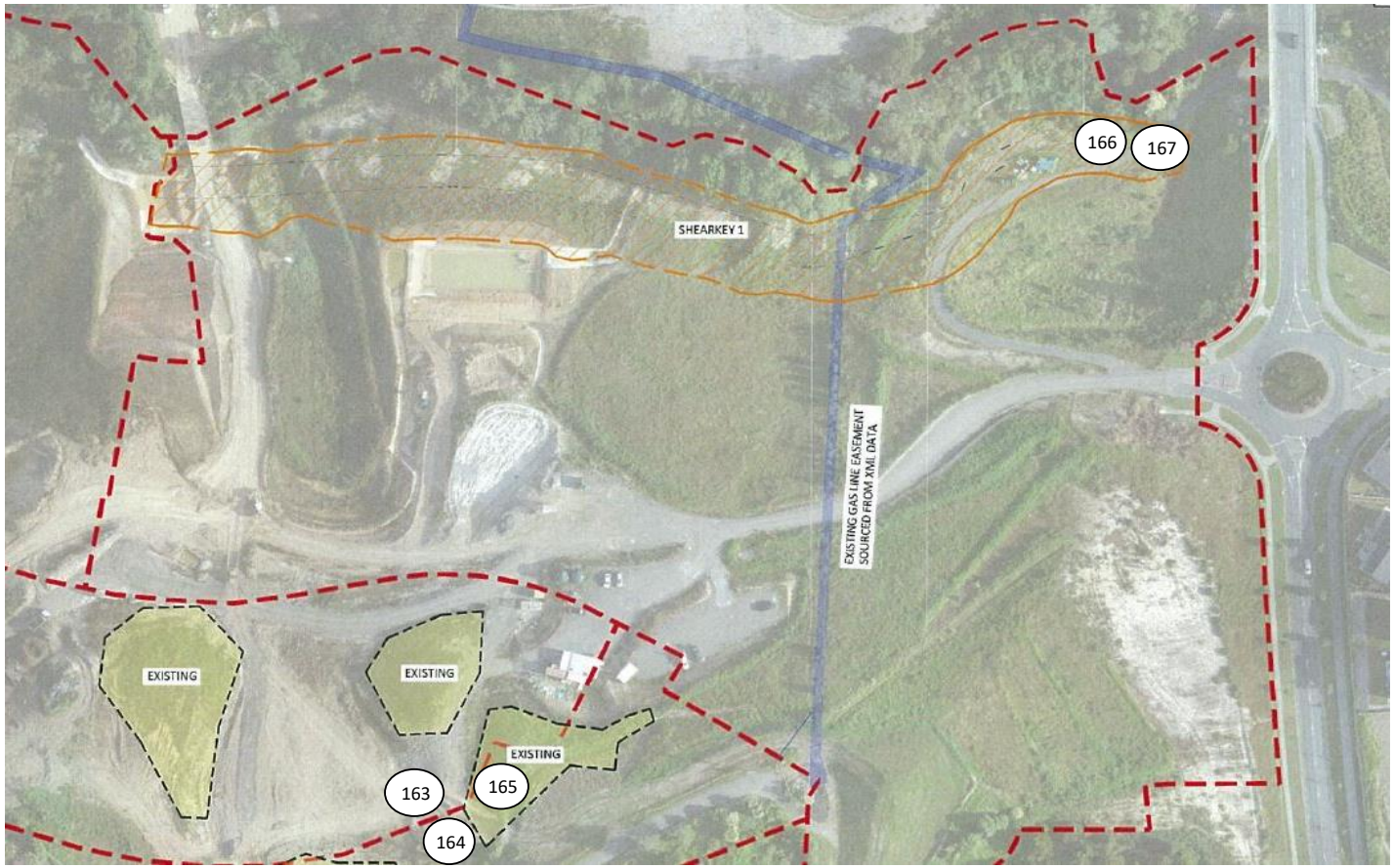
Project No:	**773-ETAM00991AA**
Work Order No:	ETAM20W00361
Page No:	2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR

Date tested: 19/02/20



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	11/03/2020

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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
25/02/2020	20W00403	TR	**179**	Fill	Silty CLAY	Gully 1	1749183	5948799	39.50	150		181+	181+	181+	181+	1.85	27.1	1.45	2.70	7
25/02/2020	20W00403	TR	**180**	Fill	Silty CLAY	Gully 1	1749156	5948809	39.80	150		169	176	179	181	1.90	30.1	1.46	2.70	2
25/02/2020	20W00403	TR	**181**	Fill	Silty CLAY	Shearkey 1	1749347	5949027	4.50	150		169	162	155	166	1.76	36.3	1.29	2.70	5

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
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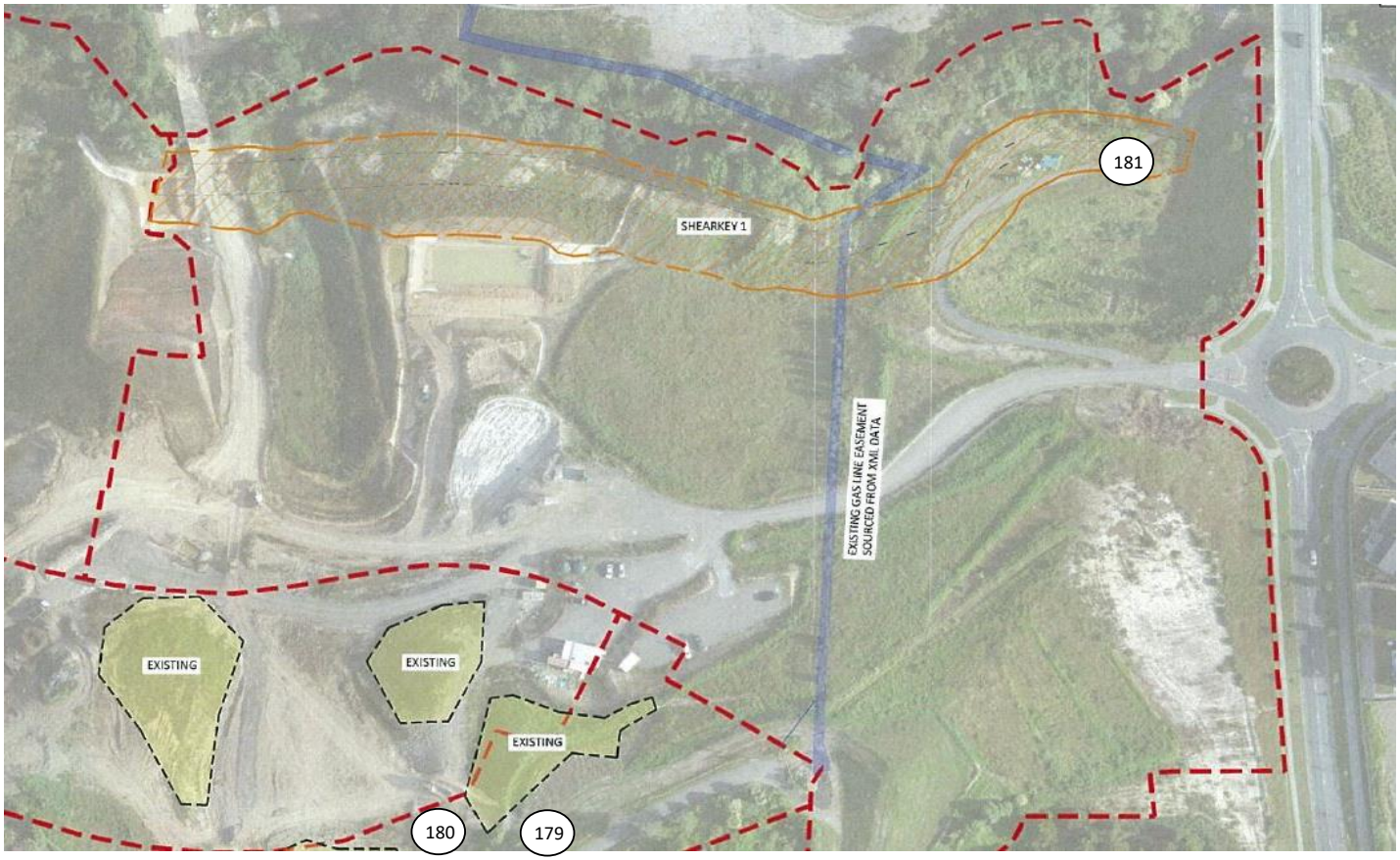
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00403
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 25/02/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
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t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	11/03/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
26/02/2020	20W00425	TR	**182**	Fill	Silty CLAY	Shearkey 1	1749330	5949023	6.30	150		181+	169	142	155	1.81	36.1	1.33	2.70	3
26/02/2020	20W00425	TR	**183**	Fill	Silty CLAY	Shearkey 1	1749341	5949031	5.80	150		155	158	142	162	1.80	39.3	1.29	2.70	1
26/02/2020	20W00425	TR	**184**	Fill	Silty CLAY	Shearkey 1	1749353	5949025	5.50	150		181+	181+	162	169	1.76	45.6	1.21	2.70	0

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PO Box 58 877, Botany, Manukau 2163, New Zealand
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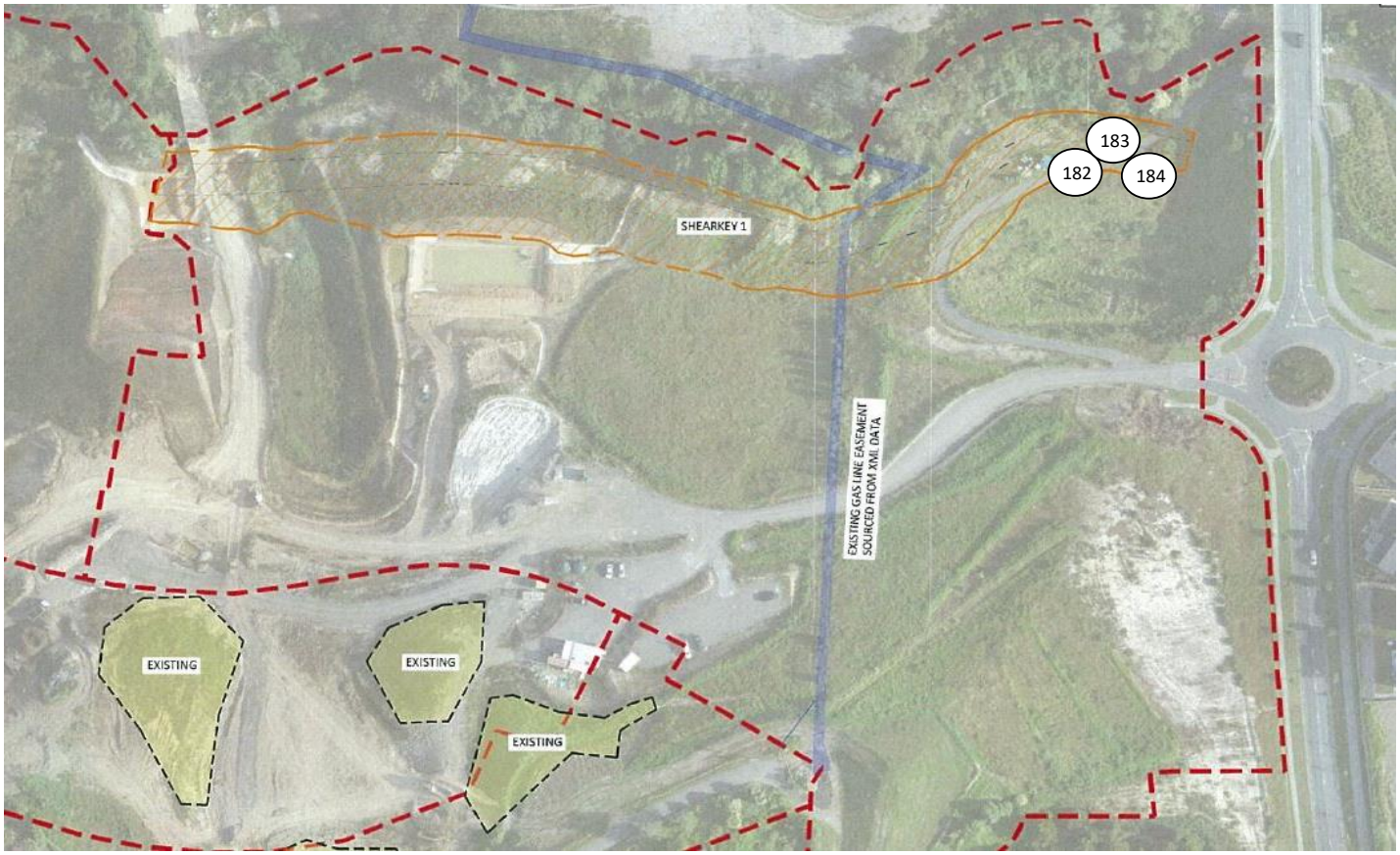
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00425
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 26/02/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	11/03/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
27/02/2020	20W00428	TR	**185**	Fill	Silty CLAY	Shearkey 1	1749336	5949032	6.80	150		UTP	181+	181+	155	1.81	33.8	1.35	2.70	4
27/02/2020	20W00428	TR	**186**	Fill	Silty CLAY	Shearkey 1	1749343	5949026	6.90	150		UTP	181+	181+	156	1.78	39.7	1.27	2.70	2
27/02/2020	20W00428	TR	**187**	Fill	Silty CLAY	Shearkey 1	1749354	5949026	6.90	150		UTP	UTP	181+	181+	1.82	31.6	1.38	2.70	5
27/02/2020	20W00428	TR	**188**	Fill	Gravelly CLAY	Gully 1	1749165	5948910	25.50	150		UTP	UTP	UTP	UTP	1.84	32.1	1.40	2.70	4
27/02/2020	20W00428	TR	**189**	Fill	Gravelly CLAY	Gully 1	1749195	5948918	25.10	150		UTP	181+	181+	169	1.86	32.7	1.40	2.70	2

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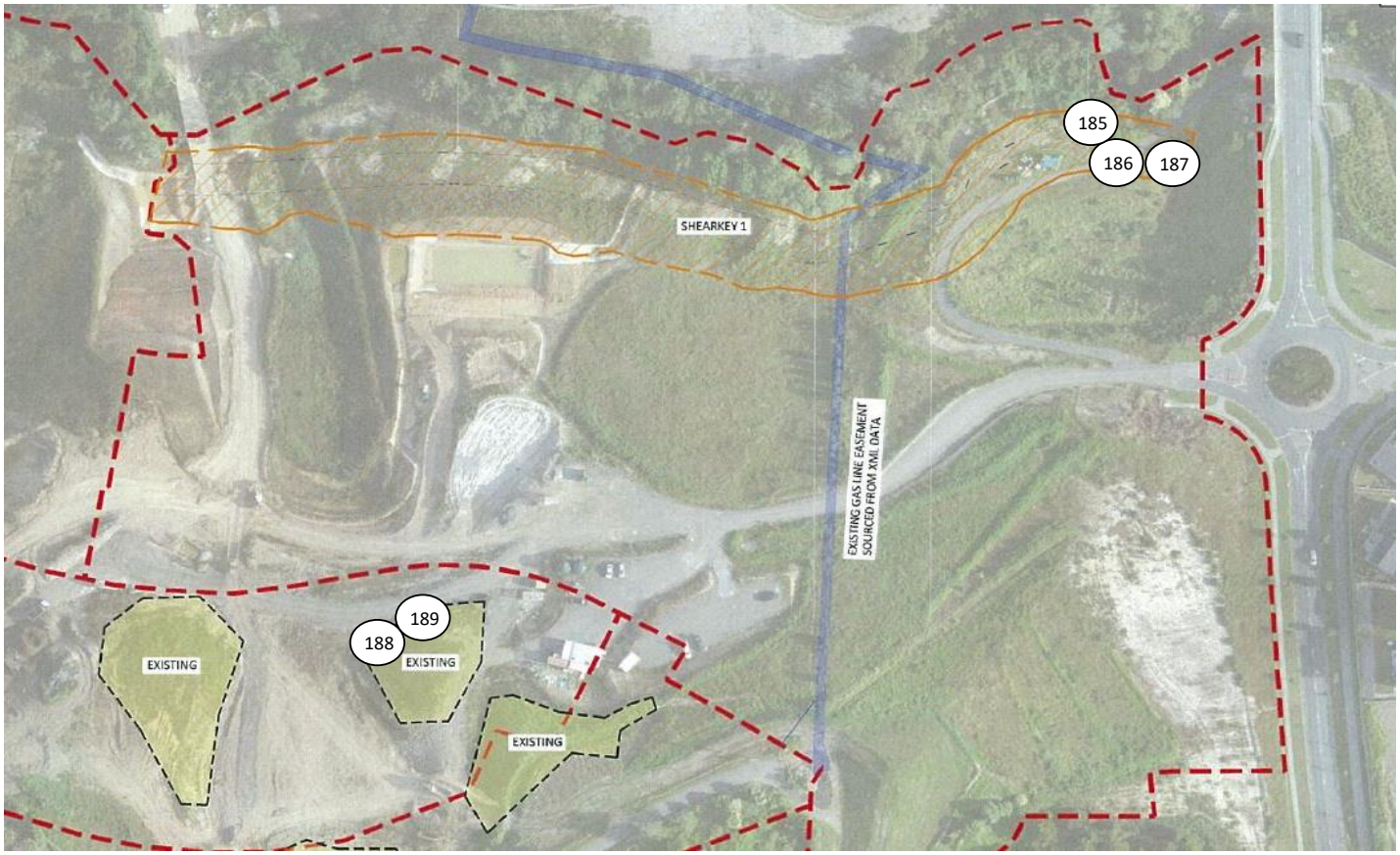
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00428
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 27/02/2020



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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	11/03/2020

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Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
28/02/2020	20W00451	TR	**190**	Fill	Silty CLAY	Shearkey 1	1749325	5949023	7.60	150		181+	181+	181+	181+	1.79	41.4	1.27	2.70	1
28/02/2020	20W00451	TR	**191**	Fill	Silty CLAY	Shearkey 1	1749341	5949022	8.10	150		155	170	181+	181+	1.75	46.2	1.20	2.70	0
28/02/2020	20W00451	TR	**192**	Fill	Silty CLAY	Shearkey 1	1749356	5949032	8.40	150		170	162	181+	181+	1.78	36.1	1.30	2.70	5
28/02/2020	20W00451	TR	**193**	Fill	Gravelly CLAY	Gully 1	1749183	5948908	27.70	150		UTP	181+	181+	181+	1.80	31.3	1.37	2.70	6

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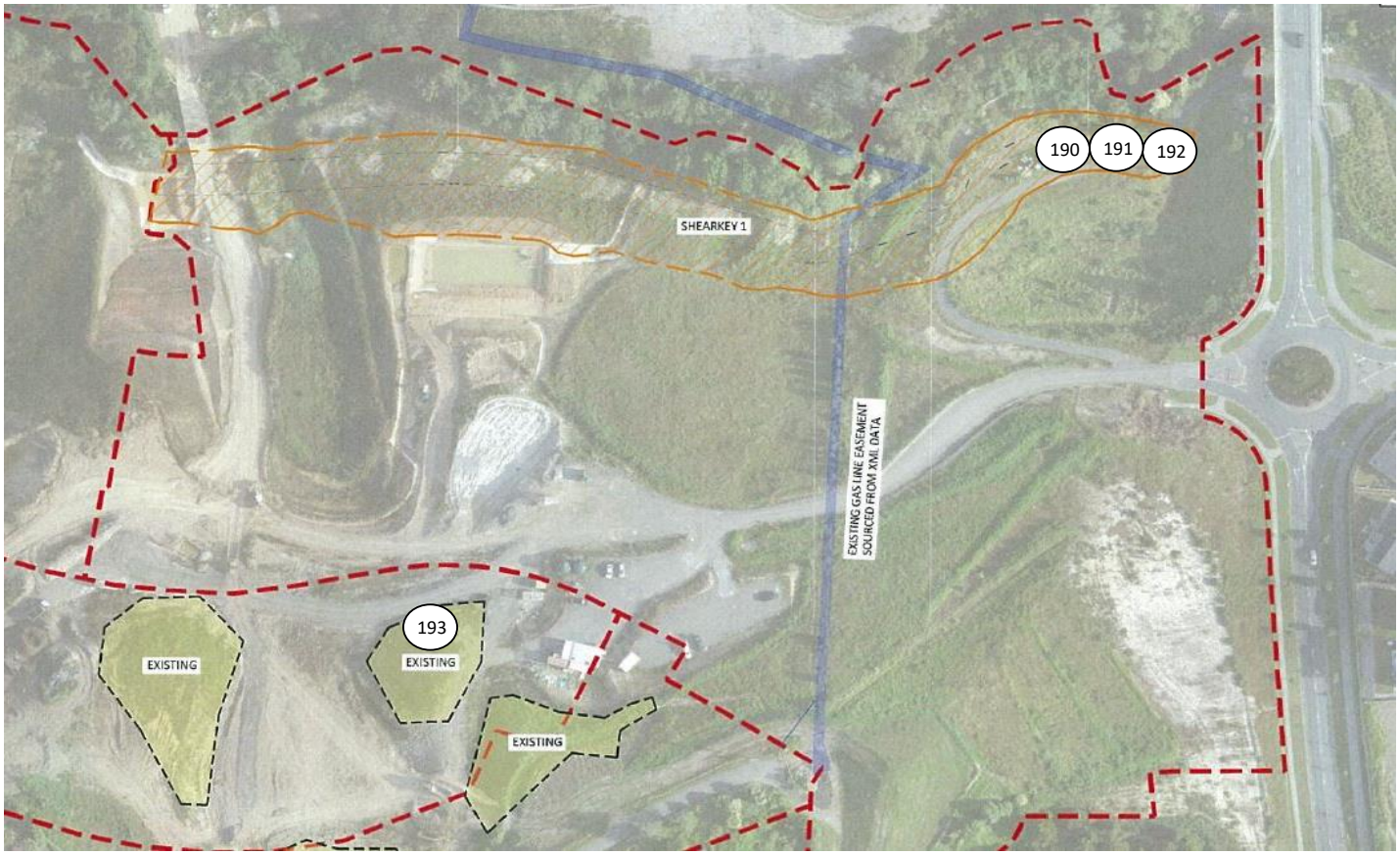
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00451
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 28/02/2020



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	11/03/2020

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

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Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
2/03/2020	20W00469	TR	**194**	Fill	Silty CLAY	Gully 1	1749213	5948920	26.00	150		UTP	UTP	UTP	169	1.91	29.2	1.48	2.70	2
2/03/2020	20W00469	TR	**195**	Fill	Silty CLAY	Gully 1	1749190	5948895	26.30	150		UTP	UTP	UTP	UTP	1.91	24.3	1.53	2.70	6
2/03/2020	20W00469	TR	**196**	Fill	Silty CLAY	Gully 1	1749170	5948905	26.90	150		UTP	UTP	UTP	UTP	1.98	25.4	1.58	2.70	2
2/03/2020	20W00469	TR	**197**	Fill	Gravelly CLAY	Shearkey 1	1749355	5949018	9.80	150		UTP	181+	148	155	1.87	32.3	1.41	2.70	2
2/03/2020	20W00469	TR	**198**	Fill	Gravelly CLAY	Shearkey 1	1749319	5949005	9.80	150		181+	155	UTP	UTP	1.86	27.9	1.45	2.70	6

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t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

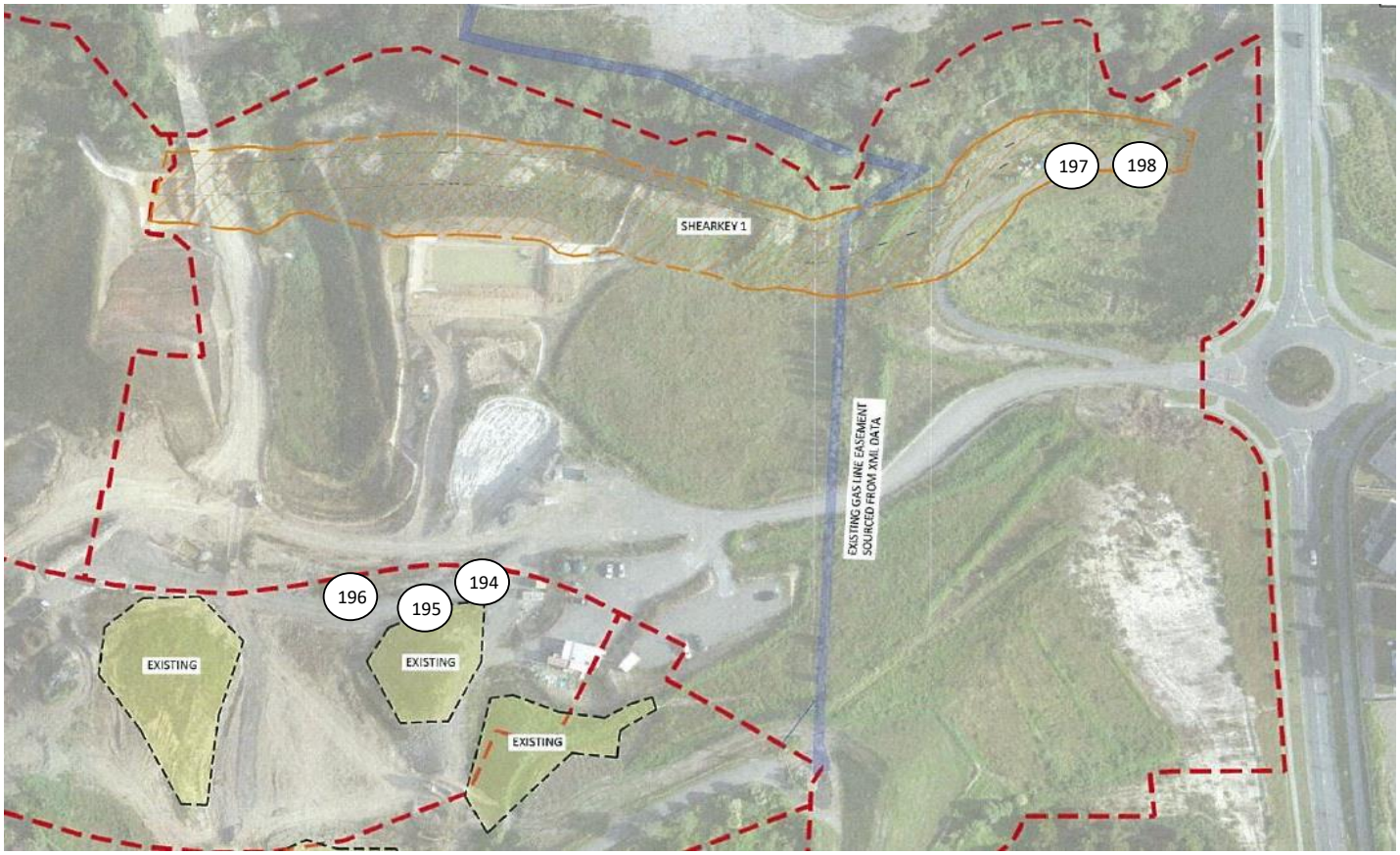
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W00469
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 28/02/2020



Issue date: 050517

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Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	11/03/2020

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Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
3/03/2020	20W00471	TR	**199**	Fill	Silty CLAY	Gully 1	1749203	5948910	26.40	150		181+	181+	181+	142	1.88	31.4	1.43	2.70	2
3/03/2020	20W00471	TR	**200**	Fill	Silty CLAY	Gully 1	1749198	5948894	26.40	150		181+	181+	148	155	1.85	30.8	1.41	2.70	4
3/03/2020	20W00471	TR	**201**	Fill	Silty CLAY	Gully 1	1749176	5948900	2.70	150		181+	181+	181+	UTP	1.86	32.6	1.41	2.70	2
3/03/2020	20W00471	TR	**202**	Fill	Gravelly CLAY	Shearkey 1	1749311	5949009	12.90	150		UTP	UTP	UTP	UTP	1.85	24.1	1.49	2.70	9
3/03/2020	20W00471	TR	**203**	Fill	Silty CLAY	Shearkey 1	1749331	5949012	10.90	150		181+	181+	UTP	UTP	1.88	28.5	1.46	2.70	4

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

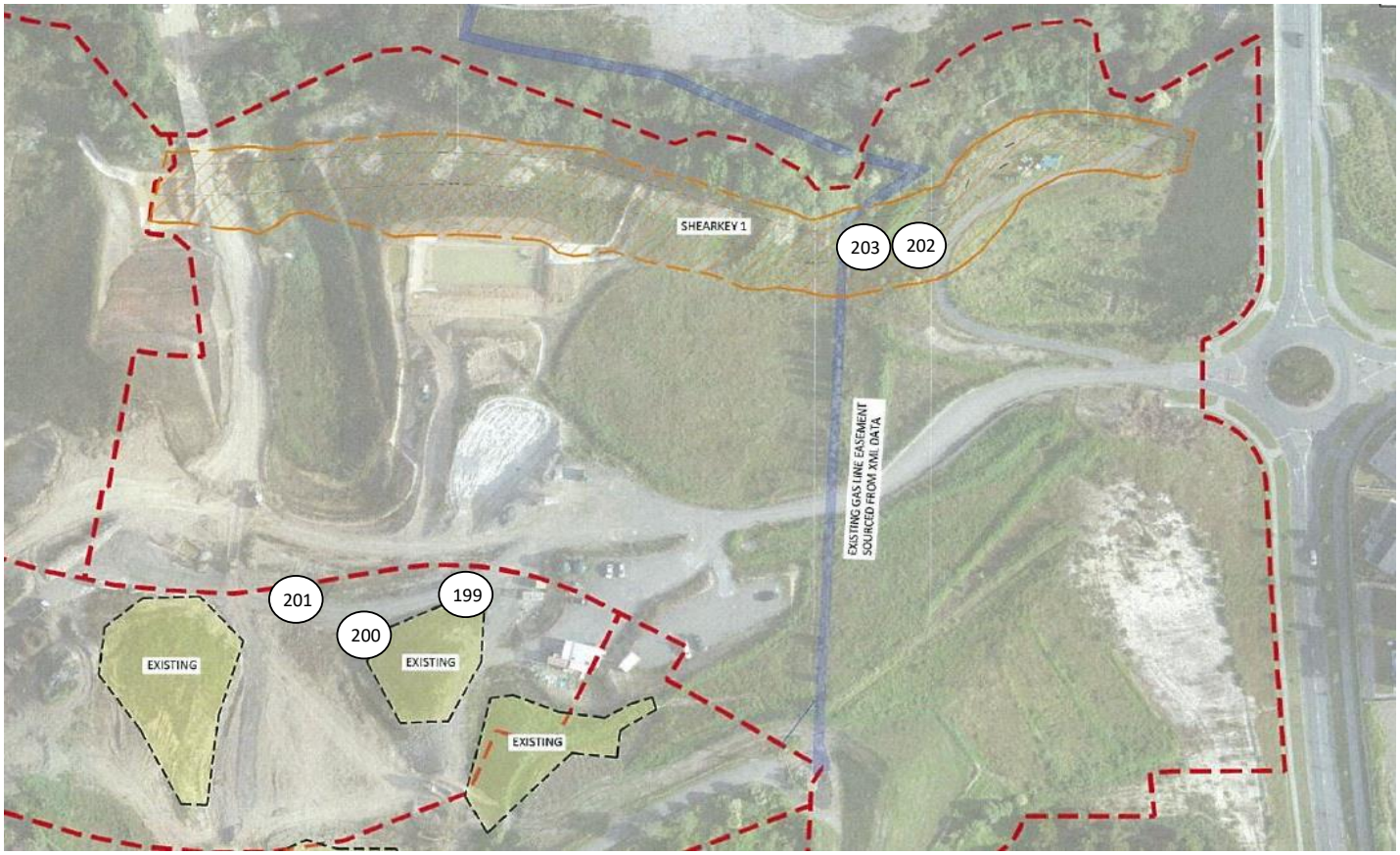
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W00471
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 3/03/2020



Issue date: 050517

Coffey Services NZ Ltd
144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa	Approved Signatory:	Cesar Pura
		Issue date:	20/03/2020

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

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
5/03/2020	20W00495	TR	**206**	Fill	Silty CLAY	Shearkey 1	1749331	5949010	11.30	150		148	148	154	155	1.84	36.2	1.35	2.70	1
5/03/2020	20W00495	TR	**207**	Fill	Silty CLAY	Shearkey 1	1749340	5949022	10.90	150		181+	181+	181+	181+	1.80	36.9	1.31	2.70	3
5/03/2020	20W00495	TR	**208**	Fill	Silty CLAY	Gully 1	1749192	5948879	27.90	150		181+	181+	181+	181+	1.89	32.3	1.43	2.70	1
5/03/2020	20W00495	TR	**209**	Fill	Gravelly CLAY	Gully 1	1749232	5948908	26.90	150		UTP	181+	181+	181+	1.95	26.8	1.54	2.70	2

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PO Box 58 877, Botany, Manukau 2163, New Zealand
t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

SITE PLAN

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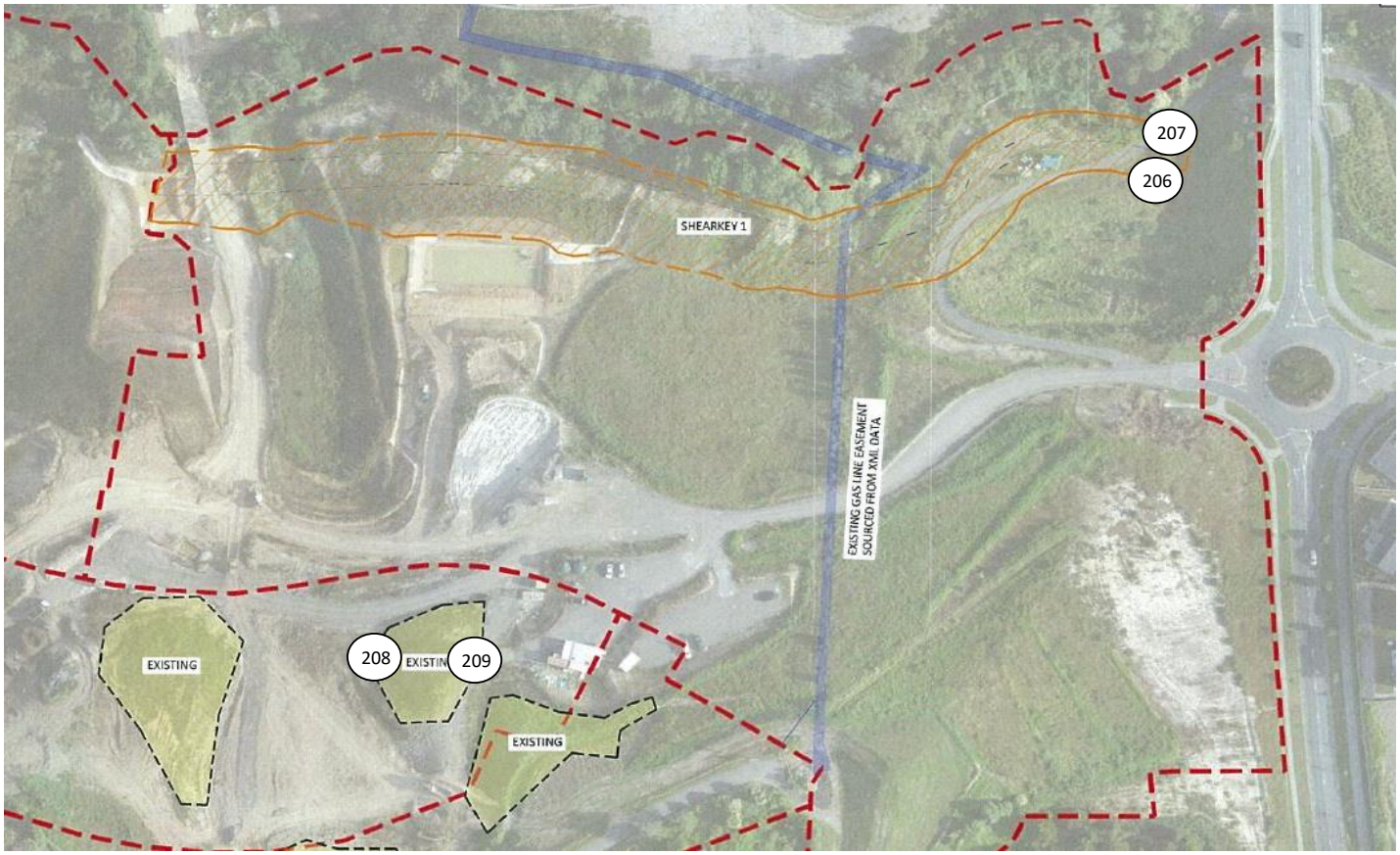
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00495
Page No: 2 of 2

