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# **GEOTECHNICAL SITE CLASSIFICATION**

## **LOT 122**

### **FIVE FARMS ESTATE STAGE 1, CLYDE NORTH**

Prepared for Frasers Property Australia c/- Beveridge Williams Pty Ltd

**Report Reference: G4589.1**

**Date: 2 February 2022**

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## PROJECT DETAILS

Project Reference	G4589.1	Rev	AV
Project Title	Five Farms Estate Stage 1		
Project Location	Clyde North	State	VIC
Date	2 February 2022		

## CLIENT DETAILS

Prepared For (Client)	Fraser's Property Australia		
Prepared For (Facilitator)	Beveridge Williams Pty Ltd		
Client Address	Level 9, 484 St Kilda Road	Suburb	Melbourne

## DISTRIBUTION

Original Held By	Ground Science Pty Ltd
One (1) Electronic Copy	Fraser's Property Australia
One (1) Electronic Copy	Beveridge Williams Pty Ltd

This document presents the results of the site classification conducted for the aforementioned project and is detailed for the sole use of the intended recipient. Should you have any questions related to this report please do not hesitate to contact the undersigned.

**AUTHOR:**



**Chris Connelly**  
Engineering Geologist

**TECHNICAL REVIEW:**



**Gee Singh, MIEAust (NER)**  
Senior Geotechnical Engineer

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## 1. INTRODUCTION

This report presents the results of the geotechnical site classification investigation carried out by Ground Science at Lot 122, Five Farms Estate Stage 1 located in Clyde North, Victoria (the site). The scope of works detailed herein was commissioned by Beveridge Williams Pty Ltd (the facilitator) on behalf of Frasers Property Australia (the Client).

## 2. PROJECT BACKGROUND & UNDERSTANDING

The project involved providing geotechnical site classifications for the allotments within Stage 1 of the Five Farms Estate residential development.

The residential development included the construction of building platforms as part of the bulk earthworks phase of the project, which primarily involved site cuts and placement of controlled fill. Controlled fill was placed and compacted to Level 1 procedures in general accordance with AS3798 (2007) 'Guidelines on Earthworks for Residential and Commercial Developments'. A plan showing the approximate areas of fill and field density test locations is shown on Figure 2 in Appendix A. Ground Science were the nominated Geotechnical Inspection and Testing Authority for the Level 1 filling works within this stage of the estate (report reference: GS5860.1 AA dated 29<sup>th</sup> September 2021).

The professional advice provided in this report is based on the information provided at the time of the report preparation and may not be valid if changes are made to the site, the development proposal, or the construction methods. In the event of such changes, further advice should be sought from Ground Science.

## 3. PROJECT AIMS

The aims of the investigation were as follows:

- To assess the subsurface conditions at the site relevant to the proposed development through a desktop regional geological study;
- To recover soil samples for laboratory analysis (representative soil samples spread across Stage 1);
- To log the soils as per the guidelines presented in AS1726 (2017) 'Geotechnical Site Investigations';
- To classify the site in accordance with AS2870 (2011) 'Residential Slabs and Footings';
- To calculate the characteristic surface movement ( $Y_s$ ) for the site;
- To provide advice on allowable bearing pressures and geotechnical parameters for the design of footing systems;
- To provide general construction advice.

## 4. FIELDWORK

The fieldwork was completed on the 9<sup>th</sup> and 13<sup>th</sup> of December 2021 which involved the drilling of 23 boreholes at the locations shown on Figure 3 in Appendix A. The boreholes were drilled using an ATS or GT10 drilling rig supplied and operated by Ground Science. The boreholes were advanced to a target depth of 2.0m below the surface level.

Details of the subsurface conditions encountered within the boreholes are presented in the engineering borehole logs in Appendix B. The fieldwork was conducted by a geotechnical engineer from Ground Science who located the boreholes, recovered soil samples, operated the drilling rig and prepared the engineering borehole logs. The laboratory testing was undertaken in Ground Science's NATA accredited laboratory in Thomastown, Victoria.

## 5. RESULTS

### 5.1 REGIONAL GEOLOGICAL CONDITIONS

An understanding of the regional geological conditions was undertaken through the review of the Geological Survey maps of Victoria, which indicates the site to be underlain by Miocene to Pliocene aged 'Red Bluff Sandstone' deposits, with Pleistocene to Holocene aged alluvial deposits indicated to exist to the west and south/west. This assessment excludes any fill or foreign material, with controlled (engineered) fill noted to have been placed on the allotments. The regional geological conditions are presented in Figure 2:

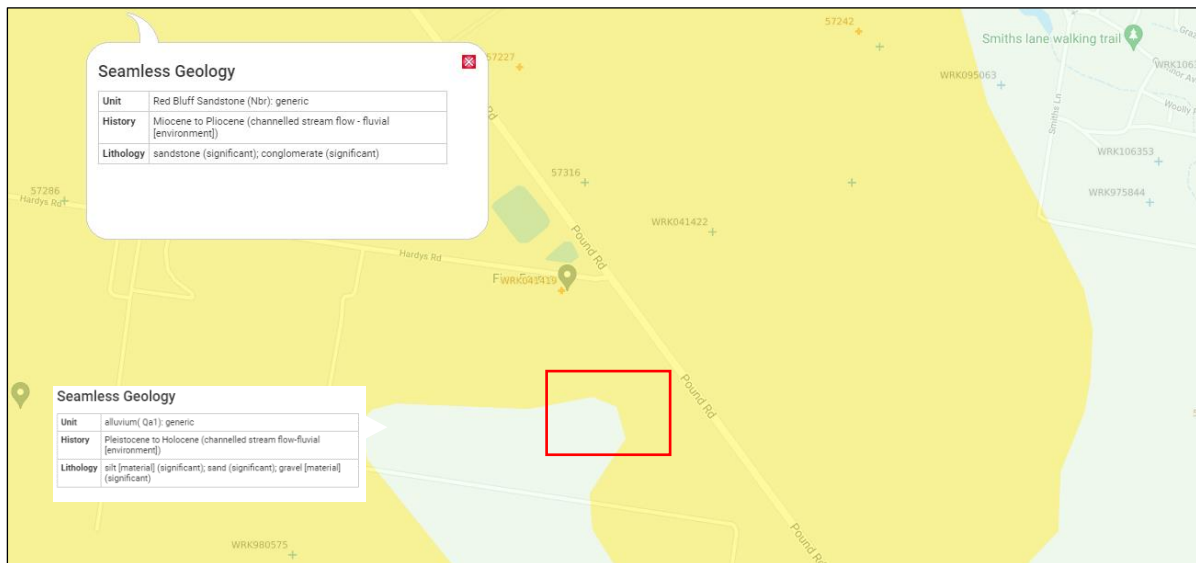


Figure 2: Regional Geological Conditions

### 5.2 SURFACE CONDITIONS

The site is located south-west of Pound Road and south of Hardys Road and situated north and east of existing greenfields that are yet to be developed. At the time of our investigation, the site was observed to be generally flat with poor to fair drainage conditions noted. The surface of the allotments was dry and generally comprised barren soil. The site was generally trafficable to a 4WD mounted drilling rig with occasional large soil stockpiles noted across the site. No trees were observed to be located within close proximity to the building envelopes.

