GEO STUDIO
Geotechnical Engineers

Geotechnical Investigation Report

43A Vipond Road & 20 Melia Place, Stanmore Bay

For Melia Development Limited

Reference: 2282
Date: 21 May 2021
Revision: B

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1 Introduction

GeoStudio Ltd has been engaged to undertake a subsoil investigation and provide geotechnical recommendations for the proposed new 2 to 3 story multi-unit development at 43A Vipond Road & 20 Melia Place, Stanmore Bay.

This geotechnical investigation has been conducted to provide recommendations with respect to slope stability and foundation design for the proposed new units. It aims to determine whether the land on which the new units have been proposed is likely to be subject to erosion, subsidence, or slippage; or whether the proposed development work itself is likely to accelerate, worsen, or result in instability of the land or any other property; and to recommend adequate provisions to protect the land or the proposed development or other property from instability in accordance with the provisions of the Building Act 2004.

2 Site Description

The site location is indicated on Figure 1. Its legal description is Lot 1 & Lot 2, DP 169527.

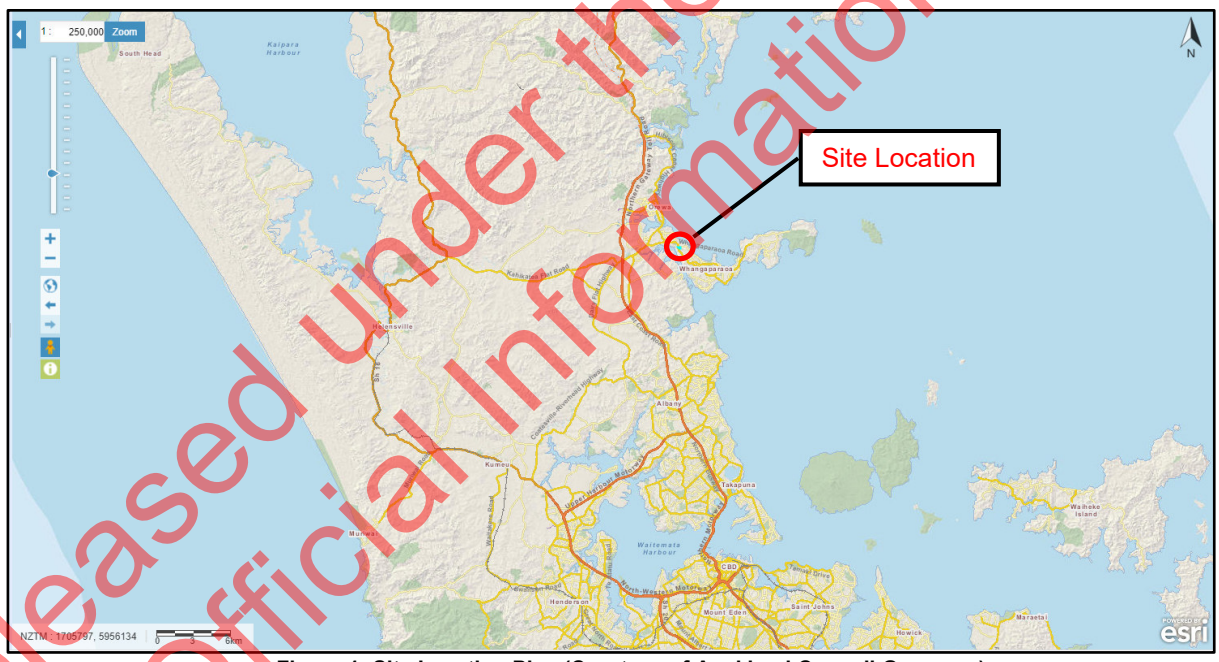

Figure 1: Site Location Plan (Courtesy of Auckland Council Geomaps)

The existing site layout is shown in Figure 2 and Photos 1 to 4.

Figure 2: Site Layout and Investigation Plan (courtesy of Auckland Council Geomaps)

Photo 1: This photo was taken at 34A Vipond Rd near HA04 facing west. Its shows the existing car park and the existing bowling club building. The grass area in the bacground is the proposed building area at 20 Melia Pl.

	**Photo 2: This photo was taken from the north eastern corner of 20 Melia Pl facing south west. It shows the drive way/ parking area at 34A Vipond Rd on the left and the grass area of 20 Melia Pl on the right.**
	**Photo 3: This photo was taken from the south west corner of the exsiting bowling green facing north east. It shows the existing bowling green and existing RSA building in the bacground.**

Photo 4: This photo was taken from the western corner of 20 Melia Pl facing east. It shows the grass area of 20 Melia Pl, the existing bowling green and building on the rigth and existing RSA building and car park in the background.

Both properties can be accessed via a long driveway from Vipond Rd and Melia Pl. At the time of our investigation the properties consisted of two existing large buildings and one existing bowling green. The area surrounding the existing buildings and bowling green consisted mostly of grass and small to large trees. The ground in the area of the proposed new units at 20 Melia Pl slopes down towards east between 8-12°. The ground in the area of the proposed new units at 43A Vipond is terraced down towards the south with small slopes of 5-7° in between the terraces. Immediately south of the proposed units at the southern area of the bowling green, the ground becomes very steep with slopes of up to 22° to the south and east.

3 Proposed Development

According to the draft site plans provided by paterson + cullen + archaus, it is proposed that the existing bowling green will be removed. It is then proposed there will be earthwork excavation of up to **2.4m** and fill of up to **3.0m,** from the existing ground level for the construction of the new units and associated civil works.

The draft site plans are attached in Appendix A.

4 Geological Map

According to Geological Map of the Auckland Area, 1:250 000 geological Map 3 by Institute of Geological and Nuclear Sciences, the site is likely to be underlain by East Coast Bays Formation (ECBF) of Waitemata Group. These soils have alternating sandstone and mudstone with variable volcanic content and interbedded volcaniclastic grit beds.

The clay rich and cohesive silt soils may also be prone to shrinking and swelling following changes in natural moisture content.

5 Previous Geotechnical Report

We have also viewed the Geotechnical Completion Report prepared by Soil & Rock Consultants, Rev: 18334, dated 24 October 2018. The specific stability and foundation design recommendations in this report are summarised below.

- Based on the laboratory tests carried out, the soils present are considered to lie in two different site classes Site Class H1 (Highly Reactive) and Site Class H2 (Highly Reactive)' in terms of BRANZ Addendum Study Report 102A (based on AS 2870:2011).

- A Dependable Bearing Capacity of 150kPa (Ultimate Bearing Capacity = 300kPa, Øbc = 0.5) is available for shallow foundations embedded 450mm into stiff natural ground or engineered fill or 600mm below final ground surface (whichever gives the deeper embedment).

6 Site investigation

We carried out a site walkover on 18th December 2020. Eight 50mm diameter hand augered exploratory holes were carried out in the area of the proposed fifty-eight new units. The locations of the exploratory holes are shown in Figure 2. In-situ Pilcon Shear Vane tests were carried out in the augered holes generally at 0.5m depth intervals. An additional Scala Penetrometer test was carried out at the base of HA08, and an additional 12.5m deep machine borehole was carried out at the edge of the steep slope along the southern edge of the existing bowling green on 18th December 2020. SPTs were carried out at 1.5m intervals. Hand auger investigation results from the previous geotechnical report are also attached herein and shown in Figure 2.

The graphical hand auger and machine borehole logs are presented in Appendix B.

7 Subsoil Conditions

The findings from our hand auger investigation generally agree with the Geological Map 3 of the Auckland area. During the day of our site investigation, we encountered non engineered fill soils which which extended from the existing ground level down to 0.4-0.8m bgl in HA01, HA03, HA04 & HA05, and down to 4.7m bgl in HA08. Underlain these non-engineered soils and from the existing ground level in HA02 & HA06, we encountered original East Coast Bays Formation (ECBF) soils which extended down to our hand auger termination depths of 3.0m bgl in HA01 – HA07 and 5.0m bgl in HA08. An additional Scala Penetrometer test was carried out at the base of HA08 which was terminated at 7.0m bgl. These original ECBF soils encountered during drilling varied from clay to silt. The shear vane tests suggest that these clayey to silty soils are generally stiff to very stiff in consistency. These stiff to very stiff original ECBF soils are considered suitable bearing strata for the proposed excavation and construction. We deem the soils encountered on-site during the day of drilling to be highly expansive (**H1**).

The machine bore hole carried out onsite encountered non-engineered fill soils which extended from the existing ground level down to 7.2m bgl. Underlain these non-engineered fill soils the bore hole encountered original alluvial soils which extended from 7.2m bgl down to 7.7m bgl. Underlain these original alluvial soils the bore hole encountered original ECBF, weathered sand and silt stone which extended from 7.7m bgl down to the bore hole termination depth of 12.5m bgl after encountering three consecutive SPT 50+ for 450mm.

A **(0.2-0.3m)** deep layer of topsoil and a **(0.4-4.7m)** deep layer of non-engineered fill was encountered in all hand auger holes during the day of exploratory drilling. This topsoil and non-engineered fill is not considered consistent bearing strata for the proposed development.

8 Groundwater

No ground water table was encountered during the day of exploratory drilling.

9 Ground Stability

On the day of our site visit, no obvious signs of global instability were observed.

We have carried out a slope stability analysis of the site with finished cut and fill levels for the proposed building platform (cross-section A-A′ shown on our site plan in Appendix B). The calculated factors of safety for the proposed building platform for normal groundwater, elevated groundwater and seismic conditions are 2.13, 1.57 and 1.52 respectively. They are considered acceptable for the proposed development. The analysis results are presented in Appendix D.

10 Earthworks

The proposed depth of excavation (up to **2.4m**) and fill (up to **3.0m**) within the boundaries of the subject site is considered reasonable.

The proposed excavations are setback at least 2x excavation depth from any neighbouring structures. We consider that the proposed excavation posts low risk to neighbouring properties, provided that good retaining wall construction practice, i.e. safe temporary batter and good construction time management are implemented.

The proposed fills are mainly in areas underlain by original ECBF soils. These stiff to very stiff, silty to clayey soils are not overly sensitive to settlement. Some fill locations, namely in proximity of the existing 525mm diameter concrete pipe, would likely cover by existing fill. Although the fill encountered was tested to be stiff to very stiff and appeared to have been reasonably compacted a number of years ago. Some minor long term settlement is still expected for the proposed maximum 3m deep additional fill. This settlement is expected to be minor and relatively uniform. It would unlikely adversely affect the performance of driveways and underground services. However, building foundations shall be supported on piles founded below the fill layer as per Section 11.

It is our opinion that provided our recommendations in Section 11 are fully implemented the earthworks would be unlikely to cause any significant ground settlement.

11 Recommendations

Our recommendations are summarised as follows:

11.1 In-ground Palisade Wall

Our sketch (**SK-2282-01**, shown in Appendix D) shows the location of our recommend in-ground palisade wall along the crest of the existing non-engineered fill slope. This palisade wall shall be designed as follows:

- The palisade wall shall be constructed immediately to the south of the proposed units and extend a minimum of **2.0m** beyond the width of the proposed building footprint. The final location of the palisade wall shall be confirmed by GeoStudio Ltd.

- The wall shall be designed by a chartered structural engineer and shall be a minimum of **0.6m** diameter steel-reinforced concrete piles at a maximum of **3xD** centre spacing. A concrete capping beam shall be included close to ground level.

- Minimum embedment depth = **10.0m** below existing ground level or socketed at least **2.5m** in moderately weathered ECBF rock whichever is greater.

- Lateral soil load depth = **5.0m** for structural design of piles. Lateral soil loads may be calculated using **γ=18kN/m^3** and **K_0=0.5** over a width of pile centre spacing.

11.2 Earthworks

- Detailed earthwork and retaining wall plans are not yet available at the time of preparing this report. Geostudio Ltd should be asked to review detailed earthwork and retaining wall plans to confirm our recommendations herein.

- Based on our subsoil investigation, the upper **1.5m** to **2.3m** depths soils were mainly moist. These moist soils would likely be able to be reused directly as engineered fill materials. Underlying these moist soils are wet to saturated soils which are unlikely to be suitable for direct use as engineered fill.

- For the benefits of utilising in situ cohesive soils for fill materials, we recommend that any major earth works are carried out during the summer months from November to March. This would reduce the risk of additional stabilisation of the fill material being required. However, the condition of the excavated material shall be inspected by a geotechnical engineer for its suitability as engineered fill. Additional air drying and/or lime stabilisation may still be required.

- We recommend that all cut slopes into natural ground and fill slopes using engineered fill should not be steeper than 2.5H:1V (21.8°). All retaining walls shall be designed by a chartered professional engineer.

- All topsoils and unsuitable soils shall be removed and benched into the slope prior to filling. The cleared ground shall be inspected by a chartered geotechnical engineer.

- Due to the complexity and volume of proposed earthwork, a Geotechnical Completion Report is recommended to ensure all earthworks are appropriately supervised during construction and are certified by a chartered professional geotechnical engineer.

- Any **cohesive fill** shall be constructed using a suitable sized pad-foot roller in layers no more than **200mm** thick. We provide the following specifications for cohesive fill compaction.
    - Undrained shear strength minimum single value = **110kPa**.
    - Undrained shear strength average value = **140kPa**.
    - Maximum single value air void =**12%.**
    - Average value air void < **10%.**

- All engineered fill shall be inspected by a geotechnical engineer every **0.5m** layer, or otherwise instructed by the engineer on site.

- Granular fill (hardfill) may be used for earthworks outside summer months. It shall be constructed using suitably sized vibrating drum roller or vibrating plat compactor in suitable thicknesses depending on compactor size. We provide the following specifications for granular fill compaction:

    - Granular fill shall be certified aggregates (GAP40 or GAP65). Other aggregate type i.e. crushed concrete/Soft Pit Run (SPR) may be accepted for fill in non-critical areas subject to specific engineer approval.

    - Clegg Hammer Impact Value (CIV) **>25.**

    - Achieve **95%** maximum dry density and **±3%** of optimum moisture content.

    - All engineered fill shall be inspected by a geotechnical engineer every **0.5m** layer, or otherwise instructed by the engineer on site.

11.3 Foundations

11.3.1 Suspended floors on Pile Foundations

Due to the presence of non-engineered fill encountered, all load bearing footings foundations as shown as shaded areas in **SK-2282-01** shall be supported on piled foundations extending below the existing non-engineered fill as follows.

- Geotechnical ultimate bearing capacity (unfactored) = **720kPa** for piles through fill with a minimum of **0.6m** into stiff original soils. The expected pile depths range from **1.2m** to **8.0m** below the existing ground level.

- Geotechnical ultimate bearing capacity (unfactored) = **4000kPa** for piles through fill with a minimum of **0.6m** into moderately weathered ECBF rock (SPT=50+). The expected pile depths range from **8.0m** to **11.0m** below the existing ground level.

- Geotechnical ultimate skin friction (unfactored) of **30kPa**, the friction contribution of the upper **0.6m** below ground level, or non-engineered fill depth should be ignored, whichever is greater.

- Due to risk of long term settlement of the underlying non-engineered fill, concrete slabs or subfloor shall be designed as **fully suspended**, i.e. not relying on ground for support.

- Based on the investigation results and our experience with similar sites, the site may be classified as subsoil **Class C** – shallow soil in accordance with ASNZS1170.5.

11.3.2 Concrete Slab Foundations

For areas outside the shaded areas in **SK-2282-01**, shallow foundations are considered suitable. We provide the following foundation design recommendations:

- The natural soils, i.e. excluding topsoil and any non-engineered fill, are generally considered suitable for NZS3604:2011 type foundations, except that due to the potential for shrinkage and swelling, the subsoil lies outside of the definition of 'good ground' as defined by NZS3604:2011. The perimeter footings shall have a minimum embedment depth of **750mm** below the cleared

ground level, or alternatively the foundations shall be specifically designed by a chartered professional engineer for expansive soil **Class H1** in terms of AS2780:2011.

- For design of shallow foundations on competent natural ground, a geotechnical ultimate bearing capacity (unfactored) of **300kPa** may be assumed.
- Based on the investigation results and our experience with similar sites, the site may be classified as subsoil **Class C** – shallow soil in accordance with ASNZS1170.5.
- All unsuitable soils (topsoil, non-engineered fill, soft original soil) shall be removed and replaced with compacted engineered fill (GAP40) under all concrete slabs. The expected undercut depth is approximately **0.1m to 0.5m** below the existing ground level.
- For the use of other pile foundations (if required), our recommendations are as follows;
    - Minimum pile depth = **0.6m** into stiff original soils.
    - Geotechnical ultimate bearing capacity (unfactored) = **300kPa or 540kPa for piles >2.5m deep**
    - Geotechnical ultimate skin friction (unfactored) of **30kPa**. The friction contribution of the upper **0.6m** below ground level.

11.4 Retaining Walls

- All new retaining walls shall be specifically designed by a chartered professional engineer for the actual retaining height and any surcharge (i.e. additional load from slopes, upper retaining walls or site boundary).
- Furthermore, we recommend that any vertical cut faces which exceed heights of **1.5m** should be benched at **1V:1H** or to be supported by additional in-ground piles prior to bulk excavation. Along with good practice during construction (covering cut faces, constructing of retaining walls within seven days of excavation), this method is to further ensure safety during works close to, or below cut faces.
- We provide the following general soil parameters for retaining wall design:
    - Bulk unit weight for retaining material — 18.0kN/m^3
    - Soil internal friction (φ') — 30º
    - Undrained shear strength (s_u) — 50kPa
    - Geotechnical ultimate bearing capacity (unfactored) — 300kPa
- All retaining wall shall be constructed with appropriate subsoil drainage system discharged as per council's requirements.
- It is the builder's/owner's responsibility to ensure that temporary stability of any soil cut face is maintained during construction of retaining walls. Where possible, all retaining walls should be constructed in dry weather conditions over a short period of time (typically within 10 days) to reduce the risk of temporary instability.

11.5 Construction Inspections

- A pre-construction meeting is highly recommended prior to commence of earthworks.
- All soil subgrade (after stripping of topsoil) shall be inspected by a chartered professional engineer (geotechnical) prior to commencement of engineered filling (if required).
- The compaction of all engineered fill shall be inspected by a chartered professional engineer (geotechnical).
- All foundation pile drill holes (if applicable) shall be inspected by a chartered professional engineer (geotechnical) prior to installation of timber poles and pouring of concrete.

12 Limitations

This report is the property of our client and GeoStudio Ltd.

Our professional services are performed using a degree of care and skill normally exercised, under similar circumstances, by reputable consultants practicing in this field at this time. No other warranty, expressed or implied, is made as to the professional advice presented in this report; in regard to its accuracy or completeness.

The recommendations and opinions contained in this report are based on our visual reconnaissance of the site, information from geological maps and field investigation(s) at discrete locations. Inferences are made about the nature and continuity of ground conditions away from the investigation(s) which cannot be guaranteed. The descriptions detailed on the exploratory hole logs are based on the field descriptions of the soils encountered at the time of investigation(s).