Project: 773-AKLGE-206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: TR
Date tested: 5/03/2020



Issue date: 050517

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144A Cryers Road, East Tamaki, Auckland 2103
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 1
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Joanna Jones

Issue date: 26/05/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Chainage (m)	Offset (m)	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
21/05/2020	20W00804	LW	**261**	Fill	Clayey SILT	Shear Key 1	150		1749304	5949026	6.56	150		157	163	144	148	1.87	32.2	1.41	2.70	2
21/05/2020	20W00804	LW	**262**	Fill	Clayey SILT	Shear Key 1	150		1749288	5949032	6.54	150		174	166	183+	183+	1.88	29.6	1.45	2.70	3

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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand
PO Box 58 877, Botany, Manukau 2163, New Zealand
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SITE PLAN

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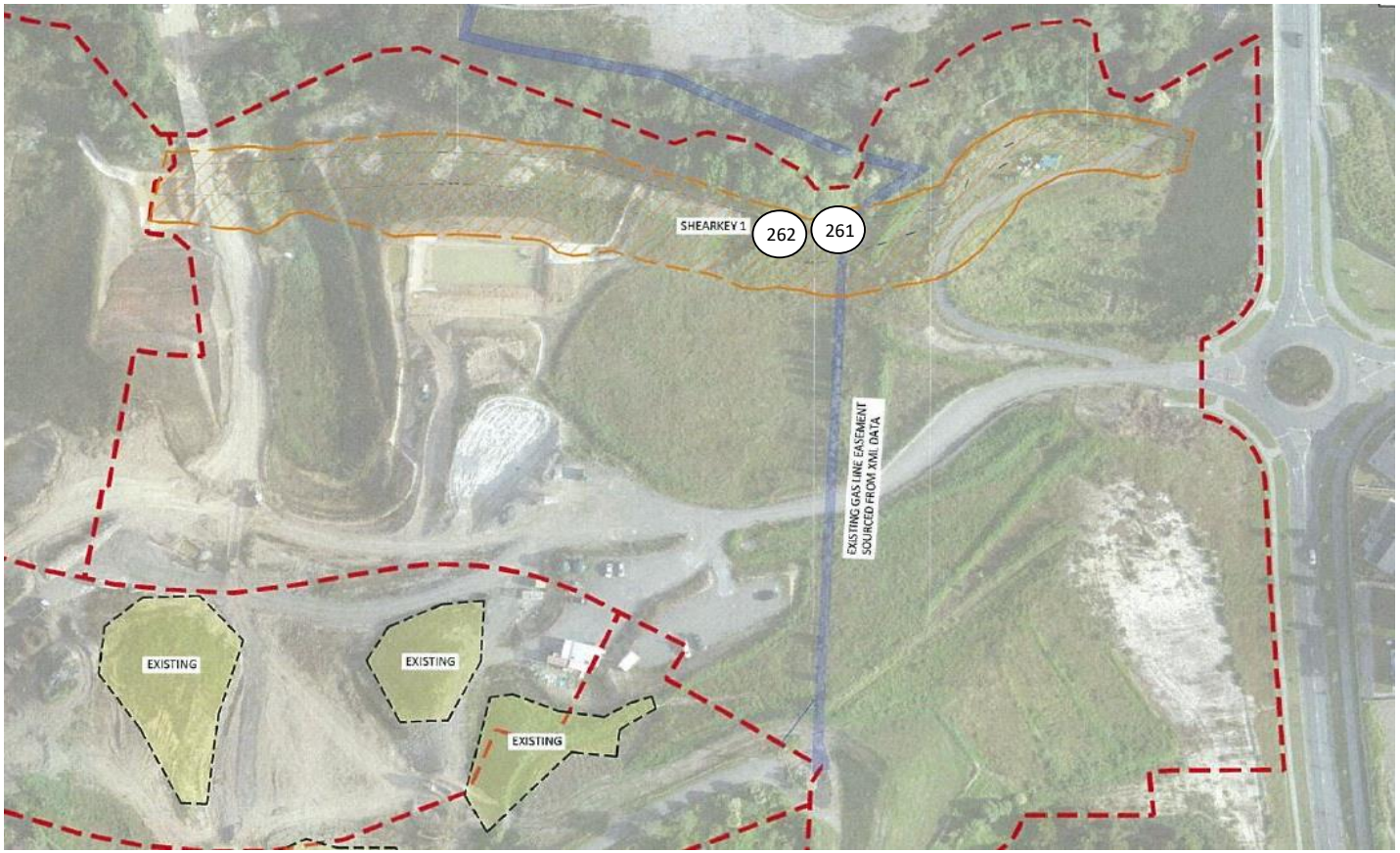
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00804
Page No: 2 of 2

Project: 8

Location: As below

Tested by: LW
Date tested: 21/05/2020



Issue date: 050517

Coffey Services NZ Ltd
333K East Tamaki Road, Otara
PO Box 58877, Botany, Manukau, Auckland 2163
t +64 92723375 f +92723378
www.coffey.com

Client:	Coffey Services NZ Ltd (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

IANZ ACCREDITED LABORATORY

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

Approved Signatory: Cesar Pura

Issue date: 3/06/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
22/05/2020	20W00820	LW	**263**	Fill	Clayey SILT	Shear Key 1	1749300	5949027	7.02	150		UTP	UTP	UTP	UTP	1.89	29.9	1.46	2.70	2
22/05/2020	20W00820	LW	**264**	Fill	Clayey SILT	Shear Key 1	1749288	5949032	7.09	150		UTP	UTP	UTP	UTP	1.85	29.5	1.43	2.70	5

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SITE PLAN

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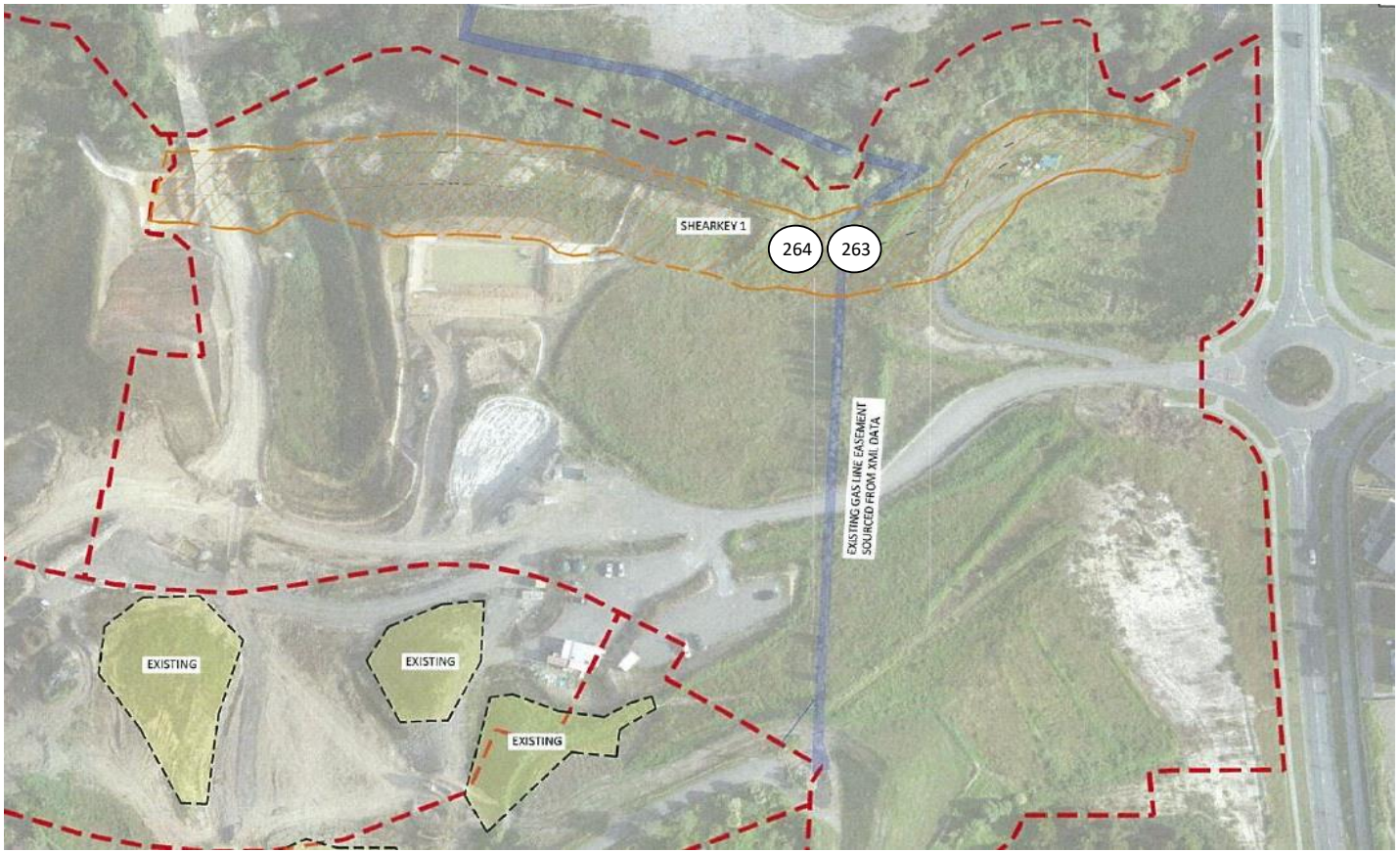
Project No: 773-ETAM00991AA
Work Order No: ETAM20W00820
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 22/05/2020



Issue date: 050517

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

Client:	Coffey Services (NZ) Limited (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 25/11/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
23/11/2020	20W01810	LW	**286**	Fill	Clayey SILT	Refer to plan	1749170	5949015	16.08	150		UTP	UTP	UTP	UTP	1.91	29.0	1.48	2.70	2
23/11/2020	20W01810	LW	**287**	Fill	Clayey SILT	Refer to plan	1749148	5949011	16.38	150		UTP	UTP	UTP	UTP	1.87	27.5	1.47	2.70	5
23/11/2020	20W01810	LW	**288**	Fill	Clayey SILT	Refer to plan	1749127	5948997	16.98	150		UTP	UTP	UTP	UTP	1.87	25.9	1.48	2.70	7

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SITE PLAN

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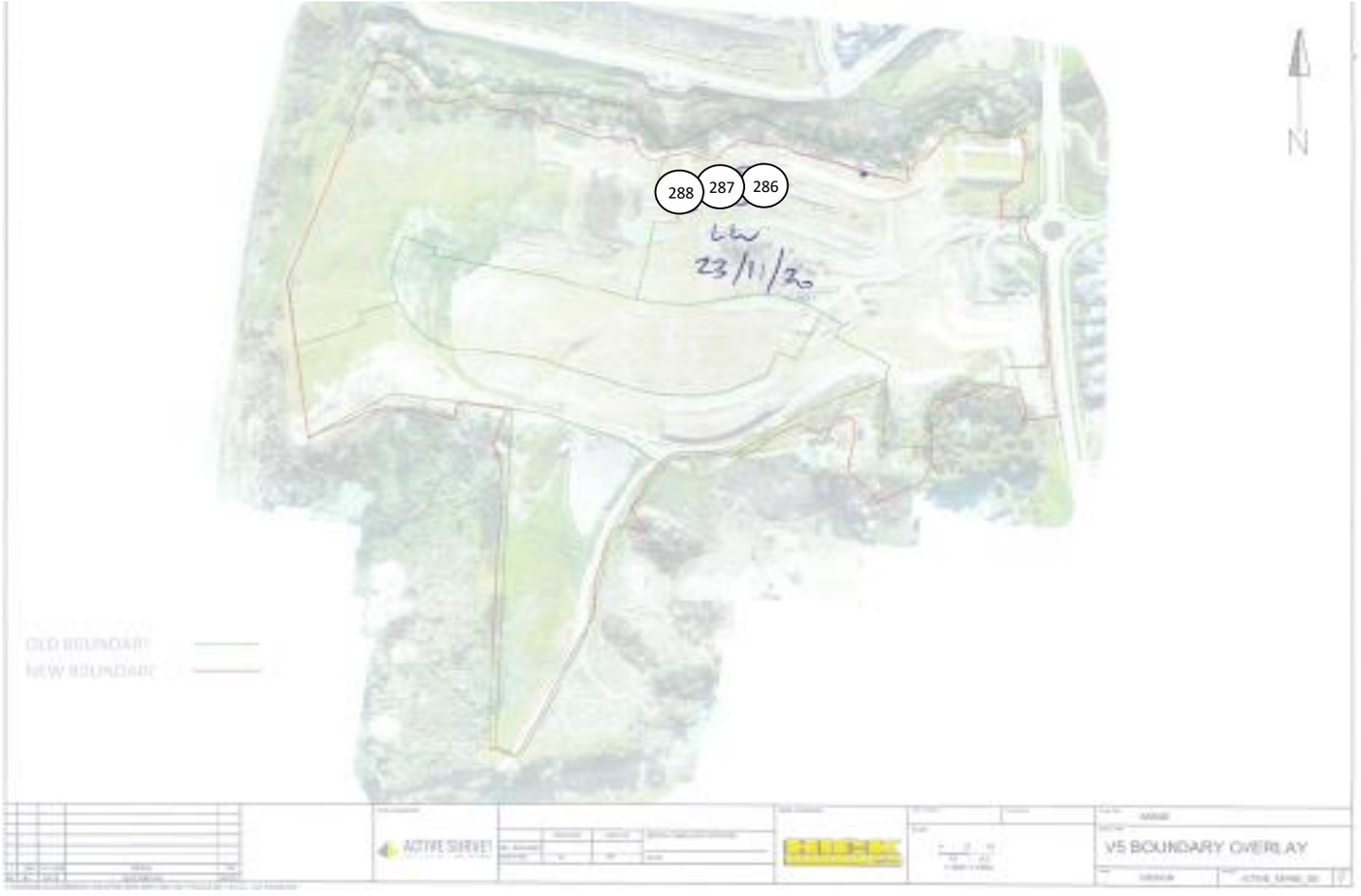
Project No: 773-ETAM00991AA
Work Order No: ETAM20W01810
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 23/11/2020



Issue date: 050517

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

Client:	Coffey Services (NZ) Limited (Auckland)	**PROJECT CODE:**	773-ETAM00991AA
Address	PO Box 8261, Symonds Street, Auckland 1150	Page:	1 of 2
Attention:	Stephen Parkes		
c.c:	-		
Project:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6		
Location:	Access off Arran Drive, Orewa		

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

Approved Signatory: Cesar Pura

Issue date: 14/12/2020

Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No: ETAM…	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL(m)	Probe Test Depth (mm)	Comments	Field Shear Strength in kPa (UTP = Unable to penetrate)				Wet Density (T/m^3)	Oven Water Content (%)	Dry Density (T/m^3)	Solid Density (T/m^3) Assumed	Air Voids (%)
11/12/2020	20W01923	LW	**303**	Fill	Clayey SILT	Shear Key	1749046	5949073	-	150		140	154	158	124	1.88	30.7	1.44	2.70	2

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Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

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Project No: 773-ETAM00991AA
Work Order No: ETAM20W01923
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 11/12/2020

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM20W01960
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01960

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 18/12/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/12/2020	ETAM20W01960	LW	311	1.89	28.6	1.47	2.70	3	UTP	UTP	UTP	UTP	Retaining Wall 311, CH100	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	312	1.91	30.1	1.46	2.70	2	UTP	UTP	UTP	UTP	Retaining Wall 311, CH150	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	313	1.93	29.6	1.49	2.70	1	UTP	UTP	UTP	UTP	Retaining Wall 311, CH170	-	-	-	Clayey SILT	0.5m below top of Blocks
14/12/2020	ETAM20W01960	LW	314	1.83	31.6	1.39	2.70	4	158+	158+	158+	144	Shear Key	1749070	5949059	-	Clayey SILT	-
14/12/2020	ETAM20W01960	LW	315	1.87	30.0	1.44	2.70	4	140	154	149	158	Shear Key	1749077	5949063	-	Clayey SILT	-
14/12/2020	ETAM20W01960	LW	316	1.83	29.9	1.41	2.70	6	UTP	UTP	UTP	UTP	Gully 1 above RW 311	1749190	5948966	-	Clayey SILT	0.6m below top of Blocks
14/12/2020	ETAM20W01960	LW	317	1.90	30.2	1.46	2.70	2	UTP	UTP	UTP	UTP	Gully 1 above RW 311	1749175	5948949	-	Clayey SILT	0.3m below top of Blocks

Form Number: R031N Issue Date: 20/09/2018

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

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Project No: 773-ETAM00991AA

Work Order No: ETAM20W01960

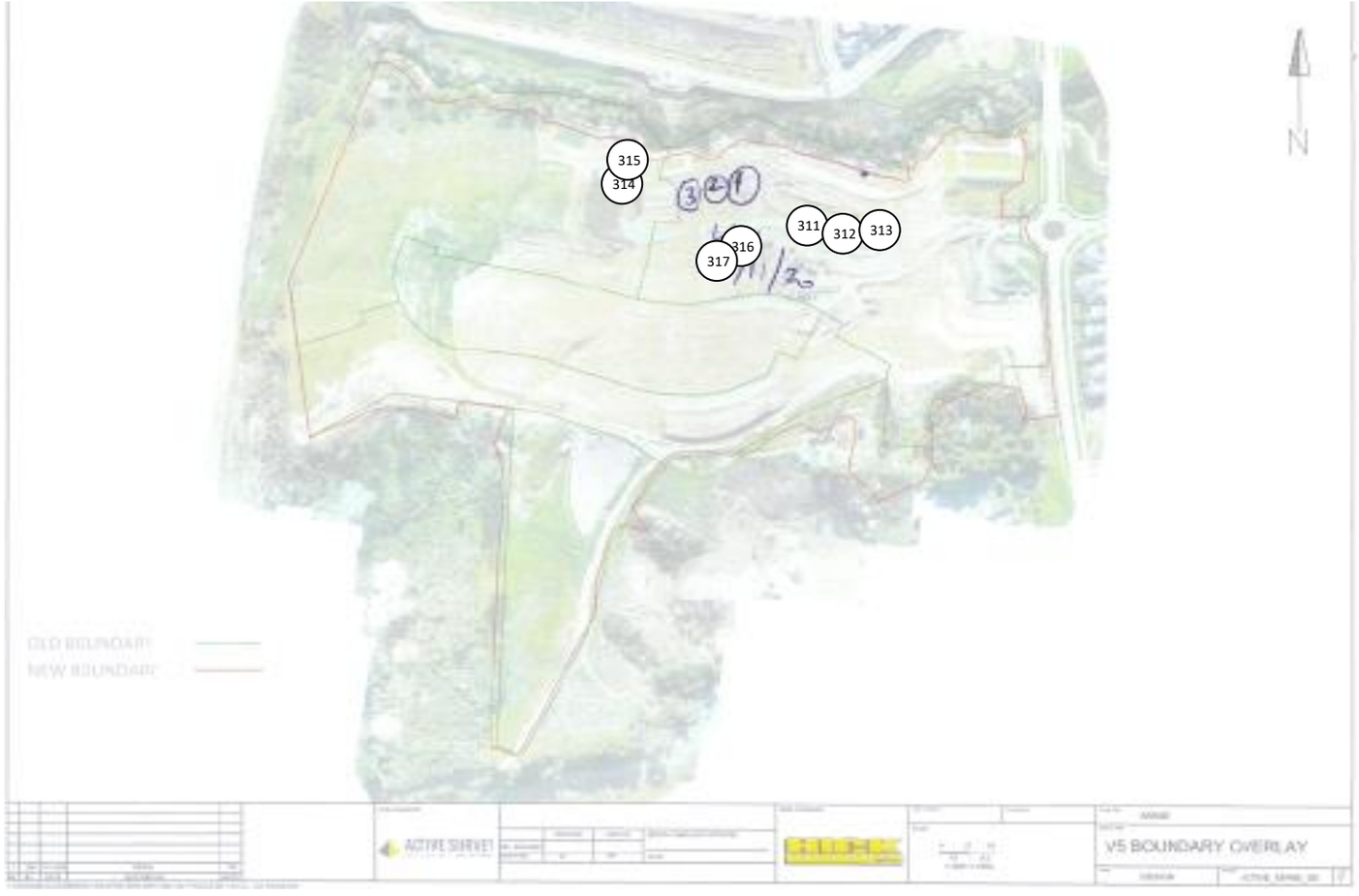
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW

Date tested: 14/12/2020



Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM20W01962
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01962

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 18/12/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
15/12/2020	ETAM20W01962	LW	318	1.87	28.6	1.46	2.70	5	UTP	UTP	UTP	UTP	Shear Key	1749053	5949067	6.5	Clayey SILT	
15/12/2020	ETAM20W01962	LW	319	1.91	29.1	1.48	2.70	2	UTP	UTP	UTP	UTP	Shear Key	1749060	5949068	6.8	Clayey SILT	
15/12/2020	ETAM20W01962	LW	320	1.85	26.7	1.46	2.70	7	158+	158+	158+	158+	Gully 1	1749139	5948974	-	Clayey SILT	At finished level
15/12/2020	ETAM20W01962	LW	321	1.92	28.7	1.50	2.70	2	158+	158+	158+	158+	Gully 1	1749110	5948963	-	Clayey SILT	At finished level

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

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Project No: 773-ETAM00991AA
Work Order No: ETAM20W01962
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 15/12/2020

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM20W01963
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01963

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 18/12/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
16/12/2020	ETAM20W01963	LW	322	1.87	37.2	1.36	2.70	0	158+	158+	158+	158+	Gully 2	1749071	5949068	8.5	Clayey SILT	
16/12/2020	ETAM20W01963	LW	323	1.89	36.1	1.39	2.70	0	158+	158+	158+	158+	Gully 2	1749051	5949066	8.6	Clayey SILT	
16/12/2020	ETAM20W01963	LW	324	1.90	32.5	1.43	2.70	0	UTP	UTP	158+	158+	Shear Key	1749091	5949049	7.0	Clayey SILT	
16/12/2020	ETAM20W01963	LW	325	1.91	33.3	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749081	5949031	7.0	Clayey SILT	
16/12/2020	ETAM20W01963	LW	326	1.88	33.9	1.41	2.70	0	UTP	UTP	UTP	UTP	Gully 1	1749127	5948956	-	Clayey SILT	0.8m below finished level
16/12/2020	ETAM20W01963	LW	327	1.92	34.5	1.43	2.70	2	UTP	UTP	UTP	UTP	Gully 1	1749128	5948930	-	Clayey SILT	0.8m below finished level

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

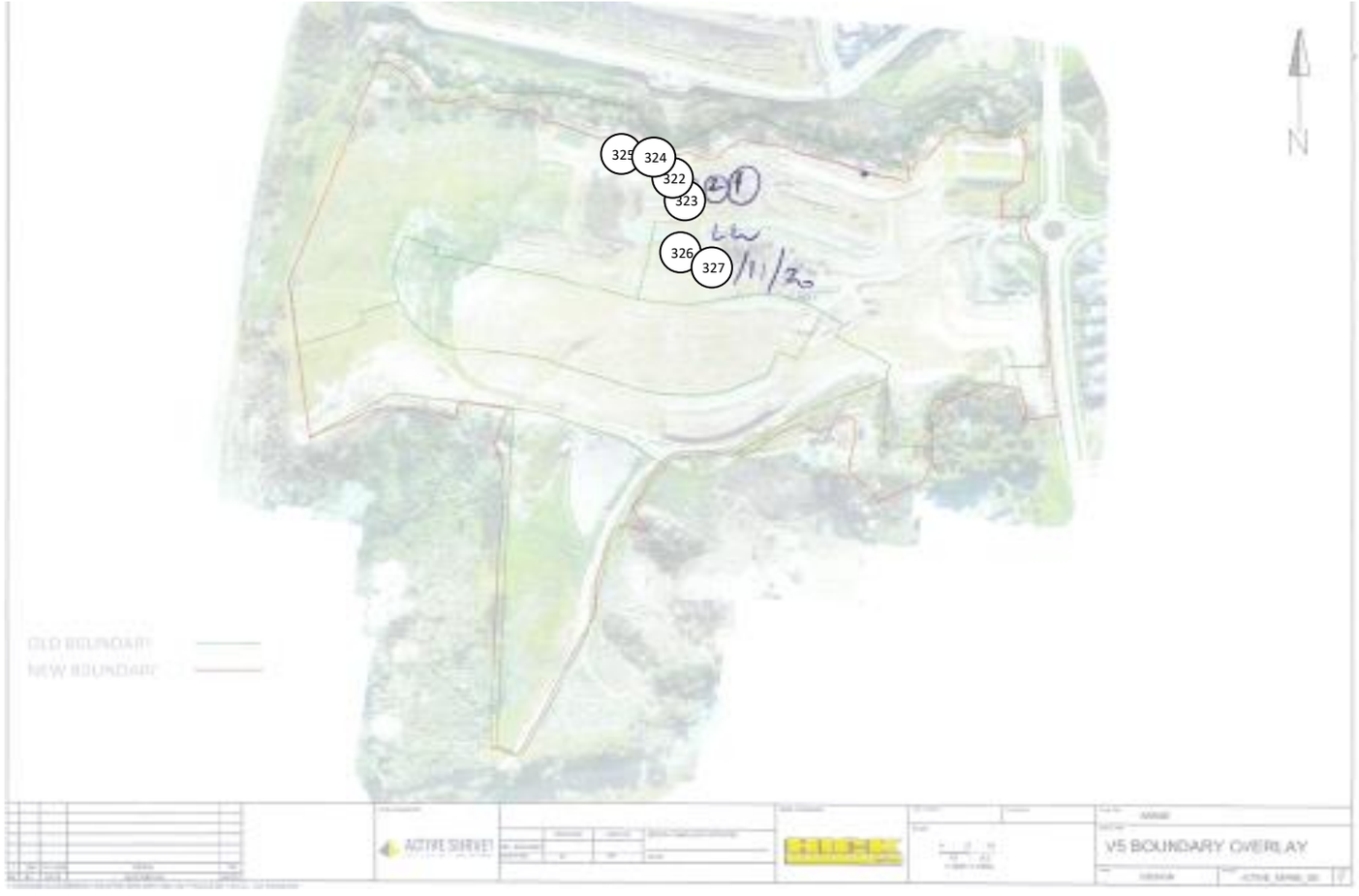
NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W01963
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 16/12/2020



Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM20W01994
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01994

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 22/12/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
17/12/2020	ETAM20W01994	LW	328	1.85	32.2	1.40	2.70	3	136	140	140	158+	Shear Key	1749057	5949067	7.80	Clayey SILT	
17/12/2020	ETAM20W01994	LW	329	1.93	31.0	1.48	2.70	0	158+	158+	158+	158+	Shear Key	1749082	5949066	8.00	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W01994
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 17/12/2020

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM20W01995
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01995

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 22/12/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
18/12/2020	ETAM20W01995	LW	330	1.97	24.9	1.58	2.70	2	UTP	UTP	UTP	UTP	Shear Key	1749078	5949069	8.80	Clayey SILT	
18/12/2020	ETAM20W01995	LW	331	1.92	34.9	1.42	2.70	0	158+	158+	158+	158+	Shear Key	1749069	5949048	9.00	Clayey SILT	
18/12/2020	ETAM20W01995	LW	332	1.99	25.4	1.58	2.70	1	UTP	UTP	UTP	UTP	Gully 2 undercut	1749072	5949000	8.20	Clayey SILT	
18/12/2020	ETAM20W01995	LW	333	1.81	34.5	1.34	2.70	4	140	140	158+	158+	Gully 2 undercut	1749068	5948990	8.20	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W01995
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 18/12/2020

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM20W01998
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM20W01998

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 22/12/2020

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
21/12/2020	ETAM20W01998	LW	334	1.85	37.6	1.35	2.70	0	140	154	158	158	Retaining Wall 700	1749263	5949036	9.50	Clayey SILT	
21/12/2020	ETAM20W01998	LW	335	1.84	33.8	1.38	2.70	3	158+	158+	144	154	Retaining Wall 700	1749299	5949020	9.50	Clayey SILT	
21/12/2020	ETAM20W01998	LW	336	1.88	37.8	1.36	2.70	0	158+	158+	158+	158+	Shear Key	1749070	5949063	9.60	Clayey SILT	
21/12/2020	ETAM20W01998	LW	337	1.89	23.1	1.54	2.70	8	UTP	UTP	UTP	UTP	Shear Key	1749067	5949050	9.80	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM20W01998
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 21/12/2020

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00030
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00030

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 11/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
7/01/2021	ETAM21W00030	LW	340	2.01	22.6	1.64	2.70	2	UTP	UTP	UTP	UTP	Shear Key	1749065	5949057	10.00	Clayey SILT	
7/01/2021	ETAM21W00030	LW	341	1.90	37.0	1.39	2.70	0	158+	158+	158+	158+	Gully 2	1749079	5949003	10.50	Clayey SILT	
7/01/2021	ETAM21W00030	LW	342	1.90	31.2	1.45	2.70	1	UTP	UTP	UTP	UTP	Retaining Wall 700	1749247	5949039	10.75	Clayey SILT	
7/01/2021	ETAM21W00030	LW	343	1.88	31.7	1.43	2.70	2	UTP	UTP	UTP	UTP	Retaining Wall 700	1749295	5949026	10.70	Clayey SILT	

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00030
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 7/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00052
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00052

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 18/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
16/01/2021	ETAM21W00052	SC	356	1.80	28.9	1.40	2.70	8	170	170	180+	180+	Bottom of Shear Key	1749030	5949075	-	Clayey SILT	3.7m from bottom of shear key
16/01/2021	ETAM21W00052	SC	357	1.82	30.7	1.40	2.70	6	170	170	170	170	Bottom of Shear Key	1749021	5949064	-	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00052

Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: SC

Date tested: 16/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00086
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00086

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 21/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
18/01/2021	ETAM21W00086	LW	358	1.94	28.2	1.51	2.70	1	UTP	UTP	UTP	UTP	Shear Key	1749025	5949077	6.30	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00086
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 18/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00113
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00113

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 25/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/01/2021	ETAM21W00113	LW	361	1.90	29.1	1.47	2.70	2	158+	158+	158+	144	Shear Key	1749033	5949064	7.00	Clayey SILT	
22/01/2021	ETAM21W00113	LW	362	1.87	29.0	1.45	2.70	4	UTP	UTP	158+	UTP	Shear Key	1749037	5949057	8.20	Clayey SILT	
22/01/2021	ETAM21W00113	LW	363	1.99	28.5	1.55	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749062	5949023	17.80	Clayey SILT	
22/01/2021	ETAM21W00113	LW	364	1.97	28.0	1.54	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749083	5948999	18.90	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00113
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 22/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00136
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00136

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 27/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
26/01/2021	ETAM21W00136	LW	367	2.00	27.4	1.57	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749011	5949085	7.50	Clayey SILT	
26/01/2021	ETAM21W00136	LW	368	1.98	26.2	1.57	2.70	1	UTP	UTP	UTP	UTP	Shear Key	1749035	5949073	7.80	Clayey SILT	
26/01/2021	ETAM21W00136	LW	369	1.90	38.6	1.37	2.70	0	158+	158+	158+	158+	Shear Key	1749068	5949010	16.32	Clayey SILT	
26/01/2021	ETAM21W00136	LW	370	1.88	36.2	1.38	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749073	5948972	18.93	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00136
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 26/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00144
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00144

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 28/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/01/2021	ETAM21W00144	LW	371	1.97	30.2	1.51	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749002	5949088	8.50	Clayey SILT	
27/01/2021	ETAM21W00144	LW	372	1.97	31.6	1.50	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749033	5949075	8.15	Clayey SILT	
27/01/2021	ETAM21W00144	LW	373	1.83	30.1	1.41	2.70	6	UTP	UTP	158+	158+	RE Wall 313	1749450	5949820	-	Clayey SILT	0.3m above base

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00144
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 27/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00157
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00157

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 29/01/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
28/01/2021	ETAM21W00157	LW	374	1.95	28.9	1.51	2.70	0	158+	UTP	UTP	UTP	RE Wall 313	1749451	5948820	-	Clayey SILT	0.6m above base
28/01/2021	ETAM21W00157	LW	375	1.96	29.6	1.51	2.70	0	158+	158+	158+	UTP	Shear Key	1749029	5949077	8.90	Clayey SILT	
28/01/2021	ETAM21W00157	LW	376	1.94	27.9	1.51	2.70	2	158+	158+	UTP	UTP	Shear Key	1749027	5949065	9.00	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00157
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 28/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00160
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00160

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 2/02/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
29/01/2021	ETAM21W00160	LW	377	1.96	30.0	1.51	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749008	5949081	9.80	Clayey SILT	
29/01/2021	ETAM21W00160	LW	378	1.97	34.0	1.47	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749033	5949062	10.00	Clayey SILT	
29/01/2021	ETAM21W00160	LW	379	1.83	31.9	1.38	2.70	5	140	158+	144	154	RE Wall 313	1749440	5948837	-	Clayey SILT	
29/01/2021	ETAM21W00160	LW	380	1.82	32.2	1.38	2.70	5	158+	158+	158+	144	RE Wall 313	1749436	5948869	-	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00160
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 29/01/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00169
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00169

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 3/02/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
2/02/2021	ETAM21W00169	LW	381	1.91	26.4	1.51	2.70	4	UTP	UTP	UTP	UTP	Retaining Wall 700	1749244	5949042	11.30	Clayey SILT	
2/02/2021	ETAM21W00169	LW	382	1.95	26.4	1.55	2.70	2	UTP	UTP	UTP	UTP	Retaining Wall 700	1749280	5949031	11.20	Clayey SILT	
2/02/2021	ETAM21W00169	LW	383	1.94	27.9	1.51	2.70	2	UTP	UTP	UTP	UTP	Shear Key	1749022	5949066	10.00	Clayey SILT	
2/02/2021	ETAM21W00169	LW	384	1.94	26.1	1.54	2.70	3	UTP	UTP	UTP	UTP	Shear Key	1749038	5949076	10.30	Clayey SILT	
2/02/2021	ETAM21W00169	LW	385	1.94	26.2	1.54	2.70	3	UTP	UTP	UTP	UTP	Gully 2	1749066	5949016	-	Clayey SILT	
2/02/2021	ETAM21W00169	LW	386	1.95	26.6	1.54	2.70	2	UTP	UTP	UTP	UTP	Gully 2	1749078	5949003	-	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00169
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 2/02/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00183
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00183

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 4/02/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
3/02/2021	ETAM21W00183	LW	387	1.95	28.2	1.52	2.70	1	UTP	UTP	UTP	UTP	Retaining Wall 306	1749383	5948912	-	Clayey SILT	
3/02/2021	ETAM21W00183	LW	388	1.93	26.9	1.52	2.70	3	UTP	UTP	UTP	UTP	Retaining Wall 313	1749436	5948874	-	Clayey SILT	
3/02/2021	ETAM21W00183	LW	389	1.94	25.3	1.55	2.70	3	UTP	UTP	UTP	UTP	Retaining Wall 313	1749436	5948856	-	Clayey SILT	
3/02/2021	ETAM21W00183	LW	390	1.92	27.7	1.51	2.70	3	UTP	UTP	UTP	UTP	Shear Key	1749000	5949096	8.20	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00183
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 3/02/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00187
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00187

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 9/02/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
4/02/2021	ETAM21W00187	LW	391	1.91	32.9	1.43	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749023	5949069	10.50	Clayey SILT	
4/02/2021	ETAM21W00187	LW	392	1.96	24.6	1.57	2.70	3	UTP	UTP	UTP	UTP	Shear Key	1749038	5949055	11.00	Clayey SILT	
4/02/2021	ETAM21W00187	LW	393	1.90	25.2	1.52	2.70	6	UTP	UTP	UTP	UTP	Gully 2	1749062	5949044	13.90	Clayey SILT	
4/02/2021	ETAM21W00187	LW	394	1.96	28.3	1.53	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749093	5949040	14.30	Clayey SILT	
4/02/2021	ETAM21W00187	LW	395	1.99	27.2	1.57	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 313	1749430	5948867	27.60	Clayey SILT	
4/02/2021	ETAM21W00187	LW	396	1.98	30.9	1.51	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 306	1749427	5948912	23.00	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00187
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 4/02/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00195
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00195

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 9/02/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
5/02/2021	ETAM21W00195	LW	397	1.91	32.7	1.44	2.70	0	140	140	158	154	Retaining Wall 306	1749394	5948903	22.50	Clayey SILT	
5/02/2021	ETAM21W00195	LW	398	1.94	29.7	1.49	2.70	0	UTP	UTP	158+	158+	Retaining Wall 306	1749422	5948908	23.80	Clayey SILT	
5/02/2021	ETAM21W00195	LW	399	1.95	42.6	1.37	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749016	5949066	11.00	Clayey SILT	
5/02/2021	ETAM21W00195	LW	400	1.95	35.5	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749039	5949056	11.50	Clayey SILT	