### 5.3 SUBSURFACE CONDITIONS

The subsurface soil profile encountered during the field investigation is considered to be generally consistent with our expectations of the site. The subsurface soils generally comprised controlled fill (Sandy CLAY (CL-CH), low to high plasticity, brown mottled orange/grey/red, stiff to very stiff and moist, approximately equal to the Plastic Limit) overlying natural occurring inferred alluvial deposits (comprising Silty SAND (SM), fine to coarse grained, grey, loose to medium dense and moist) or inferred 'Red Bluff Sandstone' residual soils (comprising Silty/Sandy CLAY (CI-CH), medium to high plasticity, grey mottled orange/brown or brown mottled orange/grey red, stiff to very stiff and moist, approximately equal to the Plastic Limit).

As observed during the Level 1 filling phase, controlled fill generally present within all allotments in the site (refer to Figure 2 in Appendix A).

### 5.4 GROUNDWATER

Groundwater was not encountered during the borehole drilling. The Visualising Victoria's Groundwater dataset indicates the regional groundwater table to exist at a depth of less than 5.0m below surface level. During wet

seasons or following torrential rainfalls, there is a possibility for a perched water table to develop in the area. This should be carefully considered during the construction stage, especially when footing excavations are left exposed or prior to topsoil application.

## 5.5 LABORATORY TESTING

Representative soil samples of natural clay soils and controlled fill materials were collected from nominated borehole locations for Shrink/Swell Index tests and Atterberg Limits tests. It is considered the soil samples generally represent the soil conditions at the time of testing. Laboratory test reports are presented in Appendix C and a summary of the laboratory test results are present in Table 1:

**Table 1: Laboratory Test Results Summary**

Sample #	Borehole	Depth (m)	Soil Unit	Liquid Limit (%)	Plasticity Index (%)	Shrink Swell Index Iss (%)
S1	BH2	0.5 - 1.0	Fill	-	-	1.1
S2	BH6	1.0 - 1.4	Natural	-	-	4.0
S3	BH9	1.0 - 1.3	Natural	-	-	3.5
S4	BH13	0.5 - 0.75	Fill	34	22	-
S5	BH16	0.5 - 0.9	Fill	-	-	3.2
S7	BH20	1.0 - 1.5	Fill	38	20	-

The laboratory test results indicate the fill to comprise low to medium plasticity material, with a Shrink/Swell Index of 1.1%. The naturally occurring materials recorded Shrink/Swell values ranging between 3.5% and 4.0%.

## 6. DISCUSSION & RECOMMENDATIONS

### 6.1 PRELIMINARY AS2870-2011 SITE CLASSIFICATION

The site has been classified in general accordance with the guidelines presented in AS2870-2011 'Residential Slabs and Footings'.

The following site characteristics were adopted in the site classification assessment:

**Table 2: Site Characteristics**

<b>Climatic Zone</b>	2 (Figure D1 of AS2870-2011)
<b>Soil Profile Group</b>	Predominantly Group 3 (Table D1 of AS2870-2011) or Controlled Fill
<b>Depth of Soil Suction Change (Hs)</b>	1.8m

Based on the results of the geotechnical investigation, the geological setting and the guidelines presented in AS2870-2011, the site has been classified as **Class H1**, with an assessed characteristic surface movement ( $y_s$ ) of between 40mm and 60mm.

According to the Building Code of Australia (BCA), the above classification is only applicable for building Class 1 to 10a. For other building types/loads, this classification should only be used as a guide.

It is recommended that precautions be taken to control moisture variations within the founding soils given the variable reactivity of subsurface soils, as follows:

- Restrict tree planting in the vicinity of the building. AS2870-2011 advises that trees be planted no closer to the building than a distance equal to 1.0 times their mature height on Class H1 sites. This distance should be increased where rows or groups of trees are involved;
- Provide paving to the edge of the building to limit soil moisture variations due to seasonal wetting and drying. The paved surface should be graded away from the building such that run-off drains away, and water cannot pond against the building;
- Service trenches, particularly plumbing and drainage, should be avoided beneath buildings. Where service trenches are to pass beneath or close to the building, they should be backfilled with a low permeability material, such as compacted clay, to prevent the ingress of water. The use of porous backfill materials should be avoided;
- Any leaking or damaged underground services should be repaired promptly; and
- During construction, footing excavations should not be left exposed to the weather for extended periods. Water should not be allowed to pond in these areas, nor should it be left unprotected to dry and crack in the sun.

### 6.2 FOOTING DESIGN

#### Shallow/Spread Footings

It is considered that shallow footings suitably embedded within the controlled fill or naturally occurring soils may adopt an allowable bearing pressure of 100kPa, under stiff/medium dense (or better) and dry to damp conditions.

#### Deep Footings

Where deep footings such as bored piers are adopted, the footings shall be founded 4 times the diameter of the pier foundation from the nominal ground level, and the below parameters may be adopted.

Allowable End Bearing Capacity (stiff/medium dense or better clay/sand): 200kPa

Allowable Skin Friction (stiff/medium dense or better clay/sand): 15kPa

No skin friction shall be adopted for downloads in fill soils or soils within 1200mm of surface level, however, are applicable for uplift load due to soil swelling. Alternatively, screw piles may be considered and the loss of ground support due to soil shrinkage may be considered as  $0.5 \times H_s$  (1.8m) for this site during the design.

It should be noted that construction during wet/winter periods may experience a reduced bearing pressure, particularly if left exposed for periods of time. Where required, a reassessment of the applicable bearing pressures may be undertaken. Footings should not be founded within any fill, unless the fill has been placed as controlled fill in accordance with AS3798 (2007) 'Guidelines for Earthworks on Residential and Commercial Developments' if applicable.

## 7. GENERAL RECOMMENDATIONS

### 7.1 FOOTINGS

- It is recommended that all footing excavations be inspected by a geotechnical engineer from this office to confirm that the founding conditions are consistent with design recommendations. The footing size and the founding level may need to be adjusted if the required founding material is not encountered at the design founding level.
- To reduce soil moisture variations near the footings, the builder should compact clean soil (without rubble or organic matter) around the footings to reduce potential water ingress around the footings.
- To reduce, but not eliminate, the possibility of damage to the footing, tree planting should be restricted as indicated earlier in this report.
- Good drainage is important to footing performance. The Builder should prevent water accumulation near the building footings (even during construction). It is recommended that sufficient ground clearance be created to accommodate paving which slopes a minimum of 1:20 away from the building. This slope should be achieved by excavation and not by building up loose fill around the footings.
- The roof water should be diverted away from the footing as soon as the roof is constructed by using temporary pipes, if necessary. The surface water should also be provided by constructing surface gutters or grading the surface to divert the water away from the footing.
- During wet conditions, machinery traffic may disturb the subgrade soils and should be avoided in the area of the building
- Any proposed footings which are close to an easement, underground service trenches, and/or other excavations, (including those in adjoining properties) should be founded below a line projected up at 45° to the horizontal (for firm/stiff Clay) and measured from the nearest base of the easement excavations.
- Avoid excavations close to footings since those founded on sandy soils can experience settlements while those founded in clayey soils can also move due to the shrinking and swelling of the clay. Plumbers and drainers should follow all the recommendations made in AS 2870-2011 and other appropriate codes with respect to drainage works.
- Protection of the footing system from moisture ingress or moisture loss after construction is the responsibility of the homeowner.