This report has been prepared for the particular project described to us and no responsibility is accepted for the use of any part of this report in any other context or for any other purposes. Except as required by law, no third party (excluding the local authority) may use or rely upon this report unless authorised by GeoStudio Ltd in writing. To the extent permitted by law, GeoStudio Ltd expressly disclaims and excludes liability for any loss, damage, cost or expense suffered by any third party relating to or resulting from the use of, or reliance upon any information contained in this report. It is the responsibility of third parties to independently make enquiries or seek advice in relation to their particular requirements.

All appendices should be read in conjunction with the main body of the report and this report should not be considered complete without them.

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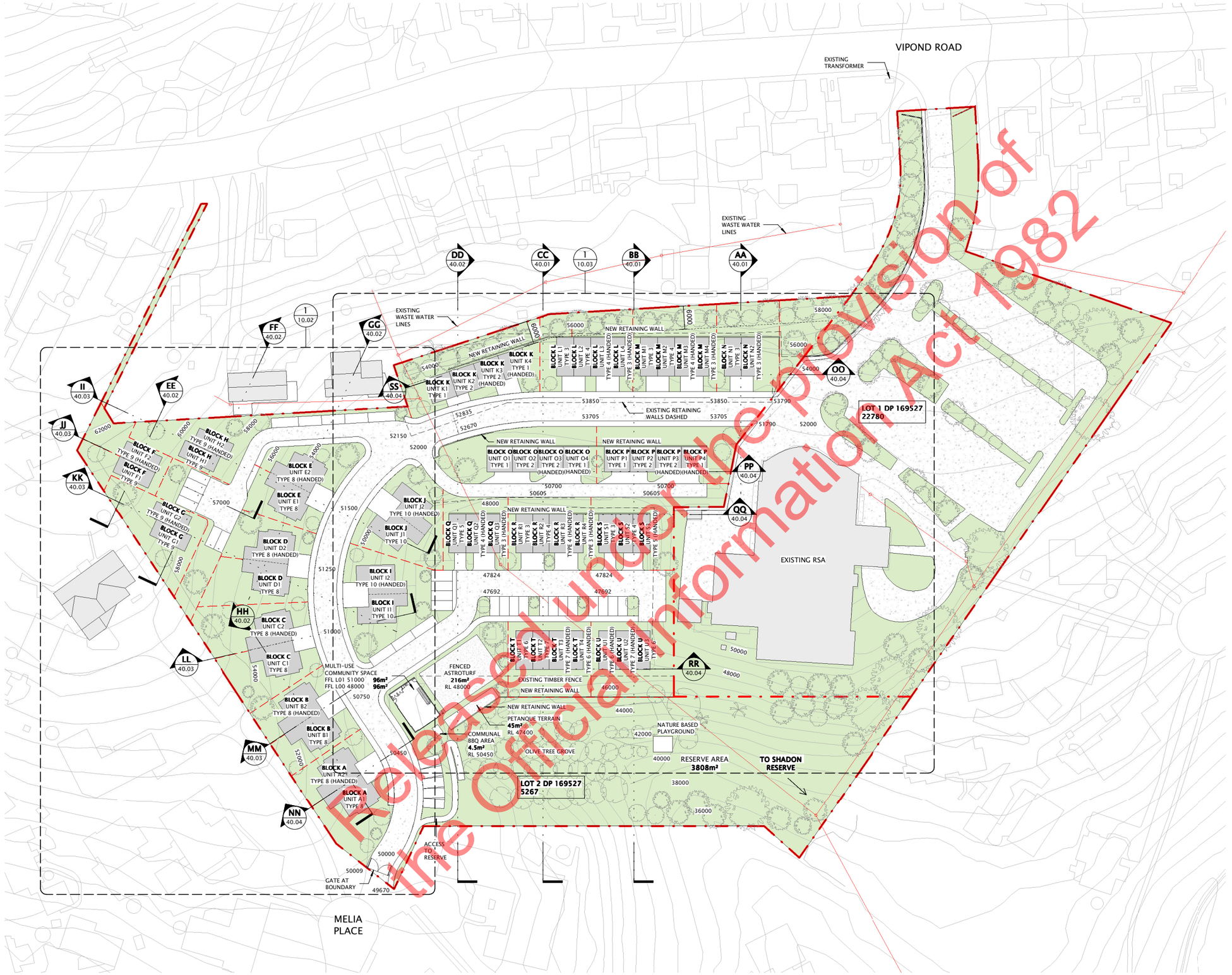
BE(civil), ME(civil), CPEng, MIPENZ
Director / Geotechnical Engineer

Appendix A

Draft Site Plans and Sections

SITE CALCULATIONS – 20 MELIA PLACE
LOT 2, DP 169527

SITE AREA:	**18250.6m²**
BUILDING COVERAGE:	3120.7m² **(17.1%)**
IMPERVIOUS AREA:	4640.9m² **(25.4 %)**
LANDSCAPED AREA:	10489m² **(57.5%)**



1 PROPOSED OVERALL DEVELOPMENT
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REV	DATE	INITIAL	AMENDMENT
REVISIONS			

PROJECT STATUS

CLIENT
MELIA DEVELOPMENT LIMITED

PROJECT
20 MELIA PLACE
20 MELIA PLACE, WHANGAPARAOA

SHEET TITLE
PROPOSED OVERALL DEVELOPMENT

TRUE NORTH	PROJECT NORTH	DESIGN	DRAWN
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SCALE @ A1 (HALF SCALE IF PRINTED @ A3)
1 : 500

FIRST ISSUE DATE: 03/25/21
PROJECT No.: 20053
SHEET No.: 10.01
REVISION:

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1 / 10.01 PROPOSED OVERALL DEVELOPMENT – ZONE 1
SCALE: 1 : 250

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TRUE NORTH
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DESIGN	DRAWN
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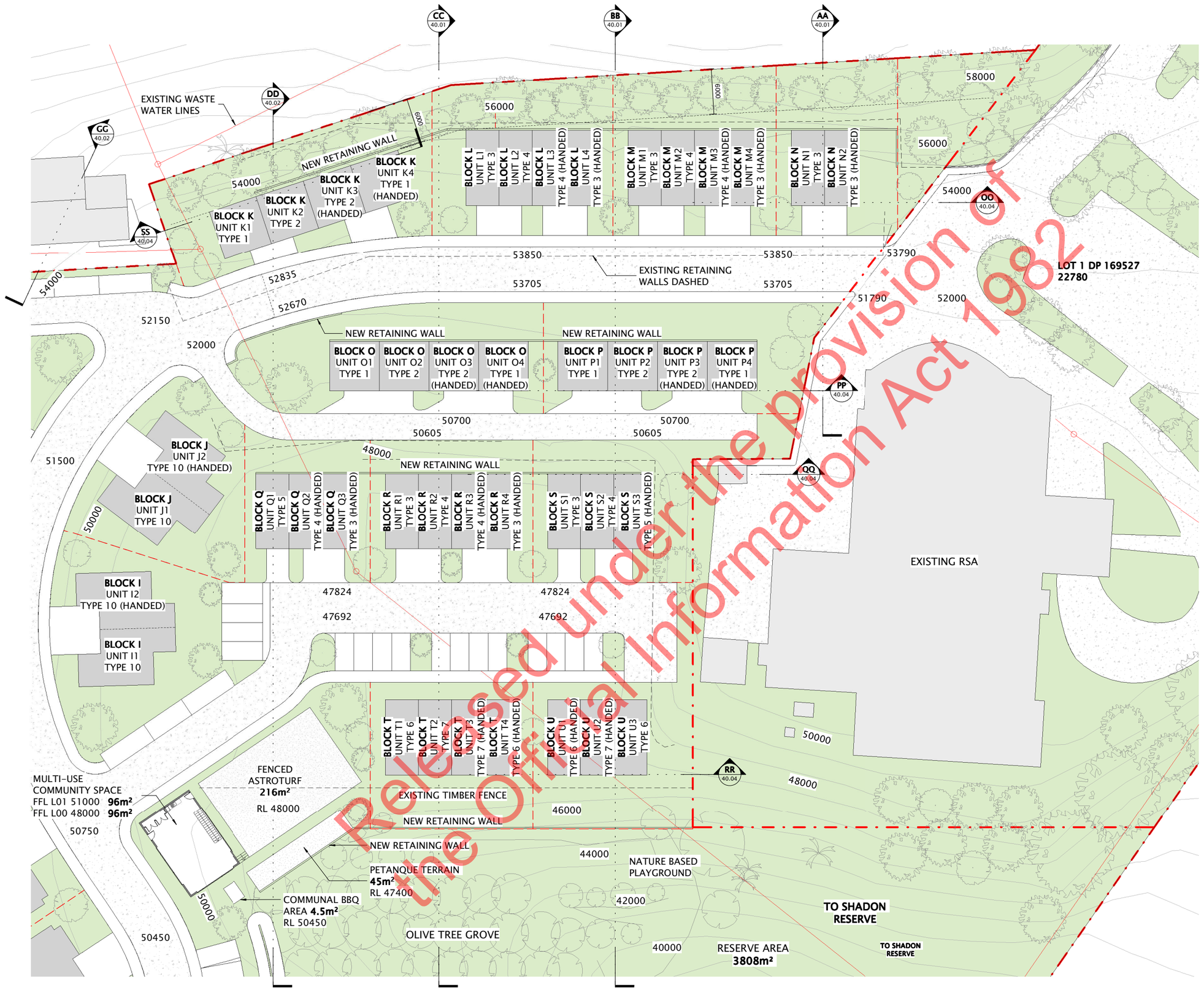

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VIPOND ROAD

EXISTING TRANSFORMER

EXISTING WASTE WATER LINES

EXISTING WASTE WATER LINES

NEW RETAINING WALL

EXISTING RETAINING WALLS DASHED

LOT 1 DP 169527
22780

LOT 2 DP 169527
5267

EXISTING RSA

RESERVE AREA
3808m²

TO SHADON RESERVE

MULTI-USE COMMUNITY SPACE
FFL L01 51000 96m²
FFL L00 48000 96m²

FENCED ASTROTURF
216m²
RL 48000

EXISTING TIMBER FENCE

NEW RETAINING WALL

PETANQUE TERRAIN
45m²
RL 47400

COMMUNAL BBQ AREA
4.5m²
RL 50450

OLIVE TREE GROVE

NATURE BASED PLAYGROUND

ACCESS TO RESERVE

GATE AT BOUNDARY

MELIA PLACE

SITE PLAN LEGEND

- 2 LEVEL UNITS
- 3 LEVELS UNITS
- COMMUNITY FACILITIES

2 LEVEL UNITS	**27** (45.8%)
3 LEVEL UNITS	**32** (54.2%)
TOTAL NO. OF UNITS	**59**

1 PROPOSED OVERALL DEVELOPMENT – TYPOLOGIES
SCALE: 1 : 500

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PROPOSED OVERALL DEVELOPMENT – TYPOLOGIES

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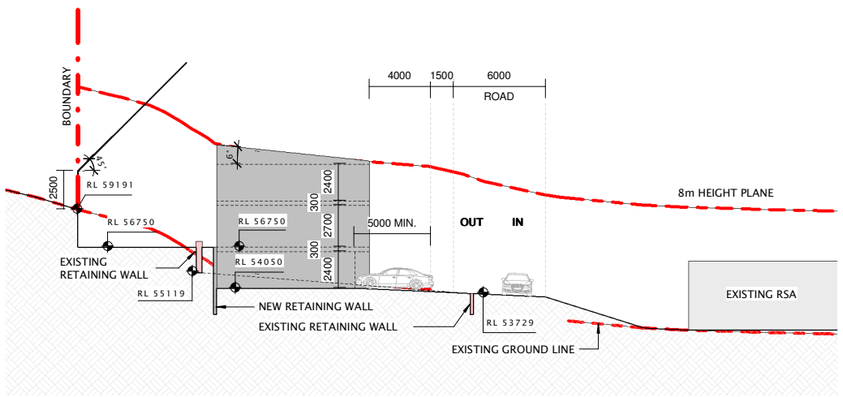

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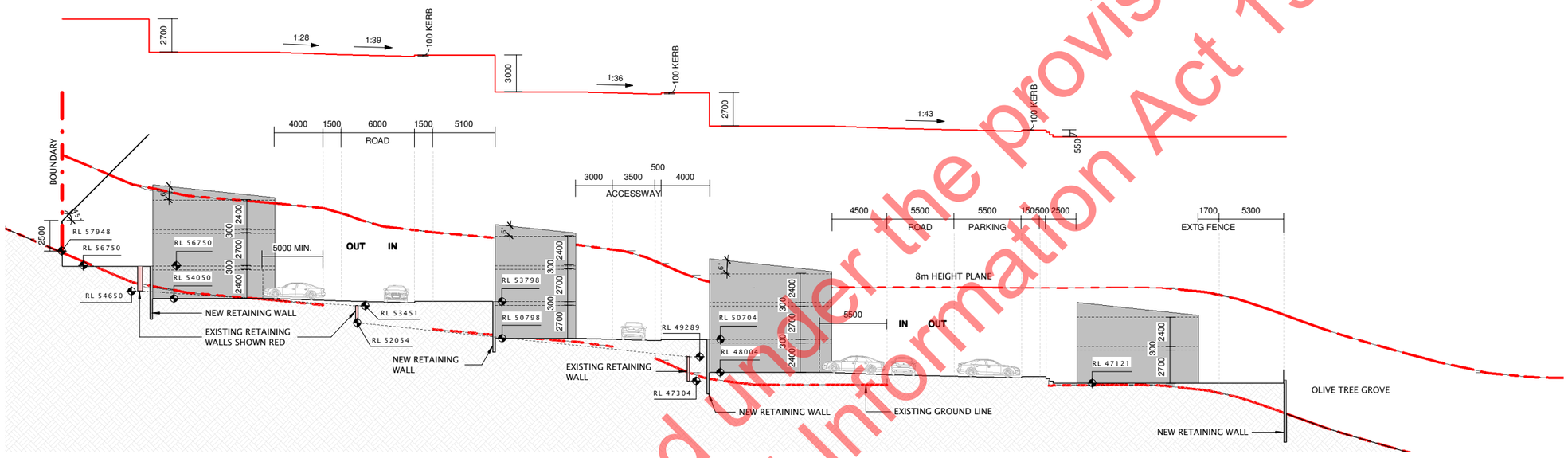

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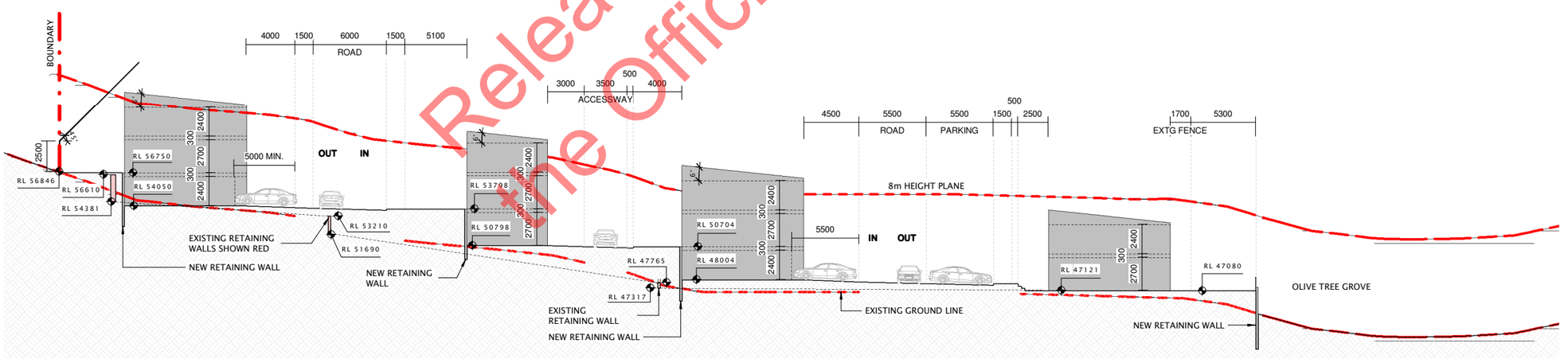

CC SITE SECTION C-C
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SITE SECTIONS

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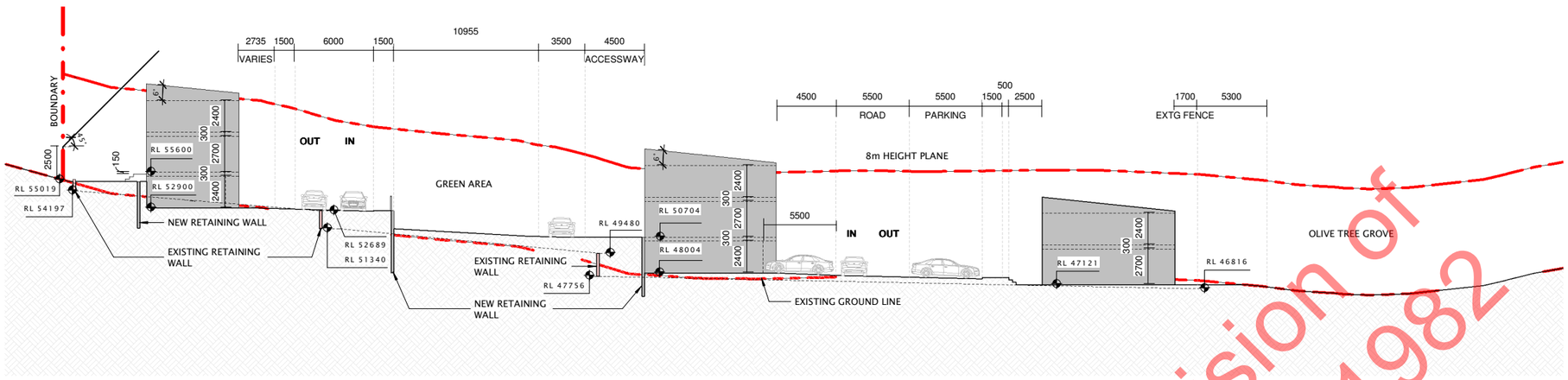

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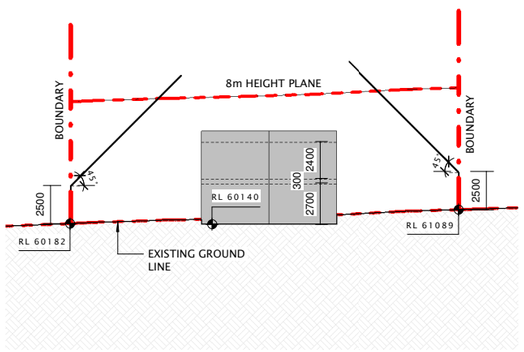