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA
Work Order No: ETAM21W00195
Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW
Date tested: 5/02/2021

Issue date: 050517

East Tamaki Laboratory

Paton Geotechnical Testing Limited
333 Unit K East Tamaki Road
Otara Auckland, 2013
Phone: 09 272 3375

Earthworks Fill Report

Report No: EFIL:ETAM21W00248
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W00248

Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM00991AA
Project Name.:	773-AKLGE206639 - 773-Millwater-Orewa Precinct 6
Project Location:	Access off Arran Drive, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/02/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/02/2021	ETAM21W00248	LW	405	1.91	32.6	1.44	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749039	5949058	11.80	Clayey SILT	
22/02/2021	ETAM21W00248	LW	406	1.88	34.0	1.40	2.70	0	UTP	UTP	UTP	UTP	Shear Key	1749063	5949061	11.90	Clayey SILT	
22/02/2021	ETAM21W00248	LW	407	1.94	33.1	1.46	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749104	5949039	12.65	Clayey SILT	
22/02/2021	ETAM21W00248	LW	408	1.91	44.2	1.45	2.70	0	158+	158+	UTP	UTP	Gully 2	1749048	5949013	14.80	Clayey SILT	
22/02/2021	ETAM21W00248	LW	409	1.96	31.3	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully 2	1749062	5948988	16.20	Clayey SILT	
22/02/2021	ETAM21W00248	LW	410	1.79	44.2	1.24	2.70	0	140	144	132	154	Retaining Wall 306	1749407	5948897	26.30	Silty CLAY	
22/02/2021	ETAM21W00248	LW	411	1.79	43.0	1.25	2.70	0	140	158	154	154	Retaining Wall 306	1749429	5948899	26.50	Silty CLAY	
22/02/2021	ETAM21W00248	LW	412	1.80	40.7	1.28	2.70	0	144	158	144	140	Retaining Wall 306	1749438	5948888	26.80	Silty CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

East Tamaki Laboratory
Paton Geotechnical Testing Limited
Unit 10, 333 East Tamaki Road, Otara, Auckland 2103
Phone: 027 475 4011

SITE PLAN

NOT TO SCALE

Project No: 773-ETAM00991AA

Work Order No: ETAM21W00248

Page No: 2 of 2

Project: 773-AKLGE206639 - 773-Millwater-Orewa Precinct 6

Location: As below

Tested by: LW

Date tested: 22/02/2021

Issue date: 050517

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01462
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01462

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 2/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
1/12/2021	ETAM21W01462	LW	568	1.82	35.9	1.34	2.70	2	163	170	159	156	Shear Key	1748982	5949096	6.24	Silty CLAY	
1/12/2021	ETAM21W01462	LW	569	1.83	35.6	1.35	2.70	2	149	142	163	177	Shear Key	1748998	5949089	6.28	Silty CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01462
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01462

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 2/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01470
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01470

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 3/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
2/12/2021	ETAM21W01470	LW	570	1.93	27.3	1.52	2.70	3	185+	185+	185+	185+	Shear Key	1748990	5949080	7.30	Clayey SILT	
2/12/2021	ETAM21W01470	LW	571	1.93	28.7	1.50	2.70	1	185+	185+	185+	185+	Shear Key	1748989	5949091	7.35	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01470
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01470

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 3/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01476
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01476

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
3/12/2021	ETAM21W01476	LW	572	1.88	32.8	1.41	2.70	1	149	172	175+	175+	Shear Key	1748998	5949081	8.10	Clayey SILT	
3/12/2021	ETAM21W01476	LW	573	1.89	33.3	1.42	2.70	0	175+	175+	175+	164	Shear Key	1748991	5949076	9.30	Clayey SILT	
3/12/2021	ETAM21W01476	LW	574	1.87	31.4	1.42	2.70	3	137	175+	175+	153	Gully	1748976	5948881	31.95	Clayey SILT	
3/12/2021	ETAM21W01476	LW	575	1.84	34.1	1.37	2.70	2	149	160	156	153	Gully	1748995	5948918	29.55	Clayey SILT	
3/12/2021	ETAM21W01476	LW	576	1.93	27.6	1.51	2.70	2	UTP	UTP	175+	175+	Gully	1749072	5948958	26.90	Clayey SILT	
3/12/2021	ETAM21W01476	LW	577	1.91	26.7	1.51	2.70	4	UTP	UTP	UTP	175+	Gully	1749105	5948969	27.10	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01476
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01476

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01485
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01485

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 7/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
6/12/2021	ETAM21W01485	LW	578	1.85	28.5	1.44	2.70	6	175+	175+	175+	UTP	Shear Key	1748987	5949075	12.20	Silty CLAY	
6/12/2021	ETAM21W01485	LW	579	1.91	31.3	1.45	2.70	1	UTP	UTP	175+	UTP	Shear Key	1748994	5949082	10.50	Silty CLAY	
6/12/2021	ETAM21W01485	LW	580	1.88	30.6	1.44	2.70	3	UTP	175+	175+	UTP	Manhole Backfill	1749174	5949001	-	Silty CLAY	Base of manhole

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01485
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01485

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 7/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01492
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01492

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
7/12/2021	ETAM21W01492	LW	581	1.90	30.9	1.45	2.70	1	149	164	175+	175+	Gully	1748965	5948906	31.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	582	1.98	27.9	1.55	2.70	0	UTP	UTP	UTP	UTP	Gully	1749002	5948937	30.20	Clayey SILT	
7/12/2021	ETAM21W01492	LW	583	1.92	33.2	1.44	2.70	0	UTP	UTP	175+	175+	Gully	1749063	5948944	27.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	584	1.87	30.5	1.43	2.70	3	175+	175+	175+	172	Gully	1749084	5948969	27.40	Clayey SILT	
7/12/2021	ETAM21W01492	LW	585	1.90	33.9	1.42	2.70	0	175+	175+	164	153	Shear Key	1748989	5949067	13.00	Clayey SILT	
7/12/2021	ETAM21W01492	LW	586	1.89	36.9	1.38	2.70	0	175+	160	149	164	Shear Key	1748977	5949066	11.60	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01492
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01492

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01526
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01526

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
13/12/2021	ETAM21W01526	LW	593	1.94	29.8	1.50	2.70	0	172	149	143	156	Shear Key	1748970	5949086	6.10	Clayey SILT	
13/12/2021	ETAM21W01526	LW	594	1.93	30.0	1.48	2.70	0	164	175	146	153	Shear Key	1748978	5949092	6.25	Clayey SILT	

Form Number: R031N Issue Date: 20/09/2018

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01526
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01526

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 14/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01550
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01550

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 21/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
20/12/2021	ETAM21W01550	LW	595	1.96	27.8	1.53	2.70	1	UTP	UTP	UTP	UTP	Shear Key	1748962	5949091	7.80	Silty CLAY	
20/12/2021	ETAM21W01550	LW	596	1.93	26.2	1.53	2.70	4	UTP	UTP	UTP	UTP	Shear Key	1748979	5949091	8.60	Silty CLAY	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01550
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01550

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 21/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/12/2021	ETAM21W01557	LW	597	1.88	32.4	1.42	2.70	1	175+	175+	175+	160	Shear Key	1748950	5949089	8.30	Clayey SILT	
22/12/2021	ETAM21W01557	LW	598	1.91	29.9	1.47	2.70	2	175+	175+	175+	175+	Shear Key	1748974	5949084	9.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	599	1.85	37.5	1.35	2.70	0	175+	175+	175+	175+	Gully	1749022	5948881	29.60	Clayey SILT	
22/12/2021	ETAM21W01557	LW	600	1.86	31.8	1.41	2.70	3	175+	175+	175+	175+	Gully	1749046	5948916	29.20	Clayey SILT	
22/12/2021	ETAM21W01557	LW	601	1.98	31.8	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749098	5948940	28.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	602	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully	1749080	5948970	27.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	603	1.94	30.1	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749110	5949033	8.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	604	1.97	29.2	1.52	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749119	5949035	9.00	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01358
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01358

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	AKLGE206639 - Millwater Precinct 6k, Orewa
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 12/11/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
11/11/2021	ETAM21W01358	LW	546	1.92	29.2	1.49	2.70	2	UTP	UTP	UTP	UTP	RW 701	1749137	5949044	8.00	Clayey SILT	
11/11/2021	ETAM21W01358	LW	547	1.92	26.2	1.52	2.70	4	UTP	UTP	UTP	UTP	RW 701	1749148	5949049	8.05	Clayey SILT	
11/11/2021	ETAM21W01358	LW	548	1.87	34.1	1.40	2.70	1	175	143	149	145	Gully	1748972	5948879	31.75	Clayey SILT	
11/11/2021	ETAM21W01358	LW	549	1.87	35.4	1.38	2.70	0	168	164	140	149	Gully	1749003	5948873	31.65	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01358
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01358

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	AKLGE206639 - Millwater Precinct 6k, Orewa
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 12/11/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01415
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01415

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/11/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/11/2021	ETAM21W01415	LW	556	1.94	29.2	1.50	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749132	5949026	8.60	Clayey SILT	
22/11/2021	ETAM21W01415	LW	557	1.95	29.0	1.51	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 702	1749142	5949029	8.80	Clayey SILT	
22/11/2021	ETAM21W01415	LW	558	1.92	35.9	1.41	2.70	0	179+	179+	179+	164	Gully	1748968	5948880	32.40	Clayey SILT	
22/11/2021	ETAM21W01415	LW	559	1.93	35.5	1.42	2.70	0	179+	179+	156	168	Gully	1748986	5948894	29.60	Clayey SILT	
22/11/2021	ETAM21W01415	LW	560	1.91	36.6	1.40	2.70	0	164	149	140	179	Gully	1749006	5948904	28.50	Clayey SILT	
22/11/2021	ETAM21W01415	LW	561	1.94	34.7	1.44	2.70	0	179+	146	156	164	Gully	1749018	5948919	27.10	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01415
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01415

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/11/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01476
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01476

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
3/12/2021	ETAM21W01476	LW	572	1.88	32.8	1.41	2.70	1	149	172	175+	175+	Shear Key	1748998	5949081	8.10	Clayey SILT	
3/12/2021	ETAM21W01476	LW	573	1.89	33.3	1.42	2.70	0	175+	175+	175+	164	Shear Key	1748991	5949076	9.30	Clayey SILT	
3/12/2021	ETAM21W01476	LW	574	1.87	31.4	1.42	2.70	3	137	175+	175+	153	Gully	1748976	5948881	31.95	Clayey SILT	
3/12/2021	ETAM21W01476	LW	575	1.84	34.1	1.37	2.70	2	149	160	156	153	Gully	1748995	5948918	29.55	Clayey SILT	
3/12/2021	ETAM21W01476	LW	576	1.93	27.6	1.51	2.70	2	UTP	UTP	175+	175+	Gully	1749072	5948958	26.90	Clayey SILT	
3/12/2021	ETAM21W01476	LW	577	1.91	26.7	1.51	2.70	4	UTP	UTP	UTP	175+	Gully	1749105	5948969	27.10	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01476
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01476

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 6/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01492
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01492

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
7/12/2021	ETAM21W01492	LW	581	1.90	30.9	1.45	2.70	1	149	164	175+	175+	Gully	1748965	5948906	31.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	582	1.98	27.9	1.55	2.70	0	UTP	UTP	UTP	UTP	Gully	1749002	5948937	30.20	Clayey SILT	
7/12/2021	ETAM21W01492	LW	583	1.92	33.2	1.44	2.70	0	UTP	UTP	175+	175+	Gully	1749063	5948944	27.60	Clayey SILT	
7/12/2021	ETAM21W01492	LW	584	1.87	30.5	1.43	2.70	3	175+	175+	175+	172	Gully	1749084	5948969	27.40	Clayey SILT	
7/12/2021	ETAM21W01492	LW	585	1.90	33.9	1.42	2.70	0	175+	175+	164	153	Shear Key	1748989	5949067	13.00	Clayey SILT	
7/12/2021	ETAM21W01492	LW	586	1.89	36.9	1.38	2.70	0	175+	160	149	164	Shear Key	1748977	5949066	11.60	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01492
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01492

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 8/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01514
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01514

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 13/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
10/12/2021	ETAM21W01514	LW	589	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749114	5949038	8.60	Clayey SILT	
10/12/2021	ETAM21W01514	LW	590	1.93	33.8	1.44	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749129	5949037	8.50	Clayey SILT	
10/12/2021	ETAM21W01514	LW	591	1.90	31.1	1.45	2.70	1	UTP	UTP	175+	175+	Gully	1749063	5948926	29.00	Clayey SILT	
10/12/2021	ETAM21W01514	LW	592	1.94	31.2	1.48	2.70	0	UTP	UTP	175+	175+	Gully	1749080	5948964	27.60	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01514
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01514

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 13/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/12/2021	ETAM21W01557	LW	597	1.88	32.4	1.42	2.70	1	175+	175+	175+	160	Shear Key	1748950	5949089	8.30	Clayey SILT	
22/12/2021	ETAM21W01557	LW	598	1.91	29.9	1.47	2.70	2	175+	175+	175+	175+	Shear Key	1748974	5949084	9.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	599	1.85	37.5	1.35	2.70	0	175+	175+	175+	175+	Gully	1749022	5948881	29.60	Clayey SILT	
22/12/2021	ETAM21W01557	LW	600	1.86	31.8	1.41	2.70	3	175+	175+	175+	175+	Gully	1749046	5948916	29.20	Clayey SILT	
22/12/2021	ETAM21W01557	LW	601	1.98	31.8	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749098	5948940	28.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	602	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully	1749080	5948970	27.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	603	1.94	30.1	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749110	5949033	8.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	604	1.97	29.2	1.52	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749119	5949035	9.00	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/01/2022	ETAM22W00017	LW	611	1.98	27.2	1.55	2.70	0.1	UTP	UTP	UTP	UTP	Gully	1748966	5948916	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	612	1.96	31.1	1.50	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1748998	5948902	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	613	1.95	29.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749052	5948933	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	614	1.97	30.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749085	5948972	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	615	1.97	16.7	1.69	2.70	9.4	UTP	UTP	UTP	UTP	RW701	1749126	5949032	11.0	Clayey silt	-
11/01/2022	ETAM22W00017	LW	616	1.96	21.8	1.61	2.70	5.5	UTP	UTP	UTP	UTP	RW701	1749087	5949036	11.2	Clayey silt	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/01/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2022	ETAM22W00072	LW	636	1.84	31.9	1.40	2.70	3.7	175	175	175	175	Gully	1749057	5948921	27.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	637	1.87	32.3	1.42	2.70	1.8	175	175	175	175	Gully	1749048	5948902	28.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	638	1.83	31.9	1.39	2.70	4.4	175	175	175	175	Gully	1749012	5948897	28.15	Silty Clay	-
19/01/2022	ETAM22W00072	LW	639	1.85	32.3	1.40	2.70	3.2	175	175	175	175	Gully	1748899	5948888	28.60	Silty Clay	-
19/01/2022	ETAM22W00072	LW	640	1.86	29.0	1.44	2.70	4.7	175	175	175	175	RW 701	1749119	5949040	11.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	641	1.85	28.7	1.44	2.70	5.3	175	175	175	175	RW 701	1749100	5949042	10.8	Silty Clay	-
19/01/2022	ETAM22W00072	LW	642	1.88	24.0	1.52	2.70	7.5	175	175	175	175	RE Wall 604 A	1749090	5949062	8.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	643	1.89	24.7	1.51	2.70	6.5	175	175	175	175	RE Wall 604 A	1749085	5949067	7.95	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00113
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00113

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 2/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
20/01/2022	ETAM22W00113	LW	644	1.85	40.1	1.32	2.70	0.0	175	175	149	160	Gully	1749034	5948927	28.95	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	645	1.87	42.5	1.31	2.70	0.0	146	140	172	175	Gully	1748977	5948921	29.1	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	646	1.84	42.0	1.30	2.70	0.0	175	175	175	137	Gully	1749009	5948886	29.55	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	647	1.85	44.7	1.28	2.70	0.0	149	164	175	146	Gully	1748991	5948873	30.15	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	648	1.95	26.4	1.54	2.70	2.2	UTP	UTP	UTP	175	RE Wall 604A	1749076	5949073	8.85	Silty CLAY	-
20/01/2022	ETAM22W00113	LW	649	1.89	25.5	1.51	2.70	5.9	175	175	175	UTP	RE Wall 604A	1749077	5949061	8.75	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00113
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00113

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 2/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00179

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 8/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
4/02/2022	ETAM22W00179	LW	667	1.86	32.6	1.41	2.70	2.1	149	160	175	175	RE Wall 604A	1749068	5949063	9.7	Silty Clay	-
4/02/2022	ETAM22W00179	LW	668	1.89	32.4	1.43	2.70	0.7	175	175	175	175	RE Wall 604A	1749075	5949054	9.8	Silty Clay	-
4/02/2022	ETAM22W00179	LW	669	1.90	33.3	1.43	2.70	0.0	175	175	175	175	RW 701	1749100	5949041	11.3	Silty Clay	-
4/02/2022	ETAM22W00179	LW	670	1.88	34.8	1.39	2.70	0.1	172	140	149	156	RW 701	1749116	5949042	11.35	Silty Clay	-
4/02/2022	ETAM22W00179	LW	671	1.92	30.8	1.47	2.70	0.3	146	143	153	140	Gully	1748980	5948855	31.3	Silty Clay	-
4/02/2022	ETAM22W00179	LW	672	1.89	29.7	1.46	2.70	2.7	160	175	175	160	Gully	1748990	5948900	29.85	Silty Clay	-
4/02/2022	ETAM22W00179	LW	673	1.95	29.6	1.50	2.70	0.0	175	175	175	175	Gully	1749009	5948909	28.15	Silty Clay	-
4/02/2022	ETAM22W00179	LW	674	1.85	29.4	1.43	2.70	4.8	153	156	140	146	Gully	1749026	5948921	28.05	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00179

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 8/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00242
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00242

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 22/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/02/2022	ETAM22W00242	SC	681	1.77	34.2	1.32	2.70	6.3	188	168	176	184	Ref to plan	1749816	5948951	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	682	1.79	36.2	1.32	2.70	3.7	168	188	188	184	Ref to plan	1749022	5948987	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	683	1.84	30.7	1.41	2.70	4.7	188	188	UTP	UTP	Gully	1748984	5948917	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	684	1.94	26.5	1.53	2.70	2.4	UTP	UTP	188	188	Gully	1749022	5948894	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	685	1.84	41.7	1.30	2.70	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749065	5948937	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	686	1.93	26.5	1.52	2.70	3.2	UTP	UTP	UTP	UTP	Silt Pond	1749109	5948928	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	687	1.86	27.0	1.46	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749058	5949002	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	688	1.80	31.5	1.37	2.70	6.2	UTP	UTP	UTP	UTP	RW 312 Backfill	1749081	5948998	-	Silty Clay	-
18/02/2022	ETAM22W00242	SC	689	1.73	37.9	1.26	2.70	5.8	146	155	146	160	Stage 1 Rock	1749321	5948750	-	Silty Clay	250mm below F/L

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00242
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00242

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 22/02/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00261
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00261

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 23/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/02/2022	ETAM22W00261	SC	694	1.87	28.4	1.45	2.70	5.0	188	188	168	168	Siltpond Backfill	1749016	5948957	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	695	1.83	33.2	1.37	2.70	3.5	168	168	168	168	Gully	1749076	5948939	-	Silty Clay	-
22/02/2022	ETAM22W00261	SC	696	1.89	27.5	1.48	2.70	4.3	168	168	188	188	Main Gully	1749025	5948902	-	Silty Clay	-

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00261
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00261

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 23/02/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00266
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00266

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
23/02/2022	ETAM22W00266	SC	697	1.82	33.0	1.37	2.70	4.1	146	155	172	168	Silt Pond Fill	1749009	5948994	-	Silty CLAY	RL unavailable
23/02/2022	ETAM22W00266	SC	698	1.81	35.6	1.33	2.70	3.3	155	155	168	168	Silt Pond Fill	1749009	5948956	-	Silty CLAY	RL unavailable
23/02/2022	ETAM22W00266	SC	699	1.75	36.5	1.28	2.70	5.9	168	168	208	208	Stage 1 Undercut	1749331	5948753	-	Silty CLAY	At FL

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00266
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00266

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/02/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00276
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00276

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
24/02/2022	ETAM22W00276	SC	700	1.87	30.0	1.44	2.70	3.8	UTP	UTP	168	168	Refer to Plan	1749096	5948920	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	701	1.76	37.6	1.28	2.70	4.5	146	155	168	146	Silt Pond	1749017	5948946	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	702	1.79	32.2	1.35	2.70	6.5	146	155	146	155	Silt Pond	1749009	5948975	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	703	1.87	31.1	1.43	2.70	2.7	168	168	180	180	Gully	1748994	5948873	-	Silty CLAY	RL unavailable
24/02/2022	ETAM22W00276	SC	704	1.87	31.2	1.43	2.70	2.6	160	168	155	160	Gully	1749001	5948917	-	Silty CLAY	RL unavailable

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00276
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00276

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/02/2022

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01948
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01948

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 24/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
17/11/2023	ETAM23W01948	SC	1194	1.85	33.6	1.39	2.65	1	183	189	207	178	Western Fill Area	1748855	5948874	-	Clayey SILT	Not Available
17/11/2023	ETAM23W01948	SC	1195	1.88	33.6	1.40	2.65	0	163	173	178	157	Western Fill Area	1748856	5948948	-	Clayey SILT	Not Available
17/11/2023	ETAM23W01948	SC	1196	1.85	33.5	1.39	2.65	1	183	178	173	163	Western Fill Area	1748835	5948993	25.00	Clayey SILT	-
17/11/2023	ETAM23W01948	SC	1197	1.77	33.6	1.32	2.65	6	142	157	147	157	Western Fill Area	1748830	5948975	25.45	Clayey SILT	-

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01948
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01948

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

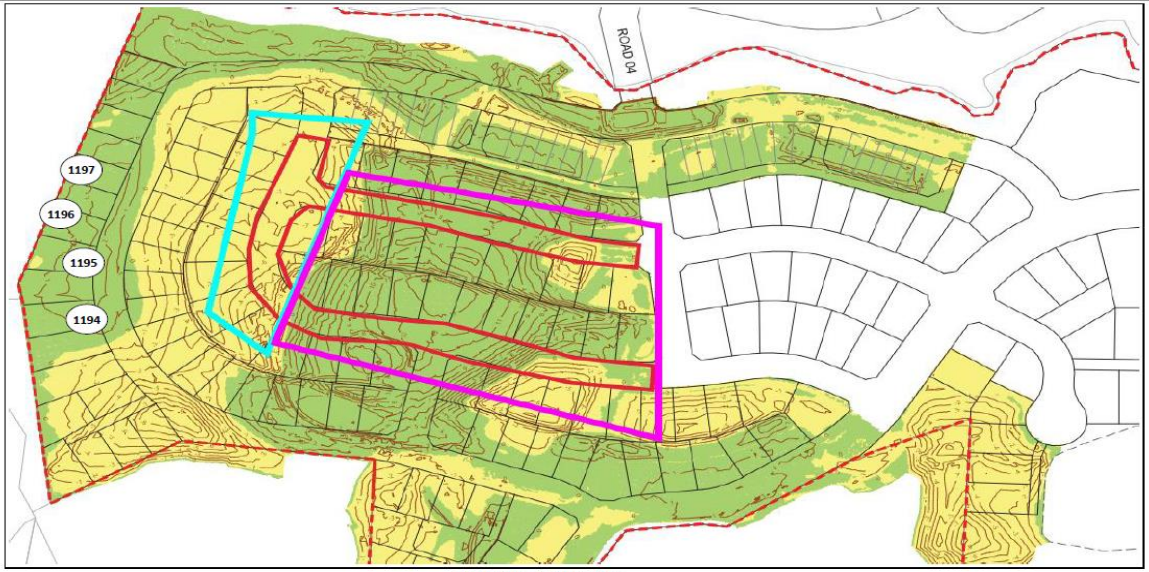
Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 24/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01948
Page No: 2 of 2

Location: Western Fill Area

Tested by: SC
Date Tested: 17/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01991
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01991

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 30/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/11/2023	ETAM23W01991	LW	1198	1.84	36.1	1.36	2.65	0	192	176	205	210	RE Wall 604	1749000	5949082	13.70	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1199	1.81	38.7	1.30	2.65	0	220+	220+	180	192	RE Wall 604	1749024	5949074	13.80	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1200	1.84	34.5	1.36	2.65	1	220+	220+	220+	220+	Western Fill Area	1748855	5948874	40.70	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1201	1.85	34.6	1.37	2.65	1	220+	220+	220+	220+	Western Fill Area	1748856	5948910	39.50	Silty CLAY	-

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01991
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

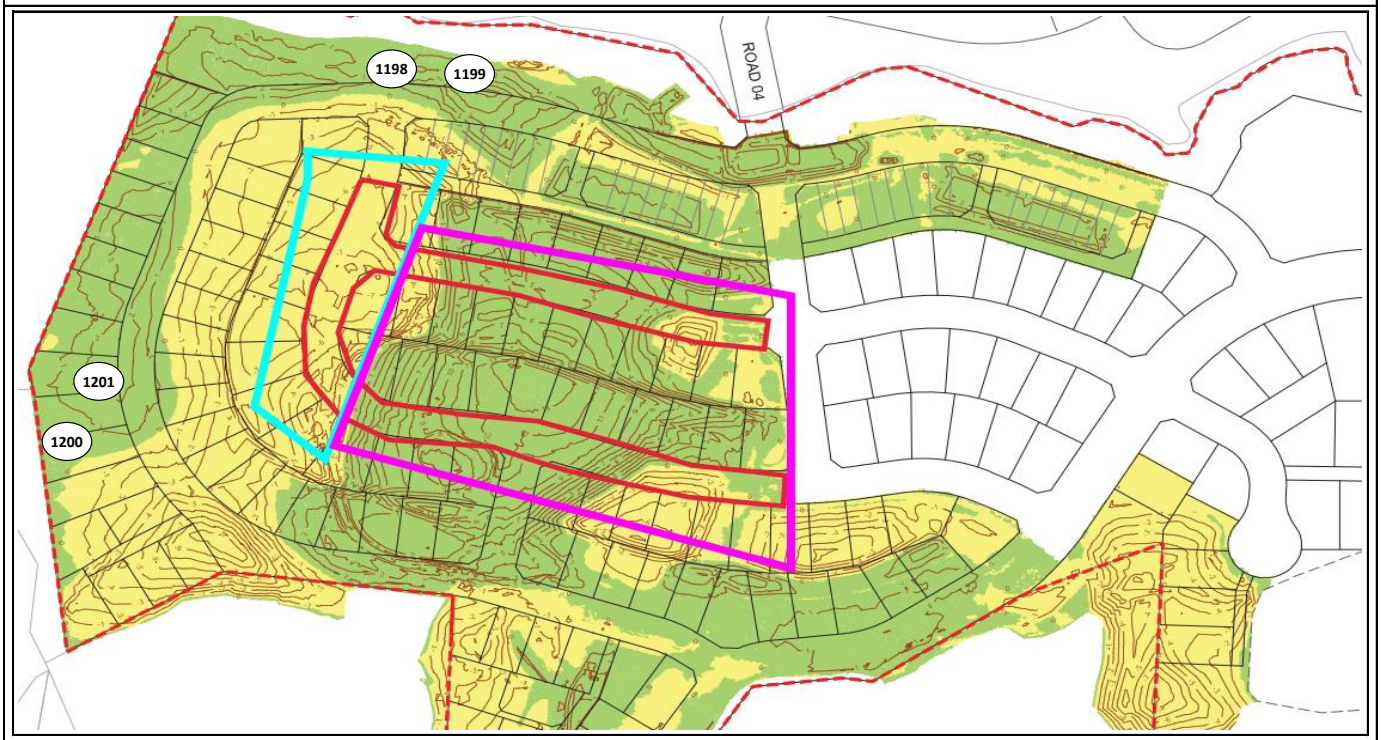
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01991
Page No: 2 of 2

Location: Western Fill Area + RE Wall 604

Tested by: SC
Date Tested: 27/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02006
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02006

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 1/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
28/11/2023	ETAM23W02006	LW	1202	1.90	29.1	1.47	2.65	2	201	172	215	192	RE Wall 604	1749004	5949078	14.50	Silty CLAY	-
28/11/2023	ETAM23W02006	LW	1203	1.88	29.0	1.46	2.65	3	149	164	146	160	RE Wall 604	1748983	5949083	14.50	Silty CLAY	-

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02006
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

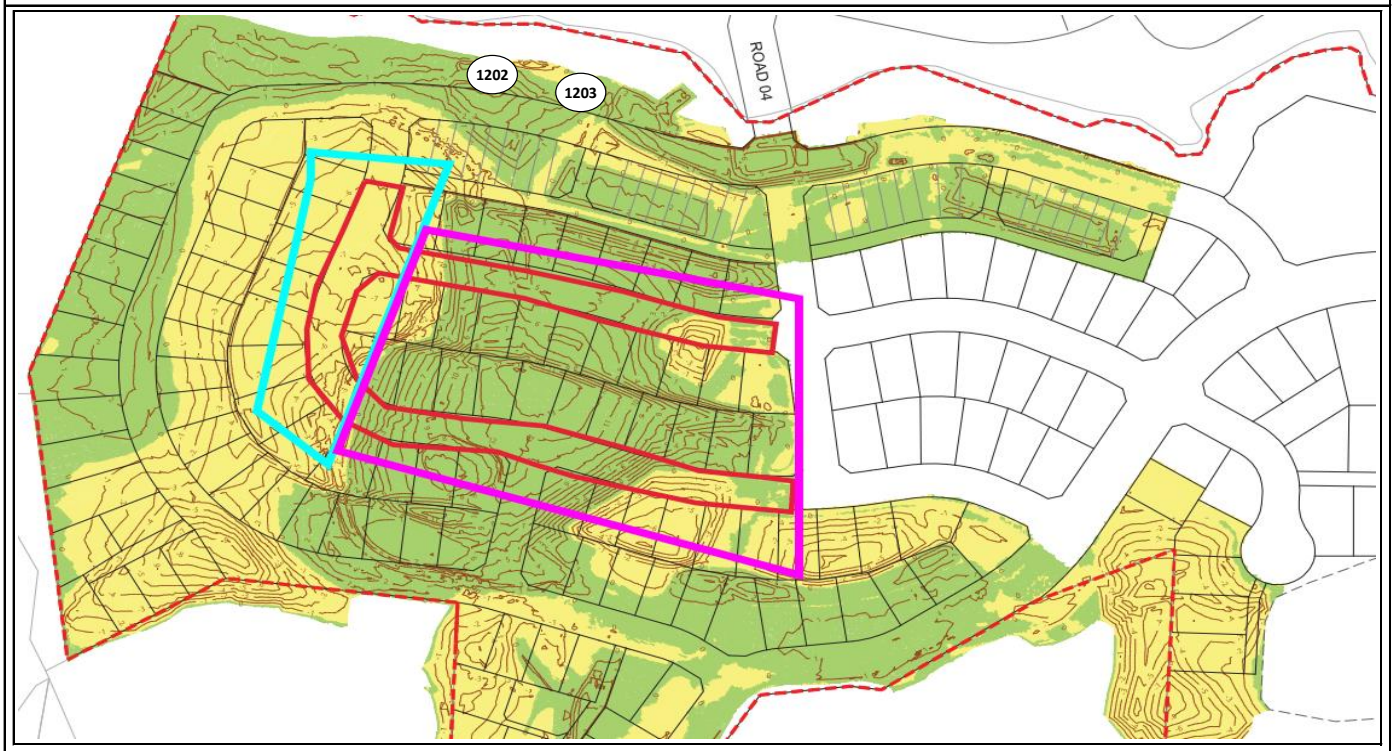
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 1/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02006
Page No: 2 of 2

Location: RE Wall 604

Tested by: LW
Date Tested: 28/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 5/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
30/11/2023	ETAM23W02017	SC	1204	1.88	31.4	1.43	2.65	1	194	175	159	175	RE Wall	1748971	5949079	15.99	Silty CLAY	-
30/11/2023	ETAM23W02017	SC	1205	1.87	30.7	1.43	2.65	2	188	198+	198+	198+	RE Wall	1748981	5949060	16.00	Silty CLAY	-
30/11/2023	ETAM23W02017	SC	1206	1.89	28.6	1.47	2.65	3	198+	175	198+	175	Western Fill Area	1748841	5948993	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1207	1.91	27.0	1.51	2.65	3	UTP	UTP	UTP	UTP	Western Fill Area	1748828	5948956	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1208	1.86	32.9	1.40	2.65	1	152	149	159	175	Western Fill Area	1748848	5948913	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1209	1.92	26.3	1.52	2.65	3	UTP	UTP	UTP	UTP	Gully Fill Area	1748975	5948886	-	Silty CLAY	RL not available
30/11/2023	ETAM23W02017	SC	1210	1.90	22.8	1.55	2.65	6	UTP	UTP	UTP	143	Gully Fill Area	1749004	5948871	-	Silty CLAY	RL not available

Form Number: R031N Issue Date: 20/09/2018

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02017
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

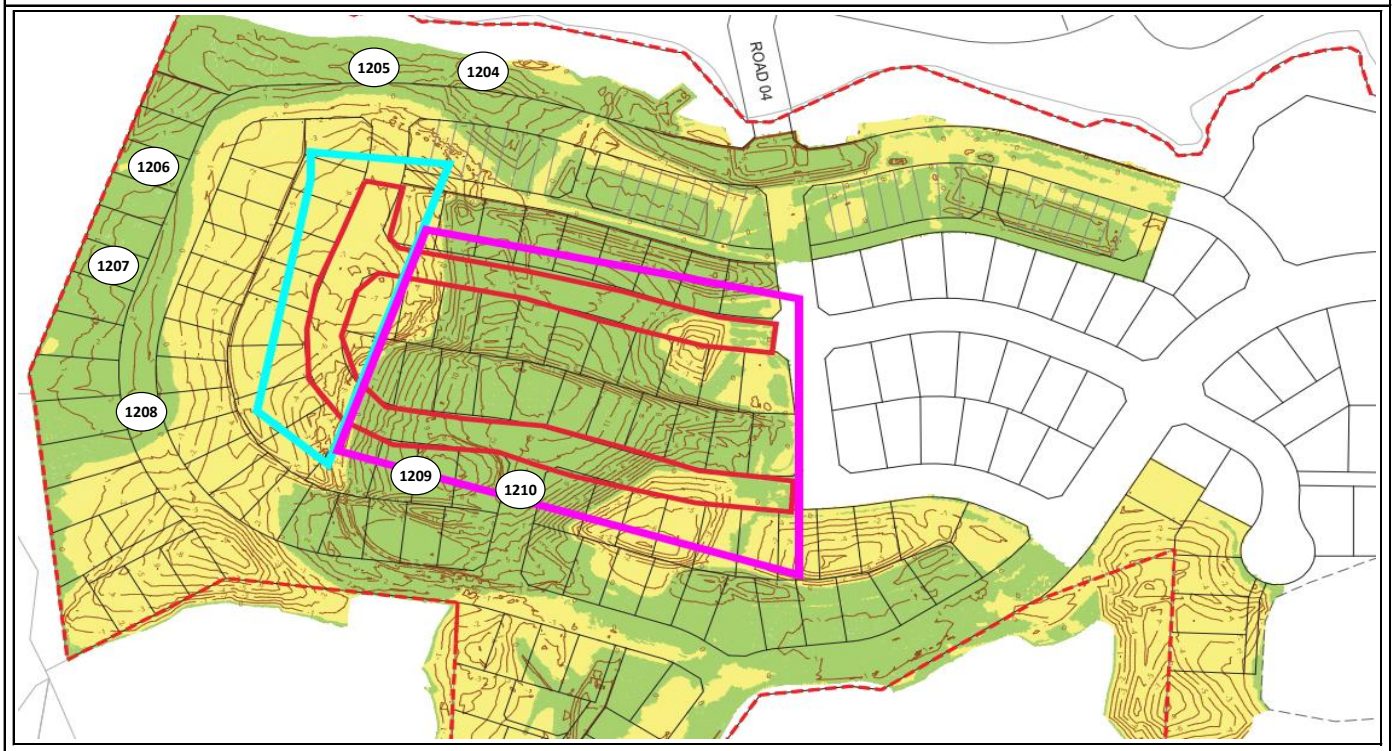
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 5/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02017
Page No: 2 of 2

Location: RE Wall + Western Area + Gully Fill Area

Tested by: SC
Date Tested: 30/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02031
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02031