### 7.2 DRAINAGE DESIGN REQUIREMENTS (AS2870-2011)

- It should be noted that the building and site drainage design, as well as height of the floor level above the finished ground level, may be affected by factors other than structural design requirements, such as below:



- Run-off water and influence of local topography;
  - Possibility of flooding;
  - Effects of existing and post-construction landscaping;
  - Level of the legal point of stormwater discharge;
  - Plumbing and drainage requirements;
  - Minimum height from finished ground level to the damp-proof course level;
  - Termite management.
- Surface drainage shall be designed and constructed to avoid water ponding against or near the footing. The ground in the immediate vicinity of the perimeter footing, including the ground uphill from the slab on cut and fill sites shall be graded to fall 50mm minimum away from the footing over 1m and shaped to prevent ponding of water. Where the filling is placed adjacent to the building, the filling shall be compacted and graded to ensure drainage of water away from the building. The requirements of Clause 5.2.2 of AS2870 (2011) shall be applied to reduce the possibility of surface water entering living areas. Alternative drainage systems will be required on zero lot line construction. Any paving shall also be suitably sloped.
  - The site classification as stated in this report shall be stated on any construction drawings. The selected footing system and any required site work and required site drainage shall be documented.

### 7.3 SUBGRADE PREPARATION

- The subgrade should be stripped of all topsoil and soils containing significant organic matter.
- The exposed subgrade surface should be presented in a suitably moist condition and test rolled with several passes of an 8-10 tonne smooth drum roller. Any soft spots identified during test rolling should be removed by excavation and replaced with well-compacted suitable fill.
- Under no circumstances should any additional fill contain a significant amount of organic matter or be a mixture of greatly different particle sizes; e.g. it should not be a mixture of rock and soil, although less than 10% rock may be permitted.
- It is important that any fill be compacted close to its optimum moisture content during compaction.
- The compaction method and equipment should suit the fill material used and its degree of compaction should be tested and/or inspected by a suitably accredited NATA laboratory to meet the requirements of AS 3798-2007 "Guidelines on earthworks for commercial and residential developments".

### 8. DISCLOSURE

This document is detailed for the sole use of the intended recipient(s) or its authorized representatives. Distribution of this report may be carried out at the Clients discretion and must be reproduced in full. Should you have any questions related to this report please do not hesitate to contact this office.

**AUTHOR:**



**Chris Connelly**  
**Engineering Geologist**

**TECHNICAL REVIEW:**



**Gee Singh, MIEAust (NER)**  
**Senior Geotechnical Engineer**



## 9. LIMITATIONS

The advice provided in this document (as per our commission) is not designed or capable of identifying all soil conditions, (which can vary with products chosen). The advice given in this document is based on the assumption that the test results are representative of the overall soil conditions. However, it should be noted that actual conditions in some parts of the site might differ from those found. If further sampling/ testing reveals soil characteristics significantly different from those shown in our findings, Ground Science must be consulted.

The scope and the period of Ground Science services are described in the document and are subject to restrictions and limitations. Ground Science did not perform a complete assessment of all possible conditions or circumstances that may exist. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Ground Science in regards to it.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Ground Science for incomplete or inaccurate data supplied by others.

It is recognized that the passage of time affects the information and assessment provided in this document. Ground Science's assessment is based on information that existed at the time of the preparation of this document. It is understood that the services provided allowed Ground Science to form no more than an opinion of the actual site conditions observed during sampling and observations of the site visit and cannot be used to assess the effects of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

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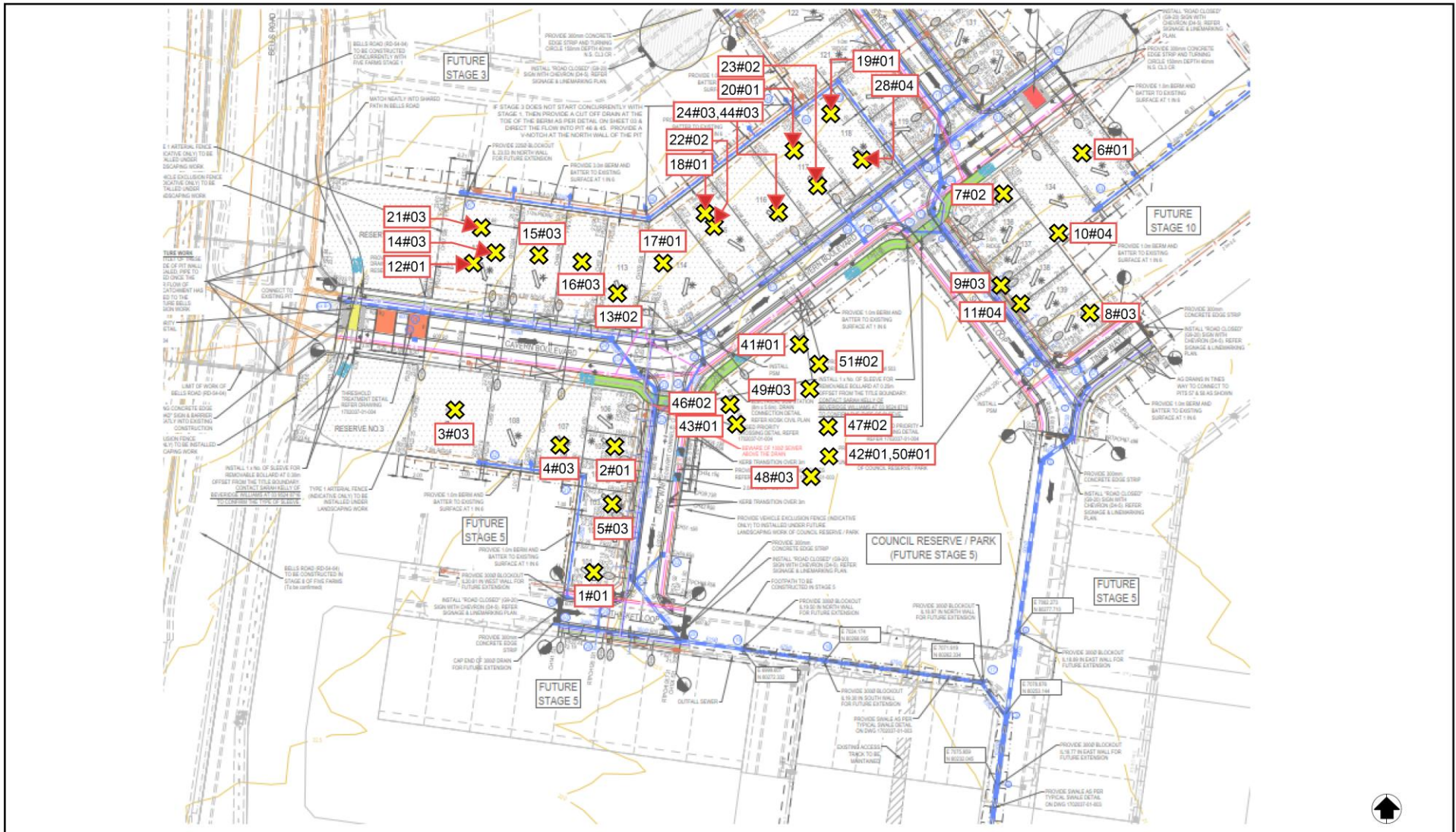


## 10. REFERENCES

- Geological maps, Geological Survey of Victoria.
- AS2870 – 2011 Residential Slabs and Footings.
- AS3798 – 2007 Guidelines on Earthworks for Residential and Commercial Developments.
- AS1289 – Testing of Soils for Engineering Purposes.
- AS1726 – 2017 Geotechnical Site Investigations.