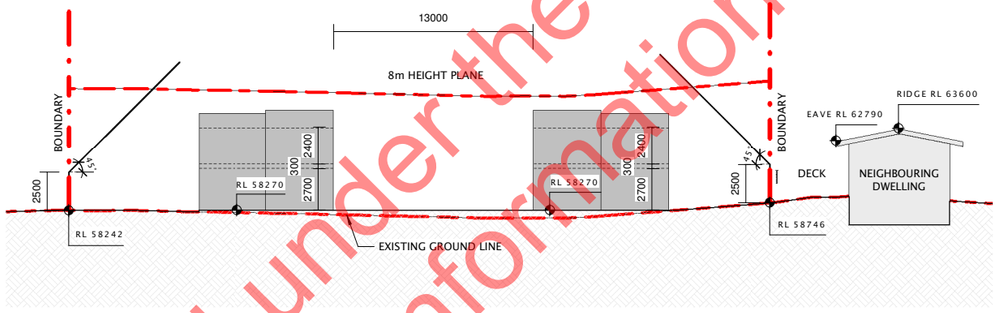

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FF SITE SECTION F-F
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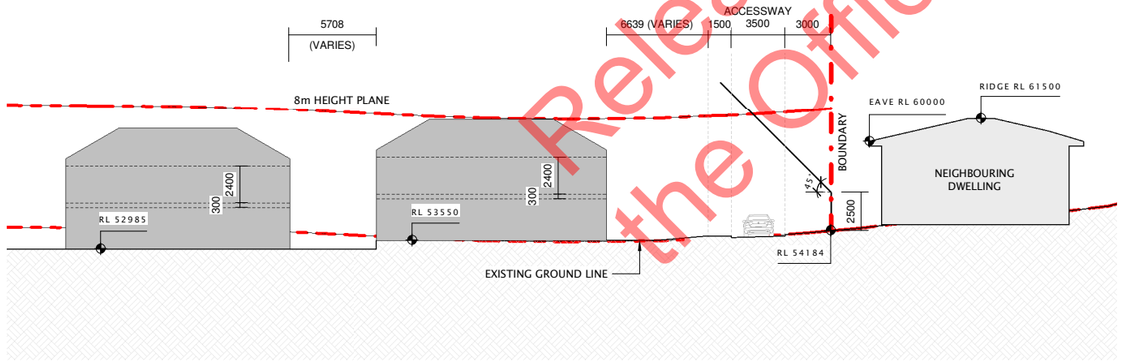

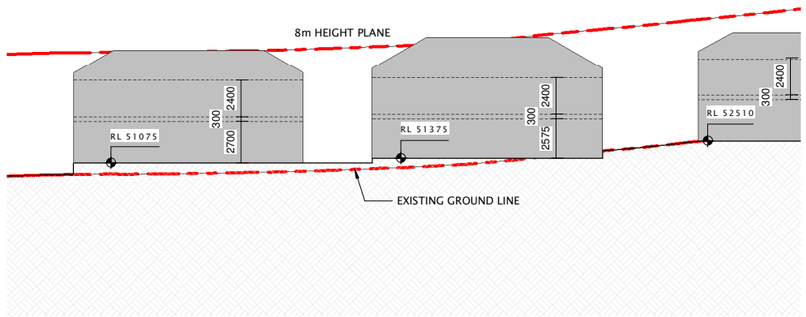

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HH SITE SECTION H-H
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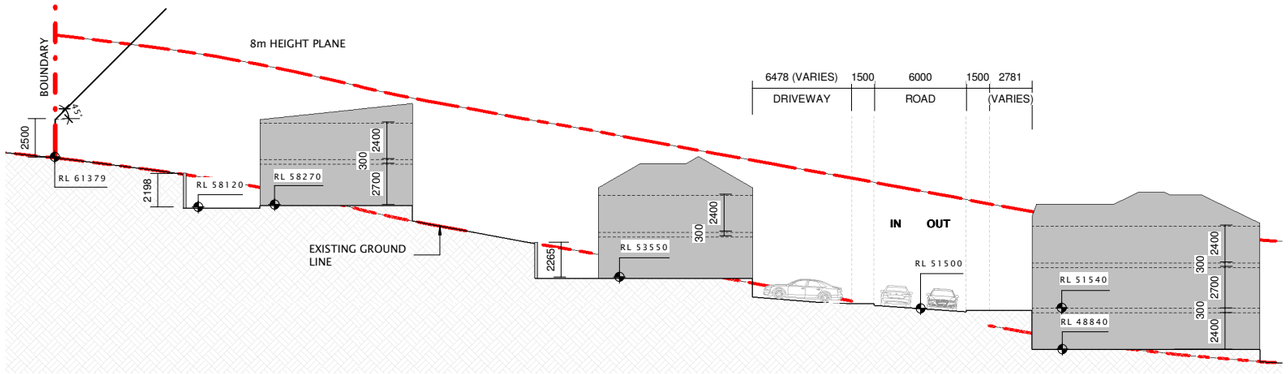

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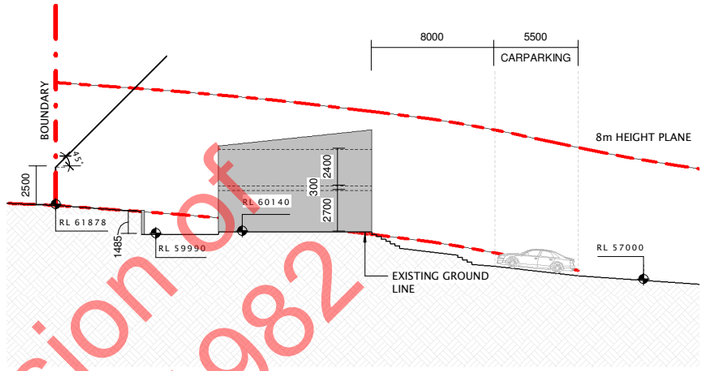

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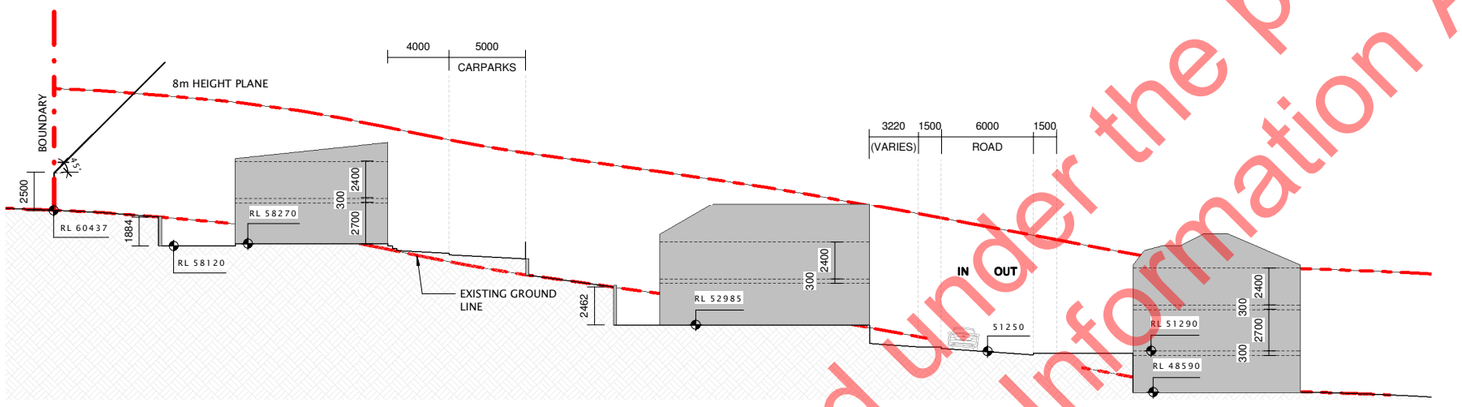

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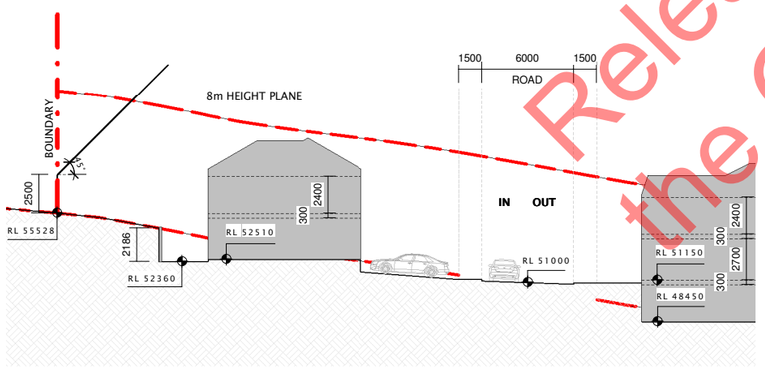

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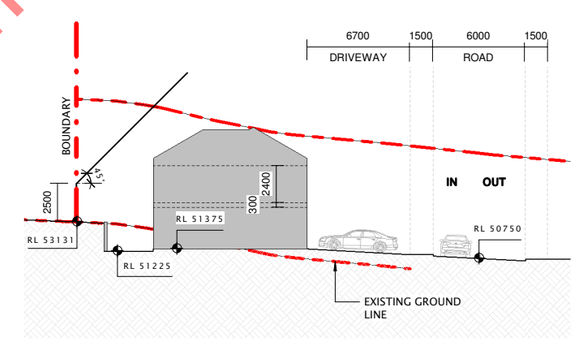

MM SITE SECTION M–M
10.01 SCALE: 1 : 200

DRAFT

REV | DATE | INITIAL | AMENDMENT
REVISIONS

PROJECT STATUS

CLIENT
MELIA DEVELOPMENT LIMITED

PROJECT
20 MELIA PLACE
20 MELIA PLACE, WHANGAPARAOA

SHEET TITLE
SITE SECTIONS

DESIGN	DRAWN
CM	LM

SCALE @ A1
(HALF SCALE IF PRINTED @ A3)
1 : 200

FIRST ISSUE DATE: 01/25/21
PROJECT No.: 20053
SHEET No.: 40.03
REVISION:

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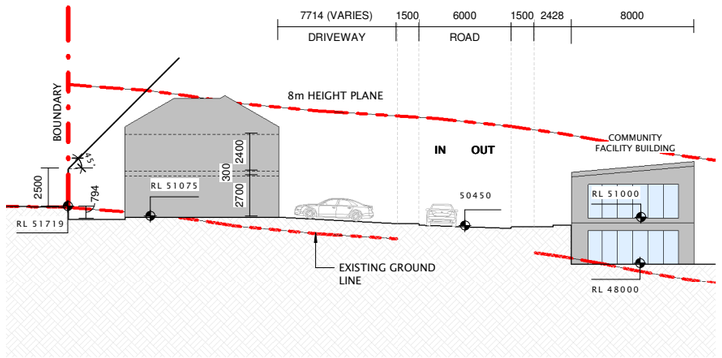

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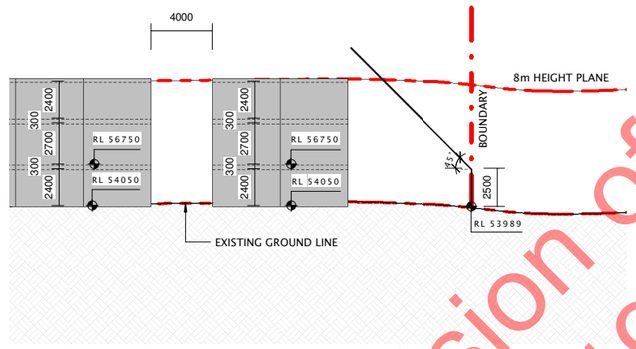

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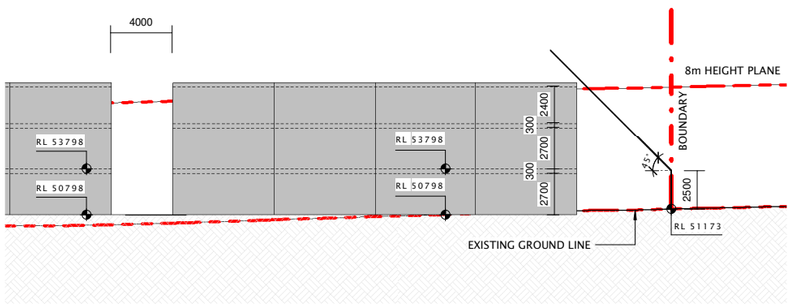

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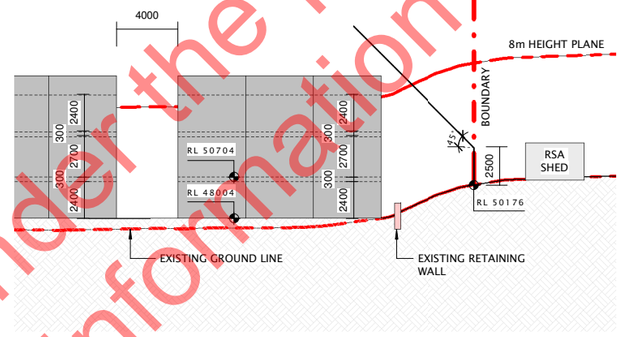

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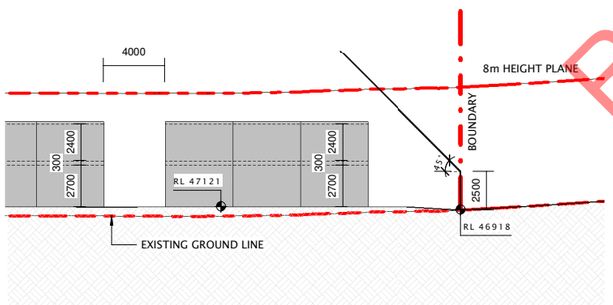

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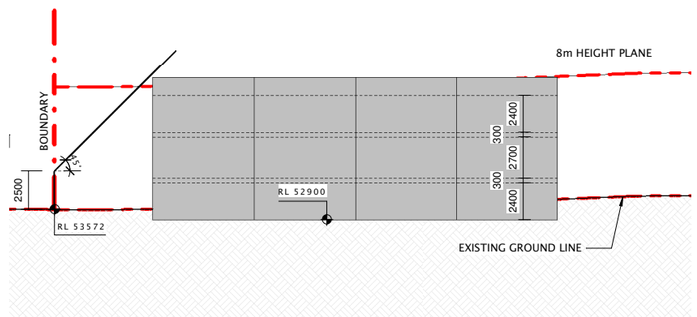

SS 10.01 SITE SECTION S-S
SCALE: 1 : 200

DRAFT

REV	DATE	INITIAL	AMENDMENT

REVISIONS

PROJECT STATUS

CLIENT
MELIA DEVELOPMENT LIMITED

PROJECT
20 MELIA PLACE
20 MELIA PLACE, WHANGAPARAOA

SHEET TITLE
SITE SECTIONS

DESIGN	DRAWN
CM	LM

SCALE @ A1
(HALF SCALE IF PRINTED @ A3)
1 : 200

FIRST ISSUE DATE	PROJECT No.
02/18/21	20053

SHEET No. 40.04
REVISION

paterson + cullen + archaus

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Appendix B

Investigation Logs

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA01**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** TL
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
	Topsoil				
	[NON ENGINEERED FILL] silty CLAY, grey mottled orangey brown, dark grey and brown, very stiff, moist to dry				
	[ECBF] silty CLAY, orangey brown mottled grey, very stiff, moist				
1					
	@1.2m becomes grey mottled orangey brown, stiff				
	@1.6m becomes moist to wet				
2					
	@2.6m becomes grey mottled orangey brown and light brownish grey				
3					
	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS
WWW.GEOSTUDIO.CO.NZ 09- 476 1417 021-134 3823
DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA02**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** TL
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
	Topsoil				
	[ECBF] silty CLAY, grey mottled orangey brown, very stiff, moist				
1	@1.1m becomes moist to wet				
	@1.4m becomes silty CLAY minor basalt grit, orangey brown mottled grey and dark orangey brown, stiff				
	@1.6m becomes silty CLAY				
2	@2.1m becomes grey mottled orangey brown, wet				
	@2.3m becomes grey mottled orangey brown and light brownish grey, very stiff				
	@2.7m becomes clayey SILT, bluish grey				
3	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA03**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** TL
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
	Topsoil				
	[NON ENGINEERED FILL] silty CLAY minor gravel, orangey brown mottled grey, very stiff, moist				
	[ECBF] clayey SILT, grey mottled orangey brown, stiff, moist to wet				
	@0.6m becomes whitish grey, wet				
	@0.8m becomes grey mottled orangey brown, very wet				
1					
	@1.3m becomes very stiff				
	@1.6m becomes bluish grey, moist to wet				
	@1.8m becomes bluish grey mottled dark bluish grey				
2					
3	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA04**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** DBT
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
0	[NON ENGINEERED FILL] clayey SILT minor gravel, brownish grey, stiff, moist				
	[ECBF] clayey SILT, orangy brown mottled brownish grey, stiff, moist to wet @0.6m becomes grey				
1					
	@1.7m becomes very stiff				
2					
3	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA05**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** DBT
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
	Topsoil				
	[NON ENGINEERED FILL] clayey SILT minor gravel, brownish grey, stiff, moist				
1	[ECBF] silty CLAY, orangy brown mottled grey, very stiff, moist				
	@1.2 becomes clayey SILT				
2	@1.8m becomes moist to wet				
3	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA06**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** DBT
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
0	Topsoil				
	[ECBF] silty CLAY, orangy brown mottled grey, very stiff, moist				
1	@0.8m becomes grey mottled orangy brown				
2	@2.0m becomes moist to wet				
3	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS

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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA07**
WEATHER:	**Fine**	SHEET 1 OF 1
PROJECT:	**Multiple Units**	**LOGGED:** HQ
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
0	Topsoil				
	[NON ENGINEERED FILL] clayey SILT, dark brown mottled light orangey brown, very stiff, moist to dry				
	[ECBF] silty CLAY, grey mottled light orangey brown, very stiff, moist				
	@0.8m becomes wet				
1					
	@1.2m becomes clayey SILT, light brown mottled light grey				
	@1.3m becomes sitff				
	@1.5m becomes silty CLAY				
	@1.8m becomes very wet				
2					
	@2.2m becomes light brownish grey mottled light brown, very stiff				
	@2.6m becomes clayey SILT, bluish grey				
3					
	EOB @3.0m, Target depth reached				
4					
5					

NOTES: - No groundwater table was encountered.