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 6/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/12/2023	ETAM23W02031	SC	1211	1.93	31.1	1.47	2.65	0	175	155	152	159	RE Wall	1749017	5949071	-	Silty CLAY	At Finish Level
1/12/2023	ETAM23W02031	SC	1212	1.89	28.6	1.47	2.65	3	159	159	155	155	RE Wall	1748996	5949076	-	Silty CLAY	At Finish Level
1/12/2023	ETAM23W02031	SC	1213	1.89	28.4	1.47	2.65	3	188	188	159	175	Western Fill Area	1748844	5948993	-	Silty CLAY	RL not available
1/12/2023	ETAM23W02031	SC	1214	1.88	28.2	1.47	2.65	3	191	191	188	188	Western Fill Area	1748935	5948978	-	Silty CLAY	RL not available
1/12/2023	ETAM23W02031	SC	1215	1.89	29.9	1.45	2.65	2	176	177	159	162	Gully Fill Area	1748963	5948831	-	Silty CLAY	RL not available
1/12/2023	ETAM23W02031	SC	1216	1.91	27.9	1.50	2.65	2	152	143	159	175	Gully Fill Area	1748642	5948811	-	Silty CLAY	RL not available

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02031
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

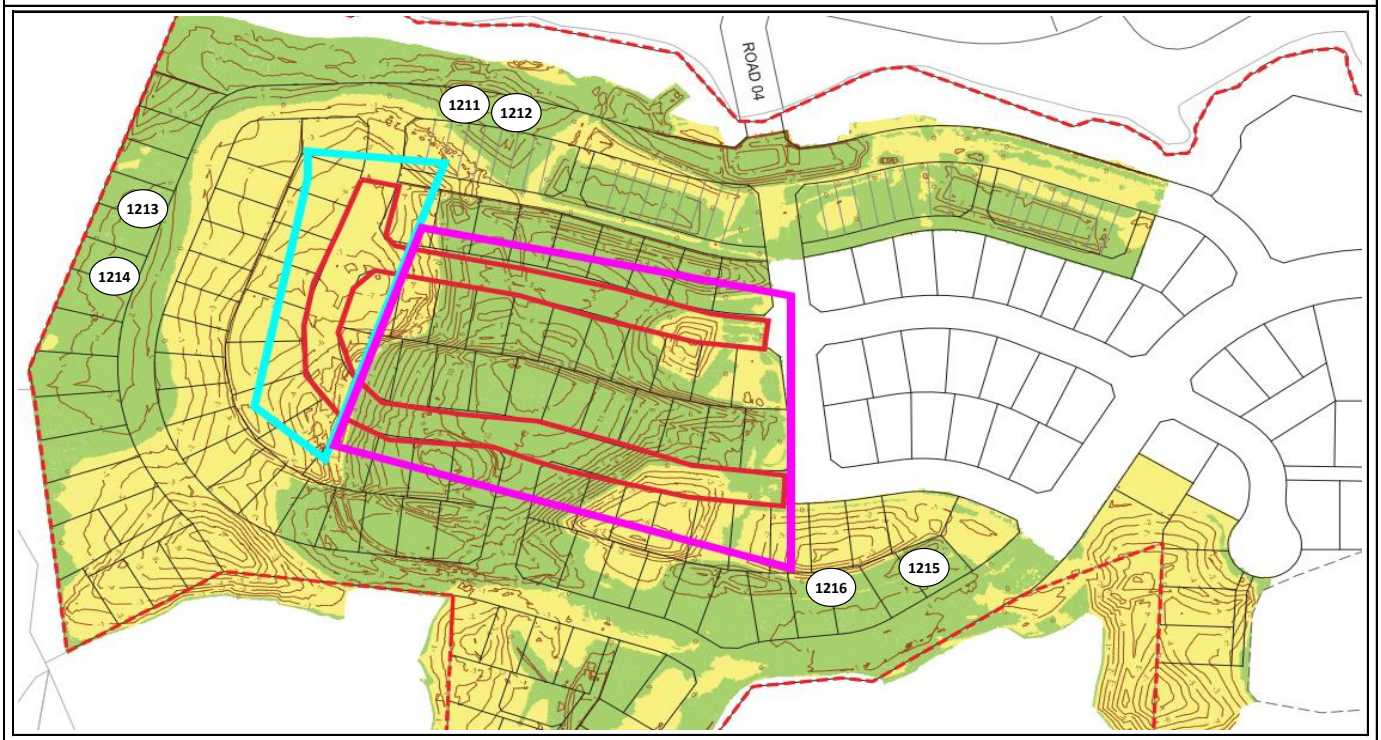
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02031
Page No: 2 of 2

Location: RE Wall + Western Area + Gully Fill Area

Tested by: SC
Date Tested: 1/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02054
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02054

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 13/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
8/12/2023	ETAM23W02054	SC	1217	1.84	35.0	1.36	2.65	1	162	175	162	171	Western Fill Area	1748864	5948984	-	Clayey SILT	RL not available
8/12/2023	ETAM23W02054	SC	1218	1.80	34.6	1.33	2.65	3	159	159	175	175	Western Fill Area	1748837	5948964	-	Clayey SILT	RL not available

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02054
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

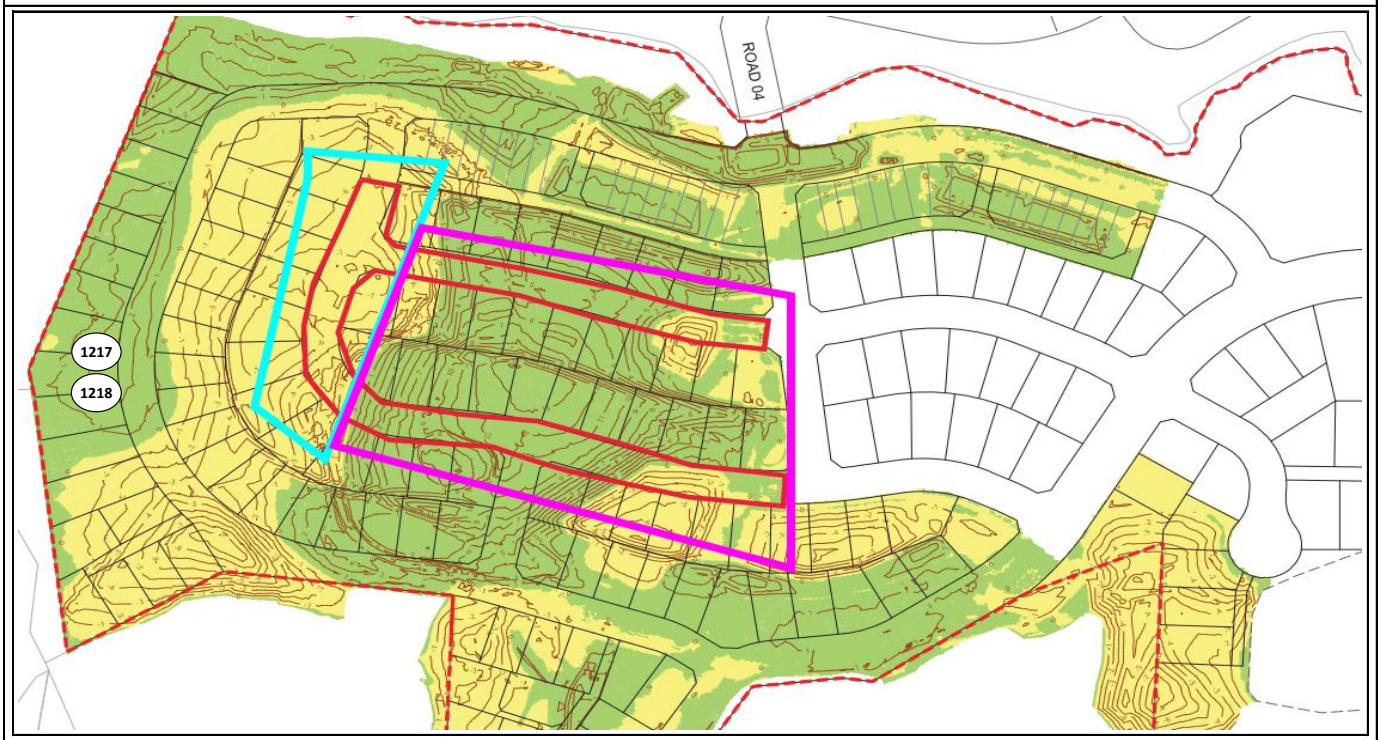
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02054
Page No: 2 of 2

Location: Western Area (see below)

Tested by: SC
Date Tested: 8/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02071
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02071

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 15/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
12/12/2023	ETAM23W02071	RP	1219	1.93	27.1	1.52	2.65	2	UTP	UTP	UTP	UTP	Western Fill Area	1748845	5948963	30.5	Silty CLAY	-
12/12/2023	ETAM23W02071	RP	1220	1.88	28.1	1.47	2.65	3	197+	197+	197+	171	Western Fill Area	1748853	5948989	27.5	Silty CLAY	-
12/12/2023	ETAM23W02071	RP	1221	1.88	28.4	1.47	2.65	3	197+	197+	197+	175	Fill Area	1749019	5948879	36.7	Silty CLAY	-
12/12/2023	ETAM23W02071	RP	1222	1.85	26.4	1.47	2.65	6	UTP	UTP	UTP	UTP	Fill Area	1748996	5948877	35.6	Silty CLAY	-

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02071
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

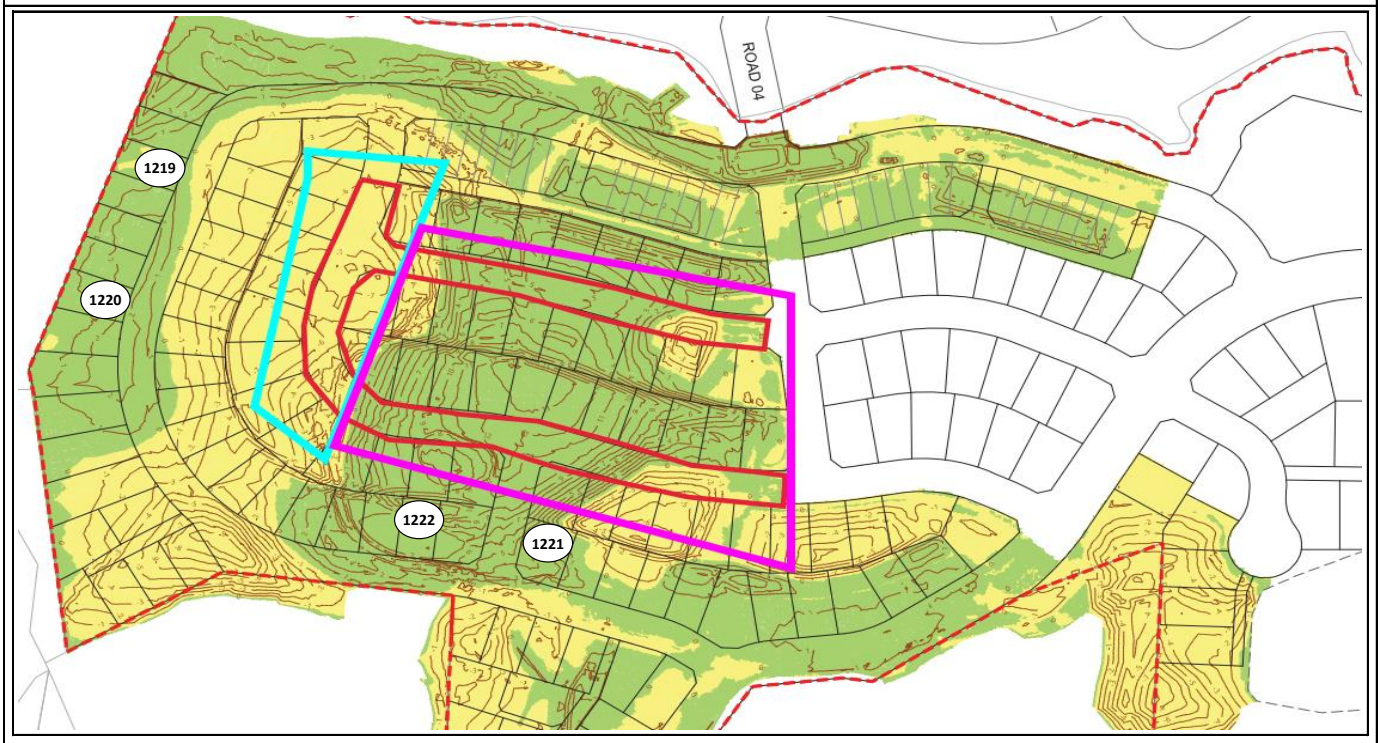
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 15/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02071
Page No: 2 of 2

Location: Western Area + Gully (see below)

Tested by: RP
Date Tested: 12/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02091
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02091

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 20/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/12/2023	ETAM23W02091	RP	1223	1.87	29.6	1.44	2.65	2.8	UTP	UTP	UTP	162	Western Fill Area	1748870	5949017	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1224	1.88	28.0	1.47	2.65	3.4	UTP	UTP	UTP	UTP	Western Fill Area	1748848	5948980	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1225	1.85	32.7	1.39	2.65	1.9	175	188	UTP	UTP	Road Undercut	1748923	5948841	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1226	1.86	30.7	1.42	2.65	2.7	UTP	UTP	UTP	UTP	Road Undercut	1748900	5948852	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1227	1.85	32.6	1.40	2.65	1.9	UTP	UTP	UTP	UTP	Road Undercut	1748877	5948870	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1228	1.91	33.4	1.43	2.65	0.0	UTP	UTP	UTP	196	Gully	1749004	5948881	-	Silty CLAY	RL not available
14/12/2023	ETAM23W02091	RP	1229	1.86	33.7	1.39	2.65	0.5	UTP	UTP	UTP	UTP	Gully	1749028	5948857	-	Silty CLAY	RL not available

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02091
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

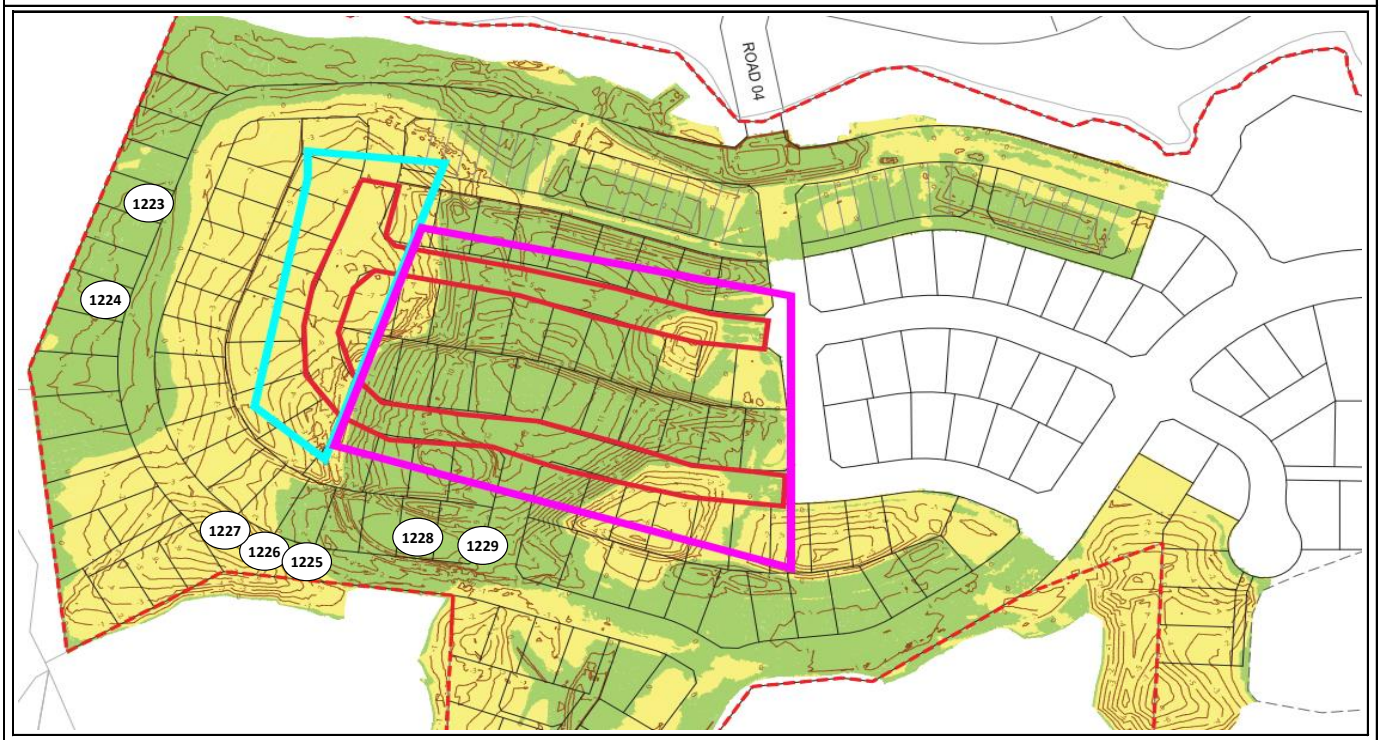
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02091
Page No: 2 of 2

Location: Western Area + Gully (see below)

Tested by: RP
Date Tested: 14/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00067
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00067

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/01/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2024	ETAM24W00067	RP	1266	1.92	25.8	1.52	2.65	3.2	UTP	UTP	UTP	UTP	RE Wall 602	1749102	5948837	-	Silty CLAY	RL not available
19/01/2024	ETAM24W00067	RP	1267	1.94	25.7	1.55	2.65	2.0	UTP	UTP	UTP	UTP	RE Wall 602	1749154	5948830	-	Silty CLAY	RL not available
19/01/2024	ETAM24W00067	RP	1268	1.88	29.5	1.45	2.65	2.3	UTP	UTP	UTP	UTP	Silt Pond	1749102	5949016	16.2	Silty CLAY	-
19/01/2024	ETAM24W00067	RP	1269	1.88	25.7	1.49	2.65	5.4	UTP	UTP	UTP	UTP	Silt Pond	1749081	5949025	14.2	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00067
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

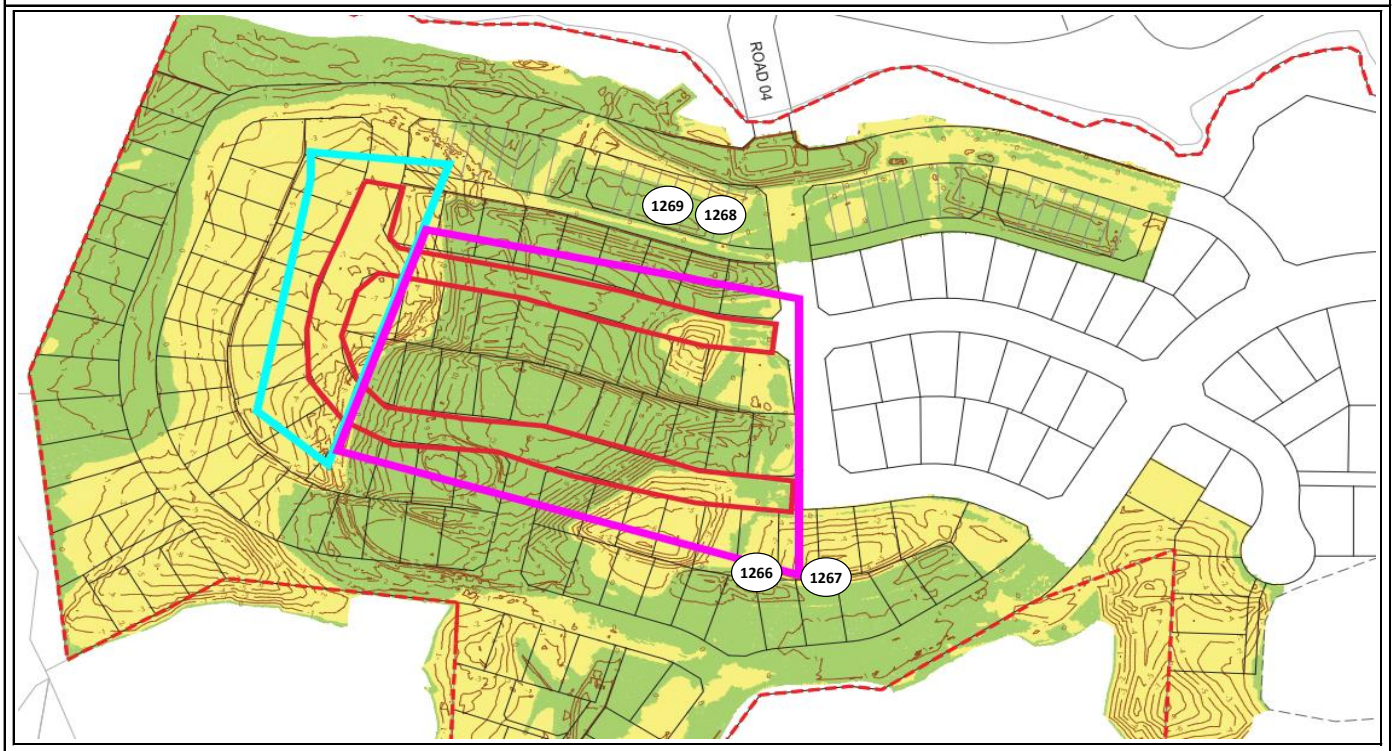
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 25/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00067
Page No: 2 of 2

Location: RE Wall 602 + Silt Pond

Tested by: RP
Date Tested: 19/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00071
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00071

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 25/01/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/01/2024	ETAM24W00071	RP	1264	1.90	30.2	1.46	2.65	0.9	UTP	UTP	128	128	Silt Pond	1749102	5949015	15.0	Silty CLAY *	-
18/01/2024	ETAM24W00071	RP	1265	1.88	25.1	1.50	2.65	5.5	UTP	UTP	UTP	UTP	Silt Pond	1749080	5949021	13.5	Silty CLAY *	-

Comments:

*** Lime dried + Aggregate present in fill for both tests**

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00071
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

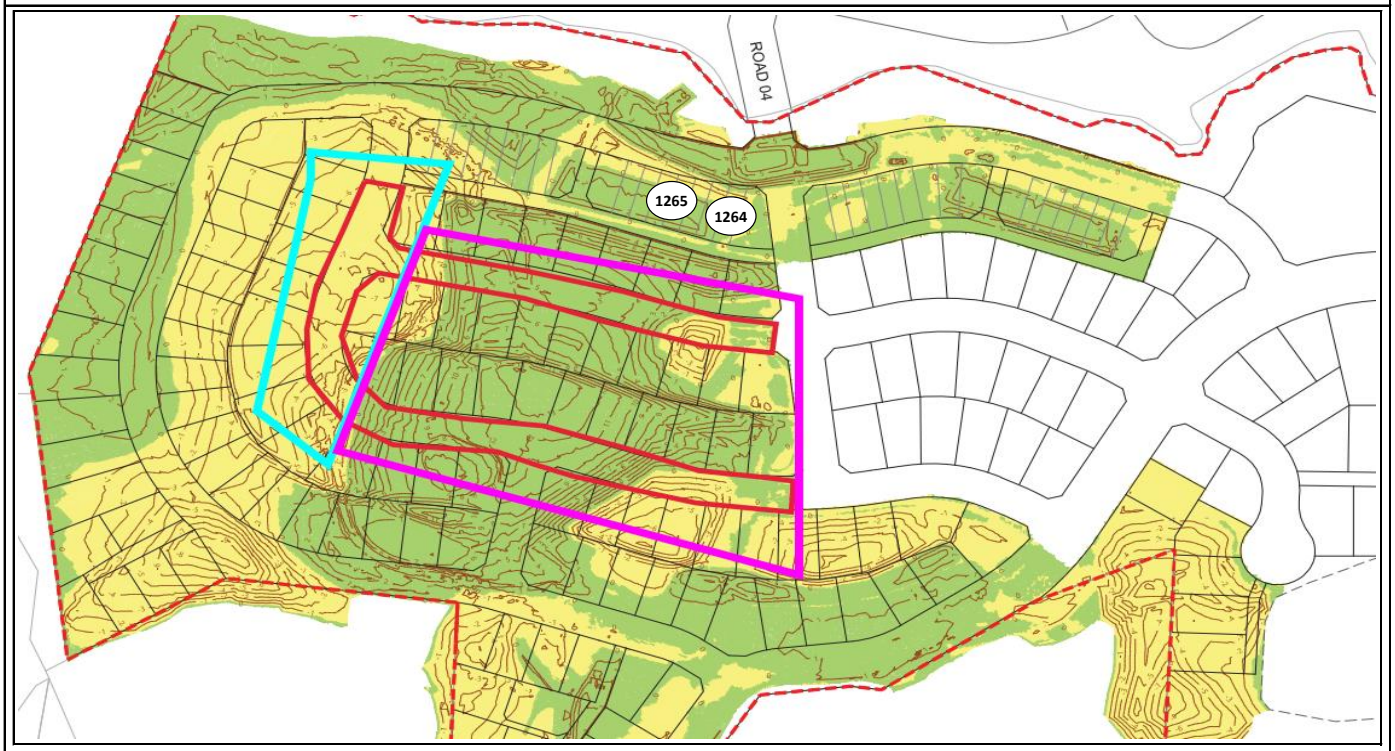
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 25/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00071
Page No: 2 of 2

Location: Silt Pond

Tested by: RP
Date Tested: 18/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00074
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00074

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 26/01/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
22/01/2024	ETAM24W00074	LW	1270	1.88	27.9	1.47	2.65	3.3	220+	220+	220+	220+	Undercut Area	1748832	5948869	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1271	1.82	31.0	1.39	2.65	4.5	220+	220+	220+	149	Undercut Area	1748852	5948881	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1272	1.94	27.1	1.53	2.65	0.9	220+	220+	220+	220+	RE Wall 602	1749200	5948845	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1273	1.90	27.8	1.49	2.65	2.4	220+	220+	220+	220+	RE Wall 602	1749165	5948831	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1274	1.90	29.7	1.47	2.65	1.1	220+	220+	220+	220+	Silt Pond	1749094	5949020	-	Silty CLAY	RL not available
22/01/2024	ETAM24W00074	LW	1275	1.90	27.5	1.49	2.65	3.0	220+	220+	220+	220+	Silt Pond	1749079	5949025	-	Silty CLAY	RL not available

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00074
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

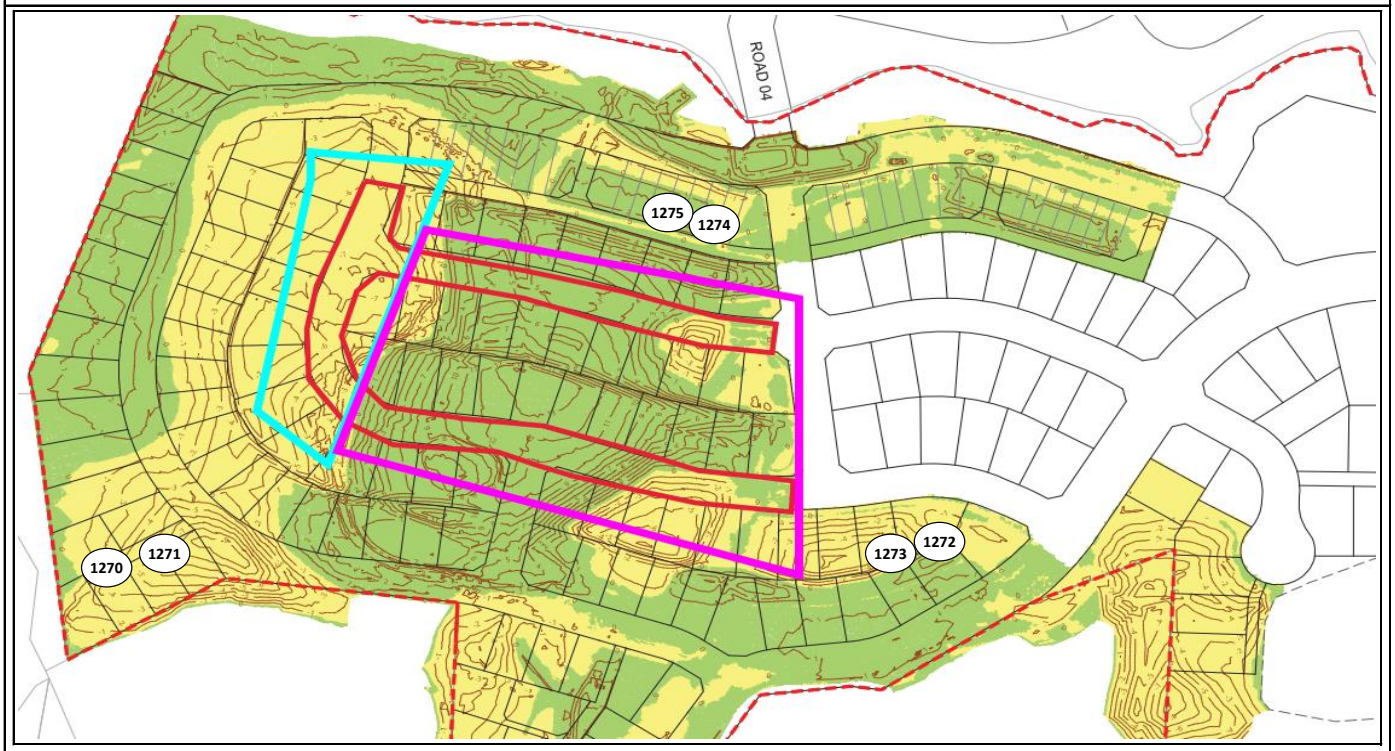
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00074
Page No: 2 of 2

Location: Undercut Area + RE Wall 602 + Silt Pond

Tested by: LW
Date Tested: 22/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00083
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00083

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 26/01/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
23/01/2024	ETAM24W00083	SC	1276	1.87	28.3	1.46	2.65	3.8	172	172	201	201	RE Wall 602	1749194	5948837	37.0	Silty CLAY	-
23/01/2024	ETAM24W00083	SC	1277	1.91	27.1	1.50	2.65	2.7	201	201	201	201	RE Wall 602	1749150	5948829	37.0	Silty CLAY	-
23/01/2024	ETAM24W00083	SC	1278	1.91	25.3	1.53	2.65	3.9	192	201	172	188	RE Wall 602	1749073	5948846	37.0	Silty CLAY	-
23/01/2024	ETAM24W00083	SC	1279	1.87	28.0	1.46	2.65	3.8	192	192	172	172	Silt Pond	1749072	5949018	-	Silty CLAY	RL not availale
23/01/2024	ETAM24W00083	SC	1280	1.85	30.1	1.42	2.65	3.4	168	172	192	188	Silt Pond	1749076	5949024	-	Silty CLAY	RL not availale

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00083
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

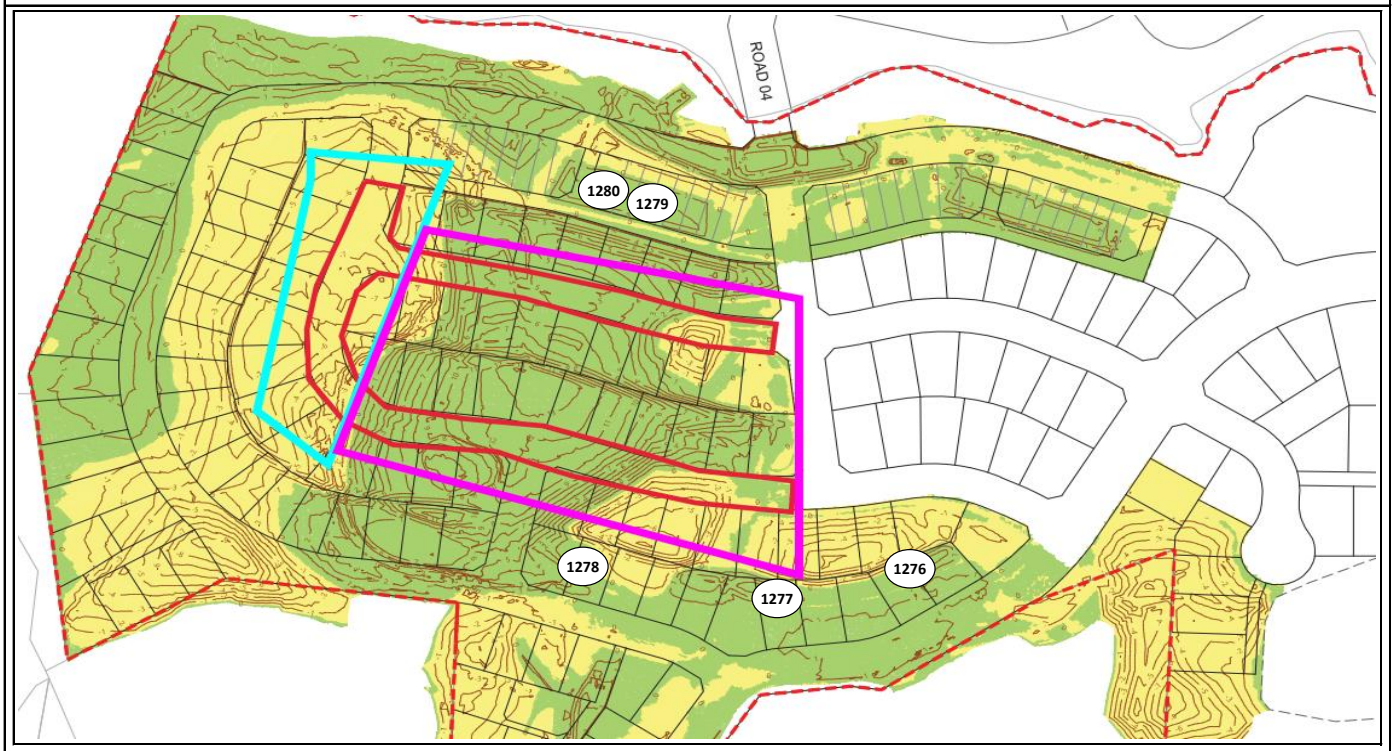
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/01/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00083
Page No: 2 of 2

Location: Gully + Silt Pond

Tested by: SC
Date Tested: 23/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00109
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00109

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 7/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
30/01/2024	ETAM24W00109	SC	1298	1.88	27.9	1.47	2.65	3.5	159	159	188	188	Fill Area (refer to plan)	1749041	5948844	-	Silty CLAY	RL not available
30/01/2024	ETAM24W00109	SC	1299	1.94	27.8	1.52	2.65	0.3	177	177	175	175	RE Wall 602	1749095	5948835	38.00	Silty CLAY	-
30/01/2024	ETAM24W00109	SC	1300	1.92	27.2	1.51	2.65	1.8	175	188	185	159	RE Wall 602	1749119	5948826	38.00	Silty CLAY	-
30/01/2024	ETAM24W00109	SC	1301	1.86	27.4	1.46	2.65	4.9	159	159	171	171	RE Wall 602	1749150	5948824	38.00	Silty CLAY	-
30/01/2024	ETAM24W00109	SC	1302	1.68	40.2	1.20	2.65	6.4	95	114	111	102	Wastewater Line K to L	1748925	5949061	18.69	Silty CLAY	-

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00109
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

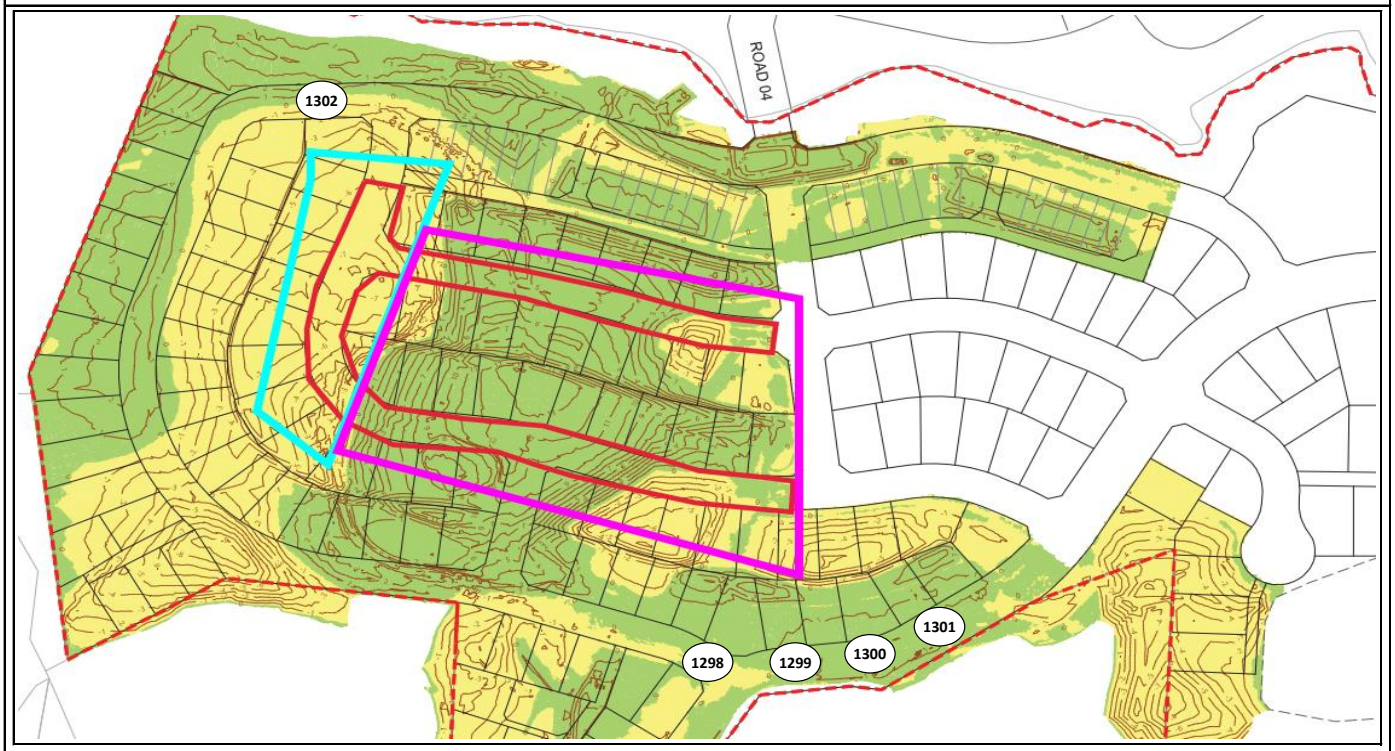
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 7/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00109
Page No: 2 of 2