## **APPENDIX A**

Site & Test Location Plans



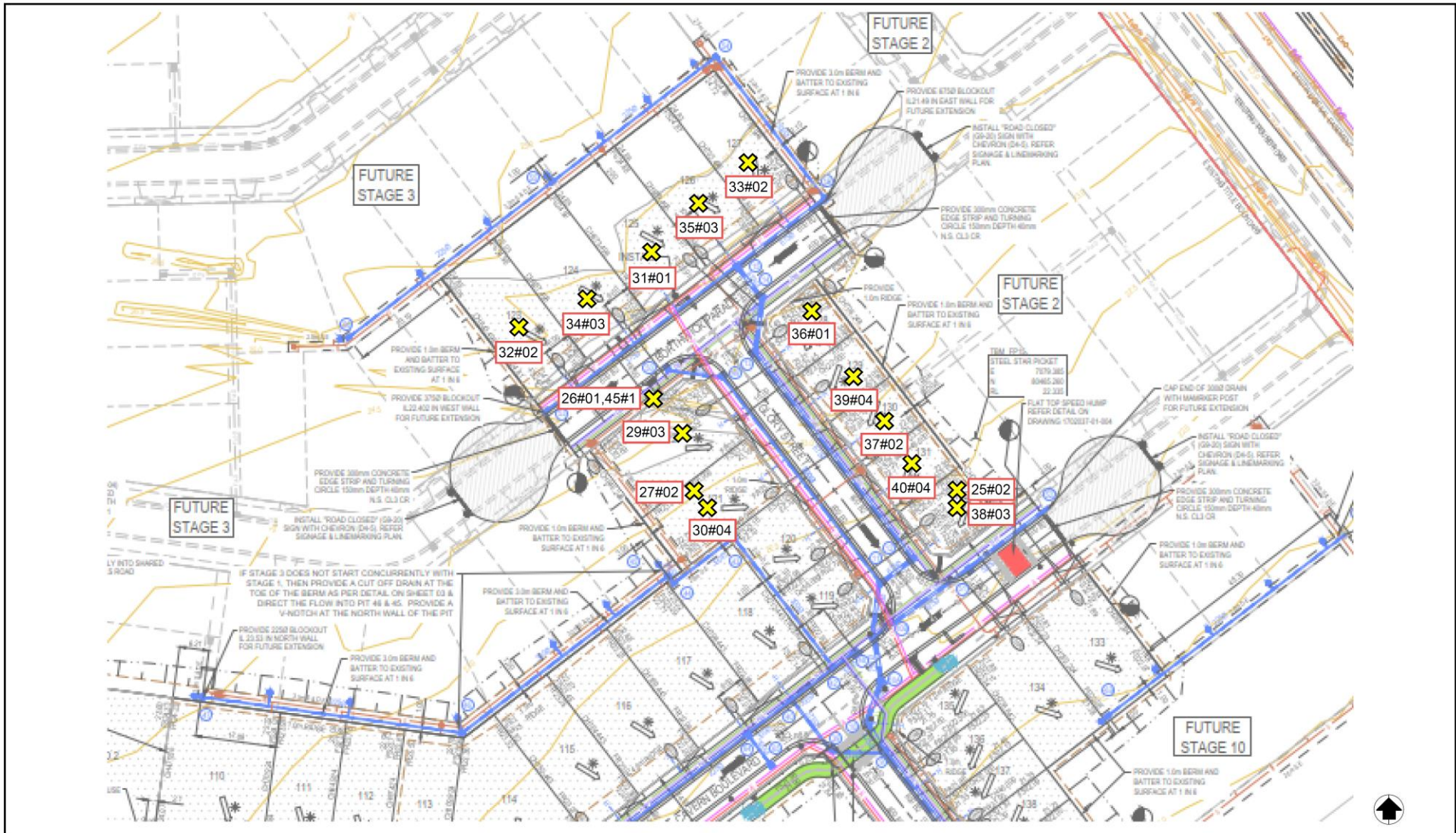
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0	AM	21/09/2021	GS	NTS

Legend
Density Test Location (#Layer number)

## FIVE FARMS - STAGE 1 CLYDE NORTH (LEVEL 1)

Prepared For: Frasers Property Australia  
Job No: GS5860.1 AA





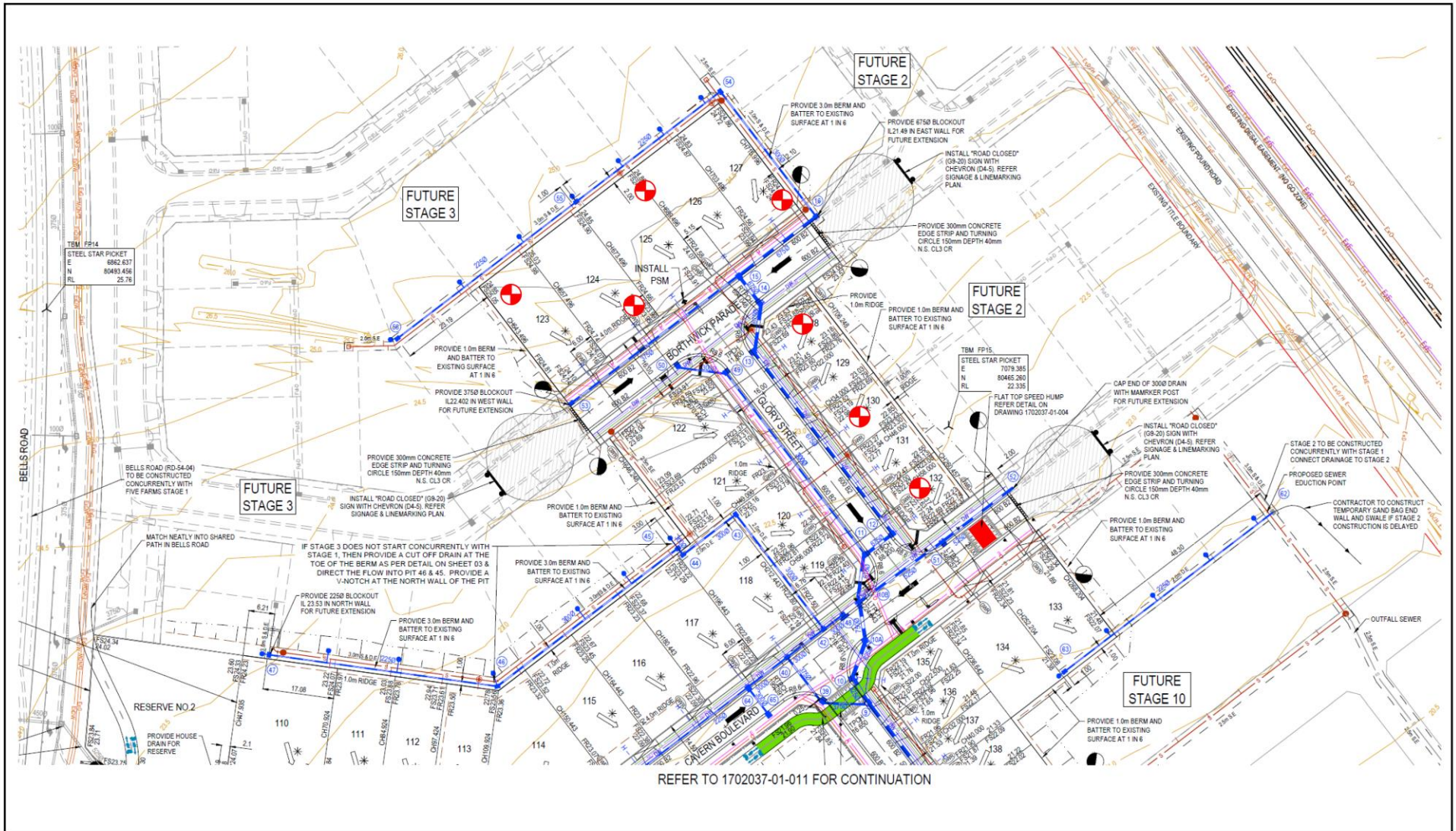
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## FIVE FARMS - STAGE 1 CLYDE NORTH (LEVEL 1)