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS
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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA08**
WEATHER:	**Fine**	SHEET 1 OF 2
PROJECT:	**Multiple Units**	**LOGGED:** HQ
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
	Topsoil				
	[NON ENGINEERED FILL] clayey SILT, light brown mottled light orangey brown, whitish grey & dark brown, very stiff, moist				
1	@0.8m becomes silty CLAY, light brown mottled whitish grey & light orangey brown, sitff, wet				
	@1.2m becomes silty CLAY minor gravel, light brown mottled orangey brown & black, very stiff, moist				
2	@1.8m becomes silty CLAY, light brown mottled light orangey brown, grey & brown				
	@2.2m becomes light brown mottled grey & dark brown				
	@2.6m becomes dark brown mottled light brown & grey				
3				UTP	
	@3.8m becomes clayey SILT, dark grey mottled dark brown				
4				UTP	
	@4.3m becomes dark brown mottled dark grey, whitish grey & orangey brown				
	@4.5m becomes dark brown mottled black & greenish black			UTP	
	@4.6m becomes light grey mottled dark brown & light brown				
	[ECBF] clayey SILT, light orangey brown mottled light grey , very stiff, moist to wet				
5	EOB @5.0m, Target depth reached				

NOTES: - No groundwater table was encountered.

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS
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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	**2282**	**HAND AUGER NO.**
ADDRESS:	**43A Vipond Road & 20 Melia Place, Stanmore Bay**	**HA08**
WEATHER:	**Fine**	SHEET 2 OF 2
PROJECT:	**Multiple Units**	**LOGGED:** HQ
CLIENT:	**KIPG**	**CHEKCED:** JS
		DRILL DATE: 18/12/2020

DEPTH (m)	SOIL DESCRIPTION	LEGEND	GROUND WATER	UNDRAINED SHEAR STRENGTH (kPa) 0 50 100 150	SCALA (BLOWS PER 100mm) 0 5 10 15
6					
7					
8					
9					
10					

NOTES: - No groundwater table was encountered.

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS
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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	2282	BOREHOLE NO.
ADDRESS:	2282_43A Vipond Road & 20 Melia Place, Stanmore Bay	MH01
WEATHER:	Fine	SHEET 1 OF 3
PROJECT:	Multi Unit development	LOGGED: JS
CLIENT:	KIPG	CHEKCED: GK
		DRILL DATE: 15/01/2021

DEPTH (m)	SOIL DESCRIPTION	LEGEND	Shear Vane (kPa)	Core Recovery (%) 20 40 60 80	SPT N-value	Notes:
0	Topsoil					
	[NON ENGINEERED FILL] silty CLAY minor gravel, grey mottled brown				0 1 1 1 N=3	
1						
2	@2.0m becomes brown mottled grey					
3					1 2 1 1 N=5	
4	@3.6m becomes brown mottled grey and dark brown					
5	@4.6m becomes silty CLAY minor gravel with traces of wood/ organic matterial				14 N=bouncing for 35mm	

NOTES:

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DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	2282	BOREHOLE NO.
ADDRESS:	2282_43A Vipond Road & 20 Melia Place, Stanmore Bay	MH01
WEATHER:	Fine	SHEET 2 OF 3
PROJECT:	Multi Unit development	LOGGED: JS
CLIENT:	KIPG	CHEKCED: GK
		DRILL DATE: 15/01/2021

DEPTH (m)	SOIL DESCRIPTION	LEGEND	Shear Vane (kPa)	Core Recovery (%) 0 20 40 60 80	SPT N-value	Notes:
6					2 2 2 2 N=8	
	@6.0m becomes silty CLAY minor gravel					
	@6.5m becomes dark brown mottled brown and grey					
7	[ALLUVIUM] clayey SILT, bluish grey mottled brown and orangey brown				3 2 3 6 N=14	
8	[ECBF] weathered SAND STONE, dark bluish grey with traces of of orangey brown					
9	@9.0m becomes dark grey				13 14 14 19 N=50	
10						

NOTES:

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS
WWW.GEOSTUDIO.CO.NZ 09- 476 1417 021-134 3823
DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

JOB NUMBER:	2282	BOREHOLE NO.
ADDRESS:	2282_43A Vipond Road & 20 Melia Place, Stanmore Bay	MH01
WEATHER:	Fine	SHEET 3 OF 3
PROJECT:	Multi Unit development	LOGGED: JS
CLIENT:	KIPG	CHEKCED: GK
		DRILL DATE: 15/01/2021

DEPTH (m)	SOIL DESCRIPTION	LEGEND	Shear Vane (kPa)	Core Recovery (%) 0 20 40 60 80	SPT N-value	Notes:
11	@10.0m becomes weathered SILT STONE, dark brown mottled dark grey				26 24 N=50+ for 55mm	
12						
	EOB @12.5m target depth reached.				N=50+ for 35mm	
13						
14						
15						

NOTES:

GEOSTUDIO LIMITED GEOTECHNICAL ENGINEERS
WWW.GEOSTUDIO.CO.NZ 09- 476 1417 021-134 3823
DIRECTOR: GEOFFREY KANG BE(CIVIL), ME(CIVIL), CPENG, MIPENZ

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH101

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Grass
Date Finished:	4/10/18	Water Level:	3.0m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
TS	0.0	SILT, minor clay, brown, firm, moist, non to slightly plastic (TOPSOIL)
WEATHERED WAITEMATA GROUP SOILS	0.0	clayey SILT, orange, very stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
	0.5	minor fine sand, orange, yellow, yellowish grey
		light yellow, orange, light grey
		some clay to clayey, trace fine to medium sand, slightly to moderately plastic
	1.0	stiff to very stiff
		light grey with orange and yellow mottles
	1.5	stiff
		clayey, moist to wet, moderately plastic
	2.0	some clay to clayey, minor fine to medium sand, slightly to moderately plastic orange, pinkish orange, yellow
	2.5	orange with yellow speckles
		minor fine to medium sand, trace coarse sand
	3.0	silty CLAY, orange, stiff, moist to wet, highly plastic
		clayey SILT, orange, yellow, stiff, moist to wet, moderately plastic
		some clay, some fine sand, orange and grey, slightly plastic
	3.5	grey
		orange and grey
		clayey, grey with orange streaks, moderately plastic
		some clay, some fine sand, grey
	4.0	trace lignite fragments as black speckles
		SILT, some fine to medium sand to sandy, some clay, grey, stiff, wet, slightly plastic water seepage
		clayey SILT, grey, stiff, moist, to wet, moderately plastic
		some clay to clayey, minor fine to medium sand, slightly to moderately plastic
	4.5	firm to stiff
		clayey, trace fine sand, moderately plastic
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	V
0.5	54	144
1.0	72	122
1.5	54	122
2.0	54	108
2.5	54	86
3.0	47	72
3.5	40	72
4.0	38	72
4.5	32	58
5.0	32	54

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH102

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	CD
Drilled By:	CD	Coordinates:		Shear Vane No - Calibration Date:	GEO361 - 27/02/2018
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Sloping, Grass
Date Finished:	4/10/18	Water Level:	2.0m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, minor to some clay, trace fine to medium sand, brown, firm, moist to wet, non to slightly plastic (TOPSOIL/FILL)
			silty CLAY and SILT, minor clay, minor fine to medium sand intermixed, light orange brown, brown, greyish brown, stiff, moist, slightly to highly plastic (FILL)
WEATHERED WAITEMATA GROUP SOILS	0.5		clayey SILT, light grey with dark orange streaks and orange speckles, stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
	1.0		
	1.5		
	2.0		some clay to clayey, firm to stiff, slightly to moderately plastic
	2.5		SILT, some clay, light brownish grey with dark orange streaks and speckles, firm to stiff, saturated, slightly plastic
	3.0		
	3.5		SILT, minor to some clay, minor fine to medium sand, grey to dark grey, stiff, saturated, slightly plastic
	4.0		firm
	4.5		stiff
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m) 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR v r
50 100 150 (kPa)

DEPTH (m)	r	V
0.5	57	123
1.0	36	66
1.5	35	79
2.0	47	92
2.5	32	63
3.0	25	55
3.5	47	114
4.0	35	63
4.5	36	71
5.0	47	95

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH103

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	CD
Drilled By:	CD	Coordinates:		Shear Vane No - Calibration Date:	GEO361 - 27/02/2018
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Sloping, Grass
Date Finished:	4/10/18	Water Level:	1.9m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, trace to minor clay, trace fine to medium sand, dark brown, firm, moist, non plastic (TOPSOIL/FILL)
	0.5	clayey SILT, trace fine to medium sand intermixed with SILT, some fine sand, brown and light greyish brown intermixed, orange streaks, stiff, moist, slightly to moderately plastic (FILL)
WEATHERED WAITEMATA GROUP SOILS		clayey SILT, trace fine sand, light greyish brown with dark orange streaks and speckles, stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
		firm to stiff
	1.0	
		some clay, stiff, slightly plastic
	1.5	
		trace to minor fine sand, moist to wet
	2.0	
		minor fine sand, wet to saturated
	2.5	
		SILT, minor to some fine to medium sand, trace to minor clay, grey, dark grey, stiff, wet to saturated, non plastic
		stiff
	3.0	
	3.5	very stiff
	4.0	
	4.5	
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

Depth (m)	Blows per 100mm	Shear strength (kPa)
0.5	38 r	95 V
1.0	28 r	63 V
1.5	32 r	95 V
2.0	28 r	95 V
2.5	28 r	79 V
3.0	47 r	111 V
3.5	49 r	114 V
4.0	62 r	141 V
4.5		200+ UTP V
5.0		200+ UTP V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH104

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Slightly to Moderately Sloping, Grass
Date Finished:	4/10/18	Water Level:	2.5m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
TS	0.0	SILT, minor clay, minor fine sand, brown, stiff, dry to moist, non to slightly plastic (TOPSOIL)
WEATHERED WAITEMATA GROUP SOILS	0.5	clayey SILT, trace fine sand, orange, yellowish orange, stiff to very stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS) yellow, orange, yellowish grey
	1.0	silty CLAY, highly plastic for 50mm light grey and orange, very stiff
	1.5	some clay to clayey, trace fine to medium sand, light grey with orange streaks, slightly to moderately plastic stiff, moist to wet
	2.0	clayey, orange, wet, non plastic a 6mm Ø dark red limonite SILT inclusion
		SILT, minor clay, some fine sand, orange, yellow, stiff, moist to wet, non to slightly plastic
	2.5	SILT, some clay to clayey, minor fine sand, light grey, orange, yellow, stiff, moist to wet, slightly to moderately plastic light grey with grey streaks
	3.0	very stiff clayey, trace fine sand, grey, bluish grey, moderately plastic lignite fragment to 8mm Ø grey, light grey, bluish grey
	3.5	SILT, some fine sand to sandy, minor clay, grey, very stiff, wet, non to slightly plastic trace clay, sandy, non plastic water seepage
	4.0	clayey SILT, trace fine sand, bluish grey, stiff to very stiff, moist to wet, moderately plastic some clay to clayey, slightly to moderately plastic clayey, moderately plastic
	4.5	SILT, some clay, some fine sand, bluish grey, stiff to very stiff, moist to wet, slightly plastic fine sandy SILT, trace clay, bluish grey, very stiff, wet, non plastic clayey SILT, bluish grey, very stiff, moist, moderately plastic
	5.0	SILT, some fine sand, minor clay, grey, very stiff, saturated, non to slightly plastic
		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
○ v
⊙ r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	72	122
1.0	68	130
1.5	36	68
2.0	36	72
2.5	40	76
3.0	54	126
3.5	54	119
4.0	54	108
4.5	72	158
5.0	79	212

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH105

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Slightlly to Moderately Sloping, Grass
Date Finished:	4/10/18	Water Level:	2.3m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"	WATER LEVEL (m)	DEPTH (m)	SCALA PENETROMETER TEST NZS:4402:1986 test 6.5.2 (Blows per 100mm Increment) 10 20 30 (Blows) SHEAR STRENGTH REMOULDED SHEAR v r 50 100 150 (kPa)	LABORATORY TESTS
TS	0.0		SILT, minor clay, minor fine sand, brown, stiff, moist, non to slightly plastic (TOPSOIL)		0.0		
WEATHERED WAITEMATA GROUP SOILS	0.5		clayey SILT, orange, light grey, stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS) some clay to clayey, trace fine sand, slightly to moderately plastic		0.5	4 r, 81 V	
	1.0		clayey, trace fine to coarse limonite sand, orange, wet, moderately plastic no limonite, light grey and orange		1.0	36 r, 101 V	
	1.5		some clay to clayey, slightly to moderately plastic clayey, moderately plastic some clay to clayey, minor fine sand, slightly to moderately plastic light grey, light yellowish grey		1.5	18 r, 72 V	
	2.0		SILT, minor clay, some fine sand to sandy, grey, stiff, wet, non to slightly plastic orange grey, yellow, grey	5/10/2018	2.0	36 r, 72 V	
	2.5		clayey SILT, trace fine sand, bluish grey, very stiff, moist, moderately plastic some clay to clayey, slightly to moderately plastic clayey, moderately plastic		2.5	54 r, 135 V	
	3.0				3.0	63 r, 144 V	
	3.5		some clay to clayey, slightly to moderately plastic some clay, some fine sand, slightly plastic water seepage, saturated clayey, moderately plastic		3.5	36 r, 153 V	
	4.0				4.0	54 r, 148 V	
	4.5		some clay, some fine sand, slightly plastic some clay to clayey, minor fine sand, slightly to moderately plastic some clay, some fine sand, slightly plastic		4.5	108 r, 189 V	
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)		5.0	72 r, 167 V	

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH106

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Grass
Date Finished:	3/10/18	Water Level:	4.0m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, minor clay, brown, firm, moist, non to slightly plastic (TOPSOIL/FILL)
BTS		clayey SILT, orange, very stiff, moist, moderately plastic (FILL)
		SILT, some clay, brown, firm, moist, slightly plastic (BURIED TOPSOIL)
WEATHERED WAITEMATA GROUP SOILS	0.5	SILT, some clay to clayey, trace fine sand, orange, yellow, light grey, stiff to very stiff, moist, slightly to moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
		some clay, some fine sand, slightly plastic
	1.0	some clay to clayey, minor fine sand, stiff, slightly to moderately plastic
		clayey, trace fine sand, light grey with orange, yellow and pink streaks
	1.5	some clay to clayey, minor fine sand, light grey with orange streaks, slightly to moderately plastic
		some clay, slightly plastic
		clayey, trace fine sand, light grey with orange and pink streaks, moderately plastic
	2.0	some clay to clayey, minor fine sand, slightly to moderately plastic
		clayey, trace fine sand, moderately plastic
		orange, yellow, light grey
	2.5	
		SILT, some clay, some fine sand, slightly plastic
	3.0	
		clayey, trace fine sand, moderately plastic
	3.5	
		trace limonite SILT inclusions to 20mm Ø
	4.0	
		saturated
		some clay, minor fine sand, slightly plastic
	4.5	
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)

SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	54	112
1.0	54	104
1.5	50	83
2.0	47	94
2.5	41	101
3.0	36	72
3.5	36	81
4.0	36	85
4.5	40	94
5.0	36	95

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH107

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	CD
Drilled By:	CD	Coordinates:		Shear Vane No - Calibration Date:	GEO361 - 27/02/2018
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Level, Grass
Date Finished:	4/10/18	Water Level:	3.0m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, minor clay, minor fine sand, trace fine to medium greywacke gravel, dark brown, stiff to very stiff, moist, non plastic (TOPSOIL/FILL)
	0.5		clayey SILT, trace fine to medium sand, trace fine greywacke gravel, orange, orange, brown, light brownish grey, very stiff, moist, slighty to moderately plastic (FILL)
	1.0		clayey SILT, trace fine sand, trace fine gravel, intermixed with silty CLAY and fine SAND, light brown, dark brown, grey with brownish black streaks, firm to stiff, moist, slightly to highly plastic
	1.5		trace fine to medium gravel
	2.0		
	2.5		some fine gravel, brownish black, very stiff for 100mm
	3.0		minor to some fine gravel, mottled brown, black, light grey and bluish grey, very stiff
	3.5		SILT, minor clay, trace fine to medium sand, brown to dark brown, very stiff, dry to moist, non plastic (TOPSOIL/FILL)
	4.0		clayey SILT, minor fine to medium sand, grey with yellowish brown speckles, very stiff, moist, moderately plastic (FILL)
			fine to coarse sandy SILT, some clay, brown and greyish green intermixed, very stiff, saturated, slightly plastic
	4.5		END OF BORE. 4.40 METRES. (SOLID OBSTRUCTION)
	5.0		

WATER LEVEL (m): 5/10/2018 at 3.0

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	
0.5	63 r, 133 V
1.0	32 r, 79 V
1.5	27 r, 79 V
2.0	35 r, 63 V
2.5	32 r, 63 V
3.0	200+ UTP V
3.5	79 r, 142 V
4.0	57 r, 126 V
4.5	200+ UTP V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH108

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NC
Drilled By:	NC	Coordinates:		Shear Vane No - Calibration Date:	GEO119 - 23/11/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Near Level, Grass
Date Finished:	3/10/18	Water Level:	1.6m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, trace clay, minor fine sand, dark brown, moist to wet, non plastic (TOPSOIL/FILL)
		SILT, some clay, minor fine to medium sand, orange, light grey, stiff, moist to wet, slightly plastic (FILL)
WEATHERED WAITEMATA GROUP SOILS	0.5	clayey SILT, trace fine sand, light orange, light grey with pink streaks, stiff, saturated, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
	1.0	silty CLAY, minor fine to medium sand, orange, light grey, light orange, very stiff, moist, highly plastic
		brown organic staining
	1.5	SILT, some clay to clayey, minor fine to medium sand, orange, light orange, very stiff, moist, slightly to moderately plastic
		stiff
		brown organic stains and mottles
	2.0	
		clayey, trace fine sand, orange light grey, very stiff, moderately plastic
	2.5	
		some clay, slightly plastic
	3.0	fine to medium sandy SILT, trace to minor clay, light brownish grey, stiff, saturated, non to slightly plastic
	3.5	
	4.0	clayey SILT, minor fine to medium sand, brownish orange, stiff, saturated, non plastic
	4.5	fine to medium sandy SILT, trace clay, orange, light orange, stiff, saturated, non plastic
		clayey SILT, trace fine sand, light grey, pink streaks, stiff, saturated, moderately plastic
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	13	52
1.0	70	117
1.5	86	156
2.0	42	91
2.5	78	117
3.0	65	99
3.5	26	70
4.0	26	104
4.5	47	91
5.0	52	99