Location: Fill Areas + RE Wall 602 + Wastewater Line K to L

Tested by: SC
Date Tested: 30/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00146
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00146

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 12/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
2/02/2023	ETAM24W00146	RP	1315	1.82	30.0	1.40	2.65	5.5	198+	198+	UTP	UTP	Undercut Area	1748834	5948862	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1316	1.89	25.9	1.50	2.65	4.5	UTP	UTP	UTP	UTP	Undercut Area	1748822	5948868	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1317	1.86	26.2	1.47	2.65	5.9	UTP	UTP	UTP	UTP	RE Wall 603	1748927	5948889	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1318	1.92	28.0	1.50	2.65	1.3	UTP	198+	198+	198+	RE Wall 603	1748901	5948906	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1319	1.88	27.8	1.47	2.65	3.8	UTP	UTP	UTP	198+	RE Wall 602	1749048	5948851	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1320	1.89	25.7	1.51	2.65	4.4	UTP	UTP	UTP	UTP	RE Wall 602	1749084	5948835	-	Silty CLAY	RL not available
2/02/2023	ETAM24W00146	RP	1321	1.71	26.5	1.35	2.65	13.4	UTP	UTP	UTP	UTP	Silt Pond	1749064	5949028	16.66	Silty CLAY	-
2/02/2023	ETAM24W00146	RP	1322	1.84	26.8	1.45	2.65	6.2	UTP	UTP	UTP	UTP	Silt Pond	1749054	5949029	16.26	Silty CLAY	-
2/02/2023	ETAM24W00146	RP	1323	1.85	31.1	1.41	2.65	2.9	UTP	UTP	UTP	UTP	Silt Pond	1749084	5949017	17.21	Silty CLAY	-

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00146
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

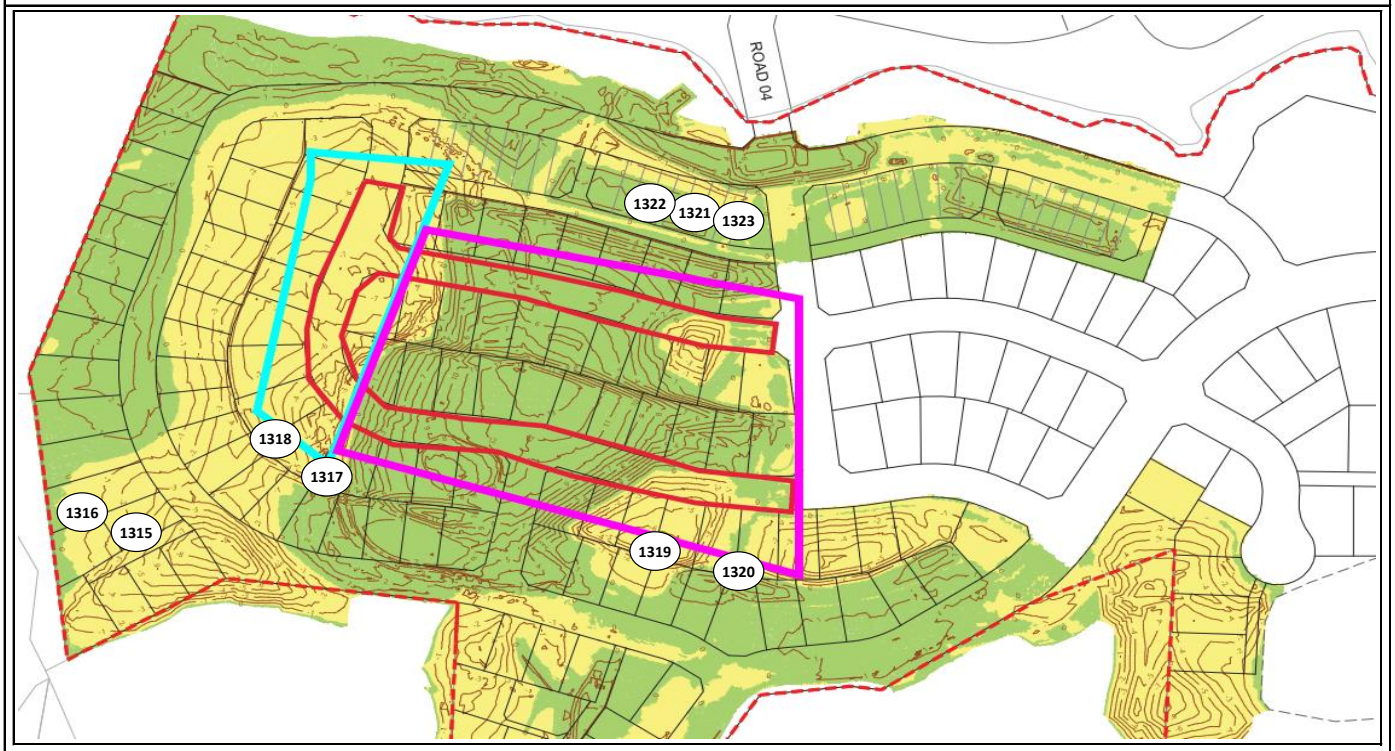
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 12/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00146
Page No: 2 of 2

Location: Undercut Area + RE Wall 602 + 603 + Silt Pond

Tested by: RP
Date Tested: 2/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00172
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00172

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/02/2024	ETAM24W00172	SC	1324	1.89	27.9	1.48	2.65	2.8	191	191	188	188	RE Wall 602	1749052	5948709	-	Silty CLAY	RL not available
7/02/2024	ETAM24W00172	SC	1325	1.91	32.0	1.44	2.65	0.0	UTP	UTP	188	188	RE Wall 602	1749085	5948835	-	Silty CLAY	RL not available
7/02/2024	ETAM24W00172	SC	1326	1.98	25.6	1.58	2.65	0.0	UTP	UTP	198	198	RE Wall 603	1748900	5948910	37.5	Silty CLAY	-
7/02/2024	ETAM24W00172	SC	1327	1.95	29.5	1.50	2.65	0.0	188	188	194	194	RE Wall 603	1748935	5948883	37.5	Silty CLAY	-
7/02/2024	ETAM24W00172	SC	1328	1.99	26.3	1.58	2.65	0.0	198+	198+	198+	198+	SPR 7	1749056	5949031	-	Silty CLAY	RL not available
7/02/2024	ETAM24W00172	SC	1329	1.99	26.2	1.58	2.65	0.0	UTP	UTP	UTP	UTP	SPR 7	1749070	5949033	-	Silty CLAY	RL not available

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00172
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

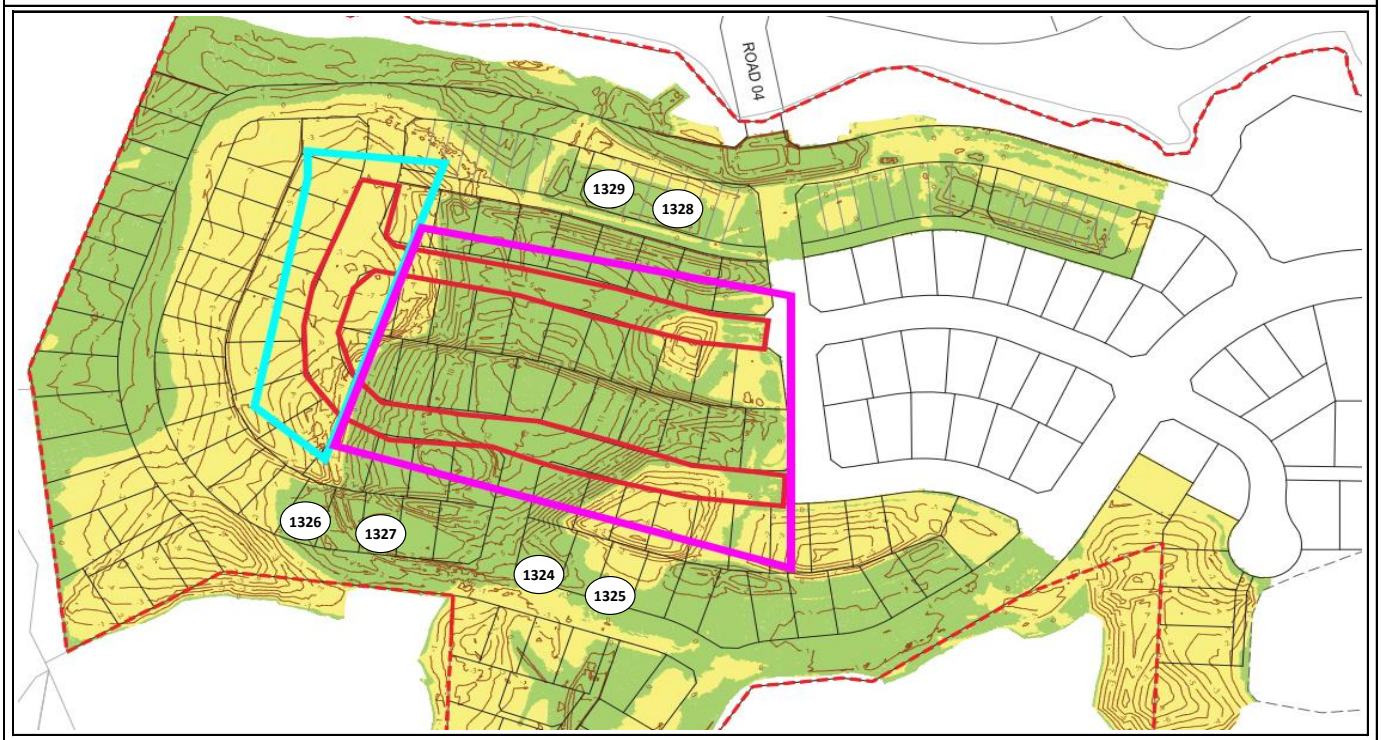
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00172
Page No: 2 of 2

Location: RE Wall 602 + 603 + SPR 7

Tested by: SC
Date Tested: 7/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00179

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes

cc to: -

Project No.: 773-ETAM01553

Project Name.: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA

Project Location: 117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
8/02/2024	ETAM24W00179	SC	1330	1.84	29.9	1.42	2.65	4.0	175	175	171	171	RE Wall 602	1749085	5948837	42.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1331	1.86	30.4	1.43	2.65	2.7	185	175	188	183	RE Wall 602	1749064	5948839	42.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1332	1.90	21.4	1.56	2.65	7.4	UTP	UTP	UTP	UTP	RE Wall 603	1748900	5948905	38.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1333	1.88	27.8	1.47	2.65	3.8	UTP	UTP	UTP	UTP	RE Wall 603	1748942	5948879	38.00	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1334	1.92	31.3	1.46	2.65	0.0	UTP	UTP	UTP	UTP	Lot 11 Undercut	1748826	5948891	39.40	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1335	1.92	32.4	1.45	2.65	0.0	188	188	185	185	Lot 12 Undercut	1748817	5948870	41.65	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1336	2.01	25.9	1.60	2.65	0.0	UTP	UTP	UTP	UTP	Silt Pond (Retest)	1749064	5949028	16.66	Silty CLAY	-
8/02/2024	ETAM24W00179	SC	1337	1.89	25.2	1.51	2.65	5.0	UTP	UTP	UTP	UTP	Silt Pond (Retest)	1749048	5949029	16.66	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00179
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

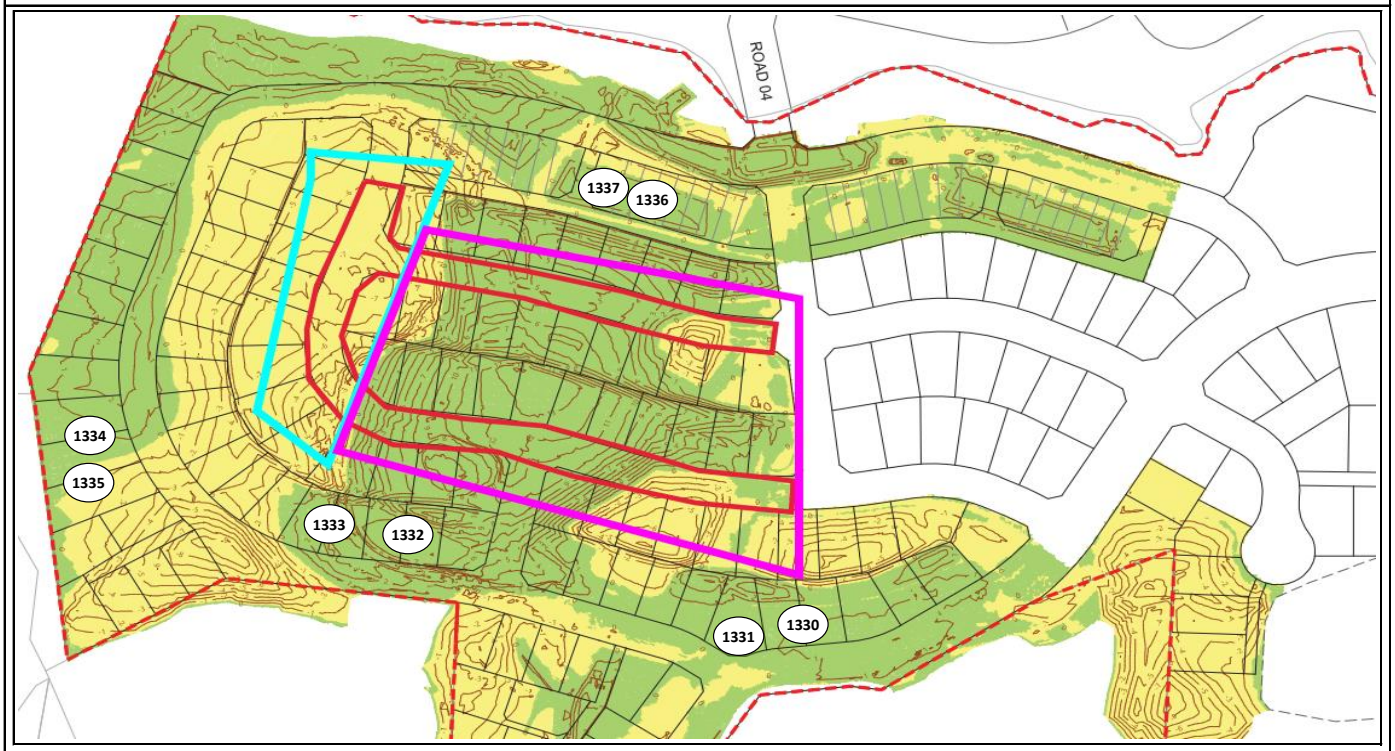
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00179
Page No: 2 of 2

Location: RE Wall 602 & 603 + Lot 11 & 12 Undercut + Silt Pond

Tested by: SC
Date Tested: 8/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00183
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00183

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/02/2024	ETAM24W00183	RP	1338	1.87	28.1	1.46	2.65	3.9	UTP	UTP	UTP	198+	Undercut Area	1748839	5948862	-	Silty CLAY	RL not available
9/02/2024	ETAM24W00183	RP	1339	1.86	31.2	1.42	2.65	2.1	198+	UTP	UTP	UTP	Undercut Area	1748850	5948883	-	Silty CLAY	RL not available
9/02/2024	ETAM24W00183	RP	1340	2.01	23.8	1.63	2.65	0.0	UTP	UTP	UTP	UTP	Silt Pond	1749074	5949019	17.60	Silty CLAY	-
9/02/2024	ETAM24W00183	RP	1341	1.90	27.1	1.50	2.65	2.9	UTP	UTP	UTP	UTP	Silt Pond	1749053	5949032	17.00	Silty CLAY	-
9/02/2024	ETAM24W00183	RP	1342	1.81	31.7	1.38	2.65	4.5	198+	UTP	UTP	UTP	Drainage Line	1748881	5949068	-	Silty CLAY	RL not available

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00183
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

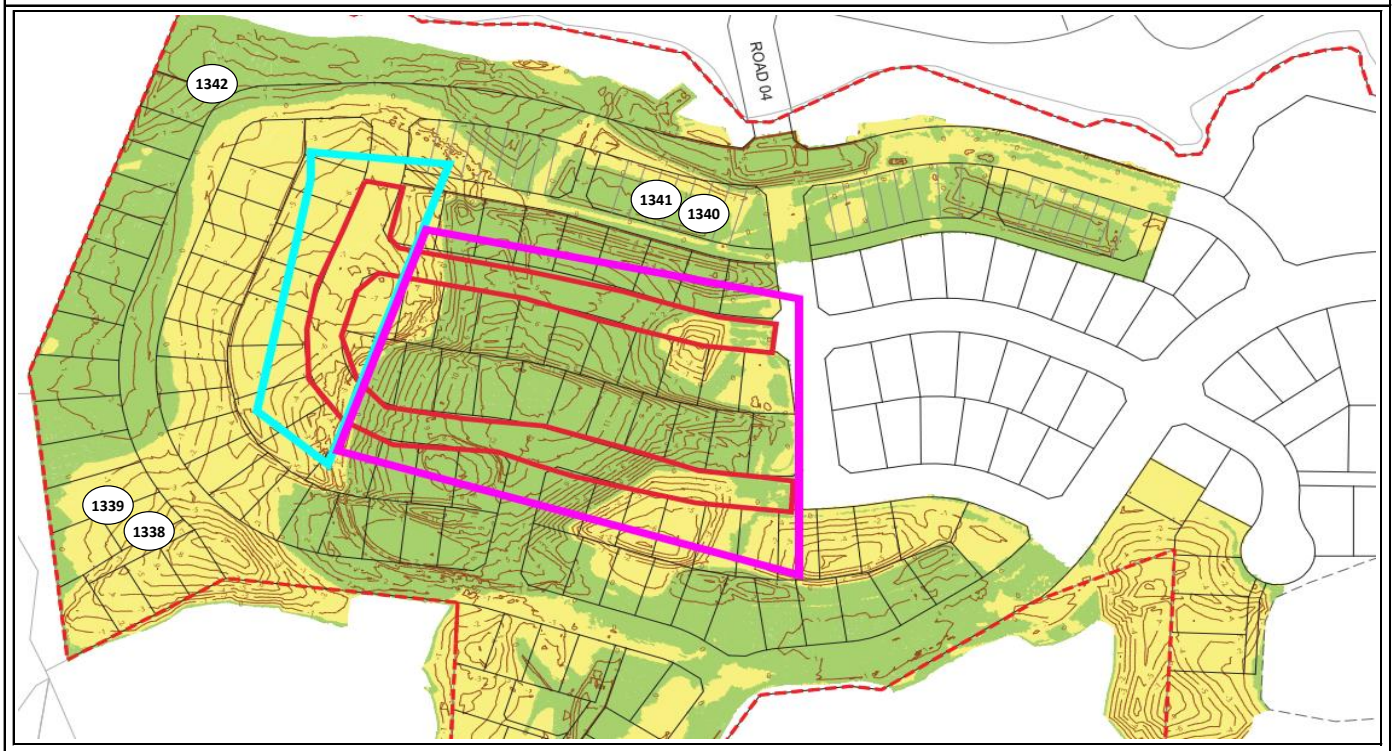
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00183
Page No: 2 of 2

Location: Undercut Area + Silt Pond + Drainage Line

Tested by: RP
Date Tested: 9/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00275
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00275

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Managing Director-Testing
IANZ Site Number: 105
Date of Issue: 27/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/02/2024	ETAM24W00275	LW	1352	1.88	32.3	1.42	2.65	0.7	192	184	172	184	6N - 27A Sewer	1748899	5949046	-	Silty CLAY	At Finish Level
19/02/2024	ETAM24W00275	LW	1353	1.95	31.0	1.48	2.65	0.0	UTP	UTP	UTP	UTP	03/09 - 03/10	1748867	5948983	-	Silty CLAY	At Finish Level
19/02/2024	ETAM24W00275	LW	1354	1.79	38.2	1.30	2.65	1.5	192	188	172	176	04/02 - 04/03	1748857	5949058	-	Silty CLAY	At Finish Level
19/02/2024	ETAM24W00275	LW	1355	1.96	34.0	1.46	2.65	0.0	220+	220+	220+	220+	04/03 - 04/04	1748842	5949024	-	Silty CLAY	At Finish Level
19/02/2024	ETAM24W00275	LW	1356	1.79	40.2	1.28	2.65	0.3	172	168	184	172	03/06 - 03/07	1748936	5949069	-	Silty CLAY	At Finish Level
19/02/2024	ETAM24W00275	LW	1357	1.85	35.0	1.37	2.65	0.3	220+	220+	220+	220+	6K - 6L Sewer	1748943	5949067	-	Silty CLAY	At Finish Level

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00275
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

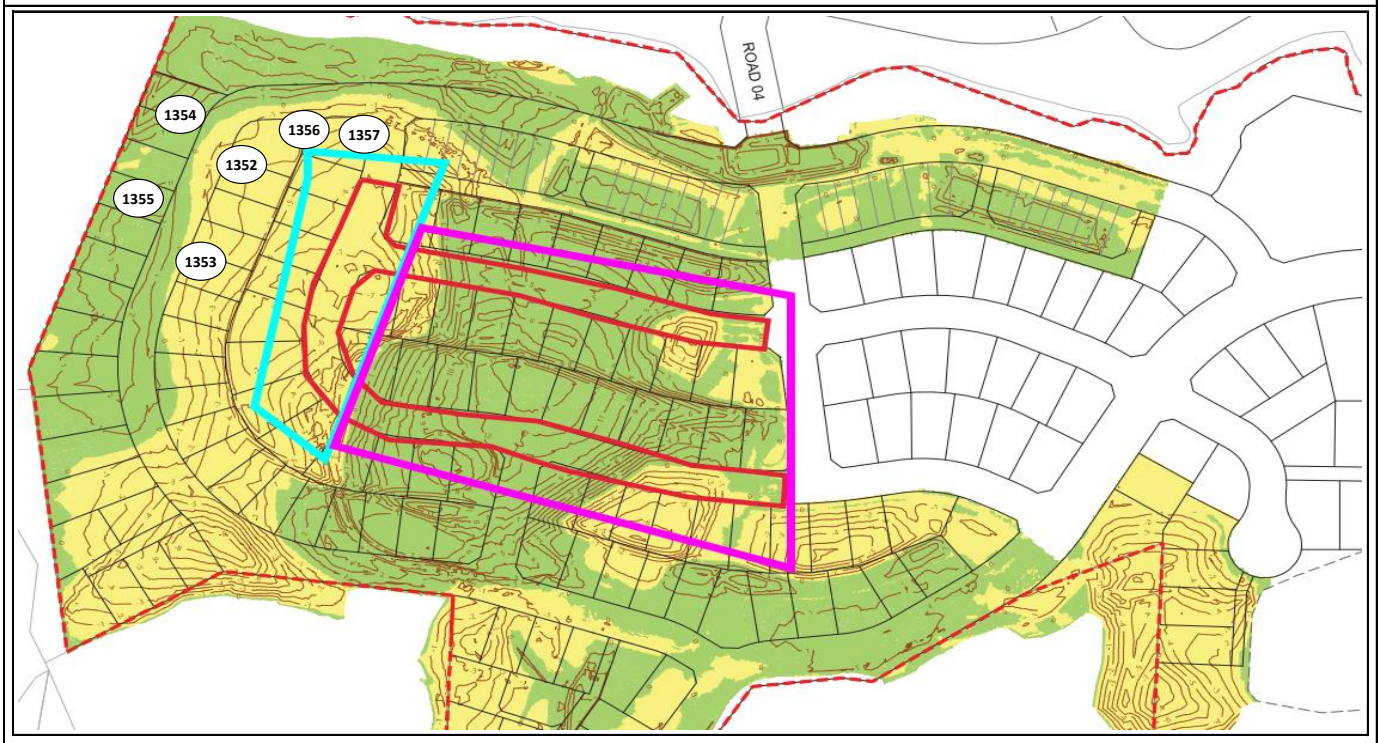
Approved Signatory: Eric Paton
(Managing Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 27/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00275
Page No: 2 of 2

Location: Sewers (see below)

Tested by: LW
Date Tested: 19/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM24W00285
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM24W00285

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Managing Director-Testing
IANZ Site Number: 105
Date of Issue: 27/02/2024

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
20/02/2024	ETAM24W00285	LW	1358	1.85	30.6	1.41	2.65	3.3	220+	220+	220+	220+	RE Wall 603	1748968	5948888	-	Silty CLAY	RL not available
20/02/2024	ETAM24W00285	LW	1359	1.85	31.0	1.41	2.65	2.8	220+	220+	220+	220+	RE Wall 603	1748947	5948890	-	Silty CLAY	RL not available
20/02/2024	ETAM24W00285	LW	1360	1.91	30.9	1.46	2.65	0.0	UTP	UTP	UTP	UTP	04/01 - 04/02	1748884	5949063	-	Silty CLAY	At Finish Level
20/02/2024	ETAM24W00285	LW	1361	1.82	29.3	1.40	2.65	5.8	220+	220+	220+	220+	03/10 - 03/11	1748869	5948969	-	Silty CLAY	At Finish Level

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM24W00285
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

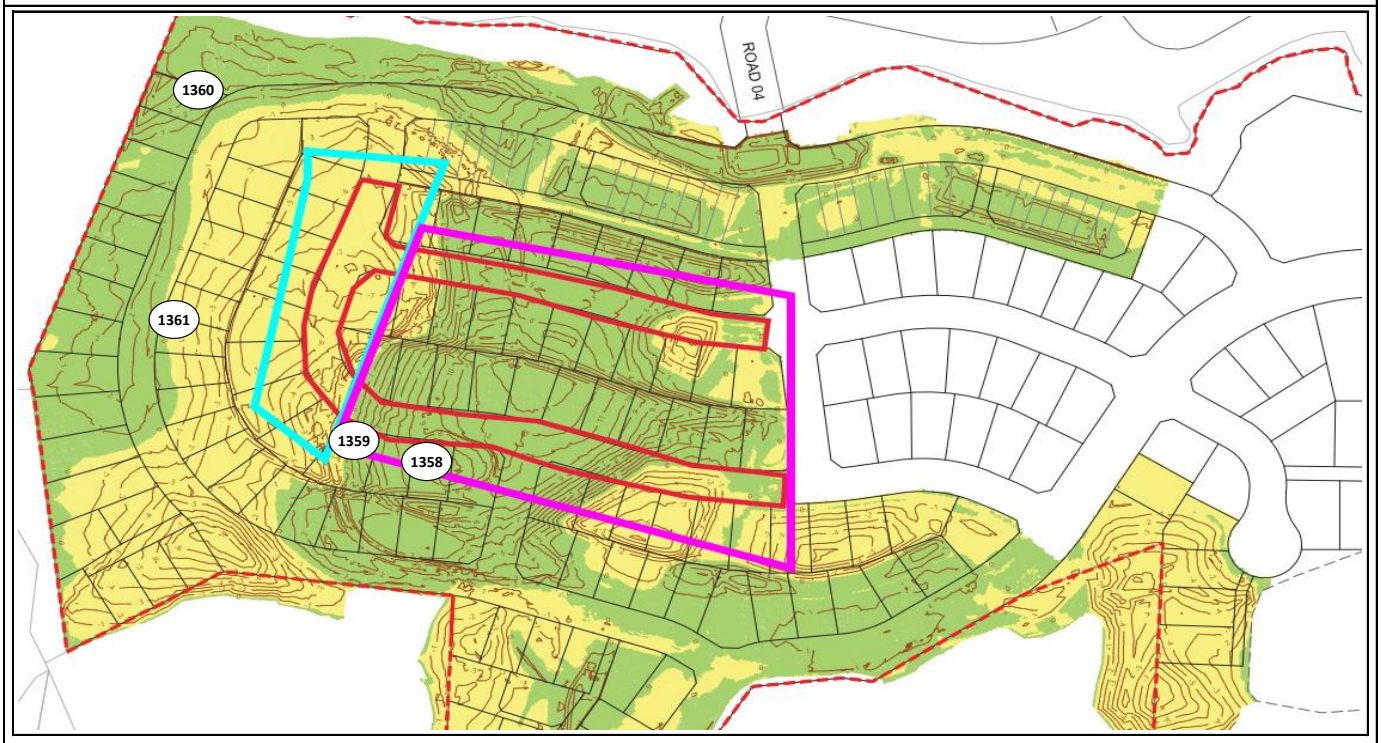
Approved Signatory: Eric Paton
(Managing Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 27/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00285
Page No: 2 of 2

Location: RE Wall 603 + 04/01-04/02 + 03/10-03/11

Tested by: LW
Date Tested: 20/02/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00110
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 7/02/2024

Testing Details

Site Tested:	Wastewater Line 6N to 60 Backfill (CH00 = Start of Manhole 6N Facing West)
Tested By:	Salvindra Chandra
Date Tested:	30/01/2024
Time Tested:	12:45
Material:	MR8 - 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3 - Backscatter Mode

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.2 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.09
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	7	0	Centreline of Trench	4.9	2.18	2.08	95
2	9	0	Centreline of Trench	4.6	2.21	2.11	96

Comments

~ Test was conducted externally and is not accredited by this laboratory.
MDD-Supplied by the Client
Random Locations Selected by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00110
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

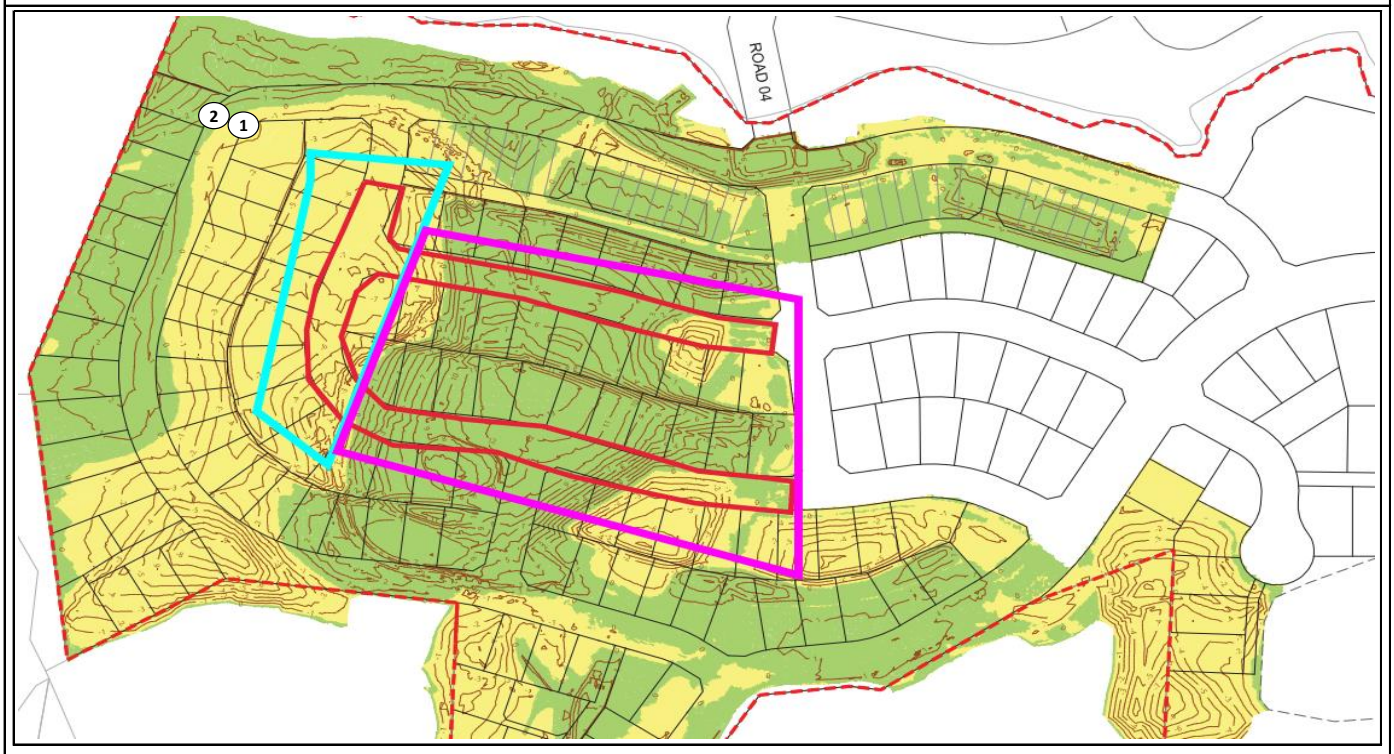
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 7/02/2024

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAM24W00110
Page No: 2 of 2

Location: Wastewater 6N to 60 Backfill
CH00 = Start of Manhole 6N Facing West

Tested by: SC
Date Tested: 30/01/2024



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00139
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 8/02/2024

Testing Details

Site Tested: SW Line Backfill 307-401 (CH00 = Manhole 307 Facing 401)
Tested By: Salvindra Chandra
Date Tested: 1/02/2024
Time Tested: 13:10
Material: MR8 65
Start Route Position:
Field Methods: NZS 4407:2015 Test 4.3 - Backscatter Mode

Compaction Target Details

Material Sample ID: External
MDD Method: ~
Max. Dry Density: 2.2 t/m³ @ 5.5 %
Min. Dry Density (t/m³): 2.09
Solid Density Type: Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	4	0	Centre of trench	RL: 19.07	4.3	2.12	2.03	92
2	8	0	Centre of trench	RL: 19.07	4.3	2.05	1.97	89
3	12	0	Centre of trench	RL: 19.07	4.9	1.90	1.81	82
4	4 *	0	Centre of trench	RL: 19.07	6.4	2.22	2.09	95
5	8 *	0	Centre of trench	RL: 19.07	5.4	2.28	2.17	98
6	12 *	0	Centre of trench	RL: 19.07	5.5	2.22	2.10	96

Comments

~ Test was conducted externally and is not accredited by this laboratory.
MDD-Supplied by the Client
Random Locations Selected by the Technician
* Retests

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00139
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