Prepared For: Frasers Property Australia

Job No: GS5860.1 AA



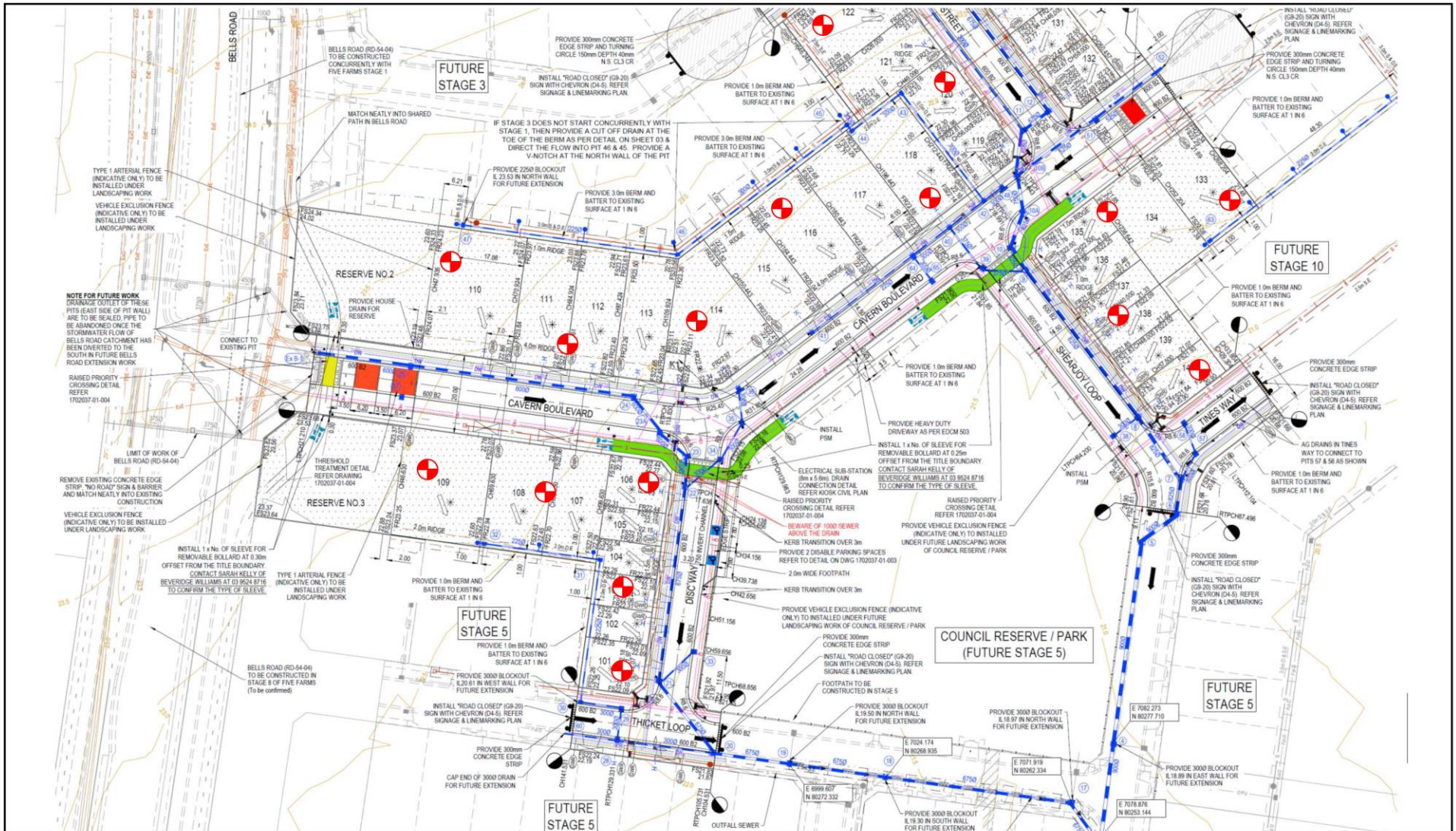



Rev	Drawn	Date	Checked	Scale	Legend
0	Figure 1 of 2: Proposed Boreholes	CC	13.09.21	NTS	 Proposed Borehole Location 

**STAGE 1 PROPOSED BOREHOLE LOCATIONS  
FIVE FARMS ESTATE, CLYDE NORTH**

Prepared For: Frasers Property Australia  
Job No: G4589.1





Rev	Drawn	Date	Checked	Scale	Legend
0	Figure 2 of 2: Proposed Boreholes	CC	13.09.21	NTS	 Proposed Borehole Location

**STAGE 1 PROPOSED BOREHOLE LOCATIONS  
FIVE FARMS ESTATE, CLYDE NORTH**

Prepared For: Frasers Property Australia  
Job No: G4589.1





## **APPENDIX B**

Borehole Log Sheets



CLIENT:	Fraser's Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
1	2	3	4	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)								
		0.0	0.05				SM	FILL: silty SAND, fine to medium grained, angular to subangular, pale brown, low plasticity silt, trace rootlets	L	M	Controlled Fill
							Cl-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt	St - VSt	w ≈ PL	
		0.5	0.50					brown, trace gravel			
			0.75				CH	silty CLAY, medium to high plasticity, brown mottled orange/grey/red, with sand	VSt		Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.5									
		1.70						sandy CLAY, high plasticity, brown mottled orange/grey/red, with sand			
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH2**

JOB No : G4589.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 09-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: GT10 Drill Rig  
 HOLE DIAMETER: 100mm

EASTING: ND  
 NORTHING: ND

INCLINATION: 90°  
 SURFACE RL: ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
1	2	3	4	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)								
		0.0					SM	FILL: silty SAND, fine to medium grained, angular to subangular, pale brown, low plasticity silt, trace rootlets	L	M	Controlled Fill
		0.30					CI-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt, trace gravel	St - VSt	w = PL	
		0.5		S1	U50						
		1.0					CH	sandy CLAY, medium to high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt, trace gravel	VSt		Inferred Red Bluff Sandstone Residual Soil
		1.10									
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w = PL Moist, near plastic limit w > PL Moist, wet of plastic limit w = LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH3**

JOB No : G4588.1

CLIENT:	Fraser Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION				
1	2	3	4	5	6	SOIL / ROCK MATERIAL DESCRIPTION		7	8	9
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					CI-CH	St - VSt	M	Controlled Fill
		0.5								
		0.65					SM	VSt	w = PL	Inferred Red Bluff Sandstone Residual Soil
		0.85					CI-CH	St - VSt		
		1.0								
		1.20					CH	VSt		
		1.5								
		1.80								
		2.0	2.00				Borehole Terminated @ 2m			
		2.5								
		3.0								
		3.5								