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH109

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NC
Drilled By:	NC	Coordinates:		Shear Vane No - Calibration Date:	GEO119 - 23/11/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Grass
Date Finished:	3/10/18	Water Level:	4.4m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, trace clay, some fine sand, brown, moist to wet, non plastic (TOPSOIL/FILL)
			orange mottles
	0.5		SILT, some clay, minor fine to medium sand, orange, light grey, very stiff, moist, slightly plastic (FILL)
	1.0		
WEATHERED WAITEMATA GROUP SOILS	1.5		clayey SILT, trace fine sand, light grey, light orange, very stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
			orange with grey mottles
			dark orange streaks
	2.0		
	2.5		SILT, minor clay, minor to some fine to medium sand, light greyish orange, stiff, moist, non to slightly plastic
			trace medium to coarse limonite sand, trace fine angular limonite gravel
	3.0		clayey SILT, trace fine sand, dark orange with light grey streaks, very stiff, moist, moderately plastic
	3.5		SILT, some clay, minor fine to medium sand, light grey and grey, very stiff, moist, slightly plastic
	4.0		clayey SILT, trace fine sand, orange with grey streaks, very stiff, moist, moderately plastic
	4.5		fine to medium sandy SILT, minor clay, dark orange, very stiff, moist, non to slightly plastic
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	Scala (Blows)	Shear Strength (kPa)
0.5		182 V
1.0		182 V
1.5	78 r	143 V
2.0	65 r	117 V
2.5	49 r	78 V
3.0	62 r	143 V
3.5		182 V
4.0	52 r	117 V
4.5		182 V
5.0		182 V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH110

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Trees
Date Finished:	3/10/18	Water Level:	1.9m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, minor clay, minor fine sand, brown, stiff, dry to moist, non to slightly plastic (TOPSOIL/FILL)
		some dark orange clayey SILT inclusions
	0.5	SILT, some clay, topsoil and clayey SILT intermixed, some fine to coarse sand, brown, dark brown, grey, dark orange, stiff, moist, slightly to moderately plastic (FILL)
		trace decomposed wood fragments to 5mm Ø
	1.0	SILT, some clay, brown, firm, moist, slightly plastic (TOPSOIL/FILL)
		clayey SILT, greyish brown, light grey, stiff, moist, moderately plastic (FILL)
T		SILT, minor clay, brown, moist, non to slightly plastic (BURIED TOPSOIL)
WEATHERED WAITEMATA GROUP SOILS	1.5	clayey SILT, trace fine sand, yellow, orange, yellowish orange, stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
		silty CLAY, yellow, orange, light grey, stiff, moist to wet, highly plastic
	2.0	clayey SILT, trace fine sand, yellow, orange, very stiff, moist, moderately plastic
		saturated
	2.5	SILT, minor clay, some fine sand, bluish grey with orange streaks, very stiff, wet, non to slighty plastic
	3.0	some limonite SILT for 50mm, dark red
	3.5	clayey SILT, bluish grey, grey, orange, very stiff to hard, saturated, moderately plastic
		SILT, minor clay, minor fine sand, dark orange, hard, saturated, non to slightly plastic
		grey, dark orange
	4.0	some clay, slightly plastic
		hard
		some fine sand, grey, very stiff to hard
		very stiff
	4.5	very stiff to hard
		some clay to clayey, hard, slightly to moderately plastic
	5.0	fine SAND, some silt, grey, medium dense, saturated
		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)

SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	
0.0	
0.5	22 r, 86 V
1.0	14 r, 36 V
1.5	32 r, 76 V
2.0	47 r, 72 V
2.5	43 r, 90 V
3.0	36 r, 148 V
3.5	216 V
4.0	200+ UTP V
4.5	216 V
5.0	200+ UTP V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH111

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	4/10/18	Ground Elevation:		Surface Conditions:	Moderately Sloping, Grass
Date Finished:	4/10/18	Water Level:	4.8m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, minor clay, minor fine sand, brown, firm, moist, non to slightly plastic (TOPSOIL/FILL)
			clayey SILT and silty CLAY intermixed, yellow, light orange, light grey, very stiff, moist, moderately to highly plastic (FILL)
	0.5		
			SILT, minor clay, minor fine sand, brown, light grey for 50mm
			dark orange, yellow
	1.0		minor fine to medium gravel
			yellow, orange, light grey
			fine to medium GRAVEL, some fine to coarse sand, light grey, grey, medium dense, moist (GRANULAR FILL)
			clayey SILT and silty CLAY intermixed, orange, yellow, light yellow, very stiff, moist, moderately plastic
	1.5		some fine to medium gravel
			UTP due to gravel
			no gravel
			silty CLAY, yellow, light orange, stiff, moist, highly plastic
	2.0		trace fine to medium gravel
			some clayey SILT inclusions, orange, light grey, brownish grey
			silty CLAY, yellow, orange, light grey, very stiff, moist, highly plastic
	2.5		clayey SILT, some inclusions of SILT, some clay, trace fine to medium sand, orange grey, orange, grey, very stiff, moist, moderately plastic
BTS			SILT, minor clay, trace fine to medium gravel, minor fine sand, brown, very stiff, moist, non to slightly plastic (BURIED TOPSOIL)
WEATHERED WAITEMATA GROUP SOILS	3.0		silty CLAY, yellow, light orange, light grey, very stiff, moist, highly plastic (WEATHERED WAITEMATA GROUP SOILS)
			clayey SILT, trace fine sand, orange, yellow, light grey, very stiff, moist, moderately plastic
	3.5		
			trace limonite SILT inclusions to 10mm Ø
			stiff to very stiff
	4.0		
	4.5		SILT, minor clay, some fine sand, light grey, firm to stiff, wet, non to slightly plastic
			SILT, some clay, minor fine sand, light grey, yellow, orange, stiff, wet, slightly plastic
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)		
0.0		
0.5	72 r	122 V
1.0	58 r	126 V
1.5	54 r	200+ UTP V, 122 V
2.0	58 r	112 V
2.5	76 r	144 V
3.0	58 r	158 V
3.5	72 r	126 V
4.0	63 r	119 V
4.5	22 r	59 V
5.0	36 r	76 V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH112

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Moderately Sloping, Grass
Date Finished:	3/10/18	Water Level:	2.2m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, some clay, brown, firm, wet, slightly plastic (TOPSOIL/FILL)
		some organic clayey SILT inclusions to 20mm Ø
	0.5	SILT, some clay, some clayey SILT inclusions, greyish brown, orange, yellowish brown, firm, wet, slightly plastic (FILL)
		tree roots to 1mm Ø
		some decomposed wood fragments to 10mm Ø
		no decomposed wood
		some fine to coarse sand
	1.0	silty CLAY, orange, yellow, firm, wet, highly plastic
		clayey SILT, trace fine gravel, light grey, orange, yellow, firm to stiff, moist to wet, moderately plastic
		wet
	1.5	SILT, some clay, yellow, orange, soft, saturated, slightly plastic, hole collapse in this layer
		clayey SILT, light grey, yellow, orange, grey, yellow, light yellow, firm, saturated, moderately plastic
		some silty CLAY inclusions
		minor fine to medium gravel
	2.0	clayey SILT, trace fine to coarse sand, organic stained brown, very stiff, moist, moderately plastic
		some fine to medium gravel
		trace gravel
	2.5	light grey, light yellow with brown streaks
		no gravel, light grey, yellow, brown
	3.0	SILT, some clay, some fine to coarse sand, organic stained brown, greyish brown, very stiff, saturated, slightly plastic
		minor fine to medium gravel
		piece of yellow plastic to 6mm Ø
	3.5	trace grass inclusions
		trace fine to medium gravel, trace decomposed wood fragments to 20mm Ø
		some light grey streaks
TS	4.0	SILT, some clay, brown, very stiff, saturated, slightly plastic (BURIED TOPSOIL)
WWGS		silty CLAY, yellow, orange, stiff, saturated, highly plastic (WEATHERED WAITEMATA GROUP SOILS)
	4.5	yellow, orange, light grey
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	18	50
1.0	22	36
1.5	18	63
2.0	90	162
2.5	20	52
3.0	18	131
3.5	43	126
4.0	90	126
4.5	54	108
5.0	58	108

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH113

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NG
Drilled By:	NG	Coordinates:		Shear Vane No - Calibration Date:	GEO122 - 1/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Sloping, Soil
Date Finished:	3/10/18	Water Level:	2.0m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, some clay, trace fine sand, brown, black, yellow, stiff, moist, slightly plastic (TOPSOIL/FILL)
			brown with orange streaks
	0.5		SILT, some fine sand, minor clay, brown with orange mottles, stiff, moist, non to slightly plastic
			trace roots
PUKETOKA FORMATION	1.0		clayey SILT, minor fine sand, brown, orange streaks, stiff, moist, moderately plastic (PUKETOKA FORMATION)
			brown
			orange with brownish grey streaks
	1.5		SILT, some fine sand, trace clay, orange with brownish grey streaks, stiff, wet, non plastic
			SILT, some clay to clayey, orange and brownish grey, stiff, wet, slightly to moderately plastic
WEATHERED WAITEMATA GROUP SOILS	2.0		SILT, minor to some fine sand, minor to some clay, orange with brown and grey streaks, stiff, wet, non to slightly plastic (WEATHERED WAITEMATA GROUP SOILS)
	2.5		SILT, minor fine sand, minor clay, orange with brown and grey streaks, very stiff, wet to saturated, non to slightly plastic
			saturated
			minor to some clay, non to slightly plastic
	3.0		SILT, some clay to clayey, minor fine sand, orange with brown and grey streaks, very stiff, saturated, slightly to moderately plastic
			trace fine siltstone gravel
	3.5		SILT, minor clay, minor fine sand, grey, very stiff, saturated, non to slightly plastic
			hard
			orange limonite as 3mm wide streaks
	4.0		
	4.5		END OF BORE. 4.40 METRES. (TOO HARD TO AUGER)
	5.0		

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)

SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	Scala (Blows per 100mm)	Shear Strength (kPa)
0.5	18 r	88 V
1.0	22 r	104 V
1.5	15 r	88 V
2.0	18 r	86 V
2.5	27 r	87 V
3.0	30 r	60 V
3.5		200+ UTP V
4.0		200+ UTP V
4.5		200+ UTP V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH114

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NC
Drilled By:	NC	Coordinates:		Shear Vane No - Calibration Date:	GEO119 - 23/11/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	
Date Finished:	3/10/18	Water Level:	4.4m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, trace clay, minor fine to medium sand, dark brown, stiff, moist, non plastic (TOPSOIL/FILL)
		SILT, some clay, minor fine to coarse sand, orange, light grey with brown mottles, stiff, moist, slightly plastic (FILL)
	0.5	light grey, light orange mottles, very stiff
	1.0	some clay to clayey, slightly to moderately plastic
	1.5	clayey SILT, trace to minor fine sand, orange and light greyish brown intermixed, very stiff, moist, moderately plastic
	2.0	stiff
	2.5	an inclusion of angular gravel organic stained greyish brown
	3.0	light brownish orange
WEATHERED WAITEMATA GROUP SOILS	3.5	SILT, some clay to clayey, minor fine sand, light orange, stiff, moist, slightly to moderately plastic (WEATHERED WAITEMATA GROUP SOILS) light grey, orange mottles
	4.0	
	4.5	some clay, minor fine to medium sand, slightly plastic
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	V
0.5	36	99
1.0	55	127
1.5	65	117
2.0	36	91
2.5	39	91
3.0	52	122
3.5	57	114
4.0	47	107
4.5	55	91
5.0	49	78

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH115

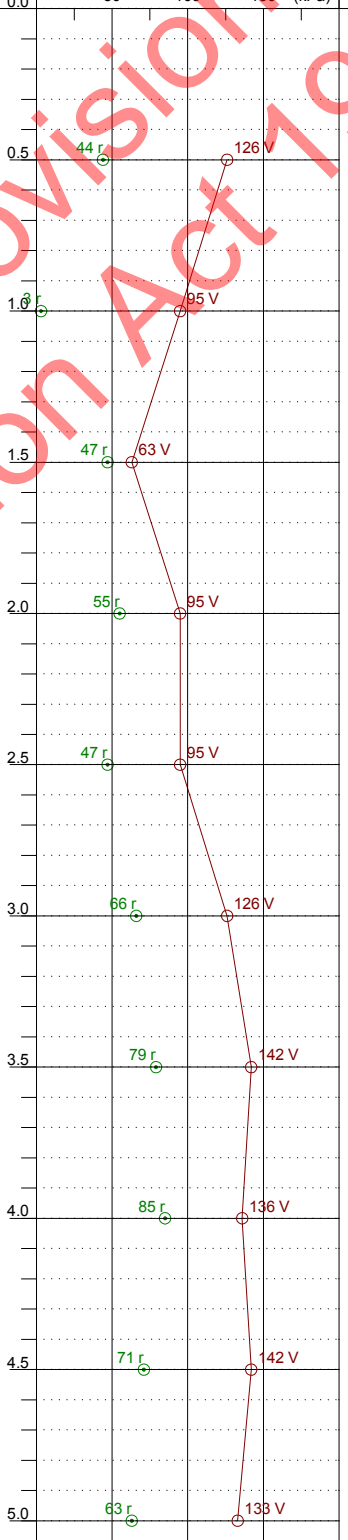
Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	CD
Drilled By:	CD	Coordinates:		Shear Vane No - Calibration Date:	GEO361 - 27/02/2018
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Sloping, Soil
Date Finished:	3/10/18	Water Level:	Not Encountered		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, minor fine to medium sand, trace clay, trace fine gravel, brown to dark brown, firm, dry to moist, non plastic (TOPSOIL/FILL)
	0.5		SILT, some clay, trace fine to medium sand, intermixed SILT inclusions, orange brown and light grey intermixed, stiff to very stiff, moist, slightly plastic (FILL)
			clayey, moderately plastic
			fine angular gravel for 50mm
	1.0		clayey SILT to silty CLAY, light orange brown with brown and grey mottles, stiff, moist, moderately to highly plastic
	1.5		black streaks
			trace fine siltstone gravel
	2.0		clayey SILT with some fine angular greywacke gravel, trace fine to medium sand, orange brown, brown and bluish grey intermixed, stiff, moist, moderately plastic
	2.5		clayey SILT to silty CLAY, light grey, orange and yellow intermixed, stiff, moist, moderately to highly plastic
	3.0		clayey SILT, minor fine gravel, trace to minor fine to medium sand, orange brown and orange light grey intermixed, bluish grey speckles, stiff to very stiff, moist, moderately plastic
			very stiff
			intermixed with topsoil inclusions
	3.5		
	4.0		minor lenses of light grey fine sand <10mm thick
	4.5		SILT, some clay, trace to minor fine to medium sand, trace fine gravel, grey and light grey intermixed, very stiff, dry to moist, non to slightly plastic
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m)

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)



LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH116

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NG
Drilled By:	NG	Coordinates:		Shear Vane No - Calibration Date:	GEO122 - 1/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Level, Grass
Date Finished:	3/10/18	Water Level:	5.0m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, minor clay, minor fine sand, brown and black, stiff, moist, non to slightly plastic (TOPSOIL/FILL)
			SILT, some clay to clayey, trace fine sand, trace fine angular gravel, orange with black and grey streaks, very stiff, moist, slightly to moderately plastic (FILL)
	0.5		clayey SILT, moderately plastic
			fine sandy SILT, brown and grey, stiff to very stiff, dry, non plastic
	1.0		clayey SILT, orange, grey and brown streaks, very stiff, moist, moderately plastic
	1.5		100mm of SILT, some clay as buried topsoil
BTS	2.0		SILT, some clay, trace fine sand, brown, very stiff, moist, slightly plastic (BURIED TOPSOIL)
WEATHERED WAITEMATA GROUP SOILS	2.5		clayey SILT, dark grey, brown, yellow, very stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
			silty CLAY, orange and yellow with grey streaks, very stiff, moist, highly plastic
	3.0		
			SILT, some clay to clayey, orange and yellow with grey streaks, very stiff, moist, slightly to moderately plastic
	3.5		stiff
	4.0		silty CLAY, grey with orange and yellow streaks, stiff, wet, highly plastic
			trace roots for 50mm
	4.5		clayey SILT to silty CLAY, orange and grey, stiff, moist, moderately to highly plastic
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	V
0.5	45	152
1.0	57	147
1.5	72	138
2.0		210
2.5	42	112
3.0	33	105
3.5	45	87
4.0	34	81
4.5	42	68
5.0	60	102

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH117

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Garden
Date Finished:	3/10/18	Water Level:	4.3m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, minor clay, brown, firm, moist, non to slightly plastic (TOPSOIL/FILL)
	0.5	clayey SILT and silty CLAY intermixed, trace fine to medium gravel, orange, yellow, yellowish orange, very stiff, moist, moderately to highly plastic (FILL) no gravel, some light grey streaks silty CLAY for 80mm trace fine to medium gravel
WEATHERED WAITEMATA GROUP SOILS	1.0	SILT, minor clay, minor fine sand, light grey, brown, hard, moist, non to slightly plastic (WEATHERED WAITEMATA GROUP SOILS)
		clayey SILT, orange, yellowish orange, very stiff to hard, moist, moderately plastic very stiff
	1.5	orange, yellow, light grey stiff to very stiff
	2.0	stiff silty CLAY, orange, light grey, stiff, moist, highly plastic
	2.5	clayey SILT, trace fine sand, orange, light grey, stiff, moist, moderately plastic
	3.0	SILT, some clay to clayey, minor fine sand, orange, light grey, yellow, stiff, moist, slightly to moderately plastic light grey with orange mottles
	3.5	SILT, minor clay, minor fine sand, light grey, some orange streaks, stiff, wet, non to slightly plastic some clay, slightly plastic
	4.0	clayey SILT, orange, dark orange, stiff, moist, moderately plastic
	4.5	minor fine to medium limonite gravel, firm to stiff, moist to wet some clay to clayey, slightly to moderately plastic light grey, grey, orange, moist to wet
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	58	126
1.0		216
1.5	54	135
2.0	58	108
2.5	58	108
3.0	50	94
3.5	36	72
4.0	40	72
4.5	36	58
5.0	40	90

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH118

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	5/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Garden
Date Finished:	5/10/18	Water Level:	3.1m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, trace clay, some fine to medium gravel, brown, firm, dry, non plastic (TOPSOIL/FILL)
		no gravel
		a 30mm Ø root
WEATHERED WAITEMATA GROUP SOILS		clayey SILT, orange, stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
	0.5	yellow and orange
		trace fine sand
		some clay to clayey, minor fine sand, slightly to moderately plastic
		clayey, trace fine sand, slightly to moderately plastic
	1.0	some clay to clayey, light grey, yellow, orange, slightly to moderately plastic
		clayey, trace fine sand, moderately plastic
		some clay to clayey, minor fine sand, light grey with yellow mottles, slightly to moderately plastic
	1.5	moist to wet
		some clay, some fine sand, slightly plastic
	2.0	clayey, trace fine sand, moderately plastic
		some clay, minor fine sand, slightly plastic, water seepage
	2.5	wet
		dark orange, yellow
	3.0	clayey, trace fine sand, moderately plastic
		SILT, some fine to medium sand to sandy, minor clay, orange, stiff, saturated, non to slightly plastic
		clayey SILT, orange, stiff, saturated, moderately plastic
	3.5	some clay to clayey, minor fine sand, grey with orange streaks, slightly to moderately plastic
		clayey, bluish grey, very stiff, moderately plastic
	4.0	fine sandy SILT, minor clay, grey, very stiff, saturated, non plastic
		clayey SILT, trace fine sand, bluish grey, stiff to very stiff, saturated, moderately plastic
	4.5	some clay to clayey, stiff, slightly to moderately plastic
		clayey, very stiff, moderately plastic
		very stiff to hard
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
○ v ⊙ r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	54	108
1.0	50	94
1.5	36	72
2.0	40	72
2.5	40	72
3.0	49	76
3.5	58	112
4.0	59	148
4.5	36	72
	72	133
5.0		200+ UTP