ACCREDITED IANZ TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 8/02/2024

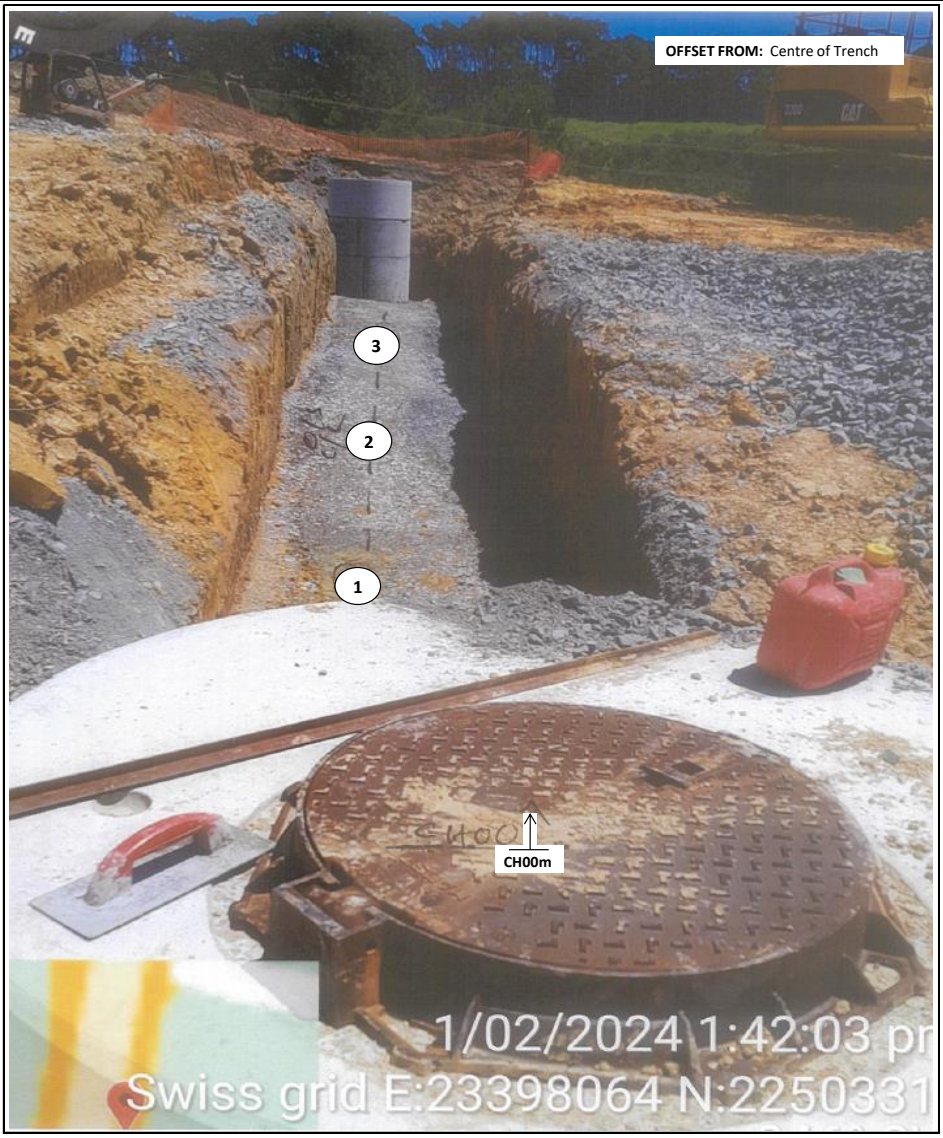
SITE PLAN

* NOT TO SCALE *

Work Order No: ETAM24W00139
Page No: 2 of 2

Location: SW Line Backfill 307-401
CH00 = Manhole 307 Facing 401

Tested by: SC
Date tested: 1/02/2024



SITE PLAN ~ (NOT TO SCALE)

Issue date: 050517

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00180
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

Testing Details

Site Tested:	SW Line Backfill 307-401 Layer 2 (CH00 = Manhole 307 Facing 401)
Tested By:	Salvindra Chandra
Date Tested:	8/02/2024
Time Tested:	11:50
Material:	MR8 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3 - Backscatter Mode

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.2 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.09
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	4	0	Centre of Trench	Layer 2	7.6	1.90	1.77	80
2	8	0	Centre of Trench	Layer 2	6.9	2.04	1.91	87
3	12	0	Centre of Trench	Layer 2	4.3	1.95	1.87	85

Comments

~ Test was conducted externally and is not accredited by this laboratory.
MDD-Supplied by the Client
Random Locations Selected by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00184
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/02/2024

Testing Details

Site Tested:	SW Line Backfill 307-401 (CH00 = Manhole 307 Facing 401)
Tested By:	Ramon Powell
Date Tested:	9/02/2024
Time Tested:	09:30
Material:	MR8 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3 - Backscatter Mode

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.2 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.09
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	8	0	Centre of Trench	Layer 2	9.6	2.33	2.13	97
2	12	0	Centre of Trench	Layer 2	9.6	2.40	2.19	99
3	4	0	Centre of Trench	Layer 2	10.3	2.39	2.16	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
MDD-Supplied by the Client
Random Locations Selected by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00258
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Managing Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/02/2024

Testing Details

Site Tested:	03/09 - 03/10 Parking Bay SW Line (CH00 = 03/09 Facing 03/10)
Tested By:	Liam Walker
Date Tested:	16/02/2024
Time Tested:	12:55
Material:	ATAP65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3 - Backscatter Mode

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.3 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.19
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	10	0	Centre of Trench	1m to FL	4.7	2.38	2.28	99
2	50	0	Centre of Trench	1m to FL	8.3	2.41	2.23	97

Comments

~ Test was conducted externally and is not accredited by this laboratory.
MDD-Supplied by the Client
Random Locations Selected by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM24W00276
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Managing Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 27/02/2024

Testing Details

Site Tested:	03/09 - 03/10 Parking Bay SW Line (CH00 = 03/09 Facing 03/10)
Tested By:	Liam Walker
Date Tested:	19/02/2024
Time Tested:	15:00
Material:	ATAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3 - Backscatter Mode

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.3 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.19
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	10	0	Centre of Trench	At Finish Level	4.5	2.38	2.28	99
2	50	0	Centre of Trench	At Finish Level	4.6	2.29	2.19	95

Comments

~ Test was conducted externally and is not accredited by this laboratory.
MDD-Supplied by the Client
Random Locations Selected by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01936
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01936

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 20/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/11/2023	ETAM23W01936	LW	1190	1.87	30.7	1.43	2.65	1.9	160	215	205	192	RE Wall 604	1748996	5949090	12.50	Silty CLAY	-
14/11/2023	ETAM23W01936	LW	1191	1.89	30.8	1.45	2.65	0.8	210	176	192	201	RE Wall 604	1749018	5949087	12.50	Silty CLAY	-
14/11/2023	ETAM23W01936	LW	1192	1.89	34.4	1.41	2.65	0.0	220+	220+	220+	220+	Western Fill Area	1748852	5948896	40.50	Silty CLAY	-
14/11/2023	ETAM23W01936	LW	1193	1.94	32.9	1.46	2.65	0.0	220+	220+	220+	220+	Western Fill Area	1748844	5948922	38.90	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01936
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

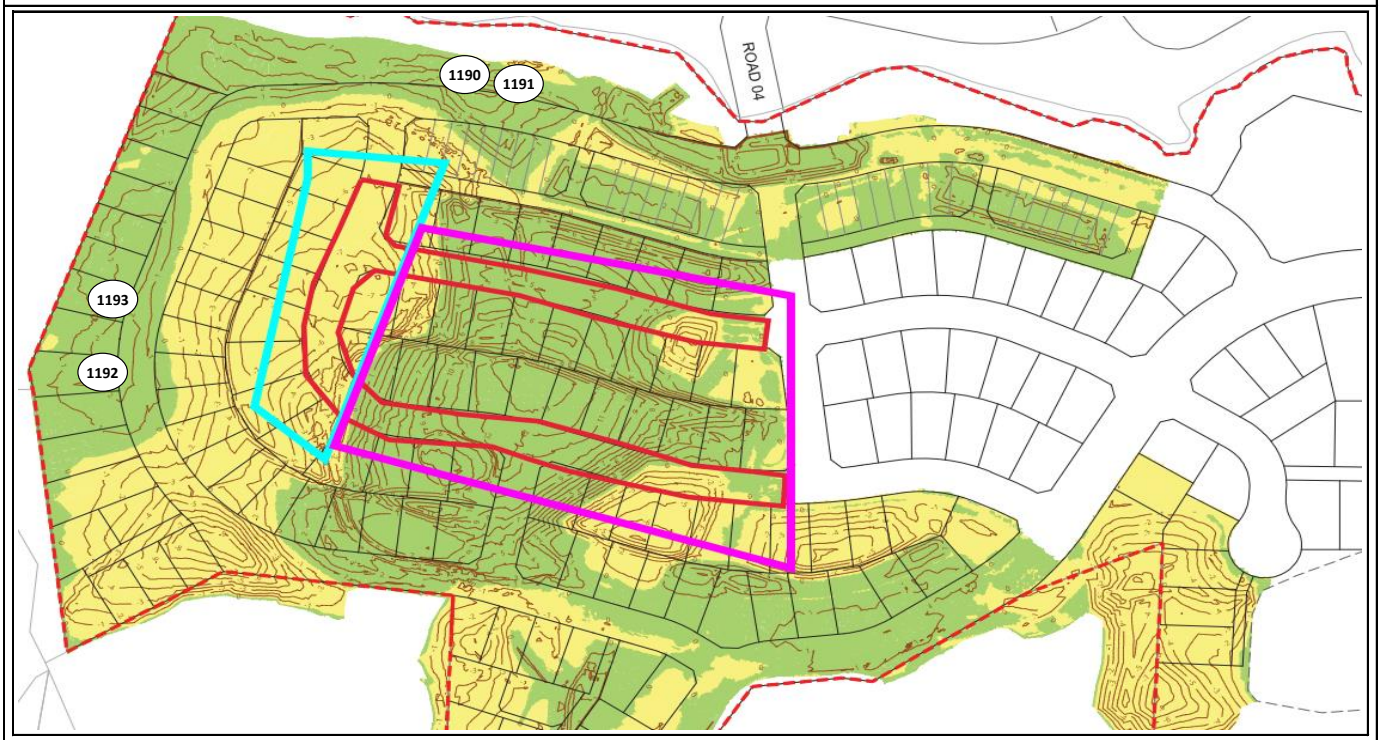
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01936
Page No: 2 of 2

Location: RE Wall 604 and Western Fill Area

Tested by: LW
Date Tested: 14/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02123
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02123

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 21/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/12/2023	ETAM23W02123	RP	1230	1.84	35.8	1.36	2.65	0.1	155	159	188	188	Western Fill Area	1748882	5949036	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1231	1.91	27.7	1.50	2.65	2.0	UTP	UTP	UTP	UTP	Western Fill Area	1748869	5949009	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1232	1.91	26.5	1.51	2.65	3.2	UTP	UTP	UTP	UTP	Road Undercut	1748882	5948872	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1233	1.95	29.0	1.51	2.65	0.0	UTP	UTP	UTP	UTP	Road Undercut	1748916	5948846	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1234	1.91	27.5	1.50	2.65	2.4	UTP	UTP	UTP	UTP	Gully 2	1749018	5948848	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1235	1.97	24.3	1.59	2.65	1.5	UTP	UTP	UTP	UTP	Gully 2	1748999	5948876	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1236	1.87	25.4	1.49	2.65	5.8	UTP	UTP	UTP	UTP	Undercut 9	1748913	5948894	-	Silty CLAY	RL not available
19/12/2023	ETAM23W02123	RP	1237	1.93	24.9	1.54	2.65	3.3	UTP	UTP	UTP	UTP	Undercut 9	1748930	5948885	-	Silty CLAY	RL not available

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02123
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

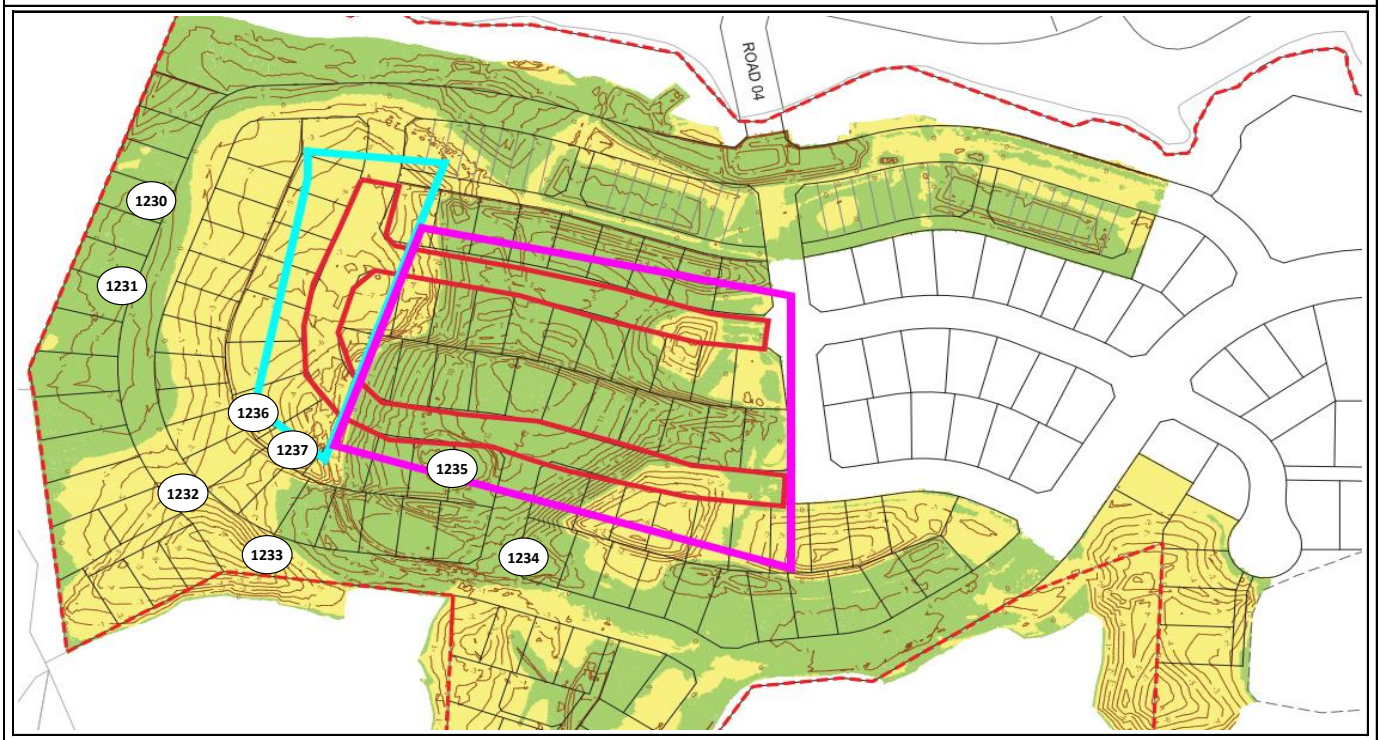
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 21/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02123
Page No: 2 of 2

Location: Western Area + Gully 2 + Road Undercut

Tested by: RP
Date Tested: 19/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00694
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/04/2023

Testing Details

Site Tested:	Retaining Wall 303 Base Layer
Tested By:	Liam Walker
Date Tested:	17/04/2023
Time Tested:	16:30
Material:	Hunua 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.36 t/m³ @ 4.4 %
Min. Dry Density (t/m³):	2.24
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	40	1	Wall face	RL 12.40	8.0	2.45	2.27	96
2	36	1	Wall face	RL 12.40	8.6	2.39	2.20	93
3	34	1	Wall face	RL 12.40	7.2	2.41	2.25	95
4	30	1	Wall face	RL 12.40	7.5	2.43	2.26	96
5	28	1	Wall face	RL 12.40	7.1	2.44	2.28	97

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures
MDD: WINSTONE AKL23-0341
Locations are selected randomly by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00717
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/04/2023

Testing Details

Site Tested:	Retaining Wall 303
Tested By:	Liam Walker
Date Tested:	18/04/2023
Time Tested:	14:15
Material:	Hunua 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.36 t/m³ @ 4.4 %
Min. Dry Density (t/m³):	2.24
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
45	0.5	Wall face	13.50	5.2	2.29	2.18	92
48	0.5	Wall face	13.50	4.9	2.41	2.29	97

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures
MDD-Winstone AKL23-0341
Random loctions chosen by technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00727
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

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

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/04/2023

Testing Details

Site Tested:	RW 303 Backfill
Tested By:	Salvindra Chandra
Date Tested:	20/04/2023
Time Tested:	11:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	40	2	RW	13.2	4.7	2.20	2.11	99
2	44	2	RW	13.2	5.0	2.23	2.12	100

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures
MDD-Supplied by the client
Random location selected by the technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00787
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 2/05/2023

Testing Details

Site Tested:	RE Wall 303
Tested By:	Salvindra Chandra
Date Tested:	26/04/2023
Time Tested:	12:15
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	30	2	Face of R. Wall	RHS	10.9	2.25	2.03	96
2	40	2	Face of R. Wall	RHS	11.4	2.27	2.04	96
3	45	1.5	Face of R. Wall	RHS	11.5	2.24	2.01	95

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures
MDD-Supplied by the Client
Random Locations Selected by the Client

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00799
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: - **TRN:** -

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/05/2023

Testing Details

Site Tested:	RW 303, as per clients chainages
Tested By:	Salvindra Chandra
Date Tested:	27/04/2023
Time Tested:	12:00
Material:	GAP65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 11 %
Min. Dry Density (t/m³):	2.00
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
30	2	Wall face	RL 14.00	12.6	2.38	2.11	100
40	2	Wall face	RL 14.00	12.4	2.28	2.03	96
48	2	Wall face	RL 14.00	13.2	2.30	2.03	96

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Locations randomly selected by technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00907
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: 773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.: **TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/05/2023

Testing Details

Site Tested:	RE Wall 303 Backfill (APCC)
Tested By:	Salvindra Chandra
Date Tested:	17/05/2023
Time Tested:	11:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	30	2	Face of R. Wall	RHS	12.7	2.15	1.91	90
2	35	2.5	Face of R. Wall	RHS	13.2	2.20	1.94	92
3	40	2.5	Face of R. Wall	RHS	13.1	2.21	1.95	92
4	44	2	Face of R. Wall	RHS	12.6	2.23	1.98	94

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field moistures
MDD supplied by client
Random locations selected by technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W00908
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/05/2023

Testing Details

Site Tested:	RE Wall 303 Backfill (APCC) Retests
Tested By:	Salvindra Chandra
Date Tested:	17/05/2023
Time Tested:	11:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Lane	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
5 (Retest of #1)	30	2	Face of R. Wall	RHS	13.4	2.34	2.06	97
6 (Retest of # 2)	35	2.5	Face of R. Wall	RHS	13.1	2.30	2.03	96
7 (Retest of # 3)	40	2.5	Face of R. Wall	RHS	13.0	2.36	2.09	98
8 (Retest of # 4)	45	2	Face of R. Wall	RHS	12.7	2.27	2.02	95

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field moistures
MDD supplied by client
Random locations selected by technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W01041
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 2/06/2023

Testing Details

Site Tested:	RE Wall 303 (APCC)
Tested By:	Liam Walker
Date Tested:	30/05/2023
Time Tested:	13:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
20	0	Wall face	RL 15.7	12.0	2.33	2.08	98
25	1	Wall face	RL 15.7	12.7	2.36	2.10	99
35	1	Wall face	RL 15.7	11.3	2.28	2.05	97
45	1	Wall face	RL 15.7	13.4	2.27	2.00	95
55	1	Wall face	RL 15.7	12.6	2.36	2.09	99
65	0	Wall face	RL 15.7	12.7	2.29	2.04	96

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures
MDD-Supplied by the client
Random Locations Chosen by the technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W01088
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 8/06/2023

Testing Details

Site Tested:	RE Wall 303
Tested By:	Liam Walker
Date Tested:	2/06/2023
Time Tested:	12:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	45	1	Face of Wall	RL 16.15	11.2	2.25	2.03	96
2	55	1	Face of Wall	RL 16.15	11.4	2.25	2.02	95
3	20	1	Face of Wall	RL 16.15	10.7	2.23	2.01	95
4	25	1	Face of Wall	RL 16.15	10.6	2.34	2.11	100

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures
MDD-Supplied by the client
Random Locations Selected by the Client

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM23W01111
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/06/2023

Testing Details

Site Tested:	RW 303 (APCC)
Tested By:	Liam Walker
Date Tested:	9/06/2023
Time Tested:	14:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Site No	Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
1	10	0	Wall face	RL 16.70	10.4	2.30	2.09	98
2	20	2	Wall face	RL 16.70	11.6	2.38	2.14	101
3	50	2	Wall face	RL 16.70	11.8	2.32	2.07	98
4	60	2	Wall face	RL 16.70	12.4	2.34	2.08	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures (Backscatter Mode)
MDD-Supplied by the client
Random Locations Selected by the Technician

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00905
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00905

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 20/05/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
17/05/2023	ETAM23W00905	SC	1152	1.82	32.8	1.37	2.65	3.5	140	170	161	155	Shear Key RW Backfill	1748848	5949087	15.1	Lime Silty Clay	-
17/05/2023	ETAM23W00905	SC	1153	1.86	36.6	1.36	2.65	0.0	155	155	158	158	Shear Key RW Backfill	1748861	5949072	15.1	Lime Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00905
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W00905

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 20/05/2023

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00939
Issue No:2
This report replaces all previous issues of report no. EFIL:ETAM23W00939

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 13/06/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
18/05/2023	ETAM23W00939	SC	1154	1.81	34.7	1.35	2.65	2.4	150	150	152	152	Shear Key	1748869	5949076	16.02	Lime Silty Clay	-
18/05/2023	ETAM23W00939	SC	1155	1.83	34.6	1.36	2.65	1.6	170	170	155	155	Shear Key	1748866	5949068	16.20	Lime Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W00939
Issue No:2
This report replaces all previous issues of report no. EFIL:ETAM23W00939

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 13/06/2023

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01126
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01126

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/06/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
12/06/2023	ETAM23W01126	LW	1158	1.86	28.7	1.44	2.65	4.2	173	164	182	159	RW 303 Fill	1748877	5949078	17.60	Silty Clay	-
12/06/2023	ETAM23W01126	LW	1159	1.88	29.3	1.45	2.65	2.5	137	164	145	159	RW 303 Fill	1748859	5949056	18.40	Silty Clay	-

Comments:

Auckland Laboratory

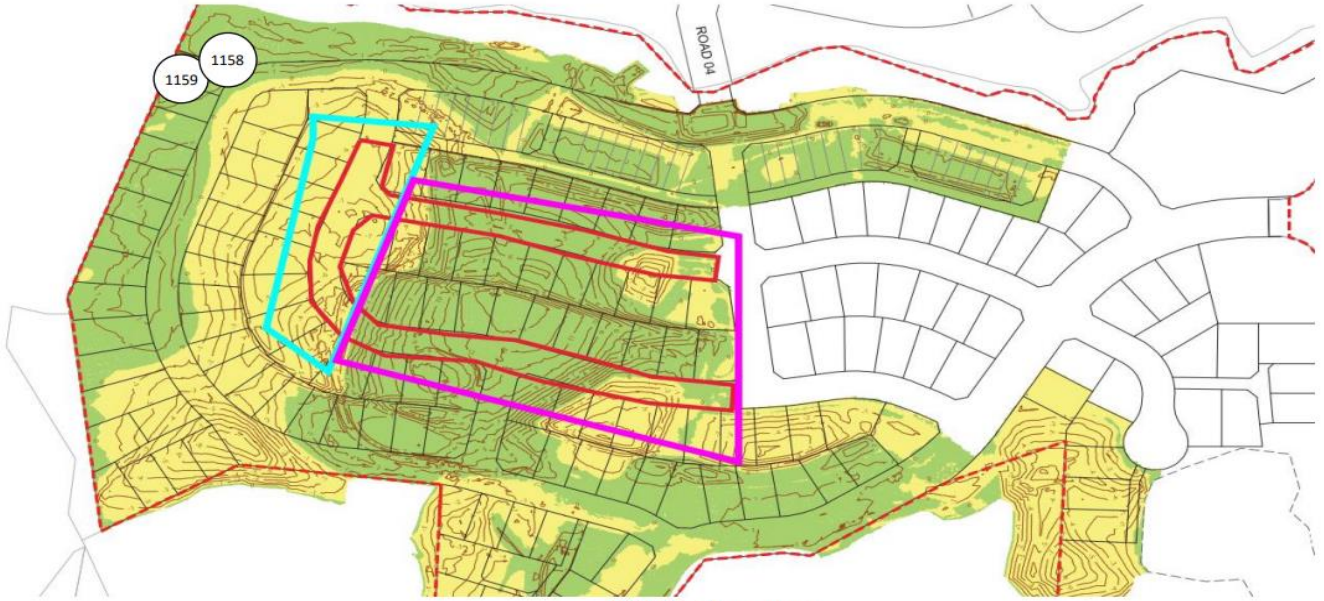
GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01126
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01126

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 16/06/2023



SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01743
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01743

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 15/10/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
4/10/2023	ETAM23W01743	LW	1164	1.84	35.1	1.36	2.65	1.0	143	153	149	146	RW303 Fill	1748882	5949084	18.42	Silty CLAY	-
4/10/2023	ETAM23W01743	LW	1165	1.85	34.3	1.38	2.65	0.8	149	140	137	164	RW303 Fill	1748875	5949071	19.00	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01743
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

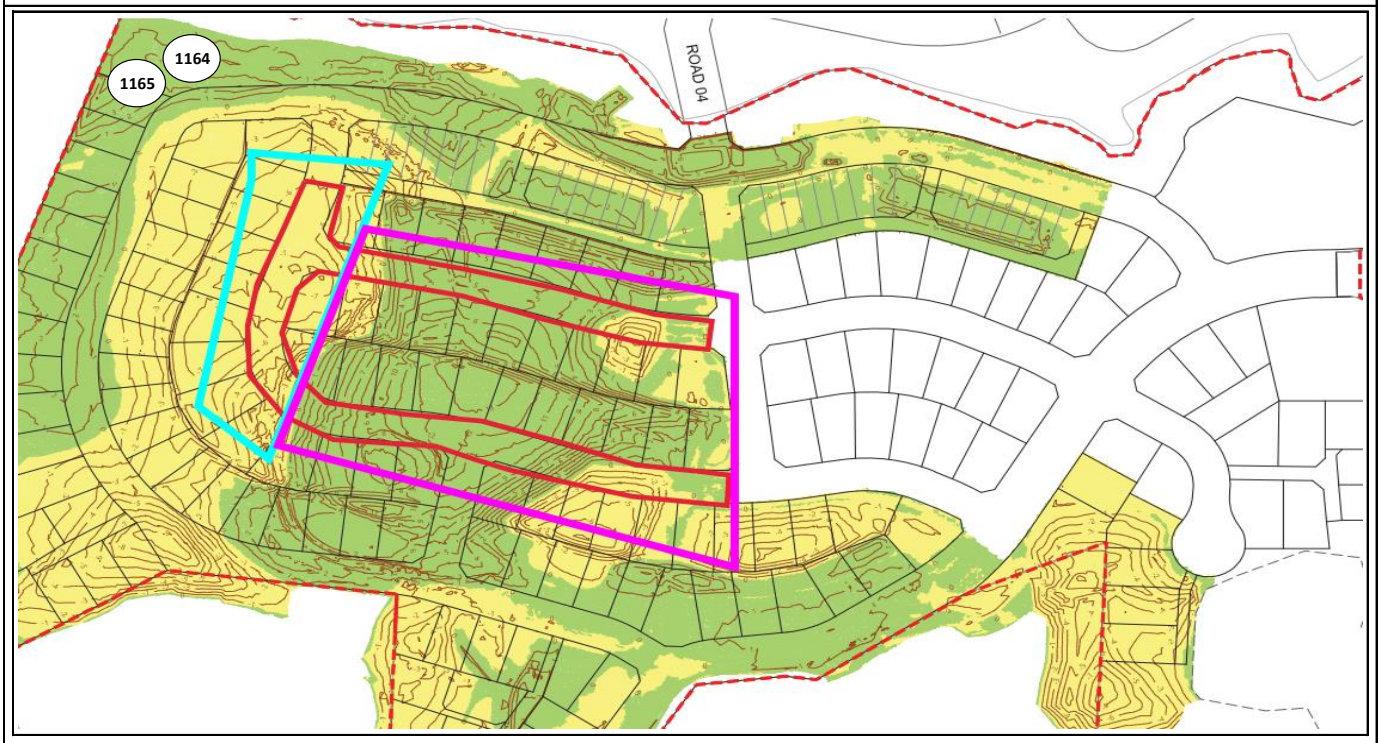
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 15/10/2023

SITE PLAN
* NOT TO SCALE *

Project No: 773-ETAM01553
Work Order No: ETAM23W01743

Project:	Millwater Precinct 6K, Orewa	**Tested by:**	LW
Location:	RW303 Fill	**Date Tested:**	4/10/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01775
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01775

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 15/10/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/10/2023	ETAM23W01775	LW	1166	1.91	33.0	1.43	2.00	0.0	143	167	170	149	Gully 2	1749036	5948867	36.10	Lime Stabilised Silty CLAY	-
11/10/2023	ETAM23W01775	LW	1167	1.88	32.4	1.42	2.65	0.6	137	170	155	158	Gully 2	1749001	5948859	36.80	Lime Stabilised Silty CLAY	-
11/10/2023	ETAM23W01775	LW	1168	1.85	31.7	1.40	2.65	2.4	170	176	167	164	RW303	1748877	5949072	19.70	Lime Stabilised Silty CLAY	-
11/10/2023	ETAM23W01775	LW	1169	1.85	31.6	1.40	2.65	2.7	152	164	155	161	RW303	1748872	5949062	20.00	Lime Stabilised Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01775
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

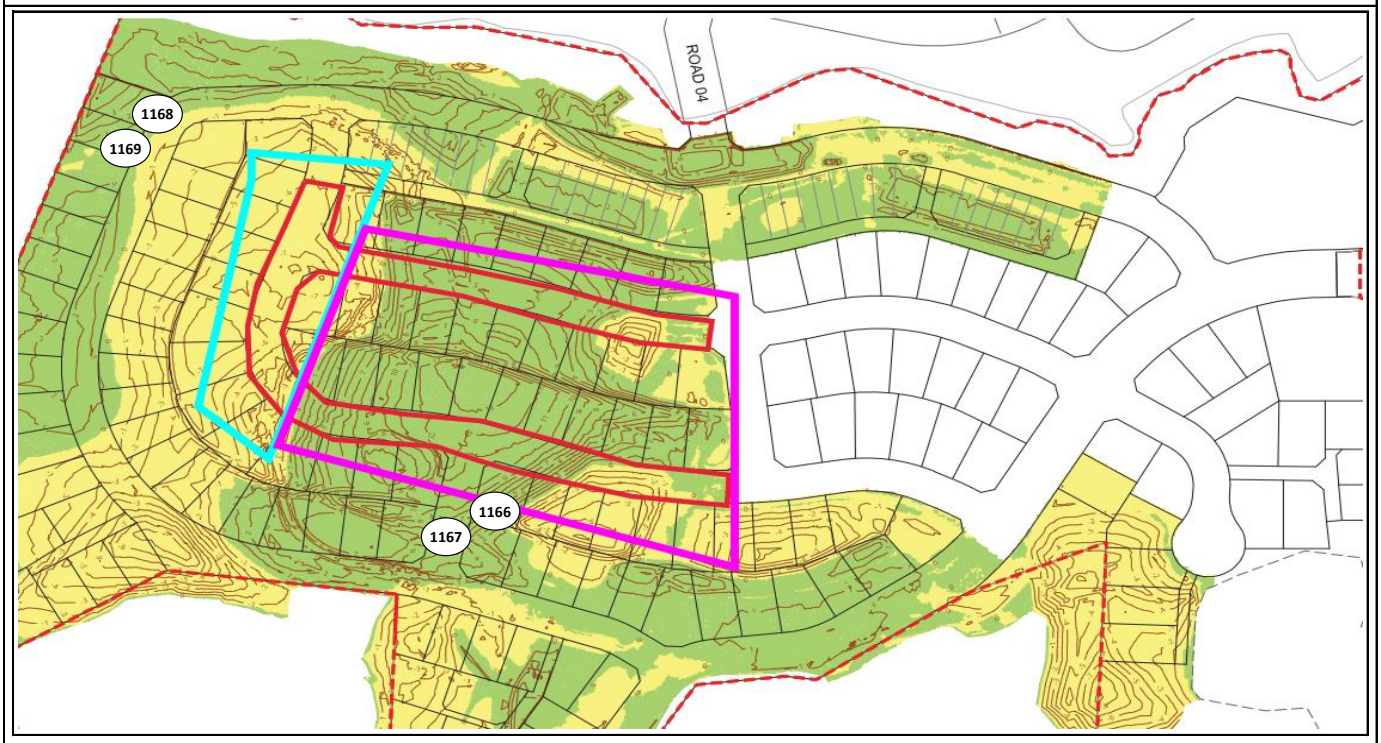
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 15/10/2023

SITE PLAN
* NOT TO SCALE *

Project No: 773-ETAM01553
Work Order No: ETAM23W01775

Project:	Millwater Precinct 6K, Orewa	**Tested by:**	LW
Location:	Gully 2 and RW303 Fill	**Date Tested:**	11/10/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01911
Issue No:2
This report replaces all previous issues of report no. EFIL:ETAM23W01911

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Liam Walker
Assistant Manager
IANZ Site Number: 105
Date of Issue: 13/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/11/2023	ETAM23W01911	LW	1176	1.89	27.2	1.49	2.65	3.4	164	188	149	168	Gully 2	1748995	5948872	36.80	Silty CLAY	-
7/11/2023	ETAM23W01911	LW	1177	1.86	31.3	1.42	2.65	2.0	180	153	143	172	Gully 2	1749022	5948869	36.90	Silty CLAY	-
7/11/2023	ETAM23W01911	LW	1178	1.88	27.3	1.48	2.65	3.8	137	149	164	153	RE Wall 604 C	1748911	5949069	10.00	Silty CLAY	-
7/11/2023	ETAM23W01911	LW	1179	1.90	28.6	1.48	2.65	2.1	180	164	143	149	RE Wall 604 C	1748936	5949071	10.00	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01911
Issue No: 2
This report replaces all previous issues of report no 'EFIL:ETAM23W01911'.

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

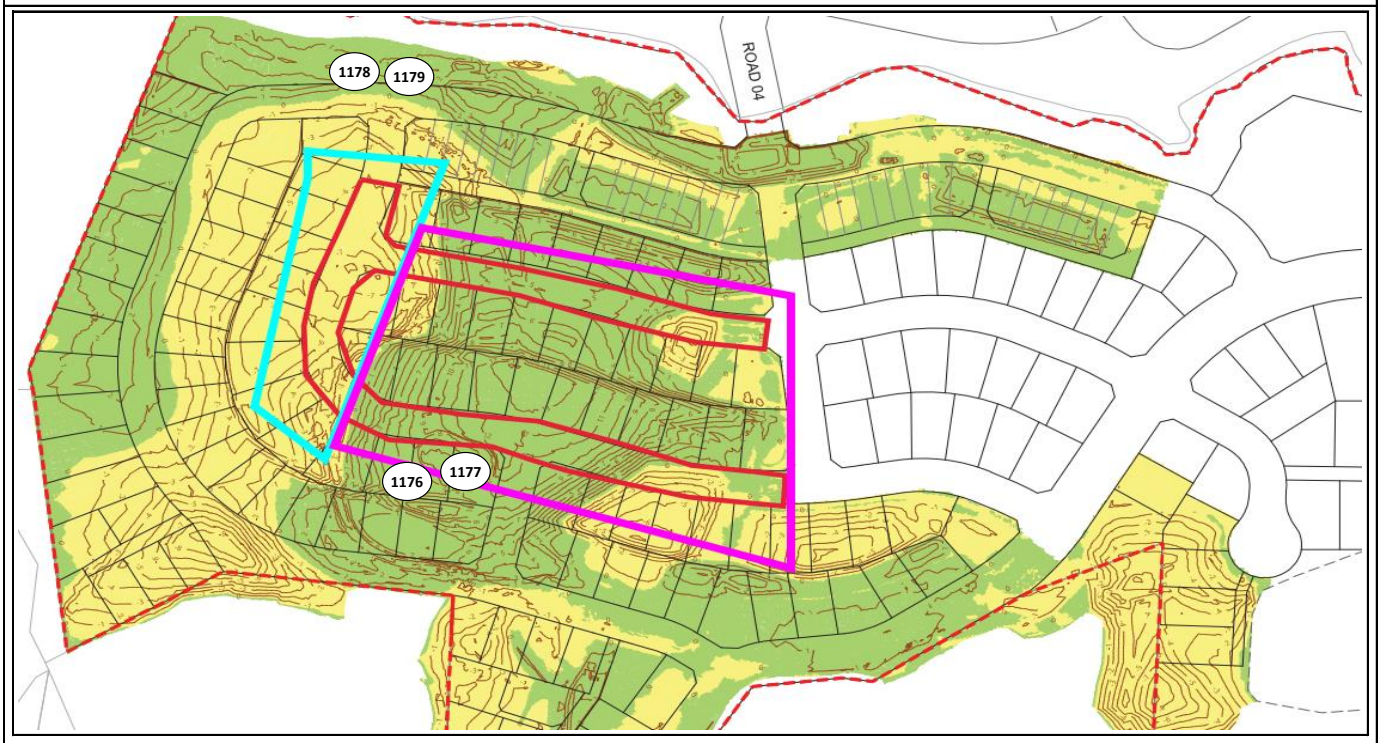
Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 13/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01911
Page No: 2 of 2

Location: Gully 2 and RE Wall 604 C

Tested by: LW
Date Tested: 7/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01991
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01991

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 30/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
27/11/2023	ETAM23W01991	LW	1198	1.84	36.1	1.36	2.65	0	192	176	205	210	RE Wall 604	1749000	5949082	13.70	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1199	1.81	38.7	1.30	2.65	0	220+	220+	180	192	RE Wall 604	1749024	5949074	13.80	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1200	1.84	34.5	1.36	2.65	1	220+	220+	220+	220+	Western Fill Area	1748855	5948874	40.70	Silty CLAY	-
27/11/2023	ETAM23W01991	LW	1201	1.85	34.6	1.37	2.65	1	220+	220+	220+	220+	Western Fill Area	1748856	5948910	39.50	Silty CLAY	-

Comments:

Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)
Reduced level (RL) was supplied by contractor and not IANZ endorsed.