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w = PL Moist, near plastic limit w > PL Moist, wet of plastic limit w = LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH4**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 09-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: GT10 Drill Rig EASTING: ND INCLINATION: 90°  
 HOLE DIAMETER: 100mm NORTHING: ND SURFACE RL: ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
1 PENETRATION RESISTANCE	2 WATER	3 DEPTH (metres)	4 DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					SM	FILL: silty SAND, fine to medium grained, angular to subangular, pale brown, low plasticity silt, with clay, trace rootlets	L	M	Controlled Fill
		0.10					Cl-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt, trace rootlets	St - VSt	w ≈ PL	
		0.5									
		0.90							VSt		Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.20					CH	CLAY, high plasticity, dark grey mottled orange-brown, trace sand		w > PL	
		1.5						pale grey mottled orange-brown, with sand		w ≈ PL	
		1.50									
		2.0						Borehole Terminated @ 2m			
		2.00									
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH5**

JOB No : G4588.1

CLIENT:	Fraser's Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION				
1	2	3	4	5	6	SOIL / ROCK MATERIAL DESCRIPTION		7	8	9
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0	0.05				SM	L	M	Controlled Fill
							CL-CH	St - VSt	w ≈ PL	
		0.5						VSt		
		0.65								
		1.0					CH			Inferred Red Bluff Sandstone Residual Soil
		1.10								
		1.5	1.50							
		2.0	2.00							Borehole Terminated @ 2m
		2.5								
		3.0								
		3.5								

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft	Fb Friable	D Dry	PP Pocket Penetrometer Test
	S Soft	VL Very Loose	M Moist	U50 Undisturbed Sample 50mm
	F Firm	L Loose	W Wet	U63 Undisturbed Sample 63mm
	St Stiff	MD Medium Dense	w < PL Moist, dry of plastic limit	D Disturbed Sample
	VSt Very Stiff	D Dense	w ≈ PL Moist, near plastic limit	Bs Bulk Sample
	H Hard	VD Very Dense	w > PL Moist, wet of plastic limit	E Environmental sample
			w ≈ LL Wet, near liquid limit	HSV Hand Shear Vane test
			w > LL Wet, wet of liquid limit	Cu Undrained Shear Strength



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH6**

JOB No : G4588.1

CLIENT:	Fraser Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION				
1	2	3	4	1	2	SOIL / ROCK MATERIAL DESCRIPTION		3	4	5
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0	0.05				SM	L	M	Controlled Fill
							CL-CH	St - VSt	w ≈ PL	
		0.5	0.50					VSt		
			0.70				SM	L - MD	M	Inferred Alluvial Deposits
			0.90				CH	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0		S2	U50					
			1.30							
		1.5								
		2.0	2.00							Borehole Terminated @ 2m
		2.5								
		3.0								
		3.5								

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft	Fb Friable	D Dry	PP Pocket Penetrometer Test
	S Soft	VL Very Loose	M Moist	U50 Undisturbed Sample 50mm
	F Firm	L Loose	W Wet	U63 Undisturbed Sample 63mm
	St Stiff	MD Medium Dense	w < PL Moist, dry of plastic limit	D Disturbed Sample
	VSt Very Stiff	D Dense	w ≈ PL Moist, near plastic limit	Bs Bulk Sample
	H Hard	VD Very Dense	w > PL Moist, wet of plastic limit	E Environmental sample
			w ≈ LL Wet, near liquid limit	HSV Hand Shear Vane test
			w > LL Wet, wet of liquid limit	Cu Undrained Shear Strength



**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH7**

JOB No : G4588.1

<b>CLIENT:</b>	Fraser's Property Group Pty Ltd	<b>TEST DATE:</b>	09-Dec-21
<b>PROJECT:</b>	Five Farms Estate Site Classification - Stage 1	<b>LOGGED BY:</b>	JSP
<b>LOCATION:</b>	Clyde North	<b>CHECKED BY:</b>	CC
<b>TEST LOCATION:</b>	Refer to site plan, Appendix A	<b>VANE SHEAR:</b>	N/A
<b>DRILL METHOD:</b>	GT10 Drill Rig	<b>EASTING:</b>	ND
<b>HOLE DIAMETER:</b>	100mm	<b>NORTHING:</b>	ND
		<b>INCLINATION:</b>	90°
		<b>SURFACE RL:</b>	ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0						SM FILL: silty SAND, fine to medium grained, angular to subangular, pale brown, low plasticity silt, with clay, trace gravel	L	M	Controlled Fill
		0.05						CI-CH FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt	St - VSt	w ≈ PL	
		0.5	0.50					FILL: silty CLAY, medium to high plasticity, brown mottled orange/grey/red	VSt		
		0.70						SM silty SAND, fine to coarse grained, angular to subangular, grey, low plasticity silt	L - MD	M	Inferred Alluvial Deposits
		0.80						CH silty CLAY, high plasticity, brown mottled orange/grey, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.5									
		1.60						sandy CLAY, high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt			
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate





**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH8**

JOB No : G4588.1

CLIENT:	Fraser's Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION				
1	2	3	4	SAMPLE OR FIELD TEST	RECOVERED	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)		GRAPHIC LOG					
		0.0				SM	FILL: silty SAND, fine to medium grained, angular to subangular, pale grey/brown, low plasticity silt, with clay, trace gravel	L	M	Controlled Fill
		0.20					silty SAND, fine to coarse grained, angular to subangular sand, pale grey-brown, trace clay	L - MD		Inferred Inferred Alluvial Deposits
		0.5								
		0.85				CH	silty CLAY, high plasticity, brown mottled orange/grey, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0								
		1.30					sandy CLAY, high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt			
		1.5								
		2.0	2.00				Borehole Terminated @ 2m			
		2.5								
		3.0								
		3.5								

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH9**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 09-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: GT10 Drill Rig  
 HOLE DIAMETER: 100mm

EASTING: ND  
 NORTHING: ND

INCLINATION: 90°  
 SURFACE RL: ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					CL-CH	FILL: sandy CLAY, medium to high plasticity, orange-yellow mottled grey, fine to coarse grained, angular to subangular sand, with silt	St	w ≈ PL	Controlled Fill
		0.30					SM	silty SAND, fine to coarse grained, angular to subangular sand, pale grey-brown, trace clay	L - MD	M	Inferred Inferred Alluvial Deposits
		0.80					CH	silty CLAY, high plasticity, brown mottled orange/grey, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0		S3		U50					
		1.40						sandy CLAY, high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt			
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH10**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A  
 TEST DATE: 09-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A  
 DRILL METHOD: GT10 Drill Rig  
 EASTING: ND  
 INCLINATION: 90°  
 HOLE DIAMETER: 100mm  
 NORTHING: ND  
 SURFACE RL: ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
1	2	3	4	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)								
		0.0					CL-CH	FILL: sandy CLAY, medium to high plasticity, orange-yellow mottled grey, fine to coarse grained, angular to subangular	St	w ≈ PL	Controlled Fill
		0.20					SM	silty SAND, fine to coarse grained, angular to subangular sand, pale grey-brown, trace clay	L - MD	M	Inferred Inferred Alluvial Deposits
		0.5									
		0.70					CH	silty CLAY, high plasticity, brown mottled orange, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.40						sandy CLAY, high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt			
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH11**

JOB No : G4588.1

CLIENT:	Fraser Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0						CL-CH FILL: sandy CLAY, medium to high plasticity, orange mottled grey/brown, fine to coarse grained, angular to subangular	St	w ≈ PL	Controlled Fill
		0.35						SM silty SAND, fine to coarse grained, angular to subangular sand, pale grey-brown, trace clay	L - MD	M	Inferred Inferred Alluvial Deposits
		0.90						CH silty CLAY, high plasticity, brown mottled orange, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.20						sandy CLAY, high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt			
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH12**