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH119

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	DEG
Drilled By:	DEG	Coordinates:		Shear Vane No - Calibration Date:	DR1768 - 21/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Garden
Date Finished:	3/10/18	Water Level:	2.6m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, minor clay, some fine to medium gravel, trace fine to coarse sand, brown, firm, moist, non to slightly plastic (TOPSOIL/FILL)
	0.5	clayey SILT and silty CLAY intermixed, trace fine to coarse sand, trace fine gravel, yellow, orange, very stiff, moist, moderately to highly plastic (FILL)
WEATHERED WAITEMATA GROUP SOILS	1.0	SILT, minor clay, minor fine sand, light grey, light brownish grey, very stiff, moist, non to slightly plastic (WEATHERED WAITEMATA GROUP SOILS)
		clayey SILT, trace fine sand, orange, yellow, very stiff, moist, moderately plastic some greyish brown organic stains
		organic stained greyish brown for 30mm
	1.5	no organic stains, stiff
		orange, yellow, light grey
	2.0	silty CLAY, yellow, orange, light grey, stiff, moist to wet, highly plastic
	2.5	clayey SILT, trace fine sand, yellow, orange, light grey, stiff, moist, moderately plastic
	3.0	light grey, some orange streaks
	3.5	SILT, minor clay, minor fine sand, orange, light grey, firm to stiff, wet, non to slightly plastic, water seepage
		SILT, some clay to clayey, trace fine sand, orange, firm to stiff, wet, slightly to moderately plastic saturated
	4.0	orange with grey streaks
		SILT, minor clay, minor fine sand, grey, firm to stiff, saturated, non to slightly plastic some clay, slightly plastic
	4.5	minor clay, non to slightly plastic
		clayey SILT, grey, stiff, saturated, moderately plastic
	5.0	SILT, some clay, minor fine sand, stiff, saturated, slightly plastic
		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	72	149
1.0	54	158
1.5	54	104
2.0	58	90
2.5	47	63
3.0	40	72
3.5	22	54
4.0	36	67
4.5	18	58
5.0	36	76

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH120

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NC
Drilled By:	NC	Coordinates:		Shear Vane No - Calibration Date:	GEO119 - 23/11/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Slightly Sloping, Grass
Date Finished:	3/10/18	Water Level:	3.9m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		fine sandy SILT, trace clay, light grey, very stiff, moist, non plastic (FILL)
	0.5		trace to minor coarse sand, dark orange streaks
WEATHERED WAITEMATA GROUP SOILS			clayey SILT, trace fine sand, light grey with pink streaks, very stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS)
	1.0		minor fine sand, orange mottles and streaks
	1.5		pink streaks and orange mottles, trace fine sand
	2.0		minor fine to medium sand, dark orange
	2.5		trace fine sand, light orange mottles
	3.0		light grey
	3.5		well cemented limonite for 3mm
			clayey SILT, trace fine sand, bluish grey, very stiff, saturated, moderately plastic
	4.0		minor fine sand, stiff
	4.5		
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)

SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	62	143
1.0	78	143
1.5	65	130
2.0	65	104
2.5	60	117
3.0	47	104
3.5	47	107
4.0	47	101
4.5	60	109
5.0	65	117

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH121

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	CD
Drilled By:	CD	Coordinates:		Shear Vane No - Calibration Date:	GEO361 - 27/02/2018
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Sloping, Grass
Date Finished:	3/10/18	Water Level:	2.2m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0		SILT, some clay, minor fine to medium sand, dark brown, firm to stiff, moist, non to slightly plastic (TOPSOIL/FILL)
			SILT, some clay, trace fine sand with occasional CLAY lenses, greyish brown with light brown streaks, stiff, moist, non to slightly plastic (FILL)
WEATHERED WAITEMATA GROUP SOILS	0.5		clayey SILT to silty CLAY, light brown, orange and orange brown intermixed, stiff, moist, moderately to highly plastic (WEATHERED WAITEMATA GROUP SOILS)
			clayey SILT, light brown with minor orange and yellowish orange streaks, stiff, moderately plastic
	1.0		
			reddish orange streaks
	1.5		
			clayey SILT to silty CLAY, some orange mottles, moderately to highly plastic
	2.0		
			firm to stiff, moist to wet
	2.5		
			saturated
	3.0		clayey SILT, trace fine to medium sand, light greyish brown with occasional orange streaks, firm to stiff, saturated, moderately plastic
	3.5		no sand, grey with minor orange streaks
	4.0		
	4.5		stiff
	5.0		END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)

SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	r	v
0.5	40	111
1.0	44	85
1.5	47	95
2.0	40	79
2.5	38	60
3.0	32	47
3.5	33	47
4.0	38	63
4.5	32	60
5.0	32	79

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Silverdale RSA

PROJECT: Geotechnical Investigation, 43A Vipond Road & 20 Melia Place, Stanmore Bay

Auger Hole No: AH122

Sheet 1 of 1

Drill Type:	50mm Hand Auger	Project No:	18334	Logged By:	NG
Drilled By:	NG	Coordinates:		Shear Vane No - Calibration Date:	GEO122 - 1/12/2017
Date Started:	3/10/18	Ground Elevation:		Surface Conditions:	Near Level, Soil
Date Finished:	3/10/18	Water Level:	1.3m 5/10/2018		

STRATIGRAPHY	DEPTH (m)	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"
FILL	0.0	SILT, some clay, minor fine sand, trace rootlets, brown, trace orange streaks, stiff, wet, slightly plastic (TOPSOIL/FILL)
		SILT, minor to some clay, minor to some fine sand, trace fine angular gravel, greyish brown, stiff, wet, non to slightly plastic (FILL)
	0.5	some fine sand, very stiff
		clayey SILT, trace fine sand, trace fine angular gravel, grey, brown and orange streaks, very stiff, moist, moderately plastic (WEATHERED WAITEMATA GROUP SOILS) orange with dark orange and grey streaks
	1.0	
WEATHERED WAITEMATA GROUP SOILS		silty CLAY, orange with grey streaks, very stiff, wet, highly plastic
		layers of SILT, some clay, less than 1mm thick
	1.5	saturated
		grey
	2.0	firm
		decomposed wood for 50mm
	2.5	grey with yellow streaks and purple organic streaks, stiff
	3.0	decomposed wood for 50mm
	3.5	bluish grey with orange streaks
	4.0	
	4.5	firm
	5.0	END OF BORE. 5.00 METRES. (TARGET DEPTH)

WATER LEVEL (m): 5/10/2018

SCALA PENETROMETER TEST
NZS:4402:1986 test 6.5.2
(Blows per 100mm Increment)
10 20 30 (Blows)
SHEAR STRENGTH
REMOULDED SHEAR
v
r
50 100 150 (kPa)

DEPTH (m)	Scala (Blows per 100mm)	Shear Strength (kPa)
0.0		
0.5		210 V
1.0	48 r	128 V
1.5	63 r	93 V
2.0	16 r	48 V
2.5	46 r	104 V
3.0	30 r	60 V
3.5	30 r	60 V
4.0	45 r	75 V
4.5	30 r	48 V
5.0	18 r	45 V

LABORATORY TESTS

HAND AUGER LOG WITH SCALA LOG - 18334 - AH 01-22 - 43A VIPOND ROAD, STANMORE BAY - 5.10.2018.GPJ S+R_2013.GDT 10/25/18

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PO Box 21-424 Henderson, Waitakere 0650
09 835 1740 Fax 09 835 1847
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SCALA PENETROMETER SHEET - TABLE OF BLOWS PER INCREMENT

JOB NAME: 43A Vipond Rd & 20 Melia Pl Stanmore Bay JOB NO: 18334 TESTED BY: CD/etc.. DATE: 3-5/10/18

Depth of Penetration [mm]	AH101	AH102	AH103	AH104	AH105	AH106	cont..	AH108	AH109	AH110	AH111	AH112
DEPTH START[m]	5.00	5.00	5.00	5.00	5.00	5.00	7.00	5.00	5.00	5.00	5.00	5.00
50 mm	0.5	3	3	2	1	1	10	1	2	1	1	1
100	0.5	4	4	3	2	1	10	1	2	2	2	1
150	1	5	4	3	3	1	10	1	2	2	2	1
200	1	5	6	4	4	1	10	2	2	2	2	1
250	1	5	8	4	4	1	10	2	3	3	2	1
300	1	8	10	5	6	1		3	2	3	2	1
350	2	8	8	7	7	1		3	3	3	3	1
400	2	10	6	7	8	2		3	3	9	3	1
450	3	8	1	7	7	2		3	4	10	3	2
500	2	8	1	8	8	3		5	5	12	6	3
550	3	10	12	8	10	3		5	5	20+	6	3
600	3	14	14	10	10	4		5	5		6	4
650	3	10	14	10	10	6		5	5		10	5
700	3	11		12	20+	6		6	5		8	6
750	3	11		12		6		8	6		9	9
800	3			11		6		8	5		9	6
850	5					6		6	5		10	7
900	6					7		8	4		10	6
950	5					7		10	10		10	8
1000	10					9		10	10		11	6
1050	7					10		12	10		10	7
1100	7					1		10	10			10
1150	1					10		10	11			13
1200	10					6						12
1250	10					6						12
1300	10					6						12
1350	11					7						
1400						7						
1450						7						
1500						7						
1550						7						
1600						10						
1650						10						
1700						7						
1750						6						
1800						7						
1850						10						
1900						10						
1950						6						
2000						6						
DEPTH END [m]	6.35	5.75	5.65	5.80	5.70	7.00	7.25	6.15	6.15	5.55	6.05	6.30

Testing Method: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer

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SCALA PENETROMETER SHEET - TABLE OF BLOWS PER INCREMENT

JOB NAME: 43A Vipond Rd & 20 Melia Pl Stanmore Bay JOB NO: 18334 TESTED BY: CD/etc.. DATE: 3-5/10/18

Depth of Penetration [mm]	AH113	AH114	AH116	AH117	AH118	AH119	cont..	AH120	AH121	AH122		
DEPTH START[m]	4.40	5.00	5.00	5.00	5.00	5.00	7.00	5.00	5.00	5.00		
50 mm	2	SUNK	SUNK	0.5	3	0.5	9	1	1	1		
100	4	↓	↓	0.5	5	0.5	10	2	1	1		
150	5	↓	1	1	5	1	10	2	2	1		
200	3	1	2	1	6	1	10	2	2	1		
250	4	1	2	1	8	1	10	2	2	1		
300	3	1	2	2	8	1	11	4	2	2		
350	5	1	2	2	10	2		3	3	2		
400	10	1	2	2	11	2		4	3	2		
450	9	2	3	3	14	2		4	2	2		
500	10	2	3	3	14	2		4	3	2		
550	10	3	3	3	13	2		4	4	2		
600	10	3	4	3		2		5	3	3		
650	6	2	3	3		3		6	3	3		
700	6	3	3	4		3		6	3	3		
750	10	5	3	4		3		6	4	3		
800	10	6	4	4		3		9	4	4		
850	10	5	4	4		4		11	4	4		
900	10	5	7	5		4		11	4	4		
950	10	5	10	5		4		10	4	4		
1000		5	10	7		4		12	5	9		
1050		12	6	7		5		12	5	7		
1100		7	7	7		6			5	11		
1150		7	7	7		5			8	8		
1200		7	7	9		6			5	12		
1250		7	7	9		6			7	10		
1300		7	7	7		6			6	10		
1350		7	7	7		7			7	10		
1400		10	8	10		8			6	10		
1450		10	10	10		7			7			
1500		10	10	10		7			8			
1550		11	10	10		7			6			
1600		10	10	10		7			7			
1650			10			8			10			
1700						8			10			
1750						9			10			
1800						9			10			
1850						10			10			
1900						10						
1950						9						
2000						7						
DEPTH END [m]	5.35	6.60	6.65	6.60	5.55	7.00	7.30	6.05	6.85	6.40		

Testing Method: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer

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SS105 (AH105)

Shrink-Swell Test Results

Job Name:	43A Vipond Road, Stanmore Bay	Job No:	18334
Date:	04.10.18	Tested By:	SV
Sample Location:	SS105 (AH105)	Date Sampled:	03.10.18
Sampling method:	Push Tube	Sampled By:	CD
Sampling depth (m):	0.4-0.7	Inert inclusions (%):	0
Sample condition:	Good	Extent of cracking (%):	<5
		Extent of crumbling (%):	0

Sample description: Silty CLAY, trace fine sand, trace rootlet inclusions, light grey and orange, very stiff, moist, highly plastic (Natural)

Wet Density	γ (t/m^3) =	1.73
Dry Density	γ_d (t/m^3) =	1.14

Shrinkage Test

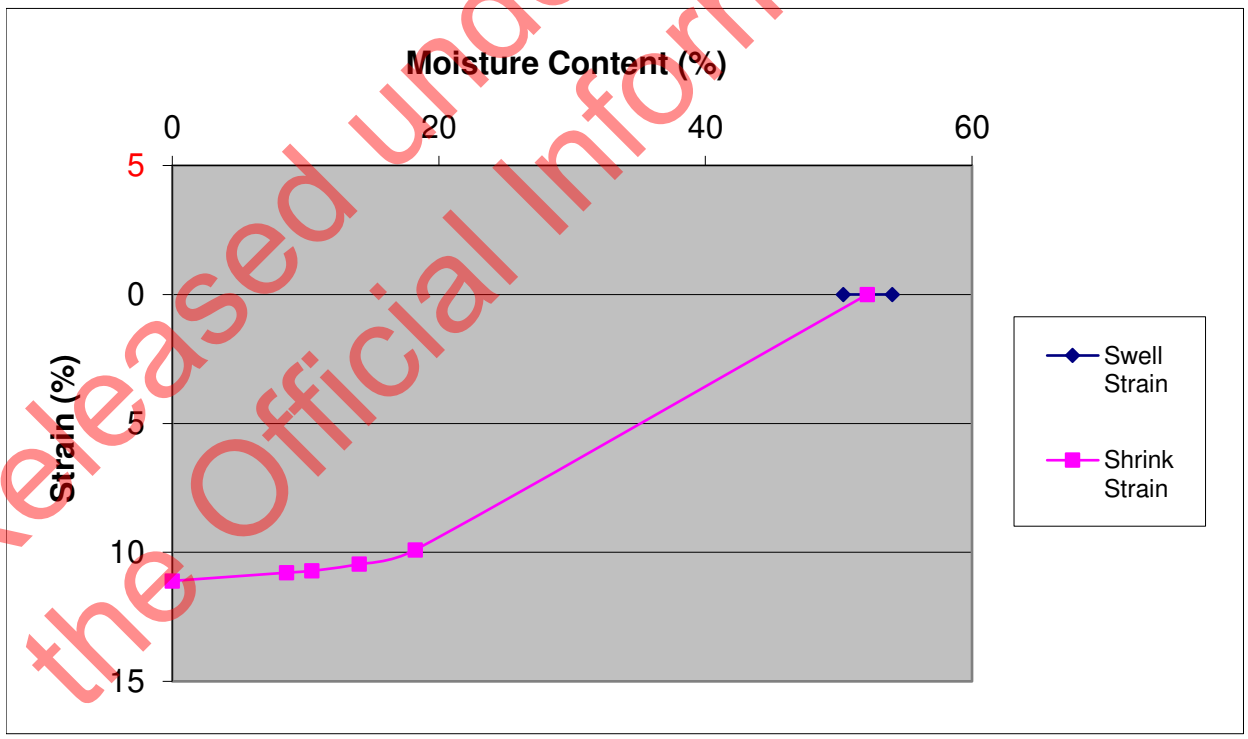
Initial moisture content (%) =	52.1
ε_{sh} = Magnitude of total shrinkage strain (%) =	11.1

Swell Test

ε_{sw} = Magnitude of the swelling strain (%) =	0.1

(Note: The ε_{sw} value is negative if the sample has undergone consolidation)

Initial moisture content (%) =	54.0
Final moisture content (%) =	50.3



Shrink-Swell index **Iss =** **6.2** **Strain per ΔpF (%)**

Testing Method: AS1289.7.1.1 - 1998 Soil reactivity tests

Soil&Rock Consultants
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SS111 (AH111)

Shrink-Swell Test Results

Job Name:	43A Vipond Road, Stanmore Bay	Job No:	18334
Date:	04.10.18	Tested By:	SV
Sample Location:	SS111 (AH111)	Date Sampled:	03.10.18
Sampling method:	Push Tube	Sampled By:	CD
Sampling depth (m):	0.4-0.7	Inert inclusions (%):	0
Sample condition:	Good	Extent of cracking (%):	<5
		Extent of crumbling (%):	0

Sample description: Clayey SILT, trace fine sand, light grey and light orange, very stiff, moist, moderately plastic (Natural)