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01991
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

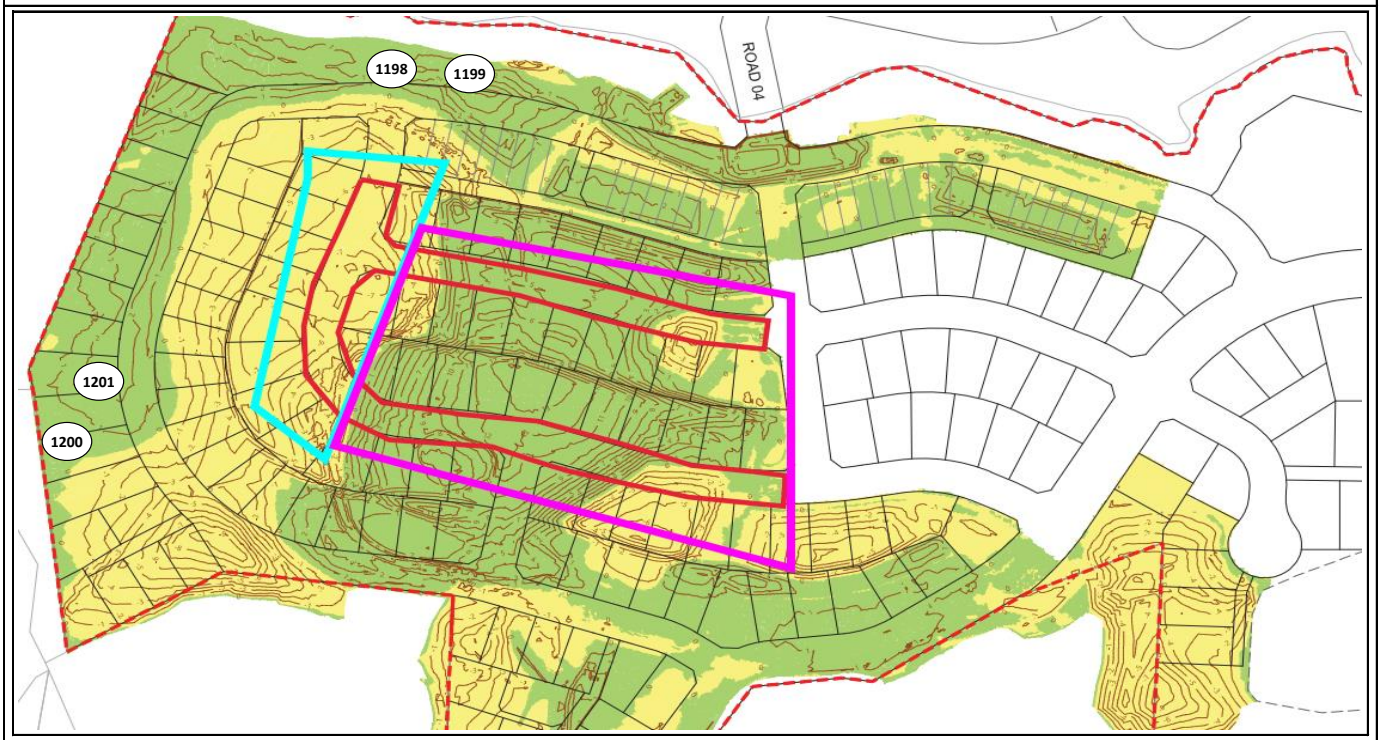
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01991
Page No: 2 of 2

Location: Western Fill Area + RE Wall 604

Tested by: SC
Date Tested: 27/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W02031
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W02031

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Laboratory Supervisor
IANZ Site Number: 105
Date of Issue: 6/12/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
1/12/2023	ETAM23W02031	SC	1211	1.93	31.1	1.47	2.65	0	175	155	152	159	RE Wall	1749017	5949071	-	Silty CLAY	At Finish Level
1/12/2023	ETAM23W02031	SC	1212	1.89	28.6	1.47	2.65	3	159	159	155	155	RE Wall	1748996	5949076	-	Silty CLAY	At Finish Level
1/12/2023	ETAM23W02031	SC	1213	1.89	28.4	1.47	2.65	3	188	188	159	175	Western Fill Area	1748844	5948993	-	Silty CLAY	RL not available
1/12/2023	ETAM23W02031	SC	1214	1.88	28.2	1.47	2.65	3	191	191	188	188	Western Fill Area	1748935	5948978	-	Silty CLAY	RL not available
1/12/2023	ETAM23W02031	SC	1215	1.89	29.9	1.45	2.65	2	176	177	159	162	Gully Fill Area	1748963	5948831	-	Silty CLAY	RL not available
1/12/2023	ETAM23W02031	SC	1216	1.91	27.9	1.50	2.65	2	152	143	159	175	Gully Fill Area	1748642	5948811	-	Silty CLAY	RL not available

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.65 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W02031
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

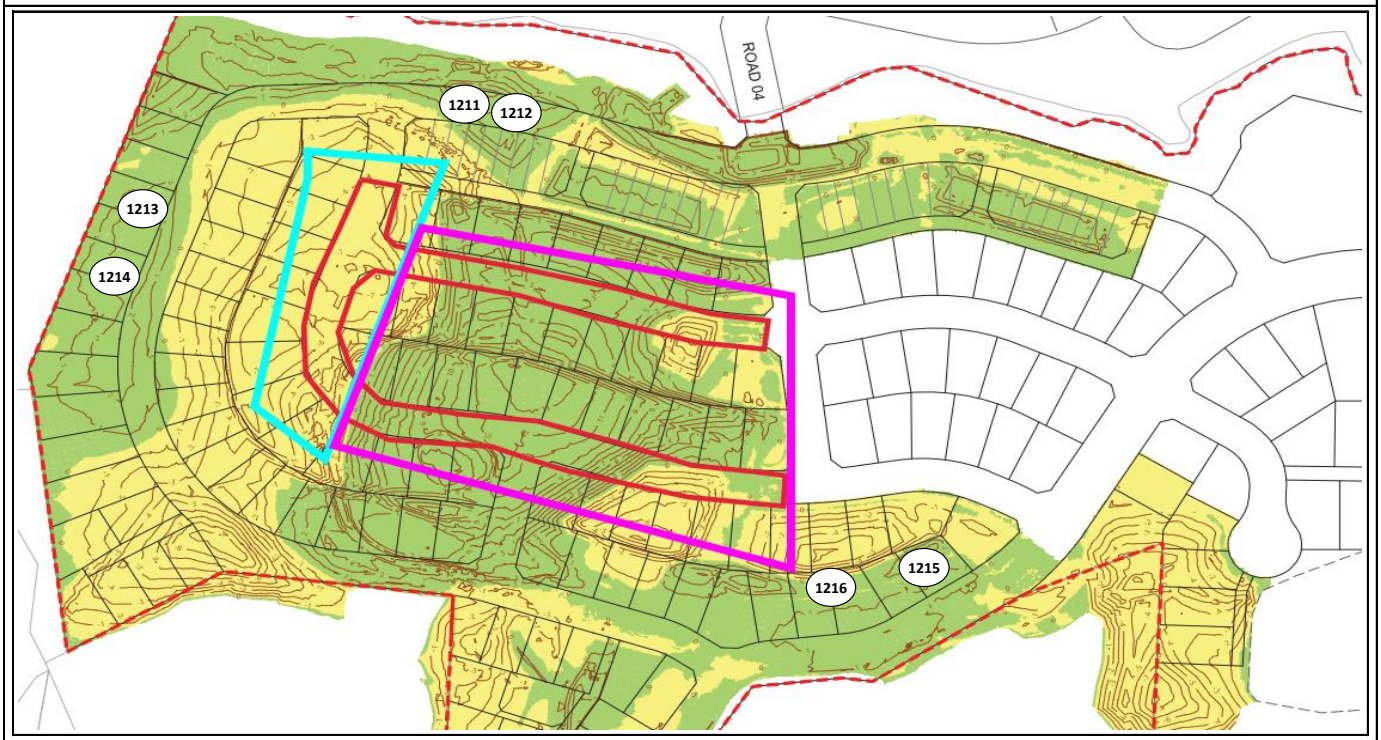
Approved Signatory: Cesar Pura
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/12/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW02031
Page No: 2 of 2

Location: RE Wall + Western Area + Gully Fill Area

Tested by: SC
Date Tested: 1/12/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01911
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01911

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 10/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
7/11/2023	ETAM23W01911	LW	1176	1.89	27.2	1.49	2.65	3.4	164	188	149	168	Gully 2	1748995	5948872	36.80	Silty CLAY	-
7/11/2023	ETAM23W01911	LW	1177	1.86	31.3	1.42	2.65	2.0	180	153	143	172	Gully 2	1749022	5948869	36.90	Silty CLAY	-
7/11/2023	ETAM23W01911	LW	1178	1.88	27.3	1.48	2.65	3.8	137	149	164	153	RE Wall 604 C	1748911	5949069	14.00	Silty CLAY	-
7/11/2023	ETAM23W01911	LW	1179	1.90	28.6	1.48	2.65	2.1	180	164	143	149	RE Wall 604 C	1748936	5949071	14.00	Silty CLAY	-

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01911
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

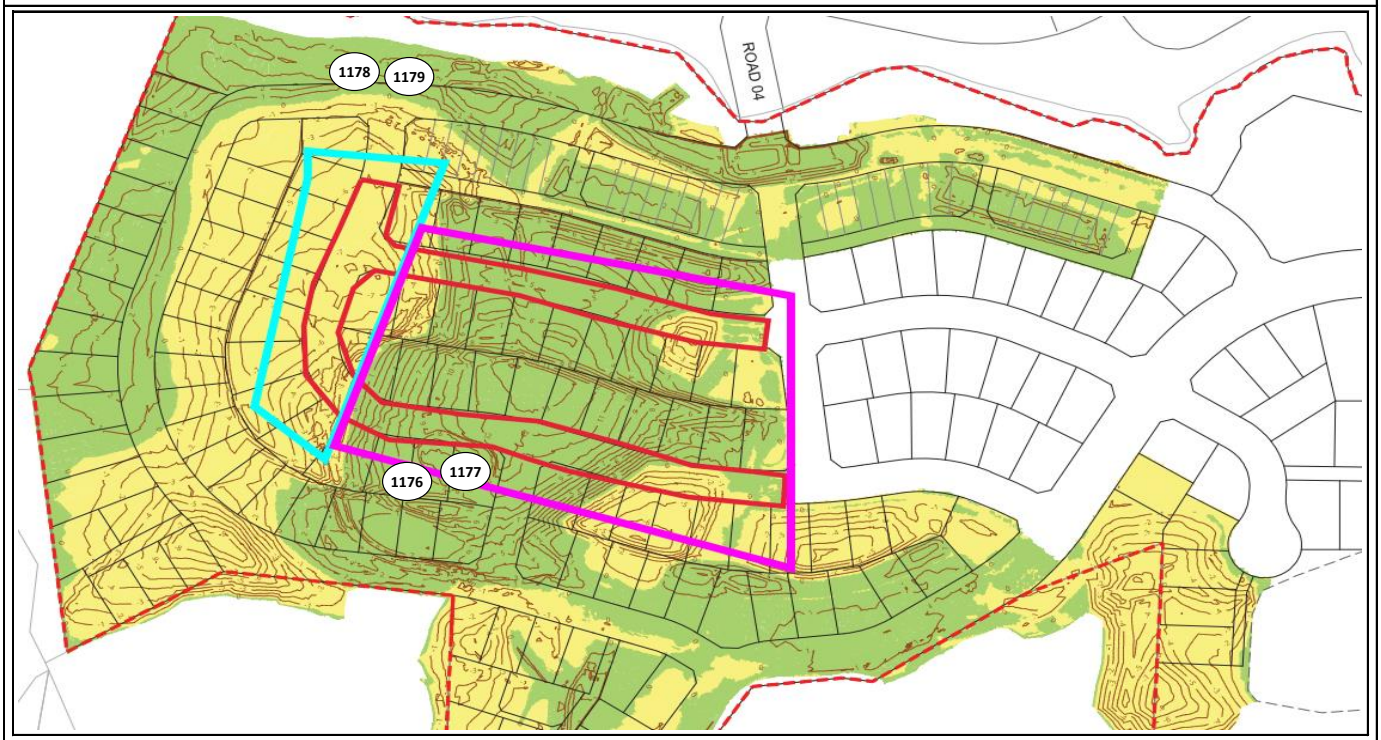
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 10/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01911
Page No: 2 of 2

Location: Gully 2 and RE Wall 604 C

Tested by: LW
Date Tested: 7/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01918
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01918

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
9/11/2023	ETAM23W01918	SC	1180	1.80	32.8	1.36	2.65	4.2	189	189	163	163	RE Wall 3	1749003	5949088	10.25	Clayey SILT	-
9/11/2023	ETAM23W01918	SC	1181	1.80	31.7	1.37	2.65	5.1	183	168	178	189	RE Wall 3	1749022	5949082	10.25	Clayey SILT	-
9/11/2023	ETAM23W01918	SC	1182	1.84	32.6	1.39	2.65	2.5	157	163	157	167	Western Fill Area	1748839	5949014	10.25	Silty CLAY	-
9/11/2023	ETAM23W01918	SC	1183	1.86	33.9	1.39	2.65	0.6	167	167	157	157	Western Fill Area	1748827	5948987	10.25	Silty CLAY	-
9/11/2023	ETAM23W01918	SC	1184	1.87	31.0	1.43	2.65	1.8	183	183	189	189	Western Fill Area	1748827	5948926	10.25	Clayey SILT	-
9/11/2023	ETAM23W01918	SC	1185	1.83	32.7	1.38	2.65	3.2	178	167	157	178	Western Fill Area	1748854	5948892	10.25	Clayey SILT	-

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01918
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

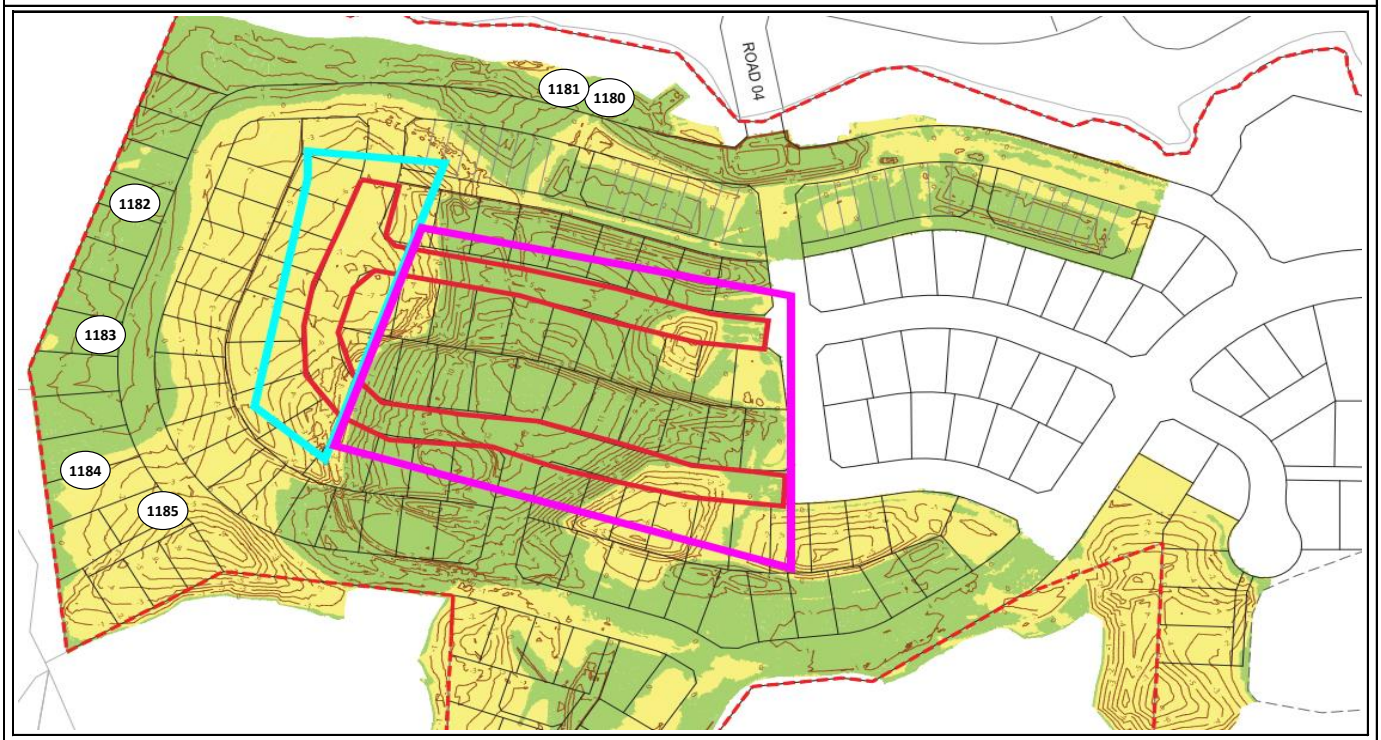
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 14/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01918
Page No: 2 of 2

Location: RE Wall 3 and Western Fill Area

Tested by: SC
Date Tested: 9/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01928
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01928

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/11/2023	ETAM23W01928	LW	1186	1.86	25.9	1.48	2.65	5.9	160	188	205	172	RE Wall 604	1749036	5949083	11.20	Silty CLAY	-
11/11/2023	ETAM23W01928	LW	1187	1.88	24.0	1.52	2.65	6.3	146	172	188	156	RE Wall 604	1749014	5949080	11.30	Silty CLAY	-
11/11/2023	ETAM23W01928	LW	1188	1.86	26.8	1.47	2.65	5.2	168	188	172	180	RE Wall 604	1749001	5949082	11.90	Silty CLAY	-
11/11/2023	ETAM23W01928	LW	1189	1.85	26.2	1.47	2.65	6.2	205	176	156	188	RE Wall 604	1748987	5949091	12.00	Silty CLAY	-

Comments:

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01928
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

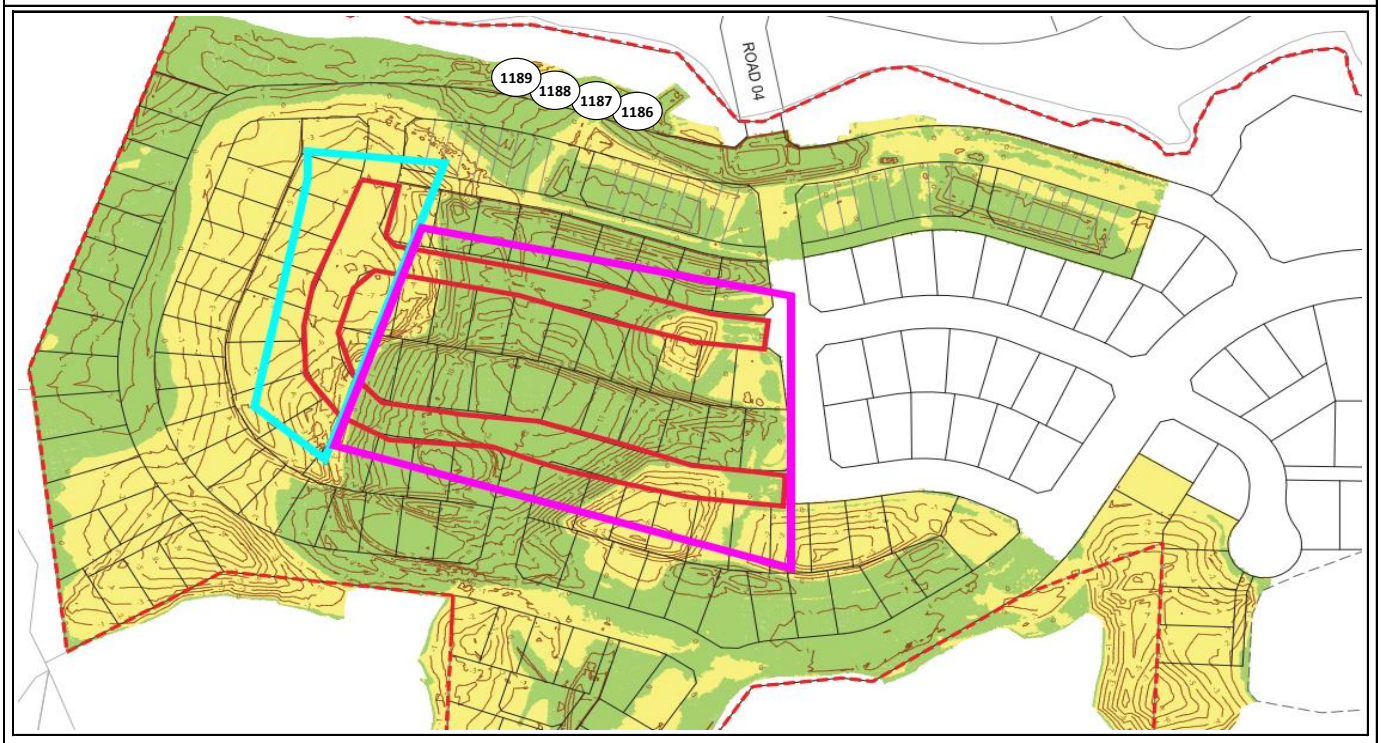
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 14/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01928
Page No: 2 of 2

Location: RE Wall 604

Tested by: LW
Date Tested: 11/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM23W01936
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM23W01936

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 20/11/2023

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
14/11/2023	ETAM23W01936	LW	1190	1.87	30.7	1.43	2.65	1.9	160	215	205	192	RE Wall 604	1748996	5949090	12.50	Silty CLAY	-
14/11/2023	ETAM23W01936	LW	1191	1.89	30.8	1.45	2.65	0.8	210	176	192	201	RE Wall 604	1749018	5949087	12.50	Silty CLAY	-
14/11/2023	ETAM23W01936	LW	1192	1.89	34.4	1.41	2.65	0.0	220+	220+	220+	220+	Western Fill Area	1748852	5948896	40.50	Silty CLAY	-
14/11/2023	ETAM23W01936	LW	1193	1.94	32.9	1.46	2.65	0.0	220+	220+	220+	220+	Western Fill Area	1748844	5948922	38.90	Silty CLAY	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Test Report NZ

Report No: EFIL:ETAM23W01936
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	**TRN:**

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

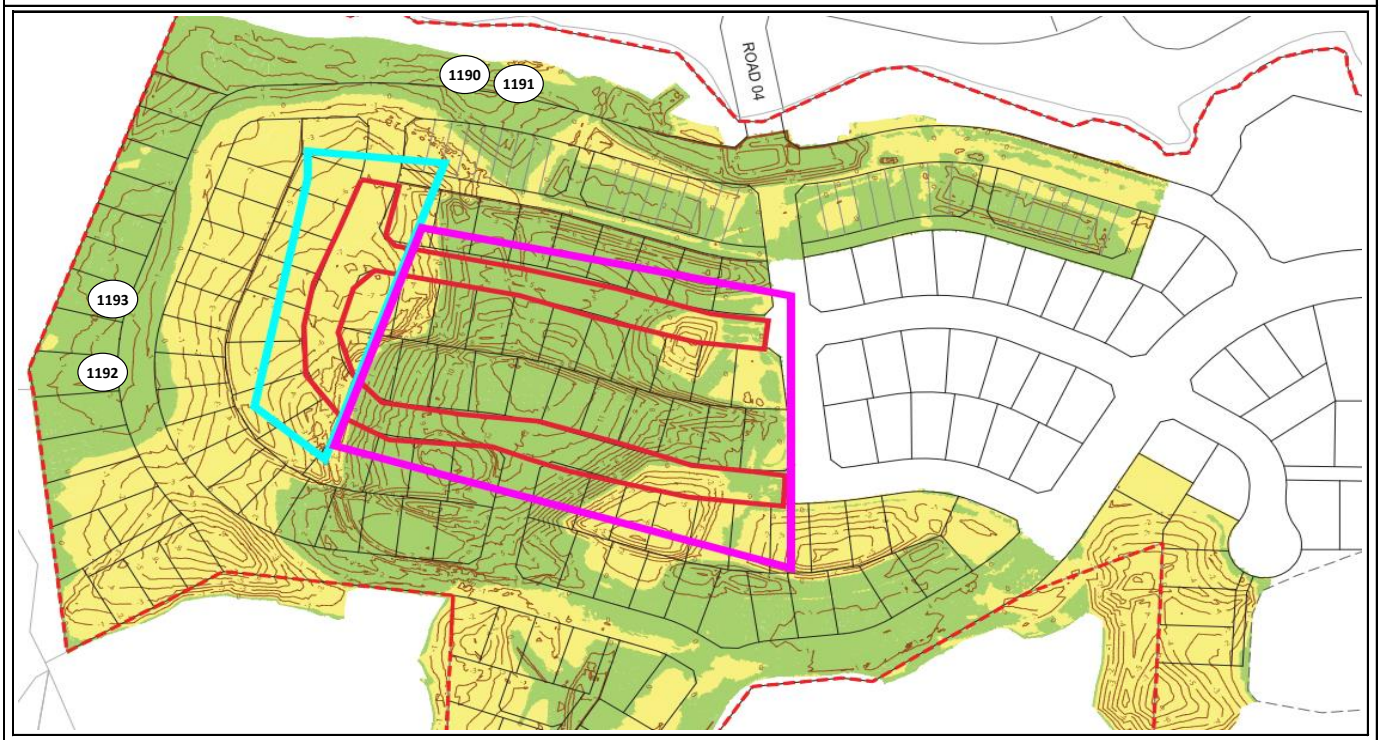
Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 20/11/2023

SITE PLAN
* NOT TO SCALE *

Work Order No: ETAMW01936
Page No: 2 of 2

Location: RE Wall 604 and Western Fill Area

Tested by: LW
Date Tested: 14/11/2023



SITE PLAN * NOT TO SCALE *

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01331
Issue No: 1

Client: Tetra Tech Coffey (NZ) Limited- Auckland
Coffey House, Level 4, Teed Street
New Market Auckland 1023

Principal: Stephen Parkes
Project No.: 773-ETAM01553
Project Name: AKLGE206639 - Millwater Precinct 6k, Orewa
Lot No.: - **TRN:** -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 9/11/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	5/11/2021
Time Tested:	07:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
60	0.5	Face of R. Wall	1st Layer	5.8	2.20	2.08	98
50	0.5	Face of R. Wall	1st Layer	4.6	2.11	2.01	95
40	0.5	Face of R. Wall	1st Layer	4.8	2.17	2.07	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01411
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/11/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	19/11/2021
Time Tested:	13:45
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
35	1.0	Face of R. Wall	4th Layer	8.8	2.32	2.14	101
45	1.0	Face of R. Wall	4th Layer	9.0	2.28	2.09	99
55	1.0	Face of R. Wall	4th Layer	8.7	2.36	2.17	103
65	1.0	Face of R. Wall	4th Layer	8.4	2.36	2.18	103

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01416
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 24/11/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	22/11/2021
Time Tested:	09:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
45	1.0	Face of R. Wall	5th Layer	7.0	2.17	2.03	96
55	1.5	Face of R. Wall	5th Layer	7.2	2.23	2.08	98
65	1.0	Face of R. Wall	5th Layer	6.7	2.26	2.11	100

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01435
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 26/11/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	25/11/2021
Time Tested:	08:45
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
35	0.5	Face of R. Wall	1st Layer	8.1	2.21	2.04	96
30	0.5	Face of R. Wall	1st Layer	8.5	2.21	2.04	96
25	0.5	Face of R. Wall	1st Layer	8.8	2.26	2.08	98
20	0.5	Face of R. Wall	1st Layer	8.9	2.25	2.07	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01450
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/11/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	29/11/2021
Time Tested:	14:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
65	1.0	Wall face	7.9	2.28	2.11	100
55	1.5	Wall face	7.9	2.30	2.13	101
45	1.0	Wall face	11.1	2.32	2.09	99

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01478
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 6/12/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	3/12/2021
Time Tested:	08:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
95	1.0	Wall face	Base Layer	8.1	2.19	2.02	96
80	1.0	Wall face	Base Layer	7.3	2.22	2.07	98
65	1.0	Wall face	Base Layer	7.6	2.25	2.09	99
50	1.0	Wall face	6th Layer	8.2	2.25	2.08	98
35	1.0	Wall face	6th Layer	7.8	2.24	2.08	98
20	1.0	Wall face	6th Layer	9.4	2.28	2.08	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01496
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 8/12/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	7/12/2021
Time Tested:	14:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
50	1.0	Wall face	7th Layer	7.9	2.22	2.06	97
35	1.0	Wall face	7th Layer	8.5	2.23	2.05	97
20	1.0	Wall face	7th Layer	9.1	2.27	2.08	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01507
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 9/12/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	8/12/2021
Time Tested:	09:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
65	1.0	Wall face	3rd Layer	10.2	2.30	2.08	98
80	1.0	Wall face	3rd Layer	9.3	2.26	2.06	97
95	1.0	Wall face	3rd Layer	9.9	2.27	2.07	97

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01525
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 14/12/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	13/12/2021
Time Tested:	08:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
15	1.0	Wall face	Base Layer	10.5	2.31	2.09	99
20	1.0	Wall face	8th Layer	9.6	2.34	2.13	101
35	1.0	Wall face	8th Layer	10.1	2.35	2.13	101
50	1.0	Wall face	8th Layer	11.4	2.26	2.03	96
65	1.0	Wall face	8th Layer	9.6	2.28	2.08	98
80	1.0	Wall face	8th Layer	10.4	2.32	2.10	99
95	1.0	Wall face	8th Layer	9.8	2.35	2.14	101
100	1.0	Wall face	Base Layer	9.9	2.32	2.11	99

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM21W01570
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Cesar Pura
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/12/2021

Testing Details

Site Tested:	Retaining Wall 701, as per clients' chainage
Tested By:	Liam Walker
Date Tested:	23/12/2021
Time Tested:	13:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 6 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
15	1.0	Wall face	8.3	2.22	2.05	97
30	1.0	Wall face	9.0	2.27	2.08	98
45	1.0	Wall face	7.8	2.23	2.06	97
60	1.0	Wall face	8.6	2.32	2.14	101
75	1.0	Wall face	8.2	2.28	2.10	99
90	1.0	Wall face	9.1	2.28	2.09	99

Comments

~ Test was conducted externally and is not accredited by this laboratory.
As reported by the nuclear gauge
Depth = 0m (Backscatter)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00003
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 10/01/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa-RW 701
Tested By:	Liam Walker
Date Tested:	8/01/2022
Time Tested:	12:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 8.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
95	1	Wall face	Layer 10	7.0	2.30	2.15	102
80	1	Wall face	Layer 10	6.1	2.24	2.11	99
65	1	Wall face	Layer 10	6.8	2.17	2.03	96
50	1	Wall face	Layer 10	8.1	2.32	2.14	101

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00014
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 14/01/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa-RW 701
Tested By:	Liam Walker
Date Tested:	10/01/2022
Time Tested:	12:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.04
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
35	1	Wall face	10	7.9	2.19	2.03	96
20	1	Wall face	10	8.6	2.26	2.08	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00024
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 14/01/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa-RW701
Tested By:	Liam Walker
Date Tested:	12/01/2022
Time Tested:	12:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
10	1	Wall face	8.9	2.20	2.02	95
25	1	Wall face	8.6	2.18	2.01	95
40	1	Wall face	7.9	2.23	2.06	97
55	1	Wall face	7.6	2.26	2.11	99
70	1	Wall face	8.8	2.24	2.06	97
85	1	Wall face	8.9	2.22	2.03	96

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00037
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 18/01/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa
Tested By:	Liam Walker
Date Tested:	17/01/2022
Time Tested:	13:15
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
15	1	Wall face	12	8.3	2.26	2.09	99
30	1	Wall face	12	8.5	2.28	2.10	99
45	1	Wall face	12	7.9	2.17	2.01	95
60	1	Wall face	12	8.2	2.22	2.05	97
75	1	Wall face	12	8.0	2.25	2.08	98
90	1	Wall face	12	8.7	2.23	2.05	97

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00114
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 2/02/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa-RW 701
Tested By:	Liam Walker
Date Tested:	20/01/2022
Time Tested:	13:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.04
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Layer	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
10	1	Face of Wall	Layer 13	8.3	2.20	2.04	96
25	1	Face of Wall	Layer 13	8.9	2.26	2.07	98
40	1	Face of Wall	Layer 13	5.7	2.22	2.10	99
55	1	Face of Wall	Layer 13	6.4	2.21	2.08	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00139
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
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Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 3/02/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa- RW701 (APCC)
Tested By:	Liam Walker
Date Tested:	1/02/2022
Time Tested:	13:00
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
10	1	Wall face	7.6	2.30	2.14	101
20	1	Wall face	8.0	2.21	2.05	97
80	1	Wall face	8.4	2.27	2.10	99
95	1	Wall face	7.8	2.25	2.08	98

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00256
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 23/02/2022

Testing Details

Site Tested:	117 Kowhai Road, Orewa-RW 701
Tested By:	Salvindra Chandra
Date Tested:	21/02/2022
Time Tested:	12:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.12 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.01
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
10	2	Face of Wall	10.2	2.22	2.01	95
20	2.5	Face of Wall	8.5	2.30	2.12	100
30	2	Face of Wall	8.0	2.22	2.05	97
40	3	Face of Wall	7.6	2.17	2.01	95
50	2.5	Face of Wall	9.0	2.18	2.00	95
60	3	Face of Wall	7.0	2.25	2.10	99
70	2.5	Face of Wall	8.5	2.24	2.07	98
80	2.5	Face of Wall	7.0	2.26	2.11	100
90	2.5	Face of Wall	8.1	2.21	2.04	96
100	2.5	Face of Wall	10.9	2.26	2.04	96

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00317
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	- TRN: -

Approved Signatory: Liam Walker
(Assistant Manager)
IANZ Accredited Laboratory Number:105
Date of Issue: 4/03/2022

Testing Details

Site Tested:	RW701, as per clients chainages
Tested By:	Salvindra Chandra
Date Tested:	2/03/2022
Time Tested:	13:00
Material:	GAP65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.1 t/m³ @ 10.5 %
Min. Dry Density (t/m³):	1.99
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
10	2.0	Wall face	7.0	2.14	2.00	95
20	2.5	Wall face	7.2	2.15	2.01	96
30	2.0	Wall face	6.7	2.12	1.99	95
40	3.0	Wall face	8.2	2.25	2.08	99
50	2.5	Wall face	7.9	2.21	2.05	98
60	2.5	Wall face	8.6	2.22	2.04	97
70	2.5	Wall face	7.0	2.26	2.11	101
80	2.5	Wall face	7.7	2.15	1.99	95
90	2.5	Wall face	7.6	2.22	2.07	98
100	2.5	Wall face	7.6	2.15	2.00	95

Comments

~ Test was conducted externally and is not accredited by this laboratory.