JOB No : G4588.1

CLIENT:	Fraser's Property Group Pty Ltd	TEST DATE:	09-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	GT10 Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0	0.05				SM	FILL: silty SAND, fine to medium grained, angular to subangular, pale brown, low plasticity silt, with clay, trace rootlets	L	M	Controlled Fill
							Cl-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt	St - VSt	w ≈ PL	
			0.90					silty CLAY, medium to high plasticity, brown mottled orange/grey	VSt		Inferred Red Bluff Sandstone Residual Soil
			1.30				CH	sandy CLAY, high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt, trace gravel			
			2.00					Borehole Terminated @ 2m			

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH13**

JOB No : G4588.1

CLIENT:	Fraser's Property Group Pty Ltd	TEST DATE:	13-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	ATS Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0						SM	L	M	Controlled Fill
		0.05						CI-CH	St - VS	w ≈ PL	
		0.5		S4		U63					
		0.95						SM	L - MD	M	Inferred Inferred Alluvial Deposits
		1.20						CH	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH14**

JOB No : G4588.1

CLIENT:	Fraser Property Group Pty Ltd	TEST DATE:	13-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	ATS Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					SM	FILL: silty SAND, fine to medium grained, angular to subangular, pale brown, low plasticity silt, with clay, trace rootlets	L	M	Controlled Fill
		0.10					Cl-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt, trace gravel	St - VSt	w ≈ PL	
		0.5									
		0.90					SM	silty SAND, fine to coarse grained, angular to subangular, grey, low plasticity silt, trace clay	L - MD	M	Inferred Inferred Alluvial Deposits
		1.0					CH	silty CLAY, high plasticity, grey mottled orange/brown, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.10									
		1.5	1.50				Cl-CH	sandy CLAY, medium to high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt, trace gravel			
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH15**

JOB No : G4588.1

CLIENT:	Frasers Property Group Pty Ltd	TEST DATE:	13-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	ATS Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					SM	FILL: silty SAND, fine to coarse grained, angular to subangular, grey, low plasticity silt, with gravel	L - MD	D	Controlled Fill
		0.10						silty SAND, fine to coarse grained, angular to subangular, grey, low plasticity silt, trace clay		M	Inferred Inferred Alluvial Deposits
		0.5									
		0.80					CH	silty CLAY, high plasticity, grey mottled orange/brown, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.40						sandy CLAY, medium to high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt, trace gravel			
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate





Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH16**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 13-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: ATS Drill Rig EASTING: ND INCLINATION: 90°  
 HOLE DIAMETER: 100mm NORTHING: ND SURFACE RL: ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					CL-Cl	FILL: sandy CLAY, low to medium plasticity, brown, fine to coarse grained, angular to subangular sand, with silt, trace rootlets	VSt	D	Controlled Fill
		0.10					SM	FILL: silty SAND, fine to coarse grained, angular to subangular, grey, low plasticity silt, with clay	L - MD	M	
		0.30					Cl-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt	St - VSt	w = PL	
		0.5		SS		U63					
		1.0									
		1.25					CH	silty CLAY, high plasticity, grey mottled orange/brown, with sand	VSt		Inferred Red Bluff Sandstone Residual Soil
		1.65						sandy CLAY, high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt, trace gravel			
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w = PL Moist, near plastic limit w > PL Moist, wet of plastic limit w = LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH17**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 13-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: ATS Drill Rig EASTING: ND INCLINATION: 90°  
 HOLE DIAMETER: 100mm NORTHING: ND SURFACE RL: ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
1	2	3	4	1	2	3	SOIL / ROCK MATERIAL DESCRIPTION		1	2	3
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL		CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					CL-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt	St - VSt	w ≈ PL	Controlled Fill
		0.5									
		0.80					CH	silty CLAY, high plasticity, grey mottled orange/brown, with sand	VSt		Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH18**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 13-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: ATS Drill Rig EASTING: ND INCLINATION: 90°  
 HOLE DIAMETER: 100mm NORTHING: ND SURFACE RL: ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
1	2	3	4	1	2	3	SOIL / ROCK MATERIAL DESCRIPTION		1	2	3
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS	
		0.0	0.05				CL-CH	St - VSt	w < PL w ≈ PL	Controlled Fill	
		0.5									
		1.0									
		1.20					SM	L - MD	M	Inferred Inferred Alluvial Deposits	
		1.30					CH	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil	
		1.5		S6	U63						
		2.0	2.00							Borehole Terminated @ 2m	
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH19**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 13-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: ATS Drill Rig EASTING: ND INCLINATION: 90°  
 HOLE DIAMETER: 100mm NORTHING: ND SURFACE RL: ND

DRILLING				SAMPLING			FIELD MATERIAL DESCRIPTION				
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0	0.05				Cl-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt	St - VSt	w < PL w ≈ PL	Controlled Fill
		0.30					CH	sandy CLAY, high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt, trace gravel	VSt		Inferred Red Bluff Sandstone Residual Soil
		0.5									
		1.0									
		1.5									
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



**Ground Science**

**ENGINEERING BOREHOLE LOG**

Borehole No **BH20**

JOB No : G4588.1

CLIENT: Frasers Property Group Pty Ltd  
 PROJECT: Five Farms Estate Site Classification - Stage 1  
 LOCATION: Clyde North  
 TEST LOCATION: Refer to site plan, Appendix A

TEST DATE: 13-Dec-21  
 LOGGED BY: JSP  
 CHECKED BY: CC  
 VANE SHEAR: N/A

DRILL METHOD: ATS Drill Rig EASTING: ND INCLINATION: 90°  
 HOLE DIAMETER: 100mm NORTHING: ND SURFACE RL: ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					SM	FILL: silty SAND, low plasticity, pale brown, fine to coarse grained, angular to subangular sand	L	D - M	Controlled Fill
		0.10					CL	FILL: sandy CLAY, low plasticity, brown, fine to coarse grained, angular to subangular sand, with silt, trace gravel	VSt	w ≈ PL	
		0.25					CI-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt, trace gravel	St - VSt		
		0.55					CH	sandy CLAY, high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt	VSt		Inferred Red Bluff Sandstone Residual Soil
		1.0									
		1.5	1.50					increased sand content with depth			
		2.0	2.00					Borehole Terminated @ 2m			
		2.5									
		3.0									
		3.5									

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH21**

JOB No : G4588.1

CLIENT:	Fraser Property Group Pty Ltd	TEST DATE:	13-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	ATS Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION					
1	2	3	4	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	SOIL / ROCK MATERIAL DESCRIPTION	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
							SM	FILL: silty SAND, fine to coarse grained, angular to subangular, pale brown	L - MD	D - M	Controlled Fill
							CI-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt, trace gravel	St - VSt	w ≈ PL	
							CH	silty CLAY, high plasticity, brown mottled orange/grey/red, with sand	VSt		Inferred Red Bluff Sandstone Residual Soil
								sandy CLAY, high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt			
								Borehole Terminated @ 2m			

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH22**

JOB No : G4588.1

CLIENT:	Fraser's Property Group Pty Ltd	TEST DATE:	13-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	ATS Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION				
1	2	3	4	1	2	SOIL / ROCK MATERIAL DESCRIPTION		3	4	5
PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH (RL)	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC SYMBOL	CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
		0.0					CL-CH	ST	w ≈ PL	Controlled Fill
		0.5		S8	U63					
		0.60					SM	L - MD	M	Inferred Inferred Alluvial Deposits
		0.70					CH	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
		1.0								
		1.30								
		1.5								
		2.0	2.00							Borehole Terminated @ 2m
		2.5								
		3.0								
		3.5								