Wet Density	γ (t/m^3) =	1.74
Dry Density	γ_d (t/m^3) =	1.17

Shrinkage Test

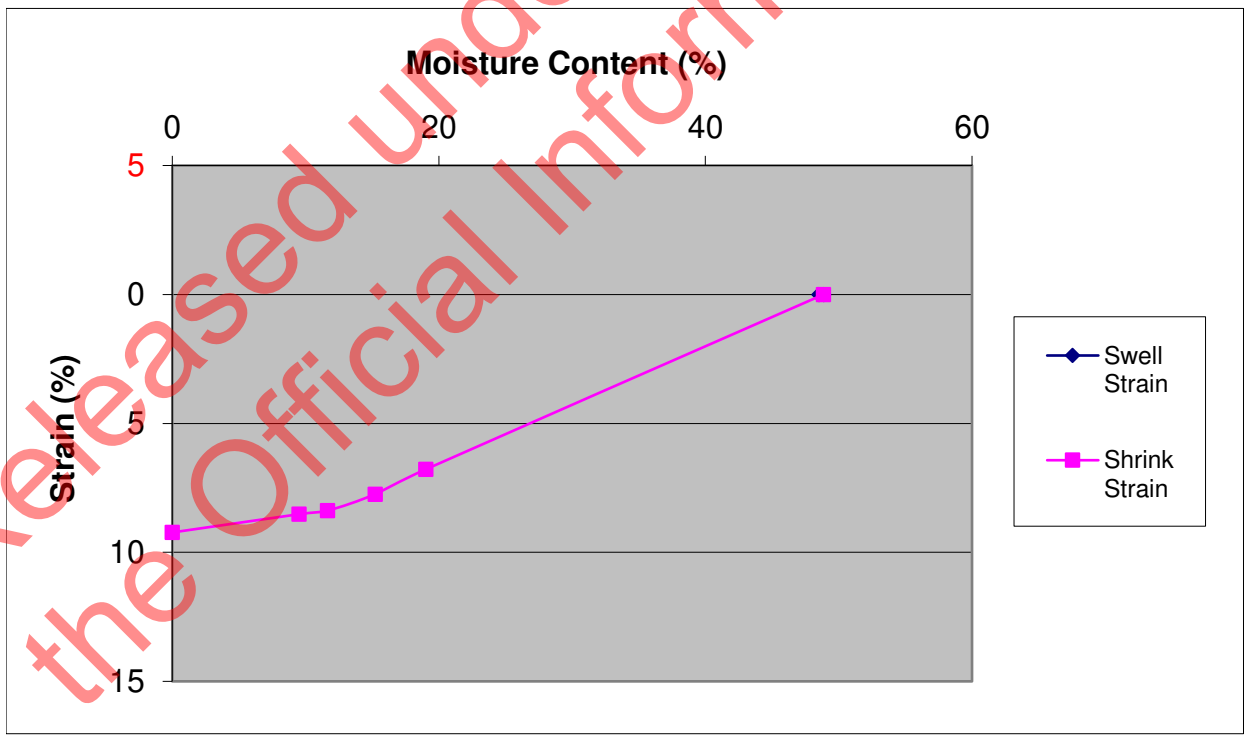
Initial moisture content (%) =	48.9
ε_{sh} = Magnitude of total shrinkage strain (%) =	9.2

Swell Test

ε_{sw} = Magnitude of the swelling strain (%) =	-0.1

(Note: The ε_{sw} value is negative if the sample has undergone consolidation)

Initial moisture content (%) =	48.5
Final moisture content (%) =	48.9



Shrink-Swell index **Iss =** 5.1 **Strain per ΔpF (%)**

Testing Method: AS1289.7.1.1 - 1998 Soil reactivity tests

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SS119 (AH119)

Shrink-Swell Test Results

Job Name:	43A Vipond Road, Stanmore Bay	Job No:	18334
Date:	04.10.18	Tested By:	SV
Sample Location:	SS119 (AH119)	Date Sampled:	03.10.18
Sampling method:	Push Tube	Sampled By:	CD
Sampling depth (m):	0.5-0.9	Inert inclusions (%):	0
Sample condition:	Good	Extent of cracking (%):	<5
		Extent of crumbling (%):	0
Sample description:	Clayey SILT, trace fine to medium sand, orange with grey streaks, very stiff, moist, moderately plastic (Natural)		

Wet Density	γ (t/m^3) =	1.84
Dry Density	γ_d (t/m^3) =	1.34

Shrinkage Test

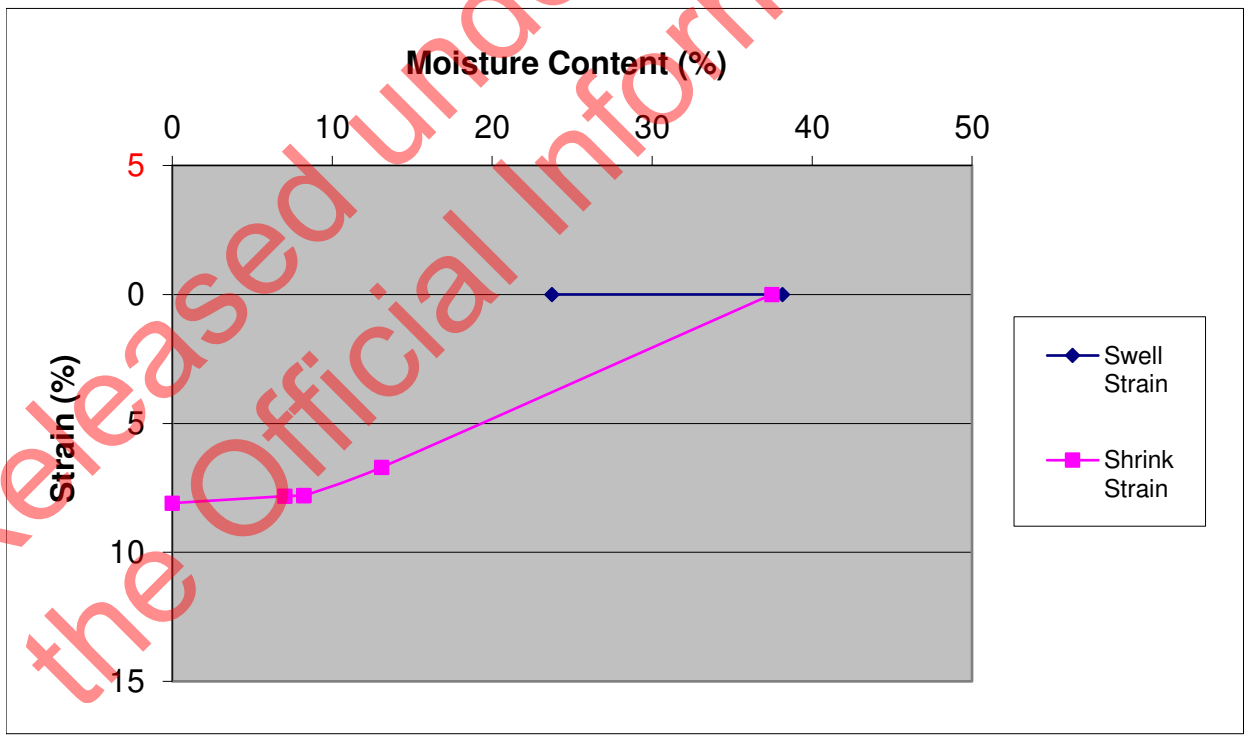
Initial moisture content (%) =	37.5
ε_{sh} = Magnitude of total shrinkage strain (%) =	8.1

Swell Test

ε_{sw} = Magnitude of the swelling strain (%) =	-1.0

(Note: The ε_{sw} value is negative if the sample has undergone consolidation)

Initial moisture content (%) =	38.2
Final moisture content (%) =	23.7

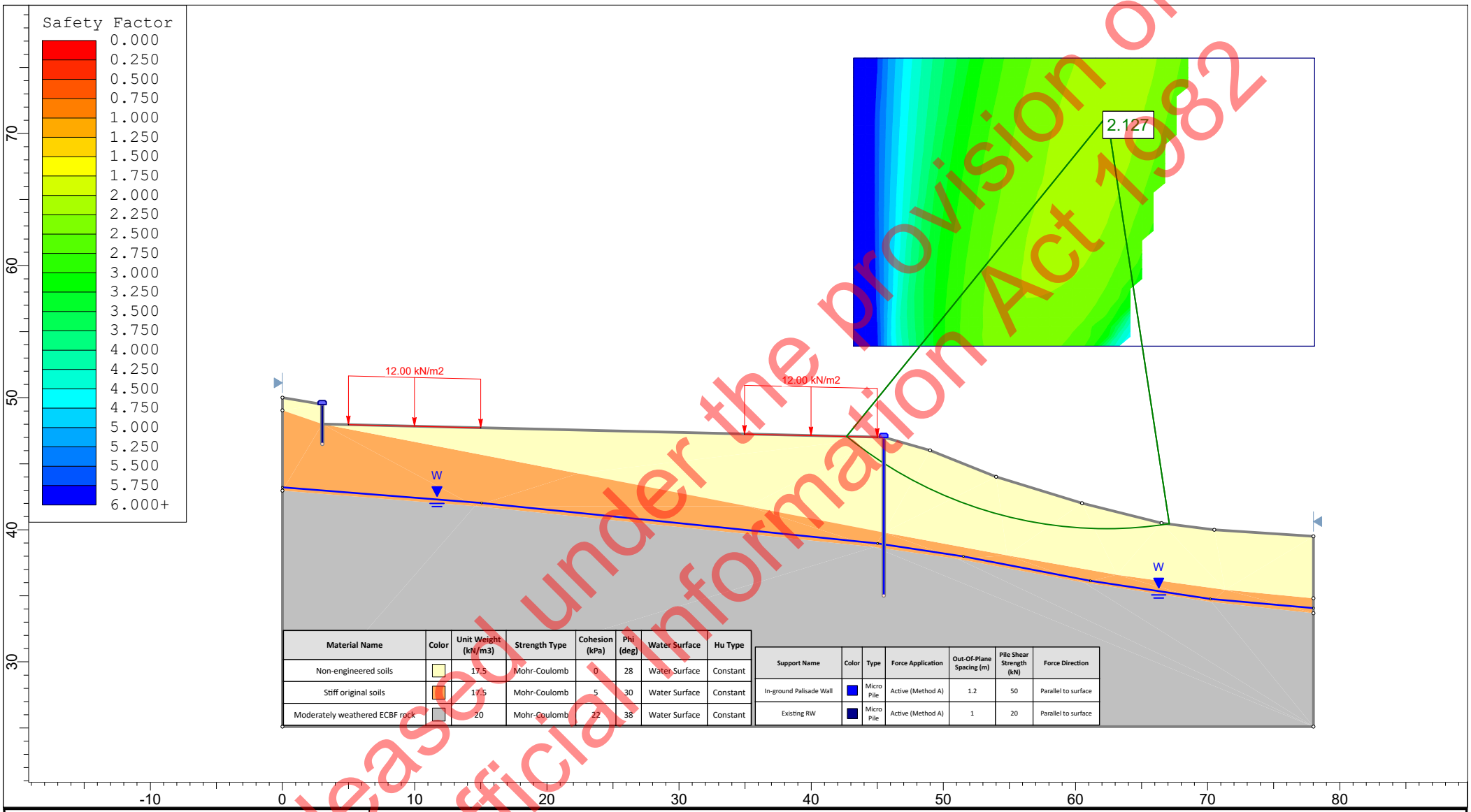


Shrink-Swell index **Iss =** **4.5** **Strain per ΔpF (%)**

Testing Method: AS1289.7.1.1 - 1998 Soil reactivity tests

Appendix C

Slope Stability Analyses

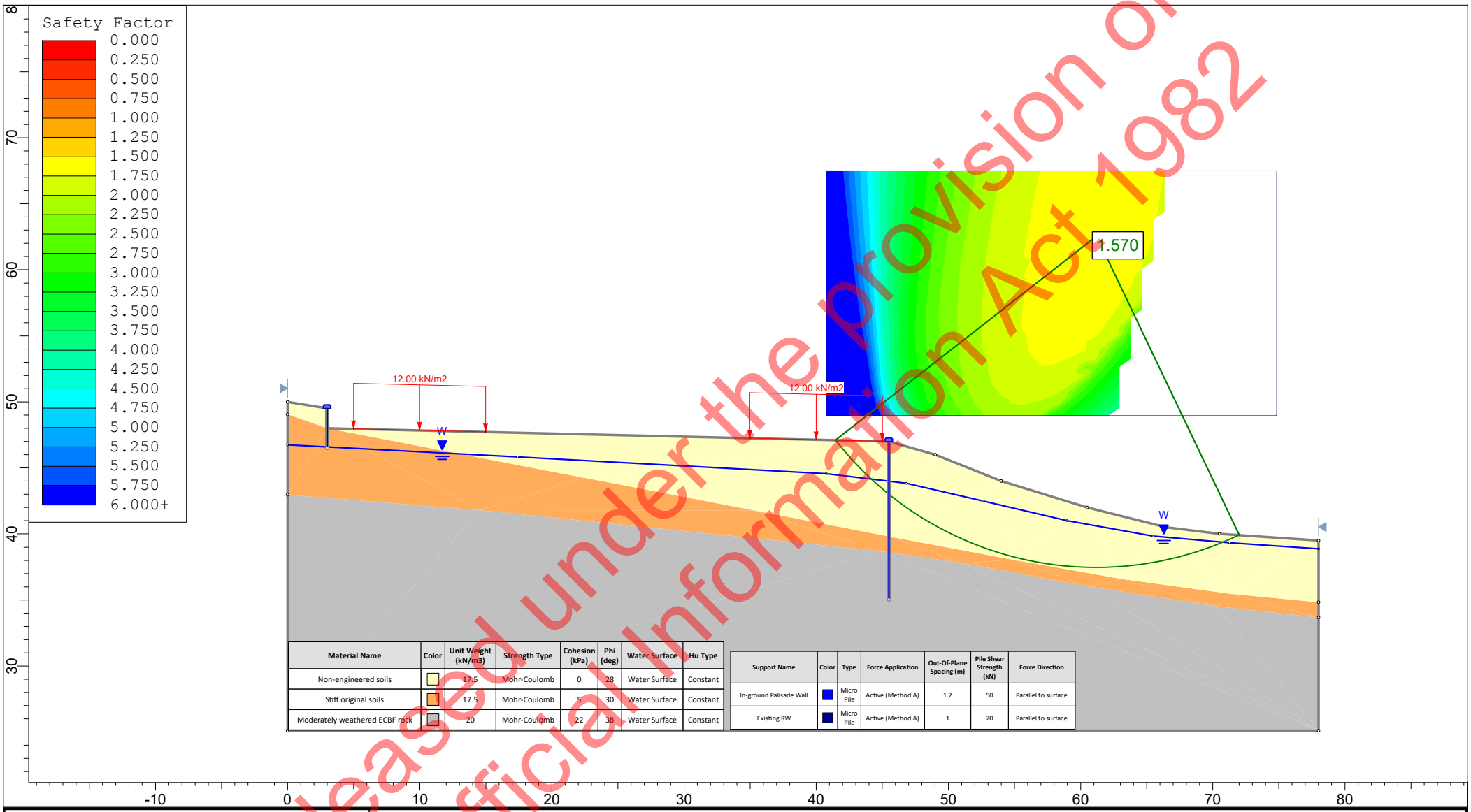


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Non-engineered soils		17.5	Mohr-Coulomb	0	28	Water Surface	Constant
Stiff original soils		17.5	Mohr-Coulomb	5	30	Water Surface	Constant
Moderately weathered ECBF rock		20	Mohr-Coulomb	22	38	Water Surface	Constant

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)	Force Direction
In-ground Palisade Wall		Micro Pile	Active (Method A)	1.2	50	Parallel to surface
Existing RW		Micro Pile	Active (Method A)	1	20	Parallel to surface

Project	43A Vipond Rd, & 20 Melia Pl, Stanmore Bay		
Analysis Description	Normal GW		
Drawn By	R.B.	*Scale* 1:400	*Company* GeoStudio Ltd
Date	16/02/2021, 8:28:51 AM		*File Name* Normal GW.slim

SLIDEINTERPRET 6.020

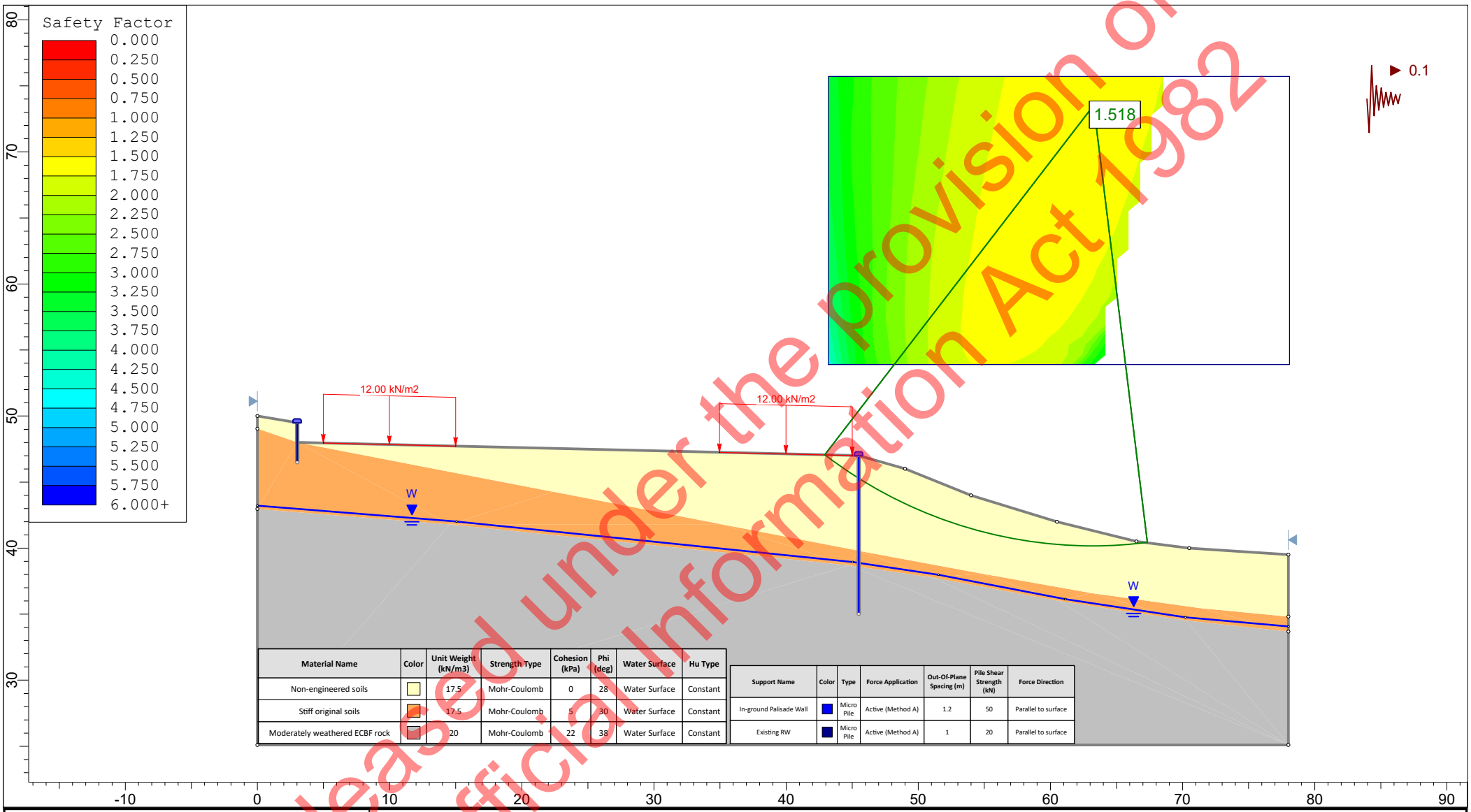


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Non-engineered soils		17.5	Mohr-Coulomb	0	28	Water Surface	Constant
Stiff original soils		17.5	Mohr-Coulomb	5	30	Water Surface	Constant
Moderately weathered ECBF rock		20	Mohr-Coulomb	22	38	Water Surface	Constant