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00406
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 17/03/2022

Testing Details

Site Tested:	RW 701
Tested By:	Salvindra Chandra
Date Tested:	15/03/2022
Time Tested:	13:10
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.1 t/m³ @ 5.5 %
Min. Dry Density (t/m³):	2.00
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
30	2.5	Retaining Wall, *RHS	9.0	2.28	2.09	99
40	3	Retaining Wall, *RHS	8.9	2.21	2.03	97
50	2.5	Retaining Wall, *RHS	7.9	2.19	2.03	97
60	2	Retaining Wall, *RHS	7.5	2.20	2.05	98
70	2.5	Retaining Wall, *RHS	7.7	2.18	2.03	97
80	2	Retaining Wall, *RHS	8.3	2.25	2.08	99
90	2	Retaining Wall, *RHS	8.4	2.21	2.04	97
100	2	Retaining Wall, *RHS	10.6	2.20	1.99	95

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field Moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Nuclear Density Report

Report No: ND:ETAM22W00507
Issue No: 1

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
Project No.:	773-ETAM01553
Project Name:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Lot No.:	TRN:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
(Director-Testing)
IANZ Accredited Laboratory Number:105
Date of Issue: 30/03/2022

Testing Details

Site Tested:	RW 701 (APCC)
Tested By:	Liam Walker
Date Tested:	29/03/2022
Time Tested:	13:30
Material:	GAP 65
Start Route Position:	
Field Methods:	NZS 4407:2015 Test 4.3

Compaction Target Details

Material Sample ID:	External
MDD Method:	~
Max. Dry Density:	2.1 t/m³ @ 10.5 %
Min. Dry Density (t/m³):	2.00
Solid Density Type:	Assumed

Test Results

Chainage (m)	Offset (m)	Offset From	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
25	1.5	Wall face	7.4	2.14	2.00	95
40	1.5	Wall face	8.1	2.19	2.02	96
55	1.5	Wall face	8.5	2.18	2.01	96
70	1.5	Wall face	7.8	2.18	2.02	96
85	1.5	Wall face	7.6	2.15	2.00	95
100	1.5	Wall face	7.2	2.14	1.99	95

Comments

~ Test was conducted externally and is not accredited by this laboratory.
Field moistures

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01358
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01358

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	AKLGE206639 - Millwater Precinct 6k, Orewa
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 12/11/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
11/11/2021	ETAM21W01358	LW	546	1.92	29.2	1.49	2.70	2	UTP	UTP	UTP	UTP	RW 701	1749137	5949044	8.00	Clayey SILT	
11/11/2021	ETAM21W01358	LW	547	1.92	26.2	1.52	2.70	4	UTP	UTP	UTP	UTP	RW 701	1749148	5949049	8.05	Clayey SILT	
11/11/2021	ETAM21W01358	LW	548	1.87	34.1	1.40	2.70	1	175	143	149	145	Gully	1748972	5948879	31.75	Clayey SILT	
11/11/2021	ETAM21W01358	LW	549	1.87	35.4	1.38	2.70	0	168	164	140	149	Gully	1749003	5948873	31.65	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01358
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01358

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	AKLGE206639 - Millwater Precinct 6k, Orewa
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 12/11/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01367
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01367

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	AKLGE206639 - Millwater Precinct 6k, Orewa
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 15/11/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
12/11/2021	ETAM21W01367	LW	550	1.84	32.8	1.38	2.70	3	146	140	160	179	RW701	1749133	5949043	8.60	Clayey SILT	
12/11/2021	ETAM21W01367	LW	551	1.81	30.9	1.38	2.70	6	156	164	149	152	RW701	1749143	5949046	8.65	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01367
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01367

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	AKLGE206639 - Millwater Precinct 6k, Orewa
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 15/11/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01415
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01415

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/11/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/11/2021	ETAM21W01415	LW	556	1.94	29.2	1.50	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749132	5949026	8.60	Clayey SILT	
22/11/2021	ETAM21W01415	LW	557	1.95	29.0	1.51	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 702	1749142	5949029	8.80	Clayey SILT	
22/11/2021	ETAM21W01415	LW	558	1.92	35.9	1.41	2.70	0	179+	179+	179+	164	Gully	1748968	5948880	32.40	Clayey SILT	
22/11/2021	ETAM21W01415	LW	559	1.93	35.5	1.42	2.70	0	179+	179+	156	168	Gully	1748986	5948894	29.60	Clayey SILT	
22/11/2021	ETAM21W01415	LW	560	1.91	36.6	1.40	2.70	0	164	149	140	179	Gully	1749006	5948904	28.50	Clayey SILT	
22/11/2021	ETAM21W01415	LW	561	1.94	34.7	1.44	2.70	0	179+	146	156	164	Gully	1749018	5948919	27.10	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01415
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01415

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 24/11/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01514
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01514

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 13/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
10/12/2021	ETAM21W01514	LW	589	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749114	5949038	8.60	Clayey SILT	
10/12/2021	ETAM21W01514	LW	590	1.93	33.8	1.44	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749129	5949037	8.50	Clayey SILT	
10/12/2021	ETAM21W01514	LW	591	1.90	31.1	1.45	2.70	1	UTP	UTP	175+	175+	Gully	1749063	5948926	29.00	Clayey SILT	
10/12/2021	ETAM21W01514	LW	592	1.94	31.2	1.48	2.70	0	UTP	UTP	175+	175+	Gully	1749080	5948964	27.60	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01514
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01514

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 13/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1):

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
22/12/2021	ETAM21W01557	LW	597	1.88	32.4	1.42	2.70	1	175+	175+	175+	160	Shear Key	1748950	5949089	8.30	Clayey SILT	
22/12/2021	ETAM21W01557	LW	598	1.91	29.9	1.47	2.70	2	175+	175+	175+	175+	Shear Key	1748974	5949084	9.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	599	1.85	37.5	1.35	2.70	0	175+	175+	175+	175+	Gully	1749022	5948881	29.60	Clayey SILT	
22/12/2021	ETAM21W01557	LW	600	1.86	31.8	1.41	2.70	3	175+	175+	175+	175+	Gully	1749046	5948916	29.20	Clayey SILT	
22/12/2021	ETAM21W01557	LW	601	1.98	31.8	1.50	2.70	0	UTP	UTP	UTP	UTP	Gully	1749098	5948940	28.00	Clayey SILT	
22/12/2021	ETAM21W01557	LW	602	1.96	31.8	1.49	2.70	0	UTP	UTP	UTP	UTP	Gully	1749080	5948970	27.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	603	1.94	30.1	1.49	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749110	5949033	8.80	Clayey SILT	
22/12/2021	ETAM21W01557	LW	604	1.97	29.2	1.52	2.70	0	UTP	UTP	UTP	UTP	Retaining Wall 701	1749119	5949035	9.00	Clayey SILT	

Comments:
Moisture contents and dry densities are corrected against oven dried moisture content testing. Probe Depth: 150mm; SG= 2.70 T/m3 (Assumed)

Form Number: R031N Issue Date: 20/09/2018

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM21W01557
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM21W01557

Client:	Tetra Tech Coffey (NZ) Limited- Auckland
	Coffey House, Level 4, Teed Street
	New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Cesar Pura
Senior Technician
IANZ Site Number: 105
Date of Issue: 23/12/2021

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
11/01/2022	ETAM22W00017	LW	611	1.98	27.2	1.55	2.70	0.1	UTP	UTP	UTP	UTP	Gully	1748966	5948916	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	612	1.96	31.1	1.50	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1748998	5948902	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	613	1.95	29.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749052	5948933	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	614	1.97	30.5	1.51	2.70	0.0	UTP	UTP	UTP	UTP	Gully	1749085	5948972	-	Clayey silt	-
11/01/2022	ETAM22W00017	LW	615	1.97	16.7	1.69	2.70	9.4	UTP	UTP	UTP	UTP	RW701	1749126	5949032	11.0	Clayey silt	-
11/01/2022	ETAM22W00017	LW	616	1.96	21.8	1.61	2.70	5.5	UTP	UTP	UTP	UTP	RW701	1749087	5949036	11.2	Clayey silt	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00017
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00017

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 14/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/01/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
19/01/2022	ETAM22W00072	LW	636	1.84	31.9	1.40	2.70	3.7	175	175	175	175	Gully	1749057	5948921	27.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	637	1.87	32.3	1.42	2.70	1.8	175	175	175	175	Gully	1749048	5948902	28.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	638	1.83	31.9	1.39	2.70	4.4	175	175	175	175	Gully	1749012	5948897	28.15	Silty Clay	-
19/01/2022	ETAM22W00072	LW	639	1.85	32.3	1.40	2.70	3.2	175	175	175	175	Gully	1748899	5948888	28.60	Silty Clay	-
19/01/2022	ETAM22W00072	LW	640	1.86	29.0	1.44	2.70	4.7	175	175	175	175	RW 701	1749119	5949040	11.00	Silty Clay	-
19/01/2022	ETAM22W00072	LW	641	1.85	28.7	1.44	2.70	5.3	175	175	175	175	RW 701	1749100	5949042	10.8	Silty Clay	-
19/01/2022	ETAM22W00072	LW	642	1.88	24.0	1.52	2.70	7.5	175	175	175	175	RE Wall 604 A	1749090	5949062	8.05	Silty Clay	-
19/01/2022	ETAM22W00072	LW	643	1.89	24.7	1.51	2.70	6.5	175	175	175	175	RE Wall 604 A	1749085	5949067	7.95	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00072
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00072

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 26/01/2022

SITE PLAN (NOT TO SCALE)

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00179
Issue No:1
This report replaces all previous issues of report no. EFIL:ETAM22W00179

Client:	Tetra Tech Coffey (NZ) Limited- Auckland Coffey House, Level 4, Teed Street New Market Auckland 1023
Principal:	Stephen Parkes
cc to:	-
Project No.:	773-ETAM01553
Project Name.:	773-AKLGE206639 - MILLWATER PRECINCT 6K, OREWA
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 8/02/2022

Test Results

Test Methods : Shear Strength (using field Shear vane in accordance with NZS 2001):Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.2.7)

Date Sampled	Work Order	Tested By	Test No.	Wet Density t/m^3	Oven Water Content %	Dry Density t/m^3	Solid Density t/m^3	Air Voids %	Field Shear Strength (UTP = Unable to penetrate) kPa				Test Location	Easting	Northing	RL	Material Tested	Comments
4/02/2022	ETAM22W00179	LW	667	1.86	32.6	1.41	2.70	2.1	149	160	175	175	RE Wall 604A	1749068	5949063	9.7	Silty Clay	-
4/02/2022	ETAM22W00179	LW	668	1.89	32.4	1.43	2.70	0.7	175	175	175	175	RE Wall 604A	1749075	5949054	9.8	Silty Clay	-
4/02/2022	ETAM22W00179	LW	669	1.90	33.3	1.43	2.70	0.0	175	175	175	175	RW 701	1749100	5949041	11.3	Silty Clay	-
4/02/2022	ETAM22W00179	LW	670	1.88	34.8	1.39	2.70	0.1	172	140	149	156	RW 701	1749116	5949042	11.35	Silty Clay	-
4/02/2022	ETAM22W00179	LW	671	1.92	30.8	1.47	2.70	0.3	146	143	153	140	Gully	1748980	5948855	31.3	Silty Clay	-
4/02/2022	ETAM22W00179	LW	672	1.89	29.7	1.46	2.70	2.7	160	175	175	160	Gully	1748990	5948900	29.85	Silty Clay	-
4/02/2022	ETAM22W00179	LW	673	1.95	29.6	1.50	2.70	0.0	175	175	175	175	Gully	1749009	5948909	28.15	Silty Clay	-
4/02/2022	ETAM22W00179	LW	674	1.85	29.4	1.43	2.70	4.8	153	156	140	146	Gully	1749026	5948921	28.05	Silty Clay	-

Comments:

Auckland Laboratory

GeoLab Limited
333K East Tamaki Road
Otara Auckland, 2013
Phone: 027 475 4011

Earthworks Fill Report

Report No: EFIL:ETAM22W00179
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cc to:	-
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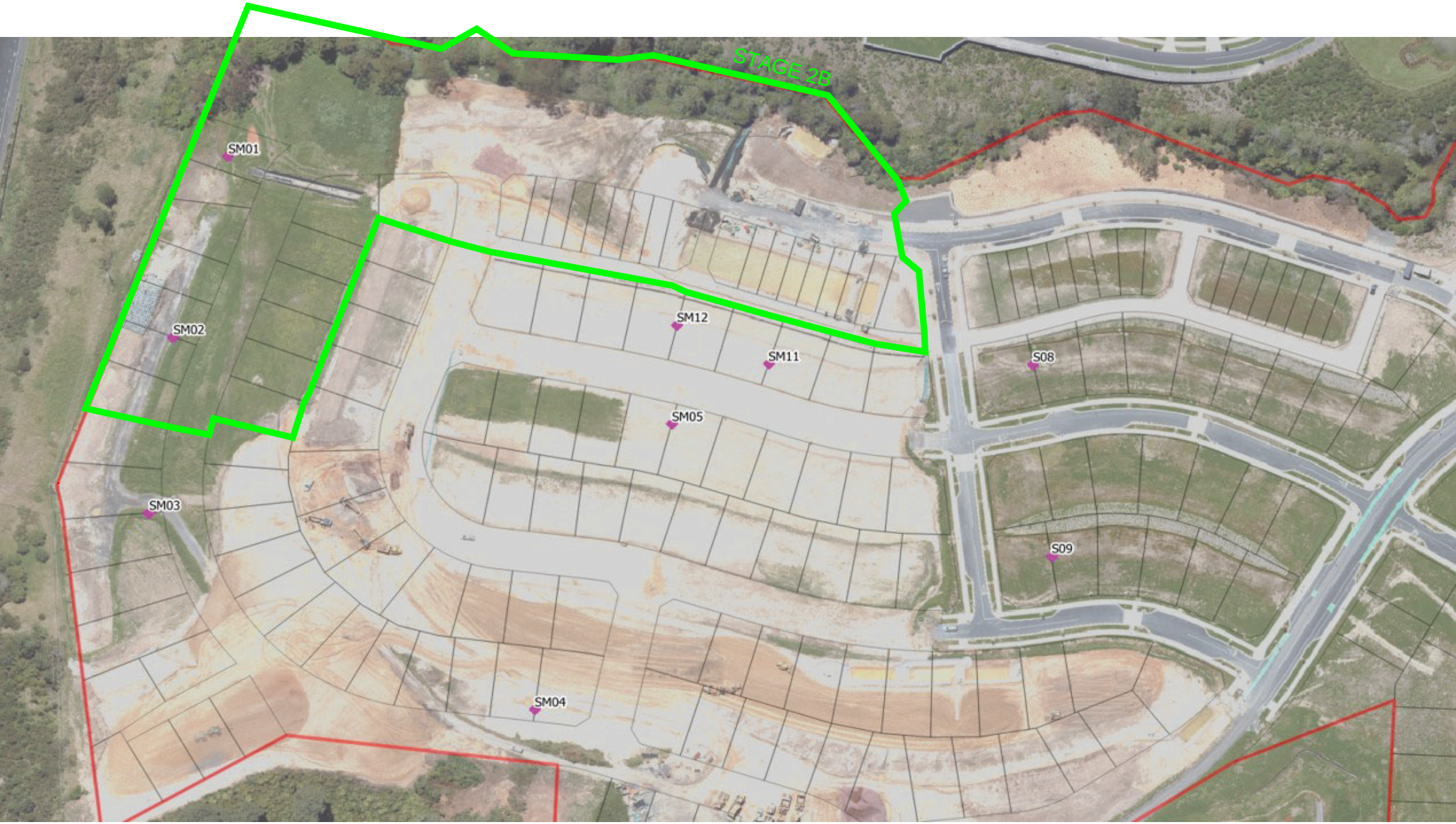
Project Location:	117 Kowhai Road, Orewa

Approved Signatory: Eric Paton
Director-Testing
IANZ Site Number: 105
Date of Issue: 8/02/2022

SITE PLAN (NOT TO SCALE)

APPENDIX E: MONITORING RESULTS


STAGE 2B
SM01
SM02
SM03
SM04
SM05
SM11
SM12
S08
S09

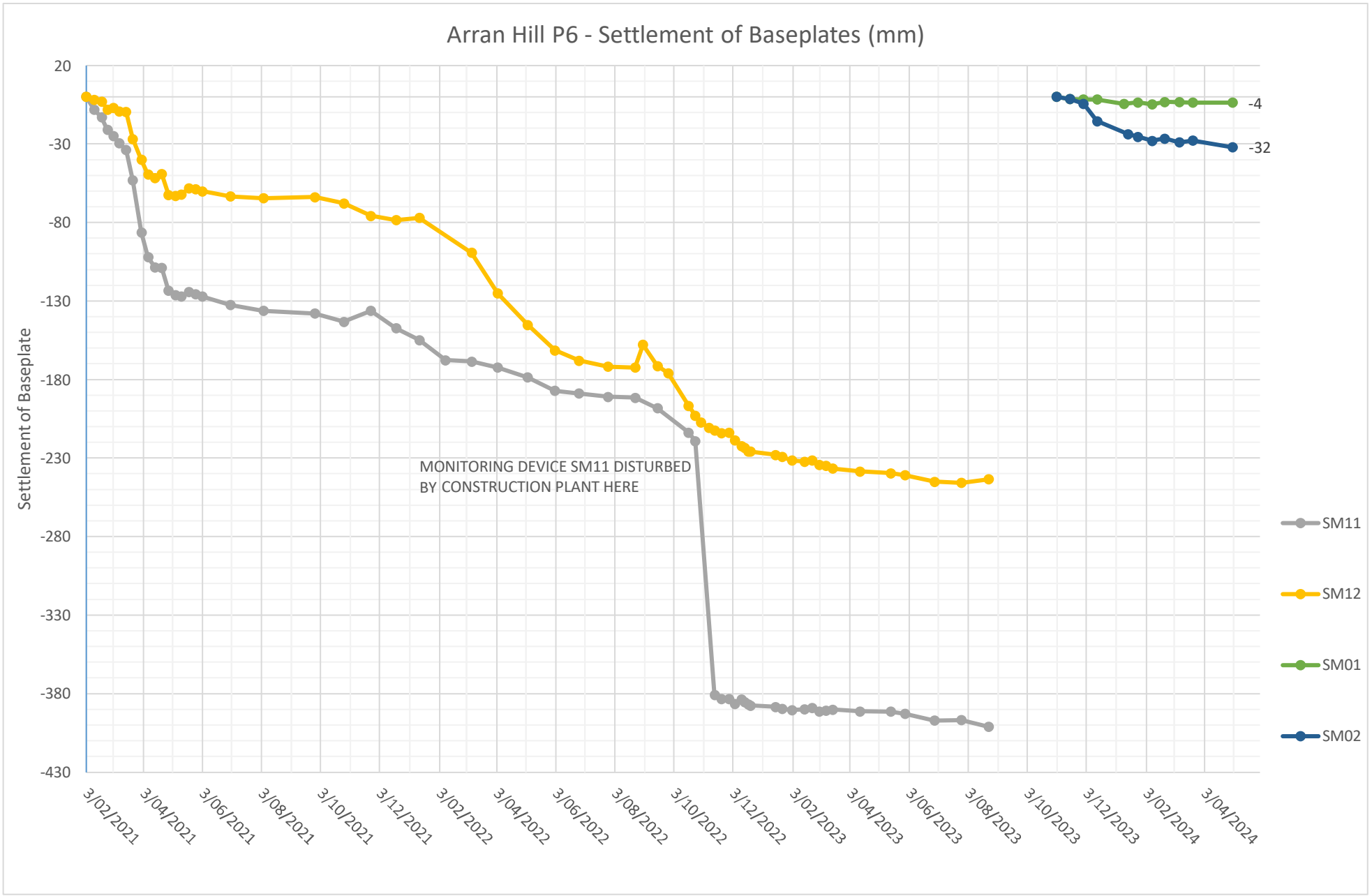
Horizontal DATUM: Mt Eden 2000
Vertical DATUM: Auckland Vertical Datum 1946
Monitoring survey datum established via RTK GPS

ARRAN HILL P6
SETTLEMENT ROD

BASE READING	SM11		SM12		SM01		SM02	
	17.877		19.821		21.304		26.684	
Date	Height	Settlement (mm)	Height	Settlement (mm)	Height	Settlement (mm)	Height	Settlement (mm)
3/02/2021	17.877	0	19.821	0				
11/02/2021	17.869	-8	19.819	-2				
19/02/2021	17.864	-13	19.818	-3				
25/02/2021	17.856	-21	19.813	-8				
3/03/2021	17.852	-25	19.814	-7				
9/03/2021	17.848	-29	19.812	-9				
16/03/2021	17.843	-34	19.812	-9				
23/03/2021	17.824	-53	19.794	-27				
1/04/2021	17.791	-86	19.781	-40				
8/04/2021	17.775	-102	19.772	-49				
15/04/2021	17.768	-109	19.769	-52				
22/04/2021	17.768	-109	19.772	-49				
29/04/2021	17.754	-123	19.759	-62				
6/05/2021	17.751	-126	19.758	-63				
12/05/2021	17.750	-127	19.759	-62				
20/05/2021	17.753	-124	19.763	-58				
27/05/2021	17.751	-126	19.762	-59				

3/06/2021	17.750	-127	19.761	-60				
2/07/2021	17.745	-133	19.758	-63				
5/08/2021	17.741	-136	19.757	-65				
27/09/2021	17.739	-138	19.757	-64				
27/10/2021	17.734	-143	19.753	-68				
24/11/2021	17.741	-136	19.745	-76				
20/12/2021	17.730	-147	19.743	-78				
13/01/2022	17.722	-155	19.744	-77				
9/02/2022	17.709	-168						
8/03/2022	17.709	-169	19.722	-99				
4/04/2022	17.705	-172	19.696	-125				
5/05/2022	17.698	-179	19.676	-145				
2/06/2022	17.690	-187	19.660	-161				
27/06/2022	17.688	-189	19.653	-168				
27/07/2022	17.686	-191	19.649	-172				
24/08/2022	17.686	-192	19.649	-172				
1/09/2022			19.663	-158				
16/09/2022	17.679	-198	19.650	-171				
27/09/2022			19.645	-176				
18/10/2022	17.663	-214	19.624	-197				
25/10/2022	17.658	-219	19.618	-203				
31/10/2022			19.614	-207				
8/11/2022			19.610	-211				
14/11/2022	17.496	-381	19.609	-212				
21/11/2022	17.494	-383	19.607	-214				
29/11/2022	17.494	-383	19.607	-214				
5/12/2022	17.491	-386	19.602	-219				
12/12/2022	17.493	-384	19.599	-222				
15/12/2022	17.492	-385	19.598	-223				
19/12/2022	17.490	-387	19.595	-226				

21/12/2022	17.489	-388	19.595	-226				
16/01/2023	17.489	-388	19.593	-228				
23/01/2023	17.487	-390	19.592	-229				
2/02/2023	17.487	-390	19.589	-232				
15/02/2023	17.487	-390	19.589	-232				
23/02/2023	17.488	-389	19.590	-231				
2/03/2023	17.486	-391	19.587	-234				
9/03/2023	17.486	-391	19.586	-235				
16/03/2023	17.487	-390	19.584	-237				
13/04/2023	17.486	-391	19.582	-239				
15/05/2023	17.486	-391	19.581	-240				
30/05/2023	17.484	-393	19.580	-241				
29/06/2023	17.480	-397	19.576	-245				
27/07/2023	17.480	-397	19.575	-246				
24/08/2023	17.476	-401	19.578	-244				
2/11/2023					21.304	0	26.684	0
16/11/2023					21.303	-1	26.683	-1
30/11/2023					21.302	-2	26.680	-4
14/12/2023					21.302	-2	26.669	-15
11/01/2024					21.299	-5		
15/01/2024							26.660	-24
25/01/2024					21.300	-3	26.659	-25
9/02/2024					21.299	-5	26.656	-28
22/02/2024					21.301	-3	26.657	-27
8/03/2024					21.301	-3	26.655	-29
22/03/2024					21.300	-4	26.656	-28
4/04/2024								
2/05/2024					21.300	-4	26.652	-32


Arran Hill P6 - Settlement of Baseplates (mm)
Settlement of Baseplate
20
-30
-80
-130
-180
-230
-280
-330
-380
-430
3/02/2021
3/04/2021
3/06/2021
3/08/2021
3/10/2021
3/12/2021
3/02/2022
3/04/2022
3/06/2022
3/08/2022
3/10/2022
3/12/2022
3/02/2023
3/04/2023
3/06/2023
3/08/2023
3/10/2023
3/12/2023
3/02/2024
3/04/2024
MONITORING DEVICE SM11 DISTURBED
BY CONSTRUCTION PLANT HERE
-4
-32
SM11
SM12
SM01
SM02

APPENDIX F: PRODUCER STATEMENT – CONSTRUCTION REVIEWS (PS4)

TETRA TECH COFFEY

Level 4, 25 Teed Street, Newmarket
Auckland
1023 New Zealand

t: +64 9 379 9463

tetratechcoffey.com

5 July 2024

Our ref: 773-AKLGE206639-BW

WFH Properties Limited
157 Millwater Parkway,
Silverdale 0992

Attention: Nigel Low

Geotechnical Observation of Retaining Wall 701 Construction at Millwater Precinct 6, Orewa West (Building Consent No. BCO10301029-7)

This letter is to confirm that we visited the above site on numerous occasions between November 2021 and July 2024 to observe the construction of a Mass Block retaining wall within Precinct 6 of the Millwater Subdivision development. This letter and accompanying Producer Statement Construction Review (PS4) covers construction of Mass Block Wall 701, certifying items *Mass Block Wall 701* and *Geotechnical* of the consent conditions.

Mass Block Wall 701 extends 113 metres from west to east, and comprises a maximum retained height of 6.4m and is founded on an undercut shear key backfilled with engineered clay fill. Founding conditions were consistent with the specifications outlined in Tetra Tech Coffey's (formerly Coffey) Geotechnical Design Report dated 15 April 2021 (Ref: AKLGE206639-AL Rev.2).

During construction, regular site visits were undertaken to observe and test the undrained shear strength of the wall foundation soils, monitor hardfill and clay fill placement and compaction, observe geogrid and geotextile placement, wall drainage construction, facing block placement and pedestrian barrier installation. The aforementioned items were completed in accordance with Tetra Tech Coffey's Geotechnical Design Report dated 15 April 2021 (Ref: AKLGE206639-AL Rev.2) and approved Building Consent drawings.

On the basis of our construction observations, in-situ soil testing, and backfill testing, we are satisfied that the site works undertaken to construct Mass Block Retaining Wall 701 were generally in accordance with our Geotechnical Design Report dated 15 April 2021 (Ref: AKLGE206639-AL Rev.2).

For and on behalf of Tetra Tech Coffey

Prepared By:

Bridget Lenting
Engineering Geologist

Reviewed and Authorised By:

Stephen Parkes
Associate Engineering Geologist
CMEngNZ, PEngGeol

Attachments – Producer Statement - Construction Review (PS4)

PRODUCER STATEMENT – PS4
CONSTRUCTION REVIEW

BUILDING CODE CLAUSE(S): B1 Structure **JOB NUMBER:** AKLGE206639BV

ISSUED BY: Tetra Tech Coffey NZ Limited
(Construction Monitoring Firm)
TO: WFH Properties Limited
(Owner/Developer)
TO BE SUPPLIED TO: Auckland Council
(Building Consent Authority)
IN RESPECT OF: Geotechnical Observation of Retaining Wall 303 construction
(Description of Building Work)
AT: 138 Kowhai Road, Upper Orewa 0873
(Address, Town/City)
LEGAL DESCRIPTION: Lot 2 DP 463561 **N/A** ☐

We have been engaged by the owner/developer referred to above to provide CM 3 **level of construction monitoring relating to** the Clause(s) named above of the Building Code for the building work which is covered by PS1(s) issued by Tetra Tech Coffey (NZ) Limited (*Engineering Design Firm*) and which is described in the documents relating to the Building Consent No. BCO10301029-9 and those relating to Building Consent Amendment(s) No. N/A issued during the course of the works, .

We have sighted these Building Consents and the conditions attached to them.
If any of the fields above are too small, please write "refer the Schedule".

Authorised instructions/variation(s) detailed/listed in the Schedule have been issued during the course of the works.

On the basis of these review(s) and information supplied by the contractor during the course of the works and **on behalf of the engineering firm** undertaking this Construction Monitoring, **I believe on reasonable grounds** that the building works covered by the above-mentioned PS1(s) have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above or in the Schedule on page 2, with respect to Clause(s) B1 - Structure of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, *(Name of Construction Monitoring Professional)* S. Parkes , am:

- CPEng number 1153826
- I hold the following qualifications BSc ,

The Construction Monitoring Firm holds a current policy of Professional Indemnity Insurance no less than $200,000 The Construction Monitoring Firm Is a member of ACE New Zealand.

SIGNED BY *(Name of Construction Monitoring Professional)*: S. Parkes
(Signature below):

ON BEHALF OF *(Construction Monitoring Firm)*: Tetra Tech Coffey NZ Limited Date: 3 June 24

Note: This statement has been prepared solely for the Building Consent Authority named above and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to the Construction Monitoring Firm only. As a condition of reliance on this statement, the Building Consent Authority accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in tort or otherwise, is limited to the sum of $200,000.

This form is to accompany **Forms 6 or 8 of the Building (Forms) Regulations 2004** for the issue of a Code Compliance Certificate.

SCHEDULE to PS4

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below:

- Tetra Tech Coffey Geotechnical Design Report ref: 773-AKLGE206639-AL Rev.3, dated 12 April 2022
- Tetra Tech Coffey Drawing entitled Wall 303 / RE Slope 310 Design Detail ref: AL/009, dated 12/04/2022

GUIDANCE ON USE OF PRODUCER STATEMENTS

Information on the use of Producer Statements and Construction Monitoring Guidelines can be found on the Engineering New Zealand website
https://www.engineeringnz.org/engineer-tools/engineering-documents/producer-statements/

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects (NZIA), Institution of Professional Engineers New Zealand (now Engineering New Zealand), Association of Consulting and Engineering New Zealand (ACE NZ) in consultation with the Building Officials Institute of New Zealand (BOINZ). The original suite of producer statements has been revised at the date of this form to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with part of the reasonable grounds necessary for the issue of a Building Consent or a Code Compliance Certificate, without necessarily having to duplicate review of design or construction monitoring undertaken by others.

PS1 DESIGN Intended for use by a suitably qualified independent engineering design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 DESIGN REVIEW Intended for use by a suitably qualified independent engineering design review professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 CONSTRUCTION Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011[2]

PS4 CONSTRUCTION REVIEW Intended for use by a suitably qualified independent engineering construction monitoring professional who either undertakes or supervises construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Engineering Professional
This statement is made by an engineering firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its personnel.

The person signing the Producer Statement on behalf of the engineering firm will have a professional qualification and proven current competence through registration on a national competence-based register such as a Chartered Professional Engineer (CPEng).

Membership of a professional body, such as Engineering New Zealand provides additional assurance of the designer's standing within the profession. If the engineering firm is a member of ACE New Zealand, this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent engineering professional".

Professional Indemnity Insurance
As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard practice for the relationship between the BCA and the engineering firm.

Professional Services during Construction Phase
There are several levels of service that an engineering firm may provide during the construction phase of a project (CM1-CM5 for engineers[3]). The building Consent Authority is encouraged to require that the service to be provided by the engineering firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4
Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Refer Also:

1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
2 NZIA Standard Conditions of Contract SCC 2011
3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACE New Zealand/Engineering New Zealand 2004)
4 PN01 Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org

TETRA TECH COFFEY

Level 4, 25 Teed Street, Newmarket
Auckland
1023 New Zealand

t: +64 9 379 9463

tetratechcoffey.com

3 July 2024

Our ref: 773-AKLGE206639-BV

WFH Properties Limited
157 Millwater Parkway,
Silverdale 0992

Attention: Nigel Low

Geotechnical Observation of Retaining Wall 303 construction at Millwater Precinct 6, Stage 2B, Orewa West (Building Consent No. BCO10301029-9)

This letter is to confirm the scope of work relating to the attached Producer Statement (PS4 – Construction Review, Retaining Wall, Geotechnical).

Tetra Tech Coffey carried out regular site visits 6 between April 2023 and July 2024 to observe the construction of Mass Block Retaining Wall 303 within Precinct 6 of the Millwater Subdivisional Development.

Mass Block Wall 303 extended over 84 lineal meters with a maximum retained height of 4.69m, founded on a 2.0m deep, 3.0m wide engineered fill undercut key from chainage 0-34.6m to maintain adequate global stability factors of safety. From chainage 34.6-84m, the wall was founded on a 2.0m deep, 3.0m wide engineered fill undercut key overlying existing in-ground palisade wall PW805.

During the course of construction, we carried out near daily site visits to observe and test the undrained shear strength of the wall foundation soils, monitor aggregate and clay fill placement and compaction, geogrid and geotextile placement, wall drainage construction, facing block placement and pedestrian barrier installation in accordance with Tetra Tech Coffey's Geotechnical Design Report dated 12 April 2022 (Ref: AKLGE206639-AL Rev.3).

On the basis of our construction observations and in-situ soil and aggregate testing, we are satisfied that the site works undertaken to construct Mass Block Retaining Wall 303 was in accordance with our Geotechnical Design Report dated 12 April 2022 (Ref: AKLGE206639-AL Rev.3), the ground conditions were also generally consistent with those that formed the basis of the recommendation presented in the report.

Accordingly, we attach our PS4 certificate for the above-mentioned works.

For and on behalf of Tetra Tech Coffey

Prepared By:

Bridget Lenting
Engineering Geologist

Reviewed and Authorised By:

Stephen Parkes
Associate Engineering Geologist
CMEngNZ, PEngGeol

Attachments – Producer Statement - Construction Review (PS4)

PRODUCER STATEMENT – PS4
CONSTRUCTION REVIEW

BUILDING CODE CLAUSE(S): B1 Structure **JOB NUMBER:** AKLGE206639

ISSUED BY: Tetra Tech Coffey NZ Limited
(Construction Monitoring Firm)
TO: WFH Properties Limited
(Owner/Developer)
TO BE SUPPLIED TO: Auckland Council
(Building Consent Authority)
IN RESPECT OF: Construction of Retaining Wall 701
(Description of Building Work)
AT: 138 Kowhai Road, Upper Orewa 0873
(Address, Town/City)
LEGAL DESCRIPTION: Lot 2, DP 463561 **N/A** ☐

We have been engaged by the owner/developer referred to above to provide CM 3 **level of construction monitoring relating to** the Clause(s) named above of the Building Code for the building work which is covered by PS1(s) issued by Tetra Tech Coffey (NZ) Limited (*Engineering Design Firm*) and which is described in the documents relating to the Building Consent No. BCO10301029-7 and those relating to Building Consent Amendment(s) No. N/A issued during the course of the works, .

We have sighted these Building Consents and the conditions attached to them.
If any of the fields above are too small, please write "refer the Schedule".

Authorised instructions/variation(s) detailed/listed in the Schedule have been issued during the course of the works.

On the basis of these review(s) and information supplied by the contractor during the course of the works and **on behalf of the engineering firm** undertaking this Construction Monitoring, **I believe on reasonable grounds** that the building works covered by the above-mentioned PS1(s) have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above or in the Schedule on page 2, with respect to Clause(s) B1 - Structure of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, *(Name of Construction Monitoring Professional)* S. Parkes , am:

- CPEng number 1153826
- I hold the following qualifications BSc ,

The Construction Monitoring Firm holds a current policy of Professional Indemnity Insurance no less than $200,000 The Construction Monitoring Firm Is a member of ACE New Zealand.

SIGNED BY *(Name of Construction Monitoring Professional)*: S. Parkes
(Signature below):

ON BEHALF OF *(Construction Monitoring Firm)*: Tetra Tech Coffey NZ Limited Date: 5 July 24

Note: This statement has been prepared solely for the Building Consent Authority named above and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to the Construction Monitoring Firm only. As a condition of reliance on this statement, the Building Consent Authority accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in tort or otherwise, is limited to the sum of $200,000.

This form is to accompany **Forms 6 or 8 of the Building (Forms) Regulations 2004** for the issue of a Code Compliance Certificate.

SCHEDULE to PS4

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below:

Coffey Geotechnical Design Report referenced 773-AKLGE206639-AL Rev. 2, dated 15 April 2021

GUIDANCE ON USE OF PRODUCER STATEMENTS

Information on the use of Producer Statements and Construction Monitoring Guidelines can be found on the Engineering New Zealand website
https://www.engineeringnz.org/engineer-tools/engineering-documents/producer-statements/

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects (NZIA), Institution of Professional Engineers New Zealand (now Engineering New Zealand), Association of Consulting and Engineering New Zealand (ACE NZ) in consultation with the Building Officials Institute of New Zealand (BOINZ). The original suite of producer statements has been revised at the date of this form to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with part of the reasonable grounds necessary for the issue of a Building Consent or a Code Compliance Certificate, without necessarily having to duplicate review of design or construction monitoring undertaken by others.

PS1 DESIGN Intended for use by a suitably qualified independent engineering design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 DESIGN REVIEW Intended for use by a suitably qualified independent engineering design review professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 CONSTRUCTION Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011[2]

PS4 CONSTRUCTION REVIEW Intended for use by a suitably qualified independent engineering construction monitoring professional who either undertakes or supervises construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Engineering Professional
This statement is made by an engineering firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its personnel.

The person signing the Producer Statement on behalf of the engineering firm will have a professional qualification and proven current competence through registration on a national competence-based register such as a Chartered Professional Engineer (CPEng).

Membership of a professional body, such as Engineering New Zealand provides additional assurance of the designer's standing within the profession. If the engineering firm is a member of ACE New Zealand, this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent engineering professional".

Professional Indemnity Insurance
As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard practice for the relationship between the BCA and the engineering firm.

Professional Services during Construction Phase
There are several levels of service that an engineering firm may provide during the construction phase of a project (CM1-CM5 for engineers[3]). The building Consent Authority is encouraged to require that the service to be provided by the engineering firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4
Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Refer Also:

1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
2 NZIA Standard Conditions of Contract SCC 2011
3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACE New Zealand/Engineering New Zealand 2004)
4 PN01 Guidelines on Producer Statements

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