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



Ground Science

ENGINEERING BOREHOLE LOG

Borehole No **BH23**

JOB No : G4588.1

CLIENT:	Fraser Property Group Pty Ltd	TEST DATE:	13-Dec-21
PROJECT:	Five Farms Estate Site Classification - Stage 1	LOGGED BY:	JSP
LOCATION:	Clyde North	CHECKED BY:	CC
TEST LOCATION:	Refer to site plan, Appendix A	VANE SHEAR:	N/A
DRILL METHOD:	ATS Drill Rig	EASTING:	ND
HOLE DIAMETER:	100mm	NORTHING:	ND
		INCLINATION:	90°
		SURFACE RL:	ND

DRILLING				SAMPLING		FIELD MATERIAL DESCRIPTION				
1	2	3	4	5	6	SOIL / ROCK MATERIAL DESCRIPTION		7	8	9
PENETRATION RESISTANCE				SAMPLE OR FIELD TEST				CONSISTENCY DENSITY	MOISTURE	ADDITIONAL OBSERVATIONS
WATER				RECOVERED	GRAPHIC LOG					
DEPTH (metres)					USC SYMBOL					
DEPTH (RL)										
						CL-CH	FILL: sandy CLAY, medium to high plasticity, brown mottled orange/grey, fine to coarse grained, angular to subangular sand, with silt, trace gravel	St	w ≈ PL	Controlled Fill
						SM	silty SAND, fine to coarse grained, angular to subangular, grey, low plasticity silt, trace clay	L - MD	M	Inferred Inferred Alluvial Deposits
						CH	silty CLAY, high plasticity, brown mottled orange/grey/red, with sand	VSt	w ≈ PL	Inferred Red Bluff Sandstone Residual Soil
							sandy CLAY, high plasticity, brown mottled orange/grey/red, fine to coarse grained, angular to subangular sand, with silt			
							Borehole Terminated @ 2m			

PENETRATION	CONSISTENCY	DENSITY	MOISTURE CONDITION	TEST NOTES
	Vs Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard	Fb Friable VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	D Dry M Moist W Wet w < PL Moist, dry of plastic limit w ≈ PL Moist, near plastic limit w > PL Moist, wet of plastic limit w ≈ LL Wet, near liquid limit w > LL Wet, wet of liquid limit	PP Pocket Penetrometer Test U50 Undisturbed Sample 50mm U63 Undisturbed Sample 63mm D Disturbed Sample Bs Bulk Sample E Environmental sample HSV Hand Shear Vane test Cu Undrained Shear Strength Groundwater Level UTP Unable to Penetrate



## **APPENDIX C**

### Laboratory Test Results

# Material Test Report



Ground Science Pty Ltd  
 Ground Science Laboratory  
 13 Brock Street Thomastown Victoria 3074  
 Phone: (03) 9464 4617  
 Email: pelin@groundscience.com.au

**Report Number:** G4589.1-1  
**Issue Number:** 1  
**Date Issued:** 13/01/2022  
**Client:** Frasers Property Australia c/- Beveridge Williams  
 1 Glenferrie Road, Malvern VIC 3144  
**Contact:** Craig Muse  
**Project Number:** G4589.1  
**Project Name:** Five Farms Residential Development - Stage 1  
**Project Location:** Clyde North  
**Work Request:** 6393  
**Sample Number:** 4589.1-S4  
**Date Sampled:** 15/12/2021  
**Dates Tested:** 15/12/2021 - 11/01/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** BH13 (0.5 - 0.75m)  
**Material:** CLAY, low plasticity, brown



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Pelin Erden  
 gs-pelin

NATA Accredited Laboratory Number: 15055

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	34		
Plastic Limit (%)	12		
<b>Plasticity Index (%)</b>	<b>22</b>		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	8.0		
Cracking Crumbling Curling	Cracking & Curling		

# Material Test Report



**Report Number:** G4589.1-1  
**Issue Number:** 1  
**Date Issued:** 13/01/2022  
**Client:** Frasers Property Australia c/- Beveridge Williams  
 1 Glenferrie Road, Malvern VIC 3144  
**Contact:** Craig Muse  
**Project Number:** G4589.1  
**Project Name:** Five Farms Residential Development - Stage 1  
**Project Location:** Clyde North  
**Work Request:** 6393  
**Sample Number:** 4589.1-S7  
**Date Sampled:** 15/12/2021  
**Dates Tested:** 15/12/2021 - 11/01/2022  
**Sampling Method:** AS 1289.1.2.1 6.5.3 - Power auger drilling  
**Sample Location:** BH20 (1 - 1.5m)  
**Material:** CLAY, medium plasticity, brown

Ground Science Pty Ltd  
 Ground Science Laboratory  
 13 Brock Street Thomastown Victoria 3074  
 Phone: (03) 9464 4617  
 Email: pelin@groundscience.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Pelin Erden  
gs-pelin

NATA Accredited Laboratory Number: 15055

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	38		
Plastic Limit (%)	18		
<b>Plasticity Index (%)</b>	<b>20</b>		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	9.5		
Cracking Crumbling Curling	Cracking		

# Material Test Report



**Report Number:** G4589.1-1  
**Issue Number:** 1  
**Date Issued:** 13/01/2022  
**Client:** Frasers Property Australia c/- Beveridge Williams  
 1 Glenferrie Road, Malvern VIC 3144  
**Contact:** Craig Muse  
**Project Number:** G4589.1  
**Project Name:** Five Farms Residential Development - Stage 1  
**Project Location:** Clyde North  
**Work Request:** 6393  
**Dates Tested:** 15/12/2021 - 17/12/2021

Ground Science Pty Ltd  
 Ground Science Laboratory  
 13 Brock Street Thomastown Victoria 3074  
 Phone: (03) 9464 4617  
 Email: pelin@groundscience.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Pelin Erden  
gs-pelin

NATA Accredited Laboratory Number: 15055

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	4589.1-S1	4589.1-S2	4589.1-S3	4589.1-S5	
Date Sampled	15/12/2021	15/12/2021	15/12/2021	15/12/2021	
Date Tested	16/12/2021	16/12/2021	16/12/2021	17/12/2021	
Material Source	**	**	**	**	
Sample Location	BH2 (0.5 - 1m)	BH6 (1 - 1.4m)	BH9 (1 - 1.3m)	BH16 (0.5 - 0.9m)	
Inert Material Estimate (%)	2	0	2	3	
Pocket Penetrometer before (kPa)	110	150	150	175	
Pocket Penetrometer after (kPa)	110	160	140	220	
Shrinkage Moisture Content (%)	16.8	31.6	26.7	16.1	
Shrinkage (%)	<b>2.0</b>	<b>6.8</b>	<b>4.9</b>	<b>5.8</b>	
Swell Moisture Content Before (%)	17.5	32.5	17.0	8.6	
Swell Moisture Content After (%)	19.8	33.2	25.4	15.9	
Swell (%)	<b>-0.1</b>	<b>1.0</b>	<b>2.8</b>	<b>-0.2</b>	
Shrink Swell Index Iss (%)	<b>1.1</b>	<b>4.0</b>	<b>3.5</b>	<b>3.2</b>	
Visual Description	sandy CLAY, medium plasticity, brown, trace gravel	silty CLAY, medium to high plasticity, brown, mottled grey, orange	sandy CLAY, medium to high plasticity, brown, mottled grey, orange	sandy CLAY, low to medium plasticity, brown, trace gravel	
Cracking	MC	SC	SC	SC	
Crumbling	No	No	No	No	
Remarks	**	**	**	**	

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.