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)	Force Direction
In-ground Palisade Wall		Micro Pile	Active (Method A)	1.2	50	Parallel to surface
Existing RW		Micro Pile	Active (Method A)	1	20	Parallel to surface

Project	43A Vipond Rd, & 20 Melia Pl, Stanmore Bay		
Analysis Description	Elevated GW		
Drawn By	R.B.	*Scale* 1:400	*Company* GeoStudio Ltd
Date	16/02/2021, 8:28:51 AM		*File Name* Elevated GW.slim

SLIDEINTERPRET 6.020



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Non-engineered soils		17.5	Mohr-Coulomb	0	28	Water Surface	Constant
Stiff original soils		17.5	Mohr-Coulomb	5	30	Water Surface	Constant
Moderately weathered ECBF rock		20	Mohr-Coulomb	22	38	Water Surface	Constant

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Pile Shear Strength (kN)	Force Direction
In-ground Palisade Wall		Micro Pile	Active (Method A)	1.2	50	Parallel to surface
Existing RW		Micro Pile	Active (Method A)	1	20	Parallel to surface

Project	43A Vipond Rd, & 20 Melia Pl, Stanmore Bay		
Analysis Description	Normal GW		
Drawn By	R.B.	*Scale* 1:400	*Company* GeoStudio Ltd
Date	16/02/2021, 8:28:51 AM		*File Name* Normal GW (seismic).slim

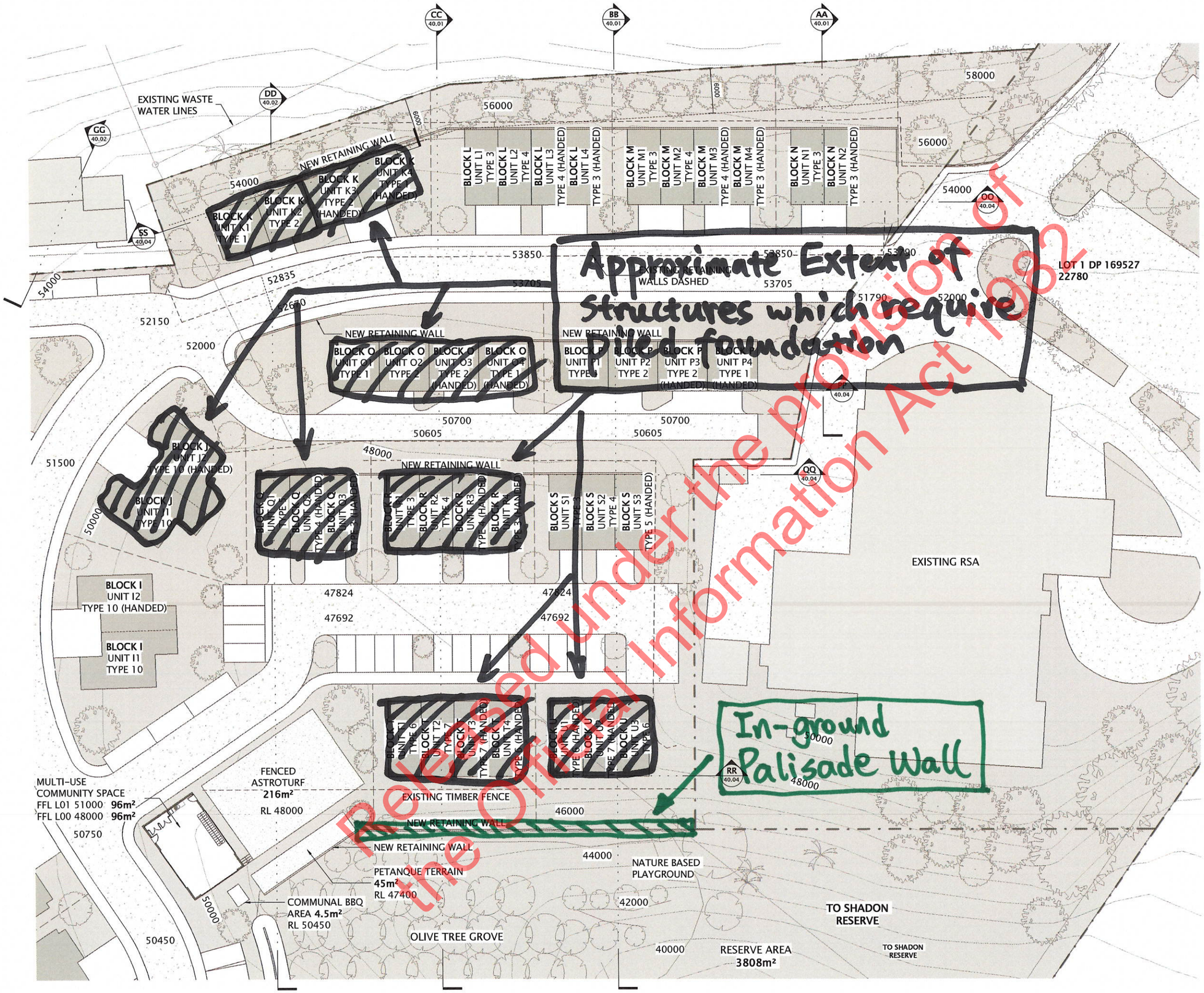
SLIDEINTERPRET 6.020

Appendix D

SK-2282-01, SK-2282-02 & SK-2282-03

SK-228-01
GeoStudio Ltd

DRAFT



1 10.01 PROPOSED OVERALL DEVELOPMENT – ZONE 2
SCALE: 1 : 250

REV	DATE	INITIAL	AMENDMENT
REVISIONS			

PROJECT STATUS

CLIENT
MELIA DEVELOPMENT LIMITED

PROJECT
20 MELIA PLACE
20 MELIA PLACE, WHANGAPARAOA

SHEET TITLE
PROPOSED DEVELOPMENT ZONE 2

TRUE NORTH		DESIGN	DRAWN
N		CM	LM

SCALE @ A1 (HALF SCALE IF PRINTED @ A3)
1 : 250

FIRST ISSUE DATE	PROJECT No.
01/27/21	20053

SHEET No. 10.03
REVISION

paterson + cullen + archaus
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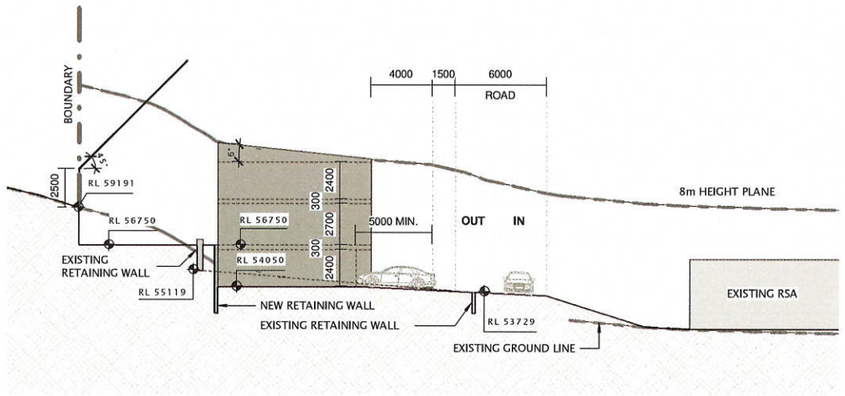
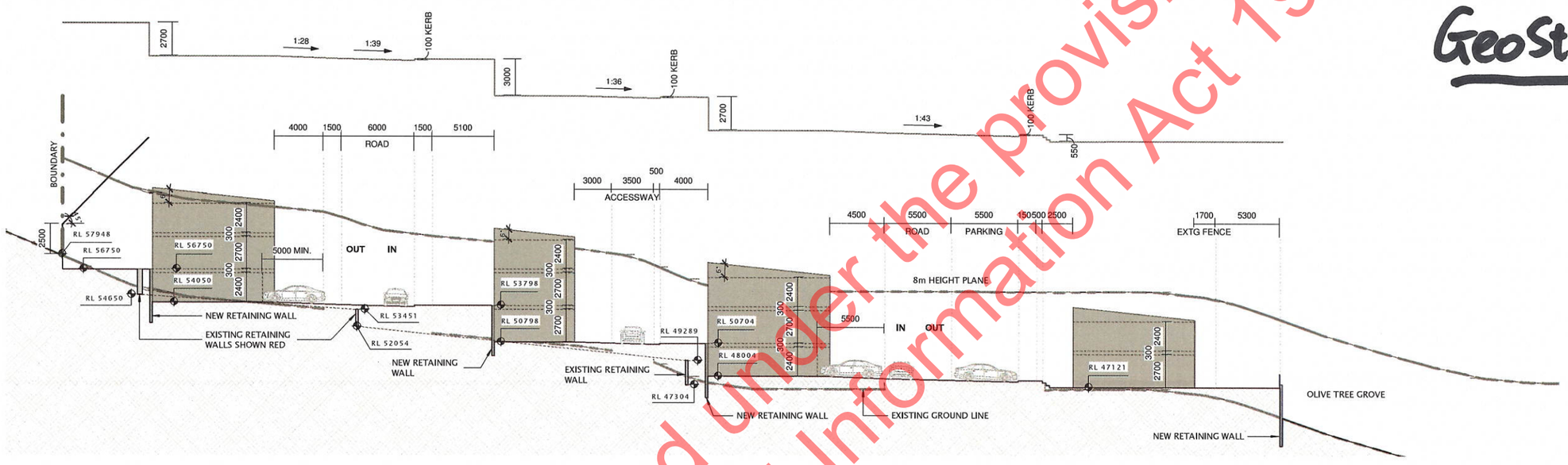


AA 10.01 SITE SECTION A–A
SCALE: 1 : 200



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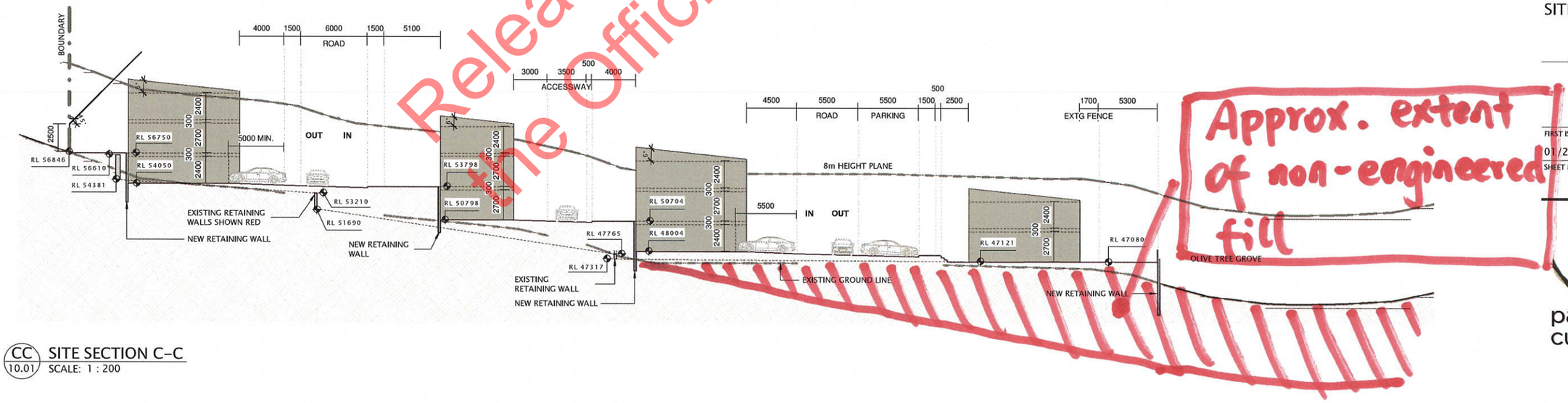
SCALE: 1 : 200



CC 10.01 SITE SECTION C–C
SCALE: 1 : 200

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DRAFT

REV	DATE	INITIAL	AMENDMENT
REVISIONS			

PROJECT STATUS

CLIENT
MELIA DEVELOPMENT LIMITED

PROJECT
20 MELIA PLACE
20 MELIA PLACE, WHANGAPARAOA

SHEET TITLE
SITE SECTIONS

DESIGN	DRAWN
CM	LM

SCALE @ A1 (HALF SCALE IF PRINTED @ A3)
1 : 200

FIRST ISSUE DATE	PROJECT No.
01/25/21	20053

SHEET No. 40.01 REVISION

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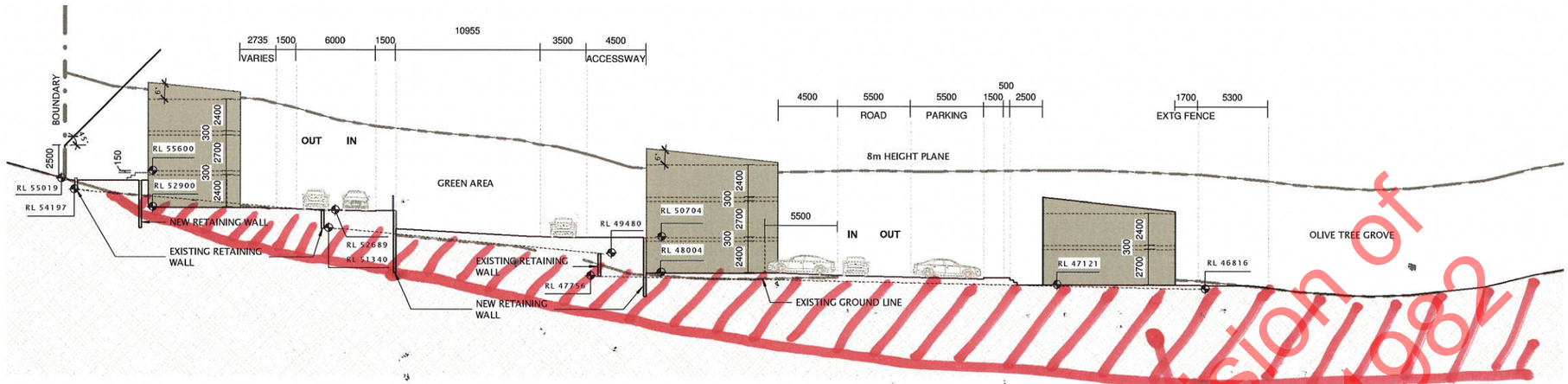
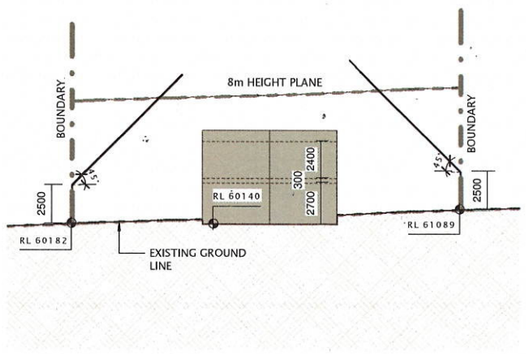
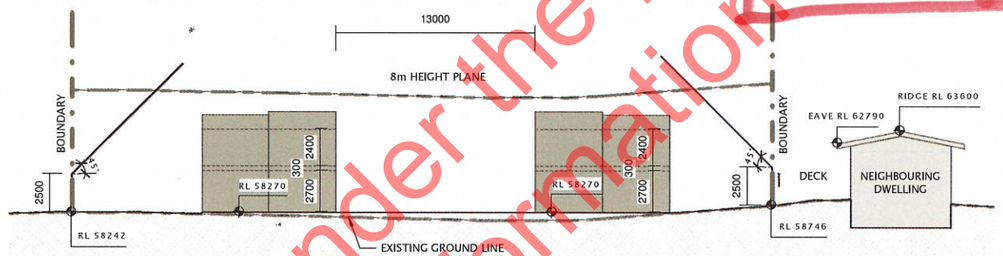


DD 10.01 SITE SECTION D–D
SCALE: 1 : 200

Approx. extent of non-engineered fill

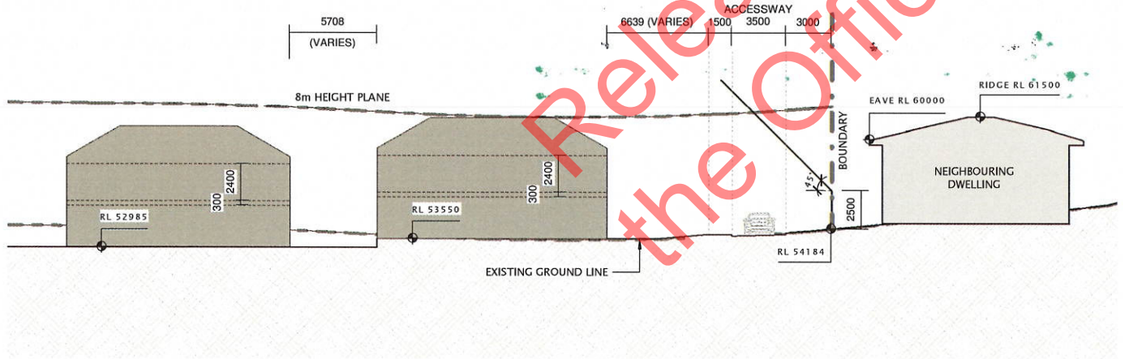
DRAFT

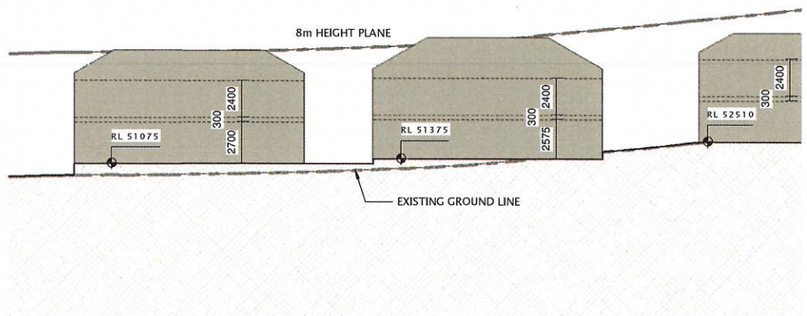




EE 10.01 SITE SECTION E–E
SCALE: 1 : 200

FF 10.01 SITE SECTION F–F
SCALE: 1 : 200





GG 10.01 SITE SECTION G–G
SCALE: 1 : 200

HH 10.01 SITE SECTION H–H
SCALE: 1 : 200

REV	DATE	INITIAL	AMENDMENT
REVISIONS			

PROJECT STATUS

CLIENT
MELIA DEVELOPMENT LIMITED

PROJECT
20 MELIA PLACE
20 MELIA PLACE, WHANGAPARAOA

SHEET TITLE
SITE SECTIONS

DESIGN	DRAWN
CM	LM

SCALE @ A1 (HALF SCALE IF PRINTED @ A3)
1 : 200

FIRST ISSUE DATE: 01/25/21
PROJECT No.: 20053
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